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: M1 Junction 14 / Northfields Roundabout Model	**-**	**-**	**2011**	**0**	**0**	**100.0**	**488.8**	**0.0**	**588.8**	**-**	**-**	**-**	**-**
J1: M1 Junction 14	**-**	**-**	**2011**	**0**	**0**	**36.4**	**135.7**	**0.0**	**172.1**	**-**	**-**	**-**	**-**
1/2+1/1	1999	1997	-	-	-	9.6	25.8	-	35.3	63.7	33.2	25.8	59.0
1/3	876	876	-	-	-	2.9	2.5	-	5.4	22.2	10.8	2.5	13.3
2/1	1113	1113	-	-	-	2.8	0.0	-	2.8	9.1	18.6	0.0	18.6
2/2	876	876	-	-	-	0.1	0.0	-	0.1	0.3	0.3	0.0	0.3
3/2+3/1	813	794	-	-	-	5.5	13.0	-	18.6	82.2	8.8	13.0	21.9
3/3	428	428	-	-	-	2.6	3.1	-	5.7	48.1	6.8	3.1	9.9
4/1	579	579	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
4/2	929	929	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
4/3	428	428	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
5/1	441	438	438	0	0	1.0	11.2	-	12.3	100.0	18.5	11.2	29.7
5/2+5/3	843	786	1573	0	0	3.1	34.5	-	37.6	160.6	20.7	34.5	55.2
6/1	820	820	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/2	476	390	-	-	-	5.6	45.6	-	51.2	387.1	9.4	45.6	55.0
7/1	841	841	-	-	-	0.7	0.0	-	0.7	2.9	2.9	0.0	2.9
7/2+7/3	864	864	-	-	-	0.6	0.0	-	0.6	2.4	10.1	0.0	10.1
8/1	134	134	-	-	-	0.9	0.0	-	0.9	25.6	2.2	0.0	2.2
8/2+8/3	523	523	-	-	-	1.0	0.0	-	1.0	6.6	2.2	0.0	2.2
9/1	1276	1276	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
10/1	798	798	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
10/2	657	657	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
11/1	715	715	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
11/2	764	764	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
11/3	780	780	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0

Full Input Data And Results

12/1	1008	1008	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
12/2	532	532	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
J2: Northfields Roundabout	**-**	**-**	**0**	**0**	**0**	**63.7**	**353.1**	**0.0**	**416.7**	**-**	**-**	**-**	**-**
1/1	651	524	-	-	-	7.8	66.0	-	73.8	408.0	13.0	66.0	78.9
1/2+1/3	770	615	-	-	-	9.1	81.7	-	90.8	424.5	16.3	81.7	98.0
2/1	792	792	-	-	-	1.3	0.0	-	1.3	6.1	10.8	0.0	10.8
2/2	794	794	-	-	-	0.3	0.0	-	0.3	1.3	0.9	0.0	0.9
2/3	53	53	-	-	-	0.0	0.0	-	0.0	0.0	0.5	0.0	0.5
3/1	802	622	-	-	-	11.0	92.1	-	103.1	462.6	19.1	92.1	111.2
3/2	860	667	-	-	-	11.8	98.9	-	110.7	463.4	20.5	98.9	119.4
3/3	301	301	-	-	-	1.4	0.5	-	1.9	22.1	4.0	0.5	4.5
4/1	715	715	-	-	-	4.3	4.5	-	8.8	44.1	10.5	4.5	15.0
4/2	764	764	-	-	-	4.4	4.4	-	8.8	41.3	11.2	4.4	15.6
4/3+4/4	780	780	-	-	-	3.9	1.2	-	5.1	23.7	5.1	1.2	6.3
5/1	189	189	-	-	-	0.5	0.0	-	0.5	8.8	2.4	0.0	2.4
5/2	159	159	-	-	-	0.5	0.0	-	0.5	11.4	2.5	0.0	2.5
5/3	6	6	-	-	-	0.0	0.0	-	0.0	10.0	0.1	0.0	0.1
6/1	480	480	-	-	-	0.0	0.0	-	0.0	0.1	1.1	0.0	1.1
6/2	770	770	-	-	-	0.4	0.0	-	0.4	2.0	8.7	0.0	8.7
6/3	368	368	-	-	-	0.1	0.0	-	0.1	0.8	0.9	0.0	0.9
6/4	412	412	-	-	-	0.1	0.0	-	0.1	0.9	0.7	0.0	0.7
7/1	322	322	-	-	-	2.0	1.5	-	3.5	38.9	5.0	1.5	6.5
7/2+7/3	602	602	-	-	-	3.6	2.5	-	6.1	36.5	5.7	2.5	8.2
8/1	557	557	-	-	-	0.4	0.0	-	0.4	2.8	1.7	0.0	1.7
8/2	781	781	-	-	-	0.6	0.0	-	0.6	2.9	7.2	0.0	7.2
8/3	233	233	-	-	-	0.0	0.0	-	0.0	0.1	0.1	0.0	0.1
9/1	558	558	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
9/2	512	512	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
10/1	1414	1414	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0

Full Input Data And Results

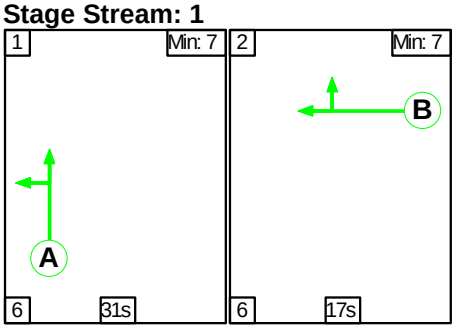
10/2	1461	1461	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
11/1	308	308	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
11/2	276	276	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
12/1	546	546	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
12/2	837	837	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0

C1	Stream: 1 PRC for Signalled Lanes (%):	-12.5	Total Delay for Signalled Lanes (pcuHr):	42.64	Cycle Time (s):	60
C1	Stream: 2 PRC for Signalled Lanes (%):	-15.4	Total Delay for Signalled Lanes (pcuHr):	27.16	Cycle Time (s):	60
C1	Stream: 3 PRC for Signalled Lanes (%):	-35.6	Total Delay for Signalled Lanes (pcuHr):	52.42	Cycle Time (s):	60
C2	Stream: 1 PRC for Signalled Lanes (%):	-39.9	Total Delay for Signalled Lanes (pcuHr):	165.65	Cycle Time (s):	60
C2	Stream: 2 PRC for Signalled Lanes (%):	-43.4	Total Delay for Signalled Lanes (pcuHr):	217.25	Cycle Time (s):	60
C2	Stream: 3 PRC for Signalled Lanes (%):	-1.1	Total Delay for Signalled Lanes (pcuHr):	23.63	Cycle Time (s):	60
C2	Stream: 4 PRC for Signalled Lanes (%):	7.5	Total Delay for Signalled Lanes (pcuHr):	10.21	Cycle Time (s):	60
	PRC Over All Lanes (%):	-43.4	Total Delay Over All Lanes(pcuHr):	588.83		

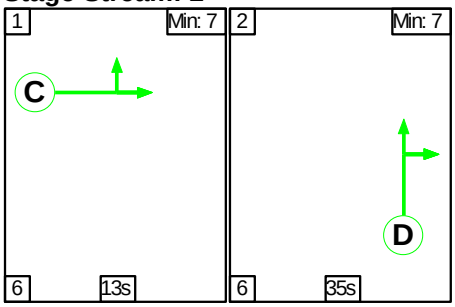
Full Input Data And Results
Scenario 23: '2033 Base + Committed PM + Dev (MKE)' (FG28: '2033 Base + Committed + Dev (MKE) PM', Plan 1: '2017 Observed AM')
C1

Stage Sequence Diagram

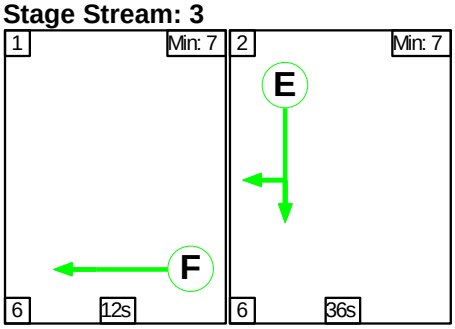
Stage Stream: 1



Stage Stream: 2



Stage Stream: 3



Stage Timings

Stage Stream: 1

Stage	1	2
Duration	31	17
Change Point	24	1

Stage Stream: 2

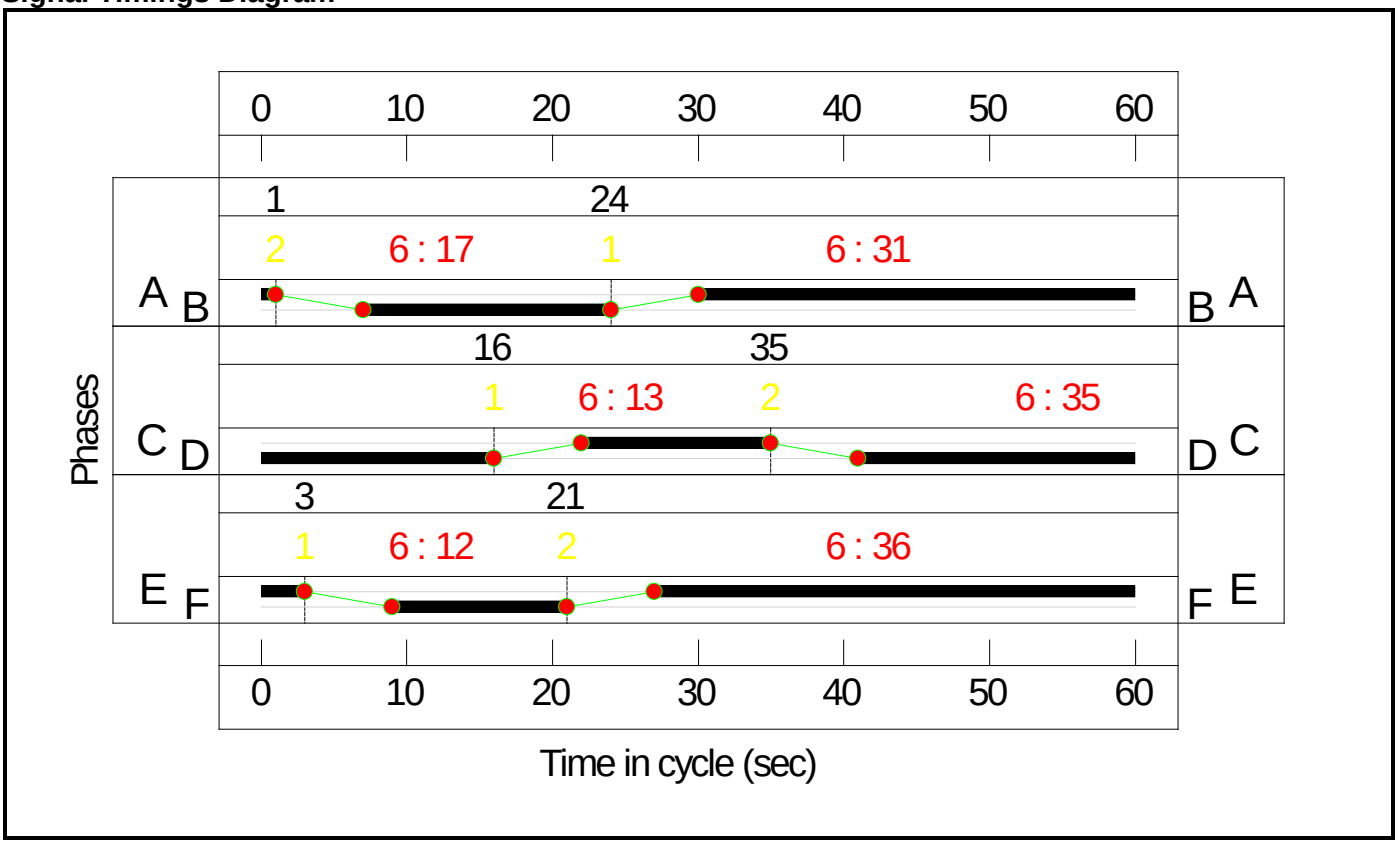
Stage	1	2
Duration	13	35
Change Point	16	35

