



Lawsonsteads, Whalley

Technical Note No 1

April 2013

PROPOSED RESIDENTIAL DEVELOPMENT
LAWSONSTEADS , WHALLEY

TECHNICAL NOTE NO 1

Report by: Alex McGarrell

Bryan G Hall
Consulting Civil & Transportation Planning Engineers
Suite E8, Joseph's Well, Hanover Walk, Leeds, LS3 1AB

Ref: 10-228-007.01

April 2013

Report Reference No: 10-228-007.01

	Name	Signed	Date
Report prepared by	Alex McGarrell	<i>A. McGarrell</i>	26/04/13
Report checked by	Stuart Wilkins	<i>S.C. Wilkins</i>	26/4/13.

CONTENTS

1.0	INTRODUCTION	1
2.0	SENSITIVITY TEST	2
3.0	BOULEVARD REASSIGNMENT	6
4.0	PRIMARY SCHOOL	11
5.0	SUMMARY AND CONCLUSIONS	14

APPENDICES

Appendix BGH1	Email to Lancashire County Council Dated Monday 22 April 2013
Appendix BGH2	Mitton Road and Barrowlands Development Generated Flows
Appendix BGH3	2018 “Base Sensitivity Test” Flows
Appendix BGH4	2018 “Base Sensitivity Test” Analysis
Appendix BGH5	Predicted “2018 Sensitivity Test” Flows
Appendix BGH6	2018 “Predicted Sensitivity Test” Analysis
Appendix BGH7	2018 “Predicted” Flows with 5% Boulevard Reassignment
Appendix BGH8	2018 “Predicted” Analysis with 5% Boulevard Reassignment
Appendix BGH9	Journey Time Calculations – With and Without Boulevard
Appendix BGH10	2 Mile Primary School Catchment Area

1.0 INTRODUCTION

- 1.1 Bryan G Hall have prepared a Transport Assessment which forms part of an outline planning application submitted on behalf of Commercial Estates Group (CEG) for the development of an area of land situated to the east of Clitheroe Road, north of Whalley in Lancashire. The application is in outline with all matters reserved for future determination, except for access, which will be determined. The illustrative plans in support of the application comprise 260 dwellings and a one form entry (210 pupils) primary school.
- 1.2 Following submission of the application Bryan G Hall met with Lancashire County Council (LCC) Highways on Tuesday 5th March 2013 to discuss the planning history of the Lawsonsteads site and the recently submitted planning application. At that meeting it was agreed that Bryan G Hall would undertake a number of actions in relation to the following:
- A sensitivity test to reflect the potential traffic generation from the Mitton Road and Barrowlands developments;
 - Provide further evidence in relation to the likely reassignment of existing traffic onto the boulevard through the site;
 - Consider the positioning and orientation of the primary school element of the development proposal, and review the likely traffic generation of the School element of the proposals; and
 - Consider the appropriate year of assessment. However, in relation to this point the Transport Assessment for the February 2011 application on the site adopted a future year of 5 years after the date of application and this was agreed with LCC, this approach is in accordance with DfT guidance on Transport Assessment. The likely build out rate for the site is 5 years (50 dwellings per year), and given the above it is considered that the adopted assessment year of 2018 is wholly appropriate.
- 1.3 Following the meeting an email exchange between LCC Highways and Bryan G Hall set out the intended approach to respond on the outstanding issues, and this Technical Note should be read in conjunction with the email exchange which is attached at **Appendix BGH1**. This Note does not specifically address the positioning and orientation of the primary school element of the development proposals which will be subject to a separate submission.

2.0 SENSITIVITY TEST

- 2.1 The respective potential generated traffic flows extracted from the Mitton Road and Barrowlands Transport Assessments are attached at **Appendix BGH2** and have been added to the 2018 Base traffic flows (which included the committed development flows from sites off Accrington Road, at Pendle Drive and north of Riddings Lane) to provide 2018 Base sensitivity test traffic flows attached at **Appendix BGH3**. For the purpose of this Technical Note, only the Clitheroe Road/Station Road/King Street and Accrington Road/King Street mini-roundabout junctions have been reassessed using the computer program Junction 8. All of the other junctions considered within the study area are considered to be operating well within their practical capacity. The results of the analysis of the operation of the junctions during the 2018 Base sensitivity test morning and evening peak hour periods are summarised in the following tables with the full outputs attached at **Appendix BGH4**.

Table 2.1: Clitheroe Road/Brookes Lane/King Street/Station Road Mini Roundabout Junction - 2018 Base Sensitivity Test Morning and Evening Peak Hour Traffic Flows

Arm	2018 Base Sensitivity Test					
	08:00-09:00			16:30-17:30		
	RFC	Queue (veh)	Mean Delay (mins)	RFC	Queue (veh)	Mean Delay (mins)
Arm A - Clitheroe Road	1.04	32	4.13	0.81	4	0.66
Arm B - Brookes Lane	0.05	0	0.45	0.04	0	0.32
Arm C - King Street	0.88	7	0.70	0.83	5	0.49
Arm D - Station Road	0.90	8	0.77	0.88	6	0.65

- 2.2 The results show that under the 2018 Base sensitivity test traffic demands this junction is predicted to operate with a maximum RFC of 1.04 on Clitheroe Road during the morning peak period with a queue of 32 vehicles, this compares to an RFC of 0.96 and a queue of 13 vehicles in the 2018 base scenario reported in the Transport Assessment. A maximum RFC of 0.88 is predicted to occur on Station Road during the evening peak period with a queue of 6 vehicles.

Table 2.2: B6246 King Street/Accrington Road/King Street Mini Roundabout Junction - 2018 Base Sensitivity Test Morning and Evening Peak Hour Traffic Flows

Arm	2018 Base Sensitivity Test					
	08:00-09:00			16:30-17:30		
	RFC	Queue (veh)	Mean Delay (mins)	RFC	Queue (veh)	Mean Delay (mins)
Arm A – B6246 King Street	1.17	121	9.72	1.07	57	4.66
Arm B – Accrington Road	0.82	4	0.58	0.71	2	0.34
Arm C – King Street	0.89	7	0.85	0.86	6	0.64

2.3 The results above show that under the 2018 Base sensitivity test traffic demands this junction will operate above its maximum practical capacity in the morning and evening peak periods with significant queuing predicted for the King Street approach from the north in both peaks. In the AM peak the maximum RFC of 1.17 is predicted on the King Street (north) approach with a queue of 121 vehicles, this compares to an RFC of 1.09 and a queue of 70 vehicles in the 2018 base scenario reported in the Transport Assessment. A maximum RFC of 1.07 is predicted to occur on King Street during the evening peak period with a queue of 57 vehicles

2.4 Further analysis has then been undertaken to predict the impact of the development related traffic on the 2018 Base sensitivity test results. The assumptions regarding traffic generation and trip distribution for the development site are identical to those used in the Transport Assessment. The 2018 predicted sensitivity test traffic flows are attached at **Appendix BGH5**. The results of the analysis of the operation of the junctions during the 2018 predicted sensitivity test morning and evening peak hour periods are summarised in the following tables with the full outputs attached at **Appendix BGH6**.

**Table 2.3: Clitheroe Road/Brookes Lane/King Street/
Station Road Mini Roundabout Junction
2018 Predicted Sensitivity Test
Morning and Evening Peak Hour Traffic Flows**

Arm	2018 Predicted Sensitivity Test					
	08:00-09:00			16:30-17:30		
	RFC	Queue (veh)	Mean Delay (mins)	RFC	Queue (veh)	Mean Delay (mins)
Arm A - Clitheroe Road	1.03	30	3.43	0.78	3	0.51
Arm B - Brookes Lane	0.04	0	0.38	0.03	0	0.26
Arm C - King Street	0.79	4	0.46	0.74	3	0.35
Arm D - Station Road	0.89	7	0.71	0.86	6	0.58

2.5

When compared with the 2018 base sensitivity test results, it can be clearly seen that with the introduction of the boulevard through the site, and subsequent reassignment of existing vehicle movements at this junction, the junction will operate marginally better during the 2018 predicted sensitivity test morning and evening peak hours than it would do in the absence of development. The junction is predicted to operate with a maximum RFC of 1.03 on Clitheroe Road during the morning peak period with a queue of 30 vehicles. A maximum RFC of 0.86 is predicted to occur on Station Road during the evening peak period with a queue of 6 vehicles.

**Table 2.4: B6246 King Street/Accrington Road/
King Street Mini Roundabout Junction
2018 Predicted Sensitivity Test
Morning and Evening Peak Hour Traffic Flows**

Arm	2018 Predicted Sensitivity Test					
	08:00-09:00			16:30-17:30		
	RFC	Queue (veh)	Mean Delay (mins)	RFC	Queue (veh)	Mean Delay (mins)
Arm A – B6246 King Street	0.94	11	1.14	0.82	4	0.48
Arm B – Accrington Road	0.59	1	0.28	0.50	1	0.20
Arm C – King Street	0.78	4	0.40	0.79	4	0.39

- 2.6 At the King Street/Accrington Road junction, when compared with the 2018 base sensitivity tests, the results clearly show that the introduction of the boulevard through the site and subsequent reassignment of existing vehicle movements has a significant impact on the operation of this junction, and it will operate significantly better during the 2018 predicted sensitivity test morning and evening peak hours. The junction is predicted to operate with RFC's well below the maximum practical capacity of 1.00 on all approaches in the morning peak and evening peak periods under the 2018 predicted sensitivity test morning and evening traffic demands, with minimal queuing.
- 2.7 In conclusion, when comparing the 2018 Base sensitivity test situation, with the 2018 predicted sensitivity test assessments, it has been shown that with the introduction of the proposed boulevard through the application site, Station Road junction with King Street works marginally better with the development, whilst the King Street/Accrington Road junction works significantly better with development given the reassignment of traffic that will take place along the boulevard from King Street.
- 2.8 With regard to the above sensitivity testing of Mitton Road and Barrowlands developments it is noted that neither of the applications are supported by Ribble Valley Borough Council at the present time. As such, there must be a doubt as to whether either site will ultimately come forward and the results are presented purely as a sensitivity test and are not considered representative of the conditions likely to be experienced on the road network.

3.0 BOULEVARD REASSIGNMENT

- 3.1 Within the Transport Assessment a methodology was adopted to demonstrate the potential reassignment of vehicle movements on to the proposed boulevard. Vehicles that currently use King Street and Accrington Road travelling to/from the south between Station Road and the A671 Accrington Road, will be able to use the boulevard as an alternative route which is likely to reduce journey times during peak hour periods when the existing settlement centre is at its busiest. Clearly some drivers will stay on their existing route, and therefore within the Transport Assessment 50% of the vehicle movements travelling between Station Road and the A671 Accrington Road were reassigned on to the proposed boulevard. Likewise, vehicles that currently use Clitheroe Road and Wiswell Lane travelling to/from Whalley will be able to use the boulevard as an alternative route and again 50% of this traffic was been assigned to the new boulevard.
- 3.2 Clearly ultimately the level of reassignment that takes place will be subject to the individual route choice of drivers, based on journey length, level of congestion anticipated on the alternative routes at key junctions and overall journey time as a consequence of these anticipated levels of congestion. Sensitivity tests have therefore been undertaken to determine the minimum level of traffic reassignment required to achieve betterment in operating conditions in the settlement centre as a consequence of the provision of the boulevard, even allowing for the additional development related traffic.
- 3.3 Given the fact that neither the Mitton Road or Barrowlands developments are supported by Ribble Valley Borough Council at the present time, and the consequent doubt as to whether either site will ultimately come forward, the traffic flows used in these sensitivity tests are the 2018 predicted traffic flows (which included the committed development flows from sites off Accrington Road, at Pendle Drive and north of Riddings Lane) used in the Transport Assessment.
- 3.4 The sensitivity testing analysis is supported by assessment of the theoretical journey times between the Station Road/Citheroe Road mini-roundabout and Accrington Road/A671 signal junction, with and without the proposed boulevard in place, to demonstrate the predicted level of congestion that is likely to occur in the future, on the alternate routes, and thus support the view that some reassignment of through traffic will clearly take place.

- 3.5 The sensitivity testing of the likely traffic reassignment to the proposed boulevard has been carried out by reducing the percentage reassignment figure from the 50% originally used in the Transport Assessment, until a point is reached where no benefits are achieved in relation to a reduction in traffic flows on King Street or in the predicted operation of the Accrington Road/King Street mini-roundabout junction. This analysis has revealed that even a 5% reassignment of through traffic between Station Road and Accrington Road from King Street to the proposed boulevard would result in some betterment in the operation of the Accrington Road/King Street junction and a reduction in traffic flows on King Street. The 2018 predicted traffic flows using a 5% traffic reassignment are attached at **Appendix BGH7**. The results of the analysis of the operation of the two junctions during the 2018 predicted morning and evening peak hour period are summarised in the following tables with the full outputs attached at **Appendix BGH8**.

**Table 3.1: Clitheroe Road/Brookes Lane/King Street/
Station Road Mini Roundabout Junction
2018 Predicted
Morning and Evening Peak Hour Traffic Flows**

Arm	2018 Predicted (5% reassignment)					
	08:00-09:00			16:30-17:30		
	RFC	Queue (veh)	Mean Delay (mins)	RFC	Queue (veh)	Mean Delay (mins)
Arm A - Clitheroe Road	1.00	22	2.78	0.86	5	0.84
Arm B - Brookes Lane	0.05	0	0.41	0.04	0	0.33
Arm C - King Street	0.89	7	0.75	0.83	5	0.51
Arm D - Station Road	0.86	6	0.59	0.86	6	0.57

- 3.6 When compared with the base situation, the results above show that even based on just a 5% reassignment of traffic on to the proposed boulevard through the site this junction will operate at a similar level with development to that which it would operate at without development. The junction is predicted to operate with a maximum RFC of 1.00 on Clitheroe Road during the morning peak period with a queue of 22 vehicles, in the base assessment reported in the original Transport assessment the RFC was 0.96 with a queue of 13 vehicles. A maximum RFC of

0.86 is predicted to occur on Station Road during the evening peak period with a queue of 6 vehicles, slightly lower than reported for the base within the Transport Assessment.

**Table 3.2: B6246 King Street/Accrington Road/
King Street Mini Roundabout Junction
2018 Predicted
Morning and Evening Peak Hour Traffic Flows**

Arm	2018 Predicted (5% reassignment)					
	08:00-09:00			16:30-17:30		
	RFC	Queue (veh)	Mean Delay (mins)	RFC	Queue (veh)	Mean Delay (mins)
Arm A – B6246 King Street	1.10	73	6.03	1.01	30	2.65
Arm B – Accrington Road	0.77	3	0.46	0.66	2	0.29
Arm C – King Street	0.86	6	0.68	0.82	4	0.48

- 3.7 When compared with the base situation, the results above show that even based on just a 5% reassignment of traffic on to the proposed boulevard this junction will operate marginally better during the 2018 predicted morning and evening peak hours than is predicted within the 2018 Base morning and evening peaks. The RFC on King Street north, of 1.10 is at the same level as that in the 2018 base analysis (RFC 1.09) whilst in the PM peak the RFC of 1.01 is better than the 1.07 predicted in the 2018 PM peak base assessment within the Transport Assessment.
- 3.8 In addition on King Street itself between the two roundabouts, the sensitivity testing shows that even with the traffic reassignment as low as 5%, the total number of the two-way vehicle movements on King Street between the two mini-roundabout junctions is 1281 and 1212 during the 2018 predicted morning and evening peak hour period compared with 1292 and 1219 during the 2018 Base morning and evening peak hour period. In effect then a 5% reassignment would reduce traffic flows on King Street even allowing for the traffic associated with the development.
- 3.9 The predicted journey times between the Station Road/Citheroe Road mini-roundabout and the Accrington Road/A671 signal junction have been calculated for the alternative routes, based on the results of the operational assessments, for

the morning and evening peak periods to demonstrate the attractiveness of the proposed boulevard through the site as an alternative route to travelling along King Street through Whalley settlement centre. The journey times have been assessed between the two junctions for scenarios both with and without the boulevard in place during the morning and evening peak. An average driving speed of 20 mph on the local road network has been used to calculate the likely time it will take to travel between junctions. An average speed of 50 mph has been used for derestricted section of Accrington Road and the A671 Whalley Easterly By-Pass. The likely delay encountered at the junctions on each journey has been extracted from the analysis results for both the 2018 Base and predicted scenarios.

- 3.10 The journey time calculations with and without the proposed boulevard in place are attached at **Appendix BGH9**. The journey times do not reflect any delays likely to be incurred on King Street between the two mini-roundabouts due to the presence of parked vehicles. However, delays on King Street do occur during peak times as a result of on-street parking on both sides of the road.
- 3.11 The results show that when travelling from the Accrington Road/A671 signal junction to the Station Road/Clitheroe Road mini-roundabout there is not a significant difference between using the proposed boulevard as an alternative route during the morning or evening peak hour period. However, the results show that when travelling from the Station Road/Clitheroe Road mini-roundabout to the Accrington Road/A671 signal junction the journey time when using the boulevard as an alternative route is significantly less than the journey time without the boulevard due to the predicted long delays on the southbound arm of the King Street/Accrington Road mini-roundabout. The journey time is predicted to be reduced by some 8 minutes during the morning peak and some 3 minutes during the evening peak period. This clearly demonstrates that the proposed boulevard will offer an attractive alternative route to King Street for traffic travelling between Station Road and the A671 and will reduce traffic movements through Whalley settlement centre.
- 3.12 In conclusion, when compared with the base situation, the results of the sensitivity testing show that even based on just a 5% reassignment of traffic on to the proposed boulevard through the site, the King Street/Accrington Road junction will operate marginally better during the 2018 predicted morning and evening peak hours with development traffic than is predicted within the 2018 Base morning and evening peaks.

- 3.13 In addition on King Street itself, the sensitivity testing shows that even with the traffic reassignment as low as 5%, the total number of the two-way vehicle movements on King Street between the two mini-roundabout junctions reduces.
- 3.14 The journey time analysis shows that given the predicted future year delays on King Street, the proposed boulevard will offer an attractive alternative route to King Street for traffic travelling between Station Road and the A671 and will therefore clearly reduce traffic movements through Whalley settlement centre.

4.0 PRIMARY SCHOOL ELEMENT

- 4.1 With regard to the likely traffic generation of the School the approach set out below is that which was previously agreed with Lancashire County Council as part of the January 2012 application for the site.
- 4.2 A residential development of 260 houses, on the Lawsonsteads site, would generate approximately 90 primary school pupils based upon an average generation factor of 0.35 pupils per dwelling. This equates to almost half of the proposed 210 primary school places, all of whom would be within walking distance of the school. Whilst it is expected that the majority of these trips will be made on foot, even if school drop off is made by car as part of a home-school-work trip, these will already have been accounted for within the residential traffic generation and taken account of in the assessment of the likely junction operations. In the unlikely event of any home-school-home car trips these will not impact on the highway network outside of the development.
- 4.3 The recently approved 'Co-Op' residential development of 80 houses off Hayhurst Road will also generate a number of new primary school pupils. Based upon the pupil generation factor of 0.35 pupils per dwelling, this approved development would generate a further 30 pupils. Given the close proximity of this development to the proposed primary school site, the school trips made by these pupils (and accompanying parents) would again be easily made on foot. Even if car borne school trips were made from the Co-op site these would be accounted for within the base traffic assessment as part of the committed development traffic flows. Therefore, the combination of 340 houses coming forward through these two developments, would account for approximately 57% of the pupil places at the proposed primary school, without any additional traffic impact on the highway network above the base traffic assessment.
- 4.4 The remaining pupil places at the proposed primary school will be filled by pupils from the wider Whalley settlement area, primarily the existing catchment area for the Whalley C of E Primary School in Whalley.
- 4.5 Lancashire County Council's Education Authority has confirmed that a primary school's catchment is based on a 2 mile radius. No further information regarding school catchment areas or populations is available from the Education Authority. The diagram attached at **Appendix BGH10** illustrates the relative 2 mile catchment areas for the existing primary school in the Whalley area and the proposed primary school on the Lawsonsteads site. This diagram shows that the

catchment area for the existing Whalley primary school and the proposed primary school are very similar. There is also a significant over-lap between the catchment area between the Whalley and Barrow primary schools.

- 4.6 It is considered that in future the most logical catchment area for the school would be from those areas of Whalley currently located, closest to the proposed school. In some instances this would clearly reduce the distance pupils are required to travel to school, thereby increasing the opportunity for trips to be made on foot and reducing mileage and emissions from cars. Once again any car trips associated with the remaining 40% of pupils are likely to be part of a home-school-work trip which will be included within the existing traffic flows.
- 4.7 It is therefore concluded that the effect of providing a new school in Whalley would potentially reduce the number of car borne trips on the highway network given the reduction in distance for pupils having to travel to school either in Whalley itself or potentially Barrow, at the same time as increasing the potential for trips to be made on foot. In many instances school car trips, are made as part of a wider home to work journey which would already be on the highway network. In constructing a second primary school within close proximity to the existing residential area of Whalley this must increase the potential for school trips to be made on foot in keeping with sustainable travel plan initiatives.
- 4.8 Rather than reduce the base traffic flows to take account of any reduction, the Transport Assessment simply assumed no traffic generation for the primary school element of the development. This has previously been agreed with LCC as representing a robust assessment. In addition it is noted that the peak period for school traffic coincides only with the morning highway peak period between 08:00 – 09:00 and does not coincide with the evening highway peak period of 17:00 – 18:00. It should also be noted that the school will be subject to the site wide Travel Plan, and the School itself will be subject to the development of a School Travel Plan.
- 4.9 In conclusion the combination of 260 houses coming forward through the full development of the Lawsonsteads site and the Co-Op residential development of 80 houses off Hayhurst Road, would account for approximately 57% of the pupil places at the proposed primary school, all of whom would be within easy walking distance of the site.
- 4.10 The remaining catchment is likely to come from the wider Whalley Primary School catchment area closest to the new site and as a result will result in a reduction in existing movements to the alternative Primary School site in Whalley as well as Barrow. Any home-school-work car borne movements to existing schools will

already be on the highway network and accounted for in the base traffic flows. As such there is not considered to be any specific need to take account of school generated traffic flows, and this was a position agreed with LCC as part of the January 2012 planning application.

5.0 SUMMARY AND CONCLUSIONS

- 5.1 Bryan G Hall prepared a Transport Assessment which formed part of an outline planning application submitted on behalf of Commercial Estates Group (CEG) for the development of an area of land situated to the east of Clitheroe Road, north of Whalley in Lancashire. Following submission of the application Bryan G Hall met with Lancashire County Council (LCC) Highways on Tuesday 5th March 2013 to discuss the planning history of the Lawsonsteads site and the recently submitted planning application. At that meeting it was agreed that Bryan G Hall would undertake a number of actions in relation to a number of issues. The results of this additional work are presented in this Technical Note and can be summarised as follows:
- 5.4 A sensitivity test has been undertaken to reflect the impact of the potential traffic generation from the Mitton Road and Barrowlands developments. These sensitivity assessments have revealed that when comparing the 2018 Base Sensitivity Test situation, with the 2018 Predicted Sensitivity Test assessments, it can be seen that with the introduction of the proposed boulevard through the application site, the Station Road mini roundabout junction with King Street works marginally better with the development, whilst the King Street/Accrington Road mini roundabout junction works significantly better with development given the reassignment that will take place along the boulevard. These results are in line with those presented in the original Transport Assessment.
- 5.5 With regard to the sensitivity testing of Mitton Road and Barrowlands developments it is noted that neither of the applications are supported by Ribble Valley Borough Council at the present time. As such, there must be a doubt as to whether either site will ultimately come forward and the results are presented purely as a sensitivity test and should not be taken as being representative of the conditions likely to be experienced on the road network.
- 5.6 The Technical Note also provides further evidence in relation to the likely reassignment of existing traffic onto the boulevard through the site. The tests have been undertaken to determine the minimum level of traffic reassignment required to achieve some betterment in operating conditions in the settlement centre as a consequence of the provision of the boulevard, even allowing for the additional development related traffic.
- 5.7 When compared with the base situation, the results of the sensitivity testing show that even based on just a 5% reassignment of traffic on to the proposed boulevard

through the site, the King Street/Accrington Road mini roundabout junction will operate marginally better during the 2018 predicted morning and evening peak hours with development traffic than is predicted within the 2018 base morning and evening peaks.

- 5.7 In addition on King Street itself, the sensitivity testing shows that even with the traffic reassignment as low as 5%, the total number of two-way vehicle movements on King Street between the two mini-roundabout junctions reduces.
- 5.8 Journey time analysis undertaken, based on the results of the operational assessments, shows that given the predicted future year delays on King Street, the proposed boulevard will offer an attractive alternative route to King Street for traffic travelling between Station Road and the A671 and will therefore clearly reduce traffic movements through Whalley settlement centre.
- 5.9 With regard to the likely traffic generation of the School the approach set out in this Technical Note is that which was previously agreed with LCC as part of the January 2012 application for the site. The combination of 340 houses coming forward through the full development of the Lawsonsteads site and the Co-Op residential development off Hayhurst Road, would account for approximately 57% of the pupil places at the proposed primary school, all of whom would be within easy walking distance of the site.
- 5.10 The remaining catchment is likely to come from the wider Whalley Primary School catchment area closest to the new school and as a result will result in a reduction in existing movements to the alternative Primary School site in Whalley as well as the school in Barrow. Any home-school-work car borne movements to existing schools will already be on the highway network and accounted for in the base traffic flows. As such there is not considered to be any specific need to take account of school generated traffic flows, and this was a position agreed with LCC as part of the January 2012 planning application.
- 5.11 In summary, this Technical Note presents additional technical analysis undertaken in response to points raised in relation to the original Transport Assessment by LCC Highways. It is once again concluded that based on the provision of the boulevard through the site and subject to the highway conditions set out in the original Transport Assessment there are no highway or transport-related reasons why these development proposals should not be granted planning permission.

BRYAN G HALL
CONSULTING CIVIL & TRANSPORTATION PLANNING ENGINEERS

Registered in England & Wales
Co No: 414802

VAT No: 399 4601 07

Registered Office

Suite E8 Joseph's Well
Hanover Walk
Leeds LS3 1AB

Telephone: 0113 246 1555

Email: highways@bryanghall.co.uk

London Office

Suite 11 Lighterman House
26-36 Wharfedale Road
London N1 9RY

Telephone: 0203 077 2162

Website: www.bryanghall.co.uk

APPENDIX BGH 1

Alex McGarrell

From: Stuart Wilkins
Sent: 22 April 2013 09:10
To: David.Watson@lancashire.gov.uk
Cc: Stephen.kilmartin@ribblevalley.gov.uk; Alex McGarrell; Sarah Wozencroft (nee Williams) (sarah.wozencroft@indigoplanning.com); Bernadette Woods (Bernadette.Woods@indigoplanning.com)
Subject: Lawsonsteads, Whalley

Follow Up Flag: Follow up
Flag Status: Flagged

David

Thank you for your email, dated 16th April 2013, which sets out the issues on which you require further technical evidence to allow you to formulate your highways response on the application to Ribble Valley Borough Council. As you'll appreciate the current development proposals are very similar in terms of land use and access arrangements to that assessed in the February 2011 application (determined at committee in January 2012) for full development on the site (indeed the quantum of development proposed then was more than that proposed by this current application). As you point out, on that occasion LCC were happy to acknowledge there was likely to be some benefit of the provision of a link road through the site and took that into account in reaching a final position on the application, which was one of no objection subject to conditions.

At our meeting on the 5th March 2013 we agreed a number of actions in relation to further technical work, and in the main the key issues and actions are reiterated in your email. As you'll appreciate we are very keen that a highways response is submitted to the planning authority, as soon as possible, particularly in light of the previous positive stance that highways have taken in relation to development of this site. Indeed it would seem unreasonable that the application could be deferred solely on the basis of a lack of a response on highways matters, particularly given that previously no objections have been raised.

