

TECHNICAL NOTE

Date: 27th February 2019

Project: Houghton Main Energy Centre

Title: Sensitivity Tests

1. Introduction

- 1.1 This Note has been prepared to respond to comments received from Aecom (on behalf of Barnsley MBC) on the heavy vehicle (HV) trip generation method set out in the SK Transport Assessment (ref: 181102/SK21847/TA01(-03)). The TA was submitted with the Section 73 application that proposes to broaden the fuel type and an increase the throughput of Refuse Derived Fuel (RDF) at the consented Energy Centre at Houghton Colliery in Barnsley.
- 1.2 The Section 73 application seeks to increase the throughput from the consented (baseline) import levels of 150,000tpa to 260,000tpa. An increase of 110,000tpa (73%).
- 1.3 The method used in the Section 73 TA was based on that previously agreed with Barnsley MBC when the original application for the Energy Centre was considered. This included use of the same method of distributing HV arrivals and departures across the day using a comparable use from the TRICS database.
- 1.4 The only adjustments made to the previously agreed method were to acknowledge changes to operation that would result from the Section 73 proposals, including:
 1. Changes to vehicle payloads – as larger vehicles would now be used for imports and exports
 2. Changes to delivery periods – as deliveries would now be extended to 7 days a week
- 1.5 Aecom has reviewed the method outlined in the Section 73 TA and states it is reasonable, but has still requested that the HV trip generation method be tested further to establish the impact of the following on the flows:
 1. Use of a flat daily arrival/departure profile
 2. Use of a basic pro-rata HV uplift based on the net increase in imports and exports
- 1.6 Further consideration is also given to the impact of the change in traffic flows resulting from the Section 73 application on the baseline operation of the site access roundabout.

2. Comparison of the Consented & Section 73 Proposals

- 2.1 A summary is outlined below of the consented situation and Section 73 situation. This information is replicated from the Section 73 TA.

Consented Situation

- 2.2 The consented Energy Centre is based on deliveries Monday to Friday between 7am and 7pm. This equates to 60 delivery hours per week.
- 2.3 The HV trip generation set out in the Section 73 TA was replicated from the documents submitted with the original application. Table 2.1 replicates the import and export loads and also the HV vehicle payloads used for the consented scheme.

	TPA	Average Payload (t)
Deliveries	150000	20
Ash Export	11133	25
Fly Export	4500	20

Table 2.1: Consented Energy Centre TPA and Vehicle Payloads

2.4 The consented Energy Centre HV flows associated with the 150,000tpa throughput is shown in Table 2.2.

	IN	OUT	TOTAL
AM	3	3	6
PM	0	1	2
Daily	30	30	60

Table 2.2: Consented Energy Centre HV Flows (150,000tpa) (not adjusted for rounding)

- 2.5 The AM and PM peak hour flows were derived using a comparable use daily arrival/departure profile from the TRICS database. This was the method was set out in the original TA and agreed with Barnsley MBC as suitable when consent was granted to the Energy Centre in 2015.
- 2.6 The consented Energy Centre is a committed development and the flows associated with it are part of the baseline flow scenario for the purposes of any future planning application in the area, including for the Section 73 application that is the subject of this Note.
- 2.7 The Energy Centre was also already consented when ASOS submitted its car park application. It was the responsibility of ASOS to demonstrate, and Barnsley MBC to ensure, that the car park proposal would not materially impact on access to the consented Energy Centre.

Section 73 Situation

- 2.8 The Section 73 application seeks to increase the throughput of the Energy Centre by 110,000tpa when compared to the consented situation.
- 2.9 The Section 73 application also seeks to change the delivery hours from the consented situation (weekdays 7am to 7pm) to also allow deliveries on both weekend days between 8am and 6pm to allow the level of on-site storage of fuel to be increased. This equates to 80 delivery hours per week, an increase of 20 hours when compared to the consented situation. The extension to the delivery hours was decided upon following consultation with Barnsley MBC and ASOS.
- 2.10 The applicant also advised that the vehicles used for imports and exports would change and that 25t or 28t payloads would now be used, rather than 20t and 25t payloads in the consented situation. For the purposes of the Section 73 TA the minimum payload was used (25t), meaning that the HV trips would in part be overestimated. The increase in vehicle payloads reflects both the nature of material being handled and the use of logistics companies that maximise material loads (through weighting plates/on board weighting systems) to allow the unit cost of transportation to be minimised.
- 2.11 Table 2.3 shows the import and export loads and also the HV vehicle payloads that would be used to carry this material, as set out in the Section 73 TA.

	TPA	Average Payload (t)
Deliveries	260000	25
Export	52000	25

Table 2.3: Section 73 TPA and Vehicle Payloads

- 2.12 The Section 73 TA also sets out the method used to assign some of the HV movements to the weekend, this is to acknowledge the extension of delivery hours to include weekend deliveries. The method acknowledges the number of hours that deliveries will occur during the week on a weekday and at the weekend, i.e. 60 hours and 20 hours respectively.
- 2.13 Tables 2.4 and 2.5 shows the HVs associated with the total Energy Centre’s throughput. This includes the traffic associated with the consented Energy Centre throughput and so represents the base and development site traffic flows.
- 2.14 In line with previously accepted method of distributing HV arrivals and departures, the AM and PM flows were derived using the TRICS profile.

Weekday	IN	OUT	TOTAL
AM	4	3	7
PM	0	2	2
Daily	39	39	78

Table 2.4: Section 73 + Consented Energy Centre HV Flows (260,000tpa) – Weekday

Weekend	IN	OUT	TOTAL
AM	4	3	7
PM	0	2	2
Daily	33	33	66

Table 2.5: Section 73 + Consented Energy Centre HV Flows (260,000tpa) – Weekend

Comparison

- 2.15 Table 2.6 shows a comparison of the consented Energy Centre situation (the baseline) and the situation that will occur following the Section 73 application changes to throughput, delivery hours and increased vehicle payloads.

	Consented	S73
Fuel Throughput	150000	260000
Vehicle Payloads (t)	20-25	25-28
Operating Days per Week	5	7
Total Delivery Hours per Week	60	80
Daily HV - Weekday	30	39
Daily HV - Weekend	0	33
Total Week HV	150	260

Table 2.6: Comparison of Energy Centre Scenarios

- 2.16 Table 2.6 shows that the throughput will increase by 73%. It also shows that the total weekly HV will also increase by 73% using the method set out in the Section 73 TA.
- 2.17 The extension of delivery hours has the effect of spreading the additional movements across the days of the week.
- 2.18 The increase in HV payloads also has an effect on the number of HV flows generated. For example, in the consented Energy Centre it was proposed to use 20t vehicles for all imports and 20t vehicles for some of the exports. This, coupled with the extended delivery hours, reduces the number of HVs required to operate the facility for the equivalent level of throughput.

3. Sensitivity Test 1: Flat Profile

- 3.1 SK maintains that the method presented in the Section 73 TA provides a robust means of assessing the impact of the changes proposed, particularly as it is based on a method previously agreed with Barnsley MBC.
- 3.2 Notwithstanding the above, a sensitivity test has been undertaken that examines the AM and PM peak trip generation should the vehicles arrive and depart with a flat profile as requested by AECOM.
- 3.3 The test has been undertaken by dividing the Section 73 total daily HV flows by 12 for the weekday and 10 for the weekend, to establish hourly flows. Table 3.1 shows the results of using a flat profile.

	Weekday					
	AM			PM		
	IN	OUT	TOTAL	IN	OUT	TOTAL
Flat Profile	3	3	7	3	3	7
Net Change from Submitted	-1	0	-1	3	2	5
	Weekend					
	AM			PM		
	IN	OUT	TOTAL	IN	OUT	TOTAL
Flat Profile	3	3	7	3	3	7
Net Change from Submitted	-1	0	0	3	1	5

Table 3.1: Flat Profile AM & PM Peak Flows (not adjusted for rounding errors)

- 3.4 Table 3.1 shows that application of the flat profile results in a minimal level of HV flows in the AM and PM peak. The maximum total HV flows using this method are shown to be 7 vehicles, this is not a significant level of traffic.

4. Sensitivity Test 2: Basic Uplift

- 4.1 SK disagrees with Aecom’s suggested method of merely uplifting the consented Energy Centre HV flows pro-rata with the increase in import and export throughput. This simplistic method fails to acknowledge the proposed changes to delivery hours and vehicle payloads advised by the applicant, as set out in the Section 73 TA.
- 4.2 Table 4.1 shows the pro-rata change in annual HV numbers, based on a basic pro-rata uplift of the annual HV flows taken from the original application TA.

	Consented TPA	S73+Consented TPA	Consented Annual HV	Basic Uplift	Revised Annual HV	Section 73 TA
Import	150000	260000	7500	73%	13000	10400
Export	15633	52000	670	233%	2229	2080

Table 4.1: Basic Uplift & Impact on Annual HV

- 4.3 Table 4.2 shows the weekly HV numbers resulting from the basic uplift method. The total uplift flows presented includes traffic associated with the throughput for the consented Energy Centre.
- 4.4 The extension of the delivery hours is an integral component of the Section 73 application and as such has to be included in the forecast method. In line with the method presented in the Section 73 TA and outlined in paragraph 2.13 of this Note, the weekly HV trips have been converted to total weekday and weekend daily HV flows.

	Basic Uplift Method			Submitted with S73 TA			Net Change from Section 73 TA	
	Total Weekly HV	Weekday Daily HV	Weekend Daily HV	Total Weekly HV	Weekday Daily HV	Weekend Daily HV	Weekday Daily HV	Weekend Daily HV
Import	271	41	34	217	33	27	8	7
Export	46	7	6	43	7	5	0	0

Table 4.2: Basic Uplift Weekly & Daily HV (not corrected for rounding errors)

- 4.5 Table 4.2 shows that the daily flows using the basic uplift approach would not be substantially different from that submitted with the Section 73 TA.
- 4.6 Using the consented arrival/departure profile method, the AM and PM peak flows are shown in Table 4.3.

	Weekday					
	AM			PM		
	IN	OUT	TOTAL	IN	OUT	TOTAL
Basic Uplift	5	4	9	0	2	3
Net Change from Submitted	1	1	2	0	0	1
	Weekend					
	AM			PM		
	IN	OUT	TOTAL	IN	OUT	TOTAL
Basic Uplift	5	4	8	0	2	2
Net Change from Submitted	1	1	1	0	0	0

Table 4.3: Basic Uplift AM & PM Total Traffic Flows (not corrected for rounding errors)

- 4.7 Table 4.3 shows that the total peak hour HV flows will not be significant, with the maximum level of HV traffic of 9 vehicles.

5. Summary of HV Trip Generation Scenarios

- 5.1 For ease, Table 5.1 shows the different flow scenarios associated with the HV trip generation tests set out above.

	AM Weekday			PM Weekday			AM Weekend			PM Weekend		
	IN	OUT	TOTAL	IN	OUT	TOTAL	IN	OUT	TOTAL	IN	OUT	TOTAL
Consented	3	3	6	0	1	1	0	0	0	0	0	0
SK S73 TA	4	3	7	0	2	2	4	3	7	0	2	2
Scenario 1	3	3	7	3	3	7	3	3	7	3	3	7
Scenario 2	5	4	9	0	2	3	5	4	8	0	2	2

Table 5.1: HV Flow Scenarios (not corrected for rounding)

6. Site Access Roundabout Operation

ASOS Car Park Impact

- 6.1 In 2017 consent was granted for ASOS to construct a 370 space car park on land opposite the existing ASOS facility, adjacent to the consented Energy Centre.
- 6.2 The documents submitted with the ASOS planning application make it clear that that the new car park is only being provided to ensure that staff that are about to start their shift have somewhere to park, while the main car park is occupied by staff just about to finish the preceding shift.
- 6.3 It is made explicitly clear throughout the ASOS TS that the new car park will not generate any additional traffic on the highway network. In line with the minimal level of impact from the proposal, RPS (acting for ASOS) prepared a Transport Statement level of assessment, rather than a full Transport Assessment with traffic surveys, forecast car park traffic generation and highway modelling.
- 6.4 The RPS Transport Statement concluded that the car park would have no 'material' impact on traffic flows, road safety or highway operation, including at the site access roundabout. At no point in the Transport Statement does RPS assert that the car park proposal will result in a 'material change' in the operation of the access roundabout.
- 6.5 The conclusions of the RPS Transport Statement was agreed by Barnsley MBC and planning consent for the new car park was granted. The highway authority did not ask RPS to provide further assessments or traffic forecasts to demonstrate that the new car park would have no impact on the operation of the roundabout. Barnsley MBC's committee report states that 'there will be no increase in traffic movements on the network' and that 'the proposed development is acceptable in highway safety grounds'.
- 6.6 Barnsley MBC's committee report is silent on highway operation and the capacity of the access roundabout. It is shown from this that Barnsley MBC did not consider the ASOS proposal to represent a 'material change' in either traffic flows at or operation of the roundabout. If this had been the case, then logically Barnsley MBC would have required RPS to present further evidence, including traffic surveys, traffic re-assignment analysis, and junction capacity assessments.
- 6.7 It is therefore surprising that the Section 73 applicant is now being asked to provide additional assessments to reassure the highway authority that the traffic flows associated with a scheme it has already consented is not causing a 'material change' to highway operation. Particularly when no requirement was levied on ASOS itself to establish the impact of the car park proposal.
- 6.8 It is also pertinent that when Barnsley MBC considered and approved the ASOS car park, consent was already in place for the Energy Centre. Any conclusions drawn by the highway authority with regards to the operation of the roundabout should naturally have ensured that appropriate and suitable access to the consented Energy Centre site could be maintained following the construction of the ASOS car park.

