TECHNICAL NOTE

Hither Green Lane, Redditch

LinSig Analysis – Response to Highways Comments

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Client:	Barratt David Wilson Homes (Mercia)	Job No:	325756
Date:	28 September 2022	File Name:	220922_325756-TN002_LinSig Review Rev C
Prepared by:	JFN	Approved by:	ALF

1. Introduction

1.1 Overview

1.1.1 This Technical Note (TN) has been prepared in response to post-application comments provided by Worcestershire County Council (WCC) in relation to the Full Planning Application (Ref: *21/01830/FUL*) for land to the west of Hither Green Lane in Redditch, Worcestershire. Specifically, this TN sets out mode's response to WCC comments regarding LinSig modelling of the Dagnell End Road / Birmingham Road (A441) junction.

1.1.2 The developments proposals comprise the following:

"*Residential development (Class C3) with a vehicular access point onto Hither Green Lane, play areas, public open space including footways and cycleways, sustainable urban drainage systems and all other ancillary and enabling infrastructure.*"

1.1.3 WCC provided comments in their role as Local Highway Authority (LHA) on 7th February 2022, in which they recommended that the application be deferred. WCC's comments are provided in **Appendix A**, for reference.

2. Background Information

2.1 Dagnell End Road / Birmingham Road - Mitigation Scheme

2.1.1 The Transport Assessment (Ref: *211015_325756_TA 001*), submitted as part of the planning application for the proposed development (Ref: *21/01830/FUL*) provides details of the mitigation scheme for the Dagnell End Road / Birmingham Road signalised junction, which is to be implemented as part of the adjacent Brockhill East Phase 3 application (Ref: *19/00976/HYB*).The mitigation scheme is outlined in PJA drawing Ref: 2809-P-12-P4, which is attached as **Appendix B**, for reference.

2.1.2 This mitigation scheme was previously identified in the Redditch District Infrastructure Delivery Plan (IDP) (CDR51). As outlined in WCC's formal response to the Brockhill East Phase 3 (Ref: *19/00976/HYB*); this scheme has been considered acceptable in what is considered a "constrained location in terms of land ownership" and is to be delivered as part of a S278 Agreement.

2.2 Modelling Details – Brockhill East Application 19/00976/HYB

2.2.1 As set out in technical notes 'Dagnell End Road – Junction Design Note' (16/09/2020) and 'Dagnell End Road – Junction Design Modelling Update' (24/11/2020) submitted as part of the Brockhill East application (Ref: *19/00976/HYB*), peak hour pedestrian crossing demand at the new signalised crossing was forecast to be relatively low, and it was anticipated that the crossing would therefore be called infrequently.

2.2.2 In addition to the above, WCC raised concerns over the incorporation of the left turn filter arrow from Dagnell End Road, as a pedestrian wishing to cross over the A441 southbound may see a stationary vehicle in the offside lane of Dagnell End Road (controlled by Phase D), without seeing the filter arrow for Phase E.

2.2.3 WCC noted that this arrangement is provided at other junctions elsewhere, and that concerns were not raised within the RSA. WCC therefore suggested that a further stage sequence, excluding the left turn filter, should be included in the modelling. The matter would then be resolved at detailed design stage or following installation of the junction based on site observations.

2.2.4 In light of the above, the modelling submitted as part of the application for Brockhill East included 3 stage sequences. A summary of the stage sequences was provided in the TA prepared by mode (Ref: *211015_325756_TA 001*), along with reference to a stage sequence diagram for each; included at Appendix H of the TA.

- Staging Sequence 1 – Pedestrian Crossing Not Called (Figure 6.1)
- Staging Sequence 2 – Pedestrian Crossing Not Called, No Filter Arrow (Figure 6.2)
- Staging Sequence 3 – Pedestrian Crossing Called Every Cycle (Sensitivity Test) (Figure 6.3)

2.2.5 The A441 / Dagnell End Road junction was therefore modelled with consideration of each of the 3 Stage Sequences in mode's TA, to replicate the modelling scenarios used for the purpose of the Brockhill East Phase 3 application.

2.3 Planning Context

2.3.1 When the TA was produced, the application for Brockhill East Phase 3 was marked as 'awaiting decision'; however, it was noted that WCC, in their capacity as LHA, had already undertaken a full review of the planning application and subsequently raised no objections. Given the site's status as the final part of a strategic allocation in the Bromsgrove District Plan and Redditch Local Plan, and the approved position from the LHA, Brockhill East Phase 3 was considered as a committed development in the modelling section of the TA produced by mode.

2.3.2 Consideration was also made of the potential highway mitigation / improvement measures associated with Brockhill East Phase 3, to ensure the proposed development at Hither Green Lane takes account of any amendments to the surrounding highway network. The mitigation scheme for the Dagnell End Road / Birmingham Road junction had been designed on topographical survey data and was deemed acceptable by WCC for the purpose of granting planning permission and was therefore considered as the baseline position for the purpose of the detailed capacity assessment presented in mode's TA.

2.3.3 The application for Brockhill East Phase 3, with the inclusion of the mitigation scheme, has since received planning consent, therefore all of the assumptions above remain valid.

3. WCC Comments

3.1 Overview

3.1.1 As part of their response to the proposed development, WCC has stated the following, in relation to the detailed junction capacity assessment for the Dagnell End Road / Birmingham Road (A441) junction:

"*Despite utilising information from the Brockhill Phase 3 application, the capacity results for the Dagnell End Road Signal Junction do not match those previously approved by the Highway Authority for the same modelling scenarios, built from a fully validated and calibrated junction model. From a review of the LinSig modelling results, it is apparent that the model itself and results are different.*

The Mode LinSig model shows the nearside lane on the Birmingham Road (S) approach to be a short lane, whereas in the previously approved model, this is shown to be a 'long lane'. As the LinSig model has not been provided, it is anticipated that further differences will also be apparent. The previously approved model should be used to assess capacity at this junction, otherwise a new model should be created, which would first require revalidation and calibration.

Adding vehicle trips to an already congested junction, increasing vehicles queues and delays in this location is not acceptable. This is a key junction provided along an arterial connecting Redditch to the M42 to the north and Birmingham beyond."

4. Modelling Input Parameters

4.1 Comparison with Approved Model

4.1.1 As part of their consultation response to the application, WCC raised concerns regarding the modelling analysis presented as part of mode's Transport Assessment (Ref: *211015_325756_TA 001*), which was included as part of the planning application submission.

4.1.2 Specifically, concerns were raised over differences between the input parameters used within the approved LinSig model prepared by PJA and the model prepared by mode. A copy of the approved model was subsequently requested by mode; however, WCC indicated that they did not have a copy of the model on file. WCC provided a contact at PJA to approach for a copy of the LinSig model; however, this was considered unfeasible as PJA (or their client) would have no obligation to provide a copy of the model.

4.1.3 In the absence of an approved model file, mode endeavoured to replicate this using publicly available details/data from the summary output reports provided in the PJA TN dated 24/11/2020, which was obtained from Redditch Borough Council's (RBC) Planning Portal. This was considered a suitable and feasible approach, and a copy of the subsequent LinSig model prepared by mode was provided to WCC for their consideration.

4.1.4 The model outputs in the PJA TN include a range of options including no pedestrians, no filter arrow and pedestrians called every cycle, which have formed the basis of different modelling scenarios presented. mode took the same approach, to enable comparison with the results presented in PJA's TN.

4.1.5 In this regard, it should be noted that the PJA TN, as obtained from RBC's planning portal, contains only the summary version of the model output report. Consideration was therefore also made of the detail in the approved mitigation scaled drawing (Ref: 2809-P-12-P4, attached at **Appendix B**), where specific details could not be obtained from the PJA TN; however, variations in the exact results of the two models were to be expected; given the limited information regarding certain modelling parameters contained within the summary model output report.

4.1.6 With regard to the comments relating to the location of the long and short lanes on the Birmingham Road (S) approach, this was assumed to be a typing error. The location of the long and short lanes on the southern approach of the LinSig model prepared by mode are comparable to those contained within the PJA model. Instead, it has been assumed that WCC was intending to query the alignment of the Birmingham Road (N) approach, as the nearside lane had previously been modelled so as to account for the diverge of the lanes and the primary movement through the junction.

4.1.7 The other item to note in this regard is the saturation flows assumed within the model. The PJA TN provides reference to upstream lane widths, not stop line widths. This was not replicated within the LinSig model presented in mode's TA, as measurements had instead been taken from the scaled PJA mitigation drawing (Ref: 2809-P-12-P4, at Appendix B).

4.2 Revised mode LinSig File

4.2.1 The variations between the LinSig model presented within mode's TA, and the approved PJA model were considered somewhat minor, and it was not envisaged that these would have a significant impact on the results of the modelling analysis.

4.2.2 Nonetheless, to address the concerns raised by highways, mode has produced a revised LinSig model (Ref: v2 Rev A), which was made available to WCC, for their detailed review. In summary, this included the following amendments:

- Saturation flows on Arm 1 (Birmingham Road (N)) were updated using upstream lane widths of 3m. Arm 2 (Dagnell End Road) was also updated to include upstream lane widths of 3.1m;
- The composition of short and long lane widths on Arm 1 (Birmingham Road (N)) were amended to align with the comments made by highways (assuming the comments were meant to refer to Birmingham Road (N) rather than Birmingham Road (S)); and,
- Intergreen from Phase 1 in the model was set to 8 seconds (mode had previously utilised 9 seconds, based on moderate use, crossing length and standard on-crossing direction).

4.3 Final WCC LinSig File

4.3.1 Following further discussions with WCC further concerns were raised over the parameters used within the updated model, and WCC requested that a copy of mode's LinSig model was provided to them. WCC indicated that they were now in a position to obtain a copy of the PJA model and would therefore provide a subsequent comparison with mode's model.

4.3.2 mode submitted a copy of the latest LinSig model prepared, along with a new request to WCC to utilise a copy of the approved LinSig model, stating the following:

"It is noted that WCC are in possession of a copy of the approved model, however thus far a copy of this has not been provided to the design team. Given WCC's stance that the LinSig they have on file is the approved model, and that our results should mirror those of the approved model, it is our stance that we should be provided with a copy of the LinSig model, in order to allow us to run our additional traffic through the model and report back on the results as part of a post-application response. The model will only be utilised for the purpose of this task."

4.3.3 This request was refused by WCC, on the basis that the approved model is owned by PJA and therefore not available for issue. In an email dated 15th September WCC stated the following: "…*whilst WCC does hold the PJA LINSIG model, this model is owned by PJA. It is not our model to issue to you. We are only able to provide you with information that is publicly available on the planning website and unfortunately this final version of the model is not."*

4.3.4 In the interest of moving matters forward, WCC instead provided some minor amendments to the model, taking into account the parameters from the PJA model they have on file. These included some minor amendments to intergreens, phase delays, saturation flows and lane lengths.

4.3.5 The latest model issued by WCC – hereby referred to as 'v2 Rev B' has been utilised by mode for the purpose of assessing the impacts of the proposed development at the junction. A review of the modelling outputs from the revised model is provided in Section 5.2, for reference.

5. Modelling Outputs

5.1 Existing Situation

5.1.1 The requirement for a comprehensive review of capacity, traffic flows, design and signalling apparatus at the Dagnell End / Birmingham Road signalised junction was previously identified in WCC's Local Transport Plan 4 (LTP4) in 2017.

5.1.2 As outlined within the subsequent Redditch District IDP (CDR51), background work was undertaken by WCC to consider the cumulative transport impacts arising from the development identified in both the Redditch and Bromsgrove Local Plans. The IDP subsequently identified the potential for an additional approach lane on the eastern arm (Dagnell End Road) and the implementation of Microprocessor Optimised Vehicle Actuation (MOVA); to enable maximisation of the throughput at the junction under actual observed conditions. The IDP indicates that funding for this mitigation scheme would be secured from developer contributions, with a total cost in the order of £520,000.

5.1.3 An overview of the base model for the existing layout of the Dagnell End / Birmingham Road junction was presented in the Junction Design Modelling Update TN (24/11/2020) for the consented application at Brockhill East Phase 3. An overview of the base model (optimised) results for the junction, as taken from the PJA TN for the consented application, is provided in **Table 5.1**, covering the following scenarios:

- 2018 Base;
- 2030 Base + Committed; and
- 2030 Base + Committed + Brockhill East Phase 3.

Table 5.1 : Existing Situation

Arm	AM Peak Hour (0800 – 0900)			PM Peak Hour (1700 – 1800)		
	DoS (%)	MMQ (PCU)	Delay / PCU (s)	DoS (%)	MMQ (PCU)	Delay / PCU (s)
2018 Base Existing Layout						
A441 (N)	93.5%	28	38	82.3%	24	33
Dagnell End Road	92.4%	12	78	106.3%	43	201
A441 (South)	81.7%	17	24	107.2%	85	182
PRC		-3.9%			-19.1%	
2030 Base + Committed (But Excluding Brockhill East Phase 3) & Existing Layout						
A441 (N)	108.2%	86	183	94.8%	38	52
Dagnell End Road	104.9%	25	184	119.9%	80	400
A441 (South)	105.9%	43	72	120.9%	165	381
PRC		-20.2%			-34.4%	
2030 Base + Committed (Including Brockhill East Phase 3) & Existing Layout						
A441 (N)	114.4%	123	274	110.4%	106	231
Dagnell End Road	110.9%	34	266	126.1%	97	482
A441 (South)	111.1%	115	224	128.8%	215	480
PRC		-27.1%			-43.2%	

5.1.4 As outlined in **Table 5.1**, in its existing format (prior to the implementation of the mitigation scheme) the junction is forecast to operate beyond its theoretical capacity prior to future year assessments and/or the introduction of the additional traffic associated with the Brockhill East Phase 3 development.

5.2 Committed Mitigation Scheme

5.2.1 The mitigation scheme at the junction Dagnell End Road / is to be delivered as part of the Brockhill East Phase 3 scheme. As outlined in WCC's formal response to the Brockhill East Phase 3 (Ref: *19/00976/HYB*):

"*The junction scheme utilises land currently within the ownership of the Local Planning Authority for the sole purpose of delivering a junction improvement in this location, in what is a constrained location in terms of land ownership. Following the delivery of the junction scheme, the land will be dedicated highway land*".

5.2.2 A summary of the results using the revised 'v2 Rev B' model issued to mode by WCC is shown in Table 5.2, with the full output report attached at Appendix C, for reference. The results provide comparisons of the 2030 Base (With Brockhill East Phase 3) and the 2030 Base (With Brockhill East Phase 3) + Development.

5.2.3 As specified in Section 2 of this TN, the mitigation scheme for the A441 / Dagnell End Road junction has been modelled with consideration of 3 x stage sequences to reflect the scenarios presented as part of the now consented Brockhill East Phase 3 application. It should be noted, however, that pedestrian demand at the junction is relatively low and therefore as specified in the PJA Junction Design Modelling Update TN (24/11/2020) submitted as part of the Brockhill East Phase 3 application, it is highly unlikely the crossing will be called every cycle.

5.2.4 In light of this, the results presented in Table 5.2 for Stage Sequences 1 and 2 are considered to be the most representative of the typical day-to-day operations of the junction.

Table 5.2 : A441 / Dagnell End Road – Committed Mitigation Scheme

Arm	AM Peak Hour (0800 – 0900)			PM Peak Hour (1700 – 1800)		
	DoS (%)	MMQ (PCU)	Delay / PCU (s)	DoS (%)	MMQ (PCU)	Delay / PCU (s)
2030 Base (Stage Sequence 1 – No Peds)						
A441 (N)	98.5%	42	52	97.7%	47	56
Dagnell End Road	99.9%	15	128	112.9%	58	291
A441 (South)	100.4%	54	68	115.5%	151	300
PRC		-11.5%			-28.3%	
2030 Base + Development (Stage Sequence 1 – No Peds)						
A441 (N)	108.4%	93	183	108%	97	189
Dagnell End Road	109.4%	34	226	118.4%	78	369
A441 (South)	105.2%	77	119	119.4%	176	356
PRC		-21.5%			-32.7%	
2030 Base (Stage Sequence 2 – No Peds & No Left Filter)						
A441 (N)	98.5%	42	52	97.7%	47	56
Dagnell End Road	99.9%	13	107	112.9%	58	294
A441 (South)	100.4%	54	68	115.5%	151	300
PRC		-11.5%			-28.3%	
2030 Base + Development (Stage Sequence 2 – No Peds & No Left Filter)						
A441 (N)	108.4%	93	183	108%	97	189
Dagnell End Road	109.4%	25	173	118.4%	78	372
A441 (South)	105.2%	77	119	119.4%	176	356
PRC		-21.5%			-32.7%	
2030 Base (Stage Sequence 3 – Peds & Left Filter)						
A441 (N)	112.7%	114	285	108.3%	94	196
Dagnell End Road	109.8%	24	212	115.8%	66	337
A441 (South)	103.2%	70	103	118.2%	165	338
PRC		-25.2%			-31.3%	
2030 Base + Development (Stage Sequence 3 – Peds & Left Filter)						
A441 (N)	118.1%	142	327	115.5%	134	306
Dagnell End Road	118.5%	40	282	121.4%	86	413
A441 (South)	107%	92	160	122.2%	190	394
PRC		-31.6%			-35.8%	

5.2.5 The results show that the junction is predicted to operate above its theoretical capacity in the 2030 Base scenario, prior to the additional traffic associated with the proposed development. In the 2030 Base (Stage Sequence 1) AM and PM peak hours, MMQs of 54 (c.311m) and 151 (c.868m) on the A441 (S) approach indicate that queues would likely back up to the adjacent Weights Lane / A441 roundabout, which is sited c.240m south of the Dagnell End Road / A441 signalised junction.

5.2.6 The addition of development traffic would give rise to a further reduction in junction capacity and performance, with slight increases in queueing and delay observed at the junction. It should be noted in this respect that LinSig results which exceed DoS of 100% often generate queue lengths that are subject to exponential growth. For this reason, consideration should be made that queue lengths on over-capacity approach arms may be indicative rather than representative of actual observed and/or forecast conditions.

5.2.7 As outlined above, the addition of traffic associated with the proposed development does not typically result in a significant impact in the PRC across each of the scenarios at the junction and does not result in a significant increase in the DoS recorded on the respective approaches, when compared with the existing junction layout baseline reference case.

5.2.8 Furthermore, it should be noted that the proposed scheme is forecast to generate approximately 152 additional two-way trips during the AM peak and 162 two-way trips during the PM peak. This equates to a c. 5% increase in development trips through this junction, when considered in context to the 2030 (effective base – including Brockhill East Phase 3) background traffic figures of 3,077 two-way trips during the AM peak and 3,172 two-way trips during the PM peak. As outlined within Section 6.4 of the accompanying TA, it is considered that this minor percentage increase would likely be accounted for within daily variations in background traffic.

5.2.9 In the accompanying TA, it is also noted that the trip generation associated with the development include trip rates taken from the donor site at Brockhill East Phase 1, which are far greater than those obtained from the TRICS database. The junction capacity assessment also includes 8-years' of forecast background traffic growth and utilises 100% of trip generation associated with the proposed development and does not take account of any sustainable measures to reduce the traffic impact of the scheme, as set out in the accompanying Travel Plan.

5.2.10 It is therefore considered that the proposed development scheme will have a relatively minor impact on the overall operation of the junction.

Incorporation of Microprocessor Optimised Vehicle Actuation (MOVA)

5.2.11 Furthermore, it is understood that the mitigation scheme for the junction will incorporate MOVA (Microprocessor Optimised Vehicle Actuation) control, which can be connected to the Urban Traffic Control)UTC) to enable monitoring and help maximise efficiency / operation of the junction. MOVA is considered to be the most efficient method of signal control, using a series of detectors that allow signal timings and cycle times to respond to changes in local traffic patterns and conditions.

5.2.12 TRL/Department for Transport research indicates that through the implementation of a MOVA system, the efficiency and operation of signalised junctions can be improved, and that up to an average 13% delay reduction may be achievable. However, it should be noted, that the effects of these optimisation improvements cannot be simulated within the LinSig model. It is therefore noted that the junction may have capability to run more efficiently than is demonstrated in the above modelling analysis and results, and that the junction could potentially operate with a greater level of capacity than indicated above.

5.2.13 It should therefore be noted that actual realised impacts at the Dagnell End Road / Birmingham Road junction could be even lower than is outlined in Table 5.2.

5.3 Modelling Summary

5.3.1 In summary, it is considered that the proposed scheme will have a relatively minor impact on the overall operation of the junction, when compared with the existing junction layout baseline reference case.

5.3.2 The proposed development is forecast to result in a c.5% increase in two-way trips through the junction, which could conceivably be accounted for in daily variations in background traffic and does not typically result in a significant increase in the DoS recorded on the respective approaches, when compared with the 2030 Committed Mitigation + Brockhill East Phase 3 scenario.

5.3.3 It is understood that the mitigation scheme for the junction is to include MOVA. TRL/Department for Transport research indicates that through the implementation of a MOVA system, the efficiency and operation of signalised junctions can be improved, and that up to an average 13% delay reduction may be achievable. However, it is noted, that the effects of these optimisation improvements cannot be simulated within the LinSig model. It is therefore considered that the mitigation scheme for the junction may have capability to run more efficiently than is demonstrated in the forecast modelling results and that the junction could potentially operate with a greater level of capacity than indicated.

5.3.4 In light of the above, it is not considered that the applicant should be liable for further mitigation works at the Dagnell End Road / Birmingham Road junction, as the junction is already forecast to operate beyond its theoretical capacity, prior to the introduction of additional traffic associated with the proposed development.

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APPENDICES

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APPENDIX A

WCC Highways Response to Live Application

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Economy and Infrastructure
Development Control Engineer

County Hall
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Paul Lester
Bromsgrove District Council
Parkside
Market Street
Bromsgrove
Worcestershire
B61 8DA

Date: 07 February 2022
Your ref: 21/01830/FUL
Ask for: Nigel Gorski

Dear Paul Lester,

TOWN AND COUNTRY PLANNING ACT 1990
(DEVELOPMENT MANAGEMENT PROCEDURE) (ENGLAND) ORDER 2015
ARTICLE 18 CONSULTATION WITH HIGHWAY AUTHORITY

PROPOSAL: **Residential development (Class C3) with a vehicular access point onto Hither Green Lane, play areas, public open space including footways and cycleways, sustainable urban drainage systems and all other ancillary and enabling infrastructure**
LOCATION: **Land West of Hither Green Lane, Redditch, Worcestershire**
APPLICANT: **Mr. A. Rowan**

Worcestershire County Council acting in its role as the Highway Authority has undertaken a full assessment of this planning application. Based on the appraisal of the development proposals. The Transport Planning and Development Management Team Leader on behalf of the County Council, under Article 18 of the Town and Country Planning (Development Management Procedure)(England) Order, 2015 recommends that this application be **deferred.**

The Highway Authority has undertaken a review of the Transport Assessment (TA) dated October 2021, as prepared on behalf of the applicant by Mode Transport Planning. Our comments are set out below.

Planning context

It is understood that this application site does not form a strategic allocation within the adopted Redditch Local Plan (2011-2030). The principle of development in this location is therefore not established and remains untested.

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Development proposals

The development proposals include for a residential site of 216 units comprising mix of private, social and affordable housing. The planning application form identifies the proposals to include no.81 x 3 bedroom private dwellings, no. 70 x 4 plus bedroom private dwellings, no. 26 x 2 bedroom social dwellings, no. 4 x 2 bedroom social flats, and no. 3 x 3 bedroom social dwellings. The site will also include no. 6 x 2 bedroom affordable dwellings and no. 17 x 3 bedroom affordable dwellings.

The proposals will replace the north-western parcel of the existing golf course located to the west of Hither Green Lane and include a new T junction access from Hither Green Lane.

Access

A single point of vehicular access is provided to the site as a new priority crossroads junction with Hither Green Lane. This junction also includes an unnamed access road serving the golf range on the opposite side of the carriageway. The TA intends the access to incorporate a 5.5m width carriageway, with 10m corner radii and 2m wide footways on either side.

For access visibility, this needs to be determined using 85th percentile speed data and not be based on the speed limit of the carriageway. Visibility should be measures from a distance of 2.4m (x) distance along the edge of the carriageway and include any tangents to the kerb line.

The swept paths provided for the access junction (with Hither Green Lane) show a refuse vehicle traversing over the centre site to turn in and out of the site. The access junction should be designed to accommodate these movements. The access design should be revisited.

Para. 4.3.1 of the TA states that *'on account of the scale of development proposed, an alternative point of access into the site will be provided for emergency vehicles'.* This to be provided on to Dagnell End Road at the western end of the site, with a 3.7m wide pedestrian link, with retractable bollards to prevent private vehicle access.

This access is however not shown on the 'proposed site layout' drawing prepared by Urban Design Ref: ME-24-21S. If proposed, the emergency access needs to be included on this drawing, with details shown of how it fits into the remainder of the site.

The TA states that a tracking assessment has been undertaken to show that a Fire Tender (8.6m) can access and egress the site via the emergency access point.

It is accepted that a fire tender could access via this route, but the access needs to be shown to a suitable level of design, complete with visibility information and details of how it could connect to the footway. Details of how the bollards could be lowered in an emergency also needs to be presented in the TA.

A TRO will also likely be required to facilitate the proposed emergency access.

Internal site design

Comments on the internal site design include:

- The site access onto Hither Green Lane proposes a visibility splay of 2.4 × 43m. This should be checked to ensure the splay is not compromised by the proposed entrance feature walls. In the southerly direction the splay should also be provided to the tangent of the nearside kerb on the curve in Hither Green Lane.
- The shared private drives indicated close to the site access create potential conflict points due to their proximity to the main access.
- All bends should have a minimum radius of 20m in accordance with the WCC Streetscape Design Guide. Suitable forward visibility should also be provided on all curves based on 20mph design speed (25m). A design speed of 15mph and 17 metre forward visibility may be acceptable on the shorter cul-de-sacs. If this extends beyond the adoptable footway or verge, then the back of footway/verge should be moved to define the visibility envelope. There are some locations where this will affect proposed plots.
- Two bends are indicated with 90-degree outer kerb lines. These serve no functional purpose and create a potential liability for the Highway Authority and the channels cannot be fully cleaned by mechanical road sweepers. These are not acceptable for adoption and should be converted to suitable radii.
- Build-outs / narrowing's appear to be proposed at three locations within the road network. These serve no functional purpose to maintain suitable vehicle speeds and are not considered necessary to aid pedestrians crossing the road. They are however a potential future maintenance and operational liability to the Highway Authority and should be removed from the design.
- All turning heads must comply with the minimum dimensions specified in WCC's Streetscape Design Guide. Some of the turning facilities are currently not compliant. However, the turning head adjacent to plots 107 to 113 exceeds the Council's requirements for adoption and should be reduced to 26m.
- A 2m wide footway should be provided at all locations where properties have direct pedestrian access to the roads. Some cul-de-sac roads appear to have

a hybrid design, which is neither traditional or shared space with 2m footways on one side and 1m service strips on the other side. There is no logic to the arrangement and only likely to raise questions/complaints from residents. 2m footways should be provided on both sides in suitable locations, or a level shared space provided in those cul-de-sac type areas.

