

TECHNICAL NOTE NO.1 REV B

Proposed Residential Development Comprising Up To 80 Dwellings

Wrexham Road, Abermorddu

CT/16244/TN01 Rev B – 22 February 2018

BACKGROUND

1. This Technical Note (TN) relates to a proposed residential development on land located to the south-west of the A541 Wrexham Road, Abermorddu. The applicant intends to develop a residential scheme comprising up to 80 dwellings and an area of open space at the south-eastern point of the site; the planning application is in outline with all matters reserved except for access.
2. SCP were engaged by the applicant to prepare a Transport Assessment (TA), this has been subject to a pre-application consultation as per the requirements of Section 17 of the Planning Wales Act 2015, and The Town and Country Planning (Development Management Procedure) (Wales) (Amendment) Order 2016.
3. As a specialist consultee, Flintshire County Council (FCC) have recently provided a highway-related pre-application consultation response (see [Appendix A](#)) which states that FCC have “no objection to the principle of the development in this area”, however they have requested further information in consideration of the transport requirements of the development and the Transport Implementation Strategy (TIS).
4. The comments provided by FCC have been reviewed and responded to in this TN. The responses are set out in broadly the same order as the FCC comments for ease of reference.

RESPONSE - FCC COMMENTS

Active and Sustainable Travel

5. FCC have stated that the TA does not address certain transport considerations outlined in the Planning Statement produced by Fisher German, particularly the following:

Paragraph 8.7.1 states that when determining a planning application for development that has transport implications, local planning authorities should take into account:

- *The impacts of the proposed development on travel demand;*
- *The level and nature of public transport provision;*



- *Accessibility by a range of different transport modes;*
- *The opportunities to promote active travel journeys, and secure new and improved active travel routes and related facilities, in accordance with the provisions of the Active Travel (Wales) Act 2013;*
- *The willingness of a developer to promote travel by walking, cycling or public transport, or to provide infrastructure or measures to manage traffic, to overcome transport objections to the proposed development (payment for such measures will not, however, justify granting planning permission to a development for which it would not otherwise be granted);*
- *The environmental impact of both transport infrastructure and the traffic generated¹² (with a particular emphasis on minimising the causes of climate change associated with transport); and*
- *The effects on the safety and convenience of other users of the transport network.*

Policy AC4 - Travel Plans for Major Traffic Generating Developments: *Developments which are likely to generate a substantial number of trips will only be permitted provided that the proposal is accompanied by a travel plan setting out what measures will be implemented to satisfactorily reduce the level of car based trips in terms of:*

- *Provision for pedestrians, cyclists and public transport;*
- *Other arrangements such as formal car sharing and private bus services;*
- *Implementation programme; and*
- *Monitoring and review procedures.*

In the case of outline or speculative proposals the Council will require the submission of a Travel Plan at reserved matters stage or other appropriate pre-agreed time, through either a planning condition or legal agreement.

Policy AC13 - Access and Traffic Impact: *The transport policy states that development proposals will be permitted only if:*

- *Approach roads to the site are of an adequate standard to accommodate the traffic likely to be generated by the development without compromising public safety, health and amenity; and*
- *Safe vehicular access can be provided by the developer both to and from the main highway network. Where considered necessary, the Council will require a transport assessment, incorporating a traffic impact assessment.*

6. Policy AC4 states that outline proposals can submit a Travel Plan at the reserved matters stage and the proposed development is considered to meet the requirements under policy AC13 including providing a safe vehicular access/egress. Furthermore, paragraph 8.7.1 has largely been considered within the TA and can be considered further within the Travel Plan which can be submitted at the reserved matters stage.

Site Access

7. FCC have advised that the separation distance between the two site accesses, shown on the indicative site layout plan in **APPENDIX B**, is considered with regards to the SSD of traffic on the A541 Wrexham Road.
8. A separation distance of 120m should therefore be considered which is commensurate with a 40mph design speed as per the robust guidelines in the Design Manual for Roads and Bridges (DMRB) and TAN 18 Table A, including an allowance for motorists traveling above the speed limit.
9. The indicative site layout plan demonstrates that the two site accesses are separated by approximately 90m, falling approximately 30m short of FCC's advised separation distance. As detailed in the TA, the site accesses have been designed so that visibility splays of 2.4m x 120m are achievable in both directions from both access. Furthermore, given the geometries of the A541 Wrexham Road and the proximity of the two site accesses, there is no interference between the visibility splays. A vehicle parked in the neighbouring access will not interfere with the visibility splays, as shown on drawing number SCP/16244/F01 REV B presented in **APPENDIX C**. Therefore, it is not considered necessary to relocate either of the site accesses.
10. It should also be noted that two site access allow for a more permeable scheme and better design for internals with regards to topography and access for refuse vehicles etc.

Swept Path Analysis

11. FCC have requested that a swept path analysis of the internal estate road is undertaken. Furthermore, they have indicated that the analysis should take into account the potential for on-street parking.

12. FCC have appropriately pointed out that the level of on-street parking will depend upon the housing layout and parking provision. The application is outline and therefore the plan is only indicative, however, as detailed in the TA, the level of car parking will be provided in line with FCC parking standards which allows for visitor parking requirements. On-street parking is therefore not anticipated at the proposed development.
13. Notwithstanding this, FCC's comments have been acknowledged and they will be considered during detailed design of the site layout. The internal road layout will be designed to safely accommodate the refuse vehicle used by FCC and consideration will be given to the potential for on-street parking.

Centre Line

14. FCC have recommended that a minimum road centre line radius of 30m is adopted throughout the site. As mentioned above, the application is only outline and therefore the plan is only indicative, however, this is a reasonable design recommendation which will be considered in the detailed design.

Pedestrian / Cycle Provision

15. It has been noted by FCC that the footway fronting the site is limited to a width of 1.0-1.2m and the existing pedestrian and cycle provision should be considered. FCC have suggested that a 3.0m wide provision is likely to be required between the site and Abermorddu County Primary School.
16. It is clear from the submitted plan that the scheme provides a traffic-free route from the development site into the primary school via a proposed gate. Therefore there is no requirement for this scheme to provide a continuous footway along the site frontage.

Highway Traffic Management Measures

17. FCC have outlined a requirement for off-road turning provision and parking provision for any properties with direct access onto the A541 Wrexham Road as well as the potential for the implementation of parking restrictions along the site frontage. FCC have also stated that it may be necessary to formalise parking bays and re-position the centre line of the road due to the on-street parking that takes place on the A541 Wrexham Road.
18. It is clear from the submitted site layout that there are no proposals for direct frontage onto the A541 Wrexham Road and therefore these comments are not valid. However, should this alter the FCC comments have been noted and will be considered at the detailed design stage.

19. FCC's comment relating to on-street parking in the vicinity of the site access seems reasonable and formalised parking bays will be incorporated into the detailed design. This is also considered to be a post-approval matter that can be dealt with via a standard planning condition.

Trip Rates

20. FCC have asked that further work be carried out to justify the trip rates within the submitted TA as they "appear uncharacteristically low".
21. In terms of the trip generation forecast methodology set out in the submitted TA, this is considered to be an accurate and representative way of forecasting the vehicular traffic that might be associated with the proposed residential development as the TRICS database was reviewed using good practice guidelines.
22. Without prejudice to the above, SCP have carried out a further review of the TRICS database, as requested by FCC.
23. Other than the selected location category, the alternative methodology is identical to that set out in the submitted TA. The application site is considered to fall within both the 'suburban area' and 'edge of town' location categories, although given that the site boundary meets the countryside, the site certainly falls within the 'edge of town' location category. Therefore, all the 'suburban area' sites selected in the TA have been removed to allow for a more robust assessment.
24. For the avoidance of doubt, the criteria for selecting the revised surveys is as follows:-
- Residential;
 - Privately Owned Houses;
 - Multi Modal Trip Rates;
 - Sites in Greater London and Ireland excluded;
 - Selection by Number of Dwellings (40-160);
 - Weekday surveys only; and
 - Only sites in 'edge of town' locations selected.

25. The revised TRICS outputs are presented in **Appendix D** with the trip rates summarised in **Table 1.1** below:-

Table 1.1 – Residential Use Trip Rates (Trip Rates per Dwelling)

Mode	Weekday AM Peak Hour		Weekday PM Peak Hour	
	Arrivals	Departures	Arrivals	Departures
Vehicles	0.154	0.359	0.326	0.131
Cyclists	0.000	0.023	0.014	0.002
Pedestrians	0.016	0.047	0.044	0.030
Public Transport	0.005	0.000	0.002	0.002

26. The above trip rates have been applied to the proposed 80 dwellings to determine the multi-modal trip generation forecasts for the development, as summarised in **Table 1.2** below.

Table 1.2 – Proposed Residential Use Trip Generation (80 Dwellings)

Mode	Weekday AM Peak Hour		Weekday PM Peak Hour	
	Arrivals	Departures	Arrivals	Departures
Vehicles	12	29	26	10
Cyclists	0	2	1	0
Pedestrians	1	4	4	2
Public Transport	0	0	0	0

27. In terms of a comparison between the vehicular traffic forecasts contained in the submitted TA and the figures presented above, the differences are as follows:-

Mode	AM Peak Hour		PM Peak Hour	
	Arrivals	Departures	Arrivals	Departures
Vehicles	+1	+1	-1	-3

28. The above table demonstrates that there is no material change between the trip generation forecasts contained in the submitted TA and the revised trip generation forecasts, therefore, we stand by our original trip generation forecast.

Traffic Distribution

29. FCC have requested that the traffic distribution used in the submitted TA is reconsidered to take the A550 into account.
30. Following a review of the traffic distribution, all traffic distributed along Wrexham Road (south) has been re-distributed at the Wrexham Road / A550 / Cymau Lane signalised junction.
31. The trip distribution percentages are presented in **Table 1.3** below:-

Table 1.3 – Proposed Development-Related Trip Distribution Forecasts

Route Reference	Route Description	Percentage
A	A541 Wrexham Road (N)	44.5%
B	A541 Wrexham Road (S)	47.0%
C	A550	8.6%
D	Cymau Lane	0.0%

32. The forecast level of traffic generated by the proposed development has been re-assigned pro rata to the routes specified above and the PICADY and LINSIG models have subsequently been amended, as detailed below.

PICADY Model

33. The PICADY model for the site access junction has been amended to take into account the above traffic distribution changes as well as the presence of parked vehicles on the A541 Wrexham Road. The PICADY model therefore assumes the road width of the A541 Wrexham Road is 6.0m which is a reduction of 3.5m.
34. As detailed in the submitted TA, only the northern access has been assessed, with 100% of development traffic routing through it, as it is assumed the majority of site traffic will utilise this access based on the site layout. This approach is considered to be extremely robust because, although the majority of traffic generated by the development will use the northern access, a proportion of development traffic will use the southern access.
35. The PICADY results for the site access junction are presented in **Appendix E** with the results summarised in **Table 1.4** below.

Table 1.4 – Proposed Site Access Junction – 2022 ‘With Development’ PICADY Results

Movement	AM PEAK (0745 to 0845)		PM PEAK (1645 to 1745)	
	RFC	MMQ	RFC	MMQ
Site Access (Left)	0.03	0.0	0.01	0.0
Site Access (Right)	0.07	0.1	0.03	0.0
Wrexham Road North (Ahead/Right)	0.02	0.0	0.04	0.1

* Note: RFC: Max demand / capacity ratio – Normal max 0.85 MMQ: mean max queue in vehicles

36. The above results clearly show that the proposed site access junction will operate well within its practical capacity in robust future assessment year of 2022, with minimal queuing and delay.

LINSIG Model

37. The LINSIG model for the Wrexham Road / A550 / Cymau Lane signalised junction has also been amended to take into account the aforementioned traffic distribution changes.
38. The LINSIG results are contained within **Appendix F** and a summary of the LINSIG capacity assessment results are presented in **Table 1.5** below.

Table 1.5 - Wrexham Road / A550 / Cymau Lane Signalised Junction

	Weekday AM (07:45-08:45)		Weekday PM (16:45-17:45)	
	DoS (%)	Queue (PCU)	DoS (%)	Queue (PCU)
2016 Base 'Without Development' Scenario				
Wrexham Road (S) (Left/Ahead/Right)	83.9	14.7	64.2	7.9
Cymau Lane (Left/Left 2/Right)	80.4	6.9	45.6	2.7
Wrexham Road (Right/U-Turn/Ahead)	63.8	15.5	67.8	14.7
A550 (Right/U-Turn/Ahead)	83.6	11.9	66.9	9.8
PRC	7.3%		32.7%	
2022 Base 'Without Development' Scenario				
Wrexham Road (S) (Left/Ahead/Right)	91.7	18.9	70.2	9.3
Cymau Lane (Left/Left 2/Right)	92.1	9.2	48.1	2.9
Wrexham Road (Right/U-Turn/Ahead)	68.8	17.3	72.0	16.0
A550 (Right/U-Turn/Ahead)	85.7	12.6	70.9	10.5
PRC	-2.4%		25.0%	
2022 Assessment 'With Development' Scenario				
Wrexham Road (S) (Left/Ahead/Right)	94.6	22.1	71.9	11.1
Cymau Lane (Left/Left 2/Right)	91.4	9.4	47.6	3.1
Wrexham Road (Right/U-Turn/Ahead)	68.4	17.4	72.1	16.4
A550 (Right/U-Turn/Ahead)	91.6	14.7	72.8	11.0
PRC	-5.1%		23.6%	

39. The updated LINSIG model does not demonstrate a material change when compared with the results contained in the submitted TA and therefore we stand by the following conclusion which was detailed in the TA:
40. The above table demonstrates that in the 2022 without development scenario, two arms are forecast to operate in excess of 90% in the AM peak hour. With the additional traffic generated by the proposed development, the DoS values and queue lengths will not significantly alter, when compared to the without development scenarios. In the PM peak hour, all arms operate within capacity in the 2022 with development scenario.
41. Given that the capacity concerns in 2022 without the proposed development in place are not significantly exacerbated by the proposed development, it does not appear reasonable to expect any junction / signal improvements.

Accessibility Review

42. FCC have stated that the TIS within the submitted TA is limited to the consideration of a Travel Plan and no consideration has been given to the adequacy or safety of the existing sustainable transport facilities. FCC have therefore assumed that some off-site infrastructure improvements will be required as part of this development.
43. Pedestrian access to the primary school, play area and other local facilities have been considered in detail and where appropriate, linkages are being provided from the application site. As such the application site is well located and offers realistic options for modes of travel other than the private car
44. Notwithstanding the above FCC can, should they wish to, condition a Travel Plan.

SUMMARY AND CONCLUSION

45. Having regard to the responses provided in this TN, the development proposals are commended to the Council for approval subject to a number of suitably-worded planning conditions.

S|C|P

APPENDIX A

Andrew Farrow
Chief Officer (Planning & Environment)
Prif Swyddog (Cynllunio a'r Amgylchedd)



c/o Fisher German Planning Team
4 Vicars Lane
Chester
CH1 1QU

By email

Your Ref/Eich Cyf
Our Ref/Ein Cyf Pre-app
Date/Dyddiad 22 December 2017
Ask for/Gofynner am Colin Simpson
Direct Dial/Rhif Union 01352 704618
email colin.simpson@flintshire.gov.uk

Dear Sirs

Pre Application Enquiry – Schedule 1C, Article 2D Consultation

LOCATION: Wrexham Road, Abermorddu

PROPOSAL: Development of up to 80 residential properties

This response has been prepared as comment to details presented on the TNW Architecture web site, primarily a Transport Assessment produced by SCP.

There is no objection to the principle of development in this area however further information is required in consideration of the transport requirements of the development and the Transport Implementation Strategy.

The Planning Statement produced by Fischer German clearly identifies the required transport considerations of development, paragraphs 4.17, 4.37 and 4.39 in particular. The TA however fails to correctly or fully address these requirements, particularly in respect of Active and sustainable Travel.

The indicative plan shows two access roads into the site; consideration should be given to the separation distance between accesses and advice that the minimum separation should be equivalent to the SSD of traffic on the road. It would appear that the site could adequately be served by a single vehicular access. Swept path analysis has been undertaken but this makes no allowance for parked vehicles especially within the turning circle; the likelihood of parked vehicles will depend upon housing layout and off-road parking provision. Minimum road centre line radius of 30m is recommended, anything less may require localized road widening. A swept path analysis of the internal estate road is required. Pedestrian and cycle provision both

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The Council welcomes correspondence in Welsh or English
Mae'r Cyngor yn croesawu gohebiaeth yn y Gymraeg neu'r Saesneg

around and within the site requires careful consideration. The footway fronting the site is limited to a width of 1.0-1.2m; a 3m wide provision is likely to be required at least up to the nearby school.

As an outline application there is no indication of the proposed layout of properties; this layout will have direct impact on highway requirements. Any property provided with direct access onto the A541 will require off-road turning provision in addition to parking provision. Any frontage development may necessitate the implementation of parking restrictions along the site frontage. Many of the properties opposite the proposed access do not have off-road parking provision and rely on on-street parking; it may be necessary to formalize parking bays and re-position the centre line of the road.

The TRICs generation rates used in the TA appear uncharacteristically low and require further justification. Traffic generation rates appear excessively low and the total 24 hour multi modal generation is indicated to be only slightly greater than 6.0. The TRICs rates have been used not only to assess the generation from the proposed development but also from the nearby development and have been used in the capacity assessment of the signal controlled junction. Any revision to generation rates will impact on both the Picady and Linsig analysis. With the capacity concerns highlighted within the TA, it should be assumed that some improvement to junction or signal operation will be required.

The Picady analysis assumes a road width of 9.5m; the presence of parked vehicles reduces the available effective width below this. The Linsig analysis assumes a traffic distribution from the site to be in the ratio of 45:55 on the A541 but no allocation towards the A550; this distribution should be reconsidered.