Stage Stream: 3

Stage	1	2
Duration	12	36
Change Point	3	21

Full Input Data And Results

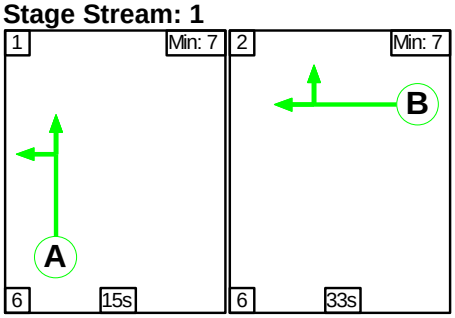
Signal Timings Diagram



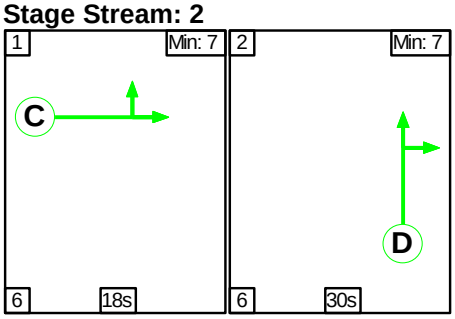
C2

Stage Sequence Diagram

Stage Stream: 1

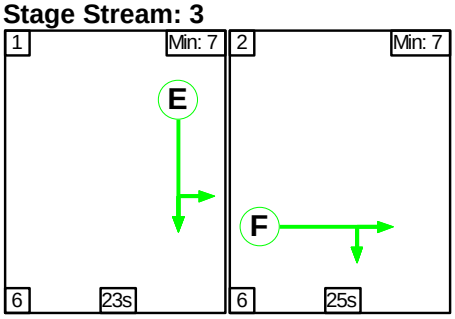


Stage Stream: 2

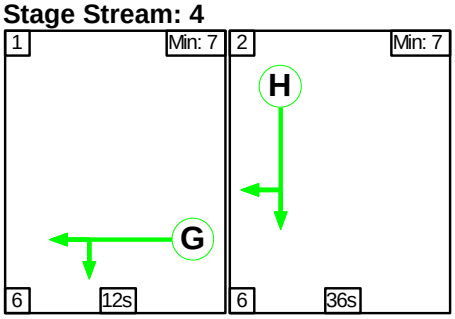


Full Input Data And Results

Stage Stream: 3



Stage Stream: 4



Stage Timings

Stage Stream: 1

Stage	1	2
Duration	15	33
Change Point	56	17

Stage Stream: 2

Stage	1	2
Duration	18	30
Change Point	34	58

Stage Stream: 3

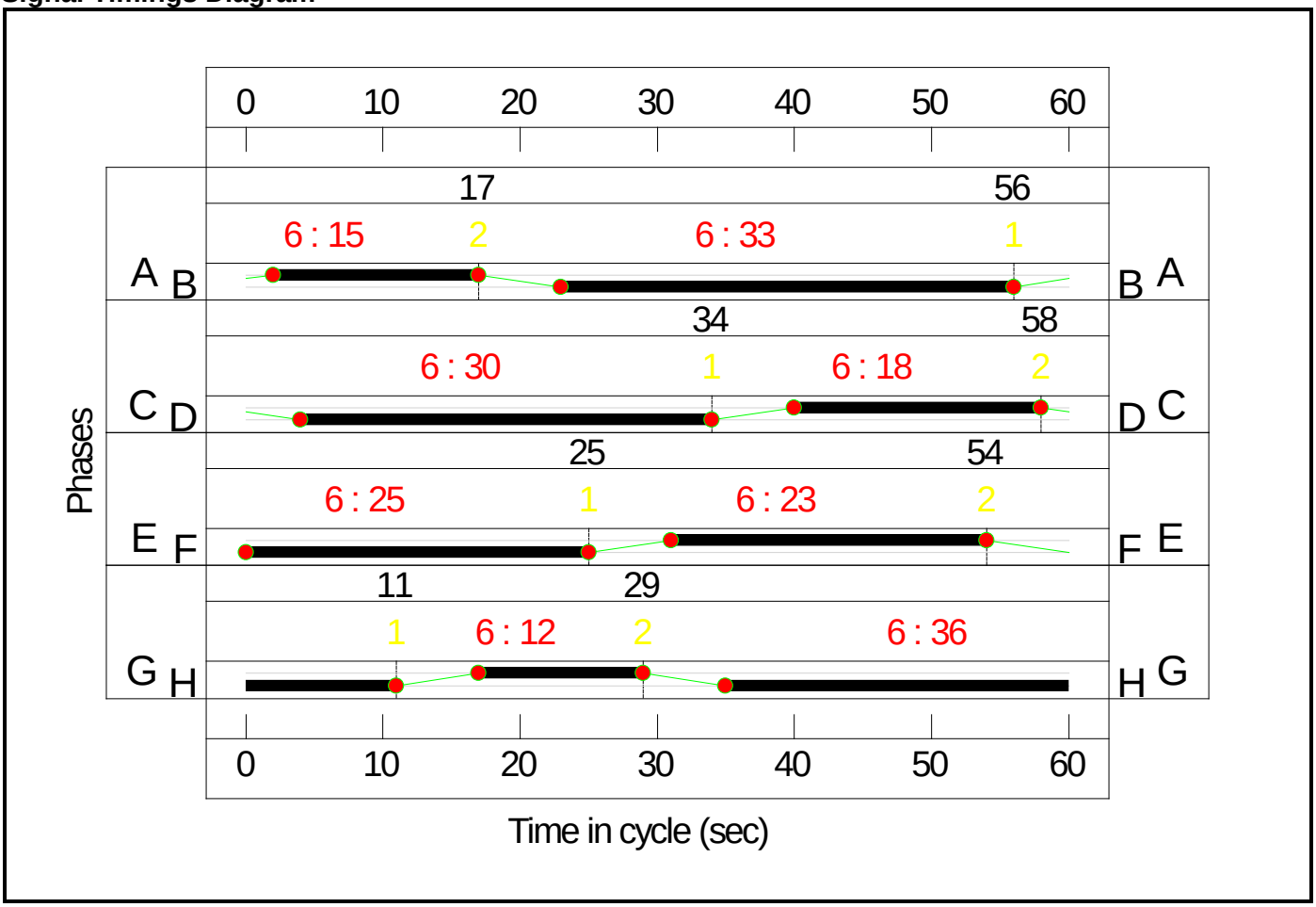
Stage	1	2
Duration	23	25
Change Point	25	54

Stage Stream: 4

Stage	1	2
Duration	12	36
Change Point	11	29

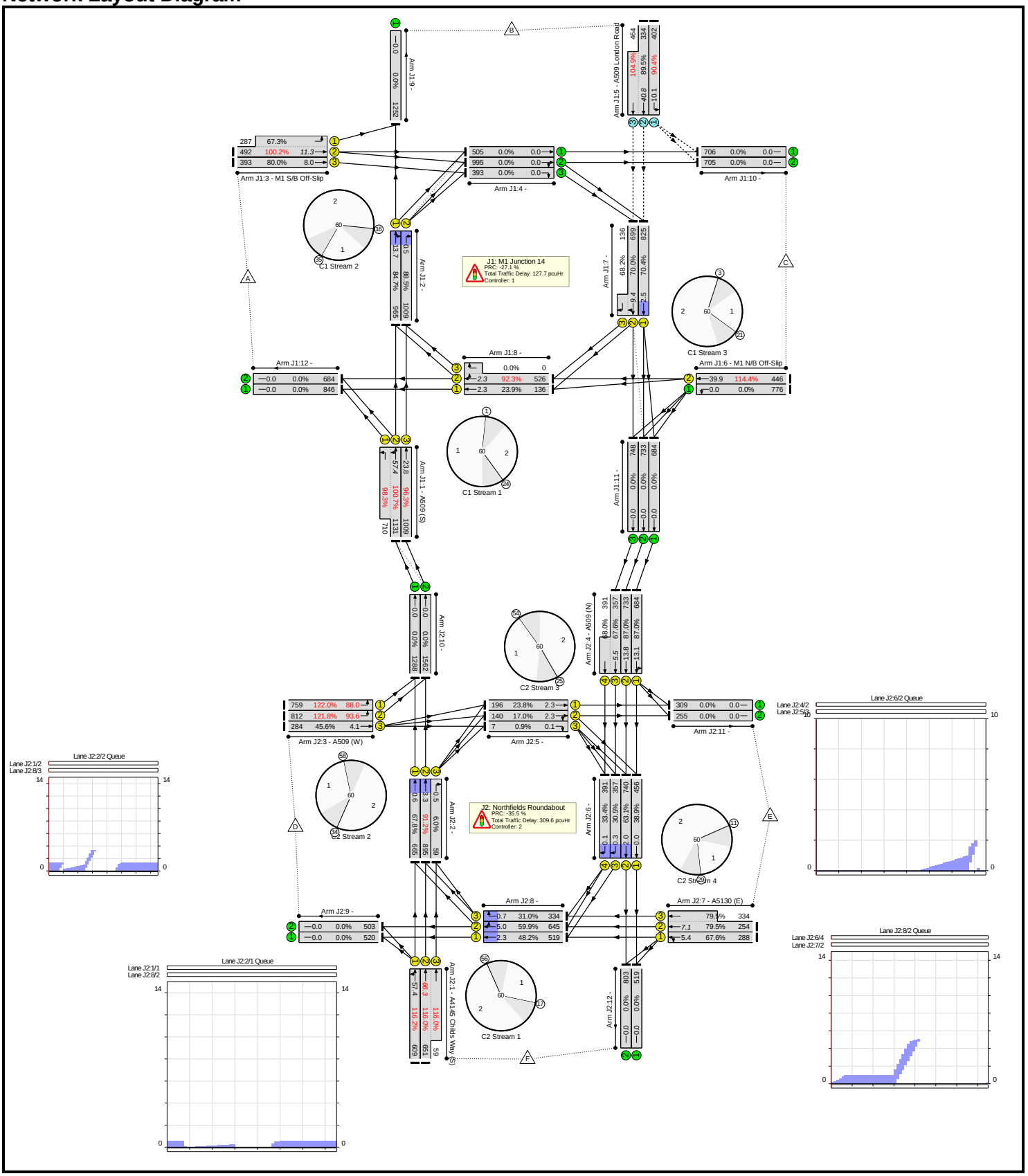
Full Input Data And Results

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: M1 Junction 14 / Northfields Roundabout Model	-	-	**N/A**	-	-		-	-	-	-	-	-	**122.0%**
J1: M1 Junction 14	-	-	**N/A**	-	-		-	-	-	-	-	-	**114.4%**
1/2+1/1	A509 (S) Ahead Left	U	1:1	N/A	C1:A		1	31	-	2136	2105:1965	1123+722	100.7 : 98.3%
1/3	A509 (S) Ahead	U	1:1	N/A	C1:A		1	31	-	1170	1965	1048	96.3%
2/1	Right Ahead	U	1:2	N/A	C1:D		1	35	-	1118	1900	1140	84.7%
2/2	Right	U	1:2	N/A	C1:D		1	35	-	1170	1900	1140	88.5%
3/2+3/1	M1 S/B Off-Slip Ahead Left	U	1:2	N/A	C1:C		1	13	-	779	2105:1828	491+427	100.2 : 67.3%
3/3	M1 S/B Off-Slip Ahead	U	1:2	N/A	C1:C		1	13	-	393	2105	491	80.0%
4/1	Ahead	U	N/A	N/A	-		-	-	-	586	Inf	Inf	0.0%
4/2	Right Ahead	U	N/A	N/A	-		-	-	-	1076	Inf	Inf	0.0%
4/3	Right	U	N/A	N/A	-		-	-	-	393	Inf	Inf	0.0%
5/1	A509 London Road Left	O	N/A	N/A	-		-	-	-	402	1871	445	90.4%
5/2+5/3	A509 London Road Ahead	O	N/A	N/A	-		-	-	-	798	2105:2105	373+442	89.5 : 104.9%
6/1	M1 N/B Off-Slip Left	U	N/A	N/A	-		-	-	-	776	Inf	Inf	0.0%
6/2	M1 N/B Off-Slip Ahead	U	1:3	N/A	C1:F		1	12	-	446	1800	390	114.4%
7/1	Ahead	U	1:3	N/A	C1:E		1	36	-	826	1900	1172	70.4%
7/2+7/3	Right Ahead	U	1:3	N/A	C1:E		1	36	-	857	1900:1900	998+200	70.0 : 68.2%
8/1	Ahead	U	1:1	N/A	C1:B		1	17	-	143	1900	570	23.9%
8/2+8/3	Right Ahead	U	1:1	N/A	C1:B		1	17	-	589	1900:1965	570+0	92.3 : 0.0%
9/1		U	N/A	N/A	-		-	-	-	1405	Inf	Inf	0.0%

