Appendix 20
Roade Bypass Options Report

BWB

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Roxhill Developments
Northampton Gateway
Strategic Rail Freight Interchange

Roade Bypass Options Report

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Notice

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1.0 INTRODUCTION AND PURPOSE

Introduction

1.1 Roxhill (Junction 15) Limited (the Applicant), intends to submit an application for a Development Consent Order (DCO). The DCO will authorise the Applicant to construct and operate a Strategic Rail Freight Interchange (SRFI), which is a "nationally significant infrastructure project", as defined in the Planning Act 2008. It will therefore be the subject of an application to the Planning Inspectorate which will be determined by the Secretary of State for Transport.

1.2 The SRFI site is proposed on land to the west of the M1 motorway and to the east of the Northampton Loop railway line. It comprises a total of approximately 247 ha (610 acres) including the works associated with Junction 15.

1.3 The current proposals comprise:

- An intermodal freight terminal including container storage and HGV parking, rail sidings to serve individual warehouses, and with the capability to also provide a 'rapid rail freight' facility as part of the intermodal freight terminal;
- Up to 468,000 sq m (approximately 5 million sq ft) (gross internal area) of warehousing and ancillary buildings, with additional floorspace provided in the form of mezzanines;
- New road infrastructure and works to the existing road network, including the provision of a new access and associated works to the A508, a new bypass to the village of Roade, improvements to Junction 15 and to J15A of the M1 motorway, the A45, and other highway improvements at junctions on the local highway network;
- Strategic landscaping and tree planting, including diverted public rights of way;
- Earthworks and demolition of existing structures on the SRFI site.

1.4 This report examines the options considered for the bypass of the village of Roade and presents preliminary details of the preferred option to be taken forward in the DCO application.

Purpose

1.5 The purpose of this report is to capture and collate the data considered in the selection of the options for the bypass of Roade. It goes on to present the relative merits of each of the options, leading to a conclusion as to which of those options should be taken forward as part of the DCO application and, should the application be successful, designed in detail for subsequent construction. Preliminary details of the preferred option are presented as part of the conclusion.

1.6 This report does not include the justification as to why the Roade Bypass is required in mitigation for the proposed SRFI – this can be found in the Transport Assessment.

2.0 HISTORY, BACKGROUND AND EXISTING CONDITIONS

History and Background

2.1 The road network as currently found in and around the village of Roade is recognisable from earliest records. **Figure 1** shows the road and field layout from historic maps dating from early 1700 and 1800. Much of what can be seen is still evident today, albeit altered in some respects by more recent human interventions.

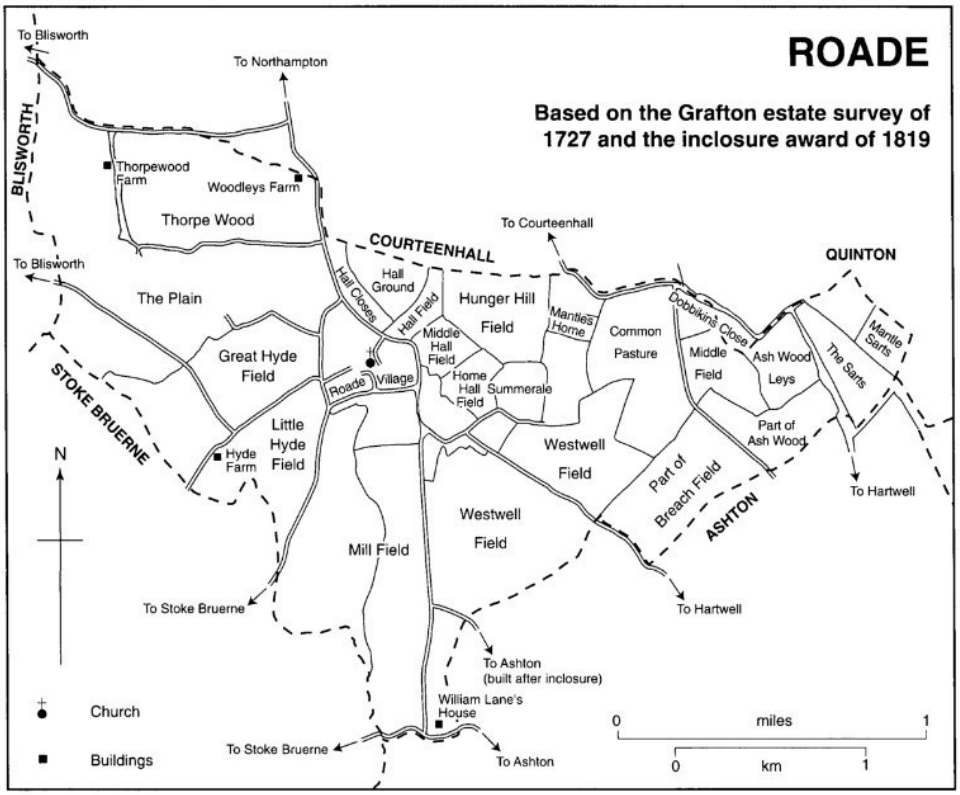

Figure 1: Roade in 1700 and 1800

2.2 A major impact on the village was brought about by construction of the London to Birmingham railway, which was opened in 1838. **Figure 2** below, when compared with **Figure 1** above, does however show that bridges constructed over the railway allowed the road network to retain the layout largely as seen before the time of the railway.

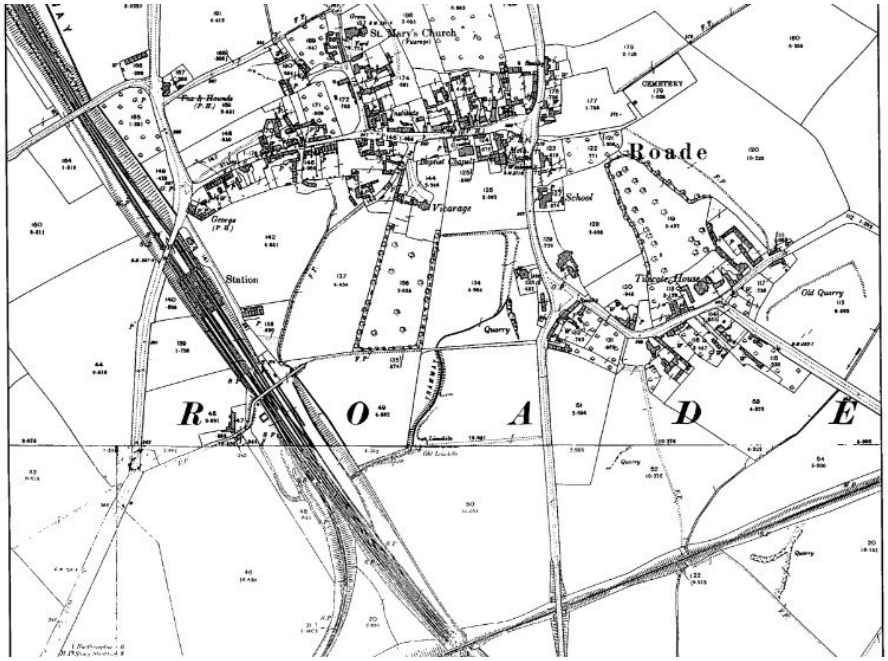

Figure 2: Roade after the construction of the railways

2.3 The railway brought about significant change in the village with growth in employment land uses and construction of associated housing and community facilities. Perhaps the most significant step in that growth process was the construction in the early 1950s of housing to the west of the railway. In spite of these significant changes, the road network serving the village remained (and remains) recognisable from earliest maps, as can be seen from the contemporary map in **Figure 3** and the aerial photograph in **Figure 4**.

Figure 3: Contemporary OS mapping

Figure 4: Roade as seen in contemporary aerial photography

Existing Conditions

2.4 The history described above presents an infrastructure network essentially unchanged from the early 1700s that is subjected to current traffic levels imposed by modern vehicle types. Whilst the roads themselves are generally recognisable as being to modern standards in terms of surfacing, lighting signage etc they are constrained by their historic alignments and features such as inappropriately sited priority junctions, the Stratford Road/High Street mini-roundabout and the narrow bridge carrying the A508 over the railway. In 2015 the annual average daily traffic flow (ADDT) through Roade on the A508 was 16,026 vehicles, with an average daily flow of 1083 HGVs[1].

2.5 The traffic conditions seen on a daily basis now are as would be expected of the summary description of the road network captured in the paragraph above. Stop start traffic is frequently seen and at peak times and queues of stationary traffic can quickly develop. Heavy goods vehicles travelling in opposing directions on the A508 bridge over the railway are often obliged to give way to each other as they are not able to pass safely on the bridge structure itself.

Predicted SRFI Development Traffic

2.6 The Proposed Development is forecast to generate around 16,500 two-way vehicle trips during a 24-hour period, of which around 4,200 two-way trips would be HGVs. Initial assessment suggested that around 10% of the development employee traffic and 9% of the development heavy goods vehicle (HGV) traffic, would use the A508 to travel to and from the south of the main site. This was confirmed by the strategic transport modelling[2] as 15% of light vehicles and, accounting for the proposed configuration of the site access that would prevent HGVs departing the development from travelling south on the A508, 9% of HGV arrivals to the development.

[1] DfT Count Point Id 57251 https://www.dft.gov.uk/traffic-counts/cp.php?la=Northamptonshire#57251

[2] Using the Northamptonshire Strategic Transport Model (NSTM2)

2.7 In doing so, some of this traffic would pass through the village of Roade. When compared to the current baseline conditions given above, the development could increase total daily traffic levels in Roade by around 13%. The development could also increase the daily number of HGVs passing through the village by some 17%, or around 190 daily HGV trips. This increase in HGVs would represent, on average, approximately one additional northbound HGV trip through the village every eight minutes.

2.8 Due to the aforementioned existing conditions at Roade, with the A508 bisecting the village and the existing congestion issues at the mini roundabout and the narrow railway bridge, it is considered that the above increases in traffic passing through the village would not be an acceptable development impact.

2.9 The proposals therefore include provision of a new Roade Bypass to take through traffic, particularly HGVs, out of the village centre. This would deliver transport and environmental benefits through Roade, including with regard to local air quality, noise, and reduced congestion.

3.0 INITIAL ROUTE OPTIONS

Overall design proposal

3.1 The bypass would be designed in accordance with the 'Design Manual for Roads and Bridges' and would incorporate, where required, suitable facilities for pedestrians, cyclists and equestrians (known as non-motorised users, or NMUs). It would include environmental mitigation where considered appropriate.

3.2 Based on the predicted traffic flows the bypass would be a Rural Single Carriageway subject to the national speed limit, with a design speed of 100kph. The cross section would be a Rural 'S2', which has a 7.3m carriageway and a 1m hardstrip either side.

3.3 Although the scheme is proposed as a single carriageway with the forecast flows being within the link capacity for a single carriageway, passive provision will be allowed for future dualling of the bypass as follows:

- The single carriageway cross section is the same as one half of a rural dual carriageway, and a second carriageway could be added on the rural side of the bypass i.e. farther from Roade;
- Any footway/cycleway route would be on the Roade side of the carriageway;
- The principal environmental mitigation bunds would be on the Roade side of the carriageway; and
- Roundabout junctions would generally be sized to permit dual carriageway approaches and exits.

Terminal Connection Points for all Bypass Options

3.4 Connection points to the existing A508 north and south of Roade for all bypass options considered were selected to keep all routes to a sensible minimum length in their own right, whilst respecting other apparent constraints. The purpose in adopting this approach is to minimise the overall environmental impact as well as limiting construction cost.

3.5 With the above approach adopted, obvious connection points to the north and south of Roade are readily evident. To the north, the relatively straight section of the existing A508 just north of the village "gateway" and south of the Woodleys Farmhouse Day Nursery property provides a potential location for either a connecting junction or for a tie in via a continuous bypass/existing A508 alignment.

3.6 To the south of Roade a likely point of connection, be it via either a junction or direct alignment connection between the bypass and the existing A508, is identified on the stretch of existing road at the approximate location of the crossing of the road by the now dismantled railway. Whilst the local topography might at first appear challenging, a preliminary assessment of how junction or direct connections might be made showed that this stretch of road does in fact provide suitable tie in location opportunities. Furthermore it is considered that the set of bends on the A508 immediately south of Roade can also be 'bypassed'.

3.7 All route options considered utilise connection points to the existing A508, be they via junctions or a continuous alignment, at the above described locations, as can be seen on **Figure 5** below.

Eastern Bypass Options

3.8 Route options are kept reasonably close to the built edge of the village to minimise incursion into open countryside. Keeping the routes as short as reasonably practicable will limit the environmental impact, construction cost and, importantly, reduce the risk that road users might be induced to continue to pass through the village rather than use a long bypass. Some separation between the routes and the village edge is however maintained to enable, with further design development, potentially intrusive impacts to be managed satisfactorily.

3.9 With the guiding principle set out above, and having identified no major topographical or other readily identifiable constraints to be considered, two possible routes for a bypass to the east of Roade are identified for consideration:-

- A route that skirts the edge of the village and passes in the narrow gap between it and the properties on Fox Covert Drive
- A route similar to the above but deviating from it to pass to the east (or "outer") side of the properties on Fox Covert Drive

3.10 Both route options are shown coloured pink in **Figure 5** below. It is immediately evident that these routes are unlikely to fare well when considered against routes to the west of Roade. They are both longer and provide a less direct connection between the existing A508 north and south of the village, making them less likely to attract traffic away from routes through the village. For this reason, no distinction is made between these two options in the further assessment that follows.

Western Bypass Options

3.11 For the same reasons set out in paragraph 3.7 above, route options to the west of Roade are kept reasonably close to the built edge of the village to minimise incursion into open countryside. No other readily identifiable constraints or major topographical features that might influence the route choices were noted and two possible routes for a bypass to the west of Roade are identified for consideration:-

- A route that skirts the edge of the village and passes in the gap between it and the Hyde Farm property on Blisworth Road (the Blue route)
- A route similar to the Blue route but deviating from it to pass to the west (or "outer") side of the Hyde Farm Property, between it and the Plainwood Business Centre properties on Blisworth Road (the Green route)

3.12 Both route options are shown **Figure 5** below.

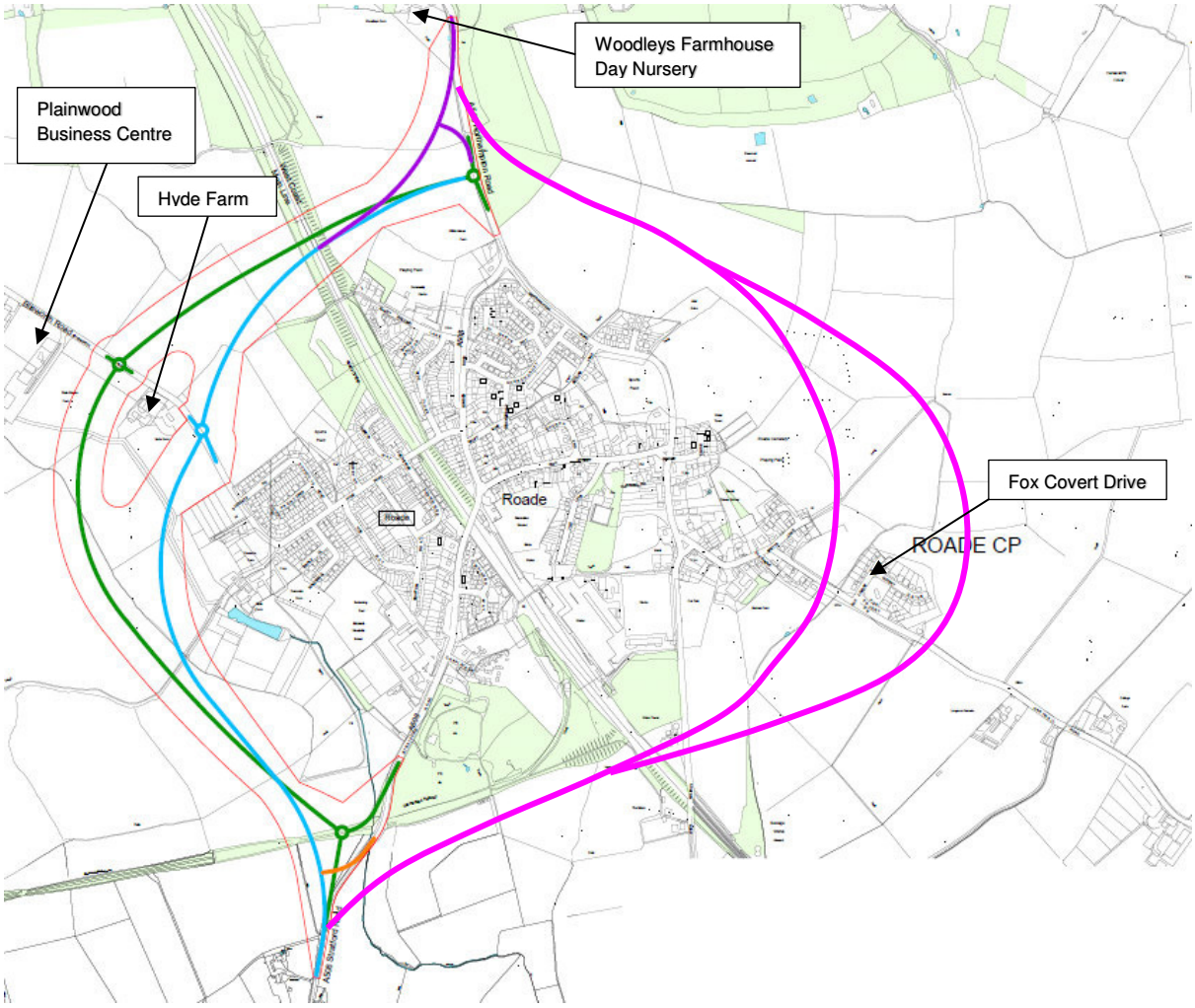

Figure 5: Initial Bypass Options

Junctions

3.13 Whilst **Figure 5** shows indicative arrangements for junctions at either end of the western bypass options and at Blisworth Road, it must be emphasised that these are indicative and that the junction options can be applied to either of the western bypass options.

3.14 Traffic modelling has been undertaken in order to assist in identifying the most advantageous solution for junctions, balancing the need to provide connectivity whilst not encouraging traffic onto inappropriate routes. Consideration has also been given to the road safety and potential environmental impact aspects of the available junction options.

4.0 ROUTE OPTIONS ASSESSMENT

Technical and Environmental Assessments

4.1 The available route options identified have been considered by the Applicant's team of professional consultants across the areas of assessment that might be expected to arise in an Environmental Assessment (leading to an Environmental Statement) process. The findings are presented in tabular form at **Appendix A**.

4.2 The western bypass routes are assessed as having advantage over the eastern bypass routes in all bar one of the assessment areas, that one area being noise and vibration.

4.3 Of the two options assessed for the western bypass route, the Blue Route is assessed as being preferable to the Green Route in eleven of the eighteen areas of assessment. In the areas where the Green Route is shown to be preferred (four in all) it can be seen that the preference is not strong. Where the Blue Route is assessed as being preferred that preference is high in the area of nature and ecology conservation, as a result of it having a less detrimental effect on notable grassland that is significant at (least) a County wide level.

First Round Public Consultation Responses

4.4 A first round of open public consultation was held in December 2016 over the afternoons and early evenings of the 12th, 13th and 14th of the month. The consultation was held at the Hilton Hotel adjacent to M1 Junction 15 and was attended by representatives from the Applicant and their consultancy team who were on hand to answer questions and provide further detail as required.

4.5 Display boards detailed the evolution of the SRFI development proposals via drawings, images and explanatory text. A physical, scale model, of the development site itself and immediate environs, but excluding the bypass routes, was on display. Drawings on the display boards showed the Blue and Green bypass routes to the west of Roade to the same level of detail shown in **Figure 5** of this report. Routes to the east of Roade were not shown having by that stage been eliminated for the reasons explained in section 3 above.

4.6 A record of all responses received both during and in follow up to the events is included in full at **Appendix B**. With regard to the bypass specifically, only a limited number of responses were received: 23 in total, divided as follows:-

- 10 individuals objected to the bypass;
- 8 individuals supported the bypass without expressing a preference for a particular route;
- 1 individual preferred the Green Route; and
- 4 individuals preferred the Blue Route.

4.7 The reasons given for objecting to the bypass and preferring the Blue Route were similar. Those objecting noted concern that the bypass would lead to more housing between the current extent of the village and the bypass. Those who preferred the Blue Route identified this preference because it was closer to the village and therefore would enable less 'infill' to take place.

4.8 Some of the objectors noted that they were concerned that the provision of a single carriageway would not be enough and that this would lead to further traffic problems in the area. As noted above passive provision has been made for future dualling.

4.9 Whilst routes for a bypass to the east of Roade were not shown on the drawings presented, no representations were received suggesting that such routes should be considered.

Preferred Route Selection

4.10 As noted above, the assessment case in favour of routes to the west of Roade as against routes to the east is clear, with the study finding in favour of routes to the east in only one of the areas of assessment. This area of assessment related to noise and vibration, and it is considered that any necessary mitigation can be provided to the western routes. In addition and as noted above, none of the consultation responses received has suggested that a bypass route to the east of Roade should be considered. Routes to the east of Roade are therefore rejected in favour of routes to the west.

4.11 The technical and environmental assessment carried out and summarised above shows that when comparing the Blue and Green routes, the preference for either is not strong across most of the assessment areas. There is however a strong presumption in favour of the Blue Route on nature and ecology conservation grounds. In addition, the Blue Route is marginally shorter than the Green Route which will make it more effective in taking through traffic out of the village, whilst at the same time making it more economical to construct.

4.12 The Blue route would restrict the potential for 'infill' development on the northern and western sides of Roade, something that is clearly a concern from the consultation.

4.13 For these reasons, the Blue Route is selected as the preferred route to be taken forward for further assessment and design development.

4.14 The preferred, Blue, route is shown on the drawing found at **Appendix C**. Full technical analysis of the route against highway design standards will be provided as part of the DCO application in the Geometric Design Strategy Record (Roade Bypass) which will be appended to the Transport Assessment.

4.15 Whilst environmental considerations have clearly been taken into account in selecting the preferred route, the full Environmental Assessment for the preferred route is found in the Environmental Statement.

4.16 Similarly, a detailed assessment of the needs and provision for NMUs will be provided as part of the DCO application and will be found in the Walking, Cycling & Horse-Riding Assessment and Review reports, both of which will be appended to the Transport Assessment.

5.0 JUNCTION OPTIONS ASSESSMENT

Introduction

5.1 Detailed analysis has been undertaken in order to determine the most appropriate form of junction at each point where the bypass route would cross an existing highway.

5.2 The following factors have been taken into consideration:

- Environmental Impact;
- Connectivity into and out of Roade for vehicles including public transport;
- Traffic analysis and junction capacity; and
- Road Safety.

5.3 Further details of the capacity assessment are found at **Appendix D**.

5.4 The following tables present the options considered for each junction and are coloured as follows:

	Beneficial
	Neutral / not applicable
	Minor adverse
	Moderate or significant adverse

A508 Stratford Road

5.5 The following options have been considered:

- No junction
- A priority "T" junction
- A 3-arm roundabout

5.6 The options have been assessed as follows:

	No Junction		T Junction		Roundabout	
Environmental	Potential loss of walking and cycling connectivity depending on design, no other significant concerns		No significant concerns		No significant concerns	
Connectivity	Would not provide a connection to Roade, which would mean a relatively lengthy diversion for traffic from Roade seeking to get to the A5 and Milton Keynes No connectivity into Roade for public transport		Connectivity to Roade provided		Connectivity to Roade provided	
Traffic analysis & capacity	n/a		Predicted to result in significant delay to drivers wishing to exit Roade onto the A508		Sufficient capacity is provided at the roundabout junction	

	No Junction		T Junction		Roundabout	
Road Safety	No significant concerns		Capacity constraints could result in driver frustration leading to unsafe right turns from Roade onto the A508		Considered to be the safest junction solution in this location	
Summary	Insufficient connectivity		Insufficient capacity leading to safety concerns		Required connectivity and capacity achieved	
Conclusion	**Option Discounted**		**Option Discounted**		**Option Selected**	

Blisworth Road

5.7 The following options have been considered:

- Staggered crossroads (Two priority "T" junctions)
- One priority "T" junction to the north, road to the south closed
- One priority "T" junction to the south, road to the north closed
- A 4-arm roundabout
- No junction: road closed at the bypass
- No junction: bridge over or under bypass

5.8 The options have been assessed as follows:

	Staggered crossroads		T Junction north, closed south		T Junction south, closed north	
Environmental	No significant concerns		Potential for loss of connectivity, see below		Potential for loss of connectivity, see below	
Connectivity	Connectivity provided between Roade and the bypass, and also between Blisworth Road and the bypass		No connectivity between Roade and the Bypass, which would result in this area of the village being accessed by one bridge over the WCML		No connectivity to the north, which could result in lengthy diversions for local users, and in combination with the proposed left-in, left-out arrangement at the A508/Blisworth Road junction would mean a significant diversion for drivers wishing to access Blisworth from the A508.	
Traffic analysis & capacity	Predicted to result in significant delay to drivers wishing to exit Roade onto the A508, and for drivers wishing to exit Blisworth Road onto the A508		Would result in significant delay to drivers wishing to exit Blisworth Road onto the A508		Would increase congestion at other local junctions. Would result in significant delay to drivers wishing to exit Roade onto the A508	
Road Safety	Capacity constraints could result in driver frustration leading to unsafe right turns from Roade onto the A508		Capacity constraints could result in driver frustration leading to unsafe right turns from Blisworth Road onto the A508		Capacity constraints could result in driver frustration leading to unsafe right turns from Roade onto the A508	

	Staggered crossroads		T Junction north, closed south		T Junction south, closed north	
Summary	Insufficient capacity leading to safety concerns		Would reduce access to western part of Roade to one link and the proposed bypass junction would have insufficient capacity leading to safety concerns		Increase congestion at other local junctions, lengthy diversions for local traffic and insufficient capacity at the bypass junction, leading to safety concerns	
Conclusion	**Option Discounted**		**Option Discounted**		**Option Discounted**	

	4-arm roundabout		No junction, road closed		No junction, bridge provided	
Environmental	May have a minor impact on the sensitive ecology area		Potential for loss of connectivity, see below		Additional noise and visual impacts, additional impact on the sensitive ecology area	
Connectivity	Connectivity provided between Roade and the bypass, and also between Blisworth Road and the bypass		No connectivity, see concerns regarding closures for options above		Maintains current situation with no connectivity to the bypass. But in combination with the proposed left-in, left-out arrangement at the A508/Blisworth Road would mean a significant diversion for drivers wishing to access Blisworth from the A508.	
Traffic analysis & capacity	Sufficient capacity is provided at the roundabout junction		Potential for increased congestion at other junctions		n/a	
Road Safety	Considered to be the safest junction solution in this location		n/a		n/a	
Summary	Required connectivity and capacity achieved without significant environmental impact		Would reduce access to western part of Roade. Lengthy diversions for local traffic.		Maintains current situation but does not maximise traffic reassignment to bypass, and likely diversions for local traffic. Potential for significant environmental impacts.	
Conclusion	**Option Selected**		**Option Discounted**		**Option Discounted**	

5.9 As explained in **Appendix D**, the strategic transport model was used to assist in determining the most appropriate junction solution. The conclusion of this element of work is that both an eastern and western connection from Blisworth Road to the bypass should be provided. This is to reduce congestion at other local junctions and to facilitate the proposed left-in, left-out arrangement at the A508/Blisworth Road junction.

A508 Northampton Road

5.10 The following options have been considered:

- No junction
- A priority "T" junction
- A 3-arm roundabout

5.11 The options have been assessed as follows:

	No Junction		T Junction		Roundabout	
Environmental	Potential for removal of existing woodland around the Courteenhall bends, potential for impact on listed buildings around the Courteenhall Estate		Potential for removal of existing woodland around the Courteenhall bends, potential for impact on listed buildings around the Courteenhall Estate		No significant concerns	
Connectivity	Would not provide a connection to Roade, which would mean a relatively lengthy diversion for traffic from Roade seeking to get to M1 J15 and Northampton No connectivity into Roade for public transport		Connectivity to Roade provided		Connectivity to Roade provided	
Traffic analysis & capacity	n/a		Insufficient capacity, with significant delay to drivers wishing to exit Roade onto the A508		Sufficient capacity is provided at the roundabout junction	
Road Safety	Alignment would tie into existing A508 just south of the Courteenhall Estate bends		Alignment would tie into existing A508 just south of the Courteenhall Estate bends Capacity constraints could result in driver frustration leading to unsafe right turns from Roade onto the A508		Considered to be the safest junction solution in this location	
Summary	Significant concerns with loss of connectivity to Roade, potential road safety and rat-running concerns.		Significant concerns over junction capacity and road safety		Connectivity, capacity and safety issues associated with other options are resolved	
Conclusion	**Option Discounted**		**Option Discounted**		**Option Selected**	

6.0 CONCLUSION

6.1 The blue route is preferred and this is shown on the drawing found at **Appendix C.**

6.2 Roundabouts are proposed where the bypass meets the existing A508 Northampton Road, Blisworth Road and the A508 Stratford Road. These junctions are indicated on the drawing found at **Appendix C.**

APPENDICES

APPENDIX A

Appendix A: Table summary of environmental effects

A508 Roade Bypass
Options Assessment Summary
Principal Route Options

Assessment Heading	Consultant	Preferred Option (Green or Blue)	Magnitude of preference	Green		Blue		Eastern Route Options
				Comments on Option	Potential mitigation measures	Comments on Option	Potential mitigation measures	Summary of benefits or disbenefits against Western options
Air Quality	Vanguardia	Green	Slight preference for Green but both would provide benefits during operation.	Would benefit air quality in Roade during operation. Potential for construction dust impacts on circa 100 dwellings to north and south of Roade.	Standard Best Practice construction dust suppression measures.	Would benefit air quality in Roade during operation. Potential for construction dust impacts on circa 250 dwellings to north, west and south of Roade.	Standard Best Practice construction dust suppression measures.	Whilst this would still provide an overall benefit, it would be likely to cause significant adverse impacts at dwellings on Hartwell Road, Fox Covert Drive and the vicinity.
Agriculture and Land use	LRA	No preference	The choice of route is effectively neutral from and agricultural perspective	The land is dominantly lower quality and a mixture of arable and grazing	None	The land is dominantly lower quality and a mixture of arable and grazing	None	None
Construction (materials, buildability, cost and programme)	Roxhill	Blue	Medium	Longer and more costly. Ecology issue, it will split a valuable meadow that will probably lead to mitigation on additional land. Possibly more complex land ownership issues.		Shorter and less costly. Fewer land ownership issues. No known constructional differences with either route		Both routes much longer and would question whether it would act as a by pass, it may be quicker to drive through the town. Numerous land owners leading to complex land severance issues.
Cultural Heritage	CgMS	Green	Medium on the basis of providing greatest separation	Grade II Listed Buildings and Courteenhall RPG – setting effects – visual and noise/dust/odour during construction and operation – likely effect will be slight Scheduled Monuments – Suitably distanced and route into existing infrastructure – no effects considered arising Conservation Areas – Suitably distanced such that no indirect setting effects should arise – potential residual beneficial effect for Roade where traffic through may be reduced Buried Archaeological remains (non-desi) – Cropmark sites and site of DMV noted on and adjacent to route option – where buried remains present then likely no more than local to regional importance with moderate to major direct effect from construction.	Mitigation built into design based on landscape screening/noise screening and this implemented at earliest stage Scheduled Monuments – None anticipated Conservation Areas – None anticipated Buried Archaeological remains (non-desi) – Implement programme of mitigation recording ahead of or during construction to offset effect	Grade II Listed Buildings and Courteenhall RPG – setting effects – visual and noise/dust/odour during construction and operation – likely effect would be Moderate to slight given marginally closer proximity of route corridor to assets Scheduled Monuments – Suitably distanced and route into existing infrastructure – no effects considered arising Conservation Areas – Suitably distanced such that no indirect setting effects should arise – potential residual beneficial effect for Roade where traffic through may be reduced Buried Archaeological remains (non-desi) – Cropmark sites, site of DMV and WWII activity noted on and adjacent to route option – where buried remains present then likely no more than local to regional importance with moderate to major direct effect from construction.	Mitigation built into design based on landscape screening/noise screening and this implemented at earliest stage Scheduled Monuments – None anticipated Conservation Areas – Buried Archaeological remains (non-desi) – Implement programme of mitigation recording ahead of or during construction to offset effect	Eastern Route option would interact and potentially effect the setting of a density of Listed Buildings and the Roade Conservation Area Potential to also interact and impact upon a greater density of noted buried archaeological sites and line of former railway Eastern route option would likely result in more extensive adverse environmental effects on historic environment than western routes
Drainage and Water Environment	BWB	Blue	Slight	Crosses watercourse at two points. Surface water flow route from watercourse. Secondary flow route from the north, by central roundabout. 6" water mains pipe runs along Northampton Road A508.	Would require culverting of watercourse at two points.	Crosses watercourse at one point. Surface water flow route.	Would require culverting of watercourse at one point.	Crosses watercourse at 4 points, would require several culverts which would have environmental impacts.
Geology and Soils	RSK	Blue	Medium	It is perceived that the southern end junction will be harder to construct due to cuttings and topography resulting in greater construction duration and earthworks requirements. As this comes closer to school more impact due to noise and dust perceived and much greater loss of mature trees and vegetation.	Cut/fill balance to be achieved. Protection of SSSI Roade Cutting required although if bridging then it is hoped that no impact will occur with careful design and set back abutments to span rail cuttings.	Shortest and easiest with least earthworks anticipated to be necessary particularly at southern end therefore dust and noise disruption reduced and helped by being able to leave in mature trees along former rail cutting	Cut/fill balance to be achieved. Protection of SSSI Roade Cutting required although if bridging then it is hoped that no impact will occur with careful design and set back abutments to span rail cuttings.	Far longer route requiring greater earthworks and disruption, noise and dust. Highway would cross a greater area of solid rock likely to be the Blisworth Limestone which would require breaking out and crushing to allow reuse which would add cost and noise and dust.

Assessment Heading	Consultant	Preferred Option (Green or Blue)	Magnitude of preference	Green		Blue		Eastern Route Options
				Comments on Option	Potential mitigation measures	Comments on Option	Potential mitigation measures	Summary of benefits or disbenefits against Western options
Highway Design	BWB	Blue	Slight	Longer route but straighter sections will give opportunity for overtaking. Roundabout junction at south end located in awkward location on former railway, but this could be amended. 3 roundabouts in total will reduce attractiveness of route	Relocate southern roundabout away from former railway line.	Shorter route and only 2 roundabouts. Reduced opportunity for overtaking.	Review alternative methods for providing overtaking such as through the roundabout areas if possible and safe to do so.	Lengthy routes, unlikely to be attractive to through traffic.
Landscape and Visual: Landscape	FPCR	Blue	Marginal	All options are within Character Area 6 Undulating Claylands: The Tove Catchment, as defined by the Northamptonshire 'Current Landscape Character Assessment'. Key characteristics of this Character Area include: • *large woodlands are not a characteristic feature, although woodland in surrounding landscape types, small deciduous copses and hedgerow trees can create the sense of a well-wooded character;* • *concentrations of small woodlands apparent around designed parklands;* • *hedgerows are often low and well clipped emphasising the undulating character of the landscape with scattered hedgerow oak and ash trees;* • *minor roads located on interfluves avoiding river valleys and emphasising the natural grain of the landscape; main routes take a direct course from the northwest to southeast* The blue route is marginally preferable as its influence over the countryside and landscape to the west is more limited. The green route is located along a slightly more elevated alignment and west of a mature hedgerow and would potentially extend an urbanising effect further into the landscape, west of Roade.				
				Some hedgerow and tree losses along the A508 (south and north of Roade), Railway corridor, Blisworth Road and some field boundaries to accommodate the road corridor. Mature vegetation losses along Dismantled Railway to accommodate the proposed roundabout.	Planting of new trees and hedgerows along the proposed road corridor to compensate for losses elsewhere. New planting around the new roundabout to compensate for losses.	Some hedgerow and tree losses along the A508 (south and north of Roade), Railway corridor, Blisworth Road and some field boundaries to accommodate the road corridor. Potentially fewer vegetation losses than the roundabout option along the Dismantled Railway.	Planting of new trees and hedgerows along the proposed road corridor to compensate for losses elsewhere. Potential to align the route to reduce vegetation losses along the Dismantled Railway.	
Landscape and Visual: Visual	FPCR	Blue	Marginal	The green route crosses 3 footpaths, including the Midshires Way long distance path, and may interfere with the end of the footpath at the southern end of the route. Clear views would be possible from the affected rights of way. The alignment is shown to the west of an existing hedgerow and there is no existing intervening vegetation between the green route and these footpaths. A number of residential properties have potential views including Hyde Farm which includes a number of Listed Buildings (see cultural heritage assessment). An existing hedgerow between the properties to the north of Dovecote Road and the proposals helps to filter views towards the green option. The field to the north of Hyde Farm and Blisworth Road appears to have some public access. The green option cuts through the middle of this field and would therefore impact on public access.	Keep routes at grade where possible and provide carefully lit bridges / underpasses where required. Planting and mounding along the proposed route could help to screen views from the existing footpaths. Planting and mounding along the proposed route will help to screen views from these properties. The meadow and public access could be created elsewhere.	The green route crosses 3 footpaths, including the Midshires Way long distance path, and may interfere with the end of the footpath at the southern end of the route. This route runs closer to Hyde Farm, but is less visible from footpaths to the west of the route. The existing hedgerow filters views towards the proposed road when viewed from the footpaths. Views from Midshires Way would be possible where the route crosses the long distance footpath. A number of residential properties have potential views including Hyde Farm which includes a number of Listed Buildings (see cultural heritage assessment). Properties to the north of Dovecote Road look directly towards the proposals, with no existing intervening vegetation. The field to the north of Hyde Farm and Blisworth Road appears to have some public access. The blue option is aligned through a corner of this field to the north of Hyde Farm and Blisworth Road.	Keep routes at grade where possible and provide carefully lit bridges / underpasses where required. Avoid the vegetation at the boundaries of Hyde Farm. Staying east of the existing hedgerow helps to screen views from the footpaths west of Roade. Planting and mounding along the proposed route could help to screen views from the Midshires Way. Planting and mounding along the proposed route will help to screen views from these properties. The meadow and public access could be created elsewhere. Potentially, slightly less effect than the green option.	The eastern options cross more footpaths (circa 8 or 9 more public rights of way). (Disbenefit) The eastern options come closer to Courteenhall – a Registered Park and Garden. The Park and garden is however relatively well enclosed by mature woodland and planting. (Potential Disbenefit) There are potentially more residential receptors affected by the eastern options. (Disbenefit).
Lighting	Vanguardia	Blue	Slight	Placement of Blisworth Rd roundabout further west plus	Mitigation will already be embedded in the design	Placement of Blisworth Rd roundabout is better.	Mitigation will already be embedded in the design	No significant difference
Nature and Ecology Conservation	FPCR	Blue	High	Both options will result in similar impacts to habitats and fauna. However the green route will clearly result in the fragmentation of a notable grassland of at least County importance	Anticipate off-site creation of similar area of species-rich grassland, with long-term management	Comparatively minor loss of notable grassland that is considered unlikely to undermine its status	At worst anticipate that mitigation may require commitment to continued management of existing grassland	Based on the available baseline data there are no significant ecological differences between the east and west routes

Assessment Heading	Consultant	Preferred Option (Green or Blue)	Magnitude of preference	Green		Blue		Eastern Route Options
				Comments on Option	Potential mitigation measures	Comments on Option	Potential mitigation measures	Summary of benefits or disbenefits against Western options
Noise and Vibration (operation)	Vanguardia	Green	Medium	Likely to have a lower adverse impact at more properties compared to the blue route as there is generally greater distance between the dwellings in Roade itself and the proposed bypass. Although it would be closer to some isolated dwellings on Blisworth Road (approx. 4 dwellings). There is a greater distance and some shielding to the residential dwellings at Hyde Farm.	For majority of properties that require mitigation options include an acoustic barrier and use of a low noise road surface. Some dwellings may qualify for sound insulation under the Noise Insulation Regulations, but only likely to be those in closest proximity to the bypass.	More properties are likely to have a higher adverse impact than the green route due to the increased proximity to properties in the vicinity of Dovecote Road. This route would also be closer to the residential property adjacent to Hyde Farm. The adverse impact would be greater at this location.	For majority of properties that require mitigation options include an acoustic barrier and use of a low noise road surface. Properties in close proximity to the proposed bypass may qualify for sound insulation Overall, it is likely that more noise mitigation would be required for this option compared to the green option.	The eastern inner route is in closer proximity to a higher number of dwellings than the western routes. In particular as it crosses Hartwell Road. Therefore, a greater number of properties are likely to be more adversely affected compared to the western routes. With regard to the eastern outer route, fewer properties would be adversely affected compared to the eastern inner route and also compared to the blue route. However, the impact is likely to be greater at those properties affected compared to those affected by the western routes.
Noise and Vibration (construction)	Vanguardia	Green	Slight	Smaller adverse impact compared with the blue route.	Good practice as set out in BS5228.	Greater adverse impact compared to the green route.	Good practice as set out in BS5228.	Eastern inner would have greater impacts than the western routes. Eastern outer about the same as blue.
Non – motorised users	ADC / BWB	No preference	little to choose between the two	Route crosses PROWs KZ2a, RS1/KS10 (bridleway), RZ3 Connection to footway on western side of A508 to south of Roade could be maintained via proposed roundabout link. Addition of roundabout junctions increase accident risk for cyclists using A508. Potential for increased amount of traffic using Hyde Road, which may impact on amenity and severance within Roade	Appropriate NMU facilities/structures at PROW interfaces with Bypass Provision of appropriate NMU facilities at junctions	Route crosses PROWs KZ2a, RS1/KS10 (bridleway), RZ3 Connection to footway on western side of A508 to south of Roade could be maintained via proposed roundabout link. Addition of roundabout junctions increase accident risk for cyclists using A508. Potential for increased amount of traffic using Hyde Road, which may impact on amenity and severance within Roade	Appropriate NMU facilities/structures at PROW interfaces with Bypass Provision of appropriate NMU facilities at junctions and within Roade	Eastern routes cross twice as many PROWs as western routes.
Planning generally and community effects	Oxalis	Blue	Medium	The increased distance from the village could reduce construction impacts (noise, dust, etc.). Hyde Farm is included 'within' the bypass – this may be preferable to those residents and wider community. But pushes the 'urban' road further into the countryside – increased visual and functional change. However, this alignment may create concerns over developer interest in 'in-filling' development proposals between village and Bypass, creating larger areas considered vulnerable (or suitable) to development proposals.	Lack of lighting noted – and welcome in terms of amenity impacts.	Construction effects (temporary) may be more significant due to proximity to existing homes. Tighter (and shorter) alignment could increase use for more local trips? Provision for cyclists? Tighter alignment likely to reduce – albeit not eliminate – local concerns about 'in-fill' development pressures. Reduces impact of the road on surrounding rural area – less 'urbanisation'.	Noise mitigation and design features may need to be considered especially where closest to existing properties. Fencing or bunding in targeted locations? Lack of street lighting noted – and welcome in terms of amenity impacts. Planting or other landscaping to mitigate any lighting effects from vehicles?	Further from much of the village so likely to have reduced impacts on many residents, but may well create more issues or concerns re: potential development 'in-fill'. Less well related to the village than either Blue or Green routes.
Public Transport	ADC	No preference	little to choose between the two	Existing bus services X4, X7, 33 and 33A currently route along the A508 and stop in Roade, services 33 and 33A then head out of the village on the High Street towards Ashton. The additional junction to the north of the village would introduce some additional delay to these services, with the X4 and X7 also affected by the additional junction to the south of village. But these delays are likely to be off-set by time savings when travelling through Roade as a result of reduced volume of through traffic due to Bypass.		Existing bus services X4, X7, 33 and 33A currently route along the A508 and stop in Roade, services 33 and 33A then head out of the village on the High Street towards Ashton. The additional junction to the north of the village would introduce some additional delay to these services, with the X4 and X7 also affected by the additional junction to the south of village. But these delays are likely to be off-set by time savings when travelling through Roade as a result of reduced volume of through traffic due to Bypass.		
Transport – motorised (HGV)	ADC	Blue	Slight	Positive impact of taking HGV through traffic out of Roade. NCC concerned that Bypass may exacerbate accident 'hotspots' on the A508 to the south of Roade (due to increased speeds/traffic volumes)	Weight restrictions on route through Roade to enforce use of Bypass for HGV traffic Potential road safety improvement at existing accident 'hot spots'	Positive impact of taking HGV through traffic out of Roade. Shortest route and one less junction compared to green route, therefore more attractive. NCC concerned that Bypass may exacerbate accident 'hotspots' on the A508 to the south of Roade (due to increased speeds/traffic volumes)	Weight restrictions on route through Roade to enforce use of Bypass for HGV traffic Potential road safety improvement at existing accident 'hot spots'	Eastern routes much longer.