Although the TA assumes that the site is considered to be in a suitable location in terms of sustainable travel, the TIS within the TA is limited to consideration of a Travel Plan. No consideration has been given to the adequacy or safety of the existing sustainable transport facility. Many of the assumed pedestrian routes do not have continuous footways, many footways within the area are below the acceptable minimum widths (Crossways is suggested as a pedestrian route but is devoid of effective footways), there are no identified cycle provision and many bus stops are not provided with shelters or raised boarding kerbs. It should be assumed that off-site infrastructure improvements will be required as part of this development.















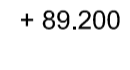


It is suggested that the content of the TA is reviewed and discussions are undertaken with this department prior to the submission of a formal planning application.

For Highway Development Control Manager

S|C|P

APPENDIX B

KEY

-  POS AND PLAY AREA
-  STREAM WITH CLEAR ZONE
-  PEDESTRIAN WAY
-  EXISTING TREES RETAINED
-  ROAD OVER STREAM
CONCRETE BOX CULVERT
INDICATIVE SIZE 1000 X 500 MM
-  OVERHEAD POWER LINE
-  GREEN LINK
-  PLOT FRONTAGE
-  VEHICLE ENTRANCE
-  AREA REFERENCE
-  PLANTING AND ATTENUATION AREA
SURFACE WATER
-  PROPOSED POND
-  PROPOSED GABION BANK REINFORCEMENT
TO INCREASE BED OF STREAM TO
1.5M, 10M EITHER SIDE OF STRUCTURE
-  OTHER LAND IN OWNERSHIP
SITE LIMITS
-  + 89.200
-  DEVELOPABLE AREA
-  HIGHWAY & PEDESTRIAN



ANWYL HOMES PARC CELYN DEVELOPEMENT

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SCALEBAR:
 0 20m 40m 60m 80m 100m
 1:1000

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REV.	DATE	BY	DESCRIPTION
A	20/12/16	BWL	Flood storage area indicated and housing omitted in area "F"
B	6/02/17	BWL	Flood storage area indicated and housing altered to avoid flood plain
C	13/03/17	BWL	Flood storage and surface water area indicated and housing layout altered

D	06/04/17	BWL	Structure 2 proposal altered
E	06/04/17	BWL	Attenuation Areas Added and units reduced in numbers
F	17/07/17		Layout of parking and footway altered
G	29/08/17		Layout of entrance roads and housing layout to north

H	30/08/17		Amendment to green areas and turning head
	06/10/17		Amendment turning head

CLIENT/PROJECT:
THE CLARK ESTATE
LAND AT ABERMORDDU

DRAWING TITLE:
INDICATIVE SITE PLAN

SCALE: 1:1000/250
 1:2000/500@A3 A1

DATE: 17.10.17

DRAWN BY:

CHECKED BY:

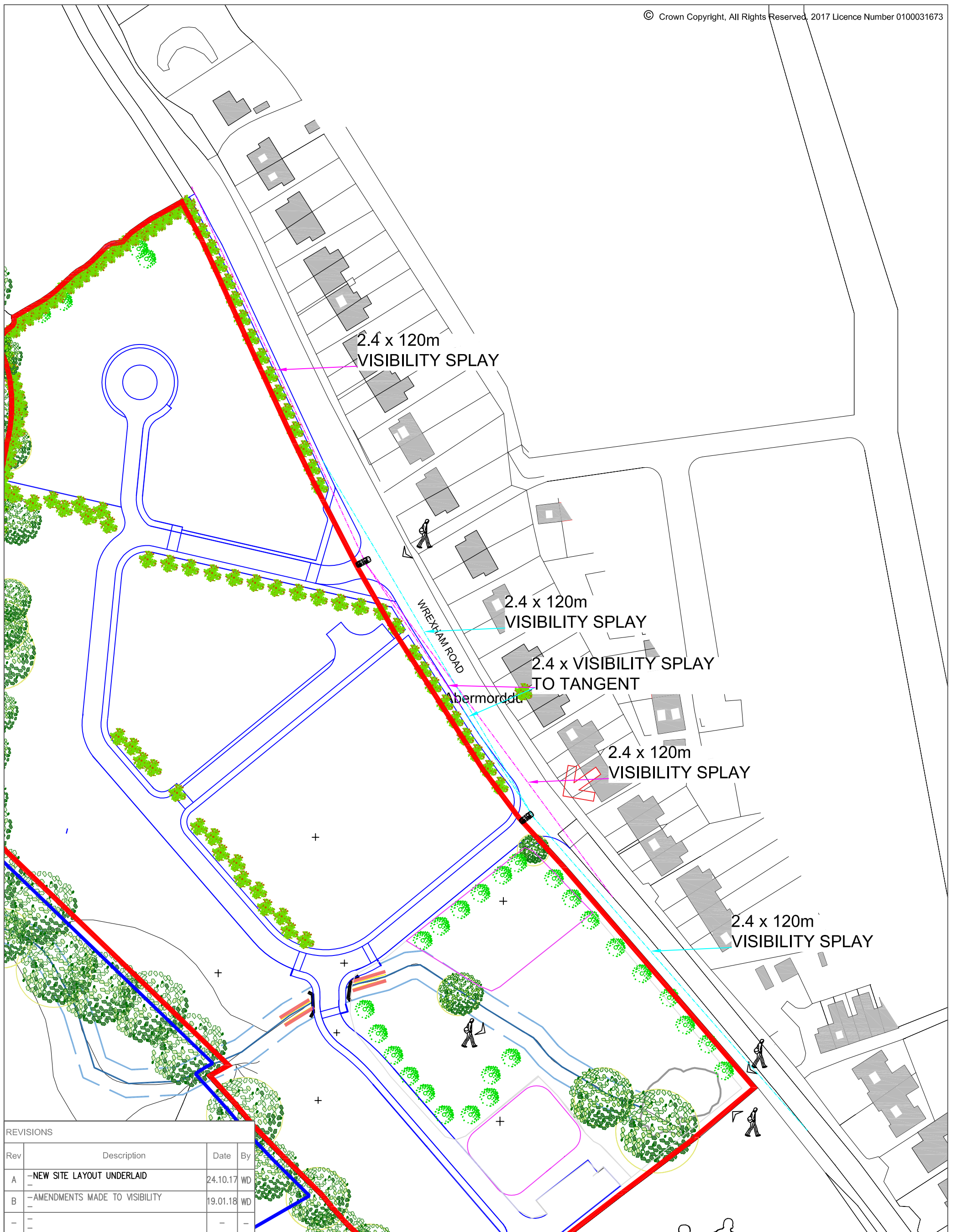
NORTH

JOB/DRAWING NUMBER:
1610 :SK05

REVISION: I STATUS:
DRAFT

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APPENDIX C



REVISIONS			
Rev	Description	Date	By
A	-NEW SITE LAYOUT UNDERLAID	24.10.17	WD
B	-AMENDMENTS MADE TO VISIBILITY	19.01.18	WD
-	-	-	-

SCP
 Transportation Planning : Infrastructure Design
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Client THE CLARK ESTATE
Project Title WREXHAM ROAD, ABERMORDDU

Drawing Title VISIBILITY SPLAYS

Scale 1:1000 @ A3
Date 04.09.2017
Approved/ Unapproved -

By WD
Checked CT / PT
Status PLANNING

Drawing No. SCP/16244/F01
Revision B

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APPENDIX D

TRIP RATE CALCULATION SELECTION PARAMETERS:

Land Use : 03 - RESIDENTIAL
 Category : A - HOUSES PRIVATELY OWNED

MULTI-MODAL VEHICLESSelected regions and areas:

02 SOUTH EAST	
SC SURREY	1 days
WS WEST SUSSEX	1 days
06 WEST MIDLANDS	
SH SHROPSHIRE	1 days
07 YORKSHIRE & NORTH LINCOLNSHIRE	
NY NORTH YORKSHIRE	1 days
09 NORTH	
CB CUMBRIA	1 days

This section displays the number of survey days per TRICS® sub-region in the selected set

Secondary Filtering selection:

This data displays the chosen trip rate parameter and its selected range. Only sites that fall within the parameter range are included in the trip rate calculation.

Parameter: Number of dwellings
 Actual Range: 54 to 151 (units:)
 Range Selected by User: 40 to 160 (units:)

Public Transport Provision:

Selection by: Include all surveys

Date Range: 01/01/09 to 27/11/17

This data displays the range of survey dates selected. Only surveys that were conducted within this date range are included in the trip rate calculation.

Selected survey days:

Tuesday	1 days
Thursday	3 days
Friday	1 days

This data displays the number of selected surveys by day of the week.

Selected survey types:

Manual count	5 days
Directional ATC Count	0 days

This data displays the number of manual classified surveys and the number of unclassified ATC surveys, the total adding up to the overall number of surveys in the selected set. Manual surveys are undertaken using staff, whilst ATC surveys are undertaken using machines.

Selected Locations:

Edge of Town	5
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This data displays the number of surveys per main location category within the selected set. The main location categories consist of Free Standing, Edge of Town, Suburban Area, Neighbourhood Centre, Edge of Town Centre, Town Centre and Not Known.

Selected Location Sub Categories:

Residential Zone	3
No Sub Category	2

This data displays the number of surveys per location sub-category within the selected set. The location sub-categories consist of Commercial Zone, Industrial Zone, Development Zone, Residential Zone, Retail Zone, Built-Up Zone, Village, Out of Town, High Street and No Sub Category.

Secondary Filtering selection:Use Class:

C3	5 days
----	--------

This data displays the number of surveys per Use Class classification within the selected set. The Use Classes Order 2005 has been used for this purpose, which can be found within the Library module of TRICS®.

Secondary Filtering selection (Cont.):Population within 1 mile:

5,001 to 10,000	3 days
10,001 to 15,000	2 days

This data displays the number of selected surveys within stated 1-mile radii of population.

Population within 5 miles:

25,001 to 50,000	2 days
75,001 to 100,000	2 days
100,001 to 125,000	1 days

This data displays the number of selected surveys within stated 5-mile radii of population.

Car ownership within 5 miles:

0.6 to 1.0	1 days
1.1 to 1.5	4 days

This data displays the number of selected surveys within stated ranges of average cars owned per residential dwelling, within a radius of 5-miles of selected survey sites.

Travel Plan:

Yes	1 days
No	4 days

This data displays the number of surveys within the selected set that were undertaken at sites with Travel Plans in place, and the number of surveys that were undertaken at sites without Travel Plans.

PTAL Rating:

No PTAL Present	5 days
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This data displays the number of selected surveys with PTAL Ratings.

LIST OF SITES relevant to selection parameters

1	CB-03-A-04	SEMI DETACHED	CUMBRIA
	MOORCLOSE ROAD		
	SALTERBACK		
	WORKINGTON		
	Edge of Town		
	No Sub Category		
	Total Number of dwellings:	82	
	Survey date: FRIDAY	24/04/09	Survey Type: MANUAL
2	NY-03-A-10	HOUSES AND FLATS	NORTH YORKSHIRE
	BOROUGHBRIDGE ROAD		
	RIPON		
	Edge of Town		
	No Sub Category		
	Total Number of dwellings:	71	
	Survey date: TUESDAY	17/09/13	Survey Type: MANUAL
3	SC-03-A-04	DETACHED & TERRACED	SURREY
	HIGH ROAD		
	BYFLEET		
	Edge of Town		
	Residential Zone		
	Total Number of dwellings:	71	
	Survey date: THURSDAY	23/01/14	Survey Type: MANUAL
4	SH-03-A-05	SEMI-DETACHED/ TERRACED	SHROPSHIRE
	SANDCROFT		
	SUTTON HILL		
	TELFORD		
	Edge of Town		
	Residential Zone		
	Total Number of dwellings:	54	
	Survey date: THURSDAY	24/10/13	Survey Type: MANUAL
5	WS-03-A-04	MIXED HOUSES	WEST SUSSEX
	HILLS FARM LANE		
	BROADBRIDGE HEATH		
	HORSHAM		
	Edge of Town		
	Residential Zone		
	Total Number of dwellings:	151	
	Survey date: THURSDAY	11/12/14	Survey Type: MANUAL

This section provides a list of all survey sites and days in the selected set. For each individual survey site, it displays a unique site reference code and site address, the selected trip rate calculation parameter and its value, the day of the week and date of each survey, and whether the survey was a manual classified count or an ATC count.

TRIP RATE for Land Use 03 - RESIDENTIAL/A - HOUSES PRIVATELY OWNED

MULTI-MODAL VEHICLES**Calculation factor: 1 DWELLS****BOLD print indicates peak (busiest) period**

Time Range	ARRIVALS			DEPARTURES			TOTALS		
	No. Days	Ave. DWELLS	Trip Rate	No. Days	Ave. DWELLS	Trip Rate	No. Days	Ave. DWELLS	Trip Rate
00:00 - 01:00									
01:00 - 02:00									
02:00 - 03:00									
03:00 - 04:00									
04:00 - 05:00									
05:00 - 06:00									
06:00 - 07:00									
07:00 - 08:00	5	86	0.089	5	86	0.294	5	86	0.383
08:00 - 09:00	5	86	0.154	5	86	0.359	5	86	0.513
09:00 - 10:00	5	86	0.138	5	86	0.172	5	86	0.310
10:00 - 11:00	5	86	0.133	5	86	0.179	5	86	0.312
11:00 - 12:00	5	86	0.149	5	86	0.177	5	86	0.326
12:00 - 13:00	5	86	0.152	5	86	0.154	5	86	0.306
13:00 - 14:00	5	86	0.182	5	86	0.159	5	86	0.341
14:00 - 15:00	5	86	0.172	5	86	0.177	5	86	0.349
15:00 - 16:00	5	86	0.254	5	86	0.189	5	86	0.443
16:00 - 17:00	5	86	0.277	5	86	0.170	5	86	0.447
17:00 - 18:00	5	86	0.326	5	86	0.131	5	86	0.457
18:00 - 19:00	5	86	0.214	5	86	0.147	5	86	0.361
19:00 - 20:00									
20:00 - 21:00									
21:00 - 22:00									
22:00 - 23:00									
23:00 - 24:00									
Total Rates:			2.240			2.308			4.548

This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.

To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is: $COUNT/TRP * FACT$. Trip rates are then rounded to 3 decimal places.

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Parameter summary

Trip rate parameter range selected:	54 - 151 (units:)
Survey date range:	01/01/09 - 27/11/17
Number of weekdays (Monday-Friday):	5
Number of Saturdays:	0
Number of Sundays:	0
Surveys automatically removed from selection:	0
Surveys manually removed from selection:	0

This section displays a quick summary of some of the data filtering selections made by the TRICS® user. The trip rate calculation parameter range of all selected surveys is displayed first, followed by the range of minimum and maximum survey dates selected by the user. Then, the total number of selected weekdays and weekend days in the selected set of surveys are shown. Finally, the number of survey days that have been manually removed from the selected set outside of the standard filtering procedure are displayed.

TRIP RATE for Land Use 03 - RESIDENTIAL/A - HOUSES PRIVATELY OWNED

MULTI-MODAL CYCLISTS

Calculation factor: 1 DWELLS

BOLD print indicates peak (busiest) period

Time Range	ARRIVALS			DEPARTURES			TOTALS		
	No. Days	Ave. DWELLS	Trip Rate	No. Days	Ave. DWELLS	Trip Rate	No. Days	Ave. DWELLS	Trip Rate
00:00 - 01:00									
01:00 - 02:00									
02:00 - 03:00									
03:00 - 04:00									
04:00 - 05:00									
05:00 - 06:00									
06:00 - 07:00									
07:00 - 08:00	5	86	0.007	5	86	0.002	5	86	0.009
08:00 - 09:00	5	86	0.000	5	86	0.023	5	86	0.023
09:00 - 10:00	5	86	0.000	5	86	0.005	5	86	0.005
10:00 - 11:00	5	86	0.005	5	86	0.014	5	86	0.019
11:00 - 12:00	5	86	0.002	5	86	0.002	5	86	0.004
12:00 - 13:00	5	86	0.005	5	86	0.000	5	86	0.005
13:00 - 14:00	5	86	0.007	5	86	0.002	5	86	0.009
14:00 - 15:00	5	86	0.005	5	86	0.002	5	86	0.007
15:00 - 16:00	5	86	0.007	5	86	0.005	5	86	0.012
16:00 - 17:00	5	86	0.019	5	86	0.009	5	86	0.028
17:00 - 18:00	5	86	0.014	5	86	0.002	5	86	0.016
18:00 - 19:00	5	86	0.000	5	86	0.002	5	86	0.002
19:00 - 20:00									
20:00 - 21:00									
21:00 - 22:00									
22:00 - 23:00									
23:00 - 24:00									
Total Rates:			0.071			0.068			0.139

This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.

To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is: COUNT/TRP* FACT. Trip rates are then rounded to 3 decimal places.

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Parameter summary

Trip rate parameter range selected:	54 - 151 (units:)
Survey date range:	01/01/09 - 27/11/17
Number of weekdays (Monday-Friday):	5
Number of Saturdays:	0
Number of Sundays:	0
Surveys automatically removed from selection:	0
Surveys manually removed from selection:	0

This section displays a quick summary of some of the data filtering selections made by the TRICS® user. The trip rate calculation parameter range of all selected surveys is displayed first, followed by the range of minimum and maximum survey dates selected by the user. Then, the total number of selected weekdays and weekend days in the selected set of surveys are shown. Finally, the number of survey days that have been manually removed from the selected set outside of the standard filtering procedure are displayed.