Full Input Data And Results

10/1		U	N/A	N/A	-		-	-	-	787	Inf	Inf	0.0%
10/2		U	N/A	N/A	-		-	-	-	785	Inf	Inf	0.0%
11/1	Ahead	U	N/A	N/A	-		-	-	-	684	Inf	Inf	0.0%
11/2	Ahead	U	N/A	N/A	-		-	-	-	733	Inf	Inf	0.0%
11/3	Ahead	U	N/A	N/A	-		-	-	-	756	Inf	Inf	0.0%
12/1		U	N/A	N/A	-		-	-	-	969	Inf	Inf	0.0%
12/2		U	N/A	N/A	-		-	-	-	781	Inf	Inf	0.0%
J2: Northfields Roundabout	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**122.0%**
1/1	A4145 Childs Way (S) Ahead Left	U	2:1	N/A	C2:A		1	15	-	609	1965	524	116.2%
1/2+1/3	A4145 Childs Way (S) Ahead	U	2:1	N/A	C2:A		1	15	-	710	2105:1965	561+51	116.0 : 116.0%
2/1	Ahead	U	2:2	N/A	C2:D		1	30	-	750	1900	982	67.8%
2/2	Ahead	U	2:2	N/A	C2:D		1	30	-	985	1900	982	91.2%
2/3	Right	U	2:2	N/A	C2:D		1	30	-	59	1900	982	6.0%
3/1	A509 (W) Left	U	2:2	N/A	C2:C		1	18	-	759	1965	622	122.0%
3/2	A509 (W) Left	U	2:2	N/A	C2:C		1	18	-	812	2105	667	121.8%
3/3	A509 (W) Ahead	U	2:2	N/A	C2:C		1	18	-	284	1965	622	45.6%
4/1	A509 (N) Ahead Left	U	2:3	N/A	C2:E		1	23	-	684	1965	786	87.0%
4/2	A509 (N) Ahead	U	2:3	N/A	C2:E		1	23	-	733	2105	842	87.0%
4/3+4/4	A509 (N) Ahead	U	2:3	N/A	C2:E		1	23	-	756	2105:1965	528+574	67.6 : 68.0%
5/1	Ahead	U	2:3	N/A	C2:F		1	25	-	196	1900	823	23.8%
5/2	Right Ahead	U	2:3	N/A	C2:F		1	25	-	140	1900	823	17.0%
5/3	Right	U	2:3	N/A	C2:F		1	25	-	7	1900	823	0.9%
6/1	Ahead	U	2:4	N/A	C2:H		1	36	-	456	1900	1172	38.9%
6/2	Ahead	U	2:4	N/A	C2:H		1	36	-	740	1900	1172	63.1%
6/3	Right	U	2:4	N/A	C2:H		1	36	-	362	1900	1172	30.5%

Full Input Data And Results

6/4	Right	U	2:4	N/A	C2:H		1	36	-	394	1900	1172	33.4%
7/1	A5130 (E) Ahead Left	U	2:4	N/A	C2:G		1	12	-	288	1965	426	67.6%
7/2+7/3	A5130 (E) Ahead	U	2:4	N/A	C2:G		1	12	-	588	2105:1965	319+420	79.5 : 79.5%
8/1	Ahead	U	2:1	N/A	C2:B		1	33	-	524	1900	1077	48.2%
8/2	Right Ahead	U	2:1	N/A	C2:B		1	33	-	648	1900	1077	59.9%
8/3	Right	U	2:1	N/A	C2:B		1	33	-	334	1900	1077	31.0%
9/1		U	N/A	N/A	-		-	-	-	525	Inf	Inf	0.0%
9/2		U	N/A	N/A	-		-	-	-	506	Inf	Inf	0.0%
10/1	Ahead	U	N/A	N/A	-		-	-	-	1509	Inf	Inf	0.0%
10/2	Ahead	U	N/A	N/A	-		-	-	-	1797	Inf	Inf	0.0%
11/1		U	N/A	N/A	-		-	-	-	309	Inf	Inf	0.0%
11/2		U	N/A	N/A	-		-	-	-	255	Inf	Inf	0.0%
12/1		U	N/A	N/A	-		-	-	-	519	Inf	Inf	0.0%
12/2		U	N/A	N/A	-		-	-	-	803	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: M1 Junction 14 / Northfields Roundabout Model	**-**	**-**	**1954**	**0**	**0**	**86.7**	**350.5**	**0.0**	**437.2**	**-**	**-**	**-**	**-**
J1: M1 Junction 14	**-**	**-**	**1954**	**0**	**0**	**32.4**	**95.2**	**0.0**	**127.7**	**-**	**-**	**-**	**-**
1/2+1/1	1840	1832	-	-	-	8.7	24.5	-	33.2	64.9	33.0	24.5	57.4
1/3	1009	1009	-	-	-	4.0	8.9	-	12.9	45.9	14.9	8.9	23.8
2/1	965	965	-	-	-	2.3	0.0	-	2.3	8.7	13.7	0.0	13.7
2/2	1009	1009	-	-	-	0.1	0.0	-	0.1	0.5	0.5	0.0	0.5
3/2+3/1	779	778	-	-	-	4.8	3.1	-	8.0	36.7	8.2	3.1	11.3
3/3	393	393	-	-	-	2.4	1.9	-	4.3	39.3	6.1	1.9	8.0
4/1	505	505	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
4/2	995	995	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
4/3	393	393	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
5/1	402	402	402	0	0	0.6	4.0	-	4.5	40.6	6.1	4.0	10.1
5/2+5/3	798	776	1552	0	0	1.8	21.3	-	23.2	104.5	19.5	21.3	40.8
6/1	776	776	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/2	446	390	-	-	-	4.5	31.5	-	36.0	291.0	8.4	31.5	39.9
7/1	825	825	-	-	-	0.6	0.0	-	0.6	2.7	2.5	0.0	2.5
7/2+7/3	835	835	-	-	-	0.6	0.0	-	0.6	2.5	9.4	0.0	9.4
8/1	136	136	-	-	-	1.0	0.0	-	1.0	25.6	2.3	0.0	2.3
8/2+8/3	526	526	-	-	-	1.0	0.0	-	1.0	6.7	2.3	0.0	2.3
9/1	1252	1252	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
10/1	706	706	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
10/2	705	705	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
11/1	684	684	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
11/2	733	733	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
11/3	748	748	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0

Full Input Data And Results

12/1	846	846	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
12/2	684	684	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
J2: Northfields Roundabout	**-**	**-**	**0**	**0**	**0**	**54.3**	**255.3**	**0.0**	**309.6**	**-**	**-**	**-**	**-**
1/1	609	524	-	-	-	6.3	45.8	-	52.1	308.0	11.6	45.8	57.4
1/2+1/3	710	620	-	-	-	7.0	52.3	-	59.2	300.4	14.0	52.3	66.3
2/1	665	665	-	-	-	0.3	0.0	-	0.3	1.7	0.6	0.0	0.6
2/2	895	895	-	-	-	0.9	0.0	-	0.9	3.5	3.3	0.0	3.3
2/3	59	59	-	-	-	0.0	0.0	-	0.0	0.0	0.5	0.0	0.5
3/1	759	622	-	-	-	9.2	71.0	-	80.3	380.7	17.0	71.0	88.0
3/2	812	667	-	-	-	9.8	75.4	-	85.2	377.9	18.2	75.4	93.6
3/3	284	284	-	-	-	1.3	0.4	-	1.7	21.7	3.7	0.4	4.1
4/1	684	684	-	-	-	4.0	3.1	-	7.2	37.8	9.9	3.1	13.1
4/2	733	733	-	-	-	4.2	3.2	-	7.4	36.4	10.6	3.2	13.8
4/3+4/4	748	748	-	-	-	3.7	1.0	-	4.7	22.8	4.5	1.0	5.5
5/1	196	196	-	-	-	0.5	0.0	-	0.5	8.5	2.3	0.0	2.3
5/2	140	140	-	-	-	0.5	0.0	-	0.5	11.8	2.3	0.0	2.3
5/3	7	7	-	-	-	0.0	0.0	-	0.0	10.2	0.1	0.0	0.1
6/1	456	456	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/2	740	740	-	-	-	0.2	0.0	-	0.2	0.9	2.0	0.0	2.0
6/3	357	357	-	-	-	0.0	0.0	-	0.0	0.2	0.3	0.0	0.3
6/4	391	391	-	-	-	0.0	0.0	-	0.0	0.1	0.1	0.0	0.1
7/1	288	288	-	-	-	1.7	1.0	-	2.8	34.4	4.4	1.0	5.4
7/2+7/3	588	588	-	-	-	3.5	1.9	-	5.4	33.3	5.2	1.9	7.1
8/1	519	519	-	-	-	0.5	0.0	-	0.5	3.1	2.3	0.0	2.3
8/2	645	645	-	-	-	0.6	0.0	-	0.6	3.4	5.0	0.0	5.0
8/3	334	334	-	-	-	0.1	0.0	-	0.1	1.1	0.7	0.0	0.7
9/1	520	520	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
9/2	503	503	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
10/1	1288	1288	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0

Full Input Data And Results

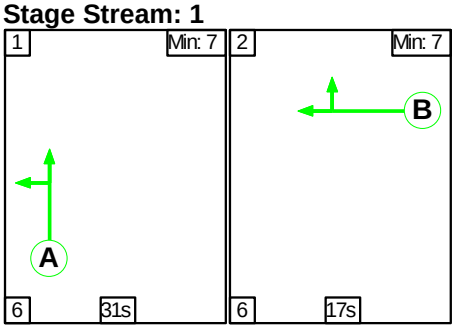
10/2	1562	1562	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
11/1	309	309	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
11/2	255	255	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
12/1	519	519	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
12/2	803	803	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0

C1	Stream: 1	PRC for Signalled Lanes (%):	-11.9	Total Delay for Signalled Lanes (pcuHr):	48.00	Cycle Time (s):	60
C1	Stream: 2	PRC for Signalled Lanes (%):	-11.3	Total Delay for Signalled Lanes (pcuHr):	14.72	Cycle Time (s):	60
C1	Stream: 3	PRC for Signalled Lanes (%):	-27.1	Total Delay for Signalled Lanes (pcuHr):	37.25	Cycle Time (s):	60
C2	Stream: 1	PRC for Signalled Lanes (%):	-29.1	Total Delay for Signalled Lanes (pcuHr):	112.51	Cycle Time (s):	60
C2	Stream: 2	PRC for Signalled Lanes (%):	-35.5	Total Delay for Signalled Lanes (pcuHr):	168.40	Cycle Time (s):	60
C2	Stream: 3	PRC for Signalled Lanes (%):	3.4	Total Delay for Signalled Lanes (pcuHr):	20.25	Cycle Time (s):	60
C2	Stream: 4	PRC for Signalled Lanes (%):	13.2	Total Delay for Signalled Lanes (pcuHr):	8.40	Cycle Time (s):	60
		PRC Over All Lanes (%):	-35.5	Total Delay Over All Lanes(pcuHr):	437.22		

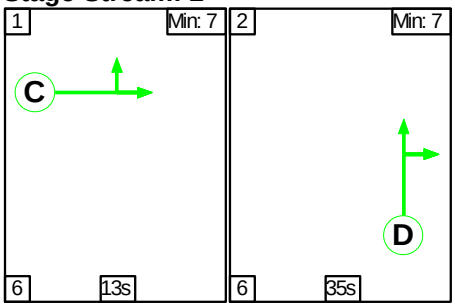
Full Input Data And Results
Scenario 24: '2041 Base + Committed PM + Dev (MKE)' (FG30: '2041 Base + Committed + Dev (MKE) PM', Plan 1: '2017 Observed AM')
C1

