REPORT N^{O} 62103694-RPT001

ADUR LOCAL PLAN SECOND ADDENDUM

TRANSPORT STUDY

CONFIDENTIAL

FEBRUARY 2016

ADUR LOCAL PLAN SECOND ADDENDUM

TRANSPORT STUDY

Adur District Council

Final
Confidential

Project no: 62103694
Date: February 2016

WSP | Parsons Brinckerhoff
Westbrook Mills, Godalming
Surrey GU7 2AZ, UK

Tel: +44(0) 1483 528400
www.wspgroup.com
www.pbworld.com

QUALITY MANAGEMENT

Issue/revision	First issue	Revision 1	Revision 2	Revision 3	Revision 4
Remarks	Issued for comment	Second draft issued for comment	Final	Final Issue 2	Final Issue 3
Date	14/10/2015	30/11/2015	18/12/2015	07/01/2016	05/02/2016
Prepared by	Michael Rolfe	Michael Rolfe	Michael Rolfe	Michael Rolfe	Michael Rolfe
Signature					
Checked by	Dan Hyde	Dan Hyde	Dan Hyde	Dan Hyde	Dan Hyde
Signature					
Authorised by	Dan Hyde	Dan Hyde	Dan Hyde	Dan Hyde	Dan Hyde
Signature					
Project number	3514563A-PTG	3514563A-PTG	3514563A-PTG	3514563A-PTG	62103694
Report number	3514563A-PTG-RPT001	3514563A-PTG-RPT001	3514563A-PTG-RPT001	3514563A-PTG-RPT001	62103694-RPT001
File reference					

PRODUCTION TEAM

CLIENT

Adur District Council	Moira Hayes | Principal Planner | Planning, Regeneration and Wellbeing
West Sussex County Council	Guy Parfect | Senior Planner, Strategic Planning,

WSP | PARSONS BRINCKERHOFF

Project Manager	Daniel Hyde | Principal Transport Planner
Lead Modeller	Michael Rolfe | Senior Transport Planner

SUBCONSULTANTS

n/a

TABLE OF CONTENTS

TABLES

FIGURES

APPENDICES

1 EXECUTIVE SUMMARY

1.1 CONTEXT AND PURPOSE OF STUDY

The main study (Adur Local Plan & Shoreham Harbour Transport Study June 2013), the previous addendum (June 2014) and this second addendum consider the transport impacts of strategic residential and commercial site allocations within Adur and Brighton & Hove in 2031 to inform the preparation of the Adur District Council (ADC) Local Plan and the Shoreham Harbour Joint Area Action Plan (JAAP) that covers development in both Adur and Brighton & Hove.

They follow on from a previous study by Parsons Brinckerhoff (now known as WSP | Parsons Brinckerhoff) for Adur District Council (Adur Core Strategy and Shoreham Harbour Transport Study 2011) which tested strategic locations for development, and considered a number of further strategic housing and employment developments in Adur to assist with setting out the spatial and strategic vision for the district.

The purpose of the study is to identify the highway impacts of the site allocations and to explore appropriate mitigation measures in addition to revising existing and potential future collision hotspots. The study is important because the Council needs to ensure that impacts of future population and employment growth do not result in severe impacts to the transport network within and around the District, meeting the provisions of paragraph 32 of the National Planning Policy Framework. The main activities in this study include:

- Produce a new 2031 reference case model;
- Forecast travel demand from each of the proposed scenario site allocations;
- Identify cumulative transport impacts from site allocations on the local and strategic network, focusing on selected key junctions;
- Identify existing highway collision hotspots
- Understand anticipated sustainable travel initiatives and recommend appropriate highway mitigation measures;
- Assess transport impacts from the above interventions;
- Assess potential collision hotspots and recommend appropriate highway mitigation measures if required; and
- Assess indicative costs of the proposed highway mitigation measures.

This addendum considers an additional development scenario. This additional scenario (referred to as Scenario C) takes account of the evolution in the development strategy for the Adur district. The principal changes incorporated into Scenario C are:

- Refined development quanta for the strategic sites;
- Revised access arrangements for the West Sompting sites; and
- Highway improvements at the key junctions identified by the main report.

Scenario C represents the current strategy of Adur District Council for the submission Local Plan.

The impact of the site allocations and mitigation proposals were considered at key junctions across the whole network in the main study. This addendum revisits the modelling and proposed interventions in light of the revised growth forecasts, with improvements proposed at the following locations:

- **A27 / A283 Steyning Road -** Partially signalise roundabout with widening on the A283 north exit and A283 south entry.
- **A259 Brighton Road / A283 Old Shoreham Road** - Expand the roundabout and widen approach westbound.
- **A259 Brighton Road / A2025 South Street** - Widen the A259 west approach and enlarge circulatory.
- **A27 Old Shoreham Road / A2025 Grinstead** - Convert existing roundabout to traffic signal controlled junction.
- **A27 Sompting Bypass / Upper Brighton Road** - Widen the south approach to provide two lanes at the stop line.

1.2 SUMMARY OF RESULTS

The modelling indicated the following results:

- The demand reduction ensures that all the measures suggested in the main report and first addendum remain effective in Scenario C. The scale of interventions suggested at the key junctions have been reviewed and subsequently reduced or removed where the demand reductions allowed.
- Improvements in the journey time as a result of the mitigation are most noticeable at A259 Brighton Road / A283 Old Shoreham Road roundabout. The reduced impact of the development proposed for Scenario C leads to journey times which are similar to the Reference Case on most tested routes, in both modelled peak hours.
- The additional capacity provided by the proposed mitigation at the key junctions listed above draws a number of trips onto the A2025 South Street / Grinstead Lane from surrounding residential roads in the Scenario C with Mitigation models.
- As a result of the reduced impact at the Steyning Road junction under Scenario C, it has also been possible to reduce the cost of the mitigation at this junction by widening only one roundabout entry and exit to accommodate partial traffic signal control.
- The mitigation suggested at A27 / Busticle Lane junction and A27 Shoreham Bypass / Hangleton Link junction is no longer required under Scenario C.
- Existing collision hotspots are identified in relation to each development site, with potential future collision hotspots also identified. Where potential issues have been shown improvement schemes have been identified.

1.3 CONCLUSIONS AND RECOMMENDATIONS

The findings of the study indicate that overall, the levels of development promoted through the preferred strategy for the Adur Local Plan and the emerging Shoreham Harbour JAAP can be accommodated in terms of both their traffic and highway safety impacts.

2 INTRODUCTION

2.1 PROJECT BACKGROUND

WSP | Parsons Brinckerhoff (formerly known as Parsons Brinckerhoff) was commissioned by Adur District Council (ADC) to undertake a transport study to inform the preparation of the updated Adur Local Plan as well as the Shoreham Harbour Transport Strategy for the Joint Area Action Plan (JAAP). Shoreham Harbour was designated as a Strategic Development Area and its geographical area covers sites in both Adur and Brighton & Hove. The redevelopment and regeneration of Shoreham Harbour is a key element of the Adur District Local Plan and also of the Brighton & Hove City Plan. The final report from the transport study was published by Parsons Brinckerhoff in August 2013 (Report Number: 3511677A-PTG / 01).

This transport study follows on from a previous study by Parsons Brinckerhoff for Adur District Council (Adur Core Strategy and Shoreham Harbour Transport Study 2011) which tested a variety of housing and employment numbers at strategic locations for development, including Shoreham Harbour where various housing and employment totals (varying from 2,000 homes and 1,800 jobs in 2026 to 12,000 homes and 10,000 jobs in 2036) were examined.

The findings of the main study indicated that the Local Plan development scenario and lower totals at Shoreham Harbour above were generally supportable albeit in that form there would be some residual issues at the A27 North Lancing and A259 / A283 Shoreham High Street junctions after mitigation strategies are applied. The subsequent addendum study therefore followed on from the findings of the 2011 main study and considered a number of further strategic housing and employment site allocations in Adur, the sustainable measures and infrastructure improvements required to mitigate the impacts of these site allocations and the requirements of West Sussex County Council (WSCC) and Highways England (formerly known as the Highways Agency).

An addendum to the 2013 transport study report was published in June 2014 (Report Number: 3511677A-PTG / 02), which considered an additional allocation scenario (B2) as the plan for development in Adur evolved. The additional B2 scenario excluded the previously proposed Hasler development site and contained access changes for other sites along with proposed highway improvements.

This second report addendum considers the impacts of a further housing and employment site allocation scenario (named C for the purposes of this report) as an extension to the Adur Local Plan and Shoreham Harbour Transport Study (ASHTS), published by Parsons Brinckerhoff in August 2013.

The principal changes incorporated into Scenario C are:

- → Refined development quanta for the strategic sites;
- → Revised access arrangements for the West Sompting sites;
- → Highway improvements at the key junctions identified by the main report; and
- → Revise of existing collision hotspots, assessment of future hotspots & identification of safety improvements if required.

It is understood that Scenario C represents the preferred strategy of Adur District Council for the submission Local Plan.

2.2 SCOPE AND METHODOLOGY

This study addendum aims to assess the impact of the strategic site allocation Scenario C for Adur on the highway transport network. Scenario C has been tested to recommend appropriate mitigations where appropriate in the form of infrastructure and sustainable transport initiatives to 2031, to assess the improvement on the transport network as a result of the proposed mitigation, and to assess the approximate costs of the proposed highway mitigation.

A 2031 reference case was produced in this study using the same method as documented in the main ASHTS report. The future demand was estimated by replacing part of the forecasted traffic growth with travel demand from individual developments in Adur and its neighbouring areas comprising known committed developments and background growth, but without the large site allocations examined as part of that study. This report, the second addendum to the main report, covers a revised development scenario, which represents the preferred strategy of Adur District Council for the submission Local Plan.

The impact on the transport network of each scenario has been assessed over the whole network as well as in detail for individual junctions. Note that the junctions assessed in detail fall within the jurisdiction of West Sussex County Council other than the A27 Trunk Road junction, which is under the jurisdiction of Highways England.

Where the development scenario is seen to have a significant impact on the highway network, mitigation measures have been examined to address capacity constraints.

2.3 SCENARIO MODELLING

The latest Shoreham Harbour Transport Model (SHTM) was employed for this study addendum, which consists of a variable demand model[1] and a highway assignment model. Running the two models together allows travellers the choice between modes of transport and the impact of transport improvements may lead to travellers switching from one mode of transport to another in order to make the same journey. The resultant highway traffic and its routes through the road network are predicted using the highway assignment model.

Forecast demand matrices have been developed for 2031 based on different land use options with the district. These include the assessment of the following scenarios:

- 2031 Reference case – TEMPro plus committed development and transport schemes (excluding Local Plan developments);
- 2031 with Local Plan developments (New Monks Farm, West Sompting, Shoreham Airport and Shoreham Harbour); and
- 2031 with Development and Transport Mitigation measures

SHTM has a base year of 2008 and a future forecast year of 2028. The proposed and committed development sites included in the Reference Case are detailed in Section 2.2 of the main ASHTS report.

The modelling for this addendum introduces a further future forecast year of 2031. The trip volumes in the initial matrices of the modelling process have been increased in line with TEMPro forecasts prior to producing the 2031 Reference Case.

[1] The OmniTRANS demand model is only focused on the mode choice response of travellers. The findings from an independent audit of the OmniTRANS model are included in Appendix A.

The TEMPro growth factors for Adur from 2028 to 2031 are:

- AM Peak: 1.0313
- PM Peak: 1.0331

There are two modelled time periods:

- AM peak: 08:00 – 09:00
- PM peak: 17:00 – 18:00

2.4 DEVELOPMENT ASSUMPTIONS

Strategic site allocations in Adur were included in the future year models for the 'with Local Plan development' scenario (Scenario C). They mainly include mixed-use residential and employment development proposed in Adur. The size of each potential development included in the tested scenario is detailed in Table 2.1 and Table 2.2.

Previous development scenarios have been examined and reported on in the original Shoreham Harbour Transport Study and the First Addendum.

Table 2.1 Adur Strategic Residential Site Allocations

Development Site	Number of Dwellings
New Monks Farm	600
West Sompting	480
Total	**1,080**

Table 2.2 Adur Strategic Employment Site Allocations

Development Site	B1 Jobs	B2 Jobs	B8 Jobs
Shoreham Airport*	416	139	71
New Monks Farm	333	143	0

**Reduced from previous work in line with floor area reduction to 15,000sqm*

Further allocations at Shoreham Harbour are also included in all development scenarios. They have been split into six areas for use in discussion and transport modelling. The allocations and the anticipated sizes of each are listed in Table 2.3 below. The location of each area is shown in **Appendix B**.

Table 2.3 Proposed and committed future development sites - Shoreham Harbour

Development Site	Number of Dwellings	B1 Jobs	B2 Jobs	B8 Jobs
Shoreham Harbour - Western Arm	970	361	640	640
Shoreham Harbour - Aldrington Basin	300	0	196	196
Shoreham Harbour - South Portslade	0	638	364	364
Shoreham Harbour - Port Operational North	0	340	235	235
Shoreham Harbour - Port Operational South	0	0	235	235
Shoreham Harbour - Port Operational East	0	0	235	235
Total	**1,270**	**1,339**	**1,434**	**1,434**

The split between these housing categories at each site are shown in Table 2.4.

Table 2.4 Dwelling Type Split by Development Site

Development Site	Affordable Flats	Affordable Houses	Private Flats	Private Houses
Aldrington Basin	27.0%	3.0%	63.0%	7.0%
Western Harbour Arm	27.0%	3.0%	63.1%	6.9%
New Monks Farm	0.0%	30.0%	0.0%	70.0%
West Sompting	2.8%	27.3%	6.4%	63.6%

It should be noted that the future job figures at the harbour are based on estimates only for the purpose of generating upper level model assumptions.

In the absence of an accurate employment survey at the time and in order to establish the number of trips associated with the existing jobs it was assumed that the current land use is split equally between B2 (General Industrial) and B8 (Storage and Distribution) land uses in order to apply appropriate trip rates. In reality, this split is more complex and also includes employment in the other use classes, in particular B1, A uses and sui generis. **Appendix C** details the estimated number of existing and new jobs included for each of the Shoreham Harbour development areas, and the resulting net number of trips. The AM peak model only is presented to maintain consistency with the analysis presented in the main ASHTS report and first Addendum.

The traffic forecasting process, including the trip rates employed and matrix building technique have been kept consistent with previous work on this study, as detailed in the main ASHTS report. Background traffic growth within Adur, for example from small scale 'windfall' developments, is included in this process. The current estimate for this growth is 1,456 dwellings within the built up area.

2.5 TRAFFIC FORECASTING

In order to determine the number of highway trips from each site, trip rates were established for appropriate land use types. Corresponding person trip rates were used to determine the number of public transport trips. The trip rates for most of the land uses identified have been retained from those used in the main ASHTS report. For the strategic allocation sites where more detail about the anticipated split in housing provision was available, the trip rates have been tailored to reflect that split.

The starting point for this process was the trip rates for each type of dwelling, shown in Table 2.5.

Table 2.5 Peak Hour Trip Rates per Dwelling

Dwelling Type	AM 08:00 – 09:00				PM 17:00 – 18:00			
	Highway		Public Transport		Highway		Public Transport	
	Arr	Dep	Arr	Dep	Arr	Dep	Arr	Dep
Private House	0.172	0.456	0.004	0.021	0.449	0.262	0.021	0.022
Affordable House	0.097	0.187	0.003	0.018	0.223	0.164	0.018	0.010
Private Flat	0.078	0.236	0.003	0.081	0.217	0.094	0.081	0.026
Affordable Flat	0.065	0.092	0.017	0.046	0.157	0.116	0.046	0.025

The dwelling type trip rates and proportions (shown in Table 2.4) for each category have then been combined to give the trip rates shown in
Table 2.6.

Table 2.6 Residential Development Site Peak Hour Trip Rates per Dwelling

Development Site	AM 08:00 – 09:00				PM 17:00 – 18:00			
	Highway		Public Transport		Highway		Public Transport	
	Arr	Dep	Arr	Dep	Arr	Dep	Arr	Dep
Aldrington Basin	0.081	0.210	0.002	0.054	0.216	0.113	0.054	0.018
Western Harbour Arm	0.081	0.210	0.002	0.054	0.216	0.113	0.054	0.018
New Monks Farm	0.150	0.375	0.004	0.020	0.381	0.233	0.020	0.018
West Sompting	0.140	0.347	0.003	0.015	0.361	0.218	0.015	0.015

2.6 JUNCTION MODELLING METHODOLOGY

Junctions 8 (ARCADY and PICADY) and LinSig software was used to assess the capacity of each junction in forecast 2031 traffic conditions. The industry standard software was used to assess junction capacity as follows:

- ARCADY for roundabout junctions; and
- LinSig for signal controlled junctions.

The junction capacity assessments and any mitigation measures suggested in response are discussed in Chapters 3 and 5.

2.7 JUNCTION IMPACTS

The performance of the junctions was modelled to determine the impact of development scenario C on the network compared to performance in the reference case. The criteria used to measure junction performance are Reference Flow/Capacity, Average delay per arriving vehicle and maximum queue length.

2.8 MITIGATION PROPOSALS

Mitigation schemes were identified for junctions, which had one or more arms shown to be exceeding capacity or where congestion was worsened relative to the reference case as a result of the local plan development traffic.

The mitigation measures have been designed with the following objectives:

- Increasing junction capacity so that the overall junction works within capacity or is no worse than the Reference Case operation;
- Being provided within the existing highway boundary where possible; and
- Providing a cost effective solution to capacity issues due to increases in highway traffic levels.

The mitigation schemes were assessed for capacity and the results are provided in Chapter 5.

2.9 REPORT STRUCTURE

The remainder of the report includes the following sections:

- Section 3 - Development Site – Collision Investigation
- Section 4 - Modelling Results – Without Mitigation Measures
- Section 5 - Mitigation Results
- Section 6 – Hangleton Junction Analysis
- Section 7 – Scheme Cost Estimates
- Section 8 – Summary and Conclusions

3 DEVELOPMENT SITE – COLLISION INVESTIGATION

3.1 INTRODUCTION

This chapter looks at existing collision hotspots, providing an analysis of the recent collision history of the affected areas and where proposed development allocations may worsen highway safety or even create highway safety issues. It also seeks where required to identify how these can be resolved so that development does not have a negative highway safety impact, addressing NPPF (paragraph 09) requirements.

All modes of transport are covered by safety considerations and collision analysis, taking into account the objective of facilitating, where reasonable to do so, the use of sustainable modes of transport.

Collision data for the period 1st January 2010 to 31st December 2014 has been obtained for Adur and Worthing from West Sussex County Council and used to assess the existing collision hotspots and identify where the proposed development allocations, as part of the West Sompting allocation, may worsen these issues.

3.2 NETWORK

Overall, 1,917 collisions were recorded in Adur and Worthing over the five year period, of these 14 were fatal and 340 were serious. 18% of the collisions were Killed or Seriously Injured (KSI) collisions, this is slightly above the national average of 15% for all roads.

Throughout the Worthing and Adur study area, 40 cluster sites have been identified as having five collisions in three years and 27 cluster sites as having eight collisions in five years. A plot of the collisions in the study area is included in **Appendix I;** the clusters identified above are also shown.

Of all cluster sites, 28 were recorded in the Worthing and Broadwater area, close to and west of the A24. The select link data (presented in Section 4) indicates that trips to / from all proposed developments are not anticipated to route through this area in any significant volumes and is therefore considered unlikely to exacerbate any of these existing clusters areas.

Eight collision cluster sites were identified with 1km of each other, centred around the Holmbush Roundabout. This is a restricted access junction with the A27, with to and from the A27 West only. Given the route choice at this junction and the development select link trips through this area, it is considered unlikely that the proposed developments would exacerbate the existing collision problems at these locations.

3.3 WEST SOMPTING

Personal Injury Collision (PIC) data has been assessed for the West Sompting residential site allocation. The location and nature of the collisions are shown in Figure 3.1.

Figure 3.1: West Sompting Development Site - Collision Location Map

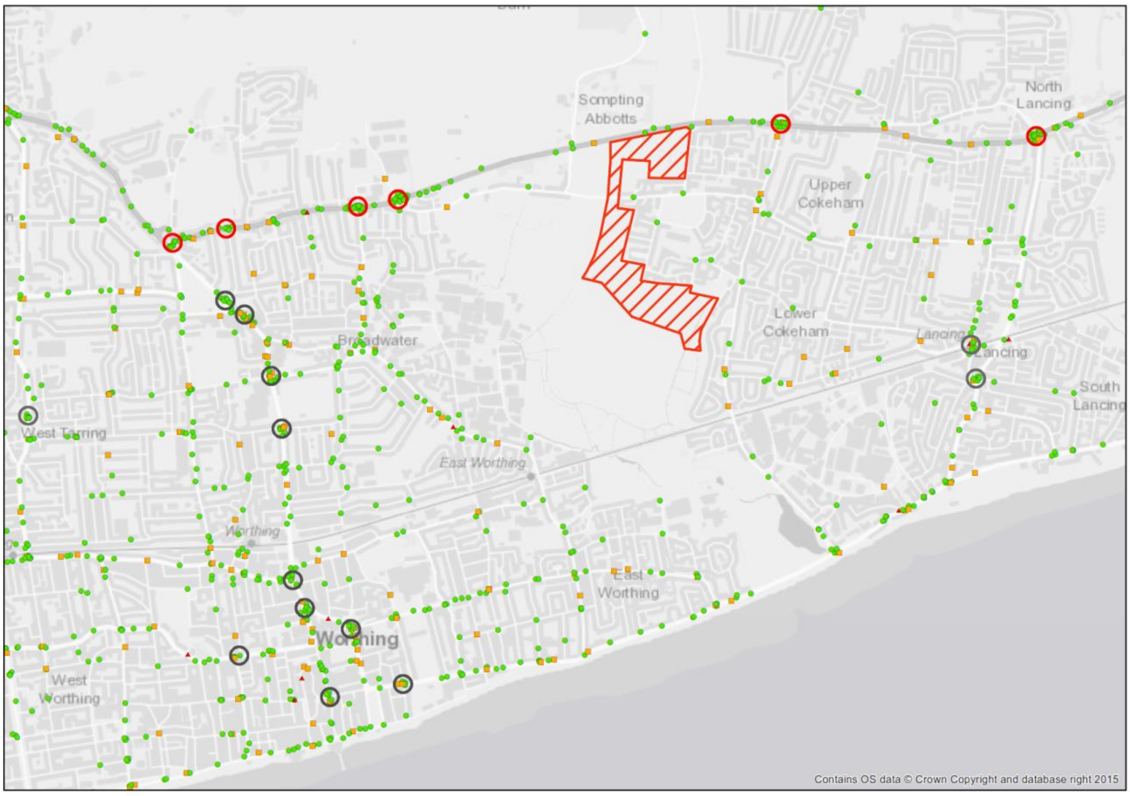


Figure 3.1 indicates that there are a low number of collisions in the vicinity of the proposed development area on the A27 and surrounding local network. There are additional collision clusters on the A27 located at the three signal junctions at Busticle Lane, Lyons Way and Sompting Road. This section of the A27 has a Killed or Seriously Injured (KSI) figure of 17% KSI, which is below the national average for non-built-up roads of 22%.

Based on the likely number of trips through this area due to the development at West Sompting, it is likely that any existing collision problems could be exacerbated at or on the approaches to the signalised junctions. It is noted however, this section of the A27 is subject to a proposed Highways England improvement scheme as part of the Roads Investment Strategy (RIS 1) 2015 – 2020 which forms part of their five year business plan.

A low number of collisions were reported on the local roads in the vicinity of the development site. A review of the collision data on the local roads in the vicinity of the site show that the collisions were typical of a local residential area, minor collisions at junctions and collisions involving pedestrians and cyclists. Therefore, it is anticipated that given the low level of trips from the proposed developments, there would be minimal road safety impact due the development.

3.4 NEW MONKS FARM AND SHOREHAM AIRPORT

Personal Injury Collision (PIC) data has been assessed for the New Monks Farm and Shoreham Airport residential and employment site allocation. The location and nature of the collisions are shown in Figure 3.2.

Figure 3.2: New Monks Farm and Shoreham Airport Development Sites - Collision Location Map

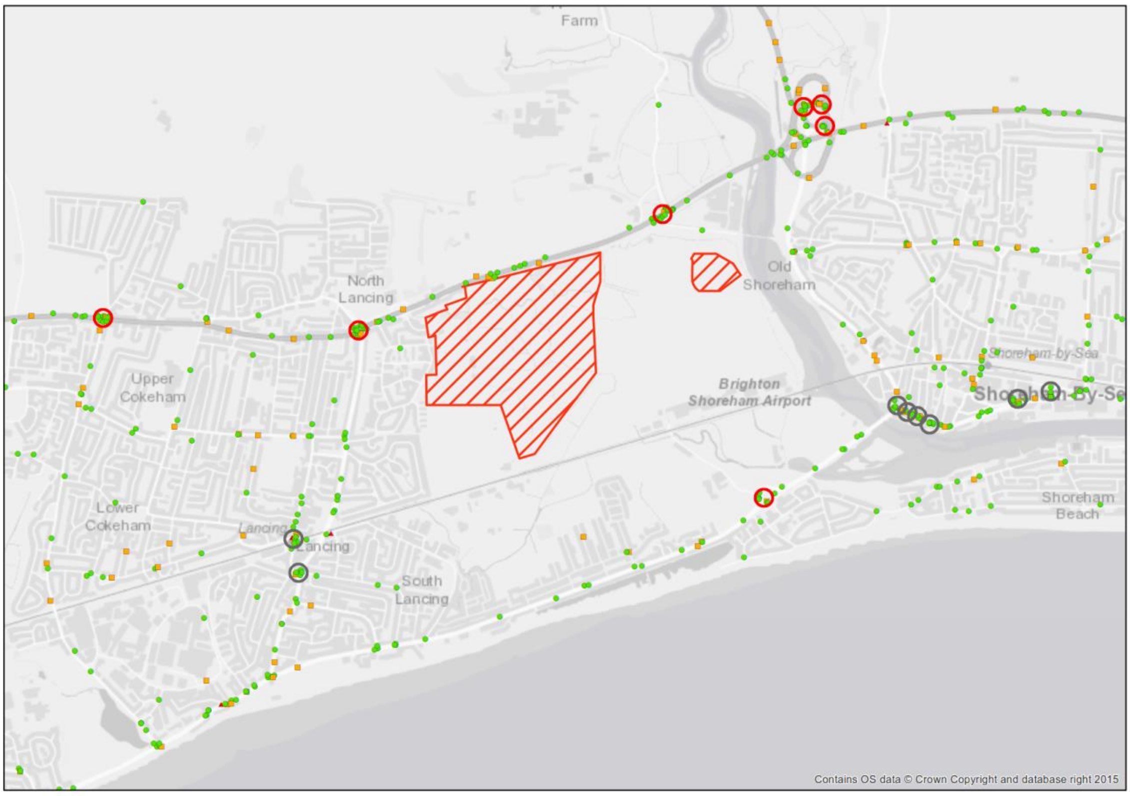


Figure 3.2 indicates that there are a number of collisions with a high proportion of serious incidents in the vicinity of the proposed development area on the A27 and surrounding local network. There are additional collision clusters on the A27 located at the roundabout with Grinstead Lane and also the signalised Sussex Pad junction. This stretch of the A27 suffers from severe queuing at peak times on the junction approaches.

Analysis of the PICs indicates that there are a number of common collisions including shunts on the A27, many including multiple vehicles. This section of the A27 has 5% KSI collisions, which is below the national average for non-built-up roads of 22%. Based on the modelled trips through the area, it is likely that the New Monks Farm development would exacerbate the existing collision problems on the A27. However, this section is subject to a proposed Highways England improvement scheme as part of the Roads Investment Strategy (RIS 1) 2015 – 2020, known as the Worthing & Lancing Improvement study, there is also a neighbouring study investigating improvements to the A27 at Arundel.

In addition to the Highways England RIS 1 schemes outlined above Shoreham Airport and new Monks Farm promoters are understood to be working on a joint access strategy, including a new access junction, which is to be agreed with Highways England and will further improve the highway network in and around the development site.

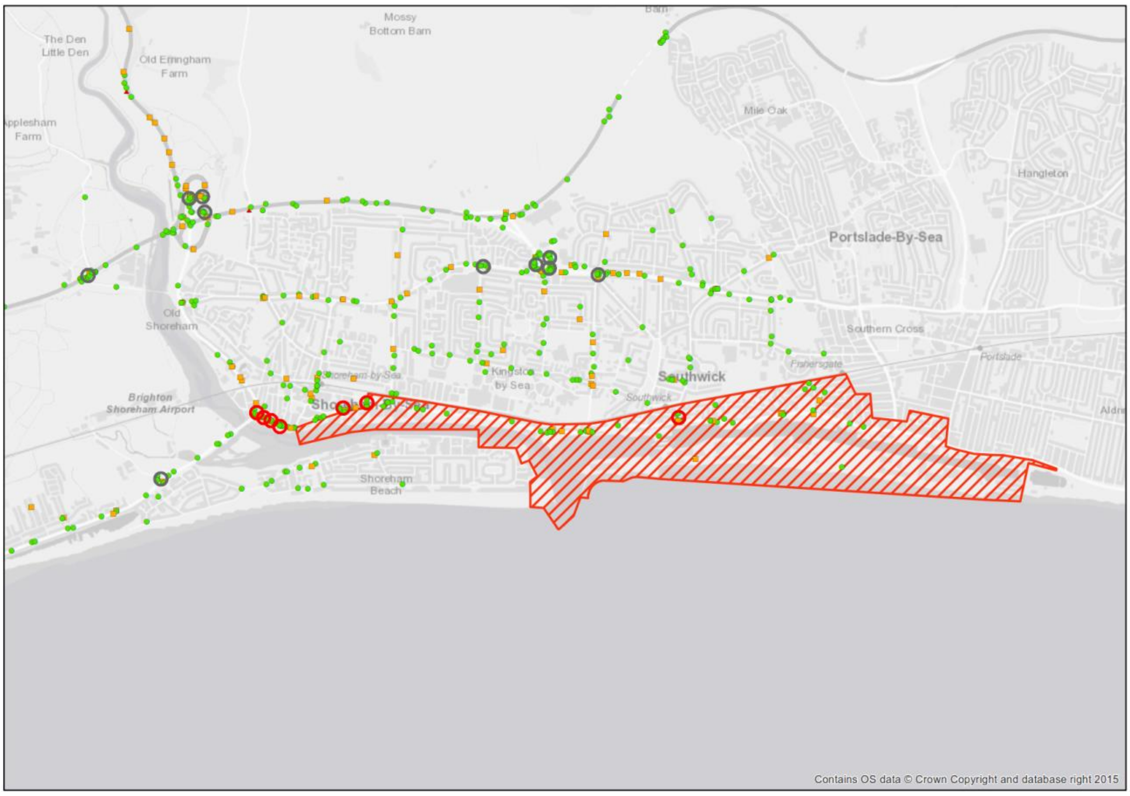
A number of collisions were reported at the A27 / A283 junction. The topographical conditions mean that the vertical alignment, slip road geometry and layout of the junction could lead to confusion. A number of collisions at this junction were due to motorcyclists losing control on the slip road bends. A number of shunts were also recorded at the roundabout. The remaining reported collisions at this location were sideswipes on the circulatory carriageway and due to drivers failing to look properly. Overall, driver behaviour or error was the cause for the majority of the collisions at this location.

It is considered likely that the existing collision issues at this junction could be exacerbated by the rise in trips through the junction as a result of the development. Given that for the majority of the collisions at this location driver behaviour or error was a cause and that there is currently high friction surfacing and chevron signage on the slip roads, the impact of any additional physical mitigation may be limited. Behavioural mitigation through vehicle activated signs and additional signage may reduce the impact of the developmental growth on the number of collisions at this location.

3.5 SHOREHAM HARBOUR

Personal Injury Collision data has been assessed for the residential and employment proposed and committed development sites in the Shoreham Harbour area. This site covers a large area, from Shoreham town centre to Southwick, including the southern side of The Canal. The Shoreham Harbour development area consists of smaller sites at Aldrington Basin, Eastern Harbour, Port Operational North, South Portslade and Western Harbour Arm. The location and nature of the collisions are shown in Figure 3.3.

Figure 3.3: Shoreham Harbour Development Site - Collision Location Map



There are a number of collisions and collision clusters at junctions along the length of the A259 through Shoreham and Southwick town centres. Two larger cluster sites are at the station Road / Old Shoreham Road and Surry Street / Old Shoreham Road junctions. A number of these collisions involved vehicles turning across the path of oncoming vehicles. A number of these were collisions between vehicles and cyclists or pedestrians. These types are typical of town centre locations.

Overall, 75% of collisions involved two or more vehicles, and typically resulted in a single casualty. 23% of all collisions were Killed or Seriously Injured (KSI) collisions; this is higher than the national average of 13% for 30mph built up roads. Given the congested town centre nature of these roads, the collisions are generally associated with turning movements / manoeuvres, or involve collisions with pedestrians and cyclists.

Based on the forecasted trips associated with the development around Shoreham Harbour, it is likely that the increase in flows would have an impact on the collision problems on the A259 through Shoreham town centre between A283/A259 roundabout and Humphrey's Gap and on the A259 to the east of Shoreham including the A259/Station Road junction.

A previous study conducted by Parsons Brinckerhoff explored potential highway improvements in the town centre as well as to the cycling and pedestrian infrastructure, it is recommended that this be used to identify mitigation measures in the Shoreham Town Centre area between A283/A259 roundabout and Humphrey's Gap.

It is anticipated that there would be minimal impact on A259 to the West of Shoreham and on the A283 south of the A27.

3.6 CONCLUSION

Looking at the existing collision problems identified through the collision data and the number of anticipated trips from the developments as identified using the select link data, it is likely that the existing collision problems identified will not be significantly exacerbated by the anticipated growth in most areas, although existing hotspots are apparent in a number of areas. Mitigation measures have been identified in the original Shoreham Harbour Transport Study and the Second Addendum at one of the cluster sites, the A27 / A283 junction, as discussed in Section 5.

A previous study conducted by Parsons Brinckerhoff proposed measures for highway and cycling/pedestrian infrastructure improvements in the Shoreham Town Centre between A259/A283 and Humphrey's Gap. It is recommended that this study be used to identify mitigation measures for the Shoreham Town Centre area.

It is also noted that any proposed capacity mitigation measures would need to undergo Road Safety Audits during detailed design and following construction. These audits would consider current collision problems as well as consider any additional safety problems that might arise from the design.

The A27 through Worthing and Lancing is also subject to Highways England's Roads Investment Strategy (RIS 1) 2015 - 2020, and therefore significant highway improvements are anticipated to be in delivered prior this period. These improvements are expected to address existing congestion and safety issues.

4 MODELLING RESULTS – WITHOUT MITIGATION MEASURES

4.1 OVERVIEW OF FINDINGS

Model runs using the Shoreham Harbour Transport Model (SHTM) have been undertaken for the development scenario detailed in Section 2.3. Results from the SHTM were then fed into analysis of individual junctions in the study area. This section gives an overview of findings from the analysis of Scenario C, covering the aspects set out below:

NETWORK PERFORMANCE

The network-wide impacts previously reported in SHTM are very similar across the four development scenarios in the main report and Scenario B2 in the first Addendum. A similar impact is expected from Scenario C. A number of analyses were undertaken as summarised below.

NETWORK STATISTICS

The increase in travel demand in the development scenarios in comparison to the reference case is clear but not considered substantial. The largest network-wide demand increase for the main report scenarios was less than 3%, which occurred in Scenario B. With the introduction of additional trips, all scenarios from both the main report and this addendum result in higher congestion on the network as expected, and this is demonstrated by increased queuing and slower average speeds. The lower demand in Scenario C, compared to Scenario B2 leads to a lower level of queuing and delay.

TRAFFIC FLOW VOLUMES

There are extensive variations in traffic volume throughout the network between the reference case and development scenarios due to traffic re-routing. In the study area to the west of the A283, increases in traffic for all forecast scenarios from both the main report and this addendum compared to the reference case mainly focus on the network at close vicinity to the strategic development sites, namely New Monks Farm and West Sompting. To the east of the A283, it is also clear that the increases in traffic primarily originate from Shoreham Harbour.

DEVELOPMENT SELECT LINK ANALYSIS

Distribution and assignment of traffic to and from individual development sites was examined. It has been found that traffic impacts from individual sites are modest with a limited number of junctions receiving over 30 trips from a single development, per peak hour. However, the collective impacts from all developments are significant as demonstrated in the journey time analysis.

Details on the above analyses are presented in **Section 4.2** of this addendum.

JUNCTION PERFORMANCE

In this section, a summary of the development traffic impact is provided using the junction capacity assessment results for the existing junction layouts. Table 4.1 – 4.3 gives the maximum ratio of flow to capacity (RFC), average delay and maximum queue length for all the approaches to each junction (Tranche 1 and 2) in the morning and evening peak hours.

Table 4.1 Summary of Junction Capacity Assessments – Max RFC

Junction	Mitigation Required?	AM Peak Max RFC		PM Peak Max RFC	
		Reference Case	Scenario C	Reference Case	Scenario C
Tranche 1					
A27 / A283 Steyning Road	Y	0.95	0.95	**1.06**	**1.35**
A259 Brighton Road / A283 Old Shoreham Road	Y	**1.72**	**1.68**	**1.58**	**1.69**
A259 Brighton Road / A2025 South Street	Y	**1.63**	**1.68**	**1.82**	**1.86**
A27 Old Shoreham Rd / A2025 Grinstead Ln	Y	**1.69**	**1.81**	**1.59**	**1.63**
Tranche 2					
A27 / Busticle Lane	N	0.97	0.96	0.97	0.99
A27 Shoreham Bypass / Hangleton Link north roundabout	N	**1.48**	0.95	0.85	0.71
A27 Shoreham Bypass / Hangleton Link south roundabout	N	**1.18**	**1.18**	**1.07**	**1.06**
A259 Brighton Road / Western Road	N	0.71	0.74	0.66	0.67
A270 Upper Shoreham Road / B2167 Kingston Lane	N	0.79	0.82	0.85	0.85
A27 Sompting Bypass / Upper Brighton Road	Y	0.99	**1.41**	0.87	0.97
A270 Old Shoreham Road / A293 Hangleton Link	N	0.73	0.73	0.67	0.70
A270 Old Shoreham Road / A2038 Hangleton Road / B2194 Carlton Terrace	N	0.91	0.90	0.97	0.95
A259 Wellington Road / B2194 Station Road	N	0.94	0.94	0.90	0.91

Table 4.2 Summary of Junction Capacity Assessments – Average Delay per Arriving Vehicle (min)

Junction	Mitigation Required?	AM Peak		PM Peak	
		Reference Case	Scenario C	Reference Case	Scenario C
Tranche 1					
A27 / A283 Steyning Road	Y	0.84	0.83	2.87	11.62
A259 Brighton Road / A283 Old Shoreham Road	Y	18.90	18.19	16.57	18.44
A259 Brighton Road / A2025 South Street	Y	17.51	18.35	20.21	20.72
A27 Old Shoreham Rd / A2025 Grinstead Ln	Y	18.40	20.05	16.74	17.41
Tranche 2					
A27 / Busticle Lane	N	1.96	1.14	1.45	1.73
A27 Shoreham Bypass / Hangleton Link north roundabout	N	14.04	0.61	0.49	0.24
A27 Shoreham Bypass / Hangleton Link south roundabout	N	7.20	7.07	3.31	3.15
A259 Brighton Road / Western Road	N	0.77	0.73	0.59	0.59
A270 Upper Shoreham Road / B2167 Kingston Lane	N	0.72	0.67	0.80	0.69
A27 Sompting Bypass / Upper Brighton Road	Y	2.33	10.53	1.30	1.58
A270 Old Shoreham Road / A293 Hangleton Link	N	0.84	0.91	0.70	0.63
A270 Old Shoreham Road / A2038 Hangleton Road / B2194 Carlton Terrace	N	1.32	1.27	1.73	1.41
A259 Wellington Road / B2194 Station Road	N	0.72	1.34	0.65	0.66

Table 4.3 Summary of Junction Capacity Assessments – Forecast Queue Length (PCU)

Junction	Mitigation Required?	AM Peak		PM Peak	
		Reference Case	Scenario C	Reference Case	Scenario C
Tranche 1					
A27 / A283 Steyning Road	Y	17.47	17.32	133.91	464.26
A259 Brighton Road / A283 Old Shoreham Road	Y	1150.13	1061.57	718.20	706.25
A259 Brighton Road / A2025 South Street	Y	391.14	727.46	535.51	562.95
A27 Old Shoreham Road / A2025 Grinstead Lane	Y	1688.42	1957.51	1878.32	2015.17
Tranche 2					
A27 / Busticle Lane	N	38.3	40.9	41.7	48.4
A27 Shoreham Bypass / Hangleton Link north roundabout	N	338.25	15.83	5.47	2.41
A27 Shoreham Bypass / Hangleton Link south roundabout	N	407.93	398.85	159.87	150.55
A259 Brighton Road / Western Road	N	12.5	12.4	9.4	9.4
A270 Upper Shoreham Road / B2167 Kingston Lane	N	13.4	12.8	17.0	17.0
A27 Sompting Bypass / Upper Brighton Road	Y	40.5	122.6	29.7	35.8
A270 Old Shoreham Road / A293 Hangleton Link	N	15.1	15.2	16.3	17.4
A270 Old Shoreham Road / A2038 Hangleton Road / B2194 Carlton Terrace	N	24.4	21.2	23.4	21.9
A259 Wellington Road / B2194 Station Road	N	42.6	42.1	30.0	33.1

The turning flows used in the detailed assessment of these junctions are given for the Reference Case and Scenario C in **Appendix D**. Full details of the outputs from the detailed junction modelling are contained in **Appendix H** of this report.

The existing traffic signal controlled A27 Sussex Pad junction is expected to be replaced by the proposed New Monks Farm / Shoreham Airport / Lancing College combined access junction (roundabout). Whilst the design of that junction has not been finalised at the time of writing, it is assumed to have sufficient capacity for forecast future demand and so no modelling is presented as part of this study.

The remaining four key junctions identified during previous stages of this study all require some mitigation to accommodate the future traffic forecasts with Scenario C development in place. The junction modelling results also suggest some mitigation could be required at the A27 Sompting Bypass / Upper Brighton Road junction to accommodate the forecast traffic demand.

The other junctions have comparable performance with both the Reference Case and Scenario C demand forecasts, so no interventions are proposed to accommodate the forecast traffic demand.

4.2 NETWORK PERFORMANCE

NETWORK STATISTICS

The global network statistics for the AM and PM peak models are shown below in Table 4.4 and Table 4.5 respectively.

Table 4.4 AM Peak Global Model Statistics

Statistic	Reference	Scenario C	Difference
Transient Queues (pcu-hrs / hr)	9,634	9,552	-83
Over Capacity Queue (pcu-hrs / hr)	8,894	9,133	239
Total Travel Time (pcu-hrs / hr)	43,419	43,832	413
Total Travel Distance (pcu-km / hr)	1,577,823	1,583,502	5,679
Average Speed (kph)	36.3	36.1	-0.2

Table 4.5 PM Peak Global Model Statistics

Statistic	Reference	Scenario C	Difference
Transient Queues (pcu-hrs / hr)	11,076	11,104	29
Over Capacity Queue (pcu-hrs / hr)	19,238	19,387	150
Total Travel Time (pcu-hrs / hr)	57,307	57,707	400
Total Travel Distance (pcu-km / hr)	1,730,476	1,737,679	7,203
Average Speed (kph)	30.2	30.1	-0.1

Two types of queue are reported; transient queues and over-capacity queues. Over capacity queues are ‘permanent’ queues at an over capacity junction during the modelled peak hours. Transient queues are those that dissipate, for example the vehicles queuing at a red traffic signal, which clear during the next green phase. Any remaining queuing vehicles at the end of the green which queue for a second red phase represent an over capacity queue.

The increases in queuing and travel time, along with the reduction in the average speed, are all indicative of a general increase in congestion across the modelled network in Scenario C when compared to the Reference Case.

DEVELOPMENT SELECT LINK ANALYSIS

In common with the other development scenarios, in the main report, select link analysis for the individual development sites has been undertaken to demonstrate the distribution of traffic to and from these developments across the highway network in the study area. Illustration plots for Scenario C in the AM and PM peak hours are presented in **Appendix G** of this report. Similar trip distribution patterns were observed on all other development scenarios.

It can be observed that traffic impacts from individual sites on the network are modest in isolation. There are a very limited number of junctions receiving over 30 trips from a single development in a peak hour. Where this does happen, the point of access (the first junction where the development traffic hits the main roads in the highway network) is usually either one of the five key junctions in Tranche 1 or the eight junctions in Tranche 2, as identified by the main report. It should be noted that the cumulative traffic impacts from all developments are still considered significant, as demonstrated in the journey time and congestion hotspot analyses presented in the SHTS report.

Table 4.6 and Table 4.7 summarise the vehicle flows (PCU’s) through the junctions of interest for each development location.

Table 4.6: Vehicle Flows (PCU's) by Development during the AM Peak

Junction	New Monks Farm		West Sompting		Aldrington Basin		Southwick Waterfront		South Portslade		Western Harbour Arm	
	From	To	From	To	From	To	From	To	From	To	From	To
A27 / A283 Steyning Road	14	22	2	1	0	0	0	1	0	0	31	9
A259 Brighton Road / A283 Old Shoreham Road	1	0	41	0	3	0	1	5	0	1	45	30
A259 Brighton Road / A2025 South Street	31	21	6	0	2	0	0	3	0	3	14	5
A27 Old Shoreham Road / A2025 Grinstead Lane	41	29	29	11	0	0	0	3	0	4	2	12

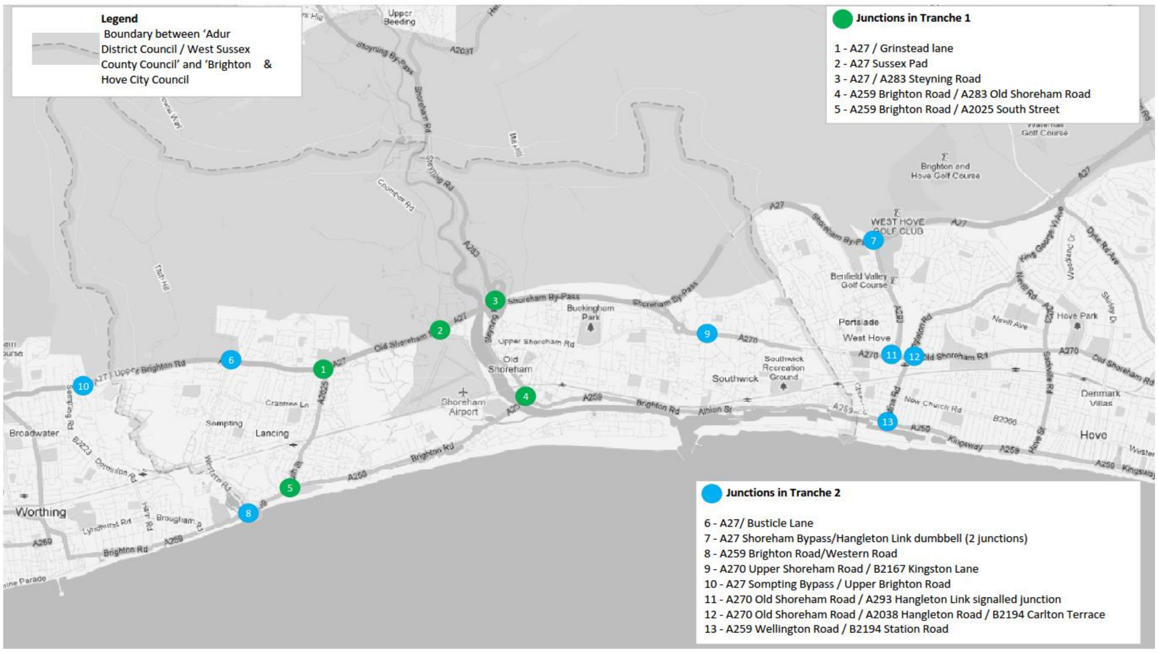
Table 4.7: Vehicle Flows (PCU's) by Development during the PM Peak

Junction	New Monks Farm		West Sompting		Aldrington Basin		Southwick Waterfront		South Portslade		Western Harbour Arm	
	From	To	From	To	From	To	From	To	From	To	From	To
A27 / A283 Steyning Road	4	9	3	4	0	0	1	0	0	0	2	31
A259 Brighton Road / A283 Old Shoreham Road	0	0	10	12	0	0	0	1	0	0	25	13
A259 Brighton Road / A2025 South Street	39	1	0	0	0	0	0	1	0	0	9	5
A27 Old Shoreham Road / A2025 Grinstead Lane	81	72	2	60	0	0	1	1	1	0	3	8

4.3 JUNCTION PERFORMANCE

A brief description of the operation of each key junction is provided below. The impact on the existing junction layouts of the Reference Case and Scenario C demand forecasts are considered. Any junction where mitigation could be required is identified in this section. The figure below indicates the location of these key junctions.

Figure 4.1 Key Junction Locations



TRANCHE 1

A27 / A283 STEYNING ROAD

The roundabout is expected to be operating close to capacity in the AM peak hour. Both A283 approaches come under similar pressure with the Reference Case and Scenario C demand forecasts.

During the PM peak hour, the junction is operating slightly over capacity with the Reference Case demand forecast. When the Scenario C development traffic is added, the approach from the westbound A27 off-slip is pushed well over capacity with a significant queue predicted by the modelling.

Additional capacity at this junction is required to mitigate the expected impact of development proposals.

A259 BRIGHTON ROAD / A283 OLD SHOREHAM ROAD

The junction modelling indicates that this junction will be over capacity in both peak hours, with the Reference Case and Scenario C traffic demand forecasts. Mitigation is therefore required to mitigate the expected impact of the development proposals.

A259 BRIGHTON ROAD / A2025 SOUTH STREET

The junction modelling indicates that all three approaches will be over capacity in both peak hours with the Reference Case and Scenario C traffic demand forecasts. Mitigation is therefore required to mitigate the expected impact of the development proposals.

A27 OLD SHOREHAM ROAD / A2025 GRINSTEAD LANE

Both the A27 Upper Brighton Road and A27 Old Shoreham Road approaches to this roundabout operate over capacity in all tested demand scenarios. The A2025 Grinstead Lane entry is also approaching capacity in all scenarios except the Scenario C AM peak hour, where demand exceeds capacity along with the A27 approaches.

Additional capacity at this junction is required to mitigate the expected impact of development proposals.

A27 SUSSEX PAD

The existing traffic signal controlled A27 Sussex Pad junction is expected to be replaced by a proposed New Monks Farm / Shoreham Airport / Lancing College combined access roundabout. Whilst the design of that junction has not been finalised at the time of writing, it is assumed to have sufficient capacity for forecast future demand and so no further modelling or mitigation is considered to be required.

TRANCHE 2

A27 / BUSTICLE LANE

The modelling indicates that this junction will operate just within capacity in both peak hours with the Reference Case and Scenario C traffic demand forecasts.

A27 SHOREHAM BYPASS / HANGLETON LINK DUMBBELL

The north and south roundabouts at this grade separated junction have been modelled and reported separately. The performance of the north roundabout improves and the south roundabout is no worse with the Scenario C demand forecasts, so no changes are proposed for this junction.

A259 BRIGHTON ROAD / WESTERN ROAD

The modelling indicates that this junction will operate well within capacity in both peak hours with the Reference Case and Scenario C traffic demand forecasts.

A270 UPPER SHOREHAM ROAD / B2167 KINGSTON LANE

The modelling indicates that this junction will operate well within capacity in both peak hours with the Reference Case and Scenario C traffic demand forecasts.

A27 SOMPTING BYPASS / UPPER BRIGHTON ROAD

The Upper Brighton Road approach to this junction moves from just within capacity to operating over-capacity in the morning peak hour following the introduction of the Scenario C demand. That entry is also approaching capacity in the PM peak hour in Scenario C.

Additional capacity on the south approach to this junction is required to mitigate the expected impact of development proposals.

A270 OLD SHOREHAM ROAD / A293 HANGLETON LINK

The modelling indicates that this junction will operate well within capacity in both peak hours with the Reference Case and Scenario C traffic demand forecasts.

A270 OLD SHOREHAM ROAD / A2038 HANGLETON ROAD / B2194 CARLTON TERRACE

The modelling indicates that this junction will operate just within capacity in both peak hours with the Reference Case and Scenario C traffic demand forecasts.

A259 WELLINGTON ROAD / B2194 STATION ROAD

The modelling indicates that this junction will operate just within capacity in both peak hours with the Reference Case and Scenario C traffic demand forecasts.

5 MITIGATION RESULTS

5.1 INTRODUCTION

The following junctions have been identified as having at least one arm, which is projected to be operating over capacity in 2031:

- A27 / A283 Steyning Road
- A259 Brighton Road / A283 Old Shoreham Road
- A259 Brighton Road / A2025 South Street
- A27 Old Shoreham Road / A2025 Grinstead Lane
- A27 Sompting Bypass / Upper Brighton Road

The mitigation measures proposed for each of these junctions in the main report (2013) and addendum (2014) have been reviewed and, where appropriate, revised to suit the Scenario C traffic demand forecasts. Each mitigated junction has been modelled (using ARCADY or LinSig software) to assess the proposed alterations to the junction geometries.

Following the identification of the mitigation measures, new model runs were undertaken using the Shoreham Harbour Transport Model (SHTM).

The revised demand for Scenario C was run in SHTM with the network, which had been updated to reflect the mitigation proposed by ASHTS. This mitigation includes the schemes proposed for the Tranche 2 junctions in the main report. The additional junctions considered in the main ASHTS report were:

- A27 / Busticle Lane;
- A27 Shoreham Bypass / Hangleton Link dumbbell;
- A259 Brighton Road / Western Road;
- A270 Upper Shoreham Road / B2167 Kingston Lane;
- A270 Old Shoreham Road / A293 Hangleton Link signalled junction;
- A270 Old Shoreham Road / A2038 Hangleton Road / B2194 Carlton Terrace;
- A259 Wellington Road / B2194 Station Road.