Assessment Heading	Consultant	Preferred Option (Green or Blue)	Magnitude of preference	Green		Blue		Eastern Route Options
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Transport – motorised (non HGV)	ADC	Blue	Slight on the basis of being more attractive to through traffic	NCC concerned that Bypass may exacerbate accident 'hotspots' on the A508 to the south of Roade (due to increased speeds/traffic volumes)	Potential road safety improvement at existing accident 'hot spots'	Shorter route compared to green route, therefore more attractive for through traffic. NCC concerned that Bypass may exacerbate accident 'hotspots' on the A508 to the south of Roade (due to increased speeds/traffic volumes)	Bypass junction strategy to encourage use of appropriate routes. Potential road safety improvement at existing accident 'hot spots'	Eastern routes much longer and therefore likely to be less effective at removing through traffic from Roade.

APPENDIX B

Appendix B: Consultation responses

Northampton Gateway SRFI Comments Tracker

Document No.	Town/Village	Reason for Objection or Comments					Additional Comments
		Q3. Support for Roade Bypass	Q3. Support for Roade Bypass green route	Q3. Support for Roade Bypass blue route	Q3. Object to Roade Bypass	General Traffic Concerns	
1	Grange Park						Suppport the concept of SRFI; but not this particular site necessarily as concern the J15 will not cope with the increased traffic. It could work taking traffic off the roads for the country at large and providing employment for people of Northamptonshire. But it will not work making life intollerable for Grange Park residents. I also think that there has been no thought of the social impact of placing a large working population so close to a residential population. I can expand on this if you contact me.
2		1					
3	Collingtree					1	**Models were useful.** We have lived in Collingtree for 3 years and this will be the last straw. What was once a lovely village to live in has been steadily developed both within and outside our boundaries to the extent that the village has been inherently damaged. You will call this progress, however, the damage to village life and quality therein can never be recaptured. Good luck with your plans but we wil be long gone as our village has been negatively chagned forever.
4	Gayton	1				1	Concerned about the impact on the environment generally from traffic and noise pollution. Particularly concerned about the Courteenhall Road junction.
5	Gayton					1	Only if necessary as we are led to believe that DIRFT at Daventry is not yet working at capacity. **Landscaping good idea in theory but hard to believe that the screening would reach the height shown** on maps and the model in 10 years. Junction A508 Courteenhall Road already a busy junction with considerable difficulties turning right from J15 toward Blisworth. With heavier traffic this needs considerable improvement.
6	Roade						Start of the Roade Bypass needs to be north of Courteenhall Road. A508/Courteenhall Road junction needs to be addressed; it is a bottleneck now and any traffic increase will lead to accidents and gridlock.
7	Roade		1			1	Not sure why it is needed so close to DIRFT. **Models were useful.** The bypass should be the green route and humps should be put through Roade village to discourage through traffic into the village.
8	Roade					1	Inconvenient viewng times. Ploy to rail-road these developments through. There seem to be no checks on how many people attend and if you arrive during the last half hour or so of your opening times there is a possibility of no comments forms. Put the address and email on the comments form. Another model of creeping urbanisation. Blot on landscape.
9	Roade						The Roade bypass would relieve some HGVs through Roade village but would cause congestion either side of Roade as it is not connected to the new proposed roundabout that will feed the interchange. It's just an excuse to build large warehouses.

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10	Roade			1			
11	East Horsbury						Better than the Howdens scheme. Closer to the A14 would make more sense. Roade bypass OK for Roade, but what about Stoke Bruerne and A508 and beyond? Just moving the traffic away from the site and to another location. **Model useful to visualise proposals.** Rain water harvesting should be used on site and treatment before entering existing water drains. Solar panels fitted to roofs to be contributed into site running costs. On site truck parking to reduce impact on local roads and parking in residentail areas. Site rail engines to be electrical and not diesel and be fed from solar generated and on site stored energy.
12	Blisworth				1	1	Roade Bypass - access on to the small/narrow road between Blisworth/Roade will incrase traffic in Blisworth and Stoke Bruerne. Against Structure Plan for Northamptonshire re no development immediately south of M1. Surely this kiind of development should be on brownfield land? Is there a need with DIRFT just to the north and several SRFIs on edge of London? Surely SRFIs need to be on parts of East Coast Main Line. Felixstowe is biggest container port so the East Coast Main Line is the relevant railway.
13	Roade				1	1	Putting in a roundabout on a busy road to 'dump' the freight traffic onto the A508 seems very simplistic. All you are doing is moving the queue further back from the M1 J15. The Roade Bypass is too close to Roade so noise will increase as road freight will leave the facility and some will head toward Milton Keynes. It's an all night operation so there will be more traffic noise at night. For these reasons I will be writing to the Council to oppose this development.
14	Roade				1	1	How much noise would residents be subject to? Roade Bypass - too much additional traffic and to much noise whichever route is chosen. Also, why is a single road being planned, surely a dual carriageway would be more suitable? This is a vast proposal. Too many years looking at an eyesire before screening is effective. Looking at the plans and reading the proposals I got the feeling that a quart was trying to fit into a pint pot. This is just wrong.
15	Blisworth						Roade already has a bypass and this would be the second one. Keep the road as far as possible nearest the village to prevent further infill of housing. Loss of 400 plus acres of food producing land cannot be replaced by landscaping and SHEDS and then seen to be an advantage. This proposal is against the wishes of the local councils. SNC already has fighting fund against Rail Central in place and surely must spend against this development as well.

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16	Blisworth					1	The site is already landscaped perfectly. Roade has already been blessed with having been given a bypass. The fact that the village has allowed housing infill and cause traffic restraints to be enforced is the decision tey made. People living on the side of the proposed routes will see the same thing happen again. Live with it. Making developments such as this, stating that they are strategic and making them so vast and beyond local government decision is wrong. Local government does not want this development in the area and already are fighting Rail Central proposals. A large freight terminal is already in operation at Daventry with spare capacity for the future. There are already ongoing issues with lorries going through the nearby villages and local people are powerless to stop it. What are you going to do to stop this happening in this area?
17	Roade			1			The Roade Bypass should be the inner route in order to stop infill on the land at a later date. **The scheme is better situated in relation to the M1 than the Rail Central scheme.** Improvements to J15 are well needed. I think that it is a very good scheme.
18	Collingtree					1	J15 improvements are poorly considered. This proposal shows a staggering lack of joined up thinking with the consideration of the potential overall development with Rail Central. The case for the impact on the local economy is not made clear - how wil 7,500 job round(? - unsure of last word)
19	Collingtree						Too close to existing development. There seems to be landscaping and screening on the edges of the site where there is no close housing. I totally oppose this proposal. It is going to remove good agricultural land from production. There are other areas of the Country where development would be better placed, i.e. DIRFT
20	Grange Park						**Models very useful** to show low impact of visual and noise pollution. Following Clipper/Amazon zonstructions the signage has not been improved sufficiently to restrict HGVs entering domestic housing at Grange Park. It would be beneficial to include 'No HGV' type signage at entrace to Grange Park/exit/egress points.
21	Blisworth					1	Roade Bypass is not that necessary. The village is not on the 508 I think this is cynical carrott t the villagers. Loss of agricultural fields. Landscaping and screening would be totally inadequate. There is no way that you can hide 5 million sq ft of dreadful warehouses and tarmac and lighting. I am very worried and upset by the proposals. This is precious countryside which needs protecting. DIRFT already expanding into its third extension, please let us use the facilities which we have instead of creating and spoiling the ever shrinking green and pleasant land.

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22	Grange Park					1	You will not be able to screen this development. Junction improvements bad as you are going to add more capacity. Reduce cars on the road including this proposal
23	Roade	1					Can see the logic of the location with the current access road and rail links but concerned that there could be 100% warehouse occupation and no requirement for anyone to be using rail interchange. J15 improvements are long overdue, but not entirely clear that they cater for the increased traffic from SRFI and the projected increase in traffic there would be anyway. Roade Bypass - needed and either alignment would be beneficial; however, concerned about the staggered or t-junctions as can be bad enough trying to cross A508 now when speed limit is 30 mph. Would prefer roundabouts at either end. **Models were useful and it would be good to see something similar for the proposed bypass.**
24						1	Roade Bypass will not square issues at the Old Stratford end. This is already beyond capacity and this will further overload this. **The model was useful** but it will take so long for it to ever look like the landscaping proposals.
25	Milton Malsor	1				1	SRFIs are necessary, but DIRFT offers a better solution with reduced impact on a Brownfield site. Either option for the Bypass should be a reality as Roade needs it. Landscaping appears OK with regard to Blisworth, unsure how this will impact on Grange Park (two other villages illegible) - **models good at explaining visual impact**.
26					1	1	Poor idea. There is already one at J18 which is going to expand in Phase 2 and 3. J15 improvements - within 10 years we will be back to the same problem we currently have. No development should be allowed until J15 has been improved and I'm naturally for a couple of years so that you can see the impact. The Roade Bypass should not go ahead as it is too small to make any effect. It will cause gridlock in Roade and on the Bypass when the M1 is closed, it is also close to houses on the outskirts. **The plan model was effective** however, the development is too big for the area. you have put litle/no thought into the development. It should be at least half the size. You have not got the transport issue right at all. It is an absolute disgrace that you have tried to bypass the Local Planning Authority. Everything you have presented is the same as your proposals in 2013 - you have not listed to any concerns issues raised then. I am also aware that Network Rail fo not have this site as a proposal not do they have capacity - go check it out!
27	Roade			1			Support if it brings employment and stability to the area, but not at any cost. J15 improvements look good but a dedicated lane for getting onto the M1 North is required i.e. new build so that the existing lanes can be used for straight on. Roade Bypass - Blue route with a roundabout at each end of the A508. A roundabout (not junction) would be safer for the Blisworth Road (Knock Lane). Models useful but do not give height perspective.

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28	Collingtree					1	The Junction 15 improvements would be great if we could have them without greatly increased traffic. Landscaping is essential for such a huge scheme - **models very helpful**. Horrified at the extent of the development.
29	Roade						Roade Bypass was proposed many years ago in association with the 'Central Park' development that failed. That proposal was sensible; it went over the road to Blisworth, around Roade, avoiding Woodleys Park, around Roade, resited the Stoke Bruerne/Ashton cross roads and passed over the Grand Union Canal. The current proposal is not a benefit to Roade or traffic traveling between MK and Northampton. If the Roade Bypass is built the village should be protected from further development by the provision of a Green Buffer similar to Brackmills Park at Hardstone. Use could be for safe cycle paths.
30		1				1	Roade Bypass - it will be good to have the lorries off the road but we have a real concern about where it feeds back onto the A508. It is still a big shed that will look ugly. It would be interesting to know how we are going to be compensated for the drop in our house prices. Do you even care what we really think?
31						1	£6 million not enough much more is needed to stop the congestion which happens now. The Roade Bypass won't stop the traffic building up at A45/408 Hunsbury area.
32					1		No - masive local damage to views wildlife house prices ruined and ruin rural villages Landscaping proposals only consider the west side not thought out properly and this is a highly funded GCSE project i.e. utter bullshit.
33							Pretty models - **don't trust the scale of models and drawings**. Sad depressing loss of countryside at what cost.
34	Collingtree	1					The impact of the traffic on the A45 on the other side of the M1 has not been considered.
35	Collingtree						Existing facility to the north of the County has spare capacity. Don't believe the employment is realistic for modern warehouses. Traffic numbers quoted only 3-8% before capacity to cope with newly generated traffic. **Models were helpful.**
36	Roade						Mixed views - the impact long term on local employment v impact on access transport etc. J15 improvements good but concern that overcapacity will be insufficient within short time. I am the Principal of the closest secondary school in Roade. My concerns are: - Impact on student numbers - predicted growth long term but negative short term during construction. - Impact on student movement particulary at key times such as exam season. - Good opportunity to liaise with large scale project on local area for benefit of students (e.g. geography/business) and to look at the skills of warehouse for next generation.

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37	Milton Malsor					1	The development is on a Greenfield site. While improvements to J15 may help, the problem is that the M1 and A508 and A45 are regularly running at capacity. The Roade Bypass moves the problem toward MK, that's all. If they are bourne out in reality then the landscape proposals mitigate the visual impact.
38	Grange Park					1	Sure that the villagers of Roade will be pleased to have less traffic run through their village. However, they will still need to get into the traffic if they want to leave the village. The landscaping looks good, but the whole of the Gateway project is too vast and will have a detrimental affect on the road infrastructure and environment. I don't agree with these proposals. There is another SRFI at Daventry and don't believe that another one should be built only a few miles away.
39	Blisworth						Mixed feelings about increased local road traffic, particularly for potential employees. There is frequent congestion at Courteenhall Road and the A508 junction; many accidents. Why not start the Roade Bypass there with a roundabout? What happened to WWII camouflage technology? WHy do warehouses have to be eyesores? Will follow with interest.
40	Blisworth					1	Over provision of this type of development within this area, this is not strateguc development. The J15 proposals are adequate for current traffic levels not so with a furtehr 16,000 movements in a 24 hour period. Presumably occupants of Roade will be encouraged to think more kindly about this scheme by a provision of this nature. I feel that the timing and location of the exhibition displays a considerable degree of cynicism on behalf of the developers. 1 week before Christmas week, not located in any of the affecteed communities and finishing at 7.30 before people have the opportunity to get home and attend. The scheme is a large, unnecessary trafiic/ pollution creation scheme, ill configured in context with other strategic developments of this type elsewhere.
41	Roade	1				1	Yes we want a bypass; could there be a weight restriction for lorries coming through the village so they have to use the bypass? Not interested in the landscaping, just want to live in a village environment not in the middle of a huge traffic jam twice a day for several hours.

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42	Roade			1		1	Not a good idea for local people living in the surrounding villages. Impact huge on our lives, making journeys toward Northmapton. Junction 15 improvements would give some improvement to the flow of traffic, however, considering the amount of traffic going through this junction will increase substantially meking journeys toward Northamton impossoble at rush hour times. The blue Roade Bypass route has less impact on the environment, however, are there any guarantees that this would not be filled with housing? This is a huge site, the whole thing will have a huge impact on the environment. Very against this proposal for the effect that it would have on the traffic. I don't think that unemployment is high in the Country, where are all the staff going to live, considering that most of the population in the area are village people, with high housing costs.
43	Roade						For anybody living in Roade or the surrounding urban areas, a resounding NO. The increase in traffic, particularly HGVs will be disastrous. Junction 15 improvements - I cannot see that the proposed changes will ease traffic flows. The current junction configuration is a disaster. No Adverse comments on landscaping - good models. Only 4 of the proposed 7 warehouse units are shown as rail linked. Therefore, presumably the 3 non-linked cannot be regarded as 'strategic' and should be subject to seperate planning scrutiny/authority. Someone - possibly seperate from the developers of this proposed site - must say 'if this goes ahead the Rail Fraight Terminal planned between Blisworth and Milton Malsor does not.' and vice versa. We cannot possibly take 2 - 1 would be bad enough.
44	Roade						I believe that the existence of DIRFT and potential expansion makes more logistical sense. The plan for the road improvements at Junction 15 look very weak and not fit for purpose. Traffic at this junction is already over capaciy and needs complete rebuilding. In terms of landscaping - I believe that more could be done to turn the site into a useful 'feature' for local residents, such as more water features, a complete circular cycle and walkway, 9 hole golf course.
45	Moulton					1	Not a good idea. This is a most outrageous scheme which is basically intended to industrialise a huge area of currenly open countryside, thus ruining the quality of life for the residents of the nearby villages which will bring about much noise pollution, traffic and utterly destroy the local environment for us and future generations! Junction 15 - whatever improvements become necessary the developers should be required to pay every penny to cover all road improvements in the area (not just the junction). I am not a resident of Roade village and they themselves should be consulted regarding what benefits such a bypass would provide. The landscape strategy is a complete farce. No artificial landscaping would be able to compensate for the total destruction of the local environment. Young trees and shrubs would take many years to mature before they would provide an effective screening of the huge warehouses. Local footpaths would be transformed into urban trackways/concrete/lighting etc and could be directed far from their original lines. The ultimate result could be an utter exclussion. Final decision should be made by the Local Planning Authority.

Northampton Gateway SRFI Comments Tracker

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		Q3. Support for Roade Bypass	Q3. Support for Roade Bypass green route	Q3. Support for Roade Bypass blue route	Q3. Object to Roade Bypass	General Traffic Concerns	
46	Blisworth					1	Blisworth has become a frightful ratrun with enormous quantities of traffic of every type. I have done a lot of personal research over the last 2 years and I can tell you that traffic to and from the proposed site that want access to and from the A43, will use Blisworth for the connection. Sat Navs and computer route planners send vehicles through Blisworth NOT up to Junction 15a. Aside from the junction of Towcester Road and the A43 being about the most dangerous in the area. As on one of the 'why here' maps the A43 was highlighted, connection to it as I see it is flawed and will further blight our community and as such I will strongly oppose this proposal. Roade was considered but not Blisworth.
47						1	The A508 does not currently cope with the volume of traffic carried at the moment, without the predicted extra 6,000 journeys each way. The proposed roundabout at the south end of the by-pass with cause considerable issues for the traffic coming through the village. The roundabout (unless flow is controlled by traffic lights) will give priority to the heavy flow of traffic from the bypass, craeting a bottleneck for the traffic trying to leave the village in a southerly direction. Travel from Roade to Milton Keynes is already difficult enough without the further disruption this roundabout is going to create. Traffic lights would probably alleviate the unfairness of this a little.
48							In the unlikely event that your plans get permission what is the maximum number of trains that would be able to enter and exit the site? 2 emails chasing response also received.
49	Roade				1	1	The distruction of the countryside and enviroment is criminal. It breaks my heart to think of all that being built on. The traffic in the morning getting out of Roade towards M1 can be horrendous and with new housing being built there'll be more to add lorries and vans constantly will make a 15 minute journey into one of 45 minutes. I have driven out of my village for 40 years between beautiful fields. I do not want to drive through an industrial estate which is what it will become. Is the future of our children really buildings rather than green fields just so you can have something delivered a few hours after ordering! No way, I'd rather teach our kids to be patient and breath clean air.
50	Blisworth					1	Whay do we need this? If we do, to what extent? Where are the truly best sites? The countryside, which may be easier, cheaper and more expedient? Or brown, already industrial areas? Would it be better to have more, smaller sites across the country? Thereby releiving the burdon and accompanying problems of concentrating it into the heart of the country and more easily fitting into brown, undustrial places. In this way avoiding the loss of the countryside, farmland and the important rural communities e.g. visual and twenty four hour air, noise and light pollution. No amount of clever planning will avoid the devastating effect which the huge increase in traffic would produce creating potential insolvable problems for miles around and years ahead. It is vital to consider the bigger picture. We all have huge responsibility in the decisions we take about land, not just for ourselves but for future generations. What will they inherit? A green and pleasant land or vast expanses of concrete and monsterous warehouses? Can we not work together for a better land to live in and not one which makes commercialism its god?

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51	Roade				1	1	Don't think much to the landscaping proposals. The whole area is vast - bigger than Roade itself. No amount of trees will hide the huge warehouses, where there are green fields now.
52	Roade				1		There is no government directive that this area needs a rail interchange. The proposals for J15 do nothing to ease the traffic on the A508 for those people who have to travel into Northampton to their place of work. It will noly benefit those travelling North onto the M1. That is if it's not blocked by accidents. The landscaping proposals do not hide the 24 hour lighting which would light up the sky. Donward pointing lights do not helo as the high ALBEDO of the ground reflects the light up into the night sky.
53	Milton Malsor					1	COMMENTS RECEIVED IN LETTER BY POST: FULL LETTER AVAILABLE, BELOW IS A SUMMARY OF THE DETAILED RESPONSE: The proposed development is more close to the villages than the motorway. Attended the public consultation event and whilst it was a big improvement on the poor efforts at public consultation up to this point, the consultation still fell short in some areas. Whilst the models and pictures were useful, the explanations from the experts still did not provide all the relevant information I had hoped to glean from the event. No light and noise expert present, but it should have been expected that most villagers effected would be interested in this above other experts. How is the increase in noise and light assessment to be measured? Are the road work developments to junction 15 considered as part of the overall noise impact in this proposal? Since the similar size proposal at East Midlands details up to 1800 HGV movements per day, what increase in noise volume will this create? Who decides how 'significant elements of built development' are agreed upon as a number? I was told repetitively that there is a 'demand' for this type of development, but how that demand had been assessed and confirmed was not clear. Has the agreed development of thousands of houses on the outskirts of Milton Keynes, adjacent to the M1, been considered within the context of this development? The NPSNN alreay explains that much of the SRFI development has already occured in the Midlands and urges more investment in the South and East instead. Surely yet another development of this scale in the Midlands, far from curing the problem of traffic overload, will only compound it? Is any saving in road transport not then lost by further increase in cars on the site for the proposed thousands of workers, since the site is not served by public transport, and given its location is never likely to be so? NPSNN quote "the logistics industry is required to develop new facilities that need to be located alongside major rail routes, close to major trunk roads as well as near to the conurbations that consume the goods". - Nobody could explain how Collingtree and Milton Malsor could be deemed 'conurbations consuming goods' since we are already consuming goods from other large warehouse developments within 4 miles of us, and each have a population of just a few hundred houses. The availibility of a suitable workforce will be an important consideration and it's important that SRFIs are located close to the business markets they will serve. - Where will the workers be recruited from - Brackmills? Surely the Government agenda is not only about warehousing and industry? Concern raised over how seriously some of the comments were taken at the consultation event.

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54	Bugbrooke					1	COMMENTS RECEIVED IN FULL LETTER BY POST: BELOW IS A SUMMARY: A508 is currently too busy and the proposed scheme will generate additional HGV traffic. Some of the roads are narrow to pass with schools generating their own traffic twice a day. The consultation took place in one location on working days: Rail Central's was in different places and at a weekend. The location is too close to ports and other existing facilities and therefore there are serious questions regarding the need for the facility in this area and the viability of proposed development. Road congestion is expected to be severe on the M1 between Junctions 15 and 18 by 2040. There is no other similar length of road in the Midlands which is expected to be so affected. Regular congestion is also expected on the M1 between Junctions 13 and 15 and northwards from Junction 18. The proposed Northampton Gateway site is an unsuitable location from a road congestion perspective. Part of the justification for building HS2 is that the West Coast Mainline will be full (in terms of train paths) by the 2020s. However, the number of pathways freed up on the WCML by HS2 will be very small by all accounts and the released train paths will be on the fast lines and not the slow lines used by freight. In addition it is expected that the East West Rail section between Bicester and Bletchley will be completed in 2024. According to the rail expert at the consultation event, freight trains from Southampton travelling to the Midlands will from 2024 onwards join the WCML at Bletchley. So 30 additional two-way rail journeys per day will need to be accommodated on the WCML. As well as freight trains there will also be additional passenger trains accessing the WCML from the East West Rail programme. It is likely that other trains will access the WCML in this area as a result of the link between Bicester and Bletchley being reopened. Therefore the claims as to how many trains will be served by the SRFI seem optimistic. Another constraint is the North London line which has 2 tracks in some places andthe expansion of services in London. Theresore we should seek to build where the Felixstowe-Nuneaton rail route can serve them, for example. It is uncertain as to whether the 4 train paths necessary to qualify an SRFI would be available. SRFIs need to be located near to densely populated areas and areas with plenty of industry and retail stores to minimise the distance that the goods need to travel by road. Northampton is not an area like this. The description of SRFIs is misleading as thier locations are not being planned on a strategic basis but simply where developers have parcels of land that are close to a rail line and major road. Rail Central would be competing for the same train paths. There are therefore also technical issues to be considered if both application were to be approved. In combination there would be a need for 480 metres of track to accommodate the requirement for northbound and southbound trains. It is questionable as to whether there is sufficient length to fit all of these points and provide for 775 metre trains within the finite space available. M1 forms a boundary which would be broken with this development. Northampton has low unemployment which suggests that employees would have to travel great distances to reach work. The proposed site is unsuitable for numerous reasons. The justification is not clear, but it does have the advantage of

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55	Wootton					1	I was disappointed to hear that you have held exhibitions (in sectret?) at the Hilton Hotel. It is essential that we have a proper consultation process. How were these publicised? When was Wootton Parish Council notified, and how? There were previous proposals for a Howdens warehouse facility on the site. The proposal did not comply with the local plan so was unlikely to be approved. This proposal was withdrawn. One can only assume that if the proposal was likely to be approved you would have progressed it, as land with planning permission is so much more valuable. The NPPF is clear that Local Plans are key to delivering sustainable development that reflects the vision and aspirations of local communities. The proposal also fails to meet the requirements of the Local Plan and Joint Core Strategy. The proposal will contribute to traffic issues with HGVs adding to the problemt and the workforce which will most likely travel by car to get to the site. Junction 15 is already gridlocked at peak times. There needs to be some consideration of the impact of all the proposed devlopments in the area. The JCS clearly shows the Northampton area of the development plan stopping at the M1 motorway, no large developments beyond the M1 are planned, indeed they are specificallly excluded. Northampton is now heavily dependent on the distribution sector, with many low paid and low skilled jobs. The development does not comply with the Local Plan and there is no point in preparing a Local Plan if a developer can simply bypass it. I am in favour of putting freight onto rail , but we need to nationally look at the rail infrastructure investment. One option could be to create new links to existing warehousing developments. Brackmills has a disused line running through it and Magna Park Lutterworth could be connected to Nuneaton and/or Rugby. We need to plan for future growth but not just build monster warehouses just because it suits a developer's profits.

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56	Wootton					1	COMMENTS RECEIVED IN A LETTER: FULL COMMENTS AVAILABLE, BELOW IS A SUMMARY OF THE DETAILED RESPONSE: Little confidence that this is more than an opportunistic development. Much of the detail relies on further work required on traffic level and flows, environmental impact and air quality assessments or is couched in vague terms about labour availability to service this growth at start up and when operational. It also appears to be predicated on previous work on the development of this site which was rejected for very sound reasons. This is not good enough given the potential impact on local communities. Crick terminal serves a similar market and development near Castle Donington has recently been approved to serve a similar purpose. Nationally Policy describes a network across the regions with a wide range of locations nationally. I wonder why, given the national policy, the duplication within the East Midlands and particularly Northamptonshire is necessary? What needs assessment has been undertaken to ensure that this facility will be used in line with the national policy and not just generate 6,000 additional HGV journeys in the vicinity? Is there spare capacity on the rail line? How realistic is the source of this labour? How does this development reduce carbon dioxide emissions? The summary asserts that this proposal responds to national policy guidance. What work has been done with logistics firms (European, National and Local) on how they would use this duplicate facility in Northamptonshire? How many lorries would be off the road and would actually use the rail option? How much consultation has been done with individual firms within the sector to analyse future use? Junction 15 can be difficult in the rush hour. I don't understand how additional lorries can helo that. Additional road journeys will also be generated by any employees coming from the whole of Northamptonshire to service this place. Will the improvements actually deal with that or should we just accept that traffic at certain times is heavy? How will this development stop the dangerous practices rather than exacerbate them in realtion to the A508/A45 overload? Traffic noise is a mahjor issue in Wootton village. Landscaping bunding needs to be exended to consideration of the local community in Wootton and the bunding needs to be extended along the A45, together with a reduction in the speed limit to a safe level. The height and breadth of the development is all dominating and will affect the area adversely. The model produced for the construction brough home the size of the development. The bunding etc and cosmetic work recognises the impact of the build on the local view. This cosmetic work needs to be rethought and surely the proposal should include at a minimum the lowering of the ground level so that at least the height of the buildings will be less intrusive. With regard to the Bypass - Salcey Forest is a fabulous local 'lung' for local commuities. Already the hum of the M1 can
57							SEE COMMENT 49: THIS IS THE SECOND RESPONSE RECEIVED FROM THE SAME PERSON AND THEREFORE THE OBJECTIONS RAISED IN THIS RESPONSE ARE NOT COUNTED WITHIN THE LIST TO AVOID DUPLICATING ONE INDIVIDUAL'S COMMENTS: Disgraceful. Not happy. Have lived in Roade all of my 40 years and the thought of all the green land and rare wildlife that you will destroy makes me feel physically sick. Constant noise and traffic will replace massive environment importance in 2016 is heart breaking, is this the way earth will look from the sky, blue sea and grey earth! God didn't create this world for this.
58	East Husbury						I was unable to attend the events but I live close to the railway line. I was obviously aware of the railway line when I bought my house, but the traffic is not high. We also have noise and pollution from the motorway which has increased in the 20 years since I purchased my property. I would like to know if there is a plan to put in any noise reduction fencing or similar by the railway to help with noise levels from increased traffic as it will be impossible to sleep with the windows open during the summer. Also would there be any comensation considered as this may make properties on Woodpecker Way lose value and be less desirable to sell?

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59	Blisworth				1	1	DETAILED RESPONSE RECEIVED, THEREFORE THE COMMENTS BELOW PROVIDE A SUMMARY OF THE POINTS RAISED; SOME OF THE POINTS ARE IDENTICAL TO THOSE RAISED IN RESPONSE NUMBER 54: Not strategic and only promoted because the developer has an option on the land. Contrary to the Joint Core Strartegy and in conflict with the commercial, transport and housing objectives of the whole region. A further development on this scale will result in a complete imbalance in this local planning strategy. If the proposal is consented there will be inevitable infill and further development south of the M1. The rural character of the area will be lost forever and the villages of Milton Malsor, Roade, Collingtree and Blisworth will be engulfed in the Northampton conurbation. The current Local Plan protects the rural community from the expansion of the conurbation south of the M1. Roxhill have not provided an alternative sites assessment. Alternative sites should be considered before alighting on the chosen option. When asked, at the exhibition, what alternative locations had been considered the representative said that they were not sure but thought that Junction 16 had been considered (J16 is nowhere near a railway). Ashfield Land's assessment of alternative sites identified eight that were nowhere near rail. A common theme seems to be emerging. Roxhill have undertaken no market research to establish a demand for transport of freight via rail in this location. Their sole justification appears to be the unconstrained freight model predictions. Northampton Gateway is remote from industrial heartlands. There is no major industry in the vicinity that could economically utilise the rail connection. Imported goods will enter the site and empty trains will leave. Rixhill are proposeing to use a greenfield site when the Government strongly recommends the use of brownfield sites. There is a limited pool of 'logistics' labour in Northampton due to predominance of warehouse activities. Workers would have to travel from some distance and negate much of the alleged carbon benefits. The second Roade bypass would result in: further noise pollution in the rural environment; inevitable housing infill betwen existing properties and the road itself; the construction of the single carriageway bypass and its three roundabouts (two t bypass the village and one to connect to Knock Lane) will negate any traffic benefits and slow traffic flows; the Courteenhall Road junction with the A508 will become an even greater bottleneck; Knock Lane/Stoke Road will become a short-cut for traffic wishing to reach the A43 and a rat run when the M1 is congested; traffic through the local villages will increase and with shift working this could involve night-time movements along village roads which is unacceptable to those living on them; despite assertions to the contrary by Roxhill there is no full proof way of preventing private vehicles from using the village roads. For many working people both the dates and times of the exhibitions would have precluded them from attending the exhibitions and I suspect this was a deliberate ploy to try and sneak the development under the radar whilst attention is focused on Rail Central. Holding the exhibitions in the weeks leading up to Christmas, coupled with the lack of publicity
60	Milton Malsor					1	Scheme is contrary to the Joint Core Strategy and the need for an SRFI has been identified as DIRFT. There is no need for the scheme as there is already enough land allocated in the WNJCS for this purpose, on Junctions 16 and 18 of the M1. The impact of the scheme on village residents will be devastating. Collingtree is adjacent to the M1 and is idetified as at maximum nitrogen dioxide air quality levels. Lorries travelling in from all directions will be using the motorway with consequent diesel pollution. Lorries travellling in from the south will impact on air quality in Towcester which is also identified as having high levels of nitrogen dioxide. Noise and light pollution from 24 hour operation, 7 days a week will destroy the relative peace in both our villages. The reason we moved here in the first place was the rural tranqulity of the place. I am very concerned that our quality, indeed way of life, will be irrevocably destroyed by Roxhill's developer driven proposal, which is both unnecessary and unwanted, as there is already an SRFI in the locality at Junction 8 of the M1.

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61	Grange Park					1	DETAILED RESPONSE IN TERMS OF TRAFFIC AND J15 ISSUES; BELOW IS A SUMMARY OF THE MAIN POINTS: J15 is a problem due to the following elements: The 'dog-bone' shape of the roundabout provides for limited waiting areas at traffic lights on the junction utself, causing tailbacks on the junction the prevent witing road users from joining the roundabout; the phasing of the traffic lights provides for limited time between traffic moving cycles; the absence of deterrents such as red light cameras does not discourage users from jumping the red signals; the absence of any signcal control for vehicles joining the junction from Saxon Way (in combination with the above factors) makes access to the junction from Grange Park both difficult and unsafe at peak times. The junction currently operates at 127% capacity, the proposed improvements are suggested to make a 30% increase in capacity, which only allows for a 3% buffer based on current traffic levels. My request is that as part of the approval of this proposed development, more significant improvements to the junction should be integrated, and these should include, but not be limited to: re-profiling the junction shape to be oval/circular with an increased circumference (Junction 18 of the M1 - which is in close proximity to another rail freight interchange has this configuration) by expanding the junction to the North West. Introduction of filter lanes between Saxon Way/M1 southbound and A508/M1 Northbound to enable signal-free access to the motorway. Addition of signal control on all feeder roads to the junction (ncluding Saxon Way). Addition of traffic signal cameras on major feeder roads (but especically A45 southbound) to discourage red light jumping. Increased capacity of waiting areas before signal controls on the junction itself. I believe that these measures will further help to mitigate the traffic impact of the proposed development which, in general, I support if it will increase tax revenue in the area and provide local employment opportunities.

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62		1				1	Firstly, as a principal, I have no objection, more freight by rail is a good idea, job creation is helpful, will generally bring economic growth to the area. The proposals should consider the impact of both of the potentail for both it and Rail Central to come forward. The plan breaches the M1 boundary and Roade will become part of the urban sprawl of Northampton. It looks like the railhead will be off the Northampton loop which woud defeat or reduce the point of the project, surely it should come directly off the West Coast Main Line. Parking for the workers seems minimal. Can't see any HGV parking facilities. The local villages are blighted by HGVs parked in all sorts of unsuitable places and the needs of the drivers are not met, so the hedgerows are used as public conveniences/waste bins. The Bypass for Roade is welcome, in the short term that's good, but in the longer term there will be infill makeing the village bigger, putting extra starin on local facilities that are already strained and links to the point above that the village will become part of Northampton, so what's been considered to assist with this? Are public transport links going to be improved? i.e. the bus route ts that now end in Grange Park, are they going to be extended, ideally to Roade to improve public transport links? Other than the proposed bypass there is no evidence of anything for the local community; what about a parkway rail station, and improved community buildings/facilities? If the above issues are not addresses at inception wthey will need to e addressed at a later point by the local Councils at their own costs and therefore the developers will have got away with it because they've not covered these costs, much as happened at Grange Park and their redevelopment of Junction 15 of the M1 which was a poor solution done on the cheap.

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63						1	Whilst strategically Northamptonshire may seem attractive, the effect of this type of development on local communities is devastating, due to the detrimental impact on the local environment and the drastic changes in living conditions for local residents. Primary reason for opposition is the lack of suitable entry/exit nodes to/from the site and the restrictions of the surrounding rural road network which is unsuitable for the traffic generated by this form of development. There are weak and narrow canal bridges. HGVs using the congested M1, A5 and A43 will attempt to short-cut through the villages, including Blisworth, Pattishall, Gayton and Shutlanger. A further signifcant weakness is that there is no contingency for emergency access/egress in the event of a major incident on-site. The increase in traffic in the area will not only have a detrimental impact on the local area but will also be a disadvantage to the site operators for whom an on-time delivery is critical, thus making the site of dubious economic value to all but the developer. Proposals for J15 improvements will always be welcome. However, will the increase in capacity be sufficient? For the Roade bypass a route which provides the minimum impact to the local population and environment would be preferable. The plans for the site however, do not a[[ear t address the problems gaining access to/from the A508 from Courteenhall Road, Blisworth. THis is know to be a hazardous junction for access onto the A508 and there is potential that the dual carriageway will exacerbate this. The models provided did aid in understanding the proposals for visual screening and containment and thus were helpful. However, there is no doubt that the character of the landscape will be destroyed not just in the physical sense but also by the impact of light and noise pollution. Noise will not be 'absorbed'. Please acknowledge receipt of my comments.

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64							DETAILED RESPONSE SUBMITTED; BELOW IS A SUMMARY OF THE KEY POINTS RAISED: NRUG are very surprised to find no consideration of the existing rail users as receptors. NRUG do not support this proposal in any way. NRUG object on the basis that it will have an adverse impact on the rail services for Northampton, both in the short and long-term. Short term - in terms of capacity for passenger trains. Long term - limiting the potential for new frequent fast services for Northampton, the very basis for NRUG's continued support for HS2. We are not anti-freight and support DIRFT. Your sequential analysis will need to set out why a new railhead at DIRFT is not a better alternative. NRUG believe that it is better to maintain any freight capacity from DIRFT to the south of Northampton for freight services through the Channel Tunnel, than use them to access a facility that replicates DIRFT in a different, nearby, but troublesome location. You need to note that HS2 will not relieve capacity on the part of the WCML running through Northampton. This track takes all the Northampton and Long Buckby passenger traffic as well as freight, and is a key part of the limitations referred to in the freight RUS and NSPNN (quoted in the response - see full response). In forming this objection, we have had regard to policy documents covering the following: - Rail freight from the east coast ports into DIRFT is oriened along the Peterborough-Nuneaton route to get to WCML. - Routes and capacity for SHell Haven (now known as Thames Gateway), if developed, will be needed. Freight would be routed via Peterborough. - There is no Bletchley east west agenda for freight. - Northampton southwards (identified as Daventry to Wembley) has a capacity gap. - Rail should offer a safe and reliable route to work. - Facilitate increases in both business and leisure travel. - Provide for the transport of freight. Adverse interactions of freight and high speed passenger rail DIRFT to Birmingham. - Adverse interaction of freight with frequent suburban and interurban passenger services DIRFT to Wembley.

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65						1	As a stand alone project when viewed in isolation, Northampton Gateway is a disaster for the area and the region. Put in the context of decades of local planning policy failures, Northampton Gateway will prove to be cacastrophic for Northamptonshire, its residents and those who work or travel near the area. Northamptonshire has suffered from over 40 years of incompetent councillors and planning officers, who have behaved more like a dissipated junta on the Costa del Sol. The scoundrels at WNDC, who caused so much damage to the area, now continue their dirty work at the JPU and have orchestrated and presided over the wholesale destruction of the rural environment and the trashing of one of the nicest parts of middle England. The creation and over development of area for business and residential construction, without sufficient infrastructure has put extraordinary strain on local services, worst of all is the pressure of the road system. The proposed location for this hideous terminal at Milton Malsor between Junction 15 and 15a could not be worse for vehicular traffic. Junction 15 is a nightmare day and night. From 3pm most work days, traffic queues on the hard shoulder of the M1 in both directions to leave the motorway. At the same time the A508 from Milton Keynes is backed up to Roade and sometimes Stoke Bruene to access the motorway. The traffic excaping the hell of Towcester, the country's biggest nightmare, on the A43 reaches a strangulation point at 15a. With traffic from the A45 joining the mix, it is a perfect storm. A 15 minute journey from Roade to Northampton can taje an hour at peak times. The roads are completely ecrewed and teribly dangerous. With more housing and other construction taking place, it is only a matter of time before the entire region grinds to a halt and the first place that this is going to happen is along the M1 between 15 and 15a. South Northamptonshire is the worst area in the region for congestion, their Council is responsible for clogging up every major road in the District. For anyone to have suggested that this terminal should be placed at such a location is pure and simple lunacy. That anyone could be so stupid and reckless is beyond belief. The negligent people responseible, who have spent taxpayers money on this project, should be prosecuted for malfeasance.
66	Blisworth				1	1	Too close to the villages of Milton Malsor, Collingtree and Blisworth. Even if Roade has a bypass, when there are traffic holdups, people will just divert through Blisworth and Stoke Bruerne (as they already do now!), so more traffic will only increase this problem. Especially concerned regarding the potential to use compulsory purchase powers for houses and land in order to build the bypass. Too many lives will be spoilt by the proposals and also the landscape. Also I understand there are no rules being applied to businesses to make them use the terminal for the rail connection.

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67	Blisworth						DETAILED RESPONSE WHICH ASKS QUESTIONS, RATHER THAN PROVIDES FEEBACK. BELOW IS A SUMMARY OF THE QUESTIONS ASKED, SEE FULL RESPONSE FOR DETAIL: I have reviewed the Environmental Statement Scoping Report, October 2016, I was struck by how thin this report was when compared to equivalent documents which I have reviewed in relation to other proposals - for example East Midlands Gateway, which raises a number of questions: - What do you mean when you refer to 'rapid rail freight' facility and can you provide any evidence of the demand for such a facility in this area? - Would the imrovements to Junction 15 be identified as a Nationally Significant Infrastructure Project in their own right, if not, why not? - What reassurances can you provide to the residents of local villages that construction traffic will not travel through the surrounding villages? - When you refer to the recent EIA scoping exercise undertaken for an SRFI nearby, can you confirm if you are relating to Rail Central? - Another SRFI is referred to later, can you confirm if this is also Rail Central and who the specific occupier referred to is? - It is intended for waste to be scoped out of the ES, can you explain the rationale for this? - There is no interest in a joint scheme with Rail Central. CAn you explain why the Rail Central site is not considered suitable for the purpose? Public Exhibitions: Time, dates and location precluded people from being able to attend. The exhibitions were poorly publicised and this is likely to have negatively impacted on the number of attendees. There were very few Roxhill representatives available to answer queries. The exhibition boards contained too much information for members of the pubic to assimilate and this was compounded by the lack of information to take away. Please acknowledge receipt of this letter and I look forward to a detailed response in relation to the various questions raised in due course.
68						1	Contrary to Local Authority Plans and the adopted Joint Core Strategy. Conflict with the commercial and housing objectives of the region. The site is not of national strategic importance, but is being promoted because it is controlled by a developer. Because of the distances travelled the transport modal shift will not occur and there is no requirement for SRFI facilities to actually accept any freight by rail. DIRFT is in the near vicinity and has ample capacity. Local trunk road network already too congested. The suggestion that the site is supported by a rail link is unsupported with the rail network operating at capacity and little support from the rail operating authoorities. The direct and immediate impact on all of the local villages and their communities will be both huge and permanent - no amount of mitigation will change this. The scheme will cause an increase in air, light and noise pollution. A huge area of agricultural land will be irrecoverably destroyed and a number of rare habitats, along with animal and plant species that currently thrive there. Job creation is not required in this area with strong employment statistics. New workers would therefore either be forced to commute or move locally causing further strain on the very limited local housing stock.