Following your email and our subsequent discussions, we are in the process of compiling a comprehensive response on all the outstanding matters, and we will be in a position to report back to you on these points no later than Tuesday 23rd April. In considering the points you raise I have set out below our thoughts and how we intend to respond on each, as follows

Sensitivity Test

- With regard to any sensitivity testing of Mitton Road and Barrowlands developments I would note that neither of the current applications are supported by Ribble Valley Borough Council at the present time, by virtue of the officer recommendations on each and subsequent evidence that has been submitted in respect of the appeals. As such, there must therefore be a serious doubt as to whether either site will come forward and we certainly do not consider that our client's application should be delayed because of what the outcome may or not otherwise be on these sites. However, notwithstanding this we are prepared to undertake the sensitivity test requested, but in assessing their impact, in the absence of any other data, consider that we are duty bound to use the data that is contained within the respective Transport Assessments for the sites, and as such is in the public domain. Overall it is our view that whilst the inclusion of traffic from Mitton Road and Barrowlands will increase general traffic levels within Whalley, it will not materially change our view that the provision of the link road will result in a reduction in traffic flows on King Street and as such will leave conditions on the network better with the development traffic than it would be in the absence of development and the new link;

Link Road Reassignment

- In relation to providing further evidence in relation to the likely reassignment of existing traffic onto the link road, we have commissioned some limited am peak hour journey time surveys between Station Road and Accrington Road which we can compare with the likely journey times through Whalley when the link road is in place. This will go some way towards demonstrating the attractiveness of the link road when it is in place. However, as you know the thrust of our argument is that the traffic relief provided by the link road along King Street allows the development traffic likely to use King Street to be accommodated, leaving conditions no worse than they would be if the development does not come forward. Whilst these assessments are based on a 50% reassignment we will undertake some sensitivity testing to determine what level of reassignment we need to achieve to result in the nil detriment position. If we can demonstrate that a significantly less reassignment than that proposed in the TA would be required to achieve the nil detriment position then this will give the authority comfort that our arguments are sound, based on your view that there is clearly likely to be some benefit resulting from the link road. We will of course couple the sensitivity testing with the results of the journey time surveys.

King Street Parking Bays Scheme

- With regard to the provision of parking bays on King Street between Woodlands Drive and Brookside Close, as stated within the Transport Assessment and echoed above the reassignment of existing traffic to the link road mitigates the impact of the proposed development on King Street and therefore in our view no further mitigation is required. However, we stated in the Transport Assessment that clearly on street parking does, at times, result in the breakdown of the through follow of traffic on King Street, and that one way of dealing with this would be through the introduction of waiting restrictions and we stated we would support this approach. We acknowledge that the provision of parking bays would be an alternative approach to reducing the impact of parking on through movements. We do not necessarily agree at this stage that such a requirement is necessary or reasonable, however, in the event that the local planning authority takes an alternative view, the applicant would be prepared to accept a grampian style planning condition which would require the design and approval of a scheme to address parking on King Street (which might be either waiting restrictions or physical works) if necessary, the work for which could be secured through a Section 278 agreement.

Primary School

- In relation to the positioning and orientation of the primary school element of the development proposal, a revised illustrative masterplan is currently being prepared, which addresses the concerns raised by you at our meeting, and we will aim to submit this layout with our additional evidence. With regard to traffic associated specifically with the School, clearly in part the location of the school has the potential to attract a considerable number of 'walk in' trips both from our site, and also from the adjacent wider catchment within Whalley. In this current Transport Assessment we have adopted an identical methodology to trip generation that was previously accepted in relation to the January 2012 application. However, notwithstanding this we will look again at the school trip generation and provide further support to evidence the position taken.

Future Year Assessment

- In relation to the February 2011 application the Transport Assessment adopted a future year of 5 years after the date of application and this was agreed with LCC, this approach is in accordance with DfT guidance on Transport Assessment. The likely build out rate for the site is 5 years (50 dwellings per year). Given this we consider that the adopted assessment year of 2018 is wholly appropriate.

PRoW

- With regard to PRoW's, there is a public footpath which runs through the application site. The indicative masterplan demonstrates the retention of the public footpath, however should there be a requirement for any minor diversions we would seek to achieve these under the Town and Country Planning Act. Steve Williams the Senior Public Rights of Way Officer for the authority has responded on the application to the

planning authority and as far as I can see he has raised no objections in relation to the impact of the development on the alignment of ProW No 30 which crosses the site.

As I indicate above we are in the process of compiling a comprehensive response on all the outstanding matters, and we will be in a position to report back to you on the above points no later than Tuesday 23rd April, but I thought it worth it giving you a heads up on our intended response in advance of then.

Regards
Stuart

Stuart Wilkins
Associate

BRYAN G HALL

CONSULTING CIVIL & TRANSPORTATION PLANNING ENGINEERS

Suite E8 Josephs Well, Hanover Walk, LEEDS LS3 1AB
T 0113 246 1555 **F** 0113 234 2201 **M** 07713 383 941
E stuartwilkins@bryanghall.co.uk
W www.bryanghall.co.uk

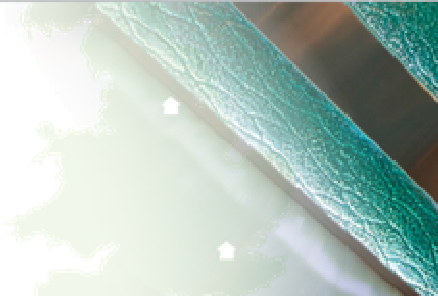
Registered in England and Wales
Company Number 4104802

BRYAN G HALL

CONSULTING CIVIL & TRANSPORTATION PLANNING ENGINEERS

Bryan G Hall Consulting Civil and Transportation Planning Engineers, based in Leeds and London, is a specialist Practice that operates throughout the UK and the Isle of Man delivering specialised consulting services to the development industry.

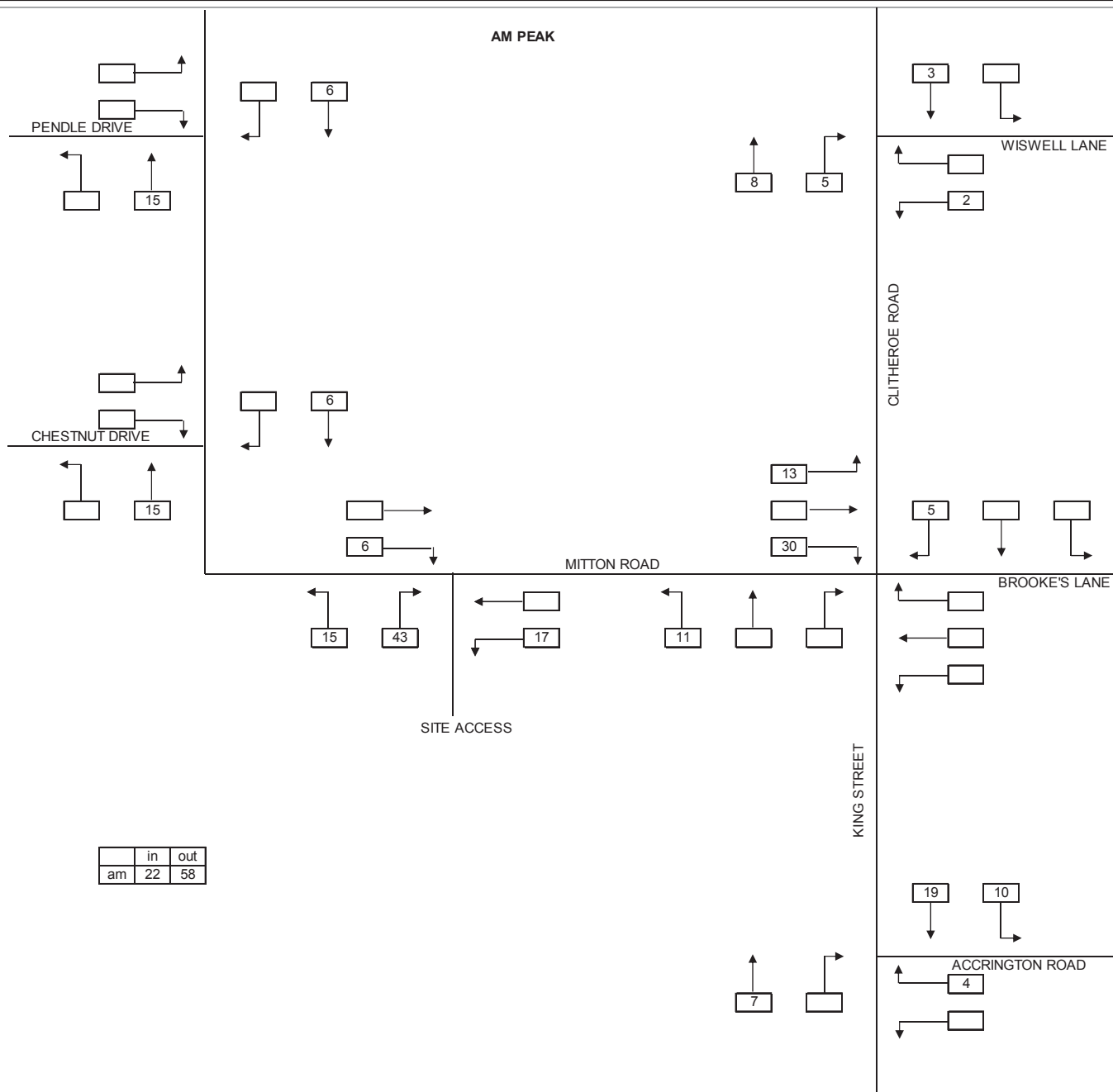
Click for more information about Bryan G Hall . . .

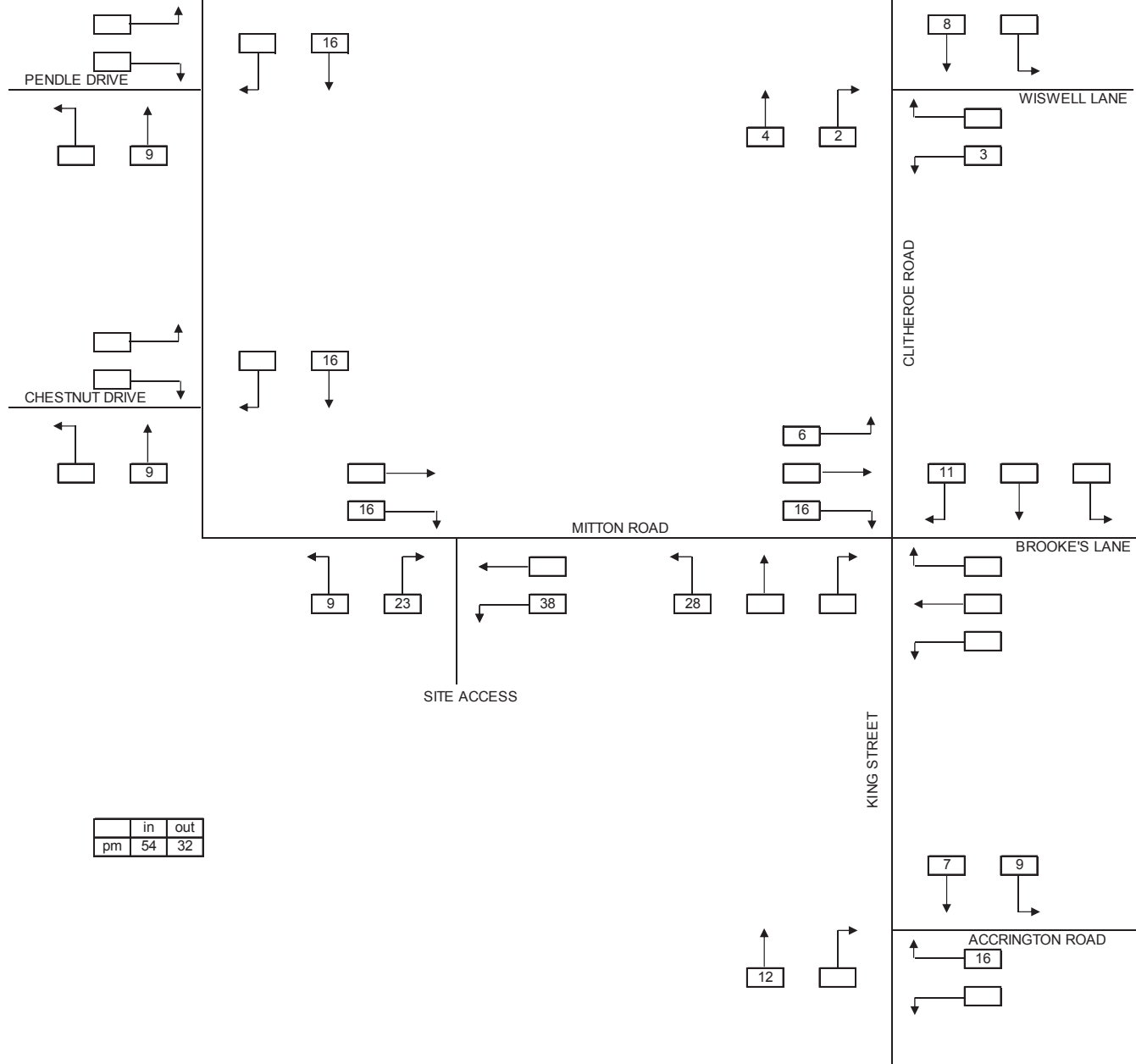


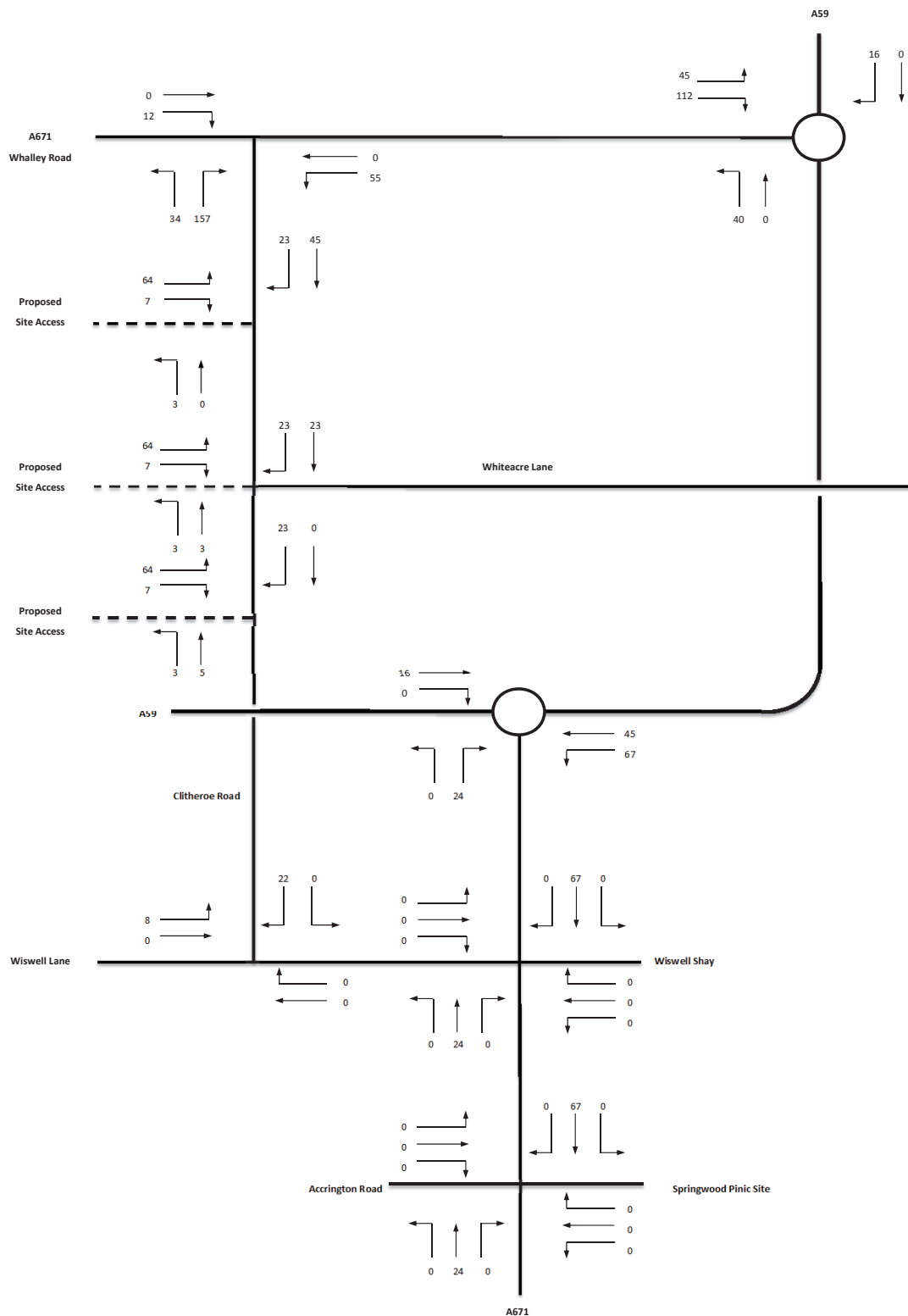
This email and any attachments are intended solely for the intended recipient and are strictly confidential, and may contain information that is privileged. If this email is received in error, please return it to the sender and then delete it. If you are not the intended recipient you are hereby notified that any review, dissemination, copying, disclosure, distribution of or other use of, or taking of any action in reliance upon, this email or attachments is strictly prohibited.

Although we routinely check for viruses, it is your responsibility to scan or otherwise check that this email and any attachments are virus free. Email transmissions cannot be guaranteed to be secure or error free and information could be intercepted, corrupted, lost, destroyed, arrive late or incomplete and Bryan G Hall does not accept responsibility or liability for any errors or omissions in the contents of this message or any attachment which arise as a result of the email transmission.

APPENDIX BGH 2







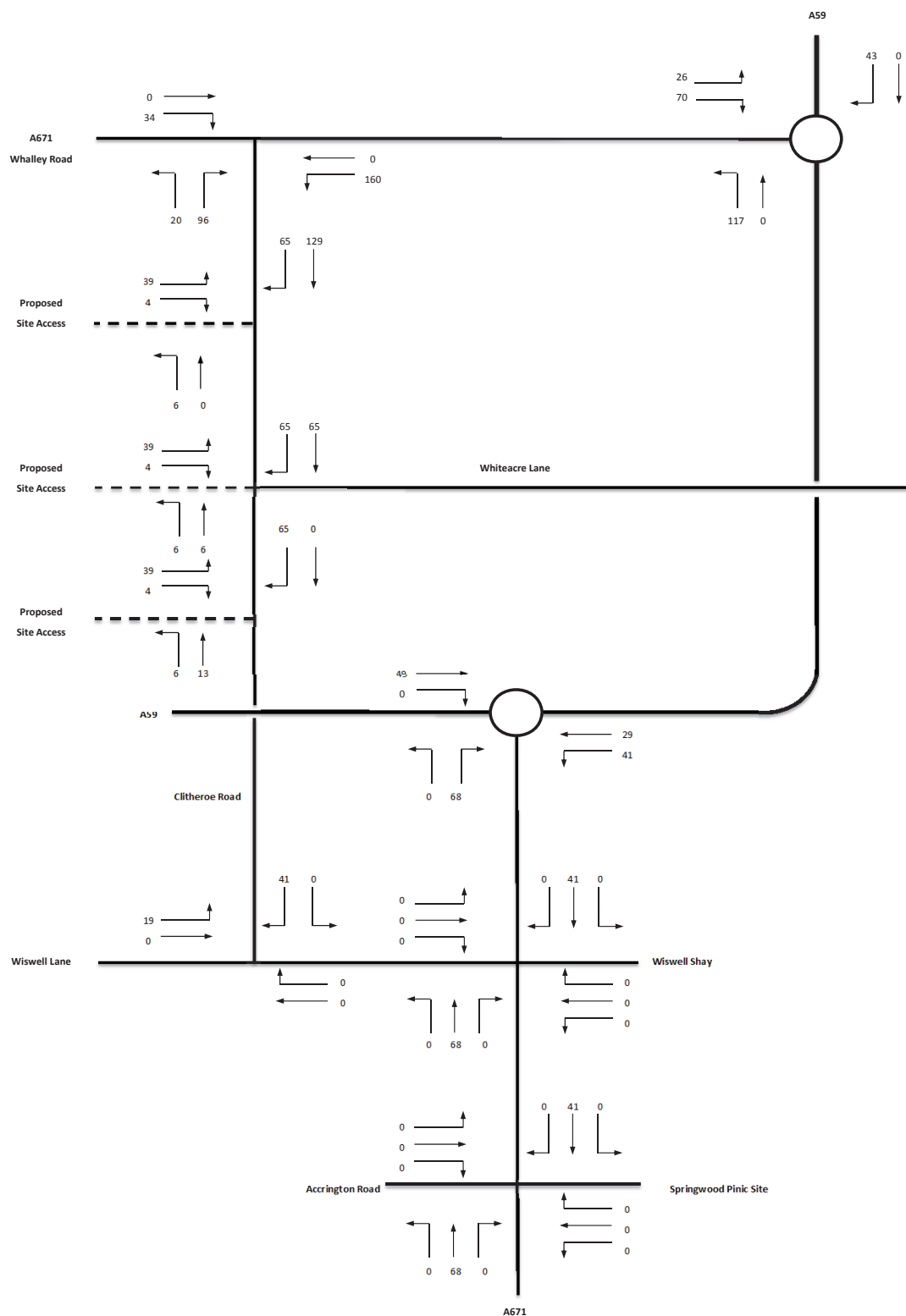
PCUs

Figure 7

Proposed Residential Trips (504 Units) (Weekday AM Peak Hour - 08:00-09:00 hrs)



3rd Floor Oxford Place, 61 Oxford Street, Manchester M1 6EQ. Tel: 0161 228 1008 www.vectos.co.uk



PCUs

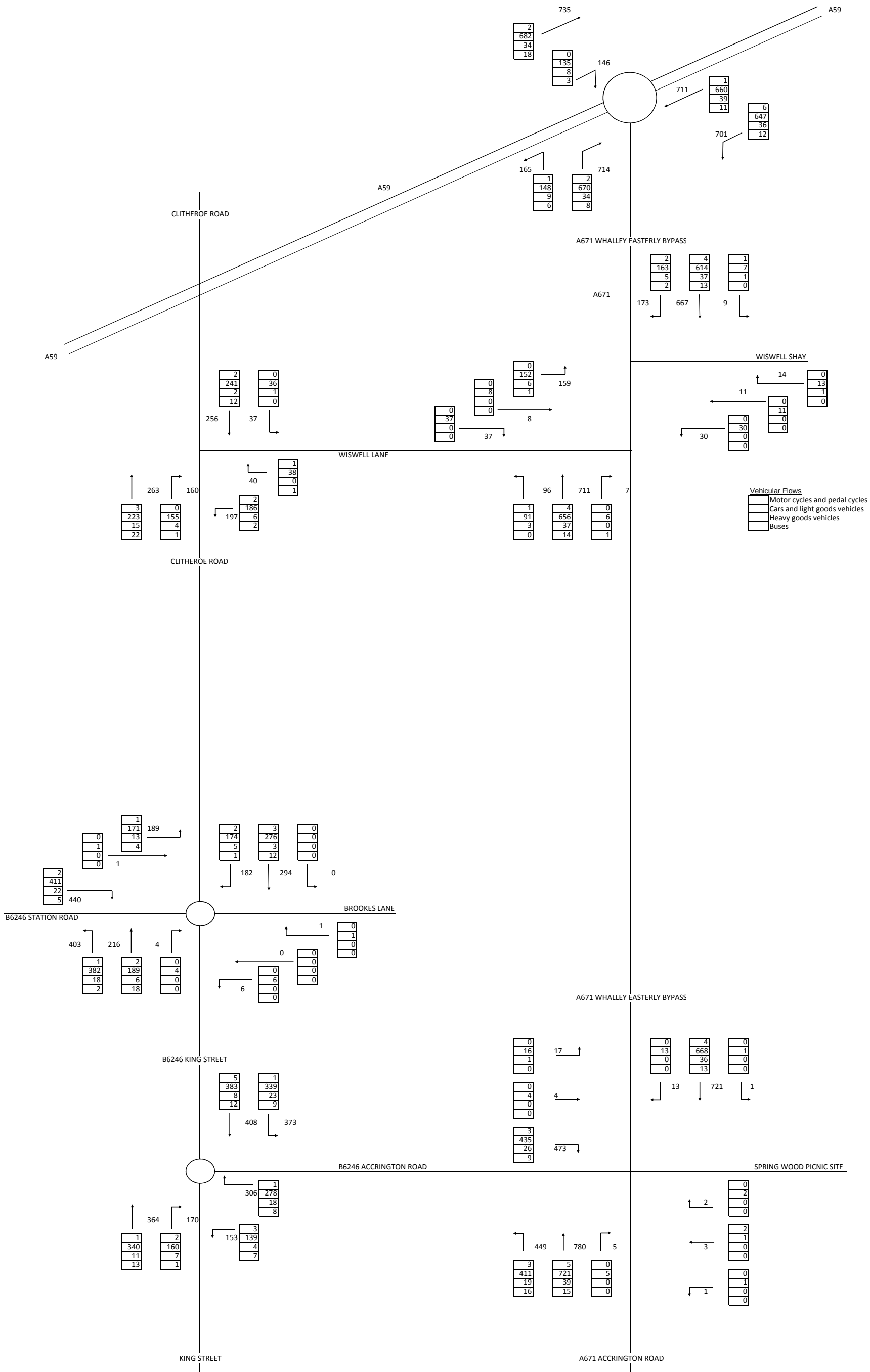
Figure 8 Proposed Residential Trips (504 Units) (Weekday PM Peak Hour (16:45-17:45))



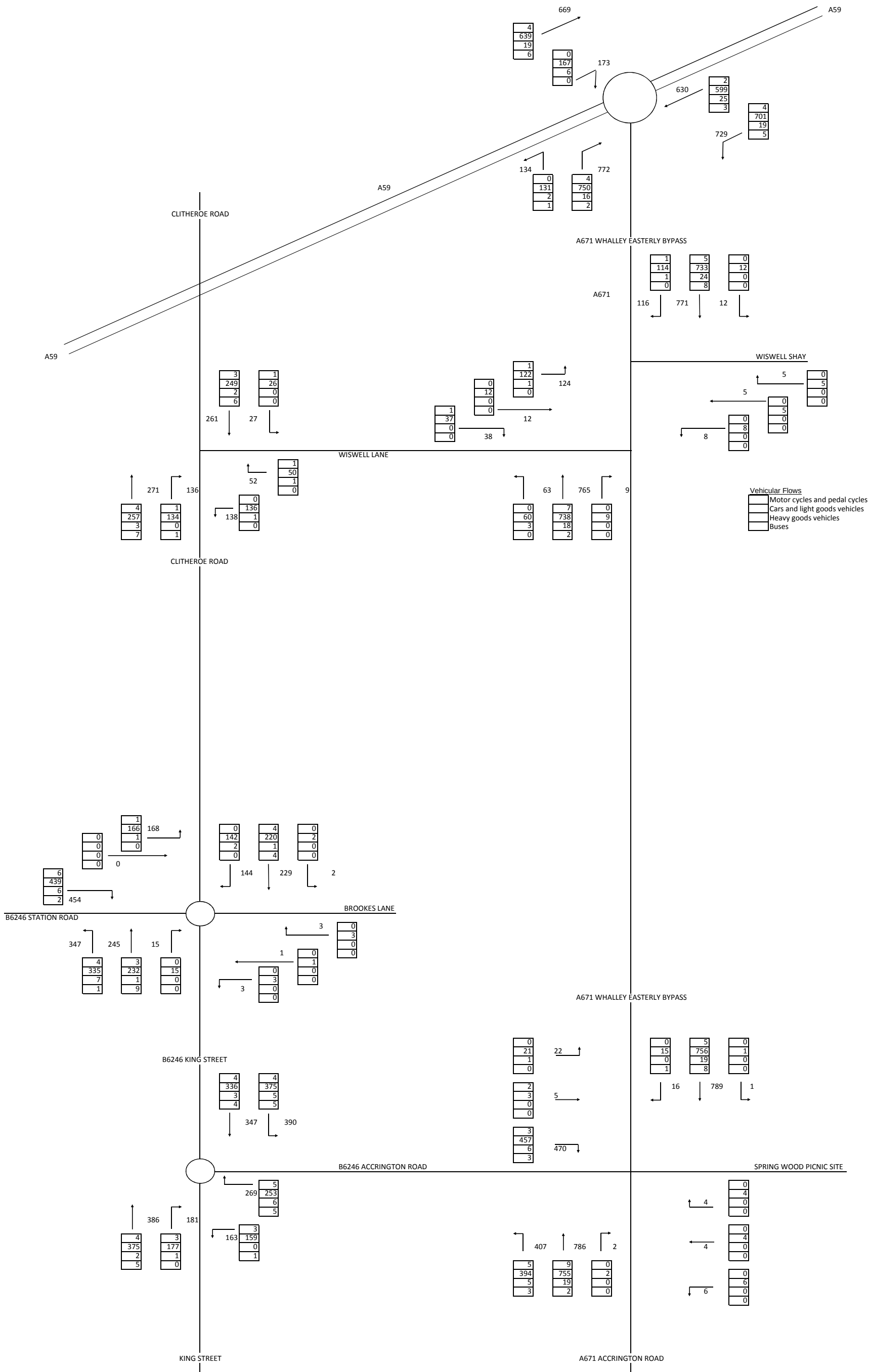
3rd Floor Oxford Place, 61 Oxford Street, Manchester M1 6EQ Tel: 0161 228 1008 www.vectos.co.uk