Baseline Position

- 6.9 Based on the consented situation, the highway authority clearly considers that the roundabout is suitable to serve both the ASOS car park and the consented Energy Centre, without causing a severe or 'material' impact on highway operation.
- 6.10 Therefore, the baseline position for the purposes of the S73 application is that the roundabout operates satisfactorily with both consented schemes in place (e.g. ASOS and the consented Energy Centre).
- 6.11 It is from this baseline position that the impact of the additional traffic arising from the Section 73 proposal should be assessed.

Additional Section 73 Traffic & Impact

- 6.12 As set out in the TA, the maximum additional traffic flows arising from the Section 73 application is only 7 vehicles in the AM peak hour (including staff traffic). This is not a significant level of traffic, particularly when considered in the context of the advice set out in NPPF and by DfT. This level of traffic will not perceptibly change traffic flows on the highway network and will not have a severe impact on baseline highway operation.
- 6.13 Even if the worst-case sensitivity test flows (Scenario 2 in this Note) are used, then a maximum change in traffic flows of only 9 vehicles occurs. This again is a minimal change in traffic flows, and it is surprising that there are now concerns that the proposal will result in a 'material change' in baseline highway operation.
- 6.14 Regardless of the trip generation method used it is clear that the Section 73 application will result in a minimal increase in traffic flows and that the proposal will not have a severe or 'material' impact on baseline highway operation, when considered in the context of paragraph 109 of NPPF.

New Traffic Counts & Development Forecasts

- 6.15 The increase in throughput at the Energy Centre has been shown not to represent a substantial change in traffic flows, when compared to baseline situation. The additional flows will not have an impact on the operation of the highway network, regardless of which HV trip generation methods are used.
- 6.16 Notwithstanding this, a new survey has been undertaken at the site access roundabout junction. The survey was undertaken on Thursday 14th February 2019, prior to the half term school holiday. In line with the assessment undertaken for the consented Energy Centre and the Section 73 assessment, the surveys have been undertaken in the AM peak (07:00-09:30) and PM peak (16:30-18:30).
- 6.17 The surveys show that the peak hour at the junction occurs between 07:00-08:00 in the AM and between 16:30-17:30 in the PM. The survey flows are presented in Appendix A. The flows are shown in Passenger Car Units (PCU).
- 6.18 In line with the Section 73 TA, the flows have been growthed to 2023 using TEMPRO adjusted NTEM. The growth factors are also shown in Appendix A. The consented Energy Centre flows have then been added to the growthed survey flows to provide the 2023 base traffic flows.
- 6.19 Three development flow scenarios have been considered as follows:
 1. Section 73 TA HV Generation
 2. Sensitivity Test 1: Flat Profile HV Generation
 3. Sensitivity Test 2: Basic Uplift HV Generation
- 6.20 The flows for scenario 1 are based on those submitted with the Section 73 TA. The HV flows are shown in Table 2.4 of this Note. The HV flows have been converted to pcu and added to the staff flows to form the total development flows. The development flows have been distributed at the

site access in line with the distribution presented in the Section 73 TA. The distributed flows are shown in Appendix A.

- 6.21 The flows for sensitivity test 1 are based on the use of a flat arrival/departure profile. The HV flows are shown in Table 3.1. The HV flows have been converted to pcu and added to the staff flows to form the total development flows. The development flows have been distributed at the site access in line with the distribution presented in the Section 73 TA. The distributed flows are shown in Appendix A.
- 6.22 The flows for sensitivity test 2 are based on the use of a basic uplift method. The HV flows are shown in Table 4.3. The HV flows have been converted to pcu and added to the staff flows to form the total development flows. The development flows have been distributed at the site access in line with the distribution presented in the Section 73 TA. The distributed flows are shown in Appendix A.
- 6.23 The development flows for each scenario have been added to the 2023 background traffic flows to form the respective 2023 base and development flows.

Highway Operation

- 6.24 The site access operation has been assessed using ARCADY. The parameters for the roundabout are the same as presented in the TA for the consented Energy Centre and also the Section 73 TA.
- 6.25 The ARCADY output for each scenario is presented in Appendix B, with summaries of the forecast operation of the roundabout provided in the tables below.

Approach	2023 Base		2023 with Scenario 1	
	RFC	Queue	RFC	Queue
AM Peak				
A6195 (N)	0.269	0	0.271	0
ASOS	0.152	0	0.152	0
A6195 (S)	0.396	1	0.398	1
Site Access	0.066	0	0.071	0
PM Peak				
A6195 (N)	0.443	1	0.445	1
ASOS	0.068	0	0.069	0
A6195 (S)	0.385	1	0.387	1
Site Access	0.008	0	0.012	0

Table 6.1: Houghton Colliery Roundabout Assessment (Scenario 1: Section 73 TA Trip Generation)

- 6.26 Table 6.1 shows that the roundabout operates well within accepted capacity thresholds in both the AM and PM peak 2023 base scenario. The addition of the traffic flows associated with the Section 73 proposal will not significantly change the operation of the junction, when compared to the base. The maximum RFC of 0.445 is forecast to occur. This is well within the theoretical capacity of the junction.

Approach	2023 with Sensitivity Test 1		2023 with Sensitivity Test 2	
	RFC	Queue	RFC	Queue
AM Peak				
A6195 (N)	0.271	0	0.272	0
ASOS	0.152	0	0.152	0
A6195 (S)	0.397	1	0.399	1
Site Access	0.071	0	0.072	0
PM Peak				
A6195 (N)	0.447	1	0.445	1
ASOS	0.069	0	0.069	0
A6195 (S)	0.389	1	0.387	1
Site Access	0.014	0	0.012	0

Table 6.2: Houghton Colliery Roundabout Assessment (Sensitivity Tests)

- 6.27 Table 6.2 shows that the roundabout is forecast to continue to operate well within accepted capacity thresholds for both of the sensitivity test flow scenarios. The maximum RFC of 0.447 is forecast to occur in the PM peak hour. This does not represent a perceptible change from either the base situation nor that shown in the scenario 1 assessment.
- 6.28 The changes in flows resulting from the Section 73 application will not have a substantial effect on the roundabouts operation. This is consistent with the findings of the Section 73 TA and is also consistent with Barnsley MBC's previous findings regarding the roundabout when it consented the ASOS car park.
- 6.29 This Note shows that the Section 73 application will not have a severe impact on highway operation when considered in the context of paragraph 109 of NPPF.

Appendix A

Houghton Main Colliery: Section 73 Trip Generation MetEMPRO 2019-2023 AM 1.051 PM 1.052

2019 Site Access Flows (in pcu)

	AM Peak: 7am - 8am				PM Peak: 4.30pm - 5.30pm			
	A6195 N	ASOS	A6195 S	Access	A6195 N	ASOS	A6195 S	Access
A6195 N	5	25	294	0	9	3	542	0
ASOS	79	0	86	0	16	0	50	0
A6195 S	497	44	4	5	532	18	1	1
Access	23	0	35	0	1	0	1	0

2023 Site Access Background Flows (in pcu)

	AM Peak				PM Peak			
	A6195 N	ASOS	A6195 S	Access	A6195 N	ASOS	A6195 S	Access
A6195 N	5	25	309	0	9	3	570	0
ASOS	83	0	90	0	17	0	53	0
A6195 S	522	46	4	5	560	19	1	1
Access	24	0	37	0	1	0	1	0

Site Access TRRC Consented Flows (in pcu)

	AM Peak				PM Peak			
	A6195 N	ASOS	A6195 S	Access	A6195 N	ASOS	A6195 S	Access
A6195 N	0	0	0	5	0	0	0	3
ASOS	0	0	0	0	0	0	0	0
A6195 S	0	0	0	5	0	0	0	0
Access	2	0	3	0	3	0	3	0

2023 Site Access Base Flows (in pcu)

	AM Peak				PM Peak			
	A6195 N	ASOS	A6195 S	Access	A6195 N	ASOS	A6195 S	Access
A6195 N	5	25	309	5	9	3	570	0
ASOS	83	0	90	0	17	0	53	0
A6195 S	522	46	4	10	560	19	1	1
Access	27	0	39	0	4	0	4	0

Site Access Development Distribution

	AM Peak				PM Peak			
	A6195 N	ASOS	A6195 S	Access	A6195 N	ASOS	A6195 S	Access
A6195 N	0%	0%	0%	48%	0%	0%	0%	49%
ASOS	0%	0%	0%	0%	0%	0%	0%	0%
A6195 S	0%	0%	0%	51%	0%	0%	0%	51%
Access	49%	0%	51%	0%	49%	0%	51%	0%

Site Access Development Flows (in pcu): Section 73 TA

	AM Peak				PM Peak			
	A6195 N	ASOS	A6195 S	Access	A6195 N	ASOS	A6195 S	Access
A6195 N				7				2
ASOS								
A6195 S				7				2
Access	5		5		5		5	

2023 Site Access Base & Development Flows (in pcu)

	AM Peak				PM Peak			
	A6195 N	ASOS	A6195 S	Access	A6195 N	ASOS	A6195 S	Access
A6195 N	5	25	309	7	9	3	570	2
ASOS	83	0	90	0	17	0	53	0
A6195 S	522	46	4	12	560	19	1	3
Access	29	0	42	0	6	0	6	0

Houghton Main Colliery: Sensitivity Test 1 TEMPRO 2019-2023 AM 1.051 PM 1.052

2019 Site Access Flows (in pcu)

	AM Peak: 7am - 8am				PM Peak: 4.30pm - 5.30pm			
	A6195 N	ASOS	A6195 S	Access	A6195 N	ASOS	A6195 S	Access
A6195 N	5	25	294	0	9	3	542	0
ASOS	79	0	86	0	16	0	50	0
A6195 S	497	44	4	5	532	18	1	1
Access	23	0	35	0	1	0	1	0

2023 Site Access Background Flows (in pcu)

	AM Peak				PM Peak			
	A6195 N	ASOS	A6195 S	Access	A6195 N	ASOS	A6195 S	Access
A6195 N	5	25	309	0	9	3	570	0
ASOS	83	0	90	0	17	0	53	0
A6195 S	522	46	4	5	560	19	1	1
Access	24	0	37	0	1	0	1	0

Site Access TRRC Consented Flows (in pcu)

	AM Peak				PM Peak			
	A6195 N	ASOS	A6195 S	Access	A6195 N	ASOS	A6195 S	Access
A6195 N	0	0	0	5	0	0	0	0
ASOS	0	0	0	0	0	0	0	0
A6195 S	0	0	0	5	0	0	0	0
Access	2	0	3	0	3	0	3	0

2023 Site Access Base Flows (in pcu)

	AM Peak				PM Peak			
	A6195 N	ASOS	A6195 S	Access	A6195 N	ASOS	A6195 S	Access
A6195 N	5	25	309	5	9	3	570	0
ASOS	83	0	90	0	17	0	53	0
A6195 S	522	46	4	10	560	19	1	1
Access	27	0	39	0	4	0	4	0

Site Access Development Distribution

	AM Peak				PM Peak			
	A6195 N	ASOS	A6195 S	Access	A6195 N	ASOS	A6195 S	Access
A6195 N	0%	0%	0%	49%	0%	0%	0%	49%
ASOS	0%	0%	0%	0%	0%	0%	0%	0%
A6195 S	0%	0%	0%	51%	0%	0%	0%	51%
Access	49%	0%	51%	0%	49%	0%	51%	0%

Site Access Development Flows (in pcu): Sensitivity Test 1

	AM Peak				PM Peak			
	A6195 N	ASOS	A6195 S	Access	A6195 N	ASOS	A6195 S	Access
A6195 N				6				5
ASOS								
A6195 S				6				5
Access	5		5		5		5	

