TECHNICAL NOTE

Job Name: Wintringham, St Neots

Job No: 332210538-400.1

Note No: TN002 Rev B

Date: 13 September 2024

Prepared By: M Seiboth

Subject: **Wintringham: Junction Capacity Assessments Without A428 Dualling**

1 Introduction

1.1 This technical note is prepared by Stantec UK Ltd on behalf of the Wintringham Partners LLP in relation to the Wintringham development, at St Neots, Cambridgeshire. Wintringham is a development of circa 2,800 dwellings (and new employment, district centre, local centre, schools, leisure and open space) which was granted planning permission in 2017 (Huntingdonshire District Council planning ref: 17/02308/OUT). The development is an urban extension to the west of St. Neots between the East Coast Mainline and the A428 (bound by Cambridge Road B1428 to the north and Potton Road B1046 to the south). The development is partially built-out with the first phases of development being completed in the northern part of the site.

1.2 As part of the planning permission for the development there are a number of planning conditions and Section 106 (S106) obligations that involve highway infrastructure mitigation works on the A428, namely at:

- The A428 / A1198 (Caxton Gibbet Roundabout) junction
- The A428 / Barford Road (Barford Roundabout) junction, and
- The A428 / B1428 Cambridge Road roundabout.

1.3 Since, planning was granted, National Highways has finalised the design of, and commenced building the dualling scheme for the A428 (as part of RIS3) which once complete, will render the highway improvements redundant, as presently required under the planning permission for Wintringham (at the junction listed above).

1.4 This technical note therefore sets out:

- A summary of discussion with the highway authorities to-date.
- Updated junction modelling results.
- Conclusion.

DOCUMENT ISSUE RECORD

Technical Note No	Rev	Date	Prepared	Checked	Approved
332210538/400.1/TN002	-	22.08.24	MS	CPR	CPR
332210538/400.1/TN002	A	22.08.24	MS	CPR	CPR
332210538/400.1/TN002	B	13.09.24	MS	CPR	CPR

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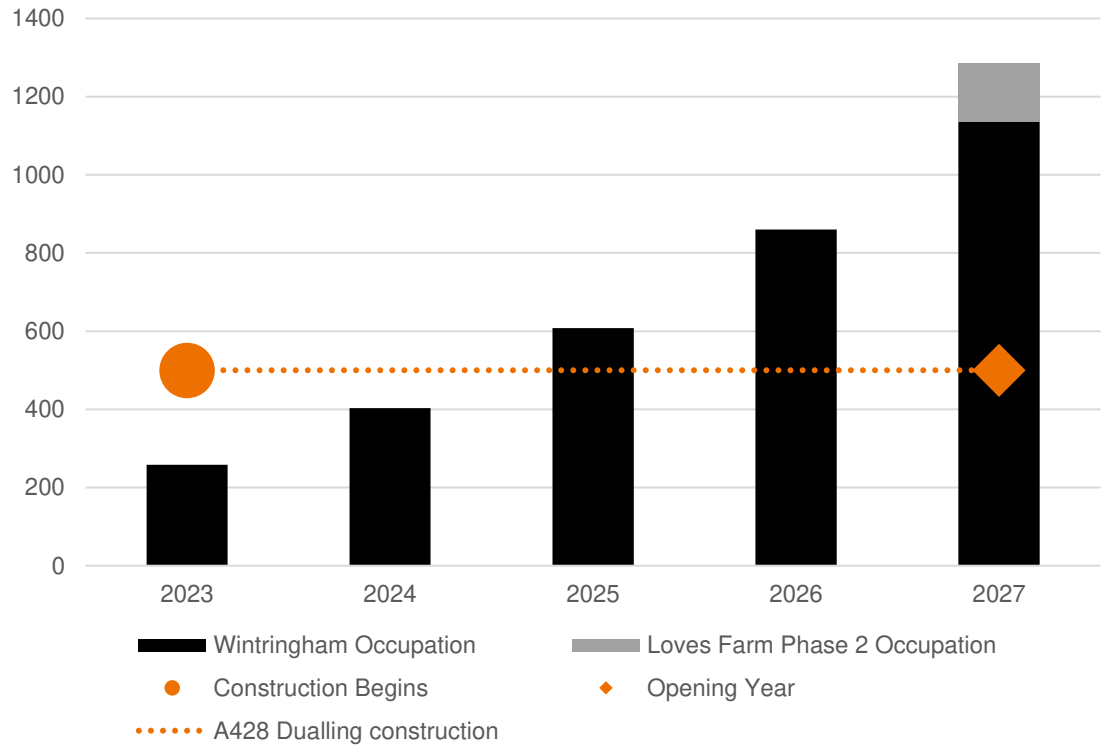
2 Discussion with Highway Authorities

2.1 Stantec met (online) with National Highway on 16 June 2023 to discuss the proposed A428 dualling scheme and how it negates the need for the mitigation works at the junctions on the A428, that would be required under planning conditions and the S106 for Wintringham.

2.2 The meeting concluded with actions for Stantec to provide a updated timeline of the A428 dualling programme against the build-out programme for Wintringham to understand the interim impact on traffic. The second action was to liaise with Cambridgeshire County Council (CCC) who would become the highway authority responsible for the Barford Road and Cambridge Road B1428 junctions on the A428 once the dualling scheme was complete (as this section would no longer form part of the Strategic Road Network).

2.3 A timeline of the A428 dualling programme against the build-out programme for Wintringham (and the Loves Farm Phase 2 development to the north of Cambridge Road B1428) is provided in **Figure 2.1**. Preparation works for the A428 Dualling scheme started in late 2023 and the scheme is expected to be completed and open in 2027. The agreed trigger point for works on the A428 as part of the Wintringham development is the occupation of 500 dwellings in the aggregate with the Loves Farm development. This trigger milestone is reached in 2024/2025.

Figure 2.1 – Timeline of A428 Dualling programme and Build-out/Occupation of Wintringham



2.4 There is a period from 2024/2025 to the completion of the A428 dualling works whereby the 500 occupations is exceed and therefore mitigation on the A428 junction is theoretically required to mitigate the traffic after 500 occupations. The principle was accepted in the meeting June 2023 that there is little benefit in providing the mitigation works longer term, and that in the interim, the disruption caused by undertaking the works on the existing A428 at the same time as the dualling works area progressing, would ultimately have a detrimental impact to traffic in the interim.

2.5 Stantec met (online) with National Highways and CCC on 5 September 2023 and agreed that updated junction capacity modelling should be undertaken for the junctions on the A428 to understand the impact of the development on the A428 in the interim period before the dualling scheme is completed.

2.6 In email correspondence sent on 11 September 2023 (to both National Highways and CCC) Stantec set out an approach to model and assess the Barford Road and Cambridge Road B1428 junctions for:

- 2025 Year with 500 dwellings at Wintringham, and
- 2027 year with 1,100 dwellings at Wintringham and a proportion of dwellings at the Loves Farm Phase 2 (it is understood from the developer to be about 150 dwellings).

2.7 For the Caxton Gibbet Roundabout, as this junction is being transformed into a grade separated junction as part of the A428 dualling scheme and works have begun, it would be impractical (if not unfeasible) for mitigation works to be implemented as it would directly conflict with the proposals and the works for the dualling scheme). Hence, new junction capacity assessments at this junction would serve no purpose and have not been included herein.

2.8 This approach was accepted by National Highways in an email response received by Stantec on 15 September 2023.

3 Junction Capacity Modelling

3.1 National Highways provided traffic flows to Stantec in May/June 2024 for the year 2025 to allow the assessment to be undertaken. Flows were provided for:

- A428 / Barford Road junction with the new Dualling Scheme in 2025
- A428 / Barford Road junction without the new Dualling Scheme in 2025
- A428 / Cambridge Road B1428 junction with the new Dualling Scheme in 2025.

3.2 Equivalent 2025 traffic flows for the A428 / Cambridge Road B1428 junction without the A428 Dualling scheme were not available from National Highways. Stantec therefore assessed the change in traffic between the flows for the A428 / Barford Road junction with and without the Dualling scheme and then applied this change in traffic for the A428 / Cambridge Road B1428 junction to derive a scenario for 2025 without the Dualling Scheme.

3.3 It was agreed with National Highways that background traffic growth would be applied at 1% per year. Therefore the 2025 traffic flows without the A428 Dualling scheme for the two junctions were multiplied by 1.02 to provide the equivalent 2027 traffic flows.

3.4 National Highways' consultant confirmed that within the 2025 traffic flows, there was an assumption that 60% of Wintringham would be occupied; 60% of the 2,800 dwelling development is 1,680 dwellings. This is more than projected occupancy of the Wintringham development in 2025 and of that agreed to be tested in the scenarios.

3.5 The agree quantum of development to be tested was 500 dwellings at Wintringham in 2025, and 1,100 dwellings at Wintringham and 150 dwellings at Loves Farm Phase 2 in 2027. The traffic flows were therefore adjusted by removing development traffic from the traffic flow scenarios a reduction of 1,180 dwellings for 2025 (1,680 - 500 = 1,180) and a reduction of 430 for 2027 (1,680 - 1,100 - 150 = 430).

3.6 The results of the junction capacity assessment for the A428 / Barford Road junction are summarised in **Table 3.1** and **3.2**. The results demonstrate that the Barford Road junction is forecast to operate within capacity in both the 2025 with 500 dwellings occupied at Wintringham and in 2027 with 1,100 dwellings occupied at Wintringham and 150 dwellings at Loves Farm Phase 2 without the A428 dualling scheme being in place. The full results of the junction capacity assessment are provided in **Appendix A**.