APPENDIX BGH 3

2018 BASE FLOWS (WITHOUT LINK ROAD) - SENSITIVITY TEST
LAWSONSTEADS, WHALLEY
8:00 am - 9:00 am



2018 BASE FLOWS (WITHOUT LINK ROAD) - SENSITIVITY TEST
LAWSONSTEADS, WHALLEY
4:30 pm - 5:30 pm



APPENDIX BGH 4

Junctions 8	
ARCADY 8 - Roundabout Module	
Version: 8.0.2.316 [14 Feb 2013] © Copyright TRL Limited, 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	
The users of this computer program for the solution of an engineering problem are in no way relieved of their responsibility for the correctness of the solution	

Filename: 2018 Predicted AM Assessment - Flat Profile (ST - 50%).arc8

Path: Y:\2010\10-226 to 10-250\10-228 CEG, Whalley\Techinca\TA - Jan 2013\Predicted Models - 'With Link Road' (260 Dwellings)\Sensitivity Test\ARCADY\Clitheroe Road-Brookes Lane-King Street-Station Road

Report generation date: 25/04/2013 12:38:14

Summary of junction performance

	AM Peak (ST)			
	Queue (Veh)	Delay (min)	RFC	LOS
Existing Layout - 2018 Base				
Arm A	32.27	4.13	1.04	F
Arm B	0.05	0.45	0.05	D
Arm C	6.87	0.70	0.88	E
Arm D	7.65	0.77	0.90	E

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

"D2 - 2018 Base, AM Peak (ST) " model duration: 08:00 - 09:00

"D3 - 2018 Predicted, AM Peak (ST)" model duration: 08:00 - 09:00

Run using Junctions 8.0.2.316 at 25/04/2013 12:38:13

File summary

File Description

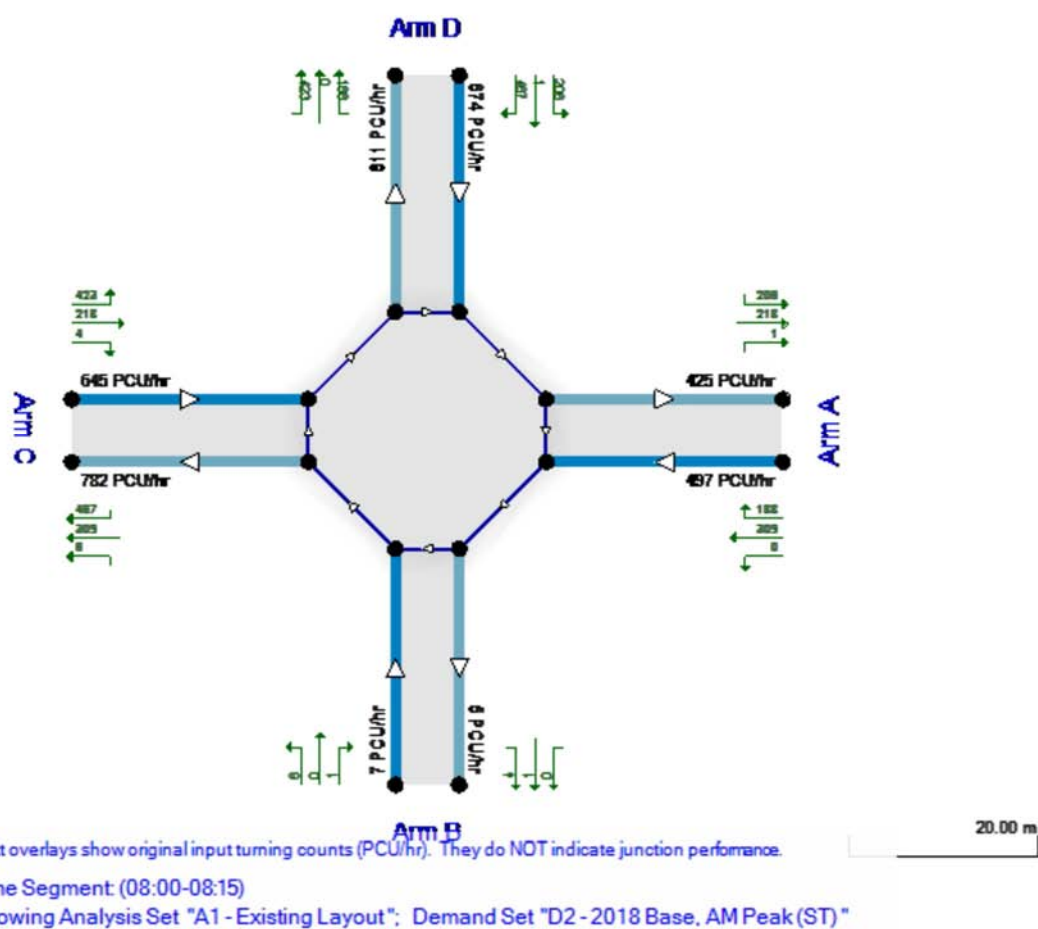
Title	2018 Base & Predicted Assessment - Sensitivity Test (50% Reassignment)
Location	Clitheroe Road-Brookes Lane-King Street-Station Road
Site Number	
Date	25/04/2013
Version	
Status	Completed
Identifier	
Client	CEG
Jobnumber	10/228
Enumerator	A McGarrell
Description	

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	Veh	Veh	perHour	min	-Min	perMin



The junction diagram reflects the last run of ARCADY.

Existing Layout - 2018 Base, AM Peak (ST)

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
Existing Layout	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
2018 Base, AM Peak (ST)	2018 Base	AM Peak (ST)		FLAT	08:00	09:00	60	15				✓		

Junction Network

Junctions

Name	Junction Type	Arm Order	Junction Delay (min)	Junction LOS
untitled	Mini-roundabout	A,B,C,D	1.66	F

Junction Network Options

Driving Side	Lighting	Road Surface	In London
Left	Normal/unknown	Normal/unknown	

Arms

Arms

Arm	Name	Description
A	Clitheroe Road	
B	Brookes Lane	
C	King Street	
D	Station Road	

Capacity Options

Arm	Minimum Capacity (PCU/hr)	Maximum Capacity (PCU/hr)	Assume Flat Start Profile	Initial Queue (PCU)
A	0.00	99999.00		0.00
B	0.00	99999.00		0.00
C	0.00	99999.00		0.00
D	0.00	99999.00		0.00

Mini Roundabout Geometry

Arm	Approach road half-width (m)	Minimum approach road half-width (m)	Entry width (m)	Effective flare length (m)	Distance to next arm (m)	Entry corner kerb line distance (m)	Gradient over 50m (%)	Kerbed central island
A	3.10	3.10	3.10	0.00	10.96	3.98	-2.40	
B	2.40	2.40	3.30	0.01	14.52	5.33	-2.40	
C	3.00	3.00	4.50	2.31	13.75	10.37	3.00	
D	3.00	3.00	3.40	1.13	16.41	13.20	2.50	

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

Pedestrian Crossings

Arm	Crossing Type
A	None
B	None
C	None
D	None

Slope / Intercept / Capacity

Roundabout Slope and Intercept used in model

Arm	Enter slope and intercept directly	Entered slope	Entered intercept (PCU/hr)	Final Slope	Final Intercept (PCU/hr)
A		(calculated)	(calculated)	0.629	772.308
B		(calculated)	(calculated)	0.595	696.183
C		(calculated)	(calculated)	0.683	852.697
D		(calculated)	(calculated)	0.658	899.081

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

Arm	Profile Type	Use Turning Counts	Average Demand Flow (Veh/hr)	Flow Scaling Factor (%)
A	FLAT	✓	476.00	100.000
B	FLAT	✓	7.00	100.000
C	FLAT	✓	623.00	100.000
D	FLAT	✓	630.00	100.000

Turning Proportions

Turning Counts or Proportions (Veh/hr) - Junction 1 (for whole period)

	To				
From		A	B	C	D
	A	0.000	0.000	294.000	182.000
	B	1.000	0.000	6.000	0.000
	C	216.000	4.000	0.000	403.000
	D	189.000	1.000	440.000	0.000

Turning Proportions (Veh) - Junction 1 (for whole period)

	To				
From		A	B	C	D
	A	0.00	0.00	0.62	0.38
	B	0.14	0.00	0.86	0.00
	C	0.35	0.01	0.00	0.65
	D	0.30	0.00	0.70	0.00

Vehicle Mix

Average PCU Per Vehicle - Junction 1 (for whole period)

	To				
From		A	B	C	D
	A	1.000	1.000	1.051	1.033
	B	1.000	1.000	1.000	1.000
	C	1.011	1.000	1.000	1.050
	D	1.090	1.000	1.061	1.000

Heavy Vehicle Percentages - Junction 1 (for whole period)

	To				
From		A	B	C	D
	A	0.000	0.000	5.100	3.300
	B	0.000	0.000	0.000	0.000
	C	1.110	0.000	0.000	4.960
	D	8.990	0.000	6.140	0.000

Results

Results Summary for whole modelled period

Arm	Max RFC	Max Delay (min)	Max Queue (Veh)	Max LOS	Average Demand (Veh/hr)	Total Junction Arrivals (Veh)	Total Queueing Delay (Veh-min)	Average Queueing Delay (min)	Rate Of Queueing Delay (Veh-min/min)	Inclusive Total Queueing Delay (Veh-min)	Inclusive Average Queueing Delay (min)
A	1.04	4.13	32.27	F	476.00	476.00	1122.73	2.36	18.71	1191.29	2.50
B	0.05	0.45	0.05	D	7.00	7.00	2.88	0.41	0.05	2.88	0.41
C	0.88	0.70	6.87	E	623.00	623.00	353.24	0.57	5.89	355.25	0.57
D	0.90	0.77	7.65	E	630.00	630.00	388.21	0.62	6.47	390.71	0.62

Main Results for each time segment

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

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Entry Flow (Veh/hr)	Exit Flow (Veh/hr)	Circulating Flow (Veh/hr)	Pedestrian Demand (Ped/hr)	Capacity (Veh/hr)	Saturation Capacity (Veh/hr)	RFC	Start Queue (Veh)	End Queue (Veh)	Delay (min)	LOS
A	476.00	119.00	429.20	391.22	428.17	0.00	465.89	434.28	1.022	0.00	11.70	1.141	F
B	7.00	1.75	6.82	4.82	852.55	0.00	162.39	128.48	0.043	0.00	0.04	0.385	C
C	623.00	155.75	601.06	694.29	165.08	0.00	710.65	697.87	0.877	0.00	5.48	0.480	D
D	630.00	157.50	606.16	552.92	213.23	0.00	707.84	675.90	0.890	0.00	5.96	0.509	D

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

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Entry Flow (Veh/hr)	Exit Flow (Veh/hr)	Circulating Flow (Veh/hr)	Pedestrian Demand (Ped/hr)	Capacity (Veh/hr)	Saturation Capacity (Veh/hr)	RFC	Start Queue (Veh)	End Queue (Veh)	Delay (min)	LOS
A	476.00	119.00	445.76	403.70	442.22	0.00	456.90	434.28	1.042	11.70	19.26	2.393	F
B	7.00	1.75	6.98	4.97	883.01	0.00	143.33	128.48	0.049	0.04	0.05	0.440	D
C	623.00	155.75	619.78	718.55	171.43	0.00	706.33	697.87	0.882	5.48	6.29	0.649	E
D	630.00	157.50	626.06	571.35	219.86	0.00	703.72	675.90	0.895	5.96	6.95	0.709	E

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

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Entry Flow (Veh/hr)	Exit Flow (Veh/hr)	Circulating Flow (Veh/hr)	Pedestrian Demand (Ped/hr)	Capacity (Veh/hr)	Saturation Capacity (Veh/hr)	RFC	Start Queue (Veh)	End Queue (Veh)	Delay (min)	LOS
A	476.00	119.00	449.16	404.95	443.73	0.00	455.94	434.28	1.044	19.26	25.97	3.296	F
B	7.00	1.75	6.99	4.99	887.91	0.00	140.27	128.48	0.050	0.05	0.05	0.450	D
C	623.00	155.75	621.53	722.16	172.74	0.00	705.44	697.87	0.883	6.29	6.66	0.681	E
D	630.00	157.50	628.21	573.79	220.48	0.00	703.33	675.90	0.896	6.95	7.39	0.750	E

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

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Entry Flow (Veh/hr)	Exit Flow (Veh/hr)	Circulating Flow (Veh/hr)	Pedestrian Demand (Ped/hr)	Capacity (Veh/hr)	Saturation Capacity (Veh/hr)	RFC	Start Queue (Veh)	End Queue (Veh)	Delay (min)	LOS
A	476.00	119.00	450.81	405.39	444.27	0.00	455.60	434.28	1.045	25.97	32.27	4.127	F
B	7.00	1.75	7.00	4.99	890.08	0.00	138.92	128.48	0.050	0.05	0.05	0.455	D
C	623.00	155.75	622.14	723.71	173.37	0.00	705.01	697.87	0.884	6.66	6.87	0.696	E
D	630.00	157.50	628.96	574.81	220.70	0.00	703.20	675.90	0.896	7.39	7.65	0.768	E

Queueing Delay Results for each time segment**Queueing Delay results: (08:00-08:15)**

Arm	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (min)	Unsignalised Level Of Service	Signalised Level Of Service
A	111.26	7.42	1.141	F	E
B	0.61	0.04	0.385	C	C
C	64.75	4.32	0.480	D	C
D	69.23	4.62	0.509	D	C

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

Arm	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (min)	Unsignalised Level Of Service	Signalised Level Of Service
A	234.25	15.62	2.393	F	F
B	0.73	0.05	0.440	D	C
C	89.39	5.96	0.649	E	D
D	98.04	6.54	0.709	E	D

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

Arm	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (min)	Unsignalised Level Of Service	Signalised Level Of Service
A	340.02	22.67	3.296	F	F
B	0.77	0.05	0.450	D	C
C	97.45	6.50	0.681	E	D
D	107.92	7.19	0.750	E	D

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

Arm	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (min)	Unsignalised Level Of Service	Signalised Level Of Service
A	437.20	29.15	4.127	F	F
B	0.78	0.05	0.455	D	C
C	101.65	6.78	0.696	E	D
D	113.02	7.53	0.768	E	D

Junctions 8	
ARCADY 8 - Roundabout Module	
Version: 8.0.2.316 [14 Feb 2013] © Copyright TRL Limited, 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	
The users of this computer program for the solution of an engineering problem are in no way relieved of their responsibility for the correctness of the solution	

Filename: 2018 Predicted PM Assessment - Flat Profile (ST - 50%).arc8

Path: Y:\2010\10-226 to 10-250\10-228 CEG, Whalley\Techinca\TA - Jan 2013\Predicted Models - 'With Link Road' (260 Dwellings)\Sensitivity Test\ARCADY\Clitheroe Road-Brookes Lane-King Street-Station Road

Report generation date: 25/04/2013 12:39:04

Summary of junction performance

	PM Peak (ST)			
	Queue (Veh)	Delay (min)	RFC	LOS
Existing Layout - 2018 Base				
Arm A	3.97	0.66	0.81	E
Arm B	0.04	0.32	0.04	C
Arm C	4.75	0.49	0.83	D
Arm D	6.46	0.65	0.88	E

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

"D2 - 2018 Base, PM Peak (ST) " model duration: 16:30 - 17:30

"D3 - 2018 Predicted, PM Peak (ST)" model duration: 16:30 - 17:30

Run using Junctions 8.0.2.316 at 25/04/2013 12:39:03

File summary

File Description

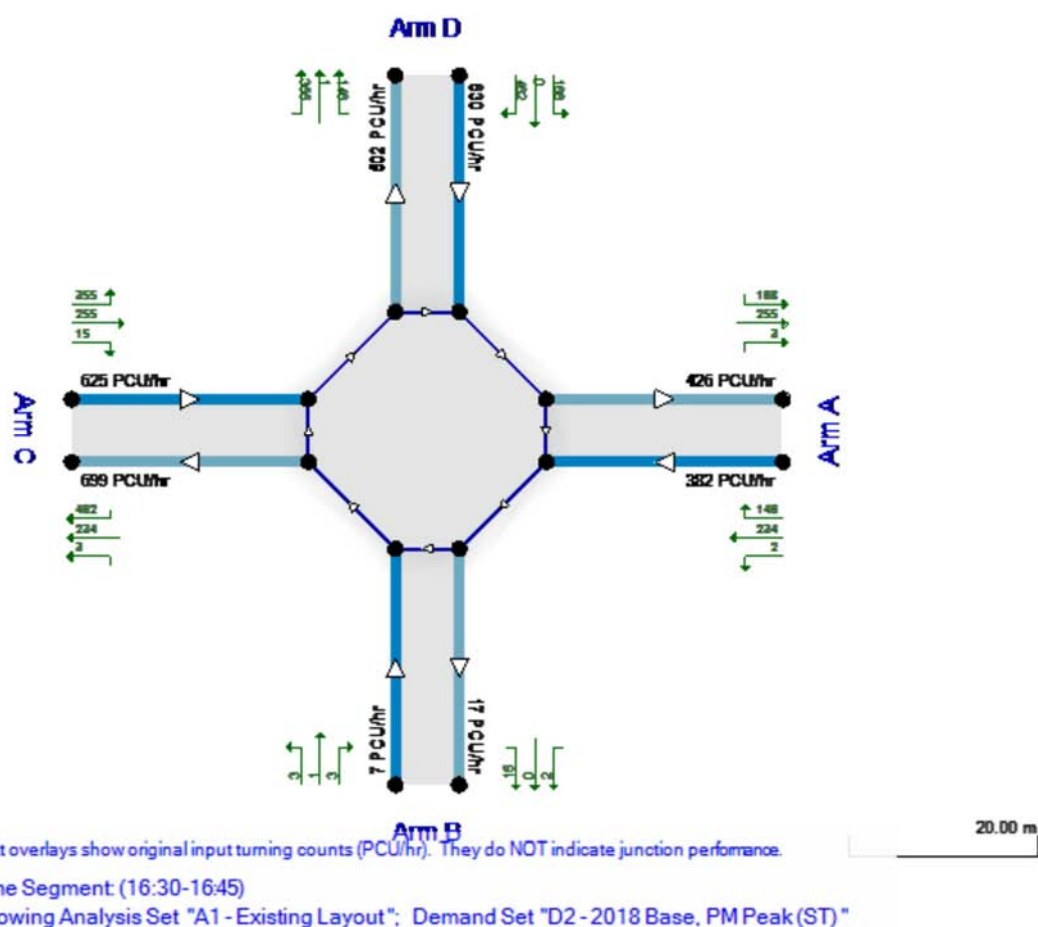
Title	2018 Base and Predicted Assessment - Sensitivity Test (50% Reassignment)
Location	Clitheroe Road-Brookes Lane-King Street-Station Road
Site Number	
Date	25/04/2013
Version	
Status	Completed
Identifier	
Client	CEG
Jobnumber	10/228
Enumerator	A McGarrell
Description	

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	Veh	Veh	perHour	min	-Min	perMin



The junction diagram reflects the last run of ARCADY.

Existing Layout - 2018 Base, PM Peak (ST)

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
Existing Layout	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
2018 Base, PM Peak (ST)	2018 Base	PM Peak (ST)		FLAT	16:30	17:30	60	15				✓		

Junction Network

Junctions

Name	Junction Type	Arm Order	Junction Delay (min)	Junction LOS
untitled	Mini-roundabout	A,B,C,D	0.59	E

Junction Network Options

Driving Side	Lighting	Road Surface	In London
Left	Normal/unknown	Normal/unknown	

Arms

Arms

Arm	Name	Description
A	Clitheroe Road	
B	Brookes Lane	
C	King Street	
D	Station Road	

Capacity Options

Arm	Minimum Capacity (PCU/hr)	Maximum Capacity (PCU/hr)	Assume Flat Start Profile	Initial Queue (PCU)
A	0.00	99999.00		0.00
B	0.00	99999.00		0.00
C	0.00	99999.00		0.00
D	0.00	99999.00		0.00

Mini Roundabout Geometry

Arm	Approach road half-width (m)	Minimum approach road half-width (m)	Entry width (m)	Effective flare length (m)	Distance to next arm (m)	Entry corner kerb line distance (m)	Gradient over 50m (%)	Kerbed central island
A	3.10	3.10	3.10	0.00	10.96	3.98	-2.40	
B	2.40	2.40	3.30	0.01	14.52	5.33	-2.40	
C	3.00	3.00	4.50	2.31	13.75	10.37	3.00	
D	3.00	3.00	3.40	1.13	16.41	13.20	2.50	

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

Pedestrian Crossings

Arm	Crossing Type
A	None
B	None
C	None
D	None

Slope / Intercept / Capacity

Roundabout Slope and Intercept used in model

Arm	Enter slope and intercept directly	Entered slope	Entered intercept (PCU/hr)	Final Slope	Final Intercept (PCU/hr)
A		(calculated)	(calculated)	0.629	772.308
B		(calculated)	(calculated)	0.595	696.183
C		(calculated)	(calculated)	0.683	852.697
D		(calculated)	(calculated)	0.658	899.081

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

Arm	Profile Type	Use Turning Counts	Average Demand Flow (Veh/hr)	Flow Scaling Factor (%)
A	FLAT	✓	375.00	100.000
B	FLAT	✓	7.00	100.000
C	FLAT	✓	607.00	100.000
D	FLAT	✓	622.00	100.000

Turning Proportions

Turning Counts or Proportions (Veh/hr) - Junction 1 (for whole period)

	To				
From		A	B	C	D
	A	0.000	2.000	229.000	144.000
	B	3.000	0.000	3.000	1.000
	C	245.000	15.000	0.000	347.000
	D	168.000	0.000	454.000	0.000

Turning Proportions (Veh) - Junction 1 (for whole period)

	To				
From		A	B	C	D
	A	0.00	0.01	0.61	0.38
	B	0.43	0.00	0.43	0.14
	C	0.40	0.02	0.00	0.57
	D	0.27	0.00	0.73	0.00

Vehicle Mix

Average PCU Per Vehicle - Junction 1 (for whole period)

	To				
From		A	B	C	D
	A	1.000	1.000	1.022	1.014
	B	1.000	1.000	1.000	1.000
	C	1.041	1.000	1.000	1.023
	D	1.000	1.000	1.018	1.000

Heavy Vehicle Percentages - Junction 1 (for whole period)

	To				
From		A	B	C	D
	A	0.000	0.000	2.180	1.390
	B	0.000	0.000	0.000	0.000
	C	4.080	0.000	0.000	2.300
	D	0.000	0.000	1.760	0.000

Results

Results Summary for whole modelled period

Arm	Max RFC	Max Delay (min)	Max Queue (Veh)	Max LOS	Average Demand (Veh/hr)	Total Junction Arrivals (Veh)	Total Queueing Delay (Veh-min)	Average Queueing Delay (min)	Rate Of Queueing Delay (Veh-min/min)	Inclusive Total Queueing Delay (Veh-min)	Inclusive Average Queueing Delay (min)
A	0.81	0.66	3.97	E	375.00	375.00	209.13	0.56	3.49	210.15	0.56
B	0.04	0.32	0.04	C	7.00	7.00	2.10	0.30	0.03	2.10	0.30
C	0.83	0.49	4.75	D	607.00	607.00	257.49	0.42	4.29	258.42	0.43
D	0.88	0.65	6.46	E	622.00	622.00	336.06	0.54	5.60	337.82	0.54

Main Results for each time segment

Main results: (16:30-16:45)

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Entry Flow (Veh/hr)	Exit Flow (Veh/hr)	Circulating Flow (Veh/hr)	Pedestrian Demand (Ped/hr)	Capacity (Veh/hr)	Saturation Capacity (Veh/hr)	RFC	Start Queue (Veh)	End Queue (Veh)	Delay (min)	LOS
A	375.00	93.75	362.00	403.53	453.23	0.00	473.34	445.80	0.792	0.00	3.25	0.494	D
B	7.00	1.75	6.87	16.52	798.71	0.00	212.53	136.55	0.033	0.00	0.03	0.292	C
C	607.00	151.75	590.33	662.65	142.93	0.00	732.02	661.19	0.829	0.00	4.17	0.388	C
D	622.00	155.50	600.96	477.46	255.81	0.00	715.21	658.64	0.870	0.00	5.26	0.464	D

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

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Entry Flow (Veh/hr)	Exit Flow (Veh/hr)	Circulating Flow (Veh/hr)	Pedestrian Demand (Ped/hr)	Capacity (Veh/hr)	Saturation Capacity (Veh/hr)	RFC	Start Queue (Veh)	End Queue (Veh)	Delay (min)	LOS
A	375.00	93.75	373.17	414.62	466.84	0.00	464.79	445.80	0.807	3.25	3.71	0.632	E
B	7.00	1.75	6.99	16.95	823.05	0.00	197.78	136.55	0.035	0.03	0.04	0.314	C
C	607.00	151.75	605.53	682.76	147.29	0.00	729.09	661.19	0.833	4.17	4.53	0.473	D
D	622.00	155.50	619.09	490.46	262.37	0.00	710.78	658.64	0.875	5.26	5.99	0.617	E

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

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Entry Flow (Veh/hr)	Exit Flow (Veh/hr)	Circulating Flow (Veh/hr)	Pedestrian Demand (Ped/hr)	Capacity (Veh/hr)	Saturation Capacity (Veh/hr)	RFC	Start Queue (Veh)	End Queue (Veh)	Delay (min)	LOS
A	375.00	93.75	374.31	415.44	468.10	0.00	464.00	445.80	0.808	3.71	3.88	0.654	E
B	7.00	1.75	7.00	16.98	825.43	0.00	196.35	136.55	0.036	0.04	0.04	0.317	C
C	607.00	151.75	606.43	684.69	147.74	0.00	728.79	661.19	0.833	4.53	4.68	0.482	D
D	622.00	155.50	620.78	491.41	262.75	0.00	710.52	658.64	0.875	5.99	6.29	0.642	E

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

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Entry Flow (Veh/hr)	Exit Flow (Veh/hr)	Circulating Flow (Veh/hr)	Pedestrian Demand (Ped/hr)	Capacity (Veh/hr)	Saturation Capacity (Veh/hr)	RFC	Start Queue (Veh)	End Queue (Veh)	Delay (min)	LOS
A	375.00	93.75	374.64	415.70	468.50	0.00	463.75	445.80	0.809	3.88	3.97	0.662	E
B	7.00	1.75	7.00	16.99	826.15	0.00	195.91	136.55	0.036	0.04	0.04	0.318	C
C	607.00	151.75	606.70	685.29	147.86	0.00	728.71	661.19	0.833	4.68	4.75	0.486	D
D	622.00	155.50	621.33	491.69	262.87	0.00	710.44	658.64	0.876	6.29	6.46	0.653	E

Queueing Delay Results for each time segment**Queueing Delay results: (16:30-16:45)**

Arm	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (min)	Unsignalised Level Of Service	Signalised Level Of Service
A	40.10	2.67	0.494	D	C
B	0.47	0.03	0.292	C	B
C	51.72	3.45	0.388	C	C
D	62.62	4.17	0.464	D	C

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

Arm	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (min)	Unsignalised Level Of Service	Signalised Level Of Service
A	52.99	3.53	0.632	E	D
B	0.53	0.04	0.314	C	B
C	65.81	4.39	0.473	D	C
D	85.35	5.69	0.617	E	D

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

Arm	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (min)	Unsignalised Level Of Service	Signalised Level Of Service
A	57.10	3.81	0.654	E	D
B	0.55	0.04	0.317	C	B
C	69.20	4.61	0.482	D	C
D	92.35	6.16	0.642	E	D