TRIP RATE for Land Use 03 - RESIDENTIAL/A - HOUSES PRIVATELY OWNED

MULTI-MODAL PEDESTRIANS

Calculation factor: 1 DWELLS

BOLD print indicates peak (busiest) period

Time Range	ARRIVALS			DEPARTURES			TOTALS		
	No. Days	Ave. DWELLS	Trip Rate	No. Days	Ave. DWELLS	Trip Rate	No. Days	Ave. DWELLS	Trip Rate
00:00 - 01:00									
01:00 - 02:00									
02:00 - 03:00									
03:00 - 04:00									
04:00 - 05:00									
05:00 - 06:00									
06:00 - 07:00									
07:00 - 08:00	5	86	0.019	5	86	0.033	5	86	0.052
08:00 - 09:00	5	86	0.016	5	86	0.047	5	86	0.063
09:00 - 10:00	5	86	0.023	5	86	0.047	5	86	0.070
10:00 - 11:00	5	86	0.044	5	86	0.026	5	86	0.070
11:00 - 12:00	5	86	0.009	5	86	0.016	5	86	0.025
12:00 - 13:00	5	86	0.009	5	86	0.019	5	86	0.028
13:00 - 14:00	5	86	0.028	5	86	0.016	5	86	0.044
14:00 - 15:00	5	86	0.054	5	86	0.040	5	86	0.094
15:00 - 16:00	5	86	0.061	5	86	0.028	5	86	0.089
16:00 - 17:00	5	86	0.061	5	86	0.040	5	86	0.101
17:00 - 18:00	5	86	0.044	5	86	0.030	5	86	0.074
18:00 - 19:00	5	86	0.049	5	86	0.037	5	86	0.086
19:00 - 20:00									
20:00 - 21:00									
21:00 - 22:00									
22:00 - 23:00									
23:00 - 24:00									
Total Rates:			0.417			0.379			0.796

This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.

To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is: COUNT/TRP* FACT. Trip rates are then rounded to 3 decimal places.

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Parameter summary

Trip rate parameter range selected:	54 - 151 (units:)
Survey date range:	01/01/09 - 27/11/17
Number of weekdays (Monday-Friday):	5
Number of Saturdays:	0
Number of Sundays:	0
Surveys automatically removed from selection:	0
Surveys manually removed from selection:	0

This section displays a quick summary of some of the data filtering selections made by the TRICS® user. The trip rate calculation parameter range of all selected surveys is displayed first, followed by the range of minimum and maximum survey dates selected by the user. Then, the total number of selected weekdays and weekend days in the selected set of surveys are shown. Finally, the number of survey days that have been manually removed from the selected set outside of the standard filtering procedure are displayed.

TRIP RATE for Land Use 03 - RESIDENTIAL/A - HOUSES PRIVATELY OWNED

MULTI-MODAL PUBLIC TRANSPORT USERS

Calculation factor: 1 DWELLS

BOLD print indicates peak (busiest) period

Time Range	ARRIVALS			DEPARTURES			TOTALS		
	No. Days	Ave. DWELLS	Trip Rate	No. Days	Ave. DWELLS	Trip Rate	No. Days	Ave. DWELLS	Trip Rate
00:00 - 01:00									
01:00 - 02:00									
02:00 - 03:00									
03:00 - 04:00									
04:00 - 05:00									
05:00 - 06:00									
06:00 - 07:00									
07:00 - 08:00	5	86	0.000	5	86	0.005	5	86	0.005
08:00 - 09:00	5	86	0.005	5	86	0.000	5	86	0.005
09:00 - 10:00	5	86	0.000	5	86	0.002	5	86	0.002
10:00 - 11:00	5	86	0.000	5	86	0.005	5	86	0.005
11:00 - 12:00	5	86	0.002	5	86	0.000	5	86	0.002
12:00 - 13:00	5	86	0.000	5	86	0.000	5	86	0.000
13:00 - 14:00	5	86	0.000	5	86	0.000	5	86	0.000
14:00 - 15:00	5	86	0.000	5	86	0.002	5	86	0.002
15:00 - 16:00	5	86	0.000	5	86	0.000	5	86	0.000
16:00 - 17:00	5	86	0.005	5	86	0.002	5	86	0.007
17:00 - 18:00	5	86	0.002	5	86	0.002	5	86	0.004
18:00 - 19:00	5	86	0.005	5	86	0.000	5	86	0.005
19:00 - 20:00									
20:00 - 21:00									
21:00 - 22:00									
22:00 - 23:00									
23:00 - 24:00									
Total Rates:			0.019			0.018			0.037

This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.

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Parameter summary

Trip rate parameter range selected:	54 - 151 (units:)
Survey date date range:	01/01/09 - 27/11/17
Number of weekdays (Monday-Friday):	5
Number of Saturdays:	0
Number of Sundays:	0
Surveys automatically removed from selection:	0
Surveys manually removed from selection:	0

This section displays a quick summary of some of the data filtering selections made by the TRICS® user. The trip rate calculation parameter range of all selected surveys is displayed first, followed by the range of minimum and maximum survey dates selected by the user. Then, the total number of selected weekdays and weekend days in the selected set of surveys are show. Finally, the number of survey days that have been manually removed from the selected set outside of the standard filtering procedure are displayed.

S|C|P

APPENDIX E

Junctions 9
PICADY 9 - Priority Intersection Module
Version: 9.0.2.5947 © Copyright TRL Limited, 2017
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Filename: SITE ACCESS_Technical Note_January_2017.j9
 Path: Z:\Job Library\2016\16244 - Wrexham Road, Abermorddu\Traffic Data\PICADY
 Report generation date: 23/01/2018 15:02:25

»2022, AM
 »2022, PM

Summary of junction performance

	AM				PM			
	Queue (PCU)	Delay (s)	RFC	LOS	Queue (PCU)	Delay (s)	RFC	LOS
	2022							
Stream B-C	0.0	7.50	0.03	A	0.0	6.81	0.01	A
Stream B-A	0.1	16.16	0.07	C	0.0	13.19	0.03	B
Stream C-AB	0.0	4.10	0.02	A	0.1	4.34	0.04	A

There are warnings associated with one or more model runs - see the 'Data Errors and Warnings' tables for each Analysis or Demand Set.

Values shown are the highest values encountered over all time segments. Delay is the maximum value of average delay per arriving vehicle.

File summary

File Description

Title	(untitled)
Location	
Site number	
Date	01/09/2017
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Enumerator	SCP\craig.thomson
Description	

Units

Distance units	Speed units	Traffic units input	Traffic units results	Flow units	Average delay units	Total delay units	Rate of delay units
m	kph	PCU	PCU	perHour	s	-Min	perMin

Analysis Options

Vehicle length (m)	Calculate Queue Percentiles	Calculate detailed queueing delay	Calculate residual capacity	RFC Threshold	Average Delay threshold (s)	Queue threshold (PCU)
5.75				0.85	36.00	20.00

Demand Set Summary

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Run automatically
D1	2022	AM	ONE HOUR	07:30	09:00	15	✓
D2	2022	PM	ONE HOUR	16:30	18:00	15	✓

Analysis Set Details

ID	Include in report	Network flow scaling factor (%)	Network capacity scaling factor (%)
A1	✓	100.000	100.000

2022, AM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Vehicle Mix		HV% is zero for all movements / time segments. Vehicle Mix matrix should be completed whether working in PCUs or Vehs.

Junction Network

Junctions

Junction	Name	Junction Type	Major road direction	Junction Delay (s)	Junction LOS
1	untitled	T-Junction	Two-way	0.33	A

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Arms

Arms

Arm	Name	Description	Arm type
A	WREXHAM ROAD SOUTH		Major
B	SITE ACCESS		Minor
C	WREXHAM ROAD NORTH		Major

Major Arm Geometry

Arm	Width of carriageway (m)	Has kerbed central reserve	Has right turn bay	Visibility for right turn (m)	Blocks?	Blocking queue (PCU)
C	6.00			180.0	✓	0.00

Geometries for Arm C are measured opposite Arm B. Geometries for Arm A (if relevant) are measured opposite Arm D.

Minor Arm Geometry

Arm	Minor arm type	Width at give-way (m)	Width at 5m (m)	Width at 10m (m)	Width at 15m (m)	Width at 20m (m)	Estimate flare length	Flare length (PCU)	Visibility to left (m)	Visibility to right (m)
B	One lane plus flare	8.50	3.20	2.75	2.75	2.75		1.00	20	18

Slope / Intercept / Capacity

Priority Intersection Slopes and Intercepts

Junction	Stream	Intercept (PCU/hr)	Slope for A-B	Slope for A-C	Slope for C-A	Slope for C-B
1	B-A	504	0.092	0.232	0.146	0.332
1	B-C	687	0.105	0.266	-	-
1	C-B	678	0.263	0.263	-	-

The slopes and intercepts shown above do NOT include any corrections or adjustments.

Streams may be combined, in which case capacity will be adjusted.

Values are shown for the first time segment only; they may differ for subsequent time segments.

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Run automatically
D1	2022	AM	ONE HOUR	07:30	09:00	15	✓

Vehicle mix varies over turn	Vehicle mix varies over entry	Vehicle mix source	PCU Factor for a HV (PCU)
✓	✓	HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
A		ONE HOUR	✓	626	100.000
B		ONE HOUR	✓	29	100.000
C		ONE HOUR	✓	644	100.000

Origin-Destination Data

Demand (PCU/hr)

	To			
	A	B	C	
From	A	0	6	620
	B	16	0	13
	C	638	6	0

Vehicle Mix

Heavy Vehicle Percentages

	To			
	A	B	C	
From	A	0	0	0
	B	0	0	0
	C	0	0	0

Results

Results Summary for whole modelled period

Stream	Max RFC	Max delay (s)	Max Queue (PCU)	Max LOS	Average Demand (PCU/hr)	Total Junction Arrivals (PCU)
B-C	0.03	7.50	0.0	A	12	18
B-A	0.07	16.16	0.1	C	15	22
C-AB	0.02	4.10	0.0	A	15	23
C-A					576	863
A-B					6	8
A-C					569	853

Main Results for each time segment

07:30 - 07:45

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
B-C	10	2	557	0.018	10	0.0	0.0	6.579	A
B-A	12	3	324	0.037	12	0.0	0.0	11.538	B
C-AB	10	2	887	0.011	10	0.0	0.0	4.105	A
C-A	475	119			475				
A-B	5	1			5				
A-C	467	117			467				

07:45 - 08:00

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
B-C	12	3	531	0.022	12	0.0	0.0	6.936	A
B-A	14	4	289	0.050	14	0.0	0.1	13.110	B
C-AB	14	3	935	0.015	14	0.0	0.0	3.908	A
C-A	565	141			565				
A-B	5	1			5				
A-C	557	139			557				

08:00 - 08:15

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
B-C	14	4	494	0.029	14	0.0	0.0	7.497	A
B-A	18	4	240	0.073	18	0.1	0.1	16.145	C
C-AB	22	5	1006	0.022	22	0.0	0.0	3.659	A
C-A	687	172			687				
A-B	7	2			7				
A-C	683	171			683				

08:15 - 08:30

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
B-C	14	4	494	0.029	14	0.0	0.0	7.504	A
B-A	18	4	240	0.073	18	0.1	0.1	16.157	C
C-AB	22	5	1006	0.022	22	0.0	0.0	3.662	A
C-A	687	172			687				
A-B	7	2			7				
A-C	683	171			683				

08:30 - 08:45

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
B-C	12	3	530	0.022	12	0.0	0.0	6.947	A
B-A	14	4	289	0.050	14	0.1	0.1	13.125	B
C-AB	14	4	935	0.015	14	0.0	0.0	3.910	A
C-A	565	141			565				
A-B	5	1			5				
A-C	557	139			557				

08:45 - 09:00

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
B-C	10	2	556	0.018	10	0.0	0.0	6.594	A
B-A	12	3	324	0.037	12	0.1	0.0	11.550	B
C-AB	10	2	887	0.011	10	0.0	0.0	4.105	A
C-A	475	119			475				
A-B	5	1			5				
A-C	467	117			467				

2022, PM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Vehicle Mix		HV% is zero for all movements / time segments. Vehicle Mix matrix should be completed whether working in PCUs or Vehs.

Junction Network

Junctions

Junction	Name	Junction Type	Major road direction	Junction Delay (s)	Junction LOS
1	untitled	T-Junction	Two-way	0.23	A

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Run automatically
D2	2022	PM	ONE HOUR	16:30	18:00	15	✓

Vehicle mix varies over turn	Vehicle mix varies over entry	Vehicle mix source	PCU Factor for a HV (PCU)
✓	✓	HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
A		ONE HOUR	✓	530	100.000
B		ONE HOUR	✓	13	100.000
C		ONE HOUR	✓	544	100.000

Origin-Destination Data

Demand (PCU/hr)

		To		
		A	B	C
From	A	0	15	515
	B	7	0	6
	C	532	12	0

Vehicle Mix

Heavy Vehicle Percentages

		To		
		A	B	C
From	A	0	0	0
	B	0	0	0
	C	0	0	0

Results

Results Summary for whole modelled period

Stream	Max RFC	Max delay (s)	Max Queue (PCU)	Max LOS	Average Demand (PCU/hr)	Total Junction Arrivals (PCU)
B-C	0.01	6.81	0.0	A	6	8
B-A	0.03	13.19	0.0	B	6	10
C-AB	0.04	4.34	0.1	A	25	38
C-A					474	711
A-B					14	21
A-C					473	709

Main Results for each time segment

16:30 - 16:45

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
B-C	5	1	586	0.008	4	0.0	0.0	6.187	A
B-A	5	1	351	0.015	5	0.0	0.0	10.413	B
C-AB	17	4	846	0.020	17	0.0	0.0	4.341	A
C-A	392	98			392				
A-B	11	3			11				
A-C	388	97			388				

16:45 - 17:00

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
B-C	5	1	565	0.010	5	0.0	0.0	6.434	A
B-A	6	2	321	0.020	6	0.0	0.0	11.424	B
C-AB	24	6	884	0.027	24	0.0	0.0	4.181	A
C-A	465	116			465				
A-B	13	3			13				
A-C	463	116			463				

17:00 - 17:15

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
B-C	7	2	536	0.012	7	0.0	0.0	6.805	A
B-A	8	2	281	0.027	8	0.0	0.0	13.191	B
C-AB	35	9	940	0.037	35	0.0	0.1	3.978	A
C-A	564	141			564				
A-B	17	4			17				
A-C	567	142			567				

17:15 - 17:30

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
B-C	7	2	535	0.012	7	0.0	0.0	6.808	A
B-A	8	2	281	0.027	8	0.0	0.0	13.193	B
C-AB	35	9	940	0.037	35	0.1	0.1	3.980	A
C-A	564	141			564				
A-B	17	4			17				
A-C	567	142			567				

17:30 - 17:45

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
B-C	5	1	564	0.010	5	0.0	0.0	6.443	A
B-A	6	2	321	0.020	6	0.0	0.0	11.427	B
C-AB	24	6	884	0.027	24	0.1	0.0	4.184	A
C-A	465	116			465				
A-B	13	3			13				
A-C	463	116			463				

17:45 - 18:00

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
B-C	5	1	586	0.008	5	0.0	0.0	6.198	A
B-A	5	1	351	0.015	5	0.0	0.0	10.416	B
C-AB	17	4	846	0.020	17	0.0	0.0	4.343	A
C-A	392	98			392				
A-B	11	3			11				
A-C	388	97			388				