Table 3.1 – 2025 (500 Dwellings at Wintringham)

Arm	Morning Peak Hour			Evening Peak Hour		
	End Queue (PCU rounded up)	Av. Delay per arriving vehicle (s)	RFC	End Queue (PCU rounded up)	Av. Delay per arriving vehicle (s)	RFC
B1043 Barford Rd (N)	2	5.22	0.51	1	3.53	0.37
A428 (East)	1	2.79	0.40	1	2.96	0.46
Barford Road (S)	1	4.51	0.25	1	7.13	0.46
A428 (West)	2	4.98	0.62	2	4.83	0.61

Table 3.2 – 2027 (1,100 Dwellings at Wintringham)

Arm	Morning Peak Hour			Evening Peak Hour		
	End Queue (PCU rounded up)	Av. Delay per arriving vehicle (s)	RFC	End Queue (PCU rounded up)	Av. Delay per arriving vehicle (s)	RFC
B1043 Barford Rd (N)	2	5.62	0.54	1	3.85	0.40
A428 (East)	1	3.06	0.46	1	3.12	0.49
Barford Road (S)	1	5.03	0.27	1	7.95	0.49
A428 (West)	2	5.34	0.64	2	5.57	0.66

3.7 The results of the junction capacity assessment for the A428 / Cambridge Road B4128 junction are summarised in **Table 3.3** and **3.4**. The results demonstrate that the Cambridge Road B4128 junction is forecast to operate within capacity in both the 2025 with 500 dwellings occupied at Wintringham and in 2027 with 1,100 dwellings occupied at Wintringham without the A428 dualling scheme being in place. The full results of the junction capacity assessment are provided in **Appendix A**.

Table 3.3 – 2025 (500 Dwellings at Wintringham)

Arm	Morning Peak Hour			Evening Peak Hour		
	End Queue (PCU rounded up)	Av. Delay per arriving vehicle (s)	RFC	End Queue (PCU rounded up)	Av. Delay per arriving vehicle (s)	RFC
A428 Cambridge Road (E)	3	6.29	0.69	7	13.79	0.86
A428 St. Neots Bypass (SW)	5	15.64	0.81	3	11.70	0.74
B1428 Cambridge Road (NW)	1	4.64	0.38	1	4.03	0.36

Table 3.4 – 2027 (1,100 Dwellings at Wintringham)

Arm	Morning Peak Hour			Evening Peak Hour		
	End Queue (PCU rounded up)	Av. Delay per arriving vehicle (s)	RFC	End Queue (PCU rounded up)	Av. Delay per arriving vehicle (s)	RFC
A428 Cambridge Road (E)	3	7.66	0.74	11	22.52	0.91
A428 St. Neots Bypass (SW)	7	21.10	0.86	6	19.65	0.84
B1428 Cambridge Road (NW)	2	6.00	0.51	1	4.48	0.42

4 Conclusion

4.1 The junction capacity assessments demonstrate that in the interim period (from the occupation of 500 dwellings at Wintringham in 2025 to the anticipated completion of the A428 dualling scheme in 2027) that both the A428 / Barford Road junction and the A428 / Cambridge Road B1428 junction are forecast to operate within capacity. Hence, there is no need for improvement works to be undertaken at these junctions prior to the opening of the A428 dualling scheme.

4.2 It should be noted that the junction assessments do not account for a reduction in traffic that would be linked to those avoiding roadworks in this area due to the construction works associated with the A428 dualling scheme. This would lead to an improvement in the operation of the junction capacity assessment results.

4.3 The junction capacity assessment work supports the case that improvement works are no longer needed at the junction on the A428 that have been conditioned as part of the Wintringham Development, and therefore these conditions and S106 obligations can be discharged.

Appendix A Junction 10 Outputs

Junctions 10

ARCADY 10 - Roundabout Module

Version: 10.1.1.1905
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Filename: 240913 - A428_Barford Rd - Flat.j10
Path: \\bir-vfps-001\bir\Projects\332210538 - Wintringham Culverts\Technical\Calcs\Transport\Junction Assessments\A428_Barford Rd
Report generation date: 13/09/2024 15:19:28

»2025 - 500 Dwellings, AM
»2025 - 500 Dwellings, PM
»2027 - 1,100 Dwellings, AM
»2027 - 1,100 Dwellings, PM

Summary of junction performance

	AM									PM							
	Set ID	Queue (PCU)	95% Queue (PCU)	Delay (s)	RFC	LOS	Junction Delay (s)	Junction LOS	Network Residual Capacity	Set ID	Queue (PCU)	95% Queue (PCU)	Delay (s)	RFC	LOS	Junction Delay (s)	Ju
2025 - 500 Dwellings																	
1 - B1043 Barford Road (N)	D1	1.1	?	5.22	0.51	A	4.36	A	41 % [1 - B1043 Barford Road (N)]	D2	0.6	~1	3.53	0.37	A	4.27	
2 - A428 (East)		0.7	~1	2.79	0.40	A					0.9	~1	2.96	0.46	A		
3 - Barford Road (S)		0.3	~1	4.51	0.25	A					0.8	~1	7.13	0.46	A		
4 - A428 (West)		1.8	?	4.98	0.62	A					1.6	?	4.83	0.61	A		
2027 - 1,100 Dwellings																	
1 - B1043 Barford Road (N)	D3	1.2	?	5.62	0.54	A	4.68	A	37 % [1 - B1043 Barford Road (N)]	D4	0.7	~1	3.85	0.40	A	4.74	
2 - A428 (East)		0.9	~1	3.06	0.46	A					1.0	?	3.12	0.49	A		
3 - Barford Road (S)		0.4	~1	5.03	0.27	A					1.0	~1	7.95	0.49	A		
4 - A428 (West)		2.0	?	5.34	0.64	A					2.0	?	5.57	0.66	A		

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

Values shown are the highest values encountered over all time segments. Delay is the maximum value of average delay per arriving vehicle. Junction LOS and Junction Delay are demand-weighted averages. Network Residual Capacity indicates the amount by which network flow could be increased before a user-definable threshold (see Analysis Options) is met.

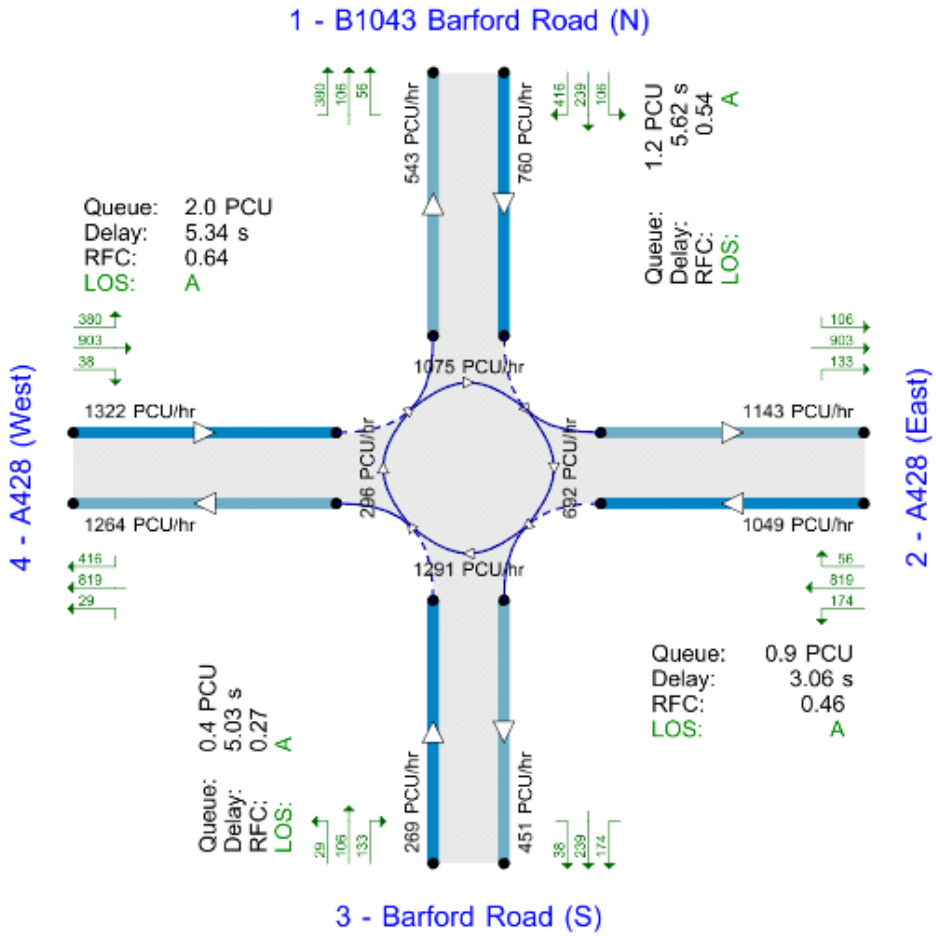
File summary

File Description

Title	Wintringham Park
Location	St.Neots
Site number	J2 A428/Barford Rd
Date	05/10/2017
Version	
Status	Existing Layout
Identifier	
Client	
Jobnumber	41481
Enumerator	PBA\mseiboth
Description	A428 / Barford Road Junction

Units

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



Flows show modelled flow through junction (PCU/hr).

Time Segment: 08:00-08:15

The junction diagram reflects the last run of Junctions.

Analysis Options

Vehicle length (m)	Calculate Queue Percentiles	Calculate detailed queueing delay	Show lane queues in feet / metres	Show all PICADY stream intercepts	Calculate residual capacity	Residual capacity criteria type	RFC Threshold	Average Delay threshold (s)	Queue threshold (PCU)	Use simulation for HCM roundabouts	Use iterations for HCM roundabouts
5.75	✓				✓	Delay	0.85	36.00	20.00		

Demand Set Summary

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time period length (min)	Time segment length (min)	Run automatically
D1	2025 - 500 Dwellings	AM	FLAT	08:00	09:00	60	15	✓
D2	2025 - 500 Dwellings	PM	FLAT	17:00	18:00	60	15	✓
D3	2027 - 1,100 Dwellings	AM	FLAT	08:00	09:00	60	15	✓
D4	2027 - 1,100 Dwellings	PM	FLAT	17:00	18:00	60	15	✓

Analysis Set Details

ID	Include in report	Network flow scaling factor (%)	Network capacity scaling factor (%)
A1	✓	100.000	100.000

2025 - 500 Dwellings, AM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Geometry	2 - A428 (East) - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.
Warning	Geometry	3 - Barford Road (S) - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.
Warning	Geometry	4 - A428 (West) - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.
Warning	Flow Arm 2	Analysis Options	Queue percentiles cannot be calculated for the selected traffic profile type.
Warning	Flow Arm 3	Analysis Options	Queue percentiles cannot be calculated for the selected traffic profile type.
Warning	Flow Arm 4	Analysis Options	Queue percentiles cannot be calculated for the selected traffic profile type.
Warning	Flow Arm 1	Analysis Options	Queue percentiles cannot be calculated for the selected traffic profile type.
Warning	Queue variations	Analysis Options	Queue percentiles may be unreliable if the mean queue in any time segment is very low or very high.

