[redacted]

From: [redacted]@arup.com>
Sent: 07 March 2018 16:37
To: [redacted]
Cc: [redacted]highland.gov.uk; [redacted]@highland.gcsx.gov.uk; [redacted]springfield.co.uk; [redacted]
Subject: RE: Planning Application 17/05667/FUL
Attachments: Transport Scotland Response, NA2 Transport Assessment, Nairn ISSUE.PDF

Good afternoon [redacted]

I trust you are well. Many thanks for your comments regarding your audit of our Transport Assessment, prepared in support of the 'NA2' development proposals in Nairn.

We have since reviewed these comments and prepared an appropriate response which I trust helps address Transport Scotland's queries.

Kind regards,

[redacted]

Arup
Scotstoun House, South Queensferry, Edinburgh EH30 9SE United Kingdom
[redacted]
www.arup.com

From: [redacted]transport.gov.scot [mailto:[redacted]@transport.gov.scot]
Sent: 06 March 2018 14:34
To: [redacted]@springfield.co.uk
Cc: [redacted]@highland.gov.uk; [redacted]@transport.gov.scot; [redacted]@highland.gcsx.gov.uk
Subject: RE: Planning Application 17/05667/FUL

[redacted]

Further to your query, I would confirm that we have finalised our review of the TA and comments were provided to ARUP by email dated 27/02/2018.

Regards

[redacted]

From: [redacted] [mailto:[redacted]@springfield.co.uk]
Sent: 06 March 2018 14:12
To: [redacted]
Cc: [redacted]@highland.gov.uk; [redacted]; [redacted]@arup.com;

[redacted]@highland.gcsx.gov.uk
Subject: RE: Planning Application 17/05667/FUL

[redacted]

Could you advise if you have as yet finalised your review of the TA. We are looking at a committee date to be finalised by end of March therefore timeframes are getting tight for ARUP to come back to you.

Many thanks

Regards

[redacted]

From: [redacted]@transport.gov.scot [mailto[redacted]@transport.gov.scot]
Sent: 26 February 2018 11:55
To: [redacted]@springfield.co.uk>
Cc: [redacted]@highland.gov.uk; [redacted]@transport.gov.scot; [redacted]@arup.com; [redacted]@highland.gcsx.gov.uk
Subject: RE: Planning Application 17/05667/FUL

[redacted]

I would confirm that Transport Scotland is in the process of finalising our review of the TA. This has identified some points that will require further clarification from ARUP prior to responding to THC on this application however, we will liaise directly with ARUP on this asap.

I trust the above is of assistance however, in the meantime, please do not hesitate to contact me should you have any queries.

Regards

[redacted]

From: [redacted]@springfield.co.uk]
Sent: 26 February 2018 10:51
To: [redacted]; [redacted]@highland.gov.uk
Cc: [redacted]@highland.gov.uk; [redacted]
Subject: RE: Planning Application 17/05667/FUL

Good Morning [redacted]

Could you advise if TS are now in a position to respond to the consultation as outlined below?

Many thanks in advance

[redacted]

From: [redacted]@transport.gov.scot [mailto:[redacted]@transport.gov.scot]
Sent: 31 January 2018 10:37
To: [redacted]@highland.gov.uk
Cc: [redacted]@springfield.co.uk>; [redacted]@highland.gov.uk; [redacted]@transport.gov.scot
Subject: RE: Planning Application 17/05667/FUL

[redacted]

The response time will obviously be dependent on the outcome of our audit of the TA. This process would have been assisted had ARUP consulted Transport Scotland when seeking to agree the scope of assessment, particularly given the potential for the proposed development to impact on a sensitive part of the trunk road network.

Notwithstanding this, we will liaise with ARUP as necessary and would anticipate being in a position to respond before the end of February.

I trust that this is of assistance.

Regards

[redacted]

From: [redacted]@highland.gov.uk]
Sent: 31 January 2018 09:29
To: [redacted]
Cc: [redacted]@springfield.co.uk'; [redacted]
Subject: RE: Planning Application 17/05667/FUL

Hi [redacted] – Noted. But can you give an indication of the likely response time? End of Feb at the latest?

Also copying in the applicant so he is aware of delay.

[redacted]
Development & Infrastructure Service, Town House, High Street, Inverness IV1 1JJ

Tel (01463) 785037
E-mail: [redacted]@highland.gov.uk

From: [redacted]@transport.gov.scot [mailto:[redacted]@transport.gov.scot]
Sent: 30 January 2018 16:55
To: [redacted]
Cc: [redacted]@transport.gov.scot
Subject: Planning Application 17/05667/FUL

[redacted]

With regard to the above planning application for residential development in Nairn, please find attached our TR/NPA/1A form requesting an extension to the normal consultation period for the reason given on the attached.

Regards

[redacted]

[redacted]

Transport Scotland
Buchanan House
58 Port Dundas Road
Glasgow
G4 0HF

For agency and travel information visit our ***website***

****

ARUP

Subject NA2, Nairn, Transport Assessment (Response to Transport Scotland)

Date 7 March 2018 **Job No/Ref** 254313-00

Planning application no. 17/05667/FUL

'NA2', Nairn, Transport Assessment

The purpose of this report is to respond to the various comments received from Transport Scotland (TS) with respect to the Transport Assessment (TA) which was submitted in support of the above planning application. TS's comments (Appendix A) have been amended to include a numbering system for ease of cross-referencing. Table 1 summarises the comments received from TS, with the Arup response provided opposite.

Table 1: Transport Scotland Comments and Arup Response

Ref	TS Comment (summarised)	Arup Response
1 (a)	Given that in excess of 90% of development generated traffic is anticipated to impact on the A96, Transport Scotland would have expected to have been consulted at the scoping stage.	While it is correct that >90% of all development trips being generated by the 'NA2' site will pass through the A96(T)/Lochloy Road junction, the use of this value to justify consultation with TS is not in accordance with standard Scottish Government guidelines. Nonetheless, there are a number of additional reasons as to why TS were not consulted as part of the scoping process, namely: a) The size, nature and remoteness of the development site from the A96(T)/Lochloy Road junction is such that any traffic impacts would be expected to be minimal. b) The criterion for assessing a junction relates to percentage impact, not absolute numbers (as inferred by TS). As outlined in Section 6.4.2 of the TA, this minimal traffic impact was subsequently demonstrated by undertaking a 'percentage impact analysis'. In accordance with the Scottish Government's Transport Assessment guidelines, values of <5% are considered acceptable with no need to undertake any further analysis on that section of the road network. In the case of the A96(T)/Lochloy Road junction, a maximum percentage impact of 3% on the A96 west approach, and 1% on the A96 east approach was demonstrated during the AM and PM peak periods. These results clearly demonstrate that the percentage contribution of traffic associated with the development proposals on the operation of the surrounding road network is limited. c) Given the above all efforts during the scoping exercise were focused on working with The Highland Council (THC) as the local Roads and Planning Authority.

Subject NA2, Nairn, Transport Assessment (Response to Transport Scotland)

Date 7 March 2018 **Job No/Ref** 254313-00

Ref	TS Comment (summarised)	Arup Response
2 (a)	We note that the anticipated vehicle trip generation has been estimated from vehicle trip rates extracted from the TRICS database and compared to observed vehicle trip rates derived from a survey of the Lochloy Road / Montgomerie Drive junction. The assessment has adopted the higher trip rates extracted from TRICS; 0.49 AM (0.17 arrivals and 0.32 departures) and 0.56 PM (0.33 arrivals and 0.23 departures) equating to 57 and 64 two-way vehicle trips during the AM and PM Peak hour periods respectively	Noted. It is also worth re-iterating the reason as to why the trip rates used within the TA were chosen. This is outlined below: a) The methodology used to derive the trip rates within the TA was discussed with THC transport officers as part of a scoping exercise. Based upon the advice received from THC, Arup undertook a comparative trip rate review, where TRICS based data was compared to those derived from the observed 2017 traffic survey data. b) This comparative exercise ultimately found that in the majority of movements, the TRICS derived results actually produced a higher trip generation than the equivalent observed conditions. Despite the observed trip rates being a more accurate reflection of how the NA5 site is currently operating, and in the interests of ensuring a robust assessment, the TRICS-based trip generation was therefore selected for the purposes of the traffic modelling.
2 (b)	Given that circa 75% of the units will be privately owned and circa 90% of these houses, the most appropriate residential sub-category in TRICS is "03/A – Houses Privately Owned (GDO use class C3)", not the individual sub-category approach adopted in the TA. As a consequence, the adopted trip rates would appear to be on the low side.....	Within TRICS, it is common to use sites which do not mirror the exact socio-demographic and geographical attributes of the locality surrounding a proposed development site. The recommendation that trips rates from the TRICS residential sub-category of '03/A – Houses Privately Owned (GDO use Class 3)' has not been fully explained by TS. A significant proportion of the site will consist of privately owned flats (8 units), affordable flats (8 units), and affordable houses (21 units). This amounts to a total of 37 units which do not fall under the 'Houses Privately Owned' category. It is therefore considered appropriate to account for these when defining trip rates. Furthermore, no TRICS output has been provided by TS to support their recommendation. Based on the above, the TRICS data used within the TA is deemed to be appropriate for use within the junction capacity modelling. Refer also to response no. 2 (a) for further information as to why the trip rates used within the TA are considered appropriate.
2 (c)	..... Notwithstanding this, it is recognised that had the TA adopted the trip rates previously accepted by THC for the NA5 Lochloy site, this would only result in an additional 15 vehicle trips on the Lochloy Road approach to the A96 / Lochloy Road / View Road traffic signal controlled junction over the AM Peak hour period. This increase is not considered to be significant in terms of detailed junction assessment nor would it change the overall conclusion of the TA. On	Noted. Refer also to response no. 2 (a) and 2 (b) which provide further information and justification as to why the trip rates used within the TA are considered appropriate.

Ref	TS Comment (summarised)	Arup Response
	that basis, the vehicle trip rates and resultant vehicle trip generation is considered to be acceptable in this instance.	
3 (a)	Background traffic conditions on the A96 have been determined from a junction turning count survey undertaken at the A96 / Lochloy Road / View Road traffic signal controlled junction in April 2017. We are satisfied that April represents a neutral month therefore the survey is considered to be acceptable.	Noted.
4 (a)	The TA has included the NA5 Lochloy site as committed development. This site is understood to have consent for up to 685 residential units. Of this total, the TA states that only 87 units remain to be constructed and occupied. We have no basis upon which to dispute the number of remaining units however, The Highland Council (THC) has subsequently intimated that the number allowed for in the TA is reasonable. The trip generation for the remaining units has therefore been estimated by applying the vehicle trip rates adopted in the TA prepared in support of this site. This approach is considered to be acceptable.	Noted.
6 (a)	The TA has adopted a 2019 opening year of assessment. 2017 observed traffic flows have been factored to the aforementioned year of opening using growth factors determined from 'TEMPro'. While a 2019 opening year would appear optimistic, applying a further years growth to 2020 at a rate of around 2% is not considered to be significant in terms of detailed junction assessment. On that basis, the adopted opening year of assessment is considered to be acceptable in this instance.	Noted. Please also note that the use of a 2019 year of opening was based upon best available knowledge and information at the time of preparing the TA. An opening year of 2019 also allows for a period of up to two years for planning consent and RCC to be awarded, and construction to be completed.
7 (b)	From the traffic flow diagrams provided in the TA, the impact of development generated traffic on the A96 to the east and west of Lochloy Road is around 1% and 3% respectively. On that basis, detailed assessment of the trunk road network has been limited to the A96 / Lochloy Road / View Road traffic signal controlled junction only. This is considered to be acceptable in this instance.	Noted. Refer also to response no. 1 (a).
7 (b)	It is noted that the assessment of the A96 / Lochloy Road / View Road traffic signal controlled junction has been undertaken using LinSig and the model developed from the traffic signal specification provided by the	Noted.

Ref	TS Comment (summarised)	Arup Response
	Operating Company, BEAR Scotland. This approach is considered to be acceptable.	
7 (c)	Notwithstanding this, the specification would appear to have been misinterpreted in terms of the modelled phase intergreen times. The traffic signals at this location are Puffin with on crossing detection, therefore the intergreen following the pedestrian Phase F is controlled by the CMX times. In summary, the max intergreen is 17 seconds. This is derived from page 8 of the specification which, for Phase F, indicates a 3s pedestrian clearance while page 16 indicates a 12s CMX clearance and 2s pedestrian demand hold. These timings generally relate to Periods 5, 6 and 9 in Table 2 (Nearside Period) of Traffic Advisory Leaflet (TAL) 5/05 Part 4 of 4. It is therefore incorrect to model a '0' intergreen from Phase F to the traffic phases in LinSig when, on site, the intergreen will range from an absolute minimum of 5s up to a maximum of 17s. It is recognised that the CMX clearance is demand dependant however, if pedestrian demand is not known, the modelling work should consider a 'worst case' scenario. We would therefore request that the model is re-run on that basis	In the interests of satisfying TS's concerns, the *LinSig* model of the A96(T)/Lochloy Road junction has been amended and re-run. The coding parameters have been revised in accordance with TS's comments, as follows: a) An increased pedestrian intergreen in Stage 4 to 17 seconds. As suggested by TS, this is to reflect a 'worst case' as opposed to a more reasonable situation addressed in the TA. b) In Lane 2/2, the associated indicative arrow phase (phase C) has been associated with the main traffic phase (phase D). Refer also to response no. 7 (d). Based upon the results of the re-run *LinSig* model (presented in Appendix C) it is considered that the modelling undertaken as part of the TA (and all subsequent sensitivity tests) is considered acceptable. This is based upon the following observations: **Based on a 17 second Pedestrian Intergreen:** a) The initial results are based upon a 17 second pedestrian intergreen (as outlined in Appendix B). These indicate that compared to the Base scenario, the Total scenario adds only marginally to the level of queuing (an increase of 4 between the PM Base and PM Total being the greatest change). b) The CMX clearance is, as noted by TS, demand dependant. Assuming a 'worst case' scenario is being assessed, this would assume that the pedestrian stage is called every 90 seconds (the modelled cycle time), and every 90 seconds the intergreen operates at its *maximum* of 17 seconds. This is considered rather onerous. Including the 10 second pedestrian green time, this equates to a total pedestrian stage time of 27 seconds. It is considered such a scenario is highly unlikely to be called *every* cycle and consequently, the operational junction performance will be improved. c) Based upon the modelling parameters suggested by TS, it is acknowledged that the degree of saturation increases marginally above the 90% threshold on the A96(T) western approach arm in both the AM and PM scenarios. Specifically, the degree of saturation on this arm is 93.3% in the Total AM scenario and 94.6% on the Total PM scenario. However, as noted above, this is based upon an intergreen of 17 seconds being called every cycle, which is considered highly unlikely. **Based on a 12 second Pedestrian Intergreen:** d) As a means of determining a more 'realistic' operation of the pedestrian stage in terms of intergreen times, a further sensitivity test has been

Ref	TS Comment (summarised)	Arup Response
		undertaken based upon applying a 12 second intergreen to the pedestrian stage. This value has been derived by calculating the 'standard error of the mean'. Taking such an approach reflects the level of variance from a defined sample size, in this case, the full range of potential intergreen times from a minimum of 5 seconds through to a maximum of 17 seconds (as confirmed by TS). Calculating the 'standard error of the mean' results in a value of 1.08 seconds. Applying this to the average intergreen time (i.e. 11 seconds) therefore assumes a value of 12 seconds which reflects an intergreen from the upper range of possible times. This is considered a more realistic interpretation of the likely pedestrian intergreen times. Based upon the above, and the results presented in Appendix B, it is considered that the A96(T)/Lochloy Road junction will continue to operate under capacity following the addition of trips associated with the NA2 development proposals.
7 (d)	In terms of which model, it is considered appropriate to use the model with Phase C coded as an Indicative Arrow (IA) phase. However, it is noted that when coding the Lane 2/2 details, the IA phase C has not been associated with the main traffic phase D resulting in Stage 2 indicating no minimum green time on the stage diagram. This should be amended when re-running the model.	The coding amendment suggested by TS has been incorporated into the revised *LinSig* model. Refer also to response no. 7 (c).
7 (e)	The reported results, which will change as a consequence of the above, currently indicate queues in excess of 100m on the A96 west approach in both the 'Base 2019' and 'Total 2019' traffic flow scenarios…….	The results and commentary of the amended *LinSig* modelling exercise are presented in response no. 7 (c) and Appendix B.
7 (f)	…… We would therefore seek clarification what steps have been taken to ensure that the predicted queuing in the base model is representative of actual conditions on the ground.	Refer to the *LinSig* results from the re-run model, along with associated commentary, as presented in response no. 7 (c) and Appendix B.

Appendix A – Transport Scotland Comments (amended)

This Appendix contains the original comments received from TS via email on 27 February 2018, but amended to include a numbering system for ease of cross-referencing.

1) **TA Scoping**
   a) Given that in excess of 90% of development generated traffic is anticipated to impact on the A96, Transport Scotland would have expected to have been consulted at the scoping stage to minimise the risk of abortive work. It is noted that scoping discussions only involved The Highland Council (THC) as local roads authority.

2) **Vehicle Trip Generation**
   a) We note that the anticipated vehicle trip generation has been estimated from vehicle trip rates extracted from the TRICS database and compared to observed vehicle trip rates derived from a survey of the Lochloy Road / Montgomerie Drive junction. The assessment has adopted the higher trip rates extracted from TRICS; 0.49 AM (0.17 arrivals and 0.32 departures) and 0.56 PM (0.33 arrivals and 0.23 departures) equating to 57 and 64 two-way vehicle trips during the AM and PM Peak hour periods respectively.
   b) Given that circa 75% of the units will be privately owned and circa 90% of these houses, the most appropriate residential sub-category in TRICS is "03/A – Houses Privately Owned (GDO use class C3)", not the individual sub-category approach adopted in the TA. As a consequence, the adopted trip rates would appear to be on the low side…….
   c) …… Notwithstanding this, it is recognised that had the TA adopted the trip rates previously accepted by THC for the NA5 Lochloy site, this would only result in an additional 15 vehicle trips on the Lochloy Road approach to the A96 / Lochloy Road / View Road traffic signal controlled junction over the AM Peak hour period. This increase is not considered to be significant in terms of detailed junction assessment nor would it change the overall conclusion of the TA. On that basis, the vehicle trip rates and resultant vehicle trip generation is considered to be acceptable in this instance.

3) **Base Traffic**
   a) Background traffic conditions on the A96 have been determined from a junction turning count survey undertaken at the A96 / Lochloy Road / View Road traffic signal controlled junction in April 2017. We are satisfied that April represents a neutral month therefore the survey is considered to be acceptable.

4) **Committed Development**
   a) The TA has included the NA5 Lochloy site as committed development. This site is understood to have consent for up to 685 residential units. Of this total, the TA states that only 87 units remain to be constructed and occupied. We have no basis upon which to dispute the number of remaining units however, The Highland Council (THC) has subsequently intimated that the number allowed for in the TA is reasonable. The trip generation for the remaining units has therefore been estimated by applying the vehicle trip rates adopted in the TA prepared in support of this site. This approach is considered to be acceptable.

5) **Assessment Year**

a) The TA has adopted a 2019 opening year of assessment. 2017 observed traffic flows have been factored to the aforementioned year of opening using growth factors determined from 'TEMPro'. While a 2019 opening year would appear optimistic, applying a further years growth to 2020 at a rate of around 2% is not considered to be significant in terms of detailed junction assessment. On that basis, the adopted opening year of assessment is considered to be acceptable in this instance.

6) Junction Assessment

a) From the traffic flow diagrams provided in the TA, the impact of development generated traffic on the A96 to the east and west of Lochloy Road is around 1% and 3% respectively. On that basis, detailed assessment of the trunk road network has been limited to the A96 / Lochloy Road / View Road traffic signal controlled junction only. This is considered to be acceptable in this instance.

b) It is noted that the assessment of the A96 / Lochloy Road / View Road traffic signal controlled junction has been undertaken using LinSig and the model developed from the traffic signal specification provided by the Operating Company, BEAR Scotland. This approach is considered to be acceptable.

c) Notwithstanding this, the specification would appear to have been misinterpreted in terms of the modelled phase intergreen times. The traffic signals at this location are Puffin with on crossing detection, therefore the intergreen following the pedestrian Phase F is controlled by the CMX times. In summary, the max intergreen is 17 seconds. This is derived from page 8 of the specification which, for Phase F, indicates a 3s pedestrian clearance while page 16 indicates a 12s CMX clearance and 2s pedestrian demand hold. These timings generally relate to Periods 5, 6 and 9 in Table 2 (Nearside Period) of Traffic Advisory Leaflet (TAL) 5/05 Part 4 of 4. It is therefore incorrect to model a '0' intergreen from Phase F to the traffic phases in LinSig when, on site, the intergreen will range from an absolute minimum of 5s up to a maximum of 17s. It is recognised that the CMX clearance is demand dependant however, if pedestrian demand is not known, the modelling work should consider a 'worst case' scenario. We would therefore request that the model is re-run on that basis.

d) In terms of which model, it is considered appropriate to use the model with Phase C coded as an Indicative Arrow (IA) phase. However, it is noted that when coding the Lane 2/2 details, the IA phase C has not been associated with the main traffic phase D resulting in Stage 2 indicating no minimum green time on the stage diagram. This should be amended when re-running the model.

e) The reported results, which will change as a consequence of the above, currently indicate queues in excess of 100m on the A96 west approach in both the 'Base 2019' and 'Total 2019' traffic flow scenarios.....

f) ..... We would therefore seek clarification what steps have been taken to ensure that the predicted queuing in the base model is representative of actual conditions on the ground.

Appendix B – *LinSig* Outputs and Commentary

The data presented in this Appendix includes a summary the *LinSig* modelling results from the revised model which now incorporates the modelling parameters suggested by TS. Refer to response no. 7 (c) for further details of this test. Refer also to Appendix C for the full set of *LinSig* model outputs.

Table B.1 summarises the original junction analysis results for the 2019 AM and PM scenarios, as presented in section 6.4.5 of the TA. Table B.2 provides the equivalent information but based upon the results from the re-run models which incorporate a 17 second intergreen. Finally, Table B.3 summarises the results based on a 12 second pedestrian intergreen.

Table B.1: Lochloy Road / A96(T) – Peak Period Capacity Results (AM & PM) – Original Results

Approach Arm	Base 2019 (AM)		Base 2019 (PM)		Total 2019 (AM)		Total 2019 (PM)	
	Deg Sat	Mean Max Q	Deg Sat	Mean Max Q	Deg Sat	Mean Max Q	Deg Sat	Mean Max Q
Lochloy Road – left, ahead & right	77.9%	9	70.9%	5	79.3%	10	75.2%	5
A96(T)(E) - right, left, ahead	64.2%	12	60.9%	11	67.4%	13	63.0%	12
View Road – ahead, right, left	4.7%	0	7.8%	0	4.3%	0	7.1%	0
A96(T)(W) – left, ahead, right	67.0%	13	70.1%	15	71.4%	15	73.4%	16

Table B.2: Lochloy Road / A96(T) – Peak Period Capacity Results (AM & PM) – Re-run Models (with 17 second intergreen)

Approach Arm	Base 2019 (AM)		Base 2019 (PM)		Total 2019 (AM)		Total 2019 (PM)	
	Deg Sat	Mean Max Q	Deg Sat	Mean Max Q	Deg Sat	Mean Max Q	Deg Sat	Mean Max Q
Lochloy Road – left, ahead & right	90.1%	11	84.2%	6	95.0%	14	88.1%	7
A96(T)(E) - right, left, ahead	85.0%	18	78.0%	17	87.9%	19	82.5%	18
View Road – ahead, right, left	5.4%	0	9.5%	0	5.2%	0	8.5%	0
A96(T)(W) – left, ahead, right	88.8%	20	89.9%	24	93.3%	23	94.6%	28

It is important to note that, based on a 17 second pedestrian intergreen, the Lochloy Road approach arm shows a degree of saturation of 90.1% under the Base scenario (i.e. without the addition of development related trips).

Table B.3: Lochloy Road / A96(T) – Peak Period Capacity Results (AM & PM) – Re-run Models (with 12 second intergreen)

Approach Arm	Base 2019 (AM)		Base 2019 (PM)		Total 2019 (AM)		Total 2019 (PM)	
	Deg Sat	Mean Max Q	Deg Sat	Mean Max Q	Deg Sat	Mean Max Q	Deg Sat	Mean Max Q
Lochloy Road – left, ahead & right	81.6%	9	77.0%	5	86.4%	11	81.1%	6
A96(T)(E) - right, left, ahead	78.7%	16	71.8%	15	81.2%	16	74.4%	16
View Road – ahead, right, left	4.9%	0	8.5%	0	4.7%	0	7.8%	0
A96(T)(W) – left, ahead, right	82.1%	17	82.7%	20	86.1%	19	86.9%	22

As shown above, the A96(T)/Lochloy Road junction operates within capacity under the original modelling exercise as presented within the TA, but also under the latest set of model re-runs which are based on the application of a 12 second pedestrian intergreen.

Appendix C – *LinSig* Model Outputs (full)

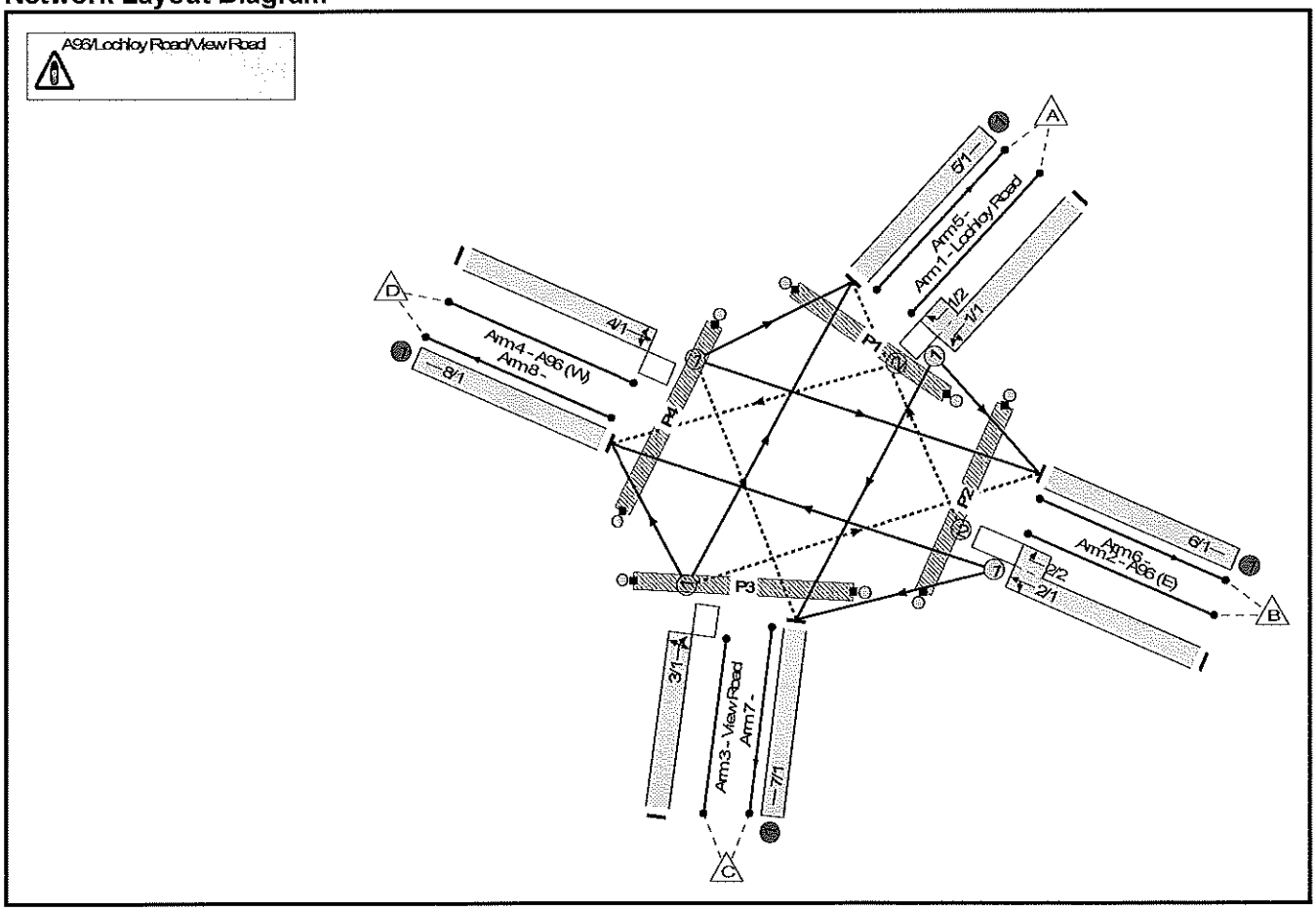
The data presented in this Appendix includes the full set of *LinSig* modelling results output from the revised model which now incorporates the modelling parameters suggested by TS (including a 17 second pedestrian intergreen), along with a further sensitivity test based on a 12 second pedestrian intergreen. A summary of the results have been tabulated and are presented in Appendix B.

NA2, Nairn - Lochloy Road / A96 4-arm signalised junction 2019

User and Project Details

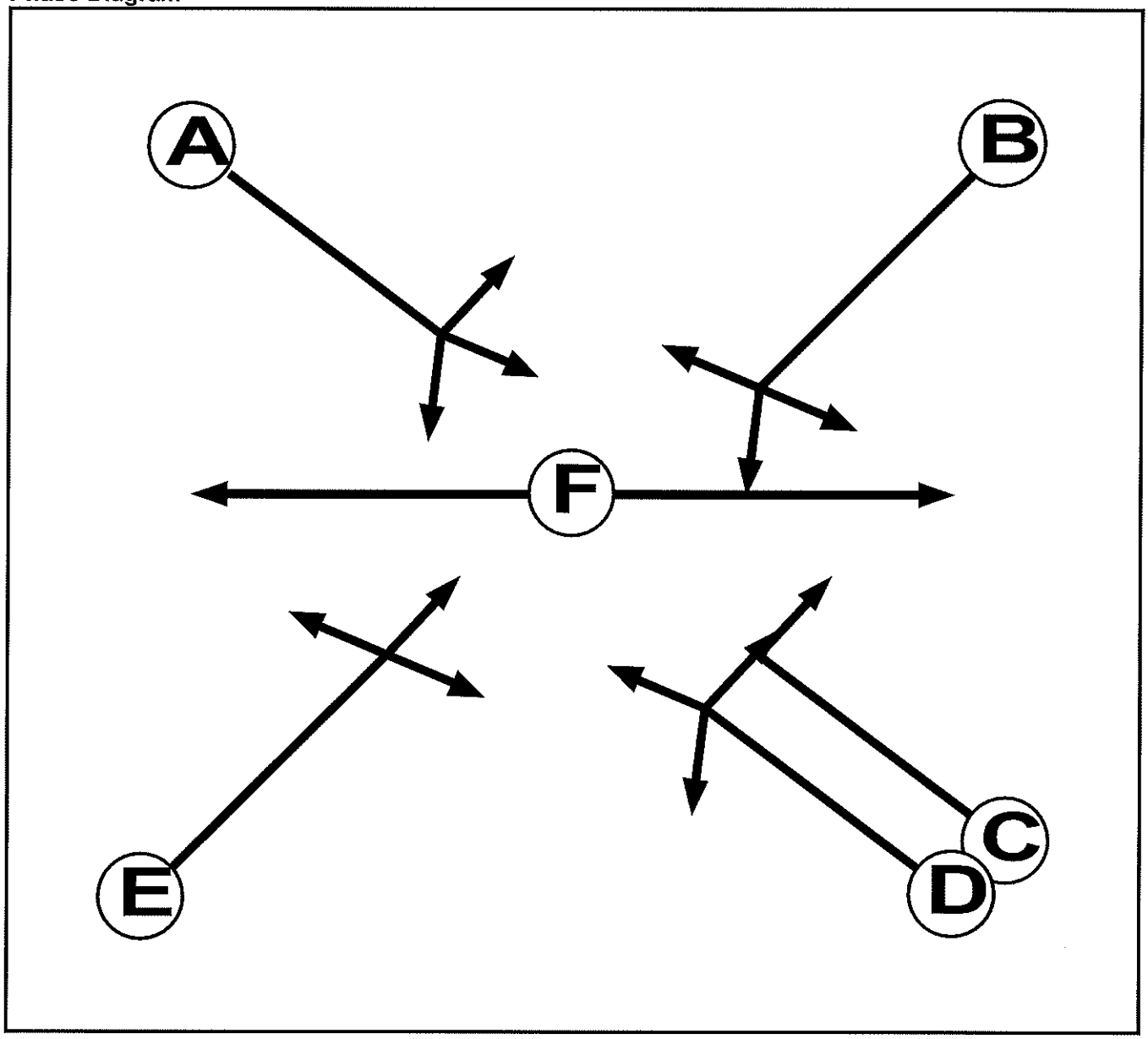
Project:	
Title:	
Location:	
File name:	A96-Lochloy Road-View Road (sensitivity) - TS Update.lsg3x
Author:	
Company:	
Address:	
Notes:	Results based on a 17 second pedestrian intergreen

Network Layout Diagram



NA2, Nairn - Lochloy Road / A96 4-arm signalised junction 2019

Phase Diagram



Phase Input Data

Phase Name	Phase Type	Assoc. Phase	Street Min	Cont Min
A	Traffic		7	7
B	Traffic		7	7
C	Ind. Arrow	D	4	4
D	Traffic		7	7
E	Traffic		7	7
F	Pedestrian		7	7

NA2, Nairn - Lochloy Road / A96 4-arm signalised junction 2019

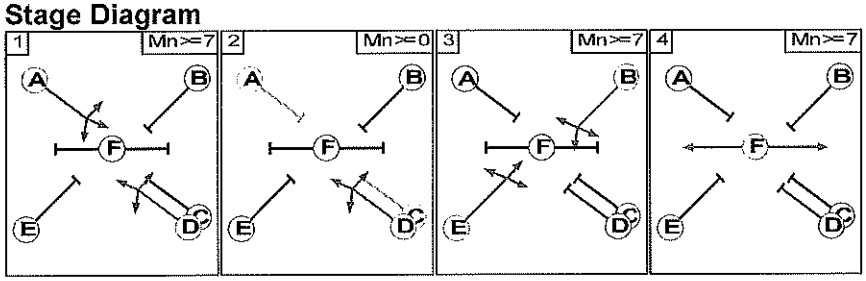
Phase Intergreens Matrix

		Starting Phase					
		A	B	C	D	E	F
Terminating Phase	A		5	5	-	5	8
	B	5		5	5	-	8
	C	5	5		-	5	8
	D	-	5	-		5	8
	E	5	-	5	5		8
	F	17	17	17	17	17	

Phases in Stage

Stage No.	Phases in Stage
1	A D
2	D
3	B E
4	F

Stage Diagram



Phase Delays

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

Prohibited Stage Change

		To Stage			
		1	2	3	4
From Stage	1		0	5	8
	2	2		5	8
	3	5	5		8
	4	17	17	17	

NA2, Nairn - Lochloy Road / A96 4-arm signalised junction 2019

Give-Way Lane Input Data

Junction: A96/Lochloy Road/View Road											
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)
1/2 (Lochloy Road)	8/1 (Right)	1439	0	3/1	1.09	To 5/1 (Ahead)	2.00	-	0.50	2	2.00
2/2 (A96 (E))	5/1 (Right)	1439	0	4/1	1.09	To 6/1 (Ahead)	3.00	-	0.50	3	2.00
3/1 (View Road)	6/1 (Right)	1439	0	1/1	1.09	To 7/1 (Ahead)	2.00	2.00	0.50	2	2.00
4/1 (A96 (W))	7/1 (Right)	1439	0	2/1	1.09	To 8/1 (Ahead)	2.00	2.00	0.50	2	2.00

NA2, Nairn - Lochloy Road / A96 4-arm signalised junction 2019

Lane Input Data

Junction: A96/Lochloy Road/View Road												
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 (Lochloy Road)	U	B	2	3	3.6	Geom	-	3.00	0.00	Y	Arm 6 Left	12.20
											Arm 7 Ahead	Inf
1/2 (Lochloy Road)	O	B	2	3	2.0	Geom	-	3.00	0.00	Y	Arm 8 Right	12.00
2/1 (A96 (E))	U	D	2	3	6.0	Geom	-	3.00	0.00	Y	Arm 7 Left	10.50
											Arm 8 Ahead	Inf
2/2 (A96 (E))	O	D C	2	3	2.0	Geom	-	3.00	0.00	Y	Arm 5 Right	10.00
3/1 (View Road)	O	E	2	3	4.0	Geom	-	2.90	0.00	Y	Arm 5 Ahead	Inf
											Arm 6 Right	14.00
											Arm 8 Left	8.00
4/1 (A96 (W))	O	A	2	3	10.4	Geom	-	3.40	0.00	Y	Arm 5 Left	12.00
											Arm 6 Ahead	Inf
											Arm 7 Right	15.00
5/1	U		2	3	60.0	Inf	-	-	-	-	-	-
6/1	U		2	3	60.0	Inf	-	-	-	-	-	-
7/1	U		2	3	60.0	Inf	-	-	-	-	-	-
8/1	U		2	3	60.0	Inf	-	-	-	-	-	-

Traffic Flow Groups

Flow Group	Start Time	End Time	Duration	Formula
1: 'AM Peak BASE'	08:10	09:10	01:00	
2: 'PM Peak BASE'	16:40	17:40	01:00	
3: 'AM Peak TOTAL'	08:10	09:10	01:00	
4: 'PM Peak TOTAL'	16:40	17:40	01:00	

Scenario 1: 'AM Peak Base 2019' (FG1: 'AM Peak BASE', Plan 1: 'Network Control Plan 1')

Traffic Flows, Desired

Desired Flow :

		Destination				
		A	B	C	D	Tot.
Origin	A	0	53	3	270	326
	B	37	0	3	624	664
	C	2	3	0	13	18
	D	133	553	10	0	696
	Tot.	172	609	16	907	1704

Traffic Lane Flows

Lane	Scenario 1: AM Peak Base 2019
Junction: A96/Lochloy Road/View Road	
1/1 (with short)	326(In) 56(Out)
1/2 (short)	270
2/1 (with short)	664(In) 627(Out)
2/2 (short)	37
3/1	18
4/1	696
5/1	172
6/1	609
7/1	16
8/1	907

Lane Saturation Flows

Junction: A96/Lochloy Road/View Road								
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat Flow (PCU/Hr)**	**Flared Sat Flow (PCU/Hr)**
1/1 (Lochloy Road)	3.00	0.00	Y	Arm 6 Left	12.20	94.6 %	1715	1715
				Arm 7 Ahead	Inf	5.4 %		
1/2 (Lochloy Road)	3.00	0.00	Y	Arm 8 Right	12.00	100.0 %	1702	1702
2/1 (A96 (E))	3.00	0.00	Y	Arm 7 Left	10.50	0.5 %	1914	1914
				Arm 8 Ahead	Inf	99.5 %		
2/2 (A96 (E))	3.00	0.00	Y	Arm 5 Right	10.00	100.0 %	1665	1665
3/1 (View Road)	2.90	0.00	Y	Arm 5 Ahead	Inf	11.1 %	1652	1652
				Arm 6 Right	14.00	16.7 %		
				Arm 8 Left	8.00	72.2 %		
4/1 (A96 (W))	3.40	0.00	Y	Arm 5 Left	12.00	19.1 %	1907	1907
				Arm 6 Ahead	Inf	79.5 %		
				Arm 7 Right	15.00	1.4 %		
5/1	Infinite Saturation Flow						Inf	Inf
6/1	Infinite Saturation Flow						Inf	Inf
7/1	Infinite Saturation Flow						Inf	Inf
8/1	Infinite Saturation Flow						Inf	Inf

Scenario 2: 'PM Peak Base 2019' (FG2: 'PM Peak BASE', Plan 1: 'Network Control Plan 1')

Traffic Flows, Desired

Desired Flow :

		Destination				
		A	B	C	D	Tot.
Origin	A	0	39	4	127	170
	B	96	0	3	656	755
	C	5	0	0	11	16
	D	187	677	10	0	874
	Tot.	288	716	17	794	1815

NA2, Nairn - Lochloy Road / A96 4-arm signalised junction 2019

Traffic Lane Flows

Lane	Scenario 2: PM Peak Base 2019
Junction: A96/Lochloy Road/View Road	
1/1 (with short)	170(In) 43(Out)
1/2 (short)	127
2/1 (with short)	755(In) 659(Out)
2/2 (short)	96
3/1	16
4/1	874
5/1	288
6/1	716
7/1	17
8/1	794

Lane Saturation Flows

Junction: A96/Lochloy Road/View Road								
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat Flow (PCU/Hr)**	**Flared Sat Flow (PCU/Hr)**
1/1 (Lochloy Road)	3.00	0.00	Y	Arm 6 Left	12.20	90.7 %	1723	1723
				Arm 7 Ahead	Inf	9.3 %		
1/2 (Lochloy Road)	3.00	0.00	Y	Arm 8 Right	12.00	100.0 %	1702	1702
2/1 (A96 (E))	3.00	0.00	Y	Arm 7 Left	10.50	0.5 %	1914	1914
				Arm 8 Ahead	Inf	99.5 %		
2/2 (A96 (E))	3.00	0.00	Y	Arm 5 Right	10.00	100.0 %	1665	1665
3/1 (View Road)	2.90	0.00	Y	Arm 5 Ahead	Inf	31.3 %	1687	1687
				Arm 6 Right	14.00	0.0 %		
				Arm 8 Left	8.00	68.8 %		
4/1 (A96 (W))	3.40	0.00	Y	Arm 5 Left	12.00	21.4 %	1902	1902
				Arm 6 Ahead	Inf	77.5 %		
				Arm 7 Right	15.00	1.1 %		
5/1	Infinite Saturation Flow						Inf	Inf
6/1	Infinite Saturation Flow						Inf	Inf
7/1	Infinite Saturation Flow						Inf	Inf
8/1	Infinite Saturation Flow						Inf	Inf

NA2, Nairn - Lochloy Road / A96 4-arm signalised junction 2019

Scenario 3: 'AM Peak TOTAL 2019' (FG3: 'AM Peak TOTAL', Plan 1: 'Network Control Plan 1')

Traffic Flows, Desired

Desired Flow :

		Destination				
		A	B	C	D	Tot.
Origin	A	0	59	4	299	362
	B	41	0	3	624	668
	C	2	3	0	13	18
	D	147	553	10	0	710
	Tot.	190	615	17	936	1758

Traffic Lane Flows

Lane	Scenario 3: AM Peak TOTAL 2019
Junction: A96/Lochloy Road/View Road	
1/1 (with short)	362(In) 63(Out)
1/2 (short)	299
2/1 (with short)	668(In) 627(Out)
2/2 (short)	41
3/1	18
4/1	710
5/1	190
6/1	615
7/1	17
8/1	936

Lane Saturation Flows

Junction: A96/Lochloy Road/View Road								
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat Flow (PCU/Hr)**	**Flared Sat Flow (PCU/Hr)**
1/1 (Lochloy Road)	3.00	0.00	Y	Arm 6 Left	12.20	93.7 %	1717	1717
				Arm 7 Ahead	Inf	6.3 %		
1/2 (Lochloy Road)	3.00	0.00	Y	Arm 8 Right	12.00	100.0 %	1702	1702
2/1 (A96 (E))	3.00	0.00	Y	Arm 7 Left	10.50	0.5 %	1914	1914
				Arm 8 Ahead	Inf	99.5 %		
2/2 (A96 (E))	3.00	0.00	Y	Arm 5 Right	10.00	100.0 %	1665	1665
3/1 (View Road)	2.90	0.00	Y	Arm 5 Ahead	Inf	11.1 %	1652	1652
				Arm 6 Right	14.00	16.7 %		
				Arm 8 Left	8.00	72.2 %		
4/1 (A96 (W))	3.40	0.00	Y	Arm 5 Left	12.00	20.7 %	1903	1903
				Arm 6 Ahead	Inf	77.9 %		
				Arm 7 Right	15.00	1.4 %		
5/1	Infinite Saturation Flow						Inf	Inf
6/1	Infinite Saturation Flow						Inf	Inf
7/1	Infinite Saturation Flow						Inf	Inf
8/1	Infinite Saturation Flow						Inf	Inf

Scenario 4: 'PM Peak TOTAL 2019' (FG4: 'PM Peak TOTAL', Plan 1: 'Network Control Plan 1')

Traffic Flows, Desired

Desired Flow :

		Destination				
		A	B	C	D	Tot.
Origin	A	0	45	5	145	195
	B	108	0	3	656	767
	C	5	0	0	11	16
	D	210	677	10	0	897
	Tot.	323	722	18	812	1875

NA2, Nairn - Lochloy Road / A96 4-arm signalised junction 2019

Traffic Lane Flows

Lane	Scenario 4: PM Peak TOTAL 2019
Junction: A96/Lochloy Road/View Road	
1/1 (with short)	195(In) 50(Out)
1/2 (short)	145
2/1 (with short)	767(In) 659(Out)
2/2 (short)	108
3/1	16
4/1	897
5/1	323
6/1	722
7/1	18
8/1	812

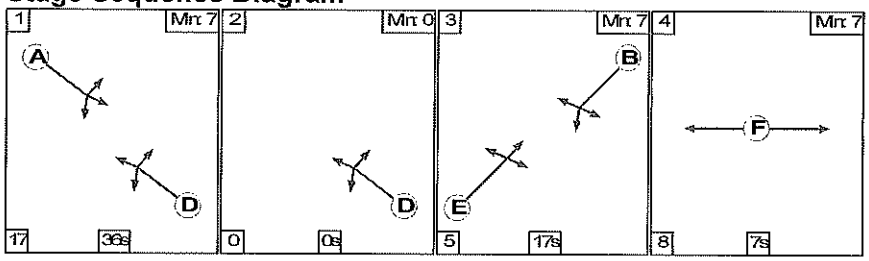
Lane Saturation Flows

Junction: A96/Lochloy Road/View Road								
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat Flow (PCU/Hr)**	**Flared Sat Flow (PCU/Hr)**
1/1 (Lochloy Road)	3.00	0.00	Y	Arm 6 Left	12.20	90.0 %	1724	1724
				Arm 7 Ahead	Inf	10.0 %		
1/2 (Lochloy Road)	3.00	0.00	Y	Arm 8 Right	12.00	100.0 %	1702	1702
2/1 (A96 (E))	3.00	0.00	Y	Arm 7 Left	10.50	0.5 %	1914	1914
				Arm 8 Ahead	Inf	99.5 %		
2/2 (A96 (E))	3.00	0.00	Y	Arm 5 Right	10.00	100.0 %	1665	1665
3/1 (View Road)	2.90	0.00	Y	Arm 5 Ahead	Inf	31.3 %	1687	1687
				Arm 6 Right	14.00	0.0 %		
				Arm 8 Left	8.00	68.8 %		
4/1 (A96 (W))	3.40	0.00	Y	Arm 5 Left	12.00	23.4 %	1897	1897
				Arm 6 Ahead	Inf	75.5 %		
				Arm 7 Right	15.00	1.1 %		
5/1	Infinite Saturation Flow						Inf	Inf
6/1	Infinite Saturation Flow						Inf	Inf
7/1	Infinite Saturation Flow						Inf	Inf
8/1	Infinite Saturation Flow						Inf	Inf

NA2, Nairn - Lochloy Road / A96 4-arm signalised junction 2019

Scenario 1: 'AM Peak Base 2019' (FG1: 'AM Peak BASE', Plan 1: 'Network Control Plan 1')

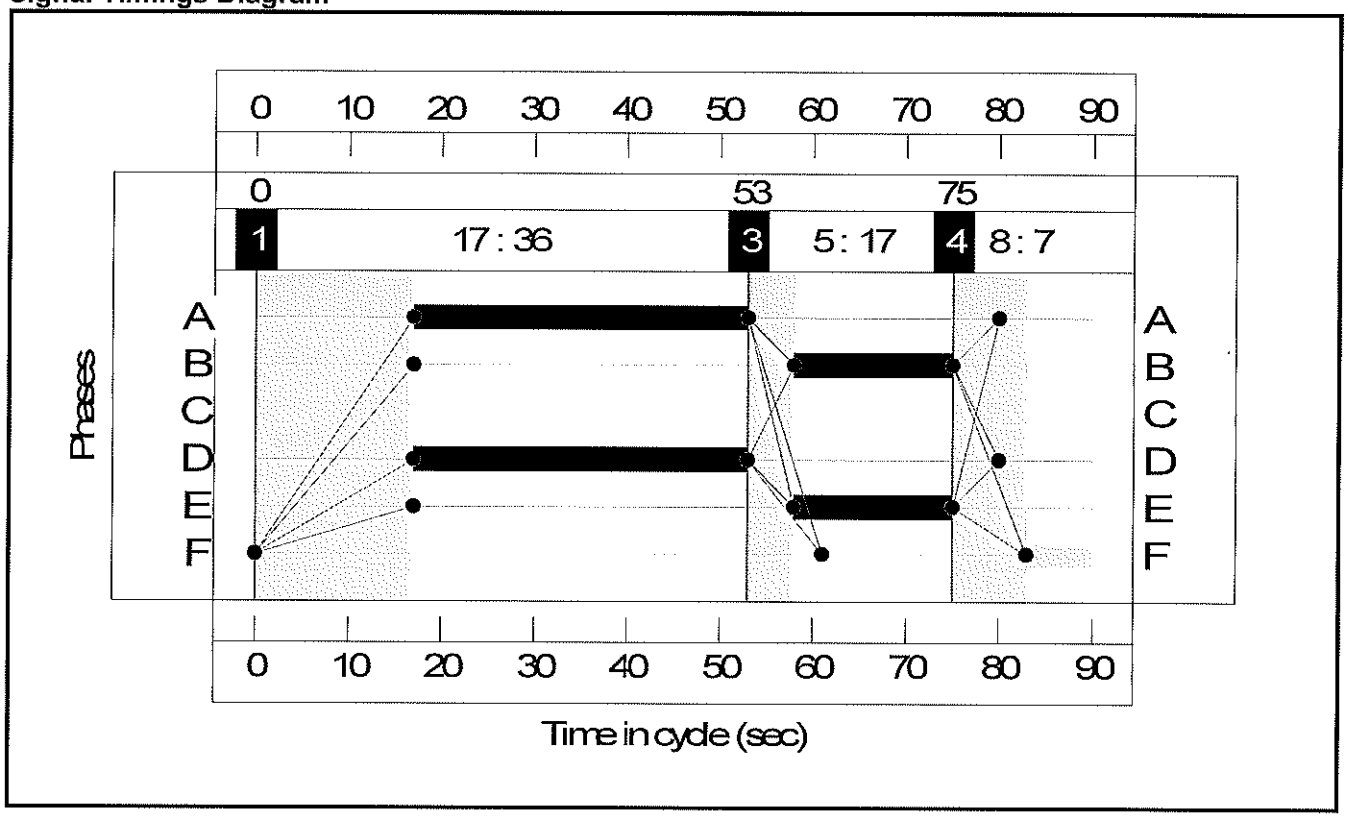
Stage Sequence Diagram



Stage Timings

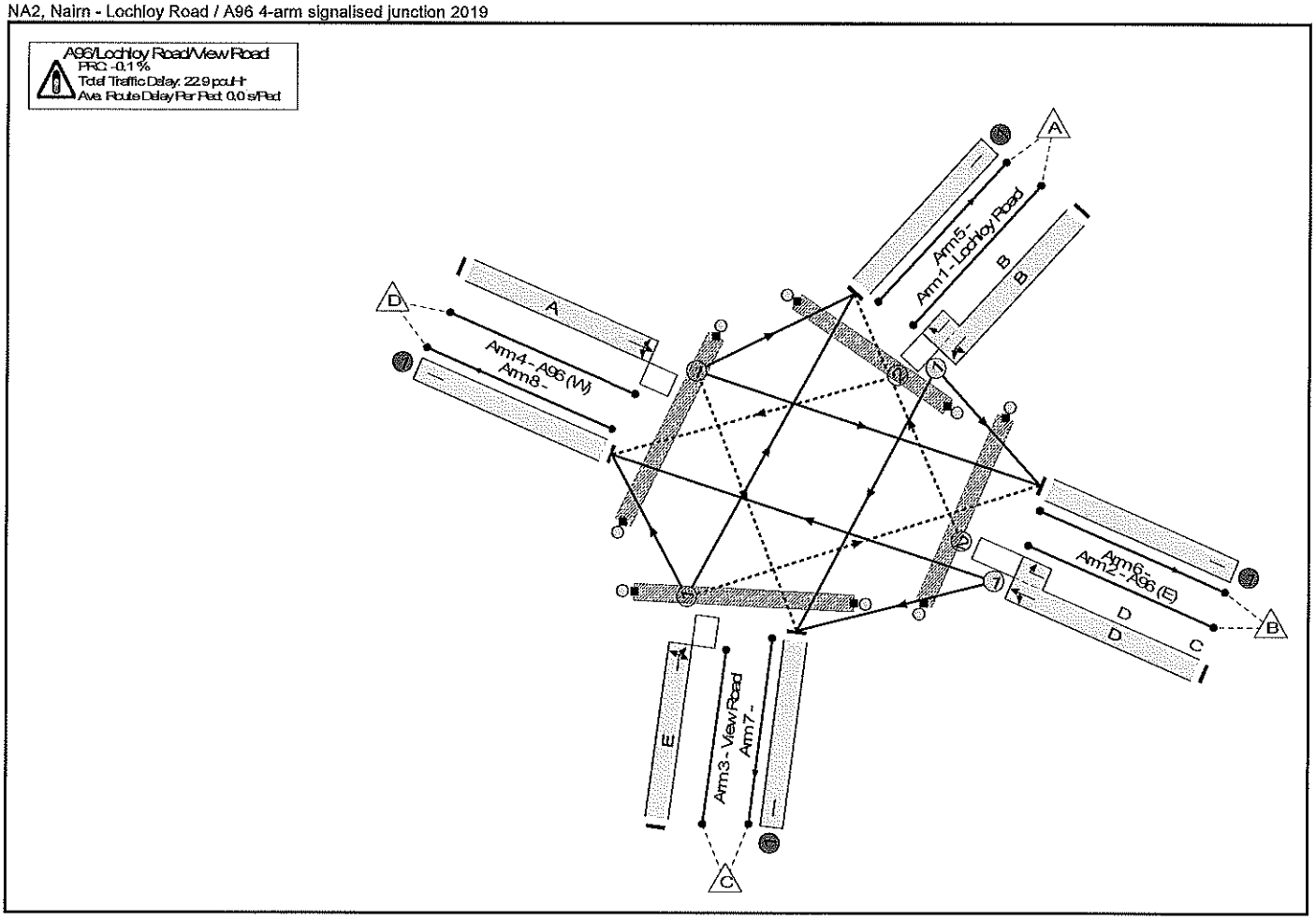
Stage	1	2	3	4
Duration	36	0	17	7
Change Point	0	53	53	75

Signal Timings Diagram



NA2, Nairn - Lochloy Road / A96 4-arm signalised junction 2019
Network Layout Diagram

NA2, Nairn - Lochloy Road / A96 4-arm signalised junction 2019



Network Results

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network	-	-	N/A	-	-		-	-	-	-	-	-	90.1%
A96/Lochloy Road/View Road	-	-	N/A	-	-		-	-	-	-	-	-	90.1%
1/1+1/2	Lochloy Road Left Ahead Right	U+O	N/A	N/A	B		1	17	-	326	1715:1702	362	90.1%
2/1+2/2	A96 (E) Right Left Ahead	U+O	N/A	N/A	D	C	1	36	0	664	1914:1665	781	85.0%
3/1	View Road Ahead Right Left	O	N/A	N/A	E		1	17	-	18	1652	330	5.4%
4/1	A96 (W) Left Ahead Right	O	N/A	N/A	A		1	36	-	696	1907	784	88.8%
5/1		U	N/A	N/A	-		-	-	-	172	Inf	Inf	0.0%
6/1		U	N/A	N/A	-		-	-	-	609	Inf	Inf	0.0%
7/1		U	N/A	N/A	-		-	-	-	16	Inf	Inf	0.0%
8/1		U	N/A	N/A	-		-	-	-	907	Inf	Inf	0.0%
Ped Link: P1	Unnamed Ped Link	-	N/A	-	F		1	7	-	0	-	0	0.0%
Ped Link: P2	Unnamed Ped Link	-	N/A	-	F		1	7	-	0	-	0	0.0%
Ped Link: P3	Unnamed Ped Link	-	N/A	-	F		1	7	-	0	-	0	0.0%
Ped Link: P4	Unnamed Ped Link	-	N/A	-	F		1	7	-	0	-	0	0.0%

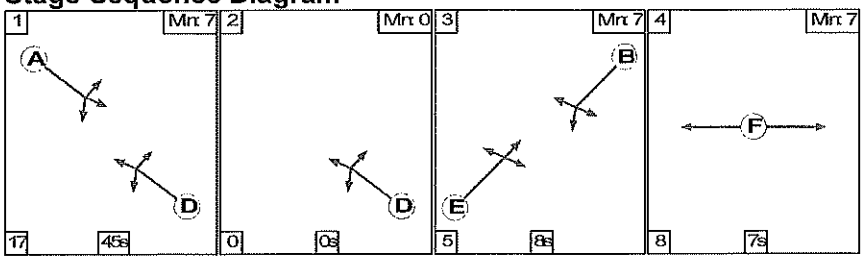
NA2, Nairn - Lochloy Road / A96 4-arm signalised junction 2019

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	-	-	320	0	0	12.5	10.2	0.3	22.9	-	-	-	-
A96/Lochloy Road/View Road	-	-	320	0	0	12.5	10.2	0.3	22.9	-	-	-	-
1/1+1/2	326	326	270	0	0	3.1	3.8	0.1	7.0	77.0	7.5	3.8	11.2
2/1+2/2	664	664	37	0	0	4.4	2.7	0.2	7.3	39.6	14.8	2.7	17.5
3/1	18	18	3	0	0	0.1	0.0	0.0	0.2	35.0	0.4	0.0	0.4
4/1	696	696	10	0	0	4.8	3.7	0.0	8.4	43.7	16.0	3.7	19.7
5/1	172	172	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	609	609	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
7/1	16	16	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
8/1	907	907	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
Ped Link: P1	0	0	-	-	-	-	-	-	-	-	-	-	-
Ped Link: P2	0	0	-	-	-	-	-	-	-	-	-	-	-
Ped Link: P3	0	0	-	-	-	-	-	-	-	-	-	-	-
Ped Link: P4	0	0	-	-	-	-	-	-	-	-	-	-	-

C1 PRC for Signalled Lanes (%): -0.1 Total Delay for Signalled Lanes (pcuHr): 22.89 Cycle Time (s): 90
PRC Over All Lanes (%): -0.1 Total Delay Over All Lanes(pcuHr): 22.89

NA2, Nairn - Lochloy Road / A96 4-arm signalised junction 2019
Scenario 2: 'PM Peak Base 2019' (FG2: 'PM Peak BASE', Plan 1: 'Network Control Plan 1')

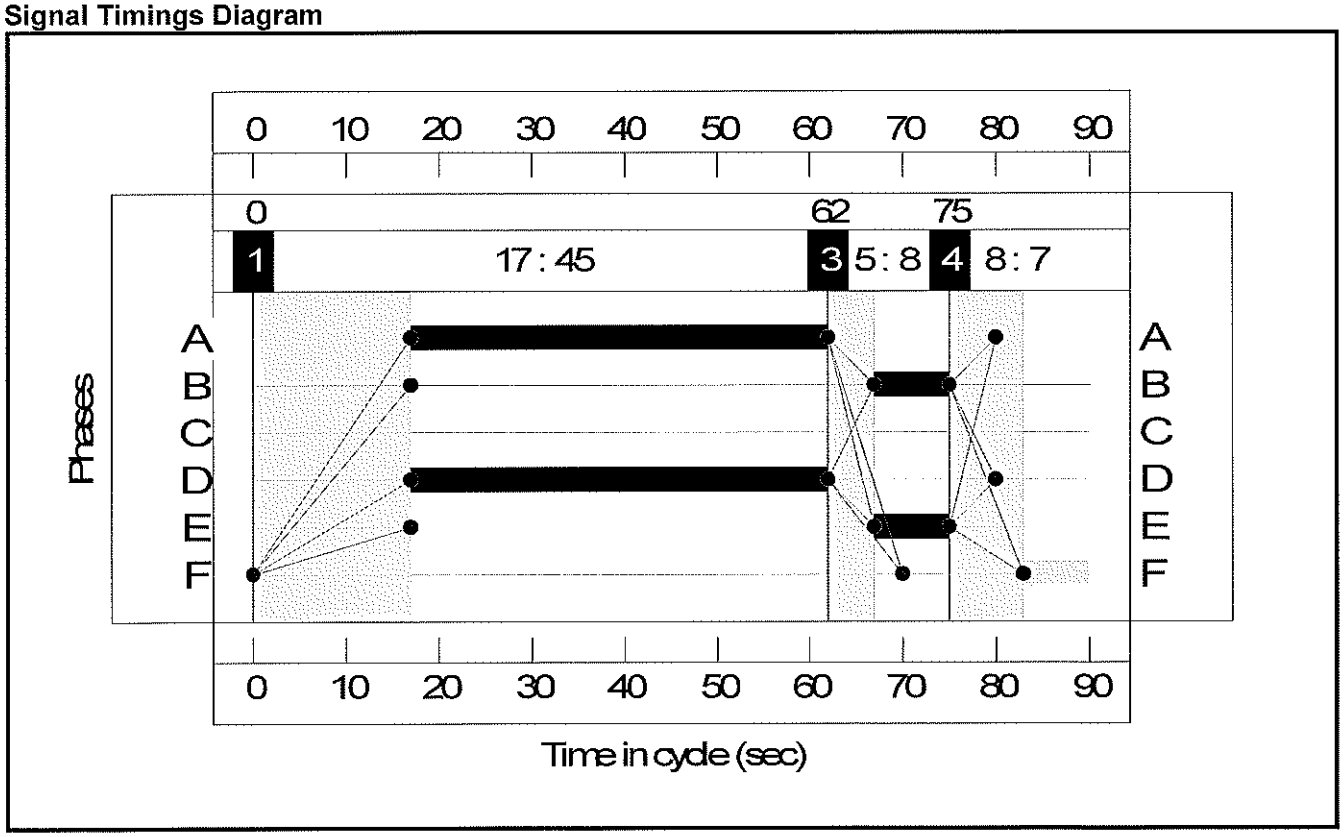
Stage Sequence Diagram



Stage Timings

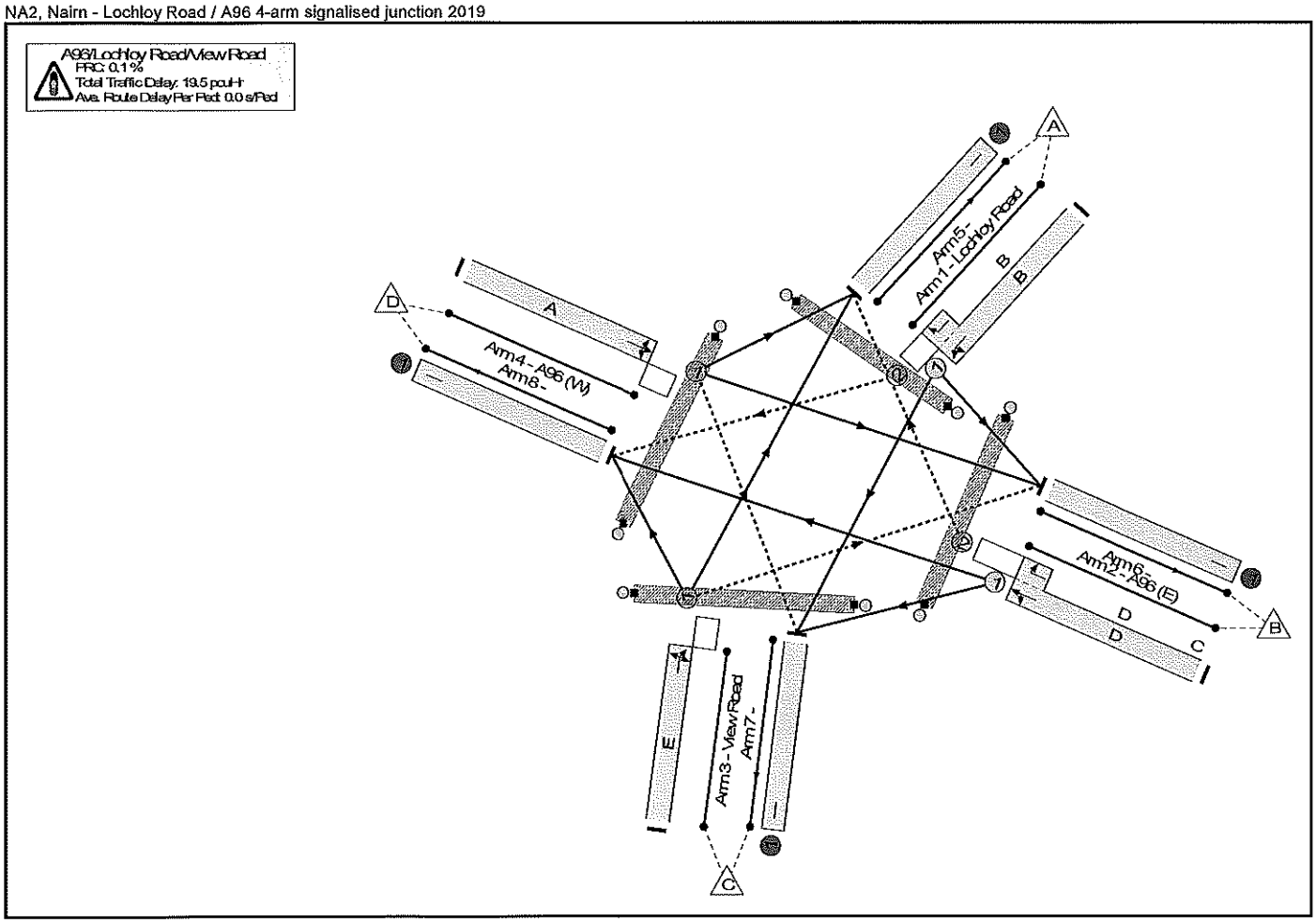
Stage	1	2	3	4
Duration	45	0	8	7
Change Point	0	62	62	75

Signal Timings Diagram



NA2, Nairn - Lochloy Road / A96 4-arm signalised junction 2019
Network Layout Diagram

NA2, Nairn - Lochloy Road / A96 4-arm signalised junction 2019



NA2, Nairn - Lochloy Road / A96 4-arm signalised junction 2019

Network Results

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network	-	-	N/A	-	-		-	-	-	-	-	-	89.9%
A96/Lochloy Road/View Road	-	-	N/A	-	-		-	-	-	-	-	-	89.9%
1/1+1/2	Lochloy Road Left Ahead Right	U+O	N/A	N/A	B		1	8	-	170	1723:1702	202	84.2%
2/1+2/2	A96 (E) Right Left Ahead	U+O	N/A	N/A	D	C	1	45	0	755	1914:1665	968	78.0%
3/1	View Road Ahead Right Left	O	N/A	N/A	E		1	8	-	16	1687	169	9.5%
4/1	A96 (W) Left Ahead Right	O	N/A	N/A	A		1	45	-	874	1902	972	89.9%
5/1		U	N/A	N/A	-		-	-	-	288	Inf	Inf	0.0%
6/1		U	N/A	N/A	-		-	-	-	716	Inf	Inf	0.0%
7/1		U	N/A	N/A	-		-	-	-	17	Inf	Inf	0.0%
8/1		U	N/A	N/A	-		-	-	-	794	Inf	Inf	0.0%
Ped Link: P1	Unnamed Ped Link	-	N/A	-	F		1	7	-	0	-	0	0.0%
Ped Link: P2	Unnamed Ped Link	-	N/A	-	F		1	7	-	0	-	0	0.0%
Ped Link: P3	Unnamed Ped Link	-	N/A	-	F		1	7	-	0	-	0	0.0%
Ped Link: P4	Unnamed Ped Link	-	N/A	-	F		1	7	-	0	-	0	0.0%

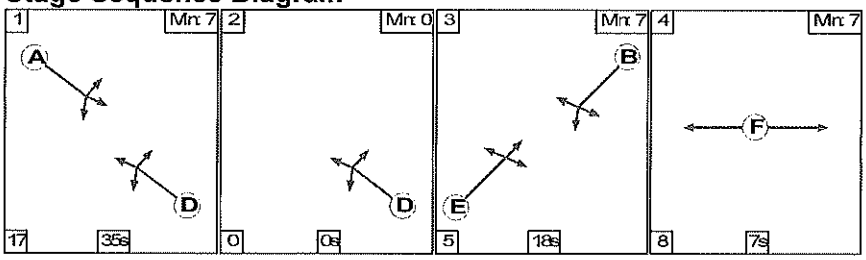
NA2, Nairn - Lochloy Road / A96 4-arm signalised junction 2019

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	-	-	203	0	30	10.6	8.2	0.7	19.5	-	-	-	-
A96/Lochloy Road/View Road	-	-	203	0	30	10.6	8.2	0.7	19.5	-	-	-	-
1/1+1/2	170	170	127	0	0	1.9	2.3	0.0	4.2	89.1	3.5	2.3	5.8
2/1+2/2	755	755	66	0	30	3.7	1.7	0.6	6.1	29.0	14.8	1.7	16.6
3/1	16	16	0	0	0	0.2	0.1	0.0	0.2	48.7	0.4	0.1	0.4
4/1	874	874	10	0	0	4.8	4.1	0.0	9.0	36.9	19.7	4.1	23.8
5/1	288	288	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	716	716	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
7/1	17	17	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
8/1	794	794	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
Ped Link: P1	0	0	-	-	-	-	-	-	-	-	-	-	-
Ped Link: P2	0	0	-	-	-	-	-	-	-	-	-	-	-
Ped Link: P3	0	0	-	-	-	-	-	-	-	-	-	-	-
Ped Link: P4	0	0	-	-	-	-	-	-	-	-	-	-	-

C1 PRC for Signalled Lanes (%): 0.1 Total Delay for Signalled Lanes (pcuHr): 19.47 Cycle Time (s): 90
PRC Over All Lanes (%): 0.1 Total Delay Over All Lanes(pcuHr): 19.47

NA2, Nairn - Lochloy Road / A96 4-arm signalised junction 2019
Scenario 3: 'AM Peak TOTAL 2019' (FG3: 'AM Peak TOTAL', Plan 1: 'Network Control Plan 1')