Stage Sequence Diagram

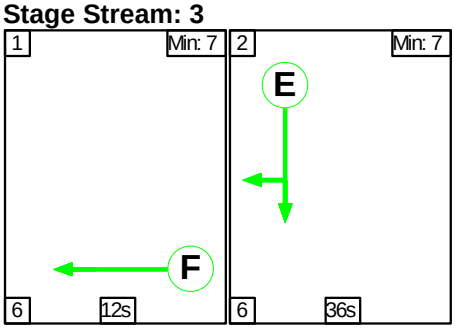
Stage Stream: 1



Stage Stream: 2



Stage Stream: 3



Stage Timings

Stage Stream: 1

Stage	1	2
Duration	31	17
Change Point	24	1

Stage Stream: 2

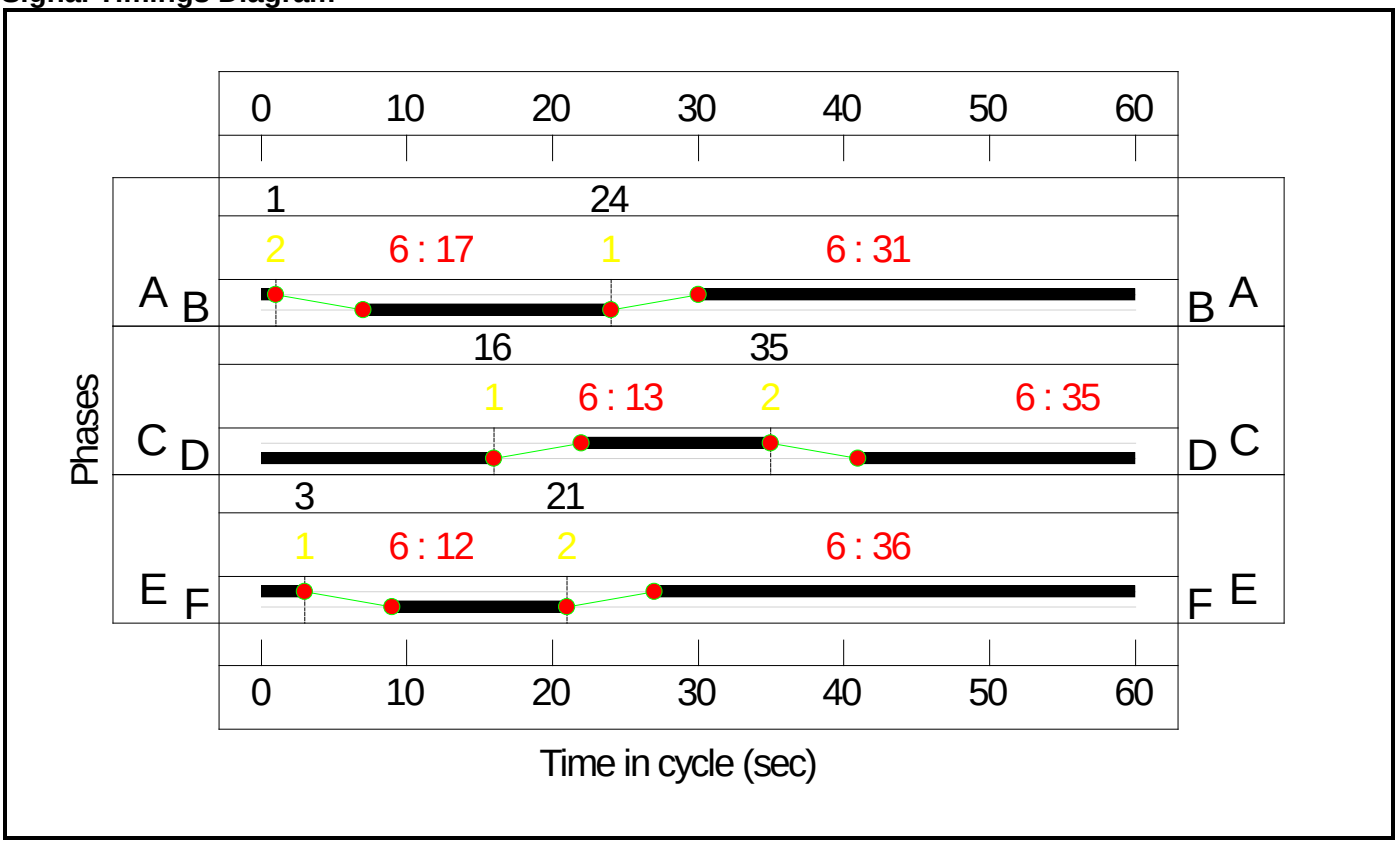
Stage	1	2
Duration	13	35
Change Point	16	35

Stage Stream: 3

Stage	1	2
Duration	12	36
Change Point	3	21

Full Input Data And Results

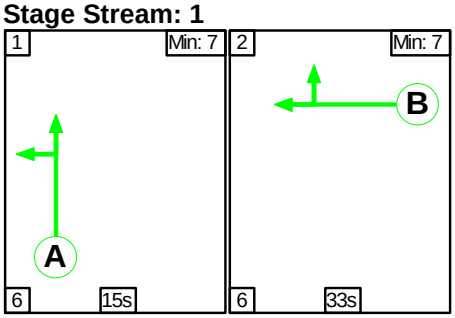
Signal Timings Diagram



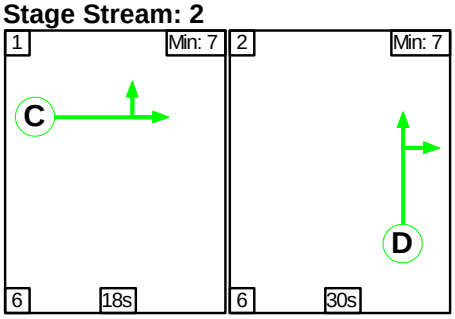
C2

Stage Sequence Diagram

Stage Stream: 1

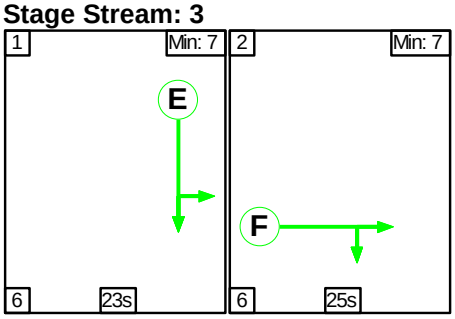


Stage Stream: 2

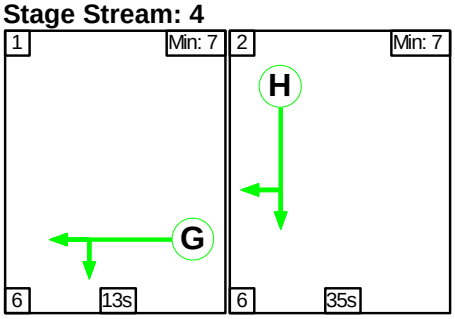


Full Input Data And Results

Stage Stream: 3



Stage Stream: 4



Stage Timings

Stage Stream: 1

Stage	1	2
Duration	15	33
Change Point	56	17

Stage Stream: 2

Stage	1	2
Duration	18	30
Change Point	34	58

Stage Stream: 3

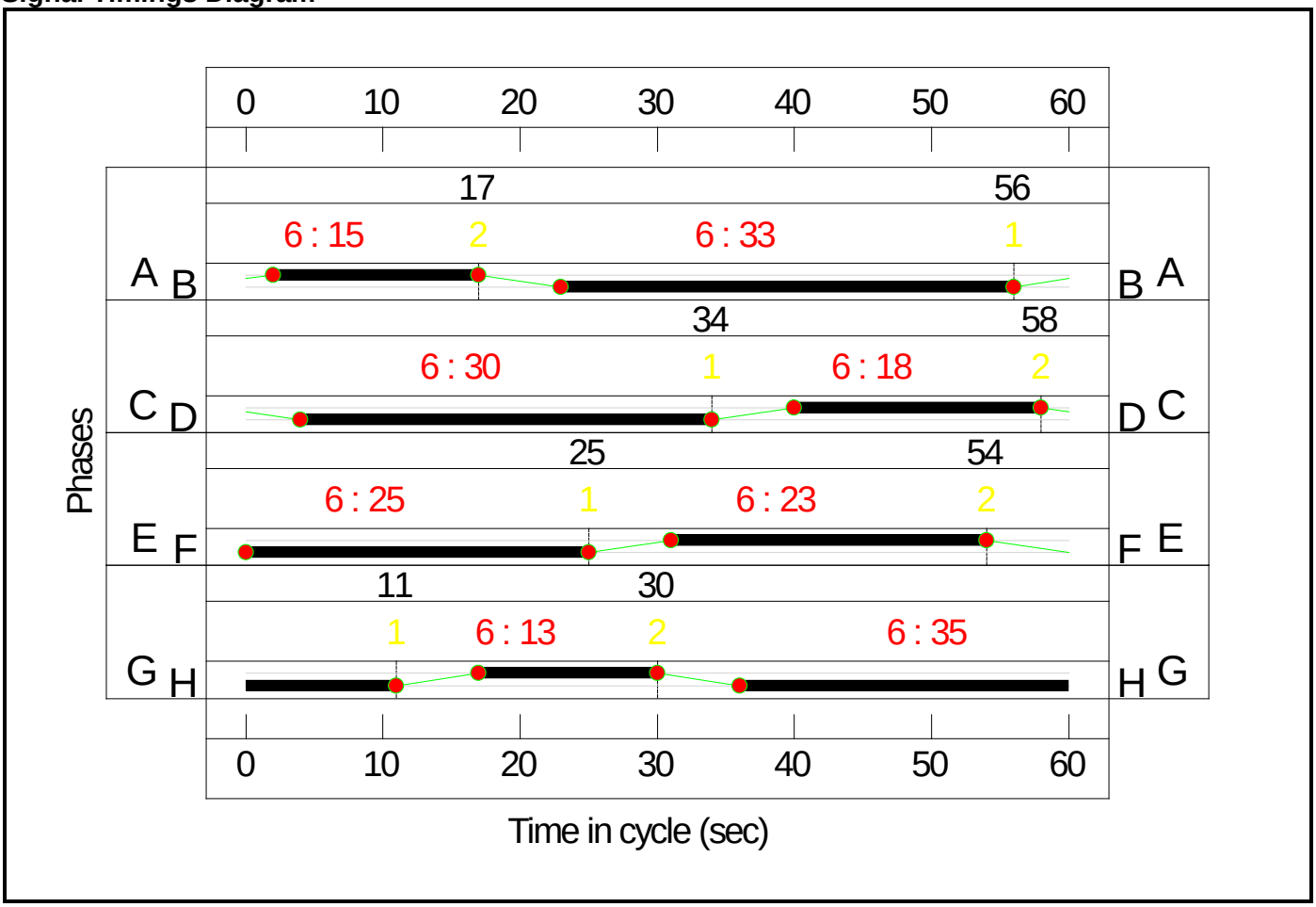
Stage	1	2
Duration	23	25
Change Point	25	54

