Isle of Wight Council

Isle of Wight Junction Assessment and Design

Junction Feasibility Study – Newport Road / Industrial Way Roundabout

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Contents

1 Introduction **1**
General 1
Site Location & Background 1
Scope/Purpose of Study 5
Report Structure 5
2 Existing Conditions **7**
General 7
Data Collection 7
Study Area/Junction Background 7
Base Traffic Flows 8
Existing Traffic Issues 10
Local Highway Network 11
3 Modelling Methodology **13**
Introduction 13
Explanation of Results 13
Base Year Modelling 13
Proposed Scheme Options 14
Forecast/Future Year Modelling 16
Outcome / Conclusions 17
4 Preferred Scheme **18**
Aims and Objectives 18
Proposed Junction Improvements 18
Cost/Benefit Analysis 20
Conclusion and Recommendations 21
Cost/Time Savings Analysis 21

Tables

Table 1.1 List of Junctions 1
Table 3.1 2017 Base Year Junction Assessment 14
Table 3.2 2017-2034 TEMPRO Growth Factors – All Urban Road Types 17
Table 3.3 2034 Future Year Junction Assessment 17
Table 4.1 Cost Estimate of Proposals – Summary 21
Table 4.2 Estimated Cost/Time Savings Analysis of Junction 12 22

Figures

Figure 1.1 Feasibility Study Area – Newport Junctions 2
Figure 1.2 Feasibility Study Area – Ryde Junctions 3
Figure 1.3 Feasibility Study Area – Sandown & Shanklin Junctions 4
Figure 1.4 Junction Location Plan 5
Figure 2.1 Junction Location Plan 8

Figure 2.2 AM Traffic Flows (PCUs) 9
Figure 2.3 PM Traffic Flows (PCUs) 10
Figure 3.1 Initial Junction Design 14
Figure 3.2 Proposed Junction Layout 16
Figure 4.1 Proposed Junction Layout 19

Appendices

Appendix A 1:200 drawings
Appendix B Modelling Output Results

1 Introduction

General

1.1 WYG have been appointed by the Isle of Wight (IOW) Council to undertake a feasibility study for a series of highway junctions located throughout the island, with a particular focus on the towns of Newport, Ryde, Shanklin and Sandown. The study has been carried out to identify traffic management issues impacting on all road users and develop proposals that will form part of a package of schemes to be progressed as part of the Council's Local Implementation Plan (LIP) process.

1.2 IOW Council has identified 15 highway junctions which currently experience traffic issues such as congestion and queuing. The study considers where the main issues lie in relation to traffic movement, road safety, bus operation, pedestrian and cycle provision, public realm, parking provision and servicing. Each of the 15 highway junctions are to be supplemented by a feasibility study report, with traffic modelling software used to test the various proposals in order to identify a range of measures aimed at improving the behaviour and movement of traffic at each junction.

1.3 The 15 key junctions identified are summarised in **Table 1.1** below:

Table 1.1 List of Junctions

ID Num	Junction Name	Area	Junction Type
1	St Mary's Roundabout	Newport	4 arm Roundabout
2	Coppins Bridge Gyratory	Newport	Gyratory
3	Hunnyhill/Hunnycross Way	Newport	Signalised Crossroads
4	Hunnycross Way/Riverway	Newport	3x Roundabouts
5	Medina Way/Coppins Bridge Roundabout	Newport	Gyratory
6	Queens Road/West Street	Ryde	5 arm Signalised Jct
7	Argyll St/West St	Ryde	Signalised Crossroads
8	Binstead Road/Pellhurst Road	Ryde	3 arm Signalised Jct
9	Quarr Hill/Newnham Road	Ryde	4 arm Roundabout
10	Marlborough Road/Great Preston Road	Ryde	Signalised Crossroads
11	High Street/Victoria Avenue, Shanklin	Shanklin	3 arm Signalised Jct
12	Newport Road/Industrial Way	Shanklin	4 arm Roundabout
13	Newport Road/Sandown Road	Shanklin	3 arm Signalised Jct
14	Lake Hill/The Fairway	Shanklin	Triangular 3x Priority Jcts
15	Morton Common/Perowne Way	Sandown	3 arm Signalised Jct

Site Location & Background

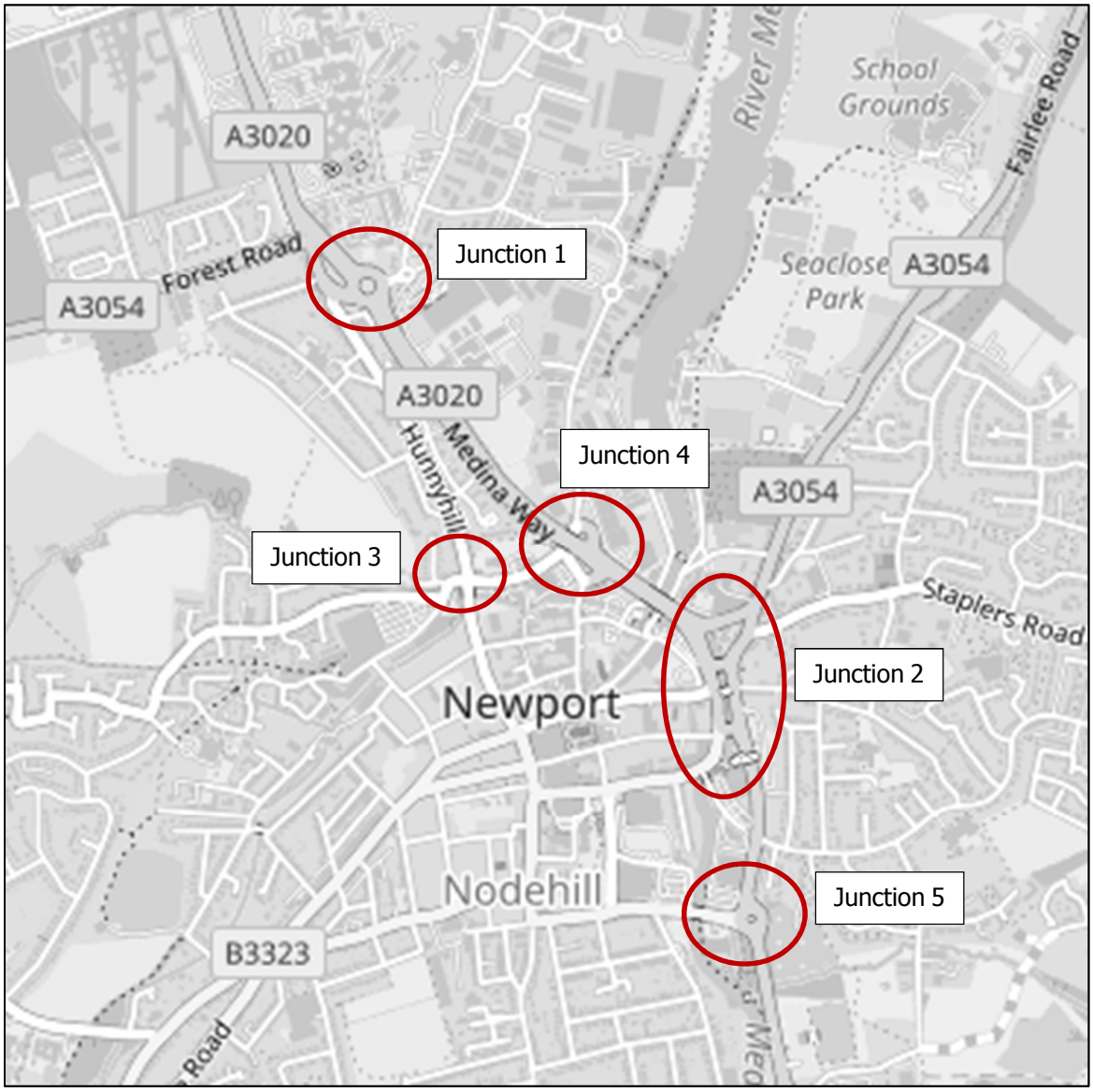
1.4 The Isle of Wight is an island located in the English Channel, approximately 6km off the Hampshire coast. The towns of Newport, Ryde, Shanklin and Sandown comprise the project study area for this feasibility study.

1.5 The town of Newport is the largest town on the IOW and is located in the centre of the island; the town of Ryde is located approximately 10km to the east of Newport, on the north-eastern coast of the island; whilst Shanklin and Sandown are located approximately 9km to the south of Ryde and 10km to the south east of Newport.

1.6 The IOW as a whole is characterised by high car ownership levels, with 77.5% of households on the island owning a car or van, as indicated by the 2011 Census. Thus, the private vehicle remains the most convenient and fastest way to travel around the island.

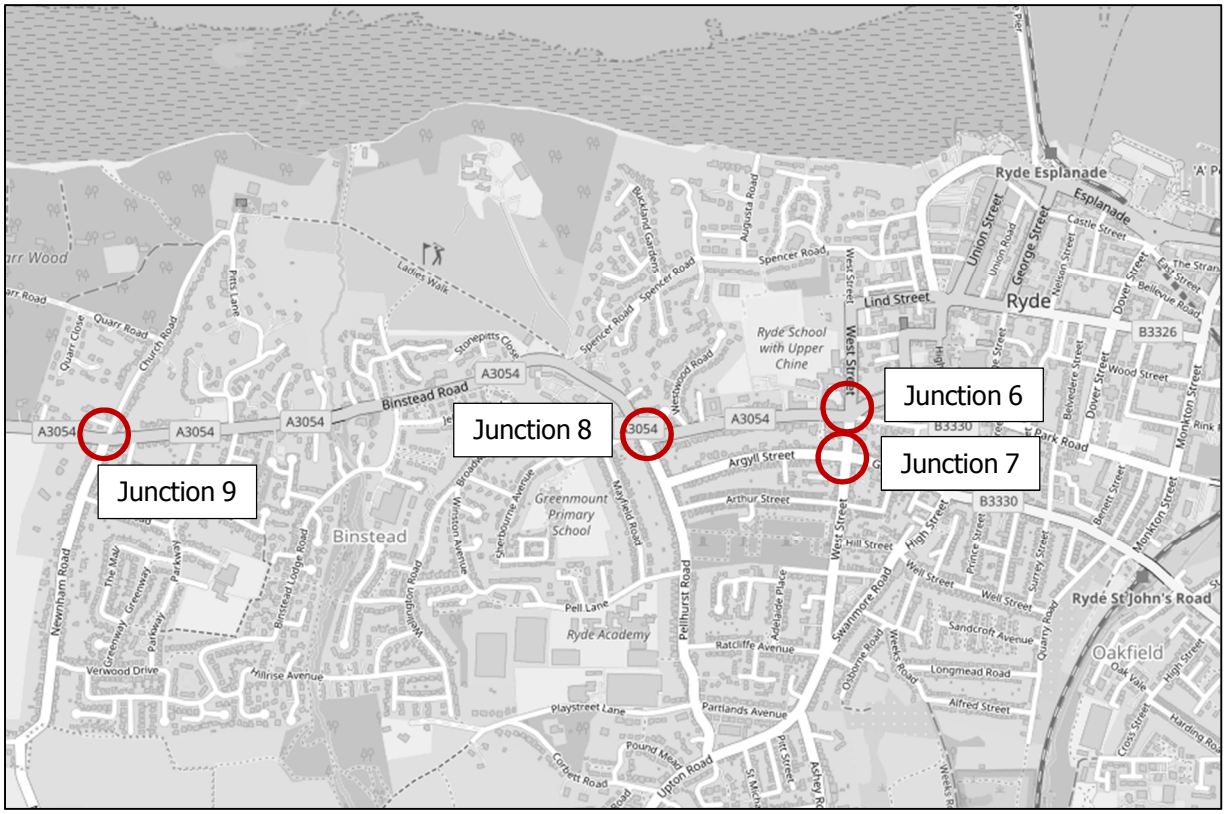
1.7 **Figures 1.1 – 1.3** presents the locations of all 15 junctions within Newport, Ryde and Shanklin & Sandown, which comprise the feasibility study area.

