Highways implications for proposed housing developments within the draft Fylde Local Plan on M55 Junction 4

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Lancashire County Council

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1. Introduction

Four Strategic Locations for Development (SLD) form the basis for the Fylde Local Plan (Publication Version) Development Strategy. These are:

- Lytham and St.Annes
- Fylde-Blackpool Periphery
- Warton
- Kirkham and Wesham

The housing trajectory for Fylde is base dated 31st March 2016. At the time of writing out of 7,891 total homes to be provided, 5,088 are committed by way of planning permission; of which 1,048 have been completed. The Local Plan goes on to allocate an additional 2,803 homes. The spatial distribution for housing development is shown in Figure 1.

Figure 1 – Spatial distribution

Local areas	Quantum of development (Publication Version) - August/September 2016	Quantum of development (Revised Preferred Option Version) - October/December 2015
Lytham and St Annes	1,839	2,090
Fylde-Blackpool Periphery	2,311	2,727
Warton	840	650
Kirkham and Wesham	1,141	1,140
Rural areas	762	716
(Allowances and	998	902

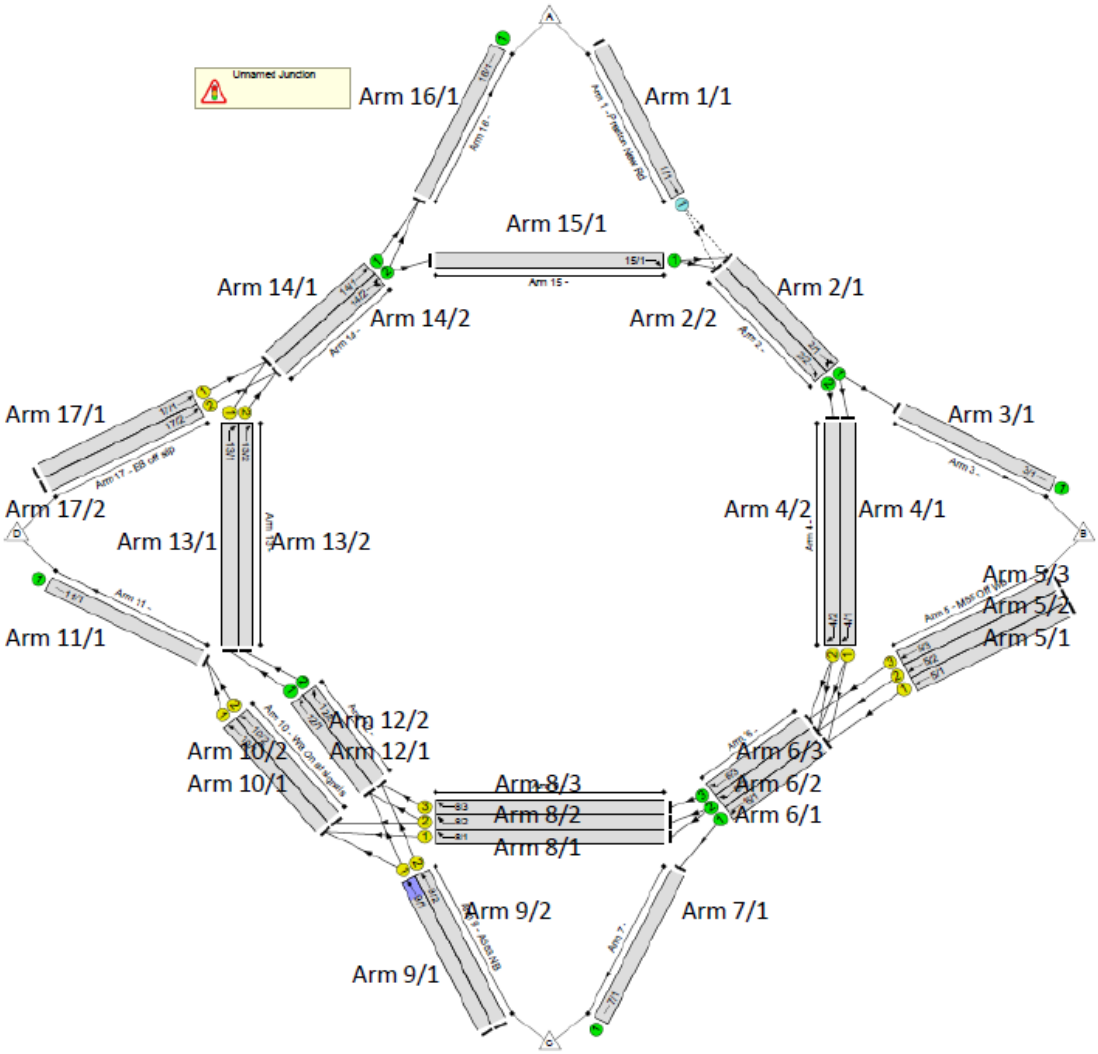
unallocated sites)		
Totals	**7,891**	**8,225**

Figure 1 shows the quantum of housing development has slightly changed since the Revised Preferred Option Version of the Local Plan. Trip generation data is only available based on the earlier Fylde Local Plan 2032 Revised Preferred Option Version and so the following assessment relies on this development scenario. The two scenarios are broadly similar and therefore the conclusions to this assessment are judged to be applicable to the publication version.

2. Methodology

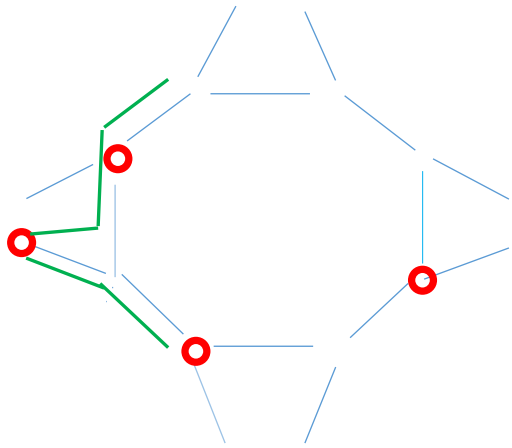
The methodology for this assessment will be undertaken in three stages. All stages will be presented on a baseline LinSig model utilised as part of the Transport Assessment (2013) for the Whyndyke Farm development (see Figure 2).

Figure 2 – M55 Junction 4 baseline LinSig model



The proposed Whyndyke Farm development will comprise of 1,400 new residential dwellings and 20 hectares of Employment Land. Section 278 works will enable part signalisation at Junction 4 and additional funding as part of a Section 106 contribution will fund enhanced pedestrian/cycling connectivity. A simplified sketch of Figure 2 is shown in Figure 3.

Figure 3 – M55 Junction 4 baseline sketch



Key

Signalised junction

Pedestrian / cycling route

A trigger point for the proposed works will be set based on the occupation of a set number of dwellings. This number is still to be agreed but outputs produced in this study are based on the full development with signalisation.

Stage one will consist of two parts;

Part A recreates the signalised junction design proposed in the Whyndyke Farm Transport Assessment, but with base 2013 traffic only (i.e.no development traffic),

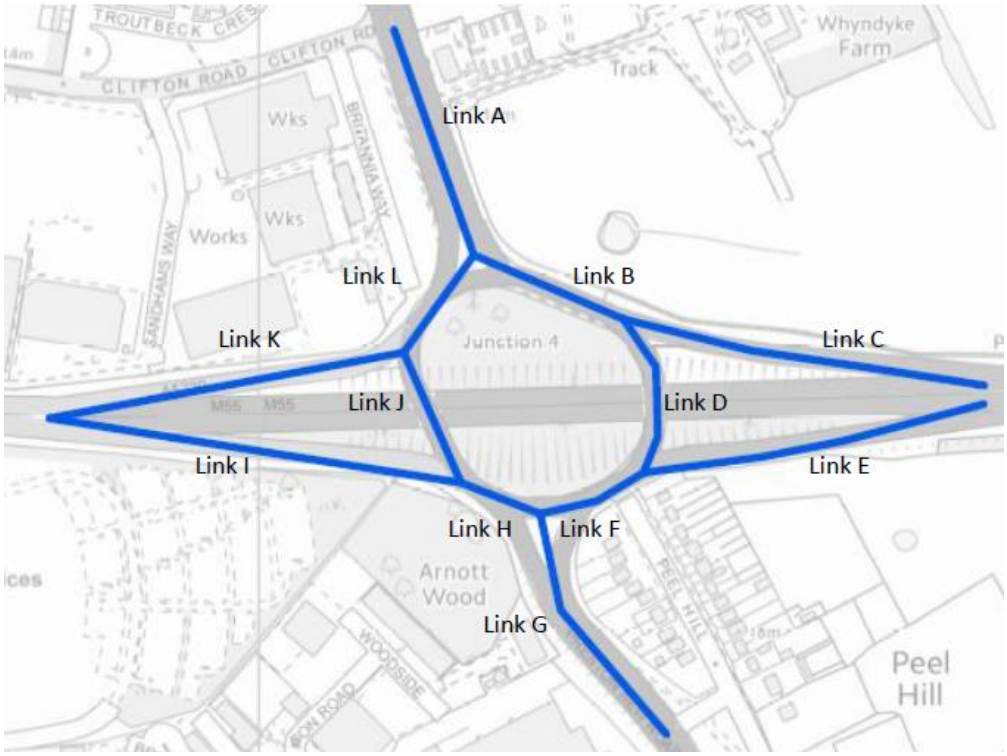
Part B derives traffic growth as a result of development within the Fylde Local Plan (publication version). This is obtained from the Graham toolkit which is a gravity model utilising TEMPro. It considers development growth within the Fylde Local Plan using background traffic growth between the base year (2014) and the end of the plan (2032).

Figure 4 shows the junction layout used for the Graham toolkit. It is noted that the junction design is not as detailed as the LinSig model and the output is two-way. Therefore a set of assumptions has to be made when translating associated growth on to the LinSig model. This includes using simultaneous equations to calculate traffic growth on missing links ((e.g. arms 15 and 8 (see Figure 2)).

TEMPro growth assigned using the Graham toolkit includes planned improvements (M55 Junction 2, Little Singleton bypass, Preston Western distributor and Broughton bypass), M55 Heyhouses link and M55 Norcross (including a link to the Little Singleton bypass).

Further information on the Graham toolkit and associated TEMPro growth is available in the Fylde Local Plan to 2032 (emerging) Highways England Assessment Report (September 2015).

Figure 4 – Graham toolkit Junction 4 design

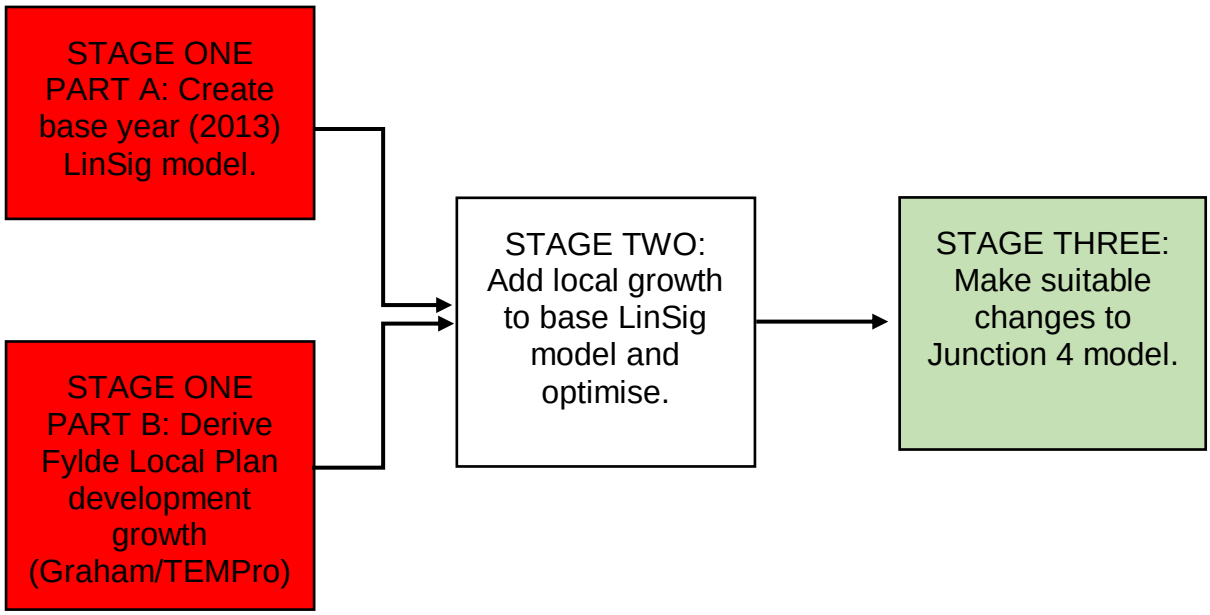


Stage two of the process will combine the design year flows from TEMPro (Part B) with the LinSig model of the junction as proposed in the Whyndyke Farm TA (Part A). Traffic light timing will be optimised to ensure the junction is operating at maximum efficiency. The output produced will represent the forecasted outputs of M55 Junction 4 in 2032 on the baseline LinSig model when all indicative development within the Fylde Local Plan has been delivered.

Stage three will be to make suitable alterations to the junction design to relieve any resulting congestion and reduce queue lengths to acceptable levels.

Figure 5 provides a flow diagram of the methodology.

Figure 5 – Methodology



Limitations

A number of limitations have been identified and these include:

- *Stage one Part B*

1) The Graham toolkit is not a traffic re-assignment model. This results in certain routes forecasting higher TEMPro growth and others lower than would otherwise be observed in a traditional transport model or in real life.

2) The Graham toolkit (Figure 4) is not as detailed as the LinSig model (Figure 2). Consequently LinSig separates a 2 lane free flow movement originating from Zone A and destined for Zone B from the model. The Graham toolkit does not resulting in higher TEMPro growth for this movement. Therefore growth for both the AM and PM peak have been manually reduced using turning movement provided within the Whyndyke Farm Transport Assessment (2013) as a guide. Furthermore TEMPro

growth figures provided within the Graham toolkit are 2 way-flows resulting in the need for simultaneous equations to calculate 1 way flows.

3) TEMPro growth forecasted in the Graham toolkit includes the Heyhouses link road which has planning permission as part of the 1,150 dwellings at Queensway, St Annes. The link road will improve access to and from Junction 4 of the M55 from St Annes, and accommodate the additional traffic generated by the Queensway development. This will significantly increase traffic accessing M55 Junction 4. It must be highlighted that this link road has not been built yet. However it is expected to be built over the period of the Local Plan.

The Graham toolkit also includes Norcross link road which is a long standing proposal to build a dual carriageway road to connect the M55 at junction 3 to Victoria Road roundabout on the A585(T) between Thornton and Cleveleys. However we do not believe this scheme would deliver sufficient benefits to offset the likely cost and that local improvements such as those already being undertaken by Highways England provides better value for money. Consequently the delivery of this scheme is unlikely within the Fylde Local Plan period. The addition of this link road will mean a slightly higher level of forecasted traffic growth on M55 Junction 4. This is predominantly due to traffic travelling to and from Blackpool Airport Local Enterprise Zone.

- *Stage two*

AM peak for TEMPro is 08:00 to 09:00 and PM peak is 17:00 to 18:00. AM peak for background demand (2013) is 07.45 to 08.45 and PM peak is 16.15 to 17.15. Consequently there is a degree of error when adding TEMPro growth onto background demand (2013).

3. Results

3.1 Stage one

Stage one will be undertaken in two parts. Both parts will utilise the baseline LinSig model as a blank canvas (Figure 2). Part A will add base year traffic demand (2013) and Part B traffic growth as a result of development within the Fylde Local Plan.

Part A

Figures 6 and 7 present the saturation flow (pcu/hr), capacity (pcu), degree saturation (%) and associated base year demand (pcu) for the AM and PM peaks respectively. Base year traffic demand (2013) has been obtained from the Transport Assessment for the Whyndyke Farm development.

Figure 6 – Base year (2013) M55 Junction 4 - AM peak (07.45 – 08.45)

Arm (see Figure 2)	Saturation flow (pcu/hr)	Capacity (pcu)	Deg Saturation (%)	Base year demand (pcu) 2013
1/1	2,000	2,000	43.8	876
2/1	1,900	1,900	39.6	752
2/2	1,900	1,900	22.4	426
3/1	4,000	4,000	3.8	150
4/1	1,900	950	63.4	602
4/2	1,900	950	44.8	426
5/1	1,900	697	59.4	414
5/2	1,900	697	45.6	318

5/3	1,900	697	49.8	347
6/1	1,900	1,900	53.5	1,016
6/2	1,900	1,900	39.2	744
6/3	1,900	1,900	18.3	347
7/1	4,000	4,000	25.4	1,016
8/1	1,900	697	45.8	319
8/2	1,900	697	61	425
8/3	1,900	697	49.8	347
9/1	1,900	950	60.1	571
9/2	1,900	950	50.9	484
10/1	1,900	1,362	36.9	502
10/2	1,900	1,362	7.9	107
11/1	4,000	4,000	15.2	609
12/1	1,900	1,900	37.2	706
12/2	1,900	1,900	43.7	831
13/1	1,900	1,267	55.7	706
13/2	1,900	1,267	65.6	831
14/1	1,900	1,900	43.6	828
14/2	1,900	1,900	51.7	983
15/1	1,900	1,900	15.9	302
16/1	4,000	4,000	37.7	1,509

17/1	1,900	253	48.2	122
17/2	1,900	253	60	152

Figure 7 – Base year (2013) M55 Junction 4 - PM peak (16.15 – 17.15)

Arm (see Figure 2)	Saturation flow (pcu/hr)	Capacity (pcu)	Deg Saturation (%)	Base year demand (pcu) 2013
1/1	2,000	2,000	40.7	814
2/1	1,900	1,900	40.1	762
2/2	1,900	1,900	17.7	337
3/1	4,000	4,000	2.4	96
4/1	1,900	1,077	61.9	666
4/2	1,900	1,077	31.3	337
5/1	1,900	570	61.1	348
5/2	1,900	570	40.7	232
5/3	1,900	570	43.5	248
6/1	1,900	1,900	53.4	1,014
6/2	1,900	1,900	29.9	569
6/3	1,900	1,900	13.1	248
7/1	4,000	4,000	25.4	1,014
8/1	1,900	633	38.4	243
8/2	1,900	633	51.5	326

8/3	1,900	633	39.2	248
9/1	1,900	1,013	52.5	532
9/2	1,900	1,013	43	436
10/1	1,900	1,362	31.7	431
10/2	1,900	1,362	6.9	94
11/1	4,000	4,000	13.1	525
12/1	1,900	1,900	30.3	576
12/2	1,900	1,900	36	684
13/1	1,900	1,172	49.2	576
13/2	1,900	1,172	58.4	684
14/1	1,900	1,900	37.7	716
14/2	1,900	1,900	45.9	873
15/1	1,900	1,900	15	285
16/1	4,000	4,000	32.6	1,304
17/1	1,900	348	40.2	140
17/2	1,900	348	54.3	189

Part B

Appendix A presents TEMPro growth figures which have been modelled on the Graham toolkit. Figure 8 shows how TEMPro growth is translated on to a baseline LinSig model. Please note that 313 passenger car units was reduced in the AM peak and 408 in the PM peak for arms 1/1, 2/1, 2/2 and 3/1 respectfully. This is due to an

estimated reduction of 33% growth originating from Zone A and destined for Zone B in the AM peak and 42% in the PM peak (see limitations for an explanation).