Junction improvements were proposed at A27 / Busticle Lane, A27 Shoreham Bypass / Hangleton Link dumbbell, A27 Sompting Bypass / Upper Brighton Road and A259 Wellington Road / B2194 Station Road to mitigate the impact of the Scenario B demand forecasts expected in November 2012 when the main ASHTS report was produced.

The flows established by the Scenario C network model runs were then fed into individual junction models of key junctions in the study area. The results from the SHTM and the junction models are presented and discussed in this section. A summary of the impact from the demand and network changes on the junction modelling results is presented in the table below.

.

Table 5.1 Summary of Junction Capacity Assessments

Junction	AM Peak Max RFC			PM Peak Max RFC		
	Reference Case	Scenario C	With Mitigation	Reference Case	Scenario C	With Mitigation
A27 / A283 Steyning Road	0.95	0.95	**0.96**	**1.06**	**1.35**	**0.97**
A259 Brighton Road / A283 Old Shoreham Road	**1.72**	**1.68**	**1.04**	**1.58**	**1.69**	0.90
A259 Brighton Road / A2025 South Street	**1.63**	**1.68**	0.90	**1.82**	**1.86**	**1.14**
A27 Old Shoreham Road / A2025 Grinstead Lane	**1.69**	**1.81**	**1.22**	**1.59**	**1.63**	**1.23**
A27 Sompting Bypass / Upper Brighton Road	0.99	**1.41**	0.97	0.87	0.97	0.85

The turning flows used in the detailed assessment of these junctions are given for the Reference Case, Scenario C and Scenario C with transport mitigation in **Appendix D**. Full details of the outputs from the detailed junction modelling are contained in **Appendix H** of this report.

5.2 SUSTAINABLE TRANSPORT MEASURES

Sustainable transport measures will be promoted to reduce demand for travel by private car in innovative ways. These may include:

- Personal travel planning
- School travel planning
- Workplace travel planning
- Cycling and walking promotion
- Public transport information and marketing
- Car clubs

Collectively these sustainable transport measures are expected to reduce the highway traffic demand in the network.

Experience from the Sustainable Travel Towns (Worcester, Peterborough and Darlington) saw a reduction of 9% in car driver trips in 2008 compared to 2004[2]. The same study found the following reductions in car use based upon distance travelled;

- Less than 1km = 22% reduction;
- 1km – 3km = 14% reduction;
- 3km – 5km = 10% reduction;
- 5km – 10km = 6% reduction;
- 10km – 50km = 3% reduction;
- Over 50km = No reduction.

[2] Sloman L, Cairns S, Newson C, Anable J, Pridmore A & Goodwin P (2010), *The Effects of Smarter Choices Programmes in Sustainable Travel Towns; Research Report*

As the existing modelling tool does not capture travellers' responses to most of these sustainable transport measures, it was agreed that a suitable approach to reflect their impacts on reducing private car use is to reduce the number of trips for certain movements and trip purposes for individual movements based upon the likely reductions above. In order to ensure that this factoring process does not over-estimate the amount of highway trip reduction, it is also agreed that such factoring should be solely related to trips to or from the site allocations and their immediately surrounding areas (within 0.4 – 0.8 km / 0.25 – 0.5 mile radius). This ensured that the scale of reduction is in proportion to the funding that may be available for Smarter Choices measures and accounts for the fact that large-scale new development may provide more opportunities for the financing of such measures.

Prior to the application of these factors, an additional reduction in trips was applied to each of the scenarios to remove those trips that would start and end within the same development site. An internalisation factor of 10% was therefore agreed for the strategic sites modelled explicitly in this analysis to account for commuting, shopping and educational escort trips starting and ending within the same site as per the pre-mitigation scenarios.

Although the impacts from sustainable transport measures were assumed to be focused on site allocation areas, it is believed a small group of these measures would still have a much wider impact. These measures are summarised in Table 5.2 below and their respective impacts were applied to the remaining area of Adur but without double counting any of the above reductions. The exact percentages of reductions were established based on information in the Yeovil Transport Strategy Review[3], which provides empirical evidence on the likely scale of reductions and greater breakdown on the effects of individual measures than in other studies.

Table 5.2 Adur District Sustainable Travel Measures

Measure	Trip Reduction	Application
Travel Awareness Campaigns	1.3%	Trips < 5km
Increase in Cycling	3.0%	Trips < 6 km
Increase in Walking	1.0%	Trips < 2km
Public Transport Improvements	2.6%	Trips between zones within 500m of no. 2 and no. 700 services

These trip reductions have been applied to the forecast travel demand for Scenario C prior to assignment on the highway network model.

[3] Walford S (2009), *Second Yeovil Transport Strategy Review; Non-Modellable Interventions*

5.3 NETWORK PERFORMANCE

NETWORK STATISTICS

The effect of the proposed sustainable travel initiatives and network mitigation measures on the global network statistics for each of the tested scenarios is examined in the following section. Table 5.3 shows a comparison of results from the AM peak models and Table 5.4 compares the network statistics from the evening peak models.

Table 5.3 AM Peak Global Model Statistics Comparison

Statistic	Reference	Scenario C	Scenario C with Mitigation	Mitigation Impact
Transient Queues (pcu-hrs / hr)	9,634	9,552	9,361	- 191
Over Cap Queue (pcu-hrs / hr)	8,894	9,133	8,662	- 472
Total Travel Time (pcu-hrs / hr)	43,419	43,832	43,003	- 828
Total Travel Distance (pcu-km / hr)	1,577,823	1,583,502	1,574,791	- 8,711
Average Speed (kph)	36.3	36.1	36.6	+ 0.5

The global network statistics from the morning peak model demonstrate that the network improvements, along with demand reduction from sustainable travel measures, result in overall network performance, which is an improvement over the Reference Case network with the original demand forecasts. Therefore the mitigation measures identified accommodate the demand from the proposed developments and lead to a slightly beneficial impact overall on the operation of the road network.

Table 5.4 PM Peak Global Model Statistics Comparison

Statistic	Reference	Scenario C	Scenario C with Mitigation	Mitigation Impact
Transient Queues (pcu-hrs / hr)	11,076	11,104	10,864	- 240
Over Cap Queue (pcu-hrs / hr)	19,238	19,387	18,619	- 768
Total Travel Time (pcu-hrs / hr)	57,307	57,707	56,589	- 1,118
Total Travel Distance (pcu-km / hr)	1,730,476	1,737,679	1,727,574	- 10,105
Average Speed (kph)	30.2	30.1	30.5	+ 0.4

The PM peak results follow a similar pattern to the AM peak statistics. The network capacity improvements, development traffic growth and sustainable travel demand reductions from the original Reference Case to Scenario C combine to give a slightly beneficial impact on the modelled highway network.

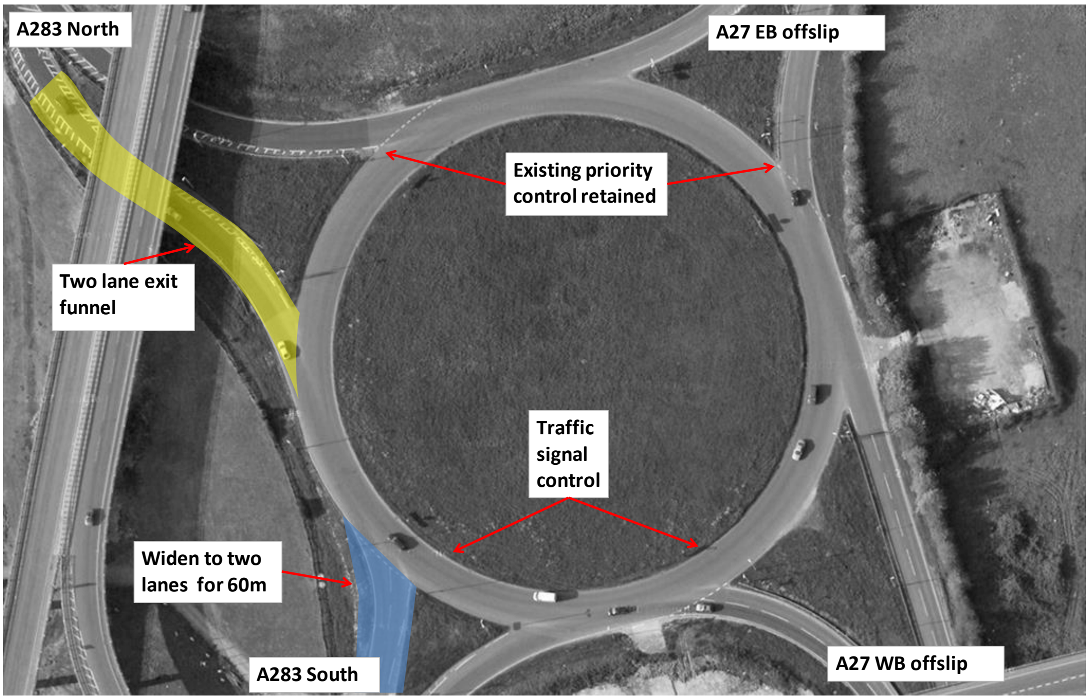
5.4 JUNCTION PERFORMANCE

A27 / A283 STEYNING ROAD

This highway mitigation is less extensive than the scheme proposed for this junction in the main report and first Addendum. The reduced development quantum in Scenario C compared to the previous tests allows for a reduction in the scale of capacity increase needed.

The signalisation of the roundabout can be reduced to just the A283 South and A27 Westbound Off-Slip approaches, with give-way control retained for the other two entries. The flare on the A283 South entry has been reduced and the widening of the A283 North approach is no longer required. The circulatory widening is also no longer required. These proposals are shown below in Figure 5.1.

Figure 5.1 Proposed Mitigation at A27 / A283 Steyning Road Roundabout



The proposed mitigation ensures the junction continues to operate within capacity in the morning peak hour and resolves the over-capacity issue identified in the evening peak hour. In both peaks the A283 North entry experiences the highest ratio of flow to capacity.

A259 BRIGHTON ROAD / A283 OLD SHOREHAM ROAD

The mitigation proposal from the previous Addendum, which considered Scenario B2, is also considered suitable for the Scenario C demand forecasts. In summary, the proposal is to realign the footway across the south of the junction to develop the A259 High Street entry flare earlier and increase the inscribed diameter of the roundabout to 28 metres to accommodate this.

The A259 Brighton Road approach is still slightly over capacity in the morning peak hour, but the constraints at this location prevent the creation of any further highway capacity at this location. The reduction in traffic demand compared to Scenario B2 (as reported in the Addendum) means that the junction performance with the proposed mitigation is improved compared to the previously tested development allocation scenarios as well as compared to the existing layout in the reference case scenario. These proposals are shown below in Figure 5.2.

Figure 5.2: Highway Mitigation Proposal for A259 Brighton Road / A283 Old Shoreham Road

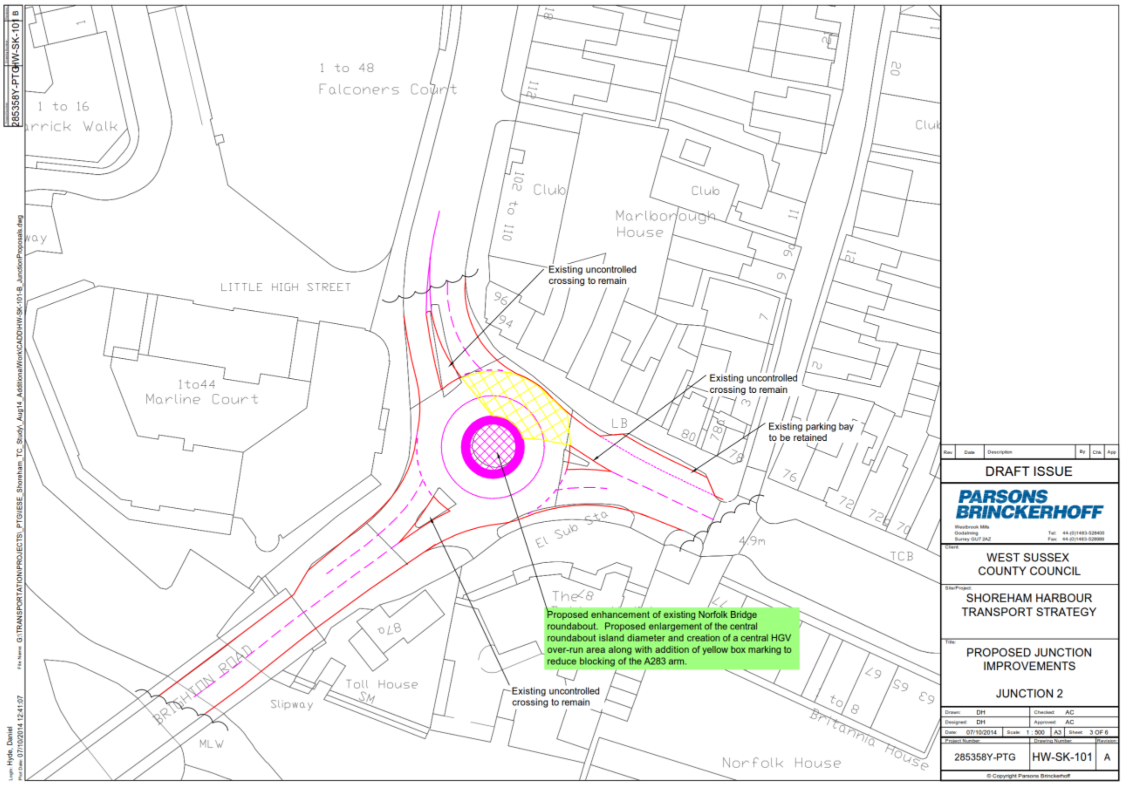


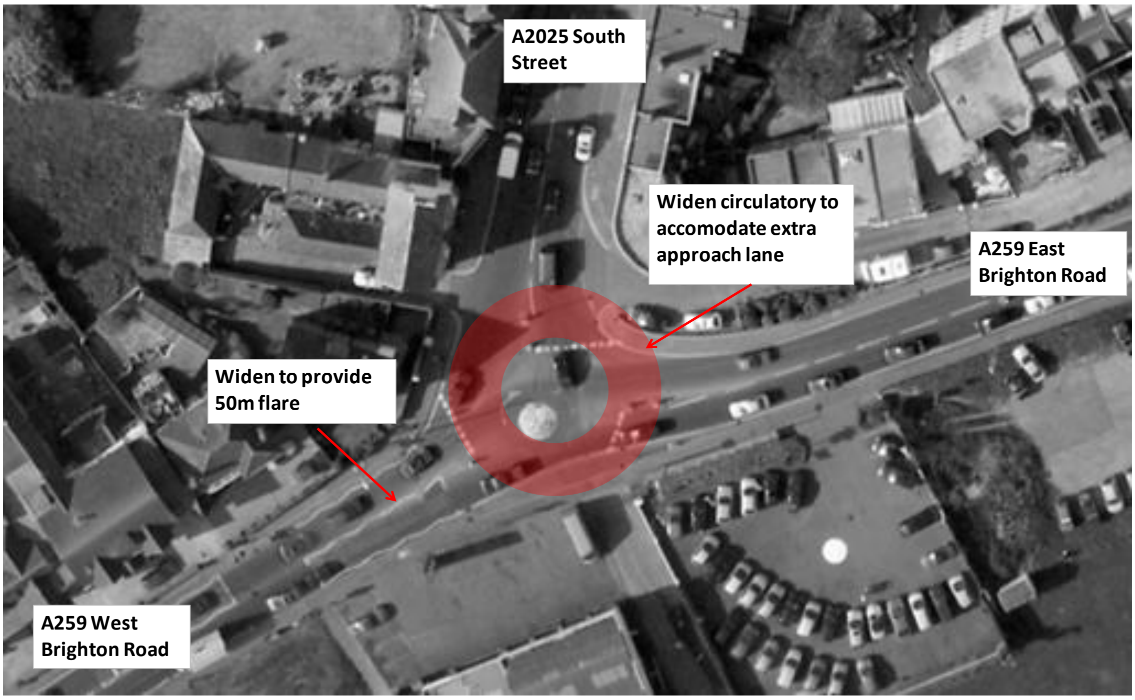
Figure 5.2 above is taken from Technical Note 01, part of the Shoreham Harbour Transport Study conducted by Parsons Brinckerhoff previously.

A259 BRIGHTON ROAD / A2025 SOUTH STREET

The highway mitigation proposal at the A259 Brighton Road / A2025 South Street is to widen the A259 west approach to provide a 50m flare and to enlarge the junction to a 30m diameter roundabout to accommodate this. This is also unchanged from the Addendum.

The proposed mitigation at this location provides sufficient capacity to accommodate the additional demand from the Local Plan development sites as well as relieving the congestion expected at this junction by 2031. These proposals are shown below in Figure 5.3.

Figure 5.3: Highway Mitigation Proposal for A259 Brighton Road / A2025 South Street

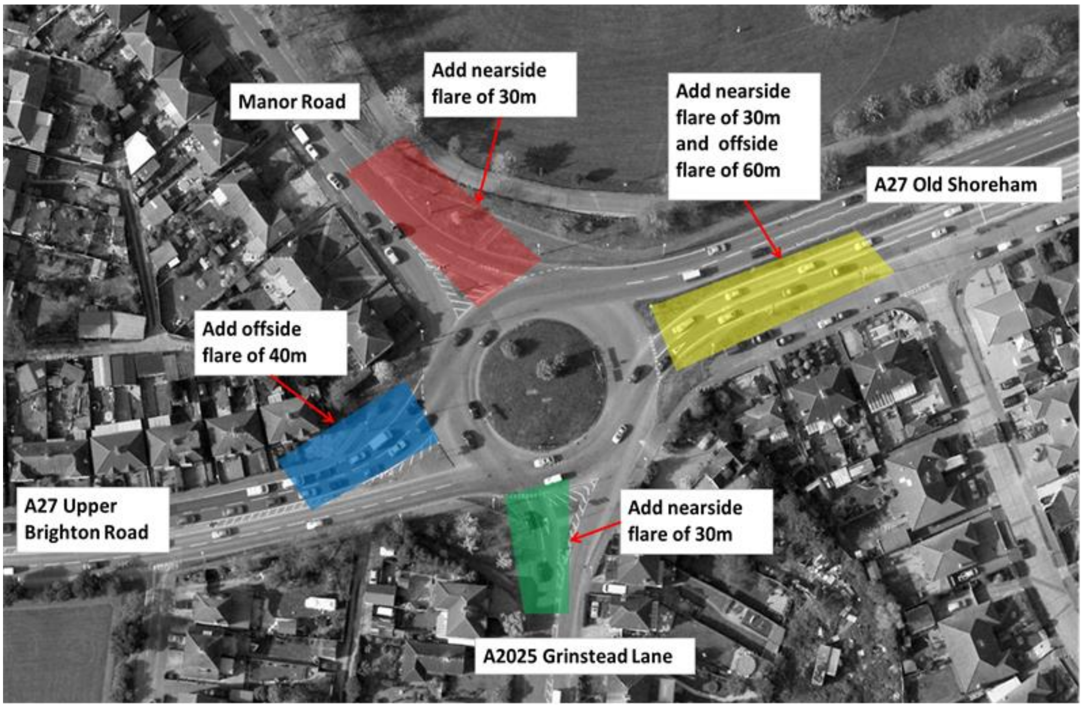


A27 OLD SHOREHAM ROAD / A2025 GRINSTEAD LANE

The highway mitigation proposal for the A27 / A2025 Grinstead Lane is to turn the existing roundabout into a signalised junction with a left turn slip lane from the A27 east and widened approaches. The A27 east approach would be widened to accommodate two full lanes with a flare either side, the A27 west approach have an additional offside flare, Manor road would have a nearside flare and Grinstead Lane would have one full lane with a flare either side.

The proposed mitigation for this junction gives a significant improvement in performance when compared to the existing layout in the reference case scenario, but does not completely eliminate the over-capacity issues identified. In both peaks the conflict between high traffic volumes on the A27 and Grinstead Lane requires a compromise in the green time allocated to the controlling stages and leads to both approaches operating over calculated capacity. These proposals are shown below in Figure 5.4.

Figure 5.4: Highway Mitigation Proposal for A27 Old Shoreham Road / A2025 Grinstead Lane

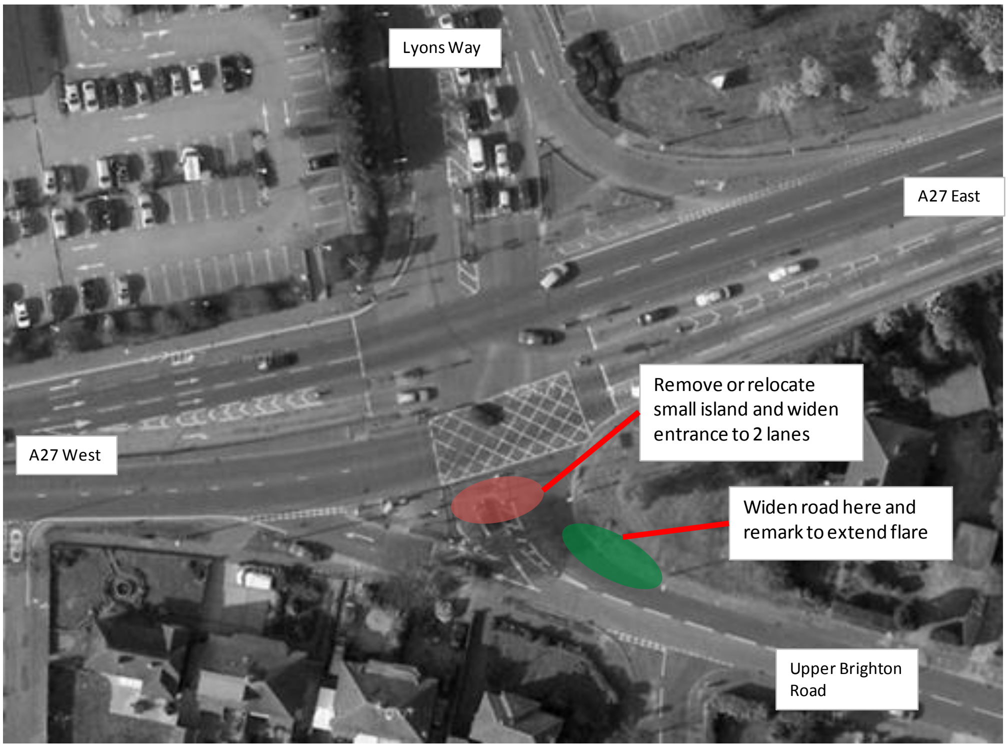


A27 SOMPTING BYPASS / UPPER BRIGHTON ROAD

The proposed mitigation is to widen the Upper Brighton Road approach to allow two lanes at the stop line with the left lane marked for ahead (to Lyons Way) and right turning (to A27 East) traffic and the right lane for right turning traffic only. The mitigation proposal is illustrated in Figure 5.5.

Some land take from the east verge of Upper Brighton Road may help the layout but the works would primarily consist of moving or removing the island on Upper Brighton Road and remarking of the road space.

Figure 5.5: Mitigation Proposal for A27 Sompting Bypass / Upper Brighton Road



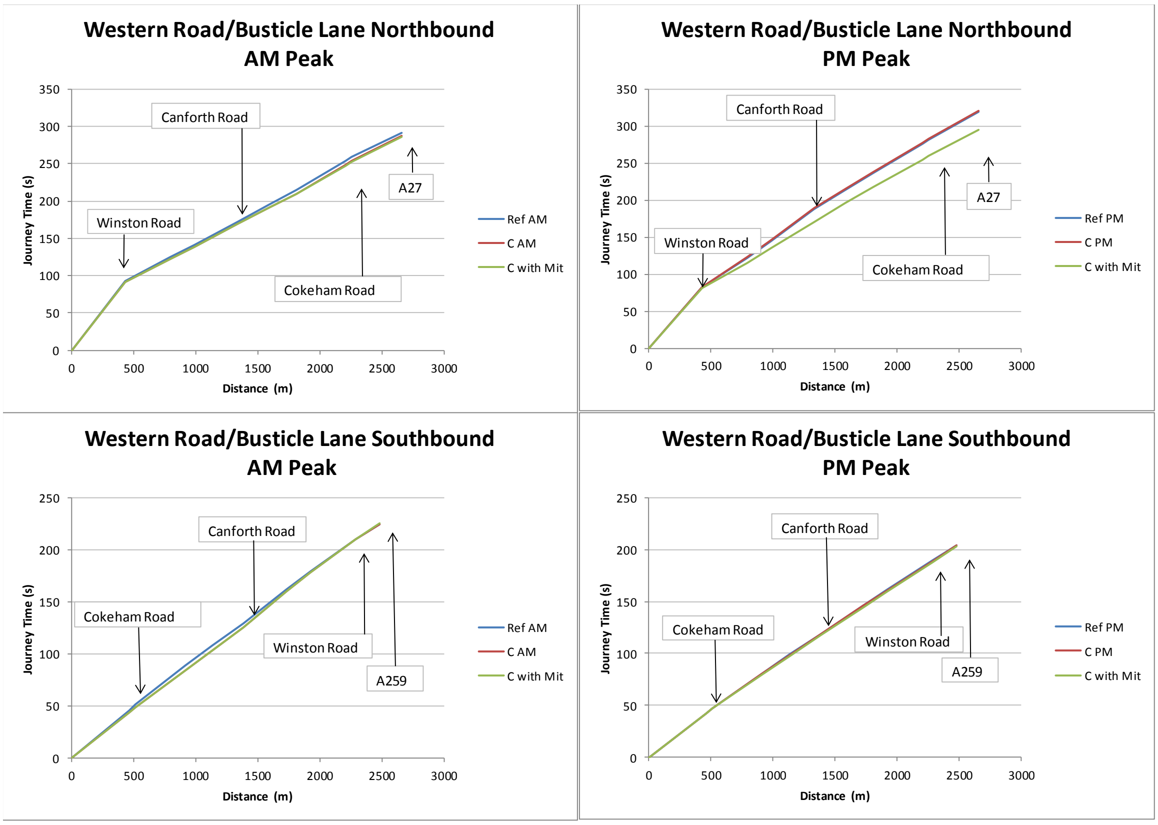
5.5 JOURNEY TIMES

Seven journey time routes have been defined in order to assess the performance of key routes through the study area. The routes are listed below and are shown on a map in Appendix E.

1. Western Road / Busticle Lane
2. South Street / Grinstead Lane
3. A283 Old Shoreham Road / Steyning Road
4. B2194 Station Road / A293
5. A27
6. A27/A270
7. A259

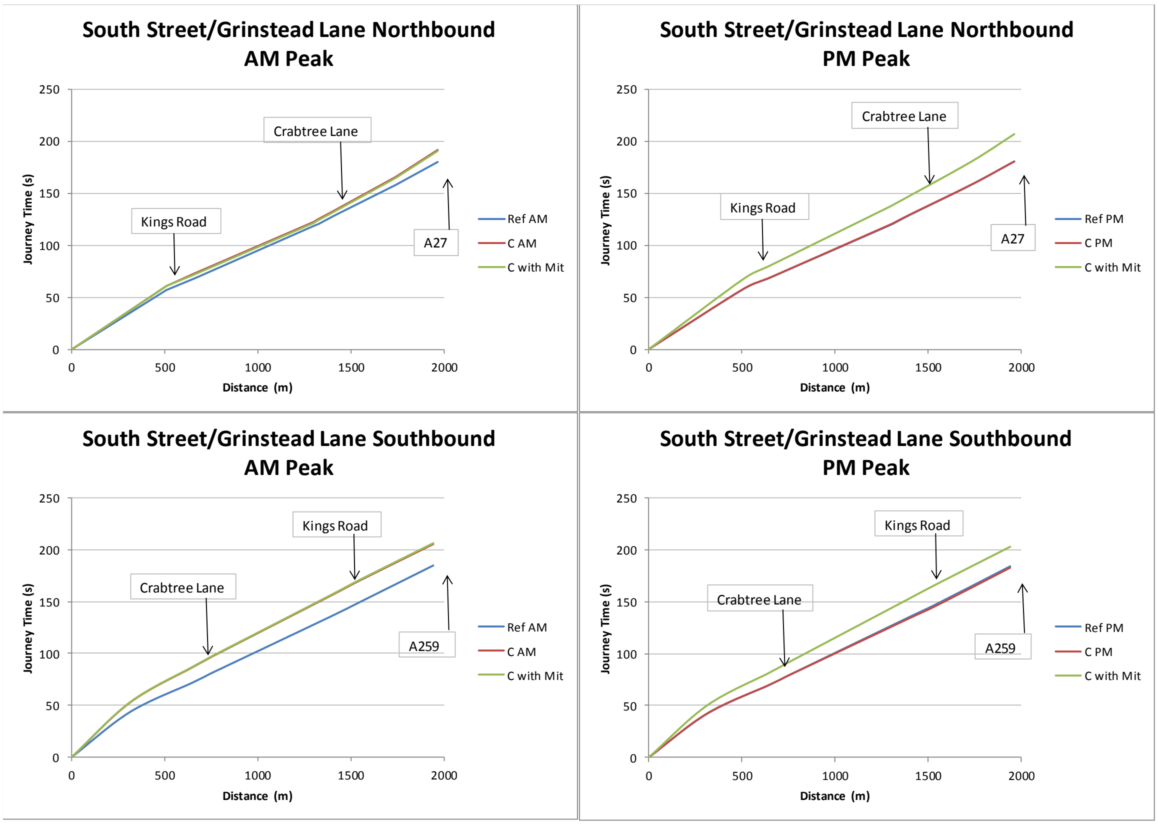
The journey times have been assessed in both directions along each route for the reference case, the initial scenario models and the with-mitigation scenario models. The results of this analysis are shown below for scenario C. Intersections with other roads are marked along the route for reference.

Figure 5.6 Route 1 - Western Road / Busticle Lane Journey Time Graphs



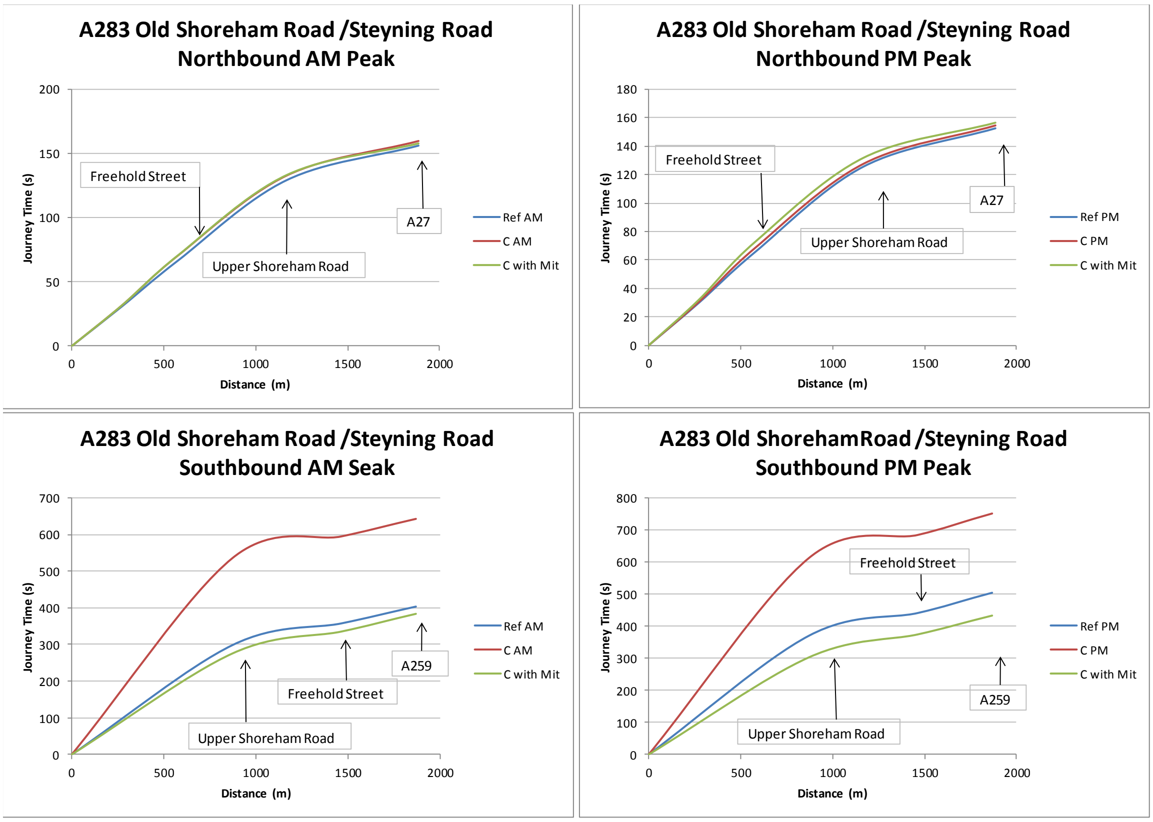
Along Western Road / Busticle Lane, the modelled journey time is very similar between the Reference case and Scenario C except northbound in the evening peak where the proposed mitigation yields some improvement.

Figure 5.7 Route 2 - South Street / Grinstead Lane Journey Time Graphs



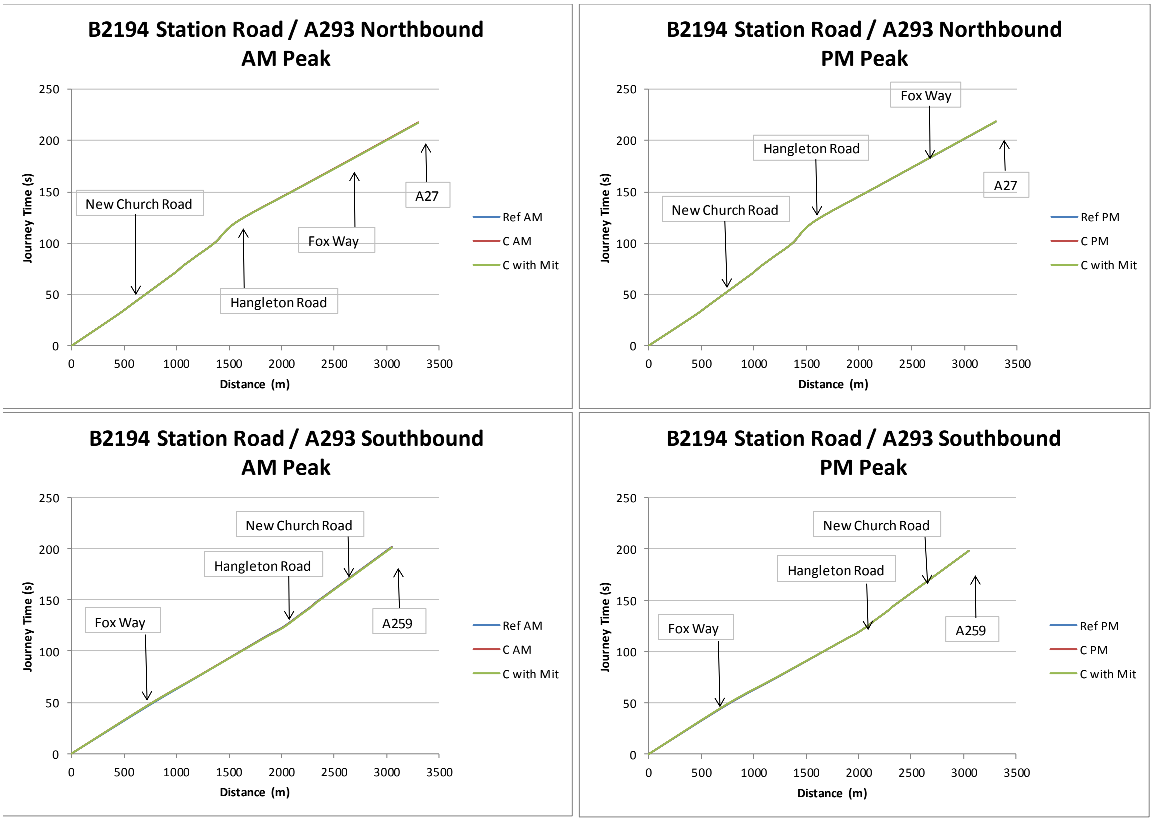
The capacity improvements at either end of South Street / Grinstead Lane attract additional demand from surrounding roads in Scenario C with mitigation when compared to the Reference case. This contributes to the slower journey times in the evening peak hour.

Figure 5.8 Route 3 - A283 Old Shoreham Road / Steyning Road



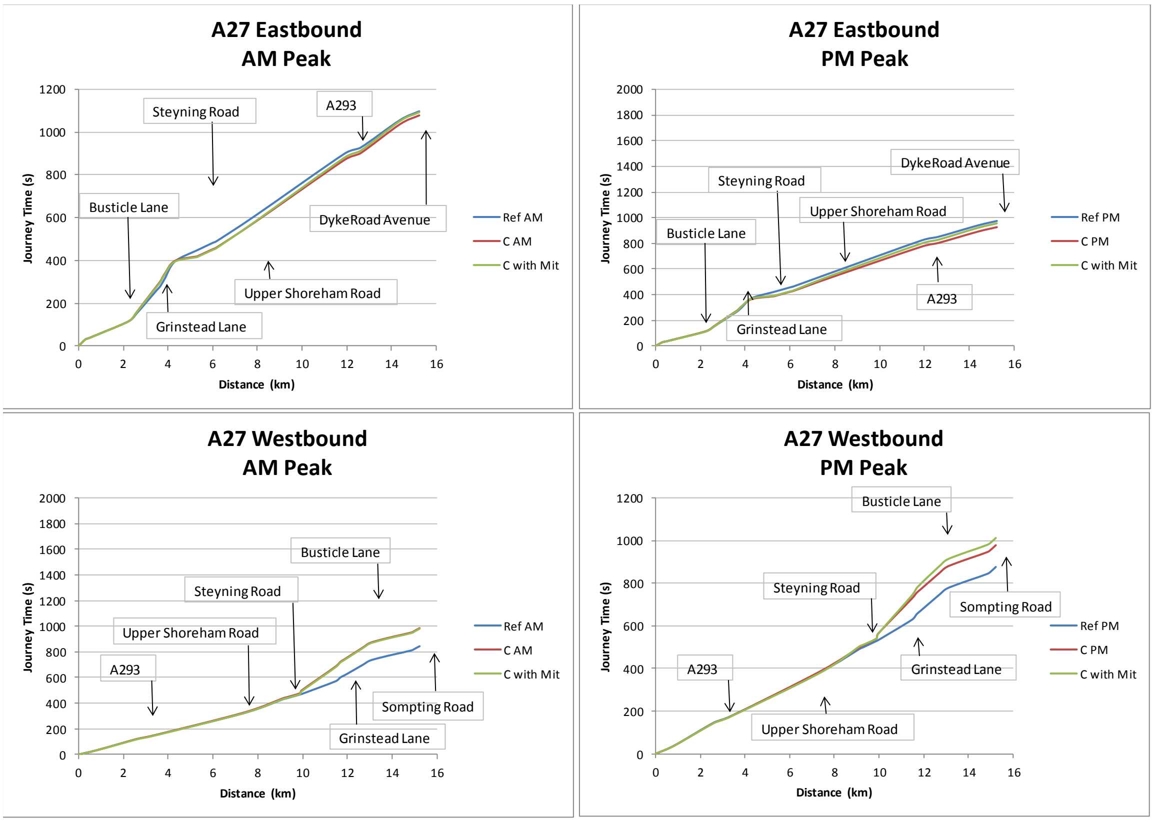
Southbound on Old Shoreham Road / Steyning Road the mitigation measures reduce the journey time by a noticeable amount, up to five minutes over the whole 2km length depending upon time period, which is less than the reference case journey time. Northbound journey times are similar in all three scenarios.

Figure 5.9 Route 4 - B2194 Station Road / A293



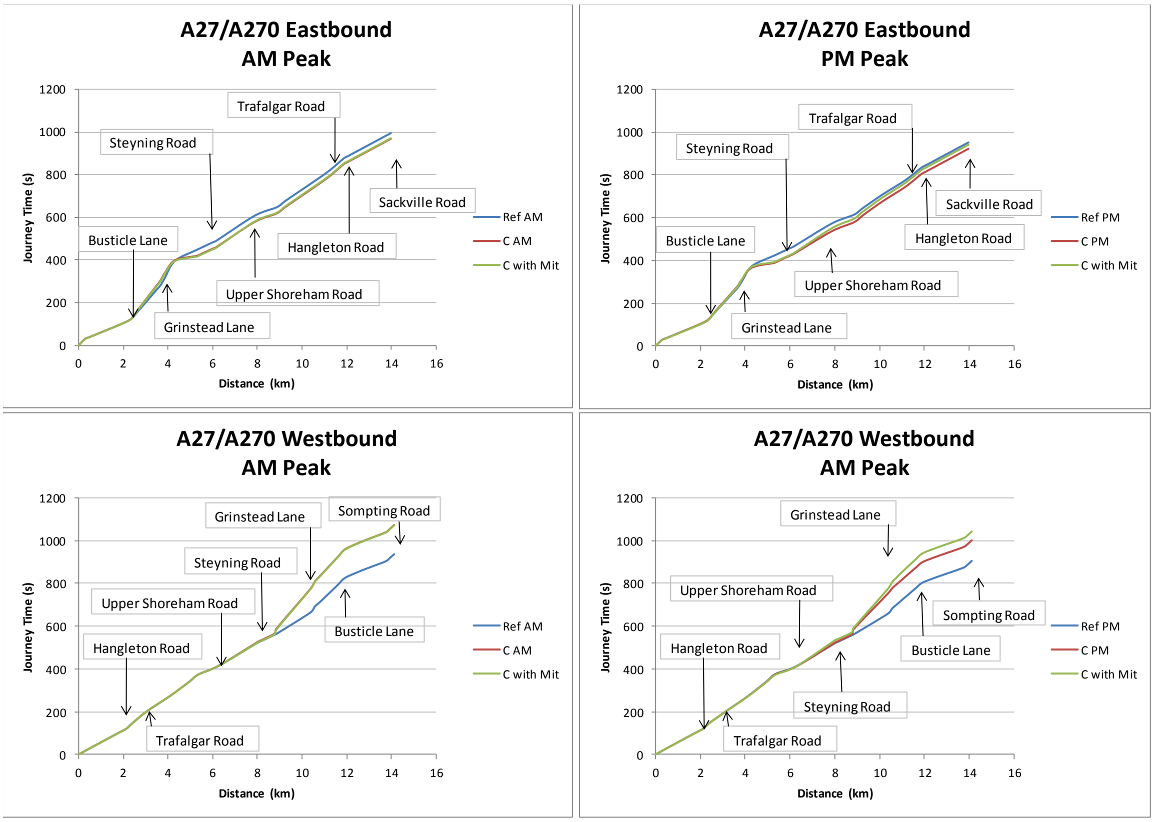
The junctions along this route do not receive any direct mitigation so the journey times are similar in all three scenarios.

Figure 5.10 Route 5 - A27 Journey Time Graphs



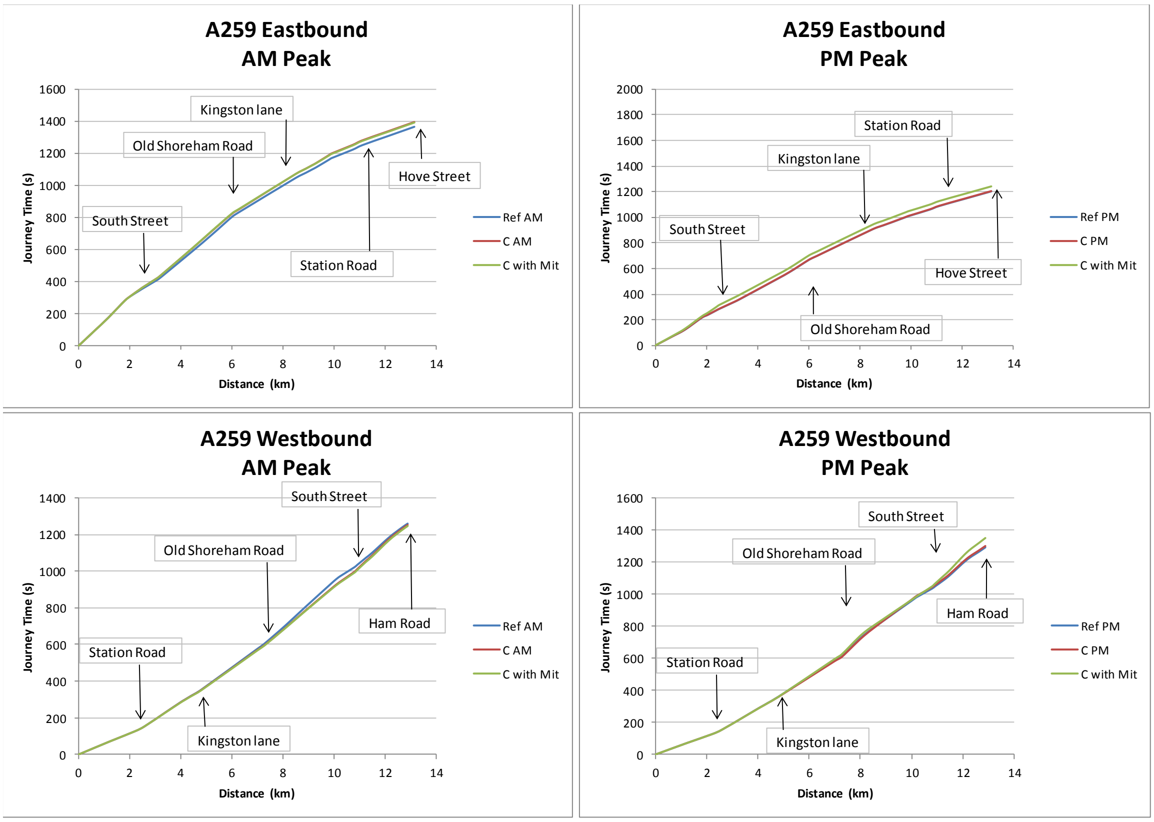
The eastbound journey times along Route 5 are similar in all three scenarios. The westbound journeys are slowed in the Scenario C models by the introduction of the roundabout, which replaces the Sussex Pad traffic signals on the A27.

Figure 5.11 Route 6 - A27 / A270 Journey Time Graphs



The eastbound journey times along Route 6 are similar in all three scenarios. The westbound journeys are slowed in the Scenario C models by the introduction of the roundabout, which replaces the Sussex Pad traffic signals on the A27.

Figure 5.12 Route 7 - A259 Journey Time Graphs



The journey times along Route 7 are similar in all three scenarios.

5.6 IMPACT ON AIR QUALITY MANAGEMENT AREAS

In addition to network statistics and individual junction assessment, traffic impacts on three local areas in Adur, where air quality is a major concern, were also investigated. These include two Air Quality Management Areas (AQMA) and one conservation area in the district as listed below:

- The A270 between the junctions with Kingston Lane and Lower Drive;
- The A259 between Ropetackle Roundabout and Surry Street;
- Sompting Conservation area, in particular a section of West Street, Sompting, between Church Lane and Lambley’s Lane.

The flow, queue and delay through the AQMAs and the Sompting Conservation area are shown in Table 5.5, Table 5.6 and Table 5.7.

Table 5.5 Flow in pcu through AQMAs and Sompting Conservation Area

AQMAs			AM Peak			PM Peak		
Road	**From**	**To**	**Ref**	**C**	**C with Mitigation**	**Ref**	**C**	**C with Mitigation**
Old Shoreham Road	Kingston Lane junction	Lower Drive junction	1,123	1,145	1,167	1,187	1,258	1,291
	Lower Drive junction	Kingston Lane junction	1,379	1,381	1,373	1,468	1,466	1,428
A259 High Street	Ropetackle Roundabout	Surry Street	919	921	913	879	820	847
	Surry Street	Ropetackle Roundabout	979	902	898	875	808	1,013
Worthing Grove Lodge / Lyons Farm	Offington Roundabout	Upper Brighton Road	1,505	1,494	1,486	1,457	1,453	1,435
	Upper Brighton Road	Offington Roundabout	1,378	1,443	1,462	1,409	1,428	1,458
Sompting Conservation Area								
	Church Lane	Lambleys Lane	999	1,075	1,066	441	461	522
	Lambleys Lane	Church Lane	382	378	353	389	358	356

Table 5.6 Average Queue in Metres through AQMAs and Sompting Conservation Area

AQMAs			AM Peak			PM Peak		
Road	**From**	**To**	**Ref**	**C**	**C with Mitigation**	**Ref**	**C**	**C with Mitigation**
Old Shoreham Road	Kingston Lane junction	Lower Drive junction	0	0	0	0	0	0
	Lower Drive junction	Kingston Lane junction	8	8	8	9	9	8
A259 High Street	Ropetackle Roundabout	Surry Street	4	4	4	4	3	4
	Surry Street	Ropetackle Roundabout	1	1	1	45	52	3
Worthing Grove Lodge / Lyons Farm	Offington Roundabout	Upper Brighton Road	6	6	5	4	3	3
	Upper Brighton Road	Offington Roundabout	10	10	9	7	7	8
Sompting Conservation Area								
	Church Lane	Lambleys Lane	0	38	33	0	0	0
	Lambleys Lane	Church Lane	0	0	0	0	0	0

Table 5.7 Delay in seconds per PCU through AQMAs and Sompting Conservation Area

AQMAs			AM Peak			PM Peak		
Road	**From**	**To**	**Ref**	**C**	**C with Mitigation**	**Ref**	**C**	**C with Mitigation**
Old Shoreham Road	Kingston Lane junction	Lower Drive junction	8	8	8	8	10	10
	Lower Drive junction	Kingston Lane junction	41	41	41	53	52	46
A259 High Street	Ropetackle Roundabout	Surry Street	47	47	45	52	40	45
	Surry Street	Ropetackle Roundabout	41	32	32	282	328	44
Worthing Grove Lodge / Lyons Farm	Offington Roundabout	Upper Brighton Road	702	690	664	592	583	555
	Upper Brighton Road	Offington Roundabout	882	826	778	709	707	738
Sompting Conservation Area								
	Church Lane	Lambleys Lane	29	164	148	6	6	8
	Lambleys Lane	Church Lane	7	7	6	7	7	6

The flows thorough the A259 High Street AQMA and the Sompting Conservation area are higher in the AM than the PM peak hour. The PM peak queue and delay reductions illustrate the improvement in westbound flow along Shoreham High Street following the proposed improvements to Ropetackle Roundabout.

There are some cases where no queue is reported but there is a delay. This is because the measure of delay includes transient delay (such as temporary queuing unrelated to junctions) and delays associated with heavy traffic flows that merely reduce vehicle speeds.

6 HANGLETON JUNCTION ANALYSIS

TRAFFIC PATTERNS

Some additional analysis of traffic patterns at the A27 Hangleton Link junction has been conducted at the request of WSCC. This junction lies just outside the Adur District boundary, but was considered by the initial analysis in the main ASHTS report.

The traffic using the Hangleton Link south of the A27 has been isolated using Select Link Analysis within the SATURN models. Hangleton Link traffic crossing the boundaries between Adur and the neighbouring districts has then been identified to isolate the origin and destination district. The Hangleton Link traffic has been grouped into the following districts:

- Worthing (including Arun and beyond);
- Horsham;
- Adur;
- Brighton and Hove;
- East Sussex;
- Mid Sussex; and
- Local traffic heading to/from West Hove Golf Club.

The breakdown of Hangleton Link traffic travelling to or from each of the identified areas is shown in Table 6.1 along with the total flow observed. The north and southbound traffic is shown separately to retain the observed pattern.

Table 6.1 Hangleton Link Traffic Summary

	Scenario C AM		Scenario C PM		Scenario C with Mitigation AM		Scenario C with Mitigation PM	
	NB	SB	NB	SB	NB	SB	NB	SB
Total Flow	1886	1511	1668	1840	1824	1429	1563	1838
Trip Origin District								
Worthing	0	136	0	44	0	134	0	47
Horsham	1	63	0	65	1	0	0	0
Adur	814	77	762	114	789	137	748	144
West Hove Golf Club	0	32	0	37	0	27	0	37
East Sussex	34	590	15	689	3	534	0	696
Mid Sussex	0	545	0	775	0	535	0	816
Brighton & Hove	1037	68	891	115	1032	61	815	98
Trip Destination District								
Worthing	184	0	114	0	183	0	78	0
Horsham	208	0	78	0	0	0	0	0
Adur	52	608	411	469	246	596	449	451
West Hove Golf Club	40	0	70	0	37	0	61	0
East Sussex	657	0	447	10	641	0	427	10
Mid Sussex	681	0	489	0	658	0	494	0
Brighton & Hove	64	903	60	1362	61	833	54	1377

As expected, the northbound traffic mostly originates in Brighton and Hove or Adur with the southbound traffic mostly heading to those two districts. Traffic using the A27 (destinations of northbound Hangleton Link traffic and the origins of southbound traffic) has a wider spread of districts covered.

MERGE/DIVERGE ASSESSMENT

The impact of the future demand forecasts on the A27 merges and diverges has also been considered. The Reference Case and Scenario C with mitigation demand flows have been used to assess whether the existing merges and diverges on the main A27 carriageway provide sufficient capacity for the anticipated future traffic levels. The assessment uses TD22/06 – Layout of Grade Separated Junctions (DMRB Volume 6, Section 2, Part 1).

The existing layout consists of a two lane dual-carriageway in both directions with Type A – Taper Merges (TD 22/06 Figure 2/4.1) and Type A – Taper Diverges (TD 22/06 Figure 2/6.1) on both the east and westbound carriageways.