2023 Site Access Base & Development Flows (in pcu)

	AM Peak				PM Peak			
	A6195 N	ASOS	A6195 S	Access	A6195 N	ASOS	A6195 S	Access
A6195 N	5	25	309	6	9	3	570	5
ASOS	83	0	90	0	17	0	53	0
A6195 S	522	46	4	11	560	19	1	6
Access	29	0	42	0	7	0	7	0

Houghton Main Colliery: Sensitivity Test 2 TEMPRO 2019-2023 AM 1.051 PM 1.052

2019 Site Access Flows (in pcu)

	AM Peak: 7am - 8am				PM Peak: 4.30pm - 5.30pm			
	A6195 N	ASOS	A6195 S	Access	A6195 N	ASOS	A6195 S	Access
A6195 N	5	25	294	0	9	3	542	0
ASOS	79	0	86	0	16	0	50	0
A6195 S	497	44	4	5	532	18	1	1
Access	23	0	35	0	1	0	1	0

2023 Site Access Background Flows (in pcu)

	AM Peak				PM Peak			
	A6195 N	ASOS	A6195 S	Access	A6195 N	ASOS	A6195 S	Access
A6195 N	5	25	309	0	9	3	570	0
ASOS	83	0	90	0	17	0	53	0
A6195 S	522	46	4	5	560	19	1	1
Access	24	0	37	0	1	0	1	0

Site Access TRRC Consented Flows (in pcu)

	AM Peak				PM Peak			
	A6195 N	ASOS	A6195 S	Access	A6195 N	ASOS	A6195 S	Access
A6195 N	0	0	0	5	0	0	0	0
ASOS	0	0	0	0	0	0	0	0
A6195 S	0	0	0	5	0	0	0	0
Access	2	0	3	0	3	0	3	0

2023 Site Access Base Flows (in pcu)

	AM Peak				PM Peak			
	A6195 N	ASOS	A6195 S	Access	A6195 N	ASOS	A6195 S	Access
A6195 N	5	25	309	5	9	3	570	0
ASOS	83	0	90	0	17	0	53	0
A6195 S	522	46	4	10	560	19	1	1
Access	27	0	39	0	4	0	4	0

Site Access Development Distribution

	AM Peak				PM Peak			
	A6195 N	ASOS	A6195 S	Access	A6195 N	ASOS	A6195 S	Access
A6195 N	0%	0%	0%	49%	0%	0%	0%	49%
ASOS	0%	0%	0%	0%	0%	0%	0%	0%
A6195 S	0%	0%	0%	51%	0%	0%	0%	51%
Access	49%	0%	51%	0%	49%	0%	51%	0%

Site Access Development Flows (in pcu): Sensitivity Test 2

	AM Peak				PM Peak			
	A6195 N	ASOS	A6195 S	Access	A6195 N	ASOS	A6195 S	Access
A6195 N				8				2
ASOS								
A6195 S				8				2
Access	5		5		5		5	

2023 Site Access Base & Development Flows (in pcu)

	AM Peak				PM Peak			
	A6195 N	ASOS	A6195 S	Access	A6195 N	ASOS	A6195 S	Access
A6195 N	5	25	309	8	9	3	570	2
ASOS	83	0	90	0	17	0	53	0
A6195 S	522	46	4	13	560	19	1	3
Access	30	0	42	0	6	0	6	0

Consented Scheme - Timber Resource Recovery Centre (HV Movements)

Daily	TPA	Average Payload (t)	Annual HV	Daily Load
Deliveries	150000	20	7500	27
Ash Export	11133	25	445	2
Fly Export	4500	20	225	1

Weekday	IN	OUT	TOTAL
AM	3	3	6
PM	0	1	2
Daily	30	30	60

NOTE:

Consented scheme is based on HV movements on weekdays only (Monday to Friday)

The agreed method to distribute across the day was to use of a typical arrival/departure profile for a TRICS landfill site.

S73 Application - Refuse Derived Fuel (HV Movements)

Daily	TPA	Average Payload (t)	Weekly (t)	Weekly HV	Weekday Daily HV	Weekend Daily HV
Deliveries	260000	25	5417	217	33	27
Export	52000	25	1083	43	7	5

Weekday	7am-7pm
Weekend	8am-6pm
Weekday Hours	12
Weekend Hours	10
No. Weekdays	5
No. Weekends	2
Total Weekday Hours	60
Total Weekend Hours	20

Weekday	IN	OUT	TOTAL
AM	4	3	7
PM	0	2	2
Daily	39	39	78

Weekend	IN	OUT	TOTAL
AM	4	3	7
PM	0	2	2
Daily	33	33	66

NOTE:

S73 scheme is based on HV movements on weekdays and weekends (Monday to Sunday)

The agreed method to distribute across the day was to use of a typical arrival/departure profile for a TRICS landfill site.

Comparison of Consented & S73 Application

	Consented	S73	Net Change
Import	150000	260000	73%
Exports	15633	52000	233%
Vehicle Payloads (t)	20-25	25-28	
Operating Days per Week	5	7	40%
Total Hours per Week	60	80	33%
Daily Weekday HV	30	39	
Daily Weekend HV	0	33	
Total Week HV	150	260	73%

Sensitivity Test 1 - Flat Profile

	Weekday			PM		
	IN	OUT	TOTAL	IN	OUT	TOTAL
Flat Profile	3	3	7	3	3	7
Net Change from Consented	0	0	1	3	1	5
Net Change from Submitted	-1	0	-1	3	1	5

	Weekend			PM		
	IN	OUT	TOTAL	IN	OUT	TOTAL
Flat Profile	3	3	7	3	3	7
Net Change from Consented	3	3	7	3	3	7
Net Change from Submitted	-1	0	0	3	1	5

Sensitivity Test 2 - Basic Import/Export Uplift

	Consented TPA	S73+Consented TPA	Consented Annual HV	Basic Uplift	Additional Annual HV	Total Adj Annual HV	S73 Annual HV
Import	150000	260000	7500	73%	5500	13000	10400
Export	15633	52000	870	233%	1559	2229	2080

	Basic Uplift Method			Submitted with S73 TA			Net Change from S73	
	Total Weekly HV	Weekday Daily HV	Weekend Daily HV	Total Weekly HV	Weekday Daily HV	Weekend Daily HV	Weekday Daily HV	Weekend Daily HV
Import	271	41	34	217	33	27	8	7
Export	46	7	6	43	7	5	0	0

Adj Weekday	IN	OUT	TOTAL
AM	5	4	9
PM	0	2	3
Daily	48	48	95

Adj Weekend	IN	OUT	TOTAL
AM	5	4	8
PM	0	2	2
Daily	40	40	79

	Weekday			PM		
	IN	OUT	TOTAL	IN	OUT	TOTAL
Basic Uplift	5	4	9	0	2	3
Net Change from Consented	2	1	3	0	0	1
Net Change from Submitted	1	1	2	0	0	1

	Weekend			PM		
	IN	OUT	TOTAL	IN	OUT	TOTAL
Basic Uplift	5	4	8	0	2	2
Net Change from Consented	5	4	8	0	2	2
Net Change from Submitted	1	1	1	0	0	0

S73 TA Staff Traffic Flows

	Weekday			Weekend		
	IN	OUT	TOTAL	IN	OUT	TOTAL
AM	6	3	9	6	3	9
PM	3	6	9	3	6	9
Daily	12	12	24	12	12	24

Consented Staff Traffic Flows

	Weekday			Weekend		
	IN	OUT	TOTAL	IN	OUT	TOTAL
AM	3	0	3	0	0	0
PM	0	3	3	0	0	0
Daily	12	12	24	0	0	0

Max HV + Staff Total Flow Scenarios (in veh)

	Consented + S73	Consented	Net
AM S73 TA	16	9	7
AM Sc1	16	9	7
AM Sc2	17	9	8
PM S73 TA	11	10	1
PM Sc1	16	10	6
PM Sc2	12	10	2

Appendix B

Junctions 8
ARCADY 8 - Roundabout Module
Version: 8.0.4.487 [15039,24/03/2014] © Copyright TRL Limited, 2019
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Filename: HMCR_1902.arc8

Path: S:\Projects\SK21847 Houghton Main\Junction Assessments

Report generation date: 24/02/2019 17:54:06

- » **HMCR - 2023 Base, AM**
- » **HMCR - 2023 Base, PM**
- » **HMCR - 2023 with Development - S73 TA, AM**
- » **HMCR - 2023 with Development - S73 TA, PM**
- » **HMCR - 2023 with Development - Sens Test 1, AM**
- » **HMCR - 2023 with Development - Sens Test 1, PM**
- » **HMCR - 2023 with Development - Sens Test 2, AM**
- » **HMCR - 2023 with Development - Sens Test 2, PM**

File summary

Title	Houghton Main Colliery Roundabout
Location	Barnsley
Site Number	
Date	01/08/2018
Version	
Status	
Identifier	
Client	
Jobnumber	SK21847
Enumerator	
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

HMCR - 2023 Base, 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
HMCR	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
2023 Base, AM	2023 Base	AM		ONE HOUR	07:15	08:45	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	A,B,C,D				3.57	A

Junction Network Options

Driving Side	Lighting
Left	Normal/unknown

Arms

Arms

Arm	Arm	Name	Description
A	A	A6195 (north)	
B	B	ASOS	
C	C	A6195 (south)	
D	D	Site Access	

Capacity Options

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

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)	Exit Only
A	3.65	6.20	5.50	20.00	60.00	21.00	
B	3.65	6.00	5.50	20.00	60.00	18.00	
C	3.65	7.00	9.00	30.00	60.00	15.00	
D	3.65	7.00	5.00	20.00	60.00	19.00	

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)
A		(calculated)	(calculated)	0.524	1461.301
B		(calculated)	(calculated)	0.527	1465.316
C		(calculated)	(calculated)	0.571	1676.463
D		(calculated)	(calculated)	0.530	1483.340

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 (%)
A	ONE HOUR	✓	345.00	100.000
B	ONE HOUR	✓	173.00	100.000
C	ONE HOUR	✓	582.00	100.000
D	ONE HOUR	✓	66.00	100.000

Direct/Resultant Flows

Direct Flows Data

Time Segment	Arm	Direct Demand Entry Flow (PCU/hr)	DirectDemandEntryFlowInPCU (PCU/hr)	Direct Demand Exit Flow (PCU/hr)	Direct Demand Pedestrian Flow (Ped/hr)
07:15-07:30	A	259.73	259.73		
07:15-07:30	B	130.24	130.24		
07:15-07:30	C	438.16	438.16		
07:15-07:30	D	49.69	49.69		
07:30-07:45	A	310.15	310.15		
07:30-07:45	B	155.52	155.52		
07:30-07:45	C	523.21	523.21		
07:30-07:45	D	59.33	59.33		
07:45-08:00	A	379.85	379.85		
07:45-08:00	B	190.48	190.48		
07:45-08:00	C	640.79	640.79		
07:45-08:00	D	72.67	72.67		
08:00-08:15	A	379.85	379.85		
08:00-08:15	B	190.48	190.48		
08:00-08:15	C	640.79	640.79		
08:00-08:15	D	72.67	72.67		
08:15-08:30	A	310.15	310.15		
08:15-08:30	B	155.52	155.52		
08:15-08:30	C	523.21	523.21		
08:15-08:30	D	59.33	59.33		
08:30-08:45	A	259.73	259.73		
08:30-08:45	B	130.24	130.24		
08:30-08:45	C	438.16	438.16		
08:30-08:45	D	49.69	49.69		

Turning Proportions

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

		To			
		A	B	C	D
From	A	5.000	26.000	309.000	5.000
	B	83.000	0.000	90.000	0.000
	C	522.000	46.000	4.000	10.000
	D	27.000	0.000	39.000	0.000

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

		To			
		A	B	C	D
From	A	0.01	0.08	0.90	0.01
	B	0.48	0.00	0.52	0.00
	C	0.90	0.08	0.01	0.02
	D	0.41	0.00	0.59	0.00

Vehicle Mix

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

		To			
From		A	B	C	D
	A	1.000	1.000	1.000	1.000
	B	1.000	1.000	1.000	1.000
	C	1.000	1.000	1.000	1.000
	D	1.000	1.000	1.000	1.000

Heavy Vehicle Percentages - Junction 1 (for whole period)

		To			
From		A	B	C	D
	A	0.0	0.0	0.0	0.0
	B	0.0	0.0	0.0	0.0
	C	0.0	0.0	0.0	0.0
	D	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)
A	0.27	3.49	0.37	A	316.58	474.87	25.99	3.28	0.29	25.99	3.28
B	0.15	3.38	0.18	A	158.75	238.12	12.68	3.20	0.14	12.68	3.20
C	0.40	3.68	0.65	A	534.05	801.08	44.54	3.34	0.49	44.54	3.34
D	0.07	3.51	0.07	A	60.56	90.84	4.98	3.29	0.06	4.98	3.29