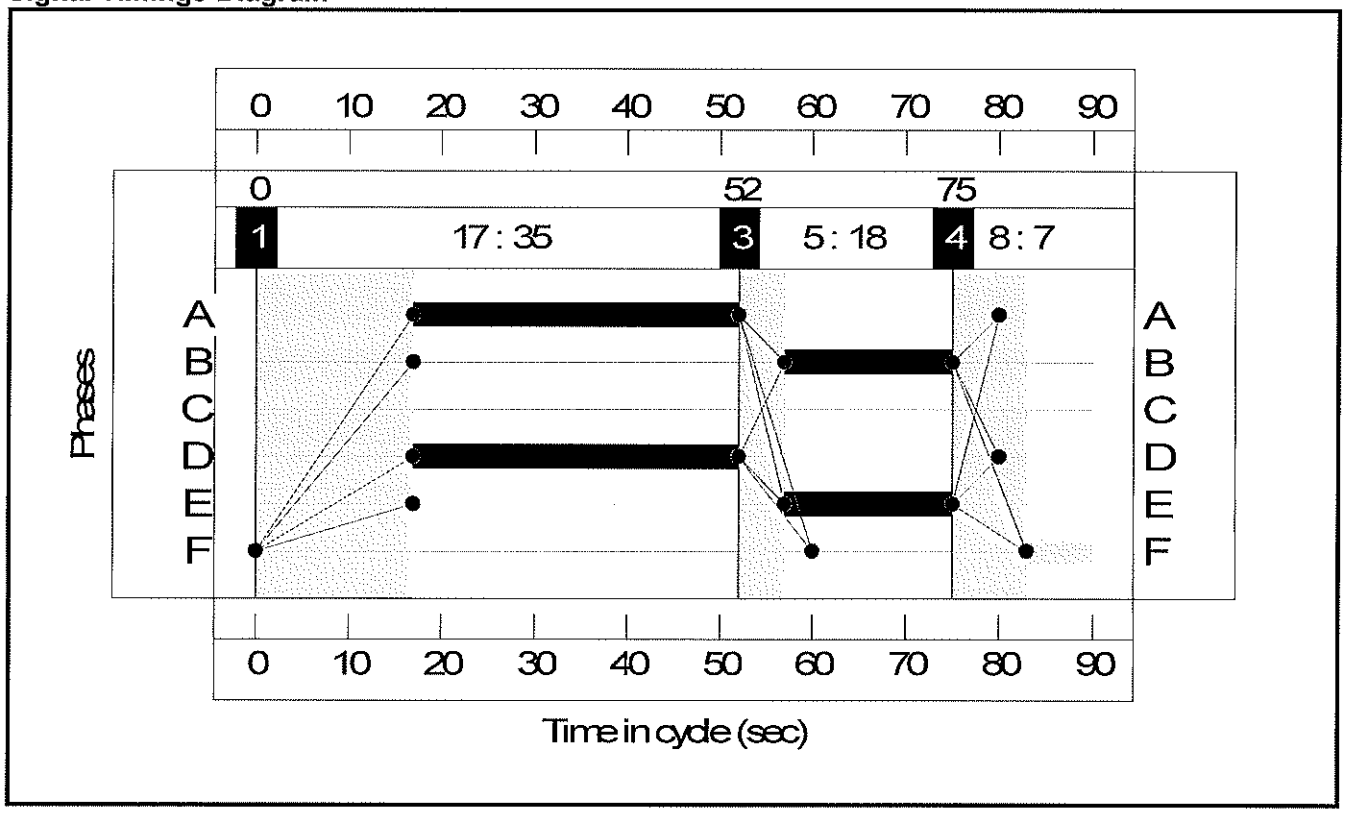
Stage Sequence Diagram



Stage Timings

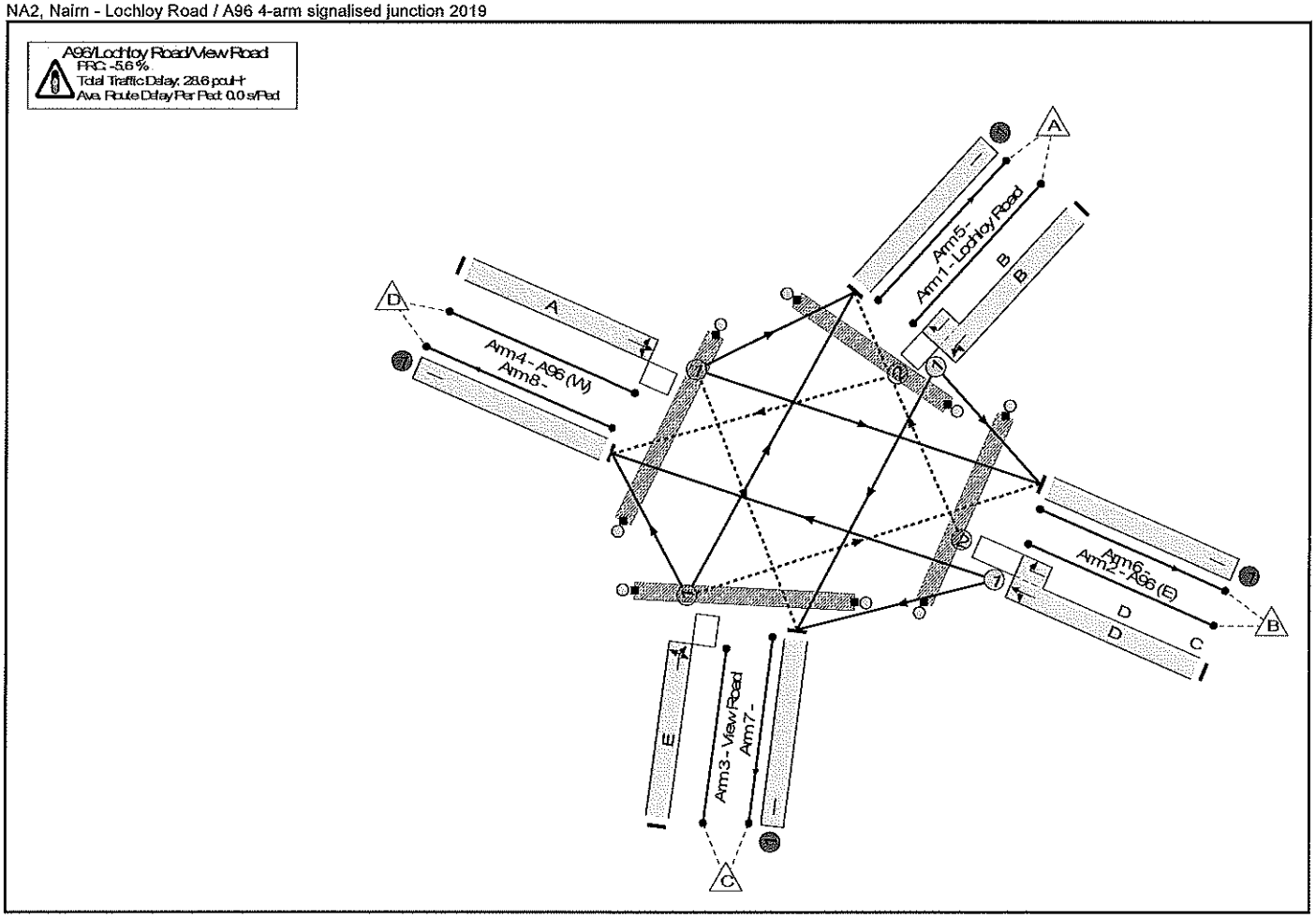
Stage	1	2	3	4
Duration	35	0	18	7
Change Point	0	52	52	75

Signal Timings Diagram



NA2, Nairn - Lochloy Road / A96 4-arm signalised junction 2019
Network Layout Diagram

NA2, Nairn - Lochloy Road / A96 4-arm signalised junction 2019



NA2, Nairn - Lochloy Road / A96 4-arm signalised junction 2019

Network Results

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network	-	-	N/A	-	-		-	-	-	-	-	-	95.0%
A96/Lochloy Road/View Road	-	-	N/A	-	-		-	-	-	-	-	-	95.0%
1/1+1/2	Lochloy Road Left Ahead Right	U+O	N/A	N/A	B		1	18	-	362	1717:1702	381	95.0%
2/1+2/2	A96 (E) Right Left Ahead	U+O	N/A	N/A	D	C	1	35	0	668	1914:1665	760	87.9%
3/1	View Road Ahead Right Left	O	N/A	N/A	E		1	18	-	18	1652	349	5.2%
4/1	A96 (W) Left Ahead Right	O	N/A	N/A	A		1	35	-	710	1903	761	93.3%
5/1		U	N/A	N/A	-		-	-	-	190	Inf	Inf	0.0%
6/1		U	N/A	N/A	-		-	-	-	615	Inf	Inf	0.0%
7/1		U	N/A	N/A	-		-	-	-	17	Inf	Inf	0.0%
8/1		U	N/A	N/A	-		-	-	-	936	Inf	Inf	0.0%
Ped Link: P1	Unnamed Ped Link	-	N/A	-	F		1	7	-	0	-	0	0.0%
Ped Link: P2	Unnamed Ped Link	-	N/A	-	F		1	7	-	0	-	0	0.0%
Ped Link: P3	Unnamed Ped Link	-	N/A	-	F		1	7	-	0	-	0	0.0%
Ped Link: P4	Unnamed Ped Link	-	N/A	-	F		1	7	-	0	-	0	0.0%

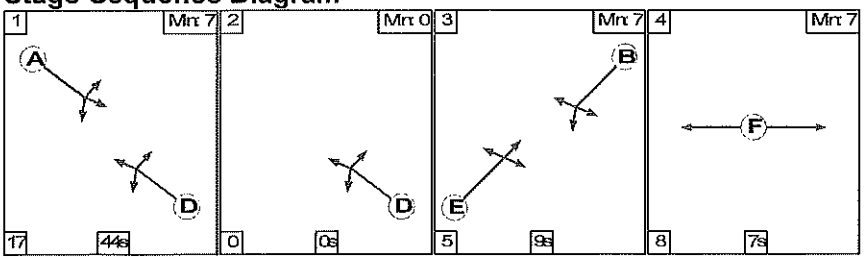
NA2, Nairn - Lochloy Road / A96 4-arm signalised junction 2019

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	-	-	348	0	5	13.3	15.0	0.3	28.6	-	-	-	-
A96/Lochloy Road/View Road	-	-	348	0	5	13.3	15.0	0.3	28.6	-	-	-	-
1/1+1/2	362	362	299	0	0	3.5	5.9	0.1	9.4	93.8	8.4	5.9	14.3
2/1+2/2	668	668	36	0	5	4.6	3.4	0.2	8.2	44.3	15.3	3.4	18.7
3/1	18	18	3	0	0	0.1	0.0	0.0	0.2	33.8	0.4	0.0	0.4
4/1	710	710	10	0	0	5.1	5.7	0.0	10.8	54.8	17.0	5.7	22.6
5/1	190	190	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	615	615	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
7/1	17	17	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
8/1	936	936	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
Ped Link: P1	0	0	-	-	-	-	-	-	-	-	-	-	-
Ped Link: P2	0	0	-	-	-	-	-	-	-	-	-	-	-
Ped Link: P3	0	0	-	-	-	-	-	-	-	-	-	-	-
Ped Link: P4	0	0	-	-	-	-	-	-	-	-	-	-	-

C1	PRC for Signalled Lanes (%):	-5.6	Total Delay for Signalled Lanes (pcuHr):	28.64	Cycle Time (s):	90
	PRC Over All Lanes (%):	-5.6	Total Delay Over All Lanes(pcuHr):	28.64		

NA2, Nairn - Lochloy Road / A96 4-arm signalised junction 2019
Scenario 4: 'PM Peak TOTAL 2019' (FG4: 'PM Peak TOTAL', Plan 1: 'Network Control Plan 1')

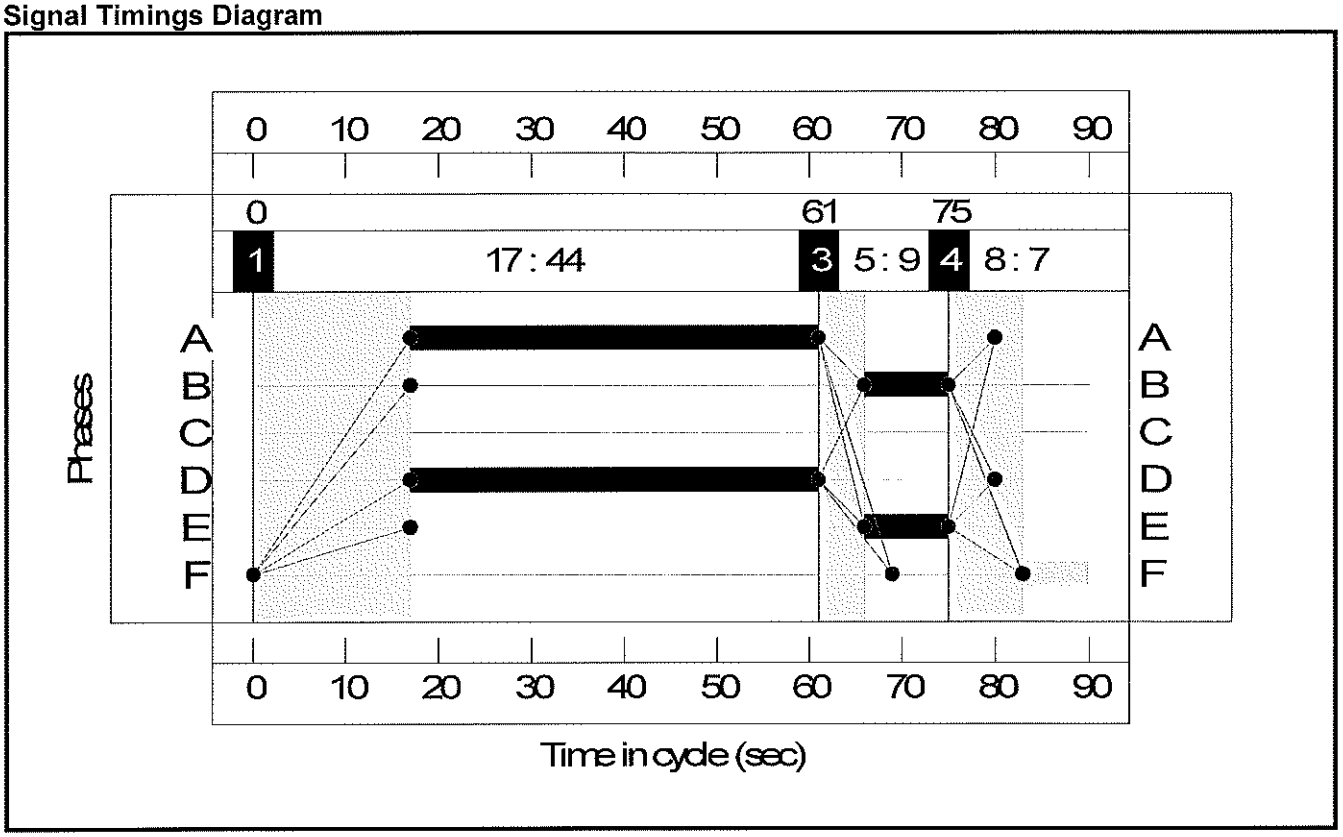
Stage Sequence Diagram



Stage Timings

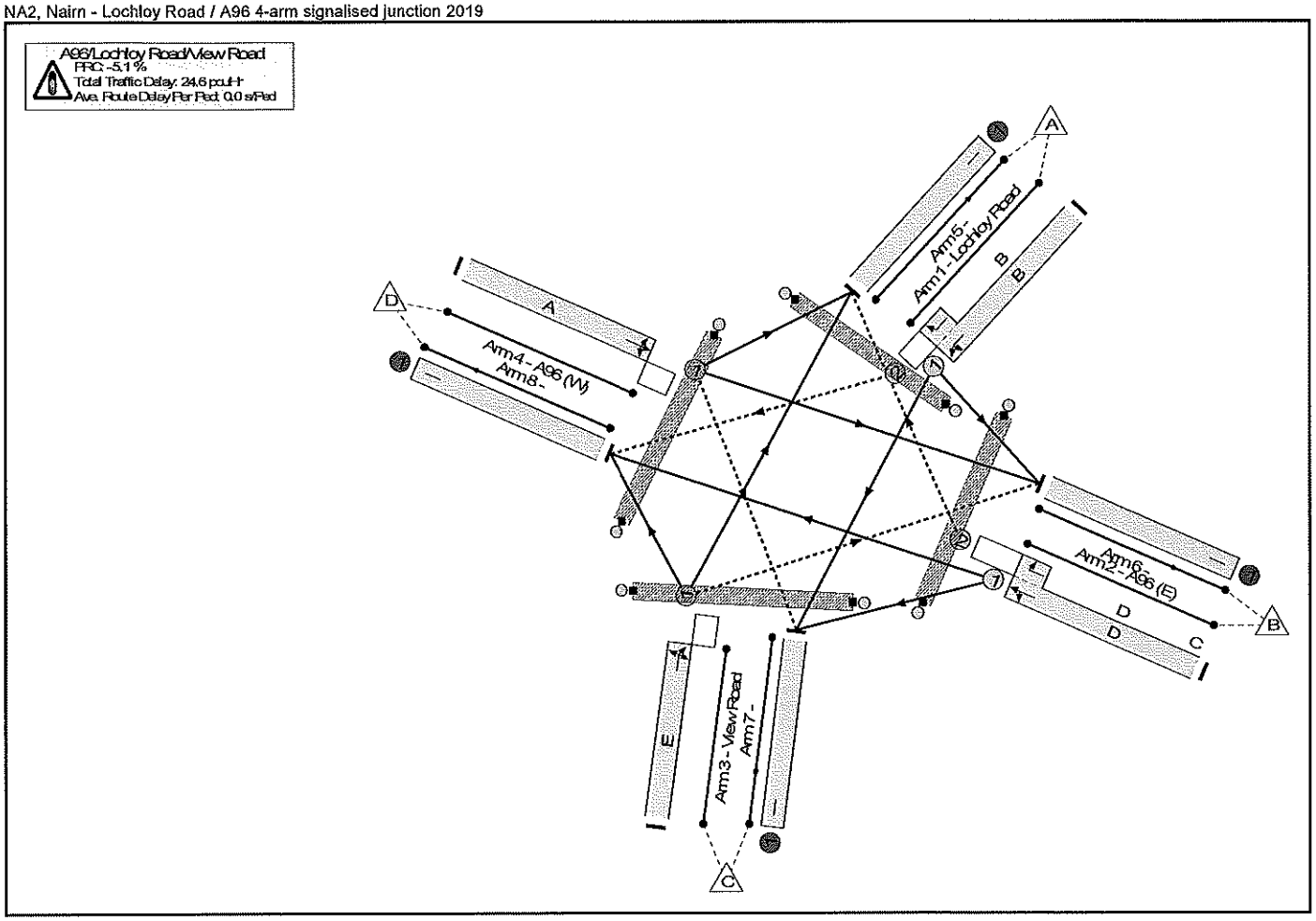
Stage	1	2	3	4
Duration	44	0	9	7
Change Point	0	61	61	75

Signal Timings Diagram



NA2, Nairn - Lochloy Road / A96 4-arm signalised junction 2019
Network Layout Diagram

NA2, Nairn - Lochloy Road / A96 4-arm signalised junction 2019



NA2, Nairn - Lochloy Road / A96 4-arm signalised junction 2019

Network Results

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network	-	-	N/A	-	-		-	-	-	-	-	-	94.6%
A96/Lochloy Road/View Road	-	-	N/A	-	-		-	-	-	-	-	-	94.6%
1/1+1/2	Lochloy Road Left Ahead Right	U+O	N/A	N/A	B		1	9	-	195	1724:1702	221	88.1%
2/1+2/2	A96 (E) Right Left Ahead	U+O	N/A	N/A	D	C	1	44	0	767	1914:1665	929	82.5%
3/1	View Road Ahead Right Left	O	N/A	N/A	E		1	9	-	16	1687	187	8.5%
4/1	A96 (W) Left Ahead Right	O	N/A	N/A	A		1	44	-	897	1897	948	94.6%
5/1		U	N/A	N/A	-		-	-	-	323	Inf	Inf	0.0%
6/1		U	N/A	N/A	-		-	-	-	722	Inf	Inf	0.0%
7/1		U	N/A	N/A	-		-	-	-	18	Inf	Inf	0.0%
8/1		U	N/A	N/A	-		-	-	-	812	Inf	Inf	0.0%
Ped Link: P1	Unnamed Ped Link	-	N/A	-	F		1	7	-	0	-	0	0.0%
Ped Link: P2	Unnamed Ped Link	-	N/A	-	F		1	7	-	0	-	0	0.0%
Ped Link: P3	Unnamed Ped Link	-	N/A	-	F		1	7	-	0	-	0	0.0%
Ped Link: P4	Unnamed Ped Link	-	N/A	-	F		1	7	-	0	-	0	0.0%

NA2, Nairn - Lochloy Road / A96 4-arm signalised junction 2019

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	-	-	191	0	72	11.6	12.2	0.8	24.6	-	-	-	-
A96/Lochloy Road/View Road	-	-	191	0	72	11.6	12.2	0.8	24.6	-	-	-	-
1/1+1/2	195	195	145	0	0	2.1	3.0	0.0	5.1	94.9	4.1	3.0	7.1
2/1+2/2	767	767	36	0	72	4.0	2.3	0.8	7.1	33.1	15.7	2.3	17.9
3/1	16	16	0	0	0	0.2	0.0	0.0	0.2	46.5	0.4	0.0	0.4
4/1	897	897	10	0	0	5.3	6.9	0.0	12.2	49.1	21.2	6.9	28.1
5/1	323	323	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	722	722	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
7/1	18	18	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
8/1	812	812	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
Ped Link: P1	0	0	-	-	-	-	-	-	-	-	-	-	-
Ped Link: P2	0	0	-	-	-	-	-	-	-	-	-	-	-
Ped Link: P3	0	0	-	-	-	-	-	-	-	-	-	-	-
Ped Link: P4	0	0	-	-	-	-	-	-	-	-	-	-	-

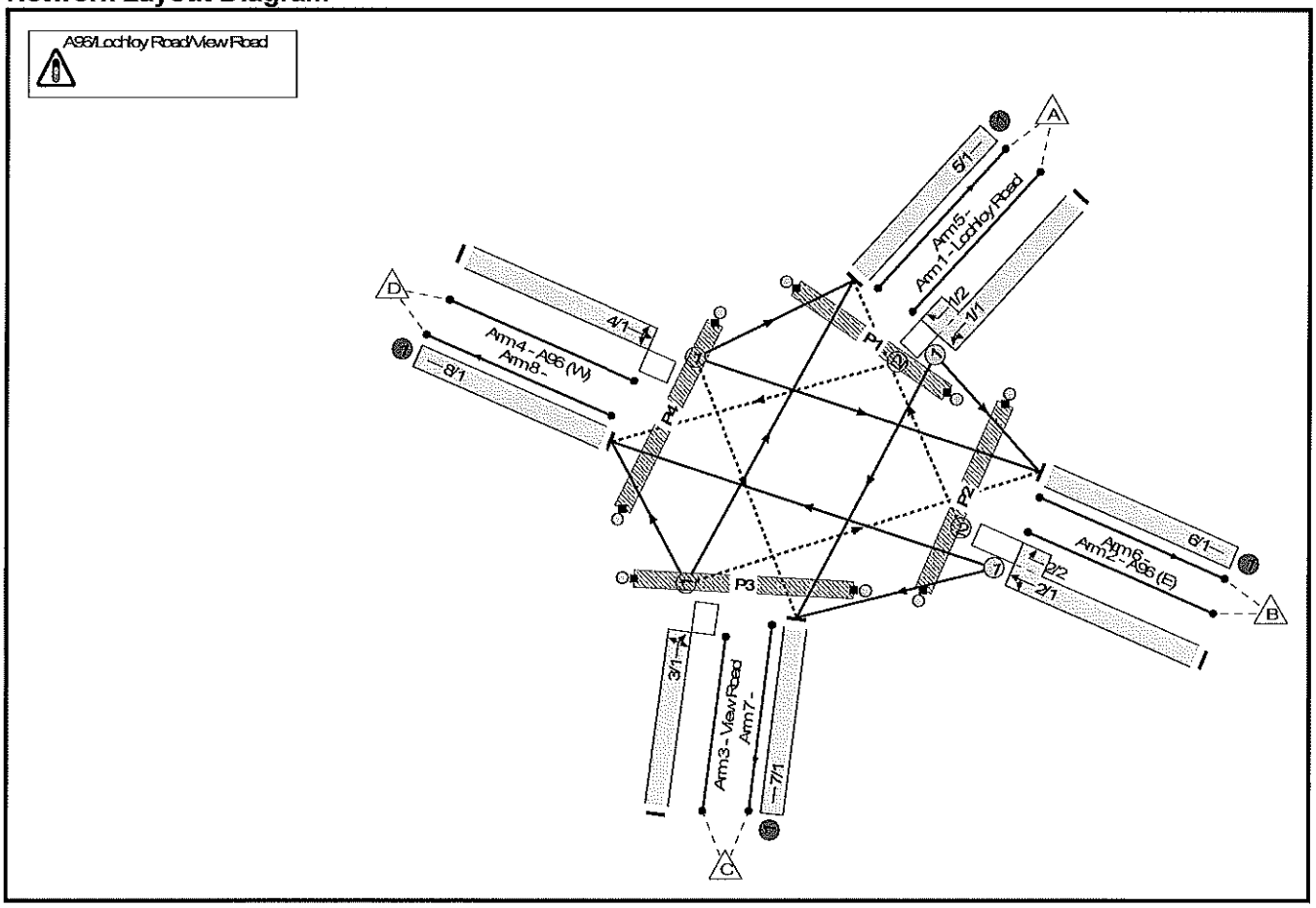
C1 PRC for Signalled Lanes (%): -5.1 Total Delay for Signalled Lanes (pcuHr): 24.62 Cycle Time (s): 90
PRC Over All Lanes (%): -5.1 Total Delay Over All Lanes(pcuHr): 24.62

NA2, Nairn - Lochloy Road / A96 4-arm signalised junction 2019

User and Project Details

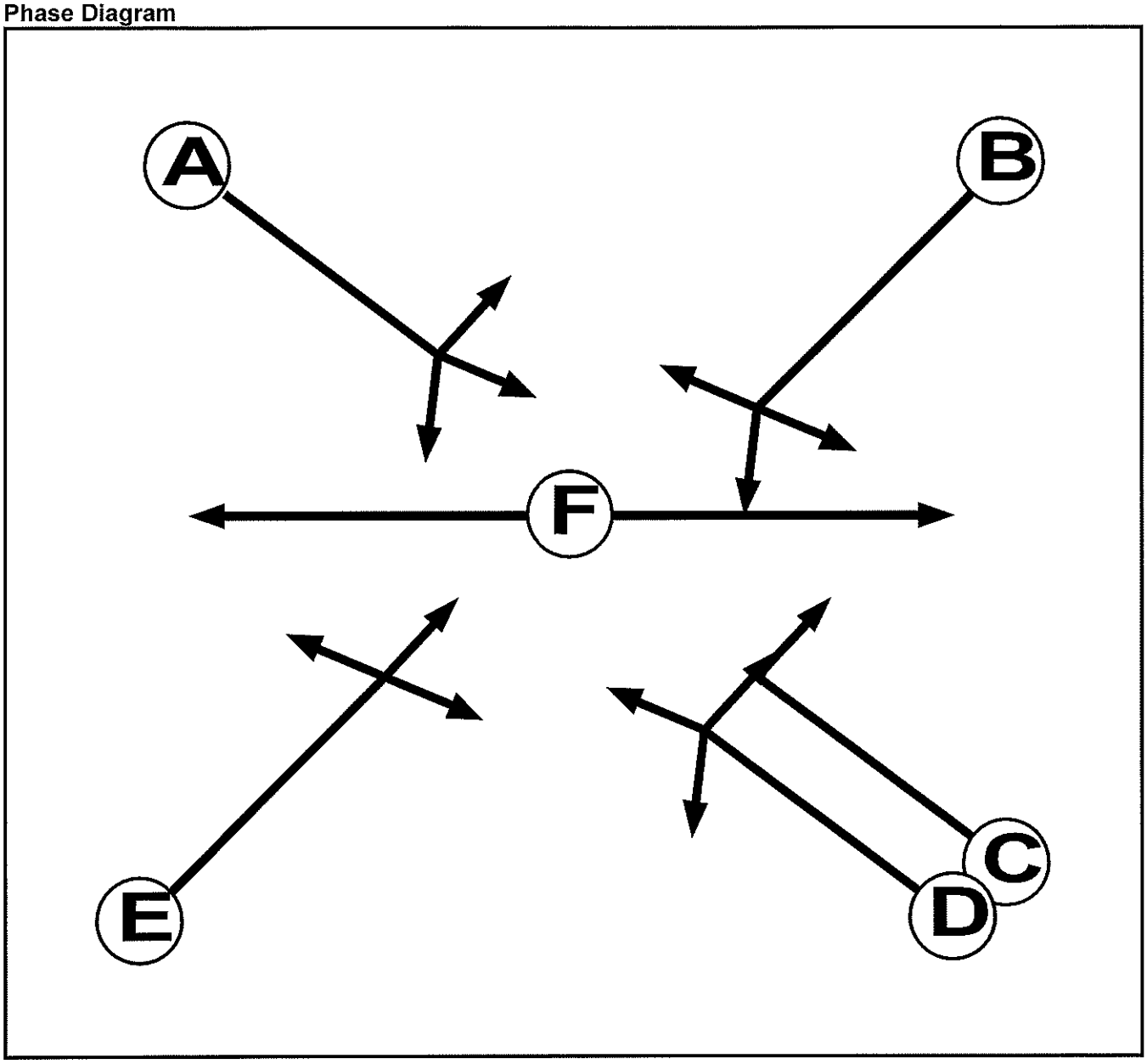
Project:	
Title:	
Location:	
File name:	A96-Lochloy Road-View Road (sensitivity) - TS Update - Standard Error of the Mean.lsg3x
Author:	
Company:	
Address:	
Notes:	Results based on a 12 second pedestrian intergreen

Network Layout Diagram



NA2, Nairn - Lochloy Road / A96 4-arm signalised junction 2019

Phase Diagram



Phase Input Data

Phase Name	Phase Type	Assoc. Phase	Street Min	Cont Min
A	Traffic		7	7
B	Traffic		7	7
C	Ind. Arrow	D	4	4
D	Traffic		7	7
E	Traffic		7	7
F	Pedestrian		7	7

NA2, Nairn - Lochloy Road / A96 4-arm signalised junction 2019

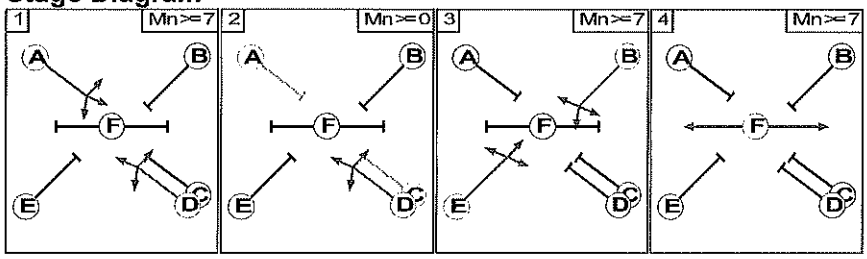
Phase Intergreens Matrix

		Starting Phase					
		A	B	C	D	E	F
Terminating Phase	A		5	5	-	5	8
	B	5		5	5	-	8
	C	5	5		-	5	8
	D	-	5	-		5	8
	E	5	-	5	5		8
	F	12	12	12	12	12	

Phases in Stage

Stage No.	Phases in Stage
1	A D
2	D
3	B E
4	F

Stage Diagram



Phase Delays

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

Prohibited Stage Change

		To Stage			
		1	2	3	4
From Stage	1		0	5	8
	2	2		5	8
	3	5	5		8
	4	12	12	12	

NA2, Nairn - Lochloy Road / A96 4-arm signalised junction 2019

Give-Way Lane Input Data

Junction: A96/Lochloy Road/View Road											
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)
1/2 (Lochloy Road)	8/1 (Right)	1439	0	3/1	1.09	To 5/1 (Ahead)	2.00	-	0.50	2	2.00
2/2 (A96 (E))	5/1 (Right)	1439	0	4/1	1.09	To 6/1 (Ahead)	3.00	-	0.50	3	2.00
3/1 (View Road)	6/1 (Right)	1439	0	1/1	1.09	To 7/1 (Ahead)	2.00	2.00	0.50	2	2.00
4/1 (A96 (W))	7/1 (Right)	1439	0	2/1	1.09	To 8/1 (Ahead)	2.00	2.00	0.50	2	2.00

Lane Input Data

Junction: A96/Lochloy Road/View Road												
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 (Lochloy Road)	U	B	2	3	3.6	Geom	-	3.00	0.00	Y	Arm 6 Left	12.20
											Arm 7 Ahead	Inf
1/2 (Lochloy Road)	O	B	2	3	2.0	Geom	-	3.00	0.00	Y	Arm 8 Right	12.00
2/1 (A96 (E))	U	D	2	3	6.0	Geom	-	3.00	0.00	Y	Arm 7 Left	10.50
											Arm 8 Ahead	Inf
2/2 (A96 (E))	O	D C	2	3	2.0	Geom	-	3.00	0.00	Y	Arm 5 Right	10.00
3/1 (View Road)	O	E	2	3	4.0	Geom	-	2.90	0.00	Y	Arm 5 Ahead	Inf
											Arm 6 Right	14.00
											Arm 8 Left	8.00
4/1 (A96 (W))	O	A	2	3	10.4	Geom	-	3.40	0.00	Y	Arm 5 Left	12.00
											Arm 6 Ahead	Inf
											Arm 7 Right	15.00
5/1	U		2	3	60.0	Inf	-	-	-	-	-	-
6/1	U		2	3	60.0	Inf	-	-	-	-	-	-
7/1	U		2	3	60.0	Inf	-	-	-	-	-	-
8/1	U		2	3	60.0	Inf	-	-	-	-	-	-

Traffic Flow Groups

Flow Group	Start Time	End Time	Duration	Formula
1: 'AM Peak BASE'	08:10	09:10	01:00	
2: 'PM Peak BASE'	16:40	17:40	01:00	
3: 'AM Peak TOTAL'	08:10	09:10	01:00	
4: 'PM Peak TOTAL'	16:40	17:40	01:00	

Scenario 1: 'AM Peak Base 2019' (FG1: 'AM Peak BASE', Plan 1: 'Network Control Plan 1')

Traffic Flows, Desired

Desired Flow :

		Destination				
		A	B	C	D	Tot.
Origin	A	0	53	3	270	326
	B	37	0	3	624	664
	C	2	3	0	13	18
	D	133	553	10	0	696
	Tot.	172	609	16	907	1704

Traffic Lane Flows

Lane	Scenario 1: AM Peak Base 2019
Junction: A96/Lochloy Road/View Road	
1/1 (with short)	326(In) 56(Out)
1/2 (short)	270
2/1 (with short)	664(In) 627(Out)
2/2 (short)	37
3/1	18
4/1	696
5/1	172
6/1	609
7/1	16
8/1	907

Lane Saturation Flows

Junction: A96/Lochloy Road/View Road								
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat Flow (PCU/Hr)**	**Flared Sat Flow (PCU/Hr)**
1/1 (Lochloy Road)	3.00	0.00	Y	Arm 6 Left	12.20	94.6 %	1715	1715
				Arm 7 Ahead	Inf	5.4 %		
1/2 (Lochloy Road)	3.00	0.00	Y	Arm 8 Right	12.00	100.0 %	1702	1702
2/1 (A96 (E))	3.00	0.00	Y	Arm 7 Left	10.50	0.5 %	1914	1914
				Arm 8 Ahead	Inf	99.5 %		
2/2 (A96 (E))	3.00	0.00	Y	Arm 5 Right	10.00	100.0 %	1665	1665
3/1 (View Road)	2.90	0.00	Y	Arm 5 Ahead	Inf	11.1 %	1652	1652
				Arm 6 Right	14.00	16.7 %		
				Arm 8 Left	8.00	72.2 %		
4/1 (A96 (W))	3.40	0.00	Y	Arm 5 Left	12.00	19.1 %	1907	1907
				Arm 6 Ahead	Inf	79.5 %		
				Arm 7 Right	15.00	1.4 %		
5/1	Infinite Saturation Flow						Inf	Inf
6/1	Infinite Saturation Flow						Inf	Inf
7/1	Infinite Saturation Flow						Inf	Inf
8/1	Infinite Saturation Flow						Inf	Inf

Scenario 2: 'PM Peak Base 2019' (FG2: 'PM Peak BASE', Plan 1: 'Network Control Plan 1')

Traffic Flows, Desired

Desired Flow :

		Destination				
		A	B	C	D	Tot.
Origin	A	0	39	4	127	170
	B	96	0	3	656	755
	C	5	0	0	11	16
	D	187	677	10	0	874
	Tot.	288	716	17	794	1815

NA2, Nairn - Lochloy Road / A96 4-arm signalised junction 2019

Traffic Lane Flows

Lane	Scenario 2: PM Peak Base 2019
Junction: A96/Lochloy Road/View Road	
1/1 (with short)	170(In) 43(Out)
1/2 (short)	127
2/1 (with short)	755(In) 659(Out)
2/2 (short)	96
3/1	16
4/1	874
5/1	288
6/1	716
7/1	17
8/1	794

Lane Saturation Flows

Junction: A96/Lochloy Road/View Road								
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat Flow (PCU/Hr)**	**Flared Sat Flow (PCU/Hr)**
1/1 (Lochloy Road)	3.00	0.00	Y	Arm 6 Left	12.20	90.7 %	1723	1723
				Arm 7 Ahead	Inf	9.3 %		
1/2 (Lochloy Road)	3.00	0.00	Y	Arm 8 Right	12.00	100.0 %	1702	1702
2/1 (A96 (E))	3.00	0.00	Y	Arm 7 Left	10.50	0.5 %	1914	1914
				Arm 8 Ahead	Inf	99.5 %		
2/2 (A96 (E))	3.00	0.00	Y	Arm 5 Right	10.00	100.0 %	1665	1665
3/1 (View Road)	2.90	0.00	Y	Arm 5 Ahead	Inf	31.3 %	1687	1687
				Arm 6 Right	14.00	0.0 %		
				Arm 8 Left	8.00	68.8 %		
4/1 (A96 (W))	3.40	0.00	Y	Arm 5 Left	12.00	21.4 %	1902	1902
				Arm 6 Ahead	Inf	77.5 %		
				Arm 7 Right	15.00	1.1 %		
5/1	Infinite Saturation Flow						Inf	Inf
6/1	Infinite Saturation Flow						Inf	Inf
7/1	Infinite Saturation Flow						Inf	Inf
8/1	Infinite Saturation Flow						Inf	Inf

NA2, Nairn - Lochloy Road / A96 4-arm signalised junction 2019

Scenario 3: 'AM Peak TOTAL 2019' (FG3: 'AM Peak TOTAL', Plan 1: 'Network Control Plan 1')

Traffic Flows, Desired

Desired Flow :

		Destination				
		A	B	C	D	Tot.
Origin	A	0	59	4	299	362
	B	41	0	3	624	668
	C	2	3	0	13	18
	D	147	553	10	0	710
	Tot.	190	615	17	936	1758

Traffic Lane Flows

Lane	Scenario 3: AM Peak TOTAL 2019
Junction: A96/Lochloy Road/View Road	
1/1 (with short)	362(In) 63(Out)
1/2 (short)	299
2/1 (with short)	668(In) 627(Out)
2/2 (short)	41
3/1	18
4/1	710
5/1	190
6/1	615
7/1	17
8/1	936

Lane Saturation Flows

Junction: A96/Lochloy Road/View Road								
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat Flow (PCU/Hr)**	**Flared Sat Flow (PCU/Hr)**
1/1 (Lochloy Road)	3.00	0.00	Y	Arm 6 Left	12.20	93.7 %	1717	1717
				Arm 7 Ahead	Inf	6.3 %		
1/2 (Lochloy Road)	3.00	0.00	Y	Arm 8 Right	12.00	100.0 %	1702	1702
2/1 (A96 (E))	3.00	0.00	Y	Arm 7 Left	10.50	0.5 %	1914	1914
				Arm 8 Ahead	Inf	99.5 %		
2/2 (A96 (E))	3.00	0.00	Y	Arm 5 Right	10.00	100.0 %	1665	1665
3/1 (View Road)	2.90	0.00	Y	Arm 5 Ahead	Inf	11.1 %	1652	1652
				Arm 6 Right	14.00	16.7 %		
				Arm 8 Left	8.00	72.2 %		
4/1 (A96 (W))	3.40	0.00	Y	Arm 5 Left	12.00	20.7 %	1903	1903
				Arm 6 Ahead	Inf	77.9 %		
				Arm 7 Right	15.00	1.4 %		
5/1	Infinite Saturation Flow						Inf	Inf
6/1	Infinite Saturation Flow						Inf	Inf
7/1	Infinite Saturation Flow						Inf	Inf
8/1	Infinite Saturation Flow						Inf	Inf

Scenario 4: 'PM Peak TOTAL 2019' (FG4: 'PM Peak TOTAL', Plan 1: 'Network Control Plan 1')

Traffic Flows, Desired

Desired Flow :

		Destination				
		A	B	C	D	Tot.
Origin	A	0	45	5	145	195
	B	108	0	3	656	767
	C	5	0	0	11	16
	D	210	677	10	0	897
	Tot.	323	722	18	812	1875

NA2, Nairn - Lochloy Road / A96 4-arm signalised junction 2019

Traffic Lane Flows

Lane	Scenario 4: PM Peak TOTAL 2019
Junction: A96/Lochloy Road/View Road	
1/1 (with short)	195(In) 50(Out)
1/2 (short)	145
2/1 (with short)	767(In) 659(Out)
2/2 (short)	108
3/1	16
4/1	897
5/1	323
6/1	722
7/1	18
8/1	812

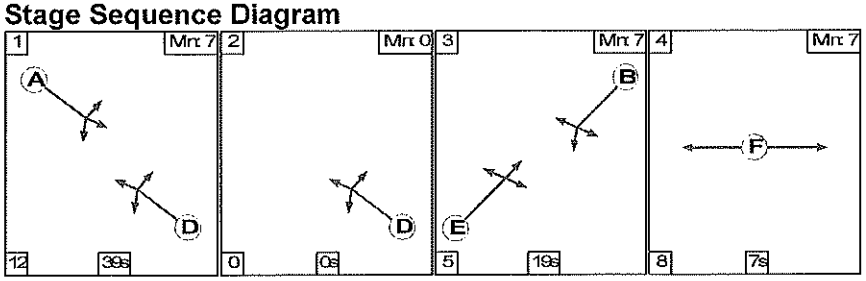
Lane Saturation Flows

Junction: A96/Lochloy Road/View Road								
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat Flow (PCU/Hr)**	**Flared Sat Flow (PCU/Hr)**
1/1 (Lochloy Road)	3.00	0.00	Y	Arm 6 Left	12.20	90.0 %	1724	1724
				Arm 7 Ahead	Inf	10.0 %		
1/2 (Lochloy Road)	3.00	0.00	Y	Arm 8 Right	12.00	100.0 %	1702	1702
2/1 (A96 (E))	3.00	0.00	Y	Arm 7 Left	10.50	0.5 %	1914	1914
				Arm 8 Ahead	Inf	99.5 %		
2/2 (A96 (E))	3.00	0.00	Y	Arm 5 Right	10.00	100.0 %	1665	1665
3/1 (View Road)	2.90	0.00	Y	Arm 5 Ahead	Inf	31.3 %	1687	1687
				Arm 6 Right	14.00	0.0 %		
				Arm 8 Left	8.00	68.8 %		
4/1 (A96 (W))	3.40	0.00	Y	Arm 5 Left	12.00	23.4 %	1897	1897
				Arm 6 Ahead	Inf	75.5 %		
				Arm 7 Right	15.00	1.1 %		
5/1	Infinite Saturation Flow						Inf	Inf
6/1	Infinite Saturation Flow						Inf	Inf
7/1	Infinite Saturation Flow						Inf	Inf
8/1	Infinite Saturation Flow						Inf	Inf

NA2, Nairn - Lochloy Road / A96 4-arm signalised junction 2019

Scenario 1: 'AM Peak Base 2019' (FG1: 'AM Peak BASE', Plan 1: 'Network Control Plan 1')

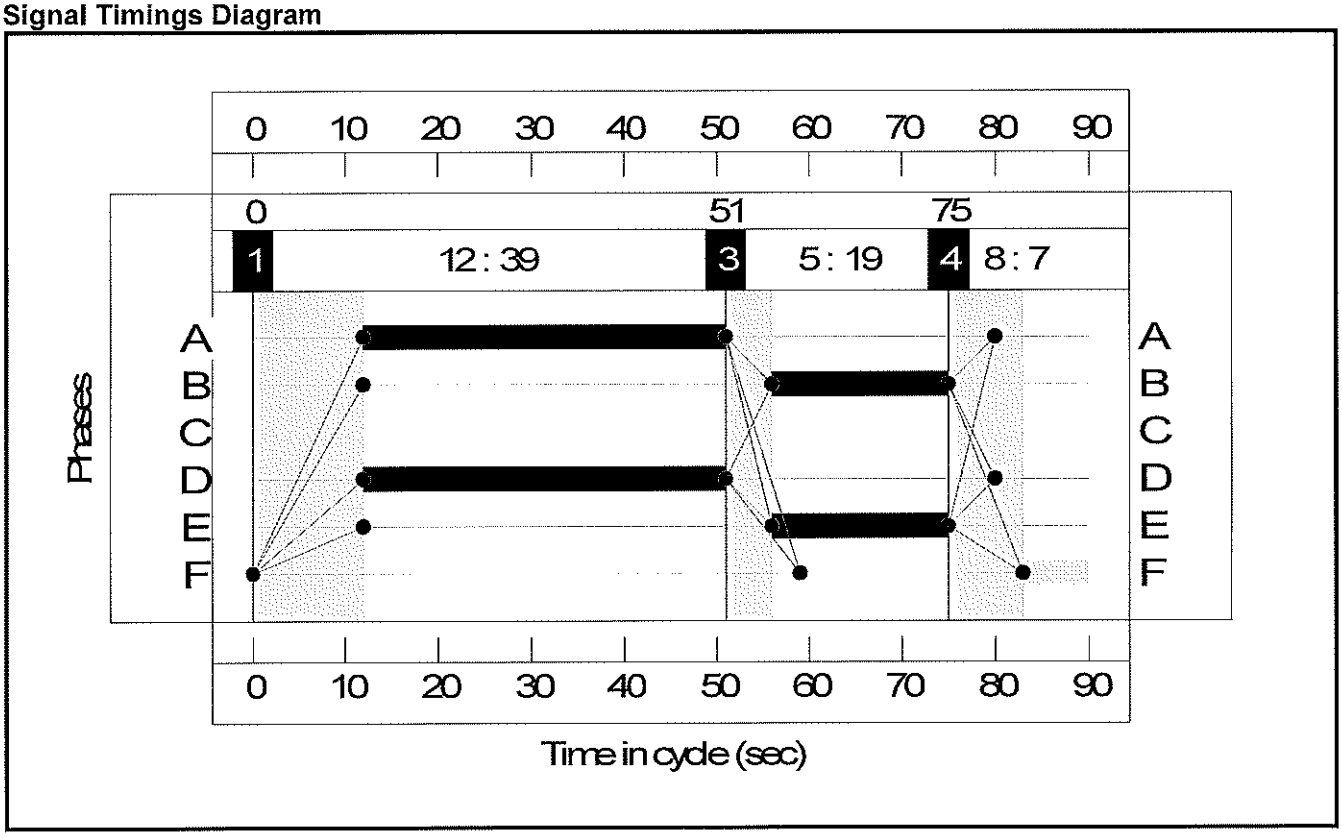
Stage Sequence Diagram



Stage Timings

Stage	1	2	3	4
Duration	39	0	19	7
Change Point	0	51	51	75

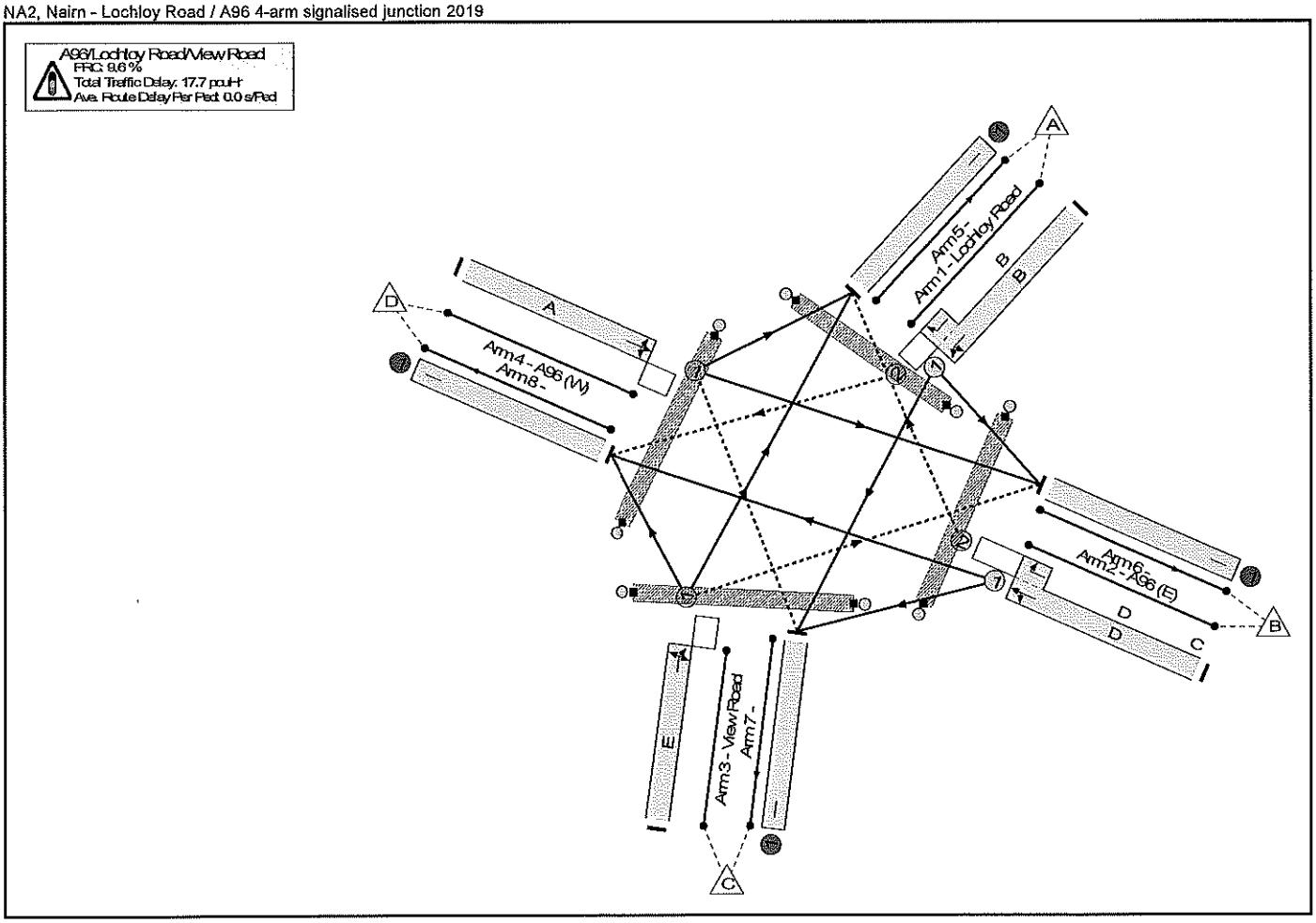
Signal Timings Diagram



NA2, Nairn - Lochloy Road / A96 4-arm signalised junction 2019

Network Layout Diagram

NA2, Nairn - Lochloy Road / A96 4-arm signalised junction 2019



NA2, Nairn - Lochloy Road / A96 4-arm signalised junction 2019

Network Results

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network	-	-	N/A	-	-		-	-	-	-	-	-	82.1%
A96/Lochloy Road/View Road	-	-	N/A	-	-		-	-	-	-	-	-	82.1%
1/1+1/2	Lochloy Road Left Ahead Right	U+O	N/A	N/A	B		1	19	-	326	1715:1702	400	81.6%
2/1+2/2	A96 (E) Right Left Ahead	U+O	N/A	N/A	D	C	1	39	0	664	1914:1665	844	78.7%
3/1	View Road Ahead Right Left	O	N/A	N/A	E		1	19	-	18	1652	367	4.9%
4/1	A96 (W) Left Ahead Right	O	N/A	N/A	A		1	39	-	696	1907	848	82.1%
5/1		U	N/A	N/A	-		-	-	-	172	Inf	Inf	0.0%
6/1		U	N/A	N/A	-		-	-	-	609	Inf	Inf	0.0%
7/1		U	N/A	N/A	-		-	-	-	16	Inf	Inf	0.0%
8/1		U	N/A	N/A	-		-	-	-	907	Inf	Inf	0.0%
Ped Link: P1	Unnamed Ped Link	-	N/A	-	F		1	7	-	0	-	0	0.0%
Ped Link: P2	Unnamed Ped Link	-	N/A	-	F		1	7	-	0	-	0	0.0%
Ped Link: P3	Unnamed Ped Link	-	N/A	-	F		1	7	-	0	-	0	0.0%
Ped Link: P4	Unnamed Ped Link	-	N/A	-	F		1	7	-	0	-	0	0.0%

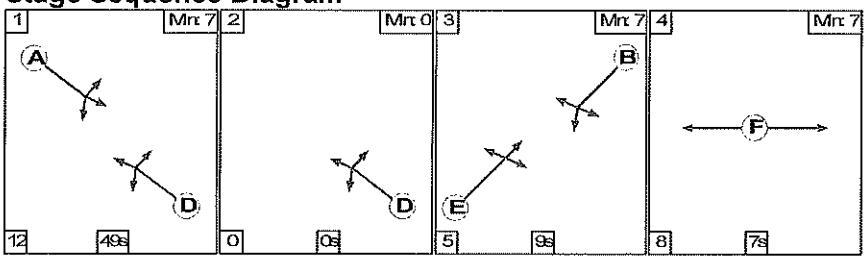
NA2, Nairn - Lochloy Road / A96 4-arm signalised junction 2019

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	-	-	320	0	0	11.3	6.2	0.2	17.7	-	-	-	-
A96/Lochloy Road/View Road	-	-	320	0	0	11.3	6.2	0.2	17.7	-	-	-	-
1/1+1/2	326	326	270	0	0	3.0	2.1	0.1	5.1	56.6	7.3	2.1	9.4
2/1+2/2	664	664	37	0	0	3.9	1.8	0.1	5.9	31.9	13.9	1.8	15.7
3/1	18	18	3	0	0	0.1	0.0	0.0	0.2	32.8	0.3	0.0	0.4
4/1	696	696	10	0	0	4.2	2.2	0.0	6.5	33.6	15.1	2.2	17.3
5/1	172	172	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	609	609	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
7/1	16	16	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
8/1	907	907	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
Ped Link: P1	0	0	-	-	-	-	-	-	-	-	-	-	-
Ped Link: P2	0	0	-	-	-	-	-	-	-	-	-	-	-
Ped Link: P3	0	0	-	-	-	-	-	-	-	-	-	-	-
Ped Link: P4	0	0	-	-	-	-	-	-	-	-	-	-	-

C1 PRC for Signalled Lanes (%): 9.6 Total Delay for Signalled Lanes (pcuHr): 17.66 Cycle Time (s): 90
PRC Over All Lanes (%): 9.6 Total Delay Over All Lanes(pcuHr): 17.66

NA2, Nairn - Lochloy Road / A96 4-arm signalised junction 2019
Scenario 2: 'PM Peak Base 2019' (FG2: 'PM Peak BASE', Plan 1: 'Network Control Plan 1')

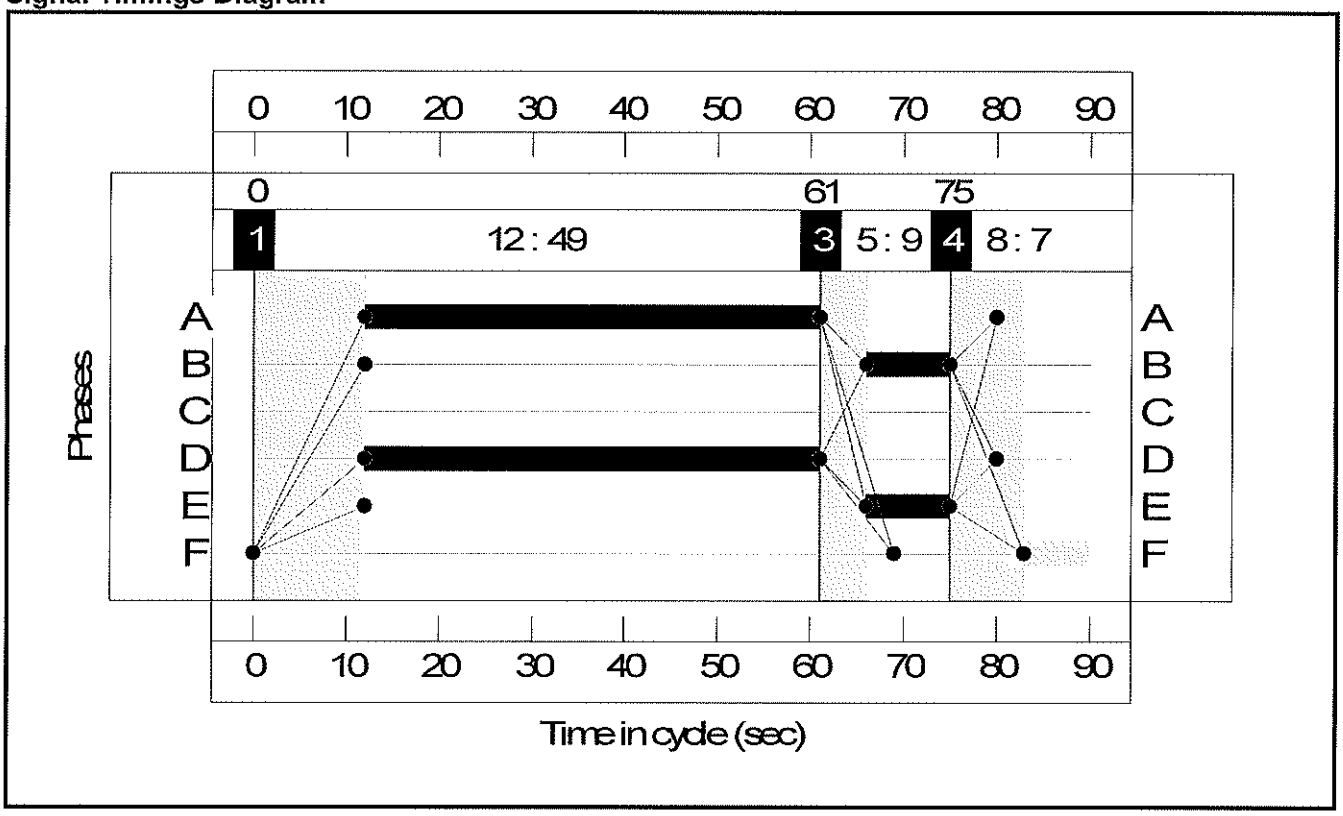
Stage Sequence Diagram



Stage Timings

Stage	1	2	3	4
Duration	49	0	9	7
Change Point	0	61	61	75

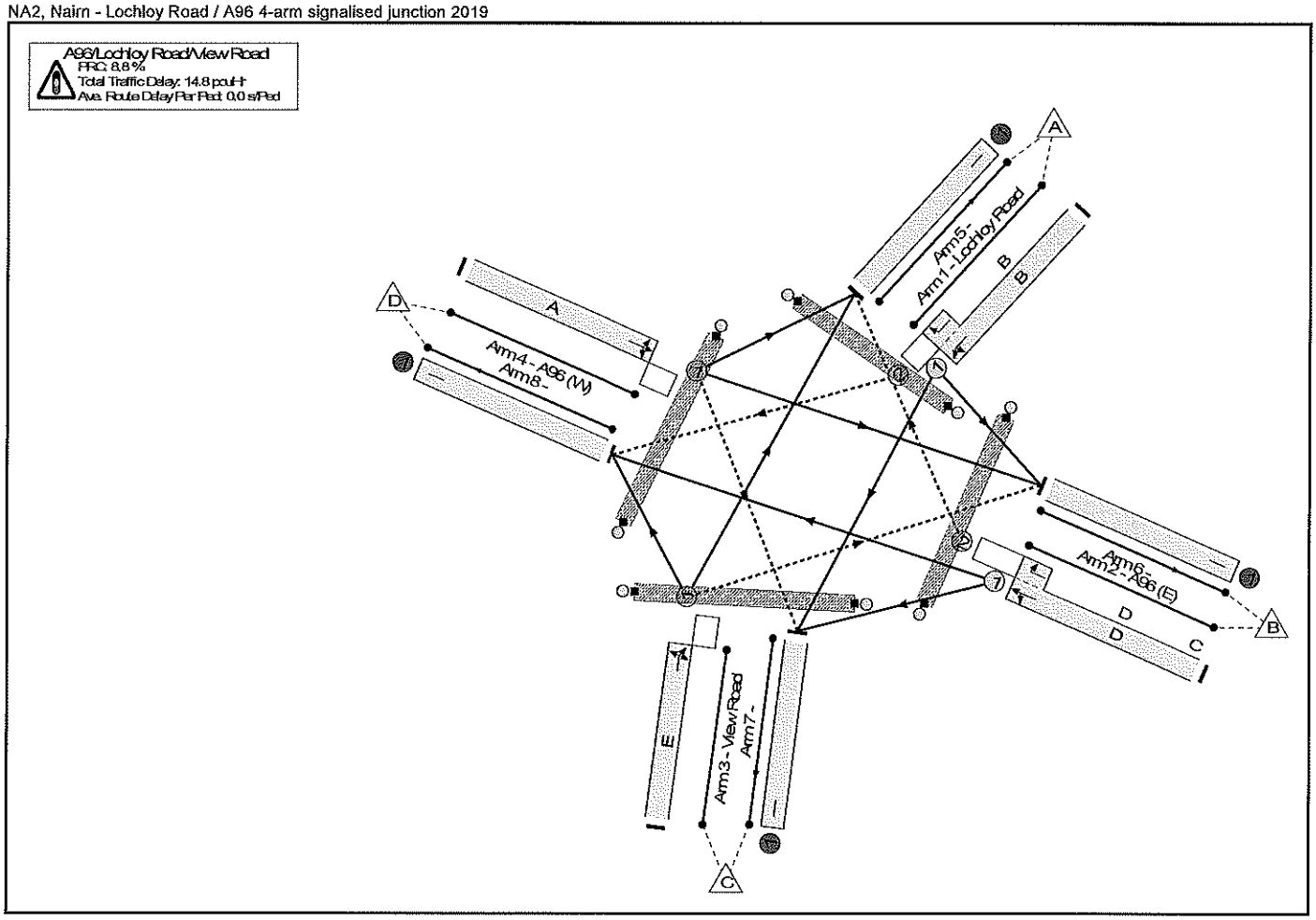
Signal Timings Diagram



NA2, Nairn - Lochloy Road / A96 4-arm signalised junction 2019

Network Layout Diagram

NA2, Nairn - Lochloy Road / A96 4-arm signalised junction 2019



NA2, Nairn - Lochloy Road / A96 4-arm signalised junction 2019

Network Results

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network	-	-	N/A	-	-		-	-	-	-	-	-	82.7%
A96/Lochloy Road/View Road	-	-	N/A	-	-		-	-	-	-	-	-	82.7%
1/1+1/2	Lochloy Road Left Ahead Right	U+O	N/A	N/A	B		1	9	-	170	1723:1702	221	77.0%
2/1+2/2	A96 (E) Right Left Ahead	U+O	N/A	N/A	D	C	1	49	0	755	1914:1665	1052	71.8%
3/1	View Road Ahead Right Left	O	N/A	N/A	E		1	9	-	16	1687	187	8.5%
4/1	A96 (W) Left Ahead Right	O	N/A	N/A	A		1	49	-	874	1902	1057	82.7%
5/1		U	N/A	N/A	-		-	-	-	288	Inf	Inf	0.0%
6/1		U	N/A	N/A	-		-	-	-	716	Inf	Inf	0.0%
7/1		U	N/A	N/A	-		-	-	-	17	Inf	Inf	0.0%
8/1		U	N/A	N/A	-		-	-	-	794	Inf	Inf	0.0%
Ped Link: P1	Unnamed Ped Link	-	N/A	-	F		1	7	-	0	-	0	0.0%
Ped Link: P2	Unnamed Ped Link	-	N/A	-	F		1	7	-	0	-	0	0.0%
Ped Link: P3	Unnamed Ped Link	-	N/A	-	F		1	7	-	0	-	0	0.0%
Ped Link: P4	Unnamed Ped Link	-	N/A	-	F		1	7	-	0	-	0	0.0%

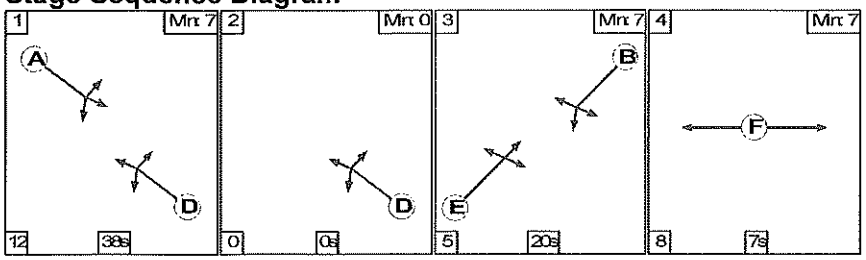
NA2, Nairn - Lochloy Road / A96 4-arm signalised junction 2019

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	-	-	232	0	1	9.0	5.2	0.6	14.8	-	-	-	-
A96/Lochloy Road/View Road	-	-	232	0	1	9.0	5.2	0.6	14.8	-	-	-	-
1/1+1/2	170	170	127	0	0	1.8	1.6	0.0	3.4	72.2	3.4	1.6	5.0
2/1+2/2	755	755	95	0	1	3.1	1.3	0.5	4.8	23.1	13.6	1.3	14.8
3/1	16	16	0	0	0	0.2	0.0	0.0	0.2	46.5	0.4	0.0	0.4
4/1	874	874	10	0	0	4.0	2.3	0.0	6.3	26.2	18.0	2.3	20.3
5/1	288	288	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	716	716	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
7/1	17	17	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
8/1	794	794	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
Ped Link: P1	0	0	-	-	-	-	-	-	-	-	-	-	-
Ped Link: P2	0	0	-	-	-	-	-	-	-	-	-	-	-
Ped Link: P3	0	0	-	-	-	-	-	-	-	-	-	-	-
Ped Link: P4	0	0	-	-	-	-	-	-	-	-	-	-	-

C1 PRC for Signalled Lanes (%): 8.8 Total Delay for Signalled Lanes (pcuHr): 14.81 Cycle Time (s): 90
PRC Over All Lanes (%): 8.8 Total Delay Over All Lanes(pcuHr): 14.81

NA2, Nairn - Lochloy Road / A96 4-arm signalised junction 2019
Scenario 3: 'AM Peak TOTAL 2019' (FG3: 'AM Peak TOTAL', Plan 1: 'Network Control Plan 1')

