TECHNICAL NOTE

Job Name:	Heyford Park
Job No:	39304
Note No:	028 Rev. A
Date:	1st November 2019
Prepared By:	Phil Rawlins
Subject:	**B430 Station Road / Ardley Road Junction Capacity Testing**

Item	Subject
1.	**Introduction** This note has been prepared by Peter Brett Associates, now part of Stantec (PBA) on behalf of Dorchester Group to set out a review of the operation of the B430 Station Road / Ardley Road staggered crossroad junction and the impact of the proposed Heyford Park development on the junction. The current junction layout provides for a four arm, priority, staggered crossroads, located in the village of Ardley between the Heyford Park development site and the M40 motorway junction. The B430 Station Road runs north – south and forms the mainline through the junction whilst the Ardley Road forms the minor arms to the east and west. The junction was originally scoped out of the assessment undertaken for the Heyford Park Transport Assessment however, Oxfordshire County Council (OCC) has subsequently requested during the post application process that the junction be modelled to establish the extent of development impact on this part of the local road network. This note sets out the validation of the model and the results of 2018 base year modelling at **Section 2**. **Section 3** sets out the results of 2031 forecast modelling of the junction with and without the Heyford development. **Section 4** sets out potential improvements for the junction and conclusions are presented at **Section 5**.
2.	**2018 Base Model** The junction has been modelled using TRANSYT 15 in order to represent the complex interaction of the multiple priority elements of the junction. The giveway coefficients have been calculated using the PICADY module of Junctions 9. The geometry for the base model has been taken from a combination of OS mapping and recent aerial photography and measurements were taken in accordance with the PICADY and TRANSYT user guides as necessary. Baseline traffic flows for the junction were surveyed on Thursday 8th February 2018, between the hours of 07:00 – 10:00 and 16:00 – 19:00. As with the rest of the work undertaken in the Transport Assessment supporting the main application (PBA, April 2018) the network peak hours of 07:45 – 08:45 and 17:00 – 18:00 have been adopted for the basis of the junction modelling. 2018 Base Modelling – Validation The model has been validated against queue surveys that were undertaken at the same time as the turning count survey. The queue surveys recorded the stationary traffic that was queuing in each approach lane to the junction, at the end of each five minute period. A comparison of the queues from the model and surveyed queues have been provided in **Table 1**.

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Table 1: B430 Station Road / Ardley Road

Link	AM Peak		PM Peak	
	Modelled Queue (veh.)	Queue Survey (ave. veh.)	Modelled Queue (veh.)	Queue Survey (ave. veh.)
B430 (N) Left Slip	0.0	0.0	0.0	0.0
B430 (N) RT	0.1	0.1	0.0	0.0
Ardley Road (E)	0.7	1.5	0.1	1.7
B430 (S) Left Slip	0.0	0.0	0.0	0.0
B430 (S) RT	0.1	0.0	0.1	0.0
Ardley Road (W) Left Slip	0.0	0.0	0.0	0.0
Ardley Road (W) RT	0.1	0.8	0.0	0.5

The results in **Table 1** show that the model predicts similar levels of queuing to those recorded for the surveyed periods in both the AM and PM peak hours. On this basis, it is considered that the model provides a robust basis to assess the forecast Reference (without development) and Test Case (with development) scenarios.

<u>2018 Base Modelling</u>

Table 2 presents the modelled junction capacity results for the 2018 base scenario at the B430 Station Road / Ardley Road junction.

Table 2: B430 Station Road / Ardley Road 2018 Base Modelling Results

Link	AM Peak			PM Peak		
	DoS	MMQ	Delay (Secs)	DoS	MMQ	Delay (Secs)
B430 Station Road (N)	38%	0.2	1	20%	0.1	1
Ardley Road (E)	69%	0.7	18	27%	0.1	2
B430 Station Road (S)	32%	0.1	1	33%	0.1	1
Ardley Road (W)	33%	0.1	2	11%	0.0	0

DoS = Degree of Saturation, MMQ = Maximum Mean Queue

Table 2 demonstrates that the B430 Station Road / Ardley Road Junction is predicted to operate within capacity in the AM and PM peak hours with a maximum DoS of 69% in the AM peak on the Ardley Road east arm and 33% in the PM peak on the B430 Station Road south arm.

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3.	**2031 Forecast Modelling**

Introduction

Since the TA was submitted in support of the main Heyford Application, further modelling has been undertaken using OCCs Bicester SATURN model in order to establish an agreed package of mitigation for the Local Road Network including the Middleton Stoney junction. The SATURN model has been used in order to determine the impact of the development on the B430 Station Road / Ardley Road junction as it will best represent any traffic reassignment arising as a result of proposed improvements associated with the M40, J10 and Middleton Stoney.

A number of scenarios have been modelled in the SATURN model. The key scenarios for the purposes of this assessment are set out below:

- 2031 Reference Case (RC): The RC scenario includes background growth and committed development proposals up to the 2031 forecast year. The Local Plan allocation at Heyford Park is not included within this assessment.
- 2031: Do Something 1 (DS1): The DS1 scenario is as the RC scenario but includes the full Local Plan allocation at Heyford Park and the highway mitigation proposed by the Heyford Park development including:
  - M40, J10 and Baynards Green Roundabout: including the potential RIS scheme for all four junctions in this complex.
  - B430 Ardley Road / Unnamed Road: signalised T-Junction
  - Middleton Stoney: Committed signalisation of the Middleton Stoney junction and the introduction of a bus gate on the western arm of the junction.
  - Hopcrofts Holt: capacity improvements to the signalised crossroad layout
  - A4260 / B4027: inclusion of a roundabout layout at the junction. Dorchester have agreed with OCC to a 5% contribution towards the implementation of safety improvements in this location. The roundabout is included within the 2031 forecast model as it is considered that OCC will have implemented this improvement or a similar scheme within this timeframe.

The results of the modelling undertaken with flows from these scenarios is set out below.

2031 Reference Case Modelling

A summary of the capacity analysis results in the RC scenario is set out within **Table 3**. The full model outputs are provided at **Appendix A**.

Table 3: B430 Station Road / Ardley Road 2031 Reference Case Modelling Results

Link	AM Peak			PM Peak		
	DoS	MMQ	Delay (Secs)	DoS	MMQ	Delay (Secs)
B430 Station Road (N)	56%	0.7	2	30%	0.1	1
Ardley Road (E)	245%	60.4	1295	75%	1.1	27
B430 Station Road (S)	61%	0.5	2	38%	0.1	1
Ardley Road (W)	44%	0.2	5	31%	0.1	2

DoS = Degree of Saturation, MMQ = Maximum Mean Queue

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	Table 3 shows that the B430 Station Road / Ardley Road Junction is predicted to operate over capacity in the AM peak with a maximum DoS of 245% on the Ardley Road east arm. The junction is predicted to operate within capacity in the PM peak with a maximum DoS of 75% on the Ardley Road east arm.

2031 Test Case Modelling – Do Something 1

A summary of the capacity analysis results in the DS1 scenario is set out within **Table 4**. The full model outputs are provided at **Appendix A**.

Table 4: B430 Station Road / Ardley Road 2031 Do something 1 Modelling Results

Link	AM Peak			PM Peak		
	DoS	MMQ	Delay (Secs)	DoS	MMQ	Delay (Secs)
B430 Station Road (N)	58%	0.8	3	28%	0.1	1
Ardley Road (E)	311%	44.8	1485	9999%	98.5	1800
B430 Station Road (S)	74%	1.0	5	78%	1.4	4
Ardley Road (W)	73%	0.9	16	57%	0.4	8

DoS = Degree of Saturation, MMQ = Maximum Mean Queue

Table 4 shows that the B430 Station Road / Ardley Road Junction is predicted to operate over capacity in the DS1 scenario in both the AM and PM peak hours. In the AM peak hour Ardley Road East has a maximum DoS of 311%. In the PM peak hour Ardley Road East has no effective capacity due to the high opposing flow on the B430.

4. Mitigation Proposals

As the junction is predicted to operate over capacity in both the Reference Case (without the development) and the Test Case (DS1 scenario including development) it is considered that highway improvements should be considered at this location. On this basis a number of options have been considered as set out below:

- Roundabout: A roundabout layout has been considered, however, due to the current carriageway alignment of Ardley Road, B430 Station Road and also Fewcott Green (the side road to the west), a single standard roundabout would not be achievable within highway land. This is due to the arm spacing of the southern and eastern arms; proximity of the western arm to Fewcott Green and the required SSD on the eastern arm. Due to the limited availability of highway land, the roundabout couldn't be moved south without reducing the size, this is also likely to introduce a similar issue with arm spacing on the northern arms.

- Signalised Crossroad: A signalised crossroad layout has been considered, however, it is noted that the capacity of the junction will be greater if a staggered crossroad arrangement can be provided because the junction will be able to operate as two separate T-junctions and less stages will be required.

- Signalised Staggered Crossroad: For the reasons set out above it is considered that a signalised staggered crossroad arrangement is likely to provide the most achievable highway

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	improvement option in this location. More details on the arrangement considered for testing purposes are set out below.

The highway improvement layout for the B430 Station Road / Ardley Road junction is illustrated in **Drawing 39304/5501/SK50 Rev A**. The drawing shows a signalised staggered crossroad arrangement. Give-way left turn slips have been included on the B430 in order to increase the capacity of the junction and ensure that queuing at the internal stop lines is kept to a minimum.

It should be noted that due to existing land ownership constraints the Stopping Sight Distance (SSD) to the nearside primary signal head on the Ardley Road east arm will be below standard, with 172m achievable rather than the standard 215m for 60mph. Whilst this represents a reduction in standard it is no worse than the SSD to the give way line under current conditions and the signalisation will provide additional safety benefits. The 60mph limit also reduces to 40mph approximately 70m from the junction which will naturally slow vehicles on their approach to the junction.

The proposed mitigation has been modelled using TRANSYT as set out below. A summary of the capacity analysis results for the mitigation in the DS1 scenario is set out within **Table 5**. The full model outputs are provided at **Appendix B**.

Table 5: B430 Station Rd / Ardley Rd 2031 Mitigation Do Something 1 Modelling Results

Link	AM Peak			PM Peak		
	DoS	MMQ	Delay (Secs)	DoS	MMQ	Delay (Secs)
B430 Station Road (N)	74%	16.5	12	37%	4.0	6
Ardley Road (E)	68%	3.1	53	59%	4.1	35
B430 Station Road (S)	93%	12.6	34	88%	22.4	20
Ardley Road (W)	92%	9.0	86	62%	4.3	37

DoS = Degree of Saturation, MMQ = Maximum Mean Queue

Table 5 shows that the B430 Station Road / Ardley Road Junction is predicted to operate at capacity in the DS1 scenario in the AM peak with a maximum DoS of 93% on the B430 Station Road south arm. The junction is predicted to operate within capacity in the PM peak with a maximum DoS of 88% on the B430 Station Road (S) arm.

As the proposed mitigation is shown to work at or within capacity in the DS1 scenario it is considered that this will represent an operational solution for this location and represents a significant betterment in terms of capacity when compared to the Reference Case scenario where the Ardley Road east arm was predicted to operate with a DoS of 245% in the AM peak hour.

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5.	**Conclusion**

This note has tested the impact of the Heyford Park Local Plan allocation on the B430 Station Road / Ardley Road junction. The junction was found to be operating significantly over capacity in the Reference Case scenario and the Do Something 1 scenario. On this basis highway improvements, have been considered for the junction in the form of a signalised staggered crossroad arrangement as illustrated in **Drawing 39304/5501/SK50 Rev A**.

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	The highway improvement layout has been demonstrated to operate at or within capacity in the Do Something 1 scenario and the junction is shown to provide betterment over the Reference Case scenario (without development). On this basis, the improvement is considered to address impacts arising from planned and committed growth in the local network for the period to 2031 including the Heyford Park Local Plan Allocation.

DOCUMENT ISSUE RECORD

Technical Note No	Rev	Date	Prepared	Checked	Reviewed (Discipline Lead)	Approved (Project Director)
39304/TN028	-	12.06.19	Phil Rawlins	-	-	Matt Whiston
39304/TN028	A	01.11.19	Phil Rawlins	-	-	Matt Whiston

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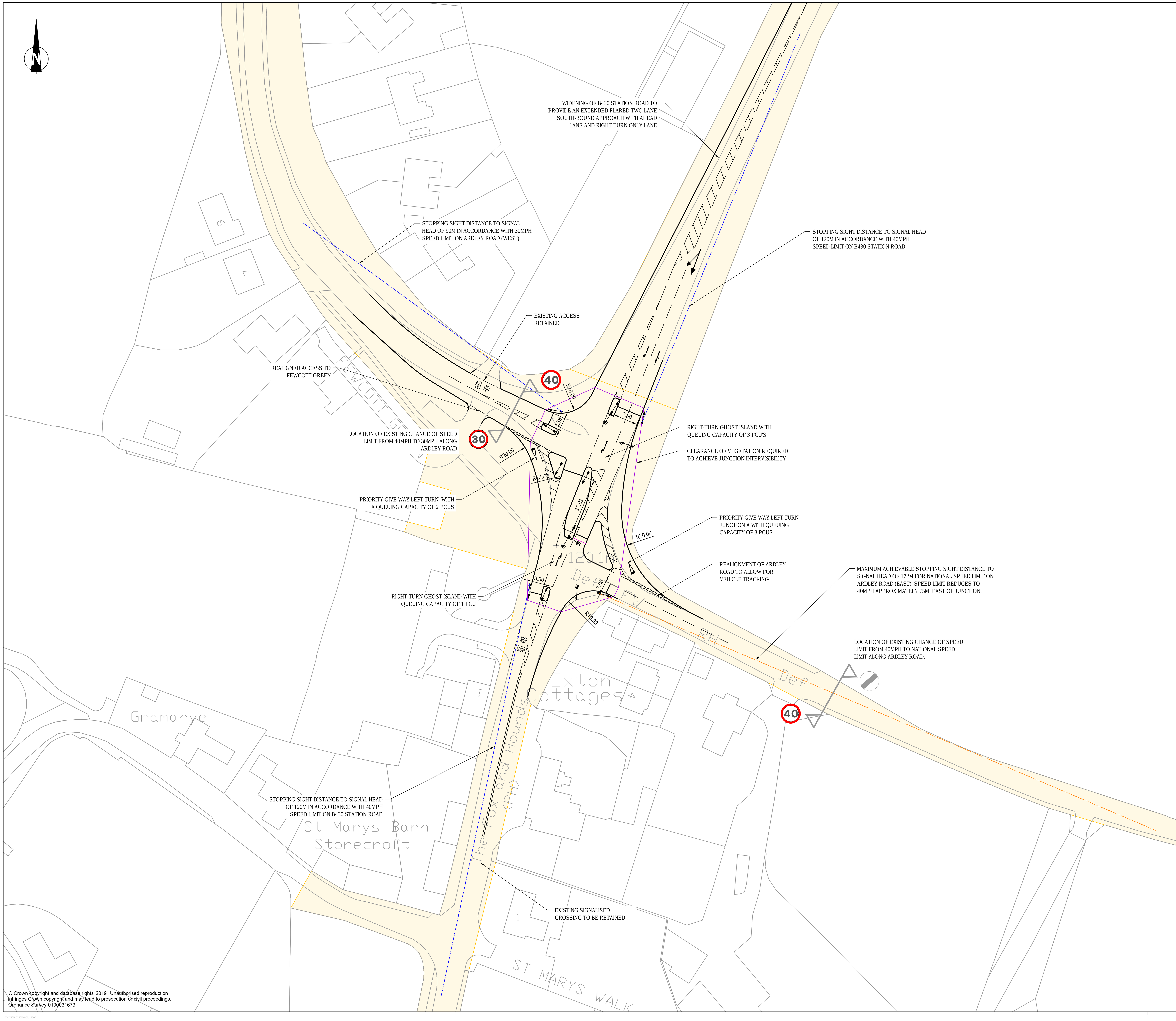
DRAWINGS



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NOTES:

1. THE LAYOUT IS SUBJECT TO DETAILED DESIGN, ROAD SAFETY AUDIT, CAPACITY TESTING, GROUND INVESTIGATIONS RESULTS & EARTHWORKS MODELLING, UTILITIES & SERVICES AND CONFIRMATION OF LAND OWNERSHIP;

2. THE DETAILED DESIGN LAYOUT WILL BE DESIGNED IN ACCORDANCE WITH ALL RELEVANT DESIGN GUIDANCE AND STANDARDS;

3. THE LAYOUT HAS BEEN BASED ON THE APPROPRIATE DESIGN SPEED FOR OUR CURRENT PROPOSALS;

4. THIS DRAWING SHOULD BE READ IN CONJUNCTION WITH ALL RELEVANT ASSOCIATED DOCUMENTS; AND

5. THE USE OF THE DRAWING DOES NOT ABSOLVE THE CLIENT FROM THEIR RESPONSIBILITIES IN REGARDS TO HEALTH & SAFETY AND CDM REGULATIONS;

KEY:

HIGHWAY BOUNDARY INFORMATION RECEIVED FROM OXFORD COUNTY COUNCIL ON 09.04.19 AND INTERPRETED BY PBA

STOPPING SIGHT DISTANCE TO JUNCTION NEAR-SIDE SIGNAL HEAD IN ACCORDANCE WITH DMRB FOR RELEVANT SPEED LIMIT ON APPROACH

STOPPING SIGHT DISTANCE (MAXIMUM ACHIEVABLE) TO JUNCTION NEAR-SIDE SIGNAL HEAD WITHIN ADOPTED HIGHWAY LAND

JUNCTION INTERVISIBILITY TO DMRB (WORST CASE SHOWN FOR A STAGGERED CROSSROADS ARRANGEMENT)

PRIMARY TRAFFIC SIGNAL HEAD AND POLE

SECONDARY TRAFFIC SIGNAL HEAD AND POLE

Mark	Revision	Date	Drawn	Chkd	Appd
A	REVISED JUNCTION TO INCLUDE GIVEWAY LEFT TURNS	31.05.19	JHo	-	-

SCALING NOTE: Do not scale from this drawing. If in doubt, ask.

UTILITIES NOTE: The position of any existing public or private sewers, utility services, plant or apparatus shown on this drawing is believed to be correct, but no warranty to this is expressed or implied. Other such plant or apparatus may also be present but not shown. The Contractor is therefore advised to undertake their own investigation where the presence of any existing sewers, services, plant or apparatus may affect their operations.

Drawing Issue Status

DRAFT

HEYFORD PARK
CONCEPT SIGNALISED JUNCTION LAYOUT OF B430 STATION ROAD / ARDLEY ROAD

Client

DORCHESTER GROUP

Date of 1st Issue	Designed	Drawn
24.04.19	P.C	P.C
A1 Scale	Checked	Approved
1:500	-	-

Drawing Number	Revision
39304/5501/SK50	A

now part of

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APPENDIX A

TRANSYT 15

Version: 15.5.2.7994
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Filename: 190523 Ardley Crossroads.t15
Path: \\pba.int\BRI\Projects\39304 Heyford Park Tranche 2\Technical\Transport\Junction Assessments\TRANSYT
Report generation date: 14/06/2019 12:56:44

File summary

File description

File title	(untitled)
Location	
Site number	
UTCRegion	
Driving side	Left
Date	14/12/2017
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Enumerator	PBA\dcollis
Description	

Model and Results

Enable controller offsets	Enable fuel consumption	Enable quick flares	Display journey time results	Display level of service results	Display blocking and starvation results	Display end of red and green queue results	Display excess queue results	Display separate uniform and random results	Display unweighted results	Display TRANSYT 12 style timings	Display effective greens in results	Display Red-With-Amber	Display End-Of-Green Amber

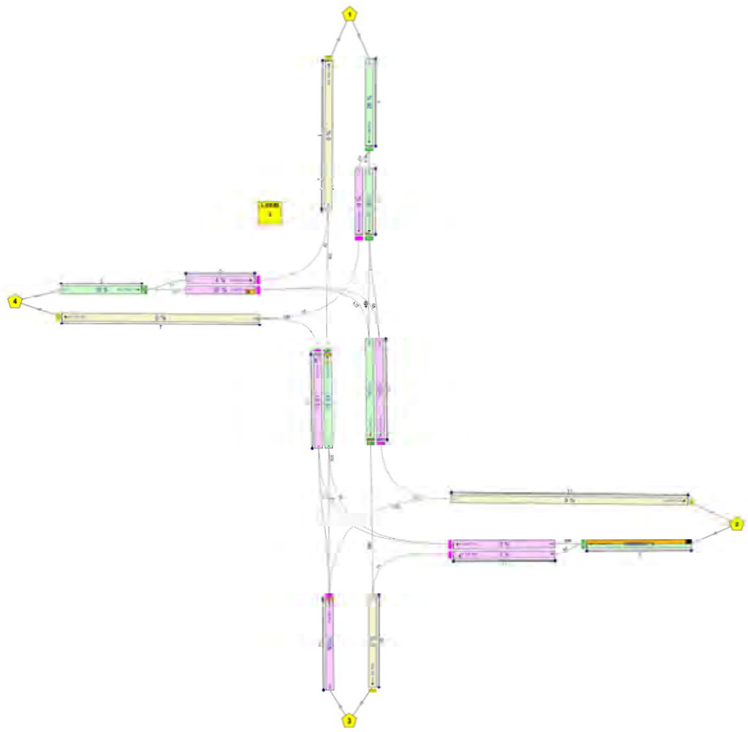
Units

Cost units	Speed units	Distance units	Fuel economy units	Fuel rate units	Mass units	Traffic units input	Traffic units results	Flow units	Average delay units	Total delay units	Rate of delay units
£	kph	m	mpg	l/h	kg	PCU	PCU	perHour	s	-Hour	perHour

Sorting

Show names instead of IDs	Sorting direction	Sorting type	Ignore prefixes when sorting	Analysis/demand set sorting	Link grouping	Source grouping	Colour Analysis/Demand Sets
	Ascending	Numerical		ID	Normal	Normal	✓

Network Diagrams



(untitled)
Cycletime 0s / 100s , Timesteps 99 / 100
8, 8
Diagram produced using TRANSYT 15.5.2.7994

A1 - 2018 AM
D1 - 2018 AM*

Summary

Data Errors and Warnings

Severity	Area	Item	Description
Info	Optimisation Order	Advanced	Because the optimisation list is blank, no optimisation will occur.

Run Summary

Analysis set used	Run start time	Run finish time	Modelling start time (HH:mm)	Network Cycle Time (s)	Performance Index (£ per hr)	Total network delay (PCU-hr/hr)	Highest DOS (%)	Item with highest DOS	Number of oversaturated items	Percentage of oversaturated items (%)	Item with worst signalised PRC	Item with worst unsignalised PRC	Item with worst overall PRC	Network within capacity
1	14/06/2019 12:56:15	14/06/2019 12:56:15	08:00	100	18.78	1.32	68.69	13/2	0	0		13/2	13/2	✓

Analysis Set Details

Name	Description	Demand set	Include in report	Locked
2018 AM		D1	✓	

Demand Set Details

Name	Description	Composite	Demand sets	Start time (HH:mm)	Locked
2018 AM				08:00	

Network Options

Network timings

Network cycle time (s)	Restrict to SCOOT cycle times	Time segment length (min)	Number of time segments	Modelled time period (min)
100		60	1	60

Signals options

Start displacement (s)	End displacement (s)
2	3

Advanced

Phase minimum broken penalty (£)	Phase maximum broken penalty (£)	Intergreen broken penalty (£)	Starting Red-with-Amber (s)
10000.00	10000.00	10000.00	2

Traffic options

Traffic model	Vehicle flow scaling factor (%)	Pedestrian flow scaling factor (%)	Cruise times or speeds
Platoon Dispersion (PDM)	100	100	Cruise Speeds

Advanced

Resolution	DOS Threshold (%)	Cruise scaling factor (%)	Use link stop weightings	Use link delay weightings	Exclude pedestrians from results calculation	Random delay mode	Type of Vehicle-in-Service	Type of random parameter	PCU Length (m)	Calculate results for Path Segments	Generate PDM Profile Data
1	90	100	✓	✓		Complex	Uniform (TRANSYT)	Uniform (TRANSYT)	5.75		✓

Normal Traffic parameters

Dispersion type	Dispersion coefficient	Travel time coefficient
Default	35	80

Normal Traffic Types

Name	PCU Factor
Normal	1.00

Bus parameters

Name	PCU Factor	Dispersion type	Acceleration (ms^[-2])	Stationary time coefficient	Cruise time coefficient
Bus	1.00	Default	0.94	30	85

Tram parameters

Name	PCU Factor	Dispersion type	Acceleration (ms^[-2])	Stationary time coefficient	Cruise time coefficient
Tram	1.00	Default	0.94	100	100

Pedestrian parameters

Dispersion type
Default

Optimisation options

Enable optimisation	Auto redistribute	Optimisation level	Enable OUT Profile accuracy
✓	✓	Offsets And Green Splits	✓

Advanced

Optimisation type	Hill climb increments	OUTProfile accuracy	Use enhanced optimisation	Auto optimisation order	Optimisation order	Master controller	Offsets relative to master controller	Master controller offset after each run
Hill Climb (Fast)	15, 40, -1, 15, 40, 1, -1, 1	50, 50, 5, 5, 0.5, 0.5, 0.05, 0.05		✓				Do nothing

Economics

Vehicle Monetary Value Of Delay (£ per PCU-hr)	Vehicle Monetary Value Of Stops (£ per 100 stops)	Pedestrian monetary value of delay (£ per Ped-hr)
14.20	2.60	14.20

Arms and Traffic Streams

Arms

Arm	Name	Description	Traffic node
(ALL)	(untitled)		

Traffic Streams

Arm	Traffic Stream	Name	Description	Auto length	Length (m)	Has Saturation Flow	Saturation flow source	Saturation flow (PCU/hr)	Auto-calculate cell saturation flow	Cell saturation flow (PCU/hr)	Is signal controlled	Is give way	Traffic type	Allow Nearside Turn On Red
1	1	(untitled)			200.00	✓	Sum of lanes	1945					Normal	
2	1	(untitled)			12.00	✓	Sum of lanes	1945					Normal	
	2	(untitled)			12.00							✓	Normal	
3	1	(untitled)			18.00							✓	Normal	
	2	(untitled)			18.00							✓	Normal	
5	1	(untitled)			200.00	✓	Sum of lanes	1945					Normal	
6	1	(untitled)			200.00								Normal	
7	1	(untitled)			200.00								Normal	
8	1	(untitled)			45.00				✓	1800		✓	Normal	
	2	(untitled)			45.00	✓	Sum of lanes	1915		1915			Normal	
10	1	(untitled)			45.00				✓	1800		✓	Normal	
	2	(untitled)			45.00	✓	Sum of lanes	1915		1915			Normal	
11	1	(untitled)			200.00								Normal	
12	1	(untitled)			200.00	✓	Sum of lanes	1895					Normal	
13	1	(untitled)			7.50							✓	Normal	
	2	(untitled)			7.50							✓	Normal	
14	1	(untitled)			200.00							✓	Normal	
15	1	(untitled)		✓	438.13								Normal	

Lanes

Arm	Traffic Stream	Lane	Name	Description	Use RR67	Surface condition	Site quality factor	Gradient (%)	Width (m)	Use connector turning radius	Proportion that turn (%)	Turning radius (m)	Nearside lane	Saturation flow (PCU/hr)
1	1	1	(untitled)		✓	N/A	N/A	0	3.30	✓	0	99999.00	✓	1945
2	1	1	(untitled)		✓	N/A	N/A	0	3.30	✓	0	99999.00	✓	1945
	2	1	(untitled)											
3	1	1	(untitled)											
	2	1	(untitled)											
5	1	1	(untitled)		✓	N/A	N/A	0	3.30	✓	0	99999.00	✓	1945
6	1	1	(untitled)											
7	1	1	(untitled)											
8	1	1	(untitled)											
	2	1	(untitled)		✓	N/A	N/A	0	3.00	✓	0	99999.00	✓	1915
10	1	1	(untitled)											
	2	1	(untitled)		✓	N/A	N/A	0	3.00	✓	0	99999.00	✓	1915
11	1	1	(untitled)											
12	1	1	(untitled)		✓	N/A	N/A	0	2.80	✓	0	99999.00	✓	1895
13	1	1	(untitled)											
	2	1	(untitled)											
14	1	1	(untitled)											
15	1	1	(untitled)											

Modelling

Arm	Traffic Stream	Traffic model	Stop weighting multiplier (%)	Delay weighting multiplier (%)	Assignment Cost Weighting (%)	Exclude from results calculation	Max queue storage (PCU)	Has queue limit	Has degree of saturation limit
1	1	NetworkDefault	100	100	100		0.00		
2	1	Flare	100	100	100		0.00		
	2	Flare	100	100	100		0.00		
3	1	Flare	100	100	100		0.00		
	2	Flare	100	100	100		0.00		
5	1	NetworkDefault	100	100	100		0.00		
6	1	NetworkDefault	100	100	100		0.00		
7	1	NetworkDefault	100	100	100		0.00		
8	1	Flare	100	100	100		0.00		
	2	CTM	100	100	100		0.00		
10	1	Flare	100	100	100		0.00		
	2	CTM	100	100	100		0.00		
11	1	NetworkDefault	100	100	100		0.00		
12	1	NetworkDefault	100	100	100		0.00		
13	1	Flare	100	100	100		0.00		
	2	Flare	100	100	100		0.00		
14	1	NetworkDefault	100	100	100		0.00		
15	1	NetworkDefault	100	100	100		0.00		

Modelling - Advanced

Arm	Traffic Stream	Initial queue (PCU)	Type of Vehicle-in-Service	Vehicle-in-Service	Type of random parameter	Random parameter	Auto cycle time	Cycle time
(ALL)	(ALL)	0.00	NetworkDefault	Not-Included	NetworkDefault	0.50	✓	100

Normal traffic - Modelling

Arm	Traffic Stream	Stop weighting (%)	Delay weighting (%)
(ALL)	(ALL)	100	100

Normal traffic - Advanced

Arm	Traffic Stream	Dispersion type for Normal Traffic
(ALL)	(ALL)	NetworkDefault

Flows

Arm	Traffic Stream	Total Flow (PCU/hr)	Normal Flow (PCU/hr)
1	1	744	744
2	1	730	730
	2	14	14
3	1	36	36
	2	137	137
5	1	173	173
6	1	512	512
7	1	81	81
8	1	76	76
	2	791	791
10	1	67	67
	2	476	476
11	1	130	130
12	1	194	194
13	1	51	51
	2	143	143
14	1	454	454
15	1	842	842

Entry Sources

Arm	Traffic Stream	Cruise time for Normal Traffic (s)	Cruise speed for Normal Traffic (kph)
(ALL)	1	24.00	30.00

Sources

Arm	Traffic Stream	Source	Source traffic stream	Destination traffic stream	Cruise time for Normal Traffic (s)	Cruise speed for Normal Traffic (kph)	Auto turning radius	Traffic turn style	Turning radius (m)
2	1	1	1/1	2/1	1.44	30.00	✓	Straight	Straight Movement
	2	1	1/1	2/2	1.44	30.00	✓	Straight	Straight Movement
3	1	1	5/1	3/1	2.16	30.00	✓	Straight	Straight Movement
	2	1	5/1	3/2	2.16	30.00	✓	Straight	Straight Movement
6	1	1	10/2	6/1	24.00	30.00	✓	Straight	Straight Movement
7	1	1	2/2	7/1	24.00	30.00	✓	Straight	Straight Movement
8	1	1	2/1	8/1	5.40	30.00	✓	Straight	Straight Movement
	2	1	2/1	8/2	5.40	30.00	✓	Straight	Straight Movement
10	1	1	13/2	10/1	5.40	30.00	✓	Straight	Straight Movement
	2	1	13/2	10/2	5.40	30.00	✓	Straight	Straight Movement
11	1	1	8/1	11/1	24.00	30.00	✓	Straight	Straight Movement
13	1	1	12/1	13/1	1.00	30.00	✓	Straight	Straight Movement
	2	1	12/1	13/2	1.00	30.00	✓	Straight	Straight Movement
15	1	1	13/1	15/1	52.58	30.00	✓	Nearside	80.02
6	1	2	3/1	6/1	24.00	30.00	✓	Straight	Straight Movement
7	1	2	10/1	7/1	24.00	30.00	✓	Nearside	70.86
8	1	2	3/2	8/1	5.40	30.00	✓	Offside	99.89
	2	2	3/2	8/2	5.40	30.00	✓	Offside	99.89
10	1	2	14/1	10/1	5.40	30.00	✓	Straight	Straight Movement
	2	2	14/1	10/2	5.40	30.00	✓	Straight	Straight Movement
11	1	2	14/1	11/1	24.00	30.00	✓	Straight	Straight Movement
15	1	2	8/2	15/1	52.58	30.00	✓	Straight	Straight Movement

Give Way Data

Arm	Traffic Stream	Opposed traffic	Use Step-wise Opposed Turn Model	Visibility restricted
2	2	AllTraffic		
3	1	AllTraffic		
	2	AllTraffic		
8	1	AllTraffic		
10	1	AllTraffic		
13	1	AllTraffic		
	2	AllTraffic		

14	1	Movement		

Give Way Data - All Movements - Conflicts

Traffic Stream	Description	Controlling type	Controlling traffic stream	Controlling from traffic stream	Controlling to traffic stream	Percentage opposing (%)	Slope coefficient	Upstream signals visible	Conflict shift	Conflict duration
2		TrafficStream	10/2			100	0.28		0	0
		TrafficStream	10/1			100	0.28		0	0
1		TrafficStream	10/2			100	0.34		0	0
2		TrafficStream	10/2			100	0.33		0	0
		TrafficStream	2/1			100	0.21		0	0
		TrafficStream	2/2			100	0.47		0	0
1		TrafficStreamMovement		14/1	11/1	100	0.29		0	0
		TrafficStream	2/2			100	0.28		0	0
		TrafficStream	8/2			100	0.29		0	0
2		TrafficStream	8/2			100	0.27		0	0
		TrafficStream	14/1			100	0.39		0	0

Give Way Data - Movements

Arm	Traffic Stream	Movement	Destination traffic stream	Max Flow (Opposed) (PCU/hr)	Max Flow (Unopposed) (PCU/hr)	Percentage opposed (%)
14	1	1	10/1	1965	1965	100
		2	10/2	1965	1965	100
		3	11/1	707	707	100

Give Way Data - Movements - Conflicts

Arm	Traffic Stream	Movement	Destination traffic stream	Description	Controlling type	Controlling traffic stream	Percentage opposing (%)	Slope coefficient	Upstream signals visible	Conflict shift	Conflict duration
14	1	3	11/1		TrafficStream	8/2	100	0.27		0	0
					TrafficStream	8/1	100	0.27		0	0

Local OD Matrix - Local Matrix: 1

Local Matrix Options

OD Matrix	Name	Use for point to point table	Auto calculate	Allocation mode	Allow paths past exit locations	Allow looped paths on arms	Allow looped paths on traffic nodes	Copy flows	Matrix to copy flows from	Limit paths by length	Path length limit multiplier	Limit paths by number	Path number limit
1	(untitled)	✓	✓	Path Equalisation			✓			✓	1.25		

Normal Input Flows (PCU/hr)

		To			
		1	2	3	4
From	1	0	21	709	14
	2	110	0	51	33
	3	366	54	0	34
	4	36	55	82	0

Bus Input Flows not shown as they are blank.

Tram Input Flows not shown as they are blank.

Pedestrian Input Flows not shown as they are blank.

Locations

OD Matrix	Location	Name	Entries	Exits	Colour
1	1	(untitled)	1/1	6/1	#0000FF
	2	(untitled)	12/1	11/1	#00FF00
	3	(untitled)	14/1	15/1	#FFFF00
	4	(untitled)	5/1	7/1	#FFFF00

Normal Paths and Flows

OD Matrix	Path	Description	From location	To location	Path items	Allocation type	Normal Calculated Flow (PCU/hr)
1	1		1	2	1/1, 2/1, 8/1, 11/1	Normal	21
	2		2	1	12/1, 13/2, 10/2, 6/1	Normal	110
	3		1	3	1/1, 2/1, 8/2, 15/1	Normal	709
	4		2	3	12/1, 13/1, 15/1	Normal	51
	5		3	1	14/1, 10/2, 6/1	Normal	366
	6		3	2	14/1, 11/1	Normal	54
	7		1	4	1/1, 2/2, 7/1	Normal	14
	8		2	4	12/1, 13/2, 10/1, 7/1	Normal	33
	9		3	4	14/1, 10/1, 7/1	Normal	34
	10		4	1	5/1, 3/1, 6/1	Normal	36
	11		4	2	5/1, 3/2, 8/1, 11/1	Normal	55
	12		4	3	5/1, 3/2, 8/2, 15/1	Normal	82

Signal Timings

Network Default: 100s cycle time; 100 steps

No Controller Streams present.

Traffic Stream Results

Traffic Stream Results: Vehicle summary

Time Segment	Arm	Traffic Stream	Degree of saturation (%)	Practical reserve capacity (%)	Calculated flow entering (PCU/hr)	Calculated sat flow (PCU/hr)	Actual green (s (per cycle))	Mean Delay per Veh (s)	Mean max queue (PCU)	Utilised storage (%)	Weighted cost of delay (£ per hr)	Weighted cost of stops (£ per hr)	Performance Index (£ per hr)
08:00-09:00	1	1	38	135	744	1945	100	0.57	0.12	0.34	1.68	0.00	1.68
	2	1	38	140	730	1945	100	0.56	0.11	5.63	1.60	0.00	1.60
		2	2	3682	14	588	100	0.07	0.00	0.01	0.00	0.00	0.00
	3	1	5	1714	36	726	100	0.13	0.00	0.04	0.02	0.00	0.02
		2	33	170	137	411	100	2.18	0.08	2.77	1.18	0.00	1.18
	5	1	9	912	173	1945	100	0.09	0.00	0.01	0.06	0.00	0.06
	6	1	0	Unrestricted	512	Unrestricted	100	0.00	0.00	0.00	0.00	0.00	0.00
	7	1	0	Unrestricted	81	Unrestricted	100	0.00	0.00	0.00	0.00	0.00	0.00
	8	1	10	762	76	728	100	0.29	0.01	0.08	0.09	0.00	0.09
		2	41	118	791	1915	100	0.66	0.15	1.86	2.06	0.00	2.06
	10	1	8	1050	67	856	100	0.18	0.00	0.04	0.05	0.00	0.05
		2	25	262	476	1915	100	0.31	0.04	0.53	0.58	0.00	0.58
	11	1	0	Unrestricted	130	Unrestricted	100	0.00	0.00	0.00	0.00	0.00	0.00
	12	1	10	779	194	1895	100	0.11	0.01	0.02	0.08	0.00	0.08
	13	1	10	832	51	528	100	0.36	0.01	0.52	0.07	0.00	0.07
		2	69	31	143	208	100	18.18	0.72	72.23	10.26	0.00	10.26
	14	1	32	183	454	1430	100	0.59	0.07	0.21	1.05	0.00	1.05
	15	1	0	Unrestricted	842	Unrestricted	100	0.00	0.00	0.00	0.00	0.00	0.00

Traffic Stream Results: Flows and signals

Time Segment	Arm	Traffic Stream	Calculated flow entering (PCU/hr)	Calculated flow out (PCU/hr)	Flow discrepancy (PCU/hr)	Adjusted flow warning	Calculated sat flow (PCU/hr)	Calculated capacity (PCU/hr)	Degree of saturation (%)	DOS Threshold exceeded	Practical reserve capacity (%)	Mean modulus of error	Actual green (s (per cycle))
08:00-09:00	1	1	744	744	0		1945	1945	38		135	0.00	100
	2	1	730	730	0		1945	1945	38		140	0.00	100
		2	14	14	0		588	588	2		3682	0.00	100
	3	1	36	36	0		726	726	5		1714	0.00	100
		2	137	137	0		411	411	33		170	0.00	100
	5	1	173	173	0		1945	1945	9		912	0.00	100
	6	1	512	512	0		Unrestricted	Unrestricted	0		Unrestricted	0.00	100
	7	1	81	81	0		Unrestricted	Unrestricted	0		Unrestricted	0.00	100
	8	1	76	76	0		728	728	10		762	0.00	100
		2	791	791	0		1915	1915	41		118	0.00	100
	10	1	67	67	0		856	856	8		1050	0.00	100
		2	476	476	0		1915	1915	25		262	0.00	100
	11	1	130	130	0		Unrestricted	Unrestricted	0		Unrestricted	0.00	100
	12	1	194	194	0		1895	1895	10		779	0.00	100
	13	1	51	51	0		528	528	10		832	0.00	100
		2	143	143	0		208	208	69		31	0.00	100
	14	1	454	454	0		1430	1430	32		183	0.00	100
	15	1	842	842	0		Unrestricted	Unrestricted	0		Unrestricted	0.00	100

Traffic Stream Results: Stops and delays

Time Segment	Arm	Traffic Stream	Mean Cruise Time per Veh (s)	Mean Delay per Veh (s)	Total delay (PCU-hr/hr)	Weighted cost of delay (£ per hr)	Mean stops per Veh (%)	Total stops (Stops per hr)	Weighted cost of stops (£ per hr)
08:00-09:00	1	1	24.00	0.57	0.12	1.68	0.00	0.00	0.00
	2	1	1.44	0.56	0.11	1.60	0.00	0.00	0.00
		2	1.44	0.07	0.00	0.00	0.00	0.00	0.00
	3	1	2.16	0.13	0.00	0.02	0.00	0.00	0.00
		2	2.16	2.18	0.08	1.18	0.00	0.00	0.00
	5	1	24.00	0.09	0.00	0.06	0.00	0.00	0.00
	6	1	24.00	0.00	0.00	0.00	0.00	0.00	0.00
	7	1	24.00	0.00	0.00	0.00	0.00	0.00	0.00
	8	1	5.40	0.29	0.01	0.09	0.00	0.00	0.00
		2	5.40	0.66	0.15	2.06	0.00	0.00	0.00
	10	1	5.40	0.18	0.00	0.05	0.00	0.00	0.00
		2	5.40	0.31	0.04	0.58	0.00	0.00	0.00
	11	1	24.00	0.00	0.00	0.00	0.00	0.00	0.00
	12	1	24.00	0.11	0.01	0.08	0.00	0.00	0.00
	13	1	1.00	0.36	0.01	0.07	0.00	0.00	0.00
		2	1.00	18.18	0.72	10.26	0.00	0.00	0.00
	14	1	24.00	0.59	0.07	1.05	0.00	0.00	0.00
	15	1	52.58	0.00	0.00	0.00	0.00	0.00	0.00

Traffic Stream Results: Queues and blocking

Time Segment	Arm	Traffic Stream	Initial queue (PCU)	Mean max queue (PCU)	Max queue storage (PCU)	Utilised storage (%)	Excess queue penalty (£ per hr)	Wasted time total (s (per cycle))	Estimated blocking
08:00-09:00	1	1	0.00	0.12	34.78	0.34	0.00	0.00	
	2	1	0.00	0.11	2.00	5.63	0.00	0.00	
		2	0.00	0.00	2.00	0.01	0.00	100.00	
	3	1	0.00	0.00	3.00	0.04	0.00	100.00	
		2	0.00	0.08	3.00	2.77	0.00	0.00	
	5	1	0.00	0.00	34.78	0.01	0.00	0.00	
	6	1	0.00	0.00	34.78	0.00	0.00	0.00	
	7	1	0.00	0.00	34.78	0.00	0.00	0.00	
	8	1	0.00	0.01	7.83	0.08	0.00	0.00	
		2	0.00	0.15	7.83	1.86	0.00	0.00	
	10	1	0.00	0.00	7.83	0.04	0.00	0.00	
		2	0.00	0.04	7.83	0.53	0.00	0.00	
	11	1	0.00	0.00	34.78	0.00	0.00	0.00	
	12	1	0.00	0.01	34.78	0.02	0.00	0.00	
	13	1	0.00	0.01	1.00	0.52	0.00	100.00	
		2	0.00	0.72	1.00	72.23	0.00	0.00	

	14	**1**	0.00	0.07	34.78	0.21	0.00	0.00	
	15	**1**	0.00	0.00	76.20	0.00	0.00	0.00	

Traffic Stream Results: Advanced

Time Segment	Arm	Traffic Stream	Degree of saturation penalty (£ per hr)	Ped gap accepting penalty (£ per hr)	Warmed up	Mean Max Queue EoTS (PCU)	Max End of Green Queue EoTS (PCU)	Max End of Red Queue EoTS (PCU)	PCU Factor	Cost of traffic penalties (£ per hr)	Performance Index (£ per hr)
08:00-09:00	**1**	**1**	0.00	0.00	✓	0.12			1.00	0.00	1.68
	2	**1**	0.00	0.00	✓	0.11			1.00	0.00	1.60
		2	0.00	0.00	✓	0.00			1.00	0.00	0.00
	3	**1**	0.00	0.00	✓	0.00			1.00	0.00	0.02
		2	0.00	0.00	✓	0.08			1.00	0.00	1.18
	5	**1**	0.00	0.00	✓	0.00			1.00	0.00	0.06
	6	**1**	0.00	0.00	✓	0.00			1.00	0.00	0.00
	7	**1**	0.00	0.00	✓	0.00			1.00	0.00	0.00
	8	**1**	0.00	0.00	✓	0.01			1.00	0.00	0.09
		2	0.00	0.00	✓	0.15			1.00	0.00	2.06
	10	**1**	0.00	0.00	✓	0.00			1.00	0.00	0.05
		2	0.00	0.00	✓	0.04			1.00	0.00	0.58
	11	**1**	0.00	0.00	✓	0.00			1.00	0.00	0.00
	12	**1**	0.00	0.00	✓	0.01			1.00	0.00	0.08
	13	**1**	0.00	0.00	✓	0.01			1.00	0.00	0.07
		2	0.00	0.00	✓	0.74			1.00	0.00	10.26
	14	**1**	0.00	0.00	✓	0.07			1.00	0.00	1.05
	15	**1**	0.00	0.00	✓	0.00			1.00	0.00	0.00

Network Results

Run Summary

Analysis set used	Run start time	Run finish time	Modelling start time (HH:mm)	Network Cycle Time (s)	Performance Index (£ per hr)	Total network delay (PCU-hr/hr)	Highest DOS (%)	Item with highest DOS	Number of oversaturated items	Percentage of oversaturated items (%)	Item with worst signalised PRC	Item with worst unsignalised PRC	Item with worst overall PRC	Network within capacity
1	14/06/2019 12:56:15	14/06/2019 12:56:15	08:00	100	18.78	1.32	68.69	13/2	0	0		13/2	13/2	✓

Network Results: Vehicle summary

Time Segment	Degree of saturation (%)	Practical reserve capacity (%)	Calculated flow entering (PCU/hr)	Actual green (s (per cycle))	Mean Delay per Veh (s)	Weighted cost of delay (£ per hr)	Weighted cost of stops (£ per hr)	Performance Index (£ per hr)
08:00-09:00	69	31	5651	1800	0.84	18.78	0.00	18.78

Network Results: Flows and signals

Time Segment	Calculated flow entering (PCU/hr)	Calculated flow out (PCU/hr)	Flow discrepancy (PCU/hr)	Adjusted flow warning	Degree of saturation (%)	DOS Threshold exceeded	Practical reserve capacity (%)	Actual green (s (per cycle))
08:00-09:00	5651	5651	0		69		31	1800

Network Results: Stops and delays

Time Segment	Mean Cruise Time per Veh (s)	Mean Delay per Veh (s)	Total delay (PCU-hr/hr)	Weighted cost of delay (£ per hr)	Mean stops per Veh (%)	Total stops (Stops per hr)	Weighted cost of stops (£ per hr)
08:00-09:00	19.19	0.84	1.32	18.78	0.00	0.00	0.00

Network Results: Queues and blocking

Time Segment	Utilised storage (%)	Excess queue penalty (£ per hr)	Wasted time total (s (per cycle))
08:00-09:00	72.23	0.00	300.00

Network Results: Advanced

Time Segment	Degree of saturation penalty (£ per hr)	Ped gap accepting penalty (£ per hr)	Warmed up	PCU Factor	Cost of traffic penalties (£ per hr)	Controller stream penalties (£ per hr)	Performance Index (£ per hr)
08:00-09:00	0.00	0.00	✓	1.00	0.00	0.00	18.78

Point to Point Journey Time

Average Journey Time (s) for Local Matrix: 1

		To			
		1	**2**	**3**	**4**
From	**1**	0.0	56.3	85.2	50.1
	2	73.0	0.0	78.0	72.9
	3	54.3	48.6	0.0	54.2
	4	50.4	58.1	87.1	0.0

Path Journey Time

Path	From Location	To Location	Normal Calculated Flow (PCU/hr)	Normal journey time (s)	Calculated Total Flow (PCU/hr)	Avg journey time (s)
1	1	2	21	56.26	21	56.26
2	2	1	110	73.00	110	73.00
3	1	3	709	85.20	709	85.20
4	2	3	51	78.05	51	78.05
5	3	1	366	54.30	366	54.30
6	3	2	54	48.59	54	48.59
7	1	4	14	50.09	14	50.09
8	2	4	33	72.87	33	72.87
9	3	4	34	54.16	34	54.16

10	4	1	36	50.38	36	50.38
11	4	2	55	58.12	55	58.12
12	4	3	82	87.07	82	87.07

Final Prediction Table

Traffic Stream Results

				FLOWS		PERFORMANCE				PER PCU			QUEUES	WEIGHTS		PENALTIES	P.I.
Arm	**Traffic Stream**	**Name**	**Traffic node**	**Calculated flow entering (PCU/hr)**	**Calculated sat flow (PCU/hr)**	**Actual green (s (per cycle))**	**Wasted time total (s (per cycle))**	**Degree of saturation (%)**	**Practical reserve capacity (%)**	**JourneyTime (s)**	**Mean Delay per Veh (s)**	**Mean stops per Veh (%)**	**Mean max queue (PCU)**	**Delay weighting multiplier (%)**	**Stop weighting multiplier (%)**	**Cost of traffic penalties (£ per hr)**	**P.I.**
1	**1**	(untitled)		744	1945	100	0.00	38	135	24.57	0.57	0.00	0.12	100	100	0.00	1.68
2	**1**	(untitled)		730	1945	100	0.00	38	140	2.00	0.56	0.00	0.11	100	100	0.00	1.60
	2	(untitled)		14	588	100	100.00	2	3682	1.51	0.07	0.00	0.00	100	100	0.00	0.00
3	**1**	(untitled)		36	726	100	100.00	5	1714	2.29	0.13	0.00	0.00	100	100	0.00	0.02
	2	(untitled)		137	411	100	0.00	33	170	4.34	2.18	0.00	0.08	100	100	0.00	1.18
5	**1**	(untitled)		173	1945	100	0.00	9	912	24.09	0.09	0.00	0.00	100	100	0.00	0.06
6	**1**	(untitled)		512	Unrestricted	100	0.00	0	Unrestricted	24.00	0.00	0.00	0.00	100	100	0.00	0.00
7	**1**	(untitled)		81	Unrestricted	100	0.00	0	Unrestricted	24.00	0.00	0.00	0.00	100	100	0.00	0.00
8	**1**	(untitled)		76	728	100	0.00	10	762	5.69	0.29	0.00	0.01	100	100	0.00	0.09
	2	(untitled)		791	1915	100	0.00	41	118	6.06	0.66	0.00	0.15	100	100	0.00	2.06
10	**1**	(untitled)		67	856	100	0.00	8	1050	5.58	0.18	0.00	0.00	100	100	0.00	0.05
	2	(untitled)		476	1915	100	0.00	25	262	5.71	0.31	0.00	0.04	100	100	0.00	0.58
11	**1**	(untitled)		130	Unrestricted	100	0.00	0	Unrestricted	24.00	0.00	0.00	0.00	100	100	0.00	0.00
12	**1**	(untitled)		194	1895	100	0.00	10	779	24.11	0.11	0.00	0.01	100	100	0.00	0.08
13	**1**	(untitled)		51	528	100	100.00	10	832	1.36	0.36	0.00	0.01	100	100	0.00	0.07
	2	(untitled)		143	208	100	0.00	69	31	19.18	18.18	0.00	0.72	100	100	0.00	10.26
14	**1**	(untitled)		454	1430	100	0.00	32	183	24.59	0.59	0.00	0.07	100	100	0.00	1.05
15	**1**	(untitled)		842	Unrestricted	100	0.00	0	Unrestricted	52.58	0.00	0.00	0.00	100	100	0.00	0.00

Network Results

	Distance travelled (PCU-km/hr)	**Time spent (PCU-hr/hr)**	**Mean journey speed (kph)**	**Total delay (PCU-hr/hr)**	**Weighted cost of delay (£ per hr)**	**Weighted cost of stops (£ per hr)**	**Excess queue penalty (£ per hr)**	**Performance Index (£ per hr)**
Normal traffic	903.45	31.44	28.73	1.32	18.78	0.00	0.00	18.78
Bus	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tram	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pedestrians								
TOTAL	903.45	31.44	28.73	1.32	18.78	0.00	0.00	18.78

- *< = adjusted flow warning (upstream links/traffic streams are over-saturated)*
- ** = Traffic Stream - Normal, Bus or Tram Stop or Delay weighting has been set to a value other than 100%*
- *^ = Traffic Stream - Normal, Bus or Tram Stop or Delay Path weighting has been set to a value other than 100%*
- *+ = average link/traffic stream excess queue is greater than 0*
- ***P.I. = PERFORMANCE INDEX***

A2 - 2018 PM
D2 - 2018 PM*

Summary

Data Errors and Warnings

Severity	Area	Item	Description
Info	Optimisation Order	Advanced	Because the optimisation list is blank, no optimisation will occur.

Run Summary

Analysis set used	Run start time	Run finish time	Modelling start time (HH:mm)	Network Cycle Time (s)	Performance Index (£ per hr)	Total network delay (PCU-hr/hr)	Highest DOS (%)	Item with highest DOS	Number of oversaturated items	Percentage of oversaturated items (%)	Item with worst signalised PRC	Item with worst unsignalised PRC	Item with worst overall PRC	Network within capacity
2	14/06/2019 12:56:15	14/06/2019 12:56:16	17:00	100	3.73	0.26	32.61	14/1	0	0		14/1	14/1	✓

Analysis Set Details

Name	Description	Demand set	Include in report	Locked
2018 PM		D2	✓	

Demand Set Details

Name	Description	Composite	Demand sets	Start time (HH:mm)	Locked
2018 PM				17:00	

Network Options

Network timings

Network cycle time (s)	Restrict to SCOOT cycle times	Time segment length (min)	Number of time segments	Modelled time period (min)
100		60	1	60

Signals options

Start displacement (s)	End displacement (s)
2	3

Advanced

Phase minimum broken penalty (£)	Phase maximum broken penalty (£)	Intergreen broken penalty (£)	Starting Red-with-Amber (s)
10000.00	10000.00	10000.00	2

Traffic options

Traffic model	Vehicle flow scaling factor (%)	Pedestrian flow scaling factor (%)	Cruise times or speeds
Platoon Dispersion (PDM)	100	100	Cruise Speeds

Advanced

Resolution	DOS Threshold (%)	Cruise scaling factor (%)	Use link stop weightings	Use link delay weightings	Exclude pedestrians from results calculation	Random delay mode	Type of Vehicle-in-Service	Type of random parameter	PCU Length (m)	Calculate results for Path Segments	Generate PDM Profile Data
1	90	100	✓	✓		Complex	Uniform (TRANSYT)	Uniform (TRANSYT)	5.75		✓

Normal Traffic parameters

Dispersion type	Dispersion coefficient	Travel time coefficient
Default	35	80

Normal Traffic Types

Name	PCU Factor
Normal	1.00

Bus parameters

Name	PCU Factor	Dispersion type	Acceleration (ms^[-2])	Stationary time coefficient	Cruise time coefficient
Bus	1.00	Default	0.94	30	85

Tram parameters

Name	PCU Factor	Dispersion type	Acceleration (ms^[-2])	Stationary time coefficient	Cruise time coefficient
Tram	1.00	Default	0.94	100	100

Pedestrian parameters

Dispersion type
Default

Optimisation options

Enable optimisation	Auto redistribute	Optimisation level	Enable OUT Profile accuracy
✓	✓	Offsets And Green Splits	✓

Advanced

Optimisation type	Hill climb increments	OUTProfile accuracy	Use enhanced optimisation	Auto optimisation order	Optimisation order	Master controller	Offsets relative to master controller	Master controller offset after each run
Hill Climb (Fast)	15, 40, -1, 15, 40, 1, -1, 1	50, 50, 5, 5, 0.5, 0.5, 0.05, 0.05		✓				Do nothing

Economics

Vehicle Monetary Value Of Delay (£ per PCU-hr)	Vehicle Monetary Value Of Stops (£ per 100 stops)	Pedestrian monetary value of delay (£ per Ped-hr)
14.20	2.60	14.20

Arms and Traffic Streams

Arms

Arm	Name	Description	Traffic node
(ALL)	(untitled)		

Traffic Streams

Arm	Traffic Stream	Name	Description	Auto length	Length (m)	Has Saturation Flow	Saturation flow source	Saturation flow (PCU/hr)	Auto-calculate cell saturation flow	Cell saturation flow (PCU/hr)	Is signal controlled	Is give way	Traffic type	Allow Nearside Turn On Red
1	1	(untitled)			200.00	✓	Sum of lanes	1945					Normal	
2	1	(untitled)			12.00	✓	Sum of lanes	1945					Normal	
	2	(untitled)			12.00							✓	Normal	
3	1	(untitled)			18.00							✓	Normal	
	2	(untitled)			18.00							✓	Normal	
5	1	(untitled)			200.00	✓	Sum of lanes	1945					Normal	
6	1	(untitled)			200.00								Normal	
7	1	(untitled)			200.00								Normal	
8	1	(untitled)			45.00				✓	1800		✓	Normal	
	2	(untitled)			45.00	✓	Sum of lanes	1915		1915			Normal	
10	1	(untitled)			45.00				✓	1800		✓	Normal	
	2	(untitled)			45.00	✓	Sum of lanes	1915		1915			Normal	
11	1	(untitled)			200.00								Normal	
12	1	(untitled)			200.00	✓	Sum of lanes	1895					Normal	
13	1	(untitled)			7.50							✓	Normal	
	2	(untitled)			7.50							✓	Normal	
14	1	(untitled)			200.00							✓	Normal	
15	1	(untitled)		✓	438.13								Normal	

Lanes

Arm	Traffic Stream	Lane	Name	Description	Use RR67	Surface condition	Site quality factor	Gradient (%)	Width (m)	Use connector turning radius	Proportion that turn (%)	Turning radius (m)	Nearside lane	Saturation flow (PCU/hr)
1	1	1	(untitled)		✓	N/A	N/A	0	3.30	✓	0	99999.00	✓	1945
2	1	1	(untitled)		✓	N/A	N/A	0	3.30	✓	0	99999.00	✓	1945
	2	1	(untitled)											
3	1	1	(untitled)											
	2	1	(untitled)											
5	1	1	(untitled)		✓	N/A	N/A	0	3.30	✓	0	99999.00	✓	1945
6	1	1	(untitled)											
7	1	1	(untitled)											
8	1	1	(untitled)											
	2	1	(untitled)		✓	N/A	N/A	0	3.00	✓	0	99999.00	✓	1915
10	1	1	(untitled)											
	2	1	(untitled)		✓	N/A	N/A	0	3.00	✓	0	99999.00	✓	1915
11	1	1	(untitled)											
12	1	1	(untitled)		✓	N/A	N/A	0	2.80	✓	0	99999.00	✓	1895
13	1	1	(untitled)											
	2	1	(untitled)											
14	1	1	(untitled)											
15	1	1	(untitled)											

Modelling

Arm	Traffic Stream	Traffic model	Stop weighting multiplier (%)	Delay weighting multiplier (%)	Assignment Cost Weighting (%)	Exclude from results calculation	Max queue storage (PCU)	Has queue limit	Has degree of saturation limit
1	1	NetworkDefault	100	100	100		0.00		
2	1	Flare	100	100	100		0.00		
	2	Flare	100	100	100		0.00		
3	1	Flare	100	100	100		0.00		
	2	Flare	100	100	100		0.00		
5	1	NetworkDefault	100	100	100		0.00		
6	1	NetworkDefault	100	100	100		0.00		
7	1	NetworkDefault	100	100	100		0.00		
8	1	Flare	100	100	100		0.00		
	2	CTM	100	100	100		0.00		
10	1	Flare	100	100	100		0.00		
	2	CTM	100	100	100		0.00		
11	1	NetworkDefault	100	100	100		0.00		
12	1	NetworkDefault	100	100	100		0.00		
13	1	Flare	100	100	100		0.00		
	2	Flare	100	100	100		0.00		
14	1	NetworkDefault	100	100	100		0.00		
15	1	NetworkDefault	100	100	100		0.00		

Modelling - Advanced

Arm	Traffic Stream	Initial queue (PCU)	Type of Vehicle-in-Service	Vehicle-in-Service	Type of random parameter	Random parameter	Auto cycle time	Cycle time
(ALL)	(ALL)	0.00	NetworkDefault	Not-Included	NetworkDefault	0.50	✓	100

Normal traffic - Modelling

Arm	Traffic Stream	Stop weighting (%)	Delay weighting (%)
(ALL)	(ALL)	100	100

Normal traffic - Advanced

Arm	Traffic Stream	Dispersion type for Normal Traffic
(ALL)	(ALL)	NetworkDefault

Flows

Arm	Traffic Stream	Total Flow (PCU/hr)	Normal Flow (PCU/hr)
1	1	391	391
2	1	314	314
	2	77	77
3	1	14	14
	2	50	50
5	1	64	64
6	1	482	482
7	1	195	195
8	1	66	66
	2	298	298
10	1	118	118
	2	468	468
11	1	109	109
12	1	121	121
13	1	37	37
	2	84	84
14	1	545	545
15	1	335	335

Entry Sources

Arm	Traffic Stream	Cruise time for Normal Traffic (s)	Cruise speed for Normal Traffic (kph)
(ALL)	1	24.00	30.00

Sources

Arm	Traffic Stream	Source	Source traffic stream	Destination traffic stream	Cruise time for Normal Traffic (s)	Cruise speed for Normal Traffic (kph)	Auto turning radius	Traffic turn style	Turning radius (m)
2	1	1	1/1	2/1	1.44	30.00	✓	Straight	Straight Movement
	2	1	1/1	2/2	1.44	30.00	✓	Straight	Straight Movement
3	1	1	5/1	3/1	2.16	30.00	✓	Straight	Straight Movement
	2	1	5/1	3/2	2.16	30.00	✓	Straight	Straight Movement
6	1	1	10/2	6/1	24.00	30.00	✓	Straight	Straight Movement
7	1	1	2/2	7/1	24.00	30.00	✓	Straight	Straight Movement
8	1	1	2/1	8/1	5.40	30.00	✓	Straight	Straight Movement
	2	1	2/1	8/2	5.40	30.00	✓	Straight	Straight Movement
10	1	1	13/2	10/1	5.40	30.00	✓	Straight	Straight Movement
	2	1	13/2	10/2	5.40	30.00	✓	Straight	Straight Movement
11	1	1	8/1	11/1	24.00	30.00	✓	Straight	Straight Movement
13	1	1	12/1	13/1	1.00	30.00	✓	Straight	Straight Movement
	2	1	12/1	13/2	1.00	30.00	✓	Straight	Straight Movement
15	1	1	13/1	15/1	52.58	30.00	✓	Nearside	80.02
6	1	2	3/1	6/1	24.00	30.00	✓	Straight	Straight Movement
7	1	2	10/1	7/1	24.00	30.00	✓	Nearside	70.86
8	1	2	3/2	8/1	5.40	30.00	✓	Offside	99.89
	2	2	3/2	8/2	5.40	30.00	✓	Offside	99.89
10	1	2	14/1	10/1	5.40	30.00	✓	Straight	Straight Movement
	2	2	14/1	10/2	5.40	30.00	✓	Straight	Straight Movement
11	1	2	14/1	11/1	24.00	30.00	✓	Straight	Straight Movement
15	1	2	8/2	15/1	52.58	30.00	✓	Straight	Straight Movement

Give Way Data

Arm	Traffic Stream	Opposed traffic	Use Step-wise Opposed Turn Model	Visibility restricted
2	2	AllTraffic		
3	1	AllTraffic		
	2	AllTraffic		
8	1	AllTraffic		
10	1	AllTraffic		
13	1	AllTraffic		
	2	AllTraffic		

14	1	Movement		

Give Way Data - All Movements - Conflicts

Traffic Stream	Description	Controlling type	Controlling traffic stream	Controlling from traffic stream	Controlling to traffic stream	Percentage opposing (%)	Slope coefficient	Upstream signals visible	Conflict shift	Conflict duration
2		TrafficStream	10/2			100	0.28		0	0
		TrafficStream	10/1			100	0.28		0	0
1		TrafficStream	10/2			100	0.34		0	0
2		TrafficStream	10/2			100	0.33		0	0
		TrafficStream	2/1			100	0.21		0	0
		TrafficStream	2/2			100	0.47		0	0
1		TrafficStreamMovement		14/1	11/1	100	0.29		0	0
		TrafficStream	2/2			100	0.28		0	0
		TrafficStream	8/2			100	0.29		0	0
2		TrafficStream	8/2			100	0.27		0	0
		TrafficStream	14/1			100	0.39		0	0

Give Way Data - Movements

Arm	Traffic Stream	Movement	Destination traffic stream	Max Flow (Opposed) (PCU/hr)	Max Flow (Unopposed) (PCU/hr)	Percentage opposed (%)
14	1	1	10/1	1965	1965	100
		2	10/2	1965	1965	100
		3	11/1	707	707	100

Give Way Data - Movements - Conflicts

Arm	Traffic Stream	Movement	Destination traffic stream	Description	Controlling type	Controlling traffic stream	Percentage opposing (%)	Slope coefficient	Upstream signals visible	Conflict shift	Conflict duration
14	1	3	11/1		TrafficStream	8/2	100	0.27		0	0
					TrafficStream	8/1	100	0.27		0	0

Local OD Matrix - Local Matrix: 1

Local Matrix Options

OD Matrix	Name	Use for point to point table	Auto calculate	Allocation mode	Allow paths past exit locations	Allow looped paths on arms	Allow looped paths on traffic nodes	Copy flows	Matrix to copy flows from	Limit paths by length	Path length limit multiplier	Limit paths by number	Path number limit
1	(untitled)	✓	✓	Path Equalisation			✓			✓	1.25		

Normal Input Flows (PCU/hr)

		To			
		1	2	3	4
From	1	0	42	272	77
	2	38	0	37	46
	3	430	43	0	72
	4	14	24	26	0

Bus Input Flows not shown as they are blank.

Tram Input Flows not shown as they are blank.

Pedestrian Input Flows not shown as they are blank.

Locations

OD Matrix	Location	Name	Entries	Exits	Colour
1	1	(untitled)	1/1	6/1	#0000FF
	2	(untitled)	12/1	11/1	#00FF00
	3	(untitled)	14/1	15/1	#FFFF00
	4	(untitled)	5/1	7/1	#FFFF00

Normal Paths and Flows

OD Matrix	Path	Description	From location	To location	Path items	Allocation type	Normal Calculated Flow (PCU/hr)
1	1		1	2	1/1, 2/1, 8/1, 11/1	Normal	42
	2		2	1	12/1, 13/2, 10/2, 6/1	Normal	38
	3		1	3	1/1, 2/1, 8/2, 15/1	Normal	272
	4		2	3	12/1, 13/1, 15/1	Normal	37
	5		3	1	14/1, 10/2, 6/1	Normal	430
	6		3	2	14/1, 11/1	Normal	43
	7		1	4	1/1, 2/2, 7/1	Normal	77
	8		2	4	12/1, 13/2, 10/1, 7/1	Normal	46
	9		3	4	14/1, 10/1, 7/1	Normal	72
	10		4	1	5/1, 3/1, 6/1	Normal	14
	11		4	2	5/1, 3/2, 8/1, 11/1	Normal	24
	12		4	3	5/1, 3/2, 8/2, 15/1	Normal	26

Signal Timings

Network Default: 100s cycle time; 100 steps

No Controller Streams present.

Traffic Stream Results

Traffic Stream Results: Vehicle summary

Time Segment	Arm	Traffic Stream	Degree of saturation (%)	Practical reserve capacity (%)	Calculated flow entering (PCU/hr)	Calculated sat flow (PCU/hr)	Actual green (s (per cycle))	Mean Delay per Veh (s)	Mean max queue (PCU)	Utilised storage (%)	Weighted cost of delay (£ per hr)	Weighted cost of stops (£ per hr)	Performance Index (£ per hr)
17:00-18:00	1	1	20	348	391	1945	100	0.23	0.03	0.07	0.36	0.00	0.36
	2	1	16	457	314	1945	100	0.18	0.02	0.78	0.22	0.00	0.22
		2	13	573	77	576	100	0.48	0.01	0.52	0.15	0.00	0.15
	3	1	2	4582	14	728	100	0.05	0.00	0.01	0.00	0.00	0.00
		2	11	746	50	470	100	0.46	0.01	0.21	0.09	0.00	0.09
	5	1	3	2635	64	1945	100	0.03	0.00	0.00	0.01	0.00	0.01
	6	1	0	Unrestricted	482	Unrestricted	100	0.00	0.00	0.00	0.00	0.00	0.00
	7	1	0	Unrestricted	195	Unrestricted	100	0.00	0.00	0.00	0.00	0.00	0.00
	8	1	9	896	66	731	100	0.24	0.00	0.06	0.06	0.00	0.06
		2	16	478	298	1915	100	0.17	0.01	0.18	0.20	0.00	0.20
	10	1	14	539	118	838	100	0.35	0.01	0.15	0.16	0.00	0.16
		2	24	268	468	1915	100	0.30	0.04	0.50	0.56	0.00	0.56
	11	1	0	Unrestricted	109	Unrestricted	100	0.00	0.00	0.00	0.00	0.00	0.00
	12	1	6	1310	121	1895	100	0.06	0.00	0.01	0.03	0.00	0.03
	13	1	6	1530	37	670	100	0.16	0.00	0.16	0.02	0.00	0.02
		2	27	228	84	306	100	2.22	0.05	5.17	0.73	0.00	0.73
	14	1	33	176	545	1671	100	0.52	0.08	0.23	1.12	0.00	1.12
	15	1	0	Unrestricted	335	Unrestricted	100	0.00	0.00	0.00	0.00	0.00	0.00

Traffic Stream Results: Flows and signals

Time Segment	Arm	Traffic Stream	Calculated flow entering (PCU/hr)	Calculated flow out (PCU/hr)	Flow discrepancy (PCU/hr)	Adjusted flow warning	Calculated sat flow (PCU/hr)	Calculated capacity (PCU/hr)	Degree of saturation (%)	DOS Threshold exceeded	Practical reserve capacity (%)	Mean modulus of error	Actual green (s (per cycle))
17:00-18:00	1	1	391	391	0		1945	1945	20		348	0.00	100
	2	1	314	314	0		1945	1945	16		457	0.00	100
		2	77	77	0		576	576	13		573	0.00	100
	3	1	14	14	0		728	728	2		4582	0.00	100
		2	50	50	0		470	470	11		746	0.00	100
	5	1	64	64	0		1945	1945	3		2635	0.00	100
	6	1	482	482	0		Unrestricted	Unrestricted	0		Unrestricted	0.00	100
	7	1	195	195	0		Unrestricted	Unrestricted	0		Unrestricted	0.00	100
	8	1	66	66	0		731	731	9		896	0.00	100
		2	298	298	0		1915	1915	16		478	0.00	100
	10	1	118	118	0		838	838	14		539	0.00	100
		2	468	468	0		1915	1915	24		268	0.00	100
	11	1	109	109	0		Unrestricted	Unrestricted	0		Unrestricted	0.00	100
	12	1	121	121	0		1895	1895	6		1310	0.00	100
	13	1	37	37	0		670	670	6		1530	0.00	100
		2	84	84	0		306	306	27		228	0.00	100
	14	1	545	545	0		1671	1671	33		176	0.00	100
	15	1	335	335	0		Unrestricted	Unrestricted	0		Unrestricted	0.00	100

Traffic Stream Results: Stops and delays

Time Segment	Arm	Traffic Stream	Mean Cruise Time per Veh (s)	Mean Delay per Veh (s)	Total delay (PCU-hr/hr)	Weighted cost of delay (£ per hr)	Mean stops per Veh (%)	Total stops (Stops per hr)	Weighted cost of stops (£ per hr)
17:00-18:00	1	1	24.00	0.23	0.03	0.36	0.00	0.00	0.00
	2	1	1.44	0.18	0.02	0.22	0.00	0.00	0.00
		2	1.44	0.48	0.01	0.15	0.00	0.00	0.00
	3	1	2.16	0.05	0.00	0.00	0.00	0.00	0.00
		2	2.16	0.46	0.01	0.09	0.00	0.00	0.00
	5	1	24.00	0.03	0.00	0.01	0.00	0.00	0.00
	6	1	24.00	0.00	0.00	0.00	0.00	0.00	0.00
	7	1	24.00	0.00	0.00	0.00	0.00	0.00	0.00
	8	1	5.40	0.24	0.00	0.06	0.00	0.00	0.00
		2	5.40	0.17	0.01	0.20	0.00	0.00	0.00
	10	1	5.40	0.35	0.01	0.16	0.00	0.00	0.00
		2	5.40	0.30	0.04	0.56	0.00	0.00	0.00
	11	1	24.00	0.00	0.00	0.00	0.00	0.00	0.00
	12	1	24.00	0.06	0.00	0.03	0.00	0.00	0.00
	13	1	1.00	0.16	0.00	0.02	0.00	0.00	0.00
		2	1.00	2.22	0.05	0.73	0.00	0.00	0.00
	14	1	24.00	0.52	0.08	1.12	0.00	0.00	0.00
	15	1	52.58	0.00	0.00	0.00	0.00	0.00	0.00

Traffic Stream Results: Queues and blocking

Time Segment	Arm	Traffic Stream	Initial queue (PCU)	Mean max queue (PCU)	Max queue storage (PCU)	Utilised storage (%)	Excess queue penalty (£ per hr)	Wasted time total (s (per cycle))	Estimated blocking
17:00-18:00	1	1	0.00	0.03	34.78	0.07	0.00	0.00	
	2	1	0.00	0.02	2.00	0.78	0.00	0.00	
		2	0.00	0.01	2.00	0.52	0.00	0.00	
	3	1	0.00	0.00	3.00	0.01	0.00	100.00	
		2	0.00	0.01	3.00	0.21	0.00	100.00	
	5	1	0.00	0.00	34.78	0.00	0.00	0.00	
	6	1	0.00	0.00	34.78	0.00	0.00	0.00	
	7	1	0.00	0.00	34.78	0.00	0.00	0.00	
	8	1	0.00	0.00	7.83	0.06	0.00	0.00	
		2	0.00	0.01	7.83	0.18	0.00	0.00	
	10	1	0.00	0.01	7.83	0.15	0.00	0.00	
		2	0.00	0.04	7.83	0.50	0.00	0.00	
	11	1	0.00	0.00	34.78	0.00	0.00	0.00	
	12	1	0.00	0.00	34.78	0.01	0.00	0.00	
	13	1	0.00	0.00	1.00	0.16	0.00	100.00	
		2	0.00	0.05	1.00	5.17	0.00	0.00	

	14	1	0.00	0.08	34.78	0.23	0.00	0.00	
	15	1	0.00	0.00	76.20	0.00	0.00	0.00	

Traffic Stream Results: Advanced

Time Segment	Arm	Traffic Stream	Degree of saturation penalty (£ per hr)	Ped gap accepting penalty (£ per hr)	Warmed up	Mean Max Queue EoTS (PCU)	Max End of Green Queue EoTS (PCU)	Max End of Red Queue EoTS (PCU)	PCU Factor	Cost of traffic penalties (£ per hr)	Performance Index (£ per hr)
17:00-18:00	1	1	0.00	0.00	✓	0.03			1.00	0.00	0.36
	2	1	0.00	0.00	✓	0.02			1.00	0.00	0.22
		2	0.00	0.00	✓	0.01			1.00	0.00	0.15
	3	1	0.00	0.00	✓	0.00			1.00	0.00	0.00
		2	0.00	0.00	✓	0.01			1.00	0.00	0.09
	5	1	0.00	0.00	✓	0.00			1.00	0.00	0.01
	6	1	0.00	0.00	✓	0.00			1.00	0.00	0.00
	7	1	0.00	0.00	✓	0.00			1.00	0.00	0.00
	8	1	0.00	0.00	✓	0.00			1.00	0.00	0.06
		2	0.00	0.00	✓	0.01			1.00	0.00	0.20
	10	1	0.00	0.00	✓	0.01			1.00	0.00	0.16
		2	0.00	0.00	✓	0.04			1.00	0.00	0.56
	11	1	0.00	0.00	✓	0.00			1.00	0.00	0.00
	12	1	0.00	0.00	✓	0.00			1.00	0.00	0.03
	13	1	0.00	0.00	✓	0.00			1.00	0.00	0.02
		2	0.00	0.00	✓	0.05			1.00	0.00	0.73
	14	1	0.00	0.00	✓	0.08			1.00	0.00	1.12
	15	1	0.00	0.00	✓	0.00			1.00	0.00	0.00

Network Results

Run Summary

Analysis set used	Run start time	Run finish time	Modelling start time (HH:mm)	Network Cycle Time (s)	Performance Index (£ per hr)	Total network delay (PCU-hr/hr)	Highest DOS (%)	Item with highest DOS	Number of oversaturated items	Percentage of oversaturated items (%)	Item with worst signalised PRC	Item with worst unsignalised PRC	Item with worst overall PRC	Network within capacity
2	14/06/2019 12:56:15	14/06/2019 12:56:16	17:00	100	3.73	0.26	32.61	14/1	0	0		14/1	14/1	✓

Network Results: Vehicle summary

Time Segment	Degree of saturation (%)	Practical reserve capacity (%)	Calculated flow entering (PCU/hr)	Actual green (s (per cycle))	Mean Delay per Veh (s)	Weighted cost of delay (£ per hr)	Weighted cost of stops (£ per hr)	Performance Index (£ per hr)
17:00-18:00	33	176	3768	1800	0.25	3.73	0.00	3.73

Network Results: Flows and signals

Time Segment	Calculated flow entering (PCU/hr)	Calculated flow out (PCU/hr)	Flow discrepancy (PCU/hr)	Adjusted flow warning	Degree of saturation (%)	DOS Threshold exceeded	Practical reserve capacity (%)	Actual green (s (per cycle))
17:00-18:00	3768	3768	0		33		176	1800

Network Results: Stops and delays

Time Segment	Mean Cruise Time per Veh (s)	Mean Delay per Veh (s)	Total delay (PCU-hr/hr)	Weighted cost of delay (£ per hr)	Mean stops per Veh (%)	Total stops (Stops per hr)	Weighted cost of stops (£ per hr)
17:00-18:00	18.40	0.25	0.26	3.73	0.00	0.00	0.00

Network Results: Queues and blocking

Time Segment	Utilised storage (%)	Excess queue penalty (£ per hr)	Wasted time total (s (per cycle))
17:00-18:00	5.17	0.00	300.00

Network Results: Advanced

Time Segment	Degree of saturation penalty (£ per hr)	Ped gap accepting penalty (£ per hr)	Warmed up	PCU Factor	Cost of traffic penalties (£ per hr)	Controller stream penalties (£ per hr)	Performance Index (£ per hr)
17:00-18:00	0.00	0.00	✓	1.00	0.00	0.00	3.73

Point to Point Journey Time

Average Journey Time (s) for Local Matrix: 1

		To			
		1	2	3	4
From	1	0.0	55.5	84.0	50.2
	2	57.0	0.0	77.8	57.0
	3	54.2	48.5	0.0	54.3
	4	50.2	56.3	84.8	0.0

Path Journey Time

Path	From Location	To Location	Normal Calculated Flow (PCU/hr)	Normal journey time (s)	Calculated Total Flow (PCU/hr)	Avg journey time (s)
1	1	2	42	55.50	42	55.50
2	2	1	38	56.98	38	56.98
3	1	3	272	84.00	272	84.00
4	2	3	37	77.80	37	77.80
5	3	1	430	54.22	430	54.22
6	3	2	43	48.52	43	48.52
7	1	4	77	50.15	77	50.15
8	2	4	46	57.03	46	57.03
9	3	4	72	54.27	72	54.27

10	4	1	14	50.24	14	50.24
11	4	2	24	56.29	24	56.29
12	4	3	26	84.80	26	84.80

Final Prediction Table

Traffic Stream Results

				FLOWS		PERFORMANCE				PER PCU			QUEUES	WEIGHTS		PENALTIES	P.I.
Arm	**Traffic Stream**	**Name**	**Traffic node**	**Calculated flow entering (PCU/hr)**	**Calculated sat flow (PCU/hr)**	**Actual green (s (per cycle))**	**Wasted time total (s (per cycle))**	**Degree of saturation (%)**	**Practical reserve capacity (%)**	**JourneyTime (s)**	**Mean Delay per Veh (s)**	**Mean stops per Veh (%)**	**Mean max queue (PCU)**	**Delay weighting multiplier (%)**	**Stop weighting multiplier (%)**	**Cost of traffic penalties (£ per hr)**	**P.I.**
1	**1**	(untitled)		391	1945	100	0.00	20	348	24.23	0.23	0.00	0.03	100	100	0.00	0.36
2	**1**	(untitled)		314	1945	100	0.00	16	457	1.62	0.18	0.00	0.02	100	100	0.00	0.22
	2	(untitled)		77	576	100	0.00	13	573	1.92	0.48	0.00	0.01	100	100	0.00	0.15
3	**1**	(untitled)		14	728	100	100.00	2	4582	2.21	0.05	0.00	0.00	100	100	0.00	0.00
	2	(untitled)		50	470	100	100.00	11	746	2.62	0.46	0.00	0.01	100	100	0.00	0.09
5	**1**	(untitled)		64	1945	100	0.00	3	2635	24.03	0.03	0.00	0.00	100	100	0.00	0.01
6	**1**	(untitled)		482	Unrestricted	100	0.00	0	Unrestricted	24.00	0.00	0.00	0.00	100	100	0.00	0.00
7	**1**	(untitled)		195	Unrestricted	100	0.00	0	Unrestricted	24.00	0.00	0.00	0.00	100	100	0.00	0.00
8	**1**	(untitled)		66	731	100	0.00	9	896	5.64	0.24	0.00	0.00	100	100	0.00	0.06
	2	(untitled)		298	1915	100	0.00	16	478	5.57	0.17	0.00	0.01	100	100	0.00	0.20
10	**1**	(untitled)		118	838	100	0.00	14	539	5.75	0.35	0.00	0.01	100	100	0.00	0.16
	2	(untitled)		468	1915	100	0.00	24	268	5.70	0.30	0.00	0.04	100	100	0.00	0.56
11	**1**	(untitled)		109	Unrestricted	100	0.00	0	Unrestricted	24.00	0.00	0.00	0.00	100	100	0.00	0.00
12	**1**	(untitled)		121	1895	100	0.00	6	1310	24.06	0.06	0.00	0.00	100	100	0.00	0.03
13	**1**	(untitled)		37	670	100	100.00	6	1530	1.16	0.16	0.00	0.00	100	100	0.00	0.02
	2	(untitled)		84	306	100	0.00	27	228	3.22	2.22	0.00	0.05	100	100	0.00	0.73
14	**1**	(untitled)		545	1671	100	0.00	33	176	24.52	0.52	0.00	0.08	100	100	0.00	1.12
15	**1**	(untitled)		335	Unrestricted	100	0.00	0	Unrestricted	52.58	0.00	0.00	0.00	100	100	0.00	0.00

Network Results

	Distance travelled (PCU-km/hr)	Time spent (PCU-hr/hr)	Mean journey speed (kph)	Total delay (PCU-hr/hr)	Weighted cost of delay (£ per hr)	Weighted cost of stops (£ per hr)	Excess queue penalty (£ per hr)	Performance Index (£ per hr)
Normal traffic	577.68	19.52	29.59	0.26	3.73	0.00	0.00	3.73
Bus	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tram	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pedestrians								
TOTAL	577.68	19.52	29.59	0.26	3.73	0.00	0.00	3.73

- *< = adjusted flow warning (upstream links/traffic streams are over-saturated)*
- ** = Traffic Stream - Normal, Bus or Tram Stop or Delay weighting has been set to a value other than 100%*
- *^ = Traffic Stream - Normal, Bus or Tram Stop or Delay Path weighting has been set to a value other than 100%*
- *+ = average link/traffic stream excess queue is greater than 0*
- ***P.I. = PERFORMANCE INDEX***

A3 - 2031 Ref AM
D3 - 2031 Ref AM*

Summary

Data Errors and Warnings

Severity	Area	Item	Description
Info	Optimisation Order	Advanced	Because the optimisation list is blank, no optimisation will occur.

Run Summary

Analysis set used	Run start time	Run finish time	Modelling start time (HH:mm)	Network Cycle Time (s)	Performance Index (£ per hr)	Total network delay (PCU-hr/hr)	Highest DOS (%)	Item with highest DOS	Number of oversaturated items	Percentage of oversaturated items (%)	Item with worst signalised PRC	Item with worst unsignalised PRC	Item with worst overall PRC	Network within capacity
3	14/06/2019 12:56:16	14/06/2019 12:56:17	08:00	100	864.61	60.41	245.31	12/1	2	11		12/1	12/1	

Analysis Set Details

Name	Description	Demand set	Include in report	Locked
2031 Ref AM		D3	✓	

Demand Set Details

Name	Description	Composite	Demand sets	Start time (HH:mm)	Locked
2031 Ref AM				08:00	

Network Options

Network timings

Network cycle time (s)	Restrict to SCOOT cycle times	Time segment length (min)	Number of time segments	Modelled time period (min)
100		60	1	60

Signals options

Start displacement (s)	End displacement (s)
2	3

Advanced

Phase minimum broken penalty (£)	Phase maximum broken penalty (£)	Intergreen broken penalty (£)	Starting Red-with-Amber (s)
10000.00	10000.00	10000.00	2

Traffic options

Traffic model	Vehicle flow scaling factor (%)	Pedestrian flow scaling factor (%)	Cruise times or speeds
Platoon Dispersion (PDM)	100	100	Cruise Speeds

Advanced

Resolution	DOS Threshold (%)	Cruise scaling factor (%)	Use link stop weightings	Use link delay weightings	Exclude pedestrians from results calculation	Random delay mode	Type of Vehicle-in-Service	Type of random parameter	PCU Length (m)	Calculate results for Path Segments	Generate PDM Profile Data
1	90	100	✓	✓		Complex	Uniform (TRANSYT)	Uniform (TRANSYT)	5.75		✓

Normal Traffic parameters

Dispersion type	Dispersion coefficient	Travel time coefficient
Default	35	80

Normal Traffic Types

Name	PCU Factor
Normal	1.00

Bus parameters

Name	PCU Factor	Dispersion type	Acceleration (ms^[-2])	Stationary time coefficient	Cruise time coefficient
Bus	1.00	Default	0.94	30	85

Tram parameters

Name	PCU Factor	Dispersion type	Acceleration (ms^[-2])	Stationary time coefficient	Cruise time coefficient
Tram	1.00	Default	0.94	100	100

Pedestrian parameters

Dispersion type
Default

Optimisation options

Enable optimisation	Auto redistribute	Optimisation level	Enable OUT Profile accuracy
✓	✓	Offsets And Green Splits	✓

Advanced

Optimisation type	Hill climb increments	OUTProfile accuracy	Use enhanced optimisation	Auto optimisation order	Optimisation order	Master controller	Offsets relative to master controller	Master controller offset after each run
Hill Climb (Fast)	15, 40, -1, 15, 40, 1, -1, 1	50, 50, 5, 5, 0.5, 0.5, 0.05, 0.05		✓				Do nothing

Economics

Vehicle Monetary Value Of Delay (£ per PCU-hr)	Vehicle Monetary Value Of Stops (£ per 100 stops)	Pedestrian monetary value of delay (£ per Ped-hr)
14.20	2.60	14.20

Arms and Traffic Streams

Arms

Arm	Name	Description	Traffic node
(ALL)	(untitled)		

Traffic Streams

Arm	Traffic Stream	Name	Description	Auto length	Length (m)	Has Saturation Flow	Saturation flow source	Saturation flow (PCU/hr)	Auto-calculate cell saturation flow	Cell saturation flow (PCU/hr)	Is signal controlled	Is give way	Traffic type	Allow Nearside Turn On Red
1	1	(untitled)			200.00	✓	Sum of lanes	1945					Normal	
2	1	(untitled)			12.00	✓	Sum of lanes	1945					Normal	
	2	(untitled)			12.00							✓	Normal	
3	1	(untitled)			18.00							✓	Normal	
	2	(untitled)			18.00							✓	Normal	
5	1	(untitled)			200.00	✓	Sum of lanes	1945					Normal	
6	1	(untitled)			200.00								Normal	
7	1	(untitled)			200.00								Normal	
8	1	(untitled)			45.00				✓	1800		✓	Normal	
	2	(untitled)			45.00	✓	Sum of lanes	1915		1915			Normal	
10	1	(untitled)			45.00				✓	1800		✓	Normal	
	2	(untitled)			45.00	✓	Sum of lanes	1915		1915			Normal	
11	1	(untitled)			200.00								Normal	
12	1	(untitled)			200.00	✓	Sum of lanes	1895					Normal	
13	1	(untitled)			7.50							✓	Normal	
	2	(untitled)			7.50							✓	Normal	
14	1	(untitled)			200.00							✓	Normal	
15	1	(untitled)		✓	438.13								Normal	

Lanes

Arm	Traffic Stream	Lane	Name	Description	Use RR67	Surface condition	Site quality factor	Gradient (%)	Width (m)	Use connector turning radius	Proportion that turn (%)	Turning radius (m)	Nearside lane	Saturation flow (PCU/hr)
1	1	1	(untitled)		✓	N/A	N/A	0	3.30	✓	0	99999.00	✓	1945
2	1	1	(untitled)		✓	N/A	N/A	0	3.30	✓	0	99999.00	✓	1945
	2	1	(untitled)											
3	1	1	(untitled)											
	2	1	(untitled)											
5	1	1	(untitled)		✓	N/A	N/A	0	3.30	✓	0	99999.00	✓	1945
6	1	1	(untitled)											
7	1	1	(untitled)											
8	1	1	(untitled)											
	2	1	(untitled)		✓	N/A	N/A	0	3.00	✓	0	99999.00	✓	1915
10	1	1	(untitled)											
	2	1	(untitled)		✓	N/A	N/A	0	3.00	✓	0	99999.00	✓	1915
11	1	1	(untitled)											
12	1	1	(untitled)		✓	N/A	N/A	0	2.80	✓	0	99999.00	✓	1895
13	1	1	(untitled)											
	2	1	(untitled)											
14	1	1	(untitled)											
15	1	1	(untitled)											

Modelling

Arm	Traffic Stream	Traffic model	Stop weighting multiplier (%)	Delay weighting multiplier (%)	Assignment Cost Weighting (%)	Exclude from results calculation	Max queue storage (PCU)	Has queue limit	Has degree of saturation limit
1	1	NetworkDefault	100	100	100		0.00		
2	1	Flare	100	100	100		0.00		
	2	Flare	100	100	100		0.00		
3	1	Flare	100	100	100		0.00		
	2	Flare	100	100	100		0.00		
5	1	NetworkDefault	100	100	100		0.00		
6	1	NetworkDefault	100	100	100		0.00		
7	1	NetworkDefault	100	100	100		0.00		
8	1	Flare	100	100	100		0.00		
	2	CTM	100	100	100		0.00		
10	1	Flare	100	100	100		0.00		
	2	CTM	100	100	100		0.00		
11	1	NetworkDefault	100	100	100		0.00		
12	1	NetworkDefault	100	100	100		0.00		
13	1	Flare	100	100	100		0.00		
	2	Flare	100	100	100		0.00		
14	1	NetworkDefault	100	100	100		0.00		
15	1	NetworkDefault	100	100	100		0.00		

Modelling - Advanced

Arm	Traffic Stream	Initial queue (PCU)	Type of Vehicle-in-Service	Vehicle-in-Service	Type of random parameter	Random parameter	Auto cycle time	Cycle time
(ALL)	(ALL)	0.00	NetworkDefault	Not-Included	NetworkDefault	0.50	✓	100

Normal traffic - Modelling

Arm	Traffic Stream	Stop weighting (%)	Delay weighting (%)
(ALL)	(ALL)	100	100

Normal traffic - Advanced

Arm	Traffic Stream	Dispersion type for Normal Traffic
(ALL)	(ALL)	NetworkDefault

Flows

Arm	Traffic Stream	Total Flow (PCU/hr)	Normal Flow (PCU/hr)
1	1	1080	1080
2	1	1062	1062
	2	18	18
3	1	38	38
	2	119	119
5	1	157	157
6	1	790	790
7	1	67	67
8	1	272	272
	2	909	909
10	1	49	49
	2	752	752
11	1	375	375
12	1	186	186
13	1	58	58
	2	128	128
14	1	776	776
15	1	967	967

Entry Sources

Arm	Traffic Stream	Cruise time for Normal Traffic (s)	Cruise speed for Normal Traffic (kph)
(ALL)	1	24.00	30.00

Sources

Arm	Traffic Stream	Source	Source traffic stream	Destination traffic stream	Cruise time for Normal Traffic (s)	Cruise speed for Normal Traffic (kph)	Auto turning radius	Traffic turn style	Turning radius (m)
2	1	1	1/1	2/1	1.44	30.00	✓	Straight	Straight Movement
	2	1	1/1	2/2	1.44	30.00	✓	Straight	Straight Movement
3	1	1	5/1	3/1	2.16	30.00	✓	Straight	Straight Movement
	2	1	5/1	3/2	2.16	30.00	✓	Straight	Straight Movement
6	1	1	10/2	6/1	24.00	30.00	✓	Straight	Straight Movement
7	1	1	2/2	7/1	24.00	30.00	✓	Straight	Straight Movement
8	1	1	2/1	8/1	5.40	30.00	✓	Straight	Straight Movement
	2	1	2/1	8/2	5.40	30.00	✓	Straight	Straight Movement
10	1	1	13/2	10/1	5.40	30.00	✓	Straight	Straight Movement
	2	1	13/2	10/2	5.40	30.00	✓	Straight	Straight Movement
11	1	1	8/1	11/1	24.00	30.00	✓	Straight	Straight Movement
13	1	1	12/1	13/1	1.00	30.00	✓	Straight	Straight Movement
	2	1	12/1	13/2	1.00	30.00	✓	Straight	Straight Movement
15	1	1	13/1	15/1	52.58	30.00	✓	Nearside	80.02
6	1	2	3/1	6/1	24.00	30.00	✓	Straight	Straight Movement
7	1	2	10/1	7/1	24.00	30.00	✓	Nearside	70.86
8	1	2	3/2	8/1	5.40	30.00	✓	Offside	99.89
	2	2	3/2	8/2	5.40	30.00	✓	Offside	99.89
10	1	2	14/1	10/1	5.40	30.00	✓	Straight	Straight Movement
	2	2	14/1	10/2	5.40	30.00	✓	Straight	Straight Movement
11	1	2	14/1	11/1	24.00	30.00	✓	Straight	Straight Movement
15	1	2	8/2	15/1	52.58	30.00	✓	Straight	Straight Movement

Give Way Data

Arm	Traffic Stream	Opposed traffic	Use Step-wise Opposed Turn Model	Visibility restricted
2	2	AllTraffic		
3	1	AllTraffic		
	2	AllTraffic		
8	1	AllTraffic		
10	1	AllTraffic		
13	1	AllTraffic		
	2	AllTraffic		

14	**1**	Movement		

Give Way Data - All Movements - Conflicts

Traffic Stream	Description	Controlling type	Controlling traffic stream	Controlling from traffic stream	Controlling to traffic stream	Percentage opposing (%)	Slope coefficient	Upstream signals visible	Conflict shift	Conflict duration
2		TrafficStream	10/2			100	0.28		0	0
		TrafficStream	10/1			100	0.28		0	0
1		TrafficStream	10/2			100	0.34		0	0
2		TrafficStream	10/2			100	0.33		0	0
		TrafficStream	2/1			100	0.21		0	0
		TrafficStream	2/2			100	0.47		0	0
1		TrafficStreamMovement		14/1	11/1	100	0.29		0	0
		TrafficStream	2/2			100	0.28		0	0
		TrafficStream	8/2			100	0.29		0	0
2		TrafficStream	8/2			100	0.27		0	0
		TrafficStream	14/1			100	0.39		0	0

Give Way Data - Movements

Arm	Traffic Stream	Movement	Destination traffic stream	Max Flow (Opposed) (PCU/hr)	Max Flow (Unopposed) (PCU/hr)	Percentage opposed (%)
14	**1**	**1**	10/1	1965	1965	100
		2	10/2	1965	1965	100
		3	11/1	707	707	100

Give Way Data - Movements - Conflicts

Arm	Traffic Stream	Movement	Destination traffic stream	Description	Controlling type	Controlling traffic stream	Percentage opposing (%)	Slope coefficient	Upstream signals visible	Conflict shift	Conflict duration
14	**1**	**3**	**11/1**		TrafficStream	8/2	100	0.27		0	0
					TrafficStream	8/1	100	0.27		0	0

Local OD Matrix - Local Matrix: 1

Local Matrix Options

OD Matrix	Name	Use for point to point table	Auto calculate	Allocation mode	Allow paths past exit locations	Allow looped paths on arms	Allow looped paths on traffic nodes	Copy flows	Matrix to copy flows from	Limit paths by length	Path length limit multiplier	Limit paths by number	Path number limit
1	(untitled)	✓	✓	Path Equalisation			✓			✓	1.25		

Normal Input Flows (PCU/hr)

		To			
		1	**2**	**3**	**4**
From	**1**	0	200	862	18
	2	114	0	58	14
	3	638	103	0	35
	4	38	72	47	0

Bus Input Flows not shown as they are blank.

Tram Input Flows not shown as they are blank.

Pedestrian Input Flows not shown as they are blank.

Locations

OD Matrix	Location	Name	Entries	Exits	Colour
1	**1**	(untitled)	1/1	6/1	#0000FF
	2	(untitled)	12/1	11/1	#00FF00
	3	(untitled)	14/1	15/1	#FFFF00
	4	(untitled)	5/1	7/1	#FFFF00

Normal Paths and Flows

OD Matrix	Path	Description	From location	To location	Path items	Allocation type	Normal Calculated Flow (PCU/hr)
1	**1**		1	2	1/1, 2/1, 8/1, 11/1	Normal	200
	2		2	1	12/1, 13/2, 10/2, 6/1	Normal	114
	3		1	3	1/1, 2/1, 8/2, 15/1	Normal	862
	4		2	3	12/1, 13/1, 15/1	Normal	58
	5		3	1	14/1, 10/2, 6/1	Normal	638
	6		3	2	14/1, 11/1	Normal	103
	7		1	4	1/1, 2/2, 7/1	Normal	18
	8		2	4	12/1, 13/2, 10/1, 7/1	Normal	14
	9		3	4	14/1, 10/1, 7/1	Normal	35
	10		4	1	5/1, 3/1, 6/1	Normal	38
	11		4	2	5/1, 3/2, 8/1, 11/1	Normal	72
	12		4	3	5/1, 3/2, 8/2, 15/1	Normal	47

Signal Timings

Network Default: 100s cycle time; 100 steps

No Controller Streams present.

Traffic Stream Results

Traffic Stream Results: Vehicle summary

Time Segment	Arm	Traffic Stream	Degree of saturation (%)	Practical reserve capacity (%)	Calculated flow entering (PCU/hr)	Calculated sat flow (PCU/hr)	Actual green (s (per cycle))	Mean Delay per Veh (s)	Mean max queue (PCU)	Utilised storage (%)	Weighted cost of delay (£ per hr)	Weighted cost of stops (£ per hr)	Performance Index (£ per hr)
08:00-09:00	1	1	56	62	1080	1945	100	1.15	0.35	0.99	4.91	0.00	4.91
	2	1	55	65	1062	1945	100	1.11	0.33	16.39	4.65	0.00	4.65
		2	3	2584	18	537	100	0.12	0.00	0.03	0.01	0.00	0.01
	3	1	6	1452	38	655	100	0.17	0.00	0.06	0.03	0.00	0.03
		2	44	106	119	272	100	5.09	0.17	5.61	2.39	0.00	2.39
	5	1	8	1015	157	1945	100	0.08	0.00	0.01	0.05	0.00	0.05
	6	1	0	Unrestricted	722	Unrestricted	100	0.00	0.00	0.00	0.00	0.00	0.00
	7	1	0	Unrestricted	59	Unrestricted	100	0.00	0.00	0.00	0.00	0.00	0.00
	8	1	38	136	272	714	100	1.55	0.12	1.50	1.66	0.00	1.66
		2	47	90	909	1915	100	0.85	0.21	2.74	3.04	0.00	3.04
	10	1	5	1791	41	855	100	0.11	0.00	0.02	0.02	0.00	0.02
		2	36	152	684	1915	100	0.52	0.10	1.27	1.41	0.00	1.41
	11	1	0	Unrestricted	375	Unrestricted	100	0.00	0.00	0.00	0.00	0.00	0.00
	12	1	245	-63	186	1895	100	1073.07	57.17	164.37	787.27	5.60	792.87
	13	1	5	1781	24	494	100	0.18	0.00	0.12	0.02	0.00	0.02
		2	100	-10	52	52	100	221.88	3.22	322.41	45.67	1.25	46.92
	14	1	61	48	776	1278	100	2.17	0.47	1.34	6.63	0.00	6.63
	15	1	0	Unrestricted	933	Unrestricted	100	0.00	0.00	0.00	0.00	0.00	0.00

Traffic Stream Results: Flows and signals

Time Segment	Arm	Traffic Stream	Calculated flow entering (PCU/hr)	Calculated flow out (PCU/hr)	Flow discrepancy (PCU/hr)	Adjusted flow warning	Calculated sat flow (PCU/hr)	Calculated capacity (PCU/hr)	Degree of saturation (%)	DOS Threshold exceeded	Practical reserve capacity (%)	Mean modulus of error	Actual green (s (per cycle))
08:00-09:00	1	1	1080	1080	0		1945	1945	56		62	0.00	100
	2	1	1062	1062	0		1945	1945	55		65	0.00	100
		2	18	18	0		537	537	3		2584	0.00	100
	3	1	38	38	0		655	655	6		1452	0.00	100
		2	119	119	0		272	272	44		106	0.00	100
	5	1	157	157	0		1945	1945	8		1015	0.00	100
	6	1	722	722	68	✓	Unrestricted	Unrestricted	0		Unrestricted	0.00	100
	7	1	59	59	8	✓	Unrestricted	Unrestricted	0		Unrestricted	0.00	100
	8	1	272	272	0		714	714	38		136	0.00	100
		2	909	909	0		1915	1915	47		90	0.00	100
	10	1	41	41	8	✓	855	855	5		1791	0.00	100
		2	684	684	68	✓	1915	1915	36		152	0.00	100
	11	1	375	375	0		Unrestricted	Unrestricted	0		Unrestricted	0.00	100
	12	1	186	76	0		1895	76	245	✓	-63	0.00	100
	13	1	24	24	34	✓	494	494	5		1781	0.61	100
		2	52	52	76	✓	52	52	100	✓	-10	0.61	100
	14	1	776	776	0		1278	1278	61		48	0.00	100
	15	1	933	933	34	✓	Unrestricted	Unrestricted	0		Unrestricted	0.00	100

Traffic Stream Results: Stops and delays

Time Segment	Arm	Traffic Stream	Mean Cruise Time per Veh (s)	Mean Delay per Veh (s)	Total delay (PCU-hr/hr)	Weighted cost of delay (£ per hr)	Mean stops per Veh (%)	Total stops (Stops per hr)	Weighted cost of stops (£ per hr)
08:00-09:00	1	1	24.00	1.15	0.35	4.91	0.00	0.00	0.00
	2	1	1.44	1.11	0.33	4.65	0.00	0.00	0.00
		2	1.44	0.12	0.00	0.01	0.00	0.00	0.00
	3	1	2.16	0.17	0.00	0.03	0.00	0.00	0.00
		2	2.16	5.09	0.17	2.39	0.00	0.00	0.00
	5	1	24.00	0.08	0.00	0.05	0.00	0.00	0.00
	6	1	24.00	0.00	0.00	0.00	0.00	0.00	0.00
	7	1	24.00	0.00	0.00	0.00	0.00	0.00	0.00
	8	1	5.40	1.55	0.12	1.66	0.00	0.00	0.00
		2	5.40	0.85	0.21	3.04	0.00	0.00	0.00
	10	1	5.40	0.11	0.00	0.02	0.00	0.00	0.00
		2	5.40	0.52	0.10	1.41	0.00	0.00	0.00
	11	1	24.00	0.00	0.00	0.00	0.00	0.00	0.00
	12	1	24.00	1073.07	55.44	787.27	588.81	446.46	5.60
	13	1	1.00	0.18	0.00	0.02	0.00	0.00	0.00
		2	1.00	221.88	3.22	45.67	236.45	123.03	1.25
	14	1	24.00	2.17	0.47	6.63	0.00	0.00	0.00
	15	1	52.58	0.00	0.00	0.00	0.00	0.00	0.00

Traffic Stream Results: Queues and blocking

Time Segment	Arm	Traffic Stream	Initial queue (PCU)	Mean max queue (PCU)	Max queue storage (PCU)	Utilised storage (%)	Excess queue penalty (£ per hr)	Wasted time total (s (per cycle))	Estimated blocking
08:00-09:00	1	1	0.00	0.35	34.78	0.99	0.00	0.00	
	2	1	0.00	0.33	2.00	16.39	0.00	0.00	
		2	0.00	0.00	2.00	0.03	0.00	100.00	
	3	1	0.00	0.00	3.00	0.06	0.00	100.00	
		2	0.00	0.17	3.00	5.61	0.00	0.00	
	5	1	0.00	0.00	34.78	0.01	0.00	0.00	
	6	1	0.00	0.00	34.78	0.00	0.00	0.00	
	7	1	0.00	0.00	34.78	0.00	0.00	100.00	
	8	1	0.00	0.12	7.83	1.50	0.00	0.00	
		2	0.00	0.21	7.83	2.74	0.00	0.00	
	10	1	0.00	0.00	7.83	0.02	0.00	100.00	
		2	0.00	0.10	7.83	1.27	0.00	0.00	
	11	1	0.00	0.00	34.78	0.00	0.00	0.00	
	12	1	0.00	57.17	34.78	164.37	0.00	100.00	
		1	0.00	0.00	1.00	0.12	0.00	100.00	

	13	2	0.00	3.22	1.00	322.41	0.00	12.00	
	14	1	0.00	0.47	34.78	1.34	0.00	0.00	
	15	1	0.00	0.00	76.20	0.00	0.00	0.00	

Traffic Stream Results: Advanced

Time Segment	Arm	Traffic Stream	Degree of saturation penalty (£ per hr)	Ped gap accepting penalty (£ per hr)	Warmed up	Mean Max Queue EoTS (PCU)	Max End of Green Queue EoTS (PCU)	Max End of Red Queue EoTS (PCU)	PCU Factor	Cost of traffic penalties (£ per hr)	Performance Index (£ per hr)
08:00-09:00	1	1	0.00	0.00	✓	0.35			1.00	0.00	4.91
	2	1	0.00	0.00	✓	0.33			1.00	0.00	4.65
		2	0.00	0.00	✓	0.00			1.00	0.00	0.01
	3	1	0.00	0.00	✓	0.00			1.00	0.00	0.03
		2	0.00	0.00	✓	0.17			1.00	0.00	2.39
	5	1	0.00	0.00	✓	0.00			1.00	0.00	0.05
	6	1	0.00	0.00	✓	0.00			1.00	0.00	0.00
	7	1	0.00	0.00	✓	0.00			1.00	0.00	0.00
	8	1	0.00	0.00	✓	0.12			1.00	0.00	1.66
		2	0.00	0.00	✓	0.21			1.00	0.00	3.04
	10	1	0.00	0.00	✓	0.00			1.00	0.00	0.02
		2	0.00	0.00	✓	0.10			1.00	0.00	1.41
	11	1	0.00	0.00	✓	0.00			1.00	0.00	0.00
	12	1	0.00	0.00		112.26			1.00	0.00	792.87
	13	1	0.00	0.00		0.00			1.00	0.00	0.02
		2	0.00	0.00		4.74			1.00	0.00	46.92
	14	1	0.00	0.00	✓	0.47			1.00	0.00	6.63
	15	1	0.00	0.00		0.00			1.00	0.00	0.00

Network Results

Run Summary

Analysis set used	Run start time	Run finish time	Modelling start time (HH:mm)	Network Cycle Time (s)	Performance Index (£ per hr)	Total network delay (PCU-hr/hr)	Highest DOS (%)	Item with highest DOS	Number of oversaturated items	Percentage of oversaturated items (%)	Item with worst signalised PRC	Item with worst unsignalised PRC	Item with worst overall PRC	Network within capacity
3	14/06/2019 12:56:16	14/06/2019 12:56:17	08:00	100	864.61	60.41	245.31	12/1	2	11		12/1	12/1	

Network Results: Vehicle summary

Time Segment	Degree of saturation (%)	Practical reserve capacity (%)	Calculated flow entering (PCU/hr)	Actual green (s (per cycle))	Mean Delay per Veh (s)	Weighted cost of delay (£ per hr)	Weighted cost of stops (£ per hr)	Performance Index (£ per hr)
08:00-09:00	245	-63	7507	1800	28.97	857.76	6.85	864.61

Network Results: Flows and signals

Time Segment	Calculated flow entering (PCU/hr)	Calculated flow out (PCU/hr)	Flow discrepancy (PCU/hr)	Adjusted flow warning	Degree of saturation (%)	DOS Threshold exceeded	Practical reserve capacity (%)	Actual green (s (per cycle))
08:00-09:00	7507	7396	296	✓	245	✓	-63	1800

Network Results: Stops and delays

Time Segment	Mean Cruise Time per Veh (s)	Mean Delay per Veh (s)	Total delay (PCU-hr/hr)	Weighted cost of delay (£ per hr)	Mean stops per Veh (%)	Total stops (Stops per hr)	Weighted cost of stops (£ per hr)
08:00-09:00	18.89	28.97	60.41	857.76	16.23	569.49	6.85

Network Results: Queues and blocking

Time Segment	Utilised storage (%)	Excess queue penalty (£ per hr)	Wasted time total (s (per cycle))
08:00-09:00	322.41	0.00	612.00

Network Results: Advanced

Time Segment	Degree of saturation penalty (£ per hr)	Ped gap accepting penalty (£ per hr)	Warmed up	PCU Factor	Cost of traffic penalties (£ per hr)	Controller stream penalties (£ per hr)	Performance Index (£ per hr)
08:00-09:00	0.00	0.00		1.00	0.00	0.00	864.61

Point to Point Journey Time

Average Journey Time (s) for Local Matrix: 1

		To			
		1	2	3	4
From	1	0.0	58.7	86.5	50.7
	2	1349.9	0.0	1150.8	1349.5
	3	56.1	50.2	0.0	55.7
	4	50.4	62.3	90.2	0.0

Path Journey Time

Path	From Location	To Location	Normal Calculated Flow (PCU/hr)	Normal journey time (s)	Calculated Total Flow (PCU/hr)	Avg journey time (s)
1	1	2	200	58.65	200	58.65
2	2	1	114	1349.87	114	1349.87
3	1	3	862	86.53	862	86.53
4	2	3	58	1150.83	58	1150.83
5	3	1	638	56.09	638	56.09
6	3	2	103	50.17	103	50.17
7	1	4	18	50.71	18	50.71
8	2	4	14	1349.45	14	1349.45

9	3	4	35	55.67	35	55.67
10	4	1	38	50.41	38	50.41
11	4	2	72	62.28	72	62.28
12	4	3	47	90.15	47	90.15

Final Prediction Table

Traffic Stream Results

				FLOWS		PERFORMANCE				PER PCU			QUEUES	WEIGHTS		PENALTIES	P.I.
Arm	**Traffic Stream**	**Name**	**Traffic node**	**Calculated flow entering (PCU/hr)**	**Calculated sat flow (PCU/hr)**	**Actual green (s (per cycle))**	**Wasted time total (s (per cycle))**	**Degree of saturation (%)**	**Practical reserve capacity (%)**	**JourneyTime (s)**	**Mean Delay per Veh (s)**	**Mean stops per Veh (%)**	**Mean max queue (PCU)**	**Delay weighting multiplier (%)**	**Stop weighting multiplier (%)**	**Cost of traffic penalties (£ per hr)**	**P.I.**
1	**1**	(untitled)		1080	1945	100	0.00	56	62	25.15	1.15	0.00	0.35	100	100	0.00	4.91
2	**1**	(untitled)		1062	1945	100	0.00	55	65	2.55	1.11	0.00	0.33	100	100	0.00	4.65
	2	(untitled)		18	537	100	100.00	3	2584	1.56	0.12	0.00	0.00	100	100	0.00	0.01
3	**1**	(untitled)		38	655	100	100.00	6	1452	2.33	0.17	0.00	0.00	100	100	0.00	0.03
	2	(untitled)		119	272	100	0.00	44	106	7.25	5.09	0.00	0.17	100	100	0.00	2.39
5	**1**	(untitled)		157	1945	100	0.00	8	1015	24.08	0.08	0.00	0.00	100	100	0.00	0.05
6	**1**	(untitled)		722	Unrestricted	100	0.00	0	Unrestricted	24.00	0.00	0.00	0.00	100	100	0.00	0.00
7	**1**	(untitled)		59	Unrestricted	100	100.00	0	Unrestricted	24.00	0.00	0.00	0.00	100	100	0.00	0.00
8	**1**	(untitled)		272	714	100	0.00	38	136	6.95	1.55	0.00	0.12	100	100	0.00	1.66
	2	(untitled)		909	1915	100	0.00	47	90	6.25	0.85	0.00	0.21	100	100	0.00	3.04
10	**1**	(untitled)		41	855	100	100.00	5	1791	5.51	0.11	0.00	0.00	100	100	0.00	0.02
	2	(untitled)		684	1915	100	0.00	36	152	5.92	0.52	0.00	0.10	100	100	0.00	1.41
11	**1**	(untitled)		375	Unrestricted	100	0.00	0	Unrestricted	24.00	0.00	0.00	0.00	100	100	0.00	0.00
12	**1**	(untitled)		186 <	1895	100	100.00	245	-63	1097.07	1073.07	588.81	57.17 +	100	100	0.00	792.87
13	**1**	(untitled)		24	494	100	100.00	5	1781	1.18	0.18	0.00	0.00	100	100	0.00	0.02
	2	(untitled)		52 <	52	100	12.00	100	-10	222.88	221.88	236.45	3.22 +	100	100	0.00	46.92
14	**1**	(untitled)		776	1278	100	0.00	61	48	26.17	2.17	0.00	0.47	100	100	0.00	6.63
15	**1**	(untitled)		933	Unrestricted	100	0.00	0	Unrestricted	52.58	0.00	0.00	0.00	100	100	0.00	0.00

Network Results

	Distance travelled (PCU-km/hr)	Time spent (PCU-hr/hr)	Mean journey speed (kph)	Total delay (PCU-hr/hr)	Weighted cost of delay (£ per hr)	Weighted cost of stops (£ per hr)	Excess queue penalty (£ per hr)	Performance Index (£ per hr)
Normal traffic	1181.74	99.80	11.84	60.41	857.76	6.85	0.00	864.61
Bus	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tram	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pedestrians								
TOTAL	1181.74	99.80	11.84	60.41	857.76	6.85	0.00	864.61

- *< = adjusted flow warning (upstream links/traffic streams are over-saturated)*
- ** = Traffic Stream - Normal, Bus or Tram Stop or Delay weighting has been set to a value other than 100%*
- *^ = Traffic Stream - Normal, Bus or Tram Stop or Delay Path weighting has been set to a value other than 100%*
- *+ = average link/traffic stream excess queue is greater than 0*
- ***P.I. = PERFORMANCE INDEX***

A4 - 2031 Ref PM
D4 - 2031 Ref PM*

Summary

Data Errors and Warnings

Severity	Area	Item	Description
Info	Optimisation Order	Advanced	Because the optimisation list is blank, no optimisation will occur.