The future flow forecasts have been plotted on the charts in TD 22/06 Figure 2/3 AP - All-Purpose Road Merging Diagram and TD 22/06 Figure 2/5 AP - All-Purpose Road Diverging Diagram to determine the recommended provision for the anticipated traffic levels. The results of the assessment for the two modelled peaks are shown in Table 6.2 and Table 6.3.

Table 6.2 Merge/Diverge Comparison – AM Peak

Location	Existing Layout			Reference Case			Scenario C with Mitigation		
	U/S Lanes	Type	D/S Lanes	U/S Lanes	Type	D/S Lanes	U/S Lanes	Type	D/S Lanes
EB Diverge	2	A - Taper	2	2	A - Taper	2	2	A - Taper	2
EB Merge	2	A - Taper	2	2	F - Lane Gain with Ghost Island	3	2	E - Lane Gain	3
WB Diverge	2	A - Taper	2	2	A - Taper	2	2	A - Taper	2
WB Merge	2	A - Taper	2	2	A - Taper	2	2	A - Taper	2

Table 6.3 Merge/Diverge Comparison – PM Peak

Location	Existing Layout			Reference Case			Scenario C with Mitigation		
	U/S Lanes	Type	D/S Lanes	U/S Lanes	Type	D/S Lanes	U/S Lanes	Type	D/S Lanes
EB Diverge	2	A - Taper	2	2	A - Taper	2	2	A - Taper	2
EB Merge	2	A - Taper	2	2	B - Parallel	2	2	B - Parallel	2
WB Diverge	2	A - Taper	2	3	D - Lane Drop with Ghost Island	2	3	D - Lane Drop with Ghost Island	2
WB Merge	2	A - Taper	2	2	E - Lane Gain	3	2	E - Lane Gain	3

The provision required for Scenario C demand is the same or lower than the Reference Case due to impacts from smarter choice initiatives and network mitigation elsewhere. As the Scenario C demand reduces the impact at this junction compared to the Reference Case, no changes to the merges or diverges are proposed.

The analysis was conducted with demand flows for consistency with the other work in this study, so any congestion in the wider network will reduce arriving traffic volumes.

7 SCHEME COST ESTIMATES

Initial proposals have already been developed for the junctions in Section 5.1 after iterative discussion with West Sussex County Council and Brighton & Hove City Council based upon the Scenario C development assumptions (subject to further detailed study). Consideration has also been given to the available land surrounding each junction and the costs of each proposal in comparison with other options. Further detailed study may be required to refine the junction designs.

It should also be noted that all cost estimates exclude land costs (including compensation), design and supervision, inflation, VAT or services. A contingency between 15% and 45% is included for each estimate depending on the perceived extent / difficulty of the works to be undertaken. This contingency takes account of uncertainty at the preliminary design stage and does not cover any of the exclusions set out above.

The cost estimates for each junction are summarised in Table 7.1 below.

Table 7.1 Scheme Cost Estimates

Junction	Estimated Total Cost
A27 / A283 Steyning Road	£541,597
A259 Brighton Road / A283 Old Shoreham Road	£342,780
A259 Brighton Road / A2025 South Street	£266,672
A27 Old Shoreham Road / A2025 Grinstead Lane	£878,829
A27 Sompting Bypass / Upper Brighton Road	£ 39,159
Total	**£2,069,037**

8 SUMMARY AND CONCLUSIONS

8.1 SUMMARY

This addendum considers the transport impacts of an additional strategic residential and commercial site allocation scenario within Adur and Brighton & Hove in 2031 to inform the preparation of the Adur District Council Local Plan and Shoreham Harbour Joint Area Action Plan. It follows on from previous work for the Adur Local Plan and Shoreham Harbour Transport Study.

The principal changes incorporated into Scenario C are:

- Revised housing and employment allocations for the strategic development sites within Adur;
- Revised access arrangements for the New Monks Farm and West Sompting sites;
- Collision and safety hotspot identification and mitigation, if required; and
- Highway improvements at the key junctions identified by the main report.

It is understood that this scenario represents the preferred strategy of Adur District Council for the submission Local Plan.

8.2 TRAFFIC IMPACT OF DEVELOPMENT

The scenario tested for this addendum yields an improvement on the forecast traffic impact due to the combined impact from a reduced quantum of proposed development and demand management from sustainable travel initiatives, alongside the inclusion of highway capacity improvements identified during previous work. The effect of the proposed development on the key junctions was examined, along with the effect on journey times along key corridors as a means of assessing any area-wide impacts.

The potential impact of the development proposals on the highway network was considered sufficient to investigate interventions to mitigate the anticipated effects. Four of the junctions examined require the same mitigation proposals as previously identified, but at the Steyning Road junction, it has been possible to reduce the scale and cost of the proposed mitigation layout, whilst enabling the junction to operate within capacity.

8.3 TRAFFIC IMPACT MITIGATION

Highway mitigation options were then explored for five junctions through individual junction assessment. The proposals seek to increase the capacity of the junctions whilst avoiding land take wherever possible and with minimum physical changes, as detailed below:

- **A27 / A283 Steyning Road** - Partially signalise roundabout with widening on the A283 north exit and A283 south entry.
- **A259 Brighton Road / A283 Old Shoreham Road** - Expand the roundabout and widen approach westbound.
- **A259 Brighton Road / A2025 South Street** - Widen the A259 west approach and enlarge circulatory.
- **A27 Old Shoreham Road / A2025 Grinstead Lane** - Convert existing roundabout to traffic signal controlled junction.

→ **A27 Sompting Bypass / Upper Brighton Road** - Widen the southern Upper Brighton Road approach to accommodate additional demand joining the A27.

The measures tested, in combination with reductions in overall travel demand, relieve the bottleneck effect of the junctions listed above to give a significant improvement in the individual junction performance and the journey times along key routes - such as the A27 and A259 corridors - through the study area. It is therefore concluded that the mitigation tested is generally sufficient to accommodate the increased traffic associated with all of the development scenarios examined.

It should be noted that the proposed junction improvements are initial concepts subject to further detailed study.

8.4 COLLISION / ROAD SAFETY

As required by NPPF paragraph 09, existing collision hotspots have been identified in relation to each development site. Potential future collision hotspots were also identified where issues could reasonably be anticipated due to traffic flow changes.

A number of existing hotspots have been identified where it is anticipated that development related flows could have the potential to increase collisions, this is predominantly on the A27 corridor. Where these potential issues have been shown improvement schemes have been identified.

8.5 LIMITATIONS OF STUDY – COST ESTIMATES AND MITIGATION PHASING

The cost estimates presented are based on the concept diagrams presented and will need detailed designs to look at issues including potential alterations to the highway boundary, surrounding ground conditions, material and landscaping requirements etc. in greater detail. Until a detailed design process is completed, the costs presented may be subject to significant changes.

The study has not looked at any interim years between the present time and 2031 to better estimate when the implementation of mitigation measures will be required but has simply examined the “with” and “without” development scenarios in 2031.

Proper consideration of the time that mitigation will be required is not possible without better knowledge of when each of the site allocations are developed and the speed of development. These factors are currently not known. Some sites in reality would be completed in a short timescale whereas others might be developed over many years. The timing of required mitigation can only be based upon general qualitative rather than detailed quantitative information and judgement.

For any site allocation, sustainable mitigation measures usually need to be implemented shortly after the first occupation of residential and commercial sites and be sustained on an on-going basis. However, it is also acknowledged that in some cases up-front mitigation / infrastructure may be required prior to new development commencing, subject to funding, so that these mitigation / infrastructure are in place when new residents move in. In both cases, investment will be required to implement and sustain these sustainable transport measures so the level of highway trip reduction assumed in this study can be achieved. Exact costs for these measures have not been included in this study.

Infrastructure improvements will be required at future year trigger points which will need to be determined as part of future planning applications. This will involve the assessment of when traffic resulting from any development is deemed to have a material impact upon queues and/or delays on the road network compared to a “without” development scenario. For each development site, the scope of the network under consideration will be proportional to the traffic generated. This practice is in line with current planning guidance, namely the National Planning Policy Framework (2012) and Highways Agency Circular 02/2013.

Reference is made to a number of mitigation schemes on the A27, which are subject to a proposed Highways England improvement scheme as part of the Roads Investment Strategy (RIS 1) 2015 – 2020, known as the Worthing & Lancing Improvement study, there is also a neighbouring study investigating improvements to the A27 at Arundel.

Following the A27 Corridor Feasibility Study completed by DfT / Highways England, the scheme was included in the March 2015 Roads Investment Strategy (RIS). In response to inclusion within the RIS 1 period Highways England are understood to have developed a Delivery Plan, which outlines the next steps for taking the scheme forward (and can be found on the HE website) and include:

- developing and assessing a range of options to inform consultation with key stakeholders
- engaging more widely with local stakeholders
- further developing proposals and assessing traffic and environmental impacts
- making recommendations on the preferred route

The estimated cost of this scheme is in the range of £50 million to £100million.

Due to the RIS 1 commitment to delivering improvements on the A27 along the Worthing and Lancing sections for construction prior to 2021 no additional mitigation scheme have been developed. It is therefore assumed that the HE proposals will address all existing and forecast capacity and highway safety issues along this section.

Appendix A

SHOREHAM HARBOUR TRANSPORT MODEL REVIEW AND UPDATE TECHNICAL NOTE

Technical Note

Subject: Review of the SHTM Model

Date: 10 August 2012

Reference: MB1202

Author: Martin Bach

Version: 1.0

---

1 Introduction

The SHTM model was developed originally by Peter Brett/Minnerva in 2010, and passed to Parsons Brinkerhoff in 2012 for application on a study in the Adur/Shoreham region. When applied on this study, trips were being 'lost' unexpectedly during the iterative process. An initial audit of the processing job by PB identified an error in one of the modelling scripts, but when corrected this did not make any difference to the model results.

Minnerva was then asked to undertake a more detailed audit of the model to understand why trips were being 'lost'.

In addition, the model was designed so that outputs from the Saturn Highway Assignment runs were passed back to the OmniTRANS Public Transport model so that PT assignments could use these 'congested' highway speeds. An important component of the multi-modal modelling structure, this link had been disabled for these model runs, and needed to be re-established.

A detailed account of the audit process follows in subsequent sections, but a summary of the key findings is presented here:

1. The basis of the mode split model is that it calculates incremental changes to the trip matrices between the base and forecast scenarios using cost differences (by mode) between the scenarios.

2. As with all incremental models, if there are no trips in the base scenario for a given zone i-j pair, but there are non-zero trips in the forecast scenario, action must be taken to ensure that zero trips are not produced for the forecast.

3. With the scenario run tested in the audit this situation was detected, but for a set of different reasons:

    a. the error in the script as identified by PB, when corrected, required the 2008 Base scenario to be re-run. This had not been done, with the result that in a forecast scenario run there were non-zero trips in cells where there were corresponding zero cells in the Base.

    b. the forecast matrices, as derived for this model application, have trips in cells which do not have trips in corresponding cells in the base. This has been observed both for zones which were 'dummy' in the base but have been used in this model, but also for 'existing' zones where base i-j cells have changed from zero to non-zero trips

4. A potential third reason exists: an apparent import error for the forecast scenarios has switched Home Based Other and Home Based Employers Business trip matrices. This could also give rise to non-zero cells in the Forecast Matrices with corresponding zero filled cells in the Base matrices. [Note: this condition has to be confirmed by PB]

5. A couple of additional minor corrections were made to the scripts, but after corrective action for the items noted in paragraph 3 above were made, a detailed audit of trip totals through the various processing stages showed that 'mechanically' the process is now correct; that is, trips are not lost during the mode split process.

6. The link between Saturn and OmniTRANS PT has been re-established, so more realistic highway speeds are used by the PT assignment.

Although the model can be shown to be working correctly in a 'mechanical' sense, there are several issues which require consideration to ensure that the model is behaving as expected. These issues are discussed in later sections, and summarised in Section 8 , below.

2 Audit Strategy

The model as supplied was in OmniTRANS V5 format, and when originally developed required the use of set of utility classes (MvDataTools) developed by Minnerva to operate. PB does not have a licence for these classes, so changes were made by PB to the model scripts to avoid use of these classes. This gave rise to a divergent set of job scripts for running the model.

Whilst having no reason to think that any of the divergent scripts were not correctly amended, the audit was undertaken reverting to the original scripts, with the one exception of the change noted in 3.a (above); this correction was made to the original scripts. By reverting to the original job set one potential source of 'error' was removed; thus avoiding the need to check the amendments in the amended scripts.

To enable the model to run, copies of the relevant MvDataTools classes used by the SHTM model have been placed in the Local_Classes directory of the model. This will enable the model to be run by anyone who does not have a licence for MvDataTools (see discussion in Section 9 below).

Having removed one source of potential error, the Audit Strategy adopted was:

a) to re-run the 2008_Base_Network_wth_Base_Demand_Scenario. This to re-establish the 2008 Base, but also to check that the trip matrix totals, as the processing progresses through the disaggregation of the input matrices, were as expected

b) to take the 2008 input data (matrices and planning data) and set up a 'dummy' scenario to run against the 2008 Base. As the data was identical, the generated matrices for one iteration of the model run, through the post-mode split stage to the production of the combined vehicle/pt-fare/pt-no-fare for the next iteration, was expected to be identical to the 2008 base.

c) repeat (b), but with input data taken from for one of the 2028 (PB) forecast runs, and to see what happened.

To assist in this audit, several jobs were updated so they generated an output, tab separated text file containing matrix totals by the various (PMTU) categories, suitable for opening in Excel and so facilitate the audit. Some other changes were made to the job scripts, the main ones noted below:

0606 - Import Trip Matrices. A switch has been put in here that distinguishes between importing OmniTRANS binary matrices (.odm) and text .CSV files as created by PB. Base 2008 matrices are imported using the .odm format, forecast matrices prepared by PB are imported as .csv.

0611 - Initial Decomposition of Trip Matrices to CA-NCA and User Classes. Output analysis file added.

0621 - Aggregation of Trip Matrices for Assignment. Comparison statistics against the Base matrices added

0628 - Run Mode Split Model per User Class. Output analysis file added, plus other revisions discussed later

For all model runs, highway assignment trip matrices generated by OmniTRANS were passed to PB for running in Saturn with the resulting loaded network and skim matrices passed back for processing.

It should be noted that as part of this audit, no checks have been made on the network structures or content, highways or public transport.

3 2008 Base_Network_with_Base_Demand

This scenario was re-run so that each step of the processing could be checked to ensure that the expected matrix totals were being generated, as well as to establish a new base given the correction to one of the scripts noted in 3.a above.

The re-run comprised running jobs 0605 - 0611 and 0621 - 0628 (all jobs run manually, not from the Scenario Manager).

An audit trail of matrix totals is presented in spreadsheet "*Audit Trail 2008 Base.xlsx"* which is stored in the directory *..\Model_Data\Model_Outputs\2008_Base_Network_with_Base_Demand.*

The results are given for the AM period and the spreadsheet shows how the original, input matrices are disaggregated, by mode, through the various stages of processing. (PM results are not shown as the mechanical process is identical as that for the AM)

[Note: in this and other spreadsheets generated for this analysis, trip totals may differ by very small number of trips due to rounding/truncation in the spreadsheet as no decimal places are shown)

During the course of this analysis, it was noted that the global variable for setting the HGV PCU factor was missing from the modelling scripts, resulting in a default factor of 1.0 being available. To remedy this, the variable $hgv_pcu_factor = 2.0 was set in 'Get_Scenario.rb'

An examination of the spreadsheet *Audit Trail 2008 Base.xlsx* shows that the set of matrices produced post-mode split, and then re-aggregated into matrices ready for the 'next' iteration (which does not happen in the Base scenario) are identical to the starting matrices.

The conclusion from this was that the matrix processing for the Base Scenario was (mechanically) correct.

4 Dummy Forecast 2009_Base_Network_with_Base_Demand

Although re-running the 2008 Base showed that trip totals generated at the end of the run were as expected, this was not testing the code for a separate forecast scenario against the base, so a dummy forecast (for 2009) was set up, using the same input data as that for the 2008 base.

When run through one iteration, to the point of re-aggregating matrices for the next iteration, the same results were obtained as running the 2008 Base, so the indication from this was that when forecast data was supplied to the model in the expected form, the model was behaving as expected.

5 2028 Forecast Run - 2028_Base_Network_with_Ref_Demand

Taking data from the 2028_Base_Network_with_Ref_Demand scenario, the model was re-run. However, this time the aggregate matrices generated for the 'next' iteration were **not** as expected, and although the trip total differences were not as large as those reported by PB when they ran the model, the differences were such that something was not correct.

Investigation showed that the discrepancy was generated in job 0628 - Run Mode Split Model per User Class.rb, where the OtChoice incremental mode split is used. This works in the following manner:

a) trip matrices by mode (highway/pt) for the Base Year are used to generate, on a cell- by-cell i-j zone basis, probabilities of using each mode

b) these probabilities are then used with cost difference matrices (forecast year - base year; per mode), to generate forecast probability matrices per mode.

c) these forecast probability matrices are then applied to the forecast total trip matrices to derive the forecast mode split matrices.

The way in which this class works, ***if there are no observed trips in the base year for a given i-j zone pair, the probabilities are set to zero.*** Consequently, if there are non-zero trips in the forecast year for that i-j zone pair, zero trips will be generated.

Although some additional issues were noted in the use of this class, this was the prime reason for trips 'disappearing'. As reported earlier, this condition arose because:

a) the base had (originally) not been re-run with the amended script (although this condition had been addressed in this run, it was present when PB ran the model)

b) i-j zone pairs, with zero trips in the Base Scenario, had non-zero trips in the Forecast Scenario; specifically in the highway pcu matrix.

c) the switching of the HBO and HBEmpBuisness trip matrices in the Forecast run (to be confirmed)

The combined effect of these conditions was to give a significant number of trips in cells which had no observed trips in the base. Consequently, for the reasons described above, the forecast year trips were being set to zero.

Some other minor changes were made to this script to improve on the output trips totals; a check was introduced to ensure that the generated probabilities summed to 1.0 (in some cases this was not the case to several decimal places, resulting in a few trips being lost when the probabilities were applied). The forecast probabilities were also applied to the forecast total trip matrix and not the base, as implied by the example given by the OtChoice manual.

To deal the main issue, a method is required to deal with those zones where there are zero trips in the base, but non-zero in the forecast. The original design intention had been that any dummy zones in the base matrices would be 'seeded' with trip (rates) to provide an 'observed' mode split, off which the forecast could pivot. These could be derived from TEMPRO, or could be the presumed car/pt mode split in the data used to establish the car trip rates for the new developments (probably from TRICS. If 'green field' sites, expected base year values could be used to indicate what would be happening in the base, given the base network configuration.

This was not possible for these tests, so a **temporary** section of code has been inserted in this job which takes the *forecast number* of trips by mode as the base values, if there are zero trips in the base, to calculate the initial probabilities. This ensures that a non-zero set of probabilities are calculated and forecast trip are generated for these i-j pairs. Whilst this may be satisfactory for the forecast development zones, it may be incorrect for 'existing non-development' zones as the forecast mode split is being imposed rather than that for the base.

The status of this temporary amendment is discussed below in Section 8 below.

When these various amendments were applied, the aggregated matrices produced at the end of the first iteration, ready for the next, produced trips totals which were as expected.

However, it should be noted that there *will be* differences in trip matrix totals, per iteration, as trips move between highway/pt modes. This is due to the effect of car occupancy. For example, given a car occupancy rate of say, 1.5. if 100 person trips move from PT to car, this will result in 100/1.5 = 67 Vehicle trips appearing in the highway matrix, an apparent loss of 33 trips.

The audit trail for the analysis of this model run is given in spreadsheet:

Audit Trail 2028 Ref Demand.xlsx

which is in *.../Model_Data\Model_Outputs\2028_Base_Network_with_Ref_Demand*

This spreadsheet is similar to that for the 2008 base analysis, but has an additional section at the bottom showing the results of the mode split analysis, and trips changing mode per purpose group.

Given the modal shifts, and the different car occupancy factors per purpose, a commentary is give non how each set of figures is obtained.

As an additional test, the second iteration was run through manually to the generation of matrices post-mode split. The results were sensible and there were no unexpected loss of trips.

As can be seen in the *Audit Trail 2028 Ref Demand.xls,* the modal shift is not very high for the first iteration, although for the second iteration the change is larger (no documented here). It is difficult to comment on why his should be the case given the various input data items which need review (see Section 8 below) but it is likely that the initial iteration is making a 'base' adjustment, with subsequent iterations (of which only one has been done) seeing the modelling interactions really taking effect.

6 Mapping the Saturn and OmniTRANS networks

A key feature of the model is the interaction between the highway and pt networks; that is, for the OmniTRANS pt assignment to use the highway speeds generated by Saturn. By doing so, any congestion in the network forecast by Saturn would be reflected in the run time for buses, which in turn would affect the generated pt skim matrices. As the skim matrices from both the highway and public transport models are inputs to the mode split model (as described above), this interaction is a vital component of the model.

This feature was disabled in the PB amended jobs for the model, but was re-instated for this audit analysis, and must be maintained for any further model runs.

7 An overview of the mapping process

The OmniTRANS and Saturn networks are, for the most part, topographically different, but the requirement exists, as noted above, to transfer data from the Saturn network to the OmniTRANS network.

Topographical differences between the two networks occur because:

- The OmniTRANS network was built using an imported NAVTEQ digital network. This includes all 'minor' roads, not present in the Saturn network
- The Saturn network is very 'abstract' for the outer study area whereas the OmniTRANS network is more detailed
- Within the 'Study Area', the Saturn network contains many 'abstract' simplifications, which are not present in the OmniTRANS network.

In areas of the network where the networks are topographically similar, a single Saturn link between nodes 'a' and 'b' may be represented by a series of OmniTRANS links; the intermediate nodes representing intersections with the 'minor' roads not present in the Saturn network.

The two networks also differ in that different node numbers are used for the same 'pint' in the network.

The challenge is then to 'map' the two networks together, recognising that there may be sections of the network where this is not possible. However, the expectation is that mapping will be successful in the parts of the network which 'matter' - that is, where the bus routes operate.

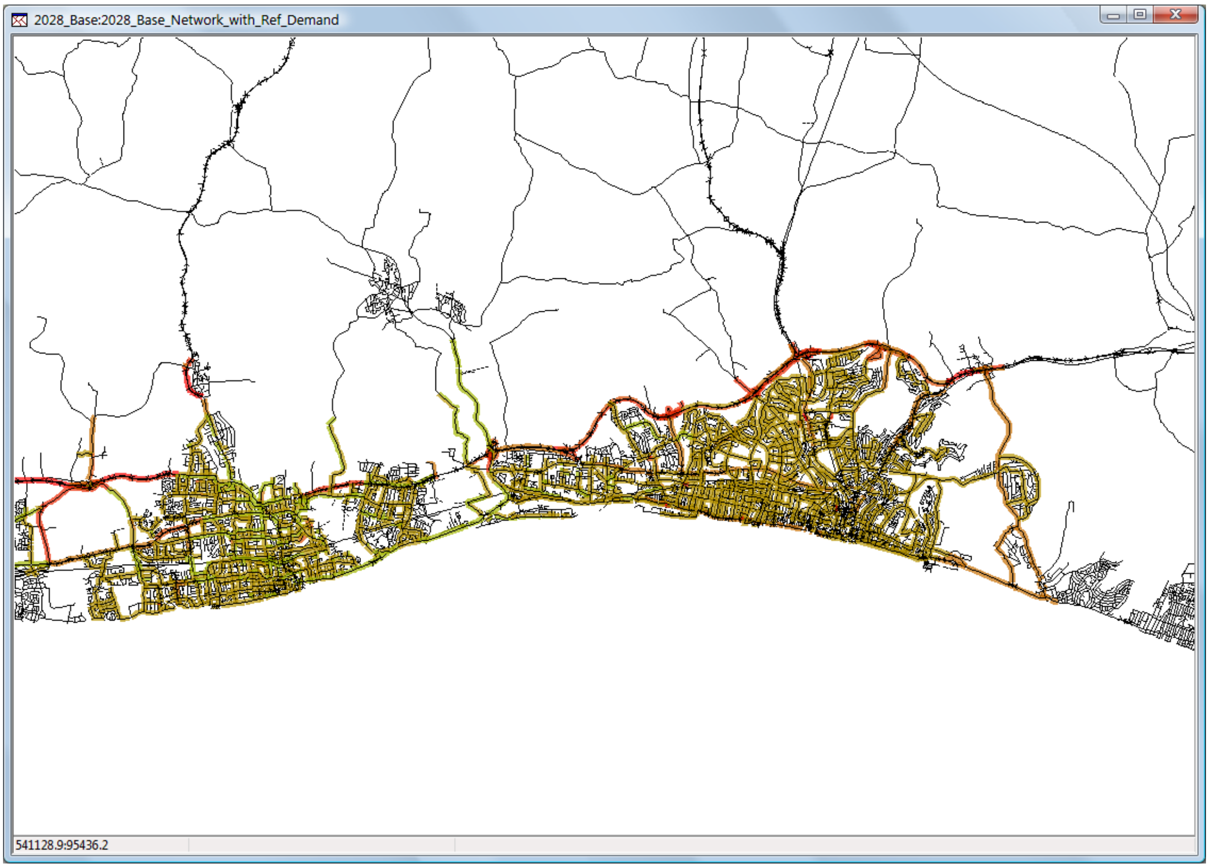
The mapping process is described as follows:

- first produce a node equivalence file between the two networks. Using grid coordinates, nodes in the two networks are 'mapped' to each other. When establishing a new forecast scenario, job *0605 - Map Forecast Year Saturn Network Nodes* **must** be run to establish the node equivalences, even if the Saturn network has not been changed from the base, or any other forecast run.

- using this node equivalence file, a link equivalence file is generated. For each link in the Saturn network, the equivalent single OmniTRANS link is found. If this does not exist, the shortest path between the two equivalent OmniTRANS nodes is built, and this set of links is equated to the Saturn link. This link equivalence file is used to transfer data from Saturn to OmniTRANS.

  When running the model, job *0624 - Import Saturn Link and Turn Times* does this mapping, and transfers both link and turn times from the loaded Saturn network to the OmniTRANS network; in turn these times are used by the pt assignment. Note that when this job is run, many apparent warning and error messages are generated. These relate to those parts of the network which cannot be mapped correctly.

  The image below shows the part of the network where speeds have been transferred across from Saturn to OmniTRANS:



[Bandwidth plot: SatDB Speeds [pmtu 1,1,21,24,1,1]

8 Conclusions and Recommendations

The audit of the model identified several issues which required addressing, and as stated, the model now appears to be running correctly in a 'mechanical' sense.

However, several issues have been noted relating to the data used for the 2028 forecasts, and it is recommended that these are reviewed. Specifically:

a. The input planning data spreadsheets appear to be identical to that for 2008. These spreadsheets contain Parking Costs and Car Availability Proportions by mode/purpose. Is it the intention that these are identical, especially parking costs?

b. Similarly, the proportion matrices used to split trips between pay/free|park/fare are identical. Is this intentional?

c. The initial input forecast vehicle pcu trip matrices should be reviewed to ensure that it is intended that there are i-j zone pairs which have non-zero trips in the forecast, but not in the base. (See job *Compare Base and PB 2028 matrices* which resides in *..\jobs\00_Utilities_Misc* to see which i-j pairs are found). If this is the intention, then action relating to the 'seeding' of the base matrices is required (discussed below)

d. The import of HBO and HBEmployers Business observed matrices. It would appear that these have been 'switched' (certainly for the 2028 forecast that was run). This needs checking.

e. Apparently the Saturn and OmniTRANS networks have not been changed from the base. Is this the intention, especially with reference to pt services which may (or indeed may not) be associated with the new developments?. If pt services, or network changes are intended for the forecast scenario then as currently stated, these will not be reflected in the mode split calculations.

A view needs to be taken on how to manage the seeding of i-j cells where there are zero trips in the base, but non-zero in the future. Options are:

a. where this occurs, to use the forecast trips to generate the base probabilities. This has been implemented as a pragmatic solution, but as discussed above could be argued to be technically incorrect in the case where more accurate base year values could be provided, based on TEMPRO/TRICS/Local trip rates. This leads to the next option:

b. to provide a mechanism that seeds candidate cells with data based on TEMPRO/TRICS/Local trip rates (by purpose, by time of day) which would give an accurate representation of potential mode split, were there trips for these zones. This could be done on a cell-by-cell basis, which might be onerous, or on a matrix wide basis using sets of 'default' rates.

c. re-organise the model structure, so that for each forecast year, a new reference base scenario is established. This would be similar in function to the 2008 Base in that any scenarios for that year would be pivoted off the base for the year. However, this only makes sense if there is no discrepancy between the matrices for the forecast year with zero/no-zero cells; otherwise we are back to the original problem.

Other than the implementation of (a), required to 'fix' the loss of trips, implementing options b or c are not achievable within the scope of this audit.

9 Model Requirements

The model in its current (post-audit) form is still in OmniTRANS V5 format, although as reported earlier it now includes the required MvDataTools classes for successful operation.

These classes are provided *gratis*, but no maintenance support is provided. Neither can they be used in any other model that PB or WSCC might construct.

If this model were to be used by any other organisation, they are unlikely to have (access to) OmniTRANS V5 and the model would have to be converted to OmniTRANS V6. It should be noted that this has several ramifications given changes between the two OmniTRANS versions:

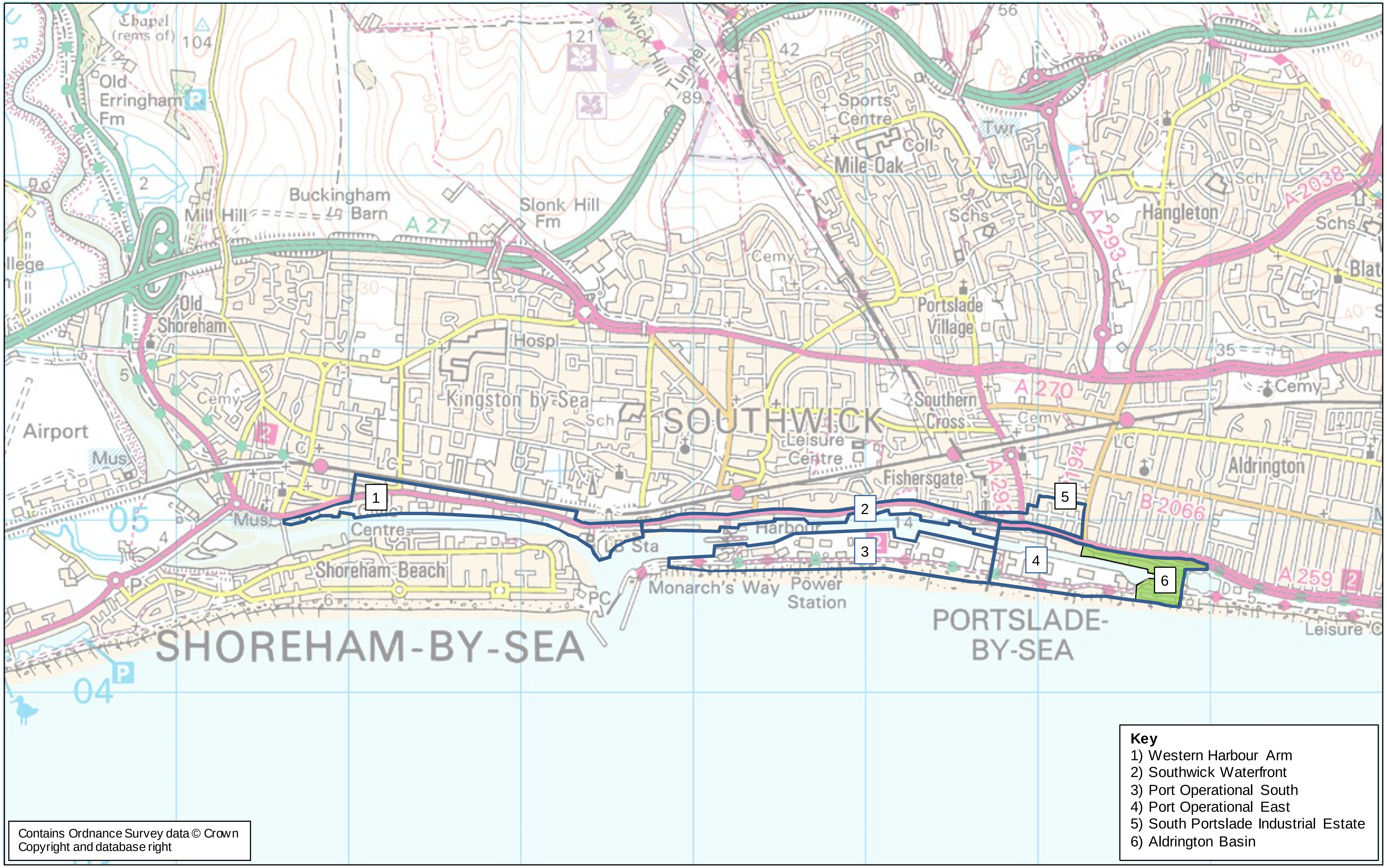
- The Scenario Manager requires re-writing as the class used to construct it is no longer supported by Omnitrans International. It would have to be replaced by using WxRuby as the successful operation of the Scenario Manager cannot be guaranteed

- As well as using MvDataTools, the V5 model used the Model Parameters Manager as developed by Minnerva. This creates the Managed Model Parameters file used in the scripts. Although the absence of the Model Parameters Manager does not preclude the running of the model as it stands, new features provided in OmniTRANS V6 render the Model

Parameters Manager obsolete. Consequently, the handling of the model parameters needs re-casting.

Appendix B

SHOREHAM HARBOUR TRANSPORT MODELLING AREAS BOUNDARY MAP



PARSONS BRINCKERHOFF

Parsons Brinckerhoff
Kings Orchard, 1 Queen St,
Bristol, BS2 0HQ

CLIENT/PROJECT
Adur District Council
Transport Study of Strategic Development Options in Adur

TITLE
Indicative Locations of Shoreham Harbour Developments

DATE
26/11/2012

SCALE
Not to scale

PRODUCED
MSR

CHECKED
SP

APPROVED
NW

Appendix B

Appendix C

SHOREHAM HARBOUR SITE ALLOCATION TRIPS

Western Harbour Arm [1]

Loading Points

Note: Red circle(s) indicate development zone loading point(s).

Zone loading location	Estimate of current jobs (B2/B8)	Estimated new jobs			Total New jobs	Net increase in job number
		New office/light industrial B1	New B2/B8	New retail (A1)		
Western Arm	1279	361	0	236	598	598

Assumption: New jobs additional to existing jobs

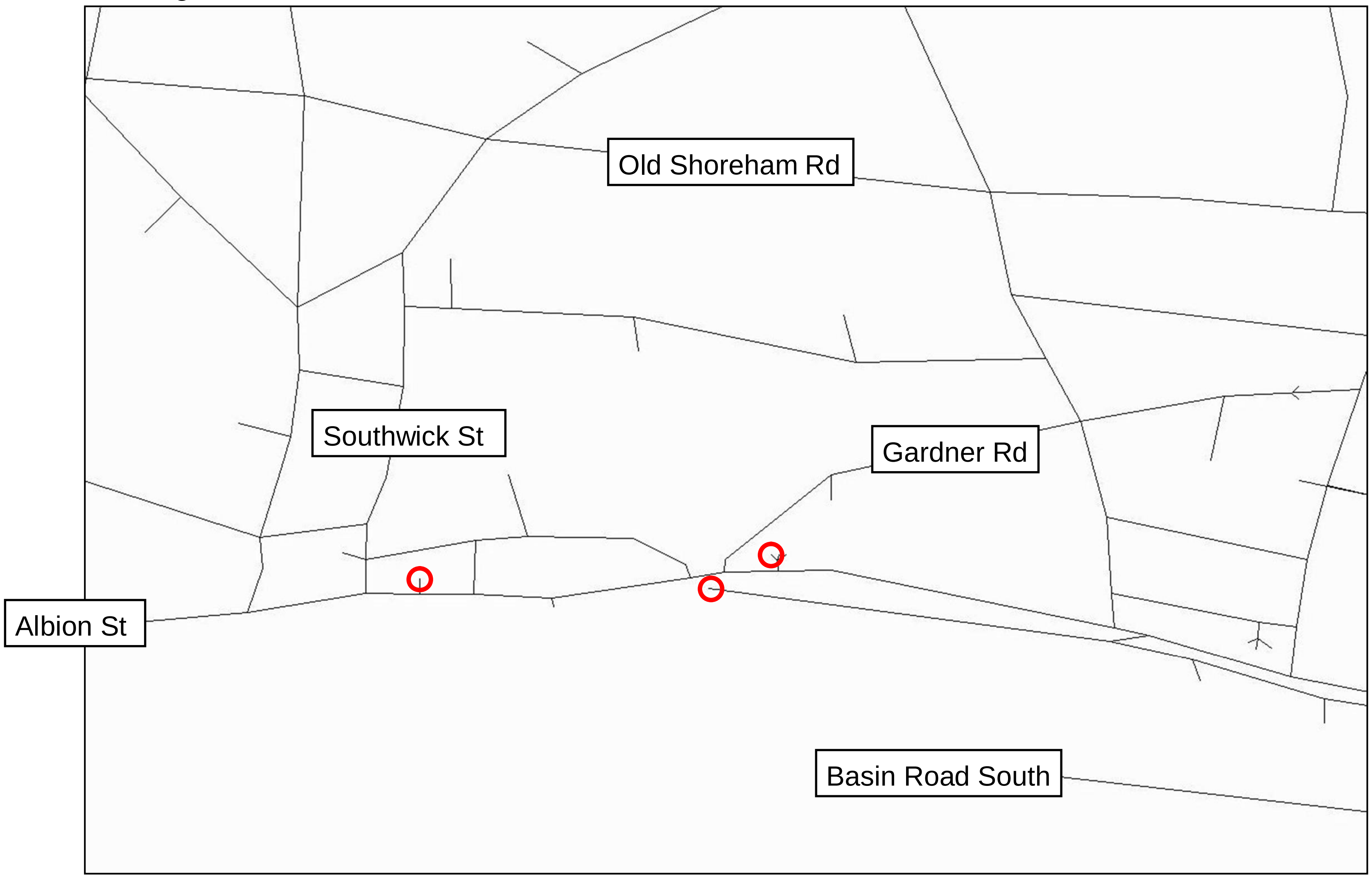
Departures (AM peak)
Net increase in departures: 225

Arrivals (AM peak)
Net increase in arrivals: 208

Method
New and existing trips will be added into the selected zones.

Southwick Waterfront [2]

Loading Points



Note: Red circle(s) indicate development zone loading point(s).

Zone loading location	Estimate of current jobs (B2/B8)	Estimated new jobs			Total New jobs	Net increase in job number
		New office/light industrial B1	New B2/B8	New retail (A1)		
Southwick Waterfront	470	340	0	0	340	340

Assumption: New jobs additional to existing jobs

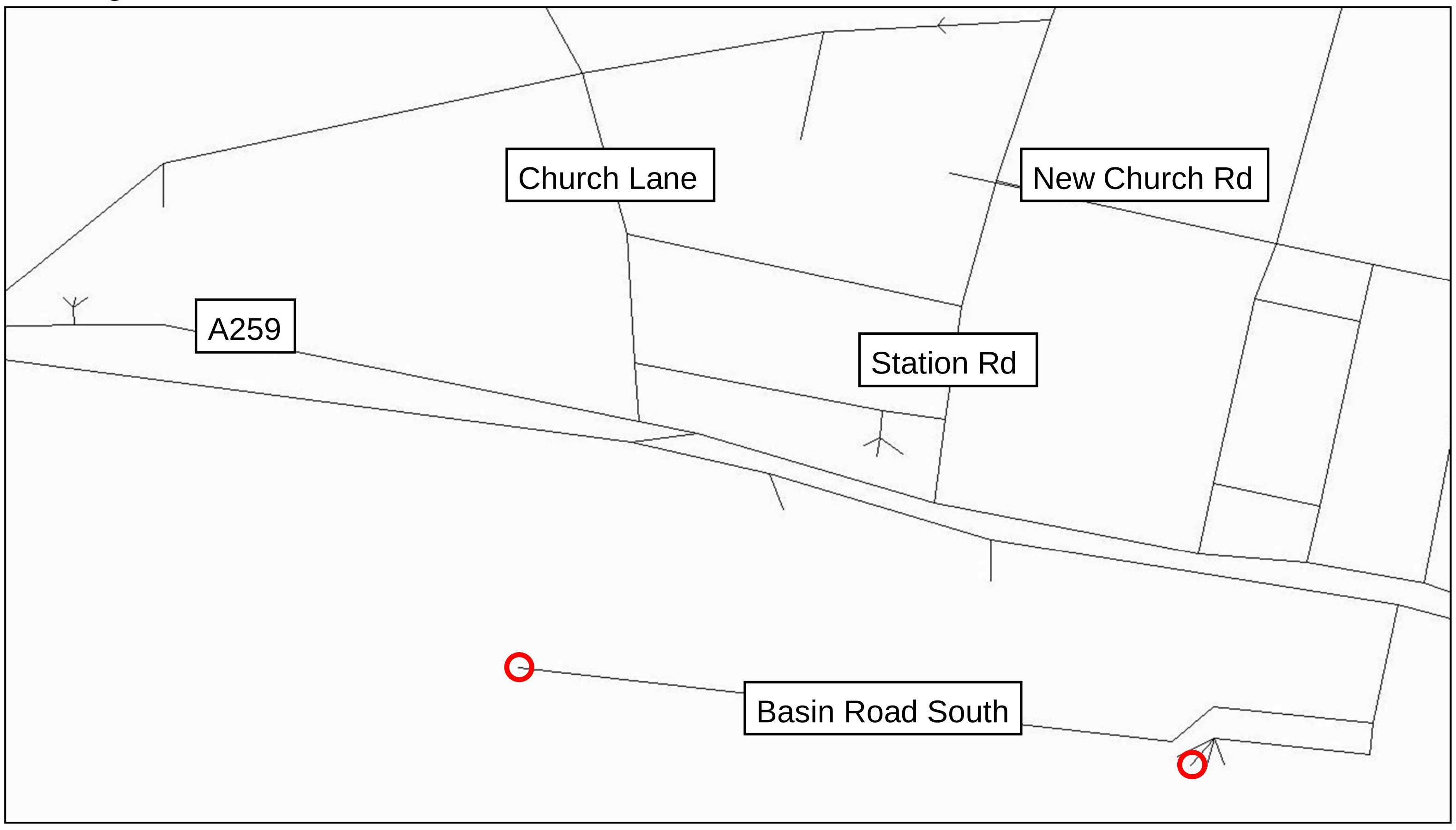
Departures (AM peak)
Net increase in departures: 11

Arrivals (AM peak)
Net increase in arrivals: 112

Method
New and existing trips will be added into the selected zones.

Port Operational South [3]

Loading Points



Note: Red circle(s) indicate development zone loading point(s).

Zone loading location	Estimate of current jobs (B2/B8)	Estimated new jobs			Total New jobs	Net increase in job number
		New office/light industrial B1	New B2/B8	New retail (A1)		
Port Operational South	470	0	0	0	0	0

Assumption: New jobs additional to existing jobs

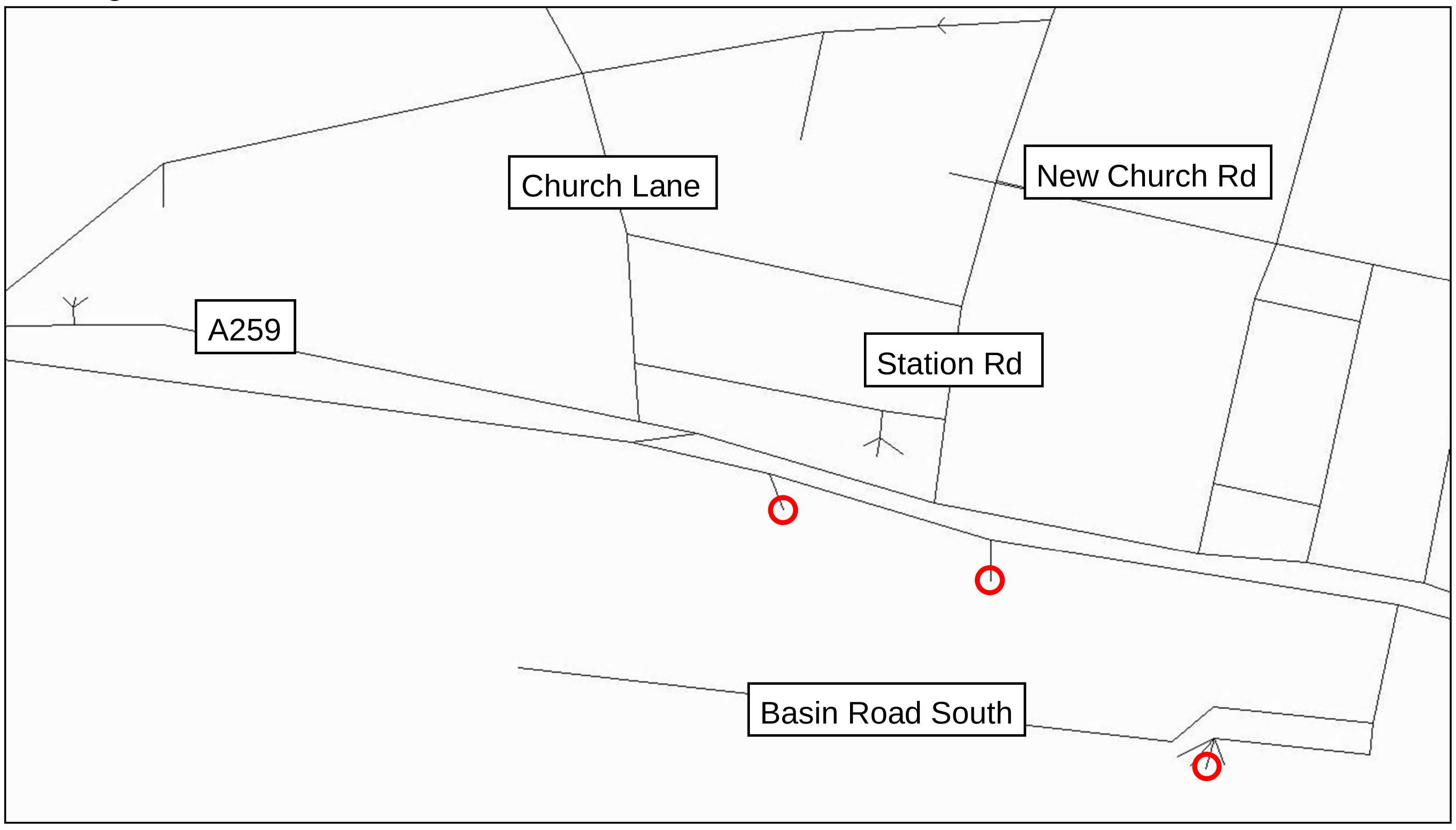
Departures (AM peak)
Net increase in departures: 0

Arrivals (AM peak)
Net increase in arrivals: 0

Method
New and existing trips will be added in to the selected zones.

Port Operational East [4]

Loading Points



Note: Red circle(s) indicate development zone loading point(s).

Zone loading location	Estimate of current jobs (B2/B8)	Estimated new jobs			Total New jobs	Net increase in job number
		New office/light industrial B1	New B2/B8	New retail (A1)		
Port Operational East	470	0	0	0	0	0

Assumption: New jobs additional to existing jobs

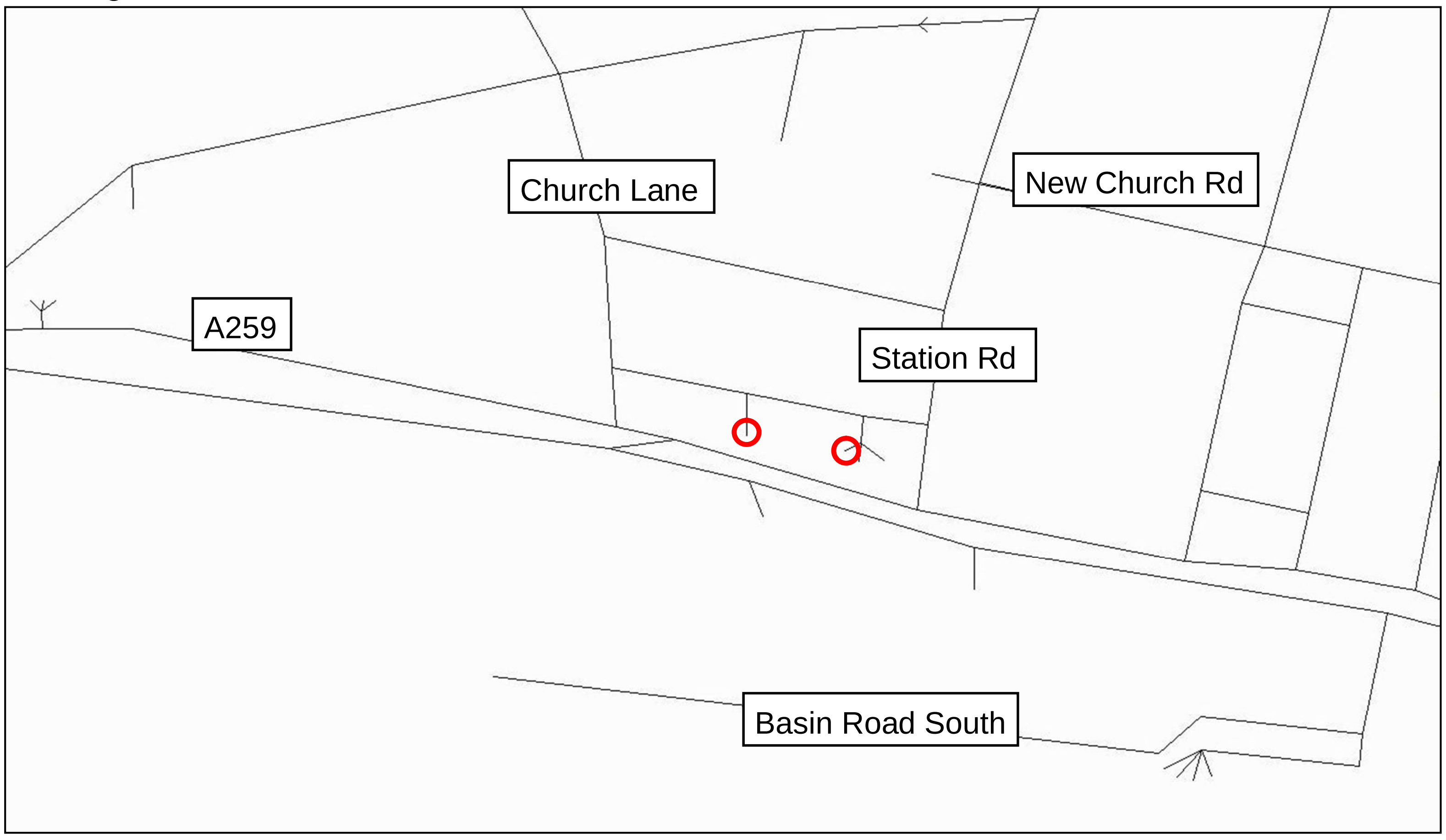
Departures (AM peak)
Net increase in departures: 0

Arrivals (AM peak)
Net increase in arrivals: 0

Method
New and existing trips will be added in to the selected zones.

South Portslade Industrial Estate [5]

Loading Points



Note: Red circle(s) indicate development zone loading point(s).

Zone loading location	Estimate of current jobs (B2/B8)	Estimated new jobs			Total New jobs	Net increase in job number
		New office/light industrial B1	New B2/B8	New retail (A1)		
South Portslade	728	638	0	0	638	638

Assumption: New jobs additional to existing jobs

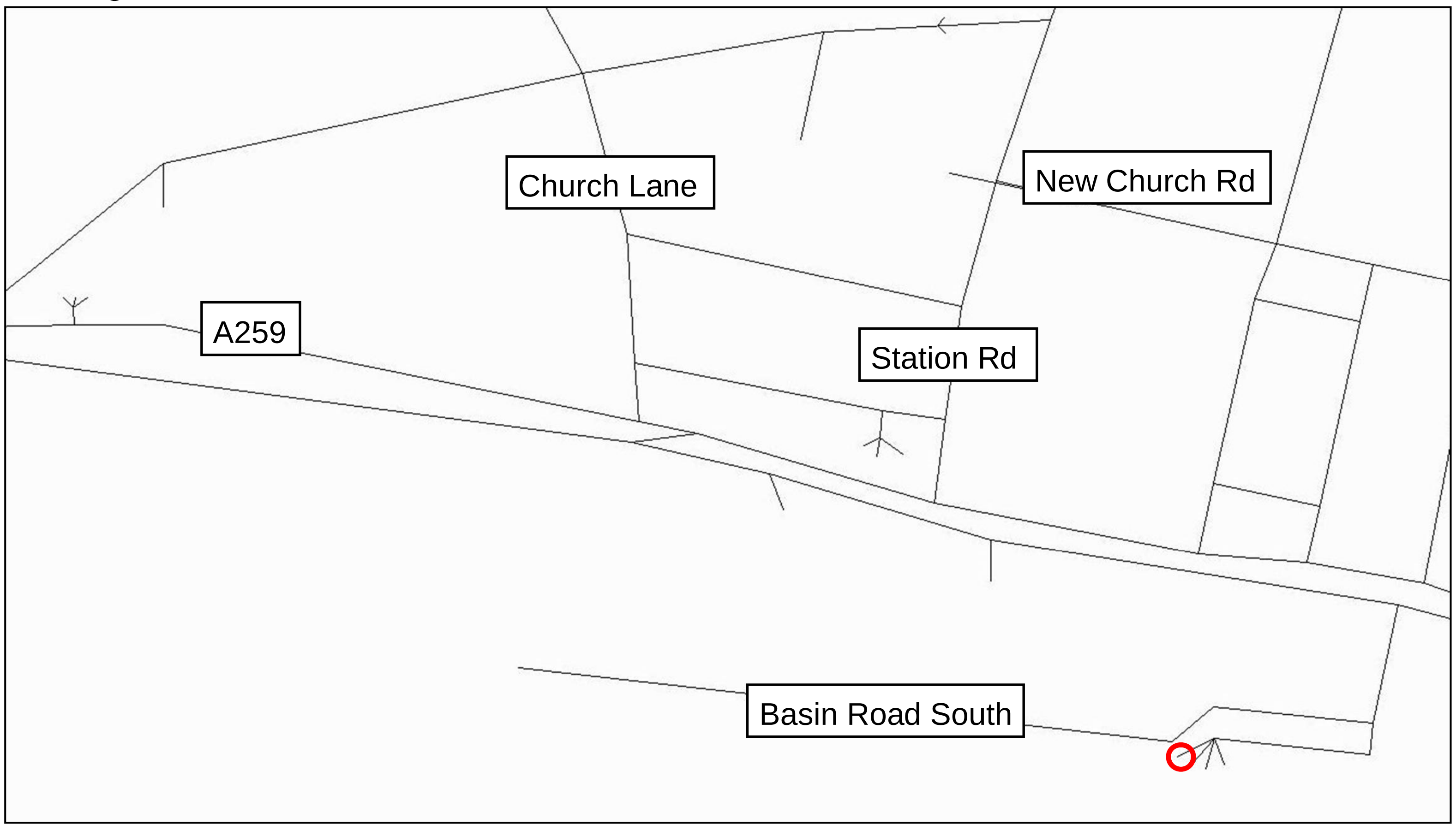
<u>Departures (AM peak)</u>
Net increase in departures: 21

<u>Arrivals (AM peak)</u>
Net increase in arrivals: 210

<u>Method</u>
New and existing trips will be added in to the selected zones.