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

Arm	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (min)	Unsignalised Level Of Service	Signalised Level Of Service
A	58.94	3.93	0.662	E	D
B	0.55	0.04	0.318	C	B
C	70.75	4.72	0.486	D	C
D	95.73	6.38	0.653	E	D

Junctions 8				
ARCADY 8 - Roundabout Module				
Version: 8.0.2.316 [14 Feb 2013] © Copyright TRL Limited, 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				
The users of this computer program for the solution of an engineering problem are in no way relieved of their responsibility for the correctness of the solution				

Filename: 2018 Predicted AM Assessment - Flat Profile (ST - 50%).arc8

Path: Y:\2010\10-226 to 10-250\10-228 CEG, Whalley\Techinca\TA - Jan 2013\Predicted Models - 'With Link Road' (260 Dwellings)\Sensitivity

Test\ARCADY\B6246 King Street-Accrington Road-King Street

Report generation date: 25/04/2013 12:39:31

Summary of junction performance

	AM Peak (ST)			
	Queue (Veh)	Delay (min)	RFC	LOS
Existing Layout - 2018 Base				
Arm A	120.55	9.72	1.17	F
Arm B	4.26	0.58	0.82	D
Arm C	7.18	0.85	0.89	F

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

"D2 - 2018 Base, AM Peak (ST)" model duration: 08:00 - 09:00

"D3 - 2018 Predicted, AM Peak (ST)" model duration: 08:00 - 09:00

Run using Junctions 8.0.2.316 at 25/04/2013 12:39:30

File summary

File Description

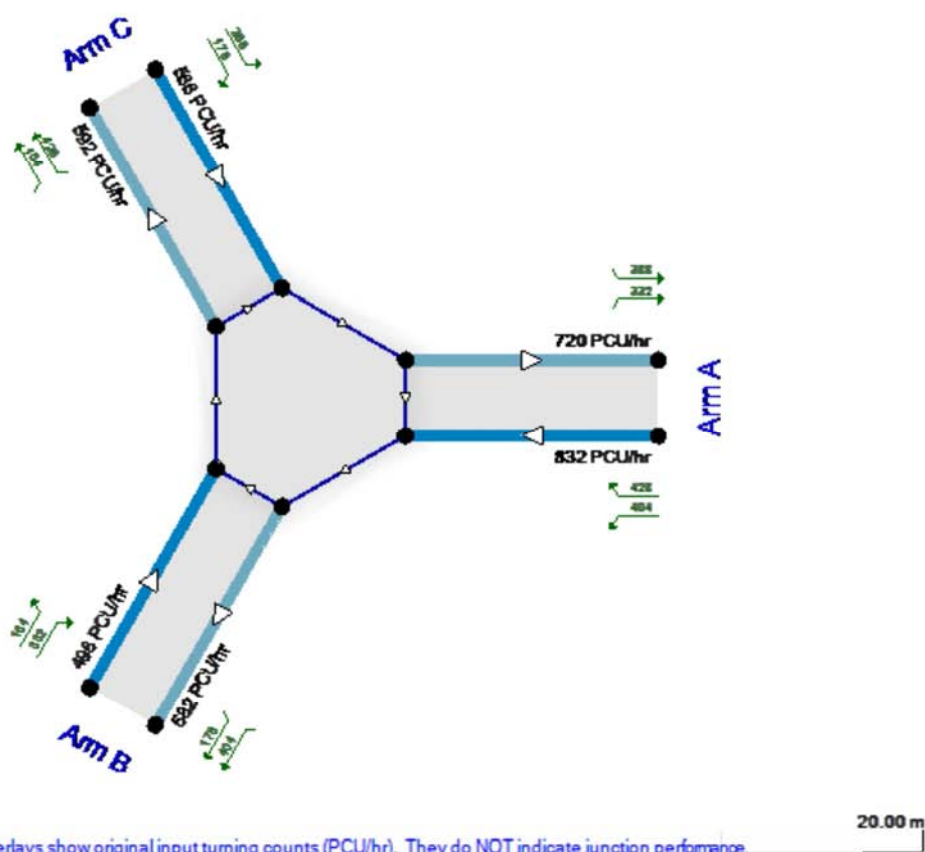
Title	2018 Base & Predicted Assessment - Sensitivity Test (50% Reassignment)
Location	B6246 King Street-Accrington Road-King Street
Site Number	
Date	25/04/2013
Version	
Status	Completed
Identifier	
Client	CEG
Jobnumber	10/228
Enumerator	A McGarrell
Description	

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	Veh	Veh	perHour	min	-Min	perMin



The junction diagram reflects the last run of ARCADY.

Existing Layout - 2018 Base, AM Peak (ST)

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
Existing Layout	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
2018 Base, AM Peak (ST)	2018 Base	AM Peak (ST)		FLAT	08:00	09:00	60	15				✓		

Junction Network

Junctions

Name	Junction Type	Arm Order	Junction Delay (min)	Junction LOS
untitled	Mini-roundabout	A,B,C	4.68	F

Junction Network Options

Driving Side	Lighting	Road Surface	In London
Left	Normal/unknown	Normal/unknown	

Arms

Arms

Arm	Name	Description
A	B6246 King Street	
B	B6246 Accrington Road	
C	King Street	

Capacity Options

Arm	Minimum Capacity (PCU/hr)	Maximum Capacity (PCU/hr)	Assume Flat Start Profile	Initial Queue (PCU)
A	0.00	99999.00		0.00
B	0.00	99999.00		0.00
C	0.00	99999.00		0.00

Mini Roundabout Geometry

Arm	Approach road half-width (m)	Minimum approach road half-width (m)	Entry width (m)	Effective flare length (m)	Distance to next arm (m)	Entry corner kerb line distance (m)	Gradient over 50m (%)	Kerbed central island
A	3.70	3.70	3.70	0.00	13.90	12.60	0.00	
B	3.70	3.70	4.55	3.10	12.40	7.10	0.00	
C	3.30	3.30	3.65	5.80	16.00	15.50	0.00	

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

Pedestrian Crossings

Arm	Crossing Type
A	None
B	None
C	None

Slope / Intercept / Capacity

Roundabout Slope and Intercept used in model

Arm	Enter slope and intercept directly	Entered slope	Entered intercept (PCU/hr)	Final Slope	Final Intercept (PCU/hr)
A		(calculated)	(calculated)	0.553	806.665
B		(calculated)	(calculated)	0.563	811.282
C		(calculated)	(calculated)	0.594	832.868

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

Arm	Profile Type	Use Turning Counts	Average Demand Flow (Veh/hr)	Flow Scaling Factor (%)
A	FLAT	✓	781.00	100.000

B	FLAT	✓	459.00	100.000
C	FLAT	✓	534.00	100.000

Turning Proportions

Turning Counts or Proportions (Veh/hr) - Junction 1 (for whole period)

	To			
		A	B	C
From	A	0.000	373.000	408.000
	B	306.000	0.000	153.000
	C	364.000	170.000	0.000

Turning Proportions (Veh) - Junction 1 (for whole period)

	To			
		A	B	C
From	A	0.00	0.48	0.52
	B	0.67	0.00	0.33
	C	0.68	0.32	0.00

Vehicle Mix

Average PCU Per Vehicle - Junction 1 (for whole period)

	To			
		A	B	C
From	A	1.000	1.083	1.049
	B	1.085	1.000	1.072
	C	1.066	1.047	1.000

Heavy Vehicle Percentages - Junction 1 (for whole period)

	To			
		A	B	C
From	A	0.000	8.310	4.900
	B	8.500	0.000	7.190
	C	6.590	4.700	0.000

Results

Results Summary for whole modelled period

Arm	Max RFC	Max Delay (min)	Max Queue (Veh)	Max LOS	Average Demand (Veh/hr)	Total Junction Arrivals (Veh)	Total Queueing Delay (Veh-min)	Average Queueing Delay (min)	Rate Of Queueing Delay (Veh-min/min)	Inclusive Total Queueing Delay (Veh-min)	Inclusive Average Queueing Delay (min)
A	1.17	9.72	120.55	F	781.00	781.00	3729.71	4.78	62.16	4385.38	5.62
B	0.82	0.58	4.26	D	459.00	459.00	228.87	0.50	3.81	229.84	0.50
C	0.89	0.85	7.18	F	534.00	534.00	361.02	0.68	6.02	363.60	0.68

Main Results for each time segment

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

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Entry Flow (Veh/hr)	Exit Flow (Veh/hr)	Circulating Flow (Veh/hr)	Pedestrian Demand (Ped/hr)	Capacity (Veh/hr)	Saturation Capacity (Veh/hr)	RFC	Start Queue (Veh)	End Queue (Veh)	Delay (min)	LOS
A	781.00	195.25	648.93	645.29	163.02	0.00	668.58	660.68	1.168	0.00	33.02	1.739	F
B	459.00	114.75	444.35	472.94	339.00	0.00	565.62	562.27	0.812	0.00	3.66	0.452	D
C	534.00	133.50	512.08	487.12	296.23	0.00	605.54	557.69	0.882	0.00	5.48	0.554	D

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

--	--	--	--	--	--	--	--	--	--	--	--	--	--

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Entry Flow (Veh/hr)	Exit Flow (Veh/hr)	Circulating Flow (Veh/hr)	Pedestrian Demand (Ped/hr)	Capacity (Veh/hr)	Saturation Capacity (Veh/hr)	RFC	Start Queue (Veh)	End Queue (Veh)	Delay (min)	LOS
A	781.00	195.25	663.81	666.29	168.74	0.00	665.47	660.68	1.174	33.02	62.31	4.519	F
B	459.00	114.75	457.48	485.77	346.78	0.00	561.38	562.27	0.818	3.66	4.04	0.561	D
C	534.00	133.50	530.04	499.28	304.99	0.00	600.21	557.69	0.890	5.48	6.47	0.781	E

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

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Entry Flow (Veh/hr)	Exit Flow (Veh/hr)	Circulating Flow (Veh/hr)	Pedestrian Demand (Ped/hr)	Capacity (Veh/hr)	Saturation Capacity (Veh/hr)	RFC	Start Queue (Veh)	End Queue (Veh)	Delay (min)	LOS
A	781.00	195.25	664.43	668.40	169.43	0.00	665.10	660.68	1.174	62.31	91.46	7.114	F
B	459.00	114.75	458.43	486.76	347.10	0.00	561.20	562.27	0.818	4.04	4.19	0.573	D
C	534.00	133.50	532.21	499.92	305.62	0.00	599.82	557.69	0.890	6.47	6.92	0.829	E

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

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Entry Flow (Veh/hr)	Exit Flow (Veh/hr)	Circulating Flow (Veh/hr)	Pedestrian Demand (Ped/hr)	Capacity (Veh/hr)	Saturation Capacity (Veh/hr)	RFC	Start Queue (Veh)	End Queue (Veh)	Delay (min)	LOS
A	781.00	195.25	664.60	669.10	169.67	0.00	664.96	660.68	1.175	91.46	120.55	9.721	F
B	459.00	114.75	458.70	487.08	347.20	0.00	561.15	562.27	0.818	4.19	4.26	0.578	D
C	534.00	133.50	532.97	500.10	305.80	0.00	599.71	557.69	0.890	6.92	7.18	0.852	F

Queueing Delay Results for each time segment

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

Arm	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (min)	Unsignalised Level Of Service	Signalised Level Of Service
A	270.56	18.04	1.739	F	F
B	45.20	3.01	0.452	D	C
C	63.50	4.23	0.554	D	C

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

Arm	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (min)	Unsignalised Level Of Service	Signalised Level Of Service
A	715.57	47.70	4.519	F	F
B	58.40	3.89	0.561	D	C
C	90.88	6.06	0.781	E	D

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

Arm	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (min)	Unsignalised Level Of Service	Signalised Level Of Service
A	1153.43	76.90	7.114	F	F
B	61.86	4.12	0.573	D	C
C	100.78	6.72	0.829	E	D

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

Arm	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (min)	Unsignalised Level Of Service	Signalised Level Of Service
A	1590.14	106.01	9.721	F	F
B	63.40	4.23	0.578	D	C
C	105.87	7.06	0.852	F	D

Junctions 8				
ARCADY 8 - Roundabout Module				
Version: 8.0.2.316 [14 Feb 2013] © Copyright TRL Limited, 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				
The users of this computer program for the solution of an engineering problem are in no way relieved of their responsibility for the correctness of the solution				

Filename: 2018 Predicted PM Assessment - Flat Profile (ST - 50%).arc8

Path: Y:\2010\10-226 to 10-250\10-228 CEG, Whalley\Techinca\TA - Jan 2013\Predicted Models - 'With Link Road' (260 Dwellings)\Sensitivity Test\ARCADY\B6246 King Street-Accrington Road-King Street

Report generation date: 25/04/2013 12:40:05

Summary of junction performance

	PM Peak (ST)			
	Queue (Veh)	Delay (min)	RFC	LOS
Existing Layout - 2018 Base				
Arm A	57.47	4.66	1.07	F
Arm B	2.38	0.34	0.71	C
Arm C	5.76	0.64	0.86	E

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

"D2 - 2018 Base, PM Peak (ST)" model duration: 16:30 - 17:30

"D3 - 2018 Predicted, PM Peak (ST)" model duration: 16:30 - 17:30

Run using Junctions 8.0.2.316 at 25/04/2013 12:40:04

File summary

File Description

Title	2018 Base & Predicted Assessment - Sensitivity Test (50% Reassignment)
Location	B6246 King Street-Accrington Road-King Street
Site Number	
Date	25/04/2013
Version	
Status	Completed
Identifier	
Client	CEG
Jobnumber	10/228
Enumerator	A McGarrell
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	Veh	Veh	perHour	min	-Min	perMin

Name	Junction Type	Arm Order	Junction Delay (min)	Junction LOS
untitled	Mini-roundabout	A,B,C	2.27	F

Junction Network Options

Driving Side	Lighting	Road Surface	In London
Left	Normal/unknown	Normal/unknown	

Arms

Arms

Arm	Name	Description
A	B6246 King Street	
B	B6246 Accrington Road	
C	King Street	

Capacity Options

Arm	Minimum Capacity (PCU/hr)	Maximum Capacity (PCU/hr)	Assume Flat Start Profile	Initial Queue (PCU)
A	0.00	99999.00		0.00
B	0.00	99999.00		0.00
C	0.00	99999.00		0.00

Mini Roundabout Geometry

Arm	Approach road half-width (m)	Minimum approach road half-width (m)	Entry width (m)	Effective flare length (m)	Distance to next arm (m)	Entry corner kerb line distance (m)	Gradient over 50m (%)	Kerbed central island
A	3.70	3.70	3.70	0.00	13.90	12.60	0.00	
B	3.70	3.70	4.55	3.10	12.40	7.10	0.00	
C	3.30	3.30	3.65	5.80	16.00	15.50	0.00	

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

Pedestrian Crossings

Arm	Crossing Type
A	None
B	None
C	None

Slope / Intercept / Capacity

Roundabout Slope and Intercept used in model

Arm	Enter slope and intercept directly	Entered slope	Entered intercept (PCU/hr)	Final Slope	Final Intercept (PCU/hr)
A		(calculated)	(calculated)	0.553	806.665
B		(calculated)	(calculated)	0.563	811.282
C		(calculated)	(calculated)	0.594	832.868

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

Arm	Profile Type	Use Turning Counts	Average Demand Flow (Veh/hr)	Flow Scaling Factor (%)
A	FLAT	✓	737.00	100.000

B	FLAT	✓	432.00	100.000
C	FLAT	✓	567.00	100.000

Turning Proportions

Turning Counts or Proportions (Veh/hr) - Junction 1 (for whole period)

	To			
		A	B	C
From	A	0.000	390.000	347.000
	B	269.000	0.000	163.000
	C	386.000	181.000	0.000

Turning Proportions (Veh) - Junction 1 (for whole period)

	To			
		A	B	C
From	A	0.00	0.53	0.47
	B	0.62	0.00	0.38
	C	0.68	0.32	0.00

Vehicle Mix

Average PCU Per Vehicle - Junction 1 (for whole period)

	To			
		A	B	C
From	A	1.000	1.026	1.020
	B	1.041	1.000	1.000
	C	1.018	1.000	1.000

Heavy Vehicle Percentages - Junction 1 (for whole period)

	To			
		A	B	C
From	A	0.000	2.560	2.020
	B	4.090	0.000	0.000
	C	1.810	0.000	0.000

Results

Results Summary for whole modelled period

Arm	Max RFC	Max Delay (min)	Max Queue (Veh)	Max LOS	Average Demand (Veh/hr)	Total Junction Arrivals (Veh)	Total Queueing Delay (Veh-min)	Average Queueing Delay (min)	Rate Of Queueing Delay (Veh-min/min)	Inclusive Total Queueing Delay (Veh-min)	Inclusive Average Queueing Delay (min)
A	1.07	4.66	57.47	F	737.00	737.00	1920.61	2.61	32.01	2064.06	2.80
B	0.71	0.34	2.38	C	432.00	432.00	133.42	0.31	2.22	133.70	0.31
C	0.86	0.64	5.76	E	567.00	567.00	303.56	0.54	5.06	305.07	0.54

Main Results for each time segment

Main results: (16:30-16:45)

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Entry Flow (Veh/hr)	Exit Flow (Veh/hr)	Circulating Flow (Veh/hr)	Pedestrian Demand (Ped/hr)	Capacity (Veh/hr)	Saturation Capacity (Veh/hr)	RFC	Start Queue (Veh)	End Queue (Veh)	Delay (min)	LOS
A	737.00	184.25	659.75	636.47	174.86	0.00	693.92	686.54	1.062	0.00	19.31	1.128	F
B	432.00	108.00	423.27	523.98	310.63	0.00	617.28	610.23	0.700	0.00	2.18	0.297	C
C	567.00	141.75	547.76	470.34	263.57	0.00	661.62	590.46	0.857	0.00	4.81	0.469	D

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

--	--	--	--	--	--	--	--	--	--	--	--	--	--

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Entry Flow (Veh/hr)	Exit Flow (Veh/hr)	Circulating Flow (Veh/hr)	Pedestrian Demand (Ped/hr)	Capacity (Veh/hr)	Saturation Capacity (Veh/hr)	RFC	Start Queue (Veh)	End Queue (Veh)	Delay (min)	LOS
A	737.00	184.25	683.52	653.09	180.25	0.00	691.00	686.54	1.067	19.31	32.68	2.521	F
B	432.00	108.00	431.48	541.95	321.82	0.00	611.02	610.23	0.707	2.18	2.31	0.332	C
C	567.00	141.75	564.66	484.63	268.68	0.00	658.50	590.46	0.861	4.81	5.40	0.609	E

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

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Entry Flow (Veh/hr)	Exit Flow (Veh/hr)	Circulating Flow (Veh/hr)	Pedestrian Demand (Ped/hr)	Capacity (Veh/hr)	Saturation Capacity (Veh/hr)	RFC	Start Queue (Veh)	End Queue (Veh)	Delay (min)	LOS
A	737.00	184.25	686.74	654.24	180.69	0.00	690.76	686.54	1.067	32.68	45.24	3.608	F
B	432.00	108.00	431.83	544.10	323.34	0.00	610.17	610.23	0.708	2.31	2.35	0.335	C
C	567.00	141.75	566.04	486.27	268.89	0.00	658.37	590.46	0.861	5.40	5.63	0.629	E

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

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Entry Flow (Veh/hr)	Exit Flow (Veh/hr)	Circulating Flow (Veh/hr)	Pedestrian Demand (Ped/hr)	Capacity (Veh/hr)	Saturation Capacity (Veh/hr)	RFC	Start Queue (Veh)	End Queue (Veh)	Delay (min)	LOS
A	737.00	184.25	688.10	654.59	180.83	0.00	690.69	686.54	1.067	45.24	57.47	4.660	F
B	432.00	108.00	431.91	544.96	323.98	0.00	609.81	610.23	0.708	2.35	2.38	0.336	C
C	567.00	141.75	566.48	486.95	268.95	0.00	658.34	590.46	0.861	5.63	5.76	0.637	E

Queueing Delay Results for each time segment

Queueing Delay results: (16:30-16:45)

Arm	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (min)	Unsignalised Level Of Service	Signalised Level Of Service
A	173.22	11.55	1.128	F	E
B	28.95	1.93	0.297	C	B
C	57.69	3.85	0.469	D	C

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

Arm	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (min)	Unsignalised Level Of Service	Signalised Level Of Service
A	391.67	26.11	2.521	F	F
B	33.95	2.26	0.332	C	B
C	77.36	5.16	0.609	E	D

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

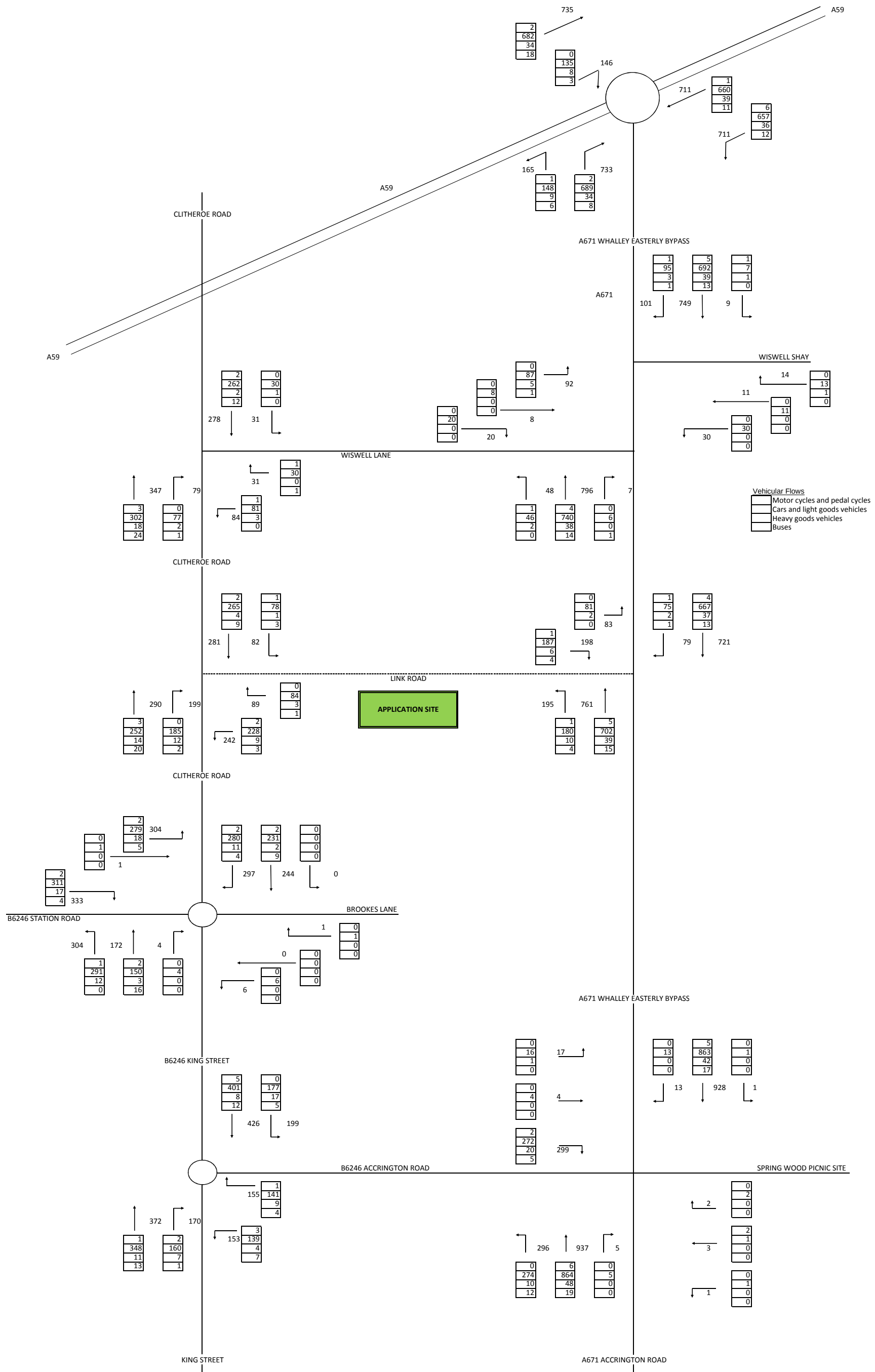
Arm	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (min)	Unsignalised Level Of Service	Signalised Level Of Service
A	585.06	39.00	3.608	F	F
B	35.04	2.34	0.335	C	C
C	82.93	5.53	0.629	E	D

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

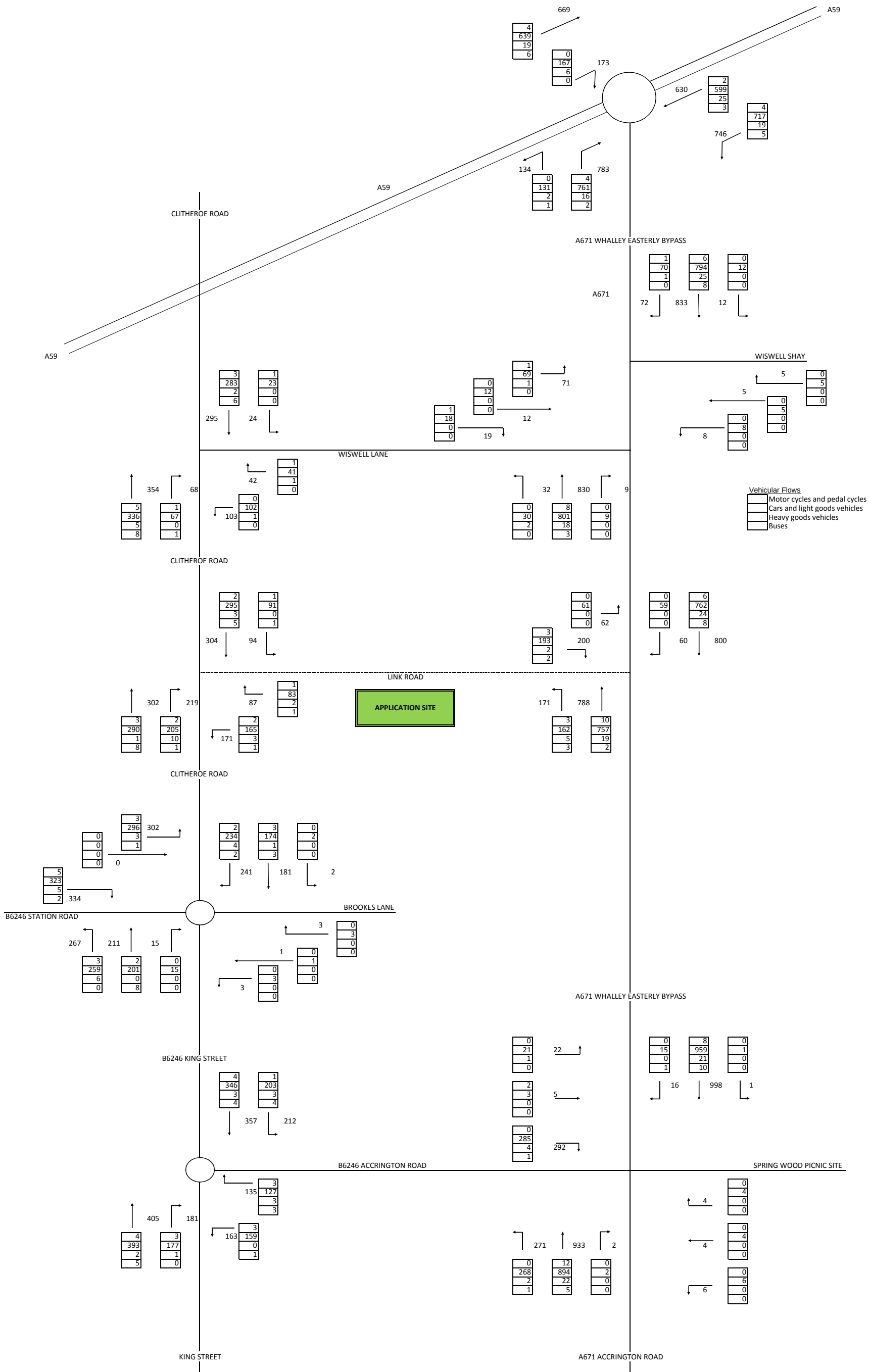
Arm	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (min)	Unsignalised Level Of Service	Signalised Level Of Service
A	770.66	51.38	4.660	F	F
B	35.49	2.37	0.336	C	C
C	85.58	5.71	0.637	E	D

