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Marcus Goldsworthy
Operational Manager Development Control
Vale and Glamorgan Council
Dock Offices
Barry Docks
Barry
CF63 4RT

Date 21 June 2011
Our ref 30327/03/GW/1720162v1
Your ref

Dear Mr Goldsworthy

Outline Planning Application for Mixed Use Development at Barry Waterfront (2009/00946/OUT and 2009/00947/OUT)

Town and Country Planning (Environmental Impact Assessment)(England & Wales) Regulations 1999 (as amended) - Request for a Formal Screening Opinion

On behalf of our client, Taylor Wimpey UK Ltd, Persimmon Homes Ltd and BDW Trading Limited ("the Consortium"), we hereby request that the Council provides a formal screening opinion to confirm the requirement for an Addendum to the Environmental Impact Assessment ('EIA') arising from proposed minor amendments to the school site which forms part of the development at Barry Waterfront.

This request is made in pursuance of Regulation 5 of the Town & Country Planning (Environmental Impact Assessment) (England & Wales) Regulations 1999 (as amended) ('the 1999 Regulations').

To enable your consideration of this issue, we set out below the following information:

1 Description of the site and its surroundings;

2 Description of the proposed development; and,

3 Review of the requirement for EIA.

1. Description of the Waterfront site and its surroundings

In accordance with the 1999 Regulations, a site plan is enclosed at Appendix 1 identifying the Barry Waterfront site. The location of the school site to which the minor amendments relate is located to the west of the site within the West Pond Character Area.

Site Location and Size

The application site at Barry Waterfront comprises a gross area of approximately 43 hectares (106 acres). The site is strategically positioned between the Town Centre, Barry Island and the harbour which encloses 30 hectares of water with 4.3 kilometres of quayside lining No 1 Dock. The railway between Cardiff and Barry Island borders the perimeter.

The site is divided into four distinct areas West Pond, South Quay, Arno Quay and East Quay as described in Chapter C of the Environmental Statement (August 2009).

Access

Access to the site is currently afforded by all modes of surface transport. Cardiff International Airport is some 5.6 km to the north west, whilst the dock gates allow access to the Waterfront by boat from the sea.

In terms of road access, the A48 runs from Culverhouse Cross to Waterton Cross in Bridgend. Access to Barry is via the Port Road to the north and east and the Five Mile Lane to the north-west. The A4055 (Broad Street and Gladstone Road) connects with the Gladstone Road Bridge into the site. Ffordd y Mileniwm provides the main access from the east and runs through the northern part of the site serving the Waterfront. Clive Road runs to the southern edge of the site with Hood Road enabling access from the north west.

Rail links are available to the site, from Barry Docks, Barry Town and Barry Island stations, with the lines connecting to the national rail network. Regular bus services pass adjacent to the site as part of the existing service provision on routes through the Town, to the Island and the surrounding areas.

Sustrans national cycle routes pass through Barry, including along the north edge of No 1 Dock. Locally, the site is accessible from the Island, the Harbour area and the Town, with positive connections available at several key locations along its length.

Pedestrian access from the Town Centre to the Waterfront is via Holton Road, Gladstone Road Bridge and Subway Road and a new pedestrian bridge at Thompson Street linking the site with the town centre. Metal steps provide access from the cliff top of Barry Island from Clive Road down to the south of the site. Access from the south east is via Dock Road.

Existing Use

Land at Arno Quay has been landscaped as a flat gravelled surface. This landform is the result of the remediation of the northern areas of Barry Docks during the 1990s which included earthworks, the removal of foundations and sub-surface structures from upper levels, the removal of contamination hotspots and the provision of a capping layer.

West Pond comprises a relatively flat grassed area with a number of rubble tips and a gravel path running through the centre. The remains of a derelict tank wash are located at the south-eastern edge of West Pond.

A number of extant buildings remain within the South Quay development area including the concrete bases of storage tanks, a tiled floor surface and a Research Vessels Services building. The area also contains a number of sunken concrete pits and pipe outlets and remnants of railway lines at the dock edge.

Surrounding Uses

The existing Waterfront development comprises some 690 residential units together with a retail area incorporating a retail food store and non-food retail units as well as a medical centre. To the west of the Gladstone Bridge is the Innovation Quarter which comprises a range of office and business starter units.

Two important listed buildings and local landmarks lie to the northern part of the site: the Dock Office to the east and the Hydraulic Pumphouse to the west.

Protruding from the Barry Waterfront application site is The Mole. The Mole lies at the centre of the main development site not only physically but also in terms of its high visibility in the centre of Dock No 1.

2. Description of the proposed development

The overall description of development is as follows and remains unchanged:

"Development of vacant land at Barry Waterfront for residential (C3), retail (A1), cafes, bars and restaurants (A3), hotel (C1), offices (B1), community and leisure uses (D1 and D2). Development of vehicular and pedestrian/cycle access including a new link road, re-grading of site to form new site levels and associated infrastructure works, parking, servicing, landscaping, public realm and public open space provision".

Parameter plans submitted as part of the outline planning application establish maximum parameters (including land uses) across the site (see Appendix 1.1 of the ES Addendum June 2010). Updated versions of these drawings are attached at Appendix 2 and summarised in Table 1 below. It should be noted however that a range of residential unit numbers and floorspace is provided within the character areas to allow for future flexibility but will be limited to a maximum of 2000 units. The maximum floorspaces have been tested within this ES to provide a worst case scenario assessment of environmental effects.

Table 1 -- Proposed Maximum Land Uses

Summary of Maximum Floorspace	
Residential Use (C3)	Up to 2000 dwellings
Retail Use (A1)	6,525 sqm GEA food store / 2,300 sqm GEA non food retail
Cafes and Restaurants (A3)	Up to 1,820 sqm GEA
Offices (B1)	Up to 3,450 sqm GEA
Hotel (C1)	Up to 3,500 sqm GEA
School (D2)	2,760 sqm GFA on a site of ~~1.0 hectares~~ 1.5 hectares *

* indicates the minor change to the school site area which is further described below.

The outline planning applications are accompanied by an Environmental Statement (August 2009 supplemented by ES Addendum 1 (January 2010) and ES Addendum 2 (June 2010)) that assess

the proposal's potential for significant effects on the environment. This concluded that the majority of the effects arising from the development would be negligible or minor adverse.

This request for a Screening Opinion relates solely to proposed amendments to the education site, the details of which are summarised below.

a. Proposed changes to the School site

We are proposing the following amendments to the submitted outline planning application(s):

1 Increase the Primary School site from 1.0ha to 1.5ha. The school building floorspace would remain unchanged and the additional site area only relates to an increase in external play space.

2 Amendment to building parameters within West Pond to accommodate the larger school site with the loss of residential units.

3 A slight increase to the external space to Commercial Plot A (B1 offices and residential above).

b. Additional Clarification to the Transport Assessment

Since the submission of ES Addendum 2 (June 2010), additional transport papers have been prepared by Arup in response to queries from the Council and their advisers, Capita Symonds. These papers have included sensitivity tests and various points of clarification. The additional analysis does not however affect the assessment on Transportation set out in the Environmental Statement (as amended) which remains as a worst case assessment of environmental effects.

The Technical Notes by Arup submitted on the 4 October 2010 and 31 May 2011 are appended at Appendices 3 and 4 for completeness.

3. Requirement for EIA

The development is one to which the EIA Regulations apply because the Waterfront scheme falls within Section 10 Part (b) of Schedule 2 which relates to "urban development projects, including the construction of shopping centres and car parks, sports stadiums, leisure centres and multiplex cinemas" where the area of development exceeds 0.5 hectares. The site is extends to 43 hectares.

Due to the scale of the proposals in relation to the existing character of the site, its surroundings and its location on land that was formerly Barry Docks, it was agreed by the project team that an EIA should be undertaken and an ES be produced to accompany the planning application.

For Schedule 2 developments, the 1999 Regulations require that an EIA be undertaken where "the development is likely to have significant effects on the environment by virtue of factors such as its nature, size or location".

In determining whether the development is likely to give rise to significant environmental effects, reference should be made to Schedule 3 of the 1999 Regulations. This identifies three categories of criteria:

1 Characteristics of the development (such as size, cumulative effects, use of natural resources, production of waste, pollution and nuisances, and risk of accidents);

2 Location of the development (by reference to the environmental sensitivity of the area); and,

3 Characteristics of the potential impact (having regard in particular to the extent of the impact, its transfrontier nature, magnitude and complexity, probability and duration, frequency and reversibility).

Taking account of the above guidance in the round, we highlight the following:

1 In terms of the characteristics of the development, we would note that the scale of the proposed amendments that are subject to this Screening Request relate only to a small increase of 0.5ha to the overall school area with minor amendments to building parameters in West Pond to accommodate this change. The changes are negligible in the context of the potential for significant effects arising from the overall Waterfront development that were assessed as part of the EIA process.

2 The Waterfront site is not considered to be particularly environmentally sensitive. The principle of developing the site has been addressed through the site's UDP allocation and thoroughly assessed in the planning submission. It is not in a "sensitive area" as defined by Regulation 2(1) of the 1999 Regulations. The nearest statutory sites of nature conservation interest are Barry Island and Hayes Point to Bendrick Point, both of which are geological Sites of Special Scientific Interest (SSSI) and within one kilometre from the site. Given the physical separation and the nature of their designation, neither are considered to be of environmental relevance to the application proposals.

3 Consideration has been given to the characteristics of potential impacts of the expanded school site, having regard to the extent of these impacts in the context of the wider Barry Waterfront proposals, their magnitude and complexity, probability and duration, frequency and reversibility.

Taking into account possible environmental interests set out in the Regulations, the following highlights the matters that have been assessed as part of the EIA and assesses whether the proposed minor amendments are likely to result in significant environmental effects that were not previously considered.

A. Transportation

The proposed amendments will not increase the size of the school building only its external space. Residential units will be lost within West Pond to accommodate the proposals so will not directly result in a higher number of trips to the site than those previously assessed. The minor alterations will have no impact on the local highway.

On this basis it is not considered that the proposals would result in additional significant transport effects on the highway network that were not previously considered as part of the ES (2009 as amended).

The additional transport analysis which has been undertaken does not affect the analysis included within the Environmental Statement (2009 as amended).

B. Landscape & Visual

Given the minor nature of amendments and that these would not increase the height of the school or residential buildings, it is not considered that the proposals would result in additional significant

visual and landscape environmental effects that were not previously considered as part of the ES (2009 as amended).

C. Ecology

The ES (2009 as amended) assessed the effects of the scheme on biodiversity for the application site to provide sufficient context to fully evaluate ecological features and wildlife populations.

The ES concluded that the proposals will have impacts on biodiversity. For the site receptors where residual impacts would be adverse, these will be offset through the implementation of ecological mitigation measures set out within the ES (2009 as amended). The expanded school site is to be developed on areas of the site that are not considered particularly sensitive in ecology terms and contain areas of spoil. It is not considered that the amended proposals would result in additional significant ecological environmental effects that were not previously considered as part of the ES (2009 as amended).

D. Archaeology

The ES (2009 as amended) concluded that the scheme would have a negligible effect on site archaeology following the implementation of mitigation measures. Given the limited nature of the amended proposals, it is not considered that these would result in additional significant archaeological effects that were not previously considered as part of the ES (2009 as amended).

E. Water Resources, Drainage and Flooding

The previous ES (2009) concluded that overall the scheme would have a negligible to minor effects on existing conditions on the site.

Given the limited nature of the amended proposals, it is not considered that these would result in additional significant flood risk, climate change and/or pollution effects that were not previously considered as part of the ES (2009 as amended).

F. Ground Conditions and Contamination

The assessment concluded that the likely environmental effects on ground conditions could be successfully addressed to ensure that these are negligible.

Based on the findings of the assessment, which included the land to be developed for the school site, it is not, therefore, considered that the proposals would result in additional significant effects on the ground related constraints that were previously considered as part of the ES (2009 as amended).

G. Noise and Vibration

The ES concludes that the majority of noise impacts will be minor adverse. Given the small scale nature of the amended proposals, it is not considered that these would result in additional significant noise and vibration effects that were not previously considered as part of the ES (2009 as amended).

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H. Air Quality

The ES concludes that during the construction period negligible to moderate adverse effects on air quality could arise but careful management of the construction process through a Construction Environmental Management Plan will minimise these effects.

In this context, any works associated with these minor amendments and potential effects on air quality can be mitigated through measures set out in the Management Plan. It is not considered that the amended proposal would result in additional significant additional effects that were not previously considered as part of the ES (2009 as amended).

I. Socio Economic

It is considered that the proposed amendments to the school including increased outdoor play space will improve the services and facilities on offer once operational and would have a positive socio-economic impact.

J. Arboricultural Effects

There are no trees affected by the amended proposals and as a result no additional significant environmental effects beyond those assessed in the ES (2009 as amended).

Conclusion

From the analysis above, it is considered that an Addendum to the ES (2009 supplemented by Addendum 1 January 2010 and Addendum 2 June 2010) is not required.

We trust that you have sufficient information to determine whether or not this is an EIA development under the 1999 Regulations. From these Regulations, we note that the local authority has three weeks (beginning from the date of receipt) to form a screening opinion.

Please contact myself or Andy Cockett if you have any questions.

Yours faithfully

Gareth Williams
Director

Copy

Richard Keogh – Barry Waterfront Consortium

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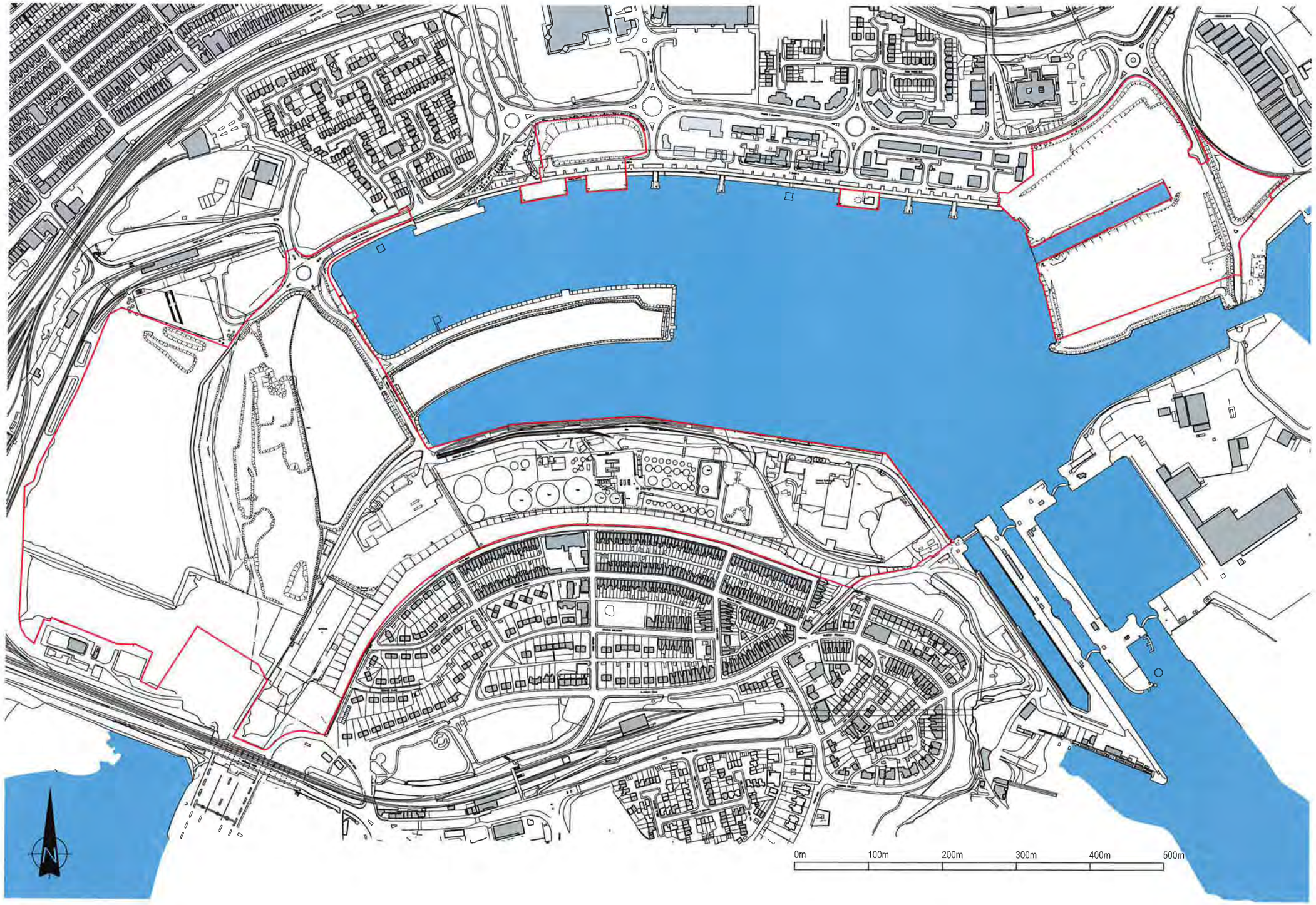
APPENDIX 1

Site Location Plan

Do not scale from drawing.

Rev.	Date	Drawn	Check	Description



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Barry Waterfront

Job No. 3514

Dwg No. SK201 Rev.

Title
Planning application boundary

Date	Drawn	Check	Status	Scale
01/07/09	JK	***	Sketch	1:2500

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APPENDIX 2

Outline Planning Application

Updated Parameter Plans (June 2011)

Do not scale from drawing.

Rev	Date	Drawn	Check	Description
A	14.01.10	EA	CJ	SCHOOL SQUARE AND DISTRICT CENTRE AMENDED
B	09.03.10	JTH	CJ	BUILDING LAYOUT ADJUSTED TO MATCH PLOTS DETAIL LAYOUT. BUILDINGS ADJACENT TO LINK ROAD REVISED TO RECTILINEAR
C	08.06.10	JTW	CJ	LAYOUT AMENDED FOLLOWING LAND ALTERED - ADDITIONAL RESIDENTIAL HOUSING ADDED IN SOUTH WEST & BLOCK PLOTS AMENDED TO SUIT
D	05.08.10	JTW	CJ	SCHOOL SITE INCREASED TO 1.2HA ADJACENT HOUSING AND OFFICE BUILDING REMOVED
E	09.09.10	JTW	CJ	LAYOUT AT WEST POND ACCESS AND G4 SCHOOL SITE AMENDED
F	19.05.11	AR	CJ	PLOT FRONTAGE LINE TO SCHOOL AND COMMERCIAL WAREHOUSE

KEY

- C3 Residential
- B1 Office / C3 Residential
- Education & Associated playing field
- C1 Hotel / B1 Office
- A1 Retail
- Carpark for A1 Retail & Petrol filling station
- A3 Retail / C3 Residential
- A3 Retail / C3 Residential / D2 Community Uses
- No build zone
- Break in building line 6m min
- Break in building line 8m min.
- +/- 1 m frontage variation

Schedule

C3 Residential development: up to 2,000 dwellings
West Pond 500-700 dwellings
South Quay 650-900 dwellings
East Quay 100-250 dwellings
Arno Quay 75-200 dwellings
District Centre up to 150 dwellings

A1 Retail use: 6,525 sq. m food store and 2,300sq m of non-food retail

A3 Café, restaurant, drinking establishment: between 750sqm – 1,820sqm

B1 Offices: up to 3,450sqm

C1 Hotel: up to 3,500sqm

Community use up to 400sqm in G2

Plot Use and Floorspace

- **A** B1 offices: up to 895 sq.m
- **B** D1 School: up to 2,760sqm
- **C** C1 Hotel: up to 3,500sqm; B1 offices: up to 1,590sqm
- **D** A1 Retail: up to 8,825sqm
- **E** Car parking for A1 retail up to 600 spaces and a Petrol Filling Station
- **F** A3 Café, Restaurant, Drinking Est. up to 260sqm; C3 dwellings: up to 40 dwellings
- **G1** A3 Café, Restaurant, Drinking Est. up to 984sqm; C3 dwellings: up to 47 apartments
- G2 A3 Cafe, Restaurant, Drinking, Est. upto 408 sq.m D2 Community use upto 400 sq.m C3 dwellings: up to 15 apartments
- G3 A3 Café, Restaurant, Drinking Est. up to 513sqm; C3 dwellings: up to 18 apartments
- **H** B1 Offices: up to 219sqm; C3 Dwellings: up to 8 apartments
- I,J,K A3 Cafe, Restaurant, Drinking Est. Up to 555sqm at ground floor
- L A3 Cafe, Restaurant, Drinking Est. Up to 130sqm at ground floor
- M A3 Cafe, Restaurant Drinking Est. Upto 200sqm at ground floor

0m 100m 200m 300m 400m 500m

This plan defines the maximum envelope of proposed building curtilages and the proposed land uses. The precise building curtilage line is subject to a variation of +/-1m for primary frontages (Link Road, District Centre, Parkside and Quay water frontage onto Dock no. 1) and +/- 4m in other locations.

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Barry Waterfront

Job No. 3514
Dwg No. SK202 Rev. F

Title
Parameter Plan 1 - Building envelope and proposed uses

Date	Drawn	Check	Status	Scale
29/07/09	JK	***	Sketch	1:2500 @A1

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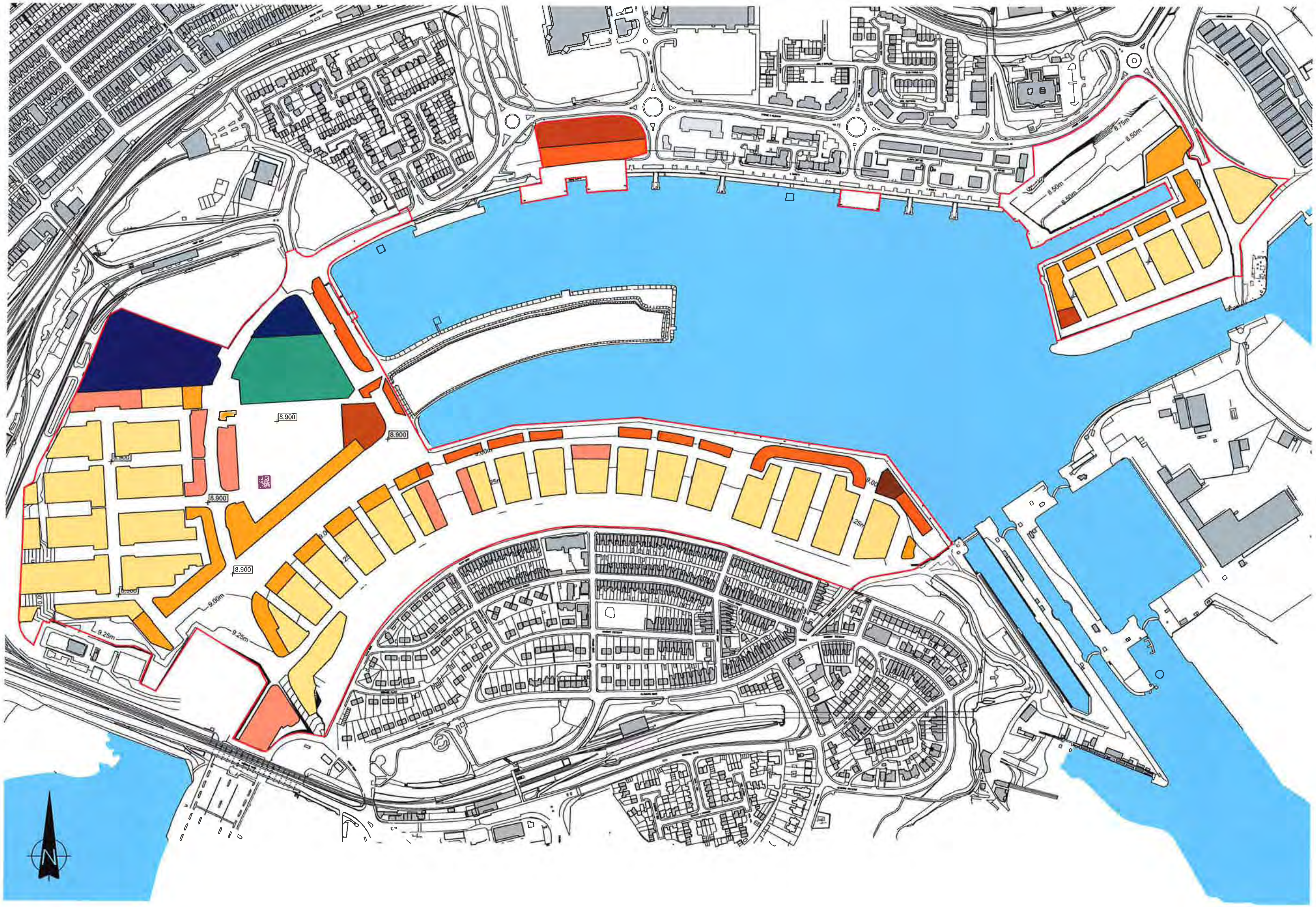
Do not scale from drawing.