Aldrington Basin [6]

Loading Points



Note: Red circle(s) indicate development zone loading point(s).

Zone loading location	Estimate of current jobs (B2/B8)	Estimated new jobs			Total New jobs	Net increase in job number
		New office/light industrial B1	New B2/B8	New retail (A1)		
Aldrington Basin	391	0	0	0	0	0

Assumption: New jobs additional to existing jobs

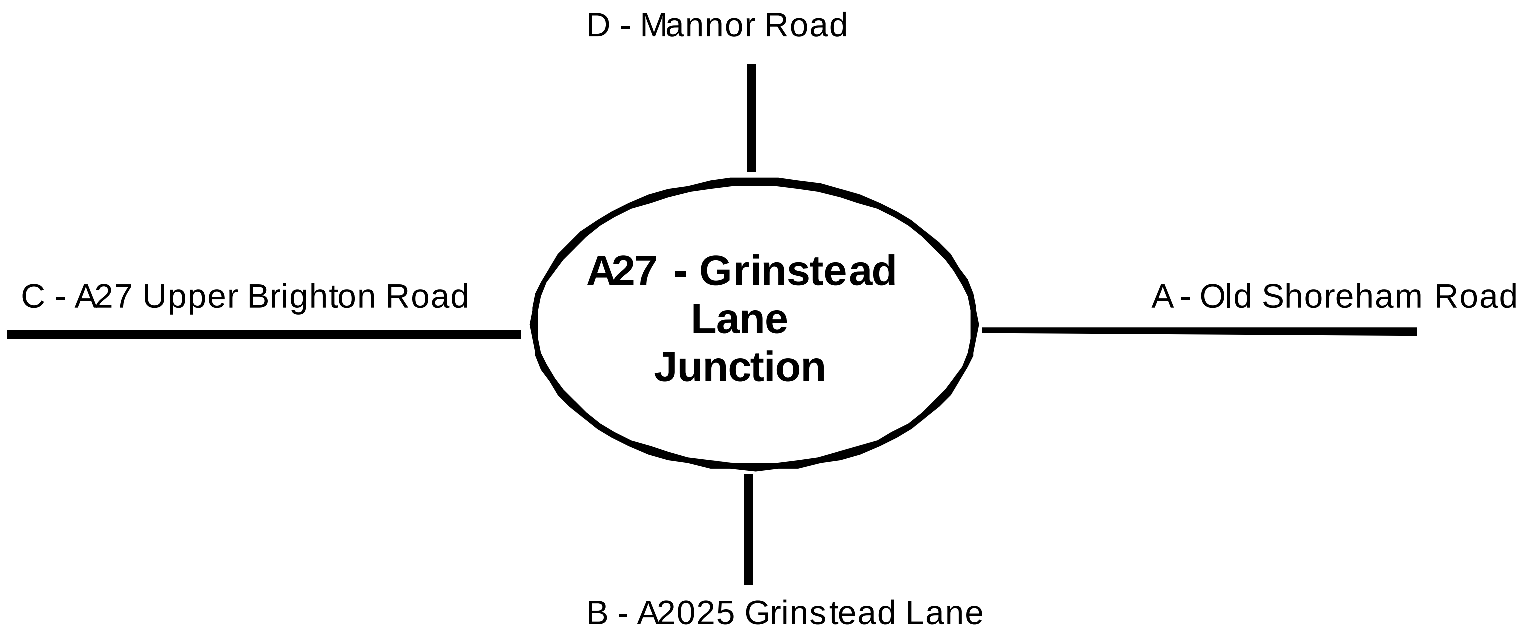
Departures (AM peak)
Net increase in departures: 63

Arrivals (AM peak)
Net increase in arrivals: 24

Method
New and existing trips will be added in to the selected zones. Previously tested scenarios included some additional employment in this area; this scenario looks at the impact of providing 300 dwellings.

Appendix D

JUNCTION TURNING FLOWS



Reference Case

	A	B	C	D
A	106	698	2189	53
B	837	0	0	0
C	2746	7	0	0
D	183	4	0	0

Initial Demands

Scenario C

	A	B	C	D
A	0	930	2317	82
B	898	0	53	78
C	2928	0	0	0
D	227	107	18	0

Demands with Mitigation

Scenario C

	A	B	C	D
A	0	941	2313	82
B	874	0	56	78
C	2852	0	0	0
D	220	101	17	0

PARSONS BRINCKERHOFF

Parsons Brinckerhoff

Kings Orchard
1 Queen St
Bristol
BS2 0HQ

CLIENT/PROJECT

Adur Distric Council
Transport Study of Strategic
Development Options in Adur

TITLE

AM Turning Flows - A27- A2025 Grinstead Lane Junction

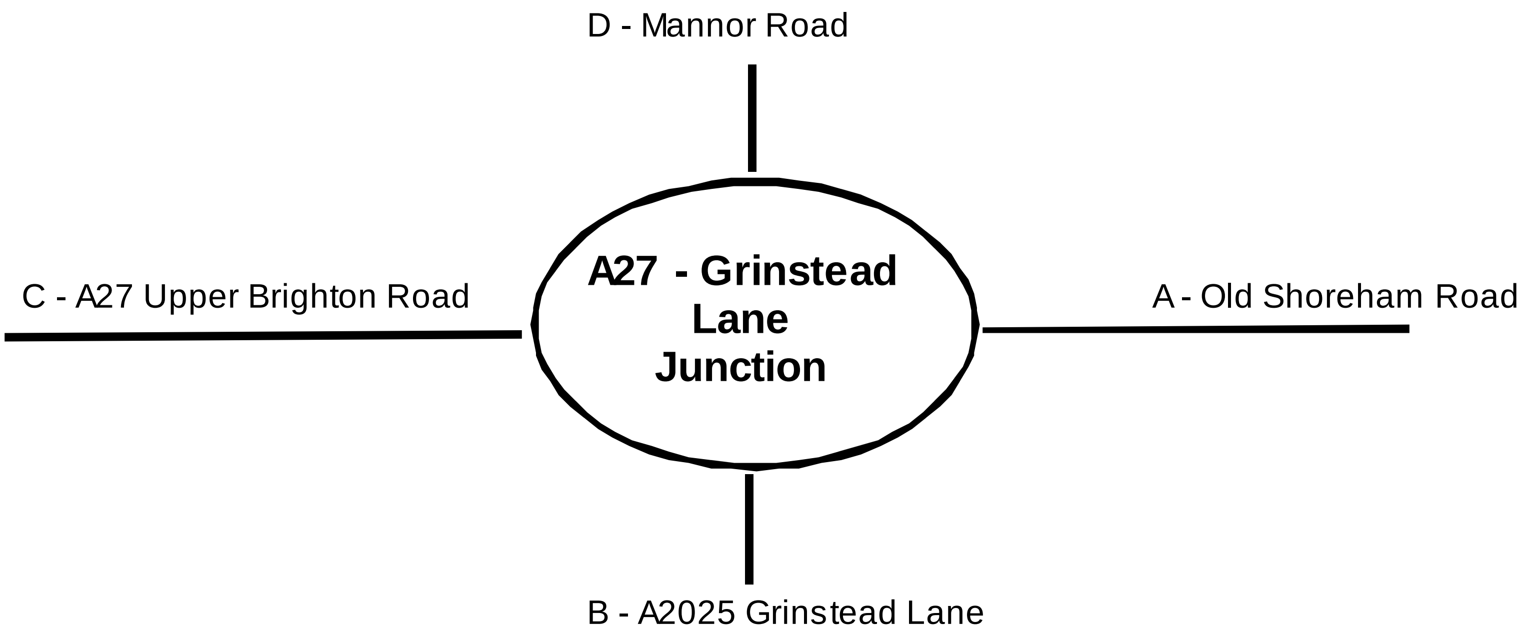
DATE
19/12/12

PRODUCED BY
LL

CHECKED BY
RH

APPROVED
SP

Figure D1



Reference Case

	A	B	C	D
A	2	710	2528	131
B	768	0	0	10
C	2293	165	12	0
D	154	9	14	0

Initial Demands

Scenario C

	A	B	C	D
A	2	718	2625	132
B	761	0	0	9
C	2370	144	12	0
D	166	8	10	0

Demands with Mitigation

Scenario C

	A	B	C	D
A	0	1032	2628	86
B	790	0	38	190
C	2454	8	0	0
D	124	87	23	0

PARSONS BRINCKERHOFF
Parsons Brinckerhoff

Kings Orchard
1 Queen St
Bristol
BS2 0HQ

CLIENT/PROJECT
Adur Distric Council
Transport Study of Strategic Development Options in Adur

TITLE
PM Turning Flows - A27- A2025 Grinstead Lane Junction

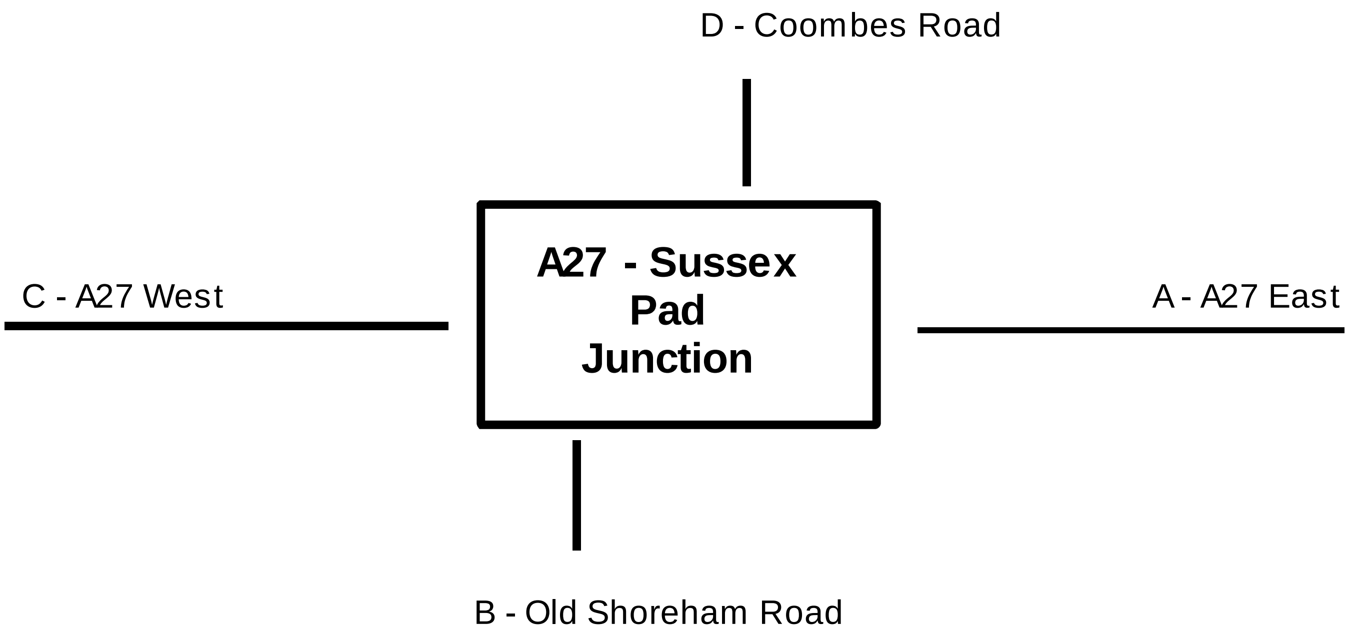
DATE
19/12/12

PRODUCED BY
LL

CHECKED BY
RH

APPROVED
SP

Figure D2



Reference Case

	A	B	C	D
A	0	111	2837	15
B	98	0	8	0
C	3657	108	0	77
D	5	0	7	0

Initial Demands

Scenario C

	A	B	C	D
A	0	125	3086	16
B	292	0	48	0
C	3733	230	11	79
D	5	0	8	0

Demands with Mitigation

Scenario C

	A	B	C	D
A	0	86	3104	15
B	287	0	45	0
C	3641	217	11	77
D	5	0	8	0

PARSONS BRINCKERHOFF
Parsons Brinckerhoff
Kings Orchard
1 Queen St
Bristol
BS2 0HQ

CLIENT/PROJECT
Adur Distric Council
Transport Study of Strategic Development Options in Adur

TITLE
AM Turning Flows - A27- Sussex Pad Junction

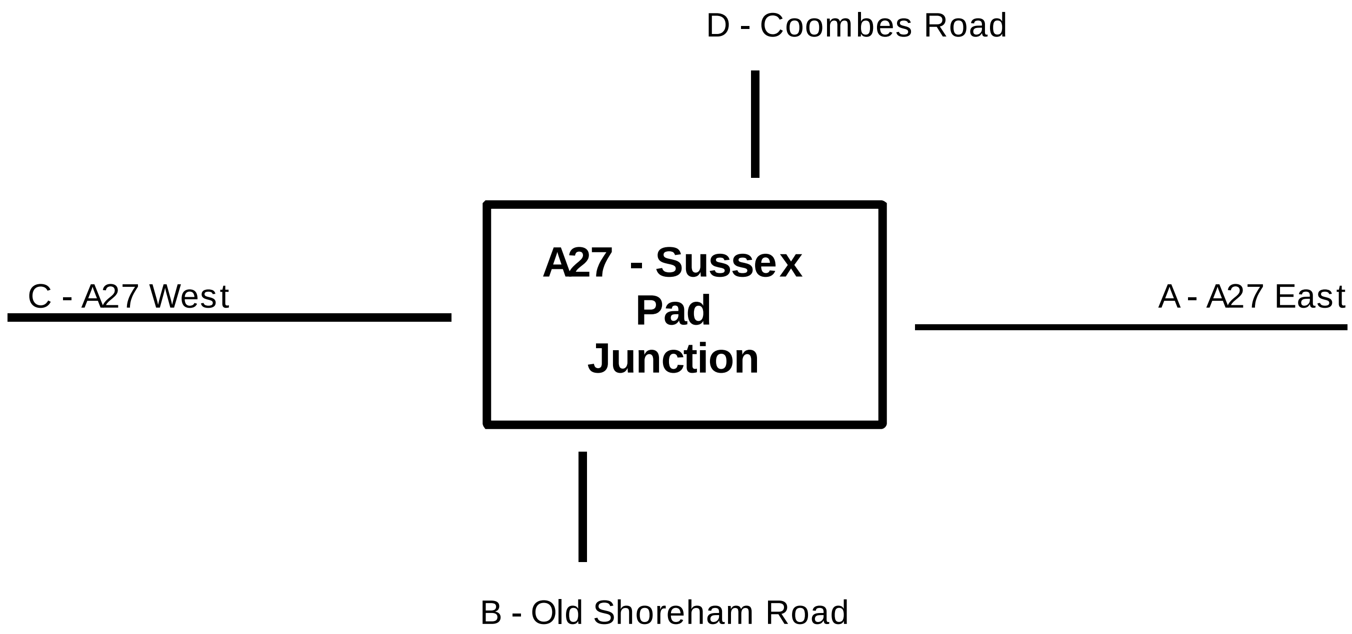
DATE
19/12/12

PRODUCED BY
LL

CHECKED BY
RH

APPROVED
SP

Figure D3



Reference Case

	A	B	C	D
A	0	284	3378	14
B	7	0	12	0
C	3144	24	0	7
D	6	0	7	0

Initial Demands

Scenario C

	A	B	C	D
A	376	396	3330	14
B	114	0	136	0
C	3145	106	40	7
D	6	0	7	0

Demands with Mitigation

Scenario C

	A	B	C	D
A	0	193	3562	14
B	97	0	174	0
C	3152	170	39	7
D	6	0	7	0

PARSONS BRINCKERHOFF
Parsons Brinckerhoff
Kings Orchard
1 Queen St
Bristol
BS2 0HQ

CLIENT/PROJECT
Adur Distric Council
Transport Study of Strategic Development Options in Adur

TITLE
PM Turning Flows - A27- Sussex Pad Junction

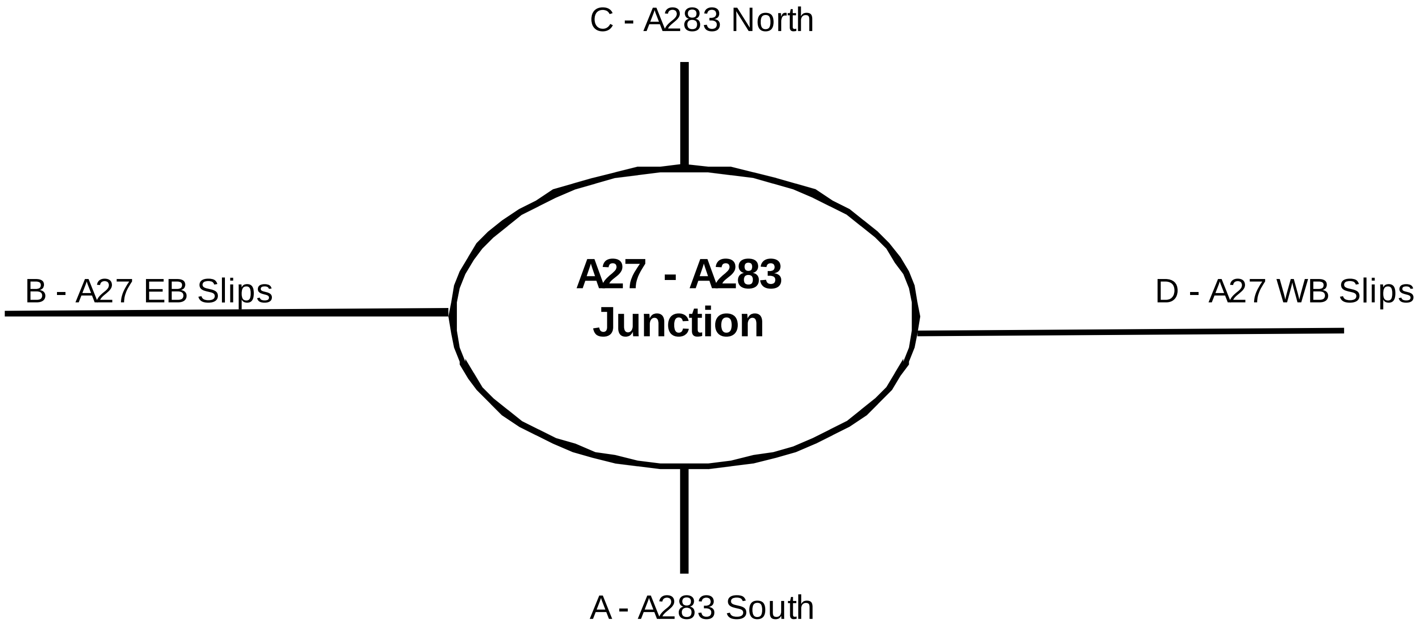
DATE
19/12/12

PRODUCED BY
LL

CHECKED BY
RH

APPROVED
SP

Figure D4



Reference Case

	A	B	C	D
A	0	542	517	159
B	349	0	1156	178
C	337	246	0	0
D	203	991	0	0

Initial Demands

Scenario C

	A	B	C	D
A	0	577	437	219
B	339	0	1150	249
C	399	290	0	0
D	243	933	0	0

Demands with Mitigation

Scenario C

	A	B	C	D
A	0	612	408	258
B	336	0	1148	287
C	354	265	0	0
D	273	924	0	0

PARSONS BRINCKERHOFF
Parsons Brinckerhoff

Kings Orchard
1 Queen St
Bristol
BS2 0HQ

CLIENT/PROJECT

Adur Distric Council
Transport Study of Strategic
Development Options in Adur

TITLE

AM Turning Flows -
A27- A283 Junction

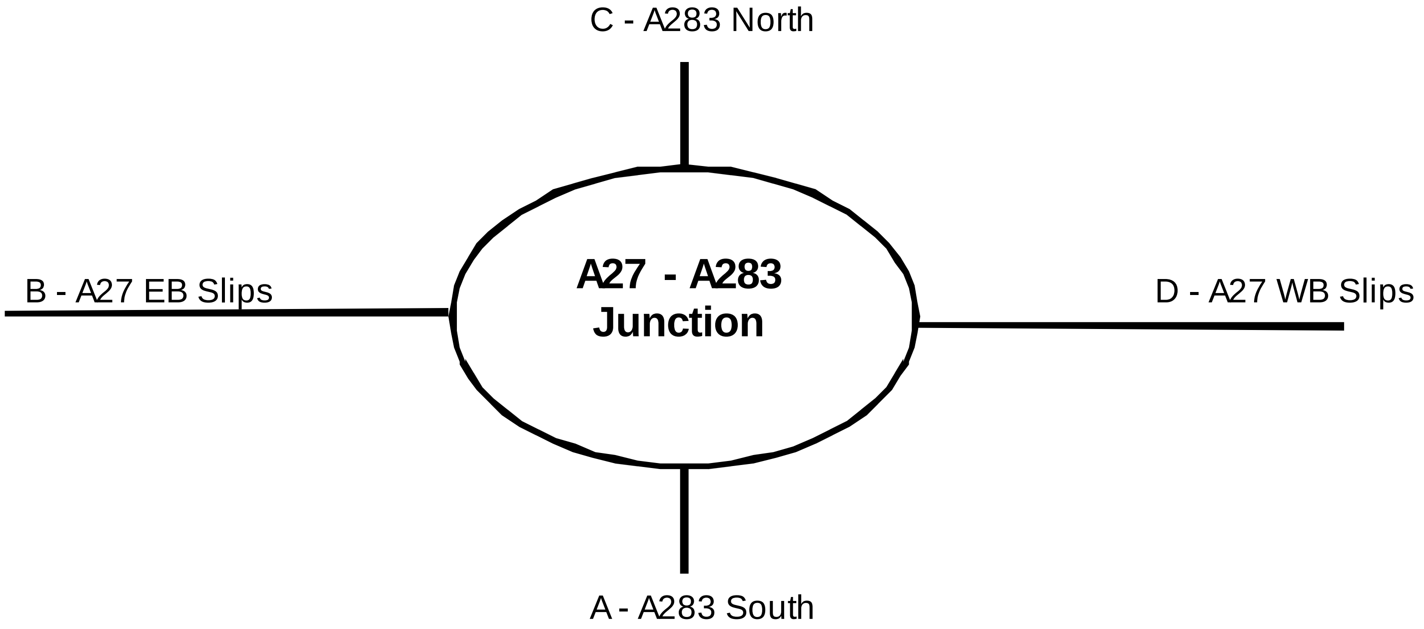
DATE
19/12/12

PRODUCED BY
LL

CHECKED BY
RH

APPROVED
SP

Figure D5



Reference Case

	A	B	C	D
A	0	886	484	125
B	697	0	929	266
C	380	42	0	0
D	363	1132	0	0

Initial Demands

Scenario C

	A	B	C	D
A	0	884	485	117
B	732	0	923	244
C	532	280	0	0
D	304	894	0	0

Demands with Mitigation

Scenario C

	A	B	C	D
A	0	101	405	201
B	639	0	960	408
C	253	40	0	0
D	490	1919	0	0

PARSONS BRINCKERHOFF
Parsons Brinckerhoff
Kings Orchard
1 Queen St
Bristol
BS2 0HQ

CLIENT/PROJECT
Adur Distric Council
Transport Study of Strategic
Development Options in Adur

TITLE
PM Turning Flows - A27- A283 Junction

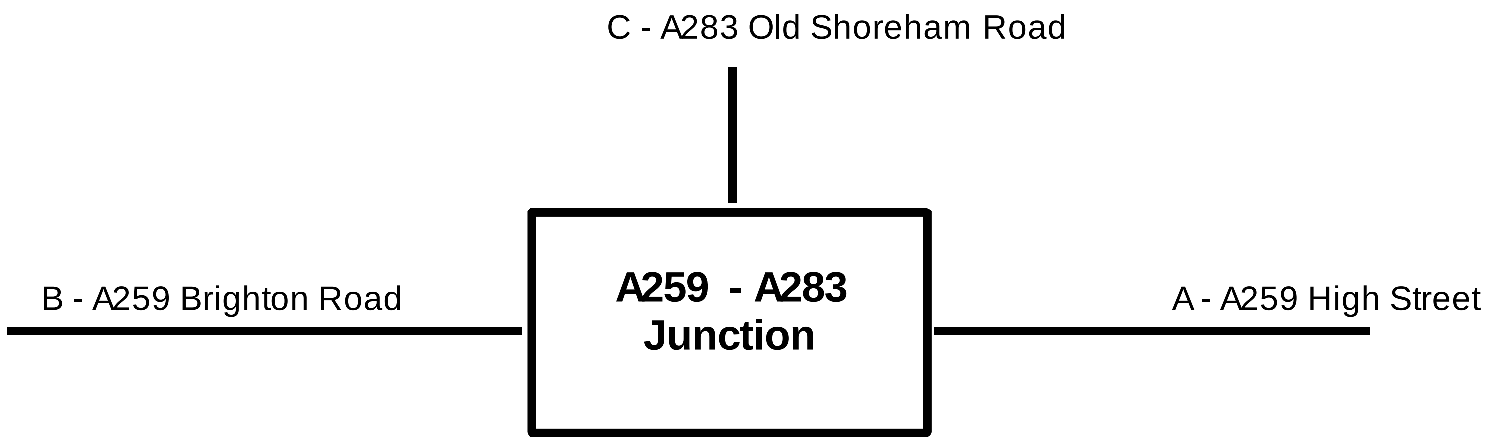
DATE
19/12/12

PRODUCED BY
LL

CHECKED BY
RH

APPROVED
SP

Figure D6



Reference Case

	A	B	C
A	0	994	87
B	1232	0	596
C	94	465	0

Initial Demands

Scenario C

	A	B	C
A	0	852	107
B	1083	0	670
C	96	527	0

Demands with Mitigation

Scenario C

	A	B	C
A	0	841	112
B	1081	0	670
C	86	527	0

PARSONS BRINCKERHOFF
Parsons Brinckerhoff
Kings Orchard
1 Queen St
Bristol
BS2 0HQ

CLIENT/PROJECT
Adur Distric Council
Transport Study of Strategic Development Options in Adur

TITLE
AM Turning Flows - A259 - A283 Junction

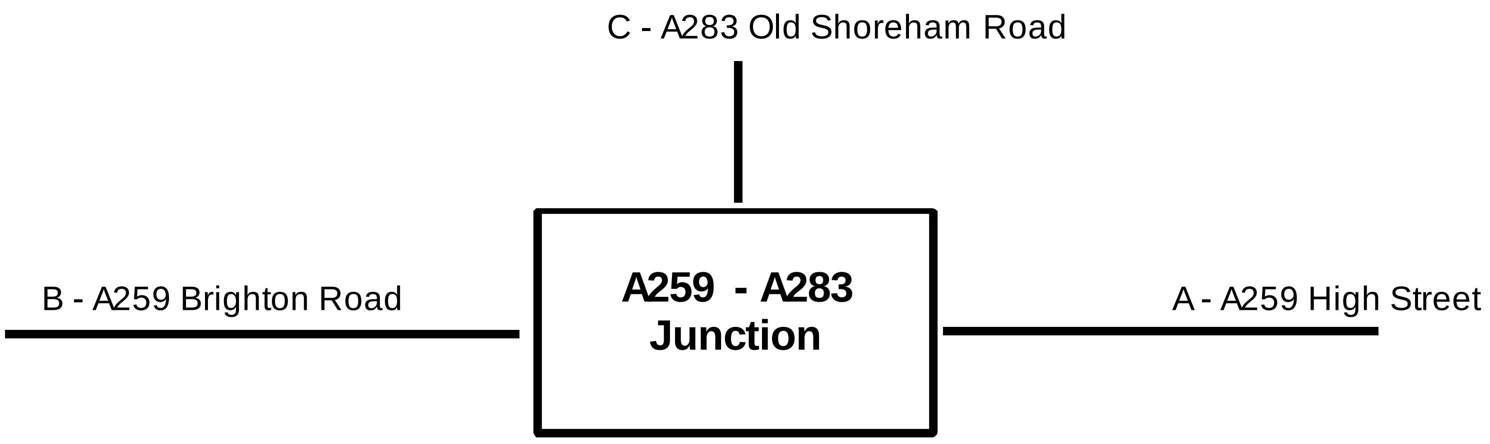
DATE
19/12/12

PRODUCED BY
LL

CHECKED BY
RH

APPROVED
SP

Figure D7



Reference Case

	A	B	C
A	0	1037	0
B	902	70	619
C	76	934	0

Initial Demands

Scenario C

	A	B	C
A	0	999	0
B	816	70	697
C	53	1017	0

Demands with Mitigation

Scenario C

	A	B	C
A	0	1209	47
B	835	17	701
C	97	815	0

PARSONS BRINCKERHOFF
Parsons Brinckerhoff

Kings Orchard
1 Queen St
Bristol
BS2 0HQ

CLIENT/PROJECT

Adur Distric Council
Transport Study of Strategic
Development Options in Adur

TITLE

PM Turning Flows -
A259 - A283 Junction

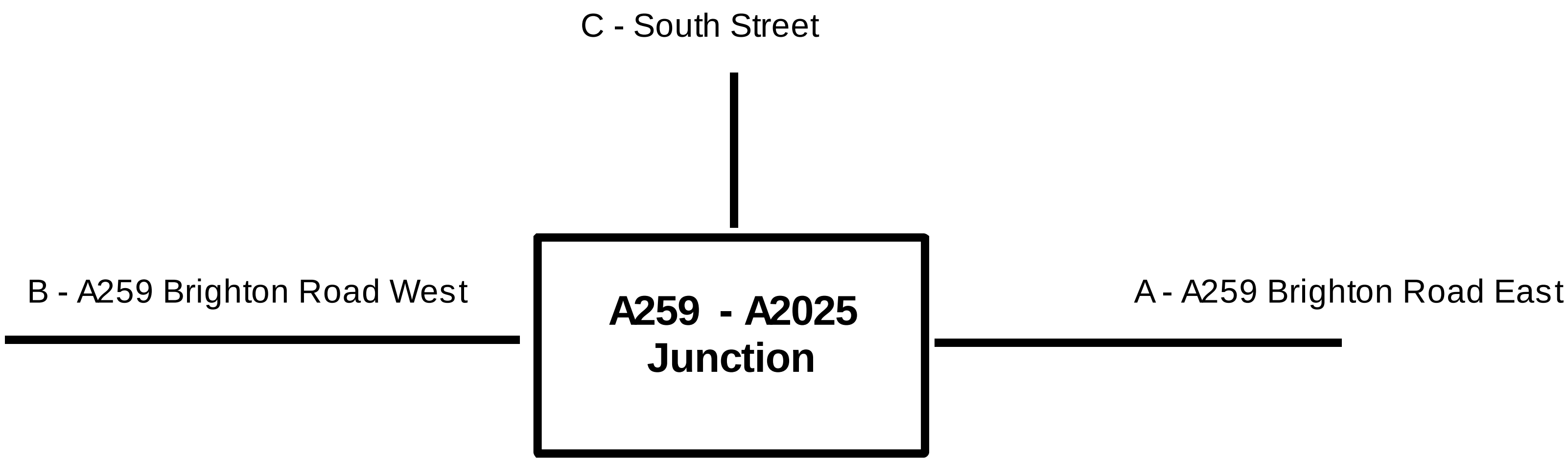
DATE
19/12/12

PRODUCED BY
LL

CHECKED BY
RH

APPROVED
SP

Figure D8



Reference Case

	A	B	C
A	0	751	0
B	1047	0	147
C	0	672	0

Initial Demands

Scenario C

	A	B	C
A	0	976	0
B	1201	0	259
C	0	634	0

Demands with Mitigation

Scenario C

	A	B	C
A	0	932	0
B	1197	0	243
C	0	649	0

PARSONS BRINCKERHOFF
Parsons Brinckerhoff

Kings Orchard
1 Queen St
Bristol
BS2 0HQ

CLIENT/PROJECT

Adur Distric Council
Transport Study of Strategic
Development Options in Adur

TITLE

AM Turning Flows -
A259 - A2025 Junction

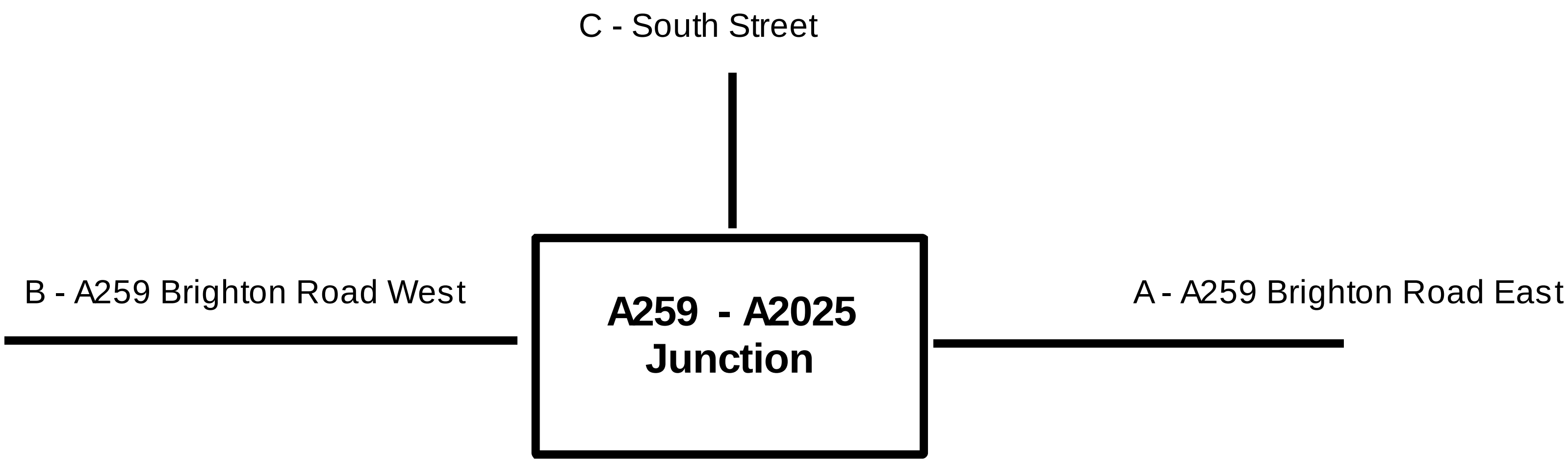
DATE
19/12/12

PRODUCED BY
LL

CHECKED BY
RH

APPROVED
SP

Figure D9



Reference Case

	A	B	C
A	0	860	0
B	908	0	184
C	0	795	0

Initial Demands

Scenario C

	A	B	C
A	0	904	0
B	870	0	815
C	0	187	0

Demands with Mitigation

Scenario C

	A	B	C
A	0	1168	0
B	990	0	582
C	0	772	0

PARSONS BRINCKERHOFF
Parsons Brinckerhoff
Kings Orchard
1 Queen St
Bristol
BS2 0HQ

CLIENT/PROJECT
Adur Distric Council
Transport Study of Strategic Development Options in Adur

TITLE
PM Turning Flows - A259 - A2025 Junction

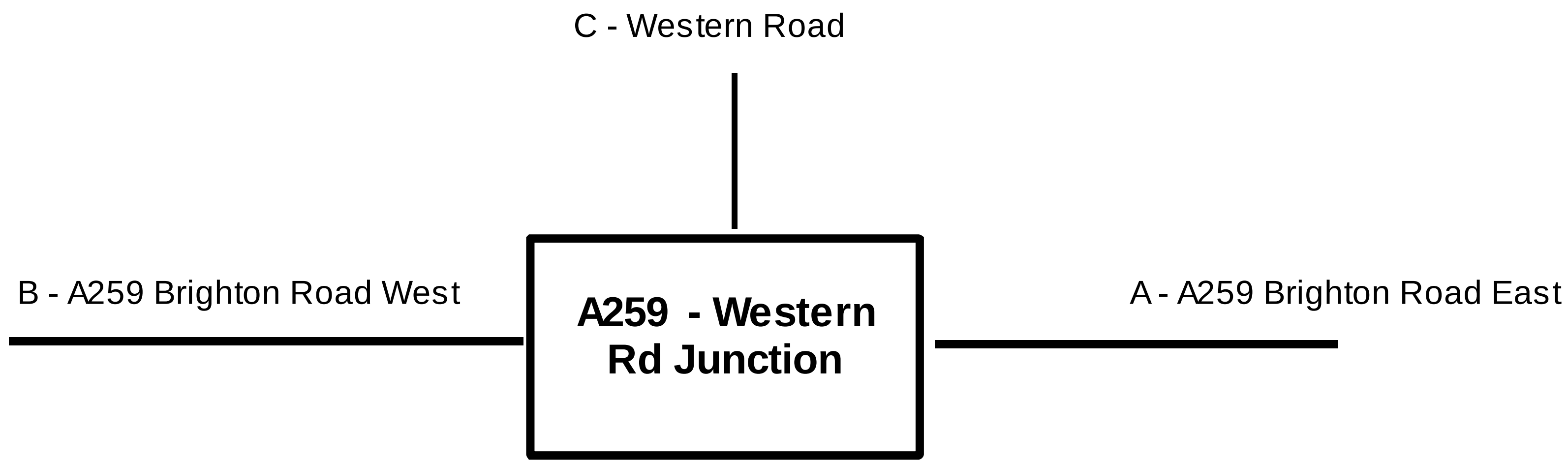
DATE
19/12/12

PRODUCED BY
LL

CHECKED BY
RH

APPROVED
SP

Figure D10



AM - Reference Case

	A	B	C
A	0	1193	1
B	1287	0	560
C	38	209	0

PM - Reference Case

	A	B	C
A	0	1416	0
B	851	0	741
C	0	222	0

AM - Scenario C

	A	B	C
A	0	1312	3
B	1310	0	533
C	108	209	0

PM - Scenario C

	A	B	C
A	0	1412	0
B	849	0	754
C	0	222	0

PARSONS BRINCKERHOFF
Parsons Brinckerhoff
Kings Orchard
1 Queen St
Bristol
BS2 0HQ

CLIENT/PROJECT
Adur Distric Council
Transport Study of Strategic Development Options in Adur

TITLE
Turning Flows - A259 Brighton Road / Western Road

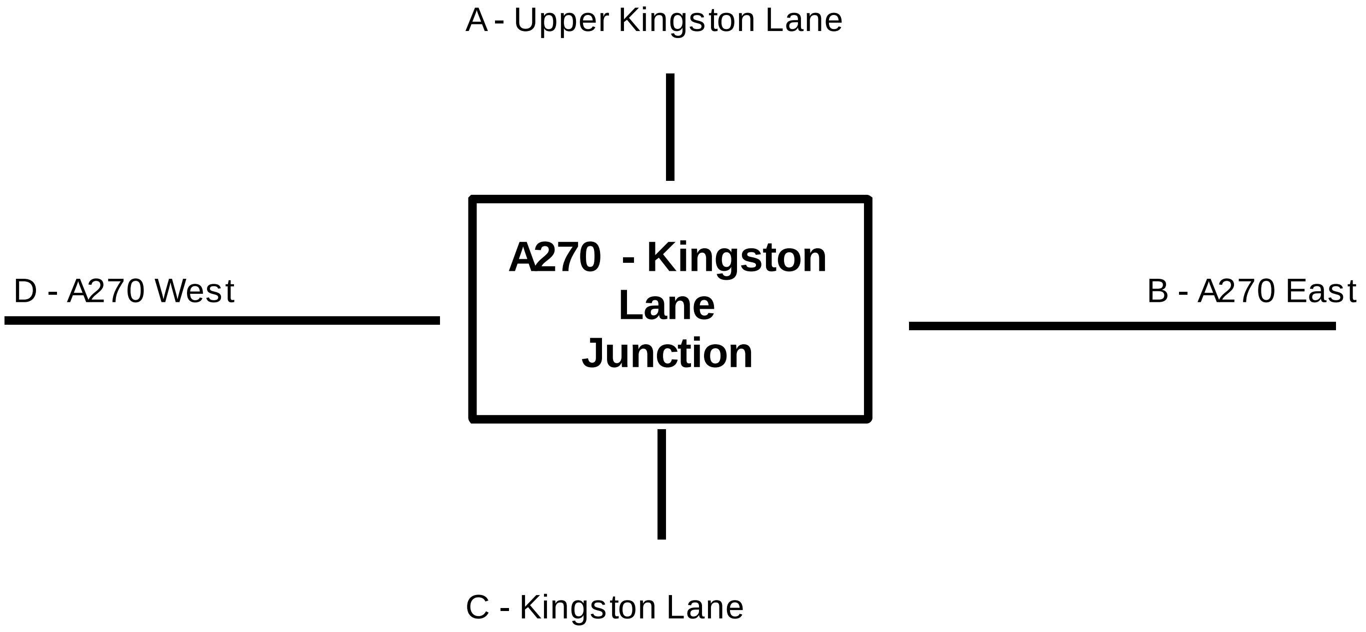
DATE
19/12/15

PRODUCED BY
MSR

CHECKED BY
DH

APPROVED
DH

Figure D11



AM - Reference Case

	A	B	C	D
A	0	34	19	32
B	0	0	20	1359
C	65	62	0	108
D	4	1027	284	0

PM - Reference Case

	A	B	C	D
A	0	3	14	13
B	0	0	1	1467
C	70	90	0	126
D	27	1093	235	0

AM - Scenario C

	A	B	C	D
A	0	33	14	37
B	0	0	19	1361
C	66	66	0	108
D	4	1046	296	0

PM - Scenario C

	A	B	C	D
A	0	3	15	14
B	0	0	1	1465
C	70	98	0	126
D	27	1157	259	0

PARSONS BRINCKERHOFF

Parsons Brinckerhoff

Kings Orchard
1 Queen St
Bristol
BS2 0HQ

CLIENT/PROJECT

Adur Distric Council
Transport Study of Strategic Development Options in Adur

TITLE

Turning Flows - A270 Upper Shoreham Road / B2167 Kingston Lane

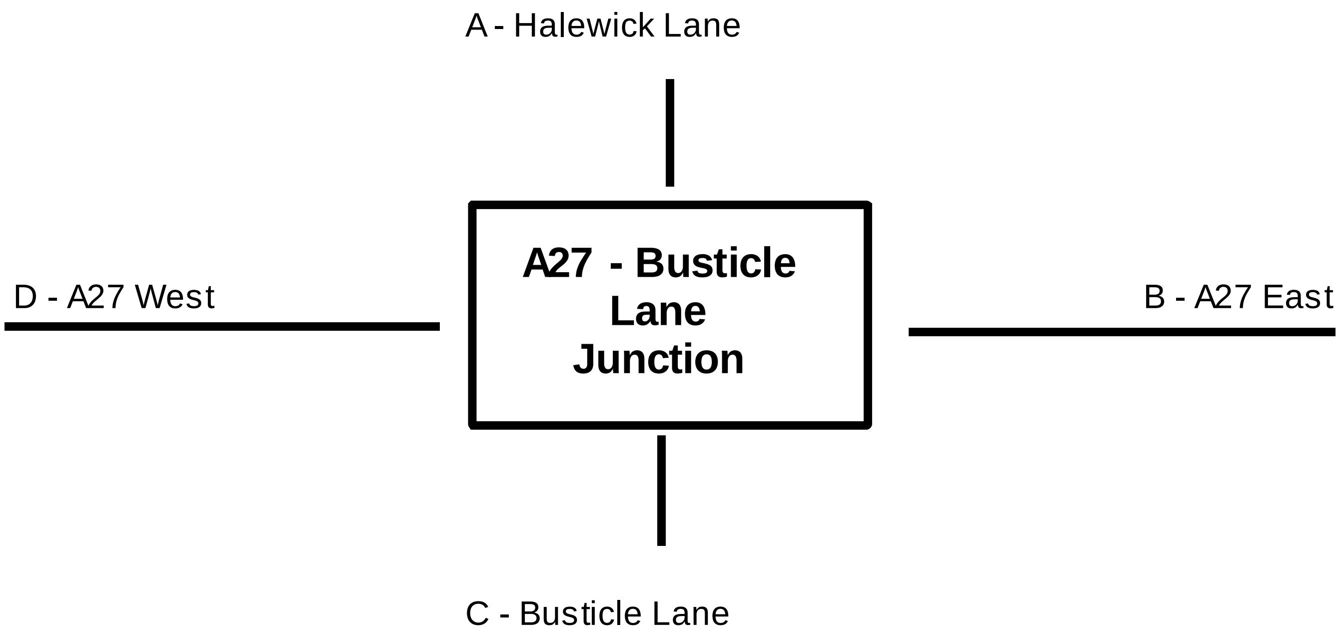
DATE
19/12/15

PRODUCED BY
MSR

CHECKED BY
DH

APPROVED
DH

Figure D12



AM - Reference Case

	A	B	C	D
A	0	149	326	123
B	16	0	170	1745
C	141	70	0	196
D	81	1961	151	0

PM - Reference Case

	A	B	C	D
A	0	52	119	20
B	35	0	242	1337
C	331	124	0	213
D	93	1962	124	0

AM - Scenario C

	A	B	C	D
A	0	289	229	126
B	11	0	157	1931
C	191	104	0	160
D	32	2066	156	0

PM - Scenario C

	A	B	C	D
A	0	32	114	31
B	35	0	223	1382
C	325	119	0	196
D	80	2065	128	0

PARSONS BRINCKERHOFF
Parsons Brinckerhoff
Kings Orchard
1 Queen St
Bristol
BS2 0HQ

CLIENT/PROJECT
Adur Distric Council
Transport Study of Strategic Development Options in Adur

TITLE
Turning Flows - A27 / Busticle Lane

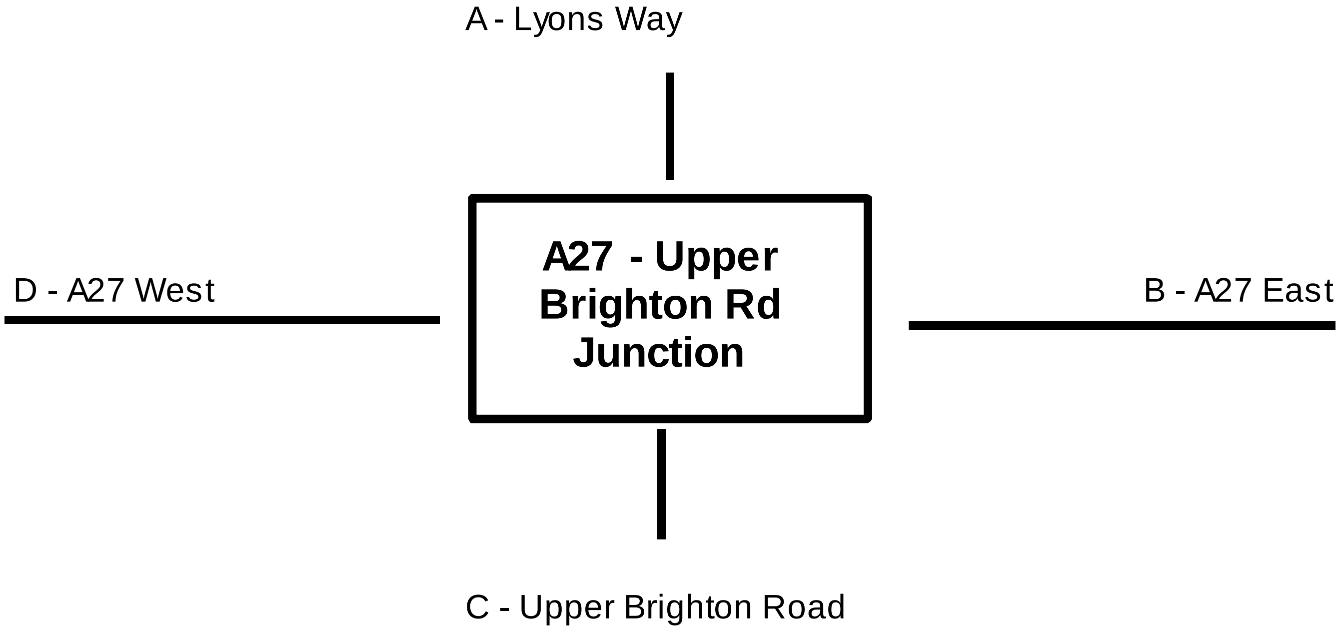
DATE
19/12/15

PRODUCED BY
MSR

CHECKED BY
DH

APPROVED
DH

Figure D13



AM - Reference Case

	A	B	C	D
A	0	105	0	75
B	140	0	182	1573
C	34	243	0	215
D	0	1864	0	0

PM - Reference Case

	A	B	C	D
A	0	186	6	193
B	31	0	0	1492
C	57	214	0	105
D	0	1792	0	0

AM - Scenario C

	A	B	C	D
A	0	9	0	105
B	145	0	60	1750
C	0	457	0	180
D	0	1824	0	0

PM - Scenario C

	A	B	C	D
A	0	168	4	196
B	17	0	1	1508
C	28	413	0	91
D	0	1707	7	0

PARSONS BRINCKERHOFF
Parsons Brinckerhoff
Kings Orchard
1 Queen St
Bristol
BS2 0HQ

CLIENT/PROJECT
Adur Distric Council
Transport Study of Strategic Development Options in Adur

TITLE
Turning Flows - A27 Sompting Bypass / Upper Brighton Road

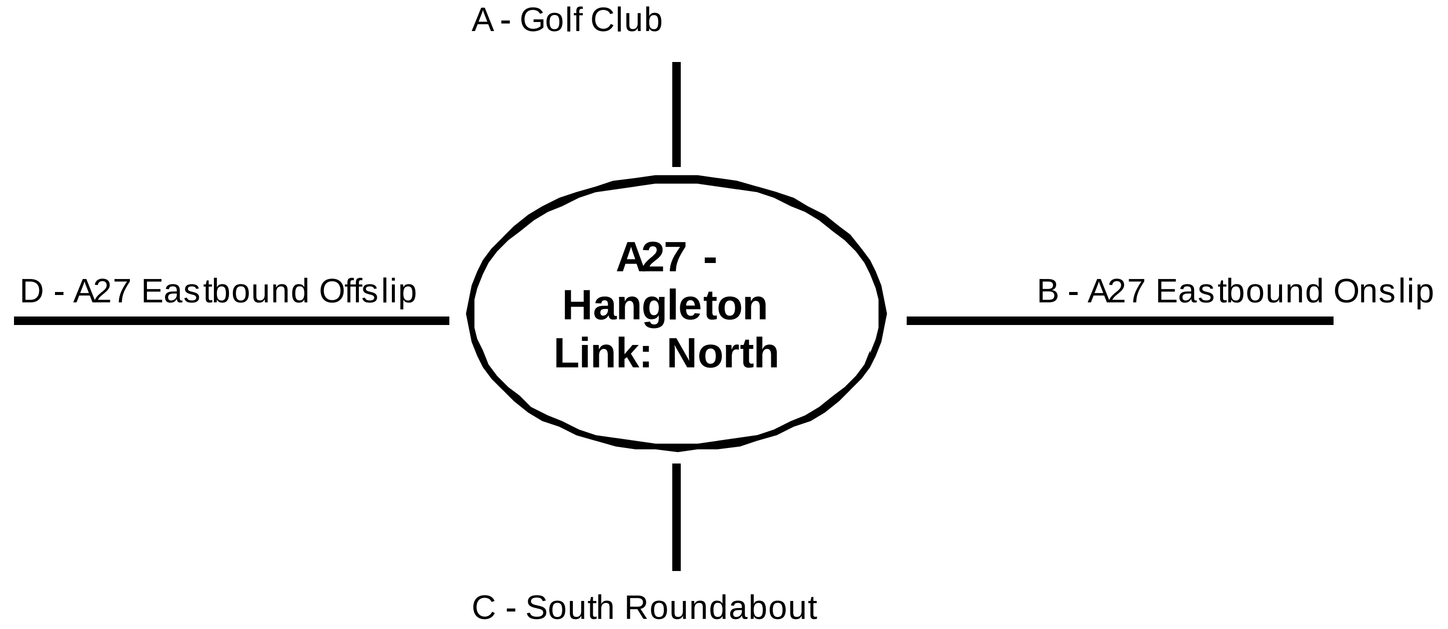
DATE
19/12/15

PRODUCED BY
MSR

CHECKED BY
DH

APPROVED
DH

Figure D14



AM - Reference Case

	A	B	C	D
A	0	0	91	0
B	0	0	0	0
C	36	1356	0	0
D	110	241	360	0

PM - Reference Case

	A	B	C	D
A	0	19	117	0
B	0	0	0	0
C	55	914	0	0
D	187	102	315	0

AM - Scenario C

	A	B	C	D
A	0	0	99	0
B	0	0	0	0
C	36	1275	0	0
D	111	0	216	0

PM - Scenario C

	A	B	C	D
A	0	19	119	0
B	0	0	0	0
C	64	915	0	0
D	191	0	186	0

PARSONS BRINCKERHOFF
Parsons Brinckerhoff
Kings Orchard
1 Queen St
Bristol
BS2 0HQ