Main Results for each time segment

Main results: (07:15-07:30)

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
A	259.73	64.93	258.85	477.97	66.78	0.00	1426.32	1229.79	0.182	0.00	0.22	3.082	A
B	130.24	32.56	129.81	54.02	271.60	0.00	1322.09	693.77	0.099	0.00	0.11	3.019	A
C	438.16	109.54	436.70	331.63	69.78	0.00	1636.62	1466.08	0.268	0.00	0.36	2.996	A
D	49.69	12.42	49.52	11.25	495.23	0.00	1221.10	534.65	0.041	0.00	0.04	3.072	A

Main results: (07:30-07:45)

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
A	310.15	77.54	309.92	572.19	79.95	0.00	1419.42	1229.79	0.219	0.22	0.28	3.244	A
B	155.52	38.88	155.41	64.68	325.19	0.00	1293.84	693.77	0.120	0.11	0.14	3.161	A
C	523.21	130.80	522.78	397.06	83.55	0.00	1628.77	1466.08	0.321	0.36	0.47	3.252	A
D	59.33	14.83	59.29	13.47	592.85	0.00	1169.41	534.65	0.051	0.04	0.05	3.242	A

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
A	379.85	94.96	379.50	700.59	97.89	0.00	1410.02	1229.79	0.269	0.28	0.37	3.493	A
B	190.48	47.62	190.31	79.19	398.20	0.00	1255.34	693.77	0.152	0.14	0.18	3.379	A
C	640.79	160.20	640.07	486.20	102.30	0.00	1618.06	1466.08	0.396	0.47	0.65	3.679	A
D	72.67	18.17	72.60	16.50	725.88	0.00	1098.97	534.65	0.066	0.05	0.07	3.506	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
A	379.85	94.96	379.85	701.34	97.99	0.00	1409.96	1229.79	0.269	0.37	0.37	3.493	A
B	190.48	47.62	190.47	79.27	398.57	0.00	1255.14	693.77	0.152	0.18	0.18	3.380	A
C	640.79	160.20	640.79	486.65	102.39	0.00	1618.00	1466.08	0.396	0.65	0.65	3.683	A
D	72.67	18.17	72.67	16.52	726.66	0.00	1098.55	534.65	0.066	0.07	0.07	3.508	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
A	310.15	77.54	310.50	573.40	80.11	0.00	1419.33	1229.79	0.219	0.37	0.28	3.249	A
B	155.52	38.88	155.69	64.81	325.80	0.00	1293.52	693.77	0.120	0.18	0.14	3.163	A
C	523.21	130.80	523.92	397.79	83.69	0.00	1628.68	1466.08	0.321	0.65	0.48	3.259	A
D	59.33	14.83	59.40	13.50	594.11	0.00	1168.74	534.65	0.051	0.07	0.05	3.244	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
A	259.73	64.93	259.96	480.03	67.07	0.00	1426.16	1229.79	0.182	0.28	0.22	3.086	A
B	130.24	32.56	130.35	54.26	272.77	0.00	1321.48	693.77	0.099	0.14	0.11	3.021	A
C	438.16	109.54	438.59	333.05	70.07	0.00	1636.46	1466.08	0.268	0.48	0.37	3.008	A
D	49.69	12.42	49.73	11.30	497.37	0.00	1219.97	534.65	0.041	0.05	0.04	3.078	A

Queueing Delay Results for each time segment
Queueing Delay results: (07:15-07:30)

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
A	3.26	0.22	3.082	A	A
B	1.61	0.11	3.019	A	A
C	5.35	0.36	2.996	A	A
D	0.62	0.04	3.072	A	A

Queueing Delay results: (07:30-07:45)

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
A	4.12	0.27	3.244	A	A
B	2.02	0.13	3.161	A	A
C	6.96	0.46	3.252	A	A
D	0.79	0.05	3.242	A	A

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
A	5.42	0.36	3.493	A	A
B	2.64	0.18	3.379	A	A
C	9.59	0.64	3.679	A	A
D	1.04	0.07	3.506	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
A	5.51	0.37	3.493	A	A
B	2.68	0.18	3.380	A	A
C	9.79	0.65	3.683	A	A
D	1.06	0.07	3.508	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
A	4.28	0.29	3.249	A	A
B	2.09	0.14	3.163	A	A
C	7.26	0.48	3.259	A	A
D	0.82	0.05	3.244	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
A	3.40	0.23	3.086	A	A
B	1.67	0.11	3.021	A	A
C	5.59	0.37	3.008	A	A
D	0.65	0.04	3.078	A	A

HMCR - 2023 Base, 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
HMCR	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
2023 Base, FM	2023 Base	FM		ONE HOUR	16:15	17:45	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	A,B,C,D				3.96	A

Junction Network Options

Driving Side	Lighting
Left	Normal/unknown

Arms

Arms

Arm	Arm	Name	Description
A	A	A6195 (north)	
B	B	ASOS	
C	C	A6195 (south)	
D	D	Site Access	

Capacity Options

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

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)	Exit Only
A	3.65	6.20	5.50	20.00	60.00	21.00	
B	3.65	6.00	5.50	20.00	60.00	18.00	
C	3.65	7.00	9.00	30.00	60.00	15.00	
D	3.65	7.00	5.00	20.00	60.00	19.00	

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)
A		(calculated)	(calculated)	0.524	1461.301
B		(calculated)	(calculated)	0.527	1465.316
C		(calculated)	(calculated)	0.571	1676.463
D		(calculated)	(calculated)	0.530	1483.340

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 (%)
A	ONE HOUR	✓	582.00	100.000
B	ONE HOUR	✓	70.00	100.000
C	ONE HOUR	✓	581.00	100.000
D	ONE HOUR	✓	8.00	100.000

Direct/Resultant Flows

Direct Flows Data

Time Segment	Arm	Direct Demand Entry Flow (PCU/hr)	DirectDemandEntryFlowInPCU (PCU/hr)	Direct Demand Exit Flow (PCU/hr)	Direct Demand Pedestrian Flow (Ped/hr)
16:15-16:30	A	438.16	438.16		
16:15-16:30	B	52.70	52.70		
16:15-16:30	C	437.41	437.41		
16:15-16:30	D	6.02	6.02		
16:30-16:45	A	523.21	523.21		
16:30-16:45	B	62.93	62.93		
16:30-16:45	C	522.31	522.31		
16:30-16:45	D	7.19	7.19		
16:45-17:00	A	640.79	640.79		
16:45-17:00	B	77.07	77.07		
16:45-17:00	C	639.69	639.69		
16:45-17:00	D	8.81	8.81		
17:00-17:15	A	640.79	640.79		
17:00-17:15	B	77.07	77.07		
17:00-17:15	C	639.69	639.69		
17:00-17:15	D	8.81	8.81		
17:15-17:30	A	523.21	523.21		
17:15-17:30	B	62.93	62.93		
17:15-17:30	C	522.31	522.31		
17:15-17:30	D	7.19	7.19		
17:30-17:45	A	438.16	438.16		
17:30-17:45	B	52.70	52.70		
17:30-17:45	C	437.41	437.41		
17:30-17:45	D	6.02	6.02		

Turning Proportions

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

		To			
		A	B	C	D
From	A	9.000	3.000	570.000	0.000
	B	17.000	0.000	53.000	0.000
	C	560.000	19.000	1.000	1.000
	D	4.000	0.000	4.000	0.000

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

		To			
		A	B	C	D
From	A	0.02	0.01	0.98	0.00
	B	0.24	0.00	0.76	0.00
	C	0.96	0.03	0.00	0.00
	D	0.50	0.00	0.50	0.00

Vehicle Mix

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

		To			
From		A	B	C	D
	A	1.000	1.000	1.000	1.000
	B	1.000	1.000	1.000	1.000
	C	1.000	1.000	1.000	1.000
	D	1.000	1.000	1.000	1.000

Heavy Vehicle Percentages - Junction 1 (for whole period)

		To			
From		A	B	C	D
	A	0.0	0.0	0.0	0.0
	B	0.0	0.0	0.0	0.0
	C	0.0	0.0	0.0	0.0
	D	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)
A	0.44	4.46	0.79	A	534.05	801.08	53.28	3.99	0.59	53.29	3.99
B	0.07	3.43	0.07	A	64.23	96.35	5.20	3.24	0.06	5.20	3.24
C	0.39	3.53	0.62	A	533.14	799.70	42.95	3.22	0.48	42.95	3.22
D	0.01	3.21	0.01	A	7.34	11.01	0.56	3.06	0.01	0.56	3.06

Main Results for each time segment

Main results: (16:15-16:30)

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
A	438.16	109.54	436.44	442.74	18.01	0.00	1451.87	1286.94	0.302	0.00	0.43	3.539	A
B	52.70	13.17	52.52	16.51	437.94	0.00	1234.38	641.86	0.043	0.00	0.04	3.045	A
C	437.41	109.35	435.99	470.96	19.50	0.00	1665.33	1576.11	0.263	0.00	0.35	2.926	A
D	6.02	1.51	6.00	0.75	454.74	0.00	1242.54	557.10	0.005	0.00	0.00	2.910	A

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

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
A	523.21	130.80	522.68	529.99	21.56	0.00	1450.01	1286.94	0.361	0.43	0.56	3.881	A
B	62.93	15.73	62.88	19.76	524.48	0.00	1188.75	641.86	0.053	0.04	0.06	3.196	A
C	522.31	130.58	521.90	564.01	23.35	0.00	1663.13	1576.11	0.314	0.35	0.46	3.154	A
D	7.19	1.80	7.19	0.90	544.36	0.00	1195.09	557.10	0.006	0.00	0.01	3.029	A

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
A	640.79	160.20	639.89	648.92	26.40	0.00	1447.47	1286.94	0.443	0.56	0.79	4.453	A
B	77.07	19.27	77.00	24.20	642.09	0.00	1126.73	641.86	0.068	0.06	0.07	3.428	A
C	639.69	159.92	639.02	690.50	28.60	0.00	1660.14	1576.11	0.385	0.46	0.62	3.524	A
D	8.81	2.20	8.80	1.10	666.52	0.00	1130.40	557.10	0.008	0.01	0.01	3.208	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
A	640.79	160.20	640.78	649.59	26.42	0.00	1447.46	1286.94	0.443	0.79	0.79	4.462	A
B	77.07	19.27	77.07	24.22	642.98	0.00	1126.26	641.86	0.068	0.07	0.07	3.430	A
C	639.69	159.92	639.69	691.43	28.63	0.00	1660.12	1576.11	0.385	0.62	0.62	3.527	A
D	8.81	2.20	8.81	1.10	667.21	0.00	1130.03	557.10	0.008	0.01	0.01	3.210	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
A	523.21	130.80	524.10	531.07	21.60	0.00	1449.98	1286.94	0.361	0.79	0.57	3.891	A
B	62.93	15.73	63.00	19.80	525.89	0.00	1188.00	641.86	0.053	0.07	0.06	3.199	A
C	522.31	130.58	522.97	565.49	23.40	0.00	1663.10	1576.11	0.314	0.62	0.46	3.161	A
D	7.19	1.80	7.20	0.90	545.47	0.00	1194.50	557.10	0.006	0.01	0.01	3.031	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
A	438.16	109.54	438.69	444.60	18.08	0.00	1451.83	1286.94	0.302	0.57	0.43	3.557	A
B	52.70	13.17	52.75	16.58	440.20	0.00	1233.19	641.86	0.043	0.06	0.04	3.051	A
C	437.41	109.35	437.82	473.35	19.59	0.00	1665.28	1576.11	0.263	0.46	0.36	2.933	A
D	6.02	1.51	6.03	0.75	456.66	0.00	1241.53	557.10	0.005	0.01	0.00	2.913	A

Queueing Delay Results for each time segment
Queueing Delay results: (16:15-16:30)

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
A	6.30	0.42	3.539	A	A
B	0.66	0.04	3.045	A	A
C	5.22	0.35	2.926	A	A
D	0.07	0.00	2.910	A	A

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

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
A	8.26	0.55	3.881	A	A
B	0.83	0.06	3.196	A	A
C	6.73	0.45	3.154	A	A
D	0.09	0.01	3.029	A	A

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
A	11.54	0.77	4.453	A	A
B	1.08	0.07	3.428	A	A
C	9.18	0.61	3.524	A	A
D	0.12	0.01	3.208	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
A	11.84	0.79	4.462	A	A
B	1.10	0.07	3.430	A	A
C	9.36	0.62	3.527	A	A
D	0.12	0.01	3.210	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
A	8.70	0.58	3.891	A	A
B	0.85	0.06	3.199	A	A
C	7.02	0.47	3.161	A	A
D	0.09	0.01	3.031	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
A	6.63	0.44	3.557	A	A
B	0.68	0.05	3.051	A	A
C	5.44	0.36	2.933	A	A
D	0.07	0.00	2.913	A	A