Northampton Gateway SRFI Comments Tracker

Document No.	Town/Village	Reason for Objection or Comments					Additional Comments
		Q3. Support for Roade Bypass	Q3. Support for Roade Bypass green route	Q3. Support for Roade Bypass blue route	Q3. Object to Roade Bypass	General Traffic Concerns	
69	Grange Park					1	this is a ridiculous suggestion. No way would I support this and the impact locally will be intolerable to say the least! Contact me to discuss further, I would be happy to contribute.
70	Milton Malsor	1				1	The proposal is in the heart of lovely countryside between Milton Malsor and Blisworth and the countryside will be ruined, plus wildlife and people's homes. The proposed changes for the junction are ridiculous and will only make (what is already a busy junction) an even worse one. As an ex-member of Grange Park, fighting the traffic every day was bad enough without this. The Roade Bypass is an absoulte must should this proposal unfortunately go ahead. There are so many downsides to this proposal. The traffix congestion will be horrendous no matter what measures are put in place to solve this. The Junction (15) is too busy even now. The environment will be ruined, the air quality, the open coutryside, the noise pollution, the wildlife. We moved to Milton to be in a quiet village setting away from heavy traffic - this will be gone a few years later. House prices will almost certainly drop putting our future in the balance after working so hard to get into this position. Air pollution will be a constant worry for my children and for our own health.
OVERALL TOTALS		**9**	**1**	**4**	**10**	**43**	

APPENDIX C

Appendix C: Drawing NGW-BWB-GEN-XX-SK-C-SK05-S2-P2

Notes

1. Do not scale this drawing. All dimensions must be checked/ verified on site. If in doubt ask.
2. This drawing is to be read in conjunction with all relevant architects, engineers and specialists drawings and specifications.
3. All dimensions in millimetres unless noted otherwise. All levels in metres unless noted otherwise.
4. Any discrepancies noted on site are to be reported to the engineer immediately.

Legend

Order limits

ISSUES & REVISIONS

Rev	Date	Details of issue / revision	Drw	Rev
P1	31.03.17	Preliminary Issue	SRH	SRH
P2	21.09.17	Amended for consultation	SRH	SRH

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Client: ROXHILL

Project Title: **NORTHAMPTON GATEWAY RAIL FREIGHT INTERCHANGE**

Drawing Title: **A508 ROADE BYPASS PREFERRED ROUTE**

Drawn:	S. Hilditch	Reviewed:	S. Hilditch
BWB Ref:	NTH 2315	Date:	31.03.17
Scale@A1:	1:5000		

Drawing Status: **FOR INFORMATION**

Project - Originator - Zone - Level - Type - Role - Number	Status	Rev
NGW-BWB-GEN-XX-SK-C-SK05	S2	P2

APPENDIX D

Appendix D: ADC Infrastructure: Roade Bypass Junction Options Technical Note

M1J15 NORTHAMPTON GATEWAY
STRATEGIC RAIL FREIGHT INTERCHANGE

ROADE BYPASS JUNCTION OPTIONS TECHNICAL NOTE

ADC Infrastructure Limited
Western House
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project number: ADC1475			report reference: ADC1475 TNB
version	date	author	comments
1	18/09/2017	Mark Higgins	internal draft
2	29/09/2017	Mark Higgins	issued for consultation

CONTENTS

DRAWINGS

NGW-BWB-GEN-XX-SK-C-SK05
NGW-BWB-HGN-03-DR-C-00103
NGW-BWB-HGN-03-DR-C-00104

APPENDICES

1.0 INTRODUCTION

1.1 ADC Infrastructure Ltd is commissioned by Roxhill (Junction 15) Ltd to provide transport advice with regards to their Nationally Significant Infrastructure Project (NSIP) for the development of a Strategic Rail Freight Interchange (SRFI) facility adjacent to M1 Junction 15 in Northamptonshire (known as Northampton Gateway SRFI).

1.2 It was agreed with the Transport Working Group that the transport impacts of the Northampton Gateway SRFI development be modelled using the Northamptonshire Strategic Transport Model (NSTM2) which is maintained on Northamptonshire County Council's (NCC's) behalf by WSP.

1.3 The outputs of the NSTM2 are being analysed to identify the impacts of the proposed development and judge the requirements for mitigation across the transport network. A key aspect of the emerging mitigation strategy is the provision of a bypass to the west of Roade. A detailed explanation for the requirement for a bypass and the selection of the most suitable route is provided at BWB Roade Bypass Options Report reference **NGW-BWB-HGN-R-RP-D-01-S4**.

1.4 This Technical Note focuses on the option testing undertaken to identify the most suitable junction configurations required to connect the proposed bypass with the A508 Stratford Road to the south of Roade, the A508 Northampton Road to the north of Roade and the connection to Knock Lane/Blisworth Road to the west of Roade. The assessments have been based on NSTM2 traffic data taken from the 2031 J1c (Development Case) scenario.

1.5 Please note that the traffic data used will change following further iterations of the NSTM2. Therefore, this document is intended to remain 'live' during the period of the Environmental Impact Assessment for the development.

2.0 ROADE BYPASS

Existing conditions

2.1 The highway infrastructure network in Roade remains essentially unchanged from the early 1700s. Whilst the roads themselves have been upgraded to modern standards in terms of surfacing, lighting and signage, they are constrained by their historic alignments and features such as the narrow bridge carrying the A508 over the railway. Further, several of the junctions along the A508 in Roade are acknowledged to suffer from congestion, with the Stratford Road/High Street mini-roundabout a significant constraint.

2.2 In 2015 the annual average daily traffic flow (ADDT) through Roade on the A508 was 16,026 vehicles, with an average daily flow of 1083 HGVs.

2.3 As a result of the constrained highway infrastructure, the average daily traffic conditions are that of slow moving traffic, particularly at peak times when queuing can quickly develop through the village. HGVs travelling in opposing directions on the A508 bridge over the railway are often obliged to give way to each other as they are not able to pass safely on the bridge. It should also be noted that this section of the A508 serves as a diversion route should there be an issue on the M1, the A5 and the A43.

Development impact

2.4 The Proposed Development is forecast to generate around 16,500 two-way vehicle trips during a 24-hour period, of which around 4,200 two-way trips would be HGVs. Outputs from the NSTM2 suggests that around 15% of the development employee traffic would travel to and from the south of the development site using the A508. Additionally, approximately 9% of the development HGV traffic would be expected to arrive from the south.

2.5 When compared to the current baseline conditions given above, the development could increase total daily traffic levels in Roade by around 13%. The development would also increase the daily number of HGVs passing through Roade by 17%, or around 190 daily HGV trips.

2.6 Due to the existing highway constraints in Roade, especially the narrow railway bridge, it is considered that the above increases in traffic would not be an acceptable impact and provision of a bypass would be the most appropriate solution. The bypass would also be important in drawing existing traffic back onto the A508 and away from local routes that are being used as rat-runs.

Roade bypass route

2.7 Following assessment and consultation, as detailed in BWB technical note **NGW-BWB-HGN-R-RP-D-01-S3-P3**, the route shown on drawing number **NGW-BWB-GEN-XX-SK-C-SK05** has been identified as the preferred route of the Roade bypass.

Roade bypass junction configuration

2.8 In terms of junctions, a connection between the bypass and the existing A508 to the north and south of Roade are required to maintain suitable access into the village.

2.9 However, what is less clear is whether a connection should be made to Knock Lane/Blisworth Road, which is crossed by the proposed bypass route. Whilst it is considered that connection to Blisworth Road to the east is essential to maintain access to residential areas for emergency service vehicles in the event of the railway bridge on Hyde Road becoming blocked, the

presence and form of a connection to Knock Lane could influence traffic patterns and requires further assessment.

2.10 NCC expressed a preference on safety grounds for the bypass junctions to be configured as roundabouts rather than priority controlled 'T' junctions.

2.11 Therefore, given the importance of maximising the effectiveness of the proposed Roade bypass, the NSTM2 has been used to investigate the suitability of a number of options. WSP have produced a Technical Note (**Appendix A**) which reports on the NSTM2 results for the following scenarios:

- 2031 Base Scenario (J1c) includes:
  - A three-arm roundabout with the A508 Northampton Road to the north and a three-arm roundabout with the A508 Stratford Road the south.
  - A four-arm roundabout with Knock Lane and Blisworth Road.
- 2031 Option A J2a includes:
  - Closing Knock Lane to the west of Roade Bypass so that the four-arm roundabout becomes a three-arm roundabout connecting to Blisworth Road.
- 2031 Option B J2b includes:
  - A three-arm roundabout with the A508 Northampton Road to the north and a three-arm roundabout with the A508 Stratford Road the south.
  - A bridge from Knock Lane to Blisworth Road that passes over Roade Bypass, removing vehicle interaction between the roads.
- 2031 Option C J2c includes:
  - A three-arm roundabout with the A508 Northampton Road to the north and a ghost island T-junction with the A508 Stratford Road the south.
  - A four-arm roundabout with Knock Lane and Blisworth Road.

2.12 The WSP technical note concludes that the 2031 Base Scenario (J1c) performs better than the other options in terms of delay and journey time along the A508/bypass corridor.

2.13 In parallel to the work undertaken by WSP, the form of the required junctions has been assessed in detail to ensure that the correct junction arrangements are identified. The geometry of the identified junctions has been designed accordingly so that they will have sufficient capacity to handle the forecast traffic demand. The following sections of this report detail this analysis.

3.0 NSTM2 TRAFFIC FLOWS

3.1 The agreed assessment scenarios for the project are summarised in the table below.

Scenario	ID	Description
Reference Case	B1	2021 Opening Year
	C1	2021 Dft 02/2013 Circular Compliant
	D1	2031 Future Year
Development Case without highway mitigation	E1	2021 Opening Year
	F1	2021 Dft 02/2013 Circular Compliant
	G1	2031 Future Year
Development Case with highway mitigation	H1	2021 Opening Year
	I1	2021 Dft 02/2013 Circular Compliant
	J1	2031 Future Year

3.2 Up until September 2017 WSP were continuing to work on the Opening Year and DfT 02/1013 Circular compliant assessment scenarios. Assessment of the development impact has therefore been undertaken based on the 2031 Future Year assessment scenario. This is a robust position to adopt as this scenario has the greatest traffic growth and therefore represents the scenario when peak hour highway capacity is lowest and when the development has greatest potential to impact upon the operation of the highway network

3.3 As the mitigation strategy for the development has developed, multiple scenarios for the 2031 Future Year Development Case have been examined using the NSTM2. These are listed in the table below.

Scenario	ID	Description
Development Case with highway mitigation	J0	G1 + site access with A508 dualling between site and M1J15, M1J15 improvement
	J1	J0 + Roade Bypass
	J1a	J1 + right turn ban for HGVs departing site access
	J1b	J1a + M1 Junction 15a improvement
	J1c	J1a + left-in, left-out at A508 Courteenhall Road

3.4 The junction options for the bypass have been developed in parallel to the wider mitigation strategy and have therefore been assessed with the most appropriate NSTM2 scenario traffic flows available at the time. This Technical Note reports on the most recent iteration of the development case model, J1c.

4.0 A508 STRATFORD ROAD/ROADE BYPASS JUNCTION

Introduction

4.1 To the south of the Roade bypass a connection to the existing A508 Stratford Road is required so that access to Roade village from the south can be maintained. However, the form of the resulting junction will have an effect on the success of the bypass, as too much delay for through-traffic could discourage traffic from reassigning back onto the A508.

4.2 Providing a traffic signal controlled junction would bring delay to the mainline flow on the bypass as traffic is stopped to allow traffic to exit the side-road, and would therefore make it less effective. For this reason, a traffic signal controlled junction option has been dismissed, leaving two possible options for the junction; a ghost island priority controlled T-junction or a 3-arm roundabout.

Ghost island T-junction

4.3 A ghost island T-junction has been considered, with the connection to Roade forming the minor arm so that there would be no delay for traffic travelling northbound and southbound on the bypass, as shown at **Figure 2.** The operation of the ghost island T-junction was modelled in the PICADY module of Junctions 8 using the J1c (Development Case) traffic flows provided at **Appendix B**.

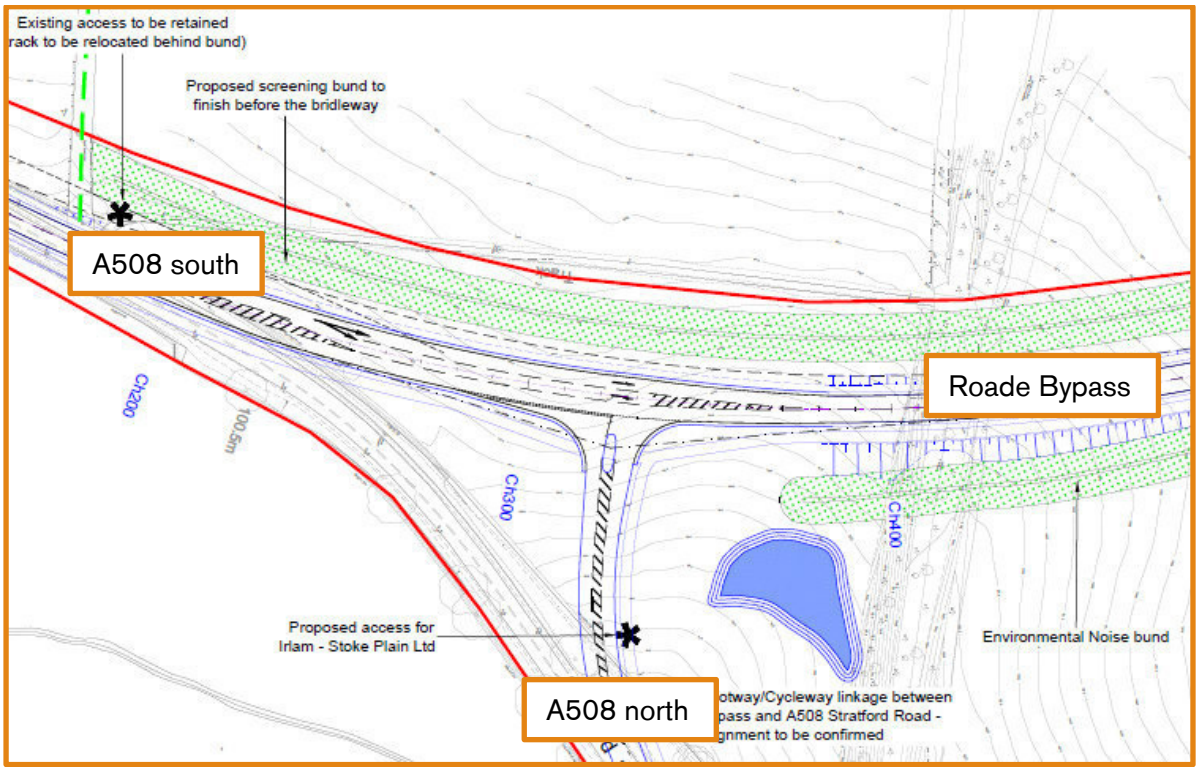

Figure 2: A508 Stratford Road/Bypass ghost island T-junction

4.4 A summary of the PICADY results are shown below, with the full results provided at **Appendix C**. The modelling demonstrates that in the 2031 J1c development case the junction is forecast to operate acceptably in both peak hours, with a ratio of flow to capacity below 85% for all priority controlled movements.

	AM (J1c)			PM (J1c)		
	Queue (PCU)	Delay (s)	RFC	Queue (PCU)	Delay (s)	RFC
	Traffic Flows - 2031					
Stream B-C	0.84	16.98	0.46	0.04	7.75	0.04
Stream B-A	0.00	0.00	0.00	0.00	0.00	0.00
Stream C-AB	0.05	10.02	0.04	3.92	38.36	0.83
Stream C-A	-	-	-	-	-	-
Stream A-B	-	-	-	-	-	-
Stream A-C	-	-	-	-	-	-

Arm A is Roade bypass
Arm B is A508 Stratford Road north
Arm C is A508 Stratford Road south

4.5 However, when the 2031 J1c traffic flows were interrogated it was shown that no vehicles are predicted to turn right from Roade to the bypass in either the morning or evening peak hour. In reality, this is unlikely to be the case and so a sensitivity test was undertaken which assumed a modest right-turn flow of just 30 vehicles in each peak hour. The results of the sensitivity test are provided at **Appendix C** and summarised below.

	AM (J1c)			PM (J1c)		
	Queue (PCU)	Delay (s)	RFC	Queue (PCU)	Delay (s)	RFC
	Traffic Flows - 2031					
Stream B-C	1.88	39.65	0.68	6.04	2894.05	2.66
Stream B-A	1.46	180.44	0.66	10.35	2624.15	2.72
Stream C-AB	0.05	10.28	0.05	4.35	42.60	0.85
Stream C-A	-	-	-	-	-	-
Stream A-B	-	-	-	-	-	-
Stream A-C	-	-	-	-	-	-

4.6 The results of the sensitivity test show that in the 2031 J1c morning peak hour the junction would operate acceptably, although there would be a delay of approximately 3 minutes for vehicles turning right out of the side road. The results also show that the junction would operate significantly over capacity in the 2031 J1c evening peak hour, with a delay of 43 minutes indicating that it would be almost impossible to turn right out of the side road. Further, the results also show that there would be a similarly high delay for vehicles turning left out of the side road as vehicles waiting to turn right block the approach to the junction.

4.7 The sensitivity test therefore demonstrates that a T-junction option is unsuitable for the bypass at this location.

3-arm roundabout

4.8 To provide a junction which can cater for all movements from the side road, whilst minimising delay to traffic on the bypass, a roundabout option has been considered as shown drawing number **NGW-BWB-HGN-03-DR-C-00103** and on **Figure 3**. The geometry of the roundabout has been designed in accordance with the standards outlined in the Design Manual for Roads and Bridges (DMRB) TD16/07, following an iterative process using Arcady as the design tool.

4.9 The roundabout has an inscribed circle diameter (ICD) of 80 metres. Both the A508 Stratford Road south and bypass approaches to the roundabout flare to two lanes for approximately 60 metres, with two circulating lanes and two lanes on the A508 Stratford Road south and bypass exits improving the efficiency for northbound and southbound vehicles.

4.10 The key controlling flows at the proposed roundabout would be the right-turn movement from the A508 Stratford Road south and the right-turn from the A508 Stratford Road north. The 2031 J1c development case traffic flows provided at **Appendix B** show that both of these flows are relatively low (a right-turn flow of 30 vehicles from the A508 Stratford Road north has been modelled as per the T-junction sensitivity test) and therefore delay to the northbound and southbound movements on the bypass should be minimal.

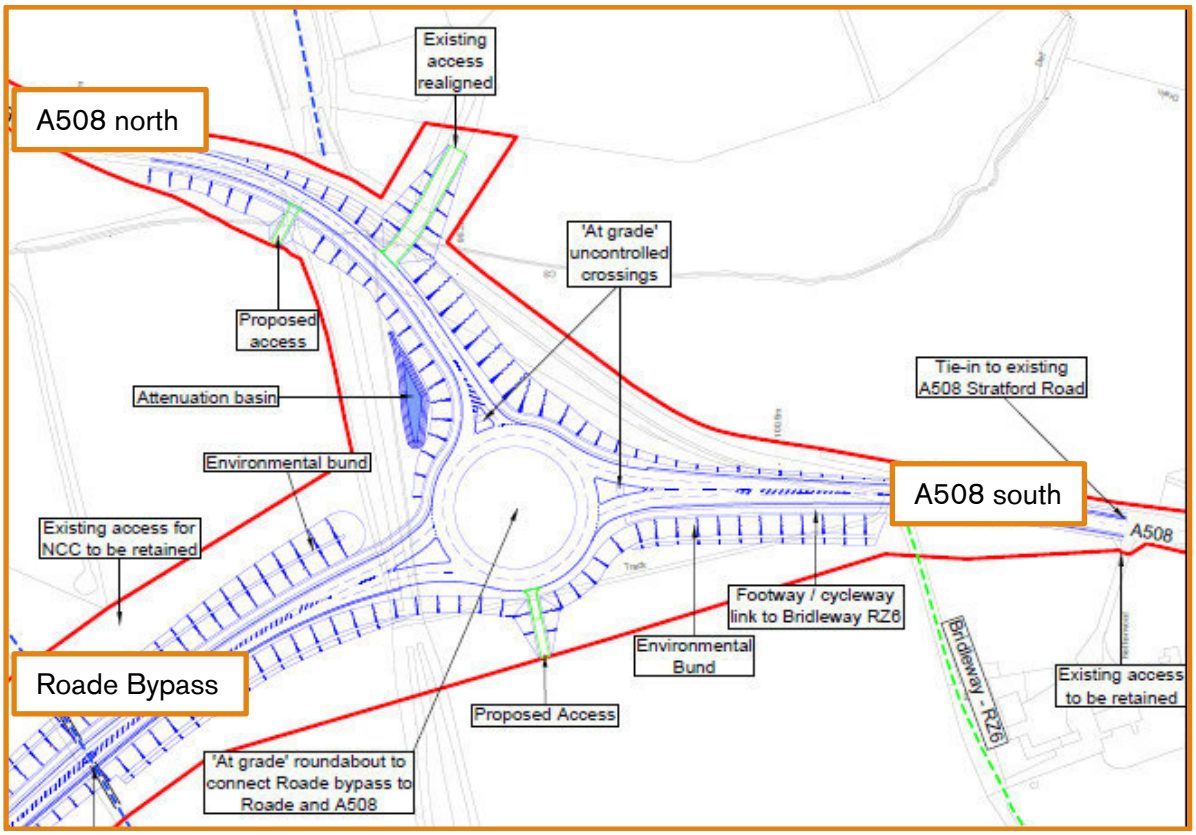

Figure 3: A508 Stratford Road/Roade Bypass 3-arm roundabout

4.11 The operation of the 3-arm roundabout was modelled in the ARCADY module of Junctions 8 using the J1c (Development Case) traffic flows provided at **Appendix B**. A summary of the ARCADY results are shown in the table below, with the full results provided at **Appendix D**.

	AM				PM			
	Queue (PCU)	Delay (s)	RFC	LOS	Queue (PCU)	Delay (s)	RFC	LOS
	A1 - J1c							
Arm 1	1.93	5.11	0.62	A	1.22	4.22	0.52	A
Arm 2	0.32	5.37	0.24	A	0.05	3.71	0.05	A
Arm 3	1.30	4.12	0.51	A	2.09	5.19	0.66	A

4.12 The modelling demonstrates that in the 2031 J1c development case the roundabout is forecast to operate acceptably in both peak hours, with a ratio of flow to capacity well below 85% for all priority controlled movements. The roundabout option is therefore the most appropriate option for the southern connection to the A508 Stratford Road.

5.0 BLISWORTH ROAD/KNOCK LANE/ROADE BYPASS JUNCTION

Introduction

5.1 Approximately mid-way along its proposed route, the Roade bypass intersects Knock Lane/Blisworth Road, which links the west of Roade with Stoke Road.

5.2 The question of whether a connection should be made to Knock Lane and/or Blisworth Road, or if a bridge over the intersection should be provided has been examined using the NSTM2. The conclusion of the examination was that to achieve the desired reassignment of traffic on to the A508 via the Roade bypass, a connection between the Roade bypass and Blisworth Road should be provided.

5.3 The NSTM2 option testing also examined the highway network performance with and without a connection to Blisworth Road/Knock Lane to the west of the bypass. This work found that congestion at the A508/Courteenhall Road and A508 Rookery Lane junctions increased when no connection was provided. In addition, as the overall mitigation strategy developed, it was proposed to restrict the A508 Northampton Road/Courteenhall Road junction to a left-in, left-out arrangement to reduce delay on the A508 southbound and assist with preventing rat running through Blisworth village, between the A508 and the A43. However, this strategy includes for Blisworth residents accessing the village via the Roade bypass and Blisworth Road/Knock Lane. Hence this requires a western connection from the bypass junction.

5.4 A 4-arm junction connecting the proposed Roade bypass with Blisworth Road and Blisworth Road/Knock Lane has therefore been considered.

5.5 Providing a traffic signal controlled junction at this location would bring significant delay to the mainline flow on the bypass as traffic is stopped to allow traffic to enter and exit the side-roads. Therefore, a traffic signal controlled junction option has been dismissed, leaving two possible options for the junction; a staggered priority controlled crossroads or a 4-arm roundabout.

Staggered crossroads junction

5.6 A priority controlled staggered crossroads has been considered, with the connections to Blisworth Road and Knock Lane forming the minor arms so that there would be no delay for traffic travelling northbound and southbound on the Roade bypass**.** The operation of the crossroads junction was modelled in the PICADY module of Junctions 8 using the J1c (Development Case) traffic flows provided at **Appendix B**.

5.7 A preliminary model was produced to form the design tool and the modelled geometry has been selected to represent an efficient junction arrangement of appropriate size for the setting and demand. Therefore, the modelled junction is a right-left stagger to enable suitably long ghost island right-turn bays with the maximum forward visibility provision, and the side roads are modelled as single lanes flaring to two lanes at the give-way lines.

5.8 A summary of the PICADY results are shown below, with the full results provided at **Appendix E**. The preliminary modelling demonstrates that in the 2031 J1c development case the junction is forecast to operate significantly over capacity in both peak hours, with a ratio of flow to capacity above 85% for all priority controlled movements.

5.9 The preliminary modelling therefore demonstrates that a priority controlled staggered crossroads option is unsuitable for the bypass at this location, and no further design work was undertaken for this option.

	AM				PM			
	Queue (PCU)	Delay (s)	RFC	LOS	Queue (PCU)	Delay (s)	RFC	LOS
	A1 - 2013 J1c							
Stream B-C	0.09	19.00	0.09	C	1.10	440.12	0.88	F
Stream B-AD	1.05	274.75	0.65	F	6.87	188.77	0.97	F
Stream A-BCD	0.10	8.29	0.09	A	0.22	9.13	0.18	A
Stream A-B	-	-	-	-	-	-	-	-
Stream A-C	-	-	-	-	-	-	-	-
Stream D-A	44.83	2478.06	2.53	F	0.50	11.95	0.34	B
Stream D-BC	74.84	2429.41	2.57	F	0.16	48.02	0.14	E
Stream C-ABD	0.02	11.08	0.02	B	0.31	9.46	0.24	A
Stream C-D	-	-	-	-	-	-	-	-
Stream C-A	-	-	-	-	-	-	-	-

Arm A is Roade bypass north
Arm B is Blisworth Road
Arm C is Roade bypass south
Arm D is Knock Lane

4-arm roundabout

5.10 To provide a junction which can cater for all predicted movements from the side road, whilst minimising delay to traffic on the bypass, a 4-arm roundabout option has been considered as shown at drawing number **NGW-BWB-HNGN-04-DR-C-00104** and on **Figure 4** below.

5.11 The key controlling flows at the proposed roundabout would be the right-turn movements from the Roade bypass (north and south) and the right-turn movements from Knock Lane and Bliworth Road. The 2031 J1c development case traffic flows provided at **Appendix B** show that the right-turn flows from each approach are relatively low and therefore delay to the northbound and southbound movements on the Roade bypass should be minimal.

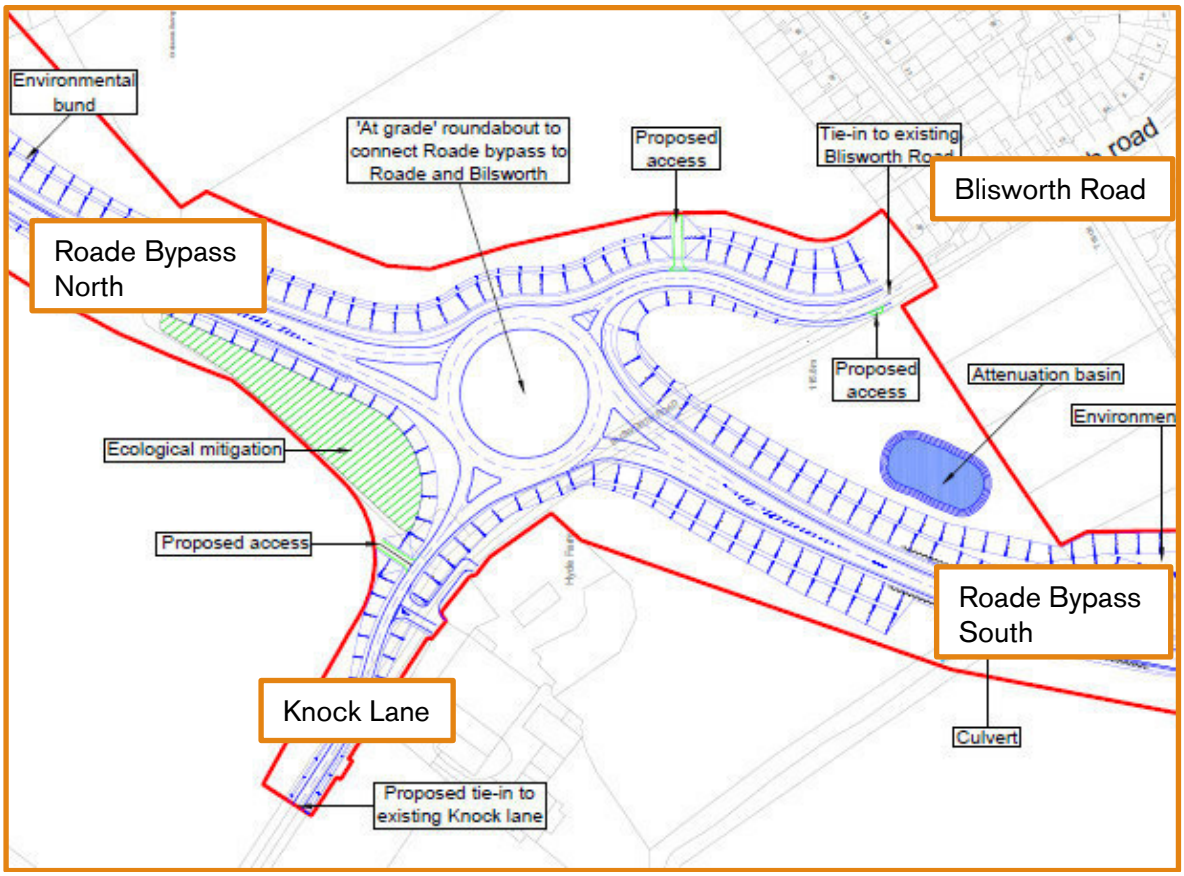

Figure 4: Blisworth Road/Knock Lane/Roade bypass 4-arm roundabout

5.12 The operation of the 4-arm roundabout was modelled in the ARCADY module of Junctions 8 using the J1c (Development Case) traffic flows provided at **Appendix B**. A summary of the ARCADY results are shown below, with the full results provided at **Appendix F**.

	AM (J1c)			PM (J1c)		
	Queue (PCU)	Delay (s)	RFC	Queue (PCU)	Delay (s)	RFC
	Traffic Flows - 2031					
Arm 1	2.09	5.86	0.64	1.49	4.71	0.56
Arm 2	0.05	5.33	0.05	0.21	5.33	0.17
Arm 3	1.29	4.16	0.51	1.25	4.12	0.52
Arm 4	0.41	5.53	0.29	0.23	5.08	0.19

Arm A is Roade bypass north
Arm B is Blisworth Road
Arm C is Roade bypass south
Arm D is Knock Lane

5.13 The modelling demonstrates that in the 2031 J1c development case the roundabout is forecast to operate acceptably in both peak hours, with a ratio of flow to capacity well below 85% for all priority controlled movements. The roundabout option is therefore the most appropriate option for the southern connection to the A508 Stratford Road.

6.0 A508 NORTHAMPTON ROAD/ROADE BYPASS JUNCTION

Introduction

6.1 To the north of the proposed Roade bypass a connection to the existing A508 Northampton Road is required so that access to Roade village from the north can be maintained. Further, a good connection at the northern end of the bypass is essential due to the proposal to restrict the A508 Northampton Road/Courteenhall Road junction to a left-in, left-out arrangement. Access to Blisworth village from the east will be provided via the bypass and Knock Lane and therefore the performance of the northern junction is important not just in terms of encouraging traffic to reassign back onto the A508, but also in terms of providing efficient access to Blisworth.

6.2 Providing a traffic signal controlled junction at this location would bring significant delay to the mainline flow on the bypass as traffic is stopped to allow traffic to exit the side-road. Therefore, a traffic signal controlled junction option has been dismissed, leaving two possible options for the junction; a ghost island priority controlled T-junction or a 3-arm roundabout.

Ghost island T-junction

6.3 The 2031 J1c development case traffic flows show that there would be right-turning flows of 253 and 469 from the A508 Northampton Road south (Roade village) to the A508 Northampton Road north in the morning and evening peak hours, respectively.

6.4 Considering this demand for the right-turn out of Roade village, it is unlikely that a ghost island T-junction could be designed to accommodate the predicted traffic flows. Nonetheless, to confirm this a T-junction arrangement has been considered, with the A508 Northampton Road south connection to Roade forming the minor arm so that there would be no delay for traffic travelling northbound and southbound on the Roade bypass. The operation of a ghost island T-junction, with the same geometry as the T-junction assessed for the southern connection, was modelled in the PICADY module of Junctions 8 using the J1c (Development Case) traffic flows provided at **Appendix B**.

6.5 A summary of the PICADY results are shown below, with the full results provided at **Appendix G.** The modelling demonstrates that in the 2031 J1c development case the junction is forecast to operate significantly over capacity in both peak hours, with a ratio of flow to capacity above 85% for all priority controlled movements.

	AM (J1c)			PM (J1c)		
	Queue (PCU)	Delay (s)	RFC	Queue (PCU)	Delay (s)	RFC
	Traffic Flows - 2031					
Stream B-C	0.00	0.00	0.00	0.00	0.00	0.00
Stream B-A	205.46	3932.87	9999999999.00	467.95	7568.05	41.78
Stream C-AB	0.84	24.08	0.46	1.18	26.18	0.55
Stream C-A	-	-	-	-	-	-
Stream A-B	-	-	-	-	-	-
Stream A-C	-	-	-	-	-	-

Arm A is A508 Northampton Road north
Arm B is A508 Northampton Roade south
Arm C is Roade bypass

6.6 The modelling therefore demonstrates that a T-junction option is unsuitable for the bypass at this location.

3-arm roundabout

6.7 To provide a junction which can cater for all movements from the side road, whilst minimising delay to traffic on the Roade bypass, a 3-arm roundabout option has been considered as shown at drawing number **NGW-BWB-HGN-03-DR-C-00104** and on **Figure 5** below. The geometry of the roundabout has been designed in accordance with the standards outlined in the DMRB TD16/07, following an iterative process using ARCADY module of Junctions 8 as the design tool.

6.8 The roundabout has an inscribed circle diameter (ICD) of 70 metres. Both the A508 Northampton Road north and the Roade bypass approaches to the roundabout flare to two lanes for approximately 60 metres, with two circulating lanes and two lanes on the A508 Northampton Road south and bypass exits improving the efficiency for northbound and southbound vehicles.

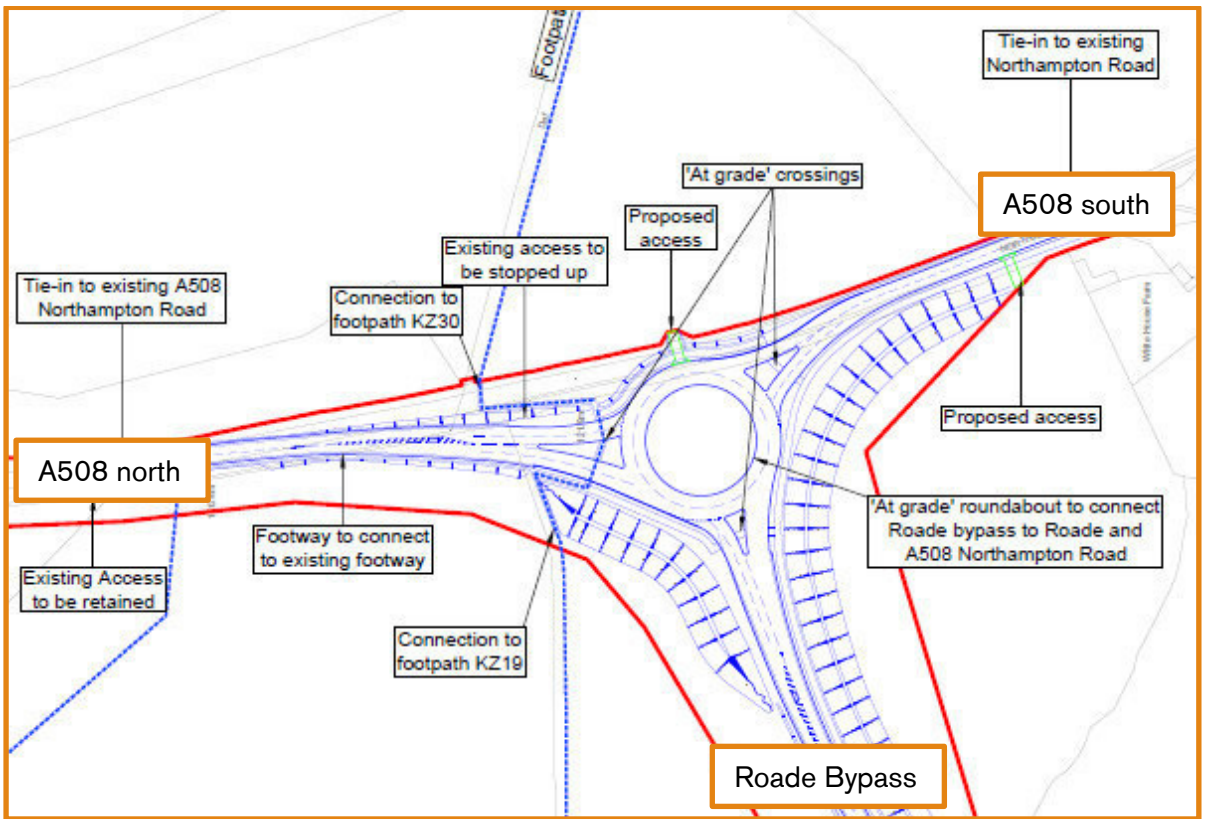

Figure 5: A508 Northampton Road/Roade Bypass 3-arm roundabout

6.9 The operation of the roundabout was modelled in the ARCADY module of Junctions 8 using the J1c (Development Case) traffic flows provided at **Appendix B**. A summary of the ARCADY results are shown below, with the full results provided at **Appendix H**.

	AM (J1c)			PM (J1c)		
	Queue (PCU)	Delay (s)	RFC	Queue (PCU)	Delay (s)	RFC
	Traffic Flows - 2031					
Arm 1	2.98	6.37	0.72	2.46	5.56	0.69
Arm 2	0.27	3.48	0.21	0.58	4.05	0.37
Arm 3	1.93	5.55	0.62	2.18	6.30	0.66

Arm A is A508 Northampton Road south
Arm B is A508 Northampton Road north
Arm C is Roade bypass

6.10 The modelling demonstrates that in the 2031 J1c development case the roundabout is forecast to operate acceptably in both peak hours, with a ratio of flow to capacity below 85% for all priority controlled movements. The roundabout option is therefore the most appropriate option for the northern connection to the A508 Northampton Road.

7.0 SUMMARY AND CONCLUSIONS

7.1 Due to existing highway constraints in Roade and traffic increases due to the proposed Northampton Gateway SRFI, a bypass to the west of the village is proposed as part of the overall highway mitigation strategy for the development. The Roade bypass would mitigate the impact of the development in Roade and would also be key in drawing existing traffic back onto the A508 and away from local routes that are being used as rat-runs

7.2 To maximise the effectiveness of the proposed bypass, detailed consideration has been given to the configuration of junctions connecting it to the wider highway network using 2031 J1c development case traffic forecasts from the NSTM2.

7.3 The design principle for the junctions has been to minimise delay for northbound and southbound vehicles on the Roade bypass to maximise the attractiveness of the route, whilst ensuring that vehicles can enter and exit Roade safely and without excessive delay.

7.4 Following a thorough options testing exercise, this Technical Note concludes that the A508 Stratford Road/Road bypass, Blisworth Road/Knock Lane/Roade bypass and A508 Northampton Road/Roade bypass junctions should all be configured as roundabouts. This Technical Note also presents the design solution for each roundabout and demonstrates that all three roundabouts would operate satisfactorily in 2031 with the development in place.

DRAWINGS

Notes

1. Do not scale this drawing. All dimensions must be checked/ verified on site. If in doubt ask.
2. This drawing is to be read in conjunction with all relevant architects, engineers and specialists drawings and specifications.
3. All dimensions in millimetres unless noted otherwise. All levels in metres unless noted otherwise.
4. Any discrepancies noted on site are to be reported to the engineer immediately.