Run Summary

Analysis set used	Run start time	Run finish time	Modelling start time (HH:mm)	Network Cycle Time (s)	Performance Index (£ per hr)	Total network delay (PCU-hr/hr)	Highest DOS (%)	Item with highest DOS	Number of oversaturated items	Percentage of oversaturated items (%)	Item with worst signalised PRC	Item with worst unsignalised PRC	Item with worst overall PRC	Network within capacity
4	14/06/2019 12:56:17	14/06/2019 12:56:17	17:00	100	22.21	1.56	75.31	13/2	0	0		13/2	13/2	✓

Analysis Set Details

Name	Description	Demand set	Include in report	Locked
2031 Ref PM		D4	✓	

Demand Set Details

Name	Description	Composite	Demand sets	Start time (HH:mm)	Locked
2031 Ref PM				17:00	

Network Options

Network timings

Network cycle time (s)	Restrict to SCOOT cycle times	Time segment length (min)	Number of time segments	Modelled time period (min)
100		60	1	60

Signals options

Start displacement (s)	End displacement (s)
2	3

Advanced

Phase minimum broken penalty (£)	Phase maximum broken penalty (£)	Intergreen broken penalty (£)	Starting Red-with-Amber (s)
10000.00	10000.00	10000.00	2

Traffic options

Traffic model	Vehicle flow scaling factor (%)	Pedestrian flow scaling factor (%)	Cruise times or speeds
Platoon Dispersion (PDM)	100	100	Cruise Speeds

Advanced

Resolution	DOS Threshold (%)	Cruise scaling factor (%)	Use link stop weightings	Use link delay weightings	Exclude pedestrians from results calculation	Random delay mode	Type of Vehicle-in-Service	Type of random parameter	PCU Length (m)	Calculate results for Path Segments	Generate PDM Profile Data
1	90	100	✓	✓		Complex	Uniform (TRANSYT)	Uniform (TRANSYT)	5.75		✓

Normal Traffic parameters

Dispersion type	Dispersion coefficient	Travel time coefficient
Default	35	80

Normal Traffic Types

Name	PCU Factor
Normal	1.00

Bus parameters

Name	PCU Factor	Dispersion type	Acceleration (ms^[-2])	Stationary time coefficient	Cruise time coefficient
Bus	1.00	Default	0.94	30	85

Tram parameters

Name	PCU Factor	Dispersion type	Acceleration (ms^[-2])	Stationary time coefficient	Cruise time coefficient
Tram	1.00	Default	0.94	100	100

Pedestrian parameters

Dispersion type
Default

Optimisation options

Enable optimisation	Auto redistribute	Optimisation level	Enable OUT Profile accuracy
✓	✓	Offsets And Green Splits	✓

Advanced

Optimisation type	Hill climb increments	OUTProfile accuracy	Use enhanced optimisation	Auto optimisation order	Optimisation order	Master controller	Offsets relative to master controller	Master controller offset after each run
Hill Climb (Fast)	15, 40, -1, 15, 40, 1, -1, 1	50, 50, 5, 5, 0.5, 0.5, 0.05, 0.05		✓				Do nothing

Economics

Vehicle Monetary Value Of Delay (£ per PCU-hr)	Vehicle Monetary Value Of Stops (£ per 100 stops)	Pedestrian monetary value of delay (£ per Ped-hr)
14.20	2.60	14.20

Arms and Traffic Streams

Arms

Arm	Name	Description	Traffic node
(ALL)	(untitled)		

Traffic Streams

Arm	Traffic Stream	Name	Description	Auto length	Length (m)	Has Saturation Flow	Saturation flow source	Saturation flow (PCU/hr)	Auto-calculate cell saturation flow	Cell saturation flow (PCU/hr)	Is signal controlled	Is give way	Traffic type	Allow Nearside Turn On Red
1	1	(untitled)			200.00	✓	Sum of lanes	1945					Normal	
2	1	(untitled)			12.00	✓	Sum of lanes	1945					Normal	
	2	(untitled)			12.00							✓	Normal	
3	1	(untitled)			18.00							✓	Normal	
	2	(untitled)			18.00							✓	Normal	
5	1	(untitled)			200.00	✓	Sum of lanes	1945					Normal	
6	1	(untitled)			200.00								Normal	
7	1	(untitled)			200.00								Normal	
8	1	(untitled)			45.00				✓	1800		✓	Normal	
	2	(untitled)			45.00	✓	Sum of lanes	1915		1915			Normal	
10	1	(untitled)			45.00				✓	1800		✓	Normal	
	2	(untitled)			45.00	✓	Sum of lanes	1915		1915			Normal	
11	1	(untitled)			200.00								Normal	
12	1	(untitled)			200.00	✓	Sum of lanes	1895					Normal	
13	1	(untitled)			7.50							✓	Normal	
	2	(untitled)			7.50							✓	Normal	
14	1	(untitled)			200.00							✓	Normal	
15	1	(untitled)		✓	438.13								Normal	

Lanes

Arm	Traffic Stream	Lane	Name	Description	Use RR67	Surface condition	Site quality factor	Gradient (%)	Width (m)	Use connector turning radius	Proportion that turn (%)	Turning radius (m)	Nearside lane	Saturation flow (PCU/hr)
1	1	1	(untitled)		✓	N/A	N/A	0	3.30	✓	0	99999.00	✓	1945
2	1	1	(untitled)		✓	N/A	N/A	0	3.30	✓	0	99999.00	✓	1945
	2	1	(untitled)											
3	1	1	(untitled)											
	2	1	(untitled)											
5	1	1	(untitled)		✓	N/A	N/A	0	3.30	✓	0	99999.00	✓	1945
6	1	1	(untitled)											
7	1	1	(untitled)											
8	1	1	(untitled)											
	2	1	(untitled)		✓	N/A	N/A	0	3.00	✓	0	99999.00	✓	1915
10	1	1	(untitled)											
	2	1	(untitled)		✓	N/A	N/A	0	3.00	✓	0	99999.00	✓	1915
11	1	1	(untitled)											
12	1	1	(untitled)		✓	N/A	N/A	0	2.80	✓	0	99999.00	✓	1895
13	1	1	(untitled)											
	2	1	(untitled)											
14	1	1	(untitled)											
15	1	1	(untitled)											

Modelling

Arm	Traffic Stream	Traffic model	Stop weighting multiplier (%)	Delay weighting multiplier (%)	Assignment Cost Weighting (%)	Exclude from results calculation	Max queue storage (PCU)	Has queue limit	Has degree of saturation limit
1	1	NetworkDefault	100	100	100		0.00		
2	1	Flare	100	100	100		0.00		
	2	Flare	100	100	100		0.00		
3	1	Flare	100	100	100		0.00		
	2	Flare	100	100	100		0.00		
5	1	NetworkDefault	100	100	100		0.00		
6	1	NetworkDefault	100	100	100		0.00		
7	1	NetworkDefault	100	100	100		0.00		
8	1	Flare	100	100	100		0.00		
	2	CTM	100	100	100		0.00		
10	1	Flare	100	100	100		0.00		
	2	CTM	100	100	100		0.00		
11	1	NetworkDefault	100	100	100		0.00		
12	1	NetworkDefault	100	100	100		0.00		
13	1	Flare	100	100	100		0.00		
	2	Flare	100	100	100		0.00		
14	1	NetworkDefault	100	100	100		0.00		
15	1	NetworkDefault	100	100	100		0.00		

Modelling - Advanced

Arm	Traffic Stream	Initial queue (PCU)	Type of Vehicle-in-Service	Vehicle-in-Service	Type of random parameter	Random parameter	Auto cycle time	Cycle time
(ALL)	(ALL)	0.00	NetworkDefault	Not-Included	NetworkDefault	0.50	✓	100

Normal traffic - Modelling

Arm	Traffic Stream	Stop weighting (%)	Delay weighting (%)
(ALL)	(ALL)	100	100

Normal traffic - Advanced

Arm	Traffic Stream	Dispersion type for Normal Traffic
(ALL)	(ALL)	NetworkDefault

Flows

Arm	Traffic Stream	Total Flow (PCU/hr)	Normal Flow (PCU/hr)
1	1	583	583
2	1	559	559
	2	24	24
3	1	20	20
	2	128	128
5	1	148	148
6	1	597	597
7	1	195	195
8	1	90	90
	2	597	597
10	1	171	171
	2	577	577
11	1	127	127
12	1	213	213
13	1	72	72
	2	141	141
14	1	644	644
15	1	669	669

Entry Sources

Arm	Traffic Stream	Cruise time for Normal Traffic (s)	Cruise speed for Normal Traffic (kph)
(ALL)	1	24.00	30.00

Sources

Arm	Traffic Stream	Source	Source traffic stream	Destination traffic stream	Cruise time for Normal Traffic (s)	Cruise speed for Normal Traffic (kph)	Auto turning radius	Traffic turn style	Turning radius (m)
2	1	1	1/1	2/1	1.44	30.00	✓	Straight	Straight Movement
	2	1	1/1	2/2	1.44	30.00	✓	Straight	Straight Movement
3	1	1	5/1	3/1	2.16	30.00	✓	Straight	Straight Movement
	2	1	5/1	3/2	2.16	30.00	✓	Straight	Straight Movement
6	1	1	10/2	6/1	24.00	30.00	✓	Straight	Straight Movement
7	1	1	2/2	7/1	24.00	30.00	✓	Straight	Straight Movement
8	1	1	2/1	8/1	5.40	30.00	✓	Straight	Straight Movement
	2	1	2/1	8/2	5.40	30.00	✓	Straight	Straight Movement
10	1	1	13/2	10/1	5.40	30.00	✓	Straight	Straight Movement
	2	1	13/2	10/2	5.40	30.00	✓	Straight	Straight Movement
11	1	1	8/1	11/1	24.00	30.00	✓	Straight	Straight Movement
13	1	1	12/1	13/1	1.00	30.00	✓	Straight	Straight Movement
	2	1	12/1	13/2	1.00	30.00	✓	Straight	Straight Movement
15	1	1	13/1	15/1	52.58	30.00	✓	Nearside	80.02
6	1	2	3/1	6/1	24.00	30.00	✓	Straight	Straight Movement
7	1	2	10/1	7/1	24.00	30.00	✓	Nearside	70.86
8	1	2	3/2	8/1	5.40	30.00	✓	Offside	99.89
	2	2	3/2	8/2	5.40	30.00	✓	Offside	99.89
10	1	2	14/1	10/1	5.40	30.00	✓	Straight	Straight Movement
	2	2	14/1	10/2	5.40	30.00	✓	Straight	Straight Movement
11	1	2	14/1	11/1	24.00	30.00	✓	Straight	Straight Movement
15	1	2	8/2	15/1	52.58	30.00	✓	Straight	Straight Movement

Give Way Data

Arm	Traffic Stream	Opposed traffic	Use Step-wise Opposed Turn Model	Visibility restricted
2	2	AllTraffic		
3	1	AllTraffic		
	2	AllTraffic		
8	1	AllTraffic		
10	1	AllTraffic		
13	1	AllTraffic		
	2	AllTraffic		

14	1	Movement		

Give Way Data - All Movements - Conflicts

Traffic Stream	Description	Controlling type	Controlling traffic stream	Controlling from traffic stream	Controlling to traffic stream	Percentage opposing (%)	Slope coefficient	Upstream signals visible	Conflict shift	Conflict duration
2		TrafficStream	10/2			100	0.28		0	0
		TrafficStream	10/1			100	0.28		0	0
1		TrafficStream	10/2			100	0.34		0	0
2		TrafficStream	10/2			100	0.33		0	0
		TrafficStream	2/1			100	0.21		0	0
		TrafficStream	2/2			100	0.47		0	0
1		TrafficStreamMovement		14/1	11/1	100	0.29		0	0
		TrafficStream	2/2			100	0.28		0	0
		TrafficStream	8/2			100	0.29		0	0
2		TrafficStream	8/2			100	0.27		0	0
		TrafficStream	14/1			100	0.39		0	0

Give Way Data - Movements

Arm	Traffic Stream	Movement	Destination traffic stream	Max Flow (Opposed) (PCU/hr)	Max Flow (Unopposed) (PCU/hr)	Percentage opposed (%)
14	1	1	10/1	1965	1965	100
		2	10/2	1965	1965	100
		3	11/1	707	707	100

Give Way Data - Movements - Conflicts

Arm	Traffic Stream	Movement	Destination traffic stream	Description	Controlling type	Controlling traffic stream	Percentage opposing (%)	Slope coefficient	Upstream signals visible	Conflict shift	Conflict duration
14	1	3	11/1		TrafficStream	8/2	100	0.27		0	0
					TrafficStream	8/1	100	0.27		0	0

Local OD Matrix - Local Matrix: 1

Local Matrix Options

OD Matrix	Name	Use for point to point table	Auto calculate	Allocation mode	Allow paths past exit locations	Allow looped paths on arms	Allow looped paths on traffic nodes	Copy flows	Matrix to copy flows from	Limit paths by length	Path length limit multiplier	Limit paths by number	Path number limit
1	(untitled)	✓	✓	Path Equalisation			✓			✓	1.25		

Normal Input Flows (PCU/hr)

		To			
		1	2	3	4
From	1	0	55	504	24
	2	91	0	72	50
	3	486	37	0	121
	4	20	35	93	0

Bus Input Flows not shown as they are blank.

Tram Input Flows not shown as they are blank.

Pedestrian Input Flows not shown as they are blank.

Locations

OD Matrix	Location	Name	Entries	Exits	Colour
1	1	(untitled)	1/1	6/1	#0000FF
	2	(untitled)	12/1	11/1	#00FF00
	3	(untitled)	14/1	15/1	#FFFF00
	4	(untitled)	5/1	7/1	#FFFF00

Normal Paths and Flows

OD Matrix	Path	Description	From location	To location	Path items	Allocation type	Normal Calculated Flow (PCU/hr)
1	1		1	2	1/1, 2/1, 8/1, 11/1	Normal	55
	2		2	1	12/1, 13/2, 10/2, 6/1	Normal	91
	3		1	3	1/1, 2/1, 8/2, 15/1	Normal	504
	4		2	3	12/1, 13/1, 15/1	Normal	72
	5		3	1	14/1, 10/2, 6/1	Normal	486
	6		3	2	14/1, 11/1	Normal	37
	7		1	4	1/1, 2/2, 7/1	Normal	24
	8		2	4	12/1, 13/2, 10/1, 7/1	Normal	50
	9		3	4	14/1, 10/1, 7/1	Normal	121
	10		4	1	5/1, 3/1, 6/1	Normal	20
	11		4	2	5/1, 3/2, 8/1, 11/1	Normal	35
	12		4	3	5/1, 3/2, 8/2, 15/1	Normal	93

Signal Timings

Network Default: 100s cycle time; 100 steps

No Controller Streams present.

Traffic Stream Results

Traffic Stream Results: Vehicle summary

Time Segment	Arm	Traffic Stream	Degree of saturation (%)	Practical reserve capacity (%)	Calculated flow entering (PCU/hr)	Calculated sat flow (PCU/hr)	Actual green (s (per cycle))	Mean Delay per Veh (s)	Mean max queue (PCU)	Utilised storage (%)	Weighted cost of delay (£ per hr)	Weighted cost of stops (£ per hr)	Performance Index (£ per hr)
17:00-18:00	1	1	30	200	583	1945	100	0.40	0.06	0.18	0.91	0.00	0.91
	2	1	29	213	559	1945	100	0.37	0.06	2.90	0.82	0.00	0.82
		2	5	1889	24	530	100	0.16	0.00	0.05	0.02	0.00	0.02
	3	1	3	3012	20	692	100	0.08	0.00	0.01	0.01	0.00	0.01
		2	31	187	128	408	100	2.01	0.07	2.38	1.01	0.00	1.01
	5	1	8	1083	148	1945	100	0.08	0.00	0.01	0.04	0.00	0.04
	6	1	0	Unrestricted	597	Unrestricted	100	0.00	0.00	0.00	0.00	0.00	0.00
	7	1	0	Unrestricted	195	Unrestricted	100	0.00	0.00	0.00	0.00	0.00	0.00
	8	1	12	632	90	732	100	0.34	0.01	0.11	0.12	0.00	0.12
		2	31	189	597	1915	100	0.43	0.07	0.90	1.00	0.00	1.00
	10	1	20	349	171	853	100	0.53	0.03	0.32	0.36	0.00	0.36
		2	30	199	577	1915	100	0.41	0.06	0.83	0.92	0.00	0.92
	11	1	0	Unrestricted	127	Unrestricted	100	0.00	0.00	0.00	0.00	0.00	0.00
	12	1	11	701	213	1895	100	0.12	0.01	0.02	0.10	0.00	0.10
	13	1	12	630	72	584	100	0.43	0.01	0.87	0.12	0.00	0.12
		2	75	20	141	187	100	27.19	1.07	106.50	15.12	0.00	15.12
	14	1	38	137	644	1696	100	0.65	0.12	0.33	1.65	0.00	1.65
	15	1	0	Unrestricted	669	Unrestricted	100	0.00	0.00	0.00	0.00	0.00	0.00

Traffic Stream Results: Flows and signals

Time Segment	Arm	Traffic Stream	Calculated flow entering (PCU/hr)	Calculated flow out (PCU/hr)	Flow discrepancy (PCU/hr)	Adjusted flow warning	Calculated sat flow (PCU/hr)	Calculated capacity (PCU/hr)	Degree of saturation (%)	DOS Threshold exceeded	Practical reserve capacity (%)	Mean modulus of error	Actual green (s (per cycle))
17:00-18:00	1	1	583	583	0		1945	1945	30		200	0.00	100
	2	1	559	559	0		1945	1945	29		213	0.00	100
		2	24	24	0		530	530	5		1889	0.00	100
	3	1	20	20	0		692	692	3		3012	0.00	100
		2	128	128	0		408	408	31		187	0.00	100
	5	1	148	148	0		1945	1945	8		1083	0.00	100
	6	1	597	597	0		Unrestricted	Unrestricted	0		Unrestricted	0.00	100
	7	1	195	195	0		Unrestricted	Unrestricted	0		Unrestricted	0.00	100
	8	1	90	90	0		732	732	12		632	0.00	100
		2	597	597	0		1915	1915	31		189	0.00	100
	10	1	171	171	0		853	853	20		349	0.00	100
		2	577	577	0		1915	1915	30		199	0.00	100
	11	1	127	127	0		Unrestricted	Unrestricted	0		Unrestricted	0.00	100
	12	1	213	213	0		1895	1895	11		701	0.00	100
	13	1	72	72	0		584	584	12		630	0.00	100
		2	141	141	0		187	187	75		20	0.00	100
	14	1	644	644	0		1696	1696	38		137	0.00	100
	15	1	669	669	0		Unrestricted	Unrestricted	0		Unrestricted	0.00	100

Traffic Stream Results: Stops and delays

Time Segment	Arm	Traffic Stream	Mean Cruise Time per Veh (s)	Mean Delay per Veh (s)	Total delay (PCU-hr/hr)	Weighted cost of delay (£ per hr)	Mean stops per Veh (%)	Total stops (Stops per hr)	Weighted cost of stops (£ per hr)
17:00-18:00	1	1	24.00	0.40	0.06	0.91	0.00	0.00	0.00
	2	1	1.44	0.37	0.06	0.82	0.00	0.00	0.00
		2	1.44	0.16	0.00	0.02	0.00	0.00	0.00
	3	1	2.16	0.08	0.00	0.01	0.00	0.00	0.00
		2	2.16	2.01	0.07	1.01	0.00	0.00	0.00
	5	1	24.00	0.08	0.00	0.04	0.00	0.00	0.00
	6	1	24.00	0.00	0.00	0.00	0.00	0.00	0.00
	7	1	24.00	0.00	0.00	0.00	0.00	0.00	0.00
	8	1	5.40	0.34	0.01	0.12	0.00	0.00	0.00
		2	5.40	0.43	0.07	1.00	0.00	0.00	0.00
	10	1	5.40	0.53	0.03	0.36	0.00	0.00	0.00
		2	5.40	0.41	0.06	0.92	0.00	0.00	0.00
	11	1	24.00	0.00	0.00	0.00	0.00	0.00	0.00
	12	1	24.00	0.12	0.01	0.10	0.00	0.00	0.00
	13	1	1.00	0.43	0.01	0.12	0.00	0.00	0.00
		2	1.00	27.19	1.07	15.12	0.00	0.00	0.00
	14	1	24.00	0.65	0.12	1.65	0.00	0.00	0.00
	15	1	52.58	0.00	0.00	0.00	0.00	0.00	0.00

Traffic Stream Results: Queues and blocking

Time Segment	Arm	Traffic Stream	Initial queue (PCU)	Mean max queue (PCU)	Max queue storage (PCU)	Utilised storage (%)	Excess queue penalty (£ per hr)	Wasted time total (s (per cycle))	Estimated blocking
17:00-18:00	1	1	0.00	0.06	34.78	0.18	0.00	0.00	
	2	1	0.00	0.06	2.00	2.90	0.00	0.00	
		2	0.00	0.00	2.00	0.05	0.00	100.00	
	3	1	0.00	0.00	3.00	0.01	0.00	100.00	
		2	0.00	0.07	3.00	2.38	0.00	0.00	
	5	1	0.00	0.00	34.78	0.01	0.00	0.00	
	6	1	0.00	0.00	34.78	0.00	0.00	0.00	
	7	1	0.00	0.00	34.78	0.00	0.00	0.00	
	8	1	0.00	0.01	7.83	0.11	0.00	0.00	
		2	0.00	0.07	7.83	0.90	0.00	0.00	
	10	1	0.00	0.03	7.83	0.32	0.00	0.00	
		2	0.00	0.06	7.83	0.83	0.00	0.00	
	11	1	0.00	0.00	34.78	0.00	0.00	0.00	
	12	1	0.00	0.01	34.78	0.02	0.00	100.00	
	13	1	0.00	0.01	1.00	0.87	0.00	0.00	
		2	0.00	1.07	1.00	106.50	0.00	0.00	

	14	**1**	0.00	0.12	34.78	0.33	0.00	0.00	
	15	**1**	0.00	0.00	76.20	0.00	0.00	0.00	

Traffic Stream Results: Advanced

Time Segment	Arm	Traffic Stream	Degree of saturation penalty (£ per hr)	Ped gap accepting penalty (£ per hr)	Warmed up	Mean Max Queue EoTS (PCU)	Max End of Green Queue EoTS (PCU)	Max End of Red Queue EoTS (PCU)	PCU Factor	Cost of traffic penalties (£ per hr)	Performance Index (£ per hr)
17:00-18:00	**1**	**1**	0.00	0.00	✓	0.06			1.00	0.00	0.91
	2	**1**	0.00	0.00	✓	0.06			1.00	0.00	0.82
		2	0.00	0.00	✓	0.00			1.00	0.00	0.02
	3	**1**	0.00	0.00	✓	0.00			1.00	0.00	0.01
		2	0.00	0.00	✓	0.07			1.00	0.00	1.01
	5	**1**	0.00	0.00	✓	0.00			1.00	0.00	0.04
	6	**1**	0.00	0.00	✓	0.00			1.00	0.00	0.00
	7	**1**	0.00	0.00	✓	0.00			1.00	0.00	0.00
	8	**1**	0.00	0.00	✓	0.01			1.00	0.00	0.12
		2	0.00	0.00	✓	0.07			1.00	0.00	1.00
	10	**1**	0.00	0.00	✓	0.03			1.00	0.00	0.36
		2	0.00	0.00	✓	0.06			1.00	0.00	0.92
	11	**1**	0.00	0.00	✓	0.00			1.00	0.00	0.00
	12	**1**	0.00	0.00	✓	0.01			1.00	0.00	0.10
	13	**1**	0.00	0.00	✓	0.01			1.00	0.00	0.12
		2	0.00	0.00	✓	1.10			1.00	0.00	15.12
	14	**1**	0.00	0.00	✓	0.12			1.00	0.00	1.65
	15	**1**	0.00	0.00	✓	0.00			1.00	0.00	0.00

Network Results

Run Summary

Analysis set used	Run start time	Run finish time	Modelling start time (HH:mm)	Network Cycle Time (s)	Performance Index (£ per hr)	Total network delay (PCU-hr/hr)	Highest DOS (%)	Item with highest DOS	Number of oversaturated items	Percentage of oversaturated items (%)	Item with worst signalised PRC	Item with worst unsignalised PRC	Item with worst overall PRC	Network within capacity
4	14/06/2019 12:56:17	14/06/2019 12:56:17	17:00	100	22.21	1.56	75.31	13/2	0	0		13/2	13/2	✓

Network Results: Vehicle summary

Time Segment	Degree of saturation (%)	Practical reserve capacity (%)	Calculated flow entering (PCU/hr)	Actual green (s (per cycle))	Mean Delay per Veh (s)	Weighted cost of delay (£ per hr)	Weighted cost of stops (£ per hr)	Performance Index (£ per hr)
17:00-18:00	75	20	5555	1800	1.01	22.21	0.00	22.21

Network Results: Flows and signals

Time Segment	Calculated flow entering (PCU/hr)	Calculated flow out (PCU/hr)	Flow discrepancy (PCU/hr)	Adjusted flow warning	Degree of saturation (%)	DOS Threshold exceeded	Practical reserve capacity (%)	Actual green (s (per cycle))
17:00-18:00	5555	5555	0		75		20	1800

Network Results: Stops and delays

Time Segment	Mean Cruise Time per Veh (s)	Mean Delay per Veh (s)	Total delay (PCU-hr/hr)	Weighted cost of delay (£ per hr)	Mean stops per Veh (%)	Total stops (Stops per hr)	Weighted cost of stops (£ per hr)
17:00-18:00	18.81	1.01	1.56	22.21	0.00	0.00	0.00

Network Results: Queues and blocking

Time Segment	Utilised storage (%)	Excess queue penalty (£ per hr)	Wasted time total (s (per cycle))
17:00-18:00	106.50	0.00	300.00

Network Results: Advanced

Time Segment	Degree of saturation penalty (£ per hr)	Ped gap accepting penalty (£ per hr)	Warmed up	PCU Factor	Cost of traffic penalties (£ per hr)	Controller stream penalties (£ per hr)	Performance Index (£ per hr)
17:00-18:00	0.00	0.00	✓	1.00	0.00	0.00	22.21

Point to Point Journey Time

Average Journey Time (s) for Local Matrix: 1

		To			
		1	**2**	**3**	**4**
From	**1**	0.0	56.0	84.6	50.0
	2	82.1	0.0	78.1	82.2
	3	54.5	48.6	0.0	54.6
	4	50.3	58.0	86.6	0.0

Path Journey Time

Path	From Location	To Location	Normal Calculated Flow (PCU/hr)	Normal journey time (s)	Calculated Total Flow (PCU/hr)	Avg journey time (s)
1	1	2	55	55.95	55	55.95
2	2	1	91	82.12	91	82.12
3	1	3	504	84.61	504	84.61
4	2	3	72	78.13	72	78.13
5	3	1	486	54.45	486	54.45
6	3	2	37	48.65	37	48.65
7	1	4	24	50.00	24	50.00
8	2	4	50	82.24	50	82.24
9	3	4	121	54.58	121	54.58

10	4	1	20	50.31	20	50.31
11	4	2	35	57.99	35	57.99
12	4	3	93	86.64	93	86.64

Final Prediction Table

Traffic Stream Results

				FLOWS		PERFORMANCE				PER PCU			QUEUES	WEIGHTS		PENALTIES	P.I.
Arm	**Traffic Stream**	**Name**	**Traffic node**	**Calculated flow entering (PCU/hr)**	**Calculated sat flow (PCU/hr)**	**Actual green (s (per cycle))**	**Wasted time total (s (per cycle))**	**Degree of saturation (%)**	**Practical reserve capacity (%)**	**JourneyTime (s)**	**Mean Delay per Veh (s)**	**Mean stops per Veh (%)**	**Mean max queue (PCU)**	**Delay weighting multiplier (%)**	**Stop weighting multiplier (%)**	**Cost of traffic penalties (£ per hr)**	**P.I.**
1	**1**	(untitled)		583	1945	100	0.00	30	200	24.40	0.40	0.00	0.06	100	100	0.00	0.91
2	**1**	(untitled)		559	1945	100	0.00	29	213	1.81	0.37	0.00	0.06	100	100	0.00	0.82
	2	(untitled)		24	530	100	100.00	5	1889	1.60	0.16	0.00	0.00	100	100	0.00	0.02
3	**1**	(untitled)		20	692	100	100.00	3	3012	2.24	0.08	0.00	0.00	100	100	0.00	0.01
	2	(untitled)		128	408	100	0.00	31	187	4.17	2.01	0.00	0.07	100	100	0.00	1.01
5	**1**	(untitled)		148	1945	100	0.00	8	1083	24.08	0.08	0.00	0.00	100	100	0.00	0.04
6	**1**	(untitled)		597	Unrestricted	100	0.00	0	Unrestricted	24.00	0.00	0.00	0.00	100	100	0.00	0.00
7	**1**	(untitled)		195	Unrestricted	100	0.00	0	Unrestricted	24.00	0.00	0.00	0.00	100	100	0.00	0.00
8	**1**	(untitled)		90	732	100	0.00	12	632	5.74	0.34	0.00	0.01	100	100	0.00	0.12
	2	(untitled)		597	1915	100	0.00	31	189	5.83	0.43	0.00	0.07	100	100	0.00	1.00
10	**1**	(untitled)		171	853	100	0.00	20	349	5.93	0.53	0.00	0.03	100	100	0.00	0.36
	2	(untitled)		577	1915	100	0.00	30	199	5.81	0.41	0.00	0.06	100	100	0.00	0.92
11	**1**	(untitled)		127	Unrestricted	100	0.00	0	Unrestricted	24.00	0.00	0.00	0.00	100	100	0.00	0.00
12	**1**	(untitled)		213	1895	100	100.00	11	701	24.12	0.12	0.00	0.01	100	100	0.00	0.10
13	**1**	(untitled)		72	584	100	0.00	12	630	1.43	0.43	0.00	0.01	100	100	0.00	0.12
	2	(untitled)		141 <	187	100	0.00	75	20	28.19	27.19	0.00	1.07 +	100	100	0.00	15.12
14	**1**	(untitled)		644	1696	100	0.00	38	137	24.65	0.65	0.00	0.12	100	100	0.00	1.65
15	**1**	(untitled)		669	Unrestricted	100	0.00	0	Unrestricted	52.58	0.00	0.00	0.00	100	100	0.00	0.00

Network Results

	Distance travelled (PCU-km/hr)	Time spent (PCU-hr/hr)	Mean journey speed (kph)	Total delay (PCU-hr/hr)	Weighted cost of delay (£ per hr)	Weighted cost of stops (£ per hr)	Excess queue penalty (£ per hr)	Performance Index (£ per hr)
Normal traffic	870.34	30.58	28.46	1.56	22.21	0.00	0.00	22.21
Bus	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tram	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pedestrians								
TOTAL	870.34	30.58	28.46	1.56	22.21	0.00	0.00	22.21

- *< = adjusted flow warning (upstream links/traffic streams are over-saturated)*
- ** = Traffic Stream - Normal, Bus or Tram Stop or Delay weighting has been set to a value other than 100%*
- *^ = Traffic Stream - Normal, Bus or Tram Stop or Delay Path weighting has been set to a value other than 100%*
- *+ = average link/traffic stream excess queue is greater than 0*
- ***P.I. = PERFORMANCE INDEX***

A7 - 2031 DS1 AM
D7 - 2031 DS1 AM*

Summary

Data Errors and Warnings

Severity	Area	Item	Description
Info	Optimisation Order	Advanced	Because the optimisation list is blank, no optimisation will occur.

Run Summary

Analysis set used	Run start time	Run finish time	Modelling start time (HH:mm)	Network Cycle Time (s)	Performance Index (£ per hr)	Total network delay (PCU-hr/hr)	Highest DOS (%)	Item with highest DOS	Number of oversaturated items	Percentage of oversaturated items (%)	Item with worst signalised PRC	Item with worst unsignalised PRC	Item with worst overall PRC	Network within capacity
7	14/06/2019 12:56:19	14/06/2019 12:56:19	08:00	100	674.06	47.16	310.74	12/1	2	11		12/1	12/1	

Analysis Set Details

Name	Description	Demand set	Include in report	Locked
2031 DS1 AM		D7	✓	

Demand Set Details

Name	Description	Composite	Demand sets	Start time (HH:mm)	Locked
2031 DS1 AM				08:00	

Network Options

Network timings

Network cycle time (s)	Restrict to SCOOT cycle times	Time segment length (min)	Number of time segments	Modelled time period (min)
100		60	1	60

Signals options

Start displacement (s)	End displacement (s)
2	3

Advanced

Phase minimum broken penalty (£)	Phase maximum broken penalty (£)	Intergreen broken penalty (£)	Starting Red-with-Amber (s)
10000.00	10000.00	10000.00	2

Traffic options

Traffic model	Vehicle flow scaling factor (%)	Pedestrian flow scaling factor (%)	Cruise times or speeds
Platoon Dispersion (PDM)	100	100	Cruise Speeds

Advanced

Resolution	DOS Threshold (%)	Cruise scaling factor (%)	Use link stop weightings	Use link delay weightings	Exclude pedestrians from results calculation	Random delay mode	Type of Vehicle-in-Service	Type of random parameter	PCU Length (m)	Calculate results for Path Segments	Generate PDM Profile Data
1	90	100	✓	✓		Complex	Uniform (TRANSYT)	Uniform (TRANSYT)	5.75		✓

Normal Traffic parameters

Dispersion type	Dispersion coefficient	Travel time coefficient
Default	35	80

Normal Traffic Types

Name	PCU Factor
Normal	1.00

Bus parameters

Name	PCU Factor	Dispersion type	Acceleration (ms^[-2])	Stationary time coefficient	Cruise time coefficient
Bus	1.00	Default	0.94	30	85

Tram parameters

Name	PCU Factor	Dispersion type	Acceleration (ms^[-2])	Stationary time coefficient	Cruise time coefficient
Tram	1.00	Default	0.94	100	100

Pedestrian parameters

Dispersion type
Default

Optimisation options

Enable optimisation	Auto redistribute	Optimisation level	Enable OUT Profile accuracy
✓	✓	Offsets And Green Splits	✓

Advanced

Optimisation type	Hill climb increments	OUTProfile accuracy	Use enhanced optimisation	Auto optimisation order	Optimisation order	Master controller	Offsets relative to master controller	Master controller offset after each run
Hill Climb (Fast)	15, 40, -1, 15, 40, 1, -1, 1	50, 50, 5, 5, 0.5, 0.5, 0.05, 0.05		✓				Do nothing

Economics

Vehicle Monetary Value Of Delay (£ per PCU-hr)	Vehicle Monetary Value Of Stops (£ per 100 stops)	Pedestrian monetary value of delay (£ per Ped-hr)
14.20	2.60	14.20

Arms and Traffic Streams

Arms

Arm	Name	Description	Traffic node
(ALL)	(untitled)		

Traffic Streams

Arm	Traffic Stream	Name	Description	Auto length	Length (m)	Has Saturation Flow	Saturation flow source	Saturation flow (PCU/hr)	Auto-calculate cell saturation flow	Cell saturation flow (PCU/hr)	Is signal controlled	Is give way	Traffic type	Allow Nearside Turn On Red
1	1	(untitled)			200.00	✓	Sum of lanes	1945					Normal	
2	1	(untitled)			12.00	✓	Sum of lanes	1945					Normal	
	2	(untitled)			12.00							✓	Normal	
3	1	(untitled)			18.00							✓	Normal	
	2	(untitled)			18.00							✓	Normal	
5	1	(untitled)			200.00	✓	Sum of lanes	1945					Normal	
6	1	(untitled)			200.00								Normal	
7	1	(untitled)			200.00								Normal	
8	1	(untitled)			45.00				✓	1800		✓	Normal	
	2	(untitled)			45.00	✓	Sum of lanes	1915		1915			Normal	
10	1	(untitled)			45.00				✓	1800		✓	Normal	
	2	(untitled)			45.00	✓	Sum of lanes	1915		1915			Normal	
11	1	(untitled)			200.00								Normal	
12	1	(untitled)			200.00	✓	Sum of lanes	1895					Normal	
13	1	(untitled)			7.50							✓	Normal	
	2	(untitled)			7.50							✓	Normal	
14	1	(untitled)			200.00							✓	Normal	
15	1	(untitled)		✓	438.13								Normal	

Lanes

Arm	Traffic Stream	Lane	Name	Description	Use RR67	Surface condition	Site quality factor	Gradient (%)	Width (m)	Use connector turning radius	Proportion that turn (%)	Turning radius (m)	Nearside lane	Saturation flow (PCU/hr)
1	1	1	(untitled)		✓	N/A	N/A	0	3.30	✓	0	99999.00	✓	1945
2	1	1	(untitled)		✓	N/A	N/A	0	3.30	✓	0	99999.00	✓	1945
	2	1	(untitled)											
3	1	1	(untitled)											
	2	1	(untitled)											
5	1	1	(untitled)		✓	N/A	N/A	0	3.30	✓	0	99999.00	✓	1945
6	1	1	(untitled)											
7	1	1	(untitled)											
8	1	1	(untitled)											
	2	1	(untitled)		✓	N/A	N/A	0	3.00	✓	0	99999.00	✓	1915
10	1	1	(untitled)											
	2	1	(untitled)		✓	N/A	N/A	0	3.00	✓	0	99999.00	✓	1915
11	1	1	(untitled)											
12	1	1	(untitled)		✓	N/A	N/A	0	2.80	✓	0	99999.00	✓	1895
13	1	1	(untitled)											
	2	1	(untitled)											
14	1	1	(untitled)											
15	1	1	(untitled)											

Modelling

Arm	Traffic Stream	Traffic model	Stop weighting multiplier (%)	Delay weighting multiplier (%)	Assignment Cost Weighting (%)	Exclude from results calculation	Max queue storage (PCU)	Has queue limit	Has degree of saturation limit
1	1	NetworkDefault	100	100	100		0.00		
2	1	Flare	100	100	100		0.00		
	2	Flare	100	100	100		0.00		
3	1	Flare	100	100	100		0.00		
	2	Flare	100	100	100		0.00		
5	1	NetworkDefault	100	100	100		0.00		
6	1	NetworkDefault	100	100	100		0.00		
7	1	NetworkDefault	100	100	100		0.00		
8	1	Flare	100	100	100		0.00		
	2	CTM	100	100	100		0.00		
10	1	Flare	100	100	100		0.00		
	2	CTM	100	100	100		0.00		
11	1	NetworkDefault	100	100	100		0.00		
12	1	NetworkDefault	100	100	100		0.00		
13	1	Flare	100	100	100		0.00		
	2	Flare	100	100	100		0.00		
14	1	NetworkDefault	100	100	100		0.00		
15	1	NetworkDefault	100	100	100		0.00		

Modelling - Advanced

Arm	Traffic Stream	Initial queue (PCU)	Type of Vehicle-in-Service	Vehicle-in-Service	Type of random parameter	Random parameter	Auto cycle time	Cycle time
(ALL)	(ALL)	0.00	NetworkDefault	Not-Included	NetworkDefault	0.50	✓	100

Normal traffic - Modelling

Arm	Traffic Stream	Stop weighting (%)	Delay weighting (%)
(ALL)	(ALL)	100	100

Normal traffic - Advanced

Arm	Traffic Stream	Dispersion type for Normal Traffic
(ALL)	(ALL)	NetworkDefault

Flows

Arm	Traffic Stream	Total Flow (PCU/hr)	Normal Flow (PCU/hr)
1	1	1135	1135
2	1	1118	1118
	2	17	17
3	1	39	39
	2	215	215
5	1	254	254
6	1	683	683
7	1	84	84
8	1	328	328
	2	1005	1005
10	1	67	67
	2	644	644
11	1	479	479
12	1	121	121
13	1	10	10
	2	111	111
14	1	751	751
15	1	1015	1015

Entry Sources

Arm	Traffic Stream	Cruise time for Normal Traffic (s)	Cruise speed for Normal Traffic (kph)
(ALL)	1	24.00	30.00

Sources

Arm	Traffic Stream	Source	Source traffic stream	Destination traffic stream	Cruise time for Normal Traffic (s)	Cruise speed for Normal Traffic (kph)	Auto turning radius	Traffic turn style	Turning radius (m)
2	1	1	1/1	2/1	1.44	30.00	✓	Straight	Straight Movement
	2	1	1/1	2/2	1.44	30.00	✓	Straight	Straight Movement
3	1	1	5/1	3/1	2.16	30.00	✓	Straight	Straight Movement
	2	1	5/1	3/2	2.16	30.00	✓	Straight	Straight Movement
6	1	1	10/2	6/1	24.00	30.00	✓	Straight	Straight Movement
7	1	1	2/2	7/1	24.00	30.00	✓	Straight	Straight Movement
8	1	1	2/1	8/1	5.40	30.00	✓	Straight	Straight Movement
	2	1	2/1	8/2	5.40	30.00	✓	Straight	Straight Movement
10	1	1	13/2	10/1	5.40	30.00	✓	Straight	Straight Movement
	2	1	13/2	10/2	5.40	30.00	✓	Straight	Straight Movement
11	1	1	8/1	11/1	24.00	30.00	✓	Straight	Straight Movement
13	1	1	12/1	13/1	1.00	30.00	✓	Straight	Straight Movement
	2	1	12/1	13/2	1.00	30.00	✓	Straight	Straight Movement
15	1	1	13/1	15/1	52.58	30.00	✓	Nearside	80.02
6	1	2	3/1	6/1	24.00	30.00	✓	Straight	Straight Movement
7	1	2	10/1	7/1	24.00	30.00	✓	Nearside	70.86
8	1	2	3/2	8/1	5.40	30.00	✓	Offside	99.89
	2	2	3/2	8/2	5.40	30.00	✓	Offside	99.89
10	1	2	14/1	10/1	5.40	30.00	✓	Straight	Straight Movement
	2	2	14/1	10/2	5.40	30.00	✓	Straight	Straight Movement
11	1	2	14/1	11/1	24.00	30.00	✓	Straight	Straight Movement
15	1	2	8/2	15/1	52.58	30.00	✓	Straight	Straight Movement

Give Way Data

Arm	Traffic Stream	Opposed traffic	Use Step-wise Opposed Turn Model	Visibility restricted
2	2	AllTraffic		
3	1	AllTraffic		
	2	AllTraffic		
8	1	AllTraffic		
10	1	AllTraffic		
13	1	AllTraffic		
	2	AllTraffic		

14	1	Movement		

Give Way Data - All Movements - Conflicts

Traffic Stream	Description	Controlling type	Controlling traffic stream	Controlling from traffic stream	Controlling to traffic stream	Percentage opposing (%)	Slope coefficient	Upstream signals visible	Conflict shift	Conflict duration
2		TrafficStream	10/2			100	0.28		0	0
		TrafficStream	10/1			100	0.28		0	0
1		TrafficStream	10/2			100	0.34		0	0
2		TrafficStream	10/2			100	0.33		0	0
		TrafficStream	2/1			100	0.21		0	0
		TrafficStream	2/2			100	0.47		0	0
1		TrafficStreamMovement		14/1	11/1	100	0.29		0	0
		TrafficStream	2/2			100	0.28		0	0
		TrafficStream	8/2			100	0.29		0	0
2		TrafficStream	8/2			100	0.27		0	0
		TrafficStream	14/1			100	0.39		0	0

Give Way Data - Movements

Arm	Traffic Stream	Movement	Destination traffic stream	Max Flow (Opposed) (PCU/hr)	Max Flow (Unopposed) (PCU/hr)	Percentage opposed (%)
14	1	1	10/1	1965	1965	100
		2	10/2	1965	1965	100
		3	11/1	707	707	100

Give Way Data - Movements - Conflicts

Arm	Traffic Stream	Movement	Destination traffic stream	Description	Controlling type	Controlling traffic stream	Percentage opposing (%)	Slope coefficient	Upstream signals visible	Conflict shift	Conflict duration
14	1	3	11/1		TrafficStream	8/2	100	0.27		0	0
					TrafficStream	8/1	100	0.27		0	0

Local OD Matrix - Local Matrix: 1

Local Matrix Options

OD Matrix	Name	Use for point to point table	Auto calculate	Allocation mode	Allow paths past exit locations	Allow looped paths on arms	Allow looped paths on traffic nodes	Copy flows	Matrix to copy flows from	Limit paths by length	Path length limit multiplier	Limit paths by number	Path number limit
1	(untitled)	✓	✓	Path Equalisation			✓			✓	1.25		

Normal Input Flows (PCU/hr)

		To			
		1	2	3	4
From	1	0	139	979	17
	2	94	0	10	17
	3	550	151	0	50
	4	39	189	26	0

Bus Input Flows not shown as they are blank.

Tram Input Flows not shown as they are blank.

Pedestrian Input Flows not shown as they are blank.

Locations

OD Matrix	Location	Name	Entries	Exits	Colour
1	1	(untitled)	1/1	6/1	#0000FF
	2	(untitled)	12/1	11/1	#00FF00
	3	(untitled)	14/1	15/1	#FFFF00
	4	(untitled)	5/1	7/1	#FFFF00

Normal Paths and Flows

OD Matrix	Path	Description	From location	To location	Path items	Allocation type	Normal Calculated Flow (PCU/hr)
1	1		1	2	1/1, 2/1, 8/1, 11/1	Normal	139
	2		2	1	12/1, 13/2, 10/2, 6/1	Normal	94
	3		1	3	1/1, 2/1, 8/2, 15/1	Normal	979
	4		2	3	12/1, 13/1, 15/1	Normal	10
	5		3	1	14/1, 10/2, 6/1	Normal	550
	6		3	2	14/1, 11/1	Normal	151
	7		1	4	1/1, 2/2, 7/1	Normal	17
	8		2	4	12/1, 13/2, 10/1, 7/1	Normal	17
	9		3	4	14/1, 10/1, 7/1	Normal	50
	10		4	1	5/1, 3/1, 6/1	Normal	39
	11		4	2	5/1, 3/2, 8/1, 11/1	Normal	189
	12		4	3	5/1, 3/2, 8/2, 15/1	Normal	26

Signal Timings

Network Default: 100s cycle time; 100 steps

No Controller Streams present.

Traffic Stream Results

Traffic Stream Results: Vehicle summary

Time Segment	Arm	Traffic Stream	Degree of saturation (%)	Practical reserve capacity (%)	Calculated flow entering (PCU/hr)	Calculated sat flow (PCU/hr)	Actual green (s (per cycle))	Mean Delay per Veh (s)	Mean max queue (PCU)	Utilised storage (%)	Weighted cost of delay (£ per hr)	Weighted cost of stops (£ per hr)	Performance Index (£ per hr)
08:00-09:00	1	1	58	54	1135	1945	100	1.29	0.41	1.17	5.79	0.00	5.79
	2	1	57	57	1118	1945	100	1.25	0.39	19.38	5.50	0.00	5.50
		2	3	2876	17	562	100	0.10	0.00	0.02	0.01	0.00	0.01
	3	1	6	1493	39	690	100	0.16	0.00	0.06	0.02	0.00	0.02
		2	73	24	215	295	100	15.65	0.93	31.15	13.27	0.00	13.27
	5	1	13	589	254	1945	100	0.14	0.01	0.03	0.14	0.00	0.14
	6	1	0	Unrestricted	619	Unrestricted	100	0.00	0.00	0.00	0.00	0.00	0.00
	7	1	0	Unrestricted	72	Unrestricted	100	0.00	0.00	0.00	0.00	0.00	0.00
	8	1	47	92	328	700	100	2.26	0.21	2.63	2.92	0.00	2.92
		2	52	71	1005	1915	100	1.04	0.29	3.70	4.11	0.00	4.11
	10	1	6	1287	55	855	100	0.15	0.00	0.03	0.03	0.00	0.03
		2	30	197	580	1915	100	0.41	0.07	0.84	0.93	0.00	0.93
	11	1	0	Unrestricted	479	Unrestricted	100	0.00	0.00	0.00	0.00	0.00	0.00
	12	1	311	-71	121	1895	100	1227.98	42.20	121.33	586.09	3.52	589.60
	13	1	1	12955	3	467	100	0.03	0.00	0.00	0.00	0.00	0.00
		2	100	-10	36	36	100	257.31	2.56	255.86	36.24	0.86	37.09
	14	1	74	22	751	1017	100	4.94	1.03	2.96	14.63	0.00	14.63
	15	1	0	Unrestricted	1008	Unrestricted	100	0.00	0.00	0.00	0.00	0.00	0.00

Traffic Stream Results: Flows and signals

Time Segment	Arm	Traffic Stream	Calculated flow entering (PCU/hr)	Calculated flow out (PCU/hr)	Flow discrepancy (PCU/hr)	Adjusted flow warning	Calculated sat flow (PCU/hr)	Calculated capacity (PCU/hr)	Degree of saturation (%)	DOS Threshold exceeded	Practical reserve capacity (%)	Mean modulus of error	Actual green (s (per cycle))
08:00-09:00	1	1	1135	1135	0		1945	1945	58		54	0.00	100
	2	1	1118	1118	0		1945	1945	57		57	0.00	100
		2	17	17	0		562	562	3		2876	0.00	100
	3	1	39	39	0		690	690	6		1493	0.00	100
		2	215	215	0		295	295	73		24	0.00	100
	5	1	254	254	0		1945	1945	13		589	0.00	100
	6	1	619	619	64	✓	Unrestricted	Unrestricted	0		Unrestricted	0.00	100
	7	1	72	72	12	✓	Unrestricted	Unrestricted	0		Unrestricted	0.00	100
	8	1	328	328	0		700	700	47		92	0.00	100
		2	1005	1005	0		1915	1915	52		71	0.00	100
	10	1	55	55	12	✓	855	855	6		1287	0.00	100
		2	580	580	64	✓	1915	1915	30		197	0.00	100
	11	1	479	479	0		Unrestricted	Unrestricted	0		Unrestricted	0.00	100
	12	1	121	39	0		1895	39	311	✓	-71	0.00	100
	13	1	3	3	7	✓	467	467	1		12955	0.71	100
		2	36	36	75	✓	36	36	100	✓	-10	0.71	100
	14	1	751	751	0		1017	1017	74		22	0.00	100
	15	1	1008	1008	7	✓	Unrestricted	Unrestricted	0		Unrestricted	0.00	100

Traffic Stream Results: Stops and delays

Time Segment	Arm	Traffic Stream	Mean Cruise Time per Veh (s)	Mean Delay per Veh (s)	Total delay (PCU-hr/hr)	Weighted cost of delay (£ per hr)	Mean stops per Veh (%)	Total stops (Stops per hr)	Weighted cost of stops (£ per hr)
08:00-09:00	1	1	24.00	1.29	0.41	5.79	0.00	0.00	0.00
	2	1	1.44	1.25	0.39	5.50	0.00	0.00	0.00
		2	1.44	0.10	0.00	0.01	0.00	0.00	0.00
	3	1	2.16	0.16	0.00	0.02	0.00	0.00	0.00
		2	2.16	15.65	0.93	13.27	0.00	0.00	0.00
	5	1	24.00	0.14	0.01	0.14	0.00	0.00	0.00
	6	1	24.00	0.00	0.00	0.00	0.00	0.00	0.00
	7	1	24.00	0.00	0.00	0.00	0.00	0.00	0.00
	8	1	5.40	2.26	0.21	2.92	0.00	0.00	0.00
		2	5.40	1.04	0.29	4.11	0.00	0.00	0.00
	10	1	5.40	0.15	0.00	0.03	0.00	0.00	0.00
		2	5.40	0.41	0.07	0.93	0.00	0.00	0.00
	11	1	24.00	0.00	0.00	0.00	0.00	0.00	0.00
	12	1	24.00	1227.98	41.27	586.09	720.49	280.41	3.52
	13	1	1.00	0.03	0.00	0.00	0.00	0.00	0.00
		2	1.00	257.31	2.55	36.24	235.92	84.37	0.86
	14	1	24.00	4.94	1.03	14.63	0.00	0.00	0.00
	15	1	52.58	0.00	0.00	0.00	0.00	0.00	0.00

Traffic Stream Results: Queues and blocking

Time Segment	Arm	Traffic Stream	Initial queue (PCU)	Mean max queue (PCU)	Max queue storage (PCU)	Utilised storage (%)	Excess queue penalty (£ per hr)	Wasted time total (s (per cycle))	Estimated blocking
08:00-09:00	1	1	0.00	0.41	34.78	1.17	0.00	0.00	
	2	1	0.00	0.39	2.00	19.38	0.00	0.00	
		2	0.00	0.00	2.00	0.02	0.00	100.00	
	3	1	0.00	0.00	3.00	0.06	0.00	100.00	
		2	0.00	0.93	3.00	31.15	0.00	0.00	
	5	1	0.00	0.01	34.78	0.03	0.00	0.00	
	6	1	0.00	0.00	34.78	0.00	0.00	0.00	
	7	1	0.00	0.00	34.78	0.00	0.00	0.00	
	8	1	0.00	0.21	7.83	2.63	0.00	0.00	
		2	0.00	0.29	7.83	3.70	0.00	0.00	
	10	1	0.00	0.00	7.83	0.03	0.00	100.00	
		2	0.00	0.07	7.83	0.84	0.00	0.00	
	11	1	0.00	0.00	34.78	0.00	0.00	0.00	
	12	1	0.00	42.20	34.78	121.33	0.00	100.00	
		1	0.00	0.00	1.00	0.00	0.00	100.00	

	13	2	0.00	2.56	1.00	255.86	0.00	20.00	
	14	1	0.00	1.03	34.78	2.96	0.00	0.00	
	15	1	0.00	0.00	76.20	0.00	0.00	0.00	

Traffic Stream Results: Advanced

Time Segment	Arm	Traffic Stream	Degree of saturation penalty (£ per hr)	Ped gap accepting penalty (£ per hr)	Warmed up	Mean Max Queue EoTS (PCU)	Max End of Green Queue EoTS (PCU)	Max End of Red Queue EoTS (PCU)	PCU Factor	Cost of traffic penalties (£ per hr)	Performance Index (£ per hr)
08:00-09:00	1	1	0.00	0.00	✓	0.41			1.00	0.00	5.79
	2	1	0.00	0.00	✓	0.39			1.00	0.00	5.50
		2	0.00	0.00	✓	0.00			1.00	0.00	0.01
	3	1	0.00	0.00	✓	0.00			1.00	0.00	0.02
		2	0.00	0.00	✓	0.95			1.00	0.00	13.27
	5	1	0.00	0.00	✓	0.01			1.00	0.00	0.14
	6	1	0.00	0.00	✓	0.00			1.00	0.00	0.00
	7	1	0.00	0.00	✓	0.00			1.00	0.00	0.00
	8	1	0.00	0.00	✓	0.21			1.00	0.00	2.92
		2	0.00	0.00	✓	0.29			1.00	0.00	4.11
	10	1	0.00	0.00	✓	0.00			1.00	0.00	0.03
		2	0.00	0.00	✓	0.07			1.00	0.00	0.93
	11	1	0.00	0.00	✓	0.00			1.00	0.00	0.00
	12	1	0.00	0.00		83.24			1.00	0.00	589.60
	13	1	0.00	0.00		0.00			1.00	0.00	0.00
		2	0.00	0.00		3.76			1.00	0.00	37.09
	14	1	0.00	0.00	✓	1.04			1.00	0.00	14.63
	15	1	0.00	0.00		0.00			1.00	0.00	0.00

Network Results

Run Summary

Analysis set used	Run start time	Run finish time	Modelling start time (HH:mm)	Network Cycle Time (s)	Performance Index (£ per hr)	Total network delay (PCU-hr/hr)	Highest DOS (%)	Item with highest DOS	Number of oversaturated items	Percentage of oversaturated items (%)	Item with worst signalised PRC	Item with worst unsignalised PRC	Item with worst overall PRC	Network within capacity
7	14/06/2019 12:56:19	14/06/2019 12:56:19	08:00	100	674.06	47.16	310.74	12/1	2	11		12/1	12/1	

Network Results: Vehicle summary

Time Segment	Degree of saturation (%)	Practical reserve capacity (%)	Calculated flow entering (PCU/hr)	Actual green (s (per cycle))	Mean Delay per Veh (s)	Weighted cost of delay (£ per hr)	Weighted cost of stops (£ per hr)	Performance Index (£ per hr)
08:00-09:00	311	-71	7837	1800	21.66	669.69	4.37	674.06

Network Results: Flows and signals

Time Segment	Calculated flow entering (PCU/hr)	Calculated flow out (PCU/hr)	Flow discrepancy (PCU/hr)	Adjusted flow warning	Degree of saturation (%)	DOS Threshold exceeded	Practical reserve capacity (%)	Actual green (s (per cycle))
08:00-09:00	7837	7755	239	✓	311	✓	-71	1800

Network Results: Stops and delays

Time Segment	Mean Cruise Time per Veh (s)	Mean Delay per Veh (s)	Total delay (PCU-hr/hr)	Weighted cost of delay (£ per hr)	Mean stops per Veh (%)	Total stops (Stops per hr)	Weighted cost of stops (£ per hr)
08:00-09:00	18.91	21.66	47.16	669.69	12.20	364.79	4.37

Network Results: Queues and blocking

Time Segment	Utilised storage (%)	Excess queue penalty (£ per hr)	Wasted time total (s (per cycle))
08:00-09:00	255.86	0.00	520.00

Network Results: Advanced

Time Segment	Degree of saturation penalty (£ per hr)	Ped gap accepting penalty (£ per hr)	Warmed up	PCU Factor	Cost of traffic penalties (£ per hr)	Controller stream penalties (£ per hr)	Performance Index (£ per hr)
08:00-09:00	0.00	0.00		1.00	0.00	0.00	674.06

Point to Point Journey Time

Average Journey Time (s) for Local Matrix: 1

		To			
		1	2	3	4
From	1	0.0	59.6	87.0	50.8
	2	1540.1	0.0	1305.6	1539.8
	3	58.7	52.9	0.0	58.5
	4	50.5	73.6	101.0	0.0

Path Journey Time

Path	From Location	To Location	Normal Calculated Flow (PCU/hr)	Normal journey time (s)	Calculated Total Flow (PCU/hr)	Avg journey time (s)
1	1	2	139	59.64	139	59.64
2	2	1	94	1540.09	94	1540.09
3	1	3	979	86.99	979	86.99
4	2	3	10	1305.58	10	1305.58
5	3	1	550	58.75	550	58.75
6	3	2	151	52.94	151	52.94
7	1	4	17	50.83	17	50.83
8	2	4	17	1539.83	17	1539.83

9	3	4	50	58.49	50	58.49
10	4	1	39	50.46	39	50.46
11	4	2	189	73.61	189	73.61
12	4	3	26	100.96	26	100.96

Final Prediction Table

Traffic Stream Results

				FLOWS		PERFORMANCE				PER PCU			QUEUES	WEIGHTS		PENALTIES	P.I.
Arm	**Traffic Stream**	**Name**	**Traffic node**	**Calculated flow entering (PCU/hr)**	**Calculated sat flow (PCU/hr)**	**Actual green (s (per cycle))**	**Wasted time total (s (per cycle))**	**Degree of saturation (%)**	**Practical reserve capacity (%)**	**JourneyTime (s)**	**Mean Delay per Veh (s)**	**Mean stops per Veh (%)**	**Mean max queue (PCU)**	**Delay weighting multiplier (%)**	**Stop weighting multiplier (%)**	**Cost of traffic penalties (£ per hr)**	**P.I.**
1	**1**	(untitled)		1135	1945	100	0.00	58	54	25.29	1.29	0.00	0.41	100	100	0.00	5.79
2	**1**	(untitled)		1118	1945	100	0.00	57	57	2.69	1.25	0.00	0.39	100	100	0.00	5.50
	2	(untitled)		17	562	100	100.00	3	2876	1.54	0.10	0.00	0.00	100	100	0.00	0.01
3	**1**	(untitled)		39	690	100	100.00	6	1493	2.32	0.16	0.00	0.00	100	100	0.00	0.02
	2	(untitled)		215	295	100	0.00	73	24	17.81	15.65	0.00	0.93	100	100	0.00	13.27
5	**1**	(untitled)		254	1945	100	0.00	13	589	24.14	0.14	0.00	0.01	100	100	0.00	0.14
6	**1**	(untitled)		619	Unrestricted	100	0.00	0	Unrestricted	24.00	0.00	0.00	0.00	100	100	0.00	0.00
7	**1**	(untitled)		72	Unrestricted	100	0.00	0	Unrestricted	24.00	0.00	0.00	0.00	100	100	0.00	0.00
8	**1**	(untitled)		328	700	100	0.00	47	92	7.66	2.26	0.00	0.21	100	100	0.00	2.92
	2	(untitled)		1005	1915	100	0.00	52	71	6.44	1.04	0.00	0.29	100	100	0.00	4.11
10	**1**	(untitled)		55	855	100	100.00	6	1287	5.55	0.15	0.00	0.00	100	100	0.00	0.03
	2	(untitled)		580	1915	100	0.00	30	197	5.81	0.41	0.00	0.07	100	100	0.00	0.93
11	**1**	(untitled)		479	Unrestricted	100	0.00	0	Unrestricted	24.00	0.00	0.00	0.00	100	100	0.00	0.00
12	**1**	(untitled)		121 <	1895	100	100.00	311	-71	1251.98	1227.98	720.49	42.20 +	100	100	0.00	589.60
13	**1**	(untitled)		3	467	100	100.00	1	12955	1.03	0.03	0.00	0.00	100	100	0.00	0.00
	2	(untitled)		36 <	36	100	20.00	100	-10	258.31	257.31	235.92	2.56 +	100	100	0.00	37.09
14	**1**	(untitled)		751	1017	100	0.00	74	22	28.94	4.94	0.00	1.03	100	100	0.00	14.63
15	**1**	(untitled)		1008	Unrestricted	100	0.00	0	Unrestricted	52.58	0.00	0.00	0.00	100	100	0.00	0.00

Network Results

	Distance travelled (PCU-km/hr)	Time spent (PCU-hr/hr)	Mean journey speed (kph)	Total delay (PCU-hr/hr)	Weighted cost of delay (£ per hr)	Weighted cost of stops (£ per hr)	Excess queue penalty (£ per hr)	Performance Index (£ per hr)
Normal traffic	1235.17	88.33	13.98	47.16	669.69	4.37	0.00	674.06
Bus	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tram	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pedestrians								
TOTAL	1235.17	88.33	13.98	47.16	669.69	4.37	0.00	674.06

- *< = adjusted flow warning (upstream links/traffic streams are over-saturated)*
- ** = Traffic Stream - Normal, Bus or Tram Stop or Delay weighting has been set to a value other than 100%*
- *^ = Traffic Stream - Normal, Bus or Tram Stop or Delay Path weighting has been set to a value other than 100%*
- *+ = average link/traffic stream excess queue is greater than 0*
- ***P.I. = PERFORMANCE INDEX***

A8 - 2031 DS1 PM
D8 - 2031 DS1 PM*

Summary

Data Errors and Warnings

Severity	Area	Item	Description
Info	Optimisation Order	Advanced	Because the optimisation list is blank, no optimisation will occur.

Run Summary

Analysis set used	Run start time	Run finish time	Modelling start time (HH:mm)	Network Cycle Time (s)	Performance Index (£ per hr)	Total network delay (PCU-hr/hr)	Highest DOS (%)	Item with highest DOS	Number of oversaturated items	Percentage of oversaturated items (%)	Item with worst signalised PRC	Item with worst unsignalised PRC	Item with worst overall PRC	Network within capacity
8	14/06/2019 12:56:19	14/06/2019 12:56:20	17:00	100	1429.29	100.65	99999900.00	12/1	1	6		12/1	12/1	

Analysis Set Details

Name	Description	Demand set	Include in report	Locked
2031 DS1 PM		D8	✓	

Demand Set Details

Name	Description	Composite	Demand sets	Start time (HH:mm)	Locked
2031 DS1 PM				17:00	

Network Options

Network timings

Network cycle time (s)	Restrict to SCOOT cycle times	Time segment length (min)	Number of time segments	Modelled time period (min)
100		60	1	60

Signals options

Start displacement (s)	End displacement (s)
2	3

Advanced

Phase minimum broken penalty (£)	Phase maximum broken penalty (£)	Intergreen broken penalty (£)	Starting Red-with-Amber (s)
10000.00	10000.00	10000.00	2

Traffic options

Traffic model	Vehicle flow scaling factor (%)	Pedestrian flow scaling factor (%)	Cruise times or speeds
Platoon Dispersion (PDM)	100	100	Cruise Speeds

Advanced

Resolution	DOS Threshold (%)	Cruise scaling factor (%)	Use link stop weightings	Use link delay weightings	Exclude pedestrians from results calculation	Random delay mode	Type of Vehicle-in-Service	Type of random parameter	PCU Length (m)	Calculate results for Path Segments	Generate PDM Profile Data
1	90	100	✓	✓		Complex	Uniform (TRANSYT)	Uniform (TRANSYT)	5.75		✓

Normal Traffic parameters

Dispersion type	Dispersion coefficient	Travel time coefficient
Default	35	80

Normal Traffic Types

Name	PCU Factor
Normal	1.00

Bus parameters

Name	PCU Factor	Dispersion type	Acceleration (ms^[-2])	Stationary time coefficient	Cruise time coefficient
Bus	1.00	Default	0.94	30	85

Tram parameters

Name	PCU Factor	Dispersion type	Acceleration (ms^[-2])	Stationary time coefficient	Cruise time coefficient
Tram	1.00	Default	0.94	100	100

Pedestrian parameters

Dispersion type
Default

Optimisation options

Enable optimisation	Auto redistribute	Optimisation level	Enable OUT Profile accuracy
✓	✓	Offsets And Green Splits	✓

Advanced

Optimisation type	Hill climb increments	OUTProfile accuracy	Use enhanced optimisation	Auto optimisation order	Optimisation order	Master controller	Offsets relative to master controller	Master controller offset after each run
Hill Climb (Fast)	15, 40, -1, 15, 40, 1, -1, 1	50, 50, 5, 5, 0.5, 0.5, 0.05, 0.05		✓				Do nothing

Economics

Vehicle Monetary Value Of Delay (£ per PCU-hr)	Vehicle Monetary Value Of Stops (£ per 100 stops)	Pedestrian monetary value of delay (£ per Ped-hr)
14.20	2.60	14.20

Arms and Traffic Streams

Arms

Arm	Name	Description	Traffic node
(ALL)	(untitled)		

Traffic Streams

Arm	Traffic Stream	Name	Description	Auto length	Length (m)	Has Saturation Flow	Saturation flow source	Saturation flow (PCU/hr)	Auto-calculate cell saturation flow	Cell saturation flow (PCU/hr)	Is signal controlled	Is give way	Traffic type	Allow Nearside Turn On Red
1	1	(untitled)			200.00	✓	Sum of lanes	1945					Normal	
2	1	(untitled)			12.00	✓	Sum of lanes	1945					Normal	
	2	(untitled)			12.00							✓	Normal	
3	1	(untitled)			18.00							✓	Normal	
	2	(untitled)			18.00							✓	Normal	
5	1	(untitled)			200.00	✓	Sum of lanes	1945					Normal	
6	1	(untitled)			200.00								Normal	
7	1	(untitled)			200.00								Normal	
8	1	(untitled)			45.00				✓	1800		✓	Normal	
	2	(untitled)			45.00	✓	Sum of lanes	1915		1915			Normal	
10	1	(untitled)			45.00				✓	1800		✓	Normal	
	2	(untitled)			45.00	✓	Sum of lanes	1915		1915			Normal	
11	1	(untitled)			200.00								Normal	
12	1	(untitled)			200.00	✓	Sum of lanes	1895					Normal	
13	1	(untitled)			7.50							✓	Normal	
	2	(untitled)			7.50							✓	Normal	
14	1	(untitled)			200.00							✓	Normal	
15	1	(untitled)		✓	438.13								Normal	

Lanes

Arm	Traffic Stream	Lane	Name	Description	Use RR67	Surface condition	Site quality factor	Gradient (%)	Width (m)	Use connector turning radius	Proportion that turn (%)	Turning radius (m)	Nearside lane	Saturation flow (PCU/hr)
1	1	1	(untitled)		✓	N/A	N/A	0	3.30	✓	0	99999.00	✓	1945
2	1	1	(untitled)		✓	N/A	N/A	0	3.30	✓	0	99999.00	✓	1945
	2	1	(untitled)											
3	1	1	(untitled)											
	2	1	(untitled)											
5	1	1	(untitled)		✓	N/A	N/A	0	3.30	✓	0	99999.00	✓	1945
6	1	1	(untitled)											
7	1	1	(untitled)											
8	1	1	(untitled)											
	2	1	(untitled)		✓	N/A	N/A	0	3.00	✓	0	99999.00	✓	1915
10	1	1	(untitled)											
	2	1	(untitled)		✓	N/A	N/A	0	3.00	✓	0	99999.00	✓	1915
11	1	1	(untitled)											
12	1	1	(untitled)		✓	N/A	N/A	0	2.80	✓	0	99999.00	✓	1895
13	1	1	(untitled)											
	2	1	(untitled)											
14	1	1	(untitled)											
15	1	1	(untitled)											

Modelling

Arm	Traffic Stream	Traffic model	Stop weighting multiplier (%)	Delay weighting multiplier (%)	Assignment Cost Weighting (%)	Exclude from results calculation	Max queue storage (PCU)	Has queue limit	Has degree of saturation limit
1	1	NetworkDefault	100	100	100		0.00		
2	1	Flare	100	100	100		0.00		
	2	Flare	100	100	100		0.00		
3	1	Flare	100	100	100		0.00		
	2	Flare	100	100	100		0.00		
5	1	NetworkDefault	100	100	100		0.00		
6	1	NetworkDefault	100	100	100		0.00		
7	1	NetworkDefault	100	100	100		0.00		
8	1	Flare	100	100	100		0.00		
	2	CTM	100	100	100		0.00		
10	1	Flare	100	100	100		0.00		
	2	CTM	100	100	100		0.00		
11	1	NetworkDefault	100	100	100		0.00		
12	1	NetworkDefault	100	100	100		0.00		
13	1	Flare	100	100	100		0.00		
	2	Flare	100	100	100		0.00		
14	1	NetworkDefault	100	100	100		0.00		
15	1	NetworkDefault	100	100	100		0.00		

Modelling - Advanced

Arm	Traffic Stream	Initial queue (PCU)	Type of Vehicle-in-Service	Vehicle-in-Service	Type of random parameter	Random parameter	Auto cycle time	Cycle time
(ALL)	(ALL)	0.00	NetworkDefault	Not-Included	NetworkDefault	0.50	✓	100

Normal traffic - Modelling

Arm	Traffic Stream	Stop weighting (%)	Delay weighting (%)
(ALL)	(ALL)	100	100

Normal traffic - Advanced

Arm	Traffic Stream	Dispersion type for Normal Traffic
(ALL)	(ALL)	NetworkDefault

Flows

Arm	Traffic Stream	Total Flow (PCU/hr)	Normal Flow (PCU/hr)
1	1	541	541
2	1	514	514
	2	27	27
3	1	23	23
	2	177	177
5	1	200	200
6	1	1018	1018
7	1	160	160
8	1	105	105
	2	586	586
10	1	133	133
	2	995	995
11	1	241	241
12	1	197	197
13	1	88	88
	2	109	109
14	1	1155	1155
15	1	674	674

Entry Sources

Arm	Traffic Stream	Cruise time for Normal Traffic (s)	Cruise speed for Normal Traffic (kph)
(ALL)	1	24.00	30.00

Sources

Arm	Traffic Stream	Source	Source traffic stream	Destination traffic stream	Cruise time for Normal Traffic (s)	Cruise speed for Normal Traffic (kph)	Auto turning radius	Traffic turn style	Turning radius (m)
2	1	1	1/1	2/1	1.44	30.00	✓	Straight	Straight Movement
	2	1	1/1	2/2	1.44	30.00	✓	Straight	Straight Movement
3	1	1	5/1	3/1	2.16	30.00	✓	Straight	Straight Movement
	2	1	5/1	3/2	2.16	30.00	✓	Straight	Straight Movement
6	1	1	10/2	6/1	24.00	30.00	✓	Straight	Straight Movement
7	1	1	2/2	7/1	24.00	30.00	✓	Straight	Straight Movement
8	1	1	2/1	8/1	5.40	30.00	✓	Straight	Straight Movement
	2	1	2/1	8/2	5.40	30.00	✓	Straight	Straight Movement
10	1	1	13/2	10/1	5.40	30.00	✓	Straight	Straight Movement
	2	1	13/2	10/2	5.40	30.00	✓	Straight	Straight Movement
11	1	1	8/1	11/1	24.00	30.00	✓	Straight	Straight Movement
13	1	1	12/1	13/1	1.00	30.00	✓	Straight	Straight Movement
	2	1	12/1	13/2	1.00	30.00	✓	Straight	Straight Movement
15	1	1	13/1	15/1	52.58	30.00	✓	Nearside	80.02
6	1	2	3/1	6/1	24.00	30.00	✓	Straight	Straight Movement
7	1	2	10/1	7/1	24.00	30.00	✓	Nearside	70.86
8	1	2	3/2	8/1	5.40	30.00	✓	Offside	99.89
	2	2	3/2	8/2	5.40	30.00	✓	Offside	99.89
10	1	2	14/1	10/1	5.40	30.00	✓	Straight	Straight Movement
	2	2	14/1	10/2	5.40	30.00	✓	Straight	Straight Movement
11	1	2	14/1	11/1	24.00	30.00	✓	Straight	Straight Movement
15	1	2	8/2	15/1	52.58	30.00	✓	Straight	Straight Movement

Give Way Data

Arm	Traffic Stream	Opposed traffic	Use Step-wise Opposed Turn Model	Visibility restricted
2	2	AllTraffic		
3	1	AllTraffic		
	2	AllTraffic		
8	1	AllTraffic		
10	1	AllTraffic		
13	1	AllTraffic		
	2	AllTraffic		

14	1	Movement		

Give Way Data - All Movements - Conflicts

Traffic Stream	Description	Controlling type	Controlling traffic stream	Controlling from traffic stream	Controlling to traffic stream	Percentage opposing (%)	Slope coefficient	Upstream signals visible	Conflict shift	Conflict duration
2		TrafficStream	10/2			100	0.28		0	0
		TrafficStream	10/1			100	0.28		0	0
1		TrafficStream	10/2			100	0.34		0	0
2		TrafficStream	10/2			100	0.33		0	0
		TrafficStream	2/1			100	0.21		0	0
		TrafficStream	2/2			100	0.47		0	0
1		TrafficStreamMovement		14/1	11/1	100	0.29		0	0
		TrafficStream	2/2			100	0.28		0	0
		TrafficStream	8/2			100	0.29		0	0
2		TrafficStream	8/2			100	0.27		0	0
		TrafficStream	14/1			100	0.39		0	0

Give Way Data - Movements

Arm	Traffic Stream	Movement	Destination traffic stream	Max Flow (Opposed) (PCU/hr)	Max Flow (Unopposed) (PCU/hr)	Percentage opposed (%)
14	1	1	10/1	1965	1965	100
		2	10/2	1965	1965	100
		3	11/1	707	707	100

Give Way Data - Movements - Conflicts

Arm	Traffic Stream	Movement	Destination traffic stream	Description	Controlling type	Controlling traffic stream	Percentage opposing (%)	Slope coefficient	Upstream signals visible	Conflict shift	Conflict duration
14	1	3	11/1		TrafficStream	8/2	100	0.27		0	0
					TrafficStream	8/1	100	0.27		0	0

Local OD Matrix - Local Matrix: 1

Local Matrix Options

OD Matrix	Name	Use for point to point table	Auto calculate	Allocation mode	Allow paths past exit locations	Allow looped paths on arms	Allow looped paths on traffic nodes	Copy flows	Matrix to copy flows from	Limit paths by length	Path length limit multiplier	Limit paths by number	Path number limit
1	(untitled)	✓	✓	Path Equalisation			✓			✓	1.25		

Normal Input Flows (PCU/hr)

		To			
		1	2	3	4
From	1	0	55	459	27
	2	89	0	88	20
	3	906	136	0	113
	4	23	50	127	0

Bus Input Flows not shown as they are blank.

Tram Input Flows not shown as they are blank.

Pedestrian Input Flows not shown as they are blank.

Locations

OD Matrix	Location	Name	Entries	Exits	Colour
1	1	(untitled)	1/1	6/1	#0000FF
	2	(untitled)	12/1	11/1	#00FF00
	3	(untitled)	14/1	15/1	#FFFF00
	4	(untitled)	5/1	7/1	#FFFF00

Normal Paths and Flows

OD Matrix	Path	Description	From location	To location	Path items	Allocation type	Normal Calculated Flow (PCU/hr)
1	1		1	2	1/1, 2/1, 8/1, 11/1	Normal	55
	2		2	1	12/1, 13/2, 10/2, 6/1	Normal	89
	3		1	3	1/1, 2/1, 8/2, 15/1	Normal	459
	4		2	3	12/1, 13/1, 15/1	Normal	88
	5		3	1	14/1, 10/2, 6/1	Normal	906
	6		3	2	14/1, 11/1	Normal	136
	7		1	4	1/1, 2/2, 7/1	Normal	27
	8		2	4	12/1, 13/2, 10/1, 7/1	Normal	20
	9		3	4	14/1, 10/1, 7/1	Normal	113
	10		4	1	5/1, 3/1, 6/1	Normal	23
	11		4	2	5/1, 3/2, 8/1, 11/1	Normal	50
	12		4	3	5/1, 3/2, 8/2, 15/1	Normal	127

Signal Timings

Network Default: 100s cycle time; 100 steps

No Controller Streams present.

Traffic Stream Results

Traffic Stream Results: Vehicle summary

Time Segment	Arm	Traffic Stream	Degree of saturation (%)	Practical reserve capacity (%)	Calculated flow entering (PCU/hr)	Calculated sat flow (PCU/hr)	Actual green (s (per cycle))	Mean Delay per Veh (s)	Mean max queue (PCU)	Utilised storage (%)	Weighted cost of delay (£ per hr)	Weighted cost of stops (£ per hr)	Performance Index (£ per hr)
17:00-18:00	1	1	28	224	541	1945	100	0.36	0.05	0.15	0.76	0.00	0.76
	2	1	26	241	514	1945	100	0.33	0.05	2.37	0.67	0.00	0.67
		2	6	1412	27	454	100	0.25	0.00	0.09	0.03	0.00	0.03
	3	1	4	2172	23	581	100	0.13	0.00	0.03	0.01	0.00	0.01
		2	57	57	177	308	100	7.76	0.38	12.71	5.42	0.00	5.42
	5	1	10	775	200	1945	100	0.11	0.01	0.02	0.08	0.00	0.08
	6	1	0	Unrestricted	929	Unrestricted	100	0.00	0.00	0.00	0.00	0.00	0.00
	7	1	0	Unrestricted	140	Unrestricted	100	0.00	0.00	0.00	0.00	0.00	0.00
	8	1	15	504	105	704	100	0.45	0.01	0.17	0.19	0.00	0.19
		2	31	194	586	1915	100	0.41	0.07	0.86	0.96	0.00	0.96
	10	1	13	579	113	852	100	0.32	0.01	0.13	0.14	0.00	0.14
		2	47	90	906	1915	100	0.84	0.21	2.71	3.01	0.00	3.01
	11	1	0	Unrestricted	241	Unrestricted	100	0.00	0.00	0.00	0.00	0.00	0.00
	12	1	99999900	-100	197	1895	100	1800.00	98.50	283.19	1398.70	0.00	1398.70
	13	1	0	Unrestricted	0	587	100	0.00	0.00	0.00	0.00	0.00	0.00
		2	0	-100	0	0	100	0.00	0.00	0.00	0.00	0.00	0.00
	14	1	78	15	1155	1482	100	4.24	1.36	3.91	19.32	0.00	19.32
	15	1	0	Unrestricted	586	Unrestricted	100	0.00	0.00	0.00	0.00	0.00	0.00

Traffic Stream Results: Flows and signals

Time Segment	Arm	Traffic Stream	Calculated flow entering (PCU/hr)	Calculated flow out (PCU/hr)	Flow discrepancy (PCU/hr)	Adjusted flow warning	Calculated sat flow (PCU/hr)	Calculated capacity (PCU/hr)	Degree of saturation (%)	DOS Threshold exceeded	Practical reserve capacity (%)	Mean modulus of error	Actual green (s (per cycle))
17:00-18:00	1	1	541	541	0		1945	1945	28		224	0.00	100
	2	1	514	514	0		1945	1945	26		241	0.00	100
		2	27	27	0		454	454	6		1412	0.00	100
	3	1	23	23	0		581	581	4		2172	0.00	100
		2	177	177	0		308	308	57		57	0.00	100
	5	1	200	200	0		1945	1945	10		775	0.00	100
	6	1	929	929	89	✓	Unrestricted	Unrestricted	0		Unrestricted	0.00	100
	7	1	140	140	20	✓	Unrestricted	Unrestricted	0		Unrestricted	0.00	100
	8	1	105	105	0		704	704	15		504	0.00	100
		2	586	586	0		1915	1915	31		194	0.00	100
	10	1	113	113	20	✓	852	852	13		579	0.00	100
		2	906	906	89	✓	1915	1915	47		90	0.00	100
	11	1	241	241	0		Unrestricted	Unrestricted	0		Unrestricted	0.00	100
	12	1	197	0	0		1895	0	99999900	✓	-100	0.00	100
	13	1	0	0	88	✓	587	587	0		Unrestricted	1.92	100
		2	0	0	109	✓	0	0	0		-100	1.92	100
	14	1	1155	1155	0		1482	1482	78		15	0.00	100
	15	1	586	586	88	✓	Unrestricted	Unrestricted	0		Unrestricted	0.00	100

Traffic Stream Results: Stops and delays

Time Segment	Arm	Traffic Stream	Mean Cruise Time per Veh (s)	Mean Delay per Veh (s)	Total delay (PCU-hr/hr)	Weighted cost of delay (£ per hr)	Mean stops per Veh (%)	Total stops (Stops per hr)	Weighted cost of stops (£ per hr)
17:00-18:00	1	1	24.00	0.36	0.05	0.76	0.00	0.00	0.00
	2	1	1.44	0.33	0.05	0.67	0.00	0.00	0.00
		2	1.44	0.25	0.00	0.03	0.00	0.00	0.00
	3	1	2.16	0.13	0.00	0.01	0.00	0.00	0.00
		2	2.16	7.76	0.38	5.42	0.00	0.00	0.00
	5	1	24.00	0.11	0.01	0.08	0.00	0.00	0.00
	6	1	24.00	0.00	0.00	0.00	0.00	0.00	0.00
	7	1	24.00	0.00	0.00	0.00	0.00	0.00	0.00
	8	1	5.40	0.45	0.01	0.19	0.00	0.00	0.00
		2	5.40	0.41	0.07	0.96	0.00	0.00	0.00
	10	1	5.40	0.32	0.01	0.14	0.00	0.00	0.00
		2	5.40	0.84	0.21	3.01	0.00	0.00	0.00
	11	1	24.00	0.00	0.00	0.00	0.00	0.00	0.00
	12	1	24.00	1800.00	98.50	1398.70	0.00	0.00	0.00
	13	1	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		2	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	14	1	24.00	4.24	1.36	19.32	0.00	0.00	0.00
	15	1	52.58	0.00	0.00	0.00	0.00	0.00	0.00

Traffic Stream Results: Queues and blocking

Time Segment	Arm	Traffic Stream	Initial queue (PCU)	Mean max queue (PCU)	Max queue storage (PCU)	Utilised storage (%)	Excess queue penalty (£ per hr)	Wasted time total (s (per cycle))	Estimated blocking
17:00-18:00	1	1	0.00	0.05	34.78	0.15	0.00	0.00	
	2	1	0.00	0.05	2.00	2.37	0.00	0.00	
		2	0.00	0.00	2.00	0.09	0.00	100.00	
	3	1	0.00	0.00	3.00	0.03	0.00	100.00	
		2	0.00	0.38	3.00	12.71	0.00	0.00	
	5	1	0.00	0.01	34.78	0.02	0.00	0.00	
	6	1	0.00	0.00	34.78	0.00	0.00	0.00	
	7	1	0.00	0.00	34.78	0.00	0.00	0.00	
	8	1	0.00	0.01	7.83	0.17	0.00	0.00	
		2	0.00	0.07	7.83	0.86	0.00	0.00	
	10	1	0.00	0.01	7.83	0.13	0.00	0.00	
		2	0.00	0.21	7.83	2.71	0.00	0.00	
	11	1	0.00	0.00	34.78	0.00	0.00	0.00	
	12	1	0.00	98.50	34.78	283.19	0.00	100.00	
		1	0.00	0.00	1.00	0.00	0.00	100.00	

	13	2	0.00	0.00	1.00	0.00	0.00	100.00	
	14	1	0.00	1.36	34.78	3.91	0.00	0.00	
	15	1	0.00	0.00	76.20	0.00	0.00	0.00	

Traffic Stream Results: Advanced

Time Segment	Arm	Traffic Stream	Degree of saturation penalty (£ per hr)	Ped gap accepting penalty (£ per hr)	Warmed up	Mean Max Queue EoTS (PCU)	Max End of Green Queue EoTS (PCU)	Max End of Red Queue EoTS (PCU)	PCU Factor	Cost of traffic penalties (£ per hr)	Performance Index (£ per hr)
17:00-18:00	1	1	0.00	0.00	✓	0.05			1.00	0.00	0.76
	2	1	0.00	0.00	✓	0.05			1.00	0.00	0.67
		2	0.00	0.00	✓	0.00			1.00	0.00	0.03
	3	1	0.00	0.00	✓	0.00			1.00	0.00	0.01
		2	0.00	0.00	✓	0.38			1.00	0.00	5.42
	5	1	0.00	0.00	✓	0.01			1.00	0.00	0.08
	6	1	0.00	0.00	✓	0.00			1.00	0.00	0.00
	7	1	0.00	0.00	✓	0.00			1.00	0.00	0.00
	8	1	0.00	0.00	✓	0.01			1.00	0.00	0.19
		2	0.00	0.00	✓	0.07			1.00	0.00	0.96
	10	1	0.00	0.00	✓	0.01			1.00	0.00	0.14
		2	0.00	0.00	✓	0.21			1.00	0.00	3.01
	11	1	0.00	0.00	✓	0.00			1.00	0.00	0.00
	12	1	0.00	0.00	✓	197.00			1.00	0.00	1398.70
	13	1	0.00	0.00	✓	0.00			1.00	0.00	0.00
		2	0.00	0.00	✓	0.00			1.00	0.00	0.00
	14	1	0.00	0.00	✓	1.37			1.00	0.00	19.32
	15	1	0.00	0.00	✓	0.00			1.00	0.00	0.00

Network Results

Run Summary

Analysis set used	Run start time	Run finish time	Modelling start time (HH:mm)	Network Cycle Time (s)	Performance Index (£ per hr)	Total network delay (PCU-hr/hr)	Highest DOS (%)	Item with highest DOS	Number of oversaturated items	Percentage of oversaturated items (%)	Item with worst signalised PRC	Item with worst unsignalised PRC	Item with worst overall PRC	Network within capacity
8	14/06/2019 12:56:19	14/06/2019 12:56:20	17:00	100	1429.29	100.65	99999900.00	12/1	1	6		12/1	12/1	

Network Results: Vehicle summary

Time Segment	Degree of saturation (%)	Practical reserve capacity (%)	Calculated flow entering (PCU/hr)	Actual green (s (per cycle))	Mean Delay per Veh (s)	Weighted cost of delay (£ per hr)	Weighted cost of stops (£ per hr)	Performance Index (£ per hr)
17:00-18:00	99999900	-100	6440	1800	56.27	1429.29	0.00	1429.29

Network Results: Flows and signals

Time Segment	Calculated flow entering (PCU/hr)	Calculated flow out (PCU/hr)	Flow discrepancy (PCU/hr)	Adjusted flow warning	Degree of saturation (%)	DOS Threshold exceeded	Practical reserve capacity (%)	Actual green (s (per cycle))
17:00-18:00	6440	6243	503	✓	99999900	✓	-100	1800

Network Results: Stops and delays

Time Segment	Mean Cruise Time per Veh (s)	Mean Delay per Veh (s)	Total delay (PCU-hr/hr)	Weighted cost of delay (£ per hr)	Mean stops per Veh (%)	Total stops (Stops per hr)	Weighted cost of stops (£ per hr)
17:00-18:00	19.09	56.27	100.65	1429.29	0.00	0.00	0.00

Network Results: Queues and blocking

Time Segment	Utilised storage (%)	Excess queue penalty (£ per hr)	Wasted time total (s (per cycle))
17:00-18:00	283.19	0.00	500.00

Network Results: Advanced

Time Segment	Degree of saturation penalty (£ per hr)	Ped gap accepting penalty (£ per hr)	Warmed up	PCU Factor	Cost of traffic penalties (£ per hr)	Controller stream penalties (£ per hr)	Performance Index (£ per hr)
17:00-18:00	0.00	0.00	✓	1.00	0.00	0.00	1429.29

Point to Point Journey Time

Average Journey Time (s) for Local Matrix: 1

		To			
		1	2	3	4
From	1	0.0	56.0	84.5	50.0
	2	1824.0	0.0	1876.6	1824.0
	3	58.5	52.2	0.0	58.0
	4	50.4	63.9	92.4	0.0

Path Journey Time

Path	From Location	To Location	Normal Calculated Flow (PCU/hr)	Normal journey time (s)	Calculated Total Flow (PCU/hr)	Avg journey time (s)
1	1	2	55	55.98	55	55.98
2	2	1	89	1824.00	89	1824.00
3	1	3	459	84.52	459	84.52
4	2	3	88	1876.58	88	1876.58
5	3	1	906	58.48	906	58.48
6	3	2	136	52.24	136	52.24
7	1	4	27	50.05	27	50.05

8	2	4	20	1824.00	20	1824.00
9	3	4	113	57.96	113	57.96
10	4	1	23	50.39	23	50.39
11	4	2	50	63.87	50	63.87
12	4	3	127	92.41	127	92.41

Final Prediction Table

Traffic Stream Results

				FLOWS		PERFORMANCE				PER PCU			QUEUES	WEIGHTS		PENALTIES	P.I.
Arm	**Traffic Stream**	**Name**	**Traffic node**	**Calculated flow entering (PCU/hr)**	**Calculated sat flow (PCU/hr)**	**Actual green (s (per cycle))**	**Wasted time total (s (per cycle))**	**Degree of saturation (%)**	**Practical reserve capacity (%)**	**JourneyTime (s)**	**Mean Delay per Veh (s)**	**Mean stops per Veh (%)**	**Mean max queue (PCU)**	**Delay weighting multiplier (%)**	**Stop weighting multiplier (%)**	**Cost of traffic penalties (£ per hr)**	**P.I.**
1	**1**	(untitled)		541	1945	100	0.00	28	224	24.36	0.36	0.00	0.05	100	100	0.00	0.76
2	**1**	(untitled)		514	1945	100	0.00	26	241	1.77	0.33	0.00	0.05	100	100	0.00	0.67
	2	(untitled)		27	454	100	100.00	6	1412	1.69	0.25	0.00	0.00	100	100	0.00	0.03
3	**1**	(untitled)		23	581	100	100.00	4	2172	2.29	0.13	0.00	0.00	100	100	0.00	0.01
	2	(untitled)		177	308	100	0.00	57	57	9.92	7.76	0.00	0.38	100	100	0.00	5.42
5	**1**	(untitled)		200	1945	100	0.00	10	775	24.11	0.11	0.00	0.01	100	100	0.00	0.08
6	**1**	(untitled)		929	Unrestricted	100	0.00	0	Unrestricted	24.00	0.00	0.00	0.00	100	100	0.00	0.00
7	**1**	(untitled)		140	Unrestricted	100	0.00	0	Unrestricted	24.00	0.00	0.00	0.00	100	100	0.00	0.00
8	**1**	(untitled)		105	704	100	0.00	15	504	5.85	0.45	0.00	0.01	100	100	0.00	0.19
	2	(untitled)		586	1915	100	0.00	31	194	5.81	0.41	0.00	0.07	100	100	0.00	0.96
10	**1**	(untitled)		113	852	100	0.00	13	579	5.72	0.32	0.00	0.01	100	100	0.00	0.14
	2	(untitled)		906	1915	100	0.00	47	90	6.24	0.84	0.00	0.21	100	100	0.00	3.01
11	**1**	(untitled)		241	Unrestricted	100	0.00	0	Unrestricted	24.00	0.00	0.00	0.00	100	100	0.00	0.00
12	**1**	(untitled)		197 <	1895	100	100.00	99999900	-100	1824.00	1800.00	0.00	98.50 +	100	100	0.00	1398.70
13	**1**	(untitled)		0	587	100	100.00	0	Unrestricted	0.00	0.00	0.00	0.00	100	100	0.00	0.00
	2	(untitled)		0	0	100	100.00	0	-100	0.00	0.00	0.00	0.00	100	100	0.00	0.00
14	**1**	(untitled)		1155	1482	100	0.00	78	15	28.24	4.24	0.00	1.36	100	100	0.00	19.32
15	**1**	(untitled)		586	Unrestricted	100	0.00	0	Unrestricted	52.58	0.00	0.00	0.00	100	100	0.00	0.00

Network Results

	Distance travelled (PCU-km/hr)	**Time spent (PCU-hr/hr)**	**Mean journey speed (kph)**	**Total delay (PCU-hr/hr)**	**Weighted cost of delay (£ per hr)**	**Weighted cost of stops (£ per hr)**	**Excess queue penalty (£ per hr)**	**Performance Index (£ per hr)**
Normal traffic	1024.39	134.80	7.60	100.65	1429.29	0.00	0.00	1429.29
Bus	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tram	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pedestrians								
TOTAL	1024.39	134.80	7.60	100.65	1429.29	0.00	0.00	1429.29

- *< = adjusted flow warning (upstream links/traffic streams are over-saturated)*
- ** = Traffic Stream - Normal, Bus or Tram Stop or Delay weighting has been set to a value other than 100%*
- *^ = Traffic Stream - Normal, Bus or Tram Stop or Delay Path weighting has been set to a value other than 100%*
- *+ = average link/traffic stream excess queue is greater than 0*
- ***P.I. = PERFORMANCE INDEX***

TECHNICAL NOTE

APPENDIX B

TRANSYT 15

Version: 15.5.2.7994
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The users of this computer program for the solution of an engineering problem are in no way relieved of their responsibility for the correctness of the solution

Filename: 190606 Ardley Crossroads Signalised 2 lanes gw.t15
Path: \\pba.int\BRI\Projects\39304 Heyford Park Tranche 2\Technical\Transport\Junction Assessments\TRANSYT
Report generation date: 14/06/2019 14:02:20

»A7 - 2031 DS1 AM : D7 - 2031 DS1 AM* :
»A8 - 2031 DS1 PM : D8 - 2031 DS1 PM* :

File summary

File description

File title	(untitled)
Location	
Site number	
UTCRegion	
Driving side	Left
Date	14/12/2017
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Enumerator	PBA\dcollis
Description	

Model and Results

Enable controller offsets	Enable fuel consumption	Enable quick flares	Display journey time results	Display level of service results	Display blocking and starvation results	Display end of red and green queue results	Display excess queue results	Display separate uniform and random results	Display unweighted results	Display TRANSYT 12 style timings	Display effective greens in results	Display Red-With-Amber	Display End-Of-Green Amber

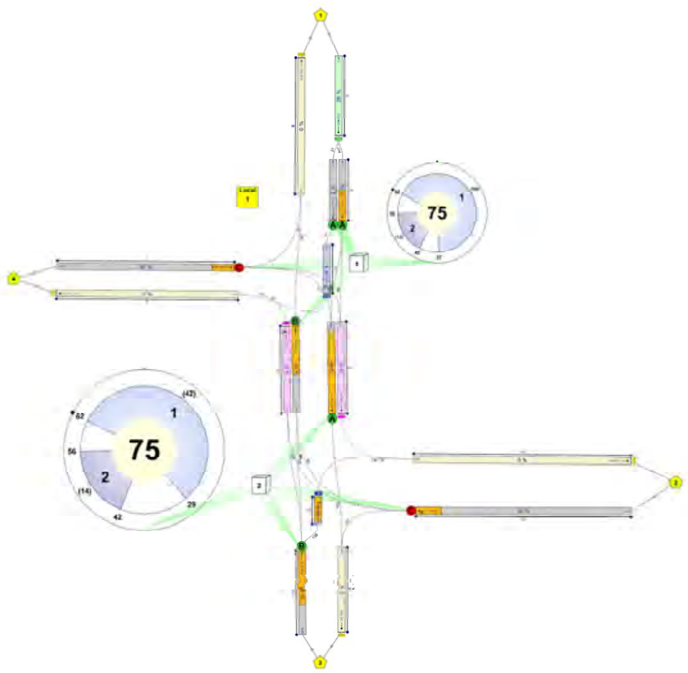
Units

Cost units	Speed units	Distance units	Fuel economy units	Fuel rate units	Mass units	Traffic units input	Traffic units results	Flow units	Average delay units	Total delay units	Rate of delay units
£	kph	m	mpg	l/h	kg	PCU	PCU	perHour	s	-Hour	perHour

Sorting

Show names instead of IDs	Sorting direction	Sorting type	Ignore prefixes when sorting	Analysis/demand set sorting	Link grouping	Source grouping	Colour Analysis/Demand Sets
	Ascending	Numerical		ID	Normal	Normal	✓

Network Diagrams



(untitled)
Cycletime 0s / 75s , Timesteps 74 / 75
8, 8
Diagram produced using TRANSYT 15.5.2.7994

A7 - 2031 DS1 AM
D7 - 2031 DS1 AM*

Summary

Data Errors and Warnings

No errors or warnings

Run Summary

Analysis set used	Run start time	Run finish time	Modelling start time (HH:mm)	Network Cycle Time (s)	Performance Index (£ per hr)	Total network delay (PCU-hr/hr)	Highest DOS (%)	Item with highest DOS	Number of oversaturated items	Percentage of oversaturated items (%)	Item with worst signalised PRC	Item with worst unsignalised PRC	Item with worst overall PRC	Network within capacity
7	14/06/2019 14:01:57	14/06/2019 14:01:58	08:00	75	361.67	22.37	93.00	14/1	2	12	14/1	1/1	14/1	

Analysis Set Details

Name	Description	Demand set	Include in report	Locked
2031 DS1 AM		D7	✓	

Demand Set Details

Name	Description	Composite	Demand sets	Start time (HH:mm)	Locked
2031 DS1 AM				08:00	

Network Options

Network timings

Network cycle time (s)	Restrict to SCOOT cycle times	Time segment length (min)	Number of time segments	Modelled time period (min)
75		60	1	60

Signals options

Start displacement (s)	End displacement (s)
2	3

Advanced

Phase minimum broken penalty (£)	Phase maximum broken penalty (£)	Intergreen broken penalty (£)	Starting Red-with-Amber (s)
10000.00	10000.00	10000.00	2

Traffic options

Traffic model	Vehicle flow scaling factor (%)	Pedestrian flow scaling factor (%)	Cruise times or speeds
Platoon Dispersion (PDM)	100	100	Cruise Speeds

Advanced

Resolution	DOS Threshold (%)	Cruise scaling factor (%)	Use link stop weightings	Use link delay weightings	Exclude pedestrians from results calculation	Random delay mode	Type of Vehicle-in-Service	Type of random parameter	PCU Length (m)	Calculate results for Path Segments	Generate PDM Profile Data
1	90	100	✓	✓		Complex	Uniform (TRANSYT)	Uniform (TRANSYT)	5.75		✓

Normal Traffic parameters

Dispersion type	Dispersion coefficient	Travel time coefficient
Default	35	80

Normal Traffic Types

Name	PCU Factor
Normal	1.00

Bus parameters

Name	PCU Factor	Dispersion type	Acceleration (ms^[-2])	Stationary time coefficient	Cruise time coefficient
Bus	1.00	Default	0.94	30	85

Tram parameters

Name	PCU Factor	Dispersion type	Acceleration (ms^[-2])	Stationary time coefficient	Cruise time coefficient
Tram	1.00	Default	0.94	100	100

Pedestrian parameters

Dispersion type
Default

Optimisation options

Enable optimisation	Auto redistribute	Optimisation level	Enable OUT Profile accuracy
✓		Offsets Only	✓

Advanced

Optimisation type	Hill climb increments	OUTProfile accuracy	Shotgun number of runs	Random seed	Use enhanced optimisation	Auto optimisation order	Optimisation order	Master controller	Offsets relative to master controller	Master controller offset after each run
Shotgun Hill Climb (Medium)	15, 40, 15, 40, 15, 1, 1	50, 50, 5, 5, 0.5, 0.05, 0.05	10	1		✓	1, 2			Do nothing

Economics

Vehicle Monetary Value Of Delay (£ per PCU-hr)	Vehicle Monetary Value Of Stops (£ per 100 stops)	Pedestrian monetary value of delay (£ per Ped-hr)
14.20	2.60	14.20

Arms and Traffic Streams

Arms

Arm	Name	Description	Traffic node
1	(untitled)		
2	(untitled)		
3	(untitled)		
6	(untitled)		
7	(untitled)		
8	(untitled)		
10	(untitled)		
11	(untitled)		
12			
13	(untitled)		
14	(untitled)		
15	(untitled)		
16			

Traffic Streams

Arm	Traffic Stream	Name	Description	Auto length	Length (m)	Has Saturation Flow	Saturation flow source	Saturation flow (PCU/hr)	Auto-calculate cell saturation flow	Cell saturation flow (PCU/hr)	Is signal controlled	Is give way	Traffic type	Allow Nearside Turn On Red
1	1	(untitled)			200.00	✓	Sum of lanes	1965					Normal	
2	2	(untitled)			45.00	✓	Sum of lanes	2105		2105	✓		Normal	
	3				45.00	✓	Sum of lanes	2105		2105	✓		Normal	
3	2	(untitled)			200.00	✓	Sum of lanes	1717			✓		Normal	
6	1	(untitled)			200.00								Normal	
7	1	(untitled)			200.00								Normal	
8	2	(untitled)			37.00				✓	1800		✓	Normal	
	3				37.00	✓	Sum of lanes	2105		2105	✓		Normal	
10	2	(untitled)			20.00							✓	Normal	
	3				32.00	✓	Sum of lanes	2105		2105	✓		Normal	
11	1	(untitled)			200.00								Normal	
12	1				17.00	✓	Sum of lanes	2105				✓	Normal	
13	2	(untitled)			200.00	✓	Sum of lanes	1665			✓		Normal	
14	1	(untitled)			200.00	✓	Sum of lanes	1965			✓		Normal	
15	1	(untitled)		✓	429.39								Normal	
16	1				9.00	✓	Sum of lanes	1915				✓	Normal	

Lanes

Arm	Traffic Stream	Lane	Name	Description	Use RR67	Surface condition	Site quality factor	Gradient (%)	Width (m)	Use connector turning radius	Proportion that turn (%)	Turning radius (m)	Nearside lane	Saturation flow (PCU/hr)
1	1	1	(untitled)		✓	N/A	N/A	0	3.50	✓	0	99999.00	✓	1965
2	2	1	(untitled)		✓	N/A	N/A	0	3.50	✓	0	99999.00		2105
	3	1	(untitled)		✓	N/A	N/A	0	3.50		0	100.00		2105
3	2	1	(untitled)		✓	N/A	N/A	0	3.60		100	10.00	✓	1717
6	1	1	(untitled)											
7	1	1	(untitled)											
8	2	1	(untitled)											
	3	1	(untitled)		✓	N/A	N/A	0	3.50		0	100.00		2105
10	2	1	(untitled)											
	3	1	(untitled)		✓	N/A	N/A	0	3.50		0	100.00		2105
11	1	1	(untitled)											
12	1	1	(untitled)		✓	N/A	N/A	0	3.50		0	10.00		2105
13	2	1	(untitled)		✓	N/A	N/A	0	3.00		100	10.00	✓	1665
14	1	1	(untitled)		✓	N/A	N/A	0	3.50	✓	0	99999.00	✓	1965
15	1	1	(untitled)											
16	1	1	(untitled)		✓	N/A	N/A	0	3.00		0	10.00	✓	1915

Modelling

Arm	Traffic Stream	Traffic model	Stop weighting multiplier (%)	Delay weighting multiplier (%)	Assignment Cost Weighting (%)	Exclude from results calculation	Max queue storage (PCU)	Has queue limit	Queue limit (PCU)	Excess queue penalty (£)	Has degree of saturation limit
1	1	NetworkDefault	100	100	100		0.00				
2	2	Flare	100	100	100		0.00				
	3	Flare	100	100	100		0.00				
3	2	NetworkDefault	100	100	100		0.00				
6	1	NetworkDefault	100	100	100		0.00				
7	1	NetworkDefault	100	100	100		0.00				
8	2	Flare	100	100	100		0.00				
	3	CTM	100	100	100		0.00				
10	2	Flare	100	100	100		0.00				
	3	Flare	100	100	100		0.00				
11	1	NetworkDefault	100	100	100		0.00				
12	1	Flare	100	100	100		3.00	✓	3.00	500.00	
13	2	NetworkDefault	100	100	100		0.00				
14	1	NetworkDefault	100	100	100		0.00				
15	1	NetworkDefault	100	100	100		0.00				
16	1	Flare	100	100	100		1.00	✓	1.00	500.00	

Modelling - Advanced

Arm	Traffic Stream	Initial queue (PCU)	Type of Vehicle-in-Service	Vehicle-in-Service	Type of random parameter	Random parameter	Auto cycle time	Cycle time
(ALL)	(ALL)	0.00	NetworkDefault	Not-Included	NetworkDefault	0.50	✓	75

Normal traffic - Modelling

Arm	Traffic Stream	Stop weighting (%)	Delay weighting (%)
(ALL)	(ALL)	100	100

Normal traffic - Advanced

Arm	Traffic Stream	Dispersion type for Normal Traffic
(ALL)	(ALL)	NetworkDefault

Flows

Arm	Traffic Stream	Total Flow (PCU/hr)	Normal Flow (PCU/hr)
1	1	1135	1135
2	2	1118	1118
	3	17	17
3	2	254	254
6	1	683	683
7	1	84	84
8	2	328	328
	3	1005	1005
10	2	67	67
	3	644	644
11	1	479	479
12	1	17	17
13	2	121	121
14	1	751	751
15	1	1015	1015
16	1	151	151

Signals

Arm	Traffic Stream	Controller stream	Phase	Second phase enabled
2	2	1	A	
	3	1	A	
3	2	1	C	
8	3	2	A	
10	3	1	B	
13	2	2	C	
14	1	2	B	

Entry Sources

Arm	Traffic Stream	Cruise time for Normal Traffic (s)	Cruise speed for Normal Traffic (kph)
(ALL)	(ALL)	24.00	30.00

Sources

Arm	Traffic Stream	Source	Source traffic stream	Destination traffic stream	Cruise time for Normal Traffic (s)	Cruise speed for Normal Traffic (kph)	Auto turning radius	Traffic turn style	Turning radius (m)
2	2	1	1/1	2/2	5.40	30.00	✓	Straight	Straight Movement
	3	1	1/1	2/3	5.40	30.00	✓	Straight	Straight Movement
6	1	1	3/2	6/1	24.00	30.00	✓	Straight	Straight Movement
7	1	1	10/2	7/1	24.00	30.00	✓	Nearside	69.87
8	2	1	3/2	8/2	4.44	30.00	✓	Straight	Straight Movement
	3	1	3/2	8/3	4.44	30.00	✓	Straight	Straight Movement
10	2	1	13/2	10/2	2.40	30.00	✓	Straight	Straight Movement
	3	1	14/1	10/3	3.84	30.00	✓	Straight	Straight Movement
11	1	1	16/1	11/1	24.00	30.00	✓	Offside	82.53
12	1	1	2/3	12/1	2.04	30.00	✓	Straight	Straight Movement
15	1	1	13/2	15/1	51.53	30.00	✓	Nearside	80.02
16	1	1	14/1	16/1	1.08	30.00	✓	Straight	Straight Movement
6	1	2	10/3	6/1	24.00	30.00	✓	Straight	Straight Movement
7	1	2	12/1	7/1	24.00	30.00	✓	Offside	6.00
8	2	2	2/2	8/2	4.44	30.00	✓	Straight	Straight Movement
	3	2	2/2	8/3	4.44	30.00	✓	Straight	Straight Movement
10	2	2	14/1	10/2	2.40	30.00	✓	Straight	Straight Movement
	3	2	13/2	10/3	3.84	30.00	✓	Straight	Straight Movement
11	1	2	8/2	11/1	24.00	30.00	✓	Straight	Straight Movement
15	1	2	8/3	15/1	51.53	30.00	✓	Straight	Straight Movement

Give Way Data

Arm	Traffic Stream	Opposed traffic	Use Step-wise Opposed Turn Model	Visibility restricted
(ALL)	(ALL)	AllTraffic		

Give Way Data - All Movements - Conflicts

Traffic Stream	Description	Controlling type	Controlling traffic stream	Percentage opposing (%)	Slope coefficient	Upstream signals visible	Conflict shift	Conflict duration
2		TrafficStream	16/1	100	0.29		0	0
		TrafficStream	12/1	100	0.28		0	0
1		TrafficStream	10/2	100	1.09		0	0
		TrafficStream	8/2	100	1.09		0	0
		TrafficStream	8/3	100	1.09		0	0

Local OD Matrix - Local Matrix: 1

Local Matrix Options

OD Matrix	Name	Use for point to point table	Auto calculate	Allocation mode	Allow paths past exit locations	Allow looped paths on arms	Allow looped paths on traffic nodes	Copy flows	Matrix to copy flows from	Limit paths by length	Path length limit multiplier	Limit paths by number	Path number limit
1	(untitled)	✓	✓	Path Equalisation			✓			✓	1.25		

Normal Input Flows (PCU/hr)

		To			
		1	2	3	4
From	1	0	139	979	17
	2	94	0	10	17
	3	550	151	0	50
	4	39	189	26	0

Bus Input Flows not shown as they are blank.

Tram Input Flows not shown as they are blank.

Pedestrian Input Flows not shown as they are blank.