- The road serving plots 180 – 189 and 171 – 179 appears to be a hybrid design between traditional road and shared surface. As a through route, it is unlikely to be suitable for shared use, and should have footways both sides as properties have direct frontage access. The road alignment is also unacceptable with the offset chicane effect. This serves no functional purpose and is likely to become a pinch point for refuse and delivery vehicles should parking take place nearby. The road should be realigned with a suitable constant width.
- One-metre-wide grass service strips are not considered viable as the grass rarely becomes established due to the kerb foundations/construction either side. These would need to be hard surfaced if offered for adoption.
- There appear to be short surface change features at a few locations, which again serve no functional purpose and should be removed.
- The internal swept path analysis should be based on the 11.7 metre refuse truck indicated within the supplied TA. No swept paths should overhang adoptable footways or service strips. Localised widening should also be provided on bends to allow a refuse truck and car to pass each other within the carriageway.
- The applicant should be aware of the maximum adoptable carriageway and footway gradients as detailed within WCC Highway Design Guide. Any block paved roads must have a minimum longitudinal gradient of 1 in 80 to reduce the risk of standing surface water. If this is not achievable then a tarmac surface will be required.
- Any private parking spaces abutting the back of adoptable footway or service strip should be a minimum of 6 metres deep.
- Tactile paving should be provided at junction crossing points. These should be placed on the pedestrian desire lines.
- Details of suitable surface water drainage arrangements for capture and discharge of water from the roads and footways would need to be provided before adoption of the roads was considered.

Street lighting

The street lighting team at WCC inform that a suitably qualified lighting engineer should be appointed to carry out an assessment for the proposed development in line with WCC's Street Lighting Design Guide (SLDG). Given the anticipated increase in usage

the assessment should also include the existing junction between Dagnell End Road and Hither Green Lane.

Should lighting be required consideration shall be given, in consultation with WCC, regarding the need for any proposed lighting to tie in with the existing decorative style currently used on Hither Green Lane.

It should also be noted that replacement lighting from Dagnell End Road to a suitable point beyond the proposed development access may be required in line with the guidance given in the SLDG with specific regard to WCC's ongoing energy, ecological and maintenance commitments. Please note it is a requirement to provide an environmental impact assessment of any lighting proposals and this shall be carried out by a qualified ecologist.

Any private lighting within the development shall need to be designed sympathetically to the surrounding environment and should include liaison with WCC's ecologist and the parish council to ensure the proposals are acceptable.

Trip generation

Mode have presented vehicle trip rates derived from TRICS and compared these to site surveys used in the Brockhill Phase 3 application. The TRICS results presented are not accepted by the Highway Authority for this site, as they reflect 'edge of town' sites with much greater sustainable transport connections. As the Hither Green Lane is more limited in its access to a good public transport network, rail, cycle and amenities in a close walking distance, the trip rates should reflect this. Especially as the proposals include some quite sizable dwellings. The trip rates presented for the Brockhill Phase 3 proposals are believed suitable for the site proposals.

The Highway Authority accepts the two-way vehicle trip rates of 0.706 (AM) and 0.750 (PM), generating 152 two-way trips (AM) and 162 two-way trips (PM).

Trip distribution / assignment

Para. 5.4.2 of the TA uses trip distribution information presented for the Brockhill Phase 3 proposals and '*the local road network has been analysed and traffic has been distributed to the zones'.* The Highway Authority requires greater clarity on how trip distribution / assignment has been calculated, as it is not clear from the information presented in the TA. This would utilise 'journey to work' census data and trips to other key destinations i.e. education, retail, etc.

Traffic figures in Appendix F are required to show the assignment of proposed development traffic separate from background and committed development trips. Traffic figures should show each traffic group separately included, so it is clear how the total traffic flows have been established. This information is requested.

Traffic Impact

Committed development traffic

In terms of committed development traffic, this should include the Brockhill Phase 3 proposals, including any dwellings of the previous Brockhill phases still be to fully be constructed. Consideration should also be given to the Foxlydiate site, given its proximity and size. The LPA should be consultant on what development should be included.

Capacity assessments - Dagnell End Road Signal Junction

Despite utilising information from the Brockhill Phase 3 application, the capacity results for the Dagnell End Road Signal Junction do not match those previously approved by the Highway Authority for the same modelling scenarios, built from a fully validated and calibrated junction model. From a review of the LinSig modelling results, it is apparent that the model itself and results are different.

The Mode LinSig model shows the nearside lane on the Birmingham Road (S) approach to be a short lane, whereas in the previously approved model, this is shown to be a 'long lane'. As the LinSig mode has not been provided, it is anticipated that further differences will also be apparent. The previously approved model should be used to assess capacity at this junction, otherwise a new model should be created, which would first require revalidation and calibration.

Adding vehicle trips to an already congested junction, increasing vehicles queues and delays in this location is not acceptable. This is a key junction provided along an arterial connecting Redditch to the M42 to the north and Birmingham beyond.

Other capacity assessments

For the Highway Authority to accept the junction capacity assessments presented, an AutoCAD drawing showing junction geometry measurements or a scaled drawing should be presented. Some form of base model validation should also be provided and be agreed, before forecast development scenarios are presented.

The Highway Authority does not accept percentage impact results or a 30 trip threshold for the purposes of identifying junctions requiring capacity assessment, and these will be determined by the volumes of development trips anticipated to travel through each junction, trips adding to sensitive movements, and the operation and safety of the junction. Junctions requiring capacity assessments will be fully determined when trip distribution / assignment information is agreed and evidence of model validation / calibration has been provided.

Sustainable transport links

Pedestrian access

The Highway Authority currently identifies the site to have limited accessibility by none car modes of transport. There are currently no pedestrian footway connections from this site to local amenities, including education, health, retail, etc. The Brockhill Phase 3 proposals (committed development) are to provide some pedestrian enhancements to the Dagnell End Road signal junction, with a short extension of the footway on the south side of the Dangell End Road carriageway. These are however shown not to reach the proposed Hither Green Lane site.

Para. 4.4.2 of the TA states that *'a new section of footway will also be provided on the southern side of Dagnell End Road, within the existing highway boundary. This will connect with the existing footway on the southern side of Dagnell End Road, providing a connection west towards the existing footway network along Birmingham Road (A441). This will be subject to confirmation of land ownership and discussions with WCC in order to agree an appropriate mechanism to tie this into the footway improvements associated with Brockhill East Phase 3'*

This connection is welcomed and further details regarding its form are requested. This should be shown on a drawing and take account of the committed improvements identified for the Dagnell End Road signal junction.

Pedestrian connections to the southwest are more important for this site, with this route providing connections to bus stops, the Abbey Stadium and a route to and from the town centre. Routes across fields are unattractive and will not be used at times in the winter when its wet and dark outside. Detailed information should be presented as to how the site will provide attractive pedestrian connections to / from the town centre, along pedestrian desire lines. Details regarding the footway surface, if lit, and crossing points are requested. Further information is requested.

Public transport access
Current Service

The nearest marked bus stops to the proposed development are on the A441 north of the Dagnell End Road junction, in excess of 700 metres away from the centre of the development. Parts of the development will be more than 800 metres away. The walking route to these bus stops does not include a footpath, although it is acknowledged that a part route is being provided as part of the Brockhill Phase 3 proposals.

The stop on the A441 is serviced by Diamond bus services 182 and 183. Only two bus services for each stop in this location, all during the day and not at a time suitable for typical 9-5 employment commuting.

In addition, two school services (S55 and S83) operate in the morning and afternoon to access Bromsgrove Schools. These services are unlikely to be suitable for adults due to the destination and the numbers of children using the service and there is unlikely to be space to take additional children.

Although Hither Green Lane is on the edge of Redditch, secondary schools for the catchment area are: North Bromsgrove High School (approx. 17km), South Bromsgrove High School (approx.. 13.5 km), Alvechurch Middle School (approx.4.9km). These distances necessitate the use of a vehicle as they are not within reach, nor are accessible via a safe route for active travel. The primary school within the catchment is Beoley First School which is approximately 2.5 km from Hither Green Lane. This is a long distance for primary age school children to walk plus there are no footways (at present) along much of Dagnall End Road leading to the school.

Future Service Requirements

In order to make this development acceptable in planning terms meeting the requirements of the 1985 Transport Act, WCC's LTP4 and the NPPF para 124 (c) a new bus or enhanced service will be required.

Due to the current uncertainties around commercial bus services and the complexities of conformance with public sector procurement regulations, Worcestershire County Council policy is to request contributions towards bus services associated with major developments on the basis of a stand-alone service. The envisaged service will provide an hourly frequency service running from Redditch bus station to the development covering working hours to allow access to Redditch for working and the train station for further afield employment opportunities. Without such a service this development would not be acceptable as it would be predominantly car dependent.

School / Community Transport

The statutory duty to provide free home to school transport is detailed in guidelines issued annually by DfE as required under the Education Act 1995. Worcestershire County Council puts these guidelines into effect through its Transport and Travel Policy again revised annually. This is a statutory provision related to the duty to provide school places and is required for the development to proceed as the development will cause the County Council to incur costs as a direct result of the distance between the proposed development and one or more designated schools.

Normally children living in Worcestershire are expected to attend the appropriate designated school for the children's age and address. Where places are not available in the designated school, the children may be assigned to another school or re-designated school. It is anticipated that school to travel and or community contributions may also be required for public transport. These will be identified as the planning application progresses.

Parking

Car and cycle parking is believed to be provided in accordance to standards set out in the WCC Streetscape Design Guide. Although it is noted in Para. 4.6.2 of the TA that the *'application is being submitted in outline form with all matters reserved apart from access, therefore the final quantum of parking will be determined at the Reserved Matters stage'.* A full application has been submitted for the proposals, so any amendments to car parking provision set out in the TA need to be identified and presented now.

Travel planning

The Highway Authority has undertaken a review of the Residential Travel Plan (RTP) and identified that the scope of external site measures put forward to encourage and promote sustainable journeys include:

- To the north of the site, a pedestrian route will link the site with Dagnell End Road and connect to a new section of footway that will be provided on the southern side of Dagnell End Road, connecting to the committed Brockhill Phase 3 proposals in this location,
- To the south and west pedestrian / cycle connections will be provided with the existing footway which runs alongside the River Arrow and connects with Birmingham Road immediately north of the river over-bridge.
- A Travel Information Pack will be produced and disseminated to residents, detailing the opportunities for sustainable travel to and from the site, including

a potential range of incentives and the promotion of regional and national car share websites

- Use of public transport will be with up-to-date public transport timetables, bus maps and ticket information disseminated to the residents. The possibility of offering residents with discounted bus vouchers/passes with local operators will also be investigated.
- Personalised Travel Planning (PTP) will allow residents to contact the TPC and arrange a meeting (either face-to-face or via email/telephone) to discuss their individual circumstances with the TPC who will assist in tailoring a travel plan specific to that resident, incorporating sustainable travel modes as much as possible.

The RTP seeks to achieve a mode shift reduction in single occupancy car trips of 5% (from baseline surveys) over a period of 5 years. Based on the trip generation results presented, the success of the RTP would reduce weekday peak hour car trips by 8 vehicles in the AM and PM peaks.

Based on the level of provision set out in the RTP, the Highway Authority does not believe this mode shift would be realised. The promotion of sustainable journeys is most successful when there are plentiful non-car opportunities in which to choose from. At present, the development site offers limited sustainable options in which to promote.

The Travel Welcome Pack should also be presented to the WCC travel plan officer for review and approval.

Summary

Unlike the Brockhill Phase 3 proposals, the proposals to the west of Hither Green Lane do not form an allocated site in the Redditch Local Plan. The site is more remote in terms of access to sustainable transport provision and amenities in the town centre.

The Highway Authority has undertaken a review of the Mode TA and has identified a series of points that require further consideration / information. The operation of the Dagnell End Road signal junction in particular is a primary concern, given that nearly all proposed development trips generated by this site would travel through it.

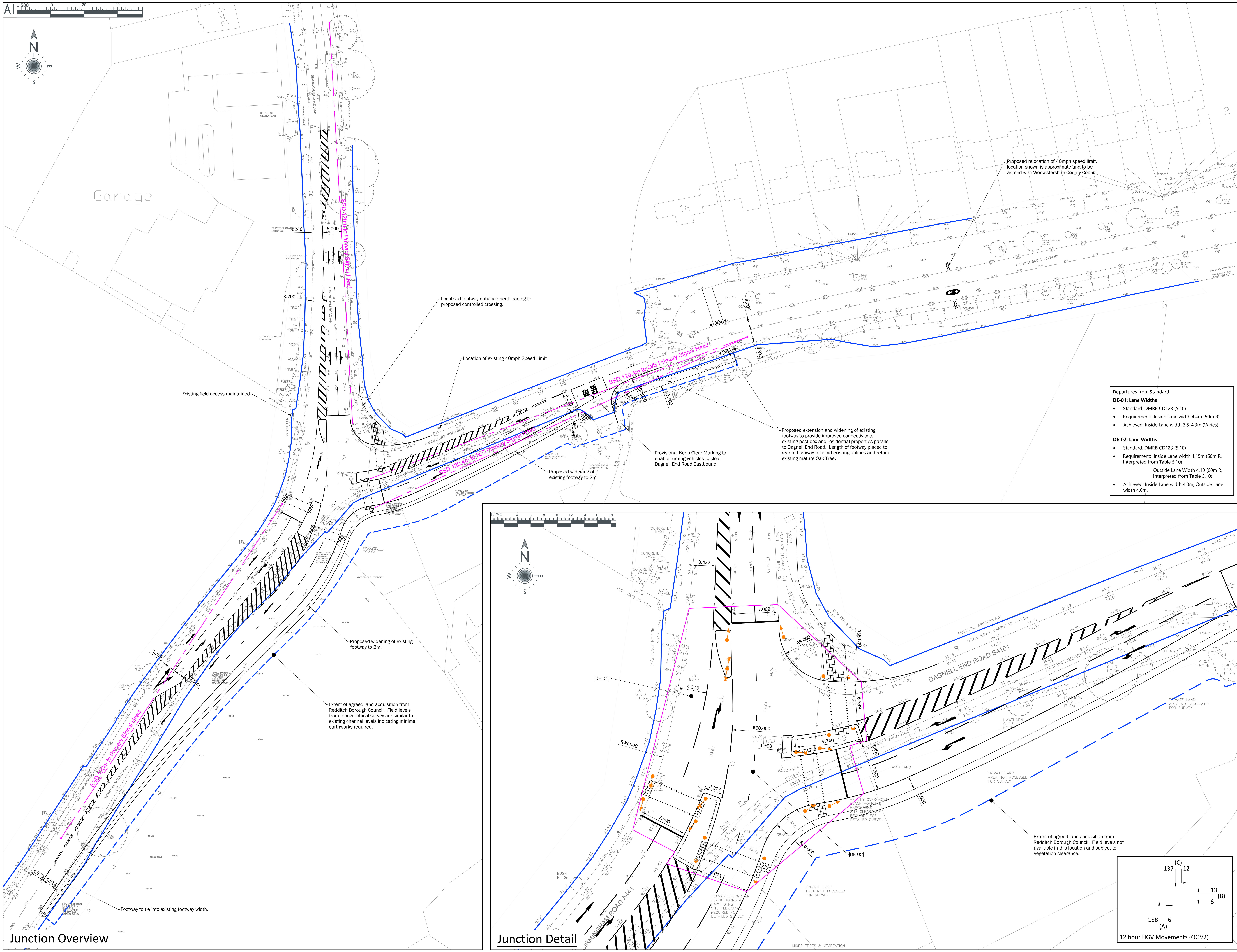
The Highway Authority therefore submits a response of deferral until the required information has been provided and considered.

Yours Sincerely

Nigel Gorski
Development Control Engineer
On behalf of Karen Hanchett, Transport Planning and Development Management Team Leader

APPENDIX B

Dagnell End Road / Birmingham Road – PJA Mitigation Drawing



Departures from Standard

DE-01: Lane Widths

- Standard: DMRB CD123 (5.10)
- Requirement: Inside Lane width 4.4m (50m R)
- Achieved: Inside Lane width 3.5-4.3m (Varies)

DE-02: Lane Widths

- Standard: DMRB CD123 (5.10)
- Requirement: Inside Lane width 4.15m (60m R, Interpreted from Table 5.10)
  Outside Lane Width 4.10 (60m R, Interpreted from Table 5.10)
- Achieved: Inside Lane width 4.0m, Outside Lane width 4.0m.

These drawings have been produced with reference to the CDM Regulations 2015. Please note that these are pre-construction phase drawings and should be subject to further design risk management as required in accordance with Regulation 9

Notes

1. Do not scale from this drawing.
2. All dimensions in metres unless stated otherwise.
3. The purpose of this drawing is to demonstrate the ability to deliver a junction improvement scheme at Dagnell End Road in support of an associated residential planning application.
4. This drawing should be read in conjunction with all other project related drawings.
5. Drawing is based on Topographical survey (ref.:27285_R2) and is limited to a 2D design at this stage.
6. OS Mapping is included for context.
7. Highway Boundary information has been reproduced and interpreted from data received from Worcestershire County Council ref 900067 dated 20/07/20..
8. For Private Land Boundary details refer to drawing 2809-P-014.
9. All boundaries have been reproduced from source data, however there are limited features in which to interpret this information against and as such all boundaries should be verified on site.
10. Design has been based on the principles of DMRB CD123, Design of Signalised Junctions and Traffic Signs Manual Chapter 6.
11. Visibility to the primary signal heads on Birmingham Road have been based on a 70kph design speed to reflect the existing 40mph speed limit.
12. Visibility to the primary signal heads on Dagnell End Road have been based on 85th Percentile speed data undertaken on 18th November 2020 and adjusted to reflect an 85th percentile speed of 44mph and visibility of 120.4m.
13. Curve widening has been applied through the junction to reflect the internal bend radii being less than 90m. Full widening has not been achievable and as such, these have been highlighted as Departures from CD123.
14. Vehicular Tracking has been undertaken using the "Design Vehicle" as specified by DMRB CD123. Tracking adjacent to refuge islands has sought to achieve a 500mm clearance between the design vehicle and kerbline where possible as required by Worcestershire County Council. Reference should be made to the predicted daily HGV movements for context.
15. Traffic signal equipment shown on the drawing is indicative and subject to detailed design.
16. The design has been updated in line with highway authority comments and incorporating controlled pedestrian facilities.
17. The design is subject to transport modeling and an updated stage 1 Road Safety Audit.

Key

- Highway Boundary
- Land Acquisition Boundary
- Proposed Channel/Kerbline
- Proposed Back of Footway
- Proposed back of verge
- Forward visibility to Primary signal head
- Junction Inter visibility Zone
- Proposed Red Tactile Paving
- Proposed Primary Signal Head
- Proposed Secondary Signal Head

REV	DATE	REVISION NOTE	BY
P4	23:11:20	Dangnell End Rd island amended, hatching & Keep clear added	SG
P3	19.11.20	Finalised to topographical Survey following meeting with WCC (16/11/20)	SG
P2	12.11.20	Updated layout for Topographical Survey incorporating WCC comments	GH
P1	07.08.20	Widening, staggered crossing WCC comments incorporated	GH
P0	01.12.19	Initial Design	JL

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CLIENT
Persimmon Homes South Midlands

PROJECT
Brockhill East
Dagnell End Road
Junction

DRAWING TITLE
Proposed Signalised
Junction Improvements

DRAWING ISSUE STATUS
PLANNING

PJA JOB No.	SUB-CODE	DRAWING NO.	REVISION
2809	- P -	12	- P4

Revision Letter : P - Prelim / A - Approval / T - Tender / C - Construction

BIM DRAWING REFERENCE
-

SCALE	DRAWN	REVIEWED	DATE
A1@1:500	GH	SG	12.2019

mode
transport planning

APPENDIX C

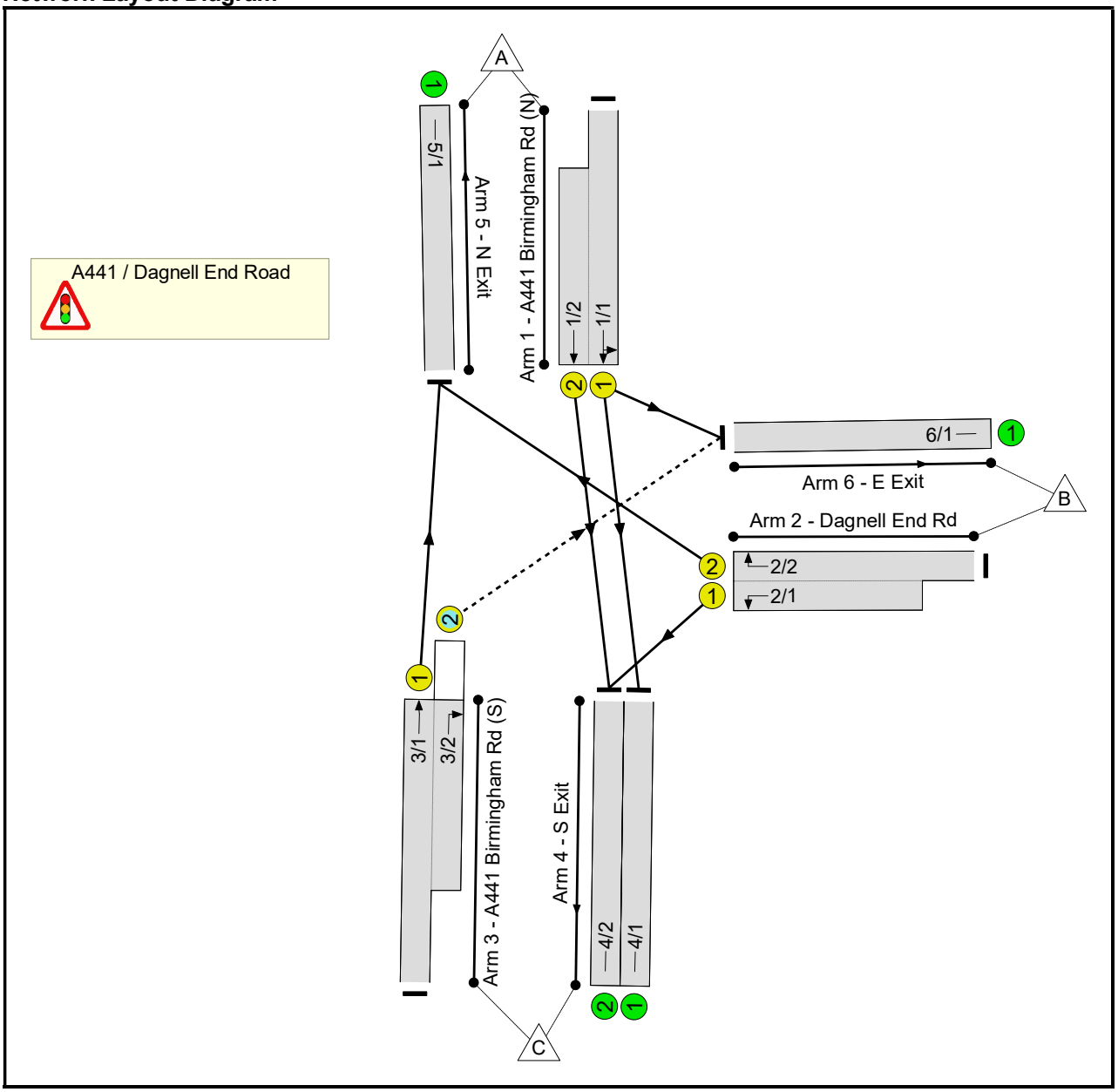
LinSig Model Output Report

Full Input Data And Results

User and Project Details

Project:	
Title:	**A441 / Dagnell End Road**
Location:	
Additional detail:	Proposed layout
File name:	A441_Dagnell End Rd v2 Rev B.lsg3x
Author:	al
Company:	
Address:	