Junction Network

Junctions

Junction	Name	Junction type	Use circulating lanes	Arm order	Junction Delay (s)	Junction LOS
1	(untitled)	Standard Roundabout		2, 3, 4, 1	4.36	A

Junction Network

Driving side	Lighting	Network residual capacity (%)	First arm reaching threshold	Network delay (s)	Network LOS
Left	Normal/unknown	41	1 - B1043 Barford Road (N)	4.36	A

Arms

Arms

Arm	Name	Description	No give-way line
1	B1043 Barford Road (N)		
2	A428 (East)		
3	Barford Road (S)		
4	A428 (West)		

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)	Entry only	Exit only
1 - B1043 Barford Road (N)	7.41	7.41	0.0	22.0	48.9	40.0		
2 - A428 (East)	4.68	12.01	59.1	18.2	48.9	40.0		
3 - Barford Road (S)	3.44	7.23	33.9	14.0	48.9	39.0		
4 - A428 (West)	4.67	8.65	33.6	35.5	48.9	37.0		

Slope / Intercept / Capacity

Roundabout Slope and Intercept used in model

Arm	Final slope	Final intercept (PCU/hr)
1 - B1043 Barford Road (N)	0.695	2176
2 - A428 (East)	0.829	2889
3 - Barford Road (S)	0.615	1789
4 - A428 (West)	0.723	2282

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

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time period length (min)	Time segment length (min)	Run automatically
D1	2025 - 500 Dwellings	AM	FLAT	08:00	09:00	60	15	✓

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
1 - B1043 Barford Road (N)		FLAT	✓	727	100.000
2 - A428 (East)		FLAT	✓	865	100.000
3 - Barford Road (S)		FLAT	✓	260	100.000
4 - A428 (West)		FLAT	✓	1163	100.000

Origin-Destination Data

Demand (Veh/hr)

		To			
		1 - B1043 Barford Road (N)	2 - A428 (East)	3 - Barford Road (S)	4 - A428 (West)
From	1 - B1043 Barford Road (N)	0	98	235	394
	2 - A428 (East)	47	0	166	652
	3 - Barford Road (S)	105	129	0	26
	4 - A428 (West)	361	768	34	0

Proportions

		To			
		1 - B1043 Barford Road (N)	2 - A428 (East)	3 - Barford Road (S)	4 - A428 (West)
From	1 - B1043 Barford Road (N)	0.00	0.13	0.32	0.54
	2 - A428 (East)	0.05	0.00	0.19	0.75
	3 - Barford Road (S)	0.40	0.50	0.00	0.10
	4 - A428 (West)	0.31	0.66	0.03	0.00

Vehicle Mix

HV data entry mode	PCU Factor for a HV (PCU)
HV Percentages	2.00

Heavy Vehicle %

		To			
		1 - B1043 Barford Road (N)	2 - A428 (East)	3 - Barford Road (S)	4 - A428 (West)
From	1 - B1043 Barford Road (N)	0	5	0	4
	2 - A428 (East)	5	0	0	10
	3 - Barford Road (S)	0	0	0	8
	4 - A428 (West)	4	13	10	0

Average PCU Per Veh

		To			
		1 - B1043 Barford Road (N)	2 - A428 (East)	3 - Barford Road (S)	4 - A428 (West)
From	1 - B1043 Barford Road (N)	1.000	1.050	1.000	1.040
	2 - A428 (East)	1.050	1.000	1.000	1.100
	3 - Barford Road (S)	1.000	1.000	1.000	1.080
	4 - A428 (West)	1.040	1.130	1.100	1.000

Detailed Demand Data

Demand for each time segment

Arm	Time Segment	Demand (Veh/hr)	Demand in PCU (PCU/hr)
1 - B1043 Barford Road (N)	08:00-08:15	727	748
	08:15-08:30	727	748
	08:30-08:45	727	748
	08:45-09:00	727	748
2 - A428 (East)	08:00-08:15	865	933
	08:15-08:30	865	933
	08:30-08:45	865	933
	08:45-09:00	865	933
3 - Barford Road (S)	08:00-08:15	260	262
	08:15-08:30	260	262
	08:30-08:45	260	262
	08:45-09:00	260	262
4 - A428 (West)	08:00-08:15	1163	1281
	08:15-08:30	1163	1281
	08:30-08:45	1163	1281
	08:45-09:00	1163	1281

Results

Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Queue (PCU)	Max 95th percentile Queue (PCU)	Max LOS	Average Demand (PCU/hr)	Total Junction Arrivals (PCU)
1 - B1043 Barford Road (N)	0.51	5.22	1.1	?	A	748	748
2 - A428 (East)	0.40	2.79	0.7	~1	A	933	933
3 - Barford Road (S)	0.25	4.51	0.3	~1	A	262	262
4 - A428 (West)	0.62	4.98	1.8	?	A	1281	1281

Main Results for each time segment

08:00 - 08:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1 - B1043 Barford Road (N)	748	187	1029	1461	0.512	743	527	0.0	1.1	5.133	A
2 - A428 (East)	933	233	678	2327	0.401	930	1094	0.0	0.7	2.771	A
3 - Barford Road (S)	262	66	1172	1069	0.245	261	436	0.0	0.3	4.484	A
4 - A428 (West)	1281	320	282	2078	0.616	1274	1150	0.0	1.7	4.887	A

08:15 - 08:30

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1 - B1043 Barford Road (N)	748	187	1034	1457	0.513	748	530	1.1	1.1	5.220	A
2 - A428 (East)	933	233	682	2324	0.401	933	1100	0.7	0.7	2.788	A
3 - Barford Road (S)	262	66	1176	1066	0.246	262	438	0.3	0.3	4.514	A
4 - A428 (West)	1281	320	283	2077	0.617	1281	1155	1.7	1.8	4.976	A

08:30 - 08:45

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1 - B1043 Barford Road (N)	748	187	1034	1457	0.513	748	530	1.1	1.1	5.220	A
2 - A428 (East)	933	233	682	2324	0.401	933	1100	0.7	0.7	2.788	A
3 - Barford Road (S)	262	66	1176	1066	0.246	262	438	0.3	0.3	4.514	A
4 - A428 (West)	1281	320	283	2077	0.617	1281	1155	1.8	1.8	4.976	A

08:45 - 09:00

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1 - B1043 Barford Road (N)	748	187	1034	1457	0.513	748	530	1.1	1.1	5.220	A
2 - A428 (East)	933	233	682	2324	0.401	933	1100	0.7	0.7	2.788	A
3 - Barford Road (S)	262	66	1176	1066	0.246	262	438	0.3	0.3	4.514	A
4 - A428 (West)	1281	320	283	2077	0.617	1281	1155	1.8	1.8	4.976	A

Queue Variation Results for each time segment

08:00 - 08:15

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1 - B1043 Barford Road (N)	1.07	?	?	?	?			N/A	N/A
2 - A428 (East)	0.72	~1	~1	~1	~1			N/A	N/A
3 - Barford Road (S)	0.33	~1	~1	~1	~1			N/A	N/A
4 - A428 (West)	1.74	?	?	?	?			N/A	N/A

08:15 - 08:30

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1 - B1043 Barford Road (N)	1.08	?	?	?	?			N/A	N/A
2 - A428 (East)	0.72	~1	~1	~1	~1			N/A	N/A
3 - Barford Road (S)	0.33	~1	~1	~1	~1			N/A	N/A
4 - A428 (West)	1.76	?	?	?	?			N/A	N/A

08:30 - 08:45

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1 - B1043 Barford Road (N)	1.08	?	?	?	?			N/A	N/A
2 - A428 (East)	0.72	~1	~1	~1	~1			N/A	N/A
3 - Barford Road (S)	0.33	~1	~1	~1	~1			N/A	N/A
4 - A428 (West)	1.76	?	?	?	?			N/A	N/A

08:45 - 09:00

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1 - B1043 Barford Road (N)	1.08	?	?	?	?			N/A	N/A
2 - A428 (East)	0.72	~1	~1	~1	~1			N/A	N/A
3 - Barford Road (S)	0.33	~1	~1	~1	~1			N/A	N/A
4 - A428 (West)	1.76	?	?	?	?			N/A	N/A

2025 - 500 Dwellings, PM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Geometry	2 - A428 (East) - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.
Warning	Geometry	3 - Barford Road (S) - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.
Warning	Geometry	4 - A428 (West) - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.
Warning	Flow Arm 2	Analysis Options	Queue percentiles cannot be calculated for the selected traffic profile type.
Warning	Flow Arm 3	Analysis Options	Queue percentiles cannot be calculated for the selected traffic profile type.
Warning	Flow Arm 4	Analysis Options	Queue percentiles cannot be calculated for the selected traffic profile type.
Warning	Flow Arm 1	Analysis Options	Queue percentiles cannot be calculated for the selected traffic profile type.
Warning	Queue variations	Analysis Options	Queue percentiles may be unreliable if the mean queue in any time segment is very low or very high.