Locations

OD Matrix	Location	Name	Entries	Exits	Colour
1	1	(untitled)	1/1	6/1	#0000FF
	2	(untitled)	13/2	11/1	#00FF00
	3	(untitled)	14/1	15/1	#FFFF00
	4	(untitled)	3/2	7/1	#FFFF00

Normal Paths and Flows

OD Matrix	Path	Description	From location	To location	Path items	Allocation type	Normal Calculated Flow (PCU/hr)
1	10		4	1	3/2, 6/1	Normal	39
	11		4	2	3/2, 8/2, 11/1	Normal	189
	12		1	3	1/1, 2/2, 8/3, 15/1	Normal	979
	13		3	1	14/1, 10/3, 6/1	Normal	550
	15		2	4	13/2, 10/2, 7/1	Normal	17
	16		3	4	14/1, 10/2, 7/1	Normal	50
	17		3	2	14/1, 16/1, 11/1	Normal	151
	19		2	3	13/2, 15/1	Normal	10
	20		4	3	3/2, 8/3, 15/1	Normal	26
	21		1	4	1/1, 2/3, 12/1, 7/1	Normal	17
	22		2	1	13/2, 10/3, 6/1	Normal	94
	23		1	2	1/1, 2/2, 8/2, 11/1	Normal	139

Signal Timings

Network Default: 75s cycle time; 75 steps

Controller Stream 1

Controller Stream	Name	Description	Use sequence	Cycle time source	Cycle time (s)
1	(untitled)		1	NetworkDefault	75

Controller Stream 1 - Properties

Controller Stream	Manufacturer name	Type	Model number	(Telephone) Line Number	Site number	Grid reference	Gaining delay type
1	Unspecified						Absolute

Controller Stream 1 - Optimisation

Controller Stream	Allow offset optimisation	Allow green split optimisation	Optimisation level	Auto redistribute	Enable stage constraint
1	✓	✓	Offsets Only		

Phases

Controller Stream	Phase	Name	Minimum green (s)	Maximum green (s)	Relative start displacement (s)	Relative end displacement (s)	Type
1	(ALL)	(untitled)	7	300	0	0	Traffic

Library Stages

Controller Stream	Library Stage	Phases in stage	User stage minimum (s)
1	1	A, B	1
	2	C	1

Losing / Gaining Phase Delays

Controller Stream	Delay	Type	Phase	From stage	To stage	Relative delay
1	1	Losing	A	1	2	1

Stage Sequences

Controller Stream	Sequence	Name	Multiple cycling	Stage IDs	Stage ends
1	1	(untitled)	Single	1, 2	20, 37

Intergreen Matrix for Controller Stream 1

		To		
		A	B	C
From	A			5
	B			6
	C	6	5	

Banned Stage transitions for Controller Stream 1

		To	
		1	2
From	1		
	2		

Interstage Matrix for Controller Stream 1

		To	
		1	2
From	1	0	6
	2	6	0

Resultant Stages

Controller Stream	Resultant Stage	Is base stage	Library Stage ID	Phases in this stage	Stage start (s)	Stage end (s)	Stage duration (s)	User stage minimum (s)	Stage minimum (s)
1	1	✓	1	A,B	43	20	52	1	6
	2	✓	2	C	26	37	11	1	7

Resultant Phase Green Periods

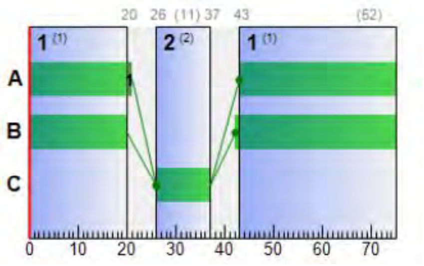
Controller Stream	Phase	Green period	Is base green period	Start time (s)	End time (s)	Duration (s)
	A	1	✓	43	21	53

1	B	1	✓	42	20	53
	C	1	✓	26	37	11

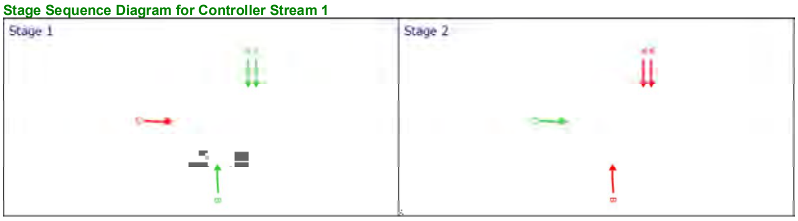
Traffic Stream Green Times

Arm	Traffic Stream	Traffic Node	Controller Stream	Phase	Green Period 1		
					Start	End	Duration
2	2		1	A	43	21	53
2	3		1	A	43	21	53
3	2		1	C	26	37	11
10	3		1	B	42	20	53

Phase Timings Diagram for Controller Stream 1



Stage Sequence Diagram for Controller Stream 1



Controller Stream 2

Controller Stream	Name	Description	Use sequence	Cycle time source	Cycle time (s)
2	(untitled)		1	NetworkDefault	75

Controller Stream 2 - Properties

Controller Stream	Manufacturer name	Type	Model number	(Telephone) Line Number	Site number	Grid reference	Gaining delay type
2	Unspecified						Absolute

Controller Stream 2 - Optimisation

Controller Stream	Allow offset optimisation	Allow green split optimisation	Optimisation level	Auto redistribute	Enable stage constraint
2	✓	✓	Offsets Only		

Phases

Controller Stream	Phase	Name	Minimum green (s)	Maximum green (s)	Relative start displacement (s)	Relative end displacement (s)	Type
2	(ALL)	(untitled)	7	300	0	0	Traffic

Library Stages

Controller Stream	Library Stage	Phases in stage	User stage minimum (s)
2	1	A, B	1
	2	C	1

Losing / Gaining Phase Delays

Controller Stream	Delay	Type	Phase	From stage	To stage	Relative delay
2	1	Losing	B	1	2	7

Stage Sequences

Controller Stream	Sequence	Name	Multiple cycling	Stage IDs	Stage ends
2	1	(untitled)	Single	1, 2	10, 30

Intergreen Matrix for Controller Stream 2

		To		
		A	B	C
From	A			6
	B			6
	C	6	6	

Banned Stage transitions for Controller Stream 2

		To	
		1	2
From	1		
	2		

Interstage Matrix for Controller Stream 2

		To	
		1	2
From	1	0	13
	2	6	0

Resultant Stages

Controller Stream	Resultant Stage	Is base stage	Library Stage ID	Phases in this stage	Stage start (s)	Stage end (s)	Stage duration (s)	User stage minimum (s)	Stage minimum (s)
2	1	✓	1	A,B	36	10	49	1	7
	2	✓	2	C	23	30	7	1	7

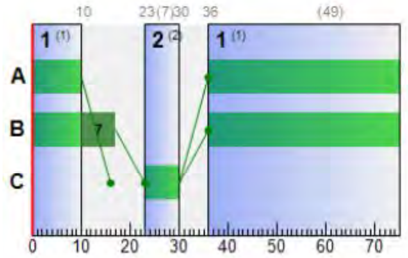
Resultant Phase Green Periods

Controller Stream	Phase	Green period	Is base green period	Start time (s)	End time (s)	Duration (s)
2	A	1	✓	36	10	49
	B	1	✓	36	17	56
	C	1	✓	23	30	7

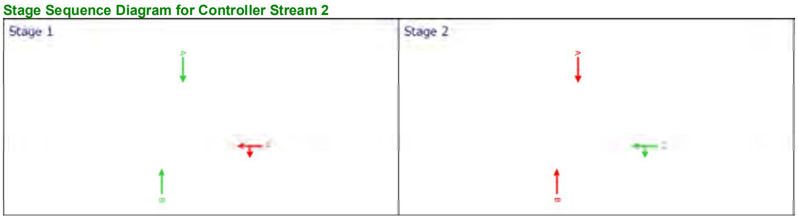
Traffic Stream Green Times

Arm	Traffic Stream	Traffic Node	Controller Stream	Phase	Green Period 1		
					Start	End	Duration
8	3		2	A	36	10	49
13	2		2	C	23	30	7
14	1		2	B	36	17	56

Phase Timings Diagram for Controller Stream 2



Stage Sequence Diagram for Controller Stream 2



Resultant penalties

Time Segment	Controller stream	Phase min max penalty (£ per hr)	Intergreen broken penalty (£ per hr)	Stage constraint broken penalty (£ per hr)	Cost of controller stream penalties (£ per hr)
08:00-09:00	(ALL)	0.00	0.00	0.00	0.00

Traffic Stream Results

Traffic Stream Results: Vehicle summary

Time Segment	Arm	Traffic Stream	Degree of saturation (%)	Practical reserve capacity (%)	Calculated flow entering (PCU/hr)	Calculated sat flow (PCU/hr)	Actual green (s (per cycle))	Mean Delay per Veh (s)	Mean max queue (PCU)	Utilised storage (%)	Weighted cost of delay (£ per hr)	Weighted cost of stops (£ per hr)	Performance Index (£ per hr)
08:00-09:00	1	1	67	35	1135	1965	75	3.60	8.24	23.69	16.12	4.03	20.16
	2	2	74	22	1118	2105	53	8.18	8.27	105.73	36.07	4.97	41.04
		3	1	7924	17	2105	53	3.09	0.10	1.27	0.21	0.06	0.27
	3	2	92	-3	254	1717	11	85.99	9.03	25.95	86.16	5.00	91.16
	6	1	0	Unrestricted	683	Unrestricted	75	0.00	0.00	0.00	0.00	0.00	0.00
	7	1	0	Unrestricted	84	Unrestricted	75	0.00	0.00	0.00	0.00	0.00	0.00
	8	2	47	92	328	700	75	4.75	3.12	48.53	6.15	1.13	7.28
		3	72	26	1005	2105	49	7.50	5.52	85.74	29.75	3.32	33.06
	10	2	8	1048	67	855	75	0.18	0.00	0.11	0.05	0.00	0.05
		3	43	112	644	2105	53	4.03	4.46	80.08	10.24	2.68	12.92
	11	1	0	Unrestricted	479	Unrestricted	75	0.00	0.00	0.00	0.00	0.00	0.00
	12	1	1	7131	17	1366	75	0.02	0.00	0.00	0.00	0.00	0.00
	13	2	68	32	121	1665	7	52.95	3.11	8.95	25.27	1.82	27.09
	14	1	93	-3	751	1965	56	33.59	12.60	36.23	99.50	11.14	110.64
	15	1	0	Unrestricted	1015	Unrestricted	75	0.00	0.00	0.00	0.00	0.00	0.00
	16	1	33	173	151	458	75	13.61	1.08	108.08	8.11	1.48	17.99

Traffic Stream Results: Flows and signals

Time Segment	Arm	Traffic Stream	Calculated flow entering (PCU/hr)	Calculated flow out (PCU/hr)	Flow discrepancy (PCU/hr)	Adjusted flow warning	Calculated sat flow (PCU/hr)	Calculated capacity (PCU/hr)	Degree of saturation (%)	DOS Threshold exceeded	Practical reserve capacity (%)	Mean modulus of error	Actual green (s (per cycle))
08:00-09:00	1	1	1135	1135	0		1965	1696	67		35	0.00	75
	2	2	1118	1118	0		2105	1516	74		22	0.23	53
		3	17	17	0		2105	1516	1		7924	0.23	53
	3	2	254	254	0		1717	275	92	✓	-3	0.00	11
	6	1	683	683	0		Unrestricted	Unrestricted	0		Unrestricted	0.52	75
	7	1	84	84	0		Unrestricted	Unrestricted	0		Unrestricted	0.27	75
	8	2	328	328	0		700	700	47		92	0.84	75
		3	1005	1005	0		2105	1403	72		26	0.53	49
	10	2	67	67	0		855	855	8		1048	0.73	75
		3	644	644	0		2105	1516	43		112	0.83	53
	11	1	479	479	0		Unrestricted	Unrestricted	0		Unrestricted	0.33	75
	12	1	17	17	0		1366	1366	1		7131	0.73	75
	13	2	121	121	0		1665	178	68		32	0.00	7
	14	1	751	751	0		1965	808	93	✓	-3	0.00	56
	15	1	1015	1015	0		Unrestricted	Unrestricted	0		Unrestricted	0.36	75
	16	1	151	151	0		458	458	33		173	0.93	75

Traffic Stream Results: Stops and delays

Time Segment	Arm	Traffic Stream	Mean Cruise Time per Veh (s)	Mean Delay per Veh (s)	Total delay (PCU-hr/hr)	Weighted cost of delay (£ per hr)	Mean stops per Veh (%)	Total stops (Stops per hr)	Weighted cost of stops (£ per hr)
	1	1	24.00	3.60	1.14	16.12	28.33	321.57	4.03
	2	2	5.40	8.18	2.54	36.07	35.48	396.62	4.97

08:00-09:00		3	5.40	3.09	0.01	0.21	28.02	4.76	0.06
	3	2	24.00	85.99	6.07	86.16	157.01	398.81	5.00
	6	1	24.00	0.00	0.00	0.00	0.00	0.00	0.00
	7	1	24.00	0.00	0.00	0.00	0.00	0.00	0.00
	8	2	4.44	4.75	0.43	6.15	27.56	90.40	1.13
		3	4.44	7.50	2.09	29.75	26.31	264.39	3.32
	10	2	2.40	0.18	0.00	0.05	0.00	0.00	0.00
		3	3.84	4.03	0.72	10.24	33.17	213.66	2.68
	11	1	24.00	0.00	0.00	0.00	0.00	0.00	0.00
	12	1	2.04	0.02	0.00	0.00	0.00	0.00	0.00
	13	2	24.00	52.95	1.78	25.27	119.93	145.12	1.82
	14	1	24.00	33.59	7.01	99.50	118.28	888.67	11.14
	15	1	51.53	0.00	0.00	0.00	0.00	0.00	0.00
	16	1	1.08	13.61	0.57	8.11	78.12	118.02	1.48

Traffic Stream Results: Queues and blocking

Time Segment	Arm	Traffic Stream	Initial queue (PCU)	Mean max queue (PCU)	Max queue storage (PCU)	Utilised storage (%)	Excess queue penalty (£ per hr)	Wasted time total (s (per cycle))	Estimated blocking
08:00-09:00	1	1	0.00	8.24	34.78	23.69	0.00	10.25	
	2	2	0.00	8.27	7.83	105.73	0.00	0.00	
		3	0.00	0.10	7.83	1.27	0.00	53.00	
	3	2	0.00	9.03	34.78	25.95	0.00	0.00	
	6	1	0.00	0.00	34.78	0.00	0.00	0.00	
	7	1	0.00	0.00	34.78	0.00	0.00	15.00	
	8	2	0.00	3.12	6.43	48.53	0.00	4.00	
		3	0.00	5.52	6.43	85.74	0.00	3.00	
	10	2	0.00	0.00	3.00	0.11	0.00	35.00	
		3	0.00	4.46	5.57	80.08	0.00	16.00	
	11	1	0.00	0.00	34.78	0.00	0.00	0.00	
	12	1	0.00	0.00	3.00	0.00	0.00	73.00	
	13	2	0.00	3.11	34.78	8.95	0.00	0.00	
	14	1	0.00	12.60	34.78	36.23	0.00	26.43	
	15	1	0.00	0.00	74.68	0.00	0.00	0.00	
	16	1	0.00	1.08	1.00	108.08	8.40	17.00	

Traffic Stream Results: Flare

Time Segment	Arm	Traffic Stream	Flare present	Flare components	Degree of saturation (%)	Mean max queue (PCU)	Calculated capacity (PCU/hr)	Practical reserve capacity (%)
08:00-09:00	1	1	✓	CTM flare: 1/1,2/2,2/3	74	16.61	1526	21

Traffic Stream Results: Advanced

Time Segment	Arm	Traffic Stream	Degree of saturation penalty (£ per hr)	Ped gap accepting penalty (£ per hr)	Warmed up	Mean Max Queue EoTS (PCU)	Max End of Green Queue EoTS (PCU)	Max End of Red Queue EoTS (PCU)	PCU Factor	Cost of traffic penalties (£ per hr)	Performance Index (£ per hr)
08:00-09:00	1	1	0.00	0.00	✓	8.24			1.00	0.00	20.16
	2	2	0.00	0.00	✓	8.28	1.03	8.26	1.00	0.00	41.04
		3	0.00	0.00	✓	0.10	0.00	0.10	1.00	0.00	0.27
	3	2	0.00	0.00	✓	9.64	4.49	8.94	1.00	0.00	91.16
	6	1	0.00	0.00		0.00			1.00	0.00	0.00
	7	1	0.00	0.00		0.00			1.00	0.00	0.00
	8	2	0.00	0.00	✓	3.12			1.00	0.00	7.28
		3	0.00	0.00	✓	5.52	0.90	5.42	1.00	0.00	33.06
	10	2	0.00	0.00		0.00			1.00	0.00	0.05
		3	0.00	0.00		4.46	0.16	4.10	1.00	0.00	12.92
	11	1	0.00	0.00	✓	0.00			1.00	0.00	0.00
	12	1	0.00	0.00	✓	0.00			1.00	0.00	0.00
	13	2	0.00	0.00	✓	3.13	0.71	2.96	1.00	0.00	27.09
	14	1	0.00	0.00		13.05	5.68	9.44	1.00	0.00	110.64
	15	1	0.00	0.00	✓	0.00			1.00	0.00	0.00
	16	1	0.00	0.00		1.08			1.00	8.40	17.99

Network Results

Run Summary

Analysis set used	Run start time	Run finish time	Modelling start time (HH:mm)	Network Cycle Time (s)	Performance Index (£ per hr)	Total network delay (PCU-hr/hr)	Highest DOS (%)	Item with highest DOS	Number of oversaturated items	Percentage of oversaturated items (%)	Item with worst signalised PRC	Item with worst unsignalised PRC	Item with worst overall PRC	Network within capacity
7	14/06/2019 14:01:57	14/06/2019 14:01:58	08:00	75	361.67	22.37	93.00	14/1	2	12	14/1	1/1	14/1	

Network Results: Vehicle summary

Time Segment	Degree of saturation (%)	Practical reserve capacity (%)	Calculated flow entering (PCU/hr)	Actual green (s (per cycle))	Mean Delay per Veh (s)	Weighted cost of delay (£ per hr)	Weighted cost of stops (£ per hr)	Performance Index (£ per hr)
08:00-09:00	93	-3	7870	957	10.23	317.63	35.63	361.67

Network Results: Flows and signals

Time Segment	Calculated flow entering (PCU/hr)	Calculated flow out (PCU/hr)	Flow discrepancy (PCU/hr)	Adjusted flow warning	Degree of saturation (%)	DOS Threshold exceeded	Practical reserve capacity (%)	Actual green (s (per cycle))
08:00-09:00	7870	7870	-1		93	✓	-3	957

Network Results: Stops and delays

Time Segment	Mean Cruise Time per Veh (s)	Mean Delay per Veh (s)	Total delay (PCU-hr/hr)	Weighted cost of delay (£ per hr)	Mean stops per Veh (%)	Total stops (Stops per hr)	Weighted cost of stops (£ per hr)
08:00-09:00	19.23	10.23	22.37	317.63	36.11	2842.02	35.63

Network Results: Queues and blocking

Time Segment	Utilised storage (%)	Excess queue penalty (£ per hr)	Wasted time total (s (per cycle))
08:00-09:00	108.08	8.40	252.68

Network Results: Advanced

Time Segment	Degree of saturation penalty (£ per hr)	Ped gap accepting penalty (£ per hr)	Warmed up	PCU Factor	Cost of traffic penalties (£ per hr)	Controller stream penalties (£ per hr)	Performance Index (£ per hr)

08:00-09:00	0.00	0.00		1.00	8.40	0.00	361.67

Point to Point Journey Time

Average Journey Time (s) for Local Matrix: 1

		To			
		1	**2**	**3**	**4**
From	**1**	0.0	72.1	104.6	62.2
	2	120.6	0.0	128.5	103.5
	3	87.4	96.3	0.0	84.2
	4	134.0	144.9	177.0	0.0

Path Journey Time

Path	From Location	To Location	Normal Calculated Flow (PCU/hr)	Normal journey time (s)	Calculated Total Flow (PCU/hr)	Avg journey time (s)
10	4	1	39	133.99	39	133.99
11	4	2	189	144.89	189	144.89
12	1	3	979	104.56	979	104.56
13	3	1	550	87.45	550	87.45
15	2	4	17	103.53	17	103.53
16	3	4	50	84.17	50	84.17
17	3	2	151	96.28	151	96.28
19	2	3	10	128.48	10	128.48
20	4	3	26	177.03	26	177.03
21	1	4	17	62.15	17	62.15
22	2	1	94	120.59	94	120.59
23	1	2	139	72.06	139	72.06

Final Prediction Table

Traffic Stream Results

				SIGNALS		FLOWS		PERFORMANCE				PER PCU			QUEUES	WEIGHTS		PENALTIES	P.I.
Arm	Traffic Stream	Name	Traffic node	Controller stream	Phase	Calculated flow entering (PCU/hr)	Calculated sat flow (PCU/hr)	Actual green (s (per cycle))	Wasted time total (s (per cycle))	Degree of saturation (%)	Practical reserve capacity (%)	JourneyTime (s)	Mean Delay per Veh (s)	Mean stops per Veh (%)	Mean max queue (PCU)	Delay weighting multiplier (%)	Stop weighting multiplier (%)	Cost of traffic penalties (£ per hr)	P.I.
1	**1**	(untitled)				1135	1965	75	10.25	67	35	27.60	3.60	28.33	8.24	100	100	0.00	20.16
2	**2**	(untitled)		1	A	1118 <	2105	53	0.00	74	22	13.58	8.18	35.48	8.27 +	100	100	0.00	41.04
	3			1	A	17	2105	53	53.00	1	7924	8.49	3.09	28.02	0.10	100	100	0.00	0.27
3	**2**	(untitled)		1	C	254	1717	11	0.00	92	-3	109.99	85.99	157.01	9.03	100	100	0.00	91.16
6	**1**	(untitled)				683	Unrestricted	75	0.00	0	Unrestricted	24.00	0.00	0.00	0.00	100	100	0.00	0.00
7	**1**	(untitled)				84	Unrestricted	75	15.00	0	Unrestricted	24.00	0.00	0.00	0.00	100	100	0.00	0.00
8	**2**	(untitled)				328	700	75	4.00	47	92	9.19	4.75	27.56	3.12	100	100	0.00	7.28
	3			2	A	1005	2105	49	3.00	72	26	11.94	7.50	26.31	5.52	100	100	0.00	33.06
10	**2**	(untitled)				67	855	75	35.00	8	1048	2.58	0.18	0.00	0.00	100	100	0.00	0.05
	3			1	B	644	2105	53	16.00	43	112	7.87	4.03	33.17	4.46	100	100	0.00	12.92
11	**1**	(untitled)				479	Unrestricted	75	0.00	0	Unrestricted	24.00	0.00	0.00	0.00	100	100	0.00	0.00
12	**1**					17	1366	75	73.00	1	7131	2.06	0.02	0.00	0.00	100	100	0.00	0.00
13	**2**	(untitled)		2	C	121	1665	7	0.00	68	32	76.95	52.95	119.93	3.11	100	100	0.00	27.09
14	**1**	(untitled)		2	B	751	1965	56	26.43	93	-3	57.59	33.59	118.28	12.60	100	100	0.00	110.64
15	**1**	(untitled)				1015	Unrestricted	75	0.00	0	Unrestricted	51.53	0.00	0.00	0.00	100	100	0.00	0.00
16	**1**					151 <	458	75	17.00	33	173	14.69	13.61	78.12	1.08 +	100	100	8.40	17.99

Network Results

	Distance travelled (PCU-km/hr)	Time spent (PCU-hr/hr)	Mean journey speed (kph)	Total delay (PCU-hr/hr)	Weighted cost of delay (£ per hr)	Weighted cost of stops (£ per hr)	Excess queue penalty (£ per hr)	Performance Index (£ per hr)
Normal traffic	1261.30	64.41	19.58	22.37	317.63	35.63	8.40	361.67
Bus	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tram	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pedestrians								
TOTAL	1261.30	64.41	19.58	22.37	317.63	35.63	8.40	361.67

- *< = adjusted flow warning (upstream links/traffic streams are over-saturated)*
- ** = Traffic Stream - Normal, Bus or Tram Stop or Delay weighting has been set to a value other than 100%*
- *^ = Traffic Stream - Normal, Bus or Tram Stop or Delay Path weighting has been set to a value other than 100%*
- *+ = average link/traffic stream excess queue is greater than 0*
- ***P.I. = PERFORMANCE INDEX***

A8 - 2031 DS1 PM
D8 - 2031 DS1 PM*

Summary

Data Errors and Warnings

No errors or warnings

Run Summary

Analysis set used	Run start time	Run finish time	Modelling start time (HH:mm)	Network Cycle Time (s)	Performance Index (£ per hr)	Total network delay (PCU-hr/hr)	Highest DOS (%)	Item with highest DOS	Number of oversaturated items	Percentage of oversaturated items (%)	Item with worst signalised PRC	Item with worst unsignalised PRC	Item with worst overall PRC	Network within capacity
8	14/06/2019 14:01:58	14/06/2019 14:01:58	17:00	75	227.18	14.11	88.17	14/1	0	0	14/1	1/1	14/1	✓

Analysis Set Details

Name	Description	Demand set	Include in report	Locked
2031 DS1 PM		D8	✓	

Demand Set Details

Name	Description	Composite	Demand sets	Start time (HH:mm)	Locked
2031 DS1 PM				17:00	

Network Options

Network timings

Network cycle time (s)	Restrict to SCOOT cycle times	Time segment length (min)	Number of time segments	Modelled time period (min)
75		60	1	60

Signals options

Start displacement (s)	End displacement (s)
2	3

Advanced

Phase minimum broken penalty (£)	Phase maximum broken penalty (£)	Intergreen broken penalty (£)	Starting Red-with-Amber (s)
10000.00	10000.00	10000.00	2

Traffic options

Traffic model	Vehicle flow scaling factor (%)	Pedestrian flow scaling factor (%)	Cruise times or speeds
Platoon Dispersion (PDM)	100	100	Cruise Speeds

Advanced

Resolution	DOS Threshold (%)	Cruise scaling factor (%)	Use link stop weightings	Use link delay weightings	Exclude pedestrians from results calculation	Random delay mode	Type of Vehicle-in-Service	Type of random parameter	PCU Length (m)	Calculate results for Path Segments	Generate PDM Profile Data
1	90	100	✓	✓		Complex	Uniform (TRANSYT)	Uniform (TRANSYT)	5.75		✓

Normal Traffic parameters

Dispersion type	Dispersion coefficient	Travel time coefficient
Default	35	80

Normal Traffic Types

Name	PCU Factor
Normal	1.00

Bus parameters

Name	PCU Factor	Dispersion type	Acceleration (ms^[-2])	Stationary time coefficient	Cruise time coefficient
Bus	1.00	Default	0.94	30	85

Tram parameters

Name	PCU Factor	Dispersion type	Acceleration (ms^[-2])	Stationary time coefficient	Cruise time coefficient
Tram	1.00	Default	0.94	100	100

Pedestrian parameters

Dispersion type
Default

Optimisation options

Enable optimisation	Auto redistribute	Optimisation level	Enable OUT Profile accuracy
✓		Offsets Only	✓

Advanced

Optimisation type	Hill climb increments	OUTProfile accuracy	Use enhanced optimisation	Auto optimisation order	Optimisation order	Master controller	Offsets relative to master controller	Master controller offset after each run
Hill Climb (Fast)	15, 40, 15, 40, 15, 1, 1	50, 50, 5, 5, 0.5, 0.05, 0.05		✓	1, 2			Do nothing

Economics

Vehicle Monetary Value Of Delay (£ per PCU-hr)	Vehicle Monetary Value Of Stops (£ per 100 stops)	Pedestrian monetary value of delay (£ per Ped-hr)
14.20	2.60	14.20

Arms and Traffic Streams

Arms

Arm	Name	Description	Traffic node
1	(untitled)		
2	(untitled)		
3	(untitled)		
6	(untitled)		
7	(untitled)		
8	(untitled)		
10	(untitled)		
11	(untitled)		
12			
13	(untitled)		
14	(untitled)		
15	(untitled)		
16			

Traffic Streams

Arm	Traffic Stream	Name	Description	Auto length	Length (m)	Has Saturation Flow	Saturation flow source	Saturation flow (PCU/hr)	Auto-calculate cell saturation flow	Cell saturation flow (PCU/hr)	Is signal controlled	Is give way	Traffic type	Allow Nearside Turn On Red
1	1	(untitled)			200.00	✓	Sum of lanes	1965					Normal	
2	2	(untitled)			45.00	✓	Sum of lanes	2105		2105	✓		Normal	
	3				45.00	✓	Sum of lanes	2105		2105	✓		Normal	
3	2	(untitled)			200.00	✓	Sum of lanes	1717			✓		Normal	
6	1	(untitled)			200.00								Normal	
7	1	(untitled)			200.00								Normal	
8	2	(untitled)			37.00				✓	1800		✓	Normal	
	3				37.00	✓	Sum of lanes	2105		2105	✓		Normal	
10	2	(untitled)			20.00							✓	Normal	
	3				32.00	✓	Sum of lanes	2105		2105	✓		Normal	
11	1	(untitled)			200.00								Normal	
12	1				17.00	✓	Sum of lanes	1830				✓	Normal	
13	2	(untitled)			200.00	✓	Sum of lanes	1665			✓		Normal	
14	1	(untitled)			200.00	✓	Sum of lanes	1965			✓		Normal	
15	1	(untitled)		✓	429.39								Normal	
16	1				9.00	✓	Sum of lanes	1665				✓	Normal	

Lanes

Arm	Traffic Stream	Lane	Name	Description	Use RR67	Surface condition	Site quality factor	Gradient (%)	Width (m)	Use connector turning radius	Proportion that turn (%)	Turning radius (m)	Nearside lane	Saturation flow (PCU/hr)
1	1	1	(untitled)		✓	N/A	N/A	0	3.50	✓	0	99999.00	✓	1965
2	2	1	(untitled)		✓	N/A	N/A	0	3.50	✓	0	99999.00		2105
	3	1	(untitled)		✓	N/A	N/A	0	3.50		0	100.00		2105
3	2	1	(untitled)		✓	N/A	N/A	0	3.60		100	10.00	✓	1717
6	1	1	(untitled)											
7	1	1	(untitled)											
8	2	1	(untitled)											
	3	1	(untitled)		✓	N/A	N/A	0	3.50		0	100.00		2105
10	2	1	(untitled)											
	3	1	(untitled)		✓	N/A	N/A	0	3.50		0	100.00		2105
11	1	1	(untitled)											
12	1	1	(untitled)		✓	N/A	N/A	0	3.50		100	10.00		1830
13	2	1	(untitled)		✓	N/A	N/A	0	3.00		100	10.00	✓	1665
14	1	1	(untitled)		✓	N/A	N/A	0	3.50	✓	0	99999.00	✓	1965
15	1	1	(untitled)											
16	1	1	(untitled)		✓	N/A	N/A	0	3.00		100	10.00	✓	1665

Modelling

Arm	Traffic Stream	Traffic model	Stop weighting multiplier (%)	Delay weighting multiplier (%)	Assignment Cost Weighting (%)	Exclude from results calculation	Max queue storage (PCU)	Has queue limit	Queue limit (PCU)	Excess queue penalty (£)	Has degree of saturation limit
1	1	NetworkDefault	100	100	100		0.00				
2	2	Flare	100	100	100		0.00				
	3	Flare	100	100	100		0.00				
3	2	NetworkDefault	100	100	100		0.00				
6	1	NetworkDefault	100	100	100		0.00				
7	1	NetworkDefault	100	100	100		0.00				
8	2	Flare	100	100	100		0.00				
	3	CTM	100	100	100		0.00				
10	2	Flare	100	100	100		0.00				
	3	Flare	100	100	100		0.00				
11	1	NetworkDefault	100	100	100		0.00				
12	1	Flare	100	100	100		3.00	✓	3.00	500.00	
13	2	NetworkDefault	100	100	100		0.00				
14	1	NetworkDefault	100	100	100		0.00				
15	1	NetworkDefault	100	100	100		0.00				
16	1	Flare	100	100	100		1.00	✓	1.00	500.00	

Modelling - Advanced

Arm	Traffic Stream	Initial queue (PCU)	Type of Vehicle-in-Service	Vehicle-in-Service	Type of random parameter	Random parameter	Auto cycle time	Cycle time
(ALL)	(ALL)	0.00	NetworkDefault	Not-Included	NetworkDefault	0.50	✓	75

Normal traffic - Modelling

Arm	Traffic Stream	Stop weighting (%)	Delay weighting (%)
(ALL)	(ALL)	100	100

Normal traffic - Advanced

Arm	Traffic Stream	Dispersion type for Normal Traffic
(ALL)	(ALL)	NetworkDefault

Flows

Arm	Traffic Stream	Total Flow (PCU/hr)	Normal Flow (PCU/hr)
1	1	541	541
2	2	514	514
	3	27	27
3	2	200	200
6	1	1018	1018
7	1	160	160
8	2	105	105
	3	586	586
10	2	133	133
	3	995	995
11	1	241	241
12	1	27	27
13	2	197	197
14	1	1155	1155
15	1	674	674
16	1	136	136

Signals

Arm	Traffic Stream	Controller stream	Phase	Second phase enabled
2	2	1	A	
	3	1	A	
3	2	1	C	
8	3	2	A	
10	3	1	B	
13	2	2	C	
14	1	2	B	

Entry Sources

Arm	Traffic Stream	Cruise time for Normal Traffic (s)	Cruise speed for Normal Traffic (kph)
(ALL)	(ALL)	24.00	30.00

Sources

Arm	Traffic Stream	Source	Source traffic stream	Destination traffic stream	Cruise time for Normal Traffic (s)	Cruise speed for Normal Traffic (kph)	Auto turning radius	Traffic turn style	Turning radius (m)
2	2	1	1/1	2/2	5.40	30.00	✓	Straight	Straight Movement
	3	1	1/1	2/3	5.40	30.00	✓	Straight	Straight Movement
6	1	1	3/2	6/1	24.00	30.00	✓	Straight	Straight Movement
7	1	1	10/2	7/1	24.00	30.00	✓	Nearside	69.87
8	2	1	3/2	8/2	4.44	30.00	✓	Straight	Straight Movement
	3	1	3/2	8/3	4.44	30.00	✓	Straight	Straight Movement
10	2	1	13/2	10/2	2.40	30.00	✓	Straight	Straight Movement
	3	1	14/1	10/3	3.84	30.00	✓	Straight	Straight Movement
11	1	1	16/1	11/1	24.00	30.00	✓	Offside	82.53
12	1	1	2/3	12/1	2.04	30.00	✓	Straight	Straight Movement
15	1	1	13/2	15/1	51.53	30.00	✓	Nearside	80.02
16	1	1	14/1	16/1	1.08	30.00	✓	Straight	Straight Movement
6	1	2	10/3	6/1	24.00	30.00	✓	Straight	Straight Movement
7	1	2	12/1	7/1	24.00	30.00	✓	Offside	6.00
8	2	2	2/2	8/2	4.44	30.00	✓	Straight	Straight Movement
	3	2	2/2	8/3	4.44	30.00	✓	Straight	Straight Movement
10	2	2	14/1	10/2	2.40	30.00	✓	Straight	Straight Movement
	3	2	13/2	10/3	3.84	30.00	✓	Straight	Straight Movement
11	1	2	8/2	11/1	24.00	30.00	✓	Straight	Straight Movement
15	1	2	8/3	15/1	51.53	30.00	✓	Straight	Straight Movement

Give Way Data

Arm	Traffic Stream	Opposed traffic	Use Step-wise Opposed Turn Model	Visibility restricted
(ALL)	(ALL)	AllTraffic		

Give Way Data - All Movements - Conflicts

Traffic Stream	Description	Controlling type	Controlling traffic stream	Percentage opposing (%)	Slope coefficient	Upstream signals visible	Conflict shift	Conflict duration
2		TrafficStream	16/1	100	0.29		0	0
		TrafficStream	12/1	100	0.28		0	0
1		TrafficStream	10/2	100	1.09		0	0
		TrafficStream	8/2	100	1.09		0	0
		TrafficStream	8/3	100	1.09		0	0

Local OD Matrix - Local Matrix: 1

Local Matrix Options

OD Matrix	Name	Use for point to point table	Auto calculate	Allocation mode	Allow paths past exit locations	Allow looped paths on arms	Allow looped paths on traffic nodes	Copy flows	Matrix to copy flows from	Limit paths by length	Path length limit multiplier	Limit paths by number	Path number limit
1	(untitled)	✓	✓	Path Equalisation			✓			✓	1.25		

Normal Input Flows (PCU/hr)

		To			
		1	2	3	4
From	1	0	55	459	27
	2	89	0	88	20
	3	906	136	0	113
	4	23	50	127	0

Bus Input Flows not shown as they are blank.

Tram Input Flows not shown as they are blank.

Pedestrian Input Flows not shown as they are blank.

Locations

OD Matrix	Location	Name	Entries	Exits	Colour
1	1	(untitled)	1/1	6/1	#0000FF
	2	(untitled)	13/2	11/1	#00FF00
	3	(untitled)	14/1	15/1	#FFFF00
	4	(untitled)	3/2	7/1	#FFFF00

Normal Paths and Flows

OD Matrix	Path	Description	From location	To location	Path items	Allocation type	Normal Calculated Flow (PCU/hr)
1	10		4	1	3/2, 6/1	Normal	23
	11		4	2	3/2, 8/2, 11/1	Normal	50
	12		1	3	1/1, 2/2, 8/3, 15/1	Normal	459
	13		3	1	14/1, 10/3, 6/1	Normal	906
	15		2	4	13/2, 10/2, 7/1	Normal	20
	16		3	4	14/1, 10/2, 7/1	Normal	113
	17		3	2	14/1, 16/1, 11/1	Normal	136
	19		2	3	13/2, 15/1	Normal	88
	20		4	3	3/2, 8/3, 15/1	Normal	127
	21		1	4	1/1, 2/3, 12/1, 7/1	Normal	27
	22		2	1	13/2, 10/3, 6/1	Normal	89
	23		1	2	1/1, 2/2, 8/2, 11/1	Normal	55

Signal Timings

Network Default: 75s cycle time; 75 steps

Controller Stream 1

Controller Stream	Name	Description	Use sequence	Cycle time source	Cycle time (s)
1	(untitled)		1	NetworkDefault	75

Controller Stream 1 - Properties

Controller Stream	Manufacturer name	Type	Model number	(Telephone) Line Number	Site number	Grid reference	Gaining delay type
1	Unspecified						Absolute

Controller Stream 1 - Optimisation

Controller Stream	Allow offset optimisation	Allow green split optimisation	Optimisation level	Auto redistribute	Enable stage constraint
1	✓	✓	Offsets Only		

Phases

Controller Stream	Phase	Name	Minimum green (s)	Maximum green (s)	Relative start displacement (s)	Relative end displacement (s)	Type
1	(ALL)	(untitled)	7	300	0	0	Traffic

Library Stages

Controller Stream	Library Stage	Phases in stage	User stage minimum (s)
1	1	A, B	1
	2	C	1

Losing / Gaining Phase Delays

Controller Stream	Delay	Type	Phase	From stage	To stage	Relative delay
1	1	Losing	A	1	2	1

Stage Sequences

Controller Stream	Sequence	Name	Multiple cycling	Stage IDs	Stage ends
1	1	(untitled)	Single	1, 2	37, 56

Intergreen Matrix for Controller Stream 1

		To		
		A	B	C
From	A			5
	B			6
	C	6	5	

Banned Stage transitions for Controller Stream 1

		To	
		1	2
From	1		
	2		

Interstage Matrix for Controller Stream 1

		To	
		1	2
From	1	0	6
	2	6	0

Resultant Stages

Controller Stream	Resultant Stage	Is base stage	Library Stage ID	Phases in this stage	Stage start (s)	Stage end (s)	Stage duration (s)	User stage minimum (s)	Stage minimum (s)
1	1	✓	1	A,B	62	37	50	1	6
	2	✓	2	C	43	56	13	1	7

Resultant Phase Green Periods

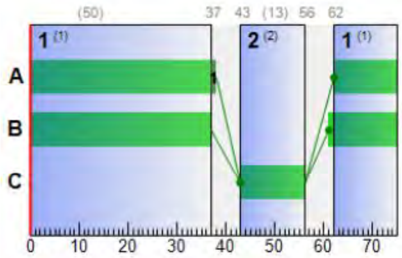
Controller Stream	Phase	Green period	Is base green period	Start time (s)	End time (s)	Duration (s)
	A	1	✓	62	38	51

1	B	1	✓	61	37	51
	C	1	✓	43	56	13

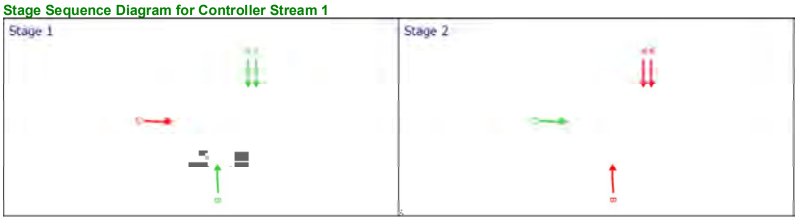
Traffic Stream Green Times

Arm	Traffic Stream	Traffic Node	Controller Stream	Phase	Green Period 1		
					Start	End	Duration
2	2		1	A	62	38	51
2	3		1	A	62	38	51
3	2		1	C	43	56	13
10	3		1	B	61	37	51

Phase Timings Diagram for Controller Stream 1



Stage Sequence Diagram for Controller Stream 1



Controller Stream 2

Controller Stream	Name	Description	Use sequence	Cycle time source	Cycle time (s)
2	(untitled)		1	NetworkDefault	75

Controller Stream 2 - Properties

Controller Stream	Manufacturer name	Type	Model number	(Telephone) Line Number	Site number	Grid reference	Gaining delay type
2	Unspecified						Absolute

Controller Stream 2 - Optimisation

Controller Stream	Allow offset optimisation	Allow green split optimisation	Optimisation level	Auto redistribute	Enable stage constraint
2	✓	✓	Offsets Only		

Phases

Controller Stream	Phase	Name	Minimum green (s)	Maximum green (s)	Relative start displacement (s)	Relative end displacement (s)	Type
2	(ALL)	(untitled)	7	300	0	0	Traffic

Library Stages

Controller Stream	Library Stage	Phases in stage	User stage minimum (s)
2	1	A, B	1
	2	C	1

Losing / Gaining Phase Delays

Controller Stream	Delay	Type	Phase	From stage	To stage	Relative delay
2	1	Losing	B	1	2	7

Stage Sequences

Controller Stream	Sequence	Name	Multiple cycling	Stage IDs	Stage ends
2	1	(untitled)	Single	1, 2	29, 56

Intergreen Matrix for Controller Stream 2

		To		
		A	B	C
From	A			6
	B			6
	C	6	6	

Banned Stage transitions for Controller Stream 2

		To	
		1	2
From	1		
	2		

Interstage Matrix for Controller Stream 2

		To	
		1	2
From	1	0	13
	2	6	0

Resultant Stages

Controller Stream	Resultant Stage	Is base stage	Library Stage ID	Phases in this stage	Stage start (s)	Stage end (s)	Stage duration (s)	User stage minimum (s)	Stage minimum (s)
2	1	✓	1	A,B	62	29	42	1	7
	2	✓	2	C	42	56	14	1	7

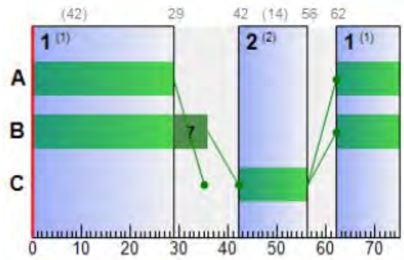
Resultant Phase Green Periods

Controller Stream	Phase	Green period	Is base green period	Start time (s)	End time (s)	Duration (s)
2	A	1	✓	62	29	42
	B	1	✓	62	36	49
	C	1	✓	42	56	14

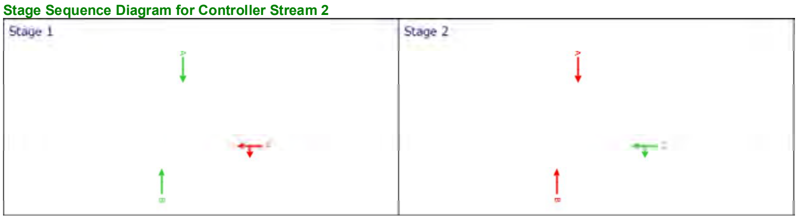
Traffic Stream Green Times

Arm	Traffic Stream	Traffic Node	Controller Stream	Phase	Green Period 1		
					Start	End	Duration
8	3		2	A	62	29	42
13	2		2	C	42	56	14
14	1		2	B	62	36	49

Phase Timings Diagram for Controller Stream 2



Stage Sequence Diagram for Controller Stream 2



Resultant penalties

Time Segment	Controller stream	Phase min max penalty (£ per hr)	Intergreen broken penalty (£ per hr)	Stage constraint broken penalty (£ per hr)	Cost of controller stream penalties (£ per hr)
17:00-18:00	(ALL)	0.00	0.00	0.00	0.00

Traffic Stream Results

Traffic Stream Results: Vehicle summary

Time Segment	Arm	Traffic Stream	Degree of saturation (%)	Practical reserve capacity (%)	Calculated flow entering (PCU/hr)	Calculated sat flow (PCU/hr)	Actual green (s (per cycle))	Mean Delay per Veh (s)	Mean max queue (PCU)	Utilised storage (%)	Weighted cost of delay (£ per hr)	Weighted cost of stops (£ per hr)	Performance Index (£ per hr)
17:00-18:00	1	1	28	227	541	1965	75	0.35	0.05	0.15	0.74	0.00	0.74
	2	2	37	143	514	2105	51	6.14	3.96	50.66	12.46	3.08	15.54
		3	2	4765	27	2105	51	3.70	0.17	2.21	0.39	0.10	0.50
	3	2	62	44	200	1717	13	37.23	4.34	12.48	29.37	2.54	31.91
	6	1	0	Unrestricted	1018	Unrestricted	75	0.00	0.00	0.00	0.00	0.00	0.00
	7	1	0	Unrestricted	160	Unrestricted	75	0.00	0.00	0.00	0.00	0.00	0.00
	8	2	15	504	105	704	75	0.45	0.01	0.20	0.19	0.00	0.19
		3	49	85	586	2105	42	8.86	5.69	88.44	20.47	3.40	23.87
	10	2	16	477	133	852	75	0.39	0.01	0.48	0.20	0.00	0.20
		3	68	32	995	2105	51	4.40	3.08	55.40	17.26	1.85	19.12
	11	1	0	Unrestricted	241	Unrestricted	75	0.00	0.00	0.00	0.00	0.00	0.00
	12	1	2	4213	27	1294	75	0.03	0.00	0.01	0.00	0.00	0.00
	13	2	59	52	197	1665	14	34.94	4.14	11.91	27.15	2.42	29.57
	14	1	88	2	1155	1965	49	19.85	22.37	64.32	90.41	12.74	103.16
	15	1	0	Unrestricted	674	Unrestricted	75	0.00	0.00	0.00	0.00	0.00	0.00
	16	1	16	480	136	877	75	3.27	0.89	89.46	1.76	0.64	2.39

Traffic Stream Results: Flows and signals

Time Segment	Arm	Traffic Stream	Calculated flow entering (PCU/hr)	Calculated flow out (PCU/hr)	Flow discrepancy (PCU/hr)	Adjusted flow warning	Calculated sat flow (PCU/hr)	Calculated capacity (PCU/hr)	Degree of saturation (%)	DOS Threshold exceeded	Practical reserve capacity (%)	Mean modulus of error	Actual green (s (per cycle))
17:00-18:00	1	1	541	541	0		1965	1965	28		227	0.00	75
	2	2	514	514	0		2105	1385	37		143	0.00	51
		3	27	27	0		2105	1459	2		4765	0.00	51
	3	2	200	200	0		1717	321	62		44	0.00	13
	6	1	1018	1018	0		Unrestricted	Unrestricted	0		Unrestricted	0.44	75
	7	1	160	160	0		Unrestricted	Unrestricted	0		Unrestricted	0.28	75
	8	2	105	105	0		704	704	15		504	0.87	75
		3	586	586	0		2105	1207	49		85	0.61	42
	10	2	133	133	0		852	852	16		477	0.44	75
		3	995	995	0		2105	1459	68		32	0.52	51
	11	1	241	241	0		Unrestricted	Unrestricted	0		Unrestricted	0.39	75
	12	1	27	27	0		1294	1294	2		4213	0.60	75
	13	2	197	197	0		1665	333	59		52	0.00	14
	14	1	1155	1155	0		1965	1310	88		2	0.00	49
	15	1	674	674	0		Unrestricted	Unrestricted	0		Unrestricted	0.42	75
	16	1	136	136	0		877	877	16		480	0.66	75

Traffic Stream Results: Stops and delays

Time Segment	Arm	Traffic Stream	Mean Cruise Time per Veh (s)	Mean Delay per Veh (s)	Total delay (PCU-hr/hr)	Weighted cost of delay (£ per hr)	Mean stops per Veh (%)	Total stops (Stops per hr)	Weighted cost of stops (£ per hr)
	1	1	24.00	0.35	0.05	0.74	0.00	0.00	0.00
	2	2	5.40	6.14	0.88	12.46	47.76	245.49	3.08

17:00-18:00		3	5.40	3.70	0.03	0.39	30.70	8.29	0.10
	3	2	24.00	37.23	2.07	29.37	101.15	202.30	2.54
	6	1	24.00	0.00	0.00	0.00	0.00	0.00	0.00
	7	1	24.00	0.00	0.00	0.00	0.00	0.00	0.00
	8	2	4.44	0.45	0.01	0.19	0.00	0.00	0.00
		3	4.44	8.86	1.44	20.47	46.29	271.27	3.40
	10	2	2.40	0.39	0.01	0.20	0.00	0.00	0.00
		3	3.84	4.40	1.22	17.26	14.84	147.70	1.85
	11	1	24.00	0.00	0.00	0.00	0.00	0.00	0.00
	12	1	2.04	0.03	0.00	0.00	0.00	0.00	0.00
	13	2	24.00	34.94	1.91	27.15	98.05	193.17	2.42
	14	1	24.00	19.85	6.37	90.41	88.00	1016.46	12.74
	15	1	51.53	0.00	0.00	0.00	0.00	0.00	0.00
	16	1	1.08	3.27	0.12	1.76	37.27	50.69	0.64

Traffic Stream Results: Queues and blocking

Time Segment	Arm	Traffic Stream	Initial queue (PCU)	Mean max queue (PCU)	Max queue storage (PCU)	Utilised storage (%)	Excess queue penalty (£ per hr)	Wasted time total (s (per cycle))	Estimated blocking
17:00-18:00	1	1	0.00	0.05	34.78	0.15	0.00	0.00	
	2	2	0.00	3.96	7.83	50.66	0.00	2.64	
		3	0.00	0.17	7.83	2.21	0.00	51.00	
	3	2	0.00	4.34	34.78	12.48	0.00	0.00	
	6	1	0.00	0.00	34.78	0.00	0.00	0.00	
	7	1	0.00	0.00	34.78	0.00	0.00	4.00	
	8	2	0.00	0.01	6.43	0.20	0.00	56.00	
		3	0.00	5.69	6.43	88.44	0.00	0.00	
	10	2	0.00	0.01	3.00	0.48	0.00	16.00	
		3	0.00	3.08	5.57	55.40	0.00	0.00	
	11	1	0.00	0.00	34.78	0.00	0.00	0.00	
	12	1	0.00	0.00	3.00	0.01	0.00	72.00	
	13	2	0.00	4.14	34.78	11.91	0.00	0.00	
	14	1	0.00	22.37	34.78	64.32	0.00	0.00	
	15	1	0.00	0.00	74.68	0.00	0.00	0.00	
	16	1	0.00	0.89	1.00	89.46	0.00	25.00	

Traffic Stream Results: Flare

Time Segment	Arm	Traffic Stream	Flare present	Flare components	Degree of saturation (%)	Mean max queue (PCU)	Calculated capacity (PCU/hr)	Practical reserve capacity (%)
17:00-18:00	1	1	✓	CTM flare: 1/1,2/2,2/3	39	4.19	1397	132

Traffic Stream Results: Advanced

Time Segment	Arm	Traffic Stream	Degree of saturation penalty (£ per hr)	Ped gap accepting penalty (£ per hr)	Warmed up	Mean Max Queue EoTS (PCU)	Max End of Green Queue EoTS (PCU)	Max End of Red Queue EoTS (PCU)	PCU Factor	Cost of traffic penalties (£ per hr)	Performance Index (£ per hr)
17:00-18:00	1	1	0.00	0.00	✓	0.05			1.00	0.00	0.74
	2	2	0.00	0.00	✓	3.96	0.11	3.68	1.00	0.00	15.54
		3	0.00	0.00	✓	0.17	0.00	0.17	1.00	0.00	0.50
	3	2	0.00	0.00	✓	4.35	0.51	3.90	1.00	0.00	31.91
	6	1	0.00	0.00	✓	0.00			1.00	0.00	0.00
	7	1	0.00	0.00	✓	0.00			1.00	0.00	0.00
	8	2	0.00	0.00	✓	0.01			1.00	0.00	0.19
		3	0.00	0.00	✓	5.69	0.23	4.53	1.00	0.00	23.87
	10	2	0.00	0.00	✓	0.01			1.00	0.00	0.20
		3	0.00	0.00	✓	3.09	0.73	3.09	1.00	0.00	19.12
	11	1	0.00	0.00	✓	0.00			1.00	0.00	0.00
	12	1	0.00	0.00	✓	0.00			1.00	0.00	0.00
	13	2	0.00	0.00	✓	4.15	0.43	3.71	1.00	0.00	29.57
	14	1	0.00	0.00	✓	22.45	3.20	11.22	1.00	0.00	103.16
	15	1	0.00	0.00	✓	0.00			1.00	0.00	0.00
	16	1	0.00	0.00	✓	0.89			1.00	0.00	2.39

Network Results

Run Summary

Analysis set used	Run start time	Run finish time	Modelling start time (HH:mm)	Network Cycle Time (s)	Performance Index (£ per hr)	Total network delay (PCU-hr/hr)	Highest DOS (%)	Item with highest DOS	Number of oversaturated items	Percentage of oversaturated items (%)	Item with worst signalised PRC	Item with worst unsignalised PRC	Item with worst overall PRC	Network within capacity
8	14/06/2019 14:01:58	14/06/2019 14:01:58	17:00	75	227.18	14.11	88.17	14/1	0	0	14/1	1/1	14/1	✓

Network Results: Vehicle summary

Time Segment	Degree of saturation (%)	Practical reserve capacity (%)	Calculated flow entering (PCU/hr)	Actual green (s (per cycle))	Mean Delay per Veh (s)	Weighted cost of delay (£ per hr)	Weighted cost of stops (£ per hr)	Performance Index (£ per hr)
17:00-18:00	88	2	6709	946	7.57	200.41	26.77	227.18

Network Results: Flows and signals

Time Segment	Calculated flow entering (PCU/hr)	Calculated flow out (PCU/hr)	Flow discrepancy (PCU/hr)	Adjusted flow warning	Degree of saturation (%)	DOS Threshold exceeded	Practical reserve capacity (%)	Actual green (s (per cycle))
17:00-18:00	6709	6709	0		88		2	946

Network Results: Stops and delays

Time Segment	Mean Cruise Time per Veh (s)	Mean Delay per Veh (s)	Total delay (PCU-hr/hr)	Weighted cost of delay (£ per hr)	Mean stops per Veh (%)	Total stops (Stops per hr)	Weighted cost of stops (£ per hr)
17:00-18:00	19.28	7.57	14.11	200.41	31.83	2135.36	26.77

Network Results: Queues and blocking

Time Segment	Utilised storage (%)	Excess queue penalty (£ per hr)	Wasted time total (s (per cycle))
17:00-18:00	89.46	0.00	226.64

Network Results: Advanced

Time	Degree of saturation penalty (£ per	Ped gap accepting penalty (£ per	Warmed	PCU	Cost of traffic penalties (£ per	Controller stream penalties (£ per	Performance Index (£ per

Segment	hr)	hr)	up	Factor	hr)	hr)	hr)
17:00-18:00	0.00	0.00	✓	1.00	0.00	0.00	227.18

Point to Point Journey Time

Average Journey Time (s) for Local Matrix: 1

		To			
		1	2	3	4
From	1	0.0	64.8	98.5	59.5
	2	103.1	0.0	110.5	85.7
	3	74.9	72.2	0.0	70.6
	4	85.2	90.1	134.1	0.0

Path Journey Time

Path	From Location	To Location	Normal Calculated Flow (PCU/hr)	Normal journey time (s)	Calculated Total Flow (PCU/hr)	Avg journey time (s)
10	4	1	23	85.23	23	85.23
11	4	2	50	90.12	50	90.12
12	1	3	459	98.49	459	98.49
13	3	1	906	74.91	906	74.91
15	2	4	20	85.73	20	85.73
16	3	4	113	70.64	113	70.64
17	3	2	136	72.20	136	72.20
19	2	3	88	110.46	88	110.46
20	4	3	127	134.11	127	134.11
21	1	4	27	59.52	27	59.52
22	2	1	89	103.11	89	103.11
23	1	2	55	64.78	55	64.78

Final Prediction Table

Traffic Stream Results

				SIGNALS		FLOWS		PERFORMANCE				PER PCU			QUEUES	WEIGHTS		PENALTIES	P.I.
Arm	Traffic Stream	Name	Traffic node	Controller stream	Phase	Calculated flow entering (PCU/hr)	Calculated sat flow (PCU/hr)	Actual green (s (per cycle))	Wasted time total (s (per cycle))	Degree of saturation (%)	Practical reserve capacity (%)	JourneyTime (s)	Mean Delay per Veh (s)	Mean stops per Veh (%)	Mean max queue (PCU)	Delay weighting multiplier (%)	Stop weighting multiplier (%)	Cost of traffic penalties (£ per hr)	P.I.
1	1	(untitled)				541	1965	75	0.00	28	227	24.35	0.35	0.00	0.05	100	100	0.00	0.74
2	2	(untitled)		1	A	514	2105	51	2.64	37	143	11.54	6.14	47.76	3.96	100	100	0.00	15.54
	3			1	A	27	2105	51	51.00	2	4765	9.10	3.70	30.70	0.17	100	100	0.00	0.50
3	2	(untitled)		1	C	200	1717	13	0.00	62	44	61.23	37.23	101.15	4.34	100	100	0.00	31.91
6	1	(untitled)				1018	Unrestricted	75	0.00	0	Unrestricted	24.00	0.00	0.00	0.00	100	100	0.00	0.00
7	1	(untitled)				160	Unrestricted	75	4.00	0	Unrestricted	24.00	0.00	0.00	0.00	100	100	0.00	0.00
8	2	(untitled)				105	704	75	56.00	15	504	4.89	0.45	0.00	0.01	100	100	0.00	0.19
	3			2	A	586	2105	42	0.00	49	85	13.30	8.86	46.29	5.69	100	100	0.00	23.87
10	2	(untitled)				133	852	75	16.00	16	477	2.79	0.39	0.00	0.01	100	100	0.00	0.20
	3			1	B	995	2105	51	0.00	68	32	8.24	4.40	14.84	3.08	100	100	0.00	19.12
11	1	(untitled)				241	Unrestricted	75	0.00	0	Unrestricted	24.00	0.00	0.00	0.00	100	100	0.00	0.00
12	1					27	1294	75	72.00	2	4213	2.07	0.03	0.00	0.00	100	100	0.00	0.00
13	2	(untitled)		2	C	197	1665	14	0.00	59	52	58.94	34.94	98.05	4.14	100	100	0.00	29.57
14	1	(untitled)		2	B	1155	1965	49	0.00	88	2	43.85	19.85	88.00	22.37	100	100	0.00	103.16
15	1	(untitled)				674	Unrestricted	75	0.00	0	Unrestricted	51.53	0.00	0.00	0.00	100	100	0.00	0.00
16	1					136	877	75	25.00	16	480	4.35	3.27	37.27	0.89	100	100	0.00	2.39

Network Results

	Distance travelled (PCU-km/hr)	Time spent (PCU-hr/hr)	Mean journey speed (kph)	Total delay (PCU-hr/hr)	Weighted cost of delay (£ per hr)	Weighted cost of stops (£ per hr)	Excess queue penalty (£ per hr)	Performance Index (£ per hr)
Normal traffic	1077.90	50.04	21.54	14.11	200.41	26.77	0.00	227.18
Bus	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tram	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pedestrians								
TOTAL	1077.90	50.04	21.54	14.11	200.41	26.77	0.00	227.18

- *< = adjusted flow warning (upstream links/traffic streams are over-saturated)*
- ** = Traffic Stream - Normal, Bus or Tram Stop or Delay weighting has been set to a value other than 100%*
- *^ = Traffic Stream - Normal, Bus or Tram Stop or Delay Path weighting has been set to a value other than 100%*
- *+ = average link/traffic stream excess queue is greater than 0*
- ***P.I. = PERFORMANCE INDEX***

Appendix C Technical Note 033

TECHNICAL NOTE

Job Name: Heyford Park

Job No: 39304

Note No: TN033

Date: 2nd March 2020

Prepared By: Rachel Kirkwood / Phil Rawlins

Subject: **B4030 Station Road / Ardley Road Junction Options and Capacity Testing**

Item	Subject
1.	**Introduction** This note has been prepared by Stantec on behalf of Dorchester Group to set out a review of potential options for improvements at the B4030 Station Road / Ardley Road junction. This follows Technical Note 028 Rev. A (TN028A) which was prepared by Stantec in November 2019 and set out a review of the operation of the B430 / Ardley Road junction. It was identified that the existing priority layout was predicted to operate significantly over capacity in the 2031 scenarios both with and without the Heyford development traffic. On this basis mitigation was proposed in the form of a signalised junction design. Oxfordshire County Council (OCC) have reviewed the proposed mitigation scheme and have requested that an alternative option for the junction be considered that could provide a smaller-scale junction, more suited to a village environment whilst still providing operational capacity and safety benefits at the junction. Section 2 of this note presents a summary of the modelling and mitigation proposals put forward within TN028A. Section 3 sets out a number of different design iterations for the junction and associated capacity testing for each. Section 4 sets out Stantec's preferred solution for the junction.
2.	**2031 Forecast Modelling** The forecast modelling undertaken within TN028A is summarised below. <u>2031 Reference Case (RC)</u> **Table 1** shows the junction capacity assessment results for the existing junction layout and traffic flows including background growth and committed development up to the 2031 forecast year but excluding the Local Plan allocation at Heyford Park. For further details of this modelling, refer to TN028A. **Table 1** demonstrates that in the 2031 RC scenario the Ardley Road East arm of the junction is predicted to operate significantly over capacity in the AM peak hour in this scenario. In the PM peak hour, the junction is predicted to operate within capacity.

Item	Subject

Table 1: B430 Station Road / Ardley Road 2031 Reference Case Modelling Results

Link	AM Peak			PM Peak		
	DoS	MMQ	Delay (Secs)	DoS	MMQ	Delay (Secs)
B430 Station Road (N)	56%	0.7	2	30%	0.1	1
Ardley Road (E)	245%	60.4	1295	75%	1.1	27
B430 Station Road (S)	61%	0.5	2	38%	0.1	1
Ardley Road (W)	44%	0.2	5	31%	0.1	2

2031 Test Case - Do Something 1 (DS1)

The 2031 Test Case DS1 scenario is as the RC scenario but includes full Local Plan allocation at Heyford Park and other highway mitigation in the wider road network proposed to support the development (details of which are set out with TN028A). A summary of the capacity analysis results for this scenario is set out within **Table 2**.

Table 2: B430 Station Road / Ardley Road 2031 Test Case – DS1 Modelling Results

Link	AM Peak			PM Peak		
	DoS	MMQ	Delay (Secs)	DoS	MMQ	Delay (Secs)
B430 Station Road (N)	58%	0.8	3	28%	0.1	1
Ardley Road (E)	311%	44.8	1485	9999%	98.5	1800
B430 Station Road (S)	74%	1.0	5	78%	1.4	4
Ardley Road (W)	73%	0.9	16	57%	0.4	8

Table 2 demonstrates that with the existing priority layout and the Heyford Park development traffic added, the Ardley Road East arm of the junction is predicted to operate significantly over capacity in the AM and PM peak hours.

2031 Test Case – Do Something 1 (DS1) with mitigation

The 2031 Test Case with mitigation scenario uses the same flows as in the Test Case DS1 scenario but the junction layout is the proposed mitigation set out within TN028A. This mitigation consists of a double junction arrangement with give-way left turn slips on the B430 as shown in **Drawing 39304/5501/SK50 Rev A.**

A summary of the capacity analysis results for this scenario is set out within **Table 3**. It should be noted that an error was found in the results provided in TN028A and that the results set out below have been updated.

Item	Subject

Table 3: B430 Station Road / Ardley Road 2031 Test Case – DS1 with mitigation Modelling Results

Link	AM Peak			PM Peak		
	DoS	MMQ	Delay (Secs)	DoS	MMQ	Delay (Secs)
B430 Station Road (N)	81%	18.9	20	40%	5.0	26
Ardley Road (E)	68%	3.1	53	68%	4.5	42
B430 Station Road (S)	86%	10.5	33	85%	20.8	19
Ardley Road (W)	85%	7.3	61	58%	4.1	34

Table 3 demonstrates that the junction is predicted to operate within capacity in both the AM and PM peak hours.

3. **Alternative Mitigation Options**

Following OCCs request that the proposed mitigation scheme for the junction is reviewed to consider potential alternative layouts, a number of options have been considered and assessed as set out below:

Option 1: Simplified Signalised Junction

This option would provide a junction reduced in size when compared to the existing arrangement and the proposed mitigation scheme set out within TN028A. The junction has also been simplified and would operate as a single junction. The layout does not provide the left-turn slips that were proposed as part of the mitigation scheme set out within TN028A. The junction proposal is illustrated in **Drawing 39302/5501/SK59.** The junction capacity of Option 1 has been assessed and the results are set out within **Table 4** and the modelling output report is provided at **Appendix A**.

Table 4: Option 1 Simplified Signalised Layout Modelling Results

Link	AM Peak			PM Peak		
	DoS	MMQ	Delay (Secs)	DoS	MMQ	Delay (Secs)
B430 Station Road (N)	84%	30.4	23	44%	9.3	14
Ardley Road (E)	109%	11.7	291	109%	17.8	265
B430 Station Road (S)	200%	197.2	953	100%	56.6	81
Ardley Road (W)	197%	67.4	923	108%	17.1	246

Table 4 demonstrates that the Option 1 mitigation design is predicted to operate over capacity in both the AM and PM peaks. It is demonstrated that the B430 South arm of the junction is predicted to operate significantly over capacity in the AM peak. This is a result of right turning vehicles on this arm needing to give way to the southbound movement. The storage space for

Item	Subject
	these vehicles is very limited and therefore these block the northbound ahead movement causing capacity issues on this arm.

Because of the capacity constraints on the B430 it is not considered that this would form a practicable option.

Option 2: Simplified Signalised Junction, Banned South to East Right Turn

This option would provide a junction very similar to Option 1 (**Drawing 39302/5501/SK59**) except the south to east right turn movement has been banned. It is considered that banning the right turn would provide more capacity at the junction, especially on the southern arm. Movements wishing to turn right could travel northbound through the junction and undertake a U-Turn at the Ardley Roundabout junction to the north before returning and turning left into Ardley Road. The junction capacity of Option 2 has been assessed and the results are set out within **Table 5** and the modelling output report is provided at **Appendix B**.

Table 5: Option 2 Simplified Signalised Junction, Banned South to East Right Turn Modelling results

Link	AM Peak			PM Peak		
	DoS	MMQ	Delay (Secs)	DoS	MMQ	Delay (Secs)
B430 Station Road (N)	99%	58.3	67	50%	11.0	12
Ardley Road (E)	109%	11.7	291	158%	41.0	709
B430 Station Road (S)	57%	13.7	12	89%	34.8	24
Ardley Road (W)	197%	67.4	923	155%	40.7	692

Table 5 demonstrates that with the banned right turn the junction is still predicted to operate over capacity in both the AM and PM peak hours, however the operation of the B430 arms of the junction have been brought down within capacity. Notwithstanding this the operation of the side roads at the junction are still seen to be significantly over capacity and the junction is not seen to provide significant benefits over the existing priority arrangement. On this basis it is not considered that this would represent a practicable option.

Option 3: Reduced Scale Double Junction, Banned South to East Right Turn

In order to further improve the capacity at the junction it was considered that the internal stoplines would need to be included within the junction. This allows the junction to operate as two separate junctions and increases overall capacity. In this option the south to east right turn is also banned. The junction is illustrated on **Drawing 39304/5501/SK65.** The junction capacity of Option 2 has been assessed and the results are set out within **Table 6** and the modelling output report is provided at **Appendix C**.

Item	Subject
	Table 6: Option 3 Reduced Scale Double Junction, Banned South to East Right Turn, Banned South to East Right Turn Modelling results

Link	AM Peak			PM Peak		
	DoS	MMQ	Delay (Secs)	DoS	MMQ	Delay (Secs)
B430 Station Road (N)	86%	35.1	23	44%	6.8	7
Ardley Road (E)	73%	4.8	79	68%	6.8	59
B430 Station Road (S)	59%	14.6	12	80%	26.3	15
Ardley Road (W)	85%	10.2	77	87%	9.0	95

Table 6 demonstrates that in this scenario the junction is predicted to operate within capacity in both the AM and PM peak hours. On this basis it is considered that the junction layout offers an alternative mitigation solution in this location.

4. Summary

This note has reviewed junction modelling previously undertaken within TN028A for the B430 Station Road / Ardley Road junction and assessed three additional mitigation design options.

The existing priority layout was predicted to operate significantly over capacity in the 2031 scenarios both with and without Heyford development traffic. The mitigation scheme proposed within TN028A was predicted to operate within capacity in both the AM and PM peak hours, however OCC requested consideration of options for a solution that could provide a smaller scale junction more suited to a village environment.

Three options for alternative schemes were therefore considered and assessed. Option 1, a simplified signalised junction, was predicted to operate over capacity in both the AM and PM peak hours and is not considered a practicable option. Option 2, a simplified signalised junction with banned south to east right turn, was still predicted to operate over capacity in both the AM and PM peak hours and is not considered a practicable option. Option 3, a reduced-scale double junction with banned south to east right turn, was predicted to operate within capacity in both the AM and PM peak hours and is therefore considered to offer an alternative mitigation solution providing a reduced scale junction whilst providing operational and safety benefits over the reference case without development. Option 3 is seen to operate with a similar level of capacity to the mitigation scheme proposed within TN028A.

Further technical discussion will be required with OCC to agree the mitigation scheme for this junction location.

DOCUMENT ISSUE RECORD

Technical Note No	Rev	Date	Prepared	Checked	Reviewed (Discipline Lead)	Approved (Project Director)
39304/5501/TN033	-	09.03.2020	RK	PR	PR	MW

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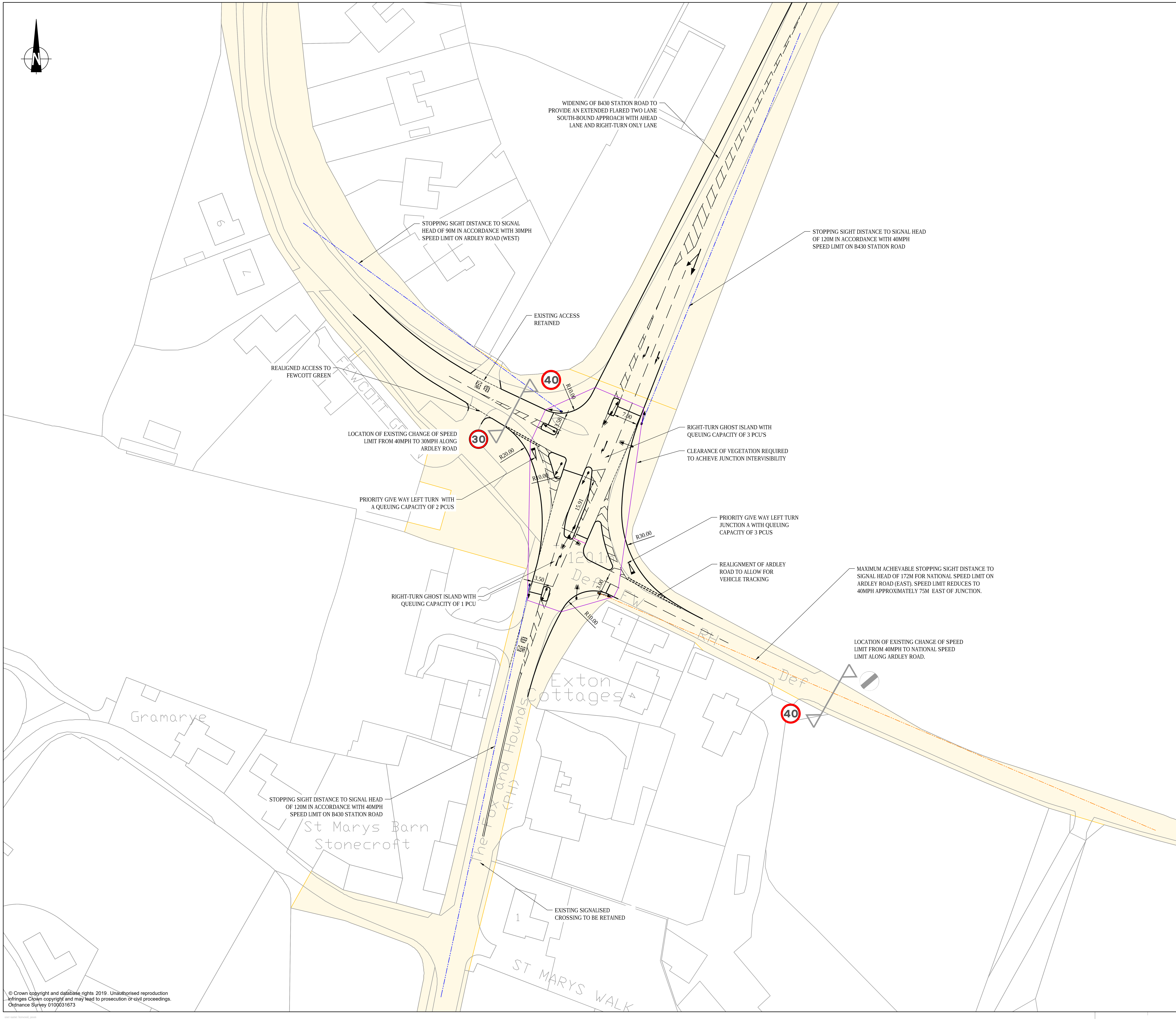
TECHNICAL NOTE

DRAWINGS



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STOPPING SIGHT DISTANCE (MAXIMUM ACHIEVABLE) TO JUNCTION NEAR-SIDE SIGNAL HEAD WITHIN ADOPTED HIGHWAY LAND

JUNCTION INTERVISIBILITY TO DMRB (WORST CASE SHOWN FOR A STAGGERED CROSSROADS ARRANGEMENT)

PRIMARY TRAFFIC SIGNAL HEAD AND POLE

SECONDARY TRAFFIC SIGNAL HEAD AND POLE

Mark	Revision	Date	Drawn	Chkd	Appd
A	REVISED JUNCTION TO INCLUDE GIVEWAY LEFT TURNS	31.05.19	JHo	-	-

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DRAFT

HEYFORD PARK
CONCEPT SIGNALISED JUNCTION LAYOUT OF B430 STATION ROAD / ARDLEY ROAD

Client

DORCHESTER GROUP

Date of 1st Issue	Designed	Drawn
24.04.19	P.C	P.C
A1 Scale	Checked	Approved
1:500	-	-

Drawing Number	Revision
39304/5501/SK50	A

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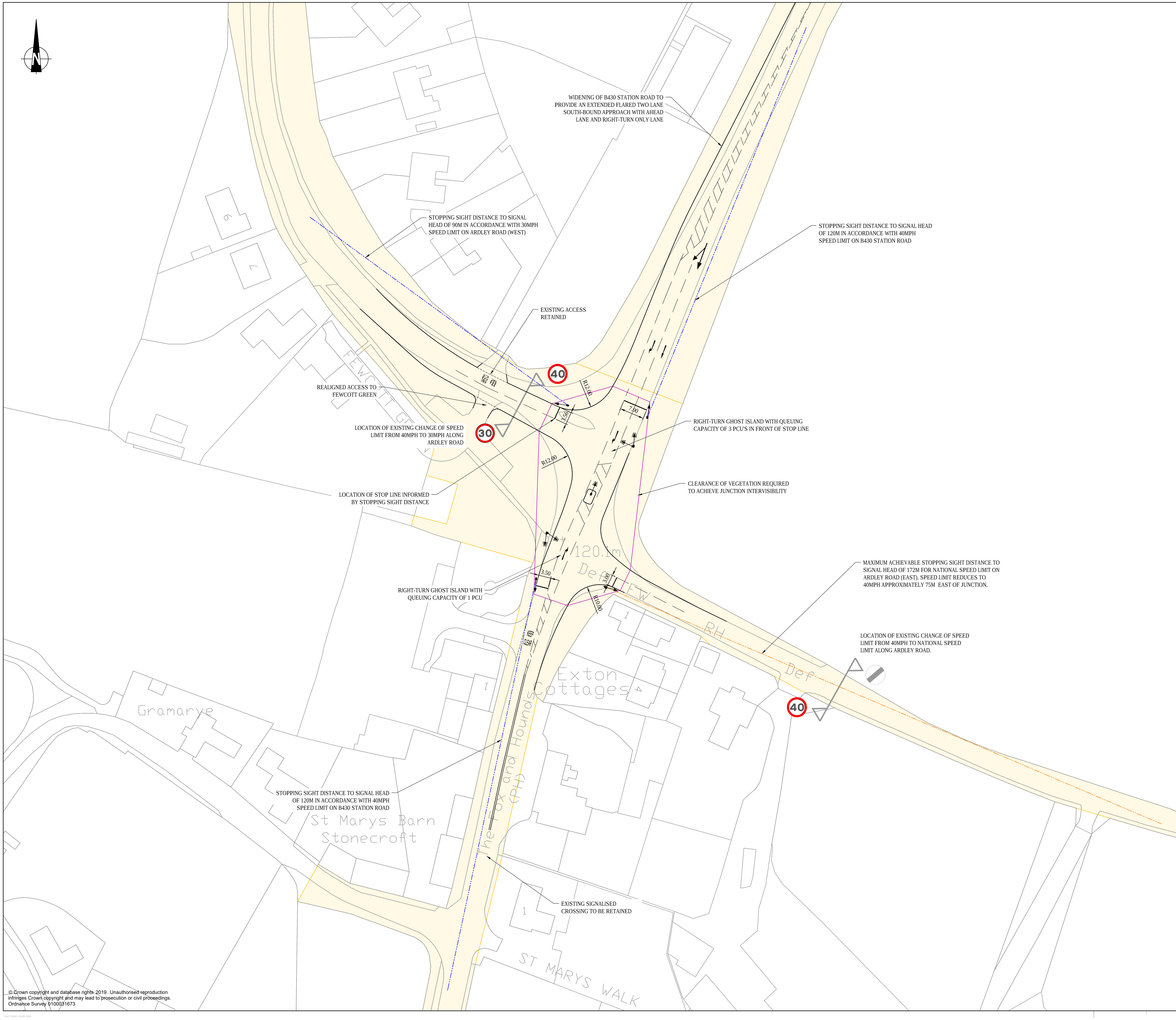
File Location: j:\39304 heyford park tranche 2\cad\brief 5501\sketches\39304-5501-sk50 ardley road_station road junction.dwg



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- STOPPING SIGHT DISTANCE TO JUNCTION NEAR-SIDE SIGNAL HEAD IN ACCORDANCE WITH DMRB FOR RELEVANT SPEED LIMIT ON APPROACH
- STOPPING SIGHT DISTANCE (MAXIMUM ACHIEVABLE) TO JUNCTION NEAR-SIDE SIGNAL HEAD WITHIN ADOPTED HIGHWAY LAND
- JUNCTION INTERVISIBILITY TO DMRB (WORST CASE SHOWN FOR A STAGGERED CROSSROADS ARRANGEMENT)
- PRIMARY TRAFFIC SIGNAL HEAD AND POLE
- SECONDARY TRAFFIC SIGNAL HEAD AND POLE

Mark	Revision	Date	Drawn	Chkd	Appd

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HEYFORD PARK
CONCEPT SIGNALISED JUNCTION LAYOUT OF B430 STATION ROAD / ARDLEY ROAD

Client

DORCHESTER GROUP

Date of 1st Issue	Designed	Drawn
20.02.20	P.C	P.C
A1 Scale 1:500	Checked -	Approved -

Drawing Number	Revision
39304/5501/SK59	-

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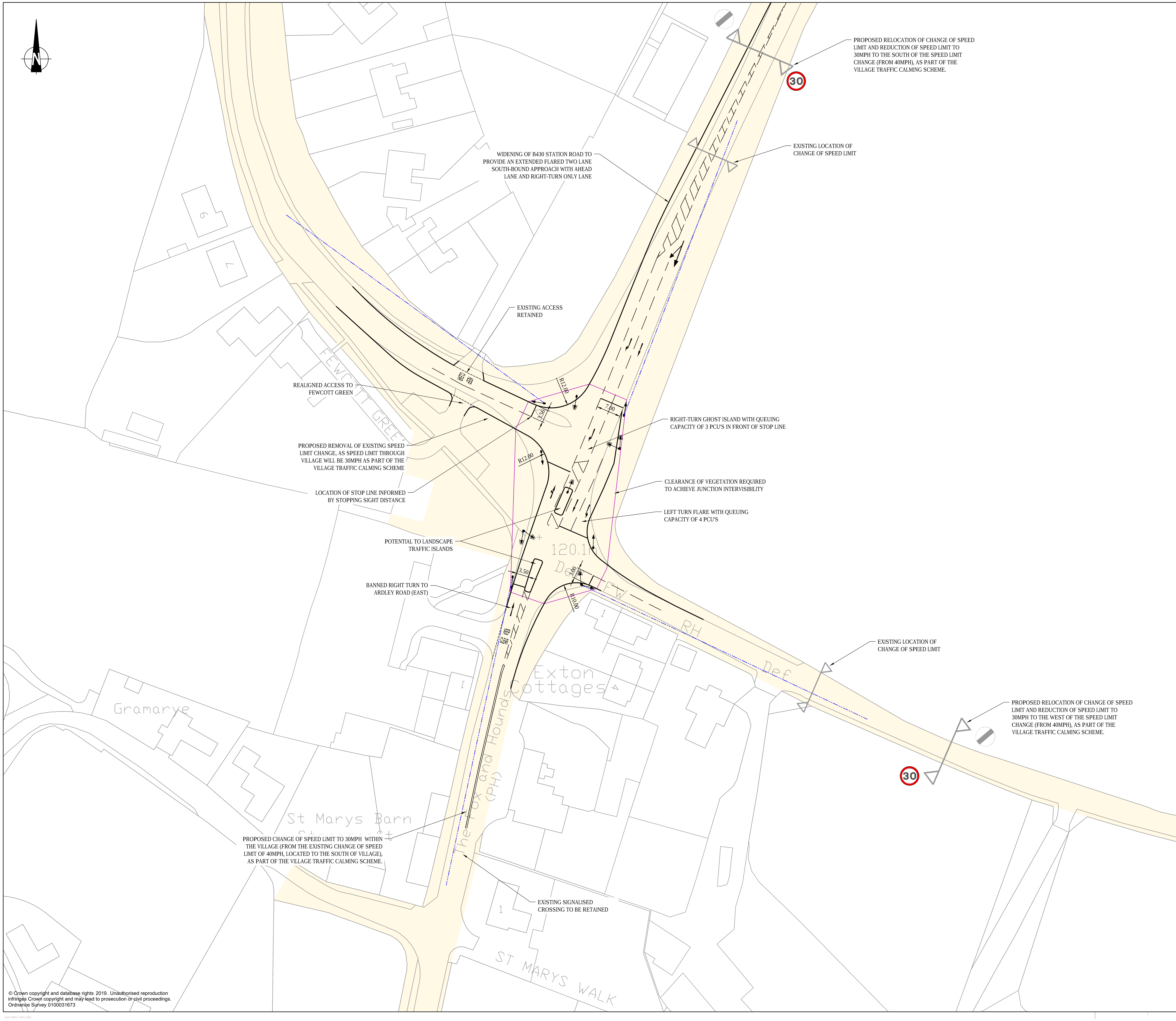

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CONCEPT SIGNALISED JUNCTION LAYOUT OF B430 STATION ROAD / ARDLEY ROAD - BANNED RIGHT TURN

Client
DORCHESTER GROUP

Date of 1st Issue	Designed	Drawn
20.02.20	P.C	P.C
A1 Scale	**Checked**	**Approved**
1:500	P.R	-

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APPENDIX A

TRANSYT 15

Version: 15.5.2.7994
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Filename: 200221 Ardley Crossroads Signalised.t15
Path: \\Bri-vfps-001.pba.int\bri\Projects\39304 Heyford Park Tranche 2\Technical\Transport\Junction Assessments\TRANSYT
Report generation date: 09/03/2020 10:57:49

»A7 - 2031 DS1 AM : D7 - 2031 DS1 AM* :
»A8 - 2031 DS1 PM : D8 - 2031 DS1 PM* :

File summary

File description

File title	(untitled)
Location	
Site number	
UTCRegion	
Driving side	Left
Date	14/12/2017
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Enumerator	PBA\dcollis
Description	

Model and Results

Enable controller offsets	Enable fuel consumption	Enable quick flares	Display journey time results	Display level of service results	Display blocking and starvation results	Display end of red and green queue results	Display excess queue results	Display separate uniform and random results	Display unweighted results	Display TRANSYT 12 style timings	Display effective greens in results	Display Red-With-Amber	Display End-Of-Green Amber

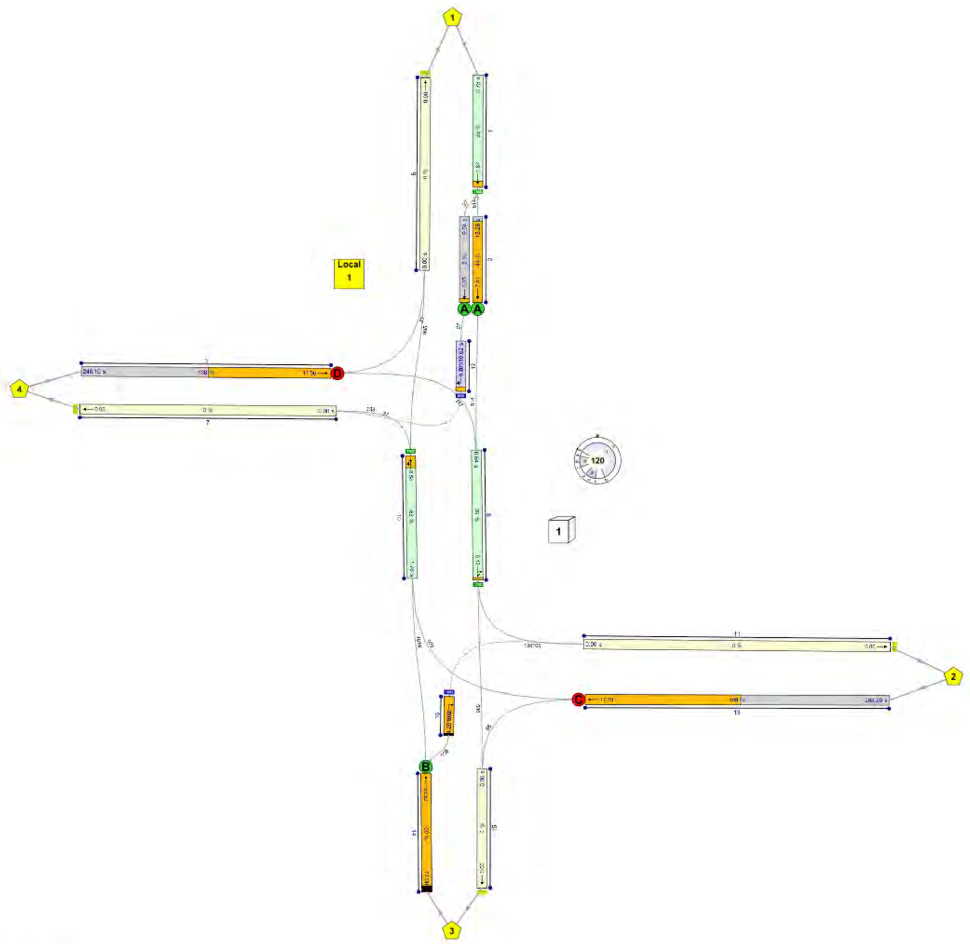
Units

Cost units	Speed units	Distance units	Fuel economy units	Fuel rate units	Mass units	Traffic units input	Traffic units results	Flow units	Average delay units	Total delay units	Rate of delay units
£	kph	m	mpg	l/h	kg	PCU	PCU	perHour	s	-Hour	perHour

Sorting

Show names instead of IDs	Sorting direction	Sorting type	Ignore prefixes when sorting	Analysis/demand set sorting	Link grouping	Source grouping	Colour Analysis/Demand Sets
	Ascending	Numerical		ID	Normal	Normal	✓

Network Diagrams



(untitled)
Cycletime 0s / 120s , Timesteps 119 / 120
8, 8
Diagram produced using TRANSYT 15.5.2.7994

A7 - 2031 DS1 AM
D7 - 2031 DS1 AM*

Summary

Data Errors and Warnings

No errors or warnings

Run Summary

Analysis set used	Run start time	Run finish time	Modelling start time (HH:mm)	Network Cycle Time (s)	Performance Index (£ per hr)	Total network delay (PCU-hr/hr)	Highest DOS (%)	Item with highest DOS	Number of oversaturated items	Percentage of oversaturated items (%)	Item with worst signalised PRC	Item with worst unsignalised PRC	Ite wit wor over PR
7	09/03/2020 10:56:34	09/03/2020 10:56:34	08:00	120	3968.94	275.51	200.31	14/1	3	21	14/1	1/1	14/

Analysis Set Details

Name	Description	Demand set	Include in report	Locked
2031 DS1 AM		D7	✓	

Demand Set Details

Name	Description	Composite	Demand sets	Start time (HH:mm)	Locked
2031 DS1 AM				08:00	

Network Options

Network timings

Network cycle time (s)	Restrict to SCOOT cycle times	Time segment length (min)	Number of time segments	Modelled time period (min)
120		60	1	60

Signals options

Start displacement (s)	End displacement (s)
2	3

Advanced

Phase minimum broken penalty (£)	Phase maximum broken penalty (£)	Intergreen broken penalty (£)	Starting Red-with-Amber (s)
10000.00	10000.00	10000.00	2

Traffic options

Traffic model	Vehicle flow scaling factor (%)	Pedestrian flow scaling factor (%)	Cruise times or speeds
Platoon Dispersion (PDM)	100	100	Cruise Speeds

Advanced

Resolution	DOS Threshold (%)	Cruise scaling factor (%)	Use link stop weightings	Use link delay weightings	Exclude pedestrians from results calculation	Random delay mode	Type of Vehicle-in-Service	Type of random parameter	PCU Length (m)	Calculate results for Path Segments	Generate PDM Profile Data
1	90	100	✓	✓		Complex	Uniform (TRANSYT)	Uniform (TRANSYT)	5.75		✓

Normal Traffic parameters

Dispersion type	Dispersion coefficient	Travel time coefficient
Default	35	80

Normal Traffic Types

Name	PCU Factor
Normal	1.00

Bus parameters

Name	PCU Factor	Dispersion type	Acceleration (ms^[-2])	Stationary time coefficient	Cruise time coefficient
Bus	1.00	Default	0.94	30	85

Tram parameters

Name	PCU Factor	Dispersion type	Acceleration (ms^[-2])	Stationary time coefficient	Cruise time coefficient
Tram	1.00	Default	0.94	100	100

Pedestrian parameters

Dispersion type
Default

Optimisation options

Enable optimisation	Auto redistribute	Optimisation level	Enable OUT Profile accuracy
✓		Offsets And Green Splits	✓

Advanced

Optimisation type	Hill climb increments	OUTProfile accuracy	Use enhanced optimisation	Auto optimisation order	Optimisation order	Master controller	Offsets relative to master controller	Master controller offset after each run
Hill Climb (Fast)	15, 40, -1, 15, 40, 1, -1, 1	50, 50, 5, 5, 0.5, 0.5, 0.05, 0.05		✓	1			Do nothing

Economics

Vehicle Monetary Value Of Delay (£ per PCU-hr)	Vehicle Monetary Value Of Stops (£ per 100 stops)	Pedestrian monetary value of delay (£ per Ped-hr)
14.20	2.60	14.20

Arms and Traffic Streams

Arms

Arm	Name	Description	Traffic node
1	(untitled)		
2	(untitled)		
3	(untitled)		
6	(untitled)		
7	(untitled)		
8	(untitled)		
10	(untitled)		
11	(untitled)		
12			
13	(untitled)		
14	(untitled)		
15	(untitled)		
16			

Traffic Streams

Arm	Traffic Stream	Name	Description	Auto length	Length (m)	Has Saturation Flow	Saturation flow source	Saturation flow (PCU/hr)	Auto-calculate cell saturation flow	Cell saturation flow (PCU/hr)	Is signal controlled	Is give way	Traffic type	Allow Nearside Turn On Red
1	1	(untitled)			200.00	✓	Sum of lanes	1965					Normal	
2	1	(untitled)			45.00	✓	Sum of lanes	1965		1965	✓		Normal	
	2	(untitled)			45.00	✓	Sum of lanes	2105		2105	✓		Normal	
3	2	(untitled)			200.00	✓	Sum of lanes	1717			✓		Normal	
6	1	(untitled)			200.00								Normal	
7	1	(untitled)			200.00								Normal	
8	2	(untitled)			37.00	✓	Sum of lanes	1762		1762			Normal	
10	2	(untitled)			32.00	✓	Sum of lanes	1762		1762			Normal	
11	1	(untitled)			200.00								Normal	
12	1				13.00	✓	Sum of lanes	2105				✓	Normal	
13	2	(untitled)			200.00	✓	Sum of lanes	1665			✓		Normal	
14	1	(untitled)			200.00	✓	Sum of lanes	1965			✓		Normal	
15	1	(untitled)		✓	434.71								Normal	
16	1				9.00	✓	Sum of lanes	1915				✓	Normal	

Lanes

Arm	Traffic Stream	Lane	Name	Description	Use RR67	Surface condition	Site quality factor	Gradient (%)	Width (m)	Use connector turning radius	Proportion that turn (%)	Turning radius (m)	Nearside lane	Saturation flow (PCU/hr)
1	1	1	(untitled)		✓	N/A	N/A	0	3.50	✓	0	99999.00	✓	1965
2	1	1	(untitled)		✓	N/A	N/A	0	3.50	✓	0	99999.00	✓	1965
	2	1	(untitled)		✓	N/A	N/A	0	3.50	✓	0	99999.00		2105
3	2	1	(untitled)		✓	N/A	N/A	0	3.60		100	10.00	✓	1717
6	1	1	(untitled)											
7	1	1	(untitled)											
8	2	1	(untitled)		✓	N/A	N/A	0	3.50		100	13.00	✓	1762
10	2	1	(untitled)		✓	N/A	N/A	0	3.50		100	13.00	✓	1762
11	1	1	(untitled)											
12	1	1	(untitled)		✓	N/A	N/A	0	3.50		0	10.00		2105
13	2	1	(untitled)		✓	N/A	N/A	0	3.00		100	10.00	✓	1665
14	1	1	(untitled)		✓	N/A	N/A	0	3.50	✓	0	99999.00	✓	1965
15	1	1	(untitled)											
16	1	1	(untitled)		✓	N/A	N/A	0	3.00		0	10.00	✓	1915

Modelling

Arm	Traffic Stream	Traffic model	Stop weighting multiplier (%)	Delay weighting multiplier (%)	Assignment Cost Weighting (%)	Exclude from results calculation	Max queue storage (PCU)	Has queue limit	Queue limit (PCU)	Excess queue penalty (£)	Has degree of saturation limit
1	1	NetworkDefault	100	100	100		0.00				
2	1	Flare	100	100	100		0.00				
	2	Flare	100	100	100		0.00				
3	2	NetworkDefault	100	100	100		0.00				
6	1	NetworkDefault	100	100	100		0.00				
7	1	NetworkDefault	100	100	100		0.00				
8	2	CTM	100	100	100		0.00				
10	2	CTM	100	100	100		0.00				
11	1	NetworkDefault	100	100	100		0.00				
12	1	Flare	100	100	100		3.00	✓	3.00	500.00	
13	2	NetworkDefault	100	100	100		0.00				
14	1	NetworkDefault	100	100	100		0.00				
15	1	NetworkDefault	100	100	100		0.00				
16	1	Flare	100	100	100		1.00	✓	1.00	500.00	

Modelling - Advanced

Arm	Traffic Stream	Initial queue (PCU)	Type of Vehicle-in-Service	Vehicle-in-Service	Type of random parameter	Random parameter	Auto cycle time	Cycle time
(ALL)	(ALL)	0.00	NetworkDefault	Not-Included	NetworkDefault	0.50	✓	120

Normal traffic - Modelling

Arm	Traffic Stream	Stop weighting (%)	Delay weighting (%)
(ALL)	(ALL)	100	100

Normal traffic - Advanced

Arm	Traffic Stream	Dispersion type for Normal Traffic
(ALL)	(ALL)	NetworkDefault

Flows

Arm	Traffic Stream	Total Flow (PCU/hr)	Normal Flow (PCU/hr)
1	1	1135	1135
2	1	1118	1118
	2	17	17
3	2	254	254
6	1	683	683
7	1	84	84
8	2	1333	1333
10	2	711	711
11	1	479	479
12	1	17	17
13	2	121	121
14	1	751	751
15	1	1015	1015
16	1	151	151

Signals

Arm	Traffic Stream	Controller stream	Phase	Second phase enabled
2	1	1	A	
	2	1	A	
3	2	1	D	
13	2	1	C	
14	1	1	B	

Entry Sources

Arm	Traffic Stream	Cruise time for Normal Traffic (s)	Cruise speed for Normal Traffic (kph)
(ALL)	(ALL)	24.00	30.00

Sources

Arm	Traffic Stream	Source	Source traffic stream	Destination traffic stream	Cruise time for Normal Traffic (s)	Cruise speed for Normal Traffic (kph)	Auto turning radius	Traffic turn style	Turning radius (m)
2	1	1	1/1	2/1	5.40	30.00	✓	Straight	Straight Movement
	2	1	1/1	2/2	5.40	30.00	✓	Straight	Straight Movement
6	1	1	10/2	6/1	24.00	30.00	✓	Straight	Straight Movement
7	1	1	10/2	7/1	24.00	30.00	✓	Nearside	69.54
8	2	1	2/1	8/2	4.44	30.00	✓	Straight	Straight Movement
10	2	1	13/2	10/2	3.84	30.00	✓	Straight	Straight Movement
11	1	1	16/1	11/1	24.00	30.00	✓	Offside	82.53
12	1	1	2/2	12/1	1.56	30.00	✓	Straight	Straight Movement
15	1	1	8/2	15/1	52.16	30.00	✓	Straight	Straight Movement
16	1	1	14/1	16/1	1.08	30.00	✓	Straight	Straight Movement
6	1	2	3/2	6/1	24.00	30.00	✓	Straight	Straight Movement
7	1	2	12/1	7/1	24.00	30.00	✓	Offside	30.85
8	2	2	3/2	8/2	4.44	30.00	✓	Straight	Straight Movement
10	2	2	14/1	10/2	3.84	30.00	✓	Straight	Straight Movement
11	1	2	8/2	11/1	24.00	30.00	✓	Nearside	99.52
15	1	2	13/2	15/1	52.16	30.00	✓	Straight	Straight Movement

Give Way Data

Arm	Traffic Stream	Opposed traffic	Use Step-wise Opposed Turn Model	Number of storage spaces	Use connector turning radius	Radius of turn (m)	Visibility restricted
12	1	AllTraffic	✓	2		13.00	
16	1	AllTraffic	✓	2		10.00	

Give Way Data - All Movements - Conflicts

Traffic Stream	Description	Controlling type	Controlling traffic stream	Percentage opposing (%)	Upstream signals visible	Conflict shift	Conflict duration
1		TrafficStream	10/2	100		2	2
		TrafficStream	8/2	100		2	2

Local OD Matrix - Local Matrix: 1

Local Matrix Options

OD Matrix	Name	Use for point to point table	Auto calculate	Allocation mode	Allow paths past exit locations	Allow looped paths on arms	Allow looped paths on traffic nodes	Copy flows	Matrix to copy flows from	Limit paths by length	Path length limit multiplier	Limit paths by number	Path number limit
1	(untitled)	✓	✓	Path Equalisation			✓			✓	1.25		

Normal Input Flows (PCU/hr)

		To			
		1	2	3	4
From	1	0	139	979	17
	2	94	0	10	17
	3	550	151	0	50
	4	39	189	26	0

Bus Input Flows not shown as they are blank.

Tram Input Flows not shown as they are blank.

Pedestrian Input Flows not shown as they are blank.

Locations

OD Matrix	Location	Name	Entries	Exits	Colour
1	1	(untitled)	1/1	6/1	#0000FF
	2	(untitled)	13/2	11/1	#00FF00
	3	(untitled)	14/1	15/1	#FFFF00
	4	(untitled)	3/2	7/1	#FFFF00

Normal Paths and Flows

OD Matrix	Path	Description	From location	To location	Path items	Allocation type	Normal Calculated Flow (PCU/hr)
1	3		1	3	1/1, 2/1, 8/2, 15/1	Normal	979
	5		3	1	14/1, 10/2, 6/1	Normal	550
	9		1	4	1/1, 2/2, 12/1, 7/1	Normal	17
	10		4	1	3/2, 6/1	Normal	39
	11		4	2	3/2, 8/2, 11/1	Normal	189
	12		4	3	3/2, 8/2, 15/1	Normal	26
	14		2	1	13/2, 10/2, 6/1	Normal	94
	15		2	4	13/2, 10/2, 7/1	Normal	17
	16		3	4	14/1, 10/2, 7/1	Normal	50
	17		3	2	14/1, 16/1, 11/1	Normal	151
	18		1	2	1/1, 2/1, 8/2, 11/1	Normal	139
	19		2	3	13/2, 15/1	Normal	10

Signal Timings

Network Default: 120s cycle time; 120 steps

Controller Stream 1

Controller Stream	Name	Description	Use sequence	Cycle time source	Cycle time (s)
1	(untitled)		1	NetworkDefault	120

Controller Stream 1 - Properties

Controller Stream	Manufacturer name	Type	Model number	(Telephone) Line Number	Site number	Grid reference	Gaining delay type
1	Unspecified						Absolute

Controller Stream 1 - Optimisation

Controller Stream	Allow offset optimisation	Allow green split optimisation	Optimisation level	Auto redistribute	Enable stage constraint
1	✓	✓	Offsets And Green Splits		

Phases

Controller Stream	Phase	Name	Minimum green (s)	Maximum green (s)	Relative start displacement (s)	Relative end displacement (s)	Type
1	(ALL)	(untitled)	7	300	0	0	Unknown

Library Stages

Controller Stream	Library Stage	Phases in stage	User stage minimum (s)
1	1	A, B	1
	2	C	1
	3	D	1

Losing / Gaining Phase Delays

Controller Stream	Delay	Type	Phase	From stage	To stage	Relative delay	Absolute delay
1	1	Losing	A	2	2	1	
	2	Losing	A	1	2	1	
	3	Losing	B	1	2	5	
	4	Losing	A	1	3	4	
	5	Gaining	A	2	1	0	0
	6	Gaining	B	2	1	0	0

Stage Sequences

Controller Stream	Sequence	Name	Multiple cycling	Stage IDs	Stage ends
1	1	(untitled)	Single	1, 3, 2	51, 68, 84

Intergreen Matrix for Controller Stream 1

		To			
		A	B	C	D
From	A			9	5
	B			5	9
	C	5	5		9
	D	5	5	9	

Banned Stage transitions for Controller Stream 1

		To		
		1	2	3
From	1			
	2			
	3			

Interstage Matrix for Controller Stream 1

		To		
		1	2	3
From	1	0	10	9
	2	5	0	9
	3	5	9	0

Resultant Stages

Controller Stream	Resultant Stage	Is base stage	Library Stage ID	Phases in this stage	Stage start (s)	Stage end (s)	Stage duration (s)	User stage minimum (s)	Stage minimum (s)
1	1	✓	1	A,B	89	51	82	1	7
	2	✓	3	D	60	68	8	1	7
	3	✓	2	C	77	84	7	1	7

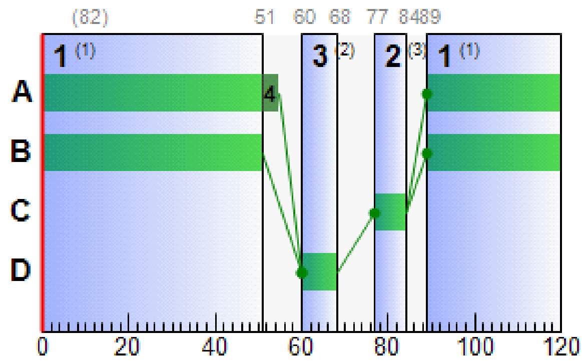
Resultant Phase Green Periods

Controller Stream	Phase	Green period	Is base green period	Start time (s)	End time (s)	Duration (s)
1	A	1	✓	89	55	86
	B	1	✓	89	51	82
	C	1	✓	77	84	7
	D	1	✓	60	68	8

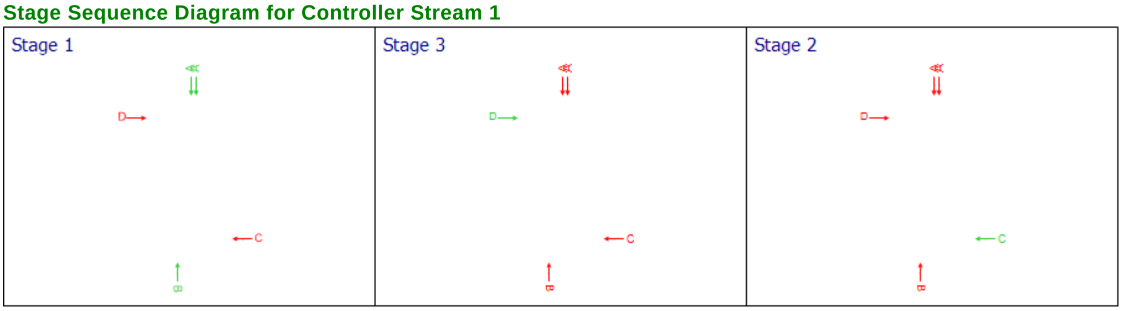
Traffic Stream Green Times

Arm	Traffic Stream	Traffic Node	Controller Stream	Phase	Green Period 1		
					Start	End	Duration
2	**1**		1	A	89	55	86
2	**2**		1	A	89	55	86
3	**2**		1	D	60	68	8
13	**2**		1	C	77	84	7
14	**1**		1	B	89	51	82

Phase Timings Diagram for Controller Stream 1



Stage Sequence Diagram for Controller Stream 1



Resultant penalties

Time Segment	Controller stream	Phase min max penalty (£ per hr)	Intergreen broken penalty (£ per hr)	Stage constraint broken penalty (£ per hr)	Cost of controller stream penalties (£ per hr)
08:00-09:00	**1**	0.00	0.00	0.00	0.00

Traffic Stream Results

Traffic Stream Results: Vehicle summary

Time Segment	Arm	Traffic Stream	Degree of saturation (%)	Practical reserve capacity (%)	Calculated flow entering (PCU/hr)	Calculated sat flow (PCU/hr)	Actual green (s (per cycle))	Mean Delay per Veh (s)	Mean max queue (PCU)	Utilised storage (%)	Weighted cost of delay (£ per hr)	Weighted cost of stops (£ per hr)	Performance Index (£ per hr)
08:00-09:00	1	1	75	21	1135	1965	120	9.41	20.95	60.22	42.13	7.33	49.46
	2	1	84	7	1118	1965	86	13.45	9.42	120.40	59.32	3.53	62.85
		2	1	7979	17	2105	86	4.25	0.11	1.41	0.29	0.04	0.33
	3	2	197	-54	254	1717	8	922.68	67.37	193.69	924.42	7.83	932.25
	6	1	0	Unrestricted	381	Unrestricted	120	0.00	0.00	0.00	0.00	0.00	0.00
	7	1	0	Unrestricted	58	Unrestricted	120	0.00	0.00	0.00	0.00	0.00	0.00
	8	2	70	29	1227	1762	120	2.33	0.79	12.34	11.28	0.00	11.28
	10	2	23	295	401	1762	120	0.30	0.03	0.60	0.48	0.00	0.48
	11	1	0	Unrestricted	310	Unrestricted	120	0.00	0.00	0.00	0.00	0.00	0.00
	12	1	1	6448	17	1237	120	0.25	0.07	2.29	0.02	0.02	0.04
	13	2	109	-17	121	1665	7	291.45	11.74	33.75	139.10	3.31	142.41
	14	1	200	-55	751	1965	82	920.04	196.14	563.90	2725.42	23.10	2748.51
	15	1	0	Unrestricted	1001	Unrestricted	120	0.00	0.00	0.00	0.00	0.00	0.00
	16	1	22	312	75	345	120	32.89	1.05	105.13	9.78	0.76	21.34

Traffic Stream Results: Flows and signals

Time Segment	Arm	Traffic Stream	Calculated flow entering (PCU/hr)	Calculated flow out (PCU/hr)	Flow discrepancy (PCU/hr)	Adjusted flow warning	Calculated sat flow (PCU/hr)	Calculated capacity (PCU/hr)	Degree of saturation (%)	DOS Threshold exceeded	Practical reserve capacity (%)	Mean modulus of error	Actual green (s (per cycle))
08:00-09:00	1	1	1135	1135	0		1965	1522	75		21	0.00	120
	2	1	1118	1118	0		1965	1328	84		7	0.36	86
		2	17	17	0		2105	1526	1		7979	0.36	86
	3	2	254	129	0		1717	129	197	✓	-54	0.00	8
	6	1	381	381	302	✓	Unrestricted	Unrestricted	0		Unrestricted	0.80	120
	7	1	58	58	26	✓	Unrestricted	Unrestricted	0		Unrestricted	0.64	120
	8	2	1227	1227	106	✓	1762	1762	70		29	0.44	120
	10	2	401	401	310	✓	1762	1762	23		295	1.35	120
	11	1	310	310	169	✓	Unrestricted	Unrestricted	0		Unrestricted	0.39	120
	12	1	17	17	0		1237	1237	1		6448	0.69	120
	13	2	121	111	0		1665	111	109	✓	-17	0.00	7
	14	1	751	375	0		1965	375	200	✓	-55	0.00	82
	15	1	1001	1001	14	✓	Unrestricted	Unrestricted	0		Unrestricted	0.37	120
	16	1	75	75	76	✓	345	345	22		312	1.45	120

Traffic Stream Results: Stops and delays

Time Segment	Arm	Traffic Stream	Mean Cruise Time per Veh (s)	Mean Delay per Veh (s)	Total delay (PCU-hr/hr)	Weighted cost of delay (£ per hr)	Mean stops per Veh (%)	Total stops (Stops per hr)	Weighted cost of stops (£ per hr)
08:00-09:00	1	1	24.00	9.41	2.97	42.13	51.53	584.86	7.33
	2	1	5.40	13.45	4.18	59.32	25.20	281.73	3.53
		2	5.40	4.25	0.02	0.29	19.46	3.31	0.04
	3	2	24.00	922.68	65.10	924.42	485.00	624.55	7.83
	6	1	24.00	0.00	0.00	0.00	0.00	0.00	0.00
	7	1	24.00	0.00	0.00	0.00	0.00	0.00	0.00
	8	2	4.44	2.33	0.79	11.28	0.00	0.00	0.00
	10	2	3.84	0.30	0.03	0.48	0.00	0.00	0.00
	11	1	24.00	0.00	0.00	0.00	0.00	0.00	0.00
	12	1	1.56	0.25	0.00	0.02	9.47	1.61	0.02
	13	2	24.00	291.45	9.80	139.10	237.84	264.00	3.31
	14	1	24.00	920.04	191.93	2725.42	491.35	1842.14	23.10
	15	1	52.16	0.00	0.00	0.00	0.00	0.00	0.00
	16	1	1.08	32.89	0.69	9.78	80.69	60.83	0.76

Traffic Stream Results: Queues and blocking

Time Segment	Arm	Traffic Stream	Initial queue (PCU)	Mean max queue (PCU)	Max queue storage (PCU)	Utilised storage (%)	Excess queue penalty (£ per hr)	Wasted time total (s (per cycle))	Estimated blocking
08:00-09:00	1	1	0.00	20.95	34.78	60.22	0.00	27.07	
	2	1	0.00	9.42	7.83	120.40	0.00	5.89	
		2	0.00	0.11	7.83	1.41	0.00	86.00	
	3	2	0.00	67.37	34.78	193.69	0.00	0.00	
	6	1	0.00	0.00	34.78	0.00	0.00	31.00	
	7	1	0.00	0.00	34.78	0.00	0.00	76.00	
	8	2	0.00	0.79	6.43	12.34	0.00	24.00	
	10	2	0.00	0.03	5.57	0.60	0.00	81.00	
	11	1	0.00	0.00	34.78	0.00	0.00	0.00	
	12	1	0.00	0.07	3.00	2.29	0.00	117.00	
	13	2	0.00	11.74	34.78	33.75	0.00	0.00	
	14	1	0.00	196.14	34.78	563.90	0.00	60.10	
	15	1	0.00	0.00	75.60	0.00	0.00	0.00	
	16	1	0.00	1.05	1.00	105.13	10.80	25.00	

Traffic Stream Results: Flare

Time Segment	Arm	Traffic Stream	Flare present	Flare components	Degree of saturation (%)	Mean max queue (PCU)	Calculated capacity (PCU/hr)	Practical reserve capacity (%)
08:00-09:00	1	1	✓	CTM flare: 1/1,2/1,2/2	85	30.48	1335	6

Traffic Stream Results: Advanced

Time Segment	Arm	Traffic Stream	Degree of saturation penalty (£ per hr)	Ped gap accepting penalty (£ per hr)	Warmed up	Mean Max Queue EoTS (PCU)	Max End of Green Queue EoTS (PCU)	Max End of Red Queue EoTS (PCU)	PCU Factor	Cost of traffic penalties (£ per hr)	Performance Index (£ per hr)
08:00-09:00	1	1	0.00	0.00	✓	20.95			1.00	0.00	49.46
	2	1	0.00	0.00	✓	9.45	2.21	9.45	1.00	0.00	62.85
		2	0.00	0.00	✓	0.11	0.00	0.11	1.00	0.00	0.33
	3	2	0.00	0.00	✓	129.99	125.73	129.70	1.00	0.00	932.25
	6	1	0.00	0.00	✓	0.00			1.00	0.00	0.00
	7	1	0.00	0.00	✓	0.00			1.00	0.00	0.00
	8	2	0.00	0.00	✓	0.80			1.00	0.00	11.28
	10	2	0.00	0.00	✓	0.03			1.00	0.00	0.48
	11	1	0.00	0.00	✓	0.00			1.00	0.00	0.00
	12	1	0.00	0.00	✓	0.07			1.00	0.00	0.04
	13	2	0.00	0.00	✓	17.43	13.76	17.22	1.00	0.00	142.41
	14	1	0.00	0.00	✓	384.18	378.91	382.76	1.00	0.00	2748.51
	15	1	0.00	0.00	✓	0.00			1.00	0.00	0.00
	16	1	0.00	0.00	✓	1.05			1.00	10.80	21.34

Network Results

Run Summary

Analysis set used	Run start time	Run finish time	Modelling start time (HH:mm)	Network Cycle Time (s)	Performance Index (£ per hr)	Total network delay (PCU-hr/hr)	Highest DOS (%)	Item with highest DOS	Number of oversaturated items	Percentage of oversaturated items (%)	Item with worst signalised PRC	Item with worst unsignalised PRC	Ite wit wor over PR
7	09/03/2020 10:56:34	09/03/2020 10:56:34	08:00	120	3968.94	275.51	200.31	14/1	3	21	14/1	1/1	14/

Network Results: Vehicle summary

Time Segment	Degree of saturation (%)	Practical reserve capacity (%)	Calculated flow entering (PCU/hr)	Actual green (s (per cycle))	Mean Delay per Veh (s)	Weighted cost of delay (£ per hr)	Weighted cost of stops (£ per hr)	Performance Index (£ per hr)
08:00-09:00	200	-55	6866	1349	144.45	3912.22	45.93	3968.94

Network Results: Flows and signals

Time Segment	Calculated flow entering (PCU/hr)	Calculated flow out (PCU/hr)	Flow discrepancy (PCU/hr)	Adjusted flow warning	Degree of saturation (%)	DOS Threshold exceeded	Practical reserve capacity (%)	Actual green (s (per cycle))
08:00-09:00	6866	6355	1003	✓	200	✓	-55	1349

Network Results: Stops and delays

Time Segment	Mean Cruise Time per Veh (s)	Mean Delay per Veh (s)	Total delay (PCU-hr/hr)	Weighted cost of delay (£ per hr)	Mean stops per Veh (%)	Total stops (Stops per hr)	Weighted cost of stops (£ per hr)
08:00-09:00	20.05	144.45	275.51	3912.22	89.45	3663.03	45.93

Network Results: Queues and blocking

Time Segment	Utilised storage (%)	Excess queue penalty (£ per hr)	Wasted time total (s (per cycle))
08:00-09:00	563.90	10.80	533.06

Network Results: Advanced

Time Segment	Degree of saturation penalty (£ per hr)	Ped gap accepting penalty (£ per hr)	Warmed up	PCU Factor	Cost of traffic penalties (£ per hr)	Controller stream penalties (£ per hr)	Performance Index (£ per hr)
08:00-09:00	0.00	0.00	✓	1.00	10.80	0.00	3968.94

Point to Point Journey Time

Average Journey Time (s) for Local Matrix: 1

		To			
		1	2	3	4
From	1	0.0	83.0	111.2	68.9
	2	343.6	0.0	367.6	343.6
	3	972.2	1002.0	0.0	972.2
	4	970.7	977.4	1005.6	0.0

Path Journey Time

Path	From Location	To Location	Normal Calculated Flow (PCU/hr)	Normal journey time (s)	Calculated Total Flow (PCU/hr)	Avg journey time (s)
3	1	3	979	111.20	979	111.20
5	3	1	550	972.18	550	972.18
9	1	4	17	68.87	17	68.87
10	4	1	39	970.68	39	970.68
11	4	2	189	977.45	189	977.45
12	4	3	26	1005.61	26	1005.61
14	2	1	94	343.59	94	343.59
15	2	4	17	343.59	17	343.59
16	3	4	50	972.18	50	972.18
17	3	2	151	1002.01	151	1002.01
18	1	2	139	83.03	139	83.03
19	2	3	10	367.61	10	367.61

Final Prediction Table

Traffic Stream Results

				SIGNALS		FLOWS		PERFORMANCE				PER PCU			QUEUES
Arm	Traffic Stream	Name	Traffic node	Controller stream	Phase	Calculated flow entering (PCU/hr)	Calculated sat flow (PCU/hr)	Actual green (s (per cycle))	Wasted time total (s (per cycle))	Degree of saturation (%)	Practical reserve capacity (%)	JourneyTime (s)	Mean Delay per Veh (s)	Mean stops per Veh (%)	Mean max queue (PCU)
1	1	(untitled)				1135	1965	120	27.07	75	21	33.41	9.41	51.53	20.95
2	1	(untitled)		1	A	1118 <	1965	86	5.89	84	7	18.85	13.45	25.20	9.42 +
	2	(untitled)		1	A	17	2105	86	86.00	1	7979	9.65	4.25	19.46	0.11
3	2	(untitled)		1	D	254 <	1717	8	0.00	197	-54	946.68	922.68	485.00	67.37 +
6	1	(untitled)				381	Unrestricted	120	31.00	0	Unrestricted	24.00	0.00	0.00	0.00
7	1	(untitled)				58	Unrestricted	120	76.00	0	Unrestricted	24.00	0.00	0.00	0.00
8	2	(untitled)				1227	1762	120	24.00	70	29	6.77	2.33	0.00	0.79
10	2	(untitled)				401	1762	120	81.00	23	295	4.14	0.30	0.00	0.03
11	1	(untitled)				310	Unrestricted	120	0.00	0	Unrestricted	24.00	0.00	0.00	0.00
12	1					17	1237	120	117.00	1	6448	1.81	0.25	9.47	0.07
13	2	(untitled)		1	C	121	1665	7	0.00	109	-17	315.45	291.45	237.84	11.74
14	1	(untitled)		1	B	751 <	1965	82	60.10	200	-55	944.04	920.04	491.35	196.14 +
15	1	(untitled)				1001	Unrestricted	120	0.00	0	Unrestricted	52.16	0.00	0.00	0.00
16	1					75 <	345	120	25.00	22	312	33.97	32.89	80.69	1.05 +

Network Results

	Distance travelled (PCU-km/hr)	Time spent (PCU-hr/hr)	Mean journey speed (kph)	Total delay (PCU-hr/hr)	Weighted cost of delay (£ per hr)	Weighted cost of stops (£ per hr)	Excess queue penalty (£ per hr)	Performance Index (£ per hr)
Normal traffic	1147.38	313.75	3.66	275.51	3912.22	45.93	10.80	3968.94
Bus	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tram	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pedestrians								
TOTAL	1147.38	313.75	3.66	275.51	3912.22	45.93	10.80	3968.94

- *< = adjusted flow warning (upstream links/traffic streams are over-saturated)*
- ** = Traffic Stream - Normal, Bus or Tram Stop or Delay weighting has been set to a value other than 100%*
- *^ = Traffic Stream - Normal, Bus or Tram Stop or Delay Path weighting has been set to a value other than 100%*
- *+ = average link/traffic stream excess queue is greater than 0*
- ***P.I. = PERFORMANCE INDEX***

A8 - 2031 DS1 PM
D8 - 2031 DS1 PM*

Summary

Data Errors and Warnings

No errors or warnings

Run Summary

Analysis set used	Run start time	Run finish time	Modelling start time (HH:mm)	Network Cycle Time (s)	Performance Index (£ per hr)	Total network delay (PCU-hr/hr)	Highest DOS (%)	Item with highest DOS	Number of oversaturated items	Percentage of oversaturated items (%)	Item with worst signalised PRC	Item with worst unsignalised PRC	Ite wit wor over PR
8	09/03/2020 10:56:38	09/03/2020 10:56:38	17:00	120	828.22	55.87	109.22	13/2	3	21	13/2	10/2	13/

Analysis Set Details

Name	Description	Demand set	Include in report	Locked
2031 DS1 PM		D8	✓	

Demand Set Details

Name	Description	Composite	Demand sets	Start time (HH:mm)	Locked
2031 DS1 PM				17:00	

Network Options

Network timings

Network cycle time (s)	Restrict to SCOOT cycle times	Time segment length (min)	Number of time segments	Modelled time period (min)
120		60	1	60

Signals options

Start displacement (s)	End displacement (s)
2	3

Advanced

Phase minimum broken penalty (£)	Phase maximum broken penalty (£)	Intergreen broken penalty (£)	Starting Red-with-Amber (s)
10000.00	10000.00	10000.00	2

Traffic options

Traffic model	Vehicle flow scaling factor (%)	Pedestrian flow scaling factor (%)	Cruise times or speeds
Platoon Dispersion (PDM)	100	100	Cruise Speeds

Advanced

Resolution	DOS Threshold (%)	Cruise scaling factor (%)	Use link stop weightings	Use link delay weightings	Exclude pedestrians from results calculation	Random delay mode	Type of Vehicle-in-Service	Type of random parameter	PCU Length (m)	Calculate results for Path Segments	Generate PDM Profile Data
1	90	100	✓	✓		Complex	Uniform (TRANSYT)	Uniform (TRANSYT)	5.75		✓

Normal Traffic parameters

Dispersion type	Dispersion coefficient	Travel time coefficient
Default	35	80

Normal Traffic Types

Name	PCU Factor
Normal	1.00

Bus parameters

Name	PCU Factor	Dispersion type	Acceleration (ms^[-2])	Stationary time coefficient	Cruise time coefficient
Bus	1.00	Default	0.94	30	85

Tram parameters

Name	PCU Factor	Dispersion type	Acceleration (ms^[-2])	Stationary time coefficient	Cruise time coefficient
Tram	1.00	Default	0.94	100	100

Pedestrian parameters

Dispersion type
Default

Optimisation options

Enable optimisation	Auto redistribute	Optimisation level	Enable OUT Profile accuracy
✓		Offsets And Green Splits	✓

Advanced

Optimisation type	Hill climb increments	OUTProfile accuracy	Use enhanced optimisation	Auto optimisation order	Optimisation order	Master controller	Offsets relative to master controller	Master controller offset after each run
Hill Climb (Fast)	15, 40, -1, 15, 40, 1, -1, 1	50, 50, 5, 5, 0.5, 0.5, 0.05, 0.05		✓	1			Do nothing

Economics

Vehicle Monetary Value Of Delay (£ per PCU-hr)	Vehicle Monetary Value Of Stops (£ per 100 stops)	Pedestrian monetary value of delay (£ per Ped-hr)
14.20	2.60	14.20

Arms and Traffic Streams

Arms

Arm	Name	Description	Traffic node
1	(untitled)		
2	(untitled)		
3	(untitled)		
6	(untitled)		
7	(untitled)		
8	(untitled)		
10	(untitled)		
11	(untitled)		
12			
13	(untitled)		
14	(untitled)		
15	(untitled)		
16			

Traffic Streams

Arm	Traffic Stream	Name	Description	Auto length	Length (m)	Has Saturation Flow	Saturation flow source	Saturation flow (PCU/hr)	Auto-calculate cell saturation flow	Cell saturation flow (PCU/hr)	Is signal controlled	Is give way	Traffic type	Allow Nearside Turn On Red
1	1	(untitled)			200.00	✓	Sum of lanes	1965					Normal	
2	1	(untitled)			45.00	✓	Sum of lanes	1965		1965	✓		Normal	
	2	(untitled)			45.00	✓	Sum of lanes	2105		2105	✓		Normal	
3	2	(untitled)			200.00	✓	Sum of lanes	1717			✓		Normal	
6	1	(untitled)			200.00								Normal	
7	1	(untitled)			200.00								Normal	
8	2	(untitled)			37.00	✓	Sum of lanes	1762		1762			Normal	
10	2	(untitled)			32.00	✓	Sum of lanes	1762		1762			Normal	
11	1	(untitled)			200.00								Normal	
12	1				13.00	✓	Sum of lanes	1830				✓	Normal	
13	2	(untitled)			200.00	✓	Sum of lanes	1665			✓		Normal	
14	1	(untitled)			200.00	✓	Sum of lanes	1965			✓		Normal	
15	1	(untitled)		✓	434.71								Normal	
16	1				9.00	✓	Sum of lanes	1665				✓	Normal	

Lanes

Arm	Traffic Stream	Lane	Name	Description	Use RR67	Surface condition	Site quality factor	Gradient (%)	Width (m)	Use connector turning radius	Proportion that turn (%)	Turning radius (m)	Nearside lane	Saturation flow (PCU/hr)
1	1	1	(untitled)		✓	N/A	N/A	0	3.50	✓	0	99999.00	✓	1965
2	1	1	(untitled)		✓	N/A	N/A	0	3.50	✓	0	99999.00	✓	1965
	2	1	(untitled)		✓	N/A	N/A	0	3.50	✓	0	99999.00		2105
3	2	1	(untitled)		✓	N/A	N/A	0	3.60		100	10.00	✓	1717
6	1	1	(untitled)											
7	1	1	(untitled)											
8	2	1	(untitled)		✓	N/A	N/A	0	3.50		100	13.00	✓	1762
10	2	1	(untitled)		✓	N/A	N/A	0	3.50		100	13.00	✓	1762
11	1	1	(untitled)											
12	1	1	(untitled)		✓	N/A	N/A	0	3.50		100	10.00		1830
13	2	1	(untitled)		✓	N/A	N/A	0	3.00		100	10.00	✓	1665
14	1	1	(untitled)		✓	N/A	N/A	0	3.50	✓	0	99999.00	✓	1965
15	1	1	(untitled)											
16	1	1	(untitled)		✓	N/A	N/A	0	3.00		100	10.00	✓	1665

Modelling

Arm	Traffic Stream	Traffic model	Stop weighting multiplier (%)	Delay weighting multiplier (%)	Assignment Cost Weighting (%)	Exclude from results calculation	Max queue storage (PCU)	Has queue limit	Queue limit (PCU)	Excess queue penalty (£)	Has degree of saturation limit
1	1	NetworkDefault	100	100	100		0.00				
2	1	Flare	100	100	100		0.00				
	2	Flare	100	100	100		0.00				
3	2	NetworkDefault	100	100	100		0.00				
6	1	NetworkDefault	100	100	100		0.00				
7	1	NetworkDefault	100	100	100		0.00				
8	2	CTM	100	100	100		0.00				
10	2	CTM	100	100	100		0.00				
11	1	NetworkDefault	100	100	100		0.00				
12	1	Flare	100	100	100		3.00	✓	3.00	500.00	
13	2	NetworkDefault	100	100	100		0.00				
14	1	NetworkDefault	100	100	100		0.00				
15	1	NetworkDefault	100	100	100		0.00				
16	1	Flare	100	100	100		1.00	✓	1.00	500.00	

Modelling - Advanced

Arm	Traffic Stream	Initial queue (PCU)	Type of Vehicle-in-Service	Vehicle-in-Service	Type of random parameter	Random parameter	Auto cycle time	Cycle time
(ALL)	(ALL)	0.00	NetworkDefault	Not-Included	NetworkDefault	0.50	✓	120

Normal traffic - Modelling

Arm	Traffic Stream	Stop weighting (%)	Delay weighting (%)
(ALL)	(ALL)	100	100

Normal traffic - Advanced

Arm	Traffic Stream	Dispersion type for Normal Traffic
(ALL)	(ALL)	NetworkDefault

Flows

Arm	Traffic Stream	Total Flow (PCU/hr)	Normal Flow (PCU/hr)
1	1	541	541
2	1	514	514
	2	27	27
3	2	200	200
6	1	1018	1018
7	1	160	160
8	2	691	691
10	2	1128	1128
11	1	241	241
12	1	27	27
13	2	197	197
14	1	1155	1155
15	1	674	674
16	1	136	136

Signals

Arm	Traffic Stream	Controller stream	Phase	Second phase enabled
2	1	1	A	
	2	1	A	
3	2	1	D	
13	2	1	C	
14	1	1	B	

Entry Sources

Arm	Traffic Stream	Cruise time for Normal Traffic (s)	Cruise speed for Normal Traffic (kph)
(ALL)	(ALL)	24.00	30.00

Sources

Arm	Traffic Stream	Source	Source traffic stream	Destination traffic stream	Cruise time for Normal Traffic (s)	Cruise speed for Normal Traffic (kph)	Auto turning radius	Traffic turn style	Turning radius (m)
2	1	1	1/1	2/1	5.40	30.00	✓	Straight	Straight Movement
	2	1	1/1	2/2	5.40	30.00	✓	Straight	Straight Movement
6	1	1	10/2	6/1	24.00	30.00	✓	Straight	Straight Movement
7	1	1	10/2	7/1	24.00	30.00	✓	Nearside	69.54
8	2	1	2/1	8/2	4.44	30.00	✓	Straight	Straight Movement
10	2	1	13/2	10/2	3.84	30.00	✓	Straight	Straight Movement
11	1	1	16/1	11/1	24.00	30.00	✓	Offside	82.53
12	1	1	2/2	12/1	1.56	30.00	✓	Straight	Straight Movement
15	1	1	8/2	15/1	52.16	30.00	✓	Straight	Straight Movement
16	1	1	14/1	16/1	1.08	30.00	✓	Straight	Straight Movement
6	1	2	3/2	6/1	24.00	30.00	✓	Straight	Straight Movement
7	1	2	12/1	7/1	24.00	30.00	✓	Offside	30.85
8	2	2	3/2	8/2	4.44	30.00	✓	Straight	Straight Movement
10	2	2	14/1	10/2	3.84	30.00	✓	Straight	Straight Movement
11	1	2	8/2	11/1	24.00	30.00	✓	Nearside	99.52
15	1	2	13/2	15/1	52.16	30.00	✓	Straight	Straight Movement

Give Way Data

Arm	Traffic Stream	Opposed traffic	Use Step-wise Opposed Turn Model	Number of storage spaces	Use connector turning radius	Radius of turn (m)	Visibility restricted
12	1	AllTraffic	✓	2		13.00	
16	1	AllTraffic	✓	2		10.00	

Give Way Data - All Movements - Conflicts

Traffic Stream	Description	Controlling type	Controlling traffic stream	Percentage opposing (%)	Upstream signals visible	Conflict shift	Conflict duration
1		TrafficStream	10/2	100		2	2
		TrafficStream	8/2	100		2	2

Local OD Matrix - Local Matrix: 1

Local Matrix Options

OD Matrix	Name	Use for point to point table	Auto calculate	Allocation mode	Allow paths past exit locations	Allow looped paths on arms	Allow looped paths on traffic nodes	Copy flows	Matrix to copy flows from	Limit paths by length	Path length limit multiplier	Limit paths by number	Path number limit
1	(untitled)	✓	✓	Path Equalisation			✓			✓	1.25		

Normal Input Flows (PCU/hr)

		To			
		1	2	3	4
From	1	0	55	459	27
	2	89	0	88	20
	3	906	136	0	113
	4	23	50	127	0

Bus Input Flows not shown as they are blank.