Figure 8 - Fylde Local Plan development growth (TEMPRO) applied to the LinSig model.

Arm (see Figure 2)	AM peak growth	PM peak growth
1/1	627	564
2/1	525	426
2/2	525	426
3/1	297	102
4/1	376	375
4/2	376	375
5/1	143	196
5/2	143	196
5/3	143	196
6/1	701	944
6/2	240	197
6/3	239	196
7/1	701	944
8/1	160	131
8/2	160	131
8/3	160	131

9/1	512	410
9/2	512	411
10/1	150	110
10/2	151	111
11/1	301	221
12/1	601	496
12/2	601	497
13/1	601	496
13/2	601	497
14/1	713	628
14/2	713	628
15/1	422	286
16/1	1,004	970
17/1	112	132
17/2	112	132

3.2 Stage two

Stage two of the process combines Stage one Part A and Part B into a baseline LinSig model for the AM peak and PM peak respectively. Traffic light timings are optimised to ensure the junction is operating at maximum efficiency. The outputs produced represent the forecast operation of the junction in the year 2032, when all

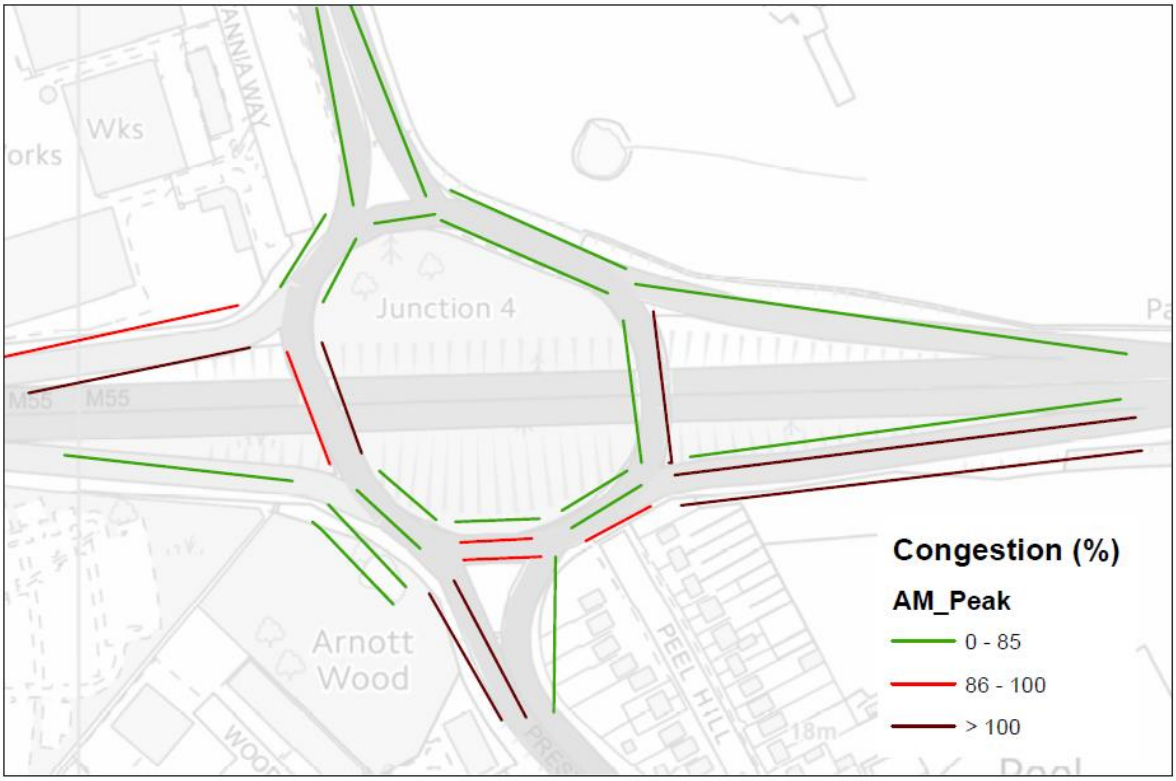
indicative development within the Fylde Local Plan (Publication Version) has been delivered.

AM peak

Appendix B provides all LinSig outputs for the AM peak and Figure 9 a sketch of the associated congestion output.

Figure 9

Baseline model - AM Peak ((volume/capacity (%))



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The output shows congestion which in parts is severe is present on a number of arms. Severe congestion is present on the westbound off slip (arms 5/1 & 5/2), southbound bridge (arm 4/1), northbound bridge (arm 13/2), northbound traffic originating from Preston New Road (arm 9/1 & arm 9/2) and the eastbound off slip (arm 17/1 & 17/2).

Figure 10 – Average maximum length of queue on selective arms

Arm	Length of queue (metres)	Length of arm (metres)
4/1	229	95
5/1	193	260
5/2	208	260
8/1	75	60
8/2	67	60
9/1	346	60
9/2	280	60
13/1	212	100
13/2	384	100
17/1	39	200
17/2	113	200

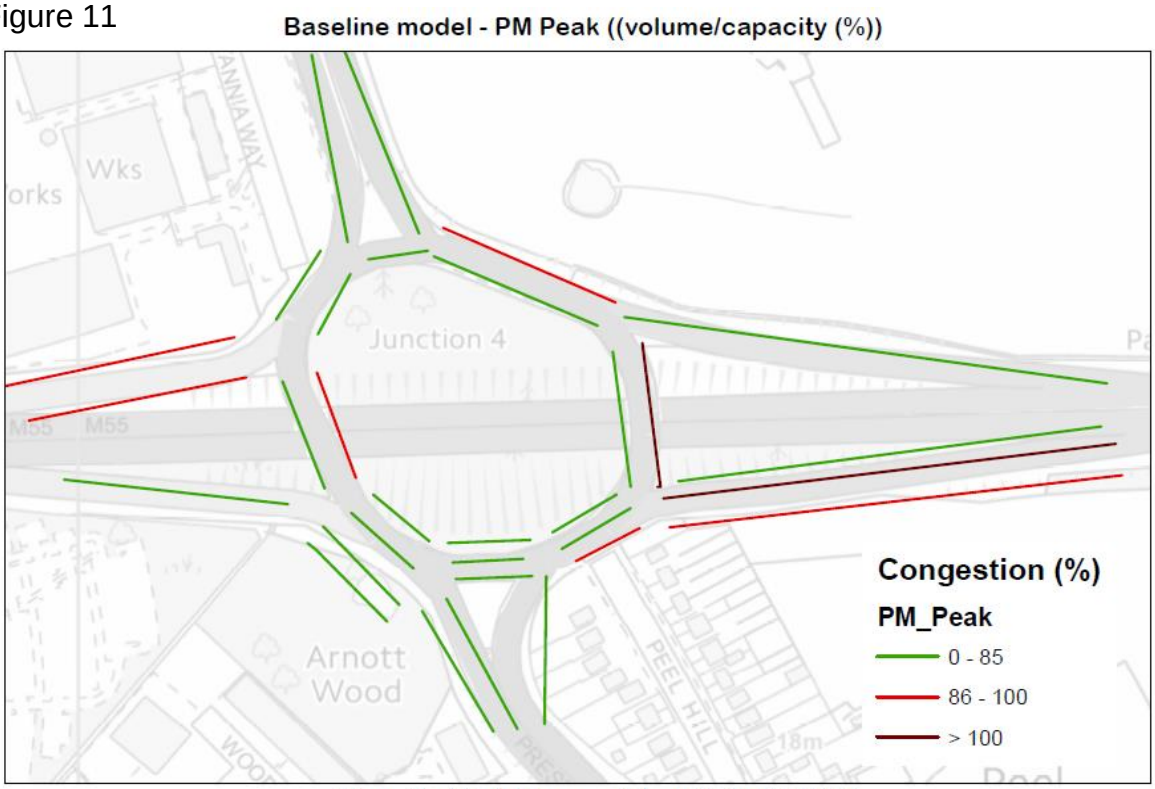
Figure 10 presents average maximum queue length on severely congested arms and those which have a mean max queue (pcu) of 12 and over. The queue length on the westbound off slip (arms 5/1 & 5/2) is contained within the length of the off slip.

There are a number of arms where the mean maximum queue length exceeds the length of the arm. Of particular concern is the queue length on the circulatory movement which includes arms 13, 8 and 4. This indicates that part signalisation of the junction delivered as part of the Whyndyke Farm development does not sufficiently satisfy congestion and queue length concerns over the Fylde Local Plan period. Further works on the junction would need to be undertaken and this is addressed in Stage 3.

PM peak

Appendix C provides all LinSig outputs for the PM peak and Figure 11 a sketch of the associated congestion output.

Figure 11



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In the PM peak areas of severe congestion are present on the westbound off slip (arm 5/2) and the southbound bridge (arm 4/1).

Figure 12 – Average maximum length of queue on selective arms

Arm (see Figure 2)	Length of queue (metres)	Length of arm (metres)
4/1	1089	95
5/1	101	260
5/2	488	260
9/1	79	60

13/2	186	100

Figure 12 presents average maximum queue length on severely congested arms and those which have a mean max queue (pcu) of 12 and over. Of particular concern is the westbound off slip (arm 5/2) where traffic queues back on to the mainline link creating a safety hazard. Concern is also raised with the length of the queue particularly on arm 4/1 and 13/2. This indicates that part signalisation of the junction delivered as part of the Whyndyke Farm development does not sufficiently satisfy congestion and queue length concerns over the Fylde Local Plan period. Further works on the junction would need to be undertaken and this is addressed in Stage 3.

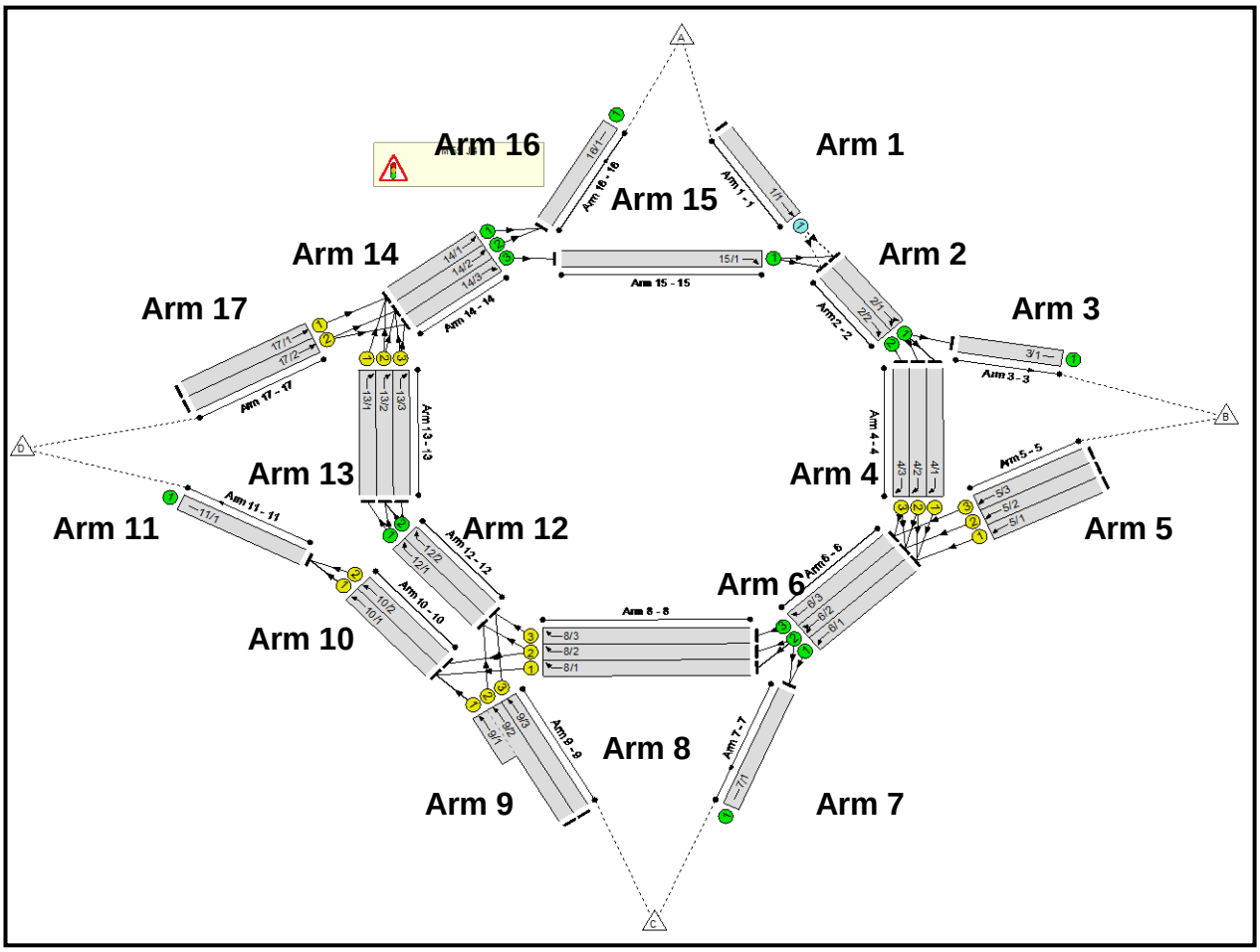
3.3 Stage three

Stage two has demonstrated that part signalisation of the junction through works delivered as a result of the Whyndyke Farm development is not sufficient to ease congestion and queue length to an acceptable level. Additional works must be undertaken to increase the capacity of the arms. The geometry of the junction suggests this can be achieved, in the most part, within the existing highway boundary. Potential works include:

- Arm 4 - an additional lane can be incorporated within the existing highway boundary which would result in the bridge carrying three lanes of traffic
- Arm 9 - an additional short lane beyond the existing highway boundary consisting of a left turn only can be engineered
- Arm 13 - an additional lane can be incorporated within the existing highway boundary which would result in the bridge carrying three lanes of traffic
- Arm 14 - an additional lane can be incorporated within the existing highway boundary which would result in three lanes

Figure 13 shows the modified junction layout as a result of the suggested works.

Figure 13 – Modified network



<u>AM peak</u>

Appendix D provides all LinSig outputs for the modified network in the AM peak and Figure 14 a sketch of the associated congestion output.

Figure 14 shows that congestion is not as severe in the AM peak when compared to the same time period on the baseline network.

Figure 14

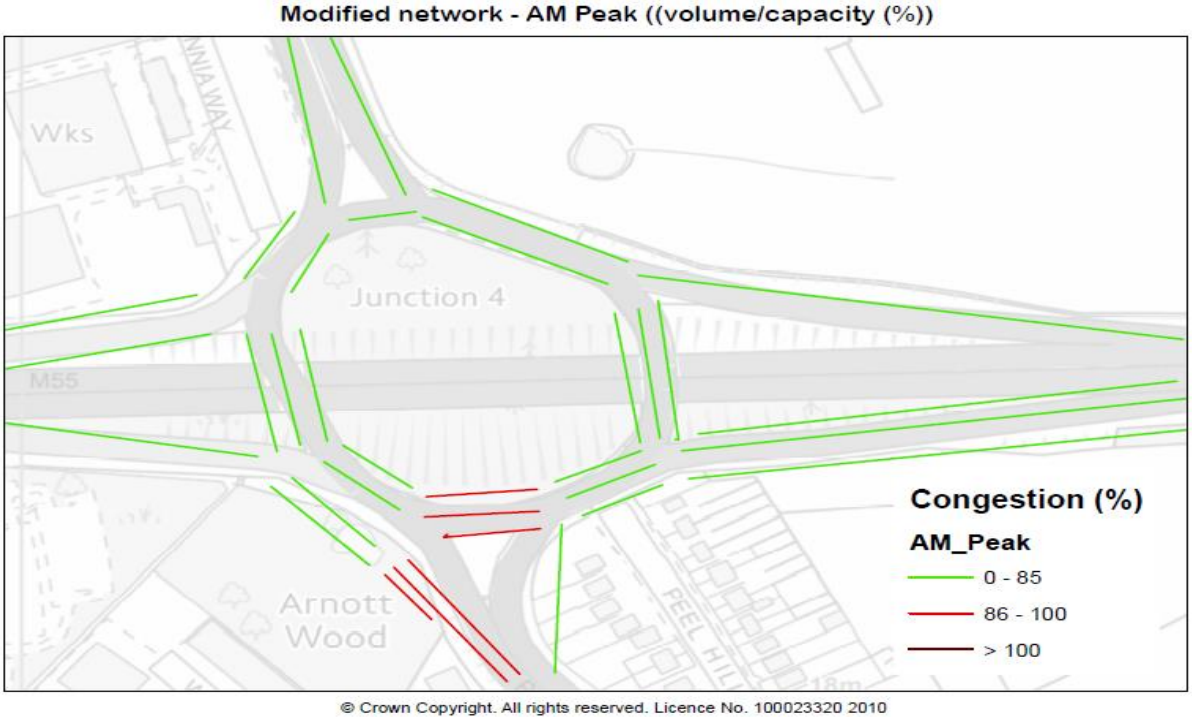


Figure 15 - Average maximum length of queue on selective arms (AM peak)

Arm (see Figure 2)	Length of queue (metres)	Length of arm (metres)
8/1	70	60
8/2	77	60
8/3	77	60
9/1	117	60
9/2	117	60
9/3	109	30
13/1	80	100
13/2	77	100
13/3	72	100

Figure 15 presents average maximum queue length on congested arms and those which have a mean max queue (pcu) of 12 and over. It is apparent that arms 8 and 9 are the worst affected arms but neither are considered excessive given the relative location of the arms. From arm 8 traffic will queue back on to arm 6 and from arm 9 it will queue back on to Preston New Road.

PM peak

Appendix D provides all LinSig outputs for the modified network in the PM peak and Figure 16 a sketch of the associated congestion output.