Junction Network

Junctions

Junction	Name	Junction type	Use circulating lanes	Arm order	Junction Delay (s)	Junction LOS
1	(untitled)	Standard Roundabout		2, 3, 4, 1	4.27	A

Junction Network

Driving side	Lighting	Network residual capacity (%)	First arm reaching threshold	Network delay (s)	Network LOS
Left	Normal/unknown	31	3 - Barford Road (S)	4.27	A

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time period length (min)	Time segment length (min)	Run automatically
D2	2025 - 500 Dwellings	PM	FLAT	17:00	18:00	60	15	✓

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
1 - B1043 Barford Road (N)		FLAT	✓	610	100.000
2 - A428 (East)		FLAT	✓	1037	100.000
3 - Barford Road (S)		FLAT	✓	426	100.000
4 - A428 (West)		FLAT	✓	1143	100.000

Origin-Destination Data

Demand (Veh/hr)

		To			
		1 - B1043 Barford Road (N)	2 - A428 (East)	3 - Barford Road (S)	4 - A428 (West)
From	1 - B1043 Barford Road (N)	0	40	130	440
	2 - A428 (East)	97	0	162	778
	3 - Barford Road (S)	186	181	0	59
	4 - A428 (West)	579	554	10	0

Proportions

		To			
		1 - B1043 Barford Road (N)	2 - A428 (East)	3 - Barford Road (S)	4 - A428 (West)
From	1 - B1043 Barford Road (N)	0.00	0.07	0.21	0.72
	2 - A428 (East)	0.09	0.00	0.16	0.75
	3 - Barford Road (S)	0.44	0.42	0.00	0.14
	4 - A428 (West)	0.51	0.48	0.01	0.00

Vehicle Mix

HV data entry mode	PCU Factor for a HV (PCU)
HV Percentages	2.00

Heavy Vehicle %

		To			
		1 - B1043 Barford Road (N)	2 - A428 (East)	3 - Barford Road (S)	4 - A428 (West)
From	1 - B1043 Barford Road (N)	0	2	0	1
	2 - A428 (East)	1	0	0	9
	3 - Barford Road (S)	0	0	0	2
	4 - A428 (West)	1	5	11	0

Average PCU Per Veh

		To			
		1 - B1043 Barford Road (N)	2 - A428 (East)	3 - Barford Road (S)	4 - A428 (West)
From	1 - B1043 Barford Road (N)	1.000	1.020	1.000	1.006
	2 - A428 (East)	1.010	1.000	1.000	1.090
	3 - Barford Road (S)	1.005	1.000	1.000	1.016
	4 - A428 (West)	1.011	1.050	1.110	1.000

Detailed Demand Data

Demand for each time segment

Arm	Time Segment	Demand (Veh/hr)	Demand in PCU (PCU/hr)
1 - B1043 Barford Road (N)	17:00-17:15	610	613
	17:15-17:30	610	613
	17:30-17:45	610	613
	17:45-18:00	610	613
2 - A428 (East)	17:00-17:15	1037	1108
	17:15-17:30	1037	1108
	17:30-17:45	1037	1108
	17:45-18:00	1037	1108
3 - Barford Road (S)	17:00-17:15	426	428
	17:15-17:30	426	428
	17:30-17:45	426	428
	17:45-18:00	426	428
4 - A428 (West)	17:00-17:15	1143	1178
	17:15-17:30	1143	1178
	17:30-17:45	1143	1178
	17:45-18:00	1143	1178

Results

Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Queue (PCU)	Max 95th percentile Queue (PCU)	Max LOS	Average Demand (PCU/hr)	Total Junction Arrivals (PCU)
1 - B1043 Barford Road (N)	0.37	3.53	0.6	~1	A	613	613
2 - A428 (East)	0.46	2.96	0.9	~1	A	1108	1108
3 - Barford Road (S)	0.46	7.13	0.8	~1	A	428	428
4 - A428 (West)	0.61	4.83	1.6	?	A	1178	1178

Main Results for each time segment

17:00 - 17:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1 - B1043 Barford Road (N)	613	153	769	1641	0.374	611	865	0.0	0.6	3.507	A
2 - A428 (East)	1108	277	581	2408	0.460	1104	799	0.0	0.9	2.942	A
3 - Barford Road (S)	428	107	1384	938	0.456	425	302	0.0	0.8	6.997	A
4 - A428 (West)	1178	294	463	1947	0.605	1172	1346	0.0	1.6	4.745	A

17:15 - 17:30

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1 - B1043 Barford Road (N)	613	153	774	1638	0.374	613	870	0.6	0.6	3.532	A
2 - A428 (East)	1108	277	584	2406	0.461	1108	804	0.9	0.9	2.963	A
3 - Barford Road (S)	428	107	1388	935	0.458	428	303	0.8	0.8	7.127	A
4 - A428 (West)	1178	294	466	1945	0.606	1178	1350	1.6	1.6	4.834	A

17:30 - 17:45

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1 - B1043 Barford Road (N)	613	153	774	1638	0.374	613	870	0.6	0.6	3.532	A
2 - A428 (East)	1108	277	584	2406	0.461	1108	804	0.9	0.9	2.963	A
3 - Barford Road (S)	428	107	1388	935	0.458	428	303	0.8	0.8	7.127	A
4 - A428 (West)	1178	294	466	1945	0.606	1178	1350	1.6	1.6	4.834	A

17:45 - 18:00

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1 - B1043 Barford Road (N)	613	153	774	1638	0.374	613	870	0.6	0.6	3.532	A
2 - A428 (East)	1108	277	584	2406	0.461	1108	804	0.9	0.9	2.963	A
3 - Barford Road (S)	428	107	1388	935	0.458	428	303	0.8	0.8	7.127	A
4 - A428 (West)	1178	294	466	1945	0.606	1178	1350	1.6	1.6	4.834	A

Queue Variation Results for each time segment

17:00 - 17:15

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1 - B1043 Barford Road (N)	0.60	~1	~1	~1	~1			N/A	N/A
2 - A428 (East)	0.91	~1	~1	~1	~1			N/A	N/A
3 - Barford Road (S)	0.83	~1	~1	~1	~1			N/A	N/A
4 - A428 (West)	1.56	?	?	?	?			N/A	N/A

17:15 - 17:30

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1 - B1043 Barford Road (N)	0.60	~1	~1	~1	~1			N/A	N/A
2 - A428 (East)	0.91	~1	~1	~1	~1			N/A	N/A
3 - Barford Road (S)	0.84	~1	~1	~1	~1			N/A	N/A
4 - A428 (West)	1.57	?	?	?	?			N/A	N/A

17:30 - 17:45

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1 - B1043 Barford Road (N)	0.60	~1	~1	~1	~1			N/A	N/A
2 - A428 (East)	0.91	~1	~1	~1	~1			N/A	N/A
3 - Barford Road (S)	0.84	~1	~1	~1	~1			N/A	N/A
4 - A428 (West)	1.57	?	?	?	?			N/A	N/A

17:45 - 18:00

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1 - B1043 Barford Road (N)	0.60	~1	~1	~1	~1			N/A	N/A
2 - A428 (East)	0.91	~1	~1	~1	~1			N/A	N/A
3 - Barford Road (S)	0.84	~1	~1	~1	~1			N/A	N/A
4 - A428 (West)	1.58	?	?	?	?			N/A	N/A

2027 - 1,100 Dwellings, AM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Geometry	2 - A428 (East) - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.
Warning	Geometry	3 - Barford Road (S) - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.
Warning	Geometry	4 - A428 (West) - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.
Warning	Flow Arm 2	Analysis Options	Queue percentiles cannot be calculated for the selected traffic profile type.
Warning	Flow Arm 3	Analysis Options	Queue percentiles cannot be calculated for the selected traffic profile type.
Warning	Flow Arm 4	Analysis Options	Queue percentiles cannot be calculated for the selected traffic profile type.
Warning	Flow Arm 1	Analysis Options	Queue percentiles cannot be calculated for the selected traffic profile type.
Warning	Queue variations	Analysis Options	Queue percentiles may be unreliable if the mean queue in any time segment is very low or very high.

Junction Network

Junctions

Junction	Name	Junction type	Use circulating lanes	Arm order	Junction Delay (s)	Junction LOS
1	(untitled)	Standard Roundabout		2, 3, 4, 1	4.68	A

Junction Network

Driving side	Lighting	Network residual capacity (%)	First arm reaching threshold	Network delay (s)	Network LOS
Left	Normal/unknown	37	1 - B1043 Barford Road (N)	4.68	A

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time period length (min)	Time segment length (min)	Run automatically
D3	2027 - 1,100 Dwellings	AM	FLAT	08:00	09:00	60	15	✓

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
1 - B1043 Barford Road (N)		FLAT	✓	744	100.000
2 - A428 (East)		FLAT	✓	983	100.000
3 - Barford Road (S)		FLAT	✓	268	100.000
4 - A428 (West)		FLAT	✓	1214	100.000

Origin-Destination Data

Demand (Veh/hr)

		To			
		1 - B1043 Barford Road (N)	2 - A428 (East)	3 - Barford Road (S)	4 - A428 (West)
From	1 - B1043 Barford Road (N)	0	102	240	402
	2 - A428 (East)	54	0	175	754
	3 - Barford Road (S)	107	134	0	27
	4 - A428 (West)	368	811	35	0

Proportions

		To			
		1 - B1043 Barford Road (N)	2 - A428 (East)	3 - Barford Road (S)	4 - A428 (West)
From	1 - B1043 Barford Road (N)	0.00	0.14	0.32	0.54
	2 - A428 (East)	0.05	0.00	0.18	0.77
	3 - Barford Road (S)	0.40	0.50	0.00	0.10
	4 - A428 (West)	0.30	0.67	0.03	0.00

Vehicle Mix

HV data entry mode	PCU Factor for a HV (PCU)
HV Percentages	2.00

Heavy Vehicle %

		To			
		1 - B1043 Barford Road (N)	2 - A428 (East)	3 - Barford Road (S)	4 - A428 (West)
From	1 - B1043 Barford Road (N)	0	5	0	4
	2 - A428 (East)	4	0	0	9
	3 - Barford Road (S)	0	0	0	8
	4 - A428 (West)	4	12	10	0