Figure 1.1 Feasibility Study Area – Newport Junctions



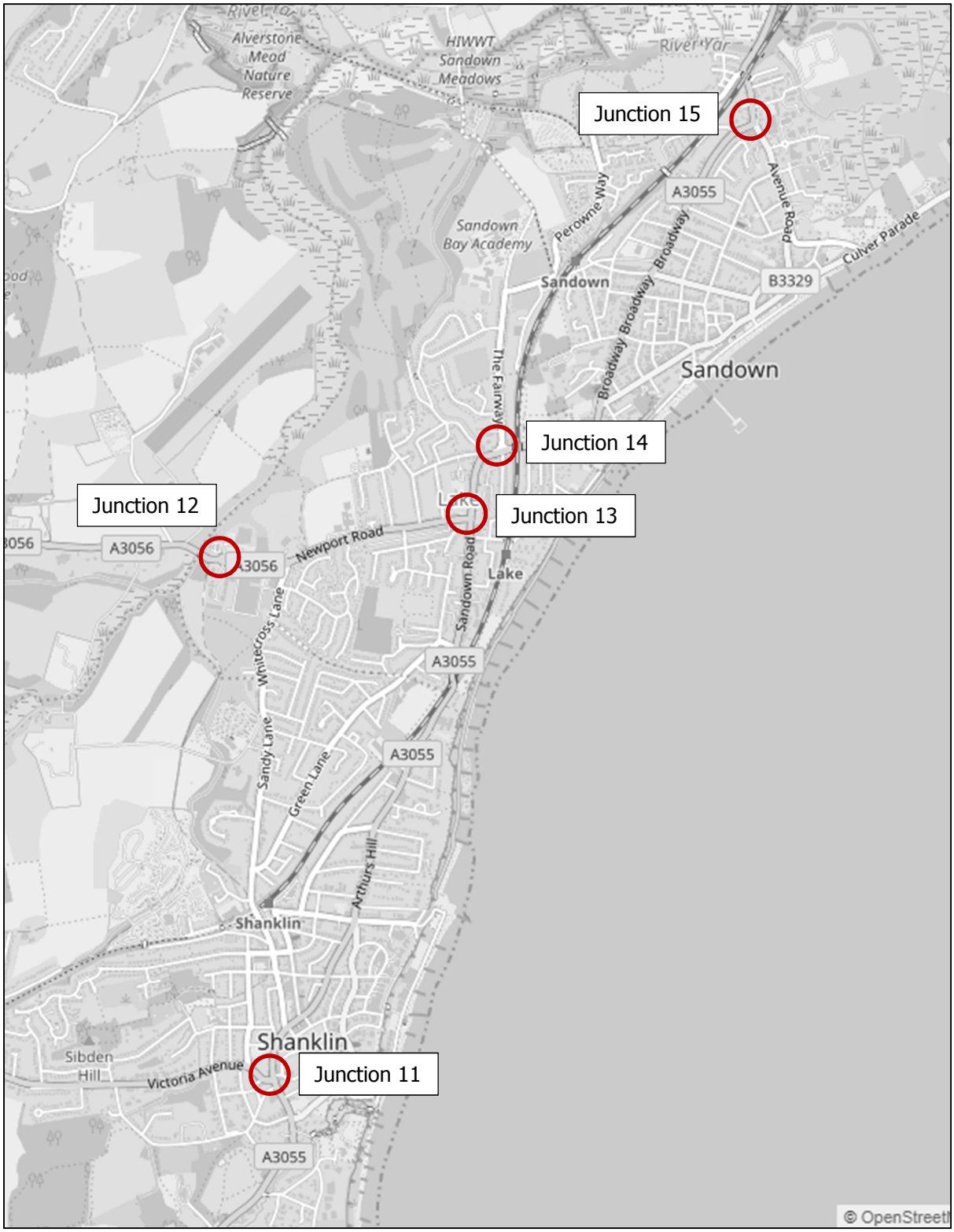
Source: OpenStreetMap with WYG Annotations, September 2017

Figure 1.2 Feasibility Study Area – Ryde Junctions



Source: OpenStreetMap, September 2017

Figure 1.3 Feasibility Study Area – Sandown & Shanklin Junctions

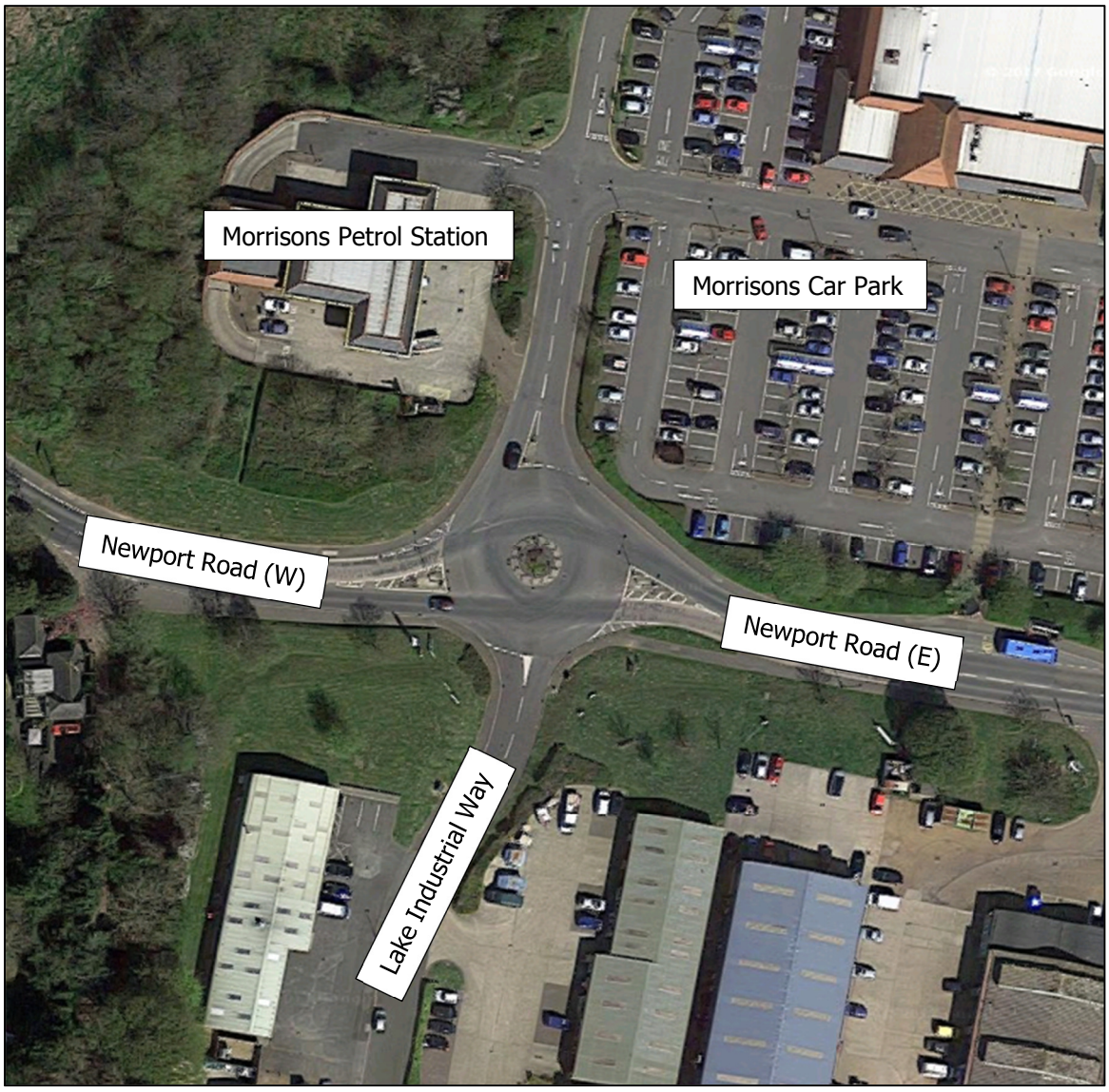


Source: OpenStreetMap, September 2017

1.8 Each of the 15 junctions are to be addressed within an individual feasibility study report. This report focuses on Junction 12, the highway junction of Newport Road / Industrial Way / Morrisons' Car Park which comprises a four-arm roundabout in Shanklin.

1.9 **Figure 1.2** presents a site location plan of the four-arm roundabout junction.

Figure 1.4 Junction Location Plan



Source: Google Satellite Image, August 2017

Scope/Purpose of Study

1.10 The purpose of the study is to identify, through the use of traffic modelling software, where the main issues lie in terms of capacity, congestion and queuing at the junction; the traffic modelling will inform the type of highway improvements and design required at each junction.

Report Structure

1.11 The remainder of this document is structured as follows:

- **Chapter 2: Existing Conditions** - summarising the existing conditions at the junction, providing background to the junction, local highway network and detailing the current traffic issues experienced at the junction;
- **Chapter 3: Modelling Methodology** - setting-out details of tasks undertaken to build traffic models of the study area using specialist software, including results of option testing for the junction of interest;

- **Chapter 4: Preferred Scheme** - detailing the preferred scheme for highway improvements at the junction and their expected outcome; and
- **Chapter 5: Summary and Conclusions** - summarising the feasibility study process and outlining the key findings of the assessment.

1.12 All Appendices are included at the end of this report for information.

2 Existing Conditions

General

2.1 This chapter establishes the existing, or 'baseline', highway conditions which prevail in the area surrounding the junction. It describes the existing local highway network and any traffic issues present at the junction.

2.2 Baseline studies have been informed by detailed site visits and desk-based research carried out between August and September 2017.

2.3 This report focuses on the four-arm roundabout junction at A3056 Newport Road / Lake Industrial Way / Morrisons Car Park in Shanklin.

Data Collection

2.4 Traffic flow surveys were undertaken by MHC Traffic Ltd on Thursday 20th July 2017 to establish the baseline traffic conditions for the local highway network on the IOW. A range of surveys were undertaken including:

- Manual Classified Counts (MCC) for turning flow information at 15 key junctions on the IOW;
- Automatic Traffic Counts (ATCs) were placed at strategic locations on the network allowing the speeds to be obtained at each of these junctions;
- Queue length surveys at stop lines of all 15 junctions; and
- Traffic video surveys at each of the 15 junctions.

2.5 The surveys allowed for the identification of turning movements at all key junctions as well as routing within the IOW. Signal timing data was additionally supplied by the IOW Council for use for the correct modelling of signal timing data.

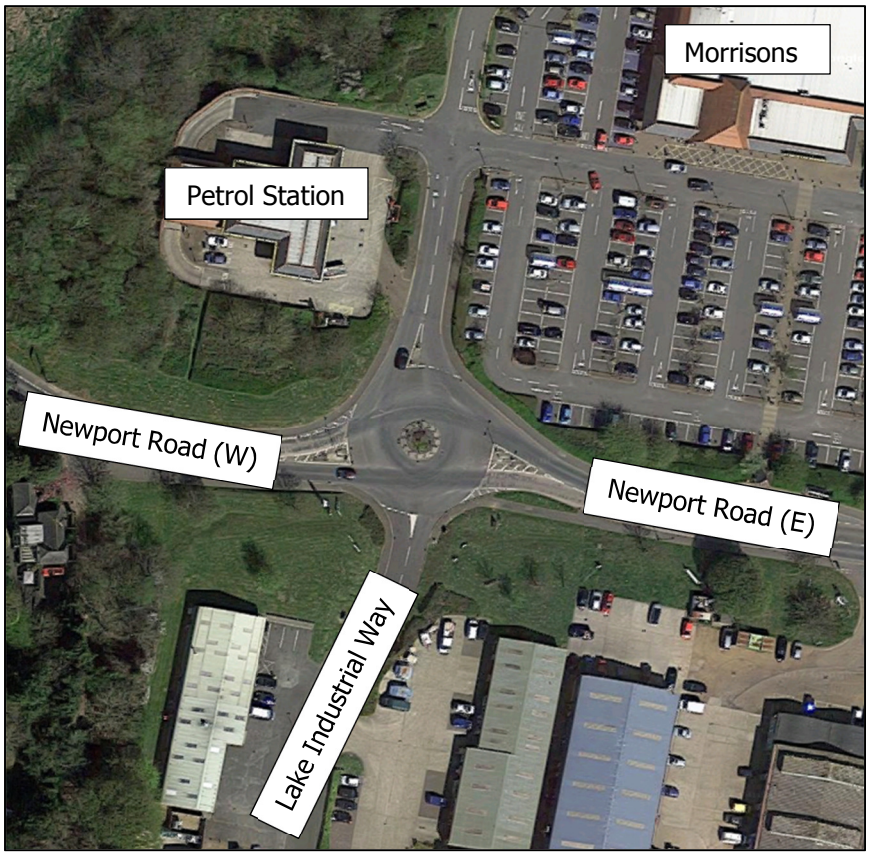
2.6 The data collected as part of the surveys was used directly for calibrating and validating the base scenario for both the Junctions 9 and LinSig models. Video footage of the surveyed junctions was additionally reviewed to ensure that the base models reflect the on-street road conditions as closely as possible.

Study Area/Junction Background

2.7 The A3056 Newport Road / Lake Industrial Way / Morrisons Car Park roundabout junction is located on the western edge of Shanklin, approximately 2km to the north of Shanklin town centre. The A3056 Newport Road forms the eastern and western arms, whilst the access road to Morrisons forms the northern arm, and Lake Industrial Way forms the southern arm.

2.8 The junction provides access to Morrisons supermarket, petrol station and car park to the north, an industrial park to the south, Shankin and Sandown to the east and forms the major route to Newport, to the west. A location plan of the junction is provided in **Figure 2.1**.