Tram Input Flows not shown as they are blank.

Pedestrian Input Flows not shown as they are blank.

Locations

OD Matrix	Location	Name	Entries	Exits	Colour
1	1	(untitled)	1/1	6/1	#0000FF
	2	(untitled)	13/2	11/1	#00FF00
	3	(untitled)	14/1	15/1	#FFFF00
	4	(untitled)	3/2	7/1	#FFFF00

Normal Paths and Flows

OD Matrix	Path	Description	From location	To location	Path items	Allocation type	Normal Calculated Flow (PCU/hr)
1	3		1	3	1/1, 2/1, 8/2, 15/1	Normal	459
	5		3	1	14/1, 10/2, 6/1	Normal	906
	9		1	4	1/1, 2/2, 12/1, 7/1	Normal	27
	10		4	1	3/2, 6/1	Normal	23
	11		4	2	3/2, 8/2, 11/1	Normal	50
	12		4	3	3/2, 8/2, 15/1	Normal	127
	14		2	1	13/2, 10/2, 6/1	Normal	89
	15		2	4	13/2, 10/2, 7/1	Normal	20
	16		3	4	14/1, 10/2, 7/1	Normal	113
	17		3	2	14/1, 16/1, 11/1	Normal	136
	18		1	2	1/1, 2/1, 8/2, 11/1	Normal	55
	19		2	3	13/2, 15/1	Normal	88

Signal Timings

Network Default: 120s cycle time; 120 steps

Controller Stream 1

Controller Stream	Name	Description	Use sequence	Cycle time source	Cycle time (s)
1	(untitled)		1	NetworkDefault	120

Controller Stream 1 - Properties

Controller Stream	Manufacturer name	Type	Model number	(Telephone) Line Number	Site number	Grid reference	Gaining delay type
1	Unspecified						Absolute

Controller Stream 1 - Optimisation

Controller Stream	Allow offset optimisation	Allow green split optimisation	Optimisation level	Auto redistribute	Enable stage constraint
1	✓	✓	Offsets And Green Splits		

Phases

Controller Stream	Phase	Name	Minimum green (s)	Maximum green (s)	Relative start displacement (s)	Relative end displacement (s)	Type
1	(ALL)	(untitled)	7	300	0	0	Unknown

Library Stages

Controller Stream	Library Stage	Phases in stage	User stage minimum (s)
1	1	A, B	1
	2	C	1
	3	D	1

Losing / Gaining Phase Delays

Controller Stream	Delay	Type	Phase	From stage	To stage	Relative delay
1	1	Losing	A	2	2	1
	2	Losing	A	1	2	1
	3	Losing	B	1	2	5
	4	Losing	A	1	3	4

Stage Sequences

Controller Stream	Sequence	Name	Multiple cycling	Stage IDs	Stage ends
1	1	(untitled)	Single	1, 2, 3	52, 74, 95

Intergreen Matrix for Controller Stream 1

		To			
		A	B	C	D
From	A			9	5
	B			5	9
	C	5	5		9
	D	5	5	9	

Banned Stage transitions for Controller Stream 1

		To		
		1	2	3
From	1			
	2			
	3			

Interstage Matrix for Controller Stream 1

		To		
		1	2	3
From	1	0	10	9
	2	5	0	9
	3	5	9	0

Resultant Stages

Controller Stream	Resultant Stage	Is base stage	Library Stage ID	Phases in this stage	Stage start (s)	Stage end (s)	Stage duration (s)	User stage minimum (s)	Stage minimum (s)
1	1	✓	1	A,B	100	52	72	1	6
	2	✓	2	C	62	74	12	1	7
	3	✓	3	D	83	95	12	1	7

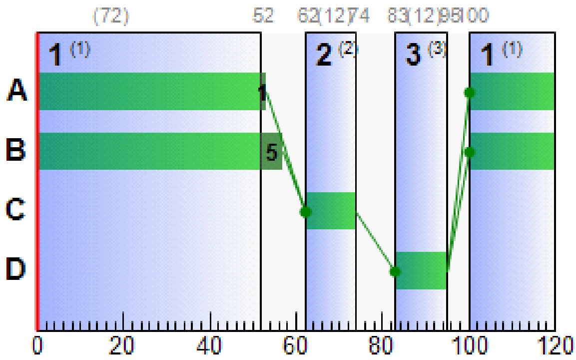
Resultant Phase Green Periods

Controller Stream	Phase	Green period	Is base green period	Start time (s)	End time (s)	Duration (s)
1	A	1	✓	100	53	73
	B	1	✓	100	57	77
	C	1	✓	62	74	12
	D	1	✓	83	95	12

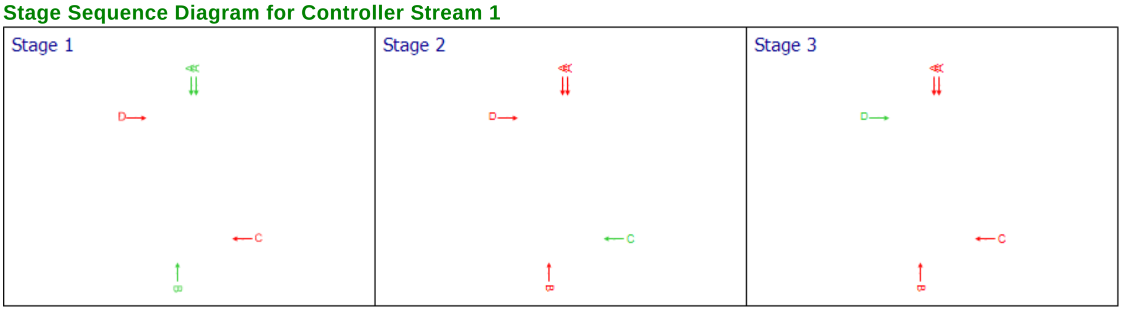
Traffic Stream Green Times

Arm	Traffic Stream	Traffic Node	Controller Stream	Phase	Green Period 1		
					Start	End	Duration
2	**1**		1	A	100	53	73
2	**2**		1	A	100	53	73
3	**2**		1	D	83	95	12
13	**2**		1	C	62	74	12
14	**1**		1	B	100	57	77

Phase Timings Diagram for Controller Stream 1



Stage Sequence Diagram for Controller Stream 1



Resultant penalties

Time Segment	Controller stream	Phase min max penalty (£ per hr)	Intergreen broken penalty (£ per hr)	Stage constraint broken penalty (£ per hr)	Cost of controller stream penalties (£ per hr)
17:00-18:00	**1**	0.00	0.00	0.00	0.00

Traffic Stream Results

Traffic Stream Results: Vehicle summary

Time Segment	Arm	Traffic Stream	Degree of saturation (%)	Practical reserve capacity (%)	Calculated flow entering (PCU/hr)	Calculated sat flow (PCU/hr)	Actual green (s (per cycle))	Mean Delay per Veh (s)	Mean max queue (PCU)	Utilised storage (%)	Weighted cost of delay (£ per hr)	Weighted cost of stops (£ per hr)	Performance Index (£ per hr)
17:00-18:00	1	1	30	202	541	1965	120	0.78	1.87	5.37	1.67	0.56	2.23
	2	1	44	107	514	1965	73	13.26	7.41	94.70	26.88	2.79	29.66
		2	2	4227	27	2105	73	9.04	0.35	4.41	0.96	0.13	1.09
	3	2	108	-16	200	1717	12	246.10	17.06	49.04	194.14	5.13	199.28
	6	1	0	Unrestricted	1006	Unrestricted	120	0.00	0.00	0.00	0.00	0.00	0.00
	7	1	0	Unrestricted	158	Unrestricted	120	0.00	0.00	0.00	0.00	0.00	0.00
	8	2	39	134	679	1762	120	0.64	0.12	1.87	1.71	0.00	1.71
	10	2	63	42	1116	1762	120	1.76	0.54	9.78	7.73	0.00	7.73
	11	1	0	Unrestricted	237	Unrestricted	120	0.00	0.00	0.00	0.00	0.00	0.00
	12	1	6	1422	27	457	120	10.62	0.26	8.66	1.13	0.18	1.31
	13	2	109	-18	197	1665	12	265.20	17.79	51.16	206.08	5.20	211.27
	14	1	100	-10	1155	1965	77	77.00	55.52	159.62	350.78	19.91	370.69
	15	1	0	Unrestricted	658	Unrestricted	120	0.00	0.00	0.00	0.00	0.00	0.00
	16	1	19	365	136	701	120	4.20	1.02	102.32	2.24	0.48	3.24

Traffic Stream Results: Flows and signals

Time Segment	Arm	Traffic Stream	Calculated flow entering (PCU/hr)	Calculated flow out (PCU/hr)	Flow discrepancy (PCU/hr)	Adjusted flow warning	Calculated sat flow (PCU/hr)	Calculated capacity (PCU/hr)	Degree of saturation (%)	DOS Threshold exceeded	Practical reserve capacity (%)	Mean modulus of error	Actual green (s (per cycle))
17:00-18:00	1	1	541	541	0		1965	1817	30		202	0.00	120
	2	1	514	514	0		1965	1181	44		107	0.10	73
		2	27	27	0		2105	1298	2		4227	0.10	73
	3	2	200	186	0		1717	186	108	✓	-16	0.00	12
	6	1	1006	1006	12	✓	Unrestricted	Unrestricted	0		Unrestricted	0.42	120
	7	1	158	158	2	✓	Unrestricted	Unrestricted	0		Unrestricted	0.29	120
	8	2	679	679	12	✓	1762	1762	39		134	0.77	120
	10	2	1116	1116	12	✓	1762	1762	63		42	0.65	120
	11	1	237	237	4	✓	Unrestricted	Unrestricted	0		Unrestricted	0.41	120
	12	1	27	27	0		457	457	6		1422	0.85	120
	13	2	197	180	0		1665	180	109	✓	-18	0.00	12
	14	1	1155	1151	0		1965	1151	100	✓	-10	0.00	77
	15	1	658	658	16	✓	Unrestricted	Unrestricted	0		Unrestricted	0.30	120
	16	1	136	136	0		701	701	19		365	0.81	120

Traffic Stream Results: Stops and delays

Time Segment	Arm	Traffic Stream	Mean Cruise Time per Veh (s)	Mean Delay per Veh (s)	Total delay (PCU-hr/hr)	Weighted cost of delay (£ per hr)	Mean stops per Veh (%)	Total stops (Stops per hr)	Weighted cost of stops (£ per hr)
17:00-18:00	1	1	24.00	0.78	0.12	1.67	8.25	44.65	0.56
	2	1	5.40	13.26	1.89	26.88	43.25	222.32	2.79
		2	5.40	9.04	0.07	0.96	38.36	10.36	0.13
	3	2	24.00	246.10	13.67	194.14	220.15	409.49	5.13
	6	1	24.00	0.00	0.00	0.00	0.00	0.00	0.00
	7	1	24.00	0.00	0.00	0.00	0.00	0.00	0.00
	8	2	4.44	0.64	0.12	1.71	0.00	0.00	0.00
	10	2	3.84	1.76	0.54	7.73	0.00	0.00	0.00
	11	1	24.00	0.00	0.00	0.00	0.00	0.00	0.00
	12	1	1.56	10.62	0.08	1.13	52.60	14.20	0.18
	13	2	24.00	265.20	14.51	206.08	229.71	414.33	5.20
	14	1	24.00	77.00	24.70	350.78	137.93	1587.99	19.91
	15	1	52.16	0.00	0.00	0.00	0.00	0.00	0.00
	16	1	1.08	4.20	0.16	2.24	28.02	37.99	0.48

Traffic Stream Results: Queues and blocking

Time Segment	Arm	Traffic Stream	Initial queue (PCU)	Mean max queue (PCU)	Max queue storage (PCU)	Utilised storage (%)	Excess queue penalty (£ per hr)	Wasted time total (s (per cycle))	Estimated blocking
17:00-18:00	1	1	0.00	1.87	34.78	5.37	0.00	9.02	
	2	1	0.00	7.41	7.83	94.70	0.00	1.86	
		2	0.00	0.35	7.83	4.41	0.00	71.00	
	3	2	0.00	17.06	34.78	49.04	0.00	0.00	
	6	1	0.00	0.00	34.78	0.00	0.00	0.00	
	7	1	0.00	0.00	34.78	0.00	0.00	16.00	
	8	2	0.00	0.12	6.43	1.87	0.00	33.00	
	10	2	0.00	0.54	5.57	9.78	0.00	35.00	
	11	1	0.00	0.00	34.78	0.00	0.00	17.00	
	12	1	0.00	0.26	3.00	8.66	0.00	41.00	
	13	2	0.00	17.79	34.78	51.16	0.00	0.00	
	14	1	0.00	55.52	34.78	159.62	0.00	7.69	
	15	1	0.00	0.00	75.60	0.00	0.00	0.00	
	16	1	0.00	1.02	1.00	102.32	0.52	42.00	

Traffic Stream Results: Flare

Time Segment	Arm	Traffic Stream	Flare present	Flare components	Degree of saturation (%)	Mean max queue (PCU)	Calculated capacity (PCU/hr)	Practical reserve capacity (%)
17:00-18:00	1	1	✓	CTM flare: 1/1,2/1,2/2	45	9.62	1195	99

Traffic Stream Results: Advanced

Time Segment	Arm	Traffic Stream	Degree of saturation penalty (£ per hr)	Ped gap accepting penalty (£ per hr)	Warmed up	Mean Max Queue EoTS (PCU)	Max End of Green Queue EoTS (PCU)	Max End of Red Queue EoTS (PCU)	PCU Factor	Cost of traffic penalties (£ per hr)	Performance Index (£ per hr)
17:00-18:00	1	1	0.00	0.00	✓	1.87			1.00	0.00	2.23
	2	1	0.00	0.00	✓	7.41	0.17	7.31	1.00	0.00	29.66
		2	0.00	0.00	✓	0.35	0.00	0.35	1.00	0.00	1.09
	3	2	0.00	0.00	✓	24.86	18.71	24.24	1.00	0.00	199.28
	6	1	0.00	0.00	✓	0.00			1.00	0.00	0.00
	7	1	0.00	0.00	✓	0.00			1.00	0.00	0.00
	8	2	0.00	0.00	✓	0.12			1.00	0.00	1.71
	10	2	0.00	0.00	✓	0.55			1.00	0.00	7.73
	11	1	0.00	0.00	✓	0.00			1.00	0.00	0.00
	12	1	0.00	0.00	✓	0.26			1.00	0.00	1.31
	13	2	0.00	0.00	✓	26.73	20.77	26.13	1.00	0.00	211.27
	14	1	0.00	0.00	✓	63.54	25.48	38.91	1.00	0.00	370.69
	15	1	0.00	0.00	✓	0.00			1.00	0.00	0.00
	16	1	0.00	0.00	✓	1.02			1.00	0.52	3.24

Network Results

Run Summary

Analysis set used	Run start time	Run finish time	Modelling start time (HH:mm)	Network Cycle Time (s)	Performance Index (£ per hr)	Total network delay (PCU-hr/hr)	Highest DOS (%)	Item with highest DOS	Number of oversaturated items	Percentage of oversaturated items (%)	Item with worst signalised PRC	Item with worst unsignalised PRC	Ite wit wor over PR
8	09/03/2020 10:56:38	09/03/2020 10:56:38	17:00	120	828.22	55.87	109.22	13/2	3	21	13/2	10/2	13/

Network Results: Vehicle summary

Time Segment	Degree of saturation (%)	Practical reserve capacity (%)	Calculated flow entering (PCU/hr)	Actual green (s (per cycle))	Mean Delay per Veh (s)	Weighted cost of delay (£ per hr)	Weighted cost of stops (£ per hr)	Performance Index (£ per hr)
17:00-18:00	109	-18	6649	1327	30.25	793.33	34.37	828.22

Network Results: Flows and signals

Time Segment	Calculated flow entering (PCU/hr)	Calculated flow out (PCU/hr)	Flow discrepancy (PCU/hr)	Adjusted flow warning	Degree of saturation (%)	DOS Threshold exceeded	Practical reserve capacity (%)	Actual green (s (per cycle))
17:00-18:00	6649	6615	60	✓	109	✓	-18	1327

Network Results: Stops and delays

Time Segment	Mean Cruise Time per Veh (s)	Mean Delay per Veh (s)	Total delay (PCU-hr/hr)	Weighted cost of delay (£ per hr)	Mean stops per Veh (%)	Total stops (Stops per hr)	Weighted cost of stops (£ per hr)
17:00-18:00	19.34	30.25	55.87	793.33	42.34	2741.33	34.37

Network Results: Queues and blocking

Time Segment	Utilised storage (%)	Excess queue penalty (£ per hr)	Wasted time total (s (per cycle))
17:00-18:00	159.62	0.52	273.58

Network Results: Advanced

Time Segment	Degree of saturation penalty (£ per hr)	Ped gap accepting penalty (£ per hr)	Warmed up	PCU Factor	Cost of traffic penalties (£ per hr)	Controller stream penalties (£ per hr)	Performance Index (£ per hr)
17:00-18:00	0.00	0.00	✓	1.00	0.52	0.00	828.22

Point to Point Journey Time

Average Journey Time (s) for Local Matrix: 1

		To			
		1	2	3	4
From	1	0.0	72.5	100.7	75.4
	2	318.8	0.0	341.4	318.8
	3	130.6	130.3	0.0	130.6
	4	294.1	299.2	327.3	0.0

Path Journey Time

Path	From Location	To Location	Normal Calculated Flow (PCU/hr)	Normal journey time (s)	Calculated Total Flow (PCU/hr)	Avg journey time (s)
3	1	3	459	100.68	459	100.68
5	3	1	906	130.59	906	130.59
9	1	4	27	75.40	27	75.40
10	4	1	23	294.10	23	294.10
11	4	2	50	299.18	50	299.18
12	4	3	127	327.34	127	327.34
14	2	1	89	318.80	89	318.80
15	2	4	20	318.80	20	318.80
16	3	4	113	130.59	113	130.59
17	3	2	136	130.27	136	130.27
18	1	2	55	72.52	55	72.52
19	2	3	88	341.37	88	341.37

Final Prediction Table

Traffic Stream Results

				SIGNALS		FLOWS		PERFORMANCE				PER PCU			QUEUES
Arm	Traffic Stream	Name	Traffic node	Controller stream	Phase	Calculated flow entering (PCU/hr)	Calculated sat flow (PCU/hr)	Actual green (s (per cycle))	Wasted time total (s (per cycle))	Degree of saturation (%)	Practical reserve capacity (%)	JourneyTime (s)	Mean Delay per Veh (s)	Mean stops per Veh (%)	Mean max queue (PCU)
1	1	(untitled)				541	1965	120	9.02	30	202	24.78	0.78	8.25	1.87
2	1	(untitled)		1	A	514	1965	73	1.86	44	107	18.66	13.26	43.25	7.41
	2	(untitled)		1	A	27	2105	73	71.00	2	4227	14.44	9.04	38.36	0.35
3	2	(untitled)		1	D	200	1717	12	0.00	108	-16	270.10	246.10	220.15	17.06
6	1	(untitled)				1006	Unrestricted	120	0.00	0	Unrestricted	24.00	0.00	0.00	0.00
7	1	(untitled)				158	Unrestricted	120	16.00	0	Unrestricted	24.00	0.00	0.00	0.00
8	2	(untitled)				679	1762	120	33.00	39	134	5.08	0.64	0.00	0.12
10	2	(untitled)				1116	1762	120	35.00	63	42	5.60	1.76	0.00	0.54
11	1	(untitled)				237	Unrestricted	120	17.00	0	Unrestricted	24.00	0.00	0.00	0.00
12	1					27	457	120	41.00	6	1422	12.18	10.62	52.60	0.26
13	2	(untitled)		1	C	197	1665	12	0.00	109	-18	289.20	265.20	229.71	17.79
14	1	(untitled)		1	B	1155 <	1965	77	7.69	100	-10	101.00	77.00	137.93	55.52 +
15	1	(untitled)				658	Unrestricted	120	0.00	0	Unrestricted	52.16	0.00	0.00	0.00
16	1					136 <	701	120	42.00	19	365	5.28	4.20	28.02	1.02 +

Network Results

	Distance travelled (PCU-km/hr)	Time spent (PCU-hr/hr)	Mean journey speed (kph)	Total delay (PCU-hr/hr)	Weighted cost of delay (£ per hr)	Weighted cost of stops (£ per hr)	Excess queue penalty (£ per hr)	Performance Index (£ per hr)
Normal traffic	1071.42	91.58	11.70	55.87	793.33	34.37	0.52	828.22
Bus	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tram	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pedestrians								
TOTAL	1071.42	91.58	11.70	55.87	793.33	34.37	0.52	828.22

- *< = adjusted flow warning (upstream links/traffic streams are over-saturated)*
- ** = Traffic Stream - Normal, Bus or Tram Stop or Delay weighting has been set to a value other than 100%*
- *^ = Traffic Stream - Normal, Bus or Tram Stop or Delay Path weighting has been set to a value other than 100%*
- *+ = average link/traffic stream excess queue is greater than 0*
- ***P.I. = PERFORMANCE INDEX***

APPENDIX B

TRANSYT 15

Version: 15.5.2.7994
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Filename: 200221 Ardley Crossroads Signalised.t15
Path: \\Bri-vfps-001.pba.int\bri\Projects\39304 Heyford Park Tranche 2\Technical\Transport\Junction Assessments\TRANSYT
Report generation date: 09/03/2020 10:54:39

»A9 - 2031 DS1 Banned NB GW AM : D9 - 2031 DS1 Banned NB GW AM* :
»A10 - 2031 DS1 Banned NB GW PM : D10 - 2031 DS1 Banned NB GW PM* :

File summary

File description

File title	(untitled)
Location	
Site number	
UTCRegion	
Driving side	Left
Date	14/12/2017
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Enumerator	PBA\dcollis
Description	

Model and Results

Enable controller offsets	Enable fuel consumption	Enable quick flares	Display journey time results	Display level of service results	Display blocking and starvation results	Display end of red and green queue results	Display excess queue results	Display separate uniform and random results	Display unweighted results	Display TRANSYT 12 style timings	Display effective greens in results	Display Red-With-Amber	Display End-Of-Green Amber

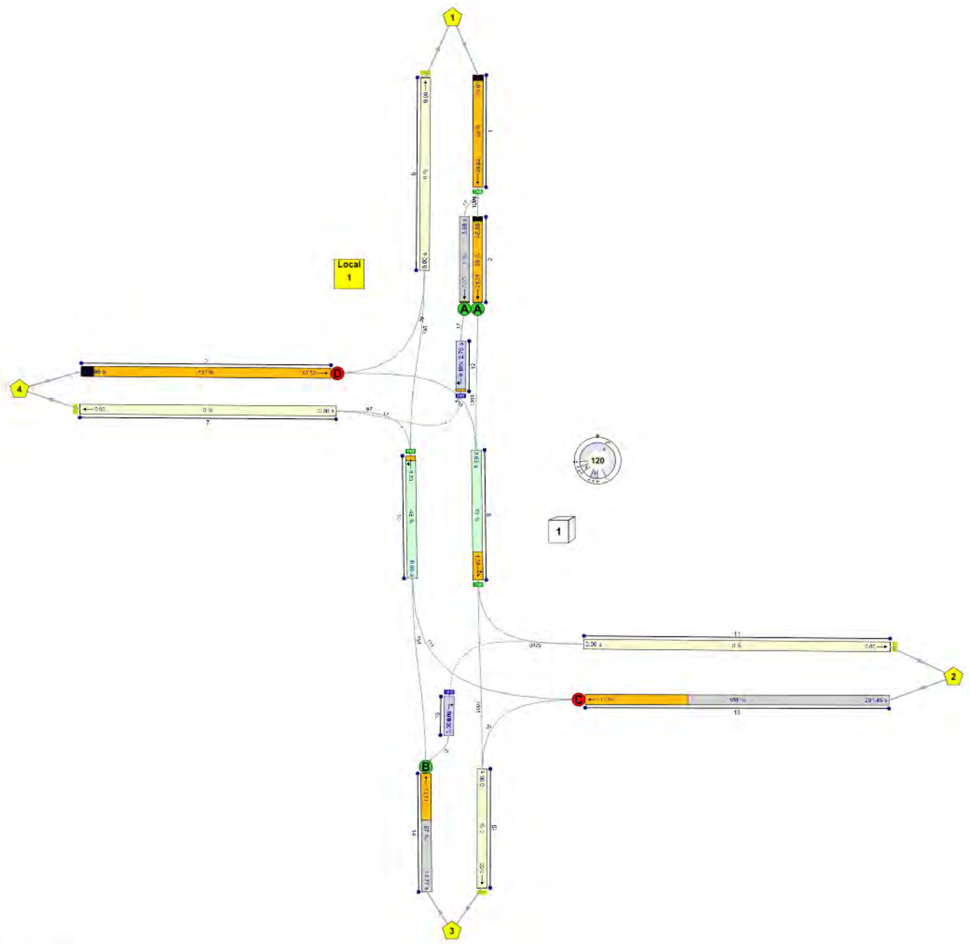
Units

Cost units	Speed units	Distance units	Fuel economy units	Fuel rate units	Mass units	Traffic units input	Traffic units results	Flow units	Average delay units	Total delay units	Rate of delay units
£	kph	m	mpg	l/h	kg	PCU	PCU	perHour	s	-Hour	perHour

Sorting

Show names instead of IDs	Sorting direction	Sorting type	Ignore prefixes when sorting	Analysis/demand set sorting	Link grouping	Source grouping	Colour Analysis/Demand Sets
	Ascending	Numerical		ID	Normal	Normal	✓

Network Diagrams



(untitled)
Cycletime 0s / 120s , Timesteps 119 / 120
9, 9
Diagram produced using TRANSYT 15.5.2.7994

A9 - 2031 DS1 Banned NB GW AM
D9 - 2031 DS1 Banned NB GW AM*

Summary

Data Errors and Warnings

No errors or warnings

Run Summary

Analysis set used	Run start time	Run finish time	Modelling start time (HH:mm)	Network Cycle Time (s)	Performance Index (£ per hr)	Total network delay (PCU-hr/hr)	Highest DOS (%)	Item with highest DOS	Number of oversaturated items	Percentage of oversaturated items (%)	Item with worst signalised PRC	Item with worst unsignalised PRC	Ite wit wor over PR
9	09/03/2020 10:54:30	09/03/2020 10:54:30	08:00	120	1494.08	102.63	197.24	3/2	3	21	3/2	1/1	3/

Analysis Set Details

Name	Description	Demand set	Include in report	Locked
2031 DS1 Banned NB GW AM		D9	✓	

Demand Set Details

Name	Description	Composite	Demand sets	Start time (HH:mm)	Locked
2031 DS1 Banned NB GW AM				08:00	

Network Options

Network timings

Network cycle time (s)	Restrict to SCOOT cycle times	Time segment length (min)	Number of time segments	Modelled time period (min)
120		60	1	60

Signals options

Start displacement (s)	End displacement (s)
2	3

Advanced

Phase minimum broken penalty (£)	Phase maximum broken penalty (£)	Intergreen broken penalty (£)	Starting Red-with-Amber (s)
10000.00	10000.00	10000.00	2

Traffic options

Traffic model	Vehicle flow scaling factor (%)	Pedestrian flow scaling factor (%)	Cruise times or speeds
Platoon Dispersion (PDM)	100	100	Cruise Speeds

Advanced

Resolution	DOS Threshold (%)	Cruise scaling factor (%)	Use link stop weightings	Use link delay weightings	Exclude pedestrians from results calculation	Random delay mode	Type of Vehicle-in-Service	Type of random parameter	PCU Length (m)	Calculate results for Path Segments	Generate PDM Profile Data
1	90	100	✓	✓		Complex	Uniform (TRANSYT)	Uniform (TRANSYT)	5.75		✓

Normal Traffic parameters

Dispersion type	Dispersion coefficient	Travel time coefficient
Default	35	80

Normal Traffic Types

Name	PCU Factor
Normal	1.00

Bus parameters

Name	PCU Factor	Dispersion type	Acceleration (ms^[-2])	Stationary time coefficient	Cruise time coefficient
Bus	1.00	Default	0.94	30	85

Tram parameters

Name	PCU Factor	Dispersion type	Acceleration (ms^[-2])	Stationary time coefficient	Cruise time coefficient
Tram	1.00	Default	0.94	100	100

Pedestrian parameters

Dispersion type
Default

Optimisation options

Enable optimisation	Auto redistribute	Optimisation level	Enable OUT Profile accuracy
✓		Offsets And Green Splits	✓

Advanced

Optimisation type	Hill climb increments	OUTProfile accuracy	Use enhanced optimisation	Auto optimisation order	Optimisation order	Master controller	Offsets relative to master controller	Master controller offset after each run
Hill Climb (Fast)	15, 40, -1, 15, 40, 1, -1, 1	50, 50, 5, 5, 0.5, 0.5, 0.05, 0.05		✓	1			Do nothing

Economics

Vehicle Monetary Value Of Delay (£ per PCU-hr)	Vehicle Monetary Value Of Stops (£ per 100 stops)	Pedestrian monetary value of delay (£ per Ped-hr)
14.20	2.60	14.20

Arms and Traffic Streams

Arms

Arm	Name	Description	Traffic node
1	(untitled)		
2	(untitled)		
3	(untitled)		
6	(untitled)		
7	(untitled)		
8	(untitled)		
10	(untitled)		
11	(untitled)		
12			
13	(untitled)		
14	(untitled)		
15	(untitled)		
16			

Traffic Streams

Arm	Traffic Stream	Name	Description	Auto length	Length (m)	Has Saturation Flow	Saturation flow source	Saturation flow (PCU/hr)	Auto-calculate cell saturation flow	Cell saturation flow (PCU/hr)	Is signal controlled	Is give way	Traffic type	Allow Nearside Turn On Red
1	1	(untitled)			200.00	✓	Sum of lanes	1965					Normal	
2	1	(untitled)			45.00	✓	Sum of lanes	1965		1965	✓		Normal	
	2	(untitled)			45.00	✓	Sum of lanes	2105		2105	✓		Normal	
3	2	(untitled)			200.00	✓	Sum of lanes	1717			✓		Normal	
6	1	(untitled)			200.00								Normal	
7	1	(untitled)			200.00								Normal	
8	2	(untitled)			37.00	✓	Sum of lanes	1762		1762			Normal	
10	2	(untitled)			32.00	✓	Sum of lanes	1762		1762			Normal	
11	1	(untitled)			200.00								Normal	
12	1				13.00	✓	Sum of lanes	2105				✓	Normal	
13	2	(untitled)			200.00	✓	Sum of lanes	1665			✓		Normal	
14	1	(untitled)			200.00	✓	Sum of lanes	1965			✓		Normal	
15	1	(untitled)		✓	434.71								Normal	
16	1				9.00	✓	Sum of lanes	1915				✓	Normal	

Lanes

Arm	Traffic Stream	Lane	Name	Description	Use RR67	Surface condition	Site quality factor	Gradient (%)	Width (m)	Use connector turning radius	Proportion that turn (%)	Turning radius (m)	Nearside lane	Saturation flow (PCU/hr)
1	1	1	(untitled)		✓	N/A	N/A	0	3.50	✓	0	99999.00	✓	1965
2	1	1	(untitled)		✓	N/A	N/A	0	3.50	✓	0	99999.00	✓	1965
	2	1	(untitled)		✓	N/A	N/A	0	3.50	✓	0	99999.00		2105
3	2	1	(untitled)		✓	N/A	N/A	0	3.60		100	10.00	✓	1717
6	1	1	(untitled)											
7	1	1	(untitled)											
8	2	1	(untitled)		✓	N/A	N/A	0	3.50		100	13.00	✓	1762
10	2	1	(untitled)		✓	N/A	N/A	0	3.50		100	13.00	✓	1762
11	1	1	(untitled)											
12	1	1	(untitled)		✓	N/A	N/A	0	3.50		0	10.00		2105
13	2	1	(untitled)		✓	N/A	N/A	0	3.00		100	10.00	✓	1665
14	1	1	(untitled)		✓	N/A	N/A	0	3.50	✓	0	99999.00	✓	1965
15	1	1	(untitled)											
16	1	1	(untitled)		✓	N/A	N/A	0	3.00		0	10.00	✓	1915

Modelling

Arm	Traffic Stream	Traffic model	Stop weighting multiplier (%)	Delay weighting multiplier (%)	Assignment Cost Weighting (%)	Exclude from results calculation	Max queue storage (PCU)	Has queue limit	Queue limit (PCU)	Excess queue penalty (£)	Has degree of saturation limit
1	1	NetworkDefault	100	100	100		0.00				
2	1	Flare	100	100	100		0.00				
	2	Flare	100	100	100		0.00				
3	2	NetworkDefault	100	100	100		0.00				
6	1	NetworkDefault	100	100	100		0.00				
7	1	NetworkDefault	100	100	100		0.00				
8	2	CTM	100	100	100		0.00				
10	2	CTM	100	100	100		0.00				
11	1	NetworkDefault	100	100	100		0.00				
12	1	Flare	100	100	100		3.00	✓	3.00	500.00	
13	2	NetworkDefault	100	100	100		0.00				
14	1	NetworkDefault	100	100	100		0.00				
15	1	NetworkDefault	100	100	100		0.00				
16	1	Flare	100	100	100		1.00	✓	1.00	500.00	

Modelling - Advanced

Arm	Traffic Stream	Initial queue (PCU)	Type of Vehicle-in-Service	Vehicle-in-Service	Type of random parameter	Random parameter	Auto cycle time	Cycle time
(ALL)	(ALL)	0.00	NetworkDefault	Not-Included	NetworkDefault	0.50	✓	120

Normal traffic - Modelling

Arm	Traffic Stream	Stop weighting (%)	Delay weighting (%)
(ALL)	(ALL)	100	100

Normal traffic - Advanced

Arm	Traffic Stream	Dispersion type for Normal Traffic
(ALL)	(ALL)	NetworkDefault

Flows

Arm	Traffic Stream	Total Flow (PCU/hr)	Normal Flow (PCU/hr)
1	1	1286	1286
2	1	1269	1269
	2	17	17
3	2	254	254
6	1	834	834
7	1	84	84
8	2	1484	1484
10	2	862	862
11	1	479	479
12	1	17	17
13	2	121	121
14	1	751	751
15	1	1015	1015
16	1	0	0

Signals

Arm	Traffic Stream	Controller stream	Phase	Second phase enabled
2	1	1	A	
	2	1	A	
3	2	1	D	
13	2	1	C	
14	1	1	B	

Entry Sources

Arm	Traffic Stream	Cruise time for Normal Traffic (s)	Cruise speed for Normal Traffic (kph)
(ALL)	(ALL)	24.00	30.00

Sources

Arm	Traffic Stream	Source	Source traffic stream	Destination traffic stream	Cruise time for Normal Traffic (s)	Cruise speed for Normal Traffic (kph)	Auto turning radius	Traffic turn style	Turning radius (m)
2	1	1	1/1	2/1	5.40	30.00	✓	Straight	Straight Movement
	2	1	1/1	2/2	5.40	30.00	✓	Straight	Straight Movement
6	1	1	10/2	6/1	24.00	30.00	✓	Straight	Straight Movement
7	1	1	10/2	7/1	24.00	30.00	✓	Nearside	69.54
8	2	1	2/1	8/2	4.44	30.00	✓	Straight	Straight Movement
10	2	1	13/2	10/2	3.84	30.00	✓	Straight	Straight Movement
11	1	1	16/1	11/1	24.00	30.00	✓	Offside	82.53
12	1	1	2/2	12/1	1.56	30.00	✓	Straight	Straight Movement
15	1	1	8/2	15/1	52.16	30.00	✓	Straight	Straight Movement
16	1	1	14/1	16/1	1.08	30.00	✓	Straight	Straight Movement
6	1	2	3/2	6/1	24.00	30.00	✓	Straight	Straight Movement
7	1	2	12/1	7/1	24.00	30.00	✓	Offside	30.85
8	2	2	3/2	8/2	4.44	30.00	✓	Straight	Straight Movement
10	2	2	14/1	10/2	3.84	30.00	✓	Straight	Straight Movement
11	1	2	8/2	11/1	24.00	30.00	✓	Nearside	99.52
15	1	2	13/2	15/1	52.16	30.00	✓	Straight	Straight Movement

Give Way Data

Arm	Traffic Stream	Opposed traffic	Use Step-wise Opposed Turn Model	Number of storage spaces	Use connector turning radius	Radius of turn (m)	Visibility restricted
12	1	AllTraffic	✓	2		13.00	
16	1	AllTraffic	✓	2		10.00	

Give Way Data - All Movements - Conflicts

Traffic Stream	Description	Controlling type	Controlling traffic stream	Percentage opposing (%)	Upstream signals visible	Conflict shift	Conflict duration
1		TrafficStream	10/2	100		2	2
		TrafficStream	8/2	100		2	2

Local OD Matrix - Local Matrix: 1

Local Matrix Options

OD Matrix	Name	Use for point to point table	Auto calculate	Allocation mode	Allow paths past exit locations	Allow looped paths on arms	Allow looped paths on traffic nodes	Copy flows	Matrix to copy flows from	Limit paths by length	Path length limit multiplier	Limit paths by number	Path number limit
1	(untitled)	✓	✓	Path Equalisation			✓			✓	1.25		

Normal Input Flows (PCU/hr)

		To			
		1	2	3	4
From	1	0	290	979	17
	2	94	0	10	17
	3	701	0	0	50
	4	39	189	26	0

Bus Input Flows not shown as they are blank.

Tram Input Flows not shown as they are blank.

Pedestrian Input Flows not shown as they are blank.

Locations

OD Matrix	Location	Name	Entries	Exits	Colour
1	1	(untitled)	1/1	6/1	#0000FF
	2	(untitled)	13/2	11/1	#00FF00
	3	(untitled)	14/1	15/1	#FFFF00
	4	(untitled)	3/2	7/1	#FFFF00

Normal Paths and Flows

OD Matrix	Path	Description	From location	To location	Path items	Allocation type	Normal Calculated Flow (PCU/hr)
1	3		1	3	1/1, 2/1, 8/2, 15/1	Normal	979
	5		3	1	14/1, 10/2, 6/1	Normal	701
	9		1	4	1/1, 2/2, 12/1, 7/1	Normal	17
	10		4	1	3/2, 6/1	Normal	39
	11		4	2	3/2, 8/2, 11/1	Normal	189
	12		4	3	3/2, 8/2, 15/1	Normal	26
	14		2	1	13/2, 10/2, 6/1	Normal	94
	15		2	4	13/2, 10/2, 7/1	Normal	17
	16		3	4	14/1, 10/2, 7/1	Normal	50
	17		3	2	14/1, 16/1, 11/1	Normal	0
	18		1	2	1/1, 2/1, 8/2, 11/1	Normal	290
	19		2	3	13/2, 15/1	Normal	10

Signal Timings

Network Default: 120s cycle time; 120 steps

Controller Stream 1

Controller Stream	Name	Description	Use sequence	Cycle time source	Cycle time (s)
1	(untitled)		1	NetworkDefault	120

Controller Stream 1 - Properties

Controller Stream	Manufacturer name	Type	Model number	(Telephone) Line Number	Site number	Grid reference	Gaining delay type
1	Unspecified						Absolute

Controller Stream 1 - Optimisation

Controller Stream	Allow offset optimisation	Allow green split optimisation	Optimisation level	Auto redistribute	Enable stage constraint
1	✓	✓	Offsets And Green Splits		

Phases

Controller Stream	Phase	Name	Minimum green (s)	Maximum green (s)	Relative start displacement (s)	Relative end displacement (s)	Type
1	(ALL)	(untitled)	7	300	0	0	Unknown

Library Stages

Controller Stream	Library Stage	Phases in stage	User stage minimum (s)
1	1	A, B	1
	2	C	1
	3	D	1

Losing / Gaining Phase Delays

Controller Stream	Delay	Type	Phase	From stage	To stage	Relative delay	Absolute delay
1	1	Losing	A	2	2	1	
	2	Losing	A	1	2	1	
	3	Losing	B	1	2	5	
	4	Losing	A	1	3	4	
	5	Gaining	A	2	1	0	0
	6	Gaining	B	2	1	0	0

Stage Sequences

Controller Stream	Sequence	Name	Multiple cycling	Stage IDs	Stage ends
1	1	(untitled)	Single	1, 3, 2	51, 68, 84

Intergreen Matrix for Controller Stream 1

	To				
From		A	B	C	D
	A			9	5
	B			5	9
	C	5	5		9
	D	5	5	9	

Banned Stage transitions for Controller Stream 1

	To			
From		1	2	3
	1			
	2			
	3			

Interstage Matrix for Controller Stream 1

	To			
From		1	2	3
	1	0	10	9
	2	5	0	9
	3	5	9	0

Resultant Stages

Controller Stream	Resultant Stage	Is base stage	Library Stage ID	Phases in this stage	Stage start (s)	Stage end (s)	Stage duration (s)	User stage minimum (s)	Stage minimum (s)
1	1	✓	1	A,B	89	51	82	1	7
	2	✓	3	D	60	68	8	1	7
	3	✓	2	C	77	84	7	1	7

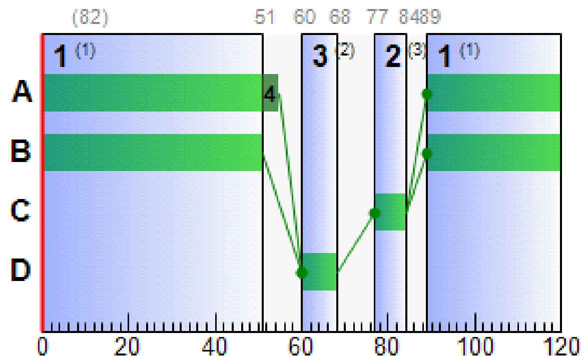
Resultant Phase Green Periods

Controller Stream	Phase	Green period	Is base green period	Start time (s)	End time (s)	Duration (s)
1	A	1	✓	89	55	86
	B	1	✓	89	51	82
	C	1	✓	77	84	7
	D	1	✓	60	68	8

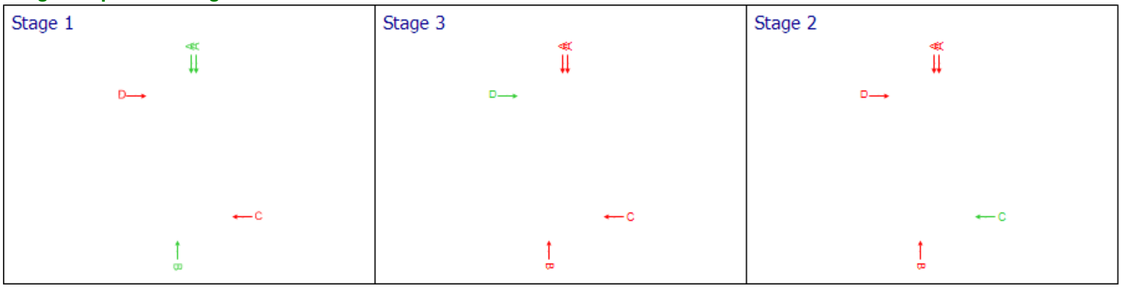
Traffic Stream Green Times

Arm	Traffic Stream	Traffic Node	Controller Stream	Phase	Green Period 1		
					Start	End	Duration
2	**1**		1	A	89	55	86
2	**2**		1	A	89	55	86
3	**2**		1	D	60	68	8
13	**2**		1	C	77	84	7
14	**1**		1	B	89	51	82

Phase Timings Diagram for Controller Stream 1



Stage Sequence Diagram for Controller Stream 1



Resultant penalties

Time Segment	Controller stream	Phase min max penalty (£ per hr)	Intergreen broken penalty (£ per hr)	Stage constraint broken penalty (£ per hr)	Cost of controller stream penalties (£ per hr)
08:00-09:00	**1**	0.00	0.00	0.00	0.00

Traffic Stream Results

Traffic Stream Results: Vehicle summary

Time Segment	Arm	Traffic Stream	Degree of saturation (%)	Practical reserve capacity (%)	Calculated flow entering (PCU/hr)	Calculated sat flow (PCU/hr)	Actual green (s (per cycle))	Mean Delay per Veh (s)	Mean max queue (PCU)	Utilised storage (%)	Weighted cost of delay (£ per hr)	Weighted cost of stops (£ per hr)	Performance Index (£ per hr)
08:00-09:00	1	1	90	1	1286	1965	120	19.91	36.82	105.87	100.99	12.91	113.90
	2	1	99	-9	1269	1965	86	46.86	21.51	274.86	234.55	7.66	242.21
		2	1	7979	17	2105	86	3.98	0.10	1.24	0.27	0.04	0.30
	3	2	197	-54	254	1717	8	922.68	67.37	193.69	924.42	7.83	932.25
	6	1	0	Unrestricted	807	Unrestricted	120	0.00	0.00	0.00	0.00	0.00	0.00
	7	1	0	Unrestricted	83	Unrestricted	120	0.00	0.00	0.00	0.00	0.00	0.00
	8	2	78	15	1378	1762	120	3.63	1.39	21.56	19.70	0.00	19.70
	10	2	48	86	853	1762	120	0.96	0.23	4.07	3.22	0.00	3.22
	11	1	0	Unrestricted	386	Unrestricted	120	0.00	0.00	0.00	0.00	0.00	0.00
	12	1	3	3386	17	659	120	2.76	0.13	4.21	0.19	0.06	0.25
	13	2	109	-17	121	1665	7	291.45	11.74	33.75	139.10	3.31	142.41
	14	1	57	57	751	1965	82	11.77	13.73	39.48	34.86	4.97	39.83
	15	1	0	Unrestricted	1001	Unrestricted	120	0.00	0.00	0.00	0.00	0.00	0.00
	16	1	0	Unrestricted	0	295	120	0.00	0.00	0.00	0.00	0.00	0.00

Traffic Stream Results: Flows and signals

Time Segment	Arm	Traffic Stream	Calculated flow entering (PCU/hr)	Calculated flow out (PCU/hr)	Flow discrepancy (PCU/hr)	Adjusted flow warning	Calculated sat flow (PCU/hr)	Calculated capacity (PCU/hr)	Degree of saturation (%)	DOS Threshold exceeded	Practical reserve capacity (%)	Mean modulus of error	Actual green (s (per cycle))
08:00-09:00	1	1	1286	1286	0		1965	1437	90		1	0.00	120
	2	1	1269	1269	0		1965	1283	99	✓	-9	0.41	86
		2	17	17	0		2105	1526	1		7979	0.41	86
	3	2	254	129	0		1717	129	197	✓	-54	0.00	8
	6	1	807	807	27	✓	Unrestricted	Unrestricted	0		Unrestricted	0.41	120
	7	1	83	83	1	✓	Unrestricted	Unrestricted	0		Unrestricted	0.39	120
	8	2	1378	1378	106	✓	1762	1762	78		15	0.40	120
	10	2	853	853	9	✓	1762	1762	48		86	0.59	120
	11	1	386	386	93	✓	Unrestricted	Unrestricted	0		Unrestricted	0.23	120
	12	1	17	17	0		659	659	3		3386	0.69	120
	13	2	121	111	0		1665	111	109	✓	-17	0.00	7
	14	1	751	751	0		1965	1313	57		57	0.00	82
	15	1	1001	1001	14	✓	Unrestricted	Unrestricted	0		Unrestricted	0.33	120
	16	1	0	0	0		295	295	0		Unrestricted	0.00	120

Traffic Stream Results: Stops and delays

Time Segment	Arm	Traffic Stream	Mean Cruise Time per Veh (s)	Mean Delay per Veh (s)	Total delay (PCU-hr/hr)	Weighted cost of delay (£ per hr)	Mean stops per Veh (%)	Total stops (Stops per hr)	Weighted cost of stops (£ per hr)
08:00-09:00	1	1	24.00	19.91	7.11	100.99	80.06	1029.51	12.91
	2	1	5.40	46.86	16.52	234.55	48.16	611.20	7.66
		2	5.40	3.98	0.02	0.27	17.14	2.91	0.04
	3	2	24.00	922.68	65.10	924.42	485.00	624.55	7.83
	6	1	24.00	0.00	0.00	0.00	0.00	0.00	0.00
	7	1	24.00	0.00	0.00	0.00	0.00	0.00	0.00
	8	2	4.44	3.63	1.39	19.70	0.00	0.00	0.00
	10	2	3.84	0.96	0.23	3.22	0.00	0.00	0.00
	11	1	24.00	0.00	0.00	0.00	0.00	0.00	0.00
	12	1	1.56	2.76	0.01	0.19	30.41	5.17	0.06
	13	2	24.00	291.45	9.80	139.10	237.84	264.00	3.31
	14	1	24.00	11.77	2.45	34.86	52.83	396.77	4.97
	15	1	52.16	0.00	0.00	0.00	0.00	0.00	0.00
	16	1	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Traffic Stream Results: Queues and blocking

Time Segment	Arm	Traffic Stream	Initial queue (PCU)	Mean max queue (PCU)	Max queue storage (PCU)	Utilised storage (%)	Excess queue penalty (£ per hr)	Wasted time total (s (per cycle))	Estimated blocking
08:00-09:00	1	1	0.00	36.82	34.78	105.87	0.00	32.26	
	2	1	0.00	21.51	7.83	274.86	0.00	8.68	
		2	0.00	0.10	7.83	1.24	0.00	86.00	
	3	2	0.00	67.37	34.78	193.69	0.00	0.00	
	6	1	0.00	0.00	34.78	0.00	0.00	0.00	
	7	1	0.00	0.00	34.78	0.00	0.00	26.00	
	8	2	0.00	1.39	6.43	21.56	0.00	24.00	
	10	2	0.00	0.23	5.57	4.07	0.00	29.00	
	11	1	0.00	0.00	34.78	0.00	0.00	0.00	
	12	1	0.00	0.13	3.00	4.21	0.00	93.00	
	13	2	0.00	11.74	34.78	33.75	0.00	0.00	
	14	1	0.00	13.73	34.78	39.48	0.00	2.79	
	15	1	0.00	0.00	75.60	0.00	0.00	0.00	
	16	1	0.00	0.00	1.00	0.00	0.00	120.00	

Traffic Stream Results: Flare

Time Segment	Arm	Traffic Stream	Flare present	Flare components	Degree of saturation (%)	Mean max queue (PCU)	Calculated capacity (PCU/hr)	Practical reserve capacity (%)
08:00-09:00	1	1	✓	CTM flare: 1/1,2/1,2/2	100	58.43	1290	-10

Traffic Stream Results: Advanced

Time Segment	Arm	Traffic Stream	Degree of saturation penalty (£ per hr)	Ped gap accepting penalty (£ per hr)	Warmed up	Mean Max Queue EoTS (PCU)	Max End of Green Queue EoTS (PCU)	Max End of Red Queue EoTS (PCU)	PCU Factor	Cost of traffic penalties (£ per hr)	Performance Index (£ per hr)
08:00-09:00	1	1	0.00	0.00	✓	36.93			1.00	0.00	113.90
	2	1	0.00	0.00	✓	26.08	18.83	26.08	1.00	0.00	242.21
		2	0.00	0.00	✓	0.10	0.00	0.10	1.00	0.00	0.30
	3	2	0.00	0.00	✓	129.99	125.73	129.70	1.00	0.00	932.25
	6	1	0.00	0.00	✓	0.00			1.00	0.00	0.00
	7	1	0.00	0.00	✓	0.00			1.00	0.00	0.00
	8	2	0.00	0.00	✓	1.40			1.00	0.00	19.70
	10	2	0.00	0.00	✓	0.23			1.00	0.00	3.22
	11	1	0.00	0.00	✓	0.00			1.00	0.00	0.00
	12	1	0.00	0.00	✓	0.13			1.00	0.00	0.25
	13	2	0.00	0.00	✓	17.43	13.76	17.22	1.00	0.00	142.41
	14	1	0.00	0.00	✓	13.73	0.38	8.10	1.00	0.00	39.83
	15	1	0.00	0.00	✓	0.00			1.00	0.00	0.00
	16	1	0.00	0.00	✓	0.00			1.00	0.00	0.00

Network Results

Run Summary

Analysis set used	Run start time	Run finish time	Modelling start time (HH:mm)	Network Cycle Time (s)	Performance Index (£ per hr)	Total network delay (PCU-hr/hr)	Highest DOS (%)	Item with highest DOS	Number of oversaturated items	Percentage of oversaturated items (%)	Item with worst signalised PRC	Item with worst unsignalised PRC	Ite wit wor over PR
9	09/03/2020 10:54:30	09/03/2020 10:54:30	08:00	120	1494.08	102.63	197.24	3/2	3	21	3/2	1/1	3/

Network Results: Vehicle summary

Time Segment	Degree of saturation (%)	Practical reserve capacity (%)	Calculated flow entering (PCU/hr)	Actual green (s (per cycle))	Mean Delay per Veh (s)	Weighted cost of delay (£ per hr)	Weighted cost of stops (£ per hr)	Performance Index (£ per hr)
08:00-09:00	197	-54	8223	1349	44.93	1457.29	36.79	1494.08

Network Results: Flows and signals

Time Segment	Calculated flow entering (PCU/hr)	Calculated flow out (PCU/hr)	Flow discrepancy (PCU/hr)	Adjusted flow warning	Degree of saturation (%)	DOS Threshold exceeded	Practical reserve capacity (%)	Actual green (s (per cycle))
08:00-09:00	8223	8087	250	✓	197	✓	-54	1349

Network Results: Stops and delays

Time Segment	Mean Cruise Time per Veh (s)	Mean Delay per Veh (s)	Total delay (PCU-hr/hr)	Weighted cost of delay (£ per hr)	Mean stops per Veh (%)	Total stops (Stops per hr)	Weighted cost of stops (£ per hr)
08:00-09:00	19.11	44.93	102.63	1457.29	43.36	2934.12	36.79

Network Results: Queues and blocking

Time Segment	Utilised storage (%)	Excess queue penalty (£ per hr)	Wasted time total (s (per cycle))
08:00-09:00	274.86	0.00	421.72

Network Results: Advanced

Time Segment	Degree of saturation penalty (£ per hr)	Ped gap accepting penalty (£ per hr)	Warmed up	PCU Factor	Cost of traffic penalties (£ per hr)	Controller stream penalties (£ per hr)	Performance Index (£ per hr)
08:00-09:00	0.00	0.00	✓	1.00	0.00	0.00	1494.08

Point to Point Journey Time

Average Journey Time (s) for Local Matrix: 1

		To			
		1	2	3	4
From	1	0.0	128.2	156.4	81.6
	2	344.2	0.0	367.6	344.2
	3	64.6	0.0	0.0	64.6
	4	970.7	978.7	1006.9	0.0

Path Journey Time

Path	From Location	To Location	Normal Calculated Flow (PCU/hr)	Normal journey time (s)	Calculated Total Flow (PCU/hr)	Avg journey time (s)
3	1	3	979	156.40	979	156.40
5	3	1	701	64.56	701	64.56
9	1	4	17	81.61	17	81.61
10	4	1	39	970.68	39	970.68
11	4	2	189	978.74	189	978.74
12	4	3	26	1006.91	26	1006.91
14	2	1	94	344.24	94	344.24
15	2	4	17	344.24	17	344.24
16	3	4	50	64.56	50	64.56
17	3	2	0	0.00	0	0.00
18	1	2	290	128.23	290	128.23
19	2	3	10	367.61	10	367.61

Final Prediction Table

Traffic Stream Results

				SIGNALS		FLOWS		PERFORMANCE				PER PCU			QUEUES
Arm	**Traffic Stream**	**Name**	**Traffic node**	**Controller stream**	**Phase**	**Calculated flow entering (PCU/hr)**	**Calculated sat flow (PCU/hr)**	**Actual green (s (per cycle))**	**Wasted time total (s (per cycle))**	**Degree of saturation (%)**	**Practical reserve capacity (%)**	**JourneyTime (s)**	**Mean Delay per Veh (s)**	**Mean stops per Veh (%)**	**Mean max queue (PCU)**
1	**1**	(untitled)				1286 <	1965	120	32.26	90	1	43.91	19.91	80.06	36.82 +
2	**1**	(untitled)		1	A	1269 <	1965	86	8.68	99	-9	52.26	46.86	48.16	21.51 +
	2	(untitled)		1	A	17	2105	86	86.00	1	7979	9.38	3.98	17.14	0.10
3	**2**	(untitled)		1	D	254 <	1717	8	0.00	197	-54	946.68	922.68	485.00	67.37 +
6	**1**	(untitled)				807	Unrestricted	120	0.00	0	Unrestricted	24.00	0.00	0.00	0.00
7	**1**	(untitled)				83	Unrestricted	120	26.00	0	Unrestricted	24.00	0.00	0.00	0.00
8	**2**	(untitled)				1378	1762	120	24.00	78	15	8.07	3.63	0.00	1.39
10	**2**	(untitled)				853	1762	120	29.00	48	86	4.80	0.96	0.00	0.23
11	**1**	(untitled)				386	Unrestricted	120	0.00	0	Unrestricted	24.00	0.00	0.00	0.00
12	**1**					17	659	120	93.00	3	3386	4.32	2.76	30.41	0.13
13	**2**	(untitled)		1	C	121	1665	7	0.00	109	-17	315.45	291.45	237.84	11.74
14	**1**	(untitled)		1	B	751	1965	82	2.79	57	57	35.77	11.77	52.83	13.73
15	**1**	(untitled)				1001	Unrestricted	120	0.00	0	Unrestricted	52.16	0.00	0.00	0.00
16	**1**					0	295	120	120.00	0	Unrestricted	0.00	0.00	0.00	0.00

Network Results

	Distance travelled (PCU-km/hr)	Time spent (PCU-hr/hr)	Mean journey speed (kph)	Total delay (PCU-hr/hr)	Weighted cost of delay (£ per hr)	Weighted cost of stops (£ per hr)	Excess queue penalty (£ per hr)	Performance Index (£ per hr)
Normal traffic	1309.15	146.26	8.95	102.63	1457.29	36.79	0.00	1494.08
Bus	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tram	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pedestrians								
TOTAL	1309.15	146.26	8.95	102.63	1457.29	36.79	0.00	1494.08

- *< = adjusted flow warning (upstream links/traffic streams are over-saturated)*
- ** = Traffic Stream - Normal, Bus or Tram Stop or Delay weighting has been set to a value other than 100%*
- *^ = Traffic Stream - Normal, Bus or Tram Stop or Delay Path weighting has been set to a value other than 100%*
- *+ = average link/traffic stream excess queue is greater than 0*
- ***P.I. = PERFORMANCE INDEX***

A10 - 2031 DS1 Banned NB GW PM
D10 - 2031 DS1 Banned NB GW PM*

Summary

Data Errors and Warnings

No errors or warnings

Run Summary

Analysis set used	Run start time	Run finish time	Modelling start time (HH:mm)	Network Cycle Time (s)	Performance Index (£ per hr)	Total network delay (PCU-hr/hr)	Highest DOS (%)	Item with highest DOS	Number of oversaturated items	Percentage of oversaturated items (%)	Item with worst signalised PRC	Item with worst unsignalised PRC	Ite wit wor over PR
10	09/03/2020 10:54:27	09/03/2020 10:54:27	17:00	120	1284.06	88.36	157.76	13/2	2	14	13/2	10/2	13/

Analysis Set Details

Name	Description	Demand set	Include in report	Locked
2031 DS1 Banned NB GW PM		D10	✓	

Demand Set Details

Name	Description	Composite	Demand sets	Start time (HH:mm)	Locked
2031 DS1 Banned NB GW PM				17:00	

Network Options

Network timings

Network cycle time (s)	Restrict to SCOOT cycle times	Time segment length (min)	Number of time segments	Modelled time period (min)
120		60	1	60

Signals options

Start displacement (s)	End displacement (s)
2	3

Advanced

Phase minimum broken penalty (£)	Phase maximum broken penalty (£)	Intergreen broken penalty (£)	Starting Red-with-Amber (s)
10000.00	10000.00	10000.00	2

Traffic options

Traffic model	Vehicle flow scaling factor (%)	Pedestrian flow scaling factor (%)	Cruise times or speeds
Platoon Dispersion (PDM)	100	100	Cruise Speeds

Advanced

Resolution	DOS Threshold (%)	Cruise scaling factor (%)	Use link stop weightings	Use link delay weightings	Exclude pedestrians from results calculation	Random delay mode	Type of Vehicle-in-Service	Type of random parameter	PCU Length (m)	Calculate results for Path Segments	Generate PDM Profile Data
1	90	100	✓	✓		Complex	Uniform (TRANSYT)	Uniform (TRANSYT)	5.75		✓

Normal Traffic parameters

Dispersion type	Dispersion coefficient	Travel time coefficient
Default	35	80

Normal Traffic Types

Name	PCU Factor
Normal	1.00

Bus parameters

Name	PCU Factor	Dispersion type	Acceleration (ms^[-2])	Stationary time coefficient	Cruise time coefficient
Bus	1.00	Default	0.94	30	85

Tram parameters

Name	PCU Factor	Dispersion type	Acceleration (ms^[-2])	Stationary time coefficient	Cruise time coefficient
Tram	1.00	Default	0.94	100	100

Pedestrian parameters

Dispersion type
Default

Optimisation options

Enable optimisation	Auto redistribute	Optimisation level	Enable OUT Profile accuracy
✓		Offsets And Green Splits	✓

Advanced

Optimisation type	Hill climb increments	OUTProfile accuracy	Use enhanced optimisation	Auto optimisation order	Optimisation order	Master controller	Offsets relative to master controller	Master controller offset after each run
Hill Climb (Fast)	15, 40, -1, 15, 40, 1, -1, 1	50, 50, 5, 5, 0.5, 0.5, 0.05, 0.05		✓	1			Do nothing

Economics

Vehicle Monetary Value Of Delay (£ per PCU-hr)	Vehicle Monetary Value Of Stops (£ per 100 stops)	Pedestrian monetary value of delay (£ per Ped-hr)
14.20	2.60	14.20

Arms and Traffic Streams

Arms

Arm	Name	Description	Traffic node
1	(untitled)		
2	(untitled)		
3	(untitled)		
6	(untitled)		
7	(untitled)		
8	(untitled)		
10	(untitled)		
11	(untitled)		
12			
13	(untitled)		
14	(untitled)		
15	(untitled)		
16			

Traffic Streams

Arm	Traffic Stream	Name	Description	Auto length	Length (m)	Has Saturation Flow	Saturation flow source	Saturation flow (PCU/hr)	Auto-calculate cell saturation flow	Cell saturation flow (PCU/hr)	Is signal controlled	Is give way	Traffic type	Allow Nearside Turn On Red
1	1	(untitled)			200.00	✓	Sum of lanes	1965					Normal	
2	1	(untitled)			45.00	✓	Sum of lanes	1965		1965	✓		Normal	
	2	(untitled)			45.00	✓	Sum of lanes	2105		2105	✓		Normal	
3	2	(untitled)			200.00	✓	Sum of lanes	1717			✓		Normal	
6	1	(untitled)			200.00								Normal	
7	1	(untitled)			200.00								Normal	
8	2	(untitled)			37.00	✓	Sum of lanes	1762		1762			Normal	
10	2	(untitled)			32.00	✓	Sum of lanes	1762		1762			Normal	
11	1	(untitled)			200.00								Normal	
12	1				13.00	✓	Sum of lanes	1830				✓	Normal	
13	2	(untitled)			200.00	✓	Sum of lanes	1665			✓		Normal	
14	1	(untitled)			200.00	✓	Sum of lanes	1965			✓		Normal	
15	1	(untitled)		✓	434.71								Normal	
16	1				9.00	✓	Sum of lanes	1665				✓	Normal	

Lanes

Arm	Traffic Stream	Lane	Name	Description	Use RR67	Surface condition	Site quality factor	Gradient (%)	Width (m)	Use connector turning radius	Proportion that turn (%)	Turning radius (m)	Nearside lane	Saturation flow (PCU/hr)
1	1	1	(untitled)		✓	N/A	N/A	0	3.50	✓	0	99999.00	✓	1965
2	1	1	(untitled)		✓	N/A	N/A	0	3.50	✓	0	99999.00	✓	1965
	2	1	(untitled)		✓	N/A	N/A	0	3.50	✓	0	99999.00		2105
3	2	1	(untitled)		✓	N/A	N/A	0	3.60		100	10.00	✓	1717
6	1	1	(untitled)											
7	1	1	(untitled)											
8	2	1	(untitled)		✓	N/A	N/A	0	3.50		100	13.00	✓	1762
10	2	1	(untitled)		✓	N/A	N/A	0	3.50		100	13.00	✓	1762
11	1	1	(untitled)											
12	1	1	(untitled)		✓	N/A	N/A	0	3.50		100	10.00		1830
13	2	1	(untitled)		✓	N/A	N/A	0	3.00		100	10.00	✓	1665
14	1	1	(untitled)		✓	N/A	N/A	0	3.50	✓	0	99999.00	✓	1965
15	1	1	(untitled)											
16	1	1	(untitled)		✓	N/A	N/A	0	3.00		100	10.00	✓	1665

Modelling

Arm	Traffic Stream	Traffic model	Stop weighting multiplier (%)	Delay weighting multiplier (%)	Assignment Cost Weighting (%)	Exclude from results calculation	Max queue storage (PCU)	Has queue limit	Queue limit (PCU)	Excess queue penalty (£)	Has degree of saturation limit
1	1	NetworkDefault	100	100	100		0.00				
2	1	Flare	100	100	100		0.00				
	2	Flare	100	100	100		0.00				
3	2	NetworkDefault	100	100	100		0.00				
6	1	NetworkDefault	100	100	100		0.00				
7	1	NetworkDefault	100	100	100		0.00				
8	2	CTM	100	100	100		0.00				
10	2	CTM	100	100	100		0.00				
11	1	NetworkDefault	100	100	100		0.00				
12	1	Flare	100	100	100		3.00	✓	3.00	500.00	
13	2	NetworkDefault	100	100	100		0.00				
14	1	NetworkDefault	100	100	100		0.00				
15	1	NetworkDefault	100	100	100		0.00				
16	1	Flare	100	100	100		1.00	✓	1.00	500.00	

Modelling - Advanced

Arm	Traffic Stream	Initial queue (PCU)	Type of Vehicle-in-Service	Vehicle-in-Service	Type of random parameter	Random parameter	Auto cycle time	Cycle time
(ALL)	(ALL)	0.00	NetworkDefault	Not-Included	NetworkDefault	0.50	✓	120

Normal traffic - Modelling

Arm	Traffic Stream	Stop weighting (%)	Delay weighting (%)
(ALL)	(ALL)	100	100

Normal traffic - Advanced

Arm	Traffic Stream	Dispersion type for Normal Traffic
(ALL)	(ALL)	NetworkDefault

Flows

Arm	Traffic Stream	Total Flow (PCU/hr)	Normal Flow (PCU/hr)
1	1	677	677
2	1	650	650
	2	27	27
3	2	200	200
6	1	1154	1154
7	1	160	160
8	2	827	827
10	2	1264	1264
11	1	241	241
12	1	27	27
13	2	197	197
14	1	1155	1155
15	1	674	674
16	1	0	0

Signals

Arm	Traffic Stream	Controller stream	Phase	Second phase enabled
2	1	1	A	
	2	1	A	
3	2	1	D	
13	2	1	C	
14	1	1	B	

Entry Sources

Arm	Traffic Stream	Cruise time for Normal Traffic (s)	Cruise speed for Normal Traffic (kph)
(ALL)	(ALL)	24.00	30.00

Sources

Arm	Traffic Stream	Source	Source traffic stream	Destination traffic stream	Cruise time for Normal Traffic (s)	Cruise speed for Normal Traffic (kph)	Auto turning radius	Traffic turn style	Turning radius (m)
2	1	1	1/1	2/1	5.40	30.00	✓	Straight	Straight Movement
	2	1	1/1	2/2	5.40	30.00	✓	Straight	Straight Movement
6	1	1	10/2	6/1	24.00	30.00	✓	Straight	Straight Movement
7	1	1	10/2	7/1	24.00	30.00	✓	Nearside	69.54
8	2	1	2/1	8/2	4.44	30.00	✓	Straight	Straight Movement
10	2	1	13/2	10/2	3.84	30.00	✓	Straight	Straight Movement
11	1	1	16/1	11/1	24.00	30.00	✓	Offside	82.53
12	1	1	2/2	12/1	1.56	30.00	✓	Straight	Straight Movement
15	1	1	8/2	15/1	52.16	30.00	✓	Straight	Straight Movement
16	1	1	14/1	16/1	1.08	30.00	✓	Straight	Straight Movement
6	1	2	3/2	6/1	24.00	30.00	✓	Straight	Straight Movement
7	1	2	12/1	7/1	24.00	30.00	✓	Offside	30.85
8	2	2	3/2	8/2	4.44	30.00	✓	Straight	Straight Movement
10	2	2	14/1	10/2	3.84	30.00	✓	Straight	Straight Movement
11	1	2	8/2	11/1	24.00	30.00	✓	Nearside	99.52
15	1	2	13/2	15/1	52.16	30.00	✓	Straight	Straight Movement

Give Way Data

Arm	Traffic Stream	Opposed traffic	Use Step-wise Opposed Turn Model	Number of storage spaces	Use connector turning radius	Radius of turn (m)	Visibility restricted
12	1	AllTraffic	✓	2		13.00	
16	1	AllTraffic	✓	2		10.00	

Give Way Data - All Movements - Conflicts

Traffic Stream	Description	Controlling type	Controlling traffic stream	Percentage opposing (%)	Upstream signals visible	Conflict shift	Conflict duration
1		TrafficStream	10/2	100		2	2
		TrafficStream	8/2	100		2	2

Local OD Matrix - Local Matrix: 1

Local Matrix Options

OD Matrix	Name	Use for point to point table	Auto calculate	Allocation mode	Allow paths past exit locations	Allow looped paths on arms	Allow looped paths on traffic nodes	Copy flows	Matrix to copy flows from	Limit paths by length	Path length limit multiplier	Limit paths by number	Path number limit
1	(untitled)	✓	✓	Path Equalisation			✓			✓	1.25		

Normal Input Flows (PCU/hr)

		To			
		1	2	3	4
From	1	0	191	459	27
	2	89	0	88	20
	3	1042	0	0	113
	4	23	50	127	0

Bus Input Flows not shown as they are blank.

Tram Input Flows not shown as they are blank.

Pedestrian Input Flows not shown as they are blank.

Locations

OD Matrix	Location	Name	Entries	Exits	Colour
1	1	(untitled)	1/1	6/1	#0000FF
	2	(untitled)	13/2	11/1	#00FF00
	3	(untitled)	14/1	15/1	#FFFF00
	4	(untitled)	3/2	7/1	#FFFF00

Normal Paths and Flows

OD Matrix	Path	Description	From location	To location	Path items	Allocation type	Normal Calculated Flow (PCU/hr)
1	3		1	3	1/1, 2/1, 8/2, 15/1	Normal	459
	5		3	1	14/1, 10/2, 6/1	Normal	1042
	9		1	4	1/1, 2/2, 12/1, 7/1	Normal	27
	10		4	1	3/2, 6/1	Normal	23
	11		4	2	3/2, 8/2, 11/1	Normal	50
	12		4	3	3/2, 8/2, 15/1	Normal	127
	14		2	1	13/2, 10/2, 6/1	Normal	89
	15		2	4	13/2, 10/2, 7/1	Normal	20
	16		3	4	14/1, 10/2, 7/1	Normal	113
	17		3	2	14/1, 16/1, 11/1	Normal	0
	18		1	2	1/1, 2/1, 8/2, 11/1	Normal	191
	19		2	3	13/2, 15/1	Normal	88

Signal Timings

Network Default: 120s cycle time; 120 steps

Controller Stream 1

Controller Stream	Name	Description	Use sequence	Cycle time source	Cycle time (s)
1	(untitled)		1	NetworkDefault	120

Controller Stream 1 - Properties

Controller Stream	Manufacturer name	Type	Model number	(Telephone) Line Number	Site number	Grid reference	Gaining delay type
1	Unspecified						Absolute

Controller Stream 1 - Optimisation

Controller Stream	Allow offset optimisation	Allow green split optimisation	Optimisation level	Auto redistribute	Enable stage constraint
1	✓	✓	Offsets And Green Splits		

Phases

Controller Stream	Phase	Name	Minimum green (s)	Maximum green (s)	Relative start displacement (s)	Relative end displacement (s)	Type
1	(ALL)	(untitled)	7	300	0	0	Unknown

Library Stages

Controller Stream	Library Stage	Phases in stage	User stage minimum (s)
1	1	A, B	1
	2	C	1
	3	D	1

Losing / Gaining Phase Delays

Controller Stream	Delay	Type	Phase	From stage	To stage	Relative delay
1	1	Losing	A	2	2	1
	2	Losing	A	1	2	1
	3	Losing	B	1	2	5
	4	Losing	A	1	3	4

Stage Sequences

Controller Stream	Sequence	Name	Multiple cycling	Stage IDs	Stage ends
1	1	(untitled)	Single	1, 2, 3	56, 74, 91

Intergreen Matrix for Controller Stream 1

		To			
		A	B	C	D
From	A			9	5
	B			5	9
	C	5	5		9
	D	5	5	9	

Banned Stage transitions for Controller Stream 1

		To		
		1	2	3
From	1			
	2			
	3			

Interstage Matrix for Controller Stream 1

		To		
		1	2	3
From	1	0	10	9
	2	5	0	9
	3	5	9	0

Resultant Stages

Controller Stream	Resultant Stage	Is base stage	Library Stage ID	Phases in this stage	Stage start (s)	Stage end (s)	Stage duration (s)	User stage minimum (s)	Stage minimum (s)
1	1	✓	1	A,B	96	56	80	1	6
	2	✓	2	C	66	74	8	1	7
	3	✓	3	D	83	91	8	1	7

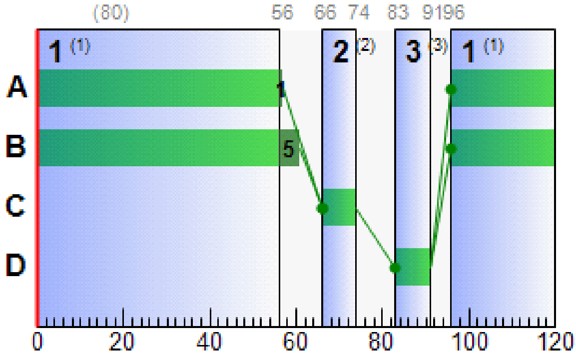
Resultant Phase Green Periods

Controller Stream	Phase	Green period	Is base green period	Start time (s)	End time (s)	Duration (s)
1	A	1	✓	96	57	81
	B	1	✓	96	61	85
	C	1	✓	66	74	8
	D	1	✓	83	91	8

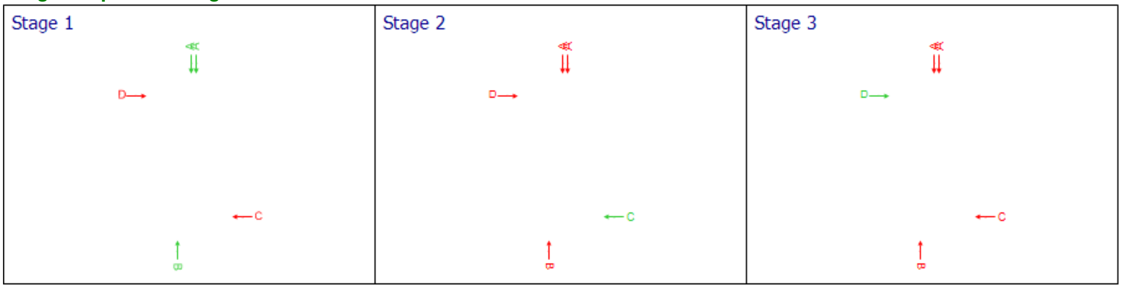
Traffic Stream Green Times

Arm	Traffic Stream	Traffic Node	Controller Stream	Phase	Green Period 1		
					Start	End	Duration
2	1		1	A	96	57	81
2	2		1	A	96	57	81
3	2		1	D	83	91	8
13	2		1	C	66	74	8
14	1		1	B	96	61	85

Phase Timings Diagram for Controller Stream 1



Stage Sequence Diagram for Controller Stream 1



Resultant penalties

Time Segment	Controller stream	Phase min max penalty (£ per hr)	Intergreen broken penalty (£ per hr)	Stage constraint broken penalty (£ per hr)	Cost of controller stream penalties (£ per hr)
17:00-18:00	1	0.00	0.00	0.00	0.00

Traffic Stream Results

Traffic Stream Results: Vehicle summary

Time Segment	Arm	Traffic Stream	Degree of saturation (%)	Practical reserve capacity (%)	Calculated flow entering (PCU/hr)	Calculated sat flow (PCU/hr)	Actual green (s (per cycle))	Mean Delay per Veh (s)	Mean max queue (PCU)	Utilised storage (%)	Weighted cost of delay (£ per hr)	Weighted cost of stops (£ per hr)	Performance Index (£ per hr)
17:00-18:00	1	1	38	135	677	1965	120	1.40	3.50	10.07	3.74	1.12	4.86
	2	1	50	81	650	1965	81	10.13	7.49	95.74	25.98	2.82	28.80
		2	2	4695	27	2105	81	6.20	0.29	3.64	0.66	0.11	0.77
	3	2	155	-42	200	1717	8	692.23	40.73	117.09	546.09	6.30	552.40
	6	1	0	Unrestricted	1113	Unrestricted	120	0.00	0.00	0.00	0.00	0.00	0.00
	7	1	0	Unrestricted	153	Unrestricted	120	0.00	0.00	0.00	0.00	0.00	0.00
	8	2	43	108	764	1762	120	0.78	0.17	2.58	2.35	0.00	2.35
	10	2	69	30	1224	1762	120	2.31	0.79	14.13	11.16	0.00	11.16
	11	1	0	Unrestricted	223	Unrestricted	120	0.00	0.00	0.00	0.00	0.00	0.00
	12	1	8	1051	27	345	120	22.85	0.51	17.09	2.43	0.22	2.66
	13	2	158	-43	197	1665	8	709.25	41.01	117.92	551.13	6.21	557.34
	14	1	89	1	1155	1965	85	24.40	34.79	100.01	111.18	12.55	123.74
	15	1	0	Unrestricted	597	Unrestricted	120	0.00	0.00	0.00	0.00	0.00	0.00
	16	1	0	Unrestricted	0	585	120	0.00	0.00	0.00	0.00	0.00	0.00

Traffic Stream Results: Flows and signals

Time Segment	Arm	Traffic Stream	Calculated flow entering (PCU/hr)	Calculated flow out (PCU/hr)	Flow discrepancy (PCU/hr)	Adjusted flow warning	Calculated sat flow (PCU/hr)	Calculated capacity (PCU/hr)	Degree of saturation (%)	DOS Threshold exceeded	Practical reserve capacity (%)	Mean modulus of error	Actual green (s (per cycle))
17:00-18:00	1	1	677	677	0		1965	1765	38		135	0.00	120
	2	1	650	650	0		1965	1306	50		81	0.15	81
		2	27	27	0		2105	1438	2		4695	0.15	81
	3	2	200	129	0		1717	129	155	✓	-42	0.00	8
	6	1	1113	1113	41	✓	Unrestricted	Unrestricted	0		Unrestricted	0.39	120
	7	1	153	153	7	✓	Unrestricted	Unrestricted	0		Unrestricted	0.25	120
	8	2	764	764	63	✓	1762	1762	43		108	0.63	120
	10	2	1224	1224	40	✓	1762	1762	69		30	0.47	120
	11	1	223	223	18	✓	Unrestricted	Unrestricted	0		Unrestricted	0.45	120
	12	1	27	27	0		345	345	8		1051	0.74	120
	13	2	197	125	0		1665	125	158	✓	-43	0.00	8
	14	1	1155	1155	0		1965	1300	89		1	0.00	85
	15	1	597	597	77	✓	Unrestricted	Unrestricted	0		Unrestricted	0.27	120
	16	1	0	0	0		585	585	0		Unrestricted	0.00	120

Traffic Stream Results: Stops and delays

Time Segment	Arm	Traffic Stream	Mean Cruise Time per Veh (s)	Mean Delay per Veh (s)	Total delay (PCU-hr/hr)	Weighted cost of delay (£ per hr)	Mean stops per Veh (%)	Total stops (Stops per hr)	Weighted cost of stops (£ per hr)
17:00-18:00	1	1	24.00	1.40	0.26	3.74	13.18	89.22	1.12
	2	1	5.40	10.13	1.83	25.98	34.58	224.75	2.82
		2	5.40	6.20	0.05	0.66	31.69	8.56	0.11
	3	2	24.00	692.23	38.46	546.09	390.47	502.83	6.30
	6	1	24.00	0.00	0.00	0.00	0.00	0.00	0.00
	7	1	24.00	0.00	0.00	0.00	0.00	0.00	0.00
	8	2	4.44	0.78	0.17	2.35	0.00	0.00	0.00
	10	2	3.84	2.31	0.79	11.16	0.00	0.00	0.00
	11	1	24.00	0.00	0.00	0.00	0.00	0.00	0.00
	12	1	1.56	22.85	0.17	2.43	65.94	17.80	0.22
	13	2	24.00	709.25	38.81	551.13	396.49	495.12	6.21
	14	1	24.00	24.40	7.83	111.18	86.68	1001.19	12.55
	15	1	52.16	0.00	0.00	0.00	0.00	0.00	0.00
	16	1	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Traffic Stream Results: Queues and blocking

Time Segment	Arm	Traffic Stream	Initial queue (PCU)	Mean max queue (PCU)	Max queue storage (PCU)	Utilised storage (%)	Excess queue penalty (£ per hr)	Wasted time total (s (per cycle))	Estimated blocking
17:00-18:00	1	1	0.00	3.50	34.78	10.07	0.00	12.23	
	2	1	0.00	7.49	7.83	95.74	0.00	2.27	
		2	0.00	0.29	7.83	3.64	0.00	76.00	
	3	2	0.00	40.73	34.78	117.09	0.00	0.00	
	6	1	0.00	0.00	34.78	0.00	0.00	0.00	
	7	1	0.00	0.00	34.78	0.00	0.00	13.00	
	8	2	0.00	0.17	6.43	2.58	0.00	29.00	
	10	2	0.00	0.79	5.57	14.13	0.00	25.00	
	11	1	0.00	0.00	34.78	0.00	0.00	17.00	
	12	1	0.00	0.51	3.00	17.09	0.00	38.00	
	13	2	0.00	41.01	34.78	117.92	0.00	0.00	
	14	1	0.00	34.79	34.78	100.01	0.00	6.61	
	15	1	0.00	0.00	75.60	0.00	0.00	0.00	
	16	1	0.00	0.00	1.00	0.00	0.00	120.00	

Traffic Stream Results: Flare

Time Segment	Arm	Traffic Stream	Flare present	Flare components	Degree of saturation (%)	Mean max queue (PCU)	Calculated capacity (PCU/hr)	Practical reserve capacity (%)
17:00-18:00	1	1	✓	CTM flare: 1/1,2/1,2/2	51	11.28	1318	75

Traffic Stream Results: Advanced

Time Segment	Arm	Traffic Stream	Degree of saturation penalty (£ per hr)	Ped gap accepting penalty (£ per hr)	Warmed up	Mean Max Queue EoTS (PCU)	Max End of Green Queue EoTS (PCU)	Max End of Red Queue EoTS (PCU)	PCU Factor	Cost of traffic penalties (£ per hr)	Performance Index (£ per hr)
17:00-18:00	1	1	0.00	0.00	✓	3.50			1.00	0.00	4.86
	2	1	0.00	0.00	✓	7.49	0.25	7.48	1.00	0.00	28.80
		2	0.00	0.00	✓	0.29	0.00	0.29	1.00	0.00	0.77
	3	2	0.00	0.00	✓	76.36	72.11	76.08	1.00	0.00	552.40
	6	1	0.00	0.00	✓	0.00			1.00	0.00	0.00
	7	1	0.00	0.00	✓	0.00			1.00	0.00	0.00
	8	2	0.00	0.00	✓	0.17			1.00	0.00	2.35
	10	2	0.00	0.00	✓	0.79			1.00	0.00	11.16
	11	1	0.00	0.00	✓	0.00			1.00	0.00	0.00
	12	1	0.00	0.00	✓	0.51			1.00	0.00	2.66
	13	2	0.00	0.00	✓	77.10	72.97	76.82	1.00	0.00	557.34
	14	1	0.00	0.00	✓	34.88	3.44	14.34	1.00	0.00	123.74
	15	1	0.00	0.00	✓	0.00			1.00	0.00	0.00
	16	1	0.00	0.00	✓	0.00			1.00	0.00	0.00

Network Results

Run Summary

Analysis set used	Run start time	Run finish time	Modelling start time (HH:mm)	Network Cycle Time (s)	Performance Index (£ per hr)	Total network delay (PCU-hr/hr)	Highest DOS (%)	Item with highest DOS	Number of oversaturated items	Percentage of oversaturated items (%)	Item with worst signalised PRC	Item with worst unsignalised PRC	Ite wit wor over PR
10	09/03/2020 10:54:27	09/03/2020 10:54:27	17:00	120	1284.06	88.36	157.76	13/2	2	14	13/2	10/2	13/

Network Results: Vehicle summary

Time Segment	Degree of saturation (%)	Practical reserve capacity (%)	Calculated flow entering (PCU/hr)	Actual green (s (per cycle))	Mean Delay per Veh (s)	Weighted cost of delay (£ per hr)	Weighted cost of stops (£ per hr)	Performance Index (£ per hr)
17:00-18:00	158	-43	7007	1343	45.40	1254.73	29.33	1284.06

Network Results: Flows and signals

Time Segment	Calculated flow entering (PCU/hr)	Calculated flow out (PCU/hr)	Flow discrepancy (PCU/hr)	Adjusted flow warning	Degree of saturation (%)	DOS Threshold exceeded	Practical reserve capacity (%)	Actual green (s (per cycle))
17:00-18:00	7007	6863	246	✓	158	✓	-43	1343

Network Results: Stops and delays

Time Segment	Mean Cruise Time per Veh (s)	Mean Delay per Veh (s)	Total delay (PCU-hr/hr)	Weighted cost of delay (£ per hr)	Mean stops per Veh (%)	Total stops (Stops per hr)	Weighted cost of stops (£ per hr)
17:00-18:00	18.86	45.40	88.36	1254.73	41.44	2339.46	29.33

Network Results: Queues and blocking

Time Segment	Utilised storage (%)	Excess queue penalty (£ per hr)	Wasted time total (s (per cycle))
17:00-18:00	117.92	0.00	339.12

Network Results: Advanced

Time Segment	Degree of saturation penalty (£ per hr)	Ped gap accepting penalty (£ per hr)	Warmed up	PCU Factor	Cost of traffic penalties (£ per hr)	Controller stream penalties (£ per hr)	Performance Index (£ per hr)
17:00-18:00	0.00	0.00	✓	1.00	0.00	0.00	1284.06

Point to Point Journey Time

Average Journey Time (s) for Local Matrix: 1

		To			
		1	2	3	4
From	1	0.0	70.2	98.3	85.4
	2	763.4	0.0	785.4	763.4
	3	78.6	0.0	0.0	78.6
	4	740.2	745.4	773.6	0.0

Path Journey Time

Path	From Location	To Location	Normal Calculated Flow (PCU/hr)	Normal journey time (s)	Calculated Total Flow (PCU/hr)	Avg journey time (s)
3	1	3	459	98.32	459	98.32
5	3	1	1042	78.56	1042	78.56
9	1	4	27	85.40	27	85.40
10	4	1	23	740.23	23	740.23
11	4	2	50	745.45	50	745.45
12	4	3	127	773.61	127	773.61
14	2	1	89	763.40	89	763.40
15	2	4	20	763.40	20	763.40
16	3	4	113	78.56	113	78.56
17	3	2	0	0.00	0	0.00
18	1	2	191	70.15	191	70.15
19	2	3	88	785.42	88	785.42

Final Prediction Table

Traffic Stream Results

				SIGNALS		FLOWS		PERFORMANCE				PER PCU			QUEUES
Arm	Traffic Stream	Name	Traffic node	Controller stream	Phase	Calculated flow entering (PCU/hr)	Calculated sat flow (PCU/hr)	Actual green (s (per cycle))	Wasted time total (s (per cycle))	Degree of saturation (%)	Practical reserve capacity (%)	JourneyTime (s)	Mean Delay per Veh (s)	Mean stops per Veh (%)	Mean max queue (PCU)
1	1	(untitled)				677	1965	120	12.23	38	135	25.40	1.40	13.18	3.50
2	1	(untitled)		1	A	650	1965	81	2.27	50	81	15.53	10.13	34.58	7.49
	2	(untitled)		1	A	27	2105	81	76.00	2	4695	11.60	6.20	31.69	0.29
3	2	(untitled)		1	D	200 <	1717	8	0.00	155	-42	716.23	692.23	390.47	40.73 +
6	1	(untitled)				1113	Unrestricted	120	0.00	0	Unrestricted	24.00	0.00	0.00	0.00
7	1	(untitled)				153	Unrestricted	120	13.00	0	Unrestricted	24.00	0.00	0.00	0.00
8	2	(untitled)				764	1762	120	29.00	43	108	5.22	0.78	0.00	0.17
10	2	(untitled)				1224	1762	120	25.00	69	30	6.15	2.31	0.00	0.79
11	1	(untitled)				223	Unrestricted	120	17.00	0	Unrestricted	24.00	0.00	0.00	0.00
12	1					27	345	120	38.00	8	1051	24.41	22.85	65.94	0.51
13	2	(untitled)		1	C	197 <	1665	8	0.00	158	-43	733.25	709.25	396.49	41.01 +
14	1	(untitled)		1	B	1155 <	1965	85	6.61	89	1	48.40	24.40	86.68	34.79 +
15	1	(untitled)				597	Unrestricted	120	0.00	0	Unrestricted	52.16	0.00	0.00	0.00
16	1					0	585	120	120.00	0	Unrestricted	0.00	0.00	0.00	0.00

Network Results

	Distance travelled (PCU-km/hr)	Time spent (PCU-hr/hr)	Mean journey speed (kph)	Total delay (PCU-hr/hr)	Weighted cost of delay (£ per hr)	Weighted cost of stops (£ per hr)	Excess queue penalty (£ per hr)	Performance Index (£ per hr)
Normal traffic	1101.20	125.07	8.80	88.36	1254.73	29.33	0.00	1284.06
Bus	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tram	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pedestrians								
TOTAL	1101.20	125.07	8.80	88.36	1254.73	29.33	0.00	1284.06

- *< = adjusted flow warning (upstream links/traffic streams are over-saturated)*
- ** = Traffic Stream - Normal, Bus or Tram Stop or Delay weighting has been set to a value other than 100%*
- *^ = Traffic Stream - Normal, Bus or Tram Stop or Delay Path weighting has been set to a value other than 100%*
- *+ = average link/traffic stream excess queue is greater than 0*
- ***P.I. = PERFORMANCE INDEX***

TECHNICAL NOTE

APPENDIX C

TRANSYT 15

Version: 15.5.2.7994
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Filename: 200304 Ardley Crossroads Signalised lanes internal SL no RT 2 Int.t15
Path: \\Bri-vfps-001.pba.int\bri\Projects\39304 Heyford Park Tranche 2\Technical\Transport\Junction Assessments\TRANSYT
Report generation date: 09/03/2020 09:28:35

»A9 - 2031 DS1 AM : D9 - 2031 DS1 AM* :
»A10 - 2031 DS1 PM : D10 - 2031 DS1 PM* :

File summary

File description

File title	(untitled)
Location	
Site number	
UTCRegion	
Driving side	Left
Date	14/12/2017
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Enumerator	PBA\dcollis
Description	

Model and Results

Enable controller offsets	Enable fuel consumption	Enable quick flares	Display journey time results	Display level of service results	Display blocking and starvation results	Display end of red and green queue results	Display excess queue results	Display separate uniform and random results	Display unweighted results	Display TRANSYT 12 style timings	Display effective greens in results	Display Red-With-Amber	Display End-Of-Green Amber

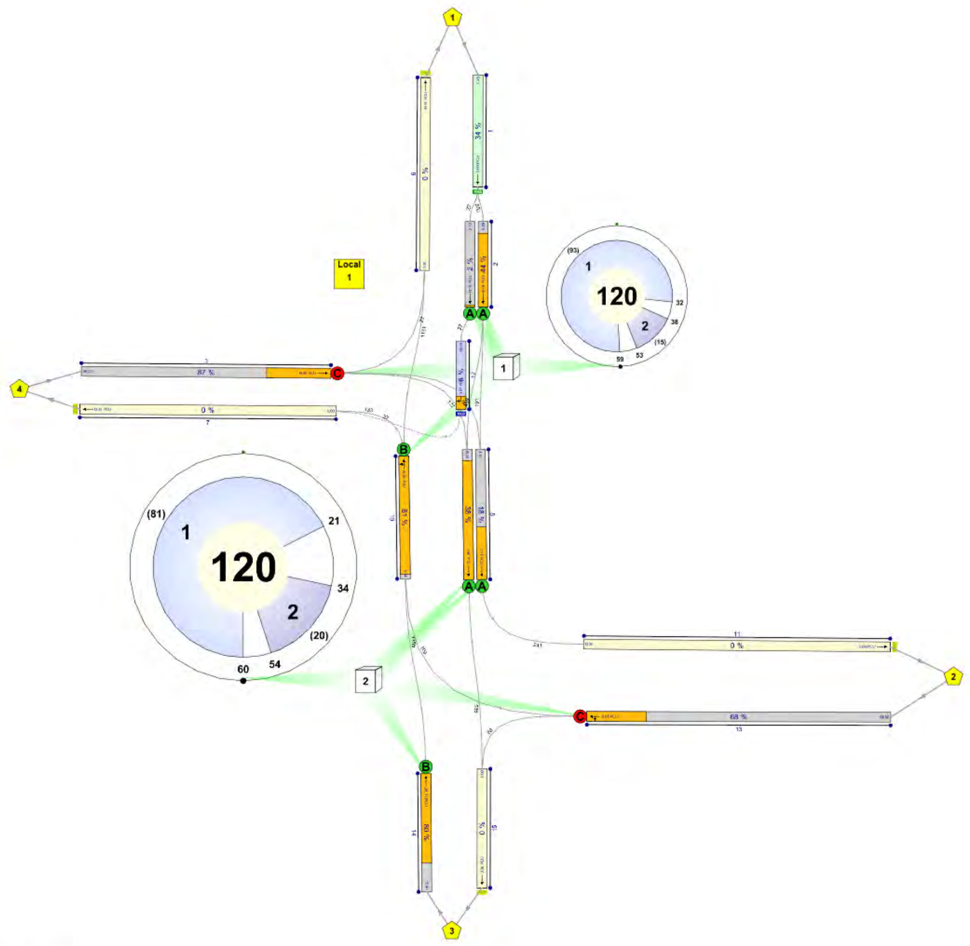
Units

Cost units	Speed units	Distance units	Fuel economy units	Fuel rate units	Mass units	Traffic units input	Traffic units results	Flow units	Average delay units	Total delay units	Rate of delay units
£	kph	m	mpg	l/h	kg	PCU	PCU	perHour	s	-Hour	perHour

Sorting

Show names instead of IDs	Sorting direction	Sorting type	Ignore prefixes when sorting	Analysis/demand set sorting	Link grouping	Source grouping	Colour Analysis/Demand Sets
	Ascending	Numerical		ID	Normal	Normal	✓

Network Diagrams



(untitled)
Cycletime 0s / 120s , Timesteps 119 / 120
10, 10
Diagram produced using TRANSYT 15.5.2.7994

A9 - 2031 DS1 AM
D9 - 2031 DS1 AM*

Summary

Data Errors and Warnings

No errors or warnings

Run Summary

Analysis set used	Run start time	Run finish time	Modelling start time (HH:mm)	Network Cycle Time (s)	Performance Index (£ per hr)	Total network delay (PCU-hr/hr)	Highest DOS (%)	Item with highest DOS	Number of oversaturated items	Percentage of oversaturated items (%)	Item with worst signalised PRC	Item with worst unsignalised PRC	Ite wit wor over PR
9	09/03/2020 09:28:26	09/03/2020 09:28:26	08:00	120	332.72	21.42	86.11	2/2	0	0	2/2	1/1	2/

Analysis Set Details

Name	Description	Demand set	Include in report	Locked
2031 DS1 AM		D9	✓	

Demand Set Details

Name	Description	Composite	Demand sets	Start time (HH:mm)	Locked
2031 DS1 AM				08:00	

Network Options

Network timings

Network cycle time (s)	Restrict to SCOOT cycle times	Time segment length (min)	Number of time segments	Modelled time period (min)
120		60	1	60

Signals options

Start displacement (s)	End displacement (s)
2	3

Advanced

Phase minimum broken penalty (£)	Phase maximum broken penalty (£)	Intergreen broken penalty (£)	Starting Red-with-Amber (s)
10000.00	10000.00	10000.00	2

Traffic options

Traffic model	Vehicle flow scaling factor (%)	Pedestrian flow scaling factor (%)	Cruise times or speeds
Platoon Dispersion (PDM)	100	100	Cruise Speeds

Advanced

Resolution	DOS Threshold (%)	Cruise scaling factor (%)	Use link stop weightings	Use link delay weightings	Exclude pedestrians from results calculation	Random delay mode	Type of Vehicle-in-Service	Type of random parameter	PCU Length (m)	Calculate results for Path Segments	Generate PDM Profile Data
1	90	100	✓	✓		Complex	Uniform (TRANSYT)	Uniform (TRANSYT)	5.75		✓

Normal Traffic parameters

Dispersion type	Dispersion coefficient	Travel time coefficient
Default	35	80

Normal Traffic Types

Name	PCU Factor
Normal	1.00

Bus parameters

Name	PCU Factor	Dispersion type	Acceleration (ms^[-2])	Stationary time coefficient	Cruise time coefficient
Bus	1.00	Default	0.94	30	85

Tram parameters

Name	PCU Factor	Dispersion type	Acceleration (ms^[-2])	Stationary time coefficient	Cruise time coefficient
Tram	1.00	Default	0.94	100	100

Pedestrian parameters

Dispersion type
Default

Optimisation options

Enable optimisation	Auto redistribute	Optimisation level	Enable OUT Profile accuracy
✓		Offsets And Green Splits	✓

Advanced

Optimisation type	Hill climb increments	OUTProfile accuracy	Shotgun number of runs	Random seed	Use enhanced optimisation	Auto optimisation order	Optimisation order	Master controller	Offsets relative to master controller	Master controller offset after each run
Shotgun Hill Climb (Medium)	15, 40, -1, 15, 40, 1, -1, 1	50, 50, 5, 5, 0.5, 0.5, 0.05, 0.05	10	1		✓	1, 2			Do nothing

Economics

Vehicle Monetary Value Of Delay (£ per PCU-hr)	Vehicle Monetary Value Of Stops (£ per 100 stops)	Pedestrian monetary value of delay (£ per Ped-hr)
14.20	2.60	14.20

Arms and Traffic Streams

Arms

Arm	Name	Description	Traffic node
1	(untitled)		
2	(untitled)		
3	(untitled)		
6	(untitled)		
7	(untitled)		
8	(untitled)		
10	(untitled)		
11	(untitled)		
12			
13	(untitled)		
14	(untitled)		
15	(untitled)		

Traffic Streams

Arm	Traffic Stream	Name	Description	Auto length	Length (m)	Has Saturation Flow	Saturation flow source	Saturation flow (PCU/hr)	Auto-calculate cell saturation flow	Cell saturation flow (PCU/hr)	Is signal controlled	Is give way	Traffic type	Allow Nearside Turn On Red
1	1	(untitled)			200.00	✓	Sum of lanes	1965					Normal	
2	2	(untitled)			45.00	✓	Sum of lanes	1965		1965	✓		Normal	
	3				45.00	✓	Sum of lanes	2105		2105	✓		Normal	
3	2	(untitled)			200.00	✓	Sum of lanes	1717			✓		Normal	
6	1	(untitled)			200.00								Normal	
7	1	(untitled)			200.00								Normal	
8	3				30.00	✓	Sum of lanes	1775		1775	✓		Normal	
	4				37.00	✓	Sum of lanes	2105		2105	✓		Normal	
10	3				32.00	✓	Sum of lanes	1965		2105	✓		Normal	
11	1	(untitled)			200.00								Normal	
12	1				17.00	✓	Sum of lanes	2105				✓	Normal	
13	2	(untitled)			200.00	✓	Sum of lanes	1665			✓		Normal	
14	1	(untitled)			200.00	✓	Sum of lanes	1965			✓		Normal	
15	1	(untitled)		✓	429.39								Normal	

Lanes

Arm	Traffic Stream	Lane	Name	Description	Use RR67	Surface condition	Site quality factor	Gradient (%)	Width (m)	Use connector turning radius	Proportion that turn (%)	Turning radius (m)	Nearside lane	Saturation flow (PCU/hr)
1	1	1	(untitled)		✓	N/A	N/A	0	3.50	✓	0	99999.00	✓	1965
2	2	1	(untitled)		✓	N/A	N/A	0	3.50	✓	0	99999.00	✓	1965
	3	1	(untitled)		✓	N/A	N/A	0	3.50		0	100.00		2105
3	2	1	(untitled)		✓	N/A	N/A	0	3.60		100	10.00	✓	1717
6	1	1	(untitled)											
7	1	1	(untitled)											
8	3	1	(untitled)		✓	N/A	N/A	0	3.50		100	14.00	✓	1775
	4	1	(untitled)		✓	N/A	N/A	0	3.50		0	100.00		2105
10	3	1	(untitled)		✓	N/A	N/A	0	3.50		0	100.00	✓	1965
11	1	1	(untitled)											
12	1	1	(untitled)		✓	N/A	N/A	0	3.50		0	10.00		2105
13	2	1	(untitled)		✓	N/A	N/A	0	3.00		100	10.00	✓	1665
14	1	1	(untitled)		✓	N/A	N/A	0	3.50	✓	0	99999.00	✓	1965
15	1	1	(untitled)											

Modelling

Arm	Traffic Stream	Traffic model	Stop weighting multiplier (%)	Delay weighting multiplier (%)	Assignment Cost Weighting (%)	Exclude from results calculation	Max queue storage (PCU)	Has queue limit	Queue limit (PCU)	Excess queue penalty (£)	Has degree of saturation limit
1	1	NetworkDefault	100	100	100		0.00				
2	2	Flare	100	100	100		0.00				
	3	Flare	100	100	100		0.00				
3	2	NetworkDefault	100	100	100		0.00				
6	1	NetworkDefault	100	100	100		0.00				
7	1	NetworkDefault	100	100	100		0.00				
8	3	CTM	100	100	100		0.00				
	4	CTM	100	100	100		0.00				
10	3	Flare	100	100	100		0.00				
11	1	NetworkDefault	100	100	100		0.00				
12	1	Flare	100	100	100		3.00	✓	3.00	500.00	
13	2	NetworkDefault	100	100	100		0.00				
14	1	NetworkDefault	100	100	100		0.00				
15	1	NetworkDefault	100	100	100		0.00				

Modelling - Advanced

Arm	Traffic Stream	Initial queue (PCU)	Type of Vehicle-in-Service	Vehicle-in-Service	Type of random parameter	Random parameter	Auto cycle time	Cycle time
(ALL)	(ALL)	0.00	NetworkDefault	Not-Included	NetworkDefault	0.50	✓	120

Normal traffic - Modelling

Arm	Traffic Stream	Stop weighting (%)	Delay weighting (%)
(ALL)	(ALL)	100	100

Normal traffic - Advanced

Arm	Traffic Stream	Dispersion type for Normal Traffic
(ALL)	(ALL)	NetworkDefault

Flows

Arm	Traffic Stream	Total Flow (PCU/hr)	Normal Flow (PCU/hr)
1	1	1286	1286
2	2	1269	1269
	3	17	17
3	2	254	254
6	1	834	834
7	1	84	84
8	3	479	479
	4	1005	1005
10	3	862	862
11	1	479	479
12	1	17	17
13	2	121	121
14	1	751	751
15	1	1015	1015

Signals

Arm	Traffic Stream	Controller stream	Phase	Second phase enabled
2	2	1	A	
	3	1	A	
3	2	1	C	
8	3	2	A	
	4	2	A	
10	3	1	B	
13	2	2	C	
14	1	2	B	

Entry Sources

Arm	Traffic Stream	Cruise time for Normal Traffic (s)	Cruise speed for Normal Traffic (kph)
(ALL)	(ALL)	24.00	30.00

Sources

Arm	Traffic Stream	Source	Source traffic stream	Destination traffic stream	Cruise time for Normal Traffic (s)	Cruise speed for Normal Traffic (kph)	Auto turning radius	Traffic turn style	Turning radius (m)
2	2	1	1/1	2/2	5.40	30.00	✓	Straight	Straight Movement
	3	1	1/1	2/3	5.40	30.00	✓	Straight	Straight Movement
6	1	1	3/2	6/1	24.00	30.00	✓	Straight	Straight Movement
7	1	1	12/1	7/1	24.00	30.00	✓	Offside	6.00
8	3	1	3/2	8/3	3.60	30.00	✓	Straight	Straight Movement
	4	1	3/2	8/4	4.44	30.00	✓	Straight	Straight Movement
10	3	1	14/1	10/3	3.84	30.00	✓	Straight	Straight Movement
11	1	1	8/3	11/1	24.00	30.00	✓	Straight	Straight Movement
12	1	1	2/3	12/1	2.04	30.00	✓	Straight	Straight Movement
15	1	1	13/2	15/1	51.53	30.00	✓	Nearside	80.02
6	1	2	10/3	6/1	24.00	30.00	✓	Straight	Straight Movement
7	1	2	10/3	7/1	24.00	30.00	✓	Nearside	69.87
8	3	2	2/2	8/3	3.60	30.00	✓	Straight	Straight Movement
	4	2	2/2	8/4	4.44	30.00	✓	Straight	Straight Movement
10	3	2	13/2	10/3	3.84	30.00	✓	Straight	Straight Movement
15	1	2	8/4	15/1	51.53	30.00	✓	Straight	Straight Movement

Give Way Data

Arm	Traffic Stream	Opposed traffic	Use Step-wise Opposed Turn Model	Visibility restricted
12	1	AllTraffic		

Give Way Data - All Movements - Conflicts

Traffic Stream	Description	Controlling type	Controlling traffic stream	Percentage opposing (%)	Slope coefficient	Upstream signals visible	Conflict shift	Conflict duration
1		TrafficStream	10/3	100	1.09		0	0

Local OD Matrix - Local Matrix: 1

Local Matrix Options

OD Matrix	Name	Use for point to point table	Auto calculate	Allocation mode	Allow paths past exit locations	Allow looped paths on arms	Allow looped paths on traffic nodes	Copy flows	Matrix to copy flows from	Limit paths by length	Path length limit multiplier	Limit paths by number	Path number limit
1	(untitled)	✓	✓	Path Equalisation			✓			✓	1.25		

Normal Input Flows (PCU/hr)

		To			
		1	2	3	4
From	1	0	290	979	17
	2	94	0	10	17
	3	701	0	0	50
	4	39	189	26	0

Bus Input Flows not shown as they are blank.

Tram Input Flows not shown as they are blank.

Pedestrian Input Flows not shown as they are blank.