Stage Stream: 4

Stage	1	2
Duration	13	35
Change Point	11	30

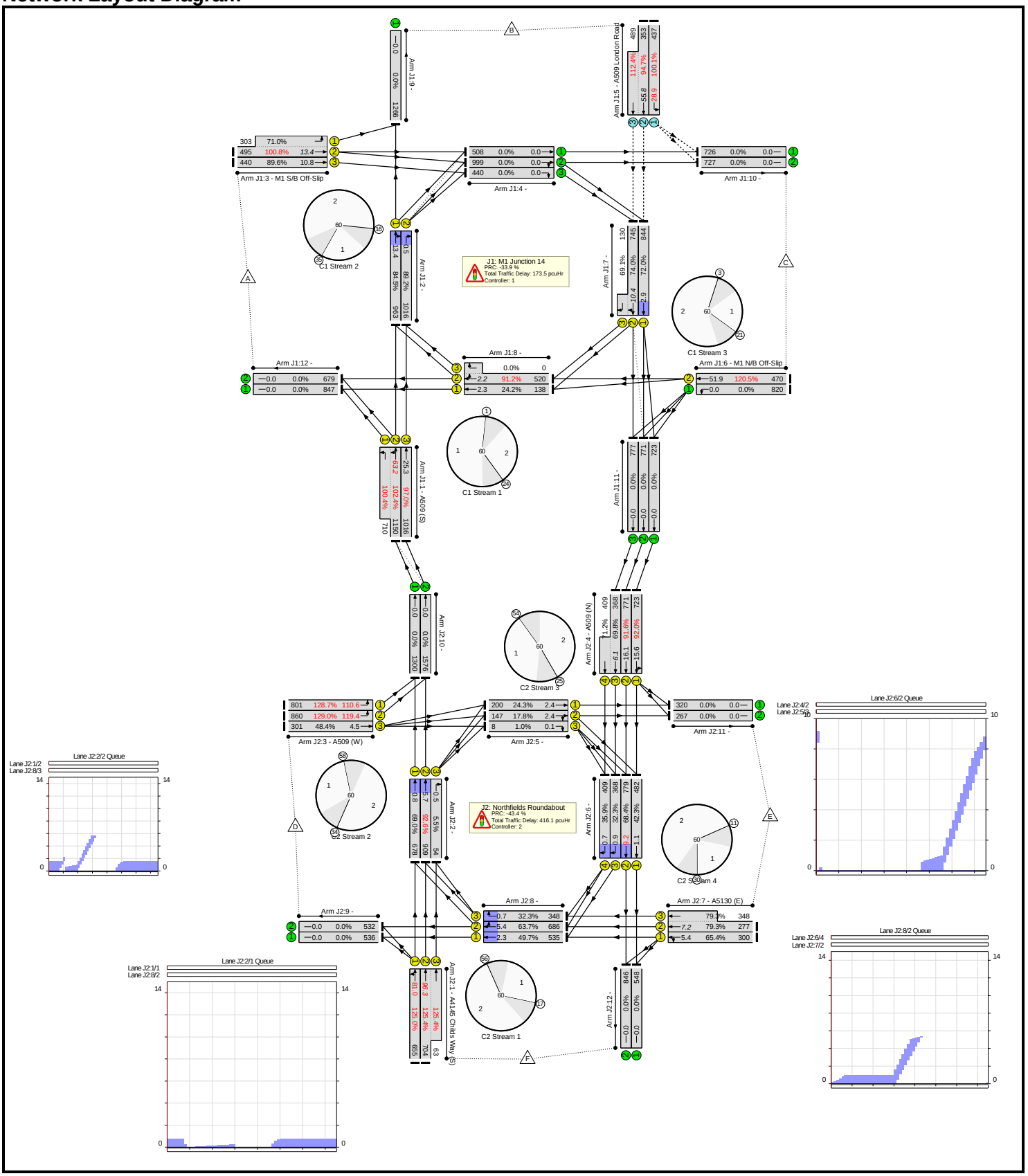
Full Input Data And Results

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: M1 Junction 14 / Northfields Roundabout Model	-	-	**N/A**	-	-		-	-	-	-	-	-	**129.0%**
J1: M1 Junction 14	-	-	**N/A**	-	-		-	-	-	-	-	-	**120.5%**
1/2+1/1	A509 (S) Ahead Left	U	1:1	N/A	C1:A		1	31	-	2275	2105:1965	1123+707	102.4 : 100.4%
1/3	A509 (S) Ahead	U	1:1	N/A	C1:A		1	31	-	1246	1965	1048	97.0%
2/1	Right Ahead	U	1:2	N/A	C1:D		1	35	-	1187	1900	1140	84.5%
2/2	Right	U	1:2	N/A	C1:D		1	35	-	1246	1900	1140	89.2%
3/2+3/1	M1 S/B Off-Slip Ahead Left	U	1:2	N/A	C1:C		1	13	-	798	2105:1828	491+427	100.8 : 71.0%
3/3	M1 S/B Off-Slip Ahead	U	1:2	N/A	C1:C		1	13	-	440	2105	491	89.6%
4/1	Ahead	U	N/A	N/A	-		-	-	-	623	Inf	Inf	0.0%
4/2	Right Ahead	U	N/A	N/A	-		-	-	-	1118	Inf	Inf	0.0%
4/3	Right	U	N/A	N/A	-		-	-	-	440	Inf	Inf	0.0%
5/1	A509 London Road Left	O	N/A	N/A	-		-	-	-	437	1871	436	100.1%
5/2+5/3	A509 London Road Ahead	O	N/A	N/A	-		-	-	-	842	2105:2105	373+435	94.7 : 112.4%
6/1	M1 N/B Off-Slip Left	U	N/A	N/A	-		-	-	-	820	Inf	Inf	0.0%
6/2	M1 N/B Off-Slip Ahead	U	1:3	N/A	C1:F		1	12	-	470	1800	390	120.5%
7/1	Ahead	U	1:3	N/A	C1:E		1	36	-	848	1900	1172	72.0%
7/2+7/3	Right Ahead	U	1:3	N/A	C1:E		1	36	-	929	1900:1900	1007+188	74.0 : 69.1%
8/1	Ahead	U	1:1	N/A	C1:B		1	17	-	155	1900	570	24.2%
8/2+8/3	Right Ahead	U	1:1	N/A	C1:B		1	17	-	616	1900:1965	570+0	91.2 : 0.0%
9/1		U	N/A	N/A	-		-	-	-	1490	Inf	Inf	0.0%

Full Input Data And Results

10/1		U	N/A	N/A	-		-	-	-	841	Inf	Inf	0.0%
10/2		U	N/A	N/A	-		-	-	-	842	Inf	Inf	0.0%
11/1	Ahead	U	N/A	N/A	-		-	-	-	725	Inf	Inf	0.0%
11/2	Ahead	U	N/A	N/A	-		-	-	-	773	Inf	Inf	0.0%
11/3	Ahead	U	N/A	N/A	-		-	-	-	798	Inf	Inf	0.0%
12/1		U	N/A	N/A	-		-	-	-	1025	Inf	Inf	0.0%
12/2		U	N/A	N/A	-		-	-	-	834	Inf	Inf	0.0%
J2: Northfields Roundabout	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**129.0%**
1/1	A4145 Childs Way (S) Ahead Left	U	2:1	N/A	C2:A		1	15	-	655	1965	524	125.0%
1/2+1/3	A4145 Childs Way (S) Ahead	U	2:1	N/A	C2:A		1	15	-	767	2105:1965	561+50	125.4 : 125.4%
2/1	Ahead	U	2:2	N/A	C2:D		1	30	-	808	1900	982	69.0%
2/2	Ahead	U	2:2	N/A	C2:D		1	30	-	1052	1900	982	92.6%
2/3	Right	U	2:2	N/A	C2:D		1	30	-	63	1900	982	5.5%
3/1	A509 (W) Left	U	2:2	N/A	C2:C		1	18	-	801	1965	622	128.7%
3/2	A509 (W) Left	U	2:2	N/A	C2:C		1	18	-	860	2105	667	129.0%
3/3	A509 (W) Ahead	U	2:2	N/A	C2:C		1	18	-	301	1965	622	48.4%
4/1	A509 (N) Ahead Left	U	2:3	N/A	C2:E		1	23	-	725	1965	786	92.0%
4/2	A509 (N) Ahead	U	2:3	N/A	C2:E		1	23	-	773	2105	842	91.6%
4/3+4/4	A509 (N) Ahead	U	2:3	N/A	C2:E		1	23	-	798	2105:1965	527+574	69.8 : 71.2%
5/1	Ahead	U	2:3	N/A	C2:F		1	25	-	209	1900	823	24.3%
5/2	Right Ahead	U	2:3	N/A	C2:F		1	25	-	147	1900	823	17.8%
5/3	Right	U	2:3	N/A	C2:F		1	25	-	8	1900	823	1.0%
6/1	Ahead	U	2:4	N/A	C2:H		1	35	-	484	1900	1140	42.3%
6/2	Ahead	U	2:4	N/A	C2:H		1	35	-	781	1900	1140	68.4%
6/3	Right	U	2:4	N/A	C2:H		1	35	-	382	1900	1140	32.3%

Full Input Data And Results

6/4	Right	U	2:4	N/A	C2:H		1	35	-	416	1900	1140	35.9%
7/1	A5130 (E) Ahead Left	U	2:4	N/A	C2:G		1	13	-	300	1965	458	65.4%
7/2+7/3	A5130 (E) Ahead	U	2:4	N/A	C2:G		1	13	-	625	2105:1965	349+439	79.3 : 79.3%
8/1	Ahead	U	2:1	N/A	C2:B		1	33	-	549	1900	1077	49.7%
8/2	Right Ahead	U	2:1	N/A	C2:B		1	33	-	693	1900	1077	63.7%
8/3	Right	U	2:1	N/A	C2:B		1	33	-	348	1900	1077	32.3%
9/1		U	N/A	N/A	-		-	-	-	550	Inf	Inf	0.0%
9/2		U	N/A	N/A	-		-	-	-	539	Inf	Inf	0.0%
10/1	Ahead	U	N/A	N/A	-		-	-	-	1609	Inf	Inf	0.0%
10/2	Ahead	U	N/A	N/A	-		-	-	-	1912	Inf	Inf	0.0%
11/1		U	N/A	N/A	-		-	-	-	329	Inf	Inf	0.0%
11/2		U	N/A	N/A	-		-	-	-	268	Inf	Inf	0.0%
12/1		U	N/A	N/A	-		-	-	-	550	Inf	Inf	0.0%
12/2		U	N/A	N/A	-		-	-	-	848	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: M1 Junction 14 / Northfields Roundabout Model	**-**	**-**	**2012**	**0**	**0**	**99.4**	**490.3**	**0.0**	**589.7**	**-**	**-**	**-**	**-**
J1: M1 Junction 14	**-**	**-**	**2012**	**0**	**0**	**35.9**	**137.6**	**0.0**	**173.5**	**-**	**-**	**-**	**-**
1/2+1/1	1859	1832	-	-	-	9.2	30.2	-	39.4	76.3	33.0	30.2	63.2
1/3	1016	1016	-	-	-	4.0	9.9	-	13.9	49.2	15.4	9.9	25.3
2/1	963	963	-	-	-	2.3	0.0	-	2.3	8.7	13.4	0.0	13.4
2/2	1016	1016	-	-	-	0.1	0.0	-	0.1	0.5	0.5	0.0	0.5
3/2+3/1	798	794	-	-	-	5.0	5.1	-	10.1	45.7	8.3	5.1	13.4
3/3	440	440	-	-	-	2.7	3.7	-	6.5	53.0	7.1	3.7	10.8
4/1	508	508	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
4/2	999	999	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
4/3	440	440	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
5/1	437	436	436	0	0	0.9	10.6	-	11.5	94.7	18.3	10.6	28.9
5/2+5/3	842	788	1576	0	0	3.0	35.3	-	38.4	164.0	20.5	35.3	55.8
6/1	820	820	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/2	470	390	-	-	-	5.4	42.7	-	48.1	368.5	9.2	42.7	51.9
7/1	844	844	-	-	-	0.7	0.0	-	0.7	2.9	2.9	0.0	2.9
7/2+7/3	875	875	-	-	-	0.6	0.0	-	0.6	2.5	10.4	0.0	10.4
8/1	138	138	-	-	-	1.0	0.0	-	1.0	25.7	2.3	0.0	2.3
8/2+8/3	520	520	-	-	-	0.9	0.0	-	0.9	6.5	2.2	0.0	2.2
9/1	1266	1266	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
10/1	726	726	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
10/2	727	727	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
11/1	723	723	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
11/2	771	771	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
11/3	777	777	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0

Full Input Data And Results

12/1	847	847	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
12/2	679	679	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
J2: Northfields Roundabout	**-**	**-**	**0**	**0**	**0**	**63.5**	**352.7**	**0.0**	**416.1**	**-**	**-**	**-**	**-**
1/1	655	524	-	-	-	8.0	67.9	-	75.9	417.0	13.1	67.9	81.0
1/2+1/3	767	615	-	-	-	9.0	80.1	-	89.1	418.3	16.2	80.1	96.3
2/1	678	678	-	-	-	0.4	0.0	-	0.4	2.2	0.8	0.0	0.8
2/2	909	909	-	-	-	1.0	0.0	-	1.0	4.1	5.7	0.0	5.7
2/3	54	54	-	-	-	0.0	0.0	-	0.0	0.0	0.5	0.0	0.5
3/1	801	622	-	-	-	11.0	91.6	-	102.5	460.8	19.1	91.6	110.6
3/2	860	667	-	-	-	11.8	98.9	-	110.7	463.4	20.5	98.9	119.4
3/3	301	301	-	-	-	1.4	0.5	-	1.9	22.1	4.0	0.5	4.5
4/1	723	723	-	-	-	4.3	4.9	-	9.2	45.8	10.6	4.9	15.6
4/2	771	771	-	-	-	4.5	4.8	-	9.3	43.6	11.3	4.8	16.1
4/3+4/4	777	777	-	-	-	3.9	1.2	-	5.1	23.6	4.9	1.2	6.1
5/1	200	200	-	-	-	0.5	0.0	-	0.5	8.7	2.4	0.0	2.4
5/2	147	147	-	-	-	0.5	0.0	-	0.5	11.7	2.4	0.0	2.4
5/3	8	8	-	-	-	0.0	0.0	-	0.0	10.0	0.1	0.0	0.1
6/1	482	482	-	-	-	0.0	0.0	-	0.0	0.1	1.1	0.0	1.1
6/2	779	779	-	-	-	0.4	0.0	-	0.4	2.0	9.2	0.0	9.2
6/3	368	368	-	-	-	0.1	0.0	-	0.1	0.9	0.9	0.0	0.9
6/4	409	409	-	-	-	0.1	0.0	-	0.1	0.9	0.7	0.0	0.7
7/1	300	300	-	-	-	1.7	0.9	-	2.7	32.0	4.5	0.9	5.4
7/2+7/3	625	625	-	-	-	3.6	1.9	-	5.5	31.7	5.3	1.9	7.2
8/1	535	535	-	-	-	0.4	0.0	-	0.4	3.0	2.3	0.0	2.3
8/2	686	686	-	-	-	0.6	0.0	-	0.6	3.2	5.4	0.0	5.4
8/3	348	348	-	-	-	0.1	0.0	-	0.1	1.1	0.7	0.0	0.7
9/1	536	536	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
9/2	532	532	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
10/1	1300	1300	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0

Full Input Data And Results

10/2	1576	1576	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
11/1	320	320	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
11/2	267	267	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
12/1	548	548	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
12/2	846	846	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0

C1	Stream: 1 PRC for Signalled Lanes (%):	-13.8	Total Delay for Signalled Lanes (pcuHr):	55.22	Cycle Time (s):	60
C1	Stream: 2 PRC for Signalled Lanes (%):	-12.0	Total Delay for Signalled Lanes (pcuHr):	19.05	Cycle Time (s):	60
C1	Stream: 3 PRC for Signalled Lanes (%):	-33.9	Total Delay for Signalled Lanes (pcuHr):	49.39	Cycle Time (s):	60
C2	Stream: 1 PRC for Signalled Lanes (%):	-39.4	Total Delay for Signalled Lanes (pcuHr):	166.15	Cycle Time (s):	60
C2	Stream: 2 PRC for Signalled Lanes (%):	-43.4	Total Delay for Signalled Lanes (pcuHr):	216.54	Cycle Time (s):	60
C2	Stream: 3 PRC for Signalled Lanes (%):	-2.2	Total Delay for Signalled Lanes (pcuHr):	24.62	Cycle Time (s):	60
C2	Stream: 4 PRC for Signalled Lanes (%):	13.5	Total Delay for Signalled Lanes (pcuHr):	8.82	Cycle Time (s):	60
	PRC Over All Lanes (%):	-43.4	Total Delay Over All Lanes(pcuHr):	589.66		

Appendix 20 – Sensitivity Assessment

Two sensitivity tests have been carried out:

- **10% Modal Shift** – A Travel Plan will be implemented in conjunction with the development to affect a modal shift away from private car use, in particular, single occupancy private car use. A 10% modal shift has therefore been applied to the car driver trips to account for the implementation of the Framework Travel Plan for the Site. The assessment includes a reduction in car driver vehicle trips of 7.28% (10% of car driver mode share), which has been transferred proportionately to sustainable modes.
- **MKE 2031 Vehicle Trip Rates** – The wider MKE SUE will bring forward significant transport and highway infrastructure improvements (HIF funded) along with further improvements to local facilities and amenities, thereby improving access to sustainable transport infrastructure, day-to-day facilities and amenities. These improvements will provide users of the Site with realistic options for travel by sustainable modes, thereby decreasing vehicular trips associated with the development. The agreed MKE vehicle trips have therefore been applied to the proposed 800 residential dwellings.