APPENDIX BGH 5

2018 PREDICTED FLOWS (WITH LINK ROAD) - SENSITIVITY TEST
LAWSONSTEADS, WHALLEY
8:00 am - 9:00 am



2018 PREDICTED FLOWS (WITH LINK ROAD) - SENSITIVITY TEST
LAWSONSTEADS, WHALLEY
4:30 pm - 5:30 pm



APPENDIX BGH 6

Junctions 8				
ARCADY 8 - Roundabout Module				
Version: 8.0.2.316 [14 Feb 2013] © Copyright TRL Limited, 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				
The users of this computer program for the solution of an engineering problem are in no way relieved of their responsibility for the correctness of the solution				

Filename: 2018 Predicted AM Assessment - Flat Profile (ST - 50%).arc8

Path: Y:\2010\10-226 to 10-250\10-228 CEG, Whalley\Techincal\TA - Jan 2013\Predicted Models - 'With Link Road' (260 Dwellings)\Sensitivity

Test\ARCADY\Clitheroe Road-Brookes Lane-King Street-Station Road

Report generation date: 25/04/2013 12:41:05

Summary of junction performance

	AM Peak (ST)			
	Queue (Veh)	Delay (min)	RFC	LOS
Existing Layout - 2018 Predicted				
Arm A	30.47	3.43	1.03	F
Arm B	0.04	0.38	0.04	C
Arm C	3.55	0.46	0.79	D
Arm D	7.16	0.71	0.89	E

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

"D2 - 2018 Base, AM Peak (ST)" model duration: 08:00 - 09:00

"D3 - 2018 Predicted, AM Peak (ST)" model duration: 08:00 - 09:00

Run using Junctions 8.0.2.316 at 25/04/2013 12:41:04

File summary

File Description

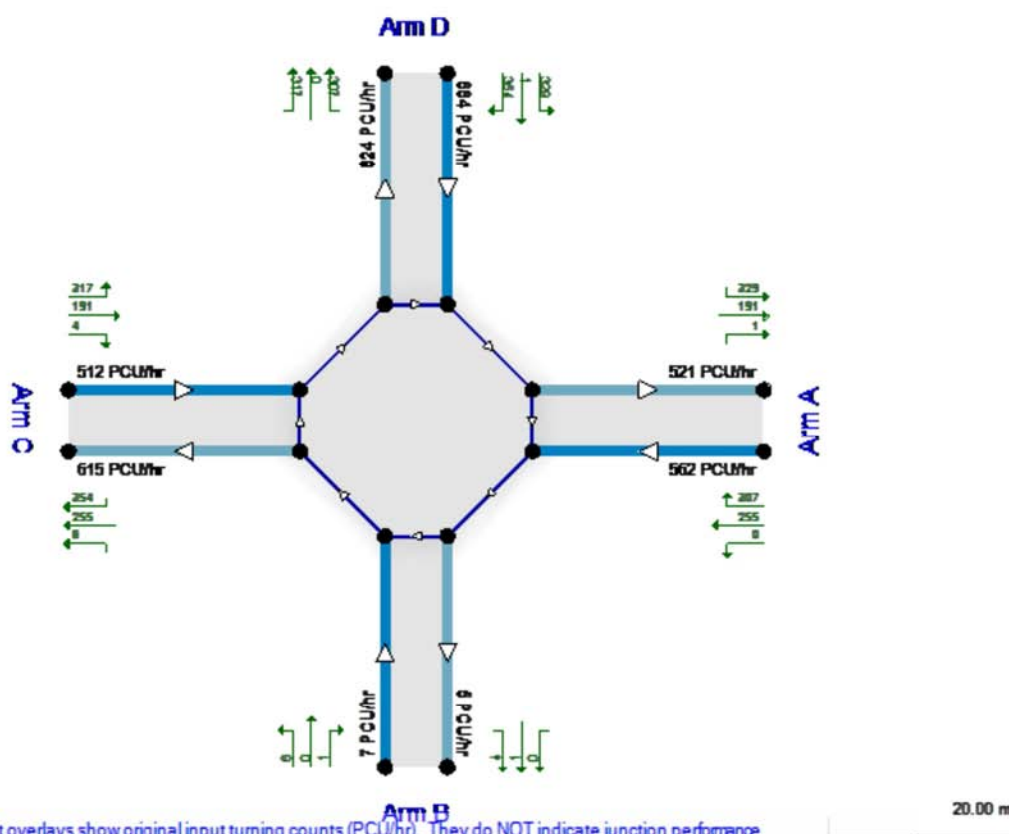
Title	2018 Base & Predicted Assessment - Sensitivity Test (50% Reassignment)
Location	Clitheroe Road-Brookes Lane-King Street-Station Road
Site Number	
Date	25/04/2013
Version	
Status	Completed
Identifier	
Client	CEG
Jobnumber	10/228
Enumerator	A McGarrell
Description	

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	Veh	Veh	perHour	min	-Min	perMin



The junction diagram reflects the last run of ARCADY.

Existing Layout - 2018 Predicted, AM Peak (ST)

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
Existing Layout	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
2018 Predicted, AM Peak (ST)	2018 Predicted	AM Peak (ST)		FLAT	08:00	09:00	60	15				✓		

Junction Network

Junctions

Name	Junction Type	Arm Order	Junction Delay (min)	Junction LOS
untitled	Mini-roundabout	A,B,C,D	1.50	F

Junction Network Options

Driving Side	Lighting	Road Surface	In London
Left	Normal/unknown	Normal/unknown	

Arms

Arms

Arm	Name	Description
A	Clitheroe Road	
B	Brookes Lane	
C	King Street	
D	Station Road	

Capacity Options

Arm	Minimum Capacity (PCU/hr)	Maximum Capacity (PCU/hr)	Assume Flat Start Profile	Initial Queue (PCU)
A	0.00	99999.00		0.00
B	0.00	99999.00		0.00
C	0.00	99999.00		0.00
D	0.00	99999.00		0.00

Mini Roundabout Geometry

Arm	Approach road half-width (m)	Minimum approach road half-width (m)	Entry width (m)	Effective flare length (m)	Distance to next arm (m)	Entry corner kerb line distance (m)	Gradient over 50m (%)	Kerbed central island
A	3.10	3.10	3.10	0.00	10.96	3.98	-2.40	
B	2.40	2.40	3.30	0.01	14.52	5.33	-2.40	
C	3.00	3.00	4.50	2.31	13.75	10.37	3.00	
D	3.00	3.00	3.40	1.13	16.41	13.20	2.50	

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

Pedestrian Crossings

Arm	Crossing Type
A	None
B	None
C	None
D	None

Slope / Intercept / Capacity

Roundabout Slope and Intercept used in model

Arm	Enter slope and intercept directly	Entered slope	Entered intercept (PCU/hr)	Final Slope	Final Intercept (PCU/hr)
A		(calculated)	(calculated)	0.629	772.308
B		(calculated)	(calculated)	0.595	696.183
C		(calculated)	(calculated)	0.683	852.697
D		(calculated)	(calculated)	0.658	899.081

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

Arm	Profile Type	Use Turning Counts	Average Demand Flow (Veh/hr)	Flow Scaling Factor (%)
A	FLAT	✓	541.00	100.000
B	FLAT	✓	7.00	100.000

C	FLAT	✓	480.00	100.000
D	FLAT	✓	638.00	100.000

Turning Proportions

Turning Counts or Proportions (Veh/hr) - Junction 1 (for whole period)

		To			
		A	B	C	D
From	A	0.000	0.000	244.000	297.000
	B	1.000	0.000	6.000	0.000
	C	172.000	4.000	0.000	304.000
	D	304.000	1.000	333.000	0.000

Turning Proportions (Veh) - Junction 1 (for whole period)

		To			
		A	B	C	D
From	A	0.00	0.00	0.45	0.55
	B	0.14	0.00	0.86	0.00
	C	0.36	0.01	0.00	0.63
	D	0.48	0.00	0.52	0.00

Vehicle Mix

Average PCU Per Vehicle - Junction 1 (for whole period)

		To			
		A	B	C	D
From	A	1.000	1.000	1.046	1.034
	B	1.000	1.000	1.000	1.000
	C	1.111	1.000	1.000	1.044
	D	1.082	1.000	1.063	1.000

Heavy Vehicle Percentages - Junction 1 (for whole period)

		To			
		A	B	C	D
From	A	0.000	0.000	4.640	3.370
	B	0.000	0.000	0.000	0.000
	C	11.060	0.000	0.000	4.350
	D	8.170	0.000	6.260	0.000

Results

Results Summary for whole modelled period

Arm	Max RFC	Max Delay (min)	Max Queue (Veh)	Max LOS	Average Demand (Veh/hr)	Total Junction Arrivals (Veh)	Total Queueing Delay (Veh-min)	Average Queueing Delay (min)	Rate Of Queueing Delay (Veh-min/min)	Inclusive Total Queueing Delay (Veh-min)	Inclusive Average Queueing Delay (min)
A	1.03	3.43	30.47	F	541.00	541.00	1100.02	2.03	18.33	1152.98	2.13
B	0.04	0.38	0.04	C	7.00	7.00	2.44	0.35	0.04	2.44	0.35
C	0.79	0.46	3.55	D	480.00	480.00	192.65	0.40	3.21	193.27	0.40
D	0.89	0.71	7.16	E	638.00	638.00	368.87	0.58	6.15	371.00	0.58

Main Results for each time segment

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

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Entry Flow (Veh/hr)	Exit Flow (Veh/hr)	Circulating Flow (Veh/hr)	Pedestrian Demand (Ped/hr)	Capacity (Veh/hr)	Saturation Capacity (Veh/hr)	RFC	Start Queue (Veh)	End Queue (Veh)	Delay (min)	LOS
A	541.00	135.25	492.71	461.58	325.84	0.00	533.53	512.32	1.014	0.00	12.07	1.034	F
B	7.00	1.75	6.85	4.86	813.69	0.00	188.72	156.47	0.037	0.00	0.04	0.330	C
C	480.00	120.00	467.67	549.07	271.47	0.00	619.35	598.54	0.775	0.00	3.08	0.371	C

D	638.00	159.50	614.97	566.68	172.46	0.00	721.75	675.99	0.884	0.00	5.76	0.489	D
---	--------	--------	--------	--------	--------	------	--------	--------	-------	------	------	-------	---

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

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Entry Flow (Veh/hr)	Exit Flow (Veh/hr)	Circulating Flow (Veh/hr)	Pedestrian Demand (Ped/hr)	Capacity (Veh/hr)	Saturation Capacity (Veh/hr)	RFC	Start Queue (Veh)	End Queue (Veh)	Delay (min)	LOS
A	541.00	135.25	513.03	475.00	336.26	0.00	526.83	512.32	1.027	12.07	19.06	2.098	F
B	7.00	1.75	6.98	4.99	844.30	0.00	169.65	156.47	0.041	0.04	0.04	0.369	C
C	480.00	120.00	478.84	568.64	282.64	0.00	611.96	598.54	0.784	3.08	3.37	0.443	D
D	638.00	159.50	634.69	584.91	176.57	0.00	718.96	675.99	0.887	5.76	6.59	0.663	E

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

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Entry Flow (Veh/hr)	Exit Flow (Veh/hr)	Circulating Flow (Veh/hr)	Pedestrian Demand (Ped/hr)	Capacity (Veh/hr)	Saturation Capacity (Veh/hr)	RFC	Start Queue (Veh)	End Queue (Veh)	Delay (min)	LOS
A	541.00	135.25	517.15	476.14	337.23	0.00	526.20	512.32	1.028	19.06	25.03	2.804	F
B	7.00	1.75	7.00	4.99	849.40	0.00	166.49	156.47	0.042	0.04	0.04	0.376	C
C	480.00	120.00	479.55	571.48	284.91	0.00	610.46	598.54	0.786	3.37	3.49	0.453	D
D	638.00	159.50	636.55	587.62	176.83	0.00	718.78	675.99	0.888	6.59	6.95	0.693	E

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

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Entry Flow (Veh/hr)	Exit Flow (Veh/hr)	Circulating Flow (Veh/hr)	Pedestrian Demand (Ped/hr)	Capacity (Veh/hr)	Saturation Capacity (Veh/hr)	RFC	Start Queue (Veh)	End Queue (Veh)	Delay (min)	LOS
A	541.00	135.25	519.22	476.52	337.57	0.00	525.99	512.32	1.029	25.03	30.47	3.432	F
B	7.00	1.75	7.00	5.00	851.78	0.00	165.01	156.47	0.042	0.04	0.04	0.380	C
C	480.00	120.00	479.75	572.74	286.04	0.00	609.71	598.54	0.787	3.49	3.55	0.458	D
D	638.00	159.50	637.18	588.88	176.91	0.00	718.73	675.99	0.888	6.95	7.16	0.707	E

Queueing Delay Results for each time segment**Queueing Delay results: (08:00-08:15)**

Arm	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (min)	Unsignalised Level Of Service	Signalised Level Of Service
A	115.93	7.73	1.034	F	E
B	0.53	0.04	0.330	C	B
C	39.33	2.62	0.371	C	C
D	67.48	4.50	0.489	D	C

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

Arm	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (min)	Unsignalised Level Of Service	Signalised Level Of Service
A	235.73	15.72	2.098	F	F
B	0.62	0.04	0.369	C	C
C	48.95	3.26	0.443	D	C
D	93.64	6.24	0.663	E	D

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

Arm	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (min)	Unsignalised Level Of Service	Signalised Level Of Service
A	331.60	22.11	2.804	F	F
B	0.64	0.04	0.376	C	C
C	51.57	3.44	0.453	D	C
D	101.82	6.79	0.693	E	D

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

Arm	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (min)	Unsignalised Level Of Service	Signalised Level Of Service
A	416.75	27.78	3.432	F	F
B	0.65	0.04	0.380	C	C
C	52.80	3.52	0.458	D	C
D	105.93	7.06	0.707	E	D

Junctions 8				
ARCADY 8 - Roundabout Module				
Version: 8.0.2.316 [14 Feb 2013] © Copyright TRL Limited, 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				
The users of this computer program for the solution of an engineering problem are in no way relieved of their responsibility for the correctness of the solution				

Filename: 2018 Predicted PM Assessment - Flat Profile (ST - 50%).arc8

Path: Y:\2010\10-226 to 10-250\10-228 CEG, Whalley\Techincal\TA - Jan 2013\Predicted Models - 'With Link Road' (260 Dwellings)\Sensitivity

Test\ARCADY\Clitheroe Road-Brookes Lane-King Street-Station Road

Report generation date: 25/04/2013 12:41:36

Summary of junction performance

	PM Peak (ST)			
	Queue (Veh)	Delay (min)	RFC	LOS
Existing Layout - 2018 Predicted				
Arm A	3.49	0.51	0.78	D
Arm B	0.03	0.26	0.03	C
Arm C	2.80	0.35	0.74	C
Arm D	5.93	0.58	0.86	D

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

"D2 - 2018 Base, PM Peak (ST)" model duration: 16:30 - 17:30

"D3 - 2018 Predicted, PM Peak (ST)" model duration: 16:30 - 17:30

Run using Junctions 8.0.2.316 at 25/04/2013 12:41:35

File summary

File Description

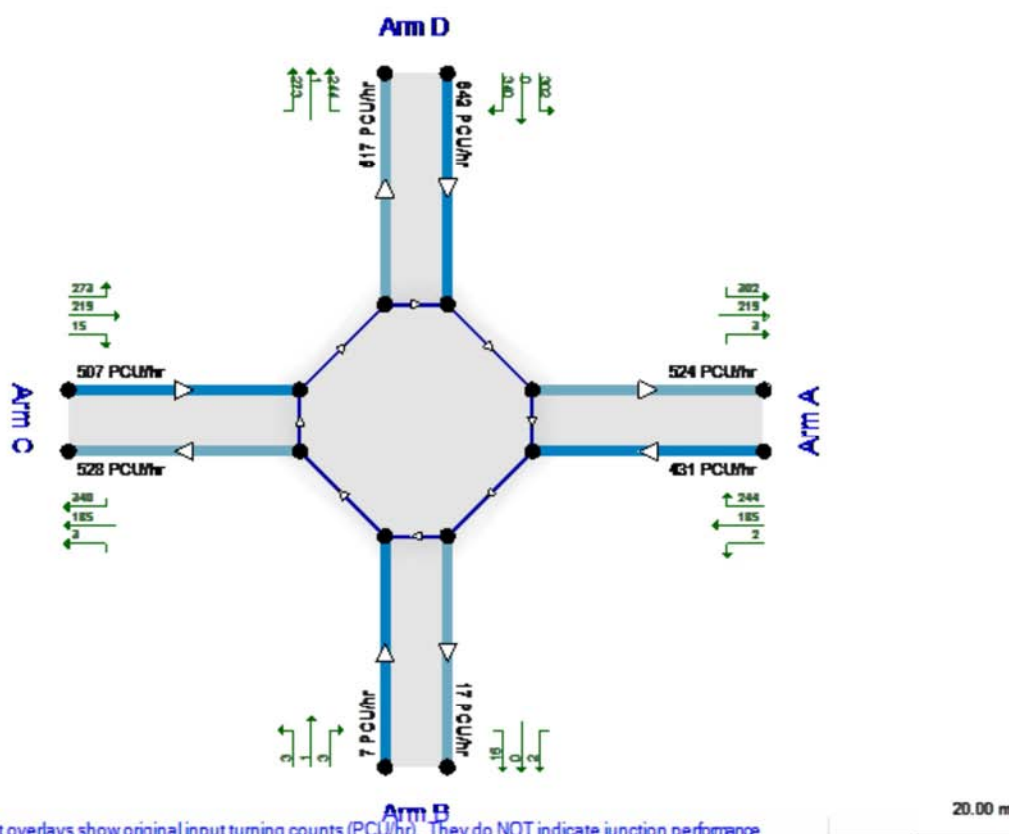
Title	2018 Base and Predicted Assessment - Sensitivity Test (50% Reassignment)
Location	Clitheroe Road-Brookes Lane-King Street-Station Road
Site Number	
Date	25/04/2013
Version	
Status	Completed
Identifier	
Client	CEG
Jobnumber	10/228
Enumerator	A McGarrell
Description	

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	Veh	Veh	perHour	min	-Min	perMin



The junction diagram reflects the last run of ARCADY.

Existing Layout - 2018 Predicted, PM Peak (ST)

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
Existing Layout	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
2018 Predicted, PM Peak (ST)	2018 Predicted	PM Peak (ST)		FLAT	16:30	17:30	60	15				✓		

Junction Network

Junctions

Name	Junction Type	Arm Order	Junction Delay (min)	Junction LOS
untitled	Mini-roundabout	A,B,C,D	0.49	D

Junction Network Options

Driving Side	Lighting	Road Surface	In London
Left	Normal/unknown	Normal/unknown	

Arms

Arms

Arm	Name	Description
A	Clitheroe Road	
B	Brookes Lane	
C	King Street	
D	Station Road	

Capacity Options

Arm	Minimum Capacity (PCU/hr)	Maximum Capacity (PCU/hr)	Assume Flat Start Profile	Initial Queue (PCU)
A	0.00	99999.00		0.00
B	0.00	99999.00		0.00
C	0.00	99999.00		0.00
D	0.00	99999.00		0.00

Mini Roundabout Geometry

Arm	Approach road half-width (m)	Minimum approach road half-width (m)	Entry width (m)	Effective flare length (m)	Distance to next arm (m)	Entry corner kerb line distance (m)	Gradient over 50m (%)	Kerbed central island
A	3.10	3.10	3.10	0.00	10.96	3.98	-2.40	
B	2.40	2.40	3.30	0.01	14.52	5.33	-2.40	
C	3.00	3.00	4.50	2.31	13.75	10.37	3.00	
D	3.00	3.00	3.40	1.13	16.41	13.20	2.50	

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

Pedestrian Crossings

Arm	Crossing Type
A	None
B	None
C	None
D	None

Slope / Intercept / Capacity

Roundabout Slope and Intercept used in model

Arm	Enter slope and intercept directly	Entered slope	Entered intercept (PCU/hr)	Final Slope	Final Intercept (PCU/hr)
A		(calculated)	(calculated)	0.629	772.308
B		(calculated)	(calculated)	0.595	696.183
C		(calculated)	(calculated)	0.683	852.697
D		(calculated)	(calculated)	0.658	899.081

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

Arm	Profile Type	Use Turning Counts	Average Demand Flow (Veh/hr)	Flow Scaling Factor (%)
A	FLAT	✓	424.00	100.000
B	FLAT	✓	7.00	100.000

C	FLAT	✓	493.00	100.000
D	FLAT	✓	636.00	100.000

Turning Proportions

Turning Counts or Proportions (Veh/hr) - Junction 1 (for whole period)

		To			
		A	B	C	D
From	A	0.000	2.000	181.000	241.000
	B	3.000	0.000	3.000	1.000
	C	211.000	15.000	0.000	267.000
	D	302.000	0.000	334.000	0.000

Turning Proportions (Veh) - Junction 1 (for whole period)

		To			
		A	B	C	D
From	A	0.00	0.00	0.43	0.57
	B	0.43	0.00	0.43	0.14
	C	0.43	0.03	0.00	0.54
	D	0.47	0.00	0.53	0.00

Vehicle Mix

Average PCU Per Vehicle - Junction 1 (for whole period)

		To			
		A	B	C	D
From	A	1.000	1.000	1.022	1.012
	B	1.000	1.000	1.000	1.000
	C	1.039	1.000	1.000	1.021
	D	1.000	1.000	1.018	1.000

Heavy Vehicle Percentages - Junction 1 (for whole period)

		To			
		A	B	C	D
From	A	0.000	0.000	2.160	1.200
	B	0.000	0.000	0.000	0.000
	C	3.920	0.000	0.000	2.060
	D	0.000	0.000	1.800	0.000

Results

Results Summary for whole modelled period

Arm	Max RFC	Max Delay (min)	Max Queue (Veh)	Max LOS	Average Demand (Veh/hr)	Total Junction Arrivals (Veh)	Total Queueing Delay (Veh-min)	Average Queueing Delay (min)	Rate Of Queueing Delay (Veh-min/min)	Inclusive Total Queueing Delay (Veh-min)	Inclusive Average Queueing Delay (min)
A	0.78	0.51	3.49	D	424.00	424.00	189.89	0.45	3.16	190.56	0.45
B	0.03	0.26	0.03	C	7.00	7.00	1.73	0.25	0.03	1.73	0.25
C	0.74	0.35	2.80	C	493.00	493.00	157.25	0.32	2.62	157.60	0.32
D	0.86	0.58	5.93	D	636.00	636.00	313.98	0.49	5.23	315.41	0.50

Main Results for each time segment

Main results: (16:30-16:45)

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Entry Flow (Veh/hr)	Exit Flow (Veh/hr)	Circulating Flow (Veh/hr)	Pedestrian Demand (Ped/hr)	Capacity (Veh/hr)	Saturation Capacity (Veh/hr)	RFC	Start Queue (Veh)	End Queue (Veh)	Delay (min)	LOS
A	424.00	106.00	411.82	502.03	338.19	0.00	547.00	527.76	0.775	0.00	3.05	0.413	C
B	7.00	1.75	6.89	16.63	733.37	0.00	252.60	165.87	0.028	0.00	0.03	0.244	B
C	493.00	123.25	482.66	502.25	238.01	0.00	669.44	564.71	0.736	0.00	2.58	0.306	C

D	636.00	159.00	616.01	496.46	224.21	0.00	739.26	669.45	0.860	0.00	5.00	0.435	D
---	--------	--------	--------	--------	--------	------	--------	--------	-------	------	------	-------	---

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

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Entry Flow (Veh/hr)	Exit Flow (Veh/hr)	Circulating Flow (Veh/hr)	Pedestrian Demand (Ped/hr)	Capacity (Veh/hr)	Saturation Capacity (Veh/hr)	RFC	Start Queue (Veh)	End Queue (Veh)	Delay (min)	LOS
A	424.00	106.00	422.83	514.66	347.78	0.00	540.96	527.76	0.784	3.05	3.34	0.498	D
B	7.00	1.75	6.99	16.98	753.63	0.00	240.35	165.87	0.029	0.03	0.03	0.257	C
C	493.00	123.25	492.42	516.29	244.33	0.00	665.19	564.71	0.741	2.58	2.73	0.345	C
D	636.00	159.00	633.71	508.02	228.73	0.00	736.21	669.45	0.864	5.00	5.57	0.560	D

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

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Entry Flow (Veh/hr)	Exit Flow (Veh/hr)	Circulating Flow (Veh/hr)	Pedestrian Demand (Ped/hr)	Capacity (Veh/hr)	Saturation Capacity (Veh/hr)	RFC	Start Queue (Veh)	End Queue (Veh)	Delay (min)	LOS
A	424.00	106.00	423.59	515.48	348.50	0.00	540.50	527.76	0.784	3.34	3.44	0.507	D
B	7.00	1.75	7.00	16.99	755.10	0.00	239.46	165.87	0.029	0.03	0.03	0.258	C
C	493.00	123.25	492.81	517.34	244.77	0.00	664.89	564.71	0.741	2.73	2.78	0.347	C
D	636.00	159.00	635.07	508.66	228.91	0.00	736.09	669.45	0.864	5.57	5.80	0.576	D

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

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Entry Flow (Veh/hr)	Exit Flow (Veh/hr)	Circulating Flow (Veh/hr)	Pedestrian Demand (Ped/hr)	Capacity (Veh/hr)	Saturation Capacity (Veh/hr)	RFC	Start Queue (Veh)	End Queue (Veh)	Delay (min)	LOS
A	424.00	106.00	423.79	515.72	348.73	0.00	540.36	527.76	0.785	3.44	3.49	0.510	D
B	7.00	1.75	7.00	17.00	755.53	0.00	239.20	165.87	0.029	0.03	0.03	0.258	C
C	493.00	123.25	492.91	517.65	244.88	0.00	664.82	564.71	0.742	2.78	2.80	0.348	C
D	636.00	159.00	635.50	508.83	228.96	0.00	736.06	669.45	0.864	5.80	5.93	0.583	D

Queueing Delay Results for each time segment**Queueing Delay results: (16:30-16:45)**

Arm	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (min)	Unsignalised Level Of Service	Signalised Level Of Service
A	38.48	2.57	0.413	C	C
B	0.40	0.03	0.244	B	B
C	33.90	2.26	0.306	C	B
D	60.27	4.02	0.435	D	C

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

Arm	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (min)	Unsignalised Level Of Service	Signalised Level Of Service
A	48.40	3.23	0.498	D	C
B	0.44	0.03	0.257	C	B
C	40.12	2.67	0.345	C	C
D	80.08	5.34	0.560	D	C

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

Arm	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (min)	Unsignalised Level Of Service	Signalised Level Of Service
A	50.96	3.40	0.507	D	C
B	0.45	0.03	0.258	C	B
C	41.36	2.76	0.347	C	C
D	85.53	5.70	0.576	D	C

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

Arm	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (min)	Unsignalised Level Of Service	Signalised Level Of Service
A	52.06	3.47	0.510	D	C
B	0.45	0.03	0.258	C	B
C	41.87	2.79	0.348	C	C
D	88.10	5.87	0.583	D	C

Junctions 8				
ARCADY 8 - Roundabout Module				
Version: 8.0.2.316 [14 Feb 2013] © Copyright TRL Limited, 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				
The users of this computer program for the solution of an engineering problem are in no way relieved of their responsibility for the correctness of the solution				

Filename: 2018 Predicted AM Assessment - Flat Profile (ST - 50%).arc8

Path: Y:\2010\10-226 to 10-250\10-228 CEG, Whalley\Techincal\TA - Jan 2013\Predicted Models - 'With Link Road' (260 Dwellings)\Sensitivity Test\ARCADY\B6246

King Street-Accrington Road-King Street

Report generation date: 25/04/2013 12:42:05

Summary of junction performance

	AM Peak (ST)			
	Queue (Veh)	Delay (min)	RFC	LOS
Existing Layout - 2018 Predicted				
Arm A	11.34	1.15	0.94	F
Arm B	1.35	0.27	0.58	C
Arm C	3.50	0.40	0.78	C

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

"D2 - 2018 Base, AM Peak (ST)" model duration: 08:00 - 09:00

"D3 - 2018 Predicted, AM Peak (ST)" model duration: 08:00 - 09:00

Run using Junctions 8.0.2.316 at 25/04/2013 12:42:04

File summary

File Description

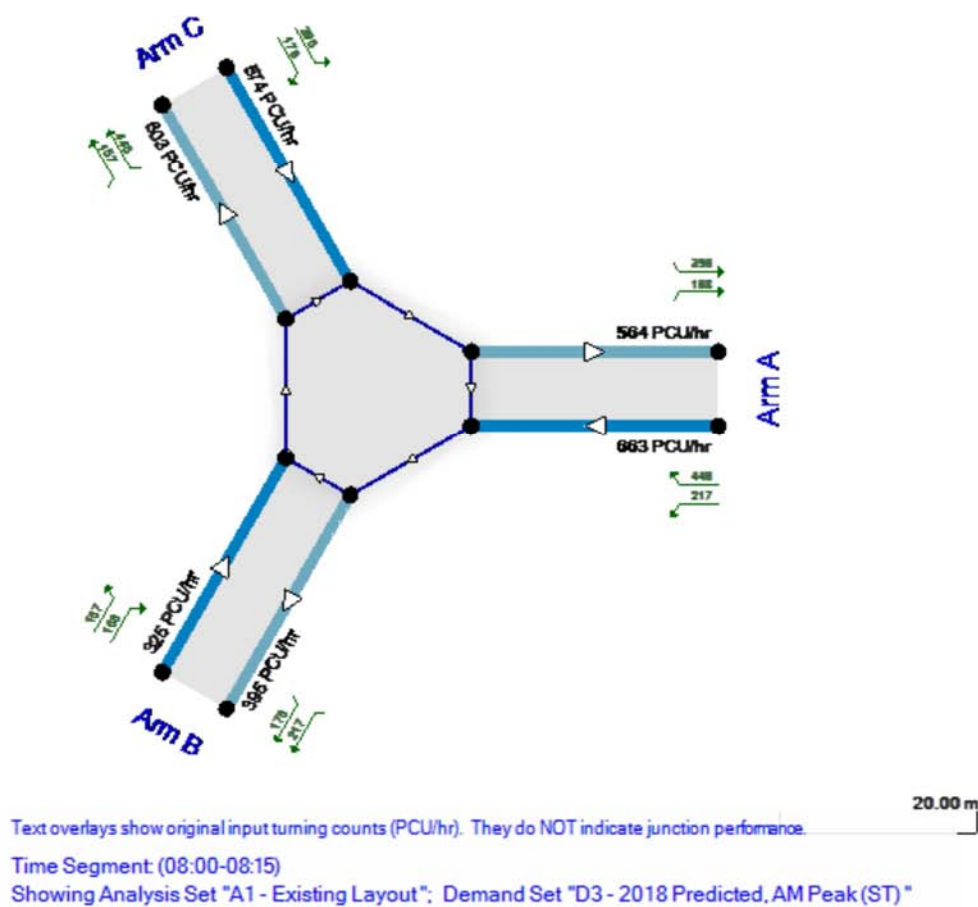
Title	2018 Base & Predicted Assessment - Sensitivity Test (50% Reassignment)
Location	B6246 King Street-Accrington Road-King Street
Site Number	
Date	25/04/2013
Version	
Status	Completed
Identifier	
Client	CEG
Jobnumber	10/228
Enumerator	A McGarrell
Description	

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	Veh	Veh	perHour	min	-Min	perMin



The junction diagram reflects the last run of ARCADY.