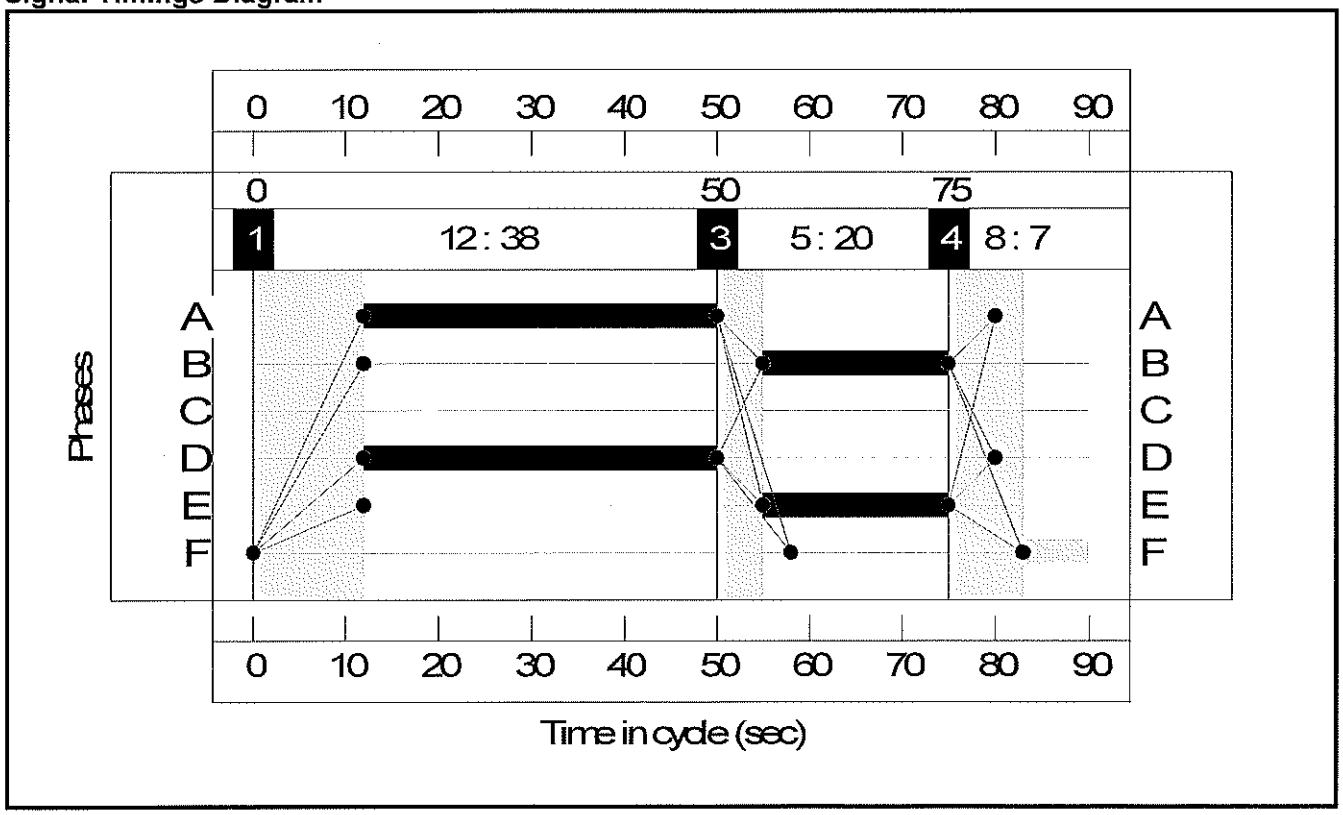
Stage Sequence Diagram



Stage Timings

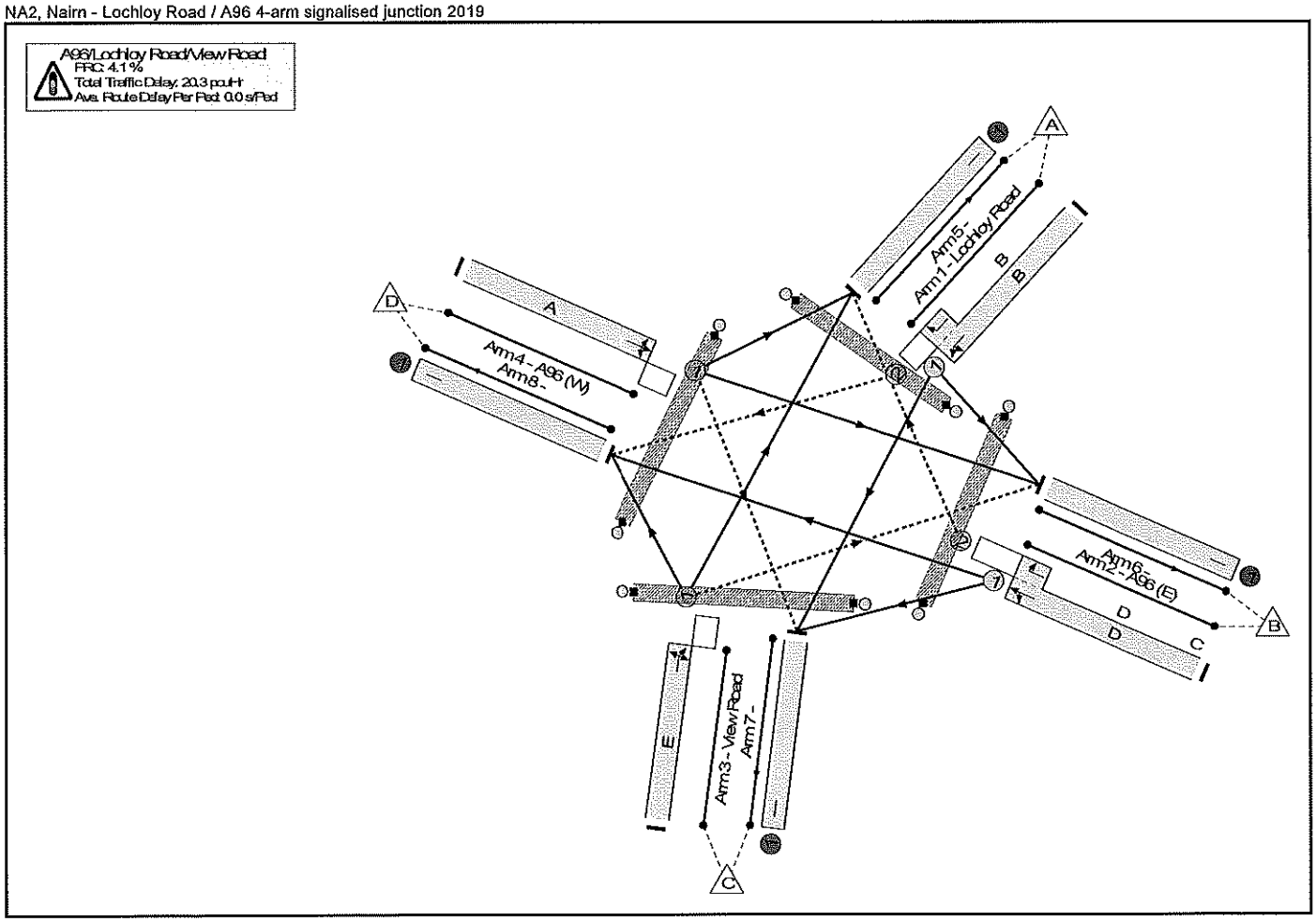
Stage	1	2	3	4
Duration	38	0	20	7
Change Point	0	50	50	75

Signal Timings Diagram



NA2, Nairn - Lochloy Road / A96 4-arm signalised junction 2019
Network Layout Diagram

NA2, Nairn - Lochloy Road / A96 4-arm signalised junction 2019



NA2, Nairn - Lochloy Road / A96 4-arm signalised junction 2019

Network Results

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network	-	-	N/A	-	-		-	-	-	-	-	-	86.4%
A96/Lochloy Road/View Road	-	-	N/A	-	-		-	-	-	-	-	-	86.4%
1/1+1/2	Lochloy Road Left Ahead Right	U+O	N/A	N/A	B		1	20	-	362	1717:1702	419	86.4%
2/1+2/2	A96 (E) Right Left Ahead	U+O	N/A	N/A	D	C	1	38	0	668	1914:1665	823	81.2%
3/1	View Road Ahead Right Left	O	N/A	N/A	E		1	20	-	18	1652	385	4.7%
4/1	A96 (W) Left Ahead Right	O	N/A	N/A	A		1	38	-	710	1903	825	86.1%
5/1		U	N/A	N/A	-		-	-	-	190	Inf	Inf	0.0%
6/1		U	N/A	N/A	-		-	-	-	615	Inf	Inf	0.0%
7/1		U	N/A	N/A	-		-	-	-	17	Inf	Inf	0.0%
8/1		U	N/A	N/A	-		-	-	-	936	Inf	Inf	0.0%
Ped Link: P1	Unnamed Ped Link	-	N/A	-	F		1	7	-	0	-	0	0.0%
Ped Link: P2	Unnamed Ped Link	-	N/A	-	F		1	7	-	0	-	0	0.0%
Ped Link: P3	Unnamed Ped Link	-	N/A	-	F		1	7	-	0	-	0	0.0%
Ped Link: P4	Unnamed Ped Link	-	N/A	-	F		1	7	-	0	-	0	0.0%

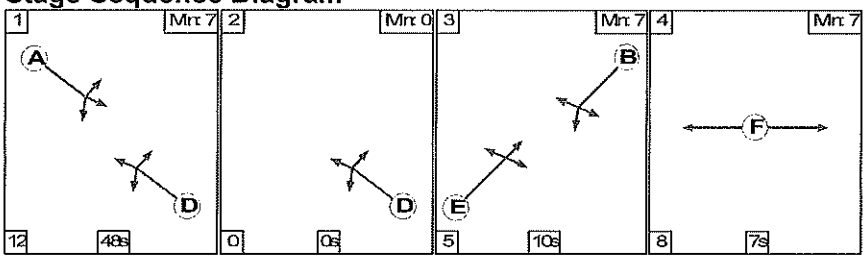
NA2, Nairn - Lochloy Road / A96 4-arm signalised junction 2019

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	-	-	353	0	0	12.1	8.0	0.3	20.3	-	-	-	-
A96/Lochloy Road/View Road	-	-	353	0	0	12.1	8.0	0.3	20.3	-	-	-	-
1/1+1/2	362	362	299	0	0	3.3	2.9	0.1	6.2	62.0	8.2	2.9	11.1
2/1+2/2	668	668	41	0	0	4.1	2.1	0.2	6.4	34.5	14.3	2.1	16.4
3/1	18	18	3	0	0	0.1	0.0	0.0	0.2	31.7	0.3	0.0	0.4
4/1	710	710	10	0	0	4.5	2.9	0.0	7.5	38.2	16.0	2.9	18.9
5/1	190	190	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	615	615	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
7/1	17	17	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
8/1	936	936	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
Ped Link: P1	0	0	-	-	-	-	-	-	-	-	-	-	-
Ped Link: P2	0	0	-	-	-	-	-	-	-	-	-	-	-
Ped Link: P3	0	0	-	-	-	-	-	-	-	-	-	-	-
Ped Link: P4	0	0	-	-	-	-	-	-	-	-	-	-	-

C1 PRC for Signalled Lanes (%): 4.1 Total Delay for Signalled Lanes (pcuHr): 20.33 Cycle Time (s): 90
PRC Over All Lanes (%): 4.1 Total Delay Over All Lanes(pcuHr): 20.33

NA2, Nairn - Lochloy Road / A96 4-arm signalised junction 2019
Scenario 4: 'PM Peak TOTAL 2019' (FG4: 'PM Peak TOTAL', Plan 1: 'Network Control Plan 1')

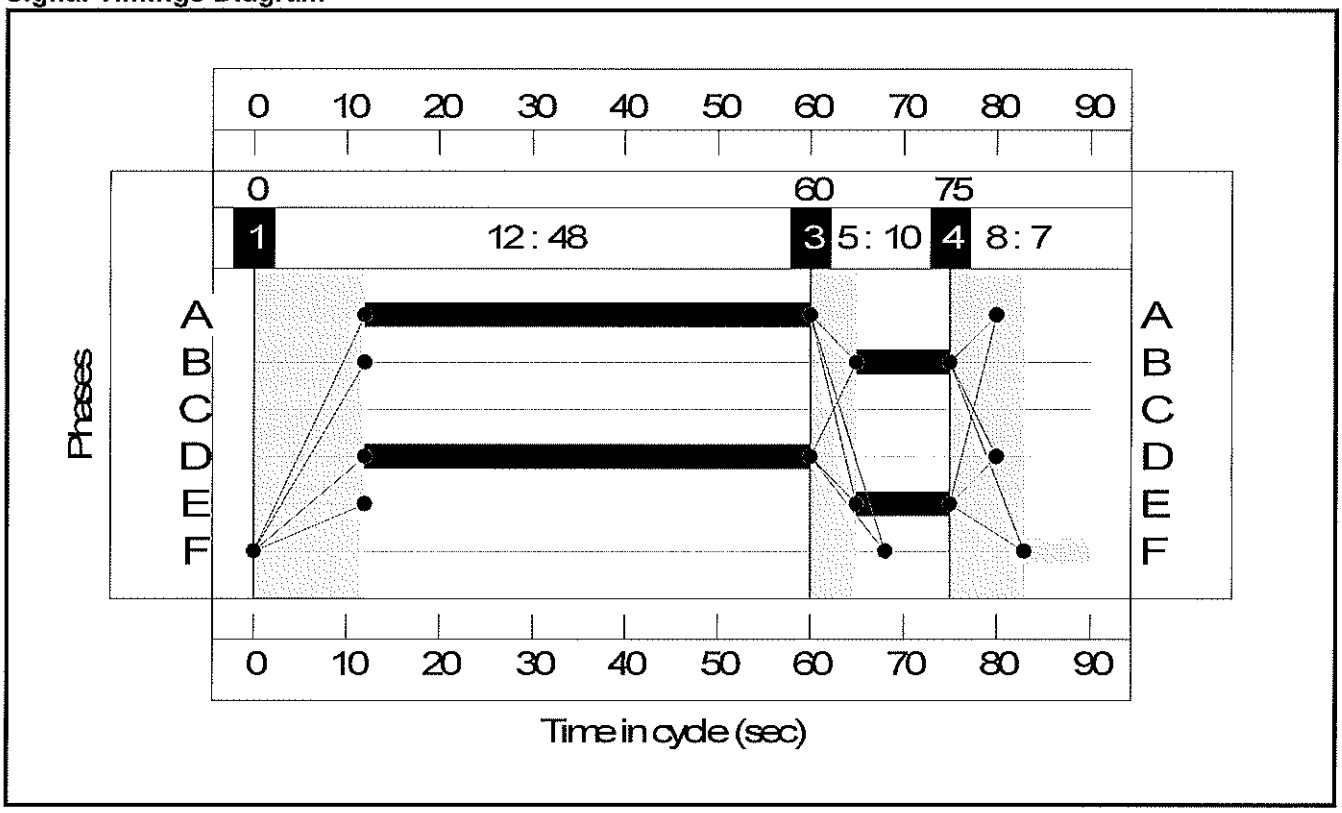
Stage Sequence Diagram



Stage Timings

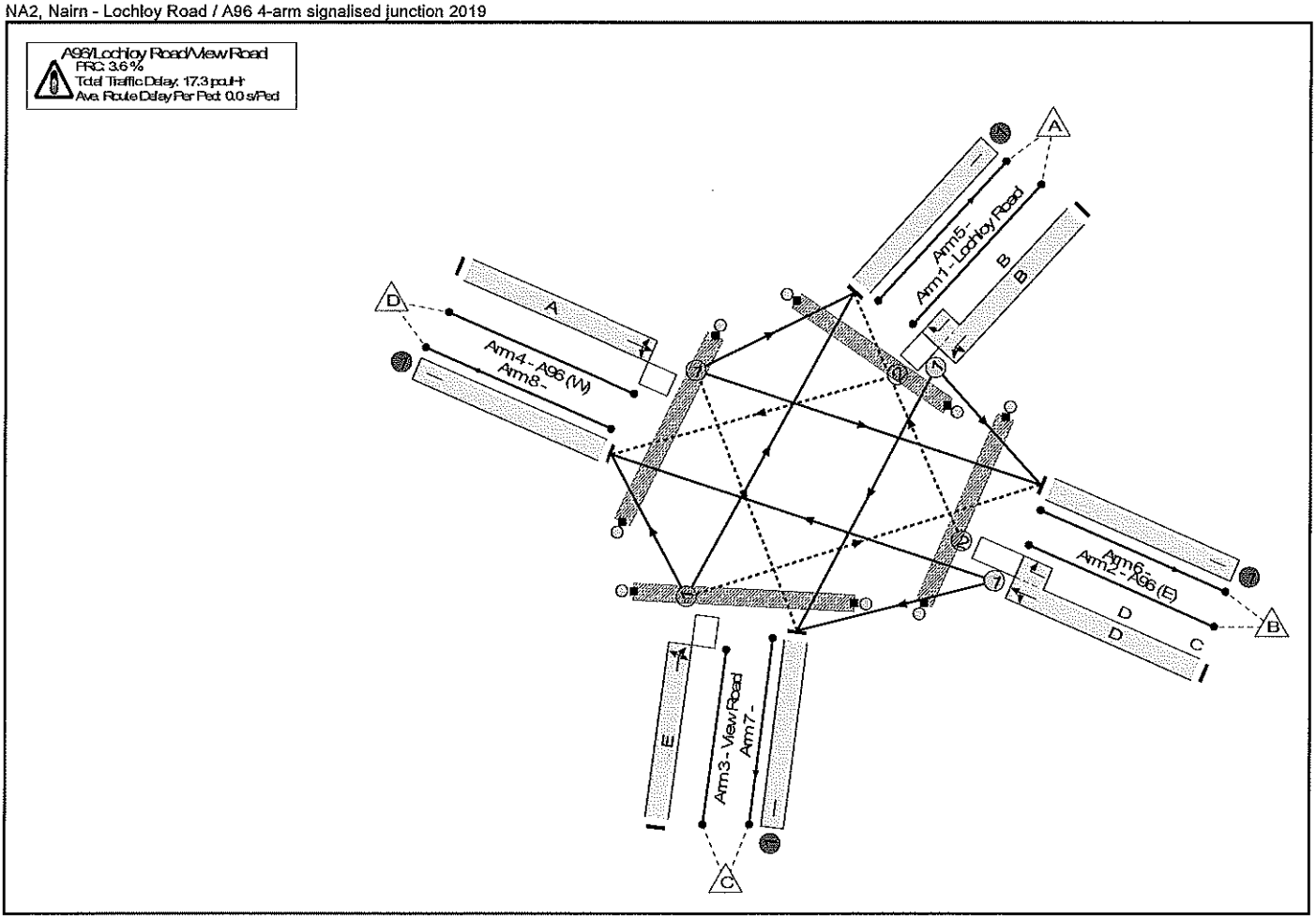
Stage	1	2	3	4
Duration	48	0	10	7
Change Point	0	60	60	75

Signal Timings Diagram



NA2, Nairn - Lochloy Road / A96 4-arm signalised junction 2019
Network Layout Diagram

NA2, Nairn - Lochloy Road / A96 4-arm signalised junction 2019



NA2, Nairn - Lochloy Road / A96 4-arm signalised junction 2019

Network Results

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network	-	-	N/A	-	-		-	-	-	-	-	-	86.9%
A96/Lochloy Road/View Road	-	-	N/A	-	-		-	-	-	-	-	-	86.9%
1/1+1/2	Lochloy Road Left Ahead Right	U+O	N/A	N/A	B		1	10	-	195	1724:1702	240	81.1%
2/1+2/2	A96 (E) Right Left Ahead	U+O	N/A	N/A	D	C	1	48	0	767	1914:1665	1030	74.4%
3/1	View Road Ahead Right Left	O	N/A	N/A	E		1	10	-	16	1687	206	7.8%
4/1	A96 (W) Left Ahead Right	O	N/A	N/A	A		1	48	-	897	1897	1033	86.9%
5/1		U	N/A	N/A	-		-	-	-	323	Inf	Inf	0.0%
6/1		U	N/A	N/A	-		-	-	-	722	Inf	Inf	0.0%
7/1		U	N/A	N/A	-		-	-	-	18	Inf	Inf	0.0%
8/1		U	N/A	N/A	-		-	-	-	812	Inf	Inf	0.0%
Ped Link: P1	Unnamed Ped Link	-	N/A	-	F		1	7	-	0	-	0	0.0%
Ped Link: P2	Unnamed Ped Link	-	N/A	-	F		1	7	-	0	-	0	0.0%
Ped Link: P3	Unnamed Ped Link	-	N/A	-	F		1	7	-	0	-	0	0.0%
Ped Link: P4	Unnamed Ped Link	-	N/A	-	F		1	7	-	0	-	0	0.0%

NA2, Nairn - Lochloy Road / A96 4-arm signalised junction 2019

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	-	-	249	0	14	9.9	6.6	0.8	17.3	-	-	-	-
A96/Lochloy Road/View Road	-	-	249	0	14	9.9	6.6	0.8	17.3	-	-	-	-
1/1+1/2	195	195	145	0	0	2.1	2.0	0.0	4.1	74.9	4.0	2.0	6.0
2/1+2/2	767	767	94	0	14	3.3	1.4	0.7	5.4	25.5	14.2	1.4	15.6
3/1	16	16	0	0	0	0.2	0.0	0.0	0.2	44.6	0.4	0.0	0.4
4/1	897	897	10	0	0	4.4	3.2	0.0	7.6	30.5	19.2	3.2	22.3
5/1	323	323	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	722	722	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
7/1	18	18	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
8/1	812	812	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
Ped Link: P1	0	0	-	-	-	-	-	-	-	-	-	-	-
Ped Link: P2	0	0	-	-	-	-	-	-	-	-	-	-	-
Ped Link: P3	0	0	-	-	-	-	-	-	-	-	-	-	-
Ped Link: P4	0	0	-	-	-	-	-	-	-	-	-	-	-

C1 PRC for Signalled Lanes (%): 3.6 Total Delay for Signalled Lanes (pcuHr): 17.29 Cycle Time (s): 90
PRC Over All Lanes (%): 3.6 Total Delay Over All Lanes(pcuHr): 17.29

[redacted]

From: [redacted]@arup.com>
Sent: 08 March 2018 10:59
To: [redacted]
Cc: [redacted]@highland.gov.uk; [redacted]@highland.gcsx.gov.uk; [redacted]@springfield.co.uk; [redacted]
Subject: RE: Planning Application 17/05667/FUL
Attachments: Issued to Transport Scotland 20180308.zip

Follow Up Flag: Follow up
Flag Status: Completed

Hi [redacted]

Apologies, I'm currently out of the office. I understand you've been trying to get hold of me with regards obtaining the raw model files relating to our response which was issued yesterday (see below). Please find attached the requested files. This includes:

- The LinSig model updated to include Transport Scotland's suggested coding amendments; and
- The LinSig model with a pedestrian intergreen of 12 seconds.

I trust this will allow you to complete your review and provide your comments to Highland Council. As you'll know, Springfield are looking at a committee date to be finalised by the end of March.

Should you have any queries, please let me know.

Regards,
[redacted]

[redacted]

From: [redacted]@arup.com>
Sent: 15 March 2018 16:42
To: [redacted]
Cc: [redacted]@highland.gcsx.gov.uk; [redacted]@springfield.co.uk; [redacted]@springfield.co.uk; [redacted]@springfield.co.uk
Subject: RE: Planning Application 17/05667/FUL

[redacted]

Many thanks for your email.

In response to your query, the 'dedicated right-turn' facility you refer to (run under Stage 2) has not been enabled due to the low level of demand for right turners. Right turners would be able to make the movement within Stage 2 either within gaps in oncoming vehicles or in the intergreen and thus without recourse the calling of the dedicated right turn arrow. Having this stage being called every cycle would also impose a level of inefficiency on the operation of the junction. The level of demand making the right turn movement (i.e. in the Total scenario, this equates to 41 PCUs in the AM peak period and 108 PCUs in the PM peak period) was found to be sufficiently low and, in the interests of maximising the operational capacity of the junction, the dedicated right-turn under Stage 2 has not been enabled. However, the stage was still coded as part of the model to allow us to undertake various assessment scenarios as part of the overall TA process.

I trust this answers your query. However, if you have any further queries, please don't hesitate to let me know.

Regards,
[redacted]

From: [redacted]@transport.gov.scot [mailto:[redacted]@transport.gov.scot]
Sent: 15 March 2018 15:45
To: [redacted]
Cc: [redacted]@transport.gov.scot; [redacted]@highland.gcsx.gov.uk; [redacted]@springfield.co.uk; [redacted]@springfield.co.uk; [redacted]@springfield.co.uk
Subject: RE: Planning Application 17/05667/FUL

[redacted]

To assist with our review of the amended LinSig runs / output, it would be appreciated if you could clarify the stage sequence that you are seeking to replicate. The model output that you have provided indicates a stage sequence comprising 4 stages as per the specification however, the IA phase (i.e. Stage 2) would not appear to have been enabled in the 'Stages View'. As a consequence, the model is not running / allocating any time to Stage 2 as evident from the 'Signal Timings Diagram'. If enabled, the 'Stage Diagram' and 'Stage Sequence Diagrams' would indicate a minimum >= 4s rather than '0'.

Further clarification in relation to the above would be appreciated however, please do not hesitate to contact me should you wish to discuss.

Regards

[redacted]

From: [redacted]
Sent: 08 March 2018 11:10
To: [redacted]
Cc: [redacted]@highland.gov.uk'; [redacted]; [redacted]@highland.gcsx.gov.uk'; [redacted]@springfield.co.uk'; [redacted]
Subject: RE: Planning Application 17/05667/FUL

[redacted]

Thank you for the files. I will be out of the office on Friday and Monday however, will pick this up on my return.

Regards

[redacted]

[redacted]

From: [redacted]@arup.com>
Sent: 17 April 2018 14:41
To: [redacted]
Cc: [redacted]@highland.gcsx.gov.uk; [redacted]@springfield.co.uk; [redacted]
Subject: FW: Planning Application 17/05667/FUL
Attachments: Transport Scotland Response 17-04-2018, NA2 Transport Assessment, Nairn ....pdf

Importance: High

Follow Up Flag: Follow up
Flag Status: Completed

[redacted]

Many thanks for your email.

We've taken into account your suggested coding revisions and re-run the *LinSig* model for both the Base and Total scenarios. The results from this latest round of testing shows that the junction operates within capacity in all scenarios. This mirrors the findings outlined in the original TA. Please see attached a short briefing paper which summarises this latest modelling assessment, along with the tabulated results and LinSig outputs.

I trust this will now allow you to provide your formal response to Highland Council. Should you have any queries, please don't hesitate to let myself or Gordon know.

Regards,
[redacted]

From: [redacted]@transport.gov.scot [mailto[redacted]@transport.gov.scot]
Sent: 17 April 2018 09:31
To: [redacted]@arup.com
Cc: [redacted]@arup.com; [redacted]@transport.gov.scot; [redacted]@highland.gcsx.gov.uk; [redacted]@springfield.co.uk>; [redacted]@springfield.co.uk>; [redacted]@springfield.co.uk>; [redacted]@springfield.co.uk>
Subject: RE: Planning Application 17/05667/FUL

[redacted]

Further to the recent correspondence below, we have now had the opportunity to review the IA and pedestrian demand data provided by BEAR. Based on the aforementioned data, we would request that to you run your model with the following changes for both the base and base plus development scenarios.

- A pedestrian intergreen of 17s;
- The IA phase (i.e. Stage 2) and pedestrian phase (i.e. Stage 4) called every second cycle.

Receipt of the above will conclude the requirements of Transport Scotland in relation to the assessment of the A96 / Lochloy Road traffic signal controlled junction. In the meantime, please do not hesitate to contact me should you have any queries.

Regards

[redacted]

From: [redacted]
Sent: 12 April 2018 14:15
To: [redacted]
Cc: [redacted]@arup.com'; [redacted]@highland.gcsx.gov.uk'; [redacted]@arup.com'; [redacted]
Subject: RE: Planning Application 17/05667/FUL

[redacted]

By way of an update, I have now received the data and will start to review it tomorrow.

Regards

[redacted]

From: [redacted]@springfield.co.uk]
Sent: 11 April 2018 15:03
To: [redacted]
Cc: [redacted]@arup.com; [redacted]@highland.gcsx.gov.uk; [redacted]@arup.com; [redacted]
Subject: Re: Planning Application 17/05667/FUL

Hi [redacted]

Thanks. In this case I think it would be sensible and to avoid further delays given there is still a review and response period for Springfield to commission the survey work via ARUP as previously discussed which I believe will gather the Data you're seeking?

Kind regards

[redacted]

Sent from my iPhone

On 11 Apr 2018, at 12:43, [redacted]@transport.gov.scot" <[redacted]@transport.gov.scot> wrote:

> [redacted]
>
> I have been regularly chasing BEAR for this data however, it has still to be provided. I appreciate that you are keen to progress matters and I will keep chasing and advise you accordingly.
>
> Regards
>
> [redacted]
>
> ---
>
> **From:** [redacted]@springfield.co.uk]
> **Sent:** 11 April 2018 10:25

To: [redacted]
Cc: [redacted]@arup.com; [redacted]@highland.gcsx.gov.uk; [redacted]@arup.com
Subject: RE: Planning Application 17/05667/FUL
Importance: High

Morning [redacted]

Any further updates on receipt of the necessary Data, it's review and a response?

Kind regards

[redacted]

From: [redacted]@transport.gov.scot [mailto:[redacted]@transport.gov.scot]
Sent: Tuesday, April 3, 2018 4:08 PM
To: [redacted]@springfield.co.uk>
Cc: [redacted]@arup.com; [redacted]@transport.gov.scot; [redacted]@highland.gcsx.gov.uk; [redacted]@springfield.co.uk>; [redacted]@springfield.co.uk>; [redacted]@arup.com
Subject: RE: Planning Application 17/05667/FUL

[redacted]

Transport Scotland is continuing to liaise with the Operating Company regarding receipt of this data however until received, it is difficult to provide a firm indication of timescales. Notwithstanding this, we are hopeful that the data will be provided for review early next week.

We trust the above is of assistance and we will seek to provide you with a further update on progress once the data is received.

Regards

[redacted]

From: [redacted]@springfield.co.uk]
Sent: 03 April 2018 14:04
To: [redacted]
Cc: [redacted]@arup.com; [redacted]; [redacted]@highland.gcsx.gov.uk; [redacted]@arup.com
Subject: Re: Planning Application 17/05667/FUL

[redacted]

Thanks for this update, can you give Springfield as applicant and the local authority as Planning Authority an indication of likely timescale to obtain, review and respond?

Many thanks.

[redacted]

Sent from my iPhone

On 3 Apr 2018, at 13:49, [redacted]@transport.gov.scot" <[redacted]@transport.gov.scot> wrote:

[redacted]

Further to your email below and our subsequent telephone conversation, Transport Scotland has been advised that data relating to the frequency of the IA phase and pedestrian stage can be remotely accessed. As discussed, Transport Scotland has requested this data to allow a more informed decision on the A96 / Lochloy Road scenario testing to be taken.

The receipt of the above data may negate the need to undertake the surveys set out in your email below however, it is recognised that you may wish to undertake your own data collection exercise which we would consider to be a matter for you and your client.

As also discussed, Transport Scotland will not in a position to issue a formal response on this planning application until this data has been received and reviewed.

I trust the above is a fair reflection of our recent telephone conversation however, please do not hesitate to contact me should you have any further queries.

Regards

[redacted]

From: [redacted]@arup.com]
Sent: 28 March 2018 15:23
To: [redacted]
Cc: [redacted]@highland.gcsx.gov.uk; [redacted]@springfield.co.uk; [redacted]springfield.co.uk; [redacted]@springfield.co.uk; [redacted]
Subject: Planning Application 17/05667/FUL

[redacted]

Further to our discussion yesterday relating to the above planning application in Nairn, I have received an instruction from my client to organise a new survey of the A96(T) / Lochloy Road junction focusing on the two areas of interest to Transport Scotland, namely

- The frequency the right turn indicative arrow from the trunk road to Lochloy Road is called during the modelled morning and evening peak periods.
- Similarly, pedestrian activity at the junction including again the frequency the pedestrian stage is called within the modelled periods. For instance is the pedestrian facility called every cycle or is it less frequent and also how long the facility runs for within a cycle? We would also intend to record the number of pedestrians crossing at the junction.

It is intended that the survey will be undertaken as soon as practical after the schools return following the Easter holidays. The results of the survey would be collated in a summary document.

In order to expedite matters and as we are committed to undertaking this survey to provide the additional comfort sought by Transport Scotland, I would be grateful if you would now submit your formal response on the application, along with any appropriate caveats relating to this additional survey which you consider appropriate.

Can you confirm that you are happy with this suggestion and would now be willing to submit your formal response on the application.

Many thanks

[redacted]

[redacted] | Transport Planning

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Scotstoun House South Queensferry Edinburgh EH30 9SE
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Subject NA2, Nairn, Transport Assessment (Response to Transport Scotland)

Date 17 April 2018 **Job No/Ref** 254313-00

Introduction

Planning application no. 17/05667/FUL

'NA2', Nairn, Transport Assessment

The purpose of this note is to respond to the latest set of comments received from Transport Scotland (TS) on 17/04/18 with respect to the Transport Assessment (TA) which was submitted in support of the above planning application.

The overall findings and content of the original TA remain correct and unchanged.

Background

In their emails of 15/03/18 and 19/03/18, TS requested clarification on the stage sequencing and timings being assessed as part of the *LinSig* model for the A96(T)/Lochloy Road signalised junction. A number of sensitivity tests were subsequently undertaken, with the results from this exercise presented in a briefing note which was issued to TS on 21/03/18 (file reference: Transport Scotland Response 21-03-2018, NA2 Transport Assessment, Nairn, pdf).

The most recent set of comments received from TS on 17/04/18 have requested that specific modelling parameters relating to staging should be incorporated into the *LinSig* model. Details of this are outlined below, with all model outputs being presented in Appendix A.

LinSig Modelling Results

The latest request from TS is as follows:

"……we would request that to you run your model with the following changes for both the base and base plus development scenarios.

- *A pedestrian intergreen of 17s; and*
- *The IA phase (i.e. Stage 2) and pedestrian phase (i.e. Stage 4) called every second cycle".*

The revised staging is illustrated in **Figure 1**.

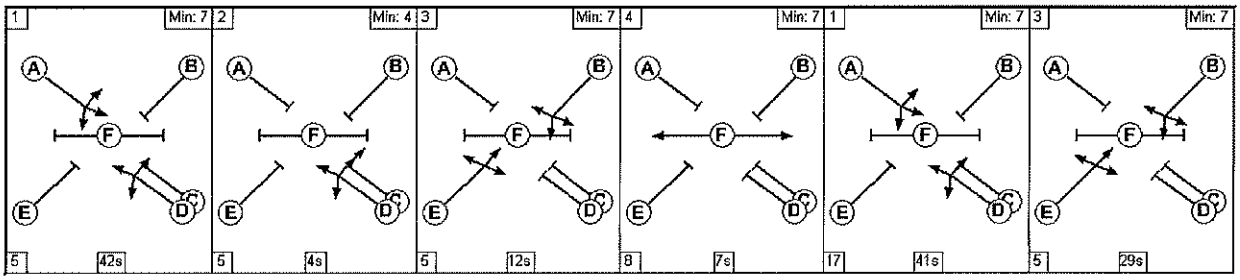


Figure 1: Stage sequencing and double cycle

Table 1 summarises the junction capacity results as outlined in the original TA. **Table 2** provides the same, but based upon the revised coding parameters in accordance with the latest TS request.

Table 1: Lochloy Road / A96(T) – Peak Period Capacity Results (AM & PM) – Original TA

Approach Arm	Base 2019 (AM)		Base 2019 (PM)		Total 2019 (AM)		Total 2019 (PM)	
	Deg Sat	Mean Max Q	Deg Sat	Mean Max Q	Deg Sat	Mean Max Q	Deg Sat	Mean Max Q
Lochloy Road – left, ahead & right	77.9%	9	70.9%	5	79.3%	10	75.2%	5
A96(T)(E) - right, left, ahead	64.2%	12	60.9%	11	67.4%	13	63.0%	12
View Road – ahead, right, left	4.7%	0	7.8%	0	4.3%	0	7.1%	0
A96(T)(W) – left, ahead, right	67.0%	13	70.1%	15	71.4%	15	73.4%	16

Table 2: Lochloy Road / A96(T) – Peak Period Capacity Results (AM & PM) – TS Request 17/04/18

Approach Arm	Base 2019 (AM)		Base 2019 (PM)		Total 2019 (AM)		Total 2019 (PM)	
	Deg Sat	Mean Max Q	Deg Sat	Mean Max Q	Deg Sat	Mean Max Q	Deg Sat	Mean Max Q
Lochloy Road – left, ahead & right	76.2%	9.6	77.0%	5.1	80.9%	11.0	78.0%	6.1
A96(T)(E) - right, left, ahead	67.0%	14.4	61.4%	15.4	68.8%	15.3	64.1%	15.7
View Road – ahead, right, left	4.6%	0.4	8.5%	0.4	4.4%	0.4	7.4%	0.4
A96(T)(W) – left, ahead, right	77.3%	18.9	76.6%	24.9	80.9%	20.6	81.1%	26.5

Key parameters: Stage 2 (the dedicated right turn arrow) is 'double cycled'. The pedestrian stage, which has a 17 second intergreen, is also 'double cycled'.

Conclusions and Recommendation

The results from this assessment indicate that the A96(T)/Lochloy Road signalised junction will continue to operate within capacity following the introduction of traffic associated with the proposed housing development on the 'NA2' site in Nairn. Furthermore, it is recommended that no mitigation as a direct result of the 'NA2' development proposals is required.

The overall findings and content of the original TA remain correct and unchanged. The work presented within this paper and all previous papers reflect a series of sensitivity tests which have been undertaken to address the concerns raised by TS (and BEAR).

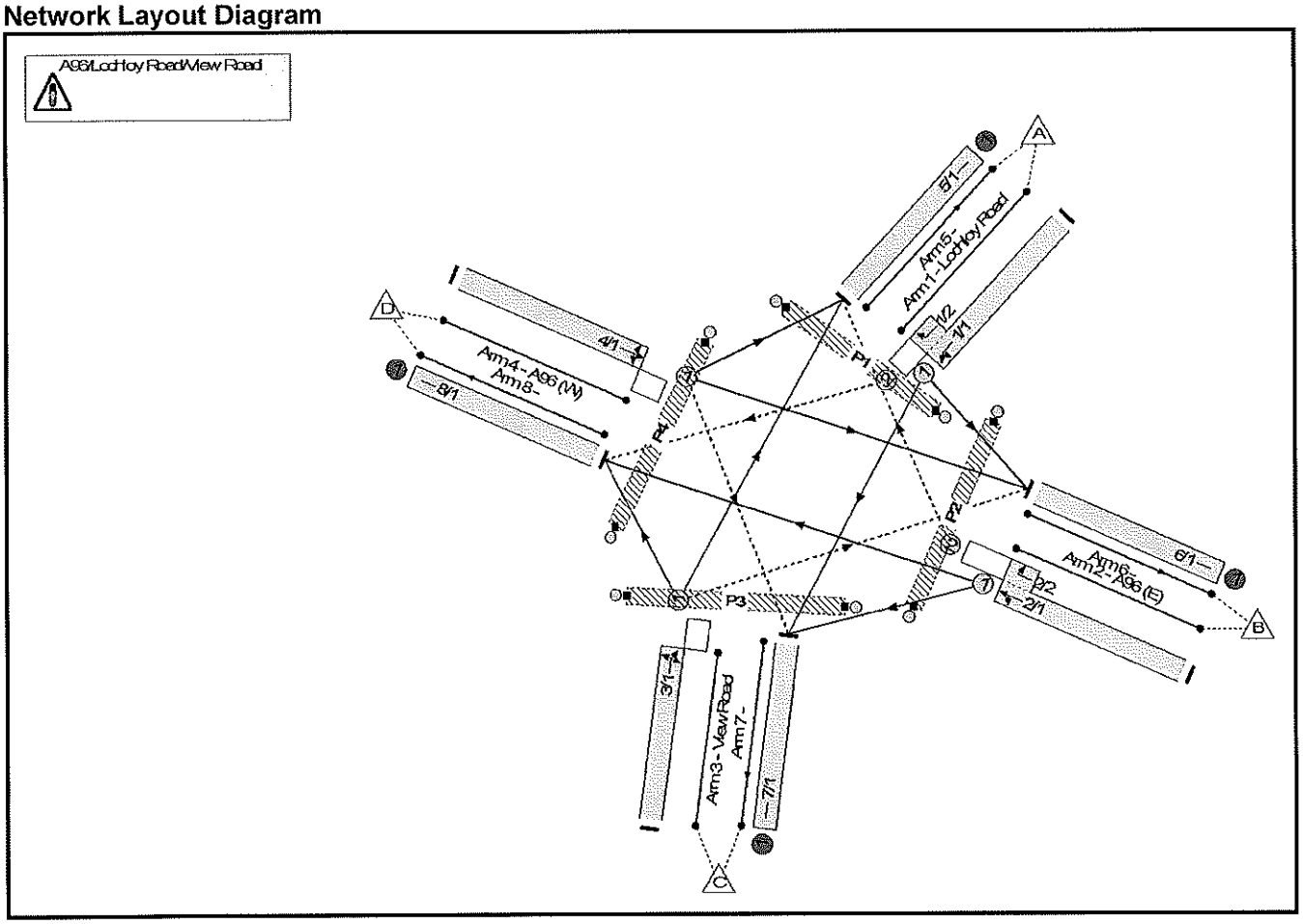
Appendix A – *LinSig* Model Outputs

Full Input Data And Results

User and Project Details

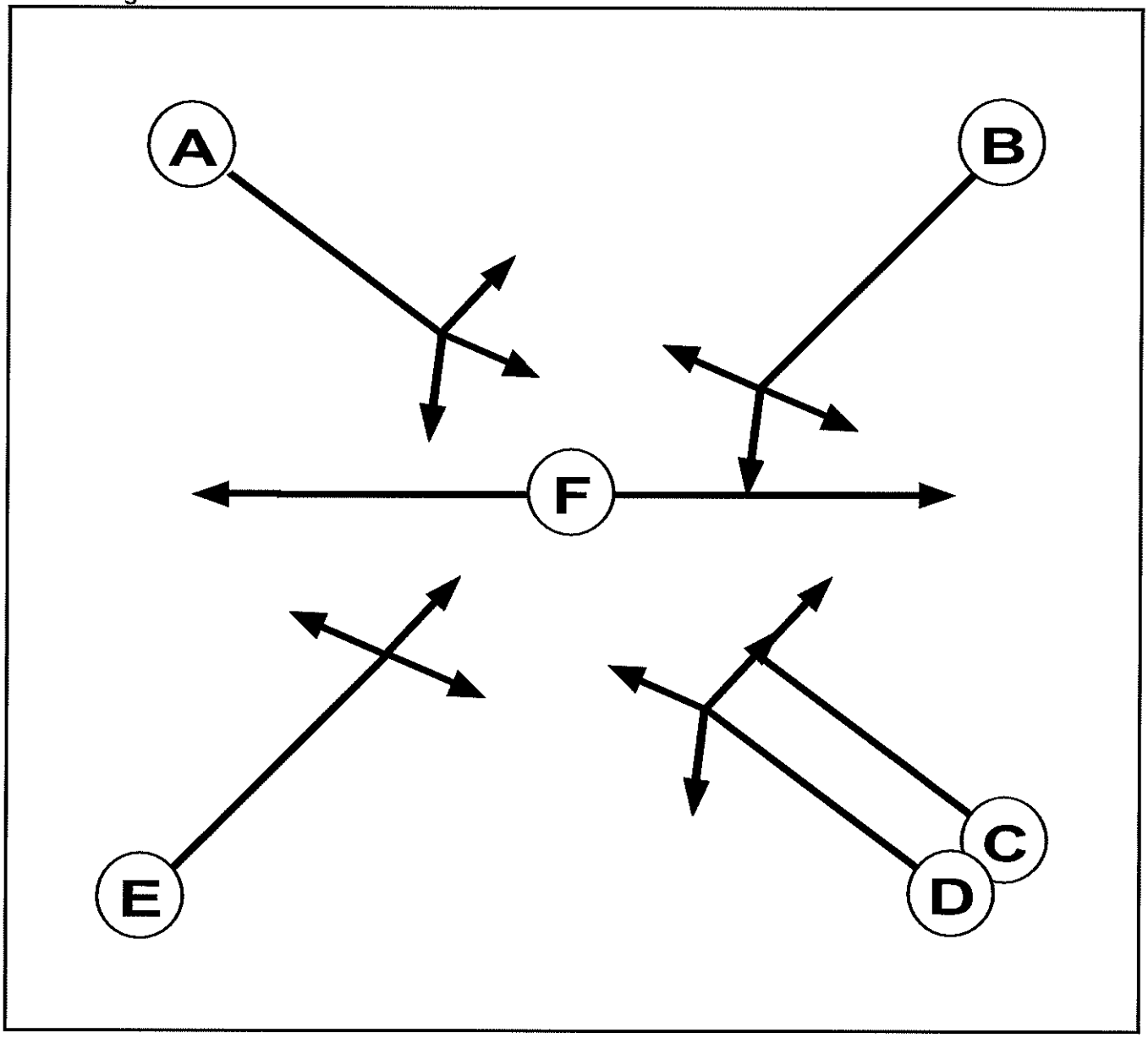
Project:	
Title:	
Location:	
File name:	A96-Lochloy Road-View Road - TS Sensitivity Test 17-04-2018.lsg3x
Author:	
Company:	
Address:	
Notes:	

Network Layout Diagram



Full Input Data And Results

Phase Diagram



Phase Input Data

Phase Name	Phase Type	Assoc. Phase	Street Min	Cont Min
A	Traffic		7	7
B	Traffic		7	7
C	Ind. Arrow	D	4	4
D	Traffic		7	7
E	Traffic		7	7
F	Pedestrian		7	7

Full Input Data And Results

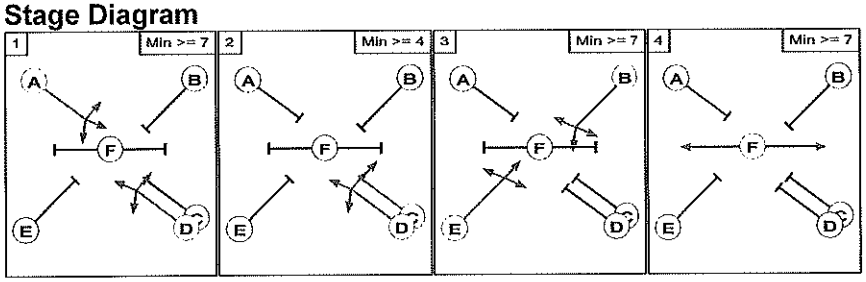
Phase Intergreens Matrix

		Starting Phase					
		A	B	C	D	E	F
Terminating Phase	A		5	5	-	5	8
	B	5		5	5	-	8
	C	5	5		-	5	8
	D	-	5	-		5	8
	E	5	-	5	5		8
	F	17	17	17	17	17	

Phases in Stage

Stage No.	Phases in Stage
1	A D
2	C D
3	B E
4	F

Stage Diagram



Phase Delays

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

Prohibited Stage Change

		To Stage			
		1	2	3	4
From Stage	1		5	5	8
	2	5		5	8
	3	5	5		8
	4	17	17	17	

Full Input Data And Results

Give-Way Lane Input Data

Junction: A96/Lochloy Road/View Road											
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)
1/2 (Lochloy Road)	8/1 (Right)	1439	0	3/1	1.09	To 5/1 (Ahead)	2.00	-	0.50	2	2.00
2/2 (A96 (E))	5/1 (Right)	1439	0	4/1	1.09	To 6/1 (Ahead)	3.00	-	0.50	3	2.00
3/1 (View Road)	6/1 (Right)	1439	0	1/1	1.09	To 7/1 (Ahead)	2.00	2.00	0.50	2	2.00
4/1 (A96 (W))	7/1 (Right)	1439	0	2/1	1.09	To 8/1 (Ahead)	2.00	2.00	0.50	2	2.00

Full Input Data And Results

Lane Input Data

Junction: A96/Lochloy Road/View Road												
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 (Lochloy Road)	U	B	2	3	3.6	Geom	-	3.00	0.00	Y	Arm 6 Left	12.20
											Arm 7 Ahead	Inf
1/2 (Lochloy Road)	O	B	2	3	2.0	Geom	-	3.00	0.00	Y	Arm 8 Right	12.00
2/1 (A96 (E))	U	D	2	3	6.0	Geom	-	3.00	0.00	Y	Arm 7 Left	10.50
											Arm 8 Ahead	Inf
2/2 (A96 (E))	O	D C	2	3	2.0	Geom	-	3.00	0.00	Y	Arm 5 Right	10.00
3/1 (View Road)	O	E	2	3	4.0	Geom	-	2.90	0.00	Y	Arm 5 Ahead	Inf
											Arm 6 Right	14.00
											Arm 8 Left	8.00
4/1 (A96 (W))	O	A	2	3	10.4	Geom	-	3.40	0.00	Y	Arm 5 Left	12.00
											Arm 6 Ahead	Inf
											Arm 7 Right	15.00
5/1	U		2	3	60.0	Inf	-	-	-	-	-	-
6/1	U		2	3	60.0	Inf	-	-	-	-	-	-
7/1	U		2	3	60.0	Inf	-	-	-	-	-	-
8/1	U		2	3	60.0	Inf	-	-	-	-	-	-

Traffic Flow Groups

Flow Group	Start Time	End Time	Duration	Formula
1: 'AM Peak BASE'	08:10	09:10	01:00	
2: 'PM Peak BASE'	16:40	17:40	01:00	
3: 'AM Peak TOTAL'	08:10	09:10	01:00	
4: 'PM Peak TOTAL'	16:40	17:40	01:00	

Full Input Data And Results

Scenario 1: 'AM Peak Base 2019' (FG1: 'AM Peak BASE', Plan 1: 'Network Control Plan 1')

Traffic Flows, Desired

Desired Flow :

		Destination				
		A	B	C	D	Tot.
Origin	A	0	53	3	270	326
	B	37	0	3	624	664
	C	2	3	0	13	18
	D	133	553	10	0	696
	Tot.	172	609	16	907	1704

Traffic Lane Flows

Lane	Scenario 1: AM Peak Base 2019
Junction: A96/Lochloy Road/View Road	
1/1 (with short)	326(In) 56(Out)
1/2 (short)	270
2/1 (with short)	664(In) 627(Out)
2/2 (short)	37
3/1	18
4/1	696
5/1	172
6/1	609
7/1	16
8/1	907

Full Input Data And Results

Lane Saturation Flows

Junction: A96/Lochloy Road/View Road								
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat Flow (PCU/Hr)**	**Flared Sat Flow (PCU/Hr)**
1/1 (Lochloy Road)	3.00	0.00	Y	Arm 6 Left	12.20	94.6 %	1715	1715
				Arm 7 Ahead	Inf	5.4 %		
1/2 (Lochloy Road)	3.00	0.00	Y	Arm 8 Right	12.00	100.0 %	1702	1702
2/1 (A96 (E))	3.00	0.00	Y	Arm 7 Left	10.50	0.5 %	1914	1914
				Arm 8 Ahead	Inf	99.5 %		
2/2 (A96 (E))	3.00	0.00	Y	Arm 5 Right	10.00	100.0 %	1665	1665
3/1 (View Road)	2.90	0.00	Y	Arm 5 Ahead	Inf	11.1 %	1652	1652
				Arm 6 Right	14.00	16.7 %		
				Arm 8 Left	8.00	72.2 %		
4/1 (A96 (W))	3.40	0.00	Y	Arm 5 Left	12.00	19.1 %	1907	1907
				Arm 6 Ahead	Inf	79.5 %		
				Arm 7 Right	15.00	1.4 %		
5/1	Infinite Saturation Flow						Inf	Inf
6/1	Infinite Saturation Flow						Inf	Inf
7/1	Infinite Saturation Flow						Inf	Inf
8/1	Infinite Saturation Flow						Inf	Inf

Scenario 2: 'PM Peak Base 2019' (FG2: 'PM Peak BASE', Plan 1: 'Network Control Plan 1')

Traffic Flows, Desired

Desired Flow :

		Destination				
		A	B	C	D	Tot.
Origin	A	0	39	4	127	170
	B	96	0	3	656	755
	C	5	0	0	11	16
	D	187	677	10	0	874
	Tot.	288	716	17	794	1815

Full Input Data And Results

Traffic Lane Flows

Lane	Scenario 2: PM Peak Base 2019
Junction: A96/Lochloy Road/View Road	
1/1 (with short)	170(In) 43(Out)
1/2 (short)	127
2/1 (with short)	755(In) 659(Out)
2/2 (short)	96
3/1	16
4/1	874
5/1	288
6/1	716
7/1	17
8/1	794

Lane Saturation Flows

Junction: A96/Lochloy Road/View Road								
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat Flow (PCU/Hr)**	**Flared Sat Flow (PCU/Hr)**
1/1 (Lochloy Road)	3.00	0.00	Y	Arm 6 Left	12.20	90.7 %	1723	1723
				Arm 7 Ahead	Inf	9.3 %		
1/2 (Lochloy Road)	3.00	0.00	Y	Arm 8 Right	12.00	100.0 %	1702	1702
2/1 (A96 (E))	3.00	0.00	Y	Arm 7 Left	10.50	0.5 %	1914	1914
				Arm 8 Ahead	Inf	99.5 %		
2/2 (A96 (E))	3.00	0.00	Y	Arm 5 Right	10.00	100.0 %	1665	1665
3/1 (View Road)	2.90	0.00	Y	Arm 5 Ahead	Inf	31.3 %	1687	1687
				Arm 6 Right	14.00	0.0 %		
				Arm 8 Left	8.00	68.8 %		
4/1 (A96 (W))	3.40	0.00	Y	Arm 5 Left	12.00	21.4 %	1902	1902
				Arm 6 Ahead	Inf	77.5 %		
				Arm 7 Right	15.00	1.1 %		
5/1	Infinite Saturation Flow						Inf	Inf
6/1	Infinite Saturation Flow						Inf	Inf
7/1	Infinite Saturation Flow						Inf	Inf
8/1	Infinite Saturation Flow						Inf	Inf

Full Input Data And Results

Scenario 3: 'AM Peak TOTAL 2019' (FG3: 'AM Peak TOTAL', Plan 1: 'Network Control Plan 1')

Traffic Flows, Desired

Desired Flow :

		Destination				
		A	B	C	D	Tot.
Origin	A	0	59	4	299	362
	B	41	0	3	624	668
	C	2	3	0	13	18
	D	147	553	10	0	710
	Tot.	190	615	17	936	1758

Traffic Lane Flows

Lane	Scenario 3: AM Peak TOTAL 2019
Junction: A96/Lochloy Road/View Road	
1/1 (with short)	362(In) 63(Out)
1/2 (short)	299
2/1 (with short)	668(In) 627(Out)
2/2 (short)	41
3/1	18
4/1	710
5/1	190
6/1	615
7/1	17
8/1	936

Full Input Data And Results

Lane Saturation Flows

Junction: A96/Lochloy Road/View Road								
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat Flow (PCU/Hr)**	**Flared Sat Flow (PCU/Hr)**
1/1 (Lochloy Road)	3.00	0.00	Y	Arm 6 Left	12.20	93.7 %	1717	1717
				Arm 7 Ahead	Inf	6.3 %		
1/2 (Lochloy Road)	3.00	0.00	Y	Arm 8 Right	12.00	100.0 %	1702	1702
2/1 (A96 (E))	3.00	0.00	Y	Arm 7 Left	10.50	0.5 %	1914	1914
				Arm 8 Ahead	Inf	99.5 %		
2/2 (A96 (E))	3.00	0.00	Y	Arm 5 Right	10.00	100.0 %	1665	1665
3/1 (View Road)	2.90	0.00	Y	Arm 5 Ahead	Inf	11.1 %	1652	1652
				Arm 6 Right	14.00	16.7 %		
				Arm 8 Left	8.00	72.2 %		
4/1 (A96 (W))	3.40	0.00	Y	Arm 5 Left	12.00	20.7 %	1903	1903
				Arm 6 Ahead	Inf	77.9 %		
				Arm 7 Right	15.00	1.4 %		
5/1	Infinite Saturation Flow						Inf	Inf
6/1	Infinite Saturation Flow						Inf	Inf
7/1	Infinite Saturation Flow						Inf	Inf
8/1	Infinite Saturation Flow						Inf	Inf

Scenario 4: 'PM Peak TOTAL 2019' (FG4: 'PM Peak TOTAL', Plan 1: 'Network Control Plan 1')

Traffic Flows, Desired

Desired Flow :

		Destination				
		A	B	C	D	Tot.
Origin	A	0	45	5	145	195
	B	108	0	3	656	767
	C	5	0	0	11	16
	D	210	677	10	0	897
	Tot.	323	722	18	812	1875

Full Input Data And Results

Traffic Lane Flows

Lane	Scenario 4: PM Peak TOTAL 2019
Junction: A96/Lochloy Road/View Road	
1/1 (with short)	195(In) 50(Out)
1/2 (short)	145
2/1 (with short)	767(In) 659(Out)
2/2 (short)	108
3/1	16
4/1	897
5/1	323
6/1	722
7/1	18
8/1	812

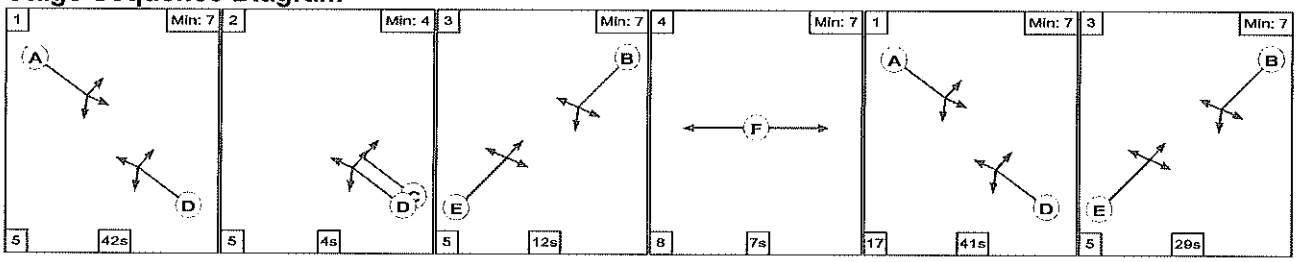
Lane Saturation Flows

Junction: A96/Lochloy Road/View Road								
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat Flow (PCU/Hr)**	**Flared Sat Flow (PCU/Hr)**
1/1 (Lochloy Road)	3.00	0.00	Y	Arm 6 Left	12.20	90.0 %	1724	1724
				Arm 7 Ahead	Inf	10.0 %		
1/2 (Lochloy Road)	3.00	0.00	Y	Arm 8 Right	12.00	100.0 %	1702	1702
2/1 (A96 (E))	3.00	0.00	Y	Arm 7 Left	10.50	0.5 %	1914	1914
				Arm 8 Ahead	Inf	99.5 %		
2/2 (A96 (E))	3.00	0.00	Y	Arm 5 Right	10.00	100.0 %	1665	1665
3/1 (View Road)	2.90	0.00	Y	Arm 5 Ahead	Inf	31.3 %	1687	1687
				Arm 6 Right	14.00	0.0 %		
				Arm 8 Left	8.00	68.8 %		
4/1 (A96 (W))	3.40	0.00	Y	Arm 5 Left	12.00	23.4 %	1897	1897
				Arm 6 Ahead	Inf	75.5 %		
				Arm 7 Right	15.00	1.1 %		
5/1	Infinite Saturation Flow						Inf	Inf
6/1	Infinite Saturation Flow						Inf	Inf
7/1	Infinite Saturation Flow						Inf	Inf
8/1	Infinite Saturation Flow						Inf	Inf

Full Input Data And Results

Scenario 1: 'AM Peak Base 2019' (FG1: 'AM Peak BASE', Plan 1: 'Network Control Plan 1')

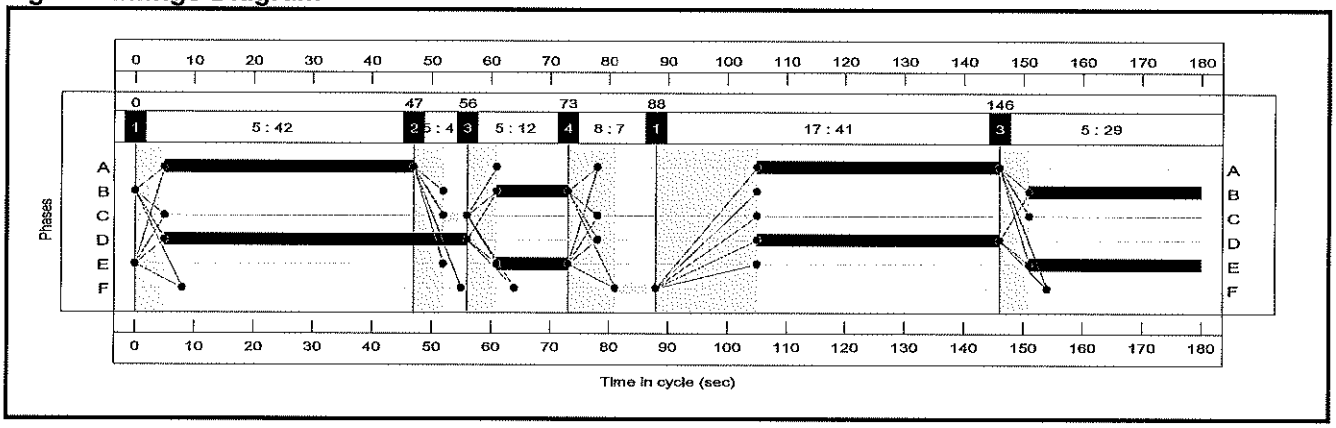
Stage Sequence Diagram



Stage Timings

Stage	1	2	3	4	1	3
Duration	42	4	12	7	41	29
Change Point	0	47	56	73	88	146

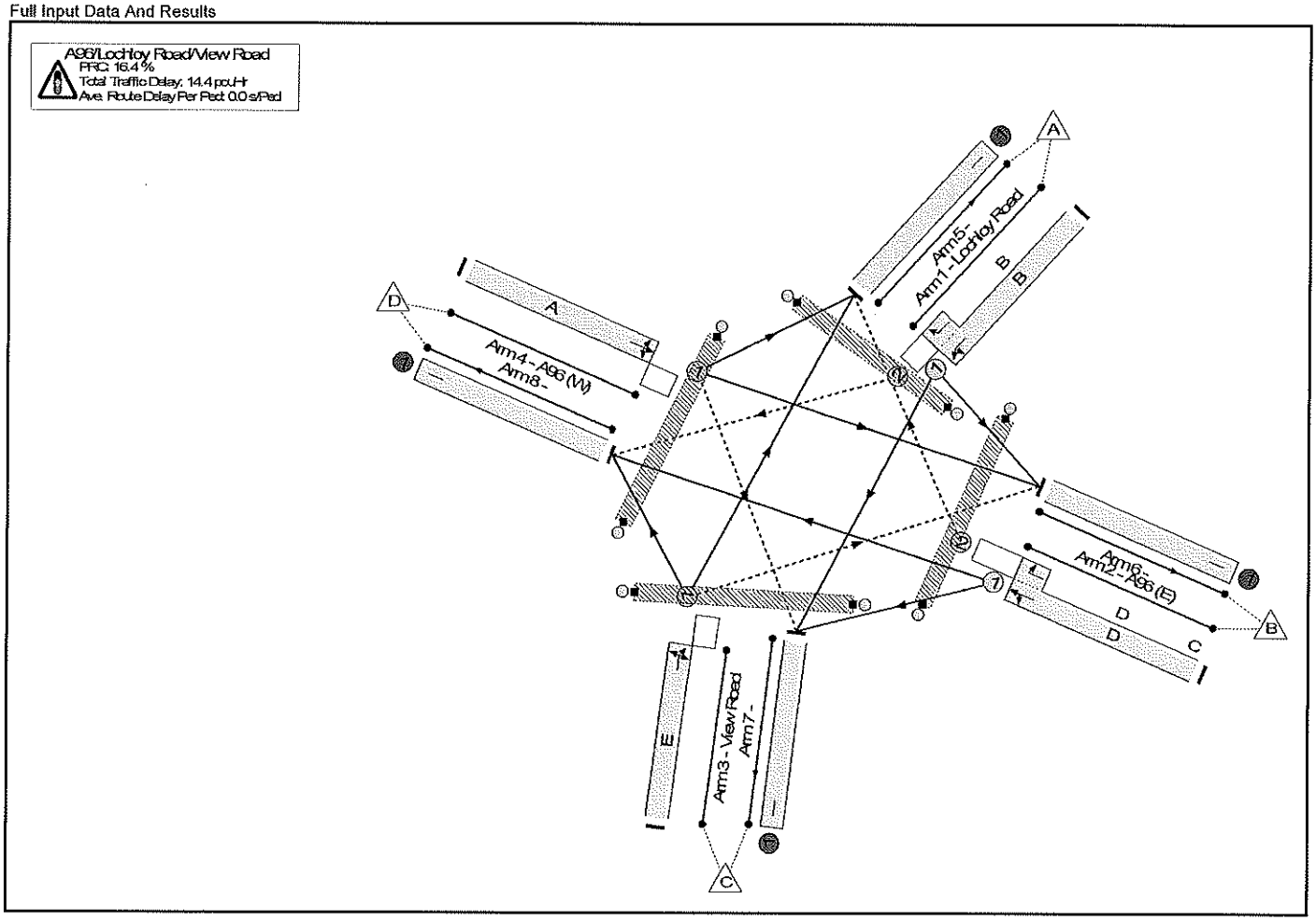
Signal Timings Diagram



Full Input Data And Results

Network Layout Diagram

Full Input Data And Results



Full Input Data And Results

Network Results

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network	-	-	N/A	-	-		-	-	-	-	-	-	77.3%
A96/Lochloy Road/View Road	-	-	N/A	-	-		-	-	-	-	-	-	77.3%
1/1+1/2	Lochloy Road Left Ahead Right	U+O	N/A	N/A	B		2	41	-	326	1715:1702	428	76.2%
2/1+2/2	A96 (E) Right Left Ahead	U+O	N/A	N/A	D	C	2	92	4	664	1914:1665	992	67.0%
3/1	View Road Ahead Right Left	O	N/A	N/A	E		2	41	-	18	1652	395	4.6%
4/1	A96 (W) Left Ahead Right	O	N/A	N/A	A		2	83	-	696	1907	901	77.3%
5/1		U	N/A	N/A	-		-	-	-	172	Inf	Inf	0.0%
6/1		U	N/A	N/A	-		-	-	-	609	Inf	Inf	0.0%
7/1		U	N/A	N/A	-		-	-	-	16	Inf	Inf	0.0%
8/1		U	N/A	N/A	-		-	-	-	907	Inf	Inf	0.0%
Ped Link: P1	Unnamed Ped Link	-	N/A	-	F		1	7	-	0	-	0	0.0%
Ped Link: P2	Unnamed Ped Link	-	N/A	-	F		1	7	-	0	-	0	0.0%
Ped Link: P3	Unnamed Ped Link	-	N/A	-	F		1	7	-	0	-	0	0.0%
Ped Link: P4	Unnamed Ped Link	-	N/A	-	F		1	7	-	0	-	0	0.0%

Full Input Data And Results

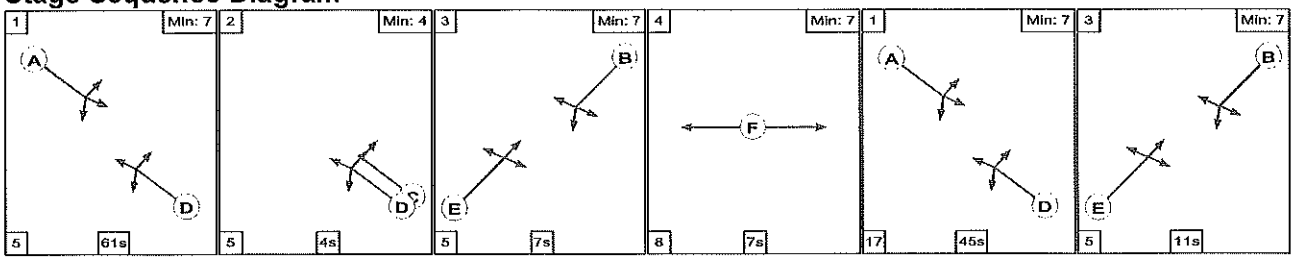
Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network	-	-	311	1	7	9.9	4.3	0.2	14.4	-	-	-	-
A96/Lochloy Road/View Road	-	-	311	1	7	9.9	4.3	0.2	14.4	-	-	-	-
1/1+1/2	326	326	264	0	6	2.9	1.6	0.1	4.5	49.6	8.0	1.6	9.6
2/1+2/2	664	664	35	1	1	2.9	1.0	0.1	4.1	22.2	13.3	1.0	14.4
3/1	18	18	3	0	0	0.1	0.0	0.0	0.2	31.6	0.4	0.0	0.4
4/1	696	696	10	0	0	4.0	1.7	0.0	5.7	29.3	17.2	1.7	18.9
5/1	172	172	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	609	609	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
7/1	16	16	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
8/1	907	907	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
Ped Link: P1	0	0	-	-	-	-	-	-	-	-	-	-	-
Ped Link: P2	0	0	-	-	-	-	-	-	-	-	-	-	-
Ped Link: P3	0	0	-	-	-	-	-	-	-	-	-	-	-
Ped Link: P4	0	0	-	-	-	-	-	-	-	-	-	-	-

C1 PRC for Signalled Lanes (%): 16.4 Total Delay for Signalled Lanes (pcuHr): 14.41 Cycle Time (s): 180
PRC Over All Lanes (%): 16.4 Total Delay Over All Lanes(pcuHr): 14.41

Full Input Data And Results

Scenario 2: 'PM Peak Base 2019' (FG2: 'PM Peak BASE', Plan 1: 'Network Control Plan 1')