Figure 16

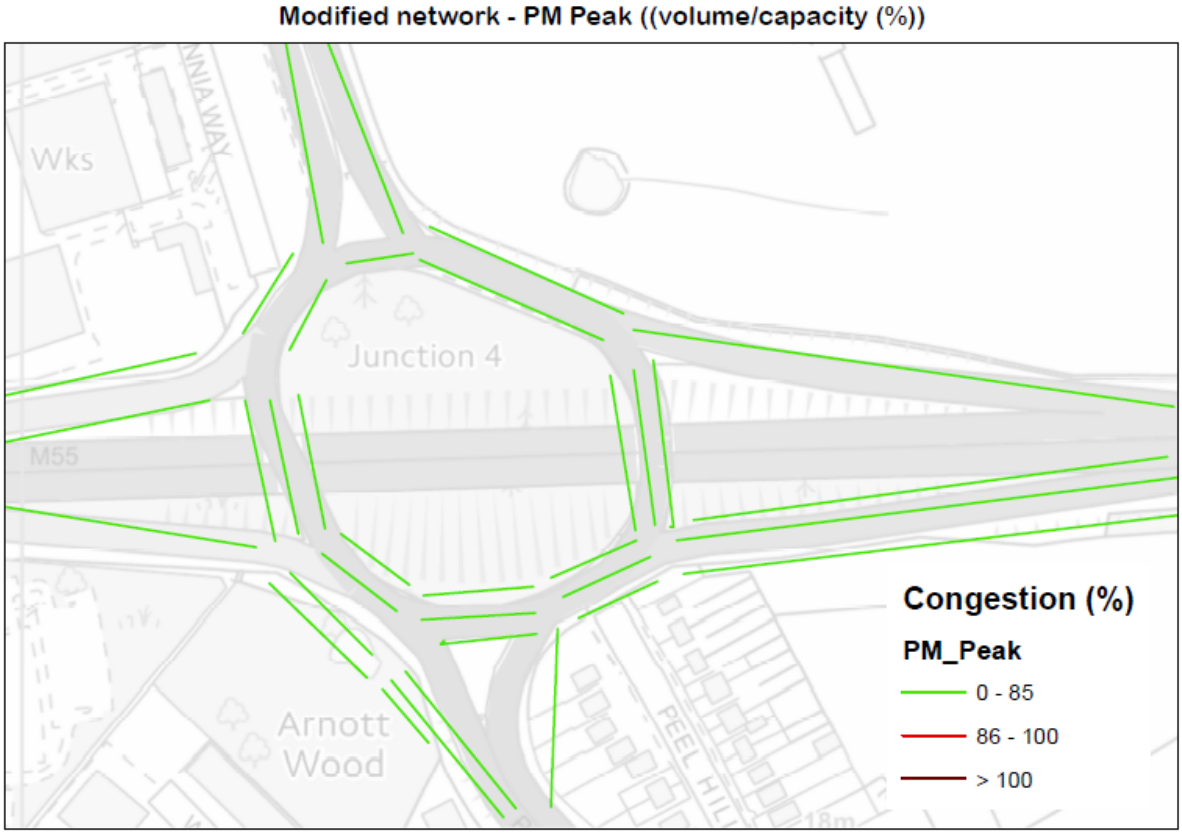


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Figure 16 shows that congestion is not a problem in the PM peak on the modified network. Significantly the queue on the westbound off slip no longer queues back on to the mainline link. The arm length of the westbound off slip is 260 metres and the maximum average queue length 44 metres. However slight queues exist on the following arms:

Figure 17 – Queue length in the PM peak (modified network)

Arm (see Figure 2)	Length of queue (metres)	Length of arm (metres)
9/1	65	30
9/2	64	60
9/3	65	60

Arms 9/1, 9/2 and 9/3 show queue lengths beyond the length of the arm resulting in traffic queueing back onto Preston New Road. However the length of the queue is not deemed severe.

3.4 Summary

It is apparent that part signalisation of M55 Junction 4 alone will not sufficiently satisfy congestion and queue length concerns over the Fylde Local Plan period. Of particular concern is the westbound off-slip which shows traffic queueing back on to the mainline link in the PM peak.

This document has suggested the following works to be undertaken on M55 Junction 4 in conjunction with part signalisation:

- Arm 4 - an additional lane can be incorporated within the existing highway boundary which would result in the bridge carrying three lanes of traffic
- Arm 9 - an additional short lane beyond the existing highway boundary consisting of a left turn only can be engineered
- Arm 13 - an additional lane can be incorporated within the existing highway boundary which would result in the bridge carrying three lanes of traffic
- Arm 14 - an additional lane can be incorporated within the existing highway boundary which would result in three lanes

When modelled on LinSig congestion and queue lengths were reduced to an acceptable level. Significantly queue length on the westbound off-slip was contained within the length of the arm.

In summary the modelling exercise within this document has demonstrated that part signalisation at M55 Junction 4, plus additional works of a similar nature to those suggested in this document, will be necessary within the Flyde Local Plan period. However it is noted that the part signalisation will only be triggered upon occupation of a yet to be agreed number of dwellings at the Whyndyke Farm development. Beyond this any uncommitted development should be looked to for contribution for necessary works.

Suggested works would need to be agreed by Highways England, Blackpool Council and Lancashire County Council. Works can be undertaken in stages with the agreement of all stakeholders.

4. Conclusion

This report has assessed the capacity of M55 Junction 4 to accommodate indicative development growth within the proposed Fylde Local Pan. At the time of writing out of 7,891 total homes to be provided, 5,088 are committed by way of planning permission; of which 1,048 have been completed.

The assessment consisted of three stages. The first stage was in two parts and both utilised a baseline LinSig model found within the Transport Assessment (2013) of the Whyndyke Farm development. The baseline model is partly signalised whilst the current configuration of M55 Junction 4 is not.

Stage one Part A applies background traffic demand (2013) to the baseline LinSig model and Part B applies Flyde Local Plan development growth. This is obtained from TEMPro which was modelled on the Graham toolkit. It considers development growth between the base year (2014) and the end of the plan (2032). The Graham toolkit network included the existing road network together with planned improvements (M55 Junction 2, Poulton – Singleton bypass, Preston Western distributor and Broughton bypass), Heyhouses link and Norcross (including a link to the Poulton – Singleton bypass). While Heyhouses link will be built over the Fylde Local Plan period Norcross will not. This results in slightly higher traffic growth than would be expected.

Stage two combines Stage one Part A and Part B onto a single LinSig baseline model to produce forecasted outputs of M55 Junction 4 in 2032 when all indicative development within the Fylde Local Plan has been delivered. The outputs show both the AM and PM peak. From the results it is clear that congestion is widespread and in parts severe. Queue lengths are also a problem with the westbound off slip queuing back on to the mainline link in the PM peak.

It is clear that part signalisation of M55 Junction 4 which will be delivered as part of the Whyndyke Farm development does not sufficiently satisfy congestion and queue length concerns over the Fylde Local Plan period. Further works on the junction is necessary.

Stage 3 makes suitable modification to the baseline LinSig model in order to ease congestion and queue length concern. The geometry of the junction suggests this can be achieved, in the most part, within the existing highway boundary. Potential works include (please see in conjunction with Figures 2 & 13):

- Arm 4 - an additional lane can be incorporated within the existing highway boundary which would result in the bridge carrying three lanes of traffic
- Arm 9 - an additional short lane beyond the existing highway boundary consisting of a left turn only can be engineered
- Arm 13 - an additional lane can be incorporated within the existing highway boundary which would result in the bridge carrying three lanes of traffic
- Arm 14 - an additional lane can be incorporated within the existing highway boundary which would result in three lanes

The modified model shows that congestion is reduced to an acceptable level both in the AM and PM peaks. Queue lengths still pose a slight problem particularly in the AM peak but this is deemed tolerable given that no safety concerns arise from the relative locations of the queues. Significantly the westbound off slip queue is contained within the length of the arm in the AM and PM peaks.

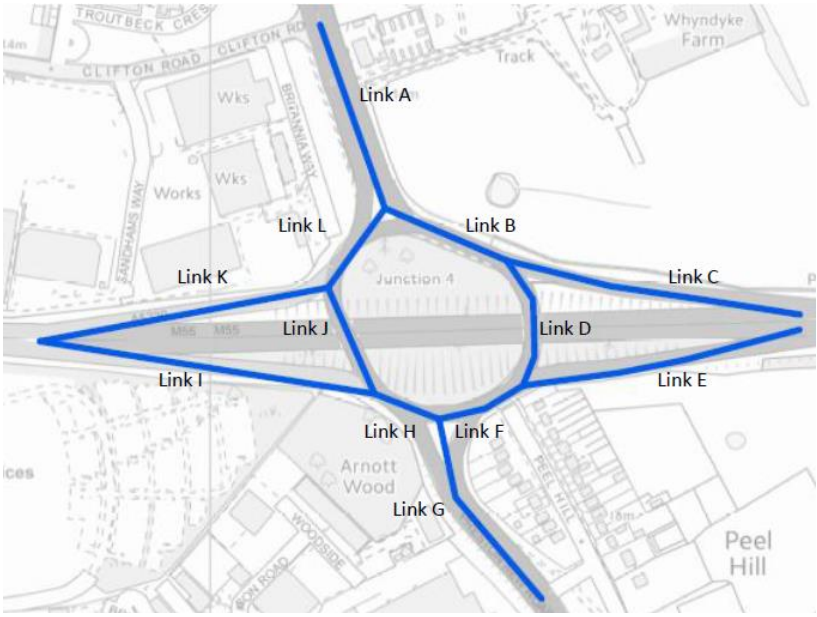
In summary the modelling exercise within this document has demonstrated that part signalisation at M55 Junction 4, plus additional works of a similar nature to those suggested in this document, will be necessary within the Flyde Local Plan period. However it is noted that the part signalisation will only be triggered upon occupation of a yet to be agreed number of dwellings at the Whyndyke Farm development. Beyond this any uncommitted development should be looked at for contribution for necessary works.

Suggested works would need to be agreed by Highways England, Blackpool Borough Council and Lancashire County Council. Works can be undertaken in stages with the agreement of all stakeholders.

Appendix A

Graham toolkit network and associated Fylde Coast development TEMPro growth figures:

Graham toolkit network



Associated TEMPro growth figures

Link	AM peak (08.00 – 09.00)	PM peak (17.00 – 18.00)
A	1,943	1,942
B	1,362	1,259
C	610	510
D	752	749
E	428	588
F	1,180	1,337
G	1,725	1,765

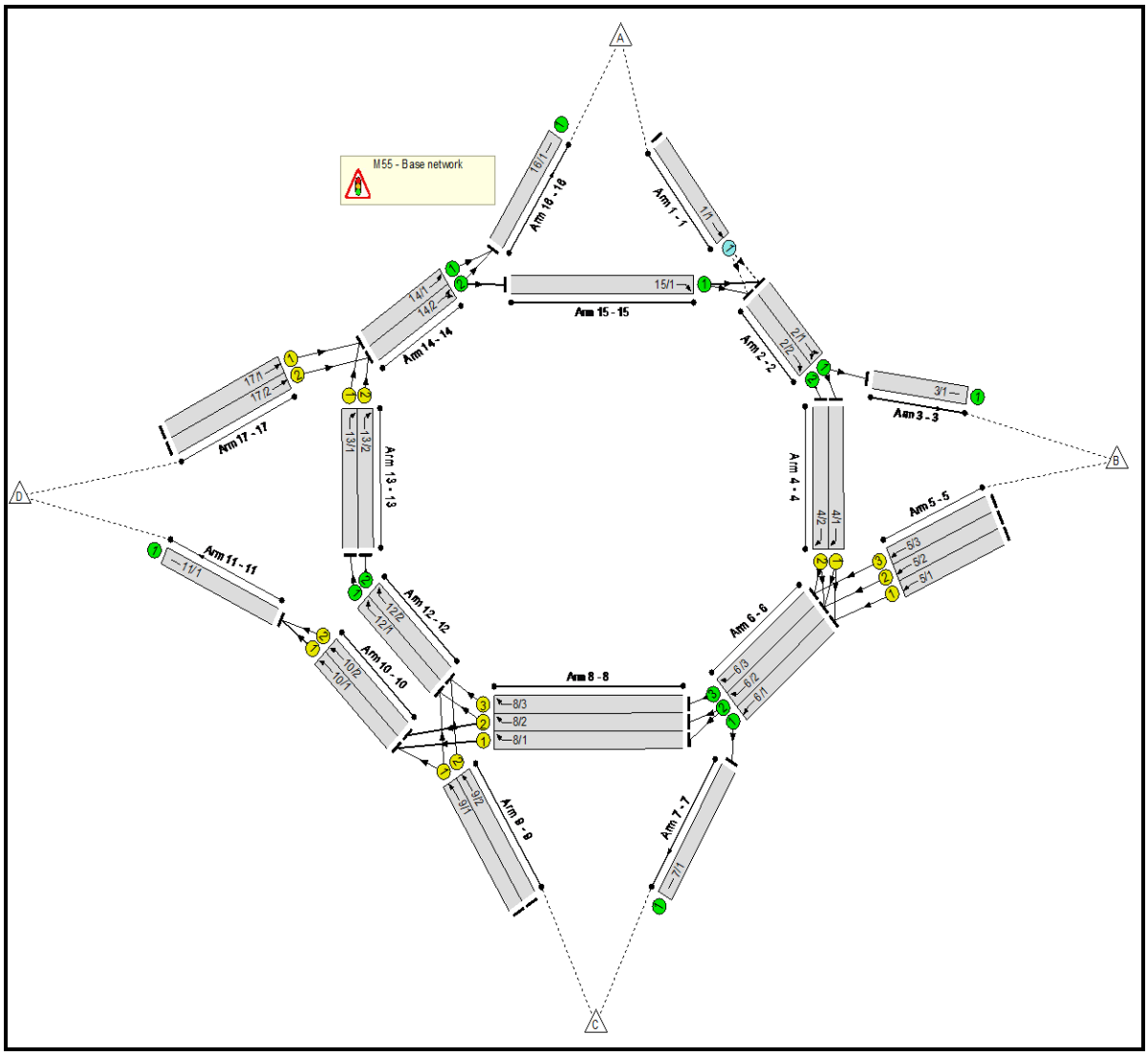
H	1,503	1,214
I	301	221
J	1,202	993
K	224	264
L	1,426	1,256

Appendix B

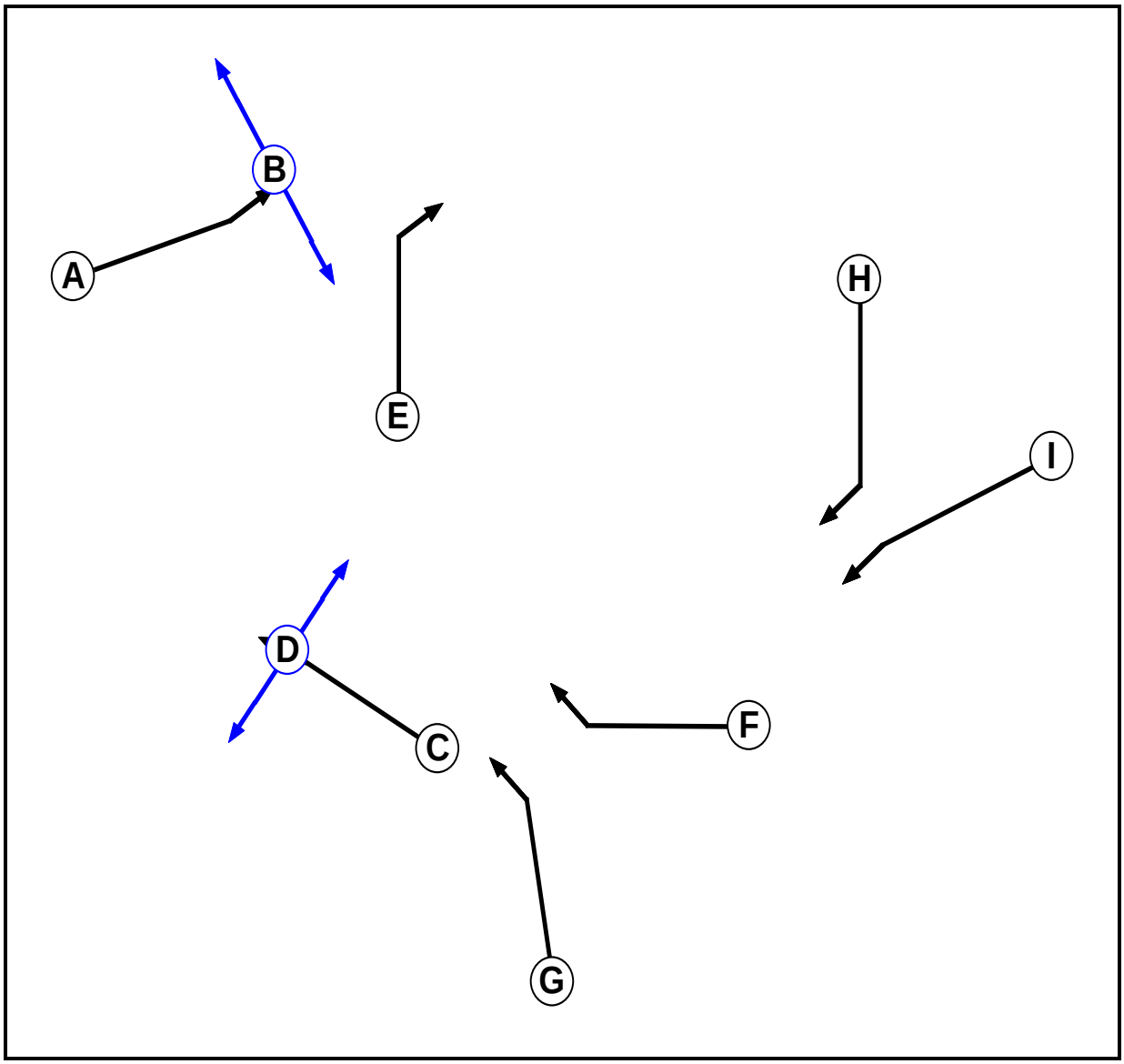
User and Project Details

Project:	**Fylde Local Plan**
Title: **Location:**	**M55 Junction 4 - Base network am**
File name:	LinSig
Author: **Company:** **Address:**	LCC
Notes:	AM peak

Network Layout Diagram



Phase Diagram



Phase Input Data

Phase Name	Phase Type	Stage Stream	Assoc. Phase	Street Min	Cont Min
A	Traffic	3		7	7
B	Pedestrian	3		7	7
C	Traffic	1		7	7
D	Pedestrian	1		5	5
E	Traffic	3		7	7
F	Traffic	2		7	7
G	Traffic	2		7	7
H	Traffic	4		7	7
I	Traffic	4		7	7

Phase Intergreens Matrix

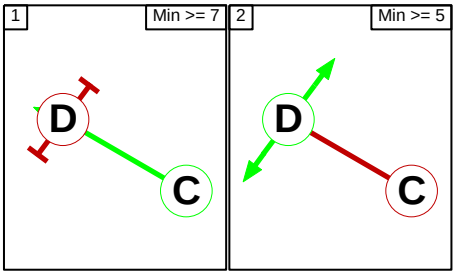
		Starting Phase								
		A	B	C	D	E	F	G	H	I
Terminating Phase	A		5	-	-	5	-	-	-	-
	B	9		-	-	-	-	-	-	-
	C	-	-		5	-	-	-	-	-
	D	-	-	8		-	-	-	-	-
	E	5	-	-	-		-	-	-	-
	F	-	-	-	-	-		5	-	-
	G	-	-	-	-	-	5		-	-
	H	-	-	-	-	-	-	-		5
	I	-	-	-	-	-	-	-	5	