Average PCU Per Veh

		To			
		1 - B1043 Barford Road (N)	2 - A428 (East)	3 - Barford Road (S)	4 - A428 (West)
From	1 - B1043 Barford Road (N)	1.000	1.050	1.000	1.040
	2 - A428 (East)	1.040	1.000	1.000	1.090
	3 - Barford Road (S)	1.000	1.000	1.000	1.080
	4 - A428 (West)	1.040	1.120	1.100	1.000

Detailed Demand Data

Demand for each time segment

Arm	Time Segment	Demand (Veh/hr)	Demand in PCU (PCU/hr)
1 - B1043 Barford Road (N)	08:00-08:15	744	765
	08:15-08:30	744	765
	08:30-08:45	744	765
	08:45-09:00	744	765
2 - A428 (East)	08:00-08:15	983	1053
	08:15-08:30	983	1053
	08:30-08:45	983	1053
	08:45-09:00	983	1053
3 - Barford Road (S)	08:00-08:15	268	270
	08:15-08:30	268	270
	08:30-08:45	268	270
	08:45-09:00	268	270
4 - A428 (West)	08:00-08:15	1214	1330
	08:15-08:30	1214	1330
	08:30-08:45	1214	1330
	08:45-09:00	1214	1330

Results

Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Queue (PCU)	Max 95th percentile Queue (PCU)	Max LOS	Average Demand (PCU/hr)	Total Junction Arrivals (PCU)
1 - B1043 Barford Road (N)	0.54	5.62	1.2	?	A	765	765
2 - A428 (East)	0.46	3.06	0.9	~1	A	1053	1053
3 - Barford Road (S)	0.27	5.03	0.4	~1	A	270	270
4 - A428 (West)	0.64	5.34	2.0	?	A	1330	1330

Main Results for each time segment

08:00 - 08:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1 - B1043 Barford Road (N)	765	191	1075	1429	0.536	760	543	0.0	1.2	5.502	A
2 - A428 (East)	1053	263	692	2316	0.455	1049	1143	0.0	0.9	3.036	A
3 - Barford Road (S)	270	68	1291	995	0.271	269	451	0.0	0.4	4.983	A
4 - A428 (West)	1330	332	296	2068	0.643	1322	1264	0.0	1.9	5.229	A

08:15 - 08:30

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1 - B1043 Barford Road (N)	765	191	1081	1424	0.537	765	546	1.2	1.2	5.615	A
2 - A428 (East)	1053	263	697	2312	0.455	1053	1149	0.9	0.9	3.061	A
3 - Barford Road (S)	270	68	1296	992	0.272	270	453	0.4	0.4	5.026	A
4 - A428 (West)	1330	332	297	2067	0.643	1329	1269	1.9	2.0	5.344	A

08:30 - 08:45

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1 - B1043 Barford Road (N)	765	191	1081	1424	0.537	765	546	1.2	1.2	5.615	A
2 - A428 (East)	1053	263	697	2312	0.455	1053	1149	0.9	0.9	3.061	A
3 - Barford Road (S)	270	68	1296	992	0.272	270	453	0.4	0.4	5.026	A
4 - A428 (West)	1330	332	297	2067	0.643	1330	1269	2.0	2.0	5.344	A

08:45 - 09:00

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1 - B1043 Barford Road (N)	765	191	1081	1424	0.537	765	546	1.2	1.2	5.615	A
2 - A428 (East)	1053	263	697	2312	0.455	1053	1149	0.9	0.9	3.061	A
3 - Barford Road (S)	270	68	1296	992	0.272	270	453	0.4	0.4	5.026	A
4 - A428 (West)	1330	332	297	2067	0.643	1330	1269	2.0	2.0	5.344	A

Queue Variation Results for each time segment

08:00 - 08:15

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1 - B1043 Barford Road (N)	1.17	?	?	?	?			N/A	N/A
2 - A428 (East)	0.89	~1	~1	~1	~1			N/A	N/A
3 - Barford Road (S)	0.37	~1	~1	~1	~1			N/A	N/A
4 - A428 (West)	1.94	?	?	?	?			N/A	N/A

08:15 - 08:30

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1 - B1043 Barford Road (N)	1.18	?	?	?	?			N/A	N/A
2 - A428 (East)	0.89	~1	~1	~1	~1			N/A	N/A
3 - Barford Road (S)	0.38	~1	~1	~1	~1			N/A	N/A
4 - A428 (West)	1.96	?	?	?	?			N/A	N/A

08:30 - 08:45

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1 - B1043 Barford Road (N)	1.19	?	?	?	?			N/A	N/A
2 - A428 (East)	0.89	~1	~1	~1	~1			N/A	N/A
3 - Barford Road (S)	0.38	~1	~1	~1	~1			N/A	N/A
4 - A428 (West)	1.96	?	?	?	?			N/A	N/A

08:45 - 09:00

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1 - B1043 Barford Road (N)	1.19	?	?	?	?			N/A	N/A
2 - A428 (East)	0.89	~1	~1	~1	~1			N/A	N/A
3 - Barford Road (S)	0.38	~1	~1	~1	~1			N/A	N/A
4 - A428 (West)	1.97	?	?	?	?			N/A	N/A

2027 - 1,100 Dwellings, PM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Geometry	2 - A428 (East) - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.
Warning	Geometry	3 - Barford Road (S) - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.
Warning	Geometry	4 - A428 (West) - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.
Warning	Flow Arm 2	Analysis Options	Queue percentiles cannot be calculated for the selected traffic profile type.
Warning	Flow Arm 3	Analysis Options	Queue percentiles cannot be calculated for the selected traffic profile type.
Warning	Flow Arm 4	Analysis Options	Queue percentiles cannot be calculated for the selected traffic profile type.
Warning	Flow Arm 1	Analysis Options	Queue percentiles cannot be calculated for the selected traffic profile type.
Warning	Queue variations	Analysis Options	Queue percentiles may be unreliable if the mean queue in any time segment is very low or very high.

Junction Network

Junctions

Junction	Name	Junction type	Use circulating lanes	Arm order	Junction Delay (s)	Junction LOS
1	(untitled)	Standard Roundabout		2, 3, 4, 1	4.74	A

Junction Network

Driving side	Lighting	Network residual capacity (%)	First arm reaching threshold	Network delay (s)	Network LOS
Left	Normal/unknown	26	3 - Barford Road (S)	4.74	A

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time period length (min)	Time segment length (min)	Run automatically
D4	2027 - 1,100 Dwellings	PM	FLAT	17:00	18:00	60	15	✓

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
1 - B1043 Barford Road (N)		FLAT	✓	627	100.000
2 - A428 (East)		FLAT	✓	1102	100.000
3 - Barford Road (S)		FLAT	✓	439	100.000
4 - A428 (West)		FLAT	✓	1238	100.000

Origin-Destination Data

Demand (Veh/hr)

		To			
		1 - B1043 Barford Road (N)	2 - A428 (East)	3 - Barford Road (S)	4 - A428 (West)
From	1 - B1043 Barford Road (N)	0	45	133	449
	2 - A428 (East)	102	0	168	832
	3 - Barford Road (S)	190	189	0	60
	4 - A428 (West)	591	637	10	0

Proportions

		To			
		1 - B1043 Barford Road (N)	2 - A428 (East)	3 - Barford Road (S)	4 - A428 (West)
From	1 - B1043 Barford Road (N)	0.00	0.07	0.21	0.72
	2 - A428 (East)	0.09	0.00	0.15	0.75
	3 - Barford Road (S)	0.43	0.43	0.00	0.14
	4 - A428 (West)	0.48	0.51	0.01	0.00

Vehicle Mix

HV data entry mode	PCU Factor for a HV (PCU)
HV Percentages	2.00

Heavy Vehicle %

		To			
		1 - B1043 Barford Road (N)	2 - A428 (East)	3 - Barford Road (S)	4 - A428 (West)
From	1 - B1043 Barford Road (N)	0	2	0	1
	2 - A428 (East)	1	0	0	8
	3 - Barford Road (S)	0	0	0	2
	4 - A428 (West)	1	4	11	0

Average PCU Per Veh

		To			
		1 - B1043 Barford Road (N)	2 - A428 (East)	3 - Barford Road (S)	4 - A428 (West)
From	1 - B1043 Barford Road (N)	1.000	1.020	1.000	1.010
	2 - A428 (East)	1.010	1.000	1.000	1.080
	3 - Barford Road (S)	1.000	1.000	1.000	1.020
	4 - A428 (West)	1.010	1.040	1.110	1.000

Detailed Demand Data

Demand for each time segment

Arm	Time Segment	Demand (Veh/hr)	Demand in PCU (PCU/hr)
1 - B1043 Barford Road (N)	17:00-17:15	627	632
	17:15-17:30	627	632
	17:30-17:45	627	632
	17:45-18:00	627	632
2 - A428 (East)	17:00-17:15	1102	1170
	17:15-17:30	1102	1170
	17:30-17:45	1102	1170
	17:45-18:00	1102	1170
3 - Barford Road (S)	17:00-17:15	439	440
	17:15-17:30	439	440
	17:30-17:45	439	440
	17:45-18:00	439	440
4 - A428 (West)	17:00-17:15	1238	1270
	17:15-17:30	1238	1270
	17:30-17:45	1238	1270
	17:45-18:00	1238	1270

Results

Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Queue (PCU)	Max 95th percentile Queue (PCU)	Max LOS	Average Demand (PCU/hr)	Total Junction Arrivals (PCU)
1 - B1043 Barford Road (N)	0.40	3.85	0.7	~1	A	632	632
2 - A428 (East)	0.49	3.12	1.0	?	A	1170	1170
3 - Barford Road (S)	0.49	7.95	1.0	~1	A	440	440
4 - A428 (West)	0.66	5.57	2.0	?	A	1270	1270

Main Results for each time segment

17:00 - 17:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1 - B1043 Barford Road (N)	632	158	857	1580	0.400	630	884	0.0	0.7	3.809	A
2 - A428 (East)	1170	292	595	2396	0.488	1166	892	0.0	1.0	3.094	A
3 - Barford Road (S)	440	110	1450	898	0.490	436	311	0.0	0.9	7.765	A
4 - A428 (West)	1270	318	478	1936	0.656	1263	1408	0.0	1.9	5.428	A