Existing Layout - 2018 Predicted, AM Peak (ST)

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
Existing Layout	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
2018 Predicted, AM Peak (ST)	2018 Predicted	AM Peak (ST)		FLAT	08:00	09:00	60	15				✓		

Junction Network

Junctions

Name	Junction Type	Arm Order	Junction Delay (min)	Junction LOS
untitled	Mini-roundabout	A,B,C	0.69	E

Junction Network Options

Driving Side	Lighting	Road Surface	In London
Left	Normal/unknown	Normal/unknown	

Arms

Arms

Arm	Name	Description
A	B6246 King Street	
B	B6246 Accrington Road	
C	King Street	

Capacity Options

Arm	Minimum Capacity (PCU/hr)	Maximum Capacity (PCU/hr)	Assume Flat Start Profile	Initial Queue (PCU)
A	0.00	99999.00		0.00
B	0.00	99999.00		0.00
C	0.00	99999.00		0.00

Mini Roundabout Geometry

Arm	Approach road half-width (m)	Minimum approach road half-width (m)	Entry width (m)	Effective flare length (m)	Distance to next arm (m)	Entry corner kerb line distance (m)	Gradient over 50m (%)	Kerbed central island
A	3.70	3.70	3.70	0.00	13.90	12.60	0.00	
B	3.70	3.70	4.55	3.10	12.40	7.10	0.00	
C	3.30	3.30	3.65	5.80	16.00	15.50	0.00	

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

Pedestrian Crossings

Arm	Crossing Type
A	None
B	None
C	None

Slope / Intercept / Capacity

Roundabout Slope and Intercept used in model

Arm	Enter slope and intercept directly	Entered slope	Entered intercept (PCU/hr)	Final Slope	Final Intercept (PCU/hr)
A		(calculated)	(calculated)	0.553	806.665
B		(calculated)	(calculated)	0.563	811.282
C		(calculated)	(calculated)	0.594	832.868

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

Arm	Profile Type	Use Turning Counts	Average Demand Flow (Veh/hr)	Flow Scaling Factor (%)
A	FLAT	✓	625.00	100.000
B	FLAT	✓	308.00	100.000
C	FLAT	✓	542.00	100.000

Turning Proportions

Turning Counts or Proportions (Veh/hr) - Junction 1 (for whole period)

From	To		
	A	B	C
	A	0.000	199.000
	B	155.000	0.000
	C	372.000	170.000
			0.000

Turning Proportions (Veh) - Junction 1 (for whole period)

From	To		
	A	B	C
	A	0.00	0.32
	B	0.50	0.00
	C	0.69	0.31
			0.00

Vehicle Mix

Average PCU Per Vehicle - Junction 1 (for whole period)

From	To		
	A	B	C
	A	1.000	1.091
	B	1.083	1.000
	C	1.065	1.047
			1.000

Heavy Vehicle Percentages - Junction 1 (for whole period)

From	To		
	A	B	C
	A	0.000	9.070
	B	8.280	0.000
	C	6.450	4.700
			0.000

Results

Results Summary for whole modelled period

Arm	Max RFC	Max Delay (min)	Max Queue (Veh)	Max LOS	Average Demand (Veh/hr)	Total Junction Arrivals (Veh)	Total Queueing Delay (Veh-min)	Average Queueing Delay (min)	Rate Of Queueing Delay (Veh-min/min)	Inclusive Total Queueing Delay (Veh-min)	Inclusive Average Queueing Delay (min)
A	0.94	1.15	11.34	F	625.00	625.00	536.65	0.86	8.94	542.43	0.87
B	0.58	0.27	1.35	C	308.00	308.00	77.02	0.25	1.28	77.12	0.25
C	0.78	0.40	3.50	C	542.00	542.00	194.89	0.36	3.25	195.42	0.36

Main Results for each time segment

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

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Entry Flow (Veh/hr)	Exit Flow (Veh/hr)	Circulating Flow (Veh/hr)	Pedestrian Demand (Ped/hr)	Capacity (Veh/hr)	Saturation Capacity (Veh/hr)	RFC	Start Queue (Veh)	End Queue (Veh)	Delay (min)	LOS
A	625.00	156.25	593.75	515.64	165.97	0.00	669.77	653.00	0.933	0.00	7.81	0.639	E
B	308.00	77.00	302.97	355.02	404.70	0.00	543.72	521.15	0.566	0.00	1.26	0.244	B
C	542.00	135.50	529.14	555.21	152.47	0.00	693.78	627.04	0.781	0.00	3.21	0.342	C

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

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Entry Flow (Veh/hr)	Exit Flow (Veh/hr)	Circulating Flow (Veh/hr)	Pedestrian Demand (Ped/hr)	Capacity (Veh/hr)	Saturation Capacity (Veh/hr)	RFC	Start Queue (Veh)	End Queue (Veh)	Delay (min)	LOS
A	625.00	156.25	617.57	526.37	169.77	0.00	667.69	653.00	0.936	7.81	9.67	0.992	F
B	308.00	77.00	307.74	366.40	420.94	0.00	534.65	521.15	0.576	1.26	1.32	0.264	C
C	542.00	135.50	541.26	573.81	154.87	0.00	692.32	627.04	0.783	3.21	3.40	0.393	C

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

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Entry Flow (Veh/hr)	Exit Flow (Veh/hr)	Circulating Flow (Veh/hr)	Pedestrian Demand (Ped/hr)	Capacity (Veh/hr)	Saturation Capacity (Veh/hr)	RFC	Start Queue (Veh)	End Queue (Veh)	Delay (min)	LOS
A	625.00	156.25	620.95	526.78	169.92	0.00	667.61	653.00	0.936	9.67	10.68	1.095	F
B	308.00	77.00	307.92	367.63	423.24	0.00	533.36	521.15	0.577	1.32	1.34	0.266	C
C	542.00	135.50	541.73	576.20	154.96	0.00	692.27	627.04	0.783	3.40	3.47	0.396	C

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

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Entry Flow (Veh/hr)	Exit Flow (Veh/hr)	Circulating Flow (Veh/hr)	Pedestrian Demand (Ped/hr)	Capacity (Veh/hr)	Saturation Capacity (Veh/hr)	RFC	Start Queue (Veh)	End Queue (Veh)	Delay (min)	LOS
A	625.00	156.25	622.38	526.89	169.96	0.00	667.59	653.00	0.936	10.68	11.34	1.155	F
B	308.00	77.00	307.96	368.12	424.21	0.00	532.82	521.15	0.578	1.34	1.35	0.267	C
C	542.00	135.50	541.86	577.20	154.98	0.00	692.26	627.04	0.783	3.47	3.50	0.397	C

Queueing Delay Results for each time segment**Queueing Delay results: (08:00-08:15)**

Arm	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (min)	Unsignalised Level Of Service	Signalised Level Of Service
A	85.17	5.68	0.639	E	D
B	17.29	1.15	0.244	B	B
C	41.20	2.75	0.342	C	C

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

Arm	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (min)	Unsignalised Level Of Service	Signalised Level Of Service
A	132.82	8.85	0.992	F	E
B	19.52	1.30	0.264	C	B
C	49.88	3.33	0.393	C	C

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

Arm	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (min)	Unsignalised Level Of Service	Signalised Level Of Service
A	153.24	10.22	1.095	F	E
B	20.01	1.33	0.266	C	B
C	51.54	3.44	0.396	C	C

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

Arm	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (min)	Unsignalised Level Of Service	Signalised Level Of Service
A	165.42	11.03	1.155	F	E
B	20.21	1.35	0.267	C	B
C	52.26	3.48	0.397	C	C

Junctions 8				
ARCADY 8 - Roundabout Module				
Version: 8.0.2.316 [14 Feb 2013] © Copyright TRL Limited, 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				
The users of this computer program for the solution of an engineering problem are in no way relieved of their responsibility for the correctness of the solution				

Filename: 2018 Predicted PM Assessment - Flat Profile (ST - 50%).arc8

Path: Y:\2010\10-226 to 10-250\10-228 CEG, Whalley\Techincal\TA - Jan 2013\Predicted Models - 'With Link Road' (260 Dwellings)\Sensitivity Test\ARCADY\B6246

King Street-Accrington Road-King Street

Report generation date: 25/04/2013 12:42:50

Summary of junction performance

	PM Peak (ST)			
	Queue (Veh)	Delay (min)	RFC	LOS
Existing Layout - 2018 Predicted				
Arm A	4.46	0.49	0.82	D
Arm B	1.00	0.20	0.50	B
Arm C	3.68	0.39	0.79	C

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

"D2 - 2018 Base, PM Peak (ST)" model duration: 16:30 - 17:30

"D3 - 2018 Predicted, PM Peak (ST)" model duration: 16:30 - 17:30

Run using Junctions 8.0.2.316 at 25/04/2013 12:42:49

File summary

File Description

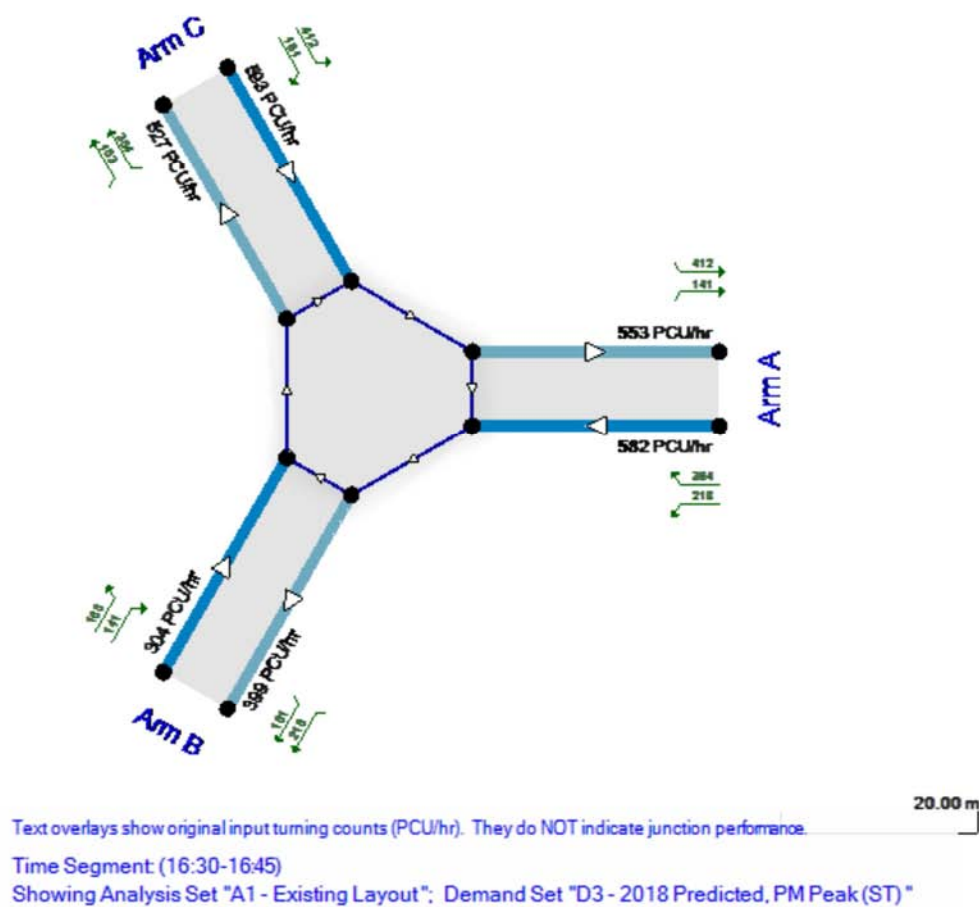
Title	2018 Base & Predicted Assessment - Sensitivity Test (50% Reassignment)
Location	B6246 King Street-Accrington Road-King Street
Site Number	
Date	25/04/2013
Version	
Status	Completed
Identifier	
Client	CEG
Jobnumber	10/228
Enumerator	A McGarrell
Description	

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	Veh	Veh	perHour	min	-Min	perMin



The junction diagram reflects the last run of ARCADY.

Existing Layout - 2018 Predicted, PM Peak (ST)

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
Existing Layout	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
2018 Predicted, PM Peak (ST)	2018 Predicted	PM Peak (ST)		FLAT	16:30	17:30	60	15				✓		

Junction Network

Junctions

Name	Junction Type	Arm Order	Junction Delay (min)	Junction LOS
untitled	Mini-roundabout	A,B,C	0.39	C

Junction Network Options

Driving Side	Lighting	Road Surface	In London
Left	Normal/unknown	Normal/unknown	

Arms

Arms

Arm	Name	Description
A	B6246 King Street	
B	B6246 Accrington Road	
C	King Street	

Capacity Options

Arm	Minimum Capacity (PCU/hr)	Maximum Capacity (PCU/hr)	Assume Flat Start Profile	Initial Queue (PCU)
A	0.00	99999.00		0.00
B	0.00	99999.00		0.00
C	0.00	99999.00		0.00

Mini Roundabout Geometry

Arm	Approach road half-width (m)	Minimum approach road half-width (m)	Entry width (m)	Effective flare length (m)	Distance to next arm (m)	Entry corner kerb line distance (m)	Gradient over 50m (%)	Kerbed central island
A	3.70	3.70	3.70	0.00	13.90	12.60	0.00	
B	3.70	3.70	4.55	3.10	12.40	7.10	0.00	
C	3.30	3.30	3.65	5.80	16.00	15.50	0.00	

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

Pedestrian Crossings

Arm	Crossing Type
A	None
B	None
C	None

Slope / Intercept / Capacity

Roundabout Slope and Intercept used in model

Arm	Enter slope and intercept directly	Entered slope	Entered intercept (PCU/hr)	Final Slope	Final Intercept (PCU/hr)
A		(calculated)	(calculated)	0.553	806.665
B		(calculated)	(calculated)	0.563	811.282
C		(calculated)	(calculated)	0.594	832.868

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

Arm	Profile Type	Use Turning Counts	Average Demand Flow (Veh/hr)	Flow Scaling Factor (%)
A	FLAT	✓	569.00	100.000
B	FLAT	✓	298.00	100.000
C	FLAT	✓	586.00	100.000

Turning Proportions

Turning Counts or Proportions (Veh/hr) - Junction 1 (for whole period)

	To			
From		A	B	C
	A	0.000	212.000	357.000
	B	135.000	0.000	163.000
	C	405.000	181.000	0.000

Turning Proportions (Veh) - Junction 1 (for whole period)

	To			
From		A	B	C
	A	0.00	0.37	0.63
	B	0.45	0.00	0.55
	C	0.69	0.31	0.00

Vehicle Mix

Average PCU Per Vehicle - Junction 1 (for whole period)

	To			
From		A	B	C
	A	1.000	1.027	1.020
	B	1.043	1.000	1.000
	C	1.017	1.000	1.000

Heavy Vehicle Percentages - Junction 1 (for whole period)

	To			
From		A	B	C
	A	0.000	2.700	1.960
	B	4.330	0.000	0.000
	C	1.730	0.000	0.000

Results

Results Summary for whole modelled period

Arm	Max RFC	Max Delay (min)	Max Queue (Veh)	Max LOS	Average Demand (Veh/hr)	Total Junction Arrivals (Veh)	Total Queueing Delay (Veh-min)	Average Queueing Delay (min)	Rate Of Queueing Delay (Veh-min/min)	Inclusive Total Queueing Delay (Veh-min)	Inclusive Average Queueing Delay (min)
A	0.82	0.49	4.46	D	569.00	569.00	242.72	0.43	4.05	243.58	0.43
B	0.50	0.20	1.00	B	298.00	298.00	57.87	0.19	0.96	57.92	0.19
C	0.79	0.39	3.68	C	586.00	586.00	205.24	0.35	3.42	205.79	0.35

Main Results for each time segment

Main results: (16:30-16:45)

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Entry Flow (Veh/hr)	Exit Flow (Veh/hr)	Circulating Flow (Veh/hr)	Pedestrian Demand (Ped/hr)	Capacity (Veh/hr)	Saturation Capacity (Veh/hr)	RFC	Start Queue (Veh)	End Queue (Veh)	Delay (min)	LOS
A	569.00	142.25	553.21	528.89	176.81	0.00	693.34	677.28	0.821	0.00	3.95	0.393	C
B	298.00	74.50	294.16	382.93	347.09	0.00	600.42	556.63	0.496	0.00	0.96	0.194	B
C	586.00	146.50	572.44	507.99	133.26	0.00	741.35	668.48	0.790	0.00	3.39	0.333	C

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

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Entry Flow (Veh/hr)	Exit Flow (Veh/hr)	Circulating Flow (Veh/hr)	Pedestrian Demand (Ped/hr)	Capacity (Veh/hr)	Saturation Capacity (Veh/hr)	RFC	Start Queue (Veh)	End Queue (Veh)	Delay (min)	LOS
A	569.00	142.25	567.71	539.43	180.77	0.00	691.20	677.28	0.823	3.95	4.27	0.475	D
B	298.00	74.50	297.90	392.29	356.19	0.00	595.30	556.63	0.501	0.96	0.99	0.202	B
C	586.00	146.50	585.24	519.14	134.95	0.00	740.31	668.48	0.792	3.39	3.58	0.382	C

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

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Entry Flow (Veh/hr)	Exit Flow (Veh/hr)	Circulating Flow (Veh/hr)	Pedestrian Demand (Ped/hr)	Capacity (Veh/hr)	Saturation Capacity (Veh/hr)	RFC	Start Queue (Veh)	End Queue (Veh)	Delay (min)	LOS
A	569.00	142.25	568.51	539.80	180.91	0.00	691.12	677.28	0.823	4.27	4.39	0.482	D
B	298.00	74.50	297.97	392.73	356.69	0.00	595.02	556.63	0.501	0.99	0.99	0.202	B
C	586.00	146.50	585.72	519.68	134.99	0.00	740.29	668.48	0.792	3.58	3.65	0.385	C

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

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Entry Flow (Veh/hr)	Exit Flow (Veh/hr)	Circulating Flow (Veh/hr)	Pedestrian Demand (Ped/hr)	Capacity (Veh/hr)	Saturation Capacity (Veh/hr)	RFC	Start Queue (Veh)	End Queue (Veh)	Delay (min)	LOS
A	569.00	142.25	568.74	539.90	180.96	0.00	691.09	677.28	0.823	4.39	4.46	0.485	D
B	298.00	74.50	297.99	392.86	356.84	0.00	594.94	556.63	0.501	0.99	1.00	0.202	B
C	586.00	146.50	585.85	519.83	134.99	0.00	740.29	668.48	0.792	3.65	3.68	0.386	C

Queueing Delay Results for each time segment**Queueing Delay results: (16:30-16:45)**

Arm	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (min)	Unsignalised Level Of Service	Signalised Level Of Service
A	49.15	3.28	0.393	C	C
B	13.45	0.90	0.194	B	B
C	43.40	2.89	0.333	C	B

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

Arm	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (min)	Unsignalised Level Of Service	Signalised Level Of Service
A	62.11	4.14	0.475	D	C
B	14.66	0.98	0.202	B	B
C	52.55	3.50	0.382	C	C

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

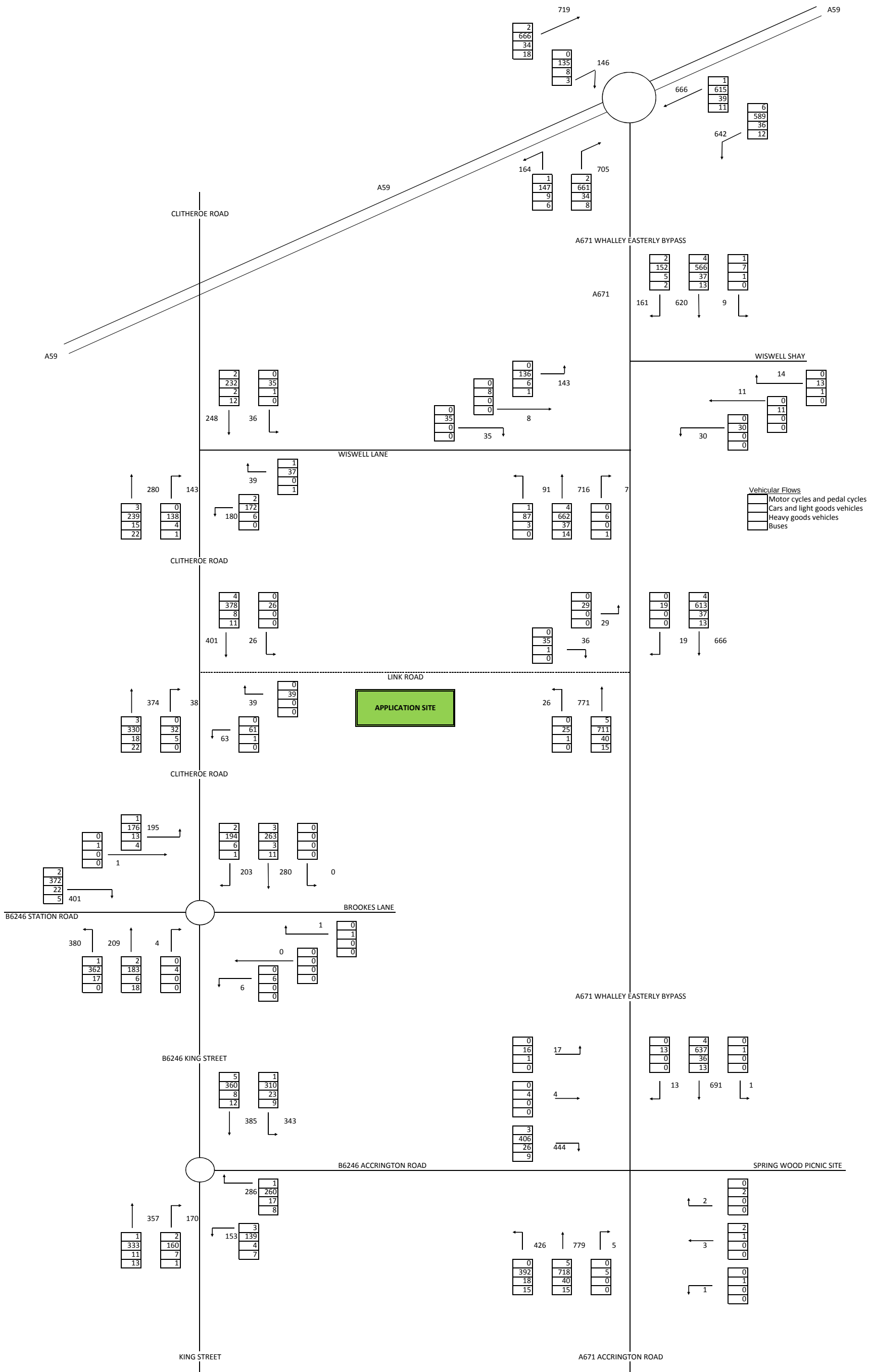
Arm	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (min)	Unsignalised Level Of Service	Signalised Level Of Service
A	65.07	4.34	0.482	D	C
B	14.85	0.99	0.202	B	B
C	54.27	3.62	0.385	C	C

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

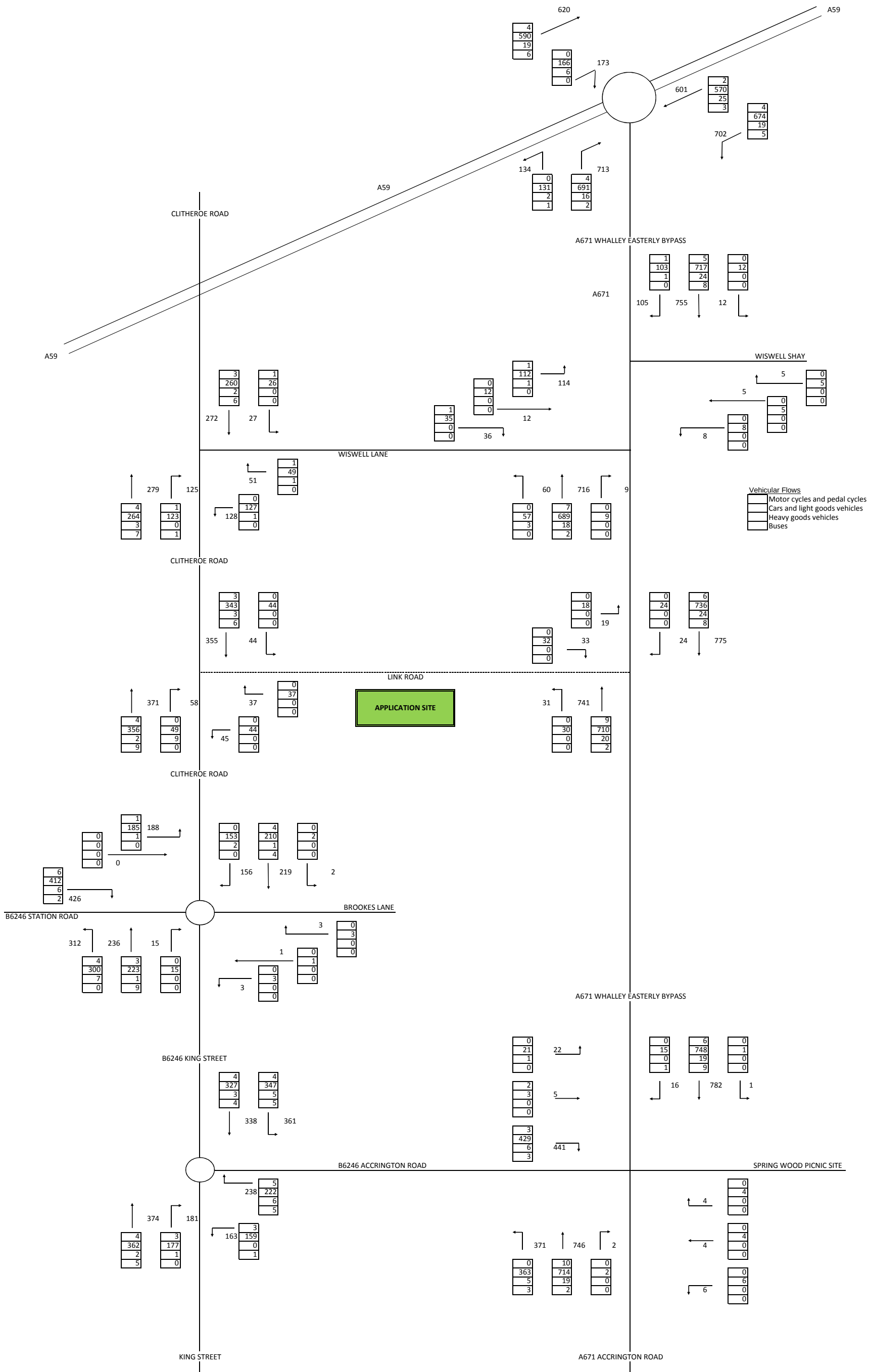
Arm	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (min)	Unsignalised Level Of Service	Signalised Level Of Service
A	66.39	4.43	0.485	D	C
B	14.92	0.99	0.202	B	B
C	55.02	3.67	0.386	C	C