Phases in Stage

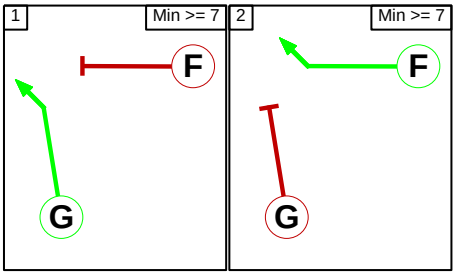
Stream	Stage No.	Phases in Stage
1	1	C
1	2	D
2	1	G
2	2	F
3	1	A
3	2	B E
4	1	H
4	2	I

Stage Diagram

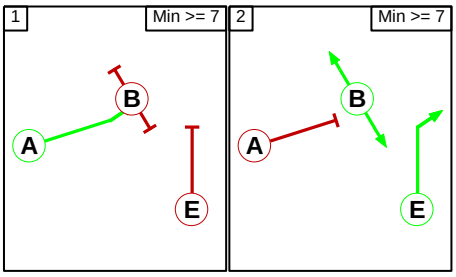
Stage Stream: 1



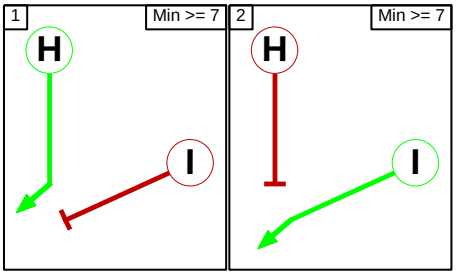
Stage Stream: 2



Stage Stream: 3



Stage Stream: 4



Phase Delays

Stage Stream: 1

Term. Stage	Start Stage	Phase	Type	Value	Cont value
There are no Phase Delays defined					

Stage Stream: 2

Term. Stage	Start Stage	Phase	Type	Value	Cont value
There are no Phase Delays defined					

Stage Stream: 3

Term. Stage	Start Stage	Phase	Type	Value	Cont value
There are no Phase Delays defined					

Stage Stream: 4

Term. Stage	Start Stage	Phase	Type	Value	Cont value
There are no Phase Delays defined					

Prohibited Stage Change

Stage Stream: 1

		To Stage	
		1	2
From Stage	1		5
	2	8	

Stage Stream: 2

		To Stage	
		1	2
From Stage	1		5
	2	5	

Stage Stream: 3

		To Stage	
		1	2
From Stage	1		5
	2	9	

Stage Stream: 4

		To Stage	
		1	2
From Stage	1		5
	2	5	

Give-Way Lane Input Data

Junction: M55 - Base network

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)
1/1 (1)	2/1 (Ahead)	3008	0	15/1	1.09	To 2/1 (Right)	-	-	-	-	-
	2/2 (Ahead)	3008	0	15/1	1.09	All					

LANE INPUT DATA

Junction: M55 - Base network

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 (1)	O		2	3	60.0	User	2000	-	-	-	-	-
2/1 (2)	U		2	3	60.0	User	1900	-	-	-	-	-
2/2 (2)	U		2	3	60.0	User	1900	-	-	-	-	-
3/1 (3)	U		2	3	60.0	User	4000	-	-	-	-	-
4/1 (4)	U	H	2	3	60.0	User	1900	-	-	-	-	-
4/2 (4)	U	H	2	3	60.0	User	1900	-	-	-	-	-
5/1 (5)	U	I	2	3	60.0	User	1900	-	-	-	-	-
5/2 (5)	U	I	2	3	60.0	User	1900	-	-	-	-	-
5/3 (5)	U	I	2	3	60.0	User	1900	-	-	-	-	-
6/1 (6)	U		2	3	60.0	User	1900	-	-	-	-	-
6/2 (6)	U		2	3	60.0	User	1900	-	-	-	-	-
6/3 (6)	U		2	3	60.0	User	1900	-	-	-	-	-
7/1 (7)	U		2	3	60.0	User	4000	-	-	-	-	-
8/1 (8)	U	F	2	3	60.0	User	1900	-	-	-	-	-

8/2 (8)	U	F	2	3	60.0	User	1900	-	-	-	-	-
8/3 (8)	U	F	2	3	60.0	User	1900	-	-	-	-	-
9/1 (9)	U	G	2	3	60.0	User	1900	-	-	-	-	-
9/2 (9)	U	G	2	3	60.0	User	1900	-	-	-	-	-
10/1 (10)	U	C	2	3	60.0	User	1900	-	-	-	-	-
10/2 (10)	U	C	2	3	60.0	User	1900	-	-	-	-	-
11/1 (11)	U		2	3	60.0	User	4000	-	-	-	-	-
12/1 (12)	U		2	3	60.0	User	1900	-	-	-	-	-
12/2 (12)	U		2	3	60.0	User	1900	-	-	-	-	-
13/1 (13)	U	E	2	3	60.0	User	1900	-	-	-	-	-
13/2 (13)	U	E	2	3	60.0	User	1900	-	-	-	-	-
14/1 (14)	U		2	3	60.0	User	1900	-	-	-	-	-
14/2 (14)	U		2	3	60.0	User	1900	-	-	-	-	-
15/1 (15)	U		2	3	60.0	User	1900	-	-	-	-	-
16/1 (16)	U		2	3	60.0	User	4000	-	-	-	-	-
17/1 (17)	U	A	2	3	60.0	User	1900	-	-	-	-	-
17/2 (17)	U	A	2	3	60.0	User	1900	-	-	-	-	-

Traffic Flow Groups

Flow Group	Start Time	End Time	Duration	Formula
1: 'Flow Group 1'	08:00	09:00	01:00	

Scenario 1: 'Scenario 1' (FG1: 'Flow Group 1', Plan 1: 'Network Control Plan 1')

Traffic Flows, Desired

Desired Flow :

		Destination				
		A	B	C	D	Tot.
Origin	A	0	0	870	633	1503
	B	935	0	573	0	1508
	C	1354	447	0	278	2079
	D	224	0	274	0	498
	Tot.	2513	447	1717	911	5588

Traffic Lane Flows

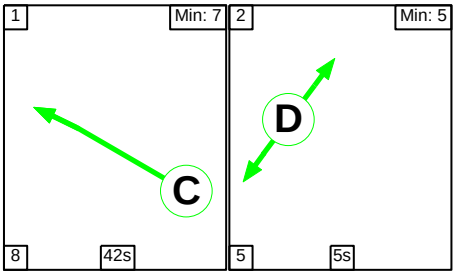
Lane	Scenario 1: Scenario 1
Junction: M55 - Base network	
1/1	1503
2/1	1591
2/2	633
3/1	447
4/1	1144
4/2	633
5/1	573
5/2	579
5/3	356
6/1	1717
6/2	1212
6/3	356
7/1	1717
8/1	598
8/2	614
8/3	356
9/1	1052
9/2	1027
10/1	876
10/2	35
11/1	911
12/1	1353
12/2	1383
13/1	1353
13/2	1383
14/1	1577

14/2	1657
15/1	721
16/1	2513
17/1	224
17/2	274

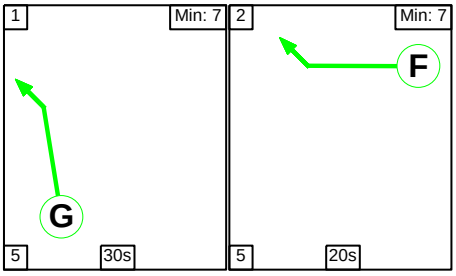
Scenario 1: 'Scenario 1' (FG1: 'Flow Group 1', Plan 1: 'Network Control Plan 1')

Stage Sequence Diagram

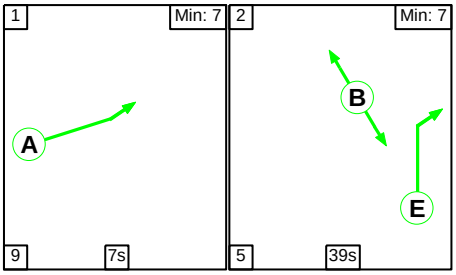
Stage Stream: 1



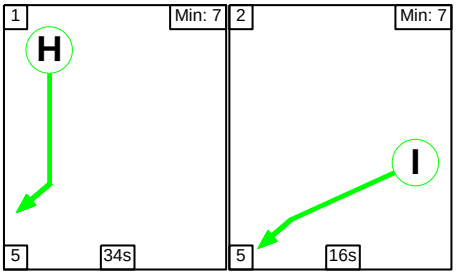
Stage Stream: 2



Stage Stream: 3



Stage Stream: 4



Stage Timings

Stage Stream: 1

Stage	1	2
Duration	42	5
Change Point	57	47

Stage Stream: 2

Stage	1	2
Duration	30	20
Change Point	56	31

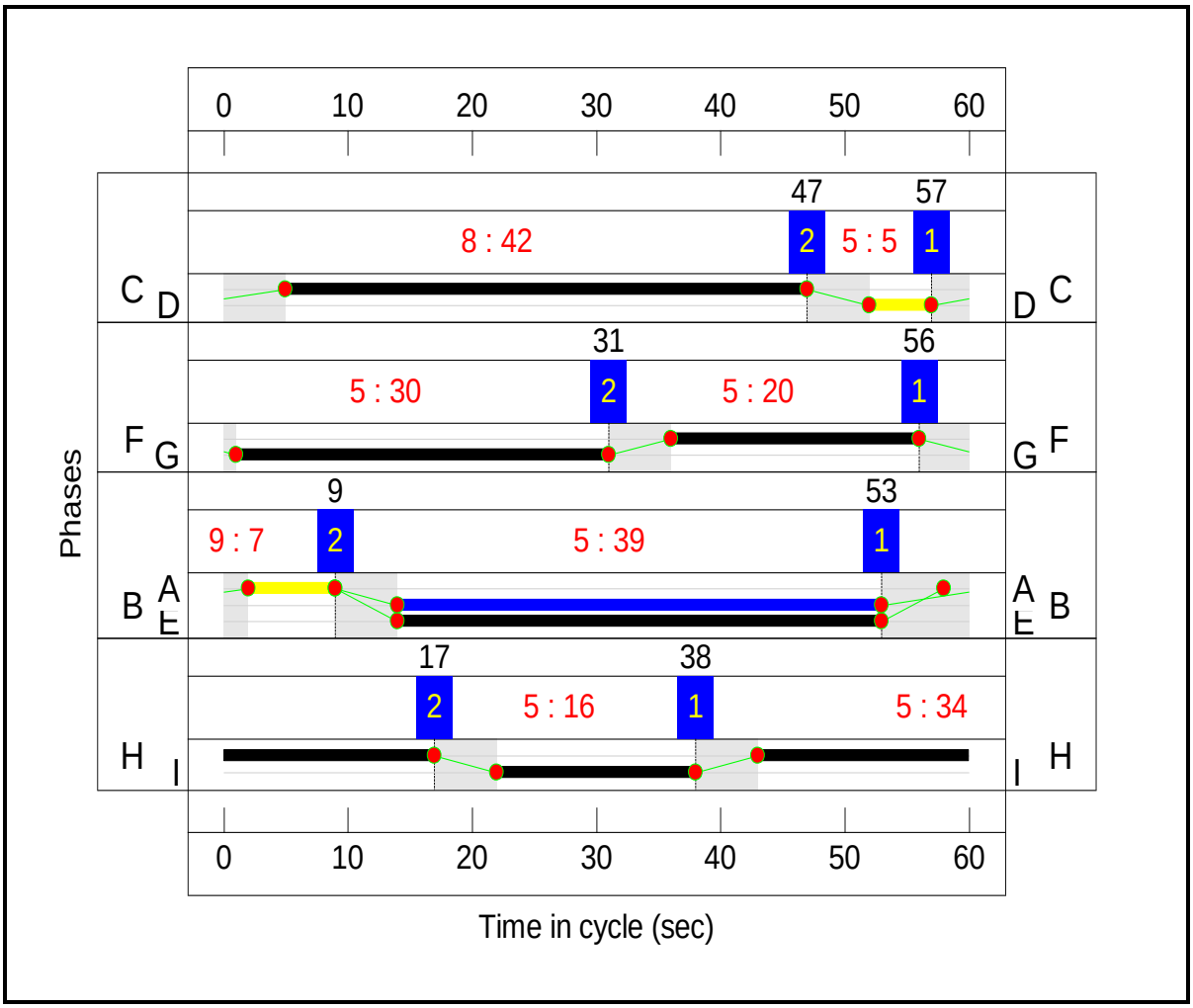
Stage Stream: 3

Stage	1	2
Duration	7	39
Change Point	53	9

Stage Stream: 4

Stage	1	2
Duration	34	16
Change Point	38	17

Signal Timings Diagram



Network Results – AM peak baseline network

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: M55 Junction 4 - Base network am	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**108.2 %**
M55 - Base network	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**108.2 %**
1/1	1 Ahead	O	N/A	N/A	-		-	-	-	1503	2000	2000	75.2%
2/1	2 Ahead Ahead2	U	N/A	N/A	-		-	-	-	1591	1900	1900	80.8%
2/2	2 Ahead	U	N/A	N/A	-		-	-	-	633	1900	1900	33.3%
3/1	3	U	N/A	N/A	-		-	-	-	447	4000	4000	10.3%
4/1	4 Right	U	4	N/A	H		1	34	-	1144	1900	1108	101.4 %
4/2	4 Right	U	4	N/A	H		1	34	-	633	1900	1108	57.1%
5/1	5 Ahead	U	4	N/A	I		1	16	-	573	1900	538	106.4 %
5/2	5 Ahead	U	4	N/A	I		1	16	-	579	1900	538	107.6 %
5/3	5 Ahead	U	4	N/A	I		1	16	-	356	1900	538	66.1%
6/1	6 Ahead	U	N/A	N/A	-		-	-	-	1717	1900	1900	86.7%
6/2	6 Ahead	U	N/A	N/A	-		-	-	-	1212	1900	1900	61.6%
6/3	6 Ahead	U	N/A	N/A	-		-	-	-	356	1900	1900	18.7%
7/1	7	U	N/A	N/A	-		-	-	-	1717	4000	4000	41.2%
8/1	8 Right	U	2	N/A	F		1	20	-	598	1900	665	89.9%
8/2	8 Right Right2	U	2	N/A	F		1	20	-	614	1900	665	86.2%
8/3	8 Right	U	2	N/A	F		1	20	-	356	1900	665	53.5%
9/1	9 Ahead Ahead2	U	2	N/A	G		1	30	-	1052	1900	982	107.2 %
9/2	9 Ahead	U	2	N/A	G		1	30	-	1027	1900	982	104.6 %

10/1	10 Ahead	U	1	N/A	C		1	42	-	876	1900	1362	63.0%
10/2	10 Ahead	U	1	N/A	C		1	42	-	35	1900	1362	2.6%
11/1	11	U	N/A	N/A	-		-	-	-	911	4000	4000	22.3%
12/1	12 Ahead	U	N/A	N/A	-		-	-	-	1353	1900	1900	66.3%
12/2	12 Ahead	U	N/A	N/A	-		-	-	-	1383	1900	1900	70.4%
13/1	13 Right	U	3	N/A	E		1	39	-	1353	1900	1267	99.5%
13/2	13 Right	U	3	N/A	E		1	39	-	1383	1900	1267	105.6 %
14/1	14 Ahead	U	N/A	N/A	-		-	-	-	1577	1900	1900	78.1%
14/2	14 Ahead Ahead2	U	N/A	N/A	-		-	-	-	1657	1900	1900	80.0%
15/1	15 Right	U	N/A	N/A	-		-	-	-	721	1900	1900	35.0%
16/1	16	U	N/A	N/A	-		-	-	-	2513	4000	4000	58.5%
17/1	17 Ahead	U	3	N/A	A		1	7	-	224	1900	253	88.4%
17/2	17 Ahead	U	3	N/A	A		1	7	-	274	1900	253	108.2 %

Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Overs at Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcu Hr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Overs at Queue (pcu)	Mean Max Queue (pcu)
Network: M55 Junction 4 - Base network am	**-**	**-**	**1503**	**0**	**0**	**47.4**	**245.7**	**0.0**	**293.1**	**-**	**-**	**-**	**-**
M55 - Base network	**-**	**-**	**1503**	**0**	**0**	**47.4**	**245.7**	**0.0**	**293.1**	**-**	**-**	**-**	**-**
1/1	1503	1503	1503	0	0	0.0	1.5	-	1.5	3.6	0.0	1.5	1.5
2/1	1535	1535	-	-	-	0.0	2.1	-	2.1	4.9	0.0	2.1	2.1

2/2	633	633	-	-	-	0.0	0.2	-	0.2	1.4	0.0	0.2	0.2
3/1	412	412	-	-	-	0.0	0.1	-	0.1	0.5	0.0	0.1	0.1
4/1	1123	1108	-	-	-	4.6	20.9	-	25.5	81.9	19.0	20.9	39.9
4/2	633	633	-	-	-	1.4	0.7	-	2.0	11.6	6.5	0.7	7.2
5/1	573	538	-	-	-	4.3	23.4	-	27.7	174.1	10.1	23.4	33.6
5/2	579	538	-	-	-	4.5	25.9	-	30.4	188.8	10.3	25.9	36.2
5/3	356	356	-	-	-	1.9	1.0	-	2.8	28.7	5.1	1.0	6.1
6/1	1647	1647	-	-	-	0.0	3.2	-	3.2	6.9	0.0	3.2	3.2
6/2	1171	1171	-	-	-	0.0	0.8	-	0.8	2.5	0.0	0.8	0.8
6/3	356	356	-	-	-	0.0	0.1	-	0.1	1.2	0.0	0.1	0.1
7/1	1647	1647	-	-	-	0.0	0.3	-	0.3	0.8	0.0	0.3	0.3
8/1	598	598	-	-	-	3.6	4.0	-	7.6	45.8	9.0	4.0	13.0
8/2	573	573	-	-	-	1.9	2.9	-	4.8	30.3	8.7	2.9	11.7
8/3	356	356	-	-	-	0.9	0.6	-	1.5	14.7	4.5	0.6	5.1
9/1	1052	982	-	-	-	6.2	41.5	-	47.7	163.3	18.7	41.5	60.2
9/2	1027	982	-	-	-	5.4	31.0	-	36.4	127.5	17.9	31.0	48.8
10/1	857	857	-	-	-	0.5	0.8	-	1.4	5.8	5.3	0.8	6.2
10/2	35	35	-	-	-	0.0	0.0	-	0.0	1.7	0.0	0.0	0.0
11/1	892	892	-	-	-	0.0	0.1	-	0.1	0.6	0.0	0.1	0.1
12/1	1261	1261	-	-	-	0.0	1.0	-	1.0	2.8	0.0	1.0	1.0
12/2	1338	1338	-	-	-	0.0	1.2	-	1.2	3.2	0.0	1.2	1.2
13/1	1261	1261	-	-	-	3.2	16.3	-	19.5	55.8	20.6	16.3	
13/2	1338	1267	-	-	-	4.8	43.2	-	48.0	129.2	23.5	43.2	
14/1	1485	1485	-	-	-	0.0	1.8	-	1.8	4.3	0.0	1.8	
14/2	1520	1520	-	-	-	0.0	2.0	-	2.0	4.7	0.0	2.0	
15/1	665	665	-	-	-	0.0	0.3	-	0.3	1.5	0.0	0.3	
16/1	2339	2339	-	-	-	0.0	0.7	-	0.7	1.1	0.0	0.7	
17/1	224	224	-	-	-	1.6	3.1	-	4.7	76.1	3.6	3.1	
17/2	274	253	-	-	-	2.6	14.9	-	17.5	230.6	4.9	14.9	