17:15 - 17:30

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1 - B1043 Barford Road (N)	632	158	863	1576	0.401	632	890	0.7	0.7	3.847	A
2 - A428 (East)	1170	292	598	2394	0.489	1170	897	1.0	1.0	3.119	A
3 - Barford Road (S)	440	110	1455	894	0.492	440	312	0.9	1.0	7.944	A
4 - A428 (West)	1270	318	482	1934	0.657	1270	1413	1.9	1.9	5.569	A

17:30 - 17:45

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1 - B1043 Barford Road (N)	632	158	863	1576	0.401	632	890	0.7	0.7	3.847	A
2 - A428 (East)	1170	292	598	2394	0.489	1170	897	1.0	1.0	3.119	A
3 - Barford Road (S)	440	110	1455	894	0.492	440	312	1.0	1.0	7.948	A
4 - A428 (West)	1270	318	482	1934	0.657	1270	1413	1.9	2.0	5.571	A

17:45 - 18:00

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1 - B1043 Barford Road (N)	632	158	863	1576	0.401	632	890	0.7	0.7	3.847	A
2 - A428 (East)	1170	292	598	2394	0.489	1170	897	1.0	1.0	3.119	A
3 - Barford Road (S)	440	110	1455	894	0.492	440	312	1.0	1.0	7.948	A
4 - A428 (West)	1270	318	482	1934	0.657	1270	1413	2.0	2.0	5.571	A

Queue Variation Results for each time segment

17:00 - 17:15

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1 - B1043 Barford Road (N)	0.67	~1	~1	~1	~1			N/A	N/A
2 - A428 (East)	1.01	?	?	?	?			N/A	N/A
3 - Barford Road (S)	0.95	~1	~1	~1	~1			N/A	N/A
4 - A428 (West)	1.92	?	?	?	?			N/A	N/A

17:15 - 17:30

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1 - B1043 Barford Road (N)	0.67	~1	~1	~1	~1			N/A	N/A
2 - A428 (East)	1.01	?	?	?	?			N/A	N/A
3 - Barford Road (S)	0.96	~1	~1	~1	~1			N/A	N/A
4 - A428 (West)	1.95	?	?	?	?			N/A	N/A

17:30 - 17:45

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1 - B1043 Barford Road (N)	0.67	~1	~1	~1	~1			N/A	N/A
2 - A428 (East)	1.01	?	?	?	?			N/A	N/A
3 - Barford Road (S)	0.97	~1	~1	~1	~1			N/A	N/A
4 - A428 (West)	1.95	?	?	?	?			N/A	N/A

17:45 - 18:00

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1 - B1043 Barford Road (N)	0.67	~1	~1	~1	~1			N/A	N/A
2 - A428 (East)	1.01	?	?	?	?			N/A	N/A
3 - Barford Road (S)	0.97	~1	~1	~1	~1			N/A	N/A
4 - A428 (West)	1.96	?	?	?	?			N/A	N/A

Junctions 10

ARCADY 10 - Roundabout Module

Version: 10.1.1.1905
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Filename: 240712 - A428_Cambridge Rd - Flat.j10
Path: \\bir-vfps-001\bir\Projects\332210538 - Wintringham Culverts\Technical\Calcs\Transport\Junction Assessments\A428_Cambridge Rd
Report generation date: 13/09/2024 14:17:59

»2025 - 500 Dwellings, AM
»2025 - 500 Dwellings, PM
»2027 - 1,100 Dwellings, AM
»2027 - 1,100 Dwellings, PM

Summary of junction performance

	AM									PM								
	Set ID	Queue (PCU)	95% Queue (PCU)	Delay (s)	RFC	LOS	Junction Delay (s)	Junction LOS	Network Residual Capacity	Set ID	Queue (PCU)	95% Queue (PCU)	Delay (s)	RFC	LOS	Junction Delay (s)	Junction LOS	Network Residual Capacity
	2025 - 500 Dwellings																	
Arm 1-1	D1	2.4	?	6.29	0.69	A	9.52	A	11 % [Arm 2]	D2	6.2	?	13.79	0.86	B	11.58	B	10 % [Arm 1-1]
Arm 2		4.7	?	15.64	0.81	C					2.9	?	11.70	0.74	B			
Arm 3		0.6	~1	4.64	0.38	A					0.6	~1	4.03	0.36	A			
	2027 - 1,100 Dwellings																	
Arm 1-1	D3	3.0	?	7.66	0.74	A	12.16	B	5 % [Arm 2]	D4	10.4	?	22.52	0.91	C	18.51	C	3 % [Arm 1-1]
Arm 2		6.6	?	21.10	0.86	C					5.3	?	19.65	0.84	C			
Arm 3		1.1	?	6.00	0.51	A					0.7	~1	4.48	0.42	A			

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

Values shown are the highest values encountered over all time segments. Delay is the maximum value of average delay per arriving vehicle. Junction LOS and Junction Delay are demand-weighted averages. Network Residual Capacity indicates the amount by which network flow could be increased before a user-definable threshold (see Analysis Options) is met.

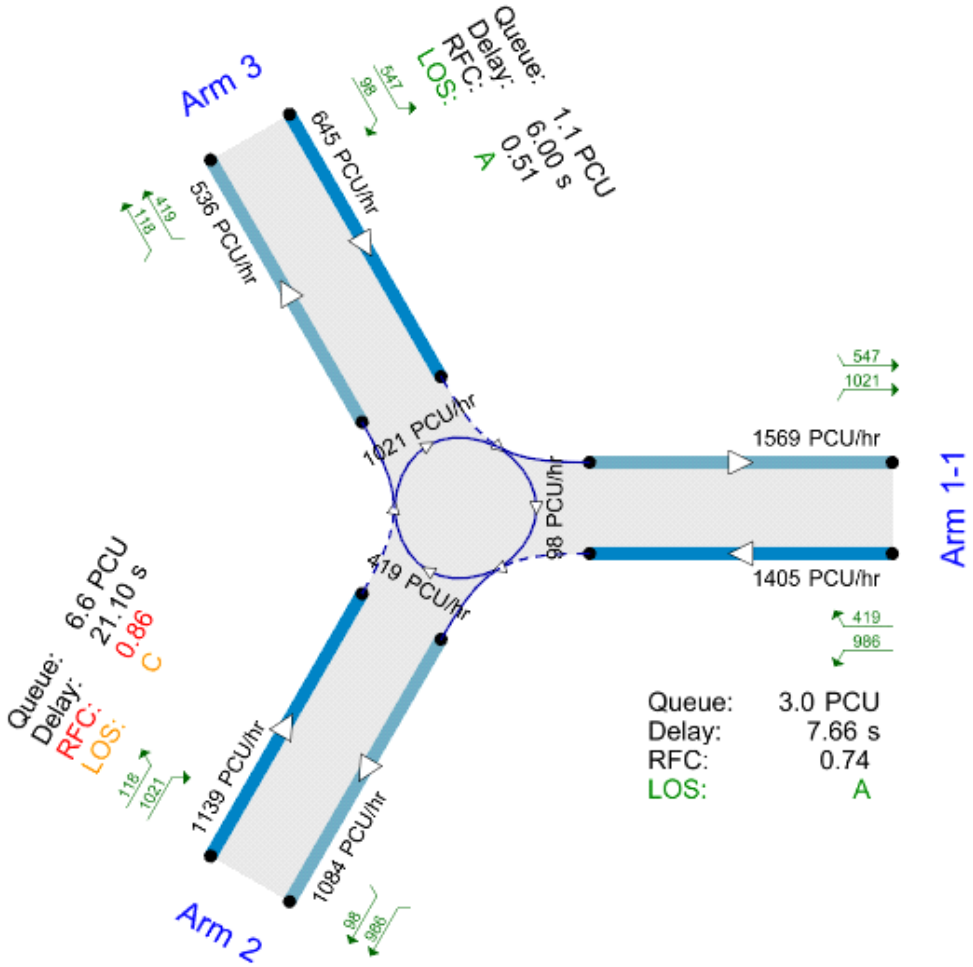
File summary

File Description

Title	Wintringham Park
Location	St.Neots
Site number	J5 - A428/B1428
Date	05/10/2017
Version	
Status	Existing Layout
Identifier	
Client	
Jobnumber	41481
Enumerator	PBA\mseiboth
Description	B1428/A428 Junction (Cambridge Road)

Units

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



Flows show modelled flow through junction (PCU/hr).

Time Segment: 08:00-08:15

The junction diagram reflects the last run of Junctions.

Analysis Options

Vehicle length (m)	Calculate Queue Percentiles	Calculate detailed queueing delay	Show lane queues in feet / metres	Show all PICADY stream intercepts	Calculate residual capacity	Residual capacity criteria type	RFC Threshold	Average Delay threshold (s)	Queue threshold (PCU)	Use simulation for HCM roundabouts	Use iterations for HCM roundabouts
5.75	✓				✓	Delay	0.85	36.00	20.00		

Demand Set Summary

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time period length (min)	Time segment length (min)	Run automatically
D1	2025 - 500 Dwellings	AM	FLAT	08:00	09:00	60	15	✓
D2	2025 - 500 Dwellings	PM	FLAT	17:00	18:00	60	15	✓
D3	2027 - 1,100 Dwellings	AM	FLAT	08:00	09:00	60	15	✓
D4	2027 - 1,100 Dwellings	PM	FLAT	17:00	18:00	60	15	✓

Analysis Set Details

ID	Include in report	Network flow scaling factor (%)	Network capacity scaling factor (%)
A1	✓	100.000	100.000

2025 - 500 Dwellings, AM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Geometry	Arm 1-1 - 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.
Warning	Flow Arm 1-1	Analysis Options	Queue percentiles cannot be calculated for the selected traffic profile type.
Warning	Flow Arm 2	Analysis Options	Queue percentiles cannot be calculated for the selected traffic profile type.
Warning	Flow Arm 3	Analysis Options	Queue percentiles cannot be calculated for the selected traffic profile type.
Warning	Queue variations	Analysis Options	Queue percentiles may be unreliable if the mean queue in any time segment is very low or very high.