Legend

Order limits

ISSUES & REVISIONS

Rev	Date	Details of issue / revision	Drw	Rev
P1	31.03.17	Preliminary Issue	SRH	SRH
P2	21.09.17	Amended for consultation	SRH	SRH

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Client: ROXHILL

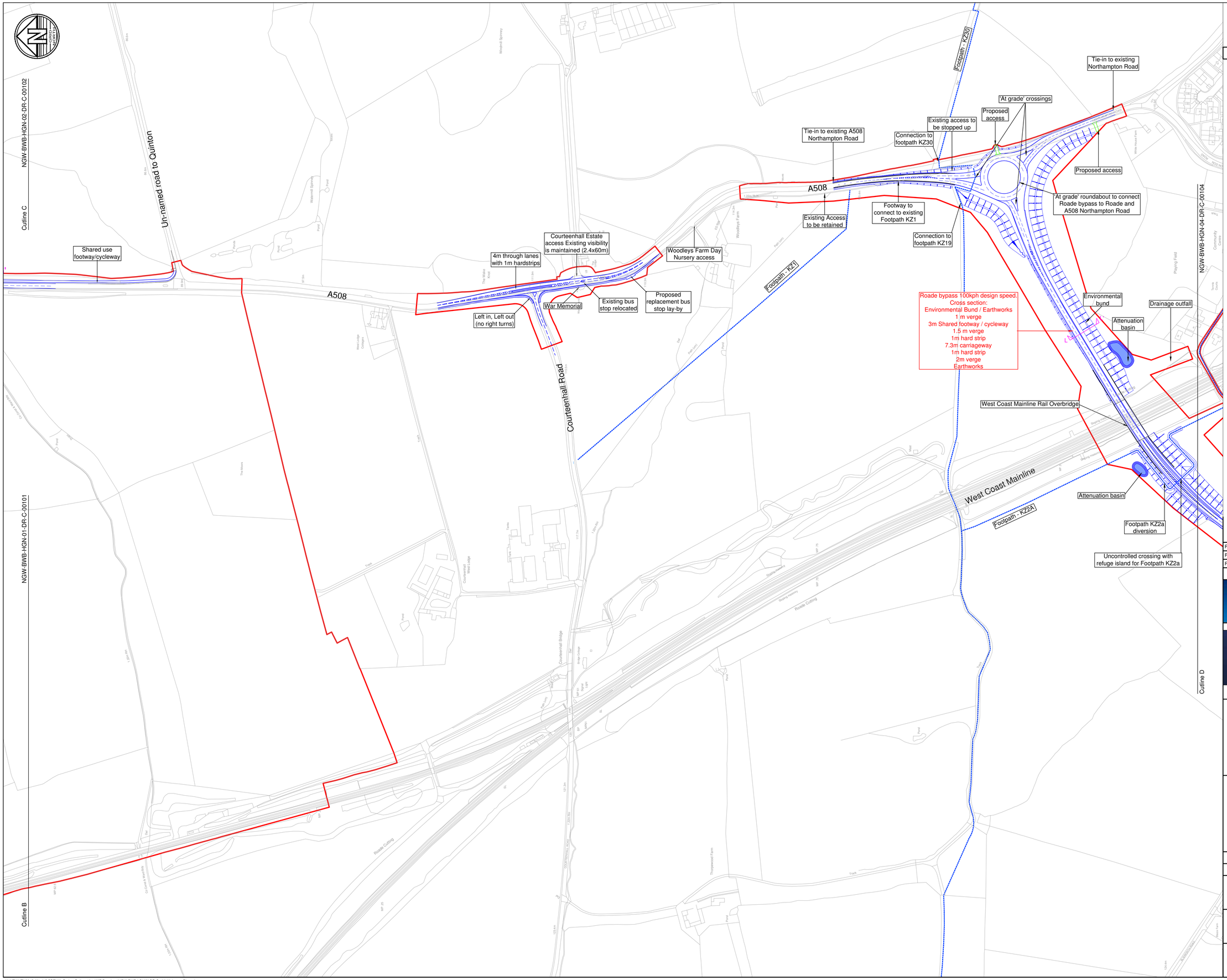
Project Title: **NORTHAMPTON GATEWAY RAIL FREIGHT INTERCHANGE**

Drawing Title: **A508 ROADE BYPASS PREFERRED ROUTE**

Drawn:	S. Hilditch	Reviewed:	S. Hilditch
BWB Ref:	NTH 2315	Date: 31.03.17	Scale@A1: 1:5000

Drawing Status: **FOR INFORMATION**

Project - Originator - Zone - Level - Type - Role - Number	Status	Rev
NGW-BWB-GEN-XX-SK-C-SK05	S2	P2



0 50 100 150 200

SCALE: METRES

Legend

- Order Limits
- Proposed Highway Works
- Section Lines (X – X')

Rev	Date	Details of issue / revision	Drw	Rev
P2	28.09.17	Layout Updated	GDJ	SRH
P1	15.09.17	Preliminary Issue	PG	SRH

ISSUES & REVISIONS

ROXHILL

NORTHAMPTON GATEWAY
STRATEGIC RAIL FREIGHT INTERCHANGE

THE NORTHAMPTON GATEWAY RAIL FREIGHT INTERCHANGE ORDER 201X

Drawing Title

GENERAL ARRANGEMENT HIGHWAY PLANS SHEET 3 OF 6

DRAFT

Scale	1:2,500	Drawn	P. Goodyear
Size	A1	Reviewed	S. Hilditch

Regulation: 5(2) (p)

Document: 2.4C

Drawing Status: DRAFT - STAGE 2 CONSULTATION

Drawing No.: NGW-BWB-HGN-03-DR-C-00103

Revision: P2

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NGW-BWB-HGN-03-DR-C-00103

NGW-BWB-HGN-05-DR-C-00105

ROADE

West Coast Main Line

A508 Stratford Road

Footpath - KZ2A

Private means of access

Environmental bund

"At grade" roundabout to connect Roade bypass to Roade and Bilsworth

Proposed access

Tie-in to existing Blisworth Road

Blisworth road

Proposed access

Attenuation basin

Environmental bund

Existing water course

Attenuation basin

Footway/Cycleway link between bypass and Bridleway KZ10/RZ1

Environmental bund

Proposed drainage outfall

Bridleway - KZ10

Ecological mitigation

Proposed access

Culvert

Proposed tie-in to existing Knock lane

Proposed Access

Underpass crossing of Bridleway RZ1 beneath bypass

Roade bypass 100kph design speed.
Cross section:
Environmental Bund / Earthworks
1 m verge
3m Shared footway / cycleway
1.5 m verge
1m hard strip
7.3m carriageway
1m hard strip
2m verge
Earthworks

Existing access realigned

"At grade" uncontrolled crossings

Proposed access

Attenuation basin

Environmental bund

Existing access for NCC to be retained

Footpath - RZ3

Tie-in to existing A508 Stratford Road

A508

Footway / cycleway link to Bridleway RZ6

Environmental Bund

Proposed Access

Bridleway - RZ6

Existing access to be retained

"At grade" roundabout to connect Roade bypass to Roade and A508

"At grade" uncontrolled crossing with refuge island for foopath RZ3

Footpath - RZ3

Proposed access

Dismantled railway

Bridleway - RZ1

Culline D

Culline E

Hyde road

Roade

Recreation Ground

Playground

The Elizabeth Woodville School

Swimming Pool

Sports Field

Playing Field

Community Centre

Stratton Court

Roade Cutting

Hyde Farm

Wilton Lodge

Pond

0 50 100 150 200

SCALE: METRES

Legend

- Order Limits
- Proposed Highway Works
- Section Lines (X – X')

Rev	Date	Details of issue / revision	Drw	Rev
P2	28.09.17	Updated Layout	GDJ	SRH
P1	15.09.17	Preliminary Issue	PG	SRH

ISSUES & REVISIONS

ROXHILL

NORTHAMPTON GATEWAY
STRATEGIC RAIL FREIGHT INTERCHANGE

THE NORTHAMPTON GATEWAY RAIL FREIGHT INTERCHANGE ORDER 201X

Drawing Title

GENERAL ARRANGEMENT HIGHWAY PLANS SHEET 4 OF 6

DRAFT

Scale	1:2,500	Drawn	P. Goodyear
Size	A1	Reviewed	S. Hilditch

Regulation: 5(2) (p)

Document: 2.4D

Drawing Status: DRAFT - STAGE 2 CONSULTATION

Drawing No.: NGW-BWB-HGN-04-DR-C-00104

Revision: P2

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APPENDIX A

WSP TECHNICAL NOTE

M1 NORTHAMPTON GATEWAY, SRFI

TECHNICAL NOTE: ROADE BYPASS OPTIONS

Quality management		Project number	70034110	Report number		File reference	
Version	Date	Author	Signed	Checked	Signed	Authorised	Signed
Second issue	28 Sept 2017	R Thomas	Author 2017.09.28 14:56:01 +01'00'	M Parveen	2017.09.28 15:07:09 +01'00'	C Drennan	Drennan, Craig

1.0 INTRODUCTION

1.1 WSP have been commissioned by ADC Infrastructure Ltd, on behalf of Roxhill Developments Ltd, to undertake transport modelling for the Northampton Gateway SRFI (Strategic Rail Freight Interchange) development adjacent to M1 Junction 15 in Northamptonshire using the Northamptonshire Strategic Traffic Model (NSTM2).

1.2 The NSTM2 models were developed for an average weekday (Monday to Friday) in the AM peak hour (08:00-09:00) and in the PM peak hour (17:00-18:00).

1.3 The site is located to the west of M1 Junction 15, bounded to the east by M1 Motorway, to the south by the A508, to the north by Collingtree Road, and by the Northampton Loop line of the West Coast Mainline railway to the west. The site location is shown in figure 1.

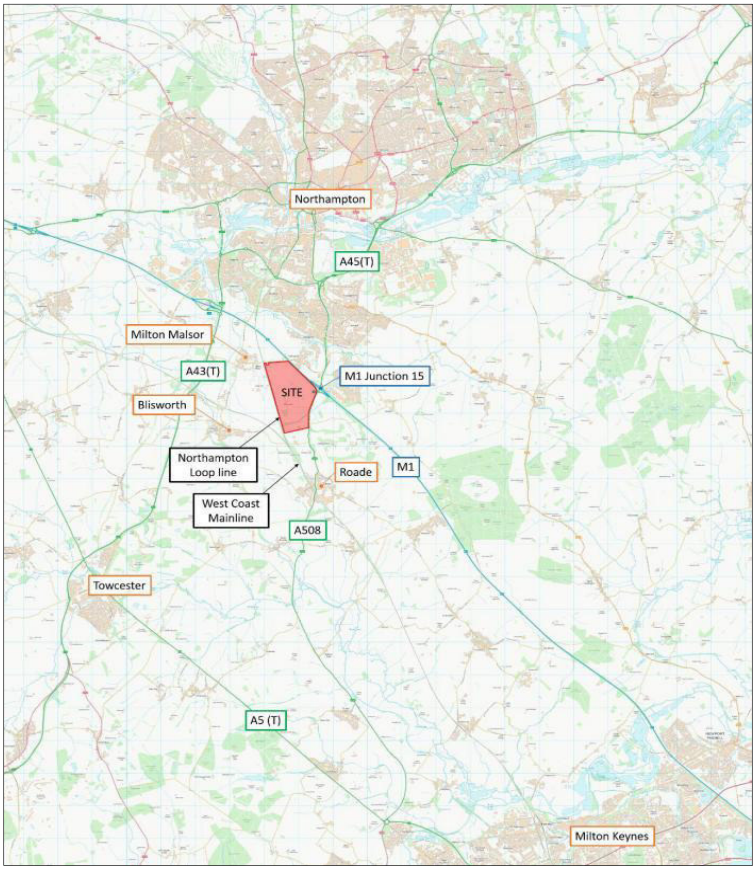

Figure 1: M1 Northampton Gateway – Site location

2.0 TASK PURPOSE AND OBJECTIVES

2.1 The transport modelling of the Northampton Gateway SRFI scheme also includes a bypass to the south of the development to mitigate impact on the town of Roade. This technical note details option scenarios for the implementation of Roade Bypass in 2031 and includes (but is not limited to):

- An indication of flow and delay impacts resulting from the different options
- An indication of the expected changes in journey times per vehicle along the A508 resulting from the different options
- An indication of the total network delay over the affected area
- Expected geographic traffic flow/reassignment effects of the scheme.

2.2 Using the 2031 model Base Scenario for Roade Bypass, both the AM peak (08:00–09:00) and PM peak (17:00–18:00) periods have been assessed.

3.0 ROADE BYPASS OPTIONS

3.1 NCC's preference (on safety grounds) is for roundabouts to be provided at any junctions on the Bypass. Therefore the base highway mitigation modelling has examined the following junction configurations:

- Roundabout to the north (A508 – Northampton Road) and the south (A508 – Stratford Road) where the bypass starts and ends
- To the west of Roade, the bypass crosses Knock Lane/Blisworth Road where a third roundabout with four arms connects the bypass with Knock Lane to the west and Blisworth Road to the right.

3.2 This configuration therefore forms the 2031 Base Scenario (J1c) for the proposed Roade Bypass.

OPTION A: CLOSURE OF KNOCK LANE

3.3 Option A closes Knock Lane to the west of Roade Bypass as shown in Figure 2. The four arm roundabout becomes a three arm roundabout, solely connecting to Blisworth Road. This option has been modelled within Scenario J2a.

Figure 2: Roade Bypass – Option A

OPTION B: KNOCK LANE BRIDGE

3.4 Option B, as shown in Figure 3, implements Knock Lane Bridge that passes over Roade Bypass, removing vehicle interaction between the roads. This option has been modelled within Scenario J2b.

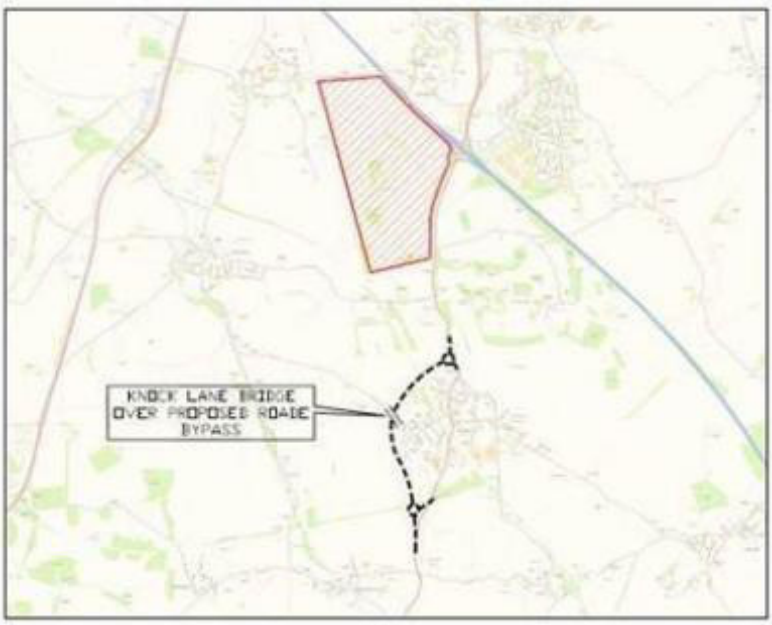

Figure 3: Roade Bypass – Option B

OPTION C: GHOST ISLAND T-JUNCTION AT SOUTHERN JUNCTION

3.5 Option C, as shown in Figure 4, changes the design of the southern Roade Bypass connection to the A508 where the roundabout design has been replaced by a priority controlled ghost island T-junction. This option has been modelled within Scenario J2c.

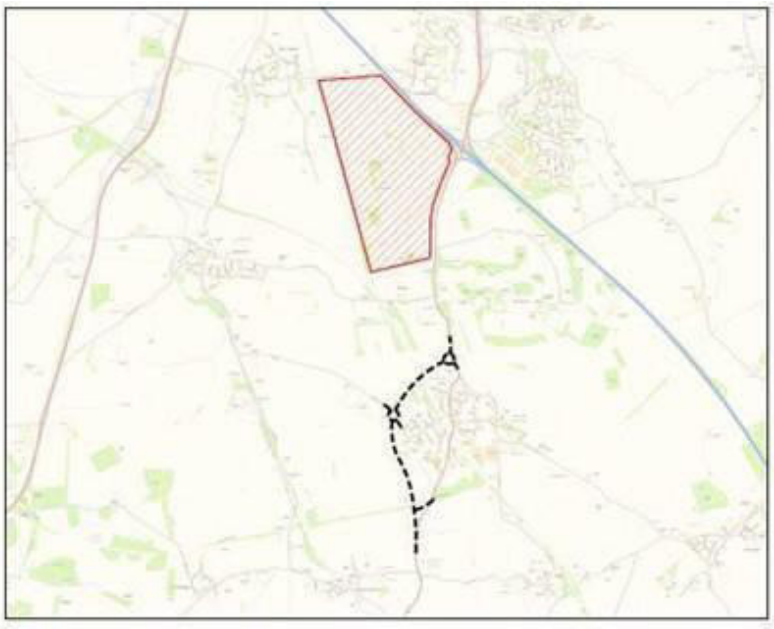

Figure 4: Roade Bypass – Option C

4.0 FLOW DIFFERENCE AND DELAY

4.1 Appendix A contains figures which show the difference in flow and delay between the 2031 Base Scenario (J1c) and the alternate Options A, B and C..

4.2 Scenario J2a and Scenario J2b lead to a decrease in flow along Roade Bypass as Knock Lane cannot be used as an entry or exit point. These figures also show the increase in delay for joining the A508 north and south of Roade in Scenario J2a and Scenario J2b.

4.3 Scenario J2a in the AM peak shows increases in delays reaching the A508 eastbound at Courteenhall Road to the north of Roade (90 seconds), and at Stoke Bruerne (150s) and Pury Road to the south (50s). Scenario J2a in the PM peak show delay on the A508 southbound at Stoke Bruerne (40s) caused by vehicles turning west towards Stoke Bruerne off the A508 as this now cannot occur at Roade Bypass.

4.4 Scenario J2b shows increased traffic within the town of Roade, as now vehicles using Knock Lane cannot connect to Roade Bypass as interaction has been removed between the two roads. Delay impact follows a similar pattern to J2a, with increased delays eastbound connecting to the A508 in the AM peak, and delays on the A508 southbound at Stoke Bruerne from vehicles turning west towards Stoke Bruerne off the A508.

4.5 Scenario J2c impacts flow at the new T-junction. In the AM, there is an increase in delay southbound leaving Roade as now this traffic needs to give way to vehicles using the Roade Bypass. This also causes a shift in traffic away from this route to using Blisworth Road, and then going south along Roade Bypass. The PM shows a similar issue in reverse, where vehicles going northbound into Roade divert using Roade Bypass and Blisworth Road.

4.6 Scenario J1c shows the best results in terms of flow and delay. The three option scenarios have drawbacks without any improvement to A508 flows or delays.

4.7 For this reason, as shown in Table 3, Scenario J1c is preferred to other Roade Bypass scenarios, such as scenarios J2a/J2b/J2c. Scenario J2b is the least preferred as it increases flows going through Roade.

Table 3: Flow and Delay Difference Ranking

Preference	Ranking	Option
Most Preferred	1st	J1c
	2nd	J2c
	3rd	J2a
Least Preferred	4th	J2b

5.0 JOURNEY TIME ANALYSIS

5.1 Journey Time Analysis carried out along the A508 (using Roade Bypass) between the M1 Junction 15 and the A5 Old Stratford Roundabout is shown in Figure 5. Table 4 summarises the journey times with Table 5 showing the time differences for the 2031 Base Roade Bypass scenario (J1c), and the Roade Bypass options (J2a, J2b, J2c outlined above).

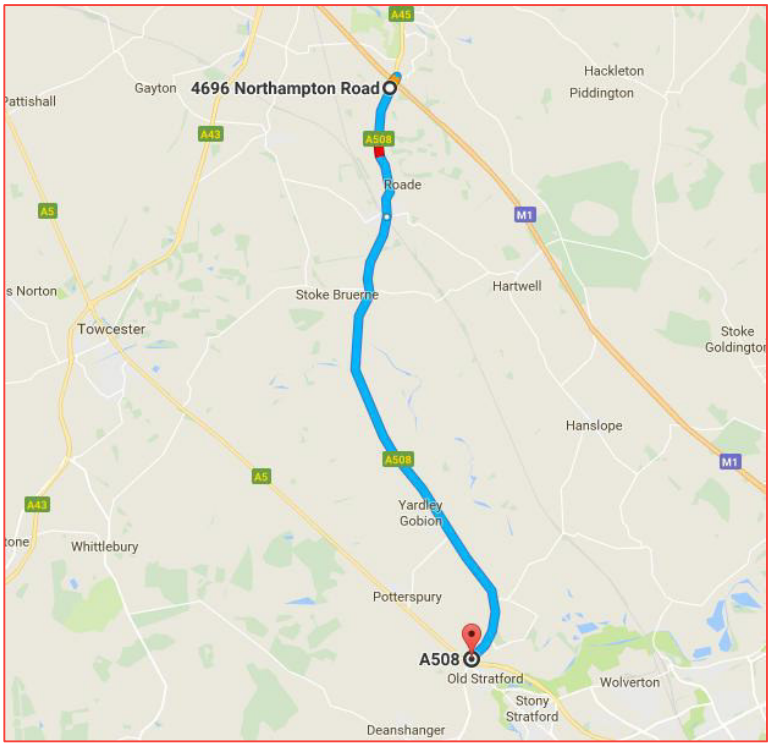

Figure 5: Journey time route

Table 4: Journey time for Roade Bypass

Journey time Analysis	J1c				J2a				J2b				J2c			
	AM		PM		AM		PM		AM		PM		AM		PM	
	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB
Time (s)	862	1070	966	1054	866	1079	967	1083	864	1095	963	1066	861	1099	960	1082
Delay (s)	190	398	296	380	194	407	296	409	195	426	296	395	191	429	292	410
Speed (kph)	65	52	58	53	65	52	58	52	65	51	58	53	65	51	58	52

Table 5: Journey time for Roade Bypass Comparisons

Journey time Analysis	Difference (from scenario J1c)												SUM		
	J2a				J2b				J2c				J2a	J2b	J2c
	AM		PM		AM		PM		AM		PM				
	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB			
Time (s)	3	9	1	29	1	25	-3	12	-2	30	-6	28	42	35	50
Delay (s)	3	9	0	28	4	28	0	15	1	31	-4	30	41	46	57
Speed (kph)	-0.3	-0.5	0.0	-1.4	-0.1	-1.2	0.2	-0.6	0.1	-1.4	0.3	-1.4	-1	0	-1

5.2 Tables 4 and 5 show that the 2031 Base Scenario (J1c) performs better than the three alternative Options A, B and C with all three showing longer journey times and higher delay on the A508 corridor.

Table 6: Journey time Ranking

Preference	Ranking	Option
Most Preferred	1st	J1c
	2nd	J2b
	3rd	J2a
Least Preferred	4th	J2c

6.0 JUNCTION CAPACITY ANALYSIS

6.1 Appendix B contains volume over capacity (VoC) statistics for nearby junctions with a 75% VoC or higher. Scenarios J1c and J2c show the best performance in terms of VoC as shown in Table 7. Scenario J2b also shows relatively similar VoC, while Scenario J2a is noticeably worse.

Table 7: Junction Capacity Ranking

Preference	Ranking	Option
Most Preferred	1st	J1c
	1st	J2c
	3rd	J2b
Least Preferred	4th	J1a

7.0 SUMMARY

7.1 Table 8 shows that scenario comparisons over the four categories of network statistics, actual flow and delay changes, journey time, and junction capacity.

Table 8: Overall Performance Ranking

Preference	Ranking	Actual Flow and Delay	Journey Time	Junction Capacity
Most Preferred	1st	J1c	J1c	J1c
	2nd	J2c	J2b	J2c
	3rd	J2a	J2a	J2b
Least Preferred	4th	J2b	J2c	J2a

7.2 It can be concluded from the transport modelling undertaken that Scenario J1c performs best in each category and is therefore the preferred option to take forward. Scenarios J2b and J2c follow, with Scenario J2a causing delays resulting from the closure of Knock Lane.

Appendix A

SATURN

Atkins Ltd /
DVV / ITS

_2031_AM_DS_
2031_J2a.UFS
_DS_2031_J1c

Scale 33373

Link Annot:

+ Actual flo
- Actual flo

Differ: 1-2

Bandwidths =
100./mm

J2a-J1c (Option A Vs J1c)
Actual Flow Difference
(PCU)
AM Peak

8- 9-17
WSP GROUP (S

SATURN

Atkins Ltd /
DVV / ITS

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2031_J2a.UFS
_DS_2031_J1c

Scale 33373

Link Annot:

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Differ: 1-2

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J2a-J1c (Option A Vs J1c)
Actual Flow Difference
(PCU)
PM Peak

8- 9-17
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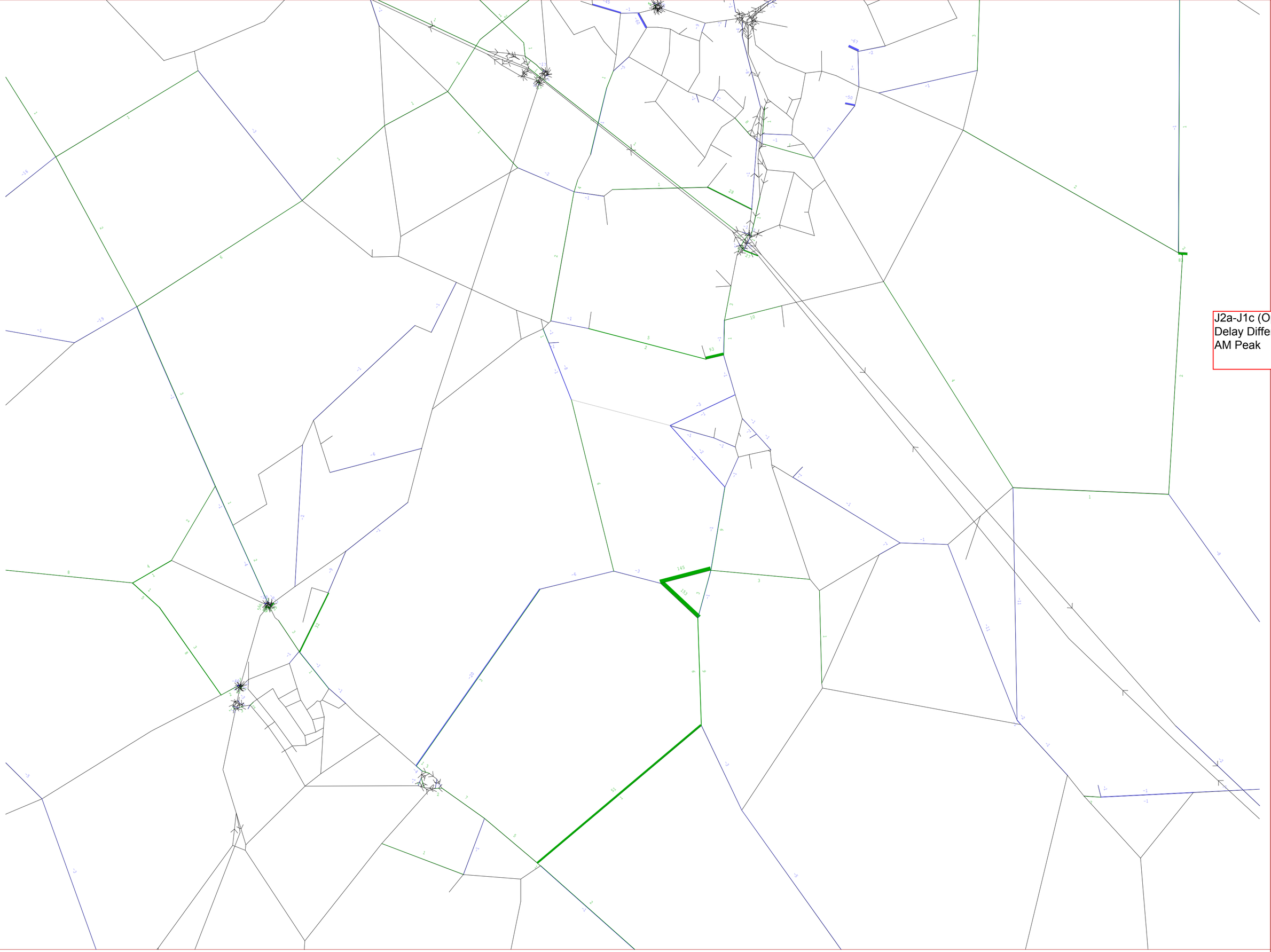
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DVV / ITS
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- Delay sec
Differ: 1-2
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J2a-J1c (Option A Vs J1c)
Delay Difference
AM Peak
8- 9-17
WSP GROUP (S

SATURN

Atkins Ltd /
DVV / ITS

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Scale 33373

Link Annot:

+ Delay sec
- Delay sec

Differ: 1-2

Bandwidths =
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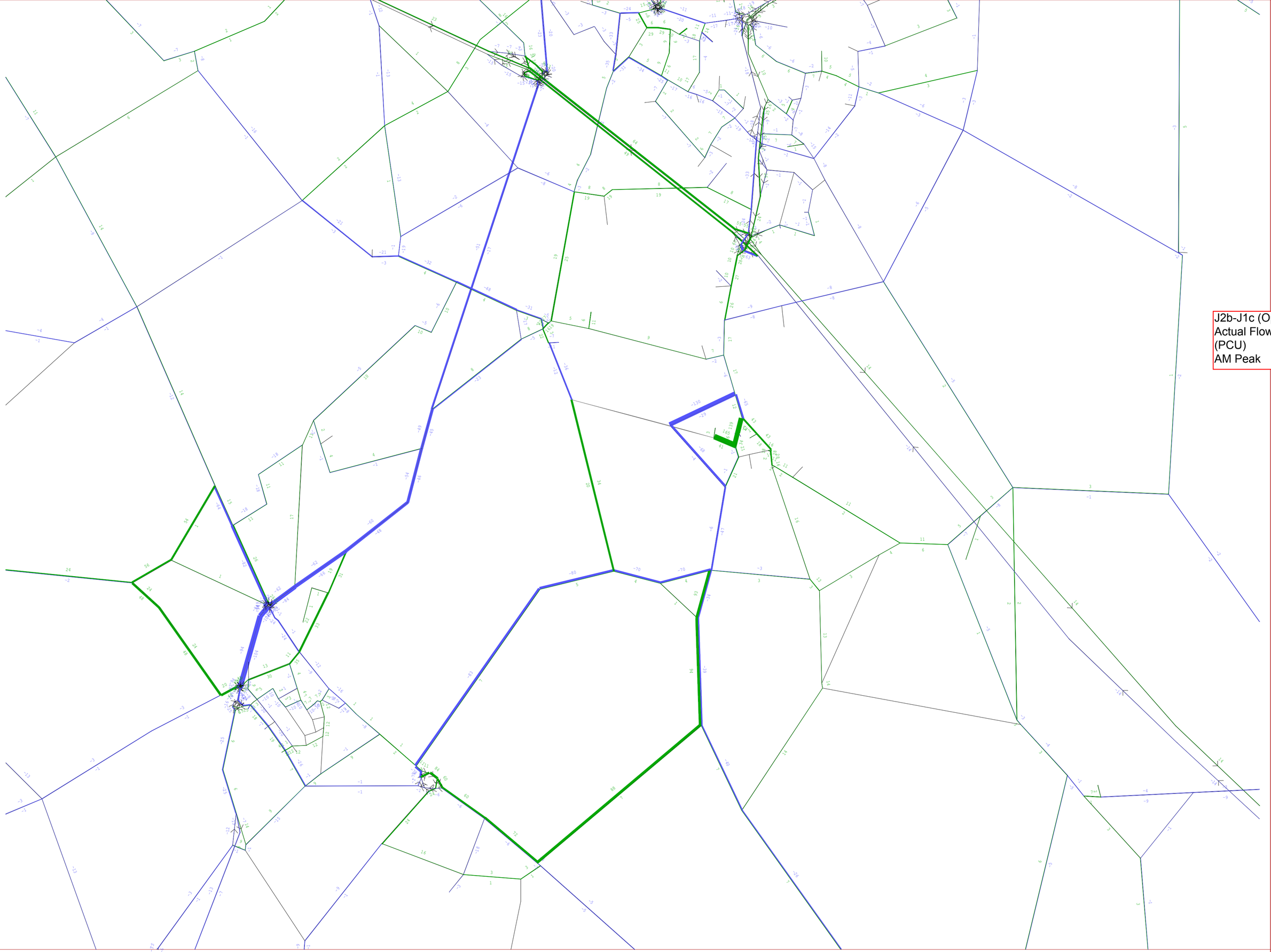
J2a-J1c (Option A Vs J1c)
Delay Difference
PM Peak

8- 9-17
WSP GROUP (S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Atkins Ltd /
DVV / ITS
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- Actual flo
Differ: 1-2
Bandwidths =
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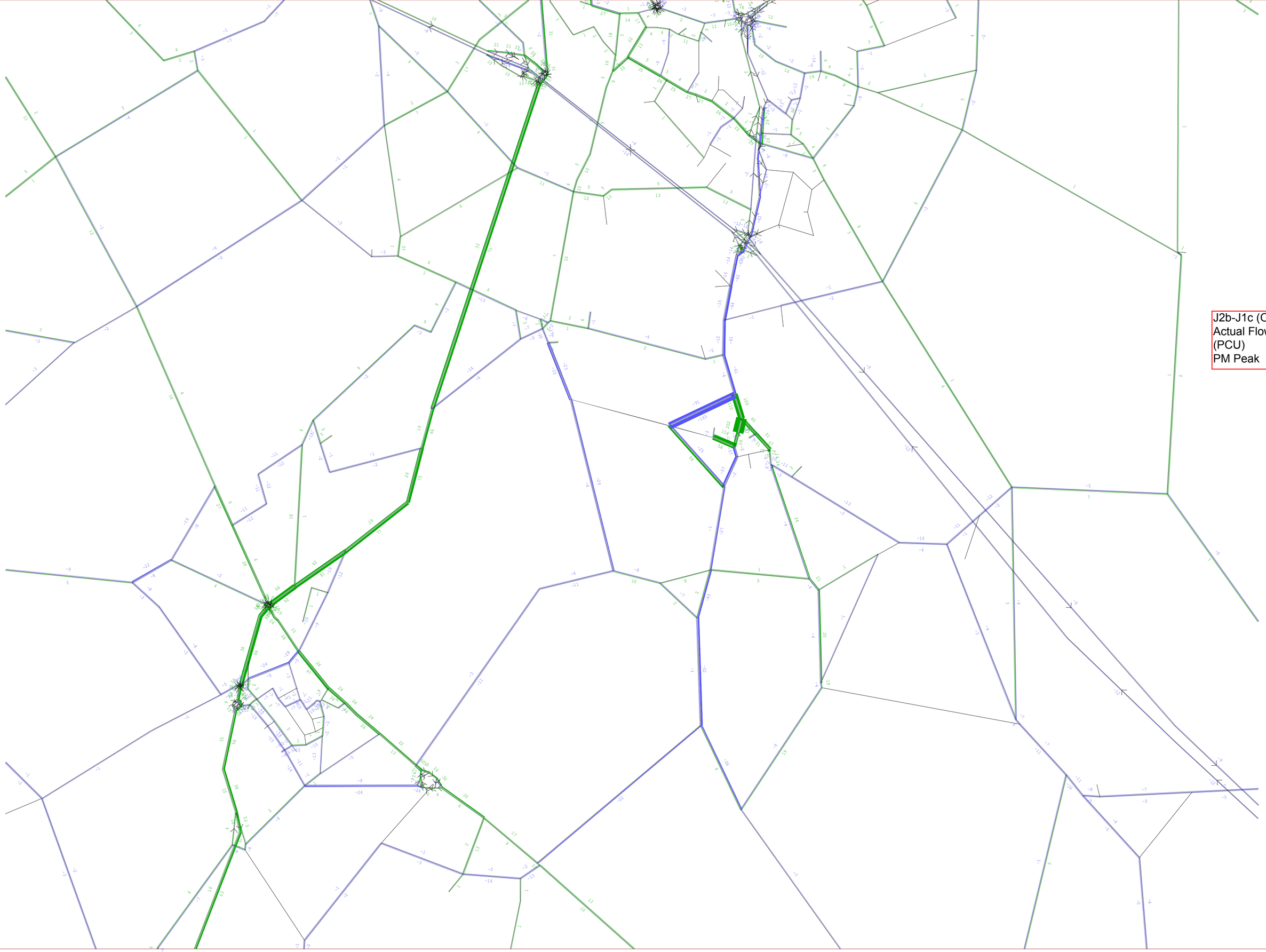
J2b-J1c (Option B Vs J1c)
Actual Flow Difference
(PCU)
AM Peak
8- 9-17
WSP GROUP (S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Atkins Ltd /
DVV / ITS
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_DS_2031_J1c
Scale 33373
Link Annot:
+ Actual flo
- Actual flo
Differ: 1-2
Bandwidths =
100./mm
J2b-J1c (Option B Vs J1c)
Actual Flow Difference
(PCU)
PM Peak
8- 9-17
WSP GROUP (S

SATURN

Atkins Ltd /
DVV / ITS

_2031_AM_DS_
2031_J2b.UFS
_DS_2031_J1c

Scale 33373

Link Annot:

+ Delay sec
- Delay sec

Differ: 1-2

Bandwidths =
100./mm

J2b-J1c (Option B Vs J1c)
Delay Difference
AM Peak

8- 9-17
WSP GROUP (S

SATURN

Atkins Ltd /
DVV / ITS

_2031_PM_DS_
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_DS_2031_J1c

Scale 33373

Link Annot:

+ Delay sec
- Delay sec

Differ: 1-2

Bandwidths =
100./mm

J2b-J1c (Option B Vs J1c)
Delay Difference
PM Peak

8- 9-17
WSP GROUP (S

SATURN

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DVV / ITS

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2031_J2c.UFS
_DS_2031_J1c

Scale 33373

Link Annot:

+ Actual flo
- Actual flo

Differ: 1-2

Bandwidths =
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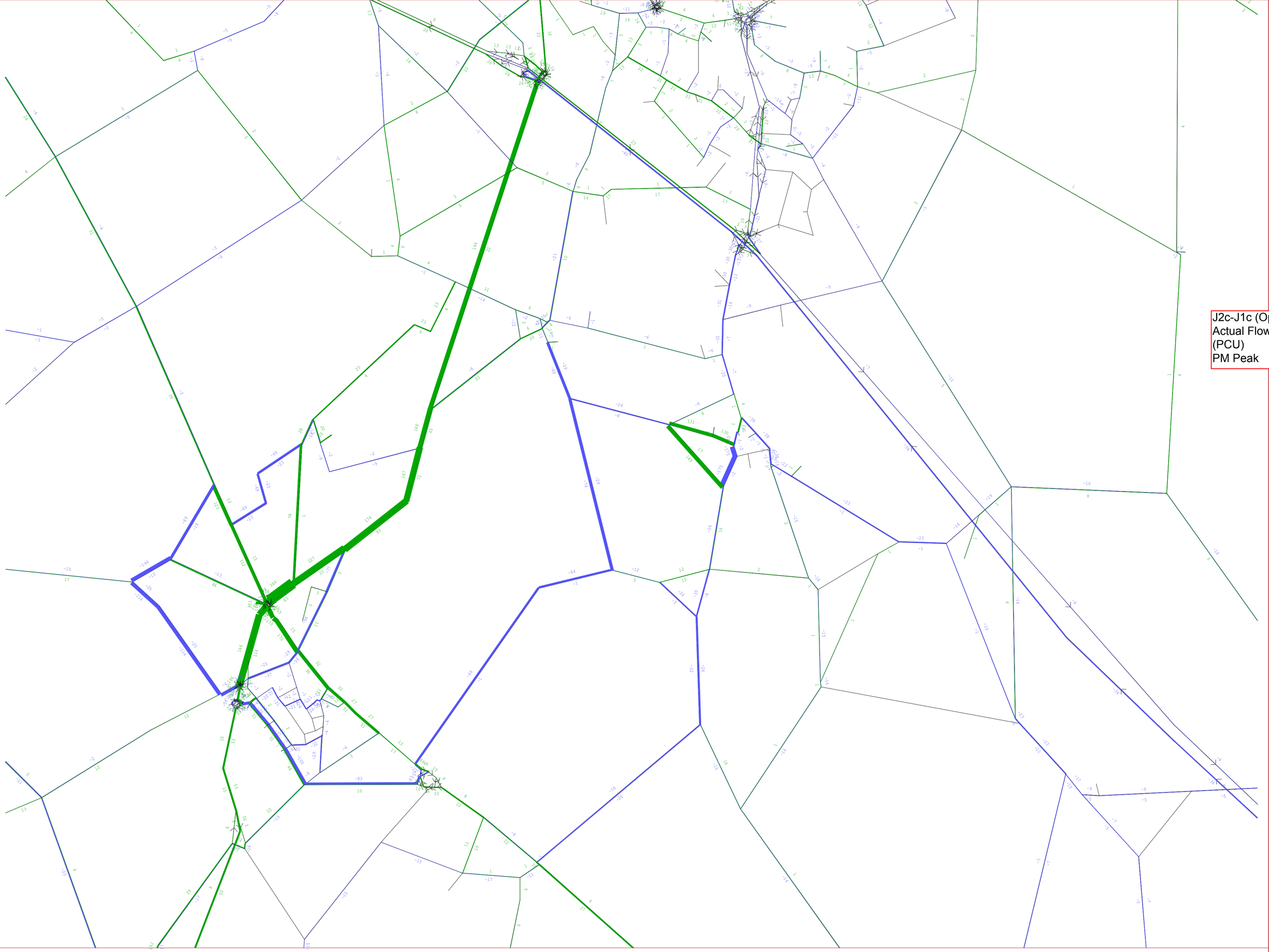
J2c-J1c (Option C Vs J1c)
Actual Flow Difference
(PCU)
AM Peak

8- 9-17
WSP GROUP (S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Atkins Ltd /
DVV / ITS
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Scale 33373
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- Actual flo
Differ: 1-2
Bandwidths =
100./mm
J2c-J1c (Option C Vs J1c)
Actual Flow Difference
(PCU)
PM Peak
8- 9-17
WSP GROUP (S

SATURN

Atkins Ltd /
DVV / ITS

_2031_AM_DS_
2031_J2c.UFS
_DS_2031_J1c

Scale 33373

Link Annot:

+ Delay sec
- Delay sec

Differ: 1-2

Bandwidths =
100./mm

J2c-J1c (Option C Vs J1c)
Delay Difference
AM Peak

8- 9-17
WSP GROUP (S

SATURN

Atkins Ltd /
DVV / ITS

_2031_PM_DS_
2031_J2c.UFS
_DS_2031_J1c

Scale 33373

Link Annot:

+ Delay sec
- Delay sec

Differ: 1-2

Bandwidths =
100./mm

J2c-J1c (Option C Vs J1c)
Delay Difference
PM Peak

8- 9-17
WSP GROUP (S

Appendix B

Appendix B: V/C (Junctions over 85, AM)							
Junction	**X**	**Y**	**Node Name**	**2031_J1c**	**2031_J2a**	**2031_J2b**	**2031_J2c**
J455	477530	259670	*A5 Tove Roundabout	111	114	113	111
J223	479590	261332	*M1 Junction 15	102	104	104	102
J173	479565	261318	*M1 Junction 15A	104	103	103	105
J291	469189	248850	A5 Watling Street/ Northampton Road	103	105	105	103
J278	475317	253627	Northampton Rd (A508)/Road to Courteenhall	89	91	90	88
J301	474934	249330	Northampton Rd (A508)/Road to Stoke Bruerne	101	109	106	101
J329	475306	253122	Northampton Rd/Courteenhall Rd	103	109	105	103
J71	475712	255218	Watering Lane/A45	97	100	98	96
J100	471108	252344	A43/Towcester Rd	107	107	107	107
J290	469865	250300	A43/Northampton Rd	104	107	107	104
J296	469619	248315	A5/Vernon Rd	100	100	100	100
J383	475122	250023	A508/Rookery Ln/Ashton Rd	102	106	103	102
J405	471859	246446	A5/Reclamation Yard Rd	102	102	102	102
J408	474984	247785	A508/Pury Rd	109	110	109	108
J410	475515	243213	A5/Main Dr	107	107	107	106
J411	476201	242622	A5/Puxley Rd	114	115	113	115
J417	478099	243010	A508/Yardley Rd	102	102	101	102
J426	475473	252552	A508/Roade Bypass Northern RB	93	90	89	93
J82	473150	255476	Towcester Rd/Gayton Rd/Rectory Ln	88	91	88	88

Appendix B: V/C (Junctions over 85, PM)							
Junction	**X**	**Y**	**Node Name**	**2031_J1c**	**2031_J2a**	**2031_J2b**	**2031_J2c**
J356	468752	249498	*A5 Tove Roundabout	123	123	122	120
J222	475665	254866	*M1 Junction 15	87	86	86	86
J173	472642	257013	*M1 Junction 15A	101	101	101	103
J293	469127	249786	A43 (East of roundabout with A5)	122	122	122	117
J291	469189	248850	A5 Watling Street/ Northampton Road	116	116	114	112
J302	470875	247201	A5/Road to Heathencote	102	101	100	100
J278	475317	253627	Northampton Rd (A508)/Road to Courteenhall	88	86	84	87
J100	471108	252344	A43/Towcester Rd	102	100	102	105
J290	469865	250300	A43/Northampton Rd	126	125	124	124
J296	469619	248315	A5/Vernon Rd	83	87	88	93
J312	472816	253613	Northampton Rd /Courteenhall Rd	100	101	101	101
J313	472704	253501	Stoke Rd/High St	89	90	90	91
J383	475122	250023	A508/Rookery Ln/Ashton Rd	107	109	108	108
J405	471859	246446	A5/Reclamation Yard Rd	93	93	93	98
J406	472626	245799	A5/Pury Rd	103	103	101	100
J408	474984	247785	A508/Pury Rd	103	105	105	103
J426	475473	252552	A508/Roade Bypass Northern RB	88	82	84	88
J82	473150	255476	Towcester Rd/Gayton Rd/Rectory Ln	102	102	101	101

Drawn By: UKRSC003

File: Q:\WSP_UK\WSP_D\Basing\Northants Multi Modal Transport Model\Analysis\Map Documents\Northampton Gateway\DS\Local study area.mxd

Key

- Local junctions

J173
J82
J71
J222
J223
J312
J313
J278
J329
J426
J100
J290
J293
J356
J455
J291
J296
J383
J301
J408
J302
J405
J406
J410
J411
J417

don Bec
Nether Heyford
Bugbrooke
A5076
A5123
15A
A45
Brackmills
Brafield-on-the-Green
Denton
Yardley Hastings
A428
Collingtree
Hackleton
Yardley Chase
Blisworth
Roade
Salcey Forest
Hartwell
Greens Norton
A43
Silverstone
A508
Yardley Gobion
Hanslope
M1
Castlethorpe
Potterspury
A5
Old Stratford