Figure 2.1 Junction Location Plan

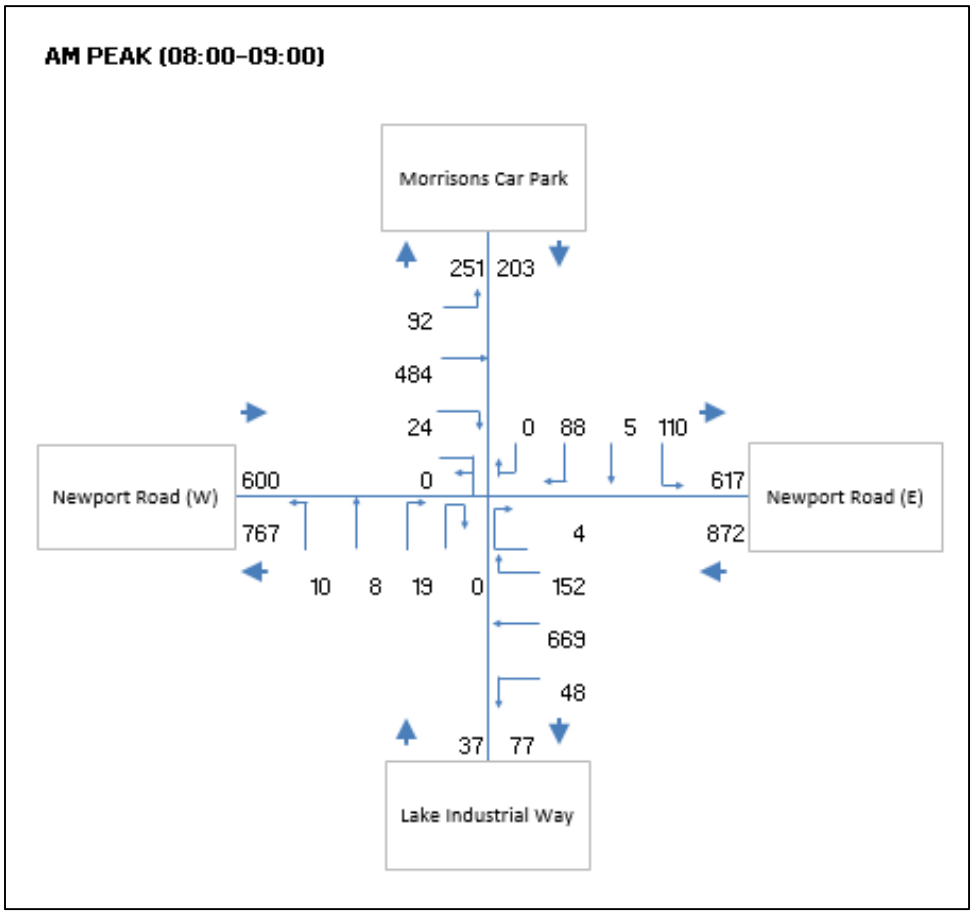


Source: Google Image, August 2017

Base Traffic Flows

2.9 This section details the current traffic flows and queuing at the junction, as recorded by the survey data. These are shown in **Figures 2.2** and **2.3**.

Figure 2.2 AM Traffic Flows (PCUs)



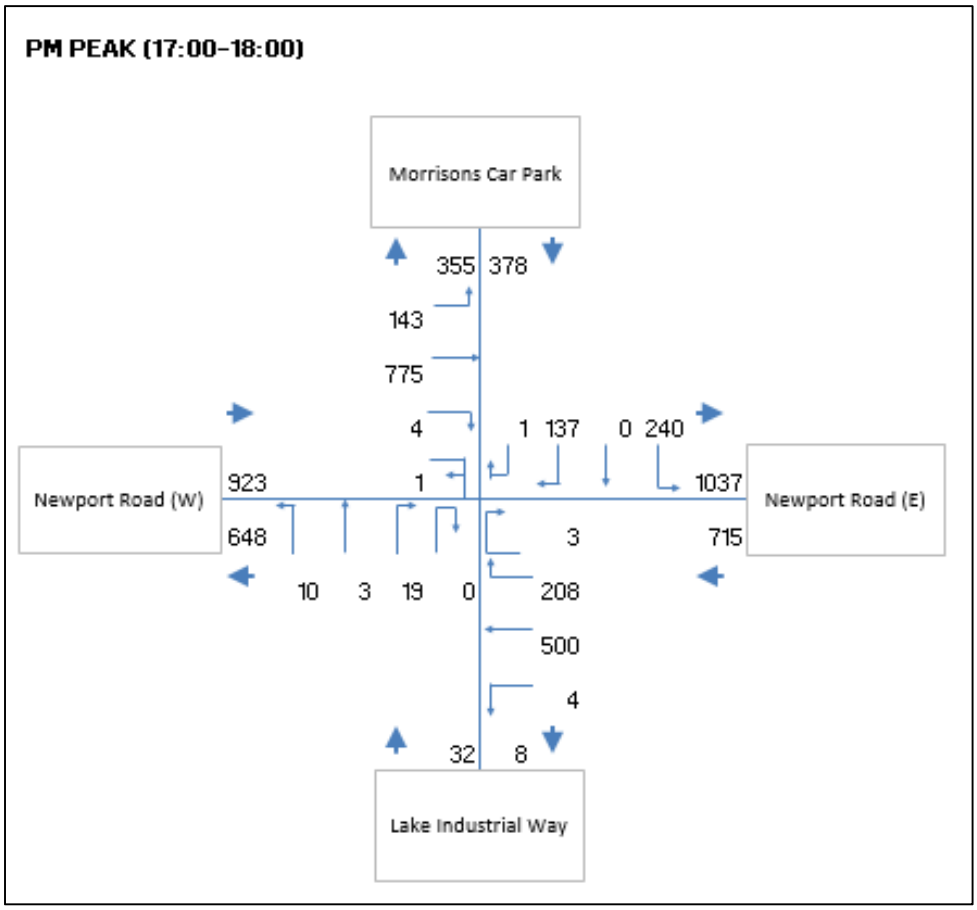
2.10 As shown in Figure 2.2, the highest traffic flows are those travelling westbound in the AM Peak (08:00-09:00) with 669 PCUs undertaking this movement. The high westbound flows are likely to be associated with those commuting to Newport for work.

2.11 Eastbound traffic is also high, with 484 PCUs recorded. It was also observed that there is a high number of right-turners from Newport Road (E) to Morrisons, with 152 PCUs recorded. A similar number of left-turners from Newport Road (W) to Morrisons were observed, with 92 PCUs recorded.

2.12 The majority of queuing occurs on Newport Road (W) with a fast-moving queue observed throughout much of the peak hour. The maximum observed queue recorded on Newport Road (W) was four vehicles, some queuing occurs on Newport Road (E) with a maximum queue of four vehicles.

2.13 **Figure 2.3** below shows the traffic flows for the PM Peak (17:00-18:00).

Figure 2.3 PM Traffic Flows (PCUs)



2.14 As shown in Figure 2.3, the highest traffic flows are those travelling eastbound in the PM Peak (17:00-18:00), with 775 PCUs undertaking this movement. Thus, this is the reverse situation compared to the AM Peak (08:00-09:00). Westbound flows are also high, with 500 PCUs recorded. Again, there is a high number of right-turners from Newport Road (E) and left-turners from Newport Road (W) to Morrisons in the PM Peak, with 208 right-turners and 143 left-turners.

2.15 The majority of queuing occurs on Newport Road (W) and Morrisons access road in the PM Peak. The highest maximum queues were recorded on Morrisons access, comprising six vehicles. Whilst, on Newport Road (W) maximum queues of four vehicles were observed.

Existing Traffic Issues

2.16 At present, the junction is known to experience congestion and queuing, which has been observed during site visits and traffic video surveys at the junction. It was observed that congestion and queuing is particularly evident on the A3056 Newport Road western arm and the Morrisons access arm.

A3056 Newport Road

2.17 The A3056 Newport Road forms both the eastern and western arms of the roundabout junction. On the western arm, there is a high number of vehicles turning left to access Morrisons in both the AM (08:00-09:00) and PM (17:00-18:00) Peaks. This arm currently comprises a single lane on the approach to the roundabout and as a result, those vehicles wanting to turn left into Morrisons block other traffic wanting to travel eastbound along Newport Road. This results in a queue stretching up to 100 metres from the junction give way line.

2.18 On the eastern arm, there is some instance of queuing in both the AM and PM Peaks which is the result of vehicles turning right to access Morrisons. However, the queuing was observed to take place intermittently during the peak hours and comprised of no more than five vehicles. This queue often cleared. Thus, queuing on this arm is considered not to be a significant issue.

Morrisons Access Road

2.19 On the northern arm (Morrisons Access Road), during both the AM and PM Peaks there is a high number of vehicles exiting the store and entering the junction. This arm currently comprises one lane with a short flare. Queuing builds up relatively quickly and stretches back to the Morrisons car park for much of the peak hours. This access road is also the only ingress and egress for the Morrisons petrol station and therefore the queue of vehicles prevents vehicles from exiting the petrol station as well as the car park.

Collisions

2.20 A collision data review for the most recent five years was undertaken at the junction, using the website crashmap.co.uk. It was found that three 'slight' collisions were recorded within the vicinity of the junction during this time period. It is therefore concluded that there are no significant highway safety issues in relation to the highway junction.

Local Highway Network

2.21 The roundabout junction comprises the A3056 Newport Road, Lake Industrial Way and the access Road to Morrisons supermarket. This section provides a description of each of these roads.

A3056 Newport Road

2.22 The A3056 Newport Road is a two-way single carriageway road and forms a strategic road on the island, providing a link between Shanklin, Sandown and Newport. In the vicinity of the junction, the road is subject to a 30mph speed limit, and pedestrian refuge islands are provided on Newport Road at the roundabout across the eastern and western arms. Footways are provided on both sides of the carriageway.

Lake Industrial Way

2.23 Lake Industrial Way is a two-way single carriageway road and comprises an access road to an industrial park. The road solely serves the industrial park and does not provide a through route. Industrial units are located on both sides of the carriageway. The road is subject to a 30mph speed limit.

Morrisons Access Road

2.24 Morrisons Access Road is a two-way single carriageway road and comprises the main access to Morrisons supermarket, petrol station and car park. A pedestrian refuge island is provided across the road at the roundabout junction. The access road links with a smaller roundabout junction which provides access to the petrol station via the western arm and the supermarket car park from the eastern arm. Footways are provided on both sides of the carriageway.

Utilities Assessment

2.25 A utilities assessment has been carried out at the junction as an indication of which utilities are present within the vicinity of the junction. The following utilities which may be affected by improvements at the junction are listed below:

- Environment Agency
- Isle of Wight Council
- LinesearchbeforeUdig

- Openreach – (British Telecommunications)
- Scottish and Southern Electricity
- SGN – Southern Gas Networks
- Southern Water

3 Modelling Methodology

Introduction

3.1 Traffic modelling has been undertaken as part of the feasibility study, identifying how the local highway network operates and how it might operate following the proposed improvements to the junction. Junctions 9 is the latest version of TRL's industry-standard software for modelling roundabouts, and has therefore been used for modelling this junction.

3.2 The modelling has been undertaken for two weekday periods determined to be the network peaks in terms of traffic volumes, with the AM peak between 08:00 and 09:00 and the PM peak between 17:00 and 18:00. These peaks were identified through analysis of traffic count data. Initially, Base Year modelling was using survey data collected in July 2017. Future Year modelling was subsequently carried out in order to test the proposed changes to the network and assess the scale of impact on road traffic.

Explanation of Results

3.3 Junction capacity results are usually expressed in terms of 'Ratio of Flow to Capacity' (RFC) for priority junctions. An existing junction is considered to have reached its theoretical capacity when it has an RFC of 1.00 or greater. However an RFC of less than 0.85 is preferred, as a value above either of this figure is considered too close to the theoretical capacity for the junction to perform satisfactorily. Where junction improvements or a new junction are proposed, an RFC of significantly less than 0.85 is desirable, although this may not always be possible in instances of a junction already operating at capacity.

3.4 Queue lengths at junction approaches are usually expressed in terms of 'Passenger Car Equivalent' (PCE) or 'Passenger Car Unit' (PCU). A standard car typically has a PCE/PCU value of 1.0; larger vehicles, such as goods vehicles, typically have PCE/PCU values greater than 1.0 and smaller vehicles, such as motorcycles, typically have PCE/PCU values less than 1.0.

Base Year Modelling

3.5 Data was collected as part of the surveys was compared to the base year outputs to match modelled flows and queue patterns to those observed, within acceptable variations. The results for the A3056 Newport Road / Lake Industrial Way / Morrisons Access Road roundabout junction are summarised in **Table 3.1**, with full output results included in **Appendix B**.