HMCR - 2023 with Development - S73 TA, 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
HMCR	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	R
2023 with Development - S73 TA, AM	2023 with Development - S73 TA	AM		ONE HOUR	07:15	08:45	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	A,B,C,D				3.58	A

Junction Network Options

Driving Side	Lighting
Left	Normal/unknown

Arms

Arms

Arm	Arm	Name	Description
A	A	A6195 (north)	
B	B	ASOS	
C	C	A6195 (south)	
D	D	Site Access	

Capacity Options

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

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)	Exit Only
A	3.65	6.20	5.50	20.00	60.00	21.00	
B	3.65	6.00	5.50	20.00	60.00	18.00	
C	3.65	7.00	9.00	30.00	60.00	15.00	
D	3.65	7.00	5.00	20.00	60.00	19.00	

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)
A		(calculated)	(calculated)	0.524	1461.301
B		(calculated)	(calculated)	0.527	1465.316
C		(calculated)	(calculated)	0.571	1676.463
D		(calculated)	(calculated)	0.530	1483.340

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 (%)
A	ONE HOUR	✓	347.00	100.000
B	ONE HOUR	✓	173.00	100.000
C	ONE HOUR	✓	584.00	100.000
D	ONE HOUR	✓	71.00	100.000

Direct/Resultant Flows

Direct Flows Data

Time Segment	Arm	Direct Demand Entry Flow (PCU/hr)	DirectDemandEntryFlowInPCU (PCU/hr)	Direct Demand Exit Flow (PCU/hr)	Direct Demand Pedestrian Flow (Ped/hr)
07:15-07:30	A	261.24	261.24		
07:15-07:30	B	130.24	130.24		
07:15-07:30	C	439.67	439.67		
07:15-07:30	D	53.45	53.45		
07:30-07:45	A	311.95	311.95		
07:30-07:45	B	155.52	155.52		
07:30-07:45	C	525.00	525.00		
07:30-07:45	D	63.83	63.83		
07:45-08:00	A	382.05	382.05		
07:45-08:00	B	190.48	190.48		
07:45-08:00	C	643.00	643.00		
07:45-08:00	D	78.17	78.17		
08:00-08:15	A	382.05	382.05		
08:00-08:15	B	190.48	190.48		
08:00-08:15	C	643.00	643.00		
08:00-08:15	D	78.17	78.17		
08:15-08:30	A	311.95	311.95		
08:15-08:30	B	155.52	155.52		
08:15-08:30	C	525.00	525.00		
08:15-08:30	D	63.83	63.83		
08:30-08:45	A	261.24	261.24		
08:30-08:45	B	130.24	130.24		
08:30-08:45	C	439.67	439.67		
08:30-08:45	D	53.45	53.45		

Turning Proportions

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

		To			
		A	B	C	D
From	A	5.000	26.000	309.000	7.000
	B	83.000	0.000	90.000	0.000
	C	522.000	46.000	4.000	12.000
	D	29.000	0.000	42.000	0.000

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

		To			
		A	B	C	D
From	A	0.01	0.07	0.89	0.02
	B	0.48	0.00	0.52	0.00
	C	0.89	0.08	0.01	0.02
	D	0.41	0.00	0.59	0.00

Vehicle Mix

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

		To			
From		A	B	C	D
	A	1.000	1.000	1.000	1.000
	B	1.000	1.000	1.000	1.000
	C	1.000	1.000	1.000	1.000
	D	1.000	1.000	1.000	1.000

Heavy Vehicle Percentages - Junction 1 (for whole period)

		To			
From		A	B	C	D
	A	0.0	0.0	0.0	0.0
	B	0.0	0.0	0.0	0.0
	C	0.0	0.0	0.0	0.0
	D	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)
A	0.27	3.51	0.37	A	318.41	477.62	26.22	3.29	0.29	26.22	3.29
B	0.15	3.39	0.18	A	158.75	238.12	12.71	3.20	0.14	12.71	3.20
C	0.40	3.70	0.66	A	535.89	803.83	44.81	3.35	0.50	44.82	3.35
D	0.07	3.53	0.08	A	65.15	97.73	5.38	3.30	0.06	5.38	3.30

Main Results for each time segment

Main results: (07:15-07:30)

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
A	261.24	65.31	260.35	479.47	69.03	0.00	1425.14	1228.49	0.183	0.00	0.22	3.089	A
B	130.24	32.56	129.81	54.02	275.35	0.00	1320.12	692.46	0.099	0.00	0.11	3.024	A
C	439.67	109.92	438.20	333.88	71.28	0.00	1635.77	1462.54	0.269	0.00	0.37	3.002	A
D	53.45	13.36	53.27	14.26	495.23	0.00	1221.10	539.50	0.044	0.00	0.05	3.082	A

Main results: (07:30-07:45)

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
A	311.95	77.99	311.72	573.99	82.64	0.00	1418.01	1228.49	0.220	0.22	0.28	3.254	A
B	155.52	38.88	155.41	64.68	329.68	0.00	1291.47	692.46	0.120	0.11	0.14	3.168	A
C	525.00	131.25	524.57	399.75	85.34	0.00	1627.74	1462.54	0.323	0.37	0.47	3.261	A
D	63.83	15.96	63.78	17.07	592.85	0.00	1169.41	539.50	0.055	0.05	0.06	3.255	A

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
A	382.05	95.51	381.70	702.78	101.19	0.00	1408.29	1228.50	0.271	0.28	0.37	3.507	A
B	190.48	47.62	190.31	79.19	403.69	0.00	1252.44	692.46	0.152	0.14	0.18	3.389	A
C	643.00	160.75	642.27	489.50	104.50	0.00	1616.80	1462.54	0.398	0.47	0.66	3.693	A
D	78.17	19.54	78.10	20.90	725.87	0.00	1098.97	539.50	0.071	0.06	0.08	3.525	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
A	382.05	95.51	382.05	703.54	101.29	0.00	1408.23	1228.50	0.271	0.37	0.37	3.507	A
B	190.48	47.62	190.47	79.27	404.07	0.00	1252.24	692.46	0.152	0.18	0.18	3.389	A
C	643.00	160.75	642.99	489.95	104.60	0.00	1616.75	1462.54	0.398	0.66	0.66	3.696	A
D	78.17	19.54	78.17	20.92	726.66	0.00	1098.55	539.50	0.071	0.08	0.08	3.527	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
A	311.95	77.99	312.30	575.20	82.81	0.00	1417.92	1228.49	0.220	0.37	0.28	3.258	A
B	155.52	38.88	155.69	64.81	330.30	0.00	1291.14	692.46	0.120	0.18	0.14	3.170	A
C	525.00	131.25	525.72	400.49	85.49	0.00	1627.65	1462.54	0.323	0.66	0.48	3.270	A
D	63.83	15.96	63.90	17.10	594.11	0.00	1168.74	539.50	0.055	0.08	0.06	3.257	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
A	261.24	65.31	261.47	481.54	69.33	0.00	1424.98	1228.49	0.183	0.28	0.23	3.094	A
B	130.24	32.56	130.35	54.26	276.54	0.00	1319.49	692.46	0.099	0.14	0.11	3.029	A
C	439.67	109.92	440.10	335.31	71.58	0.00	1635.60	1462.54	0.269	0.48	0.37	3.014	A
D	53.45	13.36	53.50	14.32	497.37	0.00	1219.97	539.50	0.044	0.06	0.05	3.085	A

Queueing Delay Results for each time segment
Queueing Delay results: (07:15-07:30)

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
A	3.29	0.22	3.089	A	A
B	1.61	0.11	3.024	A	A
C	5.38	0.36	3.002	A	A
D	0.67	0.04	3.082	A	A

Queueing Delay results: (07:30-07:45)

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
A	4.16	0.28	3.254	A	A
B	2.02	0.13	3.168	A	A
C	7.00	0.47	3.261	A	A
D	0.85	0.06	3.255	A	A

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
A	5.47	0.36	3.507	A	A
B	2.64	0.18	3.389	A	A
C	9.65	0.64	3.693	A	A
D	1.13	0.08	3.525	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
A	5.56	0.37	3.507	A	A
B	2.68	0.18	3.389	A	A
C	9.86	0.66	3.696	A	A
D	1.15	0.08	3.527	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
A	4.31	0.29	3.258	A	A
B	2.09	0.14	3.170	A	A
C	7.30	0.49	3.270	A	A
D	0.88	0.06	3.257	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
A	3.43	0.23	3.094	A	A
B	1.67	0.11	3.029	A	A
C	5.62	0.37	3.014	A	A
D	0.70	0.05	3.085	A	A

HMCR - 2023 with Development - S73 TA, 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
HMCR	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	R
2023 with Development - S73 TA, FM	2023 with Development - S73 TA	FM		ONE HOUR	16:15	17:45	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	A,B,C,D				3.97	A

Junction Network Options

Driving Side	Lighting
Left	Normal/unknown

Arms

Arms

Arm	Arm	Name	Description
A	A	A6195 (north)	
B	B	ASOS	
C	C	A6195 (south)	
D	D	Site Access	

Capacity Options

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

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)	Exit Only
A	3.65	6.20	5.50	20.00	60.00	21.00	
B	3.65	6.00	5.50	20.00	60.00	18.00	
C	3.65	7.00	9.00	30.00	60.00	15.00	
D	3.65	7.00	5.00	20.00	60.00	19.00	

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)
A		(calculated)	(calculated)	0.524	1461.301
B		(calculated)	(calculated)	0.527	1465.316
C		(calculated)	(calculated)	0.571	1676.463
D		(calculated)	(calculated)	0.530	1483.340

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 (%)
A	ONE HOUR	✓	584.00	100.000
B	ONE HOUR	✓	70.00	100.000
C	ONE HOUR	✓	583.00	100.000
D	ONE HOUR	✓	12.00	100.000

Direct/Resultant Flows

Direct Flows Data

Time Segment	Arm	Direct Demand Entry Flow (PCU/hr)	DirectDemandEntryFlowInPCU (PCU/hr)	Direct Demand Exit Flow (PCU/hr)	Direct Demand Pedestrian Flow (Ped/hr)
16:15-16:30	A	439.67	439.67		
16:15-16:30	B	52.70	52.70		
16:15-16:30	C	438.91	438.91		
16:15-16:30	D	9.03	9.03		
16:30-16:45	A	525.00	525.00		
16:30-16:45	B	62.93	62.93		
16:30-16:45	C	524.11	524.11		
16:30-16:45	D	10.79	10.79		
16:45-17:00	A	643.00	643.00		
16:45-17:00	B	77.07	77.07		
16:45-17:00	C	641.89	641.89		
16:45-17:00	D	13.21	13.21		
17:00-17:15	A	643.00	643.00		
17:00-17:15	B	77.07	77.07		
17:00-17:15	C	641.89	641.89		
17:00-17:15	D	13.21	13.21		
17:15-17:30	A	525.00	525.00		
17:15-17:30	B	62.93	62.93		
17:15-17:30	C	524.11	524.11		
17:15-17:30	D	10.79	10.79		
17:30-17:45	A	439.67	439.67		
17:30-17:45	B	52.70	52.70		
17:30-17:45	C	438.91	438.91		
17:30-17:45	D	9.03	9.03		

Turning Proportions

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

		To			
		A	B	C	D
From	A	9.000	3.000	570.000	2.000
	B	17.000	0.000	53.000	0.000
	C	560.000	19.000	1.000	3.000
	D	6.000	0.000	6.000	0.000

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

		To			
		A	B	C	D
From	A	0.02	0.01	0.98	0.00
	B	0.24	0.00	0.76	0.00
	C	0.96	0.03	0.00	0.01
	D	0.50	0.00	0.50	0.00

Vehicle Mix

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

		To			
From		A	B	C	D
	A	1.000	1.000	1.000	1.000
	B	1.000	1.000	1.000	1.000
	C	1.000	1.000	1.000	1.000
	D	1.000	1.000	1.000	1.000

Heavy Vehicle Percentages - Junction 1 (for whole period)

		To			
From		A	B	C	D
	A	0.0	0.0	0.0	0.0
	B	0.0	0.0	0.0	0.0
	C	0.0	0.0	0.0	0.0
	D	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)
A	0.44	4.48	0.80	A	535.89	803.83	53.64	4.00	0.60	53.64	4.00
B	0.07	3.44	0.07	A	64.23	96.35	5.21	3.24	0.06	5.21	3.24
C	0.39	3.54	0.63	A	534.97	802.46	43.22	3.23	0.48	43.22	3.23
D	0.01	3.22	0.01	A	11.01	16.52	0.85	3.07	0.01	0.85	3.07

Main Results for each time segment

Main results: (16:15-16:30)