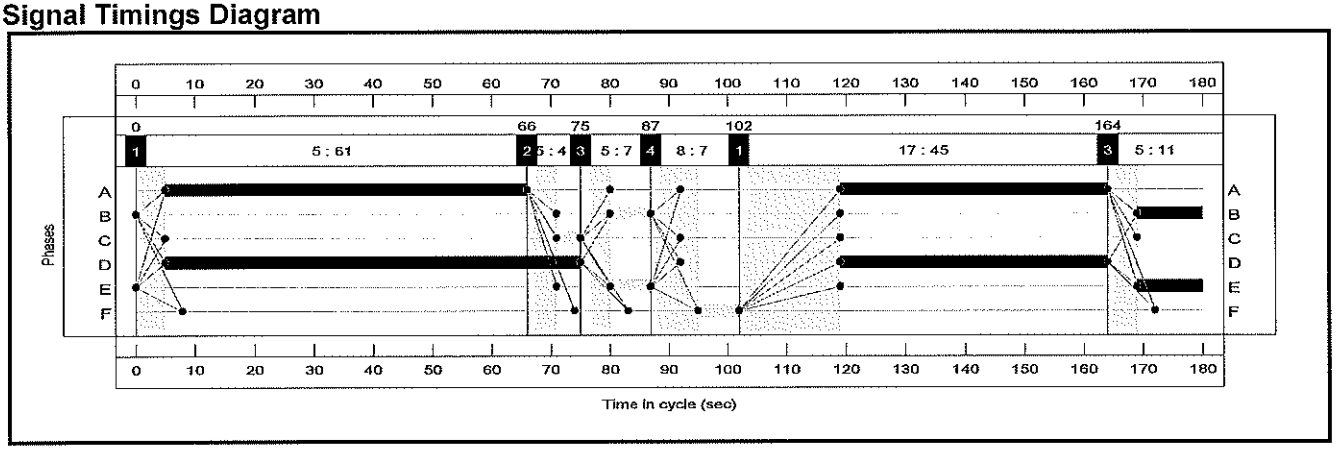
Stage Sequence Diagram



Stage Timings

Stage	1	2	3	4	1	3
Duration	61	4	7	7	45	11
Change Point	0	66	75	87	102	164

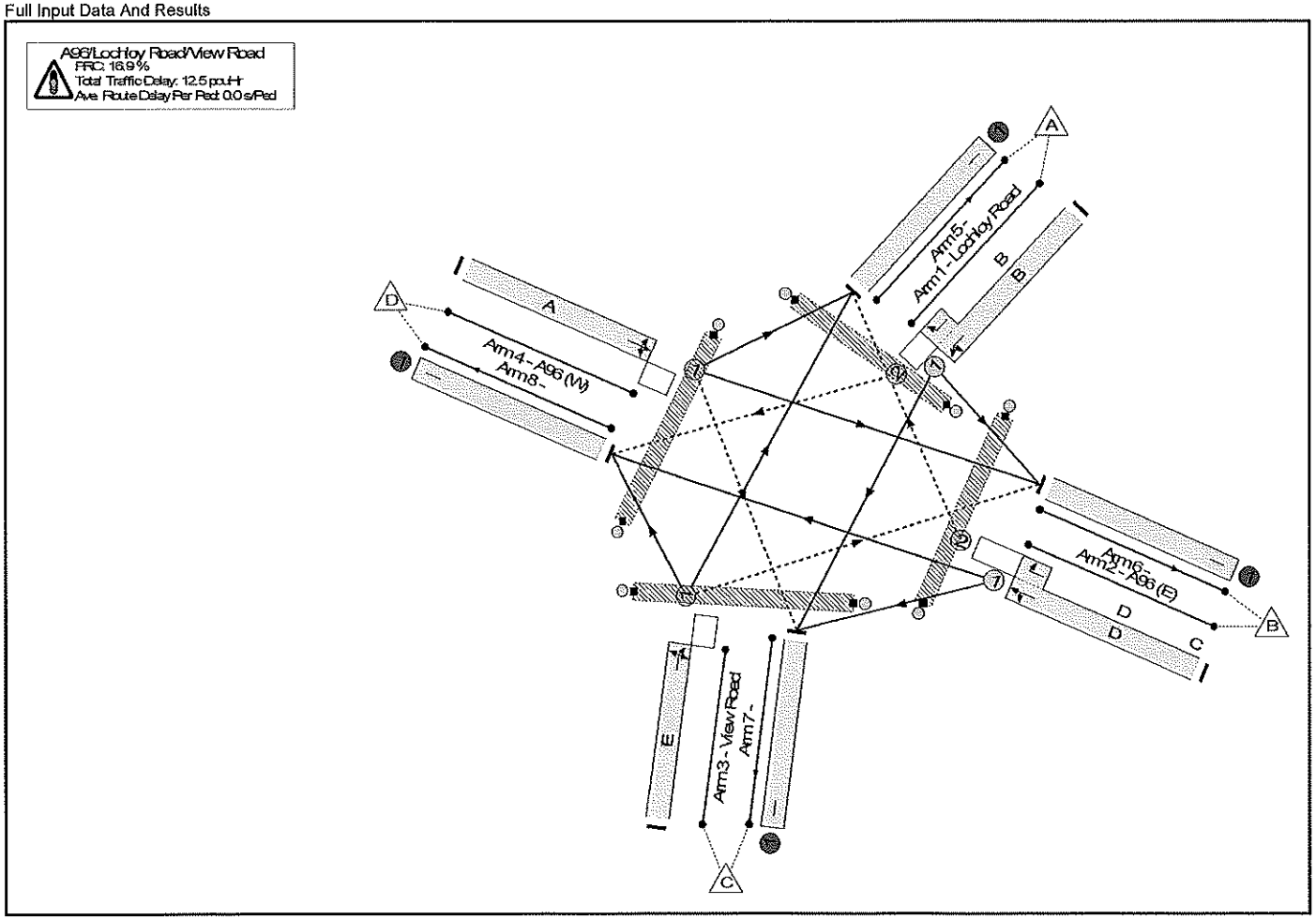
Signal Timings Diagram



Full Input Data And Results

Network Layout Diagram

Full Input Data And Results



Full Input Data And Results

Network Results

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network	-	-	N/A	-	-		-	-	-	-	-	-	77.0%
A96/Lochloy Road/View Road	-	-	N/A	-	-		-	-	-	-	-	-	77.0%
1/1+1/2	Lochloy Road Left Ahead Right	U+O	N/A	N/A	B		2	18	-	170	1723:1702	221	77.0%
2/1+2/2	A96 (E) Right Left Ahead	U+O	N/A	N/A	D	C	2	115	4	755	1914:1665	1229	61.4%
3/1	View Road Ahead Right Left	O	N/A	N/A	E		2	18	-	16	1687	187	8.5%
4/1	A96 (W) Left Ahead Right	O	N/A	N/A	A		2	106	-	874	1902	1141	76.6%
5/1		U	N/A	N/A	-		-	-	-	288	Inf	Inf	0.0%
6/1		U	N/A	N/A	-		-	-	-	716	Inf	Inf	0.0%
7/1		U	N/A	N/A	-		-	-	-	17	Inf	Inf	0.0%
8/1		U	N/A	N/A	-		-	-	-	794	Inf	Inf	0.0%
Ped Link: P1	Unnamed Ped Link	-	N/A	-	F		1	7	-	0	-	0	0.0%
Ped Link: P2	Unnamed Ped Link	-	N/A	-	F		1	7	-	0	-	0	0.0%
Ped Link: P3	Unnamed Ped Link	-	N/A	-	F		1	7	-	0	-	0	0.0%
Ped Link: P4	Unnamed Ped Link	-	N/A	-	F		1	7	-	0	-	0	0.0%

Full Input Data And Results

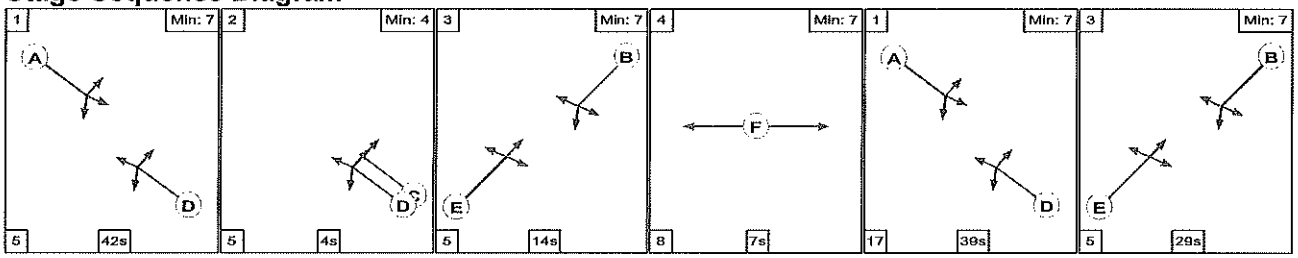
Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network	-	-	188	4	42	8.0	4.0	0.5	12.5	-	-	-	-
A96/Lochloy Road/View Road	-	-	188	4	42	8.0	4.0	0.5	12.5	-	-	-	-
1/1+1/2	170	170	127	0	0	1.8	1.6	0.0	3.4	72.2	3.5	1.6	5.1
2/1+2/2	755	755	51	4	42	2.1	0.8	0.4	3.4	16.1	14.6	0.8	15.4
3/1	16	16	0	0	0	0.2	0.0	0.0	0.2	46.5	0.4	0.0	0.4
4/1	874	874	10	0	0	3.9	1.6	0.0	5.5	22.7	23.3	1.6	24.9
5/1	288	288	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	716	716	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
7/1	17	17	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
8/1	794	794	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
Ped Link: P1	0	0	-	-	-	-	-	-	-	-	-	-	-
Ped Link: P2	0	0	-	-	-	-	-	-	-	-	-	-	-
Ped Link: P3	0	0	-	-	-	-	-	-	-	-	-	-	-
Ped Link: P4	0	0	-	-	-	-	-	-	-	-	-	-	-

C1 PRC for Signalled Lanes (%): 16.9 Total Delay for Signalled Lanes (pcuHr): 12.50 Cycle Time (s): 160
PRC Over All Lanes (%): 16.9 Total Delay Over All Lanes(pcuHr): 12.50

Full Input Data And Results

Scenario 3: 'AM Peak TOTAL 2019' (FG3: 'AM Peak TOTAL', Plan 1: 'Network Control Plan 1')

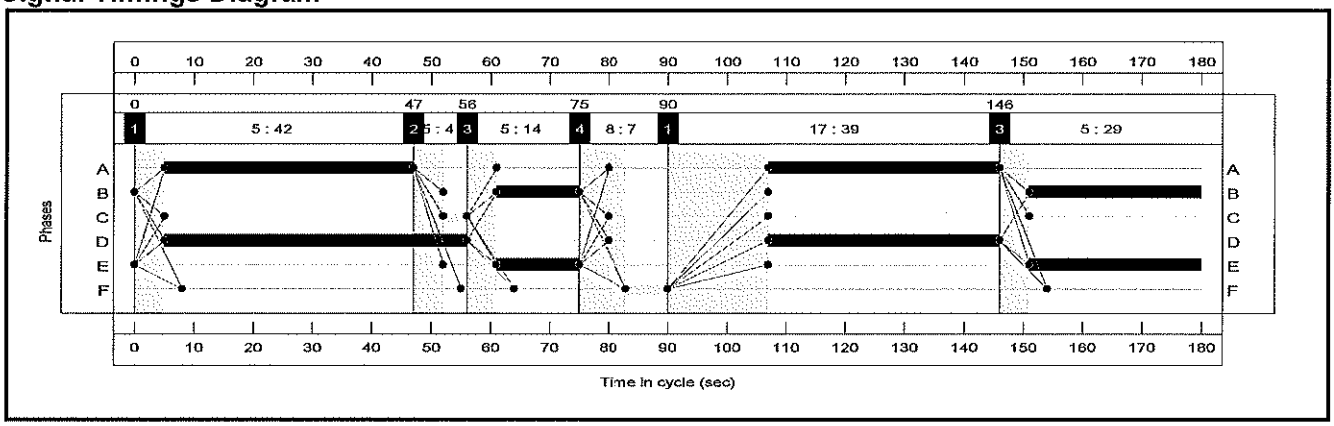
Stage Sequence Diagram



Stage Timings

Stage	1	2	3	4	1	3
Duration	42	4	14	7	39	29
Change Point	0	47	56	75	90	146

Signal Timings Diagram

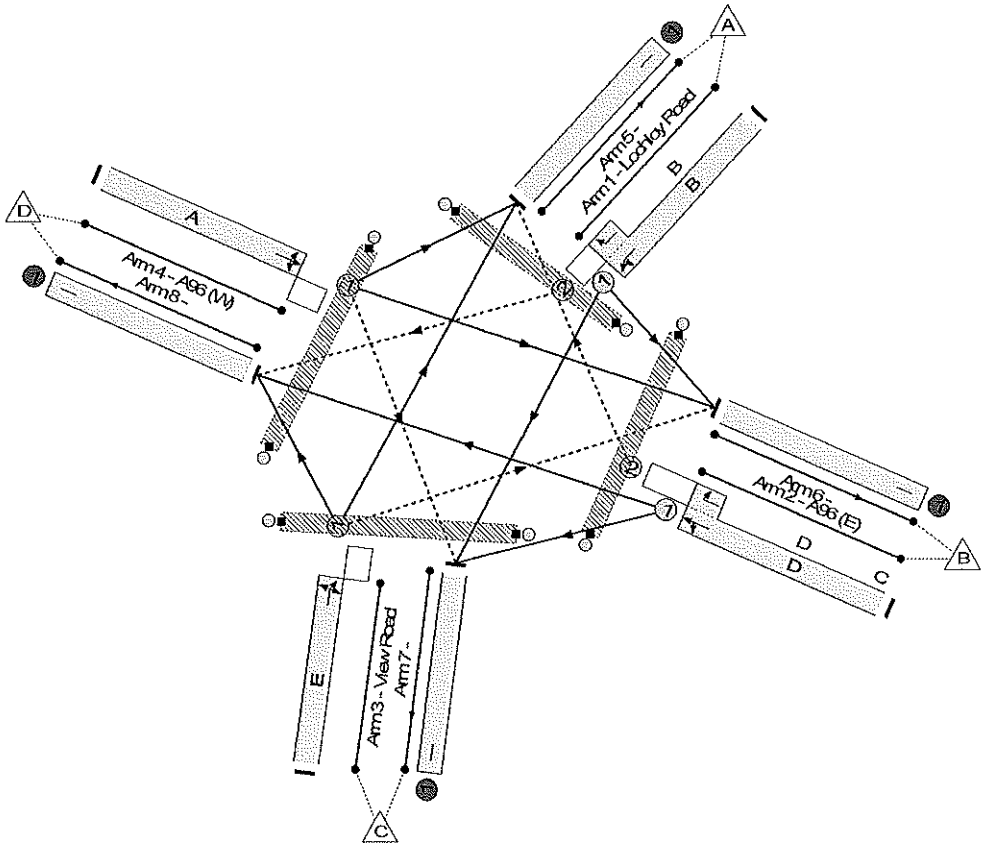


Full Input Data And Results

Network Layout Diagram

Full Input Data And Results

A96/Lochloy Road/View Road
PRC: 11.2 %
Total Traffic Delay: 16.2 pcu-Hr
Ave. Route Delay Per Ped: 0.0 s/Ped



Full Input Data And Results

Network Results

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network	-	-	N/A	-	-		-	-	-	-	-	-	80.9%
A96/Lochloy Road/View Road	-	-	N/A	-	-		-	-	-	-	-	-	80.9%
1/1+1/2	Lochloy Road Left Ahead Right	U+O	N/A	N/A	B		2	43	-	362	1717:1702	447	80.9%
2/1+2/2	A96 (E) Right Left Ahead	U+O	N/A	N/A	D	C	2	90	4	668	1914:1665	970	68.8%
3/1	View Road Ahead Right Left	O	N/A	N/A	E		2	43	-	18	1652	413	4.4%
4/1	A96 (W) Left Ahead Right	O	N/A	N/A	A		2	81	-	710	1903	877	80.9%
5/1		U	N/A	N/A	-		-	-	-	190	Inf	Inf	0.0%
6/1		U	N/A	N/A	-		-	-	-	615	Inf	Inf	0.0%
7/1		U	N/A	N/A	-		-	-	-	17	Inf	Inf	0.0%
8/1		U	N/A	N/A	-		-	-	-	936	Inf	Inf	0.0%
Ped Link: P1	Unnamed Ped Link	-	N/A	-	F		1	7	-	0	-	0	0.0%
Ped Link: P2	Unnamed Ped Link	-	N/A	-	F		1	7	-	0	-	0	0.0%
Ped Link: P3	Unnamed Ped Link	-	N/A	-	F		1	7	-	0	-	0	0.0%
Ped Link: P4	Unnamed Ped Link	-	N/A	-	F		1	7	-	0	-	0	0.0%

Full Input Data And Results

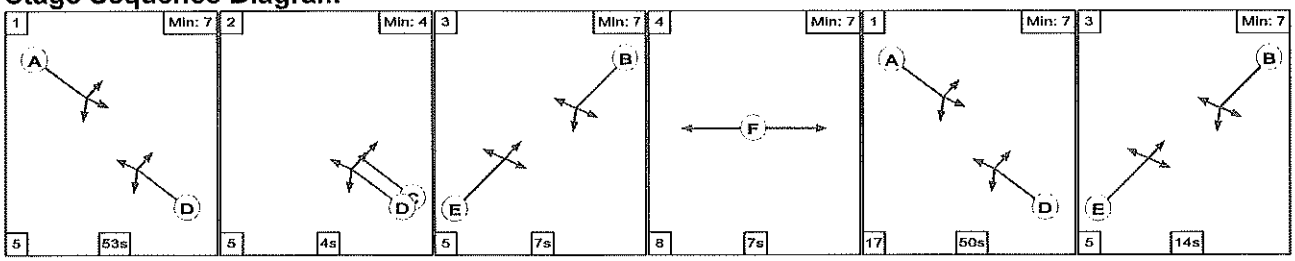
Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network	-	-	345	2	6	10.7	5.2	0.3	16.2	-	-	-	-
A96/Lochloy Road/View Road	-	-	345	2	6	10.7	5.2	0.3	16.2	-	-	-	-
1/1+1/2	362	362	293	0	6	3.2	2.0	0.1	5.3	52.4	8.9	2.0	11.0
2/1+2/2	668	668	38	2	1	3.1	1.1	0.2	4.4	23.7	14.2	1.1	15.3
3/1	18	18	3	0	0	0.1	0.0	0.0	0.2	30.6	0.4	0.0	0.4
4/1	710	710	10	0	0	4.3	2.1	0.0	6.4	32.4	18.5	2.1	20.6
5/1	190	190	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	615	615	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
7/1	17	17	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
8/1	936	936	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
Ped Link: P1	0	0	-	-	-	-	-	-	-	-	-	-	-
Ped Link: P2	0	0	-	-	-	-	-	-	-	-	-	-	-
Ped Link: P3	0	0	-	-	-	-	-	-	-	-	-	-	-
Ped Link: P4	0	0	-	-	-	-	-	-	-	-	-	-	-

C1 PRC for Signalled Lanes (%): 11.2 Total Delay for Signalled Lanes (pcu-Hr): 16.21 Cycle Time (s): 180
PRC Over All Lanes (%): 11.2 Total Delay Over All Lanes(pcu-Hr): 16.21

Full Input Data And Results

Scenario 4: 'PM Peak TOTAL 2019' (FG4: 'PM Peak TOTAL', Plan 1: 'Network Control Plan 1')

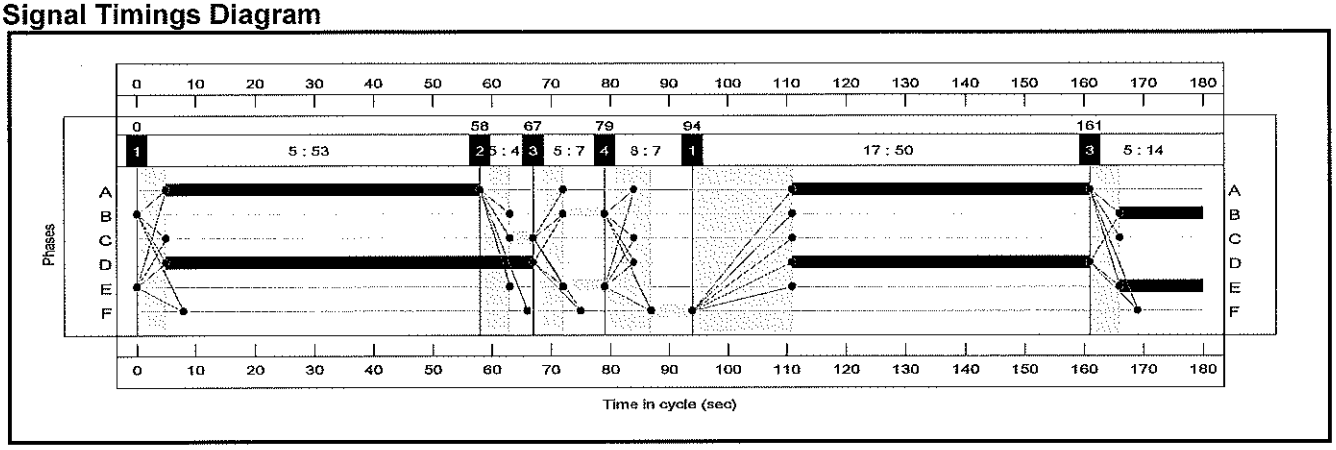
Stage Sequence Diagram



Stage Timings

Stage	1	2	3	4	1	3
Duration	53	4	7	7	50	14
Change Point	0	58	67	79	94	161

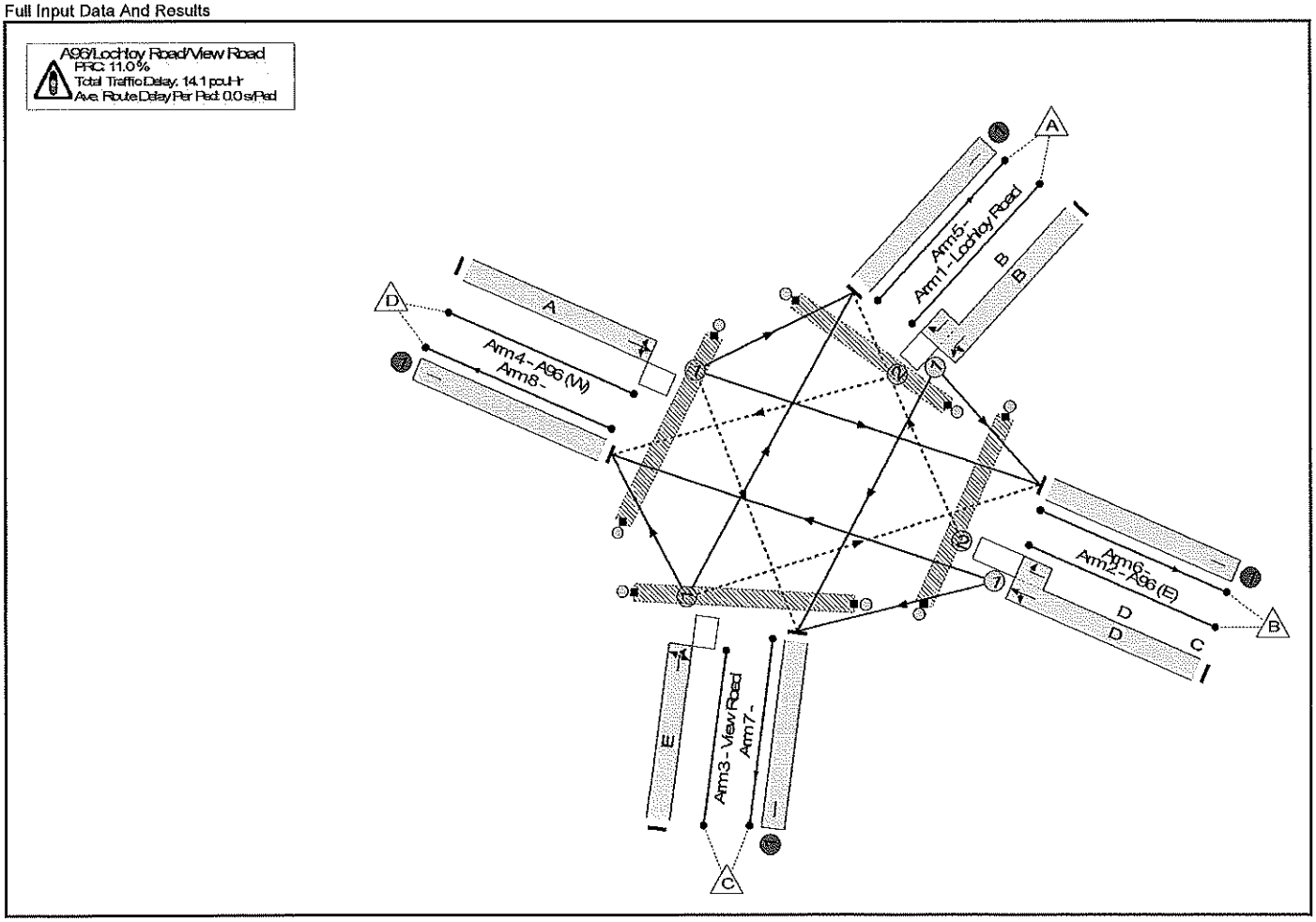
Signal Timings Diagram



Full Input Data And Results

Network Layout Diagram

Full Input Data And Results



Full Input Data And Results

Network Results

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network	-	-	N/A	-	-		-	-	-	-	-	-	81.1%
A96/Lochloy Road/View Road	-	-	N/A	-	-		-	-	-	-	-	-	81.1%
1/1+1/2	Lochloy Road Left Ahead Right	U+O	N/A	N/A	B		2	21	-	195	1724:1702	250	78.0%
2/1+2/2	A96 (E) Right Left Ahead	U+O	N/A	N/A	D	C	2	112	4	767	1914:1665	1197	64.1%
3/1	View Road Ahead Right Left	O	N/A	N/A	E		2	21	-	16	1687	216	7.4%
4/1	A96 (W) Left Ahead Right	O	N/A	N/A	A		2	103	-	897	1697	1107	81.1%
5/1		U	N/A	N/A	-		-	-	-	323	Inf	Inf	0.0%
6/1		U	N/A	N/A	-		-	-	-	722	Inf	Inf	0.0%
7/1		U	N/A	N/A	-		-	-	-	18	Inf	Inf	0.0%
8/1		U	N/A	N/A	-		-	-	-	812	Inf	Inf	0.0%
Ped Link: P1	Unnamed Ped Link	-	N/A	-	F		1	7	-	0	-	0	0.0%
Ped Link: P2	Unnamed Ped Link	-	N/A	-	F		1	7	-	0	-	0	0.0%
Ped Link: P3	Unnamed Ped Link	-	N/A	-	F		1	7	-	0	-	0	0.0%
Ped Link: P4	Unnamed Ped Link	-	N/A	-	F		1	7	-	0	-	0	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	-	-	215	4	44	8.8	4.7	0.6	14.1	-	-	-	-
A96/Lochloy Road/View Road	-	-	215	4	44	8.8	4.7	0.6	14.1	-	-	-	-
1/1+1/2	195	195	143	0	2	2.0	1.7	0.0	3.8	69.2	4.5	1.7	6.1
2/1+2/2	767	767	62	4	42	2.3	0.9	0.6	3.8	17.8	14.8	0.9	15.7
3/1	16	16	0	0	0	0.2	0.0	0.0	0.2	44.0	0.4	0.0	0.4
4/1	897	897	10	0	0	4.2	2.1	0.0	6.4	25.5	24.4	2.1	26.5
5/1	323	323	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	722	722	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
7/1	16	16	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
8/1	812	812	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
Ped Link: P1	0	0	-	-	-	-	-	-	-	-	-	-	-
Ped Link: P2	0	0	-	-	-	-	-	-	-	-	-	-	-
Ped Link: P3	0	0	-	-	-	-	-	-	-	-	-	-	-
Ped Link: P4	0	0	-	-	-	-	-	-	-	-	-	-	-

C1 PRC for Signalled Lanes (%): 11.0 Total Delay for Signalled Lanes (pcuHr): 14.11 Cycle Time (s): 160
PRC Over All Lanes (%): 11.0 Total Delay Over All Lanes(pcuHr): 14.11

[redacted]

From: [redacted]@arup.com>
Sent: 21 March 2018 12:26
To: [redacted]
Cc: [redacted]@highland.gcsx.gov.uk; [redacted]@springfield.co.uk; [redacted] [redacted]@springfield.co.uk; [redacted]@springfield.co.uk
Subject: RE: Planning Application 17/05667/FUL
Attachments: Transport Scotland Response 21-03-2018, NA2 Transport Assessment, Nairn.pdf

Importance: High

Good afternoon [redacted]

Following our earlier conversations and email correspondence, please find attached a briefing paper which summarises the results from a series of minor sensitivity tests for the A96(T) / Lochloy Road signalised junction. These tests have been undertaken to address the latest set of comments received from Transport Scotland (see below). The overall findings and conclusions of the original Transport Assessment remain unchanged.

To date, we have addressed all comments received from TS (and BEAR) and trust that the attached will now allow you to finalise your response to Highland Council with respect to the planning application for the 'NA2' site.

Should you have any queries, please let me know.

Regards,
[redacted]

From: [redacted]@transport.gov.scot [mailto[redacted]@transport.gov.scot]
Sent: 19 March 2018 16:57
To: [redacted]
Cc: [redacted]@transport.gov.scot; [redacted]@highland.gcsx.gov.uk; [redacted]@springfield.co.uk; [redacted]@springfield.co.uk; [redacted]@springfield.co.uk
Subject: RE: Planning Application 17/05667/FUL

[redacted]

Further to our earlier telephone conversation, I have had further discussions with BEAR and would advise that the views expressed in relation to pedestrian demand and the IA phase are based on their knowledge of the operation of this junction and observations made on site. On that basis, it is considered appropriate to model a 'worst case' scenario as a starting point in seeking to demonstrate that the traffic signals can accommodate the anticipated increase in traffic. It is incumbent on the developer through their own site observations or data collection exercise to justify the adoption of an alternative scenario.

I trust the above provides additional clarification however, please do not hesitate to contact me should you wish to discuss this further.

Regards

[redacted]

From: [redacted]@arup.com]
Sent: 15 March 2018 16:42
To: [redacted]
Cc: [redacted]@highland.gcsx.gov.uk; [redacted]@springfield.co.uk; [redacted]@springfield.co.uk; [redacted]@springfield.co.uk
Subject: RE: Planning Application 17/05667/FUL

[redacted]

Many thanks for your email.

In response to your query, the 'dedicated right-turn' facility you refer to (run under Stage 2) has not been enabled due to the low level of demand for right turners. Right turners would be able to make the movement within Stage 2 either within gaps in oncoming vehicles or in the intergreen and thus without recourse the calling of the dedicated right turn arrow. Having this stage being called every cycle would also impose a level of inefficiency on the operation of the junction. The level of demand making the right turn movement (i.e. in the Total scenario, this equates to 41 PCUs in the AM peak period and 108 PCUs in the PM peak period) was found to be sufficiently low and, in the interests of maximising the operational capacity of the junction, the dedicated right-turn under Stage 2 has not been enabled. However, the stage was still coded as part of the model to allow us to undertake various assessment scenarios as part of the overall TA process.

I trust this answers your query. However, if you have any further queries, please don't hesitate to let me know.

Regards,
[redacted]

From: [redacted]@transport.gov.scot [mailto [redacted]@transport.gov.scot]
Sent: 15 March 2018 15:45
To: [redacted]
Cc: [redacted]@transport.gov.scot; [redacted]@highland.gcsx.gov.uk; [redacted]@springfield.co.uk; [redacted]@springfield.co.uk; [redacted]@springfield.co.uk
Subject: RE: Planning Application 17/05667/FUL

[redacted]

To assist with our review of the amended LinSig runs / output, it would be appreciated if you could clarify the stage sequence that you are seeking to replicate. The model output that you have provided indicates a stage sequence comprising 4 stages as per the specification however, the IA phase (i.e. Stage 2) would not appear to have been enabled in the 'Stages View'. As a consequence, the model is not running / allocating any time to Stage 2 as evident from the 'Signal Timings Diagram'. If enabled, the 'Stage Diagram' and 'Stage Sequence Diagrams' would indicate a minimum >= 4s rather than '0'.

Further clarification in relation to the above would be appreciated however, please do not hesitate to contact me should you wish to discuss.

Regards

[redacted]

ARUP

Subject NA2, Nairn, Transport Assessment (Response to Transport Scotland)

Date 21 March 2018 **Job No/Ref** 254313-00

Introduction

Planning application no. 17/05667/FUL

'NA2', Nairn, Transport Assessment

The purpose of this note is to respond to comments received from Transport Scotland (TS) with respect to the Transport Assessment (TA) which was submitted in support of the above planning application. The overall findings and content of the original TA remain correct and unchanged.

Background

In their email of 15/03/18, TS requested clarification on the stage sequence being assessed as part of the *LinSig* model for the A96(T) / Lochloy Road signalised junction. It was requested that 'stage 2', which allows for a dedicated right-turn indicative arrow, is enabled every cycle.

Furthermore, TS noted in their email of 19/03/18 that following discussions with the trunk road operating company (BEAR), a 'worst case' scenario should be assessed. This assessment exercise is outlined below.

LinSig Modelling Results

A set of sensitivity tests were undertaken using the various modelling parameters summarised in Table 1. The model outputs from these sensitivity tests are presented in Appendix A.

Table 1: Sensitivity Tests and Modelling Parameters

Scenario Ref	Cycle Time (seconds)	Stage Sequence	Stage 2 min time (indicative right turn arrow, seconds)	Stage 4 Ped Intergreen (seconds)	Table Ref
Original TA	90	1, 2, 3, 4	0	5	2
A	90	1, 2, 3, 4	0	12	3
B	90	1, 2, 3, 4	0	17	4
C	90	1, 2, 3, 4	4	12	5
D ('worst case')	90	1, 2, 3, 4	4	17	6
E	180 (double cycled)	1, 2, 3, 4, 1, 3, 4 (double cycled)	4	12	7

Table 2: Lochloy Road / A96(T) – Peak Period Capacity Results (AM & PM) – Original TA

Approach Arm	Base 2019 (AM)		Base 2019 (PM)		Total 2019 (AM)		Total 2019 (PM)	
	Deg Sat	Mean Max Q	Deg Sat	Mean Max Q	Deg Sat	Mean Max Q	Deg Sat	Mean Max Q
Lochloy Road – left, ahead & right	77.9%	9	70.9%	5	79.3%	10	75.2%	5
A96(T)(E) - right, left, ahead	64.2%	12	60.9%	11	67.4%	13	63.0%	12
View Road – ahead, right, left	4.7%	0	7.8%	0	4.3%	0	7.1%	0
A96(T)(W) – left, ahead, right	67.0%	13	70.1%	15	71.4%	15	73.4%	16

Table 3: Lochloy Road / A96(T) – Peak Period Capacity Results (AM & PM) – Scenario A

Approach Arm	Base 2019 (AM)		Base 2019 (PM)		Total 2019 (AM)		Total 2019 (PM)	
	Deg Sat	Mean Max Q	Deg Sat	Mean Max Q	Deg Sat	Mean Max Q	Deg Sat	Mean Max Q
Lochloy Road – left, ahead & right	81.6%	9	77.0%	5	86.4%	11	81.1%	6
A96(T)(E) - right, left, ahead	78.7%	16	71.8%	15	81.2%	16	74.4%	16
View Road – ahead, right, left	4.9%	0	8.5%	0	4.7%	0	7.8%	0
A96(T)(W) – left, ahead, right	82.1%	17	82.7%	20	86.1%	19	86.9%	22

Key parameters: Stage 2 (the dedicated right turn arrow) is not run every cycle. The pedestrian stage has a 12 second intergreen.

Table 4: Lochloy Road / A96(T) – Peak Period Capacity Results (AM & PM) – Scenario B

Approach Arm	Base 2019 (AM)		Base 2019 (PM)		Total 2019 (AM)		Total 2019 (PM)	
	Deg Sat	Mean Max Q	Deg Sat	Mean Max Q	Deg Sat	Mean Max Q	Deg Sat	Mean Max Q
Lochloy Road – left, ahead & right	90.1%	11	84.2%	6	95.0%	14	88.1%	7
A96(T)(E) - right, left, ahead	85.0%	18	78.0%	17	87.9%	19	82.5%	18
View Road – ahead, right, left	5.4%	0	9.5%	0	5.2%	0	8.5%	0
A96(T)(W) – left, ahead, right	88.8%	20	89.9%	24	93.3%	23	94.6%	28

Key parameters: Stage 2 (the dedicated right turn arrow) is not run every cycle. The pedestrian stage has a 17 second intergreen.

Table 5: Lochloy Road / A96(T) – Peak Period Capacity Results (AM & PM) – Scenario C

Approach Arm	Base 2019 (AM)		Base 2019 (PM)		Total 2019 (AM)		Total 2019 (PM)	
	Deg Sat	Mean Max Q	Deg Sat	Mean Max Q	Deg Sat	Mean Max Q	Deg Sat	Mean Max Q
Lochloy Road – left, ahead & right	95.1%	13	92.9%	8	100.0%	18	96.3%	10
A96(T)(E) - right, left, ahead	73.2%	15	69.1%	14	75.4%	15	71.5%	15
View Road – ahead, right, left	5.8%	0	10.7%	0	5.4%	0	9.5%	0
A96(T)(W) – left, ahead, right	96.6%	25	96.2%	29	101.8%	35	101.3%	41

Key parameters: Stage 2 (the dedicated right turn arrow) is run every cycle. The pedestrian stage has a 12 second intergreen.

Table 6: Lochloy Road / A96(T) – Peak Period Capacity Results (AM & PM) – Scenario D

Approach Arm	Base 2019 (AM)		Base 2019 (PM)		Total 2019 (AM)		Total 2019 (PM)	
	Deg Sat	Mean Max Q	Deg Sat	Mean Max Q	Deg Sat	Mean Max Q	Deg Sat	Mean Max Q
Lochloy Road – left, ahead & right	106.9%	24	92.9%	8	111.7%	33	106.3%	15
A96(T)(E) - right, left, ahead	78.7%	16	76.3%	16	81.2%	16	77.6%	17
View Road – ahead, right, left	6.5%	0	10.7%	0	6.1%	0	10.7%	0
A96(T)(W) – left, ahead, right	106.0%	45	108.8%	64	111.9%	62	112.0%	77

Key parameters: Stage 2 (the dedicated right turn arrow) is run every cycle. The pedestrian stage has a 17 second intergreen.

Table 6: Lochloy Road / A96(T) – Peak Period Capacity Results (AM & PM) – Scenario E

Approach Arm	Base 2019 (AM)		Base 2019 (PM)		Total 2019 (AM)		Total 2019 (PM)	
	Deg Sat	Mean Max Q	Deg Sat	Mean Max Q	Deg Sat	Mean Max Q	Deg Sat	Mean Max Q
Lochloy Road – left, ahead & right	95.1%	13	92.9%	8	92.7%	13	92.0%	8
A96(T)(E) - right, left, ahead	73.2%	15	69.1%	14	78.2%	16	72.2%	16
View Road – ahead, right, left	5.8%	0	10.7%	0	5.0%	0	9.0%	0
A96(T)(W) – left, ahead, right	96.6%	25	96.2%	29	93.3%	23	92.5%	28

Key parameters: Under the Total scenario, stage 2 (the dedicated right turn arrow) is double-cycled. In the Base scenario, stage 2 is called every cycle in accordance with the current signal specification and as request by TS/BEAR. The pedestrian stage has a 12 second intergreen in both scenarios.

LinSig optimises the cycle time and green time for each phase/stage.

Discussion and Key Issues

Key Issues

There are three main issues that need to be taken into consideration when reviewing the above results, namely:

- Whether or not the dedicated tight-turn facility in stage 2 is enabled/required every cycle;
- The appropriate length of the pedestrian intergreen in stage 4; and
- The likelihood of the 'worst case' scenario occurring every cycle.

Right-turn Arrow (Stage 2)

Under Scenario A and Scenario B, the 'right-turn' facility in stage 2 has not been enabled due to the low level of demand for right turners. In other words, any vehicles making this movement would be able to do so either within gaps on oncoming vehicles or in the intergreen and thus without recourse the calling of the dedicated right turn arrow. (The TA provides full details of all traffic demands, including the 2017 observed survey counts).

Furthermore, having stage 2 being called every cycle would impose a level of inefficiency on the operation of the junction. In the interests of maximising the junction's operational performance, and taking into consideration that the dedicated right-turn facility is demand dependant, stage 2 has not been enabled in the first two scenarios.

Pedestrian Intergreen (Stage 4)

The CMX clearance/pedestrian intergreen is, as noted by TS, demand dependant. Assuming a 'worst case' scenario, the pedestrian stage is called every 90 seconds (the modelled cycle time), and every 90 seconds the intergreen operates at its maximum of 17 seconds. This is considered rather onerous. Including the 10 second pedestrian green time, this equates to a total pedestrian stage time of 27 seconds. It is considered that such a scenario is highly unlikely to be called every cycle and consequently, if the intergreen was reduced to a more realistic and representative value, the operational performance of the junction can be improved significantly.

Refer also to the discussion below.

'Worst Case' Scenario

A 'worst case' scenario consists of the right-turn arrow (stage 2) being called every cycle and the pedestrian stage (stage 4) having an intergreen of 17 seconds. Importantly, both stage 2 and stage 4 are demand dependant, as confirmed by TS. Running both stages every cycle reflects a scenario which is unlikely to occur and which is not considered a reasoned or realistic approach to understanding how this junction is likely to operate following the introduction of development related trips to the network. Furthermore, no quantitative information or data to support the request from TS/BEAR that a 'worst case' scenario should be considered as part of the planning application was made available.

As outlined in the TA, the highest number of development related trips making the right-turn from the A96 (east arm) onto Lochloy Road can be found during the PM peak period. Here, a total of 12 additional PCUs have been identified. This equates to approximately 1 vehicle every 5 minutes.

Having the stage 2 right-turn arrow called every 90 seconds is therefore not considered to be representative of a demand dependant facility.

Conclusions and Recommendation

In conclusion:

- The 'worst case' scenario requested by TS/BEAR is unlikely to occur on a continual basis throughout the AM and PM peak periods. This is evidenced within the TA where it has been shown that there are only 12 additional development-related trips making the right turn onto Lochloy Road during the PM peak period. This equates to *circa* 1 vehicle every 300 seconds, compared to a cycle time of 90 seconds;
- Introducing any form of mitigation at this junction to account for the introduction of 12 development related trips is not considered to be appropriate justification for the introduction of any mitigation, nor a positive example of 'value engineering'; and
- Scenario E shows that junction performance can be improved significantly through the double-cycling of stage 2 such that the results from the Total scenario (i.e. with development) mirror very closely the results from the equivalent Base scenario. This suggests that the junction will continue to operate effectively following the addition of the development related trips.

Based upon the above, it is recommended that no mitigation as a direct result of the 'NA2' development proposals is required. However, Scenario E could be implemented by TS/BEAR if considered appropriate.

Finally, the overall findings and content of the original TA remain correct and unchanged. The work presented within this paper reflect a series of simple sensitivity tests which have been undertaken to address the latest comments received from TS (and BEAR).

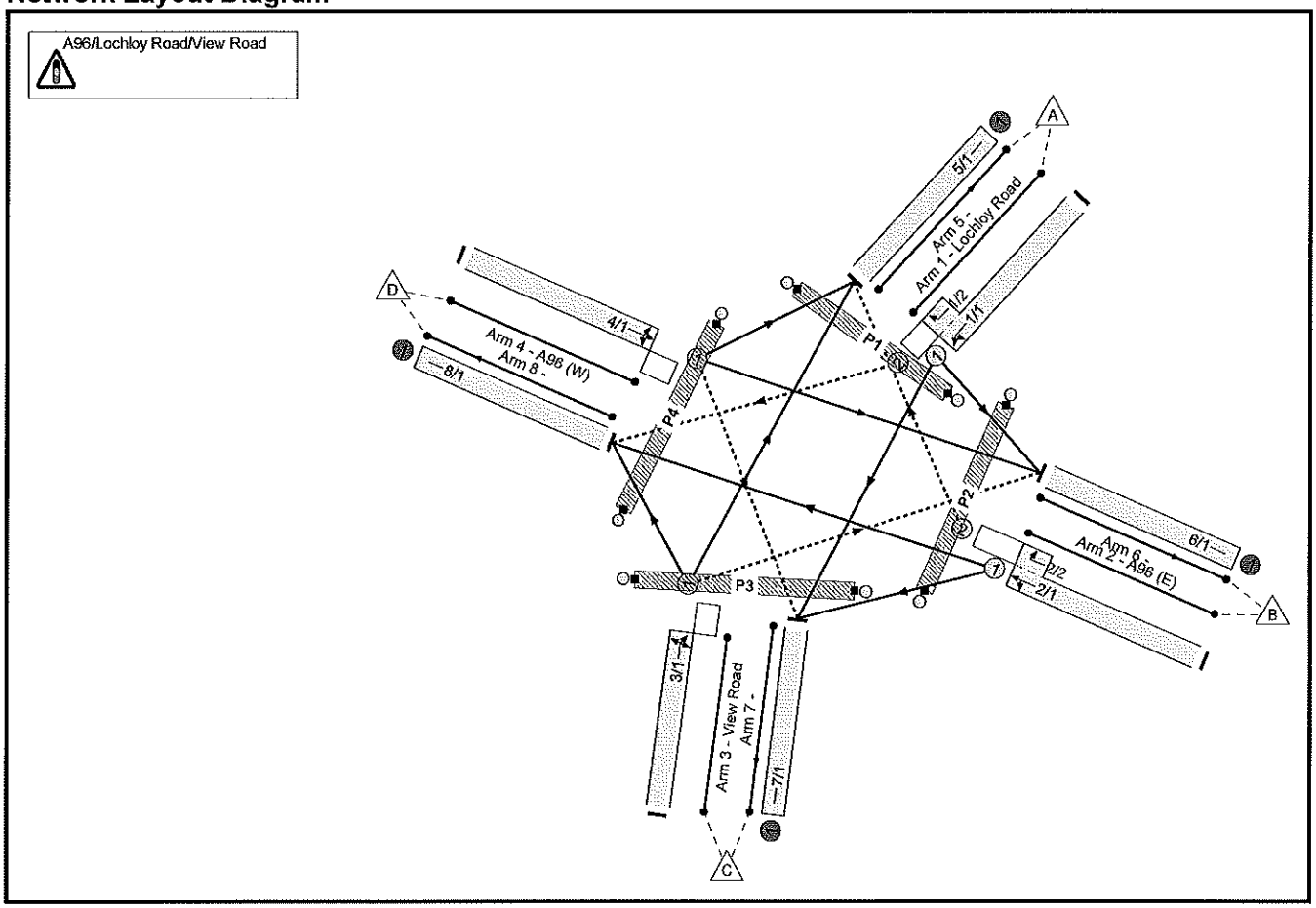
Appendix A – *LinSig* Model Outputs

NA2, Nairn - Lochloy Road / A96 4-arm signalised junction 2019

User and Project Details

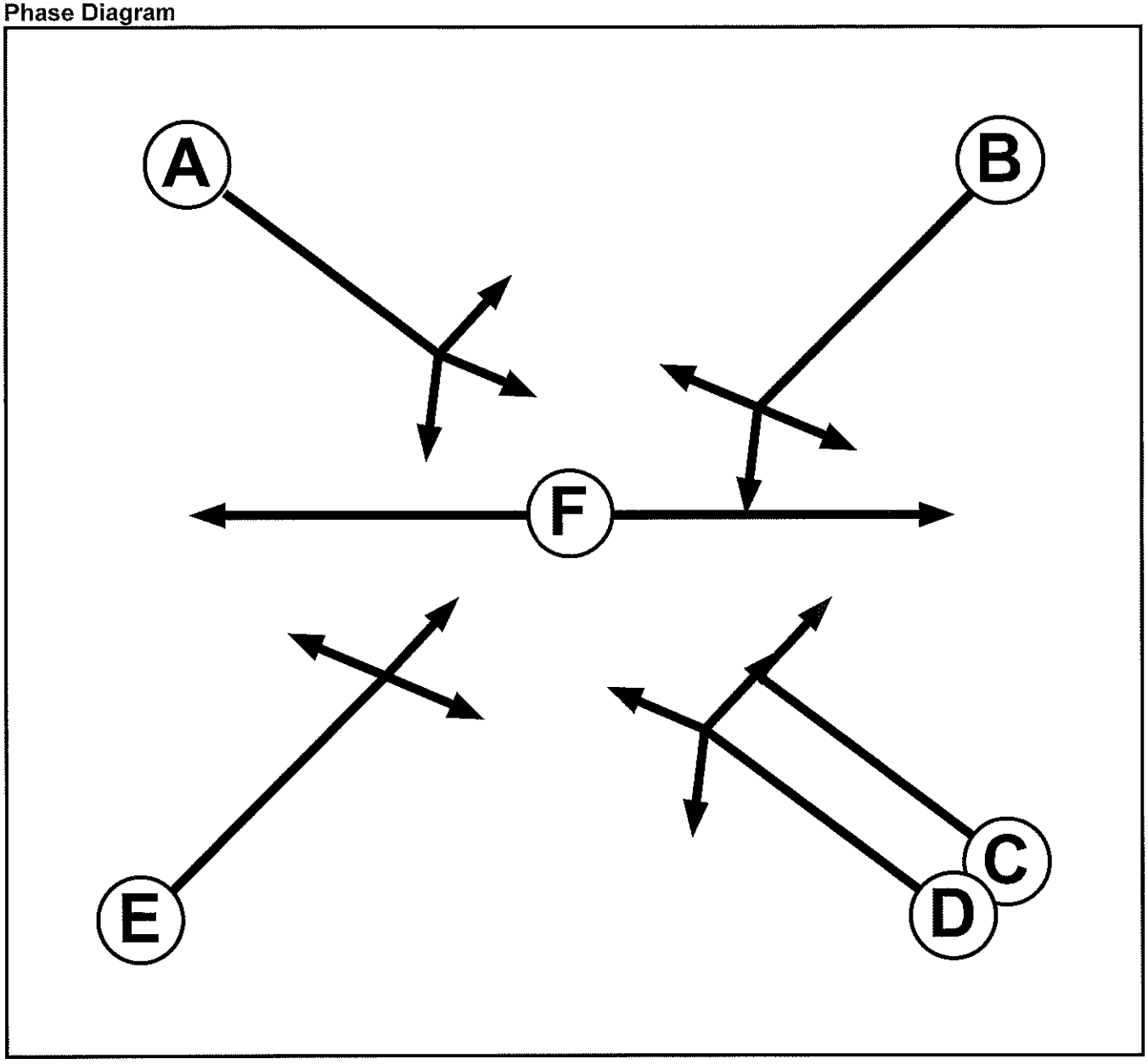
Project:	
Title:	
Location:	
File name:	A96-Lochloy Road-View Road (sensitivity) - 12 seconds RT 20-03-2018.lsg3x
Author:	
Company:	
Address:	
Notes:	

Network Layout Diagram



NA2, Nairn - Lochloy Road / A96 4-arm signalised junction 2019

Phase Diagram



Phase Input Data

Phase Name	Phase Type	Assoc. Phase	Street Min	Cont Min
A	Traffic		7	7
B	Traffic		7	7
C	Ind. Arrow	D	4	4
D	Traffic		7	7
E	Traffic		7	7
F	Pedestrian		7	7

NA2, Nairn - Lochloy Road / A96 4-arm signalised junction 2019

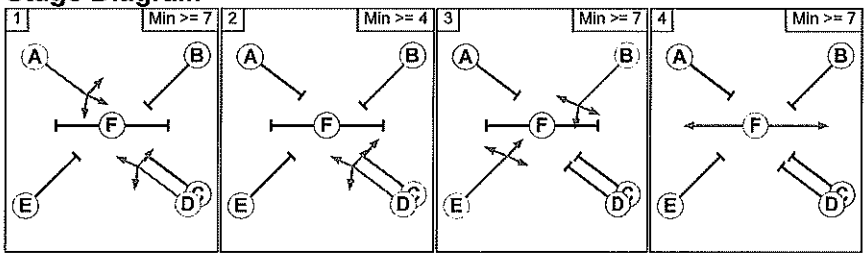
Phase Intergreens Matrix

		Starting Phase					
		A	B	C	D	E	F
Terminating Phase	A		5	5	-	5	8
	B	5		5	5	-	8
	C	5	5		-	5	8
	D	-	5	-		5	8
	E	5	-	5	5		8
	F	12	12	12	12	12	

Phases in Stage

Stage No.	Phases in Stage
1	A D
2	C D
3	B E
4	F

Stage Diagram



Phase Delays

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

Prohibited Stage Change

		To Stage			
		1	2	3	4
From Stage	1		5	5	8
	2	5		5	8
	3	5	5		8
	4	12	12	12	

NA2, Nairn - Lochloy Road / A96 4-arm signalised junction 2019

Give-Way Lane Input Data

Junction: A96/Lochloy Road/View Road											
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)
1/2 (Lochloy Road)	8/1 (Right)	1439	0	3/1	1.09	To 5/1 (Ahead)	2.00	-	0.50	2	2.00
2/2 (A96 (E))	5/1 (Right)	1439	0	4/1	1.09	To 6/1 (Ahead)	3.00	-	0.50	3	2.00
3/1 (View Road)	6/1 (Right)	1439	0	1/1	1.09	To 7/1 (Ahead)	2.00	2.00	0.50	2	2.00
4/1 (A96 (W))	7/1 (Right)	1439	0	2/1	1.09	To 8/1 (Ahead)	2.00	2.00	0.50	2	2.00

Lane Input Data

Junction: A96/Lochloy Road/View Road												
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 (Lochloy Road)	U	B	2	3	3.6	Geom	-	3.00	0.00	Y	Arm 6 Left	12.20
											Arm 7 Ahead	Inf
1/2 (Lochloy Road)	O	B	2	3	2.0	Geom	-	3.00	0.00	Y	Arm 8 Right	12.00
2/1 (A96 (E))	U	D	2	3	6.0	Geom	-	3.00	0.00	Y	Arm 7 Left	10.50
											Arm 8 Ahead	Inf
2/2 (A96 (E))	O	D C	2	3	2.0	Geom	-	3.00	0.00	Y	Arm 5 Right	10.00
3/1 (View Road)	O	E	2	3	4.0	Geom	-	2.90	0.00	Y	Arm 5 Ahead	Inf
											Arm 6 Right	14.00
											Arm 8 Left	8.00
4/1 (A96 (W))	O	A	2	3	10.4	Geom	-	3.40	0.00	Y	Arm 5 Left	12.00
											Arm 6 Ahead	Inf
											Arm 7 Right	15.00
5/1	U		2	3	60.0	Inf	-	-	-	-	-	-
6/1	U		2	3	60.0	Inf	-	-	-	-	-	-
7/1	U		2	3	60.0	Inf	-	-	-	-	-	-
8/1	U		2	3	60.0	Inf	-	-	-	-	-	-

Traffic Flow Groups

Flow Group	Start Time	End Time	Duration	Formula
1: 'AM Peak BASE'	08:10	09:10	01:00	
2: 'PM Peak BASE'	16:40	17:40	01:00	
3: 'AM Peak TOTAL'	08:10	09:10	01:00	
4: 'PM Peak TOTAL'	16:40	17:40	01:00	

Scenario 1: 'AM Peak Base 2019' (FG1: 'AM Peak BASE', Plan 1: 'Network Control Plan 1')

Traffic Flows, Desired

Desired Flow :

		Destination				
		A	B	C	D	Tot.
Origin	A	0	53	3	270	326
	B	37	0	3	624	664
	C	2	3	0	13	18
	D	133	553	10	0	696
	Tot.	172	609	16	907	1704

Traffic Lane Flows

Lane	Scenario 1: AM Peak Base 2019
Junction: A96/Lochloy Road/View Road	
1/1 (with short)	326(In) 56(Out)
1/2 (short)	270
2/1 (with short)	664(In) 627(Out)
2/2 (short)	37
3/1	18
4/1	696
5/1	172
6/1	609
7/1	16
8/1	907

Lane Saturation Flows

Junction: A96/Lochloy Road/View Road								
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat Flow (PCU/Hr)**	**Flared Sat Flow (PCU/Hr)**
1/1 (Lochloy Road)	3.00	0.00	Y	Arm 6 Left	12.20	94.6 %	1715	1715
				Arm 7 Ahead	Inf	5.4 %		
1/2 (Lochloy Road)	3.00	0.00	Y	Arm 8 Right	12.00	100.0 %	1702	1702
2/1 (A96 (E))	3.00	0.00	Y	Arm 7 Left	10.50	0.5 %	1914	1914
				Arm 8 Ahead	Inf	99.5 %		
2/2 (A96 (E))	3.00	0.00	Y	Arm 5 Right	10.00	100.0 %	1665	1665
3/1 (View Road)	2.90	0.00	Y	Arm 5 Ahead	Inf	11.1 %	1652	1652
				Arm 6 Right	14.00	16.7 %		
				Arm 8 Left	8.00	72.2 %		
4/1 (A96 (W))	3.40	0.00	Y	Arm 5 Left	12.00	19.1 %	1907	1907
				Arm 6 Ahead	Inf	79.5 %		
				Arm 7 Right	15.00	1.4 %		
5/1	Infinite Saturation Flow						Inf	Inf
6/1	Infinite Saturation Flow						Inf	Inf
7/1	Infinite Saturation Flow						Inf	Inf
8/1	Infinite Saturation Flow						Inf	Inf

Scenario 2: 'PM Peak Base 2019' (FG2: 'PM Peak BASE', Plan 1: 'Network Control Plan 1')

Traffic Flows, Desired

Desired Flow :

	Destination					
Origin		A	B	C	D	Tot.
	A	0	39	4	127	170
	B	96	0	3	656	755
	C	5	0	0	11	16
	D	187	677	10	0	874
	Tot.	288	716	17	794	1815

NA2, Nairn - Lochloy Road / A96 4-arm signalised junction 2019

Traffic Lane Flows

Lane	Scenario 2: PM Peak Base 2019
Junction: A96/Lochloy Road/View Road	
1/1 (with short)	170(In) 43(Out)
1/2 (short)	127
2/1 (with short)	755(In) 659(Out)
2/2 (short)	96
3/1	16
4/1	874
5/1	288
6/1	716
7/1	17
8/1	794

Lane Saturation Flows

Junction: A96/Lochloy Road/View Road								
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat Flow (PCU/Hr)**	**Flared Sat Flow (PCU/Hr)**
1/1 (Lochloy Road)	3.00	0.00	Y	Arm 6 Left	12.20	90.7 %	1723	1723
				Arm 7 Ahead	Inf	9.3 %		
1/2 (Lochloy Road)	3.00	0.00	Y	Arm 8 Right	12.00	100.0 %	1702	1702
2/1 (A96 (E))	3.00	0.00	Y	Arm 7 Left	10.50	0.5 %	1914	1914
				Arm 8 Ahead	Inf	99.5 %		
2/2 (A96 (E))	3.00	0.00	Y	Arm 5 Right	10.00	100.0 %	1665	1665
3/1 (View Road)	2.90	0.00	Y	Arm 5 Ahead	Inf	31.3 %	1687	1687
				Arm 6 Right	14.00	0.0 %		
				Arm 8 Left	8.00	68.8 %		
4/1 (A96 (W))	3.40	0.00	Y	Arm 5 Left	12.00	21.4 %	1902	1902
				Arm 6 Ahead	Inf	77.5 %		
				Arm 7 Right	15.00	1.1 %		
5/1	Infinite Saturation Flow						Inf	Inf
6/1	Infinite Saturation Flow						Inf	Inf
7/1	Infinite Saturation Flow						Inf	Inf
8/1	Infinite Saturation Flow						Inf	Inf

NA2, Nairn - Lochloy Road / A96 4-arm signalised junction 2019

Scenario 3: 'AM Peak TOTAL 2019' (FG3: 'AM Peak TOTAL', Plan 1: 'Network Control Plan 1')

Traffic Flows, Desired

Desired Flow :

		Destination				
		A	B	C	D	Tot.
Origin	A	0	59	4	299	362
	B	41	0	3	624	668
	C	2	3	0	13	18
	D	147	553	10	0	710
	Tot.	190	615	17	936	1758

Traffic Lane Flows

Lane	Scenario 3: AM Peak TOTAL 2019
Junction: A96/Lochloy Road/View Road	
1/1 (with short)	362(In) 63(Out)
1/2 (short)	299
2/1 (with short)	668(In) 627(Out)
2/2 (short)	41
3/1	18
4/1	710
5/1	190
6/1	615
7/1	17
8/1	936

Lane Saturation Flows

Junction: A96/Lochloy Road/View Road								
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat Flow (PCU/Hr)**	**Flared Sat Flow (PCU/Hr)**
1/1 (Lochloy Road)	3.00	0.00	Y	Arm 6 Left	12.20	93.7 %	1717	1717
				Arm 7 Ahead	Inf	6.3 %		
1/2 (Lochloy Road)	3.00	0.00	Y	Arm 8 Right	12.00	100.0 %	1702	1702
2/1 (A96 (E))	3.00	0.00	Y	Arm 7 Left	10.50	0.5 %	1914	1914
				Arm 8 Ahead	Inf	99.5 %		
2/2 (A96 (E))	3.00	0.00	Y	Arm 5 Right	10.00	100.0 %	1665	1665
3/1 (View Road)	2.90	0.00	Y	Arm 5 Ahead	Inf	11.1 %	1652	1652
				Arm 6 Right	14.00	16.7 %		
				Arm 8 Left	8.00	72.2 %		
4/1 (A96 (W))	3.40	0.00	Y	Arm 5 Left	12.00	20.7 %	1903	1903
				Arm 6 Ahead	Inf	77.9 %		
				Arm 7 Right	15.00	1.4 %		
5/1	Infinite Saturation Flow						Inf	Inf
6/1	Infinite Saturation Flow						Inf	Inf
7/1	Infinite Saturation Flow						Inf	Inf
8/1	Infinite Saturation Flow						Inf	Inf

Scenario 4: 'PM Peak TOTAL 2019' (FG4: 'PM Peak TOTAL', Plan 1: 'Network Control Plan 1')

Traffic Flows, Desired

Desired Flow :

		Destination				
		A	B	C	D	Tot.
Origin	A	0	45	5	145	195
	B	108	0	3	656	767
	C	5	0	0	11	16
	D	210	677	10	0	897
	Tot.	323	722	18	812	1875

NA2, Nairn - Lochloy Road / A96 4-arm signalised junction 2019

Traffic Lane Flows

Lane	Scenario 4: PM Peak TOTAL 2019
Junction: A96/Lochloy Road/View Road	
1/1 (with short)	195(In) 50(Out)
1/2 (short)	145
2/1 (with short)	767(In) 659(Out)
2/2 (short)	108
3/1	16
4/1	897
5/1	323
6/1	722
7/1	18
8/1	812

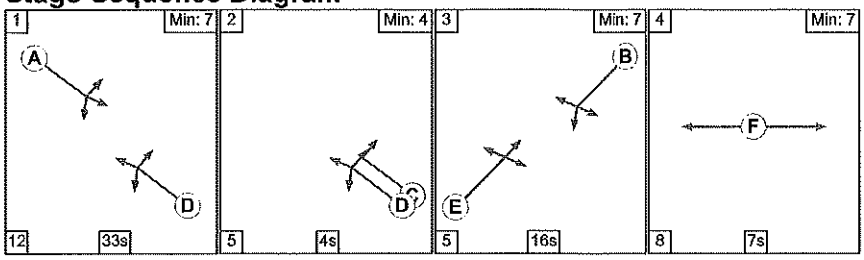
Lane Saturation Flows

Junction: A96/Lochloy Road/View Road								
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat Flow (PCU/Hr)**	**Flared Sat Flow (PCU/Hr)**
1/1 (Lochloy Road)	3.00	0.00	Y	Arm 6 Left	12.20	90.0 %	1724	1724
				Arm 7 Ahead	Inf	10.0 %		
1/2 (Lochloy Road)	3.00	0.00	Y	Arm 8 Right	12.00	100.0 %	1702	1702
2/1 (A96 (E))	3.00	0.00	Y	Arm 7 Left	10.50	0.5 %	1914	1914
				Arm 8 Ahead	Inf	99.5 %		
2/2 (A96 (E))	3.00	0.00	Y	Arm 5 Right	10.00	100.0 %	1665	1665
3/1 (View Road)	2.90	0.00	Y	Arm 5 Ahead	Inf	31.3 %	1687	1687
				Arm 6 Right	14.00	0.0 %		
				Arm 8 Left	8.00	68.8 %		
4/1 (A96 (W))	3.40	0.00	Y	Arm 5 Left	12.00	23.4 %	1897	1897
				Arm 6 Ahead	Inf	75.5 %		
				Arm 7 Right	15.00	1.1 %		
5/1	Infinite Saturation Flow						Inf	Inf
6/1	Infinite Saturation Flow						Inf	Inf
7/1	Infinite Saturation Flow						Inf	Inf
8/1	Infinite Saturation Flow						Inf	Inf

NA2, Nairn - Lochloy Road / A96 4-arm signalised junction 2019

Scenario 1: 'AM Peak Base 2019' (FG1: 'AM Peak BASE', Plan 1: 'Network Control Plan 1')

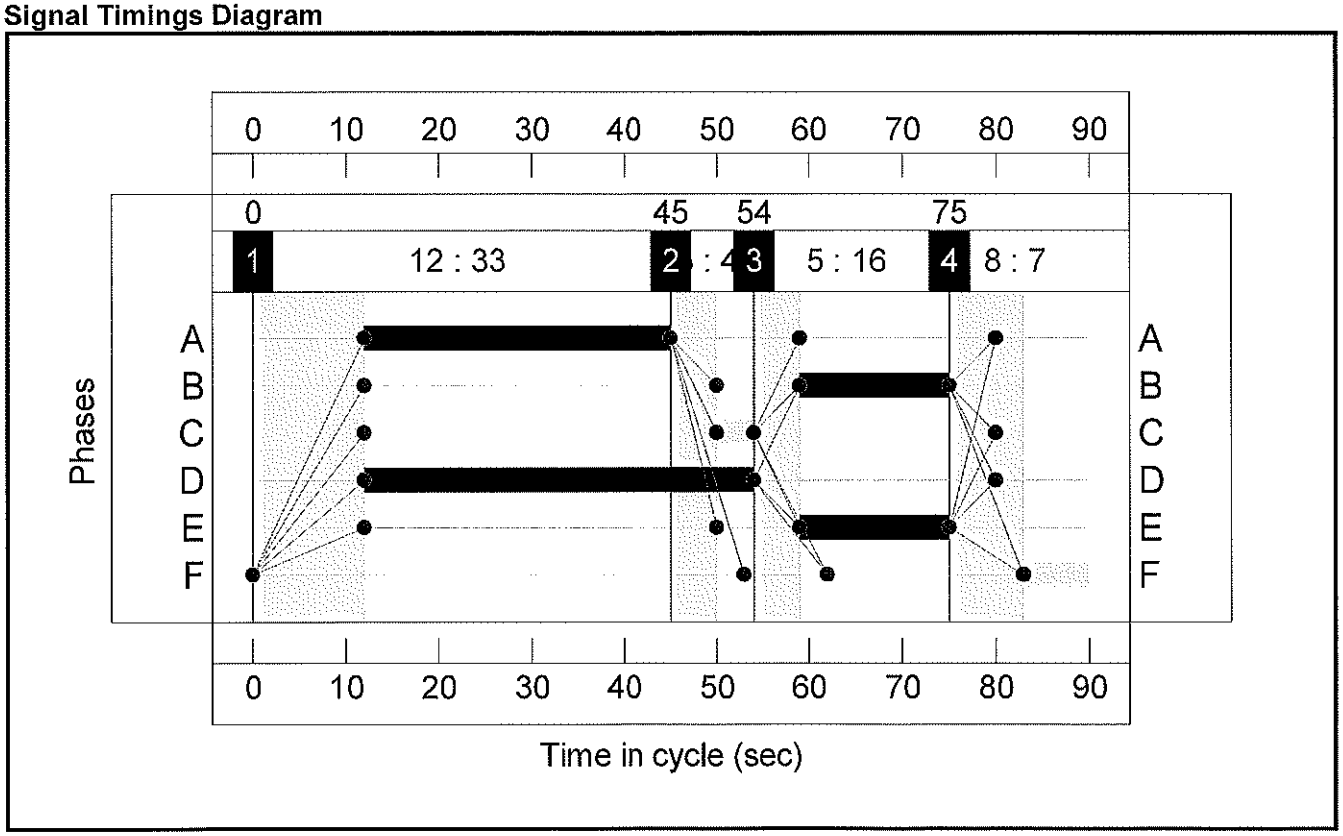
Stage Sequence Diagram



Stage Timings

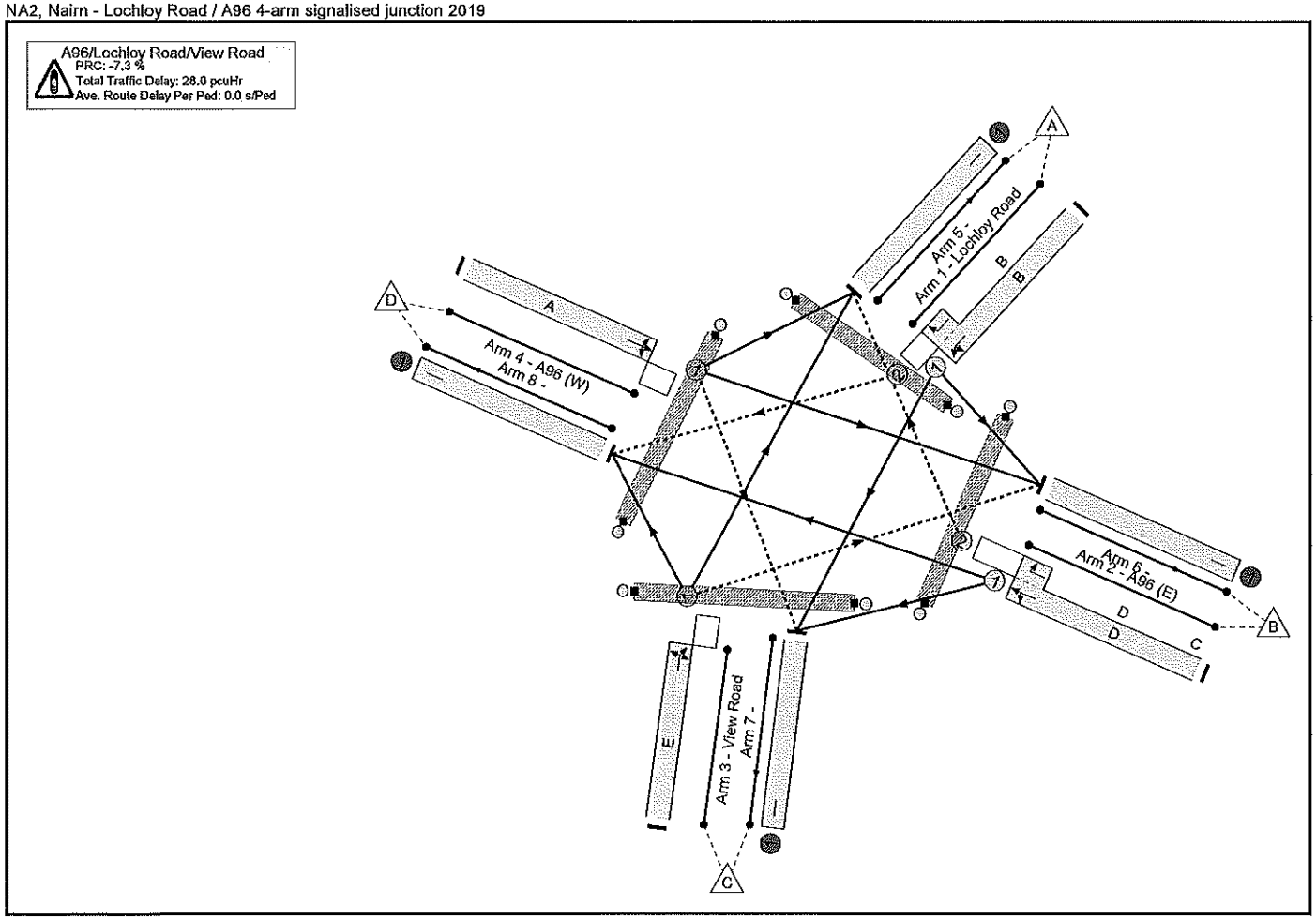
Stage	1	2	3	4
Duration	33	4	16	7
Change Point	0	45	54	75

Signal Timings Diagram



NA2, Nairn - Lochloy Road / A96 4-arm signalised junction 2019
Network Layout Diagram

NA2, Nairn - Lochloy Road / A96 4-arm signalised junction 2019



NA2, Nairn - Lochloy Road / A96 4-arm signalised junction 2019

Network Results

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network	-	-	N/A	-	-		-	-	-	-	-	-	96.6%
A96/Lochloy Road/View Road	-	-	N/A	-	-		-	-	-	-	-	-	96.6%
1/1+1/2	Lochloy Road Left Ahead Right	U+O	N/A	N/A	B		1	16	-	326	1715:1702	343	95.1%
2/1+2/2	A96 (E) Right Left Ahead	U+O	N/A	N/A	D	C	1	42	4	664	1914:1665	907	73.2%
3/1	View Road Ahead Right Left	O	N/A	N/A	E		1	16	-	18	1652	312	5.8%
4/1	A96 (W) Left Ahead Right	O	N/A	N/A	A		1	33	-	696	1907	720	96.6%
5/1		U	N/A	N/A	-		-	-	-	172	Inf	Inf	0.0%
6/1		U	N/A	N/A	-		-	-	-	609	Inf	Inf	0.0%
7/1		U	N/A	N/A	-		-	-	-	16	Inf	Inf	0.0%
8/1		U	N/A	N/A	-		-	-	-	907	Inf	Inf	0.0%
Ped Link: P1	Unnamed Ped Link	-	N/A	-	F		1	7	-	0	-	0	0.0%
Ped Link: P2	Unnamed Ped Link	-	N/A	-	F		1	7	-	0	-	0	0.0%
Ped Link: P3	Unnamed Ped Link	-	N/A	-	F		1	7	-	0	-	0	0.0%
Ped Link: P4	Unnamed Ped Link	-	N/A	-	F		1	7	-	0	-	0	0.0%