Junction 9 Results – 2017 Base Year

Table 3.1 2017 Base Year Junction Assessment

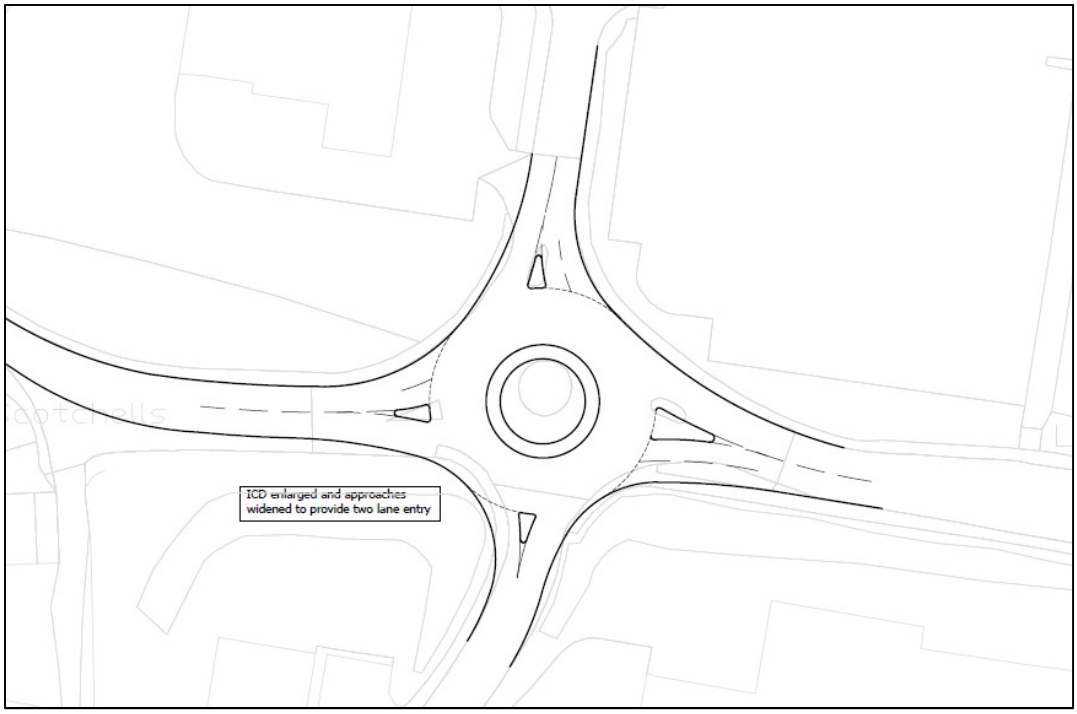
Approach	2017 Base Year Assessment			
	AM Peak (08:00-09:00)		PM Peak (17:00-18:00)	
	RFC	Queue (PCU)	RFC	Queue (PCU)
Arm 1 – A3056 Newport Road (E)	0.65	1.9	0.54	1.2
Arm 2 – Lake Industrial Way	0.06	0.1	0.05	0.1
Arm 3 – A3056 Newport Road (W)	0.53	1.1	**0.83**	**4.7**
Arm 4 – Morrisons Car Park	0.23	0.3	0.52	1.1

3.6 The base year results as shown in Table 3.1, indicate that the junction operates within recommended capacity during the AM and PM Peaks. However, it is shown that in particular the A3056 Newport Road western arm approaches the recommended capacity of 0.85 during the PM Peak with a Ratio of Flow to Capacity (RFC) of 0.83. Modelled queues of 5 PCUs are recorded on this arm which is in correlation with the observed queues and it is therefore considered that the model provides an accurate representation of the junction.

Proposed Scheme Options

3.7 A number of schemes were considered for the junction. This included a two-lane approach on three of the arms, to facilitate left and right turns and to prevent queuing at the junction approach. This scheme is shown in **Figure 3.1** below.

Figure 3.1 Initial Junction Design



Source: WYG Drawing A90129-60 SK04

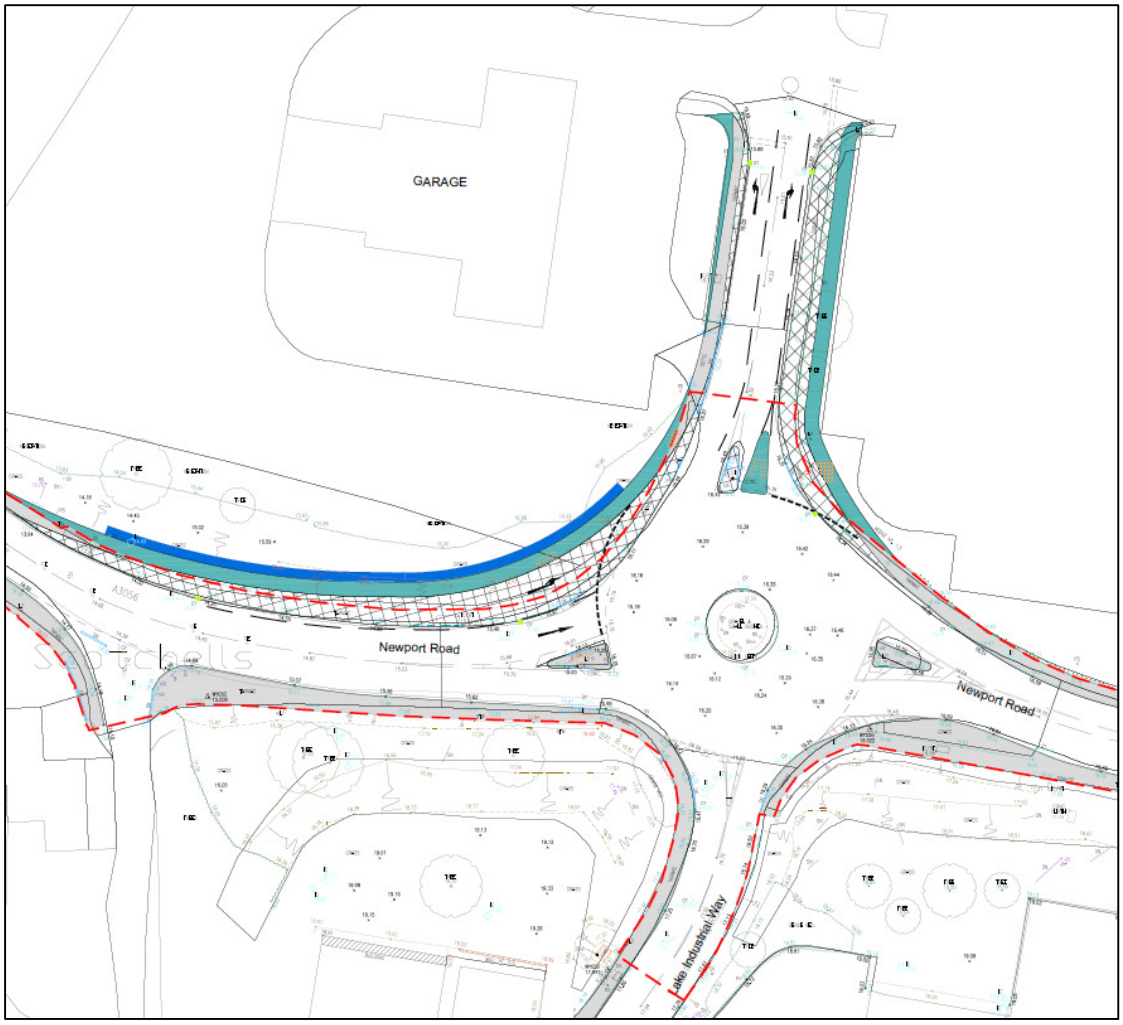
3.8 Taking into account the Base Year modelling results, the main capacity issues experienced at the junction are found on the Newport Road (W) arm. The Option 1 scheme shown above involves upgrading three of the arms to two-lane approaches. This type of scheme was not taken further for the junction as it is considered that improvements should focus primarily on the capacity issues on the Newport Road (W) arm. Two-lane approaches are not deemed necessary on the other arms due to these arms performing well within capacity.

3.9 The proposed scheme which was inevitably agreed and tested as part of the modelling includes creating a filter lane for left-turners on the western arm into Morrisons. On the northern arm, there is to be a two-lane entry into Morrisons providing a left lane for the petrol station and a right lane to turn into the Morrisons car park. Thus, eastbound (straight-ahead) traffic and right-turners will have a dedicated lane to merge onto the roundabout.

3.10 At present, the junction has little signage and therefore it is proposed that signage, clear road markings and advisory information should be included as part of the design. It is anticipated that this will encourage correct lane discipline amongst drivers, on their approach to the junction. Signs and clear road markings directing drivers to Newport and Morrisons is likely to improve the efficiency and flow of traffic through the junction.

3.11 The proposed layout is presented below in **Figure 3.2**. The 1:200 drawing is included at **Appendix A**.

Figure 3.2 Proposed Junction Layout



Source: WYG Drawing A090129-99-002, August 2017

Forecast/Future Year Modelling

3.12 Forecast or Future Year modelling was undertaken using the proposed highway design for the junction, as shown in Figure 3.2, to ascertain the effectiveness and feasibility of the design. The Future Year 2034 was assessed as part of this scenario and thus TEMPRO growth factors were applied to the 2017 traffic survey data in order to calculate the 2034 traffic flows.

3.13 A comparison of TEMPRO growth factors was undertaken for each of the three study areas; Newport, Ryde, Shanklin and Sandown, using local Super Output Areas. It was found that the TEMPRO growth factors for each of the study areas were broadly similar to the TEMPRO growth factors for the Isle of Wight as a whole. As a result, the 'Isle of Wight' as a whole was selected as the geographical area. Also, as all highway junctions within the study area are located in urban areas, it has therefore been deemed more robust that only 'Urban Road Types' were selected as part of this assessment.

3.14 These TEMPRO growth factors are shown in **Table 3.2**.

Table 3.2 2017-2034 TEMPRO Growth Factors – All Urban Road Types

Time Period	TEMPRO Growth Factors (2017-2034)
AM Peak	1.2229
PM Peak	1.2188

3.15 The Future Year results for the proposed junction design are summarised in **Table 3.3**, with full output results included in **Appendix B**.

Junction 9 Results – Future Year/Proposals

Table 3.3 2034 Future Year Junction Assessment

Approach	2034 Future Year Assessment			
	AM Peak (08:00-09:00)		PM Peak (17:00-18:00)	
	RFC	Queue (PCU)	RFC	Queue (PCU)
Arm 1 – A3056 Newport Road (E)	0.80	4.1	0.67	2.0
Arm 2 – Lake Industrial Way	0.09	0.1	0.07	0.1
Arm 3 – A3056 Newport Road (W)	0.35	0.6	0.56	1.3
Arm 4 – Morrisons' Car Park	0.32	0.5	0.79	3.6

3.16 As shown in Table 3.2, the Future Year assessment indicates that the junction operates within recommended capacity for the year 2034. As part of the junction design, the A3056 Newport Road (W) was given a longer flare, with effectively two lanes on the approach to the junction which increases capacity for left-turners and through traffic. As a result, there is a vast improvement in capacity and queuing on this arm in comparison to the 2017 Base scenario.

Outcome / Conclusions

3.17 During the Base Year scenario as per the existing junction layout, the A3056 Newport Road western arm is well approaching recommended capacity and experiences issues with queuing. With the proposed junction layout tested, the western arm experiences a vast improvement in capacity and queuing, providing greater capacity for left-turners going into Morrisons as well as capacity for eastbound traffic and right-turners.

4 Preferred Scheme

Aims and Objectives

4.1 This chapter considers the preferred improvement option for the A3056 Newport Road / Lake Industrial Way / Morrisons Access Road four-arm roundabout junction. Drawings of the proposals are included in **Appendix A**.

Proposed Junction Improvements

Junction Issues

4.2 Current issues specific to the A3056 Newport Road / Lake Industrial Way / Morrisons four-arm roundabout junction include:

- A high number of left-turners from the western arm accessing Morrisons supermarket and vice versa for the eastern arm, with a high number of right-turners.
- All four arms at the junction comprise one lane of traffic on the approach to the junction. The northern (Morrisons Access Road) and southern (Lake Industrial Way) arms comprise one lane with a short flare, whilst the eastern and western arms (A3056 Newport Road) comprise one lane with no flare.
- Particularly on the eastern and western arms, the one lane approach means that the straight-ahead traffic movement and the left or right turners use the same lane on the approach to the junction. The consequence of this is that when the left or right turners are waiting for a gap to merge onto the junction, a queue builds up relatively quickly on the western arm as those wanting to travel straight-ahead, which is the dominant movement, are unable to do so.
- For the northern arm (Morrisons), queuing occurs throughout much of the AM and PM peak hours and has been observed to stretch back to the Morrisons car park. This is due to a high number of vehicles exiting the store and attempting to turn left or right at the junction.
- This access road is also the only ingress and egress for the Morrisons petrol station and therefore the queuing prevents vehicles from exiting the petrol station as well as the car park.
- With the northern arm providing the only access for vehicles to and from Morrisons, this means that customers using the petrol station and supermarket, as well as deliveries and service vehicles, are all required to use this arm. Subsequently, there is a high traffic demand on this arm.

Opportunities

4.3 The opportunities to improve the four-arm roundabout junction are primarily focused on:

- Improving the flow of traffic through the junction, in particular for those vehicles turning left from the western arm and right from the eastern arm into Morrisons;
- Giving greater priority to dominant traffic movements such as the eastbound and westbound traffic (straight-ahead); and
- Reducing existing traffic congestion, queuing and delays.