APPENDIX BGH 7

2018 PREDICTED FLOWS (WITH LINK ROAD) - 5% REASSIGNMENT
LAWSONSTEADS, WHALLEY
8:00 am - 9:00 am



2018 PREDICTED FLOWS (WITH LINK ROAD) - 5% REASSIGNMENT
LAWSONSTEADS, WHALLEY
4:30 pm - 5:30 pm



APPENDIX BGH 8

Junctions 8				
ARCADY 8 - Roundabout Module				
Version: 8.0.2.316 [14 Feb 2013] © Copyright TRL Limited, 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				
The users of this computer program for the solution of an engineering problem are in no way relieved of their responsibility for the correctness of the solution				

Filename: 2018 Predicted AM Assessment - Flat Profile (5% Reassignment).arc8

Path: Y:\2010\10-226 to 10-250\10-228 CEG, Whalley\Techinca\TA - Jan 2013\Predicted Models - 'With Link Road' (260 Dwellings)\ARCADY\Clitheroe Road-Brookes Lane-King Street-Station Road

Report generation date: 25/04/2013 12:20:07

Summary of junction performance

	AM Peak			
	Queue (Veh)	Delay (min)	RFC	LOS
Existing Layout - 2018 Predicted				
Arm A	21.69	2.78	1.00	F
Arm B	0.05	0.41	0.05	C
Arm C	7.07	0.75	0.89	E
Arm D	5.65	0.59	0.86	E

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

"D2 - 2018 Base, AM Peak" model duration: 08:00 - 09:00

"D3 - 2018 Predicted, AM Peak " model duration: 08:00 - 09:00

Run using Junctions 8.0.2.316 at 25/04/2013 12:20:06

File summary

File Description

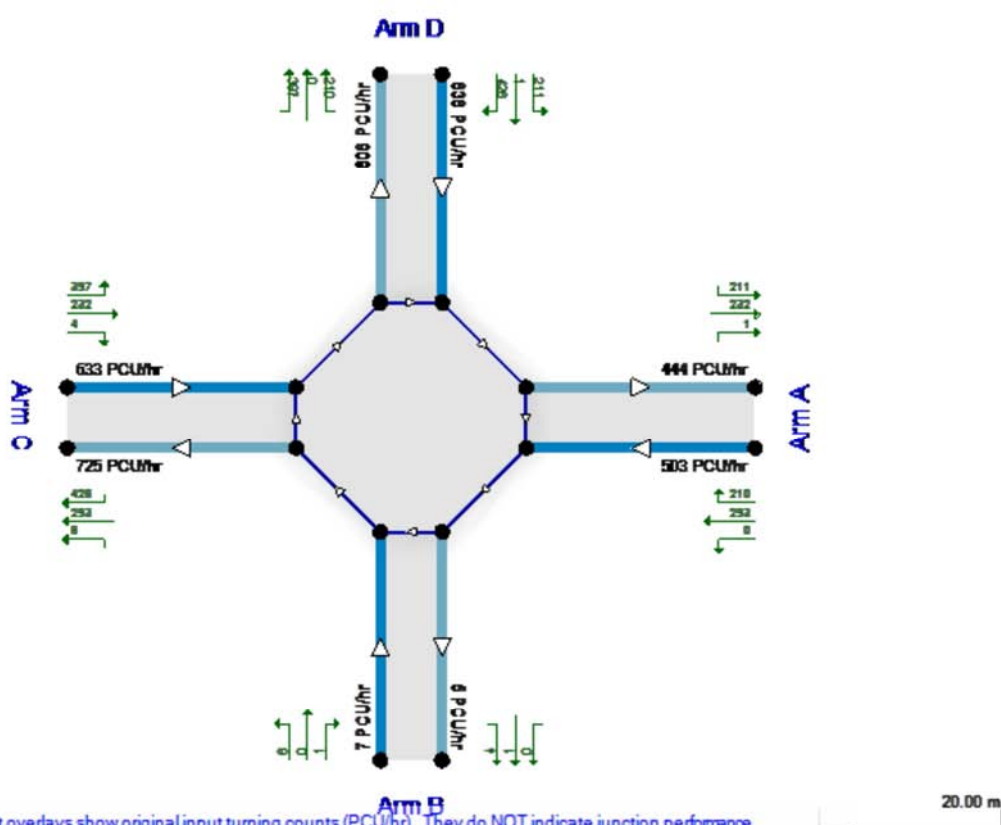
Title	2018 Predicted AM Assessment (5% Reassignment)
Location	Clitheroe Road-Brookes Lane-King Street-Station Road
Site Number	
Date	25/04/2013
Version	
Status	Completed
Identifier	
Client	CEG
Jobnumber	10/228
Enumerator	A McGarrell
Description	

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	Veh	Veh	perHour	min	-Min	perMin



The junction diagram reflects the last run of ARCADY.

Existing Layout - 2018 Predicted, AM Peak

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
Existing Layout	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
2018 Predicted, AM Peak	2018 Predicted	AM Peak	5% Reassignment	FLAT	08:00	09:00	60	15				✓		

Junction Network

Junctions

Name	Junction Type	Arm Order	Junction Delay (min)	Junction LOS
untitled	Mini-roundabout	A,B,C,D	1.27	F

Junction Network Options

Driving Side	Lighting	Road Surface	In London
Left	Normal/unknown	Normal/unknown	

Arms

Arms

Arm	Name	Description
A	Clitheroe Road	
B	Brookes Lane	
C	King Street	
D	Station Road	

Capacity Options

Arm	Minimum Capacity (PCU/hr)	Maximum Capacity (PCU/hr)	Assume Flat Start Profile	Initial Queue (PCU)
A	0.00	99999.00		0.00
B	0.00	99999.00		0.00
C	0.00	99999.00		0.00
D	0.00	99999.00		0.00

Mini Roundabout Geometry

Arm	Approach road half-width (m)	Minimum approach road half-width (m)	Entry width (m)	Effective flare length (m)	Distance to next arm (m)	Entry corner kerb line distance (m)	Gradient over 50m (%)	Kerbed central island
A	3.10	3.10	3.10	0.00	10.96	3.98	-2.40	
B	2.40	2.40	3.30	0.01	14.52	5.33	-2.40	
C	3.00	3.00	4.50	2.31	13.75	10.37	3.00	
D	3.00	3.00	3.40	1.13	16.41	13.20	2.50	

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

Pedestrian Crossings

Arm	Crossing Type
A	None
B	None
C	None
D	None

Slope / Intercept / Capacity

Roundabout Slope and Intercept used in model

Arm	Enter slope and intercept directly	Entered slope	Entered intercept (PCU/hr)	Final Slope	Final Intercept (PCU/hr)
A		(calculated)	(calculated)	0.629	772.308
B		(calculated)	(calculated)	0.595	696.183
C		(calculated)	(calculated)	0.683	852.697
D		(calculated)	(calculated)	0.658	899.081

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

Arm	Profile Type	Use Turning Counts	Average Demand Flow (Veh/hr)	Flow Scaling Factor (%)
A	FLAT	✓	483.00	100.000
B	FLAT	✓	7.00	100.000

C	FLAT	✓	593.00	100.000
D	FLAT	✓	597.00	100.000

Turning Proportions

Turning Counts or Proportions (Veh/hr) - Junction 1 (for whole period)

		To			
		A	B	C	D
From	A	0.000	0.000	280.000	203.000
	B	1.000	0.000	6.000	0.000
	C	209.000	4.000	0.000	380.000
	D	195.000	1.000	401.000	0.000

Turning Proportions (Veh) - Junction 1 (for whole period)

		To			
		A	B	C	D
From	A	0.00	0.00	0.58	0.42
	B	0.14	0.00	0.86	0.00
	C	0.35	0.01	0.00	0.64
	D	0.33	0.00	0.67	0.00

Vehicle Mix

Average PCU Per Vehicle - Junction 1 (for whole period)

		To			
		A	B	C	D
From	A	1.000	1.000	1.046	1.034
	B	1.000	1.000	1.000	1.000
	C	1.111	1.000	1.000	1.044
	D	1.082	1.000	1.063	1.000

Heavy Vehicle Percentages - Junction 1 (for whole period)

		To			
		A	B	C	D
From	A	0.000	0.000	4.640	3.370
	B	0.000	0.000	0.000	0.000
	C	11.060	0.000	0.000	4.350
	D	8.170	0.000	6.260	0.000

Results

Results Summary for whole modelled period

Arm	Max RFC	Max Delay (min)	Max Queue (Veh)	Max LOS	Average Demand (Veh/hr)	Total Junction Arrivals (Veh)	Total Queueing Delay (Veh-min)	Average Queueing Delay (min)	Rate Of Queueing Delay (Veh-min/min)	Inclusive Total Queueing Delay (Veh-min)	Inclusive Average Queueing Delay (min)
A	1.00	2.78	21.69	F	483.00	483.00	833.60	1.73	13.89	862.91	1.79
B	0.05	0.41	0.05	C	7.00	7.00	2.64	0.38	0.04	2.64	0.38
C	0.89	0.75	7.07	E	593.00	593.00	358.34	0.60	5.97	360.58	0.61
D	0.86	0.59	5.65	E	597.00	597.00	298.16	0.50	4.97	299.53	0.50

Main Results for each time segment

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

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Entry Flow (Veh/hr)	Exit Flow (Veh/hr)	Circulating Flow (Veh/hr)	Pedestrian Demand (Ped/hr)	Capacity (Veh/hr)	Saturation Capacity (Veh/hr)	RFC	Start Queue (Veh)	End Queue (Veh)	Delay (min)	LOS
A	483.00	120.75	443.96	391.08	393.15	0.00	489.45	450.51	0.987	0.00	9.76	0.971	F
B	7.00	1.75	6.84	4.82	832.29	0.00	175.86	133.95	0.040	0.00	0.04	0.355	C
C	593.00	148.25	571.04	651.56	187.57	0.00	675.09	661.64	0.878	0.00	5.49	0.503	D
D	597.00	149.25	578.13	552.52	206.09	0.00	700.70	667.31	0.852	0.00	4.72	0.439	D

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

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Entry Flow (Veh/hr)	Exit Flow (Veh/hr)	Circulating Flow (Veh/hr)	Pedestrian Demand (Ped/hr)	Capacity (Veh/hr)	Saturation Capacity (Veh/hr)	RFC	Start Queue (Veh)	End Queue (Veh)	Delay (min)	LOS
A	483.00	120.75	463.41	402.98	404.44	0.00	482.20	450.51	1.002	9.76	14.66	1.855	F
B	7.00	1.75	6.98	4.97	862.87	0.00	156.78	133.95	0.045	0.04	0.05	0.400	C
C	593.00	148.25	589.40	674.09	195.76	0.00	669.67	661.64	0.886	5.49	6.39	0.693	E
D	597.00	149.25	594.72	572.46	212.71	0.00	696.18	667.31	0.858	4.72	5.29	0.566	D

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

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Entry Flow (Veh/hr)	Exit Flow (Veh/hr)	Circulating Flow (Veh/hr)	Pedestrian Demand (Ped/hr)	Capacity (Veh/hr)	Saturation Capacity (Veh/hr)	RFC	Start Queue (Veh)	End Queue (Veh)	Delay (min)	LOS
A	483.00	120.75	467.81	404.09	405.36	0.00	481.61	450.51	1.003	14.66	18.46	2.367	F
B	7.00	1.75	6.99	4.99	868.19	0.00	153.48	133.95	0.046	0.05	0.05	0.410	C
C	593.00	148.25	591.29	677.56	197.61	0.00	668.44	661.64	0.887	6.39	6.81	0.734	E
D	597.00	149.25	596.07	575.52	213.39	0.00	695.72	667.31	0.858	5.29	5.52	0.585	E

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

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Entry Flow (Veh/hr)	Exit Flow (Veh/hr)	Circulating Flow (Veh/hr)	Pedestrian Demand (Ped/hr)	Capacity (Veh/hr)	Saturation Capacity (Veh/hr)	RFC	Start Queue (Veh)	End Queue (Veh)	Delay (min)	LOS
A	483.00	120.75	470.08	404.47	405.65	0.00	481.43	450.51	1.003	18.46	21.69	2.785	F
B	7.00	1.75	7.00	4.99	870.74	0.00	151.89	133.95	0.046	0.05	0.05	0.414	C
C	593.00	148.25	591.98	679.17	198.57	0.00	667.81	661.64	0.888	6.81	7.07	0.755	E
D	597.00	149.25	596.49	576.92	213.63	0.00	695.55	667.31	0.858	5.52	5.65	0.592	E

Queueing Delay Results for each time segment**Queueing Delay results: (08:00-08:15)**

Arm	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (min)	Unsignalised Level Of Service	Signalised Level Of Service
A	97.21	6.48	0.971	F	E
B	0.56	0.04	0.355	C	C
C	64.40	4.29	0.503	D	C
D	57.12	3.81	0.439	D	C

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

Arm	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (min)	Unsignalised Level Of Service	Signalised Level Of Service
A	185.42	12.36	1.855	F	F
B	0.67	0.04	0.400	C	C
C	90.26	6.02	0.693	E	D
D	75.88	5.06	0.566	D	C

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

Arm	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (min)	Unsignalised Level Of Service	Signalised Level Of Service
A	249.34	16.62	2.367	F	F
B	0.70	0.05	0.410	C	C
C	99.38	6.63	0.734	E	D
D	81.29	5.42	0.585	E	D

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

Arm	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (min)	Unsignalised Level Of Service	Signalised Level Of Service
A	301.63	20.11	2.785	F	F
B	0.71	0.05	0.414	C	C
C	104.30	6.95	0.755	E	D
D	83.87	5.59	0.592	E	D

Junctions 8				
ARCADY 8 - Roundabout Module				
Version: 8.0.2.316 [14 Feb 2013] © Copyright TRL Limited, 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				
The users of this computer program for the solution of an engineering problem are in no way relieved of their responsibility for the correctness of the solution				

Filename: 2018 Predicted PM Assessment - Flat Profile (5% Reassignment).arc8

Path: Y:\2010\10-226 to 10-250\10-228 CEG, Whalley\Techinca\TA - Jan 2013\Predicted Models - 'With Link Road' (260 Dwellings)\ARCADY\Clitheroe Road-Brookes Lane-King Street-Station Road

Report generation date: 25/04/2013 12:20:33

Summary of junction performance

	PM Peak			
	Queue (Veh)	Delay (min)	RFC	LOS
Existing Layout - 2018 Predicted				
Arm A	5.49	0.84	0.86	F
Arm B	0.04	0.33	0.04	C
Arm C	4.58	0.51	0.83	D
Arm D	5.58	0.57	0.86	D

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

"D2 - 2018 Base, PM Peak" model duration: 16:30 - 17:30

"D3 - 2018 Predicted, PM Peak " model duration: 16:30 - 17:30

Run using Junctions 8.0.2.316 at 25/04/2013 12:20:32

File summary

File Description

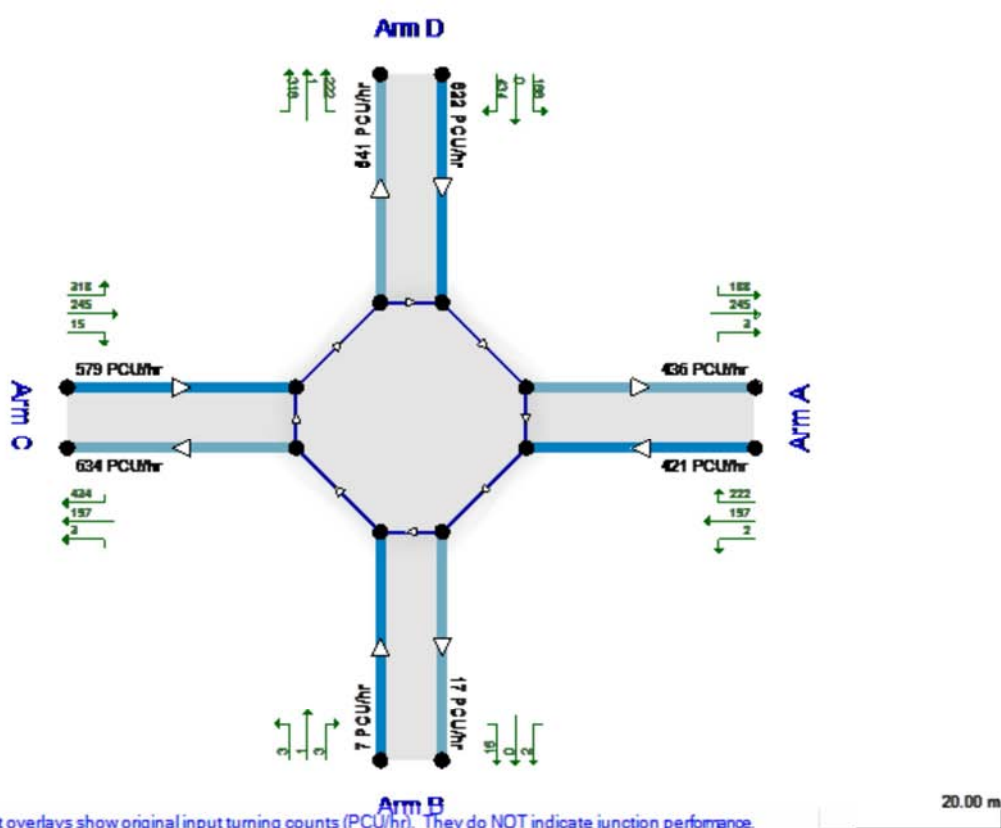
Title	2018 Predicted PM Assessment (5% Reassignment)
Location	Clitheroe Road-Brookes Lane-King Street-Station Road
Site Number	
Date	25/04/2013
Version	
Status	Completed
Identifier	
Client	CEG
Jobnumber	10/228
Enumerator	A McGarrell
Description	

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	Veh	Veh	perHour	min	-Min	perMin



The junction diagram reflects the last run of ARCADY.

Existing Layout - 2018 Predicted, PM Peak

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
Existing Layout	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
2018 Predicted, PM Peak	2018 Predicted	PM Peak	5% Reassignment	FLAT	16:30	17:30	60	15				✓		

Junction Network

Junctions

Name	Junction Type	Arm Order	Junction Delay (min)	Junction LOS
untitled	Mini-roundabout	A,B,C,D	0.61	E

Junction Network Options

Driving Side	Lighting	Road Surface	In London
Left	Normal/unknown	Normal/unknown	

Arms

Arms

Arm	Name	Description
A	Clitheroe Road	
B	Brookes Lane	
C	King Street	
D	Station Road	

Capacity Options

Arm	Minimum Capacity (PCU/hr)	Maximum Capacity (PCU/hr)	Assume Flat Start Profile	Initial Queue (PCU)
A	0.00	99999.00		0.00
B	0.00	99999.00		0.00
C	0.00	99999.00		0.00
D	0.00	99999.00		0.00

Mini Roundabout Geometry

Arm	Approach road half-width (m)	Minimum approach road half-width (m)	Entry width (m)	Effective flare length (m)	Distance to next arm (m)	Entry corner kerb line distance (m)	Gradient over 50m (%)	Kerbed central island
A	3.10	3.10	3.10	0.00	10.96	3.98	-2.40	
B	2.40	2.40	3.30	0.01	14.52	5.33	-2.40	
C	3.00	3.00	4.50	2.31	13.75	10.37	3.00	
D	3.00	3.00	3.40	1.13	16.41	13.20	2.50	

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

Pedestrian Crossings

Arm	Crossing Type
A	None
B	None
C	None
D	None

Slope / Intercept / Capacity

Roundabout Slope and Intercept used in model

Arm	Enter slope and intercept directly	Entered slope	Entered intercept (PCU/hr)	Final Slope	Final Intercept (PCU/hr)
A		(calculated)	(calculated)	0.629	772.308
B		(calculated)	(calculated)	0.595	696.183
C		(calculated)	(calculated)	0.683	852.697
D		(calculated)	(calculated)	0.658	899.081

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

Arm	Profile Type	Use Turning Counts	Average Demand Flow (Veh/hr)	Flow Scaling Factor (%)
A	FLAT	✓	414.00	100.000
B	FLAT	✓	7.00	100.000

C	FLAT	✓	563.00	100.000
D	FLAT	✓	614.00	100.000

Turning Proportions

Turning Counts or Proportions (Veh/hr) - Junction 1 (for whole period)

		To			
		A	B	C	D
From	A	0.000	2.000	193.000	219.000
	B	3.000	0.000	3.000	1.000
	C	236.000	15.000	0.000	312.000
	D	188.000	0.000	426.000	0.000

Turning Proportions (Veh) - Junction 1 (for whole period)

		To			
		A	B	C	D
From	A	0.00	0.00	0.47	0.53
	B	0.43	0.00	0.43	0.14
	C	0.42	0.03	0.00	0.55
	D	0.31	0.00	0.69	0.00

Vehicle Mix

Average PCU Per Vehicle - Junction 1 (for whole period)

		To			
		A	B	C	D
From	A	1.000	1.000	1.022	1.012
	B	1.000	1.000	1.000	1.000
	C	1.039	1.000	1.000	1.021
	D	1.000	1.000	1.018	1.000

Heavy Vehicle Percentages - Junction 1 (for whole period)

		To			
		A	B	C	D
From	A	0.000	0.000	2.160	1.200
	B	0.000	0.000	0.000	0.000
	C	3.920	0.000	0.000	2.060
	D	0.000	0.000	1.800	0.000

Results

Results Summary for whole modelled period

Arm	Max RFC	Max Delay (min)	Max Queue (Veh)	Max LOS	Average Demand (Veh/hr)	Total Junction Arrivals (Veh)	Total Queueing Delay (Veh-min)	Average Queueing Delay (min)	Rate Of Queueing Delay (Veh-min/min)	Inclusive Total Queueing Delay (Veh-min)	Inclusive Average Queueing Delay (min)
A	0.86	0.84	5.49	F	414.00	414.00	279.64	0.68	4.66	281.52	0.68
B	0.04	0.33	0.04	C	7.00	7.00	2.16	0.31	0.04	2.16	0.31
C	0.83	0.51	4.58	D	563.00	563.00	246.60	0.44	4.11	247.52	0.44
D	0.86	0.57	5.58	D	614.00	614.00	296.08	0.48	4.93	297.38	0.48

Main Results for each time segment

Main results: (16:30-16:45)

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Entry Flow (Veh/hr)	Exit Flow (Veh/hr)	Circulating Flow (Veh/hr)	Pedestrian Demand (Ped/hr)	Capacity (Veh/hr)	Saturation Capacity (Veh/hr)	RFC	Start Queue (Veh)	End Queue (Veh)	Delay (min)	LOS
A	414.00	103.50	397.01	414.56	427.52	0.00	490.48	458.98	0.844	0.00	4.25	0.568	D
B	7.00	1.75	6.86	16.50	808.03	0.00	207.29	140.79	0.034	0.00	0.03	0.299	C
C	563.00	140.75	547.19	600.97	213.93	0.00	685.69	612.76	0.821	0.00	3.95	0.397	C
D	614.00	153.50	595.18	514.23	246.89	0.00	721.72	664.74	0.851	0.00	4.70	0.426	D

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

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Entry Flow (Veh/hr)	Exit Flow (Veh/hr)	Circulating Flow (Veh/hr)	Pedestrian Demand (Ped/hr)	Capacity (Veh/hr)	Saturation Capacity (Veh/hr)	RFC	Start Queue (Veh)	End Queue (Veh)	Delay (min)	LOS
A	414.00	103.50	410.99	425.67	439.45	0.00	482.97	458.98	0.857	4.25	5.00	0.778	E
B	7.00	1.75	6.99	16.94	833.49	0.00	191.89	140.79	0.036	0.03	0.04	0.324	C
C	563.00	140.75	561.42	619.08	221.40	0.00	680.67	612.76	0.827	3.95	4.35	0.490	D
D	614.00	153.50	611.82	529.53	253.29	0.00	717.42	664.74	0.856	4.70	5.25	0.546	D

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

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Entry Flow (Veh/hr)	Exit Flow (Veh/hr)	Circulating Flow (Veh/hr)	Pedestrian Demand (Ped/hr)	Capacity (Veh/hr)	Saturation Capacity (Veh/hr)	RFC	Start Queue (Veh)	End Queue (Veh)	Delay (min)	LOS
A	414.00	103.50	412.73	426.48	440.38	0.00	482.38	458.98	0.858	5.00	5.32	0.820	E
B	7.00	1.75	7.00	16.98	836.14	0.00	190.29	140.79	0.037	0.04	0.04	0.327	C
C	563.00	140.75	562.39	620.81	222.33	0.00	680.04	612.76	0.828	4.35	4.50	0.501	D
D	614.00	153.50	613.13	530.99	253.73	0.00	717.12	664.74	0.856	5.25	5.46	0.562	D

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

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Entry Flow (Veh/hr)	Exit Flow (Veh/hr)	Circulating Flow (Veh/hr)	Pedestrian Demand (Ped/hr)	Capacity (Veh/hr)	Saturation Capacity (Veh/hr)	RFC	Start Queue (Veh)	End Queue (Veh)	Delay (min)	LOS
A	414.00	103.50	413.30	426.72	440.67	0.00	482.20	458.98	0.859	5.32	5.49	0.838	F
B	7.00	1.75	7.00	16.99	836.98	0.00	189.78	140.79	0.037	0.04	0.04	0.328	C
C	563.00	140.75	562.68	621.35	222.63	0.00	679.84	612.76	0.828	4.50	4.58	0.506	D
D	614.00	153.50	613.53	531.45	253.86	0.00	717.04	664.74	0.856	5.46	5.58	0.568	D

Queueing Delay Results for each time segment**Queueing Delay results: (16:30-16:45)**

Arm	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (min)	Unsignalised Level Of Service	Signalised Level Of Service
A	50.34	3.36	0.568	D	C
B	0.48	0.03	0.299	C	B
C	49.13	3.28	0.397	C	C
D	57.17	3.81	0.426	D	C

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

Arm	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (min)	Unsignalised Level Of Service	Signalised Level Of Service
A	70.45	4.70	0.778	E	D
B	0.55	0.04	0.324	C	B
C	62.86	4.19	0.490	D	C
D	75.44	5.03	0.546	D	C

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

Arm	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (min)	Unsignalised Level Of Service	Signalised Level Of Service
A	77.67	5.18	0.820	E	D
B	0.56	0.04	0.327	C	B
C	66.48	4.43	0.501	D	C
D	80.55	5.37	0.562	D	C

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

Arm	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (min)	Unsignalised Level Of Service	Signalised Level Of Service
A	81.19	5.41	0.838	F	D
B	0.57	0.04	0.328	C	B
C	68.13	4.54	0.506	D	C
D	82.93	5.53	0.568	D	C