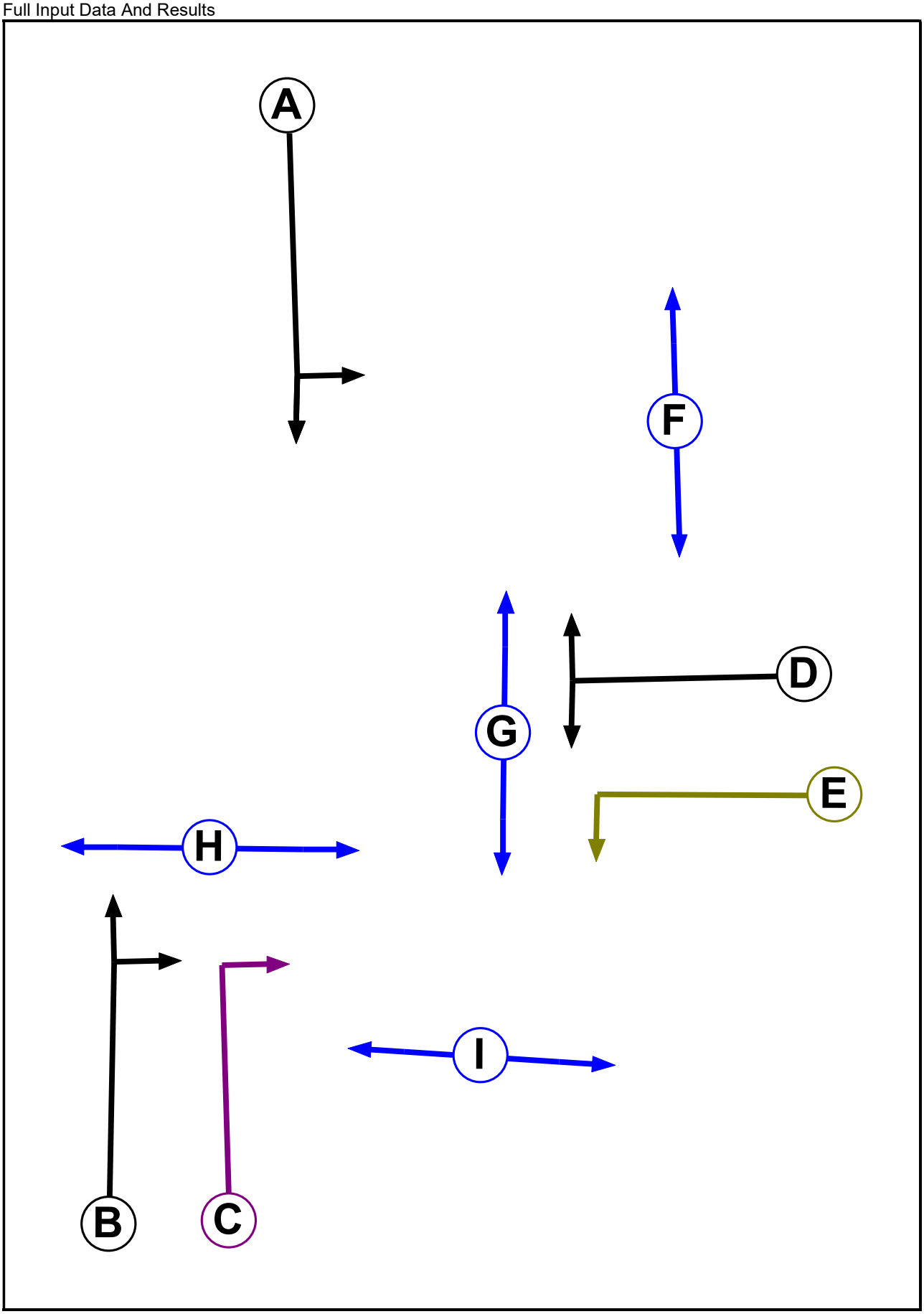
Network Layout Diagram



Full Input Data And Results

Phase Diagram

Full Input Data And Results



Full Input Data And Results

Phase Input Data

Phase Name	Phase Type	Assoc. Phase	Street Min	Cont Min
A	Traffic		7	7
B	Traffic		7	7
C	Ind. Arrow	B	4	4
D	Traffic		7	7
E	Filter	D	4	0
F	Pedestrian		7	7
G	Pedestrian		7	7
H	Pedestrian		7	7
I	Pedestrian		7	7

Phase Intergreens Matrix

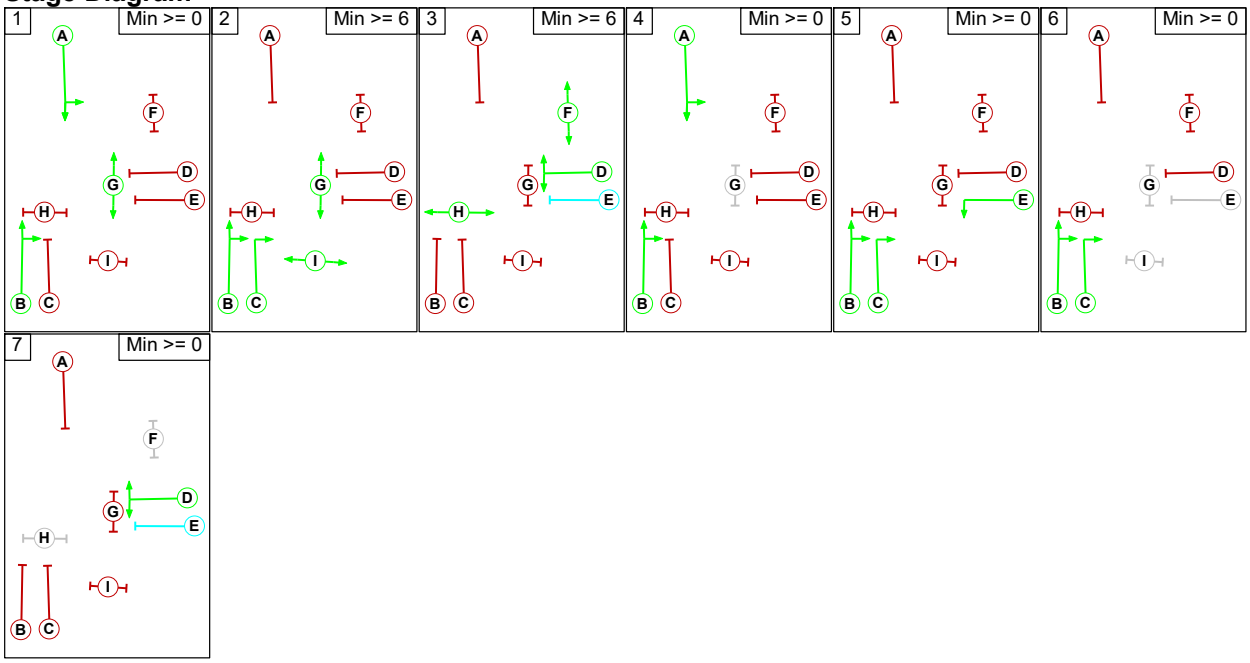
		Starting Phase								
		A	B	C	D	E	F	G	H	I
Terminating Phase	A		-	5	7	7	6	-	-	8
	B	-		-	7	-	8	-	5	-
	C	7	-		7	-	8	-	5	-
	D	7	7	7		-	-	5	-	7
	E	6	-	-	-		-	5	-	7
	F	8	8	8	-	-		-	-	-
	G	-	-	-	9	9	-		-	-
	H	-	8	8	-	-	-	-		-
	I	9	-	-	9	9	-	-	-	

Phases in Stage

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

Full Input Data And Results

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	5	6	7
From Stage	1		8	9	0	9	5	9
	2	9		9	9	9	0	9
	3	8	8		8	8	8	0
	4	0	8	8		7	5	7
	5	X	X	8	X		X	7
	6	7	0	8	7	0		7
	7	7	7	0	7	7	7	

Full Input Data And Results

Give-Way Lane Input Data

Junction: A441 / Dagnell End 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)**
3/2 (A441 Birmingham Rd (S))	6/1 (Right)	1439	0	1/1	1.09	All	3.00	-	0.50	3	3.00
				1/2	1.09	All					

Full Input Data And Results

Lane Input Data

Junction: A441 / Dagnell End 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 (A441 Birmingham Rd (N))	U	A	2	3	60.0	Geom	-	3.00	0.00	Y	Arm 4 Ahead	50.00
											Arm 6 Left	10.00
1/2 (A441 Birmingham Rd (N))	U	A	2	3	10.0	Geom	-	3.00	0.00	Y	Arm 4 Ahead	77.00
2/1 (Dagnell End Rd)	U	D E	2	3	9.6	Geom	-	3.10	0.00	Y	Arm 4 Left	38.00
2/2 (Dagnell End Rd)	U	D	2	3	60.0	Geom	-	3.10	0.00	Y	Arm 5 Right	9.00
3/1 (A441 Birmingham Rd (S))	U	B	2	3	60.0	User	1800	-	-	-	-	-
3/2 (A441 Birmingham Rd (S))	O	B C	2	3	9.7	User	1800	-	-	-	-	-
4/1 (S Exit)	U		2	3	60.0	Inf	-	-	-	-	-	-
4/2 (S Exit)	U		2	3	60.0	Inf	-	-	-	-	-	-
5/1 (N Exit)	U		2	3	60.0	Inf	-	-	-	-	-	-
6/1 (E Exit)	U		2	3	60.0	Inf	-	-	-	-	-	-

Traffic Flow Groups

Flow Group	Start Time	End Time	Duration	Formula
1: '2030 AM Effective Base'	08:00	09:00	01:00	
2: '2030 PM Effective Base'	17:00	18:00	01:00	
3: '2030 AM Effective Base + Dev'	08:00	09:00	01:00	
4: '2030 PM Effective Base + Dev'	17:00	18:00	01:00	

Full Input Data And Results

Scenario 1: '1' (FG1: '2030 AM Effective Base', Plan 1: 'Network Control Plan 1 (no Peds)')

Traffic Flows, Desired

Desired Flow :

		Destination			
		A	B	C	Tot.
Origin	A	0	206	1078	1284
	B	197	0	210	407
	C	1145	241	0	1386
	Tot.	1342	447	1288	3077

Traffic Lane Flows

Lane	Scenario 1: 1
Junction: A441 / Dagnell End Road	
1/1 (with short)	1284(In) 989(Out)
1/2 (short)	295
2/1 (short)	210
2/2 (with short)	407(In) 197(Out)
3/1 (with short)	1386(In) 1145(Out)
3/2 (short)	241
4/1	783
4/2	505
5/1	1342
6/1	447

Full Input Data And Results

Lane Saturation Flows

Junction: A441 / Dagnell End 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 (A441 Birmingham Rd (N))	3.00	0.00	Y	Arm 4 Ahead	50.00	79.2 %	1815	1815
				Arm 6 Left	10.00	20.8 %		
1/2 (A441 Birmingham Rd (N))	3.00	0.00	Y	Arm 4 Ahead	77.00	100.0 %	1878	1878
2/1 (Dagnell End Rd)	3.10	0.00	Y	Arm 4 Left	38.00	100.0 %	1852	1852
2/2 (Dagnell End Rd)	3.10	0.00	Y	Arm 5 Right	9.00	100.0 %	1650	1650
3/1 (A441 Birmingham Rd (S) Lane 1)	This lane uses a directly entered Saturation Flow						1726	1726
3/2 (A441 Birmingham Rd (S) Lane 2)	This lane uses a directly entered Saturation Flow						1679	1679
4/1 (S Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
4/2 (S Exit Lane 2)	Infinite Saturation Flow						Inf	Inf
5/1 (N Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
6/1 (E Exit Lane 1)	Infinite Saturation Flow						Inf	Inf

Scenario 2: '2' (FG2: '2030 PM Effective Base', Plan 1: 'Network Control Plan 1 (no Peds)')

Traffic Flows, Desired

Desired Flow :

		Destination			
		A	B	C	Tot.
Origin	A	0	132	1043	1175
	B	379	0	255	634
	C	1188	175	0	1363
	Tot.	1567	307	1298	3172

Full Input Data And Results

Traffic Lane Flows

Lane	Scenario 2: 2
Junction: A441 / Dagnell End Road	
1/1 (with short)	1175(In) 905(Out)
1/2 (short)	270
2/1 (short)	255
2/2 (with short)	634(In) 379(Out)
3/1 (with short)	1363(In) 1188(Out)
3/2 (short)	175
4/1	773
4/2	525
5/1	1567
6/1	307

Lane Saturation Flows

Junction: A441 / Dagnell End 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 (A441 Birmingham Rd (N))	3.00	0.00	Y	Arm 4 Ahead	50.00	85.4 %	1828	1828
				Arm 6 Left	10.00	14.6 %		
1/2 (A441 Birmingham Rd (N))	3.00	0.00	Y	Arm 4 Ahead	77.00	100.0 %	1878	1878
2/1 (Dagnell End Rd)	3.10	0.00	Y	Arm 4 Left	38.00	100.0 %	1852	1852
2/2 (Dagnell End Rd)	3.10	0.00	Y	Arm 5 Right	9.00	100.0 %	1650	1650
3/1 (A441 Birmingham Rd (S) Lane 1)	This lane uses a directly entered Saturation Flow						1641	1641
3/2 (A441 Birmingham Rd (S) Lane 2)	This lane uses a directly entered Saturation Flow						1800	1800
4/1 (S Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
4/2 (S Exit Lane 2)	Infinite Saturation Flow						Inf	Inf
5/1 (N Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
6/1 (E Exit Lane 1)	Infinite Saturation Flow						Inf	Inf

Full Input Data And Results

Scenario 3: '3' (FG3: '2030 AM Effective Base + Dev', Plan 1: 'Network Control Plan 1 (no Peds)')

Traffic Flows, Desired

Desired Flow :

		Destination			
		A	B	C	Tot.
Origin	A	0	226	1078	1304
	B	255	0	259	514
	C	1145	258	0	1403
	Tot.	1400	484	1337	3221

Traffic Lane Flows

Lane	Scenario 3: 3
Junction: A441 / Dagnell End Road	
1/1 (with short)	1304(In) 1004(Out)
1/2 (short)	300
2/1 (short)	259
2/2 (with short)	514(In) 255(Out)
3/1 (with short)	1403(In) 1145(Out)
3/2 (short)	258
4/1	778
4/2	559
5/1	1400
6/1	484

Full Input Data And Results

Lane Saturation Flows

Junction: A441 / Dagnell End 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 (A441 Birmingham Rd (N))	3.00	0.00	Y	Arm 4 Ahead	50.00	77.5 %	1812	1812
				Arm 6 Left	10.00	22.5 %		
1/2 (A441 Birmingham Rd (N))	3.00	0.00	Y	Arm 4 Ahead	77.00	100.0 %	1878	1878
2/1 (Dagnell End Rd)	3.10	0.00	Y	Arm 4 Left	38.00	100.0 %	1852	1852
2/2 (Dagnell End Rd)	3.10	0.00	Y	Arm 5 Right	9.00	100.0 %	1650	1650
3/1 (A441 Birmingham Rd (S) Lane 1)	This lane uses a directly entered Saturation Flow						1726	1726
3/2 (A441 Birmingham Rd (S) Lane 2)	This lane uses a directly entered Saturation Flow						1679	1679
4/1 (S Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
4/2 (S Exit Lane 2)	Infinite Saturation Flow						Inf	Inf
5/1 (N Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
6/1 (E Exit Lane 1)	Infinite Saturation Flow						Inf	Inf

Scenario 4: '4' (FG4: '2030 PM Effective Base + Dev', Plan 1: 'Network Control Plan 1 (no Peds)')

Traffic Flows, Desired

Desired Flow :

		Destination			
		A	B	C	Tot.
Origin	A	0	187	1043	1230
	B	407	0	278	685
	C	1188	221	0	1409
	Tot.	1595	408	1321	3324

Full Input Data And Results

Traffic Lane Flows

Lane	Scenario 4: 4
Junction: A441 / Dagnell End Road	
1/1 (with short)	1230(In) 947(Out)
1/2 (short)	283
2/1 (short)	278
2/2 (with short)	685(In) 407(Out)
3/1 (with short)	1409(In) 1188(Out)
3/2 (short)	221
4/1	760
4/2	561
5/1	1595
6/1	408

Lane Saturation Flows

Junction: A441 / Dagnell End 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 (A441 Birmingham Rd (N))	3.00	0.00	Y	Arm 4 Ahead	50.00	80.3 %	1817	1817
				Arm 6 Left	10.00	19.7 %		
1/2 (A441 Birmingham Rd (N))	3.00	0.00	Y	Arm 4 Ahead	77.00	100.0 %	1878	1878
2/1 (Dagnell End Rd)	3.10	0.00	Y	Arm 4 Left	38.00	100.0 %	1852	1852
2/2 (Dagnell End Rd)	3.10	0.00	Y	Arm 5 Right	9.00	100.0 %	1650	1650
3/1 (A441 Birmingham Rd (S) Lane 1)	This lane uses a directly entered Saturation Flow						1641	1641
3/2 (A441 Birmingham Rd (S) Lane 2)	This lane uses a directly entered Saturation Flow						1800	1800
4/1 (S Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
4/2 (S Exit Lane 2)	Infinite Saturation Flow						Inf	Inf
5/1 (N Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
6/1 (E Exit Lane 1)	Infinite Saturation Flow						Inf	Inf

Full Input Data And Results

Scenario 5: '5' (FG1: '2030 AM Effective Base', Plan 2: 'Network Control Plan 2 (no Peds, no left filter)')

Traffic Flows, Desired

Desired Flow :

		Destination			
		A	B	C	Tot.
Origin	A	0	206	1078	1284
	B	197	0	210	407
	C	1145	241	0	1386
	Tot.	1342	447	1288	3077

Traffic Lane Flows

Lane	Scenario 5: 5
Junction: A441 / Dagnell End Road	
1/1 (with short)	1284(In) 989(Out)
1/2 (short)	295
2/1 (short)	210
2/2 (with short)	407(In) 197(Out)
3/1 (with short)	1386(In) 1145(Out)
3/2 (short)	241
4/1	783
4/2	505
5/1	1342
6/1	447

Full Input Data And Results

Lane Saturation Flows

Junction: A441 / Dagnell End 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 (A441 Birmingham Rd (N))	3.00	0.00	Y	Arm 4 Ahead	50.00	79.2 %	1815	1815
				Arm 6 Left	10.00	20.8 %		
1/2 (A441 Birmingham Rd (N))	3.00	0.00	Y	Arm 4 Ahead	77.00	100.0 %	1878	1878
2/1 (Dagnell End Rd)	3.10	0.00	Y	Arm 4 Left	38.00	100.0 %	1852	1852
2/2 (Dagnell End Rd)	3.10	0.00	Y	Arm 5 Right	9.00	100.0 %	1650	1650
3/1 (A441 Birmingham Rd (S) Lane 1)	This lane uses a directly entered Saturation Flow						1726	1726
3/2 (A441 Birmingham Rd (S) Lane 2)	This lane uses a directly entered Saturation Flow						1679	1679
4/1 (S Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
4/2 (S Exit Lane 2)	Infinite Saturation Flow						Inf	Inf
5/1 (N Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
6/1 (E Exit Lane 1)	Infinite Saturation Flow						Inf	Inf

Scenario 6: '6' (FG2: '2030 PM Effective Base', Plan 2: 'Network Control Plan 2 (no Peds, no left filter)')

Traffic Flows, Desired

Desired Flow :

		Destination			
		A	B	C	Tot.
Origin	A	0	132	1043	1175
	B	379	0	255	634
	C	1188	175	0	1363
	Tot.	1567	307	1298	3172

Full Input Data And Results

Traffic Lane Flows

Lane	Scenario 6: 6
Junction: A441 / Dagnell End Road	
1/1 (with short)	1175(In) 905(Out)
1/2 (short)	270
2/1 (short)	255
2/2 (with short)	634(In) 379(Out)
3/1 (with short)	1363(In) 1188(Out)
3/2 (short)	175
4/1	773
4/2	525
5/1	1567
6/1	307

Lane Saturation Flows

Junction: A441 / Dagnell End 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 (A441 Birmingham Rd (N))	3.00	0.00	Y	Arm 4 Ahead	50.00	85.4 %	1828	1828
				Arm 6 Left	10.00	14.6 %		
1/2 (A441 Birmingham Rd (N))	3.00	0.00	Y	Arm 4 Ahead	77.00	100.0 %	1878	1878
2/1 (Dagnell End Rd)	3.10	0.00	Y	Arm 4 Left	38.00	100.0 %	1852	1852
2/2 (Dagnell End Rd)	3.10	0.00	Y	Arm 5 Right	9.00	100.0 %	1650	1650
3/1 (A441 Birmingham Rd (S) Lane 1)	This lane uses a directly entered Saturation Flow						1641	1641
3/2 (A441 Birmingham Rd (S) Lane 2)	This lane uses a directly entered Saturation Flow						1800	1800
4/1 (S Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
4/2 (S Exit Lane 2)	Infinite Saturation Flow						Inf	Inf
5/1 (N Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
6/1 (E Exit Lane 1)	Infinite Saturation Flow						Inf	Inf

Full Input Data And Results

Scenario 7: '7' (FG3: '2030 AM Effective Base + Dev', Plan 2: 'Network Control Plan 2 (no Peds, no left filter)')

Traffic Flows, Desired

Desired Flow :

		Destination			
		A	B	C	Tot.
Origin	A	0	226	1078	1304
	B	255	0	259	514
	C	1145	258	0	1403
	Tot.	1400	484	1337	3221

Traffic Lane Flows

Lane	Scenario 7: 7
Junction: A441 / Dagnell End Road	
1/1 (with short)	1304(In) 1004(Out)
1/2 (short)	300
2/1 (short)	259
2/2 (with short)	514(In) 255(Out)
3/1 (with short)	1403(In) 1145(Out)
3/2 (short)	258
4/1	778
4/2	559
5/1	1400
6/1	484

Full Input Data And Results

Lane Saturation Flows

Junction: A441 / Dagnell End 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 (A441 Birmingham Rd (N))	3.00	0.00	Y	Arm 4 Ahead	50.00	77.5 %	1812	1812
				Arm 6 Left	10.00	22.5 %		
1/2 (A441 Birmingham Rd (N))	3.00	0.00	Y	Arm 4 Ahead	77.00	100.0 %	1878	1878
2/1 (Dagnell End Rd)	3.10	0.00	Y	Arm 4 Left	38.00	100.0 %	1852	1852
2/2 (Dagnell End Rd)	3.10	0.00	Y	Arm 5 Right	9.00	100.0 %	1650	1650
3/1 (A441 Birmingham Rd (S) Lane 1)	This lane uses a directly entered Saturation Flow						1726	1726
3/2 (A441 Birmingham Rd (S) Lane 2)	This lane uses a directly entered Saturation Flow						1679	1679
4/1 (S Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
4/2 (S Exit Lane 2)	Infinite Saturation Flow						Inf	Inf
5/1 (N Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
6/1 (E Exit Lane 1)	Infinite Saturation Flow						Inf	Inf

Scenario 8: '8' (FG4: '2030 PM Effective Base + Dev', Plan 2: 'Network Control Plan 2 (no Peds, no left filter)')

Traffic Flows, Desired

Desired Flow :

		Destination			
		A	B	C	Tot.
Origin	A	0	187	1043	1230
	B	407	0	278	685
	C	1188	221	0	1409
	Tot.	1595	408	1321	3324

Full Input Data And Results

Traffic Lane Flows

Lane	Scenario 8: 8
Junction: A441 / Dagnell End Road	
1/1 (with short)	1230(In) 947(Out)
1/2 (short)	283
2/1 (short)	278
2/2 (with short)	685(In) 407(Out)
3/1 (with short)	1409(In) 1188(Out)
3/2 (short)	221
4/1	760
4/2	561
5/1	1595
6/1	408

Lane Saturation Flows

Junction: A441 / Dagnell End 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 (A441 Birmingham Rd (N))	3.00	0.00	Y	Arm 4 Ahead	50.00	80.3 %	1817	1817
				Arm 6 Left	10.00	19.7 %		
1/2 (A441 Birmingham Rd (N))	3.00	0.00	Y	Arm 4 Ahead	77.00	100.0 %	1878	1878
2/1 (Dagnell End Rd)	3.10	0.00	Y	Arm 4 Left	38.00	100.0 %	1852	1852
2/2 (Dagnell End Rd)	3.10	0.00	Y	Arm 5 Right	9.00	100.0 %	1650	1650
3/1 (A441 Birmingham Rd (S) Lane 1)	This lane uses a directly entered Saturation Flow						1641	1641
3/2 (A441 Birmingham Rd (S) Lane 2)	This lane uses a directly entered Saturation Flow						1800	1800
4/1 (S Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
4/2 (S Exit Lane 2)	Infinite Saturation Flow						Inf	Inf
5/1 (N Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
6/1 (E Exit Lane 1)	Infinite Saturation Flow						Inf	Inf

Full Input Data And Results

Scenario 9: '9' (FG1: '2030 AM Effective Base', Plan 3: 'Network Control Plan 3 (Peds)')

Traffic Flows, Desired

Desired Flow :

		Destination			
		A	B	C	Tot.
Origin	A	0	206	1078	1284
	B	197	0	210	407
	C	1145	241	0	1386
	Tot.	1342	447	1288	3077

Traffic Lane Flows

Lane	Scenario 9: 9
Junction: A441 / Dagnell End Road	
1/1 (with short)	1284(In) 998(Out)
1/2 (short)	286
2/1 (short)	210
2/2 (with short)	407(In) 197(Out)
3/1 (with short)	1386(In) 1145(Out)
3/2 (short)	241
4/1	792
4/2	496
5/1	1342
6/1	447

Full Input Data And Results

Lane Saturation Flows

Junction: A441 / Dagnell End 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 (A441 Birmingham Rd (N))	3.00	0.00	Y	Arm 4 Ahead	50.00	79.4 %	1816	1816
				Arm 6 Left	10.00	20.6 %		
1/2 (A441 Birmingham Rd (N))	3.00	0.00	Y	Arm 4 Ahead	77.00	100.0 %	1878	1878
2/1 (Dagnell End Rd)	3.10	0.00	Y	Arm 4 Left	38.00	100.0 %	1852	1852
2/2 (Dagnell End Rd)	3.10	0.00	Y	Arm 5 Right	9.00	100.0 %	1650	1650
3/1 (A441 Birmingham Rd (S) Lane 1)	This lane uses a directly entered Saturation Flow						1726	1726
3/2 (A441 Birmingham Rd (S) Lane 2)	This lane uses a directly entered Saturation Flow						1679	1679
4/1 (S Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
4/2 (S Exit Lane 2)	Infinite Saturation Flow						Inf	Inf
5/1 (N Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
6/1 (E Exit Lane 1)	Infinite Saturation Flow						Inf	Inf

Scenario 10: '10' (FG2: '2030 PM Effective Base', Plan 3: 'Network Control Plan 3 (Peds)')

Traffic Flows, Desired

Desired Flow :

		Destination			
		A	B	C	Tot.
Origin	A	0	132	1043	1175
	B	379	0	255	634
	C	1188	175	0	1363
	Tot.	1567	307	1298	3172

Full Input Data And Results

Traffic Lane Flows

Lane	Scenario 10: 10
Junction: A441 / Dagnell End Road	
1/1 (with short)	1175(In) 899(Out)
1/2 (short)	276
2/1 (short)	255
2/2 (with short)	634(In) 379(Out)
3/1 (with short)	1363(In) 1188(Out)
3/2 (short)	175
4/1	767
4/2	531
5/1	1567
6/1	307

Lane Saturation Flows

Junction: A441 / Dagnell End 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 (A441 Birmingham Rd (N))	3.00	0.00	Y	Arm 4 Ahead	50.00	85.3 %	1828	1828
				Arm 6 Left	10.00	14.7 %		
1/2 (A441 Birmingham Rd (N))	3.00	0.00	Y	Arm 4 Ahead	77.00	100.0 %	1878	1878
2/1 (Dagnell End Rd)	3.10	0.00	Y	Arm 4 Left	38.00	100.0 %	1852	1852
2/2 (Dagnell End Rd)	3.10	0.00	Y	Arm 5 Right	9.00	100.0 %	1650	1650
3/1 (A441 Birmingham Rd (S) Lane 1)	This lane uses a directly entered Saturation Flow						1641	1641
3/2 (A441 Birmingham Rd (S) Lane 2)	This lane uses a directly entered Saturation Flow						1800	1800
4/1 (S Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
4/2 (S Exit Lane 2)	Infinite Saturation Flow						Inf	Inf
5/1 (N Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
6/1 (E Exit Lane 1)	Infinite Saturation Flow						Inf	Inf