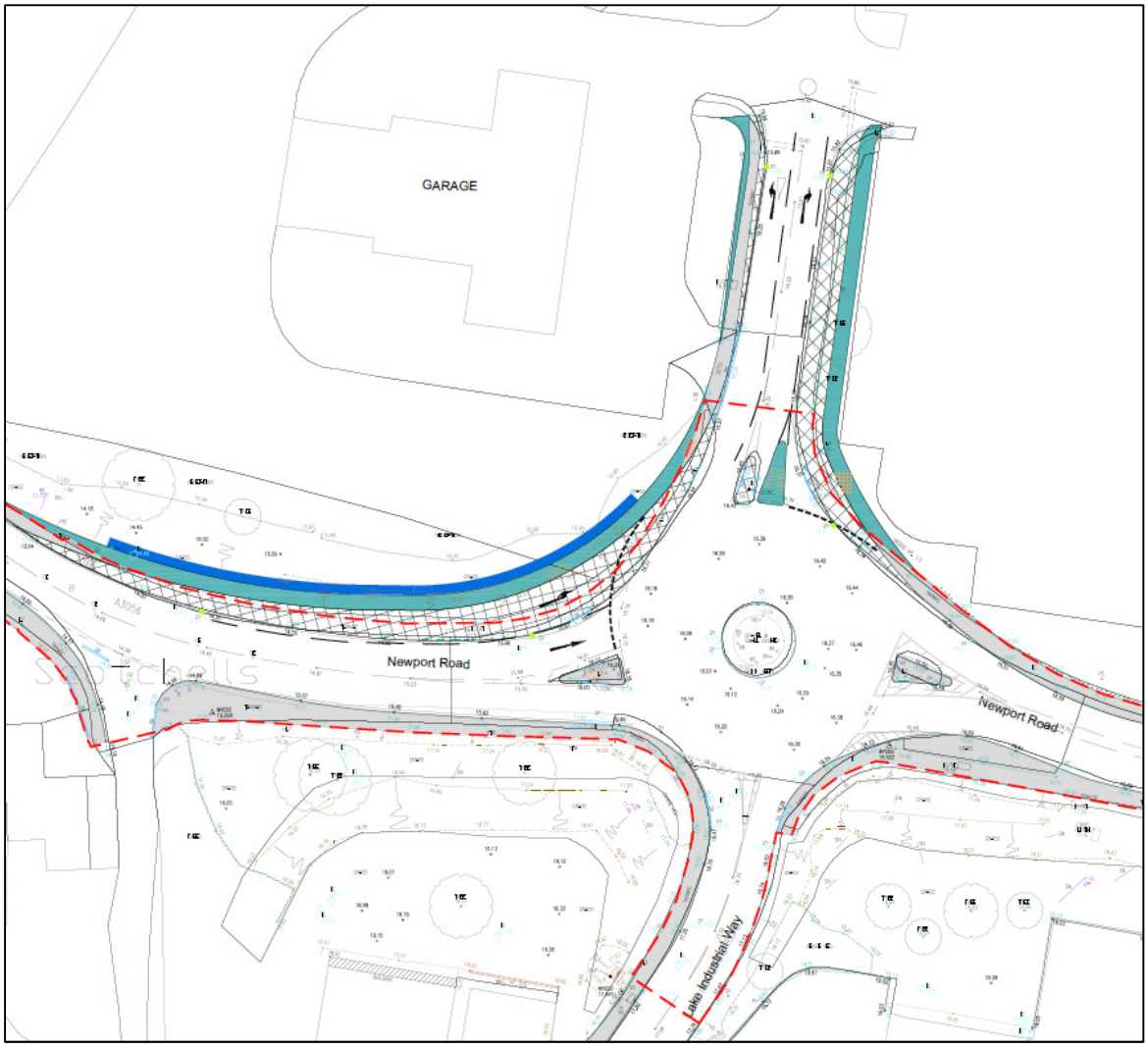
Proposals

4.4 The preferred scheme includes creating a filter lane for left-turners on the western arm into Morrisons. On the northern arm, there is to be a two-lane entry into Morrisons providing a left lane for left-turners into the petrol station and right-turners to use the right lane to turn right into Morrisons. Thus, the eastbound (straight-ahead) traffic and right-turners will have a dedicated lane to merge onto the roundabout.

4.5 At present, the junction has little signage and therefore it is proposed that signage, clear road markings and advisory information should be included as part of the design. It is anticipated that this will encourage correct lane discipline amongst drivers on their approach to the junction. Signs and clear road markings directing drivers straight-ahead to Newport or Shanklin as well as Morrisons is likely to improve the efficiency of the junction.

4.6 The proposed layout is presented below in **Figure 4.1**. The 1:200 drawing is included at **Appendix A**.

Figure 4.1 Proposed Junction Layout



Source: WYG Drawing A090129-99-002, August 2017

4.7 It should be noted that the Morrisons access road is owned by the supermarket beyond the junction. Consequently, discussions will need to take place with Morrisons to determine the feasibility of widening the access road. However, given the benefit to supermarket customers, with reduced queues into and out of the site anticipated, it is hoped that an agreement could be made.

Cost/Benefit Analysis

4.8 This section of the feasibility study sets out an indication of the costs of the proposals at each section of the study area. The costs are based on appraisal of construction prices from SPONS and WYG's understanding of similar schemes developed for other local authorities. The cost estimate is identified in **Table 4.1**.

A3056 – Newport Road (West)

4.9 The scope of improvements includes the following:

a) Construction of new carriageway along the Northern side. Dropped kerb to Northern side and placement of tactile paving. Tactile paving to be implemented on the central island and corresponding tactile paving on the southern side of the road.

b) Sign posts to be relocated on the Northern side of the road.

c) Two gullies to be removed and relocated.

d) One telegraph pole to be relocated.

e) Construction of new footway on the Northern side.

f) A rock gabion basket retaining wall will be used along the Northern side of the road.

g) Where needed, existing road markings will be removed and new markings will be implemented.

Morrisons Access Road

4.10 The scope of improvements includes the following:

a) Construction of new carriageway along the Eastern and Western side. Dropped kerb to Western side with tactile paving. New pedestrian refuge with tactile paving to be implemented on the central island and corresponding tactile paving on the Eastern side of the road.

b) Sign posts to be relocated on the Northern side of the road.

c) Three gullies to be removed and relocated.

d) Two lamp posts to be relocated.

e) Construction of new footway on the Eastern and Western side.

f) Where needed, existing road markings will be removed and new markings will be implemented.

A3056 – Newport Road (East)

4.11 The scope of improvements includes the following:

a) New carriageway construction on the junction of Morrisons Access Road and Newport Road (East) to be tied into the existing carriageway.

Summary

4.12 **Table 4.1** sets out a summary of the indicative estimated costs for the proposals within the study area.

Table 4.1 Cost Estimate of Proposals – Summary

Proposal	Cost Estimate
Construction Estimate	£166,000
Risk Variables (Statutory Undertakers, Safety Audit requirements)	£41,500
Design Administration and Land Costs	£16,600
Total	**£224,100**

Source: WYG, December 2017

Conclusion and Recommendations

Conclusion

4.13 There is substantial queuing on Newport Road (western arm) due to the single lane approach. This in turn causes problems with vehicles queuing to enter the garage and Morrisons car park (northern arm). This impacts on the vehicles wanting to travel eastbound, as there is only one lane for all movements, queues occur due to vehicles travelling eastbound having to wait behind vehicles turning left into Morrisons access road.

Recommendations

4.14 It is recommended that both these arms be widened to accommodate a two lane approach, creating a designated left turn only lane to access Morrisons Retail and garage and ahead only lane, this would allow eastbound traffic to travel unimpeded.

4.15 It is also recommended that a designated left turn only lane be provided on the Morrisons access road for access into the garage and a right turn only lane be provided to access Morrisons car park, this will also have a positive impact on Newport Road (western arm).

Cost/Time Savings Analysis

4.16 A cost savings analysis has been undertaken for the junction based on the delay/time savings as a result of the proposed alterations to the junction. In order to calculate the cost savings, fuel cost values were extracted for the average car (per km) (petrol / diesel) from the Department for Transport (DfT) document 'Values of Time and Vehicle Operating Costs' Transport Analysis Guidance (TAG), January 2014. The average fuel cost for an average car was extracted as £0.79 per kilometre.

4.17 To calculate the total cost savings, the average speed at the junction was recorded as 28mph (45kph) (based on ATC data collected by MHC Traffic Ltd), which was then applied to the total time savings to both the AM (07:00-10:00) and PM Peak periods (16:00-19:00). As a result, this determined the total distance saved. The average fuel cost per kilometre was then applied to the total distance, giving a total cost saving per Peak period, for an average weekday. For the annual cost savings, the total AM and PM Peak cost savings were applied to a total of 253 days (excluding weekends and Bank Holidays), seeing as this assessment only takes into account an average weekday. The results of this assessment are summarised in **Table 4.2** below.

Table 4.2 Estimated Cost/Time Savings Analysis of Junction 12

Time Period	Average Existing Delay per PCU (secs)	Estimated Average Delay per PCU (secs)	Average Journey Time Savings (secs)	Assumed Length of Time Period (Hours)	Average No. of PCUs per hour	Time Savings for All Vehicles During Period (secs)	Value of Time Savings Per Period (£)	Value of Time Savings Per Annum
AM Peak (07:00-10:00)	6	3	3	3	248	2,232	£22.03	£5,574.48
PM Peak (16:00-19:00)	17	4	13	3	392	15,288	£150.07	£37,966.70
TOTAL						**17,520**	**£172.10**	**£43,541.17**

4.18 As shown in Table 4.2, the estimated cost savings per peak period were £22.03 in the AM Peak and £150.07 in the PM Peak, and thus the overall annual fuel cost savings was estimated to be £43,541.17.

5 Summary and Conclusions

Summary

5.1 WYG have been appointed by the Isle of Wight (IOW) Council to undertake a feasibility study for a series of highway junctions located throughout the island, with a particular focus on the towns of Newport, Ryde, Shanklin and Sandown. The study has been carried out to identify traffic management issues impacting on all road users and develop proposals that will form part of a package of schemes to be progressed as part of the Council's Local Implementation Plan (LIP) process.

5.2 IOW Council has identified 15 highway junctions which currently experience traffic issues such as congestion and queuing. The study considers where the main issues lie in relation to traffic movement, road safety, bus operation, pedestrian and cycle provision, public realm, parking provision and servicing. Each of the 15 highway junctions is subject to a feasibility study report, with traffic modelling software used to test various proposals in order to identify a range of measures aimed at improving the behaviour and movement of traffic at each junction.

5.3 The A3056 Newport Road / Lake Industrial Way / Morrisons Car Park roundabout junction is located on the western edge of Shanklin, approximately 2km north-west of Shanklin town centre. The A3056 Newport Road forms the eastern and western arms, whilst the access road to Morrisons forms the northern arm, and Lake Industrial Way forms the southern arm.

5.4 The junction provides access to Morrisons supermarket, petrol station and car park to the north, an industrial park to the south, Shankin and Sandown to the east and forms the major route to Newport, to the west. At present, the junction is known to experience congestion and queuing, which has been informed by a site visit and traffic video surveys at the junction. It was observed that congestion and queuing is particularly evident on the A3056 Newport Road western arm and the Morrisons access arm.

5.5 The roundabout modelling software within Junctions 9 was used to model this junction. The modelling has been undertaken for two weekday periods considered to be the network peaks in terms of traffic volumes, with the AM peak between 08:00 and 09:00 and the PM peak between 17:00 and 18:00. The Base Year results indicate that the junction operates within recommended capacity during the AM and PM Peaks. However, it is shown that in particular the A3056 Newport Road western arm is approaching the recommended RFC of 0.85 during the PM Peak with an RFC of 0.83. Modelled queues of 5 PCUs are calculated on this arm, which is consistent with observed queues.

5.6 As a result, improvements to the roundabout junction has been focused around improving the flow of traffic through the junction, in particular for those vehicles turning left from the western arm and right from the eastern arm into Morrisons. In doing so, this will allow the eastbound (straight-ahead) movement to flow more efficiently and thus reduce the instance of queuing and congestion on the western arm.

5.7 With the proposed junction improvements tested for the 2034 Future Year, the results indicate that the junction is expected to operate with greater capacity on the western arm during the AM and PM Peaks. The proposals allow for a longer flare on western arm, with effectively two lanes on the approach to the junction. The result of this is a significant reduction in the RFC during both the AM and PM Peaks, and particularly in the PM Peak, the western arm would operate well within recommended capacity with an RFC of 0.56 and queues of only 1 PCU.

Conclusions

5.8 As part of this feasibility study, it can be concluded that the improvements brought forward address the existing issues related to congestion and queuing at the junction. It has been shown from the

traffic modelling results that there is a vast improvement in capacity on the western arm, and thus will allow the junction to operate more efficiently as a whole.

Appendix A
1:200 DRAWINGS

Notes:

General

1. Do not scale from drawing.
2. All dimensions are in metres, unless stated otherwise.
3. This drawing is to be read & printed in colour.
4. This drawing is for illustrative purposes only.

Disclaimer

1. The information contained in this drawing is based on a combination of OS and data provided by others and WYG shall not be liable for any inaccuracies or deficiencies.

KEY:

- Extent of highway boundary
- Existing carriageway
- Existing footway / public realm
- Existing road marking
- Proposed road marking
- New carriageway construction
- New footway construction
- Existing gullies to be relocated
- Proposed rock gabion basket retaining wall - approximately 60m in length and 1.5m height

INDICATIVE

REV	DETAILS	DRAWN BY	CHECKED BY	DATE

CLIENT: Isles of Wight Council

PROJECT: IOW

DRAWING TITLE: Junction 12 Shanklin

SCALES:	SHEET SIZE:
1:200	A1

DRAWN:	CHECKED:	DATE:
SJR	NW	12.12.2017

WYG Transport
part of WYG group
11th Floor 1 Angel Court London EC2R 7HJ
t: 0207 250 7500 f: 0207 250 7501 e: transport@wyg.com

DRAWING NUMBER: A090129-99-002

REVISION:

Appendix B
MODELLING OUTPUT RESULTS

Junctions 9

ARCADY 9 - Roundabout Module

Filename: Junction 12 - Newport Rd Industrial Way - Survey Flows - JS.j9
Path: X:\Projects\2012\A090000\A090129-99 - IoW Junction Assessment and Design\30 Technical\31 Modelling\2017 Base Models\Junction 12
Report generation date: 30/11/2017 16:13:46

»2017, AM
»2017, PM
»2034 - Base, AM
»2034 - Base, PM

Summary of junction performance

	AM					PM				
	Q (PCU)	Delay (s)	RFC	LOS	Res Cap	Q (PCU)	Delay (s)	RFC	LOS	Res Cap
	2017									
1 - Newport Rd (E)	1.9	7.12	0.65	A	41 % [1 - Newport Rd (E)]	1.2	5.34	0.54	A	10 % [3 - A3056 (W)]
2 - Lake Industrial Way	0.1	5.57	0.06	A		0.1	5.21	0.05	A	
3 - A3056 (W)	1.1	6.19	0.53	A		4.7	17.39	0.83	C	
4 - Morrisons Car Park	0.3	4.81	0.23	A		1.1	9.48	0.52	A	
	2034 - Base									
1 - Newport Rd (E)	4.0	12.55	0.80	B	16 % [1 - Newport Rd (E)]	2.0	7.51	0.67	A	-10 % [3 - A3056 (W)]
2 - Lake Industrial Way	0.1	7.06	0.09	A		0.1	6.35	0.07	A	
3 - A3056 (W)	1.9	8.51	0.66	A		41.0	111.79	1.04	F	
4 - Morrisons Car Park	0.4	5.76	0.30	A		2.4	17.66	0.72	C	

There are warnings associated with one or more model runs - see the 'Data Errors and Warnings' tables for each Analysis or Demand Set.