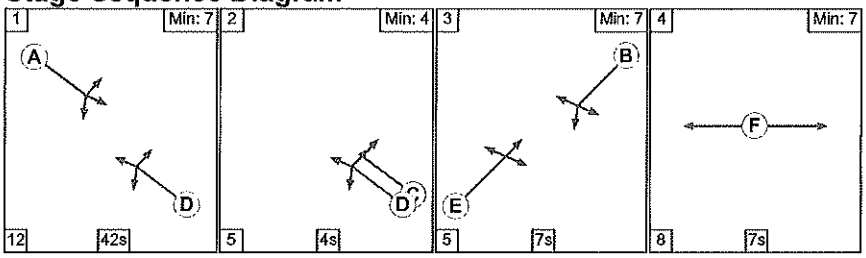
NA2, Nairn - Lochloy Road / A96 4-arm signalised junction 2019

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	-	-	299	19	2	12.2	15.6	0.3	28.0	-	-	-	-
A96/Lochloy Road/View Road	-	-	299	19	2	12.2	15.6	0.3	28.0	-	-	-	-
1/1+1/2	326	326	270	0	0	3.2	5.8	0.1	9.1	100.0	7.6	5.8	13.3
2/1+2/2	664	664	16	19	1	3.5	1.3	0.2	5.0	27.1	13.2	1.3	14.5
3/1	18	18	3	0	0	0.2	0.0	0.0	0.2	36.1	0.4	0.0	0.4
4/1	696	696	10	0	0	5.3	8.4	0.0	13.8	71.2	17.0	8.4	25.4
5/1	172	172	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	609	609	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
7/1	16	16	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
8/1	907	907	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
Ped Link: P1	0	0	-	-	-	-	-	-	-	-	-	-	-
Ped Link: P2	0	0	-	-	-	-	-	-	-	-	-	-	-
Ped Link: P3	0	0	-	-	-	-	-	-	-	-	-	-	-
Ped Link: P4	0	0	-	-	-	-	-	-	-	-	-	-	-

C1 PRC for Signalled Lanes (%): -7.3 Total Delay for Signalled Lanes (pcuHr): 27.99 Cycle Time (s): 90
PRC Over All Lanes (%): -7.3 Total Delay Over All Lanes(pcuHr): 27.99

NA2, Nairn - Lochloy Road / A96 4-arm signalised junction 2019
Scenario 2: 'PM Peak Base 2019' (FG2: 'PM Peak BASE', Plan 1: 'Network Control Plan 1')

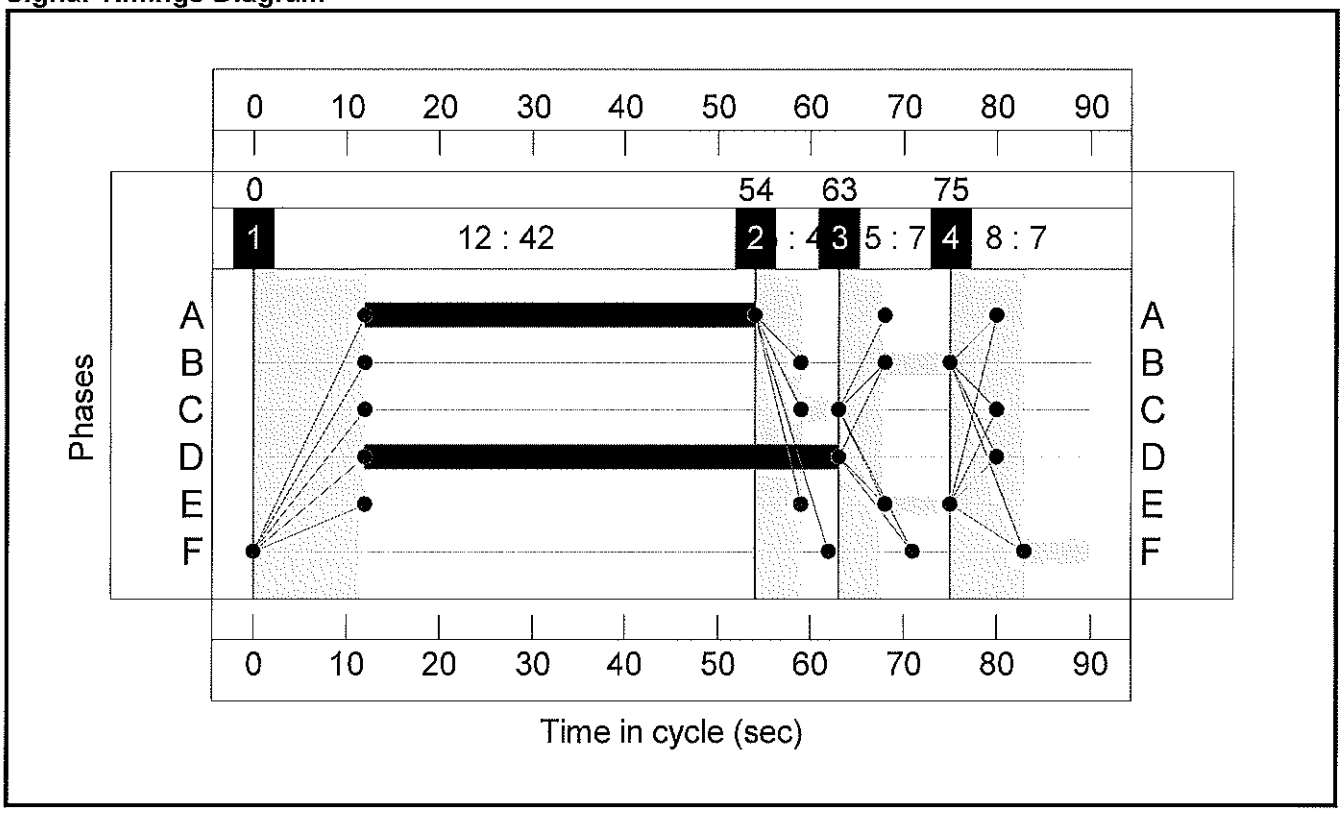
Stage Sequence Diagram



Stage Timings

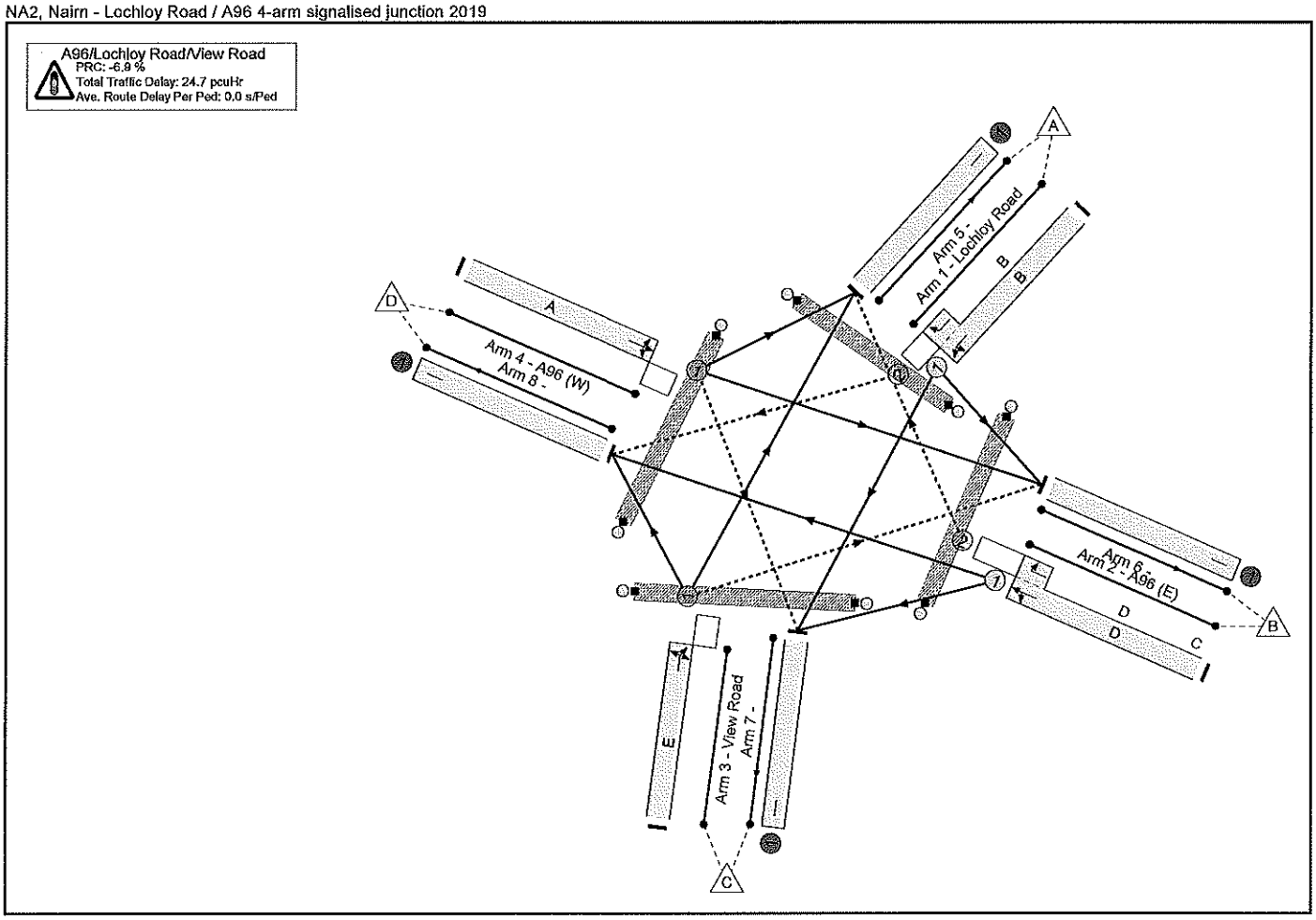
Stage	1	2	3	4
Duration	42	4	7	7
Change Point	0	54	63	75

Signal Timings Diagram



NA2, Nairn - Lochloy Road / A96 4-arm signalised junction 2019
Network Layout Diagram

NA2, Nairn - Lochloy Road / A96 4-arm signalised junction 2019



NA2, Nairn - Lochloy Road / A96 4-arm signalised junction 2019

Network Results

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network	-	-	N/A	-	-		-	-	-	-	-	-	96.2%
A96/Lochloy Road/View Road	-	-	N/A	-	-		-	-	-	-	-	-	96.2%
1/1+1/2	Lochloy Road Left Ahead Right	U+O	N/A	N/A	B		1	7	-	170	1723:1702	183	92.9%
2/1+2/2	A96 (E) Right Left Ahead	U+O	N/A	N/A	D	C	1	51	4	755	1914:1665	1093	69.1%
3/1	View Road Ahead Right Left	O	N/A	N/A	E		1	7	-	16	1687	150	10.7%
4/1	A96 (W) Left Ahead Right	O	N/A	N/A	A		1	42	-	874	1902	909	96.2%
5/1		U	N/A	N/A	-		-	-	-	288	Inf	Inf	0.0%
6/1		U	N/A	N/A	-		-	-	-	716	Inf	Inf	0.0%
7/1		U	N/A	N/A	-		-	-	-	17	Inf	Inf	0.0%
8/1		U	N/A	N/A	-		-	-	-	794	Inf	Inf	0.0%
Ped Link: P1	Unnamed Ped Link	-	N/A	-	F		1	7	-	0	-	0	0.0%
Ped Link: P2	Unnamed Ped Link	-	N/A	-	F		1	7	-	0	-	0	0.0%
Ped Link: P3	Unnamed Ped Link	-	N/A	-	F		1	7	-	0	-	0	0.0%
Ped Link: P4	Unnamed Ped Link	-	N/A	-	F		1	7	-	0	-	0	0.0%

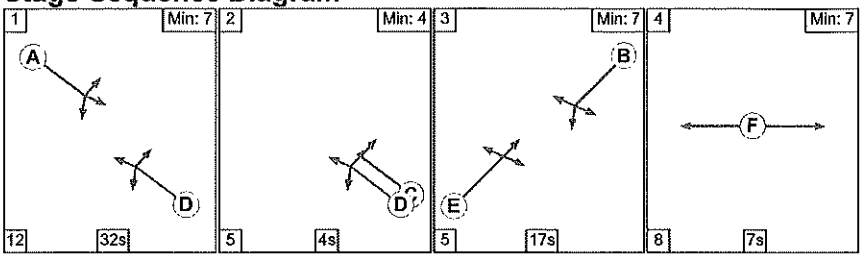
NA2, Nairn - Lochloy Road / A96 4-arm signalised junction 2019

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	-	-	156	69	8	10.3	13.7	0.7	24.7	-	-	-	-
A96/Lochloy Road/View Road	-	-	156	69	8	10.3	13.7	0.7	24.7	-	-	-	-
1/1+1/2	170	170	122	0	5	1.9	4.0	0.0	6.0	126.4	3.5	4.0	7.6
2/1+2/2	755	755	23	69	3	2.8	1.1	0.6	4.5	21.4	12.7	1.1	13.8
3/1	16	16	0	0	0	0.2	0.1	0.0	0.2	51.2	0.4	0.1	0.4
4/1	874	874	10	0	0	5.5	8.5	0.0	14.0	57.6	20.9	8.5	29.3
5/1	288	288	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	716	716	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
7/1	17	17	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
8/1	794	794	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
Ped Link: P1	0	0	-	-	-	-	-	-	-	-	-	-	-
Ped Link: P2	0	0	-	-	-	-	-	-	-	-	-	-	-
Ped Link: P3	0	0	-	-	-	-	-	-	-	-	-	-	-
Ped Link: P4	0	0	-	-	-	-	-	-	-	-	-	-	-

C1 PRC for Signalled Lanes (%): -6.9 Total Delay for Signalled Lanes (pcuHr): 24.68 Cycle Time (s): 90
PRC Over All Lanes (%): -6.9 Total Delay Over All Lanes(pcuHr): 24.68

NA2, Nairn - Lochloy Road / A96 4-arm signalised junction 2019
Scenario 3: 'AM Peak TOTAL 2019' (FG3: 'AM Peak TOTAL', Plan 1: 'Network Control Plan 1')

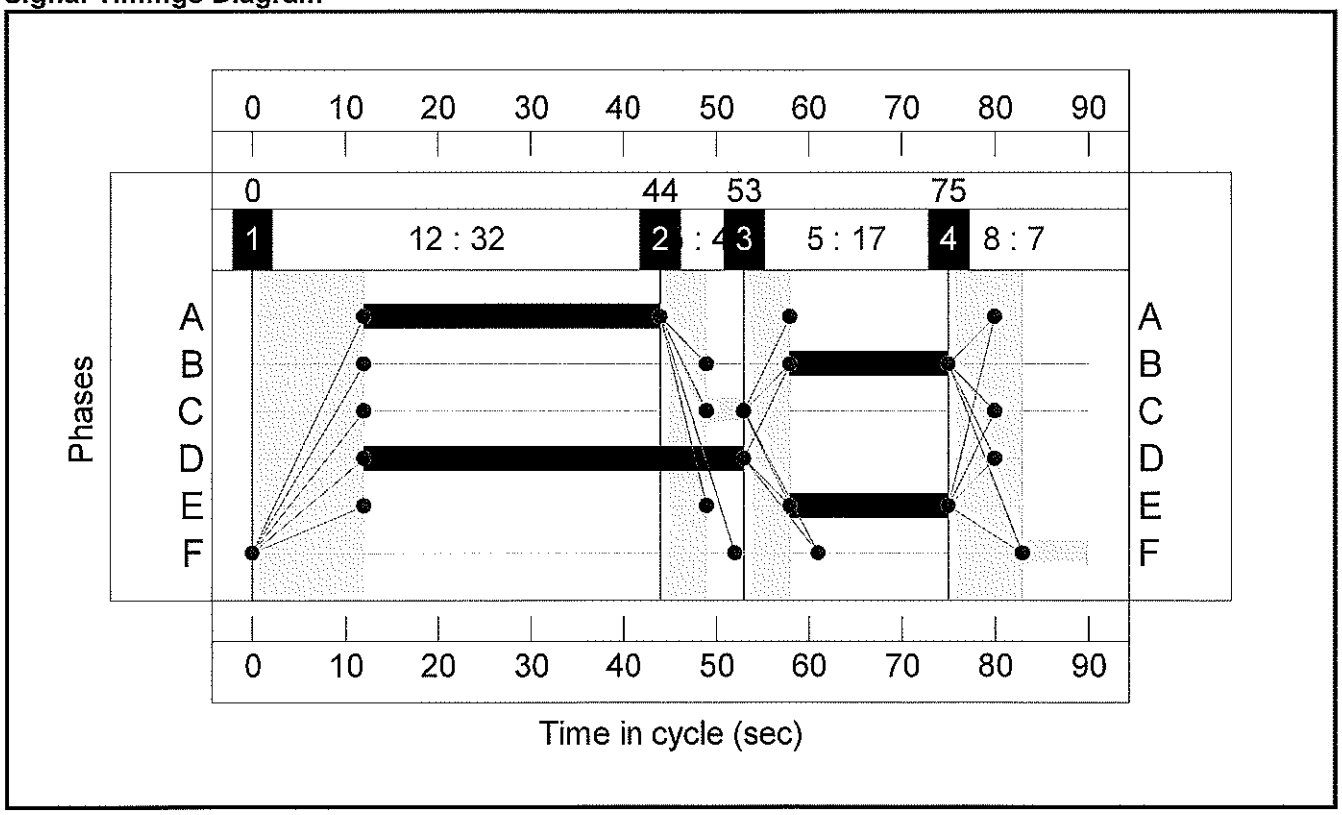
Stage Sequence Diagram



Stage Timings

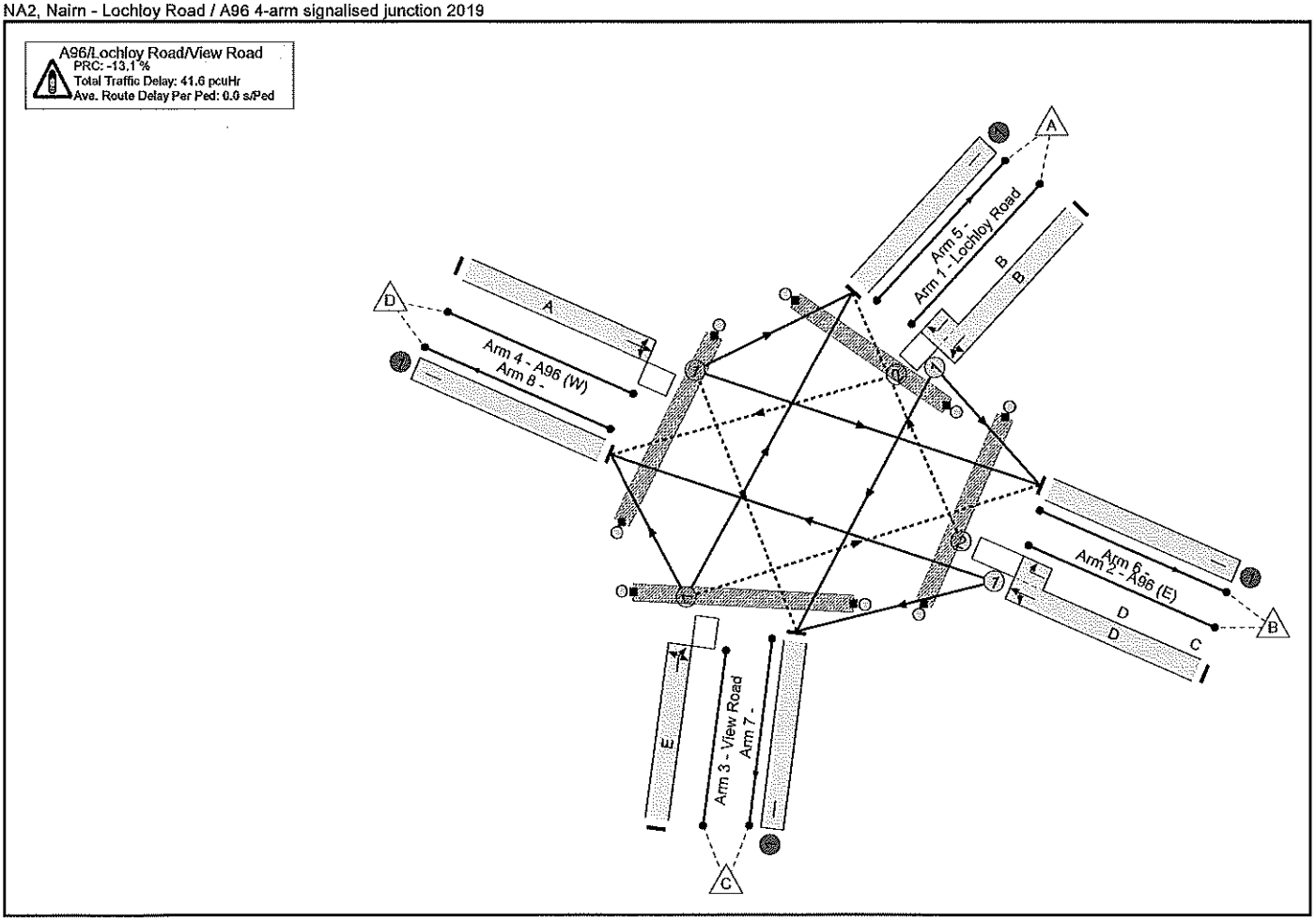
Stage	1	2	3	4
Duration	32	4	17	7
Change Point	0	44	53	75

Signal Timings Diagram



NA2, Nairn - Lochloy Road / A96 4-arm signalised junction 2019
Network Layout Diagram

NA2, Nairn - Lochloy Road / A96 4-arm signalised junction 2019



NA2, Nairn - Lochloy Road / A96 4-arm signalised junction 2019

Network Results

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network	-	-	N/A	-	-		-	-	-	-	-	-	101.8%
A96/Lochloy Road/View Road	-	-	N/A	-	-		-	-	-	-	-	-	101.8%
1/1+1/2	Lochloy Road Left Ahead Right	U+O	N/A	N/A	B		1	17	-	362	1717:1702	362	100.0%
2/1+2/2	A96 (E) Right Left Ahead	U+O	N/A	N/A	D	C	1	41	4	668	1914:1665	886	75.4%
3/1	View Road Ahead Right Left	O	N/A	N/A	E		1	17	-	18	1652	330	5.4%
4/1	A96 (W) Left Ahead Right	O	N/A	N/A	A		1	32	-	710	1903	698	101.8%
5/1		U	N/A	N/A	-		-	-	-	190	Inf	Inf	0.0%
6/1		U	N/A	N/A	-		-	-	-	615	Inf	Inf	0.0%
7/1		U	N/A	N/A	-		-	-	-	17	Inf	Inf	0.0%
8/1		U	N/A	N/A	-		-	-	-	936	Inf	Inf	0.0%
Ped Link: P1	Unnamed Ped Link	-	N/A	-	F		1	7	-	0	-	0	0.0%
Ped Link: P2	Unnamed Ped Link	-	N/A	-	F		1	7	-	0	-	0	0.0%
Ped Link: P3	Unnamed Ped Link	-	N/A	-	F		1	7	-	0	-	0	0.0%
Ped Link: P4	Unnamed Ped Link	-	N/A	-	F		1	7	-	0	-	0	0.0%

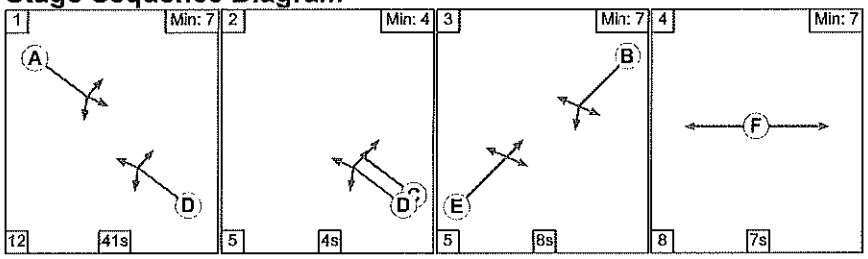
NA2, Nairn - Lochloy Road / A96 4-arm signalised junction 2019

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	-	-	298	40	15	13.5	27.8	0.3	41.6	-	-	-	-
A96/Lochloy Road/View Road	-	-	298	40	15	13.5	27.8	0.3	41.6	-	-	-	-
1/1+1/2	362	362	286	0	13	3.6	9.5	0.1	13.2	130.8	8.5	9.5	18.0
2/1+2/2	668	668	0	40	1	3.7	1.5	0.2	5.4	28.9	13.6	1.5	15.1
3/1	18	18	3	0	0	0.1	0.0	0.0	0.2	35.0	0.4	0.0	0.4
4/1	710	698	10	0	0	6.1	16.7	0.0	22.9	116.0	18.1	16.7	34.8
5/1	187	187	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	605	605	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
7/1	17	17	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
8/1	936	936	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
Ped Link: P1	0	0	-	-	-	-	-	-	-	-	-	-	-
Ped Link: P2	0	0	-	-	-	-	-	-	-	-	-	-	-
Ped Link: P3	0	0	-	-	-	-	-	-	-	-	-	-	-
Ped Link: P4	0	0	-	-	-	-	-	-	-	-	-	-	-

C1 PRC for Signalled Lanes (%): -13.1 Total Delay for Signalled Lanes (pcuHr): 41.58 Cycle Time (s): 90
PRC Over All Lanes (%): -13.1 Total Delay Over All Lanes(pcuHr): 41.58

NA2, Nairn - Lochloy Road / A96 4-arm signalised junction 2019
Scenario 4: 'PM Peak TOTAL 2019' (FG4: 'PM Peak TOTAL', Plan 1: 'Network Control Plan 1')

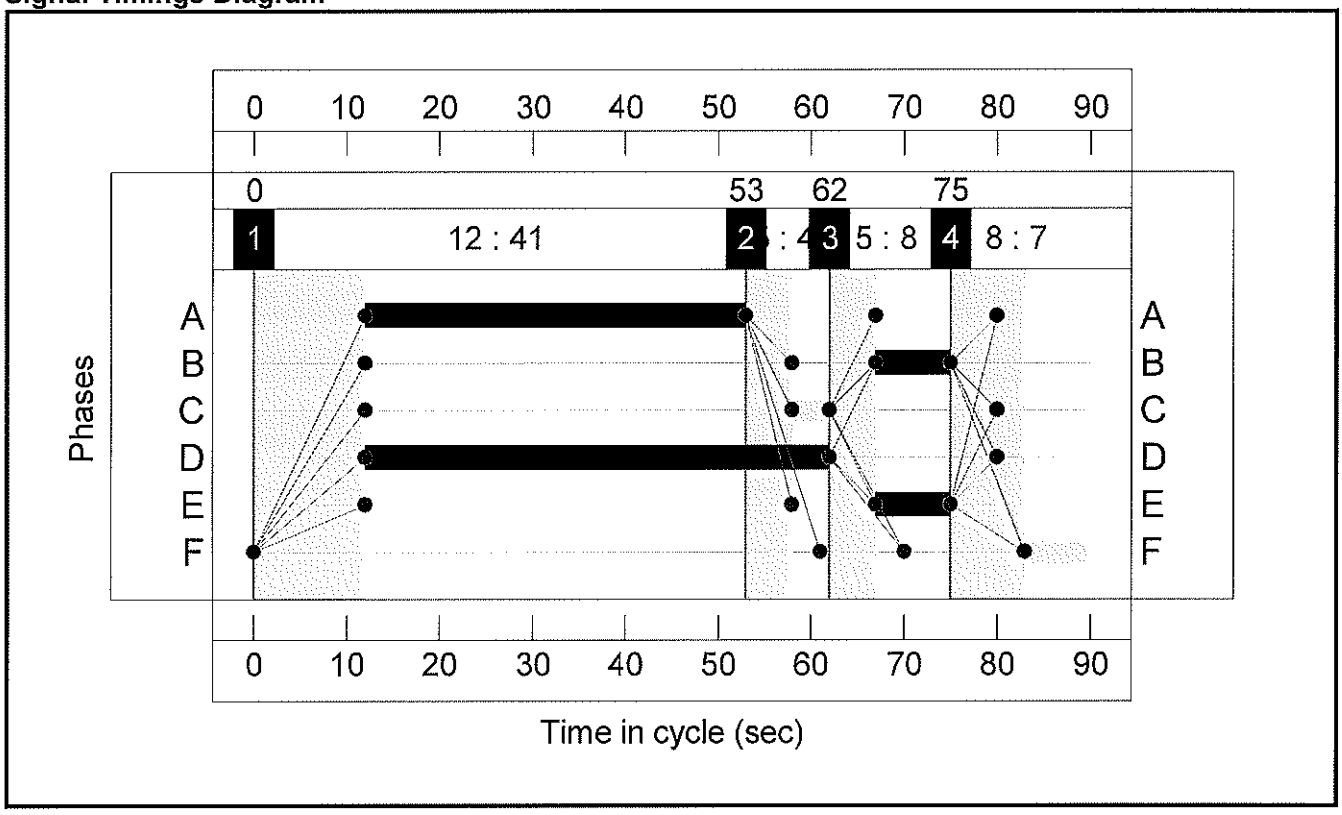
Stage Sequence Diagram



Stage Timings

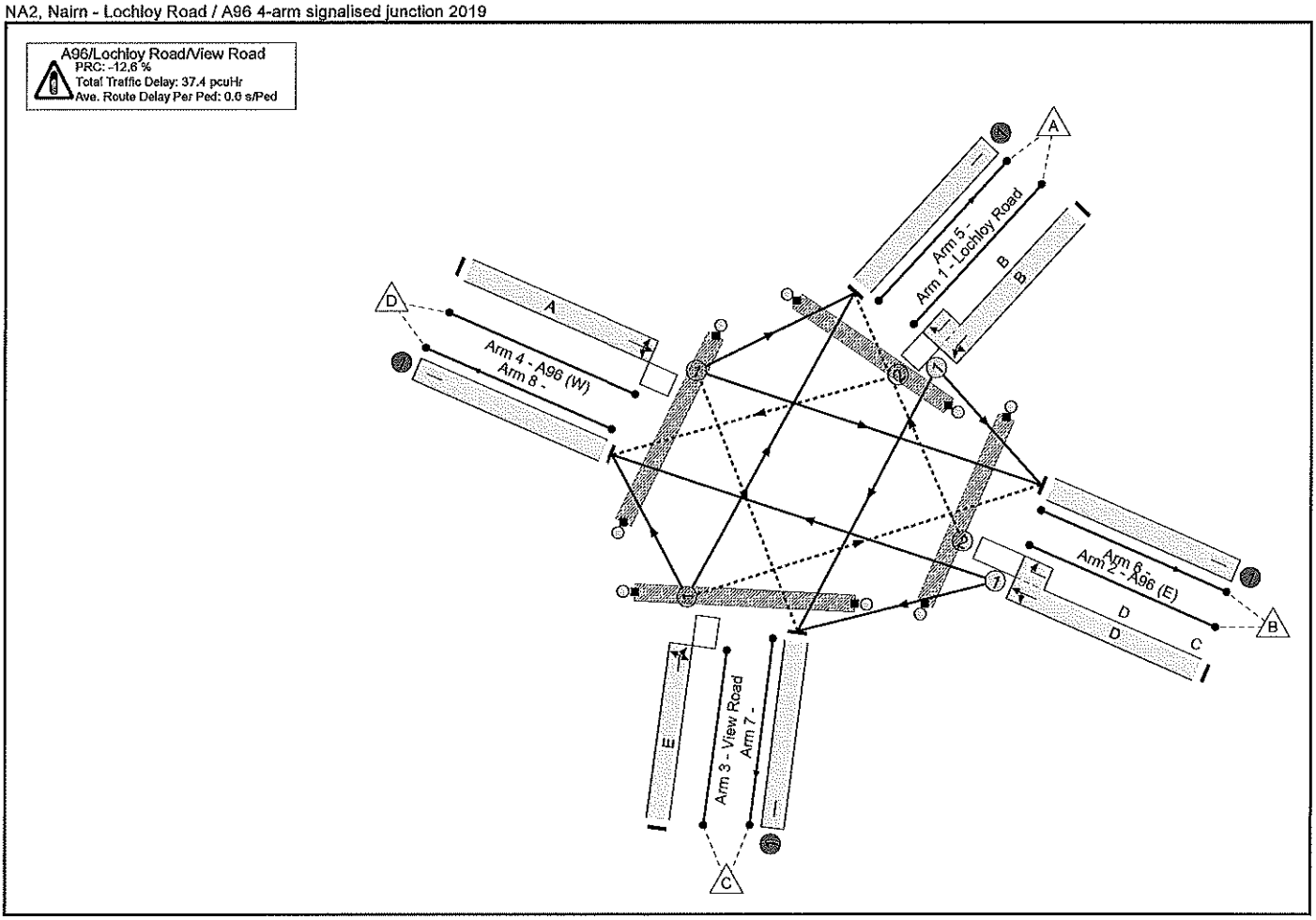
Stage	1	2	3	4
Duration	41	4	8	7
Change Point	0	53	62	75

Signal Timings Diagram



NA2, Nairn - Lochloy Road / A96 4-arm signalised junction 2019
Network Layout Diagram

NA2, Nairn - Lochloy Road / A96 4-arm signalised junction 2019



NA2, Nairn - Lochloy Road / A96 4-arm signalised junction 2019

Network Results

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network	-	-	N/A	-	-		-	-	-	-	-	-	101.3%
A96/Lochloy Road/View Road	-	-	N/A	-	-		-	-	-	-	-	-	101.3%
1/1+1/2	Lochloy Road Left Ahead Right	U+O	N/A	N/A	B		1	8	-	195	1724:1702	202	96.3%
2/1+2/2	A96 (E) Right Left Ahead	U+O	N/A	N/A	D	C	1	50	4	767	1914:1665	1072	71.5%
3/1	View Road Ahead Right Left	O	N/A	N/A	E		1	8	-	16	1687	169	9.5%
4/1	A96 (W) Left Ahead Right	O	N/A	N/A	A		1	41	-	897	1897	885	101.3%
5/1		U	N/A	N/A	-		-	-	-	323	Inf	Inf	0.0%
6/1		U	N/A	N/A	-		-	-	-	722	Inf	Inf	0.0%
7/1		U	N/A	N/A	-		-	-	-	18	Inf	Inf	0.0%
8/1		U	N/A	N/A	-		-	-	-	812	Inf	Inf	0.0%
Ped Link: P1	Unnamed Ped Link	-	N/A	-	F		1	7	-	0	-	0	0.0%
Ped Link: P2	Unnamed Ped Link	-	N/A	-	F		1	7	-	0	-	0	0.0%
Ped Link: P3	Unnamed Ped Link	-	N/A	-	F		1	7	-	0	-	0	0.0%
Ped Link: P4	Unnamed Ped Link	-	N/A	-	F		1	7	-	0	-	0	0.0%

NA2, Nairn - Lochloy Road / A96 4-arm signalised junction 2019

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	-	-	148	104	10	11.7	24.9	0.8	37.4	-	-	-	-
A96/Lochloy Road/View Road	-	-	148	104	10	11.7	24.9	0.8	37.4	-	-	-	-
1/1+1/2	195	195	138	0	7	2.2	5.4	0.0	7.6	139.5	4.1	5.4	9.5
2/1+2/2	767	767	0	104	4	3.0	1.2	0.7	4.9	23.2	13.5	1.2	14.8
3/1	16	16	0	0	0	0.2	0.1	0.0	0.2	48.7	0.4	0.1	0.4
4/1	897	885	10	0	0	6.5	18.2	0.0	24.7	99.0	22.7	18.2	40.9
5/1	320	320	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	713	713	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
7/1	18	18	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
8/1	812	812	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
Ped Link: P1	0	0	-	-	-	-	-	-	-	-	-	-	-
Ped Link: P2	0	0	-	-	-	-	-	-	-	-	-	-	-
Ped Link: P3	0	0	-	-	-	-	-	-	-	-	-	-	-
Ped Link: P4	0	0	-	-	-	-	-	-	-	-	-	-	-

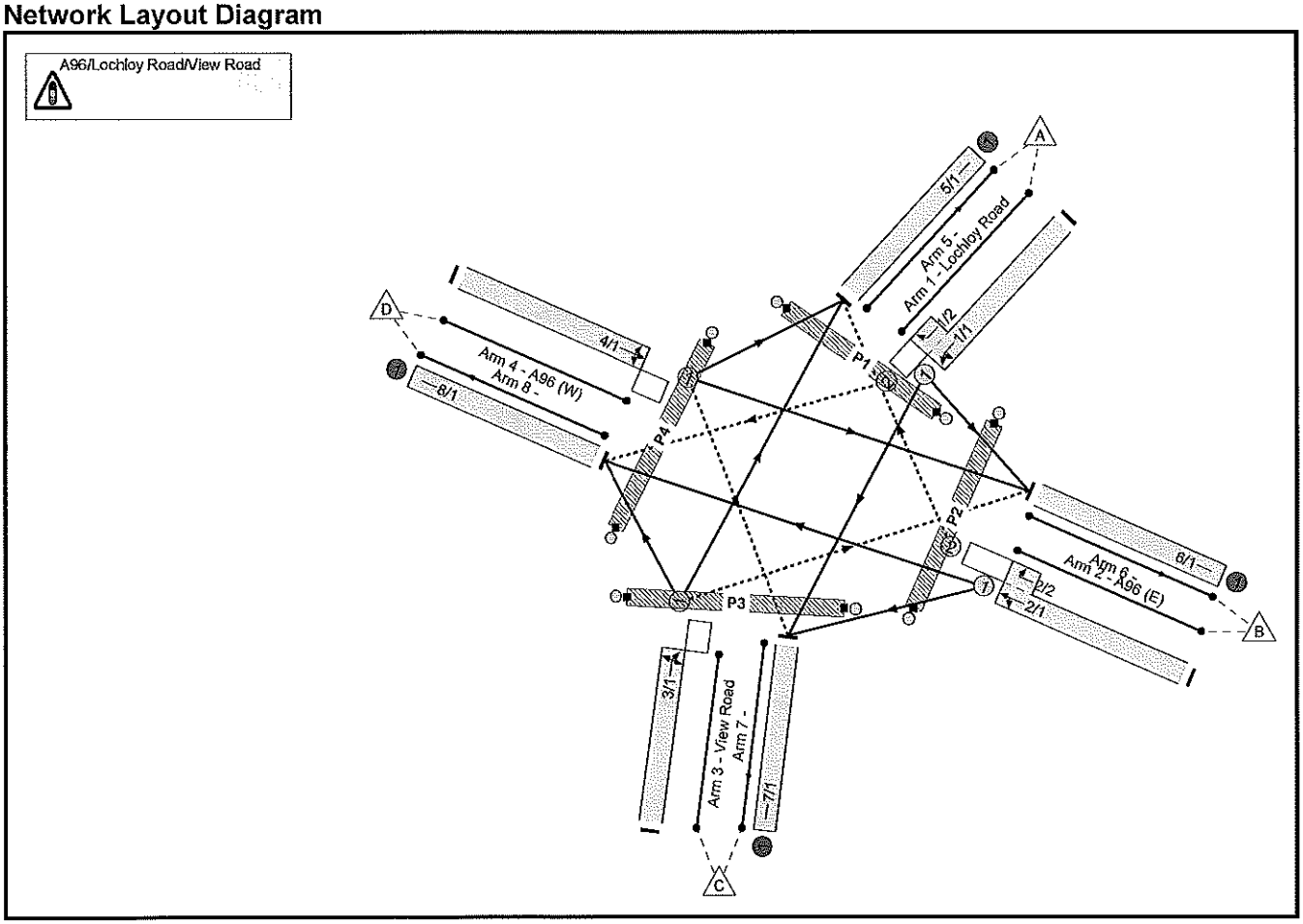
C1 PRC for Signalled Lanes (%): -12.6 Total Delay for Signalled Lanes (pcuHr): 37.39 Cycle Time (s): 90
PRC Over All Lanes (%): -12.6 Total Delay Over All Lanes(pcuHr): 37.39

NA2, Nairn - Lochloy Road / A96 4-arm signalised junction 2019

User and Project Details

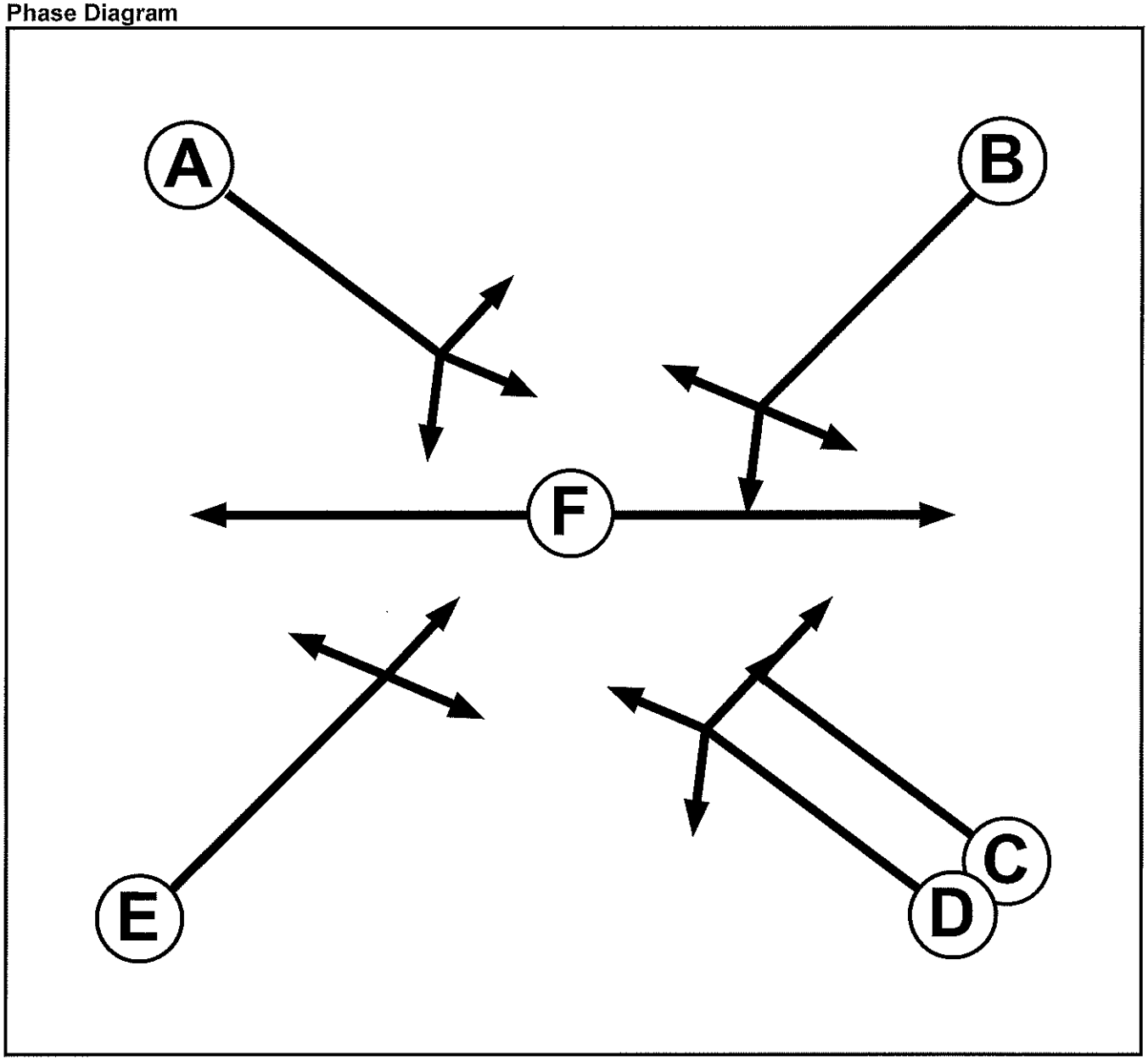
Project:	
Title:	
Location:	
File name:	A96-Lochloy Road-View Road (sensitivity) - 17 seconds RT 20-03-2018.lsg3x
Author:	
Company:	
Address:	
Notes:	

Network Layout Diagram



NA2, Nairn - Lochloy Road / A96 4-arm signalised junction 2019

Phase Diagram



Phase Input Data

Phase Name	Phase Type	Assoc. Phase	Street Min	Cont Min
A	Traffic		7	7
B	Traffic		7	7
C	Ind. Arrow	D	4	4
D	Traffic		7	7
E	Traffic		7	7
F	Pedestrian		7	7

NA2, Nairn - Lochloy Road / A96 4-arm signalised junction 2019

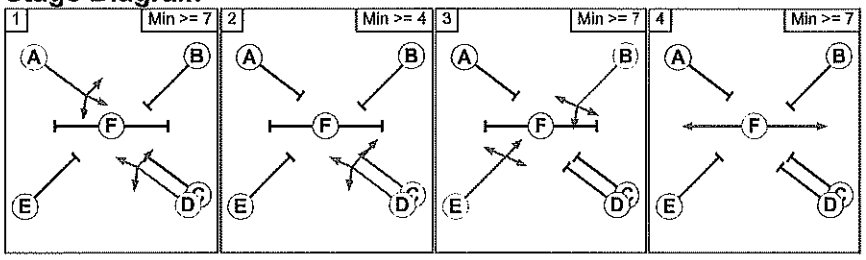
Phase Intergreens Matrix

		Starting Phase					
		A	B	C	D	E	F
Terminating Phase	A		5	5	-	5	8
	B	5		5	5	-	8
	C	5	5		-	5	8
	D	-	5	-		5	8
	E	5	-	5	5		8
	F	17	17	17	17	17	

Phases in Stage

Stage No.	Phases in Stage
1	A D
2	C D
3	B E
4	F

Stage Diagram



Phase Delays

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

Prohibited Stage Change

		To Stage			
		1	2	3	4
From Stage	1		5	5	8
	2	5		5	8
	3	5	5		8
	4	17	17	17	

NA2, Nairn - Lochloy Road / A96 4-arm signalised junction 2019

Give-Way Lane Input Data

Junction: A96/Lochloy Road/View Road											
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)
1/2 (Lochloy Road)	8/1 (Right)	1439	0	3/1	1.09	To 5/1 (Ahead)	2.00	-	0.50	2	2.00
2/2 (A96 (E))	5/1 (Right)	1439	0	4/1	1.09	To 6/1 (Ahead)	3.00	-	0.50	3	2.00
3/1 (View Road)	6/1 (Right)	1439	0	1/1	1.09	To 7/1 (Ahead)	2.00	2.00	0.50	2	2.00
4/1 (A96 (W))	7/1 (Right)	1439	0	2/1	1.09	To 8/1 (Ahead)	2.00	2.00	0.50	2	2.00

Lane Input Data

Junction: A96/Lochloy Road/View Road												
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 (Lochloy Road)	U	B	2	3	3.6	Geom	-	3.00	0.00	Y	Arm 6 Left	12.20
											Arm 7 Ahead	Inf
1/2 (Lochloy Road)	O	B	2	3	2.0	Geom	-	3.00	0.00	Y	Arm 8 Right	12.00
2/1 (A96 (E))	U	D	2	3	6.0	Geom	-	3.00	0.00	Y	Arm 7 Left	10.50
											Arm 8 Ahead	Inf
2/2 (A96 (E))	O	D C	2	3	2.0	Geom	-	3.00	0.00	Y	Arm 5 Right	10.00
3/1 (View Road)	O	E	2	3	4.0	Geom	-	2.90	0.00	Y	Arm 5 Ahead	Inf
											Arm 6 Right	14.00
											Arm 8 Left	8.00
4/1 (A96 (W))	O	A	2	3	10.4	Geom	-	3.40	0.00	Y	Arm 5 Left	12.00
											Arm 6 Ahead	Inf
											Arm 7 Right	15.00
5/1	U		2	3	60.0	Inf	-	-	-	-	-	-
6/1	U		2	3	60.0	Inf	-	-	-	-	-	-
7/1	U		2	3	60.0	Inf	-	-	-	-	-	-
8/1	U		2	3	60.0	Inf	-	-	-	-	-	-

Traffic Flow Groups

Flow Group	Start Time	End Time	Duration	Formula
1: 'AM Peak BASE'	08:10	09:10	01:00	
2: 'PM Peak BASE'	16:40	17:40	01:00	
3: 'AM Peak TOTAL'	08:10	09:10	01:00	
4: 'PM Peak TOTAL'	16:40	17:40	01:00	

Scenario 1: 'AM Peak Base 2019' (FG1: 'AM Peak BASE', Plan 1: 'Network Control Plan 1')

Traffic Flows, Desired

Desired Flow :

		Destination				
		A	B	C	D	Tot.
Origin	A	0	53	3	270	326
	B	37	0	3	624	664
	C	2	3	0	13	18
	D	133	553	10	0	696
	Tot.	172	609	16	907	1704

Traffic Lane Flows

Lane	Scenario 1: AM Peak Base 2019
Junction: A96/Lochloy Road/View Road	
1/1 (with short)	326(In) 56(Out)
1/2 (short)	270
2/1 (with short)	664(In) 627(Out)
2/2 (short)	37
3/1	18
4/1	696
5/1	172
6/1	609
7/1	16
8/1	907

Lane Saturation Flows

Junction: A96/Lochloy Road/View Road								
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat Flow (PCU/Hr)**	**Flared Sat Flow (PCU/Hr)**
1/1 (Lochloy Road)	3.00	0.00	Y	Arm 6 Left	12.20	94.6 %	1715	1715
				Arm 7 Ahead	Inf	5.4 %		
1/2 (Lochloy Road)	3.00	0.00	Y	Arm 8 Right	12.00	100.0 %	1702	1702
2/1 (A96 (E))	3.00	0.00	Y	Arm 7 Left	10.50	0.5 %	1914	1914
				Arm 8 Ahead	Inf	99.5 %		
2/2 (A96 (E))	3.00	0.00	Y	Arm 5 Right	10.00	100.0 %	1665	1665
3/1 (View Road)	2.90	0.00	Y	Arm 5 Ahead	Inf	11.1 %	1652	1652
				Arm 6 Right	14.00	16.7 %		
				Arm 8 Left	8.00	72.2 %		
4/1 (A96 (W))	3.40	0.00	Y	Arm 5 Left	12.00	19.1 %	1907	1907
				Arm 6 Ahead	Inf	79.5 %		
				Arm 7 Right	15.00	1.4 %		
5/1	Infinite Saturation Flow						Inf	Inf
6/1	Infinite Saturation Flow						Inf	Inf
7/1	Infinite Saturation Flow						Inf	Inf
8/1	Infinite Saturation Flow						Inf	Inf

Scenario 2: 'PM Peak Base 2019' (FG2: 'PM Peak BASE', Plan 1: 'Network Control Plan 1')

Traffic Flows, Desired

Desired Flow :

	Destination					
Origin		A	B	C	D	Tot.
	A	0	39	4	127	170
	B	96	0	3	656	755
	C	5	0	0	11	16
	D	187	677	10	0	874
	Tot.	288	716	17	794	1815

NA2, Nairn - Lochloy Road / A96 4-arm signalised junction 2019

Traffic Lane Flows

Lane	Scenario 2: PM Peak Base 2019
Junction: A96/Lochloy Road/View Road	
1/1 (with short)	170(In) 43(Out)
1/2 (short)	127
2/1 (with short)	755(In) 659(Out)
2/2 (short)	96
3/1	16
4/1	874
5/1	288
6/1	716
7/1	17
8/1	794

Lane Saturation Flows

Junction: A96/Lochloy Road/View Road								
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat Flow (PCU/Hr)**	**Flared Sat Flow (PCU/Hr)**
1/1 (Lochloy Road)	3.00	0.00	Y	Arm 6 Left	12.20	90.7 %	1723	1723
				Arm 7 Ahead	Inf	9.3 %		
1/2 (Lochloy Road)	3.00	0.00	Y	Arm 8 Right	12.00	100.0 %	1702	1702
2/1 (A96 (E))	3.00	0.00	Y	Arm 7 Left	10.50	0.5 %	1914	1914
				Arm 8 Ahead	Inf	99.5 %		
2/2 (A96 (E))	3.00	0.00	Y	Arm 5 Right	10.00	100.0 %	1665	1665
3/1 (View Road)	2.90	0.00	Y	Arm 5 Ahead	Inf	31.3 %	1687	1687
				Arm 6 Right	14.00	0.0 %		
				Arm 8 Left	8.00	68.8 %		
4/1 (A96 (W))	3.40	0.00	Y	Arm 5 Left	12.00	21.4 %	1902	1902
				Arm 6 Ahead	Inf	77.5 %		
				Arm 7 Right	15.00	1.1 %		
5/1	Infinite Saturation Flow						Inf	Inf
6/1	Infinite Saturation Flow						Inf	Inf
7/1	Infinite Saturation Flow						Inf	Inf
8/1	Infinite Saturation Flow						Inf	Inf

NA2, Nairn - Lochloy Road / A96 4-arm signalised junction 2019

Scenario 3: 'AM Peak TOTAL 2019' (FG3: 'AM Peak TOTAL', Plan 1: 'Network Control Plan 1')

Traffic Flows, Desired

Desired Flow :

		Destination				
		A	B	C	D	Tot.
Origin	A	0	59	4	299	362
	B	41	0	3	624	668
	C	2	3	0	13	18
	D	147	553	10	0	710
	Tot.	190	615	17	936	1758

Traffic Lane Flows

Lane	Scenario 3: AM Peak TOTAL 2019
Junction: A96/Lochloy Road/View Road	
1/1 (with short)	362(In) 63(Out)
1/2 (short)	299
2/1 (with short)	668(In) 627(Out)
2/2 (short)	41
3/1	18
4/1	710
5/1	190
6/1	615
7/1	17
8/1	936

Lane Saturation Flows

Junction: A96/Lochloy Road/View Road								
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat Flow (PCU/Hr)**	**Flared Sat Flow (PCU/Hr)**
1/1 (Lochloy Road)	3.00	0.00	Y	Arm 6 Left	12.20	93.7 %	1717	1717
				Arm 7 Ahead	Inf	6.3 %		
1/2 (Lochloy Road)	3.00	0.00	Y	Arm 8 Right	12.00	100.0 %	1702	1702
2/1 (A96 (E))	3.00	0.00	Y	Arm 7 Left	10.50	0.5 %	1914	1914
				Arm 8 Ahead	Inf	99.5 %		
2/2 (A96 (E))	3.00	0.00	Y	Arm 5 Right	10.00	100.0 %	1665	1665
3/1 (View Road)	2.90	0.00	Y	Arm 5 Ahead	Inf	11.1 %	1652	1652
				Arm 6 Right	14.00	16.7 %		
				Arm 8 Left	8.00	72.2 %		
4/1 (A96 (W))	3.40	0.00	Y	Arm 5 Left	12.00	20.7 %	1903	1903
				Arm 6 Ahead	Inf	77.9 %		
				Arm 7 Right	15.00	1.4 %		
5/1	Infinite Saturation Flow						Inf	Inf
6/1	Infinite Saturation Flow						Inf	Inf
7/1	Infinite Saturation Flow						Inf	Inf
8/1	Infinite Saturation Flow						Inf	Inf

Scenario 4: 'PM Peak TOTAL 2019' (FG4: 'PM Peak TOTAL', Plan 1: 'Network Control Plan 1')

Traffic Flows, Desired

Desired Flow :

		Destination				
		A	B	C	D	Tot.
Origin	A	0	45	5	145	195
	B	108	0	3	656	767
	C	5	0	0	11	16
	D	210	677	10	0	897
	Tot.	323	722	18	812	1875

NA2, Nairn - Lochloy Road / A96 4-arm signalised junction 2019

Traffic Lane Flows

Lane	Scenario 4: PM Peak TOTAL 2019
Junction: A96/Lochloy Road/View Road	
1/1 (with short)	195(In) 50(Out)
1/2 (short)	145
2/1 (with short)	767(In) 659(Out)
2/2 (short)	108
3/1	16
4/1	897
5/1	323
6/1	722
7/1	18
8/1	812

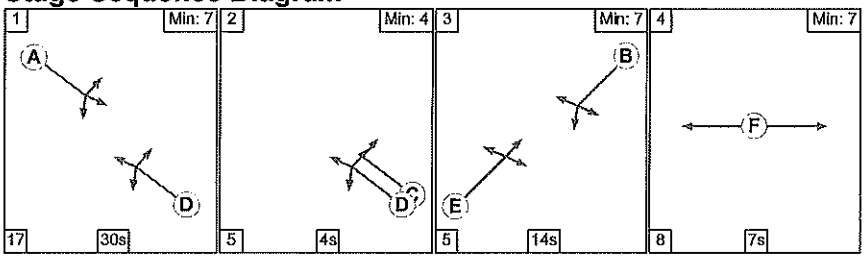
Lane Saturation Flows

Junction: A96/Lochloy Road/View Road								
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat Flow (PCU/Hr)**	**Flared Sat Flow (PCU/Hr)**
1/1 (Lochloy Road)	3.00	0.00	Y	Arm 6 Left	12.20	90.0 %	1724	1724
				Arm 7 Ahead	Inf	10.0 %		
1/2 (Lochloy Road)	3.00	0.00	Y	Arm 8 Right	12.00	100.0 %	1702	1702
2/1 (A96 (E))	3.00	0.00	Y	Arm 7 Left	10.50	0.5 %	1914	1914
				Arm 8 Ahead	Inf	99.5 %		
2/2 (A96 (E))	3.00	0.00	Y	Arm 5 Right	10.00	100.0 %	1665	1665
3/1 (View Road)	2.90	0.00	Y	Arm 5 Ahead	Inf	31.3 %	1687	1687
				Arm 6 Right	14.00	0.0 %		
				Arm 8 Left	8.00	68.8 %		
4/1 (A96 (W))	3.40	0.00	Y	Arm 5 Left	12.00	23.4 %	1897	1897
				Arm 6 Ahead	Inf	75.5 %		
				Arm 7 Right	15.00	1.1 %		
5/1	Infinite Saturation Flow						Inf	Inf
6/1	Infinite Saturation Flow						Inf	Inf
7/1	Infinite Saturation Flow						Inf	Inf
8/1	Infinite Saturation Flow						Inf	Inf

NA2, Nairn - Lochloy Road / A96 4-arm signalised junction 2019

Scenario 1: 'AM Peak Base 2019' (FG1: 'AM Peak BASE', Plan 1: 'Network Control Plan 1')

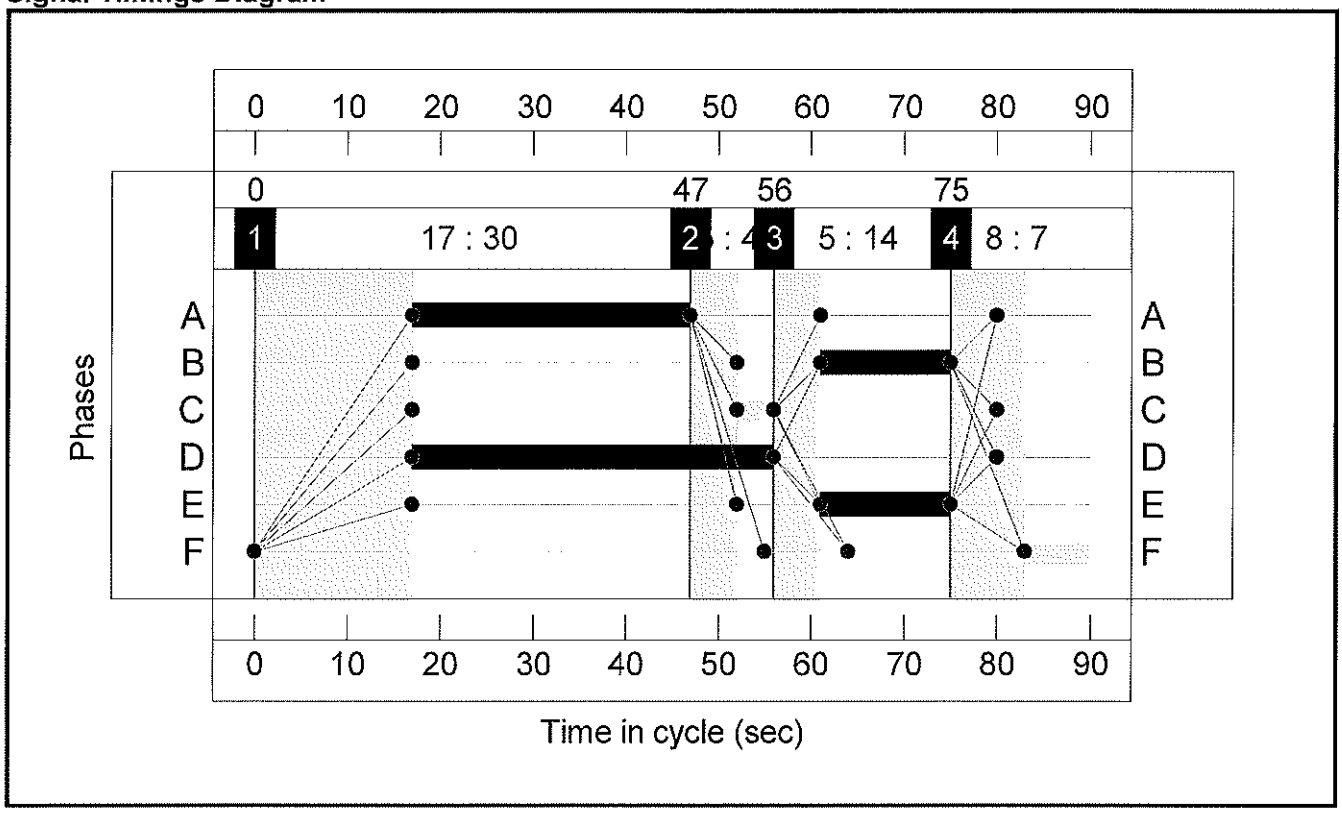
Stage Sequence Diagram



Stage Timings

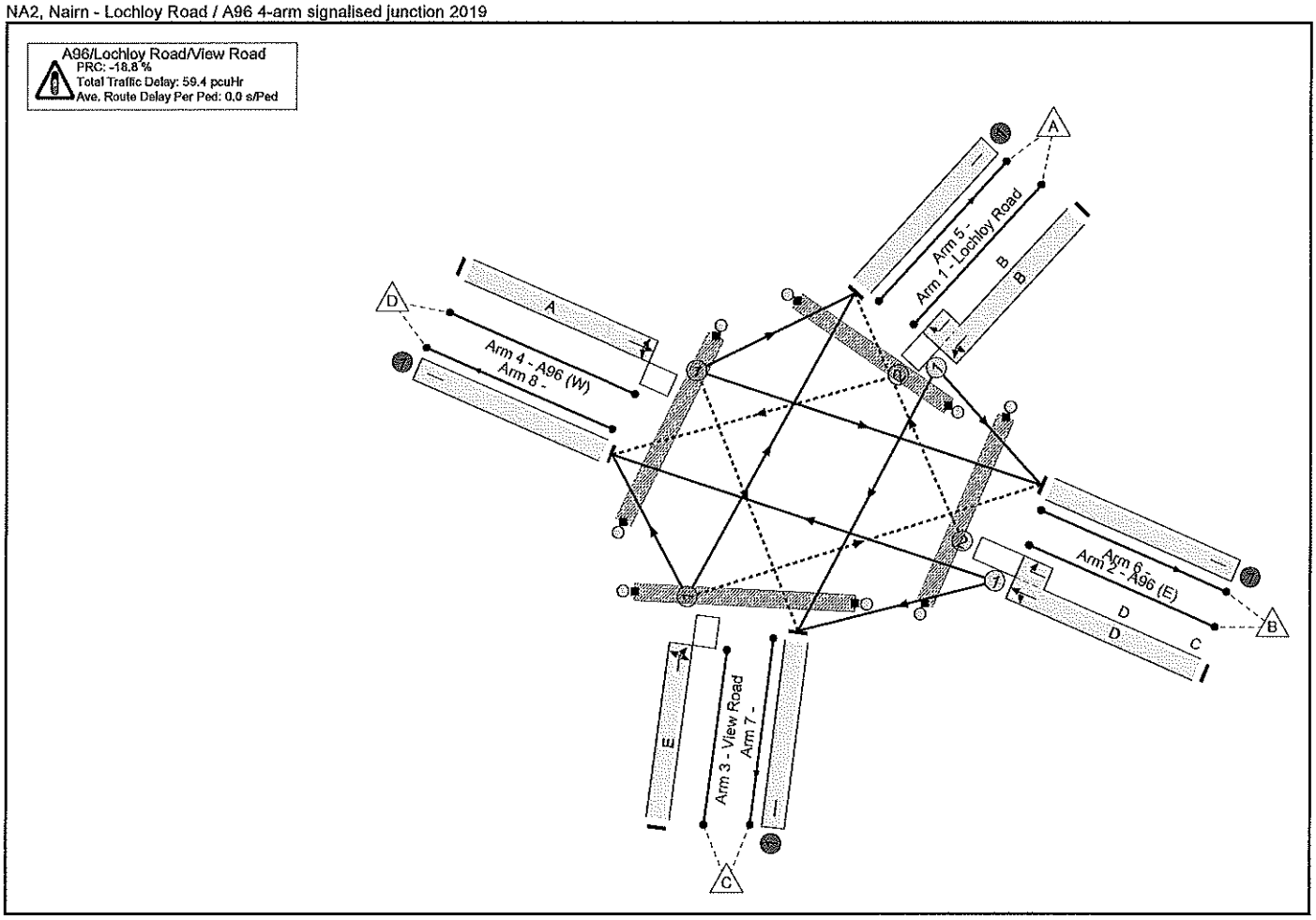
Stage	1	2	3	4
Duration	30	4	14	7
Change Point	0	47	56	75

Signal Timings Diagram



NA2, Nairn - Lochloy Road / A96 4-arm signalised junction 2019
Network Layout Diagram

NA2, Nairn - Lochloy Road / A96 4-arm signalised junction 2019



NA2, Nairn - Lochloy Road / A96 4-arm signalised junction 2019

Network Results

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network	-	-	N/A	-	-		-	-	-	-	-	-	106.9%
A96/Lochloy Road/View Road	-	-	N/A	-	-		-	-	-	-	-	-	106.9%
1/1+1/2	Lochloy Road Left Ahead Right	U+O	N/A	N/A	B		1	14	-	326	1715:1702	305	106.9%
2/1+2/2	A96 (E) Right Left Ahead	U+O	N/A	N/A	D	C	1	39	4	664	1914:1665	844	78.7%
3/1	View Road Ahead Right Left	O	N/A	N/A	E		1	14	-	18	1652	275	6.5%
4/1	A96 (W) Left Ahead Right	O	N/A	N/A	A		1	30	-	696	1907	657	106.0%
5/1		U	N/A	N/A	-		-	-	-	172	Inf	Inf	0.0%
6/1		U	N/A	N/A	-		-	-	-	609	Inf	Inf	0.0%
7/1		U	N/A	N/A	-		-	-	-	16	Inf	Inf	0.0%
8/1		U	N/A	N/A	-		-	-	-	907	Inf	Inf	0.0%
Ped Link: P1	Unnamed Ped Link	-	N/A	-	F		1	7	-	0	-	0	0.0%
Ped Link: P2	Unnamed Ped Link	-	N/A	-	F		1	7	-	0	-	0	0.0%
Ped Link: P3	Unnamed Ped Link	-	N/A	-	F		1	7	-	0	-	0	0.0%
Ped Link: P4	Unnamed Ped Link	-	N/A	-	F		1	7	-	0	-	0	0.0%

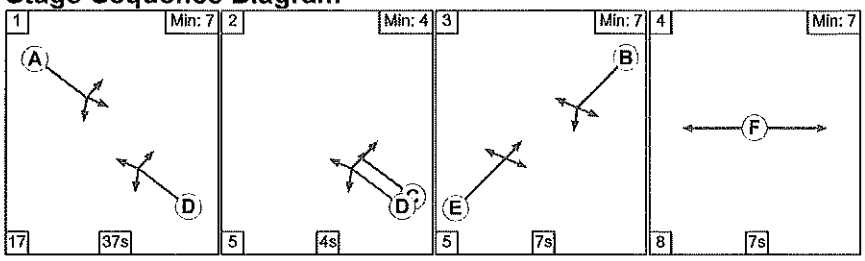
NA2, Nairn - Lochloy Road / A96 4-arm signalised junction 2019

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	-	-	250	36	16	15.4	43.8	0.2	59.4	-	-	-	-
A96/Lochloy Road/View Road	-	-	250	36	16	15.4	43.8	0.2	59.4	-	-	-	-
1/1+1/2	326	305	238	0	15	4.0	15.7	0.1	19.8	218.7	8.4	15.7	24.2
2/1+2/2	664	664	0	36	1	3.9	1.8	0.2	5.9	32.0	13.9	1.8	15.7
3/1	18	18	3	0	0	0.2	0.0	0.0	0.2	38.7	0.4	0.0	0.4
4/1	696	657	9	0	0	7.3	26.2	0.0	33.5	173.4	18.4	26.2	44.6
5/1	165	165	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	574	574	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
7/1	15	15	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
8/1	890	890	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
Ped Link: P1	0	0	-	-	-	-	-	-	-	-	-	-	-
Ped Link: P2	0	0	-	-	-	-	-	-	-	-	-	-	-
Ped Link: P3	0	0	-	-	-	-	-	-	-	-	-	-	-
Ped Link: P4	0	0	-	-	-	-	-	-	-	-	-	-	-

C1 PRC for Signalled Lanes (%): -16.8 Total Delay for Signalled Lanes (pcuHr): 59.43 Cycle Time (s): 90
PRC Over All Lanes (%): -16.8 Total Delay Over All Lanes(pcuHr): 59.43

NA2, Nairn - Lochloy Road / A96 4-arm signalised junction 2019
Scenario 2: 'PM Peak Base 2019' (FG2: 'PM Peak BASE', Plan 1: 'Network Control Plan 1')