CLIENT/PROJECT
Adur Distric Council Transport Study of Strategic Development Options in Adur

TITLE
Turning Flows - A27 / Hangleton Link North Roundabout

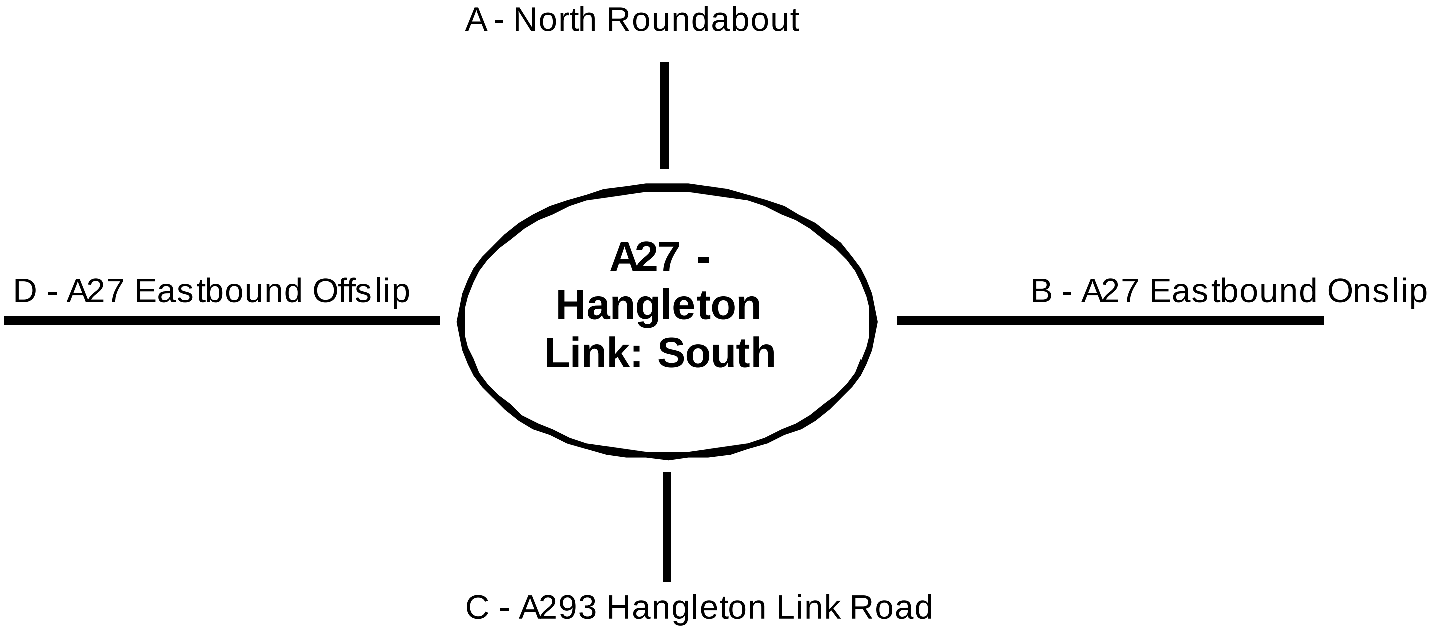
DATE
19/12/15

PRODUCED BY
MSR

CHECKED BY
DH

APPROVED
DH

Figure D15



AM - Reference Case

	A	B	C	D
A	0	0	398	53
B	0	0	1065	0
C	1392	0	0	329
D	0	0	0	0

PM - Reference Case

	A	B	C	D
A	0	0	361	71
B	0	0	1218	0
C	969	0	0	570
D	0	0	0	0

AM - Scenario C

	A	B	C	D
A	0	0	259	56
B	0	0	1080	0
C	1310	0	0	403
D	0	0	0	0

PM - Scenario C

	A	B	C	D
A	0	0	232	73
B	0	0	1092	0
C	979	0	0	552
D	0	0	0	0

PARSONS BRINCKERHOFF

Parsons Brinckerhoff

Kings Orchard
1 Queen St
Bristol
BS2 0HQ

CLIENT/PROJECT

Adur Distric Council Transport Study of Strategic Development Options in Adur

TITLE

Turning Flows - A27 / Hangleton Link North Roundabout

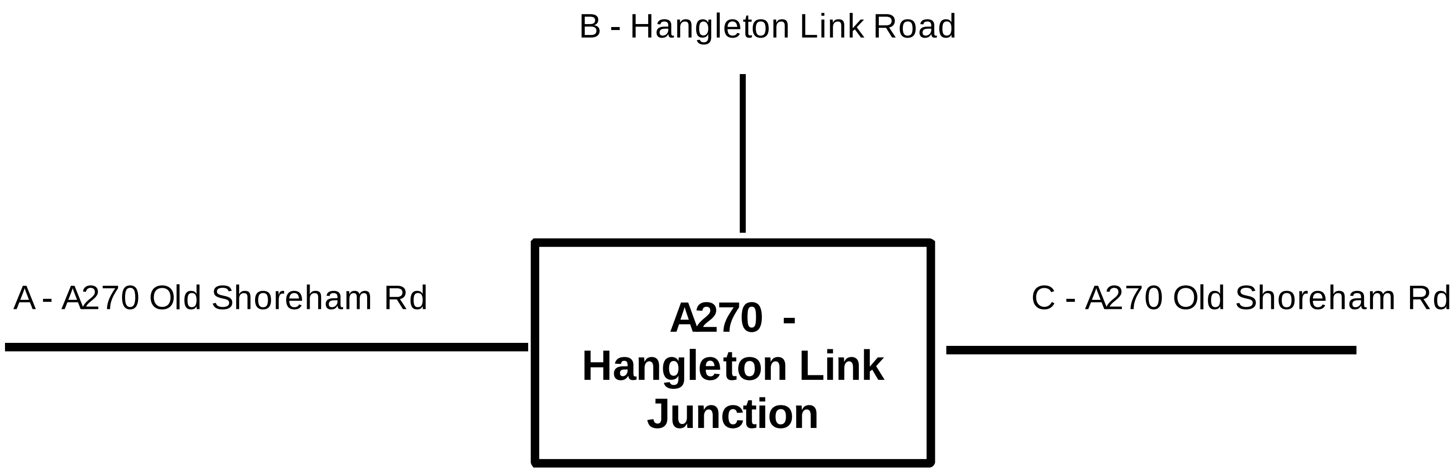
DATE
19/12/15

PRODUCED BY
MSR

CHECKED BY
DH

APPROVED
DH

Figure D16



AM - Reference Case

	A	B	C
A	0	504	882
B	498	0	658
C	833	387	0

PM - Reference Case

	A	B	C
A	0	606	669
B	302	0	819
C	1050	326	0

AM - Scenario C

	A	B	C
A	0	518	889
B	510	0	620
C	884	396	0

PM - Scenario C

	A	B	C
A	0	612	724
B	296	0	801
C	1048	338	0

PARSONS BRINCKERHOFF
Parsons Brinckerhoff
Kings Orchard
1 Queen St
Bristol
BS2 0HQ

CLIENT/PROJECT
Adur Distric Council
Transport Study of Strategic Development Options in Adur

TITLE
Turning Flows - A270 Old Shoreham Road / A293 Hangleton Link

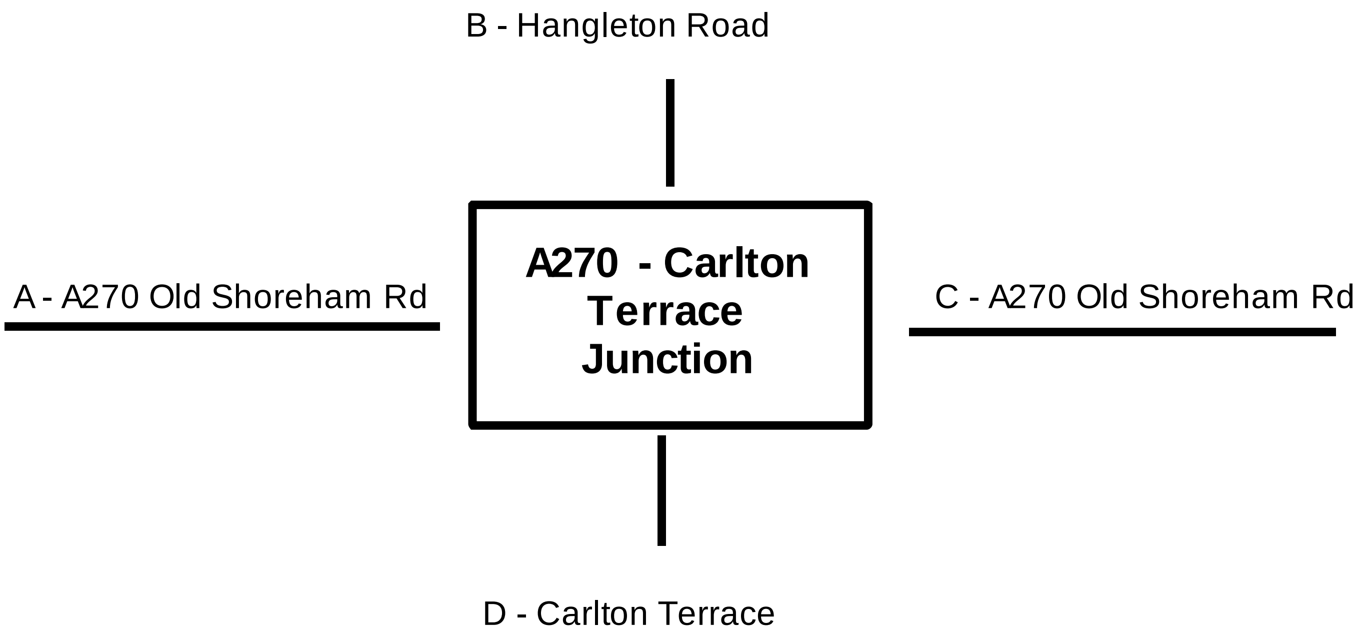
DATE
19/12/15

PRODUCED BY
MSR

CHECKED BY
DH

APPROVED
DH

Figure D17



AM - Reference Case

	A	B	C	D
A	0	327	1057	156
B	90	0	0	322
C	904	23	0	45
D	226	447	161	0

PM - Reference Case

	A	B	C	D
A	0	185	1115	188
B	269	0	0	328
C	1027	8	0	32
D	80	452	228	0

AM - Scenario C

	A	B	C	D
A	0	318	1033	158
B	68	0	0	325
C	906	76	0	48
D	306	352	171	0

PM - Scenario C

	A	B	C	D
A	0	227	1110	188
B	240	0	0	308
C	1050	11	0	22
D	96	450	219	0

PARSONS BRINCKERHOFF
Parsons Brinckerhoff

Kings Orchard
1 Queen St
Bristol
BS2 0HQ

CLIENT/PROJECT
Adur Distric Council
Transport Study of Strategic Development Options in Adur

TITLE
Turning Flows - A270 Old Shoreham Road / Carlton Terrace

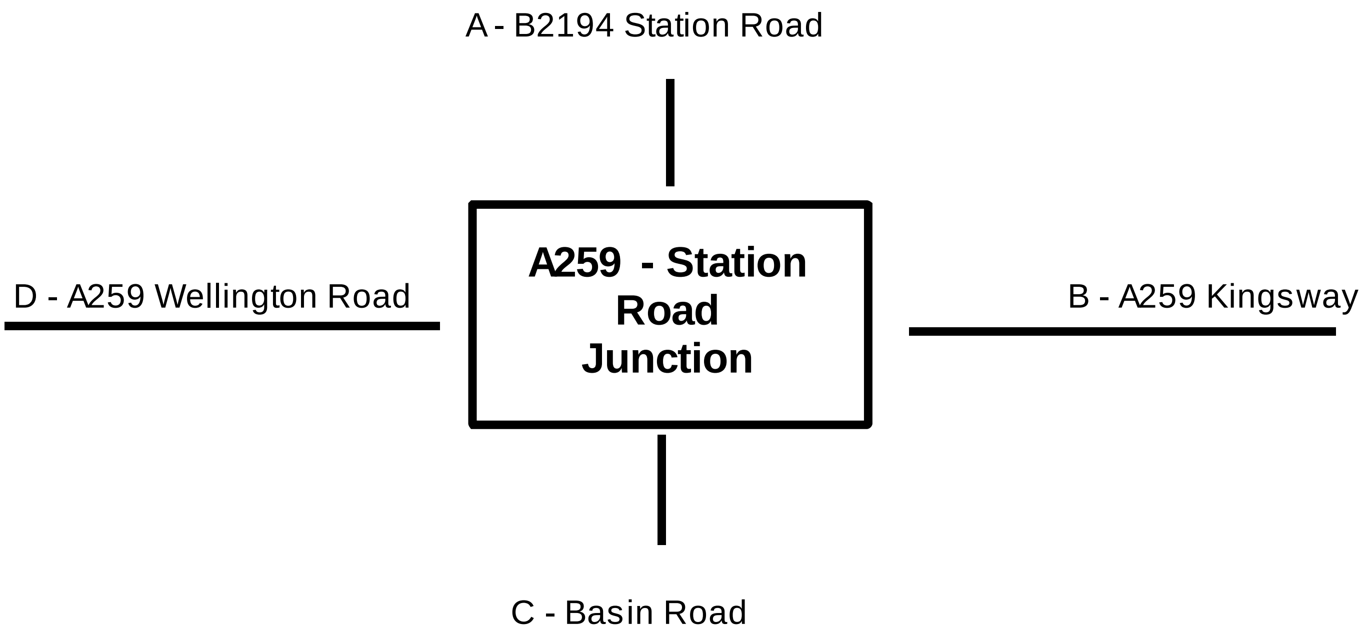
DATE
19/12/15

PRODUCED BY
MSR

CHECKED BY
DH

APPROVED
DH

Figure D18



AM - Reference Case

	A	B	C	D
A	0	168	0	8
B	121	0	0	174
C	0	0	0	0
D	17	1150	0	0

PM - Reference Case

	A	B	C	D
A	0	119	0	3
B	160	0	0	421
C	0	0	0	0
D	48	916	0	0

AM - Scenario C

	A	B	C	D
A	0	174	0	8
B	116	0	0	168
C	0	0	0	0
D	26	1150	0	0

PM - Scenario C

	A	B	C	D
A	0	134	0	3
B	164	0	0	421
C	0	0	0	0
D	55	928	0	0

PARSONS BRINCKERHOFF
Parsons Brinckerhoff

Kings Orchard
1 Queen St
Bristol
BS2 0HQ

CLIENT/PROJECT
Adur Distric Council
Transport Study of Strategic Development Options in Adur

TITLE
Turning Flows - A259 Wellington Road / B2194 Station Road

DATE
19/12/15

PRODUCED BY
MSR

CHECKED BY
DH

APPROVED
DH

Figure D19

Appendix E

JOURNEY TIME ROUTE MAPS

Journey Time Routes:

1 - Western Road/Busticle Lane
2 - South Street/Grinstead Lane
3 - A283 Old ShorehamRoad /Steyning Road
4 - B2194 Station Road / A293
5- A27
6- A27/A270

PARSONS BRINCKERHOFF

Parsons Brinckerhoff
Queen Victoria House,
Redland Hill, Bristol BS6 6US
Tel: (0117) 933 9300
Fax: (0117) 933 9250

CLIENT/PROJECT
Adur District Council
Transport Study of Strategic Development

TITLE
Journey Time Routes

DATE
18/12/12

SCALE
Not to scale

PRODUCED
LL

CHECKED
RH

APPROVED
SP

Appendix E

Appendix F

GLOSSARY OF TERMS

Appendix F – Glossary of Terms

General Terms

The Passenger Car Unit (PCU) is a means of standardising traffic flow that considers the impact a mode of transport has compared to a single car. Larger vehicles such as buses and heavy goods vehicles are assigned multiple PCUs to reflect their increased length and so additional space required when using the highway network.

Actual flow is the number of vehicles observed passing through a junction or other given point in a network within the modelled period. Any vehicles heading to that point, but unable to complete the counted movement within the modelled period due to congestion or queuing upstream or at the junction itself are not counted in the actual flow.

Demand flow wanting to pass through a junction or other given point in a network within the modelled period. It can be equal to or higher than the actual flow depending on congestion within the network. If the network is free flowing, with no queuing, the demand flow will be equal to the actual flow. If congestion exists in the network that has delayed one or more vehicles upstream of the observation point, the demand flow will be higher.

Saturation flow is an expression of the volume of traffic (often expressed in PCU) that could be expected to pass a stop line (or observation point in the network) in normal free flowing conditions with no opposing traffic.

Capacity is the volume of traffic that can pass a stop line within the allocated green time (at traffic signal controlled junctions) or can enter a roundabout in the gaps left by circulating traffic during a given period.

Modal shift is an assessment of whether people travelling on one mode of transport (such as private cars, buses, cycling etc.) would change to an alternative mode in response to changes in the cost and journey time of one (or more) mode compared to the others available. Estimating the patronage of a new transport option, perhaps following the introduction of a new bus service, also relies on mode shift calculations when assessing the likelihood of travellers to switch onto it.

ARCADY Modelling

ARCADY is a piece of junction modelling software for estimating the capacity of give-way controlled roundabouts. The capacity of each entry to the circulatory is estimated from the geometric layout of the junction, based on academic research into driving behaviour at roundabouts. The expected vehicle demand is also entered and compared by the software to the calculated capacity of each entry.

The performance results are calculated for each time interval, usually 15 minute periods, with the highest values from the modelled hour reported. The main performance statistics reported are the ratio of flow to capacity (RFC), the average queue and delay per vehicle.

- Max RFC (ratio of flow to capacity). The RFC is the ratio of traffic flow to the calculated capacity of each entry to the roundabout. The normal practical maximum RFC value is 0.85, above which there is an increased risk of excessive queues and delays. The maximum RFC from each set of six results was recorded;
- Max Average Queues (PCUs). A predicted value for the expected queue length. The highest average queue from each of the modelled time intervals is recorded for each arm of the junction.

Furnessing

The Furness balancing technique is used when a travel demand matrix is to be factored to meet target row and column totals. In the context of this study, the targets are the forecasted total number of trips departing from or arriving at individual zones. These include existing traffic as well as new development-generated traffic. With Furness a factor is applied to match row totals, then the variation against column targets is used to apply a factor to match those. This continues in a sequential process until both the row and column totals match the targets.

LinSig Modelling

LinSig is a piece of junction modelling software for estimating the capacity of traffic signal controlled junctions. The capacity of each lane of all modelled stop lines can be entered directly from survey data or estimated from the geometric layout. Traffic signal set-up information such as the phases, staging, intergreens, phase delays etc. is entered for use in calculating the capacity of each stop line over the modelled period. The expected vehicle demand is also entered and compared by the software to the calculated capacity of each entry.

The performance results are calculated for the whole modelled period, usually an hour, with the reported results representing the average for the whole period. The main performance statistics reported are:

- Degree of saturation (DoS). This is the ratio of the arriving traffic flow on a given link to the link's capacity, usually expressed as a percentage. A DoS value of 100% indicates that the demand flow exactly matches the capacity and no additional traffic could be accommodated. A DoS value of over 100% indicates that the link is over-saturated, and queues and delays will increase with time. In practice, a DoS value of 90% is normally used as the 'practical' upper threshold because, above this value, there is a higher risk of excessive queues and delays, mainly due to random fluctuations in vehicle arrival rates;
- Mean maximum queues (MMQs) in PCUs. The mean maximum queue is the average, over the modelled hour, of the maximum number of vehicles within a discharging queue, when the rearmost vehicle begins to move away. At high degrees of saturation, actual maximum queues on site, could be significantly longer than the average values predicted by LinSig (particularly later in the period);

- Average delay per PCU (in seconds). LinSig calculates an average value for the modelled hour. At high degrees of saturation, LinSig may significantly underestimate the actual maximum delays which could be experienced;
- Practical reserve capacity (PRC) is an indication of the potential spare capacity of a junction. The PRC value is the percentage change in traffic required to return the busiest stop line within the junction to 90% DoS. A positive PRC value indicates spare capacity, a value of zero no spare capacity and a negative value indicates that the junction has insufficient capacity. The PRC will be zero if the maximum DoS value on any of the links is 90%.

OmniTRANS Modelling

OmniTRANS is a transport modelling software platform allowing the integration of multiple transport modes (such as bus routes, rail services, walking and cycling) and a mode choice model into the assignment process. For this study, a mode choice model has been used to determine the shift of demand between car and public transport trips to estimate the likely level of future demand on the highway network in the study area.

SATURN Modelling

SATURN is a traffic modelling software platform focused on highway network assignment models. The highway travel demand from the OmniTRANS mode choice model was passed to SATURN to assess the likely route choice for each trip and the cumulative effect of all trips on traffic flow volumes, journey times, link and junction delays, total vehicle kilometres etc.

The highway assignment model in SATURN reports the V/C ratio for each modelled link and all allowed turns at the modelled junctions. This compares the traffic volume assigned to each link or turn (V) with the calculated capacity for that movement (C) and is similar to the RFC and DoS used in junction models.

TRANSYT Modelling

TRANSYT is also a piece of junction modelling software used for the assessment of capacity at traffic signal controlled junctions. It is produced by a rival software company to LinSig and is based on the same principles and research, producing directly comparable results.

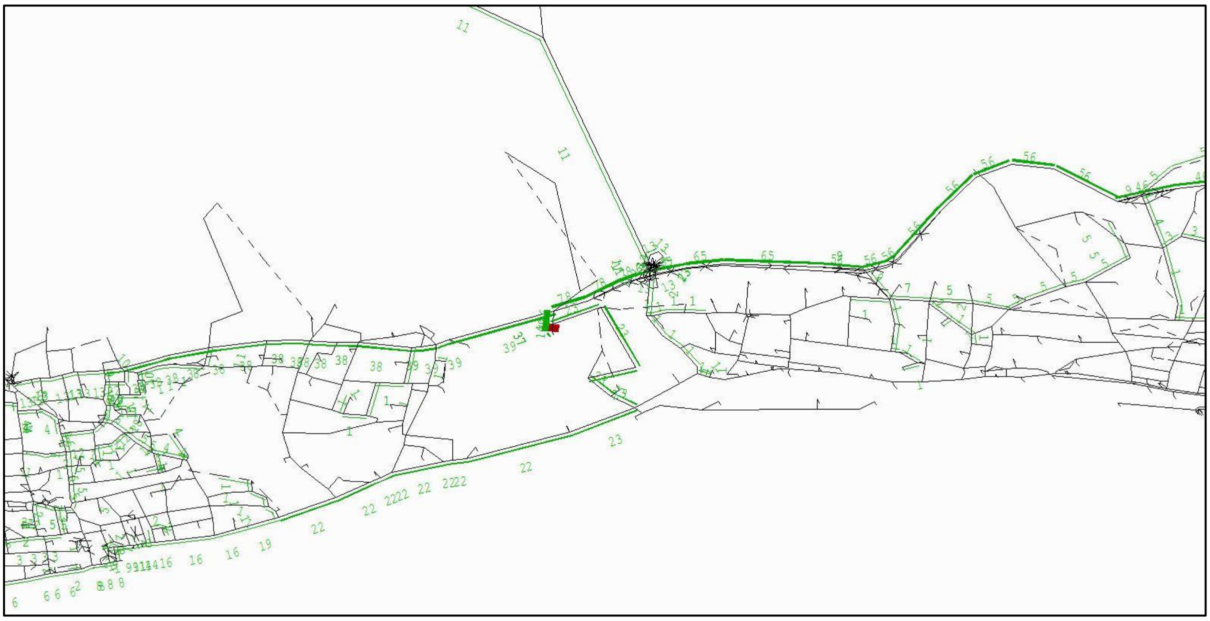
Appendix G

SELECT LINK PLOTS FOR SITE ALLOCATIONS

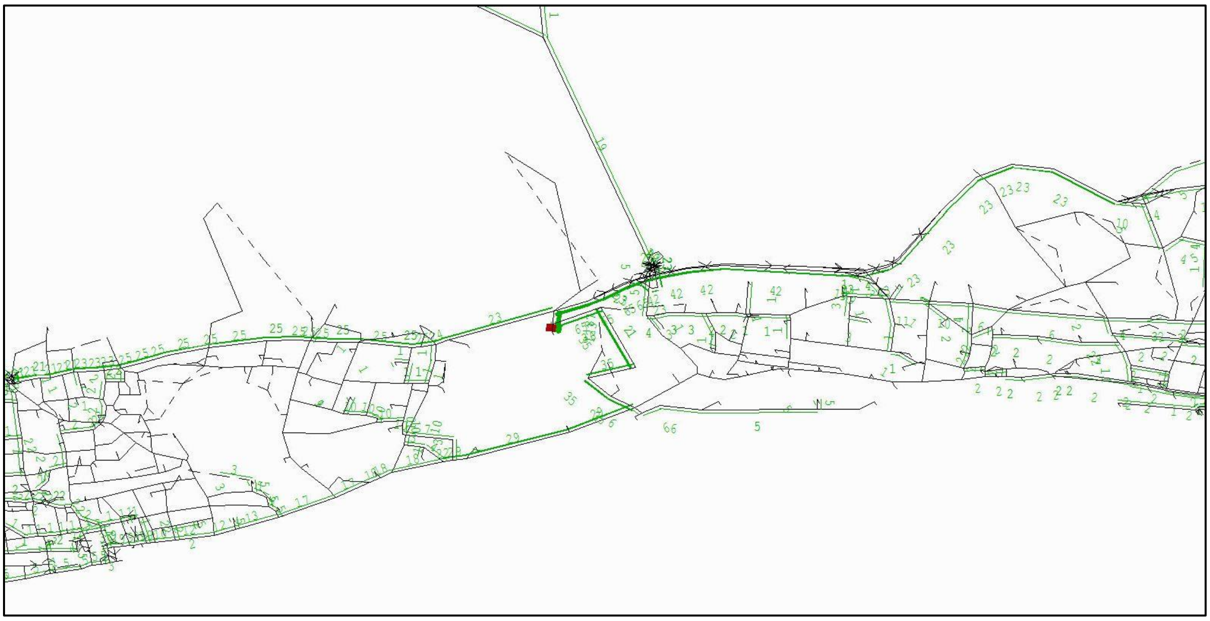
KEY

- → The numbers on each plot relate to the number of vehicle trips to or from a specific development named in individual plots.
- → The thickness of the green band next to each road increases as the volume of traffic on that road becomes greater.
- → Red marks on each plot represent the key access / egress links relating to a specific development.

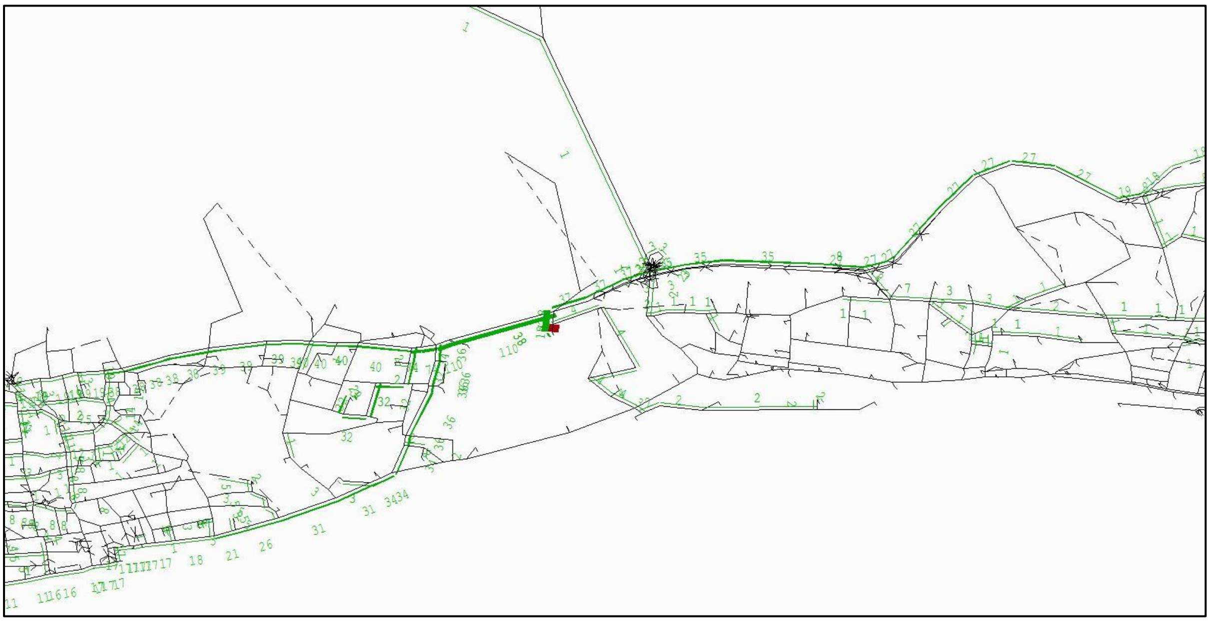
Trips from New Monks Farm, Scenario C AM



Trips to New Monks Farm, Scenario C AM



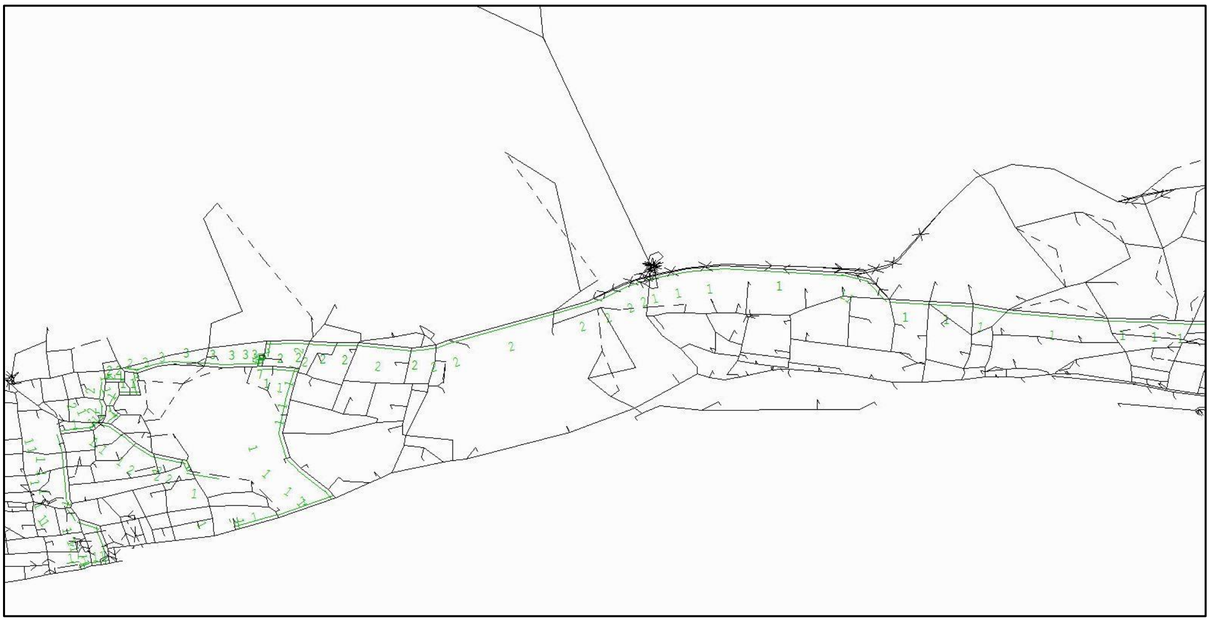
Trips from New Monks Farm, Scenario C PM



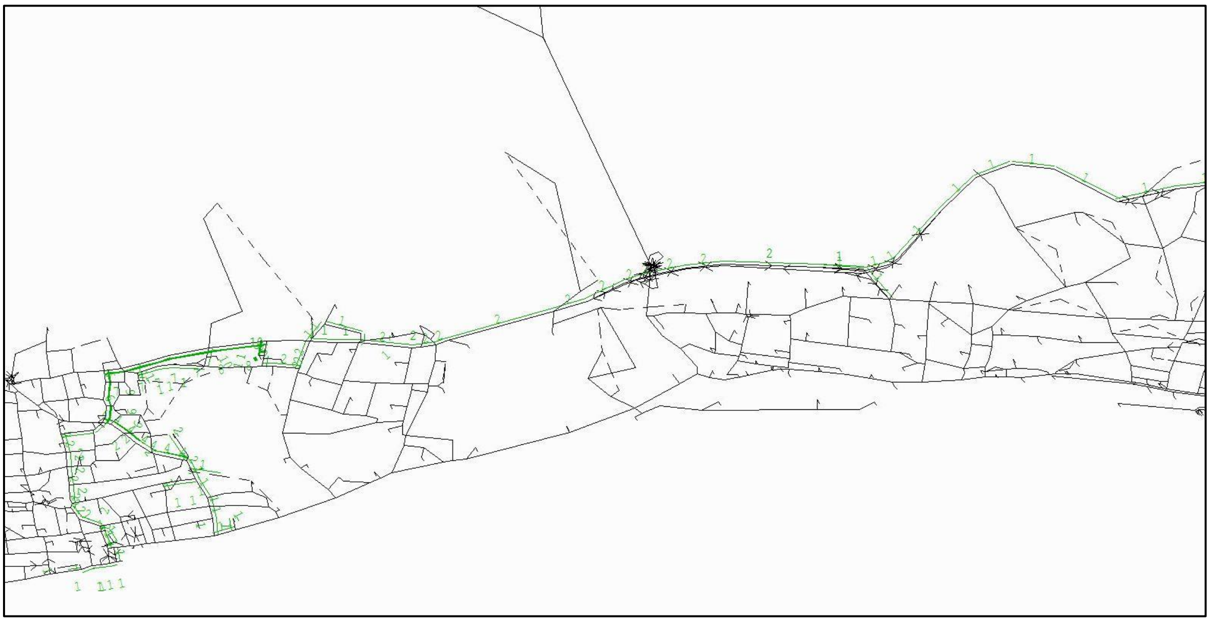
Trips to New Monks Farm, Scenario C PM

Trips from Sompting North, Scenario C AM

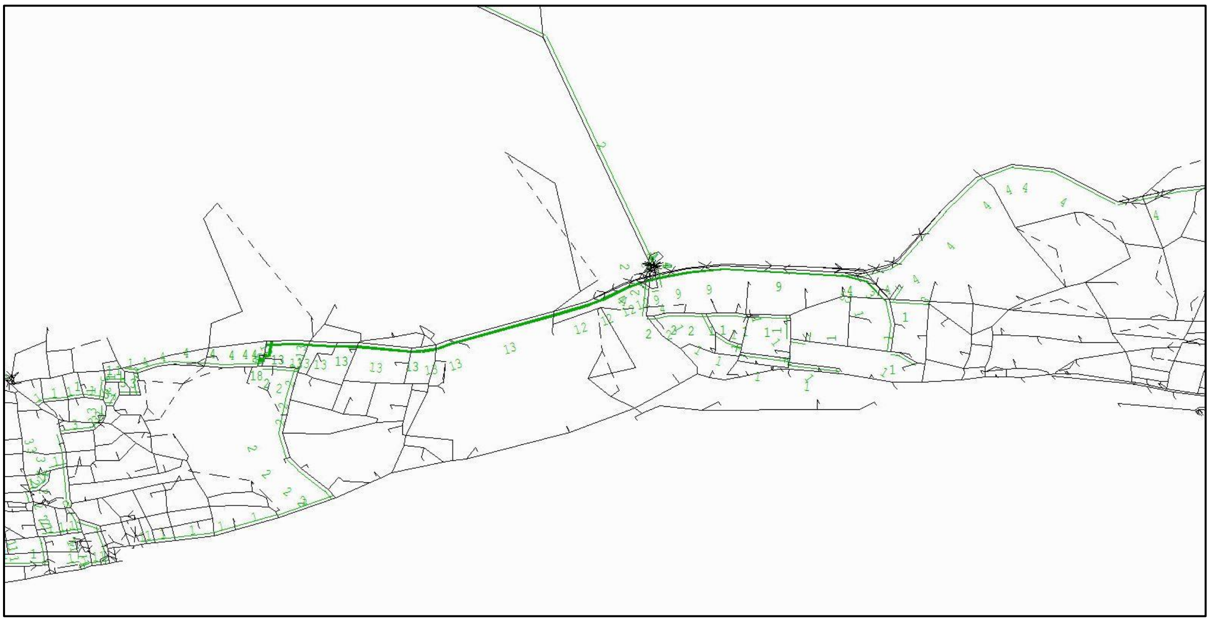
Trips to Sompting North, Scenario C AM



Trips from Sompting North, Scenario C PM



Trips to Sompting North, Scenario C PM

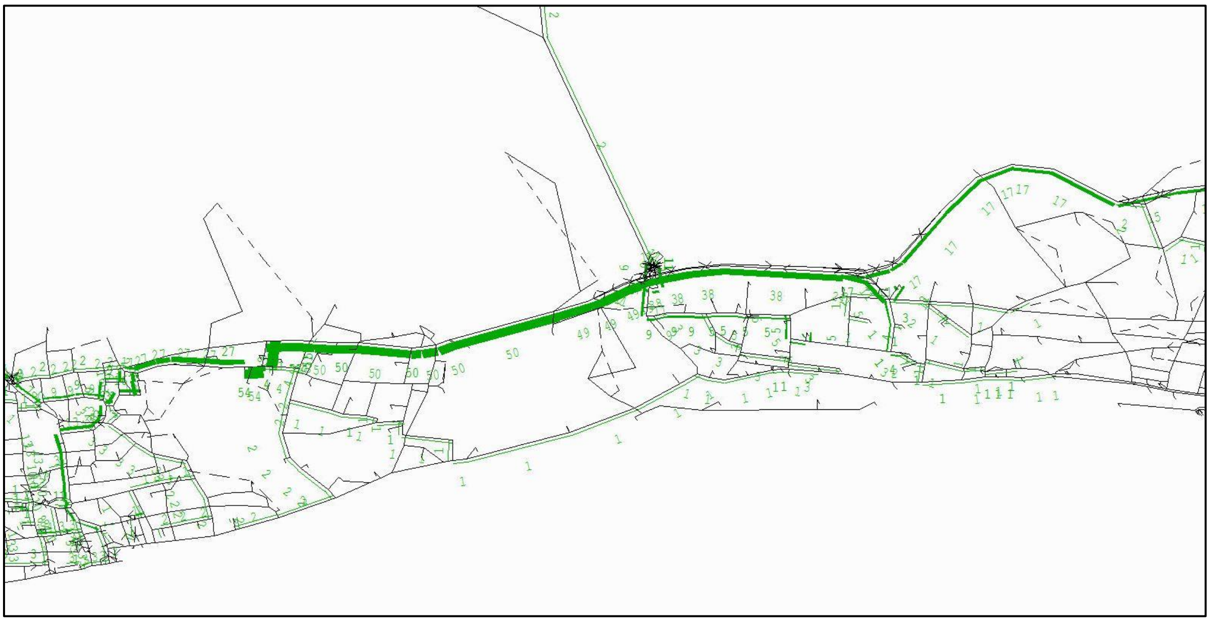


Trips from West Sompting, Scenario C AM

Trips to West Sompting, Scenario C AM

Trips from West Sompting, Scenario C PM

Trips to West Sompting, Scenario C PM

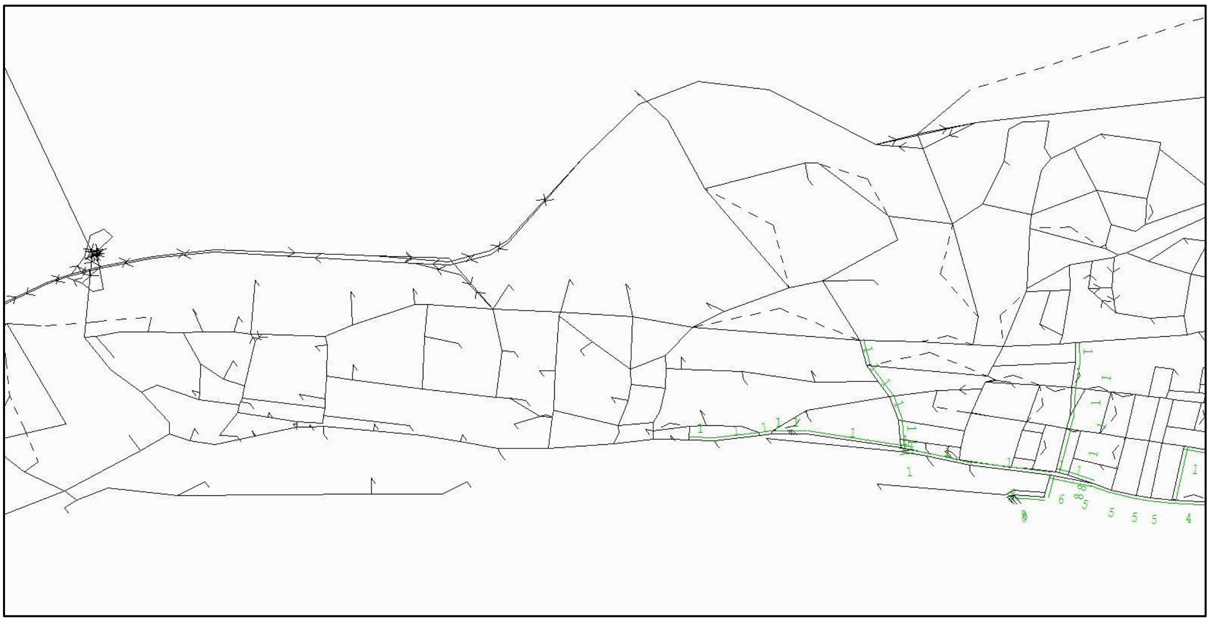


Trips from Aldrington Basin, Scenario C AM

Trips from Aldrington Basin, Scenario C AM

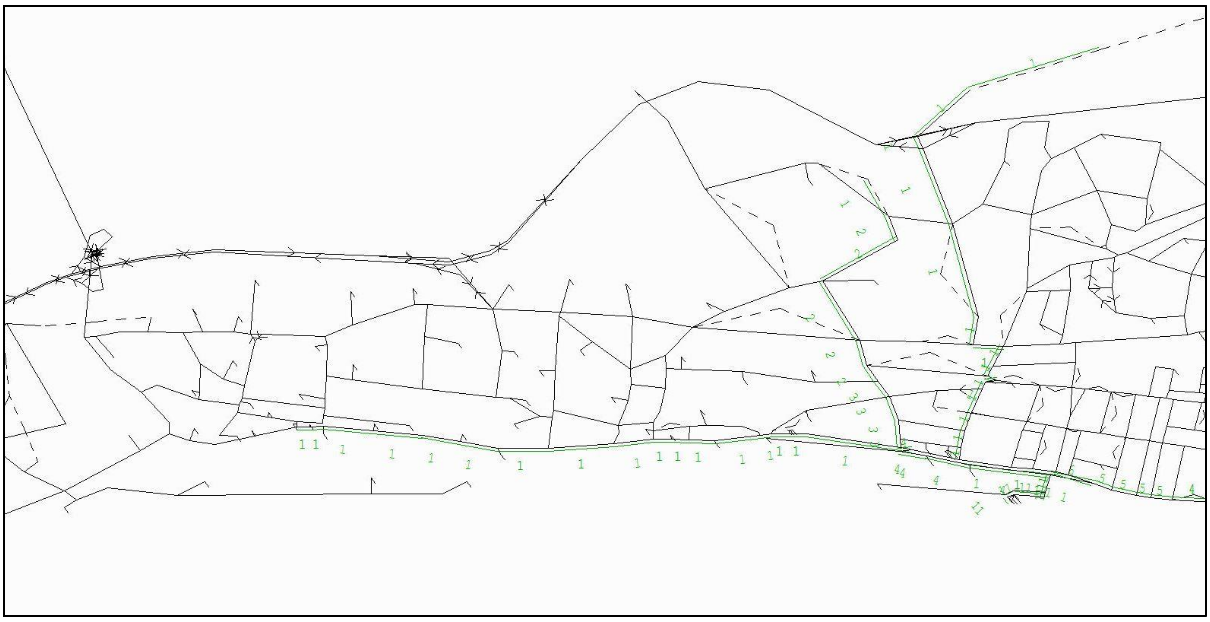
Trips to Aldrington Basin, Scenario C AM

Trips to Aldrington Basin, Scenario C AM



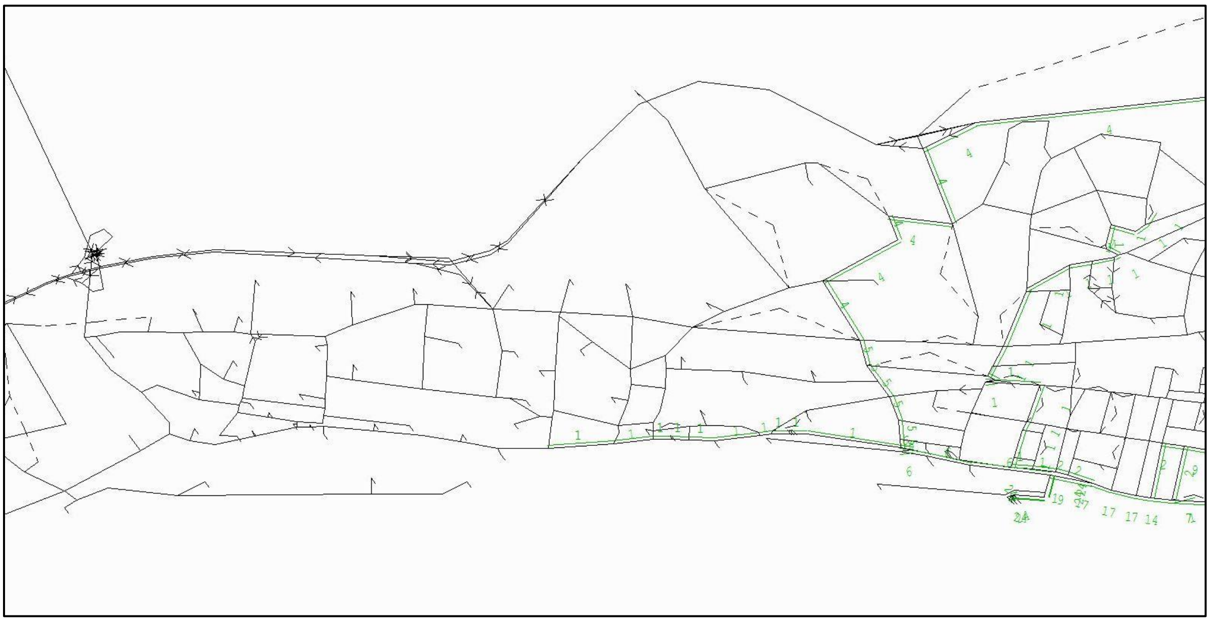
Trips from Aldrington Basin, Scenario C PM

Trips from Aldrington Basin, Scenario C PM



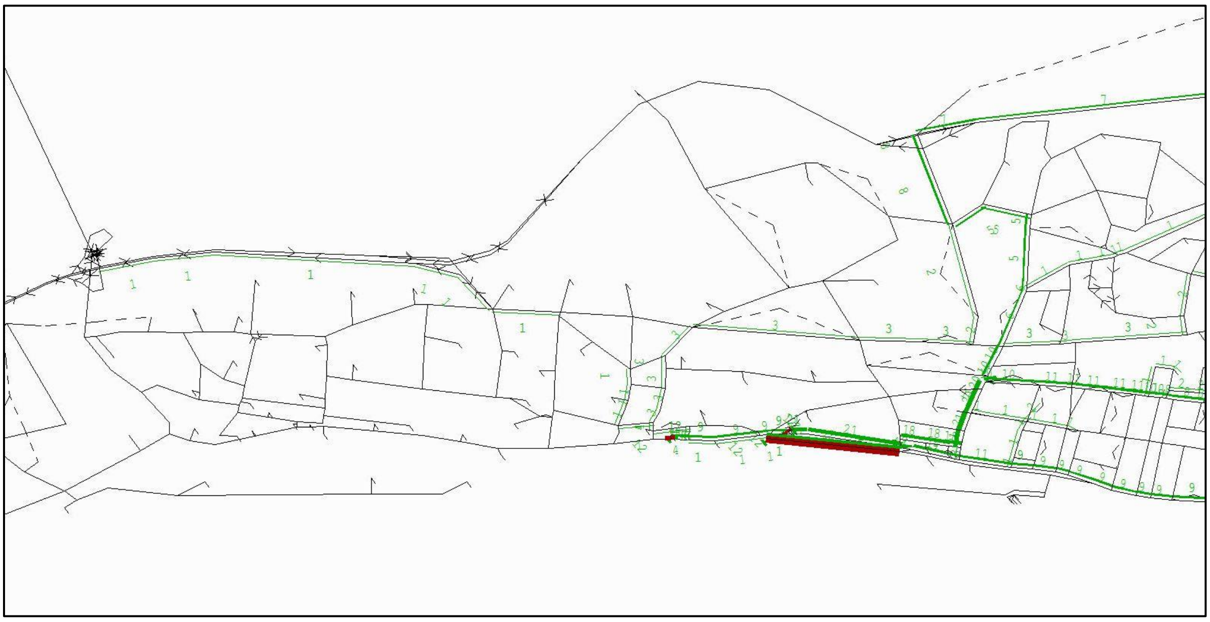
Trips to Aldrington Basin, Scenario C PM

Trips to Aldrington Basin, Scenario C PM



Trips from Southwick Waterfront, Scenario C AM

Trips from Southwick Waterfront, Scenario C AM



Trips to Southwick Waterfront, Scenario C AM

Trips to Southwick Waterfront, Scenario C AM

Trips from Southwick Waterfront, Scenario C PM

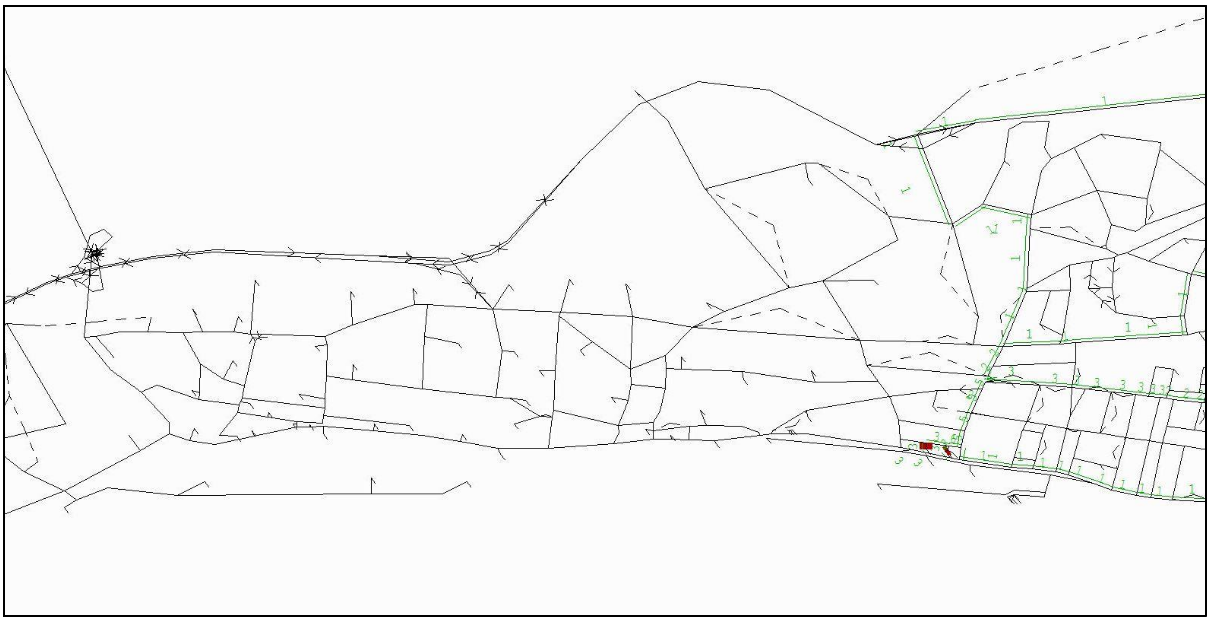
Trips from Southwick Waterfront, Scenario C PM