Date	Drawn	Check	Description	Rev.
[illegible]	SW	CJ	[illegible]	A
[illegible]	JTW	CJ	LINK ROAD LAYOUT ADJUSTED TO MATCH DEALER'S DETAIL LAYOUT. BUILDINGS ADJACENT TO LINK ROAD ADJUSTED AS NECESSARY.	B
[illegible]	JTW	CJ	LAYOUT AROUND EDUCATION LAND ALTERED. ADDITIONAL RESIDENTIAL HOUSING ADDED. [illegible]	C
[illegible]	JTW	CJ	SCHOOL SITE [illegible] AMENDED	D
[illegible]	JTW	CJ	LAYOUT OF WEST POND HOUSING AND [illegible] SCHOOL SITE AMENDED	E
[illegible]	AR	CJ	[illegible]	F



KEY

Residential / Mixed Use

- 2-2.5 Storey (7.5m +/-2m)
- 2-3 Storey (7.5 -10m +/-2m)
- 3 Storey (9.5m +/-2m)
- 3-4 Storey (9.5-12.5m +/-2m)
- 3-5 Storey (9.5m-15.5m +/-2m)
- 5-7 Storey (18m-22m +/-2m)

Non-Residential

- (12m +/-2m)
- (5.5m +/-2m)
- (5-8.5m +/-2m)
- (11.5m +/-2m)

8.900 Proposed spot height

8.50m Proposed contours

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Barry Waterfront	Job No. 3514	
	Dwg No. SK203	Rev F

Title

Parameter Plan 2 - Building heights

Date	Drawn	Check	Status	Scale
29/07/09	JK	CJ	Sketch	1:2500 @A1

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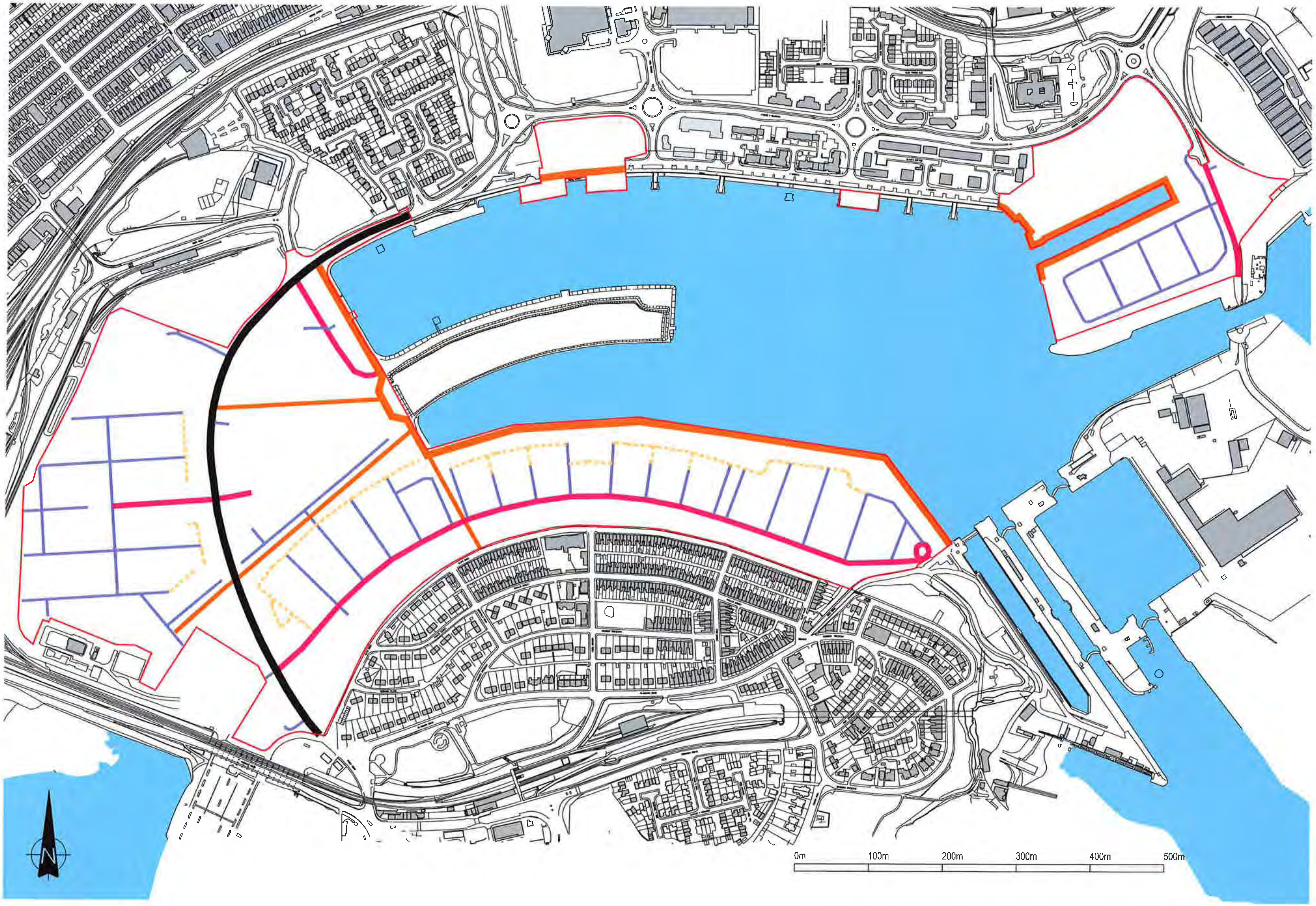
Do not scale from drawing.



KEY

- Pedestrian/ Cycle route min. 6m
- Pedestrian/ Cycle route 3-6m
- Primary vehicle route
- Secondary vehicle route
- Tertiary vehicle route
- Shared surface

HolderMathiasarchitects

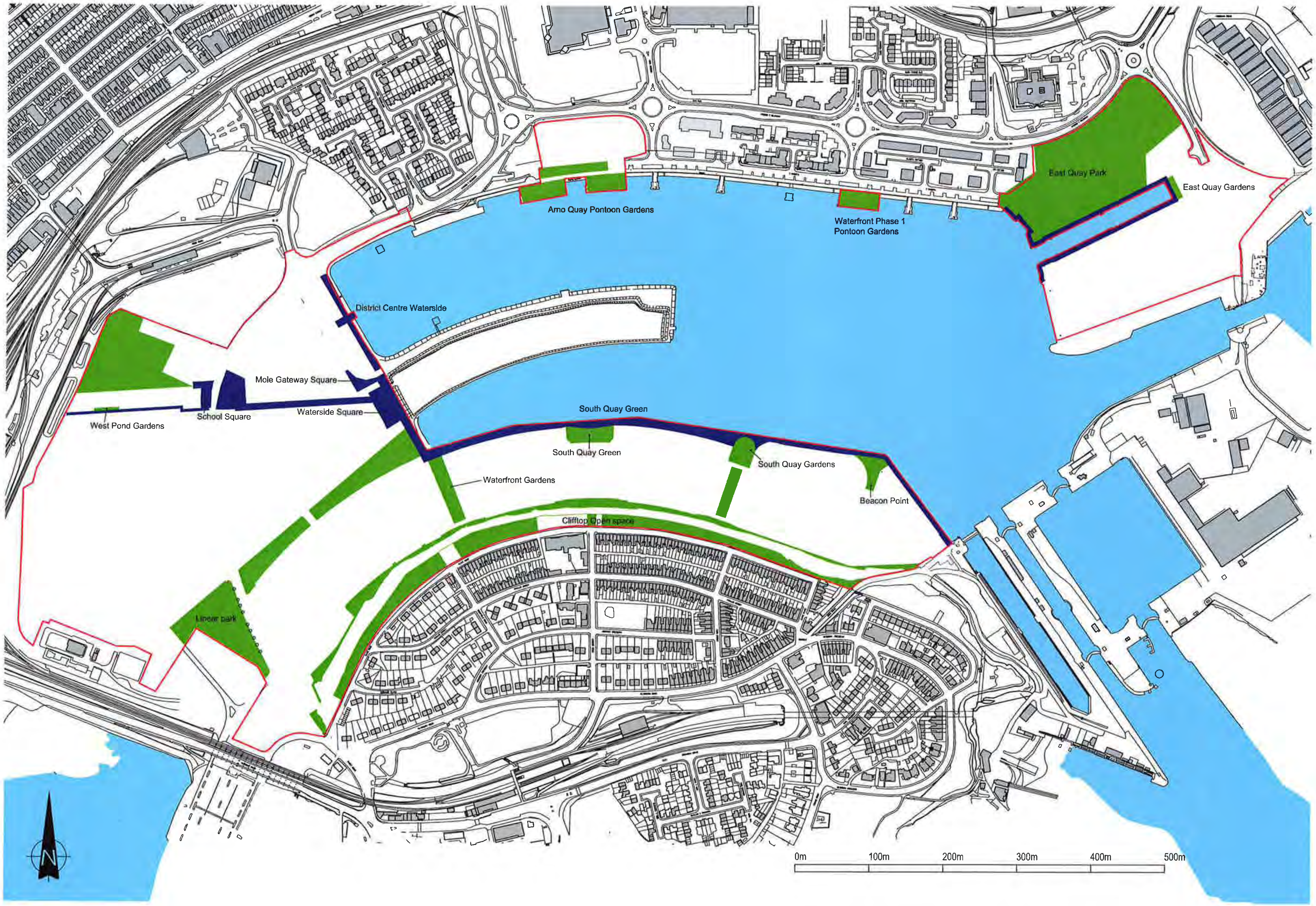
Barry Waterfront	Job No. 3514	
	Dwg No. SK204	Rev. F

Title

Parameter Plan 3 - Movement

Date	Drawn	Check	Status	Scale
29/07/09	JK	***	Sketch	1:2500 @A1

Do not scale from drawing.



KEY

- Green open space
- Public realm

Public Open Space Schedule

Total public open space provided: 6.24ha

Total public realm provided: 1.72ha

Total public open space and public realm: 7.96ha

Of which children's play areas: 0.59ha (LAP's: 0.27ha, LEAPs & NEAPs: 0.32ha)

School Open Space

Total school open space provided: 0.98ha (including dual use playing pitch)

Note:

Total figure includes: Whole of cliff top open space and ecological mitigation areas.

Total figure excludes:
VoG Land adjacent to Linear Park : 0.52ha, and Proposed Ecological Mitigation Areas (not accessible for POS use)

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Barry Waterfront	Job No 3514	
	Dwg No. SK205	Rev. F

Title
Parameter Plan 4 - Public Open Space

Date	Drawn	Check	Status	Scale
08/09/09	JK	***	Sketch	1:2500 @A1

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APPENDIX 3

Arup Technical Note (4 October 2010)

(Bound Separately)

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Project title	Waterfront Barry	Job number	122374-00
cc	Richard Keogh Jonathan Kinghorn John Smith	File reference	4-70
Prepared by	Roddy Beynon (Cardiff)	Date	5 October 2010
Subject	Response to Audit of Transport Assessment Rev A		

1. INTRODUCTION

This technical note provides a response to the points requiring clarification or comment in the Capita Symonds audit of the Transport Assessment Rev A issued by Arup in relation to the outline planning application.

The audit report produced by Capita Symonds includes a commentary and description of the Transport Assessment, only those points requiring clarification or comment are considered and are organised on a by chapter basis.

Additionally there are a number of points which required the Vale of Glamorgan Council to confirm applicable standards in relation to the development.

2. RESPONSE TO AUDIT POINTS

2.1 Chapter 1: Introduction

No audit comments raised requiring response. Chapter agreed.

2.2 Chapter 2: Existing Site

Audit Ref. 2.2.3: Tables 2.1 and 2.3 refer to the proposed signalisation of Biglis Junction. This signalisation has been dropped as a proposal in Chapter 7.

Arup Response: Typographical error there is currently no proposed improvement at Biglis junction.

2.3 Chapter 3: Development History

No audit comments raised requiring response. Chapter agreed.

2.4 Chapter 4: Policy Context

Audit Ref. 2.4.4: The South East Wales Transport Alliance Regional Transport Plan dated March 2010 should replace the 2008 draft plan in section 4.2.1.

Arup Response: Accepted, this document has been approved since the original Transport Assessment was submitted. There have been no changes to the finalised document that affect its input to the TA.

2.5 Chapter 5: The Masterplan and The Transport Strategy

No audit comments raised requiring response. Chapter agreed.

2.6 Chapter 6: Trip Making

No audit comments raised requiring response. Chapter agreed.

2.7 Chapter 7: Highway Assessment

Audit Ref 2.7.2: The trip making section estimates that Morrisons is trading at 158% and with the introduction of the new food store, this figure will reduce to 117%. This reduction has not been taken into account in the capacity analysis.

Arup Response: Agreed, therefore the analysis represents a worst case in terms of traffic generation from Morrisons.

Audit Ref 2.7.3: 6 – Port Road /Barry Dock Link Road

Appropriate dedicated left turn facilities are required. These are not adequately provided for in current proposals. The dedicated left turn lane exist are give way. No capacity analysis on the exits from has been undertaken.

Port Road westbound merge is 50m. Minimum of 100m preferred.

The left from Barry Dock Link Road does not meet the minimum flow requirements for a dedicated left turn. The RFC for this approach is just under 0.85 with or without dedicated left.

The required minimum entry angle of 20 degrees on the give way is not achieved.

Arup Response: Detailed design issues. Exits could be eased with additional third party land, the proposals represent an improvement in roundabout geometry in comparison to the standards of the existing roundabout. Dedicated L from Barry Docks Link Rd can be removed however it is considered that the dedicated L turn does make a contribution to capacity.

Audit Ref 2.7.3: 8 – Harbour Road / Station Approach/Paget Road: Traffic signals. Comments on this junction and modelling of all other traffic signal junctions are contained within appendix A.

Arup Response: The comments raised in this Appendix have been fully considered and responded to in section 2.8.

Audit Ref 2.7.3: 16 – Wimbourne Road/Ffordd y Mileniwm:

The proposed junction is 170m from the existing roundabout Cardiff Road/Weston Square Roundabout. The modelling work indicates that with development traffic is expected to queue back (43 vehicles/247m) through the new junction, from the adjacent junction.

Arup Response: The queue indicated in the modelling work is 4.3 PCU, it would appear that a typographical error has been made elsewhere. A queue of 4.3 PCU can be accommodated on the link.

Audit Ref 2.7.3: 21 – Gladstone Bridge / Ffordd y Mileniwm: Improvement to existing roundabout.

The proposed improvement design to the roundabout has remained unchanged. However, the ARCADY analysis has revised parameters and the queues on Ffordd y Mileniwm are resolved with the geometry included in the ARCADY (entry width increased from 7.03 to 8.66 and roundabout diameter increased from 37 to 45). The revised design is required.

Sensitivity testing of unequal lane use has been stated in Appendix Q (section 8.36) to have been undertaken but the results are not included and are required.

Arup Response: Figure 7.15 included in TA Rev A has measurements which are consistent with entry width of 8.66 and ICD of 45m. Table 1 presents the results of sensitivity testing on the Cardiff Rd E arm of the junction comparing the proposed improvement to the roundabout and the results for a single lane with the heaviest turning volume in the PM 2020 development scenario. The results indicate that the capacity of the roundabout is more balanced through the use of increased entry widths with improved capacity on the Gladstone Bridge arm.

Table 1: Sensitivity testing of entry width variation at Ffordd Y Mileniwm/Gladstone Bridge

	RFC		Queue (veh)	
	Proposed	Single lane	Proposed	Single lane
Ffordd Y Mileniwm E	0.864	0.804	4.0	6.1
Ffordd Y Mileniwm W	0.563	0.512	1.0	1.3
Gladstone Bridge	0.777	0.942	10.9	3.4

Audit Ref 2.7.4: The Highway Authority will have concerns at locations where nil detriment cannot be achieved. The previous proposals for Biglis Roundabout had a 'modest impact on the operational efficiency' (Section 7.6.3 of the August 2009 TA). There is however, a large area defined as 'Highway land' which is outside the adopted highway area. Options should be considered to improve this junction within the land available.

Also, at Palmerston Road/Cardiff Road Signals, there is a large area to the north of Cardiff Road in the Council's control and a large area to the south in private ownership. What improvements could be considered at this location should the land to the south be acquired?

Arup Response: It was at the councils request that a wider range of junction improvements wase not proposed in the TA Rev A and thus proposals for Biglis roundabout were removed from revision A of the TA.

At the Palmerston Road junction the consortium are unable to commit to providing solutions requiring third party land. The previously available information on land ownership was restricted to areas of highway land, solutions using land to the north of Cardiff Road in council control could be considered but it is suggested that use of land to the south would result in a superior solution.

Audit Ref 2.7.6: Table C highlights that in 2020, the year in which the development is completed, three proposed internal junctions (i / v / viii) have RFCs in excess of the practical capacity.

Arup Response: The internal junctions will all remain within theoretical capacity and are only forecast to have RFC in excess of practical capacity during the PM peak hour. The analysis has not included consideration of signal technologies such as vehicle actuation or MOVA. Elsewhere such technologies have been proven to improve the operation of signalised junctions. It is considered that designing these junctions to provide plentiful capacity in a future year for limited

peak periods would require additional lanes at the junctions and compromise the urban nature and discourage sustainable transport around the development.

2.8 Audit Appendix A – Signalised junctions

Appendix A of the Revision A audit raised a number of technical points in relation to the modelling of signalised junctions. This section responds to the points raised which are referenced at the start of each section, the bold text relates to the queried areas of the model. Where appropriate minor alterations have been made to the junction models. Results for these revised models are included as appendices A-E.

2.8.1.1 Audit Ref App A, 8.11: Merrie Harrier

Arup has revisited the site following implementation of the Merrie Harrier junction improvements and altered the Linsig model accordingly to more closely replicate the conditions. The two sections of the junction now run on a split stream controller to allow better coordination, phasing/staging has been changed accordingly. The revised model output is included as Appendix A.

Pedestrian crossing on Barry Road east, site observations show there is little activity at the pedestrian crossing during the peak periods. It is thus considered that its omission would have minimal effect on capacity.

Phase D left turn into Penlan Road, this has now been modelled with a signal as on site, but there is an effective green throughout the cycle with a left turn filter. Left turning traffic advances to a junction at which it gives way to the right turners from Barry Road. In combination this arrangement effectively runs as a give way.

Phase L right into Redlands Road, altered to run as a give way with a demand dependant stage for the indicative right arrow, the indicative right only runs approximately every fourth cycle so has been omitted from the model.

Andrews Road, is a bus only arm off Merrie Harrier junction. The stage is demand dependant and only called when a bus is present. As a result of the relatively low number of bus movements this link been omitted from the model.

Phase H left turn into Redlands Road, the movement is not modelled to experience congestion, the phase has been revised to operate as a left turn filter in an additional stage. This change has a nominal effect.

Tourism Scenario, has been modelled with and without development in the PM peak.

Link 5/2, left turn into Redlands road (Link 5/1) is a flare with a 6 PCU capacity fed by link 5/2. With development in 2020 link 5/2 queues and block vehicles from entering the left turn flare but releases at the start of the green stage allowing full saturation of both Link 5/1 and 5/2.

Internal Links, during some scenarios the internal links have a mean max queue (MMQ) above the physical storage but have an end of red queue within storage capacity. As a test queue limiters were applied to the internal links this test forced the mean max queues down and increased the RFC of the feeding arms. In reality when the internal link starts to empty the feeding arm adds to the back of the queue generating a rolling queue that fully depletes before the stage closes down as shown in Figure 1.

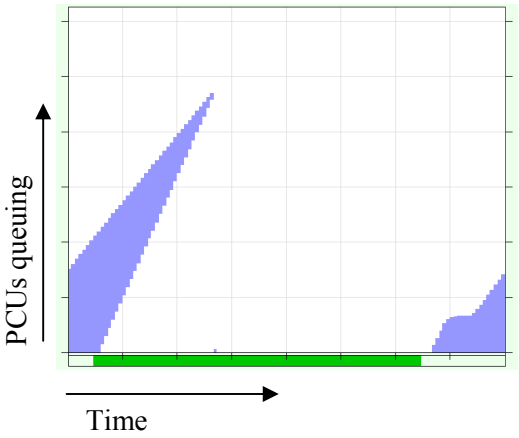


Figure 1: Queue depletion pattern on Merrie Harrier junction link

Figure 1 shows the back of queue building while the front of the queue is released. The queue becomes fully depleted before the next red stage commences.

2.8.1.2 Audit Ref App A, 8.12: Murch Crossroads

Revisions to the model have been made in light of audit comments, Appendix B includes the revised results set.

Geometry, left turn into Murch Road south (Link 1/1) has been set to 8m radius and left turn into Cardiff Road east has been set to a 10m radius.

Cycle Times, during site observations complex staging with demand dependant stages and large fluctuation in cycle times. It is therefore considered reasonable to allow Linsig to optimise the cycle time as a flat profile.

Queue Lengths, the queue on Cardiff Road eastbound/westbound is a rolling queue that fully releases within their green phase.

Over Capacity, the junction operates over capacity in the base situation and as outlined in section 7.6 of the TA no remedial measures are proposed in relation to the Waterfront Barry scenario.

2.8.2 Audit Ref App A, 8.16: Palmerston Road/Cardiff Road

Revisions to the model have been made in light of audit comments, Appendix C includes the revised results set.

Saturation flows, the saturations flows have been based on a report issued by TRL 'The prediction of saturation flows for road junctions controlled by traffic signals' report (RR67) which has been adopted as a recognised method to determine saturation flows at signalised junctions. The note was produced in 1986 and it could be argued that as a result of increased driver familiarity with traffic signals an increase in saturation flows above that laid out in RR67 could be justified. RR67 is based on road geometry and is supported directly in the Linsig modelling software as well as other standard transport guidance and modelling software.

While it is important not to overestimate the capacity of a junction underestimating the capacity could result in an over engineered design for a one hour peak that is inappropriate for the level of demand and its location.

Proposed junction, as discussed in section 7.6 of the TA Rev A the junction operates over capacity in the existing situation. Due to the available Highway land it has not been possible to propose an improved solution.

Indicative right into Palmerston Road, has now been modelled as an indicative right. This indicative right is a demand actuated stage that is double cycled in the AM peak. This has only a nominal improvement effect to the junction capacity results.

Over capacity, the junction does currently have capacity issues but as outlined in section 7.6 of the TA no improvements are proposed in the TA Rev A for the with development scenario.

2.8.3 Audit Ref App A, 8.18: Hood Road/Broad Street

Revisions to the model have been made in light of audit comments; Appendix D includes the revised results set.

Opposed right turns, The right turn from Island Road north and Hood Road south have now been modelled with give way parameters. Because of the low demand and opposing flow this has a negligible effect.

Combined link 4/1 and 4/2, Broad Street west is a one lane approach (link 4/1) with right hand flare (link 4/2), in order to accurately model the right hand flare in Linsig the option 'short lane with lane on left' needs to be selected. This allows Linsig to determine the usage of the flare which could be limited by the blocking back of the vehicles in the long lane. It is not possible to separate the queues for analysis purposes between the flare and the straight ahead queue.

Queue blocking back, there may be some cases in which traffic blocks vehicles entering adjacent flares or adjacent lanes however these effects are considered by the modelling software when calculating overall queue lengths.

2.8.4 Audit Ref App A, 8.29: Harbour Road/Station Approach Road

Revisions to the model have been made in light of audit comments, Appendix E includes the revised results set.

Pedestrian Phases, the pedestrian crossings at Station Road and Paget Road have been staggered and therefore can be run during the other stages without affecting green times. For this reason they have been omitted from the Linsig analysis.

Right turn coefficient, the right turn coefficient into Plymouth Road has now been updated.

Right turn stacking, the right turn storage into Plymouth Road has been reduced to one blocking PCU.

Tourism Scenario, it is accepted that the junction will be over capacity during the peak of tourism.

Internal Queue Length, the internal storage between junctions fills and dissipates within each cycle. If demand fluctuates from this level there is still capacity within the junctions to balance the queues.

Only covers 2020 with development and development plus tourism, the junction improvements are part of development and are therefore not assessed in the 2008 base year.

Saturation flows, as 8.16.

2.8.5 Audit Ref App A, 8.38: South Quay Junction (junction viii)

Saturation flows, as 8.16.

Only covers 2020 with development, the junction is part of the development and is therefore only assessed not assessed for the 2008 base year.

Combined link 1/1 and 1/2, the southbound through road from the supermarket is a one lane approach (link 1/1) with right hand flare (link 4/2) in order to accurately model the right hand flare in Linsig the option 'short lane with lane on left' needs to be selected. This allows Linsig to

determine the usage of the flare caused by the blocking back of the vehicles in the long lane. The queues between the flare and the straight ahead queue cannot be separated.

On the limit of capacity 2020 PM, agreed, in order to add further significant capacity a step change would be required to the design, this would result in an over-engineered design for a one hour peak that is inappropriate for the level of demand and its location for the rest of the day.

Right turning movements, this is one of the key junctions along the spine road, approaching the junction the carriageway flares to three lanes on the northern arm the right turners have been set to run during their own stage which allows the legs of the pedestrian staggers to run and therefore keeping the stages to minimum.

Whilst it is agreed that the opposed right turn stage is a departure from standards there are a number of junctions using such phasing in the surrounding area. This solution offers benefits in terms of space required for the junction, capacity and vehicular delay. The acceptability of implementing such phasing lies with the Vale of Glamorgan.

2.8.6 Audit Ref App A, 8.39: Central West Pond Junction (junction v)

Pedestrian Intergreens, this is a compact junction with short staggered pedestrian crossings which only require short intergreens.

Saturation flows, as 8.16.

Only covers 2020 with development, the junction is part of the development and is therefore only assessed for 2020 base plus development traffic.

Combined links 1/2 & 1/3, 2/1 & 2/2 and 3/1 & 3/2, as previously stated it is not possible to separate the queue lengths on links.

2.8.7 Audit Ref App A, 8.40: Internal Northern Junction (junction i)

Pedestrian Intergreens, this is a compact junction with short staggered pedestrian crossing which only require short intergreens.

Right turning movements, As 8.38. As modelled the dedicated right turn movements run at the same as a pedestrian phase. In order to run the right turn as an indicative phase an additional stage would required or an all red pedestrian stage that would push the junction over capacity.

Saturation flows, as 8.16.

Only covers 2020 with development, the junction is part of the development and is therefore only assessed for 2020 base plus development traffic.

2.8.8 Summary of effects of revisions to signalised junctions

Tables 2 and 3 provide a comparison of the capacity results between those models presented in the Transport Assessment Rev A (Arup, June 2010) and revised models following the changes made according to audit comments (Capita Symonds, August 2010).

The changes have had the effect of minor improvements to capacity at Merrie Harrier and at the Palmerston Road junction in the 2008 AM period. At other junctions the alterations have had no significant effect on capacity; it is therefore considered that the previously presented results are representative and that the comments raised in the most recent audit are minor in nature.

Table 2: Signalised junction Capacity results presented in Transport Assessment Rev A, June 2010.