Full Input Data And Results

Scenario 11: '11' (FG3: '2030 AM Effective Base + Dev', Plan 3: 'Network Control Plan 3 (Peds)')

Traffic Flows, Desired

Desired Flow :

		Destination			
		A	B	C	Tot.
Origin	A	0	226	1078	1304
	B	255	0	259	514
	C	1145	258	0	1403
	Tot.	1400	484	1337	3221

Traffic Lane Flows

Lane	Scenario 11: 11
Junction: A441 / Dagnell End Road	
1/1 (with short)	1304(In) 1004(Out)
1/2 (short)	300
2/1 (short)	259
2/2 (with short)	514(In) 255(Out)
3/1 (with short)	1403(In) 1145(Out)
3/2 (short)	258
4/1	778
4/2	559
5/1	1400
6/1	484

Full Input Data And Results

Lane Saturation Flows

Junction: A441 / Dagnell End 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 (A441 Birmingham Rd (N))	3.00	0.00	Y	Arm 4 Ahead	50.00	77.5 %	1812	1812
				Arm 6 Left	10.00	22.5 %		
1/2 (A441 Birmingham Rd (N))	3.00	0.00	Y	Arm 4 Ahead	77.00	100.0 %	1878	1878
2/1 (Dagnell End Rd)	3.10	0.00	Y	Arm 4 Left	38.00	100.0 %	1852	1852
2/2 (Dagnell End Rd)	3.10	0.00	Y	Arm 5 Right	9.00	100.0 %	1650	1650
3/1 (A441 Birmingham Rd (S) Lane 1)	This lane uses a directly entered Saturation Flow						1726	1726
3/2 (A441 Birmingham Rd (S) Lane 2)	This lane uses a directly entered Saturation Flow						1679	1679
4/1 (S Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
4/2 (S Exit Lane 2)	Infinite Saturation Flow						Inf	Inf
5/1 (N Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
6/1 (E Exit Lane 1)	Infinite Saturation Flow						Inf	Inf

Scenario 12: '12' (FG4: '2030 PM Effective Base + Dev', Plan 3: 'Network Control Plan 3 (Peds)')

Traffic Flows, Desired

Desired Flow :

		Destination			
		A	B	C	Tot.
Origin	A	0	187	1043	1230
	B	407	0	278	685
	C	1188	221	0	1409
	Tot.	1595	408	1321	3324

Full Input Data And Results

Traffic Lane Flows

Lane	Scenario 12: 12
Junction: A441 / Dagnell End Road	
1/1 (with short)	1230(In) 947(Out)
1/2 (short)	283
2/1 (short)	278
2/2 (with short)	685(In) 407(Out)
3/1 (with short)	1409(In) 1188(Out)
3/2 (short)	221
4/1	760
4/2	561
5/1	1595
6/1	408

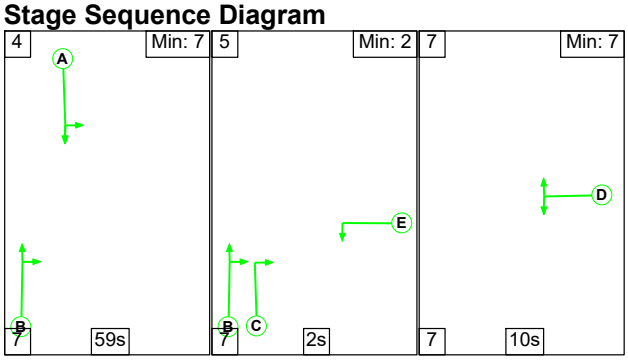
Lane Saturation Flows

Junction: A441 / Dagnell End 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 (A441 Birmingham Rd (N))	3.00	0.00	Y	Arm 4 Ahead	50.00	80.3 %	1817	1817
				Arm 6 Left	10.00	19.7 %		
1/2 (A441 Birmingham Rd (N))	3.00	0.00	Y	Arm 4 Ahead	77.00	100.0 %	1878	1878
2/1 (Dagnell End Rd)	3.10	0.00	Y	Arm 4 Left	38.00	100.0 %	1852	1852
2/2 (Dagnell End Rd)	3.10	0.00	Y	Arm 5 Right	9.00	100.0 %	1650	1650
3/1 (A441 Birmingham Rd (S) Lane 1)	This lane uses a directly entered Saturation Flow						1641	1641
3/2 (A441 Birmingham Rd (S) Lane 2)	This lane uses a directly entered Saturation Flow						1800	1800
4/1 (S Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
4/2 (S Exit Lane 2)	Infinite Saturation Flow						Inf	Inf
5/1 (N Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
6/1 (E Exit Lane 1)	Infinite Saturation Flow						Inf	Inf

Full Input Data And Results

Scenario 1: '1' (FG1: '2030 AM Effective Base', Plan 1: 'Network Control Plan 1 (no Peds)')

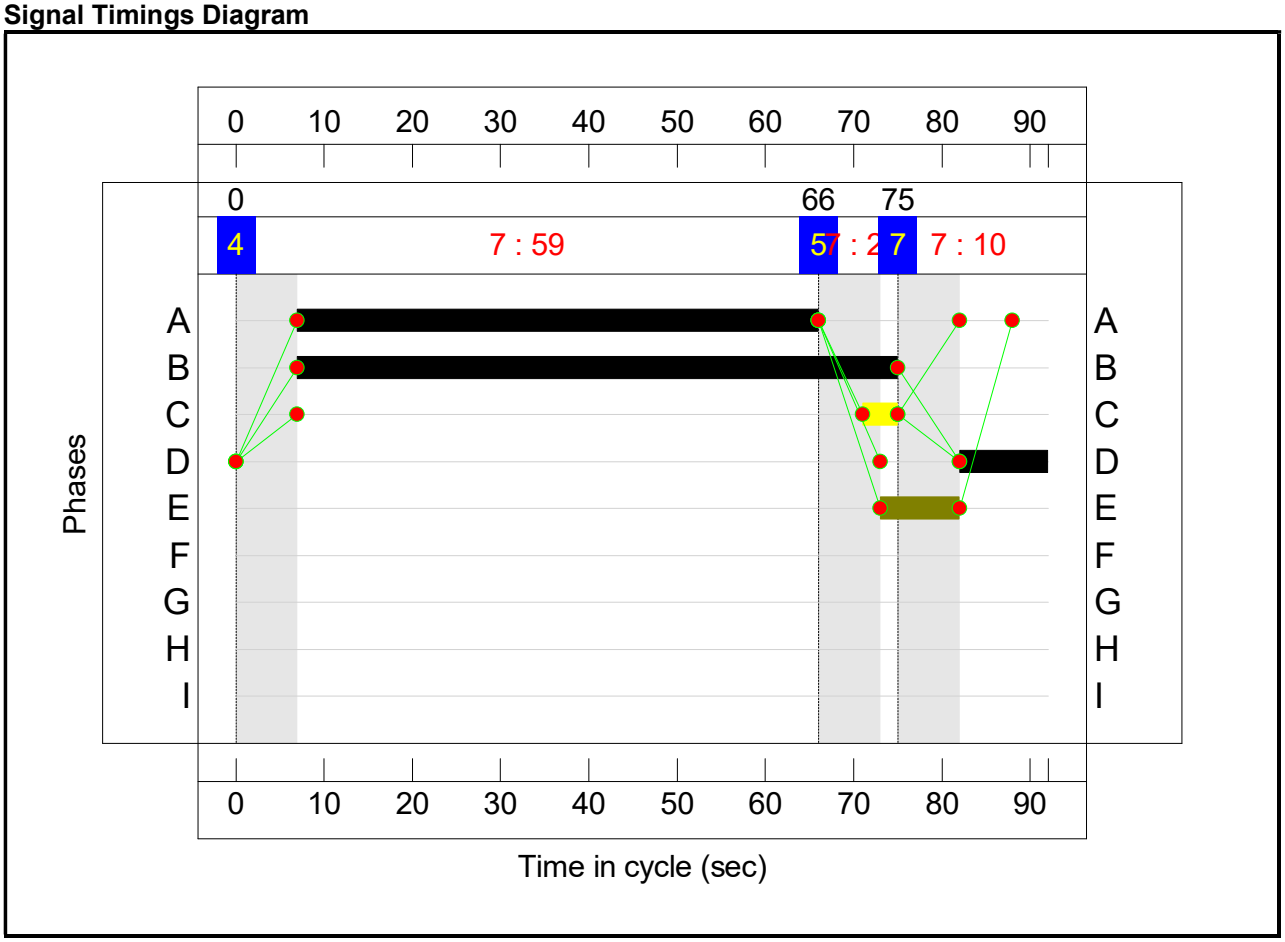
Stage Sequence Diagram



Stage Timings

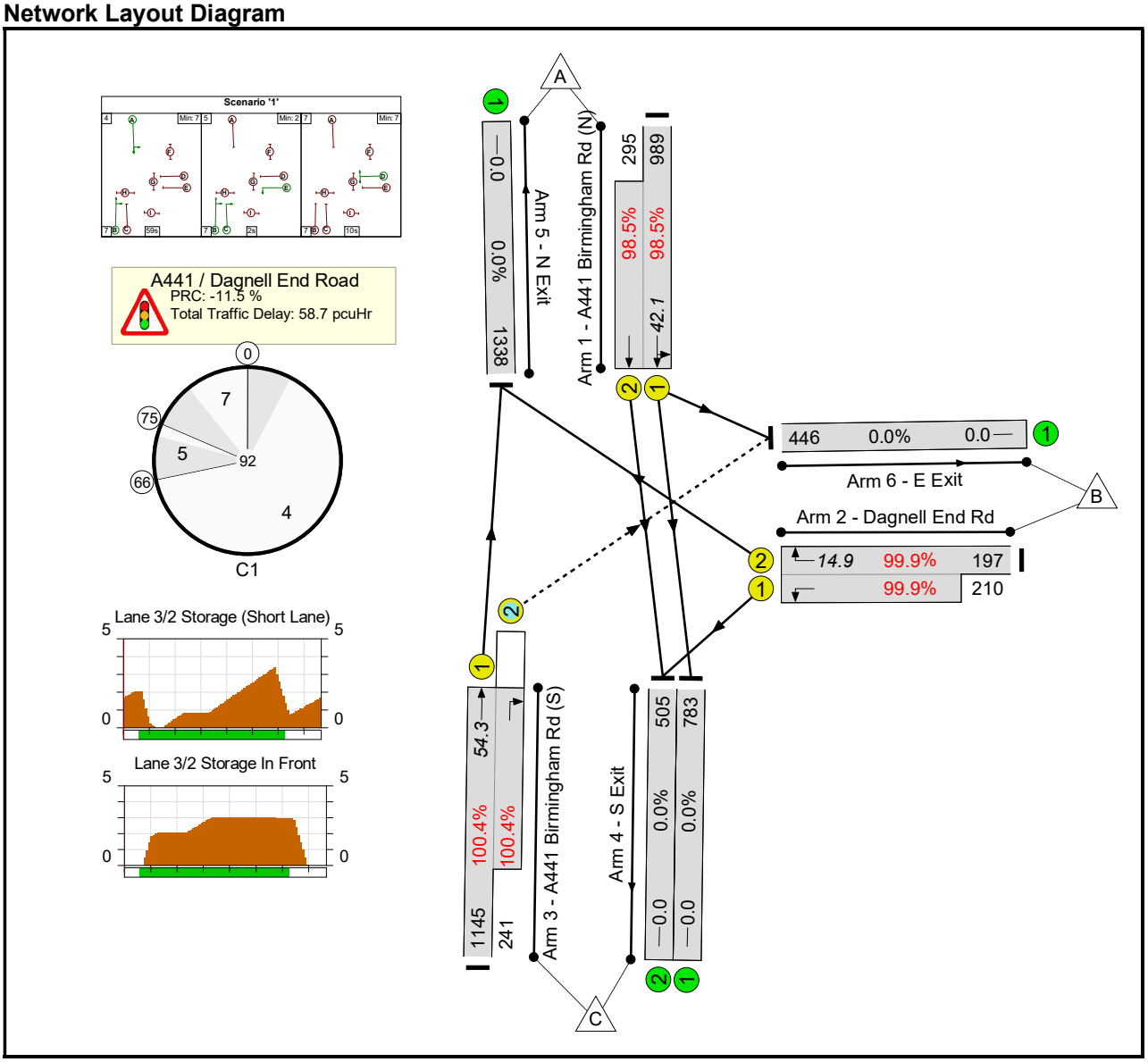
Stage	4	5	7
Duration	59	2	10
Change Point	0	66	75

Signal Timings Diagram



Full Input Data And Results

Network Layout Diagram



Full Input Data And Results

Network Results

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network: A441 / Dagnell End Road	-	-	**N/A**	-	-		-	-	-	-	-	-	**100.4%**
A441 / Dagnell End Road	-	-	**N/A**	-	-		-	-	-	-	-	-	**100.4%**
1/1+1/2	A441 Birmingham Rd (N) Ahead Left	U	N/A	N/A	A		1	59	-	1284	1815:1878	1004+299	98.5 : 98.5%
2/2+2/1	Dagnell End Rd Left Right	U	N/A	N/A	D	E	1	10:19	9	407	1650:1852	197+210	99.9 : 99.9%
3/1+3/2	A441 Birmingham Rd (S) Ahead Right	U+O	N/A	N/A	B	C	1	68	4	1386	1726:1679	1141+240	100.4 : 100.4%
4/1	S Exit	U	N/A	N/A	-		-	-	-	783	Inf	Inf	0.0%
4/2	S Exit	U	N/A	N/A	-		-	-	-	505	Inf	Inf	0.0%
5/1	N Exit	U	N/A	N/A	-		-	-	-	1342	Inf	Inf	0.0%
6/1	E Exit	U	N/A	N/A	-		-	-	-	447	Inf	Inf	0.0%

Full Input Data And Results

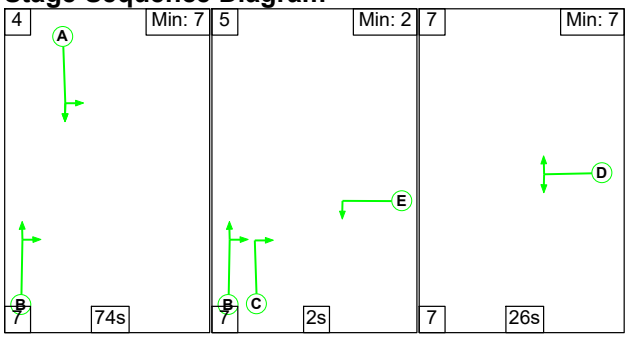
Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network: A441 / Dagnell End Road	**-**	**-**	**1**	**128**	**111**	**13.2**	**43.7**	**1.8**	**58.7**	**-**	**-**	**-**	**-**
A441 / Dagnell End Road	**-**	**-**	**1**	**128**	**111**	**13.2**	**43.7**	**1.8**	**58.7**	**-**	**-**	**-**	**-**
1/1+1/2	1284	1284	-	-	-	4.7	13.7	-	18.4 (14.4+4.1)	51.7 (52.3:49.5)	28.4	13.7	42.1
2/2+2/1	407	407	-	-	-	4.1	9.9	-	14.0 (7.0+7.0)	123.9 (128.4:119.7)	5.0	9.9	14.9
3/1+3/2	1386	1381	1	128	111	4.4	20.0	1.8	26.2 (19.9+6.3)	68.1 (62.4:94.8)	34.3	20.0	54.3
4/1	783	783	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
4/2	505	505	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
5/1	1338	1338	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	446	446	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0

C1 PRC for Signalled Lanes (%): -11.5 Total Delay for Signalled Lanes (pcuHr): 58.65 Cycle Time (s): 92
PRC Over All Lanes (%): -11.5 Total Delay Over All Lanes(pcuHr): 58.65

Full Input Data And Results

Scenario 2: '2' (FG2: '2030 PM Effective Base', Plan 1: 'Network Control Plan 1 (no Peds)')

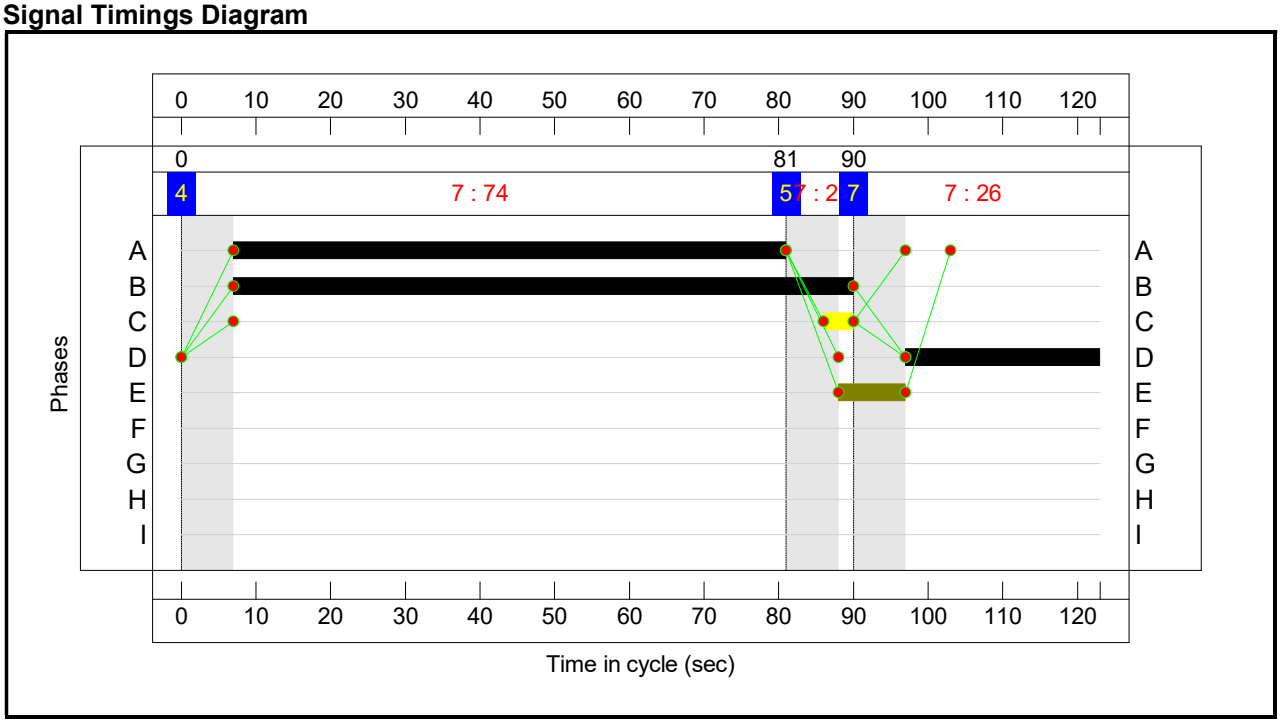
Stage Sequence Diagram



Stage Timings

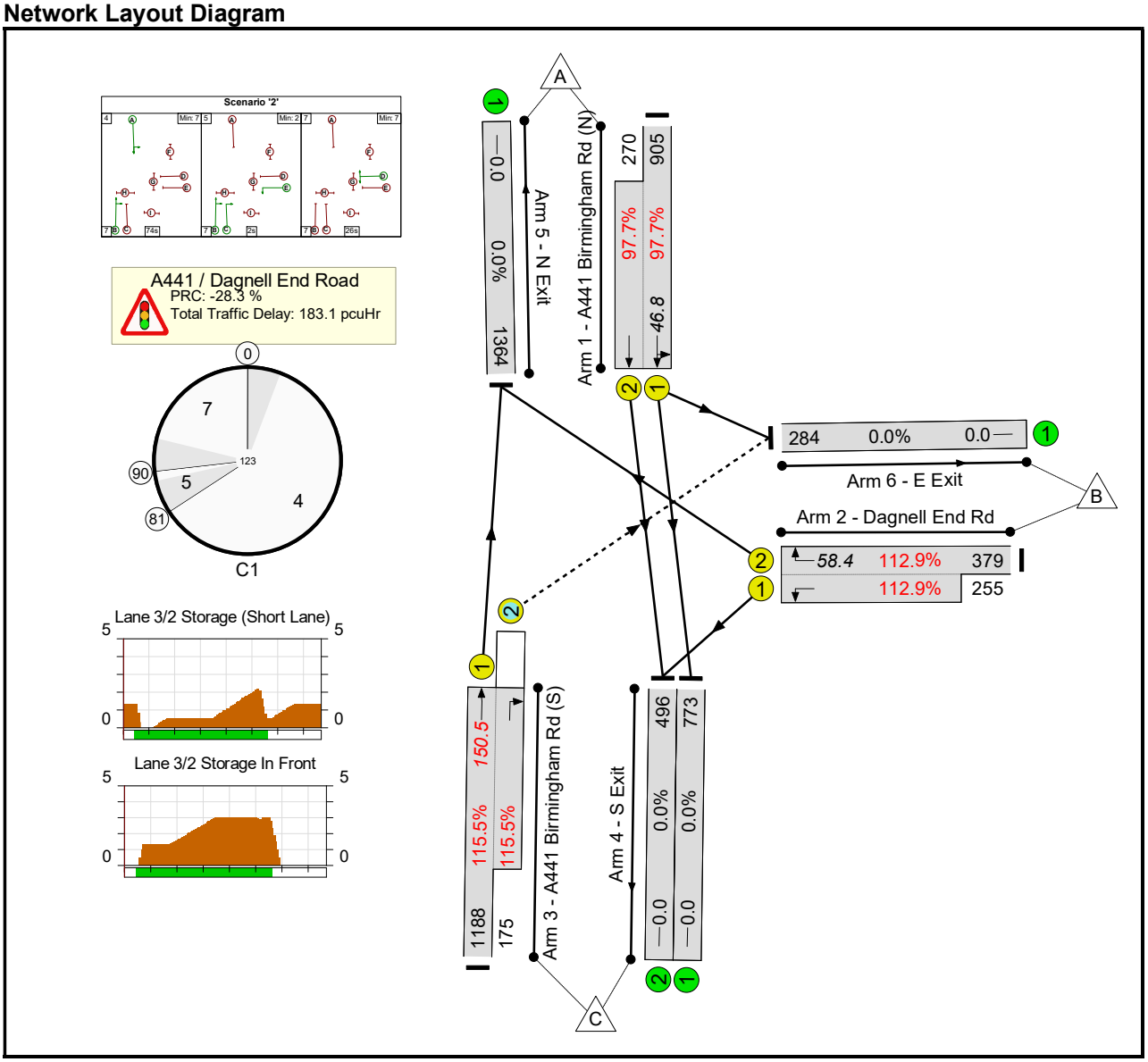
Stage	4	5	7
Duration	74	2	26
Change Point	0	81	90

Signal Timings Diagram



Full Input Data And Results

Network Layout Diagram



Full Input Data And Results

Network Results

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network: A441 / Dagnell End Road	-	-	**N/A**	-	-		-	-	-	-	-	-	**115.5%**
A441 / Dagnell End Road	-	-	**N/A**	-	-		-	-	-	-	-	-	**115.5%**
1/1+1/2	A441 Birmingham Rd (N) Ahead Left	U	N/A	N/A	A		1	74	-	1175	1828:1878	926+276	97.7 : 97.7%
2/2+2/1	Dagnell End Rd Left Right	U	N/A	N/A	D	E	1	26:35	9	634	1650:1852	336+226	112.9 : 112.9%
3/1+3/2	A441 Birmingham Rd (S) Ahead Right	U+O	N/A	N/A	B	C	1	83	4	1363	1641:1800	1029+152	115.5 : 115.5%
4/1	S Exit	U	N/A	N/A	-		-	-	-	773	Inf	Inf	0.0%
4/2	S Exit	U	N/A	N/A	-		-	-	-	525	Inf	Inf	0.0%
5/1	N Exit	U	N/A	N/A	-		-	-	-	1567	Inf	Inf	0.0%
6/1	E Exit	U	N/A	N/A	-		-	-	-	307	Inf	Inf	0.0%

Full Input Data And Results

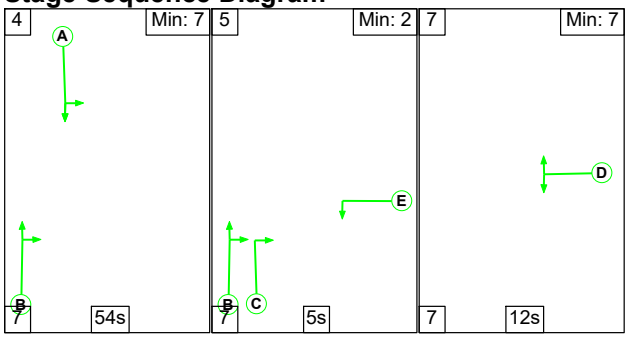
Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network: A441 / Dagnell End Road	**-**	**-**	**6**	**102**	**43**	**34.9**	**146.8**	**1.4**	**183.1**	**-**	**-**	**-**	**-**
A441 / Dagnell End Road	**-**	**-**	**6**	**102**	**43**	**34.9**	**146.8**	**1.4**	**183.1**	**-**	**-**	**-**	**-**
1/1+1/2	1175	1175	-	-	-	6.8	11.6	-	18.4 (14.3+4.1)	56.2 (56.8:54.4)	35.2	11.6	46.8
2/2+2/1	634	561	-	-	-	11.1	40.2	-	51.3 (31.3+20.1)	291.4 (297.0:283.1)	18.2	40.2	58.4
3/1+3/2	1363	1180	6	102	43	17.0	94.9	1.4	113.4 (97.5+15.9)	299.6 (295.5:327.8)	55.5	94.9	150.5
4/1	773	773	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
4/2	496	496	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
5/1	1364	1364	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	284	284	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0

C1 PRC for Signalled Lanes (%): -28.3 Total Delay for Signalled Lanes (pcuHr): 183.12 Cycle Time (s): 123
PRC Over All Lanes (%): -28.3 Total Delay Over All Lanes(pcuHr): 183.12

Full Input Data And Results

Scenario 3: '3' (FG3: '2030 AM Effective Base + Dev', Plan 1: 'Network Control Plan 1 (no Peds)')