0 0.5 1 Kilometers

DRAWING STATUS:

wsp

CLIENT:

ARCHITECT:

PROJECT:

NORTHAMPTON M1 GATEWAY

TITLE:

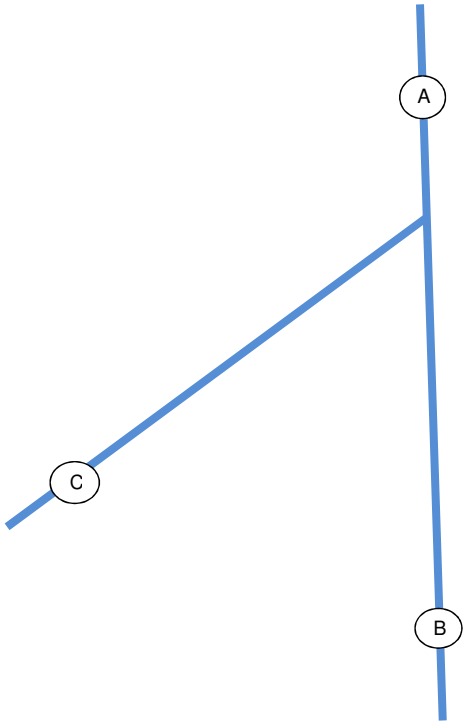
LOCAL STUDY AREA

SCALE @ A1:	CHECKED:	APPROVED:
CAD FILE:	DESIGN-DRAWN:	DATE: —
PROJECT No:	DRAWING No:	REV:

APPENDIX B

NSTM2 OUTPUTS

Junction: **(6) A508/ Roade Bypass northern roundabout**



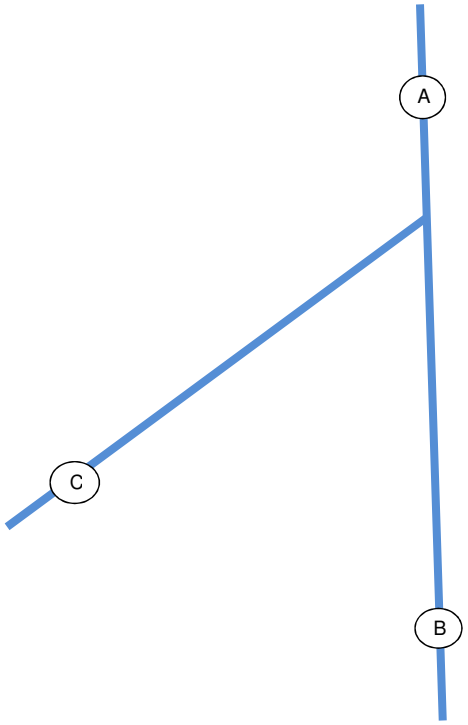
AM (0800-0900)

Jct Node Number			TO ARM							
		Road name	A	B	C	D	E	F	G	Total
FROM ARM	A	A508 (SB)	0	373	1175					1549
	B	A508 (NB)	253	0	0					253
	C	Roade Bypass	1031	116	0					1147
	D									
	E									
	F									
	G									
Total			1285	489	1175					2949

PM (1700-1800)

Jct Node Number			TO ARM							
		Road name	A	B	C	D	E	F	G	Total
FROM ARM	A	A508 (SB)	0	418	1041					1459
	B	A508 (NB)	469	0	0					469
	C	Roade Bypass	991	151	0					1141
	D									
	E									
	F									
	G									
Total			1459	569	1041					3069

Junction: **(6) A508/ Roade Bypass northern roundabout**



HGV Flow

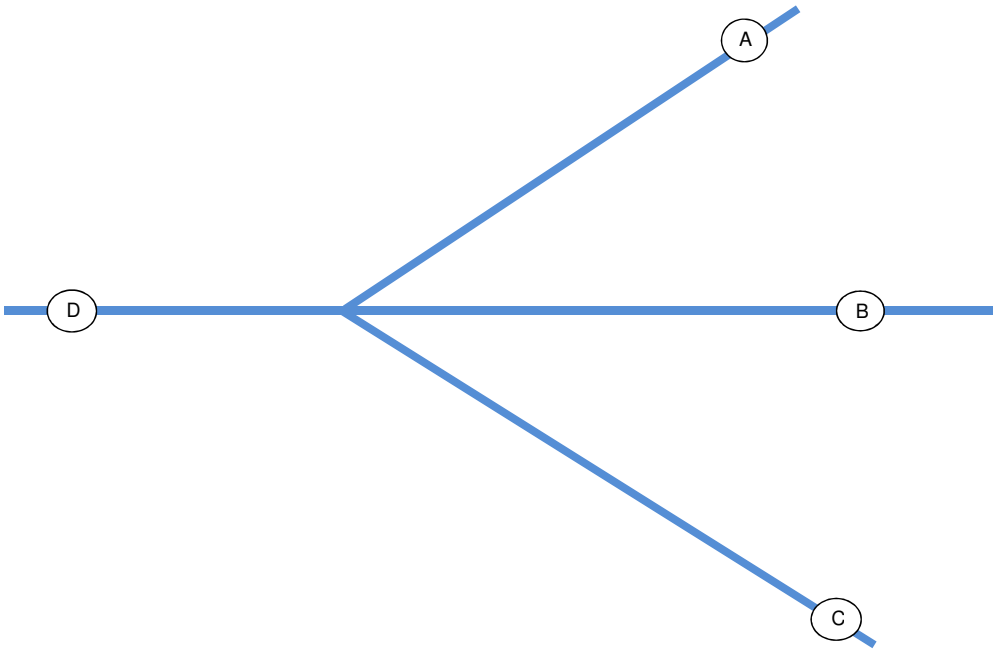
AM (0800-0900)

Jct Node Number			TO ARM							
		Road name	A	B	C	D	E	F	G	Total
FROM ARM	A	A508 (SB)	0	1	186					187
	B	A508 (NB)	2	0	0					2
	C	Roade Bypass	188	0	0					188
	D									
	E									
	F									
	G									
Total			190	1	186					376

PM (1700-1800)

Jct Node Number			TO ARM							
		Road name	A	B	C	D	E	F	G	Total
FROM ARM	A	A508 (SB)	0	1	137					138
	B	A508 (NB)	0	0	0					0
	C	Roade Bypass	126	0	0					126
	D									
	E									
	F									
	G									
Total			126	1	137					264

Junction: **(7) Roade Bypass/ Knock Lane roundabout**



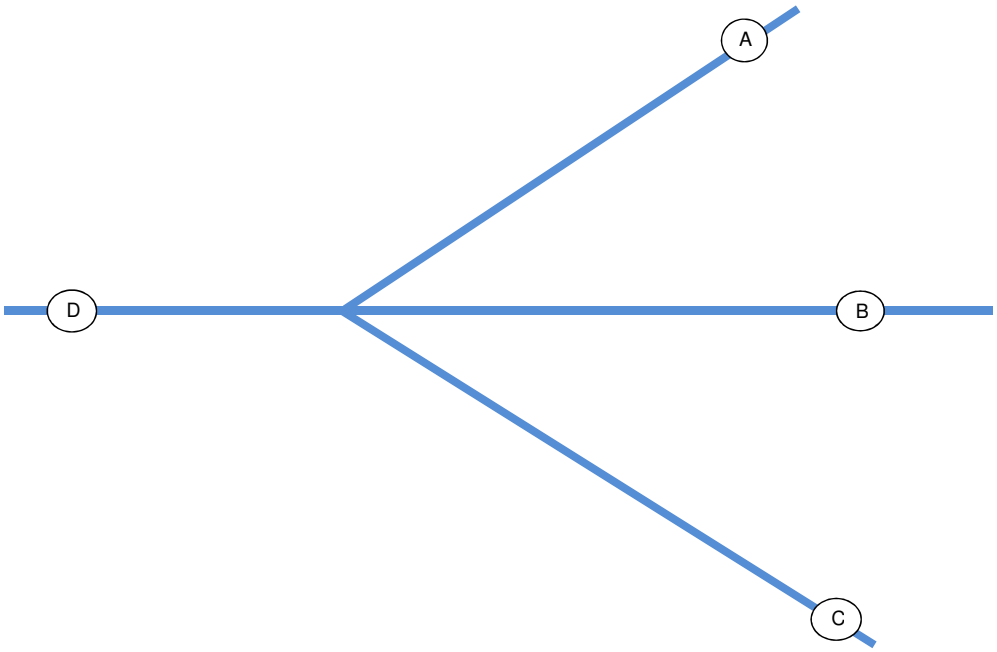
AM (0800-0900)

Jct Node Number			TO ARM							
		Road name	A	B	C	D	E	F	G	Total
FROM ARM	A	Road Bypass	0	39	1095	41				1175
	B	Knock Ln	14	0	16	1				30
	C	Road Bypass	1014	5	0	3				1022
	D	Knock Ln	120	19	103	0				241
	E									
	F									
	G									
Total			1148	63	1214	44				2469

PM (1700-1800)

Jct Node Number			TO ARM							
		Road name	A	B	C	D	E	F	G	Total
FROM ARM	A	Road Bypass	0	48	913	79				1041
	B	Knock Ln	118	0	7	5				130
	C	Road Bypass	885	108	0	1				994
	D	Knock Ln	138	11	0	0				149
	E									
	F									
	G									
Total			1141	168	920	85				2314

Junction: **(7) Roade Bypass/ Knock Lane roundabout**



HGV Flow

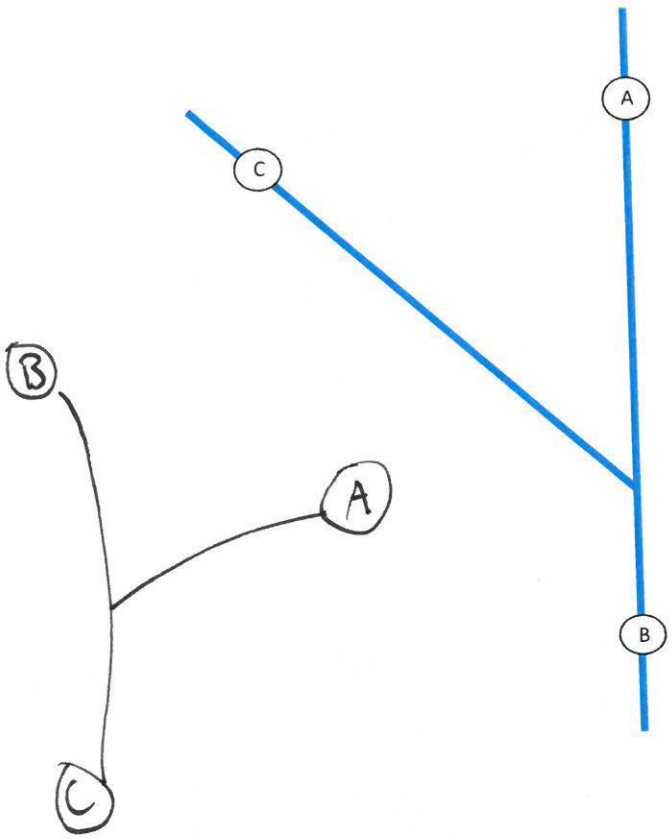
AM (0800-0900)

Jct Node Number			TO ARM							
		Road name	A	B	C	D	E	F	G	Total
FROM ARM	A	Road Bypass	0	1	185	0				186
	B	Knock Ln	0	0	0	0				0
	C	Road Bypass	187	0	0	0				187
	D	Knock Ln	0	0	0	0				0
	E									
	F									
	G									
Total			187	1	185	0				373

PM (1700-1800)

Jct Node Number			TO ARM							
		Road name	A	B	C	D	E	F	G	Total
FROM ARM	A	Road Bypass	0	0	137	0				137
	B	Knock Ln	0	0	0	0				0
	C	Road Bypass	127	0	0	0				127
	D	Knock Ln	0	0	0	0				0
	E									
	F									
	G									
Total			127	0	137	0				264

Junction: **(8) A508/Roade Bypass southern roundabout**



AM

	A	B	C
A	0	0	1375
B	0	0	12
C	1014	7	0

PM

	A	B	C
A	0	0	895
B	0	0	11
C	1248	80	0

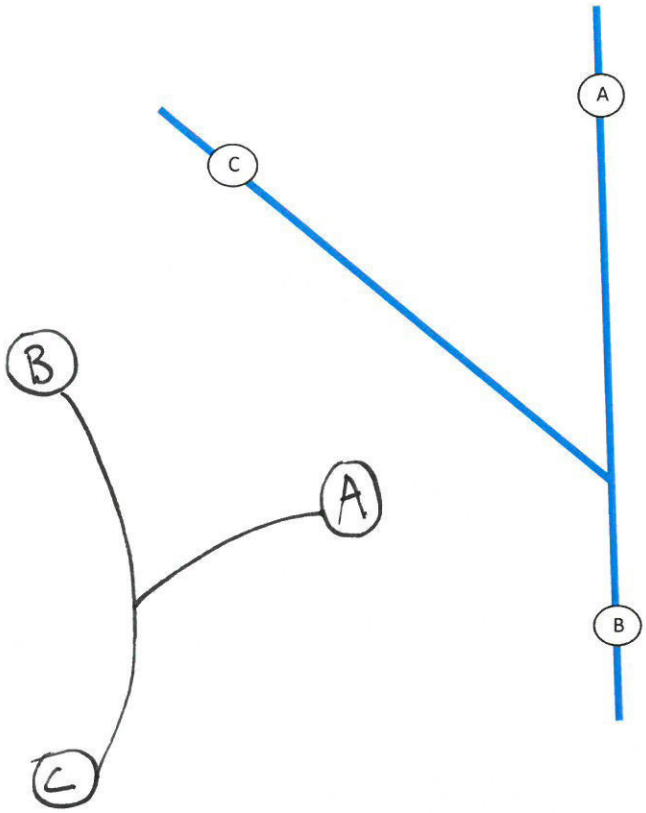
AM (0800-0900)

Jct Node Number			TO ARM							
		Road name	A	B	C	D	E	F	G	Total
FROM ARM	A	A508 (SB)	0	12	0					12
	B	A508 (NB)	7	0	1014					1020
	C	Roade Bypass	0	1375	0					1375
	D									
	E									
	F									
	G									
Total			7	1387	1014					2408

PM (1700-1800)

Jct Node Number			TO ARM							
		Road name	A	B	C	D	E	F	G	Total
FROM ARM	A	A508 (SB)	0	11	0					11
	B	A508 (NB)	80	0	1248					1327
	C	Roade Bypass	0	895	0					895
	D									
	E									
	F									
	G									
Total			80	906	1248					2233

Junction: **(8) A508/Roade Bypass southern roundabout**



HGV Flow

AM

	A	B	C
A	0	0	9
B	0	0	0
C	187	0	0

PM

	A	B	C
A	0	0	0
B	0	0	0
C	137	0	0

AM (0800-0900)

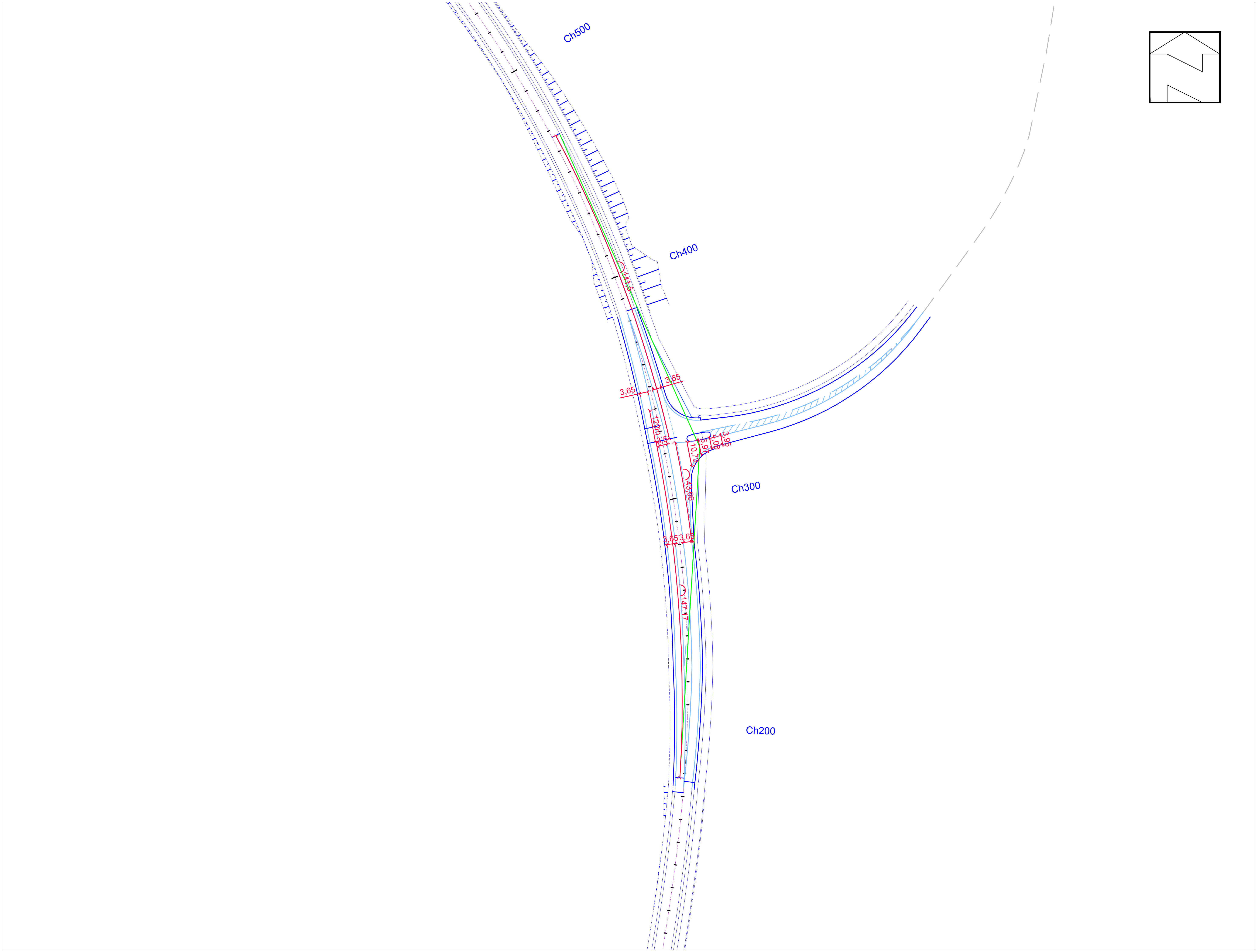
Jct Node Number			TO ARM							
		Road name	A	B	C	D	E	F	G	Total
FROM ARM	A	A508 (SB)	0	0	0					0
	B	A508 (NB)	0	0	187					187
	C	Roade Bypass	0	9	0					9
	D									
	E									
	F									
	G									
Total			0	9	187					196

PM (1700-1800)

Jct Node Number			TO ARM							
		Road name	A	B	C	D	E	F	G	Total
FROM ARM	A	A508 (SB)	0	0	0					0
	B	A508 (NB)	0	0	137					138
	C	Roade Bypass	0	0	0					0
	D									
	E									
	F									
	G									
Total			0	0	137					138

APPENDIX C

A508 STRATFORD ROAD/ROADE BYPASS PICADY OUTPUT



Ch500
Ch400
Ch300
Ch200
3.65
3.65
3.65
3.65
141.5
43.00
147.47
10.75
3.95
4.05

Junctions 8

PICADY 8 - Priority Intersection Module

Version: 8.0.4.487 [15039,24/03/2014]

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

Filename: Roade Bypass - Southern T-Junction_PICADY.arc8
Path: C:\Users\ADCteam\Dropbox\~ JN8 TEMP\Roade Bypass Roundabout\Roade Bypass - Southern T-Junction
Report generation date: 07/08/2017 17:01:30

Summary of junction performance

	AM (J1c)			PM (J1c)		
	Queue (PCU)	Delay (s)	RFC	Queue (PCU)	Delay (s)	RFC
	Traffic Flows - 2031					
Stream B-C	0.84	16.98	0.46	0.04	7.75	0.04
Stream B-A	0.00	0.00	0.00	0.00	0.00	0.00
Stream C-AB	0.05	10.02	0.04	3.92	38.36	0.83
Stream C-A	-	-	-	-	-	-
Stream A-B	-	-	-	-	-	-
Stream A-C	-	-	-	-	-	-

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

"D1 - 2031, AM (J1c) " model duration: 07:45 - 09:15
"D2 - 2031, PM (J1c)" model duration: 16:45 - 18:15

Run using Junctions 8.0.4.487 at 07/08/2017 17:01:28

File summary

Title	Southern T-junction
Location	Roade
Site Number	
Date	03/08/2017
Version	
Status	(new file)
Identifier	KG
Client	
Jobnumber	ADC1475
Enumerator	ADCteam
Description	

Analysis Options

Vehicle Length (m)	Do Queue Variations	Calculate Residual Capacity	Residual Capacity Criteria Type	RFC Threshold	Average Delay Threshold (s)	Queue Threshold (PCU)
5.75			N/A	0.85	36.00	20.00

Units

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

Traffic Flows - 2031, AM (J1c)

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
Traffic Flows	N/A		✓				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
2031, AM (J1c)	2031	AM (J1c)		ONE HOUR	07:45	09:15	90	15				✓		

Junction Network

Junctions

Junction	Name	Junction Type	Major Road Direction	Arm Order	Do Geometric Delay	Junction Delay (s)	Junction LOS
1	(untitled)	T-Junction	Two-way	A,B,C		16.39	C

Junction Network Options

Driving Side	Lighting
Left	Normal/unknown

Arms

Arms

Arm	Arm	Name	Description	Arm Type
A	A	Roade Bypass		Major
B	B	A508 (South)		Minor
C	C	A508 (North)		Major

Major Arm Geometry

Arm	Width of carriageway (m)	Has kerbed central reserve	Width of kerbed central reserve (m)	Has right turn bay	Width For Right Turn (m)	Visibility For Right Turn (m)	Blocks?	Blocking Queue (PCU)
C	7.30		0.00	✓	3.50	120.00	✓	13.00

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

Minor Arm Geometry

Arm	Minor Arm Type	Lane Width (m)	Lane Width (Left) (m)	Lane Width (Right) (m)	Width at give-way (m)	Width at 5m (m)	Width at 10m (m)	Width at 15m (m)	Width at 20m (m)	Estimate Flare Length	Flare Length (PCU)	Visibility To Left (m)	Visibility To Right (m)
B	One lane plus flare				10.00	10.00	5.97	4.08	3.95		1.00	116	59

Slope / Intercept / Capacity

Priority Intersection Slopes and Intercepts

Junction	Stream	Intercept (PCU/hr)	Slope for A-B	Slope for A-C	Slope for C-A	Slope for C-B
1	B-A	580.853	0.100	0.252	0.159	0.360
1	B-C	767.373	0.111	0.281	-	-
1	C-B	734.496	0.268	0.268	-	-

The slopes and intercepts shown above do NOT include any corrections or adjustments.

Streams may be combined, in which case capacity will be adjusted.

Values are shown for the first time segment only; they may differ for subsequent time segments.

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	2.30				✓	✓

Entry Flows

General Flows Data

Arm	Profile Type	Use Turning Counts	Average Demand Flow (PCU/hr)	Flow Scaling Factor (%)
A	ONE HOUR	✓	1214.00	100.000
B	ONE HOUR	✓	164.00	100.000
C	ONE HOUR	✓	1037.00	100.000

Turning Proportions

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

		To		
		A	B	C
From	A	0.000	0.000	1214.000
	B	0.000	0.000	164.000
	C	1022.000	15.000	0.000

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

		To		
		A	B	C
From	A	0.00	0.00	1.00
	B	0.00	0.00	1.00
	C	0.99	0.01	0.00

Vehicle Mix

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

		To		
		A	B	C
From	A	1.000	1.000	1.199
	B	1.000	1.000	1.000
	C	1.238	1.000	1.000

Heavy Vehicle Percentages - Junction 1 (for whole period)

		To		
		A	B	C
From	A	0.0	0.0	15.3
	B	0.0	0.0	0.0
	C	18.3	0.0	0.0

Results

Results Summary for whole modelled period

Stream	Max RFC	Max Delay (s)	Max Queue (PCU)	Max LOS	Average Demand (PCU/hr)	Total Junction Arrivals (PCU)	Total Queueing Delay (PCU-min)	Average Queueing Delay (s)	Rate Of Queueing Delay (PCU-min/min)	Inclusive Total Queueing Delay (PCU-min)	Inclusive Average Queueing Delay (s)
B-C	0.46	16.98	0.84	C	150.49	225.73	47.82	12.71	0.53	47.83	12.71
B-A	0.00	0.00	0.00	A	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C-AB	0.04	10.02	0.05	B	13.76	20.65	3.03	8.79	0.03	3.03	8.79
C-A	-	-	-	-	937.81	1406.71	-	-	-	-	-
A-B	-	-	-	-	0.00	0.00	-	-	-	-	-
A-C	-	-	-	-	1113.99	1670.98	-	-	-	-	-

Main Results for each time segment

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

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	Start Queue (PCU)	End Queue (PCU)	Delay (s)	LOS
B-C	123.47	30.87	122.21	0.00	511.00	0.242	0.00	0.31	9.231	A
B-A	0.00	0.00	0.00	0.00	224.09	0.000	0.00	0.00	0.000	A
C-AB	11.29	2.82	11.20	0.00	489.11	0.023	0.00	0.02	7.533	A
C-A	769.42	192.35	769.42	0.00	-	-	-	-	-	-
A-B	0.00	0.00	0.00	0.00	-	-	-	-	-	-
A-C	913.96	228.49	913.96	0.00	-	-	-	-	-	-

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

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	Start Queue (PCU)	End Queue (PCU)	Delay (s)	LOS
B-C	147.43	36.86	146.84	0.00	461.24	0.320	0.31	0.46	11.428	B
B-A	0.00	0.00	0.00	0.00	154.80	0.000	0.00	0.00	0.000	A
C-AB	13.48	3.37	13.45	0.00	441.48	0.031	0.02	0.03	8.411	A
C-A	918.76	229.69	918.76	0.00	-	-	-	-	-	-
A-B	0.00	0.00	0.00	0.00	-	-	-	-	-	-
A-C	1091.36	272.84	1091.36	0.00	-	-	-	-	-	-

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

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	Start Queue (PCU)	End Queue (PCU)	Delay (s)	LOS
B-C	180.57	45.14	179.11	0.00	392.44	0.460	0.46	0.82	16.760	C
B-A	0.00	0.00	0.00	0.00	59.05	0.000	0.00	0.00	0.000	A
C-AB	16.52	4.13	16.46	0.00	375.63	0.044	0.03	0.05	10.022	B
C-A	1125.24	281.31	1125.24	0.00	-	-	-	-	-	-
A-B	0.00	0.00	0.00	0.00	-	-	-	-	-	-
A-C	1336.64	334.16	1336.64	0.00	-	-	-	-	-	-

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

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	Start Queue (PCU)	End Queue (PCU)	Delay (s)	LOS
B-C	180.57	45.14	180.51	0.00	392.44	0.460	0.82	0.84	16.976	C
B-A	0.00	0.00	0.00	0.00	59.03	0.000	0.00	0.00	0.000	A
C-AB	16.52	4.13	16.51	0.00	375.63	0.044	0.05	0.05	10.024	B
C-A	1125.24	281.31	1125.24	0.00	-	-	-	-	-	-
A-B	0.00	0.00	0.00	0.00	-	-	-	-	-	-
A-C	1336.64	334.16	1336.64	0.00	-	-	-	-	-	-

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

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	Start Queue (PCU)	End Queue (PCU)	Delay (s)	LOS
B-C	147.43	36.86	148.87	0.00	461.24	0.320	0.84	0.48	11.578	B
B-A	0.00	0.00	0.00	0.00	154.77	0.000	0.00	0.00	0.000	A
C-AB	13.48	3.37	13.54	0.00	441.48	0.031	0.05	0.03	8.413	A
C-A	918.76	229.69	918.76	0.00	-	-	-	-	-	-
A-B	0.00	0.00	0.00	0.00	-	-	-	-	-	-
A-C	1091.36	272.84	1091.36	0.00	-	-	-	-	-	-

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

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	Start Queue (PCU)	End Queue (PCU)	Delay (s)	LOS
B-C	123.47	30.87	124.09	0.00	511.00	0.242	0.48	0.32	9.319	A
B-A	0.00	0.00	0.00	0.00	224.04	0.000	0.00	0.00	0.000	A
C-AB	11.29	2.82	11.32	0.00	489.11	0.023	0.03	0.02	7.534	A
C-A	769.42	192.35	769.42	0.00	-	-	-	-	-	-
A-B	0.00	0.00	0.00	0.00	-	-	-	-	-	-
A-C	913.96	228.49	913.96	0.00	-	-	-	-	-	-

Queueing Delay Results for each time segment

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

Stream	Queueing Total Delay (PCU-min)	Queueing Rate Of Delay (PCU-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
B-C	4.51	0.30	9.231	A	A
B-A	0.00	0.00	0.000	A	A
C-AB	0.35	0.02	7.533	A	A
C-A	-	-	-	-	-
A-B	-	-	-	-	-
A-C	-	-	-	-	-

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

Stream	Queueing Total Delay (PCU-min)	Queueing Rate Of Delay (PCU-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
B-C	6.66	0.44	11.428	B	B
B-A	0.00	0.00	0.000	A	A
C-AB	0.47	0.03	8.411	A	A
C-A	-	-	-	-	-
A-B	-	-	-	-	-
A-C	-	-	-	-	-

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

Stream	Queueing Total Delay (PCU-min)	Queueing Rate Of Delay (PCU-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
B-C	11.62	0.77	16.760	C	B
B-A	0.00	0.00	0.000	A	A
C-AB	0.68	0.05	10.022	B	B
C-A	-	-	-	-	-
A-B	-	-	-	-	-
A-C	-	-	-	-	-

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

Stream	Queueing Total Delay (PCU-min)	Queueing Rate Of Delay (PCU-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
B-C	12.49	0.83	16.976	C	B
B-A	0.00	0.00	0.000	A	A
C-AB	0.69	0.05	10.024	B	B
C-A	-	-	-	-	-
A-B	-	-	-	-	-
A-C	-	-	-	-	-

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

Stream	Queueing Total Delay (PCU-min)	Queueing Rate Of Delay (PCU-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
B-C	7.53	0.50	11.578	B	B
B-A	0.00	0.00	0.000	A	A
C-AB	0.48	0.03	8.413	A	A
C-A	-	-	-	-	-
A-B	-	-	-	-	-
A-C	-	-	-	-	-

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

Stream	Queueing Total Delay (PCU-min)	Queueing Rate Of Delay (PCU-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
B-C	5.01	0.33	9.319	A	A
B-A	0.00	0.00	0.000	A	A
C-AB	0.36	0.02	7.534	A	A
C-A	-	-	-	-	-
A-B	-	-	-	-	-
A-C	-	-	-	-	-

Traffic Flows - 2031, PM (J1c)

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
Traffic Flows	N/A		✓				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
2031, PM (J1c)	2031	PM (J1c)		ONE HOUR	16:45	18:15	90	15				✓		

Junction Network

Junctions

Junction	Name	Junction Type	Major Road Direction	Arm Order	Do Geometric Delay	Junction Delay (s)	Junction LOS
1	(untitled)	T-Junction	Two-way	A,B,C		36.95	E

Junction Network Options

Driving Side	Lighting
Left	Normal/unknown

Arms

Arms

Arm	Arm	Name	Description	Arm Type
A	A	Roade Bypass		Major
B	B	A508 (South)		Minor
C	C	A508 (North)		Major

Major Arm Geometry

Arm	Width of carriageway (m)	Has kerbed central reserve	Width of kerbed central reserve (m)	Has right turn bay	Width For Right Turn (m)	Visibility For Right Turn (m)	Blocks?	Blocking Queue (PCU)
C	7.30		0.00	✓	3.50	120.00	✓	13.00

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

Minor Arm Geometry

Arm	Minor Arm Type	Lane Width (m)	Lane Width (Left) (m)	Lane Width (Right) (m)	Width at give-way (m)	Width at 5m (m)	Width at 10m (m)	Width at 15m (m)	Width at 20m (m)	Estimate Flare Length	Flare Length (PCU)	Visibility To Left (m)	Visibility To Right (m)
B	One lane plus flare				10.00	10.00	5.97	4.08	3.95		1.00	116	59

Slope / Intercept / Capacity

Priority Intersection Slopes and Intercepts

Junction	Stream	Intercept (PCU/hr)	Slope for A-B	Slope for A-C	Slope for C-A	Slope for C-B
1	B-A	580.853	0.100	0.252	0.159	0.360
1	B-C	767.373	0.111	0.281	-	-
1	C-B	734.496	0.268	0.268	-	-

The slopes and intercepts shown above do NOT include any corrections or adjustments.

Streams may be combined, in which case capacity will be adjusted.

Values are shown for the first time segment only; they may differ for subsequent time segments.

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	2.30				✓	✓

Entry Flows

General Flows Data

Arm	Profile Type	Use Turning Counts	Average Demand Flow (PCU/hr)	Flow Scaling Factor (%)
A	ONE HOUR	✓	920.00	100.000
B	ONE HOUR	✓	17.00	100.000
C	ONE HOUR	✓	1329.00	100.000

Turning Proportions

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

		To		
		A	B	C
From	A	0.000	0.000	920.000
	B	0.000	0.000	17.000
	C	994.000	335.000	0.000

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

		To		
		A	B	C
From	A	0.00	0.00	1.00
	B	0.00	0.00	1.00
	C	0.75	0.25	0.00

Vehicle Mix

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

		To		
		A	B	C
From	A	1.000	1.000	1.194
	B	1.000	1.000	1.000
	C	1.166	1.000	1.000

Heavy Vehicle Percentages - Junction 1 (for whole period)

		To		
		A	B	C
From	A	0.0	0.0	14.9
	B	0.0	0.0	0.0
	C	12.8	0.0	0.0

Results

Results Summary for whole modelled period

Stream	Max RFC	Max Delay (s)	Max Queue (PCU)	Max LOS	Average Demand (PCU/hr)	Total Junction Arrivals (PCU)	Total Queueing Delay (PCU-min)	Average Queueing Delay (s)	Rate Of Queueing Delay (PCU-min/min)	Inclusive Total Queueing Delay (PCU-min)	Inclusive Average Queueing Delay (s)
B-C	0.04	7.75	0.04	A	15.60	23.40	2.75	7.06	0.03	2.75	7.06
B-A	0.00	0.00	0.00	A	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C-AB	0.83	38.36	3.92	E	322.92	484.38	178.68	22.13	1.99	178.72	22.14
C-A	-	-	-	-	896.59	1344.89	-	-	-	-	-
A-B	-	-	-	-	0.00	0.00	-	-	-	-	-
A-C	-	-	-	-	844.21	1266.31	-	-	-	-	-

Main Results for each time segment

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

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	Start Queue (PCU)	End Queue (PCU)	Delay (s)	LOS
B-C	12.80	3.20	12.71	0.00	573.09	0.022	0.00	0.02	6.424	A
B-A	0.00	0.00	0.00	0.00	196.45	0.000	0.00	0.00	0.000	A
C-AB	252.22	63.05	248.90	0.00	548.56	0.460	0.00	0.83	11.889	B
C-A	748.32	187.08	748.32	0.00	-	-	-	-	-	-
A-B	0.00	0.00	0.00	0.00	-	-	-	-	-	-
A-C	692.62	173.16	692.62	0.00	-	-	-	-	-	-

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

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	Start Queue (PCU)	End Queue (PCU)	Delay (s)	LOS
B-C	15.28	3.82	15.26	0.00	535.38	0.029	0.02	0.03	6.920	A
B-A	0.00	0.00	0.00	0.00	120.64	0.000	0.00	0.00	0.000	A
C-AB	301.68	75.42	299.53	0.00	513.02	0.588	0.83	1.37	16.689	C
C-A	893.06	223.27	893.06	0.00	-	-	-	-	-	-
A-B	0.00	0.00	0.00	0.00	-	-	-	-	-	-
A-C	827.06	206.77	827.06	0.00	-	-	-	-	-	-

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

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	Start Queue (PCU)	End Queue (PCU)	Delay (s)	LOS
B-C	18.72	4.68	18.67	0.00	483.24	0.039	0.03	0.04	7.749	A
B-A	0.00	0.00	0.00	0.00	16.70	0.000	0.00	0.00	0.000	A
C-AB	414.86	103.71	405.99	0.00	500.75	0.828	1.37	3.59	33.889	D
C-A	1048.40	262.10	1048.40	0.00	-	-	-	-	-	-
A-B	0.00	0.00	0.00	0.00	-	-	-	-	-	-
A-C	1012.94	253.23	1012.94	0.00	-	-	-	-	-	-

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

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	Start Queue (PCU)	End Queue (PCU)	Delay (s)	LOS
B-C	18.72	4.68	18.72	0.00	483.24	0.039	0.04	0.04	7.749	A
B-A	0.00	0.00	0.00	0.00	13.82	0.000	0.00	0.00	0.000	A
C-AB	414.86	103.71	413.53	0.00	504.08	0.823	3.59	3.92	38.357	E
C-A	1048.40	262.10	1048.40	0.00	-	-	-	-	-	-
A-B	0.00	0.00	0.00	0.00	-	-	-	-	-	-
A-C	1012.94	253.23	1012.94	0.00	-	-	-	-	-	-

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

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	Start Queue (PCU)	End Queue (PCU)	Delay (s)	LOS
B-C	15.28	3.82	15.32	0.00	535.38	0.029	0.04	0.03	6.924	A
B-A	0.00	0.00	0.00	0.00	116.53	0.000	0.00	0.00	0.000	A
C-AB	301.68	75.42	311.39	0.00	517.74	0.583	3.92	1.49	18.587	C
C-A	893.06	223.27	893.06	0.00	-	-	-	-	-	-
A-B	0.00	0.00	0.00	0.00	-	-	-	-	-	-
A-C	827.06	206.77	827.06	0.00	-	-	-	-	-	-

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

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	Start Queue (PCU)	End Queue (PCU)	Delay (s)	LOS
B-C	12.80	3.20	12.82	0.00	573.09	0.022	0.03	0.02	6.425	A
B-A	0.00	0.00	0.00	0.00	194.30	0.000	0.00	0.00	0.000	A
C-AB	252.22	63.05	254.70	0.00	548.63	0.460	1.49	0.87	12.352	B
C-A	748.32	187.08	748.32	0.00	-	-	-	-	-	-
A-B	0.00	0.00	0.00	0.00	-	-	-	-	-	-
A-C	692.62	173.16	692.62	0.00	-	-	-	-	-	-

Queueing Delay Results for each time segment

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

Stream	Queueing Total Delay (PCU-min)	Queueing Rate Of Delay (PCU-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
B-C	0.33	0.02	6.424	A	A
B-A	0.00	0.00	0.000	A	A
C-AB	12.17	0.81	11.889	B	B
C-A	-	-	-	-	-
A-B	-	-	-	-	-
A-C	-	-	-	-	-

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

Stream	Queueing Total Delay (PCU-min)	Queueing Rate Of Delay (PCU-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
B-C	0.43	0.03	6.920	A	A
B-A	0.00	0.00	0.000	A	A
C-AB	20.25	1.35	16.689	C	B
C-A	-	-	-	-	-
A-B	-	-	-	-	-
A-C	-	-	-	-	-

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

Stream	Queueing Total Delay (PCU-min)	Queueing Rate Of Delay (PCU-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
B-C	0.59	0.04	7.749	A	A
B-A	0.00	0.00	0.000	A	A
C-AB	48.64	3.24	33.889	D	C
C-A	-	-	-	-	-
A-B	-	-	-	-	-
A-C	-	-	-	-	-

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

Stream	Queueing Total Delay (PCU-min)	Queueing Rate Of Delay (PCU-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
B-C	0.60	0.04	7.749	A	A
B-A	0.00	0.00	0.000	A	A
C-AB	60.61	4.04	38.357	E	D
C-A	-	-	-	-	-
A-B	-	-	-	-	-
A-C	-	-	-	-	-

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

Stream	Queueing Total Delay (PCU-min)	Queueing Rate Of Delay (PCU-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
B-C	0.45	0.03	6.924	A	A
B-A	0.00	0.00	0.000	A	A
C-AB	23.70	1.58	18.587	C	B
C-A	-	-	-	-	-
A-B	-	-	-	-	-
A-C	-	-	-	-	-

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

Stream	Queueing Total Delay (PCU-min)	Queueing Rate Of Delay (PCU-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
B-C	0.35	0.02	6.425	A	A
B-A	0.00	0.00	0.000	A	A
C-AB	13.30	0.89	12.352	B	B
C-A	-	-	-	-	-
A-B	-	-	-	-	-
A-C	-	-	-	-	-

Junctions 8

PICADY 8 - Priority Intersection Module

Version: 8.0.4.487 [15039,24/03/2014]

For sales and distribution information, program advice and maintenance, contact TRL:
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Filename: Roade Bypass - Southern T-Junction_PICADY (Sensitivity Test).arc8
Path: C:\Users\ADCteam\Dropbox\~ JN8 TEMP\ADC1475\Roade Bypass Roundabout\Roade Bypass - Southern T-Junction
Report generation date: 08/08/2017 16:50:46

Summary of junction performance

	AM (J1c)			PM (J1c)		
	Queue (PCU)	Delay (s)	RFC	Queue (PCU)	Delay (s)	RFC
	Traffic Flows - 2031					
Stream B-C	1.88	39.65	0.68	6.04	2894.05	2.66
Stream B-A	1.46	180.44	0.66	10.35	2624.15	2.72
Stream C-AB	0.05	10.28	0.05	4.35	42.60	0.85
Stream C-A	-	-	-	-	-	-
Stream A-B	-	-	-	-	-	-
Stream A-C	-	-	-	-	-	-

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

"D1 - 2031, AM (J1c) " model duration: 07:45 - 09:15
"D2 - 2031, PM (J1c)" model duration: 16:45 - 18:15

Run using Junctions 8.0.4.487 at 08/08/2017 16:50:44

File summary

Title	Southern T-junction
Location	Roade
Site Number	
Date	03/08/2017
Version	
Status	(new file)
Identifier	KG
Client	
Jobnumber	ADC1475
Enumerator	ADCteam
Description	

Analysis Options

Vehicle Length (m)	Do Queue Variations	Calculate Residual Capacity	Residual Capacity Criteria Type	RFC Threshold	Average Delay Threshold (s)	Queue Threshold (PCU)
5.75			N/A	0.85	36.00	20.00

Units

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

Traffic Flows - 2031, AM (J1c)

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
Traffic Flows	N/A		✓				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
2031, AM (J1c)	2031	AM (J1c)		ONE HOUR	07:45	09:15	90	15				✓		

Junction Network

Junctions

Junction	Name	Junction Type	Major Road Direction	Arm Order	Do Geometric Delay	Junction Delay (s)	Junction LOS
1	(untitled)	T-Junction	Two-way	A,B,C		57.75	F

Junction Network Options

Driving Side	Lighting
Left	Normal/unknown

Arms

Arms

Arm	Arm	Name	Description	Arm Type
A	A	Roade Bypass		Major
B	B	A508 (South)		Minor
C	C	A508 (North)		Major

Major Arm Geometry

Arm	Width of carriageway (m)	Has kerbed central reserve	Width of kerbed central reserve (m)	Has right turn bay	Width For Right Turn (m)	Visibility For Right Turn (m)	Blocks?	Blocking Queue (PCU)
C	7.30		0.00	✓	3.50	120.00	✓	13.00

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

Minor Arm Geometry

Arm	Minor Arm Type	Lane Width (m)	Lane Width (Left) (m)	Lane Width (Right) (m)	Width at give-way (m)	Width at 5m (m)	Width at 10m (m)	Width at 15m (m)	Width at 20m (m)	Estimate Flare Length	Flare Length (PCU)	Visibility To Left (m)	Visibility To Right (m)
B	One lane plus flare				10.00	10.00	5.97	4.08	3.95		1.00	147	142

Slope / Intercept / Capacity

Priority Intersection Slopes and Intercepts

Junction	Stream	Intercept (PCU/hr)	Slope for A-B	Slope for A-C	Slope for C-A	Slope for C-B
1	B-A	638.447	0.110	0.277	0.174	0.396
1	B-C	827.660	0.120	0.303	-	-
1	C-B	734.496	0.268	0.268	-	-

The slopes and intercepts shown above do NOT include any corrections or adjustments.