Locations

OD Matrix	Location	Name	Entries	Exits	Colour
1	1	(untitled)	1/1	6/1	#0000FF
	2	(untitled)	13/2	11/1	#00FF00
	3	(untitled)	14/1	15/1	#FFFF00
	4	(untitled)	3/2	7/1	#FFFF00

Normal Paths and Flows

OD Matrix	Path	Description	From location	To location	Path items	Allocation type	Normal Calculated Flow (PCU/hr)
1	10		4	1	3/2, 6/1	Normal	39
	11		1	2	1/1, 2/2, 8/3, 11/1	Normal	290
	12		4	3	3/2, 8/4, 15/1	Normal	26
	13		3	1	14/1, 10/3, 6/1	Normal	701
	19		2	3	13/2, 15/1	Normal	10
	21		1	4	1/1, 2/3, 12/1, 7/1	Normal	17
	22		2	1	13/2, 10/3, 6/1	Normal	94
	24		2	4	13/2, 10/3, 7/1	Normal	17
	25		3	4	14/1, 10/3, 7/1	Normal	50
	26		4	2	3/2, 8/3, 11/1	Normal	189
	27		1	3	1/1, 2/2, 8/4, 15/1	Normal	979

Signal Timings

Network Default: 120s cycle time; 120 steps

Controller Stream 1

Controller Stream	Name	Description	Use sequence	Cycle time source	Cycle time (s)
1	(untitled)		1	NetworkDefault	120

Controller Stream 1 - Properties

Controller Stream	Manufacturer name	Type	Model number	(Telephone) Line Number	Site number	Grid reference	Gaining delay type
1	Unspecified						Absolute

Controller Stream 1 - Optimisation

Controller Stream	Allow offset optimisation	Allow green split optimisation	Optimisation level	Auto redistribute	Enable stage constraint
1	✓	✓	Offsets And Green Splits		

Phases

Controller Stream	Phase	Name	Minimum green (s)	Maximum green (s)	Relative start displacement (s)	Relative end displacement (s)	Type
1	**(ALL)**	(untitled)	7	300	0	0	Traffic

Library Stages

Controller Stream	Library Stage	Phases in stage	User stage minimum (s)
1	**1**	A, B	1
	2	C	1

Losing / Gaining Phase Delays

Controller Stream	Delay	Type	Phase	From stage	To stage	Relative delay
1	**1**	Losing	A	1	2	1

Stage Sequences

Controller Stream	Sequence	Name	Multiple cycling	Stage IDs	Stage ends
1	**1**	(untitled)	Single	1, 2	4, 30

Intergreen Matrix for Controller Stream 1

		To		
		A	**B**	**C**
From	**A**			5
	B			6
	C	6	5	

Banned Stage transitions for Controller Stream 1

		To	
		1	**2**
From	**1**		
	2		

Interstage Matrix for Controller Stream 1

		To	
		1	**2**
From	**1**	0	6
	2	6	0

Resultant Stages

Controller Stream	Resultant Stage	Is base stage	Library Stage ID	Phases in this stage	Stage start (s)	Stage end (s)	Stage duration (s)	User stage minimum (s)	Stage minimum (s)
1	**1**	✓	1	A,B	36	4	88	1	6
	2	✓	2	C	10	30	20	1	7

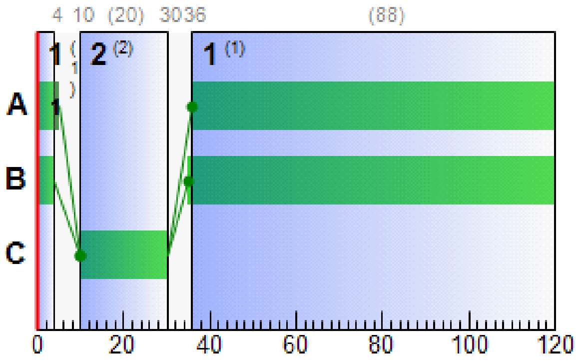
Resultant Phase Green Periods

Controller Stream	Phase	Green period	Is base green period	Start time (s)	End time (s)	Duration (s)
1	**A**	**1**	✓	36	5	89
	B	**1**	✓	35	4	89
	C	**1**	✓	10	30	20

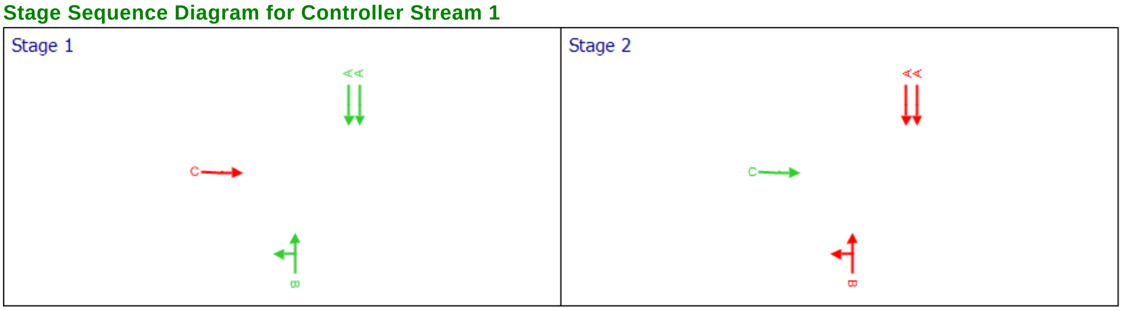
Traffic Stream Green Times

Arm	Traffic Stream	Traffic Node	Controller Stream	Phase	Green Period 1		
					Start	End	Duration
2	2		1	A	36	5	89
2	3		1	A	36	5	89
3	2		1	C	10	30	20
10	3		1	B	35	4	89

Phase Timings Diagram for Controller Stream 1



Stage Sequence Diagram for Controller Stream 1



Controller Stream 2

Controller Stream	Name	Description	Use sequence	Cycle time source	Cycle time (s)
2	(untitled)		1	NetworkDefault	120

Controller Stream 2 - Properties

Controller Stream	Manufacturer name	Type	Model number	(Telephone) Line Number	Site number	Grid reference	Gaining delay type
2	Unspecified						Absolute

Controller Stream 2 - Optimisation

Controller Stream	Allow offset optimisation	Allow green split optimisation	Optimisation level	Auto redistribute	Enable stage constraint
2	✓	✓	Offsets And Green Splits		

Phases

Controller Stream	Phase	Name	Minimum green (s)	Maximum green (s)	Relative start displacement (s)	Relative end displacement (s)	Type
2	(ALL)	(untitled)	7	300	0	0	Traffic

Library Stages

Controller Stream	Library Stage	Phases in stage	User stage minimum (s)
2	1	A, B	1
	2	C	1

Stage Sequences

Controller Stream	Sequence	Name	Multiple cycling	Stage IDs	Stage ends
2	1	(untitled)	Single	1, 2	110, 7

Intergreen Matrix for Controller Stream 2

		To		
		A	B	C
From	A			6
	B			6
	C	6	6	

Banned Stage transitions for Controller Stream 2

		To	
		1	2
From	1		
	2		

Interstage Matrix for Controller Stream 2

		To	
		1	2
From	1	0	6
	2	6	0

Resultant Stages

Controller Stream	Resultant Stage	Is base stage	Library Stage ID	Phases in this stage	Stage start (s)	Stage end (s)	Stage duration (s)	User stage minimum (s)	Stage minimum (s)
2	1	✓	1	A,B	13	110	97	1	7
	2	✓	2	C	116	7	11	1	7

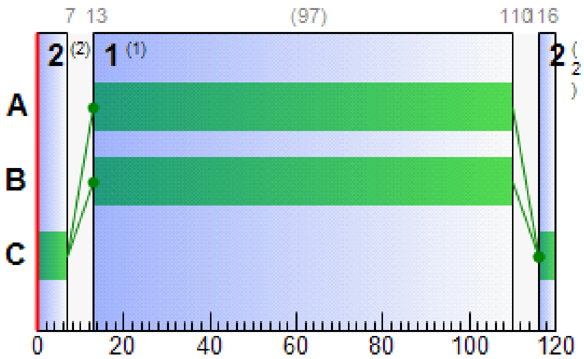
Resultant Phase Green Periods

Controller Stream	Phase	Green period	Is base green period	Start time (s)	End time (s)	Duration (s)
2	A	1	✓	13	110	97
	B	1	✓	13	110	97
	C	1	✓	116	7	11

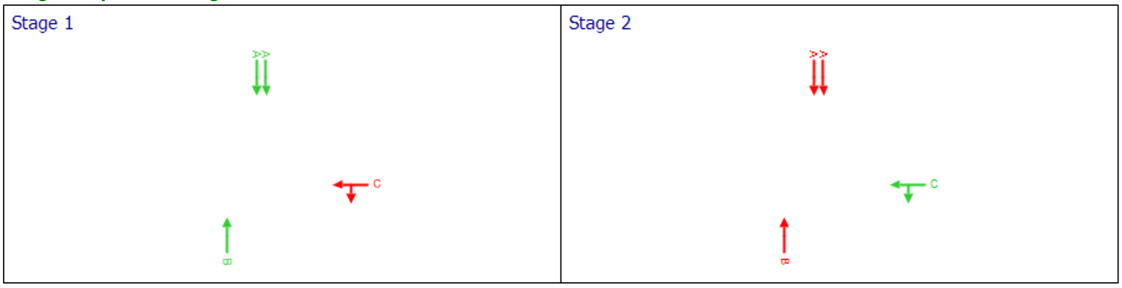
Traffic Stream Green Times

Arm	Traffic Stream	Traffic Node	Controller Stream	Phase	Green Period 1		
					Start	End	Duration
8	3		2	A	13	110	97
8	4		2	A	13	110	97
13	2		2	C	116	7	11
14	1		2	B	13	110	97

Phase Timings Diagram for Controller Stream 2



Stage Sequence Diagram for Controller Stream 2



Resultant penalties

Time Segment	Controller stream	Phase min max penalty (£ per hr)	Intergreen broken penalty (£ per hr)	Stage constraint broken penalty (£ per hr)	Cost of controller stream penalties (£ per hr)
08:00-09:00	(ALL)	0.00	0.00	0.00	0.00

Traffic Stream Results

Traffic Stream Results: Vehicle summary

Time Segment	Arm	Traffic Stream	Degree of saturation (%)	Practical reserve capacity (%)	Calculated flow entering (PCU/hr)	Calculated sat flow (PCU/hr)	Actual green (s (per cycle))	Mean Delay per Veh (s)	Mean max queue (PCU)	Utilised storage (%)	Weighted cost of delay (£ per hr)	Weighted cost of stops (£ per hr)	Performance Index (£ per hr)
08:00-09:00	1	1	81	11	1286	1965	120	10.93	25.29	72.70	55.43	8.81	64.24
	2	2	86	5	1269	1965	89	11.87	9.83	125.58	59.40	3.68	63.08
		3	1	8258	17	2105	89	3.47	0.10	1.24	0.23	0.04	0.27
	3	2	85	6	254	1717	20	77.05	10.24	29.44	77.19	3.76	80.95
	6	1	0	Unrestricted	834	Unrestricted	120	0.00	0.00	0.00	0.00	0.00	0.00
	7	1	0	Unrestricted	84	Unrestricted	120	0.00	0.00	0.00	0.00	0.00	0.00
	8	3	33	172	479	1775	97	2.27	3.32	63.55	4.29	1.02	5.31
		4	58	54	1005	2105	97	4.13	5.82	90.47	16.37	2.19	18.56
	10	3	58	54	862	1965	89	5.46	4.76	85.51	18.56	1.79	20.35
	11	1	0	Unrestricted	479	Unrestricted	120	0.00	0.00	0.00	0.00	0.00	0.00
	12	1	2	4372	17	845	120	5.68	0.19	6.19	0.38	0.08	0.46
	13	2	73	24	121	1665	11	79.26	4.80	13.80	37.83	1.77	39.60
	14	1	59	52	751	1965	97	11.66	14.61	42.02	34.53	5.35	39.89
	15	1	0	Unrestricted	1015	Unrestricted	120	0.00	0.00	0.00	0.00	0.00	0.00

Traffic Stream Results: Flows and signals

Time Segment	Arm	Traffic Stream	Calculated flow entering (PCU/hr)	Calculated flow out (PCU/hr)	Flow discrepancy (PCU/hr)	Adjusted flow warning	Calculated sat flow (PCU/hr)	Calculated capacity (PCU/hr)	Degree of saturation (%)	DOS Threshold exceeded	Practical reserve capacity (%)	Mean modulus of error	Actual green (s (per cycle))
08:00-09:00	1	1	1286	1286	0		1965	1586	81		11	0.00	120
	2	2	1269	1269	0		1965	1474	86		5	0.36	89
		3	17	17	0		2105	1579	1		8258	0.36	89
	3	2	254	254	0		1717	300	85		6	0.00	20
	6	1	834	834	0		Unrestricted	Unrestricted	0		Unrestricted	0.45	120
	7	1	84	84	0		Unrestricted	Unrestricted	0		Unrestricted	0.41	120
	8	3	479	479	0		1775	1450	33		172	0.47	97
		4	1005	1005	0		2105	1719	58		54	0.46	97
	10	3	862	862	0		1965	1474	58		54	0.63	89
	11	1	479	479	0		Unrestricted	Unrestricted	0		Unrestricted	0.45	120
	12	1	17	17	0		845	845	2		4372	0.63	120
	13	2	121	121	0		1665	167	73		24	0.00	11
	14	1	751	751	0		1965	1268	59		52	0.00	97
	15	1	1015	1015	0		Unrestricted	Unrestricted	0		Unrestricted	0.31	120

Traffic Stream Results: Stops and delays

Time Segment	Arm	Traffic Stream	Mean Cruise Time per Veh (s)	Mean Delay per Veh (s)	Total delay (PCU-hr/hr)	Weighted cost of delay (£ per hr)	Mean stops per Veh (%)	Total stops (Stops per hr)	Weighted cost of stops (£ per hr)
08:00-09:00	1	1	24.00	10.93	3.90	55.43	54.63	702.59	8.81
	2	2	5.40	11.87	4.18	59.40	23.14	293.67	3.68
		3	5.40	3.47	0.02	0.23	17.14	2.91	0.04
	3	2	24.00	77.05	5.44	77.19	118.15	300.09	3.76
	6	1	24.00	0.00	0.00	0.00	0.00	0.00	0.00
	7	1	24.00	0.00	0.00	0.00	0.00	0.00	0.00
	8	3	3.60	2.27	0.30	4.29	16.98	81.36	1.02
		4	4.44	4.13	1.15	16.37	17.38	174.69	2.19
	10	3	3.84	5.46	1.31	18.56	16.56	142.71	1.79
	11	1	24.00	0.00	0.00	0.00	0.00	0.00	0.00
	12	1	2.04	5.68	0.03	0.38	36.36	6.18	0.08
	13	2	24.00	79.26	2.66	37.83	116.80	141.33	1.77
	14	1	24.00	11.66	2.43	34.53	56.83	426.77	5.35
	15	1	51.53	0.00	0.00	0.00	0.00	0.00	0.00

Traffic Stream Results: Queues and blocking

Time Segment	Arm	Traffic Stream	Initial queue (PCU)	Mean max queue (PCU)	Max queue storage (PCU)	Utilised storage (%)	Excess queue penalty (£ per hr)	Wasted time total (s (per cycle))	Estimated blocking
08:00-09:00	1	1	0.00	25.29	34.78	72.70	0.00	23.15	
	2	2	0.00	9.83	7.83	125.58	0.00	0.00	
		3	0.00	0.10	7.83	1.24	0.00	89.00	
	3	2	0.00	10.24	34.78	29.44	0.00	0.00	
	6	1	0.00	0.00	34.78	0.00	0.00	0.00	
	7	1	0.00	0.00	34.78	0.00	0.00	28.00	
	8	3	0.00	3.32	5.22	63.55	0.00	5.00	
		4	0.00	5.82	6.43	90.47	0.00	9.00	
	10	3	0.00	4.76	5.57	85.51	0.00	5.00	
	11	1	0.00	0.00	34.78	0.00	0.00	11.00	
	12	1	0.00	0.19	3.00	6.19	0.00	85.00	
	13	2	0.00	4.80	34.78	13.80	0.00	0.00	
	14	1	0.00	14.61	34.78	42.02	0.00	20.59	
	15	1	0.00	0.00	74.68	0.00	0.00	0.00	

Traffic Stream Results: Flare

Time Segment	Arm	Traffic Stream	Flare present	Flare components	Degree of saturation (%)	Mean max queue (PCU)	Calculated capacity (PCU/hr)	Practical reserve capacity (%)
08:00-09:00	1	1	✓	CTM flare: 1/1,2/3,2/2	87	35.21	1481	4

Traffic Stream Results: Advanced

Time Segment	Arm	Traffic Stream	Degree of saturation penalty (£ per hr)	Ped gap accepting penalty (£ per hr)	Warmed up	Mean Max Queue EoTS (PCU)	Max End of Green Queue EoTS (PCU)	Max End of Red Queue EoTS (PCU)	PCU Factor	Cost of traffic penalties (£ per hr)	Performance Index (£ per hr)
08:00-09:00	1	1	0.00	0.00	✓	25.30			1.00	0.00	64.24
	2	2	0.00	0.00	✓	9.87	2.62	9.87	1.00	0.00	63.08
		3	0.00	0.00	✓	0.10	0.00	0.10	1.00	0.00	0.27
	3	2	0.00	0.00	✓	10.35	2.17	9.15	1.00	0.00	80.95
	6	1	0.00	0.00	✓	0.00			1.00	0.00	0.00
	7	1	0.00	0.00	✓	0.00			1.00	0.00	0.00
	8	3	0.00	0.00	✓	3.32	0.08	1.89	1.00	0.00	5.31
		4	0.00	0.00	✓	5.82	0.41	5.68	1.00	0.00	18.56
	10	3	0.00	0.00	✓	4.76	0.41	4.76	1.00	0.00	20.35
	11	1	0.00	0.00	✓	0.00			1.00	0.00	0.00
	12	1	0.00	0.00	✓	0.19			1.00	0.00	0.46
	13	2	0.00	0.00	✓	4.83	0.93	4.56	1.00	0.00	39.60
	14	1	0.00	0.00	✓	14.62	0.43	5.02	1.00	0.00	39.89
	15	1	0.00	0.00	✓	0.00			1.00	0.00	0.00

Network Results

Run Summary

Analysis set used	Run start time	Run finish time	Modelling start time (HH:mm)	Network Cycle Time (s)	Performance Index (£ per hr)	Total network delay (PCU-hr/hr)	Highest DOS (%)	Item with highest DOS	Number of oversaturated items	Percentage of oversaturated items (%)	Item with worst signalised PRC	Item with worst unsignalised PRC	Ite wit wor over PR
9	09/03/2020 09:28:26	09/03/2020 09:28:26	08:00	120	332.72	21.42	86.11	2/2	0	0	2/2	1/1	2/

Network Results: Vehicle summary

Time Segment	Degree of saturation (%)	Practical reserve capacity (%)	Calculated flow entering (PCU/hr)	Actual green (s (per cycle))	Mean Delay per Veh (s)	Weighted cost of delay (£ per hr)	Weighted cost of stops (£ per hr)	Performance Index (£ per hr)
08:00-09:00	86	5	8473	1309	9.10	304.22	28.49	332.72

Network Results: Flows and signals

Time Segment	Calculated flow entering (PCU/hr)	Calculated flow out (PCU/hr)	Flow discrepancy (PCU/hr)	Adjusted flow warning	Degree of saturation (%)	DOS Threshold exceeded	Practical reserve capacity (%)	Actual green (s (per cycle))
08:00-09:00	8473	8473	0		86		5	1309

Network Results: Stops and delays

Time Segment	Mean Cruise Time per Veh (s)	Mean Delay per Veh (s)	Total delay (PCU-hr/hr)	Weighted cost of delay (£ per hr)	Mean stops per Veh (%)	Total stops (Stops per hr)	Weighted cost of stops (£ per hr)
08:00-09:00	18.91	9.10	21.42	304.22	26.82	2272.31	28.49

Network Results: Queues and blocking

Time Segment	Utilised storage (%)	Excess queue penalty (£ per hr)	Wasted time total (s (per cycle))
08:00-09:00	125.58	0.00	275.73

Network Results: Advanced

Time Segment	Degree of saturation penalty (£ per hr)	Ped gap accepting penalty (£ per hr)	Warmed up	PCU Factor	Cost of traffic penalties (£ per hr)	Controller stream penalties (£ per hr)	Performance Index (£ per hr)
08:00-09:00	0.00	0.00	✓	1.00	0.00	0.00	332.72

Point to Point Journey Time

Average Journey Time (s) for Local Matrix: 1

		To			
		1	2	3	4
From	1	0.0	82.6	112.3	75.5
	2	142.0	0.0	154.8	142.0
	3	68.1	0.0	0.0	68.1
	4	125.0	130.1	160.3	0.0

Path Journey Time

Path	From Location	To Location	Normal Calculated Flow (PCU/hr)	Normal journey time (s)	Calculated Total Flow (PCU/hr)	Avg journey time (s)
10	4	1	39	125.05	39	125.05
11	1	2	290	82.58	290	82.58
12	4	3	26	160.34	26	160.34
13	3	1	701	68.15	701	68.15
19	2	3	10	154.78	10	154.78
21	1	4	17	75.52	17	75.52
22	2	1	94	142.02	94	142.02
24	2	4	17	142.02	17	142.02
25	3	4	50	68.15	50	68.15
26	4	2	189	130.13	189	130.13
27	1	3	979	112.31	979	112.31

Final Prediction Table

Traffic Stream Results

				SIGNALS		FLOWS		PERFORMANCE				PER PCU			QUEUES
Arm	Traffic Stream	Name	Traffic node	Controller stream	Phase	Calculated flow entering (PCU/hr)	Calculated sat flow (PCU/hr)	Actual green (s (per cycle))	Wasted time total (s (per cycle))	Degree of saturation (%)	Practical reserve capacity (%)	JourneyTime (s)	Mean Delay per Veh (s)	Mean stops per Veh (%)	Mean max queue (PCU)
1	1	(untitled)				1286	1965	120	23.15	81	11	34.93	10.93	54.63	25.29
2	2	(untitled)		1	A	1269 <	1965	89	0.00	86	5	17.27	11.87	23.14	9.83 +
	3			1	A	17	2105	89	89.00	1	8258	8.87	3.47	17.14	0.10
3	2	(untitled)		1	C	254	1717	20	0.00	85	6	101.05	77.05	118.15	10.24
6	1	(untitled)				834	Unrestricted	120	0.00	0	Unrestricted	24.00	0.00	0.00	0.00
7	1	(untitled)				84	Unrestricted	120	28.00	0	Unrestricted	24.00	0.00	0.00	0.00
8	3			2	A	479	1775	97	5.00	33	172	5.87	2.27	16.98	3.32
	4			2	A	1005	2105	97	9.00	58	54	8.57	4.13	17.38	5.82
10	3			1	B	862	1965	89	5.00	58	54	9.30	5.46	16.56	4.76
11	1	(untitled)				479	Unrestricted	120	11.00	0	Unrestricted	24.00	0.00	0.00	0.00
12	1					17	845	120	85.00	2	4372	7.72	5.68	36.36	0.19
13	2	(untitled)		2	C	121	1665	11	0.00	73	24	103.26	79.26	116.80	4.80
14	1	(untitled)		2	B	751	1965	97	20.59	59	52	35.66	11.66	56.83	14.61
15	1	(untitled)				1015	Unrestricted	120	0.00	0	Unrestricted	51.53	0.00	0.00	0.00

Network Results

	Distance travelled (PCU-km/hr)	Time spent (PCU-hr/hr)	Mean journey speed (kph)	Total delay (PCU-hr/hr)	Weighted cost of delay (£ per hr)	Weighted cost of stops (£ per hr)	Excess queue penalty (£ per hr)	Performance Index (£ per hr)
Normal traffic	1334.93	65.92	20.25	21.42	304.22	28.49	0.00	332.72
Bus	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tram	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pedestrians								
TOTAL	1334.93	65.92	20.25	21.42	304.22	28.49	0.00	332.72

- *< = adjusted flow warning (upstream links/traffic streams are over-saturated)*
- ** = Traffic Stream - Normal, Bus or Tram Stop or Delay weighting has been set to a value other than 100%*
- *^ = Traffic Stream - Normal, Bus or Tram Stop or Delay Path weighting has been set to a value other than 100%*
- *+ = average link/traffic stream excess queue is greater than 0*
- ***P.I. = PERFORMANCE INDEX***

A10 - 2031 DS1 PM
D10 - 2031 DS1 PM*

Summary

Data Errors and Warnings

No errors or warnings

Run Summary

Analysis set used	Run start time	Run finish time	Modelling start time (HH:mm)	Network Cycle Time (s)	Performance Index (£ per hr)	Total network delay (PCU-hr/hr)	Highest DOS (%)	Item with highest DOS	Number of oversaturated items	Percentage of oversaturated items (%)	Item with worst signalised PRC	Item with worst unsignalised PRC	Ite wit wor over PR
10	09/03/2020 09:28:28	09/03/2020 09:28:28	17:00	120	287.37	18.58	87.36	3/2	0	0	3/2	1/1	3/

Analysis Set Details

Name	Description	Demand set	Include in report	Locked
2031 DS1 PM		D10	✓	

Demand Set Details

Name	Description	Composite	Demand sets	Start time (HH:mm)	Locked
2031 DS1 PM				17:00	

Network Options

Network timings

Network cycle time (s)	Restrict to SCOOT cycle times	Time segment length (min)	Number of time segments	Modelled time period (min)
120		60	1	60

Signals options

Start displacement (s)	End displacement (s)
2	3

Advanced

Phase minimum broken penalty (£)	Phase maximum broken penalty (£)	Intergreen broken penalty (£)	Starting Red-with-Amber (s)
10000.00	10000.00	10000.00	2

Traffic options

Traffic model	Vehicle flow scaling factor (%)	Pedestrian flow scaling factor (%)	Cruise times or speeds
Platoon Dispersion (PDM)	100	100	Cruise Speeds

Advanced

Resolution	DOS Threshold (%)	Cruise scaling factor (%)	Use link stop weightings	Use link delay weightings	Exclude pedestrians from results calculation	Random delay mode	Type of Vehicle-in-Service	Type of random parameter	PCU Length (m)	Calculate results for Path Segments	Generate PDM Profile Data
1	90	100	✓	✓		Complex	Uniform (TRANSYT)	Uniform (TRANSYT)	5.75		✓

Normal Traffic parameters

Dispersion type	Dispersion coefficient	Travel time coefficient
Default	35	80

Normal Traffic Types

Name	PCU Factor
Normal	1.00

Bus parameters

Name	PCU Factor	Dispersion type	Acceleration (ms^[-2])	Stationary time coefficient	Cruise time coefficient
Bus	1.00	Default	0.94	30	85

Tram parameters

Name	PCU Factor	Dispersion type	Acceleration (ms^[-2])	Stationary time coefficient	Cruise time coefficient
Tram	1.00	Default	0.94	100	100

Pedestrian parameters

Dispersion type
Default

Optimisation options

Enable optimisation	Auto redistribute	Optimisation level	Enable OUT Profile accuracy
✓		Offsets And Green Splits	✓

Advanced

Optimisation type	Hill climb increments	OUTProfile accuracy	Use enhanced optimisation	Auto optimisation order	Optimisation order	Master controller	Offsets relative to master controller	Master controller offset after each run
Hill Climb (Fast)	15, 40, -1, 15, 40, 1, -1, 1	50, 50, 5, 5, 0.5, 0.5, 0.05, 0.05		✓	1, 2			Do nothing

Economics

Vehicle Monetary Value Of Delay (£ per PCU-hr)	Vehicle Monetary Value Of Stops (£ per 100 stops)	Pedestrian monetary value of delay (£ per Ped-hr)
14.20	2.60	14.20

Arms and Traffic Streams

Arms

Arm	Name	Description	Traffic node
1	(untitled)		
2	(untitled)		
3	(untitled)		
6	(untitled)		
7	(untitled)		
8	(untitled)		
10	(untitled)		
11	(untitled)		
12			
13	(untitled)		
14	(untitled)		
15	(untitled)		

Traffic Streams

Arm	Traffic Stream	Name	Description	Auto length	Length (m)	Has Saturation Flow	Saturation flow source	Saturation flow (PCU/hr)	Auto-calculate cell saturation flow	Cell saturation flow (PCU/hr)	Is signal controlled	Is give way	Traffic type	Allow Nearside Turn On Red
1	1	(untitled)			200.00	✓	Sum of lanes	1965					Normal	
2	2	(untitled)			45.00	✓	Sum of lanes	1965		1965	✓		Normal	
	3				45.00	✓	Sum of lanes	2105		2105	✓		Normal	
3	2	(untitled)			200.00	✓	Sum of lanes	1717			✓		Normal	
6	1	(untitled)			200.00								Normal	
7	1	(untitled)			200.00								Normal	
8	3				30.00	✓	Sum of lanes	1775		1775	✓		Normal	
	4				37.00	✓	Sum of lanes	2105		2105	✓		Normal	
10	3				32.00	✓	Sum of lanes	1965		2105	✓		Normal	
11	1	(untitled)			200.00								Normal	
12	1				17.00	✓	Sum of lanes	1830				✓	Normal	
13	2	(untitled)			200.00	✓	Sum of lanes	1665			✓		Normal	
14	1	(untitled)			200.00	✓	Sum of lanes	1965			✓		Normal	
15	1	(untitled)		✓	429.39								Normal	

Lanes

Arm	Traffic Stream	Lane	Name	Description	Use RR67	Surface condition	Site quality factor	Gradient (%)	Width (m)	Use connector turning radius	Proportion that turn (%)	Turning radius (m)	Nearside lane	Saturation flow (PCU/hr)
1	1	1	(untitled)		✓	N/A	N/A	0	3.50	✓	0	99999.00	✓	1965
2	2	1	(untitled)		✓	N/A	N/A	0	3.50	✓	0	99999.00	✓	1965
	3	1	(untitled)		✓	N/A	N/A	0	3.50		0	100.00		2105
3	2	1	(untitled)		✓	N/A	N/A	0	3.60		100	10.00	✓	1717
6	1	1	(untitled)											
7	1	1	(untitled)											
8	3	1	(untitled)		✓	N/A	N/A	0	3.50		100	14.00	✓	1775
	4	1	(untitled)		✓	N/A	N/A	0	3.50		0	100.00		2105
10	3	1	(untitled)		✓	N/A	N/A	0	3.50		0	100.00	✓	1965
11	1	1	(untitled)											
12	1	1	(untitled)		✓	N/A	N/A	0	3.50		100	10.00		1830
13	2	1	(untitled)		✓	N/A	N/A	0	3.00		100	10.00	✓	1665
14	1	1	(untitled)		✓	N/A	N/A	0	3.50	✓	0	99999.00	✓	1965
15	1	1	(untitled)											

Modelling

Arm	Traffic Stream	Traffic model	Stop weighting multiplier (%)	Delay weighting multiplier (%)	Assignment Cost Weighting (%)	Exclude from results calculation	Max queue storage (PCU)	Has queue limit	Queue limit (PCU)	Excess queue penalty (£)	Has degree of saturation limit
1	1	NetworkDefault	100	100	100		0.00				
2	2	Flare	100	100	100		0.00				
	3	Flare	100	100	100		0.00				
3	2	NetworkDefault	100	100	100		0.00				
6	1	NetworkDefault	100	100	100		0.00				
7	1	NetworkDefault	100	100	100		0.00				
8	3	CTM	100	100	100		0.00				
	4	CTM	100	100	100		0.00				
10	3	Flare	100	100	100		0.00				
11	1	NetworkDefault	100	100	100		0.00				
12	1	Flare	100	100	100		3.00	✓	3.00	500.00	
13	2	NetworkDefault	100	100	100		0.00				
14	1	NetworkDefault	100	100	100		0.00				
15	1	NetworkDefault	100	100	100		0.00				

Modelling - Advanced

Arm	Traffic Stream	Initial queue (PCU)	Type of Vehicle-in-Service	Vehicle-in-Service	Type of random parameter	Random parameter	Auto cycle time	Cycle time
(ALL)	(ALL)	0.00	NetworkDefault	Not-Included	NetworkDefault	0.50	✓	120

Normal traffic - Modelling

Arm	Traffic Stream	Stop weighting (%)	Delay weighting (%)
(ALL)	(ALL)	100	100

Normal traffic - Advanced

Arm	Traffic Stream	Dispersion type for Normal Traffic
(ALL)	(ALL)	NetworkDefault

Flows

Arm	Traffic Stream	Total Flow (PCU/hr)	Normal Flow (PCU/hr)
1	1	677	677
2	2	650	650
	3	27	27
3	2	200	200
6	1	1154	1154
7	1	160	160
8	3	241	241
	4	586	586
10	3	1264	1264
11	1	241	241
12	1	27	27
13	2	197	197
14	1	1155	1155
15	1	674	674

Signals

Arm	Traffic Stream	Controller stream	Phase	Second phase enabled
2	2	1	A	
	3	1	A	
3	2	1	C	
8	3	2	A	
	4	2	A	
10	3	1	B	
13	2	2	C	
14	1	2	B	

Entry Sources

Arm	Traffic Stream	Cruise time for Normal Traffic (s)	Cruise speed for Normal Traffic (kph)
(ALL)	(ALL)	24.00	30.00

Sources

Arm	Traffic Stream	Source	Source traffic stream	Destination traffic stream	Cruise time for Normal Traffic (s)	Cruise speed for Normal Traffic (kph)	Auto turning radius	Traffic turn style	Turning radius (m)
2	2	1	1/1	2/2	5.40	30.00	✓	Straight	Straight Movement
	3	1	1/1	2/3	5.40	30.00	✓	Straight	Straight Movement
6	1	1	3/2	6/1	24.00	30.00	✓	Straight	Straight Movement
7	1	1	12/1	7/1	24.00	30.00	✓	Offside	6.00
8	3	1	3/2	8/3	3.60	30.00	✓	Straight	Straight Movement
	4	1	3/2	8/4	4.44	30.00	✓	Straight	Straight Movement
10	3	1	14/1	10/3	3.84	30.00	✓	Straight	Straight Movement
11	1	1	8/3	11/1	24.00	30.00	✓	Straight	Straight Movement
12	1	1	2/3	12/1	2.04	30.00	✓	Straight	Straight Movement
15	1	1	13/2	15/1	51.53	30.00	✓	Nearside	80.02
6	1	2	10/3	6/1	24.00	30.00	✓	Straight	Straight Movement
7	1	2	10/3	7/1	24.00	30.00	✓	Nearside	69.87
8	3	2	2/2	8/3	3.60	30.00	✓	Straight	Straight Movement
	4	2	2/2	8/4	4.44	30.00	✓	Straight	Straight Movement
10	3	2	13/2	10/3	3.84	30.00	✓	Straight	Straight Movement
15	1	2	8/4	15/1	51.53	30.00	✓	Straight	Straight Movement

Give Way Data

Arm	Traffic Stream	Opposed traffic	Use Step-wise Opposed Turn Model	Visibility restricted
12	1	AllTraffic		

Give Way Data - All Movements - Conflicts

Traffic Stream	Description	Controlling type	Controlling traffic stream	Percentage opposing (%)	Slope coefficient	Upstream signals visible	Conflict shift	Conflict duration
1		TrafficStream	10/3	100	1.09		0	0

Local OD Matrix - Local Matrix: 1

Local Matrix Options

OD Matrix	Name	Use for point to point table	Auto calculate	Allocation mode	Allow paths past exit locations	Allow looped paths on arms	Allow looped paths on traffic nodes	Copy flows	Matrix to copy flows from	Limit paths by length	Path length limit multiplier	Limit paths by number	Path number limit
1	(untitled)	✓	✓	Path Equalisation			✓			✓	1.25		

Normal Input Flows (PCU/hr)

		To			
		1	2	3	4
From	1	0	191	459	27
	2	89	0	88	20
	3	1042	0	0	113
	4	23	50	127	0

Bus Input Flows not shown as they are blank.

Tram Input Flows not shown as they are blank.

Pedestrian Input Flows not shown as they are blank.

Locations

OD Matrix	Location	Name	Entries	Exits	Colour
1	1	(untitled)	1/1	6/1	#0000FF
	2	(untitled)	13/2	11/1	#00FF00
	3	(untitled)	14/1	15/1	#FFFF00
	4	(untitled)	3/2	7/1	#FFFF00

Normal Paths and Flows

OD Matrix	Path	Description	From location	To location	Path items	Allocation type	Normal Calculated Flow (PCU/hr)
1	10		4	1	3/2, 6/1	Normal	23
	11		1	2	1/1, 2/2, 8/3, 11/1	Normal	191
	12		4	3	3/2, 8/4, 15/1	Normal	127
	13		3	1	14/1, 10/3, 6/1	Normal	1042
	19		2	3	13/2, 15/1	Normal	88
	21		1	4	1/1, 2/3, 12/1, 7/1	Normal	27
	22		2	1	13/2, 10/3, 6/1	Normal	89
	24		2	4	13/2, 10/3, 7/1	Normal	20
	25		3	4	14/1, 10/3, 7/1	Normal	113
	26		4	2	3/2, 8/3, 11/1	Normal	50
	27		1	3	1/1, 2/2, 8/4, 15/1	Normal	459

Signal Timings

Network Default: 120s cycle time; 120 steps

Controller Stream 1

Controller Stream	Name	Description	Use sequence	Cycle time source	Cycle time (s)
1	(untitled)		1	NetworkDefault	120

Controller Stream 1 - Properties

Controller Stream	Manufacturer name	Type	Model number	(Telephone) Line Number	Site number	Grid reference	Gaining delay type
1	Unspecified						Absolute

Controller Stream 1 - Optimisation

Controller Stream	Allow offset optimisation	Allow green split optimisation	Optimisation level	Auto redistribute	Enable stage constraint
1	✓	✓	Offsets And Green Splits		

Phases

Controller Stream	Phase	Name	Minimum green (s)	Maximum green (s)	Relative start displacement (s)	Relative end displacement (s)	Type
1	(ALL)	(untitled)	7	300	0	0	Traffic

Library Stages

Controller Stream	Library Stage	Phases in stage	User stage minimum (s)
1	1	A, B	1
	2	C	1

Losing / Gaining Phase Delays

Controller Stream	Delay	Type	Phase	From stage	To stage	Relative delay
1	1	Losing	A	1	2	1

Stage Sequences

Controller Stream	Sequence	Name	Multiple cycling	Stage IDs	Stage ends
1	1	(untitled)	Single	1, 2	32, 53

Intergreen Matrix for Controller Stream 1

		To		
		A	B	C
From	A			5
	B			6
	C	6	5	

Banned Stage transitions for Controller Stream 1

		To	
		1	2
From	1		
	2		

Interstage Matrix for Controller Stream 1

		To	
		1	2
From	1	0	6
	2	6	0

Resultant Stages

Controller Stream	Resultant Stage	Is base stage	Library Stage ID	Phases in this stage	Stage start (s)	Stage end (s)	Stage duration (s)	User stage minimum (s)	Stage minimum (s)
1	1	✓	1	A,B	59	32	93	1	6
	2	✓	2	C	38	53	15	1	7

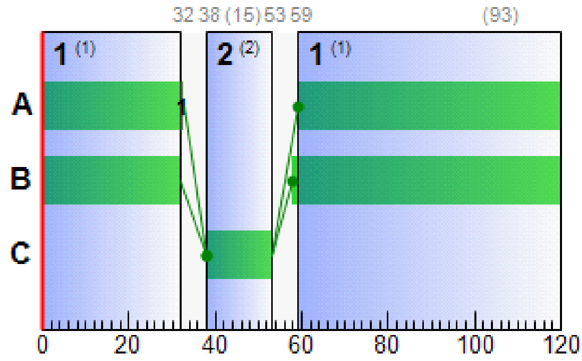
Resultant Phase Green Periods

Controller Stream	Phase	Green period	Is base green period	Start time (s)	End time (s)	Duration (s)
1	A	1	✓	59	33	94
	B	1	✓	58	32	94
	C	1	✓	38	53	15

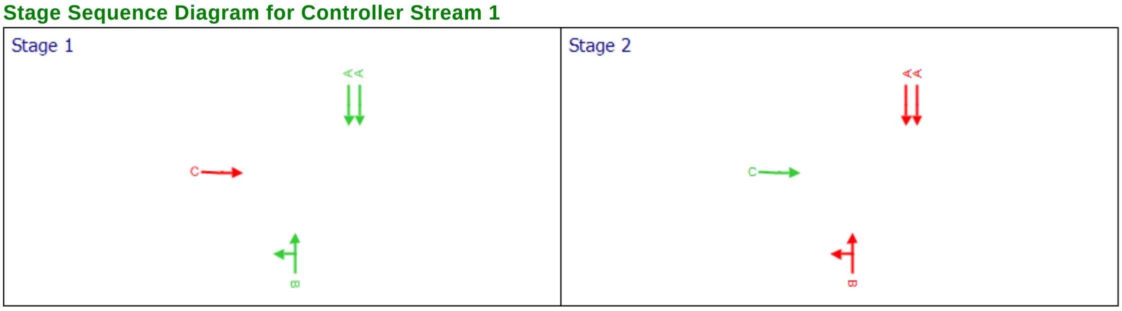
Traffic Stream Green Times

Arm	Traffic Stream	Traffic Node	Controller Stream	Phase	Green Period 1		
					Start	End	Duration
2	**2**		1	A	59	33	94
2	**3**		1	A	59	33	94
3	**2**		1	C	38	53	15
10	**3**		1	B	58	32	94

Phase Timings Diagram for Controller Stream 1



Stage Sequence Diagram for Controller Stream 1



Controller Stream 2

Controller Stream	Name	Description	Use sequence	Cycle time source	Cycle time (s)
2	(untitled)		1	NetworkDefault	120

Controller Stream 2 - Properties

Controller Stream	Manufacturer name	Type	Model number	(Telephone) Line Number	Site number	Grid reference	Gaining delay type
2	Unspecified						Absolute

Controller Stream 2 - Optimisation

Controller Stream	Allow offset optimisation	Allow green split optimisation	Optimisation level	Auto redistribute	Enable stage constraint
2	✓	✓	Offsets And Green Splits		

Phases

Controller Stream	Phase	Name	Minimum green (s)	Maximum green (s)	Relative start displacement (s)	Relative end displacement (s)	Type
2	**(ALL)**	(untitled)	7	300	0	0	Traffic

Library Stages

Controller Stream	Library Stage	Phases in stage	User stage minimum (s)
2	**1**	A, B	1
	2	C	1

Losing / Gaining Phase Delays

Controller Stream	Delay	Type	Phase	From stage	To stage	Relative delay
2	1	Losing	B	1	2	7
	2	Losing	A	1	2	7

Stage Sequences

Controller Stream	Sequence	Name	Multiple cycling	Stage IDs	Stage ends
2	1	(untitled)	Single	1, 2	21, 54

Intergreen Matrix for Controller Stream 2

		To		
		A	B	C
From	A			6
	B			6
	C	6	6	

Banned Stage transitions for Controller Stream 2

		To	
		1	2
From	1		
	2		

Interstage Matrix for Controller Stream 2

		To	
		1	2
From	1	0	13
	2	6	0

Resultant Stages

Controller Stream	Resultant Stage	Is base stage	Library Stage ID	Phases in this stage	Stage start (s)	Stage end (s)	Stage duration (s)	User stage minimum (s)	Stage minimum (s)
2	1	✓	1	A,B	60	21	81	1	1
	2	✓	2	C	34	54	20	1	7

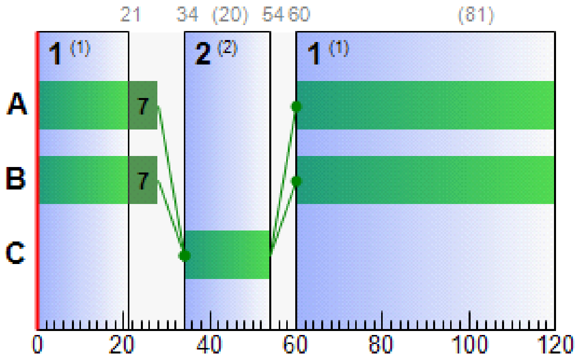
Resultant Phase Green Periods

Controller Stream	Phase	Green period	Is base green period	Start time (s)	End time (s)	Duration (s)
2	A	1	✓	60	28	88
	B	1	✓	60	28	88
	C	1	✓	34	54	20

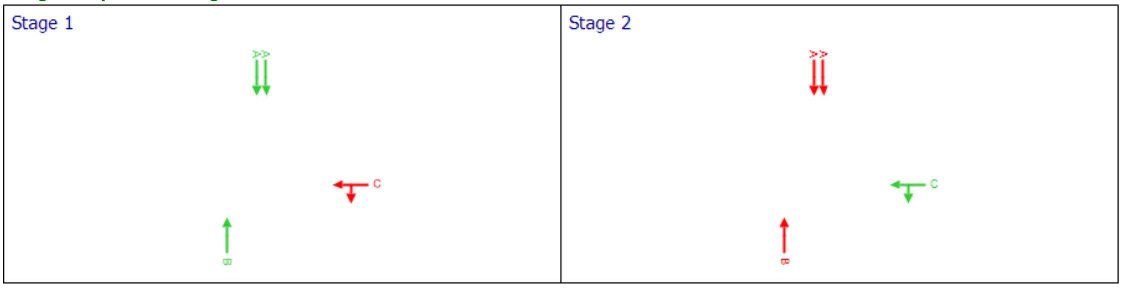
Traffic Stream Green Times

Arm	Traffic Stream	Traffic Node	Controller Stream	Phase	Green Period 1		
					Start	End	Duration
8	3		2	A	60	28	88
8	4		2	A	60	28	88
13	2		2	C	34	54	20
14	1		2	B	60	28	88

Phase Timings Diagram for Controller Stream 2



Stage Sequence Diagram for Controller Stream 2



Resultant penalties

Time Segment	Controller stream	Phase min max penalty (£ per hr)	Intergreen broken penalty (£ per hr)	Stage constraint broken penalty (£ per hr)	Cost of controller stream penalties (£ per hr)
17:00-18:00	(ALL)	0.00	0.00	0.00	0.00

Traffic Stream Results

Traffic Stream Results: Vehicle summary

Time Segment	Arm	Traffic Stream	Degree of saturation (%)	Practical reserve capacity (%)	Calculated flow entering (PCU/hr)	Calculated sat flow (PCU/hr)	Actual green (s (per cycle))	Mean Delay per Veh (s)	Mean max queue (PCU)	Utilised storage (%)	Weighted cost of delay (£ per hr)	Weighted cost of stops (£ per hr)	Performance Index (£ per hr)
17:00-18:00	1	1	34	161	677	1965	120	0.48	0.09	0.26	1.28	0.00	1.28
	2	2	44	104	650	1965	94	6.39	6.74	86.13	16.38	2.84	19.22
		3	2	5455	27	2105	94	2.73	0.19	2.40	0.29	0.07	0.36
	3	2	87	3	200	1717	15	95.22	8.96	25.75	75.12	3.26	78.38
	6	1	0	Unrestricted	1154	Unrestricted	120	0.00	0.00	0.00	0.00	0.00	0.00
	7	1	0	Unrestricted	160	Unrestricted	120	0.00	0.00	0.00	0.00	0.00	0.00
	8	3	18	392	241	1775	88	4.81	2.11	40.48	4.57	0.79	5.37
		4	38	140	586	2105	88	6.05	5.90	91.62	13.98	2.22	16.20
	10	3	81	11	1264	1965	94	6.74	5.36	96.39	33.61	2.04	35.64
	11	1	0	Unrestricted	241	Unrestricted	120	0.00	0.00	0.00	0.00	0.00	0.00
	12	1	6	1411	27	453	120	25.44	0.57	18.92	2.71	0.25	2.96
	13	2	68	33	197	1665	20	58.86	6.81	19.59	45.74	2.53	48.26
	14	1	80	12	1155	1965	88	15.41	26.31	75.64	70.19	9.51	79.70
	15	1	0	Unrestricted	674	Unrestricted	120	0.00	0.00	0.00	0.00	0.00	0.00

Traffic Stream Results: Flows and signals

Time Segment	Arm	Traffic Stream	Calculated flow entering (PCU/hr)	Calculated flow out (PCU/hr)	Flow discrepancy (PCU/hr)	Adjusted flow warning	Calculated sat flow (PCU/hr)	Calculated capacity (PCU/hr)	Degree of saturation (%)	DOS Threshold exceeded	Practical reserve capacity (%)	Mean modulus of error	Actual green (s (per cycle))
17:00-18:00	1	1	677	677	0		1965	1965	34		161	0.00	120
	2	2	650	650	0		1965	1476	44		104	0.00	94
		3	27	27	0		2105	1666	2		5455	0.00	94
	3	2	200	200	0		1717	229	87		3	0.00	15
	6	1	1154	1154	0		Unrestricted	Unrestricted	0		Unrestricted	0.38	120
	7	1	160	160	0		Unrestricted	Unrestricted	0		Unrestricted	0.36	120
	8	3	241	241	0		1775	1316	18		392	0.49	88
		4	586	586	0		2105	1561	38		140	0.50	88
	10	3	1264	1264	0		1965	1556	81		11	0.41	94
	11	1	241	241	0		Unrestricted	Unrestricted	0		Unrestricted	0.59	120
	12	1	27	27	0		453	453	6		1411	0.41	120
	13	2	197	197	0		1665	291	68		33	0.00	20
	14	1	1155	1155	0		1965	1439	80		12	0.00	88
	15	1	674	674	0		Unrestricted	Unrestricted	0		Unrestricted	0.37	120

Traffic Stream Results: Stops and delays

Time Segment	Arm	Traffic Stream	Mean Cruise Time per Veh (s)	Mean Delay per Veh (s)	Total delay (PCU-hr/hr)	Weighted cost of delay (£ per hr)	Mean stops per Veh (%)	Total stops (Stops per hr)	Weighted cost of stops (£ per hr)
17:00-18:00	1	1	24.00	0.48	0.09	1.28	0.00	0.00	0.00
	2	2	5.40	6.39	1.15	16.38	34.79	226.14	2.84
		3	5.40	2.73	0.02	0.29	20.85	5.63	0.07
	3	2	24.00	95.22	5.29	75.12	130.11	260.22	3.26
	6	1	24.00	0.00	0.00	0.00	0.00	0.00	0.00
	7	1	24.00	0.00	0.00	0.00	0.00	0.00	0.00
	8	3	3.60	4.81	0.32	4.57	26.29	63.36	0.79
		4	4.44	6.05	0.98	13.98	30.18	176.87	2.22
	10	3	3.84	6.74	2.37	33.61	12.86	162.55	2.04
	11	1	24.00	0.00	0.00	0.00	0.00	0.00	0.00
	12	1	2.04	25.44	0.19	2.71	72.63	19.61	0.25
	13	2	24.00	58.86	3.22	45.74	102.29	201.52	2.53
	14	1	24.00	15.41	4.94	70.19	65.65	758.22	9.51
	15	1	51.53	0.00	0.00	0.00	0.00	0.00	0.00

Traffic Stream Results: Queues and blocking

Time Segment	Arm	Traffic Stream	Initial queue (PCU)	Mean max queue (PCU)	Max queue storage (PCU)	Utilised storage (%)	Excess queue penalty (£ per hr)	Wasted time total (s (per cycle))	Estimated blocking
17:00-18:00	1	1	0.00	0.09	34.78	0.26	0.00	0.00	
	2	2	0.00	6.74	7.83	86.13	0.00	4.87	
		3	0.00	0.19	7.83	2.40	0.00	94.00	
	3	2	0.00	8.96	34.78	25.75	0.00	0.00	
	6	1	0.00	0.00	34.78	0.00	0.00	0.00	
	7	1	0.00	0.00	34.78	0.00	0.00	20.00	
	8	3	0.00	2.11	5.22	40.48	0.00	2.00	
		4	0.00	5.90	6.43	91.62	0.00	0.00	
	10	3	0.00	5.36	5.57	96.39	0.00	1.00	
	11	1	0.00	0.00	34.78	0.00	0.00	23.00	
	12	1	0.00	0.57	3.00	18.92	0.00	55.00	
	13	2	0.00	6.81	34.78	19.59	0.00	0.00	
	14	1	0.00	26.31	34.78	75.64	0.00	1.13	
	15	1	0.00	0.00	74.68	0.00	0.00	0.00	

Traffic Stream Results: Flare

Time Segment	Arm	Traffic Stream	Flare present	Flare components	Degree of saturation (%)	Mean max queue (PCU)	Calculated capacity (PCU/hr)	Practical reserve capacity (%)
17:00-18:00	1	1	✓	CTM flare: 1/1,2/3,2/2	46	7.02	1485	97

Traffic Stream Results: Advanced

Time Segment	Arm	Traffic Stream	Degree of saturation penalty (£ per hr)	Ped gap accepting penalty (£ per hr)	Warmed up	Mean Max Queue EoTS (PCU)	Max End of Green Queue EoTS (PCU)	Max End of Red Queue EoTS (PCU)	PCU Factor	Cost of traffic penalties (£ per hr)	Performance Index (£ per hr)
17:00-18:00	1	1	0.00	0.00	✓	0.09			1.00	0.00	1.28
	2	2	0.00	0.00	✓	6.74	0.17	5.23	1.00	0.00	19.22
		3	0.00	0.00	✓	0.19	0.00	0.19	1.00	0.00	0.36
	3	2	0.00	0.00	✓	9.19	2.69	8.47	1.00	0.00	78.38
	6	1	0.00	0.00	✓	0.00			1.00	0.00	0.00
	7	1	0.00	0.00	✓	0.00			1.00	0.00	0.00
	8	3	0.00	0.00	✓	2.11	0.02	2.11	1.00	0.00	5.37
		4	0.00	0.00	✓	5.90	0.11	5.49	1.00	0.00	16.20
	10	3	0.00	0.00	✓	5.38	1.75	5.38	1.00	0.00	35.64
	11	1	0.00	0.00	✓	0.00			1.00	0.00	0.00
	12	1	0.00	0.00	✓	0.57			1.00	0.00	2.96
	13	2	0.00	0.00	✓	6.82	0.70	6.11	1.00	0.00	48.26
	14	1	0.00	0.00	✓	26.32	1.62	11.56	1.00	0.00	79.70
	15	1	0.00	0.00	✓	0.00			1.00	0.00	0.00

Network Results

Run Summary

Analysis set used	Run start time	Run finish time	Modelling start time (HH:mm)	Network Cycle Time (s)	Performance Index (£ per hr)	Total network delay (PCU-hr/hr)	Highest DOS (%)	Item with highest DOS	Number of oversaturated items	Percentage of oversaturated items (%)	Item with worst signalised PRC	Item with worst unsignalised PRC	Ite wit wor over PR
10	09/03/2020 09:28:28	09/03/2020 09:28:28	17:00	120	287.37	18.58	87.36	3/2	0	0	3/2	1/1	3/

Network Results: Vehicle summary

Time Segment	Degree of saturation (%)	Practical reserve capacity (%)	Calculated flow entering (PCU/hr)	Actual green (s (per cycle))	Mean Delay per Veh (s)	Weighted cost of delay (£ per hr)	Weighted cost of stops (£ per hr)	Performance Index (£ per hr)
17:00-18:00	87	3	7253	1301	9.22	263.87	23.50	287.37

Network Results: Flows and signals

Time Segment	Calculated flow entering (PCU/hr)	Calculated flow out (PCU/hr)	Flow discrepancy (PCU/hr)	Adjusted flow warning	Degree of saturation (%)	DOS Threshold exceeded	Practical reserve capacity (%)	Actual green (s (per cycle))
17:00-18:00	7253	7253	0		87		3	1301

Network Results: Stops and delays

Time Segment	Mean Cruise Time per Veh (s)	Mean Delay per Veh (s)	Total delay (PCU-hr/hr)	Weighted cost of delay (£ per hr)	Mean stops per Veh (%)	Total stops (Stops per hr)	Weighted cost of stops (£ per hr)
17:00-18:00	18.97	9.22	18.58	263.87	25.84	1874.12	23.50

Network Results: Queues and blocking

Time Segment	Utilised storage (%)	Excess queue penalty (£ per hr)	Wasted time total (s (per cycle))
17:00-18:00	96.39	0.00	201.00

Network Results: Advanced

Time Segment	Degree of saturation penalty (£ per hr)	Ped gap accepting penalty (£ per hr)	Warmed up	PCU Factor	Cost of traffic penalties (£ per hr)	Controller stream penalties (£ per hr)	Performance Index (£ per hr)
17:00-18:00	0.00	0.00	✓	1.00	0.00	0.00	287.37

Point to Point Journey Time

Average Journey Time (s) for Local Matrix: 1

		To			
		1	2	3	4
From	1	0.0	66.1	95.2	84.1
	2	132.7	0.0	134.4	132.7
	3	72.6	0.0	0.0	72.6
	4	143.2	161.7	192.5	0.0

Path Journey Time

Path	From Location	To Location	Normal Calculated Flow (PCU/hr)	Normal journey time (s)	Calculated Total Flow (PCU/hr)	Avg journey time (s)
10	4	1	23	143.22	23	143.22
11	1	2	191	66.05	191	66.05
12	4	3	127	192.46	127	192.46
13	3	1	1042	72.55	1042	72.55
19	2	3	88	134.38	88	134.38
21	1	4	27	84.09	27	84.09
22	2	1	89	132.67	89	132.67
24	2	4	20	132.67	20	132.67
25	3	4	113	72.55	113	72.55
26	4	2	50	161.67	50	161.67
27	1	3	459	95.18	459	95.18

Final Prediction Table

Traffic Stream Results

				SIGNALS		FLOWS		PERFORMANCE				PER PCU			QUEUES
Arm	**Traffic Stream**	**Name**	**Traffic node**	**Controller stream**	**Phase**	**Calculated flow entering (PCU/hr)**	**Calculated sat flow (PCU/hr)**	**Actual green (s (per cycle))**	**Wasted time total (s (per cycle))**	**Degree of saturation (%)**	**Practical reserve capacity (%)**	**JourneyTime (s)**	**Mean Delay per Veh (s)**	**Mean stops per Veh (%)**	**Mean max queue (PCU)**
1	**1**	(untitled)				677	1965	120	0.00	34	161	24.48	0.48	0.00	0.09
2	**2**	(untitled)		1	A	650	1965	94	4.87	44	104	11.79	6.39	34.79	6.74
	3			1	A	27	2105	94	94.00	2	5455	8.13	2.73	20.85	0.19
3	**2**	(untitled)		1	C	200	1717	15	0.00	87	3	119.22	95.22	130.11	8.96
6	**1**	(untitled)				1154	Unrestricted	120	0.00	0	Unrestricted	24.00	0.00	0.00	0.00
7	**1**	(untitled)				160	Unrestricted	120	20.00	0	Unrestricted	24.00	0.00	0.00	0.00
8	**3**			2	A	241	1775	88	2.00	18	392	8.41	4.81	26.29	2.11
	4			2	A	586	2105	88	0.00	38	140	10.49	6.05	30.18	5.90
10	**3**			1	B	1264	1965	94	1.00	81	11	10.58	6.74	12.86	5.36
11	**1**	(untitled)				241	Unrestricted	120	23.00	0	Unrestricted	24.00	0.00	0.00	0.00
12	**1**					27	453	120	55.00	6	1411	27.48	25.44	72.63	0.57
13	**2**	(untitled)		2	C	197	1665	20	0.00	68	33	82.86	58.86	102.29	6.81
14	**1**	(untitled)		2	B	1155	1965	88	1.13	80	12	39.41	15.41	65.65	26.31
15	**1**	(untitled)				674	Unrestricted	120	0.00	0	Unrestricted	51.53	0.00	0.00	0.00

Network Results

	Distance travelled (PCU-km/hr)	Time spent (PCU-hr/hr)	Mean journey speed (kph)	Total delay (PCU-hr/hr)	Weighted cost of delay (£ per hr)	Weighted cost of stops (£ per hr)	Excess queue penalty (£ per hr)	Performance Index (£ per hr)
Normal traffic	1146.49	56.80	20.19	18.58	263.87	23.50	0.00	287.37
Bus	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tram	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pedestrians								
TOTAL	1146.49	56.80	20.19	18.58	263.87	23.50	0.00	287.37

- *< = adjusted flow warning (upstream links/traffic streams are over-saturated)*
- ** = Traffic Stream - Normal, Bus or Tram Stop or Delay weighting has been set to a value other than 100%*
- *^ = Traffic Stream - Normal, Bus or Tram Stop or Delay Path weighting has been set to a value other than 100%*
- *+ = average link/traffic stream excess queue is greater than 0*
- ***P.I. = PERFORMANCE INDEX***

Appendix D Technical Note 031 Rev B

TECHNICAL NOTE

Job Name: Heyford Park

Job No: 39304

Note No: 031 Rev B

Date: 5th March 2020

Prepared By: Phil Rawlins

Subject: **Middleton Stoney Mitigation Package**

Item	Subject
1.	**Introduction** This note has been prepared by Stantec on behalf of Dorchester Group to set out the package of highway improvements proposed to mitigate the impact of the Heyford Park development on Middleton Stoney Village and the B430 / B4030 Junction (Middleton Stoney Junction). The note has been prepared following discussions with Oxfordshire County Council (OCC) and it should be read in conjunction with Technical Note 024 Revision D (TN024D) (PBA, March 2020) which sets out the results of modelling the Middleton Stoney junction in a number of scenarios. The proposals are subject to consultation with Middleton Stoney Parish Council, however, it is considered that the principle of this package of measures have been agreed with OCC.
2.	**Mitigation Package – Highway Improvements** The proposals set out below are considered to mitigate the impact of the proposed Heyford Park development on Middleton Stoney Village and the Middleton Stoney Junction. An overview of the scheme is set out on **Drawing 39304/5501/SK53 Rev A**. B430 / B4030 Junction (Middleton Stoney Junction) There is a previously agreed S278 scheme for the Middleton Stoney junction that was consented as part of the 1,075 dwelling Heyford Park planning application. It is proposed that this scheme is implemented as part of this package of works. The scheme layout is set out in Woods Hardwick Drawing HEYF/5/582 Rev C at **Appendix A**. B4030 Lower Heyford Road Bus Gate It is proposed that a bus gate will be provided on the B4030 west of the Middleton Stoney junction. The bus gate will be provided close to the B4030 Lower Heyford Road / Unnamed Road to Camp Road junction and there are two options for the gate restrictions as shown on **Drawings 39304/5501/SK51 Rev B** and **39304/5501/SK60**. The first option is to restrict traffic in a southbound direction only. The second option is to restrict traffic in both southbound and northbound directions. Both options would restrict the amount of traffic at the Middleton Stoney Junction and therefore provide improved operational performance at the junction which will enable an improved cycling environment and improved environmental amenity in this part of Middleton Stoney Village. A review of the predicted reduction in flows on the links between Camp Road and Middleton Stoney has been undertaken. **Table 1** below sets out the predicted traffic flows on the B4030 South Heyford Road link for each scenario.

Item	Subject

Table 1: Bus Gate Traffic Flows

	AM Flow	PM Flow
No Bus Gate	1169	977
Southbound only restriction	686	604
Two-way restriction	116	89

OCC have advised that in order to provide a suitable cycle route using advisory cycle lanes, two way flows on the corridor should not exceed 400 vehicles per hour. **Table 1** shows that the two-way restriction option is the only option to reduce traffic flows below this 400 vehicle threshold and therefore this is the preferred bus gate option as it would provide a significantly improved environment for cyclists using this route.

The bus gate will be enforced using cameras at a time when decriminalised parking is in operation in Cherwell.

B4030 Lower Heyford Road / Unnamed Road to Camp Road junction

In line with the implementation of the bus gate it is proposed that the priority is changed at the B4030 Lower Heyford Road / Unnamed Road to Camp Road in order to facilitate the operation of the bus gate. Two different schemes have been designed to reflect the two bus gate options (one-way or two-way restriction) and the resultant requirements of the junction. These proposals are set out on **Drawing 39304/5501/SK51 Rev B** and **Drawing 39304/5501/SK60** for the one-way and two-way bus gate options respectively.

For a one-way bus gate it is proposed that the mainline carriageway be changed to the north / south movement with the western arm becoming the minor arm. This arrangement will provide a safer environment for the implementation of the bus gate.

For a two-way bus gate, the main carriageway would be for the north / west movement with the southern arm providing access for permitted vehicles only.

B4030 Bicester Road HGV Restriction

It is proposed that a HGV restriction is placed on the B4030 east of the Middleton Stoney junction. This restriction will limit the number of HGVs travelling through Middleton Stoney on route to Bicester which will improve the environmental amenity in Middleton Stoney Village and reduce the number of vehicles travelling through the Middleton Stoney Junction.

Cycle Improvement – Camp Road to Middleton Stoney

It is proposed that the centre line be removed along this section of route and two 1.5m wide advisory cycle lanes be provided on either side of the carriageway along the length of the road. The scheme can be supplemented with a number of build outs at which point vehicles would be required to give-way to on-coming vehicles. It is also proposed to restrict the speed limit to 40mph for this section of route. Additionally, cyclists will benefit from a reduction in number of vehicles along this route due to the proposed bus gate. It is considered that this scheme would reduce vehicle speeds along the length of the road and therefore provide a safer environment for cycling along this route. This scheme is illustrated on **Drawing 39304/5501/SK52 Rev A**.

Cycle Improvement – Middleton Stoney to Bicester

Between Middleton Stoney Village and the Himley Village development a 2.5m wide segregated foot / cycleway will be provided along the southern side of the carriageway. Connection will be made to cycle infrastructure provided by the Himley Village development that will provide an

Item	Subject
	onward connection to Bicester Town Centre. This scheme is illustrated on **Drawing 39304/5501/101**. <u>Camp Road / Chilgrove Drive Junction</u> As set out in previous proposals it is intended to signalise the Camp Road / Chilgrove Drive junction to provide site access into Heyford Park via Chilgrove Drive. This scheme is set out on **Drawing 39304/5501/SK26 Rev I**. It is considered that the signalisation of this junction will allow for control of traffic flows in this location and would complement the bus gate proposals. <u>B430 Ardley Road / Unnamed Road</u> It is proposed to signalise the B430 / Unnamed Road junction in order to facilitate the additional traffic that would likely re-assign and use this junction as an outcome of the bus gate intervention. The scheme is set out on **Drawing 39304/5501/SK58**. It is considered that the signalisation of this junction will allow for control of increased traffic flows in this location and would complement the bus gate proposals.
3.	**Wider Mitigation Package** A number of proposals have been put forward that are likely to contribute over time to the reduction in vehicle trip generation associated with the Heyford Park development and trips between the site and Bicester and these are set out below. <u>Travel Plan</u> Full Residential and Workplace Travel Plans and associated measures are being prepared by Calibro on behalf of Dorchester. The Travel Plans aim to reduce the overall vehicular trip generation of Heyford Park. The Travel Plans will be submitted as part of an addendum submission and will set out key proposed measures including but not limited to: - Provision of Travel Plan welcome packs and leaflets including plans showing walk and cycle routes, and bus service locations. - Personalised Travel Planning for residents and employees - Provision of a free 3month bus pass for residents and employees - Implementation of a bike hire scheme and one free annual membership for residents and employees - Adult and child cycle training will be made available - Public bike maintenance and bike pump stands will be installed and maintained within the development. - A community club will be established offering leisure cycle rides and walks around the development. - Setting up and management of a car share club for residents and employees - The introduction of an electric car club vehicle - Twice annual public travel events - Secure and sheltered employee cycle parking - A forum of workplace champions will be established to share knowledge, issues and opportunities - Where possible the incorporation of showers and drying rooms into commercial buildings - Assess with each business the potential to provide car sharer only parking and smart parking. - A commitment to undertake bike maintenance sessions at travel plan events and have a monthly mobile bike repair service. - The community cycle club will organise biker breakfasts, buddy schemes and encourage cycle champions from the site to encourage work alongside the TPC. - Establish a bike miles scheme where employees can earn points in exchange for vouchers - Businesses at the site will be able to claim 50% of the cost of installing audio and video conferencing systems at their premises up to £500

Item	Subject
	- Up to 5 desks with wifi access will be made available within offices on site to create an informal co-working space to provide an alternative to home working without the need to travel. <u>Bus Service Improvements</u> It is proposed that bus services between the Heyford Park development and Bicester are increased from the existing 1 bus per hour to 4 per hour. The existing service runs between Oxford and Bicester via Heyford Park. It is proposed that the service is split at Heyford Park. This will allow buses to Bicester to run more reliably than at the current time and the provision of the bus gate should also aid with journey time reliability. The buses to Bicester will also serve Bicester Village station providing onward connections to London and Oxford.
4.	**Conclusion** This note has set out the package of highway improvements proposed to mitigate the impact of the Heyford Park development on Middleton Stoney Village and the B430 / B4030 Junction (Middleton Stoney Junction). The package includes: - S278 scheme of improvements at the B430 / B4030 junction - A bus gate with either one-way or two-way restrictions on the B4030 Lower Heyford Road. A two-way restriction is the preferred option due to the reduction in traffic flows and resultant benefit to cyclists along the corridor between Camp Road and Middleton Stoney - Re-prioritisation of the B4030 Lower Heyford Road / Unnamed Road to Camp Road junction - HGV restriction on the B4030 Bicester Road - Cycle improvements between Camp Road and Bicester via Middleton Stoney - Signalisation of the Camp Road / Chilgrove Drive junction - Signalisation of the B430 Ardley Road / Unnamed Road junction - Site wide Travel Plans - Bus Service Improvements It is considered that the package will adequately mitigate the impact of the Heyford Park development on Middleton Stoney Village and the Middleton Stoney Junction.

DOCUMENT ISSUE RECORD

Technical Note No	Rev	Date	Prepared	Checked	Reviewed (Discipline Lead)	Approved (Project Director)
39304/TN031	-	06.08.19	PR	-	-	MW
39304/TN031	A	30.08.19	PR	-	-	-
39304/TN031	B	05.03.20	RK	PR	PR	MW

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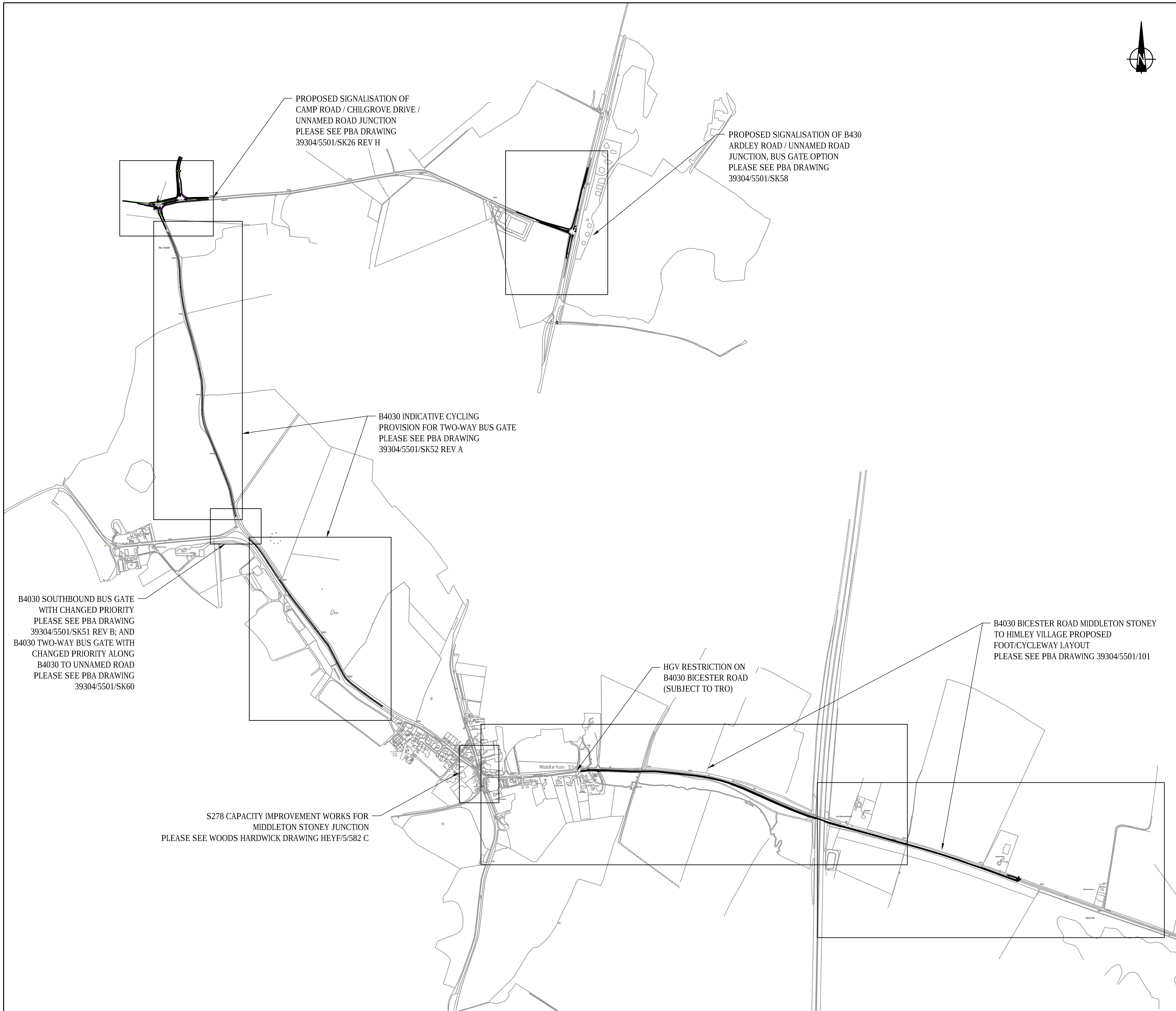
TECHNICAL NOTE

DRAWINGS



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Mark	Revision	Date	Drawn	Chkd	Appd
A	UPDATED DRAWING REFS AND INCLUSION OF MS TO HV F/CYCLEWAY	05.03.20	PC	PR	

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Drawing Issue Status

PRELIMINARY CONCEPT SKETCH

HEYFORD PARK, OXFORDSHIRE

MIDDLETON STONEY PACKAGE OVERVIEW PLAN

Client

DORCHESTER GROUP

Date of 1st Issue	Designed	Drawn
05.08.2019	-	PC
A2 Scale	**Checked**	**Approved**
N.T.S	PR	PR

Drawing Number: 39304/5501/SK53

Revision: A

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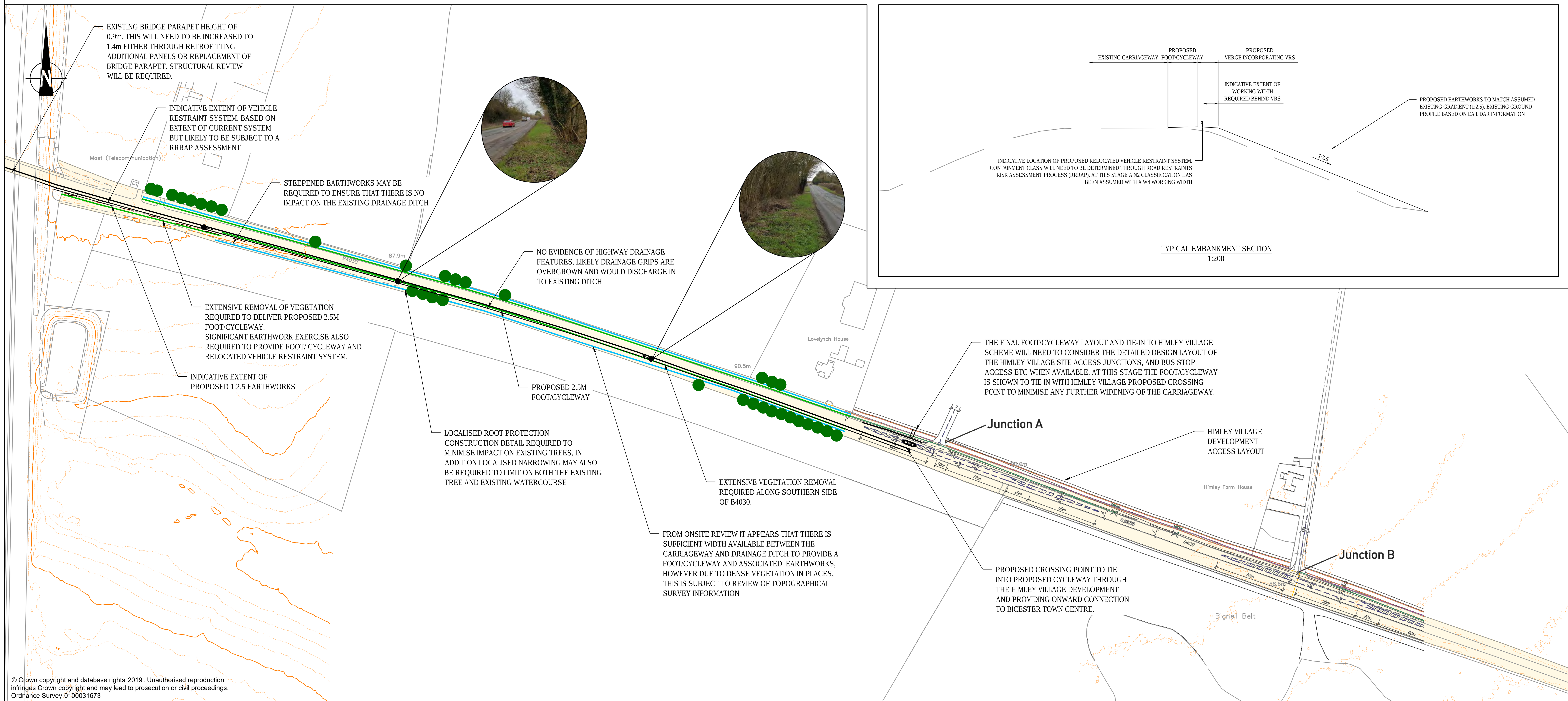

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TYPICAL EMBANKMENT SECTION
1:200

NOTES

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KEY:

- HIGHWAY BOUNDARY INFORMATION RECEIVED FROM OXFORD COUNTY COUNCIL ON 06.12.19 AND INTERPRETED BY STANTEC.
- EXISTING CONTOURS (BASED ON AVAILABLE LIDAR DATA ALONG B4030).
- INDICATIVE LOCATION OF HEDGEROW / VEGETATION
- INDICATIVE LOCATION OF DRAINAGE DITCH / BROOK
- INDICATIVE LOCATION OF SIGNIFICANT TREES

Mark	Revision	Date	Drawn	Chkd	Appd

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Drawing Issue Status
FOR DISCUSSION

HEYFORD PARK, OXFORDSHIRE
B4030 BICESTER ROAD
MIDDLETON STONEY TO HIMLEY VILLAGE
PROPOSED FOOT/CYCLEWAY LAYOUT

Client
DORCHESTER GROUP

Date of 1st Issue	Designed	Drawn
09.03.20	ET	ET
A1 Scale	Checked	Approved
1:1000	JMH	-

Drawing Number	Revision
39304/5501/101	-

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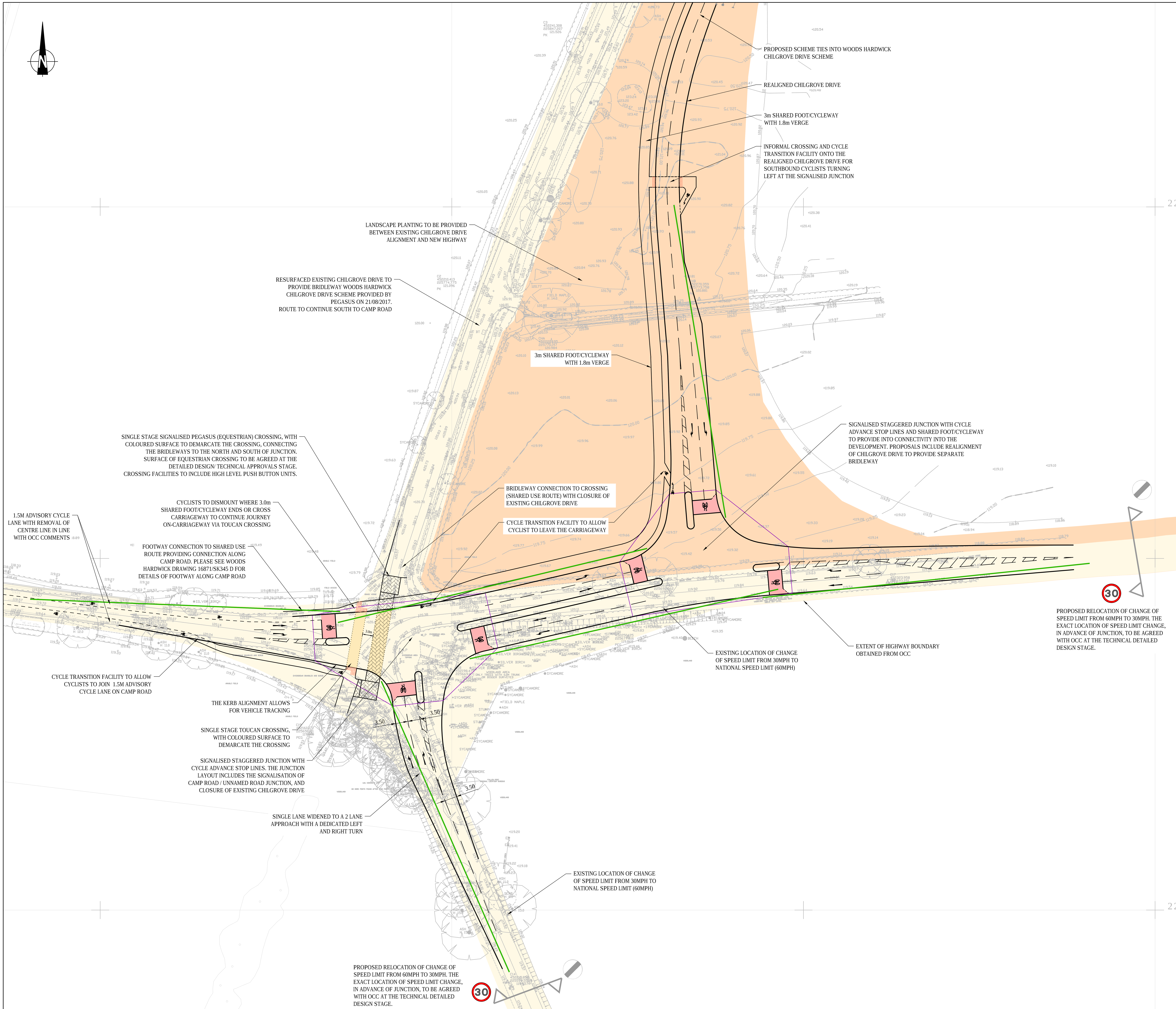
Tel: 01173 327 840

File Location: j:\39304 heyford park tranche 2\cad\brief 5501\dwgs\39304-5501-101 b4030 to bicester village cycleway general arrangement.dwg



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KEY:

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LAND UNDER THE CLIENT'S CONTROL. LAND TITLE ON288089 (UPPER HEYFORD GP LTD)

90M STOPPING SIGHT DISTANCE TO A PRIMARY SIGNAL HEAD IN ACCORDANCE WITH DMRB FOR A 30MPH ROAD

JUNCTION INTERVISIBILITY

Mark	Revision	Date	Drawn	Chkd	Appd
I	UPDATED TO STANTEC BORDER	26.02.20	PC	PR	-
H	ADDITIONAL UPDATES FOLLOWING OCC COMMENTS	10.10.18	PC		-
G	COMMENTS FROM OCC INCORPORATED INTO PLAN	02.10.18	PC		-
F	COMMENTS FROM THE BHS INCORPORATED INTO PLAN	07.06.18	JDS	PR	-
E	COLOURED SURFACE PROVIDED ON CROSSING	19.03.18	PC	PR	-
D	REVISED IN ACCORDANCE WITH OCC COMMENTS 05/03/18	19.03.18	PC	PR	MW
C	REVISED PEDESTRIAN CYCLE ROUTE ALONG CHILGROVE DRIVE	08.02.18	JHo	PC	PR
B	ADDED NOTE ON PLANTING	17.01.18	AA	PR	-
A	AMENDMENTS MADE IN ACCORDANCE WITH OCC COMMENTS	04.01.18	PC	PR	-

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Drawing Issue Status

FOR DISCUSSION

HEYFORD PARK, TRANCHE 2
CHILGROVE DRIVE
POTENTIAL SIGNALISED JUNCTION

Client

DORCHESTER GROUP

Date of 1st Issue	Designed	Drawn
06.10.2017	JHo	JHo
A1 Scale	Checked	Approved
1:500	PC	PR

Drawing Number: 39304/5501/SK26

Revision: I

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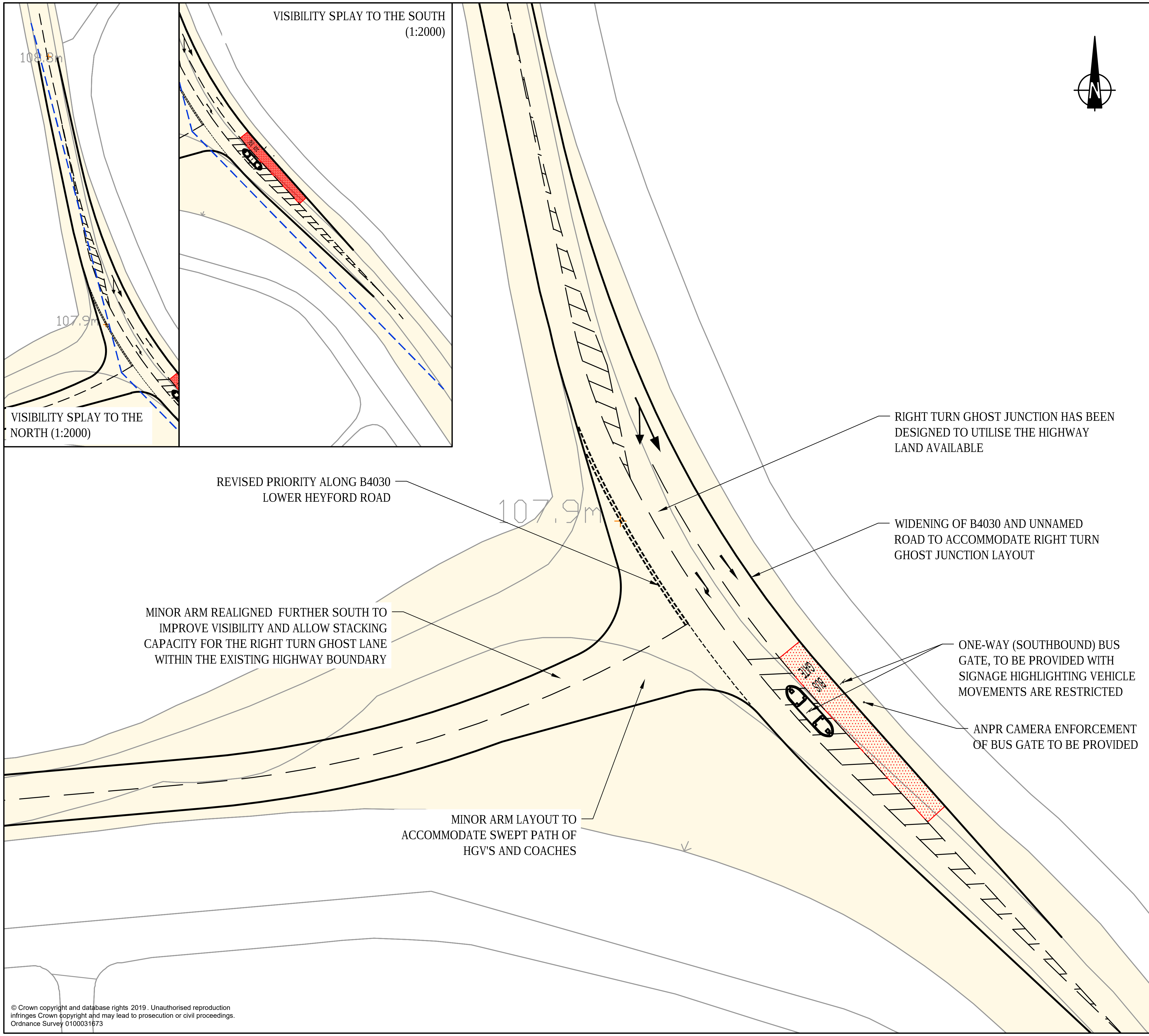

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KEY:

4.5M X 120M VISIBILITY SPLAY FOR THE PROPOSED SPEED LIMIT OF 40MPH IN ACCORDANCE WITH DMRB CD 123

HIGHWAY BOUNDARY INFORMATION RECEIVED FROM OXFORD COUNTY COUNCIL ON 13.03.17

Mark	Revision	Date	Drawn	Chkd	Appd
B	LAYOUT REVISED TO ACCOMODATE TRACKING	05.03.20	PC	PR	
A	UPDATE TO STANTEC BORDER	24.02.20	PC	PR	-

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Drawing Issue Status
PRELIMINARY CONCEPT SKETCH

HEYFORD PARK, OXFORDSHIRE
B4030 SOUTHBOUND BUS GATE
WITH CHANGED PRIORITY
AND A RIGHT TURN GHOST ISLAND

Client
DORCHESTER GROUP

Date of 1st Issue	Designed	Drawn
01.08.2019	JHo	JHo
A3 Scale	Checked	Approved
1:500	PC	PR

Drawing Number: 39304/5501/SK51
Revision: B

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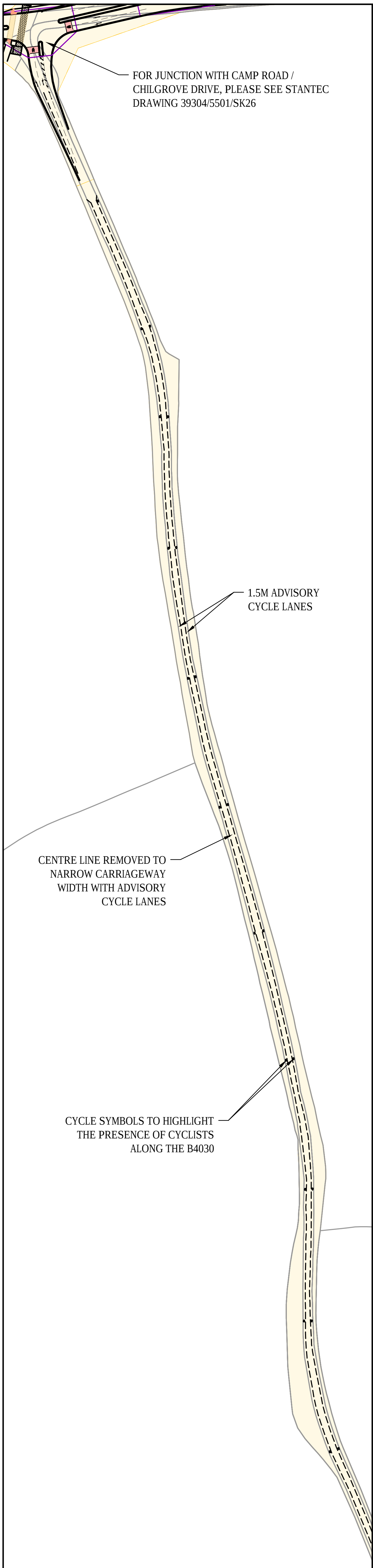
Tel: 01173 327 840

user name: coote, paul

File Location: j:\39304 heyford park tranche 2\cad\brief 5501\sketches\39304-5501-sk51 b4030 bus gate junction.dwg



INSET 1

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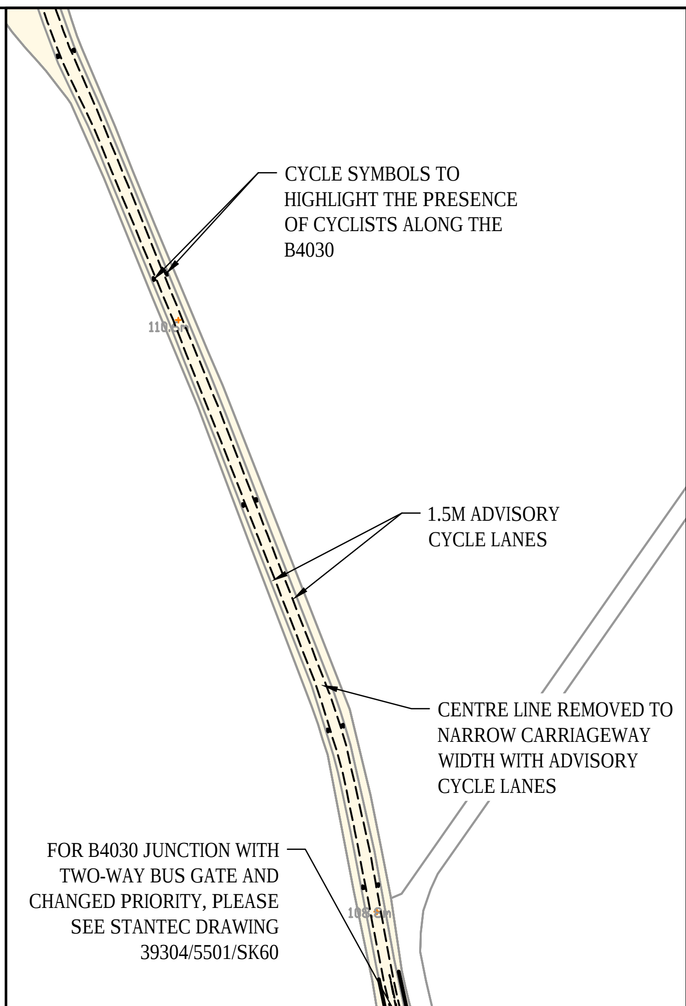

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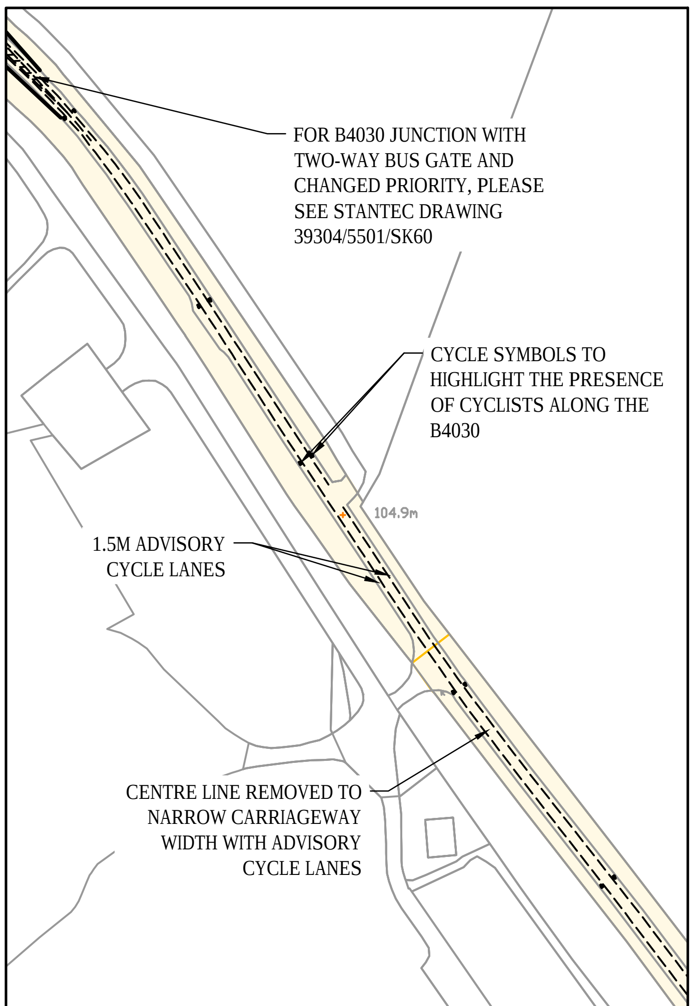

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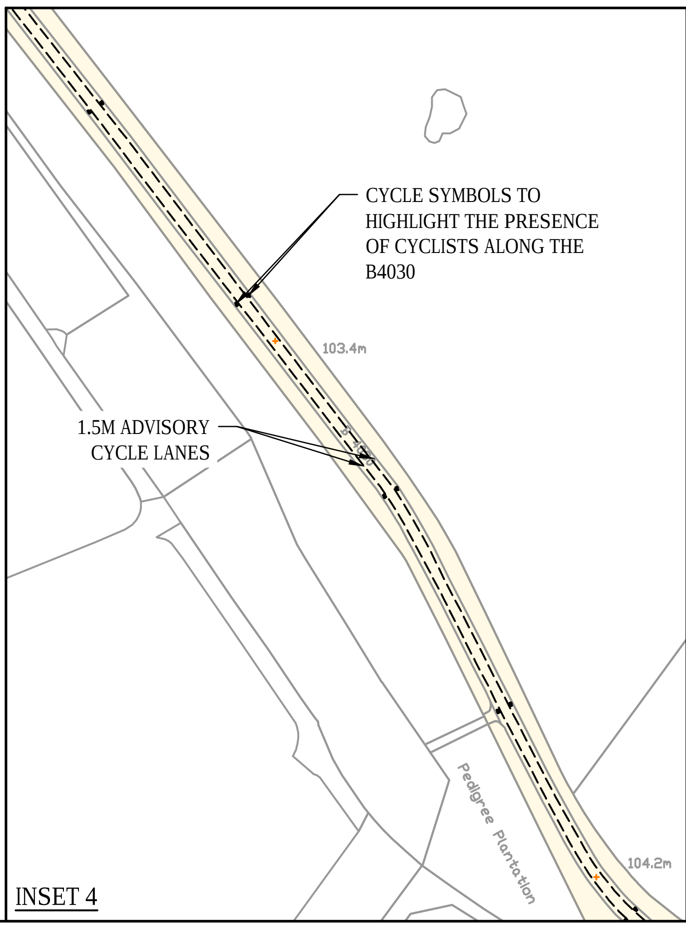

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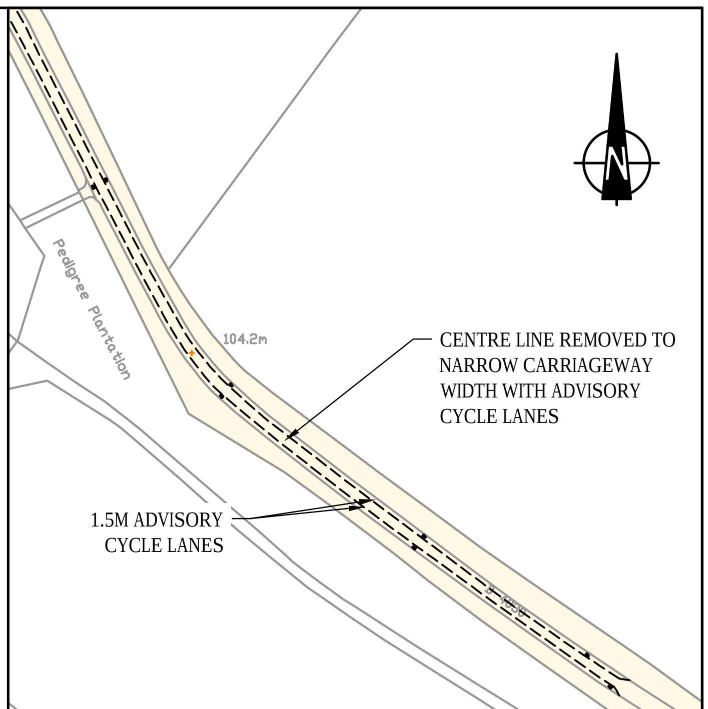

INSET 5

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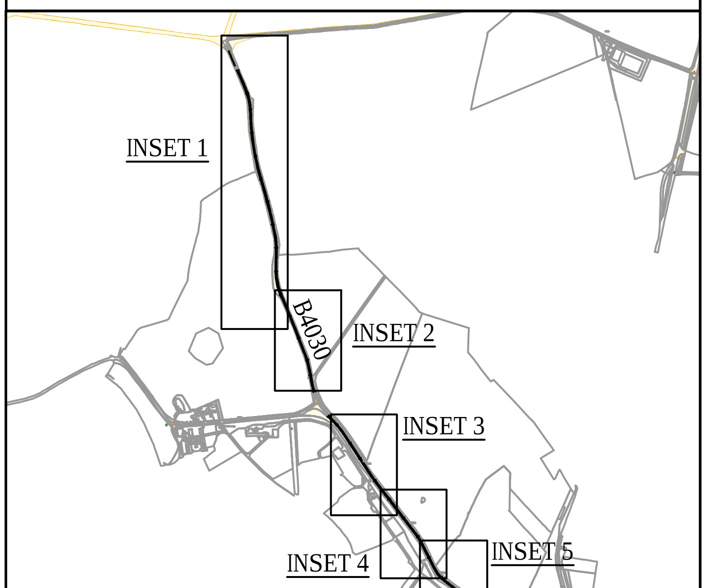

KEYPLAN

Mark	Revision	Date	Drawn	Chkd	Appd
A	BUILD OUTS REMOVED, UPDATE TO STANTEC BORDER	24.02.20	PC	PR	-

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Drawing Issue Status
PRELIMINARY CONCEPT SKETCH

HEYFORD PARK, OXFORDSHIRE

B4030 INDICATIVE CYCLING PROVISION

Client
DORCHESTER GROUP

Date of 1st Issue	Designed	Drawn
01.08.2019	JHo	JHo
A3 Scale	**Checked**	**Approved**
1:2500	PC	PR

Drawing Number: 39304/5501/SK52
Revision: A

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KEY:

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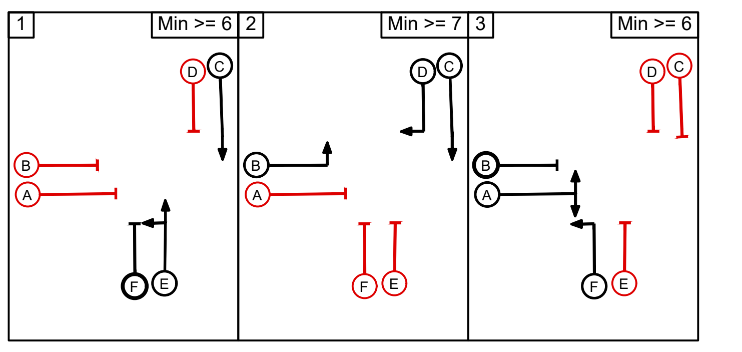
LAND UNDER THE CLIENT'S CONTROL. LAND TITLE ON288089 (UPPER HEYFORD GP LTD)

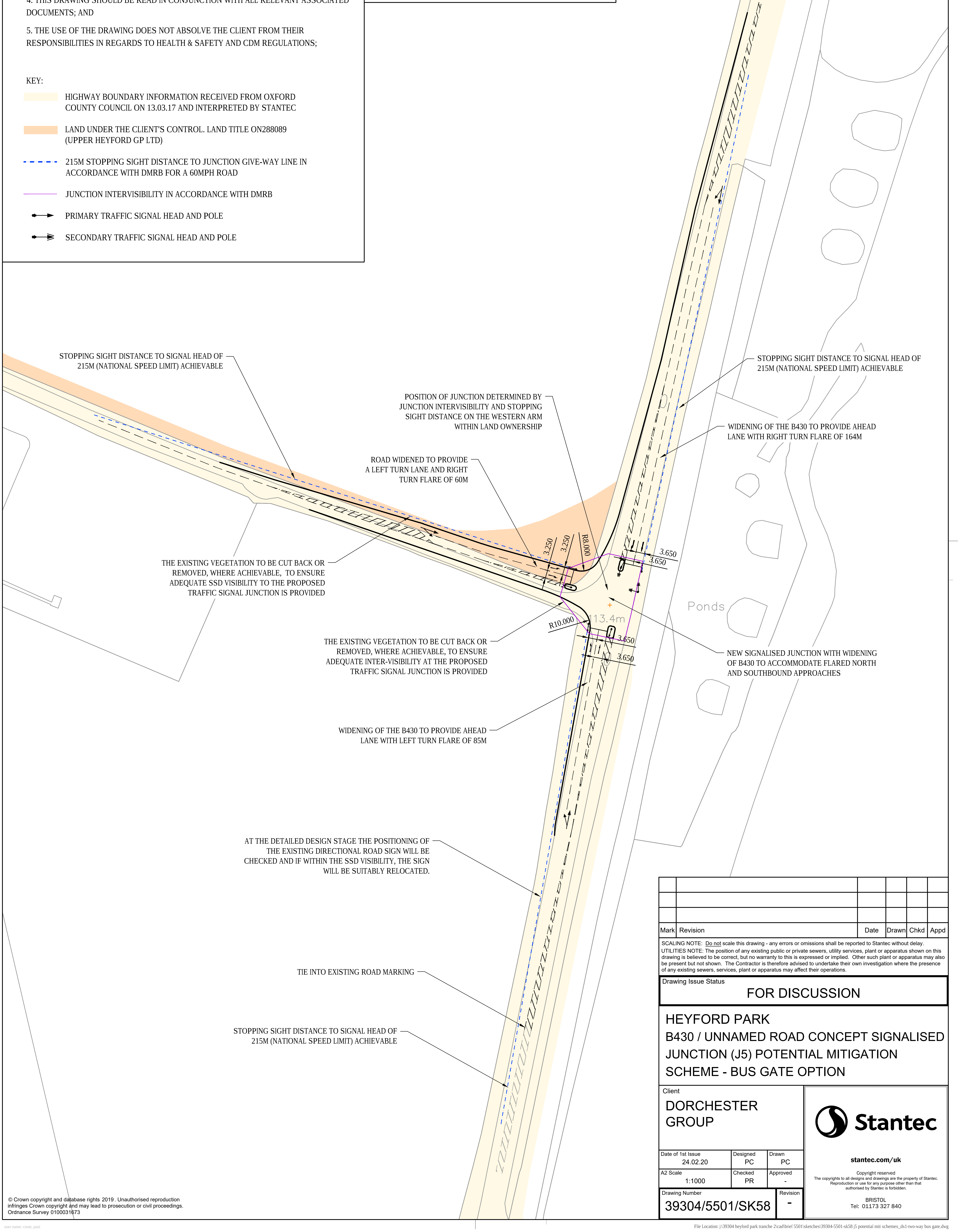
215M STOPPING SIGHT DISTANCE TO JUNCTION GIVE-WAY LINE IN ACCORDANCE WITH DMRB FOR A 60MPH ROAD

JUNCTION INTERVISIBILITY IN ACCORDANCE WITH DMRB

PRIMARY TRAFFIC SIGNAL HEAD AND POLE

SECONDARY TRAFFIC SIGNAL HEAD AND POLE





Mark	Revision	Date	Drawn	Chkd	Appd

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Drawing Issue Status

FOR DISCUSSION

HEYFORD PARK
B430 / UNNAMED ROAD CONCEPT SIGNALISED JUNCTION (J5) POTENTIAL MITIGATION SCHEME - BUS GATE OPTION

Client

DORCHESTER GROUP

Date of 1st Issue	Designed	Drawn
24.02.20	PC	PC
A2 Scale	**Checked**	**Approved**
1:1000	PR	-

Drawing Number: 39304/5501/SK58

Revision: -

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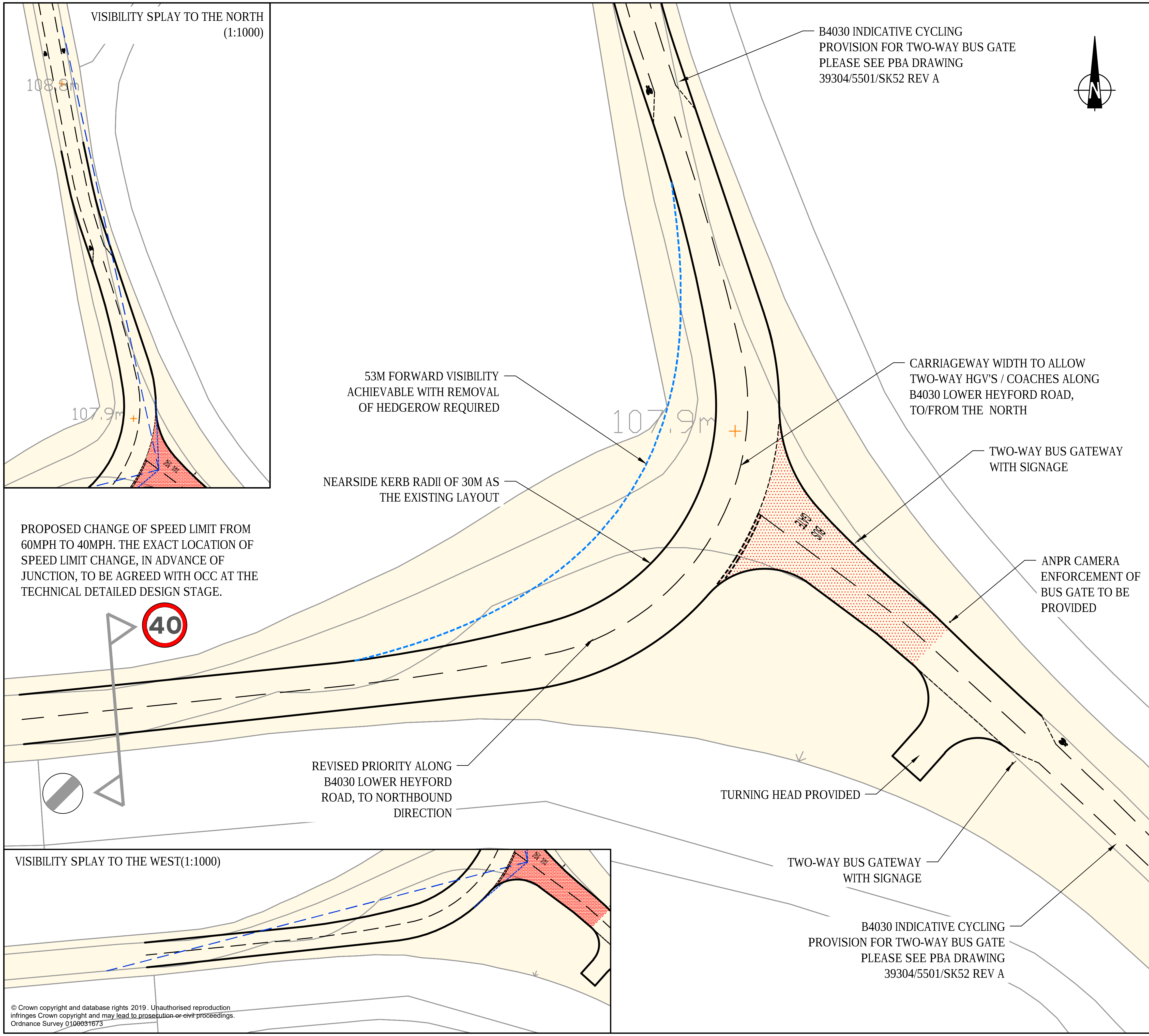

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KEY:

53M FORWARD VISIBILITY PROVIDED ENVELOPE

4.5M X 120M VISIBILITY SPLAY FOR THE PROPOSED SPEED LIMIT OF 40MPH IN ACCORDANCE WITH DMRB CD123

TANGENTIAL 4.5M X 120M VISIBILITY SPLAY

HIGHWAY BOUNDARY INFORMATION RECEIVED FROM OXFORD COUNTY COUNCIL ON 13.03.17 AND INTERPRETED BY STANTEC

Mark	Revision	Date	Drawn	Chkd	Appd

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Drawing Issue Status
PRELIMINARY CONCEPT SKETCH

HEYFORD PARK, OXFORDSHIRE
B4030 TWO-WAY BUS GATE
WITH CHANGED PRIORITY ALONG B4030
TO UNNAMED ROAD

Client
DORCHESTER GROUP

Date of 1st Issue	Designed	Drawn
24.02.20	PC	PC
A3 Scale	Checked	Approved
1:500	PC	PR

Drawing Number: 39304/5501/SK60
Revision: -

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user name: coote, paul

File Location: j:\39304 heyford park tranche 2\cad\brief 5501\sketches\39304-5501-sk60 b4030 bus gate junction_two-way.dwg

TECHNICAL NOTE

APPENDIX A

KEY

- S278 WORKS BOUNDARY
- HIGHWAY BOUNDARY

NOTES

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6. NEW MARKINGS ARE TO TIE INTO EXISTING AS APPROPRIATE.
7. TRAFFIC SIGNS OR LAMP COLUMNS TO BE:- LOCATED SUCH THAT THERE IS A MINIMUM HORIZONTAL CLEARANCE TO THE SIGN OR LAMP COLUMN OF 600mm FROM THE EDGE OF THE KERB FACE, VERTICAL CLEARANCE TO APPROPRIATE HEIGHT.
8. ALL REDUNDANT DIRECTIONAL SIGNS TO BE REMOVED.
9. REFER TO HEYF-5-583 FOR JUNCTION TRACKING.

TO BE READ IN CONJUNCTION WITH DRAWINGS HEY/5/592, HEY/5/593, HEY/5/596

Revision	Description	Drawn	Checked	Date
C	PROPOSED FOOTWAY WIDENED TO AVOID EXISTING SERVICES	DSH	JGF	10-03-2014
B	ARDLEY ROAD RIGHT TURN LANE TO HEYFORD ROAD ADDED AS REQUESTED BY OCC	SD	JGF	26-11-2013
A	MINOR AMENDMENTS	DSH	JGF	17-09-2013

Preliminary ■ Information ☐ Tender ☐ Construction ☐ As Built ☐

Woods Hardwick
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15-17 Goldington Road
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Title: UPPER HEYFORD

Details: OFF-SITE S278 - MIDDLETON STONEY JUNCTION GENERAL ARRANGEMENT & SITE CLEARANCE

Scale: 1:200 @ A1 Date: JULY 2013 Drawn: SD Chk: JGF

HEYF/5/582 C

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Appendix E Technical Note 024 Rev D

TECHNICAL NOTE

Job Name: Heyford Park

Job No: 39304

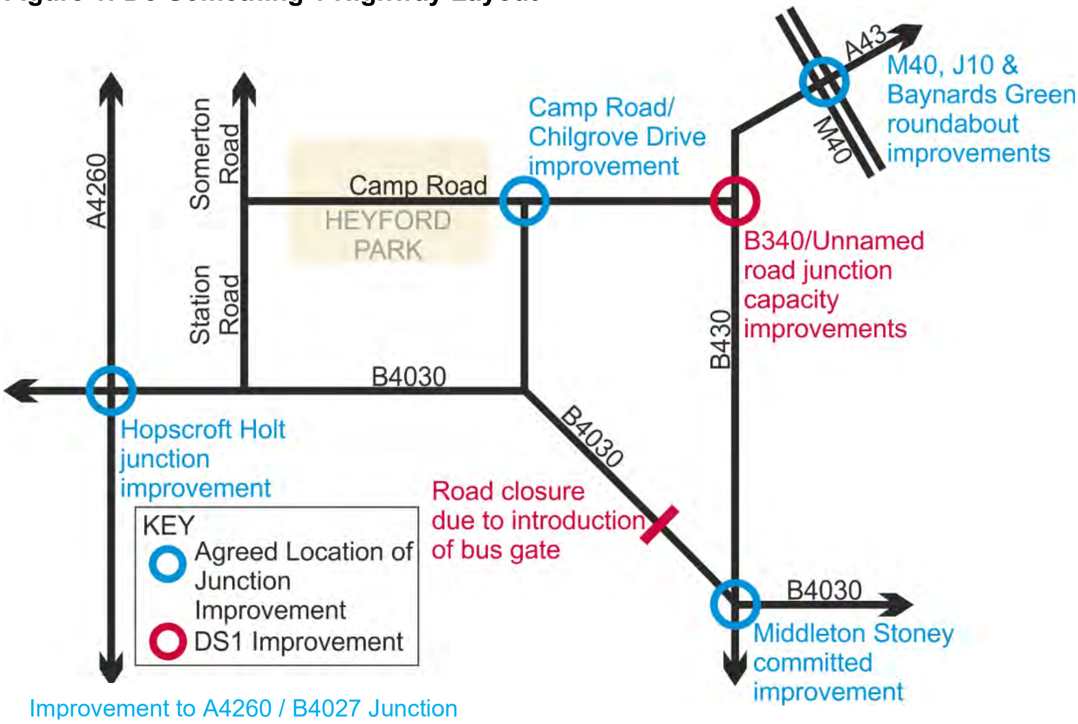
Note No: 024 Rev D

Date: 05th March 2020

Prepared By: Phil Rawlins / Jack Harris

Subject: **Detailed LinSig Modelling associated with the DS1 SATURN Model Scenario**

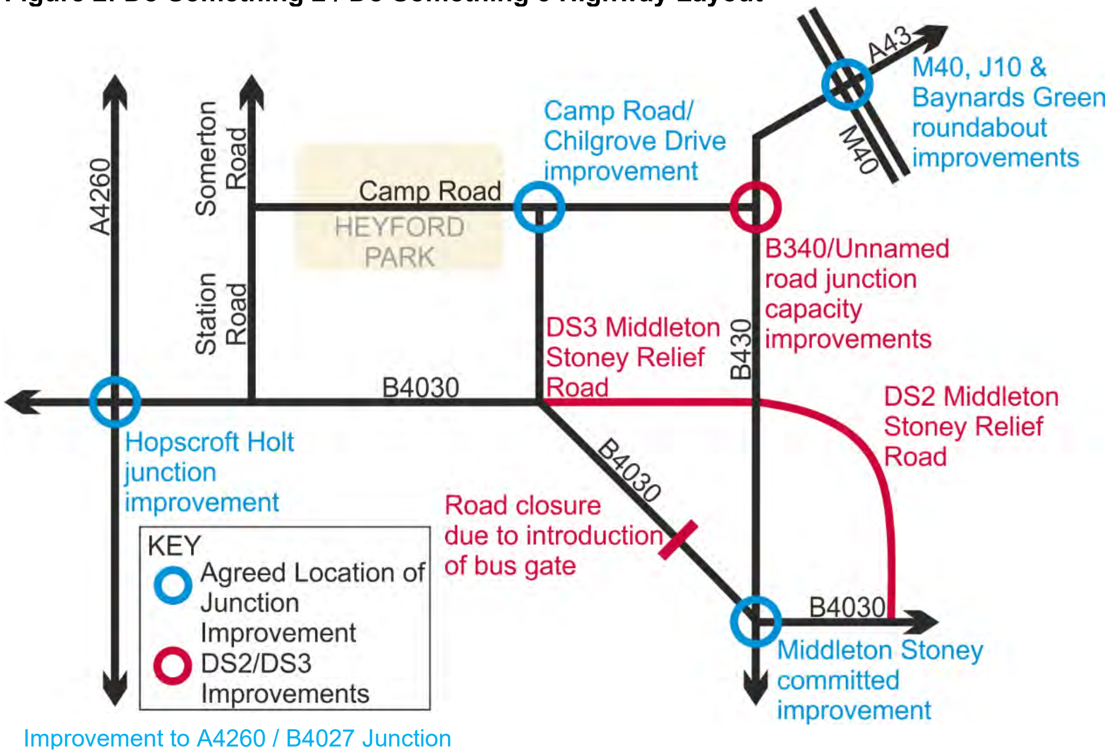
Item	Subject
1.	**Introduction** This Technical Note (TN) has been prepared by Stantec, on behalf of Dorchester Group and Oxfordshire County Council (OCC) and sets out detailed modelling analysis of the Middleton Stoney Signalised junction and Ardley Road / Unnamed Road junction following strategic modelling of the Do Something 1 (DS1) scenario using OCCs Bicester SATURN model. By way of background to this modelling exercise, a planning application was submitted for the Heyford Park development in May 2018. A Transport Assessment (TA) accompanied this application and set out that the Middleton Stoney junction was predicted to operate over capacity in the 2031 forecast year scenario both with and without the Heyford Park allocation. A number of scheme options were considered as mitigation however no further improvement scheme was considered deliverable in this location beyond the previously approved S278 scheme associated with delivery of the previously approved 1,075 dwelling scheme. On this basis, consideration of a more strategic solution to providing mitigation in this location was requested by OCC and a number of options have been considered as a package of schemes and set out below. These schemes have been assessed through a SATURN Variable Demand Model (VDM). Do Something 1 (DS1) – The DS1 scenario is a similar scheme to that proposed as part of the testing that was undertaken to inform the allocation of the site within the Cherwell Local Plan 2011 – 2031 (December 2016). The scheme includes the introduction of a bus gate on the B4030 Heyford Road arm of the Middleton Stoney junction. This bus gate will be located to the west of Heyford Village, allowing access to the Middleton Stoney junction for Middleton Stoney residents but banning through movements associated with both Heyford Park and the wider area from using the arm. In this scenario the Middleton Stoney junction will operate with a reduced number of signal stages with the B4030 Heyford Road arm operating on demand to serve buses and local residential traffic and therefore extra capacity can be created at the junction. In this scenario it is considered that the mitigation proposals in the form of traffic signals identified for the B430 Ardley Road / Unnamed Road junction to the north of Middleton Stoney are likely to require amending to increase the flare lengths at the junction in order to accommodate the extra traffic using this junction as a consequence of local re-routing. It is considered that this scenario represents an option that is promoting sustainable travel in line with the Cherwell Local Plan Policy Villages 5 objective that states *“The settlement should be designed to encourage walking, cycling and use of public transport rather than travel by private car, with the provision of footpaths and cycleways that link to existing networks. Improved access to public transport will be required”.*

Item	Subject
	Improvements to public transport will be achieved with the introduction of the bus gate on the western arm of the junction which will improve bus journey times and service reliability between Heyford Park and Bicester when compared to a scenario without the bus gate. The bus gate will also provide a relatively low traffic environment for people wishing to cycle between Heyford Park and Bicester along the B4030 as far as Middleton Stoney and it is therefore considered that this could form part of a strategic cycle route into Bicester. It is also considered that this scheme represents a scenario that could be delivered by Dorchester / OCC without a requirement for third-party land. **Figure 1** below illustrates the proposals included in the DS1 scenario. It should be noted that improvements at the B430 / Ardley Road junction are not included within this scenario, but mitigation options are being considered in this location in conjunction with OCC. **Figure 1: Do Something 1 Highway Layout**  The DS1 scenario has been run through the VDM process and this Technical Note sets out detailed modelling analysis of the Middleton Stoney Signalised junction and Ardley Road / Unnamed Road junction. <u>Do Something 2 and 3 (DS2 and DS3)</u> – The DS2 and DS3 scenarios take the mitigation for Middleton Stoney a step further and provide a new highway connection to bypass the junction in Middleton Stoney. DS2 provides a connection between the B430 Ardley Road in the north and the B4030 Bicester Road in the east. DS3 includes the connection provided in DS2 but also includes a connection from the B430 Ardley Road in the north to the B4030 Heyford Road to the west. It is considered that whilst the DS2 option is able to provide some of the sustainable transport benefits that are delivered by the DS1 scenario it will also create extra highway capacity and therefore encourage more people to use the private car to travel into Bicester rather than choose an alternative option. In the DS3 scenario it is considered that the sustainable transport benefits, especially to cycling are removed through the introduction of the link road between the B4030 Heyford Road and B430 Ardley Road. **Figure 2** illustrates the schemes included for the DS2 and DS3 scenarios. It should be noted that improvements at the B430 /

Item	Subject

Ardley Road junction are not included within this scenario, but mitigation options are currently being considered in this location in conjunction with OCC.