The sensitivity tests have been undertaken for the scenarios listed below, reflecting when the development will be fully operational.

- **2033** (full build-out of 800 units):
  - Without Development – future baseline traffic which includes the permitted / committed developments AM and PM peak hour.
  - With Development – future baseline traffic with the development proposals AM and PM peak hour.
- **2041** (for M1 and Northfield Junctions only):
  - Without Development – future baseline traffic which includes the permitted / committed developments AM and PM peak hour.
  - With Development – future baseline traffic with the development proposals AM and PM peak hour.

As would be expected the traffic flows across the network for the 10% MS and MKE vehicle trip rates development scenarios are lower when compared to the main development impact assessment (see **Table 7.2** in **Section 7** and **Tables 1** and **2** below). Consequently, the impacts of these two scenarios are lower and this is also reflected in the overall traffic impact across the network with lower DoS and shorter queue lengths, than the main assessment in **Section 7**. Further details are set out in the following paragraphs.

A Technical Report providing a detailed summary of the model results for all scenarios and junctions, along with a commentary, is included in **Appendix 11**. The full Junctions 9 ARCADY model outputs are provided in **Appendix 12** of this report. The full LinSig modelling reports are included in **Appendices 13 to 15**.

10% Modal Shift

Trip Generation

Table 1 sets out the multi-modal trips taking account of the 10% modal shift.

Table 1: Multi-Modal Trips By Mode – 10% Modal Shift

Mode of Travel	Modal Share with 10% Modal Shift	Proposed Multi Modal Trip Generation			
		Morning Peak Hour		Evening Peak Hour	
		Arrivals	Departures	Arrivals	Departures
Train	4.6%	6	18	16	9
Bus, minibus or coach	5.3%	7	21	18	11
Taxi	1.0%	1	4	3	2
Motorcycle, scooter or moped	1.1%	1	4	4	2
Driving a car or van	65.5%	84	254	222	132
Passenger in a car or van	8.1%	10	32	28	16
Bicycle	4.4%	6	17	15	9
On foot	9.0%	12	35	31	18
Other method of travel to work	0.6%	1	2	2	1
Total	**100%**	128	387	339	201

Source: Census (2011), RPS Calculations, note figures may not sum due to rounding factors.

Table 1 demonstrates that with the 10% modal shift, the proposed residential development is expected to generate 338 two-way vehicle trips in the morning peak hour and 354 two-way vehicle trips in the evening peak hour.

Traffic Flow Changes

Table 2 compares the two-way traffic flow on the arms of each of the study area junctions for the 2033 scenarios, without and with the forecast Bloor Homes development traffic and the resultant percentage change.

Table 2 illustrates that even though some of the junction arms will experience more than a 5% increase in traffic flows because of the development proposals, the overall *total* changes in junction flows are all less than a 5% increase between the 2033 without and 2033 with scenarios, except for Tongwell Roundabout whereby there is an increase of 5 % in the morning peak hour and an increase of 6.2% in the evening peak hour. The greatest increase is for Willen Road (S) at Marsh End Roundabout, in the morning peak hour, where there is an increase in 121 vehicles (18.9%), resulting from the proposed development, in accordance with the no modal shift scenario. The results of the detailed junction assessments are presented below.

Table 2: Traffic Flow Changes – 10% Modal Shift

		AM Peak Hour (08:00-09:00)			PM Peak Hour (17:00-18:00)		
Junction	**Arm**	**2033 w/o**	**2033 With**	**% Change**	**2033 w/o**	**2033 With**	**% Change**
Marsh End RAB	A422 (W)	1,060	1,078	+1.7	2,115	2,162	+2.2
	Willen Rd (N)	1,182	1,189	+0.6	698	716	+2.6
	A422 (E)	2,200	2,216	+0.7	1,473	1,514	+2.7
	Willen Rd (S)	639	760	+18.9	1,064	1,127	+5.9
	Total	**5,082**	**5,242**	**+3.2**	**5,351**	**5,519**	**+3.1**
Tickford RAB	A422 (W)	1,172	1,218	+3.9	2,260	2,284	+1.1
	B526 (N)	835	835	0.0	534	534	0.0
	A509 (E)	1,993	1,998	+0.3	1,430	1,444	+1.0
	A509 (S)	755	765	+1.3	1,327	1,354	+2.0
	Total	**4,756**	**4,817**	**+1.3**	**5,552**	**5,616**	**+1.2**
Renny Lodge RAB	A509 (W)	1,080	1,096	+1.5	2,101	2,109	+0.4
	Renny Park Rd (N)	274	275	+0.5	445	449	+0.8
	A509 (E)	1,830	1,834	+0.2	1,097	1,107	+0.9
	Total	**3,184**	**3,205**	**+0.7**	**3,643**	**3,665**	**+0.6**
Tongwell RAB	Michigan Dr	96	100	+4.0	511	522	+2.0
	Willen Rd (N)	1,664	1,798	+8.0	726	777	+7.1
	Tongwell St (S)	1,257	1,274	+1.4	720	766	+6.4
	Dansteed Way	530	553	+4.3	776	837	+7.8
	Total	**3,548**	**3,726**	**+5.0**	**2,733**	**2,902**	**+6.2**
Pineham RAB	A509 (W)	1,102	1,102	0.0	1,588	1,588	0.0
	Tongwell St (N)	1,025	1,078	+5.2	976	1,004	+2.8
	A509 (E)	2,305	2,309	+0.2	950	962	+1.2
	V11 (S)	986	999	+1.3	1,011	1,046	+3.4
	Total	**5,418**	**5,489**	**+1.3**	**4,526**	**4,600**	**+1.6**
Northfield RAB	A509 (W)	1,064	1,078	+1.3	1,856	1,863	+0.4
	A509 (N)	3,955	3,959	+0.1	2,162	2,174	+0.5
	A5130 Fen St	897	897	0.0	877	877	0.0
	H6 Child's Way	943	943	0.0	1,327	1,327	0.0
	Total	**6,859**	**6,877**	**+0.3**	**6,222**	**6,240**	**+0.3**
M1 J14 RAB	M1N (SB diverge)	278	278	0.0	287	287	0.0
	M1N (NB merge)	961	974	+1.4	1,469	1,476	+0.5
	A509 (N)	1,222	1,252	+2.5	1,239	1,254	+1.3

Junction	Arm	AM Peak Hour (08:00-09:00)			PM Peak Hour (17:00-18:00)		
		2033 w/o	2033 With	% Change	2033 w/o	2033 With	% Change
	M1S (NB diverge)	1,703	1,703	0.0	780	780	0.0
	M1S (SB merge)	355	385	+8.6	402	418	+3.9
	A509 (S)	2,009	2,022	+0.7	3,326	3,333	+0.2
	Total	**6,527**	**6,615**	**+1.3**	**7,503**	**7,549**	**+0.6**

Northern and Southern site Accesses & Marsh End Roundabout

A comparison of the 2033 PRC for each scenario is set out in **Table 3**.

Table 3: Northern and Southern Site Access / Marsh End Roundabout – PRC Comparison

Scenario	AM Peak Hour (08:00-09:00)	PM Peak Hour (17:00-18:00)
2033 Baseline + Committed	0.2	-8.3
2033 Baseline + Committed + Development	0.0	-9.8
2033 Baseline + Committed + Development (10% MS)	0.4	-9.6

Table 3 shows that the overall PRC for the 2033 forecast years remains broadly consistent with and without the development. The PRC values for the 10% MS scenario show an improvement in the junctions' operation, reflecting the lower traffic impact of the development proposals. The modelling output results illustrate that the proposed development would have a negligible overall impact on capacity results. It should be noted that it is likely that there would be no southern access without the Bloor Homes development.

Proposed Northern Site access / Willen Road / Caldecote Farm Employment site access

The proposed northern Site access will operate within capacity in the morning and evening peak hours in the 2033 Baseline and Development (10% MS) scenario. The proposed northern access itself is forecast to operate with 20% spare capacity and with a queue of five vehicles in the morning peak hour. Willen Road (N) arm is forecast to operate with a DoS of 81% and a queue 31 vehicles in the morning peak hour.

The forecast queue is lower than the main assessment in **Section 7** (34 vehicles); this is due to lower traffic flows and an improvement in the junctions' operation.

As detailed in **Section 7**, the total queue for this arm (38 vehicles) will be dispersed across all links, the two lanes (plus flare) to be provided (links 1/1, 1/2 + 1/3), which provide a total capacity for up to 65 vehicles. Hence, there would be sufficient capacity to accommodate the forecast queues, without blocking back onto Marsh End Roundabout.

The improved PRC values in **Table 3** show that overall, the operation of Marsh End Roundabout has improved in the 10% MS scenario. All other arms will operate with a high level of spare capacity and with minimal queuing in the morning peak hour. In the evening peak hour, all arms will operate with a high level of spare capacity and with minimal queuing.

When compared to the main worst-case assessment (2033 Baseline and Development) in **Section 7**, the DoS and queue lengths are broadly similar, but the DoS for the northern access is improved in the morning peak hour (from 88% in **Section 7** to 80% in the 10% MS scenario).

The model results illustrate that the proposed northern Site access will operate with sufficient capacity and the traffic impact of the Bloor Homes development on Willen Road is not severe in NPPF terms, with a reduction in DoS on Willen Road (N), between the 2033 with Development (**Section 7**) and 10% MS scenarios.

Proposed Southern Site access / Willen Road

The Site's proposed southern access will operate within capacity in the morning and evening peak hours in the 2033 Baseline and Development (10% MS) scenario. The Willen Road (N) arm is forecast to operate with a DoS of 84% and with a queue of 13 vehicles in the morning peak hour. In reality, the total queue for this arm (17 vehicles) will be dispersed across links the two lanes to be provided (links 5/1 & 5/2), which provide a total capacity for up to 51 vehicles. Therefore, there would be sufficient capacity to accommodate the forecast queues on the southbound approach without blocking back into the proposed northern access. All other arms will operate with a high level of spare capacity and with minimal queues in the morning peak hour. In the evening peak hour, all arms will operate within capacity.

When compared to the main assessment (2033 Baseline and Development) in **Section 7**, the DoS and queue lengths are slightly improved. The 2033 Baseline and Development (10% MS) scenario is therefore considered to have a negligible impact on the operation of the proposed southern access.

A422 / Willen Road / Marsh End Road (Marsh End Roundabout)

The model results for the 2033 Baseline and Development (10% MS) morning and evening peak hour scenarios for the Marsh End Roundabout, broadly show a slight improvement in the DoS and queue lengths for some links, when compared to the main development impact assessment in **Section 7** (see **Table 7.6**); due to the lower traffic flows on the network.

Marsh End Roundabout junction will operate at 90% capacity in the morning peak hour and at 95% capacity in the evening peak hour in the 2033 Baseline and Development (10% MS) scenario. This is compared to 90% and 98%, respectively for the main assessment (2033 Baseline and Development) in **Section 7**. There is also a slight improvement in queue lengths from 16 to 15 vehicles in the 2033 10% MS morning peak hour scenario, when compared to the **Section 7** assessment. 10% MS model results therefore show a slight improvement in DoS and queue lengths, compared to the **Section 7** assessment.

The percentage increase in *total* junction flows because of the Baseline + Committed + Development (10% MS) scenario is predicted to be 3.2% and 3.1% in the morning and evening peak hours, respectively (see **Table 2**); this is lower than **Table 7.2**.

Overall, in terms of the impact of the Bloor Homes development on the operation of the Marsh End Roundabout, the model results show existing capacity issues, with the junction already operating over capacity in the 2021 Baseline scenario. The proposed signalisation of the roundabout, will provide the improvements required to increase the junctions' capacity to cater for both the employment site and the wider MKE SUE development. The model results between the main 2033 assessment in **Section 7** and the 10% MS scenario illustrate minor improvements in the DoS and queues.

It is therefore considered that the traffic impacts of the Bloor Homes development on the operation of Marsh End Roundabout are not severe in NPPF terms.