Streams may be combined, in which case capacity will be adjusted.

Values are shown for the first time segment only; they may differ for subsequent time segments.

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	2.30				✓	✓

Entry Flows

General Flows Data

Arm	Profile Type	Use Turning Counts	Average Demand Flow (PCU/hr)	Flow Scaling Factor (%)
A	ONE HOUR	✓	1244.00	100.000
B	ONE HOUR	✓	194.00	100.000
C	ONE HOUR	✓	1037.00	100.000

Turning Proportions

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

		To		
		A	B	C
From	A	0.000	30.000	1214.000
	B	30.000	0.000	164.000
	C	1022.000	15.000	0.000

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

		To		
		A	B	C
From	A	0.00	0.02	0.98
	B	0.15	0.00	0.85
	C	0.99	0.01	0.00

Vehicle Mix

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

		To		
		A	B	C
From	A	1.000	1.000	1.199
	B	1.000	1.000	1.000
	C	1.238	1.000	1.000

Heavy Vehicle Percentages - Junction 1 (for whole period)

		To		
		A	B	C
From	A	0.0	0.0	15.3
	B	0.0	0.0	0.0
	C	18.3	0.0	0.0

Results

Results Summary for whole modelled period

Stream	Max RFC	Max Delay (s)	Max Queue (PCU)	Max LOS	Average Demand (PCU/hr)	Total Junction Arrivals (PCU)	Total Queueing Delay (PCU-min)	Average Queueing Delay (s)	Rate Of Queueing Delay (PCU-min/min)	Inclusive Total Queueing Delay (PCU-min)	Inclusive Average Queueing Delay (s)
B-C	0.68	39.65	1.88	E	150.49	225.73	68.60	18.23	0.76	68.60	18.23
B-A	0.66	180.44	1.46	F	27.53	41.29	43.64	63.41	0.48	43.64	63.41
C-AB	0.05	10.28	0.05	B	13.76	20.65	3.09	8.97	0.03	3.09	8.97
C-A	-	-	-	-	937.81	1406.71	-	-	-	-	-
A-B	-	-	-	-	27.53	41.29	-	-	-	-	-
A-C	-	-	-	-	1113.99	1670.98	-	-	-	-	-

Main Results for each time segment

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

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	Start Queue (PCU)	End Queue (PCU)	Delay (s)	LOS
B-C	123.47	30.87	122.28	0.00	534.80	0.231	0.00	0.30	8.703	A
B-A	22.59	5.65	22.18	0.00	241.18	0.094	0.00	0.10	16.409	C
C-AB	11.29	2.82	11.20	0.00	483.04	0.023	0.00	0.02	7.627	A
C-A	769.42	192.35	769.42	0.00	-	-	-	-	-	-
A-B	22.59	5.65	22.59	0.00	-	-	-	-	-	-
A-C	913.96	228.49	913.96	0.00	-	-	-	-	-	-

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

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	Start Queue (PCU)	End Queue (PCU)	Delay (s)	LOS
B-C	147.43	36.86	146.82	0.00	470.38	0.313	0.30	0.45	11.105	B
B-A	26.97	6.74	26.60	0.00	162.49	0.166	0.10	0.19	26.423	D
C-AB	13.48	3.37	13.45	0.00	434.24	0.031	0.02	0.03	8.555	A
C-A	918.76	229.69	918.76	0.00	-	-	-	-	-	-
A-B	26.97	6.74	26.97	0.00	-	-	-	-	-	-
A-C	1091.36	272.84	1091.36	0.00	-	-	-	-	-	-

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

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	Start Queue (PCU)	End Queue (PCU)	Delay (s)	LOS
B-C	180.57	45.14	176.59	0.00	296.08	0.610	0.45	1.44	29.231	D
B-A	33.03	8.26	29.00	0.00	52.00	0.635	0.19	1.20	140.342	F
C-AB	16.52	4.13	16.46	0.00	366.76	0.045	0.03	0.05	10.276	B
C-A	1125.24	281.31	1125.24	0.00	-	-	-	-	-	-
A-B	33.03	8.26	33.03	0.00	-	-	-	-	-	-
A-C	1336.64	334.16	1336.64	0.00	-	-	-	-	-	-

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

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	Start Queue (PCU)	End Queue (PCU)	Delay (s)	LOS
B-C	180.57	45.14	178.82	0.00	267.36	0.675	1.44	1.88	39.648	E
B-A	33.03	8.26	31.99	0.00	50.39	0.656	1.20	1.46	180.435	F
C-AB	16.52	4.13	16.51	0.00	366.76	0.045	0.05	0.05	10.278	B
C-A	1125.24	281.31	1125.24	0.00	-	-	-	-	-	-
A-B	33.03	8.26	33.03	0.00	-	-	-	-	-	-
A-C	1336.64	334.16	1336.64	0.00	-	-	-	-	-	-

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

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	Start Queue (PCU)	End Queue (PCU)	Delay (s)	LOS
B-C	147.43	36.86	153.06	0.00	463.90	0.318	1.88	0.47	11.783	B
B-A	26.97	6.74	31.98	0.00	161.90	0.167	1.46	0.21	28.671	D
C-AB	13.48	3.37	13.54	0.00	434.24	0.031	0.05	0.03	8.558	A
C-A	918.76	229.69	918.76	0.00	-	-	-	-	-	-
A-B	26.97	6.74	26.97	0.00	-	-	-	-	-	-
A-C	1091.36	272.84	1091.36	0.00	-	-	-	-	-	-

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

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	Start Queue (PCU)	End Queue (PCU)	Delay (s)	LOS
B-C	123.47	30.87	124.15	0.00	534.25	0.231	0.47	0.30	8.794	A
B-A	22.59	5.65	22.99	0.00	240.99	0.094	0.21	0.11	16.544	C
C-AB	11.29	2.82	11.33	0.00	483.04	0.023	0.03	0.02	7.631	A
C-A	769.42	192.35	769.42	0.00	-	-	-	-	-	-
A-B	22.59	5.65	22.59	0.00	-	-	-	-	-	-
A-C	913.96	228.49	913.96	0.00	-	-	-	-	-	-

Queueing Delay Results for each time segment

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

Stream	Queueing Total Delay (PCU-min)	Queueing Rate Of Delay (PCU-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
B-C	4.26	0.28	8.703	A	A
B-A	1.43	0.10	16.409	C	B
C-AB	0.35	0.02	7.627	A	A
C-A	-	-	-	-	-
A-B	-	-	-	-	-
A-C	-	-	-	-	-

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

Stream	Queueing Total Delay (PCU-min)	Queueing Rate Of Delay (PCU-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
B-C	6.48	0.43	11.105	B	B
B-A	2.70	0.18	26.423	D	C
C-AB	0.48	0.03	8.555	A	A
C-A	-	-	-	-	-
A-B	-	-	-	-	-
A-C	-	-	-	-	-

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

Stream	Queueing Total Delay (PCU-min)	Queueing Rate Of Delay (PCU-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
B-C	19.12	1.27	29.231	D	C
B-A	13.55	0.90	140.342	F	F
C-AB	0.70	0.05	10.276	B	B
C-A	-	-	-	-	-
A-B	-	-	-	-	-
A-C	-	-	-	-	-

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

Stream	Queueing Total Delay (PCU-min)	Queueing Rate Of Delay (PCU-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
B-C	26.18	1.75	39.648	E	D
B-A	20.27	1.35	180.435	F	F
C-AB	0.71	0.05	10.278	B	B
C-A	-	-	-	-	-
A-B	-	-	-	-	-
A-C	-	-	-	-	-

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

Stream	Queueing Total Delay (PCU-min)	Queueing Rate Of Delay (PCU-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
B-C	7.83	0.52	11.783	B	B
B-A	4.01	0.27	28.671	D	C
C-AB	0.49	0.03	8.558	A	A
C-A	-	-	-	-	-
A-B	-	-	-	-	-
A-C	-	-	-	-	-

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

Stream	Queueing Total Delay (PCU-min)	Queueing Rate Of Delay (PCU-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
B-C	4.73	0.32	8.794	A	A
B-A	1.67	0.11	16.544	C	B
C-AB	0.36	0.02	7.631	A	A
C-A	-	-	-	-	-
A-B	-	-	-	-	-
A-C	-	-	-	-	-

Traffic Flows - 2031, PM (J1c)

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
Traffic Flows	N/A		✓				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
2031, PM (J1c)	2031	PM (J1c)		ONE HOUR	16:45	18:15	90	15				✓		

Junction Network

Junctions

Junction	Name	Junction Type	Major Road Direction	Arm Order	Do Geometric Delay	Junction Delay (s)	Junction LOS
1	(untitled)	T-Junction	Two-way	A,B,C		354.17	F

Junction Network Options

Driving Side	Lighting
Left	Normal/unknown

Arms

Arms

Arm	Arm	Name	Description	Arm Type
A	A	Roade Bypass		Major
B	B	A508 (South)		Minor
C	C	A508 (North)		Major

Major Arm Geometry

Arm	Width of carriageway (m)	Has kerbed central reserve	Width of kerbed central reserve (m)	Has right turn bay	Width For Right Turn (m)	Visibility For Right Turn (m)	Blocks?	Blocking Queue (PCU)
C	7.30		0.00	✓	3.50	120.00	✓	13.00

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

Minor Arm Geometry

Arm	Minor Arm Type	Lane Width (m)	Lane Width (Left) (m)	Lane Width (Right) (m)	Width at give-way (m)	Width at 5m (m)	Width at 10m (m)	Width at 15m (m)	Width at 20m (m)	Estimate Flare Length	Flare Length (PCU)	Visibility To Left (m)	Visibility To Right (m)
B	One lane plus flare				10.00	10.00	5.97	4.08	3.95		1.00	147	142

Slope / Intercept / Capacity

Priority Intersection Slopes and Intercepts

Junction	Stream	Intercept (PCU/hr)	Slope for A-B	Slope for A-C	Slope for C-A	Slope for C-B
1	B-A	695.238	0.119	0.302	0.190	0.431
1	B-C	788.193	0.114	0.288	-	-
1	C-B	734.496	0.268	0.268	-	-

The slopes and intercepts shown above do NOT include any corrections or adjustments.

Streams may be combined, in which case capacity will be adjusted.

Values are shown for the first time segment only; they may differ for subsequent time segments.

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	2.30				✓	✓

Entry Flows

General Flows Data

Arm	Profile Type	Use Turning Counts	Average Demand Flow (PCU/hr)	Flow Scaling Factor (%)
A	ONE HOUR	✓	950.00	100.000
B	ONE HOUR	✓	47.00	100.000
C	ONE HOUR	✓	1329.00	100.000

Turning Proportions

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

		To		
		A	B	C
From	A	0.000	30.000	920.000
	B	30.000	0.000	17.000
	C	994.000	335.000	0.000

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

		To		
		A	B	C
From	A	0.00	0.03	0.97
	B	0.64	0.00	0.36
	C	0.75	0.25	0.00

Vehicle Mix

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

		To		
		A	B	C
From	A	1.000	1.000	1.194
	B	1.000	1.000	1.000
	C	1.166	1.000	1.000

Heavy Vehicle Percentages - Junction 1 (for whole period)

		To		
		A	B	C
From	A	0.0	0.0	14.9
	B	0.0	0.0	0.0
	C	12.8	0.0	0.0

Results

Results Summary for whole modelled period

Stream	Max RFC	Max Delay (s)	Max Queue (PCU)	Max LOS	Average Demand (PCU/hr)	Total Junction Arrivals (PCU)	Total Queueing Delay (PCU-min)	Average Queueing Delay (s)	Rate Of Queueing Delay (PCU-min/min)	Inclusive Total Queueing Delay (PCU-min)	Inclusive Average Queueing Delay (s)
B-C	2.66	2894.05	6.04	F	15.60	23.40	97.42	249.80	1.08	97.42	249.80
B-A	2.72	2624.15	10.35	F	27.53	41.29	199.74	290.23	2.22	199.74	290.24
C-AB	0.85	42.60	4.35	E	327.74	491.60	191.39	23.36	2.13	191.44	23.36
C-A	-	-	-	-	891.78	1337.67	-	-	-	-	-
A-B	-	-	-	-	27.53	41.29	-	-	-	-	-
A-C	-	-	-	-	844.21	1266.31	-	-	-	-	-

Main Results for each time segment

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

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	Start Queue (PCU)	End Queue (PCU)	Delay (s)	LOS
B-C	12.80	3.20	12.71	0.00	571.36	0.022	0.00	0.02	6.444	A
B-A	22.59	5.65	22.16	0.00	232.42	0.097	0.00	0.11	17.082	C
C-AB	252.22	63.06	248.83	0.00	542.50	0.465	0.00	0.85	12.125	B
C-A	748.32	187.08	748.32	0.00	-	-	-	-	-	-
A-B	22.59	5.65	22.59	0.00	-	-	-	-	-	-
A-C	692.62	173.16	692.62	0.00	-	-	-	-	-	-

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

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	Start Queue (PCU)	End Queue (PCU)	Delay (s)	LOS
B-C	15.28	3.82	15.25	0.00	516.67	0.030	0.02	0.03	7.179	A
B-A	26.97	6.74	26.48	0.00	141.17	0.191	0.11	0.23	31.259	D
C-AB	301.80	75.45	299.53	0.00	505.90	0.597	0.85	1.41	17.247	C
C-A	892.95	223.24	892.95	0.00	-	-	-	-	-	-
A-B	26.97	6.74	26.97	0.00	-	-	-	-	-	-
A-C	827.06	206.77	827.06	0.00	-	-	-	-	-	-

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

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	Start Queue (PCU)	End Queue (PCU)	Delay (s)	LOS
B-C	18.72	4.68	6.71	0.00	8.86	2.112	0.03	3.03	972.928	F
B-A	33.03	8.26	13.65	0.00	15.97	2.069	0.23	5.07	860.524	F
C-AB	429.19	107.30	419.14	0.00	502.81	0.854	1.41	3.93	36.873	E
C-A	1034.07	258.52	1034.07	0.00	-	-	-	-	-	-
A-B	33.03	8.26	33.03	0.00	-	-	-	-	-	-
A-C	1012.94	253.23	1012.94	0.00	-	-	-	-	-	-

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

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	Start Queue (PCU)	End Queue (PCU)	Delay (s)	LOS
B-C	18.72	4.68	6.70	0.00	7.03	2.663	3.03	6.04	2894.054	F
B-A	33.03	8.26	11.90	0.00	12.15	2.719	5.07	10.35	2624.148	F
C-AB	429.19	107.30	427.48	0.00	506.98	0.847	3.93	4.35	42.605	E
C-A	1034.07	258.52	1034.07	0.00	-	-	-	-	-	-
A-B	33.03	8.26	33.03	0.00	-	-	-	-	-	-
A-C	1012.94	253.23	1012.94	0.00	-	-	-	-	-	-

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

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	Start Queue (PCU)	End Queue (PCU)	Delay (s)	LOS
B-C	15.28	3.82	39.28	0.00	423.04	0.036	6.04	0.04	9.978	A
B-A	26.97	6.74	67.32	0.00	135.17	0.200	10.35	0.27	84.314	F
C-AB	301.80	75.45	313.02	0.00	511.90	0.590	4.35	1.55	19.569	C
C-A	892.95	223.24	892.95	0.00	-	-	-	-	-	-
A-B	26.97	6.74	26.97	0.00	-	-	-	-	-	-
A-C	827.06	206.77	827.06	0.00	-	-	-	-	-	-

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

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	Start Queue (PCU)	End Queue (PCU)	Delay (s)	LOS
B-C	12.80	3.20	12.86	0.00	569.64	0.022	0.04	0.02	6.465	A
B-A	22.59	5.65	23.21	0.00	230.07	0.098	0.27	0.11	17.454	C
C-AB	252.22	63.06	254.85	0.00	542.58	0.465	1.55	0.89	12.628	B
C-A	748.32	187.08	748.32	0.00	-	-	-	-	-	-
A-B	22.59	5.65	22.59	0.00	-	-	-	-	-	-
A-C	692.62	173.16	692.62	0.00	-	-	-	-	-	-

Queueing Delay Results for each time segment

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

Stream	Queueing Total Delay (PCU-min)	Queueing Rate Of Delay (PCU-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
B-C	0.33	0.02	6.444	A	A
B-A	1.48	0.10	17.082	C	B
C-AB	12.41	0.83	12.125	B	B
C-A	-	-	-	-	-
A-B	-	-	-	-	-
A-C	-	-	-	-	-

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

Stream	Queueing Total Delay (PCU-min)	Queueing Rate Of Delay (PCU-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
B-C	0.44	0.03	7.179	A	A
B-A	3.14	0.21	31.259	D	C
C-AB	20.90	1.39	17.247	C	B
C-A	-	-	-	-	-
A-B	-	-	-	-	-
A-C	-	-	-	-	-

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

Stream	Queueing Total Delay (PCU-min)	Queueing Rate Of Delay (PCU-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
B-C	24.47	1.63	972.928	F	F
B-A	41.59	2.77	860.524	F	F
C-AB	52.38	3.49	36.873	E	D
C-A	-	-	-	-	-
A-B	-	-	-	-	-
A-C	-	-	-	-	-

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

Stream	Queueing Total Delay (PCU-min)	Queueing Rate Of Delay (PCU-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
B-C	68.13	4.54	2894.054	F	F
B-A	115.78	7.72	2624.148	F	F
C-AB	67.20	4.48	42.605	E	D
C-A	-	-	-	-	-
A-B	-	-	-	-	-
A-C	-	-	-	-	-

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

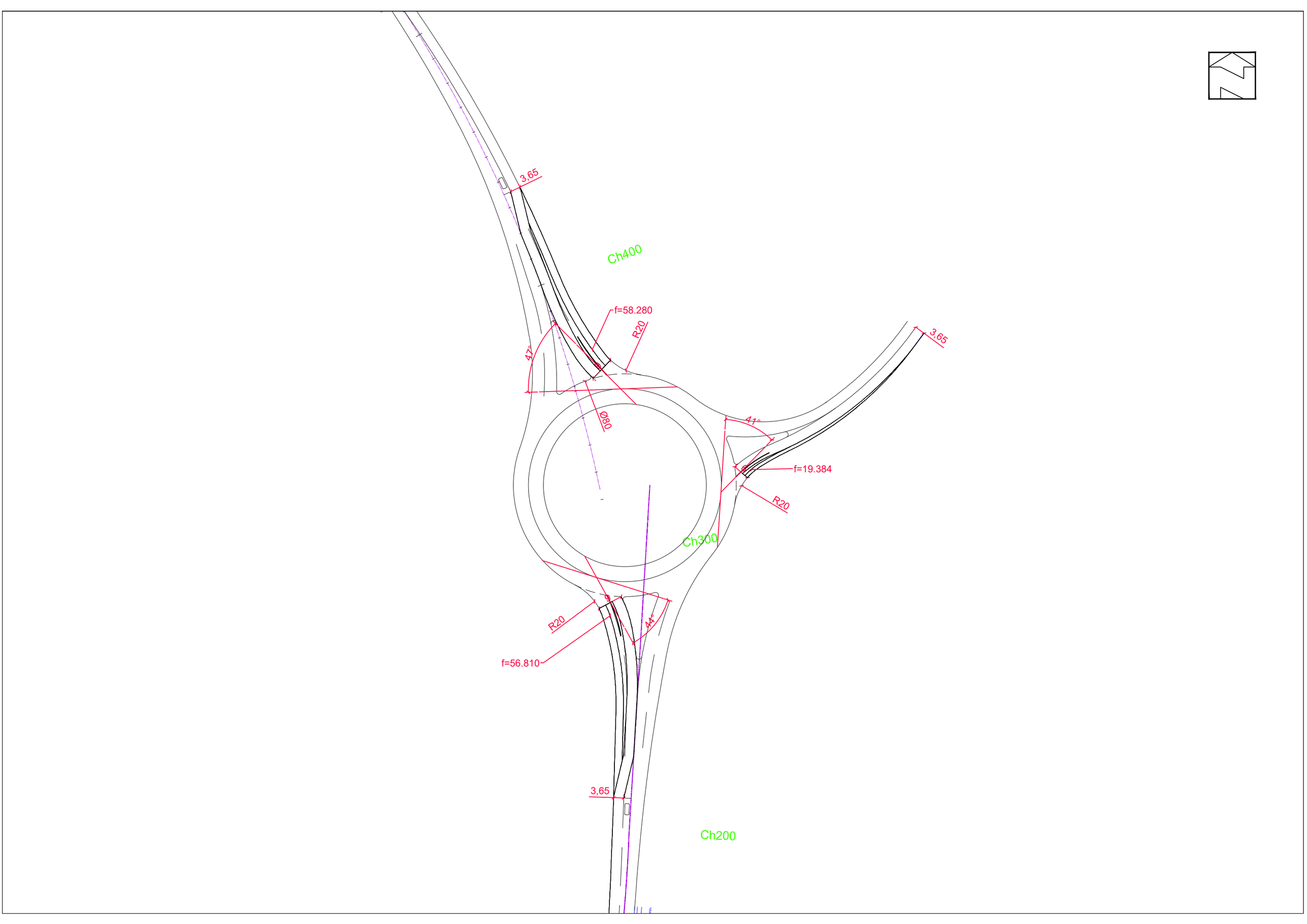
Stream	Queueing Total Delay (PCU-min)	Queueing Rate Of Delay (PCU-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
B-C	3.69	0.25	9.978	A	A
B-A	35.97	2.40	84.314	F	F
C-AB	24.89	1.66	19.569	C	B
C-A	-	-	-	-	-
A-B	-	-	-	-	-
A-C	-	-	-	-	-

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

Stream	Queueing Total Delay (PCU-min)	Queueing Rate Of Delay (PCU-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
B-C	0.36	0.02	6.465	A	A
B-A	1.78	0.12	17.454	C	B
C-AB	13.61	0.91	12.628	B	B
C-A	-	-	-	-	-
A-B	-	-	-	-	-
A-C	-	-	-	-	-

APPENDIX D

A508 STRATFORD ROAD/ROADE BYPASS ARCADY OUTPUT


3,65
Ch400
f=58.280
R20
47°
Ø80
41°
f=19.384
R20
3,65
Ch300
R20
44°
f=56.810
3,65
Ch200

Junctions 8

ARCADY 8 - Roundabout Module

Version: 8.0.4.487 [15039,24/03/2014]

Filename: Roade Bypass _ Southern Roundabut (equal lane test).arc8
Path: C:\Users\ADCteam\Dropbox\~ JN8 TEMP\ADC1475\Roade Bypass Roundabout\Roade Bypass - Southern T-Junction
Report generation date: 21/08/2017 14:00:04

Summary of junction performance

	AM				PM			
	Queue (PCU)	Delay (s)	RFC	LOS	Queue (PCU)	Delay (s)	RFC	LOS
	A1 - J1c							
Arm 1	1.93	5.11	0.62	A	1.22	4.22	0.52	A
Arm 2	0.32	5.37	0.24	A	0.05	3.71	0.05	A
Arm 3	1.30	4.12	0.51	A	2.09	5.19	0.66	A

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

"D1 - J1c, AM" model duration: 07:45 - 09:15
"D2 - J1c, PM " model duration: 17:45 - 19:15

Run using Junctions 8.0.4.487 at 21/08/2017 14:00:03

File summary

Title	Roade Bypass (southern roundabout)
Location	
Site Number	
Date	21/08/2017
Version	
Status	(new file)
Identifier	
Client	Roxhill (Junction 15) Ltd
Jobnumber	ADC1475
Enumerator	ADCteam
Description	

Analysis Options

Vehicle Length (m)	Do Queue Variations	Calculate Residual Capacity	Residual Capacity Criteria Type	RFC Threshold	Average Delay Threshold (s)	Queue Threshold (PCU)
5.75			N/A	0.85	36.00	20.00

Units

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

(Default Analysis Set) - J1c, PM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Geometry	Arm 1 - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.
Warning	Geometry	Arm 3 - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.

Analysis Set Details

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

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Results For Central Hour Only	Single Time Segment Only	Locked	Run Automatically	Use Relationship	Relationship
J1c, PM	J1c	PM		ONE HOUR	17:45	19:15	90	15				✓		

Junction Network

Junctions

Junction	Name	Junction Type	Arm Order	Grade Separated	Large Roundabout	Do Geometric Delay	Junction Delay (s)	Junction LOS
1	(untitled)	Roundabout	1,2,3				4.77	A

Junction Network Options

Driving Side	Lighting
Left	Normal/unknown

Arms

Arms

Arm	Arm	Name	Description
1	1	A508 N	
2	2	Roade	
3	3	A508 S	

Capacity Options

Arm	Minimum Capacity (PCU/hr)	Maximum Capacity (PCU/hr)	Assume Flat Start Profile	Initial Queue (PCU)
1	0.00	99999.00		0.00
2	0.00	99999.00		0.00
3	0.00	99999.00		0.00

Roundabout Geometry

Arm	V - Approach road half-width (m)	E - Entry width (m)	l' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit Only
1	3.65	9.00	58.00	20.00	80.00	47.00	
2	3.00	6.00	19.00	20.00	80.00	41.00	
3	3.65	9.00	57.00	20.00	80.00	44.00	

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)
1		(calculated)	(calculated)	0.535	2218.487
2		(calculated)	(calculated)	0.428	1455.134
3		(calculated)	(calculated)	0.540	2238.287

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 (PCU/hr)	Flow Scaling Factor (%)
1	ONE HOUR	✓	950.00	100.000
2	ONE HOUR	✓	47.00	100.000
3	ONE HOUR	✓	1329.00	100.000

Turning Proportions

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

		To		
		1	2	3
From	1	0.000	30.000	920.000
	2	30.000	0.000	17.000
	3	994.000	335.000	0.000

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

		To		
		1	2	3
From	1	0.00	0.03	0.97
	2	0.64	0.00	0.36
	3	0.75	0.25	0.00

Vehicle Mix

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

		To		
		1	2	3
From	1	1.000	1.000	1.149
	2	1.000	1.000	1.000
	3	1.128	1.000	1.000

Heavy Vehicle Percentages - Junction 1 (for whole period)

		To		
		1	2	3
From	1	0.0	0.0	14.9
	2	0.0	0.0	0.0
	3	12.8	0.0	0.0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Queue (PCU)	Max LOS	Average Demand (PCU/hr)	Total Junction Arrivals (PCU)	Total Queueing Delay (PCU-min)	Average Queueing Delay (s)	Rate Of Queueing Delay (PCU-min/min)	Inclusive Total Queueing Delay (PCU-min)	Inclusive Average Queueing Delay (s)
1	0.52	4.22	1.22	A	871.74	1307.60	78.32	3.59	0.87	78.33	3.59
2	0.05	3.71	0.05	A	43.13	64.69	3.72	3.45	0.04	3.72	3.45
3	0.66	5.19	2.09	A	1219.51	1829.27	126.18	4.14	1.40	126.19	4.14

Main Results for each time segment

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

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Entry Flow (PCU/hr)	Exit Flow (PCU/hr)	Circulating Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	Saturation Capacity (PCU/hr)	RFC	Start Queue (PCU)	End Queue (PCU)	Delay (s)	LOS
1	715.21	178.80	712.83	768.19	251.31	0.00	2083.98	1946.70	0.343	0.00	0.59	2.997	A
2	35.38	8.85	35.26	273.82	690.32	0.00	1159.85	648.73	0.031	0.00	0.03	3.200	A
3	1000.54	250.14	997.00	703.07	22.51	0.00	2226.12	2014.49	0.449	0.00	0.89	3.191	A

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

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Entry Flow (PCU/hr)	Exit Flow (PCU/hr)	Circulating Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	Saturation Capacity (PCU/hr)	RFC	Start Queue (PCU)	End Queue (PCU)	Delay (s)	LOS
1	854.03	213.51	853.18	919.42	300.78	0.00	2057.50	1946.70	0.415	0.59	0.81	3.417	A
2	42.25	10.56	42.22	327.73	826.24	0.00	1101.71	648.73	0.038	0.03	0.04	3.397	A
3	1194.74	298.69	1193.26	841.51	26.95	0.00	2223.72	2014.49	0.537	0.89	1.26	3.813	A

Main results: (18:15-18:30)

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Entry Flow (PCU/hr)	Exit Flow (PCU/hr)	Circulating Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	Saturation Capacity (PCU/hr)	RFC	Start Queue (PCU)	End Queue (PCU)	Delay (s)	LOS
1	1045.97	261.49	1044.34	1124.96	368.02	0.00	2021.51	1946.70	0.517	0.81	1.21	4.206	A
2	51.75	12.94	51.69	400.99	1011.36	0.00	1022.53	648.73	0.051	0.04	0.05	3.707	A
3	1463.26	365.81	1459.98	1030.06	33.00	0.00	2220.45	2014.49	0.659	1.26	2.08	5.150	A

Main results: (18:30-18:45)

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Entry Flow (PCU/hr)	Exit Flow (PCU/hr)	Circulating Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	Saturation Capacity (PCU/hr)	RFC	Start Queue (PCU)	End Queue (PCU)	Delay (s)	LOS
1	1045.97	261.49	1045.95	1127.39	368.83	0.00	2021.08	1946.70	0.518	1.21	1.22	4.221	A
2	51.75	12.94	51.75	401.85	1012.92	0.00	1021.86	648.73	0.051	0.05	0.05	3.709	A
3	1463.26	365.81	1463.19	1031.63	33.03	0.00	2220.44	2014.49	0.659	2.08	2.09	5.194	A

Main results: (18:45-19:00)

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Entry Flow (PCU/hr)	Exit Flow (PCU/hr)	Circulating Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	Saturation Capacity (PCU/hr)	RFC	Start Queue (PCU)	End Queue (PCU)	Delay (s)	LOS
1	854.03	213.51	855.64	923.02	301.98	0.00	2056.86	1946.70	0.415	1.22	0.82	3.431	A
2	42.25	10.56	42.30	329.00	828.62	0.00	1100.69	648.73	0.038	0.05	0.04	3.400	A
3	1194.74	298.69	1198.00	843.93	27.00	0.00	2223.69	2014.49	0.537	2.09	1.28	3.848	A

Main results: (19:00-19:15)

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Entry Flow (PCU/hr)	Exit Flow (PCU/hr)	Circulating Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	Saturation Capacity (PCU/hr)	RFC	Start Queue (PCU)	End Queue (PCU)	Delay (s)	LOS
1	715.21	178.80	716.08	772.09	252.59	0.00	2083.29	1946.70	0.343	0.82	0.60	3.014	A
2	35.38	8.85	35.42	275.20	693.46	0.00	1158.51	648.73	0.031	0.04	0.03	3.207	A
3	1000.54	250.14	1002.07	706.27	22.61	0.00	2226.07	2014.49	0.449	1.28	0.90	3.217	A

Queueing Delay Results for each time segment

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

Arm	Queueing Total Delay (PCU-min)	Queueing Rate Of Delay (PCU-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
1	8.73	0.58	2.997	A	A
2	0.46	0.03	3.200	A	A
3	12.96	0.86	3.191	A	A

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

Arm	Queueing Total Delay (PCU-min)	Queueing Rate Of Delay (PCU-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
1	11.88	0.79	3.417	A	A
2	0.59	0.04	3.397	A	A
3	18.42	1.23	3.813	A	A

Queueing Delay results: (18:15-18:30)

Arm	Queueing Total Delay (PCU-min)	Queueing Rate Of Delay (PCU-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
1	17.76	1.18	4.206	A	A
2	0.79	0.05	3.707	A	A
3	29.98	2.00	5.150	A	A

Queueing Delay results: (18:30-18:45)

Arm	Queueing Total Delay (PCU-min)	Queueing Rate Of Delay (PCU-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
1	18.28	1.22	4.221	A	A
2	0.80	0.05	3.709	A	A
3	31.32	2.09	5.194	A	A

Queueing Delay results: (18:45-19:00)

Arm	Queueing Total Delay (PCU-min)	Queueing Rate Of Delay (PCU-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
1	12.52	0.83	3.431	A	A
2	0.61	0.04	3.400	A	A
3	19.76	1.32	3.848	A	A

Queueing Delay results: (19:00-19:15)

Arm	Queueing Total Delay (PCU-min)	Queueing Rate Of Delay (PCU-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
1	9.16	0.61	3.014	A	A
2	0.48	0.03	3.207	A	A
3	13.74	0.92	3.217	A	A

APPENDIX E

BLISWORTH ROAD/KNOCK LANE/ROADE BYPASS PICADY OUTPUT

Junctions 8

PICADY 8 - Priority Intersection Module

Version: 8.0.4.487 [15039,24/03/2014]

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

Filename: Roade Bypass_Knock Lane PICADY.arc8
Path: C:\Users\ADCteam\Dropbox\~ JN8 TEMP\ADC1475\Roade Bypass Roundabout\Roade Bypass- Knock Lane Roundabout
Report generation date: 15/09/2017 11:48:37

» (Default Analysis Set) - 2013 J1c, AM
» (Default Analysis Set) - 2013 J1c, PM

Summary of junction performance

	AM				PM			
	Queue (PCU)	Delay (s)	RFC	LOS	Queue (PCU)	Delay (s)	RFC	LOS
	A1 - 2013 J1c							
Stream B-C	0.09	19.00	0.09	C	1.10	440.12	0.88	F
Stream B-AD	1.05	274.75	0.65	F	6.87	188.77	0.97	F
Stream A-BCD	0.10	8.29	0.09	A	0.22	9.13	0.18	A
Stream A-B	-	-	-	-	-	-	-	-
Stream A-C	-	-	-	-	-	-	-	-
Stream D-A	44.83	2478.06	2.53	F	0.50	11.95	0.34	B
Stream D-BC	74.84	2429.41	2.57	F	0.16	48.02	0.14	E
Stream C-ABD	0.02	11.08	0.02	B	0.31	9.46	0.24	A
Stream C-D	-	-	-	-	-	-	-	-
Stream C-A	-	-	-	-	-	-	-	-

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

"D1 - 2013 J1c, AM " model duration: 07:45 - 09:15
"D2 - 2013 J1c, PM" model duration: 16:45 - 18:15

Run using Junctions 8.0.4.487 at 15/09/2017 11:48:32

File summary

Title	Roade Bypass_Knock Lane Roundabout
Location	Roade
Site Number	
Date	15/09/2017
Version	v1
Status	(new file)
Identifier	MH
Client	Roxhill
Jobnumber	ADC1475
Enumerator	ADCteam
Description	

Analysis Options

Vehicle Length (m)	Do Queue Variations	Calculate Residual Capacity	Residual Capacity Criteria Type	RFC Threshold	Average Delay Threshold (s)	Queue Threshold (PCU)
5.75			N/A	0.85	36.00	20.00

Units

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

(Default Analysis Set) - 2013 J1c, AM

Data Errors and Warnings

No errors or warnings

Analysis Set Details

Name	Roundabout Capacity Model	Description	Include In Report	Use Specific Demand Set(s)	Specific Demand Set (s)	Locked	Network Flow Scaling Factor (%)	Network Capacity Scaling Factor (%)	Reason For Scaling Factors
(Default Analysis Set)	N/A		✓				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
2013 J1c, AM	2013 J1c	AM		ONE HOUR	07:45	09:15	90	15				✓		

Junction Network

Junctions

Junction	Name	Junction Type	Major Road Direction	Arm Order	Do Geometric Delay	Junction Delay (s)	Junction LOS
1	(untitled)	OS-NS Stagger (UK RL Stagger)	Two-way	A,B,C,D		1988.40	F

Junction Network Options

Driving Side	Lighting
Left	Normal/unknown

Arms

Arms

Arm	Arm	Name	Description	Arm Type
A	A	Roade Bypass North		Major
B	B	Blisworth Road		Minor
C	C	Roade Bypass South		Major
D	D	Knock Lane		Minor

Major Arm Geometry

Arm	Width of carriageway (m)	Has kerbed central reserve	Width of kerbed central reserve (m)	Has right turn bay	Width For Right Turn (m)	Visibility For Right Turn (m)	Blocks?	Blocking Queue (PCU)
A	7.30		0.00	✓	3.50	250.00	✓	10.00
C	7.30		0.00	✓	3.50	250.00	✓	10.00

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

Minor Arm Geometry

Arm	Minor Arm Type	Lane Width (m)	Lane Width (Left) (m)	Lane Width (Right) (m)	Width at give-way (m)	Width at 5m (m)	Width at 10m (m)	Width at 15m (m)	Width at 20m (m)	Estimate Flare Length	Flare Length (PCU)	Visibility To Left (m)	Visibility To Right (m)
B	One lane plus flare				10.00	7.00	6.00	4.50	3.00	✓	2.00	120	120
D	One lane plus flare				10.00	7.00	6.00	4.50	3.00	✓	2.00	120	120

Slope / Intercept / Capacity

Priority Intersection Slopes and Intercepts

Junction	Stream	Intercept (PCU/hr)	Slope for A-B	Slope for A-C	Slope for A-D	Slope for B-A	Slope for B-D	Slope for C-A	Slope for C-B	Slope for C-D	Slope for D-B	Slope for D-C
1	A-D	820.431	-	-	-	0.300	0.300	0.300	-	0.300	-	-
1	B-AD	599.331	0.103	0.260	-	-	-	0.164	0.372	0.164	0.103	0.260
1	B-C	735.060	0.106	0.269	-	-	-	-	-	-	0.106	0.269
1	C-B	820.431	0.300	0.300	-	-	-	-	-	-	0.300	0.300
1	D-A	690.754	-	-	-	0.253	0.100	0.253	-	0.100	-	-
1	D-BC	635.949	0.174	0.174	0.395	0.276	0.109	0.276	-	0.109	-	-

The slopes and intercepts shown above do NOT include any corrections or adjustments.

Streams may be combined, in which case capacity will be adjusted.

Values are shown for the first time segment only; they may differ for subsequent time segments.