Figure 2: Do Something 2 / Do Something 3 Highway Layout



2. Junction Operation at B430 Ardley Road / Unnamed Road (Junction 5)

Flows for the B430 Ardley Road / Unnamed Road junction have been extracted from the 2031 Do Something 1 (DS1) SATURN model that includes the bus gate on the western arm of the Middleton Stoney junction. The flows have been assessed in LinSig using the proposed mitigation model set up for the Heyford Park TA. The outcomes of this modelling are set out within **Table 1** with full modelling outputs provided at **Appendix A**.

Table 1: B430 Ardley Road / Unnamed Road – TA Mitigation

Link	AM Peak			PM Peak		
	DoS (%)	MMQ	Delay (Secs)	DoS (%)	MMQ	Delay (Secs)
B430 Ardley Road (S)	89.5	14	34	102.3	49	99
Minor Road	88.8	19	34	100.4	28	95
B430 Ardley Road (N)	88.5	18	32	93.6	7	21

Table 1 demonstrates that the junction is predicted to operate with a maximum DoS of 90% in the AM peak hour and 102% in the PM peak hour. These results are better than those predicted by the SATURN modelling which predicted a maximum V/C of 139% in the AM peak hour and 109% in the PM peak hour.

Item	Subject
	As the junction was shown to operate over capacity in the PM peak using the mitigation put forward within the TA a further assessment was undertaken with revised flare lengths on two of the arms. These adjustments included: - Increasing the left turn flare length on the B430 south arm from 74m to 85m - Increasing the right turn flare length on the Unnamed Road west arm from 29m to 60m The revised junction design is shown on **Drawing 39304/5501/SK58**. The outcomes of this modelling are set out within **Table 2** with full modelling outputs provided at **Appendix A**.

Table 2: B430 Ardley Road / Unnamed Road – DS1 Mitigation

Link	AM Peak			PM Peak		
	DoS (%)	MMQ	Delay (Secs)	DoS (%)	MMQ	Delay (Secs)
B430 Ardley Road (S)	82.0	12	7	89.5	20	8
Minor Road	82.2	12	6	88.5	13	9
B430 Ardley Road (N)	79.2	16	8	85.8	6	4

Item	Subject
	Table 2 demonstrates that the junction is predicted to operate with a maximum DoS of 82.2% in the AM peak hour and 89.5% in the PM peak hour. The results show improved performance compared with those predicted by the SATURN modelling which predicted a maximum V/C of 139% in the AM peak hour and 109% in the PM peak hour. **Table 2** demonstrates that the junction layout illustrated in **Drawing 39304/5501/SK58** is predicted to operate within capacity in a scenario where a bus gate is introduced on the B4030 Heyford Road. These improvements are considered to be deliverable within land under the control of Dorchester Group or dedicated as highway.
3.	**Junction Operation at Middleton Stoney (Junction 6)** <u>Reference Case Scenario</u> In order to understand how the Middleton Stoney junction operated in the DS1 scenario when compared to the Reference Case scenario, the committed improvement scheme at Middleton Stoney has been tested in LinSig using flows extracted from the 2031 Reference Case SATURN model. This model does not include the current Heyford Park development allocation but does include the previously consented development at Heyford Park. The results of this modelling are set out within **Table 3** below with full modelling outputs provided at **Appendix A**.

Item	Subject

Table 3: Middleton Stoney 2031 Reference Case

Link	AM Peak			PM Peak		
	DoS (%)	MMQ	Delay (Secs)	DoS (%)	MMQ	Delay (Secs)
B430 Ardley Road (N)	109.2	67	231	86.0	19	59
B4030 Bicester Road (E)	109.9	37	265	93.0	21	79
B430 Oxford Road (S)	75.4	17	43	93.6	24	74
B4030 Heyford Road (W)	109.7	50	256	92.8	18	88

Table 3 demonstrates that the junction is predicted to operate with a maximum Degree of Saturation (DoS) of 110% in the AM peak hour and 94% in the PM peak hour. The results show improved performance compared with the SATURN modelling outcomes which predicted a maximum V/C of 123% in the AM peak hour and 105% in the PM peak hour.

Do Minimum Scenario

As a further comparison against the DS1 mitigation scenario the committed improvement scheme at Middleton Stoney has been tested in LinSig using flows extracted from the 2031 Do Minimum SATURN model. This model includes the previously consented Heyford Park development, the Heyford Park allocation and highway mitigation as set out within the TA but no mitigation at Middleton Stoney over and above the consented S278 improvement scheme. It should be noted that the Do Minimum scheme includes junction improvements at the B430 / Unnamed Road junction but the improvements are not as extensive as included within the DS1 scenario. The results of this modelling are set out within **Table 4** below with full modelling outputs provided at **Appendix A**.

Table 4: Middleton Stoney 2031 Do Minimum

Link	AM Peak			PM Peak		
	DoS (%)	MMQ	Delay (Secs)	DoS (%)	MMQ	Delay (Secs)
B430 Ardley Road (N)	108.8	67	223	82.8	18	53
B4030 Bicester Road (E)	106.2	30	246	100.9	29	134
B430 Oxford Road (S)	83.3	21	47	100.1	36	110
B4030 Heyford Road (W)	107.0	45	221	99.1	23	126

Table 4 demonstrates that the junction is predicted to operate over capacity with a maximum Degree of Saturation (DoS) of 109% in the AM peak hour and 101% in the PM peak hour. These results show that the junction will operate with a similar level of capacity when compared to the Reference Case scenario in the AM peak but with worsening conditions in the PM peak. The results predict improved performance in both the AM and PM peaks compared with the results predicted by the SATURN modelling.

Item	Subject

Do Something 1 Scenario

Flows extracted from the 2031 Do Something 1 (DS1) SATURN model scenario have also been assessed. The DS1 scenario includes all of the elements from the Do Minimum scenario with the addition of a bus gate on the Heyford Road west of the junction preventing through traffic from using this arm and further improvements at the B430 / Unnamed Road junction beyond the improvements included in the Do Minimum scenario. Traffic associated with existing development in Middleton Stoney Village can still use this arm however, as can buses. Within LinSig all of the improvements associated with the committed Middleton Stoney scheme have been included but the Heyford Road arm has only been run every 3 cycles to represent the average operation of this arm with reduced traffic levels.

It is considered that the flows extracted directly from SATURN are likely to over estimate the level of flow that is likely to be using the B430 Heyford Road arm of the junction because the model has the Middleton Stoney zone accessed directly off of this arm. This zone accounts for traffic from a much wider area than the development that can access directly from this arm and was a known limitation of the SATURN model in this area. On this basis PBA have calculated the number of trips that are likely to be associated with this arm in the following manner:

- The number of dwellings that have direct access from the Heyford Road arm between the approximate location of the proposed bus gate and Middleton Stoney have been calculated from a simple review of aerial mapping. This determined that there were approximately 70 dwellings with access from this arm.
- The number of trips generated by 70 dwellings were calculated using the sensitivity trip rates used within the Heyford Park TA.
- The distribution of trips at the junction was calculated using the distribution of trips into and out of the arm in the SATURN model.
- 3 buses per hour in each direction were added to these flows.

The flows with adjustments made to the Heyford Road arm were run through the LinSig model and the results are set out within **Table 5** below with full modelling outputs provided at **Appendix A**.

Table 5: Middleton Stoney 2031 Do Something 1 Flows

Link	AM Peak			PM Peak		
	DoS (%)	MMQ	Delay (Secs)	DoS (%)	MMQ	Delay (Secs)
B430 Ardley Road (N)	115.2	169	375	89.4	30	41
B4030 Bicester Road (E)	114.3	83	397	88.9	20	64
B430 Oxford Road (S)	75.0	9	30	66.9	19	27
B4030 Heyford Road (W)	97.6	7	447	45.6	2	255

Table 5 demonstrates that the junction is predicted to operate over capacity in the AM peak hour and within capacity in the PM peak hour. Compared with the Reference Case scenario the operation of the junction is marginally worse in the AM peak hour with a DoS of 115% compared to 110% in the Reference Case. In the PM peak, the junction is predicted to

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	operate slightly better than the Reference Case scenario with a DoS of 89% compared with 94% in the Reference Case. It also operates better than the Do Minimum scenario in the PM peak hour. When comparing the queues from this scenario with the Reference Case, **Table 5** shows that the queue lengths are forecast to be a maximum of 169 PCUs during the AM peak compared with 67 in the reference case scenario on the B430 Ardley Road arm. The queue lengths on the B4030 Bicester Road arm are predicted to 83 compared with 37 in the Reference Case scenario. Queues in the PM peak hour are much more comparable between the two scenarios.
4.	**Junction Operation at Middleton Stoney Junction – PBA TA Trip Rate** The TA includes details of the trip generation methodology that was undertaken to inform the modelling assessment. This included residential trip rates based on a typical large, mixed use and sustainable development comparable to Heyford Park as well as a sensitivity test undertaken using higher residential person trip rates that were agreed with OCC. These higher sensitivity rates were used in the subsequent modelling analysis to support the application and followed through to be used within the DS1 modelling scenario. For reference, the sensitivity trip rates and original PBA TA trip rates are set out in **Table 6**.

Table 6: Sensitivity and Standard Trip Rates

	Time Period	Arrival	Departure	Total
Sensitivity Trip Rate	AM Peak	0.147	0.452	0.599
	PM Peak	0.319	0.165	0.485
PBA TA Trip Rate	AM Peak	0.110	0.369	0.479
	PM Peak	0.281	0.187	0.469

Since the original assessment was completed, a number of sustainable access improvements are confirmed to be implemented or proposals put forward that are likely to reduce the vehicle trip generation of the proposed development. This includes the impact of proposed walk and cycle infrastructure and the implementation of the site Travel Plan, which will aim to reduce the overall vehicular trip generation of Heyford Park. Dorchester and consultants Calibro (who are undertaking the Travel Plan) have met with OCCs Travel Plan officer to discuss the Travel Plan measures that would be required to be implemented in order to achieve the level of trip reduction between the development and Bicester that is reflected by the reduction in trip rate. It is understood that full Travel Plans are being prepared for the development and they will include but are not limited to measures such as:

- Provision of Travel Plan welcome packs and leaflets including plans showing walk and cycle routes, and bus service locations.
- Personalised Travel Planning for residents and employees
- Provision of a free 3 month bus pass for residents and employees
- Implementation of a bike hire scheme and one free annual membership for residents and employees
- Adult and child cycle training will be made available
- Public bike maintenance and bike pump stands will be installed and maintained within the development.
- A community club will be established offering leisure cycle rides and walks around the development.

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	- Setting up and management of a car share club for residents and employees - The introduction of an electric car club vehicle - Twice annual public travel events - Secure and sheltered employee cycle parking - A forum of workplace champions will be established to share knowledge, issues and opportunities - Where possible the incorporation of showers and drying rooms into commercial buildings - Assess with each business the potential to provide car sharer only parking and smart parking. - A commitment to undertake bike maintenance sessions at travel plan events and have a monthly mobile bike repair service. - The community cycle club will organise biker breakfasts, buddy schemes and encourage cycle champions from the site to encourage work alongside the TPC. - Establish a bike miles scheme where employees can earn points in exchange for vouchers - Businesses at the site will be able to claim 50% of the cost of installing audio and video conferencing systems at their premises up to £500 - Up to 5 desks with wifi access will be made available within offices on site to create an informal co-working space to provide an alternative to home working without the need to travel. In addition to these Travel Plan specific measures, there are proposals to increase the bus service that connects Heyford Park with Bicester from one service per hour up to three. This is anticipated to increase the patronage of the bus service and as a result, reduce the vehicle trips generated by Heyford Park, especially for trips travelling to Bicester. Furthermore, the provision of a bus gate on the B4030 Heyford Road to the west of Middleton Stoney will improve the travel time and reliability for buses between Heyford park and Bicester due to the removal of through traffic on the link. This is expected to further incentivise public transport trips and reduce vehicle trips. It is also anticipated that the implementation of the bus gate will make for a low traffic route along the B4030 to Middleton Stoney and therefore this is likely to encourage people to cycle between the development and Bicester. It is proposed that a contribution be made towards cycle infrastructure between Camp Road and Middleton Stoney as part of the proposed package of measures to support the Middleton Stoney mitigation. Therefore, the residential trip rates that were set out within the TA, but not used within the DS1 modelling exercise are considered to be appropriate for use within this assessment. In addition, it is considered that these lower trip rates should be applied to the consented residential development that is also located within Heyford Park as these residents would also benefit from the Travel Plan measures. In addition to the above, the lower trip rates have been applied to the approximately 70 dwellings that are within Middleton Stoney and accessed via Heyford Road. The improved bus service provision is also anticipated to provide a benefit for Middleton Stoney residents and as such the lower trip rates are considered to be appropriate for application here as well. It is noted that the currently consented dwellings do not currently benefit from a Travel Plan associated with the development. Notwithstanding this it is considered appropriate that the lower trip rate is applied to the consented dwellings at the development because: - All existing residents will benefit from the same increase in provision of services and travel choices as future residents. - Not all of the consented units have been built and occupied at the current time. At the end of 2019 there were 755 occupations on site. On this basis there are approximately 423

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units or 36% left to be occupied. The majority of these will benefit from a Travel Plan on day 1.

- The currently occupied dwellings will experience a level of turn over and therefore future residents of the existing dwellings will also benefit from moving into a property with a Travel Plan in place. In order to provide an estimate of this Dorchester have provided turnover statistics for the Heyford site as set out below:
  - Open Market Sales – 350 units. Turnover of 15% – 20% every 5 years
  - Open Market Rental – 325 units. Turnover of 20% every year
  - Affordable Rental – 80 units. Turn over of 10% every 5 years.

  On the basis of the above the number of units that will have been turned over by 2031 (assuming 10 years) is set out below:
  - Open Market Sale – 123 units in new ownership (assuming 17.5% turnover)
  - Open market rental – 325 units with new tenants
  - Affordable Rental – 16 units with new tenants

  On this basis it is likely that 464 of the currently occupied properties will have a new owner / tenant and will benefit from the proposed travel plan by 2031. Once these are added to the new properties, it is likely that there will be 887 (75%) of the total 1178 consented units that benefit from moving into a property with an established Travel Plan in place.

Based on the comparison with the Reference Case, there are not considered to be any capacity issues at the junction during the PM peak. As such, only the AM peak results are reported for the remainder of this report. The total reduction in vehicle trips is set out in the **Table 7**.

Table 7: Trip Reductions from Sensitivity Trip Rates

Link	Consented Heyford Development	Allocated Heyford Development	Middleton Stoney Reduction	Total
B430 Ardley Road (N)	30	38	1	69
B4030 Bicester Road (E)	14	17	1	32
B430 Oxford Road (S)	2	3	1	6
B4030 Heyford Road (W)	0	0	6	6
Total	46	58	9	113

These adjusted flows have been run through the LinSig model and the results are set out within **Table 8** below with full modelling outputs provided at **Appendix A**. The Heyford Road arm is still set to run every 3 cycles.

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Table 8: Middleton Stoney Do Something – PBA TA Trip Rates

Link	AM Peak		
	DoS (%)	MMQ	Delay (Secs)
B430 Ardley Road (N)	108.4%	119	246
B4030 Bicester Road (E)	108.1%	62	273
B430 Oxford Road (S)	75%	10	31
B4030 Heyford Road (W)	82.1%	5	353

Table 8 demonstrates that the junction is predicted to operate with a maximum DoS of 108% in the AM peak hour. Compared with the Reference Case scenario the operation of the junction is marginally better in the AM peak hour with a DoS of 108% compared to 110% in the Reference Case, however the queue lengths are higher with a maximum forecast of 119 and 62 PCUs on Ardley Road and Bicester Road in this scenario, compared to 67 and 37 PCUs respectively in the Reference Case.

The queue lengths in the Do Minimum scenario are broadly the same as those recorded in the Reference case and so the queue length increase when compared to this scenario is similar.

However, whilst the queues have increased on Ardley Road and Bicester Road, the queue lengths forecast on Oxford Road have reduced from 17 / 21 PCUs in the Reference case / Do minimum scenario to 10 PCUs in this scenario. Similarly, the queues forecast on Heyford Road have reduced from 45 / 50 PCUs in the Reference Case / Do Minimum to 5 PCUs in the scenario set out above. This is predominantly due to the bus gate significantly reducing the amount of traffic using this route.

Impact of Enhanced Public Transport Provision

As set out above there are proposals for the provision of up to 3 buses per hour to connect the site with Bicester town centre. The provision of 3 buses per hour is one of the factors that has permitted the use of the lower trip rates set out in **Table 7**, alongside the implementation of the Travel Plan and the potential for a higher level of cycling trips to Bicester. In addition to the 3 proposed buses per hour, there is the potential that an additional bus service could be provided, which would have the potential to encourage further modal shift by providing additional capacity.

In order to forecast the potential impact that the provision of additional bus services may have on the traffic flows through the junction, an assessment has been made on the likely uptake of patronage due to the additional service. Using a standard demand elasticity factor of 0.4 (as set out in Section 7.4.1 and Table 7.5 of TRL Report 593 "The Demand for Public Transport a Practical Guide", extract attached at **Appendix B**) it is likely that there will be an additional 12% of passengers due to the introduction of a 4th bus. The calculation associated with this is provided at **Appendix C**.

This factor has been applied to the target public transport mode share in order to calculate the likely additional passengers that will use the bus service. The Travel Plan sets a residential target of 6.8% by bus and an employment target of 2.0%. On this basis it is predicted that there will be a mode shift to bus of 0.82% for residential trips and 0.24% for employment trips. The number of trips that are likely to shift to use the new bus service are set out within **Table 9** below.

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	Table 9: Modal Shift Due to Extra Bus Service

	AM Peak Hour	Inbound	Outbound	Total
Residential	Committed Heyford Development	3	8	11
	Allocated Heyford Development	4	11	15
Employment	Committed Heyford Development	2	0	2
	Allocated Heyford Development	2	0	2
Total		11	19	30

The trips set out within **Table 9** were removed from the turning movements at the Middleton Stoney junction such that Inbound trips were removed from the right turn movement between Bicester Road and Ardley Road and the outbound trips were removed from the left turn movement between Ardley Road and Bicester Road.

The impact of these 19 fewer left turn movements on Ardley Road and 11 right turn movements on Bicester road on the operation of the junction has been tested in the LinSig model, the results of which are set out in **Table 10** with full modelling outputs provided at **Appendix A**.

Table 10: Middleton Stoney Do Something – Enhanced Public Transport Provision

Link	AM Peak		
	DoS (%)	MMQ	Delay (Secs)
B430 Ardley Road (N)	106.5%	99	203
B4030 Bicester Road (E)	106.4%	53	238
B430 Oxford Road (S)	75.0%	9	30
B4030 Heyford Road (W)	87.0%	5	378

Table 10 demonstrates that the junction is predicted to operate with a maximum DoS of 106% in the AM peak hour, an improvement over the Reference Case which is predicted to be at 110%. When compared to the Reference Case results, the maximum queue lengths are forecast to increase on the Ardley Road arm, from 67 to 99 PCUs and on the Bicester Road arm from 37 to 53 PCUs. However, there is a reduction in queueing overall at the junction when compared with the reference case scenario with total queuing in the DS1 scenario of 166 PCUs compared with 171 in the reference case scenario. Total queue lengths at the junction are similar when compared with the Do Minimum scenario where total queues at the junction are predicted to be 163 PCUs

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	The inclusion of the bus gate, Travel Planning measures, additional bus services and contribution towards cycle infrastructure result in the junction operating with a similar level of capacity and queuing as that set out in the Reference case (Table 3) and Do minimum scenarios (Table 4). It is therefore considered that this scenario is able to effectively mitigate the impact of the Heyford Park development on the Middleton Stoney junction.
5.	**Junction Operation at Middleton Stoney – HGV Restriction on B4030 East**

In addition to the measures set out above OCC have been in discussion with Middleton Stoney Parish council regarding the implementation of a HGV restriction on the B4030 Bicester Road to the east of the junction. It was considered that this would help to reduce the number of HGV trips travelling through the village and improve air quality in the area.

It is considered that this scheme could be delivered as part of the mitigation proposed for the Middleton Stoney as it would also help to reduce the number of trips travelling through Middleton Stoney and is likely to improve the operation of the junction.

On this basis Select Link Analysis has been undertaken in the SATURN model for the AM peak DS1 scenario in order to determine the number of HGV trips that are using the B4030 Bicester Road and travelling through the Middleton Stoney junction. **Table 11** sets out the number of HGV trips using the B4030 Bicester Road and the SATURN plots setting out the total HGVs on this link are provided at **Appendix D**.

Table 11: HGV Trips using the B4030 Bicester Road Junction

Direction of Movement on B4030 Bicester Road	Trip Route	Movement at Middleton Stoney	Flow (PCUs) AM Peak DS1
Eastbound	M40 to Bicester	B430 North to B4030 East	14
Eastbound	Heyford Park to Bicester	B430 North to B4030 East	17
Eastbound	Middleton Stoney to Bicester	B4030 West to B4030 East	2
Westbound	Bicester to M40	B4030 East to B430 North	25
Westbound	Bicester to Heyford Park	B4030 East to B430 North	10
Westbound	Bicester to Middleton Stoney	B4030 East to B4030 West	1

If an HGV restriction were to be placed on the B4030 Bicester Road the HGV trips set out in **Table 11** would re-assign to other parts of the network in order to avoid the restriction. The following assumptions for this re-assignment have been agreed with OCC.

- Trips between Bicester and the M40 (and vice-versa) will reassign via the B4100 and Baynards Green Roundabout in order to access the motorway.
- Trips between Bicester and Heyford Park (and vice-versa) will reassign to the following routes:
    - 50% via the B4100, M40, J10 and B430 / Unnamed Junction (J5) to Camp Road.
    - 50% via the A41, A34, B430 and B430 / Unnamed Junction (J5) to Camp Road.
- Trips between Bicester and Middleton Stoney (and vice-versa) would reassign to the A41, A34, B430 and Middleton Stoney Junction to Heyford Road.

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	On the basis of the implementation of a HGV restriction and these assumptions the change in traffic flow at the Middleton Stoney junction in the AM peak DS1 scenario is set out in **Table 12**.

Table 12: Change in Traffic Flow at Middleton Stoney associated with HGV Restriction on B4030 Bicester Road

	B430 North	B4030 East	B430 South	B4030 West	Total
B430 North	0	-31	9	0	-22
B4030 East	-35	0	0	-1	-36
B430 South	5	0	0	1	6
B4030 West	0	-2	2	0	0
Total	-30	-33	11	0	-52

The flow changes set out within **Table 12** have been applied to the DS1 LinSig model. The results of this revised model are set out in **Table 13** with full modelling outputs provided at **Appendix A**.

Table 13: Middleton Stoney Do Something – Enhanced Public Transport Provision and HGV Restriction

Link	AM Peak		
	DoS (%)	MMQ	Delay (Secs)
B430 Ardley Road (N)	102.7%	74	127
B4030 Bicester Road (E)	102.4%	37	171
B430 Oxford Road (S)	75.0%	9	29
B4030 Heyford Road (W)	87.0%	5	378

Table 13 demonstrates that the junction is predicted to operate with a maximum DoS of 103% in the AM peak hour which is an improvement over the Reference Case which is predicted to be at 110%. When compared to Reference Case results, the maximum queue lengths are forecast to have a minor increase on the Ardley Road arm, from 67 to 74 PCUs and they remain consistent on the Bicester Road arm with both scenarios having a queue of 37 PCUs. There is a reduction in queueing overall at the junction when compared with the Reference Case scenario with total queuing in the DS1 scenario of 125 PCUs compared with 171 in the Reference Case scenario. Total queue lengths at the junction are also predicted to be lower than when compared with the Do Minimum scenario where total queues at the junction are predicted to be 163 PCUs

It should also be noted that the way in which the signals have been modelled means that the delay shown on the western arm of the junction is significantly overestimated in the scenarios where the bus gate is present. The modelling is based on a fixed operation and the western arm has been set to run once every third cycle, or approximately once every 360 seconds. In the model vehicles arriving ahead of the arm obtaining a green light would need to wait until its next scheduled which could be up to 360 seconds time, hence the model is reporting large delays on this arm. In reality the junction would adapt to allow vehicles through when they

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	arrive such that a vehicle would be unlikely to wait longer than one cycle or 120 seconds. **Table 13** shows that the western arm has a delay per vehicle of 378 seconds. In practice we would expect this delay to be approximately 120 seconds. On the ground the traffic signals will operate via an adaptive traffic control system called MOVA. The MOVA operation is continuously adapting the signal timing and stage sequence within set parameters to try and reduce the delay at the junction. The system detects traffic travelling towards the junction by sensing cars travelling towards the junction via inductive loops that are cut into the road surface. These sensors are located based on road speed and user behaviour to ensure reliable detection. The system is flexible enough that if an arm did not have any vehicle demand then the associated stage could be skipped and will only be called when there is demand. In this way the junction will not run the stage associated with the western arm if there is no demand but can run this stage at the appropriate time in the cycle if a vehicle is present at the junction. The inclusion of the bus gate, HGV restriction on the B4030 east, Travel Plan measures, additional bus services (4 bus per hour) and contribution towards local cycle infrastructure result in the junction operating with a better level of performance and reduced queuing compared with both the Reference Case (Table 3) and Do minimum scenarios (Table 4). It is therefore considered that in this scenario the combination of measures are able to effectively mitigate the impact of the Heyford Park development on the Middleton Stoney junction.
6.	**Conclusion** This Technical Note has tested the impact of the Heyford Park development on the B430 Ardley Road / Unnamed Road junction and Middleton Stoney junction in the DS1 mitigation scenario. The DS1 scenario includes putting a bus gate on the B4030 Heyford Road arm of the Middleton Stoney junction to prevent through traffic and capacity enhancements at the B430 Ardley Road / Unnamed Road junction. It was identified that whilst the junction mitigation identified for the B430 Ardley Road / Unnamed Road junction within the Heyford Park TA did not operate within capacity in the DS1 scenario improvements could be made to this design, through increasing flare lengths, that would allow the junction to operate within capacity. The junction could be delivered on land within the control of Dorchester or dedicated as highway. The note has also identified that the operation of the Middleton Stoney signalised junction in the DS1 scenario is likely to be similar or better than in the Reference Case scenario (albeit with a slightly different distribution of DoS and queuing across all the arms of the junction) if there is a mode shift away from the private car for trips between Heyford Park and Bicester compared to the Sensitivity Test trips that were assessed within the TA. A summary of the operation of the junction in the different scenarios set out within the note is provided at **Table 14**.

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Table 14: Summary of Operation of Middleton Stoney Junction

Link	AM Peak		PM Peak	
	Worst DoS (%)	Total Queue	Worst DoS (%)	Total Queue
2031 Reference Case	109.9	171	93.6	83
2031 Do Minimum	108.8	163	100.9	106
2031 Do Something 1	115.2	268	89.4	72
Do Something 1: PBA TA Trip Rates	108.4	196	-	-
Do Something 1: PBA TA Trip Rates and Enhanced Public Transport	106.5	166	-	-
Do Something 1: PBA TA Trip Rates, Enhanced Public Transport and HGV Restriction	102.7	125	-	-

It is considered that a mode shift to more sustainable modes for trips from Heyford Park is likely due to:

- A comprehensive Travel Plan being prepared for the development
- The introduction of a more frequent bus service to Bicester (up to 4 buses per hour) would encourage a move to public transport trips
- The introduction of the bus gate on the Heyford Road arm of the junction will improve bus journey times and reliability between the development and Bicester and encourage shift to public transport.
- The introduction of the bus gate on the Heyford Road arm of the junction will provide for a low traffic environment on the B4030 between the development and Middleton Stoney. This could allow the route to form part of a strategic cycle route to Bicester which is likely to encourage a mode shift to bike and it is proposed that a contribution be made towards cycle infrastructure between Camp Road and Middleton Stoney.

It is also considered that the introduction of a HGV restriction on the B4030 Bicester would reduce the number of HGVs travelling through the junction which would provide an improvement in operation as well as improving the environmental amenity for Middleton Stoney residents.

It should be noted that in the DS1 scenario with a reduced trip rate, an additional bus service and the HGV restriction in place the junction is predicted to operate with improved levels of capacity and queuing when compared to the reference case scenario whilst accommodating an increase in person movements through the junction. This increase in person movements is due to higher traffic flows in this scenario and an increase in bus patronage due to the improved service provision and associated benefits for journey times and reliability afforded by the bus gate.

In the context of the above, this exercise demonstrates that the package of off-site highway mitigation schemes, proposed public transport infrastructure and bus service improvements set out in this note can adequately mitigate the impacts of the proposed development traffic at the Middleton Stoney signalised junction with overall junction performance operating better than in the without development scenario (Reference Case).

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	The DS1 mitigation measures can be implemented and delivered by the developer and it is therefore considered that they represent a preferred mitigation solution for the development when compared with the DS2 and DS3 scenarios. The DS2 and DS3 scenarios have significant risk and uncertainty associated with delivery due to the requirements for third party land, external funding which is not secured and the additional uncertainty that this causes in terms of timescale. On this basis it is considered that the implementation of the following measures would form an appropriate and deliverable package of mitigation measures for Middleton Stoney in combination with other off-site local highway mitigation measures on the local road network as discussed with OCC**:** - a bus gate on the B4030 Heyford Road arm of the Middleton Stoney junction; - enhanced improvements at the B430 Ardley Road / Unnamed Road junction; - new / revised bus services; - a HGV restriction on the B4030 Bicester Road arm; and - contributions towards cycle infrastructure between Camp Road and Middleton Stoney,

DOCUMENT ISSUE RECORD

Technical Note No	Rev	Date	Prepared	Checked	Reviewed (Discipline Lead)	Approved (Project Director)
39304/TN024	-	09.01.19	PR / JH	PR	-	MW
39304/TN024	A	30.01.19	PR	-	-	MW
39304/TN024	B	10.06.19	PR	-	-	MW
39304/TN024	C	29.08.19	PR	-	-	-
39304/TN024	D	06.03.20	RK	-	PR	MW

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TECHNICAL NOTE

DRAWINGS

NOTES:

1. THE LAYOUT IS SUBJECT TO DETAILED DESIGN, ROAD SAFETY AUDIT, CAPACITY TESTING, GROUND INVESTIGATIONS RESULTS & EARTHWORKS MODELLING, UTILITIES & SERVICES AND CONFIRMATION OF LAND OWNERSHIP;

2. THE DETAILED DESIGN LAYOUT WILL BE DESIGNED IN ACCORDANCE WITH ALL RELEVANT DESIGN GUIDANCE AND STANDARDS;

3. THE LAYOUT HAS BEEN BASED ON THE APPROPRIATE DESIGN SPEED FOR OUR CURRENT PROPOSALS;

4. THIS DRAWING SHOULD BE READ IN CONJUNCTION WITH ALL RELEVANT ASSOCIATED DOCUMENTS; AND

5. THE USE OF THE DRAWING DOES NOT ABSOLVE THE CLIENT FROM THEIR RESPONSIBILITIES IN REGARDS TO HEALTH & SAFETY AND CDM REGULATIONS;

KEY:

HIGHWAY BOUNDARY INFORMATION RECEIVED FROM OXFORD COUNTY COUNCIL ON 13.03.17 AND INTERPRETED BY STANTEC

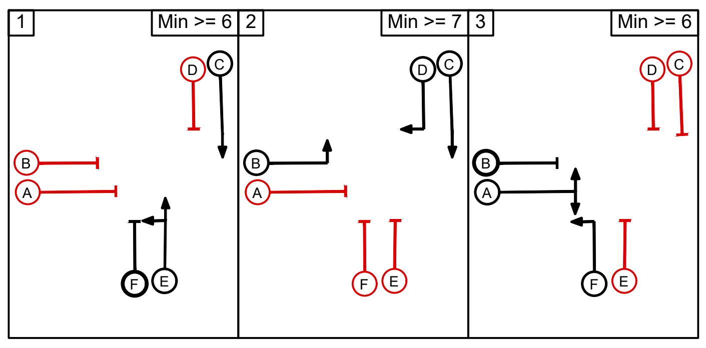
LAND UNDER THE CLIENT'S CONTROL. LAND TITLE ON288089 (UPPER HEYFORD GP LTD)

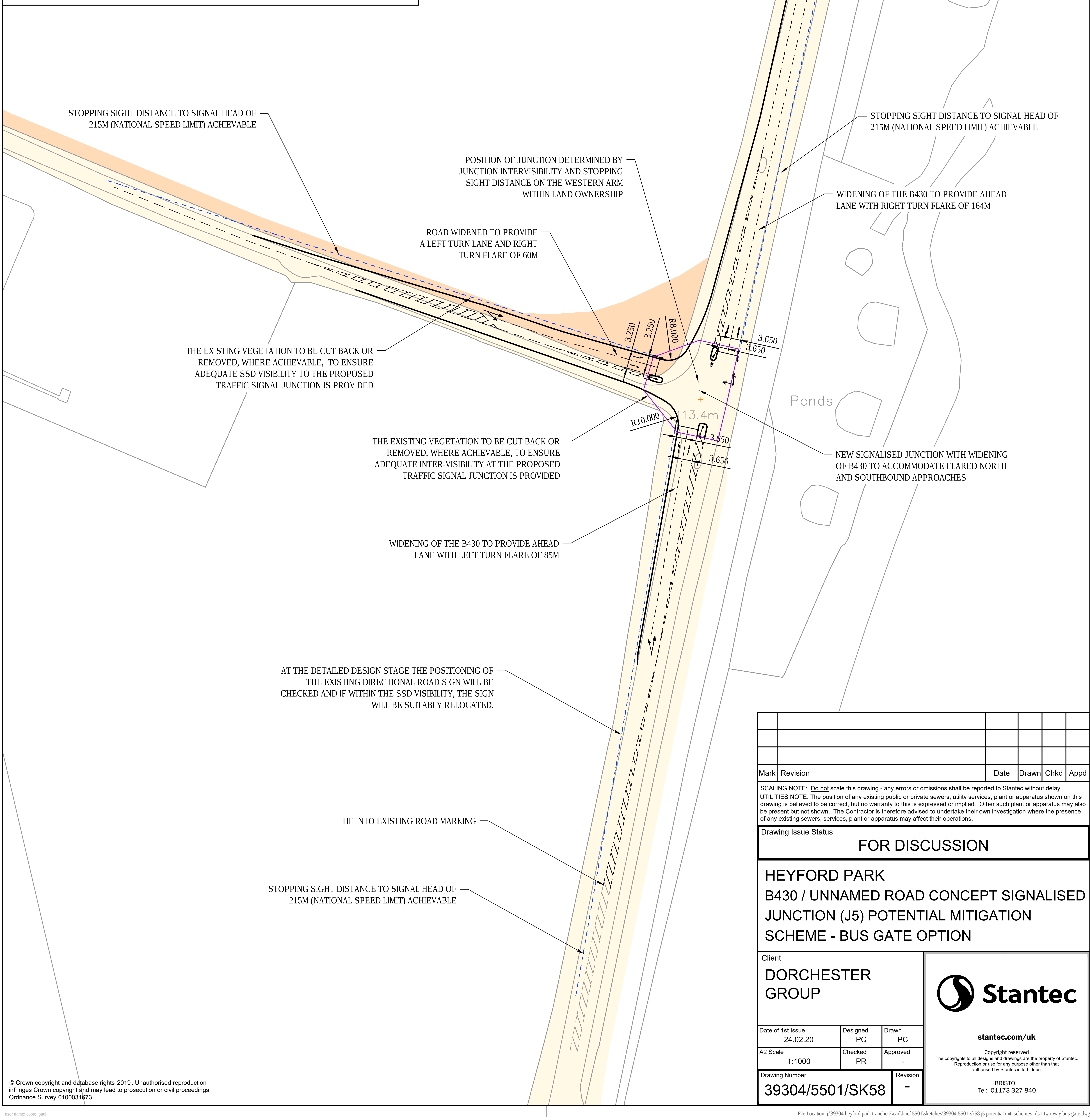
215M STOPPING SIGHT DISTANCE TO JUNCTION GIVE-WAY LINE IN ACCORDANCE WITH DMRB FOR A 60MPH ROAD

JUNCTION INTERVISIBILITY IN ACCORDANCE WITH DMRB

PRIMARY TRAFFIC SIGNAL HEAD AND POLE

SECONDARY TRAFFIC SIGNAL HEAD AND POLE





Mark	Revision	Date	Drawn	Chkd	Appd

SCALING NOTE: Do not scale this drawing - any errors or omissions shall be reported to Stantec without delay.

UTILITIES NOTE: The position of any existing public or private sewers, utility services, plant or apparatus shown on this drawing is believed to be correct, but no warranty to this is expressed or implied. Other such plant or apparatus may also be present but not shown. The Contractor is therefore advised to undertake their own investigation where the presence of any existing sewers, services, plant or apparatus may affect their operations.

Drawing Issue Status

FOR DISCUSSION

HEYFORD PARK

B430 / UNNAMED ROAD CONCEPT SIGNALISED JUNCTION (J5) POTENTIAL MITIGATION SCHEME - BUS GATE OPTION

Client

DORCHESTER GROUP

Date of 1st Issue	Designed	Drawn
24.02.20	PC	PC
A2 Scale	**Checked**	**Approved**
1:1000	PR	-

Drawing Number: 39304/5501/SK58

Revision: -

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user name: coote, paul

File Location: j:\39304 heyford park tranche 2\cad\brief 5501\sketches\39304-5501-sk58 j5 potential miti schemes_ds1-two-way bus gate.dwg

TECHNICAL NOTE

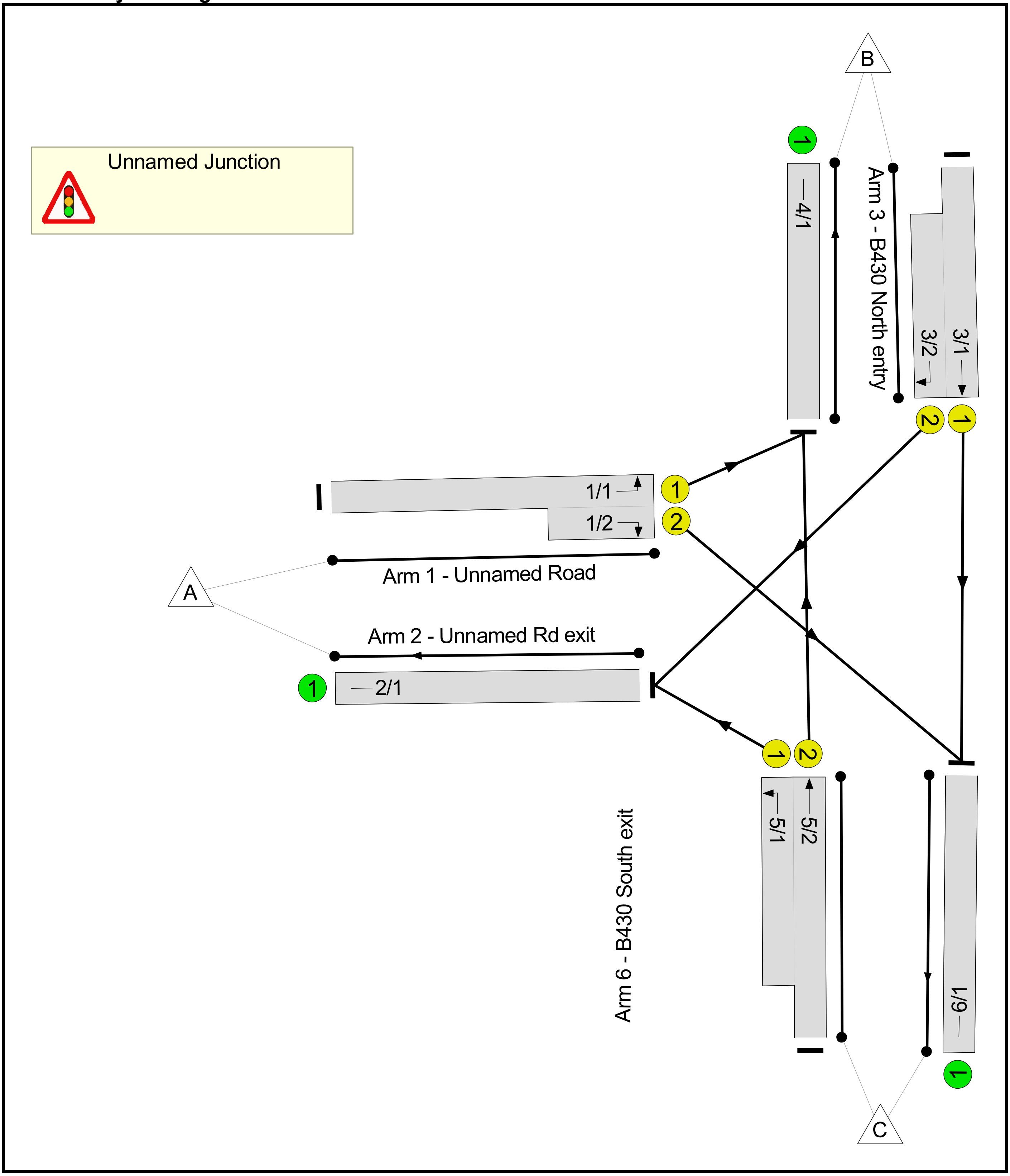
APPENDIX A

Full Input Data And Results

User and Project Details

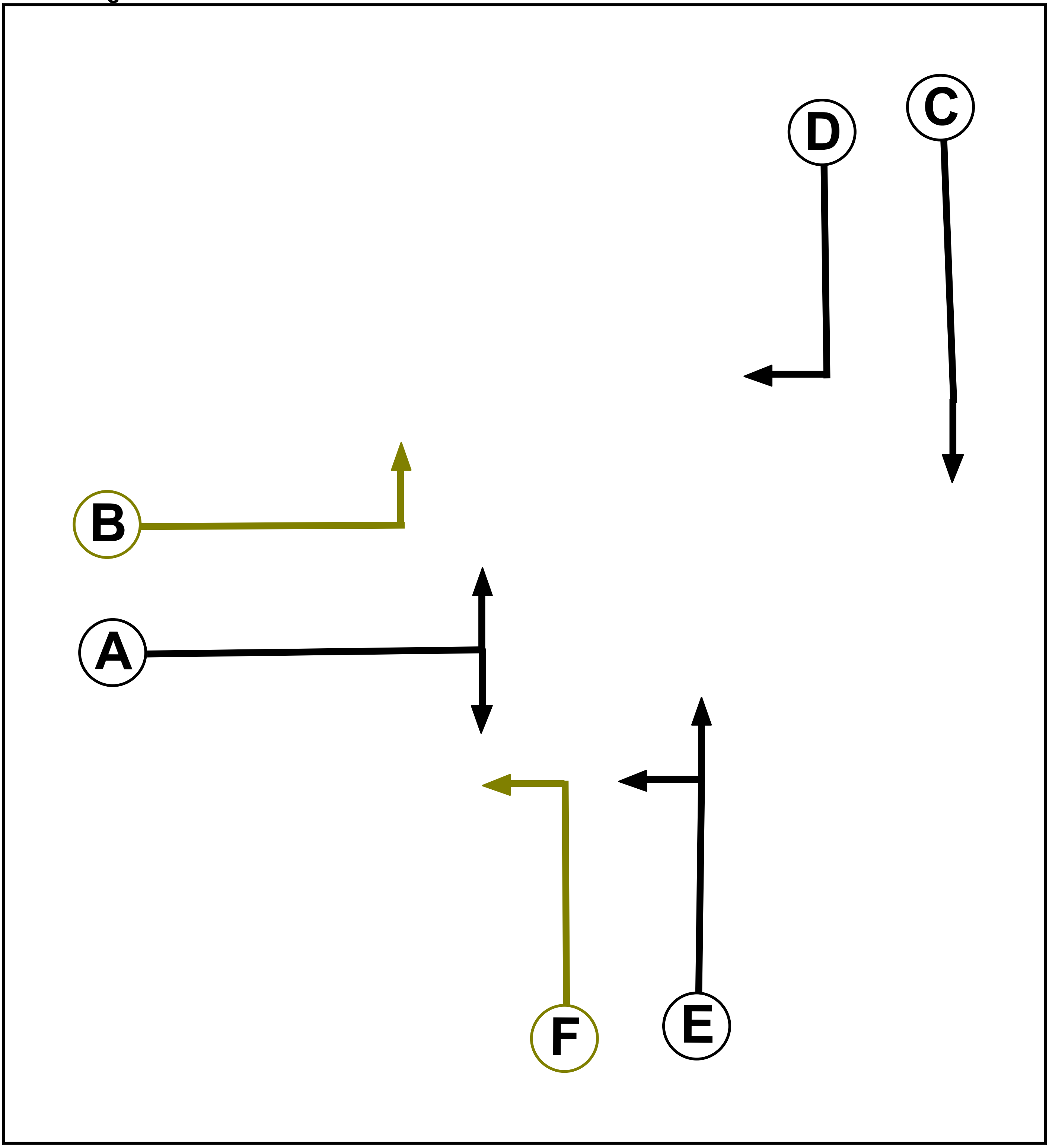
Project:	
Title:	
Location:	
File name:	J5 B430 minor rd single lane (possible mit Opt4) V6.lsg3x – TA Geometry
Author:	
Company:	
Address:	
Notes:	

Network Layout Diagram



Full Input Data And Results

Phase Diagram



Full Input Data And Results

Phase Input Data

Phase Name	Phase Type	Assoc. Phase	Street Min	Cont Min
A	Traffic		7	7
B	Filter	A	4	0
C	Traffic		7	7
D	Traffic		7	7
E	Traffic		7	7
F	Filter	E	4	0

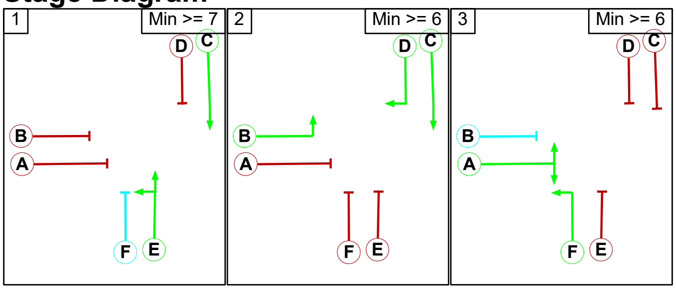
Phase Intergreens Matrix

		Starting Phase					
		A	B	C	D	E	F
Terminating Phase	A		-	5	5	5	-
	B	-		-	-	5	-
	C	5	-		-	-	-
	D	5	-	-		5	6
	E	5	6	-	5		-
	F	-	-	-	5	-	

Phases in Stage

Stage No.	Phases in Stage
1	C E
2	B C D
3	A F

Stage Diagram



Phase Delays

Term. Stage	Start Stage	Phase	Type	Value	Cont value
There are no Phase Delays defined					

Full Input Data And Results

Prohibited Stage Change

	To Stage			
From Stage		1	2	3
	1		6	5
	2	X		6
	3	5	X	

Full Input Data And Results

Give-Way Lane Input Data

Junction: Unnamed Junction
There are no Opposed Lanes in this Junction

Full Input Data And Results

Lane Input Data

Junction: Unnamed Junction												
Lane	**Lane Type**	**Phases**	**Start Disp.**	**End Disp.**	**Physical Length (PCU)**	**Sat Flow Type**	**Def User Saturation Flow (PCU/Hr)**	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Turns**	**Turning Radius (m)**
1/1 (Unnamed Road)	U	A B	2	3	60.0	Geom	-	3.25	0.00	Y	Arm 4 Left	15.00
1/2 (Unnamed Road)	U	A	2	3	5.0	Geom	-	3.25	0.00	Y	Arm 6 Right	20.00
2/1 (Unnamed Rd exit)	U		2	3	60.0	Inf	-	-	-	-	-	-
3/1 (B430 North entry)	U	C	2	3	60.0	Geom	-	3.65	0.00	Y	Arm 6 Ahead	Inf
3/2 (B430 North entry)	U	D	2	3	28.5	Geom	-	3.65	0.00	Y	Arm 2 Right	15.00
4/1 (B430 North exit)	U		2	3	60.0	Inf	-	-	-	-	-	-
5/1 (B430 South)	U	E F	2	3	12.9	Geom	-	3.65	0.00	Y	Arm 2 Left	10.00
5/2 (B430 South)	U	E	2	3	60.0	Geom	-	3.65	0.00	Y	Arm 4 Ahead	Inf
6/1 (B430 South exit)	U		2	3	60.0	Inf	-	-	-	-	-	-

Traffic Flow Groups

Flow Group	Start Time	End Time	Duration	Formula
13: 'SATURN Run DS1 AM'	08:00	09:00	01:00	
14: 'SATURN Run DS1 PM'	17:00	18:00	01:00	

Scenario 13: 'SATURN Run DS1 AM' (FG13: 'SATURN Run DS1 AM', Plan 1: 'Network Control Plan 1')

Traffic Flows, Desired

Desired Flow :

	Destination				
		A	B	C	Tot.
Origin	A	0	319	487	806
	B	301	0	754	1055
	C	476	433	0	909
	Tot.	777	752	1241	2770

Full Input Data And Results

Traffic Lane Flows

Lane	Scenario 13: SATURN Run DS1 AM
Junction: Unnamed Junction	
1/1 (with short)	806(In) 319(Out)
1/2 (short)	487
2/1	777
3/1 (with short)	1055(In) 754(Out)
3/2 (short)	301
4/1	752
5/1 (short)	476
5/2 (with short)	909(In) 433(Out)
6/1	1241

Lane Saturation Flows

Junction: Unnamed Junction								
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat Flow (PCU/Hr)**	**Flared Sat Flow (PCU/Hr)**
1/1 (Unnamed Road)	3.25	0.00	Y	Arm 4 Left	15.00	100.0 %	1764	1764
1/2 (Unnamed Road)	3.25	0.00	Y	Arm 6 Right	20.00	100.0 %	1805	1805
2/1 (Unnamed Rd exit Lane 1)	Infinite Saturation Flow						Inf	Inf
3/1 (B430 North entry)	3.65	0.00	Y	Arm 6 Ahead	Inf	100.0 %	1980	1980
3/2 (B430 North entry)	3.65	0.00	Y	Arm 2 Right	15.00	100.0 %	1800	1800
4/1 (B430 North exit Lane 1)	Infinite Saturation Flow						Inf	Inf
5/1 (B430 South)	3.65	0.00	Y	Arm 2 Left	10.00	100.0 %	1722	1722
5/2 (B430 South)	3.65	0.00	Y	Arm 4 Ahead	Inf	100.0 %	1980	1980
6/1 (B430 South exit Lane 1)	Infinite Saturation Flow						Inf	Inf

Scenario 14: 'SATURN Run DS1 PM' (FG14: 'SATURN Run DS1 PM', Plan 1: 'Network Control Plan 1')

Traffic Flows, Desired

Desired Flow :

		Destination			
		A	B	C	Tot.
Origin	A	0	367	384	751
	B	206	0	489	695
	C	354	765	0	1119
	Tot.	560	1132	873	2565

Traffic Lane Flows

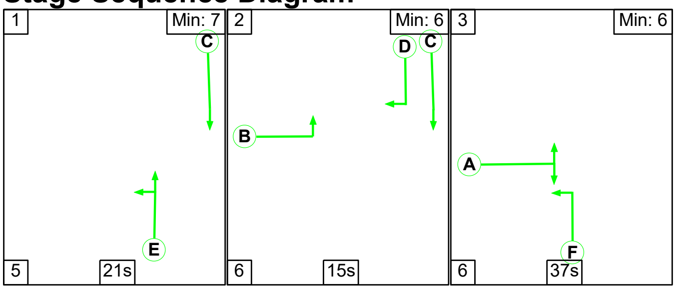
Lane	Scenario 14: SATURN Run DS1 PM
Junction: Unnamed Junction	
1/1 (with short)	751(In) 367(Out)
1/2 (short)	384
2/1	560
3/1 (with short)	695(In) 489(Out)
3/2 (short)	206
4/1	1132
5/1 (short)	354
5/2 (with short)	1119(In) 765(Out)
6/1	873

Lane Saturation Flows

Junction: Unnamed Junction								
Lane	Lane Width (m)	Gradient	Nearside Lane	Allowed Turns	Turning Radius (m)	Turning Prop.	Sat Flow (PCU/Hr)	Flared Sat Flow (PCU/Hr)
1/1 (Unnamed Road)	3.25	0.00	Y	Arm 4 Left	15.00	100.0 %	1764	1764
1/2 (Unnamed Road)	3.25	0.00	Y	Arm 6 Right	20.00	100.0 %	1805	1805
2/1 (Unnamed Rd exit Lane 1)	Infinite Saturation Flow						Inf	Inf
3/1 (B430 North entry)	3.65	0.00	Y	Arm 6 Ahead	Inf	100.0 %	1980	1980
3/2 (B430 North entry)	3.65	0.00	Y	Arm 2 Right	15.00	100.0 %	1800	1800
4/1 (B430 North exit Lane 1)	Infinite Saturation Flow						Inf	Inf
5/1 (B430 South)	3.65	0.00	Y	Arm 2 Left	10.00	100.0 %	1722	1722
5/2 (B430 South)	3.65	0.00	Y	Arm 4 Ahead	Inf	100.0 %	1980	1980
6/1 (B430 South exit Lane 1)	Infinite Saturation Flow						Inf	Inf

Scenario 13: 'SATURN Run DS1 AM' (FG13: 'SATURN Run DS1 AM', Plan 1: 'Network Control Plan 1')

Stage Sequence Diagram

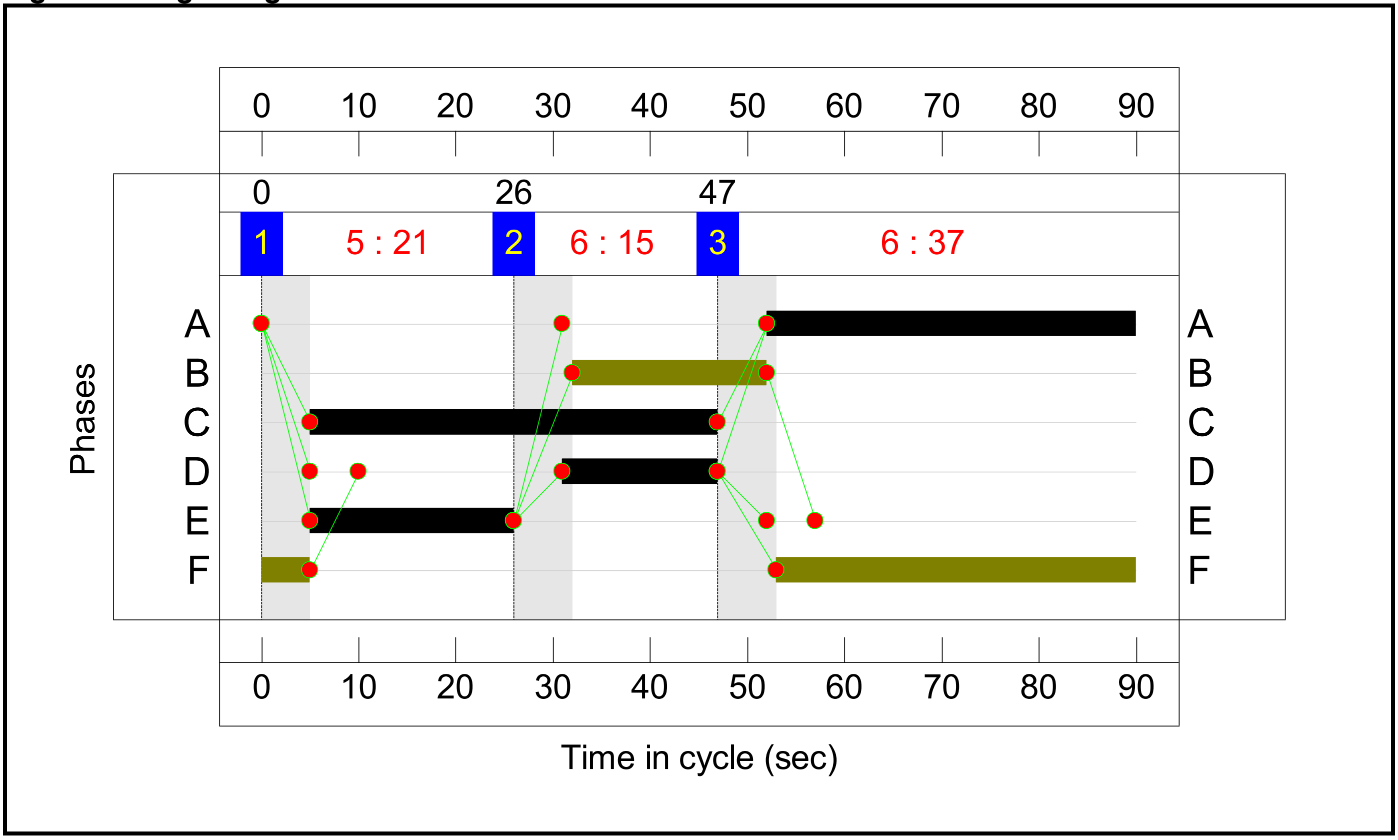


Stage Timings

Stage	1	2	3
Duration	21	15	37
Change Point	0	26	47

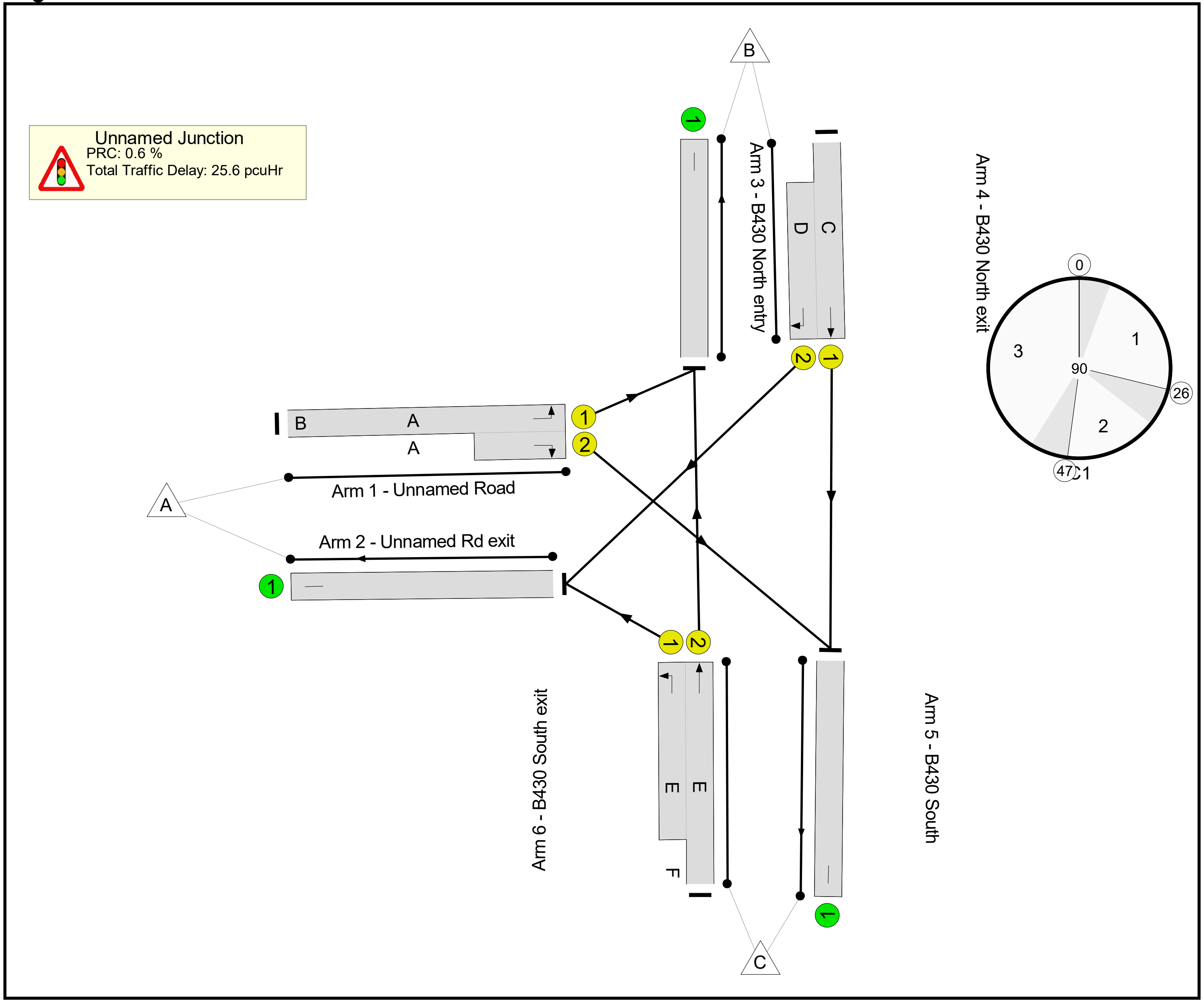
Full Input Data And Results

Signal Timings Diagram



Full Input Data And Results

Network Layout Diagram



Full Input Data And Results

Network Results

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**89.5%**
Unnamed Junction	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**89.5%**
1/1+1/2	Unnamed Road Left Right	U	N/A	N/A	A	B	1	58:38	20	806	1764:1805	359+548	88.8 : 88.8%
2/1	Unnamed Rd exit	U	N/A	N/A	-		-	-	-	777	Inf	Inf	0.0%
3/1+3/2	B430 North entry Right Ahead	U	N/A	N/A	C D		1	42:16	-	1055	1980:1800	946+340	79.7 : 88.5%
4/1	B430 North exit	U	N/A	N/A	-		-	-	-	752	Inf	Inf	0.0%
5/2+5/1	B430 South Left Ahead	U	N/A	N/A	E	F	1	21:63	42	909	1980:1722	484+532	89.5 : 89.5%
6/1	B430 South exit	U	N/A	N/A	-		-	-	-	1241	Inf	Inf	0.0%

Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network	**-**	**-**	**0**	**0**	**0**	**15.7**	**9.9**	**0.0**	**25.6**	**-**	**-**	**-**	**-**
Unnamed Junction	**-**	**-**	**0**	**0**	**0**	**15.7**	**9.9**	**0.0**	**25.6**	**-**	**-**	**-**	**-**
1/1+1/2	806	806	-	-	-	4.0	3.7	-	7.7	34.3	14.9	3.7	18.6
2/1	777	777	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
3/1+3/2	1055	1055	-	-	-	7.1	2.2	-	9.4	32.0	15.7	2.2	17.9
4/1	752	752	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
5/2+5/1	909	909	-	-	-	4.6	4.0	-	8.6	34.0	10.5	4.0	14.4
6/1	1241	1241	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0

C1 PRC for Signalled Lanes (%): 0.6 Total Delay for Signalled Lanes (pcuHr): 25.64 Cycle Time (s): 90
PRC Over All Lanes (%): 0.6 Total Delay Over All Lanes(pcuHr): 25.64

Network Results

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Start Green (s)	End Green (s)	Arrow Green (s)	Bonus Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Max Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)	Arriving (pcu)	Leaving (pcu)
Network	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**89.5%**	**-**	**-**
Unnamed Junction	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**89.5%**	**-**	**-**
1/1+1/2	Unnamed Road Left Right	U	N/A	N/A	A	B	1	58:38	32:52	0	20	-	806	1764:1805	1764	359+548	88.8 : 88.8%	806	806
2/1	Unnamed Rd exit	U	N/A	N/A	-		-	-	-	-	-	-	777	Inf	Inf	Inf	0.0%	777	777
3/1+3/2	B430 North entry Right Ahead	U	N/A	N/A	C D		1	42:16	5:31	47	-	-	1055	1980:1800	1980	946+340	79.7 : 88.5%	1055	1055
4/1	B430 North exit	U	N/A	N/A	-		-	-	-	-	-	-	752	Inf	Inf	Inf	0.0%	752	752
5/2+5/1	B430 South Left Ahead	U	N/A	N/A	E	F	1	21:63	5:53	26	42	-	909	1980:1722	1980	484+532	89.5 : 89.5%	909	909
6/1	B430 South exit	U	N/A	N/A	-		-	-	-	-	-	-	1241	Inf	Inf	Inf	0.0%	1241	1241

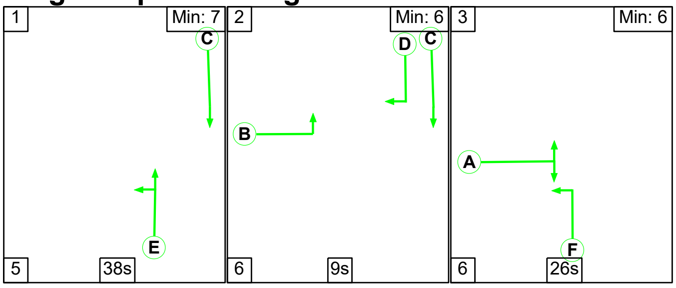
Item	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Uniform Stops (stops)	Av. Uniform Stops Per PCU (stops/pcu)	Back of Uniform Q At End of Red(pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)	De-sliver Threshold (pcu)	Average Excess Queue (pcu)	Weighted Deg Sat (%)	Weighted Total Delay (pcuHr)	Ignoring Random Delay ?
Network	**0**	**0**	**0**	**15.7**	**9.9**	**0.0**	**25.6**	**-**	**2247.5**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**89.5%**	**29.7**	**-**
Unnamed Junction	**0**	**0**	**0**	**15.7**	**9.9**	**0.0**	**25.6**	**-**	**2247.5**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**89.5%**	**29.7**	**-**
1/1+1/2	-	-	-	4.0	3.7	-	7.7	34.3	724.5	0.9	3.9	14.9	3.7	18.6	-	0.00	88.8 : 88.8%	9.0	-
2/1	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	-	0.00	0.0%	0.0	-
3/1+3/2	-	-	-	7.1	2.2	-	9.4	32.0	919.3	0.9	9.4	15.7	2.2	17.9	-	0.00	79.7 : 88.5%	11.0	-
4/1	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	-	0.00	0.0%	0.0	-
5/2+5/1	-	-	-	4.6	4.0	-	8.6	34.0	603.7	0.7	7.9	10.5	4.0	14.4	-	0.00	89.5 : 89.5%	9.7	-
6/1	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	-	0.00	0.0%	0.0	-

C1 PRC for Signalled Lanes (%): 0.6 Total Delay for Signalled Lanes (pcuHr): 25.64 Cycle Time (s): 90
PRC Over All Lanes (%): 0.6 Total Delay Over All Lanes(pcuHr): 25.64

Full Input Data And Results

Scenario 14: 'SATURN Run DS1 PM' (FG14: 'SATURN Run DS1 PM', Plan 1: 'Network Control Plan 1')

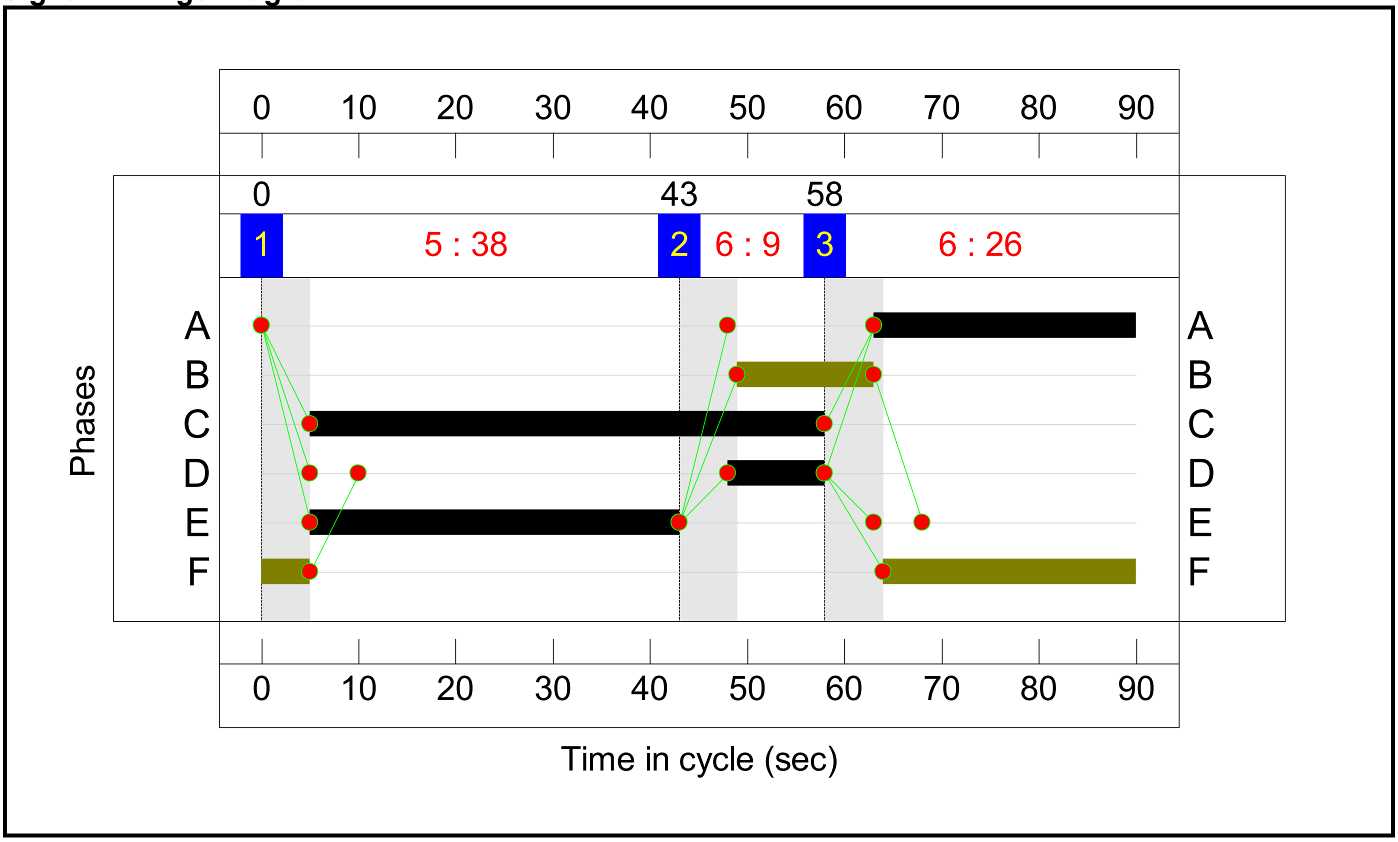
Stage Sequence Diagram



Stage Timings

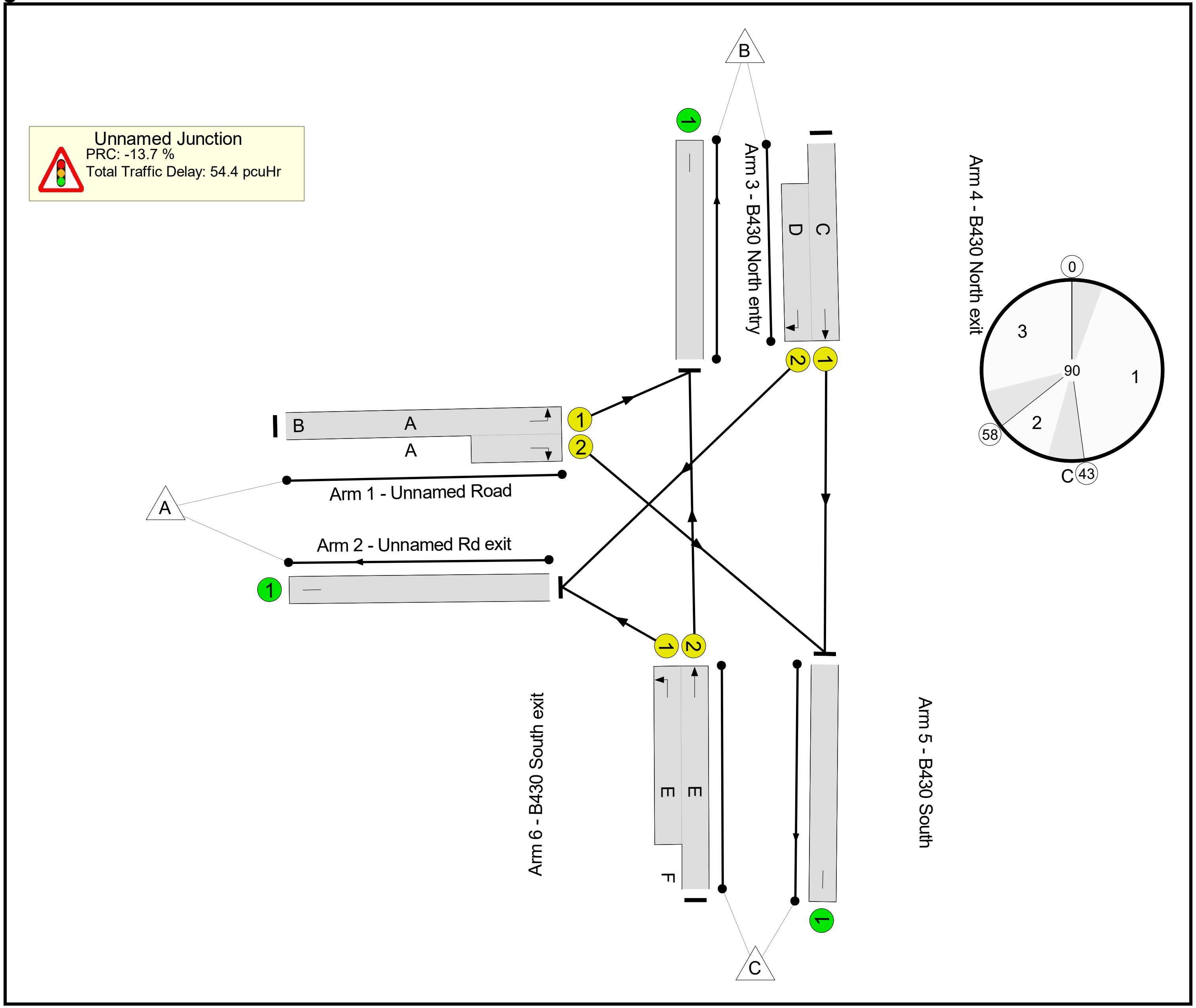
Stage	1	2	3
Duration	38	9	26
Change Point	0	43	58

Signal Timings Diagram



Full Input Data And Results

Network Layout Diagram



Full Input Data And Results

Network Results

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**102.3%**
Unnamed Junction	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**102.3%**
1/1+1/2	Unnamed Road Left Right	U	N/A	N/A	A	B	1	41:27	14	751	1764:1805	366+383	100.4 : 100.4%
2/1	Unnamed Rd exit	U	N/A	N/A	-		-	-	-	560	Inf	Inf	0.0%
3/1+3/2	B430 North entry Right Ahead	U	N/A	N/A	C D		1	53:10	-	695	1980:1800	1179+220	41.5 : 93.6%
4/1	B430 North exit	U	N/A	N/A	-		-	-	-	1132	Inf	Inf	0.0%
5/2+5/1	B430 South Left Ahead	U	N/A	N/A	E	F	1	38:69	31	1119	1980:1722	748+346	102.3 : 102.3%
6/1	B430 South exit	U	N/A	N/A	-		-	-	-	873	Inf	Inf	0.0%

Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network	**-**	**-**	**0**	**0**	**0**	**15.4**	**39.1**	**0.0**	**54.4**	**-**	**-**	**-**	**-**
Unnamed Junction	**-**	**-**	**0**	**0**	**0**	**15.4**	**39.1**	**0.0**	**54.4**	**-**	**-**	**-**	**-**
1/1+1/2	751	748	-	-	-	5.3	14.4	-	19.8	94.7	14.0	14.4	28.4
2/1	560	560	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
3/1+3/2	695	695	-	-	-	3.5	0.5	-	4.0	20.9	6.4	0.5	6.9
4/1	1113	1113	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
5/2+5/1	1119	1102	-	-	-	6.5	24.1	-	30.6	98.6	24.4	24.1	48.5
6/1	872	872	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0

C1 PRC for Signalled Lanes (%): -13.7 Total Delay for Signalled Lanes (pcuHr): 54.44 Cycle Time (s): 90
PRC Over All Lanes (%): -13.7 Total Delay Over All Lanes(pcuHr): 54.44

Full Input Data And Results

Network Results

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Start Green (s)	End Green (s)	Arrow Green (s)	Bonus Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Max Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)	Arriving (pcu)	Leaving (pcu)
Network	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**102.3%**	**-**	**-**
Unnamed Junction	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**102.3%**	**-**	**-**
1/1+1/2	Unnamed Road Left Right	U	N/A	N/A	A	B	1	41:27	49:63	0	14	-	751	1764:1805	1764	366+383	100.4 : 100.4%	751	748
2/1	Unnamed Rd exit	U	N/A	N/A	-		-	-	-	-	-	-	560	Inf	Inf	Inf	0.0%	560	560
3/1+3/2	B430 North entry Right Ahead	U	N/A	N/A	C D		1	53:10	5:48	58	-	-	695	1980:1800	1980	1179+220	41.5 : 93.6%	695	695
4/1	B430 North exit	U	N/A	N/A	-		-	-	-	-	-	-	1132	Inf	Inf	Inf	0.0%	1113	1113
5/2+5/1	B430 South Left Ahead	U	N/A	N/A	E	F	1	38:69	5:64	43	31	-	1119	1980:1722	1980	748+346	102.3 : 102.3%	1119	1102
6/1	B430 South exit	U	N/A	N/A	-		-	-	-	-	-	-	873	Inf	Inf	Inf	0.0%	872	872

Item	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Uniform Stops (stops)	Av. Uniform Stops Per PCU (stops/pcu)	Back of Uniform Q At End of Red(pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)	De-sliver Threshold (pcu)	Average Excess Queue (pcu)	Weighted Deg Sat (%)	Weighted Total Delay (pcuHr)	Ignoring Random Delay ?
Network	**0**	**0**	**0**	**15.4**	**39.1**	**0.0**	**54.4**	**-**	**2353.3**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**102.3%**	**58.7**	**-**
Unnamed Junction	**0**	**0**	**0**	**15.4**	**39.1**	**0.0**	**54.4**	**-**	**2353.3**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**102.3%**	**58.7**	**-**
1/1+1/2	-	-	-	5.3	14.4	-	19.8	94.7	758.3	1.0	4.9	14.0	14.4	28.4	-	0.00	100.4 : 100.4%	21.2	-
2/1	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	-	0.00	0.0%	0.0	-
3/1+3/2	-	-	-	3.5	0.5	-	4.0	20.9	459.1	0.7	4.6	6.4	0.5	6.9	-	0.00	41.5 : 93.6%	4.9	-
4/1	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	-	0.00	0.0%	0.0	-
5/2+5/1	-	-	-	6.5	24.1	-	30.6	98.6	1135.9	1.0	10.8	24.4	24.1	48.5	-	0.00	102.3 : 102.3%	32.7	-
6/1	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	-	0.00	0.0%	0.0	-

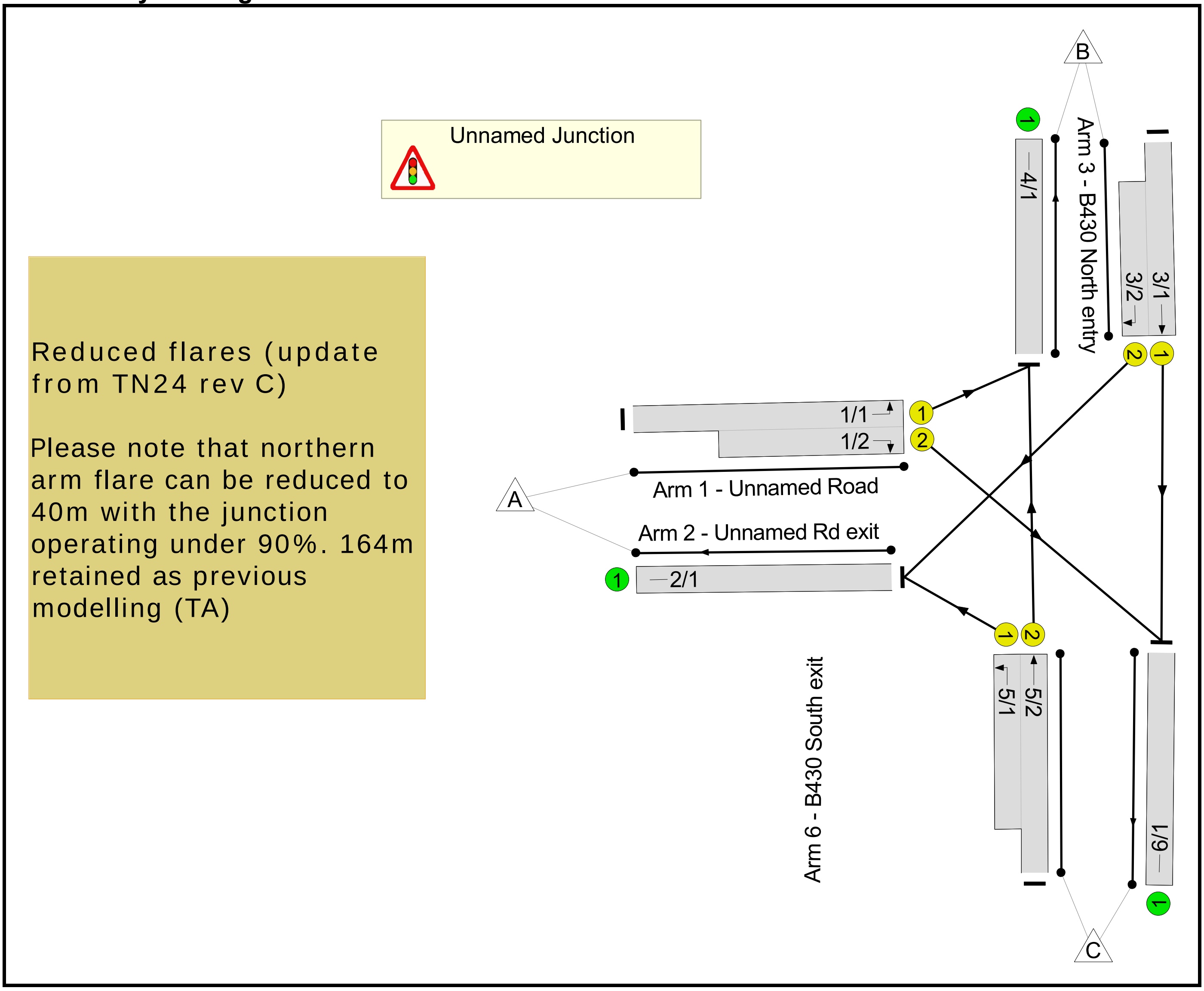
C1 PRC for Signalled Lanes (%): -13.7 Total Delay for Signalled Lanes (pcuHr): 54.44 Cycle Time (s): 90
PRC Over All Lanes (%): -13.7 Total Delay Over All Lanes(pcuHr): 54.44

Full Input Data And Results

User and Project Details

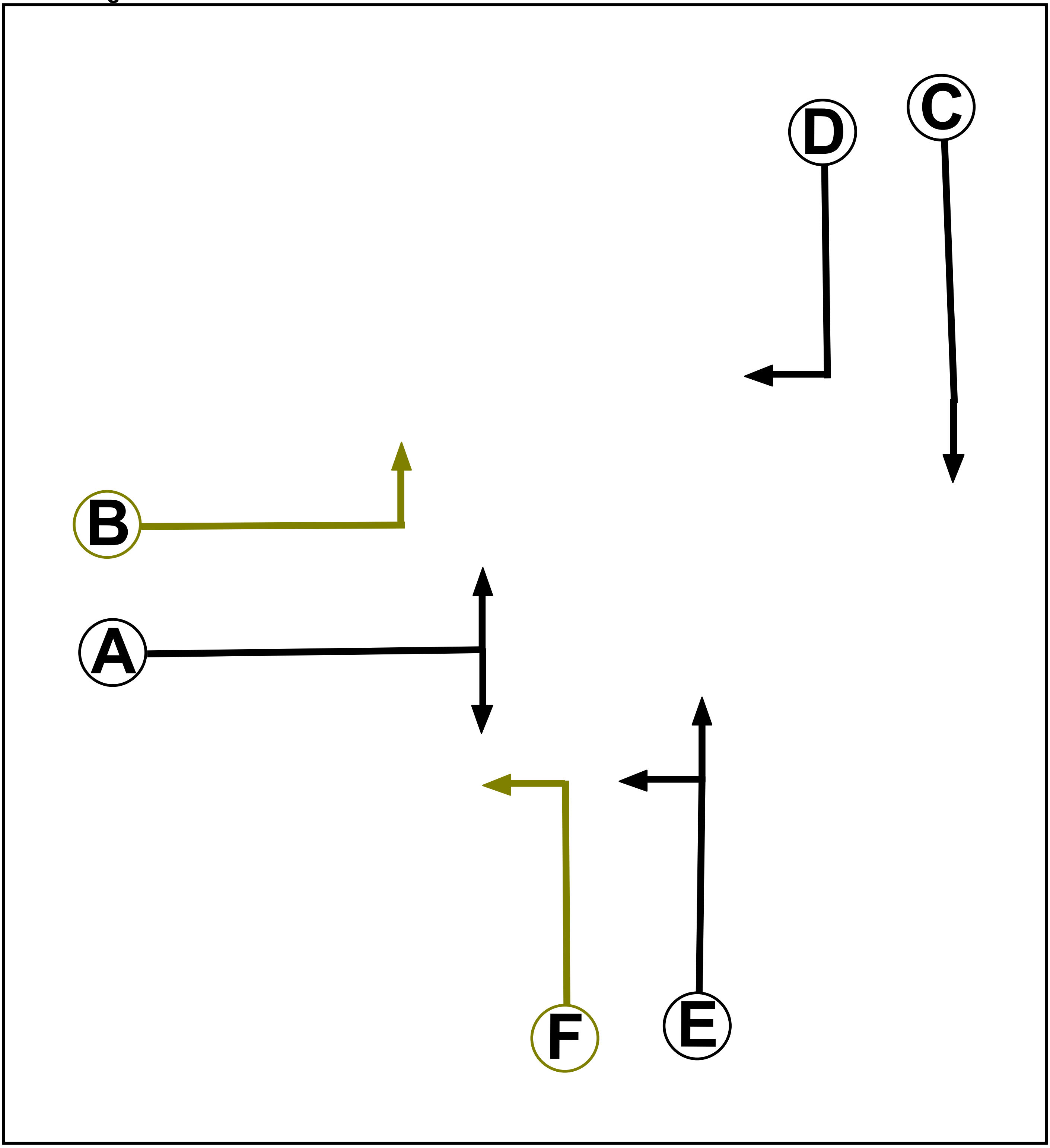
Project:	
Title:	
Location:	
File name:	J5 B430 minor rd single lane (possible mit Opt4) V7 - TEST FOR SATURN MOD_Feb 2020.lsg3x
Author:	
Company:	
Address:	
Notes:	

Network Layout Diagram



Full Input Data And Results

Phase Diagram



Full Input Data And Results

Phase Input Data

Phase Name	Phase Type	Assoc. Phase	Street Min	Cont Min
A	Traffic		7	7
B	Filter	A	4	0
C	Traffic		7	7
D	Traffic		7	7
E	Traffic		7	7
F	Filter	E	4	0

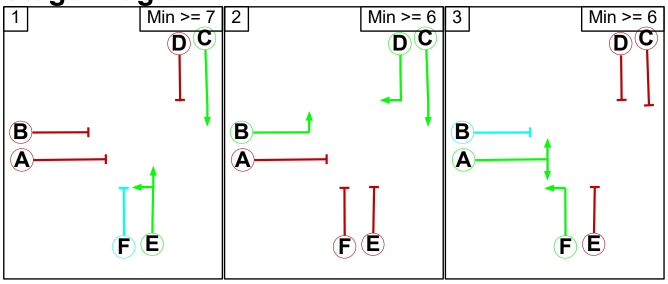
Phase Intergreens Matrix

		Starting Phase					
		A	B	C	D	E	F
Terminating Phase	A		-	5	5	5	-
	B	-		-	-	5	-
	C	5	-		-	-	-
	D	5	-	-		5	6
	E	5	6	-	5		-
	F	-	-	-	5	-	

Phases in Stage

Stage No.	Phases in Stage
1	C E
2	B C D
3	A F

Stage Diagram



Phase Delays

Term. Stage	Start Stage	Phase	Type	Value	Cont value
There are no Phase Delays defined					

Full Input Data And Results

Prohibited Stage Change

		To Stage		
From Stage		1	2	3
	1		6	5
	2	X		6
	3	5	X	

Full Input Data And Results

Give-Way Lane Input Data

Junction: Unnamed Junction
There are no Opposed Lanes in this Junction

Full Input Data And Results

Lane Input Data

Junction: Unnamed Junction												
Lane	**Lane Type**	**Phases**	**Start Disp.**	**End Disp.**	**Physical Length (PCU)**	**Sat Flow Type**	**Def User Saturation Flow (PCU/Hr)**	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Turns**	**Turning Radius (m)**
1/1 (Unnamed Road)	U	A B	2	3	60.0	Geom	-	3.25	0.00	Y	Arm 4 Left	15.00
1/2 (Unnamed Road)	U	A	2	3	10.4	Geom	-	3.25	0.00	Y	Arm 6 Right	20.00
2/1 (Unnamed Rd exit)	U		2	3	60.0	Inf	-	-	-	-	-	-
3/1 (B430 North entry)	U	C	2	3	60.0	Geom	-	3.65	0.00	Y	Arm 6 Ahead	Inf
3/2 (B430 North entry)	U	D	2	3	28.5	Geom	-	3.65	0.00	Y	Arm 2 Right	15.00
4/1 (B430 North exit)	U		2	3	60.0	Inf	-	-	-	-	-	-
5/1 (B430 South)	U	E F	2	3	14.8	Geom	-	3.65	0.00	Y	Arm 2 Left	10.00
5/2 (B430 South)	U	E	2	3	60.0	Geom	-	3.65	0.00	Y	Arm 4 Ahead	Inf
6/1 (B430 South exit)	U		2	3	60.0	Inf	-	-	-	-	-	-

Traffic Flow Groups

Flow Group	Start Time	End Time	Duration	Formula
13: 'SATURN Run DS1 AM'	07:45	08:45	01:00	
14: 'SATURN Run DS1 PM'	17:00	18:00	01:00	

Scenario 13: 'SATURN Run DS1 AM' (FG13: 'SATURN Run DS1 AM', Plan 1: 'Network Control Plan 1')

Traffic Flows, Desired

Desired Flow :

	Destination				
Origin		A	B	C	Tot.
	A	0	319	487	806
	B	301	0	754	1055
	C	476	433	0	909
	Tot.	777	752	1241	2770

Full Input Data And Results

Traffic Lane Flows

Lane	Scenario 13: SATURN Run DS1 AM
Junction: Unnamed Junction	
1/1 (with short)	806(In) 319(Out)
1/2 (short)	487
2/1	777
3/1 (with short)	1055(In) 754(Out)
3/2 (short)	301
4/1	752
5/1 (short)	476
5/2 (with short)	909(In) 433(Out)
6/1	1241

Lane Saturation Flows

Junction: Unnamed Junction								
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat Flow (PCU/Hr)**	**Flared Sat Flow (PCU/Hr)**
1/1 (Unnamed Road)	3.25	0.00	Y	Arm 4 Left	15.00	100.0 %	1764	1764
1/2 (Unnamed Road)	3.25	0.00	Y	Arm 6 Right	20.00	100.0 %	1805	1805
2/1 (Unnamed Rd exit Lane 1)	Infinite Saturation Flow						Inf	Inf
3/1 (B430 North entry)	3.65	0.00	Y	Arm 6 Ahead	Inf	100.0 %	1980	1980
3/2 (B430 North entry)	3.65	0.00	Y	Arm 2 Right	15.00	100.0 %	1800	1800
4/1 (B430 North exit Lane 1)	Infinite Saturation Flow						Inf	Inf
5/1 (B430 South)	3.65	0.00	Y	Arm 2 Left	10.00	100.0 %	1722	1722
5/2 (B430 South)	3.65	0.00	Y	Arm 4 Ahead	Inf	100.0 %	1980	1980
6/1 (B430 South exit Lane 1)	Infinite Saturation Flow						Inf	Inf

Scenario 14: 'SATURN Run DS1 PM' (FG14: 'SATURN Run DS1 PM', Plan 1: 'Network Control Plan 1')

Traffic Flows, Desired

Desired Flow :

	Destination				
Origin		A	B	C	Tot.
	A	0	367	384	751
	B	206	0	489	695
	C	354	765	0	1119
	Tot.	560	1132	873	2565

Traffic Lane Flows

Lane	Scenario 14: SATURN Run DS1 PM
Junction: Unnamed Junction	
1/1 (with short)	751(In) 367(Out)
1/2 (short)	384
2/1	560
3/1 (with short)	695(In) 489(Out)
3/2 (short)	206
4/1	1132
5/1 (short)	354
5/2 (with short)	1119(In) 765(Out)
6/1	873

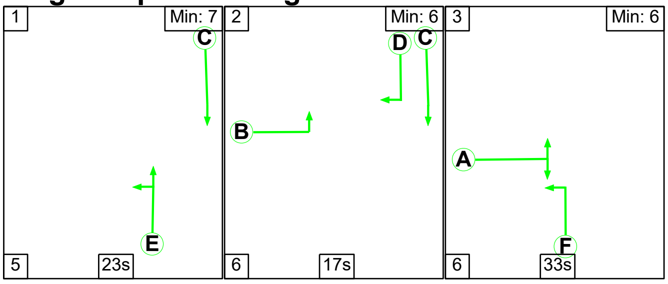
Full Input Data And Results

Lane Saturation Flows

Junction: Unnamed Junction								
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat Flow (PCU/Hr)**	**Flared Sat Flow (PCU/Hr)**
1/1 (Unnamed Road)	3.25	0.00	Y	Arm 4 Left	15.00	100.0 %	1764	1764
1/2 (Unnamed Road)	3.25	0.00	Y	Arm 6 Right	20.00	100.0 %	1805	1805
2/1 (Unnamed Rd exit Lane 1)	Infinite Saturation Flow						Inf	Inf
3/1 (B430 North entry)	3.65	0.00	Y	Arm 6 Ahead	Inf	100.0 %	1980	1980
3/2 (B430 North entry)	3.65	0.00	Y	Arm 2 Right	15.00	100.0 %	1800	1800
4/1 (B430 North exit Lane 1)	Infinite Saturation Flow						Inf	Inf
5/1 (B430 South)	3.65	0.00	Y	Arm 2 Left	10.00	100.0 %	1722	1722
5/2 (B430 South)	3.65	0.00	Y	Arm 4 Ahead	Inf	100.0 %	1980	1980
6/1 (B430 South exit Lane 1)	Infinite Saturation Flow						Inf	Inf

Scenario 13: 'SATURN Run DS1 AM' (FG13: 'SATURN Run DS1 AM', Plan 1: 'Network Control Plan 1')

Stage Sequence Diagram

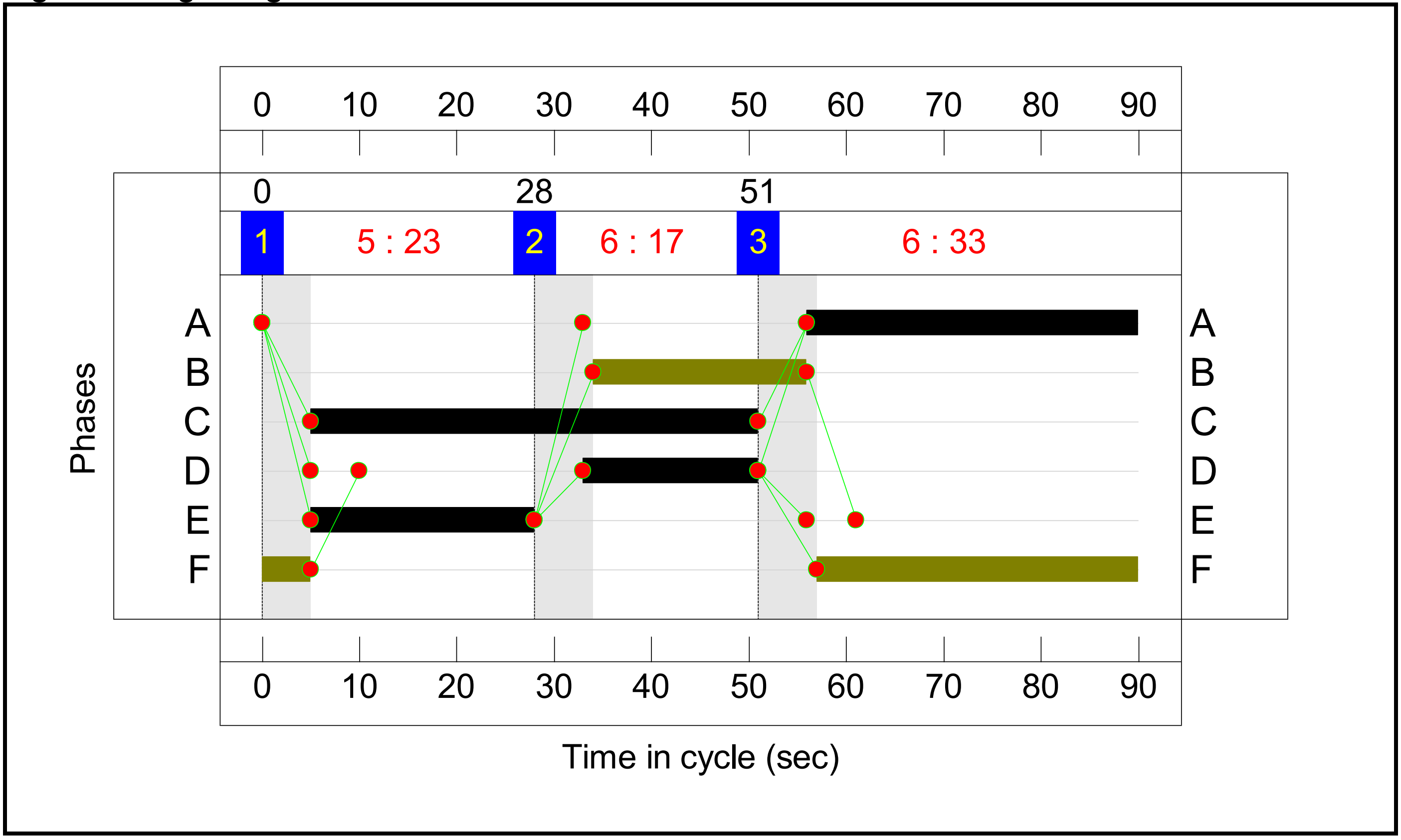


Stage Timings

Stage	1	2	3
Duration	23	17	33
Change Point	0	28	51

Full Input Data And Results

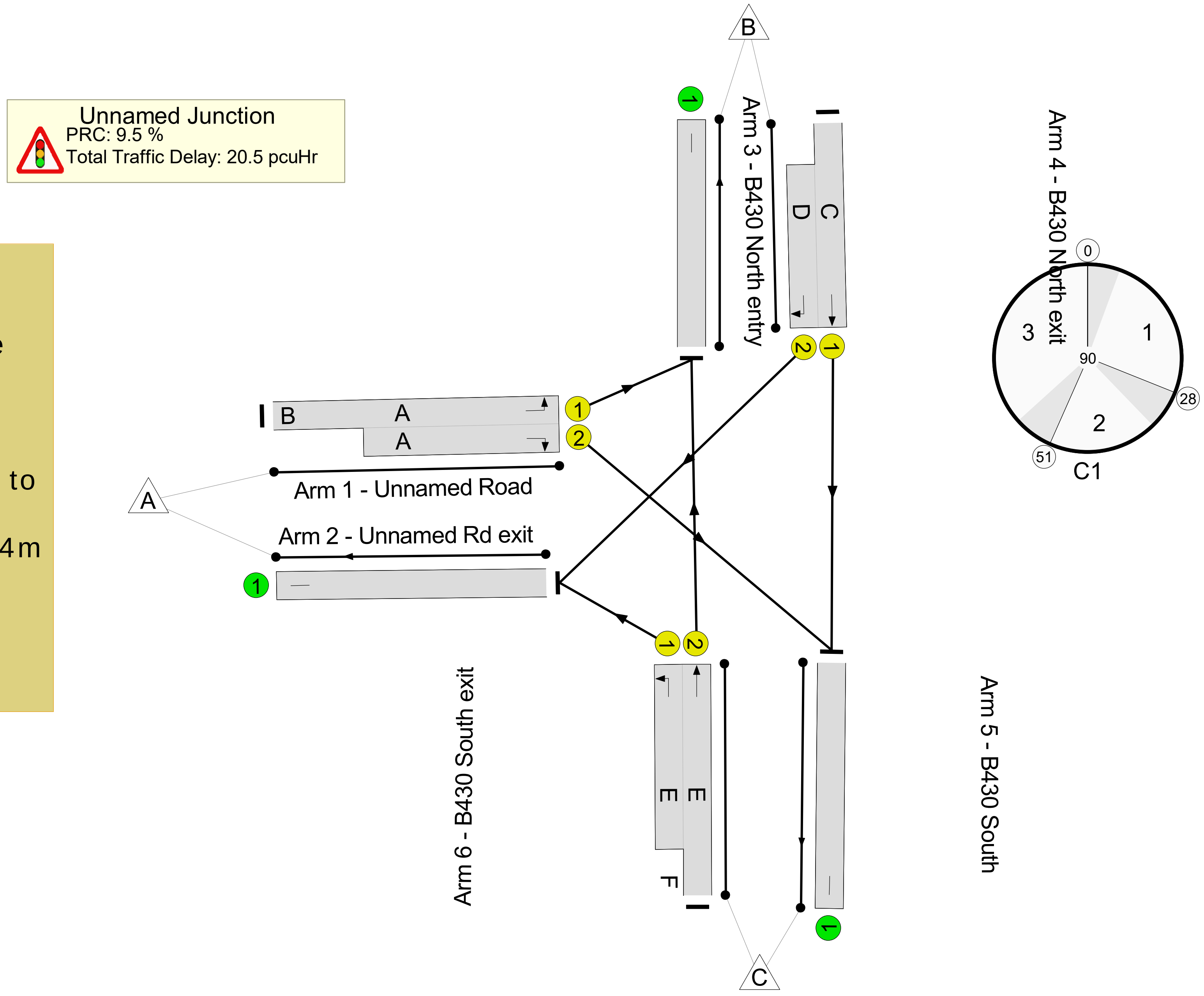
Signal Timings Diagram



Full Input Data And Results

Network Layout Diagram

Full Input Data And Results



Reduced flares (update from TN24 rev C)

Please note that northern arm flare can be reduced to 40m with the junction operating under 90%. 164m retained as previous modelling (TA)

Full Input Data And Results

Network Results

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**82.2%**
Unnamed Junction	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**82.2%**
1/1+1/2	Unnamed Road Left Right	U	N/A	N/A	A	B	1	56:34	22	806	1764:1805	388+593	82.2 : 82.2%
2/1	Unnamed Rd exit	U	N/A	N/A	-		-	-	-	777	Inf	Inf	0.0%
3/1+3/2	B430 North entry Right Ahead	U	N/A	N/A	C D		1	46:18	-	1055	1980:1800	1034+380	72.9 : 79.2%
4/1	B430 North exit	U	N/A	N/A	-		-	-	-	752	Inf	Inf	0.0%
5/2+5/1	B430 South Left Ahead	U	N/A	N/A	E	F	1	23:61	38	909	1980:1722	528+580	82.0 : 82.0%
6/1	B430 South exit	U	N/A	N/A	-		-	-	-	1241	Inf	Inf	0.0%

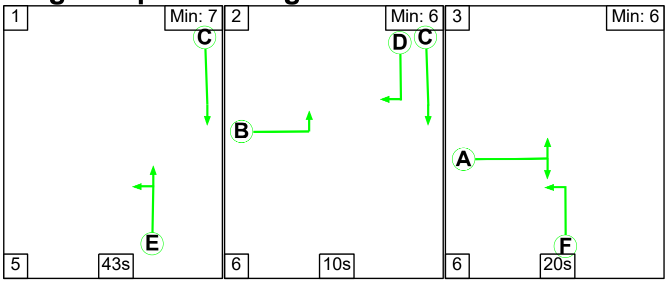
Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network	**-**	**-**	**0**	**0**	**0**	**14.6**	**5.9**	**0.0**	**20.5**	**-**	**-**	**-**	**-**
Unnamed Junction	**-**	**-**	**0**	**0**	**0**	**14.6**	**5.9**	**0.0**	**20.5**	**-**	**-**	**-**	**-**
1/1+1/2	806	806	-	-	-	3.8	2.2	-	6.0	26.9	10.1	2.2	12.4
2/1	777	777	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
3/1+3/2	1055	1055	-	-	-	6.3	1.5	-	7.7	26.4	14.5	1.5	15.9
4/1	752	752	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
5/2+5/1	909	909	-	-	-	4.5	2.2	-	6.8	26.7	10.1	2.2	12.3
6/1	1241	1241	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0

C1 PRC for Signalled Lanes (%): 9.5 Total Delay for Signalled Lanes (pcuHr): 20.51 Cycle Time (s): 90
PRC Over All Lanes (%): 9.5 Total Delay Over All Lanes(pcuHr): 20.51

Full Input Data And Results

Scenario 14: 'SATURN Run DS1 PM' (FG14: 'SATURN Run DS1 PM', Plan 1: 'Network Control Plan 1')

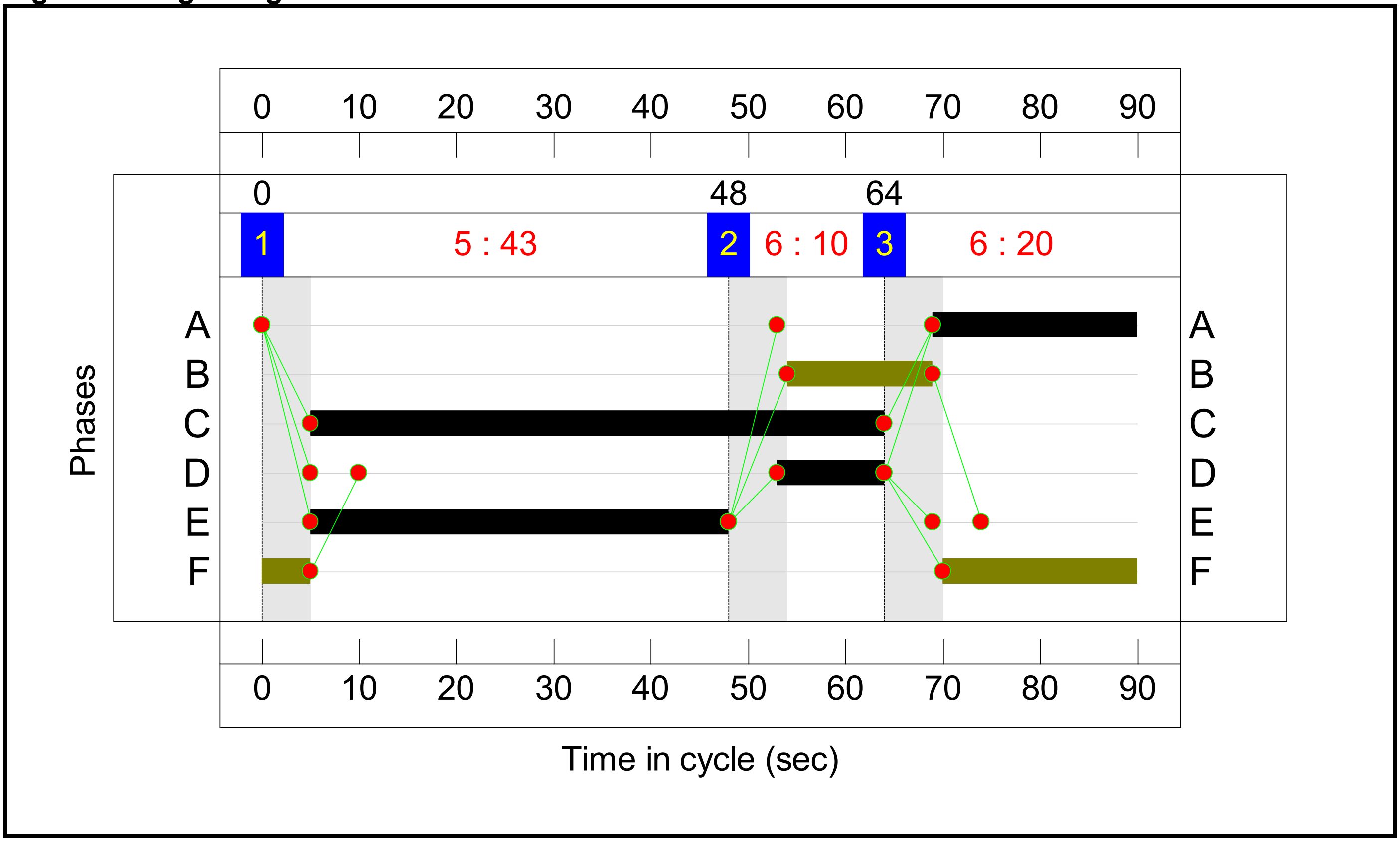
Stage Sequence Diagram



Stage Timings

Stage	1	2	3
Duration	43	10	20
Change Point	0	48	64

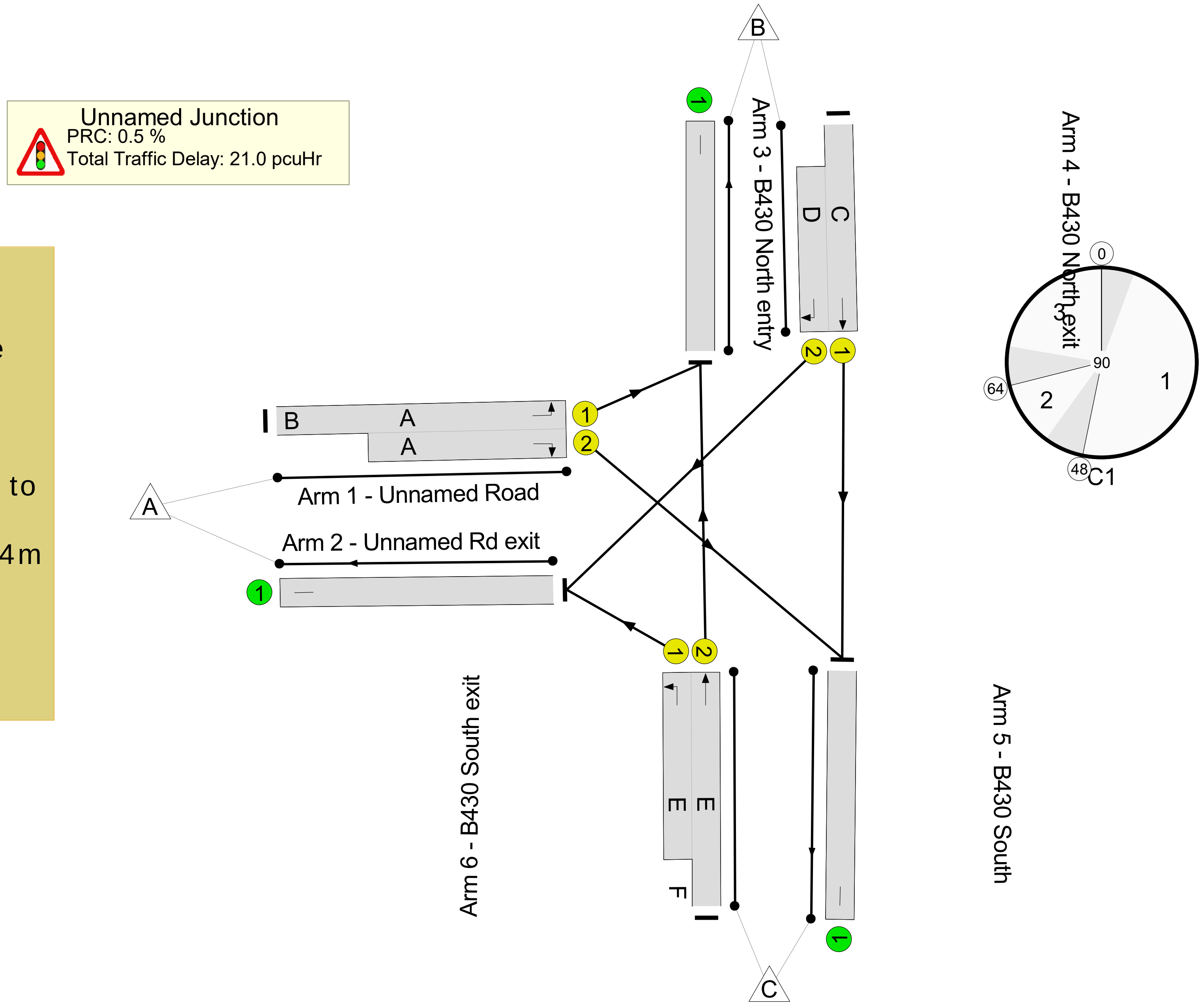
Signal Timings Diagram



Full Input Data And Results

Network Layout Diagram

Full Input Data And Results



Reduced flares (update from TN24 rev C)

Please note that northern arm flare can be reduced to 40m with the junction operating under 90%. 164m retained as previous modelling (TA)

Full Input Data And Results

Network Results

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**89.5%**
Unnamed Junction	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**89.5%**
1/1+1/2	Unnamed Road Left Right	U	N/A	N/A	A	B	1	36:21	15	751	1764:1805	415+434	88.5 : 88.5%
2/1	Unnamed Rd exit	U	N/A	N/A	-		-	-	-	560	Inf	Inf	0.0%
3/1+3/2	B430 North entry Right Ahead	U	N/A	N/A	C D		1	59:11	-	695	1980:1800	1269+240	38.5 : 85.8%
4/1	B430 North exit	U	N/A	N/A	-		-	-	-	1132	Inf	Inf	0.0%
5/2+5/1	B430 South Left Ahead	U	N/A	N/A	E	F	1	43:68	25	1119	1980:1722	854+395	89.5 : 89.5%
6/1	B430 South exit	U	N/A	N/A	-		-	-	-	873	Inf	Inf	0.0%

Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network	**-**	**-**	**0**	**0**	**0**	**13.0**	**8.0**	**0.0**	**21.0**	**-**	**-**	**-**	**-**
Unnamed Junction	**-**	**-**	**0**	**0**	**0**	**13.0**	**8.0**	**0.0**	**21.0**	**-**	**-**	**-**	**-**
1/1+1/2	751	751	-	-	-	5.5	3.6	-	9.1	43.6	9.2	3.6	12.8
2/1	560	560	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
3/1+3/2	695	695	-	-	-	3.1	0.4	-	3.5	18.2	5.3	0.4	5.7
4/1	1132	1132	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
5/2+5/1	1119	1119	-	-	-	4.4	4.0	-	8.4	27.1	16.4	4.0	20.4
6/1	873	873	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0

C1 PRC for Signalled Lanes (%): 0.5 Total Delay for Signalled Lanes (pcuHr): 21.01 Cycle Time (s): 90
PRC Over All Lanes (%): 0.5 Total Delay Over All Lanes(pcuHr): 21.01