Values shown are the highest values encountered over all time segments. Delay is the maximum value of Av. delay per arriving vehicle. Res Cap indicates the amount by which network flow could be increased before a user-definable threshold (see Analysis Options) is met.

File summary

File Description

Title	(untitled)
Location	
Site number	
Date	19/12/2016
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Enumerator	WYG\philip.eveleigh
Description	

Units

Distance units	Speed units	Traffic units input	Traffic units results	Flow units	Av. delay units	Total delay units	Rate of delay units
m	kph	PCU	PCU	perHour	s	-Min	perMin

Analysis Options

Calculate Q Percentiles	Calculate residual capacity	Residual capacity criteria type	RFC Threshold	Av. Delay threshold (s)	Q threshold (PCU)
	✓	Delay	0.85	36.00	20.00

Demand Set Summary

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D1	2017	AM	ONE HOUR	07:45	09:15	15
D2	2017	PM	ONE HOUR	16:45	18:15	15
D3	2034 - Base	AM	ONE HOUR	07:45	09:15	15
D4	2034 - Base	PM	ONE HOUR	16:45	18:15	15

Analysis Set Details

ID	Network flow scaling factor (%)
A1	100.000

2017, AM

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction Type	Junction Delay (s)	Junction LOS
1	Newport Rd/Industrial Way	Standard Roundabout	6.49	A

Junction Network Options

Driving side	Lighting	Res Cap (%)	First arm reaching threshold
Left	Normal/unknown	41	1 - Newport Rd (E)

Arms

Arms

Arm	Name	Description
1	Newport Rd (E)	
2	Lake Industrial Way	
3	A3056 (W)	
4	Morrisons Car Park	

Roundabout Geometry

Arm	V (m)	E (m)	I' (m)	R (m)	D (m)	PHI (deg)	Exit only
1 - Newport Rd (E)	3.70	5.40	9.0	18.0	28.1	4.0	
2 - Lake Industrial Way	3.60	4.80	3.3	14.0	28.1	24.0	
3 - A3056 (W)	3.40	4.80	5.0	25.0	28.1	3.0	
4 - Morrisons Car Park	3.40	5.50	3.0	21.3	28.1	5.0	

Slope / Intercept / Capacity

Roundabout Slope and Intercept used in model

Arm	Final slope	Final intercept (PCU/hr)
1 - Newport Rd (E)	0.658	1564
2 - Lake Industrial Way	0.569	1259
3 - A3056 (W)	0.627	1383
4 - Morrisons Car Park	0.613	1337

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

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D1	2017	AM	ONE HOUR	07:45	09:15	15

Vehicle mix source	PCU Factor for a HV (PCU)
HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Av. Demand (PCU/hr)	Scaling Factor (%)
1 - Newport Rd (E)		✓	873	100.000
2 - Lake Industrial Way		✓	37	100.000
3 - A3056 (W)		✓	600	100.000
4 - Morrisons Car Park		✓	203	100.000

Origin-Destination Data

Demand (PCU/hr)

		To			
		1 - Newport Rd (E)	2 - Lake Industrial Way	3 - A3056 (W)	4 - Morrisons Car Park
From	1 - Newport Rd (E)	4	48	669	152
	2 - Lake Industrial Way	19	0	10	8
	3 - A3056 (W)	484	24	0	92
	4 - Morrisons Car Park	110	5	88	0

Vehicle Mix

HV %s

		To			
		1 - Newport Rd (E)	2 - Lake Industrial Way	3 - A3056 (W)	4 - Morrisons Car Park
From	1 - Newport Rd (E)	33	0	3	1
	2 - Lake Industrial Way	0	0	0	0
	3 - A3056 (W)	3	0	0	1
	4 - Morrisons Car Park	0	0	2	0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max delay (s)	Max Q (PCU)	Max LOS
1 - Newport Rd (E)	0.65	7.12	1.9	A
2 - Lake Industrial Way	0.06	5.57	0.1	A
3 - A3056 (W)	0.53	6.19	1.1	A
4 - Morrisons Car Park	0.23	4.81	0.3	A

Main Results for each time segment

07:45 - 08:00

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
1 - Newport Rd (E)	657	88	1507	0.436	654	0.8	4.316	A
2 - Lake Industrial Way	28	684	869	0.032	28	0.0	4.277	A
3 - A3056 (W)	452	137	1297	0.348	450	0.5	4.343	A
4 - Morrisons Car Park	153	398	1093	0.140	152	0.2	3.858	A

08:00 - 08:15

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
1 - Newport Rd (E)	785	105	1495	0.525	783	1.1	5.179	A
2 - Lake Industrial Way	33	819	792	0.042	33	0.0	4.741	A
3 - A3056 (W)	539	164	1280	0.421	539	0.7	4.972	A
4 - Morrisons Car Park	182	477	1044	0.175	182	0.2	4.210	A

08:15 - 08:30

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
1 - Newport Rd (E)	961	129	1480	0.650	958	1.9	7.039	A
2 - Lake Industrial Way	41	1002	688	0.059	41	0.1	5.558	A
3 - A3056 (W)	661	201	1257	0.525	659	1.1	6.154	A
4 - Morrisons Car Park	224	583	979	0.228	223	0.3	4.801	A

08:30 - 08:45

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
1 - Newport Rd (E)	961	129	1480	0.650	961	1.9	7.119	A
2 - Lake Industrial Way	41	1005	687	0.059	41	0.1	5.572	A
3 - A3056 (W)	661	201	1257	0.526	661	1.1	6.189	A
4 - Morrisons Car Park	224	585	978	0.228	224	0.3	4.810	A

08:45 - 09:00

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
1 - Newport Rd (E)	785	105	1495	0.525	788	1.1	5.242	A
2 - Lake Industrial Way	33	824	790	0.042	33	0.0	4.759	A
3 - A3056 (W)	539	165	1280	0.421	541	0.8	5.006	A
4 - Morrisons Car Park	182	479	1043	0.175	183	0.2	4.221	A

09:00 - 09:15

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
1 - Newport Rd (E)	657	88	1506	0.436	659	0.8	4.363	A
2 - Lake Industrial Way	28	689	867	0.032	28	0.0	4.291	A
3 - A3056 (W)	452	138	1297	0.348	453	0.6	4.377	A
4 - Morrisons Car Park	153	400	1091	0.140	153	0.2	3.872	A

2017, PM

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction Type	Junction Delay (s)	Junction LOS
1	Newport Rd/Industrial Way	Standard Roundabout	11.53	B

Junction Network Options

Driving side	Lighting	Res Cap (%)	First arm reaching threshold
Left	Normal/unknown	10	3 - A3056 (W)

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D2	2017	PM	ONE HOUR	16:45	18:15	15

Vehicle mix source	PCU Factor for a HV (PCU)
HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Av. Demand (PCU/hr)	Scaling Factor (%)
1 - Newport Rd (E)		✓	715	100.000
2 - Lake Industrial Way		✓	32	100.000
3 - A3056 (W)		✓	923	100.000
4 - Morrisons Car Park		✓	378	100.000

Origin-Destination Data

Demand (PCU/hr)

		To			
		1 - Newport Rd (E)	2 - Lake Industrial Way	3 - A3056 (W)	4 - Morrisons Car Park
From	1 - Newport Rd (E)	3	4	500	208
	2 - Lake Industrial Way	19	0	10	3
	3 - A3056 (W)	775	4	1	143
	4 - Morrisons Car Park	240	0	137	1

Vehicle Mix

HV %s

		To			
		1 - Newport Rd (E)	2 - Lake Industrial Way	3 - A3056 (W)	4 - Morrisons Car Park
From	1 - Newport Rd (E)	0	0	0	0
	2 - Lake Industrial Way	0	0	0	0
	3 - A3056 (W)	1	0	0	0
	4 - Morrisons Car Park	0	0	0	0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max delay (s)	Max Q (PCU)	Max LOS
1 - Newport Rd (E)	0.54	5.34	1.2	A
2 - Lake Industrial Way	0.05	5.21	0.1	A
3 - A3056 (W)	0.83	17.39	4.7	C
4 - Morrisons Car Park	0.52	9.48	1.1	A

Main Results for each time segment

16:45 - 17:00

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
1 - Newport Rd (E)	538	107	1494	0.360	536	0.6	3.751	A
2 - Lake Industrial Way	24	637	896	0.027	24	0.0	4.127	A
3 - A3056 (W)	695	175	1273	0.546	690	1.2	6.176	A
4 - Morrisons Car Park	285	600	969	0.294	283	0.4	5.234	A

17:00 - 17:15

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
1 - Newport Rd (E)	643	128	1480	0.434	642	0.8	4.292	A
2 - Lake Industrial Way	29	763	824	0.035	29	0.0	4.523	A
3 - A3056 (W)	830	210	1252	0.663	827	1.9	8.484	A
4 - Morrisons Car Park	340	718	896	0.379	339	0.6	6.451	A

17:15 - 17:30

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
1 - Newport Rd (E)	787	157	1461	0.539	786	1.2	5.320	A
2 - Lake Industrial Way	35	934	727	0.048	35	0.1	5.200	A
3 - A3056 (W)	1016	257	1222	0.831	1006	4.5	16.060	C
4 - Morrisons Car Park	416	874	801	0.520	414	1.1	9.273	A

17:30 - 17:45

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
1 - Newport Rd (E)	787	157	1461	0.539	787	1.2	5.343	A
2 - Lake Industrial Way	35	936	726	0.049	35	0.1	5.209	A
3 - A3056 (W)	1016	258	1222	0.832	1015	4.7	17.392	C
4 - Morrisons Car Park	416	882	796	0.523	416	1.1	9.477	A

17:45 - 18:00

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
1 - Newport Rd (E)	643	129	1479	0.435	644	0.8	4.318	A
2 - Lake Industrial Way	29	766	823	0.035	29	0.0	4.537	A
3 - A3056 (W)	830	211	1251	0.663	840	2.0	9.057	A
4 - Morrisons Car Park	340	730	889	0.382	342	0.6	6.599	A

18:00 - 18:15

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
1 - Newport Rd (E)	538	108	1493	0.360	539	0.6	3.777	A
2 - Lake Industrial Way	24	641	894	0.027	24	0.0	4.138	A
3 - A3056 (W)	695	176	1273	0.546	698	1.2	6.354	A
4 - Morrisons Car Park	285	607	965	0.295	285	0.4	5.306	A

2034 - Base, AM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Vehicle Mix		HV% is zero for all movements / time segments. Vehicle Mix matrix should be completed whether working in PCUs or Vehs.