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 (PCU/hr)	Flow Scaling Factor (%)
A	ONE HOUR	✓	1175.00	100.000
B	ONE HOUR	✓	31.00	100.000
C	ONE HOUR	✓	1022.00	100.000
D	ONE HOUR	✓	323.00	100.000

Turning Proportions

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

		To			
		A	B	C	D
From	A	0.000	39.000	1095.000	41.000
	B	14.000	0.000	16.000	1.000
	C	1014.000	5.000	0.000	3.000
	D	120.000	100.000	103.000	0.000

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

		To			
		A	B	C	D
From	A	0.00	0.03	0.93	0.03
	B	0.45	0.00	0.52	0.03
	C	0.99	0.00	0.00	0.00
	D	0.37	0.31	0.32	0.00

Vehicle Mix

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

		To			
		A	B	C	D
From	A	1.000	1.026	1.169	1.000
	B	1.000	1.000	1.000	1.000
	C	1.184	1.000	1.000	1.000
	D	1.000	1.000	1.000	1.000

Heavy Vehicle Percentages - Junction 1 (for whole period)

		To			
		A	B	C	D
From	A	0.0	2.6	16.9	0.0
	B	0.0	0.0	0.0	0.0
	C	18.4	0.0	0.0	0.0
	D	0.0	0.0	0.0	0.0

Results

Results Summary for whole modelled period

Stream	Max RFC	Max Delay (s)	Max Queue (PCU)	Max LOS	Average Demand (PCU/hr)	Total Junction Arrivals (PCU)	Total Queueing Delay (PCU-min)	Average Queueing Delay (s)	Rate Of Queueing Delay (PCU-min/min)	Inclusive Total Queueing Delay (PCU-min)	Inclusive Average Queueing Delay (s)
B-C	0.09	19.00	0.09	C	14.68	22.02	4.15	11.31	0.05	4.15	11.31
B-AD	0.65	274.75	1.05	F	13.76	20.65	23.73	68.95	0.26	23.73	68.95
A-BCD	0.09	8.29	0.10	A	37.62	56.43	6.96	7.40	0.08	6.96	7.40
A-B	-	-	-	-	35.79	53.68	-	-	-	-	-
A-C	-	-	-	-	1004.79	1507.19	-	-	-	-	-
D-A	2.53	2478.06	44.83	F	110.11	165.17	2034.46	739.04	22.61	2229.02	809.71
D-BC	2.57	2429.41	74.84	F	186.28	279.41	3362.96	722.14	37.37	3682.49	790.76
C-ABD	0.02	11.08	0.02	B	4.59	6.88	1.05	9.17	0.01	1.05	9.17
C-D	-	-	-	-	2.75	4.13	-	-	-	-	-
C-A	-	-	-	-	930.46	1395.70	-	-	-	-	-

Main Results for each time segment

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

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	Start Queue (PCU)	End Queue (PCU)	Delay (s)	LOS
B-C	12.05	3.01	11.94	0.00	475.61	0.025	0.00	0.03	7.762	A
B-AD	11.29	2.82	11.09	0.00	226.99	0.050	0.00	0.05	16.658	C
A-BCD	30.87	7.72	30.65	0.00	587.43	0.053	0.00	0.06	6.461	A
A-B	29.36	7.34	29.36	0.00	-	-	-	-	-	-
A-C	824.37	206.09	824.37	0.00	-	-	-	-	-	-
D-A	90.34	22.59	89.14	0.00	386.34	0.234	0.00	0.30	12.066	B
D-BC	152.83	38.21	147.59	0.00	260.22	0.587	0.00	1.31	30.728	D
C-ABD	3.76	0.94	3.74	0.00	518.56	0.007	0.00	0.01	6.992	A
C-D	2.26	0.56	2.26	0.00	-	-	-	-	-	-
C-A	763.39	190.85	763.39	0.00	-	-	-	-	-	-

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

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	Start Queue (PCU)	End Queue (PCU)	Delay (s)	LOS
B-C	14.38	3.60	14.35	0.00	421.45	0.034	0.03	0.03	8.843	A
B-AD	13.48	3.37	13.32	0.00	153.88	0.088	0.05	0.09	25.581	D
A-BCD	36.86	9.21	36.79	0.00	542.14	0.068	0.06	0.07	7.123	A
A-B	35.06	8.77	35.06	0.00	-	-	-	-	-	-
A-C	984.38	246.10	984.38	0.00	-	-	-	-	-	-
D-A	107.88	26.97	89.75	0.00	107.20	1.006	0.30	4.83	164.048	F
D-BC	182.49	45.62	162.73	0.00	184.51	0.989	1.31	6.25	126.208	F
C-ABD	4.49	1.12	4.48	0.00	458.40	0.010	0.01	0.01	7.930	A
C-D	2.70	0.67	2.70	0.00	-	-	-	-	-	-
C-A	911.57	227.89	911.57	0.00	-	-	-	-	-	-

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

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	Start Queue (PCU)	End Queue (PCU)	Delay (s)	LOS
B-C	17.62	4.40	17.53	0.00	325.41	0.054	0.03	0.06	11.691	B
B-AD	16.52	4.13	15.21	0.00	50.28	0.328	0.09	0.42	99.585	F
A-BCD	45.14	11.29	45.02	0.00	479.56	0.094	0.07	0.10	8.283	A
A-B	42.94	10.73	42.94	0.00	-	-	-	-	-	-
A-C	1205.62	301.40	1205.62	0.00	-	-	-	-	-	-
D-A	132.12	33.03	52.62	0.00	53.15	2.486	4.83	24.71	1011.675	F
D-BC	223.51	55.88	86.77	0.00	87.21	2.563	6.25	40.43	943.644	F
C-ABD	5.51	1.38	5.48	0.00	371.46	0.015	0.01	0.01	9.836	A
C-D	3.30	0.83	3.30	0.00	-	-	-	-	-	-
C-A	1116.43	279.11	1116.43	0.00	-	-	-	-	-	-

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

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	Start Queue (PCU)	End Queue (PCU)	Delay (s)	LOS
B-C	17.62	4.40	17.48	0.00	206.84	0.085	0.06	0.09	18.996	C
B-AD	16.52	4.13	14.02	0.00	25.43	0.650	0.42	1.05	274.749	F
A-BCD	45.14	11.29	45.14	0.00	479.17	0.094	0.10	0.10	8.294	A
A-B	42.94	10.73	42.94	0.00	-	-	-	-	-	-
A-C	1205.62	301.40	1205.62	0.00	-	-	-	-	-	-
D-A	132.12	33.03	52.06	0.00	52.13	2.534	24.71	44.72	2478.057	F
D-BC	223.51	55.88	86.92	0.00	86.97	2.570	40.43	74.58	2429.412	F
C-ABD	5.51	1.38	5.50	0.00	330.45	0.017	0.01	0.02	11.078	B
C-D	3.30	0.83	3.30	0.00	-	-	-	-	-	-
C-A	1116.43	279.11	1116.43	0.00	-	-	-	-	-	-

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

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	Start Queue (PCU)	End Queue (PCU)	Delay (s)	LOS
B-C	14.38	3.60	14.57	0.00	350.53	0.041	0.09	0.04	10.721	B
B-AD	13.48	3.37	17.03	0.00	102.74	0.131	1.05	0.16	43.467	E
A-BCD	36.86	9.21	36.98	0.00	540.95	0.068	0.10	0.07	7.144	A
A-B	35.06	8.77	35.06	0.00	-	-	-	-	-	-
A-C	984.38	246.10	984.38	0.00	-	-	-	-	-	-
D-A	107.88	26.97	107.43	0.00	108.99	0.990	44.72	44.83	1351.918	F
D-BC	182.49	45.62	181.47	0.00	182.75	0.999	74.58	74.84	1336.023	F
C-ABD	4.49	1.12	4.51	0.00	370.50	0.012	0.02	0.01	9.838	A
C-D	2.70	0.67	2.70	0.00	-	-	-	-	-	-
C-A	911.57	227.89	911.57	0.00	-	-	-	-	-	-

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

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	Start Queue (PCU)	End Queue (PCU)	Delay (s)	LOS
B-C	12.05	3.01	12.10	0.00	416.01	0.029	0.04	0.03	8.915	A
B-AD	11.29	2.82	11.64	0.00	172.98	0.065	0.16	0.07	22.357	C
A-BCD	30.87	7.72	30.94	0.00	587.24	0.053	0.07	0.06	6.473	A
A-B	29.36	7.34	29.36	0.00	-	-	-	-	-	-
A-C	824.37	206.09	824.37	0.00	-	-	-	-	-	-
D-A	90.34	22.59	145.45	0.00	148.70	0.608	44.83	31.05	944.543	F
D-BC	152.83	38.21	246.05	0.00	249.33	0.613	74.84	51.53	927.810	F
C-ABD	3.76	0.94	3.78	0.00	428.79	0.009	0.01	0.01	8.470	A
C-D	2.26	0.56	2.26	0.00	-	-	-	-	-	-
C-A	763.39	190.85	763.39	0.00	-	-	-	-	-	-

Queueing Delay Results for each time segment

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

Stream	Queueing Total Delay (PCU-min)	Queueing Rate Of Delay (PCU-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
B-C	0.37	0.02	7.762	A	A
B-AD	0.73	0.05	16.658	C	B
A-BCD	0.82	0.05	6.461	A	A
A-B	-	-	-	-	-
A-C	-	-	-	-	-
D-A	4.26	0.28	12.066	B	B
D-BC	17.02	1.13	30.728	D	C
C-ABD	0.11	0.01	6.992	A	A
C-D	-	-	-	-	-
C-A	-	-	-	-	-

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

Stream	Queueing Total Delay (PCU-min)	Queueing Rate Of Delay (PCU-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
B-C	0.51	0.03	8.843	A	A
B-AD	1.32	0.09	25.581	D	C
A-BCD	1.09	0.07	7.123	A	A
A-B	-	-	-	-	-
A-C	-	-	-	-	-
D-A	46.67	3.11	164.048	F	F
D-BC	64.32	4.29	126.208	F	F
C-ABD	0.15	0.01	7.930	A	A
C-D	-	-	-	-	-
C-A	-	-	-	-	-

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

Stream	Queueing Total Delay (PCU-min)	Queueing Rate Of Delay (PCU-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
B-C	0.82	0.05	11.691	B	B
B-AD	5.20	0.35	99.585	F	F
A-BCD	1.54	0.10	8.283	A	A
A-B	-	-	-	-	-
A-C	-	-	-	-	-
D-A	221.98	14.80	1011.675	F	F
D-BC	350.56	23.37	943.644	F	F
C-ABD	0.22	0.01	9.836	A	A
C-D	-	-	-	-	-
C-A	-	-	-	-	-

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

Stream	Queueing Total Delay (PCU-min)	Queueing Rate Of Delay (PCU-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
B-C	1.30	0.09	18.996	C	B
B-AD	12.12	0.81	274.749	F	F
A-BCD	1.56	0.10	8.294	A	A
A-B	-	-	-	-	-
A-C	-	-	-	-	-
D-A	520.74	34.72	2478.057	F	F
D-BC	862.64	57.51	2429.412	F	F
C-ABD	0.25	0.02	11.078	B	B
C-D	-	-	-	-	-
C-A	-	-	-	-	-

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

Stream	Queueing Total Delay (PCU-min)	Queueing Rate Of Delay (PCU-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
B-C	0.68	0.05	10.721	B	B
B-AD	3.20	0.21	43.467	E	D
A-BCD	1.11	0.07	7.144	A	A
A-B	-	-	-	-	-
A-C	-	-	-	-	-
D-A	671.66	44.78	1351.918	F	F
D-BC	1120.64	74.71	1336.023	F	F
C-ABD	0.19	0.01	9.838	A	A
C-D	-	-	-	-	-
C-A	-	-	-	-	-

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

Stream	Queueing Total Delay (PCU-min)	Queueing Rate Of Delay (PCU-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
B-C	0.46	0.03	8.915	A	A
B-AD	1.16	0.08	22.357	C	C
A-BCD	0.84	0.06	6.473	A	A
A-B	-	-	-	-	-
A-C	-	-	-	-	-
D-A	569.16	37.94	944.543	F	F
D-BC	947.78	63.19	927.810	F	F
C-ABD	0.13	0.01	8.470	A	A
C-D	-	-	-	-	-
C-A	-	-	-	-	-

(Default Analysis Set) - 2013 J1c, PM

Data Errors and Warnings

No errors or warnings

Analysis Set Details

Name	Roundabout Capacity Model	Description	Include In Report	Use Specific Demand Set(s)	Specific Demand Set (s)	Locked	Network Flow Scaling Factor (%)	Network Capacity Scaling Factor (%)	Reason For Scaling Factors
(Default Analysis Set)	N/A		✓				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
2013 J1c, PM	2013 J1c	PM		ONE HOUR	16:45	18:15	90	15				✓		

Junction Network

Junctions

Junction	Name	Junction Type	Major Road Direction	Arm Order	Do Geometric Delay	Junction Delay (s)	Junction LOS
1	(untitled)	OS-NS Stagger (UK RL Stagger)	Two-way	A,B,C,D		64.85	F

Junction Network Options

Driving Side	Lighting
Left	Normal/unknown

Arms

Arms

Arm	Arm	Name	Description	Arm Type
A	A	Roade Bypass North		Major
B	B	Blisworth Road		Minor
C	C	Roade Bypass South		Major
D	D	Knock Lane		Minor

Major Arm Geometry

Arm	Width of carriageway (m)	Has kerbed central reserve	Width of kerbed central reserve (m)	Has right turn bay	Width For Right Turn (m)	Visibility For Right Turn (m)	Blocks?	Blocking Queue (PCU)
A	7.30		0.00	✓	3.50	250.00	✓	10.00
C	7.30		0.00	✓	3.50	250.00	✓	10.00

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

Minor Arm Geometry

Arm	Minor Arm Type	Lane Width (m)	Lane Width (Left) (m)	Lane Width (Right) (m)	Width at give-way (m)	Width at 5m (m)	Width at 10m (m)	Width at 15m (m)	Width at 20m (m)	Estimate Flare Length	Flare Length (PCU)	Visibility To Left (m)	Visibility To Right (m)
B	One lane plus flare				10.00	7.00	6.00	4.50	3.00	✓	2.00	120	120
D	One lane plus flare				10.00	7.00	6.00	4.50	3.00	✓	2.00	120	120

Slope / Intercept / Capacity

Priority Intersection Slopes and Intercepts

Junction	Stream	Intercept (PCU/hr)	Slope for A-B	Slope for A-C	Slope for A-D	Slope for B-A	Slope for B-D	Slope for C-A	Slope for C-B	Slope for C-D	Slope for D-B	Slope for D-C
1	A-D	820.431	-	-	-	0.300	0.300	0.300	-	0.300	-	-
1	B-AD	662.105	0.114	0.288	-	-	-	0.181	0.411	0.181	0.114	0.288
1	B-C	633.693	0.092	0.232	-	-	-	-	-	-	0.092	0.232
1	C-B	820.431	0.300	0.300	-	-	-	-	-	-	0.300	0.300
1	D-A	799.873	-	-	-	0.292	0.116	0.292	-	0.116	-	-
1	D-BC	525.024	0.143	0.143	0.326	0.228	0.090	0.228	-	0.090	-	-

The slopes and intercepts shown above do NOT include any corrections or adjustments.

Streams may be combined, in which case capacity will be adjusted.

Values are shown for the first time segment only; they may differ for subsequent time segments.

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 (PCU/hr)	Flow Scaling Factor (%)
A	ONE HOUR	✓	1040.00	100.000
B	ONE HOUR	✓	130.00	100.000
C	ONE HOUR	✓	994.00	100.000
D	ONE HOUR	✓	149.00	100.000

Turning Proportions

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

		To			
		A	B	C	D
From	A	0.000	48.000	913.000	79.000
	B	118.000	0.000	7.000	5.000
	C	885.000	108.000	0.000	1.000
	D	138.000	11.000	0.000	0.000

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

		To			
		A	B	C	D
From	A	0.00	0.05	0.88	0.08
	B	0.91	0.00	0.05	0.04
	C	0.89	0.11	0.00	0.00
	D	0.93	0.07	0.00	0.00

Vehicle Mix

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

		To			
		A	B	C	D
From	A	1.000	1.000	1.150	1.000
	B	1.000	1.000	1.000	1.000
	C	1.144	1.000	1.000	1.000
	D	1.000	1.000	1.000	1.000

Heavy Vehicle Percentages - Junction 1 (for whole period)

		To			
		A	B	C	D
From	A	0.0	0.0	15.0	0.0
	B	0.0	0.0	0.0	0.0
	C	14.4	0.0	0.0	0.0
	D	0.0	0.0	0.0	0.0

Results

Results Summary for whole modelled period

Stream	Max RFC	Max Delay (s)	Max Queue (PCU)	Max LOS	Average Demand (PCU/hr)	Total Junction Arrivals (PCU)	Total Queueing Delay (PCU-min)	Average Queueing Delay (s)	Rate Of Queueing Delay (PCU-min/min)	Inclusive Total Queueing Delay (PCU-min)	Inclusive Average Queueing Delay (s)
B-C	0.88	440.12	1.10	F	6.42	9.64	18.76	116.80	0.21	18.76	116.80
B-AD	0.97	188.77	6.87	F	112.87	169.30	191.47	67.86	2.13	191.49	67.86
A-BCD	0.18	9.13	0.22	A	72.49	108.74	14.39	7.94	0.16	14.39	7.94
A-B	-	-	-	-	44.05	66.07	-	-	-	-	-
A-C	-	-	-	-	837.78	1256.68	-	-	-	-	-
D-A	0.34	11.95	0.50	B	126.63	189.95	30.39	9.60	0.34	30.40	9.60
D-BC	0.14	48.02	0.16	E	10.09	15.14	7.31	28.95	0.08	7.31	28.95
C-ABD	0.24	9.46	0.31	A	99.10	148.65	20.31	8.20	0.23	20.32	8.20
C-D	-	-	-	-	0.92	1.38	-	-	-	-	-
C-A	-	-	-	-	812.09	1218.14	-	-	-	-	-

Main Results for each time segment

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

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	Start Queue (PCU)	End Queue (PCU)	Delay (s)	LOS
B-C	5.27	1.32	5.22	0.00	431.20	0.012	0.00	0.01	8.450	A
B-AD	92.60	23.15	90.90	0.00	305.31	0.303	0.00	0.42	16.666	C
A-BCD	59.48	14.87	59.03	0.00	592.62	0.100	0.00	0.11	6.741	A
A-B	36.14	9.03	36.14	0.00	-	-	-	-	-	-
A-C	687.35	171.84	687.35	0.00	-	-	-	-	-	-
D-A	103.89	25.97	103.02	0.00	573.34	0.181	0.00	0.22	7.640	A
D-BC	8.28	2.07	8.13	0.00	229.05	0.036	0.00	0.04	16.285	C
C-ABD	81.31	20.33	80.69	0.00	600.97	0.135	0.00	0.16	6.909	A
C-D	0.75	0.19	0.75	0.00	-	-	-	-	-	-
C-A	666.27	166.57	666.27	0.00	-	-	-	-	-	-

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

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	Start Queue (PCU)	End Queue (PCU)	Delay (s)	LOS
B-C	6.29	1.57	6.27	0.00	367.27	0.017	0.01	0.02	9.972	A
B-AD	110.57	27.64	108.93	0.00	235.79	0.469	0.42	0.84	28.018	D
A-BCD	71.02	17.75	70.87	0.00	547.89	0.130	0.11	0.15	7.545	A
A-B	43.15	10.79	43.15	0.00	-	-	-	-	-	-
A-C	820.77	205.19	820.77	0.00	-	-	-	-	-	-
D-A	124.06	31.01	123.72	0.00	527.25	0.235	0.22	0.30	8.914	A
D-BC	9.89	2.47	9.80	0.00	170.91	0.058	0.04	0.06	22.335	C
C-ABD	97.09	24.27	96.88	0.00	558.33	0.174	0.16	0.21	7.798	A
C-D	0.90	0.22	0.90	0.00	-	-	-	-	-	-
C-A	795.60	198.90	795.60	0.00	-	-	-	-	-	-

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

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	Start Queue (PCU)	End Queue (PCU)	Delay (s)	LOS
B-C	7.71	1.93	5.80	0.00	17.35	0.444	0.02	0.49	286.752	F
B-AD	135.43	33.86	118.92	0.00	139.94	0.968	0.84	4.96	125.222	F
A-BCD	86.98	21.75	86.71	0.00	486.26	0.179	0.15	0.22	9.003	A
A-B	52.85	13.21	52.85	0.00	-	-	-	-	-	-
A-C	1005.23	251.31	1005.23	0.00	-	-	-	-	-	-
D-A	151.94	37.99	151.21	0.00	458.94	0.331	0.30	0.49	11.670	B
D-BC	12.11	3.03	11.77	0.00	90.73	0.133	0.06	0.15	45.400	E
C-ABD	118.91	29.73	118.51	0.00	499.41	0.238	0.21	0.31	9.442	A
C-D	1.10	0.28	1.10	0.00	-	-	-	-	-	-
C-A	974.40	243.60	974.40	0.00	-	-	-	-	-	-

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

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	Start Queue (PCU)	End Queue (PCU)	Delay (s)	LOS
B-C	7.71	1.93	5.27	0.00	8.71	0.885	0.49	1.10	440.118	F
B-AD	135.43	33.86	127.80	0.00	139.67	0.970	4.96	6.87	188.774	F
A-BCD	86.98	21.75	86.97	0.00	481.31	0.181	0.22	0.22	9.128	A
A-B	52.85	13.21	52.85	0.00	-	-	-	-	-	-
A-C	1005.23	251.31	1005.23	0.00	-	-	-	-	-	-
D-A	151.94	37.99	151.89	0.00	453.13	0.335	0.49	0.50	11.947	B
D-BC	12.11	3.03	12.07	0.00	86.97	0.139	0.15	0.16	48.016	E
C-ABD	118.91	29.73	118.90	0.00	499.31	0.238	0.31	0.31	9.463	A
C-D	1.10	0.28	1.10	0.00	-	-	-	-	-	-
C-A	974.40	243.60	974.40	0.00	-	-	-	-	-	-

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

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	Start Queue (PCU)	End Queue (PCU)	Delay (s)	LOS
B-C	6.29	1.57	10.63	0.00	332.69	0.019	1.10	0.02	11.324	B
B-AD	110.57	27.64	134.25	0.00	235.13	0.470	6.87	0.95	42.860	E
A-BCD	71.02	17.75	71.28	0.00	540.16	0.131	0.22	0.15	7.683	A
A-B	43.15	10.79	43.15	0.00	-	-	-	-	-	-
A-C	820.77	205.19	820.77	0.00	-	-	-	-	-	-
D-A	124.06	31.01	124.78	0.00	519.24	0.239	0.50	0.32	9.144	A
D-BC	9.89	2.47	10.25	0.00	165.07	0.060	0.16	0.07	23.303	C
C-ABD	97.09	24.27	97.48	0.00	558.19	0.174	0.31	0.21	7.821	A
C-D	0.90	0.22	0.90	0.00	-	-	-	-	-	-
C-A	795.60	198.90	795.60	0.00	-	-	-	-	-	-

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

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	Start Queue (PCU)	End Queue (PCU)	Delay (s)	LOS
B-C	5.27	1.32	5.30	0.00	428.98	0.012	0.02	0.01	8.498	A
B-AD	92.60	23.15	94.61	0.00	304.96	0.304	0.95	0.45	17.270	C
A-BCD	59.48	14.87	59.64	0.00	591.48	0.101	0.15	0.11	6.772	A
A-B	36.14	9.03	36.14	0.00	-	-	-	-	-	-
A-C	687.35	171.84	687.35	0.00	-	-	-	-	-	-
D-A	103.89	25.97	104.27	0.00	572.02	0.182	0.32	0.22	7.702	A
D-BC	8.28	2.07	8.39	0.00	228.04	0.036	0.07	0.04	16.399	C
C-ABD	81.31	20.33	81.53	0.00	600.89	0.135	0.21	0.16	6.936	A
C-D	0.75	0.19	0.75	0.00	-	-	-	-	-	-
C-A	666.27	166.57	666.27	0.00	-	-	-	-	-	-

Queueing Delay Results for each time segment

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

Stream	Queueing Total Delay (PCU-min)	Queueing Rate Of Delay (PCU-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
B-C	0.18	0.01	8.450	A	A
B-AD	5.91	0.39	16.666	C	B
A-BCD	1.65	0.11	6.741	A	A
A-B	-	-	-	-	-
A-C	-	-	-	-	-
D-A	3.16	0.21	7.640	A	A
D-BC	0.52	0.03	16.285	C	B
C-ABD	2.31	0.15	6.909	A	A
C-D	-	-	-	-	-
C-A	-	-	-	-	-

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

Stream	Queueing Total Delay (PCU-min)	Queueing Rate Of Delay (PCU-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
B-C	0.25	0.02	9.972	A	A
B-AD	11.48	0.77	28.018	D	C
A-BCD	2.22	0.15	7.545	A	A
A-B	-	-	-	-	-
A-C	-	-	-	-	-
D-A	4.43	0.30	8.914	A	A
D-BC	0.85	0.06	22.335	C	C
C-ABD	3.13	0.21	7.798	A	A
C-D	-	-	-	-	-
C-A	-	-	-	-	-

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

Stream	Queueing Total Delay (PCU-min)	Queueing Rate Of Delay (PCU-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
B-C	5.15	0.34	286.752	F	F
B-AD	50.80	3.39	125.222	F	F
A-BCD	3.23	0.22	9.003	A	A
A-B	-	-	-	-	-
A-C	-	-	-	-	-
D-A	6.99	0.47	11.670	B	B
D-BC	1.98	0.13	45.400	E	D
C-ABD	4.62	0.31	9.442	A	A
C-D	-	-	-	-	-
C-A	-	-	-	-	-

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

Stream	Queueing Total Delay (PCU-min)	Queueing Rate Of Delay (PCU-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
B-C	12.46	0.83	440.118	F	F
B-AD	89.71	5.98	188.774	F	F
A-BCD	3.31	0.22	9.128	A	A
A-B	-	-	-	-	-
A-C	-	-	-	-	-
D-A	7.41	0.49	11.947	B	B
D-BC	2.28	0.15	48.016	E	D
C-ABD	4.69	0.31	9.463	A	A
C-D	-	-	-	-	-
C-A	-	-	-	-	-

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

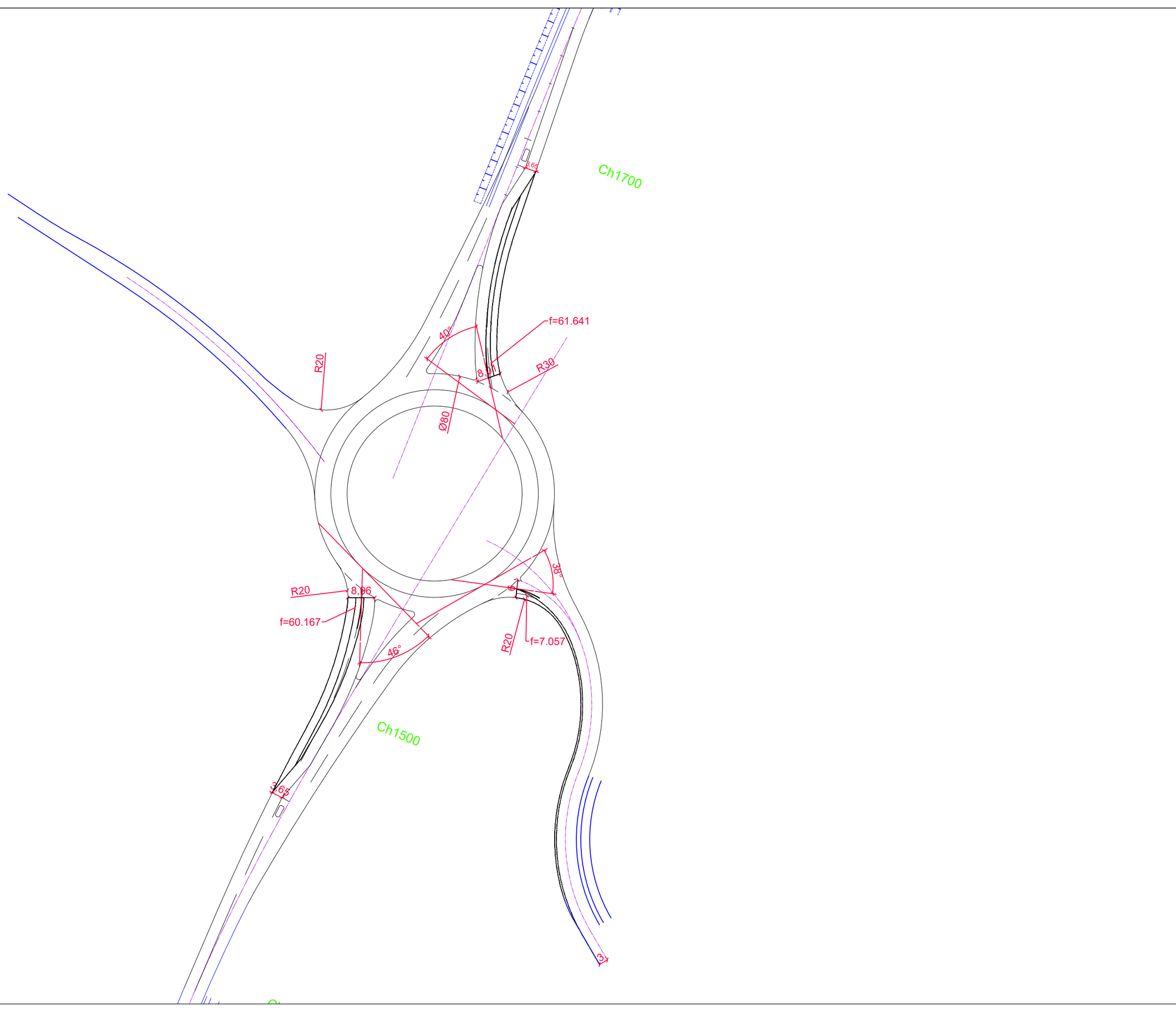
Stream	Queueing Total Delay (PCU-min)	Queueing Rate Of Delay (PCU-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
B-C	0.51	0.03	11.324	B	B
B-AD	26.37	1.76	42.860	E	D
A-BCD	2.30	0.15	7.683	A	A
A-B	-	-	-	-	-
A-C	-	-	-	-	-
D-A	4.94	0.33	9.144	A	A
D-BC	1.06	0.07	23.303	C	C
C-ABD	3.20	0.21	7.821	A	A
C-D	-	-	-	-	-
C-A	-	-	-	-	-

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

Stream	Queueing Total Delay (PCU-min)	Queueing Rate Of Delay (PCU-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
B-C	0.19	0.01	8.498	A	A
B-AD	7.20	0.48	17.270	C	B
A-BCD	1.69	0.11	6.772	A	A
A-B	-	-	-	-	-
A-C	-	-	-	-	-
D-A	3.46	0.23	7.702	A	A
D-BC	0.60	0.04	16.399	C	B
C-ABD	2.37	0.16	6.936	A	A
C-D	-	-	-	-	-
C-A	-	-	-	-	-

APPENDIX F

BLISWORTH ROAD/KNOCK LANE/ROADE BYPASS ARCADY OUTPUT


Ch1700
f=61.641
40°
R20
8.311
R30
Ø80
38°
R20
8.96
f=60.167
46°
R20
f=7.057
Ch1500

Junctions 8

ARCADY 8 - Roundabout Module

Version: 8.0.4.487 [15039,24/03/2014]

Filename: Roade Bypass_Knock Lane ARCADY (equal lane test).arc8
Path: C:\Users\ADCteam\Dropbox\~ JN8 TEMP\ADC1475\Roade Bypass Roundabout\Roade Bypass- Knock Lane Roundabout
Report generation date: 21/08/2017 13:33:42

Summary of junction performance

	AM (J1c)			PM (J1c)		
	Queue (PCU)	Delay (s)	RFC	Queue (PCU)	Delay (s)	RFC
	Traffic Flows - 2031					
Arm 1	2.09	5.86	0.64	1.49	4.71	0.56
Arm 2	0.05	5.33	0.05	0.21	5.33	0.17
Arm 3	1.29	4.16	0.51	1.25	4.12	0.52
Arm 4	0.41	5.53	0.29	0.23	5.08	0.19

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

"D1 - 2031, AM (J1c) " model duration: 07:45 - 09:15
"D2 - 2031, PM (J1c)" model duration: 16:45 - 18:15

Run using Junctions 8.0.4.487 at 21/08/2017 13:33:40

File summary

Title	Roade Bypass_Knock Lane Roundabout
Location	Roade
Site Number	
Date	28/07/2017
Version	
Status	(new file)
Identifier	KG
Client	
Jobnumber	ADC1475
Enumerator	ADCteam
Description	

Analysis Options

Vehicle Length (m)	Do Queue Variations	Calculate Residual Capacity	Residual Capacity Criteria Type	RFC Threshold	Average Delay Threshold (s)	Queue Threshold (PCU)
5.75			N/A	0.85	36.00	20.00

Units

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

Traffic Flows - 2031, AM (J1c)

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Geometry	Arm 1 - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.
Warning	Geometry	Arm 3 - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.

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
Traffic Flows	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
2031, AM (J1c)	2031	AM (J1c)		ONE HOUR	07:45	09:15	90	15				✓		

Junction Network

Junctions

Junction	Name	Junction Type	Arm Order	Grade Separated	Large Roundabout	Do Geometric Delay	Junction Delay (s)	Junction LOS
1	(untitled)	Roundabout	1,2,3,4				5.12	A

Junction Network Options

Driving Side	Lighting
Left	Normal/unknown

Arms

Arms

Arm	Arm	Name	Description
1	1	Roade Bypass N	
2	2	Knock Lane E	
3	3	Roade Bypass S	
4	4	Knock Lane W	

Capacity Options

Arm	Minimum Capacity (PCU/hr)	Maximum Capacity (PCU/hr)	Assume Flat Start Profile	Initial Queue (PCU)
1	0.00	99999.00		0.00
2	0.00	99999.00		0.00
3	0.00	99999.00		0.00
4	0.00	99999.00		0.00

Roundabout Geometry

Arm	V - Approach road half-width (m)	E - Entry width (m)	l' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit Only
1	3.65	8.00	62.00	20.00	80.00	40.00	
2	3.00	6.00	7.00	20.00	80.00	38.00	
3	3.65	8.96	60.00	20.00	80.00	46.00	
4	3.00	6.00	19.12	20.00	60.00	30.00	

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)
1		(calculated)	(calculated)	0.524	2106.607
2		(calculated)	(calculated)	0.401	1256.439
3		(calculated)	(calculated)	0.538	2228.776
4		(calculated)	(calculated)	0.525	1514.156

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	2.30				✓	✓

Entry Flows

General Flows Data

Arm	Profile Type	Use Turning Counts	Average Demand Flow (PCU/hr)	Flow Scaling Factor (%)
1	ONE HOUR	✓	1175.00	100.000
2	ONE HOUR	✓	31.00	100.000
3	ONE HOUR	✓	1022.00	100.000
4	ONE HOUR	✓	242.00	100.000

Turning Proportions

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

		To			
		1	2	3	4
From	1	0.000	39.000	1095.000	41.000
	2	14.000	0.000	16.000	1.000
	3	1014.000	5.000	0.000	3.000
	4	120.000	19.000	103.000	0.000

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

		To			
		1	2	3	4
From	1	0.00	0.03	0.93	0.03
	2	0.45	0.00	0.52	0.03
	3	0.99	0.00	0.00	0.00
	4	0.50	0.08	0.43	0.00

Vehicle Mix

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

		To			
		1	2	3	4
From	1	1.000	1.034	1.220	1.000
	2	1.000	1.000	1.000	1.000
	3	1.240	1.000	1.000	1.000
	4	1.000	1.000	1.000	1.000

Heavy Vehicle Percentages - Junction 1 (for whole period)

		To			
		1	2	3	4
From	1	0.0	2.6	16.9	0.0
	2	0.0	0.0	0.0	0.0
	3	18.4	0.0	0.0	0.0
	4	0.0	0.0	0.0	0.0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Queue (PCU)	Max LOS	Average Demand (PCU/hr)	Total Junction Arrivals (PCU)	Total Queueing Delay (PCU-min)	Average Queueing Delay (s)	Rate Of Queueing Delay (PCU-min/min)	Inclusive Total Queueing Delay (PCU-min)	Inclusive Average Queueing Delay (s)
1	0.64	5.86	2.09	A	1078.20	1617.30	126.80	4.70	1.41	126.82	4.70
2	0.05	5.33	0.05	A	28.45	42.67	3.38	4.75	0.04	3.38	4.75
3	0.51	4.16	1.29	A	937.81	1406.71	84.71	3.61	0.94	84.71	3.61
4	0.29	5.53	0.41	A	222.06	333.10	26.02	4.69	0.29	26.02	4.69

Main Results for each time segment

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

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Entry Flow (PCU/hr)	Exit Flow (PCU/hr)	Circulating Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	Saturation Capacity (PCU/hr)	RFC	Start Queue (PCU)	End Queue (PCU)	Delay (s)	LOS
1	884.60	221.15	881.00	861.22	95.20	0.00	2056.70	2015.32	0.430	0.00	0.90	3.674	A
2	23.34	5.83	23.23	47.24	928.96	0.00	884.04	419.86	0.026	0.00	0.03	4.182	A
3	769.42	192.35	766.78	910.21	41.98	0.00	2206.21	2081.78	0.349	0.00	0.66	3.089	A
4	182.19	45.55	181.41	33.74	775.02	0.00	1107.39	325.22	0.165	0.00	0.20	3.884	A

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

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Entry Flow (PCU/hr)	Exit Flow (PCU/hr)	Circulating Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	Saturation Capacity (PCU/hr)	RFC	Start Queue (PCU)	End Queue (PCU)	Delay (s)	LOS
1	1056.30	264.08	1054.82	1030.99	114.02	0.00	2046.84	2015.32	0.516	0.90	1.27	4.360	A
2	27.87	6.97	27.83	56.56	1112.29	0.00	810.54	419.86	0.034	0.03	0.04	4.599	A
3	918.76	229.69	917.87	1089.85	50.28	0.00	2201.75	2081.78	0.417	0.66	0.88	3.468	A
4	217.55	54.39	217.27	40.40	927.75	0.00	1027.23	325.22	0.212	0.20	0.27	4.444	A

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

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Entry Flow (PCU/hr)	Exit Flow (PCU/hr)	Circulating Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	Saturation Capacity (PCU/hr)	RFC	Start Queue (PCU)	End Queue (PCU)	Delay (s)	LOS
1	1293.70	323.42	1290.51	1262.05	139.54	0.00	2033.46	2015.32	0.636	1.27	2.07	5.804	A
2	34.13	8.53	34.07	69.21	1360.84	0.00	710.90	419.86	0.048	0.04	0.05	5.318	A
3	1125.24	281.31	1123.61	1333.40	61.52	0.00	2195.71	2081.78	0.512	0.88	1.29	4.149	A
4	266.45	66.61	265.89	49.43	1135.70	0.00	918.08	325.22	0.290	0.27	0.41	5.515	A

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

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Entry Flow (PCU/hr)	Exit Flow (PCU/hr)	Circulating Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	Saturation Capacity (PCU/hr)	RFC	Start Queue (PCU)	End Queue (PCU)	Delay (s)	LOS
1	1293.70	323.42	1293.63	1263.94	139.83	0.00	2033.31	2015.32	0.636	2.07	2.09	5.855	A
2	34.13	8.53	34.13	69.36	1364.09	0.00	709.60	419.86	0.048	0.05	0.05	5.329	A
3	1125.24	281.31	1125.22	1336.57	61.65	0.00	2195.64	2081.78	0.512	1.29	1.29	4.161	A
4	266.45	66.61	266.44	49.54	1137.33	0.00	917.23	325.22	0.290	0.41	0.41	5.531	A

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

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Entry Flow (PCU/hr)	Exit Flow (PCU/hr)	Circulating Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	Saturation Capacity (PCU/hr)	RFC	Start Queue (PCU)	End Queue (PCU)	Delay (s)	LOS
1	1056.30	264.08	1059.46	1033.92	114.45	0.00	2046.61	2015.32	0.516	2.09	1.30	4.403	A
2	27.87	6.97	27.93	56.79	1117.12	0.00	808.61	419.86	0.034	0.05	0.04	4.611	A
3	918.76	229.69	920.37	1094.57	50.48	0.00	2201.64	2081.78	0.417	1.29	0.89	3.482	A
4	217.55	54.39	218.10	40.57	930.28	0.00	1025.90	325.22	0.212	0.41	0.27	4.460	A

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

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Entry Flow (PCU/hr)	Exit Flow (PCU/hr)	Circulating Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	Saturation Capacity (PCU/hr)	RFC	Start Queue (PCU)	End Queue (PCU)	Delay (s)	LOS
1	884.60	221.15	886.13	865.33	95.76	0.00	2056.41	2015.32	0.430	1.30	0.91	3.705	A
2	23.34	5.83	23.37	47.51	934.38	0.00	881.86	419.86	0.026	0.04	0.03	4.193	A
3	769.42	192.35	770.32	915.53	42.23	0.00	2206.08	2081.78	0.349	0.89	0.67	3.106	A
4	182.19	45.55	182.48	33.94	778.61	0.00	1105.50	325.22	0.165	0.27	0.20	3.902	A

Queueing Delay Results for each time segment

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

Arm	Queueing Total Delay (PCU-min)	Queueing Rate Of Delay (PCU-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
1	13.16	0.88	3.674	A	A
2	0.40	0.03	4.182	A	A
3	9.67	0.64	3.089	A	A
4	2.87	0.19	3.884	A	A

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

Arm	Queueing Total Delay (PCU-min)	Queueing Rate Of Delay (PCU-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
1	18.59	1.24	4.360	A	A
2	0.52	0.03	4.599	A	A
3	12.97	0.86	3.468	A	A
4	3.93	0.26	4.444	A	A

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

Arm	Queueing Total Delay (PCU-min)	Queueing Rate Of Delay (PCU-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
1	29.81	1.99	5.804	A	A
2	0.74	0.05	5.318	A	A
3	18.86	1.26	4.149	A	A
4	5.94	0.40	5.515	A	A

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

Arm	Queueing Total Delay (PCU-min)	Queueing Rate Of Delay (PCU-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
1	31.19	2.08	5.855	A	A
2	0.75	0.05	5.329	A	A
3	19.39	1.29	4.161	A	A
4	6.10	0.41	5.531	A	A

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

Arm	Queueing Total Delay (PCU-min)	Queueing Rate Of Delay (PCU-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
1	20.03	1.34	4.403	A	A
2	0.55	0.04	4.611	A	A
3	13.66	0.91	3.482	A	A
4	4.15	0.28	4.460	A	A

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

Arm	Queueing Total Delay (PCU-min)	Queueing Rate Of Delay (PCU-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
1	14.02	0.93	3.705	A	A
2	0.42	0.03	4.193	A	A
3	10.16	0.68	3.106	A	A
4	3.03	0.20	3.902	A	A

Traffic Flows - 2031, PM (J1c)

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Geometry	Arm 1 - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.
Warning	Geometry	Arm 3 - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.