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
A	439.67	109.92	437.94	444.23	19.51	0.00	1451.08	1285.97	0.303	0.00	0.43	3.547	A
B	52.70	13.17	52.52	16.51	440.94	0.00	1232.80	641.25	0.043	0.00	0.04	3.049	A
C	438.91	109.73	437.49	472.46	21.00	0.00	1664.47	1573.72	0.264	0.00	0.36	2.932	A
D	9.03	2.26	9.01	3.75	454.74	0.00	1242.54	561.34	0.007	0.00	0.01	2.917	A

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

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
A	525.00	131.25	524.48	531.78	23.36	0.00	1449.06	1285.97	0.362	0.43	0.56	3.892	A
B	62.93	15.73	62.88	19.76	528.07	0.00	1186.85	641.25	0.053	0.04	0.06	3.202	A
C	524.11	131.03	523.70	565.80	25.15	0.00	1662.10	1573.72	0.315	0.36	0.46	3.162	A
D	10.79	2.70	10.78	4.49	544.36	0.00	1195.09	561.34	0.009	0.01	0.01	3.039	A

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
A	643.00	160.75	642.08	651.12	28.60	0.00	1446.32	1285.97	0.445	0.56	0.79	4.472	A
B	77.07	19.27	77.00	24.20	646.48	0.00	1124.41	641.25	0.069	0.06	0.07	3.436	A
C	641.89	160.47	641.22	692.69	30.79	0.00	1658.88	1573.72	0.387	0.46	0.63	3.536	A
D	13.21	3.30	13.20	5.50	666.51	0.00	1130.40	561.34	0.012	0.01	0.01	3.221	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
A	643.00	160.75	642.98	651.80	28.63	0.00	1446.30	1285.97	0.445	0.79	0.80	4.481	A
B	77.07	19.27	77.07	24.22	647.39	0.00	1123.94	641.25	0.069	0.07	0.07	3.438	A
C	641.89	160.47	641.89	693.63	30.83	0.00	1658.86	1573.72	0.387	0.63	0.63	3.539	A
D	13.21	3.30	13.21	5.51	667.21	0.00	1130.03	561.34	0.012	0.01	0.01	3.222	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
A	525.00	131.25	525.90	532.87	23.40	0.00	1449.04	1285.97	0.362	0.80	0.57	3.903	A
B	62.93	15.73	63.00	19.80	529.50	0.00	1186.10	641.25	0.053	0.07	0.06	3.207	A
C	524.11	131.03	524.77	567.29	25.21	0.00	1662.07	1573.72	0.315	0.63	0.46	3.168	A
D	10.79	2.70	10.80	4.50	545.47	0.00	1194.50	561.34	0.009	0.01	0.01	3.040	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
A	439.67	109.92	440.21	446.11	19.59	0.00	1451.04	1285.97	0.303	0.57	0.44	3.562	A
B	52.70	13.17	52.75	16.58	443.22	0.00	1231.60	641.25	0.043	0.06	0.04	3.053	A
C	438.91	109.73	439.33	474.86	21.10	0.00	1664.42	1573.72	0.264	0.46	0.36	2.941	A
D	9.03	2.26	9.04	3.77	456.66	0.00	1241.53	561.34	0.007	0.01	0.01	2.922	A

Queueing Delay Results for each time segment
Queueing Delay results: (16:15-16:30)

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
A	6.33	0.42	3.547	A	A
B	0.66	0.04	3.049	A	A
C	5.25	0.35	2.932	A	A
D	0.11	0.01	2.917	A	A

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

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
A	8.32	0.55	3.892	A	A
B	0.83	0.06	3.202	A	A
C	6.77	0.45	3.162	A	A
D	0.13	0.01	3.039	A	A

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
A	11.63	0.78	4.472	A	A
B	1.09	0.07	3.436	A	A
C	9.24	0.62	3.536	A	A
D	0.17	0.01	3.221	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
A	11.93	0.80	4.481	A	A
B	1.10	0.07	3.438	A	A
C	9.43	0.63	3.539	A	A
D	0.18	0.01	3.222	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
A	8.76	0.58	3.903	A	A
B	0.85	0.06	3.207	A	A
C	7.06	0.47	3.168	A	A
D	0.14	0.01	3.040	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
A	6.67	0.44	3.562	A	A
B	0.68	0.05	3.053	A	A
C	5.47	0.36	2.941	A	A
D	0.11	0.01	2.922	A	A

HMCR - 2023 with Development - Sens Test 1, 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
HMCR	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	R
2023 with Development - Sens Test 1, AM	2023 with Development - Sens Test 1	AM		ONE HOUR	07:15	08:45	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	A,B,C,D				3.58	A

Junction Network Options

Driving Side	Lighting
Left	Normal/unknown

Arms

Arms

Arm	Arm	Name	Description
A	A	A6195 (north)	
B	B	ASOS	
C	C	A6195 (south)	
D	D	Site Access	

Capacity Options

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

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)	Exit Only
A	3.65	6.20	5.50	20.00	60.00	21.00	
B	3.65	6.00	5.50	20.00	60.00	18.00	
C	3.65	7.00	9.00	30.00	60.00	15.00	
D	3.65	7.00	5.00	20.00	60.00	19.00	

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)
A		(calculated)	(calculated)	0.524	1461.301
B		(calculated)	(calculated)	0.527	1465.316
C		(calculated)	(calculated)	0.571	1676.463
D		(calculated)	(calculated)	0.530	1483.340

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 (%)
A	ONE HOUR	✓	346.00	100.000
B	ONE HOUR	✓	173.00	100.000
C	ONE HOUR	✓	583.00	100.000
D	ONE HOUR	✓	71.00	100.000

Direct/Resultant Flows

Direct Flows Data

Time Segment	Arm	Direct Demand Entry Flow (PCU/hr)	DirectDemandEntryFlowInPCU (PCU/hr)	Direct Demand Exit Flow (PCU/hr)	Direct Demand Pedestrian Flow (Ped/hr)
07:15-07:30	A	260.49	260.49		
07:15-07:30	B	130.24	130.24		
07:15-07:30	C	438.91	438.91		
07:15-07:30	D	53.45	53.45		
07:30-07:45	A	311.05	311.05		
07:30-07:45	B	155.52	155.52		
07:30-07:45	C	524.11	524.11		
07:30-07:45	D	63.83	63.83		
07:45-08:00	A	380.95	380.95		
07:45-08:00	B	190.48	190.48		
07:45-08:00	C	641.89	641.89		
07:45-08:00	D	78.17	78.17		
08:00-08:15	A	380.95	380.95		
08:00-08:15	B	190.48	190.48		
08:00-08:15	C	641.89	641.89		
08:00-08:15	D	78.17	78.17		
08:15-08:30	A	311.05	311.05		
08:15-08:30	B	155.52	155.52		
08:15-08:30	C	524.11	524.11		
08:15-08:30	D	63.83	63.83		
08:30-08:45	A	260.49	260.49		
08:30-08:45	B	130.24	130.24		
08:30-08:45	C	438.91	438.91		
08:30-08:45	D	53.45	53.45		

Turning Proportions

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

		To			
		A	B	C	D
From	A	5.000	26.000	309.000	6.000
	B	83.000	0.000	90.000	0.000
	C	522.000	46.000	4.000	11.000
	D	29.000	0.000	42.000	0.000

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

		To			
		A	B	C	D
From	A	0.01	0.08	0.89	0.02
	B	0.48	0.00	0.52	0.00
	C	0.90	0.08	0.01	0.02
	D	0.41	0.00	0.59	0.00

Vehicle Mix

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

		To			
From		A	B	C	D
	A	1.000	1.000	1.000	1.000
	B	1.000	1.000	1.000	1.000
	C	1.000	1.000	1.000	1.000
	D	1.000	1.000	1.000	1.000

Heavy Vehicle Percentages - Junction 1 (for whole period)

		To			
From		A	B	C	D
	A	0.0	0.0	0.0	0.0
	B	0.0	0.0	0.0	0.0
	C	0.0	0.0	0.0	0.0
	D	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)
A	0.27	3.50	0.37	A	317.50	476.24	26.12	3.29	0.29	26.12	3.29
B	0.15	3.39	0.18	A	158.75	238.12	12.71	3.20	0.14	12.71	3.20
C	0.40	3.69	0.66	A	534.97	802.46	44.67	3.34	0.50	44.68	3.34
D	0.07	3.53	0.08	A	65.15	97.73	5.38	3.30	0.06	5.38	3.30

Main Results for each time segment

Main results: (07:15-07:30)

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
A	260.49	65.12	259.60	479.47	69.03	0.00	1425.14	1229.05	0.183	0.00	0.22	3.087	A
B	130.24	32.56	129.81	54.02	274.60	0.00	1320.51	693.07	0.099	0.00	0.11	3.023	A
C	438.91	109.73	437.45	333.88	70.53	0.00	1636.20	1464.32	0.268	0.00	0.36	2.999	A
D	53.45	13.36	53.27	12.76	495.23	0.00	1221.10	537.09	0.044	0.00	0.05	3.082	A

Main results: (07:30-07:45)

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
A	311.05	77.76	310.82	573.99	82.64	0.00	1418.01	1229.05	0.219	0.22	0.28	3.251	A
B	155.52	38.88	155.41	64.68	328.78	0.00	1291.94	693.07	0.120	0.11	0.14	3.167	A
C	524.11	131.03	523.68	399.75	84.44	0.00	1628.25	1464.32	0.322	0.36	0.47	3.257	A
D	63.83	15.96	63.78	15.27	592.85	0.00	1169.41	537.09	0.055	0.05	0.06	3.255	A

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
A	380.95	95.24	380.60	702.79	101.19	0.00	1408.29	1229.05	0.271	0.28	0.37	3.503	A
B	190.48	47.62	190.31	79.19	402.59	0.00	1253.02	693.07	0.152	0.14	0.18	3.387	A
C	641.89	160.47	641.17	489.50	103.40	0.00	1617.43	1464.32	0.397	0.47	0.65	3.686	A
D	78.17	19.54	78.10	18.70	725.88	0.00	1098.97	537.09	0.071	0.06	0.08	3.525	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
A	380.95	95.24	380.95	703.54	101.29	0.00	1408.23	1229.05	0.271	0.37	0.37	3.503	A
B	190.48	47.62	190.47	79.27	402.97	0.00	1252.82	693.07	0.152	0.18	0.18	3.387	A
C	641.89	160.47	641.89	489.95	103.50	0.00	1617.38	1464.32	0.397	0.65	0.66	3.689	A
D	78.17	19.54	78.17	18.72	726.66	0.00	1098.55	537.09	0.071	0.08	0.08	3.527	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
A	311.05	77.76	311.40	575.20	82.81	0.00	1417.92	1229.05	0.219	0.37	0.28	3.253	A
B	155.52	38.88	155.69	64.81	329.40	0.00	1291.62	693.07	0.120	0.18	0.14	3.171	A
C	524.11	131.03	524.82	400.49	84.59	0.00	1628.17	1464.32	0.322	0.66	0.48	3.264	A
D	63.83	15.96	63.90	15.30	594.11	0.00	1168.74	537.09	0.055	0.08	0.06	3.260	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
A	260.49	65.12	260.72	481.54	69.33	0.00	1424.98	1229.05	0.183	0.28	0.22	3.094	A
B	130.24	32.56	130.35	54.26	275.79	0.00	1319.89	693.07	0.099	0.14	0.11	3.026	A
C	438.91	109.73	439.35	335.31	70.83	0.00	1636.03	1464.32	0.268	0.48	0.37	3.008	A
D	53.45	13.36	53.50	12.81	497.37	0.00	1219.97	537.09	0.044	0.06	0.05	3.088	A

Queueing Delay Results for each time segment
Queueing Delay results: (07:15-07:30)

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
A	3.28	0.22	3.087	A	A
B	1.61	0.11	3.023	A	A
C	5.37	0.36	2.999	A	A
D	0.67	0.04	3.082	A	A

Queueing Delay results: (07:30-07:45)

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
A	4.14	0.28	3.251	A	A
B	2.02	0.13	3.167	A	A
C	6.98	0.47	3.257	A	A
D	0.85	0.06	3.255	A	A

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
A	5.45	0.36	3.503	A	A
B	2.64	0.18	3.387	A	A
C	9.62	0.64	3.686	A	A
D	1.13	0.08	3.525	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
A	5.54	0.37	3.503	A	A
B	2.68	0.18	3.387	A	A
C	9.82	0.65	3.689	A	A
D	1.15	0.08	3.527	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
A	4.30	0.29	3.253	A	A
B	2.09	0.14	3.171	A	A
C	7.28	0.49	3.264	A	A
D	0.88	0.06	3.260	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
A	3.41	0.23	3.094	A	A
B	1.67	0.11	3.026	A	A
C	5.60	0.37	3.008	A	A
D	0.70	0.05	3.088	A	A