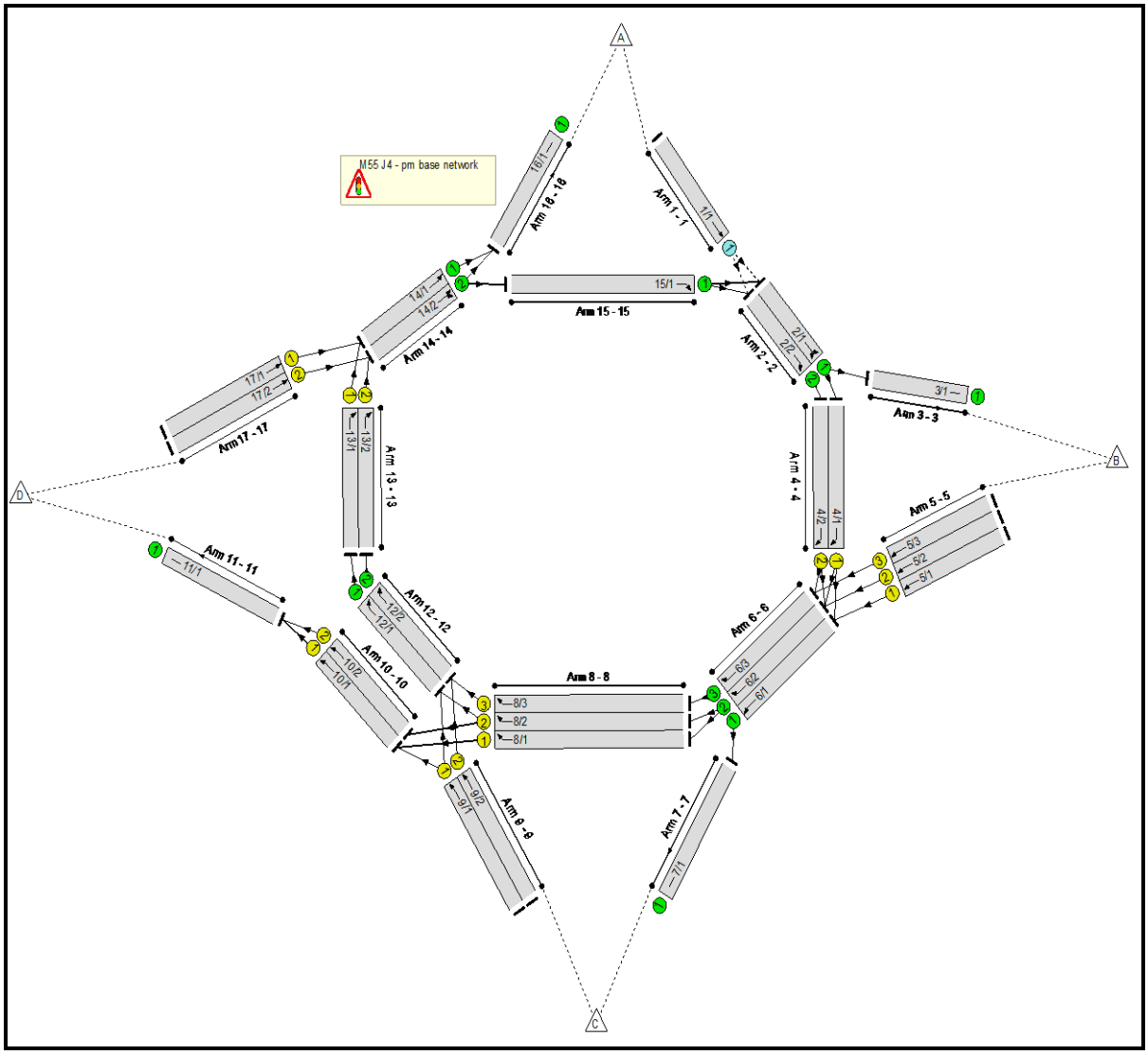
C1	Stream: 1 PRC for Signalled Lanes (%):	42.9	Total Delay for Signalled Lanes
C1	Stream: 2 PRC for Signalled Lanes (%):	-19.1	Total Delay for Signalled Lanes
C1	Stream: 3 PRC for Signalled Lanes (%):	-20.2	Total Delay for Signalled Lanes
C1	Stream: 4 PRC for Signalled Lanes (%):	-19.5	Total Delay for Signalled Lanes
	PRC Over All Lanes (%):	-20.2	Total Delay Over All Lanes

Appendix C

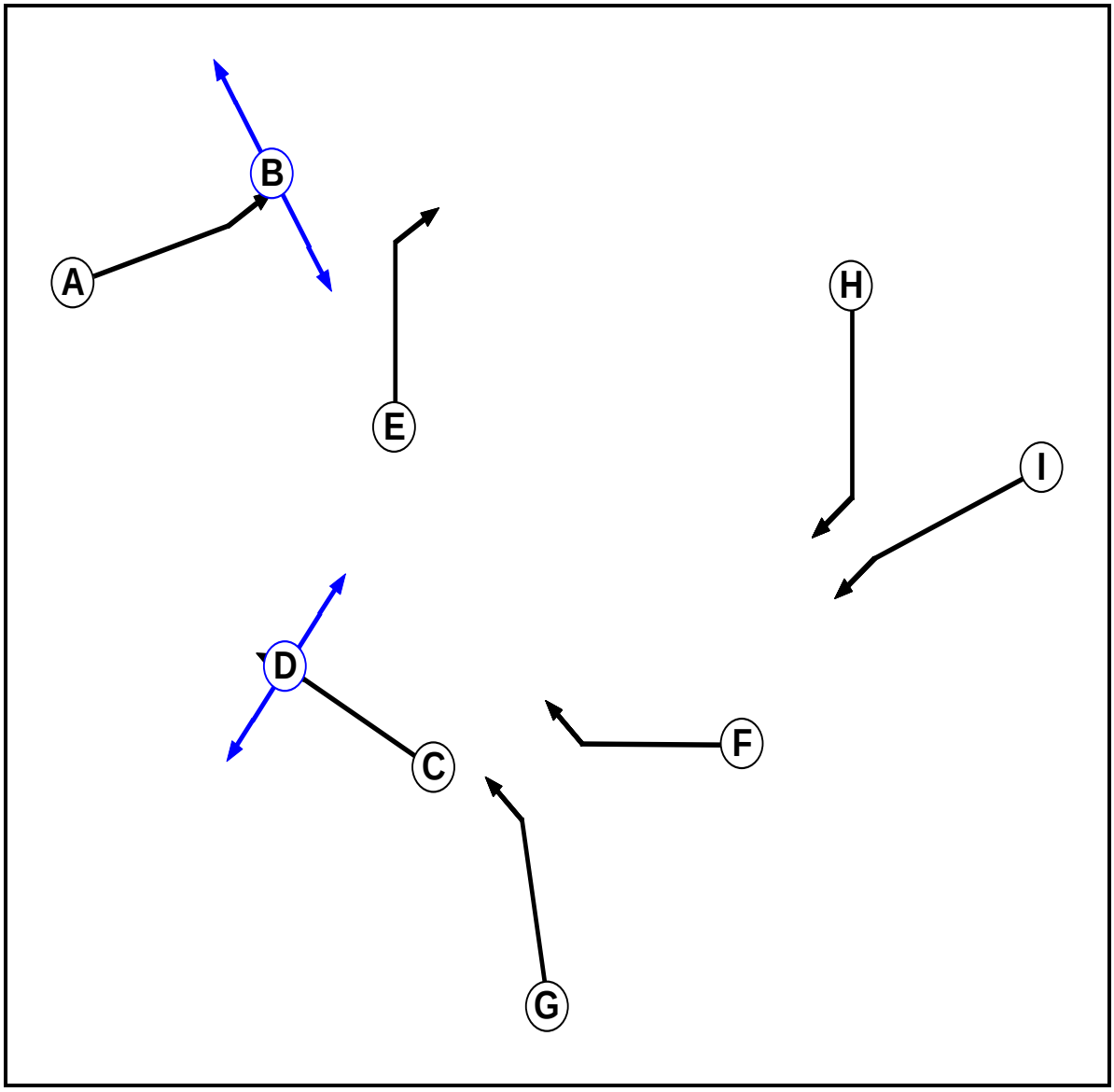
User and Project Details

Project:	**Fylde Local Plan**
Title:	**M55 Junction 4 – Base network pm**
Location:	
File name:	LinSig PM
Author:	
Company:	LCC
Address:	
Notes:	PM peak

Network Layout Diagram



Phase Diagram



Phase Input Data

Phase Name	Phase Type	Stage Stream	Assoc. Phase	Street Min	Cont Min
A	Traffic	3		7	7
B	Pedestrian	3		7	7
C	Traffic	1		7	7
D	Pedestrian	1		5	5
E	Traffic	3		7	7
F	Traffic	2		7	7
G	Traffic	2		7	7
H	Traffic	4		7	7
I	Traffic	4		7	7

Phase Intergreens Matrix

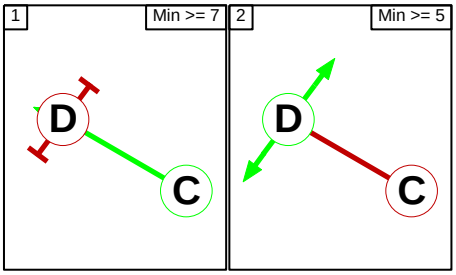
		Starting Phase								
		A	B	C	D	E	F	G	H	I
Terminating Phase	A		5	-	-	5	-	-	-	-
	B	9		-	-	-	-	-	-	-
	C	-	-		5	-	-	-	-	-
	D	-	-	8		-	-	-	-	-
	E	5	-	-	-		-	-	-	-
	F	-	-	-	-	-		5	-	-
	G	-	-	-	-	-	5		-	-
	H	-	-	-	-	-	-	-		5
	I	-	-	-	-	-	-	-	5	

Phases in Stage

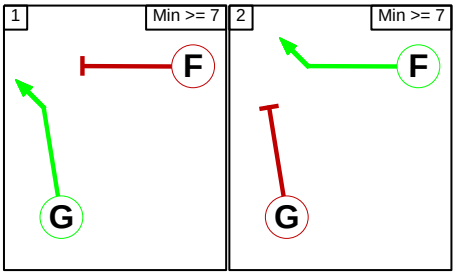
Stream	Stage No.	Phases in Stage
1	1	C
1	2	D
2	1	G
2	2	F
3	1	A
3	2	B E
4	1	H
4	2	I

Stage Diagram

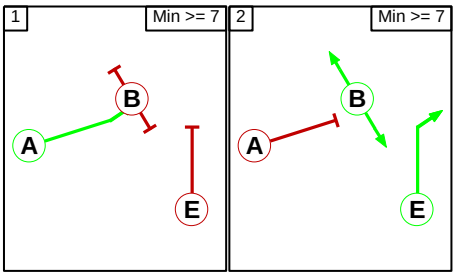
Stage Stream: 1



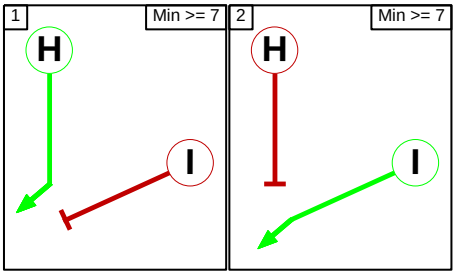
Stage Stream: 2



Stage Stream: 3



Stage Stream: 4



Phase Delays

Stage Stream: 1

Term. Stage	Start Stage	Phase	Type	Value	Cont value
There are no Phase Delays defined					

Stage Stream: 2

Term. Stage	Start Stage	Phase	Type	Value	Cont value
There are no Phase Delays defined					

Stage Stream: 3

Term. Stage	Start Stage	Phase	Type	Value	Cont value
There are no Phase Delays defined					

Stage Stream: 4

Term. Stage	Start Stage	Phase	Type	Value	Cont value
There are no Phase Delays defined					

Prohibited Stage Change

Stage Stream: 1

		To Stage	
		1	2
From Stage	1		5
	2	8	

Stage Stream: 2

		To Stage	
		1	2
From Stage	1		5
	2	5	

Stage Stream: 3

		To Stage	
		1	2
From Stage	1		5
	2	9	

Stage Stream: 4

	To Stage		
		1	2
From Stage	1		5
	2	5	

Give-Way Lane Input Data

Junction: M55 J4 - pm base network

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)
1/1 (1)	2/1 (Ahead)	3008	0	15/1	1.09	To 2/1 (Right)	-	-	-	-	-
	2/2 (Ahead)	3008	0	15/1	1.09	All					

Junction: M55 J4 - pm base network

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 (1)	O		2	3	60.0	User	2000	-	-	-	-	-
2/1 (2)	U		2	3	60.0	User	1900	-	-	-	-	-
2/2 (2)	U		2	3	60.0	User	1900	-	-	-	-	-
3/1 (3)	U		2	3	60.0	User	4000	-	-	-	-	-
4/1 (4)	U	H	2	3	60.0	User	1900	-	-	-	-	-
4/2 (4)	U	H	2	3	60.0	User	1900	-	-	-	-	-
5/1 (5)	U	I	2	3	60.0	User	1900	-	-	-	-	-
5/2 (5)	U	I	2	3	60.0	User	1900	-	-	-	-	-
5/3 (5)	U	I	2	3	60.0	User	1900	-	-	-	-	-
6/1 (6)	U		2	3	60.0	User	1900	-	-	-	-	-
6/2 (6)	U		2	3	60.0	User	1900	-	-	-	-	-
6/3 (6)	U		2	3	60.0	User	1900	-	-	-	-	-
7/1 (7)	U		2	3	60.0	User	4000	-	-	-	-	-
8/1 (8)	U	F	2	3	60.0	User	1900	-	-	-	-	-

8/2 (8)	U	F	2	3	60.0	User	1900	-	-	-	-	-
8/3 (8)	U	F	2	3	60.0	User	1900	-	-	-	-	-
9/1 (9)	U	G	2	3	60.0	User	1900	-	-	-	-	-
9/2 (9)	U	G	2	3	60.0	User	1900	-	-	-	-	-
10/1 (10)	U	C	2	3	60.0	User	1900	-	-	-	-	-
10/2 (10)	U	C	2	3	60.0	User	1900	-	-	-	-	-
11/1 (11)	U		2	3	60.0	User	4000	-	-	-	-	-
12/1 (12)	U		2	3	60.0	User	1900	-	-	-	-	-
12/2 (12)	U		2	3	60.0	User	1900	-	-	-	-	-
13/1 (13)	U	E	2	3	60.0	User	1900	-	-	-	-	-
13/2 (13)	U	E	2	3	60.0	User	1900	-	-	-	-	-
14/1 (14)	U		2	3	60.0	User	1900	-	-	-	-	-
14/2 (14)	U		2	3	60.0	User	1900	-	-	-	-	-
15/1 (15)	U		2	3	60.0	User	1900	-	-	-	-	-
16/1 (16)	U		2	3	60.0	User	4000	-	-	-	-	-
17/1 (17)	U	A	2	3	60.0	User	1900	-	-	-	-	-
17/2 (17)	U	A	2	3	60.0	User	1900	-	-	-	-	-

Traffic Flow Groups

Flow Group	Start Time	End Time	Duration	Formula
1: 'Flow Group 2'	17:00	18:00	01:00	

Scenario 1: 'Scenario 1' (FG1: 'Flow Group 2', Plan 1: 'Network Control Plan 1')

Traffic Flows, Desired

Desired Flow :

		Destination				
		A	B	C	D	Tot.
Origin	A	0	70	1201	106	1377
	B	565	0	471	380	1416
	C	1408	121	0	260	1789
	D	301	7	285	0	593
	Tot.	2274	198	1957	746	5175

Traffic Lane Flows

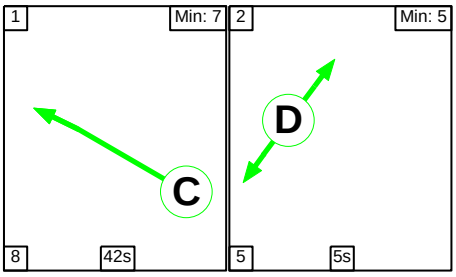
Lane	Scenario 1: Scenario 1
Junction: M55 J4 - pm base network	
1/1	1377
2/1	1684
2/2	106
3/1	198
4/1	1486
4/2	106
5/1	471
5/2	613
5/3	332
6/1	1957
6/2	719
6/3	332
7/1	1957
8/1	328
8/2	391
8/3	332
9/1	936
9/2	853
10/1	588
10/2	158
11/1	746
12/1	909
12/2	1185
13/1	909
13/2	1185
14/1	1206

14/2	1481
15/1	413
16/1	2274
17/1	297
17/2	296

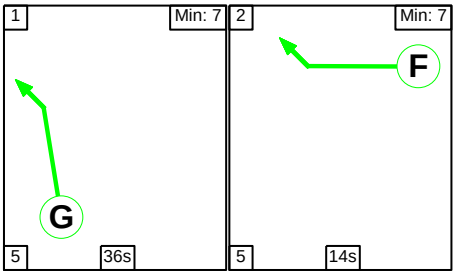
Scenario 1: 'Scenario 1' (FG1: 'Flow Group 2', Plan 1: 'Network Control Plan 1')