Junction Network

Junctions

Junction	Name	Junction Type	Junction Delay (s)	Junction LOS
1	Newport Rd/Industrial Way	Standard Roundabout	10.21	B

Junction Network Options

Driving side	Lighting	Res Cap (%)	First arm reaching threshold
Left	Normal/unknown	16	1 - Newport Rd (E)

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D3	2034 - Base	AM	ONE HOUR	07:45	09:15	15

Vehicle mix source	PCU Factor for a HV (PCU)
HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Av. Demand (PCU/hr)	Scaling Factor (%)
1 - Newport Rd (E)		✓	1067	100.000
2 - Lake Industrial Way		✓	45	100.000
3 - A3056 (W)		✓	733	100.000
4 - Morrisons Car Park		✓	249	100.000

Origin-Destination Data

Demand (PCU/hr)

		To			
		1 - Newport Rd (E)	2 - Lake Industrial Way	3 - A3056 (W)	4 - Morrisons Car Park
From	1 - Newport Rd (E)	4	59	818	186
	2 - Lake Industrial Way	23	0	12	10
	3 - A3056 (W)	592	29	0	112
	4 - Morrisons Car Park	135	6	108	0

Vehicle Mix

HV %s

		To			
		1 - Newport Rd (E)	2 - Lake Industrial Way	3 - A3056 (W)	4 - Morrisons Car Park
From	1 - Newport Rd (E)	0	0	0	0
	2 - Lake Industrial Way	0	0	0	0
	3 - A3056 (W)	0	0	0	0
	4 - Morrisons Car Park	0	0	0	0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max delay (s)	Max Q (PCU)	Max LOS
1 - Newport Rd (E)	0.80	12.55	4.0	B
2 - Lake Industrial Way	0.09	7.06	0.1	A
3 - A3056 (W)	0.66	8.51	1.9	A
4 - Morrisons Car Park	0.30	5.76	0.4	A

Main Results for each time segment

07:45 - 08:00

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
1 - Newport Rd (E)	803	107	1494	0.538	799	1.1	5.145	A
2 - Lake Industrial Way	34	835	783	0.043	34	0.0	4.801	A
3 - A3056 (W)	552	167	1279	0.432	549	0.8	4.913	A
4 - Morrisons Car Park	187	485	1039	0.180	187	0.2	4.217	A

08:00 - 08:15

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
1 - Newport Rd (E)	959	128	1480	0.648	957	1.8	6.845	A
2 - Lake Industrial Way	40	1001	689	0.059	40	0.1	5.548	A
3 - A3056 (W)	659	200	1258	0.524	658	1.1	5.982	A
4 - Morrisons Car Park	224	581	980	0.228	224	0.3	4.755	A

08:15 - 08:30

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
1 - Newport Rd (E)	1175	157	1461	0.804	1167	3.9	11.902	B
2 - Lake Industrial Way	50	1221	564	0.088	49	0.1	6.994	A
3 - A3056 (W)	807	244	1230	0.656	804	1.9	8.379	A
4 - Morrisons Car Park	274	711	901	0.304	274	0.4	5.733	A

08:30 - 08:45

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
1 - Newport Rd (E)	1175	157	1461	0.804	1174	4.0	12.548	B
2 - Lake Industrial Way	50	1228	560	0.089	50	0.1	7.055	A
3 - A3056 (W)	807	245	1230	0.656	807	1.9	8.514	A
4 - Morrisons Car Park	274	713	899	0.305	274	0.4	5.757	A

08:45 - 09:00

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
1 - Newport Rd (E)	959	129	1480	0.648	968	1.9	7.143	A
2 - Lake Industrial Way	40	1011	683	0.059	41	0.1	5.603	A
3 - A3056 (W)	659	202	1257	0.524	662	1.1	6.083	A
4 - Morrisons Car Park	224	585	978	0.229	224	0.3	4.782	A

09:00 - 09:15

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
1 - Newport Rd (E)	803	108	1493	0.538	806	1.2	5.260	A
2 - Lake Industrial Way	34	843	779	0.043	34	0.0	4.832	A
3 - A3056 (W)	552	168	1278	0.432	553	0.8	4.979	A
4 - Morrisons Car Park	187	489	1037	0.181	188	0.2	4.241	A

2034 - Base, PM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Vehicle Mix		HV% is zero for all movements / time segments. Vehicle Mix matrix should be completed whether working in PCUs or Vehs.

Junction Network

Junctions

Junction	Name	Junction Type	Junction Delay (s)	Junction LOS
1	Newport Rd/Industrial Way	Standard Roundabout	56.33	F

Junction Network Options

Driving side	Lighting	Res Cap (%)	First arm reaching threshold
Left	Normal/unknown	-10	3 - A3056 (W)

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D4	2034 - Base	PM	ONE HOUR	16:45	18:15	15

Vehicle mix source	PCU Factor for a HV (PCU)
HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Av. Demand (PCU/hr)	Scaling Factor (%)
1 - Newport Rd (E)		✓	872	100.000
2 - Lake Industrial Way		✓	39	100.000
3 - A3056 (W)		✓	1124	100.000
4 - Morrisons Car Park		✓	461	100.000

Origin-Destination Data

Demand (PCU/hr)

		To			
		1 - Newport Rd (E)	2 - Lake Industrial Way	3 - A3056 (W)	4 - Morrisons Car Park
From	1 - Newport Rd (E)	4	5	609	254
	2 - Lake Industrial Way	23	0	12	4
	3 - A3056 (W)	944	5	1	174
	4 - Morrisons Car Park	293	0	167	1

Vehicle Mix

HV %s

		To			
		1 - Newport Rd (E)	2 - Lake Industrial Way	3 - A3056 (W)	4 - Morrisons Car Park
From	1 - Newport Rd (E)	0	0	0	0
	2 - Lake Industrial Way	0	0	0	0
	3 - A3056 (W)	0	0	0	0
	4 - Morrisons Car Park	0	0	0	0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max delay (s)	Max Q (PCU)	Max LOS
1 - Newport Rd (E)	0.67	7.51	2.0	A
2 - Lake Industrial Way	0.07	6.35	0.1	A
3 - A3056 (W)	1.04	111.79	41.0	F
4 - Morrisons Car Park	0.72	17.66	2.4	C

Main Results for each time segment

16:45 - 17:00

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
1 - Newport Rd (E)	656	130	1479	0.444	653	0.8	4.344	A
2 - Lake Industrial Way	29	776	817	0.036	29	0.0	4.569	A
3 - A3056 (W)	846	214	1249	0.677	838	2.0	8.600	A
4 - Morrisons Car Park	347	729	890	0.390	345	0.6	6.569	A

17:00 - 17:15

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
1 - Newport Rd (E)	784	156	1462	0.536	783	1.1	5.288	A
2 - Lake Industrial Way	35	929	730	0.048	35	0.1	5.181	A
3 - A3056 (W)	1010	257	1222	0.827	1001	4.3	15.638	C
4 - Morrisons Car Park	414	870	803	0.516	413	1.0	9.185	A

17:15 - 17:30

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
1 - Newport Rd (E)	960	189	1440	0.667	957	2.0	7.404	A
2 - Lake Industrial Way	43	1136	612	0.070	43	0.1	6.320	A
3 - A3056 (W)	1238	314	1187	1.043	1153	25.5	58.760	F
4 - Morrisons Car Park	508	1004	721	0.704	503	2.2	16.144	C

17:30 - 17:45

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
1 - Newport Rd (E)	960	191	1439	0.667	960	2.0	7.514	A
2 - Lake Industrial Way	43	1140	610	0.070	43	0.1	6.350	A
3 - A3056 (W)	1238	315	1186	1.043	1175	41.0	111.790	F
4 - Morrisons Car Park	508	1023	709	0.715	507	2.4	17.664	C

17:45 - 18:00

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
1 - Newport Rd (E)	784	159	1460	0.537	787	1.2	5.377	A
2 - Lake Industrial Way	35	936	726	0.048	35	0.1	5.213	A
3 - A3056 (W)	1010	258	1222	0.827	1151	5.9	66.128	F
4 - Morrisons Car Park	414	997	725	0.571	419	1.4	11.890	B

18:00 - 18:15

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
1 - Newport Rd (E)	656	132	1477	0.444	658	0.8	4.402	A
2 - Lake Industrial Way	29	782	813	0.036	29	0.0	4.593	A
3 - A3056 (W)	846	216	1248	0.678	861	2.2	9.632	A
4 - Morrisons Car Park	347	748	878	0.395	350	0.7	6.850	A

Junctions 9

ARCADY 9 - Roundabout Module

Filename: Junction 12 - Newport Rd Industrial Way - Proposed Junction.j9
Path: X:\Projects\2012\A090000\A090129-99 - IoW Junction Assessment and Design\30 Technical\31 Modelling\2034 Proposed Junction\Junction 12
Report generation date: 30/11/2017 16:16:46

»2017, AM
»2017, PM
»2034 - Base, AM
»2034 - Base, PM

Summary of junction performance

	AM					PM				
	Q (PCU)	Delay (s)	RFC	LOS	Res Cap	Q (PCU)	Delay (s)	RFC	LOS	Res Cap
	2017									
1 - Newport Rd (E)	1.9	7.12	0.65	A	41 % [1 - Newport Rd (E)]	1.2	5.34	0.54	A	25 % [4 - Morrisons Car Park]
2 - Lake Industrial Way	0.1	5.57	0.06	A		0.1	5.21	0.05	A	
3 - A3056 (W)	0.4	2.24	0.29	A		0.8	2.91	0.45	A	
4 - Morrisons Car Park	0.3	5.15	0.24	A		1.2	10.70	0.55	B	
	2034 - Base									
1 - Newport Rd (E)	4.1	12.83	0.80	B	15 % [1 - Newport Rd (E)]	2.0	7.52	0.67	A	3 % [4 - Morrisons Car Park]
2 - Lake Industrial Way	0.1	7.05	0.09	A		0.1	6.35	0.07	A	
3 - A3056 (W)	0.6	2.52	0.35	A		1.3	3.71	0.56	A	
4 - Morrisons Car Park	0.5	6.28	0.32	A		3.6	26.83	0.79	D	

Values shown are the highest values encountered over all time segments. Delay is the maximum value of Av. delay per arriving vehicle. Res Cap indicates the amount by which network flow could be increased before a user-definable threshold (see Analysis Options) is met.

File summary

File Description

Title	(untitled)
Location	
Site number	
Date	19/12/2016
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Enumerator	WYG\philip.eveleigh
Description	

Units

Distance units	Speed units	Traffic units input	Traffic units results	Flow units	Av. delay units	Total delay units	Rate of delay units
m	kph	PCU	PCU	perHour	s	-Min	perMin

Analysis Options

Calculate Q Percentiles	Calculate residual capacity	Residual capacity criteria type	RFC Threshold	Av. Delay threshold (s)	Q threshold (PCU)
	✓	Delay	0.85	36.00	20.00

Demand Set Summary

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D1	2017	AM	ONE HOUR	08:00	09:30	15
D2	2017	PM	ONE HOUR	17:00	18:30	15
D3	2034 - Base	AM	ONE HOUR	08:00	09:30	15
D4	2034 - Base	PM	ONE HOUR	17:00	18:30	15

Analysis Set Details

ID	Network flow scaling factor (%)
A1	100.000

2017, AM

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction Type	Junction Delay (s)	Junction LOS
1	Newport Rd/Industrial Way	Standard Roundabout	5.14	A

Junction Network Options

Driving side	Lighting	Res Cap (%)	First arm reaching threshold
Left	Normal/unknown	41	1 - Newport Rd (E)

Arms

Arms

Arm	Name	Description
1	Newport Rd (E)	
2	Lake Industrial Way	
3	A3056 (W)	
4	Morrisons Car Park	

Roundabout Geometry

Arm	V (m)	E (m)	I' (m)	R (m)	D (m)	PHI (deg)	Exit only
1 - Newport Rd (E)	3.70	5.40	9.0	18.0	28.1	4.0	
2 - Lake Industrial Way	3.60	4.80	3.3	14.0	28.1	24.0	
3 - A3056 (W)	6.00	9.60	13.0	25.0	28.1	23.0	
4 - Morrisons Car Park	3.50	5.50	2.0	21.3	28.1	14.5	

Slope / Intercept / Capacity

Roundabout Slope and Intercept used in model

Arm	Final slope	Final intercept (PCU/hr)
1 - Newport Rd (E)	0.658	1564
2 - Lake Industrial Way	0.569	1259
3 - A3056 (W)	0.830	2478
4 - Morrisons Car Park	0.590	1273

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

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D1	2017	AM	ONE HOUR	08:00	09:30	15

Vehicle mix source	PCU Factor for a HV (PCU)
HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Av. Demand (PCU/hr)	Scaling Factor (%)
1 - Newport Rd (E)		✓	873	100.000
2 - Lake Industrial Way		✓	37	100.000
3 - A3056 (W)		✓	600	100.000
4 - Morrisons Car Park		✓	203	100.000

Origin-Destination Data

Demand (PCU/hr)

		To			
		1 - Newport Rd (E)	2 - Lake Industrial Way	3 - A3056 (W)	4 - Morrisons Car Park
From	1 - Newport Rd (E)	4	48	669	152
	2 - Lake Industrial Way	19	0	10	8
	3 - A3056 (W)	484	24	0	92
	4 - Morrisons Car Park	110	5	88	0

Vehicle Mix

HV %s

		To			
		1 - Newport Rd (E)	2 - Lake Industrial Way	3 - A3056 (W)	4 - Morrisons Car Park
From	1 - Newport Rd (E)	33	0	3	1
	2 - Lake Industrial Way	0	0	0	0
	3 - A3056 (W)	3	0	0	1
	4 - Morrisons Car Park	0	0	2	0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max delay (s)	Max Q (PCU)	Max LOS
1 - Newport Rd (E)	0.65	7.12	1.9	A
2 - Lake Industrial Way	0.06	5.57	0.1	A
3 - A3056 (W)	0.29	2.24	0.4	A
4 - Morrisons Car Park	0.24	5.15	0.3	A

Main Results for each time segment

08:00 - 08:15

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
1 - Newport Rd (E)	657	88	1507	0.436	654	0.8	4.316	A
2 - Lake Industrial Way	28	684	869	0.032	28	0.0	4.277	A
3 - A3056 (W)	452	137	2364	0.191	451	0.2	1.928	A
4 - Morrisons Car Park	153	399	1038	0.147	152	0.2	4.099	A

08:15 - 08:30

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
1 - Newport Rd (E)	785	105	1495	0.525	783	1.1	5.179	A
2 - Lake Industrial Way	33	819	792	0.042	33	0.0	4.741	A
3 - A3056 (W)	539	164	2342	0.230	539	0.3	2.048	A
4 - Morrisons Car Park	182	477	992	0.184	182	0.2	4.484	A

08:30 - 08:45

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
1 - Newport Rd (E)	961	129	1480	0.650	958	1.9	7.040	A
2 - Lake Industrial Way	41	1002	688	0.059	41	0.1	5.558	A
3 - A3056 (W)	661	201	2311	0.286	660	0.4	2.236	A
4 - Morrisons Car Park	224	584	929	0.241	223	0.3	5.144	A