S|C|P

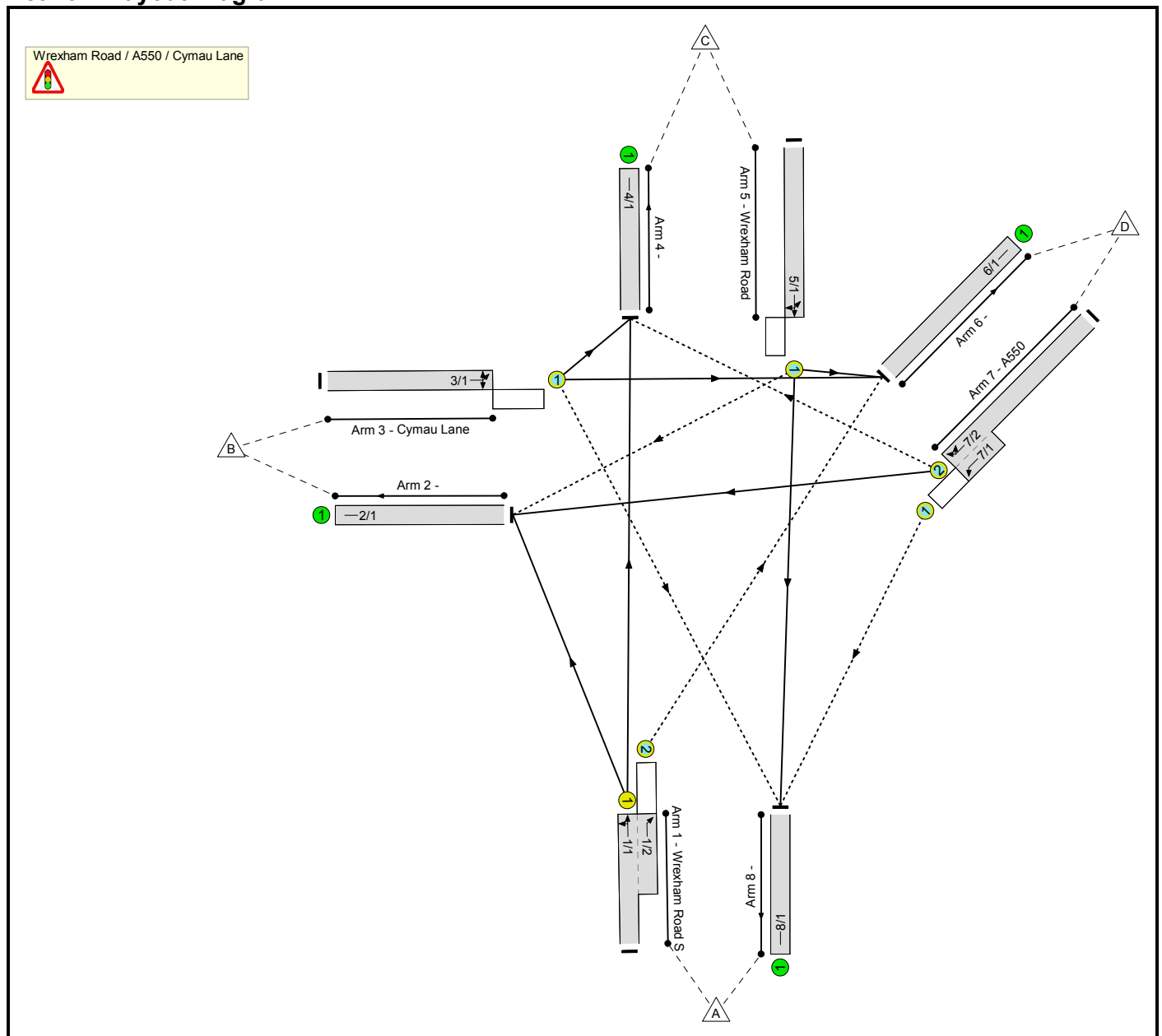
APPENDIX F

Full Input Data And Results
Full Input Data And Results

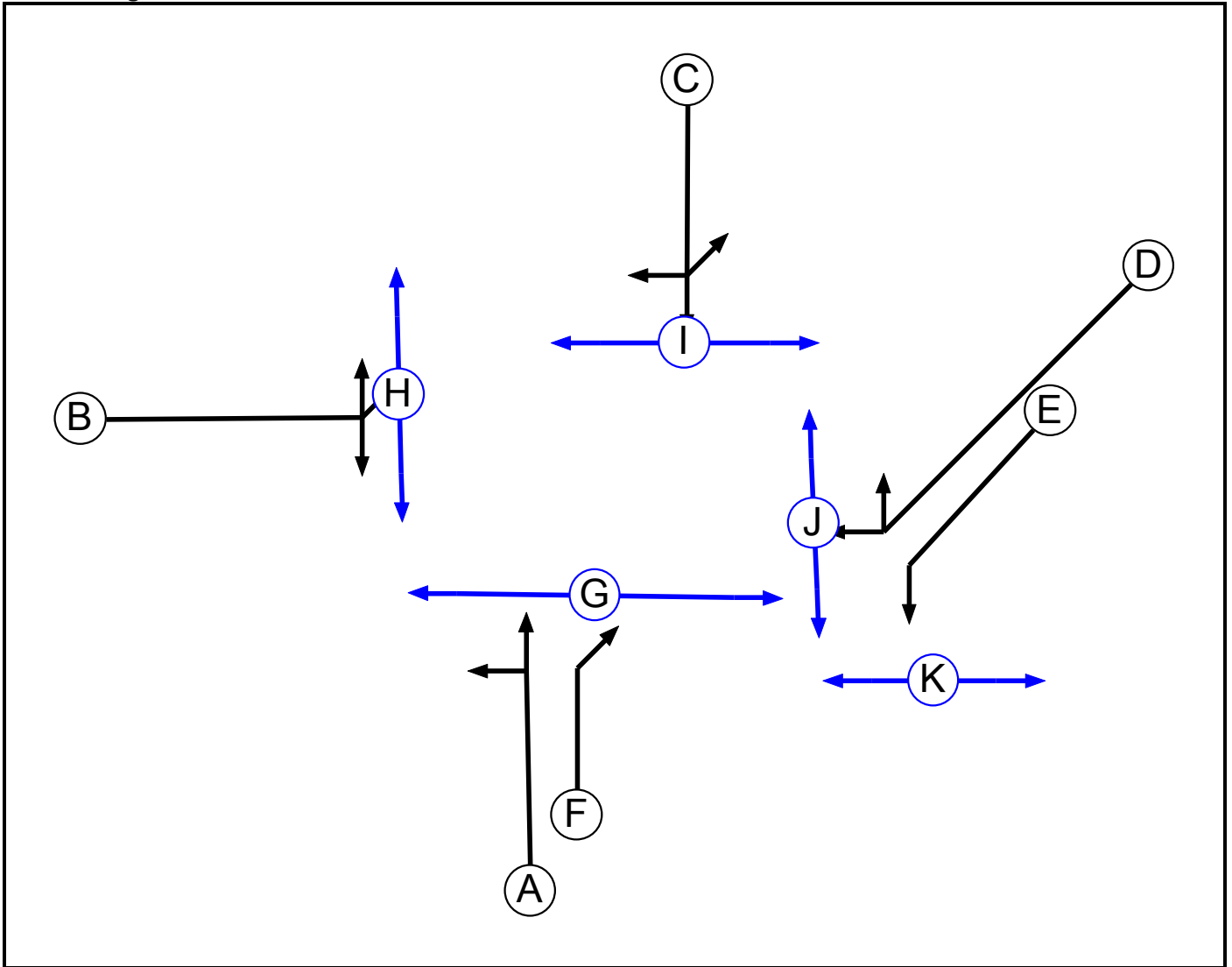
User and Project Details

Project:	Wrexham Road, Abermorddu
Title:	
Location:	
Additional detail:	
File name:	Wrexham Road_A550_Cymau Lane_LB_Technical Note_January 2018.lsg3x
Author:	Sam Beckett
Company:	SCP
Address:	Colwyn Chambers, 19 York Street, Manchester, M20 4BT

Network Layout Diagram



Phase Diagram



Phase Input Data

Phase Name	Phase Type	Assoc. Phase	Street Min	Cont Min
A	Traffic		7	7
B	Traffic		7	7
C	Traffic		7	7
D	Traffic		7	7
E	Traffic		7	7
F	Traffic		7	7
G	Pedestrian		7	7
H	Pedestrian		7	7
I	Pedestrian		7	7
J	Pedestrian		7	7
K	Pedestrian		7	7

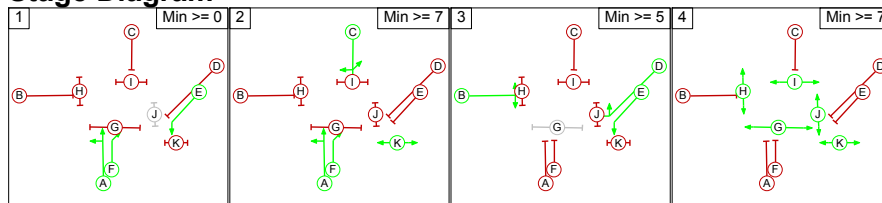
Phase Intergrens Matrix

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

Phases in Stage

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

Stage Diagram



Phase Delays

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

Prohibited Stage Change

From Stage	To Stage			
	1	2	3	4
1	8	6	6	
2	8	8	9	
3	6	8	8	
4	6	6	6	

Full Input Data And Results

Give-Way Lane Input Data

Junction: Wrexham Road / A550 / Cymau Lane

Lane	Movement	Max Flow when Giving Way (PCU/Hr)	Min Flow when Giving Way (PCU/Hr)	Opposing Lane	Opp. Lane Coeff.	Opp. Mvmnts.	Right Turn Storage (PCU)	Non-Blocking Storage (PCU)	RTF	Right Turn Move up (s)	Max Turns in Intergreen (PCU)
1/2 (Wrexham Road S)	6/1 (Right)	1440	0	5/1	1.09	To 6/1 (U-Turn) To 8/1 (Ahead)	4.00	-	0.50	4	4.00
3/1 (Cymau Lane)	8/1 (Right)	1440	0	7/2	1.09	To 2/1 (Right)	4.00	4.00	0.50	4	4.00
5/1 (Wrexham Road)	2/1 (Right)	1440	0	1/1	1.09	All	3.00	3.00	0.50	3	3.00
7/1 (A550)	8/1 (Ahead)	1440	0	5/1	0.22	To 8/1 (Ahead)	3.00	-	0.50	3	3.00
				3/1	0.22	To 8/1 (Right)					
7/2 (A550)	4/1 (Right)	1440	0	3/1	1.09	To 4/1 (Left) To 6/1 (Left)	-	-	-	-	-

Full Input Data And Results

Lane Input Data

Junction: Wrexham Road / A550 / Cymau Lane												
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 (Wrexham Road S)	U	A	2	3	60.0	Geom	-	3.50	0.00	Y	Arm 2 Left	12.00
											Arm 4 Ahead	Inf
1/2 (Wrexham Road S)	O	F	2	3	6.3	Geom	-	3.25	0.00	N	Arm 6 Right	23.00
2/1	U		2	3	60.0	Inf	-	-	-	-	-	-
3/1 (Cymau Lane)	O	B	2	3	60.0	Geom	-	3.00	0.00	Y	Arm 4 Left	14.00
											Arm 6 Left	Inf
											Arm 8 Right	14.00
4/1	U		2	3	60.0	Inf	-	-	-	-	-	-
5/1 (Wrexham Road)	O	C	2	3	60.0	Geom	-	3.25	0.00	Y	Arm 2 Right	20.00
											Arm 6 U-Turn	12.00
											Arm 8 Ahead	Inf
6/1	U		2	3	60.0	Geom	-	3.25	0.00	Y		
7/1 (A550)	O	E	2	3	4.0	Geom	-	3.50	0.00	Y	Arm 8 Ahead	Inf
7/2 (A550)	O	D	2	3	60.0	Geom	-	3.75	0.00	N	Arm 2 Right	Inf
											Arm 4 Right	12.00
8/1	U		2	3	60.0	Geom	-	2.75	0.00	Y		

Traffic Flow Groups

Flow Group	Start Time	End Time	Duration	Formula
1: 'Base 2016 AM'	07:45	08:45	01:00	
2: 'Base 2016 PM'	17:15	18:15	01:00	
3: 'Base 2022 AM'	07:45	08:45	01:00	
4: 'Base 2022 PM'	17:15	18:15	01:00	
5: 'Base + Development 2022 AM'	07:45	08:45	01:00	
6: 'Base + Development 2022 PM'	17:15	18:15	01:00	

Full Input Data And Results

Scenario 1: 'Base 2016 AM' (FG1: 'Base 2016 AM', Plan 1: 'Network Control Plan 1')

Traffic Flows, Desired

Desired Flow :

		Destination				
		A	B	C	D	Tot.
Origin	A	0	33	545	493	1071
	B	77	0	33	45	155
	C	553	28	0	4	585
	D	391	23	3	0	417
	Tot.	1021	84	581	542	2228

Traffic Lane Flows

Lane	Scenario 1: Base 2016 AM
Junction: Wrexham Road / A550 / Cymau Lane	
1/1 (with short)	1071(In) 578(Out)
1/2 (short)	493
2/1	84
3/1	155
4/1	581
5/1	585
6/1	542
7/1 (short)	391
7/2 (with short)	417(In) 26(Out)
8/1	1021

Full Input Data And Results

Lane Saturation Flows

Junction: Wrexham Road / A550 / Cymau Lane								
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 (Wrexham Road S)	3.50	0.00	Y	Arm 2 Left	12.00	5.7 %	1951	1951
				Arm 4 Ahead	Inf	94.3 %		
1/2 (Wrexham Road S)	3.25	0.00	N	Arm 6 Right	23.00	100.0 %	1953	1953
2/1	Infinite Saturation Flow						Inf	Inf
3/1 (Cymau Lane)	3.00	0.00	Y	Arm 4 Left	14.00	21.3 %	1780	1780
				Arm 6 Left	Inf	29.0 %		
				Arm 8 Right	14.00	49.7 %		
4/1	Infinite Saturation Flow						Inf	Inf
5/1 (Wrexham Road)	3.25	0.00	Y	Arm 2 Right	20.00	4.8 %	1931	1931
				Arm 6 U-Turn	12.00	0.7 %		
				Arm 8 Ahead	Inf	94.5 %		
6/1	3.25	0.00	Y				1940	1940
7/1 (A550)	3.50	0.00	Y	Arm 8 Ahead	Inf	100.0 %	1965	1965
7/2 (A550)	3.75	0.00	N	Arm 2 Right	Inf	88.5 %	2100	2100
				Arm 4 Right	12.00	11.5 %		
8/1	2.75	0.00	Y				1890	1890

Scenario 2: 'Base 2016 PM' (FG2: 'Base 2016 PM', Plan 1: 'Network Control Plan 1')

Traffic Flows, Desired

Desired Flow :

Origin	Destination					
	A	B	C	D	Tot.	
A	0	50	456	403	909	
B	35	0	22	17	74	
C	450	28	0	12	490	
D	432	30	6	0	468	
Tot.	917	108	484	432	1941	

Full Input Data And Results

Traffic Lane Flows

Lane	Scenario 2: Base 2016 PM
Junction: Wrexham Road / A550 / Cymau Lane	
1/1 (with short)	909(In) 506(Out)
1/2 (short)	403
2/1	108
3/1	74
4/1	484
5/1	490
6/1	432
7/1 (short)	432
7/2 (with short)	468(In) 36(Out)
8/1	917

Lane Saturation Flows

Junction: Wrexham Road / A550 / Cymau Lane								
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 (Wrexham Road S)	3.50	0.00	Y	Arm 2 Left	12.00	9.9 %	1941	1941
				Arm 4 Ahead	Inf	90.1 %		
1/2 (Wrexham Road S)	3.25	0.00	N	Arm 6 Right	23.00	100.0 %	1953	1953
2/1	Infinite Saturation Flow						Inf	Inf
3/1 (Cymau Lane)	3.00	0.00	Y	Arm 4 Left	14.00	29.7 %	1769	1769
				Arm 6 Left	Inf	23.0 %		
				Arm 8 Right	14.00	47.3 %		
4/1	Infinite Saturation Flow						Inf	Inf
5/1 (Wrexham Road)	3.25	0.00	Y	Arm 2 Right	20.00	5.7 %	1926	1926
				Arm 6 U-Turn	12.00	2.4 %		
				Arm 8 Ahead	Inf	91.8 %		
6/1	3.25	0.00	Y				1940	1940
7/1 (A550)	3.50	0.00	Y	Arm 8 Ahead	Inf	100.0 %	1965	1965
7/2 (A550)	3.75	0.00	N	Arm 2 Right	Inf	83.3 %	2087	2087
				Arm 4 Right	12.00	16.7 %		
8/1	2.75	0.00	Y				1890	1890

Full Input Data And Results

Scenario 3: 'Base 2022 AM' (FG3: 'Base 2022 AM', Plan 1: 'Network Control Plan 1')

Traffic Flows, Desired

Desired Flow :

	Destination					
		A	B	C	D	Tot.
Origin	A	0	35	577	522	1134
	B	81	0	35	48	164
	C	586	30	0	4	620
	D	414	25	3	0	442
	Tot.	1081	90	615	574	2360

Traffic Lane Flows

Lane	Scenario 3: Base 2022 AM
Junction: Wrexham Road / A550 / Cymau Lane	
1/1 (with short)	1134(In) 612(Out)
1/2 (short)	522
2/1	90
3/1	164
4/1	615
5/1	620
6/1	574
7/1 (short)	414
7/2 (with short)	442(In) 28(Out)
8/1	1081

Full Input Data And Results

Lane Saturation Flows

Junction: Wrexham Road / A550 / Cymau Lane								
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 (Wrexham Road S)	3.50	0.00	Y	Arm 2 Left	12.00	5.7 %	1951	1951
				Arm 4 Ahead	Inf	94.3 %		
1/2 (Wrexham Road S)	3.25	0.00	N	Arm 6 Right	23.00	100.0 %	1953	1953
2/1	Infinite Saturation Flow						Inf	Inf
3/1 (Cymau Lane)	3.00	0.00	Y	Arm 4 Left	14.00	21.3 %	1780	1780
				Arm 6 Left	Inf	29.3 %		
				Arm 8 Right	14.00	49.4 %		
4/1	Infinite Saturation Flow						Inf	Inf
5/1 (Wrexham Road)	3.25	0.00	Y	Arm 2 Right	20.00	4.8 %	1931	1931
				Arm 6 U-Turn	12.00	0.6 %		
				Arm 8 Ahead	Inf	94.5 %		
6/1	3.25	0.00	Y				1940	1940
7/1 (A550)	3.50	0.00	Y	Arm 8 Ahead	Inf	100.0 %	1965	1965
7/2 (A550)	3.75	0.00	N	Arm 2 Right	Inf	89.3 %	2102	2102
				Arm 4 Right	12.00	10.7 %		
8/1	2.75	0.00	Y				1890	1890

Scenario 4: 'Base 2022 PM' (FG4: 'Base 2022 PM', Plan 1: 'Network Control Plan 1')

Traffic Flows, Desired

Desired Flow :

Origin	Destination					Tot.
	A	B	C	D	Tot.	
A	0	53	483	427	963	
B	37	0	23	18	78	
C	477	30	0	13	520	
D	458	32	6	0	496	
Tot.	972	115	512	458	2057	

Full Input Data And Results

Traffic Lane Flows

Lane	Scenario 4: Base 2022 PM
Junction: Wrexham Road / A550 / Cymau Lane	
1/1 (with short)	963(In) 536(Out)
1/2 (short)	427
2/1	115
3/1	78
4/1	512
5/1	520
6/1	458
7/1 (short)	458
7/2 (with short)	496(In) 38(Out)
8/1	972

Lane Saturation Flows

Junction: Wrexham Road / A550 / Cymau Lane								
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 (Wrexham Road S)	3.50	0.00	Y	Arm 2 Left	12.00	9.9 %	1941	1941
				Arm 4 Ahead	Inf	90.1 %		
1/2 (Wrexham Road S)	3.25	0.00	N	Arm 6 Right	23.00	100.0 %	1953	1953
2/1	Infinite Saturation Flow						Inf	Inf
3/1 (Cymau Lane)	3.00	0.00	Y	Arm 4 Left	14.00	29.5 %	1769	1769
				Arm 6 Left	Inf	23.1 %		
				Arm 8 Right	14.00	47.4 %		
4/1	Infinite Saturation Flow						Inf	Inf
5/1 (Wrexham Road)	3.25	0.00	Y	Arm 2 Right	20.00	5.8 %	1926	1926
				Arm 6 U-Turn	12.00	2.5 %		
				Arm 8 Ahead	Inf	91.7 %		
6/1	3.25	0.00	Y				1940	1940
7/1 (A550)	3.50	0.00	Y	Arm 8 Ahead	Inf	100.0 %	1965	1965
7/2 (A550)	3.75	0.00	N	Arm 2 Right	Inf	84.2 %	2089	2089
				Arm 4 Right	12.00	15.8 %		
8/1	2.75	0.00	Y				1890	1890