Trips to Southwick Waterfront, Scenario C PM

Trips to Southwick Waterfront, Scenario C PM

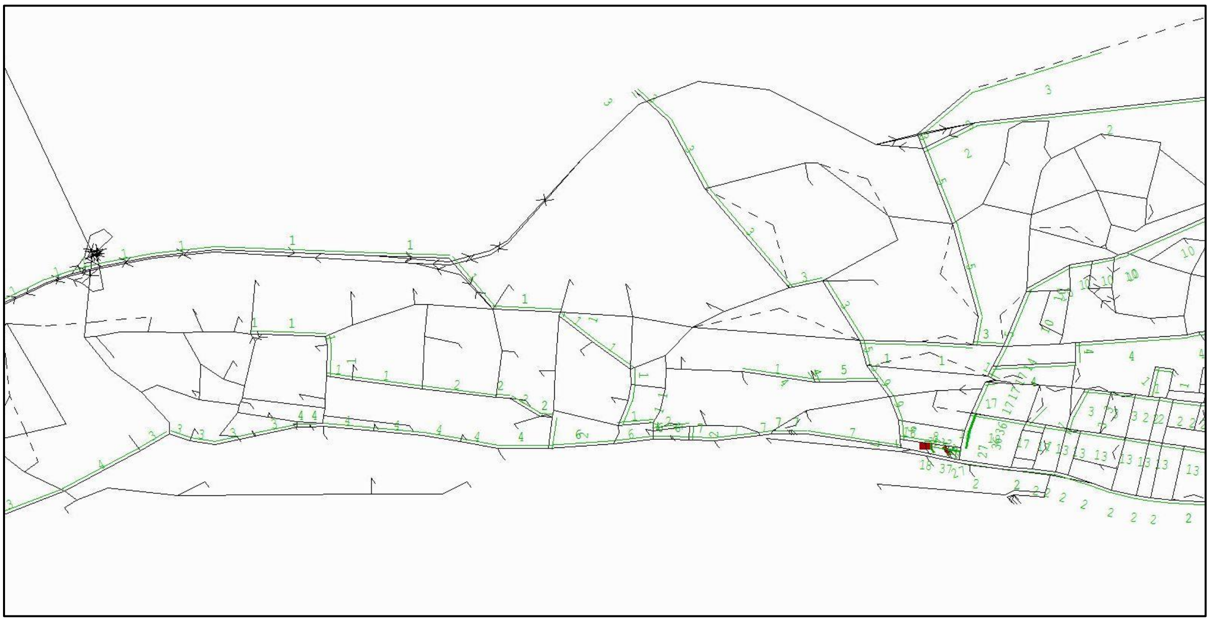
Trips from South Portslade, Scenario C AM

Trips from South Portslade, Scenario C AM



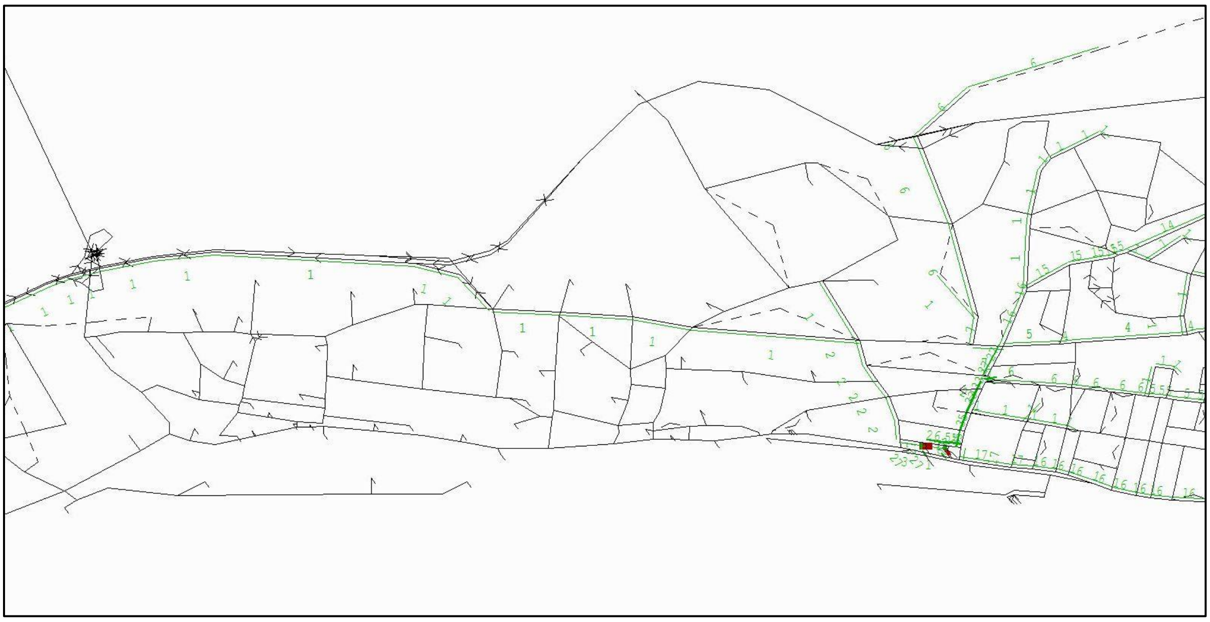
Trips to South Portslade, Scenario C AM

Trips to South Portslade, Scenario C AM



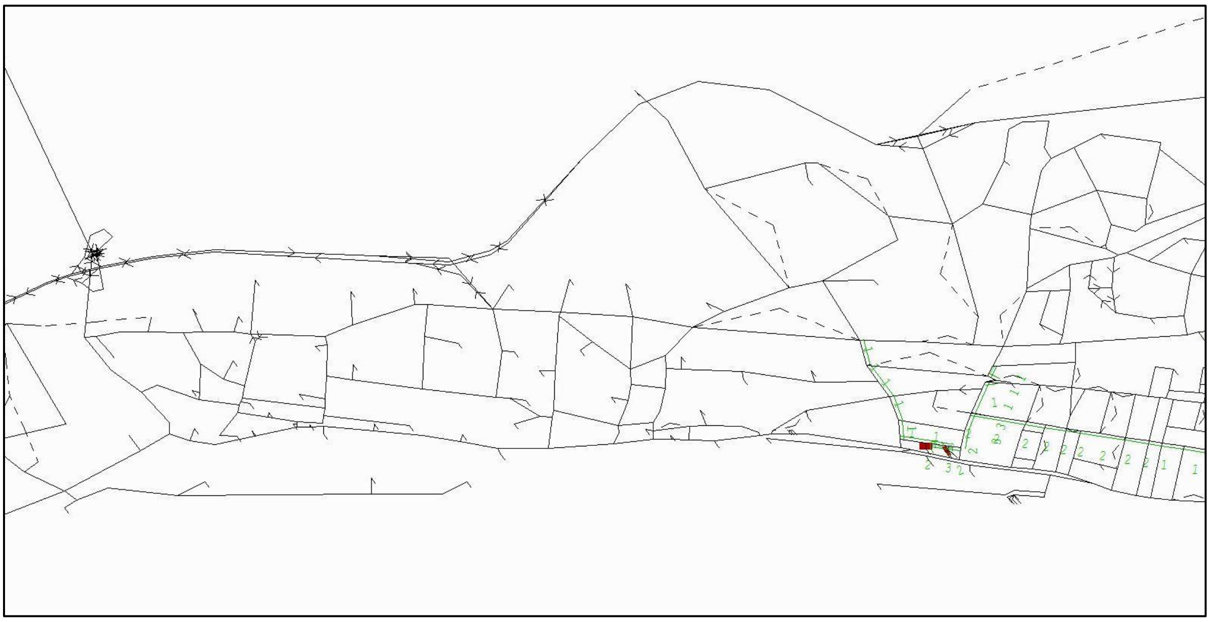
Trips from South Portslade, Scenario C PM

Trips from South Portslade, Scenario C PM

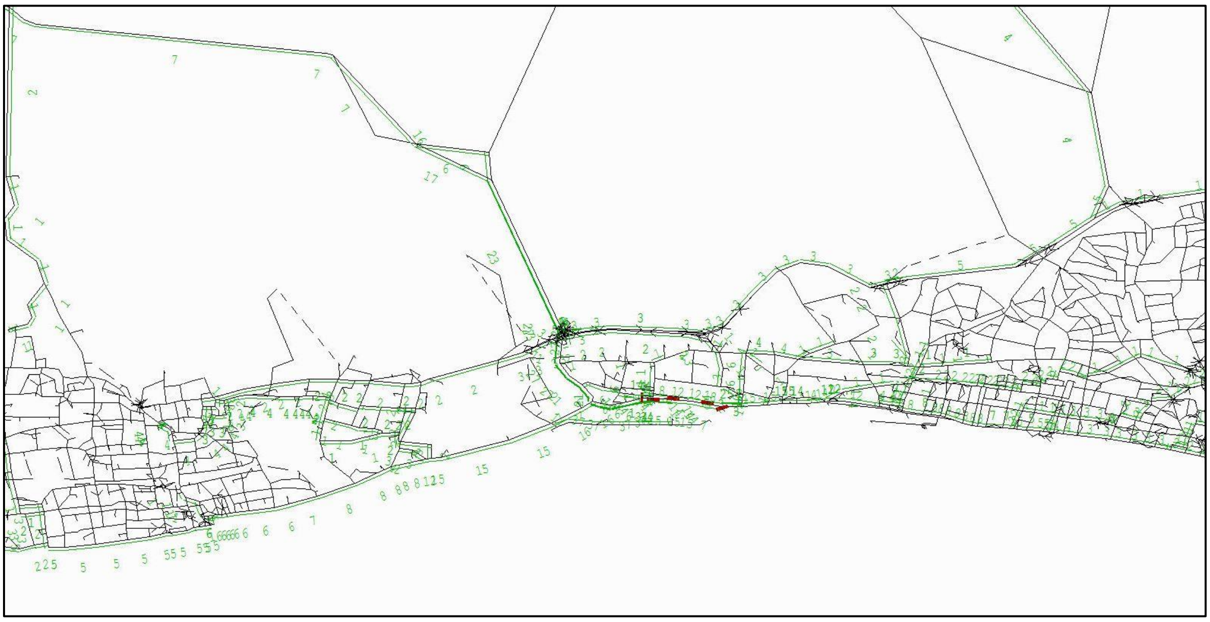


Trips to South Portslade, Scenario C PM

Trips to South Portslade, Scenario C PM

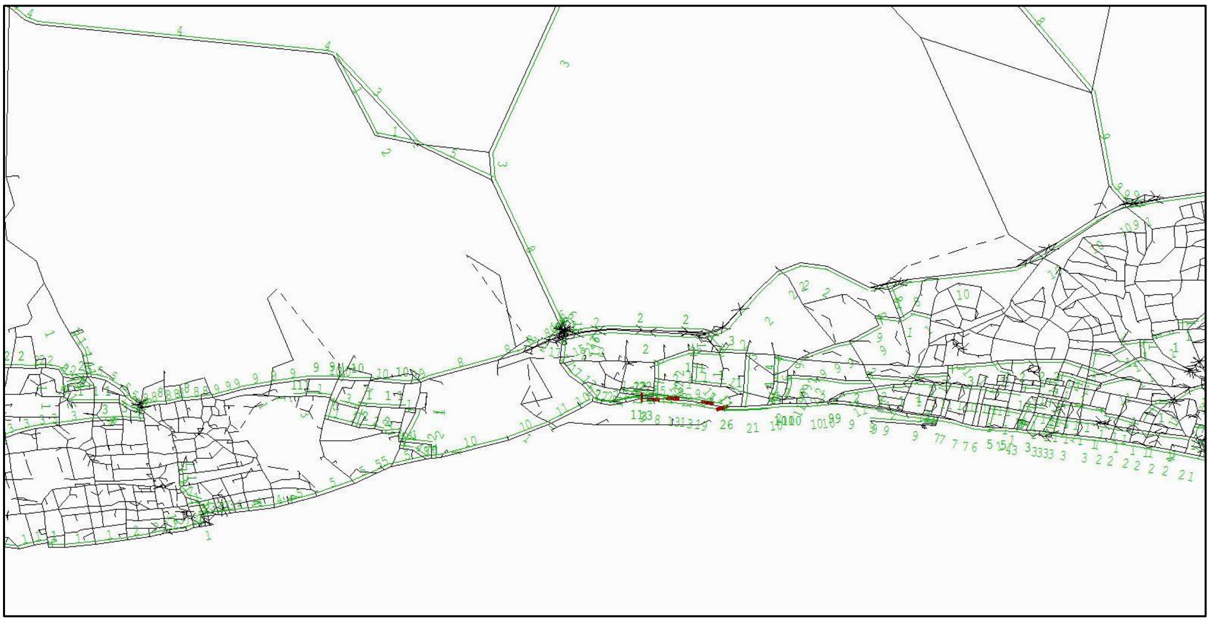


Trips from Western Harbour Arm, Scenario C AM

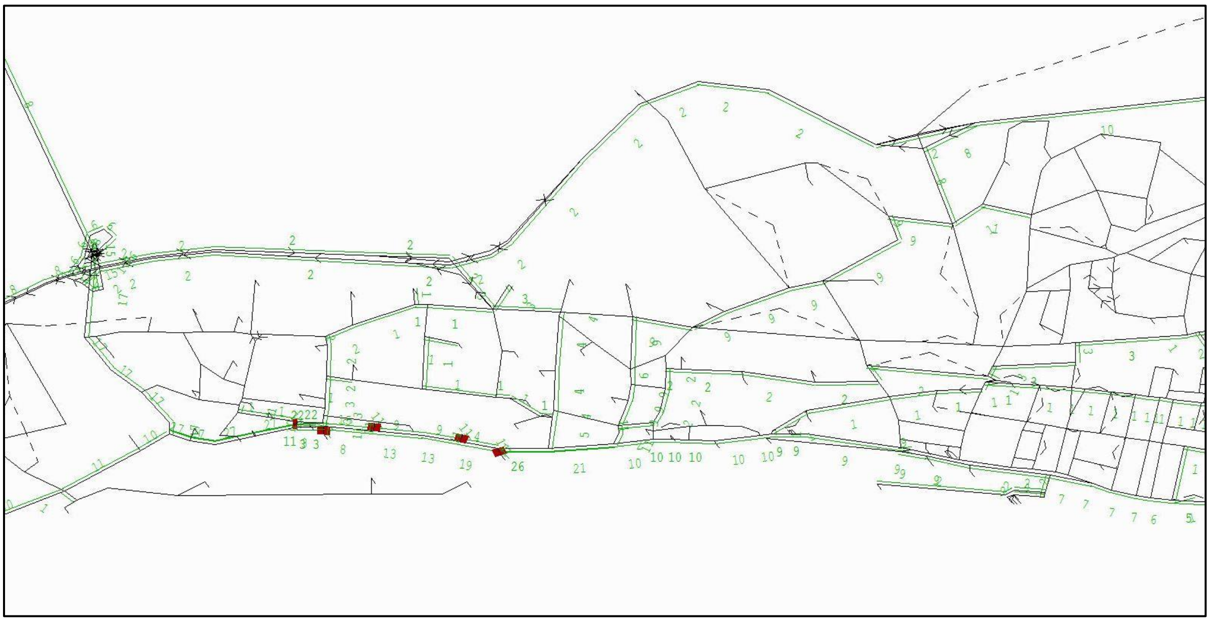


Trips from Western Harbour Arm, Scenario C AM

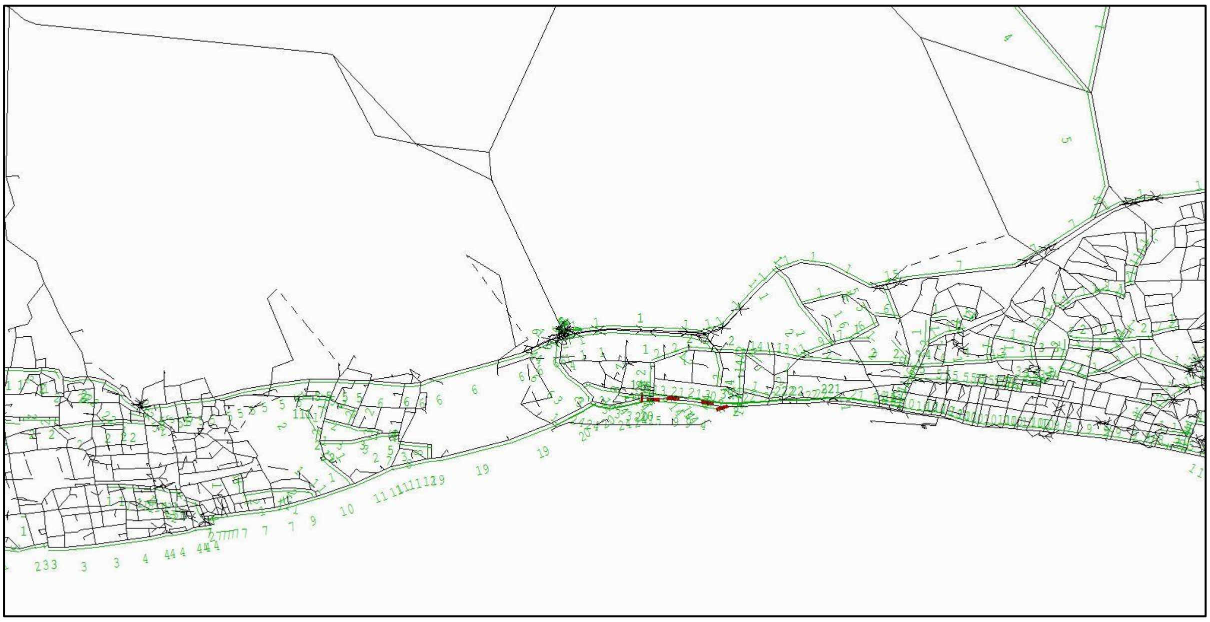
Trips to Western Harbour Arm, Scenario C AM



Trips to Western Harbour Arm, Scenario C AM

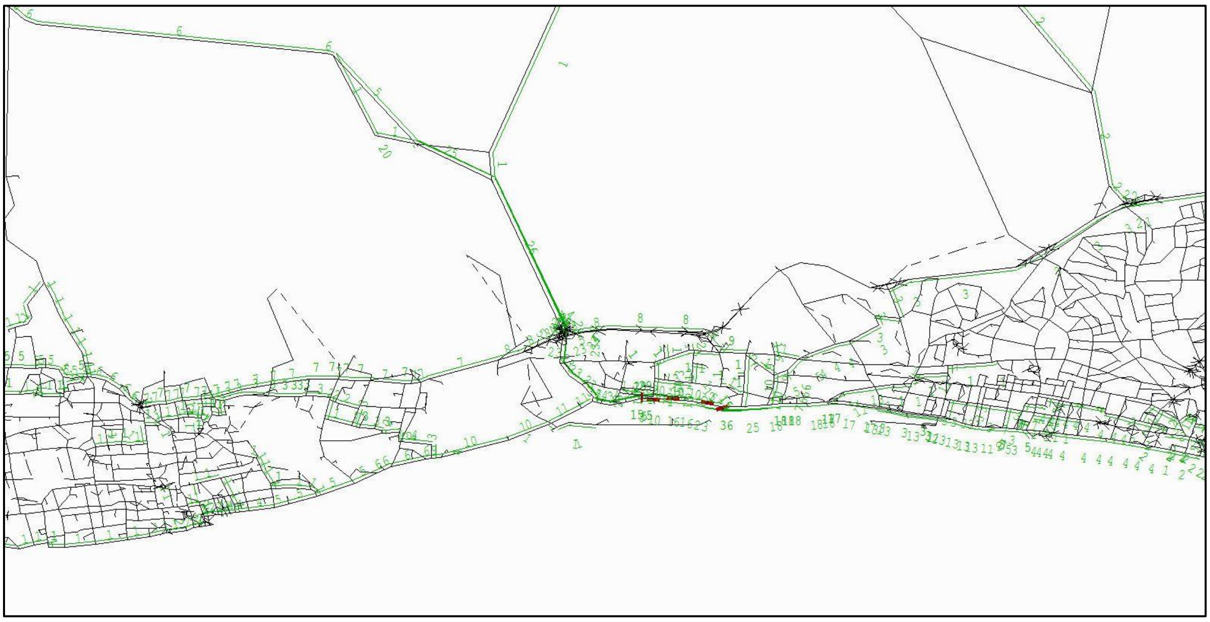


Trips from Western Harbour Arm, Scenario C PM

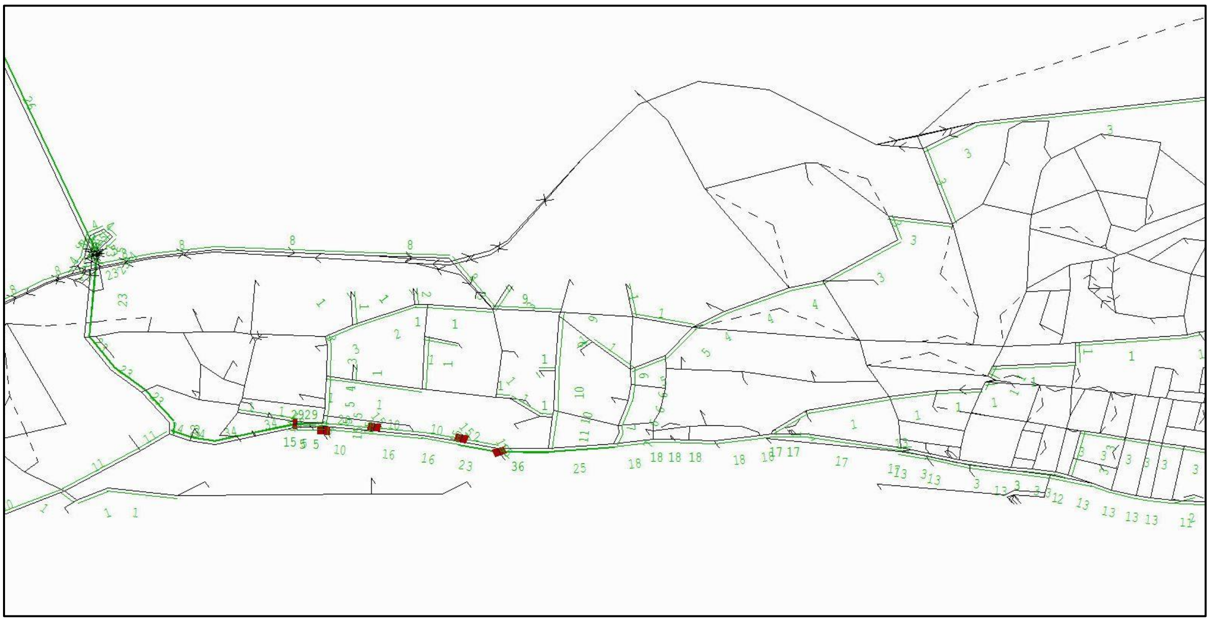


Trips from Western Harbour Arm, Scenario C PM

Trips to Western Harbour Arm, Scenario C PM



Trips to Western Harbour Arm, Scenario C PM



Appendix H

DETAILED MODEL OUTPUT

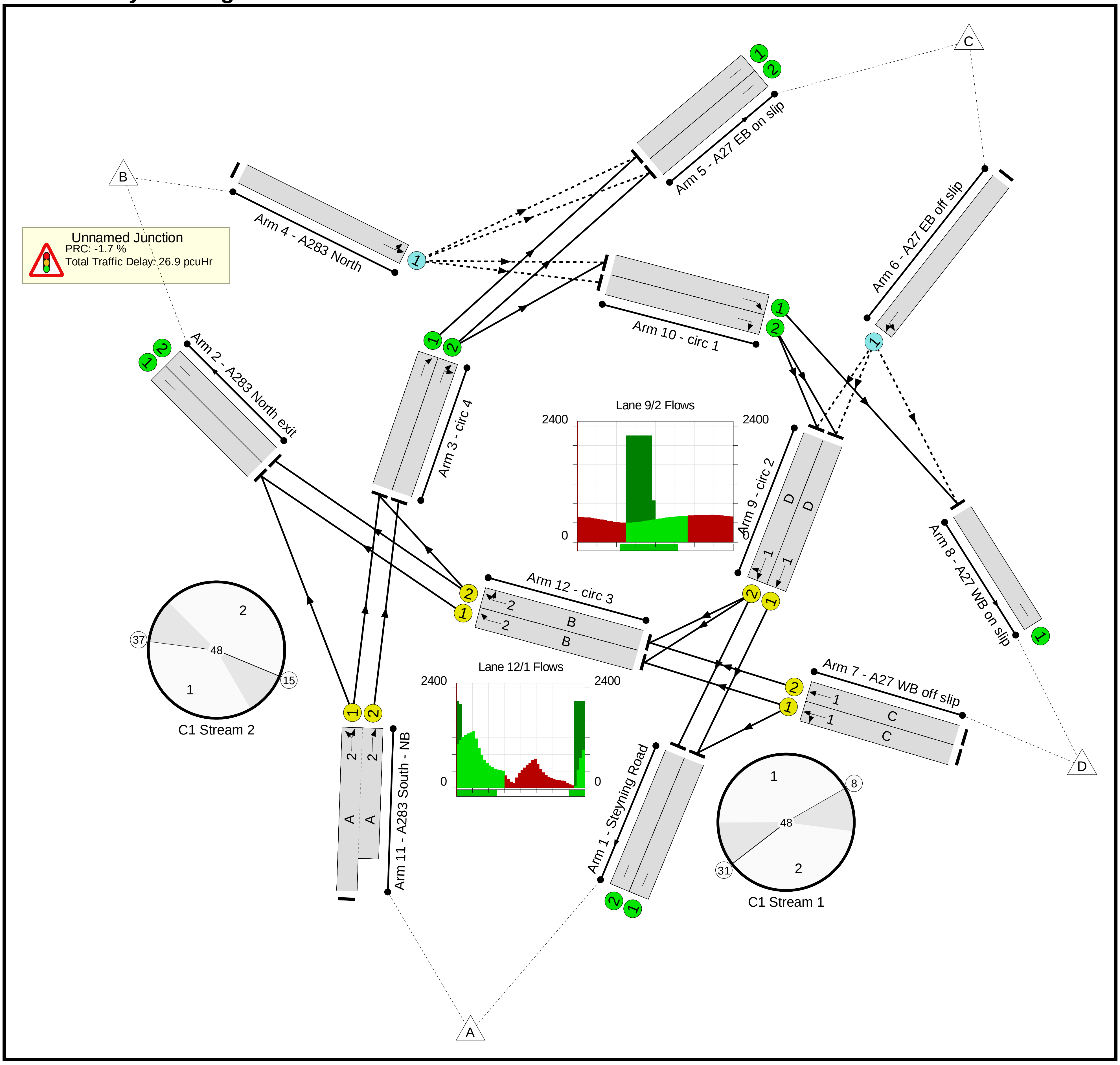
Basic Results Summary
Basic Results Summary

User and Project Details

Project:	
Title:	
Location:	
File name:	A27-A283_SteyningJct_ReducedMitigation_2SigEntry.lsg3x
Author:	
Company:	
Address:	
Notes:	

Scenario 1: 'Ref Case AM' (FG1: 'Ref Case AM', Plan 1: 'Network Control Plan 1')

Network Layout Diagram



Basic Results Summary

Basic Results Summary

Network Results

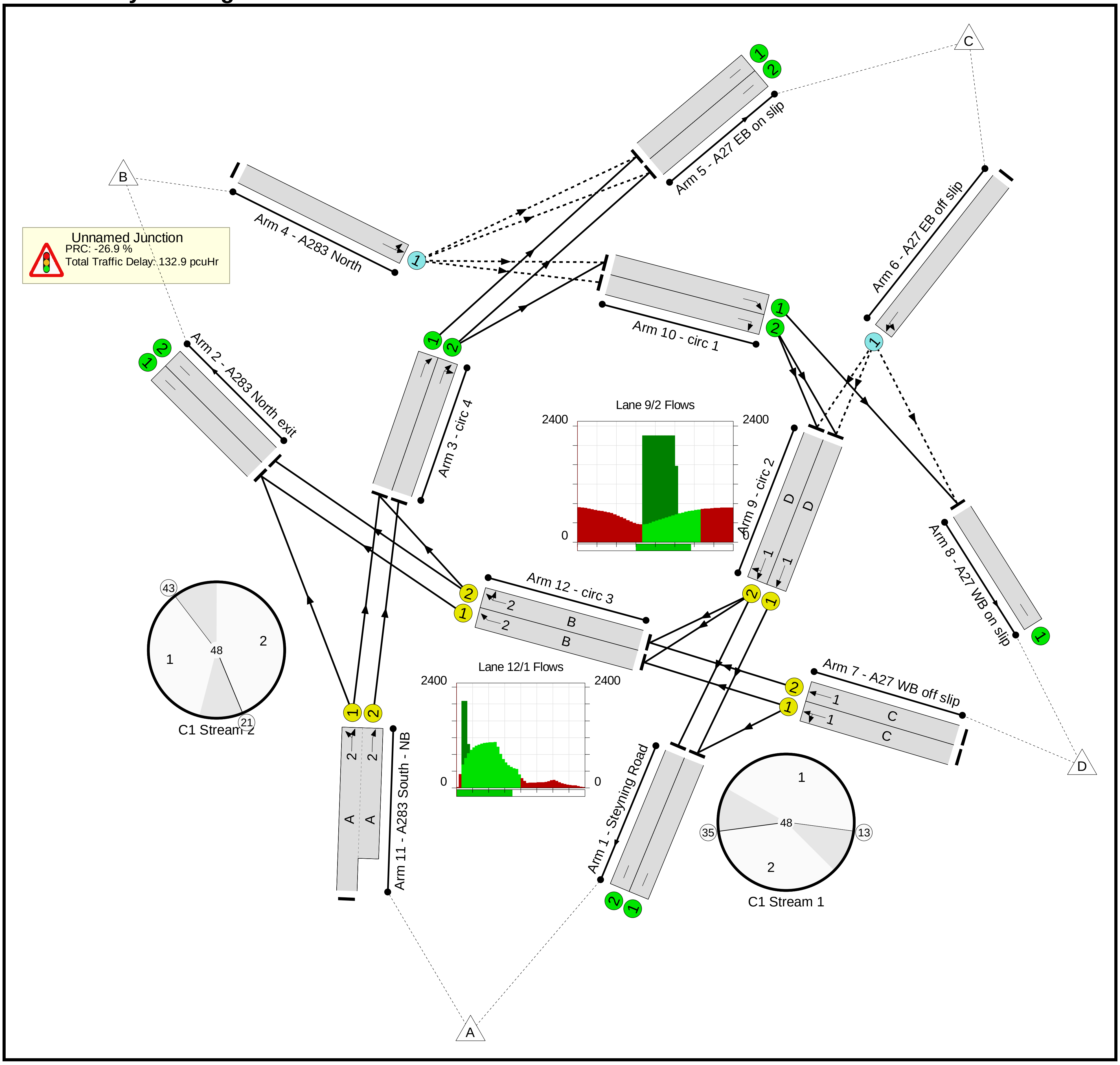
Item	Lane Description	Lane Type	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Mean Max Queue (pcu)
Network	**-**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**91.5%**	**26.9**	**-**	**-**
Unnamed Junction	**-**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**91.5%**	**26.9**	**-**	**-**
3/1	circ 4 Ahead	U	-		-	-	-	62	2065	2065	3.0%	0.0	0.9	0.0
3/2	circ 4 Ahead Right	U	-		-	-	-	614	2205	2205	27.8%	0.2	1.1	0.2
4/1	A283 North Left Ahead	O	-		-	-	-	1683	2643	1839	91.5%	7.4	15.7	23.3
6/1	A27 EB off slip Left Ahead	O	-		-	-	-	583	2958	2092	27.9%	0.2	1.2	0.2
7/1	A27 WB off slip Left Ahead	U	C		1	20	-	587	2115	925	63.4%	2.6	15.8	6.9
7/2	A27 WB off slip Ahead	U	C		1	20	-	607	2205	965	62.9%	2.6	15.5	7.1
9/1	circ 2 Ahead	U	D		1	18	-	439	2065	817	53.7%	2.1	17.4	4.9
9/2	circ 2 Ahead Right	U	D		1	18	-	493	2205	873	56.5%	2.3	16.8	5.7
10/1	circ 1 Ahead	U	-		-	-	-	337	2205	2205	15.3%	0.1	1.0	0.1
10/2	circ 1 Right	U	-		-	-	-	349	2155	2155	16.2%	0.1	1.0	0.1
11/1+11/2	A283 South - NB Left Ahead	U	A		1	17	-	1218	2115:2255	1558	78.2%	6.2	18.2	8.8
12/1	circ 3 Ahead	U	B		1	21	-	534	2065	946	56.4%	1.4	9.7	3.8
12/2	circ 3 Ahead Right	U	B		1	21	-	703	2205	1011	69.6%	1.8	9.0	3.7

C1	Stream: 1	PRC for Signalled Lanes (%):	41.9	Total Delay for Signalled Lanes (pcuHr):	9.60	Cycle Time (s):	48
C1	Stream: 2	PRC for Signalled Lanes (%):	15.1	Total Delay for Signalled Lanes (pcuHr):	9.38	Cycle Time (s):	48
		PRC Over All Lanes (%):	-1.7	Total Delay Over All Lanes(pcuHr):	26.93		

Basic Results Summary

Scenario 2: 'Ref Case PM' (FG2: 'Ref Case PM', Plan 1: 'Network Control Plan 1')

Network Layout Diagram



Basic Results Summary

Network Results

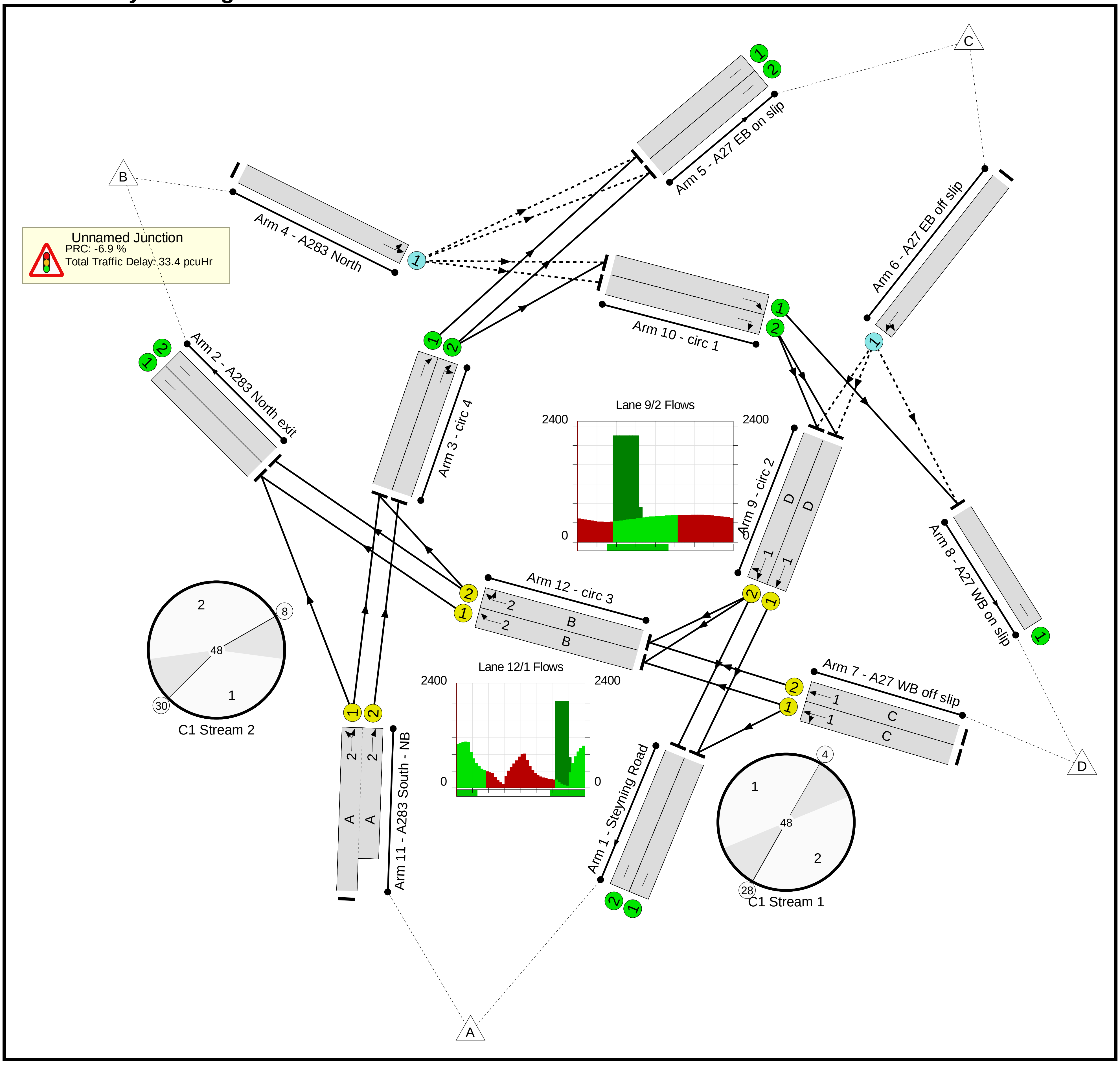
Item	Lane Description	Lane Type	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Mean Max Queue (pcu)
Network	**-**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**114.2%**	**132.9**	**-**	**-**
Unnamed Junction	**-**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**114.2%**	**132.9**	**-**	**-**
3/1	circ 4 Ahead	U	-		-	-	-	1	2065	2065	0.0%	0.0	0.9	0.0
3/2	circ 4 Ahead Right	U	-		-	-	-	608	2205	2205	24.1%	0.2	1.1	0.2
4/1	A283 North Left Ahead	O	-		-	-	-	1892	2643	1993	94.9%	10.2	19.4	29.1
6/1	A27 EB off slip Left Ahead	O	-		-	-	-	422	2958	1676	25.2%	0.2	1.4	0.2
7/1	A27 WB off slip Left Ahead	U	C		1	21	-	755	2115	969	77.9%	4.0	19.2	10.1
7/2	A27 WB off slip Ahead	U	C		1	21	-	740	2205	1011	73.2%	3.5	17.2	9.4
9/1	circ 2 Ahead	U	D		1	17	-	534	2065	774	69.0%	3.2	21.7	6.9
9/2	circ 2 Ahead Right	U	D		1	17	-	585	2205	827	70.7%	3.5	21.6	7.6
10/1	circ 1 Ahead	U	-		-	-	-	391	2205	2205	17.0%	0.1	1.0	0.1
10/2	circ 1 Right	U	-		-	-	-	697	2155	2155	32.3%	0.2	1.2	0.2
11/1+11/2	A283 South - NB Left Ahead	U	A		1	17	-	1495	2115:2255	1309	114.2%	105.5	254.0	113.1
12/1	circ 3 Ahead	U	B		1	21	-	434	2065	946	45.9%	0.7	5.8	1.6
12/2	circ 3 Ahead Right	U	B		1	21	-	740	2205	1011	73.2%	1.6	7.6	2.6

C1 Stream: 1 PRC for Signalled Lanes (%): 15.6 Total Delay for Signalled Lanes (pcuHr): 14.29 Cycle Time (s): 48
C1 Stream: 2 PRC for Signalled Lanes (%): -26.9 Total Delay for Signalled Lanes (pcuHr): 107.73 Cycle Time (s): 48
PRC Over All Lanes (%): -26.9 Total Delay Over All Lanes(pcuHr): 132.87

Basic Results Summary

Scenario 3: 'Scenario C with Mitigation AM' (FG3: 'Scenario C with Mitigation AM', Plan 1: 'Network Control Plan 1')

Network Layout Diagram



Basic Results Summary

Network Results

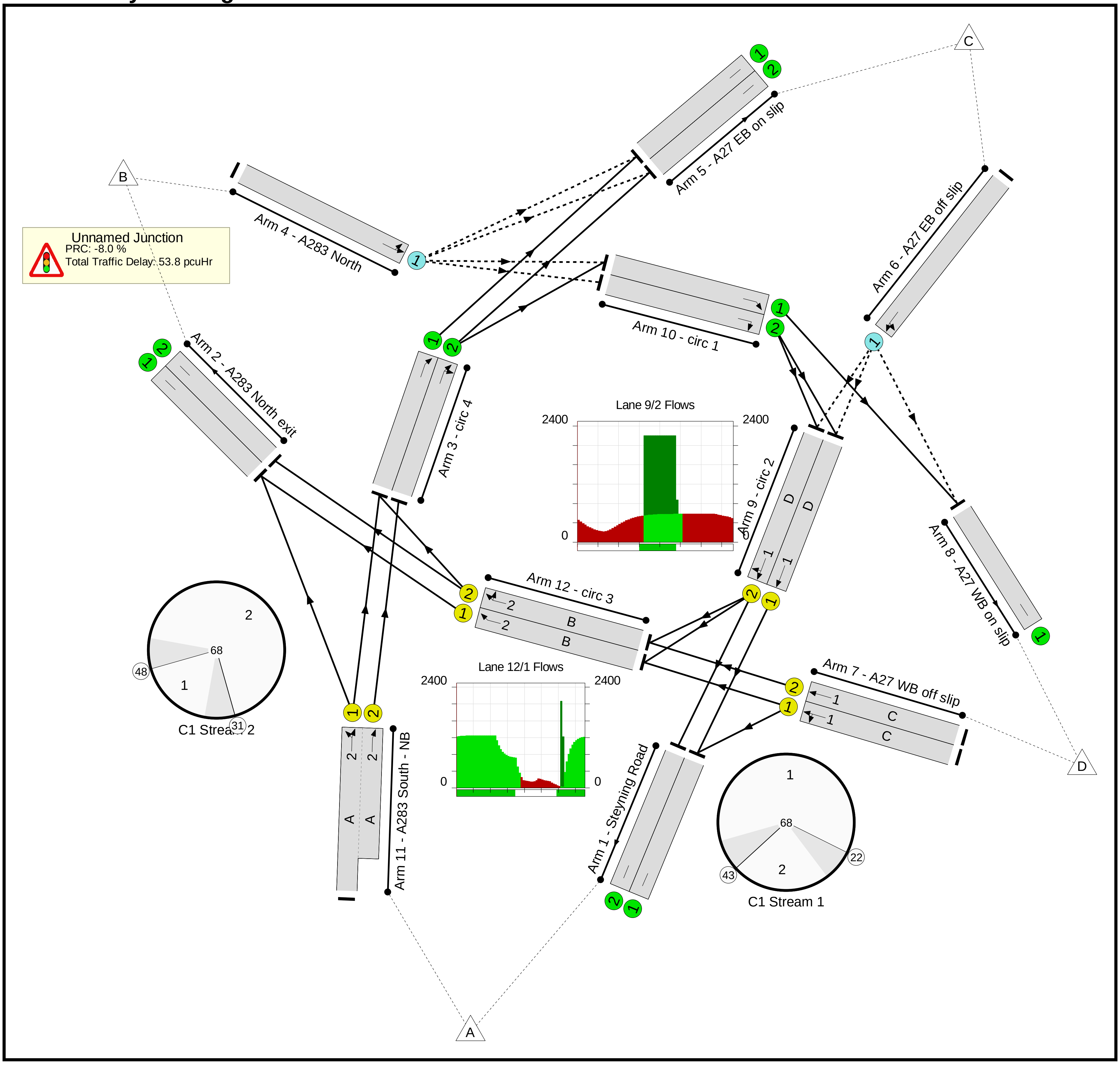
Item	Lane Description	Lane Type	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Mean Max Queue (pcu)
Network	**-**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**96.2%**	**33.4**	**-**	**-**
Unnamed Junction	**-**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**96.2%**	**33.4**	**-**	**-**
3/1	circ 4 Ahead	U	-		-	-	-	22	2065	2065	1.1%	0.0	0.9	0.0
3/2	circ 4 Ahead Right	U	-		-	-	-	644	2205	2205	29.2%	0.2	1.2	0.2
4/1	A283 North Left Ahead	O	-		-	-	-	1771	2643	1841	96.2%	12.5	25.4	31.0
6/1	A27 EB off slip Left Ahead	O	-		-	-	-	619	2958	1825	33.9%	0.3	1.5	0.3
7/1	A27 WB off slip Left Ahead	U	C		1	19	-	591	2115	881	67.1%	2.9	17.5	7.2
7/2	A27 WB off slip Ahead	U	C		1	19	-	606	2205	919	66.0%	2.9	17.0	7.4
9/1	circ 2 Ahead	U	D		1	19	-	449	2065	860	52.2%	2.0	15.7	4.7
9/2	circ 2 Ahead Right	U	D		1	19	-	506	2205	919	55.1%	2.2	15.4	5.6
10/1	circ 1 Ahead	U	-		-	-	-	545	2205	2205	24.7%	0.2	1.1	0.2
10/2	circ 1 Right	U	-		-	-	-	336	2155	2155	15.6%	0.1	1.0	0.1
11/1+11/2	A283 South - NB Left Ahead	U	A		1	17	-	1278	2115:2255	1557	82.1%	7.0	19.6	9.6
12/1	circ 3 Ahead	U	B		1	21	-	502	2065	946	53.0%	1.5	10.7	3.5
12/2	circ 3 Ahead Right	U	B		1	21	-	687	2205	1011	68.0%	1.8	9.7	3.1

C1 Stream: 1 PRC for Signalled Lanes (%): 34.2 Total Delay for Signalled Lanes (pcuHr): 9.85 Cycle Time (s): 48
C1 Stream: 2 PRC for Signalled Lanes (%): 9.7 Total Delay for Signalled Lanes (pcuHr): 10.29 Cycle Time (s): 48
PRC Over All Lanes (%): -6.9 Total Delay Over All Lanes(pcuHr): 33.38

Basic Results Summary

Scenario 4: 'Scenario C with Mitigation PM' (FG4: 'Scenario C with Mitigation PM', Plan 1: 'Network Control Plan 1')

Network Layout Diagram



Basic Results Summary

Network Results

Item	Lane Description	Lane Type	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Mean Max Queue (pcu)
Network	**-**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**97.2%**	**53.8**	**-**	**-**
Unnamed Junction	**-**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**97.2%**	**53.8**	**-**	**-**
3/1	circ 4 Ahead	U	-		-	-	-	241	2065	2065	11.7%	0.1	1.0	0.1
3/2	circ 4 Ahead Right	U	-		-	-	-	365	2205	2205	16.6%	0.1	1.0	0.1
4/1	A283 North Left Ahead	O	-		-	-	-	2007	2643	2066	97.2%	15.6	28.0	46.1
6/1	A27 EB off slip Left Ahead	O	-		-	-	-	293	2958	1422	20.6%	0.1	1.6	0.1
7/1	A27 WB off slip Left Ahead	U	C		1	42	-	1192	2115	1337	89.1%	7.4	22.3	22.8
7/2	A27 WB off slip Ahead	U	C		1	42	-	1217	2205	1394	87.3%	6.8	20.0	21.9
9/1	circ 2 Ahead	U	D		1	16	-	448	2065	516	86.8%	6.0	48.6	10.9
9/2	circ 2 Ahead Right	U	D		1	16	-	484	2205	551	87.8%	6.6	48.9	11.9
10/1	circ 1 Ahead	U	-		-	-	-	609	2205	2205	27.6%	0.2	1.1	0.2
10/2	circ 1 Right	U	-		-	-	-	639	2155	2155	29.7%	0.2	1.2	0.2
11/1+11/2	A283 South - NB Left Ahead	U	A		1	12	-	707	2115:2255	835	84.6%	7.9	40.0	9.2
12/1	circ 3 Ahead	U	B		1	46	-	738	2065	1427	51.7%	0.7	3.4	1.4
12/2	circ 3 Ahead Right	U	B		1	46	-	1221	2205	1524	80.1%	2.1	6.2	2.5

C1 Stream: 1 PRC for Signalled Lanes (%): 1.0 Total Delay for Signalled Lanes (pcuHr): 26.77 Cycle Time (s): 68
C1 Stream: 2 PRC for Signalled Lanes (%): 6.4 Total Delay for Signalled Lanes (pcuHr): 10.67 Cycle Time (s): 68
PRC Over All Lanes (%): -8.0 Total Delay Over All Lanes(pcuHr): 53.78

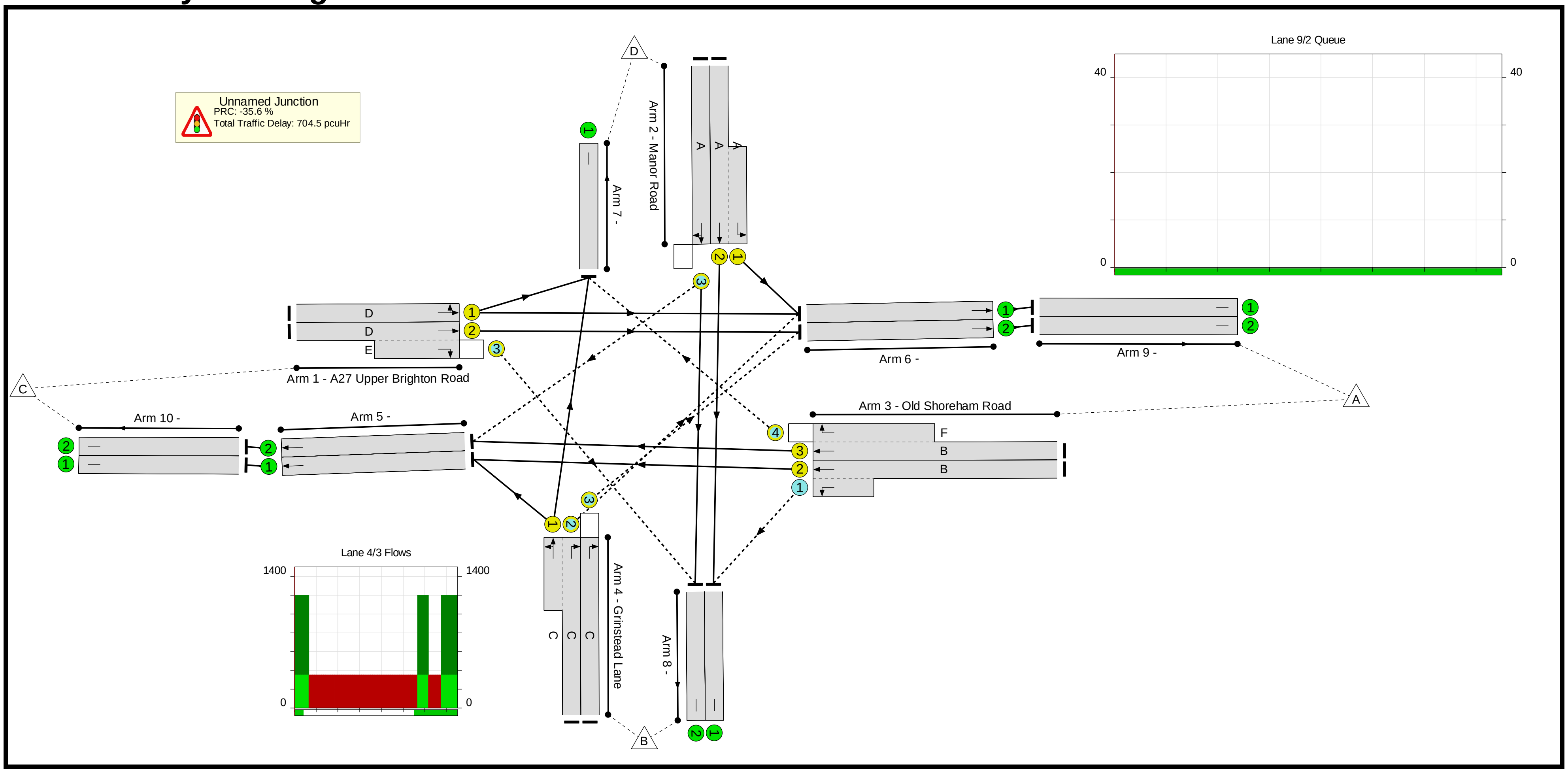
Basic Results Summary

User and Project Details

Project:	
Title:	
Location:	
File name:	A27_NorthLancingRbt_v5.1.lsg3x
Author:	
Company:	
Address:	
Notes:	

Scenario 1: 'AM Peak' (FG1: 'AM peak', Plan 1: 'Network Control Plan 1')

Network Layout Diagram



Basic Results Summary

Network Results

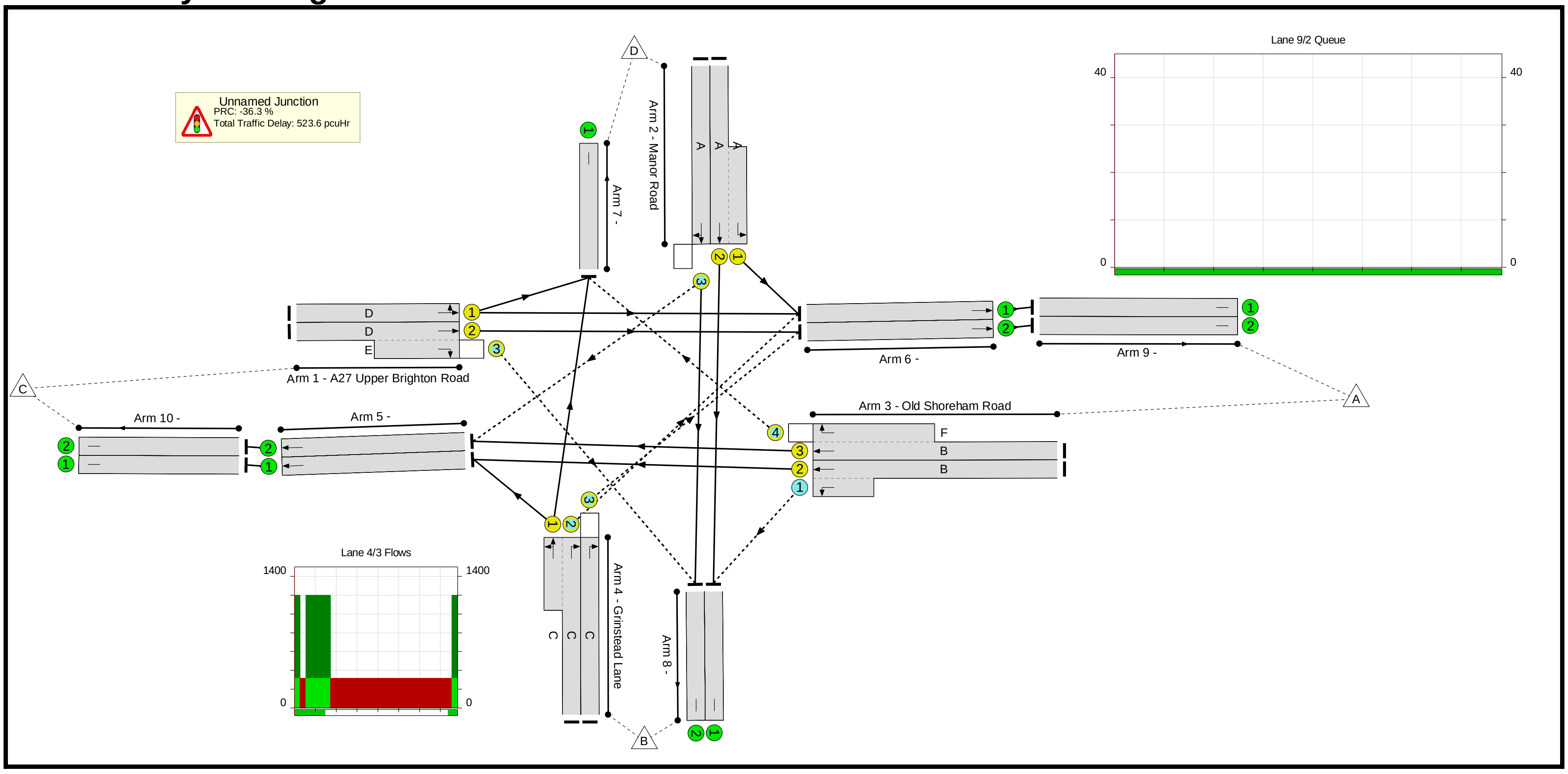
Item	Lane Description	Lane Type	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Mean Max Queue (pcu)
Network	**-**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**122.1%**	**258**	**1214**	**139**	**704.5**	**-**	**-**
Unnamed Junction	**-**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**122.1%**	**258**	**1214**	**139**	**704.5**	**-**	**-**
1/1	A27 Upper Brighton Road Ahead Left	U	D		1	51	-	1382	2015	1164	118.7%	-	-	-	127.9	333.1	152.0
1/2+1/3	A27 Upper Brighton Road Ahead Right	U+O	D E		1	51:50	-	1470	2155:2255	1238	118.8%	0	0	0	136.2	333.5	163.8
2/2+2/1	Manor Road Left Ahead	U	A		1	13	-	266	2255:1967	370	71.9%	-	-	-	3.9	52.5	6.4
2/3	Manor Road Right Ahead	O	A		1	13	-	72	1200	187	38.6%	17	0	0	1.0	50.0	1.9
3/2+3/1	Old Shoreham Road Ahead Left	U+O	B -		1	51	-	1798	2155:2155	1473	122.1%	144	627	0	184.1	368.6	263.0
3/3+3/4	Old Shoreham Road Ahead Right	U+O	B F		1	51	-	1538	2155:2255	1263	121.8%	0	0	67	159.9	374.3	188.2
4/2+4/1	Grinstead Lane Left Right Ahead	O+U	C		1	29	-	656	2255:2051	565	116.2%	48	401	0	59.6	327.2	66.9
4/3	Grinstead Lane Right	O	C		1	29	-	352	1200	307	114.8%	48	187	72	31.9	326.5	36.3

C1 PRC for Signalled Lanes (%): -35.6 Total Delay for Signalled Lanes (pcuHr): 704.49 Cycle Time (s): 90
PRC Over All Lanes (%): -35.6 Total Delay Over All Lanes(pcuHr): 704.49

Basic Results Summary

Scenario 2: 'PM peak' (FG2: 'PM peak', Plan 1: 'Network Control Plan 1')

Network Layout Diagram



Basic Results Summary

Network Results

Item	Lane Description	Lane Type	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Mean Max Queue (pcu)
Network	**-**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**122.7%**	**218**	**1241**	**138**	**523.6**	**-**	**-**
Unnamed Junction	**-**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**122.7%**	**218**	**1241**	**138**	**523.6**	**-**	**-**
1/1	A27 Upper Brighton Road Ahead Left	U	D		1	55	-	1189	2015	1312	90.6%	-	-	-	8.7	26.4	28.6
1/2+1/3	A27 Upper Brighton Road Ahead Right	U+O	D E		1	55:54	-	1273	2155:2148	1397	91.1%	0	0	8	9.4	26.6	30.5
2/2+2/1	Manor Road Left Ahead	U	A		1	8	-	211	2255:1967	350	60.2%	-	-	-	2.9	49.2	3.6
2/3	Manor Road Right Ahead	O	A		1	8	-	23	1200	84	27.5%	23	0	0	0.4	69.3	0.7
3/2+3/1	Old Shoreham Road Ahead Left	U+O	B -		1	55	-	2004	2155:2155	1634	122.6%	91	750	0	208.6	374.7	325.0
3/3+3/4	Old Shoreham Road Ahead Right	U+O	B F		1	55	-	1742	2155:2255	1420	122.7%	0	0	70	183.3	378.8	216.9
4/2+4/1	Grinstead Lane Left Right Ahead	O+U	C		1	21	-	700	2255:2089	578	121.1%	52	338	0	75.6	388.6	81.2
4/3	Grinstead Lane Right	O	C		1	21	-	318	1200	265	119.9%	52	153	60	34.7	392.7	38.0

C1 PRC for Signalled Lanes (%): -36.3 Total Delay for Signalled Lanes (pcuHr): 523.59 Cycle Time (s): 86
PRC Over All Lanes (%): -36.3 Total Delay Over All Lanes(pcuHr): 523.59

Junctions 8

ARCADY 8 - Roundabout Module

Version: 8.0.2.316 [14 Feb 2013]

For sales and distribution information, program advice and maintenance, contact TRL:
Tel: +44 (0)1344 770758   E-mail: software@trl.co.uk   Web: http://www.trlsoftware.co.uk

Filename: A259-A283_ShorehamHighSt_v6_standard Rabt.arc8
Path: K:\TRANSPORT\PTG\3511677A-PTG Adur\New Scenario Modelling Sept 2015\06 Junction Models\Proposed Mitigation\A259-A283
Report generation date: 25/11/2015 18:17:32

Summary of junction performance

	AM			PM		
	Queue (PCU)	Delay (min)	RFC	Queue (PCU)	Delay (min)	RFC
	A1 - Ref Case					
A259 Westbound	1.77	0.10	0.64	4.08	0.24	0.80
A259 Eastbound	211.37	6.96	1.08	9.60	0.36	0.91
A283 Old Shoreham Rd	1.05	0.11	0.51	5.04	0.30	0.83
	A1 - Scenario C with Mitigation					
A259 Westbound	1.38	0.09	0.58	7.70	0.37	0.89
A259 Eastbound	129.17	4.37	1.04	9.05	0.35	0.90
A283 Old Shoreham Rd	1.11	0.11	0.53	2.38	0.16	0.70

Values shown are the maximum values over all time segments. Delay is the maximum value of average delay per arriving vehicle.