		2008 Existing		2020 Base		2020 with Dev't		2020 PM Tourism	
Junction		AM	PM	AM	PM	AM	PM	Without Dev't	With Dev
3	Merrie Harrier Signals Junction	3	2	4	3	4	3	4	4
4	Murch Crossroads	1	1	2	3	3	4	4	4
8	Harbour Road / Paget Road	1	1	1	1	1	2	4	4
14	Palmerston Road/Cardiff Road Signals Junction	4	2	4	4	4	4	4	4
23	Broad Street / Hood Road Signals	1	2	1	3	1	2	4	4

Table 3: Signalised junction capacity results following model alterations in relation to audit comments

		2008 Existing		2020 Base		2020 with Dev't		2020 PM Tourism	
Junction		AM	PM	AM	PM	AM	PM	Without Dev't	With Dev
3	Merrie Harrier Signals Junction	3	2	**3**	**2**	4	**2**	**2**	**3**
4	Murch Crossroads	1	1	2	3	3	4	4	4
8	Harbour Road / Paget Road	1	1	1	1	1	2	4	4
14	Palmerston Road/Cardiff Road Signals Junction	**3**	2	4	4	4	4	4	4
23	Broad Street / Hood Road Signals	1	2	1	3	1	2	4	4

1 - Within Capacity	2 - Approaching Practical Capacity	3 - Over Practical Capacity, Approaching Theoretical Capacity	4 - Over Theoretical Capacity
Priority RFC <0.75 Signals RFC <0.80	Priority RFC >0.75, <0.85 Signals RFC >0.80, <0.90	Priority RFC >0.85, <1.00 Signals RFC >0.90, <1.00	Priority RFC >1.00 Signals RFC >1.00

2.9 Chapter 8: Parking Assessment

Audit Ref 2.8.4: The lack of an agreed parking provision for cyclists is of concern. With the predicted vehicular congestion on the adjacent road network highlight, the sustainability of the site is key. With significant differences between the standards, an agreed provision should be part of the planning process.

Arup Response: The consortium are awaiting clarification of which standard is required from the Vale of Glamorgan Council. The Transport Assessment provides comparison of proposed parking levels to a range of standards, it is considered that the location and sustainable objectives of the site make the CSS standards appropriate. It is also considered that in line with Manual for Streets principles on-street spaces will form a key part of the parking strategy for Waterfront Barry.

Actions: Vale of Glamorgan Council to clarify parking standards (car and cycle) to be applied to the site and acceptability of currently proposed parking schedules, Tables 8.1, 8.2 and 8.3 of the Transport Assessment Rev A.

2.10 Chapter 9: Rail Assessment

Audit Ref 2.9.1: The previous audit noted that the proposed Defence Technical College and Aerospace Business Park at St Athan had not been taken into account. This is now mentioned in Section 9.1.5, but not analysed in detail.

Arup Response: Demand generated by the Defence Technical College and Aerospace Business Park at St Athan is remote from the Barry train stations which lie several kilometres to the south. It is considered that the express bus to Cardiff, due to be implemented by the Welsh Assembly Government will offer a preferable transport service to Cardiff. Local transport needs are likely to be shared between existing local bus services and the rail service. It is considered that more detailed analysis is not therefore required.

Audit Ref 2.9.2: Figure 9.3 highlights capacity on the 07:56 train from Barry. Maximum capacity ranges from 280-300 with occupancy recorded at 245 approx. Table 6.11 identified a predicted121 residents departing by public transport in the AM peak. Based on the public

transport times comparison in section 10.1.1, most commuters to Cardiff will use the train. Although here are alternative trains in the AM peak, the one service highlighted had spare capacity of only 35 to 56.

Arup Response: It is agreed that the most attractive form of public transport to Cardiff is likely to be by the train services with a service frequency of 15 minutes throughout the day. The agreed gravity model (Table 6.12) suggests that around 29% of trips are to Cardiff in the AM peak period, therefore if 100% of public transport users to Cardiff used rail this would result in 29% of 121 public transport trips which is 35 trips. This number of trips could be accommodated on the single peak train service. In reality use is likely to be more evenly spread over the alternative services distributed across the peak hour with some destinations better served by bus. Improvements in service are also likely should the level of demand increase to a commercially viable level.

2.11 Chapter 10: Bus Assessment

Audit Ref 2.10.3: Cardiff Bus has taken the view that adequate capacity and frequency would remain at these stops. At minimum, the services remaining will be one every 30 minutes.

Arup response: Many stops are served by more than one service and therefore many of the stops will retain a service frequency greater than 30 minutes.

Audit Ref 2.10.4: A patronage survey of route 95 has been undertaken to determine spare capacity. It indicates that there is adequate spare seated capacity to enable a diversion of the route through the development site. The 95 service operating every 20 minutes, with provision for 30 seating and 15 standing, is likely to be sufficient to accommodate the predicted peak of 97 departures in the AM. However, is this frequency sufficient to encourage the sustainability the site requires with the predicted congestion on the adjacent highway network?

Arup Response: The performance and patronage of the service will be monitored as part of the Travel Plan monitoring by both the consortium and the Vale of Glamorgan Council.

2.12 Chapter 11: Walking and Cycling Assessment

Audit Ref 2.11.3: Access to Barry Railway Station is key to the development, as the railway provides a quick, frequent and sustainable commuting route to Cardiff for the potential residents of the development. The failure to have a direct link from the proposed residential area to the railway station is a major concern especially as the sustainability of the site is crucial. Have all alternatives been assessed e.g. provision of a pedestrian crossing over the steam railway been reviewed with operation only in the non tourist season?

Arup Response: All options for improving this link have been considered by the consortium. The Vale of Glamorgan Council is not willing to fully support level crossing. Arup were commissioned to investigate options for crossing the steam railway lines and noted implementation of level crossings in similar situations elsewhere. During a site visit with the Vale of Glamorgan and Cambrian railways objections were raised to a level crossing, Cambrian transport stated they would object to such a proposal. It is considered that a crossing would be of significant benefit to a significant number of daily users but that a stepped alternative would be costly and lack the directness and benefits of a level crossing. If a level crossing cannot be achieved consideration will be given to altering the masterplan at the detailed design stage to improve the route to Barry railway station.

Audit Ref 2.11.4: The quality/extent of the proposed improvements is of concern e.g. cosmetic improvements to underpasses.

Arup Response: The proposals for five sustainable links are comprehensive and improve connectivity between the site and a variety of key destinations. The majority of the routes are pre-

existing and essential infrastructure is in place. Recent inspection of underpasses indicated that lighting and drainage were in good order. It is considered that cosmetic improvements are important for making routes attractive to a range of users for whom personal security is a major consideration. Improvements to surfacing will also be key for the elderly or mobility impaired.

2.13 Chapter 12: Other Travel Considerations

No audit comments raised requiring response. Chapter agreed.

2.14 Chapter 13: Outline Travel Plan

Audit Ref 2.13.1: The previous audit noted quantitative modal split targets had not been identified in the outline travel plan. Quantified modal split targets of 65% car, 35% walking, 8% bus and 3% cycle are now specified. These targets, however, sum to 111%

Arup Response: Typographical error. Correct split is 65/27/6/2 which is directly related to the resultant trip generation split presented in section 6.2.7 of the TA Rev A.

2.15 Chapter 14: Recommendations and Summary

No audit comments raised requiring response. Chapter agreed.

3. SUMMARY

The audit indicates that with the exception of minor typographical errors chapters 1-6, 12 and 13 of the Waterfront Barry Transport Assessment Revision A are now agreed. This technical note provides a response to points raised in relation to chapters 7-11 of the Transport Assessment.

It is notable that a large number of points have been raised in relation to the capacity modelling work undertaken but that revision of the models in line with a number of these points have led to only a very marginal change in results at two junctions where available capacity has improved.

The consortium requires clarification from the Vale of Glamorgan Council on the parking standards to be applied to the site and the acceptability of implementing of suggested signal phasing.

It is therefore considered that the overall findings and conclusions of the Waterfront Barry Transport Assessment Rev A remain valid.

Appendix A

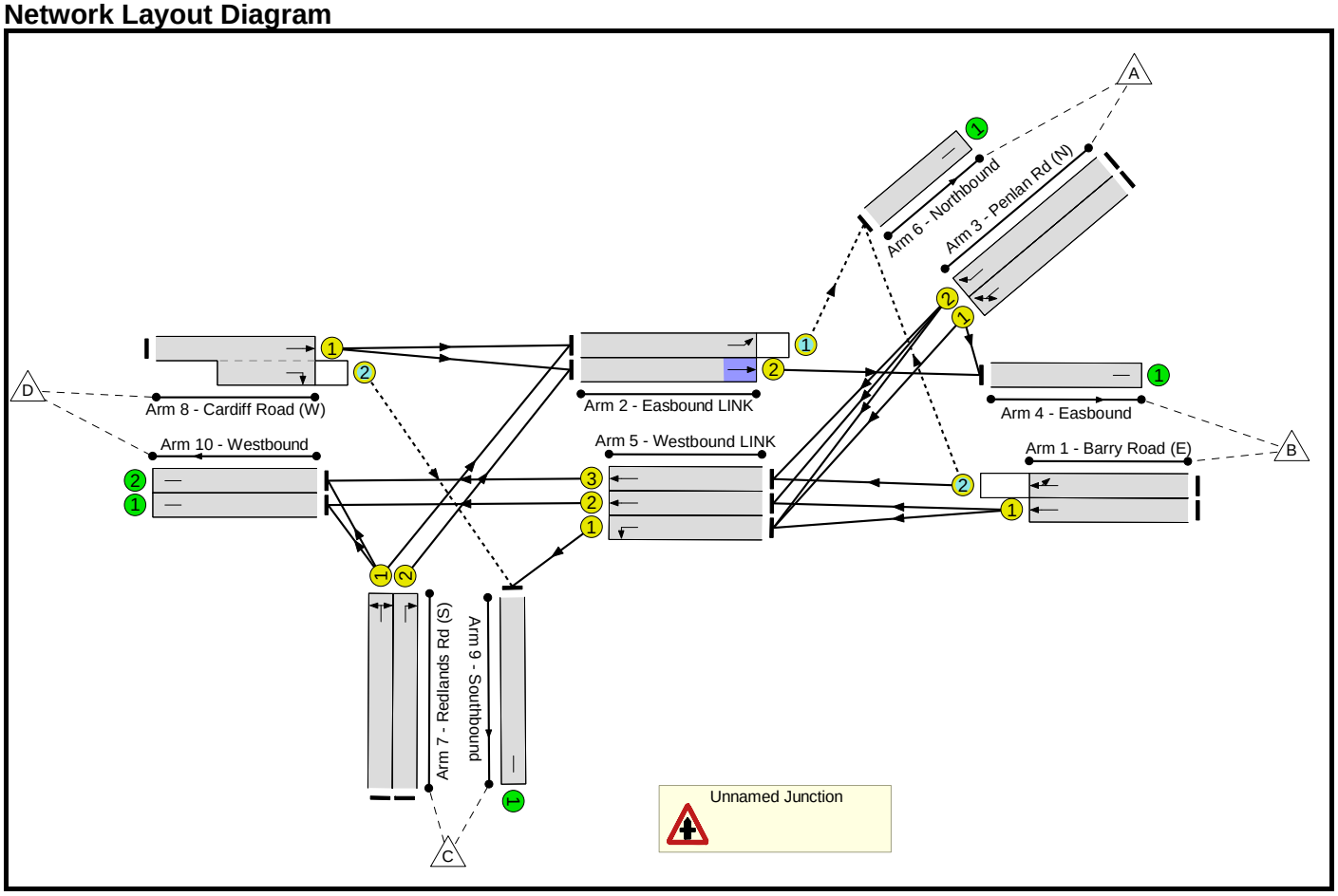
Merrie Harrier

Full Input Data And Results

User and Project Details

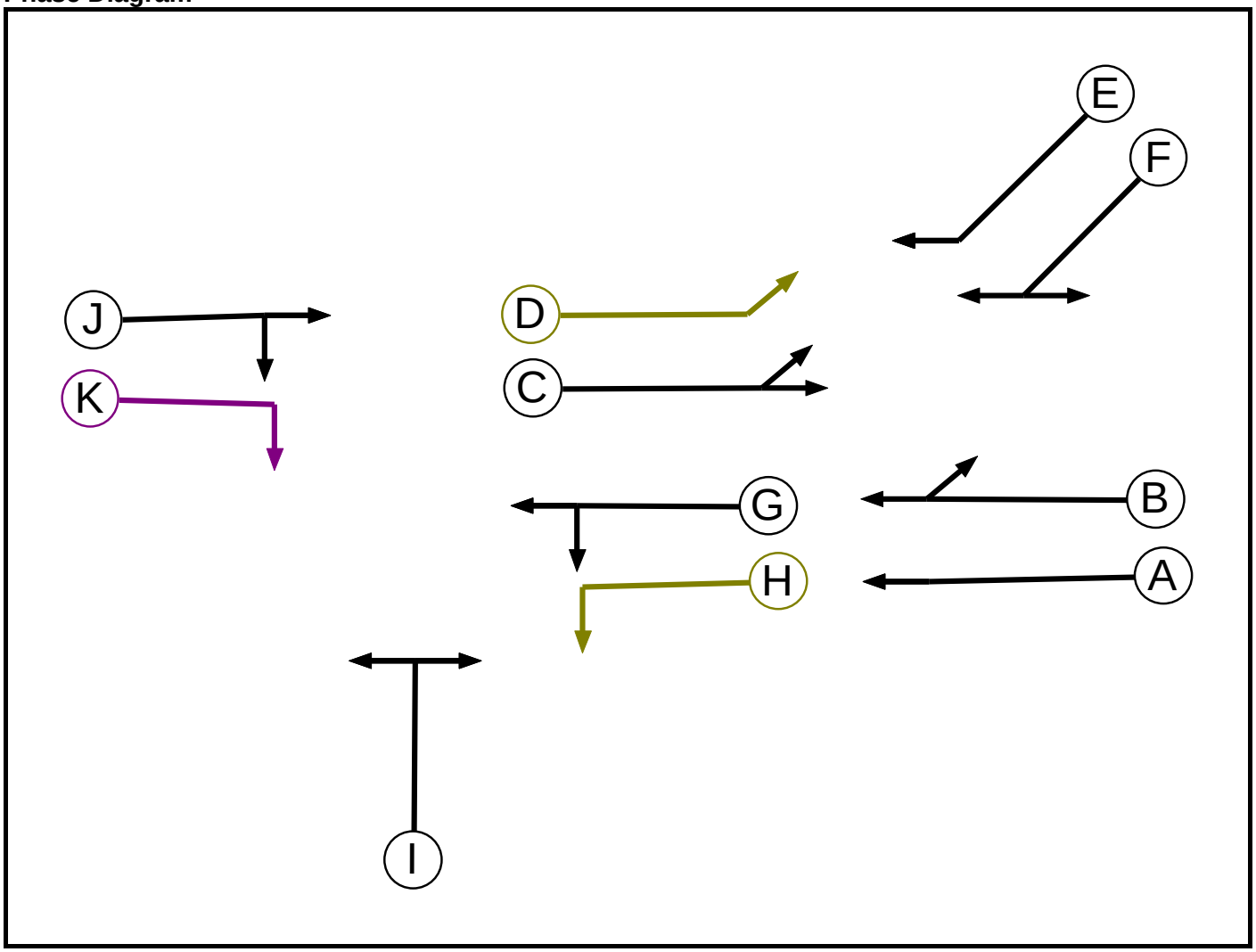
Project:	**Waterfront Barry**
Title:	
Location:	Merrie Harrier, Vale of Glamorgan
File name:	post2009_Merrie Harrier.lsg3x
Author:	Ryan Hopkins
Company:	Arup
Address:	
Notes:	

Network Layout Diagram



Full Input Data And Results

Phase Diagram



Phase Input Data

Phase Name	Phase Type	Stage Stream	Assoc. Phase	Street Min	Cont Min
A	Traffic	1		7	7
B	Traffic	1		7	7
C	Traffic	1		7	7
D	Filter	1	C	4	0
E	Traffic	1		7	7
F	Traffic	1		7	7
G	Traffic	2		7	7
H	Filter	2	G	4	0
I	Traffic	2		7	7
J	Traffic	2		7	7
K	Ind. Arrow	2	J	4	4

Full Input Data And Results

Phase Intergreens Matrix

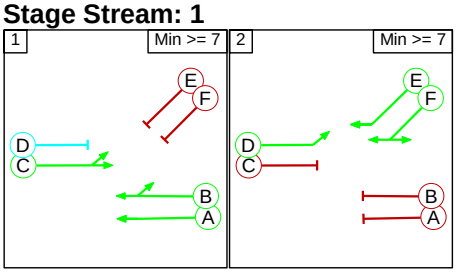
		Starting Phase										
		A	B	C	D	E	F	G	H	I	J	K
Terminating Phase	A		-	-	-	7	7	-	-	-	-	-
	B	-		-	-	7	7	-	-	-	-	-
	C	-	-		-	8	8	-	-	-	-	-
	D	-	-	-		-	-	-	-	-	-	-
	E	7	7	7	-		-	-	-	-	-	-
	F	7	7	7	-	-		-	-	-	-	-
	G	-	-	-	-	-	-		-	7	-	-
	H	-	-	-	-	-	-	-		-	-	-
	I	-	-	-	-	-	-	7	-		8	6
	J	-	-	-	-	-	-	-	-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

Phases in Stage

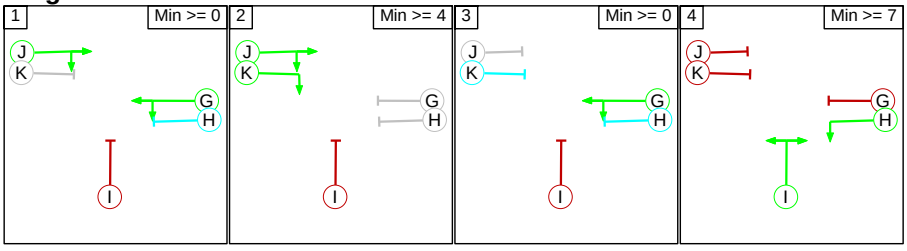
Stream	Stage No.	Phases in Stage
1	1	A B C
1	2	D E F
2	1	G J
2	2	J K
2	3	G
2	4	H I

Stage Diagram

Stage Stream: 1



Stage Stream: 2



Phase Delays

Stage Stream: 1

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

Full Input Data And Results

Stage Stream: 2

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

Prohibited Stage Changes

Stage Stream: 1

From Stage \ To Stage	1	2
1		8
2	7	

Stage Stream: 2

From Stage \ To Stage	1	2	3	4
1		0	0	8
2	2		2	8
3	2	X		7
4	8	X	7	

Full Input Data And Results

Give-Way Lane Input Data

Junction: Unnamed Junction

Lane	Movement	Max 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 (Barry Road (E))	6/1 (U-Turn)	1440	2/2	1.09	2/2	3.00	-	0.50	3	3.00
2/1 (Easbound LINK)	6/1 (Ahead)	1440	1/2	1.09	1/2	2.00	-	0.50	2	2.00
8/2 (Cardiff Road (W))	9/1 (Right)	1439	5/1	1.09	5/1	2.00	-	0.50	2	2.00

Full Input Data And Results

Lane Input Data

Junction: Unnamed Junction

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 (Barry Road (E))	U	A	2	3	60.0	Geom	-	3.00	0.00	Y	Arm 5 Ahead	Inf
1/2 (Barry Road (E))	O	B	2	3	60.0	Geom	-	3.00	0.00	N	Arm 5 Ahead	Inf
											Arm 6 U-Turn	12.00
2/1 (Easbound LINK)	O	C D	2	3	6.0	Geom	-	3.65	0.00	Y	Arm 6 Ahead	Inf
2/2 (Easbound LINK)	U	C	2	3	6.0	Geom	-	3.65	0.00	N	Arm 4 Ahead	Inf
3/1 (Penlan Rd (N))	U	F	2	3	60.0	Geom	-	3.00	0.00	Y	Arm 4 U-Turn	10.00
											Arm 5 Ahead	Inf
3/2 (Penlan Rd (N))	U	E	2	3	60.0	Geom	-	3.00	0.00	N	Arm 5 Ahead	Inf
4/1 (Easbound)	U		2	3	60.0	Inf	-	-	-	-	-	-
5/1 (Westbound LINK)	U	G H	2	3	6.0	Geom	-	3.25	0.00	Y	Arm 9 Left	13.00
5/2 (Westbound LINK)	U	G	2	3	60.0	Geom	-	3.25	0.00	N	Arm 10 Ahead	Inf
5/3 (Westbound LINK)	U	G	2	3	6.0	Geom	-	3.25	0.00	N	Arm 10 Ahead	Inf
6/1 (Northbound)	U		2	3	60.0	Inf	-	-	-	-	-	-
7/1 (Redlands Rd (S))	U	I	2	3	60.0	Geom	-	3.00	0.00	Y	Arm 2 Right	17.00
											Arm 10 Left	14.00
7/2 (Redlands Rd (S))	U	I	2	3	60.0	Geom	-	3.00	0.00	N	Arm 2 Right	20.00
8/1 (Cardiff Road (W))	U	J	2	3	60.0	Geom	-	3.25	0.00	Y	Arm 2 Ahead	Inf
8/2 (Cardiff Road (W))	O	J K	2	3	6.0	Geom	-	3.25	0.00	N	Arm 9 Right	20.00
9/1 (Southbound)	U		2	3	60.0	Inf	-	-	-	-	-	-
10/1 (Westbound)	U		2	3	60.0	Inf	-	-	-	-	-	-

10/2 (Westbound)	U		2	3	60.0	Inf	-	-	-	-	-	-

Traffic Flow Groups

Flow Group	Start Time	End Time	Duration	Formula
1: 'AM 2008 Base'	08:30	09:30	01:00	
2: 'PM 2008 Base'	16:30	17:30	01:00	
3: 'AM 2020 Base'	08:30	09:30	01:00	
4: 'PM 2020 Base'	16:30	17:30	01:00	
5: 'AM 2020 with Dev'	08:30	09:30	01:00	
6: 'PM 2020 with Dev'	16:30	17:30	01:00	
7: '2020 with Dev + Tourism'	16:30	17:30	01:00	
10: 'PM 2020 Base + Tourism'	16:30	17:30	01:00	

Traffic Lane Flows

Lane	Scenario 1: AM Base 2008
Junction: Unnamed Junction	
1/1	514
1/2	208
2/1	501
2/2	1033
3/1	164
3/2	196
4/1	1128
5/1	383
5/2	323
5/3	106
6/1	676
7/1	402
7/2	618
8/1 (with short)	726(In) 616(Out)
8/2 (short)	110
9/1	493
10/1	422
10/2	109

Full Input Data And Results

Scenario 1: 'AM Base 2008' (FG1: 'AM 2008 Base', Plan 1: 'Staging Plan No. 1')

Traffic Lane Flows

Junction: Unnamed Junction

Lane	Lane Width (m)	Gradient	Nearside Lane	Allowed Turns	Turning Radius (m)	Turning Prop.	Sat flow (PCU/Hr)
1/1 (Barry Road (E))	3.00	0.00	Y	Arm 5 Ahead	Inf	100.0 %	1915
1/2 (Barry Road (E))	3.00	0.00	N	Arm 5 Ahead Arm 6 U-Turn	Inf 12.00	15.9 % 84.1 %	1859
2/1 (Easbound LINK)	3.65	0.00	Y	Arm 6 Ahead	Inf	100.0 %	1980
2/2 (Easbound LINK)	3.65	0.00	N	Arm 4 Ahead	Inf	100.0 %	2120
3/1 (Penlan Rd (N))	3.00	0.00	Y	Arm 4 U-Turn Arm 5 Ahead	10.00 Inf	57.9 % 42.1 %	1762
3/2 (Penlan Rd (N))	3.00	0.00	N	Arm 5 Ahead	Inf	100.0 %	2055
4/1 (Easbound Lane 1)	Infinite Saturation Flow						Inf
5/1 (Westbound LINK)	3.25	0.00	Y	Arm 9 Left	13.00	100.0 %	1739
5/2 (Westbound LINK)	3.25	0.00	N	Arm 10 Ahead	Inf	100.0 %	2080
5/3 (Westbound LINK)	3.25	0.00	N	Arm 10 Ahead	Inf	100.0 %	2080
6/1 (Northbound Lane 1)	Infinite Saturation Flow						Inf
7/1 (Redlands Rd (S))	3.00	0.00	Y	Arm 2 Right Arm 10 Left	17.00 14.00	74.6 % 25.4 %	1752
7/2 (Redlands Rd (S))	3.00	0.00	N	Arm 2 Right	20.00	100.0 %	1912
8/1 (Cardiff Road (W))	3.25	0.00	Y	Arm 2 Ahead	Inf	100.0 %	1940
8/2 (Cardiff Road (W))	3.25	0.00	N	Arm 9 Right	20.00	100.0 %	1935
9/1 (Southbound Lane 1)	Infinite Saturation Flow						Inf
10/1 (Westbound Lane 1)	Infinite Saturation Flow						Inf
10/2 (Westbound Lane 2)	Infinite Saturation Flow						Inf

Full Input Data And Results

Traffic Lane Flows

Lane	Scenario 2: PM Base 2008
Junction: Unnamed Junction	
1/1	756
1/2	331
2/1	289
2/2	739
3/1	303
3/2	369
4/1	878
5/1	739
5/2	412
5/3	376
6/1	382
7/1	236
7/2	311
8/1 (with short)	696(In) 595(Out)
8/2 (short)	101
9/1	840
10/1	516
10/2	386

Full Input Data And Results

Scenario 2: 'PM Base 2008' (FG2: 'PM 2008 Base', Plan 1: 'Staging Plan No. 1')