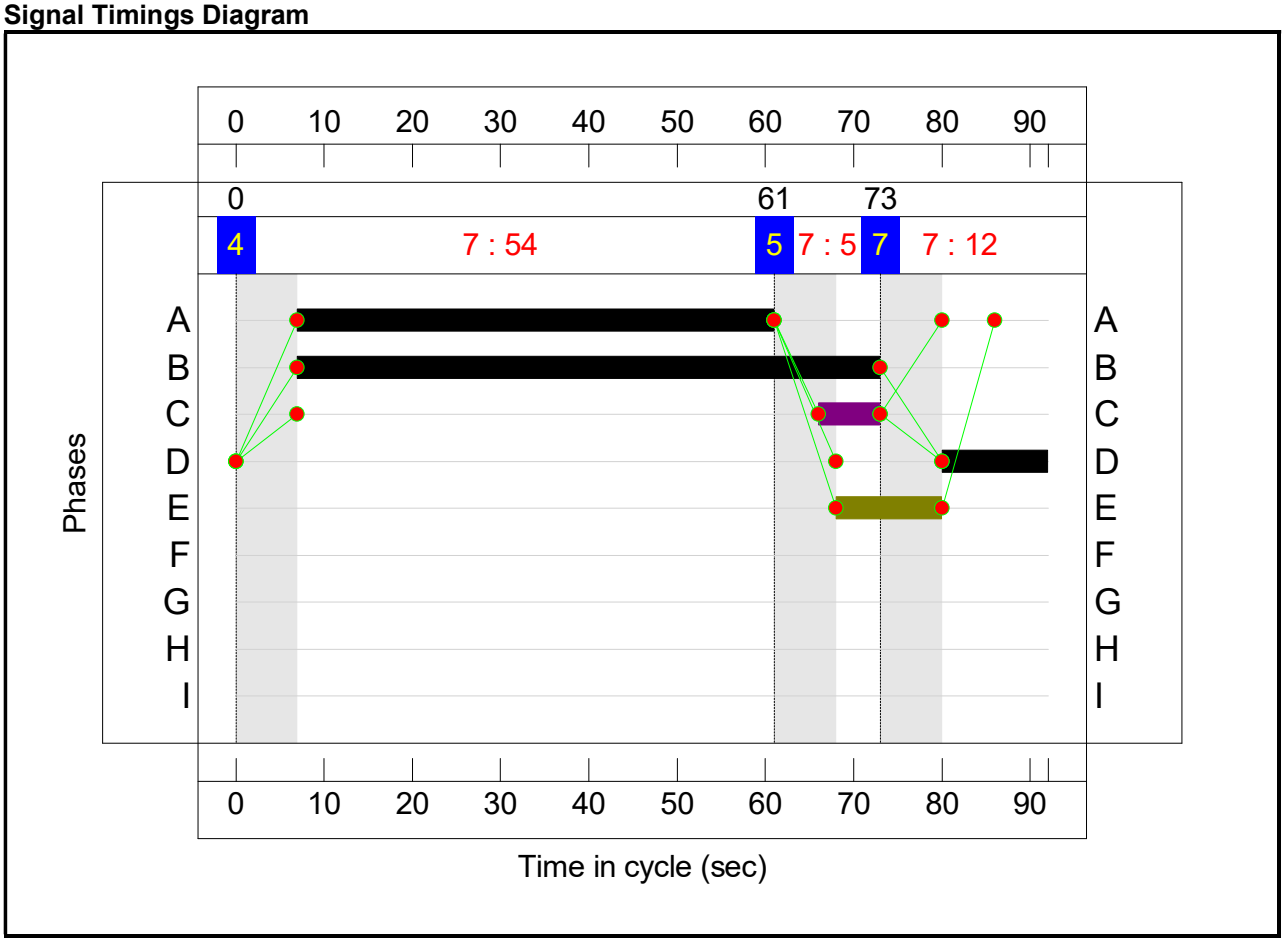
Stage Sequence Diagram



Stage Timings

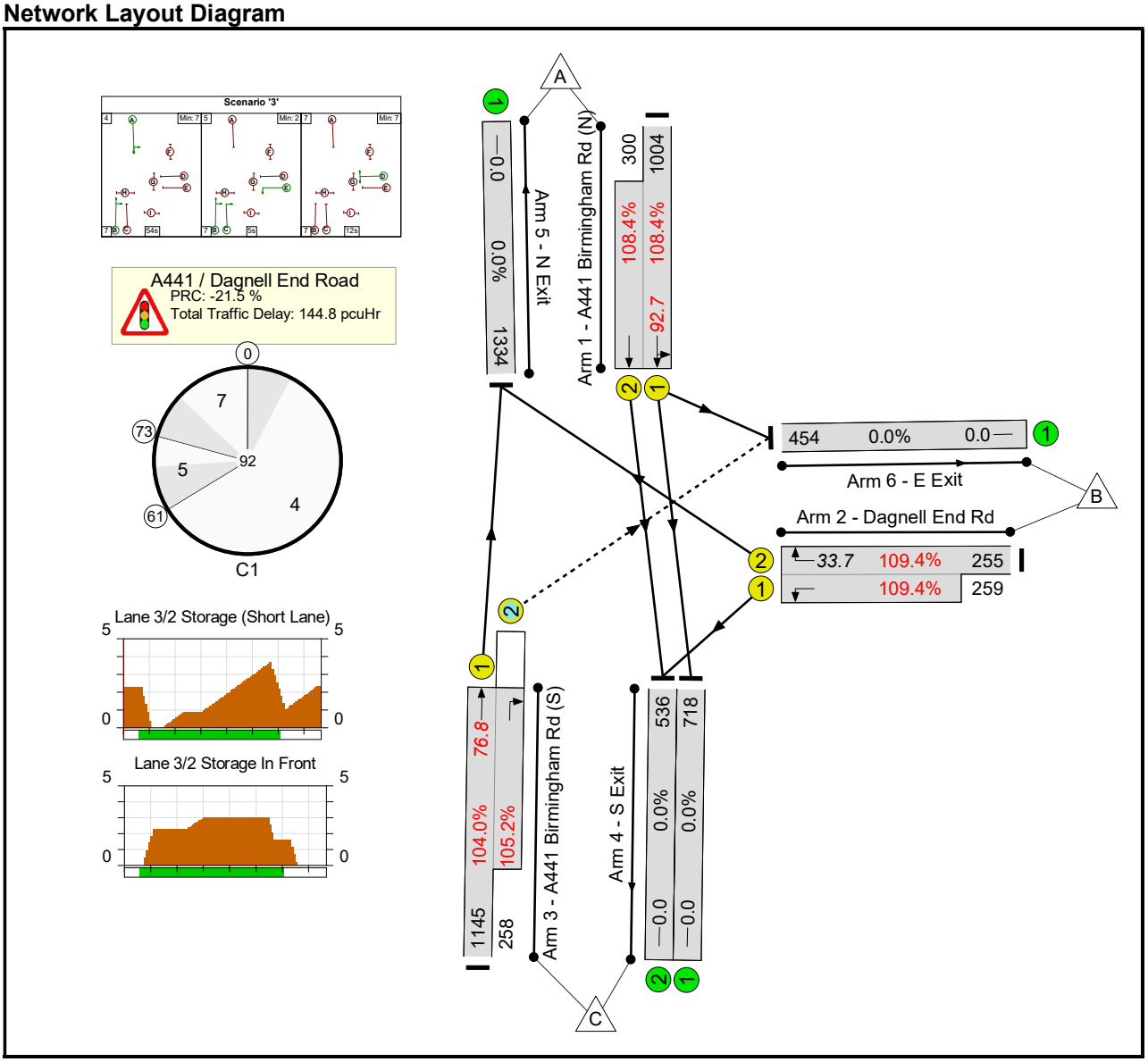
Stage	4	5	7
Duration	54	5	12
Change Point	0	61	73

Signal Timings Diagram



Full Input Data And Results

Network Layout Diagram



Full Input Data And Results

Network Results

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network: A441 / Dagnell End Road	-	-	**N/A**	-	-		-	-	-	-	-	-	**109.4%**
A441 / Dagnell End Road	-	-	**N/A**	-	-		-	-	-	-	-	-	**109.4%**
1/1+1/2	A441 Birmingham Rd (N) Ahead Left	U	N/A	N/A	A		1	54	-	1304	1812:1878	926+277	108.4 : 108.4%
2/2+2/1	Dagnell End Rd Left Right	U	N/A	N/A	D	E	1	12:24	12	514	1650:1852	233+237	109.4 : 109.4%
3/1+3/2	A441 Birmingham Rd (S) Ahead Right	U+O	N/A	N/A	B	C	1	66	7	1403	1726:1679	1101+245	104.0 : 105.2%
4/1	S Exit	U	N/A	N/A	-		-	-	-	778	Inf	Inf	0.0%
4/2	S Exit	U	N/A	N/A	-		-	-	-	559	Inf	Inf	0.0%
5/1	N Exit	U	N/A	N/A	-		-	-	-	1400	Inf	Inf	0.0%
6/1	E Exit	U	N/A	N/A	-		-	-	-	484	Inf	Inf	0.0%

Full Input Data And Results

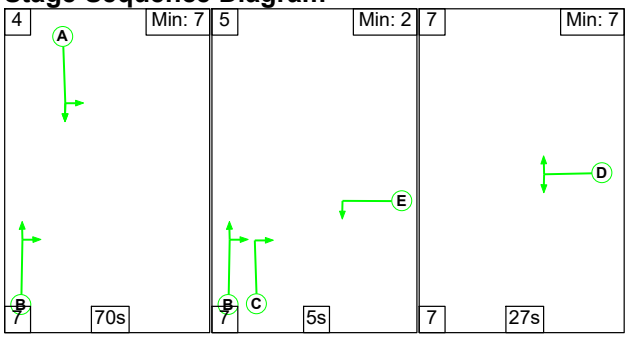
Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network: A441 / Dagnell End Road	**-**	**-**	**0**	**183**	**63**	**22.3**	**120.8**	**1.6**	**144.8**	**-**	**-**	**-**	**-**
A441 / Dagnell End Road	**-**	**-**	**0**	**183**	**63**	**22.3**	**120.8**	**1.6**	**144.8**	**-**	**-**	**-**	**-**
1/1+1/2	1304	1203	-	-	-	10.1	56.2	-	66.3 (51.2+15.1)	182.9 (183.6:180.6)	36.5	56.2	92.7
2/2+2/1	514	492	-	-	-	5.4	26.8	-	32.2 (16.7+15.6)	225.8 (235.5:216.2)	6.9	26.8	33.7
3/1+3/2	1403	1346	0	183	63	6.9	37.8	1.6	46.3 (34.9+11.4)	118.8 (109.8:159.0)	39.0	37.8	76.8
4/1	718	718	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
4/2	536	536	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
5/1	1334	1334	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	454	454	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0

C1 PRC for Signalled Lanes (%): -21.5 Total Delay for Signalled Lanes (pcuHr): 144.80 Cycle Time (s): 92
PRC Over All Lanes (%): -21.5 Total Delay Over All Lanes(pcuHr): 144.80

Full Input Data And Results

Scenario 4: '4' (FG4: '2030 PM Effective Base + Dev', Plan 1: 'Network Control Plan 1 (no Peds)')

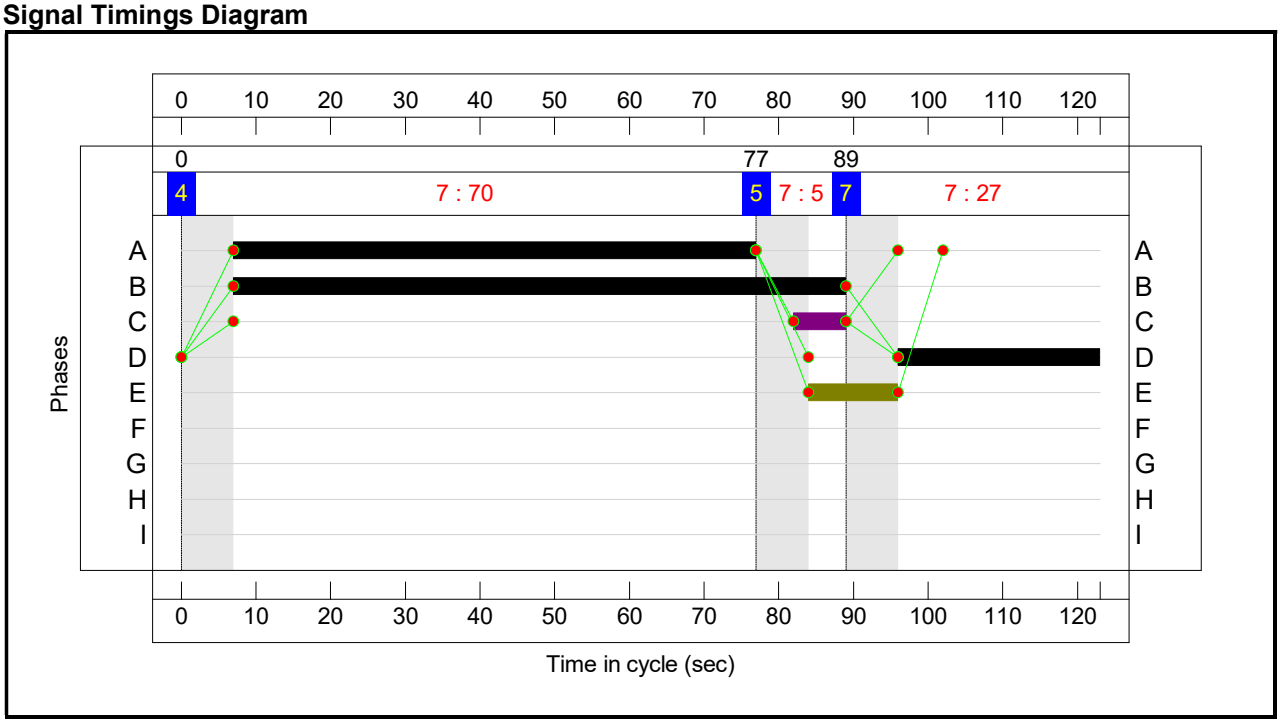
Stage Sequence Diagram



Stage Timings

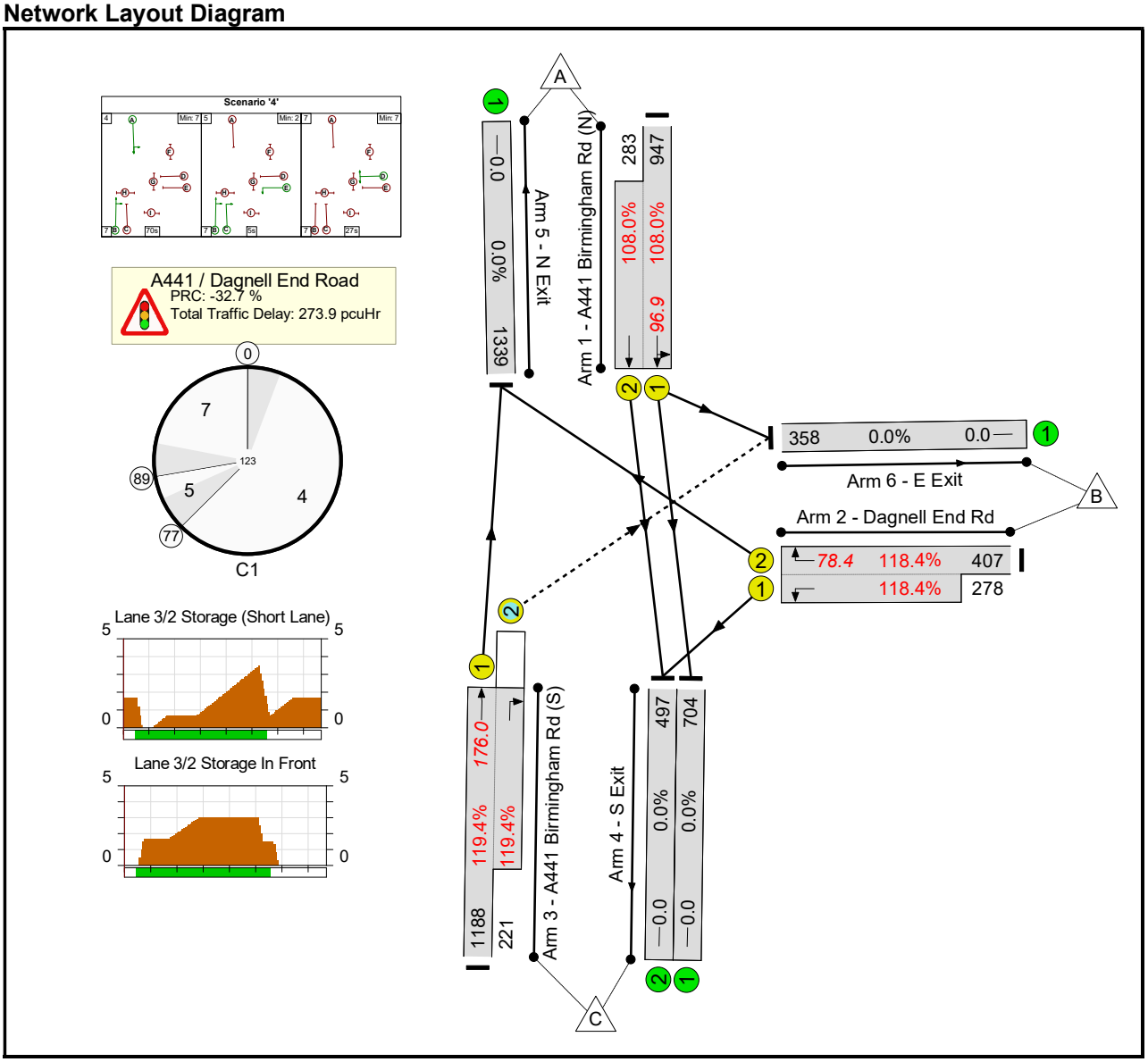
Stage	4	5	7
Duration	70	5	27
Change Point	0	77	89

Signal Timings Diagram



Full Input Data And Results

Network Layout Diagram



Full Input Data And Results

Network Results

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network: A441 / Dagnell End Road	-	-	**N/A**	-	-		-	-	-	-	-	-	**119.4%**
A441 / Dagnell End Road	-	-	**N/A**	-	-		-	-	-	-	-	-	**119.4%**
1/1+1/2	A441 Birmingham Rd (N) Ahead Left	U	N/A	N/A	A		1	70	-	1230	1817:1878	877+262	108.0 : 108.0%
2/2+2/1	Dagnell End Rd Left Right	U	N/A	N/A	D	E	1	27:39	12	685	1650:1852	344+235	118.4 : 118.4%
3/1+3/2	A441 Birmingham Rd (S) Ahead Right	U+O	N/A	N/A	B	C	1	82	7	1409	1641:1800	995+185	119.4 : 119.4%
4/1	S Exit	U	N/A	N/A	-		-	-	-	760	Inf	Inf	0.0%
4/2	S Exit	U	N/A	N/A	-		-	-	-	561	Inf	Inf	0.0%
5/1	N Exit	U	N/A	N/A	-		-	-	-	1595	Inf	Inf	0.0%
6/1	E Exit	U	N/A	N/A	-		-	-	-	408	Inf	Inf	0.0%

Full Input Data And Results

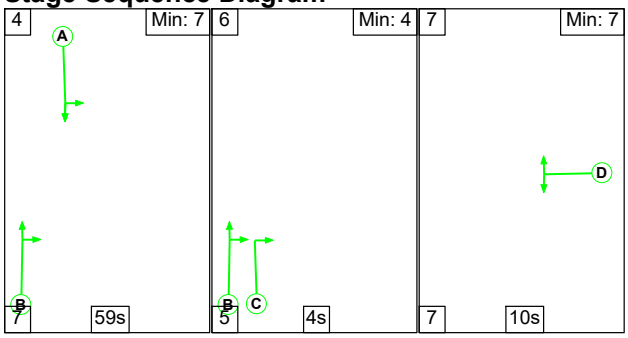
Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network: A441 / Dagnell End Road	**-**	**-**	**0**	**146**	**39**	**47.3**	**225.2**	**1.5**	**273.9**	**-**	**-**	**-**	**-**
A441 / Dagnell End Road	**-**	**-**	**0**	**146**	**39**	**47.3**	**225.2**	**1.5**	**273.9**	**-**	**-**	**-**	**-**
1/1+1/2	1230	1139	-	-	-	13.2	51.4	-	64.6 (49.9+14.7)	189.0 (189.6:187.1)	45.6	51.4	96.9
2/2+2/1	685	578	-	-	-	13.9	56.3	-	70.2 (42.4+27.8)	368.9 (374.8:360.3)	22.0	56.3	78.4
3/1+3/2	1409	1180	0	146	39	20.2	117.5	1.5	139.2 (115.8+23.4)	355.6 (350.9:380.8)	58.5	117.5	176.0
4/1	704	704	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
4/2	497	497	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
5/1	1339	1339	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	358	358	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0

C1 PRC for Signalled Lanes (%): -32.7 Total Delay for Signalled Lanes (pcuHr): 273.92 Cycle Time (s): 123
PRC Over All Lanes (%): -32.7 Total Delay Over All Lanes(pcuHr): 273.92

Full Input Data And Results

Scenario 5: '5' (FG1: '2030 AM Effective Base', Plan 2: 'Network Control Plan 2 (no Peds, no left filter)')

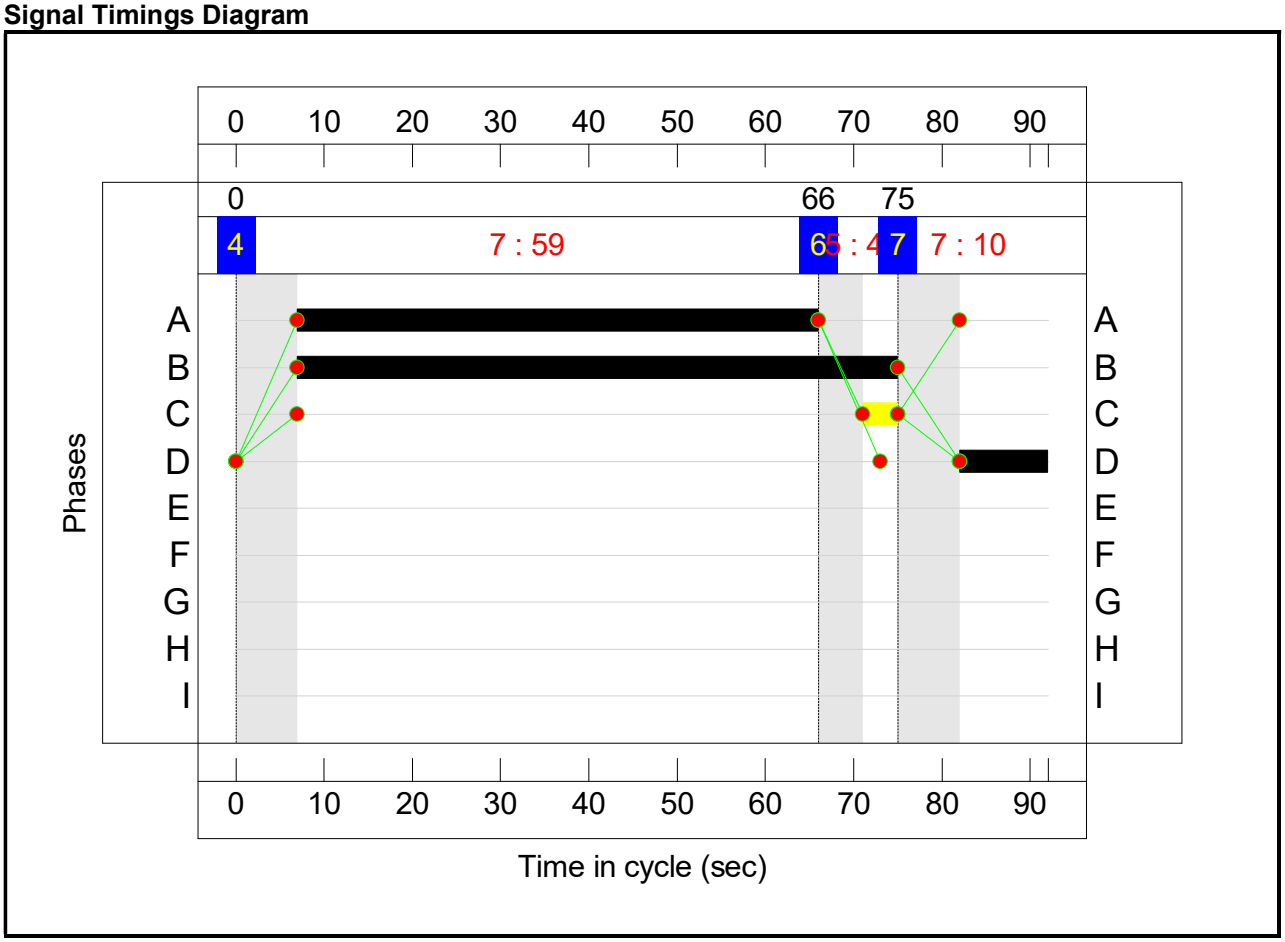
Stage Sequence Diagram



Stage Timings

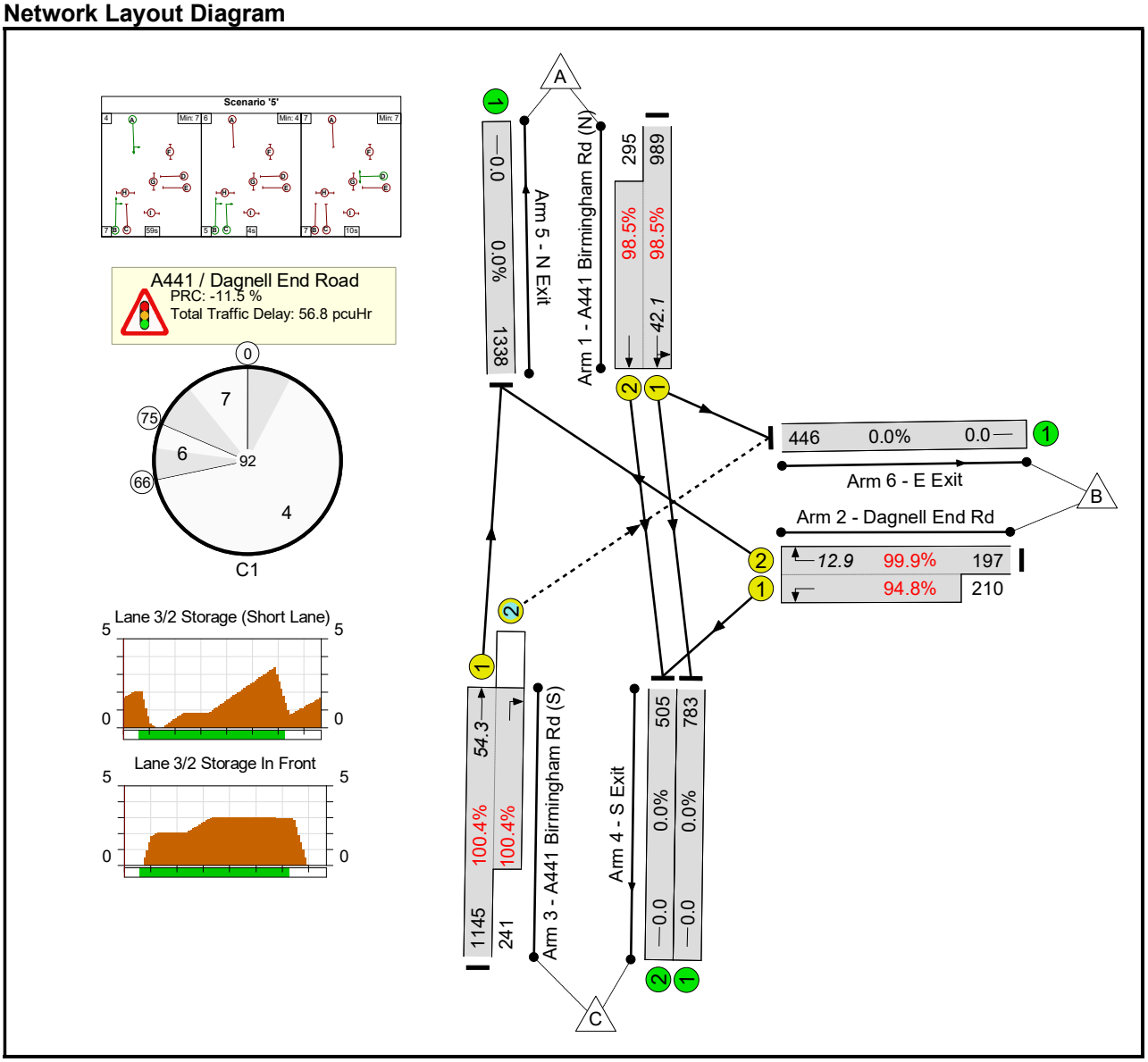
Stage	4	6	7
Duration	59	4	10
Change Point	0	66	75