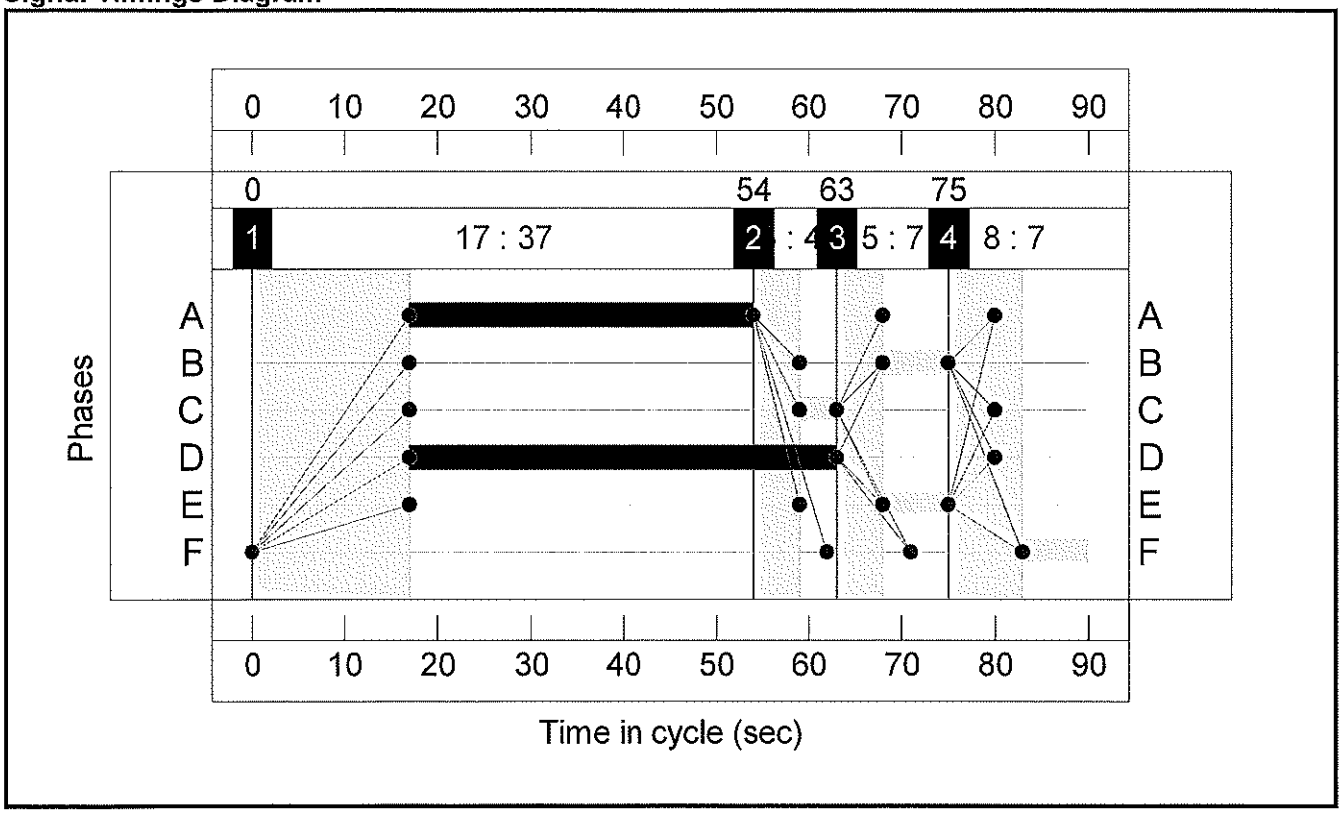
Stage Sequence Diagram



Stage Timings

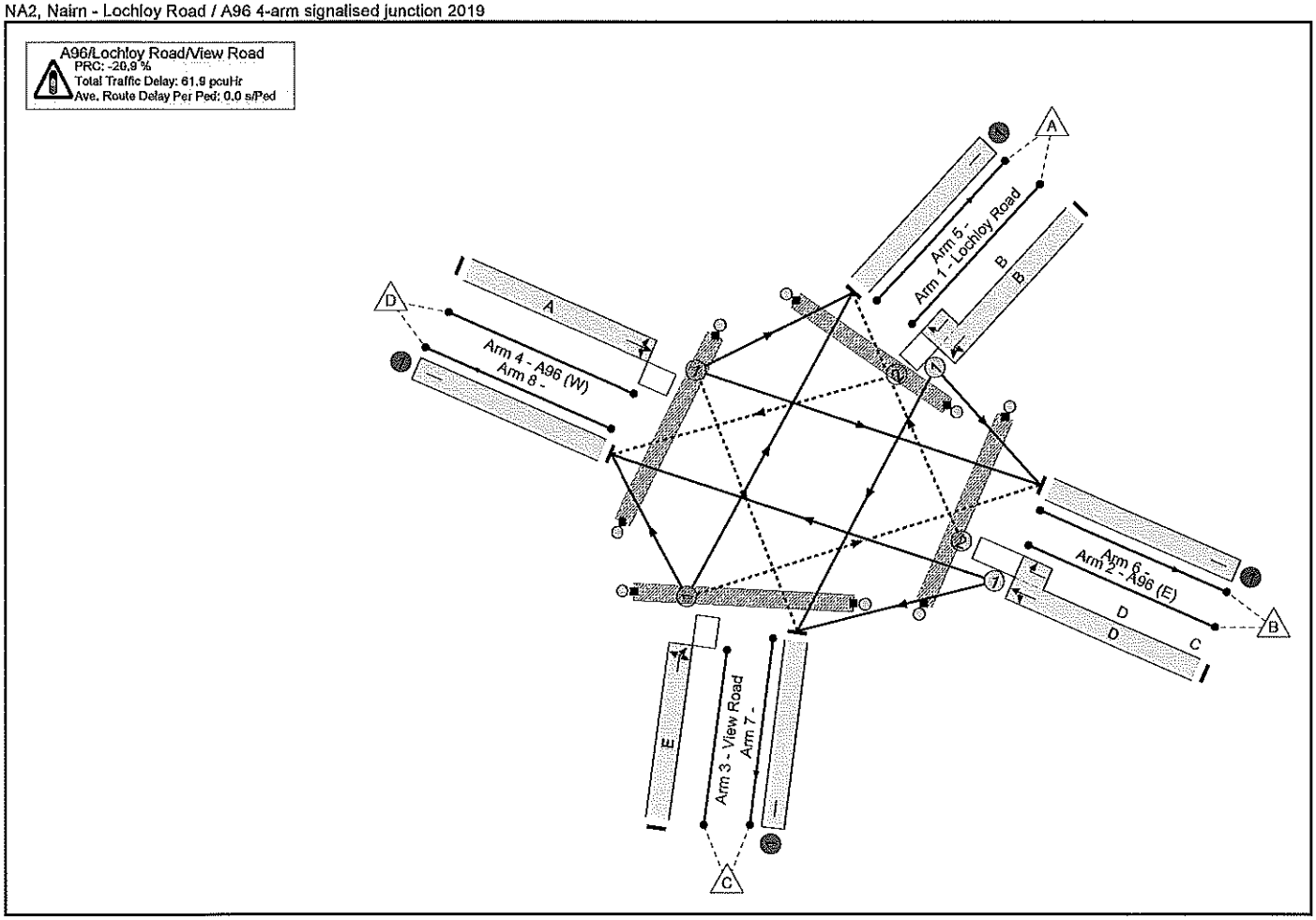
Stage	1	2	3	4
Duration	37	4	7	7
Change Point	0	54	63	75

Signal Timings Diagram



NA2, Nairn - Lochloy Road / A96 4-arm signalised junction 2019
Network Layout Diagram

NA2, Nairn - Lochloy Road / A96 4-arm signalised junction 2019



NA2, Nairn - Lochloy Road / A96 4-arm signalised junction 2019

Network Results

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network	-	-	N/A	-	-		-	-	-	-	-	-	108.8%
A96/Lochloy Road/View Road	-	-	N/A	-	-		-	-	-	-	-	-	108.8%
1/1+1/2	Lochloy Road Left Ahead Right	U+O	N/A	N/A	B		1	7	-	170	1723:1702	183	92.9%
2/1+2/2	A96 (E) Right Left Ahead	U+O	N/A	N/A	D	C	1	46	4	755	1914:1665	989	76.3%
3/1	View Road Ahead Right Left	O	N/A	N/A	E		1	7	-	16	1687	150	10.7%
4/1	A96 (W) Left Ahead Right	O	N/A	N/A	A		1	37	-	874	1902	803	108.8%
5/1		U	N/A	N/A	-		-	-	-	288	Inf	Inf	0.0%
6/1		U	N/A	N/A	-		-	-	-	716	Inf	Inf	0.0%
7/1		U	N/A	N/A	-		-	-	-	17	Inf	Inf	0.0%
8/1		U	N/A	N/A	-		-	-	-	794	Inf	Inf	0.0%
Ped Link: P1	Unnamed Ped Link	-	N/A	-	F		1	7	-	0	-	0	0.0%
Ped Link: P2	Unnamed Ped Link	-	N/A	-	F		1	7	-	0	-	0	0.0%
Ped Link: P3	Unnamed Ped Link	-	N/A	-	F		1	7	-	0	-	0	0.0%
Ped Link: P4	Unnamed Ped Link	-	N/A	-	F		1	7	-	0	-	0	0.0%

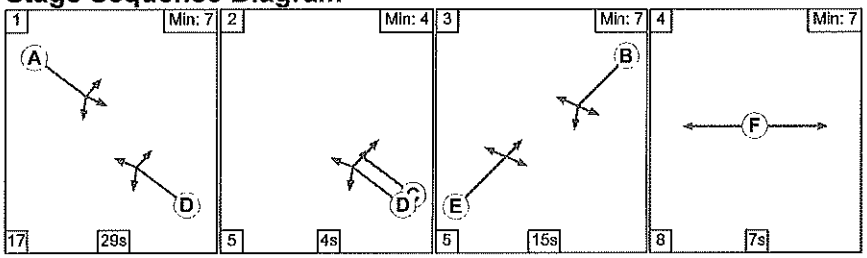
NA2, Nairn - Lochloy Road / A96 4-arm signalised junction 2019

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	-	-	132	93	8	14.7	46.5	0.6	61.9	-	-	-	-
A96/Lochloy Road/View Road	-	-	132	93	8	14.7	46.5	0.6	61.9	-	-	-	-
1/1+1/2	170	170	122	0	5	1.9	4.0	0.0	6.0	126.4	3.5	4.0	7.6
2/1+2/2	755	755	0	93	3	3.5	1.6	0.6	5.7	27.1	14.6	1.6	16.2
3/1	16	16	0	0	0	0.2	0.1	0.0	0.2	51.2	0.4	0.1	0.4
4/1	874	803	9	0	0	9.1	40.8	0.0	50.0	205.8	23.6	40.8	64.4
5/1	273	273	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	661	661	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
7/1	16	16	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
8/1	794	794	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
Ped Link: P1	0	0	-	-	-	-	-	-	-	-	-	-	-
Ped Link: P2	0	0	-	-	-	-	-	-	-	-	-	-	-
Ped Link: P3	0	0	-	-	-	-	-	-	-	-	-	-	-
Ped Link: P4	0	0	-	-	-	-	-	-	-	-	-	-	-

C1 PRC for Signalled Lanes (%): -20.9 Total Delay for Signalled Lanes (pcuHr): 61.85 Cycle Time (s): 90
PRC Over All Lanes (%): -20.9 Total Delay Over All Lanes(pcuHr): 61.85

NA2, Nairn - Lochloy Road / A96 4-arm signalised junction 2019
Scenario 3: 'AM Peak TOTAL 2019' (FG3: 'AM Peak TOTAL', Plan 1: 'Network Control Plan 1')

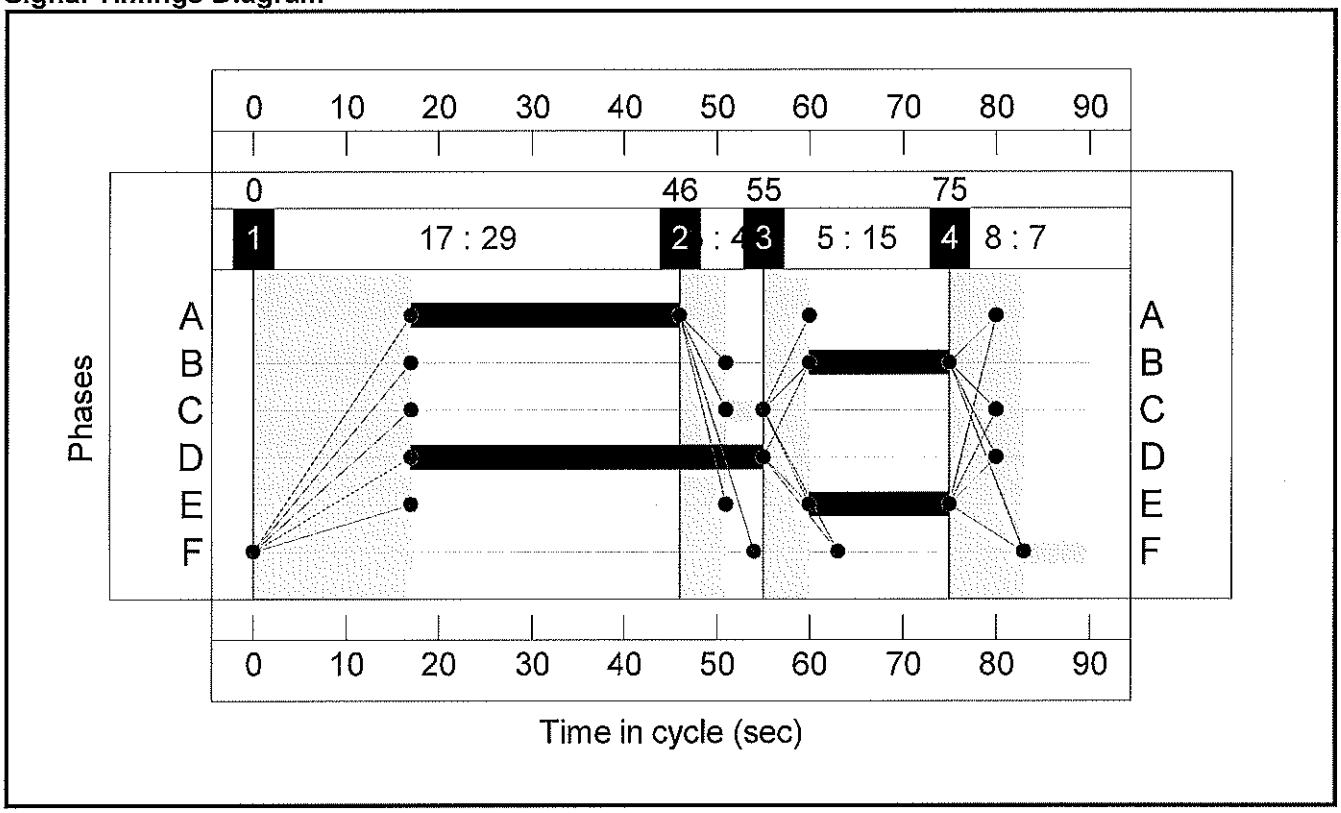
Stage Sequence Diagram



Stage Timings

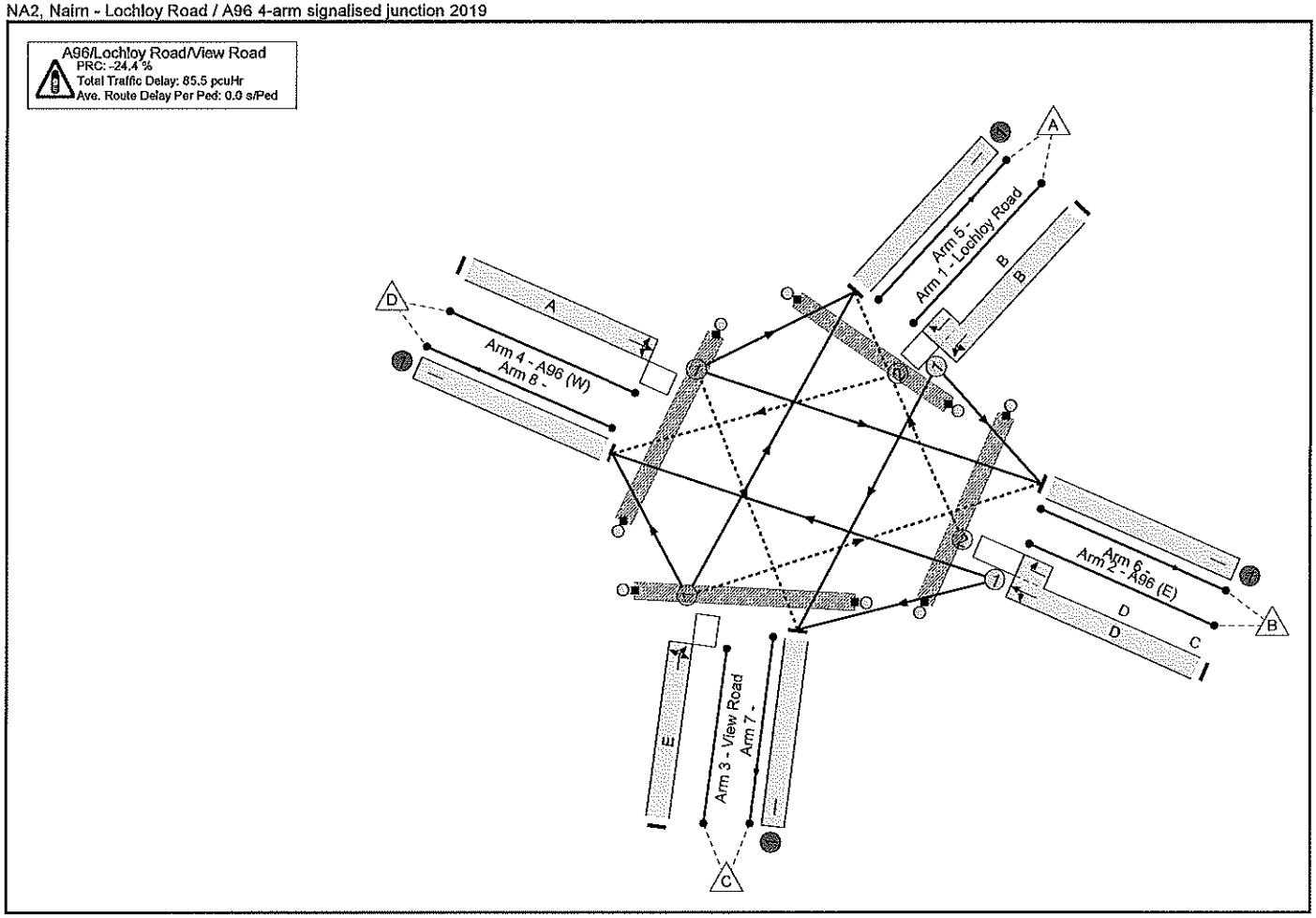
Stage	1	2	3	4
Duration	29	4	15	7
Change Point	0	46	55	75

Signal Timings Diagram



NA2, Nairn - Lochloy Road / A96 4-arm signalised junction 2019
Network Layout Diagram

NA2, Nairn - Lochloy Road / A96 4-arm signalised junction 2019



NA2, Nairn - Lochloy Road / A96 4-arm signalised junction 2019

Network Results

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network	-	-	N/A	-	-		-	-	-	-	-	-	111.9%
A96/Lochloy Road/View Road	-	-	N/A	-	-		-	-	-	-	-	-	111.9%
1/1+1/2	Lochloy Road Left Ahead Right	U+O	N/A	N/A	B		1	15	-	362	1717:1702	324	111.7%
2/1+2/2	A96 (E) Right Left Ahead	U+O	N/A	N/A	D	C	1	38	4	668	1914:1665	823	81.2%
3/1	View Road Ahead Right Left	O	N/A	N/A	E		1	15	-	18	1652	294	6.1%
4/1	A96 (W) Left Ahead Right	O	N/A	N/A	A		1	29	-	710	1903	634	111.9%
5/1		U	N/A	N/A	-		-	-	-	180	Inf	Inf	0.0%
6/1		U	N/A	N/A	-		-	-	-	615	Inf	Inf	0.0%
7/1		U	N/A	N/A	-		-	-	-	17	Inf	Inf	0.0%
8/1		U	N/A	N/A	-		-	-	-	936	Inf	Inf	0.0%
Ped Link: P1	Unnamed Ped Link	-	N/A	-	F		1	7	-	0	-	0	0.0%
Ped Link: P2	Unnamed Ped Link	-	N/A	-	F		1	7	-	0	-	0	0.0%
Ped Link: P3	Unnamed Ped Link	-	N/A	-	F		1	7	-	0	-	0	0.0%
Ped Link: P4	Unnamed Ped Link	-	N/A	-	F		1	7	-	0	-	0	0.0%

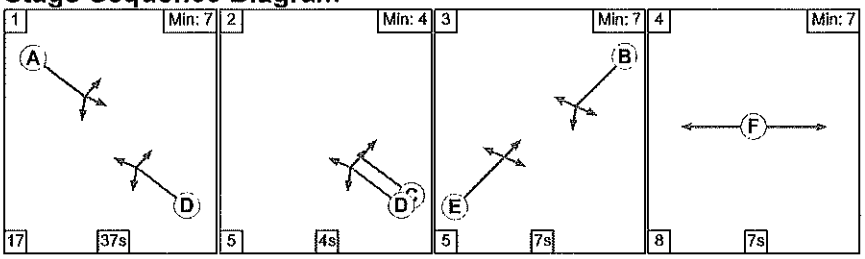
NA2, Nairn - Lochloy Road / A96 4-arm signalised junction 2019

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	-	-	266	40	15	18.1	67.1	0.3	85.5	-	-	-	-
A96/Lochloy Road/View Road	-	-	266	40	15	18.1	67.1	0.3	85.5	-	-	-	-
1/1+1/2	362	324	254	0	14	4.8	22.9	0.1	27.8	276.4	9.8	22.9	32.7
2/1+2/2	668	668	0	40	1	4.1	2.1	0.2	6.4	34.5	14.3	2.1	16.4
3/1	18	18	3	0	0	0.2	0.0	0.0	0.2	37.4	0.4	0.0	0.4
4/1	710	634	9	0	0	9.0	42.1	0.0	51.1	259.0	19.6	42.1	61.7
5/1	174	174	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	550	550	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
7/1	16	16	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
8/1	905	905	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
Ped Link: P1	0	0	-	-	-	-	-	-	-	-	-	-	-
Ped Link: P2	0	0	-	-	-	-	-	-	-	-	-	-	-
Ped Link: P3	0	0	-	-	-	-	-	-	-	-	-	-	-
Ped Link: P4	0	0	-	-	-	-	-	-	-	-	-	-	-

C1 PRC for Signalled Lanes (%): -24.4 Total Delay for Signalled Lanes (pcuHr): 85.46 Cycle Time (s): 90
PRC Over All Lanes (%): -24.4 Total Delay Over All Lanes(pcuHr): 85.46

NA2, Nairn - Lochloy Road / A96 4-arm signalised junction 2019
Scenario 4: 'PM Peak TOTAL 2019' (FG4: 'PM Peak TOTAL', Plan 1: 'Network Control Plan 1')

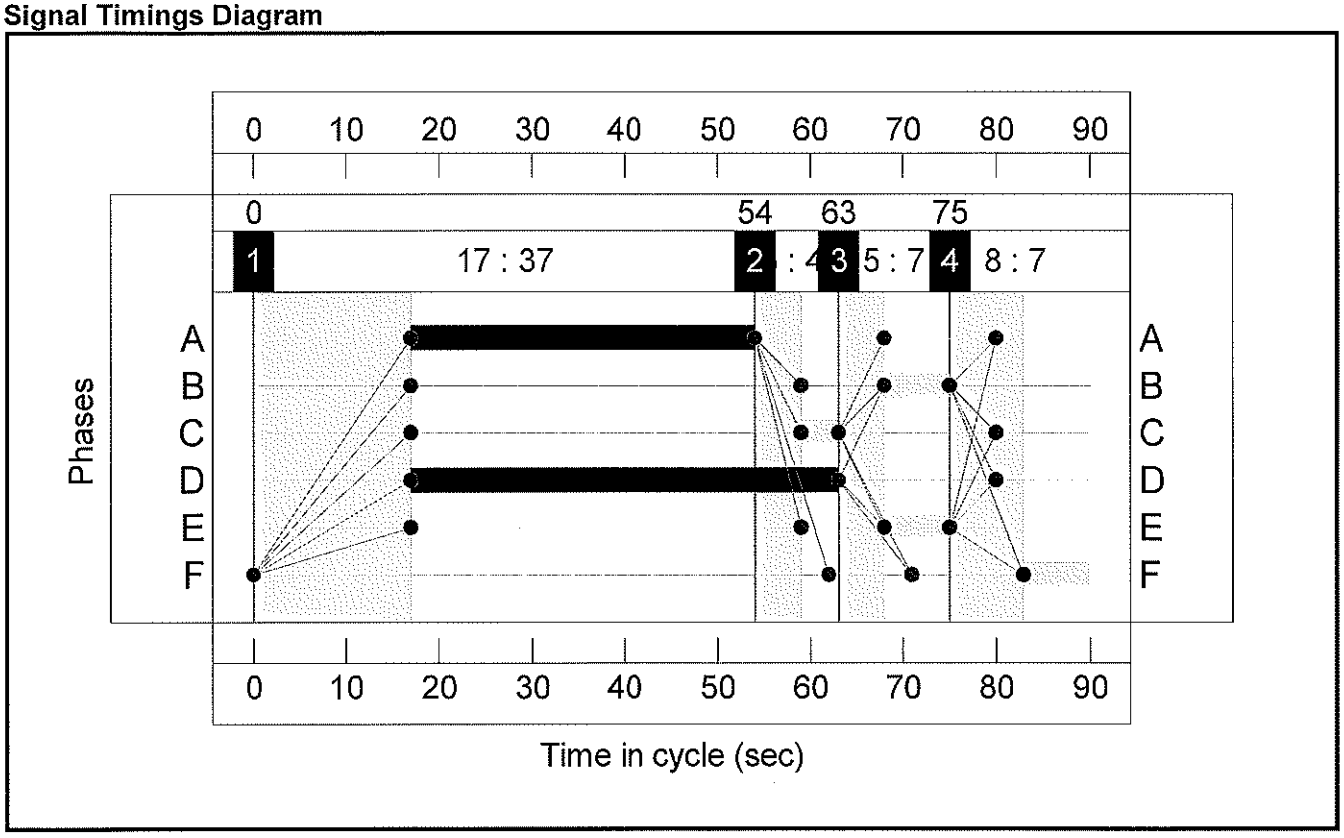
Stage Sequence Diagram



Stage Timings

Stage	1	2	3	4
Duration	37	4	7	7
Change Point	0	54	63	75

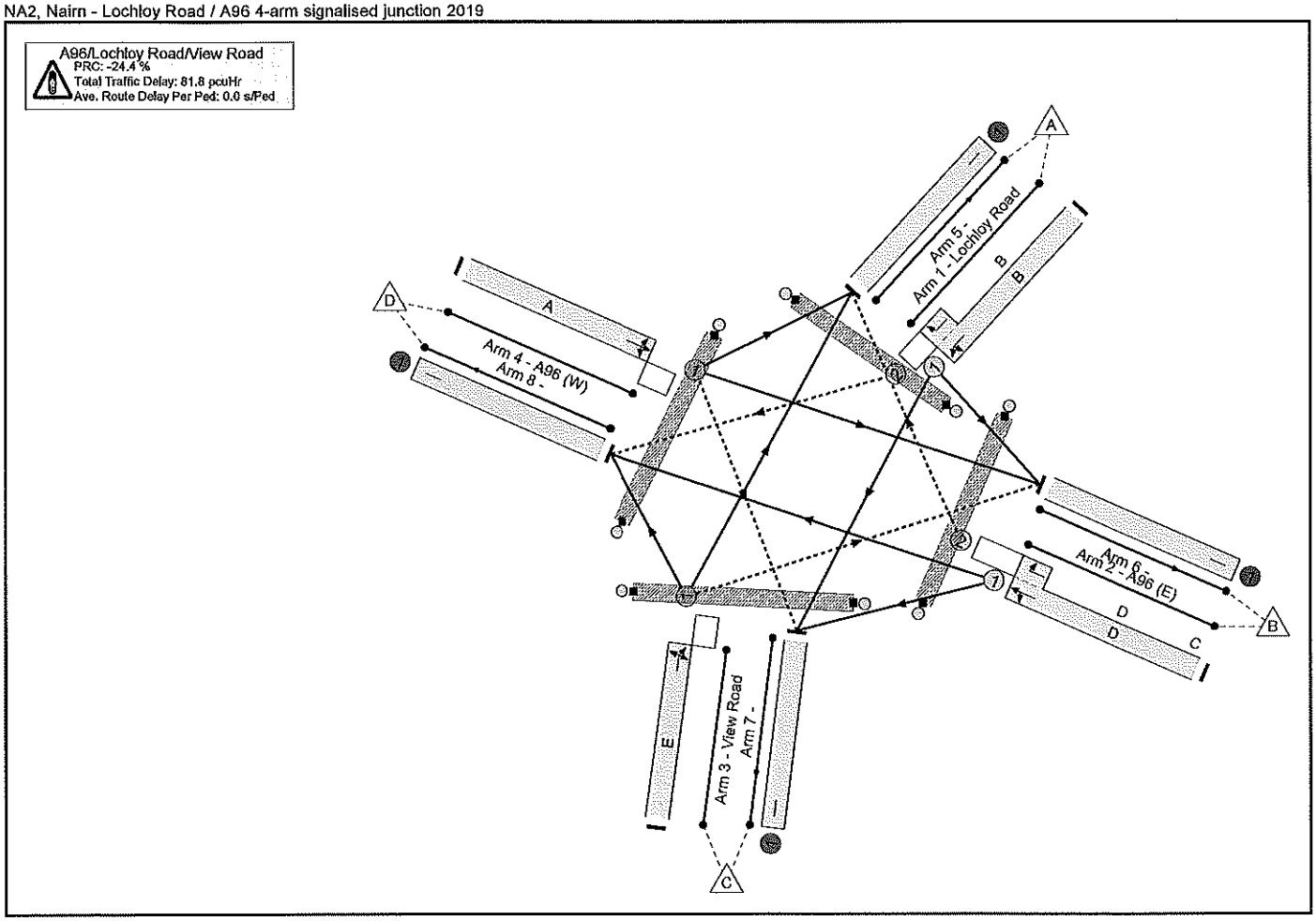
Signal Timings Diagram



NA2, Nairn - Lochloy Road / A96 4-arm signalised junction 2019

Network Layout Diagram

NA2, Nairn - Lochloy Road / A96 4-arm signalised junction 2019



NA2, Nairn - Lochloy Road / A96 4-arm signalised junction 2019

Network Results

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network	-	-	N/A	-	-		-	-	-	-	-	-	112.0%
A96/Lochloy Road/View Road	-	-	N/A	-	-		-	-	-	-	-	-	112.0%
1/1+1/2	Lochloy Road Left Ahead Right	U+O	N/A	N/A	B		1	7	-	195	1724:1702	183	106.3%
2/1+2/2	A96 (E) Right Left Ahead	U+O	N/A	N/A	D	C	1	46	4	767	1914:1665	989	77.6%
3/1	View Road Ahead Right Left	O	N/A	N/A	E		1	7	-	16	1687	150	10.7%
4/1	A96 (W) Left Ahead Right	O	N/A	N/A	A		1	37	-	897	1897	801	112.0%
5/1		U	N/A	N/A	-		-	-	-	323	Inf	Inf	0.0%
6/1		U	N/A	N/A	-		-	-	-	722	Inf	Inf	0.0%
7/1		U	N/A	N/A	-		-	-	-	18	Inf	Inf	0.0%
8/1		U	N/A	N/A	-		-	-	-	812	Inf	Inf	0.0%
Ped Link: P1	Unnamed Ped Link	-	N/A	-	F		1	7	-	0	-	0	0.0%
Ped Link: P2	Unnamed Ped Link	-	N/A	-	F		1	7	-	0	-	0	0.0%
Ped Link: P3	Unnamed Ped Link	-	N/A	-	F		1	7	-	0	-	0	0.0%
Ped Link: P4	Unnamed Ped Link	-	N/A	-	F		1	7	-	0	-	0	0.0%

NA2, Nairn - Lochloy Road / A96 4-arm signalised junction 2019

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	-	-	131	104	18	16.6	64.5	0.7	81.8	-	-	-	-
A96/Lochloy Road/View Road	-	-	131	104	18	16.6	64.5	0.7	81.8	-	-	-	-
1/1+1/2	195	183	122	0	14	2.5	10.4	0.0	13.0	240.1	4.5	10.4	15.0
2/1+2/2	767	767	0	104	4	3.6	1.7	0.6	6.0	28.0	14.8	1.7	16.5
3/1	16	16	0	0	0	0.2	0.1	0.0	0.2	51.2	0.4	0.1	0.4
4/1	897	801	9	0	0	10.3	52.3	0.0	62.6	251.3	24.8	52.3	77.1
5/1	301	301	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	647	647	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
7/1	17	17	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
8/1	803	803	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
Ped Link: P1	0	0	-	-	-	-	-	-	-	-	-	-	-
Ped Link: P2	0	0	-	-	-	-	-	-	-	-	-	-	-
Ped Link: P3	0	0	-	-	-	-	-	-	-	-	-	-	-
Ped Link: P4	0	0	-	-	-	-	-	-	-	-	-	-	-

C1

PRC for Signalled Lanes (%): -24.4 | Total Delay for Signalled Lanes (pcuHr): 81.81 | Cycle Time (s): 90

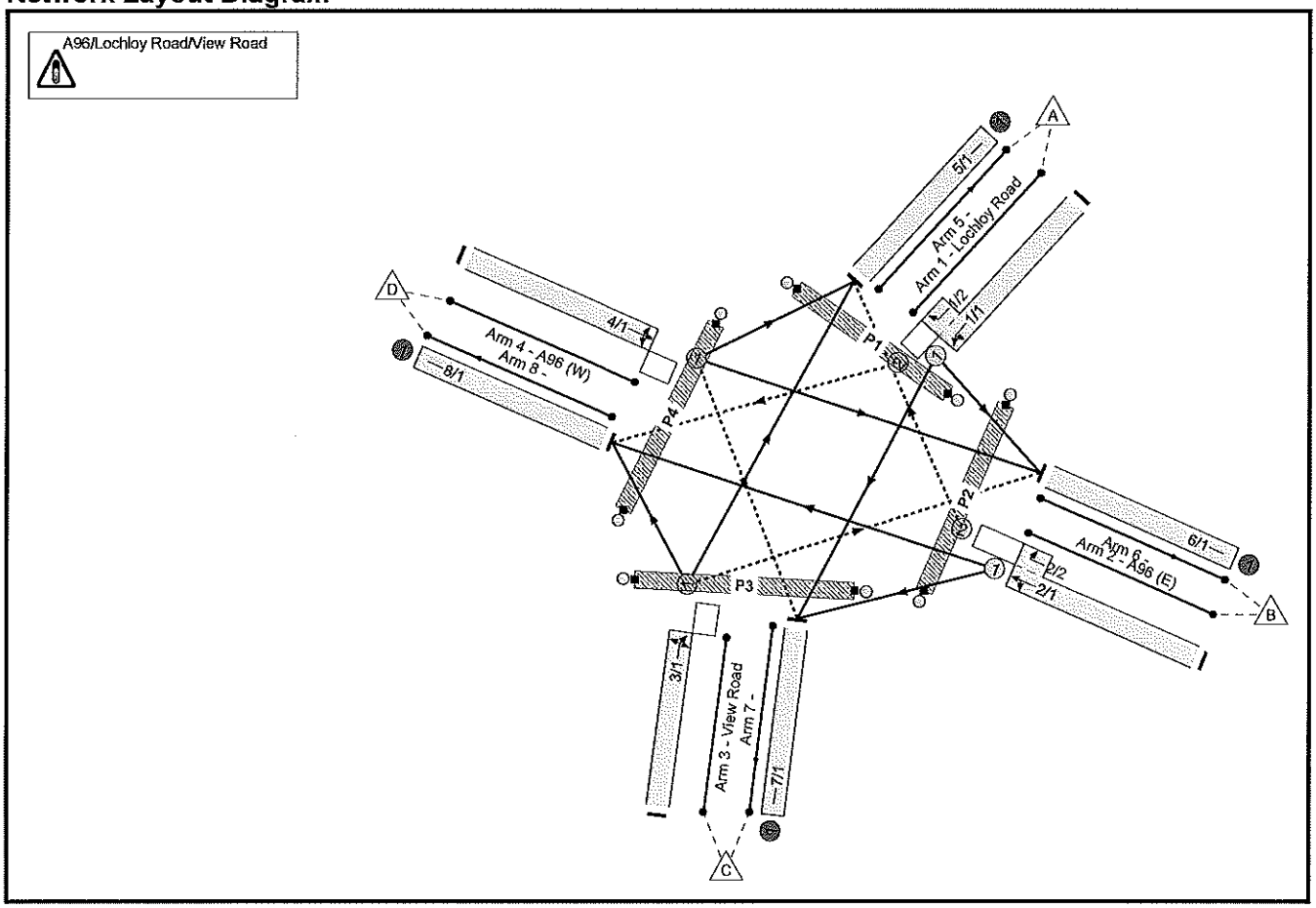
PRC Over All Lanes (%): -24.4 | Total Delay Over All Lanes(pcuHr): 81.81

NA2, Nairn - Lochloy Road / A96 4-arm signalised junction 2019

User and Project Details

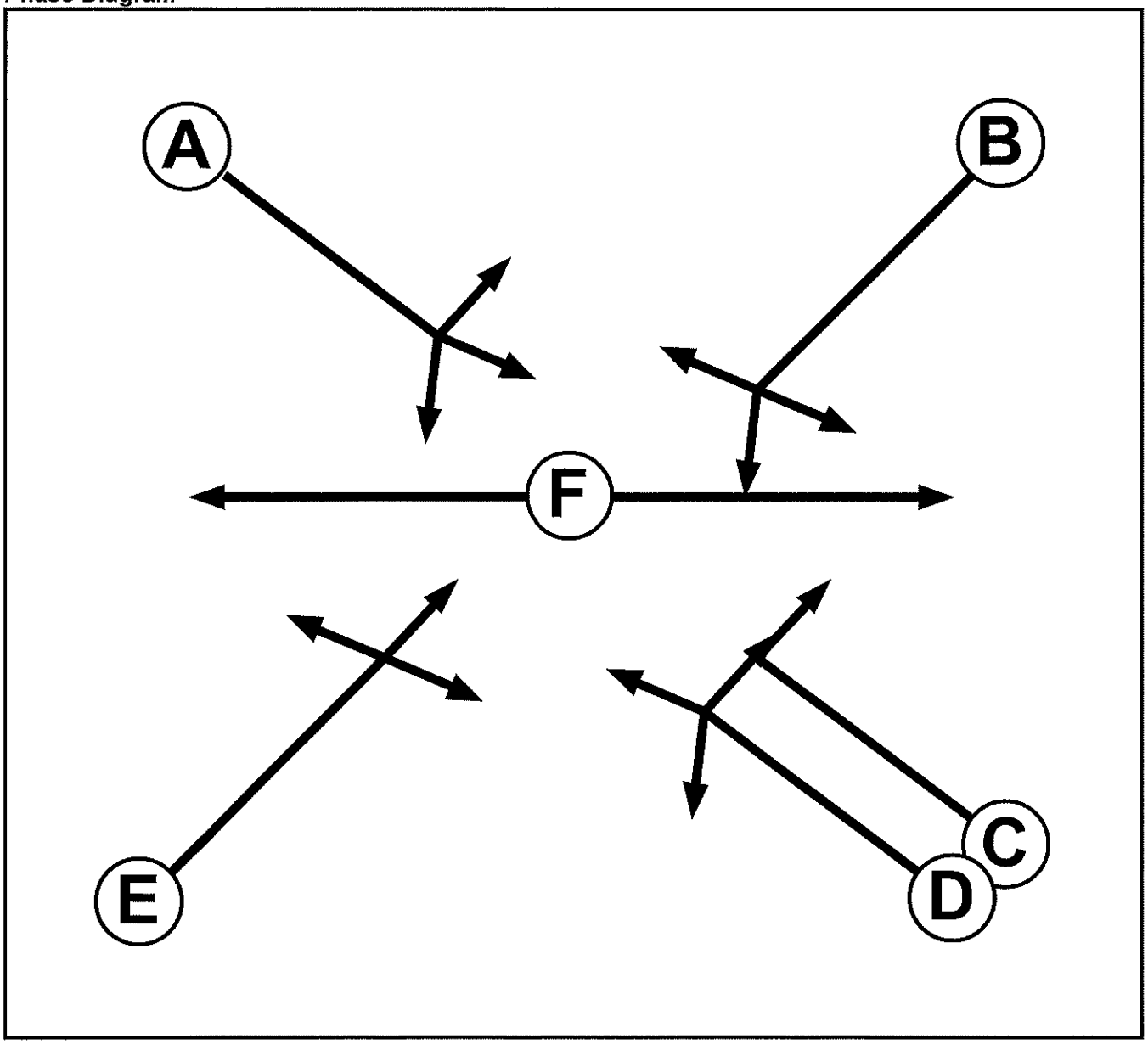
Project:	
Title:	
Location:	
File name:	A96-Lochloy Road-View Road (sensitivity) - 12 seconds (RT every second cycle) 20-03-2018.lsg3x
Author:	
Company:	
Address:	
Notes:	

Network Layout Diagram



NA2, Nairn - Lochloy Road / A96 4-arm signalised junction 2019

Phase Diagram



Phase Input Data

Phase Name	Phase Type	Assoc. Phase	Street Min	Cont Min
A	Traffic		7	7
B	Traffic		7	7
C	Ind. Arrow	D	4	4
D	Traffic		7	7
E	Traffic		7	7
F	Pedestrian		7	7

NA2, Nairn - Lochloy Road / A96 4-arm signalised junction 2019

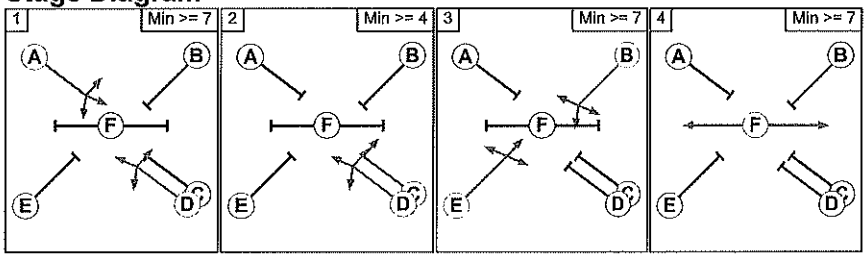
Phase Intergreens Matrix

		Starting Phase					
		A	B	C	D	E	F
Terminating Phase	A		5	5	-	5	8
	B	5		5	5	-	8
	C	5	5		-	5	8
	D	-	5	-		5	8
	E	5	-	5	5		8
	F	12	12	12	12	12	

Phases in Stage

Stage No.	Phases in Stage
1	A D
2	C D
3	B E
4	F

Stage Diagram



Phase Delays

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

Prohibited Stage Change

		To Stage			
		1	2	3	4
From Stage	1		5	5	8
	2	5		5	8
	3	5	5		8
	4	12	12	12	

NA2, Nairn - Lochloy Road / A96 4-arm signalised junction 2019

Give-Way Lane Input Data

Junction: A96/Lochloy Road/View Road											
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)
1/2 (Lochloy Road)	8/1 (Right)	1439	0	3/1	1.09	To 5/1 (Ahead)	2.00	-	0.50	2	2.00
2/2 (A96 (E))	5/1 (Right)	1439	0	4/1	1.09	To 6/1 (Ahead)	3.00	-	0.50	3	2.00
3/1 (View Road)	6/1 (Right)	1439	0	1/1	1.09	To 7/1 (Ahead)	2.00	2.00	0.50	2	2.00
4/1 (A96 (W))	7/1 (Right)	1439	0	2/1	1.09	To 8/1 (Ahead)	2.00	2.00	0.50	2	2.00

Lane Input Data

Junction: A96/Lochloy Road/View Road												
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 (Lochloy Road)	U	B	2	3	3.6	Geom	-	3.00	0.00	Y	Arm 6 Left	12.20
											Arm 7 Ahead	Inf
1/2 (Lochloy Road)	O	B	2	3	2.0	Geom	-	3.00	0.00	Y	Arm 8 Right	12.00
2/1 (A96 (E))	U	D	2	3	6.0	Geom	-	3.00	0.00	Y	Arm 7 Left	10.50
											Arm 8 Ahead	Inf
2/2 (A96 (E))	O	D C	2	3	2.0	Geom	-	3.00	0.00	Y	Arm 5 Right	10.00
3/1 (View Road)	O	E	2	3	4.0	Geom	-	2.90	0.00	Y	Arm 5 Ahead	Inf
											Arm 6 Right	14.00
											Arm 8 Left	8.00
4/1 (A96 (W))	O	A	2	3	10.4	Geom	-	3.40	0.00	Y	Arm 5 Left	12.00
											Arm 6 Ahead	Inf
											Arm 7 Right	15.00
5/1	U		2	3	60.0	Inf	-	-	-	-	-	-
6/1	U		2	3	60.0	Inf	-	-	-	-	-	-
7/1	U		2	3	60.0	Inf	-	-	-	-	-	-
8/1	U		2	3	60.0	Inf	-	-	-	-	-	-

Traffic Flow Groups

Flow Group	Start Time	End Time	Duration	Formula
1: 'AM Peak BASE'	08:10	09:10	01:00	
2: 'PM Peak BASE'	16:40	17:40	01:00	
3: 'AM Peak TOTAL'	08:10	09:10	01:00	
4: 'PM Peak TOTAL'	16:40	17:40	01:00	

Scenario 1: 'AM Peak Base 2019' (FG1: 'AM Peak BASE', Plan 1: 'Network Control Plan 1')

Traffic Flows, Desired

Desired Flow :

		Destination				
		A	B	C	D	Tot.
Origin	A	0	53	3	270	326
	B	37	0	3	624	664
	C	2	3	0	13	18
	D	133	553	10	0	696
	Tot.	172	609	16	907	1704

Traffic Lane Flows

Lane	Scenario 1: AM Peak Base 2019
Junction: A96/Lochloy Road/View Road	
1/1 (with short)	326(In) 56(Out)
1/2 (short)	270
2/1 (with short)	664(In) 627(Out)
2/2 (short)	37
3/1	18
4/1	696
5/1	172
6/1	609
7/1	16
8/1	907

Lane Saturation Flows

Junction: A96/Lochloy Road/View Road								
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat Flow (PCU/Hr)**	**Flared Sat Flow (PCU/Hr)**
1/1 (Lochloy Road)	3.00	0.00	Y	Arm 6 Left	12.20	94.6 %	1715	1715
				Arm 7 Ahead	Inf	5.4 %		
1/2 (Lochloy Road)	3.00	0.00	Y	Arm 8 Right	12.00	100.0 %	1702	1702
2/1 (A96 (E))	3.00	0.00	Y	Arm 7 Left	10.50	0.5 %	1914	1914
				Arm 8 Ahead	Inf	99.5 %		
2/2 (A96 (E))	3.00	0.00	Y	Arm 5 Right	10.00	100.0 %	1665	1665
3/1 (View Road)	2.90	0.00	Y	Arm 5 Ahead	Inf	11.1 %	1652	1652
				Arm 6 Right	14.00	16.7 %		
				Arm 8 Left	8.00	72.2 %		
4/1 (A96 (W))	3.40	0.00	Y	Arm 5 Left	12.00	19.1 %	1907	1907
				Arm 6 Ahead	Inf	79.5 %		
				Arm 7 Right	15.00	1.4 %		
5/1	Infinite Saturation Flow						Inf	Inf
6/1	Infinite Saturation Flow						Inf	Inf
7/1	Infinite Saturation Flow						Inf	Inf
8/1	Infinite Saturation Flow						Inf	Inf

Scenario 2: 'PM Peak Base 2019' (FG2: 'PM Peak BASE', Plan 1: 'Network Control Plan 1')

Traffic Flows, Desired

Desired Flow :

		Destination				
		A	B	C	D	Tot.
Origin	A	0	39	4	127	170
	B	96	0	3	656	755
	C	5	0	0	11	16
	D	187	677	10	0	874
	Tot.	288	716	17	794	1815

NA2, Nairn - Lochloy Road / A96 4-arm signalised junction 2019

Traffic Lane Flows

Lane	Scenario 2: PM Peak Base 2019
Junction: A96/Lochloy Road/View Road	
1/1 (with short)	170(In) 43(Out)
1/2 (short)	127
2/1 (with short)	755(In) 659(Out)
2/2 (short)	96
3/1	16
4/1	874
5/1	288
6/1	716
7/1	17
8/1	794

Lane Saturation Flows

Junction: A96/Lochloy Road/View Road								
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat Flow (PCU/Hr)**	**Flared Sat Flow (PCU/Hr)**
1/1 (Lochloy Road)	3.00	0.00	Y	Arm 6 Left	12.20	90.7 %	1723	1723
				Arm 7 Ahead	Inf	9.3 %		
1/2 (Lochloy Road)	3.00	0.00	Y	Arm 8 Right	12.00	100.0 %	1702	1702
2/1 (A96 (E))	3.00	0.00	Y	Arm 7 Left	10.50	0.5 %	1914	1914
				Arm 8 Ahead	Inf	99.5 %		
2/2 (A96 (E))	3.00	0.00	Y	Arm 5 Right	10.00	100.0 %	1665	1665
3/1 (View Road)	2.90	0.00	Y	Arm 5 Ahead	Inf	31.3 %	1687	1687
				Arm 6 Right	14.00	0.0 %		
				Arm 8 Left	8.00	68.8 %		
4/1 (A96 (W))	3.40	0.00	Y	Arm 5 Left	12.00	21.4 %	1902	1902
				Arm 6 Ahead	Inf	77.5 %		
				Arm 7 Right	15.00	1.1 %		
5/1	Infinite Saturation Flow						Inf	Inf
6/1	Infinite Saturation Flow						Inf	Inf
7/1	Infinite Saturation Flow						Inf	Inf
8/1	Infinite Saturation Flow						Inf	Inf

NA2, Nairn - Lochloy Road / A96 4-arm signalised junction 2019

Scenario 3: 'AM Peak TOTAL 2019' (FG3: 'AM Peak TOTAL', Plan 1: 'Network Control Plan 1')

Traffic Flows, Desired

Desired Flow :

		Destination				
		A	B	C	D	Tot.
Origin	A	0	59	4	299	362
	B	41	0	3	624	668
	C	2	3	0	13	18
	D	147	553	10	0	710
	Tot.	190	615	17	936	1758

Traffic Lane Flows

Lane	Scenario 3: AM Peak TOTAL 2019
Junction: A96/Lochloy Road/View Road	
1/1 (with short)	362(In) 63(Out)
1/2 (short)	299
2/1 (with short)	668(In) 627(Out)
2/2 (short)	41
3/1	18
4/1	710
5/1	190
6/1	615
7/1	17
8/1	936

Lane Saturation Flows

Junction: A96/Lochloy Road/View Road								
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat Flow (PCU/Hr)**	**Flared Sat Flow (PCU/Hr)**
1/1 (Lochloy Road)	3.00	0.00	Y	Arm 6 Left	12.20	93.7 %	1717	1717
				Arm 7 Ahead	Inf	6.3 %		
1/2 (Lochloy Road)	3.00	0.00	Y	Arm 8 Right	12.00	100.0 %	1702	1702
2/1 (A96 (E))	3.00	0.00	Y	Arm 7 Left	10.50	0.5 %	1914	1914
				Arm 8 Ahead	Inf	99.5 %		
2/2 (A96 (E))	3.00	0.00	Y	Arm 5 Right	10.00	100.0 %	1665	1665
3/1 (View Road)	2.90	0.00	Y	Arm 5 Ahead	Inf	11.1 %	1652	1652
				Arm 6 Right	14.00	16.7 %		
				Arm 8 Left	8.00	72.2 %		
4/1 (A96 (W))	3.40	0.00	Y	Arm 5 Left	12.00	20.7 %	1903	1903
				Arm 6 Ahead	Inf	77.9 %		
				Arm 7 Right	15.00	1.4 %		
5/1	Infinite Saturation Flow						Inf	Inf
6/1	Infinite Saturation Flow						Inf	Inf
7/1	Infinite Saturation Flow						Inf	Inf
8/1	Infinite Saturation Flow						Inf	Inf

Scenario 4: 'PM Peak TOTAL 2019' (FG4: 'PM Peak TOTAL', Plan 1: 'Network Control Plan 1')

Traffic Flows, Desired

Desired Flow :

		Destination				
		A	B	C	D	Tot.
Origin	A	0	45	5	145	195
	B	108	0	3	656	767
	C	5	0	0	11	16
	D	210	677	10	0	897
	Tot.	323	722	18	812	1875

NA2, Nairn - Lochloy Road / A96 4-arm signalised junction 2019

Traffic Lane Flows

Lane	Scenario 4: PM Peak TOTAL 2019
Junction: A96/Lochloy Road/View Road	
1/1 (with short)	195(In) 50(Out)
1/2 (short)	145
2/1 (with short)	767(In) 659(Out)
2/2 (short)	108
3/1	16
4/1	897
5/1	323
6/1	722
7/1	18
8/1	812

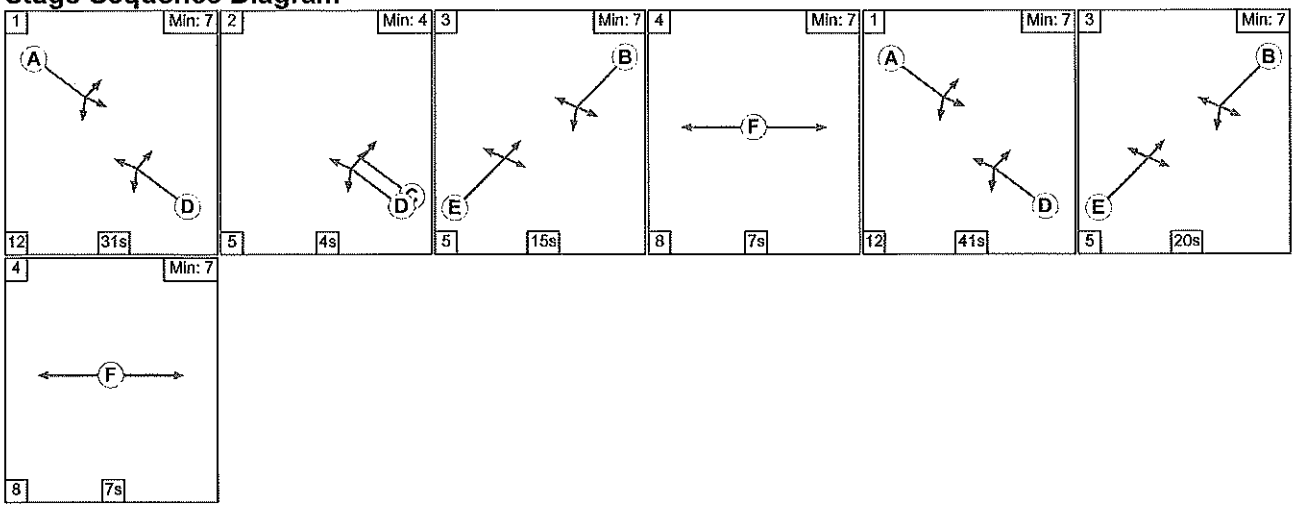
Lane Saturation Flows

Junction: A96/Lochloy Road/View Road								
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat Flow (PCU/Hr)**	**Flared Sat Flow (PCU/Hr)**
1/1 (Lochloy Road)	3.00	0.00	Y	Arm 6 Left	12.20	90.0 %	1724	1724
				Arm 7 Ahead	Inf	10.0 %		
1/2 (Lochloy Road)	3.00	0.00	Y	Arm 8 Right	12.00	100.0 %	1702	1702
2/1 (A96 (E))	3.00	0.00	Y	Arm 7 Left	10.50	0.5 %	1914	1914
				Arm 8 Ahead	Inf	99.5 %		
2/2 (A96 (E))	3.00	0.00	Y	Arm 5 Right	10.00	100.0 %	1665	1665
3/1 (View Road)	2.90	0.00	Y	Arm 5 Ahead	Inf	31.3 %	1687	1687
				Arm 6 Right	14.00	0.0 %		
				Arm 8 Left	8.00	68.8 %		
4/1 (A96 (W))	3.40	0.00	Y	Arm 5 Left	12.00	23.4 %	1897	1897
				Arm 6 Ahead	Inf	75.5 %		
				Arm 7 Right	15.00	1.1 %		
5/1	Infinite Saturation Flow						Inf	Inf
6/1	Infinite Saturation Flow						Inf	Inf
7/1	Infinite Saturation Flow						Inf	Inf
8/1	Infinite Saturation Flow						Inf	Inf

NA2, Nairn - Lochloy Road / A96 4-arm signalised junction 2019

Scenario 1: 'AM Peak Base 2019' (FG1: 'AM Peak BASE', Plan 1: 'Network Control Plan 1')

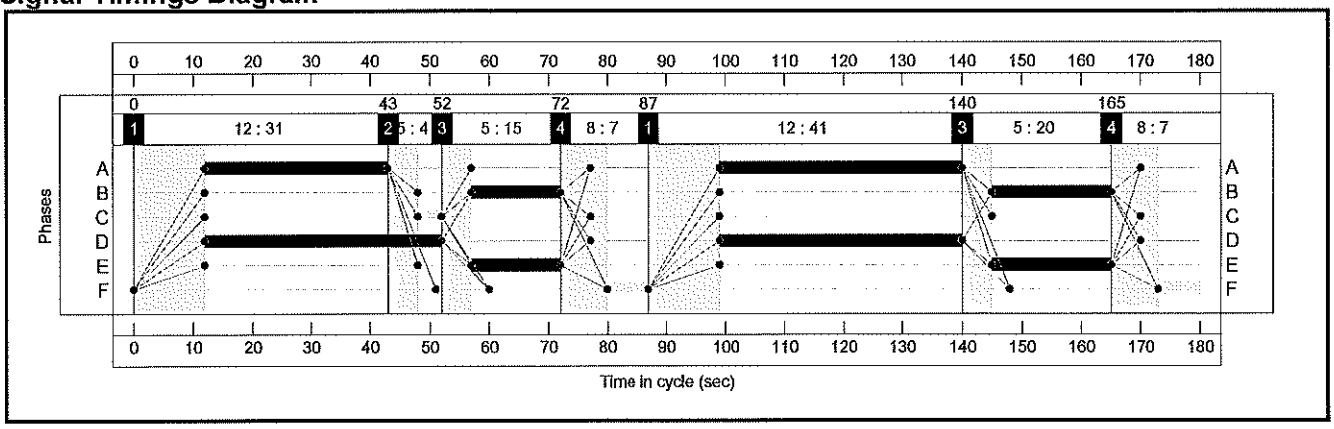
Stage Sequence Diagram



Stage Timings

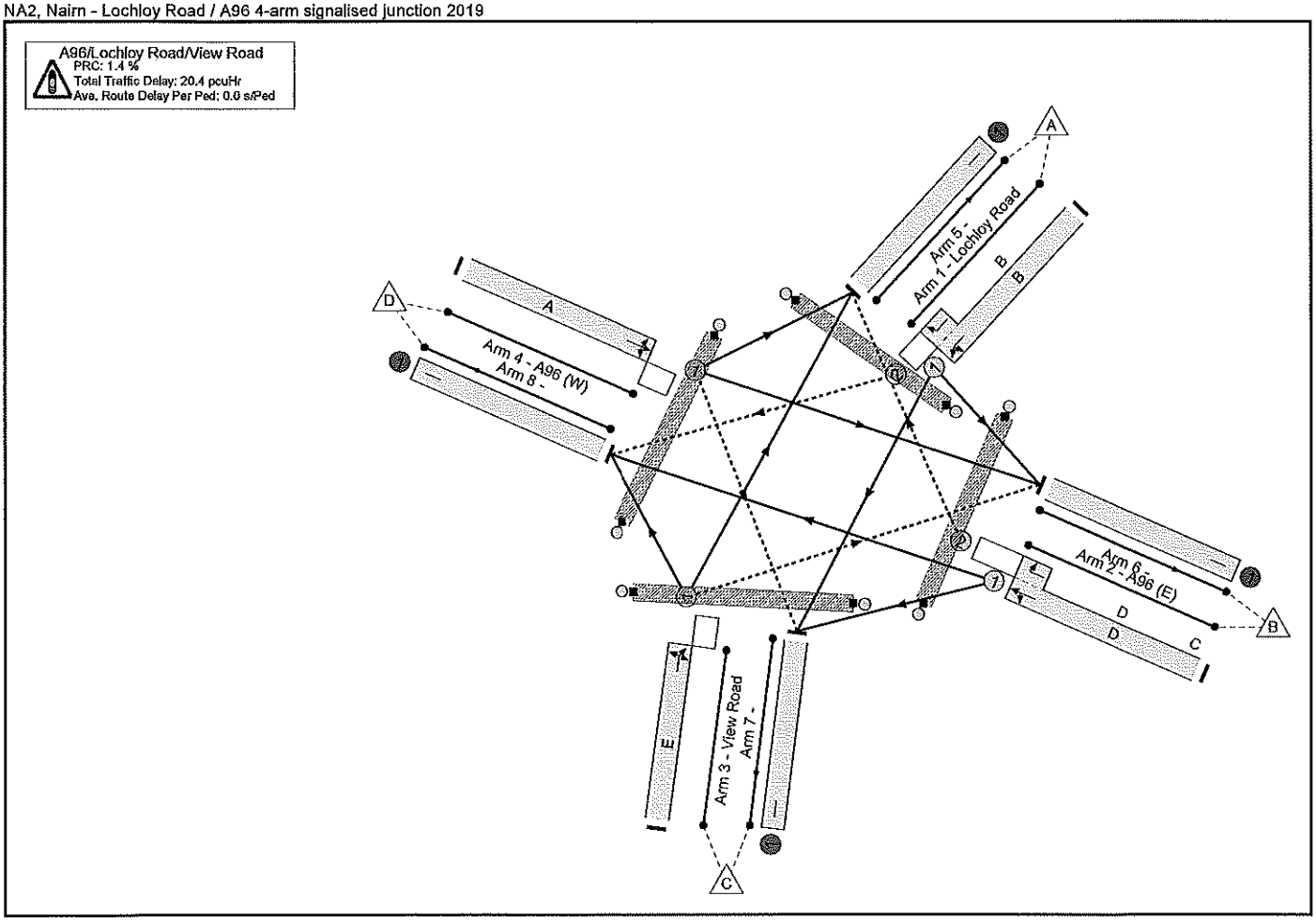
Stage	1	2	3	4	1	3	4
Duration	31	4	15	7	41	20	7
Change Point	0	43	52	72	87	140	165

Signal Timings Diagram



NA2, Nairn - Lochloy Road / A96 4-arm signalised junction 2019
Network Layout Diagram

NA2, Nairn - Lochloy Road / A96 4-arm signalised junction 2019



NA2, Nairn - Lochloy Road / A96 4-arm signalised junction 2019

Network Results

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network	-	-	N/A	-	-		-	-	-	-	-	-	88.8%
A96/Lochloy Road/View Road	-	-	N/A	-	-		-	-	-	-	-	-	88.8%
1/1+1/2	Lochloy Road Left Ahead Right	U+O	N/A	N/A	B		2	35	-	326	1715:1702	371	87.8%
2/1+2/2	A96 (E) Right Left Ahead	U+O	N/A	N/A	D	C	2	81	4	664	1914:1665	876	75.8%
3/1	View Road Ahead Right Left	O	N/A	N/A	E		2	35	-	18	1652	340	5.3%
4/1	A96 (W) Left Ahead Right	O	N/A	N/A	A		2	72	-	696	1907	784	88.8%
5/1		U	N/A	N/A	-		-	-	-	172	Inf	Inf	0.0%
6/1		U	N/A	N/A	-		-	-	-	609	Inf	Inf	0.0%
7/1		U	N/A	N/A	-		-	-	-	16	Inf	Inf	0.0%
8/1		U	N/A	N/A	-		-	-	-	907	Inf	Inf	0.0%
Ped Link: P1	Unnamed Ped Link	-	N/A	-	F		2	14	-	0	-	0	0.0%
Ped Link: P2	Unnamed Ped Link	-	N/A	-	F		2	14	-	0	-	0	0.0%
Ped Link: P3	Unnamed Ped Link	-	N/A	-	F		2	14	-	0	-	0	0.0%
Ped Link: P4	Unnamed Ped Link	-	N/A	-	F		2	14	-	0	-	0	0.0%

NA2, Nairn - Lochloy Road / A96 4-arm signalised junction 2019

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	-	-	309	6	4	11.7	8.4	0.3	20.4	-	-	-	-
A96/Lochloy Road/View Road	-	-	309	6	4	11.7	8.4	0.3	20.4	-	-	-	-
1/1+1/2	326	326	266	0	4	3.1	3.2	0.1	6.3	69.8	7.5	3.2	10.6
2/1+2/2	664	664	30	6	1	3.7	1.5	0.2	5.4	29.4	14.3	1.5	15.8
3/1	18	18	3	0	0	0.1	0.0	0.0	0.2	34.4	0.4	0.0	0.4
4/1	696	696	10	0	0	4.8	3.7	0.0	8.4	43.7	16.6	3.7	20.3
5/1	172	172	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	609	609	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
7/1	16	16	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
8/1	907	907	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
Ped Link: P1	0	0	-	-	-	-	-	-	-	-	-	-	-
Ped Link: P2	0	0	-	-	-	-	-	-	-	-	-	-	-
Ped Link: P3	0	0	-	-	-	-	-	-	-	-	-	-	-
Ped Link: P4	0	0	-	-	-	-	-	-	-	-	-	-	-

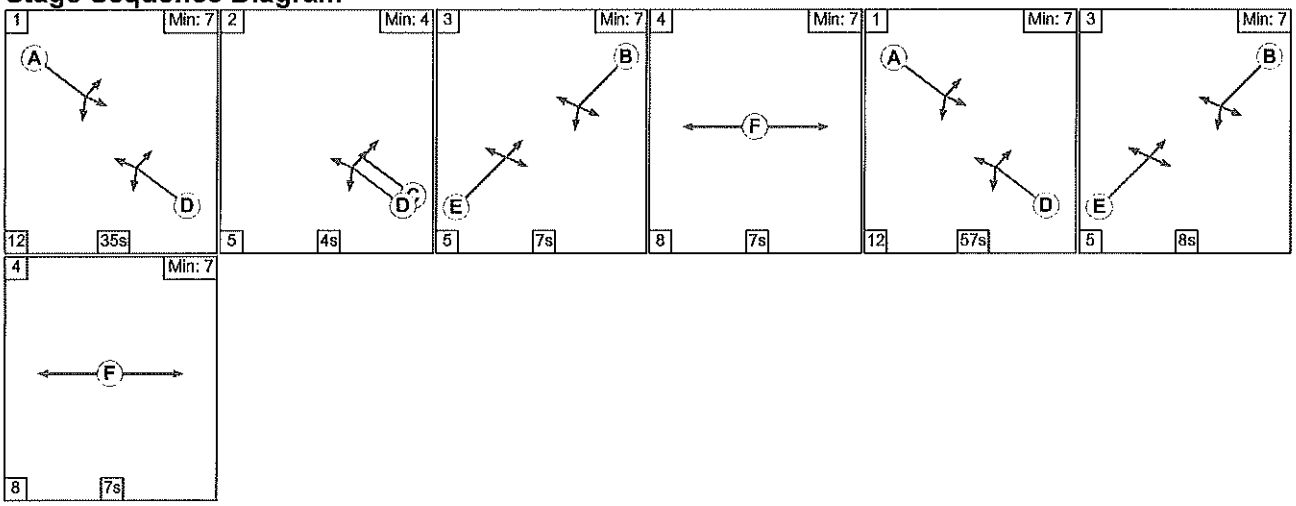
C1

PRC for Signalled Lanes (%): 1.4 Total Delay for Signalled Lanes (pcuHr): 20.35 Cycle Time (s): 180

PRC Over All Lanes (%): 1.4 Total Delay Over All Lanes(pcuHr): 20.35

NA2, Nairn - Lochloy Road / A96 4-arm signalised junction 2019
Scenario 2: 'PM Peak Base 2019' (FG2: 'PM Peak BASE', Plan 1: 'Network Control Plan 1')