Traffic Lane Flows

Junction: Unnamed Junction

Lane	Lane Width (m)	Gradient	Nearside Lane	Allowed Turns	Turning Radius (m)	Turning Prop.	Sat flow (PCU/Hr)
1/1 (Barry Road (E))	3.00	0.00	Y	Arm 5 Ahead	Inf	100.0 %	1915
1/2 (Barry Road (E))	3.00	0.00	N	Arm 5 Ahead Arm 6 U-Turn	Inf 12.00	71.9 % 28.1 %	1985
2/1 (Easbound LINK)	3.65	0.00	Y	Arm 6 Ahead	Inf	100.0 %	1980
2/2 (Easbound LINK)	3.65	0.00	N	Arm 4 Ahead	Inf	100.0 %	2120
3/1 (Penlan Rd (N))	3.00	0.00	Y	Arm 4 U-Turn Arm 5 Ahead	10.00 Inf	45.9 % 54.1 %	1792
3/2 (Penlan Rd (N))	3.00	0.00	N	Arm 5 Ahead	Inf	100.0 %	2055
4/1 (Easbound Lane 1)	Infinite Saturation Flow						Inf
5/1 (Westbound LINK)	3.25	0.00	Y	Arm 9 Left	13.00	100.0 %	1739
5/2 (Westbound LINK)	3.25	0.00	N	Arm 10 Ahead	Inf	100.0 %	2080
5/3 (Westbound LINK)	3.25	0.00	N	Arm 10 Ahead	Inf	100.0 %	2080
6/1 (Northbound Lane 1)	Infinite Saturation Flow						Inf
7/1 (Redlands Rd (S))	3.00	0.00	Y	Arm 2 Right Arm 10 Left	17.00 14.00	51.7 % 48.3 %	1745
7/2 (Redlands Rd (S))	3.00	0.00	N	Arm 2 Right	20.00	100.0 %	1912
8/1 (Cardiff Road (W))	3.25	0.00	Y	Arm 2 Ahead	Inf	100.0 %	1940
8/2 (Cardiff Road (W))	3.25	0.00	N	Arm 9 Right	20.00	100.0 %	1935
9/1 (Southbound Lane 1)	Infinite Saturation Flow						Inf
10/1 (Westbound Lane 1)	Infinite Saturation Flow						Inf
10/2 (Westbound Lane 2)	Infinite Saturation Flow						Inf

Full Input Data And Results

Traffic Lane Flows

Lane	Scenario 3: AM Base 2020
Junction: Unnamed Junction	
1/1	634
1/2	209
2/1	584
2/2	1205
3/1	193
3/2	227
4/1	1316
5/1	447
5/2	407
5/3	93
6/1	789
7/1	468
7/2	721
8/1 (with short)	847(In) 719(Out)
8/2 (short)	128
9/1	575
10/1	524
10/2	95

Full Input Data And Results

Scenario 3: 'AM Base 2020' (FG3: 'AM 2020 Base', Plan 1: 'Staging Plan No. 1')

Traffic Lane Flows

Junction: Unnamed Junction

Lane	Lane Width (m)	Gradient	Nearside Lane	Allowed Turns	Turning Radius (m)	Turning Prop.	Sat flow (PCU/Hr)
1/1 (Barry Road (E))	3.00	0.00	Y	Arm 5 Ahead	Inf	100.0 %	1915
1/2 (Barry Road (E))	3.00	0.00	N	Arm 5 Ahead Arm 6 U-Turn	Inf 12.00	1.9 % 98.1 %	1831
2/1 (Easbound LINK)	3.65	0.00	Y	Arm 6 Ahead	Inf	100.0 %	1980
2/2 (Easbound LINK)	3.65	0.00	N	Arm 4 Ahead	Inf	100.0 %	2120
3/1 (Penlan Rd (N))	3.00	0.00	Y	Arm 4 U-Turn Arm 5 Ahead	10.00 Inf	57.5 % 42.5 %	1763
3/2 (Penlan Rd (N))	3.00	0.00	N	Arm 5 Ahead	Inf	100.0 %	2055
4/1 (Easbound Lane 1)	Infinite Saturation Flow						Inf
5/1 (Westbound LINK)	3.25	0.00	Y	Arm 9 Left	13.00	100.0 %	1739
5/2 (Westbound LINK)	3.25	0.00	N	Arm 10 Ahead	Inf	100.0 %	2080
5/3 (Westbound LINK)	3.25	0.00	N	Arm 10 Ahead	Inf	100.0 %	2080
6/1 (Northbound Lane 1)	Infinite Saturation Flow						Inf
7/1 (Redlands Rd (S))	3.00	0.00	Y	Arm 2 Right Arm 10 Left	17.00 14.00	74.6 % 25.4 %	1752
7/2 (Redlands Rd (S))	3.00	0.00	N	Arm 2 Right	20.00	100.0 %	1912
8/1 (Cardiff Road (W))	3.25	0.00	Y	Arm 2 Ahead	Inf	100.0 %	1940
8/2 (Cardiff Road (W))	3.25	0.00	N	Arm 9 Right	20.00	100.0 %	1935
9/1 (Southbound Lane 1)	Infinite Saturation Flow						Inf
10/1 (Westbound Lane 1)	Infinite Saturation Flow						Inf
10/2 (Westbound Lane 2)	Infinite Saturation Flow						Inf

Full Input Data And Results

Traffic Lane Flows

Lane	Scenario 4: PM Base 2020
Junction: Unnamed Junction	
1/1	1053
1/2	212
2/1	337
2/2	860
3/1	362
3/2	420
4/1	1022
5/1	859
5/2	646
5/3	271
6/1	446
7/1	274
7/2	362
8/1 (with short)	811(In) 693(Out)
8/2 (short)	118
9/1	977
10/1	772
10/2	277

Full Input Data And Results

Scenario 4: 'PM Base 2020' (FG4: 'PM 2020 Base', Plan 1: 'Staging Plan No. 1')

Traffic Lane Flows

Junction: Unnamed Junction

Lane	Lane Width (m)	Gradient	Nearside Lane	Allowed Turns	Turning Radius (m)	Turning Prop.	Sat flow (PCU/Hr)
1/1 (Barry Road (E))	3.00	0.00	Y	Arm 5 Ahead	Inf	100.0 %	1915
1/2 (Barry Road (E))	3.00	0.00	N	Arm 5 Ahead Arm 6 U-Turn	Inf 12.00	48.6 % 51.4 %	1931
2/1 (Easbound LINK)	3.65	0.00	Y	Arm 6 Ahead	Inf	100.0 %	1980
2/2 (Easbound LINK)	3.65	0.00	N	Arm 4 Ahead	Inf	100.0 %	2120
3/1 (Penlan Rd (N))	3.00	0.00	Y	Arm 4 U-Turn Arm 5 Ahead	10.00 Inf	44.8 % 55.2 %	1795
3/2 (Penlan Rd (N))	3.00	0.00	N	Arm 5 Ahead	Inf	100.0 %	2055
4/1 (Easbound Lane 1)	Infinite Saturation Flow						Inf
5/1 (Westbound LINK)	3.25	0.00	Y	Arm 9 Left	13.00	100.0 %	1739
5/2 (Westbound LINK)	3.25	0.00	N	Arm 10 Ahead	Inf	100.0 %	2080
5/3 (Westbound LINK)	3.25	0.00	N	Arm 10 Ahead	Inf	100.0 %	2080
6/1 (Northbound Lane 1)	Infinite Saturation Flow						Inf
7/1 (Redlands Rd (S))	3.00	0.00	Y	Arm 2 Right Arm 10 Left	17.00 14.00	51.8 % 48.2 %	1745
7/2 (Redlands Rd (S))	3.00	0.00	N	Arm 2 Right	20.00	100.0 %	1912
8/1 (Cardiff Road (W))	3.25	0.00	Y	Arm 2 Ahead	Inf	100.0 %	1940
8/2 (Cardiff Road (W))	3.25	0.00	N	Arm 9 Right	20.00	100.0 %	1935
9/1 (Southbound Lane 1)	Infinite Saturation Flow						Inf
10/1 (Westbound Lane 1)	Infinite Saturation Flow						Inf
10/2 (Westbound Lane 2)	Infinite Saturation Flow						Inf

Full Input Data And Results

Traffic Lane Flows

Lane	Scenario 5: AM 2020 with Dev
Junction: Unnamed Junction	
1/1	658
1/2	209
2/1	597
2/2	1339
3/1	196
3/2	230
4/1	1450
5/1	447
5/2	435
5/3	95
6/1	802
7/1	452
7/2	740
8/1 (with short)	998(In) 866(Out)
8/2 (short)	132
9/1	579
10/1	556
10/2	96

Full Input Data And Results

Scenario 5: 'AM 2020 with Dev' (FG5: 'AM 2020 with Dev', Plan 1: 'Staging Plan No. 1')

Traffic Lane Flows

Junction: Unnamed Junction

Lane	Lane Width (m)	Gradient	Nearside Lane	Allowed Turns	Turning Radius (m)	Turning Prop.	Sat flow (PCU/Hr)
1/1 (Barry Road (E))	3.00	0.00	Y	Arm 5 Ahead	Inf	100.0 %	1915
1/2 (Barry Road (E))	3.00	0.00	N	Arm 5 Ahead Arm 6 U-Turn	Inf 12.00	1.9 % 98.1 %	1831
2/1 (Easbound LINK)	3.65	0.00	Y	Arm 6 Ahead	Inf	100.0 %	1980
2/2 (Easbound LINK)	3.65	0.00	N	Arm 4 Ahead	Inf	100.0 %	2120
3/1 (Penlan Rd (N))	3.00	0.00	Y	Arm 4 U-Turn Arm 5 Ahead	10.00 Inf	56.6 % 43.4 %	1765
3/2 (Penlan Rd (N))	3.00	0.00	N	Arm 5 Ahead	Inf	100.0 %	2055
4/1 (Easbound Lane 1)	Infinite Saturation Flow						Inf
5/1 (Westbound LINK)	3.25	0.00	Y	Arm 9 Left	13.00	100.0 %	1739
5/2 (Westbound LINK)	3.25	0.00	N	Arm 10 Ahead	Inf	100.0 %	2080
5/3 (Westbound LINK)	3.25	0.00	N	Arm 10 Ahead	Inf	100.0 %	2080
6/1 (Northbound Lane 1)	Infinite Saturation Flow						Inf
7/1 (Redlands Rd (S))	3.00	0.00	Y	Arm 2 Right Arm 10 Left	17.00 14.00	73.0 % 27.0 %	1752
7/2 (Redlands Rd (S))	3.00	0.00	N	Arm 2 Right	20.00	100.0 %	1912
8/1 (Cardiff Road (W))	3.25	0.00	Y	Arm 2 Ahead	Inf	100.0 %	1940
8/2 (Cardiff Road (W))	3.25	0.00	N	Arm 9 Right	20.00	100.0 %	1935
9/1 (Southbound Lane 1)	Infinite Saturation Flow						Inf
10/1 (Westbound Lane 1)	Infinite Saturation Flow						Inf
10/2 (Westbound Lane 2)	Infinite Saturation Flow						Inf

Full Input Data And Results

Traffic Lane Flows

Lane	Scenario 6: PM 2020 with Dev
Junction: Unnamed Junction	
1/1	1178
1/2	226
2/1	344
2/2	891
3/1	369
3/2	424
4/1	1053
5/1	858
5/2	769
5/3	299
6/1	453
7/1	276
7/2	363
8/1 (with short)	854(In) 732(Out)
8/2 (short)	122
9/1	980
10/1	899
10/2	305

Full Input Data And Results

Scenario 6: 'PM 2020 with Dev' (FG6: 'PM 2020 with Dev', Plan 1: 'Staging Plan No. 1')

Traffic Lane Flows

Junction: Unnamed Junction

Lane	Lane Width (m)	Gradient	Nearside Lane	Allowed Turns	Turning Radius (m)	Turning Prop.	Sat flow (PCU/Hr)
1/1 (Barry Road (E))	3.00	0.00	Y	Arm 5 Ahead	Inf	100.0 %	1915
1/2 (Barry Road (E))	3.00	0.00	N	Arm 5 Ahead Arm 6 U-Turn	Inf 12.00	51.8 % 48.2 %	1938
2/1 (Easbound LINK)	3.65	0.00	Y	Arm 6 Ahead	Inf	100.0 %	1980
2/2 (Easbound LINK)	3.65	0.00	N	Arm 4 Ahead	Inf	100.0 %	2120
3/1 (Penlan Rd (N))	3.00	0.00	Y	Arm 4 U-Turn Arm 5 Ahead	10.00 Inf	43.9 % 56.1 %	1797
3/2 (Penlan Rd (N))	3.00	0.00	N	Arm 5 Ahead	Inf	100.0 %	2055
4/1 (Easbound Lane 1)	Infinite Saturation Flow						Inf
5/1 (Westbound LINK)	3.25	0.00	Y	Arm 9 Left	13.00	100.0 %	1739
5/2 (Westbound LINK)	3.25	0.00	N	Arm 10 Ahead	Inf	100.0 %	2080
5/3 (Westbound LINK)	3.25	0.00	N	Arm 10 Ahead	Inf	100.0 %	2080
6/1 (Northbound Lane 1)	Infinite Saturation Flow						Inf
7/1 (Redlands Rd (S))	3.00	0.00	Y	Arm 2 Right Arm 10 Left	17.00 14.00	50.7 % 49.3 %	1745
7/2 (Redlands Rd (S))	3.00	0.00	N	Arm 2 Right	20.00	100.0 %	1912
8/1 (Cardiff Road (W))	3.25	0.00	Y	Arm 2 Ahead	Inf	100.0 %	1940
8/2 (Cardiff Road (W))	3.25	0.00	N	Arm 9 Right	20.00	100.0 %	1935
9/1 (Southbound Lane 1)	Infinite Saturation Flow						Inf
10/1 (Westbound Lane 1)	Infinite Saturation Flow						Inf
10/2 (Westbound Lane 2)	Infinite Saturation Flow						Inf

Full Input Data And Results

Traffic Lane Flows

Lane	Scenario 7: PM 2020 with Dev + tourism
Junction: Unnamed Junction	
1/1	1330
1/2	175
2/1	345
2/2	1004
3/1	369
3/2	424
4/1	1166
5/1	858
5/2	910
5/3	259
6/1	454
7/1	265
7/2	375
8/1 (with short)	967(In) 845(Out)
8/2 (short)	122
9/1	980
10/1	1040
10/2	265

Full Input Data And Results

Scenario 7: 'PM 2020 with Dev + tourism' (FG7: '2020 with Dev + Tourism', Plan 1: 'Staging Plan No. 1')

Traffic Lane Flows

Junction: Unnamed Junction

Lane	Lane Width (m)	Gradient	Nearside Lane	Allowed Turns	Turning Radius (m)	Turning Prop.	Sat flow (PCU/Hr)
1/1 (Barry Road (E))	3.00	0.00	Y	Arm 5 Ahead	Inf	100.0 %	1915
1/2 (Barry Road (E))	3.00	0.00	N	Arm 5 Ahead Arm 6 U-Turn	Inf 12.00	37.7 % 62.3 %	1907
2/1 (Easbound LINK)	3.65	0.00	Y	Arm 6 Ahead	Inf	100.0 %	1980
2/2 (Easbound LINK)	3.65	0.00	N	Arm 4 Ahead	Inf	100.0 %	2120
3/1 (Penlan Rd (N))	3.00	0.00	Y	Arm 4 U-Turn Arm 5 Ahead	10.00 Inf	43.9 % 56.1 %	1797
3/2 (Penlan Rd (N))	3.00	0.00	N	Arm 5 Ahead	Inf	100.0 %	2055
4/1 (Easbound Lane 1)	Infinite Saturation Flow						Inf
5/1 (Westbound LINK)	3.25	0.00	Y	Arm 9 Left	13.00	100.0 %	1739
5/2 (Westbound LINK)	3.25	0.00	N	Arm 10 Ahead	Inf	100.0 %	2080
5/3 (Westbound LINK)	3.25	0.00	N	Arm 10 Ahead	Inf	100.0 %	2080
6/1 (Northbound Lane 1)	Infinite Saturation Flow						Inf
7/1 (Redlands Rd (S))	3.00	0.00	Y	Arm 2 Right Arm 10 Left	17.00 14.00	48.7 % 51.3 %	1744
7/2 (Redlands Rd (S))	3.00	0.00	N	Arm 2 Right	20.00	100.0 %	1912
8/1 (Cardiff Road (W))	3.25	0.00	Y	Arm 2 Ahead	Inf	100.0 %	1940
8/2 (Cardiff Road (W))	3.25	0.00	N	Arm 9 Right	20.00	100.0 %	1935
9/1 (Southbound Lane 1)	Infinite Saturation Flow						Inf
10/1 (Westbound Lane 1)	Infinite Saturation Flow						Inf
10/2 (Westbound Lane 2)	Infinite Saturation Flow						Inf

Full Input Data And Results

Traffic Lane Flows

Lane	Scenario 8: PM 2020 Base + tourism
Junction: Unnamed Junction	
1/1	1115
1/2	251
2/1	336
2/2	973
3/1	364
3/2	419
4/1	1135
5/1	859
5/2	707
5/3	312
6/1	445
7/1	261
7/2	374
8/1 (with short)	924(In) 806(Out)
8/2 (short)	118
9/1	977
10/1	824
10/2	327

Full Input Data And Results

Scenario 8: 'PM 2020 Base + tourism' (FG10: 'PM 2020 Base + Tourism', Plan 1: 'Staging Plan No. 1')

Traffic Lane Flows

Junction: Unnamed Junction

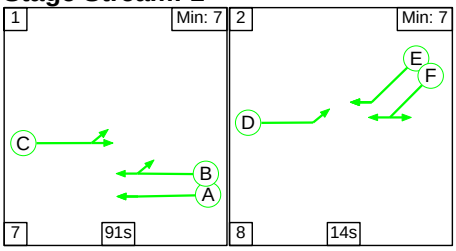
Lane	Lane Width (m)	Gradient	Nearside Lane	Allowed Turns	Turning Radius (m)	Turning Prop.	Sat flow (PCU/Hr)
1/1 (Barry Road (E))	3.00	0.00	Y	Arm 5 Ahead	Inf	100.0 %	1915
1/2 (Barry Road (E))	3.00	0.00	N	Arm 5 Ahead Arm 6 U-Turn	Inf 12.00	56.6 % 43.4 %	1949
2/1 (Easbound LINK)	3.65	0.00	Y	Arm 6 Ahead	Inf	100.0 %	1980
2/2 (Easbound LINK)	3.65	0.00	N	Arm 4 Ahead	Inf	100.0 %	2120
3/1 (Penlan Rd (N))	3.00	0.00	Y	Arm 4 U-Turn Arm 5 Ahead	10.00 Inf	44.5 % 55.5 %	1795
3/2 (Penlan Rd (N))	3.00	0.00	N	Arm 5 Ahead	Inf	100.0 %	2055
4/1 (Easbound Lane 1)	Infinite Saturation Flow						Inf
5/1 (Westbound LINK)	3.25	0.00	Y	Arm 9 Left	13.00	100.0 %	1739
5/2 (Westbound LINK)	3.25	0.00	N	Arm 10 Ahead	Inf	100.0 %	2080
5/3 (Westbound LINK)	3.25	0.00	N	Arm 10 Ahead	Inf	100.0 %	2080
6/1 (Northbound Lane 1)	Infinite Saturation Flow						Inf
7/1 (Redlands Rd (S))	3.00	0.00	Y	Arm 2 Right Arm 10 Left	17.00 14.00	49.4 % 50.6 %	1744
7/2 (Redlands Rd (S))	3.00	0.00	N	Arm 2 Right	20.00	100.0 %	1912
8/1 (Cardiff Road (W))	3.25	0.00	Y	Arm 2 Ahead	Inf	100.0 %	1940
8/2 (Cardiff Road (W))	3.25	0.00	N	Arm 9 Right	20.00	100.0 %	1935
9/1 (Southbound Lane 1)	Infinite Saturation Flow						Inf
10/1 (Westbound Lane 1)	Infinite Saturation Flow						Inf
10/2 (Westbound Lane 2)	Infinite Saturation Flow						Inf

Full Input Data And Results

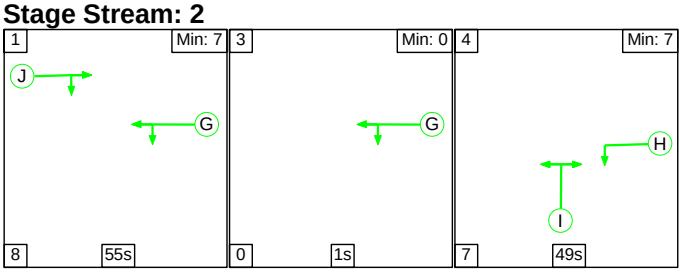
Scenario 1: 'AM Base 2008' (FG1: 'AM 2008 Base', Plan 1: 'Staging Plan No. 1')

Stage Sequence Diagram

Stage Stream: 1



Stage Stream: 2



Stage Timings

Stage Stream: 1

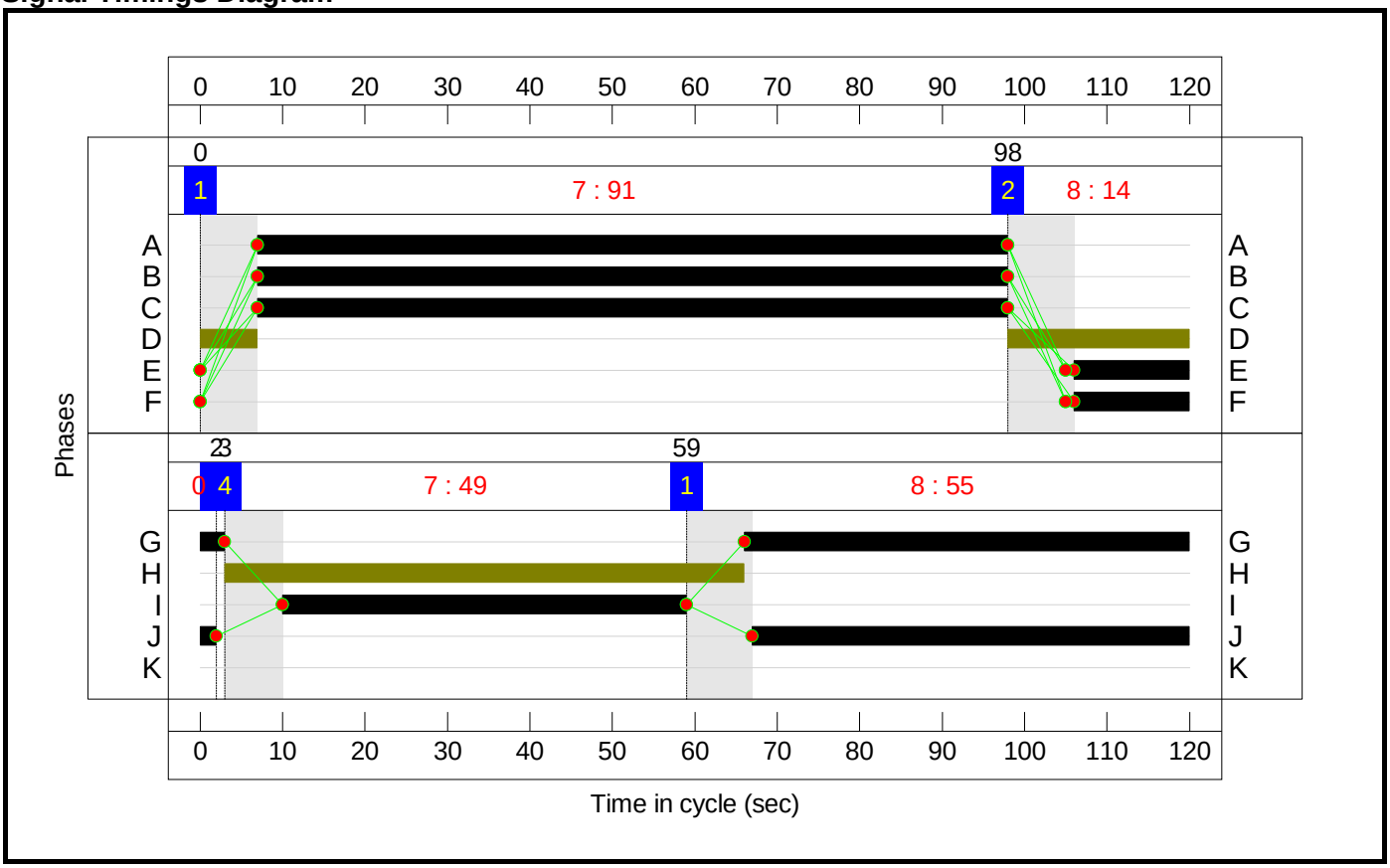
Stage	1	2
Duration	91	14
Change Point	0	98