Signal Timings Diagram



Full Input Data And Results

Network Layout Diagram



Full Input Data And Results

Network Results

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network: A441 / Dagnell End Road	-	-	**N/A**	-	-		-	-	-	-	-	-	**100.4%**
A441 / Dagnell End Road	-	-	**N/A**	-	-		-	-	-	-	-	-	**100.4%**
1/1+1/2	A441 Birmingham Rd (N) Ahead Left	U	N/A	N/A	A		1	59	-	1284	1815:1878	1004+299	98.5 : 98.5%
2/2+2/1	Dagnell End Rd Left Right	U	N/A	N/A	D	E	1	10	0	407	1650:1852	197+221	99.9 : 94.8%
3/1+3/2	A441 Birmingham Rd (S) Ahead Right	U+O	N/A	N/A	B	C	1	68	4	1386	1726:1679	1141+240	100.4 : 100.4%
4/1	S Exit	U	N/A	N/A	-		-	-	-	783	Inf	Inf	0.0%
4/2	S Exit	U	N/A	N/A	-		-	-	-	505	Inf	Inf	0.0%
5/1	N Exit	U	N/A	N/A	-		-	-	-	1342	Inf	Inf	0.0%
6/1	E Exit	U	N/A	N/A	-		-	-	-	447	Inf	Inf	0.0%

Full Input Data And Results

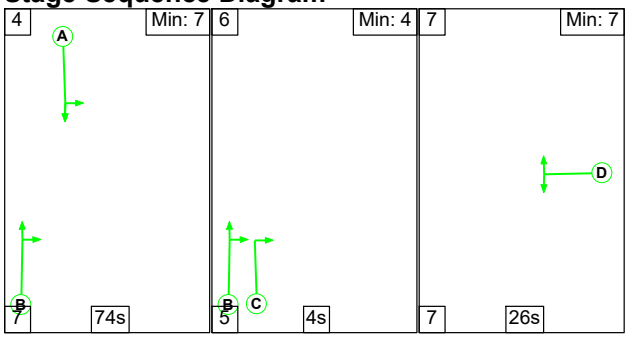
Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network: A441 / Dagnell End Road	**-**	**-**	**1**	**128**	**111**	**13.7**	**41.3**	**1.8**	**56.8**	**-**	**-**	**-**	**-**
A441 / Dagnell End Road	**-**	**-**	**1**	**128**	**111**	**13.7**	**41.3**	**1.8**	**56.8**	**-**	**-**	**-**	**-**
1/1+1/2	1284	1284	-	-	-	4.7	13.7	-	18.4 (14.4+4.1)	51.7 (52.3:49.5)	28.4	13.7	42.1
2/2+2/1	407	407	-	-	-	4.6	7.6	-	12.1 (5.9+6.3)	107.4 (107.5:107.2)	5.3	7.6	12.9
3/1+3/2	1386	1381	1	128	111	4.4	20.0	1.8	26.2 (19.9+6.3)	68.1 (62.4:94.8)	34.3	20.0	54.3
4/1	783	783	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
4/2	505	505	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
5/1	1338	1338	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	446	446	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0

C1 PRC for Signalled Lanes (%): -11.5 Total Delay for Signalled Lanes (pcuHr): 56.78 Cycle Time (s): 92
PRC Over All Lanes (%): -11.5 Total Delay Over All Lanes(pcuHr): 56.78

Full Input Data And Results

Scenario 6: '6' (FG2: '2030 PM Effective Base', Plan 2: 'Network Control Plan 2 (no Peds, no left filter)')

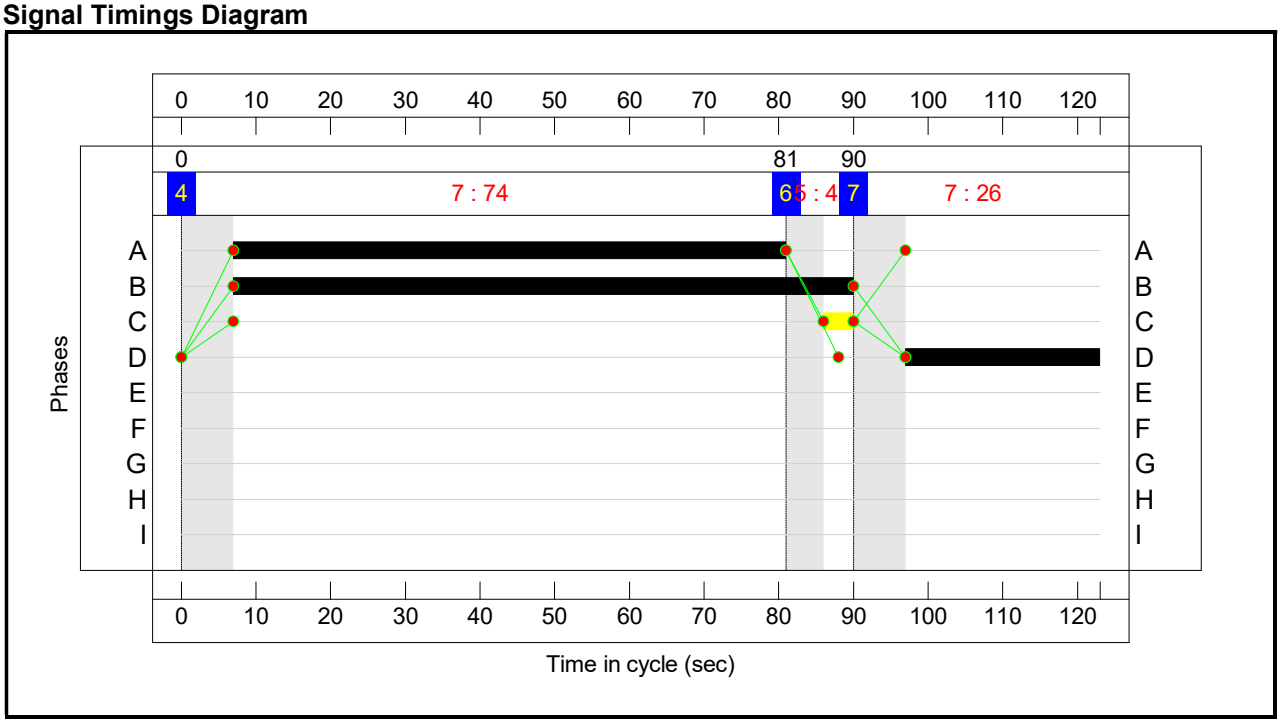
Stage Sequence Diagram



Stage Timings

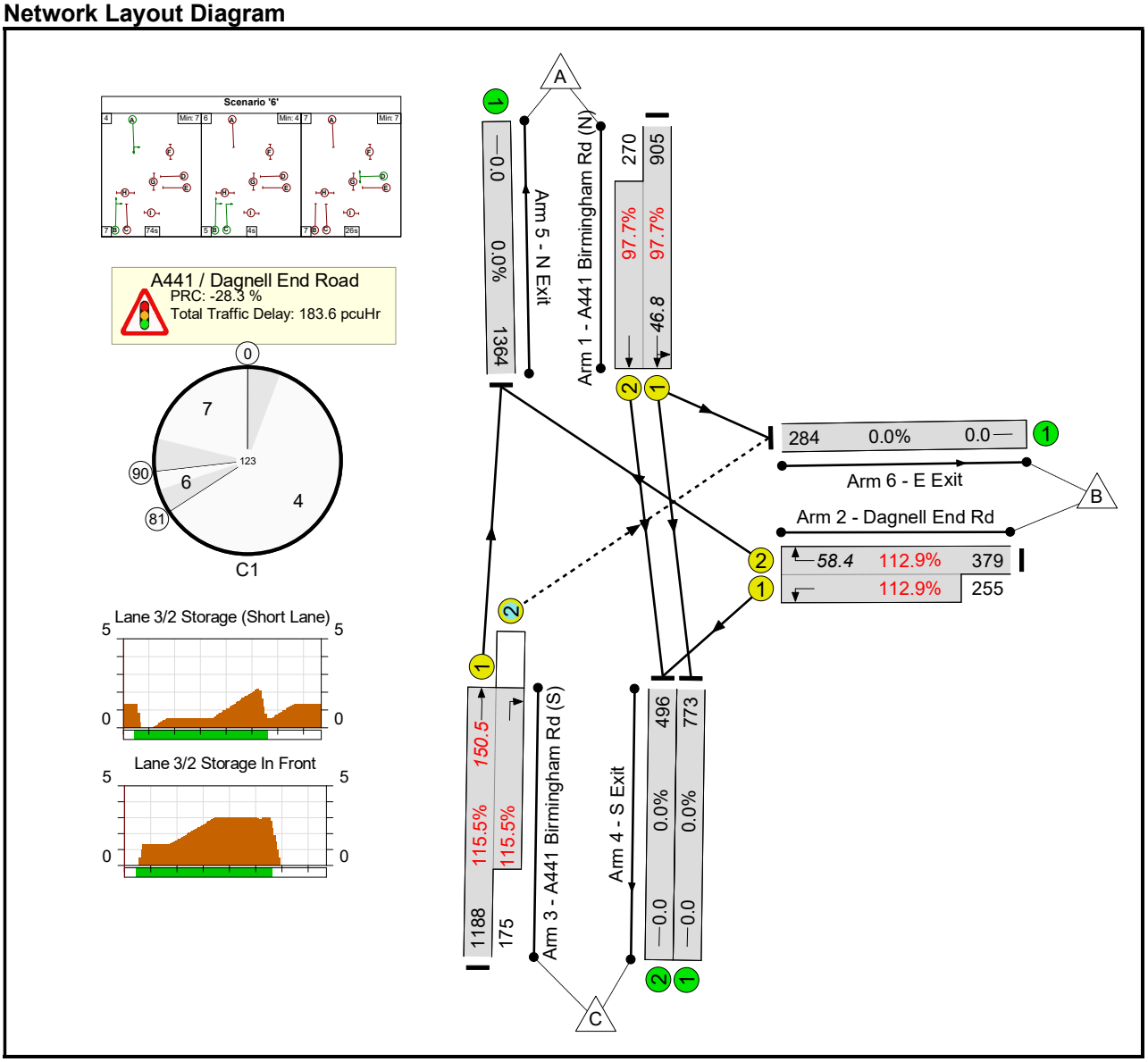
Stage	4	6	7
Duration	74	4	26
Change Point	0	81	90

Signal Timings Diagram



Full Input Data And Results

Network Layout Diagram



Full Input Data And Results

Network Results

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network: A441 / Dagnell End Road	-	-	**N/A**	-	-		-	-	-	-	-	-	**115.5%**
A441 / Dagnell End Road	-	-	**N/A**	-	-		-	-	-	-	-	-	**115.5%**
1/1+1/2	A441 Birmingham Rd (N) Ahead Left	U	N/A	N/A	A		1	74	-	1175	1828:1878	926+276	97.7 : 97.7%
2/2+2/1	Dagnell End Rd Left Right	U	N/A	N/A	D	E	1	26	0	634	1650:1852	336+226	112.9 : 112.9%
3/1+3/2	A441 Birmingham Rd (S) Ahead Right	U+O	N/A	N/A	B	C	1	83	4	1363	1641:1800	1029+152	115.5 : 115.5%
4/1	S Exit	U	N/A	N/A	-		-	-	-	773	Inf	Inf	0.0%
4/2	S Exit	U	N/A	N/A	-		-	-	-	525	Inf	Inf	0.0%
5/1	N Exit	U	N/A	N/A	-		-	-	-	1567	Inf	Inf	0.0%
6/1	E Exit	U	N/A	N/A	-		-	-	-	307	Inf	Inf	0.0%

Full Input Data And Results

Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network: A441 / Dagnell End Road	**-**	**-**	**6**	**102**	**43**	**35.3**	**146.8**	**1.4**	**183.6**	**-**	**-**	**-**	**-**
A441 / Dagnell End Road	**-**	**-**	**6**	**102**	**43**	**35.3**	**146.8**	**1.4**	**183.6**	**-**	**-**	**-**	**-**
1/1+1/2	1175	1175	-	-	-	6.8	11.6	-	18.4 (14.3+4.1)	56.2 (56.8:54.4)	35.2	11.6	46.8
2/2+2/1	634	561	-	-	-	11.5	40.2	-	51.8 (31.3+20.5)	293.9 (297.0:289.2)	18.2	40.2	58.4
3/1+3/2	1363	1180	6	102	43	17.0	94.9	1.4	113.4 (97.5+15.9)	299.6 (295.5:327.8)	55.5	94.9	150.5
4/1	773	773	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
4/2	496	496	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
5/1	1364	1364	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	284	284	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0

C1

PRC for Signalled Lanes (%): -28.3
PRC Over All Lanes (%): -28.3

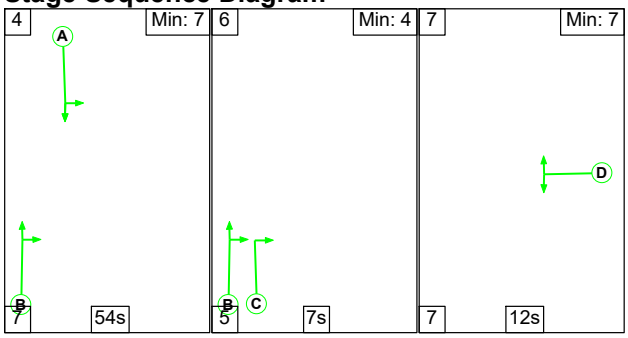
Total Delay for Signalled Lanes (pcuHr): 183.55
Total Delay Over All Lanes(pcuHr): 183.55

Cycle Time (s): 123

Full Input Data And Results

Scenario 7: '7' (FG3: '2030 AM Effective Base + Dev', Plan 2: 'Network Control Plan 2 (no Peds, no left filter)')

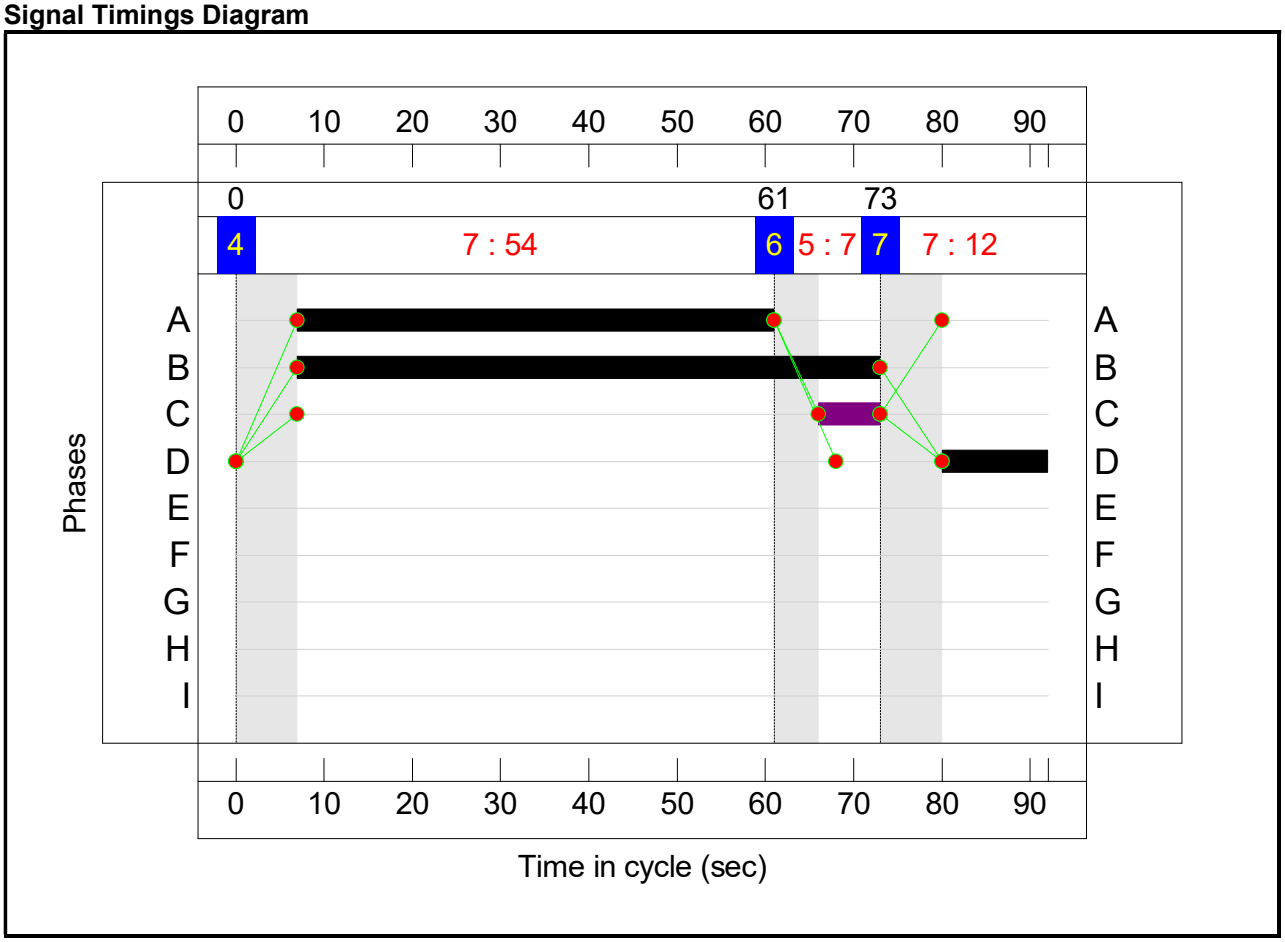
Stage Sequence Diagram



Stage Timings

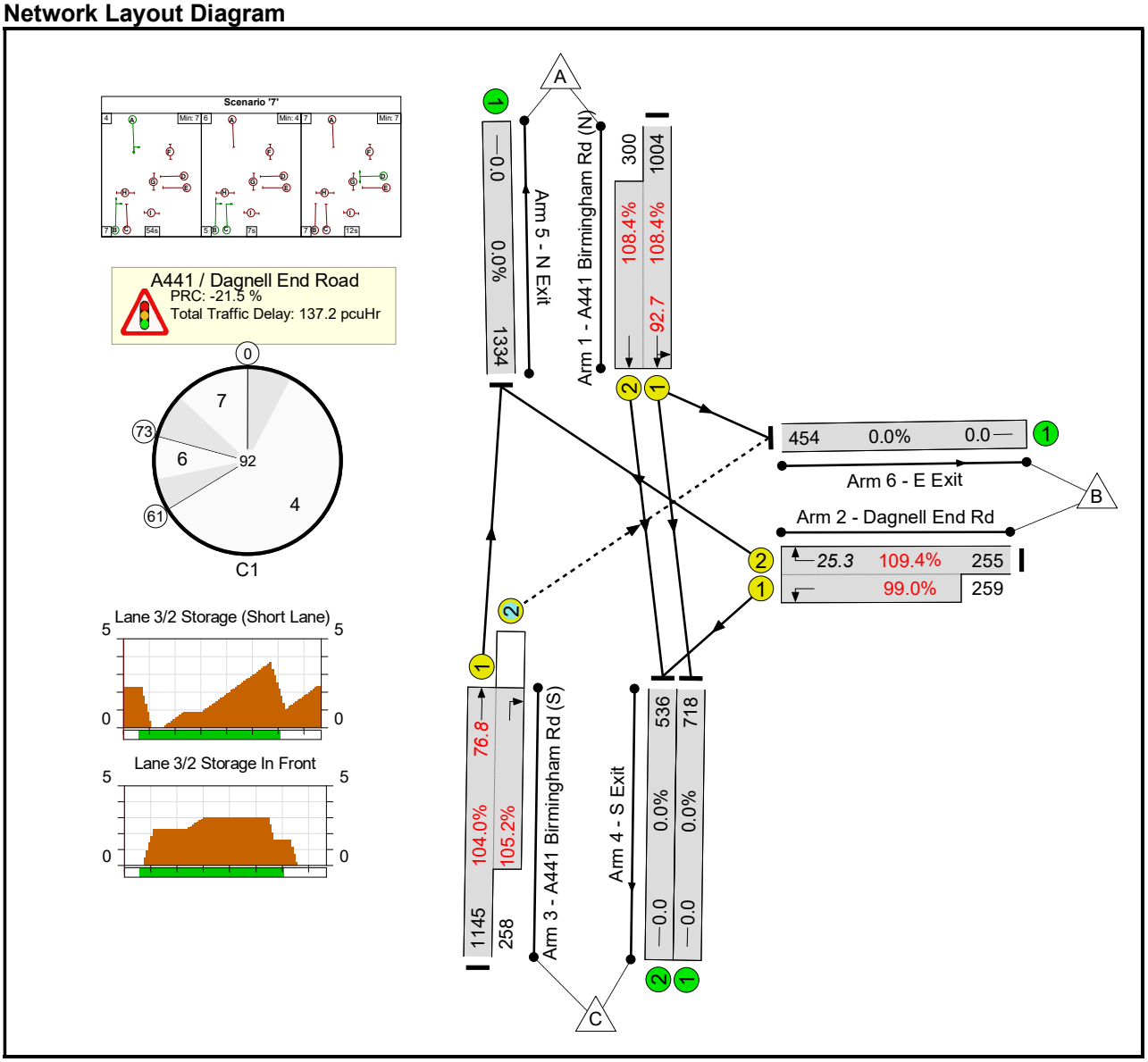
Stage	4	6	7
Duration	54	7	12
Change Point	0	61	73

Signal Timings Diagram



Full Input Data And Results

Network Layout Diagram



Full Input Data And Results

Network Results

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network: A441 / Dagnell End Road	-	-	**N/A**	-	-		-	-	-	-	-	-	**109.4%**
A441 / Dagnell End Road	-	-	**N/A**	-	-		-	-	-	-	-	-	**109.4%**
1/1+1/2	A441 Birmingham Rd (N) Ahead Left	U	N/A	N/A	A		1	54	-	1304	1812:1878	926+277	108.4 : 108.4%
2/2+2/1	Dagnell End Rd Left Right	U	N/A	N/A	D	E	1	12	0	514	1650:1852	233+262	109.4 : 99.0%
3/1+3/2	A441 Birmingham Rd (S) Ahead Right	U+O	N/A	N/A	B	C	1	66	7	1403	1726:1679	1101+245	104.0 : 105.2%
4/1	S Exit	U	N/A	N/A	-		-	-	-	778	Inf	Inf	0.0%
4/2	S Exit	U	N/A	N/A	-		-	-	-	559	Inf	Inf	0.0%
5/1	N Exit	U	N/A	N/A	-		-	-	-	1400	Inf	Inf	0.0%
6/1	E Exit	U	N/A	N/A	-		-	-	-	484	Inf	Inf	0.0%

Full Input Data And Results

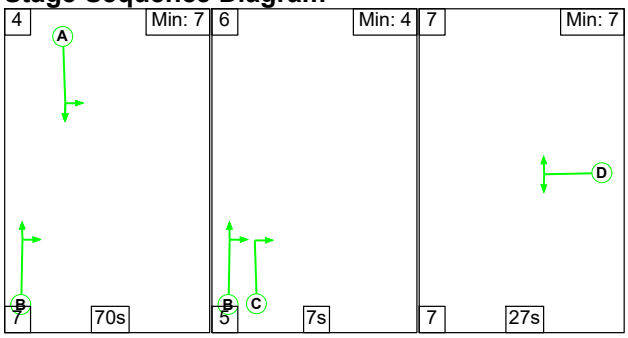
Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network: A441 / Dagnell End Road	**-**	**-**	**0**	**183**	**63**	**23.1**	**112.5**	**1.6**	**137.2**	**-**	**-**	**-**	**-**
A441 / Dagnell End Road	**-**	**-**	**0**	**183**	**63**	**23.1**	**112.5**	**1.6**	**137.2**	**-**	**-**	**-**	**-**
1/1+1/2	1304	1203	-	-	-	10.1	56.2	-	66.3 (51.2+15.1)	182.9 (183.6:180.6)	36.5	56.2	92.7
2/2+2/1	514	492	-	-	-	6.2	18.4	-	24.7 (18.0+6.6)	172.7 (254.6:92.1)	6.9	18.4	25.3
3/1+3/2	1403	1346	0	183	63	6.9	37.8	1.6	46.3 (34.9+11.4)	118.8 (109.8:159.0)	39.0	37.8	76.8
4/1	718	718	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
4/2	536	536	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
5/1	1334	1334	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	454	454	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0