"D1 - Ref Case, AM " model duration: 07:45 - 09:15
"D2 - Ref Case, PM" model duration: 16:45 - 18:15
"D9 - Scenario C with Mitigation, AM" model duration: 07:45 - 09:15
"D10 - Scenario C with Mitigation, PM" model duration: 16:45 - 18:15

Run using Junctions 8.0.2.316 at 25/11/2015 18:17:31

File summary

File Description

Title	A259-A2025 South St, Lancing
Location	
Site Number	
Date	09/01/2012
Version	
Status	Darft
Identifier	
Client	
Jobnumber	
Enumerator	CORP\hyded
Description	

Analysis Options

Vehicle Length (m)	Do Queue Variations	Calculate Residual Capacity	Residual Capacity Criteria Type	RFC Threshold	Average Delay Threshold (min)	Queue Threshold (PCU)
5.75			N/A	0.85	0.60	20.00

Units

Distance Units	Speed Units	Traffic Units Input	Traffic Units Results	Flow Units	Average Delay Units	Total Delay Units	Rate Of Delay Units
m	kph	PCU	PCU	perHour	min	-Min	perMin

(Default Analysis Set) - Ref Case, AM

Data Errors and Warnings

No errors or warnings

Analysis Set Details

Name	Roundabout Capacity Model	Description	Include In Report	Use Specific Demand Set(s)	Specific Demand Set (s)	Locked	Network Flow Scaling Factor (%)	Network Capacity Scaling Factor (%)	Reason For Scaling Factors
(Default Analysis Set)	ARCADY		✓				100.000	100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Results For Central Hour Only	Single Time Segment Only	Locked	Run Automatically	Use Relationship	Relationship
Ref Case, AM	Ref Case	AM	2031 AM Reference Case SATURN Flows	FLAT	07:45	09:15	90	15				✓		

Junction Network

Junctions

Name	Junction Type	Arm Order	Grade Separated	Large Roundabout	Do Geometric Delay	Junction Delay (min)	Junction LOS
A259-A283	Roundabout	1,2,3				3.72	F

Junction Network Options

Driving Side	Lighting
Left	Normal/unknown

Arms

Arms

Name	Name	Description
A259 Westbound	A259 Westbound	
A259 Eastbound	A259 Eastbound	
A283 Old Shoreham Rd	A283 Old Shoreham Rd	

Capacity Options

Name	Minimum Capacity (PCU/hr)	Maximum Capacity (PCU/hr)	Assume Flat Start Profile	Initial Queue (PCU)
A259 Westbound	0.00	1800.00	✓	
A259 Eastbound	0.00	1800.00	✓	
A283 Old Shoreham Rd	0.00	1800.00	✓	

Roundabout Geometry

Name	V - Approach road half-width (m)	E - Entry width (m)	l' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit Only
A259 Westbound	5.00	7.90	10.00	64.00	22.50	30.00	
A259 Eastbound	3.15	6.70	27.30	40.00	22.50	30.00	
A283 Old Shoreham Rd	3.60	8.10	19.00	32.00	22.50	30.00	

Geometries for Arm C are measured opposite Arm B. Geometries for Arm A (if relevant) are measured opposite Arm D.

Pedestrian Crossings

Name	Crossing Type
A259 Westbound	None
A259 Eastbound	None
A283 Old Shoreham Rd	None

Slope / Intercept / Capacity

Roundabout Slope and Intercept used in model

Name	Enter slope and intercept directly	Entered slope	Entered intercept (PCU/hr)	Final Slope	Final Intercept (PCU/hr)
A259 Westbound		(calculated)	(calculated)	0.743	2037.012
A259 Eastbound		(calculated)	(calculated)	0.683	1755.935
A283 Old Shoreham Rd		(calculated)	(calculated)	0.710	1900.670

The slope and intercept shown above include any corrections and adjustments.

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCU Factor for a HV (PCU)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		✓	✓	HV Percentages	2.00				✓	✓

Entry Flows

General Flows Data

Name	Profile Type	Use Turning Counts	Average Demand Flow (PCU/hr)	Flow Scaling Factor (%)
A259 Westbound	FLAT	✓	1081.00	100.000
A259 Eastbound	FLAT	✓	1828.00	100.000
A283 Old Shoreham Rd	FLAT	✓	559.00	100.000

Turning Proportions

Turning Counts or Proportions (PCU/hr) - A259- A283 (for whole period)

		To		
		1	**2**	**3**
From	**1**	0.000	994.000	87.000
	2	1232.000	0.000	596.000
	3	94.000	465.000	0.000

Turning Proportions (PCU) - A259- A283 (for whole period)

		To		
		1	**2**	**3**
From	**1**	0.00	0.92	0.08
	2	0.67	0.00	0.33
	3	0.17	0.83	0.00

Vehicle Mix

Average PCU Per Vehicle - A259- A283 (for whole period)

		To		
		1	**2**	**3**
From	**1**	1.000	1.000	1.000
	2	1.000	1.000	1.000
	3	1.000	1.000	1.000

Heavy Vehicle Percentages - A259- A283 (for whole period)

		To		
		1	**2**	**3**
From	**1**	0.000	0.000	0.000
	2	0.000	0.000	0.000
	3	0.000	0.000	0.000

Results

Results Summary for whole modelled period

Name	Max RFC	Max Delay (min)	Max Queue (PCU)	Max LOS	Average Demand (PCU/hr)	Total Junction Arrivals (PCU)	Total Queueing Delay (PCU-min)	Average Queueing Delay (min)	Rate Of Queueing Delay (PCU-min/min)	Inclusive Total Queueing Delay (PCU-min)	Inclusive Average Queueing Delay (min)
A259 Westbound	0.64	0.10	1.77	A	1081.00	1621.50	159.22	0.10	1.77	159.28	0.10
A259 Eastbound	1.08	6.96	211.37	F	1828.00	2742.00	10042.24	3.66	111.58	10832.29	3.95
A283 Old Shoreham Rd	0.51	0.11	1.05	A	559.00	838.50	94.03	0.11	1.04	94.07	0.11

Main Results for each time segment

Main results: (07:45-08:00)

Name	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Entry Flow (PCU/hr)	Exit Flow (PCU/hr)	Circulating Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	Saturation Capacity (PCU/hr)	RFC	Start Queue (PCU)	End Queue (PCU)	Delay (min)	LOS
A259 Westbound	1081.00	270.25	1081.00	1221.31	465.00	0.00	1691.34	1359.49	0.639	1.77	1.77	0.098	A
A259 Eastbound	1828.00	457.00	1672.67	1459.00	87.00	0.00	1696.55	1681.26	1.077	5.97	44.81	1.075	F
A283 Old Shoreham Rd	559.00	139.75	559.00	632.35	1127.31	0.00	1099.74	1095.62	0.508	1.03	1.03	0.111	A

Main results: (08:00-08:15)

Name	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Entry Flow (PCU/hr)	Exit Flow (PCU/hr)	Circulating Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	Saturation Capacity (PCU/hr)	RFC	Start Queue (PCU)	End Queue (PCU)	Delay (min)	LOS
A259 Westbound	1081.00	270.25	1081.00	1234.38	464.97	0.00	1691.36	1359.49	0.639	1.77	1.77	0.098	A
A259 Eastbound	1828.00	457.00	1692.07	1458.97	87.00	0.00	1696.55	1681.26	1.077	44.81	78.79	2.316	F
A283 Old Shoreham Rd	559.00	139.75	558.96	638.68	1140.39	0.00	1090.45	1095.62	0.513	1.03	1.04	0.113	A

Main results: (08:15-08:30)

Name	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Entry Flow (PCU/hr)	Exit Flow (PCU/hr)	Circulating Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	Saturation Capacity (PCU/hr)	RFC	Start Queue (PCU)	End Queue (PCU)	Delay (min)	LOS
A259 Westbound	1081.00	270.25	1081.00	1236.03	464.99	0.00	1691.35	1359.49	0.639	1.77	1.77	0.098	A
A259 Eastbound	1828.00	457.00	1694.50	1458.98	87.00	0.00	1696.55	1681.26	1.077	78.79	112.16	3.479	F
A283 Old Shoreham Rd	559.00	139.75	558.98	639.48	1142.03	0.00	1089.28	1095.62	0.513	1.04	1.05	0.113	A

Main results: (08:30-08:45)

Name	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Entry Flow (PCU/hr)	Exit Flow (PCU/hr)	Circulating Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	Saturation Capacity (PCU/hr)	RFC	Start Queue (PCU)	End Queue (PCU)	Delay (min)	LOS
A259 Westbound	1081.00	270.25	1081.00	1236.61	464.99	0.00	1691.34	1359.49	0.639	1.77	1.77	0.098	A
A259 Eastbound	1828.00	457.00	1695.37	1458.99	87.00	0.00	1696.55	1681.26	1.077	112.16	145.32	4.640	F
A283 Old Shoreham Rd	559.00	139.75	558.99	639.76	1142.61	0.00	1088.87	1095.62	0.513	1.05	1.05	0.113	A

Main results: (08:45-09:00)

Name	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Entry Flow (PCU/hr)	Exit Flow (PCU/hr)	Circulating Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	Saturation Capacity (PCU/hr)	RFC	Start Queue (PCU)	End Queue (PCU)	Delay (min)	LOS
A259 Westbound	1081.00	270.25	1081.00	1236.89	465.00	0.00	1691.34	1359.49	0.639	1.77	1.77	0.098	A
A259 Eastbound	1828.00	457.00	1695.78	1459.00	87.00	0.00	1696.55	1681.26	1.077	145.32	178.37	5.802	F
A283 Old Shoreham Rd	559.00	139.75	558.99	639.89	1142.89	0.00	1088.67	1095.62	0.513	1.05	1.05	0.113	A

Main results: (09:00-09:15)

Name	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Entry Flow (PCU/hr)	Exit Flow (PCU/hr)	Circulating Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	Saturation Capacity (PCU/hr)	RFC	Start Queue (PCU)	End Queue (PCU)	Delay (min)	LOS
A259 Westbound	1081.00	270.25	1081.00	1237.04	465.00	0.00	1691.34	1359.49	0.639	1.77	1.77	0.098	A
A259 Eastbound	1828.00	457.00	1696.01	1459.00	87.00	0.00	1696.55	1681.26	1.077	178.37	211.37	6.963	F
A283 Old Shoreham Rd	559.00	139.75	559.00	639.97	1143.04	0.00	1088.56	1095.62	0.514	1.05	1.05	0.113	A

Queueing Delay Results for each time segment

Queueing Delay results: (07:45-08:00)

Name	Queueing Total Delay (PCU-min)	Queueing Rate Of Delay (PCU-min/min)	Average Delay Per Arriving Vehicle (min)	Unsignalised Level Of Service	Signalised Level Of Service
A259 Westbound	26.53	1.77	0.098	A	A
A259 Eastbound	399.22	26.61	1.075	F	E
A283 Old Shoreham Rd	15.49	1.03	0.111	A	A

Queueing Delay results: (08:00-08:15)

Name	Queueing Total Delay (PCU-min)	Queueing Rate Of Delay (PCU-min/min)	Average Delay Per Arriving Vehicle (min)	Unsignalised Level Of Service	Signalised Level Of Service
A259 Westbound	26.53	1.77	0.098	A	A
A259 Eastbound	928.26	61.88	2.316	F	F
A283 Old Shoreham Rd	15.59	1.04	0.113	A	A

Queueing Delay results: (08:15-08:30)

Name	Queueing Total Delay (PCU-min)	Queueing Rate Of Delay (PCU-min/min)	Average Delay Per Arriving Vehicle (min)	Unsignalised Level Of Service	Signalised Level Of Service
A259 Westbound	26.54	1.77	0.098	A	A
A259 Eastbound	1432.52	95.50	3.479	F	F
A283 Old Shoreham Rd	15.69	1.05	0.113	A	A

Queueing Delay results: (08:30-08:45)

Name	Queueing Total Delay (PCU-min)	Queueing Rate Of Delay (PCU-min/min)	Average Delay Per Arriving Vehicle (min)	Unsignalised Level Of Service	Signalised Level Of Service
A259 Westbound	26.54	1.77	0.098	A	A
A259 Eastbound	1931.28	128.75	4.640	F	F
A283 Old Shoreham Rd	15.73	1.05	0.113	A	A

Queueing Delay results: (08:45-09:00)

Name	Queueing Total Delay (PCU-min)	Queueing Rate Of Delay (PCU-min/min)	Average Delay Per Arriving Vehicle (min)	Unsignalised Level Of Service	Signalised Level Of Service
A259 Westbound	26.54	1.77	0.098	A	A
A259 Eastbound	2427.80	161.85	5.802	F	F
A283 Old Shoreham Rd	15.76	1.05	0.113	A	A

Queueing Delay results: (09:00-09:15)

Name	Queueing Total Delay (PCU-min)	Queueing Rate Of Delay (PCU-min/min)	Average Delay Per Arriving Vehicle (min)	Unsignalised Level Of Service	Signalised Level Of Service
A259 Westbound	26.54	1.77	0.098	A	A
A259 Eastbound	2923.16	194.88	6.963	F	F
A283 Old Shoreham Rd	15.78	1.05	0.113	A	A

(Default Analysis Set) - Ref Case, PM

Data Errors and Warnings

No errors or warnings

Analysis Set Details

Name	Roundabout Capacity Model	Description	Include In Report	Use Specific Demand Set(s)	Specific Demand Set (s)	Locked	Network Flow Scaling Factor (%)	Network Capacity Scaling Factor (%)	Reason For Scaling Factors
(Default Analysis Set)	ARCADY		✓				100.000	100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Results For Central Hour Only	Single Time Segment Only	Locked	Run Automatically	Use Relationship	Relationship
Ref Case, PM	Ref Case	PM	2031 PM Reference Case SATURN Flows	FLAT	16:45	18:15	90	15				✓		

Junction Network

Junctions

Name	Junction Type	Arm Order	Grade Separated	Large Roundabout	Do Geometric Delay	Junction Delay (min)	Junction LOS
A259-A283	Roundabout	1,2,3				0.31	C

Junction Network Options

Driving Side	Lighting
Left	Normal/unknown

Arms

Arms

Name	Name	Description
A259 Westbound	A259 Westbound	
A259 Eastbound	A259 Eastbound	
A283 Old Shoreham Rd	A283 Old Shoreham Rd	

Capacity Options

Name	Minimum Capacity (PCU/hr)	Maximum Capacity (PCU/hr)	Assume Flat Start Profile	Initial Queue (PCU)
A259 Westbound	0.00	1800.00	✓	
A259 Eastbound	0.00	1800.00	✓	
A283 Old Shoreham Rd	0.00	1800.00	✓	

Roundabout Geometry

Name	V - Approach road half-width (m)	E - Entry width (m)	l' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit Only
A259 Westbound	5.00	7.90	10.00	64.00	22.50	30.00	
A259 Eastbound	3.15	6.70	27.30	40.00	22.50	30.00	
A283 Old Shoreham Rd	3.60	8.10	19.00	32.00	22.50	30.00	

Geometries for Arm C are measured opposite Arm B. Geometries for Arm A (if relevant) are measured opposite Arm D.

Pedestrian Crossings

Name	Crossing Type
A259 Westbound	None
A259 Eastbound	None
A283 Old Shoreham Rd	None

Slope / Intercept / Capacity

Roundabout Slope and Intercept used in model

Name	Enter slope and intercept directly	Entered slope	Entered intercept (PCU/hr)	Final Slope	Final Intercept (PCU/hr)
A259 Westbound		(calculated)	(calculated)	0.743	2037.012
A259 Eastbound		(calculated)	(calculated)	0.683	1755.935
A283 Old Shoreham Rd		(calculated)	(calculated)	0.710	1900.670

The slope and intercept shown above include any corrections and adjustments.

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCU Factor for a HV (PCU)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		✓	✓	HV Percentages	2.00				✓	✓

Entry Flows

General Flows Data

Name	Profile Type	Use Turning Counts	Average Demand Flow (PCU/hr)	Flow Scaling Factor (%)
A259 Westbound	FLAT	✓	1037.00	100.000
A259 Eastbound	FLAT	✓	1591.00	100.000
A283 Old Shoreham Rd	FLAT	✓	1010.00	100.000

Turning Proportions

Turning Counts or Proportions (PCU/hr) - A259- A283 (for whole period)

		To		
		1	2	3
From	1	0.000	1037.000	0.000
	2	902.000	70.000	619.000
	3	76.000	934.000	0.000

Turning Proportions (PCU) - A259- A283 (for whole period)

		To		
		1	2	3
From	1	0.00	1.00	0.00
	2	0.57	0.04	0.39
	3	0.08	0.92	0.00

Vehicle Mix

Average PCU Per Vehicle - A259- A283 (for whole period)

		To		
		1	2	3
From	1	1.000	1.000	1.000
	2	1.000	1.000	1.000
	3	1.000	1.000	1.000

Heavy Vehicle Percentages - A259- A283 (for whole period)

		To		
		1	2	3
From	1	0.000	0.000	0.000
	2	0.000	0.000	0.000
	3	0.000	0.000	0.000

Results

Results Summary for whole modelled period

Name	Max RFC	Max Delay (min)	Max Queue (PCU)	Max LOS	Average Demand (PCU/hr)	Total Junction Arrivals (PCU)	Total Queueing Delay (PCU-min)	Average Queueing Delay (min)	Rate Of Queueing Delay (PCU-min/min)	Inclusive Total Queueing Delay (PCU-min)	Inclusive Average Queueing Delay (min)
A259 Westbound	0.80	0.24	4.08	B	1037.00	1555.50	367.54	0.24	4.08	367.93	0.24
A259 Eastbound	0.91	0.36	9.60	C	1591.00	2386.50	863.96	0.36	9.60	865.54	0.36
A283 Old Shoreham Rd	0.83	0.30	5.04	C	1010.00	1515.00	453.48	0.30	5.04	454.11	0.30

Main Results for each time segment

Main results: (16:45-17:00)

Name	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Entry Flow (PCU/hr)	Exit Flow (PCU/hr)	Circulating Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	Saturation Capacity (PCU/hr)	RFC	Start Queue (PCU)	End Queue (PCU)	Delay (min)	LOS
A259 Westbound	1037.00	259.25	1037.00	978.00	1004.00	0.00	1290.65	1196.92	0.803	4.08	4.08	0.237	B
A259 Eastbound	1591.00	397.75	1591.00	2041.00	0.00	0.00	1755.93	1755.93	0.906	9.60	9.60	0.363	C
A283 Old Shoreham Rd	1010.00	252.50	1010.00	619.00	972.00	0.00	1210.08	1138.49	0.835	5.04	5.04	0.300	C

Main results: (17:00-17:15)

Name	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Entry Flow (PCU/hr)	Exit Flow (PCU/hr)	Circulating Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	Saturation Capacity (PCU/hr)	RFC	Start Queue (PCU)	End Queue (PCU)	Delay (min)	LOS
A259 Westbound	1037.00	259.25	1037.00	978.00	1004.00	0.00	1290.65	1196.92	0.803	4.08	4.08	0.237	B
A259 Eastbound	1591.00	397.75	1591.00	2041.00	0.00	0.00	1755.93	1755.93	0.906	9.60	9.60	0.363	C
A283 Old Shoreham Rd	1010.00	252.50	1010.00	619.00	972.00	0.00	1210.08	1138.49	0.835	5.04	5.04	0.300	C

Main results: (17:15-17:30)

Name	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Entry Flow (PCU/hr)	Exit Flow (PCU/hr)	Circulating Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	Saturation Capacity (PCU/hr)	RFC	Start Queue (PCU)	End Queue (PCU)	Delay (min)	LOS
A259 Westbound	1037.00	259.25	1037.00	978.00	1004.00	0.00	1290.65	1196.92	0.803	4.08	4.08	0.237	B
A259 Eastbound	1591.00	397.75	1591.00	2041.00	0.00	0.00	1755.93	1755.93	0.906	9.60	9.60	0.363	C
A283 Old Shoreham Rd	1010.00	252.50	1010.00	619.00	972.00	0.00	1210.08	1138.49	0.835	5.04	5.04	0.300	C

Main results: (17:30-17:45)

Name	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Entry Flow (PCU/hr)	Exit Flow (PCU/hr)	Circulating Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	Saturation Capacity (PCU/hr)	RFC	Start Queue (PCU)	End Queue (PCU)	Delay (min)	LOS
A259 Westbound	1037.00	259.25	1037.00	978.00	1004.00	0.00	1290.65	1196.92	0.803	4.08	4.08	0.237	B
A259 Eastbound	1591.00	397.75	1591.00	2041.00	0.00	0.00	1755.93	1755.93	0.906	9.60	9.60	0.363	C
A283 Old Shoreham Rd	1010.00	252.50	1010.00	619.00	972.00	0.00	1210.08	1138.49	0.835	5.04	5.04	0.300	C

Main results: (17:45-18:00)

Name	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Entry Flow (PCU/hr)	Exit Flow (PCU/hr)	Circulating Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	Saturation Capacity (PCU/hr)	RFC	Start Queue (PCU)	End Queue (PCU)	Delay (min)	LOS
A259 Westbound	1037.00	259.25	1037.00	978.00	1004.00	0.00	1290.65	1196.92	0.803	4.08	4.08	0.237	B
A259 Eastbound	1591.00	397.75	1591.00	2041.00	0.00	0.00	1755.93	1755.93	0.906	9.60	9.60	0.363	C
A283 Old Shoreham Rd	1010.00	252.50	1010.00	619.00	972.00	0.00	1210.08	1138.49	0.835	5.04	5.04	0.300	C

Main results: (18:00-18:15)

Name	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Entry Flow (PCU/hr)	Exit Flow (PCU/hr)	Circulating Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	Saturation Capacity (PCU/hr)	RFC	Start Queue (PCU)	End Queue (PCU)	Delay (min)	LOS
A259 Westbound	1037.00	259.25	1037.00	978.00	1004.00	0.00	1290.65	1196.92	0.803	4.08	4.08	0.237	B
A259 Eastbound	1591.00	397.75	1591.00	2041.00	0.00	0.00	1755.93	1755.93	0.906	9.60	9.60	0.363	C
A283 Old Shoreham Rd	1010.00	252.50	1010.00	619.00	972.00	0.00	1210.08	1138.49	0.835	5.04	5.04	0.300	C

Queueing Delay Results for each time segment

Queueing Delay results: (16:45-17:00)

Name	Queueing Total Delay (PCU-min)	Queueing Rate Of Delay (PCU-min/min)	Average Delay Per Arriving Vehicle (min)	Unsignalised Level Of Service	Signalised Level Of Service
A259 Westbound	61.25	4.08	0.237	B	B
A259 Eastbound	143.96	9.60	0.363	C	C
A283 Old Shoreham Rd	75.57	5.04	0.300	C	B

Queueing Delay results: (17:00-17:15)

Name	Queueing Total Delay (PCU-min)	Queueing Rate Of Delay (PCU-min/min)	Average Delay Per Arriving Vehicle (min)	Unsignalised Level Of Service	Signalised Level Of Service
A259 Westbound	61.26	4.08	0.237	B	B
A259 Eastbound	143.97	9.60	0.363	C	C
A283 Old Shoreham Rd	75.58	5.04	0.300	C	B

Queueing Delay results: (17:15-17:30)

Name	Queueing Total Delay (PCU-min)	Queueing Rate Of Delay (PCU-min/min)	Average Delay Per Arriving Vehicle (min)	Unsignalised Level Of Service	Signalised Level Of Service
A259 Westbound	61.26	4.08	0.237	B	B
A259 Eastbound	143.99	9.60	0.363	C	C
A283 Old Shoreham Rd	75.58	5.04	0.300	C	B

Queueing Delay results: (17:30-17:45)

Name	Queueing Total Delay (PCU-min)	Queueing Rate Of Delay (PCU-min/min)	Average Delay Per Arriving Vehicle (min)	Unsignalised Level Of Service	Signalised Level Of Service
A259 Westbound	61.26	4.08	0.237	B	B
A259 Eastbound	144.00	9.60	0.363	C	C
A283 Old Shoreham Rd	75.58	5.04	0.300	C	B

Queueing Delay results: (17:45-18:00)

Name	Queueing Total Delay (PCU-min)	Queueing Rate Of Delay (PCU-min/min)	Average Delay Per Arriving Vehicle (min)	Unsignalised Level Of Service	Signalised Level Of Service
A259 Westbound	61.26	4.08	0.237	B	B
A259 Eastbound	144.01	9.60	0.363	C	C
A283 Old Shoreham Rd	75.58	5.04	0.300	C	B

Queueing Delay results: (18:00-18:15)

Name	Queueing Total Delay (PCU-min)	Queueing Rate Of Delay (PCU-min/min)	Average Delay Per Arriving Vehicle (min)	Unsignalised Level Of Service	Signalised Level Of Service
A259 Westbound	61.26	4.08	0.237	B	B
A259 Eastbound	144.03	9.60	0.363	C	C
A283 Old Shoreham Rd	75.58	5.04	0.300	C	B

(Default Analysis Set) - Scenario C with Mitigation, AM

Data Errors and Warnings

No errors or warnings

Analysis Set Details

Name	Roundabout Capacity Model	Description	Include In Report	Use Specific Demand Set(s)	Specific Demand Set (s)	Locked	Network Flow Scaling Factor (%)	Network Capacity Scaling Factor (%)	Reason For Scaling Factors
(Default Analysis Set)	ARCADY		✓				100.000	100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Results For Central Hour Only	Single Time Segment Only	Locked	Run Automatically	Use Relationship	Relationshi
Scenario C with Mitigation, AM	Scenario C with Mitigation	AM	2031 AM Scenario C with Mitigation SATURN Flows	FLAT	07:45	09:15	90	15				✓		

Junction Network

Junctions

Name	Junction Type	Arm Order	Grade Separated	Large Roundabout	Do Geometric Delay	Junction Delay (min)	Junction LOS
A259-A283	Roundabout	1,2,3				2.35	F

Junction Network Options

Driving Side	Lighting
Left	Normal/unknown

Arms

Arms

Name	Name	Description
A259 Westbound	A259 Westbound	
A259 Eastbound	A259 Eastbound	
A283 Old Shoreham Rd	A283 Old Shoreham Rd	

Capacity Options

Name	Minimum Capacity (PCU/hr)	Maximum Capacity (PCU/hr)	Assume Flat Start Profile	Initial Queue (PCU)
A259 Westbound	0.00	1800.00	✓	
A259 Eastbound	0.00	1800.00	✓	
A283 Old Shoreham Rd	0.00	1800.00	✓	

Roundabout Geometry

Name	V - Approach road half-width (m)	E - Entry width (m)	l' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit Only
A259 Westbound	5.00	7.90	10.00	64.00	22.50	30.00	
A259 Eastbound	3.15	6.70	27.30	40.00	22.50	30.00	
A283 Old Shoreham Rd	3.60	8.10	19.00	32.00	22.50	30.00	

Geometries for Arm C are measured opposite Arm B. Geometries for Arm A (if relevant) are measured opposite Arm D.

Pedestrian Crossings

Name	Crossing Type
A259 Westbound	None
A259 Eastbound	None
A283 Old Shoreham Rd	None

Slope / Intercept / Capacity

Roundabout Slope and Intercept used in model

Name	Enter slope and intercept directly	Entered slope	Entered intercept (PCU/hr)	Final Slope	Final Intercept (PCU/hr)
A259 Westbound		(calculated)	(calculated)	0.743	2037.012
A259 Eastbound		(calculated)	(calculated)	0.683	1755.935
A283 Old Shoreham Rd		(calculated)	(calculated)	0.710	1900.670

The slope and intercept shown above include any corrections and adjustments.

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCU Factor for a HV (PCU)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		✓	✓	HV Percentages	2.00				✓	✓

Entry Flows

General Flows Data

Name	Profile Type	Use Turning Counts	Average Demand Flow (PCU/hr)	Flow Scaling Factor (%)
A259 Westbound	FLAT	✓	953.00	100.000
A259 Eastbound	FLAT	✓	1751.00	100.000
A283 Old Shoreham Rd	FLAT	✓	613.00	100.000

Turning Proportions

Turning Counts or Proportions (PCU/hr) - A259- A283 (for whole period)

		To		
		1	**2**	**3**
From	**1**	0.000	841.000	112.000
	2	1081.000	0.000	670.000
	3	86.000	527.000	0.000

Turning Proportions (PCU) - A259- A283 (for whole period)

		To		
		1	**2**	**3**
From	**1**	0.00	0.88	0.12
	2	0.62	0.00	0.38
	3	0.14	0.86	0.00

Vehicle Mix

Average PCU Per Vehicle - A259- A283 (for whole period)

		To		
		1	**2**	**3**
From	**1**	1.000	1.000	1.000
	2	1.000	1.000	1.000
	3	1.000	1.000	1.000

Heavy Vehicle Percentages - A259- A283 (for whole period)

		To		
		1	**2**	**3**
From	**1**	0.000	0.000	0.000
	2	0.000	0.000	0.000
	3	0.000	0.000	0.000

Results

Results Summary for whole modelled period

Name	Max RFC	Max Delay (min)	Max Queue (PCU)	Max LOS	Average Demand (PCU/hr)	Total Junction Arrivals (PCU)	Total Queueing Delay (PCU-min)	Average Queueing Delay (min)	Rate Of Queueing Delay (PCU-min/min)	Inclusive Total Queueing Delay (PCU-min)	Inclusive Average Queueing Delay (min)
A259 Westbound	0.58	0.09	1.38	A	953.00	1429.50	123.78	0.09	1.38	123.82	0.09
A259 Eastbound	1.04	4.37	129.17	F	1751.00	2626.50	6509.93	2.48	72.33	6807.94	2.59
A283 Old Shoreham Rd	0.53	0.11	1.11	A	613.00	919.50	98.77	0.11	1.10	98.80	0.11

Main Results for each time segment

Main results: (07:45-08:00)

Name	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Entry Flow (PCU/hr)	Exit Flow (PCU/hr)	Circulating Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	Saturation Capacity (PCU/hr)	RFC	Start Queue (PCU)	End Queue (PCU)	Delay (min)	LOS
A259 Westbound	953.00	238.25	953.00	1103.41	527.00	0.00	1645.25	1285.62	0.579	1.38	1.38	0.087	A
A259 Eastbound	1751.00	437.75	1647.99	1368.00	112.00	0.00	1679.49	1652.81	1.043	7.88	33.63	0.926	F
A283 Old Shoreham Rd	613.00	153.25	613.00	742.58	1017.41	0.00	1177.82	1175.71	0.520	1.08	1.08	0.106	A

Main results: (08:00-08:15)

Name	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Entry Flow (PCU/hr)	Exit Flow (PCU/hr)	Circulating Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	Saturation Capacity (PCU/hr)	RFC	Start Queue (PCU)	End Queue (PCU)	Delay (min)	LOS
A259 Westbound	953.00	238.25	953.00	1116.49	526.96	0.00	1645.27	1285.62	0.579	1.38	1.38	0.087	A
A259 Eastbound	1751.00	437.75	1669.19	1367.96	112.00	0.00	1679.49	1652.81	1.043	33.63	54.08	1.713	F
A283 Old Shoreham Rd	613.00	153.25	612.96	750.69	1030.49	0.00	1168.53	1175.71	0.525	1.08	1.09	0.108	A

Main results: (08:15-08:30)

Name	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Entry Flow (PCU/hr)	Exit Flow (PCU/hr)	Circulating Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	Saturation Capacity (PCU/hr)	RFC	Start Queue (PCU)	End Queue (PCU)	Delay (min)	LOS
A259 Westbound	953.00	238.25	953.00	1119.28	526.98	0.00	1645.26	1285.62	0.579	1.38	1.38	0.087	A
A259 Eastbound	1751.00	437.75	1673.71	1367.98	112.00	0.00	1679.49	1652.81	1.043	54.08	73.40	2.399	F
A283 Old Shoreham Rd	613.00	153.25	612.98	752.43	1033.29	0.00	1166.54	1175.71	0.525	1.09	1.10	0.108	A

Main results: (08:30-08:45)

Name	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Entry Flow (PCU/hr)	Exit Flow (PCU/hr)	Circulating Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	Saturation Capacity (PCU/hr)	RFC	Start Queue (PCU)	End Queue (PCU)	Delay (min)	LOS
A259 Westbound	953.00	238.25	953.00	1120.51	526.99	0.00	1645.25	1285.62	0.579	1.38	1.38	0.087	A
A259 Eastbound	1751.00	437.75	1675.70	1367.99	112.00	0.00	1679.49	1652.81	1.043	73.40	92.23	3.065	F
A283 Old Shoreham Rd	613.00	153.25	612.99	753.19	1034.51	0.00	1165.67	1175.71	0.526	1.10	1.10	0.109	A

Main results: (08:45-09:00)

Name	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Entry Flow (PCU/hr)	Exit Flow (PCU/hr)	Circulating Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	Saturation Capacity (PCU/hr)	RFC	Start Queue (PCU)	End Queue (PCU)	Delay (min)	LOS
A259 Westbound	953.00	238.25	953.00	1121.18	526.99	0.00	1645.25	1285.62	0.579	1.38	1.38	0.087	A
A259 Eastbound	1751.00	437.75	1676.79	1367.99	112.00	0.00	1679.49	1652.81	1.043	92.23	110.78	3.722	F
A283 Old Shoreham Rd	613.00	153.25	612.99	753.60	1035.18	0.00	1165.19	1175.71	0.526	1.10	1.11	0.109	A

Main results: (09:00-09:15)

Name	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Entry Flow (PCU/hr)	Exit Flow (PCU/hr)	Circulating Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	Saturation Capacity (PCU/hr)	RFC	Start Queue (PCU)	End Queue (PCU)	Delay (min)	LOS
A259 Westbound	953.00	238.25	953.00	1121.60	527.00	0.00	1645.25	1285.62	0.579	1.38	1.38	0.087	A
A259 Eastbound	1751.00	437.75	1677.46	1368.00	112.00	0.00	1679.49	1652.81	1.043	110.78	129.17	4.374	F
A283 Old Shoreham Rd	613.00	153.25	612.99	753.86	1035.60	0.00	1164.90	1175.71	0.526	1.11	1.11	0.109	A

Queueing Delay Results for each time segment

Queueing Delay results: (07:45-08:00)

Name	Queueing Total Delay (PCU-min)	Queueing Rate Of Delay (PCU-min/min)	Average Delay Per Arriving Vehicle (min)	Unsignalised Level Of Service	Signalised Level Of Service
A259 Westbound	20.63	1.38	0.087	A	A
A259 Eastbound	327.68	21.85	0.926	F	E
A283 Old Shoreham Rd	16.26	1.08	0.106	A	A

Queueing Delay results: (08:00-08:15)

Name	Queueing Total Delay (PCU-min)	Queueing Rate Of Delay (PCU-min/min)	Average Delay Per Arriving Vehicle (min)	Unsignalised Level Of Service	Signalised Level Of Service
A259 Westbound	20.63	1.38	0.087	A	A
A259 Eastbound	660.02	44.00	1.713	F	F
A283 Old Shoreham Rd	16.36	1.09	0.108	A	A

Queueing Delay results: (08:15-08:30)

Name	Queueing Total Delay (PCU-min)	Queueing Rate Of Delay (PCU-min/min)	Average Delay Per Arriving Vehicle (min)	Unsignalised Level Of Service	Signalised Level Of Service
A259 Westbound	20.63	1.38	0.087	A	A
A259 Eastbound	956.98	63.80	2.399	F	F
A283 Old Shoreham Rd	16.47	1.10	0.108	A	A

Queueing Delay results: (08:30-08:45)

Name	Queueing Total Delay (PCU-min)	Queueing Rate Of Delay (PCU-min/min)	Average Delay Per Arriving Vehicle (min)	Unsignalised Level Of Service	Signalised Level Of Service
A259 Westbound	20.63	1.38	0.087	A	A
A259 Eastbound	1242.66	82.84	3.065	F	F
A283 Old Shoreham Rd	16.53	1.10	0.109	A	A

Queueing Delay results: (08:45-09:00)

Name	Queueing Total Delay (PCU-min)	Queueing Rate Of Delay (PCU-min/min)	Average Delay Per Arriving Vehicle (min)	Unsignalised Level Of Service	Signalised Level Of Service
A259 Westbound	20.63	1.38	0.087	A	A
A259 Eastbound	1522.81	101.52	3.722	F	F
A283 Old Shoreham Rd	16.57	1.10	0.109	A	A

Queueing Delay results: (09:00-09:15)

Name	Queueing Total Delay (PCU-min)	Queueing Rate Of Delay (PCU-min/min)	Average Delay Per Arriving Vehicle (min)	Unsignalised Level Of Service	Signalised Level Of Service
A259 Westbound	20.63	1.38	0.087	A	A
A259 Eastbound	1799.76	119.98	4.374	F	F
A283 Old Shoreham Rd	16.59	1.11	0.109	A	A

(Default Analysis Set) - Scenario C with Mitigation, PM

Data Errors and Warnings

No errors or warnings

Analysis Set Details

Name	Roundabout Capacity Model	Description	Include In Report	Use Specific Demand Set(s)	Specific Demand Set (s)	Locked	Network Flow Scaling Factor (%)	Network Capacity Scaling Factor (%)	Reason For Scaling Factors
(Default Analysis Set)	ARCADY		✓				100.000	100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Results For Central Hour Only	Single Time Segment Only	Locked	Run Automatically	Use Relationship	Relationshi
Scenario C with Mitigation, PM	Scenario C with Mitigation	PM	2031 PM Scenario C with Mitigation SATURN Flows	FLAT	16:45	18:15	90	15				✓		

Junction Network

Junctions

Name	Junction Type	Arm Order	Grade Separated	Large Roundabout	Do Geometric Delay	Junction Delay (min)	Junction LOS
A259-A283	Roundabout	1,2,3				0.31	C

Junction Network Options

Driving Side	Lighting
Left	Normal/unknown

Arms

Arms

Name	Name	Description
A259 Westbound	A259 Westbound	
A259 Eastbound	A259 Eastbound	
A283 Old Shoreham Rd	A283 Old Shoreham Rd	

Capacity Options

Name	Minimum Capacity (PCU/hr)	Maximum Capacity (PCU/hr)	Assume Flat Start Profile	Initial Queue (PCU)
A259 Westbound	0.00	1800.00	✓	
A259 Eastbound	0.00	1800.00	✓	
A283 Old Shoreham Rd	0.00	1800.00	✓	

Roundabout Geometry

Name	V - Approach road half-width (m)	E - Entry width (m)	l' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit Only
A259 Westbound	5.00	7.90	10.00	64.00	22.50	30.00	
A259 Eastbound	3.15	6.70	27.30	40.00	22.50	30.00	
A283 Old Shoreham Rd	3.60	8.10	19.00	32.00	22.50	30.00	

Geometries for Arm C are measured opposite Arm B. Geometries for Arm A (if relevant) are measured opposite Arm D.

Pedestrian Crossings

Name	Crossing Type
A259 Westbound	None
A259 Eastbound	None
A283 Old Shoreham Rd	None

Slope / Intercept / Capacity

Roundabout Slope and Intercept used in model

Name	Enter slope and intercept directly	Entered slope	Entered intercept (PCU/hr)	Final Slope	Final Intercept (PCU/hr)
A259 Westbound		(calculated)	(calculated)	0.743	2037.012
A259 Eastbound		(calculated)	(calculated)	0.683	1755.935
A283 Old Shoreham Rd		(calculated)	(calculated)	0.710	1900.670

The slope and intercept shown above include any corrections and adjustments.

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCU Factor for a HV (PCU)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		✓	✓	HV Percentages	2.00				✓	✓

Entry Flows

General Flows Data

Name	Profile Type	Use Turning Counts	Average Demand Flow (PCU/hr)	Flow Scaling Factor (%)
A259 Westbound	FLAT	✓	1256.00	100.000
A259 Eastbound	FLAT	✓	1553.00	100.000
A283 Old Shoreham Rd	FLAT	✓	912.00	100.000

Turning Proportions

Turning Counts or Proportions (PCU/hr) - A259- A283 (for whole period)

		To		
		1	2	3
From	1	0.000	1209.000	47.000
	2	835.000	17.000	701.000
	3	97.000	815.000	0.000

Turning Proportions (PCU) - A259- A283 (for whole period)

		To		
		1	2	3
From	1	0.00	0.96	0.04
	2	0.54	0.01	0.45
	3	0.11	0.89	0.00

Vehicle Mix

Average PCU Per Vehicle - A259- A283 (for whole period)

		To		
		1	2	3
From	1	1.000	1.000	1.000
	2	1.000	1.000	1.000
	3	1.000	1.000	1.000

Heavy Vehicle Percentages - A259- A283 (for whole period)

		To		
		1	2	3
From	1	0.000	0.000	0.000
	2	0.000	0.000	0.000
	3	0.000	0.000	0.000

Results

Results Summary for whole modelled period

Name	Max RFC	Max Delay (min)	Max Queue (PCU)	Max LOS	Average Demand (PCU/hr)	Total Junction Arrivals (PCU)	Total Queueing Delay (PCU-min)	Average Queueing Delay (min)	Rate Of Queueing Delay (PCU-min/min)	Inclusive Total Queueing Delay (PCU-min)	Inclusive Average Queueing Delay (min)
A259 Westbound	0.89	0.37	7.70	C	1256.00	1884.00	692.72	0.37	7.70	693.97	0.37
A259 Eastbound	0.90	0.35	9.05	C	1553.00	2329.50	814.29	0.35	9.05	815.71	0.35
A283 Old Shoreham Rd	0.70	0.16	2.38	A	912.00	1368.00	214.02	0.16	2.38	214.15	0.16

Main Results for each time segment

Main results: (16:45-17:00)

Name	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Entry Flow (PCU/hr)	Exit Flow (PCU/hr)	Circulating Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	Saturation Capacity (PCU/hr)	RFC	Start Queue (PCU)	End Queue (PCU)	Delay (min)	LOS
A259 Westbound	1256.00	314.00	1256.00	932.00	832.00	0.00	1418.51	1207.01	0.885	7.69	7.70	0.369	C
A259 Eastbound	1553.00	388.25	1553.00	2041.00	47.00	0.00	1723.86	1725.11	0.901	9.05	9.05	0.351	C
A283 Old Shoreham Rd	912.00	228.00	912.00	748.00	852.00	0.00	1295.34	1228.26	0.704	2.38	2.38	0.157	A

Main results: (17:00-17:15)

Name	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Entry Flow (PCU/hr)	Exit Flow (PCU/hr)	Circulating Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	Saturation Capacity (PCU/hr)	RFC	Start Queue (PCU)	End Queue (PCU)	Delay (min)	LOS
A259 Westbound	1256.00	314.00	1256.00	932.00	832.00	0.00	1418.51	1207.01	0.885	7.70	7.70	0.369	C
A259 Eastbound	1553.00	388.25	1553.00	2041.00	47.00	0.00	1723.86	1725.11	0.901	9.05	9.05	0.351	C
A283 Old Shoreham Rd	912.00	228.00	912.00	748.00	852.00	0.00	1295.34	1228.26	0.704	2.38	2.38	0.157	A

Main results: (17:15-17:30)

Name	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Entry Flow (PCU/hr)	Exit Flow (PCU/hr)	Circulating Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	Saturation Capacity (PCU/hr)	RFC	Start Queue (PCU)	End Queue (PCU)	Delay (min)	LOS
A259 Westbound	1256.00	314.00	1256.00	932.00	832.00	0.00	1418.51	1207.01	0.885	7.70	7.70	0.369	C
A259 Eastbound	1553.00	388.25	1553.00	2041.00	47.00	0.00	1723.86	1725.11	0.901	9.05	9.05	0.351	C
A283 Old Shoreham Rd	912.00	228.00	912.00	748.00	852.00	0.00	1295.34	1228.26	0.704	2.38	2.38	0.157	A

Main results: (17:30-17:45)

Name	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Entry Flow (PCU/hr)	Exit Flow (PCU/hr)	Circulating Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	Saturation Capacity (PCU/hr)	RFC	Start Queue (PCU)	End Queue (PCU)	Delay (min)	LOS
A259 Westbound	1256.00	314.00	1256.00	932.00	832.00	0.00	1418.51	1207.01	0.885	7.70	7.70	0.369	C
A259 Eastbound	1553.00	388.25	1553.00	2041.00	47.00	0.00	1723.86	1725.11	0.901	9.05	9.05	0.351	C
A283 Old Shoreham Rd	912.00	228.00	912.00	748.00	852.00	0.00	1295.34	1228.26	0.704	2.38	2.38	0.157	A

Main results: (17:45-18:00)

Name	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Entry Flow (PCU/hr)	Exit Flow (PCU/hr)	Circulating Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	Saturation Capacity (PCU/hr)	RFC	Start Queue (PCU)	End Queue (PCU)	Delay (min)	LOS
A259 Westbound	1256.00	314.00	1256.00	932.00	832.00	0.00	1418.51	1207.01	0.885	7.70	7.70	0.369	C
A259 Eastbound	1553.00	388.25	1553.00	2041.00	47.00	0.00	1723.86	1725.11	0.901	9.05	9.05	0.351	C
A283 Old Shoreham Rd	912.00	228.00	912.00	748.00	852.00	0.00	1295.34	1228.26	0.704	2.38	2.38	0.157	A

Main results: (18:00-18:15)

Name	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Entry Flow (PCU/hr)	Exit Flow (PCU/hr)	Circulating Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	Saturation Capacity (PCU/hr)	RFC	Start Queue (PCU)	End Queue (PCU)	Delay (min)	LOS
A259 Westbound	1256.00	314.00	1256.00	932.00	832.00	0.00	1418.51	1207.01	0.885	7.70	7.70	0.369	C
A259 Eastbound	1553.00	388.25	1553.00	2041.00	47.00	0.00	1723.86	1725.11	0.901	9.05	9.05	0.351	C
A283 Old Shoreham Rd	912.00	228.00	912.00	748.00	852.00	0.00	1295.34	1228.26	0.704	2.38	2.38	0.157	A

Queueing Delay Results for each time segment

Queueing Delay results: (16:45-17:00)

Name	Queueing Total Delay (PCU-min)	Queueing Rate Of Delay (PCU-min/min)	Average Delay Per Arriving Vehicle (min)	Unsignalised Level Of Service	Signalised Level Of Service
A259 Westbound	115.43	7.70	0.369	C	C
A259 Eastbound	135.68	9.05	0.351	C	C
A283 Old Shoreham Rd	35.67	2.38	0.157	A	A

Queueing Delay results: (17:00-17:15)

Name	Queueing Total Delay (PCU-min)	Queueing Rate Of Delay (PCU-min/min)	Average Delay Per Arriving Vehicle (min)	Unsignalised Level Of Service	Signalised Level Of Service
A259 Westbound	115.44	7.70	0.369	C	C
A259 Eastbound	135.70	9.05	0.351	C	C
A283 Old Shoreham Rd	35.67	2.38	0.157	A	A

Queueing Delay results: (17:15-17:30)

Name	Queueing Total Delay (PCU-min)	Queueing Rate Of Delay (PCU-min/min)	Average Delay Per Arriving Vehicle (min)	Unsignalised Level Of Service	Signalised Level Of Service
A259 Westbound	115.45	7.70	0.369	C	C
A259 Eastbound	135.71	9.05	0.351	C	C
A283 Old Shoreham Rd	35.67	2.38	0.157	A	A

Queueing Delay results: (17:30-17:45)

Name	Queueing Total Delay (PCU-min)	Queueing Rate Of Delay (PCU-min/min)	Average Delay Per Arriving Vehicle (min)	Unsignalised Level Of Service	Signalised Level Of Service
A259 Westbound	115.46	7.70	0.369	C	C
A259 Eastbound	135.72	9.05	0.351	C	C
A283 Old Shoreham Rd	35.67	2.38	0.157	A	A

Queueing Delay results: (17:45-18:00)

Name	Queueing Total Delay (PCU-min)	Queueing Rate Of Delay (PCU-min/min)	Average Delay Per Arriving Vehicle (min)	Unsignalised Level Of Service	Signalised Level Of Service
A259 Westbound	115.47	7.70	0.369	C	C
A259 Eastbound	135.73	9.05	0.351	C	C
A283 Old Shoreham Rd	35.67	2.38	0.157	A	A

Queueing Delay results: (18:00-18:15)

Name	Queueing Total Delay (PCU-min)	Queueing Rate Of Delay (PCU-min/min)	Average Delay Per Arriving Vehicle (min)	Unsignalised Level Of Service	Signalised Level Of Service
A259 Westbound	115.47	7.70	0.369	C	C
A259 Eastbound	135.74	9.05	0.351	C	C
A283 Old Shoreham Rd	35.67	2.38	0.157	A	A

Junctions 8

ARCADY 8 - Roundabout Module

Filename: A259-A2025_SouthSt_standard Rabt_2lane entry_v8.arc8
Path: K:\TRANSPORT\PTG\3511677A-PTG Adur\New Scenario Modelling Sept 2015\06 Junction Models\Proposed Mitigation\A259-A2025
Report generation date: 25/11/2015 18:19:22

Summary of junction performance

	AM			PM		
	Queue (PCU)	Delay (min)	RFC	Queue (PCU)	Delay (min)	RFC
	A1 - Ref Case					
A259 Westbound	4.23	0.30	0.81	10.02	0.70	0.91
A259 Eastbound	2.80	0.14	0.74	1.90	0.11	0.65
A2025 South St	2.26	0.18	0.69	2.35	0.16	0.70
	A1 - Scenario C with Mitigation					
A259 Westbound	5.36	0.35	0.84	224.74	12.21	1.14
A259 Eastbound	9.17	0.38	0.90	34.36	1.35	0.98
A2025 South St	2.16	0.20	0.68	2.33	0.18	0.70

Values shown are the maximum values over all time segments. Delay is the maximum value of average delay per arriving vehicle.