Stage Stream: 2

Stage	1	3	4
Duration	55	1	49
Change Point	59	2	3

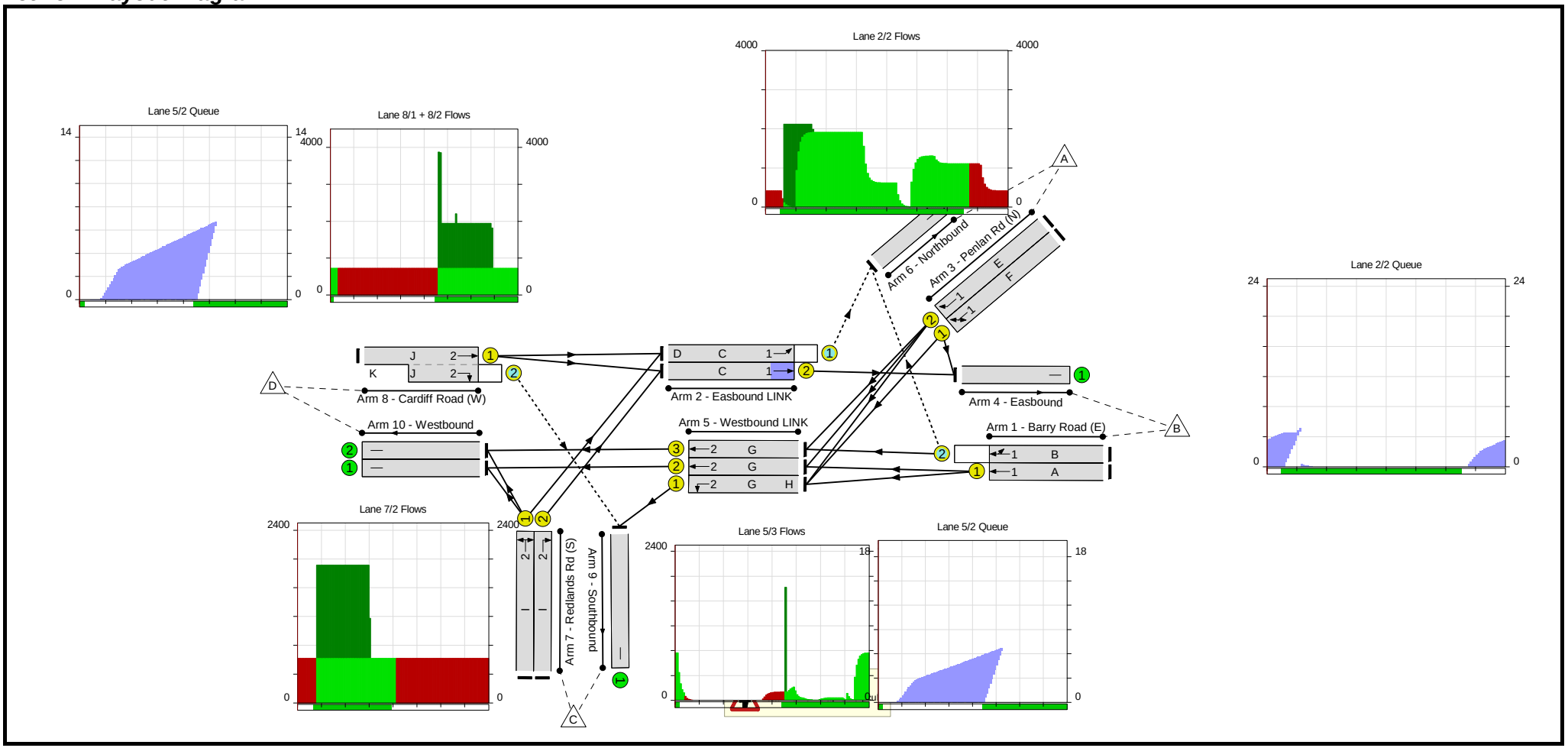
Full Input Data And Results

Signal Timings Diagram



Full Input Data And Results

Network Layout Diagram



Full Input Data And Results

Network Results

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**77.6%**
Unnamed Junction	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**77.6%**
1/1	Barry Road (E) Ahead	U	1	N/A	A		1	91	-	514	1915	1468	35.0%
1/2	Barry Road (E) Ahead U-Turn	O	1	N/A	B		1	91	-	208	1859	323	64.5%
2/1	Easbound LINK Ahead	O	1	N/A	C	D	1	120	29	501	1980	1321	37.9%
2/2	Easbound LINK Ahead	U	1	N/A	C		1	91	-	1033	2120	1625	63.6%
3/1	Penlan Rd (N) U-Turn Ahead	U	1	N/A	F		1	14	-	164	1762	220	74.5%
3/2	Penlan Rd (N) Ahead	U	1	N/A	E		1	14	-	196	2055	257	76.3%
4/1	Easbound	U	N/A	N/A	-		-	-	-	1128	Inf	Inf	0.0%
5/1	Westbound LINK Left	U	2	N/A	G	H	1	120	63	383	1739	1739	22.0%
5/2	Westbound LINK Ahead	U	2	N/A	G		1	57	-	323	2080	1005	32.1%
5/3	Westbound LINK Ahead	U	2	N/A	G		1	57	-	106	2080	1005	10.5%
6/1	Northbound	U	N/A	N/A	-		-	-	-	676	Inf	Inf	0.0%
7/1	Redlands Rd (S) Right Left	U	2	N/A	I		1	49	-	402	1752	730	55.1%
7/2	Redlands Rd (S) Right	U	2	N/A	I		1	49	-	618	1912	797	77.6%
8/1+8/2	Cardiff Road (W) Ahead Right	U+O	2	N/A	J	K	1	55	-	726	1940:1935	939	77.3%
9/1	Southbound	U	N/A	N/A	-		-	-	-	493	Inf	Inf	0.0%
10/1	Westbound	U	N/A	N/A	-		-	-	-	422	Inf	Inf	0.0%
10/2	Westbound	U	N/A	N/A	-		-	-	-	109	Inf	Inf	0.0%

Full Input Data And Results

Item	Entering (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	**-**	**-**	**713**	**63**	**10**	**22.2**	**9.7**	**1.0**	**32.9**	**-**	**-**	**-**	**-**
Unnamed Junction	**-**	**-**	**713**	**63**	**10**	**22.2**	**9.7**	**1.0**	**32.9**	**-**	**-**	**-**	**-**
1/1	514	514	-	-	-	0.6	0.3	-	0.9	6.4	5.4	0.3	5.7
1/2	208	208	165	0	10	0.3	0.9	1.0	2.2	38.7	1.8	0.9	2.7
2/1	501	501	438	63	0	0.0	0.3	0.0	0.3	2.2	0.0	0.3	0.3
2/2	1033	1033	-	-	-	0.8	0.9	-	1.7	5.9	5.2	0.9	6.1
3/1	164	164	-	-	-	2.3	1.4	-	3.7	81.2	5.2	1.4	6.6
3/2	196	196	-	-	-	2.8	1.5	-	4.3	78.9	6.3	1.5	7.8
4/1	1128	1128	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
5/1	383	383	-	-	-	0.0	0.1	-	0.1	1.3	0.0	0.1	0.1
5/2	323	323	-	-	-	2.0	0.2	-	2.3	25.2	6.7	0.2	7.0
5/3	106	106	-	-	-	0.0	0.1	-	0.1	3.4	0.5	0.1	0.5
6/1	676	676	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
7/1	402	402	-	-	-	3.0	0.6	-	3.6	32.0	10.1	0.6	10.7
7/2	618	618	-	-	-	5.2	1.7	-	6.9	40.1	17.7	1.7	19.4
8/1+8/2	726	726	110	0	0	5.2	1.7	0.0	6.9	34.0	18.7	1.7	20.4
9/1	493	493	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
10/1	422	422	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
10/2	109	109	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0

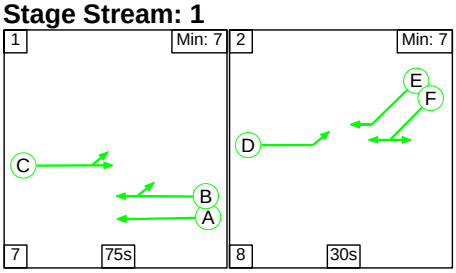
C1 Stream: 1 PRC for Signalled Lanes (%): 18.0 Total Delay for Signalled Lanes (pcuHr): 13.13
C1 Stream: 2 PRC for Signalled Lanes (%): 16.0 Total Delay for Signalled Lanes (pcuHr): 19.81
PRC Over All Lanes (%): 16.0 Total Delay Over All Lanes(pcuHr): 32.94 Cycle Time (s): 120

Full Input Data And Results

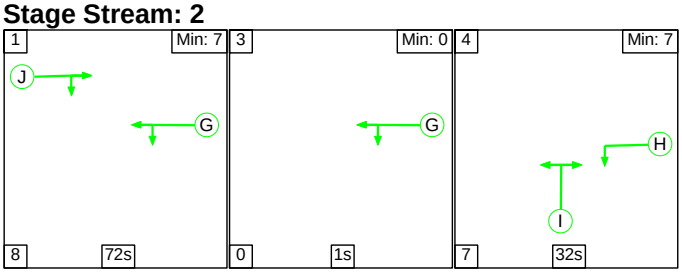
Scenario 2: 'PM Base 2008' (FG2: 'PM 2008 Base', Plan 1: 'Staging Plan No. 1')

Stage Sequence Diagram

Stage Stream: 1



Stage Stream: 2



Stage Timings

Stage Stream: 1

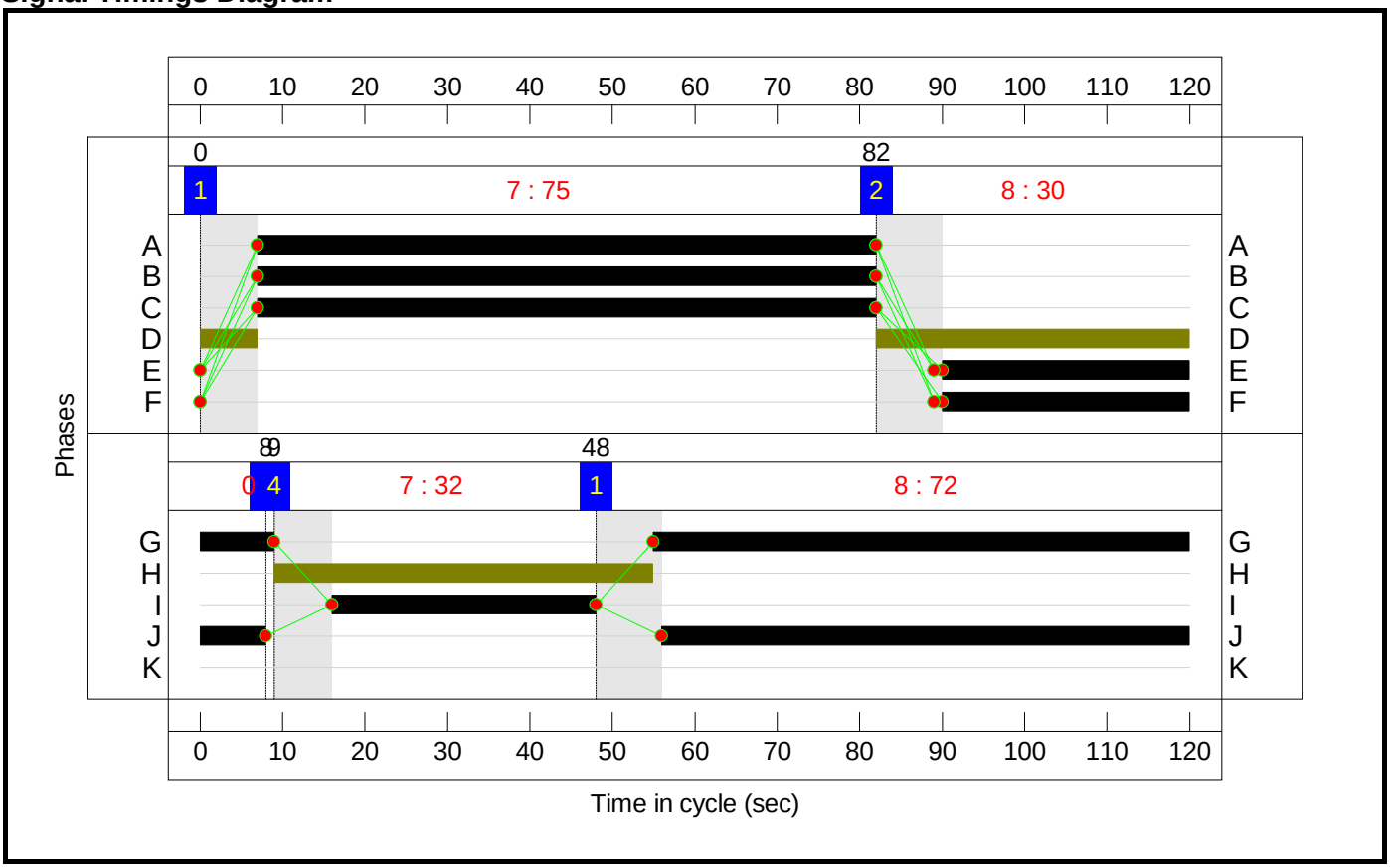
Stage	1	2
Duration	75	30
Change Point	0	82

Stage Stream: 2

Stage	1	3	4
Duration	72	1	32
Change Point	48	8	9

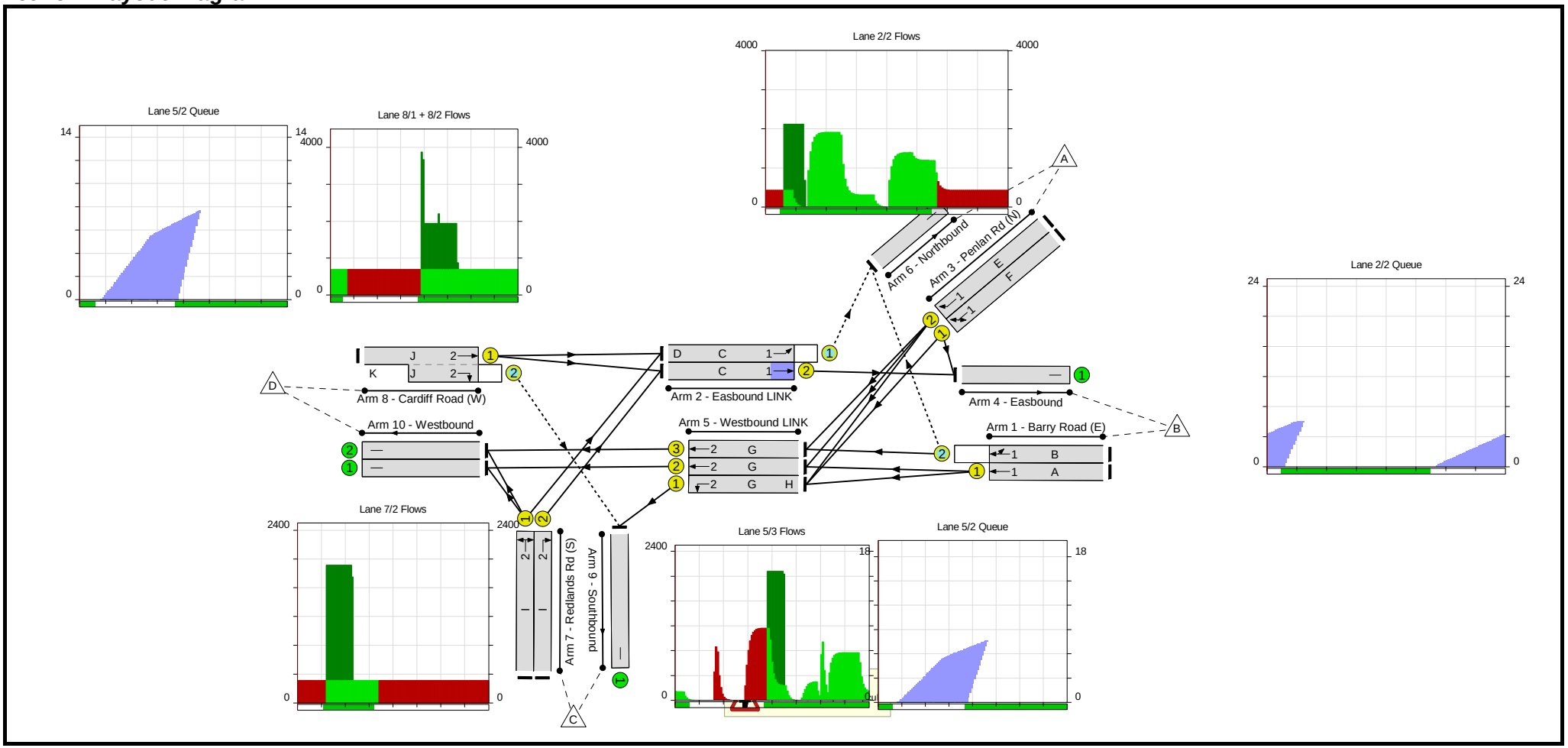
Full Input Data And Results

Signal Timings Diagram



Full Input Data And Results

Network Layout Diagram



Full Input Data And Results

Network Results

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network	-	-	**N/A**	-	-		-	-	-	-	-	-	**69.5%**
Unnamed Junction	-	-	**N/A**	-	-		-	-	-	-	-	-	**69.5%**
1/1	Barry Road (E) Ahead	U	1	N/A	A		1	75	-	756	1915	1213	62.3%
1/2	Barry Road (E) Ahead U-Turn	O	1	N/A	B		1	75	-	331	1985	481	68.8%
2/1	Easbound LINK Ahead	O	1	N/A	C	D	1	120	45	289	1980	1316	22.0%
2/2	Easbound LINK Ahead	U	1	N/A	C		1	75	-	739	2120	1343	55.0%
3/1	Penlan Rd (N) U-Turn Ahead	U	1	N/A	F		1	30	-	303	1792	463	65.5%
3/2	Penlan Rd (N) Ahead	U	1	N/A	E		1	30	-	369	2055	531	69.5%
4/1	Easbound	U	N/A	N/A	-		-	-	-	878	Inf	Inf	0.0%
5/1	Westbound LINK Left	U	2	N/A	G	H	1	120	46	739	1739	1739	42.5%
5/2	Westbound LINK Ahead	U	2	N/A	G		1	74	-	412	2080	1300	31.7%
5/3	Westbound LINK Ahead	U	2	N/A	G		1	74	-	376	2080	1300	28.9%
6/1	Northbound	U	N/A	N/A	-		-	-	-	382	Inf	Inf	0.0%
7/1	Redlands Rd (S) Right Left	U	2	N/A	I		1	32	-	236	1745	480	49.2%
7/2	Redlands Rd (S) Right	U	2	N/A	I		1	32	-	311	1912	526	59.1%
8/1+8/2	Cardiff Road (W) Ahead Right	U+O	2	N/A	J	K	1	72	-	696	1940:1935	1213	57.4%
9/1	Southbound	U	N/A	N/A	-		-	-	-	840	Inf	Inf	0.0%
10/1	Westbound	U	N/A	N/A	-		-	-	-	516	Inf	Inf	0.0%
10/2	Westbound	U	N/A	N/A	-		-	-	-	386	Inf	Inf	0.0%

Full Input Data And Results

Item	Entering (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	**-**	**-**	**415**	**60**	**8**	**23.7**	**7.4**	**0.3**	**31.4**	**-**	**-**	**-**	**-**
Unnamed Junction	**-**	**-**	**415**	**60**	**8**	**23.7**	**7.4**	**0.3**	**31.4**	**-**	**-**	**-**	**-**
1/1	756	756	-	-	-	2.8	0.8	-	3.6	17.3	15.1	0.8	15.9
1/2	331	331	85	0	8	1.5	1.1	0.2	2.8	30.4	7.7	1.1	8.8
2/1	289	289	229	60	0	0.0	0.1	0.0	0.2	2.3	0.0	0.1	0.1
2/2	739	739	-	-	-	1.2	0.6	-	1.9	9.1	6.1	0.6	6.7
3/1	303	303	-	-	-	3.3	0.9	-	4.3	50.8	9.0	0.9	9.9
3/2	369	369	-	-	-	4.1	1.1	-	5.2	51.2	11.1	1.1	12.2
4/1	878	878	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
5/1	739	739	-	-	-	0.0	0.4	-	0.4	1.8	0.0	0.4	0.4
5/2	412	412	-	-	-	1.8	0.2	-	2.1	17.9	7.7	0.2	7.9
5/3	376	376	-	-	-	0.6	0.2	-	0.8	8.1	6.3	0.2	6.5
6/1	382	382	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
7/1	236	236	-	-	-	2.4	0.5	-	2.9	43.8	6.6	0.5	7.0
7/2	311	311	-	-	-	3.3	0.7	-	4.0	46.0	8.9	0.7	9.6
8/1+8/2	696	696	101	0	0	2.6	0.7	0.0	3.3	17.0	12.5	0.7	13.2
9/1	840	840	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
10/1	516	516	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
10/2	386	386	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0

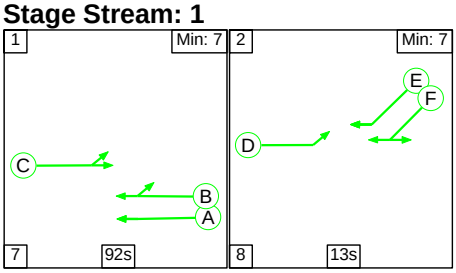
C1 Stream: 1 PRC for Signalled Lanes (%): 29.5 Total Delay for Signalled Lanes (pcuHr): 17.99
C1 Stream: 2 PRC for Signalled Lanes (%): 52.2 Total Delay for Signalled Lanes (pcuHr): 13.40
PRC Over All Lanes (%): 29.5 Total Delay Over All Lanes(pcuHr): 31.40 Cycle Time (s): 120

Full Input Data And Results

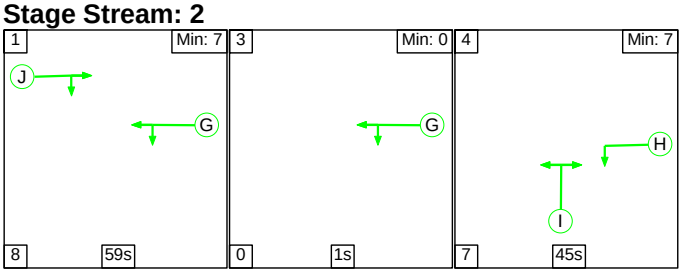
Scenario 3: 'AM Base 2020' (FG3: 'AM 2020 Base', Plan 1: 'Staging Plan No. 1')

Stage Sequence Diagram

Stage Stream: 1



Stage Stream: 2



Stage Timings

Stage Stream: 1

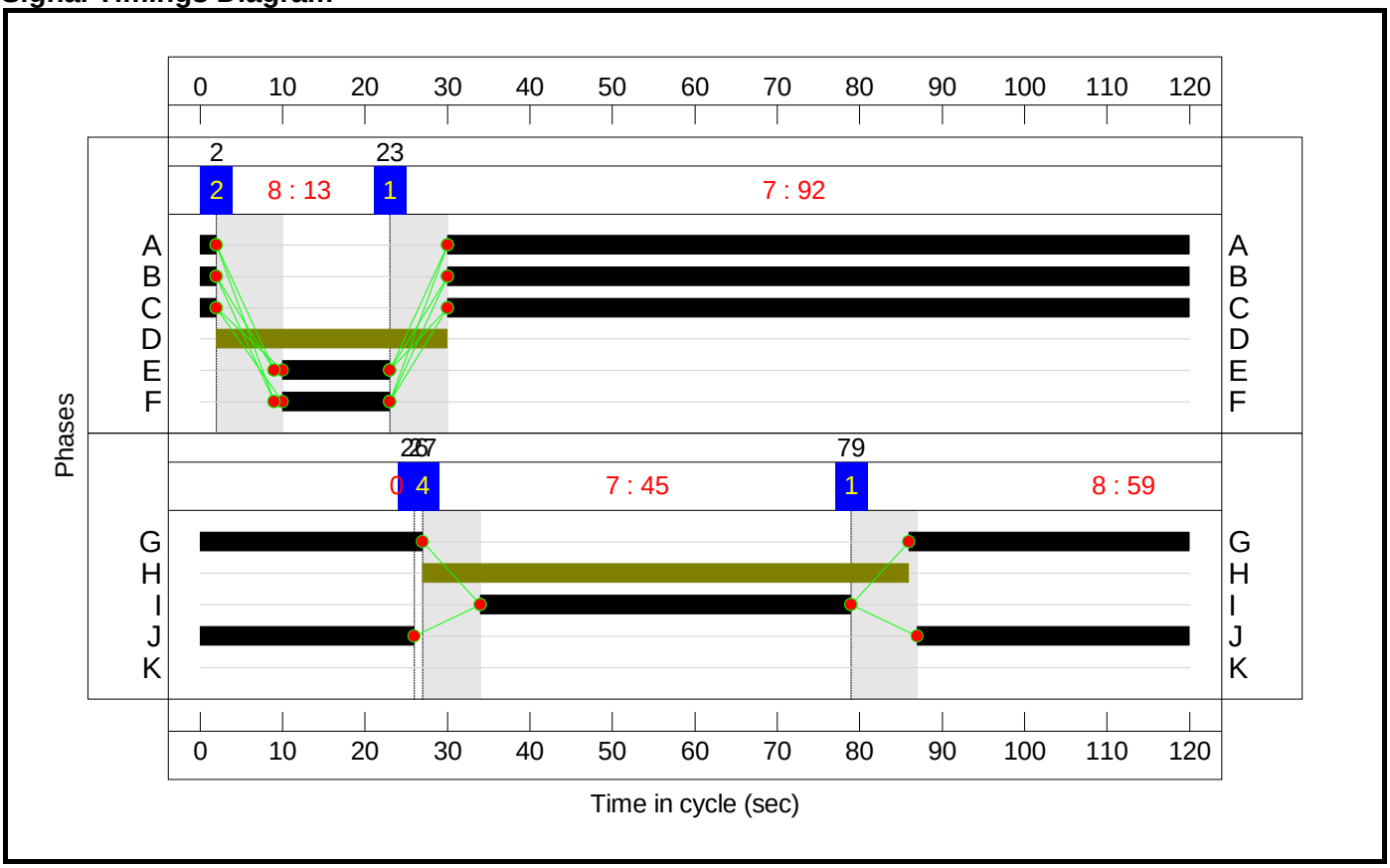
Stage	1	2
Duration	92	13
Change Point	23	2