Full Input Data And Results

Scenario 5: 'Base + Development 2022 AM' (FG5: 'Base + Development 2022 AM', Plan 1: 'Network Control Plan 1')

Traffic Flows, Desired

Desired Flow :

		Destination				
		A	B	C	D	Tot.
Origin	A	0	37	582	522	1141
	B	87	0	40	49	176
	C	599	32	0	7	638
	D	414	25	4	0	443
	Tot.	1100	94	626	578	2398

Traffic Lane Flows

Lane	Scenario 5: Base + Development 2022 AM
Junction: Wrexham Road / A550 / Cymau Lane	
1/1 (with short)	1141(In) 619(Out)
1/2 (short)	522
2/1	94
3/1	176
4/1	626
5/1	638
6/1	578
7/1 (short)	414
7/2 (with short)	443(In) 29(Out)
8/1	1100

Full Input Data And Results

Lane Saturation Flows

Junction: Wrexham Road / A550 / Cymau Lane								
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 (Wrexham Road S)	3.50	0.00	Y	Arm 2 Left	12.00	6.0 %	1950	1950
				Arm 4 Ahead	Inf	94.0 %		
1/2 (Wrexham Road S)	3.25	0.00	N	Arm 6 Right	23.00	100.0 %	1953	1953
2/1	Infinite Saturation Flow						Inf	Inf
3/1 (Cymau Lane)	3.00	0.00	Y	Arm 4 Left	14.00	22.7 %	1778	1778
				Arm 6 Left	Inf	27.8 %		
				Arm 8 Right	14.00	49.4 %		
4/1	Infinite Saturation Flow						Inf	Inf
5/1 (Wrexham Road)	3.25	0.00	Y	Arm 2 Right	20.00	5.0 %	1930	1930
				Arm 6 U-Turn	12.00	1.1 %		
				Arm 8 Ahead	Inf	93.9 %		
6/1	3.25	0.00	Y				1940	1940
7/1 (A550)	3.50	0.00	Y	Arm 8 Ahead	Inf	100.0 %	1965	1965
7/2 (A550)	3.75	0.00	N	Arm 2 Right	Inf	86.2 %	2094	2094
				Arm 4 Right	12.00	13.8 %		
8/1	2.75	0.00	Y				1890	1890

Scenario 6: 'Base + Development 2022 PM' (FG6: 'Base + Development 2022 PM', Plan 1: 'Network Control Plan 1')

Traffic Flows, Desired

Desired Flow :

Origin	Destination					
	A	B	C	D	Tot.	
A	0	59	496	427	982	
B	40	0	26	18	84	
C	483	35	0	14	532	
D	458	33	9	0	500	
Tot.	981	127	531	459	2098	

Full Input Data And Results

Traffic Lane Flows

Lane	Scenario 6: Base + Development 2022 PM
Junction: Wrexham Road / A550 / Cymau Lane	
1/1 (with short)	982(In) 555(Out)
1/2 (short)	427
2/1	127
3/1	84
4/1	531
5/1	532
6/1	459
7/1 (short)	458
7/2 (with short)	500(In) 42(Out)
8/1	981

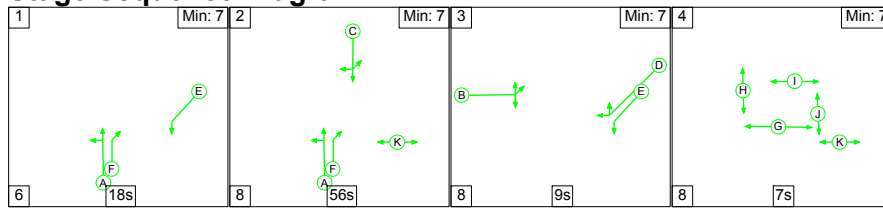
Lane Saturation Flows

Junction: Wrexham Road / A550 / Cymau Lane								
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 (Wrexham Road S)	3.50	0.00	Y	Arm 2 Left Arm 4 Ahead	12.00 Inf	10.6 % 89.4 %	1939	1939
1/2 (Wrexham Road S)	3.25	0.00	N	Arm 6 Right	23.00	100.0 %	1953	1953
2/1	Infinite Saturation Flow						Inf	Inf
3/1 (Cymau Lane)	3.00	0.00	Y	Arm 4 Left Arm 6 Left Arm 8 Right	14.00 Inf 14.00	31.0 % 21.4 % 47.6 %	1766	1766
4/1	Infinite Saturation Flow						Inf	Inf
5/1 (Wrexham Road)	3.25	0.00	Y	Arm 2 Right Arm 6 U-Turn Arm 8 Ahead	20.00 12.00 Inf	6.6 % 2.6 % 90.8 %	1924	1924
6/1	3.25	0.00	Y				1940	1940
7/1 (A550)	3.50	0.00	Y	Arm 8 Ahead	Inf	100.0 %	1965	1965
7/2 (A550)	3.75	0.00	N	Arm 2 Right Arm 4 Right	Inf 12.00	78.6 % 21.4 %	2074	2074
8/1	2.75	0.00	Y				1890	1890

Full Input Data And Results

Scenario 1: 'Base 2016 AM' (FG1: 'Base 2016 AM', Plan 1: 'Network Control Plan 1')

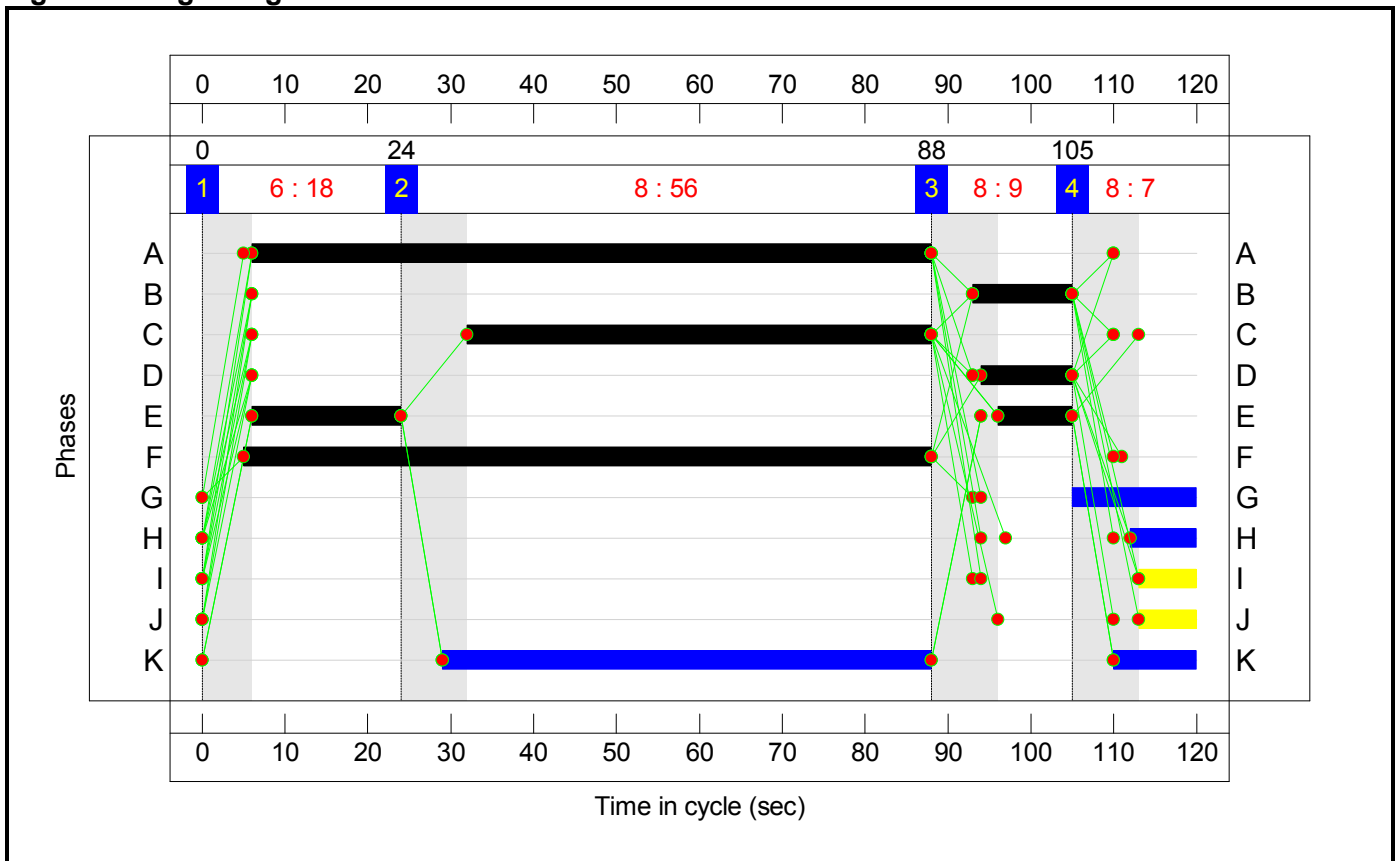
Stage Sequence Diagram



Stage Timings

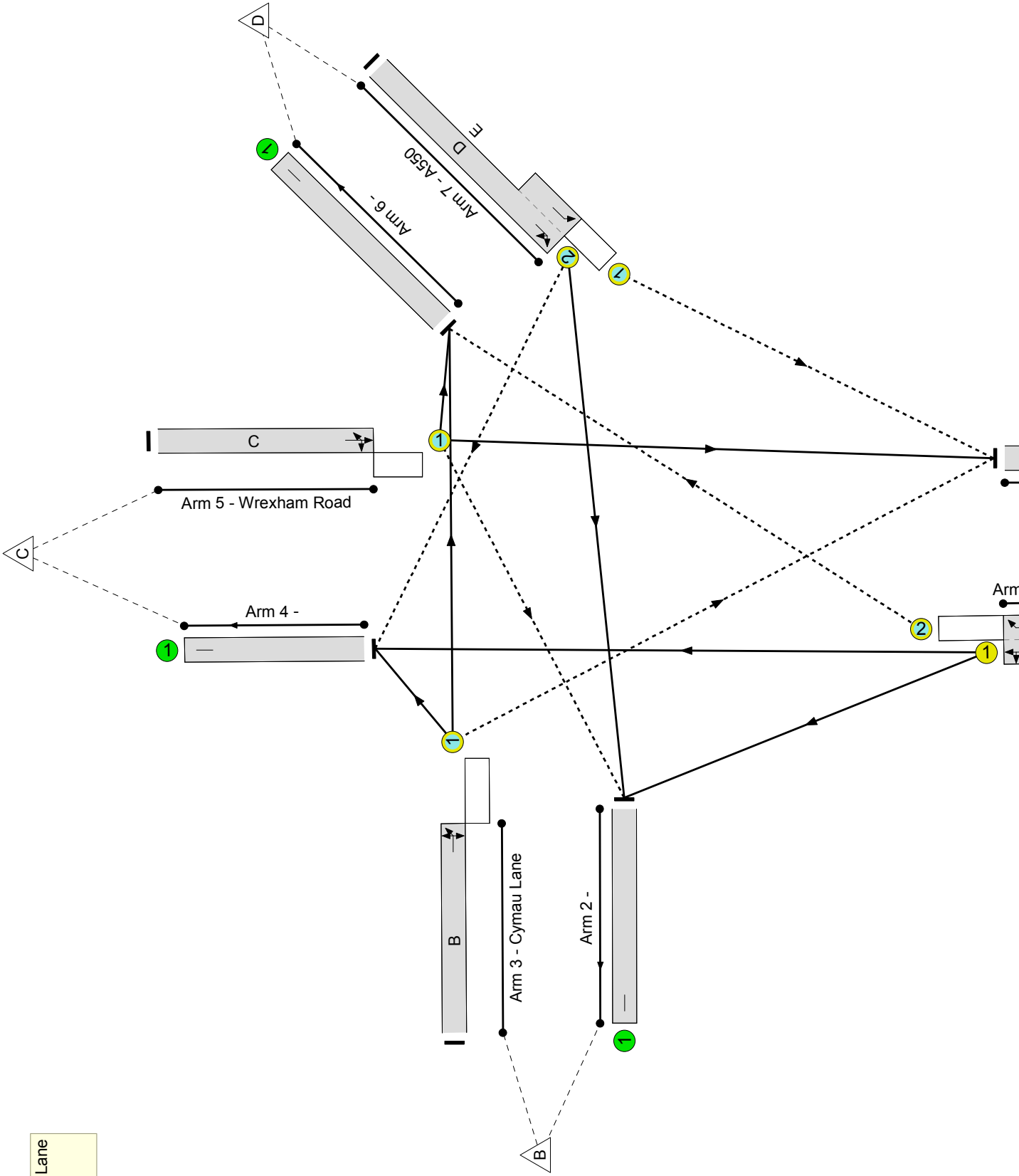
Stage	1	2	3	4
Duration	18	56	9	7
Change Point	0	24	88	105

Signal Timings Diagram



Full Input Data And Results

Wrexham Road / A550 / Cymau Lane
PRC: 7.3%
Total Traffic Delay: 22.6 pcu·hr



Full Input Data And Results

Network Results

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network	-	-	N/A	-	-	-	-	-	-	-	-	-	83.9%
Wrexham Road / A550 / Cymau Lane	-	-	N/A	-	-	-	-	-	-	-	-	-	83.9%
1/1+1/2	Wrexham Road S Left Ahead Right	U+O	N/A	N/A	A F	-	1	82:83	-	1071	1951:1953	1276	83.9%
2/1		U	N/A	N/A	-	-	-	-	-	84	Inf	Inf	0.0%
3/1	Cymau Lane Left Left2 Right	O	N/A	N/A	B	-	1	12	-	155	1780	193	80.4%
4/1		U	N/A	N/A	-	-	-	-	-	581	Inf	Inf	0.0%
5/1	Wrexham Road Right U-Turn Ahead	O	N/A	N/A	C	-	1	56	-	585	1931	917	63.8%
6/1		U	N/A	N/A	-	-	-	-	-	542	1940	1940	27.9%
7/2+7/1	A550 Right Right2 Ahead	O	N/A	N/A	D E	-	1:2	11:27	-	417	2100:1965	499	83.6%
8/1		U	N/A	N/A	-	-	-	-	-	1021	1890	1890	54.0%

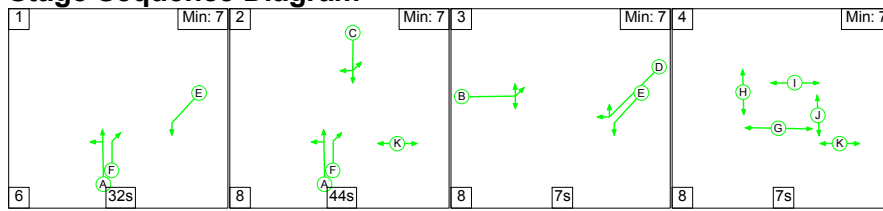
Full Input Data And Results

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	-	-	500	679	207	12.9	8.5	1.2	22.6	-	-	-	-
Wrexham Road / A550 / Cymau Lane	-	-	500	679	207	12.9	8.5	1.2	22.6	-	-	-	-
1/1+1/2	1071	1071	204	242	47	2.4	2.5	1.1	6.1	20.6	12.2	2.5	14.7
2/1	84	84	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
3/1	155	155	76	0	1	2.3	1.9	0.0	4.1	95.8	5.0	1.9	6.9
4/1	581	581	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
5/1	585	585	28	0	0	3.9	0.9	0.0	4.7	29.1	14.6	0.9	15.5
6/1	542	542	-	-	-	0.0	0.2	-	0.2	1.3	0.0	0.2	0.2
7/2+7/1	417	417	193	437	158	4.4	2.4	0.1	6.9	59.4	9.5	2.4	11.9
8/1	1021	1021	-	-	-	0.0	0.6	-	0.6	2.1	4.7	0.6	5.3
C1													
			PRC for Signalled Lanes (%):	7.3	Total Delay for Signalled Lanes (pcuHr):	21.85	Cycle Time (s):	120					
			PRC Over All Lanes (%):	7.3	Total Delay Over All Lanes(pcuHr):	22.63							

Full Input Data And Results

Scenario 2: 'Base 2016 PM' (FG2: 'Base 2016 PM', Plan 1: 'Network Control Plan 1')