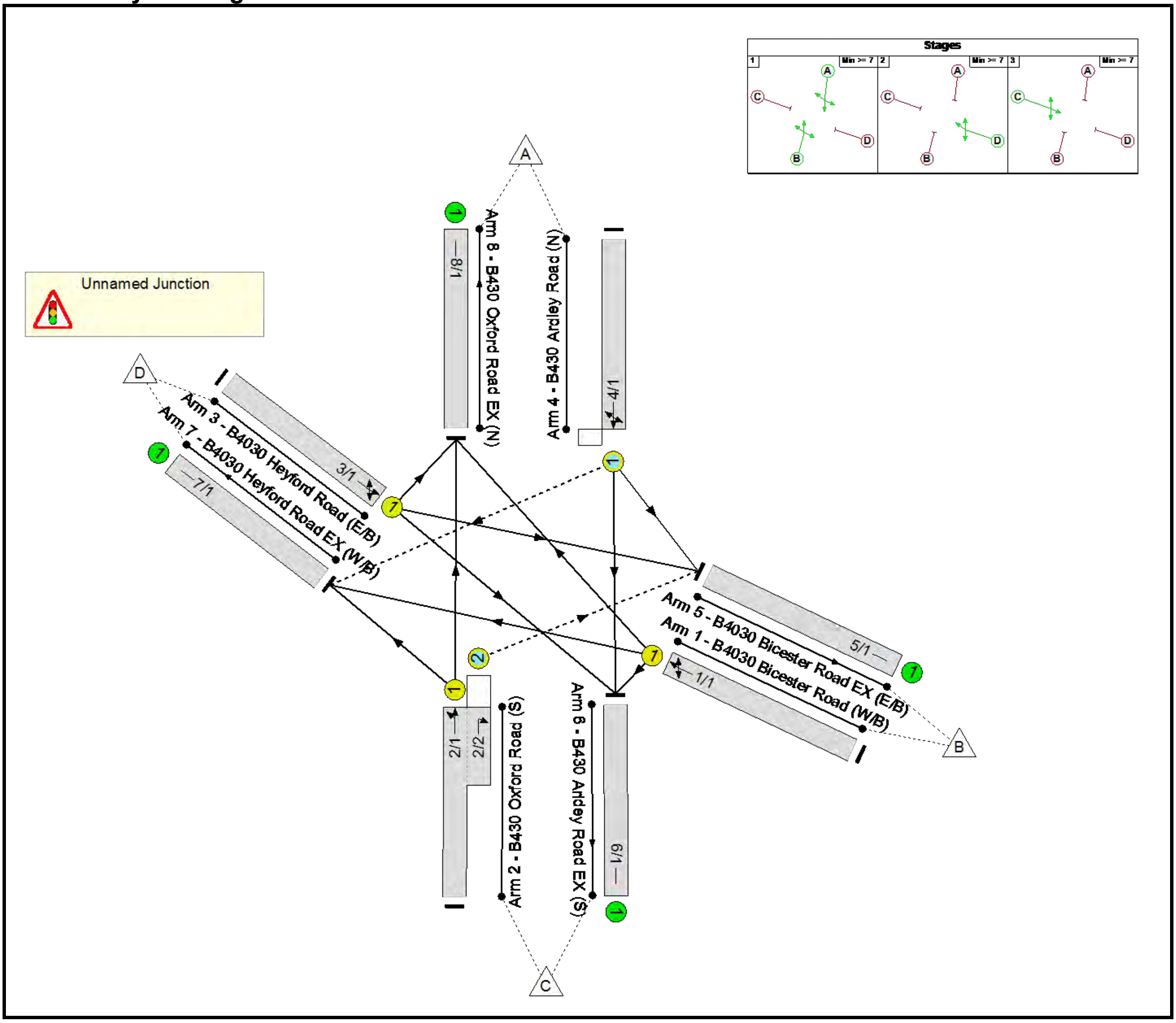
Full Input Data And Results

Full Input Data And Results

User and Project Details

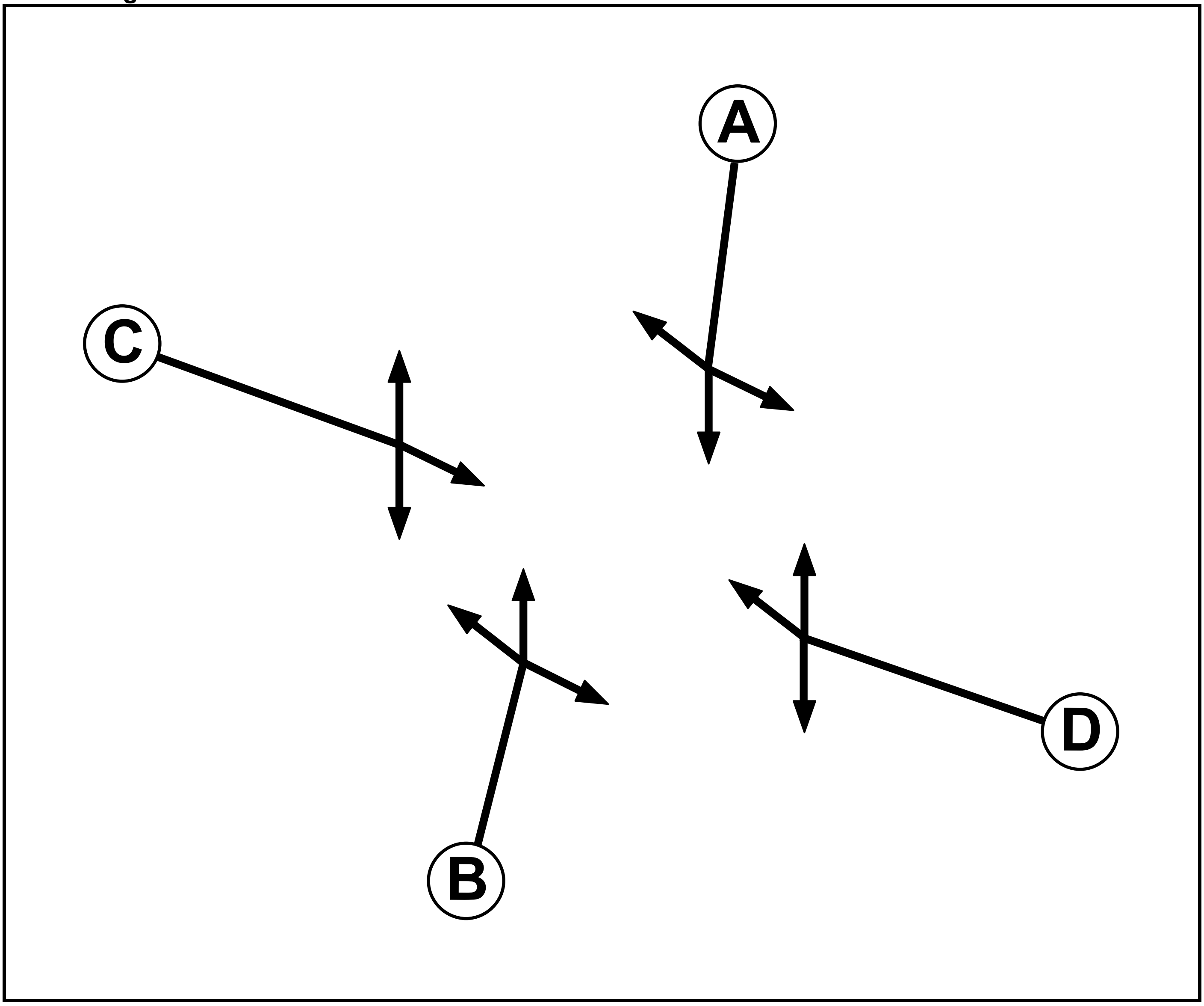
Project:	**Heyford Park**
Title:	**Middleton Stoney Junction**
Location:	
File name:	Middleton Stoney Signalised Junction_Consented V4 Bus Gate Test.lsg3x
Author:	ekeen
Company:	Peter Brett Associates
Address:	10 Queen Square
Notes:	Existing Layout

Network Layout Diagram



Full Input Data And Results

Phase Diagram



Phase Input Data

Phase Name	Phase Type	Assoc. Phase	Street Min	Cont Min
A	Traffic		7	7
B	Traffic		7	7
C	Traffic		7	7
D	Traffic		7	7

Full Input Data And Results

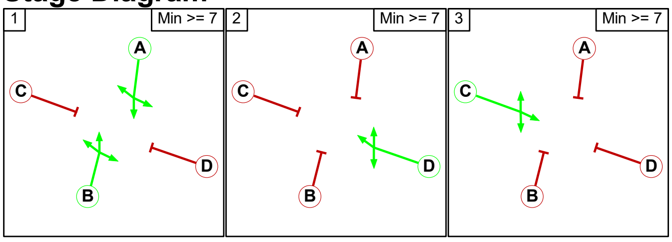
Phase Intergreens Matrix

	Starting Phase				
		A	B	C	D
Terminating Phase	A		-	5	8
	B	-		8	5
	C	5	7		8
	D	7	5	8	

Phases in Stage

Stage No.	Phases in Stage
1	A B
2	D
3	C

Stage Diagram



Phase Delays

Term. Stage	Start Stage	Phase	Type	Value	Cont value
1	2	B	Losing	3	3

Prohibited Stage Change

	To Stage			
		1	2	3
From Stage	1		8	8
	2	7		8
	3	7	8	

Full Input Data And Results

Give-Way Lane Input Data

Junction: Unnamed Junction											
Lane	**Movement**	**Max Flow when Giving Way (PCU/Hr)**	**Min Flow when Giving Way (PCU/Hr)**	**Opposing Lane**	**Opp. Lane Coeff.**	**Opp. Mvmnts.**	**Right Turn Storage (PCU)**	**Non-Blocking Storage (PCU)**	**RTF**	**Right Turn Move up (s)**	**Max Turns in Intergreen (PCU)**
2/2 (B430 Oxford Road (S))	5/1 (Right)	1439	0	4/1	1.09	To 5/1 (Left) To 6/1 (Ahead)	2.00	-	0.50	2	2.00
4/1 (B430 Ardley Road (N))	7/1 (Right)	1439	0	2/1	1.09	To 7/1 (Left) To 8/1 (Ahead)	1.00	1.00	0.50	1	1.00

Full Input Data And Results

Lane Input Data

Junction: Unnamed Junction												
Lane	**Lane Type**	**Phases**	**Start Disp.**	**End Disp.**	**Physical Length (PCU)**	**Sat Flow Type**	**Def User Saturation Flow (PCU/Hr)**	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Turns**	**Turning Radius (m)**
1/1 (B4030 Bicester Road (W/B))	U	D	2	3	60.0	Geom	-	3.00	0.00	Y	Arm 6 Left	13.00
											Arm 7 Ahead	30.00
											Arm 8 Right	30.00
2/1 (B430 Oxford Road (S))	U	B	2	3	60.0	Geom	-	3.00	0.00	Y	Arm 7 Left	30.00
											Arm 8 Ahead	Inf
2/2 (B430 Oxford Road (S))	O	B	2	3	5.0	Geom	-	3.00	0.00	N	Arm 5 Right	10.00
3/1 (B4030 Heyford Road (E/B))	U	C	2	3	60.0	Geom	-	3.00	0.00	Y	Arm 5 Ahead	30.00
											Arm 6 Right	30.00
											Arm 8 Left	7.00
4/1 (B430 Ardley Road (N))	O	A	2	3	60.0	Geom	-	3.32	0.00	Y	Arm 5 Left	12.00
											Arm 6 Ahead	Inf
											Arm 7 Right	8.00
5/1 (B4030 Bicester Road EX (E/B))	U		2	3	60.0	Inf	-	-	-	-	-	-
6/1 (B430 Arldey Road EX (S))	U		2	3	60.0	Inf	-	-	-	-	-	-
7/1 (B4030 Heyford Road EX (W/B))	U		2	3	60.0	Inf	-	-	-	-	-	-
8/1 (B430 Oxford Road EX (N))	U		2	3	60.0	Inf	-	-	-	-	-	-

Full Input Data And Results

Traffic Flow Groups

Flow Group	Start Time	End Time	Duration	Formula
21: 'SATURN Modelling RC AM'	07:30	08:30	01:00	
22: 'SATURN Modelling RC PM'	17:00	18:00	01:00	
23: 'SATURN Run DS1 Middleton Stoney Amend AM'	07:30	08:30	01:00	
24: 'SATURN Run DS1 Middleton Stoney Amend PM'	17:00	18:00	01:00	
25: 'SATURN Run DS1 Mid Stoney Amend - Low TR AM'	07:30	08:30	01:00	
26: 'SATURN Modelling DM AM'	07:30	08:30	01:00	
27: 'SATURN Modelling DM PM'	17:00	18:00	01:00	
28: 'SATURN Run DS1 Mid Stoney Amend - Low TR - Extra BusAM'	07:30	08:30	01:00	

Scenario 21: 'SATURN Modelling RC AM' (FG21: 'SATURN Modelling RC AM', Plan 1: 'Network Control Plan 1')

Traffic Flows, Desired

Desired Flow :

	Destination					
Origin		A	B	C	D	Tot.
	A	0	23	755	14	792
	B	59	0	60	278	397
	C	454	20	0	84	558
	D	14	490	44	0	548
	Tot.	527	533	859	376	2295

Traffic Lane Flows

Lane	Scenario 21: SATURN Modelling RC AM
Junction: Unnamed Junction	
1/1	397
2/1 (with short)	558(In) 538(Out)
2/2 (short)	20
3/1	548
4/1	792
5/1	533
6/1	859
7/1	376
8/1	527

Lane Saturation Flows

Junction: Unnamed Junction								
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat Flow (PCU/Hr)**	**Flared Sat Flow (PCU/Hr)**
1/1 (B4030 Bicester Road (W/B))	3.00	0.00	Y	Arm 6 Left	13.00	15.1 %	1807	1807
				Arm 7 Ahead	30.00	70.0 %		
				Arm 8 Right	30.00	14.9 %		
2/1 (B430 Oxford Road (S))	3.00	0.00	Y	Arm 7 Left	30.00	15.6 %	1900	1900
				Arm 8 Ahead	Inf	84.4 %		
2/2 (B430 Oxford Road (S))	3.00	0.00	N	Arm 5 Right	10.00	100.0 %	1787	1787
3/1 (B4030 Heyford Road (E/B))	3.00	0.00	Y	Arm 5 Ahead	30.00	89.4 %	1817	1817
				Arm 6 Right	30.00	8.0 %		
				Arm 8 Left	7.00	2.6 %		
4/1 (B430 Ardley Road (N))	3.32	0.00	Y	Arm 5 Left	12.00	2.9 %	1934	1934
				Arm 6 Ahead	Inf	95.3 %		
				Arm 7 Right	8.00	1.8 %		
5/1 (B4030 Bicester Road EX (E/B) Lane 1)	Infinite Saturation Flow						Inf	Inf
6/1 (B430 Arldey Road EX (S) Lane 1)	Infinite Saturation Flow						Inf	Inf
7/1 (B4030 Heyford Road EX (W/B) Lane 1)	Infinite Saturation Flow						Inf	Inf
8/1 (B430 Oxford Road EX (N) Lane 1)	Infinite Saturation Flow						Inf	Inf

Scenario 22: 'SATURN Modelling RC PM' (FG22: 'SATURN Modelling RC PM', Plan 1: 'Network Control Plan 1')

Traffic Flows, Desired

Desired Flow :

	Destination					
Origin		A	B	C	D	Tot.
	A	0	89	418	10	517
	B	41	0	25	427	493
	C	488	72	0	42	602
	D	5	368	35	0	408
	Tot.	534	529	478	479	2020

Full Input Data And Results

Traffic Lane Flows

Lane	Scenario 22: SATURN Modelling RC PM
Junction: Unnamed Junction	
1/1	493
2/1 (with short)	602(In) 530(Out)
2/2 (short)	72
3/1	408
4/1	517
5/1	529
6/1	478
7/1	479
8/1	534

Lane Saturation Flows

Junction: Unnamed Junction								
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat Flow (PCU/Hr)**	**Flared Sat Flow (PCU/Hr)**
1/1 (B4030 Bicester Road (W/B))	3.00	0.00	Y	Arm 6 Left	13.00	5.1 %	1818	1818
				Arm 7 Ahead	30.00	86.6 %		
				Arm 8 Right	30.00	8.3 %		
2/1 (B430 Oxford Road (S))	3.00	0.00	Y	Arm 7 Left	30.00	7.9 %	1907	1907
				Arm 8 Ahead	Inf	92.1 %		
2/2 (B430 Oxford Road (S))	3.00	0.00	N	Arm 5 Right	10.00	100.0 %	1787	1787
3/1 (B4030 Heyford Road (E/B))	3.00	0.00	Y	Arm 5 Ahead	30.00	90.2 %	1820	1820
				Arm 6 Right	30.00	8.6 %		
				Arm 8 Left	7.00	1.2 %		
4/1 (B430 Ardley Road (N))	3.32	0.00	Y	Arm 5 Left	12.00	17.2 %	1899	1899
				Arm 6 Ahead	Inf	80.9 %		
				Arm 7 Right	8.00	1.9 %		
5/1 (B4030 Bicester Road EX (E/B) Lane 1)	Infinite Saturation Flow						Inf	Inf
6/1 (B430 Arldey Road EX (S) Lane 1)	Infinite Saturation Flow						Inf	Inf
7/1 (B4030 Heyford Road EX (W/B) Lane 1)	Infinite Saturation Flow						Inf	Inf
8/1 (B430 Oxford Road EX (N) Lane 1)	Infinite Saturation Flow						Inf	Inf

Scenario 23: 'SATURN Run Modelling DS1 Middleton Stoney Amend AM' (FG23: 'SATURN Run DS1 Middleton Stoney Amend AM', Plan 2: 'Bus Gate Heyford Road')

Traffic Flows, Desired

Desired Flow :

	Destination					
Origin		A	B	C	D	Tot.
	A	0	464	757	4	1225
	B	500	0	76	10	586
	C	388	45	0	2	435
	D	10	17	11	0	38
	Tot.	898	526	844	16	2284

Traffic Lane Flows

Lane	Scenario 23: SATURN Run Modelling DS1 Middleton Stoney Amend AM
Junction: Unnamed Junction	
1/1	586
2/1 (with short)	435(In) 390(Out)
2/2 (short)	45
3/1	38
4/1	1225
5/1	526
6/1	844
7/1	16
8/1	898

Lane Saturation Flows

Junction: Unnamed Junction								
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat Flow (PCU/Hr)**	**Flared Sat Flow (PCU/Hr)**
1/1 (B4030 Bicester Road (W/B))	3.00	0.00	Y	Arm 6 Left	13.00	13.0 %	1809	1809
				Arm 7 Ahead	30.00	1.7 %		
				Arm 8 Right	30.00	85.3 %		
2/1 (B430 Oxford Road (S))	3.00	0.00	Y	Arm 7 Left	30.00	0.5 %	1915	1915
				Arm 8 Ahead	Inf	99.5 %		
2/2 (B430 Oxford Road (S))	3.00	0.00	N	Arm 5 Right	10.00	100.0 %	1787	1787
3/1 (B4030 Heyford Road (E/B))	3.00	0.00	Y	Arm 5 Ahead	30.00	44.7 %	1752	1752
				Arm 6 Right	30.00	28.9 %		
				Arm 8 Left	7.00	26.3 %		
4/1 (B430 Ardley Road (N))	3.32	0.00	Y	Arm 5 Left	12.00	37.9 %	1858	1858
				Arm 6 Ahead	Inf	61.8 %		
				Arm 7 Right	8.00	0.3 %		
5/1 (B4030 Bicester Road EX (E/B) Lane 1)	Infinite Saturation Flow						Inf	Inf
6/1 (B430 Arldey Road EX (S) Lane 1)	Infinite Saturation Flow						Inf	Inf
7/1 (B4030 Heyford Road EX (W/B) Lane 1)	Infinite Saturation Flow						Inf	Inf
8/1 (B430 Oxford Road EX (N) Lane 1)	Infinite Saturation Flow						Inf	Inf

Scenario 24: 'SATURN Run Modelling DS1 Middleton Stoney Amend PM' (FG24: 'SATURN Run DS1 Middleton Stoney Amend PM', Plan 2: 'Bus Gate Heyford Road')

Traffic Flows, Desired

Desired Flow :

		Destination				
		A	B	C	D	Tot.
Origin	A	0	519	336	7	862
	B	466	0	38	16	520
	C	642	87	0	5	734
	D	3	11	4	0	18
	Tot.	1111	617	378	28	2134

Traffic Lane Flows

Lane	Scenario 24: SATURN Run Modelling DS1 Middleton Stoney Amend PM
Junction: Unnamed Junction	
1/1	520
2/1 (with short)	734(In) 647(Out)
2/2 (short)	87
3/1	18
4/1	862
5/1	617
6/1	378
7/1	28
8/1	1111

Lane Saturation Flows

Junction: Unnamed Junction								
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat Flow (PCU/Hr)**	**Flared Sat Flow (PCU/Hr)**
1/1 (B4030 Bicester Road (W/B))	3.00	0.00	Y	Arm 6 Left	13.00	7.3 %	1816	1816
				Arm 7 Ahead	30.00	3.1 %		
				Arm 8 Right	30.00	89.6 %		
2/1 (B430 Oxford Road (S))	3.00	0.00	Y	Arm 7 Left	30.00	0.8 %	1914	1914
				Arm 8 Ahead	Inf	99.2 %		
2/2 (B430 Oxford Road (S))	3.00	0.00	N	Arm 5 Right	10.00	100.0 %	1787	1787
3/1 (B4030 Heyford Road (E/B))	3.00	0.00	Y	Arm 5 Ahead	30.00	61.1 %	1777	1777
				Arm 6 Right	30.00	22.2 %		
				Arm 8 Left	7.00	16.7 %		
4/1 (B430 Ardley Road (N))	3.32	0.00	Y	Arm 5 Left	12.00	60.2 %	1808	1808
				Arm 6 Ahead	Inf	39.0 %		
				Arm 7 Right	8.00	0.8 %		
5/1 (B4030 Bicester Road EX (E/B) Lane 1)	Infinite Saturation Flow						Inf	Inf
6/1 (B430 Arldey Road EX (S) Lane 1)	Infinite Saturation Flow						Inf	Inf
7/1 (B4030 Heyford Road EX (W/B) Lane 1)	Infinite Saturation Flow						Inf	Inf
8/1 (B430 Oxford Road EX (N) Lane 1)	Infinite Saturation Flow						Inf	Inf

Scenario 25: 'SATURN Run Modelling DS1 Mid Stoney Amend - Low TR AM' (FG25: 'SATURN Run DS1 Mid Stoney Amend - Low TR AM', Plan 2: 'Bus Gate Heyford Road')

Traffic Flows, Desired

Desired Flow :

	Destination					
		A	B	C	D	Tot.
Origin	A	0	401	753	3	1157
	B	469	0	76	9	554
	C	383	45	0	1	429
	D	8	15	9	0	32
	Tot.	860	461	838	13	2172

Traffic Lane Flows

Lane	Scenario 25: SATURN Run Modelling DS1 Mid Stoney Amend - Low TR AM
Junction: Unnamed Junction	
1/1	554
2/1 (with short)	429(In) 384(Out)
2/2 (short)	45
3/1	32
4/1	1157
5/1	461
6/1	838
7/1	13
8/1	860

Lane Saturation Flows

Junction: Unnamed Junction								
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat Flow (PCU/Hr)**	**Flared Sat Flow (PCU/Hr)**
1/1 (B4030 Bicester Road (W/B))	3.00	0.00	Y	Arm 6 Left	13.00	13.7 %	1808	1808
				Arm 7 Ahead	30.00	1.6 %		
				Arm 8 Right	30.00	84.7 %		
2/1 (B430 Oxford Road (S))	3.00	0.00	Y	Arm 7 Left	30.00	0.3 %	1915	1915
				Arm 8 Ahead	Inf	99.7 %		
2/2 (B430 Oxford Road (S))	3.00	0.00	N	Arm 5 Right	10.00	100.0 %	1787	1787
3/1 (B4030 Heyford Road (E/B))	3.00	0.00	Y	Arm 5 Ahead	30.00	46.9 %	1755	1755
				Arm 6 Right	30.00	28.1 %		
				Arm 8 Left	7.00	25.0 %		
4/1 (B430 Ardley Road (N))	3.32	0.00	Y	Arm 5 Left	12.00	34.7 %	1865	1865
				Arm 6 Ahead	Inf	65.1 %		
				Arm 7 Right	8.00	0.3 %		
5/1 (B4030 Bicester Road EX (E/B) Lane 1)	Infinite Saturation Flow						Inf	Inf
6/1 (B430 Arldey Road EX (S) Lane 1)	Infinite Saturation Flow						Inf	Inf
7/1 (B4030 Heyford Road EX (W/B) Lane 1)	Infinite Saturation Flow						Inf	Inf
8/1 (B430 Oxford Road EX (N) Lane 1)	Infinite Saturation Flow						Inf	Inf

Scenario 26: 'SATURN Modelling DM AM' (FG26: 'SATURN Modelling DM AM', Plan 1: 'Network Control Plan 1')

Traffic Flows, Desired

Desired Flow :

	Destination					
Origin		A	B	C	D	Tot.
	A	0	123	661	25	809
	B	30	0	36	277	343
	C	269	20	0	331	620
	D	13	506	34	0	553
	Tot.	312	649	731	633	2325

Full Input Data And Results

Traffic Lane Flows

Lane	Scenario 26: SATURN Modelling DM AM
Junction: Unnamed Junction	
1/1	343
2/1 (with short)	620(In) 600(Out)
2/2 (short)	20
3/1	553
4/1	809
5/1	649
6/1	731
7/1	633
8/1	312

Lane Saturation Flows

Lane	Lane Width (m)	Gradient	Nearside Lane	Allowed Turns	Turning Radius (m)	Turning Prop.	Sat Flow (PCU/Hr)	Flared Sat Flow (PCU/Hr)
Junction: Unnamed Junction								
1/1 (B4030 Bicester Road (W/B))	3.00	0.00	Y	Arm 6 Left	13.00	10.5 %	1812	1812
				Arm 7 Ahead	30.00	80.8 %		
				Arm 8 Right	30.00	8.7 %		
2/1 (B430 Oxford Road (S))	3.00	0.00	Y	Arm 7 Left	30.00	55.2 %	1864	1864
				Arm 8 Ahead	Inf	44.8 %		
2/2 (B430 Oxford Road (S))	3.00	0.00	N	Arm 5 Right	10.00	100.0 %	1787	1787
3/1 (B4030 Heyford Road (E/B))	3.00	0.00	Y	Arm 5 Ahead	30.00	91.5 %	1817	1817
				Arm 6 Right	30.00	6.1 %		
				Arm 8 Left	7.00	2.4 %		
4/1 (B430 Ardley Road (N))	3.32	0.00	Y	Arm 5 Left	12.00	15.2 %	1900	1900
				Arm 6 Ahead	Inf	81.7 %		
				Arm 7 Right	8.00	3.1 %		
5/1 (B4030 Bicester Road EX (E/B) Lane 1)	Infinite Saturation Flow						Inf	Inf
6/1 (B430 Arldey Road EX (S) Lane 1)	Infinite Saturation Flow						Inf	Inf
7/1 (B4030 Heyford Road EX (W/B) Lane 1)	Infinite Saturation Flow						Inf	Inf
8/1 (B430 Oxford Road EX (N) Lane 1)	Infinite Saturation Flow						Inf	Inf

Scenario 27: 'SATURN Modelling DM PM' (FG27: 'SATURN Modelling DM PM', Plan 1: 'Network Control Plan 1')

Traffic Flows, Desired

Desired Flow :

	Destination					
Origin		A	B	C	D	Tot.
	A	0	207	301	14	522
	B	11	0	16	478	505
	C	559	43	0	80	682
	D	6	381	34	0	421
	Tot.	576	631	351	572	2130

Traffic Lane Flows

Lane	Scenario 27: SATURN Modelling DM PM
Junction: Unnamed Junction	
1/1	505
2/1 (with short)	682(In) 639(Out)
2/2 (short)	43
3/1	421
4/1	522
5/1	631
6/1	351
7/1	572
8/1	576

Lane Saturation Flows

Junction: Unnamed Junction								
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat Flow (PCU/Hr)**	**Flared Sat Flow (PCU/Hr)**
1/1 (B4030 Bicester Road (W/B))	3.00	0.00	Y	Arm 6 Left	13.00	3.2 %	1820	1820
				Arm 7 Ahead	30.00	94.7 %		
				Arm 8 Right	30.00	2.2 %		
2/1 (B430 Oxford Road (S))	3.00	0.00	Y	Arm 7 Left	30.00	12.5 %	1903	1903
				Arm 8 Ahead	Inf	87.5 %		
2/2 (B430 Oxford Road (S))	3.00	0.00	N	Arm 5 Right	10.00	100.0 %	1787	1787
3/1 (B4030 Heyford Road (E/B))	3.00	0.00	Y	Arm 5 Ahead	30.00	90.5 %	1820	1820
				Arm 6 Right	30.00	8.1 %		
				Arm 8 Left	7.00	1.4 %		
4/1 (B430 Ardley Road (N))	3.32	0.00	Y	Arm 5 Left	12.00	39.7 %	1846	1846
				Arm 6 Ahead	Inf	57.7 %		
				Arm 7 Right	8.00	2.7 %		
5/1 (B4030 Bicester Road EX (E/B) Lane 1)	Infinite Saturation Flow						Inf	Inf
6/1 (B430 Arldey Road EX (S) Lane 1)	Infinite Saturation Flow						Inf	Inf
7/1 (B4030 Heyford Road EX (W/B) Lane 1)	Infinite Saturation Flow						Inf	Inf
8/1 (B430 Oxford Road EX (N) Lane 1)	Infinite Saturation Flow						Inf	Inf

Scenario 28: 'SATURN Run Modelling DS1 Mid Stoney Amend - Low TR - Extra Bus AM' (FG28: 'SATURN Run DS1 Mid Stoney Amend - Low TR - Extra BusAM', Plan 2: 'Bus Gate Heyford Road')

Traffic Flows, Desired

Desired Flow :

	Destination					
		A	B	C	D	Tot.
Origin	A	0	382	753	3	1138
	B	458	0	76	11	545
	C	383	45	0	1	429
	D	8	17	9	0	34
	Tot.	849	444	838	15	2146

Traffic Lane Flows

Lane	Scenario 28: SATURN Run Modelling DS1 Mid Stoney Amend - Low TR - Extra Bus AM
Junction: Unnamed Junction	
1/1	545
2/1 (with short)	429(In) 384(Out)
2/2 (short)	45
3/1	34
4/1	1138
5/1	444
6/1	838
7/1	15
8/1	849

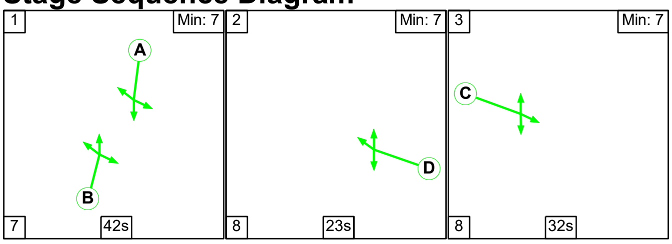
Full Input Data And Results

Lane Saturation Flows

Junction: Unnamed Junction								
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat Flow (PCU/Hr)**	**Flared Sat Flow (PCU/Hr)**
1/1 (B4030 Bicester Road (W/B))	3.00	0.00	Y	Arm 6 Left	13.00	13.9 %	1808	1808
				Arm 7 Ahead	30.00	2.0 %		
				Arm 8 Right	30.00	84.0 %		
2/1 (B430 Oxford Road (S))	3.00	0.00	Y	Arm 7 Left	30.00	0.3 %	1915	1915
				Arm 8 Ahead	Inf	99.7 %		
2/2 (B430 Oxford Road (S))	3.00	0.00	N	Arm 5 Right	10.00	100.0 %	1787	1787
3/1 (B4030 Heyford Road (E/B))	3.00	0.00	Y	Arm 5 Ahead	30.00	50.0 %	1759	1759
				Arm 6 Right	30.00	26.5 %		
				Arm 8 Left	7.00	23.5 %		
4/1 (B430 Ardley Road (N))	3.32	0.00	Y	Arm 5 Left	12.00	33.6 %	1868	1868
				Arm 6 Ahead	Inf	66.2 %		
				Arm 7 Right	8.00	0.3 %		
5/1 (B4030 Bicester Road EX (E/B) Lane 1)	Infinite Saturation Flow						Inf	Inf
6/1 (B430 Arldey Road EX (S) Lane 1)	Infinite Saturation Flow						Inf	Inf
7/1 (B4030 Heyford Road EX (W/B) Lane 1)	Infinite Saturation Flow						Inf	Inf
8/1 (B430 Oxford Road EX (N) Lane 1)	Infinite Saturation Flow						Inf	Inf

Scenario 21: 'SATURN Modelling RC AM' (FG21: 'SATURN Modelling RC AM', Plan 1: 'Network Control Plan 1')

Stage Sequence Diagram

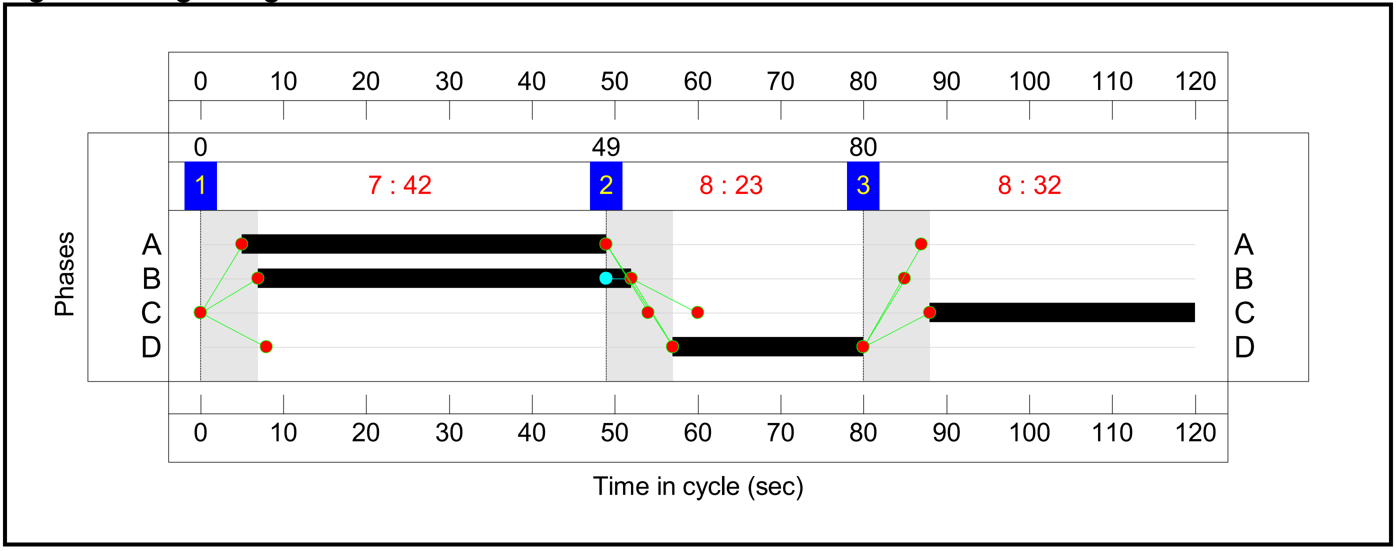


Stage Timings

Stage	**1**	**2**	**3**
Duration	42	23	32
Change Point	0	49	80

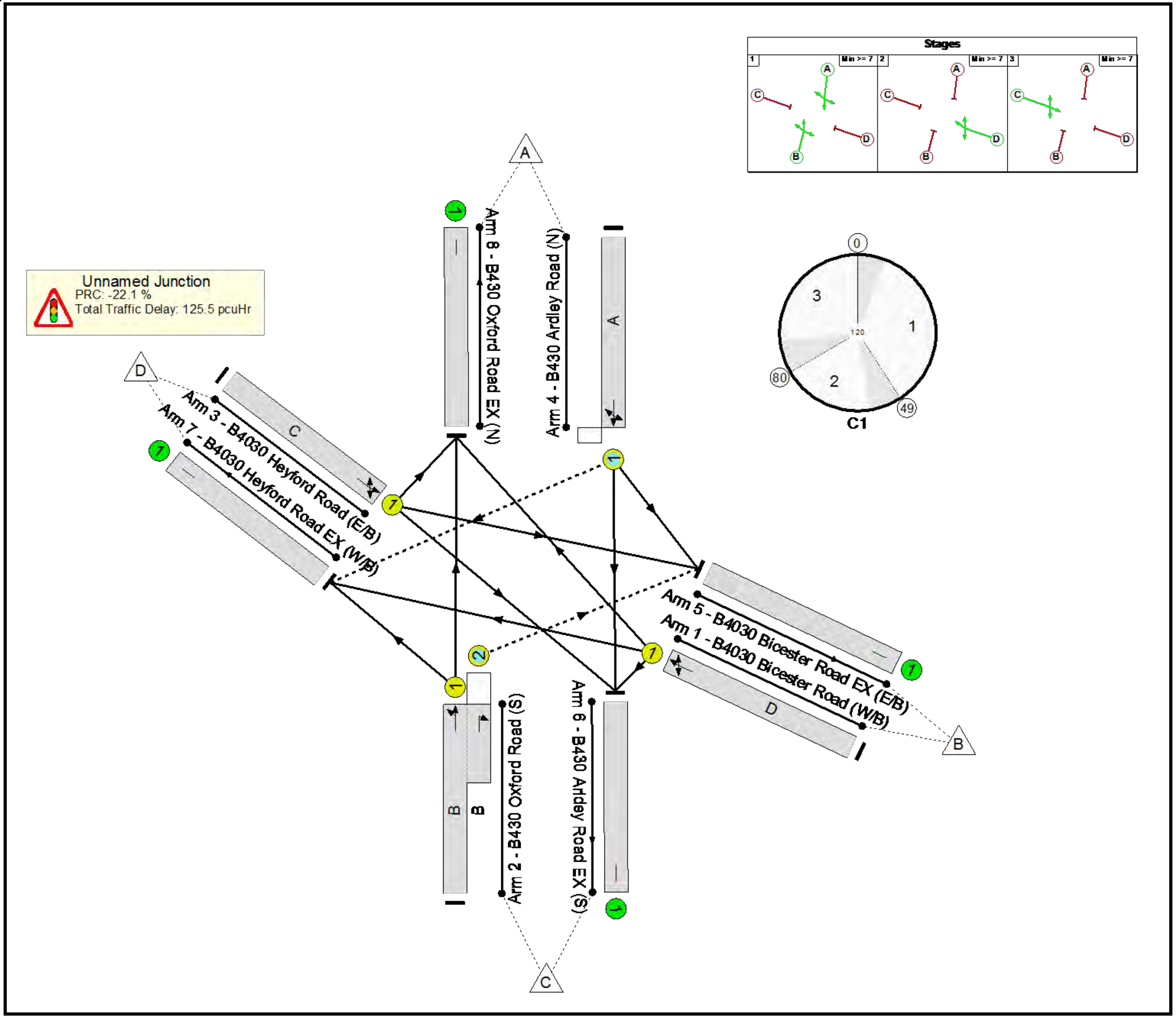
Full Input Data And Results

Signal Timings Diagram



Full Input Data And Results

Network Layout Diagram



Full Input Data And Results

Network Results

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network: Middleton Stoney Junction	-	-	**N/A**	-	-		-	-	-	-	-	-	**109.9%**
Unnamed Junction	-	-	**N/A**	-	-		-	-	-	-	-	-	**109.9%**
1/1	B4030 Bicester Road (W/B) Left Ahead Right	U	N/A	N/A	D		1	23	-	397	1807	361	109.9%
2/1+2/2	B430 Oxford Road (S) Right Left Ahead	U+O	N/A	N/A	B		1	45	-	558	1900:1787	740	75.4%
3/1	B4030 Heyford Road (E/B) Ahead Right Left	U	N/A	N/A	C		1	32	-	548	1817	500	109.7%
4/1	B430 Ardley Road (N) Left Ahead Right	O	N/A	N/A	A		1	44	-	792	1934	725	109.2%
5/1	B4030 Bicester Road EX (E/B)	U	N/A	N/A	-		-	-	-	533	Inf	Inf	0.0%
6/1	B430 Arldey Road EX (S)	U	N/A	N/A	-		-	-	-	859	Inf	Inf	0.0%
7/1	B4030 Heyford Road EX (W/B)	U	N/A	N/A	-		-	-	-	376	Inf	Inf	0.0%
8/1	B430 Oxford Road EX (N)	U	N/A	N/A	-		-	-	-	527	Inf	Inf	0.0%

Full Input Data And Results

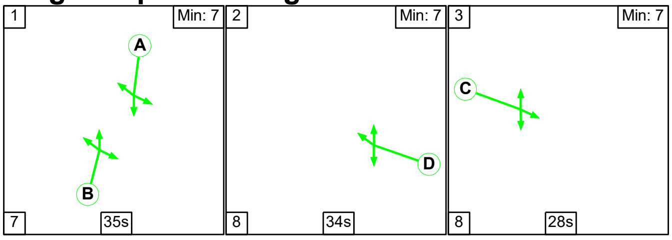
Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network: Middleton Stoney Junction	**-**	**-**	**13**	**15**	**5**	**34.1**	**91.2**	**0.2**	**125.5**	**-**	**-**	**-**	**-**
Unnamed Junction	**-**	**-**	**13**	**15**	**5**	**34.1**	**91.2**	**0.2**	**125.5**	**-**	**-**	**-**	**-**
1/1	397	361	-	-	-	7.0	22.3	-	29.2	265.0	14.4	22.3	36.7
2/1+2/2	558	558	0	15	5	4.9	1.5	0.1	6.6	42.5	15.8	1.5	17.3
3/1	548	500	-	-	-	10.0	28.9	-	38.9	255.8	21.0	28.9	49.9
4/1	792	725	13	0	0	12.2	38.5	0.0	50.7	230.5	28.6	38.5	67.1
5/1	488	488	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	786	786	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
7/1	350	350	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
8/1	520	520	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0

C1 PRC for Signalled Lanes (%): -22.1 Total Delay for Signalled Lanes (pcuHr): 125.47 Cycle Time (s): 120
PRC Over All Lanes (%): -22.1 Total Delay Over All Lanes(pcuHr): 125.47

Full Input Data And Results

Scenario 22: 'SATURN Modelling RC PM' (FG22: 'SATURN Modelling RC PM', Plan 1: 'Network Control Plan 1')

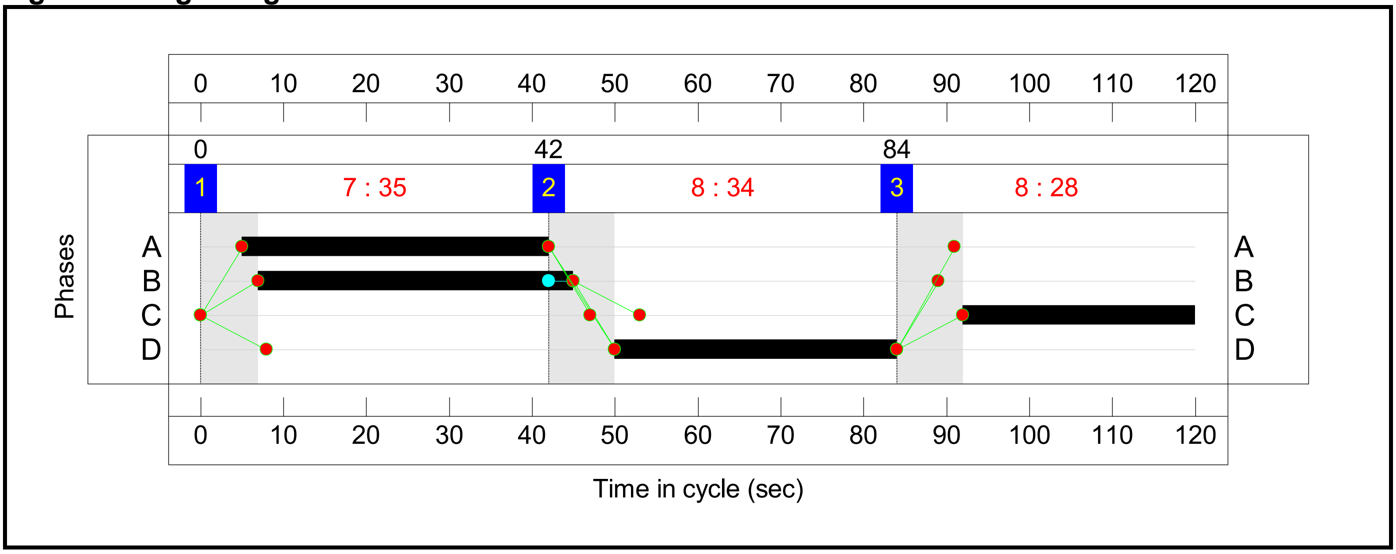
Stage Sequence Diagram



Stage Timings

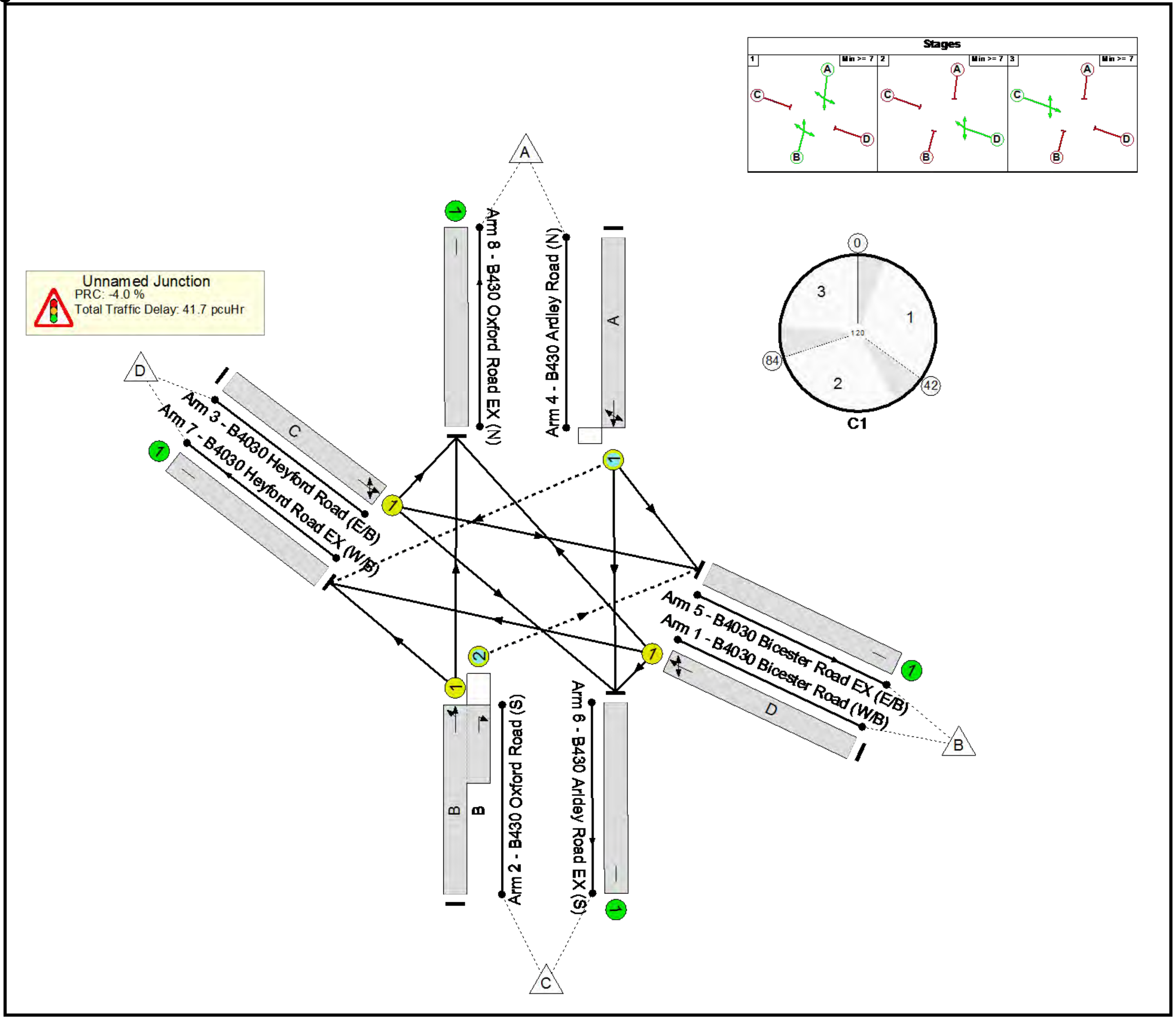
Stage	1	2	3
Duration	35	34	28
Change Point	0	42	84

Signal Timings Diagram



Full Input Data And Results

Network Layout Diagram



Full Input Data And Results

Network Results

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network: Middleton Stoney Junction	-	-	**N/A**	-	-		-	-	-	-	-	-	**93.6%**
Unnamed Junction	-	-	**N/A**	-	-		-	-	-	-	-	-	**93.6%**
1/1	B4030 Bicester Road (W/B) Left Ahead Right	U	N/A	N/A	D		1	34	-	493	1818	530	93.0%
2/1+2/2	B430 Oxford Road (S) Right Left Ahead	U+O	N/A	N/A	B		1	38	-	602	1907:1787	643	93.6%
3/1	B4030 Heyford Road (E/B) Ahead Right Left	U	N/A	N/A	C		1	28	-	408	1820	440	92.8%
4/1	B430 Ardley Road (N) Left Ahead Right	O	N/A	N/A	A		1	37	-	517	1899	601	86.0%
5/1	B4030 Bicester Road EX (E/B)	U	N/A	N/A	-		-	-	-	529	Inf	Inf	0.0%
6/1	B430 Arldey Road EX (S)	U	N/A	N/A	-		-	-	-	478	Inf	Inf	0.0%
7/1	B4030 Heyford Road EX (W/B)	U	N/A	N/A	-		-	-	-	479	Inf	Inf	0.0%
8/1	B430 Oxford Road EX (N)	U	N/A	N/A	-		-	-	-	534	Inf	Inf	0.0%

Full Input Data And Results

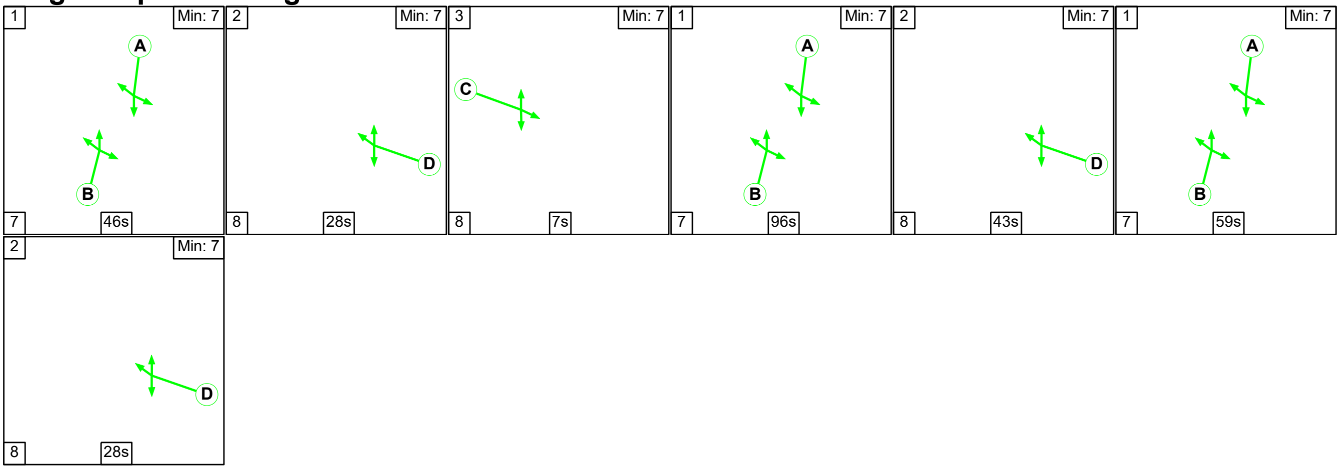
Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network: Middleton Stoney Junction	**-**	**-**	**61**	**15**	**5**	**22.7**	**18.7**	**0.4**	**41.7**	**-**	**-**	**-**	**-**
Unnamed Junction	**-**	**-**	**61**	**15**	**5**	**22.7**	**18.7**	**0.4**	**41.7**	**-**	**-**	**-**	**-**
1/1	493	493	-	-	-	5.7	5.2	-	10.8	79.1	15.9	5.2	21.1
2/1+2/2	602	602	52	15	5	6.5	5.7	0.3	12.5	74.7	18.7	5.7	24.4
3/1	408	408	-	-	-	5.0	4.9	-	9.9	87.7	13.3	4.9	18.2
4/1	517	517	10	0	0	5.5	2.9	0.1	8.5	58.9	16.1	2.9	19.0
5/1	529	529	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	478	478	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
7/1	479	479	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
8/1	534	534	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0

C1 PRC for Signalled Lanes (%): -4.0 Total Delay for Signalled Lanes (pcuHr): 41.73 Cycle Time (s): 120
PRC Over All Lanes (%): -4.0 Total Delay Over All Lanes(pcuHr): 41.73

Full Input Data And Results

Scenario 23: 'SATURN Run Modelling DS1 Middleton Stoney Amend AM' (FG23: 'SATURN Run DS1 Middleton Stoney Amend AM', Plan 2: 'Bus Gate Heyford Road')

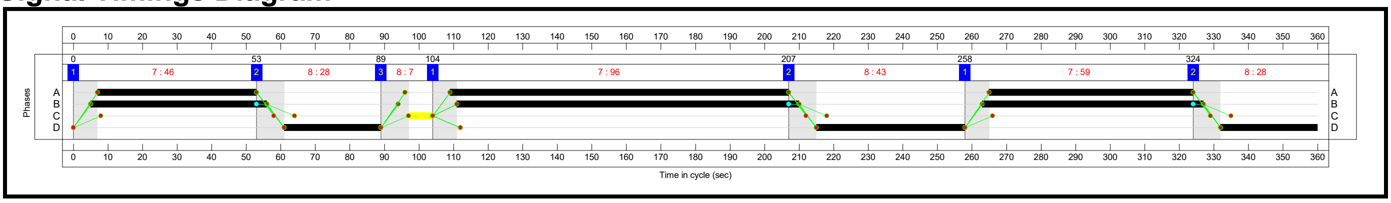
Stage Sequence Diagram



Stage Timings

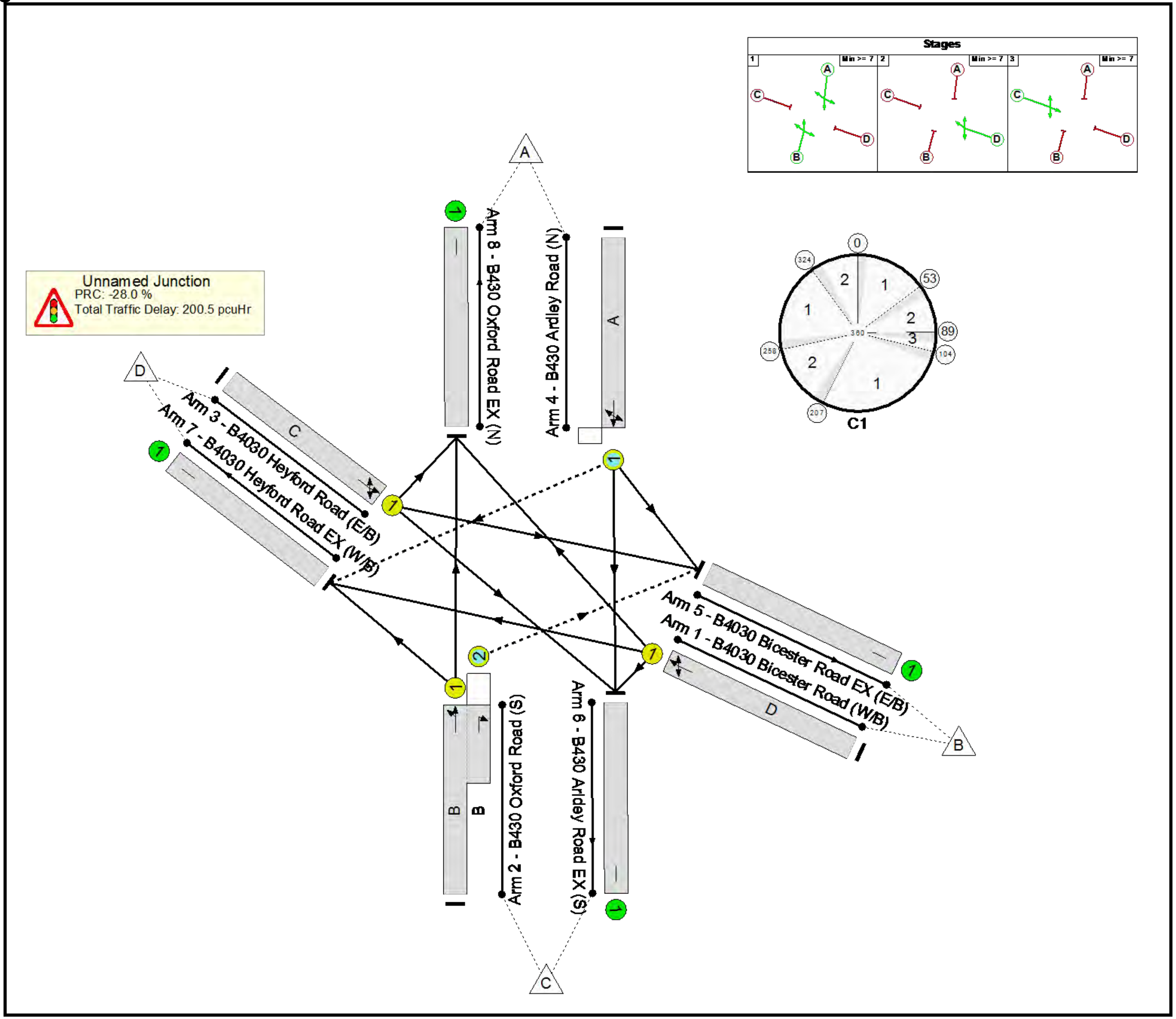
Stage	1	2	3	1	2	1	2
Duration	46	28	7	96	43	59	28
Change Point	0	53	89	104	207	258	324

Signal Timings Diagram



Full Input Data And Results

Network Layout Diagram



Full Input Data And Results

Network Results

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network: Middleton Stoney Junction	-	-	**N/A**	-	-		-	-	-	-	-	-	**115.2%**
Unnamed Junction	-	-	**N/A**	-	-		-	-	-	-	-	-	**115.2%**
1/1	B4030 Bicester Road (W/B) Left Ahead Right	U	N/A	N/A	D		3	99	-	586	1809	513	114.3%
2/1+2/2	B430 Oxford Road (S) Right Left Ahead	U+O	N/A	N/A	B		3	214	-	435	1915:1787	580	75.0%
3/1	B4030 Heyford Road (E/B) Ahead Right Left	U	N/A	N/A	C		1	7	-	38	1752	39	97.6%
4/1	B430 Ardley Road (N) Left Ahead Right	O	N/A	N/A	A		3	203	-	1225	1858	1063	115.2%
5/1	B4030 Bicester Road EX (E/B)	U	N/A	N/A	-		-	-	-	526	Inf	Inf	0.0%
6/1	B430 Arldey Road EX (S)	U	N/A	N/A	-		-	-	-	844	Inf	Inf	0.0%
7/1	B4030 Heyford Road EX (W/B)	U	N/A	N/A	-		-	-	-	16	Inf	Inf	0.0%
8/1	B430 Oxford Road EX (N)	U	N/A	N/A	-		-	-	-	898	Inf	Inf	0.0%

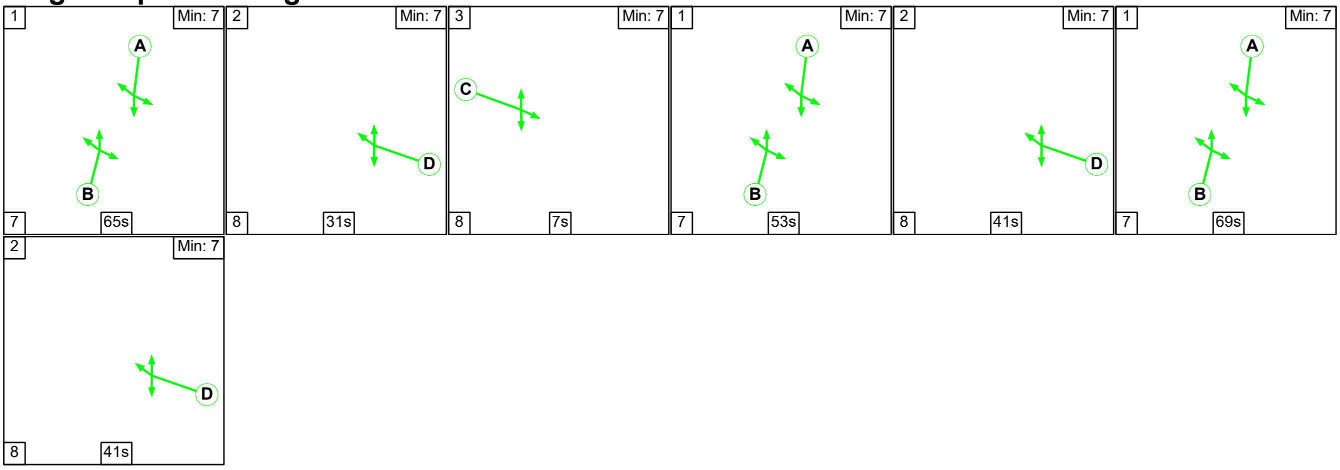
Full Input Data And Results

Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network: Middleton Stoney Junction	**-**	**-**	**3**	**15**	**30**	**70.6**	**129.2**	**0.6**	**200.5**	**-**	**-**	**-**	**-**
Unnamed Junction	**-**	**-**	**3**	**15**	**30**	**70.6**	**129.2**	**0.6**	**200.5**	**-**	**-**	**-**	**-**
1/1	586	513	-	-	-	24.3	40.4	-	64.6	397.0	42.2	40.4	82.6
2/1+2/2	435	435	0	15	30	1.5	1.5	0.6	3.6	29.5	7.5	1.5	9.0
3/1	38	38	-	-	-	1.9	2.9	-	4.7	446.6	3.8	2.9	6.6
4/1	1225	1063	3	0	0	43.0	84.5	0.0	127.6	374.9	84.8	84.5	169.3
5/1	465	465	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	734	734	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
7/1	14	14	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
8/1	835	835	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0

C1 PRC for Signalled Lanes (%): -28.0 Total Delay for Signalled Lanes (pcuHr): 200.46 Cycle Time (s): 360
PRC Over All Lanes (%): -28.0 Total Delay Over All Lanes(pcuHr): 200.46

Full Input Data And Results
Scenario 24: 'SATURN Run Modelling DS1 Middleton Stoney Amend PM' (FG24: 'SATURN Run DS1 Middleton Stoney Amend PM', Plan 2: 'Bus Gate Heyford Road')

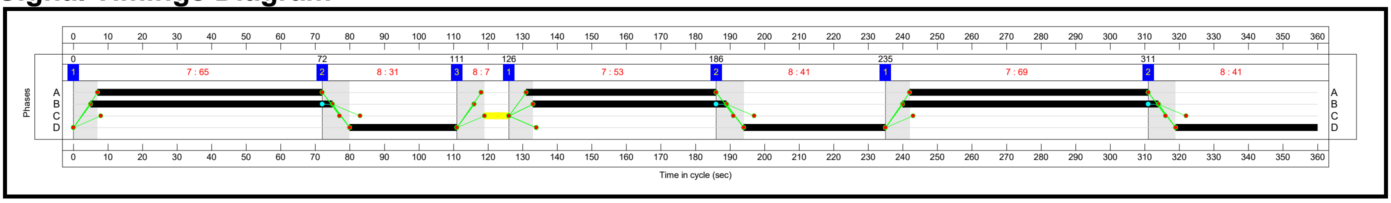
Stage Sequence Diagram



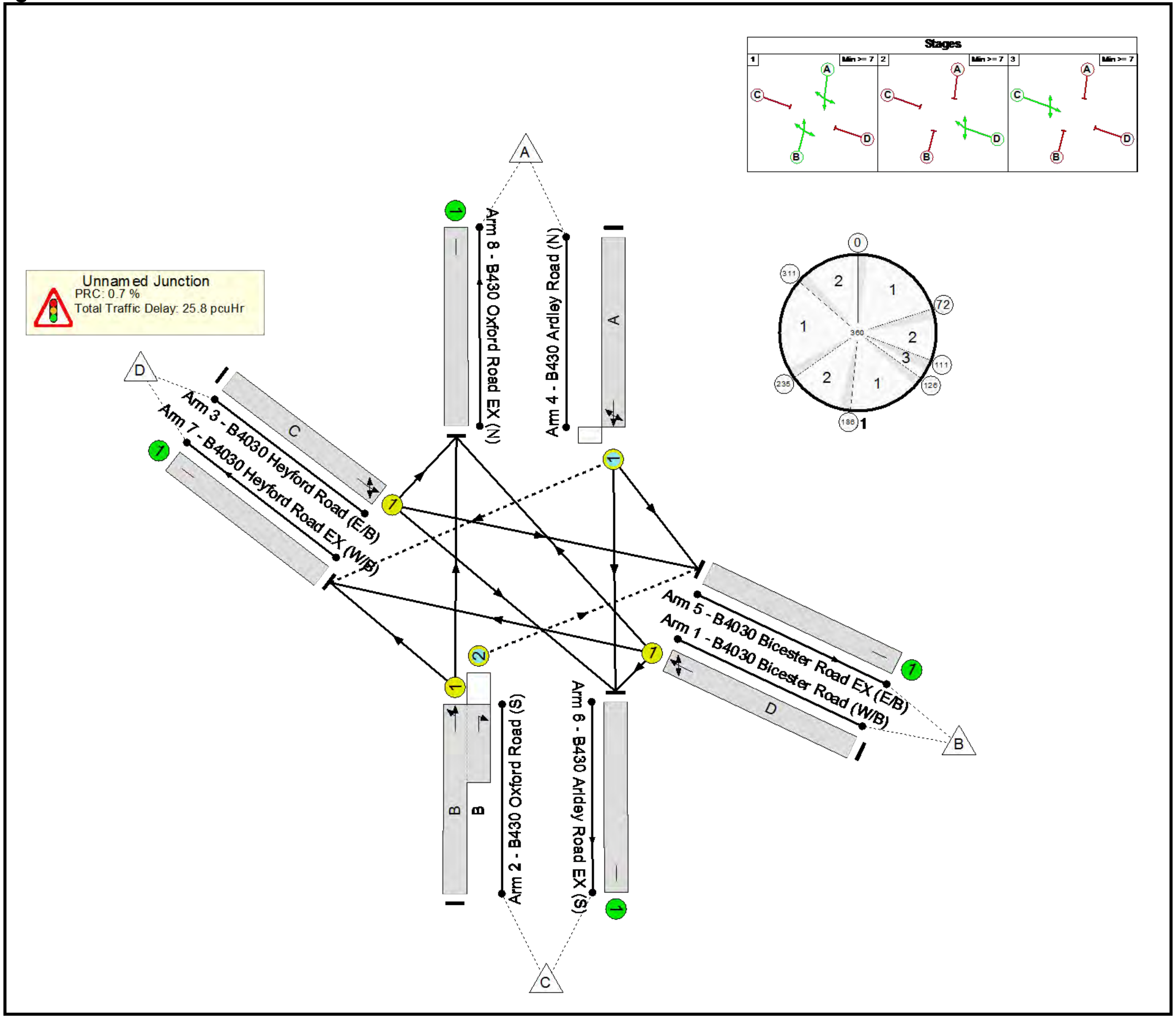
Stage Timings

Stage	1	2	3	1	2	1	2
Duration	65	31	7	53	41	69	41
Change Point	0	72	111	126	186	235	311

Signal Timings Diagram



Full Input Data And Results
Network Layout Diagram



Network Results

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network: Middleton Stoney Junction	-	-	**N/A**	-	-		-	-	-	-	-	-	**89.4%**
Unnamed Junction	-	-	**N/A**	-	-		-	-	-	-	-	-	**89.4%**
1/1	B4030 Bicester Road (W/B) Left Ahead Right	U	N/A	N/A	D		3	113	-	520	1816	585	88.9%
2/1+2/2	B430 Oxford Road (S) Right Left Ahead	U+O	N/A	N/A	B		3	200	-	734	1914:1787	1097	66.9%
3/1	B4030 Heyford Road (E/B) Ahead Right Left	U	N/A	N/A	C		1	7	-	18	1777	39	45.6%
4/1	B430 Ardley Road (N) Left Ahead Right	O	N/A	N/A	A		3	189	-	862	1808	964	89.4%
5/1	B4030 Bicester Road EX (E/B)	U	N/A	N/A	-		-	-	-	617	Inf	Inf	0.0%
6/1	B430 Arldey Road EX (S)	U	N/A	N/A	-		-	-	-	378	Inf	Inf	0.0%
7/1	B4030 Heyford Road EX (W/B)	U	N/A	N/A	-		-	-	-	28	Inf	Inf	0.0%
8/1	B430 Oxford Road EX (N)	U	N/A	N/A	-		-	-	-	1111	Inf	Inf	0.0%

Full Input Data And Results

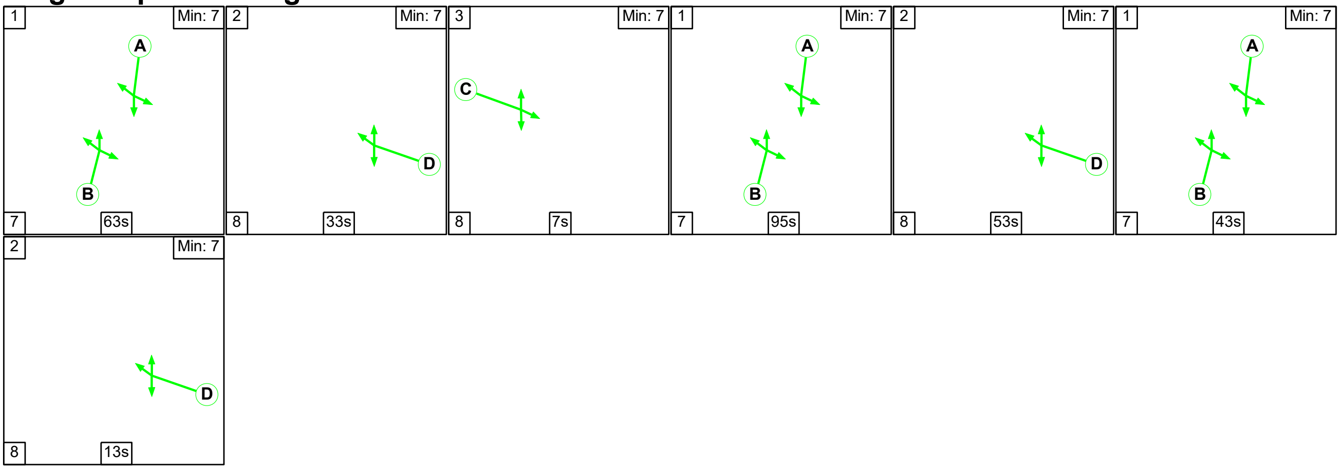
Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network: Middleton Stoney Junction	**-**	**-**	**61**	**12**	**21**	**16.1**	**8.9**	**0.8**	**25.8**	**-**	**-**	**-**	**-**
Unnamed Junction	**-**	**-**	**61**	**12**	**21**	**16.1**	**8.9**	**0.8**	**25.8**	**-**	**-**	**-**	**-**
1/1	520	520	-	-	-	5.6	3.6	-	9.2	63.5	16.8	3.6	20.3
2/1+2/2	734	734	54	12	21	3.7	1.0	0.8	5.5	26.8	17.7	1.0	18.7
3/1	18	18	-	-	-	0.9	0.4	-	1.3	254.6	1.8	0.4	2.2
4/1	862	862	7	0	0	6.0	3.9	0.0	9.9	41.4	26.3	3.9	30.3
5/1	617	617	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	378	378	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
7/1	28	28	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
8/1	1111	1111	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0

C1 PRC for Signalled Lanes (%): 0.7 Total Delay for Signalled Lanes (pcuHr): 25.82 Cycle Time (s): 360
PRC Over All Lanes (%): 0.7 Total Delay Over All Lanes(pcuHr): 25.82

Full Input Data And Results

Scenario 25: 'SATURN Run Modelling DS1 Mid Stoney Amend - Low TR AM' (FG25: 'SATURN Run DS1 Mid Stoney Amend - Low TR AM', Plan 2: 'Bus Gate Heyford Road')

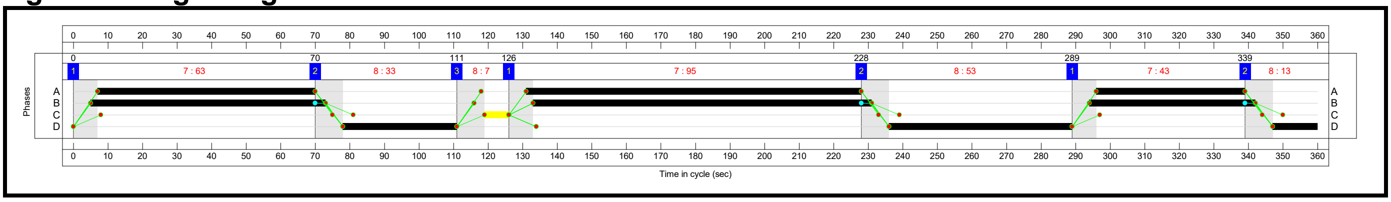
Stage Sequence Diagram



Stage Timings

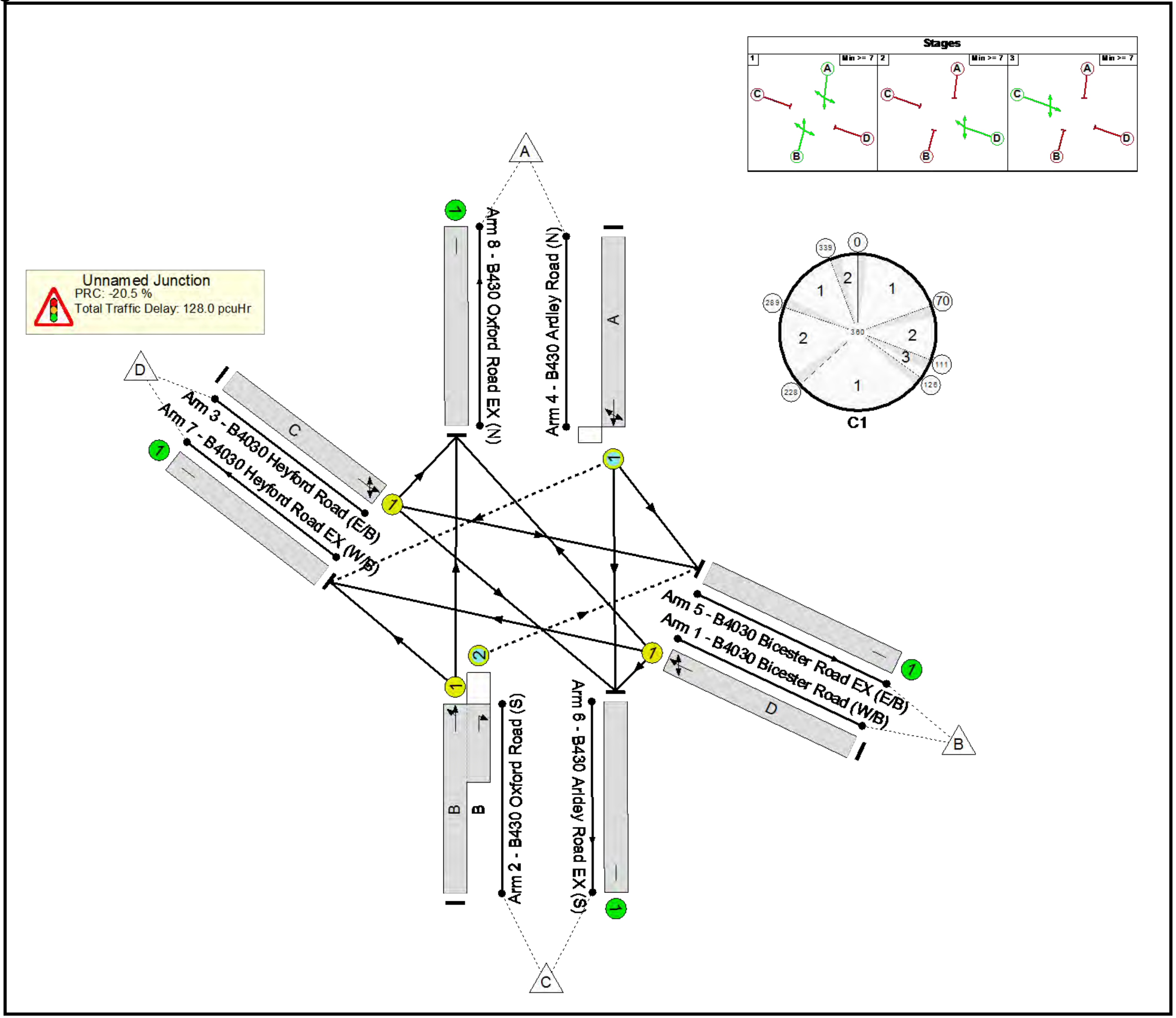
Stage	1	2	3	1	2	1	2
Duration	63	33	7	95	53	43	13
Change Point	0	70	111	126	228	289	339

Signal Timings Diagram



Full Input Data And Results

Network Layout Diagram



Full Input Data And Results

Network Results

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network: Middleton Stoney Junction	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**108.4%**
Unnamed Junction	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**108.4%**
1/1	B4030 Bicester Road (W/B) Left Ahead Right	U	N/A	N/A	D		3	99	-	554	1808	512	108.1%
2/1+2/2	B430 Oxford Road (S) Right Left Ahead	U+O	N/A	N/A	B		3	214	-	429	1915:1787	572	75.0%
3/1	B4030 Heyford Road (E/B) Ahead Right Left	U	N/A	N/A	C		1	7	-	32	1755	39	82.1%
4/1	B430 Ardley Road (N) Left Ahead Right	O	N/A	N/A	A		3	203	-	1157	1865	1067	108.4%
5/1	B4030 Bicester Road EX (E/B)	U	N/A	N/A	-		-	-	-	461	Inf	Inf	0.0%
6/1	B430 Arldey Road EX (S)	U	N/A	N/A	-		-	-	-	838	Inf	Inf	0.0%
7/1	B4030 Heyford Road EX (W/B)	U	N/A	N/A	-		-	-	-	13	Inf	Inf	0.0%
8/1	B430 Oxford Road EX (N)	U	N/A	N/A	-		-	-	-	860	Inf	Inf	0.0%

Full Input Data And Results

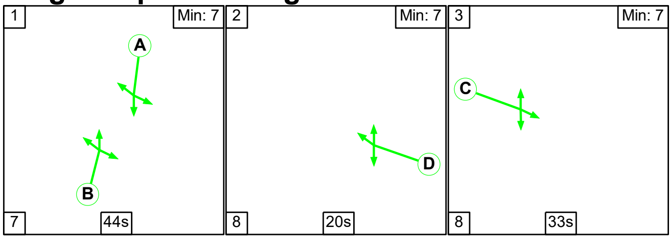
Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network: Middleton Stoney Junction	**-**	**-**	**3**	**15**	**30**	**47.5**	**79.8**	**0.6**	**128.0**	**-**	**-**	**-**	**-**
Unnamed Junction	**-**	**-**	**3**	**15**	**30**	**47.5**	**79.8**	**0.6**	**128.0**	**-**	**-**	**-**	**-**
1/1	554	512	-	-	-	15.9	26.2	-	42.0	273.2	35.7	26.2	61.9
2/1+2/2	429	429	0	15	30	1.6	1.5	0.6	3.7	31.0	8.7	1.5	10.2
3/1	32	32	-	-	-	1.6	1.6	-	3.1	352.6	3.2	1.6	4.8
4/1	1157	1067	3	0	0	28.5	50.6	0.0	79.1	246.2	68.7	50.6	119.4
5/1	430	430	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	774	774	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
7/1	12	12	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
8/1	825	825	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0

C1 PRC for Signalled Lanes (%): -20.5 Total Delay for Signalled Lanes (pcuHr): 127.99 Cycle Time (s): 360
PRC Over All Lanes (%): -20.5 Total Delay Over All Lanes(pcuHr): 127.99

Full Input Data And Results

Scenario 26: 'SATURN Modelling DM AM' (FG26: 'SATURN Modelling DM AM', Plan 1: 'Network Control Plan 1')

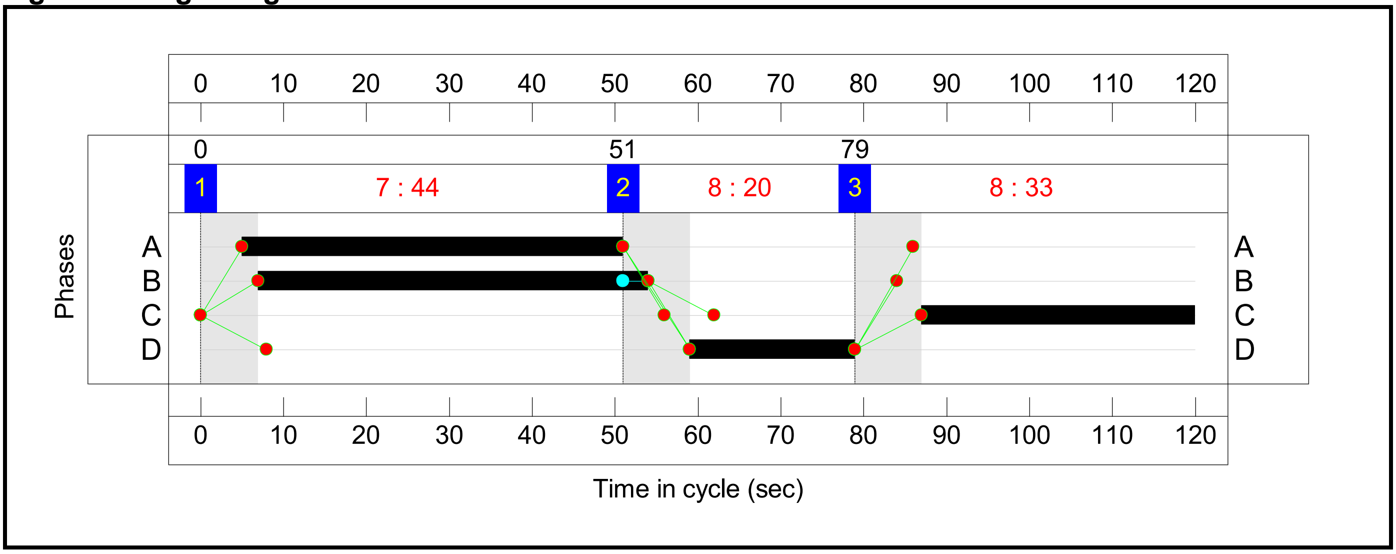
Stage Sequence Diagram



Stage Timings

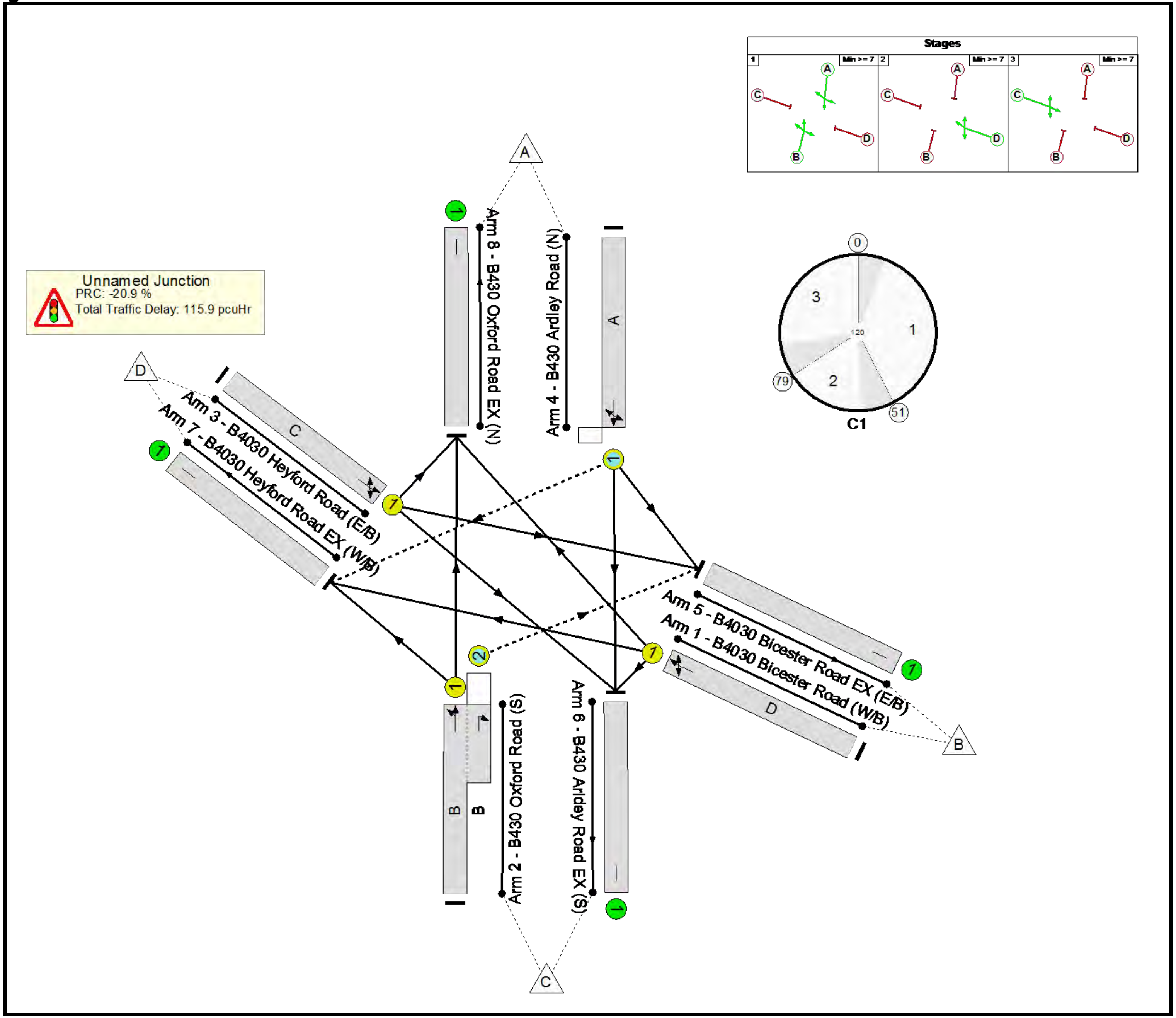
Stage	1	2	3
Duration	44	20	33
Change Point	0	51	79

Signal Timings Diagram



Full Input Data And Results

Network Layout Diagram



Full Input Data And Results

Network Results

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network: Middleton Stoney Junction	-	-	**N/A**	-	-		-	-	-	-	-	-	**108.8%**
Unnamed Junction	-	-	**N/A**	-	-		-	-	-	-	-	-	**108.8%**
1/1	B4030 Bicester Road (W/B) Left Ahead Right	U	N/A	N/A	D		1	20	-	343	1812	317	108.2%
2/1+2/2	B430 Oxford Road (S) Right Left Ahead	U+O	N/A	N/A	B		1	47	-	620	1864:1787	744	83.3%
3/1	B4030 Heyford Road (E/B) Ahead Right Left	U	N/A	N/A	C		1	33	-	553	1817	515	107.4%
4/1	B430 Ardley Road (N) Left Ahead Right	O	N/A	N/A	A		1	46	-	809	1900	744	108.8%
5/1	B4030 Bicester Road EX (E/B)	U	N/A	N/A	-		-	-	-	649	Inf	Inf	0.0%
6/1	B430 Arldey Road EX (S)	U	N/A	N/A	-		-	-	-	731	Inf	Inf	0.0%
7/1	B4030 Heyford Road EX (W/B)	U	N/A	N/A	-		-	-	-	633	Inf	Inf	0.0%
8/1	B430 Oxford Road EX (N)	U	N/A	N/A	-		-	-	-	312	Inf	Inf	0.0%

Full Input Data And Results

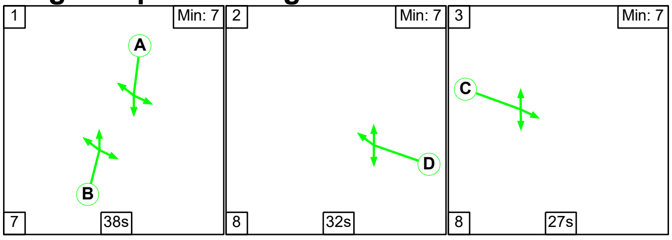
Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network: Middleton Stoney Junction	**-**	**-**	**22**	**15**	**5**	**32.8**	**82.9**	**0.2**	**115.9**	**-**	**-**	**-**	**-**
Unnamed Junction	**-**	**-**	**22**	**15**	**5**	**32.8**	**82.9**	**0.2**	**115.9**	**-**	**-**	**-**	**-**
1/1	343	317	-	-	-	5.9	17.8	-	23.7	248.8	12.3	17.8	30.1
2/1+2/2	620	620	0	15	5	5.6	2.4	0.1	8.1	47.1	18.3	2.4	20.7
3/1	553	515	-	-	-	9.3	24.7	-	34.0	221.3	20.5	24.7	45.2
4/1	809	744	22	0	0	12.0	38.0	0.1	50.1	223.0	29.1	38.0	67.2
5/1	604	604	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	673	673	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
7/1	610	610	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
8/1	309	309	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0

C1 PRC for Signalled Lanes (%): -20.9 Total Delay for Signalled Lanes (pcuHr): 115.93 Cycle Time (s): 120
PRC Over All Lanes (%): -20.9 Total Delay Over All Lanes(pcuHr): 115.93

Full Input Data And Results

Scenario 27: 'SATURN Modelling DM PM' (FG27: 'SATURN Modelling DM PM', Plan 1: 'Network Control Plan 1')

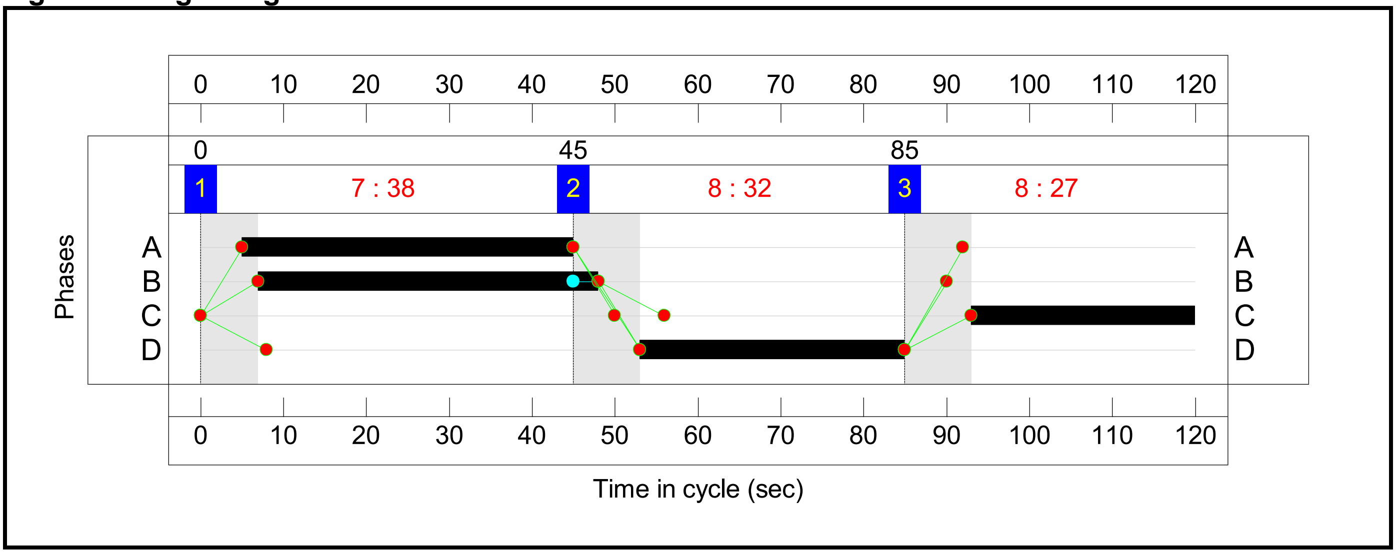
Stage Sequence Diagram



Stage Timings

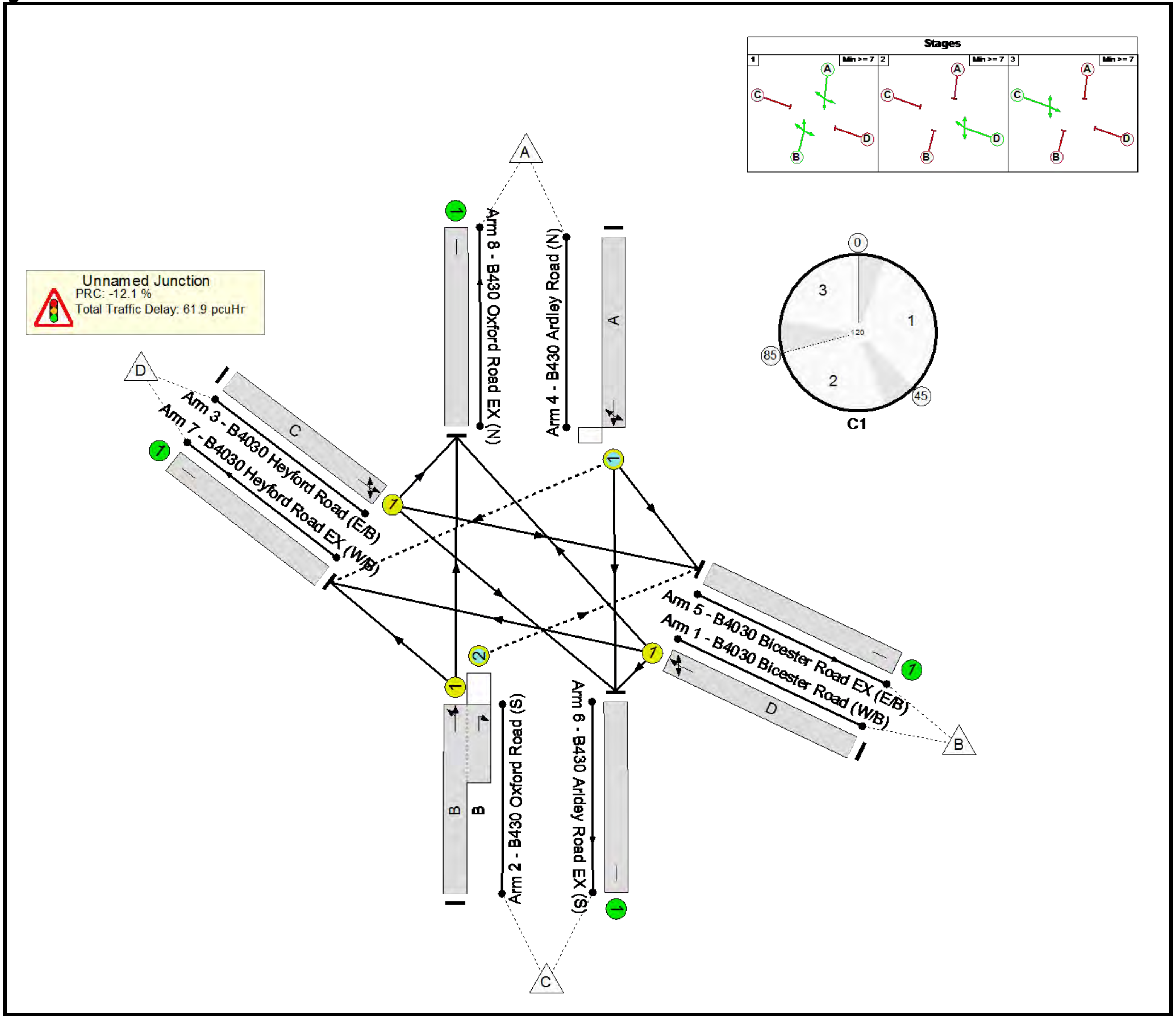
Stage	1	2	3
Duration	38	32	27
Change Point	0	45	85

Signal Timings Diagram



Full Input Data And Results

Network Layout Diagram



Full Input Data And Results

Network Results

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network: Middleton Stoney Junction	-	-	**N/A**	-	-		-	-	-	-	-	-	**100.9%**
Unnamed Junction	-	-	**N/A**	-	-		-	-	-	-	-	-	**100.9%**
1/1	B4030 Bicester Road (W/B) Left Ahead Right	U	N/A	N/A	D		1	32	-	505	1820	501	100.9%
2/1+2/2	B430 Oxford Road (S) Right Left Ahead	U+O	N/A	N/A	B		1	41	-	682	1903:1787	681	100.1%
3/1	B4030 Heyford Road (E/B) Ahead Right Left	U	N/A	N/A	C		1	27	-	421	1820	425	99.1%
4/1	B430 Ardley Road (N) Left Ahead Right	O	N/A	N/A	A		1	40	-	522	1846	631	82.8%
5/1	B4030 Bicester Road EX (E/B)	U	N/A	N/A	-		-	-	-	631	Inf	Inf	0.0%
6/1	B430 Arldey Road EX (S)	U	N/A	N/A	-		-	-	-	351	Inf	Inf	0.0%
7/1	B4030 Heyford Road EX (W/B)	U	N/A	N/A	-		-	-	-	572	Inf	Inf	0.0%
8/1	B430 Oxford Road EX (N)	U	N/A	N/A	-		-	-	-	576	Inf	Inf	0.0%

Full Input Data And Results

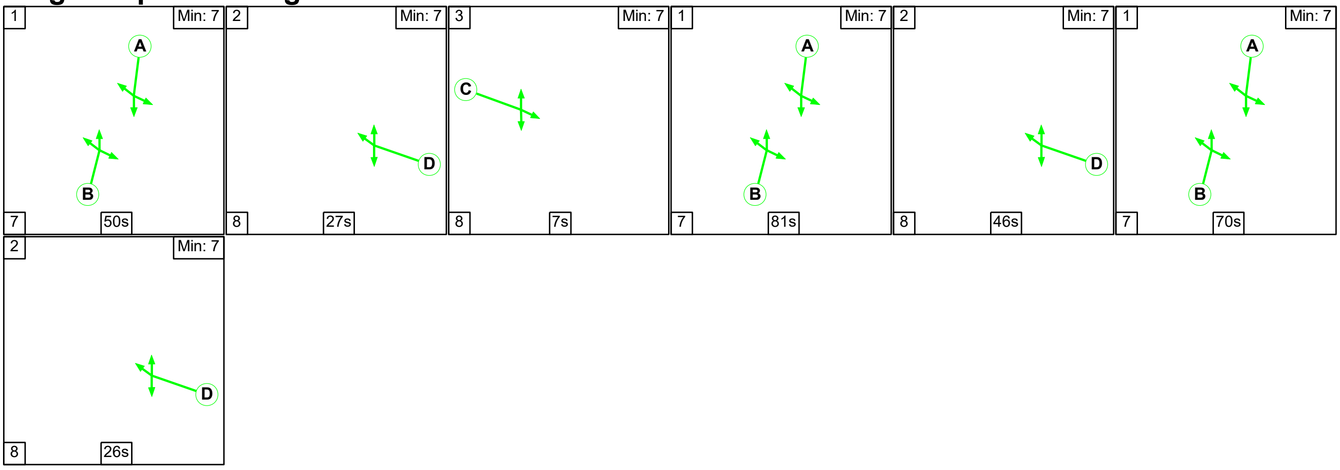
Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network: Middleton Stoney Junction	**-**	**-**	**40**	**1**	**16**	**24.3**	**37.3**	**0.3**	**61.9**	**-**	**-**	**-**	**-**
Unnamed Junction	**-**	**-**	**40**	**1**	**16**	**24.3**	**37.3**	**0.3**	**61.9**	**-**	**-**	**-**	**-**
1/1	505	501	-	-	-	6.3	12.4	-	18.7	133.5	17.0	12.4	29.4
2/1+2/2	682	681	40	1	2	7.4	13.2	0.2	20.8	109.6	22.4	13.2	35.7
3/1	421	421	-	-	-	5.4	9.4	-	14.7	126.1	13.9	9.4	23.3
4/1	522	522	0	0	14	5.3	2.3	0.1	7.7	52.9	15.9	2.3	18.3
5/1	631	631	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	351	351	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
7/1	568	568	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
8/1	575	575	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0

C1 PRC for Signalled Lanes (%): -12.1 Total Delay for Signalled Lanes (pcuHr): 61.91 Cycle Time (s): 120
PRC Over All Lanes (%): -12.1 Total Delay Over All Lanes(pcuHr): 61.91

Full Input Data And Results

Scenario 28: 'SATURN Run Modelling DS1 Mid Stoney Amend - Low TR - Extra Bus AM' (FG28: 'SATURN Run DS1 Mid Stoney Amend - Low TR - Extra BusAM', Plan 2: 'Bus Gate Heyford Road')

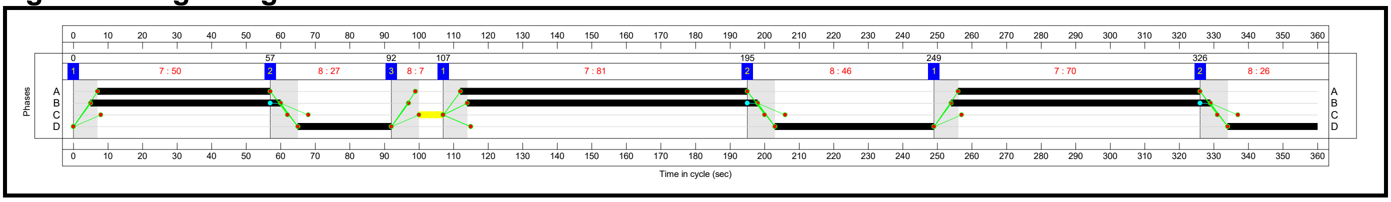
Stage Sequence Diagram



Stage Timings

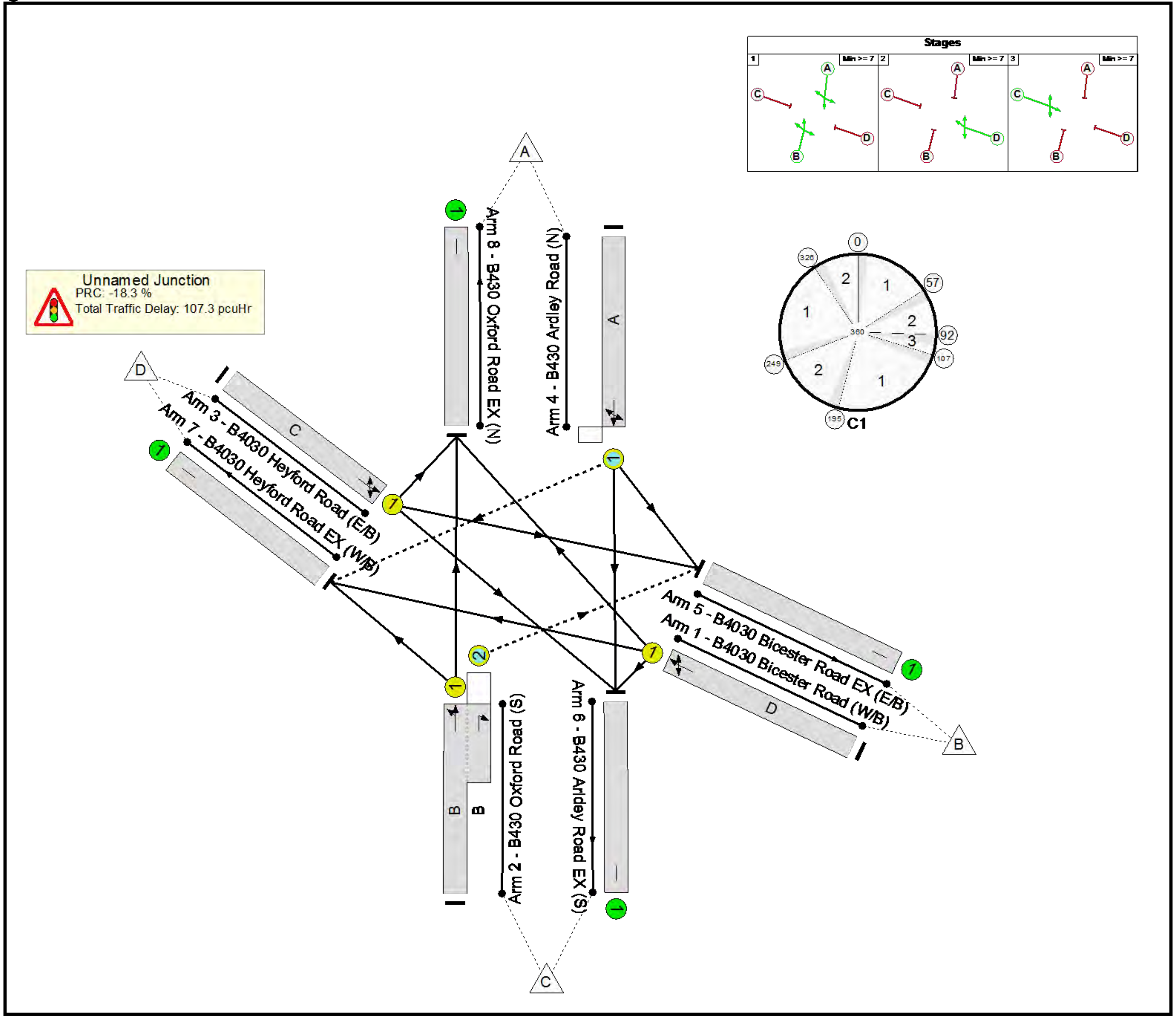
Stage	1	2	3	1	2	1	2
Duration	50	27	7	81	46	70	26
Change Point	0	57	92	107	195	249	326

Signal Timings Diagram



Full Input Data And Results

Network Layout Diagram



Full Input Data And Results

Network Results

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network: Middleton Stoney Junction	-	-	**N/A**	-	-		-	-	-	-	-	-	**106.5%**
Unnamed Junction	-	-	**N/A**	-	-		-	-	-	-	-	-	**106.5%**
1/1	B4030 Bicester Road (W/B) Left Ahead Right	U	N/A	N/A	D		3	99	-	545	1808	512	106.4%
2/1+2/2	B430 Oxford Road (S) Right Left Ahead	U+O	N/A	N/A	B		3	214	-	429	1915:1787	572	75.0%
3/1	B4030 Heyford Road (E/B) Ahead Right Left	U	N/A	N/A	C		1	7	-	34	1759	39	87.0%
4/1	B430 Ardley Road (N) Left Ahead Right	O	N/A	N/A	A		3	203	-	1138	1868	1069	106.5%
5/1	B4030 Bicester Road EX (E/B)	U	N/A	N/A	-		-	-	-	444	Inf	Inf	0.0%
6/1	B430 Arldey Road EX (S)	U	N/A	N/A	-		-	-	-	838	Inf	Inf	0.0%
7/1	B4030 Heyford Road EX (W/B)	U	N/A	N/A	-		-	-	-	15	Inf	Inf	0.0%
8/1	B430 Oxford Road EX (N)	U	N/A	N/A	-		-	-	-	849	Inf	Inf	0.0%

Full Input Data And Results

Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network: Middleton Stoney Junction	**-**	**-**	**3**	**15**	**30**	**39.5**	**67.2**	**0.6**	**107.3**	**-**	**-**	**-**	**-**
Unnamed Junction	**-**	**-**	**3**	**15**	**30**	**39.5**	**67.2**	**0.6**	**107.3**	**-**	**-**	**-**	**-**
1/1	545	512	-	-	-	13.6	22.4	-	36.0	237.8	30.3	22.4	52.8
2/1+2/2	429	429	0	15	30	1.4	1.5	0.6	3.5	29.6	7.5	1.5	9.0
3/1	34	34	-	-	-	1.7	1.9	-	3.6	377.6	3.4	1.9	5.3
4/1	1138	1069	3	0	0	22.8	41.4	0.0	64.2	203.1	57.4	41.4	98.9
5/1	421	421	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	788	788	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
7/1	14	14	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
8/1	821	821	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0

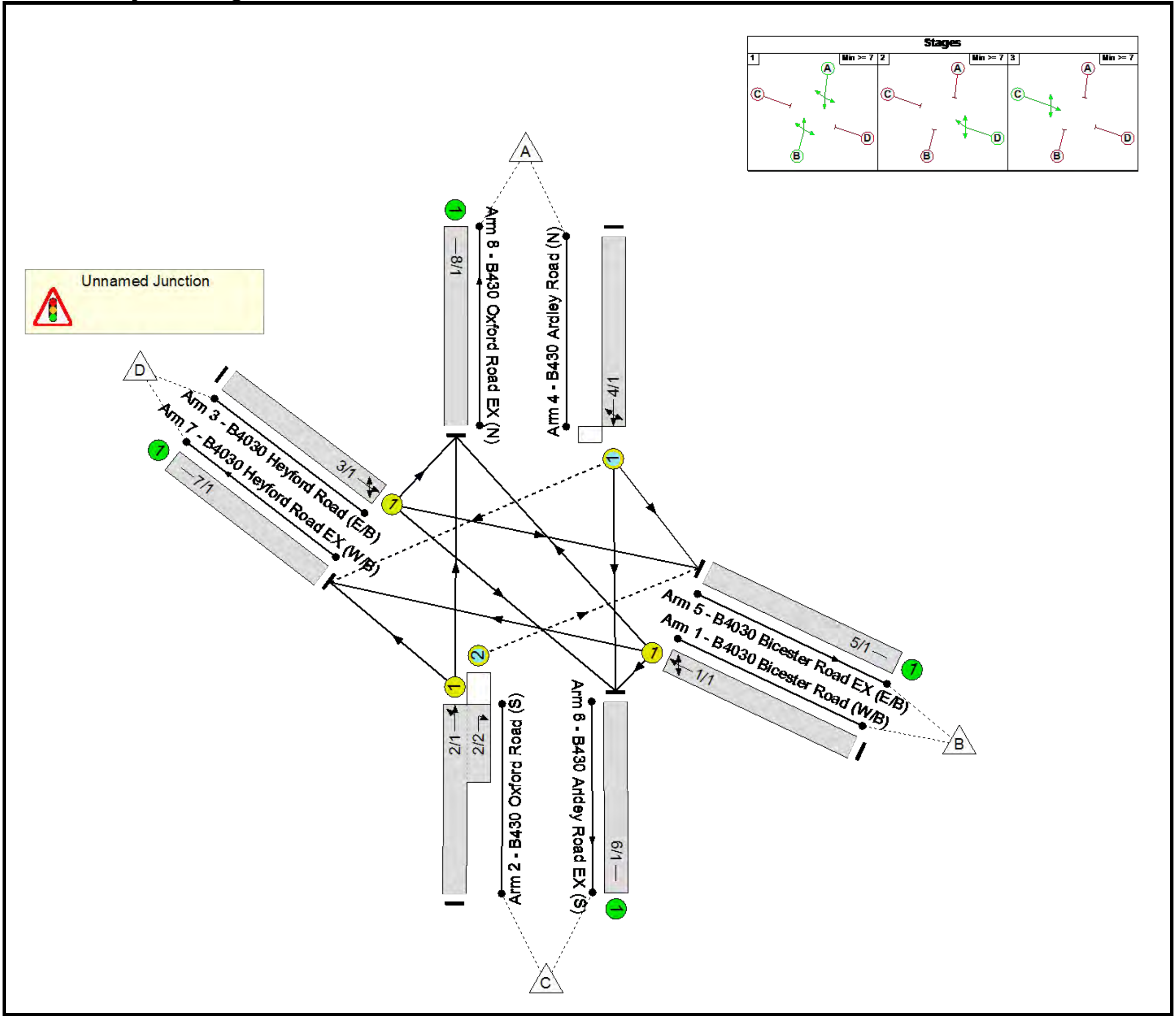
C1 PRC for Signalled Lanes (%): -18.3 Total Delay for Signalled Lanes (pcuHr): 107.31 Cycle Time (s): 360
PRC Over All Lanes (%): -18.3 Total Delay Over All Lanes(pcuHr): 107.31

Full Input Data And Results

User and Project Details

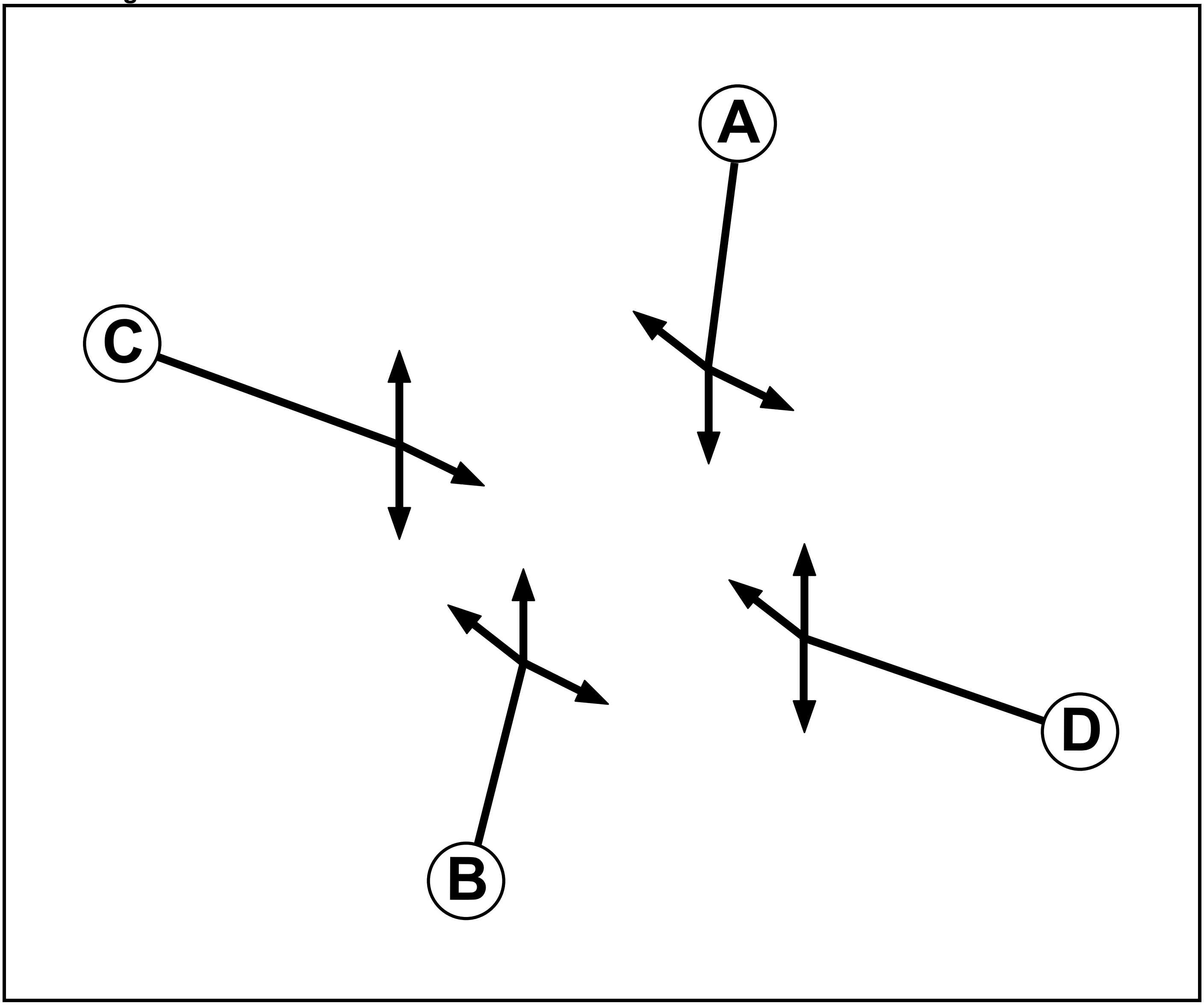
Project:	**Heyford Park**
Title:	**Middleton Stoney Junction**
Location:	
File name:	190517 Middleton Stoney Signalised Junction_Consented V5.lsg3x – HGV Restriction
Author:	ekeen
Company:	Peter Brett Associates
Address:	10 Queen Square
Notes:	Existing Layout

Network Layout Diagram



Full Input Data And Results

Phase Diagram



Phase Input Data

Phase Name	Phase Type	Assoc. Phase	Street Min	Cont Min
A	Traffic		7	7
B	Traffic		7	7
C	Traffic		7	7
D	Traffic		7	7

Full Input Data And Results

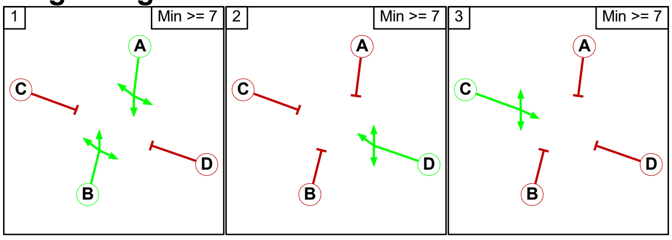
Phase Intergreens Matrix

	Starting Phase				
		A	B	C	D
Terminating Phase	A		-	5	8
	B	-		8	5
	C	5	7		8
	D	7	5	8	

Phases in Stage

Stage No.	Phases in Stage
1	A B
2	D
3	C

Stage Diagram



Phase Delays

Term. Stage	Start Stage	Phase	Type	Value	Cont value
1	2	B	Losing	3	3

Prohibited Stage Change

	To Stage			
		1	2	3
From Stage	1		8	8
	2	7		8
	3	7	8	

Full Input Data And Results

Give-Way Lane Input Data

Junction: Unnamed Junction											
Lane	Movement	Max Flow when Giving Way (PCU/Hr)	Min Flow when Giving Way (PCU/Hr)	Opposing Lane	Opp. Lane Coeff.	Opp. Mvmnts.	Right Turn Storage (PCU)	Non-Blocking Storage (PCU)	RTF	Right Turn Move up (s)	Max Turns in Intergreen (PCU)
2/2 (B430 Oxford Road (S))	5/1 (Right)	1439	0	4/1	1.09	To 5/1 (Left) To 6/1 (Ahead)	2.00	-	0.50	2	2.00
4/1 (B430 Ardley Road (N))	7/1 (Right)	1439	0	2/1	1.09	To 7/1 (Left) To 8/1 (Ahead)	1.00	1.00	0.50	1	1.00

Lane Input Data

Junction: Unnamed Junction													
Lane	**Lane Type**	**Phases**	**Start Disp.**	**End Disp.**	**Physical Length (PCU)**	**Sat Flow Type**	**Def User Saturation Flow (PCU/Hr)**	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Turns**	**Turning Radius (m)**
1/1 (B4030 Bicester Road (W/B))	U	D	2	3	60.0	Geom	-	3.00	0.00	Y	Arm 6 Left	13.00
											Arm 7 Ahead	30.00
											Arm 8 Right	30.00
2/1 (B430 Oxford Road (S))	U	B	2	3	60.0	Geom	-	3.00	0.00	Y	Arm 7 Left	30.00
											Arm 8 Ahead	Inf
2/2 (B430 Oxford Road (S))	O	B	2	3	5.0	Geom	-	3.00	0.00	N	Arm 5 Right	10.00
3/1 (B4030 Heyford Road (E/B))	U	C	2	3	60.0	Geom	-	3.00	0.00	Y	Arm 5 Ahead	30.00
											Arm 6 Right	30.00
											Arm 8 Left	7.00
4/1 (B430 Ardley Road (N))	O	A	2	3	60.0	Geom	-	3.32	0.00	Y	Arm 5 Left	12.00
											Arm 6 Ahead	Inf
											Arm 7 Right	8.00
5/1 (B4030 Bicester Road EX (E/B))	U		2	3	60.0	Inf	-	-	-	-	-	-
6/1 (B430 Arldey Road EX (S))	U		2	3	60.0	Inf	-	-	-	-	-	-
7/1 (B4030 Heyford Road EX (W/B))	U		2	3	60.0	Inf	-	-	-	-	-	-
8/1 (B430 Oxford Road EX (N))	U		2	3	60.0	Inf	-	-	-	-	-	-

Traffic Flow Groups

Flow Group	Start Time	End Time	Duration	Formula
1: 'SATURN Run DS1 Mid Stoney Amend - Low TR - Extra BusAM'	07:30	08:30	01:00	

Full Input Data And Results

Scenario 1: 'SATURN Run Modelling DS1 Mid Stoney Amend - Low TR - Extra Bus AM' (FG1: 'SATURN Run DS1 Mid Stoney Amend - Low TR - Extra BusAM', Plan 2: 'Bus Gate Heyford Road')

Traffic Flows, Desired

Desired Flow :

	Destination					
Origin		A	B	C	D	Tot.
	A	0	351	762	3	1116
	B	423	0	76	10	509
	C	388	45	0	2	435
	D	8	15	11	0	34
	Tot.	819	411	849	15	2094

Traffic Lane Flows

Lane	**Scenario 1: SATURN Run Modelling DS1 Mid Stoney Amend - Low TR - Extra Bus AM**
Junction: Unnamed Junction	
1/1	509
2/1 (with short)	435(In) 390(Out)
2/2 (short)	45
3/1	34
4/1	1116
5/1	411
6/1	849
7/1	15
8/1	819

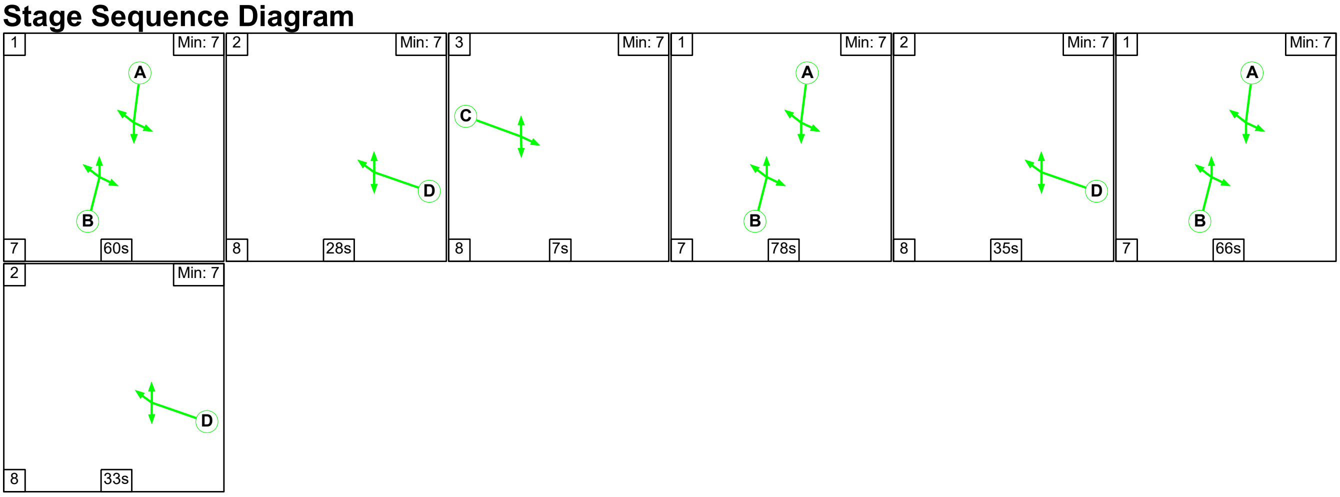
Full Input Data And Results

Lane Saturation Flows

Junction: Unnamed Junction								
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat Flow (PCU/Hr)**	**Flared Sat Flow (PCU/Hr)**
1/1 (B4030 Bicester Road (W/B))	3.00	0.00	Y	Arm 6 Left	13.00	14.9 %	1807	1807
				Arm 7 Ahead	30.00	2.0 %		
				Arm 8 Right	30.00	83.1 %		
2/1 (B430 Oxford Road (S))	3.00	0.00	Y	Arm 7 Left	30.00	0.5 %	1915	1915
				Arm 8 Ahead	Inf	99.5 %		
2/2 (B430 Oxford Road (S))	3.00	0.00	N	Arm 5 Right	10.00	100.0 %	1787	1787
3/1 (B4030 Heyford Road (E/B))	3.00	0.00	Y	Arm 5 Ahead	30.00	44.1 %	1759	1759
				Arm 6 Right	30.00	32.4 %		
				Arm 8 Left	7.00	23.5 %		
4/1 (B430 Ardley Road (N))	3.32	0.00	Y	Arm 5 Left	12.00	31.5 %	1872	1872
				Arm 6 Ahead	Inf	68.3 %		
				Arm 7 Right	8.00	0.3 %		
5/1 (B4030 Bicester Road EX (E/B) Lane 1)	Infinite Saturation Flow						Inf	Inf
6/1 (B430 Arldey Road EX (S) Lane 1)	Infinite Saturation Flow						Inf	Inf
7/1 (B4030 Heyford Road EX (W/B) Lane 1)	Infinite Saturation Flow						Inf	Inf
8/1 (B430 Oxford Road EX (N) Lane 1)	Infinite Saturation Flow						Inf	Inf

Scenario 1: 'SATURN Run Modelling DS1 Mid Stoney Amend - Low TR - Extra Bus AM' (FG1: 'SATURN Run DS1 Mid Stoney Amend - Low TR - Extra BusAM', Plan 2: 'Bus Gate Heyford Road')

Stage Sequence Diagram

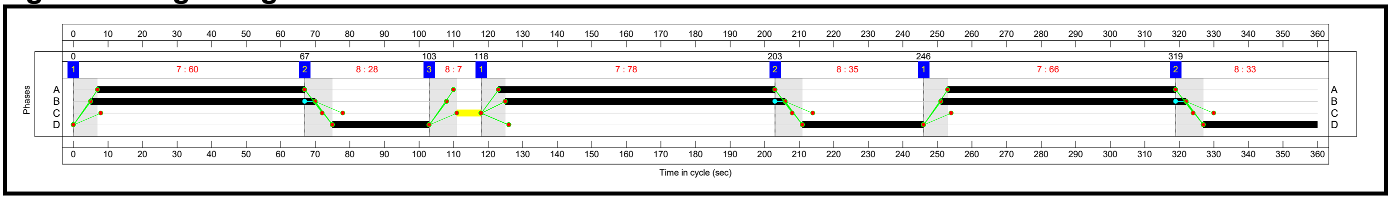


Full Input Data And Results

Stage Timings

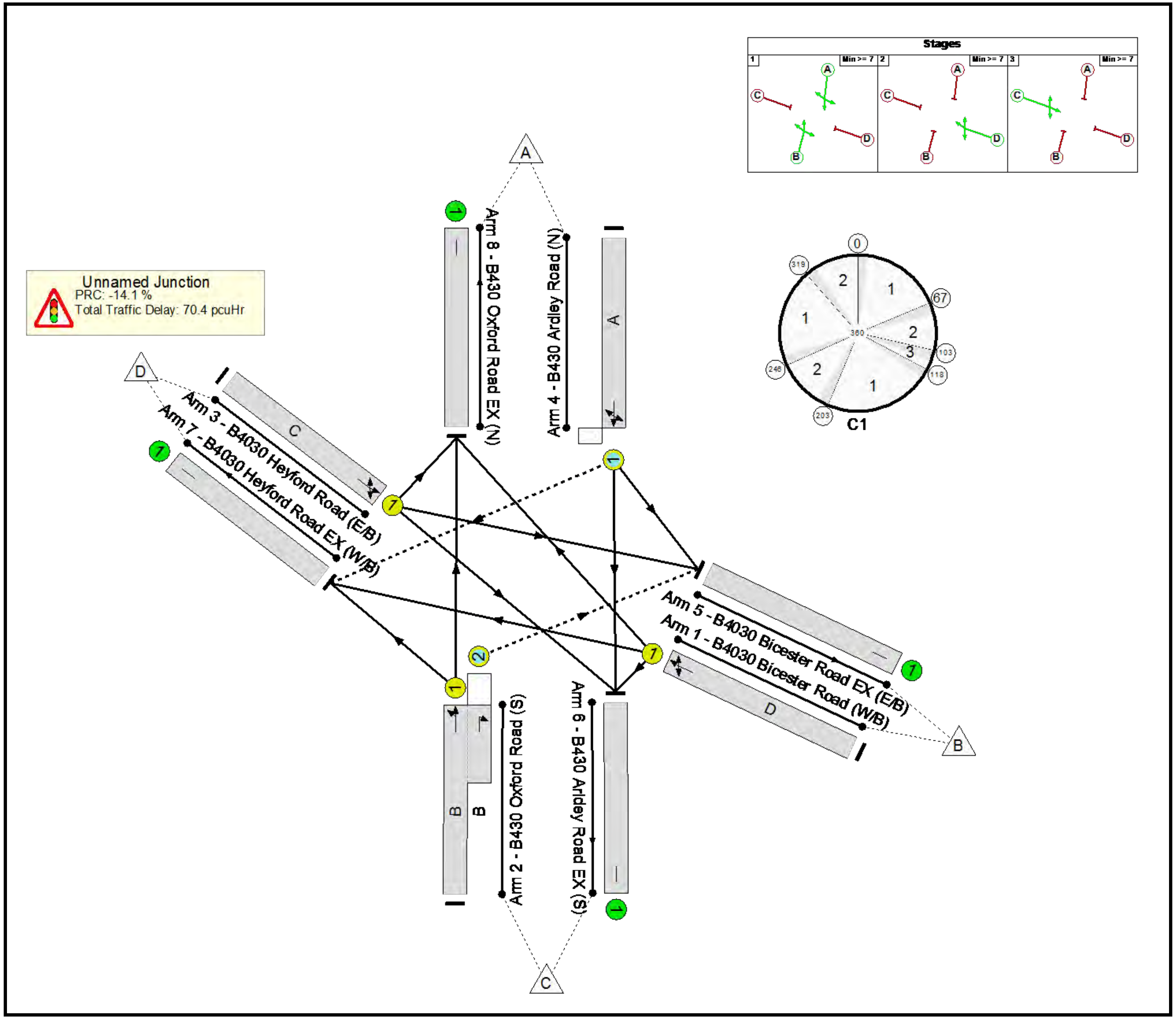
Stage	1	2	3	1	2	1	2
Duration	60	28	7	78	35	66	33
Change Point	0	67	103	118	203	246	319

Signal Timings Diagram



Full Input Data And Results

Network Layout Diagram



Full Input Data And Results

Network Results

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network: Middleton Stoney Junction	-	-	**N/A**	-	-		-	-	-	-	-	-	**102.7%**
Unnamed Junction	-	-	**N/A**	-	-		-	-	-	-	-	-	**102.7%**
1/1	B4030 Bicester Road (W/B) Left Ahead Right	U	N/A	N/A	D		3	96	-	509	1807	497	102.4%
2/1+2/2	B430 Oxford Road (S) Right Left Ahead	U+O	N/A	N/A	B		3	217	-	435	1915:1787	580	75.0%
3/1	B4030 Heyford Road (E/B) Ahead Right Left	U	N/A	N/A	C		1	7	-	34	1759	39	87.0%
4/1	B430 Ardley Road (N) Left Ahead Right	O	N/A	N/A	A		3	206	-	1116	1872	1087	102.7%
5/1	B4030 Bicester Road EX (E/B)	U	N/A	N/A	-		-	-	-	411	Inf	Inf	0.0%
6/1	B430 Arldey Road EX (S)	U	N/A	N/A	-		-	-	-	849	Inf	Inf	0.0%
7/1	B4030 Heyford Road EX (W/B)	U	N/A	N/A	-		-	-	-	15	Inf	Inf	0.0%
8/1	B430 Oxford Road EX (N)	U	N/A	N/A	-		-	-	-	819	Inf	Inf	0.0%

Full Input Data And Results

Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network: Middleton Stoney Junction	**-**	**-**	**3**	**15**	**30**	**26.2**	**43.6**	**0.6**	**70.4**	**-**	**-**	**-**	**-**
Unnamed Junction	**-**	**-**	**3**	**15**	**30**	**26.2**	**43.6**	**0.6**	**70.4**	**-**	**-**	**-**	**-**
1/1	509	497	-	-	-	9.4	14.7	-	24.1	170.8	22.6	14.7	37.3
2/1+2/2	435	435	0	15	30	1.4	1.5	0.6	3.5	28.6	7.5	1.5	9.0
3/1	34	34	-	-	-	1.7	1.9	-	3.6	377.6	3.4	1.9	5.3
4/1	1116	1087	3	0	0	13.7	25.5	0.0	39.3	126.7	48.0	25.5	73.5
5/1	402	402	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	827	827	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
7/1	15	15	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
8/1	809	809	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0

C1 PRC for Signalled Lanes (%): -14.1 Total Delay for Signalled Lanes (pcuHr): 70.45 Cycle Time (s): 360
PRC Over All Lanes (%): -14.1 Total Delay Over All Lanes(pcuHr): 70.45

TECHNICAL NOTE

APPENDIX B

significant, correct sign and plausible variations in the values of time have been estimated. Compared to other findings with relatively simple tabulations, the model provided a significant advance. It should be noted that this model is estimated using the dataset in the above mentioned meta-analysis.