Stage Stream: 2

Stage	1	3	4
Duration	59	1	45
Change Point	79	26	27

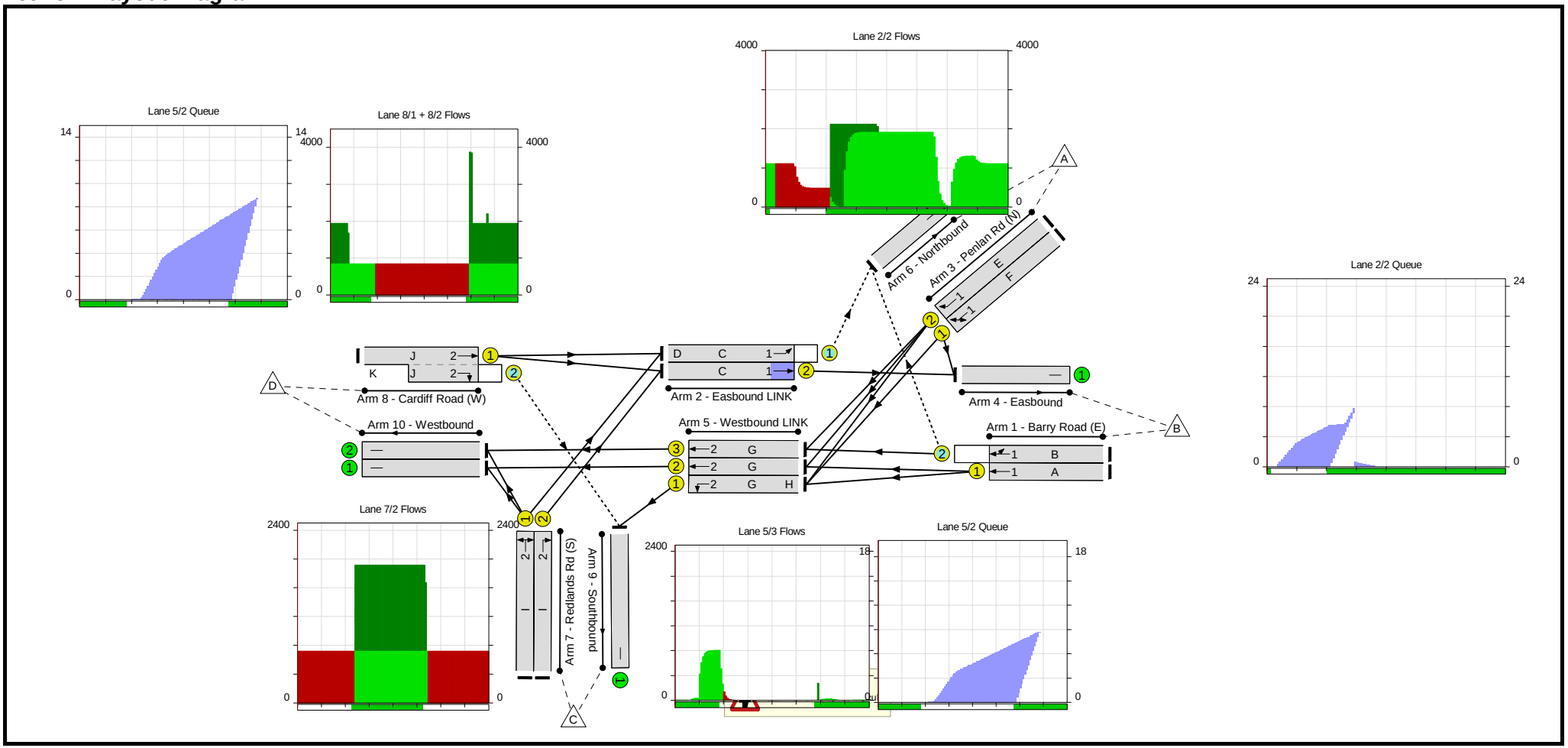
Full Input Data And Results

Signal Timings Diagram



Full Input Data And Results

Network Layout Diagram



Full Input Data And Results

Network Results

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network	-	-	**N/A**	-	-		-	-	-	-	-	-	**98.4%**
Unnamed Junction	-	-	**N/A**	-	-		-	-	-	-	-	-	**98.4%**
1/1	Barry Road (E) Ahead	U	1	N/A	A		1	92	-	634	1915	1484	42.7%
1/2	Barry Road (E) Ahead U-Turn	O	1	N/A	B		1	92	-	209	1831	213	98.2%
2/1	Easbound LINK Ahead	O	1	N/A	C	D	1	120	28	584	1980	1398	41.8%
2/2	Easbound LINK Ahead	U	1	N/A	C		1	92	-	1205	2120	1643	73.3%
3/1	Penlan Rd (N) U-Turn Ahead	U	1	N/A	F		1	13	-	193	1763	206	93.8%
3/2	Penlan Rd (N) Ahead	U	1	N/A	E		1	13	-	227	2055	240	94.7%
4/1	Easbound	U	N/A	N/A	-		-	-	-	1316	Inf	Inf	0.0%
5/1	Westbound LINK Left	U	2	N/A	G	H	1	120	59	447	1739	1739	25.7%
5/2	Westbound LINK Ahead	U	2	N/A	G		1	61	-	407	2080	1075	37.9%
5/3	Westbound LINK Ahead	U	2	N/A	G		1	61	-	93	2080	1075	8.7%
6/1	Northbound	U	N/A	N/A	-		-	-	-	789	Inf	Inf	0.0%
7/1	Redlands Rd (S) Right Left	U	2	N/A	I		1	45	-	468	1752	672	69.7%
7/2	Redlands Rd (S) Right	U	2	N/A	I		1	45	-	721	1912	733	98.4%
8/1+8/2	Cardiff Road (W) Ahead Right	U+O	2	N/A	J	K	1	59	-	847	1940:1935	1004	84.4%
9/1	Southbound	U	N/A	N/A	-		-	-	-	575	Inf	Inf	0.0%
10/1	Westbound	U	N/A	N/A	-		-	-	-	524	Inf	Inf	0.0%
10/2	Westbound	U	N/A	N/A	-		-	-	-	95	Inf	Inf	0.0%

Full Input Data And Results

Item	Entering (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	**-**	**-**	**756**	**76**	**85**	**28.2**	**33.0**	**2.0**	**63.2**	**-**	**-**	**-**	**-**
Unnamed Junction	**-**	**-**	**756**	**76**	**85**	**28.2**	**33.0**	**2.0**	**63.2**	**-**	**-**	**-**	**-**
1/1	634	634	-	-	-	0.8	0.4	-	1.2	6.7	7.0	0.4	7.4
1/2	209	209	120	0	85	0.5	6.4	2.0	8.8	152.3	2.1	6.4	8.5
2/1	584	584	508	76	0	0.0	0.4	0.0	0.4	2.3	0.0	0.4	0.4
2/2	1205	1205	-	-	-	1.0	1.4	-	2.4	7.1	7.8	1.4	9.1
3/1	193	193	-	-	-	2.8	4.5	-	7.3	135.9	6.4	4.5	10.8
3/2	227	227	-	-	-	3.3	5.0	-	8.3	131.8	7.5	5.0	12.5
4/1	1316	1316	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
5/1	447	447	-	-	-	0.0	0.2	-	0.2	1.4	0.0	0.2	0.2
5/2	407	407	-	-	-	2.5	0.3	-	2.8	24.6	8.8	0.3	9.1
5/3	93	93	-	-	-	0.0	0.0	-	0.1	3.2	0.1	0.0	0.1
6/1	789	789	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
7/1	468	468	-	-	-	4.0	1.1	-	5.2	39.9	13.0	1.1	14.1
7/2	721	721	-	-	-	7.3	10.8	-	18.1	90.4	23.6	10.8	34.4
8/1+8/2	847	847	128	0	0	5.9	2.6	0.0	8.5	36.1	22.9	2.6	25.5
9/1	575	575	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
10/1	524	524	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
10/2	95	95	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0

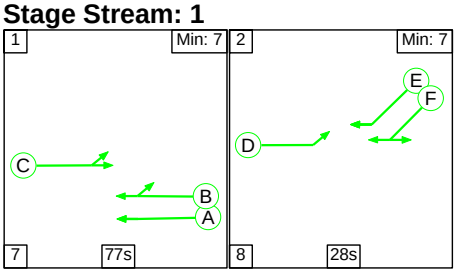
C1 Stream: 1 PRC for Signalled Lanes (%): -9.2 Total Delay for Signalled Lanes (pcuHr): 28.37
C1 Stream: 2 PRC for Signalled Lanes (%): -9.3 Total Delay for Signalled Lanes (pcuHr): 34.82
PRC Over All Lanes (%): -9.3 Total Delay Over All Lanes(pcuHr): 63.19 Cycle Time (s): 120

Full Input Data And Results

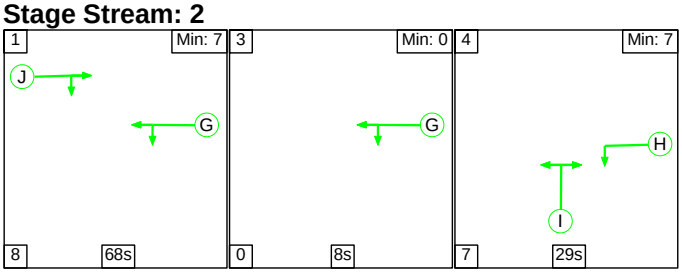
Scenario 4: 'PM Base 2020' (FG4: 'PM 2020 Base', Plan 1: 'Staging Plan No. 1')

Stage Sequence Diagram

Stage Stream: 1



Stage Stream: 2



Stage Timings

Stage Stream: 1

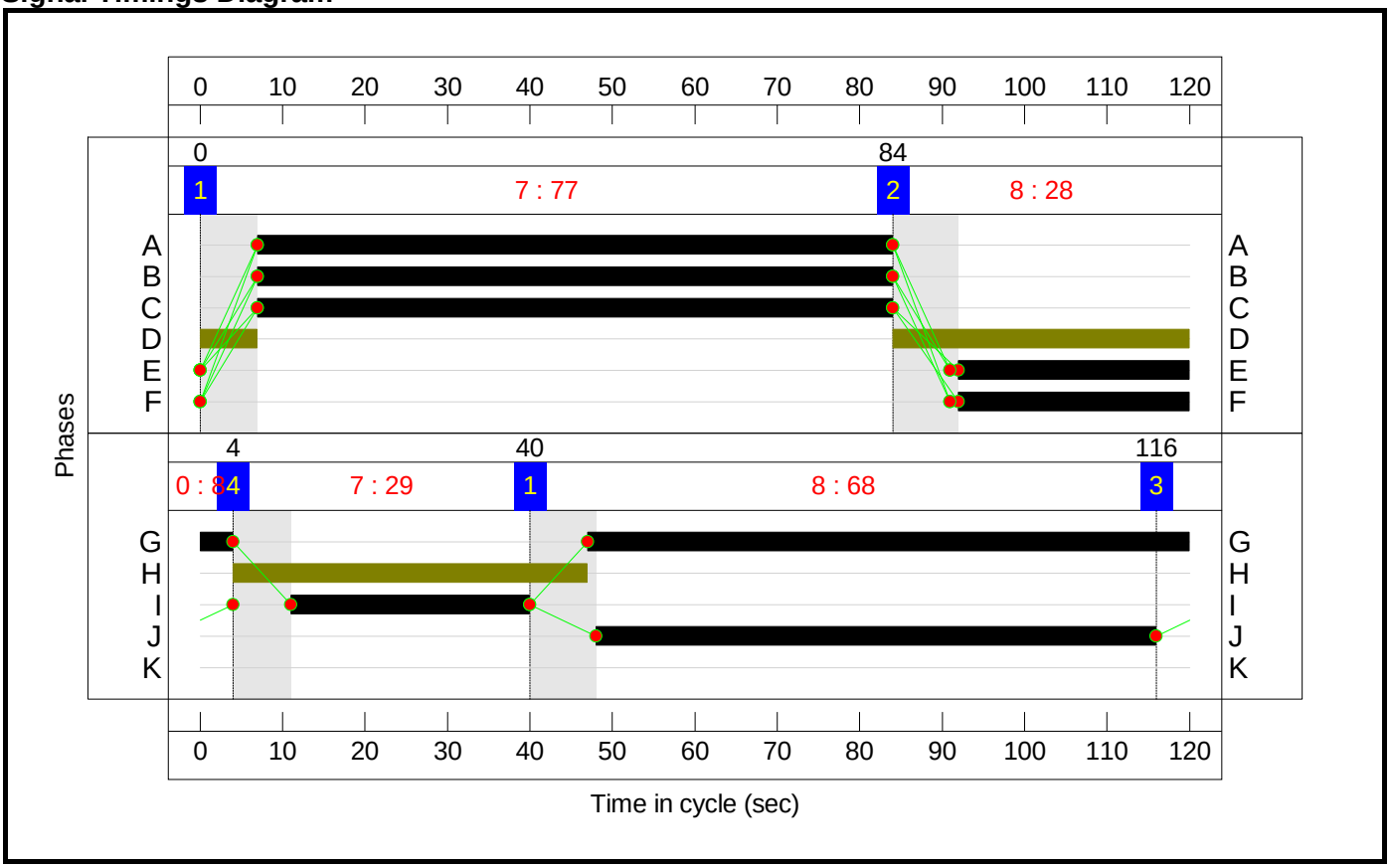
Stage	1	2
Duration	77	28
Change Point	0	84

Stage Stream: 2

Stage	1	3	4
Duration	68	8	29
Change Point	40	116	4

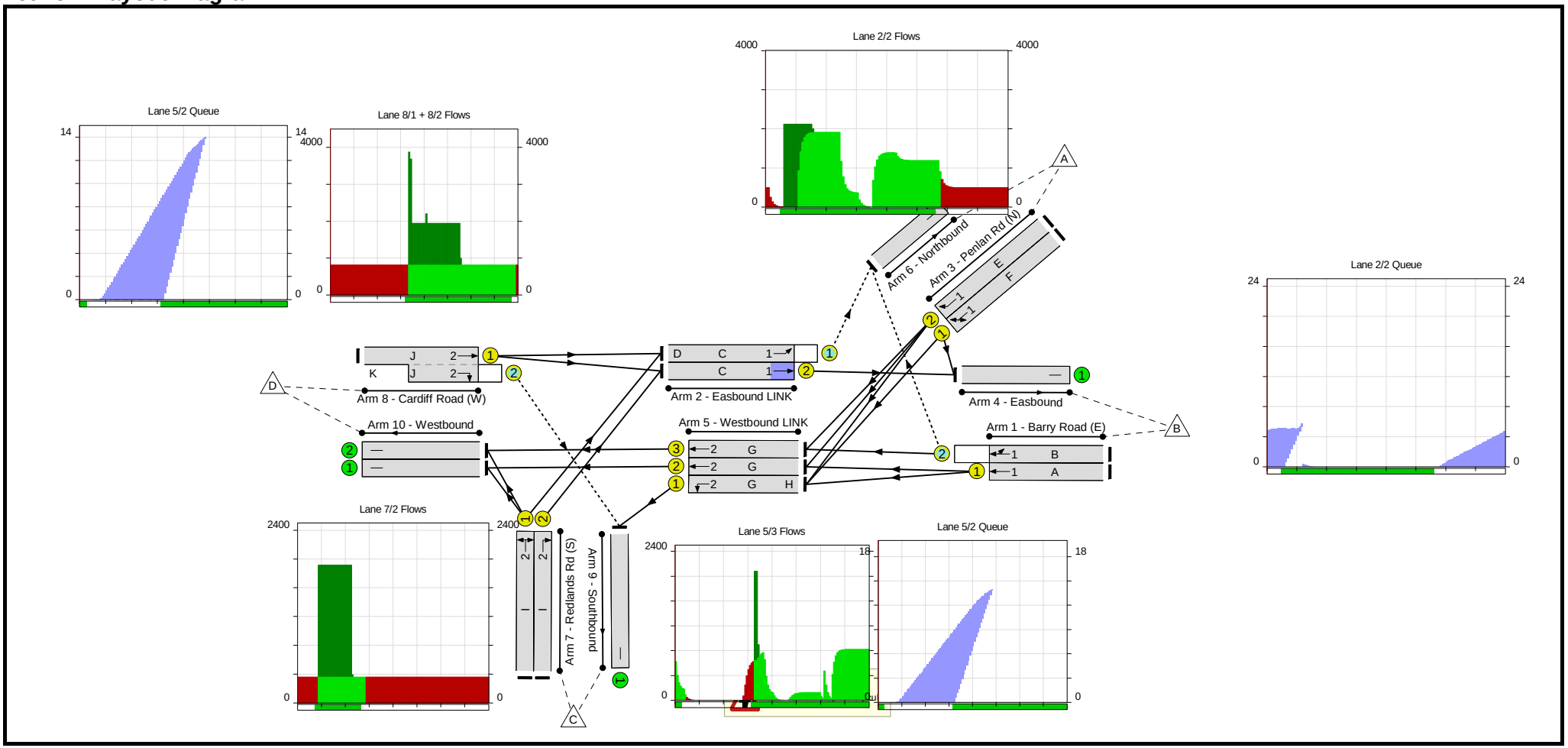
Full Input Data And Results

Signal Timings Diagram



Full Input Data And Results

Network Layout Diagram



Full Input Data And Results

Network Results

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network	-	-	**N/A**	-	-		-	-	-	-	-	-	**84.6%**
Unnamed Junction	-	-	**N/A**	-	-		-	-	-	-	-	-	**84.6%**
1/1	Barry Road (E) Ahead	U	1	N/A	A		1	77	-	1053	1915	1245	84.6%
1/2	Barry Road (E) Ahead U-Turn	O	1	N/A	B		1	77	-	212	1931	323	65.6%
2/1	Easbound LINK Ahead	O	1	N/A	C	D	1	120	43	337	1980	1392	24.2%
2/2	Easbound LINK Ahead	U	1	N/A	C		1	77	-	860	2120	1378	62.4%
3/1	Penlan Rd (N) U-Turn Ahead	U	1	N/A	F		1	28	-	362	1795	434	83.5%
3/2	Penlan Rd (N) Ahead	U	1	N/A	E		1	28	-	420	2055	497	84.6%
4/1	Easbound	U	N/A	N/A	-		-	-	-	1022	Inf	Inf	0.0%
5/1	Westbound LINK Left	U	2	N/A	G	H	1	120	43	859	1739	1739	49.4%
5/2	Westbound LINK Ahead	U	2	N/A	G		1	77	-	646	2080	1352	47.8%
5/3	Westbound LINK Ahead	U	2	N/A	G		1	77	-	271	2080	1352	20.0%
6/1	Northbound	U	N/A	N/A	-		-	-	-	446	Inf	Inf	0.0%
7/1	Redlands Rd (S) Right Left	U	2	N/A	I		1	29	-	274	1745	436	62.8%
7/2	Redlands Rd (S) Right	U	2	N/A	I		1	29	-	362	1912	478	75.7%
8/1+8/2	Cardiff Road (W) Ahead Right	U+O	2	N/A	J	K	1	68	-	811	1940:1935	1148	70.6%
9/1	Southbound	U	N/A	N/A	-		-	-	-	977	Inf	Inf	0.0%
10/1	Westbound	U	N/A	N/A	-		-	-	-	772	Inf	Inf	0.0%
10/2	Westbound	U	N/A	N/A	-		-	-	-	277	Inf	Inf	0.0%

Full Input Data And Results

Item	Entering (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	**-**	**-**	**496**	**60**	**8**	**29.6**	**14.2**	**0.6**	**44.3**	**-**	**-**	**-**	**-**
Unnamed Junction	**-**	**-**	**496**	**60**	**8**	**29.6**	**14.2**	**0.6**	**44.3**	**-**	**-**	**-**	**-**
1/1	1053	1053	-	-	-	4.8	2.7	-	7.4	25.5	27.2	2.7	29.9
1/2	212	212	101	0	8	0.6	0.9	0.5	2.0	34.7	2.8	0.9	3.7
2/1	337	337	277	60	0	0.0	0.2	0.0	0.2	1.8	0.0	0.2	0.2
2/2	860	860	-	-	-	1.2	0.8	-	2.1	8.6	5.8	0.8	6.6
3/1	362	362	-	-	-	4.3	2.4	-	6.7	66.7	11.4	2.4	13.7
3/2	420	420	-	-	-	5.1	2.6	-	7.6	65.4	13.3	2.6	15.9
4/1	1022	1022	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
5/1	859	859	-	-	-	0.0	0.5	-	0.5	2.0	0.0	0.5	0.5
5/2	646	646	-	-	-	2.3	0.5	-	2.8	15.5	14.0	0.5	14.5
5/3	271	271	-	-	-	0.0	0.1	-	0.2	2.1	1.2	0.1	1.3
6/1	446	446	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
7/1	274	274	-	-	-	3.0	0.8	-	3.9	51.0	8.1	0.8	8.9
7/2	362	362	-	-	-	4.2	1.5	-	5.7	56.8	11.2	1.5	12.7
8/1+8/2	811	811	118	0	0	3.9	1.2	0.1	5.2	23.1	17.9	1.2	19.1
9/1	977	977	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
10/1	772	772	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
10/2	277	277	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0

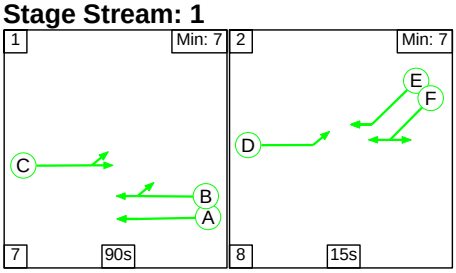
C1 Stream: 1 PRC for Signalled Lanes (%): 6.4 Total Delay for Signalled Lanes (pcuHr): 26.06
C1 Stream: 2 PRC for Signalled Lanes (%): 18.8 Total Delay for Signalled Lanes (pcuHr): 18.22
PRC Over All Lanes (%): 6.4 Total Delay Over All Lanes(pcuHr): 44.29 Cycle Time (s): 120

Full Input Data And Results

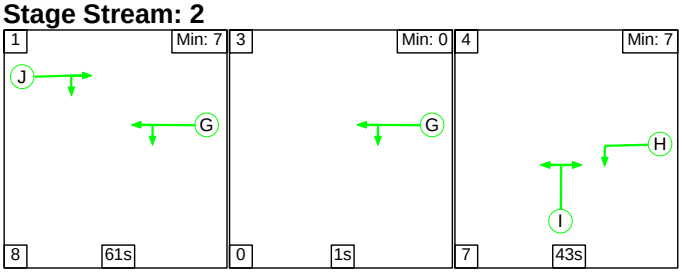
Scenario 5: 'AM 2020 with Dev' (FG5: 'AM 2020 with Dev', Plan 1: 'Staging Plan No. 1')

Stage Sequence Diagram

Stage Stream: 1



Stage Stream: 2



Stage Timings

Stage Stream: 1

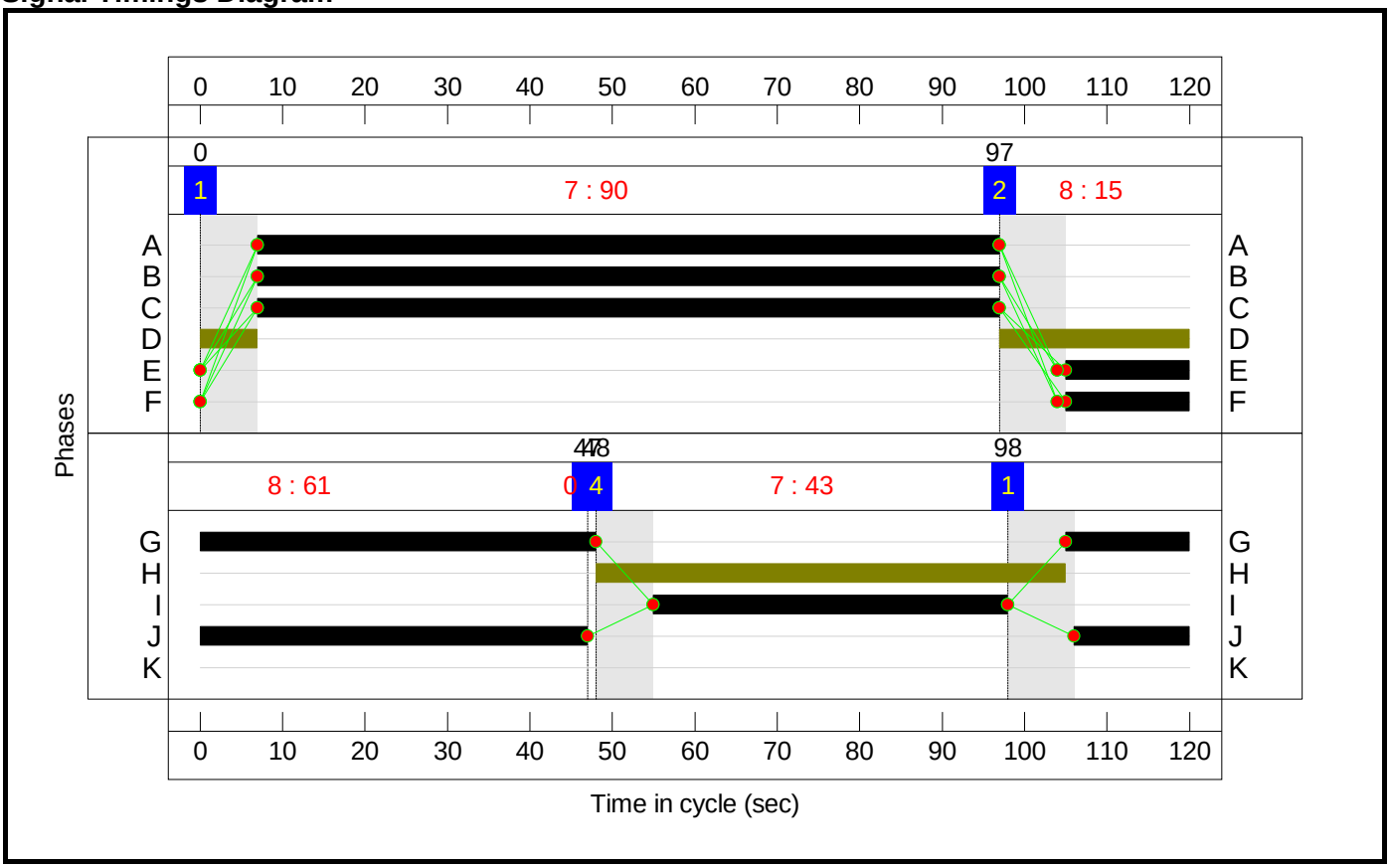
Stage	1	2
Duration	90	15
Change Point	0	97