Pedestrian Crossing Option

The pedestrian crossing option has been assessed for the 2033 Baseline and Development (10% MS) scenario. The model indicates a queue of one vehicle in the morning peak hour and circa 13 vehicles in the evening peak hour.

As in **Section 7**, the model does assume that the crossing is called every cycle, in reality it is unlikely that will happen, therefore provides a robust assessment.

Similar to **Section 7**, overall, the initial modelling suggests that a new signal-controlled pedestrian crossing would have an impact on the operation of Marsh End Roundabout, mostly confined to the evening peak hour; however, there is a lower impact (shorter queue) with the 2033 Baseline and Development (10% MS) scenario, due to the lower traffic flows on the network.

Tongwell Roundabout

The model results for the 2033 Baseline and Development (10% MS) scenario are broadly similar but show a slight improvement on the 2033 Baseline and Development scenario in **Section 7**. For the morning peak hour, Willen Road (N) is predicted to operate at 4% over capacity, with a queue of 83 vehicles. Tongwell Street is forecast to operate at 91% capacity. Similar to **Section 7**, the traffic modelling results illustrate that the junction will operate well within capacity in the evening peak hour.

The percentage increase in *total* junction flows because of the 2033 Baseline and Development (10% MS) scenario is predicted to be 5% and 6.2% in the morning and evening peak hours, respectively (see **Table 2**); which are lower than assessed in **Section 7**.

Based on the above, mitigation in the form of an extension of the existing flare for Willen Road (N), has been considered, which significantly reduces the queue length in the 2033 Baseline and Development (10% MS) morning peak hour scenario from 83 vehicles to 43.

It is therefore considered that an improvement at the Willen Road (N) arm could satisfactorily address the impact of the Bloor Homes development, if deemed necessary.

Tickford Roundabout

A comparison of the PRC is set out in **Table 4**.

Table 4: Tickford Roundabout – PRC Comparison

Scenario	AM Peak Hour (08:00-09:00)	PM Peak Hour (17:00-18:00)
2033 Baseline + Committed	0.1	-27.9
2033 Baseline + Committed + Development	-2.7	-29.4
2033 Baseline + Committed + Development (10% MS)	-2.4	-29.3

Table 4 demonstrates that the impact of the development in the 2033 forecast years is negligible with very minor increases noted in terms of overall PRC values with the introduction of the development.

The 2033 Baseline and Development (10% MS) scenario will operate with a similar DoS and queue length results to the 2033 Baseline and Development scenario assessed in **Section 7**. The junction will operate

at 92% (B526) capacity and a queue of 11 (A509 (E)) vehicles (in the morning peak hour). In the evening peak hour, the DoS and queues are 116% and 105 vehicles, respectively. This is compared to the main assessment in **Section 7**, which is also has a DoS of 92% and queue of 11 vehicles in the morning peak hour and a DoS of 116% and 105 vehicles in the evening peak hour.

It is noted that the percentage increase in *total* junction flows in the 2033 Baseline and Development (10% MS) scenario is 1.3% and 1.2% in the morning and evening peak hours (see **Table 2**), respectively. This is slightly lower than the main assessment in **Section 7** and is considered to be negligible.

Taking account of the above and the assessment in **Section 7**, the 2033 Baseline and Development (10% MS) scenario is considered to have a negligible impact on the operation of the Tickford Roundabout, with no highway improvements required to mitigate the impacts of the Bloor Homes Site.

Renny Lodge Roundabout

Similar to the 2033 Baseline and Development scenario assessed in **Section 7**, the 2033 Baseline and Development (10% MS) scenario the junction will operate within capacity in both the morning and evening peak hours.

The traffic modelling results for the 2033 Baseline and Development (10% MS) scenario shows very little difference in DoS, queues and delays, compared to the 2033 Baseline and Development assessment (see Section 7). It is therefore considered that the Bloor Homes development would have a negligible impact on the operation of the Renny Lodge Roundabout.

Pineham Roundabout

Similar to the 2033 Baseline and Development scenario assessed in **Section 7**, the junction will operate at 6% over capacity, with a queue of 135 vehicles in the Baseline and Development (10% MS) morning peak hour scenario. In the evening peak hour, the junction will operate well within capacity.

It should be noted that the percentage increase in *total* junction flows because of the 2033 Baseline and Development (10% MS) scenario is predicted to be 1.3% and 1.6% in the morning and evening peak hours (see **Table 2**), respectively. This is slightly lower than the 2033 Baseline and Development scenario.

The traffic modelling results for the 2033 Baseline and Development (10% MS) scenario shows very little difference in DoS, queues and delays, compared to the 2033 Baseline and Development assessment (see **Section 7**).

Notwithstanding, it can be concluded that the proposed Bloor Homes development will have a negligible impact on the operation of the Pineham Roundabout.

Northfield Roundabout and M1 J14

A comparison of the PRC is set out in **Table 5**.

Table 5: Northfield Roundabout and M1 J14 – PRC Comparison

Scenario	AM Peak Hour (08:00-09:00)	PM Peak Hour (17:00-18:00)
2033 Baseline + Committed	-61.9	-35.2
2033 Baseline + Committed + Development	-61.9	-35.9
2033 Baseline + Committed + Development (10% MS)	-61.9	-35.9
2041 Baseline + Committed	-71.0	-42.7
2041 Baseline + Committed + Development	-71.4	-43.4
2041 Baseline + Committed + Development (10% MS)	-71.4	-43.4

The impact of the development in the 2033 and 2041 forecast years is negligible with very minor increases noted in terms of overall PRC values with the introduction of the development.

Northfield Roundabout

The model results for the Northfield Roundabout for the 2033 Baseline and Development (10% MS) scenario are broadly similar, with a marginal improvement on the 2033 Baseline and Development scenario in **Section 7**; with a slightly lower DoS and shorter queues.

Similar to the 2033 Baseline and Development, in the morning peak hour Baseline and Development (10% MS) scenario, Northfield Roundabout is still forecast to operate 46% over capacity (A4145) for 2033 and 54% over capacity in 2041. Also, similar to the 2033 Baseline and Development, in the evening peak hour Northfield Roundabout is forecast to operate 22% over capacity in 2033 and 29% in 2041.

Overall, the model results for the 2033 and 2041 Baseline and Development (10% MS) scenarios show a negligible difference in DoS and queues, compared to the Baseline and Development scenario (see **Section 7**); demonstrating that the proposed development would not have a severe impact on the operation of the Northfield Roundabout in NPPF terms. No highway improvements are therefore required to mitigate the impacts of the Bloor Homes Site.

Broughton Roundabout Interchange (M1 J14)

The model results for the 2033 Baseline and Development (10% MS) scenario are improved in comparison to the 2033 Baseline and Development scenario in **Section 7**; with a slightly lower DoS and shorter queues.

Similar to the model results in **Section 7**, in the 2033 Baseline and Development (10% MS) assessment morning peak hour, the M1 J14 is forecast to operate 14% over capacity (M1 NB Off Slip). In the evening peak hour, the same arm of the M1 J14 is forecast to operate 16% over capacity.

For the 2041 Baseline and Development (10% MS) scenario, the junction is forecast to operate 21% and 22% over capacity, in the morning and evening peak hours, respectively. This compares to 21% and 23% for the 2041 Baseline and Development, respectively.

Overall, the model results for the 2033 and 2041 Baseline and Development (10% MS) scenarios show a negligible difference in DoS and queues, compared to the Baseline and Development scenario (see **Section 7**).

MKE 2031 Vehicle Trip Rates

Introduction

This section sets out the results of the sensitivity assessment for the application of the agreed MKE 2031 vehicle trips to the proposed 800 residential dwellings, reflecting the wider significant strategic HIF transport and highway infrastructure improvements, which the development will benefit from in the longer term.

Trip Generation

Table 6 sets out the MKE vehicle trip rates and the resultant vehicle trips for the proposed development of 800 units.

Table 6: MKE Residential Vehicular Trip Rates and Trips

	AM Peak (08:00 – 09:00)			PM Peak (17:00 – 18:00)		
	Arr	Dep	2-way	Arr	Dep	2-way
MKE Vehicular Trip Rate (Private Houses)	0.068	0.237	0.305	0.216	0.12	0.336
800 residential dwellings	54	190	244	173	96	269

Source: MKC, RPS Calculations, note figures may not sum due to rounding factors.

Table 6 shows that with the application of the MKE vehicle trip rates, the proposed residential development is expected to generate 244 two-way vehicle trips in the morning peak hour and 269 two-way vehicle trips in the evening peak hour. These are lower than the 10% MS and the main assessment in **Section 7**.

Traffic Flow Changes

Table 7 compares the two-way traffic flow on the arms of each of the study area junctions for the 2033 scenario, without and with the forecast Bloor Homes development traffic and the resultant percentage change.

Table 7 illustrates that the overall *total* changes in junction flows are all less than a 5% increase between the 2033 without and 2033 with Development scenarios, except for Tongwell Roundabout whereby there is an increase in 5.2% in the evening peak hour. The greatest increase is for Willen Road (S) at Marsh End Roundabout, in the morning peak hour, where there is an increase in 90 vehicles (14.1%), resulting from the proposed development. The results of the detailed junction assessments are presented below.

Table 7: Traffic Flow Changes – MKE 2031 Vehicle Trip Rates

		AM Peak Hour (08:00-09:00)			PM Peak Hour (17:00-18:00)		
Junction	Arm	2033 w/o	2033 With	% Change	2033 w/o	2033 With	% Change
Marsh End RAB	A422 (W)	1,060	1,072	+1.1	2,115	2,152	+1.7
	Willen Rd (N)	1,182	1,186	+0.4	698	712	+2.0
	A422 (E)	2,200	2,210	+0.4	1,473	1,505	+2.1
	Willen Rd (S)	639	729	+14.1	1,064	1,110	+4.3
	Total	**5,082**	**5,198**	**+2.3**	**5,351**	**5,478**	**+2.4**

		AM Peak Hour (08:00-09:00)			PM Peak Hour (17:00-18:00)		
Junction	**Arm**	**2033 w/o**	**2033 With**	**% Change**	**2033 w/o**	**2033 With**	**% Change**
Tickford RAB	A422 (W)	1,172	1,207	+2.9	2,260	2,277	+0.8
	B526 (N)	835	835	0.0	534	534	0.0
	A509 (E)	1,993	1,997	+0.2	1,430	1,441	+0.7
	A509 (S)	755	762	+0.9	1,327	1,348	+1.6
	Total	**4,756**	**4,800**	**+0.9**	**5,552**	**5,601**	**+0.9**
Renny Lodge RAB	A509 (W)	1,080	1,092	+1.1	2,101	2,107	+0.3
	Renny Park Rd (N)	274	275	0.3	445	448	+0.6
	A509 (E)	1,830	1,833	+0.1	1,097	1,105	+0.7
	Total	**3,184**	**3,199**	**+0.5**	**3,643**	**3,660**	**+0.5**
Tongwell RAB	Michigan Dr	96	99	+2.6	511	519	+1.6
	Willen Rd (N)	1,664	1,764	+6.0	726	776	+7.0
	Tongwell St (S)	1,257	1,268	+0.9	720	756	+5.0
	Dansteed Way	530	545	+2.8	776	823	+6.0
	Total	**3,548**	**3,676**	**+3.6**	**2,733**	**2,875**	**+5.2**
Pineham RAB	A509 (W)	1,102	1,102	0.0	1,588	1,588	0.0
	Tongwell St (N)	1,025	1,064	+3.8	976	996	+2.0
	A509 (E)	2,305	2,308	+0.1	950	960	+1.0
	V11 (S)	986	995	+0.9	1,011	1,038	+2.7
	Total	**5,418**	**5,469**	**+0.9**	**4,526**	**4,582**	**+1.2**
Northfield RAB	A509 (W)	1,064	1,074	+0.9	1,856	1,861	+0.3
	A509 (N)	3,955	3,958	+0.1	2,162	2,171	+0.4
	A5130 Fen St	897	897	0.0	877	877	0.0
	H6 Child's Way	943	943	0.0	1,327	1,327	0.0
	Total	**6,859**	**6,872**	**+0.2**	**6,222**	**6,236**	**+0.2**
M1 J14 RAB	M1N (SB diverge)	278	278	0.0	287	287	0.0
	M1N (NB merge)	961	971	+1.0	1,469	1,477	+0.5
	A509 (N)	1,222	1,245	+1.9	1,239	1,250	+0.9
	M1S (NB diverge)	1,703	1,703	0.0	780	780	0.0
	M1S (SB merge)	355	377	+6.4	402	414	+2.9
	A509 (S)	2,009	2,019	+0.5	3,326	3,334	+0.2
	Total	**6,527**	**6,592**	**+1.0**	**7,503**	**7,542**	**+0.5**

Junction Analysis

The results of the junction assessments for this sensitivity test are included herein.

Northern and Southern site accesses & Marsh End Roundabout

A comparison of the PRC is set out in **Table 8**. The PRC for the 2033 Baseline and 2033 Baseline and Development scenarios are also included for reference and comparison purposes.