Stage Sequence Diagram

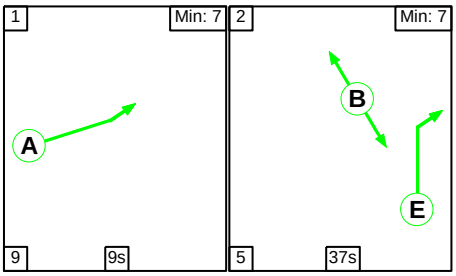
Stage Stream: 1



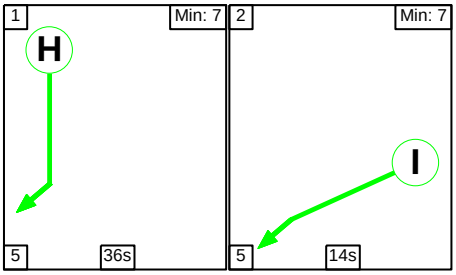
Stage Stream: 2



Stage Stream: 3



Stage Stream: 4



Stage Timings

Stage Stream: 1

Stage	1	2
Duration	42	5
Change Point	38	28

Stage Stream: 2

Stage	1	2
Duration	36	14
Change Point	37	18

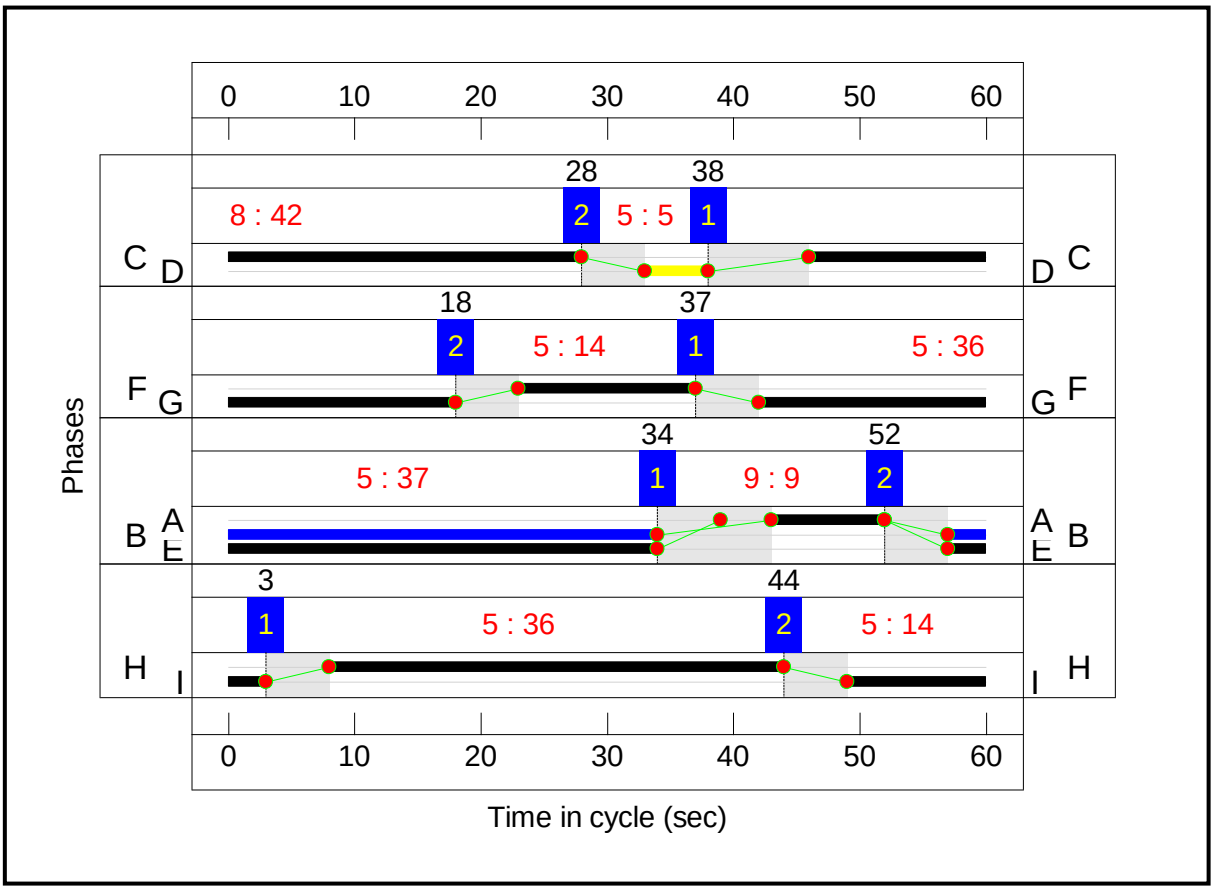
Stage Stream: 3

Stage	1	2
Duration	9	37
Change Point	34	52

Stage Stream: 4

Stage	1	2
Duration	36	14

Signal Timings Diagram



Baseline Network PM peak

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: M55 Junction 4 - pm base network	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**129.1 %**
M55 J4 - pm base network	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**129.1 %**
1/1	1 Ahead	O	N/A	N/A	-		-	-	-	1377	2000	2000	68.9%
2/1	2 Ahead Ahead2	U	N/A	N/A	-		-	-	-	1684	1900	1900	88.6%
2/2	2 Ahead	U	N/A	N/A	-		-	-	-	106	1900	1900	5.6%
3/1	3	U	N/A	N/A	-		-	-	-	198	4000	4000	5.0%
4/1	4 Right	U	4	N/A	H		1	36	-	1486	1900	1172	126.8 %
4/2	4 Right	U	4	N/A	H		1	36	-	106	1900	1172	9.0%
5/1	5 Ahead	U	4	N/A	I		1	14	-	471	1900	475	99.2%
5/2	5 Ahead	U	4	N/A	I		1	14	-	613	1900	475	129.1 %
5/3	5 Ahead	U	4	N/A	I		1	14	-	332	1900	475	69.9%
6/1	6 Ahead	U	N/A	N/A	-		-	-	-	1957	1900	1900	86.5%
6/2	6 Ahead	U	N/A	N/A	-		-	-	-	719	1900	1900	30.6%
6/3	6 Ahead	U	N/A	N/A	-		-	-	-	332	1900	1900	17.5%
7/1	7	U	N/A	N/A	-		-	-	-	1957	4000	4000	41.1%
8/1	8 Right	U	2	N/A	F		1	14	-	328	1900	475	56.7%
8/2	8 Right Right2	U	2	N/A	F		1	14	-	391	1900	475	65.6%
8/3	8 Right	U	2	N/A	F		1	14	-	332	1900	475	69.9%
9/1	9 Ahead Ahead2	U	2	N/A	G		1	36	-	936	1900	1172	79.9%
9/2	9 Ahead	U	2	N/A	G		1	36	-	853	1900	1172	72.8%

10/1	10 Ahead	U	1	N/A	C		1	42	-	588	1900	1362	38.9%
10/2	10 Ahead	U	1	N/A	C		1	42	-	158	1900	1362	9.6%
11/1	11	U	N/A	N/A	-		-	-	-	746	4000	4000	16.5%
12/1	12 Ahead	U	N/A	N/A	-		-	-	-	909	1900	1900	45.1%
12/2	12 Ahead	U	N/A	N/A	-		-	-	-	1185	1900	1900	62.4%
13/1	13 Right	U	3	N/A	E		1	37	-	909	1900	1203	71.2%
13/2	13 Right	U	3	N/A	E		1	37	-	1185	1900	1203	98.5%
14/1	14 Ahead	U	N/A	N/A	-		-	-	-	1206	1900	1900	60.7%
14/2	14 Ahead Ahead2	U	N/A	N/A	-		-	-	-	1481	1900	1900	77.9%
15/1	15 Right	U	N/A	N/A	-		-	-	-	413	1900	1900	21.7%
16/1	16	U	N/A	N/A	-		-	-	-	2274	4000	4000	55.5%
17/1	17 Ahead	U	3	N/A	A		1	9	-	297	1900	317	93.8%
17/2	17 Ahead	U	3	N/A	A		1	9	-	296	1900	317	93.5%

Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Overs at Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcu Hr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Overs at Queue (pcu)	Mean Max Queue (pcu)
Network: M55 Junction 4 - pm base network	**-**	**-**	**1377**	**0**	**0**	**45.1**	**285.8**	**0.0**	**330.9**	**-**	**-**	**-**	**-**
M55 J4 - pm base network	**-**	**-**	**1377**	**0**	**0**	**45.1**	**285.8**	**0.0**	**330.9**	**-**	**-**	**-**	**-**
1/1	1377	1377	1377	0	0	0.0	1.1	-	1.1	2.9	0.0	1.1	1.1
2/1	1684	1684	-	-	-	0.0	3.8	-	3.8	8.1	0.0	3.8	3.8
2/2	106	106	-	-	-	0.0	0.0	-	0.0	1.0	0.0	0.0	0.0
3/1	198	198	-	-	-	0.0	0.0	-	0.0	0.5	0.0	0.0	0.0
4/1	1486	1172	-	-	-	13.0	159.5	-	172.5	417.8	30.0	159.5	189.5
4/2	106	106	-	-	-	0.1	0.0	-	0.2	6.4	0.7	0.0	0.8
5/1	471	471	-	-	-	2.9	9.9	-	12.8	98.1	7.7	9.9	17.6
5/2	613	475	-	-	-	8.5	71.2	-	79.7	467.8	13.8	71.2	84.9
5/3	332	332	-	-	-	1.9	1.1	-	3.0	32.8	5.0	1.1	6.1
6/1	1643	1643	-	-	-	0.0	3.1	-	3.1	6.8	0.0	3.1	3.1
6/2	581	581	-	-	-	0.0	0.2	-	0.2	1.4	0.0	0.2	0.2
6/3	332	332	-	-	-	0.0	0.1	-	0.1	1.1	0.0	0.1	0.1
7/1	1643	1643	-	-	-	0.0	0.3	-	0.3	0.8	0.0	0.3	0.3
8/1	269	269	-	-	-	1.4	0.7	-	2.0	27.3	4.1	0.7	4.8
8/2	312	312	-	-	-	1.7	0.9	-	2.6	30.4	4.9	0.9	5.9
8/3	332	332	-	-	-	2.0	1.1	-	3.1	33.8	5.4	1.1	6.5
9/1	936	936	-	-	-	2.3	2.0	-	4.2	16.2	11.7	2.0	13.7
9/2	853	853	-	-	-	1.9	1.3	-	3.2	13.6	9.7	1.3	11.0
10/1	529	529	-	-	-	0.4	0.3	-	0.7	4.7	2.3	0.3	2.6

10/2	131	131	-	-	-	0.0	0.1	-	0.1	1.8	0.1	0.1	0.1
11/1	660	660	-	-	-	0.0	0.1	-	0.1	0.5	0.0	0.1	0.1
12/1	857	857	-	-	-	0.0	0.4	-	0.4	1.7	0.0	0.4	0.4
12/2	1185	1185	-	-	-	0.0	0.8	-	0.8	2.5	0.0	0.8	0.8

13/1	857	857	-	-	-	1.5	1.2	-	2.7	11.5	9.8	1.2	11.0
13/2	1185	1185	-	-	-	3.5	13.2	-	16.7	50.9	19.1	13.2	32.4
14/1	1154	1154	-	-	-	0.0	0.8	-	0.8	2.4	0.0	0.8	0.8
14/2	1481	1481	-	-	-	0.0	1.8	-	1.8	4.3	0.0	1.8	1.8
15/1	413	413	-	-	-	0.0	0.1	-	0.1	1.2	0.0	0.1	0.1
16/1	2222	2222	-	-	-	0.0	0.6	-	0.6	1.0	0.0	0.6	0.6
17/1	297	297	-	-	-	2.0	5.0	-	7.0	85.4	4.9	5.0	9.9
17/2	296	296	-	-	-	2.0	4.9	-	6.9	83.9	4.9	4.9	9.7

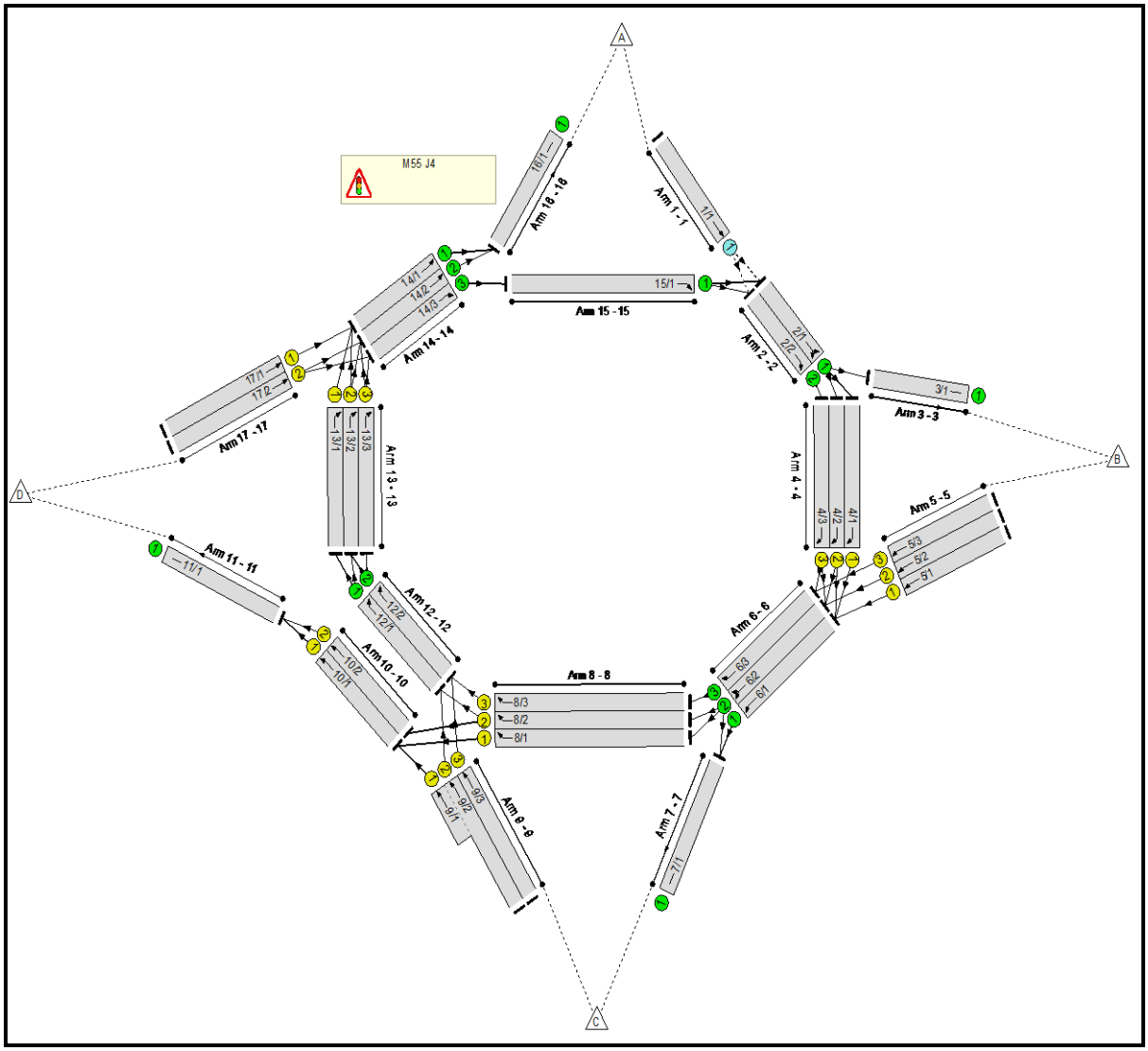
C1	Stream: 1 PRC for Signalled Lanes (%):	131.6	Total Delay for Signalled Lanes
C1	Stream: 2 PRC for Signalled Lanes (%):	12.7	Total Delay for Signalled Lanes
C1	Stream: 3 PRC for Signalled Lanes (%):	-9.4	Total Delay for Signalled Lanes
C1	Stream: 4 PRC for Signalled Lanes (%):	-43.4	Total Delay for Signalled Lanes
	PRC Over All Lanes (%):	-43.4	Total Delay Over All Lanes

Appendix D

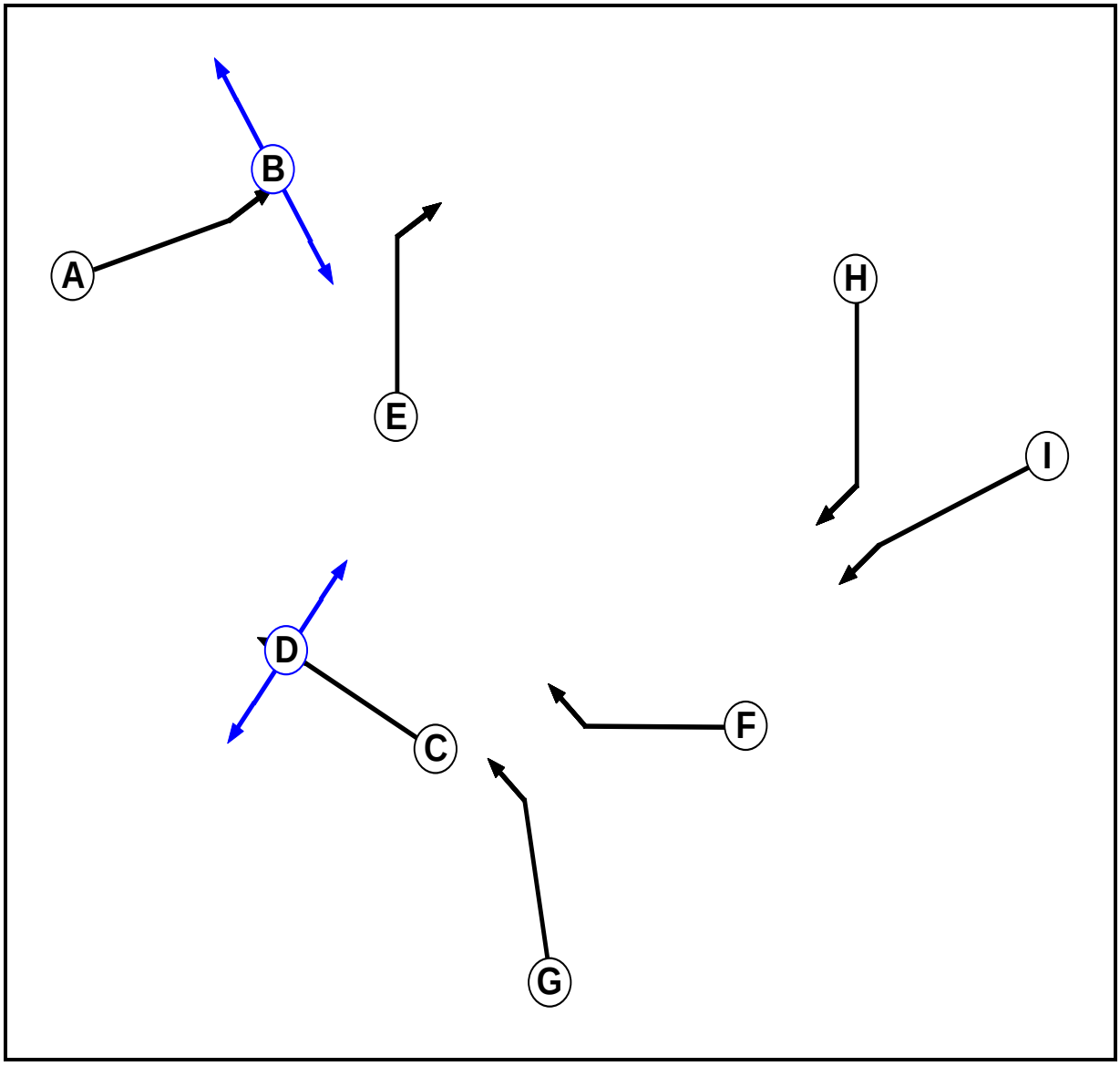
User and Project Details

Project:	**Fylde Local Plan**
Title:	**M55 Junction 4 – Modified network**
Location:	
File name:	LinSig updated network
Author:	
Company:	LCC
Address:	
Notes:	AM, PM scenarios, Modified network