Stage Stream: 2

Stage	1	3	4
Duration	61	1	43
Change Point	98	47	48

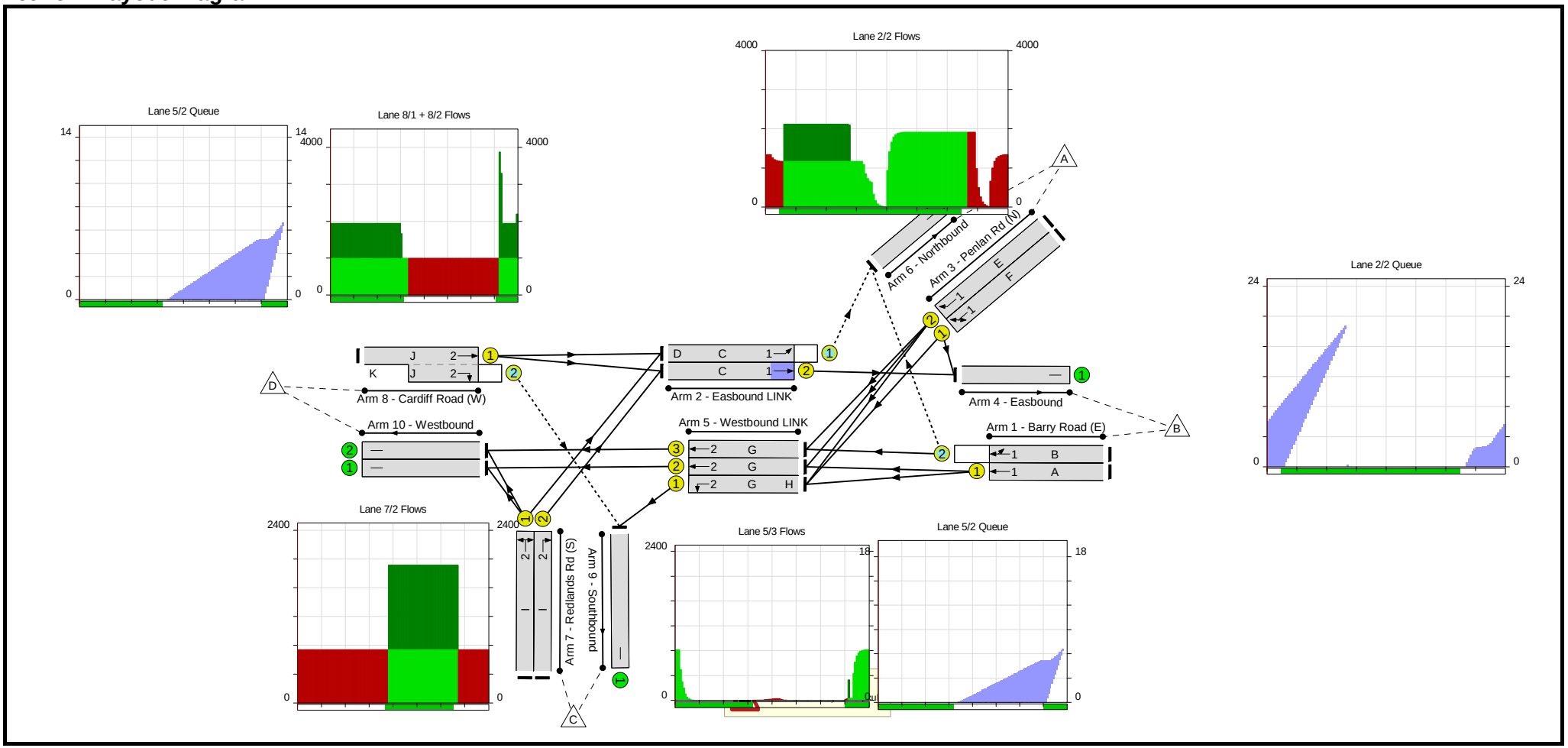
Full Input Data And Results

Signal Timings Diagram



Full Input Data And Results

Network Layout Diagram



Full Input Data And Results

Network Results

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network	-	-	**N/A**	-	-		-	-	-	-	-	-	**105.6%**
Unnamed Junction	-	-	**N/A**	-	-		-	-	-	-	-	-	**105.6%**
1/1	Barry Road (E) Ahead	U	1	N/A	A		1	90	-	658	1915	1452	45.3%
1/2	Barry Road (E) Ahead U-Turn	O	1	N/A	B		1	90	-	209	1831	205	101.9%
2/1	Easbound LINK Ahead	O	1	N/A	C	D	1	120	30	597	1980	1416	42.2%
2/2	Easbound LINK Ahead	U	1	N/A	C		1	90	-	1339	2120	1608	80.9%
3/1	Penlan Rd (N) U-Turn Ahead	U	1	N/A	F		1	15	-	196	1765	235	83.3%
3/2	Penlan Rd (N) Ahead	U	1	N/A	E		1	15	-	230	2055	274	83.9%
4/1	Easbound	U	N/A	N/A	-		-	-	-	1450	Inf	Inf	0.0%
5/1	Westbound LINK Left	U	2	N/A	G	H	1	120	57	447	1739	1739	25.7%
5/2	Westbound LINK Ahead	U	2	N/A	G		1	63	-	435	2080	1109	39.2%
5/3	Westbound LINK Ahead	U	2	N/A	G		1	63	-	95	2080	1109	8.6%
6/1	Northbound	U	N/A	N/A	-		-	-	-	802	Inf	Inf	0.0%
7/1	Redlands Rd (S) Right Left	U	2	N/A	I		1	43	-	452	1752	642	70.4%
7/2	Redlands Rd (S) Right	U	2	N/A	I		1	43	-	740	1912	701	105.6%
8/1+8/2	Cardiff Road (W) Ahead Right	U+O	2	N/A	J	K	1	61	-	998	1940:1935	1032	96.7%
9/1	Southbound	U	N/A	N/A	-		-	-	-	579	Inf	Inf	0.0%
10/1	Westbound	U	N/A	N/A	-		-	-	-	556	Inf	Inf	0.0%
10/2	Westbound	U	N/A	N/A	-		-	-	-	96	Inf	Inf	0.0%

Full Input Data And Results

Item	Entering (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	**-**	**-**	**755**	**86**	**88**	**32.3**	**53.4**	**1.8**	**87.5**	**-**	**-**	**-**	**-**
Unnamed Junction	**-**	**-**	**755**	**86**	**88**	**32.3**	**53.4**	**1.8**	**87.5**	**-**	**-**	**-**	**-**
1/1	658	658	-	-	-	1.0	0.4	-	1.4	7.6	8.0	0.4	8.5
1/2	209	205	113	0	88	0.4	8.3	1.7	10.4	179.9	2.0	8.3	10.3
2/1	597	597	511	86	0	0.0	0.4	0.0	0.4	2.4	0.0	0.4	0.4
2/2	1300	1300	-	-	-	2.2	2.1	-	4.3	12.0	18.8	2.1	20.9
3/1	196	196	-	-	-	2.8	2.2	-	5.0	91.8	6.3	2.2	8.6
3/2	230	230	-	-	-	3.2	2.4	-	5.6	87.7	7.5	2.4	9.8
4/1	1411	1411	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
5/1	447	447	-	-	-	0.0	0.2	-	0.2	1.4	0.0	0.2	0.2
5/2	435	435	-	-	-	1.5	0.3	-	1.8	15.2	6.6	0.3	6.9
5/3	95	95	-	-	-	0.0	0.0	-	0.1	2.8	0.1	0.0	0.1
6/1	798	798	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
7/1	452	452	-	-	-	4.1	1.2	-	5.2	41.8	12.8	1.2	14.0
7/2	740	701	-	-	-	9.6	26.5	-	36.0	175.2	26.0	26.5	52.4
8/1+8/2	998	998	132	0	0	7.5	9.5	0.0	17.0	61.4	31.0	9.5	40.4
9/1	579	579	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
10/1	556	556	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
10/2	96	96	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0

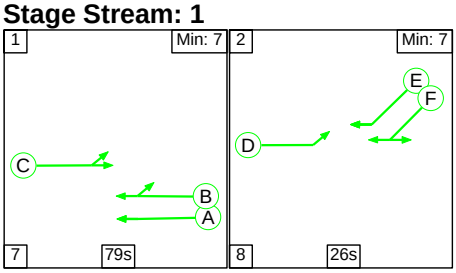
C1 Stream: 1 PRC for Signalled Lanes (%): -13.2 Total Delay for Signalled Lanes (pcuHr): 27.15
C1 Stream: 2 PRC for Signalled Lanes (%): -17.3 Total Delay for Signalled Lanes (pcuHr): 60.37
PRC Over All Lanes (%): -17.3 Total Delay Over All Lanes(pcuHr): 87.51 Cycle Time (s): 120

Full Input Data And Results

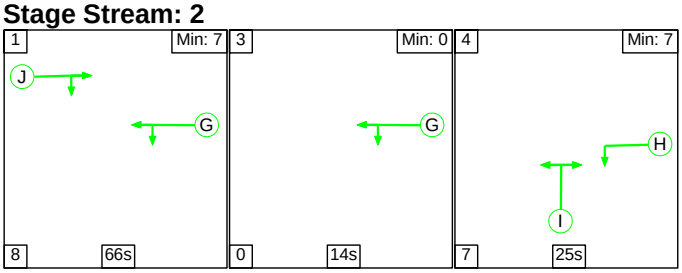
Scenario 6: 'PM 2020 with Dev' (FG6: 'PM 2020 with Dev', Plan 1: 'Staging Plan No. 1')

Stage Sequence Diagram

Stage Stream: 1



Stage Stream: 2



Stage Timings

Stage Stream: 1

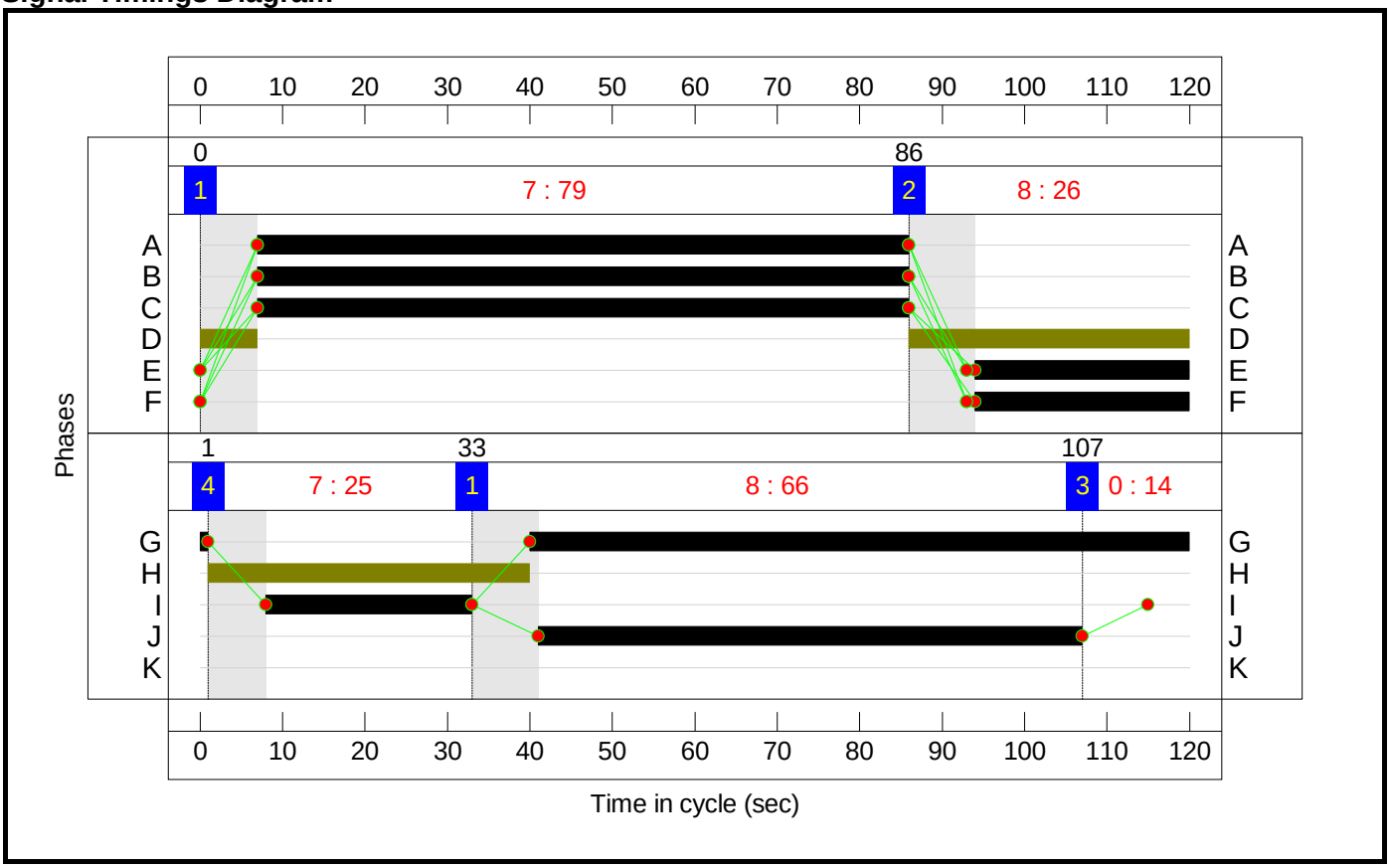
Stage	1	2
Duration	79	26
Change Point	0	86

Stage Stream: 2

Stage	1	3	4
Duration	66	14	25
Change Point	33	107	1

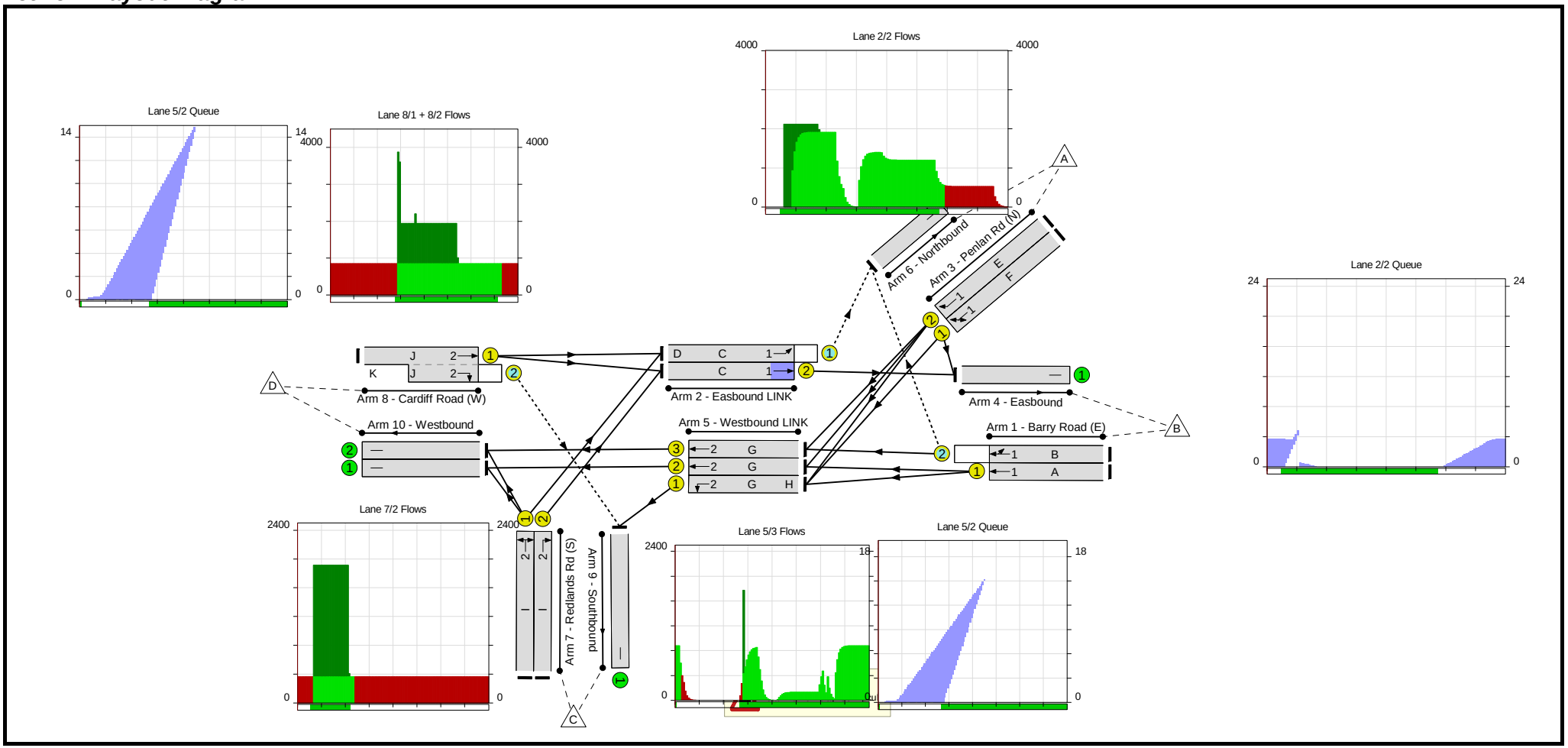
Full Input Data And Results

Signal Timings Diagram



Full Input Data And Results

Network Layout Diagram



Full Input Data And Results

Network Results

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network	-	-	**N/A**	-	-		-	-	-	-	-	-	**92.3%**
Unnamed Junction	-	-	**N/A**	-	-		-	-	-	-	-	-	**92.3%**
1/1	Barry Road (E) Ahead	U	1	N/A	A		1	79	-	1178	1915	1277	92.3%
1/2	Barry Road (E) Ahead U-Turn	O	1	N/A	B		1	79	-	226	1938	306	74.0%
2/1	Easbound LINK Ahead	O	1	N/A	C	D	1	120	41	344	1980	1370	25.1%
2/2	Easbound LINK Ahead	U	1	N/A	C		1	79	-	891	2120	1413	63.0%
3/1	Penlan Rd (N) U-Turn Ahead	U	1	N/A	F		1	26	-	369	1797	404	91.3%
3/2	Penlan Rd (N) Ahead	U	1	N/A	E		1	26	-	424	2055	462	91.7%
4/1	Easbound	U	N/A	N/A	-		-	-	-	1053	Inf	Inf	0.0%
5/1	Westbound LINK Left	U	2	N/A	G	H	1	120	39	858	1739	1739	49.3%
5/2	Westbound LINK Ahead	U	2	N/A	G		1	81	-	769	2080	1421	54.1%
5/3	Westbound LINK Ahead	U	2	N/A	G		1	81	-	299	2080	1421	21.0%
6/1	Northbound	U	N/A	N/A	-		-	-	-	453	Inf	Inf	0.0%
7/1	Redlands Rd (S) Right Left	U	2	N/A	I		1	25	-	276	1745	378	73.0%
7/2	Redlands Rd (S) Right	U	2	N/A	I		1	25	-	363	1912	414	87.6%
8/1+8/2	Cardiff Road (W) Ahead Right	U+O	2	N/A	J	K	1	66	-	854	1940:1935	1115	76.6%
9/1	Southbound	U	N/A	N/A	-		-	-	-	980	Inf	Inf	0.0%
10/1	Westbound	U	N/A	N/A	-		-	-	-	899	Inf	Inf	0.0%
10/2	Westbound	U	N/A	N/A	-		-	-	-	305	Inf	Inf	0.0%

Full Input Data And Results

Item	Entering (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	**-**	**-**	**527**	**43**	**5**	**31.8**	**23.8**	**0.5**	**56.1**	**-**	**-**	**-**	**-**
Unnamed Junction	**-**	**-**	**527**	**43**	**5**	**31.8**	**23.8**	**0.5**	**56.1**	**-**	**-**	**-**	**-**
1/1	1178	1178	-	-	-	5.7	5.4	-	11.1	33.8	33.7	5.4	39.1
1/2	226	226	104	0	5	0.6	1.4	0.5	2.5	39.4	2.8	1.4	4.2
2/1	344	344	301	43	0	0.0	0.2	0.0	0.2	1.8	0.0	0.2	0.2
2/2	891	891	-	-	-	1.0	0.9	-	1.8	7.4	4.8	0.9	5.6
3/1	369	369	-	-	-	4.6	4.2	-	8.9	86.5	12.0	4.2	16.2
3/2	424	424	-	-	-	5.3	4.5	-	9.8	83.4	13.8	4.5	18.3
4/1	1053	1053	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
5/1	858	858	-	-	-	0.0	0.5	-	0.5	2.0	0.0	0.5	0.5
5/2	769	769	-	-	-	1.9	0.6	-	2.5	11.8	15.2	0.6	15.8
5/3	299	299	-	-	-	0.1	0.1	-	0.2	2.6	0.4	0.1	0.5
6/1	453	453	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
7/1	276	276	-	-	-	3.4	1.3	-	4.7	60.9	8.5	1.3	9.8
7/2	363	363	-	-	-	4.6	3.2	-	7.7	76.7	11.7	3.2	14.8
8/1+8/2	854	854	122	0	0	4.6	1.6	0.1	6.3	26.6	20.6	1.6	22.2
9/1	980	980	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
10/1	899	899	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
10/2	305	305	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0

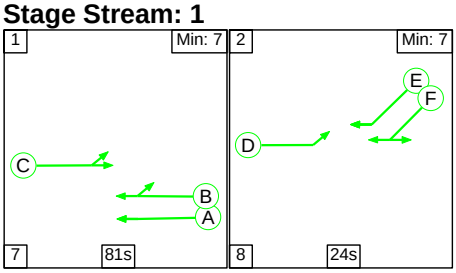
C1 Stream: 1 PRC for Signalled Lanes (%): -2.5 Total Delay for Signalled Lanes (pcuHr): 34.22
C1 Stream: 2 PRC for Signalled Lanes (%): 2.7 Total Delay for Signalled Lanes (pcuHr): 21.92
PRC Over All Lanes (%): -2.5 Total Delay Over All Lanes(pcuHr): 56.14 Cycle Time (s): 120

Full Input Data And Results

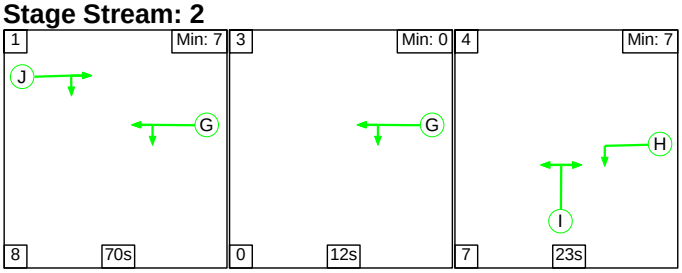
Scenario 7: 'PM 2020 with Dev + tourism' (FG7: '2020 with Dev + Tourism', Plan 1: 'Staging Plan No. 1')

Stage Sequence Diagram

Stage Stream: 1



Stage Stream: 2



Stage Timings

Stage Stream: 1

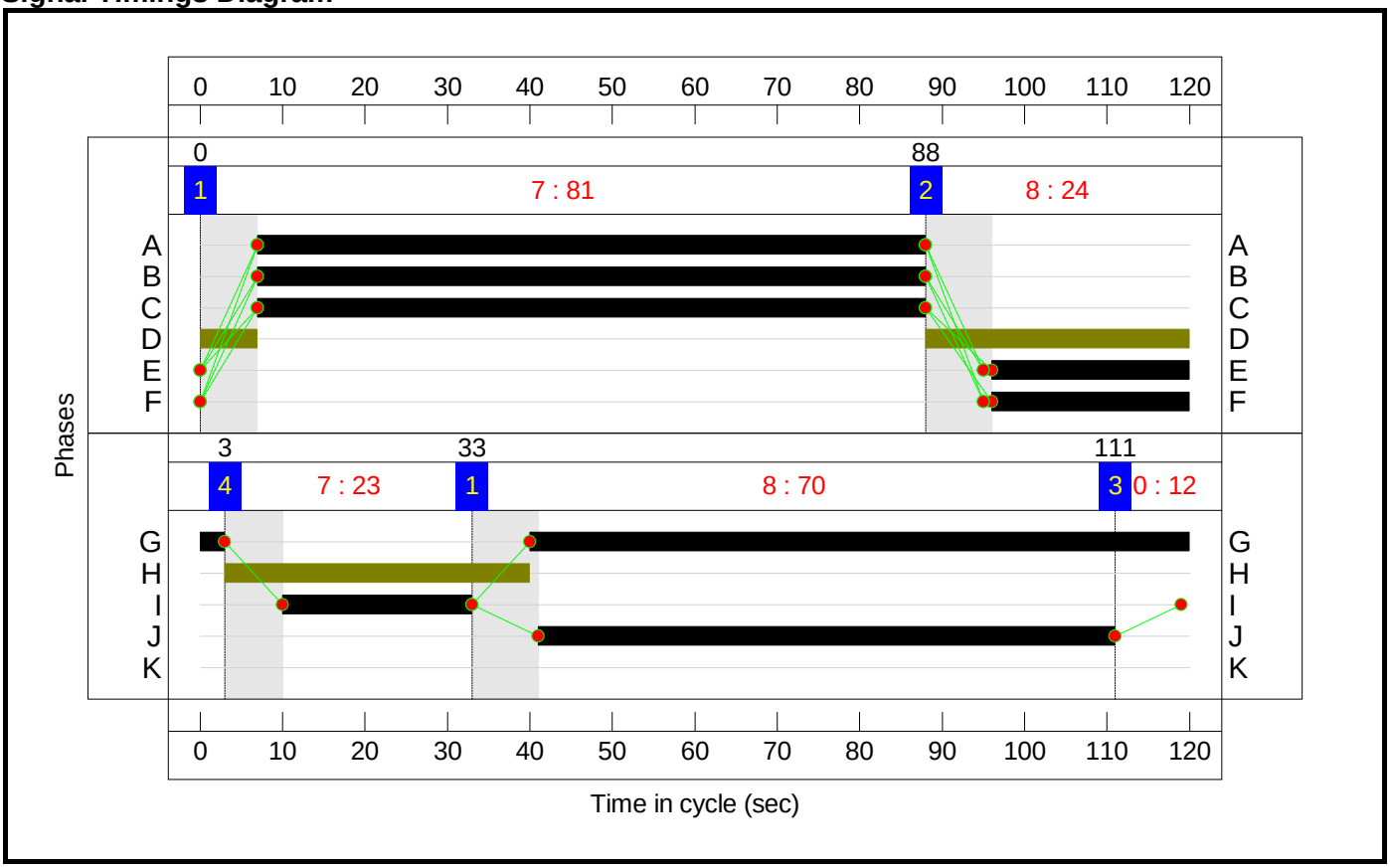
Stage	1	2
Duration	81	24
Change Point	0	88