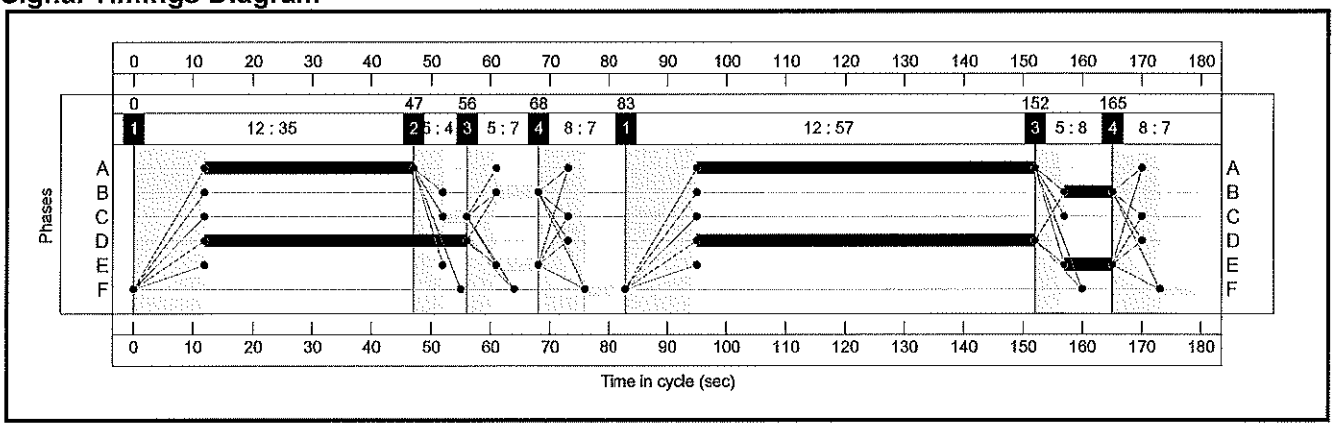
Stage Sequence Diagram



Stage Timings

Stage	1	2	3	4	1	3	4
Duration	35	4	7	7	57	8	7
Change Point	0	47	56	68	83	152	165

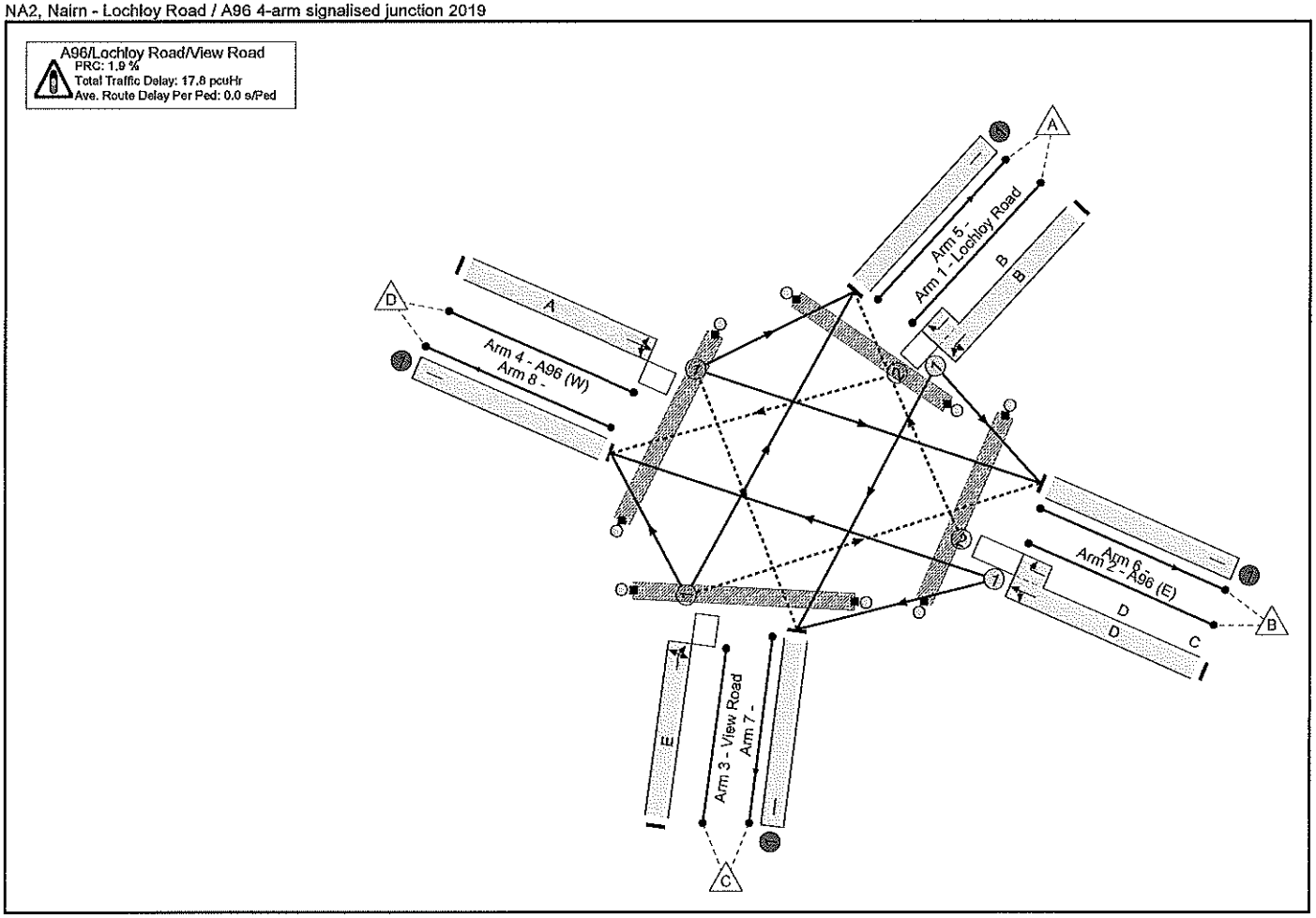
Signal Timings Diagram



NA2, Nairn - Lochloy Road / A96 4-arm signalised junction 2019

Network Layout Diagram

NA2, Nairn - Lochloy Road / A96 4-arm signalised junction 2019



NA2, Nairn - Lochloy Road / A96 4-arm signalised junction 2019

Network Results

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network	-	-	N/A	-	-		-	-	-	-	-	-	88.3%
A96/Lochloy Road/View Road	-	-	N/A	-	-		-	-	-	-	-	-	88.3%
1/1+1/2	Lochloy Road Left Ahead Right	U+O	N/A	N/A	B		2	15	-	170	1723:1702	192	88.3%
2/1+2/2	A96 (E) Right Left Ahead	U+O	N/A	N/A	D	C	2	101	4	755	1914:1665	1083	69.7%
3/1	View Road Ahead Right Left	O	N/A	N/A	E		2	15	-	16	1687	159	10.0%
4/1	A96 (W) Left Ahead Right	O	N/A	N/A	A		2	92	-	874	1902	993	88.0%
5/1		U	N/A	N/A	-		-	-	-	288	Inf	Inf	0.0%
6/1		U	N/A	N/A	-		-	-	-	716	Inf	Inf	0.0%
7/1		U	N/A	N/A	-		-	-	-	17	Inf	Inf	0.0%
8/1		U	N/A	N/A	-		-	-	-	794	Inf	Inf	0.0%
Ped Link: P1	Unnamed Ped Link	-	N/A	-	F		2	14	-	0	-	0	0.0%
Ped Link: P2	Unnamed Ped Link	-	N/A	-	F		2	14	-	0	-	0	0.0%
Ped Link: P3	Unnamed Ped Link	-	N/A	-	F		2	14	-	0	-	0	0.0%
Ped Link: P4	Unnamed Ped Link	-	N/A	-	F		2	14	-	0	-	0	0.0%

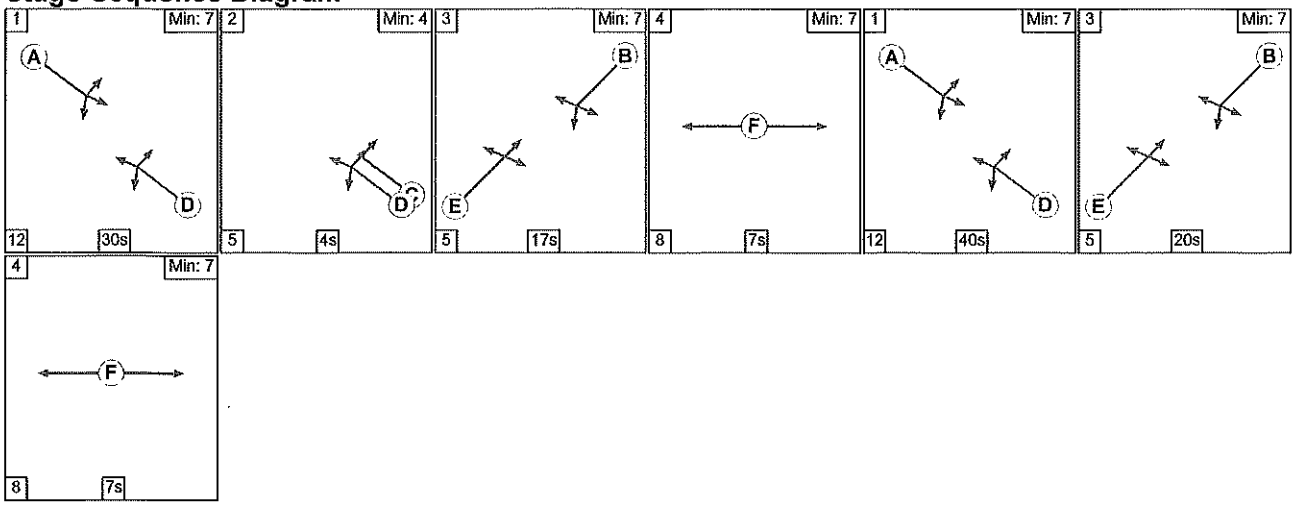
NA2, Nairn - Lochloy Road / A96 4-arm signalised junction 2019

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	-	-	199	32	2	9.5	7.7	0.6	17.8	-	-	-	-
A96/Lochloy Road/View Road	-	-	199	32	2	9.5	7.7	0.6	17.8	-	-	-	-
1/1+1/2	170	170	127	0	0	1.9	3.0	0.0	4.9	103.9	3.8	3.0	6.8
2/1+2/2	755	755	62	32	2	2.8	1.1	0.6	4.5	21.6	13.1	1.1	14.3
3/1	16	16	0	0	0	0.2	0.1	0.0	0.2	50.1	0.4	0.1	0.4
4/1	874	874	10	0	0	4.7	3.5	0.0	8.1	33.5	20.9	3.5	24.3
5/1	288	288	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	716	716	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
7/1	17	17	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
8/1	794	794	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
Ped Link: P1	0	0	-	-	-	-	-	-	-	-	-	-	-
Ped Link: P2	0	0	-	-	-	-	-	-	-	-	-	-	-
Ped Link: P3	0	0	-	-	-	-	-	-	-	-	-	-	-
Ped Link: P4	0	0	-	-	-	-	-	-	-	-	-	-	-

C1 PRC for Signalled Lanes (%): 1.9 Total Delay for Signalled Lanes (pcuHr): 17.81 Cycle Time (s): 180
PRC Over All Lanes (%): 1.9 Total Delay Over All Lanes(pcuHr): 17.81

NA2, Nairn - Lochloy Road / A96 4-arm signalised junction 2019
Scenario 3: 'AM Peak TOTAL 2019' (FG3: 'AM Peak TOTAL', Plan 1: 'Network Control Plan 1')

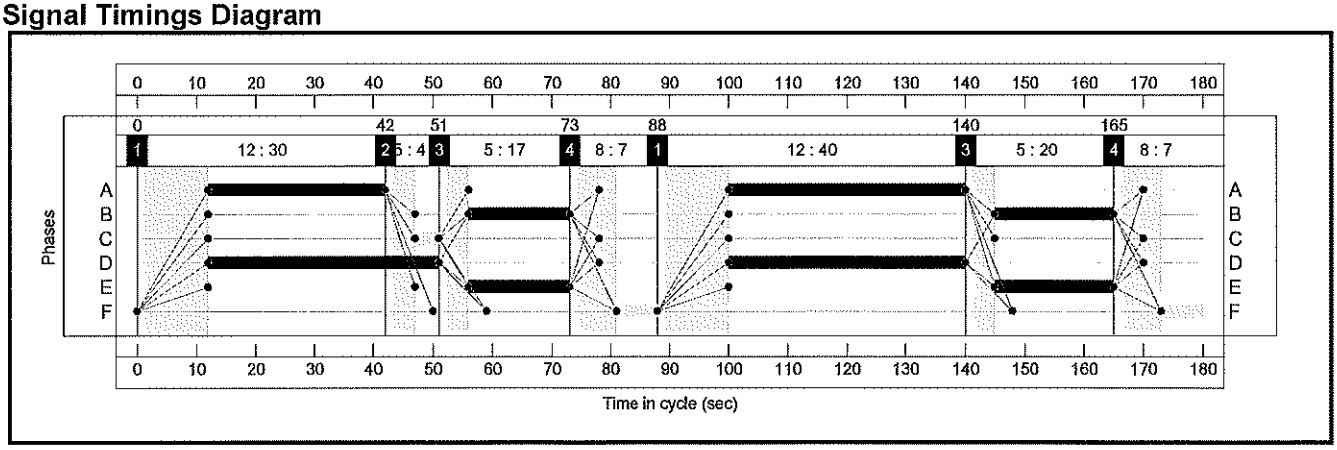
Stage Sequence Diagram



Stage Timings

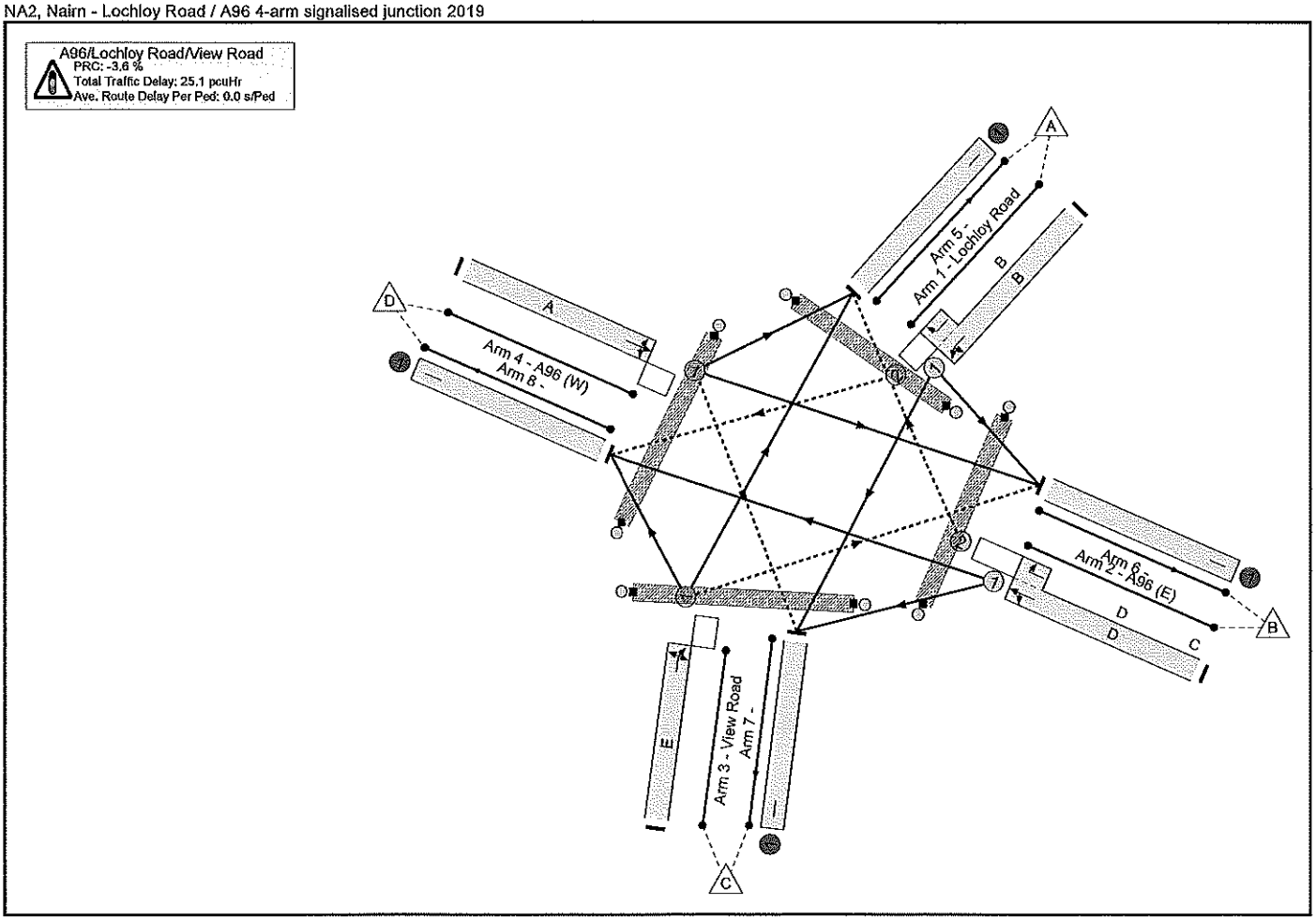
Stage	1	2	3	4	1	3	4
Duration	30	4	17	7	40	20	7
Change Point	0	42	51	73	88	140	165

Signal Timings Diagram



NA2, Nairn - Lochloy Road / A96 4-arm signalised junction 2019
Network Layout Diagram

NA2, Nairn - Lochloy Road / A96 4-arm signalised junction 2019



NA2, Nairn - Lochloy Road / A96 4-arm signalised junction 2019

Network Results

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network	-	-	N/A	-	-		-	-	-	-	-	-	93.3%
A96/Lochloy Road/View Road	-	-	N/A	-	-		-	-	-	-	-	-	93.3%
1/1+1/2	Lochloy Road Left Ahead Right	U+O	N/A	N/A	B		2	37	-	362	1717:1702	390	92.7%
2/1+2/2	A96 (E) Right Left Ahead	U+O	N/A	N/A	D	C	2	79	4	668	1914:1665	854	78.2%
3/1	View Road Ahead Right Left	O	N/A	N/A	E		2	37	-	18	1652	358	5.0%
4/1	A96 (W) Left Ahead Right	O	N/A	N/A	A		2	70	-	710	1903	761	93.3%
5/1		U	N/A	N/A	-		-	-	-	190	Inf	Inf	0.0%
6/1		U	N/A	N/A	-		-	-	-	615	Inf	Inf	0.0%
7/1		U	N/A	N/A	-		-	-	-	17	Inf	Inf	0.0%
8/1		U	N/A	N/A	-		-	-	-	936	Inf	Inf	0.0%
Ped Link: P1	Unnamed Ped Link	-	N/A	-	F		2	14	-	0	-	0	0.0%
Ped Link: P2	Unnamed Ped Link	-	N/A	-	F		2	14	-	0	-	0	0.0%
Ped Link: P3	Unnamed Ped Link	-	N/A	-	F		2	14	-	0	-	0	0.0%
Ped Link: P4	Unnamed Ped Link	-	N/A	-	F		2	14	-	0	-	0	0.0%

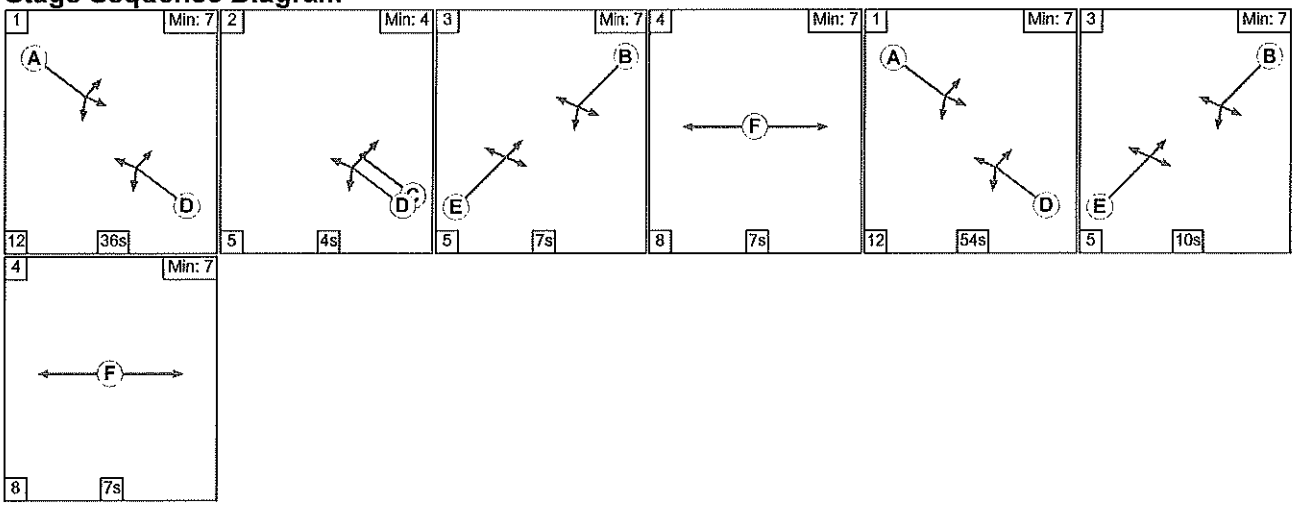
NA2, Nairn - Lochloy Road / A96 4-arm signalised junction 2019

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	-	-	331	17	4	12.6	12.2	0.3	25.1	-	-	-	-
A96/Lochloy Road/View Road	-	-	331	17	4	12.6	12.2	0.3	25.1	-	-	-	-
1/1+1/2	362	362	296	0	3	3.4	4.8	0.1	8.3	82.2	8.4	4.8	13.2
2/1+2/2	668	668	23	17	1	3.9	1.8	0.2	5.8	31.5	14.3	1.8	16.1
3/1	18	18	3	0	0	0.1	0.0	0.0	0.2	33.3	0.4	0.0	0.4
4/1	710	710	10	0	0	5.1	5.7	0.0	10.8	54.9	17.7	5.7	23.4
5/1	190	190	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	615	615	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
7/1	17	17	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
8/1	936	936	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
Ped Link: P1	0	0	-	-	-	-	-	-	-	-	-	-	-
Ped Link: P2	0	0	-	-	-	-	-	-	-	-	-	-	-
Ped Link: P3	0	0	-	-	-	-	-	-	-	-	-	-	-
Ped Link: P4	0	0	-	-	-	-	-	-	-	-	-	-	-

C1 PRC for Signalled Lanes (%): -3.6 Total Delay for Signalled Lanes (pcuHr): 25.09 Cycle Time (s): 180
PRC Over All Lanes (%): -3.6 Total Delay Over All Lanes(pcuHr): 25.09

NA2, Nairn - Lochloy Road / A96 4-arm signalised junction 2019
Scenario 4: 'PM Peak TOTAL 2019' (FG4: 'PM Peak TOTAL', Plan 1: 'Network Control Plan 1')

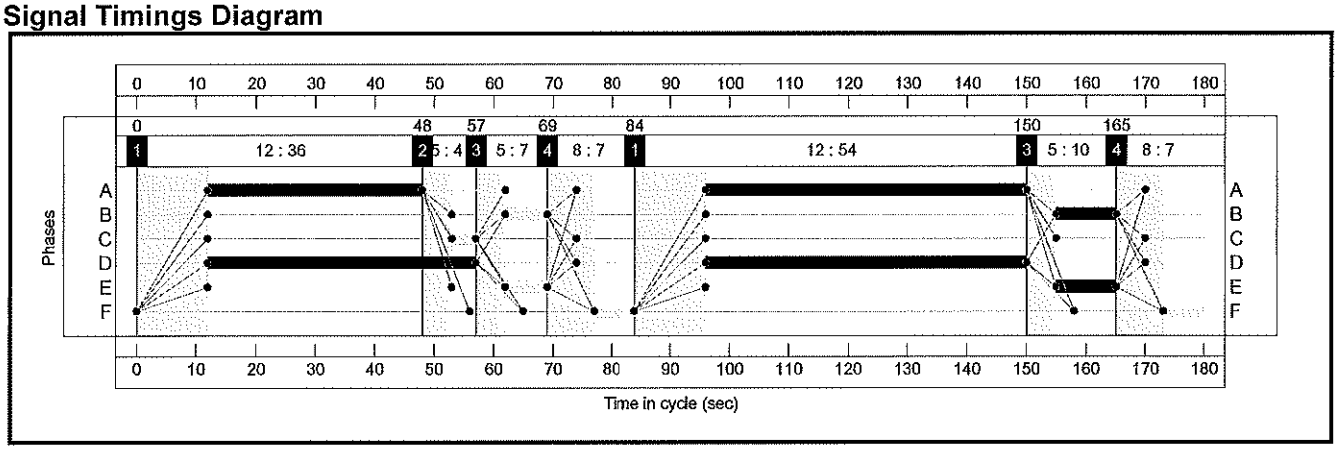
Stage Sequence Diagram



Stage Timings

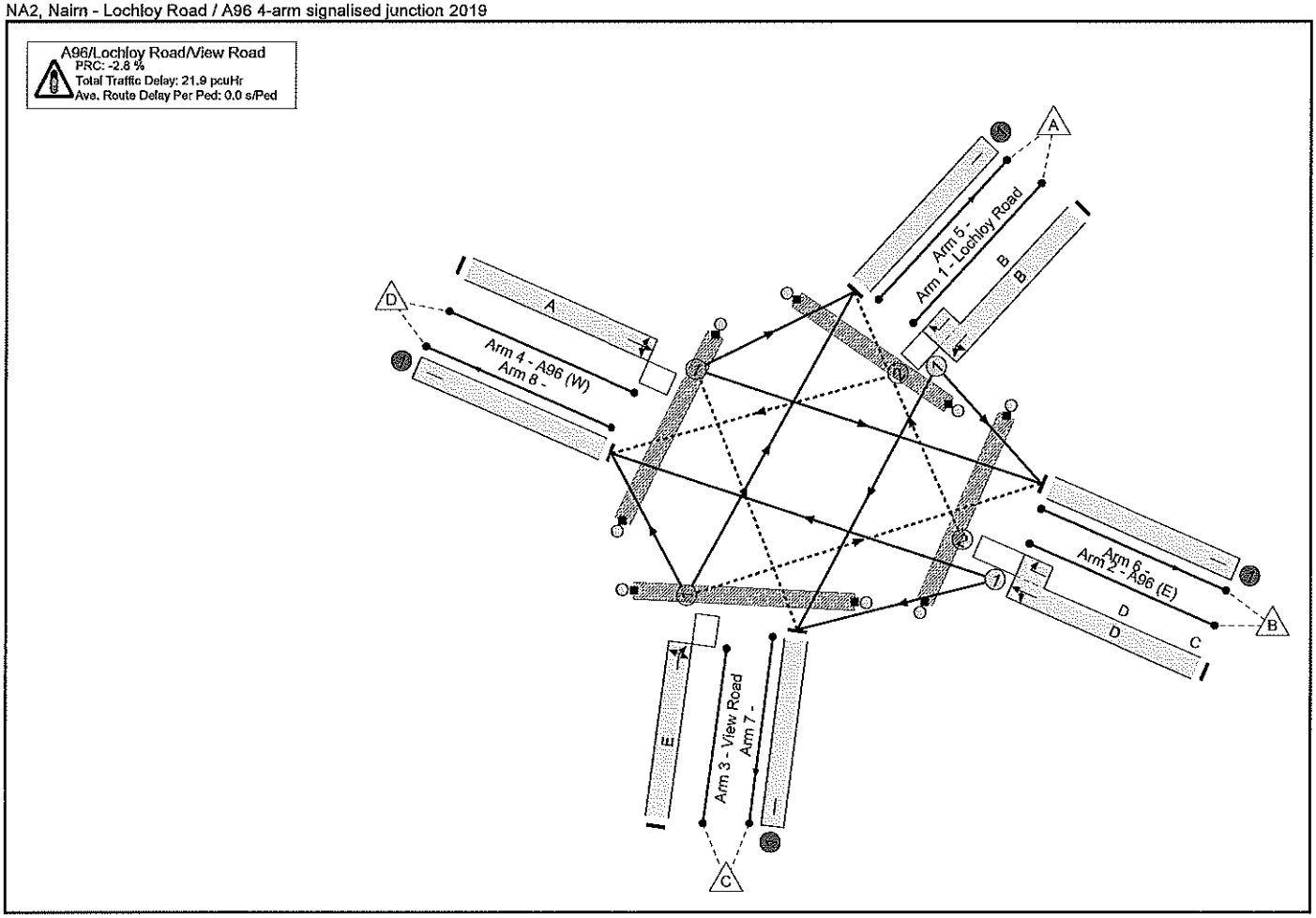
Stage	1	2	3	4	1	3	4
Duration	36	4	7	7	54	10	7
Change Point	0	48	57	69	84	150	165

Signal Timings Diagram



NA2, Nairn - Lochloy Road / A96 4-arm signalised junction 2019
Network Layout Diagram

NA2, Nairn - Lochloy Road / A96 4-arm signalised junction 2019



NA2, Nairn - Lochloy Road / A96 4-arm signalised junction 2019

Network Results

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network	-	-	N/A	-	-		-	-	-	-	-	-	92.5%
A96/Lochloy Road/View Road	-	-	N/A	-	-		-	-	-	-	-	-	92.5%
1/1+1/2	Lochloy Road Left Ahead Right	U+O	N/A	N/A	B		2	17	-	195	1724:1702	212	92.0%
2/1+2/2	A96 (E) Right Left Ahead	U+O	N/A	N/A	D	C	2	99	4	767	1914:1665	1062	72.2%
3/1	View Road Ahead Right Left	O	N/A	N/A	E		2	17	-	16	1687	178	9.0%
4/1	A96 (W) Left Ahead Right	O	N/A	N/A	A		2	90	-	897	1897	970	92.5%
5/1		U	N/A	N/A	-		-	-	-	323	Inf	Inf	0.0%
6/1		U	N/A	N/A	-		-	-	-	722	Inf	Inf	0.0%
7/1		U	N/A	N/A	-		-	-	-	18	Inf	Inf	0.0%
8/1		U	N/A	N/A	-		-	-	-	812	Inf	Inf	0.0%
Ped Link: P1	Unnamed Ped Link	-	N/A	-	F		2	14	-	0	-	0	0.0%
Ped Link: P2	Unnamed Ped Link	-	N/A	-	F		2	14	-	0	-	0	0.0%
Ped Link: P3	Unnamed Ped Link	-	N/A	-	F		2	14	-	0	-	0	0.0%
Ped Link: P4	Unnamed Ped Link	-	N/A	-	F		2	14	-	0	-	0	0.0%

NA2, Nairn - Lochloy Road / A96 4-arm signalised junction 2019

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	-	-	199	50	14	10.5	10.7	0.8	21.9	-	-	-	-
A96/Lochloy Road/View Road	-	-	199	50	14	10.5	10.7	0.8	21.9	-	-	-	-
1/1+1/2	195	195	139	0	6	2.1	3.9	0.0	6.1	112.7	4.4	3.9	8.3
2/1+2/2	767	767	50	50	8	3.1	1.3	0.7	5.1	23.8	14.2	1.3	15.5
3/1	16	16	0	0	0	0.2	0.0	0.0	0.2	47.7	0.4	0.0	0.4
4/1	897	897	10	0	0	5.1	5.4	0.0	10.5	42.2	22.2	5.4	27.6
5/1	323	323	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	722	722	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
7/1	18	18	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
8/1	812	812	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
Ped Link: P1	0	0	-	-	-	-	-	-	-	-	-	-	-
Ped Link: P2	0	0	-	-	-	-	-	-	-	-	-	-	-
Ped Link: P3	0	0	-	-	-	-	-	-	-	-	-	-	-
Ped Link: P4	0	0	-	-	-	-	-	-	-	-	-	-	-

C1 PRC for Signalled Lanes (%): -2.8 Total Delay for Signalled Lanes (pcuHr): 21.89 Cycle Time (s): 180
PRC Over All Lanes (%): -2.8 Total Delay Over All Lanes(pcuHr): 21.89

[redacted]

From: [redacted]@arup.com>
Sent: 28 March 2018 15:23
To: [redacted]
Cc: [redacted]@highland.gcsx.gov.uk; [redacted]@springfield.co.uk; [redacted]@springfield.co.uk; [redacted]@springfield.co.uk; [redacted]
Subject: Planning Application 17/05667/FUL

[redacted]

Further to our discussion yesterday relating to the above planning application in Nairn, I have received an instruction from my client to organise a new survey of the A96(T) / Lochloy Road junction focusing on the two areas of interest to Transport Scotland, namely

- The frequency the right turn indicative arrow from the trunk road to Lochloy Road is called during the modelled morning and evening peak periods.
- Similarly, pedestrian activity at the junction including again the frequency the pedestrian stage is called within the modelled periods. For instance is the pedestrian facility called every cycle or is it less frequent and also how long the facility runs for within a cycle? We would also intend to record the number of pedestrians crossing at the junction.

It is intended that the survey will be undertaken as soon as practical after the schools return following the Easter holidays. The results of the survey would be collated in a summary document.

In order to expedite matters and as we are committed to undertaking this survey to provide the additional comfort sought by Transport Scotland, I would be grateful if you would now submit your formal response on the application, along with any appropriate caveats relating to this additional survey which you consider appropriate.

Can you confirm that you are happy with this suggestion and would now be willing to submit your formal response on the application.

Many thanks

[redacted]

[redacted]

Arup
Scotstoun House South Queensferry Edinburgh EH30 9SE
[redacted]
www.arup.com

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Works Order : 460474951
EM Number : E70642
Engineer : [redacted]
Intersection : LOCHLOY ROAD FORRES ROAD NAIRN

Administration

General Specifications

Customer Name: [redacted]

Intersection/ General Description: LOCHLOY ROAD FORRES ROAD NAIRN

Controller: (•) New ( ) Modification

Area Specifications/ Customer Drawings:

Specification:

Contract/Tender:

Quotation No.:

Works Order No.: 460474951

Customer Order:

Controller/ Serial Number:

S.T.S. /EM Number: E70642 Issue: 7

Equipment Installation by:

Slot Cutting by:

Civil Works by:

Customer's: [redacted]

Telephone Number: [redacted]

Signal Company Use Only

Signal Engineer: [redacted]

(IF PROM Label as >) PROM: 16260 PROM: 302

Configuration Check: B5 1E 78 A5

Controller Options

Hardware: ST900 Firmware Type and Issue: PB801 ISS 1 Other Options:

ST950/ST900/ST750 Series Cabinet Options

Cabinet/Rack: Cabinet Kit Type: (•) UK-Std ( ) Non-UK ( ) ( )

Cabinet/Rack: Grey Cuckoo: None Gemini Unit Fittec: ☑

Mains Supply: 230 Volts 50 Hz

Peak Lamp Current: 3 Amps

Average Lamp: 950 Watts

Total Average Power: 1025 Watts

Dimming Voltage: 160

Low Inrush Transformer: ☐

Answer Issue: 0

Edit: 13

Date Created: 31/03/10

Power feed fuse rating: requires 30 Amp minimum for controller, 15 Amp minimum for pelican/lightly loaded

Works Order : 460474951
EM Number : E70642
Engineer : [redacted]
Intersection : LOCHLOY ROAD FORRES ROAD NAIRN

Phases, Stages and Streams

Phases, Stages and Streams

Add/Delete/Insert Streams:

Streams

(•) Current Number of Streams: 1

Phases

( ) Current Total Number of Phases: 7

(•) Number of Real Phases: 6

( ) Number of Dummy: 1

Stages

( ) Current Number of stages (inc. ALL-RED stages): 5

Switched Signs

( ) Number of Switched: 0

Action

Add At | Delete At

Works Order : 460474951
EM Number : E70642
Engineer : [redacted]
Intersection : LOCHLOY ROAD FORRES ROAD NAIRN

Facilities/Modes Enabled and Mode Priority Levels

Facilities

UTC
- ☑ Serial/Internal UTMC OT
- ☐ Free-standing OTL
- ☐ Integral TC12 OTL
- ☑ Serial MOVA

9 Starting

- ☑ Master Time Clock
- ☐ Holiday Clock
- ☑ FT To Current MAX
- ☐ Linked Fixed Time
- ☑ Lamp Monitoring
- ☑ RED Lamp Monitoring
- ☑ Pelican/Puffin/Toucan
- ☐ Standalone Manual
- ☐ Extend All Red
- ☐ Speed Measuremen
- ☐ Ripple Change
- ☐ London IMU
- ☐ Non-UK
- ☐ Fail to Part Time
- ☐ Fail To Hardware Flashin
- ☐
- ☐ Download To Level 3

Mode Priority

	1	2	3	4	5	6	7	8	9	10	11	12	13
☐ Part Time	○	○	○	○	○	○	○	○	○	○	○	○	○
☐ Emergency Vehicles	○	○	○	○	○	○	○	○	○	○	○	○	○
☐ Hurry Call	○	○	○	○	○	○	○	○	○	○	○	○	○
☐	○	○	○	○	○	○	○	○	○	○	○	○	○
☐ Priority Vehicle	○	○	○	○	○	○	○	○	○	○	○	○	○
☑ Manual Control	◉	○	○	○	○	○	○	○	○	○	○	○	○
☐ Manual Step On	○	○	○	○	○	○	○	○	○	○	○	○	○
☑ Selected FT or VA or	○	◉	○	○	○	○	○	○	○	○	○	○	○
☑ UTC	○	○	◉	○	○	○	○	○	○	○	○	○	○
☐	○	○	○	○	○	○	○	○	○	○	○	○	○
☐ CLF (Non-Base Tim	○	○	○	○	○	○	○	○	○	○	○	○	○
☑ CLF (Base Time)	○	○	○	◉	○	○	○	○	○	○	○	○	○
☑ Vehicle Actuated	○	○	○	○	◉	○	○	○	○	○	○	○	○
☑ Fixed	○	○	○	○	○	○	○	○	○	○	◉	○	○

Configuration Complexity

○ Low ○ Medium ○ High ◉ Maximum

standardPB801.8df
Default PROM data file

Correspondence Monitoring to inc.

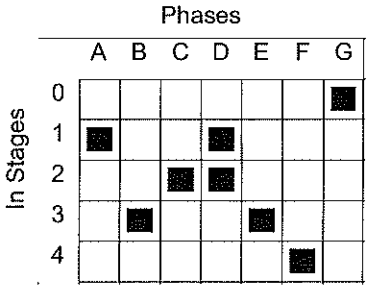
- ☑ Reds
- ☑ Ambers
- ☐ Switched Signs
- ☐ Ignore Reds and Amber

Flash Rate (ms)

400 Off 400 On

Works Order : 460474951
EM Number : E70642
Engineer : [redacted]
Intersection : LOCHLOY ROAD FORRES ROAD NAIRN

Phases in Stages



Works Order : 460474951
EM Number : E70642
Engineer : [redacted]
Intersection : LOCHLOY ROAD FORRES ROAD NAIRN

Stages in Streams

Stages in Streams

	0	1	2	3	4	5	6	7
Phase or Stage to revert to in absence of		1						
Startup		1						
Switch Off Stage								
Standalone Pedestrian Stages	☐	☐	☐	☐	☐	☐	☐	☐

Note: For a Stand-Alone Stream, the reversion must be to All Red stage or Traffic stage/phase to meet the relevant standard or specification.

In Stream

	0	1	2	3	4
0	■	■	■	■	■

Works Order : 460474951
EM Number : E70642
Engineer : [redacted]
Intersection : LOCHLOY ROAD FORRES ROAD NAIRN

Phase Type and Conditions

Phase Type and Conditions

(•) Phases A to P ( )

Phase	Title	Type	App. Type	Term. Type	Assoc. Phase
A	BRIDGE STREET	0 - UK Traffic	0	0 -	
B	LOCH LOY ROAD	0 - UK Traffic	0	0 -	
C	FORRES ROAD RIGHT TURN	2 - UK GreenArrow	0	2 -	D
D	FORRES ROAD	0 - UK Traffic	0	0 -	
E	MACRAE AVENUE	0 - UK Traffic	0	0 -	
F	PEDS	3 - UK Near Side Pedestrian	0	0 -	
G	DUMMY RED	0 - UK Traffic	0	0 -	

1) App Types: 0 = Always Appears, 1 = Appears if dem'd prior to interstage, 2 = If dem'd, 3 = If dem'd before end of window time
2) Term Types: 0 = Term's at end of stage, 1 = Term's when Assoc phase gains R.O.W, 2 = Term's when Assoc phase loses R.O.W.
3) The H/W Fail Flash fields are for information only on all but ST900ELV Controllers. For other controllers, physical switches or links (etc.) select which aspects flash and these need to be set up manually.

Works Order : 460474951
EM Number : E70642
Engineer : [redacted]
Intersection : LOCHLOY ROAD FORRES ROAD NAIRN

Opposing and Conflicting Phases

Select Stream(s) To Configure

○ All ○ 0 ○ ○ ○ ○ ○ ○ ○ ○ Initialise

☑ Amber Conflict Monitorin

To Phase

From Phase	A	B	C	D	E	F	G
A		Co	Co	o	Co	Co	
B	Co		Co	Co	o	Co	
C	Co	Co		o	Co	Co	
D	o	Co	o		Co	Co	
E	Co	o	Co	Co		Co	
F	Co	Co	Co	Co	Co		
G							

Works Order : 460474951
EM Number : E70642
Engineer : [redacted]
Intersection : LOCHLOY ROAD FORRES ROAD NAIRN

Phase Minimums, Maximums, Extensions, Ped Leaving Periods

Phase Minimums, Maximums, Extensions, Ped Leaving Periods

(•) Phases A to P ( )

Phase	Min Gree	Min Ped C	Extensio	Maximums A	B	C	D	E	F	G	H	Pre-time
A	7	0	1.6	20	49	30	71	40	40	40	40	☐
B	7	0	1.6	20	33	15	11	40	40	40	40	☐
C	4	0	1.6	10	10	10	20	40	40	40	40	☐
D	7	0	1.6	20	49	30	71	40	40	40	40	☐
E	7	0	1.6	20	33	15	11	40	40	40	40	☐
F	7	3	0.0	0	0	0	0	0	0	0	0	☐
G	3	0	0.0	0	0	0	0	0	0	0	0	☐

Note: For Standalone Streams see Help for use of Max

Works Order : 460474951
EM Number : E70642
Engineer : [redacted]
Intersection : LOCHLOY ROAD FORRES ROAD NAIRN

Phase Intergreen Times

Select Stream(s) To Configure

○ All ○ 0 ○ ○ ○ ○ ○ ○ ○

Note: On a Stand Alone Pelican/Toucan/Puffin Stream the Intergreens between Pedestrian and Traffic Phases are controlled by the timings (PBT, PIT, CMX, CDY, CRD and PAR), therefore 0 should be entered for the appropriate intergreen times in grid below.

To Phase

From Phase	A	B	C	D	E	F	G
A		5	5		5	8	
B	5		5	5		8	
C	5	5			5	8	
D		5			5	8	
E	5		5	5		8	
F	0	0	0	0	0		
G							

Works Order : 460474951
EM Number : E70642
Engineer : [redacted]
Intersection : LOCHLOY ROAD FORRES ROAD NAIRN

Intergreen Handset Limits

HIGH 199

Copy Intergreen Values

To Phase

From Phase	A	B	C	D	E	F	G
A		5	5		5	6	
B	5		5	5		6	
C	5	5			5	6	
D		5			5	6	
E	5		5	5		6	
F	8	8	8	8	8		
G							

Works Order : 460474951
EM Number : E70642
Engineer : [redacted]
Intersection : LOCHLOY ROAD FORRES ROAD NAIRN

Phase Timing Handset Ranges

Phase Timing Handset Ranges

Initialise Min Green Limits

Phase	Min. Green Min.	Min. Green Max.
A	3	255
B	3	255
C	3	255
D	3	255
E	3	255
F	3	255
G	3	255
H		
I		
J		
K		
L		
M		
N		
O		
P		

Phase	Min. Green Min.	Min. Green Max.
Q		
R		
S		
T		
U		
V		
W		
X		
Y		
Z		
A2		
B2		
C2		
D2		
E2		
F2		

Max. Green Min. 0 Max. 255

Vehicle Extension Min. 0.0 Max. 10.0

Phase Delay Min. 0 Max. 10

Starting I/G Min. 4 Max. 12

Min Pedestrian Clearance (PBT) Min. 0 Max. 12

Traffic Phase Leaving Min. 3.0 Max. 3.0

Traffic Phase Red/Amber Min. 2 Max. 2

Works Order : 460474951
EM Number : E70642
Engineer : [redacted]
Intersection : LOCHLOY ROAD FORRES ROAD NAIRN

VA Demand and Extend Definitions

VA Demand and Extend Definitions

◉ Phases A to P ○

Demands

For Unlatched demands precede the name with a #.
Conditioning MUST be used to specify unlatched

Phase				
A	MVDA	ASL21		
B	MVDB			
C	#CC5			
D	MVDD	DSL23		
E	MVDE			
F	PEDF1	PEDF2	PEDF3	PEDF4
G				

Extensions

MVDA	ASL21	AX1	
MVDB	BSL22		
CC5			
MVDD	DSL23	DX3	
MVDD	ESL24		

Works Order : 460474951
EM Number : E70642
Engineer : [redacted]
Intersection : LOCHLOY ROAD FORRES ROAD NAIRN

Phase Internal/Revertive Demands

Phase Internal/Revertive Demands

Start-up Vehicle Responsive Demands

A	B	C	D	E	F	G									
☑	☑	☑	☑	☑	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Demands Inserted When Leaving Manual and Fixed Time Modes

A	B	C	D	E	F	G									
☑	☑	☑	☑	☑	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Unlatched Demands that Start Max Timers

A	B	C	D	E	F	G									
☑	☑	☑	☑	☑	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Revertive Phase Demands

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
A	B	D	D	E											

Q	R	S	T	U	V	W	X	Y	Z	A2	B2	C2	D2	E2	F2

Works Order : 460474951
EM Number : E70642
Engineer : [redacted]
Intersection : LOCHLOY ROAD FORRES ROAD NAIRN

Phase - On Crossing and Kerbside Detector Definitions

On Crossing and Kerbside Input Definitions

(•) Phases A to P ( )

Phase	On Crossing				Kerbside			
A								
B								
C								
D								
E								
F	ONCF1	ONCF2	ONCF3	ONCF4	KBSF1	KBSF2	KBSF3	KBSF4
G								

Works Order : 460474951
EM Number : E70642
Engineer : [redacted]
Intersection : LOCHLOY ROAD FORRES ROAD NAIRN

Stream - Pelican/Puffin/Toucan Times

Stream - Pelican/Puffin/Toucan Times

Pedestrian Enable VA Mode (PEV)

Stream:	0	1	2	3	4	5	6	7

Pedestrian All Red Times (Vehicle to Pedestrian)

Stream:	0	1	2	3	4	5	6	7
(PAR n 0) VA Gap Change								
(PAR n 1) VA Max Change								
(PAR n 2) FVP Change								
(PAR n 3) UTC Change								
(PAR n 4) Local Link Change								

Handset Range Li

	Min	Max
(PAR n 2) FVP Change	0	0

Pelican Intergreen times

	Min	Max
(PIT n 0) Veh Red/Ped Flash	0	0
(PIT n 1) Veh Flash Amber/Ped Flash	0	0
(PIT n 2) Veh Flash Amber/Ped	0	0
(PIT n 3) Veh Flash Amber/Ped Red	0	0

Works Order : 460474951
EM Number : E70642
Engineer : [redacted]
Intersection : LOCHLOY ROAD FORRES ROAD NAIRN

Phase - Pelican, Puffin and Toucan Times

Phase - Pelican, Puffin and Toucan Times

◉ Phases A to P ○

Phase	PDD Ped Demand Delay	PDX Ped Demand Hold	CMX Clearance	CDY 0 Clearance Delay Gap	CDY 1 Clearance Delay Max	CRD Clearance Minimum	
A	0	0.0	0	0	0	0	
B	0	0.0	0	0	0	0	
C	0	0.0	0	0	0	0	☐
D	0	0.0	0	0	0	0	
E	0	0.0	0	0	0	0	☐
F	1	2.0	12	0	0	0	
G	0	0.0	0	0	0	0	

Pedestrian Handset Range Limits

	MIN	MAX
Demand Delay PDD	0	10
Demand Hold PDX	0.0	10.0
Clearance Maximum CMX	0	30
Clearance Delays CDY 0 and CDY1	0	10
Clearance Minimum Red CRD	0	10

Works Order : 460474951
EM Number : E70642
Engineer : [redacted]
Intersection : LOCHLOY ROAD FORRES ROAD NAIRN

IO and Link - Pelican/Puffin/Toucan Times

I/O and Link - Pelican/Puffin/Toucan Times

Stream: 0 1 2 3 4 5 6 7

Computer Control

PV

Window Time

Local Link

PV1

Link Delay Time

Link Window Time

Link Override Time

Kerbside Mat Test

Works Order : 460474951
EM Number : E70642
Engineer : [redacted]
Intersection : LOCHLOY ROAD FORRES ROAD NAIRN

Pelican, Puffin, Toucan Pushbutton/Kerbside Associations

Pelican, Puffin, Toucan Pushbutton/Kerbside Associations

	Phase	Demand	KBS
0	F	PEDF1	KBSF1
1	F	PEDF2	KBSF2
2	F	PEDF3	KBSF3
3	F	PEDF4	KBSF4
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			

	Phase	Demand	KBS
16			
17			
18			
19			
20			
21			
22			
23			
24			
25			
26			

	Phase	Demand	KBS
32			
33			
34			
35			
36			
37			
38			
39			
40			
41			
42			

	Phase	Demand	KBS
48			
49			
50			
51			
52			
53			
54			
55			
56			
57			
58			

Note: Any association pushed off the screen will have any previous association

Works Order : 460474951
EM Number : E70642
Engineer : [redacted]
Intersection : LOCHLOY ROAD FORRES ROAD NAIRN

Stages - Prohibited, Alternative, Ignored Moves

Stages - Prohibited, Alternative, Ignored Moves

Sets
- (•) 1
- ( ) 2
- ( ) 3
- ( ) 4

Modes	Restrictions	No Restrictions
Urban Traffic Control	(•)	( )
Cableless Linking	(•)	( )
Vehicle Actuated	(•)	( )
	( )	( )
Fixed Time	(•)	( )
	( )	( )

Modes	Restrictions Apply To:	No Restrictions
Manual	(•)	( )
	( )	( )
	( )	( )
	( )	( )
	( )	( )

To Stage

From Stage	0	1	2	3	4
0	■		1		
1		■			
2		0	■		
3			1	■	
4			1		■

Works Order : 460474951
EM Number : E70642
Engineer : [redacted]
Intersection : LOCHLOY ROAD FORRES ROAD NAIRN

Stage Internal Demands/Pedestrian Window Times

Stage Internal Demands/Pedestrian Window Times

Start-up Vehicle Responsive Demands

0	1	2	3	4												

Demands Inserted When Leaving Manual and Fixed Time Modes

0	1	2	3	4												
	☑	☑	☑	☑												

Unlatched Demands that Start Maximum Timers

0	1	2	3	4												
☑	☑	☑	☑	☑												

Window Times

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
0	0	0	0	0											

16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31

Exceptional Stages

Works Order : 460474951
EM Number : E70642
Engineer : [redacted]
Intersection : LOCHLOY ROAD FORRES ROAD NAIRN

Fixed Time

Fixed Time

Stage Moves & Times (Not Fixed Time to Current Max)

Current Stage	0	1	2	3	4	5	6	7
Next Stage								
Time								
Current Stage	8	9	10	11	12	13	14	15
Next Stage								
Time								
Current Stage	16	17	18	19	20	21	22	23
Next Stage								
Time								
Current Stage	24	25	26	27	28	29	30	31
Next Stage								
Time								

Phases Demanded and Extended under Fixed Time to Current Max.

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
Demand	☑	☑	☑	☑	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Extend	☑	☑	☑	☑	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

	Q	R	S	T	U	V	W	X	Y	Z	A2	B2	C2	D2	E2	F2
Demand	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Extend	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Works Order : 460474951
EM Number : E70642
Engineer : [redacted]
Intersection : LOCHLOY ROAD FORRES ROAD NAIRN

CLF - Base Time

CLF - Base Time

Controller Base Date: XX/XX/XX

Controller Base Time: 02:00:00

Plan Offset

	Minutes	Seconds		Minutes	Seconds
Plan 0	0	0	Plan 8	0	0
Plan 1	0	0	Plan 9	0	0
Plan 2	0	0	Plan 10	0	0
Plan 3	0	0	Plan 11	0	0
Plan 4	0	0	Plan 12	0	0
Plan 5	0	0	Plan 13	0	0
Plan 6	0	0	Plan 14	0	0
Plan 7	0	0	Plan 15	0	0

Handset Range Limits

	Minutes	Seconds
Min	0	0
Max	255	59

Works Order : 460474951
EM Number : E70642
Engineer : [redacted]
Intersection : LOCHLOY ROAD FORRES ROAD NAIRN

UTC General Data

UTC General Data

Type of UTC

(•) 106 ( ) 316

Integral OTU Address

2 Number of Control Words

2 Number of Reply Words

☐ Controller to respond to TC bit.

☐ Introduction of UTC to be disabled by Priori

[ ] Non UTC RTC synchronisation input

RTC Synchronisation Times

Clock Synchronise Time (UTC TS inpu

Day	Time
Saturday	00:00:00

Clock Confirm Time (UTC RT output)

Day	Time
Saturday	00:00:00

Works Order : 460474951
EM Number : E70642
Engineer : [redacted]
Intersection : LOCHLOY ROAD FORRES ROAD NAIRN

UTC Control and Reply Data Format

UTC Control and Reply Data Format

Control Words

	Bit 1	Bit 2	Bit 3	Bit 4	Bit 5	Bit 6	Bit 7	Bit 8
Word 1	F1	F2	F3	F4				
Word 2								
Word 3								
Word								

Reply Words

Word 1	G1	G2	G3	G4	PHD			
Word 2								
Word 3								
Word 4								
Word 5								
Word 6								
Word 7								
Word 8								
Word 9								
Word 10								
Word 11								
Word 12								
Word 13								
Word 14								

Works Order : 460474951
EM Number : E70642
Engineer : [redacted]
Intersection : LOCHLOY ROAD FORRES ROAD NAIRN

UTC Stage and Mode Data Definitions

UTC Stage and Mode Data Definitions

Stage	Force Bit	Green Confirm Bit	Demand Confirm Bit	Stage	Force Bit	Green Confirm Bit	Demand Confirm Bit
0				16			
1	F1	G1		17			
2	F2	G2		18			
3	F3	G3		19			
4	F4	G4		20			
5				21			
6				22			
7				23			
8				24			
9				25			
10				26			
11				27			
12				28			
13				29			
14				30			
15				31			

Mode Data Definitions

Manual Mode Operative:
☐ G1/G2 ☐ RR ☐

Manual Mode Selected:
☐ G1/G2 ☐ RR ☐

No Lamp Power, or Lamps Off due to RLM or Part Time:
☐ G1/G2 ☐ ☐

Detector Fault:
☐ ☐ ☐ DF

Normal NOT selected on the
☐ G1/G2 ☐ RR ☐

RR Button Selected:
☐ G1/G2 ☐ RR ☐

If UTC Reply Confirms are required for a Controller Fault (CF) OR for separate MC and RR replies, Conditioning must be used.

Works Order : 460474951
EM Number : E70642
Engineer : [redacted]
Intersection : LOCHLOY ROAD FORRES ROAD NAIRN

UTC and MOVA Detectors

UTC and MOVA Detectors

Detector Mappir

☑ Combined

Set Selection

○ ○ ○ ○ ○

1	AX1	2	BX2	3	DX3	4		5	CC5	6		7		8	
9		10		11	AIN11	12	BIN12	13	DIN13	14		15		16	
17		18		19		20		21	ASL21	22	BSL22	23	DSL23	24	ESL24
25		26		27		28		29		30		31		32	
33		34		35		36		37		38		39		40	
41		42		43		44		45		46		47		48	
49		50		51		52		53		54		55		56	
57		58		59		60		61		62		63		64	

Note - only 32 detectors available on MOVA 4.0

Works Order : 460474951
EM Number : E70642
Engineer : [redacted]
Intersection : LOCHLOY ROAD FORRES ROAD NAIRN

MTC - Time Switch Parameters

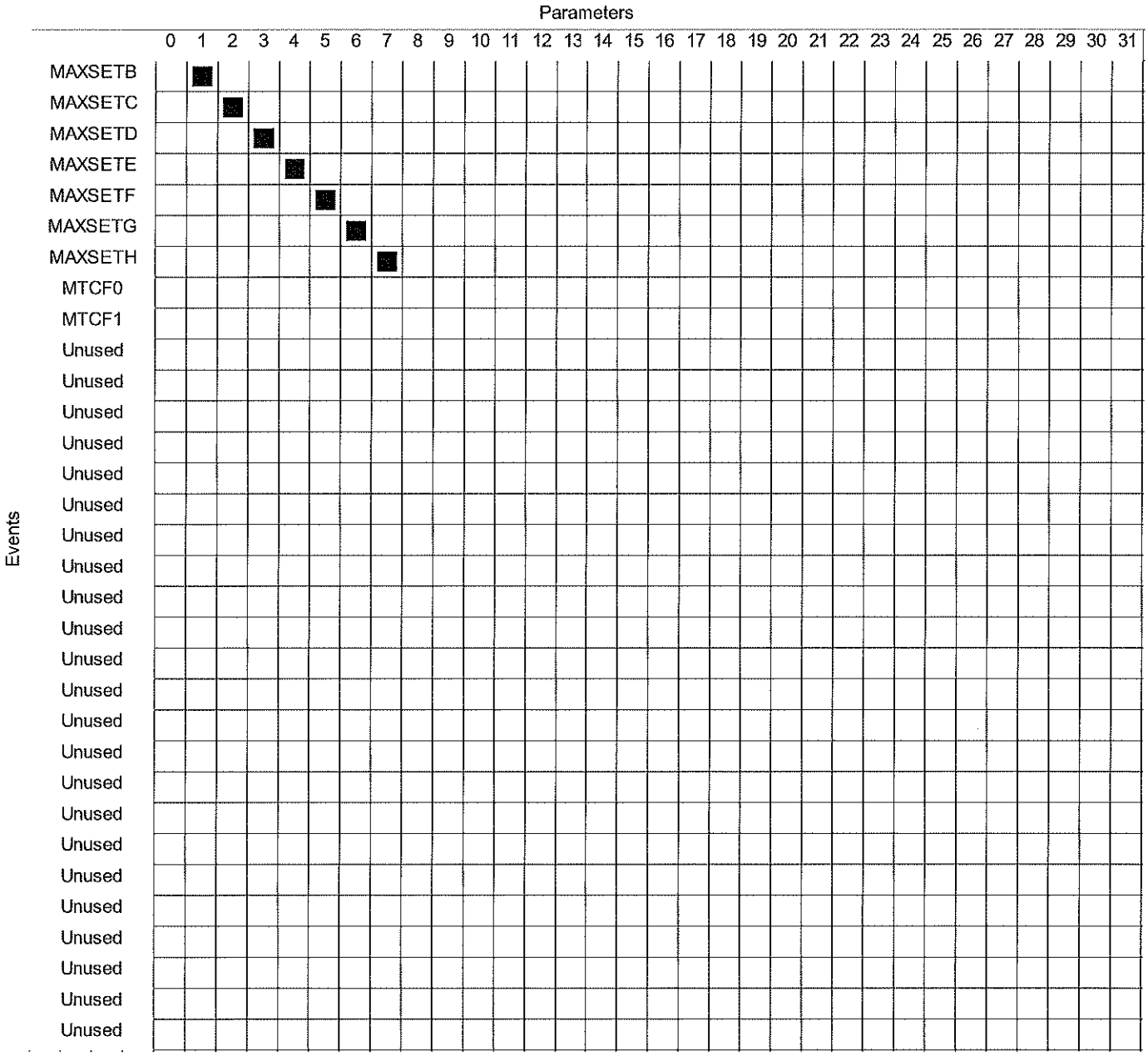
MTC - Time Switch Parameters

	Type	Event
0	Alternate Max	MAXSETB
1	Alternate Max	MAXSETC
2	Alternate Max	MAXSETD
3	Alternate Max	MAXSETE
4	Alternate Max	MAXSETF
5	Alternate Max	MAXSETG
6	Alternate Max	MAXSETH
7	Conditioning	MTCF0
8	Conditioning	MTCF1
9	No Action	
10	No Action	
11	No Action	
12	No Action	
13	No Action	
14	No Action	
15	No Action	

	Type	Event
16	No Action	
17	No Action	
18	No Action	
19	No Action	
20	No Action	
21	No Action	
22	No Action	
23	No Action	
24	No Action	
25	No Action	
26	No Action	
27	No Action	
28	No Action	
29	No Action	
30	No Action	
31	No Action	

Works Order : 460474951
EM Number : E70642
Engineer : [redacted]
Intersection : LOCHLOY ROAD FORRES ROAD NAIRN

MTC - Time Switch Parameters Array



Works Order : 460474951
EM Number : E70642
Engineer : [redacted]
Intersection : LOCHLOY ROAD FORRES ROAD NAIRN

MTC - Day Type

MTC - Day Type

No.	Mon	Tue	Wed	Thu	Fri	Sat	Sun
0	☐	☐	☐	☐	☐	☑	☐
1	☐	☐	☐	☐	☐	☐	☑
2	☑	☐	☐	☐	☐	☐	☐
3	☐	☑	☐	☐	☐	☐	☐
4	☐	☐	☑	☐	☐	☐	☐
5	☐	☐	☐	☑	☐	☐	☐
6	☐	☐	☐	☐	☑	☐	☐
7	☑	☑	☑	☑	☑	☑	☑
8	☑	☑	☑	☑	☑	☑	☐
9	☑	☑	☑	☑	☑	☐	☐
10	☐	☐	☐	☐	☐	☐	☐
11	☐	☐	☐	☐	☐	☐	☐
12	☐	☐	☐	☐	☐	☐	☐
13	☐	☐	☐	☐	☐	☐	☐
14	☐	☐	☐	☐	☐	☐	☐
15	☐	☐	☐	☐	☐	☐	☐

Works Order : 460474951
EM Number : E70642
Engineer : [redacted]
Intersection : LOCHLOY ROAD FORRES ROAD NAIRN

MTC - Timetable

MTC - Timetable

View Timetable Settings

(•) 0 - 15 ( ) 16 - 31 ( ) 32 - 47 ( ) 48 - 63

No.	Day Type	Time	Description	Function Code	Plan/ Parameter
0	9	07:00:00	MAX SET B	2	1
1	9	10:00:00	MAX SET C	2	2
2	9	16:00:00	MAX SET D	2	3
3	9	19:00:00	MAX SET C	2	2
4	9	22:00:00	MAX SET A	2	0
5	0	09:00:00	MAX SET A	2	0
6	0	21:00:00	MAX SET C	2	2
7	1	09:00:00	MAX SET C	2	2
8	1	21:00:00	MAX SET A	2	0
9	7	07:00:00	AUDIO ON	3	7
10	7	23:00:00	AUDIO OFF	4	7
11	7	07:00:00	FORRES AND NINIAN OUT ON	3	8
12	7	21:00:00	FORRES AND NINIAN OUT OFF	4	8
13	0			0	0
14	0			0	0
15	0			0	0

Function Codes:

0 = Isolate From CLF

1 = Introduce a CLF Plan

2 = Introduce a Parameter (Combination of event switches)

3 = Selects an Individual event switch to be set

4 = Selects an Individual event switch to be cleared.

Works Order : 460474951
EM Number : E70642
Engineer : [redacted]
Intersection : LOCHLOY ROAD FORRES ROAD NAIRN

LMU - General

LMU - General

Lamp Monitoring - LMU Voltage

- (•) 200-240
- ( ) 50-0-50, 100-120
- ( ) 230 CLS

Red Lamp Monitoring

Max Red Bulb: 50

First Red Lamp Fault: 0

- [ ] RLF2 Cancels RLM additional Intergreens
- [x] RLF2 Only Cleared by RFL = 1
- [ ] RLF1 Only Cleared by RFL = 1

RLM Additional Intergreen Handset Limit

Minimum	Maximum
2	10

Streams with Phase BlackOut on RLF2

[ ] 0 [ ] [ ] [ ] [ ] [ ] [ ] [ ]

Works Order : 460474951
EM Number : E70642
Engineer : [redacted]
Intersection : LOCHLOY ROAD FORRES ROAD NAIRN

LMU - Sensors

LMU - Sensors

Onboard Sensors

Sensor\	Sensor	Bulb Watts	Sensor	Sensor	Bulb Watts
1 \ A	As Seq.	40	17 \ Q		
2 \ B	As Seq.	40	18 \ R		
3 \ C	As Seq.	40	19 \ S		
4 \ D	As Seq.	40	20 \ T		
5 \ E	As Seq.	40	21 \ U		
6 \ F	None	40	22 \ V		
7 \ G	None	40	23 \ W		
8 \ H	None	40	24 \ X		
9 \ I			25 \ Y		
10 \ J			26 \ Z		
11 \ K			27 \ A2		
12 \ L			28 \ B2		
13 \ M			29 \ C2		
14 \ N			30 \ D2		
15 \ O			31 \ E2		
16 \ P			32 \ F2		

External Sensors

Sensor\	Drive	Sensor	Bulb Watts
33 \ h14		Regulatory Sign	7
34 \ z16		Regulatory Sign	7
35 \ z14		Regulatory Sign	7
36 \ z12		Regulatory Sign	7
37 \ h14			
38 \ z16			
39 \ z14			
40 \ z12			
41 \ h14			
42 \ z16			
43 \ z14			
44 \ z12			
45 \ h14			
46 \ z16			
47 \ z14			
48 \ z12			

Works Order : 460474951
EM Number : E70642
Engineer : [redacted]
Intersection : LOCHLOY ROAD FORRES ROAD NAIRN

LMU Sensor Load Types

LMU Sensor Load Types

Screen Select

1 of 1

Senso	Phase	Sensor	LED	Load	LLF
1	A	As Seq.			
2	B	As Seq.			
3	C	As Seq.			
4	D	As Seq.			
5	E	As Seq.			
33	N/A	Regulatory Sign			
34	N/A	Regulatory Sign			
35	N/A	Regulatory Sign			
36	N/A	Regulatory Sign			

Works Order : 460474951
EM Number : E70642
Engineer : [redacted]
Intersection : LOCHLOY ROAD FORRES ROAD NAIRN

RLM Additional Intergreens

Phases Delayed

Phases with RLF1	A	B	C	D	E	F	G
A						2	
B						2	
C							
D						2	
E						2	
F							
G							

Works Order : 460474951
EM Number : E70642
Engineer : [redacted]
Intersection : LOCHLOY ROAD FORRES ROAD NAIRN

RLM Phase Inhibits

Phases Inhibited/Blacked-Out

Phases with RLF2	A	B	C	D	E	F	G
A						■	
B						■	
C							
D						■	
E						■	
F							
G							

Works Order : 460474951
EM Number : E70642
Engineer : [redacted]
Intersection : LOCHLOY ROAD FORRES ROAD NAIRN

Manual Panel

Manual Panel

Stage Buttons and LEDs

Button No.	Title	Called Stage for 0 1 2 3 4 5 6 7
0	ALL RED	0
1	MAIN ROAD	1
2	RIGH TURN	2
3	SIDE ROAD	3
4	PEDS	4
5		
6		
7		

General LEDs

	AUX 1	AUX 2	AUX 3	AUX 4 (Hurry Call)	AUX 5 (Higher
Conditioned	☑	☑	☑	☐	☑

Manual Mode Enable

- ◉ Always
- ○ When Handset Plugged in (Note
- ○ When 'MND' Command Entere

NOTE: For this to operate Special Conditioning is required.