HMCR - 2023 with Development - Sens Test 1, 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
HMCR	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	R
2023 with Development - Sens Test 1, PM	2023 with Development - Sens Test 1	PM		ONE HOUR	16:15	17:45	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	A,B,C,D				3.99	A

Junction Network Options

Driving Side	Lighting
Left	Normal/unknown

Arms

Arms

Arm	Arm	Name	Description
A	A	A6195 (north)	
B	B	ASOS	
C	C	A6195 (south)	
D	D	Site Access	

Capacity Options

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

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)	Exit Only
A	3.65	6.20	5.50	20.00	60.00	21.00	
B	3.65	6.00	5.50	20.00	60.00	18.00	
C	3.65	7.00	9.00	30.00	60.00	15.00	
D	3.65	7.00	5.00	20.00	60.00	19.00	

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)
A		(calculated)	(calculated)	0.524	1461.301
B		(calculated)	(calculated)	0.527	1465.316
C		(calculated)	(calculated)	0.571	1676.463
D		(calculated)	(calculated)	0.530	1483.340

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 (%)
A	ONE HOUR	✓	587.00	100.000
B	ONE HOUR	✓	70.00	100.000
C	ONE HOUR	✓	586.00	100.000
D	ONE HOUR	✓	14.00	100.000

Direct/Resultant Flows

Direct Flows Data

Time Segment	Arm	Direct Demand Entry Flow (PCU/hr)	DirectDemandEntryFlowInPCU (PCU/hr)	Direct Demand Exit Flow (PCU/hr)	Direct Demand Pedestrian Flow (Ped/hr)
16:15-16:30	A	441.92	441.92		
16:15-16:30	B	52.70	52.70		
16:15-16:30	C	441.17	441.17		
16:15-16:30	D	10.54	10.54		
16:30-16:45	A	527.70	527.70		
16:30-16:45	B	62.93	62.93		
16:30-16:45	C	526.80	526.80		
16:30-16:45	D	12.59	12.59		
16:45-17:00	A	646.30	646.30		
16:45-17:00	B	77.07	77.07		
16:45-17:00	C	645.20	645.20		
16:45-17:00	D	15.41	15.41		
17:00-17:15	A	646.30	646.30		
17:00-17:15	B	77.07	77.07		
17:00-17:15	C	645.20	645.20		
17:00-17:15	D	15.41	15.41		
17:15-17:30	A	527.70	527.70		
17:15-17:30	B	62.93	62.93		
17:15-17:30	C	526.80	526.80		
17:15-17:30	D	12.59	12.59		
17:30-17:45	A	441.92	441.92		
17:30-17:45	B	52.70	52.70		
17:30-17:45	C	441.17	441.17		
17:30-17:45	D	10.54	10.54		

Turning Proportions

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

		To			
		A	B	C	D
From	A	9.000	3.000	570.000	5.000
	B	17.000	0.000	53.000	0.000
	C	560.000	19.000	1.000	6.000
	D	7.000	0.000	7.000	0.000

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

		To			
		A	B	C	D
From	A	0.02	0.01	0.97	0.01
	B	0.24	0.00	0.76	0.00
	C	0.96	0.03	0.00	0.01
	D	0.50	0.00	0.50	0.00

Vehicle Mix

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

		To			
From		A	B	C	D
	A	1.000	1.000	1.000	1.000
	B	1.000	1.000	1.000	1.000
	C	1.000	1.000	1.000	1.000
	D	1.000	1.000	1.000	1.000

Heavy Vehicle Percentages - Junction 1 (for whole period)

		To			
From		A	B	C	D
	A	0.0	0.0	0.0	0.0
	B	0.0	0.0	0.0	0.0
	C	0.0	0.0	0.0	0.0
	D	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)
A	0.45	4.50	0.80	A	538.64	807.96	54.12	4.02	0.60	54.12	4.02
B	0.07	3.45	0.07	A	64.23	96.35	5.21	3.25	0.06	5.21	3.25
C	0.39	3.56	0.64	A	537.72	806.59	43.62	3.24	0.48	43.62	3.24
D	0.01	3.23	0.01	A	12.85	19.27	0.99	3.07	0.01	0.99	3.07

Main Results for each time segment

Main results: (16:15-16:30)

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
A	441.92	110.48	440.18	444.98	20.26	0.00	1450.69	1284.53	0.305	0.00	0.44	3.556	A
B	52.70	13.17	52.52	16.51	443.94	0.00	1231.22	640.34	0.043	0.00	0.04	3.053	A
C	441.17	110.29	439.73	473.20	23.25	0.00	1663.19	1570.19	0.265	0.00	0.36	2.940	A
D	10.54	2.63	10.51	8.25	454.74	0.00	1242.54	567.62	0.008	0.00	0.01	2.921	A

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

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
A	527.70	131.93	527.17	532.68	24.25	0.00	1448.59	1284.53	0.364	0.44	0.57	3.904	A
B	62.93	15.73	62.88	19.76	531.66	0.00	1184.96	640.34	0.053	0.04	0.06	3.207	A
C	526.80	131.70	526.39	566.70	27.84	0.00	1660.57	1570.19	0.317	0.36	0.46	3.174	A
D	12.59	3.15	12.58	9.88	544.36	0.00	1195.09	567.62	0.011	0.01	0.01	3.043	A

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
A	646.30	161.57	645.37	652.21	29.70	0.00	1445.74	1284.53	0.447	0.57	0.80	4.491	A
B	77.07	19.27	77.00	24.20	650.87	0.00	1122.10	640.34	0.069	0.06	0.07	3.444	A
C	645.20	161.30	644.51	693.78	34.09	0.00	1657.00	1570.19	0.389	0.46	0.63	3.554	A
D	15.41	3.85	15.40	12.10	666.51	0.00	1130.40	567.62	0.014	0.01	0.01	3.227	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
A	646.30	161.57	646.29	652.90	29.73	0.00	1445.73	1284.53	0.447	0.80	0.80	4.502	A
B	77.07	19.27	77.07	24.22	651.79	0.00	1121.61	640.34	0.069	0.07	0.07	3.445	A
C	645.20	161.30	645.19	694.73	34.13	0.00	1656.98	1570.19	0.389	0.63	0.64	3.557	A
D	15.41	3.85	15.41	12.11	667.21	0.00	1130.03	567.62	0.014	0.01	0.01	3.229	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
A	527.70	131.93	528.61	533.78	24.30	0.00	1448.57	1284.53	0.364	0.80	0.58	3.918	A
B	62.93	15.73	63.00	19.80	533.11	0.00	1184.20	640.34	0.053	0.07	0.06	3.210	A
C	526.80	131.70	527.48	568.20	27.91	0.00	1660.53	1570.19	0.317	0.64	0.47	3.180	A
D	12.59	3.15	12.60	9.90	545.48	0.00	1194.49	567.62	0.011	0.01	0.01	3.047	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
A	441.92	110.48	442.47	446.86	20.35	0.00	1450.64	1284.53	0.305	0.58	0.44	3.574	A
B	52.70	13.17	52.75	16.58	446.24	0.00	1230.01	640.34	0.043	0.06	0.04	3.057	A
C	441.17	110.29	441.59	475.62	23.36	0.00	1663.13	1570.19	0.265	0.47	0.36	2.947	A
D	10.54	2.63	10.55	8.29	456.66	0.00	1241.52	567.62	0.008	0.01	0.01	2.926	A

Queueing Delay Results for each time segment
Queueing Delay results: (16:15-16:30)

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
A	6.38	0.43	3.556	A	A
B	0.66	0.04	3.053	A	A
C	5.29	0.35	2.940	A	A
D	0.13	0.01	2.921	A	A

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

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
A	8.39	0.56	3.904	A	A
B	0.83	0.06	3.207	A	A
C	6.83	0.46	3.174	A	A
D	0.16	0.01	3.043	A	A

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
A	11.74	0.78	4.491	A	A
B	1.09	0.07	3.444	A	A
C	9.33	0.62	3.554	A	A
D	0.20	0.01	3.227	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
A	12.05	0.80	4.502	A	A
B	1.10	0.07	3.445	A	A
C	9.52	0.63	3.557	A	A
D	0.21	0.01	3.229	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
A	8.83	0.59	3.918	A	A
B	0.86	0.06	3.210	A	A
C	7.12	0.47	3.180	A	A
D	0.16	0.01	3.047	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
A	6.72	0.45	3.574	A	A
B	0.68	0.05	3.057	A	A
C	5.52	0.37	2.947	A	A
D	0.13	0.01	2.926	A	A

HMCR - 2023 with Development - Sens Test 2, 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
HMCR	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	R
2023 with Development - Sens Test 2, AM	2023 with Development - Sens Test 2	AM		ONE HOUR	07:15	08:45	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	A,B,C,D				3.59	A

Junction Network Options

Driving Side	Lighting
Left	Normal/unknown

ARMS

Arms

Arm	Arm	Name	Description
A	A	A6195 (north)	
B	B	ASOS	
C	C	A6195 (south)	
D	D	Site Access	

Capacity Options

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

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)	Exit Only
A	3.65	6.20	5.50	20.00	60.00	21.00	
B	3.65	6.00	5.50	20.00	60.00	18.00	
C	3.65	7.00	9.00	30.00	60.00	15.00	
D	3.65	7.00	5.00	20.00	60.00	19.00	

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)
A		(calculated)	(calculated)	0.524	1461.301
B		(calculated)	(calculated)	0.527	1465.316
C		(calculated)	(calculated)	0.571	1676.463
D		(calculated)	(calculated)	0.530	1483.340

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 (%)
A	ONE HOUR	✓	348.00	100.000
B	ONE HOUR	✓	173.00	100.000
C	ONE HOUR	✓	585.00	100.000
D	ONE HOUR	✓	72.00	100.000

Direct/Resultant Flows

Direct Flows Data

Time Segment	Arm	Direct Demand Entry Flow (PCU/hr)	DirectDemandEntryFlowInPCU (PCU/hr)	Direct Demand Exit Flow (PCU/hr)	Direct Demand Pedestrian Flow (Ped/hr)
07:15-07:30	A	261.99	261.99		
07:15-07:30	B	130.24	130.24		
07:15-07:30	C	440.42	440.42		
07:15-07:30	D	54.21	54.21		
07:30-07:45	A	312.84	312.84		
07:30-07:45	B	155.52	155.52		
07:30-07:45	C	525.90	525.90		
07:30-07:45	D	64.73	64.73		
07:45-08:00	A	383.16	383.16		
07:45-08:00	B	190.48	190.48		
07:45-08:00	C	644.10	644.10		
07:45-08:00	D	79.27	79.27		
08:00-08:15	A	383.16	383.16		
08:00-08:15	B	190.48	190.48		
08:00-08:15	C	644.10	644.10		
08:00-08:15	D	79.27	79.27		
08:15-08:30	A	312.84	312.84		
08:15-08:30	B	155.52	155.52		
08:15-08:30	C	525.90	525.90		
08:15-08:30	D	64.73	64.73		
08:30-08:45	A	261.99	261.99		
08:30-08:45	B	130.24	130.24		
08:30-08:45	C	440.42	440.42		
08:30-08:45	D	54.21	54.21		

Turning Proportions

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

		To			
		A	B	C	D
From	A	5.000	26.000	309.000	8.000
	B	83.000	0.000	90.000	0.000
	C	522.000	46.000	4.000	13.000
	D	30.000	0.000	42.000	0.000

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

		To			
		A	B	C	D
From	A	0.01	0.07	0.89	0.02
	B	0.48	0.00	0.52	0.00
	C	0.89	0.08	0.01	0.02
	D	0.42	0.00	0.58	0.00

Vehicle Mix

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

		To			
From		A	B	C	D
	A	1.000	1.000	1.000	1.000
	B	1.000	1.000	1.000	1.000
	C	1.000	1.000	1.000	1.000
	D	1.000	1.000	1.000	1.000

Heavy Vehicle Percentages - Junction 1 (for whole period)

		To			
From		A	B	C	D
	A	0.0	0.0	0.0	0.0
	B	0.0	0.0	0.0	0.0
	C	0.0	0.0	0.0	0.0
	D	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)
A	0.27	3.51	0.37	A	319.33	479.00	26.32	3.30	0.29	26.32	3.30
B	0.15	3.39	0.18	A	158.75	238.12	12.72	3.20	0.14	12.72	3.20
C	0.40	3.70	0.66	A	536.81	805.21	44.95	3.35	0.50	44.96	3.35
D	0.07	3.53	0.08	A	66.07	99.10	5.46	3.31	0.06	5.46	3.31

Main Results for each time segment

Main results: (07:15-07:30)