Network Layout Diagram



Phase Diagram



Phase Input Data

Phase Name	Phase Type	Stage Stream	Assoc. Phase	Street Min	Cont Min
A	Traffic	3		7	7
B	Pedestrian	3		7	7
C	Traffic	1		7	7
D	Pedestrian	1		5	5
E	Traffic	3		7	7
F	Traffic	2		7	7
G	Traffic	2		7	7
H	Traffic	4		7	7
I	Traffic	4		7	7

Phase Intergreens Matrix

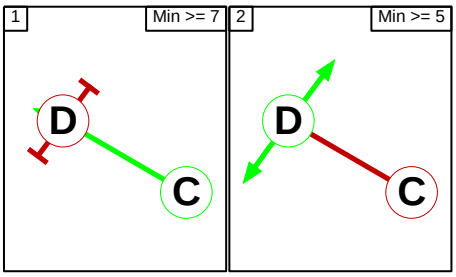
		Starting Phase								
		A	B	C	D	E	F	G	H	I
Terminating Phase	A		5	-	-	5	-	-	-	-
	B	9		-	-	-	-	-	-	-
	C	-	-		5	-	-	-	-	-
	D	-	-	8		-	-	-	-	-
	E	5	-	-	-		-	-	-	-
	F	-	-	-	-	-		5	-	-
	G	-	-	-	-	-	5		-	-
	H	-	-	-	-	-	-	-		5
	I	-	-	-	-	-	-	-	5	

Phases in Stage

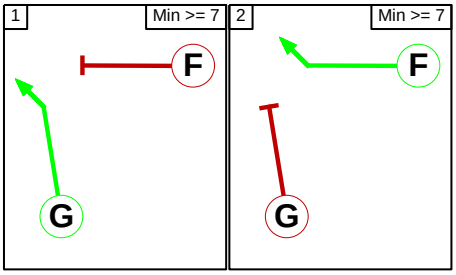
Stream	Stage No.	Phases in Stage
1	1	C
1	2	D
2	1	G
2	2	F
3	1	A
3	2	B E
4	1	H
4	2	I

Stage Diagram

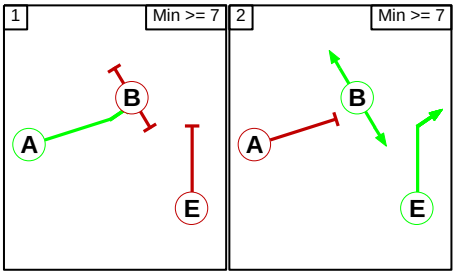
Stage Stream: 1



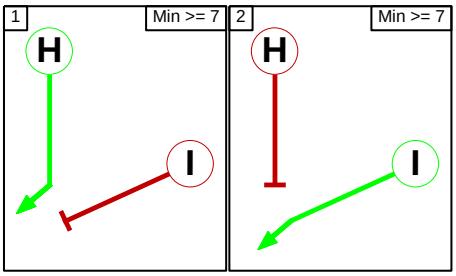
Stage Stream: 2



Stage Stream: 3



Stage Stream: 4



Phase Delays

Stage Stream: 1

Term. Stage	Start Stage	Phase	Type	Value	Cont value
There are no Phase Delays defined					

Stage Stream: 2

Term. Stage	Start Stage	Phase	Type	Value	Cont value
There are no Phase Delays defined					

Stage Stream: 3

Term. Stage	Start Stage	Phase	Type	Value	Cont value
There are no Phase Delays defined					

Stage Stream: 4

Term. Stage	Start Stage	Phase	Type	Value	Cont value
There are no Phase Delays defined					

Prohibited Stage Change

Stage Stream: 1

		To Stage	
		1	2
From Stage	1		5
	2	8	

Stage Stream: 2

		To Stage	
		1	2
From Stage	1		5
	2	5	

Stage Stream: 3

		To Stage	
		1	2
From Stage	1		5
	2	9	

Stage Stream: 4

		To Stage	
		1	2
From Stage	1		5
	2	5	

Give-Way Lane Input Data

Junction: M55 J4

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)
1/1 (1)	2/1 (Ahead)	3008	0	15/1	1.09	To 2/1 (Right)	-	-	-	-	-
	2/2 (Ahead)	3008	0	15/1	1.09	All					

Junction: M55 J4

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 (1)	O		2	3	60.0	User	2000	-	-	-	-	-
2/1 (2)	U		2	3	60.0	User	1900	-	-	-	-	-
2/2 (2)	U		2	3	60.0	User	1900	-	-	-	-	-
3/1 (3)	U		2	3	60.0	User	4000	-	-	-	-	-
4/1 (4)	U	H	2	3	60.0	User	1800	-	-	-	-	-
4/2 (4)	U	H	2	3	60.0	User	1900	-	-	-	-	-
4/3 (4)	U	H	2	3	60.0	User	1900	-	-	-	-	-
5/1 (5)	U	I	2	3	60.0	User	1900	-	-	-	-	-
5/2 (5)	U	I	2	3	60.0	User	1900	-	-	-	-	-
5/3 (5)	U	I	2	3	60.0	User	1900	-	-	-	-	-
6/1 (6)	U		2	3	60.0	User	1900	-	-	-	-	-
6/2 (6)	U		2	3	60.0	User	1900	-	-	-	-	-
6/3 (6)	U		2	3	60.0	User	1900	-	-	-	-	-
7/1 (7)	U		2	3	60.0	User	4000	-	-	-	-	-

8/1 (8)	U	F	2	3	60.0	User	1900	-	-	-	-	-
8/2 (8)	U	F	2	3	60.0	User	1900	-	-	-	-	-
8/3 (8)	U	F	2	3	60.0	User	1900	-	-	-	-	-
9/1 (9)	U	G	2	3	5.0	User	1800	-	-	-	-	-
9/2 (9)	U	G	2	3	60.0	User	1900	-	-	-	-	-
9/3 (9)	U	G	2	3	60.0	User	1900	-	-	-	-	-
10/1 (10)	U	C	2	3	60.0	User	1900	-	-	-	-	-
10/2 (10)	U	C	2	3	60.0	User	1900	-	-	-	-	-
11/1 (11)	U		2	3	60.0	User	4000	-	-	-	-	-
12/1 (12)	U		2	3	60.0	User	1900	-	-	-	-	-
12/2 (12)	U		2	3	60.0	User	1900	-	-	-	-	-
13/1 (13)	U	E	2	3	60.0	User	1900	-	-	-	-	-
13/2 (13)	U	E	2	3	60.0	User	1900	-	-	-	-	-
13/3 (13)	U	E	2	3	60.0	User	1900	-	-	-	-	-
14/1 (14)	U		2	3	60.0	User	1900	-	-	-	-	-
14/2 (14)	U		2	3	60.0	User	1900	-	-	-	-	-
14/3 (14)	U		2	3	60.0	User	1800	-	-	-	-	-

15/1 (15)	U		2	3	60.0	User	1900	-	-	-	-	-
16/1 (16)	U		2	3	60.0	User	4000	-	-	-	-	-
17/1 (17)	U	A	2	3	60.0	User	1900	-	-	-	-	-
17/2 (17)	U	A	2	3	60.0	User	1900	-	-	-	-	-

Traffic Flow Groups

Flow Group	Start Time	End Time	Duration	Formula
1: 'Flow Group 1 AM all dev'	08:00	09:00	01:00	
2: 'Flow Group 2 PM all dev'	17:00	18:00	01:00	

Scenario 1: 'Scenario 1' (FG1: 'Flow Group 1 AM all dev', Plan 1: 'Network Control Plan 1')

Traffic Flows, Desired

Desired Flow :

		Destination				
		A	B	C	D	Tot.
Origin	A	0	0	870	633	1503
	B	935	0	573	0	1508
	C	1354	447	0	278	2079
	D	224	0	274	0	498
	Tot.	2513	447	1717	911	5588

Traffic Lane Flows

Lane	Scenario 1: AM peak
Junction: M55 J4	
1/1	1503
2/1	1542
2/2	682
3/1	447
4/1	524
4/2	571
4/3	682
5/1	496
5/2	487
5/3	525
6/1	1341
6/2	1419
6/3	525
7/1	1717
8/1	517
8/2	526
8/3	525
9/1 (short)	278
9/2 (with short)	1100(In) 822(Out)
9/3	979
10/1	795
10/2	116
11/1	911
12/1	1232
12/2	1504

13/1	904
13/2	919
13/3	913
14/1	1351
14/2	1162
14/3	721
15/1	721
16/1	2513
17/1	224
17/2	274

Scenario 2: 'New Scenario' (FG2: 'Flow Group 2 PM all dev', Plan 1: 'Network Control Plan 1')

Traffic Flows, Desired

Desired Flow :

		Destination				
		A	B	C	D	Tot.
Origin	A	0	0	972	406	1378
	B	793	0	623	0	1416
	C	1251	198	0	340	1789
	D	230	0	363	0	593
	Tot.	2274	198	1958	746	5176

Traffic Lane Flows

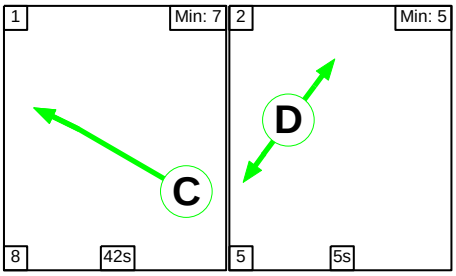
Lane	Scenario 2: PM peak
Junction: M55 J4	
1/1	1378
2/1	1302
2/2	637
3/1	198
4/1	529
4/2	575
4/3	637
5/1	487
5/2	490
5/3	439
6/1	1361
6/2	1357
6/3	439
7/1	1958
8/1	360
8/2	400
8/3	439
9/1 (short)	340
9/2 (with short)	996(In) 656(Out)
9/3	793
10/1	700
10/2	46
11/1	746
12/1	1010
12/2	1232

13/1	732
13/2	757
13/3	753
14/1	1188
14/2	1086
14/3	561
15/1	561
16/1	2274
17/1	230
17/2	363

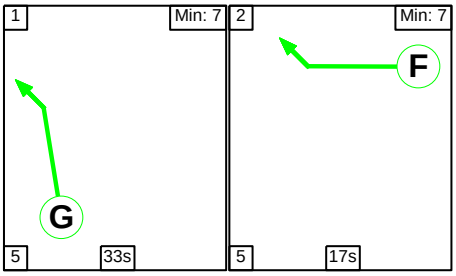
Scenario 1: 'AM Peak' (FG1: 'Flow Group 1 AM all dev', Plan 1: 'Network Control Plan 1')

Stage Sequence Diagram

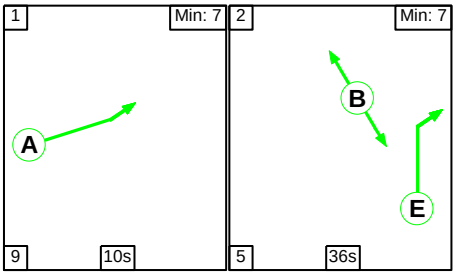
Stage Stream: 1



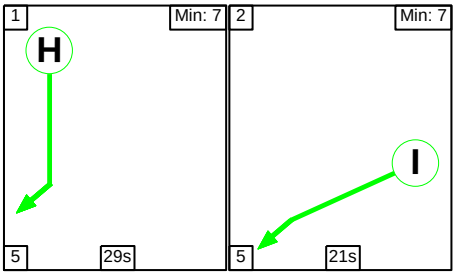
Stage Stream: 2



Stage Stream: 3



Stage Stream: 4



Stage Timings

Stage Stream: 1

Stage	1	2
Duration	42	5
Change Point	57	47

Stage Stream: 2

Stage	1	2
Duration	33	17
Change Point	56	34

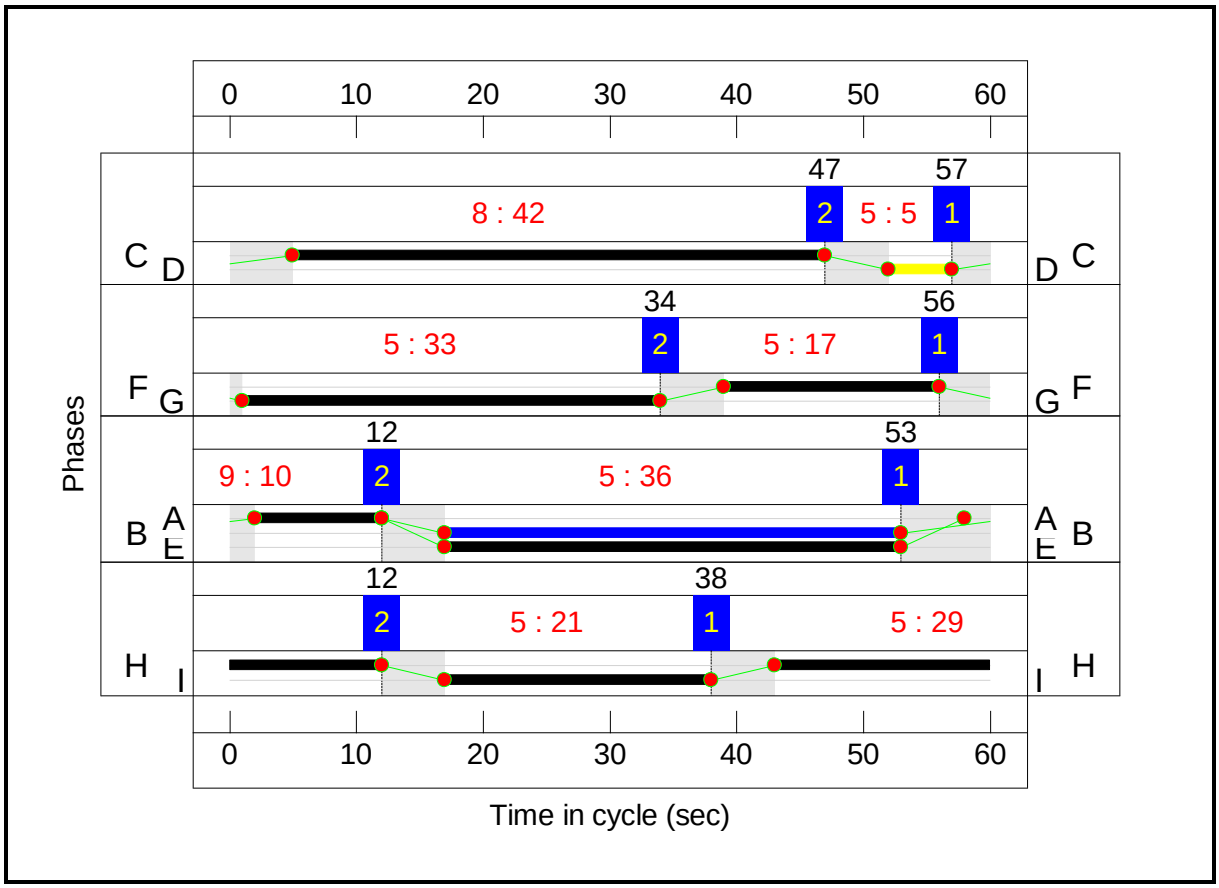
Stage Stream: 3

Stage	1	2
Duration	10	36
Change Point	53	12

Stage Stream: 4

Stage	1	2
Duration	29	21
Change Point	38	12

Signal Timings Diagram



Network results – Modified network AM peak

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: M55 Junction 4	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**93.0 %**
M55 J4	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**93.0 %**
1/1	1 Ahead	O	N/A	N/A	-		-	-	-	1503	2000	2000	75.2 %
2/1	2 Ahead Ahead2	U	N/A	N/A	-		-	-	-	1542	1900	1900	81.2 %
2/2	2 Ahead	U	N/A	N/A	-		-	-	-	682	1900	1900	35.9 %
3/1	3	U	N/A	N/A	-		-	-	-	447	4000	4000	11.2 %
4/1	4 Right	U	4	N/A	H		1	29	-	524	1800	900	58.2 %
4/2	4 Right	U	4	N/A	H		1	29	-	571	1900	950	60.1 %
4/3	4 Right	U	4	N/A	H		1	29	-	682	1900	950	71.8 %
5/1	5 Ahead	U	4	N/A	I		1	21	-	496	1900	697	71.2 %
5/2	5 Ahead	U	4	N/A	I		1	21	-	487	1900	697	69.9 %
5/3	5 Ahead	U	4	N/A	I		1	21	-	525	1900	697	75.4 %
6/1	6 Ahead	U	N/A	N/A	-		-	-	-	1341	1900	1900	70.6 %
6/2	6 Ahead Ahead2	U	N/A	N/A	-		-	-	-	1419	1900	1900	74.7 %
6/3	6 Ahead	U	N/A	N/A	-		-	-	-	525	1900	1900	27.6 %
7/1	7	U	N/A	N/A	-		-	-	-	1717	4000	4000	42.9 %
8/1	8 Right	U	2	N/A	F		1	17	-	517	1900	570	90.7 %
8/2	8 Right Right2	U	2	N/A	F		1	17	-	526	1900	570	92.3 %

8/3	8 Right	U	2	N/A	F		1	17	-	525	1900	570	92.1 %
9/2+9/1	9 Ahead Ahead2	U	2	N/A	G		1	33	-	1100	1900:1800	883+299	93.0 : 93.0 %
9/3	9 Ahead	U	2	N/A	G		1	33	-	979	1900	1077	90.9 %
10/1	10 Ahead	U	1	N/A	C		1	42	-	795	1900	1362	58.4 %
10/2	10 Ahead	U	1	N/A	C		1	42	-	116	1900	1362	8.5%
11/1	11	U	N/A	N/A	-		-	-	-	911	4000	4000	22.8 %
12/1	12 Ahead	U	N/A	N/A	-		-	-	-	1232	1900	1900	64.8 %
12/2	12 Ahead	U	N/A	N/A	-		-	-	-	1504	1900	1900	79.2 %
13/1	13 Right	U	3	N/A	E		1	36	-	904	1900	1172	77.2 %
13/2	13 Right	U	3	N/A	E		1	36	-	919	1900	1172	78.4 %
13/3	13 Right	U	3	N/A	E		1	36	-	913	1900	1172	77.9 %
14/1	14 Ahead	U	N/A	N/A	-		-	-	-	1351	1900	1900	71.1 %
14/2	14 Ahead	U	N/A	N/A	-		-	-	-	1162	1900	1900	61.2 %
14/3	14 Ahead	U	N/A	N/A	-		-	-	-	721	1800	1800	40.1 %
15/1	15 Right	U	N/A	N/A	-		-	-	-	721	1900	1900	37.9 %
16/1	16	U	N/A	N/A	-		-	-	-	2513	4000	4000	62.8 %
17/1	17 Ahead	U	3	N/A	A		1	10	-	224	1900	348	64.3 %
17/2	17 Ahead	U	3	N/A	A		1	10	-	274	1900	348	78.7 %

Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Overs at Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcu Hr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Overs at Queue (pcu)	Mean Max Queue (pcu)
Network: M55 Junction 4	**-**	**-**	**1503**	**0**	**0**	**37.4**	**53.2**	**0.0**	**90.6**	**-**	**-**	**-**	**-**
M55 J4	**-**	**-**	**1503**	**0**	**0**	**37.4**	**53.2**	**0.0**	**90.6**	**-**	**-**	**-**	**-**
1/1	1503	1503	1503	0	0	0.0	1.5	-	1.5	3.6	0.0	1.5	1.5
2/1	1542	1542	-	-	-	0.0	2.1	-	2.1	5.0	0.0	2.1	2.1
2/2	682	682	-	-	-	0.0	0.3	-	0.3	1.5	0.0	0.3	0.3
3/1	447	447	-	-	-	0.0	0.1	-	0.1	0.5	0.0	0.1	0.1
4/1	524	524	-	-	-	1.7	0.7	-	2.4	16.2	6.3	0.7	7.0
4/2	571	571	-	-	-	1.8	0.8	-	2.5	16.0	6.9	0.8	7.7
4/3	682	682	-	-	-	2.3	1.3	-	3.6	18.8	9.0	1.3	10.2
5/1	496	496	-	-	-	2.2	1.2	-	3.5	25.2	7.0	1.2	8.2
5/2	487	487	-	-	-	2.2	1.1	-	3.3	24.7	6.9	1.1	8.0
5/3	525	525	-	-	-	2.4	1.5	-	3.9	26.9	7.6	1.5	9.1
6/1	1341	1341	-	-	-	0.0	1.2	-	1.2	3.3	6.4	1.2	7.6
6/2	1419	1419	-	-	-	0.1	1.5	-	1.5	3.9	8.5	1.5	10.0
6/3	525	525	-	-	-	0.0	0.2	-	0.2	1.3	0.0	0.2	0.2
7/1	1717	1717	-	-	-	0.0	0.4	-	0.4	0.8	0.0	0.4	0.4
8/1	517	517	-	-	-	3.6	4.2	-	7.8	54.3	8.0	4.2	12.2
8/2	526	526	-	-	-	2.5	4.9	-	7.4	50.5	8.5	4.9	13.4
8/3	525	525	-	-	-	2.1	4.8	-	7.0	47.7	8.5	4.8	13.4
9/2+9/1	1100	1100	-	-	-	3.2	5.9	-	9.1	29.6	14.5	5.9	20.4
9/3	979	979	-	-	-	3.2	4.6	-	7.7	28.5	14.4	4.6	19.0
10/1	795	795	-	-	-	0.4	0.7	-	1.1	5.1	2.9	0.7	3.6
10/2	116	116	-	-	-	0.0	0.0	-	0.1	1.8	0.1	0.0	0.1
11/1	911	911	-	-	-	0.0	0.1	-	0.1	0.6	0.0	0.1	0.1
12/1	1232	1232	-	-	-	0.0	0.9	-	0.9	2.7	0.0	0.9	0.9

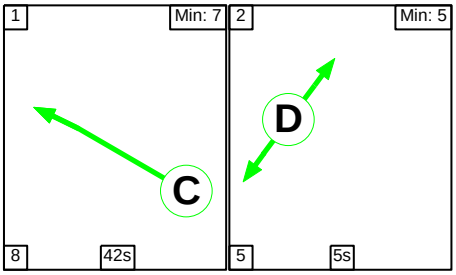
12/2	1504	1504	-	-	-	0.0	1.9	-	1.9	4.5	0.0	1.9	1.9
13/1	904	904	-	-	-	1.8	1.7	-	3.5	14.0	12.2	1.7	13.9
13/2	919	919	-	-	-	2.2	1.8	-	4.0	15.7	11.6	1.8	13.4
13/3	913	913	-	-	-	2.4	1.7	-	4.1	16.2	10.8	1.7	12.6
14/1	1351	1351	-	-	-	0.1	1.2	-	1.3	3.5	10.1	1.2	11.3
14/2	1162	1162	-	-	-	0.0	0.8	-	0.8	2.4	0.0	0.8	0.8
14/3	721	721	-	-	-	0.0	0.3	-	0.3	1.7	0.0	0.3	0.3
15/1	721	721	-	-	-	0.0	0.3	-	0.3	1.5	0.0	0.3	0.3
16/1	2513	2513	-	-	-	0.0	0.8	-	0.8	1.2	0.0	0.8	0.8
17/1	224	224	-	-	-	1.4	0.9	-	2.3	37.0	3.4	0.9	4.3
17/2	274	274	-	-	-	1.8	1.8	-	3.5	46.5	4.3	1.8	6.1

C1	Stream: 1 PRC for Signalled Lanes (%):	54.2	Total Delay for Signalled Lanes
C1	Stream: 2 PRC for Signalled Lanes (%):	-3.4	Total Delay for Signalled Lanes
C1	Stream: 3 PRC for Signalled Lanes (%):	14.4	Total Delay for Signalled Lanes
C1	Stream: 4 PRC for Signalled Lanes (%):	19.4	Total Delay for Signalled Lanes
	PRC Over All Lanes (%):	-3.4	Total Delay Over All Lanes

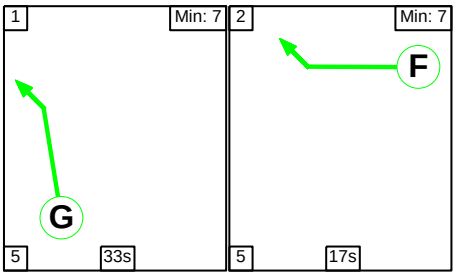
Scenario 2: 'PM Peak' (FG2: 'Flow Group 2 PM all dev', Plan 1: 'Network Control Plan 1')

Stage Sequence Diagram

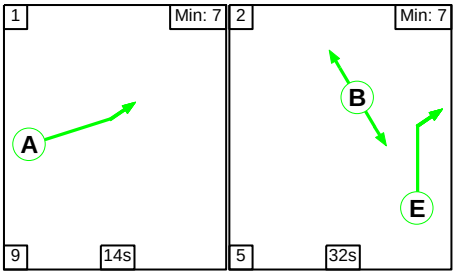
Stage Stream: 1



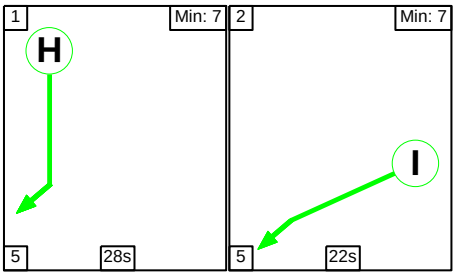
Stage Stream: 2



Stage Stream: 3



Stage Stream: 4



Stage Timings

Stage Stream: 1

Stage	1	2
Duration	42	5
Change Point	0	50

Stage Stream: 2

Stage	1	2
Duration	33	17
Change Point	0	38

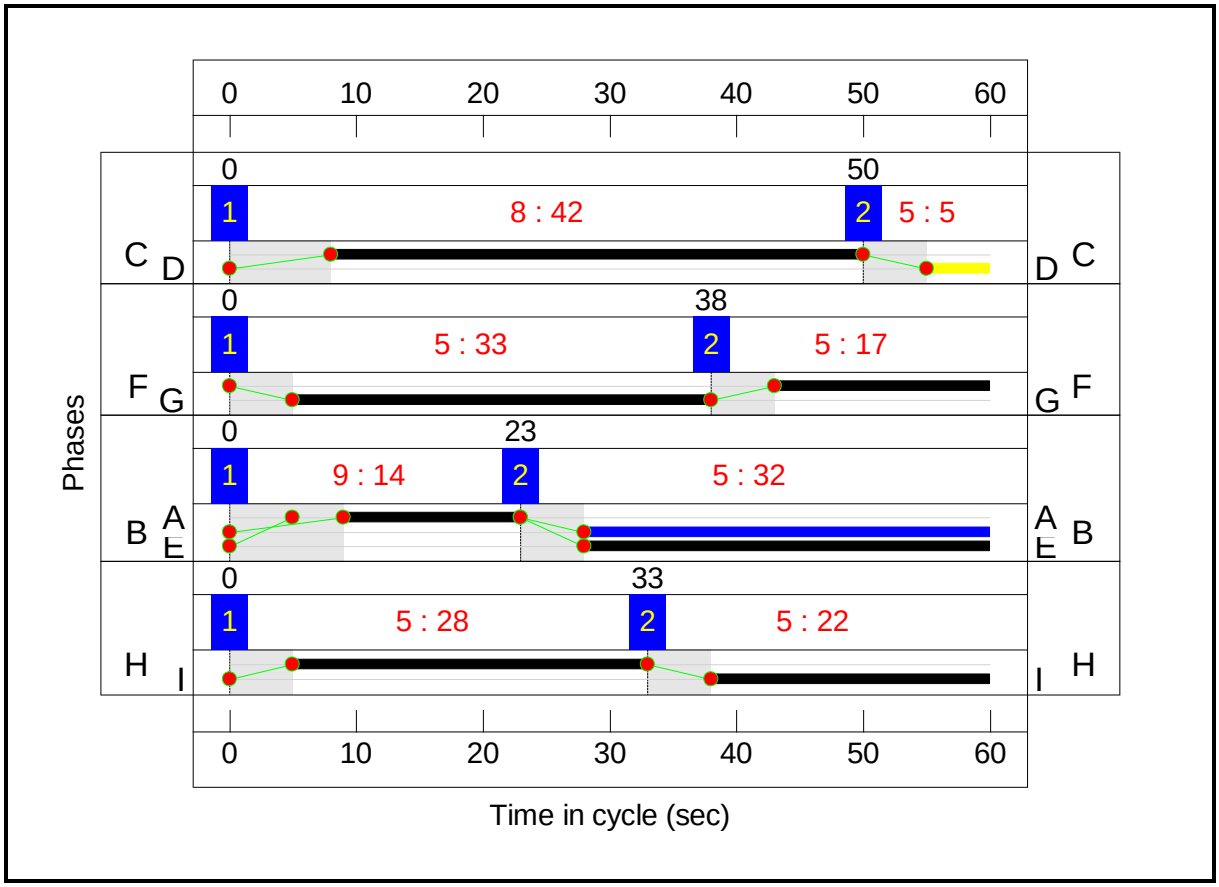
Stage Stream: 3

Stage	1	2
Duration	14	32
Change Point	0	23

Stage Stream: 4

Stage	1	2
Duration	28	22
Change Point	0	33

Signal Timings Diagram



Network results – Modified network PM peak

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: M55 Junction 4	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**80.8 %**
M55 J4	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**80.8 %**
1/1	1 Ahead	O	N/A	N/A	-		-	-	-	1378	2000	2000	68.9 %
2/1	2 Ahead Ahead2	U	N/A	N/A	-		-	-	-	1302	1900	1900	68.5 %
2/2	2 Ahead	U	N/A	N/A	-		-	-	-	637	1900	1900	33.5 %
3/1	3	U	N/A	N/A	-		-	-	-	198	4000	4000	5.0%
4/1	4 Right	U	4	N/A	H		1	28	-	529	1800	870	60.8 %
4/2	4 Right	U	4	N/A	H		1	28	-	575	1900	918	62.6 %
4/3	4 Right	U	4	N/A	H		1	28	-	637	1900	918	69.4 %
5/1	5 Ahead	U	4	N/A	I		1	22	-	487	1900	728	66.9 %
5/2	5 Ahead	U	4	N/A	I		1	22	-	490	1900	728	67.3 %
5/3	5 Ahead	U	4	N/A	I		1	22	-	439	1900	728	60.3 %
6/1	6 Ahead	U	N/A	N/A	-		-	-	-	1361	1900	1900	71.6 %
6/2	6 Ahead Ahead2	U	N/A	N/A	-		-	-	-	1357	1900	1900	71.4 %
6/3	6 Ahead	U	N/A	N/A	-		-	-	-	439	1900	1900	23.1 %
7/1	7	U	N/A	N/A	-		-	-	-	1958	4000	4000	49.0 %
8/1	8 Right	U	2	N/A	F		1	17	-	360	1900	570	63.2 %
8/2	8 Right Right2	U	2	N/A	F		1	17	-	400	1900	570	70.2 %

8/3	8 Right	U	2	N/A	F		1	17	-	439	1900	570	77.0 %
9/2+9/1	9 Ahead Ahead2	U	2	N/A	G		1	33	-	996	1900:1800	812+421	80.8 : 80.8 %
9/3	9 Ahead	U	2	N/A	G		1	33	-	793	1900	1077	73.7 %
10/1	10 Ahead	U	1	N/A	C		1	42	-	700	1900	1362	51.4 %
10/2	10 Ahead	U	1	N/A	C		1	42	-	46	1900	1362	3.4%
11/1	11	U	N/A	N/A	-		-	-	-	746	4000	4000	18.7 %
12/1	12 Ahead	U	N/A	N/A	-		-	-	-	1010	1900	1900	53.2 %
12/2	12 Ahead	U	N/A	N/A	-		-	-	-	1232	1900	1900	64.8 %
13/1	13 Right	U	3	N/A	E		1	32	-	732	1900	1045	70.0 %
13/2	13 Right	U	3	N/A	E		1	32	-	757	1900	1045	72.4 %
13/3	13 Right	U	3	N/A	E		1	32	-	753	1900	1045	72.1 %
14/1	14 Ahead	U	N/A	N/A	-		-	-	-	1188	1900	1900	62.5 %
14/2	14 Ahead	U	N/A	N/A	-		-	-	-	1086	1900	1900	57.2 %
14/3	14 Ahead	U	N/A	N/A	-		-	-	-	561	1800	1800	31.2 %
15/1	15 Right	U	N/A	N/A	-		-	-	-	561	1900	1900	29.5 %
16/1	16	U	N/A	N/A	-		-	-	-	2274	4000	4000	56.9 %
17/1	17 Ahead	U	3	N/A	A		1	14	-	230	1900	475	48.4 %
17/2	17 Ahead	U	3	N/A	A		1	14	-	363	1900	475	76.4 %

Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Overs at Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcu Hr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Overs at Queue (pcu)	Mean Max Queue (pcu)
Network: M55 Junction 4	**-**	**-**	**1378**	**0**	**0**	**32.3**	**28.7**	**0.0**	**61.1**	**-**	**-**	**-**	**-**
M55 J4	**-**	**-**	**1378**	**0**	**0**	**32.3**	**28.7**	**0.0**	**61.1**	**-**	**-**	**-**	**-**
1/1	1378	1378	1378	0	0	0.0	1.1	-	1.1	2.9	0.0	1.1	1.1
2/1	1302	1302	-	-	-	0.0	1.1	-	1.1	3.0	0.0	1.1	1.1
2/2	637	637	-	-	-	0.0	0.3	-	0.3	1.4	0.0	0.3	0.3
3/1	198	198	-	-	-	0.0	0.0	-	0.0	0.5	0.0	0.0	0.0
4/1	529	529	-	-	-	1.7	0.8	-	2.5	17.0	6.2	0.8	7.0
4/2	575	575	-	-	-	1.9	0.8	-	2.7	17.0	6.9	0.8	7.8
4/3	637	637	-	-	-	2.2	1.1	-	3.3	18.6	8.0	1.1	9.2
5/1	487	487	-	-	-	2.1	1.0	-	3.1	22.7	6.6	1.0	7.6
5/2	490	490	-	-	-	2.1	1.0	-	3.1	22.9	6.7	1.0	7.7
5/3	439	439	-	-	-	1.8	0.8	-	2.6	21.0	5.9	0.8	6.6
6/1	1361	1361	-	-	-	0.0	1.3	-	1.3	3.4	6.9	1.3	8.1
6/2	1357	1357	-	-	-	0.0	1.2	-	1.3	3.4	5.9	1.2	7.1
6/3	439	439	-	-	-	0.0	0.2	-	0.2	1.2	0.0	0.2	0.2
7/1	1958	1958	-	-	-	0.0	0.5	-	0.5	0.9	0.0	0.5	0.5
8/1	360	360	-	-	-	2.0	0.9	-	2.9	28.9	5.7	0.9	6.6
8/2	400	400	-	-	-	1.8	1.2	-	2.9	26.3	5.0	1.2	6.2
8/3	439	439	-	-	-	1.9	1.6	-	3.5	28.6	5.8	1.6	7.5
9/2+9/1	996	996	-	-	-	2.4	2.1	-	4.4	16.0	9.3	2.1	11.4
9/3	793	793	-	-	-	2.1	1.4	-	3.5	16.0	9.7	1.4	11.1
10/1	700	700	-	-	-	0.5	0.5	-	1.0	5.1	2.8	0.5	3.4
10/2	46	46	-	-	-	0.0	0.0	-	0.0	1.7	0.0	0.0	0.0
11/1	746	746	-	-	-	0.0	0.1	-	0.1	0.6	0.0	0.1	0.1
12/1	1010	1010	-	-	-	0.0	0.6	-	0.6	2.0	0.0	0.6	0.6

12/2	1232	1232	-	-	-	0.0	0.9	-	0.9	2.7	0.0	0.9	0.9

13/1	732	732	-	-	-	2.2	1.2	-	3.3	16.3	10.1	1.2	11.3
13/2	757	757	-	-	-	2.2	1.3	-	3.5	16.6	9.6	1.3	10.9
13/3	753	753	-	-	-	2.2	1.3	-	3.5	16.6	8.5	1.3	9.8
14/1	1188	1188	-	-	-	0.0	0.8	-	0.9	2.6	6.4	0.8	7.2
14/2	1086	1086	-	-	-	0.0	0.7	-	0.7	2.2	4.8	0.7	5.4
14/3	561	561	-	-	-	0.0	0.2	-	0.2	1.5	0.0	0.2	0.2
15/1	561	561	-	-	-	0.0	0.2	-	0.2	1.3	0.0	0.2	0.2
16/1	2274	2274	-	-	-	0.0	0.7	-	0.7	1.0	0.0	0.7	0.7
17/1	230	230	-	-	-	1.2	0.5	-	1.7	26.5	3.3	0.5	3.7
17/2	363	363	-	-	-	2.1	1.6	-	3.7	36.5	5.5	1.6	7.1

C1	Stream: 1 PRC for Signalled Lanes (%):	75.1	Total Delay for Signalled Lanes
C1	Stream: 2 PRC for Signalled Lanes (%):	11.4	Total Delay for Signalled Lanes
C1	Stream: 3 PRC for Signalled Lanes (%):	17.8	Total Delay for Signalled Lanes
C1	Stream: 4 PRC for Signalled Lanes (%):	29.7	Total Delay for Signalled Lanes
	PRC Over All Lanes (%):	11.4	Total Delay Over All Lanes