"D1 - Ref Case, AM " model duration: 07:45 - 09:15
"D2 - Ref Case, PM" model duration: 16:45 - 18:15
"D9 - Scenario C with Mitigation, AM" model duration: 07:45 - 09:15
"D10 - Scenario C with Mitigation, PM" model duration: 16:45 - 18:15

Run using Junctions 8.0.2.316 at 25/11/2015 18:19:20

File summary

File Description

Title	A259-South St, Lancing
Location	
Site Number	
Date	15/04/2010
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Enumerator	CORP\hyded
Description	

Analysis Options

Vehicle Length (m)	Do Queue Variations	Calculate Residual Capacity	Residual Capacity Criteria Type	RFC Threshold	Average Delay Threshold (min)	Queue Threshold (PCU)
5.75			N/A	0.85	0.60	20.00

Units

Distance Units	Speed Units	Traffic Units Input	Traffic Units Results	Flow Units	Average Delay Units	Total Delay Units	Rate Of Delay Units
m	kph	PCU	PCU	perHour	min	-Min	perMin

(Default Analysis Set) - Ref Case, AM

Data Errors and Warnings

No errors or warnings

Analysis Set Details

Name	Roundabout Capacity Model	Description	Include In Report	Use Specific Demand Set(s)	Specific Demand Set (s)	Locked	Network Flow Scaling Factor (%)	Network Capacity Scaling Factor (%)	Reason For Scaling Factors
(Default Analysis Set)	ARCADY		✓				100.000	100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Results For Central Hour Only	Single Time Segment Only	Locked	Run Automatically	Use Relationship	Relationship
Ref Case, AM	Ref Case	AM	2031 AM Reference Case SATURN Flows	FLAT	07:45	09:15	90	15				✓		

Junction Network

Junctions

Name	Junction Type	Arm Order	Grade Separated	Large Roundabout	Do Geometric Delay	Junction Delay (min)	Junction LOS
A259-A2025	Roundabout	1,2,3				0.20	B

Junction Network Options

Driving Side	Lighting
Left	Normal/unknown

Arms

Arms

Name	Name	Description
A259 Westbound	A259 Westbound	
A259 Eastbound	A259 Eastbound	
A2025 South St	A2025 South St	A2025 South St

Capacity Options

Name	Minimum Capacity (PCU/hr)	Maximum Capacity (PCU/hr)	Assume Flat Start Profile	Initial Queue (PCU)
A259 Westbound	0.00	1800.00	✓	
A259 Eastbound	0.00	1800.00	✓	
A2025 South St	0.00	1800.00	✓	

Roundabout Geometry

Name	V - Approach road half-width (m)	E - Entry width (m)	l' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit Only
A259 Westbound	3.50	5.00	10.00	33.50	28.00	0.00	
A259 Eastbound	3.25	6.50	10.00	15.00	28.00	0.00	
A2025 South St	3.60	6.50	15.00	20.00	28.00	0.00	

Geometries for Arm C are measured opposite Arm B. Geometries for Arm A (if relevant) are measured opposite Arm D.

Pedestrian Crossings

Name	Crossing Type
A259 Westbound	None
A259 Eastbound	None
A2025 South St	None

Slope / Intercept / Capacity

Roundabout Slope and Intercept used in model

Name	Enter slope and intercept directly	Entered slope	Entered intercept (PCU/hr)	Final Slope	Final Intercept (PCU/hr)
A259 Westbound		(calculated)	(calculated)	0.665	1536.911
A259 Eastbound		(calculated)	(calculated)	0.666	1596.315
A2025 South St		(calculated)	(calculated)	0.713	1803.718

The slope and intercept shown above include any corrections and adjustments.

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCU Factor for a HV (PCU)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		✓	✓	HV Percentages	2.00				✓	✓

Entry Flows

General Flows Data

Name	Profile Type	Use Turning Counts	Average Demand Flow (PCU/hr)	Flow Scaling Factor (%)
A259 Westbound	FLAT	✓	836.00	100.000
A259 Eastbound	FLAT	✓	1177.00	100.000
A2025 South St	FLAT	✓	758.00	100.000

Turning Proportions

Turning Counts or Proportions (PCU/hr) - A259- A2025 (for whole period)

		To		
		1	2	3
From	1	0.000	836.000	0.000
	2	997.000	0.000	180.000
	3	0.000	758.000	0.000

Turning Proportions (PCU) - A259- A2025 (for whole period)

		To		
		1	2	3
From	1	0.00	1.00	0.00
	2	0.85	0.00	0.15
	3	0.00	1.00	0.00

Vehicle Mix

Average PCU Per Vehicle - A259- A2025 (for whole period)

		To		
		1	2	3
From	1	1.000	1.000	1.000
	2	1.000	1.000	1.000
	3	1.000	1.000	1.000

Heavy Vehicle Percentages - A259- A2025 (for whole period)

		To		
		1	2	3
From	1	0.000	0.000	0.000
	2	0.000	0.000	0.000
	3	0.000	0.000	0.000

Results

Results Summary for whole modelled period

Name	Max RFC	Max Delay (min)	Max Queue (PCU)	Max LOS	Average Demand (PCU/hr)	Total Junction Arrivals (PCU)	Total Queueing Delay (PCU-min)	Average Queueing Delay (min)	Rate Of Queueing Delay (PCU-min/min)	Inclusive Total Queueing Delay (PCU-min)	Inclusive Average Queueing Delay (min)
A259 Westbound	0.81	0.30	4.23	C	836.00	1254.00	380.73	0.30	4.23	381.25	0.30
A259 Eastbound	0.74	0.14	2.80	A	1177.00	1765.50	252.44	0.14	2.80	252.59	0.14
A2025 South St	0.69	0.18	2.26	B	758.00	1137.00	203.80	0.18	2.26	203.94	0.18

Main Results for each time segment

Main results: (07:45-08:00)

Name	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Entry Flow (PCU/hr)	Exit Flow (PCU/hr)	Circulating Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	Saturation Capacity (PCU/hr)	RFC	Start Queue (PCU)	End Queue (PCU)	Delay (min)	LOS
A259 Westbound	836.00	209.00	836.00	997.00	758.00	0.00	1033.02	979.12	0.809	4.23	4.23	0.304	C
A259 Eastbound	1177.00	294.25	1177.00	1594.00	0.00	0.00	1596.31	1596.31	0.737	2.80	2.80	0.143	A
A2025 South St	758.00	189.50	758.00	180.00	997.00	0.00	1092.47	839.08	0.694	2.26	2.26	0.179	B

Main results: (08:00-08:15)

Name	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Entry Flow (PCU/hr)	Exit Flow (PCU/hr)	Circulating Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	Saturation Capacity (PCU/hr)	RFC	Start Queue (PCU)	End Queue (PCU)	Delay (min)	LOS
A259 Westbound	836.00	209.00	836.00	997.00	758.00	0.00	1033.02	979.12	0.809	4.23	4.23	0.304	C
A259 Eastbound	1177.00	294.25	1177.00	1594.00	0.00	0.00	1596.31	1596.31	0.737	2.80	2.80	0.143	A
A2025 South St	758.00	189.50	758.00	180.00	997.00	0.00	1092.47	839.08	0.694	2.26	2.26	0.179	B

Main results: (08:15-08:30)

Name	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Entry Flow (PCU/hr)	Exit Flow (PCU/hr)	Circulating Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	Saturation Capacity (PCU/hr)	RFC	Start Queue (PCU)	End Queue (PCU)	Delay (min)	LOS
A259 Westbound	836.00	209.00	836.00	997.00	758.00	0.00	1033.02	979.12	0.809	4.23	4.23	0.304	C
A259 Eastbound	1177.00	294.25	1177.00	1594.00	0.00	0.00	1596.31	1596.31	0.737	2.80	2.80	0.143	A
A2025 South St	758.00	189.50	758.00	180.00	997.00	0.00	1092.47	839.08	0.694	2.26	2.26	0.179	B

Main results: (08:30-08:45)

Name	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Entry Flow (PCU/hr)	Exit Flow (PCU/hr)	Circulating Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	Saturation Capacity (PCU/hr)	RFC	Start Queue (PCU)	End Queue (PCU)	Delay (min)	LOS
A259 Westbound	836.00	209.00	836.00	997.00	758.00	0.00	1033.02	979.12	0.809	4.23	4.23	0.304	C
A259 Eastbound	1177.00	294.25	1177.00	1594.00	0.00	0.00	1596.31	1596.31	0.737	2.80	2.80	0.143	A
A2025 South St	758.00	189.50	758.00	180.00	997.00	0.00	1092.47	839.08	0.694	2.26	2.26	0.179	B

Main results: (08:45-09:00)

Name	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Entry Flow (PCU/hr)	Exit Flow (PCU/hr)	Circulating Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	Saturation Capacity (PCU/hr)	RFC	Start Queue (PCU)	End Queue (PCU)	Delay (min)	LOS
A259 Westbound	836.00	209.00	836.00	997.00	758.00	0.00	1033.02	979.12	0.809	4.23	4.23	0.304	C
A259 Eastbound	1177.00	294.25	1177.00	1594.00	0.00	0.00	1596.31	1596.31	0.737	2.80	2.80	0.143	A
A2025 South St	758.00	189.50	758.00	180.00	997.00	0.00	1092.47	839.08	0.694	2.26	2.26	0.179	B

Main results: (09:00-09:15)

Name	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Entry Flow (PCU/hr)	Exit Flow (PCU/hr)	Circulating Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	Saturation Capacity (PCU/hr)	RFC	Start Queue (PCU)	End Queue (PCU)	Delay (min)	LOS
A259 Westbound	836.00	209.00	836.00	997.00	758.00	0.00	1033.02	979.12	0.809	4.23	4.23	0.304	C
A259 Eastbound	1177.00	294.25	1177.00	1594.00	0.00	0.00	1596.31	1596.31	0.737	2.80	2.80	0.143	A
A2025 South St	758.00	189.50	758.00	180.00	997.00	0.00	1092.47	839.08	0.694	2.26	2.26	0.179	B

Queueing Delay Results for each time segment

Queueing Delay results: (07:45-08:00)

Name	Queueing Total Delay (PCU-min)	Queueing Rate Of Delay (PCU-min/min)	Average Delay Per Arriving Vehicle (min)	Unsignalised Level Of Service	Signalised Level Of Service
A259 Westbound	63.44	4.23	0.304	C	B
A259 Eastbound	42.07	2.80	0.143	A	A
A2025 South St	33.96	2.26	0.179	B	B

Queueing Delay results: (08:00-08:15)

Name	Queueing Total Delay (PCU-min)	Queueing Rate Of Delay (PCU-min/min)	Average Delay Per Arriving Vehicle (min)	Unsignalised Level Of Service	Signalised Level Of Service
A259 Westbound	63.45	4.23	0.304	C	B
A259 Eastbound	42.07	2.80	0.143	A	A
A2025 South St	33.97	2.26	0.179	B	B

Queueing Delay results: (08:15-08:30)

Name	Queueing Total Delay (PCU-min)	Queueing Rate Of Delay (PCU-min/min)	Average Delay Per Arriving Vehicle (min)	Unsignalised Level Of Service	Signalised Level Of Service
A259 Westbound	63.45	4.23	0.304	C	B
A259 Eastbound	42.07	2.80	0.143	A	A
A2025 South St	33.97	2.26	0.179	B	B

Queueing Delay results: (08:30-08:45)

Name	Queueing Total Delay (PCU-min)	Queueing Rate Of Delay (PCU-min/min)	Average Delay Per Arriving Vehicle (min)	Unsignalised Level Of Service	Signalised Level Of Service
A259 Westbound	63.46	4.23	0.304	C	B
A259 Eastbound	42.07	2.80	0.143	A	A
A2025 South St	33.97	2.26	0.179	B	B

Queueing Delay results: (08:45-09:00)

Name	Queueing Total Delay (PCU-min)	Queueing Rate Of Delay (PCU-min/min)	Average Delay Per Arriving Vehicle (min)	Unsignalised Level Of Service	Signalised Level Of Service
A259 Westbound	63.46	4.23	0.304	C	B
A259 Eastbound	42.07	2.80	0.143	A	A
A2025 South St	33.97	2.26	0.179	B	B

Queueing Delay results: (09:00-09:15)

Name	Queueing Total Delay (PCU-min)	Queueing Rate Of Delay (PCU-min/min)	Average Delay Per Arriving Vehicle (min)	Unsignalised Level Of Service	Signalised Level Of Service
A259 Westbound	63.47	4.23	0.304	C	B
A259 Eastbound	42.07	2.80	0.143	A	A
A2025 South St	33.97	2.26	0.179	B	B

(Default Analysis Set) - Ref Case, PM

Data Errors and Warnings

No errors or warnings

Analysis Set Details

Name	Roundabout Capacity Model	Description	Include In Report	Use Specific Demand Set(s)	Specific Demand Set (s)	Locked	Network Flow Scaling Factor (%)	Network Capacity Scaling Factor (%)	Reason For Scaling Factors
(Default Analysis Set)	ARCADY		✓				100.000	100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Results For Central Hour Only	Single Time Segment Only	Locked	Run Automatically	Use Relationship	Relationship
Ref Case, PM	Ref Case	PM	2031 PM Reference Case SATURN Flows	FLAT	16:45	18:15	90	15				✓		

Junction Network

Junctions

Name	Junction Type	Arm Order	Grade Separated	Large Roundabout	Do Geometric Delay	Junction Delay (min)	Junction LOS
A259-A2025	Roundabout	1,2,3				0.31	C

Junction Network Options

Driving Side	Lighting
Left	Normal/unknown

Arms

Arms

Name	Name	Description
A259 Westbound	A259 Westbound	
A259 Eastbound	A259 Eastbound	
A2025 South St	A2025 South St	A2025 South St

Capacity Options

Name	Minimum Capacity (PCU/hr)	Maximum Capacity (PCU/hr)	Assume Flat Start Profile	Initial Queue (PCU)
A259 Westbound	0.00	1800.00	✓	
A259 Eastbound	0.00	1800.00	✓	
A2025 South St	0.00	1800.00	✓	

Roundabout Geometry

Name	V - Approach road half-width (m)	E - Entry width (m)	l' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit Only
A259 Westbound	3.50	5.00	10.00	33.50	28.00	0.00	
A259 Eastbound	3.25	6.50	10.00	15.00	28.00	0.00	
A2025 South St	3.60	6.50	15.00	20.00	28.00	0.00	

Geometries for Arm C are measured opposite Arm B. Geometries for Arm A (if relevant) are measured opposite Arm D.

Pedestrian Crossings

Name	Crossing Type
A259 Westbound	None
A259 Eastbound	None
A2025 South St	None

Slope / Intercept / Capacity

Roundabout Slope and Intercept used in model

Name	Enter slope and intercept directly	Entered slope	Entered intercept (PCU/hr)	Final Slope	Final Intercept (PCU/hr)
A259 Westbound		(calculated)	(calculated)	0.665	1536.911
A259 Eastbound		(calculated)	(calculated)	0.666	1596.315
A2025 South St		(calculated)	(calculated)	0.713	1803.718

The slope and intercept shown above include any corrections and adjustments.

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCU Factor for a HV (PCU)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		✓	✓	HV Percentages	2.00				✓	✓

Entry Flows

General Flows Data

Name	Profile Type	Use Turning Counts	Average Demand Flow (PCU/hr)	Flow Scaling Factor (%)
A259 Westbound	FLAT	✓	860.00	100.000
A259 Eastbound	FLAT	✓	1045.00	100.000
A2025 South St	FLAT	✓	890.00	100.000

Turning Proportions

Turning Counts or Proportions (PCU/hr) - A259- A2025 (for whole period)

		To		
		1	2	3
From	1	0.000	860.000	0.000
	2	749.000	0.000	296.000
	3	0.000	890.000	0.000

Turning Proportions (PCU) - A259- A2025 (for whole period)

		To		
		1	2	3
From	1	0.00	1.00	0.00
	2	0.72	0.00	0.28
	3	0.00	1.00	0.00

Vehicle Mix

Average PCU Per Vehicle - A259- A2025 (for whole period)

		To		
		1	2	3
From	1	1.000	1.000	1.000
	2	1.000	1.000	1.000
	3	1.000	1.000	1.000

Heavy Vehicle Percentages - A259- A2025 (for whole period)

		To		
		1	2	3
From	1	0.000	0.000	0.000
	2	0.000	0.000	0.000
	3	0.000	0.000	0.000

Results

Results Summary for whole modelled period

Name	Max RFC	Max Delay (min)	Max Queue (PCU)	Max LOS	Average Demand (PCU/hr)	Total Junction Arrivals (PCU)	Total Queueing Delay (PCU-min)	Average Queueing Delay (min)	Rate Of Queueing Delay (PCU-min/min)	Inclusive Total Queueing Delay (PCU-min)	Inclusive Average Queueing Delay (min)
A259 Westbound	0.91	0.70	10.02	E	860.00	1290.00	901.36	0.70	10.02	904.54	0.70
A259 Eastbound	0.65	0.11	1.90	A	1045.00	1567.50	170.56	0.11	1.90	170.63	0.11
A2025 South St	0.70	0.16	2.35	A	890.00	1335.00	211.07	0.16	2.35	211.20	0.16

Main Results for each time segment

Main results: (16:45-17:00)

Name	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Entry Flow (PCU/hr)	Exit Flow (PCU/hr)	Circulating Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	Saturation Capacity (PCU/hr)	RFC	Start Queue (PCU)	End Queue (PCU)	Delay (min)	LOS
A259 Westbound	860.00	215.00	860.00	749.00	890.00	0.00	945.27	880.47	0.910	10.01	10.01	0.701	E
A259 Eastbound	1045.00	261.25	1045.00	1750.00	0.00	0.00	1596.31	1596.31	0.655	1.90	1.90	0.109	A
A2025 South St	890.00	222.50	890.00	296.00	749.00	0.00	1269.39	987.49	0.701	2.35	2.35	0.158	A

Main results: (17:00-17:15)

Name	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Entry Flow (PCU/hr)	Exit Flow (PCU/hr)	Circulating Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	Saturation Capacity (PCU/hr)	RFC	Start Queue (PCU)	End Queue (PCU)	Delay (min)	LOS
A259 Westbound	860.00	215.00	860.00	749.00	890.00	0.00	945.27	880.47	0.910	10.01	10.01	0.701	E
A259 Eastbound	1045.00	261.25	1045.00	1750.00	0.00	0.00	1596.31	1596.31	0.655	1.90	1.90	0.109	A
A2025 South St	890.00	222.50	890.00	296.00	749.00	0.00	1269.39	987.49	0.701	2.35	2.35	0.158	A

Main results: (17:15-17:30)

Name	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Entry Flow (PCU/hr)	Exit Flow (PCU/hr)	Circulating Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	Saturation Capacity (PCU/hr)	RFC	Start Queue (PCU)	End Queue (PCU)	Delay (min)	LOS
A259 Westbound	860.00	215.00	860.00	749.00	890.00	0.00	945.27	880.47	0.910	10.01	10.02	0.701	E
A259 Eastbound	1045.00	261.25	1045.00	1750.00	0.00	0.00	1596.31	1596.31	0.655	1.90	1.90	0.109	A
A2025 South St	890.00	222.50	890.00	296.00	749.00	0.00	1269.39	987.49	0.701	2.35	2.35	0.158	A

Main results: (17:30-17:45)

Name	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Entry Flow (PCU/hr)	Exit Flow (PCU/hr)	Circulating Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	Saturation Capacity (PCU/hr)	RFC	Start Queue (PCU)	End Queue (PCU)	Delay (min)	LOS
A259 Westbound	860.00	215.00	860.00	749.00	890.00	0.00	945.27	880.47	0.910	10.02	10.02	0.701	E
A259 Eastbound	1045.00	261.25	1045.00	1750.00	0.00	0.00	1596.31	1596.31	0.655	1.90	1.90	0.109	A
A2025 South St	890.00	222.50	890.00	296.00	749.00	0.00	1269.39	987.49	0.701	2.35	2.35	0.158	A

Main results: (17:45-18:00)

Name	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Entry Flow (PCU/hr)	Exit Flow (PCU/hr)	Circulating Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	Saturation Capacity (PCU/hr)	RFC	Start Queue (PCU)	End Queue (PCU)	Delay (min)	LOS
A259 Westbound	860.00	215.00	860.00	749.00	890.00	0.00	945.27	880.47	0.910	10.02	10.02	0.701	E
A259 Eastbound	1045.00	261.25	1045.00	1750.00	0.00	0.00	1596.31	1596.31	0.655	1.90	1.90	0.109	A
A2025 South St	890.00	222.50	890.00	296.00	749.00	0.00	1269.39	987.49	0.701	2.35	2.35	0.158	A

Main results: (18:00-18:15)

Name	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Entry Flow (PCU/hr)	Exit Flow (PCU/hr)	Circulating Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	Saturation Capacity (PCU/hr)	RFC	Start Queue (PCU)	End Queue (PCU)	Delay (min)	LOS
A259 Westbound	860.00	215.00	860.00	749.00	890.00	0.00	945.27	880.47	0.910	10.02	10.02	0.701	E
A259 Eastbound	1045.00	261.25	1045.00	1750.00	0.00	0.00	1596.31	1596.31	0.655	1.90	1.90	0.109	A
A2025 South St	890.00	222.50	890.00	296.00	749.00	0.00	1269.39	987.49	0.701	2.35	2.35	0.158	A

Queueing Delay Results for each time segment

Queueing Delay results: (16:45-17:00)

Name	Queueing Total Delay (PCU-min)	Queueing Rate Of Delay (PCU-min/min)	Average Delay Per Arriving Vehicle (min)	Unsignalised Level Of Service	Signalised Level Of Service
A259 Westbound	150.19	10.01	0.701	E	D
A259 Eastbound	28.43	1.90	0.109	A	A
A2025 South St	35.18	2.35	0.158	A	A

Queueing Delay results: (17:00-17:15)

Name	Queueing Total Delay (PCU-min)	Queueing Rate Of Delay (PCU-min/min)	Average Delay Per Arriving Vehicle (min)	Unsignalised Level Of Service	Signalised Level Of Service
A259 Westbound	150.21	10.01	0.701	E	D
A259 Eastbound	28.43	1.90	0.109	A	A
A2025 South St	35.18	2.35	0.158	A	A

Queueing Delay results: (17:15-17:30)

Name	Queueing Total Delay (PCU-min)	Queueing Rate Of Delay (PCU-min/min)	Average Delay Per Arriving Vehicle (min)	Unsignalised Level Of Service	Signalised Level Of Service
A259 Westbound	150.22	10.01	0.701	E	D
A259 Eastbound	28.43	1.90	0.109	A	A
A2025 South St	35.18	2.35	0.158	A	A

Queueing Delay results: (17:30-17:45)

Name	Queueing Total Delay (PCU-min)	Queueing Rate Of Delay (PCU-min/min)	Average Delay Per Arriving Vehicle (min)	Unsignalised Level Of Service	Signalised Level Of Service
A259 Westbound	150.23	10.02	0.701	E	D
A259 Eastbound	28.43	1.90	0.109	A	A
A2025 South St	35.18	2.35	0.158	A	A

Queueing Delay results: (17:45-18:00)

Name	Queueing Total Delay (PCU-min)	Queueing Rate Of Delay (PCU-min/min)	Average Delay Per Arriving Vehicle (min)	Unsignalised Level Of Service	Signalised Level Of Service
A259 Westbound	150.25	10.02	0.701	E	D
A259 Eastbound	28.43	1.90	0.109	A	A
A2025 South St	35.18	2.35	0.158	A	A

Queueing Delay results: (18:00-18:15)

Name	Queueing Total Delay (PCU-min)	Queueing Rate Of Delay (PCU-min/min)	Average Delay Per Arriving Vehicle (min)	Unsignalised Level Of Service	Signalised Level Of Service
A259 Westbound	150.26	10.02	0.701	E	D
A259 Eastbound	28.43	1.90	0.109	A	A
A2025 South St	35.18	2.35	0.158	A	A

(Default Analysis Set) - Scenario C with Mitigation, AM

Data Errors and Warnings

No errors or warnings

Analysis Set Details

Name	Roundabout Capacity Model	Description	Include In Report	Use Specific Demand Set(s)	Specific Demand Set (s)	Locked	Network Flow Scaling Factor (%)	Network Capacity Scaling Factor (%)	Reason For Scaling Factors
(Default Analysis Set)	ARCADY		✓				100.000	100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Results For Central Hour Only	Single Time Segment Only	Locked	Run Automatically	Use Relationship	Relationshi
Scenario C with Mitigation, AM	Scenario C with Mitigation	AM	2031 AM Scenario C with Mitigation SATURN Flows	FLAT	07:45	09:15	90	15				✓		

Junction Network

Junctions

Name	Junction Type	Arm Order	Grade Separated	Large Roundabout	Do Geometric Delay	Junction Delay (min)	Junction LOS
A259-A2025	Roundabout	1,2,3				0.33	C

Junction Network Options

Driving Side	Lighting
Left	Normal/unknown

Arms

Arms

Name	Name	Description
A259 Westbound	A259 Westbound	
A259 Eastbound	A259 Eastbound	
A2025 South St	A2025 South St	A2025 South St

Capacity Options

Name	Minimum Capacity (PCU/hr)	Maximum Capacity (PCU/hr)	Assume Flat Start Profile	Initial Queue (PCU)
A259 Westbound	0.00	1800.00	✓	
A259 Eastbound	0.00	1800.00	✓	
A2025 South St	0.00	1800.00	✓	

Roundabout Geometry

Name	V - Approach road half-width (m)	E - Entry width (m)	l' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit Only
A259 Westbound	3.50	5.00	10.00	33.50	28.00	0.00	
A259 Eastbound	3.25	6.50	10.00	15.00	28.00	0.00	
A2025 South St	3.60	6.50	15.00	20.00	28.00	0.00	

Geometries for Arm C are measured opposite Arm B. Geometries for Arm A (if relevant) are measured opposite Arm D.

Pedestrian Crossings

Name	Crossing Type
A259 Westbound	None
A259 Eastbound	None
A2025 South St	None

Slope / Intercept / Capacity

Roundabout Slope and Intercept used in model

Name	Enter slope and intercept directly	Entered slope	Entered intercept (PCU/hr)	Final Slope	Final Intercept (PCU/hr)
A259 Westbound		(calculated)	(calculated)	0.665	1536.911
A259 Eastbound		(calculated)	(calculated)	0.666	1596.315
A2025 South St		(calculated)	(calculated)	0.713	1803.718

The slope and intercept shown above include any corrections and adjustments.

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCU Factor for a HV (PCU)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		✓	✓	HV Percentages	2.00				✓	✓

Entry Flows

General Flows Data

Name	Profile Type	Use Turning Counts	Average Demand Flow (PCU/hr)	Flow Scaling Factor (%)
A259 Westbound	FLAT	✓	932.00	100.000
A259 Eastbound	FLAT	✓	1440.00	100.000
A2025 South St	FLAT	✓	649.00	100.000

Turning Proportions

Turning Counts or Proportions (PCU/hr) - A259- A2025 (for whole period)

		To		
		1	**2**	**3**
From	**1**	0.000	932.000	0.000
	2	1197.000	0.000	243.000
	3	0.000	649.000	0.000

Turning Proportions (PCU) - A259- A2025 (for whole period)

		To		
		1	**2**	**3**
From	**1**	0.00	1.00	0.00
	2	0.83	0.00	0.17
	3	0.00	1.00	0.00

Vehicle Mix

Average PCU Per Vehicle - A259- A2025 (for whole period)

	To		
From	1	2	3
1	1.000	1.000	1.000
2	1.000	1.000	1.000
3	1.000	1.000	1.000

Heavy Vehicle Percentages - A259- A2025 (for whole period)

	To		
From	1	2	3
1	0.000	0.000	0.000
2	0.000	0.000	0.000
3	0.000	0.000	0.000

Results

Results Summary for whole modelled period

Name	Max RFC	Max Delay (min)	Max Queue (PCU)	Max LOS	Average Demand (PCU/hr)	Total Junction Arrivals (PCU)	Total Queueing Delay (PCU-min)	Average Queueing Delay (min)	Rate Of Queueing Delay (PCU-min/min)	Inclusive Total Queueing Delay (PCU-min)	Inclusive Average Queueing Delay (min)
A259 Westbound	0.84	0.35	5.36	C	932.00	1398.00	482.40	0.35	5.36	483.18	0.35
A259 Eastbound	0.90	0.38	9.17	C	1440.00	2160.00	825.08	0.38	9.17	826.66	0.38
A2025 South St	0.68	0.20	2.16	B	649.00	973.50	194.08	0.20	2.16	194.23	0.20

Main Results for each time segment

Main results: (07:45-08:00)

Name	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Entry Flow (PCU/hr)	Exit Flow (PCU/hr)	Circulating Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	Saturation Capacity (PCU/hr)	RFC	Start Queue (PCU)	End Queue (PCU)	Delay (min)	LOS
A259 Westbound	932.00	233.00	932.00	1197.00	649.00	0.00	1105.48	967.15	0.843	5.36	5.36	0.346	C
A259 Eastbound	1440.00	360.00	1440.00	1581.00	0.00	0.00	1596.31	1596.31	0.902	9.16	9.17	0.383	C
A2025 South St	649.00	162.25	649.00	243.00	1197.00	0.00	949.79	857.10	0.683	2.16	2.16	0.199	B

Main results: (08:00-08:15)

Name	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Entry Flow (PCU/hr)	Exit Flow (PCU/hr)	Circulating Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	Saturation Capacity (PCU/hr)	RFC	Start Queue (PCU)	End Queue (PCU)	Delay (min)	LOS
A259 Westbound	932.00	233.00	932.00	1197.00	649.00	0.00	1105.48	967.15	0.843	5.36	5.36	0.346	C
A259 Eastbound	1440.00	360.00	1440.00	1581.00	0.00	0.00	1596.31	1596.31	0.902	9.17	9.17	0.383	C
A2025 South St	649.00	162.25	649.00	243.00	1197.00	0.00	949.79	857.10	0.683	2.16	2.16	0.199	B

Main results: (08:15-08:30)

Name	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Entry Flow (PCU/hr)	Exit Flow (PCU/hr)	Circulating Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	Saturation Capacity (PCU/hr)	RFC	Start Queue (PCU)	End Queue (PCU)	Delay (min)	LOS
A259 Westbound	932.00	233.00	932.00	1197.00	649.00	0.00	1105.48	967.15	0.843	5.36	5.36	0.346	C
A259 Eastbound	1440.00	360.00	1440.00	1581.00	0.00	0.00	1596.31	1596.31	0.902	9.17	9.17	0.383	C
A2025 South St	649.00	162.25	649.00	243.00	1197.00	0.00	949.79	857.10	0.683	2.16	2.16	0.199	B

Main results: (08:30-08:45)

Name	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Entry Flow (PCU/hr)	Exit Flow (PCU/hr)	Circulating Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	Saturation Capacity (PCU/hr)	RFC	Start Queue (PCU)	End Queue (PCU)	Delay (min)	LOS
A259 Westbound	932.00	233.00	932.00	1197.00	649.00	0.00	1105.48	967.15	0.843	5.36	5.36	0.346	C
A259 Eastbound	1440.00	360.00	1440.00	1581.00	0.00	0.00	1596.31	1596.31	0.902	9.17	9.17	0.383	C
A2025 South St	649.00	162.25	649.00	243.00	1197.00	0.00	949.79	857.10	0.683	2.16	2.16	0.199	B

Main results: (08:45-09:00)

Name	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Entry Flow (PCU/hr)	Exit Flow (PCU/hr)	Circulating Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	Saturation Capacity (PCU/hr)	RFC	Start Queue (PCU)	End Queue (PCU)	Delay (min)	LOS
A259 Westbound	932.00	233.00	932.00	1197.00	649.00	0.00	1105.48	967.15	0.843	5.36	5.36	0.346	C
A259 Eastbound	1440.00	360.00	1440.00	1581.00	0.00	0.00	1596.31	1596.31	0.902	9.17	9.17	0.383	C
A2025 South St	649.00	162.25	649.00	243.00	1197.00	0.00	949.79	857.10	0.683	2.16	2.16	0.199	B

Main results: (09:00-09:15)

Name	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Entry Flow (PCU/hr)	Exit Flow (PCU/hr)	Circulating Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	Saturation Capacity (PCU/hr)	RFC	Start Queue (PCU)	End Queue (PCU)	Delay (min)	LOS
A259 Westbound	932.00	233.00	932.00	1197.00	649.00	0.00	1105.48	967.15	0.843	5.36	5.36	0.346	C
A259 Eastbound	1440.00	360.00	1440.00	1581.00	0.00	0.00	1596.31	1596.31	0.902	9.17	9.17	0.383	C
A2025 South St	649.00	162.25	649.00	243.00	1197.00	0.00	949.79	857.10	0.683	2.16	2.16	0.199	B

Queueing Delay Results for each time segment

Queueing Delay results: (07:45-08:00)

Name	Queueing Total Delay (PCU-min)	Queueing Rate Of Delay (PCU-min/min)	Average Delay Per Arriving Vehicle (min)	Unsignalised Level Of Service	Signalised Level Of Service
A259 Westbound	80.39	5.36	0.346	C	C
A259 Eastbound	137.48	9.17	0.383	C	C
A2025 South St	32.35	2.16	0.199	B	B

Queueing Delay results: (08:00-08:15)

Name	Queueing Total Delay (PCU-min)	Queueing Rate Of Delay (PCU-min/min)	Average Delay Per Arriving Vehicle (min)	Unsignalised Level Of Service	Signalised Level Of Service
A259 Westbound	80.40	5.36	0.346	C	C
A259 Eastbound	137.49	9.17	0.383	C	C
A2025 South St	32.35	2.16	0.199	B	B

Queueing Delay results: (08:15-08:30)

Name	Queueing Total Delay (PCU-min)	Queueing Rate Of Delay (PCU-min/min)	Average Delay Per Arriving Vehicle (min)	Unsignalised Level Of Service	Signalised Level Of Service
A259 Westbound	80.40	5.36	0.346	C	C
A259 Eastbound	137.51	9.17	0.383	C	C
A2025 South St	32.35	2.16	0.199	B	B

Queueing Delay results: (08:30-08:45)

Name	Queueing Total Delay (PCU-min)	Queueing Rate Of Delay (PCU-min/min)	Average Delay Per Arriving Vehicle (min)	Unsignalised Level Of Service	Signalised Level Of Service
A259 Westbound	80.40	5.36	0.346	C	C
A259 Eastbound	137.52	9.17	0.383	C	C
A2025 South St	32.35	2.16	0.199	B	B

Queueing Delay results: (08:45-09:00)

Name	Queueing Total Delay (PCU-min)	Queueing Rate Of Delay (PCU-min/min)	Average Delay Per Arriving Vehicle (min)	Unsignalised Level Of Service	Signalised Level Of Service
A259 Westbound	80.41	5.36	0.346	C	C
A259 Eastbound	137.53	9.17	0.383	C	C
A2025 South St	32.35	2.16	0.199	B	B

Queueing Delay results: (09:00-09:15)

Name	Queueing Total Delay (PCU-min)	Queueing Rate Of Delay (PCU-min/min)	Average Delay Per Arriving Vehicle (min)	Unsignalised Level Of Service	Signalised Level Of Service
A259 Westbound	80.41	5.36	0.346	C	C
A259 Eastbound	137.54	9.17	0.383	C	C
A2025 South St	32.35	2.16	0.199	B	B

(Default Analysis Set) - Scenario C with Mitigation, PM

Data Errors and Warnings

No errors or warnings

Analysis Set Details

Name	Roundabout Capacity Model	Description	Include In Report	Use Specific Demand Set(s)	Specific Demand Set (s)	Locked	Network Flow Scaling Factor (%)	Network Capacity Scaling Factor (%)	Reason For Scaling Factors
(Default Analysis Set)	ARCADY		✓				100.000	100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Results For Central Hour Only	Single Time Segment Only	Locked	Run Automatically	Use Relationship	Relationshi
Scenario C with Mitigation, PM	Scenario C with Mitigation	PM	2031 PM Scenario C with Mitigation SATURN Flows	FLAT	16:45	18:15	90	15				✓		

Junction Network

Junctions

Name	Junction Type	Arm Order	Grade Separated	Large Roundabout	Do Geometric Delay	Junction Delay (min)	Junction LOS
A259-A2025	Roundabout	1,2,3				4.71	F

Junction Network Options

Driving Side	Lighting
Left	Normal/unknown

Arms

Arms

Name	Name	Description
A259 Westbound	A259 Westbound	
A259 Eastbound	A259 Eastbound	
A2025 South St	A2025 South St	A2025 South St

Capacity Options

Name	Minimum Capacity (PCU/hr)	Maximum Capacity (PCU/hr)	Assume Flat Start Profile	Initial Queue (PCU)
A259 Westbound	0.00	1800.00	✓	
A259 Eastbound	0.00	1800.00	✓	
A2025 South St	0.00	1800.00	✓	

Roundabout Geometry

Name	V - Approach road half-width (m)	E - Entry width (m)	l' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit Only
A259 Westbound	3.50	5.00	10.00	33.50	28.00	0.00	
A259 Eastbound	3.25	6.50	10.00	15.00	28.00	0.00	
A2025 South St	3.60	6.50	15.00	20.00	28.00	0.00	

Geometries for Arm C are measured opposite Arm B. Geometries for Arm A (if relevant) are measured opposite Arm D.

Pedestrian Crossings

Name	Crossing Type
A259 Westbound	None
A259 Eastbound	None
A2025 South St	None

Slope / Intercept / Capacity

Roundabout Slope and Intercept used in model

Name	Enter slope and intercept directly	Entered slope	Entered intercept (PCU/hr)	Final Slope	Final Intercept (PCU/hr)
A259 Westbound		(calculated)	(calculated)	0.665	1536.911
A259 Eastbound		(calculated)	(calculated)	0.666	1596.315
A2025 South St		(calculated)	(calculated)	0.713	1803.718

The slope and intercept shown above include any corrections and adjustments.

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCU Factor for a HV (PCU)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		✓	✓	HV Percentages	2.00				✓	✓

Entry Flows

General Flows Data

Name	Profile Type	Use Turning Counts	Average Demand Flow (PCU/hr)	Flow Scaling Factor (%)
A259 Westbound	FLAT	✓	1168.00	100.000
A259 Eastbound	FLAT	✓	1572.00	100.000
A2025 South St	FLAT	✓	772.00	100.000

Turning Proportions

Turning Counts or Proportions (PCU/hr) - A259- A2025 (for whole period)

		To		
		1	2	3
From	1	0.000	1168.000	0.000
	2	990.000	0.000	582.000
	3	0.000	772.000	0.000

Turning Proportions (PCU) - A259- A2025 (for whole period)

		To		
		1	2	3
From	1	0.00	1.00	0.00
	2	0.63	0.00	0.37
	3	0.00	1.00	0.00

Vehicle Mix

Average PCU Per Vehicle - A259- A2025 (for whole period)

		To		
		1	2	3
From	1	1.000	1.000	1.000
	2	1.000	1.000	1.000
	3	1.000	1.000	1.000

Heavy Vehicle Percentages - A259- A2025 (for whole period)

		To		
		1	2	3
From	1	0.000	0.000	0.000
	2	0.000	0.000	0.000
	3	0.000	0.000	0.000

Results

Results Summary for whole modelled period

Name	Max RFC	Max Delay (min)	Max Queue (PCU)	Max LOS	Average Demand (PCU/hr)	Total Junction Arrivals (PCU)	Total Queueing Delay (PCU-min)	Average Queueing Delay (min)	Rate Of Queueing Delay (PCU-min/min)	Inclusive Total Queueing Delay (PCU-min)	Inclusive Average Queueing Delay (min)
A259 Westbound	1.14	12.21	224.74	F	1168.00	1752.00	10444.95	5.96	116.05	11925.07	6.81
A259 Eastbound	0.98	1.35	34.36	F	1572.00	2358.00	2402.63	1.02	26.70	2424.82	1.03
A2025 South St	0.70	0.18	2.33	B	772.00	1158.00	207.11	0.18	2.30	207.26	0.18

Main Results for each time segment

Main results: (16:45-17:00)

Name	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Entry Flow (PCU/hr)	Exit Flow (PCU/hr)	Circulating Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	Saturation Capacity (PCU/hr)	RFC	Start Queue (PCU)	End Queue (PCU)	Delay (min)	LOS
A259 Westbound	1168.00	292.00	1008.75	972.14	772.00	0.00	1023.72	814.62	1.141	3.74	43.55	1.608	F
A259 Eastbound	1572.00	393.00	1543.64	1780.75	0.00	0.00	1596.31	1596.31	0.985	13.17	20.26	0.780	E
A2025 South St	772.00	193.00	772.00	571.50	972.14	0.00	1110.20	1086.54	0.695	2.28	2.28	0.177	B

Main results: (17:00-17:15)

Name	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Entry Flow (PCU/hr)	Exit Flow (PCU/hr)	Circulating Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	Saturation Capacity (PCU/hr)	RFC	Start Queue (PCU)	End Queue (PCU)	Delay (min)	LOS
A259 Westbound	1168.00	292.00	1021.90	978.98	771.96	0.00	1023.75	814.62	1.141	43.55	80.08	3.784	F
A259 Eastbound	1572.00	393.00	1554.50	1793.86	0.00	0.00	1596.31	1596.31	0.985	20.26	24.64	0.974	F
A2025 South St	772.00	193.00	771.96	575.52	978.98	0.00	1105.32	1086.54	0.698	2.28	2.29	0.180	B

Main results: (17:15-17:30)

Name	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Entry Flow (PCU/hr)	Exit Flow (PCU/hr)	Circulating Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	Saturation Capacity (PCU/hr)	RFC	Start Queue (PCU)	End Queue (PCU)	Delay (min)	LOS
A259 Westbound	1168.00	292.00	1022.99	981.87	771.95	0.00	1023.75	814.62	1.141	80.08	116.33	5.883	F
A259 Eastbound	1572.00	393.00	1559.09	1794.94	0.00	0.00	1596.31	1596.31	0.985	24.64	27.86	1.105	F
A2025 South St	772.00	193.00	771.95	577.22	981.87	0.00	1103.26	1086.54	0.700	2.29	2.30	0.181	B

Main results: (17:30-17:45)

Name	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Entry Flow (PCU/hr)	Exit Flow (PCU/hr)	Circulating Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	Saturation Capacity (PCU/hr)	RFC	Start Queue (PCU)	End Queue (PCU)	Delay (min)	LOS
A259 Westbound	1168.00	292.00	1023.33	983.54	771.96	0.00	1023.74	814.62	1.141	116.33	152.50	7.988	F
A259 Eastbound	1572.00	393.00	1561.75	1795.29	0.00	0.00	1596.31	1596.31	0.985	27.86	30.43	1.205	F
A2025 South St	772.00	193.00	771.96	578.20	983.54	0.00	1102.07	1086.54	0.701	2.30	2.31	0.182	B

Main results: (17:45-18:00)

Name	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Entry Flow (PCU/hr)	Exit Flow (PCU/hr)	Circulating Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	Saturation Capacity (PCU/hr)	RFC	Start Queue (PCU)	End Queue (PCU)	Delay (min)	LOS
A259 Westbound	1168.00	292.00	1023.48	984.65	771.97	0.00	1023.74	814.62	1.141	152.50	188.63	10.097	F
A259 Eastbound	1572.00	393.00	1563.51	1795.44	0.00	0.00	1596.31	1596.31	0.985	30.43	32.55	1.286	F
A2025 South St	772.00	193.00	771.97	578.86	984.65	0.00	1101.28	1086.54	0.701	2.31	2.32	0.182	B

Main results: (18:00-18:15)

Name	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Entry Flow (PCU/hr)	Exit Flow (PCU/hr)	Circulating Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	Saturation Capacity (PCU/hr)	RFC	Start Queue (PCU)	End Queue (PCU)	Delay (min)	LOS
A259 Westbound	1168.00	292.00	1023.55	985.45	771.97	0.00	1023.73	814.62	1.141	188.63	224.74	12.207	F
A259 Eastbound	1572.00	393.00	1564.77	1795.53	0.00	0.00	1596.31	1596.31	0.985	32.55	34.36	1.355	F
A2025 South St	772.00	193.00	771.97	579.32	985.45	0.00	1100.71	1086.54	0.701	2.32	2.33	0.182	B

Queueing Delay Results for each time segment

Queueing Delay results: (16:45-17:00)

Name	Queueing Total Delay (PCU-min)	Queueing Rate Of Delay (PCU-min/min)	Average Delay Per Arriving Vehicle (min)	Unsignalised Level Of Service	Signalised Level Of Service
A259 Westbound	368.88	24.59	1.608	F	F
A259 Eastbound	256.41	17.09	0.780	E	D
A2025 South St	34.17	2.28	0.177	B	B

Queueing Delay results: (17:00-17:15)

Name	Queueing Total Delay (PCU-min)	Queueing Rate Of Delay (PCU-min/min)	Average Delay Per Arriving Vehicle (min)	Unsignalised Level Of Service	Signalised Level Of Service
A259 Westbound	927.83	61.86	3.784	F	F
A259 Eastbound	338.67	22.58	0.974	F	E
A2025 South St	34.27	2.28	0.180	B	B

Queueing Delay results: (17:15-17:30)

Name	Queueing Total Delay (PCU-min)	Queueing Rate Of Delay (PCU-min/min)	Average Delay Per Arriving Vehicle (min)	Unsignalised Level Of Service	Signalised Level Of Service
A259 Westbound	1473.21	98.21	5.883	F	F
A259 Eastbound	394.78	26.32	1.105	F	E
A2025 South St	34.45	2.30	0.181	B	B

Queueing Delay results: (17:30-17:45)

Name	Queueing Total Delay (PCU-min)	Queueing Rate Of Delay (PCU-min/min)	Average Delay Per Arriving Vehicle (min)	Unsignalised Level Of Service	Signalised Level Of Service
A259 Westbound	2016.26	134.42	7.988	F	F
A259 Eastbound	437.84	29.19	1.205	F	E
A2025 South St	34.61	2.31	0.182	B	B

Queueing Delay results: (17:45-18:00)

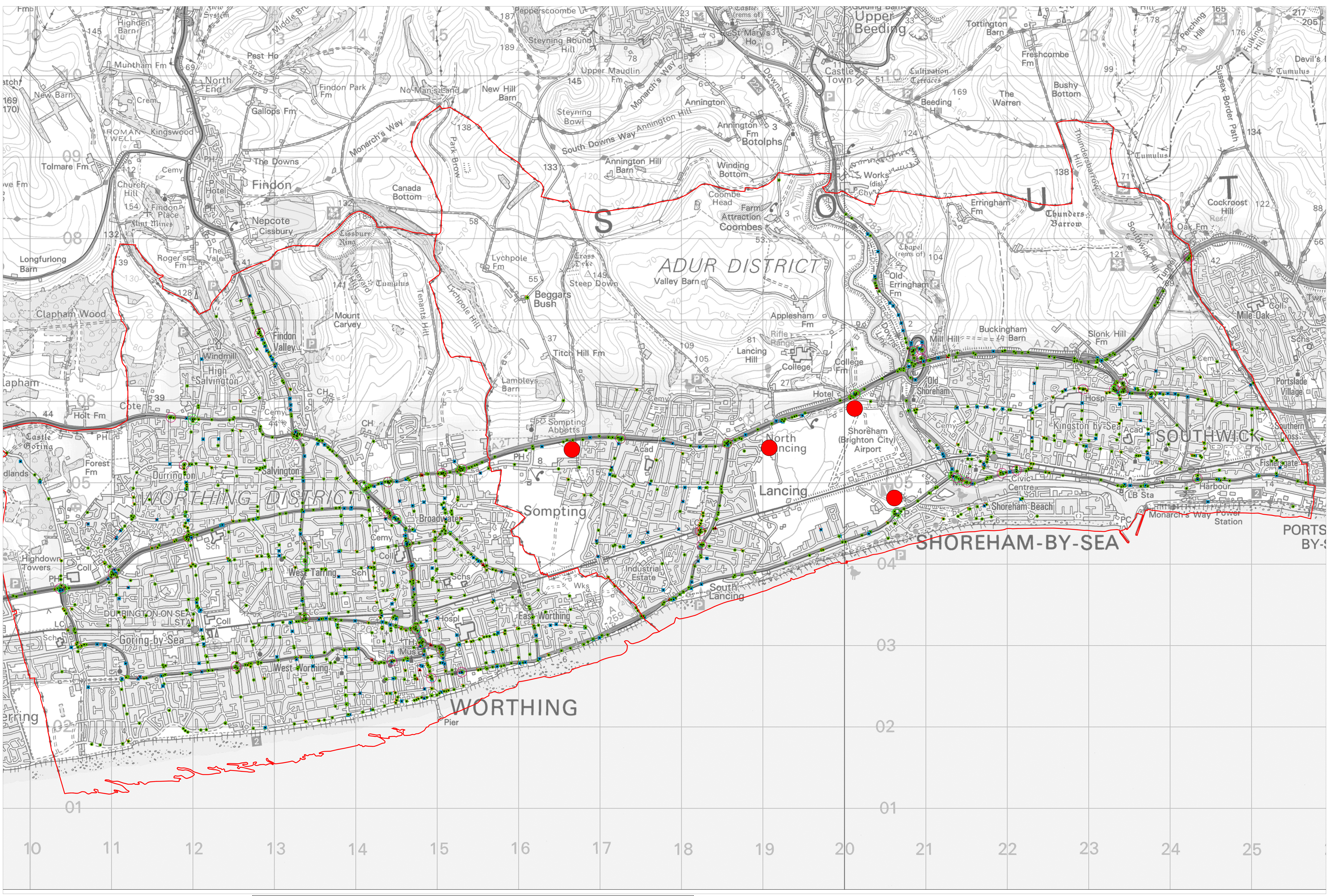
Name	Queueing Total Delay (PCU-min)	Queueing Rate Of Delay (PCU-min/min)	Average Delay Per Arriving Vehicle (min)	Unsignalised Level Of Service	Signalised Level Of Service
A259 Westbound	2558.47	170.56	10.097	F	F
A259 Eastbound	472.79	31.52	1.286	F	E
A2025 South St	34.75	2.32	0.182	B	B

Queueing Delay results: (18:00-18:15)

Name	Queueing Total Delay (PCU-min)	Queueing Rate Of Delay (PCU-min/min)	Average Delay Per Arriving Vehicle (min)	Unsignalised Level Of Service	Signalised Level Of Service
A259 Westbound	3100.28	206.69	12.207	F	F
A259 Eastbound	502.14	33.48	1.355	F	F
A2025 South St	34.86	2.32	0.182	B	B

Appendix I

WORTHING AND ADUR DISTRICT COLLISIONS 2010-2014



Accident Severity		Casualty Severity		Casualty Class	
Slight	1563	Slight	1952	Driver	1166
Serious	340	Serious	355	P.Riders	447
Fatal	14	Fatal	14	Pass.	373
				Ped.	335

Cluster Sites found based on an initial 60m diameter search for the following accidents

Magenta Circle found 5 accidents in 3 years

Green Circle found 8 accidents in 5 years

Highway locations significant to scheme

Rev	Date	Amendment	Name

West Sussex County Council

PIA Search Reference 15114
Worthing and Adur Districts
1 Jan 2010 to 31 Dec 2014

AREA	Worthing & Adur	DRG No.	
ROUTE No.		SCALE	Not Std
FILE No.	15114		
DRAWN	DN		
CHECKED			
DATE	14/9/15		

Nicola Debnam
Director of Highways and Transport
County Hall, West Street
Chichester,
West Sussex, PO19 1RH
(Tel: 01243 642105)