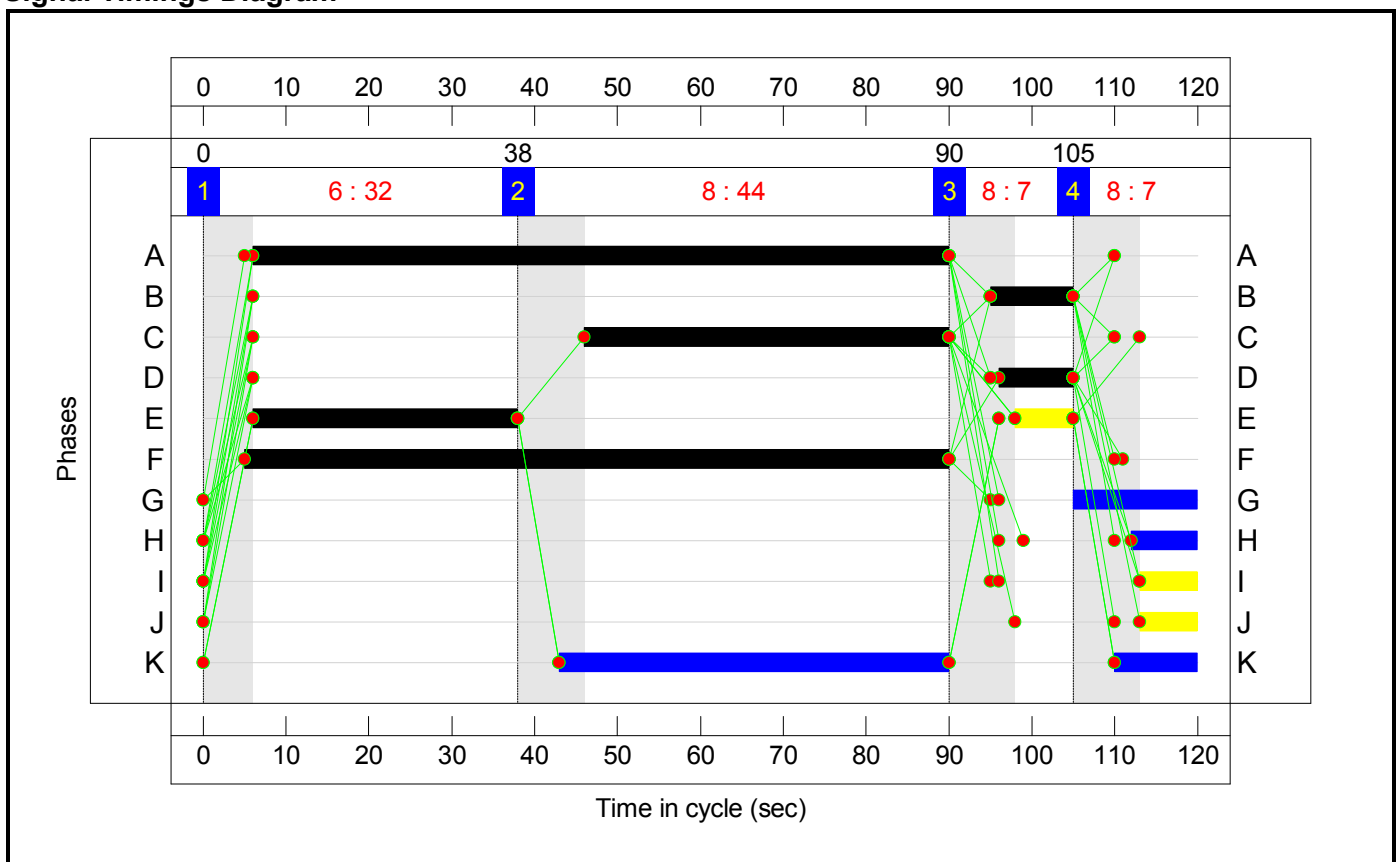
Stage Sequence Diagram



Stage Timings

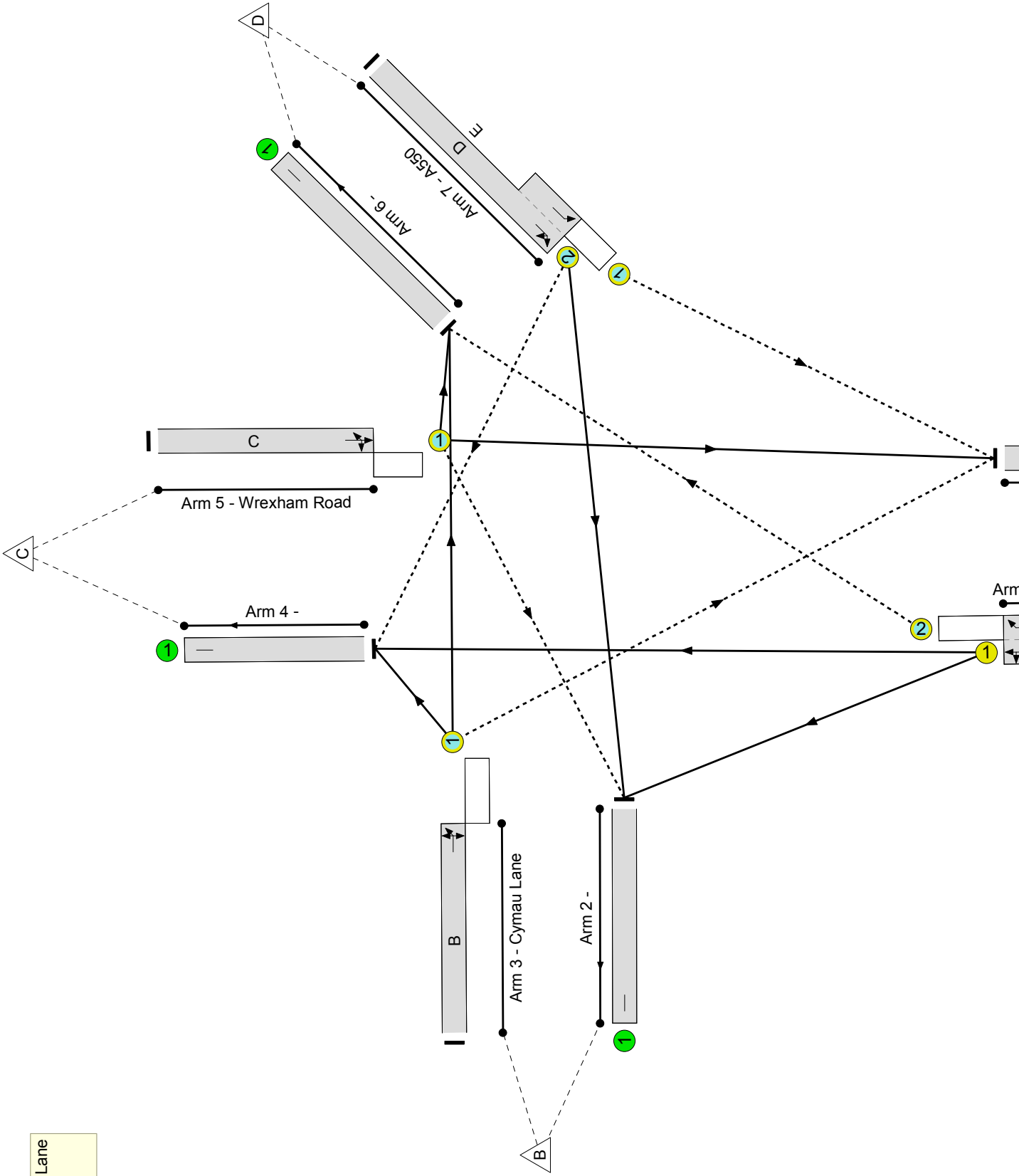
Stage	1	2	3	4
Duration	32	44	7	7
Change Point	0	38	90	105

Signal Timings Diagram



Full Input Data And Results

Wrexham Road / A550 / Cymau Lane
PRC: 32.7 %
Total Traffic Delay: 15.8 pcu·hr



Full Input Data And Results

Network Results

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network	-	-	N/A	-	-	-	-	-	-	-	-	-	67.8%
Wrexham Road / A550 / Cymau Lane	-	-	N/A	-	-	-	-	-	-	-	-	-	67.8%
1/1+1/2	Wrexham Road S Left Ahead Right	U+O	N/A	N/A	A F	-	1	84.85	-	909	1941:1953	1416	64.2%
2/1		U	N/A	N/A	-	-	-	-	-	108	Inf	Inf	0.0%
3/1	Cymau Lane Left Left2 Right	O	N/A	N/A	B	-	1	10	-	74	1769	162	45.6%
4/1		U	N/A	N/A	-	-	-	-	-	484	Inf	Inf	0.0%
5/1	Wrexham Road Right U-Turn Ahead	O	N/A	N/A	C	-	1	44	-	490	1926	722	67.8%
6/1		U	N/A	N/A	-	-	-	-	-	432	1940	1940	22.3%
7/2+7/1	A550 Right Right2 Ahead	O	N/A	N/A	D E	-	1:2	9:39	-	468	2087:1965	700	66.9%
8/1		U	N/A	N/A	-	-	-	-	-	917	1890	1890	48.5%

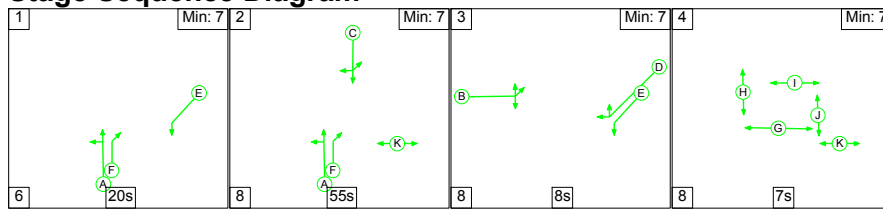
Full Input Data And Results

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	-	-	376	819	147	11.1	4.0	0.7	15.8	-	-	-	-		
Wrexham Road / A550 / Cymau Lane	-	-	376	819	147	11.1	4.0	0.7	15.8	-	-	-	-		
1/1+1/2	909	909	149	238	16	1.7	0.9	0.6	3.2	12.6	7.1	0.9	7.9		
2/1	108	108	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0		
3/1	74	74	34	0	1	1.1	0.4	0.0	1.5	72.5	2.3	0.4	2.7		
4/1	484	484	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0		
5/1	490	490	28	0	0	4.3	1.0	0.0	5.3	39.1	13.6	1.0	14.7		
6/1	432	432	-	-	-	0.0	0.1	-	0.1	1.2	0.0	0.1	0.1		
7/2+7/1	468	468	165	580	130	4.1	1.0	0.1	5.2	39.7	8.8	1.0	9.8		
8/1	917	917	-	-	-	0.0	0.5	-	0.5	1.8	1.6	0.5	2.0		
C1															
PRC for Signalised Lanes (%):				32.7	Total Delay for Signalised Lanes (pcuHr):				15.16	Cycle Time (s):					120
PRC Over All Lanes (%):				32.7	Total Delay Over All Lanes (pcuHr):				15.77						

Full Input Data And Results

Scenario 3: 'Base 2022 AM' (FG3: 'Base 2022 AM', Plan 1: 'Network Control Plan 1')

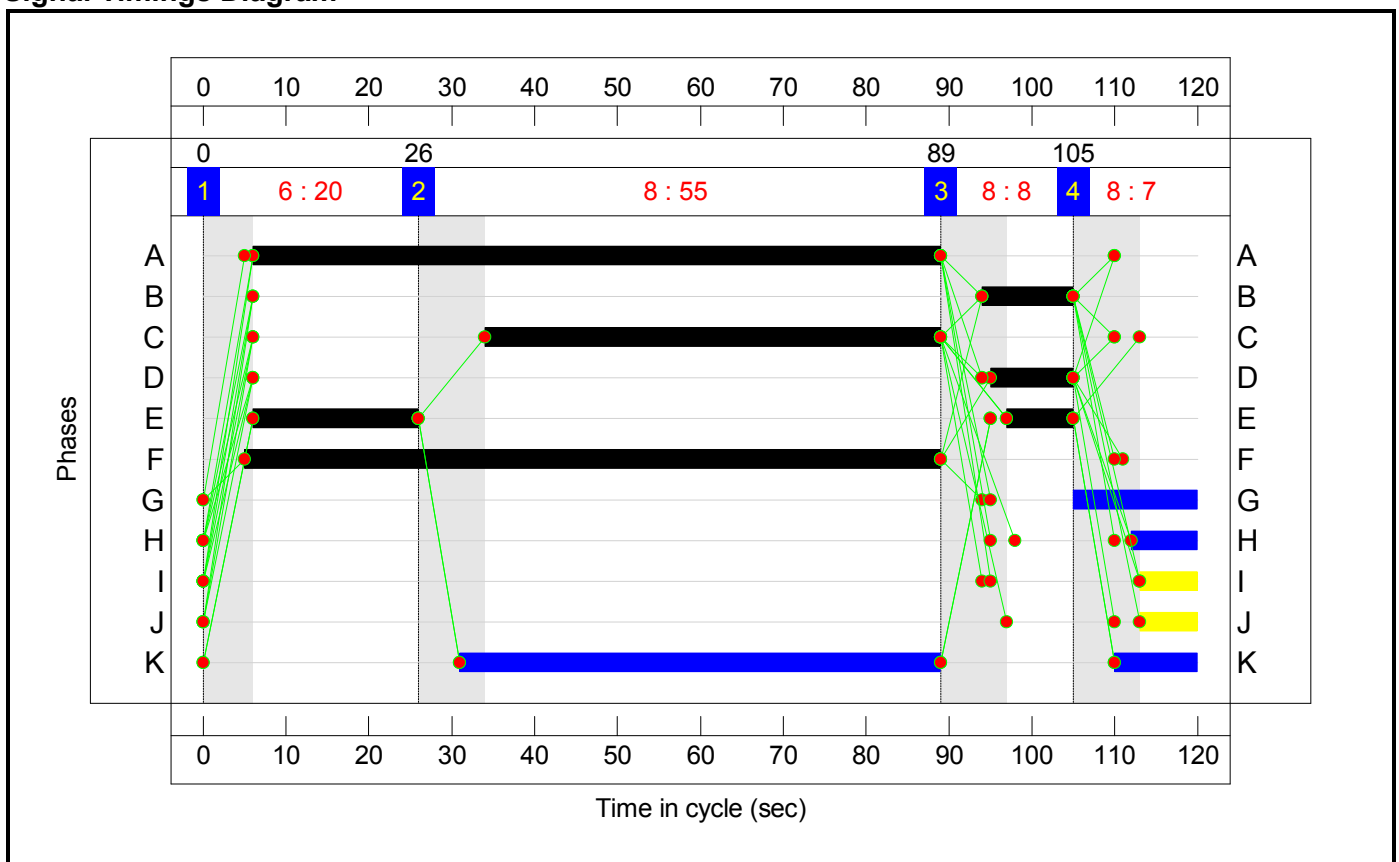
Stage Sequence Diagram



Stage Timings

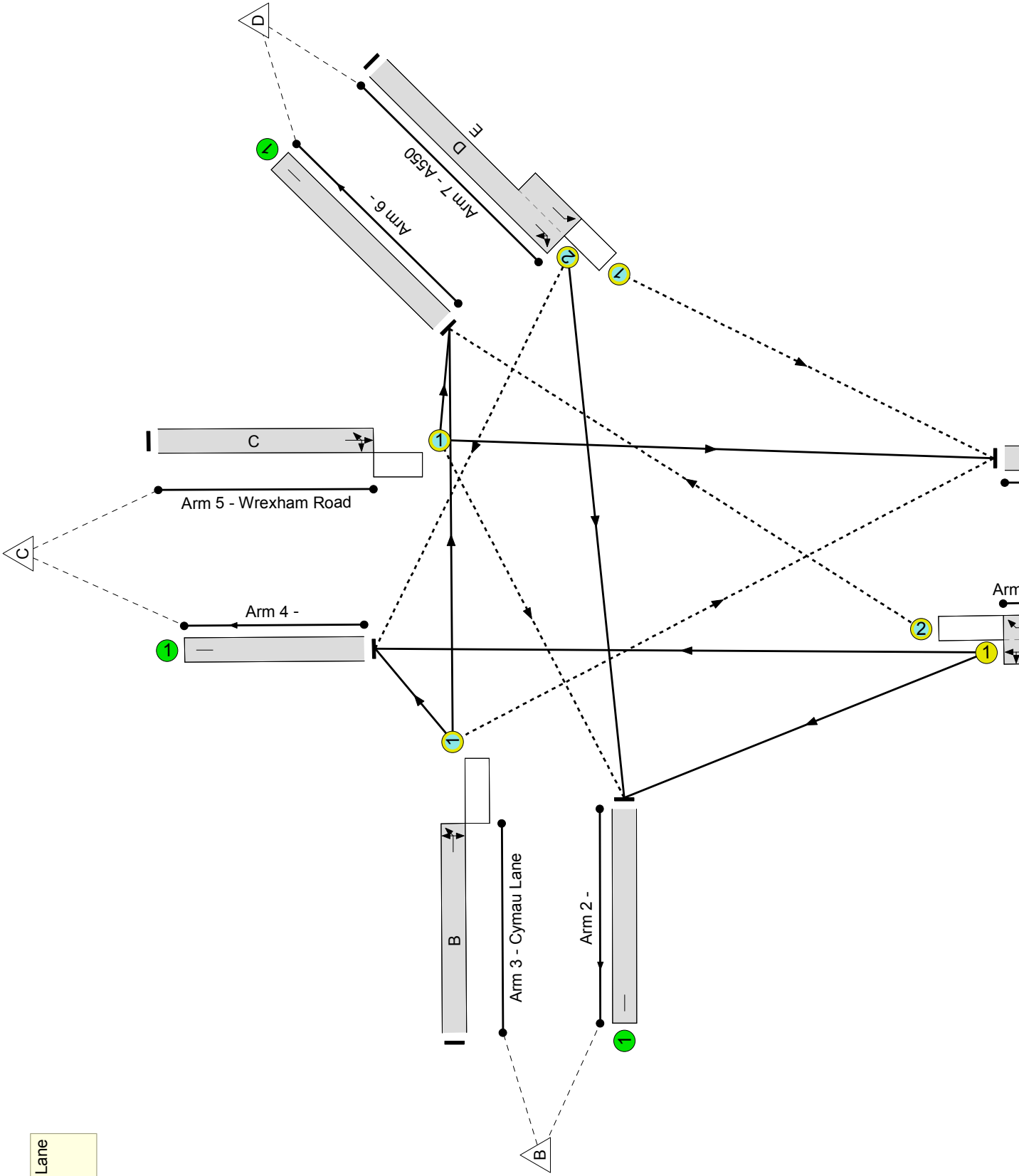
Stage	1	2	3	4
Duration	20	55	8	7
Change Point	0	26	89	105