General Buttons

	None	SW1	SW2	SW3
Momentary		☐	☐	☐
Dim	◉	○	○	○
RR	◉	○	○	○

Manual Signals On

- ◉ Immediate Signals Or
- ○ As Start-Up

Mode Select Switches Disabled

☐ VA ☐ Fixed Time ☐ CLF

Works Order : 460474951
EM Number : E70642
Engineer : [redacted]
Intersection : LOCHLOY ROAD FORRES ROAD NAIRN

Special Conditioning

```
((RTCMIN EQL<0>)+(RTCMIN EQL<10>)+(RTCMIN EQL<20>)+(RTCMIN EQL<30>)+(RTCMIN EQL <40>)+(RTCMIN EQL<50>)).(RTCSEC   GRT<54>)=
IFT (MODE0 EQL<6>) THN
CNDTMA0.(NOT(SSMAN+SSVA+SSFIX+SSCLF+MAUXSW1))=MOVACRB
ELS
CNDTMA0.(NOT(SSMAN+SSVA+SSFIX+SSCLF+MAUXSW1+SCRT0))=MOVACRB
END
IFT PRSLMPRA+PRSLMPAA+PRSLMPGA THN
RUN<0>
END
MAUXSW1=MIL22                    ;CHECK RUNING MOVA AND CYCLE CRB BIT
;_____________________________________________________________________
MODE0 EQL<6>=MIL17               ;MOVA LIGHTS HIGHER PRIORITY LED
;_____________________________________________________________________
NOT(PHASED)=PHD                  ;MOVA CONFIRM PHASED
NOT(LMP2RED0).PRSLMPAF=MOVADET32;MOVA PED DEMAND INPUTS
;_____________________________________________________________________
IFT PHASEF.SCRT1.LMPON THN
RUN<1>
END
CNDTMA1:::=TACTF
        *=TACTF1                 ;TACTILE SWITCH
        *=TACTF2
        *=TACTF3
NOT(PHASEF)=SCRT1
;_____________________________________________________________________
IFT STAGE4.SCRT2.MTCF0.LMPON THN
RUN<2>
END
CNDTMA2=AUDIO                    ;AUDIO SWITCH
NOT(STAGE4)=SCRT2
;_____________________________________________________________________

CCTO1+(MODE0 EQL<6>.BSL22.CFE0)=MOVADET22
CCTO2+(MODE0 EQL<6>.ESL24.CFE1)=MOVADET24
```

Works Order : 460474951
EM Number : E70642
Engineer : [redacted]
Intersection : LOCHLOY ROAD FORRES ROAD NAIRN

Special Conditioning

```
NOT(CFE6).MTCF1.(ATOROW+MINA+EXTAA)=FORRESA
NOT(CFE7).MTCF1.(DTOROW+MIND+EXTAD)=NINIAND

IFT NOT(NINIAN) THN
RUN<3>
END
IFT CNDTER3 THN
RUN<4>
END
CNDTMA4.NOT(CFE8)=+MOVADET33; MOVADET 33 PULSE

IFT (NINIAN+EXTAA).NOT(CFE8) THN
RUN<5>
END
CNDTMA5=+MOVADET34

IFT NOT(FORRES) THN
RUN<6>
END
IFT CNDTER6 THN
RUN<7>
END
CNDTMA7.NOT(CFE9)=+MOVADET35; MOVADET 35 PULSE

IFT (FORRES+EXTAD).NOT(CFE9) THN
RUN<8>
END
CNDTMA8=+MOVADET36
```

Works Order : 460474951
EM Number : E70642
Engineer : [redacted]
Intersection : LOCHLOY ROAD FORRES ROAD NAIRN

Special Conditioning Timers

Special Conditioning Timers

Timers

0-31

No	Value	Min	Max	200ms	Description	No	Value	Min	Max	200ms	Description
0	1	0	255	☐	CRB TIMER	16		0	255	☐	
1	4	0	255	☐	TACTILE TIMER	17		0	255	☐	
2	4	0	255	☐	AUDIO TIMER	18		0	255	☐	
3	5	0	255	☐	NINIAN TIMER	19		0	255	☐	
4	2	0	255	☐	MOVADET33 PULSE	20		0	255	☐	
5	5	0	255	☐	MOVADET 34 HOLD	21		0	255	☐	
6	10	0	255	☐	FORRES TIMER	22		0	255	☐	
7	2	0	255	☐	MOVADET 35 PULSE	23		0	255	☐	
8	5	0	255	☐	MOVADET 36 HOLD	24		0	255	☐	
9		0	255	☐		25		0	255	☐	
10		0	255	☐		26		0	255	☐	
11		0	255	☐		27		0	255	☐	
12		0	255	☐		28		0	255	☐	
13		0	255	☐		29		0	255	☐	
14		0	255	☐		30		0	255	☐	
15		0	255	☐		31		0	255	☐	

Works Order : 460474951
EM Number : E70642
Engineer [redacted]
Intersection : LOCHLOY ROAD FORRES ROAD NAIRN

Special Instructions

Works Order : 460474951
EM Number : E70642
Engineer : [redacted]
Intersection : LOCHLOY ROAD FORRES ROAD NAIRN

Call Cancel

Call Cancel

Unit No.	Input Name	Call Delay	Cancel Delay	Phase Demanded (Unlatched Demand)
0	CC5	2	4	C
1	BSL22	3	0	B
2	ESL24	3	0	E
3		0	0	
4		0	0	
5		0	0	
6		0	0	
7		0	0	

Works Order : 460474951
EM Number : E70642
Engineer : [redacted]
Intersection : LOCHLOY ROAD FORRES ROAD NAIRN

Inputs and Outputs

Inputs and Outputs

☐ Enable Signal Required
☐ Manual Allocation

Port Number & Type
Port: 0
○ Inputs ○ Outputs ◉ Inputs & Outputs

Card Type & Address
Intelligent Backplane 16/0
Card Address: 1

	DET	Bit No	Type I or O	Name	Req'd	BP	Inv	U/D	Misc	DFM	DFM Group	Ext time	Used By Phs	UTC	SDE	Pri	HC	CC	IG	UD	LRT	Term Block	Terminal
○	0	0	I	ASL21	☑	☑	☐	☐	☐	A	0	0.0	☑	☐	☐	☐	☐	☐	☐	☐	☐	1 LT1	A1
○	1	1	I	AX1	☑	☑	☐	☐	☐	A	0	0.0	☑	☐	☐	☐	☐	☐	☐	☐	☐	1 LT1	A2
○	2	2	I	AIN11	☑	☑	☐	☐	☐	A	0	0.0	☑	☐	☐	☐	☐	☐	☐	☐	☐	1 LT1	A3
○	3	3	I	BSL22	☑	☑	☐	☐	☐	A	0	0.0	☑	☐	☐	☐	☐	☑	☐	☐	☐	1 LT1	A4
○	4	4	I	BX2	☑	☑	☐	☐	☐	A	0	0.0	☑	☐	☐	☐	☐	☐	☐	☐	☐	1 LT1	B1
○	5	5	I	BIN12	☑	☑	☐	☐	☐	A	0	0.0	☑	☐	☐	☐	☐	☐	☐	☐	☐	1 LT1	B2
○	6	6	I		☐	☐	☐	☐	☐				☐	☐	☐	☐	☐	☐	☐	☐	☐	1 LT1	B3
○	7	7	I		☐	☐	☐		☐				☐	☐	☐	☐	☐	☐	☐	☐	☐	1 LT1	B4

Add | Delete | Move | Clear Used By | Move to/from backplane

Manual Map Optimisatio

Works Order : 460474951
EM Number : E70642
Engineer : [redacted]
Intersection : LOCHLOY ROAD FORRES ROAD NAIRN

Inputs and Outputs

Inputs and Outputs

☐ Enable Signal Required
☐ Manual Allocation

Port Number & Type

Port: 1

○ Inputs ○ Outputs ◉ Inputs & Outputs

Card Type & Address

Intelligent Backplane 16/0
Card Address: 1

	DET	Bit No	Type I or O	Name	Req'd	BP	Inv	U/D	Misc	DFM	DFM Group	Ext time	Used By Phs	UTC	SDE	Pri	HC	CC	IG	UD	LRT	Term Block	Terminal
○	8	0	I	DSL23	☑	☑	☐	☐	☐	A	0	0.0	☑	☐	☐	☐	☐	☐	☐	☐	☐	1 LT1	C1
○	9	1	I	DX3	☑	☑	☐	☐	☐	A	0	0.0	☑	☐	☐	☐	☐	☐	☐	☐	☐	1 LT1	C2
○	10	2	I	DIN13	☑	☑	☐	☐	☐	A	0	0.0	☑	☐	☐	☐	☐	☐	☐	☐	☐	1 LT1	C3
○	11	3	I	ESL24	☑	☑	☐	☐	☐	A	0	0.0	☑	☐	☐	☐	☐	☑	☐	☐	☐	1 LT1	C4
○	12	4	I	CC5	☑	☑	☐	☐	☐	A	0	0.0	☑	☐	☐	☐	☐	☑	☐	☐	☐	1 LT1	D1
○	13	5	I		☐	☐	☐	☐	☐				☐	☐	☐	☐	☐	☐	☐	☐	☐	1 LT1	D2
○	14	6	I		☐	☐	☐	☐	☐				☐	☐	☐	☐	☐	☐	☐	☐	☐	1 LT1	D3
○	15	7	I		☐	☐	☐		☐				☐	☐	☐	☐	☐	☐	☐	☐	☐	1 LT1	D4

Add | Delete | Move | Clear Used By | Move to/from backplane | Manual Map Optimisatio

Works Order : 460474951
EM Number : E70642
Engineer : [redacted]
Intersection : LOCHLOY ROAD FORRES ROAD NAIRN

Inputs and Outputs

Inputs and Outputs

☐ Enable Signal Required
☐ Manual Allocation

Port Number & Type
Port: 2
○ Inputs ○ Outputs
◉ Inputs & Outputs

Card Type & Address
Serial IO 24/16
Card Address: 2

	DET	Bit No	Type I or O	Name	Req'd	BP	Inv	U/D	Misc	DFM	DFM Grou	Ext time	Used By Phs	UTC	SDE	Pri	HC	CC	IG	UD	LRT	Term Block	Line No
○	16	0	I	MVDA	☑	☐	☐	☐	☐	A	1	0.0	☑	☐	☐	☐	☐	☐	☐	☐	☐	1I/O1	I-0
○	17	1	I	MVDB	☑	☐	☐	☐	☐	A	1	0.0	☑	☐	☐	☐	☐	☐	☐	☐	☐	1I/O1	I-1
○	18	2	I	MVDD	☑	☐	☐	☐	☐	A	1	0.0	☑	☐	☐	☐	☐	☐	☐	☐	☐	1I/O1	I-2
○	19	3	I	MVDE	☑	☐	☐	☐	☐	A	1	0.0	☑	☐	☐	☐	☐	☐	☐	☐	☐	1I/O1	I-3
○	20	4	I	NINIAN	☑	☐	☐	☐	☐	N		0.0	☐	☐	☐	☐	☐	☐	☐	☐	☐	1I/O1	I-4
○	21	5	I	FORRES	☑	☐	☐	☐	☐	N		0.0	☐	☐	☐	☐	☐	☐	☐	☐	☐	1I/O1	I-5
○	22	6	I		☐	☐	☐	☐	☐				☐	☐	☐	☐	☐	☐	☐	☐	☐	1I/O1	I-6
○	23	7	I		☐	☐	☐		☐				☐	☐	☐	☐	☐	☐	☐	☐	☐	1I/O1	I-7

Add | Delete | Move | Clear Used By | Move to/from backplane

Manual Map Optimisatio

Works Order : 460474951
EM Number : E70642
Engineer : [redacted]
Intersection : LOCHLOY ROAD FORRES ROAD NAIRN

Inputs and Outputs

Inputs and Outputs

☐ Enable Signal Required
☐ Manual Allocation

Port Number & Type
Port: 3
○ Inputs ○ Outputs ◉ Inputs & Outputs

Card Type & Address
Serial IO 24/16
Card Address: 2

	DET	Bit No	Type I or O	Name	Req'd	BP	Inv	U/D	Misc	DFM	DFM Group	Ext time	Used By Phs	UTC	SDE	Pri	HC	CC	IG	UD	LRT	Term Block	Line No
○	24	0	I	PEDF1	☑	☐	☐	☐	☐	Y	2	0.0	☑	☐	☐	☐	☐	☐	☐	☐	☐	1I/O1	I-8
○	25	1	I	KBSF1	☑	☐	☐	☐	☐	A	3	0.0	☑	☐	☐	☐	☐	☐	☐	☐	☐	1I/O1	I-9
○	26	2	I	PEDF2	☑	☐	☐	☐	☐	Y	2	0.0	☑	☐	☐	☐	☐	☐	☐	☐	☐	1I/O1	I-10
○	27	3	I	KBSF2	☑	☐	☐	☐	☐	A	3	0.0	☑	☐	☐	☐	☐	☐	☐	☐	☐	1I/O1	I-11
○	28	4	I	PEDF3	☑	☐	☐	☐	☐	Y	2	0.0	☑	☐	☐	☐	☐	☐	☐	☐	☐	1I/O1	I-12
○	29	5	I	KBSF3	☑	☐	☐	☐	☐	A	3	0.0	☑	☐	☐	☐	☐	☐	☐	☐	☐	1I/O1	I-13
○	30	6	I	PEDF4	☑	☐	☐	☐	☐	Y	2	0.0	☑	☐	☐	☐	☐	☐	☐	☐	☐	1I/O1	I-14
○	31	7	I	KBSF4	☑	☐	☐		☐	A	3	0.0	☑	☐	☐	☐	☐	☐	☐	☐	☐	1I/O1	I-15

Add | Delete | Move | Clear Used By | Move to/from backplane | Manual Map Optimisatio

Works Order : 460474951
EM Number : E70642
Engineer : [redacted]
Intersection : LOCHLOY ROAD FORRES ROAD NAIRN

Inputs and Outputs

Inputs and Outputs

☐ Enable Signal Required
☐ Manual Allocation

Port Number & Type
Port: 4
○ Inputs ○ Outputs ◉ Inputs & Outputs

Card Type & Address
Serial IO 24/16
Card Address: 2

	DET	Bit No	Type I or O	Name	Req'd	BP	Inv	U/D	Misc	DFM	DFM Grou	Ext time	Used By Phs	UTC	SDE	Pri	HC	CC	IG	UD	LRT	Term Block	Line No
○	32	0	I	ONCF1	☑	☐	☐	☐	☐	A	4	2.0	☑	☐	☐	☐	☐	☐	☐	☐	☐	1I/O1	I-16
○	33	1	I	ONCF2	☑	☐	☐	☐	☐	A	4	2.0	☑	☐	☐	☐	☐	☐	☐	☐	☐	1I/O1	I-17
○	34	2	I	ONCF3	☑	☐	☐	☐	☐	A	4	2.0	☑	☐	☐	☐	☐	☐	☐	☐	☐	1I/O1	I-18
○	35	3	I	ONCF4	☑	☐	☐	☐	☐	A	4	2.0	☑	☐	☐	☐	☐	☐	☐	☐	☐	1I/O1	I-19
○	36	4	I		☐	☐	☐	☐	☐				☐	☐	☐	☐	☐	☐	☐	☐	☐	1I/O1	I-20
○	37	5	I		☐	☐	☐	☐	☐				☐	☐	☐	☐	☐	☐	☐	☐	☐	1I/O1	I-21
○	38	6	I		☐	☐	☐	☐	☐				☐	☐	☐	☐	☐	☐	☐	☐	☐	1I/O1	I-22
○	39	7	I		☐	☐	☐		☐				☐	☐	☐	☐	☐	☐	☐	☐	☐	1I/O1	I-23

Add | Delete | Move | Clear Used By | Move to/from backplane | Manual Map Optimisatio

Works Order : 460474951
EM Number : E70642
Engineer : [redacted]
Intersection : LOCHLOY ROAD FORRES ROAD NAIRN

Inputs and Outputs

Inputs and Outputs

☐ Enable Signal Required
☐ Manual Allocation

Port Number & Type
Port: 5
○ Inputs ○ Outputs ◉ Inputs & Outputs

Card Type & Address
Serial IO 24/16
Card Address: 2

	DET	Bit No	Type I or O	Name	Req'd	BP	Inv	U/D	Misc	DFM	DFM Group	Ext time	Used By Phs	UTC	SDE	Pri	HC	CC	IG	UD	LRT	Term Block	Line No
○	40	0	O	TACTF	☑	☐	☐	☐	☐	N		0.0	☐	☐	☐	☐	☐	☐	☐	☐	☐	1I/O1	O-0
○	41	1	O	TACTF1	☑	☐	☐	☐	☐	N		0.0	☐	☐	☐	☐	☐	☐	☐	☐	☐	1I/O1	O-1
○	42	2	O	TACTF2	☑	☐	☐	☐	☐	N		0.0	☐	☐	☐	☐	☐	☐	☐	☐	☐	1I/O1	O-2
○	43	3	O	TACTF3	☑	☐	☐	☐	☐	N		0.0	☐	☐	☐	☐	☐	☐	☐	☐	☐	1I/O1	O-3
○	44	4	O	AUDIO	☑	☐	☐	☐	☐	N		0.0	☐	☐	☐	☐	☐	☐	☐	☐	☐	1I/O1	O-4
○	45	5	O		☐	☐	☐	☐	☐				☐	☐	☐	☐	☐	☐	☐	☐	☐	1I/O1	O-5
○	46	6	O	FORRESA	☑	☐	☐	☐	☐	N		0.0	☐	☐	☐	☐	☐	☐	☐	☐	☐	1I/O1	O-6
○	47	7	O	NINIAND	☑	☐	☐		☐	N		0.0	☐	☐	☐	☐	☐	☐	☐	☐	☐	1I/O1	O-7

Add | Delete | Move | Clear Used By | Move to/from backplane
Manual Map Optimisatio

Works Order : 460474951
EM Number : E70642
Engineer : [redacted]
Intersection : LOCHLOY ROAD FORRES ROAD NAIRN

Aspect Drives

Aspect Drives

(•) A-L ( ) M-X ( ) Y-F2

Phase Driver Card 1

	Used For	Term Block	Term No
A - Red	Phase	1TBA	1
A - Amber	Phase	1TBA	2
A - Green	Phase	1TBA	3
B - Red	Phase	1TBA	4
B - Amber	Phase	1TBA	5
B - Green	Phase	1TBA	6
C - Red	Phase	1TBA	7
C - Amber	Phase	1TBA	8
C - Green	Phase	1TBA	9
D - Red	Phase	1TBA	10
D - Amber	Phase	1TBA	11
D - Green	Phase	1TBA	12

Phase Driver Card 1

	Used For	Term Block	Term No
E - Red	Phase	1TBB	1
E - Amber	Phase	1TBB	2
E - Green	Phase	1TBB	3
F - Red	Phase	1TBB	4
F - Amber	Phase	1TBB	5
F - Green	Phase	1TBB	6
G - Red			
G -			
G -			
H - Red			
H - Amber			
H - Green			

Phase Driver Card 2

	Used For	Term Block	Term No
I - Red			
I - Amber			
I - Green			
J - Red			
J - Amber			
J - Green			
K - Red			
K - Amber			
K - Green			
L - Red			
L - Amber			
L - Green			

Works Order : 460474951
EM Number : E70642
Engineer : [redacted]
Intersection : LOCHLOY ROAD FORRES ROAD NAIRN

I/O - DFM Group Timings

I/O - DFM Group Timings

Input	State	SET	SET	SET	SET
Group	Active (Mins)	30	30	30	30
	InActive (Hrs)	18	18	18	18
Group	Active (Mins)	30	30	30	30
	InActive (Hrs)	18	18	18	18
Group	Active (Mins)	5	5	5	5
	InActive (Hrs)	254	254	254	254
Group	Active (Mins)	30	30	30	30
	InActive (Hrs)	18	18	18	18
Group	Active (Mins)	30	30	30	30
	InActive (Hrs)	18	18	18	18
Group	Active (Mins)	30	30	30	30
	InActive (Hrs)	18	18	18	18
Group	Active (Mins)	30	30	30	30
	InActive (Hrs)	18	18	18	18
Group	Active (Mins)	30	30	30	30
	InActive (Hrs)	18	18	18	18

Note - 255 or blank disables DFM monitoring of that state (active or inactive) during that timeset (A to D)

Handset Limiting Values

State	Min	Max
Active (Mins)	0	254
InActive (Hrs)	0	254

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[redacted]

From: [redacted]
Sent: 27 February 2018 13:30
To: [redacted]
Cc: [redacted]
Subject: RE: NA2, Nairn, Transport Assessment - LinSig modelling files

[redacted]

Thank you for providing the modelling files. Having now had the opportunity to review these and the Transport Assessment (TA), we would offer the following comments.

TA Scoping

Given that in excess of 90% of development generated traffic is anticipated to impact on the A96, Transport Scotland would have expected to have been consulted at the scoping stage to minimise the risk of abortive work. It is noted that scoping discussions only involved The Highland Council (THC) as local roads authority.

Vehicle Trip Generation

We note that the anticipated vehicle trip generation has been estimated from vehicle trip rates extracted from the TRICS database and compared to observed vehicle trip rates derived from a survey of the Lochloy Road / Montgomerie Drive junction. The assessment has adopted the higher trip rates extracted from TRICS; 0.49 AM (0.17 arrivals and 0.32 departures) and 0.56 PM (0.33 arrivals and 0.23 departures) equating to 57 and 64 two-way vehicle trips during the AM and PM Peak hour periods respectively.

Given that circa 75% of the units will be privately owned and circa 90% of these houses, the most appropriate residential sub-category in TRICS is "03/A – Houses Privately Owned (GDO use class C3)", not the individual sub-category approach adopted in the TA. As a consequence, the adopted trip rates would appear to be on the low side. Notwithstanding this, it is recognised that had the TA adopted the trip rates previously accepted by THC for the NA5 Lochloy site, this would only result in an additional 15 vehicle trips on the Lochloy Road approach to the A96 / Lochloy Road / View Road traffic signal controlled junction over the AM Peak hour period. This increase is not considered to be significant in terms of detailed junction assessment nor would it change the overall conclusion of the TA. On that basis, the vehicle trip rates and resultant vehicle trip generation is considered to be acceptable in this instance.

Base Traffic

Background traffic conditions on the A96 have been determined from a junction turning count survey undertaken at the A96 / Lochloy Road / View Road traffic signal controlled junction in April 2017. We are satisfied that April represents a neutral month therefore the survey is considered to be acceptable.

Committed Development

The TA has included the NA5 Lochloy site as committed development. This site is understood to have consent for up to 685 residential units. Of this total, the TA states that only 87 units remain to be constructed and occupied. We have no basis upon which to dispute the number of remaining units however, The Highland Council (THC) has subsequently intimated that the number allowed

for in the TA is reasonable. The trip generation for the remaining units has therefore been estimated by applying the vehicle trip rates adopted in the TA prepared in support of this site. This approach is considered to be acceptable.

Assessment Year

The TA has adopted a 2019 opening year of assessment. 2017 observed traffic flows have been factored to the aforementioned year of opening using growth factors determined from 'TEMPro'. While a 2019 opening year would appear optimistic, applying a further years growth to 2020 at a rate of around 2% is not considered to be significant in terms of detailed junction assessment. On that basis, the adopted opening year of assessment is considered to be acceptable in this instance.

Junction Assessment

From the traffic flow diagrams provided in the TA, the impact of development generated traffic on the A96 to the east and west of Lochloy Road is around 1% and 3% respectively. On that basis, detailed assessment of the trunk road network has been limited to the A96 / Lochloy Road / View Road traffic signal controlled junction only. This is considered to be acceptable in this instance.

It is noted that the assessment of the A96 / Lochloy Road / View Road traffic signal controlled junction has been undertaken using LinSig and the model developed from the traffic signal specification provided by the Operating Company, BEAR Scotland. This approach is considered to be acceptable.

Notwithstanding this, the specification would appear to have been misinterpreted in terms of the modelled phase intergreen times. The traffic signals at this location are Puffin with on crossing detection, therefore the intergreen following the pedestrian Phase F is controlled by the CMX times. In summary, the max intergreen is 17 seconds. This is derived from page 8 of the specification which, for Phase F, indicates a 3s pedestrian clearance while page 16 indicates a 12s CMX clearance and 2s pedestrian demand hold. These timings generally relate to Periods 5, 6 and 9 in Table 2 (Nearside Period) of Traffic Advisory Leaflet (TAL) 5/05 Part 4 of 4. It is therefore incorrect to model a '0' intergreen from Phase F to the traffic phases in LinSig when, on site, the intergreen will range from an absolute minimum of 5s up to a maximum of 17s. It is recognised that the CMX clearance is demand dependant however, if pedestrian demand is not known, the modelling work should consider a 'worst case' scenario. We would therefore request that the model is re-run on that basis.

In terms of which model, it is considered appropriate to use the model with Phase C coded as an Indicative Arrow (IA) phase. However, it is noted that when coding the Lane 2/2 details, the IA phase C has not been associated with the main traffic phase D resulting in Stage 2 indicating no minimum green time on the stage diagram. This should be amended when re-running the model.

The reported results, which will change as a consequence of the above, currently indicate queues in excess of 100m on the A96 west approach in both the 'Base 2019' and 'Total 2019' traffic flow scenarios. We would therefore seek clarification what steps have been taken to ensure that the predicted queuing in the base model is representative of actual conditions on the ground.

We trust that you will seek to address the above comments where an action is required however, in the meantime, please do not hesitate to contact me should you have any queries.

Regards

[redacted]

[redacted]

Transport Scotland
Buchanan House
58 Port Dundas Road
Glasgow
G4 0HF

*For agency and travel information visit our **website***

Transport Scotland, the national transport agency
C[redacted]mhdhail Alba, buidheann n[redacted]iseanta na c[redacted]mhdhail

---

From: [redacted]@arup.com]
Sent: 31 January 2018 11:15
To: [redacted]
Cc: [redacted]
Subject: NA2, Nairn, Transport Assessment - LinSig modelling files

[redacted]

Many thanks for your phone call.

As requested, please find attached a copy of the LinSig models which were used as part of the Nairn (NA2) Transport Assessment. The first model reflects the one which was used to inform the TA. The second model (titled 'sensitivity test') reflects a minor coding amendment which connects the RT movement from the A96 into Lochloy Road to an associated phase. All other coding remains the same and, as you'll see, this has had a negligible impact on the results.

Please note, we are currently reviewing all of the Council's comments regarding the TA to help ensure that all of their concerns are suitably addressed.

Also attached is a copy of the signal spec which was used to inform the signal modelling.

If you have any further queries, please don't hesitate to let me know.

Regards,

[redacted]
MA (Hons), MSc, CMILT, MCIHT, MIEnvSc, FRGS

Arup
Scotstoun House South Queensferry Edinburgh EH30 9SE United Kingdom
[redacted]

[redacted]

From: [redacted]
Sent: 31 January 2018 11:36
To: [redacted]
Cc: [redacted]
Subject: RE: NA2, Nairn, Transport Assessment - LinSig modelling files

[redacted]

Thank you for providing the requested information.

Regards

[redacted]

[redacted]

From: [redacted]@bearscotland.co.uk>
Sent: 11 April 2018 16:24
To: [redacted]
Cc: [redacted]
Subject: RE: A96 / Lochloy Signal IA / Pedestrian Data
Attachments: Lochloy.7z

Follow Up Flag: Follow up
Flag Status: Completed

Hi [redacted]

Apologies for delay, there was an issue with the RMS config for this site which we have now fixed.

I've attached the assessment log which will allow you to review how many times the RTIA and pedestrian stage have run in a given period.

Regards,

[redacted]

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From: [redacted]@transport.gov.scot <[redacted]@transport.gov.scot>
Sent: 11 April 2018 12:48
To: [redacted]@bearscotland.co.uk>
Cc: [redacted]@transport.gov.scot
Subject: FW: A96 / Lochloy Signal IA / Pedestrian Data
Importance: High

[redacted]

I appreciate that you are busy however, obtaining this data has now become critical. We are under pressure to respond on the planning application and have already missed one committee date. It would therefore be appreciated if you could chase Siemens for the data.

Thanks

[redacted]

From: [redacted]
Sent: 09 April 2018 09:37
To: [redacted]@bearscotland.co.uk'
Cc: [redacted]
Subject: A96 / Lochloy Signal IA / Pedestrian Data

[redacted]

Any further update from Siemens regarding the above?

Regards

[redacted]

[redacted]

Transport Scotland
Buchanan House
58 Port Dundas Road
Glasgow
G4 0HF

[redacted]

From: [redacted]@bearscotland.co.uk>
Sent: 13 April 2018 16:06
To: [redacted]
Cc: [redacted]
Subject: RE: A96 / Lochloy Signal IA / Pedestrian Data

[redacted]

Your interpretation of the data looks sound to me. The data shows the ped stage running for 10 seconds as this was the length of the ped stage when the pedestrian facilities were farsided. When the site was updated to nearsided the ped min was reduced to 7 seconds from 10. Technically the MOVA dataset should have been updated to allow for the reduced ped length. Unfortunately the controller does not record the actual intergreens that ran, therefore when modeling in LinSig I would probably just use the maximum possible value.

Regards,

[redacted]

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From: [redacted]@transport.gov.scot <[redacted]@transport.gov.scot>
Sent: 13 April 2018 12:02
To: [redacted]@bearscotland.co.uk>
Cc: [redacted]@transport.gov.scot
Subject: RE: A96 / Lochloy Signal IA / Pedestrian Data

[redacted]

Further to our recent telephone conversation, please find attached a spreadsheet summarising the AM and PM IA and pedestrian demand; 'Peak Hour Summary' tab. As discussed, it would be appreciated if you could give it a very quick spot check to ensure I have not misinterpreted the raw data.

It would appear to indicate that the IA phase is called once every 4 cycles max and once every 8 cycles on average during the AM peak with the pedestrian phase called once every 2 cycles max and once every 3 cycles on average during the equivalent period.

During the PM peak, the data would appear to indicate that the IA phase is called once every 3 cycles max and once every 4 cycles on average with the pedestrian phase called once every 2 cycles max and once every 3 cycles on average during the equivalent period.

The modelling undertaken to date has assumed a pedestrian intergreen of 12s and the maximum of 17s. This is in addition to the minimum green of 7s modelled for the pedestrian phase. The data indicates a max duration for the pedestrian phase of 10s during both peak periods. Does the 10s relate to the CMX timings therefore it would be acceptable to model a 10s intergreen in addition to the 7s min green or is this the overall time given to the pedestrian phase inclusive of the min green (i.e. you would model a 7s min green and a 3s intergreen)?

Happy to discuss.

Regards

[redacted]

From: [redacted]@bearscotland.co.uk]
Sent: 11 April 2018 16:24
To: [redacted]
Cc: [redacted]
Subject: RE: A96 / Lochloy Signal IA / Pedestrian Data

Hi [redacted]

Apologies for delay, there was an issue with the RMS config for this site which we have now fixed.

I've attached the assessment log which will allow you to review how many times the RTIA and pedestrian stage have run in a given period.

Regards,

[redacted]

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[redacted]

From: [redacted]@bearscotland.co.uk>
Sent: 14 February 2018 17:24
To: [redacted]
Subject: RE: A96 / Lochloy Rd Traffic Signals - Nairn

Hi [redacted]

Apologies for the delay in coming back to you.

The existing traffic signals at this location are PUFFIN with on crossing detection, therefore the inter-green is controlled by the CMX times.

In summary, the max inter-green is 17 seconds, and I have added screenshots from the specification together with explanation to allow you to see where this derived from.

Page 8 of specification for Phase F indicates 3 second pedestrian clearance

Phase Minimums, Maximums, Extensions, Ped Leaving Periods

◉ Phases A to P ○

Phase	Min Gree	Min Ped C	Extensio	Maximums A	B	C	D	E	F	G	H
A	7	0	1.6	20	49	30	71	40	40	40	40
B	7	0	1.6	20	33	15	11	40	40	40	40
C	4	0	1.6	10	10	10	20	40	40	40	40
D	7	0	1.6	20	49	30	71	40	40	40	40
E	7	0	1.6	20	33	15	11	40	40	40	40
F	7	3	0.0	0	0	0	0	0	0	0	0
G	3	0	0.0	0	0	0	0	0	0	0	0

Page 16 of specification for Phase F states 12second CMX clearance and 2second pestrian demand hold

Phase - Pelican, Puffin and Toucan Times

◉ Phases A to P ○

Phase	PDD Ped Demand Delay	PDX Ped Demand Hold	CMX Clearance	CDY 0 Clearance Delay Gap	CDY 1 Clearance Delay Max	CRD Clearance Minimum
A	0	0.0	0	0	0	0
B	0	0.0	0	0	0	0
C	0	0.0	0	0	0	0
D	0	0.0	0	0	0	0
E	0	0.0	0	0	0	0
F	1	2.0	12	0	0	0
G	0	0.0	0	0	0	0

Pedestrian Handset Range Limits

	MIN	M
Demand Delay PDD	0	1

Let me know if you need anything furtner.

Regards,

[redacted]

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Please consider the environment before printing this e-mail.

From: [redacted]@transport.gov.scot [mailto [redacted]@transport.gov.scot]
Sent: 01 February 2018 09:25
To: [redacted]
Cc: [redacted]@transport.gov.scot
Subject: A96 / Lochloy Rd Traffic Signals - Nairn

[redacted]

Please find attached the specification used to develop the LinSig model of the A96 / Lochloy Road junction in Nairn. As discussed, the consultant has replicated the following intergreen matrix from the attached however, unlike the handset limits, it would appear to indicate no intergreen value from peds back to traffic which I would have thought is incorrect. Any clarification you can provide on this would be appreciated.

Regards

[redacted]

Works Order : 460474951
EM Number : E70642
Engineer : [redacted]
Intersection : LOCHLOY ROAD FORRES ROAD NAIRN

Phase Intergreen Times

Select Stream(s) To Configure

○ All ○ 0 ○ ○ ○ ○ ○ ○ ○

Note: On a Stand Alone Pelican/Toucan/Puffin Stream the Intergreens between Pedestrian and Traffic Phases are controlled by the timings (PBT, PIT, CMX, CDY, CRD and PAR), therefore 0 should be entered for the appropriate intergreen times in [illegible]

To Phase

From Phase	A	B	C	D	E	F	G
A		5	5		5	8	
B	5		5	5		8	
C	5	5			5	8	
D		5			5	8	
E	5		5	5		8	
F	0	0	0	0	0		
G							

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[redacted]

From: [redacted]@bearscotland.co.uk>
Sent: 26 February 2018 12:38
To: [redacted]
Cc: [redacted]
Subject: RE: A96 / Lochloy Rd Traffic Signals - Nairn

Hi [redacted]

The handset limits (page 10) should be ignored in this case and the intergreens on page 9 used for all traffic to traffic and traffic to ped movements. The handset limits have nothing to do with the calculation of the CMX times.

The maximum (worst case) intergreen following the ped stage is 17 seconds which comprises of; the 3 seconds Min Ped Clearance (page 8) **plus** the 12 seconds CMX time **plus** the 2 seconds starting amber. The handset limit and pedestrian demand hold times do not apply here.

Within your modelling exercise you will have to decide how often the ped stage is called and how much of the CMX period is used.

Regards,

[redacted]

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From: [redacted]@transport.gov.scot [mailto[redacted]@transport.gov.scot]
Sent: 26 February 2018 09:23
To: [redacted]
Cc: [redacted]@transport.gov.scot
Subject: RE: A96 / Lochloy Rd Traffic Signals - Nairn
Importance: High

[redacted]

Thanks for the information below. I am currently preparing a response and just wanted to confirm one final point. As discussed, the model of the junction includes the phase intergreen times on page 9 of the specification and therefore does not take account of pedestrian intergreen controlled by the CMX timings.

The intergreen handset limits on page 10 of the specification has an intergreen before Phase F of 6s and 8s after equating to 14s which is consistent with the CMX (i.e. 12s CMX clearance and 2s pestrian demand hold).

The model is currently running with an 8s intergreen before Phase F and '0' after. Instead of '0', should this be modelled as 6s to match the CMX timings or for the purpose of assessment, model the intergreen handset limits on page 10.

Happy to discuss. You can contact me on [redacted]

Thanks

[redacted]

[redacted]

From: [redacted]@bearscotland.co.uk>
Sent: 26 February 2018 14:47
To: [redacted]
Cc: [redacted]
Subject: RE: A96 / Lochloy Rd Traffic Signals - Nairn

[redacted]

If the crossing is cleared within the green man time, then the CMX timer will not start.

Regards,

[redacted]

Visit us @ www.bearscot.com

Please consider the environment before printing this e-mail.

From: [redacted]@transport.gov.scot [mailto:[redacted]@transport.gov.scot]
Sent: 26 February 2018 13:13
To: [redacted]
Cc: [redacted]@transport.gov.scot
Subject: RE: A96 / Lochloy Rd Traffic Signals - Nairn

[redacted]

Thanks for the further clarification. One final question, if 17s represents the worst case, would there be a minimum intergreen following the ped stage. Is there a minimum CMX time that would apply in addition to the 3s ped clearance and 2s starting amber?

Regards

[redacted]

From: [redacted]@bearscotland.co.uk]
Sent: 26 February 2018 12:38
To: [redacted]
Cc: [redacted]
Subject: RE: A96 / Lochloy Rd Traffic Signals - Nairn

Hi [redacted]

The handset limits (page 10) should be ignored in this case and the intergreens on page 9 used for all traffic to traffic and traffic to ped movements. The handset limits have nothing to do with the calculation of the CMX times.

The maximum (worst case) intergreen following the ped stage is 17 seconds which comprises of; the 3 seconds Min Ped Clearance (page 8) **plus** the 12 seconds CMX time **plus** the 2 seconds starting amber. The handset limit and pedestrian demand hold times do not apply here.

Within your modelling exercise you will have to decide how often the ped stage is called and how much of the CMX period is used.

Regards,

[redacted]

Visit us @ www.bearscot.com

Please consider the environment before printing this e-mail.

From: [redacted]@transport.gov.scot [mailto[redacted]@transport.gov.scot]
Sent: 26 February 2018 09:23
To: [redacted]
Cc: [redacted]@transport.gov.scot
Subject: RE: A96 / Lochloy Rd Traffic Signals - Nairn
Importance: High

[redacted]

Thanks for the information below. I am currently preparing a response and just wanted to confirm one final point. As discussed, the model of the junction includes the phase intergreen times on page 9 of the specification and therefore does not take account of pedestrian intergreen controlled by the CMX timings.

The intergreen handset limits on page 10 of the specification has an intergreen before Phase F of 6s and 8s after equating to 14s which is consistent with the CMX (i.e. 12s CMX clearance and 2s pestrian demand hold).

The model is currently running with an 8s intergreen before Phase F and '0' after. Instead of '0', should this be modelled as 6s to match the CMX timings or for the purpose of assessment, model the intergreen handset limits on page 10.

Happy to discuss. You can contact me on [redacted]

Thanks

[redacted]

Kingsteps, Nairn - Weekday IA and Pedestrian Demand

Modelling is based on a 90s; Cycles per hour = 40

		Stage 2 - IA		Stage 4 - Peds	
		Times Called	Duration (s)	Times Called	Duration (s)
Time	Date				
0800-0900	06-Apr	2	11	16	9
	05-Apr	7	9	7	10
	04-Apr	5	10	12	10
	03-Apr	5	10	12	10
	02-Apr	5	9	14	10
	01-Apr	10	8	5	10
	29-Mar	3	9	7	10
	28-Mar	5	10	16	10
	27-Mar	6	10	17	10
	26-Mar	5	10	20	10
	23-Mar	5	9	10	10
	22-Mar	1	9	10	10
	21-Mar	4	10	9	10
	Max	10	11	20	10
	Min	1	8	5	9
	Ave	5	10	12	10

AM Peak		Demand (per every no. of cycles)	Duration (s)
Stage 2 - IA	Max	4	11
	Min	40	8
	Ave	8	10
Stage 4 - Peds	Max	2	10
	Min	8	9
	Ave	3	10

		Stage 2 - IA		Stage 4 - Peds	
		Times Called	Duration (s)	Times Called	Duration (s)
Time	Date				
1700-1800	06-Apr				
	05-Apr	10	11	14	10
	04-Apr	9	10	12	10
	03-Apr	9	10	11	10
	02-Apr	6	10	7	10
	01-Apr	8	10	10	10
	29-Mar	13	10	12	10
	28-Mar	9	10	11	10
	27-Mar	9	11	12	10

PM Peak		Demand (per every no. of cycles)	Duration (s)
Stage 2 - IA	Max	3	11
	Min	7	10
	Ave	4	10
Stage 4 - Peds	Max	2	10
	Min	6	9
	Ave	3	10

26-Mar	11	11	17	10
23-Mar	13	10	18	10
22-Mar	15	11	10	10
21-Mar	9	10	15	9
Max	15	11	18	10
Min	6	10	7	9
Ave	10	10	12	10

[redacted]

From: [redacted]@highland.gov.uk>
Sent: 12 February 2018 13:26
To: [redacted]
Subject: Development at Lochloy - Nairn
Attachments: Scanned from a Xerox Multifunction Printer.pdf; Scanned from a Xerox Multifunction Printer.pdf

Hi [redacted]

Here are some plans of development phases at Lochloy since around 2000.

The one plan shows the whole area and the other the last phase of development by Springfield (for which is well underway 178 houses) over a 100 of which have been completed.

Estimates of houses in this area approximately 350 - 375.

Let me know if you need anything else.

[redacted]
Development & Infrastructure Service, Town House, High Street, Inverness IV1 1JJ

Tel [redacted]
E-mail: [redacted]@highland.gov.uk

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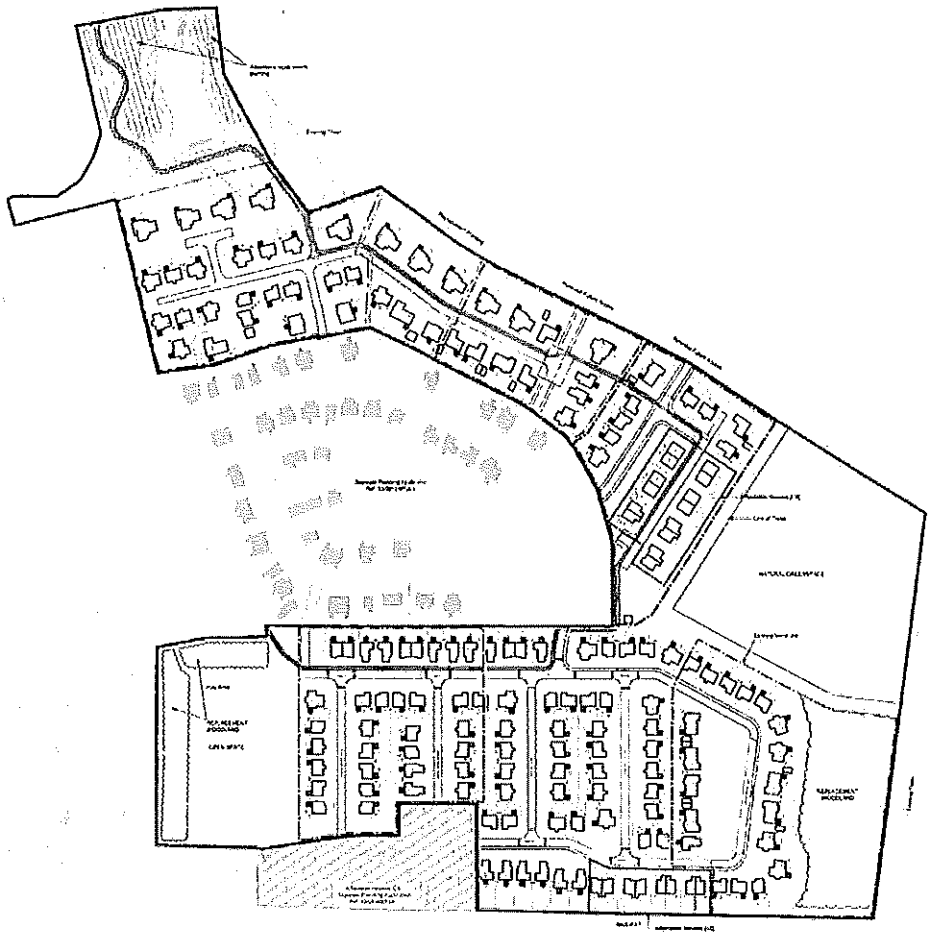
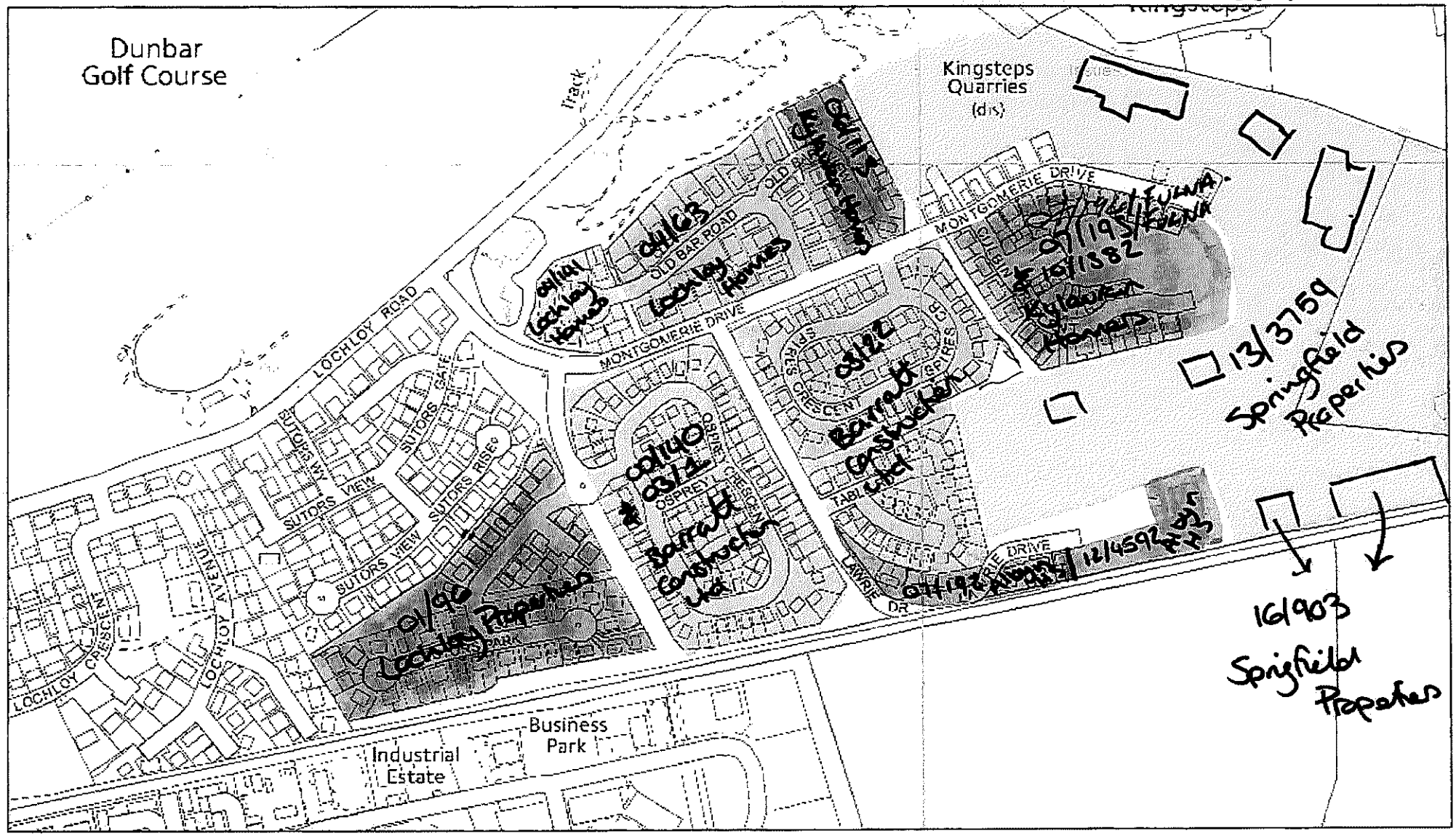
Listening * Open * Valuing * Improving * Supporting * Partnering * Delivering
Èisteachd * Fosgailte * Luach * Leasachadh * Taic * Com-pàirteachas * Lìbhrigeadh


Springfield

Lochloy 00/00006/OUTNA LOCHLOY DEVT COMPANY



June 23, 2016

13/3759 - Suitable conditions ✱

00/140 (Barratts/Osprey) Conditions required maintenance proposals only

1:4,800

0 0.04 0.08 0.16 mi

0 0.05 0.1 0.2 km

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[redacted]

From: [redacted]@highland.gov.uk>
Sent: 26 March 2018 11:39
To: [redacted]
Subject: RE: Planning Application 17/05667/FUL

Hi [redacted]

This item will not being going to the next committee.as hoped.

Number of matters has caused this decision: -

- Need for final information from applicant
- Need for statutory consultee input
- Other applications and
- Easter Holidays – resulting in key staff being absent and deadline for committee reports being pulled forward.

This will now go to the June 12 committee.

I would appreciate the TS response [redacted] as soon as possible as I need to re-consult my own transport people on its content.

[redacted]
Development & Infrastructure Service, Town House, High Street, Inverness IV1 1JJ

[redacted]
E-mail: [redacted]@highland.gov.uk

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[redacted]

From: [redacted]
Sent: 20 April 2018 14:00
To: [redacted]gov.uk'
Cc: [redacted]@highland.gcsx.gov.uk'
Subject: Planning Application 17/05667/FUL - Transport Scotland Consultation Response
Attachments: Issued Response.pdf

Please find attached our consultation response to the above planning application.

Regards

[redacted]

[redacted]

Transport Scotland
Buchanan House
58 Port Dundas Road
Glasgow
G4 0HF

*For agency and travel information visit our **website***

Transport Scotland, the national transport agency
*C*mhdhail Alba, buidheann n*iseanta na c*mhdhail*

Transport Scotland

Trunk Road and Bus Operations (TRBO)
Network Operations - Development Management

TRANSPORT SCOTLAND

Response On Development Affecting Trunk Roads and Special Roads

The Town and Country Planning (Scotland) Act 1997

The Town and Country Planning (Development Management Procedure) (Scotland) Regulations 2013 S.I.2013 No 155 (S.25)

Town and Country Planning (Notification of Applications) (Scotland) Direction 2009

To Highland Council	Council Reference:-	17/05667/FUL
	TS TRBO Reference:-	NE/18/2018

Application made by Springfield Properties PLC, Per Mr Robert Grant,Alexander Fleming House,8 Southfield Drive,Elgin , and received by Transport Scotland on 24 January 2018 for planning permission for residential development & associated infrastructure located at Land 123m SE of Rosebank,Kingsteps,Lochloy Road,Nairn affecting the A96 Trunk Road.

Director, Trunk Roads Network Management Advice

1. The Director does not propose to advise against the granting of permission ☑
2. The Director advises that planning permission be refused (see overleaf for reasons). ☐
3. The Director advises that the conditions shown overleaf be attached to any permission the council may give (see overleaf for reasons). ☐

To obtain permission to work within the trunk road boundary, contact the Route Manager through the general contact number below. The Operating Company has responsibility for co-ordination and supervision of works and after permission has been granted it is the developer's contractor's responsibility to liaise with the Operating Company during the construction period to ensure all necessary permissions are obtained.

TS Contact:-	Route Manager (A96) 0141 272 7100 Buchanan House, 58 Port Dundas Road, Glasgow, G4 0HF
Operating Company:-	NORTH EAST
Address:-	Bear House, Inveralmond Road, Inveralmond Industrial Estate, PERTH, PH1 3TW
Telephone Number:-	01738 448600
e-mail address:-	NEplanningapplications@bearscotland.co.uk

Transport Scotland Response Date:- 20-Apr-2018

Transport Scotland Contact:- [redacted]

Transport Scotland Contact Details:-
Trunk Road and Bus Operations, Network Operations - Development Management
Buchanan House, 58 Port Dundas Road, Glasgow, G4 0HF
Telephone Number:
e-mail: development_management@transport.gov.scot

NB - Planning etc. (Scotland) Act 2006
Planning Authorities are requested to provide Transport Scotland, Trunk Road and Bus Operations, Network Operations - Development Management with a copy of the decision notice, and notify Transport Scotland, Trunk Roads Network Management Directorate if the recommended advice is not accepted.

[redacted]

From: [redacted]
Sent: 30 January 2018 16:55
To: [redacted]@highland.gcsx.gov.uk'
Cc: [redacted]highland.gov.uk'; [redacted]
Subject: Planning Application 17/05667/FUL
Attachments: Issued TRNPA1A.pdf

[redacted]

With regard to the above planning application for residential development in Nairn, please find attached our TR/NPA/1A form requesting an extension to the normal consultation period for the reason given on the attached.

Regards

[redacted]

[redacted]

Transport Scotland
Buchanan House
58 Port Dundas Road
Glasgow
G4 0HF

*For agency and travel information visit our **website***

Transport Scotland, the national transport agency
C□mhdhail Alba, buidheann n□iseanta na c□mhdhail

Transport Scotland

Trunk Road Network Management

TR/NPA/1A

TRANSPORT SCOTLAND

I acknowledge receipt of the planning application 17/05667/FUL for Residential development & associated infrastructure at Land 123M SE Of Rosebank
Kingsteps
Lochloy Road
Nairn which was received on 24/01/2018.

Planning Officer: [redacted]

I am currently assessing the implications of the planning application on the trunk road but will not be able to respond within the normal timescale for the reasons stated below. I should therefore be obliged if you would extend the consultation period until this process is completed.

Reasons

Transport Assessment requires to be audited

Until the formal issue of a TR/NPA/2 this Notice must be taken as intent to respond recommending conditions relating to this application, or to refuse the application. On this basis the interest of the Transport Scotland, an agency of the Scottish Government, as a Statutory Body must be taken into account.

[redacted]

e-mail: development_management@transportscotland.gsi.gov.uk

30/01/2018

[redacted]

From: [redacted]@gmail.com>
Sent: 09 February 2018 10:54
To: [redacted]
Subject: Highland Council Planning Application 17/05667/FUL - Kingsteps, Nairn
Attachments: Critique Transport Report 2.pdf; Critique transport report2 2.pages

[redacted]

I note and welcome your involvement in reviewing the impact of the proposed development at Kingsteps, Nairn on the A96 trunk road, and in particular the Locally Road/A96 Junction.

I write to make you aware of the involvement of there Kingsteps Residents Group in challenging the findings of the applicants Traffic Impact Assessment Report as prepared by One Arup.

I append our initial review of the TIA together with our subsequent response to Ove Arup response to both our and the River Community Councils review.

We are concerned at the impact of the proposed additional 115 houses will have on the A96 traffic flow through Nairn which is already heavily congested appeal times. Its is clear that the
Lochloy Road junction already has a significant impact on the traffic flow of the A96. It is worth noting that if the additional 115 houses are constructed it will result in some 25% of Nairn's
population using the Lochloy Road junction as the only access to the A96.

We look forward to your own review of the situation and trust that you will take on board our own review of the TIA.

Kind Regards

[redacted]

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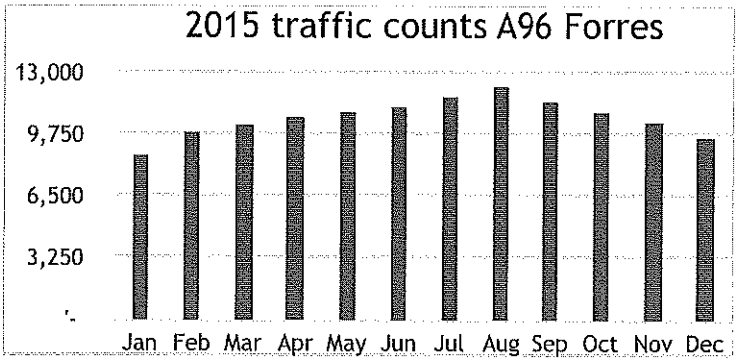
Critique of Transport Assesment for Kingsteps Development.

1. The TA completely ignores the fact that all initial egress from the development is through two narrow residential streets ? to be called Dulnain St. and Averon St. There are 9 houses with drives onto these roads, where they will be backing out into all the traffic from 115 houses. Usually there has to be a distributor road into a major development like this.

2. Traffic counts taken on April 4th 2017. A low time of year (see graph)
Can expect 10 - 20% increase in later months.



3. The development is judged for traffic purposes to be 'completed by 2019'. (part 1 p 19) This is clearly nonsense, and is purely to avoid annual traffic growth uplifts until true completion which is likely to be 5-10 years.
Scottish Gov. Guidelines: 'Design dates for appraisal should generally be for shortly after opening, within a year, especially for retail and employment uses, or on completion of the development in the cases where the development is large and phased over a long period of time (e.g. large residential developments).'

4. The Consultants rationale that traffic has not grown since 2008 is based on estimated figures, not true counts. (Table 6.2) The traffic at this point has not been counted since 2008. True counts from the DfT Gollanfield counter show an increase of average daily flow from 11778 in 2006 to 13240 in 2016. (12.5% increase in 10 years).

5. All the calculations on page 22 of TA part 1 are incorrect as NA 5 has around 360 houses planned/built on it, the figure of 685 used includes older parts of the development.

6. Trip rates are extremely low, and not appropriate for out of town site with poor public transport links
(bus stop 800m away apparently). It is inconceivable that only 6 morning rush hour trips will be made from 25 affordable houses. These houses will all have families in them.
Generally 0.5 or above is around the figure local authorities should expect for mainly private developments in edge of town settings with poor transport links.
Remembering that the TRICS trip rate is an average of trips from different towns, there is a 50% chance of it being higher whatever level it is set at.
There has been no attempt to provide the output from the TRICS search in an appendix , which is required by the HC guidelines. 'The output from the TRICS selection process should be included in the TA as an appendix'
The comparison of TRICS and observed trips (table 6.9) are worthless, as TRICS includes LGVs HGVs and buses, whereas the consultants have used only cars, and omitted the significant numbers of commercial vehicles. In addition Montgomerie Drive is not the only exit from this area, 4% of cars are estimated to exit from Sutors Way.
They have actually been economical with the truth at the bottom of page 22 as their figure of 204 is for cars only not 'traffic' - there are a further 10 LGVs and 3 HGV/bus departures, which count as 21 car equivalents.
This affects all the calculations.

7. Traffic Lights.

There seems to be a major input error in the package to assess whether the Lochloy lights can cope.
On TA part 2 p11. diagram (Total trips 2019) there are 362 vehicles approaching the lights from Lochloy Rd. In Part 4 p6 the number is entered as 326. Many of the figures in this Scenario 1 table for the Lochloy traffic flows are wrong on the low side.

8. This has a major impact on the lights which would be at 87% capacity against an allowed maximum of 90% if the correct figure was used. This percentage is against the maximum capacity of the Lochloy junction calculated as if it had unrestricted egress from the junction. As the A96 through Nairn is stacked back across all junctions during both rush hours, the maximum flow capacity of the lights from Lochloy road at 419 is vastly overstated, meaning the junction will be even more overwhelmed than it is at present.

9. The traffic light sequencing is very odd, with only 2 seconds allowed for pedestrians to finish crossing after their light goes red and the traffic starts on the A96. This is clearly very unsafe.

10. In general the 'deadtime' between reds is extremely short, (5 and 8 seconds) presumably because it is not possible to get the software to get the cars through otherwise. This is much shorter than previous TAs for Nairn and clearly is unachievable with stacked traffic.

Conclusion:

1. Dangers : a) Access through narrow residential streets with house drives and gardens onto street.
   b) Pedestrian phase of lights dangerously short.

2. Major underestimation of traffic.
   a) April counts. Expect 10 - 20% increase in other months.
   b) Omission of LGVs/HGV/Buses in observed counts.
   c) Very low trip rates
   d) Major errors in entering traffic stats into traffic lights software
   e) Not using true counts for growth figures only estimates.

[redacted]

From: [redacted]@gmail.com>
Sent: 16 March 2018 09:39
To: [redacted]
Subject: Planning Application :17/05667/FUL - NA2 Kingsteps

Re: HC application Planning Application :17/05667/FUL - NA2 Kingsteps, Nairn

The Kingsteps residents group has read with concern recent correspondence between Transport Scotland (as represented by yourself) and ARUP in connection with this planning application, and respond and comment as follows:-

Transport Scotland recognise the Lochloy/A96 junction as 'critical' as far as overloading and A96 delay is concerned, and local residents experience gridlock at this junction for several hours per day.

We are vexed that what is being experienced daily on the ground is apparently being ignored, and extensive manipulative computer modelling by people in the Central Belt who may never have been in our town given precedence.

Are you on behalf of TS not liasing with Highland Council Transport Planning team who have put in a thorough and rigorous critique of the TA and asked for several sections to be rewritten?

As it now appears that a safe pedestrian phase will take the capacity of the lights over the maximum 90% in most directions, surely great caution must be taken to avoid any possible underestimate of the true volume of traffic.

We have checked the pedestrian crossing time and it takes a fit adult 8 seconds to cross the three lanes. In the ARUP TA and their subsequent submissions there are several Individual sources of error which TS seems to be regarding as not significant, which when added together will attain major significance and have the capacity to create even more havoc at this junction.

1. **TRICS underestimate.**
We do not accept that incorrect TRICS data should be accepted by you on behalf of TS. This is not an option for transport watchdogs. If it's wrong it must be corrected. Highland Council have asked that the whole TRICS analysis be redone to reflect accurately this isolated development (see below)
'Given this, we ask that the TRICS outputs are redone to better reflect the location of this site.' (HC)

TS have asked ARUP that it be considered as private houses. Why has this not been done?

With a critical junction like this we would also have expected a stress test of 85% centile to be done, not 50% (a 50% chance that the levels will be higher.)

- **40% undercount of development traffic**

2. **Traffic Diagrams and Analyses**
We have still not had any audit trail from ARUP to the traffic figures entered into the analyses in spite of requests from ourselves and HC.

How have they been accrued from the traffic counts, and are they trips or PCUs? It makes a huge difference.

- **Possible major undercount**.

3. **Completion of Development**

It is clearly nonsense to say the development will be completed next year. Private house completion in the whole of Nairnshire has been around 20/year for the last decade (HC stats.) Springfield know this.
It is very worrying that TS watchdogs are condoning this rubbish in complete ignorance of the facts.

A development of 115 houses in Nairn will take at least 7 years to complete maybe longer.
Highland Council have also criticised this section in their objections. (see below)
'Given that we are already in 2018 and there is no Planning Permission or Road Construction Consent in-place, we are of the opinion that achieving completion of the full 115 units proposed by 2019 is still overly optimistic and should be extended accordingly and justified' (HC)

As TS watchdog, you cannot possibly be seen to be accept this fantasy that the development will be completed next year when Locals and their Council completely disagree on statistically proven grounds.

Your own TS/SG guidelines say:
'Design dates for appraisal should generally be for shortly after opening, within a year, especially for retail and employment uses, or **on completion of the development in the cases where the development is large and phased over a long period of time (e.g. large residential developments).'**

2% traffic growth per year must therefore be added to background traffic for a minimum of 5 years.

- **10% + undercount of all traffic over next 5 years**

4. **Seasonal Traffic Increase in Highlands**

You have stated that April 4th is a shoulder month, therefore you are ignoring the increase of traffic for the subsequent 6 months each year as the holiday traffic causes chaos.

This is not Glasgow, and traffic patterns here are very different from the Central Belt.

If the lights are at 90% in April 2019 then what will it be like with the 20% summer increase?

It is quite unacceptable that there is no acknowledgement of the very seasonal nature of traffic flow in the Highlands, which is proven by statistics from your own TS local counters.

- **Up to 20% undercount of all traffic for 6 months of year**

5. **Omission of R filter phase and no account taken of westward exit blocking**.

Highland Council pointed out that there has been no allowance in the traffic light phasing for the westward traffic flow to filter right.

There is a filter, and clearly the eastbound traffic is stopped while this takes place. We see nothing from ARUP to prove that this has been satisfactorily modelled that can be checked by either HC or concerned parties.

We also ask if you are aware that as soon as westbound traffic crosses the lights it is frequently halted by right turners into two entrances to busy retail units, and then a third road down to a huge caravan park. (Three right turns in 40m)

It is clearly completely unacceptable to have the saturation flowmodelled as if there is clear exit from the junction when traffic frequently comes to a standstill metres after going through the lights.

- **Major overestimation of flow capacity both ways at Lochloy junction.**

Conclusion

With a safe pedestrian phase the lights will be above the permitted maximum of 90% and it is accepted that general traffic will increase 10% in five years with 20% seasonal traffic on top.
To compound the problem of this undercount, flow rates through the lights are greatly overestimated.

We would ask that as a representative of Transport Scotland in a watchdog role you will not accept erroneous and potentiallymisleading figures from ARUP in support of this application, or piecemeal bits of revisions here and there.

TS could suffer serious reputational damage if they are not seen to be doing their job with due rigour.

TS should, in conjunction with HC insist that a properly rewritten, recalculated and presented TA addressing all parties' concerns will be submitted for full scrutiny and consultation.

Local people experience the misery of this junction on a daily basis, TS knows it's gridlocked and an unacceptable major choke point on the A96. Fiddling with computers in the central belt is not going to make this go away.

We have duly copied this letter and our concerns to [redacted] the Planning Officer at Highland Council.

For and on Behalf of
The Kingsteps Residents Group

Sent from my iPhone

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For more information please visit http://www.symanteccloud.com

[redacted]

From: [redacted]@gmail.com>
Sent: 20 April 2018 17:06
To: [redacted]
Subject: Re: Planning Application :17/05667/FUL - NA2 Kingsteps

[redacted]

Many thanks for your response to my and Nairn residents concerns over the current traffic congestion on the A96 through Nairn, and the impact that the new proposed developments will have on the traffic flow.

It's good to learn that Transport Scotland are monitoring the traffic flow, and I note that there has been "minimal variation" - as a local resident I can confirm that this is indeed the case and the A96 through Nairn continues to be congested.

Whilst traffic monitoring and computers are all very well I believe however that there is nothing to beat local knowledge. This afternoon for example it took me 35 minutes to travel through Nairn on the A 96 - the congestion being caused as always by the hold up at the Lochloy Road/A96 Junction. It is a well known fact that it is this junction which continues to cause the severe congestion to the flow of through traffic, hence our objections to approving the building of a further 115 houses at Kingsteps together with the ongoing house building at the Lochloy housing estate.

It is abundantly clear that these developments will seriously impact on the A96/ Lochloy Road junction and hence our disbelief that Arup's conclusion that there would be no effect on the traffic flow of surrounding roads. Their Traffic Impact Study has been shown to be seriously flawed and in no way does it represent the true situation as experienced daily by Nairn's residents.

Finally I trust that when considering the situation Traffic Scotland will take due account of all proposed new developments which will further impact on the A96 - namely the proposed 35 houses planned for Forres Road, Nairn and the retail development and drive through McDonald's outlet planned for the Sainsbury site beside the A96.

I, and the people of Nairn, await with interest the response of Transport Scotland to the current Planning Application.

Regards

[redacted]

Sent from my iPad

On 19 Apr 2018, at 17:04, <[redacted]@transport.gov.scot> <[redacted]@transport.gov.scot> wrote:

> Dear [redacted]
>
> Thank you for your previous and more recent correspondence below. Transport Scotland is aware of the concerns of local residents in relation to the operation of the traffic signal controlled junctions on the A96 through Nairn. Transport Scotland proactively meets with representatives of the local community to discuss relevant A96 matters that are raised. In response to wider network concerns, Transport Scotland has put measures in place that allows journey times through Nairn to be

monitored. This monitoring indicates minimal variation to journey times across the calendar year.

With regards to this particular planning application and the work undertaken by ARUP in support of it, the Lochloy signals have recently been re-assessed by Arup based on specific on-site records which will now allow Transport Scotland to consider its response to the planning application to be considered in accordance with current policy and guidance in the normal manner and taking the significance of potential variation to assessment factors into consideration.

We trust that the above clarifies the position of Transport Scotland in relation to this matter however, please do hesitate to contact me should you wish to discuss the concerns raised in more detail.

Regards

[redacted]

[redacted]

Transport Scotland
Buchanan House
58 Port Dundas Road
Glasgow
G4 0HF

For agency and travel information visit our ***website***

Transport Scotland, the national transport agency
*C*mhdhail Alba, buidheann n*iseanta na c*mhdhail*

[redacted]

From: [redacted]@springfield.co.uk>
Sent: 11 April 2018 10:25
To: [redacted]
Cc: [redacted]@arup.com; [redacted]@highland.gcsx.gov.uk; [redacted]@arup.com
Subject: RE: Planning Application 17/05667/FUL

Importance: High

Morning [redacted]

Any further updates on receipt of the necessary Data, it's review and a response?

Kind regards

[redacted]

From: [redacted]@transport.gov.scot [mailto [redacted]@transport.gov.scot]
Sent: Tuesday, April 3, 2018 4:08 PM
To: [redacted]@springfield.co.uk>
Cc: [redacted]@arup.com; [redacted]@transport.gov.scot; [redacted]@highland.gcsx.gov.uk; [redacted]@springfield.co.uk>; [redacted]@springfield.co.uk>; [redacted]@arup.com
Subject: RE: Planning Application 17/05667/FUL

[redacted]

Transport Scotland is continuing to liaise with the Operating Company regarding receipt of this data however until received, it is difficult to provide a firm indication of timescales. Notwithstanding this, we are hopeful that the data will be provided for review early next week.

We trust the above is of assistance and we will seek to provide you with a further update on progress once the data is received.

Regards

[redacted]

From: [redacted]@springfield.co.uk]
Sent: 03 April 2018 14:04
To: [redacted]
Cc: [redacted]@arup.com; [redacted]; [redacted]@highland.gcsx.gov.uk; [redacted]@arup.com
Subject: Re: Planning Application 17/05667/FUL

[redacted]

Thanks for this update, can you give Springfield as applicant and the local authority as Planning Authority an indication of likely timescale to obtain, review and respond?

Many thanks.

[redacted]

From: [redacted]@springfield.co.uk>
Sent: 12 April 2018 14:37
To: [redacted]
Cc: [redacted]@arup.com; [redacted]@highland.gcsx.gov.uk; [redacted]@arup.com; [redacted]
Subject: Re: Planning Application 17/05667/FUL

[redacted]

Many thanks for the update.

Kind regards

[redacted]

Sent from my iPhone

On 12 Apr 2018, at 14:15, [redacted]@transport.gov.scot" <[redacted]@transport.gov.scot> wrote:

[redacted]

By way of an update, I have now received the data and will start to review it tomorrow.

Regards

[redacted]

From: [redacted]@springfield.co.uk]
Sent: 11 April 2018 15:03
To: [redacted]
Cc: [redacted]@arup.com; [redacted]; [redacted]@highland.gcsx.gov.uk; [redacted]@arup.com; [redacted]
Subject: Re: Planning Application 17/05667/FUL

Hi [redacted]

Thanks. In this case I think it would be sensible and to avoid further delays given there is still a review and response period for Springfield to commission the survey work via ARUP as previously discussed which I believe will gather the Data you're seeking?

Kind regards

[redacted]

Sent from my iPhone

On 11 Apr 2018, at 12:43, [redacted]@transport.gov.scot" <[redacted]@transport.gov.scot> wrote:

[redacted]

[redacted]

From: [redacted]@springfield.co.uk>
Sent: 14 March 2018 08:29
To: [redacted]@arup.com
Cc: [redacted]@highland.gov.uk; [redacted]@highland.gcsx.gov.uk; [redacted]@arup.com; [redacted]@arup.com; [redacted]
Subject: RE: Planning Application 17/05667/FUL

Good Morning,

Could you advise if TS are in a position to issue their consultation response on the basis of the additional details submitted by ARUP? Many thanks

[redacted]

From: [redacted]@transport.gov.scot [mailto:[redacted]@transport.gov.scot]
Sent: 08 March 2018 11:10
To: [redacted]@arup.com
Cc: [redacted]@highland.gov.uk; [redacted]@transport.gov.scot; [redacted]@highland.gcsx.gov.uk; [redacted] <[redacted]@springfield.co.uk>; [redacted]@arup.com; [redacted]@arup.com; [redacted]@springfield.co.uk>; [redacted]@springfield.co.uk>
Subject: RE: Planning Application 17/05667/FUL

[redacted]

Thank you for the files. I will be out of the office on Friday and Monday however, will pick this up on my return.

Regards

[redacted]

[redacted]

From: [redacted]@springfield.co.uk>
Sent: 19 April 2018 14:58
To: [redacted]
Cc: [redacted]@arup.com; [redacted]@arup.com; [redacted]@highland.gcsx.gov.uk; [redacted]
Subject: RE: Planning Application 17/05667/FUL

Ok many thanks for your assistance [redacted] I take it the response is likely to be a positive one?

Kind Regards

[redacted]

From: [redacted]@transport.gov.scot [mailto[redacted]@transport.gov.scot]
Sent: Thursday, April 19, 2018 2:14 PM
To: [redacted]@springfield.co.uk>
Cc: [redacted]@arup.com; [redacted]@arup.com; [redacted]@transport.gov.scot; [redacted]@highland.gcsx.gov.uk; [redacted]@springfield.co.uk>; [redacted]@springfield.co.uk>; [redacted]@springfield.co.uk>
Subject: RE: Planning Application 17/05667/FUL

[redacted]

I would confirm that nothing further is required from ARUP and that our response will be issued in the next few days.

Regards

[redacted]

[redacted]

From: [redacted]@springfield.co.uk>
Sent: 26 March 2018 11:33
To: [redacted]
Cc: [redacted]@highland.gcsx.gov.uk; [redacted]
Subject: RE: Planning Application 17/05667/FUL

Good morning [redacted]

We are now really pushed for a committee deadline for this application – the end of this month for April. Could you now confirm that we are okay, your various concerns and queries addressed and that you can respond accordingly to THC on the application?

Apologies for pushing you on this but time is of the essence.

Regards

[redacted]

From: [redacted]@arup.com]
Sent: 21 March 2018 12:26
To: [redacted]@transport.gov.scot
Cc: [redacted]@transport.gov.scot; [redacted]@highland.gcsx.gov.uk; [redacted]@springfield.co.uk>; [redacted]@arup.com>; [redacted]@arup.com>; [redacted]@springfield.co.uk>; [redacted]@springfield.co.uk>
Subject: RE: Planning Application 17/05667/FUL
Importance: High

Good afternoon [redacted]

Following our earlier conversations and email correspondence, please find attached a briefing paper which summarises the results from a series of minor sensitivity tests for the A96(T) / Lochloy Road signalised junction. These tests have been undertaken to address the latest set of comments received from Transport Scotland (see below). The overall findings and conclusions of the original Transport Assessment remain unchanged.

To date, we have addressed all comments received from TS (and BEAR) and trust that the attached will now allow you to finalise your response to Highland Council with respect to the planning application for the 'NA2' site.

Should you have any queries, please let me know.

Regards,
[redacted]

From: [redacted]@transport.gov.scot [mailto:[redacted]@transport.gov.scot]
Sent: 19 March 2018 16:57
To: [redacted]
Cc: [redacted]@transport.scot [redacted]@highland.gcsx.gov.uk; [redacted]@springfield.co.uk;