Junctions 8				
ARCADY 8 - Roundabout Module				
Version: 8.0.2.316 [14 Feb 2013] © Copyright TRL Limited, 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				
The users of this computer program for the solution of an engineering problem are in no way relieved of their responsibility for the correctness of the solution				

Filename: 2018 Predicted AM Assessment - Flat Profile (5% Reassignment).arc8

Path: Y:\2010\10-226 to 10-250\10-228 CEG, Whalley\Techinca\TA - Jan 2013\Predicted Models - 'With Link Road' (260 Dwellings)\ARCADY\B6246 King Street-Accrington Road-King Street

Report generation date: 25/04/2013 12:23:53

Summary of junction performance

	AM Peak			
	Queue (Veh)	Delay (min)	RFC	LOS
Existing Layout - 2018 Predicted				
Arm A	72.80	6.03	1.10	F
Arm B	3.24	0.46	0.77	D
Arm C	5.68	0.68	0.86	E

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

"D2 - 2018 Base, AM Peak" model duration: 08:00 - 09:00

"D3 - 2018 Predicted, AM Peak " model duration: 08:00 - 09:00

Run using Junctions 8.0.2.316 at 25/04/2013 12:23:52

File summary

File Description

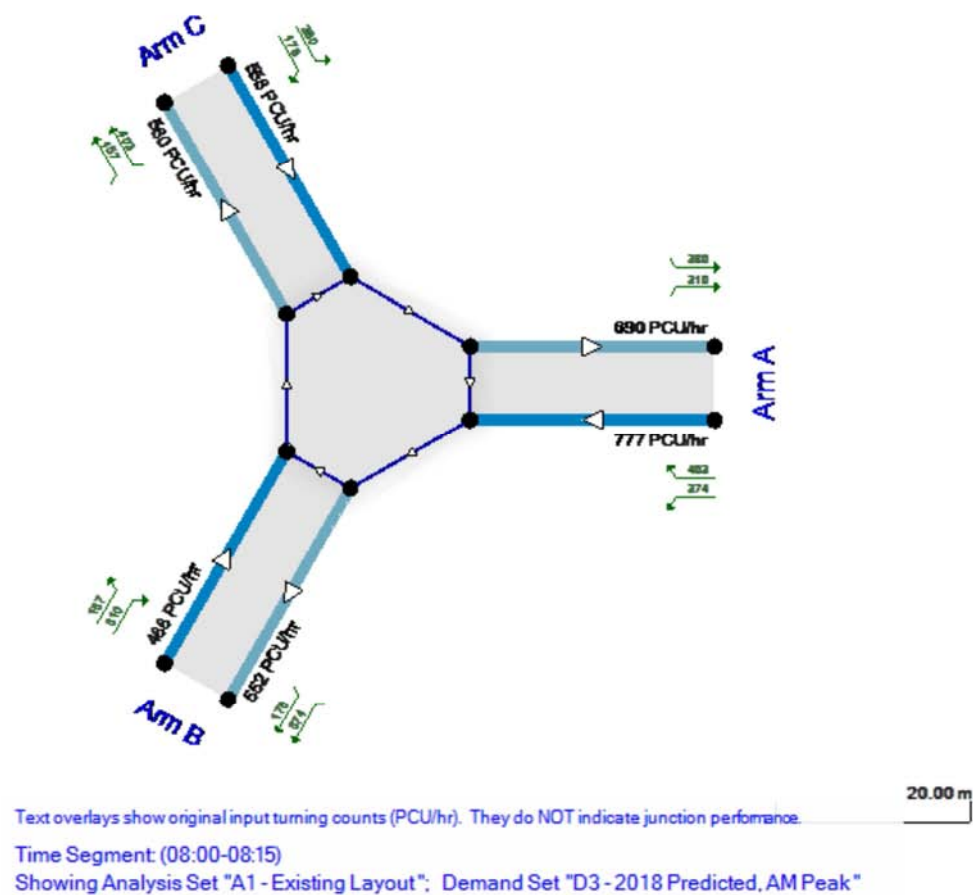
Title	2018 Predicted AM Assessment (5% Reassignment)
Location	B6246 King Street-Accrington Road-King Street
Site Number	
Date	25/04/2013
Version	
Status	Completed
Identifier	
Client	CEG
Jobnumber	10/228
Enumerator	A McGarrell
Description	

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	Veh	Veh	perHour	min	-Min	perMin



The junction diagram reflects the last run of ARCADY.

Existing Layout - 2018 Predicted, AM Peak

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
Existing Layout	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
2018 Predicted, AM Peak	2018 Predicted	AM Peak	5% Reassignment	FLAT	08:00	09:00	60	15				✓		

Junction Network

Junctions

Name	Junction Type	Arm Order	Junction Delay (min)	Junction LOS
untitled	Mini-roundabout	A,B,C	2.93	F

Junction Network Options

Driving Side	Lighting	Road Surface	In London
Left	Normal/unknown	Normal/unknown	

Arms

Arms

Arm	Name	Description
A	B6246 King Street	
B	B6246 Accrington Road	
C	King Street	

Capacity Options

Arm	Minimum Capacity (PCU/hr)	Maximum Capacity (PCU/hr)	Assume Flat Start Profile	Initial Queue (PCU)
A	0.00	99999.00		0.00
B	0.00	99999.00		0.00
C	0.00	99999.00		0.00

Mini Roundabout Geometry

Arm	Approach road half-width (m)	Minimum approach road half-width (m)	Entry width (m)	Effective flare length (m)	Distance to next arm (m)	Entry corner kerb line distance (m)	Gradient over 50m (%)	Kerbed central island
A	3.70	3.70	3.70	0.00	13.90	12.60	0.00	
B	3.70	3.70	4.55	3.10	12.40	7.10	0.00	
C	3.30	3.30	3.65	5.80	16.00	15.50	0.00	

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

Pedestrian Crossings

Arm	Crossing Type
A	None
B	None
C	None

Slope / Intercept / Capacity

Roundabout Slope and Intercept used in model

Arm	Enter slope and intercept directly	Entered slope	Entered intercept (PCU/hr)	Final Slope	Final Intercept (PCU/hr)
A		(calculated)	(calculated)	0.553	806.665
B		(calculated)	(calculated)	0.563	811.282
C		(calculated)	(calculated)	0.594	832.868

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

Arm	Profile Type	Use Turning Counts	Average Demand Flow (Veh/hr)	Flow Scaling Factor (%)
A	FLAT	✓	728.00	100.000
B	FLAT	✓	439.00	100.000
C	FLAT	✓	527.00	100.000

Turning Proportions

Turning Counts or Proportions (Veh/hr) - Junction 1 (for whole period)

From	To		
	A	B	C
	0.000	343.000	385.000
	286.000	0.000	153.000
	357.000	170.000	0.000

Turning Proportions (Veh) - Junction 1 (for whole period)

From	To		
	A	B	C
	0.00	0.47	0.53
	0.65	0.00	0.35
	0.68	0.32	0.00

Vehicle Mix

Average PCU Per Vehicle - Junction 1 (for whole period)

From	To		
	A	B	C
	1.000	1.091	1.047
	1.083	1.000	1.024
	1.065	1.047	1.000

Heavy Vehicle Percentages - Junction 1 (for whole period)

From	To		
	A	B	C
	0.000	9.070	4.690
	8.280	0.000	2.430
	6.450	4.700	0.000

Results

Results Summary for whole modelled period

Arm	Max RFC	Max Delay (min)	Max Queue (Veh)	Max LOS	Average Demand (Veh/hr)	Total Junction Arrivals (Veh)	Total Queueing Delay (Veh-min)	Average Queueing Delay (min)	Rate Of Queueing Delay (Veh-min/min)	Inclusive Total Queueing Delay (Veh-min)	Inclusive Average Queueing Delay (min)
A	1.10	6.03	72.80	F	728.00	728.00	2351.14	3.23	39.19	2590.77	3.56
B	0.77	0.46	3.24	D	439.00	439.00	177.83	0.41	2.96	178.38	0.41
C	0.86	0.68	5.68	E	527.00	527.00	296.96	0.56	4.95	298.54	0.57

Main Results for each time segment

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

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Entry Flow (Veh/hr)	Exit Flow (Veh/hr)	Circulating Flow (Veh/hr)	Pedestrian Demand (Ped/hr)	Capacity (Veh/hr)	Saturation Capacity (Veh/hr)	RFC	Start Queue (Veh)	End Queue (Veh)	Delay (min)	LOS
A	728.00	182.00	638.22	622.88	163.98	0.00	666.65	657.52	1.092	0.00	22.45	1.300	F
B	439.00	109.75	427.52	464.68	337.52	0.00	576.52	570.87	0.761	0.00	2.87	0.378	C
C	527.00	131.75	508.33	486.52	278.52	0.00	617.26	560.49	0.854	0.00	4.67	0.490	D

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

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Entry Flow (Veh/hr)	Exit Flow (Veh/hr)	Circulating Flow (Veh/hr)	Pedestrian Demand (Ped/hr)	Capacity (Veh/hr)	Saturation Capacity (Veh/hr)	RFC	Start Queue (Veh)	End Queue (Veh)	Delay (min)	LOS
A	728.00	182.00	659.13	640.69	169.20	0.00	663.82	657.52	1.097	22.45	39.66	3.066	F
B	439.00	109.75	438.02	479.75	348.58	0.00	570.39	570.87	0.770	2.87	3.11	0.446	D
C	527.00	131.75	524.53	501.24	285.36	0.00	613.10	560.49	0.860	4.67	5.28	0.643	E

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

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Entry Flow (Veh/hr)	Exit Flow (Veh/hr)	Circulating Flow (Veh/hr)	Pedestrian Demand (Ped/hr)	Capacity (Veh/hr)	Saturation Capacity (Veh/hr)	RFC	Start Queue (Veh)	End Queue (Veh)	Delay (min)	LOS
A	728.00	182.00	661.31	642.09	169.67	0.00	663.56	657.52	1.097	39.66	56.33	4.554	F

B	439.00	109.75	438.66	481.25	349.73	0.00	569.75	570.87	0.771	3.11	3.20	0.454	D
C	527.00	131.75	525.99	502.61	285.78	0.00	612.85	560.49	0.860	5.28	5.54	0.666	E

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

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Entry Flow (Veh/hr)	Exit Flow (Veh/hr)	Circulating Flow (Veh/hr)	Pedestrian Demand (Ped/hr)	Capacity (Veh/hr)	Saturation Capacity (Veh/hr)	RFC	Start Queue (Veh)	End Queue (Veh)	Delay (min)	LOS
A	728.00	182.00	662.14	642.51	169.82	0.00	663.48	657.52	1.097	56.33	72.80	6.027	F
B	439.00	109.75	438.83	481.79	350.17	0.00	569.51	570.87	0.771	3.20	3.24	0.456	D
C	527.00	131.75	526.45	503.11	285.89	0.00	612.78	560.49	0.860	5.54	5.68	0.676	E

Queueing Delay Results for each time segment**Queueing Delay results: (08:00-08:15)**

Arm	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (min)	Unsignalised Level Of Service	Signalised Level Of Service
A	194.96	13.00	1.300	F	E
B	36.71	2.45	0.378	C	C
C	55.83	3.72	0.490	D	C

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

Arm	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (min)	Unsignalised Level Of Service	Signalised Level Of Service
A	467.10	31.14	3.066	F	F
B	45.32	3.02	0.446	D	C
C	75.51	5.03	0.643	E	D

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

Arm	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (min)	Unsignalised Level Of Service	Signalised Level Of Service
A	720.39	48.03	4.554	F	F
B	47.45	3.16	0.454	D	C
C	81.40	5.43	0.666	E	D

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

Arm	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (min)	Unsignalised Level Of Service	Signalised Level Of Service
A	968.69	64.58	6.027	F	F
B	48.36	3.22	0.456	D	C
C	84.21	5.61	0.676	E	D

Junctions 8				
ARCADY 8 - Roundabout Module				
Version: 8.0.2.316 [14 Feb 2013] © Copyright TRL Limited, 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				
The users of this computer program for the solution of an engineering problem are in no way relieved of their responsibility for the correctness of the solution				

Filename: 2018 Predicted PM Assessment - Flat Profile (5% Reassignment).arc8

Path: Y:\2010\10-226 to 10-250\10-228 CEG, Whalley\Techinca\TA - Jan 2013\Predicted Models - 'With Link Road' (260 Dwellings)\ARCADY\B6246 King Street-Accrington Road-King Street

Report generation date: 25/04/2013 12:24:33

Summary of junction performance

	PM Peak			
	Queue (Veh)	Delay (min)	RFC	LOS
Existing Layout - 2018 Predicted				
Arm A	30.28	2.65	1.01	F
Arm B	1.91	0.29	0.66	C
Arm C	4.34	0.48	0.82	D

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

"D2 - 2018 Base, PM Peak" model duration: 16:30 - 17:30

"D3 - 2018 Predicted, PM Peak " model duration: 16:30 - 17:30

Run using Junctions 8.0.2.316 at 25/04/2013 12:24:32

File summary

File Description

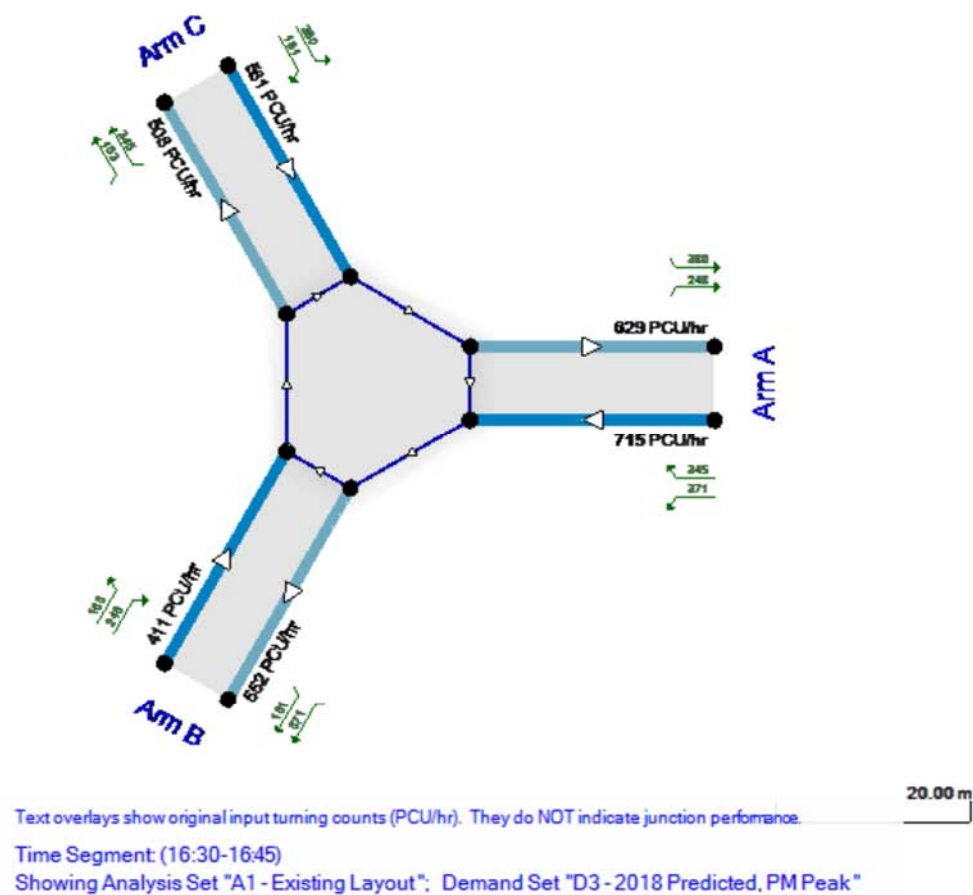
Title	2018 Predicted PM Assessment (5% Reassignment)
Location	B6246 King Street-Accrington Road-King Street
Site Number	
Date	25/04/2013
Version	
Status	Completed
Identifier	
Client	CEG
Jobnumber	10/228
Enumerator	A McGarrell
Description	

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	Veh	Veh	perHour	min	-Min	perMin



The junction diagram reflects the last run of ARCADY.

Existing Layout - 2018 Predicted, PM Peak

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
Existing Layout	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
2018 Predicted, PM Peak	2018 Predicted	PM Peak	5% Reassignment	FLAT	16:30	17:30	60	15				✓		

Junction Network

Junctions

Name	Junction Type	Arm Order	Junction Delay (min)	Junction LOS
untitled	Mini-roundabout	A,B,C	1.35	F

Junction Network Options

Driving Side	Lighting	Road Surface	In London
Left	Normal/unknown	Normal/unknown	

Arms

Arms

Arm	Name	Description
A	B6246 King Street	
B	B6246 Accrington Road	
C	King Street	

Capacity Options

Arm	Minimum Capacity (PCU/hr)	Maximum Capacity (PCU/hr)	Assume Flat Start Profile	Initial Queue (PCU)
A	0.00	99999.00		0.00
B	0.00	99999.00		0.00
C	0.00	99999.00		0.00

Mini Roundabout Geometry

Arm	Approach road half-width (m)	Minimum approach road half-width (m)	Entry width (m)	Effective flare length (m)	Distance to next arm (m)	Entry corner kerb line distance (m)	Gradient over 50m (%)	Kerbed central island
A	3.70	3.70	3.70	0.00	13.90	12.60	0.00	
B	3.70	3.70	4.55	3.10	12.40	7.10	0.00	
C	3.30	3.30	3.65	5.80	16.00	15.50	0.00	

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

Pedestrian Crossings

Arm	Crossing Type
A	None
B	None
C	None

Slope / Intercept / Capacity

Roundabout Slope and Intercept used in model

Arm	Enter slope and intercept directly	Entered slope	Entered intercept (PCU/hr)	Final Slope	Final Intercept (PCU/hr)
A		(calculated)	(calculated)	0.553	806.665
B		(calculated)	(calculated)	0.563	811.282
C		(calculated)	(calculated)	0.594	832.868

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

Arm	Profile Type	Use Turning Counts	Average Demand Flow (Veh/hr)	Flow Scaling Factor (%)
A	FLAT	✓	699.00	100.000
B	FLAT	✓	401.00	100.000
C	FLAT	✓	555.00	100.000

Turning Proportions

Turning Counts or Proportions (Veh/hr) - Junction 1 (for whole period)

From	To		
	A	B	C
	A	0.000	361.000
	B	238.000	0.000
	C	374.000	181.000

Turning Proportions (Veh) - Junction 1 (for whole period)

From	To		
	A	B	C
	A	0.00	0.52
	B	0.59	0.00
	C	0.67	0.33

Vehicle Mix

Average PCU Per Vehicle - Junction 1 (for whole period)

From	To		
	A	B	C
	A	1.000	1.027
	B	1.043	1.000
	C	1.017	1.000

Heavy Vehicle Percentages - Junction 1 (for whole period)

From	To		
	A	B	C
	A	0.000	2.700
	B	4.330	0.000
	C	1.730	0.000

Results

Results Summary for whole modelled period

Arm	Max RFC	Max Delay (min)	Max Queue (Veh)	Max LOS	Average Demand (Veh/hr)	Total Junction Arrivals (Veh)	Total Queueing Delay (Veh-min)	Average Queueing Delay (min)	Rate Of Queueing Delay (Veh-min/min)	Inclusive Total Queueing Delay (Veh-min)	Inclusive Average Queueing Delay (min)
A	1.01	2.65	30.28	F	699.00	699.00	1147.47	1.64	19.12	1187.32	1.70
B	0.66	0.29	1.91	C	401.00	401.00	108.13	0.27	1.80	108.31	0.27
C	0.82	0.48	4.34	D	555.00	555.00	236.55	0.43	3.94	237.39	0.43

Main Results for each time segment

Main results: (16:30-16:45)

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Entry Flow (Veh/hr)	Exit Flow (Veh/hr)	Circulating Flow (Veh/hr)	Pedestrian Demand (Ped/hr)	Capacity (Veh/hr)	Saturation Capacity (Veh/hr)	RFC	Start Queue (Veh)	End Queue (Veh)	Delay (min)	LOS
A	699.00	174.75	645.15	597.44	175.98	0.00	693.07	681.96	1.009	0.00	13.46	0.885	F
B	401.00	100.25	393.92	509.17	311.96	0.00	616.51	606.55	0.650	0.00	1.77	0.262	C
C	555.00	138.75	539.62	472.08	233.80	0.00	679.93	602.56	0.816	0.00	3.85	0.393	C

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

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Entry Flow (Veh/hr)	Exit Flow (Veh/hr)	Circulating Flow (Veh/hr)	Pedestrian Demand (Ped/hr)	Capacity (Veh/hr)	Saturation Capacity (Veh/hr)	RFC	Start Queue (Veh)	End Queue (Veh)	Delay (min)	LOS
A	699.00	174.75	672.34	610.93	180.59	0.00	690.58	681.96	1.012	13.46	20.13	1.726	F
B	401.00	100.25	400.63	527.82	325.11	0.00	609.15	606.55	0.658	1.77	1.86	0.287	C
C	555.00	138.75	553.74	487.95	237.78	0.00	677.49	602.56	0.819	3.85	4.16	0.474	D

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

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Entry Flow (Veh/hr)	Exit Flow (Veh/hr)	Circulating Flow (Veh/hr)	Pedestrian Demand (Ped/hr)	Capacity (Veh/hr)	Saturation Capacity (Veh/hr)	RFC	Start Queue (Veh)	End Queue (Veh)	Delay (min)	LOS
A	699.00	174.75	677.40	611.61	180.85	0.00	690.44	681.96	1.012	20.13	25.53	2.222	F

B	401.00	100.25	400.87	530.69	327.55	0.00	607.78	606.55	0.660	1.86	1.89	0.289	C
C	555.00	138.75	554.53	490.50	237.93	0.00	677.40	602.56	0.819	4.16	4.28	0.481	D

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

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Entry Flow (Veh/hr)	Exit Flow (Veh/hr)	Circulating Flow (Veh/hr)	Pedestrian Demand (Ped/hr)	Capacity (Veh/hr)	Saturation Capacity (Veh/hr)	RFC	Start Queue (Veh)	End Queue (Veh)	Delay (min)	LOS
A	699.00	174.75	679.99	611.80	180.92	0.00	690.40	681.96	1.012	25.53	30.28	2.645	F
B	401.00	100.25	400.93	532.10	328.81	0.00	607.08	606.55	0.661	1.89	1.91	0.291	C
C	555.00	138.75	554.75	491.78	237.96	0.00	677.38	602.56	0.819	4.28	4.34	0.484	D

Queueing Delay Results for each time segment**Queueing Delay results: (16:30-16:45)**

Arm	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (min)	Unsignalised Level Of Service	Signalised Level Of Service
A	130.38	8.69	0.885	F	D
B	23.92	1.59	0.262	C	B
C	47.98	3.20	0.393	C	C

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

Arm	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (min)	Unsignalised Level Of Service	Signalised Level Of Service
A	254.36	16.96	1.726	F	F
B	27.44	1.83	0.287	C	B
C	60.52	4.03	0.474	D	C

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

Arm	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (min)	Unsignalised Level Of Service	Signalised Level Of Service
A	343.51	22.90	2.222	F	F
B	28.21	1.88	0.289	C	B
C	63.39	4.23	0.481	D	C

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

Arm	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (min)	Unsignalised Level Of Service	Signalised Level Of Service
A	419.22	27.95	2.645	F	F
B	28.55	1.90	0.291	C	B
C	64.67	4.31	0.484	D	C

APPENDIX BGH 9

JOURNEY TIMES WITHOUT BOULEVARD IN PLACE

* Delay calculated using 2018 Base analysis

Route 1 - Accrington Road/A671 signal junction to Station Road/Clitheroe Road mini-roundabout

AM Peak

Route distance = 1,030 metres

Section 1 of Route:

60mph section of A671 = 500 metres. 500 metres @ 50mph = 22 seconds.

Section 2 of Route:

30mph section of Accrington Road and King Street = 530 metres. 530 metres @ 20mph = 59 seconds. Delay at Accrington Road/King Street mini-roundabout junction is 31 seconds. Total time taken over section is 1 minute and 30 seconds.

Route 1 = 1 minutes and 52 seconds.

PM Peak

Route distance = 1,030 metres

Section 1 of Route:

60mph Section of A671 = 500 metres. 500 metres @ 50 mph = 22 seconds.

Section 2 of Route:

30mph section of Accrington Road and King Street = 530 metres. 530 metres @ 20mph = 59 seconds. Delay at Accrington Road/King Street mini-roundabout junction is 18 seconds. Total time taken over section is 1 minute and 17 seconds.

Route 1 = 1 minutes and 39 seconds.

Route 2 - Station Road/Clitheroe Road mini-roundabout to Accrington Road/A671 signal junction

AM Peak

Route distance = 1,030metres

Section 1 of Route:

30mph section of Accrington Road and King Street = 530 metres. 530 metres @ 20mph = 59 seconds. Delay at Accrington Road/King Street mini-roundabout junction is 9 minutes 43 seconds. Total time taken over section is 10 minute and 42 seconds.

Section 2 of Route:

60mph section of A671 = 500 metres. 500 metres @ 50 mph = 22 seconds.

Route 1 = 11 minutes and 4 seconds.

PM Peak

Route distance = 1,030metres

Section 1 of Route:

30mph section of Accrington Road and King Street = 530 metres. 530 metres @ 20mph = 59 seconds. Delay at Accrington Road/King Street mini-roundabout junction is 4 minutes 40 seconds. Total time taken over section is 5 minute and 39 seconds.

Section 2 of Route:

60 mph section of A671 = 500 metres. 500 metres @ 50 mph = 22 seconds.

Route 1 = 6 minutes and 1 seconds.

JOURNEY TIMES WITH BOULEVARD IN PLACE

* Delay calculated using 2018 Predicted analysis

Route 1 - Accrington Road/A671 signal junction to Station Road/Clitheroe Road mini-roundabout via proposed Boulevard

AM Peak

Route distance = 1,480 metres

Section 1 of Route:

60mph section of A671 = 580 metres. 580 metres @ 50 mph = 26 seconds. Delay at proposed A671 site access junction is 6 seconds. Total time taken over section is 32 seconds.

Section 2 of Route:

30mph section of Link Road and Clitheroe Road section of route = 900 metres. 900 metres @ 20mph = 1 minute and 41 seconds. Delay at proposed Clitheroe Road site access junction is 7 seconds. Total time taken over section is 1 minute and 48 seconds.

Route 1 = 2 minutes and 20 Seconds

PM Peak

Route distance = 1,480 metres

Section 1 of Route:

60mph section of A671 = 580 metres. 580 metres @ 50 mph = 26 seconds. Delay at proposed A671 site access junction is 6 seconds. Total time taken over section is 32 seconds.

Section 2 of Route:

30mph section of Link Road and Clitheroe Road = 900 metres. 900 metres @ 20mph = 1 minute and 41 seconds. Delay at proposed Clitheroe Road site access junction is 7 seconds. Total time taken over section is 1 minute 48 seconds.

Route 1 = 2 minutes and 20 seconds.

Route 2 - Station Road/Clitheroe Road mini-roundabout to Accrington Road/A671 signal junction via proposed Boulevard

AM Peak

Route distance = 1,480 metres

Section 1 of Route:

30mph section of Clitheroe Road and Link Road = 900 metres. 900 metres @ 20mph = 1 minute and 41 seconds. Delay at proposed Clitheroe Road site access junction is 6 seconds. Total time taken over section is 1 minute 47 seconds.

Section 2 of Route:

60mph section of A671 = 580 metres. 580 metres @ 50 mph = 26 seconds. Delay at proposed A671 site access junction is 43 seconds. Total time taken over section is 1 minute 9 seconds.

Route 1 = 2 minutes and 56 seconds.

PM Peak

Route distance = 1,480 metres

Section 1 of Route:

30mph section of Clitheroe Road and Link Road = 900 metres. 900 metres @ 20mph = 1 minute and 41 seconds. Delay at proposed Clitheroe Road site access junction is 6 seconds. Total time taken over section is 1 minute 47 seconds.

Section 2 of Route:

60mph section of A671 = 580 metres. 580 metres @ 50 mph = 26 seconds. Delay at proposed A671 site access junction is 41 seconds. Total time taken over section is 1 minute 7 seconds.

Route 1 = 2 minutes and 54 seconds.

APPENDIX BGH 10