Signal Timings Diagram



Full Input Data And Results

Wrexham Road / A550 / Cymau Lane
PRC: -2.4 %
Total Traffic Delay: 29.3 pcu/hr



Full Input Data And Results

Network Results

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network	-	-	N/A	-	-	-	-	-	-	-	-	-	92.1%
Wrexham Road / A550 / Cymau Lane	-	-	N/A	-	-	-	-	-	-	-	-	-	92.1%
1/1+1/2	Wrexham Road S Left Ahead Right	U+O	N/A	N/A	A F	-	1	83.84	-	1134	1951:1953	1236	91.7%
2/1		U	N/A	N/A	-	-	-	-	-	90	Inf	Inf	0.0%
3/1	Cymau Lane Left Left2 Right	O	N/A	N/A	B	-	1	11	-	164	1780	178	92.1%
4/1		U	N/A	N/A	-	-	-	-	-	615	Inf	Inf	0.0%
5/1	Wrexham Road Right U-Turn Ahead	O	N/A	N/A	C	-	1	55	-	620	1931	901	68.8%
6/1		U	N/A	N/A	-	-	-	-	-	574	1940	1940	29.6%
7/2+7/1	A550 Right Right2 Ahead	O	N/A	N/A	D E	-	1:2	10:28	-	442	2102:1965	516	85.7%
8/1		U	N/A	N/A	-	-	-	-	-	1081	1890	1890	57.2%

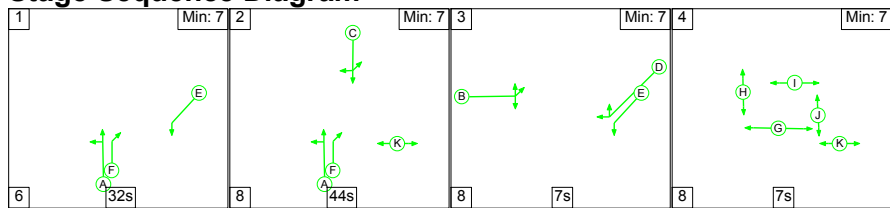
Full Input Data And Results

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	-	-	445	770	252	14.2	13.6	1.5	29.3	-	-	-	-	
Wrexham Road / A550 / Cymau Lane	-	-	445	770	252	14.2	13.6	1.5	29.3	-	-	-	-	
1/1+1/2	1134	1134	170	257	95	2.7	5.1	1.4	9.1	29.0	13.8	5.1	18.9	
2/1	90	90	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0	
3/1	164	164	73	0	8	2.4	3.8	0.0	6.2	137.1	5.4	3.8	9.2	
4/1	615	615	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0	
5/1	620	620	30	0	0	4.3	1.1	0.0	5.4	31.5	16.2	1.1	17.3	
6/1	574	574	-	-	-	0.0	0.2	-	0.2	1.3	1.1	0.2	1.3	
7/2+7/1	442	442	172	513	149	4.8	2.8	0.1	7.6	62.3	9.8	2.8	12.6	
8/1	1081	1081	-	-	-	0.0	0.7	-	0.7	2.3	4.7	0.7	5.4	
C1														
PRC for Signalised Lanes (%):				-2.4	Total Delay for Signalised Lanes (pcuHr):				28.45	Cycle Time (s):				120
PRC Over All Lanes (%):				-2.4	Total Delay Over All Lanes (pcuHr):				29.34					

Full Input Data And Results

Scenario 4: 'Base 2022 PM' (FG4: 'Base 2022 PM', Plan 1: 'Network Control Plan 1')

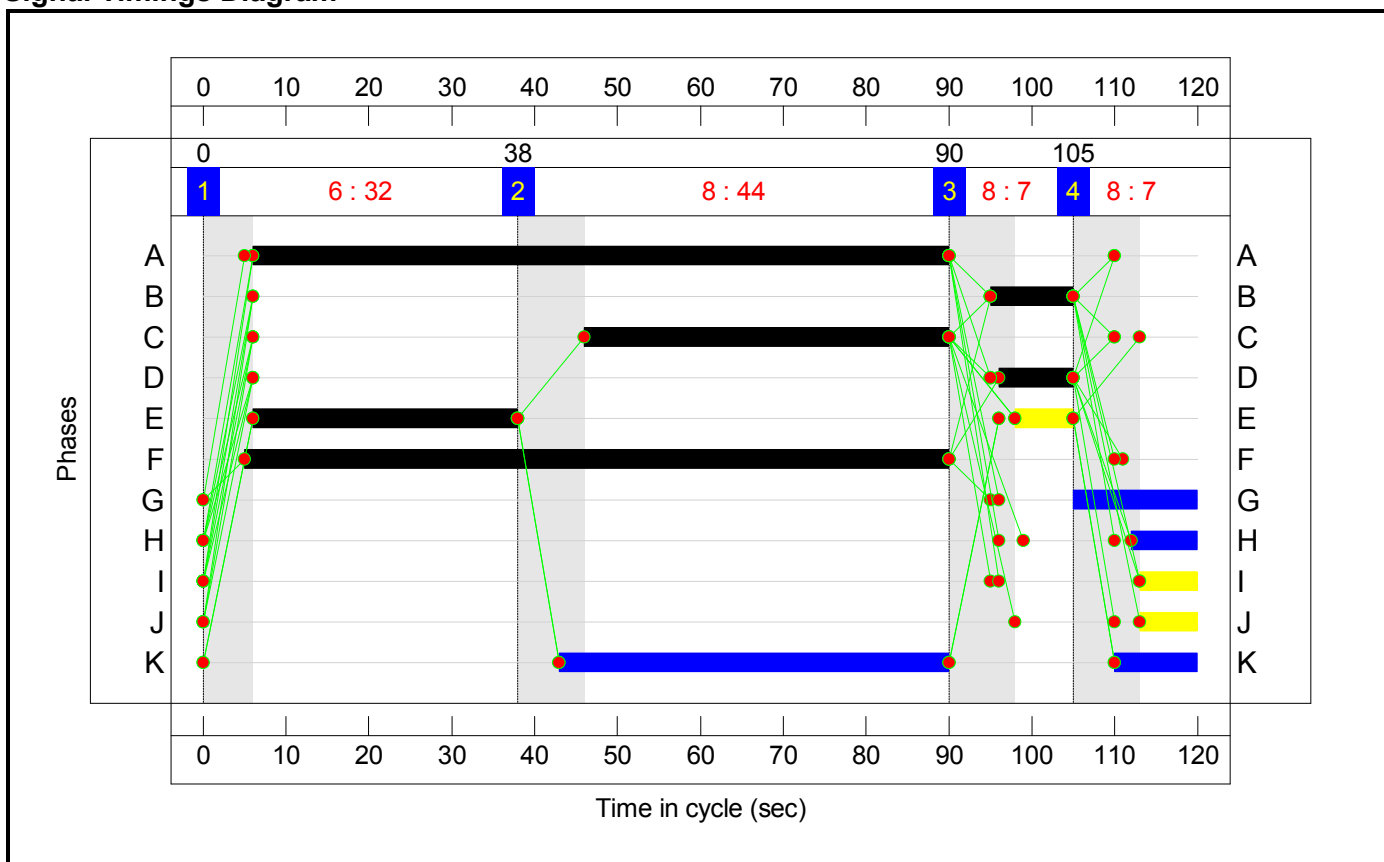
Stage Sequence Diagram



Stage Timings

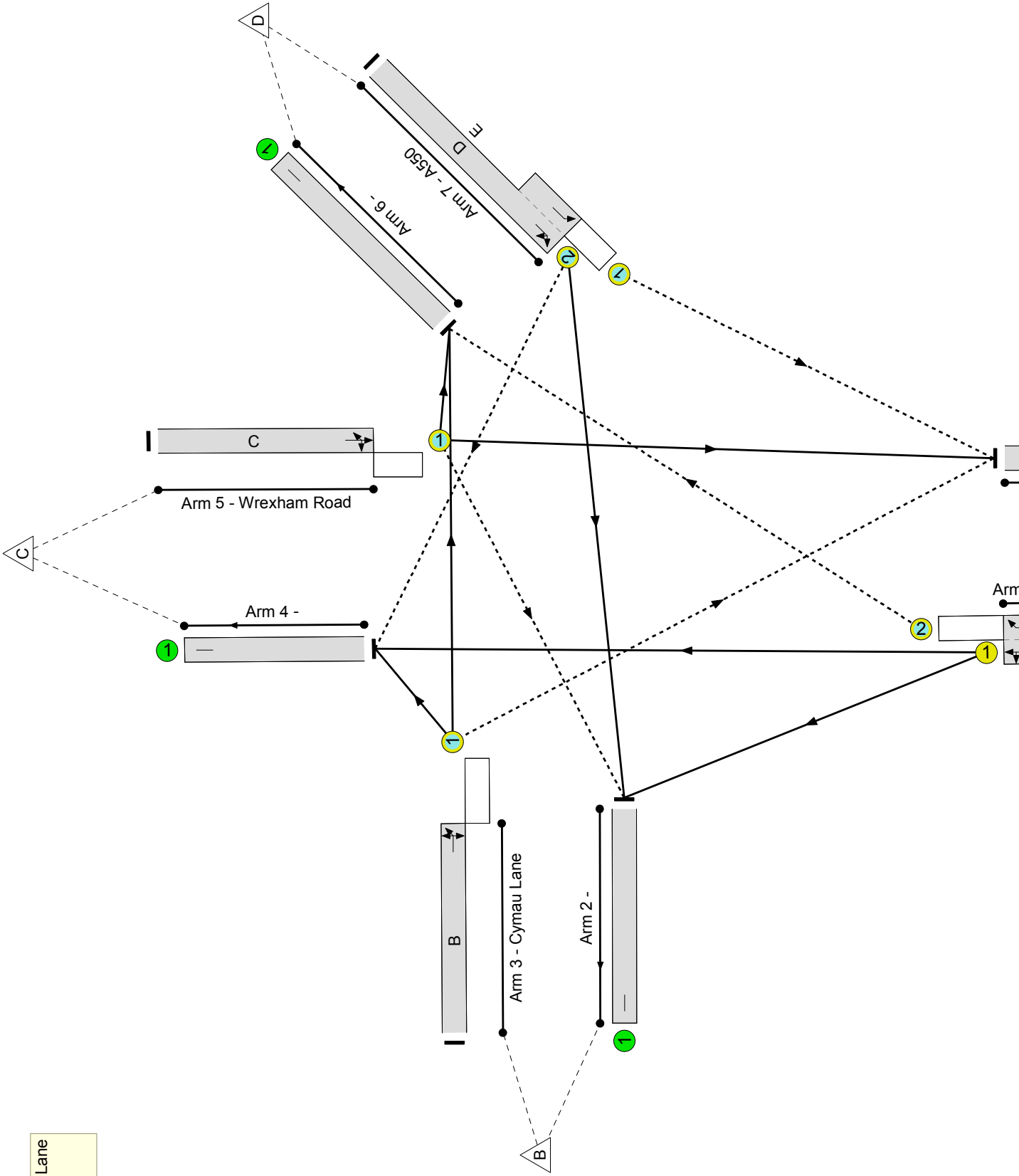
Stage	1	2	3	4
Duration	32	44	7	7
Change Point	0	38	90	105

Signal Timings Diagram



Full Input Data And Results

Wrexham Road / A550 / Cymau Lane
PRC: 25.0 %
Total Traffic Delay: 17.7 pcu·hr



Full Input Data And Results

Network Results

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network	-	-	N/A	-	-	-	-	-	-	-	-	-	72.0%
Wrexham Road / A550 / Cymau Lane	-	-	N/A	-	-	-	-	-	-	-	-	-	72.0%
1/1+1/2	Wrexham Road S Left Ahead Right	U+O	N/A	N/A	A F	-	1	84:85	-	963	1941:1953	1371	70.2%
2/1		U	N/A	N/A	-	-	-	-	-	115	Inf	Inf	0.0%
3/1	Cymau Lane Left Left2 Right	O	N/A	N/A	B	-	1	10	-	78	1769	162	48.1%
4/1		U	N/A	N/A	-	-	-	-	-	512	Inf	Inf	0.0%
5/1	Wrexham Road Right U-Turn Ahead	O	N/A	N/A	C	-	1	44	-	520	1926	722	72.0%
6/1		U	N/A	N/A	-	-	-	-	-	458	1940	1940	23.6%
7/2+7/1	A550 Right Right2 Ahead	O	N/A	N/A	D E	-	1:2	9:39	-	496	2089:1965	700	70.9%
8/1		U	N/A	N/A	-	-	-	-	-	972	1890	1890	51.4%

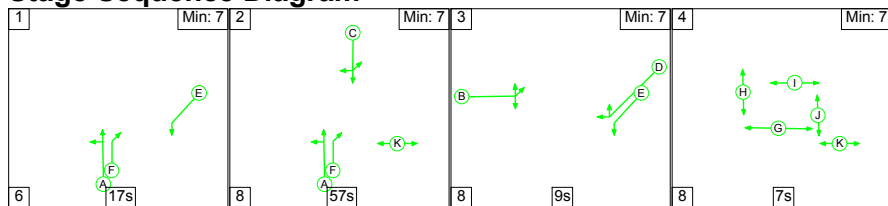
Full Input Data And Results

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	-	-	359	884	180	12.1	4.8	0.9	17.7	-	-	-	-		
Wrexham Road / A550 / Cymau Lane	-	-	359	884	180	12.1	4.8	0.9	17.7	-	-	-	-		
1/1+1/2	963	963	128	253	46	1.8	1.2	0.8	3.8	14.1	8.2	1.2	9.3		
2/1	115	115	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0		
3/1	78	78	36	0	1	1.1	0.5	0.0	1.6	73.6	2.5	0.5	2.9		
4/1	512	512	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0		
5/1	520	520	30	0	0	4.6	1.3	0.0	5.9	40.9	14.7	1.3	16.0		
6/1	458	458	-	-	-	0.0	0.2	-	0.2	1.2	0.0	0.2	0.2		
7/2+7/1	496	496	164	631	133	4.5	1.2	0.1	5.7	41.7	9.3	1.2	10.5		
8/1	972	972	-	-	-	0.0	0.5	-	0.5	2.0	1.6	0.5	2.1		
C1															
PRC for Signalised Lanes (%):				25.0	Total Delay for Signalised Lanes (pcuHr):				17.03	Cycle Time (s):					120
PRC Over All Lanes (%):				25.0	Total Delay Over All Lanes (pcuHr):				17.71						

Full Input Data And Results

Scenario 5: 'Base + Development 2022 AM' (FG5: 'Base + Development 2022 AM', Plan 1: 'Network Control Plan 1')