08:45 - 09:00

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
1 - Newport Rd (E)	961	129	1480	0.650	961	1.9	7.119	A
2 - Lake Industrial Way	41	1005	687	0.059	41	0.1	5.572	A
3 - A3056 (W)	661	201	2311	0.286	661	0.4	2.237	A
4 - Morrisons Car Park	224	585	928	0.241	224	0.3	5.150	A

09:00 - 09:15

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
1 - Newport Rd (E)	785	105	1495	0.525	788	1.1	5.244	A
2 - Lake Industrial Way	33	824	790	0.042	33	0.0	4.759	A
3 - A3056 (W)	539	165	2341	0.230	540	0.3	2.050	A
4 - Morrisons Car Park	182	478	991	0.184	183	0.2	4.492	A

09:15 - 09:30

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
1 - Newport Rd (E)	657	88	1506	0.436	659	0.8	4.364	A
2 - Lake Industrial Way	28	689	867	0.032	28	0.0	4.291	A
3 - A3056 (W)	452	138	2363	0.191	452	0.2	1.931	A
4 - Morrisons Car Park	153	400	1037	0.147	153	0.2	4.106	A

2017, PM

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction Type	Junction Delay (s)	Junction LOS
1	Newport Rd/Industrial Way	Standard Roundabout	5.23	A

Junction Network Options

Driving side	Lighting	Res Cap (%)	First arm reaching threshold
Left	Normal/unknown	25	4 - Morrisons Car Park

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D2	2017	PM	ONE HOUR	17:00	18:30	15

Vehicle mix source	PCU Factor for a HV (PCU)
HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Av. Demand (PCU/hr)	Scaling Factor (%)
1 - Newport Rd (E)		✓	715	100.000
2 - Lake Industrial Way		✓	32	100.000
3 - A3056 (W)		✓	923	100.000
4 - Morrisons Car Park		✓	378	100.000

Origin-Destination Data

Demand (PCU/hr)

		To			
		1 - Newport Rd (E)	2 - Lake Industrial Way	3 - A3056 (W)	4 - Morrisons Car Park
From	1 - Newport Rd (E)	3	4	500	208
	2 - Lake Industrial Way	19	0	10	3
	3 - A3056 (W)	775	4	1	143
	4 - Morrisons Car Park	240	0	137	1

Vehicle Mix

HV %s

		To			
		1 - Newport Rd (E)	2 - Lake Industrial Way	3 - A3056 (W)	4 - Morrisons Car Park
From	1 - Newport Rd (E)	0	0	0	0
	2 - Lake Industrial Way	0	0	0	0
	3 - A3056 (W)	1	0	0	0
	4 - Morrisons Car Park	0	0	0	0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max delay (s)	Max Q (PCU)	Max LOS
1 - Newport Rd (E)	0.54	5.34	1.2	A
2 - Lake Industrial Way	0.05	5.21	0.1	A
3 - A3056 (W)	0.45	2.91	0.8	A
4 - Morrisons Car Park	0.55	10.70	1.2	B

Main Results for each time segment

17:00 - 17:15

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
1 - Newport Rd (E)	538	107	1494	0.360	536	0.6	3.751	A
2 - Lake Industrial Way	24	637	896	0.027	24	0.0	4.127	A
3 - A3056 (W)	695	175	2332	0.298	693	0.4	2.213	A
4 - Morrisons Car Park	285	602	918	0.310	283	0.4	5.651	A

17:15 - 17:30

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
1 - Newport Rd (E)	643	128	1480	0.434	642	0.8	4.292	A
2 - Lake Industrial Way	29	763	824	0.035	29	0.0	4.523	A
3 - A3056 (W)	830	210	2304	0.360	829	0.6	2.462	A
4 - Morrisons Car Park	340	720	848	0.401	339	0.7	7.057	A

17:30 - 17:45

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
1 - Newport Rd (E)	787	157	1461	0.539	786	1.2	5.320	A
2 - Lake Industrial Way	35	934	727	0.048	35	0.1	5.200	A
3 - A3056 (W)	1016	257	2265	0.449	1015	0.8	2.902	A
4 - Morrisons Car Park	416	882	753	0.553	414	1.2	10.553	B

17:45 - 18:00

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
1 - Newport Rd (E)	787	157	1461	0.539	787	1.2	5.344	A
2 - Lake Industrial Way	35	936	726	0.049	35	0.1	5.209	A
3 - A3056 (W)	1016	258	2264	0.449	1016	0.8	2.908	A
4 - Morrisons Car Park	416	883	752	0.553	416	1.2	10.699	B

18:00 - 18:15

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
1 - Newport Rd (E)	643	129	1479	0.435	644	0.8	4.320	A
2 - Lake Industrial Way	29	766	823	0.035	29	0.0	4.537	A
3 - A3056 (W)	830	211	2303	0.360	831	0.6	2.468	A
4 - Morrisons Car Park	340	722	847	0.401	342	0.7	7.151	A

18:15 - 18:30

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
1 - Newport Rd (E)	538	108	1493	0.360	539	0.6	3.775	A
2 - Lake Industrial Way	24	641	894	0.027	24	0.0	4.140	A
3 - A3056 (W)	695	176	2332	0.298	695	0.4	2.219	A
4 - Morrisons Car Park	285	604	917	0.310	285	0.5	5.709	A

2034 - Base, AM

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction Type	Junction Delay (s)	Junction LOS
1	Newport Rd/Industrial Way	Standard Roundabout	8.31	A

Junction Network Options

Driving side	Lighting	Res Cap (%)	First arm reaching threshold
Left	Normal/unknown	15	1 - Newport Rd (E)

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D3	2034 - Base	AM	ONE HOUR	08:00	09:30	15

Vehicle mix source	PCU Factor for a HV (PCU)
HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Av. Demand (PCU/hr)	Scaling Factor (%)
1 - Newport Rd (E)		✓	1067	100.000
2 - Lake Industrial Way		✓	45	100.000
3 - A3056 (W)		✓	733	100.000
4 - Morrisons Car Park		✓	249	100.000

Origin-Destination Data

Demand (PCU/hr)

		To			
		1 - Newport Rd (E)	2 - Lake Industrial Way	3 - A3056 (W)	4 - Morrisons Car Park
From	1 - Newport Rd (E)	4	59	818	186
	2 - Lake Industrial Way	23	0	12	10
	3 - A3056 (W)	592	29	0	112
	4 - Morrisons Car Park	135	6	108	0

Vehicle Mix

HV %s

		To			
		1 - Newport Rd (E)	2 - Lake Industrial Way	3 - A3056 (W)	4 - Morrisons Car Park
From	1 - Newport Rd (E)	33	0	3	1
	2 - Lake Industrial Way	0	0	0	0
	3 - A3056 (W)	3	0	0	1
	4 - Morrisons Car Park	0	0	2	0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max delay (s)	Max Q (PCU)	Max LOS
1 - Newport Rd (E)	0.80	12.83	4.1	B
2 - Lake Industrial Way	0.09	7.05	0.1	A
3 - A3056 (W)	0.35	2.52	0.6	A
4 - Morrisons Car Park	0.32	6.28	0.5	A

Main Results for each time segment

08:00 - 08:15

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
1 - Newport Rd (E)	803	107	1494	0.538	799	1.2	5.275	A
2 - Lake Industrial Way	34	835	783	0.043	34	0.0	4.801	A
3 - A3056 (W)	552	167	2339	0.236	551	0.3	2.063	A
4 - Morrisons Car Park	187	487	986	0.190	187	0.2	4.537	A

08:15 - 08:30

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
1 - Newport Rd (E)	959	128	1480	0.648	957	1.8	7.017	A
2 - Lake Industrial Way	40	1001	689	0.059	40	0.1	5.547	A
3 - A3056 (W)	659	200	2312	0.285	659	0.4	2.233	A
4 - Morrisons Car Park	224	582	930	0.241	224	0.3	5.138	A

08:30 - 08:45

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
1 - Newport Rd (E)	1175	157	1461	0.804	1166	3.9	12.194	B
2 - Lake Industrial Way	50	1221	564	0.088	49	0.1	6.992	A
3 - A3056 (W)	807	244	2276	0.355	806	0.6	2.512	A
4 - Morrisons Car Park	274	713	853	0.321	274	0.5	6.261	A

08:45 - 09:00

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
1 - Newport Rd (E)	1175	157	1461	0.804	1174	4.1	12.825	B
2 - Lake Industrial Way	50	1228	560	0.089	50	0.1	7.055	A
3 - A3056 (W)	807	245	2274	0.355	807	0.6	2.516	A
4 - Morrisons Car Park	274	713	852	0.322	274	0.5	6.278	A

09:00 - 09:15

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
1 - Newport Rd (E)	959	129	1480	0.648	968	1.9	7.331	A
2 - Lake Industrial Way	40	1012	683	0.059	41	0.1	5.604	A
3 - A3056 (W)	659	202	2310	0.285	660	0.4	2.239	A
4 - Morrisons Car Park	224	583	929	0.241	224	0.3	5.157	A

09:15 - 09:30

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
1 - Newport Rd (E)	803	108	1493	0.538	806	1.2	5.396	A
2 - Lake Industrial Way	34	843	779	0.043	34	0.0	4.834	A
3 - A3056 (W)	552	168	2338	0.236	552	0.3	2.069	A
4 - Morrisons Car Park	187	488	985	0.190	188	0.2	4.556	A

2034 - Base, PM

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction Type	Junction Delay (s)	Junction LOS
1	Newport Rd/Industrial Way	Standard Roundabout	9.35	A

Junction Network Options

Driving side	Lighting	Res Cap (%)	First arm reaching threshold
Left	Normal/unknown	3	4 - Morrisons Car Park

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D4	2034 - Base	PM	ONE HOUR	17:00	18:30	15

Vehicle mix source	PCU Factor for a HV (PCU)
HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Av. Demand (PCU/hr)	Scaling Factor (%)
1 - Newport Rd (E)		✓	872	100.000
2 - Lake Industrial Way		✓	39	100.000
3 - A3056 (W)		✓	1124	100.000
4 - Morrisons Car Park		✓	461	100.000

Origin-Destination Data

Demand (PCU/hr)

		To			
		1 - Newport Rd (E)	2 - Lake Industrial Way	3 - A3056 (W)	4 - Morrisons Car Park
From	1 - Newport Rd (E)	4	5	609	254
	2 - Lake Industrial Way	23	0	12	4
	3 - A3056 (W)	944	5	1	174
	4 - Morrisons Car Park	293	0	167	1

Vehicle Mix

HV %s

		To			
		1 - Newport Rd (E)	2 - Lake Industrial Way	3 - A3056 (W)	4 - Morrisons Car Park
From	1 - Newport Rd (E)	0	0	0	0
	2 - Lake Industrial Way	0	0	0	0
	3 - A3056 (W)	1	0	0	0
	4 - Morrisons Car Park	0	0	0	0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max delay (s)	Max Q (PCU)	Max LOS
1 - Newport Rd (E)	0.67	7.52	2.0	A
2 - Lake Industrial Way	0.07	6.35	0.1	A
3 - A3056 (W)	0.56	3.71	1.3	A
4 - Morrisons Car Park	0.79	26.83	3.6	D

Main Results for each time segment

17:00 - 17:15

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
1 - Newport Rd (E)	656	130	1479	0.444	653	0.8	4.344	A
2 - Lake Industrial Way	29	776	817	0.036	29	0.0	4.569	A
3 - A3056 (W)	846	214	2300	0.368	844	0.6	2.488	A
4 - Morrisons Car Park	347	733	841	0.413	344	0.7	7.213	A

17:15 - 17:30

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
1 - Newport Rd (E)	784	156	1462	0.536	783	1.1	5.288	A
2 - Lake Industrial Way	35	929	730	0.048	35	0.1	5.180	A
3 - A3056 (W)	1010	257	2265	0.446	1010	0.8	2.890	A
4 - Morrisons Car Park	414	878	756	0.548	412	1.2	10.429	B

17:30 - 17:45

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
1 - Newport Rd (E)	960	188	1440	0.667	957	2.0	7.393	A
2 - Lake Industrial Way	43	1134	613	0.070	43	0.1	6.311	A
3 - A3056 (W)	1238	314	2218	0.558	1236	1.3	3.691	A
4 - Morrisons Car Park	508	1074	640	0.793	499	3.4	24.153	C

17:45 - 18:00

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
1 - Newport Rd (E)	960	191	1439	0.667	960	2.0	7.517	A
2 - Lake Industrial Way	43	1140	610	0.070	43	0.1	6.349	A
3 - A3056 (W)	1238	315	2217	0.558	1238	1.3	3.706	A
4 - Morrisons Car Park	508	1076	639	0.795	507	3.6	26.835	D

18:00 - 18:15

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
1 - Newport Rd (E)	784	160	1459	0.537	787	1.2	5.383	A
2 - Lake Industrial Way	35	938	725	0.048	35	0.1	5.219	A
3 - A3056 (W)	1010	258	2264	0.446	1012	0.8	2.904	A
4 - Morrisons Car Park	414	880	754	0.549	424	1.3	11.191	B

18:15 - 18:30

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
1 - Newport Rd (E)	656	132	1478	0.444	658	0.8	4.401	A
2 - Lake Industrial Way	29	782	814	0.036	29	0.0	4.592	A
3 - A3056 (W)	846	216	2299	0.368	847	0.6	2.501	A
4 - Morrisons Car Park	347	736	839	0.414	349	0.7	7.381	A