C1 PRC for Signalled Lanes (%): -21.5 Total Delay for Signalled Lanes (pcuHr): 137.22 Cycle Time (s): 92
PRC Over All Lanes (%): -21.5 Total Delay Over All Lanes(pcuHr): 137.22

Full Input Data And Results

Scenario 8: '8' (FG4: '2030 PM Effective Base + Dev', Plan 2: 'Network Control Plan 2 (no Peds, no left filter)')

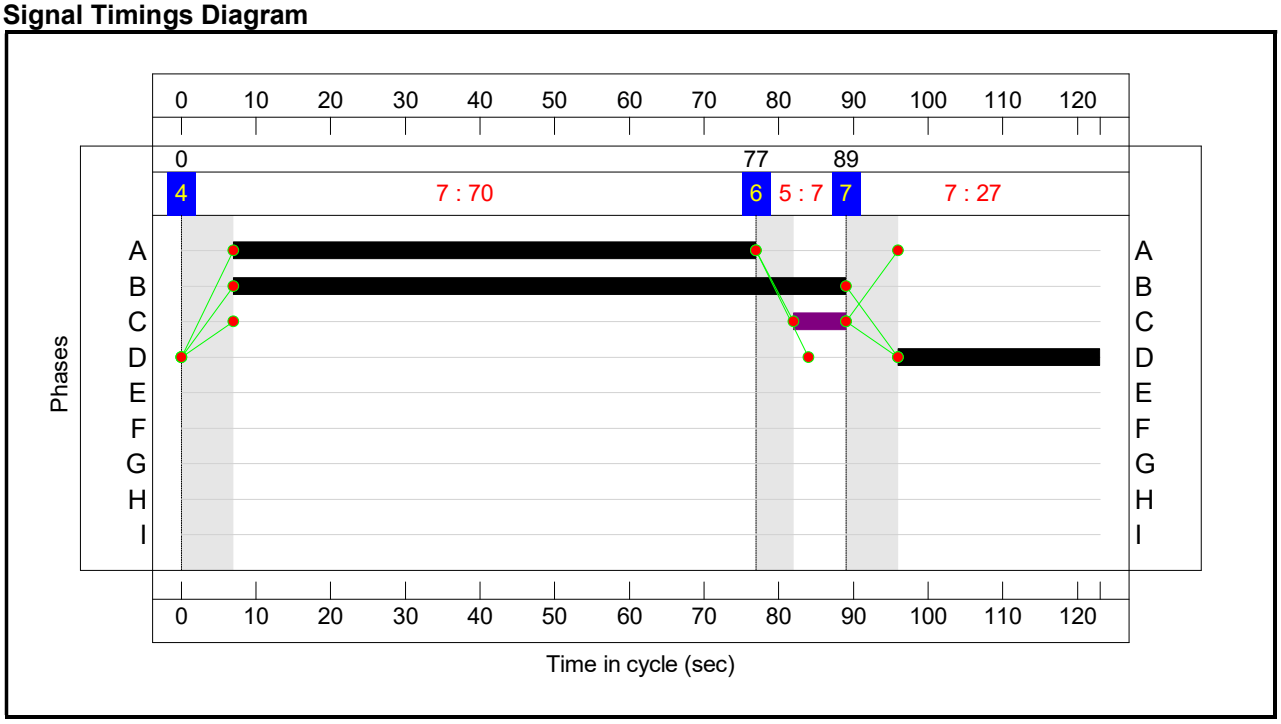
Stage Sequence Diagram



Stage Timings

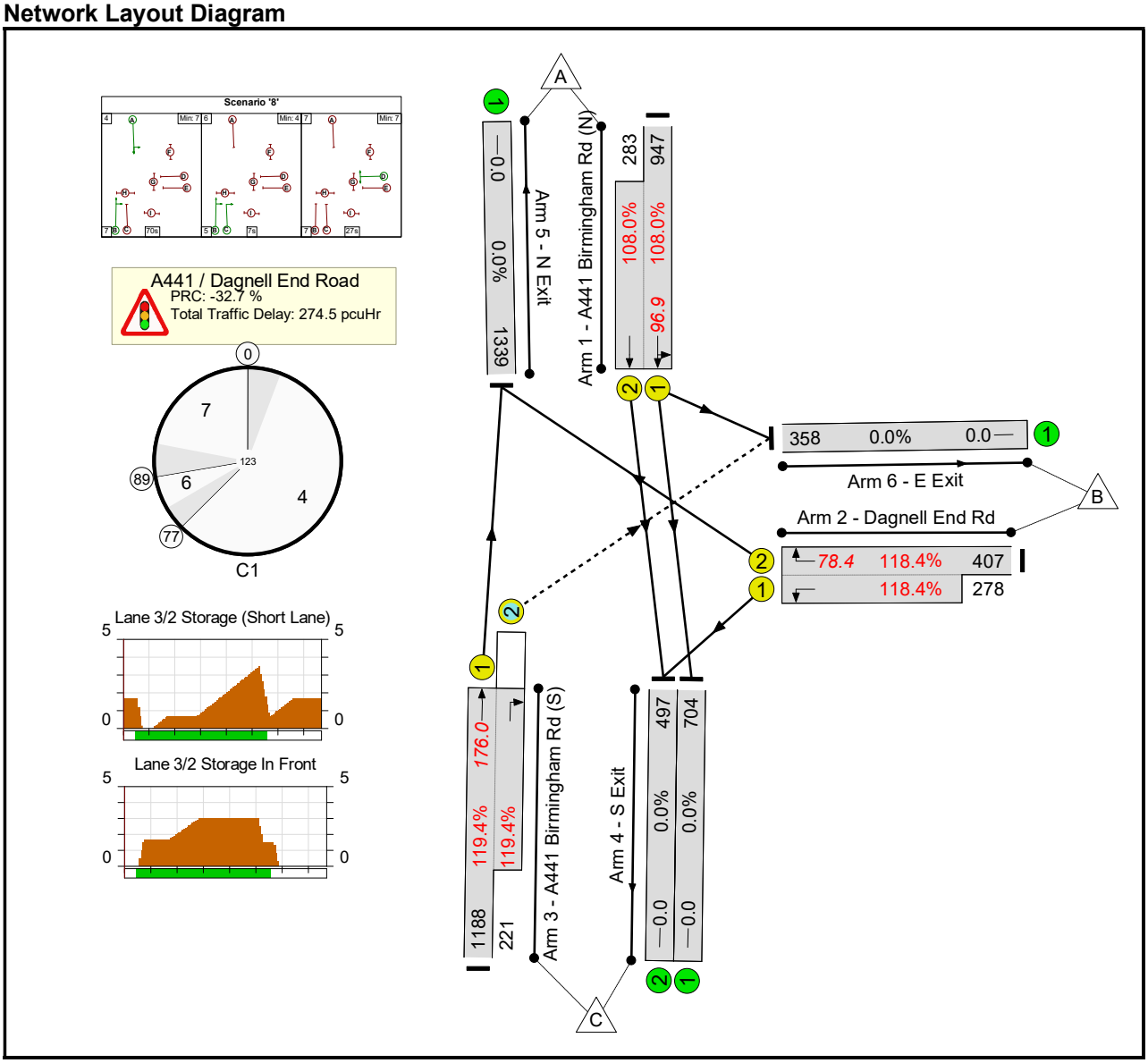
Stage	4	6	7
Duration	70	7	27
Change Point	0	77	89

Signal Timings Diagram



Full Input Data And Results

Network Layout Diagram



Full Input Data And Results

Network Results

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network: A441 / Dagnell End Road	-	-	**N/A**	-	-		-	-	-	-	-	-	**119.4%**
A441 / Dagnell End Road	-	-	**N/A**	-	-		-	-	-	-	-	-	**119.4%**
1/1+1/2	A441 Birmingham Rd (N) Ahead Left	U	N/A	N/A	A		1	70	-	1230	1817:1878	877+262	108.0 : 108.0%
2/2+2/1	Dagnell End Rd Left Right	U	N/A	N/A	D	E	1	27	0	685	1650:1852	344+235	118.4 : 118.4%
3/1+3/2	A441 Birmingham Rd (S) Ahead Right	U+O	N/A	N/A	B	C	1	82	7	1409	1641:1800	995+185	119.4 : 119.4%
4/1	S Exit	U	N/A	N/A	-		-	-	-	760	Inf	Inf	0.0%
4/2	S Exit	U	N/A	N/A	-		-	-	-	561	Inf	Inf	0.0%
5/1	N Exit	U	N/A	N/A	-		-	-	-	1595	Inf	Inf	0.0%
6/1	E Exit	U	N/A	N/A	-		-	-	-	408	Inf	Inf	0.0%

Full Input Data And Results

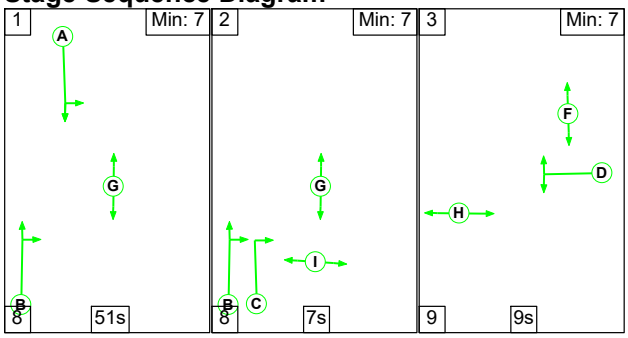
Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network: A441 / Dagnell End Road	**-**	**-**	**0**	**146**	**39**	**47.8**	**225.2**	**1.5**	**274.5**	**-**	**-**	**-**	**-**
A441 / Dagnell End Road	**-**	**-**	**0**	**146**	**39**	**47.8**	**225.2**	**1.5**	**274.5**	**-**	**-**	**-**	**-**
1/1+1/2	1230	1139	-	-	-	13.2	51.4	-	64.6 (49.9+14.7)	189.0 (189.6:187.1)	45.6	51.4	96.9
2/2+2/1	685	578	-	-	-	14.4	56.3	-	70.8 (42.4+28.4)	372.0 (374.8:367.8)	22.0	56.3	78.4
3/1+3/2	1409	1180	0	146	39	20.2	117.5	1.5	139.2 (115.8+23.4)	355.6 (350.9:380.8)	58.5	117.5	176.0
4/1	704	704	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
4/2	497	497	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
5/1	1339	1339	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	358	358	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0

C1 PRC for Signalled Lanes (%): -32.7 Total Delay for Signalled Lanes (pcuHr): 274.50 Cycle Time (s): 123
PRC Over All Lanes (%): -32.7 Total Delay Over All Lanes(pcuHr): 274.50

Full Input Data And Results

Scenario 9: '9' (FG1: '2030 AM Effective Base', Plan 3: 'Network Control Plan 3 (Peds)')

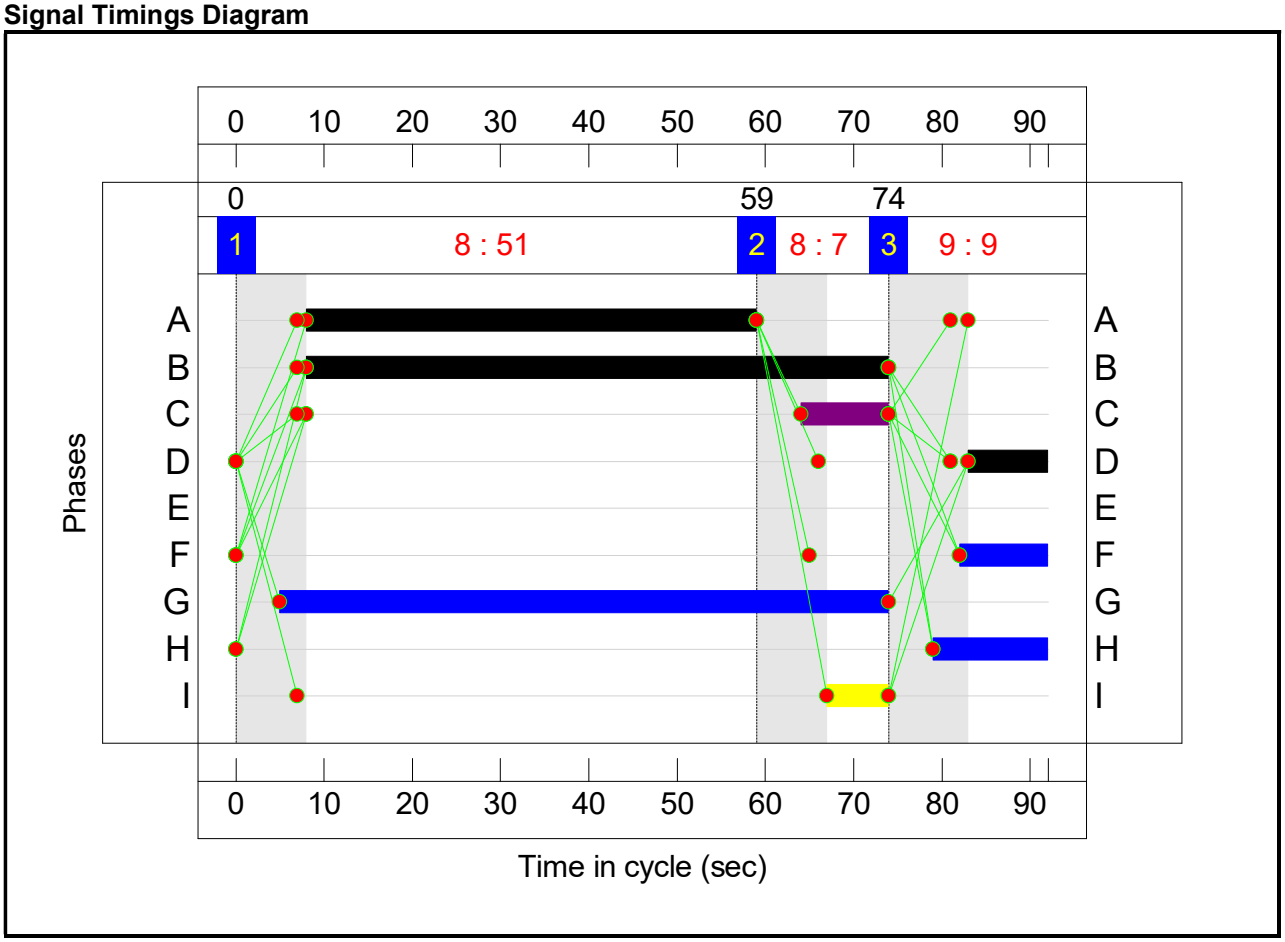
Stage Sequence Diagram



Stage Timings

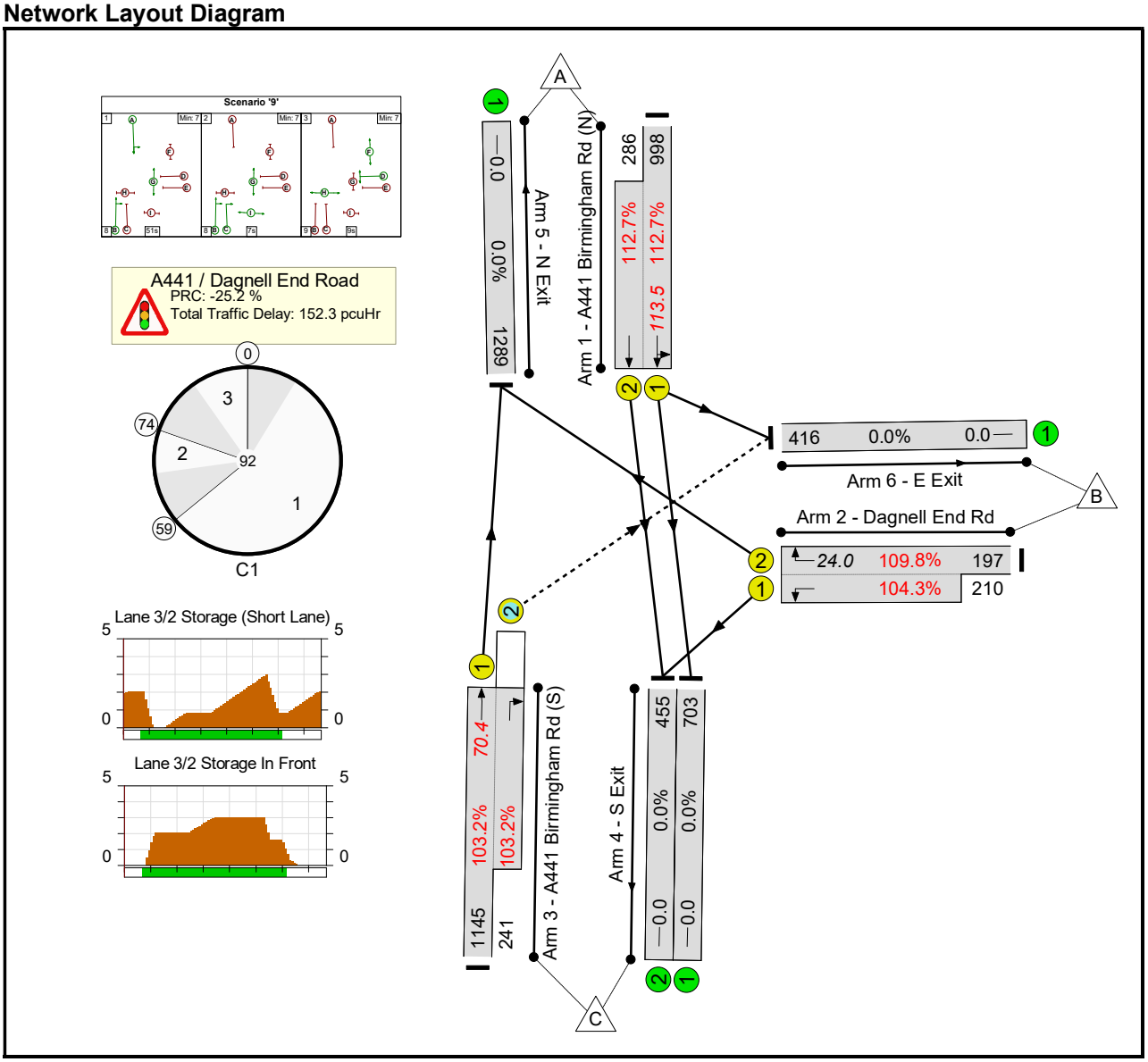
Stage	1	2	3
Duration	51	7	9
Change Point	0	59	74

Signal Timings Diagram



Full Input Data And Results

Network Layout Diagram



Full Input Data And Results

Network Results

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network: A441 / Dagnell End Road	-	-	**N/A**	-	-		-	-	-	-	-	-	**112.7%**
A441 / Dagnell End Road	-	-	**N/A**	-	-		-	-	-	-	-	-	**112.7%**
1/1+1/2	A441 Birmingham Rd (N) Ahead Left	U	N/A	N/A	A		1	51	-	1284	1816:1878	886+254	112.7 : 112.7%
2/2+2/1	Dagnell End Rd Left Right	U	N/A	N/A	D	E	1	9	0	407	1650:1852	179+201	109.8 : 104.3%
3/1+3/2	A441 Birmingham Rd (S) Ahead Right	U+O	N/A	N/A	B	C	1	66	10	1386	1726:1679	1110+234	103.2 : 103.2%
4/1	S Exit	U	N/A	N/A	-		-	-	-	792	Inf	Inf	0.0%
4/2	S Exit	U	N/A	N/A	-		-	-	-	496	Inf	Inf	0.0%
5/1	N Exit	U	N/A	N/A	-		-	-	-	1342	Inf	Inf	0.0%
6/1	E Exit	U	N/A	N/A	-		-	-	-	447	Inf	Inf	0.0%

Full Input Data And Results

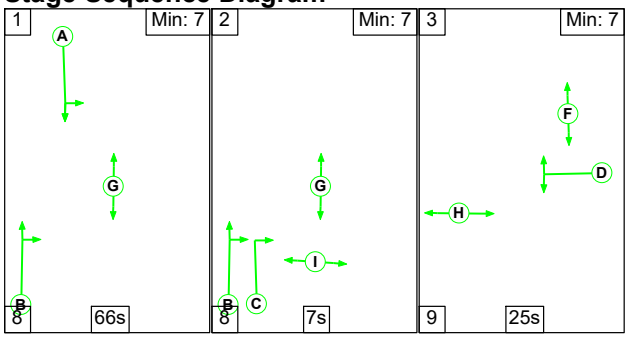
Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network: A441 / Dagnell End Road	-	-	**0**	**224**	**10**	**23.8**	**127.1**	**1.5**	**152.3**	-	-	-	-
A441 / Dagnell End Road	-	-	**0**	**224**	**10**	**23.8**	**127.1**	**1.5**	**152.3**	-	-	-	-
1/1+1/2	1284	1140	-	-	-	12.4	76.3	-	88.7 (69.1+19.6)	248.6 (249.3:246.3)	37.2	76.3	113.5
2/2+2/1	407	381	-	-	-	5.3	18.6	-	24.0 (14.2+9.8)	212.1 (259.3:167.7)	5.4	18.6	24.0
3/1+3/2	1386	1343	0	224	10	6.1	32.1	1.5	39.7 (31.4+8.3)	103.1 (98.8:123.5)	38.3	32.1	70.4
4/1	703	703	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
4/2	455	455	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
5/1	1289	1289	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	416	416	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0

C1 PRC for Signalled Lanes (%): -25.2 Total Delay for Signalled Lanes (pcuHr): 152.34 Cycle Time (s): 92
PRC Over All Lanes (%): -25.2 Total Delay Over All Lanes(pcuHr): 152.34

Full Input Data And Results

Scenario 10: '10' (FG2: '2030 PM Effective Base', Plan 3: 'Network Control Plan 3 (Peds)')

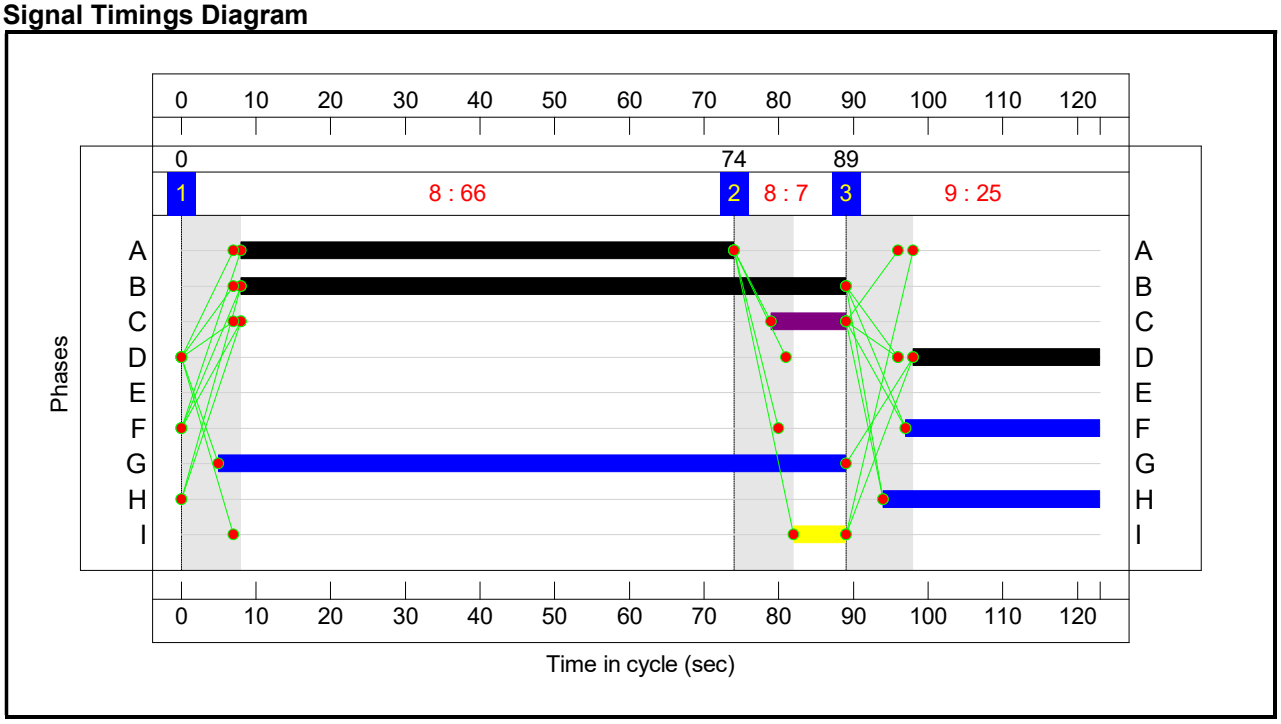
Stage Sequence Diagram



Stage Timings

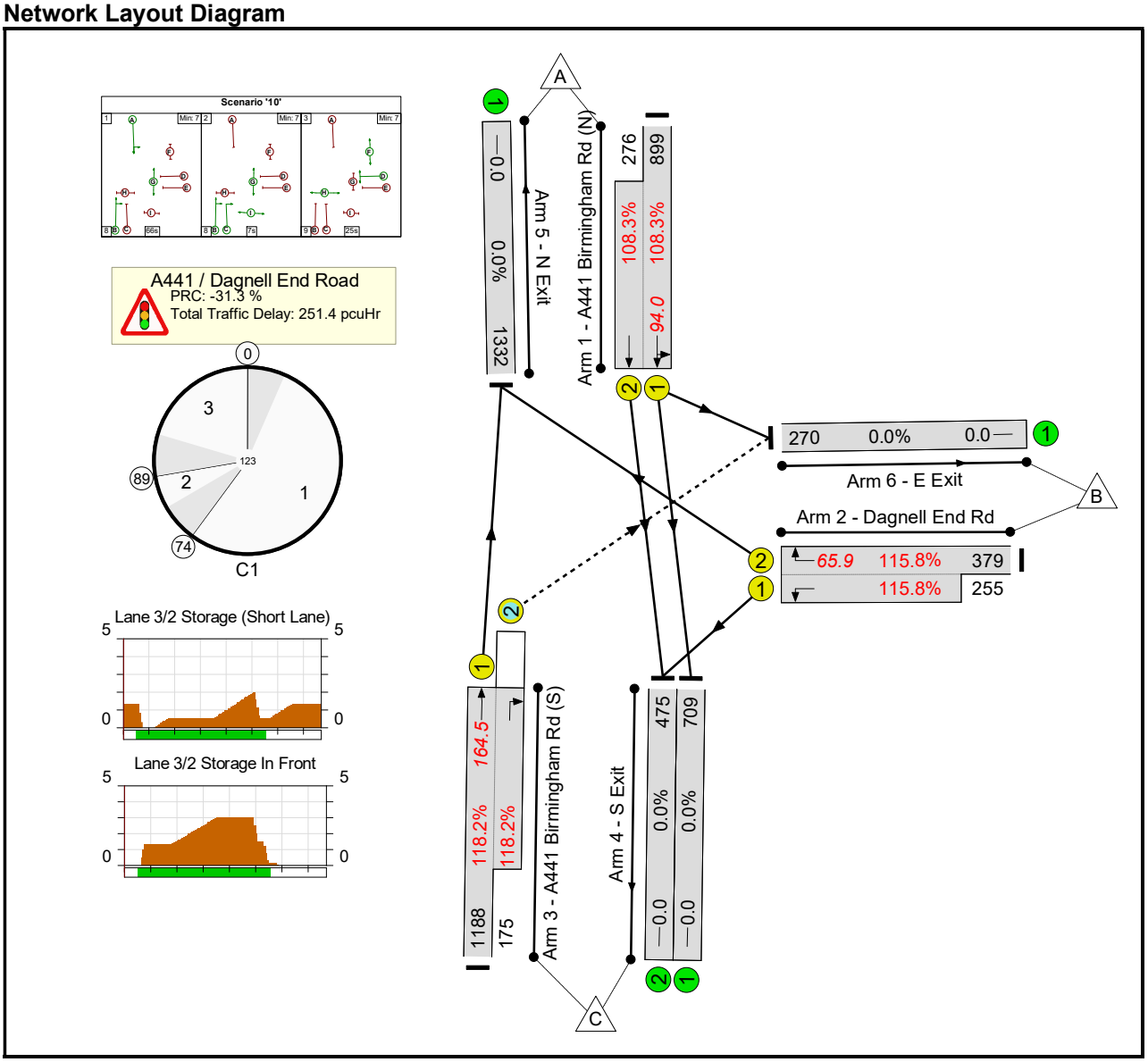
Stage	1	2	3
Duration	66	7	25
Change Point	0	74	89