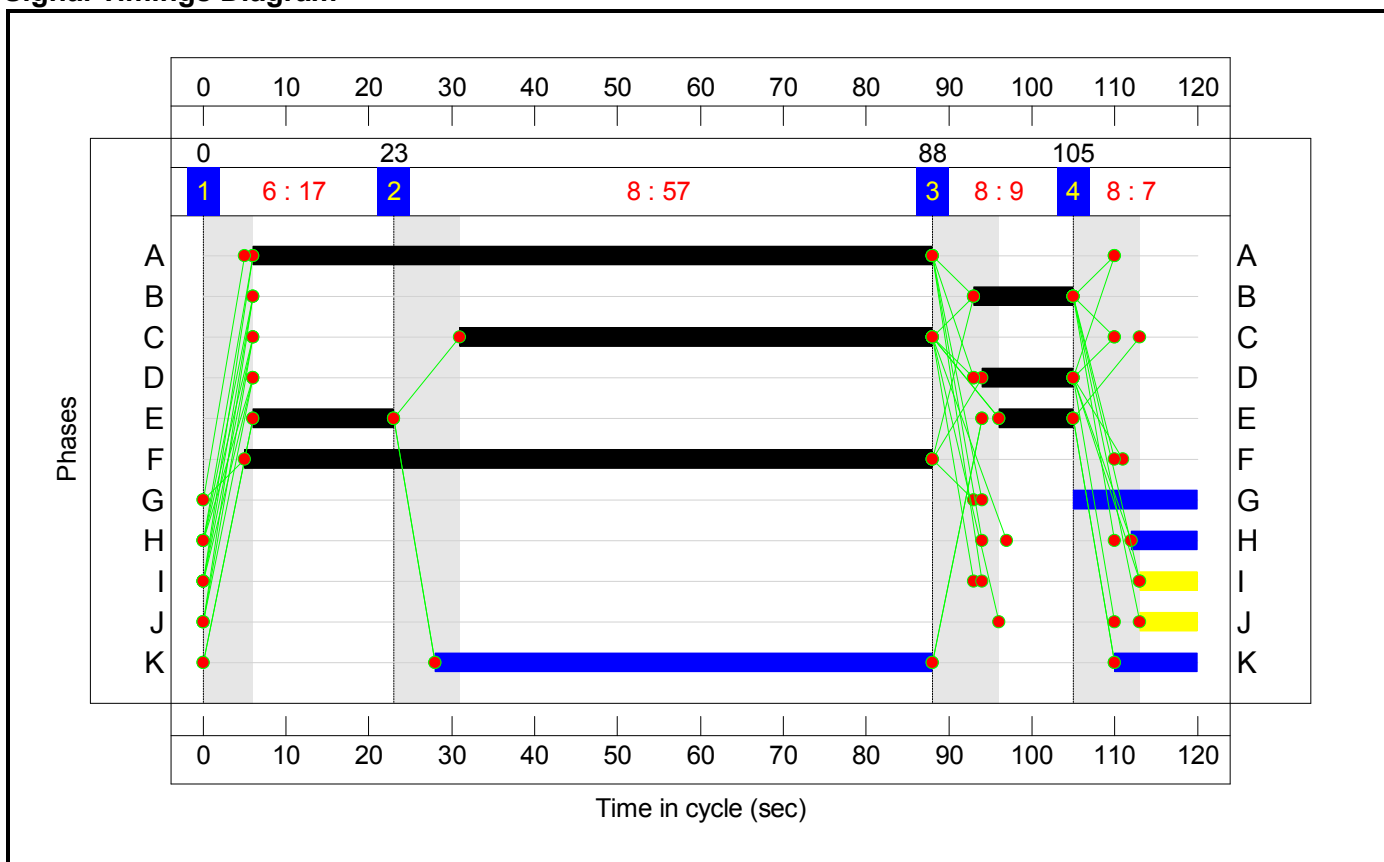
Stage Sequence Diagram



Stage Timings

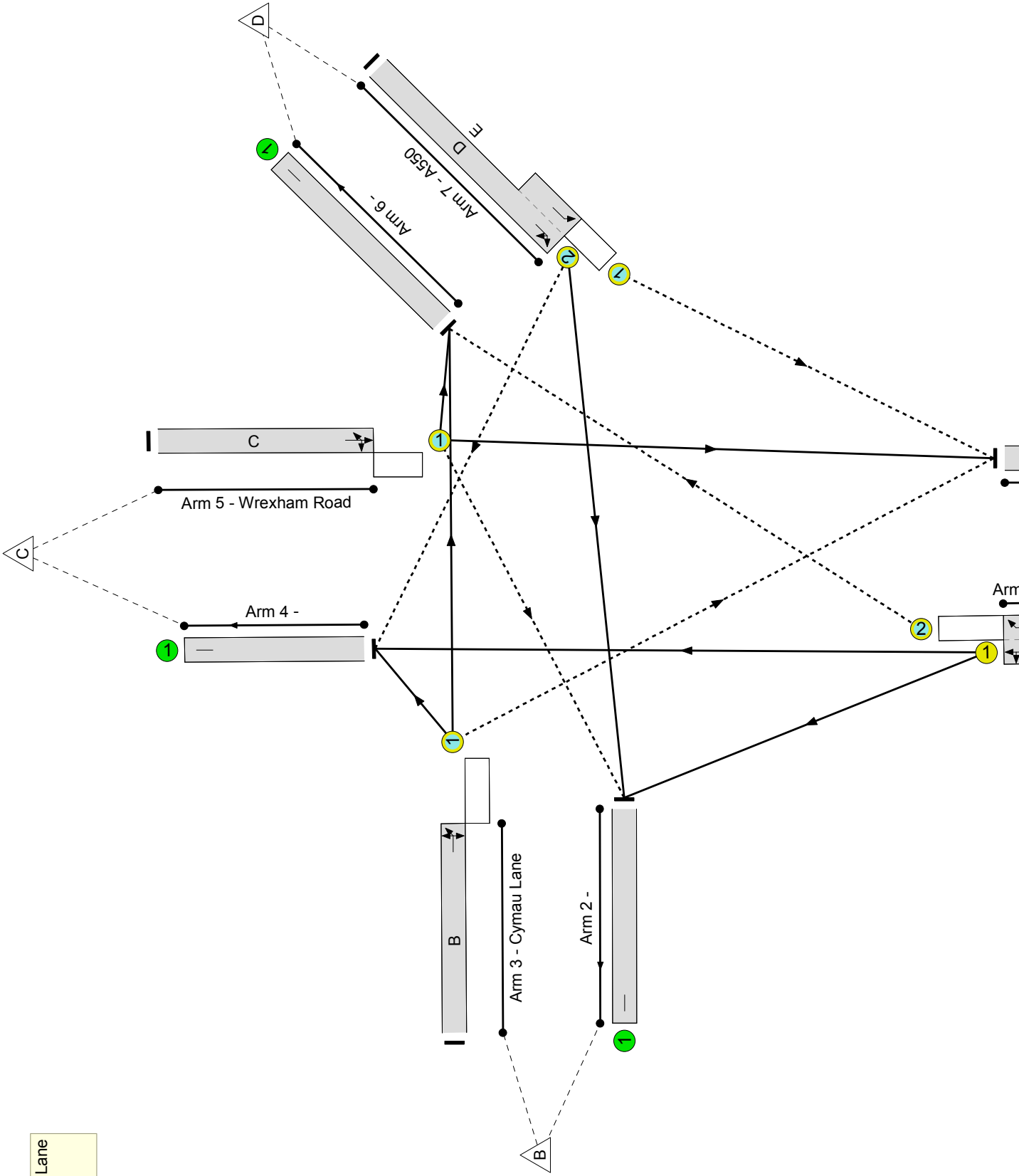
Stage	1	2	3	4
Duration	17	57	9	7
Change Point	0	23	88	105

Signal Timings Diagram



Full Input Data And Results

Wrexham Road / A550 / Cymau Lane
PRC: -5.1 %
Total Traffic Delay: 33.9 pcu·hr



Full Input Data And Results

Network Results

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network	-	-	N/A	-	-	-	-	-	-	-	-	-	94.6%
Wrexham Road / A550 / Cymau Lane	-	-	N/A	-	-	-	-	-	-	-	-	-	94.6%
1/1+1/2	Wrexham Road S Left Ahead Right	U+O	N/A	N/A	A F	-	1	82:83	-	1141	1950:1953	1207	94.6%
2/1		U	N/A	N/A	-	-	-	-	-	94	Inf	Inf	0.0%
3/1	Cymau Lane Left Left2 Right	O	N/A	N/A	B	-	1	12	-	176	1778	193	91.4%
4/1		U	N/A	N/A	-	-	-	-	-	626	Inf	Inf	0.0%
5/1	Wrexham Road Right U-Turn Ahead	O	N/A	N/A	C	-	1	57	-	638	1930	933	68.4%
6/1		U	N/A	N/A	-	-	-	-	-	578	1940	1940	29.8%
7/2+7/1	A550 Right Right2 Ahead	O	N/A	N/A	D E	-	1:2	11:26	-	443	2094:1965	483	91.6%
8/1		U	N/A	N/A	-	-	-	-	-	1100	1890	1890	58.2%

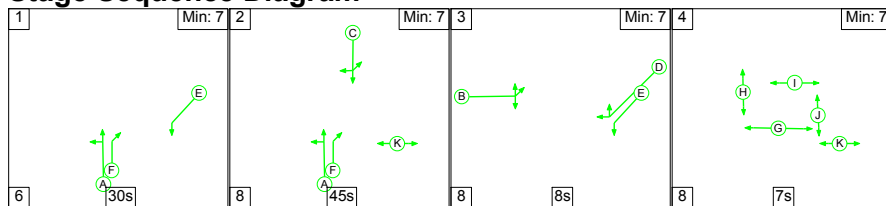
Full Input Data And Results

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	-	-	483	721	273	15.0	17.3	1.7	33.9	-	-	-	-	
Wrexham Road / A550 / Cymau Lane	-	-	483	721	273	15.0	17.3	1.7	33.9	-	-	-	-	
1/1+1/2	1141	1141	175	240	107	3.2	7.1	1.6	11.9	37.5	15.0	7.1	22.1	
2/1	94	94	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0	
3/1	176	176	81	0	6	2.6	3.7	0.0	6.3	128.3	5.8	3.7	9.4	
4/1	626	626	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0	
5/1	638	638	32	0	0	4.2	1.1	0.0	5.3	30.0	16.3	1.1	17.4	
6/1	578	578	-	-	-	0.0	0.2	-	0.2	1.3	1.7	0.2	1.9	
7/2+7/1	443	443	195	482	159	4.9	4.5	0.1	9.5	77.3	10.2	4.5	14.7	
8/1	1100	1100	-	-	-	0.0	0.7	-	0.7	2.3	5.4	0.7	6.1	
C1														
			PRC for Signalised Lanes (%):	-5.1	Total Delay for Signalised Lanes (pcuHr):			32.98	Cycle Time (s):			120		
			PRC Over All Lanes (%):	-5.1	Total Delay Over All Lanes (pcuHr):			33.90						

Full Input Data And Results

Scenario 6: 'Base + Development 2022 PM' (FG6: 'Base + Development 2022 PM', Plan 1: 'Network Control Plan 1')

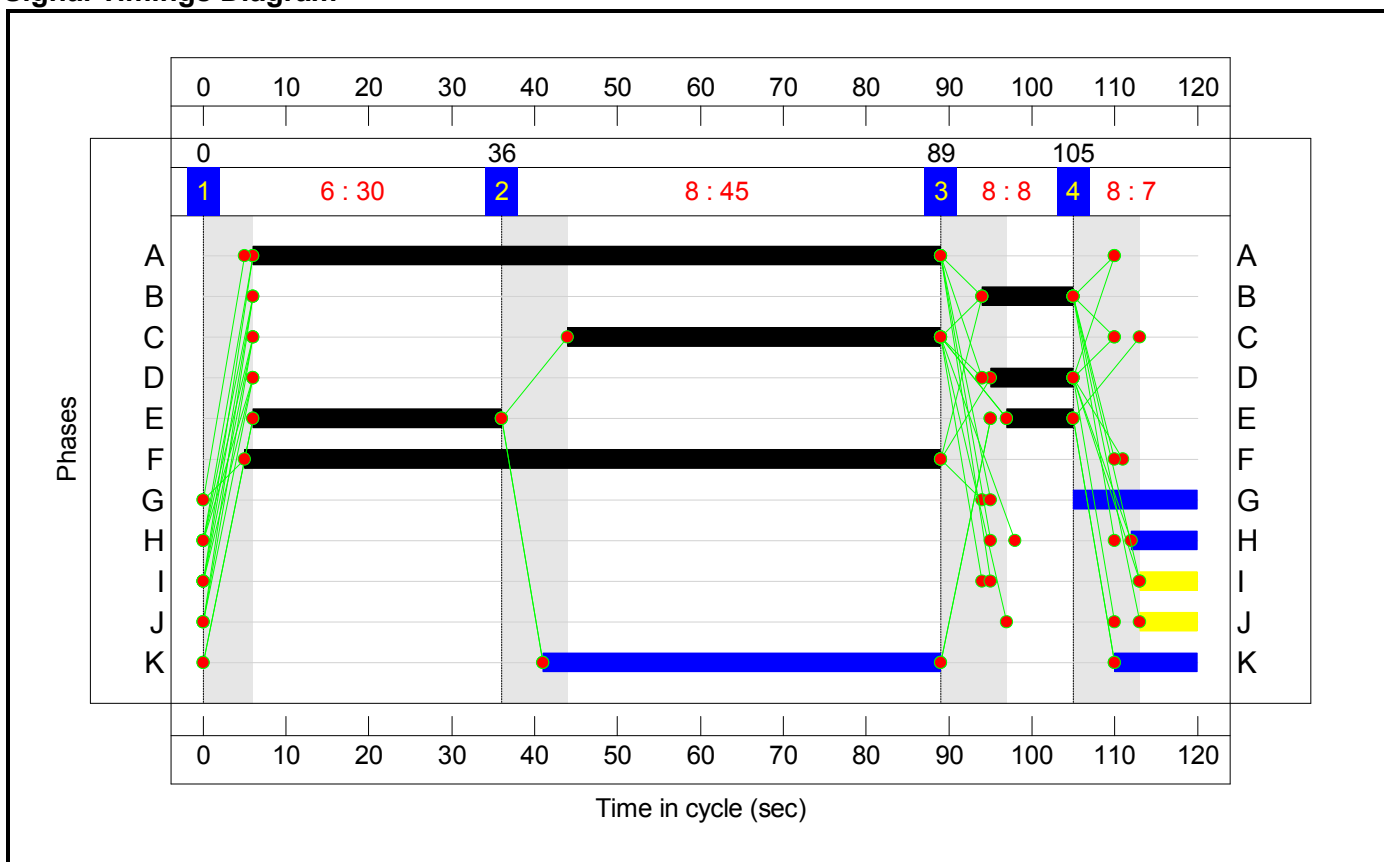
Stage Sequence Diagram



Stage Timings

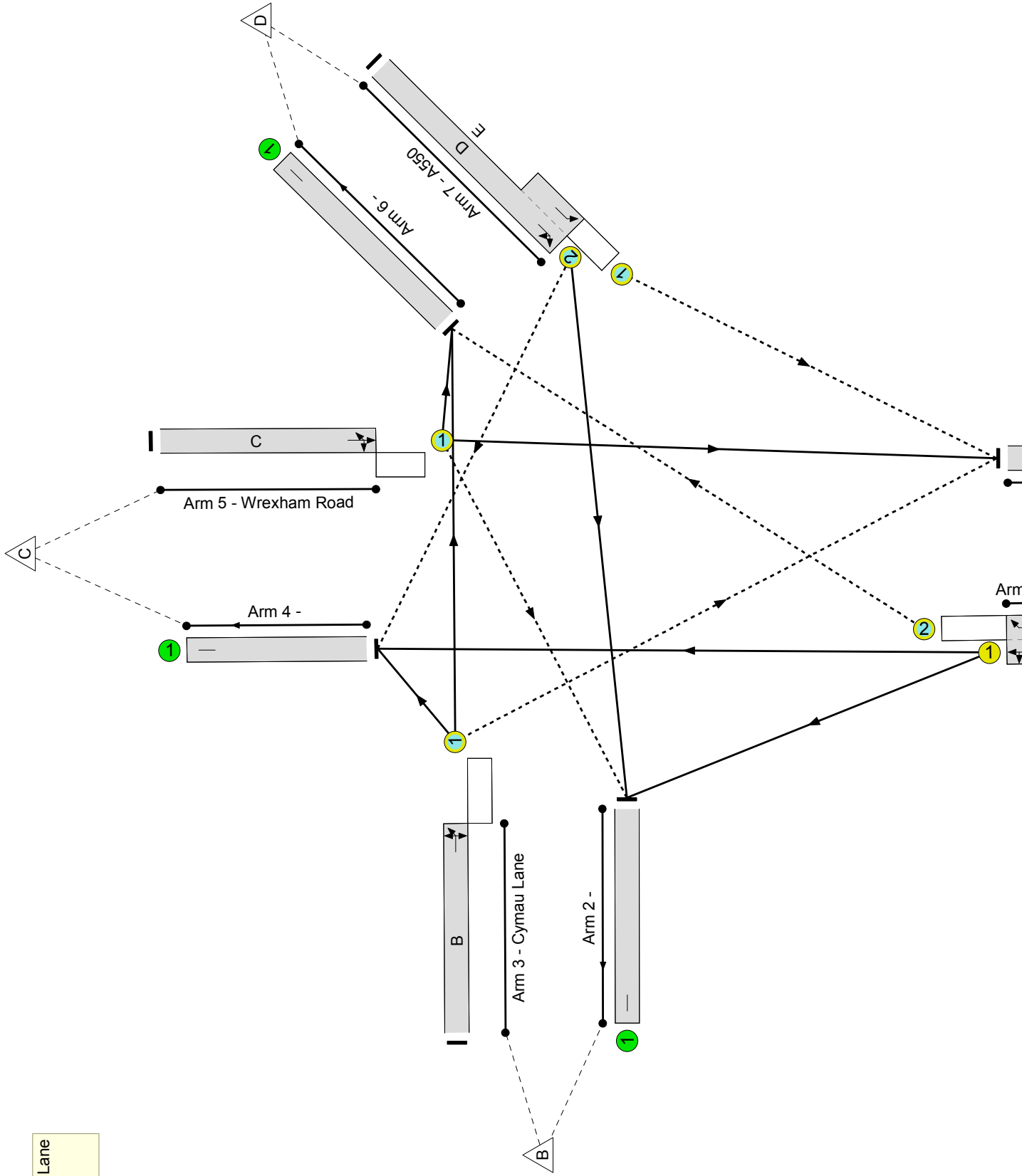

Stage	1	2	3	4
Duration	30	45	8	7
Change Point	0	36	89	105

Signal Timings Diagram



Full Input Data And Results

Wrexham Road / A550 / Cymau Lane
PRC: 23.6 %
Total Traffic Delay: 18.3 pcu·hr



Full Input Data And Results

Network Results

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network	-	-	N/A	-	-	-	-	-	-	-	-	-	72.8%
Wrexham Road / A550 / Cymau Lane	-	-	N/A	-	-	-	-	-	-	-	-	-	72.8%
1/1+1/2	Wrexham Road S Left Ahead Right	U+O	N/A	N/A	A F	-	1	83:84	-	982	1939:1953	1365	71.9%
2/1		U	N/A	N/A	-	-	-	-	-	127	Inf	Inf	0.0%
3/1	Cymau Lane Left Left2 Right	O	N/A	N/A	B	-	1	11	-	84	1766	177	47.6%
4/1		U	N/A	N/A	-	-	-	-	-	531	Inf	Inf	0.0%
5/1	Wrexham Road Right U-Turn Ahead	O	N/A	N/A	C	-	1	45	-	532	1924	738	72.1%
6/1		U	N/A	N/A	-	-	-	-	-	459	1940	1940	23.7%
7/2+7/1	A550 Right Right2 Ahead	O	N/A	N/A	D E	-	1:2	10:38	-	500	2074:1965	687	72.8%
8/1		U	N/A	N/A	-	-	-	-	-	981	1890	1890	51.9%

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	-	-	398	847	190	12.4	5.0	0.9	18.3	-	-	-	-
Wrexham Road / A550 / Cymau Lane	-	-	398	847	190	12.4	5.0	0.9	18.3	-	-	-	-
1/1+1/2	982	982	131	249	47	2.0	1.3	0.8	4.1	15.0	9.8	1.3	11.1
2/1	127	127	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
3/1	84	84	39	0	1	1.2	0.4	0.0	1.7	70.8	2.6	0.4	3.1
4/1	531	531	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
5/1	532	532	35	0	0	4.7	1.3	0.0	5.9	40.2	15.1	1.3	16.4
6/1	459	459	-	-	-	0.0	0.2	-	0.2	1.2	0.0	0.2	0.2
7/2+7/1	500	500	193	598	143	4.6	1.3	0.1	6.0	42.9	9.6	1.3	11.0
8/1	981	981	-	-	-	0.0	0.5	-	0.5	2.0	0.5	0.5	1.1
C1													
			PRC for Signalised Lanes (%):	23.6	Total Delay for Signalised Lanes (pcuHr):		17.65	Cycle Time (s):		120			
			PRC Over All Lanes (%):	23.6	Total Delay Over All Lanes (pcuHr):		18.34						