Based on the estimated model, the author provides illustrative figures for a range of circumstances for the money value of in vehicle time and weighting of walk time, wait time and headway. The walk time weighting is reported in Table 7.3, while other values are reported in the following sections of the chapter. It should be noted that Table 7.1 reports the average value in the database, while Table 7.3 reports the value implied by the model, which is estimated using the same database.

Table 7.3 Walk time weightings implied by the quantitative model (in units of in-vehicle time)

Time (mins)	*Distance (miles)*	*Car*	*Bus*	*Rail*	*Under-ground*
2	2	2.18	1.68	1.28	1.5
5		2.79	2.15	1.65	1.93
10		3.37	2.59	1.99	2.33
20		4.07	3.13	2.4	2.82
2	10	1.72	1.49	1.14	1.33
5		2.2	1.91	1.46	1.71
10		2.66	2.3	1.77	2.08
20		3.21	2.78	2.13	2.5
2	25	1.5	1.39	1.07	1.25
5		1.92	1.79	1.37	1.6
10		2.32	2.16	1.65	1.94
20		2.8	2.6	1.99	2.34
2	50	1.35	1.32	1.02	1.18
5		1.74	1.7	1.3	1.52
10		2.09	2.05	1.57	1.84
20		2.53	2.47	1.9	2.23
2	100	1.22	1.26	0.97	1.13
5		1.57	1.61	1.24	1.45
10		1.89	1.95	1.49	1.75
20		2.28	2.35	1.8	2.12
2	200	1.1	1.2	0.92	1.07
5		1.41	1.53	1.18	1.38
10		1.71	1.85	1.42	1.66
20		2.06	2.23	1.71	2.01

Source: Wardman (2001)

In the table, the first two columns refers to the assumed walk time and distance travelled. The next four columns report the walk time weighting by each user type in different mode (e.g. how bus users value walk time for bus mode). The most noticeable feature of the IVT values of walk is that they vary considerably. In part this is because of differences in the money value of IVT by user type and mode, but there are other strong influences at work. The increase in the IVT values of walk time as the levels of walk time increase is quite clear, as is the fall in the values as distance increases.

Wardman *et al.* (2001b) provide a valuation of walk time in relation to interchange facilities, based on stated preference analysis. The attribute weights held by users of different modes are shown in Table 7.4.

Table 7.4 Walk values in association with interchange attributes, Edinburgh

Attribute	*Users*	*Value (IVT mins / trip)*	*95% confidence interval*
Walk time at interchange	Bus	1.6	27%
Walk time to bus	Car	1.3	40%
Between stations walk time	Rail	3.7	32%

Source: Wardman et al. (2001b)

7.4 Effect of service intervals

The effect of service intervals can be measured in a number of ways: total vehicle kilometres or hours, frequency, headway/service interval, wait time and schedule delay. Evidence is a mixture of elasticity and attribute value measures.

7.4.1 Elasticity based evidence

The dominant indicator is vehicle kilometres. Table 7.5 indicates that bus demand is relatively insensitive to service change with a short-run elasticity of approximately 0.4 and a long run elasticity of 0.7.

Table 7.5 Service elasticities, with range and standard deviation according to average values – Bus

Run	*Elasticity*	*Range*	*Standard deviation*	*No of measure-ments*
Short run	0.38	0.10 to 0.74	0.135	27
Long run	0.66	0.22 to 1.04	0.275	23

Sources: Appendix to Chapter 7

Table 7.6 shows that urban rail may be more sensitive than bus to service change but the evidence is limited to a small number of short-run estimates.

Table 7.6 Service elasticity, with range and standard deviation according to average values - Rail

Run	*Elasticity*	*Range*	*Standard deviation*	*No of measure-ments*
Run not stated*	-0.49	-0.33 to -0.65	0.23	2
Short run	0.75	0.65 to 0.90	0.13	3

* *Based on headway.*
Sources: Appendix to Chapter 7.

The importance of service quality to meeting the needs of public transport customers and decreasing reliance on the car is indicated by the findings of Arsenio's (2000) examination of railway demand in Spanish cities (Table 7.7)

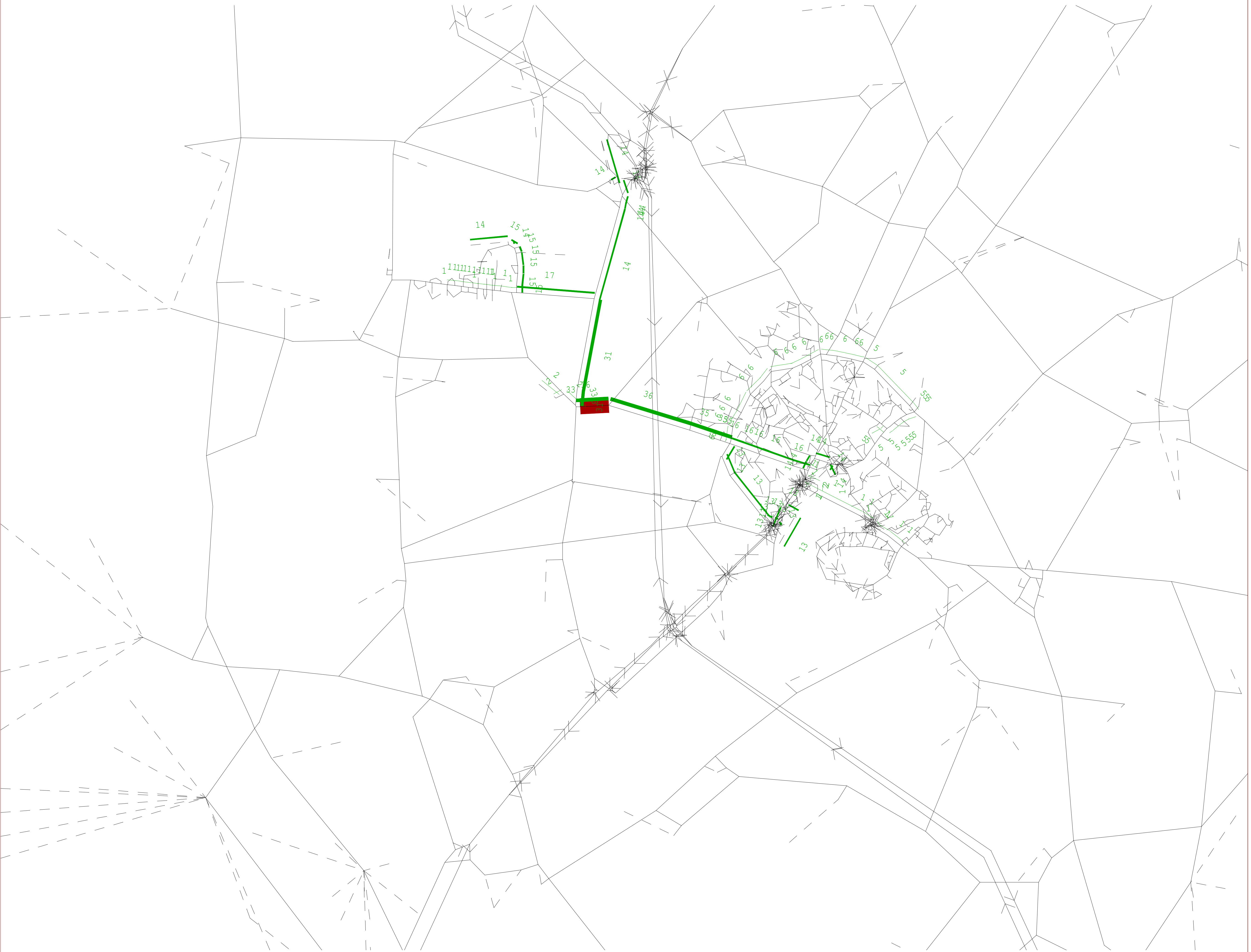
TECHNICAL NOTE

APPENDIX C

Heyford Bus Service Elasticity Calculation

The formula used is as follows:				
	D2	=	D1 x power (S2/S1, e)	
Where	D1	=	original demand with original service level, say =	100
	D2	=	new demand with new service level	?
	S1	=	original service level (3 buses per hour)	3
	S2	=	new service level (4 buses per hour)	4
	e	=	elasticity factor of 0.4	0.4
Substituting the values into the formula:				
	D2	=	100 x power (4/3, 0.4)	
		=	112.1955145	
		=	12% increase on D1	

APPENDIX D



SATURN

Atkins Ltd /
DVV / ITS

Network.UFS
2031_DS1_AM_

Scale 94944

Link Annot:

S.L.A.

Bandwidths =
50./mm

Selected
Link
Assignment
Thru links:
96030 40215

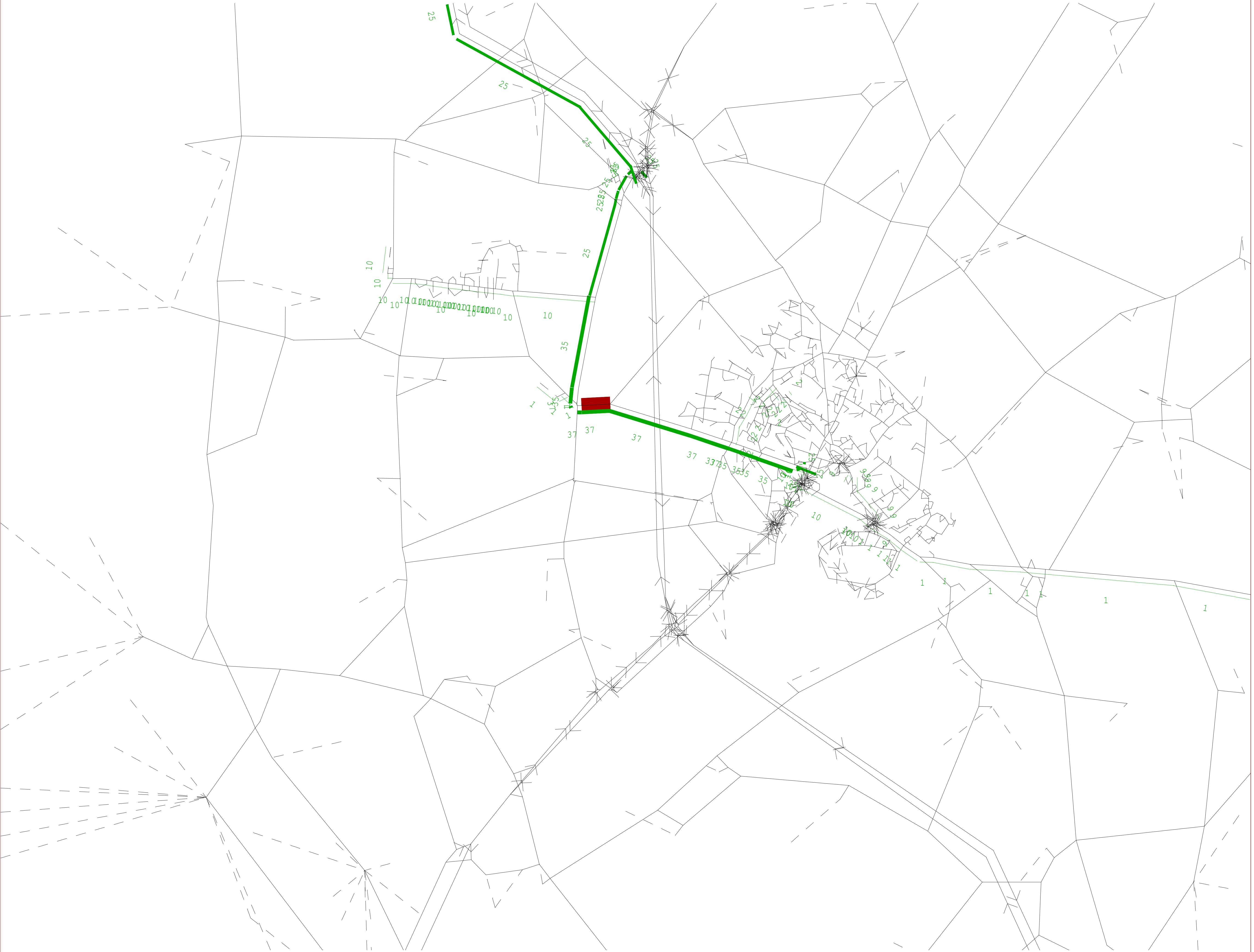
Total Demand
Flow = 36

Network fixd
Flow = 20

User Cl. 6

25- 4-19
WHITE YOUNG

Bicester Network - 2031 Heyford Park Do Something 1 AM Peak 25- 4-19



SATURN

Atkins Ltd /

DVV / ITS

Network.UFS

2031_DS1_AM_

Scale 94944

Link Annot:

S.L.A.

Bandwidths =

50./mm

Selected

Link

Assignment

Thru links:

40215 96030

Total Demand

Flow = 37

Network fixd

Flow = 9

User Cl. 6

25- 4-19

WHITE YOUNG

Bicester Network - 2031 Heyford Park Do Something 1 AM Peak 25- 4-19

Appendix F AECOM Technical Note 11

DRAFT

M40 Junction 10 TN11

Vissim Forecast Modelling

Highways England

Project reference: 60598250
Project number: EMS107
60598250.EMS107.TN11

October 2019

Quality information

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Revision	Revision date	Details	Authorized	Name	Position
Rev.00		Draft	Y	Martin Drapier	Consultant
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Executive Summary

01

Executive Summary

AECOM was commissioned by Highways England to carry out a traffic impact analysis of set of proposed mitigations on junction 10 of the M40. This traffic impact analysis assesses the benefits of each of the proposed schemes in the overall junction performance using 2026 flows including Heyford Park development flows.

The proposed schemes were combined in 5 different scenarios to assess which combination will provide better results for the overall junction operation.

The schemes provide additional capacity at the key junctions listed below:

- **Baynard's Green roundabout;**
- **Padbury Junction; and**
- **Ardley Roundabout**

Different combinations of schemes were tested in the scenarios below.

Name	Scheme
Reference Case	-
Do minimum	
Do Something 1	(1) Baynard's Green Roundabout
Do Something 2	(2) Padbury Roundabout
Do Something 3	(1+2) Baynard's Green & Padbury Roundabouts
Do Something 4	(1+2+3) Baynard's Green & Padbury & Ardley Roundabouts
Do Something 5	(1+3) Baynard's Green & Ardley Roundabouts

A general view of the performance of each scenario is provided below.

Do Something 1

The mitigation at Baynard's Green roundabout results in:

- ✓ a reduction of queues on all approaches to the junction and a significant reduction of the latent demand in the model;
- × the increase in flow through Baynard's Green lead to an increase in journey times along the A43 between Baynard's Green and Ardley roundabout;
- × the additional demand southbound on Ardley roundabout create queues that back up onto Cherwell junction in the AM peak, these queues affect the southbound flows along the A43.

Do Something 2

The mitigation at Padbury junction results in:

- ✓ the elimination of queuing on the M40 southbound off-slip;
- × the increase in flow from the M40 southbound off-slip results in longer journey times and queues along the A43;
- × the additional demand southbound on Ardley roundabout create queues that extend back to Padbury and Baynard's Green junctions in the AM peak, reducing the capacity and increasing in latent demand on the approaches to Baynard's Green roundabout.

Do Something 3

The combination of the mitigation schemes at Baynard's Green and Padbury junctions result in:

- ✓ a reduction of queues on all approaches to Baynard's Green junction and a significant reduction of the latent demand in the model;
- ✓ the elimination of queuing on the M40 southbound off-slip;
- ✗ the increase in flows across Baynard's Green and the southbound off-slip results in longer journey times and queues along the A43;
- ✗ the additional demand on the southbound approach to Ardley roundabout results in queues backing up on to Cherwell junction, affecting the southbound movements along the A43.

Do Something 4

The combination of the mitigation schemes at all three junctions result in:

- ✓ a reduction of queues on all approaches to Baynard's Green and the elimination of the latent demand in the model;
- ✓ the elimination of queuing on the M40 southbound off-slip;
- ✓ a reduction in southbound queues on the A43 approaching Ardley roundabout, which no longer back up to Cherwell junction;
- ✓ a reduction in journey times southbound along the A43 as the access to the southbound on-slip is unaffected by queues from Ardley junction;

Do something 5

The combination of the mitigation schemes at Baynard's Green and Ardley junctions result in:

- ✓ a reduction of queues on all approaches to Baynard's Green and the elimination of the latent demand in the model;
- ✓ a reduction in southbound queues on the A43 approaching Ardley roundabout, which no longer affect Cherwell junction;
- ✓ a reduction in journey times southbound along the A43 as the access to the southbound on-slip is unaffected by queues from Ardley junction; and
- \- a slight reduction in queues on the southbound off-slip compared to Do Minimum in AM, due to the better operation of the A43.

Introduction

02

Introduction

AECOM has been commissioned by Highways England to carry out a traffic impact analysis of set of proposed mitigations on junction 10 of the M40. The purpose of which is to assess the benefits of each of the schemes in the overall junction performance.

This report details the purpose of the models, the changes made to the base model to produce the 2026 option tests and sets out the methodology adopted. This document also details the changes in measured key journey times, changes in queues, and key network performance indicators between the different scenarios.

Background

This background section provides a simple chronological record of the discussions and development of the M40 J10 Study as well as a summary of the improvement options proposed and tested to date:

- In 2011 A-One+ undertook the Congestion Scoping Study, which resulted in the implementation of the recently delivered M40 J10 pinch point scheme (PPS).
- In December 2013, AECOM's M40 J10 Stage 1 Study Report detailed the strategic development sites, trip generation and forecast the traffic impact on the A43 and M40 J10 up to future year 2031.
- On 3rd April 2014, a meeting was held between Highways England (HE), Oxfordshire County Council (OCC), South Northamptonshire District Council (SNDC) and Cherwell District Council (CDC) to review the developments and growth forecast up to 2031. At this meeting several additional and updated documents were cited for review. Whilst the M40 J10 PPS was going to be delivered, the local planning authorities were concerned about the ability of the M40 J10 PPS to cater for economic growth aspirations, indicating 2020-2025 as the period within which the network is considered to reach unacceptable level of operation and proposing therefore to investigate further potential improvement options.
- On 23rd July 2014, a meeting was held between HE, OCC and CDC to discuss initial modelling results and potential cumulative impacts of proposed growth on the SRN. In addition, it was agreed to carry out modelling assessment at M40 J9 using HE's M40 J9 LinSig model.
- In October 2014, AECOM's M40 J10 Stage 2 Study Report included a review of growth up to 2031 contained in AECOM's M40 J10 Stage 1 Study Report. In addition, it identified the following four improvement options:
  - Option 1: Pinch Point Widening;
  - Option 2: Dumbbell Roundabout with removal of Padbury roundabout;
  - Option 3: Dumbbell Roundabout retaining Padbury roundabout;
  - Option 4: Two Bridge roundabout.
- In March 2015, AECOM's Technical Note 4 (TN4) identified Option 4 as offering the best performance; it was decided that this should be assessed further.
- In April 2015, AECOM's Technical Note 5 (TN5) submitted AECOM's Two Bridge roundabout improvement scheme and tested outputs up to 2031. A43 Baynards Green roundabout was recognised as a constraint for the network operation, causing extensive queues along the A43 and potentially constraining the traffic at M40 J10. Conclusions of TN5 were that further testing was needed to be undertaken to determine when the M40 J10 PPS would fail and how to address queues on the A43 taking into consideration the interaction with A43 Baynards Green roundabout acting as a bottleneck holding back traffic on the A43 into M40 J10.
- In November 2015, AECOM's Technical Note 6 (TN6) identified the 2021-2026 time period as the tipping point of the M40 J10 PPS. In addition, AECOM's Two Bridge roundabout improvement scheme was tested for 2026 assuming that the A43 Baynards Green roundabout constraint had been removed (i.e. roundabout removal assuming expressway implementation on the A43), so that queues were released onto the A43 Padbury junction. In this instance, the A43 westbound approach resulted in severe queue issues that needed to be

addressed. Thus, AECOM recognised that the improvement scheme needed to be reviewed in order to achieve optimum operation at all M40 J10 approaches.

- In March 2016, AECOM's Technical Note 7 (TN7) reviewed AECOM's Two Bridge Roundabout option and it was clear that this scheme would not be capable of preventing the high level of queue formation at the A43 southbound approach. Therefore, AECOM undertook an iteration exercise to design an improvement scheme that can accommodate future growth up to 2031 that secures optimal operation on both the M40 mainline and the A43 approach to M40 J10. This scheme included signal control at Ardley, Cherwell and Padbury junctions using MOVA control. In addition, the proposed scheme would require a lane drop at the M40 mainline in the southbound direction between the off-and on-slip and a DMRB (TD 22/06) Merge Lane Layout Type G with a two lane gain after the on-slip. Finally, AECOM carried out an indicative gap analysis of the proposed scheme which showed a low level of completion of the tasks required for the Project Control Framework Stage 0 in order to initiate a project.
- In October 2016, AECOM revalidated HE's M40 J10 VISSIM Model using traffic survey data collected in March 2016. The purpose of this model revalidation was to understand the performance of the junction with the PPS improvements implemented.
- On 14th November 2016, AECOM and HE carried out a workshop to identify potential risks associated with the M40 J10 proposed highway scheme.
- Following discussions with Highways England's Transport Planning Group (TPG) – formerly known as Traffic Appraisal Modelling and Economics (TAME) – it was deemed that although the 2016 revalidated model provided suitable levels of validation in accordance with both DMRB and WebTAG standards, in order to ensure that a robust tool is available for undertaking a Value for Money (VfM) assessment, tighter levels of validation were required at the M40 Southbound off-slip approach. Therefore, in August 2017 AECOM completed a revalidation of Highways England's M40 J10 VISSIM base model.
- In September 2017, AECOM was commissioned by HE to undertake further assessments of the potential impacts of HS2 construction traffic at M40 J10 up to a 2018 future year, using the 2017 revalidated Vissim model and to analyse several mitigation schemes.
- In January 2019 AECOM produced a 2031 forecast year assessment using the 2017 revalidated Vissim model. These models were used to assess the capacity of a series of proposed mitigation schemes to accommodate future year flows.
- Further to this modelling exercise, Oxfordshire County Council (OCC) showed interest in using this Vissim model to assess the impact of the expected traffic growth and proposed mitigations.

Structure of the note

It is recommended that this TN is read in conjunction with AECOM's M40 Junction 10 TN9 and TN10 in order to get a better understanding of all issues around the junction.

The structure of this note is detailed as follows:

- Section 03: Presents the modelling approach;
- Section 04: Details the assumptions and methodology for the development of the demand matrices;
- Section 05: Summarises the outputs obtained and provides a discussion of the findings; and
- Section 06: Provides a summary of work undertaken and conclusions.

Modelling Approach

03

Overview

M40 J10, commonly known as Cherwell Valley Interchange, is located to the north-west of Bicester. Whilst the junction is within the boundary of Oxfordshire County Council, it is managed by Highways England's Area 7 Spatial Planning & Economic Development (SPED) team. However, M40 J10 is part of DBFO (area) 30 – M40 [J1-15] Denham to Warwick and the DBFO company is UK Highways M40 Ltd.

Initially designed as a standard two-roundabout dumbbell junction, the current extent of the junction includes:

- A43 Cherwell junction;
- A43 / B430 Ardley Roundabout; and
- A43 Padbury Junction.

M40 J10 is a critical point of the SRN being one of the waypoints on the main freight route to the north-east. It is widely used for movements between the M40 and the A43 and suffers from high congestion, particularly on A43 approaches.

Modelling approach

The junction has been modelled using VISSIM, an industry standard micro-simulation modelling software package, using dynamic traffic assignment (DTA).

As highlighted in the previous section, in August 2017 AECOM revised and refined the latest M40 Junction 10 model validated in October 2016 focusing on validation enhancements, particularly for the PM peak. The model produced in 2017 also provides tighter levels of validation of the M40 southbound off-slip to Junction 10, and therefore is deemed to provide a better platform for future year testing than the 2016 model.

Based on the above, it has been agreed to undertake the re-assessment of the impact of the proposed developments' traffic upon M40 Junction 10 using the M40 Junction 10 VISSIM model revalidated by AECOM in 2017.

The model includes the following junctions/roundabouts:

- A43 Cherwell junction
- A43 / B4100 Baynards Green;
- A43 / B430 Ardley Roundabout; and
- A43 Padbury Junction.

The extents of the model are shown in **Error! Reference source not found.**.

A more detailed breakdown of the re-validated model, including model and matrix development, can be found in the M40 Junction 10 Local Model Validation Report (EMS 107.LMVR).

The assessment of the proposed mitigations is carried out based on a sequential modelling approach that allows the analysis of the impact of the different interventions and the cumulative impact of different combination of them, as shown in Table 2.

It was agreed that, in order to narrow down the number of scenarios to be modelled, the 2026 "Do Minimum" demand would be assigned to all the mitigation scenarios at this stage, which will inform the selection of a preferred combination of schemes. This modelling assumption entails that the results reported in the TN are not showing any rerouting effects caused by the schemes in the wider network; these results are a static picture of the operation of the proposed schemes.

It is envisaged that further scenarios for 2031 and 2036 will be built in a subsequent modelling exercise and will assess the impact of the mitigations with demand assumptions that consider the reassignment/ rerouting induced by the chosen mitigation.

Figure 1. Modelled VISSIM Network - Source: OpenStreetMap (and) contributors, CC-BY-SA

Modelling parameters

Modelling parameters have been kept as in the base model. These are shown in Table 1.

Table 1. M40 J10 – Modelling parameters

Modelling Parameters		
Evaluation Periods	AM Peak	0745-0845
	PM Peak	1630-1730
Additional Periods	AM Build-Up	0645-0745
	AM Cool-Down	0845-0915
	PM Build-Up	1530-1630

Modelling Parameters

	PM Cool-Down	1730-1800
Vehicle Types	Light Vehicles, LVs	
	Heavy Vehicles, HVs	
VISSIM Version	5.40.06	
PC MOVA Version	PC MOVA 7	

Modelled scenarios

Table 2 below shows demand assumptions and coded schemes for each of the coded scenarios:

Table 2. Modelling Scenarios – Summary

Name	Year	Flows	Scheme
Reference Case	2026	Reference Case 2026	-
Do minimum	2026	Do Minimum 2026	
Do Something 1	2026	Do Minimum 2026	(1) Baynard's Green Roundabout
Do Something 2	2026	Do Minimum 2026	(2) Padbury Roundabout
Do Something 3	2026	Do Minimum 2026	(1+2) Baynard's Green & Padbury Roundabouts
Do Something 4	2026	Do Minimum 2026	(1+2+3) Baynard's Green & Padbury & Ardley Roundabouts
Do Something 5	2026	Do Minimum 2026	(1+3) Baynard's Green & Ardley Roundabouts

Modelled schemes

Figure 2 to Figure 3 below show the schemes modelled in scenarios Do Something 1 to Do Something 5.

The mitigation for **Baynard's Green roundabout (1)**, shown in Figure 2, consists in the addition of an extra flare in each of the approaches, the addition of a circulating lane inside the roundabout, the signalisation of all arms and an increase in the size of the circulatory to increase storage capacity.

The mitigation at **Padbury Junction (2)**, shown in Figure 3, consists in the signalisation of the southbound approach on the A43 and on the M40 southbound off-slip, and the addition of an extra lane between these two approaches.

The mitigation at **Ardley Roundabout (3)**, shown in Figure 4, consists in the signalisation of all approaches to the junction plus the addition of a lane inside the circulatory.

It should be noted that the signal operation has been developed using PC MOVA and it is consistent with the signal operation developed for the forecast test undertaken in 2017.

DRAFT

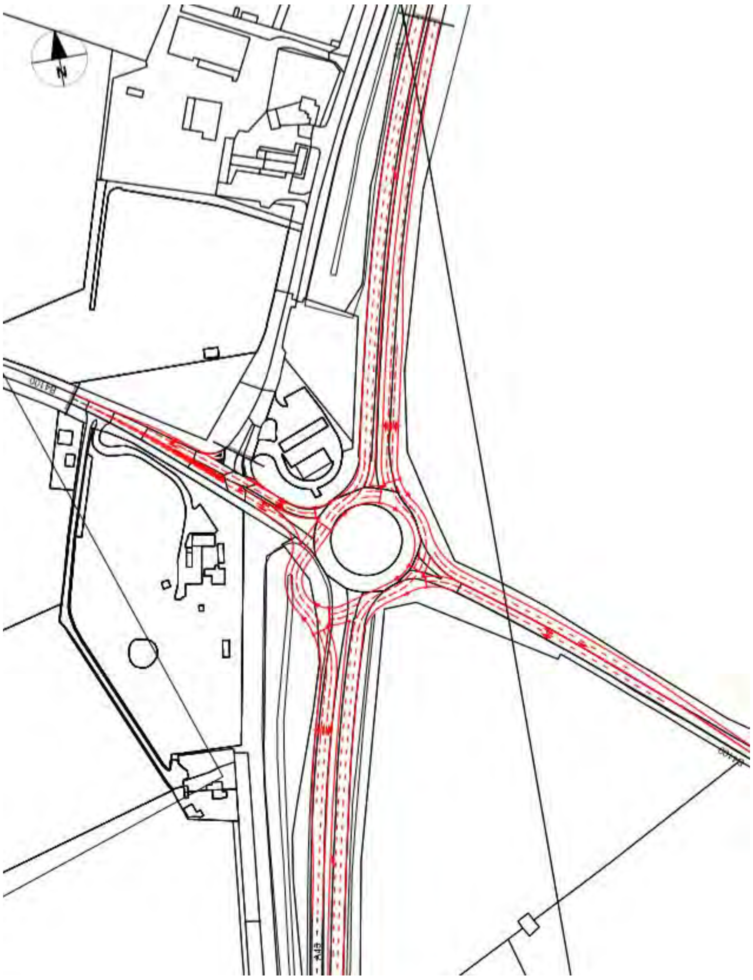

Figure 2. Baynard's Green Roundabout (1).

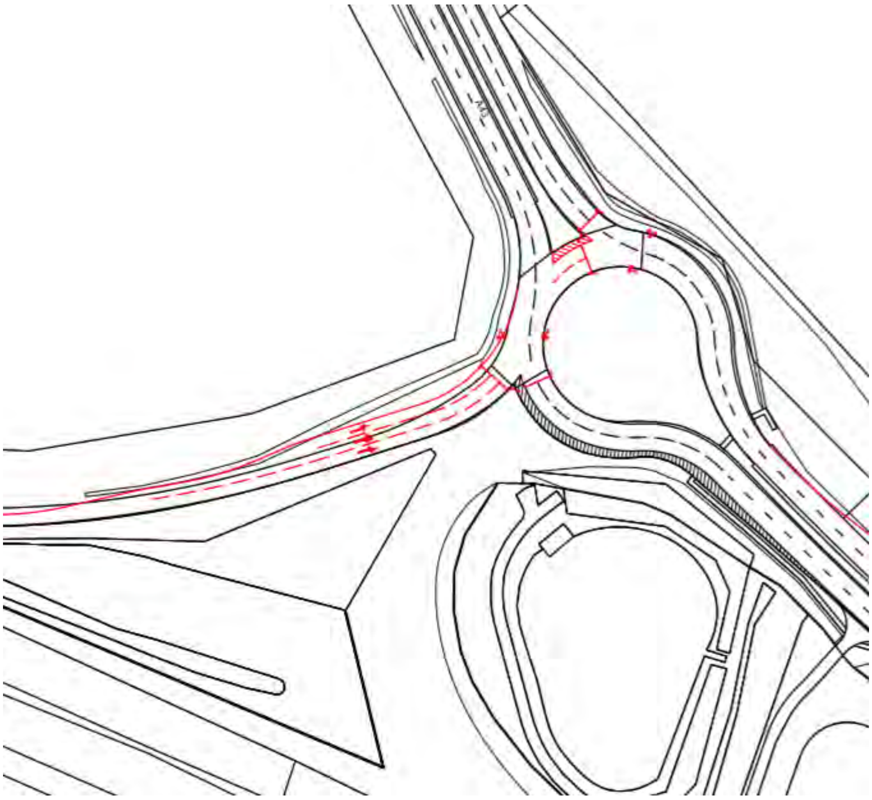

Figure 3. Padbury junction (2).

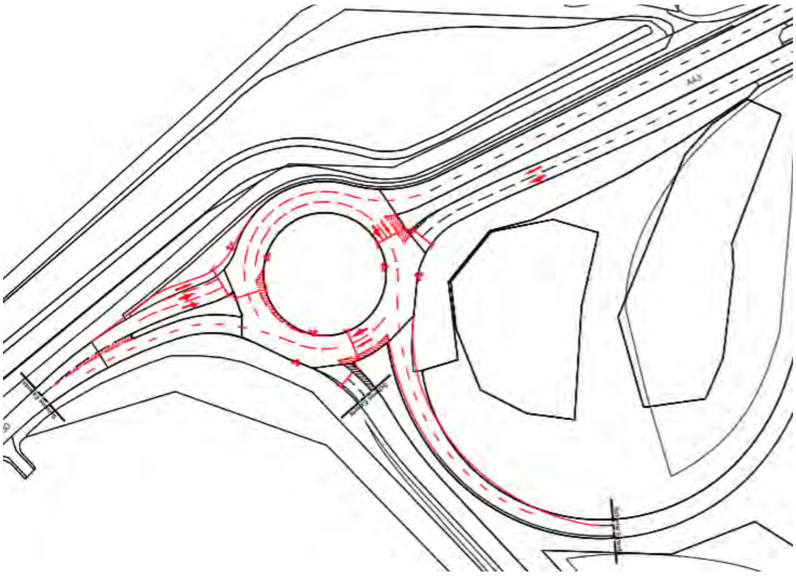

Figure 4. Ardley roundabout (3).

Demand development

Assumptions

Two sets of demand matrices have been assigned in these models, as shown in Table 2 (page 15), i.e. Reference Case 2026 and Do Minimum 2026.

- The **Reference Case demand** contains the base modes flows plus the expected growth from 2016 to 2026 without developments; whilst
- the **Do Minimum demand** consist of the base flows plus the expected growth from 2016 to 2026 with Heyford Park development flows.

It should be highlighted that the only additional flow in the Do Minimum demand is Heyford Park development; all other growth is included in the Reference case demand.

The absolute growth from 2016 to 2026 in both sets of demand have been calculated, as detailed in the section below, based on Highways England's Regional Traffic Model (RTM), assigned onto the existing network, i.e. none of the proposed schemes have been coded in the strategic models for the calculation of the demand flows.

Matrix development

The demand growth from 2016 to 2026 for both flow scenarios have been calculated by adding the trip end growth from the RTM strategic model to the validated Vissim's base demand matrices, which then have been furnessed. This methodology has been agreed with OCC and HE as the best approach to develop the forecast VISSIM matrices and minimize the possible turning count discrepancies between the RTM and VISSIM.

The trip end growth from the strategic model have been calculated as follows:

Reference Case growth = Reference Case 2026 flows – Base 2016 flows

Do Minimum growth = Do Minimum 2026 flows – Base 2016 flows

Since the RTM peak hour matrices represent one-hour flows and the Vissim matrices are divided in 15 minutes periods, the RTM growth has been divided into 15-minute slots based on the flow profile extracted from the base Vissim matrices, as shown in Figure 5.

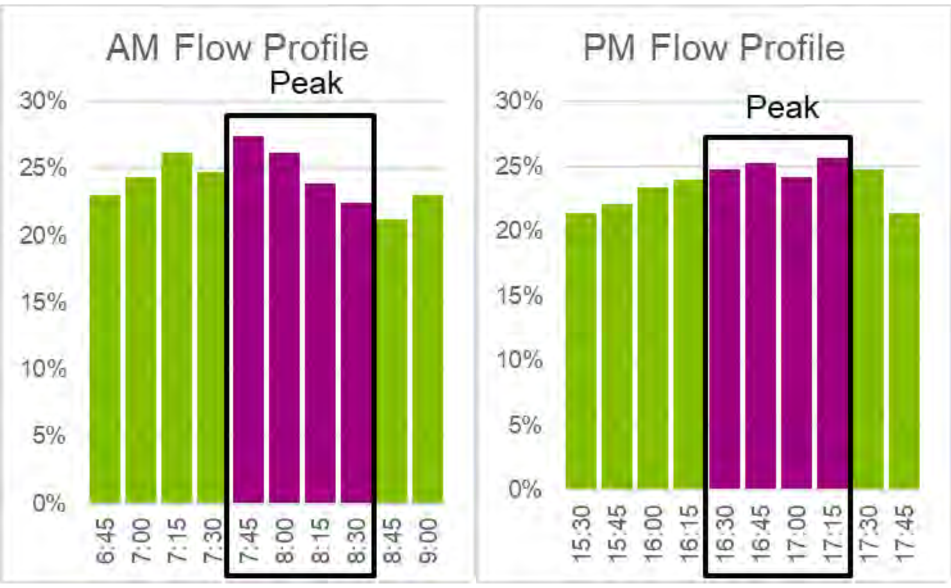

Figure 5. Flow profiles[1].

The absolute growth extracted from the strategic model and the absolute growth assigned to the Vissim model during the peak hour has been checked to be identical.

Demand growth checks

The demand assumed for the Vissim models in the peak hours has been checked against TEMPro growth factors for the area; this comparison can be found on Table 3.

The adopted growth in the Vissim model considerably exceeds the growth estimated using TEMPro.

Table 3. Comparison of TEMPro growth factors and growth adopted in the Vissim matrices.

	Growth from Vissim matrices		TEMPro
	2026 RC - 2016 Base	2026 DM - 2016 Base	2016 - 2026
AM	1.1987	1.2136	1.1383
PM	1.2086	1.2117	1.1369

For details on the calculation of the adopted TEMPro factors, refer to Appendix B.

Comparison of growth

The demand used as an input for the VISSIM models has been compared to the hourly demand in the assignment models for the same peaks. The total of vehicles in these matrices appears in Table 4.

As it is shown, the difference between the strategic models and the VISSIM models is consistent through the scenarios, which denotes a constant absolute growth.

[1] Refer to *M40 Junction 10 Local Model Validation Report (EMS 107.LMVR)* for further details on the definition of the peak time periods.

Table 4. Total vehicles in VISSIM and strategic modelling peak hours.

		2016 Base	2026 RC	2026 DM
Strategic models Matrices	AM	10456	12702	12876
	PM	11484	14014	14051
VISSIM Matrices	AM	10332	12578	12752
	PM	11611	14141	14178

Model convergence

The approach used to validate the base models have been also applied in this test.

Whilst the models have been run using Dynamic Traffic Assignment (DTA), there is no route choice between OD pairs, therefore, the model convergence has no impact in the final traffic assignment. The models have nonetheless been converged according to DMRB and TfL's criteria (TfL has developed specific guidance for VISSIM models):

- (1). 95% of all path traffic volumes change by less than 5% for at least four consecutive iterations;
- (2). 95% of the travel times on all paths change by less than 20% for at least four consecutive iterations; and
- (3). The percentage change in user costs or time spent within the network (V) should be less than 1% for four consecutive iterations.

After achieving convergence, models have been multi-run for results using 10 different random seeds, starting with random seed 1 and ending at random seed 10, with a random seed increment of 1.

Results presented in the following sections show average measurements, as derived from 10 model runs undertaken, for each of the AM and PM peaks.

Model adjustments

The models have been optimized in key areas, such as Cherwell roundabout, to improve the model operation and reproduce the changes in the vehicle's behaviour caused by the additional demand and layout changes. However, to provide a like by like comparison the same parameters have been coded in all the models.

The optimization changes applied to the models are listed below:

- The lane changes operation at Cherwell roundabout;
- A route closure has been added to stop vehicles leaving the M40 southbound going through the junction, only to join the M40 again.

Modelling Results

04

Modelling results

Journey times

In Figure 6, one route was defined by section to assess the impacts in journey time in the junction 10 of the M40. The route was defined separately for southbound and northbound directions.

AM Peak

Figure 7 and Figure 8 show the journey time results northbound and southbound across the model for the AM peak.

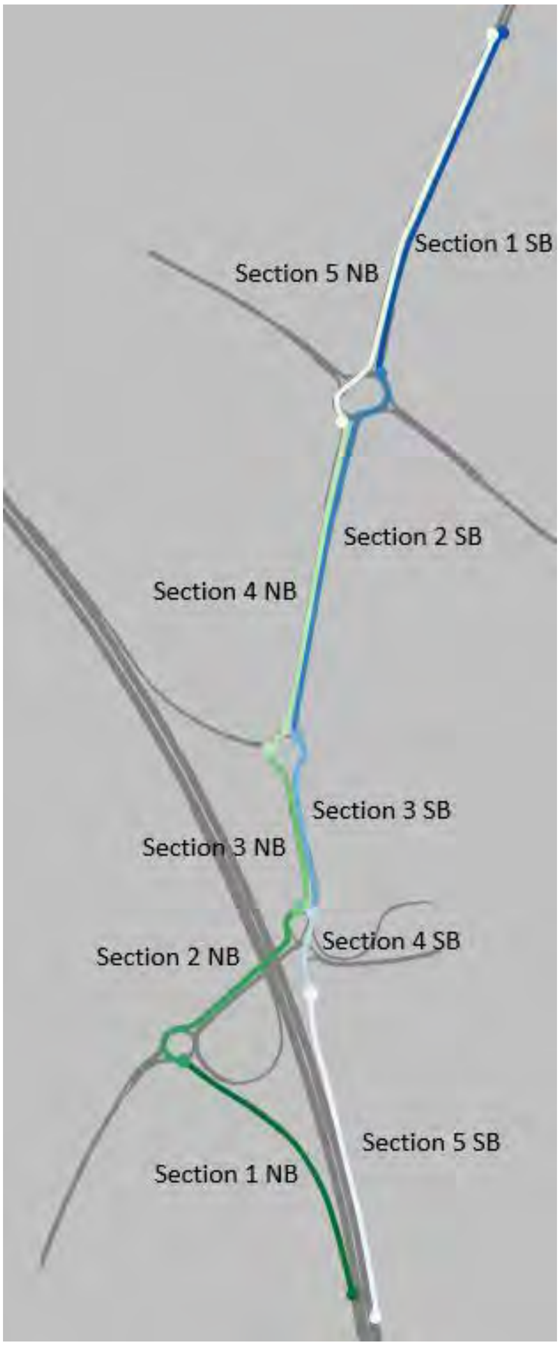

Figure 6. Locations of journey time route sections.

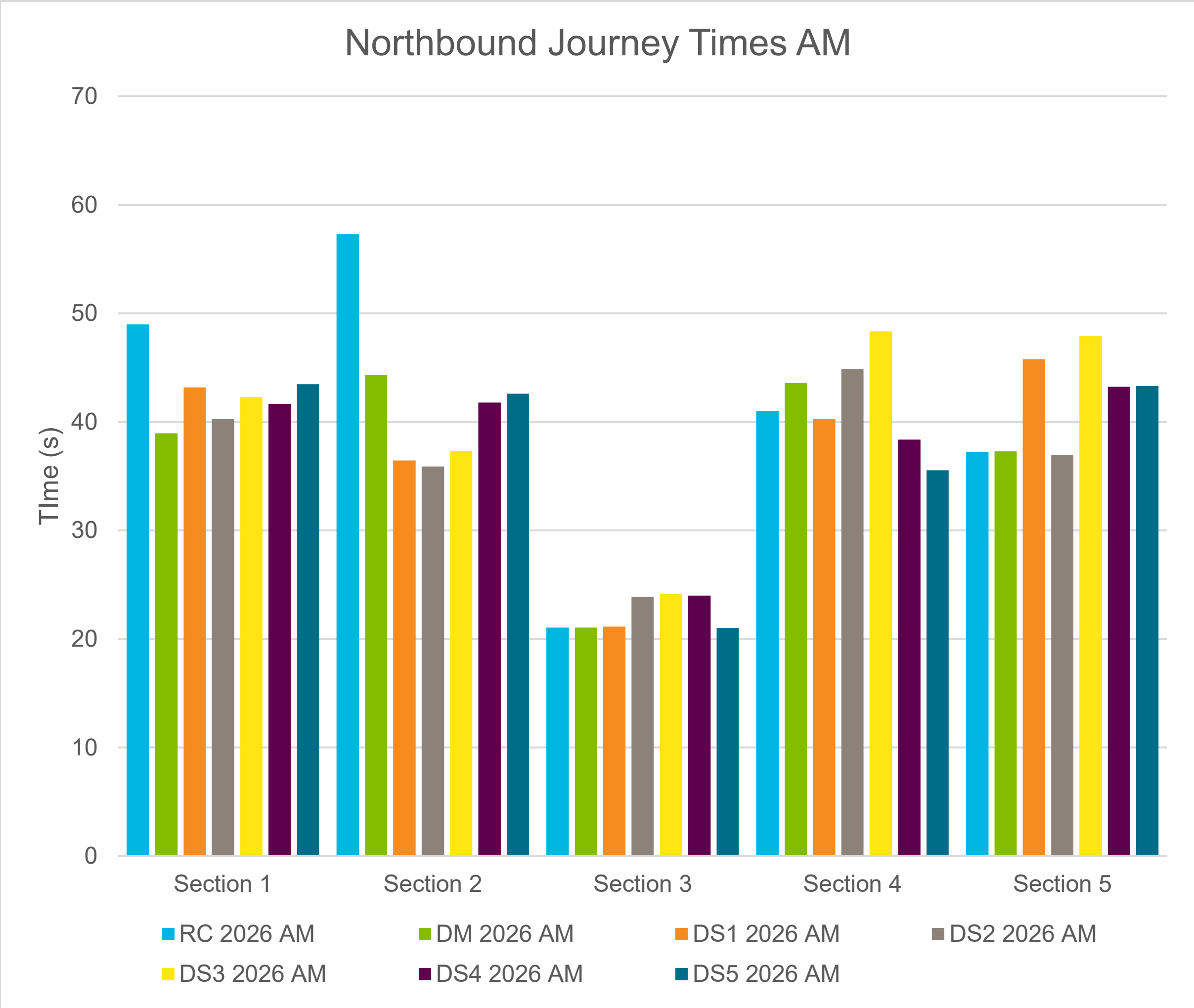

Figure 7. Northbound journey times by section - AM peak.

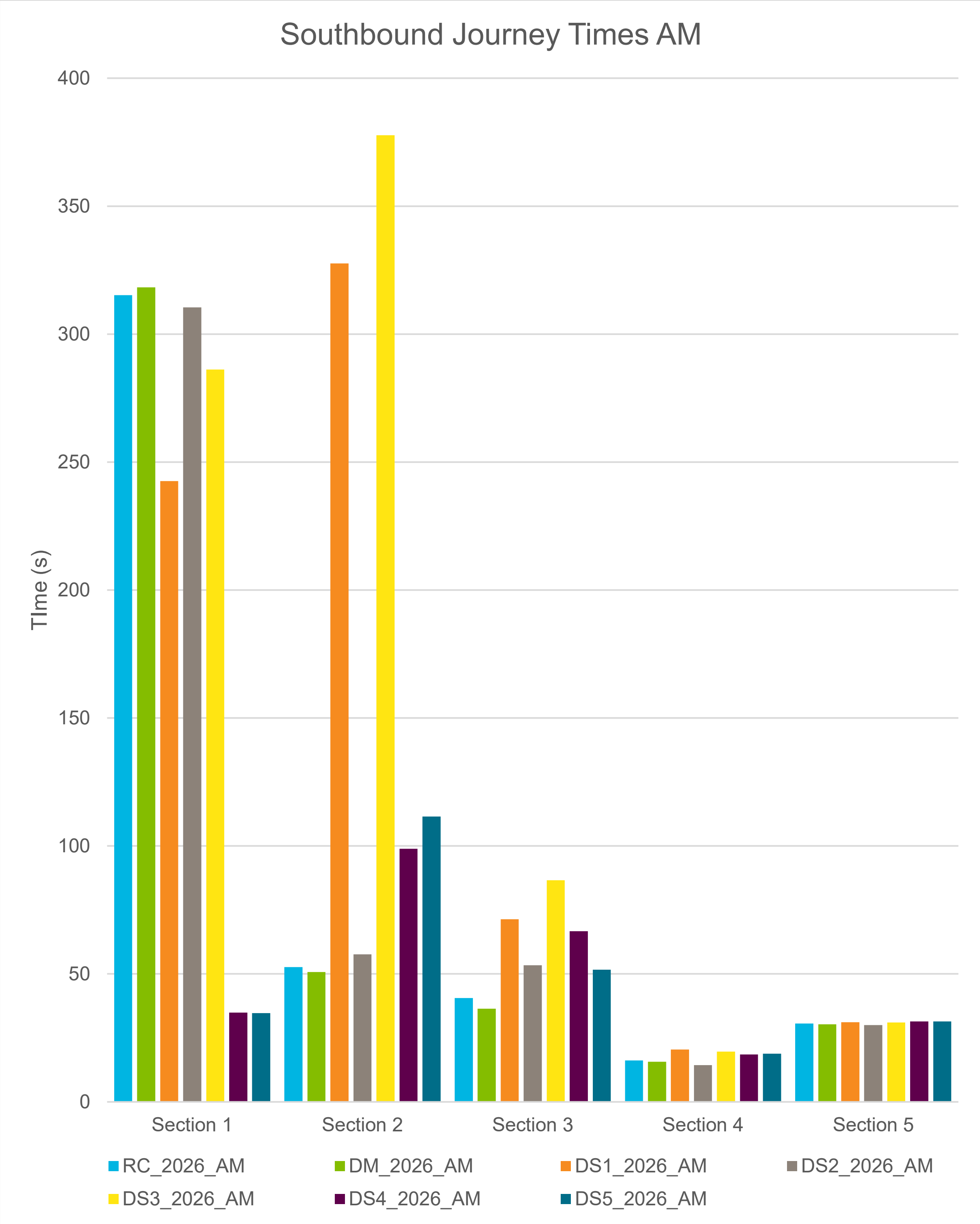

Figure 8. Southbound journey times by section - AM peak.

Do Minimum

There is a slight reduction in the number of vehicles leaving towards Ardley in the Do Something demand compared to Reference Case, which creates more gaps in the southbound traffic approaching Ardley roundabout, resulting in a reduction in journey times in the approach to Ardley roundabout from the northbound off-slip (Section 1). Additionally, there is a reduction of 40 and 30 vehicles accessing Ardley roundabout from the northbound off-slip and the B430 respectively in the Do Something demand, which also contributes to the reduction in journey times observed in the first two sections of this route in the AM peak. This reduction in northbound demand along the A43 is likely to be caused by a wider rerouting, resulting from the additional congestion imposed by the development traffic.

It should be highlighted that this reduction in northbound traffic along the A43 in the AM peak is carried over from the strategic models' flows, thus replicated in the Vissim models. Given the main AM flows are southbound, it seems only reasonable that the additional development demand and associated congestion causes wider rerouting of northbound flows.

Finally, the Do Something models have been observed to allocate a slightly increased green time for the main north-south movements across Cherwell junction caused by the reduction in northbound flows along the A43 (the northbound right turn phase from the A43 onto Cherwell service stations gets activated with a lower frequency) and the increased southbound flows accessing the southbound on-slip (the main southbound phase lasts slightly longer).

The rest of the northbound route does not present significant differences between Reference Case and Do Minimum.

The southbound route presents no significant differences between the Reference Case and Do Minimum scenarios.

Do Something 1

The improvements on Baynard's Green roundabout results in greater flows southbound through this junction onto the A43, this leads to queues building up from downstream junctions. The increased southbound throughput of the junction significantly affects the southbound journey time to access Baynard's Green roundabout. The journey time reductions are 70 seconds in section 1 (to 243 seconds) but in sections 2 and 3 southbound journey times increase by over 28 seconds to 58 seconds and 30 seconds to 53 seconds respectively. What this scheme is effectively causing is a shift of the bottleneck for the southbound movements onto the downstream junctions, particularly Ardley roundabout.

As with the Do Minimum scenario, the increased southbound demand at Cherwell Roundabout results in an increase in green time allocation for the main north-south movements, which causes an 8 second reduction in journey times to 36 seconds in section 2 northbound.

The last northbound section is slightly slower in Do Something 1 due increased flow across Baynard's Green Roundabout.

Do Something 2

There are no significant differences in journey times along the A43 compared to Do Minimum.

Do Something 3

For the northbound movements along the A43, the combination of the mitigation schemes at Baynard's Green roundabout and Padbury junction result in a slight increase in journey time of 11 seconds compared to Do Something 2 in the last section to a total of 48 seconds. This is caused by the additional traffic from the southbound off-slip routing north along the A43.

Whereas, for the southbound movements the additional throughput from the southbound off-slip makes the first section 45s slower to access compared to Do Something 1 to a total of 286s as queues extend back from Padbury roundabout. However, this scenario is 20 seconds faster than Do Something 2 where Baynard's Green has no mitigation and therefore the southbound traffic along the A43 is held back at the first roundabout.

On the second section, the journey times increase by 50 seconds to 377 seconds compared with Do Something 1 and 320 seconds compared to Do Something 2. The first can be explained by the signals at Padbury junction balancing the queues between the southbound off-slip and the A43 southbound while the second is caused by the additional traffic southbound across Baynard's Green roundabout.

As it was described in Scenario 1, this combination of mitigation schemes effectively shifts the bottleneck from Baynard's Green roundabout and Padbury junction onto the downstream junctions.

Do Something 4

The mitigation at Ardley roundabout reduces the queues southbound on the A43 approaching this junction (refer to queue results). This backed up onto Cherwell Junction, affecting the southbound discharge onto the southbound on-slip. With the southbound flow at Cherwell junction unaffected by the queues from Ardley roundabout, the journey times southbound along the A43 are reduced significantly (in section 1 by 300 seconds to a total of 35 seconds, in section 2 by 280 seconds to 99 seconds, and in section 3 by 20 seconds to a total of 67 seconds).

Do Something 5

The comparison between Do Something 1 and 5 is similar to that between Do Something 3 and 4. The reduction in queues approaching Ardley roundabout results in an increase flows southbound through Cherwell junction and a generalised reduction of southbound journey times (in section 1 by 200s to a total 35 seconds, in section 2 by 280 to 111 seconds, and in section 3 by 20 to 52 seconds).

PM Peak

Figure 9 and Figure 10 show the journey time results northbound and southbound across the model for the PM peak.

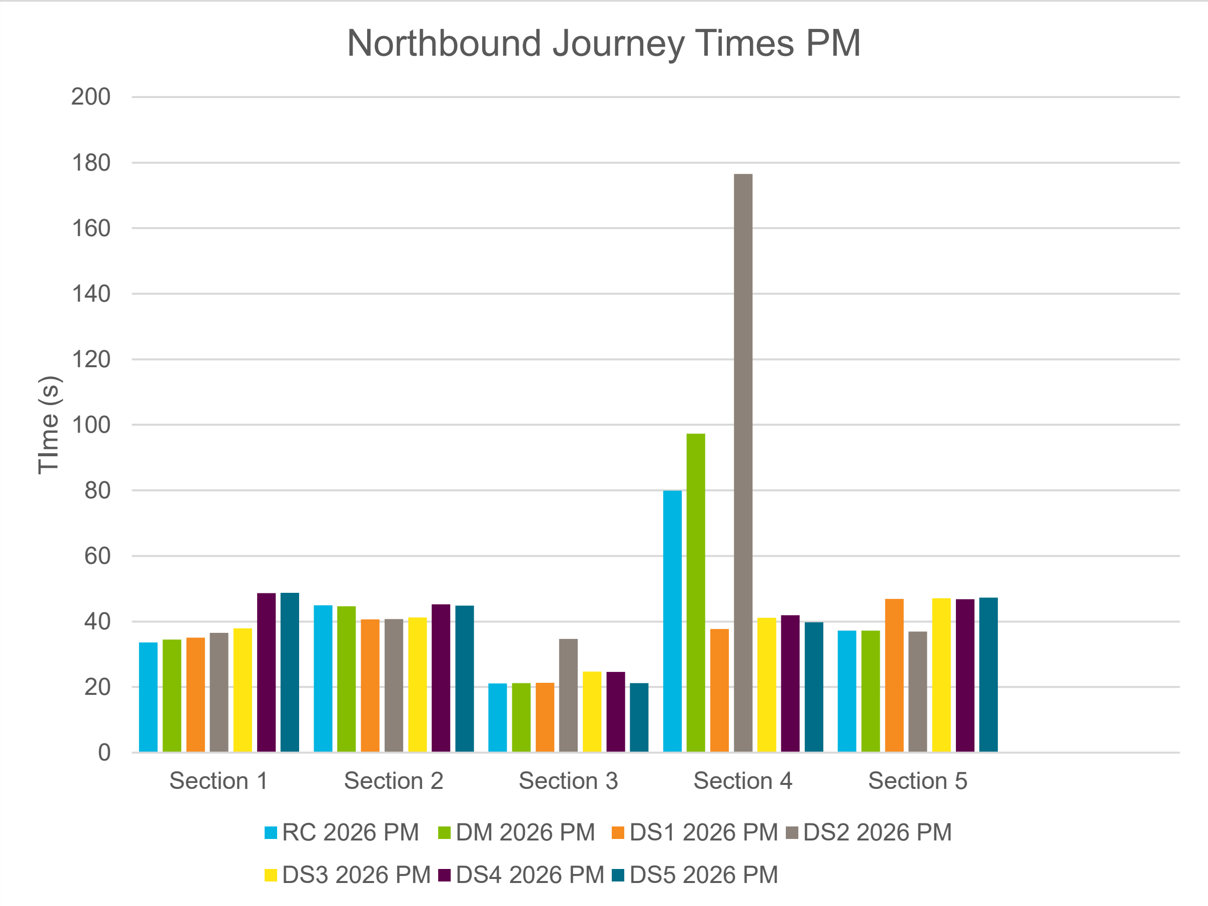

Figure 9. Northbound journey times by section - PM peak.

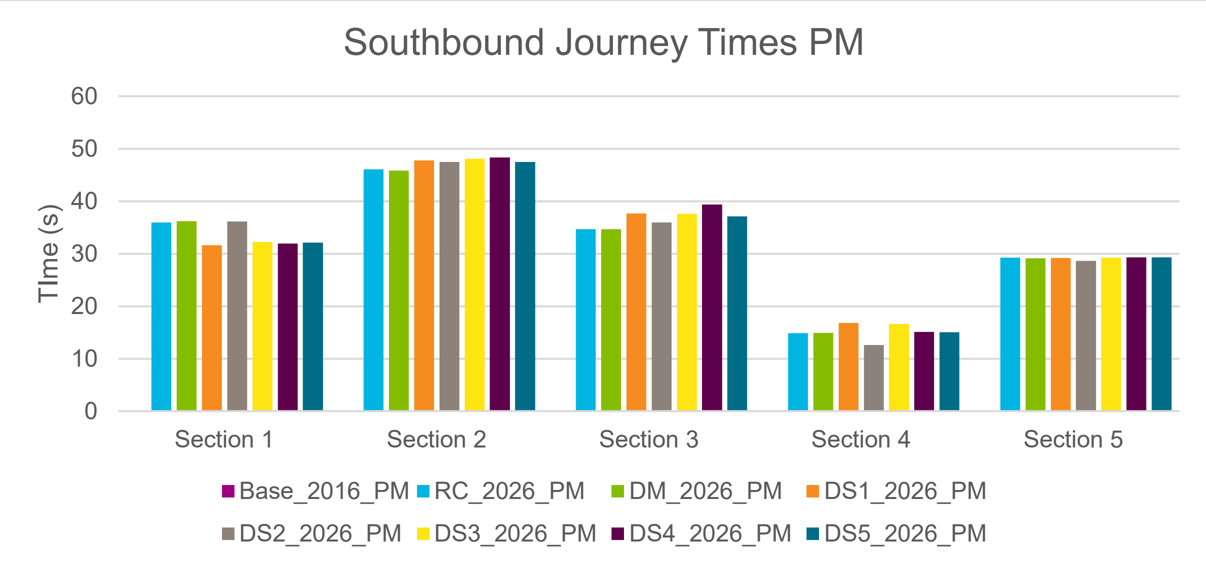

Figure 10. Southbound journey times by section - PM peak.

Do minimum

The only significant difference on journey time results between the Reference Case and Do Minimum scenarios is on the northbound approach to Baynard's Green Roundabout, where there is an increase in journey times of around 10 seconds, caused by the additional northbound demand of the Do Minimum matrices.

Do Something 1

The only significant difference between Do Something 1 and Do Minimum is the reduction in of 55 seconds from 93 seconds for the northbound journey time on the approach to Baynard's Green roundabout (Section 4).

Do Something 2

The only significant impact of the mitigation of Padbury junction is also the journey times to access Baynard's Green roundabout northbound (Section 4), in this case an increase of 84 seconds to 177 seconds due to additional traffic accessing the A43 from the M40 southbound off-slip.

Do Something 3

The mitigation at Baynard's Green roundabout offsets the impact that the mitigation of Padbury junction had on the northbound journey times, allowing the extra vehicles coming from the M40 off slip.

Do Something 4

There are no significant differences between Do Something 3 and Do Something 4 other than model variability.

Do Something 5

There are no significant differences in journey times between scenarios Do Something 1 and Do Something 5.

Queues

AM Peak

Figure 12 shows the AM queue results for selected markers. The complete set of results can be found in Appendix C. Figure 11shows the location of the queue counters in the models. These queue results represent the length of the queue from the queue counter to the back of the queue, spread across all lanes, i.e.: if the queue backs up onto different approaches or lanes, the queue counter will record the information of the longest maximum queue length.

It should be noted that the queue results represent the average queue across the peak hour.

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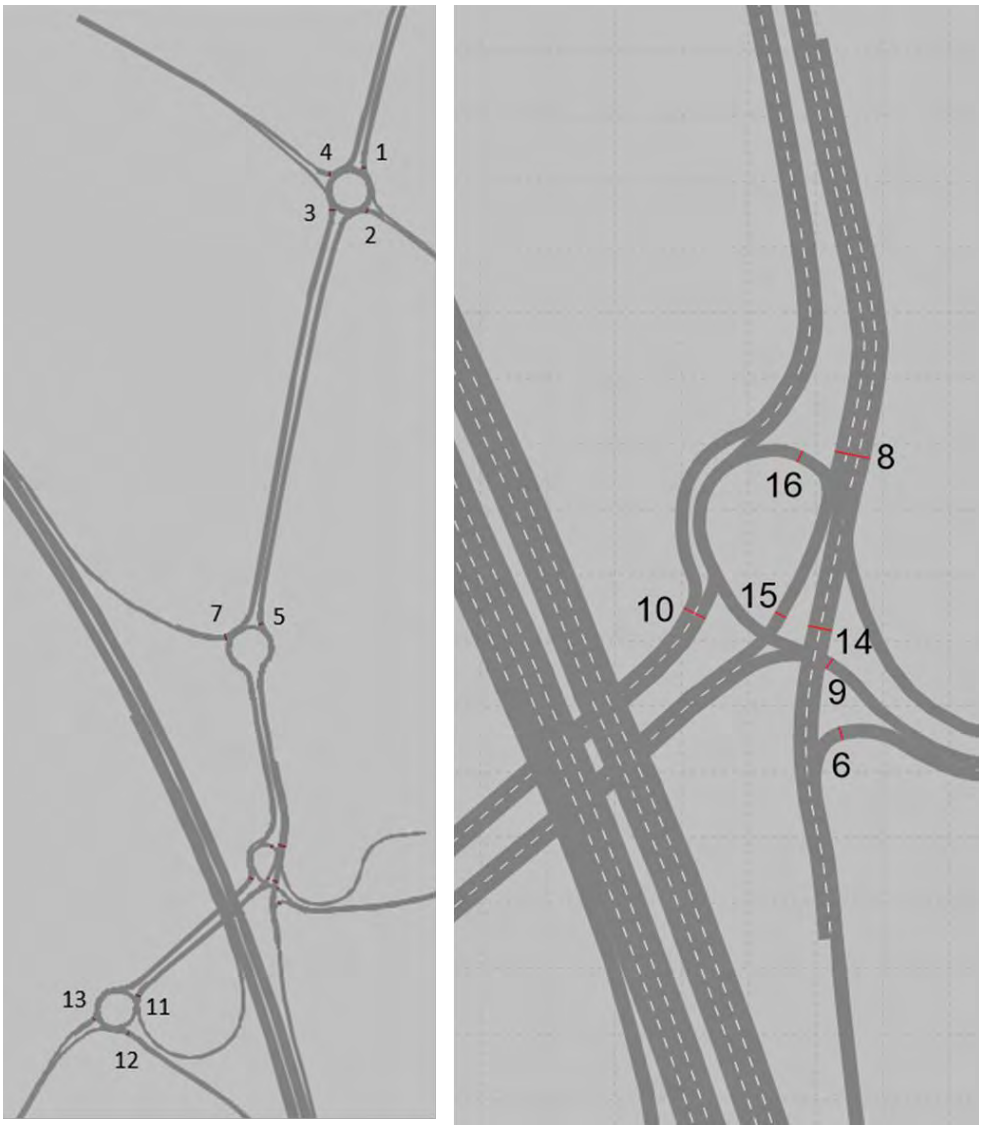

Figure 11. Location of queue counters in the model.

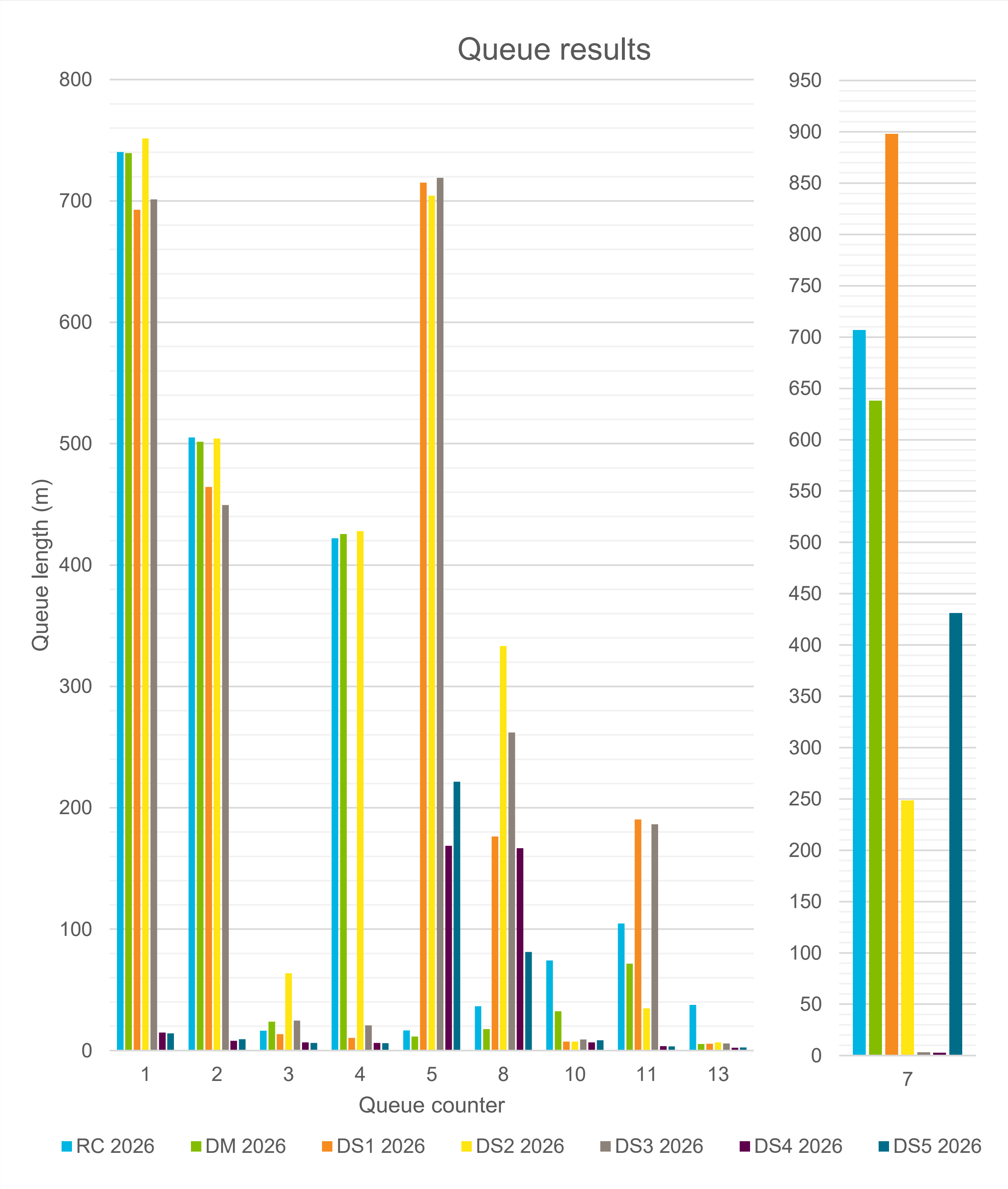

Figure 12. AM queue results for selected markers.

Do Minimum

There are no significant differences in queue results between Reference Case and Do Minimum in queue counters other than 7, 10,11 and 13.

For the southbound off-slip (counter 7), there is a reduction of 70 meters to 638 meters, due to a slight reduction in northbound movements along the A43, which facilitates the discharge from the from the off-slip into the junction.

For queue counter 10, there is a reduction in queues of 40 meters from 74 meters, which is in line with the journey time results northbound shown for this section due to the reduced demand northbound along the A43 and increased green time for the north-south movements at Cherwell junction.

This reduction in demand accessing the A43 northbound from the B430 and the northbound off-slip is also causing the reduction in queues on these approaches (13 and 12 respectively)

There is a slight reduction in demand accessing Ardley from the A43 in the Do Minimum Scenario, which results in a decrease in queues of 44 meters to a total of 190 meters at this approach (queue counter 11).

Do something 1

The implementation of the mitigation at Baynard's Green roundabout results in the following changes in queuing:

- ✓ on the southbound approach (queue counter 1), despite the mitigation achieving a higher discharge from this arm, the queues still extend along the entire length of the link; there is a reduction in latent demand from the zone loading onto this link (refer to latent demand results) but the additional southbound discharge saturates the downstream junctions and the queues build up to reach this junction;
- ✓ on the westbound approach (counter 2), there is a reduction in queues, which in the Reference Case and Do Minimum scenarios extend for the whole length of the link. This results in a reduction in latent demand in the zones loading in this link.
- ✓ queues on the eastbound approach (counter 4), are reduced from the whole length of the link in the Reference Case and Do Something scenarios (with the corresponding reduction in latent demand on this link) to only 10 meters in Do Something 1; and
- ✓ there is no difference in queues on the northbound approach to this junction.

On the southbound approach to Cherwell junction (queue counter 8) the additional southbound traffic along the A43 results in an increase in queues of around 150 meters to a total of 176 meters. The northbound approach to this junction (queue counter 10) experiences a reduction in queues caused by the increased green time for the north-south movements.

The only significant change at the Ardley roundabout is an increase in queues of 120 to 190 meters on the southbound approach caused by the increased southbound traffic along the A43.

Do Something 2

The most significant impact of the mitigation of Padbury junction is the reduction in queues on the M40 southbound off-slip (counter 7), from 630 meters on Do Minimum to 250 meters; it should be noted that the length of the off-slip is 550 meters from the main carriageway to the stop line.

On the other hand, the increase in flow from the southbound off-slip results in an increase in queues on the southbound approach to Cherwell junction, with its queues increasing by 310 to 330 meters compared to Do Minimum. These queues back up onto Padbury roundabout and Baynard's Green roundabout and result in an increase in queues from the eastbound and westbound approaches to Baynard's Green roundabout. It should be noted that given that in both the Reference Case and Do Minimum models the queues extend for the whole length of the link from the start of the AM peak hour, any increase in queues at this approaches would be reflected in an increase in latent demand (refer to Latent demand results in page 32).

Do Something 3

The most significant impacts in queue results of the scenario Do Something 3 are:

- ✓ A reduction of 400 to 20 meters on the eastbound approach to Baynard's Green roundabout compared to Do Something 2; and
- ✓ A further 250 meters reduction to an almost non-existent queue on the southbound off-slip compared to Do Something 2.

These results are in line with those for journey times, the reduction in queues on the southbound off-slip reflects its higher throughput onto the A43, which shows increased levels of saturation.

Do Something 4

The main impact of the mitigation of Ardley roundabout is a reduction in queues on the southbound approach to this junction to virtually 0m. Without the queues from Ardley roundabout backing up onto Cherwell junction, the southbound queues along the A43 are significantly reduced:

- ✓ Queues on all approaches to Baynard's Green roundabout virtually disappear (counters 1 to 4); and
- ✓ Queues on the southbound approach to Cherwell junction (counter 8) are reduced by 100 to 168 meters.

Do Something 5

The comparison between Do Something 1 and 5 is similar to that between Do Something 3 and 4. The reduction of queues approaching Ardley roundabout (180 meters, queue counter 11) results in an unobstructed southbound flow at Cherwell junction and a generalised reduction of southbound queues along the A43:

- ✓ Queues on all approaches to Baynard's Green roundabout virtually disappear;
- ✓ Queues on the southbound approach to Cherwell junction (counter 8) are reduced to 81 meters; and
- ✓ Queues on the M40 southbound off-slip are reduced to 430 meters .

PM Peak

Figure 13 shows the queue results for the PM peak.

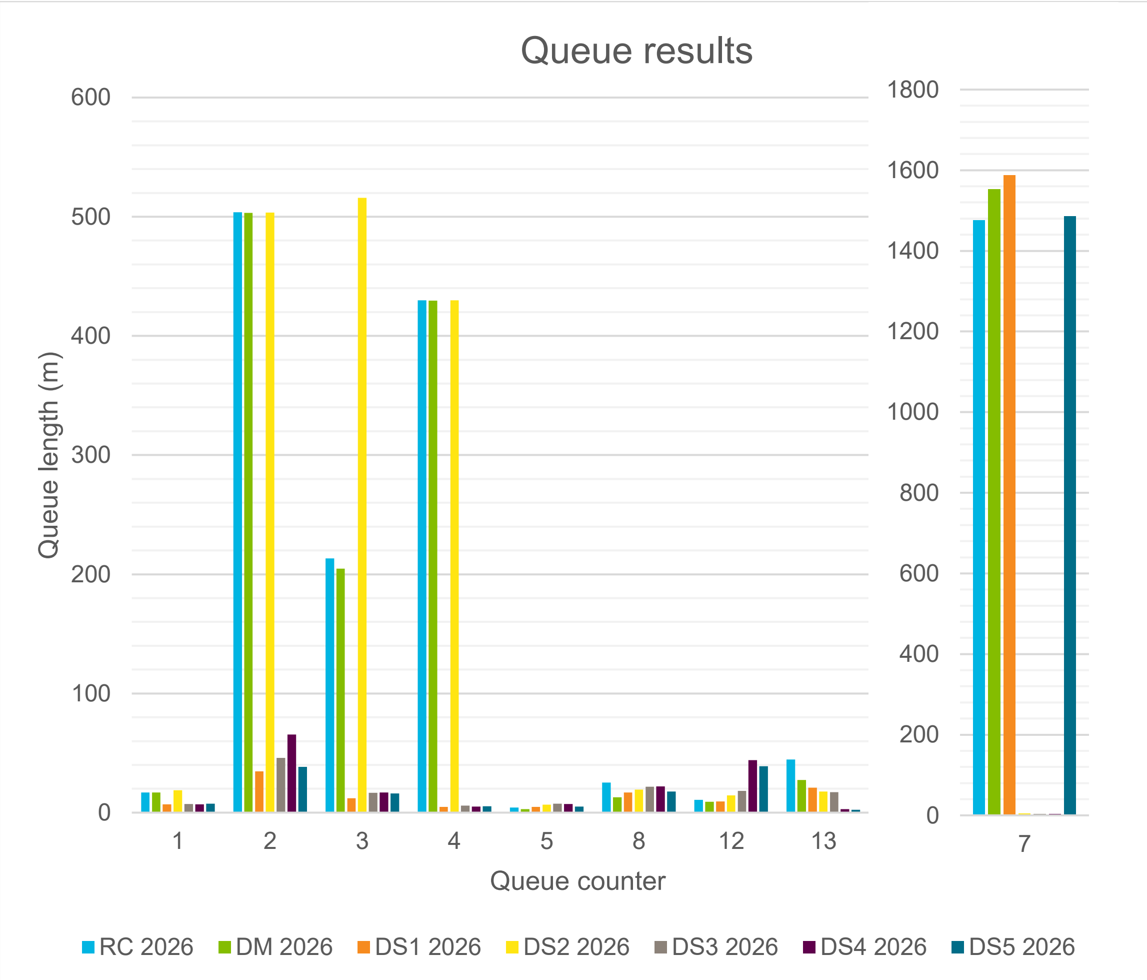

Figure 13. PM queue results for selected markers.

Do Minimum

There are no significant differences in queues between Reference Case and Do Minimum except an increase of 80m on the A40 southbound off-slip (counter 7), from 1476 meters .

Do something 1

The mitigation at Baynard's Green roundabout results in a significant reduction in queues at the approaches to this junction due to its better operation and increased capacity:

- ✓ westbound approach, reduction from the whole length of the link to 35 meters;
- ✓ eastbound approach, reduction from the whole length of the link to almost inexistent; and
- ✓ northbound approach, reduction of 200 meters to almost inexistent.

Due to the additional flows along the A43, there is an increase in queues on the southbound off-slip (counter 7 – 40 meters).

Do Something 2

The most significant impact of the mitigation at Padbury junction is a reduction of queues on the M40 southbound off-slip from over 1500 meters in Do Minimum to under 20 meters.

The additional traffic accessing the A43 from the southbound off-slip results in an increase in queues on the northbound approach to Baynard's Green roundabout (counter 3 – 516 meters)

Do Something 3

The combination of mitigation schemes at Baynard's Green and Padbury junctions' results remove the queues created by the additional demand released from the M40 off-slip on the northbound approach to Baynard's Green roundabout (counter 3). As in the Do Something 1 scenario, the queues at Baynard's Green almost disappear.

Do Something 4

There are no significant differences in queuing between Scenarios 3 and 4 in the PM peak.

Do Something 5

There are no significant changes in queues between Do Something 1 and Do Something 5, with the exception of a decrease on the southbound off-slip (by 100 meters to a total of 1486 meters – counter 7).

Network Performance

Latent demand

Figure 14 shows the latent demand results for AM and PM.

Almost all latent demand in the models is located on the approaches to Baynard's Green roundabout; its mitigation in the AM in scenarios Do Something 1, 4 and 5 achieves a reduction, but the increase in traffic from the southbound off-slip in scenario Do Something 2 leads to even further over-saturation of the approaches to Baynard's Green roundabout.

In PM, the mitigation of Baynard's Green reduces the latent demand observed on the approaches to this junction.

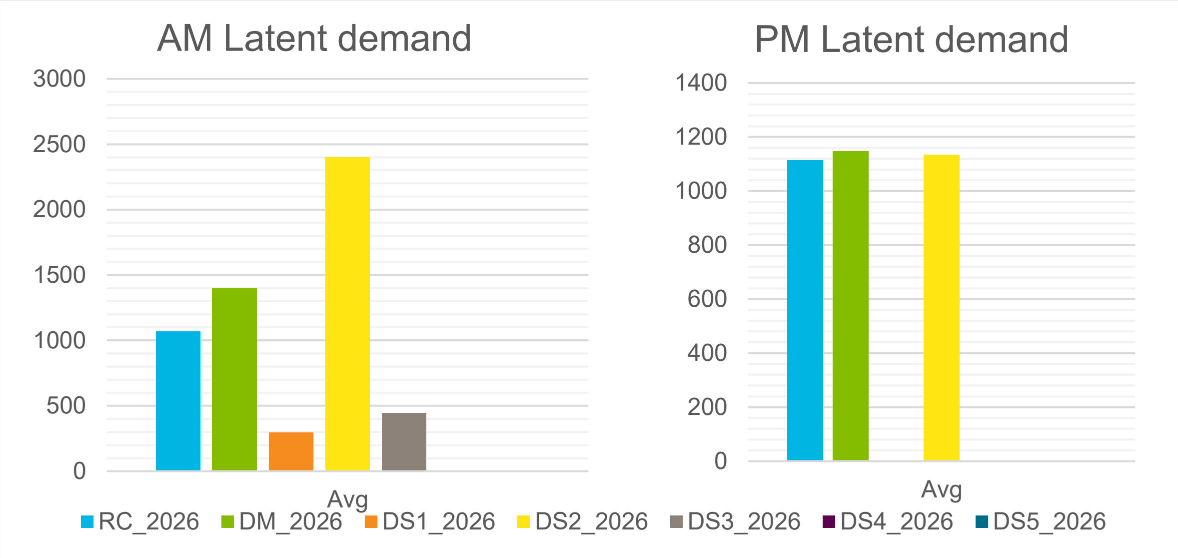

Figure 14. Latent demand results.

Total Delay

Figure 15 shows the total recorded delay for all vehicles that have entered the network at the end of the evaluation period, plus the latent delay[2]. The overall delay results provide a general view of the impact caused by the Heyford Park Development and the overall improvement provided by each scenario.

Scenario 1 achieves a 30% and 65% reduction in delays in the AM and PM peak respectively, mainly in the for of latent delay on the approaches to Baynard’s Green roundabout.

Scenario 2 fails to achieve a reduction in overall delays; the delay experienced by vehicles queuing on the M40 southbound off-slip in the Reference Case and Do Minimum scenarios now occurs along the A43 for those same vehicles, and increase the latent delay on the approaches to Baynard’s Green roundabout.

Scenario 3 results in a 30% reduction of overall delays in the AM peak, as the reduction in queues on the southbound off-slip is countered by an increase in congestion of the A43 southbound; and 85% decrease in the PM peak as congestion along the A43 gets reduced significantly in this scenario.

Scenario 4 results in additional reductions in delays, 85% in both AM and PM compared to Reference Case, as the improvements at Ardley junction improves the southbound movements along the A43.

Scenario 5 experiences an 80% reduction in delays in the AM peak compared to Reference Case, mainly attributed to the elimination of latent delay on the approaches to Baynard’s Green roundabout. In the PM peak, the reduction is of 65% compared to Reference Case, due to a reduction in latent demand on the approaches to Baynard’s Green roundabout.

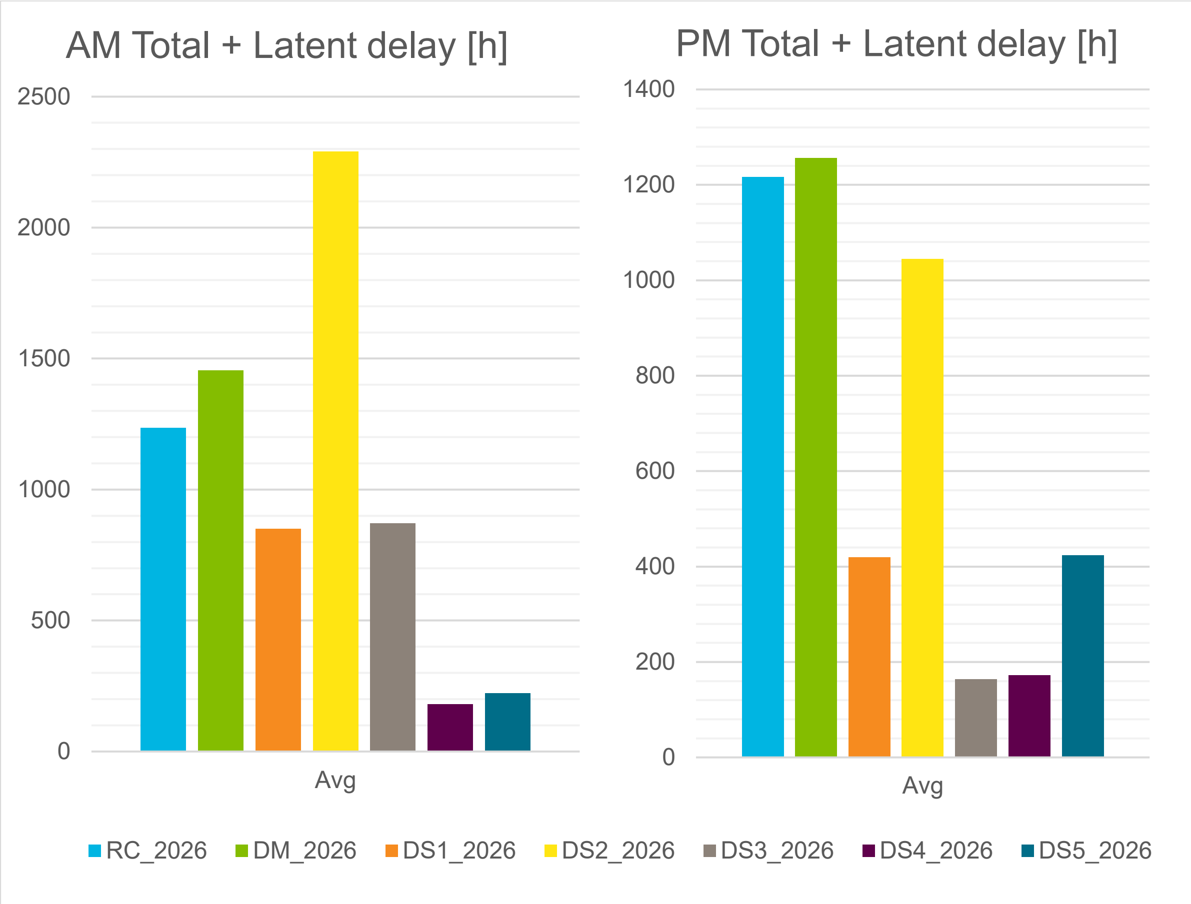

Figure 15. Addition of total recorded delay and latent delay[2].

[2] Latent delay is defined as , defined as the overall time waited by vehicles between their specified start time and the actual time when they are loaded in the network, or the end of the evaluation period – Vissim 5.40 – User Manual.

Summary & Conclusions

05

Summary

The results can be summarised as follows:

Do Something 1

The mitigation at Baynard's Green roundabout results in:

- ✓ a reduction of queues on all approaches to the junction and a significant reduction of the latent demand in the model;
- ✗ the increase in flow through Baynard's Green lead to an increase in journey times along the A43 between Baynard's Green and Ardley roundabout;
- ✗ the additional demand southbound on Ardley roundabout create queues that back up onto Cherwell junction in the AM peak, these queues affect the southbound flows along the A43.

Do Something 2

The mitigation at Padbury junction results in:

- ✓ the elimination of queuing on the M40 southbound off-slip;
- ✗ the increase in flow from the M40 southbound off-slip results in longer journey times and queues along the A43;
- ✗ the additional demand southbound on Ardley roundabout create queues that extend back to Padbury and Baynard's Green junctions in the AM peak, reducing the capacity and increasing in latent demand on the approaches to Baynard's Green roundabout.

Do Something 3

The combination of the mitigation schemes at Baynard's Green and Padbury junctions result in:

- ✓ a reduction of queues on all approaches to Baynard's Green junction and a significant reduction of the latent demand in the model;
- ✓ the elimination of queuing on the M40 southbound off-slip;
- ✗ the increase in flows across Baynard's Green and the southbound off-slip results in longer journey times and queues along the A43;
- ✗ the additional demand on the southbound approach to Ardley roundabout results in queues backing up on to Cherwell junction, affecting the southbound movements along the A43.

Do Something 4

The combination of the mitigation schemes at all three junctions result in:

- ✓ a reduction of queues on all approaches to Baynard's Green and the elimination of the latent demand in the model;
- ✓ the elimination of queuing on the M40 southbound off-slip;
- ✓ a reduction in southbound queues on the A43 approaching Ardley roundabout, which no longer back up to Cherwell junction;
- ✓ a reduction in journey times southbound along the A43 as the access to the southbound on-slip is unaffected by queues from Ardley junction;

Do something 5

The combination of the mitigation schemes at Baynard's Green and Ardley junctions result in:

- ✓ a reduction of queues on all approaches to Baynard's Green and the elimination of the latent demand in the model;

- ✓ a reduction in southbound queues on the A43 approaching Ardley roundabout, which no longer affect Cherwell junction;
- ✓ a reduction in journey times southbound along the A43 as the access to the southbound on-slip is unaffected by queues from Ardley junction; and
- a slight reduction in queues on the southbound off-slip compared to Do Minimum in AM, due to the better operation of the A43.

Appendices

06

Appendix A – O-D Matrices

A.1 Reference Case AM

* time interval in hours [hh.mm]:
6.45 7.00
* Scaling factor:
1
* number of zones:
7
* zones:

1	2	3	4	5	6	7
0	66	17	274	146	2	6
67	0	0	0	0	41	32
7	6	0	38	12	5	3
113	0	13	12	2	475	5
39	6	17	14	0	69	1
10	34	39	841	41	5	1
11	59	0	25	2	0	0

* time interval in hours [hh.mm]:
7.00 7.15
* Scaling factor:
1
* number of zones:
7
* zones:

1	2	3	4	5	6	7
0	72	7	246	155	11	8
85	0	0	0	11	30	46
5	1	0	34	19	14	5
147	1	42	3	6	564	11
48	9	2	12	0	84	7
5	46	41	786	43	4	2
8	60	0	19	8	1	0

* time interval in hours [hh.mm]:
7.15 7.30
* Scaling factor:
1
* number of zones:
7
* zones:

1	2	3	4	5	6	7
0	85	13	230	156	9	16
80	0	0	3	7	35	51
8	4	0	39	12	21	1
176	1	43	10	7	606	8
51	0	4	20	0	102	4
13	47	24	813	63	1	6
29	73	0	38	5	0	0

* time interval in hours [hh.mm]:
7.30 7.45
* Scaling factor:
1
* number of zones:
7
* zones:

1	2	3	4	5	6	7

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0	41	9	171	108	7	9
77	0	0	2	10	28	64
10	4	0	44	14	21	0
168	1	52	9	18	641	8
48	2	2	10	0	119	8
11	53	38	722	60	4	3
22	79	1	50	10	0	1

* time interval in hours [hh.mm]:
7.45 8.00
* Scaling factor:
1
* number of zones:
7
* zones:

1	2	3	4	5	6	7
0	79	10	241	118	16	9
103	0	0	5	3	29	66
16	1	0	43	10	36	0
189	1	34	11	17	710	13
56	8	4	17	0	102	4
10	42	42	791	64	3	1
24	71	0	51	4	0	1

* time interval in hours [hh.mm]:
8.00 8.15
* Scaling factor:
1
* number of zones:
7
* zones:

1	2	3	4	5	6	7
0	55	13	246	98	14	13
74	0	5	3	2	54	72
11	0	0	54	14	22	1
211	1	26	9	15	670	9
59	2	10	12	0	98	6
20	38	43	648	88	6	3
29	109	0	43	3	1	1

* time interval in hours [hh.mm]:
8.15 8.30
* Scaling factor:
1
* number of zones:
7
* zones:

1	2	3	4	5	6	7
0	58	16	217	109	21	13
53	0	2	0	6	31	63
6	0	0	42	14	28	0
174	1	34	8	4	562	10
48	6	5	12	0	89	4
10	50	35	729	62	1	4
24	68	0	33	7	0	3

* time interval in hours [hh.mm]:
8.30 8.45
* Scaling factor:
1
* number of zones:
7
* zones:

1	2	3	4	5	6	7

0	57	15	198	102	14	6
49	0	4	0	3	29	68
11	1	0	44	12	23	0
175	1	43	2	7	560	17
49	6	13	7	0	62	12
10	31	28	629	60	4	2
15	87	1	31	5	0	0

* time interval in hours [hh.mm]:
8.45   9.00
* Scaling factor:
1
* number of zones:
7
* zones:

1	2	3	4	5	6	7
0	51	13	202	90	22	10
40	2	5	5	9	19	46
12	0	0	50	9	35	0
146	0	38	1	16	474	11
29	0	9	2	0	63	6
11	34	34	696	46	1	2
21	72	0	28	2	0	0

* time interval in hours [hh.mm]:
9.00   9.15
* Scaling factor:
1
* number of zones:
7
* zones:

1	2	3	4	5	6	7
0	66	17	274	146	2	6
67	0	0	0	0	41	32
7	6	0	38	12	5	3
113	0	13	12	2	475	5
39	6	17	14	0	69	1
10	34	39	841	41	5	1
11	59	0	25	2	0	0

A.2 Reference Case PM

* time interval in hours [hh.mm]:
15.30   15.45
* Scaling factor:
1
* number of zones:
7
* zones:

1	2	3	4	5	6	7
0	47	15	193	55	19	6
94	0	0	4	0	33	80
15	0	0	59	7	27	0
250	1	47	12	12	887	16
31	1	2	5	0	33	4
9	15	38	604	31	4	5
18	64	1	15	6	1	0

* time interval in hours [hh.mm]:
15.45   16.00
* Scaling factor:
1
* number of zones:
7

* zones:

1	2	3	4	5	6	7
0	45	30	196	61	21	2
85	0	12	2	6	33	76
21	3	0	53	2	43	0
272	0	23	4	17	856	19
51	1	0	2	0	31	3
9	14	34	674	27	0	2
19	81	0	21	2	0	0

* time interval in hours [hh.mm]:
16.00 16.15
* Scaling factor:
1
* number of zones:
7
* zones:

1	2	3	4	5	6	7
0	52	11	232	50	13	10
107	0	4	2	6	36	65
14	0	0	54	7	38	0
264	1	48	8	12	881	11
68	1	7	6	0	55	1
7	16	51	709	40	0	3
20	90	0	21	4	0	0

* time interval in hours [hh.mm]:
16.15 16.30
* Scaling factor:
1
* number of zones:
7
* zones:

1	2	3	4	5	6	7
0	44	27	189	65	15	7
117	0	6	0	3	42	82
23	0	0	54	5	32	0
263	0	43	14	6	932	7
101	5	2	2	0	40	5
13	28	31	739	33	1	3
23	87	0	13	4	0	2

* time interval in hours [hh.mm]:
16.30 16.45
* Scaling factor:
1
* number of zones:
7
* zones:

1	2	3	4	5	6	7
1	76	15	202	57	22	9
124	0	11	3	0	41	85
26	1	0	43	4	33	4
299	0	28	16	14	933	7
89	1	2	2	0	56	4
11	22	41	746	31	5	5
16	88	0	28	5	0	1

* time interval in hours [hh.mm]:
16.45 17.00
* Scaling factor:
1
* number of zones:
7

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* zones:

1	2	3	4	5	6	7
0	81	15	243	45	22	9
143	0	4	4	3	25	103
21	0	0	47	0	32	0
311	0	44	16	9	973	7
86	1	3	7	0	52	4
24	34	29	686	61	2	2
19	82	0	16	7	0	2

* time interval in hours [hh.mm]:
17.00 17.15
* Scaling factor:
1
* number of zones:
7
* zones:

1	2	3	4	5	6	7
0	85	29	224	61	23	6
147	0	5	0	5	35	78
23	0	0	44	4	16	1
302	0	29	18	18	878	16
107	1	6	2	0	38	2
24	18	37	677	36	1	7
17	90	2	10	2	0	5

* time interval in hours [hh.mm]:
17.15 17.30
* Scaling factor:
1
* number of zones:
7
* zones:

1	2	3	4	5	6	7
1	76	20	238	55	17	9
133	0	2	2	2	50	105
15	1	0	37	3	41	3
324	1	41	17	18	955	13
100	2	3	2	0	53	1
6	25	28	709	64	4	7
21	102	0	11	8	0	2

* time interval in hours [hh.mm]:
17.30 17.45
* Scaling factor:
1
* number of zones:
7
* zones:

1	2	3	4	5	6	7
0	69	14	205	55	17	11
110	0	0	0	10	48	91
38	0	0	46	9	23	0
312	0	34	16	19	912	14
97	1	4	2	0	53	5
9	23	43	723	32	0	4
21	96	0	18	12	1	2

* time interval in hours [hh.mm]:
17.45 18.00
* Scaling factor:
1
* number of zones:
7

* zones:

1	2	3	4	5	6	7
0	47	15	193	55	19	6
94	0	0	4	0	33	80
15	0	0	59	7	27	0
250	1	47	12	12	887	16
31	1	2	5	0	33	4
9	15	38	604	31	4	5
18	64	1	15	6	1	0

A.3 Do Minimum AM

* time interval in hours [hh.mm]:
6.45 7.00
* Scaling factor:
1
* number of zones:
7
* zones:

1	2	3	4	5	6	7
0	77	18	293	142	2	7
70	0	0	0	0	42	37
7	6	0	38	11	5	3
120	0	14	12	2	483	6
37	6	15	13	0	63	1
10	36	38	837	37	5	1
11	62	0	24	2	0	0

* time interval in hours [hh.mm]:
7.00 7.15
* Scaling factor:
1
* number of zones:
7
* zones:

1	2	3	4	5	6	7
0	84	7	265	152	12	9
89	0	0	0	11	31	51
5	1	0	35	18	14	5
155	1	43	4	6	572	12
46	10	2	11	0	76	7
5	49	40	782	39	4	2
8	63	0	18	7	1	0

* time interval in hours [hh.mm]:
7.15 7.30
* Scaling factor:
1
* number of zones:
7
* zones:

1	2	3	4	5	6	7
0	98	13	249	154	9	18
84	0	0	3	7	35	57
8	5	0	40	12	20	1
185	1	44	11	6	615	9
49	0	4	19	0	94	4
13	50	24	811	57	1	7
28	76	0	38	5	0	0

* time interval in hours [hh.mm]:
7.30 7.45
* Scaling factor:

1
* number of zones:
7
* zones:

1	2	3	4	5	6	7
0	49	10	191	108	8	10
80	0	0	2	9	28	70
11	5	0	45	13	21	0
175	1	53	9	17	650	9
46	2	2	9	0	110	8
11	57	37	720	53	4	3
21	84	1	49	9	0	1

* time interval in hours [hh.mm]:
7.45 8.00
* Scaling factor:
1
* number of zones:
7
* zones:

1	2	3	4	5	6	7
0	92	11	261	115	17	11
107	0	0	5	3	29	72
16	1	0	44	9	36	0
198	1	34	12	16	719	15
53	8	3	16	0	93	4
10	45	41	789	58	2	1
23	75	0	50	4	0	1

* time interval in hours [hh.mm]:
8.00 8.15
* Scaling factor:
1
* number of zones:
7
* zones:

1	2	3	4	5	6	7
0	65	14	265	97	15	14
77	0	5	3	2	55	78
11	0	0	55	13	22	1
221	1	26	10	15	678	10
56	2	10	11	0	91	6
20	41	43	646	81	6	3
28	115	0	41	3	1	1

* time interval in hours [hh.mm]:
8.15 8.30
* Scaling factor:
1
* number of zones:
7
* zones:

1	2	3	4	5	6	7
0	69	16	234	108	22	15
56	0	2	0	5	32	68
6	0	0	44	13	28	0
182	1	34	9	3	569	11
45	6	5	12	0	82	4
10	53	34	727	56	1	4
24	71	0	32	7	0	3

* time interval in hours [hh.mm]:
8.30 8.45
* Scaling factor:

1
* number of zones:
7
* zones:

1	2	3	4	5	6	7
0	67	16	214	100	14	6
51	0	4	0	3	29	74
11	1	0	45	11	23	0
183	1	44	2	7	566	18
46	6	11	7	0	56	12
11	34	27	627	55	4	2
15	91	1	30	5	0	0

* time interval in hours [hh.mm]:
8.45 9.00
* Scaling factor:
1
* number of zones:
7
* zones:

1	2	3	4	5	6	7
0	60	14	218	88	22	12
42	2	5	6	8	20	51
12	0	0	51	8	34	0
154	0	39	1	15	480	12
27	0	8	2	0	56	6
11	37	33	694	41	1	2
20	76	0	27	2	0	0

* time interval in hours [hh.mm]:
9.00 9.15
* Scaling factor:
1
* number of zones:
7
* zones:

1	2	3	4	5	6	7
0	77	18	293	142	2	7
70	0	0	0	0	42	37
7	6	0	38	11	5	3
120	0	14	12	2	483	6
37	6	15	13	0	63	1
10	36	38	837	37	5	1
11	62	0	24	2	0	0

A.4 Do Minimum PM

* time interval in hours [hh.mm]:
15.30 15.45
* Scaling factor:
1
* number of zones:
7
* zones:

1	2	3	4	5	6	7
0	45	15	194	54	19	7
93	0	0	4	0	32	80
15	0	0	59	7	27	0
251	1	47	12	12	890	16
32	1	2	5	0	35	4
10	14	38	603	30	4	5
19	66	1	16	6	2	0

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* time interval in hours [hh.mm]:
15.45 16.00
* Scaling factor:
1
* number of zones:
7
* zones:

1	2	3	4	5	6	7
0	43	31	197	60	22	2
84	0	12	2	6	32	77
22	3	0	53	2	44	0
273	0	23	4	17	860	20
54	1	0	2	0	33	3
9	14	34	672	27	0	2
20	83	0	23	2	0	0

* time interval in hours [hh.mm]:
16.00 16.15
* Scaling factor:
1
* number of zones:
7
* zones:

1	2	3	4	5	6	7
0	50	11	232	49	13	10
106	0	4	2	6	36	66
14	0	0	54	7	39	0
265	1	48	8	12	885	11
70	1	7	6	0	57	1
7	16	51	707	39	0	3
21	92	0	22	4	0	0

* time interval in hours [hh.mm]:
16.15 16.30
* Scaling factor:
1
* number of zones:
7
* zones:

1	2	3	4	5	6	7
0	43	27	189	63	15	7
115	0	6	0	3	42	83
23	0	0	53	5	32	0
263	0	43	14	5	937	7
104	5	2	2	0	41	5
14	27	31	738	32	1	3
25	89	0	14	4	0	2

* time interval in hours [hh.mm]:
16.30 16.45
* Scaling factor:
1
* number of zones:
7
* zones:

1	2	3	4	5	6	7
1	74	15	202	56	23	9
123	0	11	3	0	41	86
27	1	0	43	4	33	4
300	0	28	16	14	937	7
92	1	2	2	0	58	4
12	21	41	744	31	5	5
18	90	0	29	5	0	1

* time interval in hours [hh.mm]:
16.45 17.00
* Scaling factor:
1
* number of zones:
7
* zones:

1	2	3	4	5	6	7
0	79	15	243	44	22	9
142	0	4	4	3	24	103
21	0	0	47	0	33	0
312	0	44	16	9	977	7
89	1	3	7	0	54	5
24	33	29	684	60	3	2
20	84	0	17	7	0	2

* time interval in hours [hh.mm]:
17.00 17.15
* Scaling factor:
1
* number of zones:
7
* zones:

1	2	3	4	5	6	7
0	83	29	225	60	23	6
146	0	5	0	5	35	79
24	0	0	44	4	16	1
302	0	29	18	17	882	16
110	1	7	2	0	39	3
25	17	37	676	35	1	7
18	93	2	11	2	0	5

* time interval in hours [hh.mm]:
17.15 17.30
* Scaling factor:
1
* number of zones:
7
* zones:

1	2	3	4	5	6	7
1	73	20	238	54	17	9
132	0	2	2	2	50	105
15	1	0	37	3	41	3
324	1	40	17	17	960	13
104	2	3	2	0	55	2
6	24	28	708	63	4	7
22	105	0	11	8	0	2

* time interval in hours [hh.mm]:
17.30 17.45
* Scaling factor:
1
* number of zones:
7
* zones:

1	2	3	4	5	6	7
0	67	14	206	54	17	11
110	0	0	0	10	48	91
38	0	0	46	9	23	0
313	0	34	15	19	917	14
100	1	4	2	0	55	6
9	22	44	721	31	0	4
22	98	0	19	13	2	2

* time interval in hours [hh.mm]:
17.45 18.00
* Scaling factor:
1
* number of zones:
7
* zones:

1	2	3	4	5	6	7
0	45	15	194	54	19	7
93	0	0	4	0	32	80
15	0	0	59	7	27	0
251	1	47	12	12	890	16
32	1	2	5	0	35	4
10	14	38	603	30	4	5
19	66	1	16	6	2	0

Appendix B – TEMPro growth factors

To extract growth factors, TEMPRO v7.2 has been interrogated for the origin and destination trip ends

The most updated National Transport Model (NTM) Dataset AF15 has been used in order to extract separate growth predictions for the following relevant areas within the M40 J10 network:

– Northampton;
– Milton Keynes;
– Oxford;
– West Oxfordshire;
– Cherwell; and
– South Northamptonshire.

A weighted average of the districts listed above has been applied to ascertain the final growth factors that have then been used to compare with the growth from the strategic model. Individual weights for each zone have been extracted, based on the distance to the M40 J10 and the number of household and jobs for each district.

These weights are tabulated below in Table 5.

Table 5. NTEM Areas – 2016-2018 Weights

NTEM Area	Weight (%)
Northampton	9%
Milton Keynes	3%
Oxford	19%
West Oxfordshire	9%
Cherwell	52%
South Northamptonshire	7%

By applying these weights together with the individual growth factor for each of the areas considered, final growth factors are derived. These are shown below in Table 6.

Table 6. TEMPRO growth factors – 2016-2018

Peak Period	NTEM Factors
AM Peak	1.1383
PM Peak	1.1369

Areas covered by TEMPRO zones mentioned above are shown in Figure 16.