Table 8: PRC Comparison Proposed Northern and Southern Access / Marsh End Roundabout

Scenario	AM Peak Hour (08:00-09:00)	PM Peak Hour (17:00-18:00)
2033 Baseline + Committed	0.2	-8.3
2033 Baseline + Committed + Development	0.0	-9.8
2033 Baseline + Committed + Development (MKE)	1.3	-7.4

Table 8 shows that the overall PRC for the 2033 forecast years remains broadly consistent with and without the development. The PRC values for the MKE scenario show an improvement in the junctions' operation, reflecting the lower traffic impact of the development proposals. The modelling output results illustrate that the development would have a negligible overall impact on the capacity results. As mentioned previously, it is likely that there would be no southern access without the Bloor Homes development.

Proposed Northern Site access / Willen Road / Caldecote Farm Employment site access

The proposed northern Site access will operate within capacity in the morning and evening peak hours in the 2033 Baseline and Development (MKE) scenario. The proposed northern access itself is forecast to operate with 32% spare capacity and a queue of three vehicles in the morning peak hour. Willen Road (N) arm is forecast to operate with a DoS of 84% and a queue of 36 vehicles in the morning peak hour.

As mentioned earlier and in **Section 7**, the total queue for this arm (41 vehicles) will be dispersed across all links, the two lanes (plus flare) to be provided (links 1/1, 1/2 + 1/3), which provide a total capacity for up to 65 vehicles. Hence, there would be sufficient capacity to accommodate the forecast queues, without blocking back into Marsh End Roundabout.

The improved PRC values in **Table 8** show that overall operation of Marsh End Roundabout has improved in the MKE scenario. All other arms will operate with a high level of spare capacity and with minimal queuing. In the evening peak hour, the junction will operate with a high level of spare capacity and with minimal queuing.

When compared to the main assessment (2033 Baseline and Development) in **Section 7**, the DoS and queue lengths are broadly similar, but the DoS for the northern access is improved in the morning peak hour (from 88% in the main assessment to 68% in the 2033 Baseline and Development (MKE scenario). When compared to the 2033 10% MS assessment scenario (79%), the 2033 MKE model results are lower.

The model results for the 2033 Baseline and Development (MKE) scenario show a noticeable improvement (especially for the proposed northern Site access), compared to the 2033 + Baseline and Development

assessment (see **Section 7**) and 2033 + Baseline and Development (10% MS) assessment above and is therefore considered to have a negligible impact on the operation of the proposed northern Site access junction.

Proposed Southern Site access / Willen Road

The proposed Southern Site access will operate within capacity in the morning and evening peak hours in the 2033 Baseline and Development (MKE) scenario. The Willen Road (N) arm is forecast to operate with a DoS of 89% and with queues of 20 vehicles in the morning peak hour.

In reality, the total queue for this arm (22 vehicles) will be dispersed across links the two lanes to be provided (links 5/1 & 5/2), which provide a total capacity for up to 51 vehicles, suggesting that there is sufficient capacity to accommodate the forecast queues on the southbound approach without blocking back into the proposed northern access. All other arms will operate with a high level of spare capacity and with minimal queues in the morning peak hour. In the evening peak hour, all arms will operate within capacity.

When compared to the main assessment (2033 Baseline and Development) in **Section 7**, the DoS and queue lengths are overall slightly improved. It is therefore considered that the proposed southern access junction would be able to accommodate the traffic flows resulting from the 2033 Baseline and Development (MKE) scenario.

A422 / Willen Road / Marsh End Road (Marsh End Roundabout)

The model results for the 2033 Baseline and Development (MKE) morning and evening peak hour scenarios are slightly improved, when compared to the 2033 Baseline and Development and 2033 Baseline and Development (10% MS) scenarios.

Marsh End Roundabout junction will operate at 87% capacity in the morning peak hour and at 97% capacity in the evening peak hour in the 2033 Baseline and Development (MKE) scenario. This is compared to 90% and 98%, respectively for the main assessment (2033 Baseline and Development) in **Section 7** and 90% and 95% in the 2033 10% MS scenario.

The percentage increase in *total* junction flows because of the MKE scenario is predicted to be 2.3% and 2.4% in the morning and evening peak hours, respectively (see **Table 7**); this is lower than **Tables 7.2** and **2** (10% MS scenario).

Overall, in terms of the impact of the Bloor Homes development on the operation of the Marsh End Roundabout, the model results show existing capacity issues, with the junction already operating over capacity in the 2021 Baseline scenario. The proposed signalisation of the roundabout, will provide the improvements required to increase the junctions' capacity to cater for both the employment site and the wider MKE SUE development. The model results between the main 2033 assessment in **Section 7** and the MKE scenario illustrate improvements in the DoS and queues.

It is therefore considered that the traffic impacts of the Bloor Homes development on the operation of Marsh End Roundabout are not severe in NPPF terms.

Pedestrian Crossing Option

The pedestrian crossing option has been assessed for the MKE scenario. The model indicates a queue of one vehicle in the morning peak hour and approximately 12 vehicles in the evening peak hour.

The model assumes that the crossing is called every cycle. In reality it is unlikely that will happen; therefore, the model provides a robust assessment.

Similar to **Section 7**, overall, the initial modelling suggests that a new signal-controlled pedestrian crossing would have an impact on the operation of Marsh End Roundabout, mostly confined to the evening peak hour; however, there is a lower impact (shorter queue) with the 2033 Baseline and Development (MKE) scenario due to the lower traffic flows on the network.

Tongwell Roundabout

The model results for the Tongwell Roundabout for the 2033 Baseline and Development (MKE) scenario are broadly similar, with a slight improvement on the 2033 Baseline and Development scenario as summarised in **Section 7**. For the morning peak hour, Willen Road (N) is predicted to operate at 2% over capacity, with a queue of 59 vehicles. Tongwell Street is forecast to operate at 91% capacity. Similar to **Section 7**, the traffic modelling results illustrate that the Tongwell Roundabout will operate well within capacity in the evening peak hour.

The percentage increase in *total* junction flows because of the 2033 Baseline and Development (MKE) scenario is predicted to be 3.6% and 5.2% in the morning and evening peak hours respectively (see **Table 7**); which are lower than assessed in **Section 7** and in the 2033 Baseline and Development (10% MS) assessment above.

Based on the above, mitigation in the form of an extension of the existing flare for Willen Road (N), has been considered, which significantly reduces the queue length in the 2033 Baseline and Development (MKE) morning peak hour scenario from 59 vehicles to 29.

It is therefore considered that an improvement at the Willen Road (N) arm could satisfactorily address the impact of the Bloor Homes development, if deemed necessary.

Tickford Roundabout

A comparison of the PRC is set out in **Table 9**.

Table 9: Tickford Roundabout – PRC Comparison

Scenario	AM Peak Hour (08:00-09:00)	PM Peak Hour (17:00-18:00)
2033 Baseline + Committed	0.1	-27.9
2033 Baseline + Committed + Development	-2.7	-29.4
2033 Baseline + Committed + Development (MKE)	0.1	-27.9

The impact of the development the 2033 forecast years is negligible with very minor increases noted in terms of overall PRC values with the introduction of the proposed development.

The 2033 Baseline and Development (MKE) scenario will operate with a similar DoS and queue length results to the 2033 Baseline and Development scenario assessed in **Section 7**. The junction will operate at 90% (B526) capacity and a queue of 12 (A509 (E)) vehicles (in the morning peak hour). In the evening peak hour, the DoS and queues are 115% and 99 vehicles, respectively. This is compared to the main assessment in **Section 7**, which is also has a DoS of 92% and queue of 11 vehicles in the morning peak hour and a DoS of 116% and 105 vehicles in the evening peak hour.

It should be noted that in the 2033 Base + Committed scenario, the junction is forecast to operate at 90% DoS and a queue of 12 vehicles in the morning peak hour. In the evening peak hour, the junction is forecast to operate at 115% and a queue of 99 vehicles. Hence there is no change in the junctions' operation from the 2033 Baseline + Committed scenario, as a result of the proposed development traffic.

It should be noted that the percentage increase in *total* junction flows in the 2033 Baseline and Development (MKE) scenario is 0.9% and 0.9% in the morning and evening peak hours (see **Table 7**), respectively. This is slightly lower than the main assessment in **Section 7** and similar to the 2033 Baseline and Development (MKE) assessment above.

Taking account of the above and the assessment in **Section 7**, the 2033 Baseline and Development (MKE) scenario is considered to have a negligible impact on the operation of the Tickford Roundabout, with no highway improvements required to mitigate the impacts of the Bloor Homes Site.

Renny Lodge Roundabout

Similar to the 2033 Baseline and Development scenario assessed in **Section 7**, in the 2033 Baseline and Development (MKE) scenario the junction will operate within capacity in both the morning and evening peak hours.

The traffic modelling results for the 2033 Baseline and Development (MKE) scenario shows very little difference in DoS, queues and delays, compared to the 2033 Baseline and Development assessment (see **Section 7**) and the 2033 Baseline and Development (10% MS) scenario. It is therefore considered that the 2033 Baseline and Development (MKE) scenario would have a negligible impact on the operation of the Renny Lodge Roundabout.

Pineham Roundabout

The model results for the Pineham Roundabout for the 2033 Baseline and Development (MKE) scenario show a slight improvement when compared to the 2033 Baseline and Development scenario assessed in **Section 7**. The model shows that the junction would operate at 5% over capacity, with a queue of 123 vehicles in the 2033 MKE morning peak hour. In the evening peak hour, the junction will operate well within capacity.

It is noted that the percentage increase in *total* junction flows because of the MKE scenario is predicted to be 0.9% and 1.2% in the morning and evening peak hours (see **Table 7**), respectively. This is slightly lower than the 2033 Baseline and Development scenario and the 2033 Baseline and Development (10% MS) scenario.

The traffic modelling results for the 2033 Baseline and Development (MKE) development scenario shows very little difference in DoS, queues and delays, compared to the 2033 Baseline and Development assessment (see **Section 7**) and the 2033 Baseline and Development (10% MS) scenario. The modelling results show that the impact of the development traffic on the Pineham Roundabout would be minimal and would not have a severe impact on its operation in NPPF terms.

Northfield Roundabout and M1 J14

A comparison of the PRC is set out in **Table 10** below.

Table 10: Northfield Roundabout and M1 J14 – PRC Comparison

Scenario	AM Peak Hour (08:00-09:00)	PM Peak Hour (17:00-18:00)
2033 Baseline + Committed	-61.9	-35.2
2033 Baseline + Committed + Development	-61.9	-35.9
2033 Baseline + Committed + Development (MKE)	-61.9	-35.5
2041 Baseline + Committed	-71.0	-42.7
2041 Baseline + Committed + Development	-71.4	-43.4
2041 Baseline + Committed + Development (MKE)	-71.4	-43.4

The impact of the development in the 2033 and 2041 forecast years is negligible with very minor increases noted in terms of overall PRC values with the introduction of the development.

Northfield Roundabout

The model results for the 2033 Baseline and Development (MKE) scenario are broadly similar to both the 2033 / 2041 Baseline + Committed + Development (see **Section 7**) and 10% MS scenarios (see above); with slightly lower DoS and shorter queues.

Similar to the 2033 Baseline and Development scenario, in the morning peak hour MKE scenarios Northfield Roundabout is still forecast to operate 46% over capacity (A4145) for 2033 and 54% over capacity in 2041.

In the evening peak hour, Northfield Roundabout is forecast to operate 22% over capacity in 2033 and 29% in 2041.

Overall, the model results for the 2033 and 2041 Baseline and Development (MKE) scenarios show a negligible difference in DoS and queues, compared to the 2033 / 2041 Baseline and Development scenario (see **Section 7**) and 2033 / 2041 Baseline and Development (10% MS) scenario (see above); demonstrating that the proposed development would not have a severe impact on the operation of the Northfield Roundabout in NPPF terms. No highway improvements are therefore required to mitigate the impacts of the Bloor Homes Site.

Broughton Roundabout Interchange (M1 J14)

The model results for the 2033 Baseline and Development (MKE) scenario show a slight improvement on the 2033 / 2041 Baseline and Development scenario (see **Section 7**) and similar to the 2033 / 2041 Baseline and 10% MS Development scenario (see above).

For the 2033 Baseline and Development (MKE) scenario in the morning peak hour, the M1 J14 is forecast to operate 13% over capacity (M1 NB Off Slip). In the evening peak hour, the M1 J14 is forecast to operate 14% over capacity (A509 (S)). For the 2041 Baseline and Development (MKE) scenario the junction is forecast to operate at 21% over capacity for both the 2041 MKE morning and evening peak hour scenarios.

Overall, the model results for the 2033 and 2041 Baseline and Development (MKE) scenarios show a negligible change in the junctions' capacity, demonstrating that the proposed development would not have a severe impact on the operation of the Broughton Roundabout Interchange in NPPF terms. No highway improvements are therefore required to mitigate the impacts of the Bloor Homes Site.