Junction Network

Junctions

Junction	Name	Junction type	Use circulating lanes	Arm order	Junction Delay (s)	Junction LOS
1	(untitled)	Standard Roundabout		1-1, 2, 3	9.52	A

Junction Network

Driving side	Lighting	Network residual capacity (%)	First arm reaching threshold	Network delay (s)	Network LOS
Left	Normal/unknown	11	Arm 2	9.52	A

Arms

Arms

Arm	Name	Description	No give-way line
1-1	A428 Cambridge Road		
2	A428 St.Neots Bypass		
3	B1428 Cambridge Road		

Roundabout Geometry

Arm	V - Approach road half-width (m)	E - Entry width (m)	I' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Entry only	Exit only
1-1	4.64	6.89	37.0	18.0	54.6	28.0		
2	2.63	5.84	64.4	21.2	54.6	40.0		
3	3.33	7.27	38.5	18.2	54.6	28.0		

Slope / Intercept / Capacity

Roundabout Slope and Intercept used in model

Arm	Final slope	Final intercept (PCU/hr)
1-1	0.638	1979
2	0.557	1584
3	0.626	1913

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

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time period length (min)	Time segment length (min)	Run automatically
D1	2025 - 500 Dwellings	AM	FLAT	08:00	09:00	60	15	✓

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
1-1		FLAT	✓	1291	100.000
2		FLAT	✓	1000	100.000
3		FLAT	✓	471	100.000

Origin-Destination Data

Demand (Veh/hr)

		To		
		1-1	2	3
From	1-1	0	903	388
	2	913	0	87
	3	471	0	0

Proportions

		To		
		1-1	2	3
From	1-1	0.00	0.70	0.30
	2	0.91	0.00	0.09
	3	1.00	0.00	0.00

Vehicle Mix

HV data entry mode	PCU Factor for a HV (PCU)
HV Percentages	2.00

Heavy Vehicle %

		To		
		1-1	2	3
From	1-1	0	8	2
	2	12	0	0
	3	2	0	0

Average PCU Per Veh

		To		
		1-1	2	3
From	1-1	1.000	1.080	1.020
	2	1.120	1.000	1.000
	3	1.022	1.005	1.000

Detailed Demand Data

Demand for each time segment

Arm	Time Segment	Demand (Veh/hr)	Demand in PCU (PCU/hr)
1-1	08:00-08:15	1291	1371
	08:15-08:30	1291	1371
	08:30-08:45	1291	1371
	08:45-09:00	1291	1371
2	08:00-08:15	1000	1110
	08:15-08:30	1000	1110
	08:30-08:45	1000	1110
	08:45-09:00	1000	1110
3	08:00-08:15	471	481
	08:15-08:30	471	481
	08:30-08:45	471	481
	08:45-09:00	471	481

Results

Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Queue (PCU)	Max 95th percentile Queue (PCU)	Max LOS	Average Demand (PCU/hr)	Total Junction Arrivals (PCU)
1-1	0.69	6.29	2.4	?	A	1371	1371
2	0.81	15.64	4.7	?	C	1110	1110
3	0.38	4.64	0.6	~1	A	481	481

Main Results for each time segment

08:00 - 08:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1-1	1371	343	0	1979	0.693	1362	1485	0.0	2.3	6.107	A
2	1110	277	393	1366	0.813	1092	969	0.0	4.4	13.819	B
3	481	120	1006	1283	0.375	479	479	0.0	0.6	4.559	A

08:15 - 08:30

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1-1	1371	343	0	1979	0.693	1371	1503	2.3	2.4	6.289	A
2	1110	277	396	1364	0.813	1109	975	4.4	4.6	15.526	C
3	481	120	1022	1273	0.378	481	483	0.6	0.6	4.642	A

08:30 - 08:45

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1-1	1371	343	0	1979	0.693	1371	1504	2.4	2.4	6.291	A
2	1110	277	396	1364	0.813	1109	975	4.6	4.7	15.607	C
3	481	120	1022	1273	0.378	481	483	0.6	0.6	4.644	A

08:45 - 09:00

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1-1	1371	343	0	1979	0.693	1371	1504	2.4	2.4	6.291	A
2	1110	277	396	1364	0.813	1109	975	4.7	4.7	15.636	C
3	481	120	1022	1273	0.378	481	483	0.6	0.6	4.644	A

Queue Variation Results for each time segment

08:00 - 08:15

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1-1	2.34	?	?	?	?			N/A	N/A
2	4.43	?	?	?	?			N/A	N/A
3	0.61	~1	~1	~1	~1			N/A	N/A

08:15 - 08:30

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1-1	2.37	?	?	?	?			N/A	N/A
2	4.62	?	?	?	?			N/A	N/A
3	0.62	~1	~1	~1	~1			N/A	N/A

08:30 - 08:45

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1-1	2.38	?	?	?	?			N/A	N/A
2	4.69	?	?	?	?			N/A	N/A
3	0.62	~1	~1	~1	~1			N/A	N/A

08:45 - 09:00

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1-1	2.38	?	?	?	?			N/A	N/A
2	4.73	?	?	?	?			N/A	N/A
3	0.62	~1	~1	~1	~1			N/A	N/A

2025 - 500 Dwellings, PM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Geometry	Arm 1-1 - 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.
Warning	Flow Arm 1-1	Analysis Options	Queue percentiles cannot be calculated for the selected traffic profile type.
Warning	Flow Arm 2	Analysis Options	Queue percentiles cannot be calculated for the selected traffic profile type.
Warning	Flow Arm 3	Analysis Options	Queue percentiles cannot be calculated for the selected traffic profile type.
Warning	Queue variations	Analysis Options	Queue percentiles may be unreliable if the mean queue in any time segment is very low or very high.

Junction Network

Junctions

Junction	Name	Junction type	Use circulating lanes	Arm order	Junction Delay (s)	Junction LOS
1	(untitled)	Standard Roundabout		1-1, 2, 3	11.58	B

Junction Network

Driving side	Lighting	Network residual capacity (%)	First arm reaching threshold	Network delay (s)	Network LOS
Left	Normal/unknown	10	Arm 1-1	11.58	B

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time period length (min)	Time segment length (min)	Run automatically
D2	2025 - 500 Dwellings	PM	FLAT	17:00	18:00	60	15	✓

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
1-1		FLAT	✓	1560	100.000
2		FLAT	✓	861	100.000
3		FLAT	✓	495	100.000

Origin-Destination Data

Demand (Veh/hr)

		To		
		1-1	2	3
From	1-1	0	917	643
	2	800	0	61
	3	392	103	0

Proportions

		To		
		1-1	2	3
From	1-1	0.00	0.59	0.41
	2	0.93	0.00	0.07
	3	0.79	0.21	0.00

Vehicle Mix

HV data entry mode	PCU Factor for a HV (PCU)
HV Percentages	2.00

Heavy Vehicle %

		To		
		1-1	2	3
From	1-1	0	8	1
	2	5	0	0
	3	0	0	0

Average PCU Per Veh

		To		
		1-1	2	3
From	1-1	1.000	1.080	1.010
	2	1.050	1.000	1.000
	3	1.000	1.000	1.000

Detailed Demand Data

Demand for each time segment

Arm	Time Segment	Demand (Veh/hr)	Demand in PCU (PCU/hr)
1-1	17:00-17:15	1560	1640
	17:15-17:30	1560	1640
	17:30-17:45	1560	1640
	17:45-18:00	1560	1640
2	17:00-17:15	861	901
	17:15-17:30	861	901
	17:30-17:45	861	901
	17:45-18:00	861	901
3	17:00-17:15	495	495
	17:15-17:30	495	495
	17:30-17:45	495	495
	17:45-18:00	495	495

Results

Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Queue (PCU)	Max 95th percentile Queue (PCU)	Max LOS	Average Demand (PCU/hr)	Total Junction Arrivals (PCU)
1-1	0.86	13.79	6.2	?	B	1640	1640
2	0.74	11.70	2.9	?	B	901	901
3	0.36	4.03	0.6	~1	A	495	495

Main Results for each time segment

17:00 - 17:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1-1	1640	410	103	1913	0.857	1617	1220	0.0	5.7	11.985	B
2	901	225	640	1228	0.734	890	1079	0.0	2.8	10.827	B
3	495	124	830	1394	0.355	493	701	0.0	0.5	3.986	A

17:15 - 17:30

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1-1	1640	410	103	1913	0.857	1639	1232	5.7	6.0	13.674	B
2	901	225	649	1223	0.737	901	1093	2.8	2.9	11.656	B
3	495	124	840	1387	0.357	495	710	0.5	0.6	4.033	A

17:30 - 17:45

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1-1	1640	410	103	1913	0.857	1640	1232	6.0	6.1	13.760	B
2	901	225	649	1223	0.737	901	1093	2.9	2.9	11.684	B
3	495	124	840	1387	0.357	495	710	0.6	0.6	4.034	A

17:45 - 18:00

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1-1	1640	410	103	1913	0.857	1640	1232	6.1	6.2	13.793	B
2	901	225	649	1223	0.737	901	1093	2.9	2.9	11.696	B
3	495	124	840	1387	0.357	495	710	0.6	0.6	4.034	A

Queue Variation Results for each time segment

17:00 - 17:15

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1-1	5.74	?	?	?	?			N/A	N/A
2	2.76	?	?	?	?			N/A	N/A
3	0.55	~1	~1	~1	~1			N/A	N/A

17:15 - 17:30

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1-1	6.00	?	?	?	?			N/A	N/A
2	2.85	?	?	?	?			N/A	N/A
3	0.55	~1	~1	~1	~1			N/A	N/A

17:30 - 17:45

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1-1	6.10	?	?	?	?			N/A	N/A
2	2.88	?	?	?	?			N/A	N/A
3	0.55	~1	~1	~1	~1			N/A	N/A

17:45 - 18:00

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1-1	6.15	?	?	?	?			N/A	N/A
2	2.89	?	?	?	?			N/A	N/A
3	0.55	~1	~1	~1	~1			N/A	N/A

2027 - 1,100 Dwellings, AM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Geometry	Arm 1-1 - 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.
Warning	Flow Arm 1-1	Analysis Options	Queue percentiles cannot be calculated for the selected traffic profile type.
Warning	Flow Arm 2	Analysis Options	Queue percentiles cannot be calculated for the selected traffic profile type.
Warning	Flow Arm 3	Analysis Options	Queue percentiles cannot be calculated for the selected traffic profile type.
Warning	Queue variations	Analysis Options	Queue percentiles may be unreliable if the mean queue in any time segment is very low or very high.