Signal Timings Diagram



Full Input Data And Results

Network Layout Diagram



Full Input Data And Results

Network Results

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network: A441 / Dagnell End Road	-	-	**N/A**	-	-		-	-	-	-	-	-	**118.2%**
A441 / Dagnell End Road	-	-	**N/A**	-	-		-	-	-	-	-	-	**118.2%**
1/1+1/2	A441 Birmingham Rd (N) Ahead Left	U	N/A	N/A	A		1	66	-	1175	1828:1878	830+255	108.3 : 108.3%
2/2+2/1	Dagnell End Rd Left Right	U	N/A	N/A	D	E	1	25	0	634	1650:1852	327+220	115.8 : 115.8%
3/1+3/2	A441 Birmingham Rd (S) Ahead Right	U+O	N/A	N/A	B	C	1	81	10	1363	1641:1800	1005+148	118.2 : 118.2%
4/1	S Exit	U	N/A	N/A	-		-	-	-	767	Inf	Inf	0.0%
4/2	S Exit	U	N/A	N/A	-		-	-	-	531	Inf	Inf	0.0%
5/1	N Exit	U	N/A	N/A	-		-	-	-	1567	Inf	Inf	0.0%
6/1	E Exit	U	N/A	N/A	-		-	-	-	307	Inf	Inf	0.0%

Full Input Data And Results

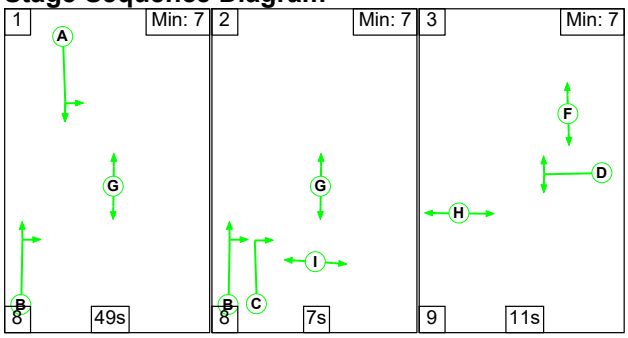
Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network: A441 / Dagnell End Road	**-**	**-**	**0**	**143**	**5**	**44.9**	**205.3**	**1.2**	**251.4**	**-**	**-**	**-**	**-**
A441 / Dagnell End Road	**-**	**-**	**0**	**143**	**5**	**44.9**	**205.3**	**1.2**	**251.4**	**-**	**-**	**-**	**-**
1/1+1/2	1175	1085	-	-	-	13.4	50.6	-	64.0 (49.1+14.9)	196.1 (196.7:194.1)	43.4	50.6	94.0
2/2+2/1	634	547	-	-	-	12.6	46.7	-	59.3 (35.8+23.5)	336.9 (340.0:332.2)	19.2	46.7	65.9
3/1+3/2	1363	1153	0	143	5	18.8	108.0	1.2	128.1 (110.5+17.6)	338.2 (334.9:361.0)	56.5	108.0	164.5
4/1	709	709	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
4/2	475	475	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
5/1	1332	1332	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	270	270	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0

C1 PRC for Signalled Lanes (%): -31.3 Total Delay for Signalled Lanes (pcuHr): 251.40 Cycle Time (s): 123
PRC Over All Lanes (%): -31.3 Total Delay Over All Lanes(pcuHr): 251.40

Full Input Data And Results

Scenario 11: '11' (FG3: '2030 AM Effective Base + Dev', Plan 3: 'Network Control Plan 3 (Peds)')

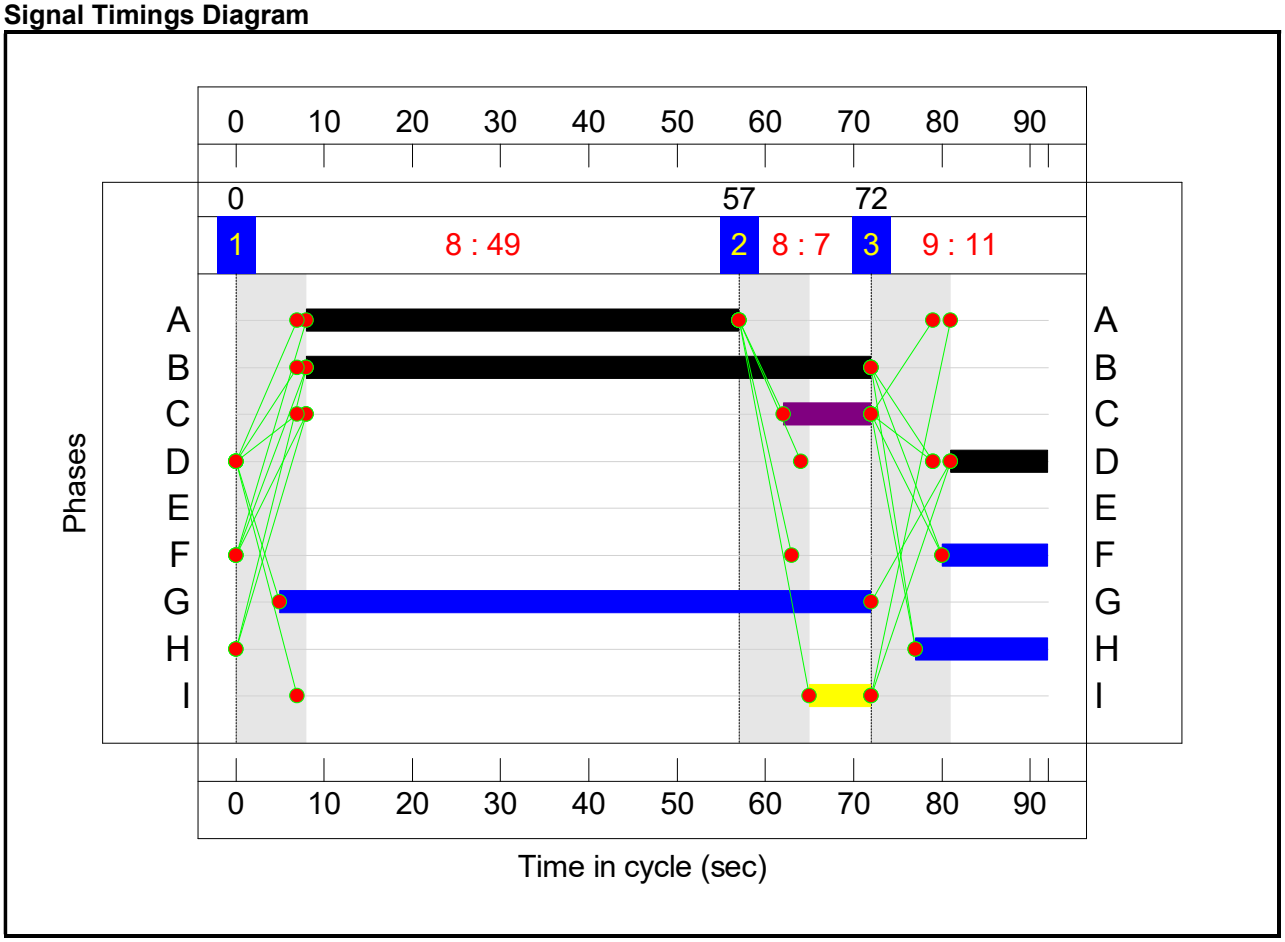
Stage Sequence Diagram



Stage Timings

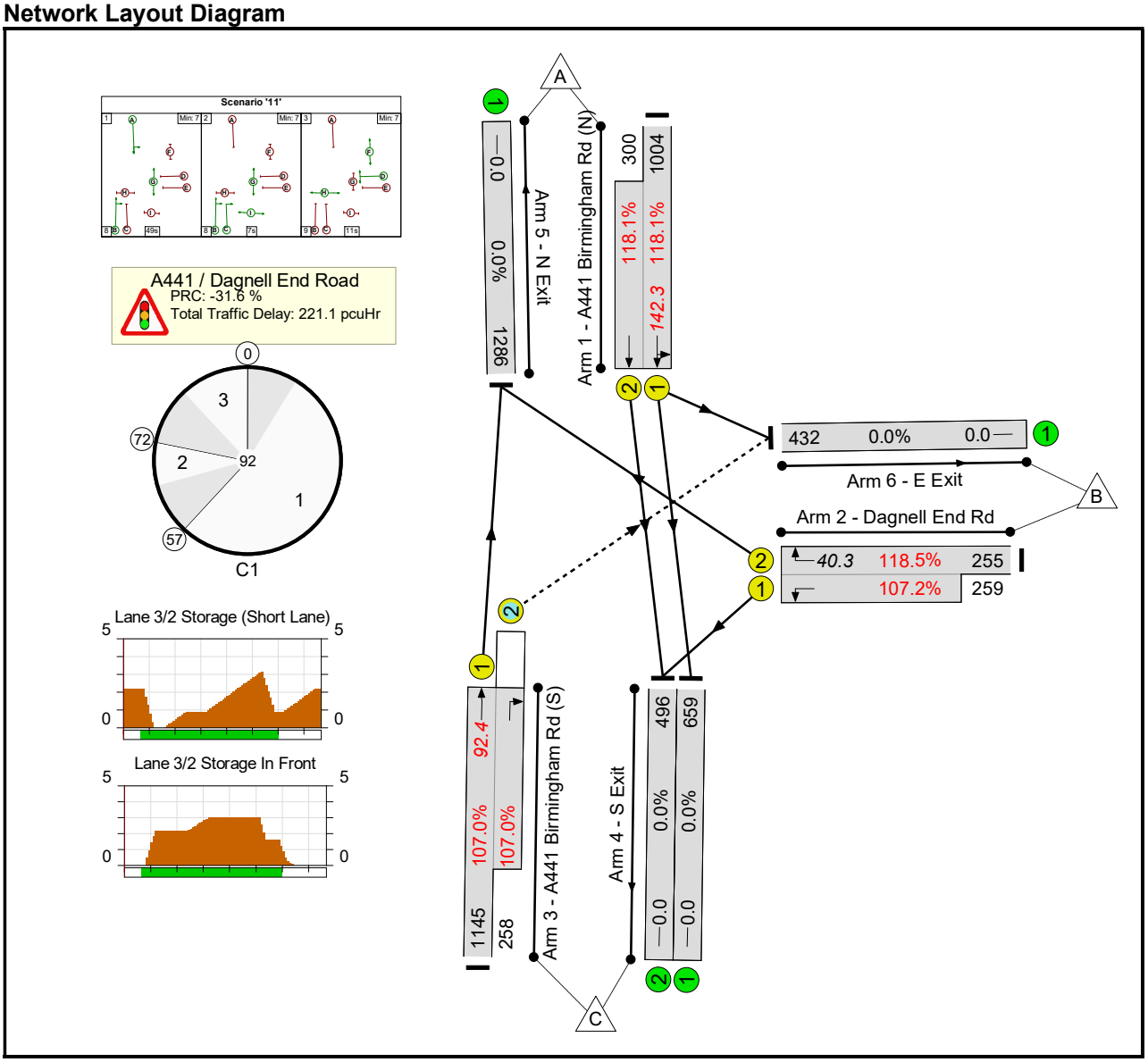
Stage	1	2	3
Duration	49	7	11
Change Point	0	57	72

Signal Timings Diagram



Full Input Data And Results

Network Layout Diagram



Full Input Data And Results

Network Results

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network: A441 / Dagnell End Road	-	-	**N/A**	-	-		-	-	-	-	-	-	**118.5%**
A441 / Dagnell End Road	-	-	**N/A**	-	-		-	-	-	-	-	-	**118.5%**
1/1+1/2	A441 Birmingham Rd (N) Ahead Left	U	N/A	N/A	A		1	49	-	1304	1812:1878	850+254	118.1 : 118.1%
2/2+2/1	Dagnell End Rd Left Right	U	N/A	N/A	D	E	1	11	0	514	1650:1852	215+242	118.5 : 107.2%
3/1+3/2	A441 Birmingham Rd (S) Ahead Right	U+O	N/A	N/A	B	C	1	64	10	1403	1726:1679	1070+241	107.0 : 107.0%
4/1	S Exit	U	N/A	N/A	-		-	-	-	778	Inf	Inf	0.0%
4/2	S Exit	U	N/A	N/A	-		-	-	-	559	Inf	Inf	0.0%
5/1	N Exit	U	N/A	N/A	-		-	-	-	1400	Inf	Inf	0.0%
6/1	E Exit	U	N/A	N/A	-		-	-	-	484	Inf	Inf	0.0%

Full Input Data And Results

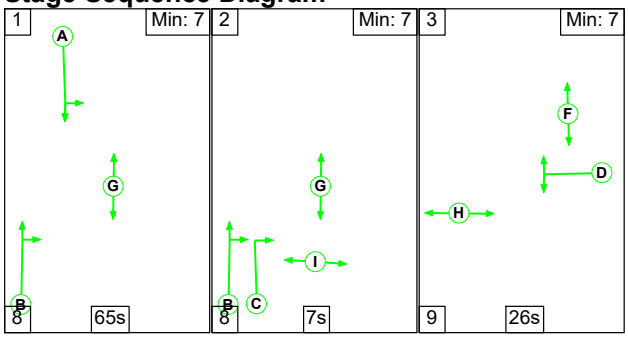
Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network: A441 / Dagnell End Road	**-**	**-**	**0**	**231**	**10**	**31.5**	**188.2**	**1.4**	**221.1**	**-**	**-**	**-**	**-**
A441 / Dagnell End Road	**-**	**-**	**0**	**231**	**10**	**31.5**	**188.2**	**1.4**	**221.1**	**-**	**-**	**-**	**-**
1/1+1/2	1304	1104	-	-	-	15.2	103.2	-	118.4 (91.4+27.1)	326.9 (327.6:324.6)	39.1	103.2	142.3
2/2+2/1	514	457	-	-	-	7.8	32.6	-	40.3 (26.2+14.1)	282.4 (369.7:196.4)	7.8	32.6	40.3
3/1+3/2	1403	1311	0	231	10	8.5	52.5	1.4	62.4 (49.6+12.8)	160.1 (155.9:179.0)	39.9	52.5	92.4
4/1	659	659	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
4/2	496	496	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
5/1	1286	1286	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	432	432	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0

C1 PRC for Signalled Lanes (%): -31.6 Total Delay for Signalled Lanes (pcuHr): 221.13 Cycle Time (s): 92
PRC Over All Lanes (%): -31.6 Total Delay Over All Lanes(pcuHr): 221.13

Full Input Data And Results

Scenario 12: '12' (FG4: '2030 PM Effective Base + Dev', Plan 3: 'Network Control Plan 3 (Peds)')

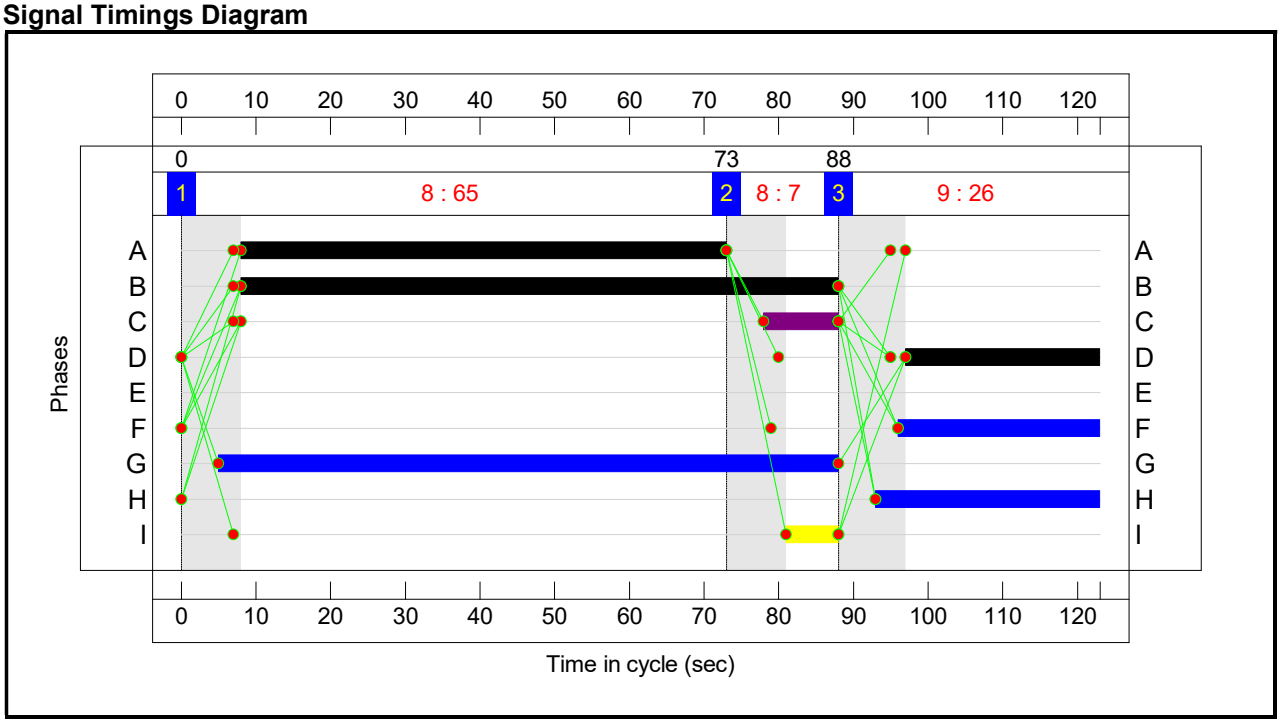
Stage Sequence Diagram



Stage Timings

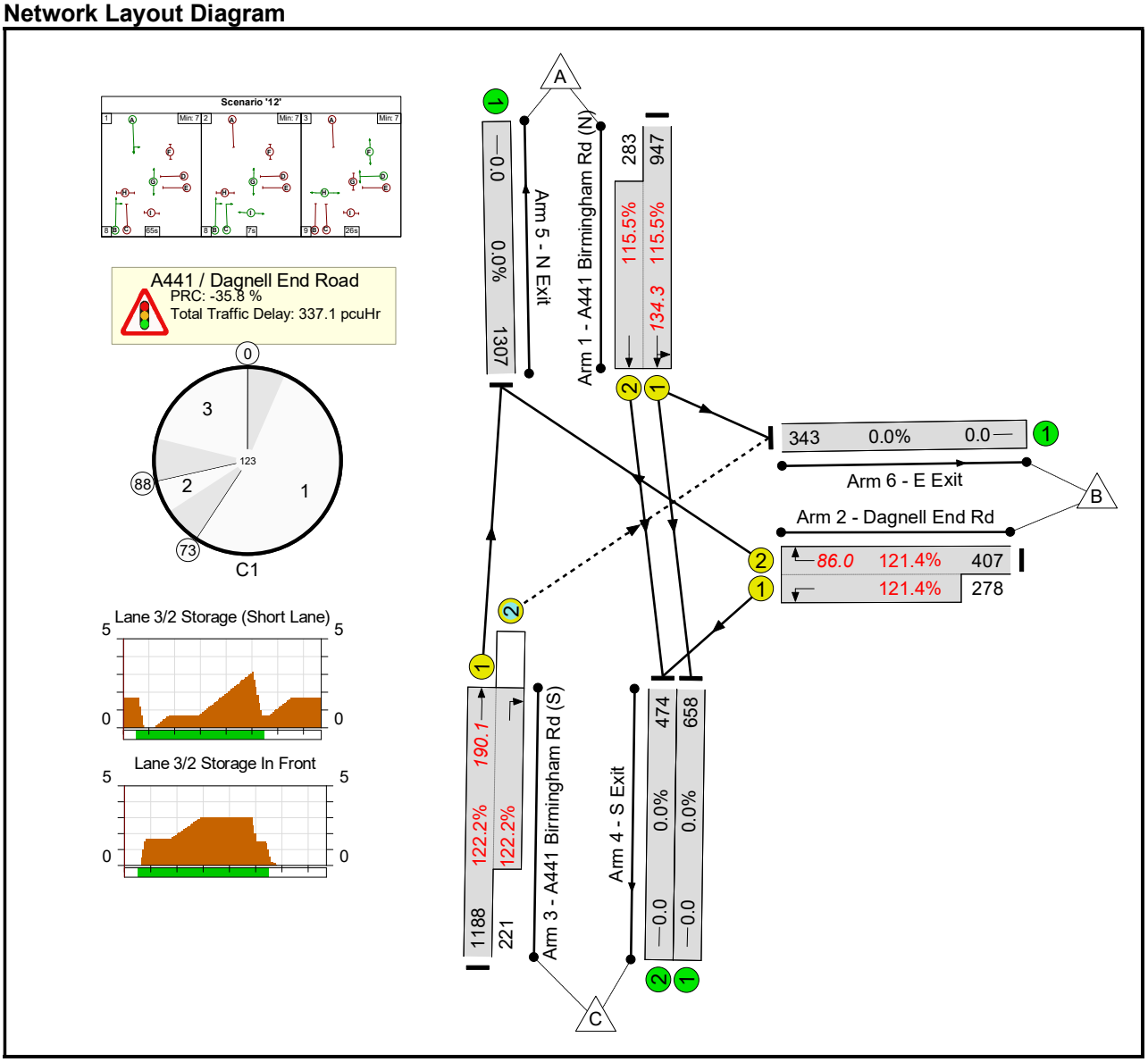
Stage	1	2	3
Duration	65	7	26
Change Point	0	73	88

Signal Timings Diagram



Full Input Data And Results

Network Layout Diagram



Full Input Data And Results

Network Results

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network: A441 / Dagnell End Road	-	-	**N/A**	-	-		-	-	-	-	-	-	**122.2%**
A441 / Dagnell End Road	-	-	**N/A**	-	-		-	-	-	-	-	-	**122.2%**
1/1+1/2	A441 Birmingham Rd (N) Ahead Left	U	N/A	N/A	A		1	65	-	1230	1817:1878	820+245	115.5 : 115.5%
2/2+2/1	Dagnell End Rd Left Right	U	N/A	N/A	D	E	1	26	0	685	1650:1852	335+229	121.4 : 121.4%
3/1+3/2	A441 Birmingham Rd (S) Ahead Right	U+O	N/A	N/A	B	C	1	80	10	1409	1641:1800	972+181	122.2 : 122.2%
4/1	S Exit	U	N/A	N/A	-		-	-	-	760	Inf	Inf	0.0%
4/2	S Exit	U	N/A	N/A	-		-	-	-	561	Inf	Inf	0.0%
5/1	N Exit	U	N/A	N/A	-		-	-	-	1595	Inf	Inf	0.0%
6/1	E Exit	U	N/A	N/A	-		-	-	-	408	Inf	Inf	0.0%

Full Input Data And Results

Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network: A441 / Dagnell End Road	**-**	**-**	**0**	**174**	**6**	**55.9**	**279.9**	**1.3**	**337.1**	**-**	**-**	**-**	**-**
A441 / Dagnell End Road	**-**	**-**	**0**	**174**	**6**	**55.9**	**279.9**	**1.3**	**337.1**	**-**	**-**	**-**	**-**
1/1+1/2	1230	1065	-	-	-	18.3	86.2	-	104.5 (80.6+23.9)	305.9 (306.5:304.0)	48.1	86.2	134.3
2/2+2/1	685	564	-	-	-	15.5	63.0	-	78.6 (47.0+31.6)	413.0 (415.8:408.8)	23.0	63.0	86.0
3/1+3/2	1409	1153	0	174	6	22.0	130.7	1.3	154.0 (128.5+25.5)	393.5 (389.4:415.4)	59.4	130.7	190.1
4/1	658	658	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
4/2	474	474	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
5/1	1307	1307	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	343	343	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0

C1 PRC for Signalled Lanes (%): -35.8 Total Delay for Signalled Lanes (pcuHr): 337.11 Cycle Time (s): 123
PRC Over All Lanes (%): -35.8 Total Delay Over All Lanes(pcuHr): 337.11

mode

transport planning

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