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
A	261.99	65.50	261.10	480.22	69.03	0.00	1425.14	1230.33	0.184	0.00	0.22	3.091	A
B	130.24	32.56	129.81	54.02	276.10	0.00	1319.72	693.08	0.099	0.00	0.11	3.025	A
C	440.42	110.10	438.95	333.88	72.03	0.00	1635.34	1460.38	0.269	0.00	0.37	3.005	A
D	54.21	13.55	54.02	15.76	495.23	0.00	1221.10	541.77	0.044	0.00	0.05	3.084	A

Main results: (07:30-07:45)

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
A	312.84	78.21	312.61	574.89	82.64	0.00	1418.01	1230.33	0.221	0.22	0.28	3.256	A
B	155.52	38.88	155.41	64.68	330.58	0.00	1290.99	693.08	0.120	0.11	0.14	3.169	A
C	525.90	131.48	525.47	399.75	86.24	0.00	1627.23	1460.38	0.323	0.37	0.48	3.265	A
D	64.73	16.18	64.68	18.86	592.85	0.00	1169.41	541.77	0.055	0.05	0.06	3.258	A

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
A	383.16	95.79	382.80	703.88	101.19	0.00	1408.29	1230.33	0.272	0.28	0.37	3.510	A
B	190.48	47.62	190.31	79.19	404.79	0.00	1251.86	693.08	0.152	0.14	0.18	3.390	A
C	644.10	161.02	643.36	489.50	105.60	0.00	1616.17	1460.38	0.399	0.48	0.66	3.699	A
D	79.27	19.82	79.20	23.10	725.87	0.00	1098.97	541.77	0.072	0.06	0.08	3.529	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
A	383.16	95.79	383.15	704.64	101.29	0.00	1408.23	1230.33	0.272	0.37	0.37	3.511	A
B	190.48	47.62	190.47	79.27	405.17	0.00	1251.66	693.08	0.152	0.18	0.18	3.391	A
C	644.10	161.02	644.09	489.95	105.70	0.00	1616.12	1460.38	0.399	0.66	0.66	3.702	A
D	79.27	19.82	79.27	23.12	726.66	0.00	1098.55	541.77	0.072	0.08	0.08	3.531	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
A	312.84	78.21	313.20	576.11	82.81	0.00	1417.92	1230.33	0.221	0.37	0.28	3.261	A
B	155.52	38.88	155.69	64.81	331.20	0.00	1290.67	693.08	0.121	0.18	0.14	3.171	A
C	525.90	131.48	526.62	400.49	86.39	0.00	1627.14	1460.38	0.323	0.66	0.48	3.275	A
D	64.73	16.18	64.80	18.90	594.12	0.00	1168.74	541.77	0.055	0.08	0.06	3.260	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
A	261.99	65.50	262.23	482.29	69.33	0.00	1424.98	1230.33	0.184	0.28	0.23	3.098	A
B	130.24	32.56	130.35	54.26	277.30	0.00	1319.09	693.08	0.099	0.14	0.11	3.030	A
C	440.42	110.10	440.86	335.31	72.34	0.00	1635.17	1460.38	0.269	0.48	0.37	3.014	A
D	54.21	13.55	54.25	15.83	497.37	0.00	1219.97	541.77	0.044	0.06	0.05	3.090	A

Queueing Delay Results for each time segment
Queueing Delay results: (07:15-07:30)

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
A	3.30	0.22	3.091	A	A
B	1.61	0.11	3.025	A	A
C	5.40	0.36	3.005	A	A
D	0.68	0.05	3.084	A	A

Queueing Delay results: (07:30-07:45)

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
A	4.17	0.28	3.256	A	A
B	2.02	0.13	3.169	A	A
C	7.02	0.47	3.265	A	A
D	0.87	0.06	3.258	A	A

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
A	5.49	0.37	3.510	A	A
B	2.64	0.18	3.390	A	A
C	9.69	0.65	3.699	A	A
D	1.15	0.08	3.529	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
A	5.59	0.37	3.511	A	A
B	2.68	0.18	3.391	A	A
C	9.89	0.66	3.702	A	A
D	1.16	0.08	3.531	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
A	4.33	0.29	3.261	A	A
B	2.09	0.14	3.171	A	A
C	7.33	0.49	3.275	A	A
D	0.89	0.06	3.260	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
A	3.44	0.23	3.098	A	A
B	1.67	0.11	3.030	A	A
C	5.64	0.38	3.014	A	A
D	0.71	0.05	3.090	A	A

HMCR - 2023 with Development - Sens Test 2, 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
HMCR	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	R
2023 with Development - Sens Test 2, PM	2023 with Development - Sens Test 2	PM		ONE HOUR	16:15	17:45	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	A,B,C,D				3.97	A

Junction Network Options

Driving Side	Lighting
Left	Normal/unknown

Arms

Arms

Arm	Arm	Name	Description
A	A	A6195 (north)	
B	B	ASOS	
C	C	A6195 (south)	
D	D	Site Access	

Capacity Options

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

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)	Exit Only
A	3.65	6.20	5.50	20.00	60.00	21.00	
B	3.65	6.00	5.50	20.00	60.00	18.00	
C	3.65	7.00	9.00	30.00	60.00	15.00	
D	3.65	7.00	5.00	20.00	60.00	19.00	

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)
A		(calculated)	(calculated)	0.524	1461.301
B		(calculated)	(calculated)	0.527	1465.316
C		(calculated)	(calculated)	0.571	1676.463
D		(calculated)	(calculated)	0.530	1483.340

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 (%)
A	ONE HOUR	✓	584.00	100.000
B	ONE HOUR	✓	70.00	100.000
C	ONE HOUR	✓	583.00	100.000
D	ONE HOUR	✓	12.00	100.000

Direct/Resultant Flows

Direct Flows Data

Time Segment	Arm	Direct Demand Entry Flow (PCU/hr)	DirectDemandEntryFlowInPCU (PCU/hr)	Direct Demand Exit Flow (PCU/hr)	Direct Demand Pedestrian Flow (Ped/hr)
16:15-16:30	A	439.67	439.67		
16:15-16:30	B	52.70	52.70		
16:15-16:30	C	438.91	438.91		
16:15-16:30	D	9.03	9.03		
16:30-16:45	A	525.00	525.00		
16:30-16:45	B	62.93	62.93		
16:30-16:45	C	524.11	524.11		
16:30-16:45	D	10.79	10.79		
16:45-17:00	A	643.00	643.00		
16:45-17:00	B	77.07	77.07		
16:45-17:00	C	641.89	641.89		
16:45-17:00	D	13.21	13.21		
17:00-17:15	A	643.00	643.00		
17:00-17:15	B	77.07	77.07		
17:00-17:15	C	641.89	641.89		
17:00-17:15	D	13.21	13.21		
17:15-17:30	A	525.00	525.00		
17:15-17:30	B	62.93	62.93		
17:15-17:30	C	524.11	524.11		
17:15-17:30	D	10.79	10.79		
17:30-17:45	A	439.67	439.67		
17:30-17:45	B	52.70	52.70		
17:30-17:45	C	438.91	438.91		
17:30-17:45	D	9.03	9.03		

Turning Proportions

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

		To			
		A	B	C	D
From	A	9.000	3.000	570.000	2.000
	B	17.000	0.000	53.000	0.000
	C	560.000	19.000	1.000	3.000
	D	6.000	0.000	6.000	0.000

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

		To			
		A	B	C	D
From	A	0.02	0.01	0.98	0.00
	B	0.24	0.00	0.76	0.00
	C	0.96	0.03	0.00	0.01
	D	0.50	0.00	0.50	0.00

Vehicle Mix

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

		To			
From		A	B	C	D
	A	1.000	1.000	1.000	1.000
	B	1.000	1.000	1.000	1.000
	C	1.000	1.000	1.000	1.000
	D	1.000	1.000	1.000	1.000

Heavy Vehicle Percentages - Junction 1 (for whole period)

		To			
From		A	B	C	D
	A	0.0	0.0	0.0	0.0
	B	0.0	0.0	0.0	0.0
	C	0.0	0.0	0.0	0.0
	D	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)
A	0.44	4.48	0.80	A	535.89	803.83	53.64	4.00	0.60	53.64	4.00
B	0.07	3.44	0.07	A	64.23	96.35	5.21	3.24	0.06	5.21	3.24
C	0.39	3.54	0.63	A	534.97	802.46	43.22	3.23	0.48	43.22	3.23
D	0.01	3.22	0.01	A	11.01	16.52	0.85	3.07	0.01	0.85	3.07

Main Results for each time segment

Main results: (16:15-16:30)

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
A	439.67	109.92	437.94	444.23	19.51	0.00	1451.08	1285.97	0.303	0.00	0.43	3.547	A
B	52.70	13.17	52.52	16.51	440.94	0.00	1232.80	641.25	0.043	0.00	0.04	3.049	A
C	438.91	109.73	437.49	472.46	21.00	0.00	1664.47	1573.72	0.264	0.00	0.36	2.932	A
D	9.03	2.26	9.01	3.75	454.74	0.00	1242.54	561.34	0.007	0.00	0.01	2.917	A

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

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
A	525.00	131.25	524.48	531.78	23.36	0.00	1449.06	1285.97	0.362	0.43	0.56	3.892	A
B	62.93	15.73	62.88	19.76	528.07	0.00	1186.85	641.25	0.053	0.04	0.06	3.202	A
C	524.11	131.03	523.70	565.80	25.15	0.00	1662.10	1573.72	0.315	0.36	0.46	3.162	A
D	10.79	2.70	10.78	4.49	544.36	0.00	1195.09	561.34	0.009	0.01	0.01	3.039	A

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
A	643.00	160.75	642.08	651.12	28.60	0.00	1446.32	1285.97	0.445	0.56	0.79	4.472	A
B	77.07	19.27	77.00	24.20	646.48	0.00	1124.41	641.25	0.069	0.06	0.07	3.436	A
C	641.89	160.47	641.22	692.69	30.79	0.00	1658.88	1573.72	0.387	0.46	0.63	3.536	A
D	13.21	3.30	13.20	5.50	666.51	0.00	1130.40	561.34	0.012	0.01	0.01	3.221	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
A	643.00	160.75	642.98	651.80	28.63	0.00	1446.30	1285.97	0.445	0.79	0.80	4.481	A
B	77.07	19.27	77.07	24.22	647.39	0.00	1123.94	641.25	0.069	0.07	0.07	3.438	A
C	641.89	160.47	641.89	693.63	30.83	0.00	1658.86	1573.72	0.387	0.63	0.63	3.539	A
D	13.21	3.30	13.21	5.51	667.21	0.00	1130.03	561.34	0.012	0.01	0.01	3.222	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
A	525.00	131.25	525.90	532.87	23.40	0.00	1449.04	1285.97	0.362	0.80	0.57	3.903	A
B	62.93	15.73	63.00	19.80	529.50	0.00	1186.10	641.25	0.053	0.07	0.06	3.207	A
C	524.11	131.03	524.77	567.29	25.21	0.00	1662.07	1573.72	0.315	0.63	0.46	3.168	A
D	10.79	2.70	10.80	4.50	545.47	0.00	1194.50	561.34	0.009	0.01	0.01	3.040	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
A	439.67	109.92	440.21	446.11	19.59	0.00	1451.04	1285.97	0.303	0.57	0.44	3.562	A
B	52.70	13.17	52.75	16.58	443.22	0.00	1231.60	641.25	0.043	0.06	0.04	3.053	A
C	438.91	109.73	439.33	474.86	21.10	0.00	1664.42	1573.72	0.264	0.46	0.36	2.941	A
D	9.03	2.26	9.04	3.77	456.66	0.00	1241.53	561.34	0.007	0.01	0.01	2.922	A

Queueing Delay Results for each time segment
Queueing Delay results: (16:15-16:30)

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
A	6.33	0.42	3.547	A	A
B	0.66	0.04	3.049	A	A
C	5.25	0.35	2.932	A	A
D	0.11	0.01	2.917	A	A

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

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
A	8.32	0.55	3.892	A	A
B	0.83	0.06	3.202	A	A
C	6.77	0.45	3.162	A	A
D	0.13	0.01	3.039	A	A

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
A	11.63	0.78	4.472	A	A
B	1.09	0.07	3.436	A	A
C	9.24	0.62	3.536	A	A
D	0.17	0.01	3.221	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
A	11.93	0.80	4.481	A	A
B	1.10	0.07	3.438	A	A
C	9.43	0.63	3.539	A	A
D	0.18	0.01	3.222	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
A	8.76	0.58	3.903	A	A
B	0.85	0.06	3.207	A	A
C	7.06	0.47	3.168	A	A
D	0.14	0.01	3.040	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
A	6.67	0.44	3.562	A	A
B	0.68	0.05	3.053	A	A
C	5.47	0.36	2.941	A	A
D	0.11	0.01	2.922	A	A