Junction Network

Junctions

Junction	Name	Junction type	Use circulating lanes	Arm order	Junction Delay (s)	Junction LOS
1	(untitled)	Standard Roundabout		1-1, 2, 3	12.16	B

Junction Network

Driving side	Lighting	Network residual capacity (%)	First arm reaching threshold	Network delay (s)	Network LOS
Left	Normal/unknown	5	Arm 2	12.16	B

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time period length (min)	Time segment length (min)	Run automatically
D3	2027 - 1,100 Dwellings	AM	FLAT	08:00	09:00	60	15	✓

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
1-1		FLAT	✓	1335	100.000
2		FLAT	✓	1051	100.000
3		FLAT	✓	637	100.000

Origin-Destination Data

Demand (Veh/hr)

		To		
		1-1	2	3
From	1-1	0	921	414
	2	931	0	120
	3	539	98	0

Proportions

		To		
		1-1	2	3
From	1-1	0.00	0.69	0.31
	2	0.89	0.00	0.11
	3	0.85	0.15	0.00

Vehicle Mix

HV data entry mode	PCU Factor for a HV (PCU)
HV Percentages	2.00

Heavy Vehicle %

		To		
		1-1	2	3
From	1-1	0	8	2
	2	12	0	0
	3	2	0	0

Average PCU Per Veh

		To		
		1-1	2	3
From	1-1	1.000	1.080	1.020
	2	1.120	1.000	1.000
	3	1.022	1.005	1.000

Detailed Demand Data

Demand for each time segment

Arm	Time Segment	Demand (Veh/hr)	Demand in PCU (PCU/hr)
1-1	08:00-08:15	1335	1417
	08:15-08:30	1335	1417
	08:30-08:45	1335	1417
	08:45-09:00	1335	1417
2	08:00-08:15	1051	1163
	08:15-08:30	1051	1163
	08:30-08:45	1051	1163
	08:45-09:00	1051	1163
3	08:00-08:15	637	649
	08:15-08:30	637	649
	08:30-08:45	637	649
	08:45-09:00	637	649

Results

Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Queue (PCU)	Max 95th percentile Queue (PCU)	Max LOS	Average Demand (PCU/hr)	Total Junction Arrivals (PCU)
1-1	0.74	7.66	3.0	?	A	1417	1417
2	0.86	21.10	6.6	?	C	1163	1163
3	0.51	6.00	1.1	?	A	649	649

Main Results for each time segment

08:00 - 08:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1-1	1417	354	98	1916	0.739	1405	1569	0.0	2.9	7.321	A
2	1163	291	419	1351	0.861	1139	1084	0.0	5.9	17.217	C
3	649	162	1021	1274	0.510	645	536	0.0	1.0	5.798	A

08:15 - 08:30

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1-1	1417	354	98	1916	0.740	1417	1592	2.9	3.0	7.650	A
2	1163	291	422	1349	0.862	1161	1093	5.9	6.4	20.709	C
3	649	162	1041	1261	0.515	649	542	1.0	1.1	5.990	A

08:30 - 08:45

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1-1	1417	354	98	1916	0.740	1417	1593	3.0	3.0	7.656	A
2	1163	291	422	1349	0.862	1162	1093	6.4	6.5	20.993	C
3	649	162	1042	1261	0.515	649	542	1.1	1.1	5.998	A

08:45 - 09:00

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1-1	1417	354	98	1916	0.740	1417	1593	3.0	3.0	7.656	A
2	1163	291	422	1349	0.862	1162	1093	6.5	6.6	21.102	C
3	649	162	1042	1261	0.515	649	542	1.1	1.1	6.000	A

Queue Variation Results for each time segment

08:00 - 08:15

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1-1	2.92	?	?	?	?			N/A	N/A
2	5.94	?	?	?	?			N/A	N/A
3	1.05	?	?	?	?			N/A	N/A

08:15 - 08:30

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1-1	2.97	?	?	?	?			N/A	N/A
2	6.37	?	?	?	?			N/A	N/A
3	1.07	?	?	?	?			N/A	N/A

08:30 - 08:45

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1-1	2.98	?	?	?	?			N/A	N/A
2	6.53	?	?	?	?			N/A	N/A
3	1.08	?	?	?	?			N/A	N/A

08:45 - 09:00

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1-1	2.99	?	?	?	?			N/A	N/A
2	6.62	?	?	?	?			N/A	N/A
3	1.08	?	?	?	?			N/A	N/A

2027 - 1,100 Dwellings, PM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Geometry	Arm 1-1 - 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.
Warning	Flow Arm 1-1	Analysis Options	Queue percentiles cannot be calculated for the selected traffic profile type.
Warning	Flow Arm 2	Analysis Options	Queue percentiles cannot be calculated for the selected traffic profile type.
Warning	Flow Arm 3	Analysis Options	Queue percentiles cannot be calculated for the selected traffic profile type.
Warning	Queue variations	Analysis Options	Queue percentiles may be unreliable if the mean queue in any time segment is very low or very high.

Junction Network

Junctions

Junction	Name	Junction type	Use circulating lanes	Arm order	Junction Delay (s)	Junction LOS
1	(untitled)	Standard Roundabout		1-1, 2, 3	18.51	C

Junction Network

Driving side	Lighting	Network residual capacity (%)	First arm reaching threshold	Network delay (s)	Network LOS
Left	Normal/unknown	3	Arm 1-1	18.51	C

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time period length (min)	Time segment length (min)	Run automatically
D4	2027 - 1,100 Dwellings	PM	FLAT	17:00	18:00	60	15	✓

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
1-1		FLAT	✓	1639	100.000
2		FLAT	✓	959	100.000
3		FLAT	✓	573	100.000

Origin-Destination Data

Demand (Veh/hr)

		To		
		1-1	2	3
From	1-1	0	936	703
	2	816	0	143
	3	425	148	0

Proportions

		To		
		1-1	2	3
From	1-1	0.00	0.57	0.43
	2	0.85	0.00	0.15
	3	0.74	0.26	0.00

Vehicle Mix

HV data entry mode	PCU Factor for a HV (PCU)
HV Percentages	2.00

Heavy Vehicle %

		To		
		1-1	2	3
From	1-1	0	8	1
	2	5	0	0
	3	0	0	0

Average PCU Per Veh

		To		
		1-1	2	3
From	1-1	1.000	1.080	1.010
	2	1.050	1.000	1.000
	3	1.000	1.000	1.000

Detailed Demand Data

Demand for each time segment

Arm	Time Segment	Demand (Veh/hr)	Demand in PCU (PCU/hr)
1-1	17:00-17:15	1639	1721
	17:15-17:30	1639	1721
	17:30-17:45	1639	1721
	17:45-18:00	1639	1721
2	17:00-17:15	959	1000
	17:15-17:30	959	1000
	17:30-17:45	959	1000
	17:45-18:00	959	1000
3	17:00-17:15	573	573
	17:15-17:30	573	573
	17:30-17:45	573	573
	17:45-18:00	573	573

Results

Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Queue (PCU)	Max 95th percentile Queue (PCU)	Max LOS	Average Demand (PCU/hr)	Total Junction Arrivals (PCU)
1-1	0.91	22.52	10.4	?	C	1721	1721
2	0.84	19.65	5.3	?	C	1000	1000
3	0.42	4.48	0.7	~1	A	573	573

Main Results for each time segment

17:00 - 17:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1-1	1721	430	147	1885	0.913	1685	1264	0.0	8.9	16.769	C
2	1000	250	696	1197	0.835	981	1137	0.0	4.7	16.175	C
3	573	143	841	1387	0.413	570	836	0.0	0.7	4.393	A

17:15 - 17:30

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1-1	1721	430	148	1884	0.913	1718	1280	8.9	9.8	21.677	C
2	1000	250	709	1190	0.840	998	1157	4.7	5.1	19.268	C
3	573	143	855	1378	0.416	573	851	0.7	0.7	4.474	A

17:30 - 17:45

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1-1	1721	430	148	1884	0.913	1720	1281	9.8	10.1	22.268	C
2	1000	250	710	1189	0.841	999	1158	5.1	5.2	19.550	C
3	573	143	856	1377	0.416	573	852	0.7	0.7	4.477	A

17:45 - 18:00

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1-1	1721	430	148	1884	0.913	1720	1282	10.1	10.4	22.522	C
2	1000	250	710	1189	0.841	1000	1158	5.2	5.3	19.647	C
3	573	143	857	1377	0.416	573	853	0.7	0.7	4.478	A

Queue Variation Results for each time segment

17:00 - 17:15

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1-1	8.89	?	?	?	?			N/A	N/A
2	4.73	?	?	?	?			N/A	N/A
3	0.70	~1	~1	~1	~1			N/A	N/A

17:15 - 17:30

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1-1	9.77	?	?	?	?			N/A	N/A
2	5.11	?	?	?	?			N/A	N/A
3	0.71	~1	~1	~1	~1			N/A	N/A

17:30 - 17:45

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1-1	10.15	?	?	?	?			N/A	N/A
2	5.24	?	?	?	?			N/A	N/A
3	0.71	~1	~1	~1	~1			N/A	N/A

17:45 - 18:00

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1-1	10.35	?	?	?	?			N/A	N/A
2	5.31	?	?	?	?			N/A	N/A
3	0.71	~1	~1	~1	~1			N/A	N/A