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
Traffic Flows	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
2031, PM (J1c)	2031	PM (J1c)		ONE HOUR	16:45	18:15	90	15				✓		

Junction Network

Junctions

Junction	Name	Junction Type	Arm Order	Grade Separated	Large Roundabout	Do Geometric Delay	Junction Delay (s)	Junction LOS
1	(untitled)	Roundabout	1,2,3,4				4.51	A

Junction Network Options

Driving Side	Lighting
Left	Normal/unknown

Arms

Arms

Arm	Arm	Name	Description
1	1	Roade Bypass N	
2	2	Knock Lane E	
3	3	Roade Bypass S	
4	4	Knock Lane W	

Capacity Options

Arm	Minimum Capacity (PCU/hr)	Maximum Capacity (PCU/hr)	Assume Flat Start Profile	Initial Queue (PCU)
1	0.00	99999.00		0.00
2	0.00	99999.00		0.00
3	0.00	99999.00		0.00
4	0.00	99999.00		0.00

Roundabout Geometry

Arm	V - Approach road half-width (m)	E - Entry width (m)	l' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit Only
1	3.65	8.00	62.00	20.00	80.00	40.00	
2	3.00	6.00	7.00	20.00	80.00	38.00	
3	3.65	8.96	60.00	20.00	80.00	46.00	
4	3.00	6.00	19.12	20.00	60.00	30.00	

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)
1		(calculated)	(calculated)	0.524	2106.607
2		(calculated)	(calculated)	0.401	1256.439
3		(calculated)	(calculated)	0.538	2228.776
4		(calculated)	(calculated)	0.525	1514.156

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	2.30				✓	✓

Entry Flows

General Flows Data

Arm	Profile Type	Use Turning Counts	Average Demand Flow (PCU/hr)	Flow Scaling Factor (%)
1	ONE HOUR	✓	1040.00	100.000
2	ONE HOUR	✓	130.00	100.000
3	ONE HOUR	✓	994.00	100.000
4	ONE HOUR	✓	149.00	100.000

Turning Proportions

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

		To			
		1	2	3	4
From	1	0.000	48.000	913.000	79.000
	2	118.000	0.000	7.000	5.000
	3	885.000	108.000	0.000	1.000
	4	138.000	11.000	0.000	0.000

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

		To			
		1	2	3	4
From	1	0.00	0.05	0.88	0.08
	2	0.91	0.00	0.05	0.04
	3	0.89	0.11	0.00	0.00
	4	0.93	0.07	0.00	0.00

Vehicle Mix

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

		To			
		1	2	3	4
From	1	1.000	1.000	1.195	1.000
	2	1.000	1.000	1.000	1.000
	3	1.187	1.000	1.000	1.000
	4	1.000	1.000	1.000	1.000

Heavy Vehicle Percentages - Junction 1 (for whole period)

		To			
		1	2	3	4
From	1	0.0	0.0	15.0	0.0
	2	0.0	0.0	0.0	0.0
	3	14.4	0.0	0.0	0.0
	4	0.0	0.0	0.0	0.0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Queue (PCU)	Max LOS	Average Demand (PCU/hr)	Total Junction Arrivals (PCU)	Total Queueing Delay (PCU-min)	Average Queueing Delay (s)	Rate Of Queueing Delay (PCU-min/min)	Inclusive Total Queueing Delay (PCU-min)	Inclusive Average Queueing Delay (s)
1	0.56	4.71	1.49	A	954.32	1431.48	94.65	3.97	1.05	94.66	3.97
2	0.17	5.33	0.21	A	119.29	178.94	14.15	4.74	0.16	14.15	4.74
3	0.52	4.12	1.25	A	912.11	1368.17	80.71	3.54	0.90	80.71	3.54
4	0.19	5.08	0.23	A	136.73	205.09	15.02	4.39	0.17	15.02	4.39

Main Results for each time segment

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

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Entry Flow (PCU/hr)	Exit Flow (PCU/hr)	Circulating Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	Saturation Capacity (PCU/hr)	RFC	Start Queue (PCU)	End Queue (PCU)	Delay (s)	LOS
1	782.97	195.74	780.12	855.96	89.29	0.00	2059.80	1987.68	0.380	0.00	0.71	3.277	A
2	97.87	24.47	97.42	125.29	744.11	0.00	958.14	496.40	0.102	0.00	0.11	4.181	A
3	748.34	187.08	745.86	690.10	151.43	0.00	2147.38	1895.17	0.348	0.00	0.62	2.981	A
4	112.18	28.04	111.71	63.76	833.54	0.00	1076.67	283.99	0.104	0.00	0.12	3.728	A

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

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Entry Flow (PCU/hr)	Exit Flow (PCU/hr)	Circulating Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	Saturation Capacity (PCU/hr)	RFC	Start Queue (PCU)	End Queue (PCU)	Delay (s)	LOS
1	934.94	233.73	933.90	1024.69	106.87	0.00	2050.58	1987.68	0.456	0.71	0.97	3.759	A
2	116.87	29.22	116.73	149.98	890.80	0.00	899.34	496.40	0.130	0.11	0.15	4.600	A
3	893.59	223.40	892.72	826.14	181.38	0.00	2131.28	1895.17	0.419	0.62	0.83	3.378	A
4	133.95	33.49	133.79	76.33	997.78	0.00	990.47	283.99	0.135	0.12	0.16	4.202	A

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

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Entry Flow (PCU/hr)	Exit Flow (PCU/hr)	Circulating Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	Saturation Capacity (PCU/hr)	RFC	Start Queue (PCU)	End Queue (PCU)	Delay (s)	LOS
1	1145.06	286.27	1143.03	1254.31	130.82	0.00	2038.03	1987.68	0.562	0.97	1.48	4.684	A
2	143.13	35.78	142.89	183.58	1090.27	0.00	819.37	496.40	0.175	0.15	0.21	5.320	A
3	1094.41	273.60	1092.78	1011.14	222.02	0.00	2109.44	1895.17	0.519	0.83	1.24	4.110	A
4	164.05	41.01	163.76	93.42	1221.38	0.00	873.11	283.99	0.188	0.16	0.23	5.072	A

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

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Entry Flow (PCU/hr)	Exit Flow (PCU/hr)	Circulating Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	Saturation Capacity (PCU/hr)	RFC	Start Queue (PCU)	End Queue (PCU)	Delay (s)	LOS
1	1145.06	286.27	1145.03	1256.24	131.02	0.00	2037.93	1987.68	0.562	1.48	1.49	4.705	A
2	143.13	35.78	143.13	183.87	1092.18	0.00	818.61	496.40	0.175	0.21	0.21	5.329	A
3	1094.41	273.60	1094.39	1012.91	222.40	0.00	2109.23	1895.17	0.519	1.24	1.25	4.124	A
4	164.05	41.01	164.05	93.58	1223.21	0.00	872.16	283.99	0.188	0.23	0.23	5.083	A

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

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Entry Flow (PCU/hr)	Exit Flow (PCU/hr)	Circulating Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	Saturation Capacity (PCU/hr)	RFC	Start Queue (PCU)	End Queue (PCU)	Delay (s)	LOS
1	934.94	233.73	936.95	1027.66	107.18	0.00	2050.43	1987.68	0.456	1.49	0.99	3.782	A
2	116.87	29.22	117.11	150.42	893.70	0.00	898.17	496.40	0.130	0.21	0.15	4.611	A
3	893.59	223.40	895.20	828.84	181.98	0.00	2130.96	1895.17	0.419	1.25	0.85	3.393	A
4	133.95	33.49	134.24	76.58	1000.60	0.00	988.99	283.99	0.135	0.23	0.16	4.214	A

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

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Entry Flow (PCU/hr)	Exit Flow (PCU/hr)	Circulating Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	Saturation Capacity (PCU/hr)	RFC	Start Queue (PCU)	End Queue (PCU)	Delay (s)	LOS
1	782.97	195.74	784.03	860.07	89.70	0.00	2059.59	1987.68	0.380	0.99	0.72	3.298	A
2	97.87	24.47	98.01	125.88	747.84	0.00	956.64	496.40	0.102	0.15	0.11	4.194	A
3	748.34	187.08	749.21	693.56	152.29	0.00	2146.92	1895.17	0.349	0.85	0.63	2.996	A
4	112.18	28.04	112.34	64.08	837.43	0.00	1074.63	283.99	0.104	0.16	0.12	3.740	A

Queueing Delay Results for each time segment

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

Arm	Queueing Total Delay (PCU-min)	Queueing Rate Of Delay (PCU-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
1	10.42	0.69	3.277	A	A
2	1.66	0.11	4.181	A	A
3	9.09	0.61	2.981	A	A
4	1.70	0.11	3.728	A	A

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

Arm	Queueing Total Delay (PCU-min)	Queueing Rate Of Delay (PCU-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
1	14.27	0.95	3.759	A	A
2	2.19	0.15	4.600	A	A
3	12.29	0.82	3.378	A	A
4	2.30	0.15	4.202	A	A

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

Arm	Queueing Total Delay (PCU-min)	Queueing Rate Of Delay (PCU-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
1	21.54	1.44	4.684	A	A
2	3.09	0.21	5.320	A	A
3	18.17	1.21	4.110	A	A
4	3.38	0.23	5.072	A	A

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

Arm	Queueing Total Delay (PCU-min)	Queueing Rate Of Delay (PCU-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
1	22.27	1.48	4.705	A	A
2	3.16	0.21	5.329	A	A
3	18.69	1.25	4.124	A	A
4	3.46	0.23	5.083	A	A

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

Arm	Queueing Total Delay (PCU-min)	Queueing Rate Of Delay (PCU-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
1	15.15	1.01	3.782	A	A
2	2.30	0.15	4.611	A	A
3	12.94	0.86	3.393	A	A
4	2.41	0.16	4.214	A	A

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

Arm	Queueing Total Delay (PCU-min)	Queueing Rate Of Delay (PCU-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
1	11.00	0.73	3.298	A	A
2	1.75	0.12	4.194	A	A
3	9.53	0.64	2.996	A	A
4	1.78	0.12	3.740	A	A

APPENDIX G

A508 NORTHAMPTON ROAD/ROADE BYPASS PICADY OUTPUT

Junctions 8

PICADY 8 - Priority Intersection Module

Version: 8.0.4.487 [15039,24/03/2014]

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

Filename: Roade Bypass - Northern T-Junction_PICADY.arc8
Path: C:\Users\ADCteam\Dropbox\~ JN8 TEMP\ADC1475\Roade Bypass Roundabout\Roade Bypass - Northern Roundabout
Report generation date: 15/09/2017 11:18:29

Summary of junction performance

	AM (J1c)			PM (J1c)		
	Queue (PCU)	Delay (s)	RFC	Queue (PCU)	Delay (s)	RFC
	Traffic Flows - 2031					
Stream B-C	0.00	0.00	0.00	0.00	0.00	0.00
Stream B-A	205.46	3932.87	9999999999.00	467.95	7568.05	41.78
Stream C-AB	0.84	24.08	0.46	1.18	26.18	0.55
Stream C-A	-	-	-	-	-	-
Stream A-B	-	-	-	-	-	-
Stream A-C	-	-	-	-	-	-

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

"D1 - 2031, AM (J1c) " model duration: 07:45 - 09:15
"D2 - 2031, PM (J1c)" model duration: 16:45 - 18:15

Run using Junctions 8.0.4.487 at 15/09/2017 11:18:26

File summary

Title	Southern T-junction
Location	Roade
Site Number	
Date	03/08/2017
Version	
Status	(new file)
Identifier	KG
Client	
Jobnumber	ADC1475
Enumerator	ADCteam
Description	

Analysis Options

Vehicle Length (m)	Do Queue Variations	Calculate Residual Capacity	Residual Capacity Criteria Type	RFC Threshold	Average Delay Threshold (s)	Queue Threshold (PCU)
5.75			N/A	0.85	36.00	20.00

Units

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

Traffic Flows - 2031, AM (J1c)

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
Traffic Flows	N/A		✓				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
2031, AM (J1c)	2031	AM (J1c)		ONE HOUR	07:45	09:15	90	15				✓		

Junction Network

Junctions

Junction	Name	Junction Type	Major Road Direction	Arm Order	Do Geometric Delay	Junction Delay (s)	Junction LOS
1	(untitled)	T-Junction	Two-way	A,B,C		2704.03	F

Junction Network Options

Driving Side	Lighting
Left	Normal/unknown

Arms

Arms

Arm	Arm	Name	Description	Arm Type
A	A	A508 Northampton Road North		Major
B	B	A508 Northampton Road South		Minor
C	C	Roade Bypass		Major

Major Arm Geometry

Arm	Width of carriageway (m)	Has kerbed central reserve	Width of kerbed central reserve (m)	Has right turn bay	Width For Right Turn (m)	Visibility For Right Turn (m)	Blocks?	Blocking Queue (PCU)
C	7.30		0.00	✓	3.50	120.00	✓	13.00

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

Minor Arm Geometry

Arm	Minor Arm Type	Lane Width (m)	Lane Width (Left) (m)	Lane Width (Right) (m)	Width at give-way (m)	Width at 5m (m)	Width at 10m (m)	Width at 15m (m)	Width at 20m (m)	Estimate Flare Length	Flare Length (PCU)	Visibility To Left (m)	Visibility To Right (m)
B	One lane plus flare				10.00	10.00	6.00	5.00	4.00		1.00	90	90

Slope / Intercept / Capacity

Priority Intersection Slopes and Intercepts

Junction	Stream	Intercept (PCU/hr)	Slope for A-B	Slope for A-C	Slope for C-A	Slope for C-B
1	B-A	651.683	0.112	0.283	0.178	0.404
1	B-C	663.560	0.096	0.243	-	-
1	C-B	734.496	0.268	0.268	-	-

The slopes and intercepts shown above do NOT include any corrections or adjustments.

Streams may be combined, in which case capacity will be adjusted.

Values are shown for the first time segment only; they may differ for subsequent time segments.

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	2.30				✓	✓

Entry Flows

General Flows Data

Arm	Profile Type	Use Turning Counts	Average Demand Flow (PCU/hr)	Flow Scaling Factor (%)
A	ONE HOUR	✓	1548.00	100.000
B	ONE HOUR	✓	253.00	100.000
C	ONE HOUR	✓	1147.00	100.000

Turning Proportions

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

		To		
		A	B	C
From	A	0.000	373.000	1175.000
	B	253.000	0.000	0.000
	C	1031.000	116.000	0.000

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

		To		
		A	B	C
From	A	0.00	0.24	0.76
	B	1.00	0.00	0.00
	C	0.90	0.10	0.00

Vehicle Mix

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

		To		
		A	B	C
From	A	1.000	1.004	1.205
	B	1.010	1.000	1.000
	C	1.237	1.000	1.000

Heavy Vehicle Percentages - Junction 1 (for whole period)

		To		
		A	B	C
From	A	0.0	0.3	15.8
	B	0.8	0.0	0.0
	C	18.2	0.0	0.0

Results

Results Summary for whole modelled period

Stream	Max RFC	Max Delay (s)	Max Queue (PCU)	Max LOS	Average Demand (PCU/hr)	Total Junction Arrivals (PCU)	Total Queueing Delay (PCU-min)	Average Queueing Delay (s)	Rate Of Queueing Delay (PCU-min/min)	Inclusive Total Queueing Delay (PCU-min)	Inclusive Average Queueing Delay (s)
B-C	0.00	0.00	0.00	A	0.00	0.00	0.00	0.00	0.00	0.00	0.00
B-A	9999999999.00	3932.87	205.46	F	232.16	348.24	9469.03	1631.49	105.21	15875.40	2735.29
C-AB	0.46	24.08	0.84	C	106.45	159.68	44.89	16.87	0.50	44.90	16.87
C-A	-	-	-	-	946.06	1419.08	-	-	-	-	-
A-B	-	-	-	-	342.27	513.41	-	-	-	-	-
A-C	-	-	-	-	1078.20	1617.30	-	-	-	-	-

Main Results for each time segment

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

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	Start Queue (PCU)	End Queue (PCU)	Delay (s)	LOS
B-C	0.00	0.00	0.00	0.00	319.68	0.000	0.00	0.00	0.000	A
B-A	190.47	47.62	167.24	0.00	196.33	0.970	0.00	5.81	93.900	F
C-AB	87.33	21.83	86.30	0.00	421.60	0.207	0.00	0.26	10.706	B
C-A	776.19	194.05	776.19	0.00	-	-	-	-	-	-
A-B	280.81	70.20	280.81	0.00	-	-	-	-	-	-
A-C	884.60	221.15	884.60	0.00	-	-	-	-	-	-

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

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	Start Queue (PCU)	End Queue (PCU)	Delay (s)	LOS
B-C	0.00	0.00	0.00	0.00	281.38	0.000	0.00	0.00	0.000	A
B-A	227.44	56.86	106.81	0.00	107.53	2.115	5.81	35.97	1896.823	F
C-AB	104.28	26.07	103.72	0.00	360.86	0.289	0.26	0.40	13.969	B
C-A	926.85	231.71	926.85	0.00	-	-	-	-	-	-
A-B	335.32	83.83	335.32	0.00	-	-	-	-	-	-
A-C	1056.30	264.08	1056.30	0.00	-	-	-	-	-	-

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

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	Start Queue (PCU)	End Queue (PCU)	Delay (s)	LOS
B-C	0.00	0.00	0.00	0.00	232.77	0.000	0.00	0.00	0.000	A
B-A	278.56	69.64	0.00	0.00	0.00	9999999999.000	35.97	105.61	1644.261	F
C-AB	127.74	31.94	126.06	0.00	276.93	0.461	0.40	0.82	23.602	C
C-A	1135.13	283.78	1135.13	0.00	-	-	-	-	-	-
A-B	410.68	102.67	410.68	0.00	-	-	-	-	-	-
A-C	1293.70	323.42	1293.70	0.00	-	-	-	-	-	-

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

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	Start Queue (PCU)	End Queue (PCU)	Delay (s)	LOS
B-C	0.00	0.00	0.00	0.00	232.77	0.000	0.00	0.00	0.000	A
B-A	278.56	69.64	0.00	0.00	0.00	9999999999.000	105.61	175.25	1879.693	F
C-AB	127.74	31.94	127.67	0.00	276.93	0.461	0.82	0.84	24.085	C
C-A	1135.13	283.78	1135.13	0.00	-	-	-	-	-	-
A-B	410.68	102.67	410.68	0.00	-	-	-	-	-	-
A-C	1293.70	323.42	1293.70	0.00	-	-	-	-	-	-

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

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	Start Queue (PCU)	End Queue (PCU)	Delay (s)	LOS
B-C	0.00	0.00	0.00	0.00	281.38	0.000	0.00	0.00	0.000	A
B-A	227.44	56.86	106.58	0.00	106.59	2.134	175.25	205.46	3932.867	F
C-AB	104.28	26.07	105.97	0.00	360.87	0.289	0.84	0.42	14.211	B
C-A	926.85	231.71	926.85	0.00	-	-	-	-	-	-
A-B	335.32	83.83	335.32	0.00	-	-	-	-	-	-
A-C	1056.30	264.08	1056.30	0.00	-	-	-	-	-	-

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

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	Start Queue (PCU)	End Queue (PCU)	Delay (s)	LOS
B-C	0.00	0.00	0.00	0.00	316.54	0.000	0.00	0.00	0.000	A
B-A	190.47	47.62	194.70	0.00	195.65	0.974	205.46	204.40	3789.316	F
C-AB	87.33	21.83	87.93	0.00	421.60	0.207	0.42	0.27	10.810	B
C-A	776.19	194.05	776.19	0.00	-	-	-	-	-	-
A-B	280.81	70.20	280.81	0.00	-	-	-	-	-	-
A-C	884.60	221.15	884.60	0.00	-	-	-	-	-	-

Queueing Delay Results for each time segment

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

Stream	Queueing Total Delay (PCU-min)	Queueing Rate Of Delay (PCU-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
B-C	0.00	0.00	0.000	A	A
B-A	57.58	3.84	93.900	F	F
C-AB	3.80	0.25	10.706	B	B
C-A	-	-	-	-	-
A-B	-	-	-	-	-
A-C	-	-	-	-	-

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

Stream	Queueing Total Delay (PCU-min)	Queueing Rate Of Delay (PCU-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
B-C	0.00	0.00	0.000	A	A
B-A	313.98	20.93	1896.823	F	F
C-AB	5.95	0.40	13.969	B	B
C-A	-	-	-	-	-
A-B	-	-	-	-	-
A-C	-	-	-	-	-

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

Stream	Queueing Total Delay (PCU-min)	Queueing Rate Of Delay (PCU-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
B-C	0.00	0.00	0.000	A	A
B-A	1061.80	70.79	1644.261	F	F
C-AB	12.00	0.80	23.602	C	C
C-A	-	-	-	-	-
A-B	-	-	-	-	-
A-C	-	-	-	-	-

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

Stream	Queueing Total Delay (PCU-min)	Queueing Rate Of Delay (PCU-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
B-C	0.00	0.00	0.000	A	A
B-A	2106.39	140.43	1879.693	F	F
C-AB	12.77	0.85	24.085	C	C
C-A	-	-	-	-	-
A-B	-	-	-	-	-
A-C	-	-	-	-	-

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

Stream	Queueing Total Delay (PCU-min)	Queueing Rate Of Delay (PCU-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
B-C	0.00	0.00	0.000	A	A
B-A	2855.30	190.35	3932.867	F	F
C-AB	6.35	0.42	14.211	B	B
C-A	-	-	-	-	-
A-B	-	-	-	-	-
A-C	-	-	-	-	-

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

Stream	Queueing Total Delay (PCU-min)	Queueing Rate Of Delay (PCU-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
B-C	0.00	0.00	0.000	A	A
B-A	3073.98	204.93	3789.316	F	F
C-AB	4.01	0.27	10.810	B	B
C-A	-	-	-	-	-
A-B	-	-	-	-	-
A-C	-	-	-	-	-

Traffic Flows - 2031, PM (J1c)

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
Traffic Flows	N/A		✓				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
2031, PM (J1c)	2031	PM (J1c)		ONE HOUR	16:45	18:15	90	15				✓		

Junction Network

Junctions

Junction	Name	Junction Type	Major Road Direction	Arm Order	Do Geometric Delay	Junction Delay (s)	Junction LOS
1	(untitled)	T-Junction	Two-way	A,B,C		5730.43	F

Junction Network Options

Driving Side	Lighting
Left	Normal/unknown

Arms

Arms

Arm	Arm	Name	Description	Arm Type
A	A	A508 Northampton Road North		Major
B	B	A508 Northampton Road South		Minor
C	C	Roade Bypass		Major

Major Arm Geometry

Arm	Width of carriageway (m)	Has kerbed central reserve	Width of kerbed central reserve (m)	Has right turn bay	Width For Right Turn (m)	Visibility For Right Turn (m)	Blocks?	Blocking Queue (PCU)
C	7.30		0.00	✓	3.50	120.00	✓	13.00

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

Minor Arm Geometry

Arm	Minor Arm Type	Lane Width (m)	Lane Width (Left) (m)	Lane Width (Right) (m)	Width at give-way (m)	Width at 5m (m)	Width at 10m (m)	Width at 15m (m)	Width at 20m (m)	Estimate Flare Length	Flare Length (PCU)	Visibility To Left (m)	Visibility To Right (m)
B	One lane plus flare				10.00	10.00	6.00	5.00	4.00		1.00	90	90

Slope / Intercept / Capacity

Priority Intersection Slopes and Intercepts

Junction	Stream	Intercept (PCU/hr)	Slope for A-B	Slope for A-C	Slope for C-A	Slope for C-B
1	B-A	651.683	0.112	0.283	0.178	0.404
1	B-C	663.560	0.096	0.243	-	-
1	C-B	734.496	0.268	0.268	-	-

The slopes and intercepts shown above do NOT include any corrections or adjustments.

Streams may be combined, in which case capacity will be adjusted.

Values are shown for the first time segment only; they may differ for subsequent time segments.

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	2.30				✓	✓

Entry Flows

General Flows Data

Arm	Profile Type	Use Turning Counts	Average Demand Flow (PCU/hr)	Flow Scaling Factor (%)
A	ONE HOUR	✓	1459.00	100.000
B	ONE HOUR	✓	469.00	100.000
C	ONE HOUR	✓	1142.00	100.000

Turning Proportions

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

		To		
		A	B	C
From	A	0.000	418.000	1041.000
	B	469.000	0.000	0.000
	C	991.000	151.000	0.000

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

		To		
		A	B	C
From	A	0.00	0.29	0.71
	B	1.00	0.00	0.00
	C	0.87	0.13	0.00

Vehicle Mix

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

		To		
		A	B	C
From	A	1.000	1.003	1.172
	B	1.000	1.000	1.000
	C	1.165	1.000	1.000

Heavy Vehicle Percentages - Junction 1 (for whole period)

		To		
		A	B	C
From	A	0.0	0.2	13.2
	B	0.0	0.0	0.0
	C	12.7	0.0	0.0

Results

Results Summary for whole modelled period

Stream	Max RFC	Max Delay (s)	Max Queue (PCU)	Max LOS	Average Demand (PCU/hr)	Total Junction Arrivals (PCU)	Total Queueing Delay (PCU-min)	Average Queueing Delay (s)	Rate Of Queueing Delay (PCU-min/min)	Inclusive Total Queueing Delay (PCU-min)	Inclusive Average Queueing Delay (s)
B-C	0.00	0.00	0.00	A	0.00	0.00	0.00	0.00	0.00	0.00	0.00
B-A	41.78	7568.05	467.95	F	430.36	645.54	21103.33	1961.45	234.48	51675.00	4802.93
C-AB	0.55	26.18	1.18	D	138.64	207.96	61.87	17.85	0.69	61.88	17.85
C-A	-	-	-	-	909.28	1363.92	-	-	-	-	-
A-B	-	-	-	-	383.56	575.35	-	-	-	-	-
A-C	-	-	-	-	955.24	1432.86	-	-	-	-	-

Main Results for each time segment

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

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	Start Queue (PCU)	End Queue (PCU)	Delay (s)	LOS
B-C	0.00	0.00	0.00	0.00	332.45	0.000	0.00	0.00	0.000	A
B-A	353.09	88.27	209.93	0.00	215.79	1.636	0.00	35.79	434.508	F
C-AB	113.68	28.42	112.31	0.00	439.59	0.259	0.00	0.34	10.954	B
C-A	746.08	186.52	746.08	0.00	-	-	-	-	-	-
A-B	314.69	78.67	314.69	0.00	-	-	-	-	-	-
A-C	783.72	195.93	783.72	0.00	-	-	-	-	-	-

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

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	Start Queue (PCU)	End Queue (PCU)	Delay (s)	LOS
B-C	0.00	0.00	0.00	0.00	300.38	0.000	0.00	0.00	0.000	A
B-A	421.62	105.41	130.59	0.00	130.63	3.228	35.79	108.55	1757.068	F
C-AB	135.75	33.94	134.97	0.00	382.35	0.355	0.34	0.54	14.506	B
C-A	890.89	222.72	890.89	0.00	-	-	-	-	-	-
A-B	375.77	93.94	375.77	0.00	-	-	-	-	-	-
A-C	935.84	233.96	935.84	0.00	-	-	-	-	-	-

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

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	Start Queue (PCU)	End Queue (PCU)	Delay (s)	LOS
B-C	0.00	0.00	0.00	0.00	256.04	0.000	0.00	0.00	0.000	A
B-A	516.38	129.09	13.34	0.00	13.34	38.706	108.55	234.31	4941.150	F
C-AB	166.50	41.62	164.06	0.00	303.54	0.549	0.54	1.15	25.377	D
C-A	1090.87	272.72	1090.87	0.00	-	-	-	-	-	-
A-B	460.23	115.06	460.23	0.00	-	-	-	-	-	-
A-C	1146.16	286.54	1146.16	0.00	-	-	-	-	-	-

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

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	Start Queue (PCU)	End Queue (PCU)	Delay (s)	LOS
B-C	0.00	0.00	0.00	0.00	256.04	0.000	0.00	0.00	0.000	A
B-A	516.38	129.09	12.36	0.00	12.36	41.783	234.31	360.31	6205.669	F
C-AB	166.50	41.62	166.37	0.00	303.57	0.548	1.15	1.18	26.175	D
C-A	1090.87	272.72	1090.87	0.00	-	-	-	-	-	-
A-B	460.23	115.06	460.23	0.00	-	-	-	-	-	-
A-C	1146.16	286.54	1146.16	0.00	-	-	-	-	-	-

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

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	Start Queue (PCU)	End Queue (PCU)	Delay (s)	LOS
B-C	0.00	0.00	0.00	0.00	300.38	0.000	0.00	0.00	0.000	A
B-A	421.62	105.41	129.28	0.00	129.28	3.261	360.31	433.40	7025.000	F
C-AB	135.75	33.94	138.21	0.00	382.39	0.355	1.18	0.56	14.888	B
C-A	890.89	222.72	890.89	0.00	-	-	-	-	-	-
A-B	375.77	93.94	375.77	0.00	-	-	-	-	-	-
A-C	935.84	233.96	935.84	0.00	-	-	-	-	-	-

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

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Entry Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	Start Queue (PCU)	End Queue (PCU)	Delay (s)	LOS
B-C	0.00	0.00	0.00	0.00	332.45	0.000	0.00	0.00	0.000	A
B-A	353.09	88.27	214.88	0.00	214.88	1.643	433.40	467.95	7568.048	F
C-AB	113.68	28.42	114.52	0.00	439.59	0.259	0.56	0.35	11.102	B
C-A	746.08	186.52	746.08	0.00	-	-	-	-	-	-
A-B	314.69	78.67	314.69	0.00	-	-	-	-	-	-
A-C	783.72	195.93	783.72	0.00	-	-	-	-	-	-

Queueing Delay Results for each time segment

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

Stream	Queueing Total Delay (PCU-min)	Queueing Rate Of Delay (PCU-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
B-C	0.00	0.00	0.000	A	A
B-A	276.77	18.45	434.508	F	F
C-AB	5.07	0.34	10.954	B	B
C-A	-	-	-	-	-
A-B	-	-	-	-	-
A-C	-	-	-	-	-

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

Stream	Queueing Total Delay (PCU-min)	Queueing Rate Of Delay (PCU-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
B-C	0.00	0.00	0.000	A	A
B-A	1082.57	72.17	1757.068	F	F
C-AB	8.03	0.54	14.506	B	B
C-A	-	-	-	-	-
A-B	-	-	-	-	-
A-C	-	-	-	-	-

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

Stream	Queueing Total Delay (PCU-min)	Queueing Rate Of Delay (PCU-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
B-C	0.00	0.00	0.000	A	A
B-A	2571.42	171.43	4941.150	F	F
C-AB	16.69	1.11	25.377	D	C
C-A	-	-	-	-	-
A-B	-	-	-	-	-
A-C	-	-	-	-	-

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

Stream	Queueing Total Delay (PCU-min)	Queueing Rate Of Delay (PCU-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
B-C	0.00	0.00	0.000	A	A
B-A	4459.65	297.31	6205.669	F	F
C-AB	18.07	1.20	26.175	D	C
C-A	-	-	-	-	-
A-B	-	-	-	-	-
A-C	-	-	-	-	-

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

Stream	Queueing Total Delay (PCU-min)	Queueing Rate Of Delay (PCU-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
B-C	0.00	0.00	0.000	A	A
B-A	5952.83	396.86	7025.000	F	F
C-AB	8.66	0.58	14.888	B	B
C-A	-	-	-	-	-
A-B	-	-	-	-	-
A-C	-	-	-	-	-

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

Stream	Queueing Total Delay (PCU-min)	Queueing Rate Of Delay (PCU-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
B-C	0.00	0.00	0.000	A	A
B-A	6760.10	450.67	7568.048	F	F
C-AB	5.36	0.36	11.102	B	B
C-A	-	-	-	-	-
A-B	-	-	-	-	-
A-C	-	-	-	-	-

APPENDIX H

A508 NORTHAMPTON ROAD/ROADE BYPASS ARCADY OUTPUT

Junctions 8

ARCADY 8 - Roundabout Module

Version: 8.0.4.487 [15039,24/03/2014]

Filename: Roade Bypass - Northern Roundabout_ARCADY.arc8
Path: C:\Users\ADCteam\Dropbox\~ JN8 TEMP\ADC1475\Roade Bypass Roundabout\Roade Bypass - Northern Roundabout
Report generation date: 15/09/2017 11:00:42

Summary of junction performance

	AM (J1c)			PM (J1c)		
	Queue (PCU)	Delay (s)	RFC	Queue (PCU)	Delay (s)	RFC
	Traffic Flows - 2031					
Arm 1	2.98	6.37	0.72	2.46	5.56	0.69
Arm 2	0.27	3.48	0.21	0.58	4.05	0.37
Arm 3	1.93	5.55	0.62	2.18	6.30	0.66

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

"D1 - 2031, AM (J1c) " model duration: 07:45 - 09:15
"D2 - 2031, PM (J1c)" model duration: 16:45 - 18:15

Run using Junctions 8.0.4.487 at 15/09/2017 11:00:41

File summary

Title	Northern Roundabout
Location	Roade Bypass
Site Number	
Date	03/08/2017
Version	
Status	(new file)
Identifier	KG
Client	
Jobnumber	ADC1475
Enumerator	ADCteam
Description	

Analysis Options

Vehicle Length (m)	Do Queue Variations	Calculate Residual Capacity	Residual Capacity Criteria Type	RFC Threshold	Average Delay Threshold (s)	Queue Threshold (PCU)
5.75			N/A	0.85	36.00	20.00

Units

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

Traffic Flows - 2031, AM (J1c)

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Geometry	Arm 1 - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.
Warning	Geometry	Arm 2 - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.
Warning	Geometry	Arm 3 - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.

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
Traffic Flows	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
2031, AM (J1c)	2031	AM (J1c)		ONE HOUR	07:45	09:15	90	15				✓		

Junction Network

Junctions

Junction	Name	Junction Type	Arm Order	Grade Separated	Large Roundabout	Do Geometric Delay	Junction Delay (s)	Junction LOS
1	(untitled)	Roundabout	1,2,3				5.80	A

Junction Network Options

Driving Side	Lighting
Left	Normal/unknown

Arms

Arms

Arm	Arm	Name	Description
1	1	A508 (S)	
2	2	A508 (N)	
3	3	Roade Bypass	

Capacity Options

Arm	Minimum Capacity (PCU/hr)	Maximum Capacity (PCU/hr)	Assume Flat Start Profile	Initial Queue (PCU)
1	0.00	99999.00		0.00
2	0.00	99999.00		0.00
3	0.00	99999.00		0.00

Roundabout Geometry

Arm	V - Approach road half-width (m)	E - Entry width (m)	l' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit Only
1	3.65	9.00	67.00	24.00	70.00	28.00	
2	3.65	7.90	37.00	20.00	70.00	30.00	
3	3.65	9.00	39.00	20.00	70.00	33.00	

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)
1		(calculated)	(calculated)	0.624	2433.258
2		(calculated)	(calculated)	0.560	2047.585
3		(calculated)	(calculated)	0.583	2209.241

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	2.30				✓	✓

Entry Flows

General Flows Data

Arm	Profile Type	Use Turning Counts	Average Demand Flow (PCU/hr)	Flow Scaling Factor (%)
1	ONE HOUR	✓	1548.00	100.000
2	ONE HOUR	✓	253.00	100.000
3	ONE HOUR	✓	1147.00	100.000

Turning Proportions

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

		To		
		1	2	3
From	1	0.000	373.000	1175.000
	2	253.000	0.000	0.000
	3	1031.000	116.000	0.000

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

		To		
		1	2	3
From	1	0.00	0.24	0.76
	2	1.00	0.00	0.00
	3	0.90	0.10	0.00

Vehicle Mix

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

		To		
		1	2	3
From	1	1.000	1.004	1.205
	2	1.010	1.000	1.000
	3	1.237	1.000	1.000

Heavy Vehicle Percentages - Junction 1 (for whole period)

		To		
		1	2	3
From	1	0.0	0.3	15.8
	2	0.8	0.0	0.0
	3	18.2	0.0	0.0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Queue (PCU)	Max LOS	Average Demand (PCU/hr)	Total Junction Arrivals (PCU)	Total Queueing Delay (PCU-min)	Average Queueing Delay (s)	Rate Of Queueing Delay (PCU-min/min)	Inclusive Total Queueing Delay (PCU-min)	Inclusive Average Queueing Delay (s)
1	0.72	6.37	2.98	A	1420.47	2130.71	168.87	4.76	1.88	168.88	4.76
2	0.21	3.48	0.27	A	232.16	348.24	17.83	3.07	0.20	17.83	3.07
3	0.62	5.55	1.93	A	1052.51	1578.76	117.67	4.47	1.31	117.68	4.47

Main Results for each time segment

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

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Entry Flow (PCU/hr)	Exit Flow (PCU/hr)	Circulating Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	Saturation Capacity (PCU/hr)	RFC	Start Queue (PCU)	End Queue (PCU)	Delay (s)	LOS
1	1165.42	291.35	1161.03	963.08	86.99	0.00	2378.93	2332.62	0.490	0.00	1.10	3.386	A
2	190.47	47.62	189.91	366.75	881.27	0.00	1553.87	1055.66	0.123	0.00	0.14	2.664	A
3	863.52	215.88	860.17	881.27	189.91	0.00	2098.49	1593.61	0.412	0.00	0.84	3.503	A

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

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Entry Flow (PCU/hr)	Exit Flow (PCU/hr)	Circulating Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	Saturation Capacity (PCU/hr)	RFC	Start Queue (PCU)	End Queue (PCU)	Delay (s)	LOS
1	1391.62	347.91	1389.52	1152.88	104.14	0.00	2368.22	2332.62	0.588	1.10	1.62	4.219	A
2	227.44	56.86	227.26	438.96	1054.71	0.00	1456.71	1055.66	0.156	0.14	0.19	2.958	A
3	1031.13	257.78	1029.76	1054.71	227.26	0.00	2076.71	1593.61	0.497	0.84	1.18	4.148	A

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

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Entry Flow (PCU/hr)	Exit Flow (PCU/hr)	Circulating Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	Saturation Capacity (PCU/hr)	RFC	Start Queue (PCU)	End Queue (PCU)	Delay (s)	LOS
1	1704.38	426.09	1699.08	1410.74	127.42	0.00	2353.69	2332.61	0.724	1.62	2.95	6.272	A
2	278.56	69.64	278.23	536.82	1289.68	0.00	1325.07	1055.67	0.210	0.19	0.27	3.474	A
3	1262.87	315.72	1259.93	1289.68	278.23	0.00	2046.98	1593.61	0.617	1.18	1.92	5.503	A

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

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Entry Flow (PCU/hr)	Exit Flow (PCU/hr)	Circulating Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	Saturation Capacity (PCU/hr)	RFC	Start Queue (PCU)	End Queue (PCU)	Delay (s)	LOS
1	1704.38	426.09	1704.24	1413.65	127.71	0.00	2353.51	2332.61	0.724	2.95	2.98	6.370	A
2	278.56	69.64	278.55	538.36	1293.59	0.00	1322.88	1055.67	0.211	0.27	0.27	3.481	A
3	1262.87	315.72	1262.81	1293.59	278.55	0.00	2046.80	1593.61	0.617	1.92	1.93	5.545	A

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

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Entry Flow (PCU/hr)	Exit Flow (PCU/hr)	Circulating Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	Saturation Capacity (PCU/hr)	RFC	Start Queue (PCU)	End Queue (PCU)	Delay (s)	LOS
1	1391.62	347.91	1396.92	1157.23	104.58	0.00	2367.95	2332.62	0.588	2.98	1.66	4.285	A
2	227.44	56.86	227.76	441.17	1060.32	0.00	1453.56	1055.66	0.156	0.27	0.19	2.967	A
3	1031.13	257.78	1034.04	1060.32	227.76	0.00	2076.42	1593.61	0.497	1.93	1.20	4.183	A

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

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Entry Flow (PCU/hr)	Exit Flow (PCU/hr)	Circulating Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	Saturation Capacity (PCU/hr)	RFC	Start Queue (PCU)	End Queue (PCU)	Delay (s)	LOS
1	1165.42	291.35	1167.59	968.11	87.47	0.00	2378.63	2332.62	0.490	1.66	1.11	3.423	A
2	190.47	47.62	190.66	368.81	886.26	0.00	1551.08	1055.66	0.123	0.19	0.14	2.673	A
3	863.52	215.88	864.93	886.26	190.66	0.00	2098.06	1593.61	0.412	1.20	0.85	3.528	A

Queueing Delay Results for each time segment

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

Arm	Queueing Total Delay (PCU-min)	Queueing Rate Of Delay (PCU-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
1	15.99	1.07	3.386	A	A
2	2.08	0.14	2.664	A	A
3	12.26	0.82	3.503	A	A

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

Arm	Queueing Total Delay (PCU-min)	Queueing Rate Of Delay (PCU-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
1	23.63	1.58	4.219	A	A
2	2.76	0.18	2.958	A	A
3	17.29	1.15	4.148	A	A

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

Arm	Queueing Total Delay (PCU-min)	Queueing Rate Of Delay (PCU-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
1	41.93	2.80	6.272	A	A
2	3.95	0.26	3.474	A	A
3	27.68	1.85	5.503	A	A

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

Arm	Queueing Total Delay (PCU-min)	Queueing Rate Of Delay (PCU-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
1	44.51	2.97	6.370	A	A
2	4.02	0.27	3.481	A	A
3	28.86	1.92	5.545	A	A

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

Arm	Queueing Total Delay (PCU-min)	Queueing Rate Of Delay (PCU-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
1	25.73	1.72	4.285	A	A
2	2.86	0.19	2.967	A	A
3	18.55	1.24	4.183	A	A

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

Arm	Queueing Total Delay (PCU-min)	Queueing Rate Of Delay (PCU-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
1	17.08	1.14	3.423	A	A
2	2.15	0.14	2.673	A	A
3	13.02	0.87	3.528	A	A

Traffic Flows - 2031, PM (J1c)

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Geometry	Arm 1 - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.
Warning	Geometry	Arm 2 - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.
Warning	Geometry	Arm 3 - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.

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
Traffic Flows	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
2031, PM (J1c)	2031	PM (J1c)		ONE HOUR	16:45	18:15	90	15				✓		

Junction Network

Junctions

Junction	Name	Junction Type	Arm Order	Grade Separated	Large Roundabout	Do Geometric Delay	Junction Delay (s)	Junction LOS
1	(untitled)	Roundabout	1,2,3				5.61	A

Junction Network Options

Driving Side	Lighting
Left	Normal/unknown

Arms

Arms

Arm	Arm	Name	Description
1	1	A508 (S)	
2	2	A508 (N)	
3	3	Roade Bypass	

Capacity Options

Arm	Minimum Capacity (PCU/hr)	Maximum Capacity (PCU/hr)	Assume Flat Start Profile	Initial Queue (PCU)
1	0.00	99999.00		0.00
2	0.00	99999.00		0.00
3	0.00	99999.00		0.00

Roundabout Geometry

Arm	V - Approach road half-width (m)	E - Entry width (m)	l' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit Only
1	3.65	9.00	67.00	24.00	70.00	28.00	
2	3.65	7.90	37.00	20.00	70.00	30.00	
3	3.65	9.00	39.00	20.00	70.00	33.00	

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)
1		(calculated)	(calculated)	0.624	2433.258
2		(calculated)	(calculated)	0.560	2047.585
3		(calculated)	(calculated)	0.583	2209.241

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	2.30				✓	✓

Entry Flows

General Flows Data

Arm	Profile Type	Use Turning Counts	Average Demand Flow (PCU/hr)	Flow Scaling Factor (%)
1	ONE HOUR	✓	1459.00	100.000
2	ONE HOUR	✓	469.00	100.000
3	ONE HOUR	✓	1142.00	100.000

Turning Proportions

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

		To		
		1	2	3
From	1	0.000	418.000	1041.000
	2	469.000	0.000	0.000
	3	991.000	151.000	0.000

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

		To		
		1	2	3
From	1	0.00	0.29	0.71
	2	1.00	0.00	0.00
	3	0.87	0.13	0.00

Vehicle Mix

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

		To		
		1	2	3
From	1	1.000	1.003	1.172
	2	1.000	1.000	1.000
	3	1.165	1.000	1.000

Heavy Vehicle Percentages - Junction 1 (for whole period)

		To		
		1	2	3
From	1	0.0	0.2	13.2
	2	0.0	0.0	0.0
	3	12.7	0.0	0.0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Queue (PCU)	Max LOS	Average Demand (PCU/hr)	Total Junction Arrivals (PCU)	Total Queueing Delay (PCU-min)	Average Queueing Delay (s)	Rate Of Queueing Delay (PCU-min/min)	Inclusive Total Queueing Delay (PCU-min)	Inclusive Average Queueing Delay (s)
1	0.69	5.56	2.46	A	1338.80	2008.21	143.34	4.28	1.59	143.35	4.28
2	0.37	4.05	0.58	A	430.36	645.54	37.04	3.44	0.41	37.04	3.44
3	0.66	6.30	2.18	A	1047.92	1571.88	126.83	4.84	1.41	126.84	4.84

Main Results for each time segment

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

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Entry Flow (PCU/hr)	Exit Flow (PCU/hr)	Circulating Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	Saturation Capacity (PCU/hr)	RFC	Start Queue (PCU)	End Queue (PCU)	Delay (s)	LOS
1	1098.41	274.60	1094.55	1095.09	113.23	0.00	2362.55	2305.08	0.465	0.00	0.96	3.164	A
2	353.09	88.27	351.97	426.82	780.97	0.00	1610.06	1126.19	0.219	0.00	0.28	2.858	A
3	859.76	214.94	856.35	780.97	351.97	0.00	2003.98	1552.48	0.429	0.00	0.85	3.566	A

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

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Entry Flow (PCU/hr)	Exit Flow (PCU/hr)	Circulating Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	Saturation Capacity (PCU/hr)	RFC	Start Queue (PCU)	End Queue (PCU)	Delay (s)	LOS
1	1311.61	327.90	1309.87	1310.77	135.54	0.00	2348.62	2305.08	0.558	0.96	1.40	3.867	A
2	421.62	105.41	421.22	510.82	934.59	0.00	1524.00	1126.19	0.277	0.28	0.38	3.264	A
3	1026.63	256.66	1025.09	934.59	421.22	0.00	1963.60	1552.48	0.523	0.85	1.24	4.366	A

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

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Entry Flow (PCU/hr)	Exit Flow (PCU/hr)	Circulating Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	Saturation Capacity (PCU/hr)	RFC	Start Queue (PCU)	End Queue (PCU)	Delay (s)	LOS
1	1606.39	401.60	1602.25	1603.51	165.77	0.00	2329.74	2305.07	0.690	1.40	2.43	5.498	A
2	516.38	129.09	515.60	624.81	1143.21	0.00	1407.13	1126.19	0.367	0.38	0.58	4.034	A
3	1257.37	314.34	1253.68	1143.21	515.60	0.00	1908.56	1552.48	0.659	1.24	2.16	6.233	A

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

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Entry Flow (PCU/hr)	Exit Flow (PCU/hr)	Circulating Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	Saturation Capacity (PCU/hr)	RFC	Start Queue (PCU)	End Queue (PCU)	Delay (s)	LOS
1	1606.39	401.60	1606.29	1607.40	166.24	0.00	2329.44	2305.07	0.690	2.43	2.46	5.561	A
2	516.38	129.09	516.37	626.44	1146.09	0.00	1405.51	1126.19	0.367	0.58	0.58	4.048	A
3	1257.37	314.34	1257.28	1146.09	516.37	0.00	1908.11	1552.48	0.659	2.16	2.18	6.304	A

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

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Entry Flow (PCU/hr)	Exit Flow (PCU/hr)	Circulating Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	Saturation Capacity (PCU/hr)	RFC	Start Queue (PCU)	End Queue (PCU)	Delay (s)	LOS
1	1311.61	327.90	1315.73	1316.47	136.23	0.00	2348.19	2305.08	0.559	2.46	1.43	3.913	A
2	421.62	105.41	422.39	513.19	938.78	0.00	1521.65	1126.19	0.277	0.58	0.39	3.276	A
3	1026.63	256.66	1030.31	938.78	422.39	0.00	1962.91	1552.48	0.523	2.18	1.26	4.418	A

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

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Entry Flow (PCU/hr)	Exit Flow (PCU/hr)	Circulating Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	Saturation Capacity (PCU/hr)	RFC	Start Queue (PCU)	End Queue (PCU)	Delay (s)	LOS
1	1098.41	274.60	1100.21	1100.96	113.89	0.00	2362.14	2305.08	0.465	1.43	0.98	3.194	A
2	353.09	88.27	353.50	429.10	785.00	0.00	1607.80	1126.19	0.220	0.39	0.28	2.872	A
3	859.76	214.94	861.36	785.00	353.50	0.00	2003.09	1552.48	0.429	1.26	0.86	3.599	A

Queueing Delay Results for each time segment

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

Arm	Queueing Total Delay (PCU-min)	Queueing Rate Of Delay (PCU-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
1	14.10	0.94	3.164	A	A
2	4.12	0.27	2.858	A	A
3	12.42	0.83	3.566	A	A

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

Arm	Queueing Total Delay (PCU-min)	Queueing Rate Of Delay (PCU-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
1	20.48	1.37	3.867	A	A
2	5.62	0.37	3.264	A	A
3	18.08	1.21	4.366	A	A

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

Arm	Queueing Total Delay (PCU-min)	Queueing Rate Of Delay (PCU-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
1	34.95	2.33	5.498	A	A
2	8.46	0.56	4.034	A	A
3	30.96	2.06	6.233	A	A

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

Arm	Queueing Total Delay (PCU-min)	Queueing Rate Of Delay (PCU-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
1	36.74	2.45	5.561	A	A
2	8.66	0.58	4.048	A	A
3	32.58	2.17	6.304	A	A

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

Arm	Queueing Total Delay (PCU-min)	Queueing Rate Of Delay (PCU-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
1	22.08	1.47	3.913	A	A
2	5.88	0.39	3.276	A	A
3	19.55	1.30	4.418	A	A

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

Arm	Queueing Total Delay (PCU-min)	Queueing Rate Of Delay (PCU-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
1	14.98	1.00	3.194	A	A
2	4.30	0.29	2.872	A	A
3	13.24	0.88	3.599	A	A

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