Stage Stream: 2

Stage	1	3	4
Duration	70	12	23
Change Point	33	111	3

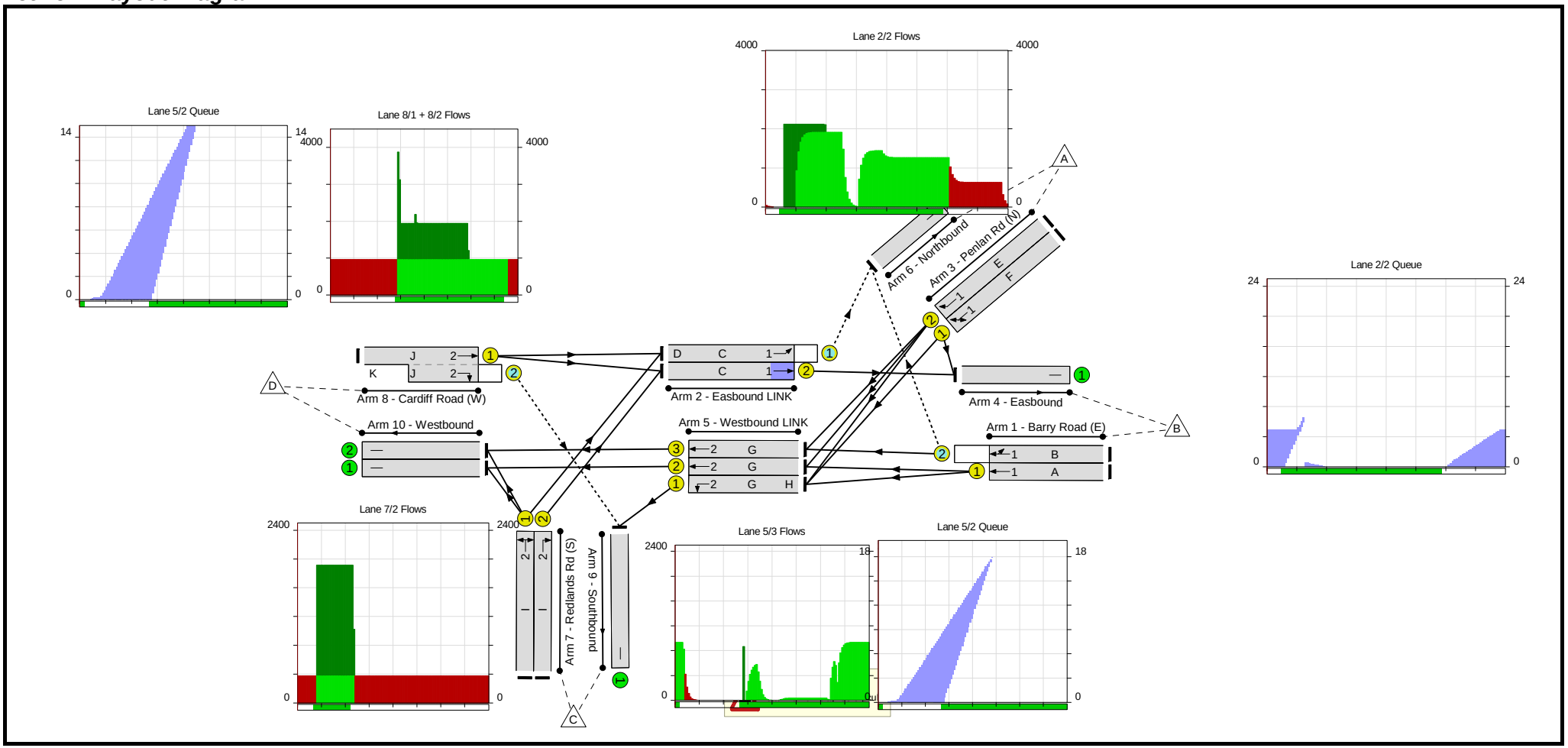
Full Input Data And Results

Signal Timings Diagram



Full Input Data And Results

Network Layout Diagram



Full Input Data And Results

Network Results

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network	-	-	**N/A**	-	-		-	-	-	-	-	-	**101.6%**
Unnamed Junction	-	-	**N/A**	-	-		-	-	-	-	-	-	**101.6%**
1/1	Barry Road (E) Ahead	U	1	N/A	A		1	81	-	1330	1915	1309	101.6%
1/2	Barry Road (E) Ahead U-Turn	O	1	N/A	B		1	81	-	175	1907	206	84.8%
2/1	Easbound LINK Ahead	O	1	N/A	C	D	1	120	39	345	1980	1460	23.6%
2/2	Easbound LINK Ahead	U	1	N/A	C		1	81	-	1004	2120	1449	69.3%
3/1	Penlan Rd (N) U-Turn Ahead	U	1	N/A	F		1	24	-	369	1797	374	98.6%
3/2	Penlan Rd (N) Ahead	U	1	N/A	E		1	24	-	424	2055	428	99.0%
4/1	Easbound	U	N/A	N/A	-		-	-	-	1166	Inf	Inf	0.0%
5/1	Westbound LINK Left	U	2	N/A	G	H	1	120	37	858	1739	1739	48.8%
5/2	Westbound LINK Ahead	U	2	N/A	G		1	83	-	910	2080	1456	61.7%
5/3	Westbound LINK Ahead	U	2	N/A	G		1	83	-	259	2080	1456	17.8%
6/1	Northbound	U	N/A	N/A	-		-	-	-	454	Inf	Inf	0.0%
7/1	Redlands Rd (S) Right Left	U	2	N/A	I		1	23	-	265	1744	349	76.0%
7/2	Redlands Rd (S) Right	U	2	N/A	I		1	23	-	375	1912	382	98.1%
8/1+8/2	Cardiff Road (W) Ahead Right	U+O	2	N/A	J	K	1	70	-	967	1940:1935	1176	82.3%
9/1	Southbound	U	N/A	N/A	-		-	-	-	980	Inf	Inf	0.0%
10/1	Westbound	U	N/A	N/A	-		-	-	-	1040	Inf	Inf	0.0%
10/2	Westbound	U	N/A	N/A	-		-	-	-	265	Inf	Inf	0.0%

Full Input Data And Results

Item	Entering (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	**-**	**-**	**488**	**51**	**37**	**35.8**	**58.9**	**0.8**	**95.5**	**-**	**-**	**-**	**-**
Unnamed Junction	**-**	**-**	**488**	**51**	**37**	**35.8**	**58.9**	**0.8**	**95.5**	**-**	**-**	**-**	**-**
1/1	1330	1309	-	-	-	8.2	24.4	-	32.5	88.0	45.0	24.4	69.4
1/2	175	175	72	0	37	0.4	2.4	0.8	3.5	72.7	2.0	2.4	4.4
2/1	345	345	294	51	0	0.0	0.2	0.0	0.2	1.6	0.0	0.2	0.2
2/2	1004	1004	-	-	-	1.3	1.1	-	2.4	8.5	6.6	1.1	7.7
3/1	369	369	-	-	-	4.9	8.4	-	13.2	128.8	12.2	8.4	20.6
3/2	424	424	-	-	-	5.6	9.3	-	14.9	126.5	14.0	9.3	23.3
4/1	1166	1166	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
5/1	848	848	-	-	-	0.0	0.5	-	0.5	2.0	0.0	0.5	0.5
5/2	898	898	-	-	-	2.2	0.8	-	3.0	12.2	17.9	0.8	18.7
5/3	259	259	-	-	-	0.1	0.1	-	0.2	2.5	0.2	0.1	0.3
6/1	454	454	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
7/1	265	265	-	-	-	3.3	1.5	-	4.9	66.0	8.3	1.5	9.8
7/2	375	375	-	-	-	5.0	8.0	-	13.0	124.6	12.4	8.0	20.4
8/1+8/2	967	967	122	0	0	5.0	2.3	0.0	7.3	27.2	24.4	2.3	26.7
9/1	970	970	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
10/1	1028	1028	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
10/2	265	265	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0

C1 Stream: 1 PRC for Signalled Lanes (%): -12.9
C1 Stream: 2 PRC for Signalled Lanes (%): -9.0
PRC Over All Lanes (%): -12.9

Total Delay for Signalled Lanes (pcuHr): 66.68
Total Delay for Signalled Lanes (pcuHr): 28.85
Total Delay Over All Lanes(pcuHr): 95.52

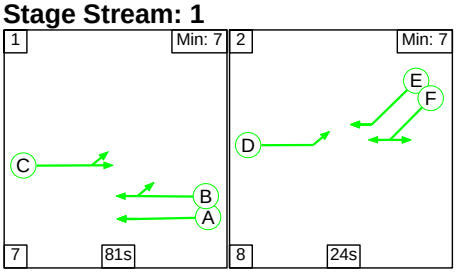
Cycle Time (s): 120

Full Input Data And Results

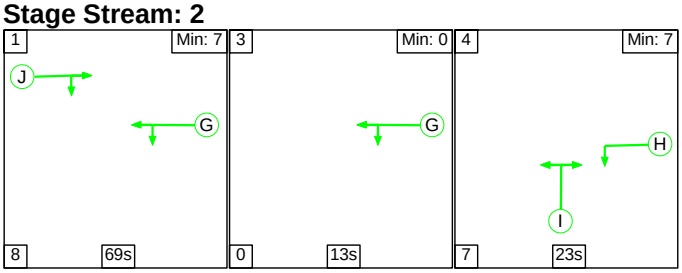
Scenario 8: 'PM 2020 Base + tourism' (FG10: 'PM 2020 Base + Tourism', Plan 1: 'Staging Plan No. 1')

Stage Sequence Diagram

Stage Stream: 1



Stage Stream: 2



Stage Timings

Stage Stream: 1

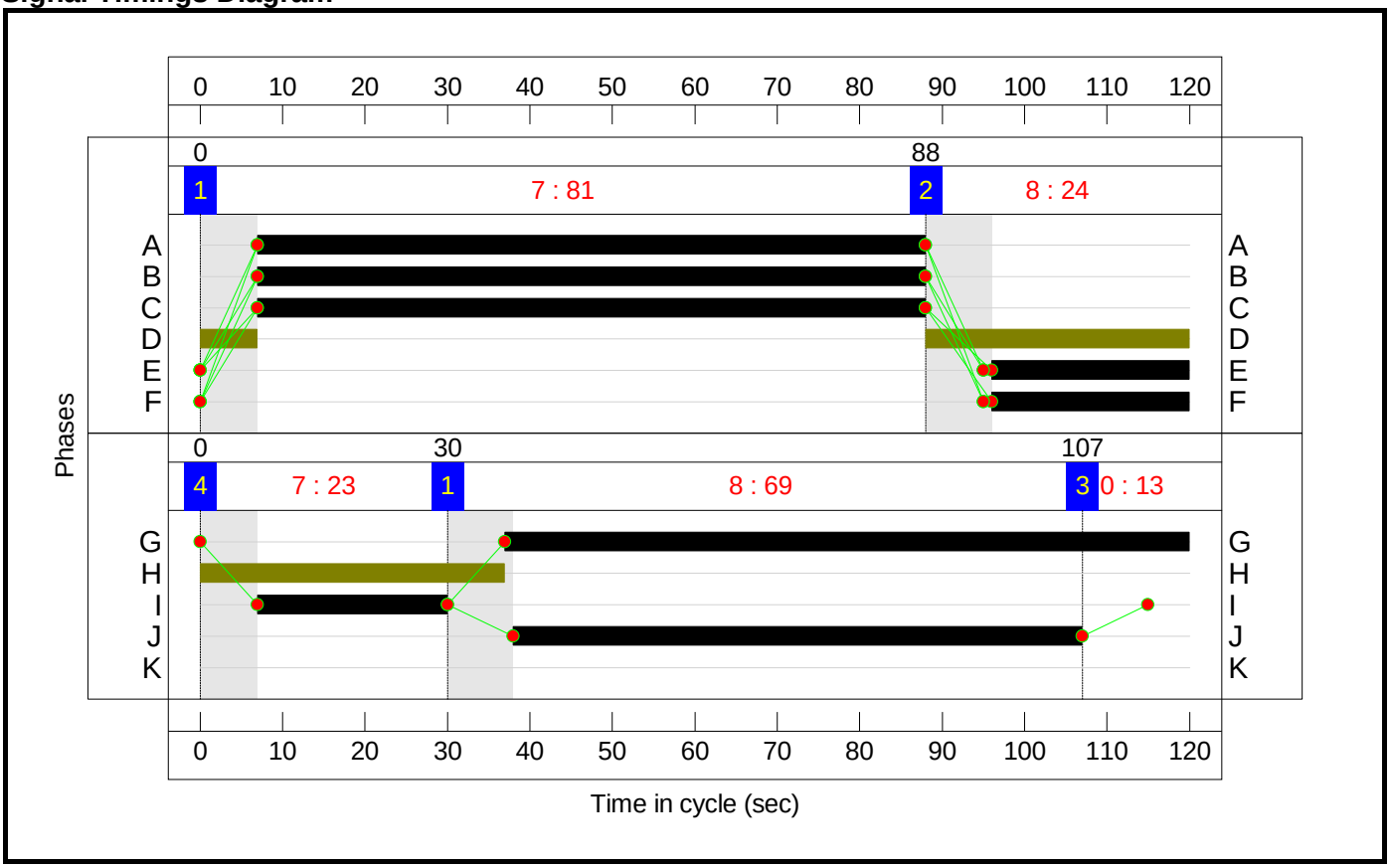
Stage	1	2
Duration	81	24
Change Point	0	88

Stage Stream: 2

Stage	1	3	4
Duration	69	13	23
Change Point	30	107	0

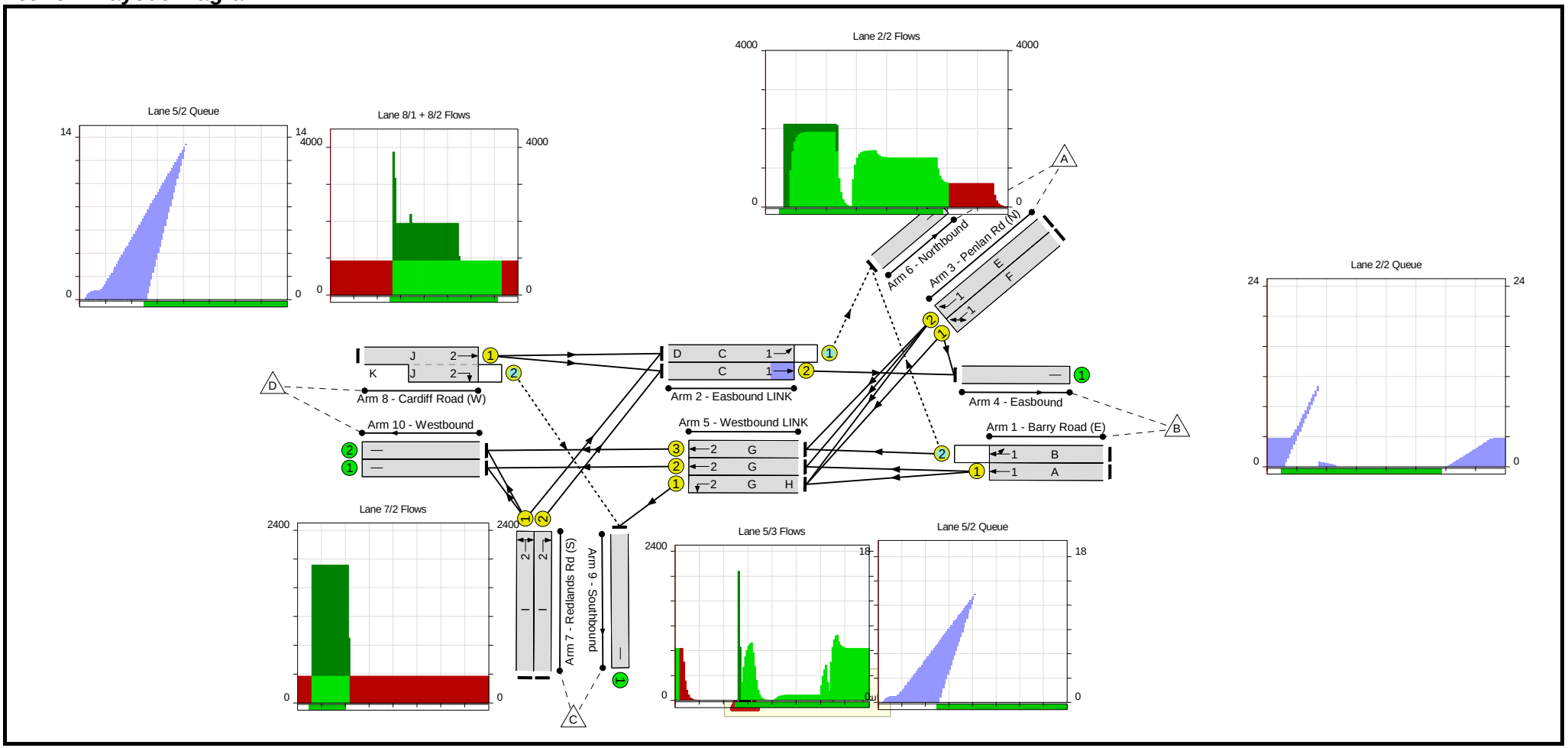
Full Input Data And Results

Signal Timings Diagram



Full Input Data And Results

Network Layout Diagram



Full Input Data And Results

Network Results

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network	-	-	**N/A**	-	-		-	-	-	-	-	-	**97.9%**
Unnamed Junction	-	-	**N/A**	-	-		-	-	-	-	-	-	**97.9%**
1/1	Barry Road (E) Ahead	U	1	N/A	A		1	81	-	1115	1915	1309	85.2%
1/2	Barry Road (E) Ahead U-Turn	O	1	N/A	B		1	81	-	251	1949	261	96.3%
2/1	Easbound LINK Ahead	O	1	N/A	C	D	1	120	39	336	1980	1407	23.9%
2/2	Easbound LINK Ahead	U	1	N/A	C		1	81	-	973	2120	1449	67.2%
3/1	Penlan Rd (N) U-Turn Ahead	U	1	N/A	F		1	24	-	364	1795	374	97.3%
3/2	Penlan Rd (N) Ahead	U	1	N/A	E		1	24	-	419	2055	428	97.9%
4/1	Easbound	U	N/A	N/A	-		-	-	-	1135	Inf	Inf	0.0%
5/1	Westbound LINK Left	U	2	N/A	G	H	1	120	37	859	1739	1739	49.4%
5/2	Westbound LINK Ahead	U	2	N/A	G		1	83	-	707	2080	1456	48.6%
5/3	Westbound LINK Ahead	U	2	N/A	G		1	83	-	312	2080	1456	21.4%
6/1	Northbound	U	N/A	N/A	-		-	-	-	445	Inf	Inf	0.0%
7/1	Redlands Rd (S) Right Left	U	2	N/A	I		1	23	-	261	1744	349	74.8%
7/2	Redlands Rd (S) Right	U	2	N/A	I		1	23	-	374	1912	382	97.8%
8/1+8/2	Cardiff Road (W) Ahead Right	U+O	2	N/A	J	K	1	69	-	924	1940:1935	1160	79.7%
9/1	Southbound	U	N/A	N/A	-		-	-	-	977	Inf	Inf	0.0%
10/1	Westbound	U	N/A	N/A	-		-	-	-	824	Inf	Inf	0.0%
10/2	Westbound	U	N/A	N/A	-		-	-	-	327	Inf	Inf	0.0%

Full Input Data And Results

Item	Entering (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	**-**	**-**	**488**	**40**	**35**	**31.5**	**37.7**	**0.8**	**70.0**	**-**	**-**	**-**	**-**
Unnamed Junction	**-**	**-**	**488**	**40**	**35**	**31.5**	**37.7**	**0.8**	**70.0**	**-**	**-**	**-**	**-**
1/1	1115	1115	-	-	-	4.5	2.8	-	7.3	23.4	27.9	2.8	30.7
1/2	251	251	74	0	35	0.8	5.9	0.7	7.4	106.1	5.1	5.9	11.0
2/1	336	336	296	40	0	0.0	0.2	0.0	0.2	1.7	0.0	0.2	0.2
2/2	973	973	-	-	-	1.1	1.0	-	2.1	7.8	10.7	1.0	11.7
3/1	364	364	-	-	-	4.8	7.4	-	12.1	120.1	12.0	7.4	19.4
3/2	419	419	-	-	-	5.5	8.2	-	13.7	117.7	13.9	8.2	22.1
4/1	1135	1135	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
5/1	859	859	-	-	-	0.0	0.5	-	0.5	2.0	0.0	0.5	0.5
5/2	707	707	-	-	-	1.7	0.5	-	2.2	11.0	13.4	0.5	13.9
5/3	312	312	-	-	-	0.2	0.1	-	0.4	4.3	0.8	0.1	1.0
6/1	445	445	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
7/1	261	261	-	-	-	3.3	1.4	-	4.7	65.0	8.1	1.4	9.6
7/2	374	374	-	-	-	5.0	7.8	-	12.8	122.8	12.4	7.8	20.2
8/1+8/2	924	924	118	0	0	4.8	1.9	0.1	6.8	26.3	22.7	1.9	24.7
9/1	977	977	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
10/1	824	824	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
10/2	327	327	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0

C1 Stream: 1 PRC for Signalled Lanes (%): -8.7 Total Delay for Signalled Lanes (pcuHr): 42.77
C1 Stream: 2 PRC for Signalled Lanes (%): -8.7 Total Delay for Signalled Lanes (pcuHr): 27.23
PRC Over All Lanes (%): -8.7 Total Delay Over All Lanes(pcuHr): 70.01 Cycle Time (s): 120

Appendix B

Murch Cross

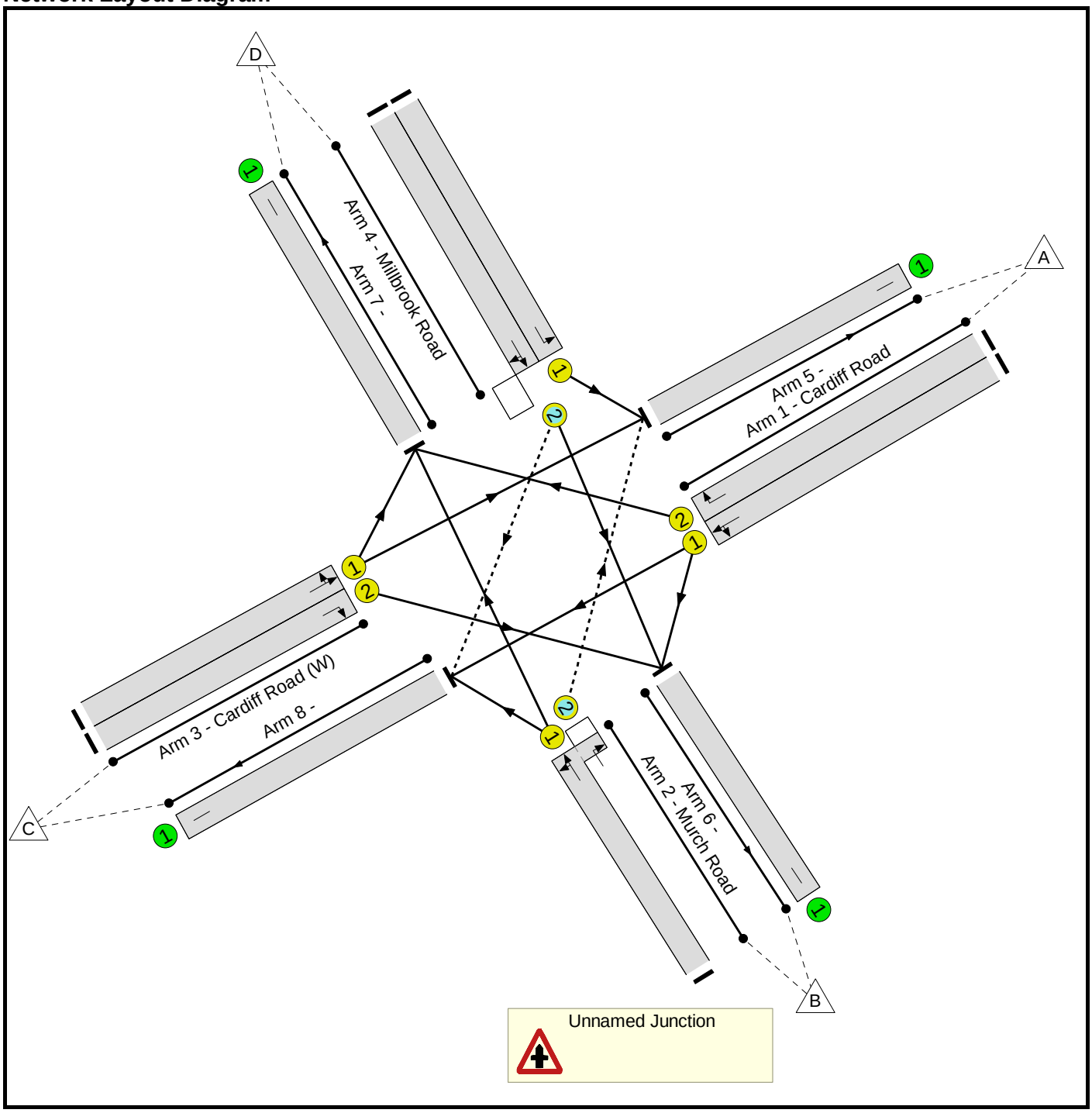
Full Input Data And Results

User and Project Details

Project:	**Waterfront Barry**
Title:	**Exisiting Situation**
Location:	Murch Crossroads, Dinas Powys
File name:	Base Murch Crossroads.lsg3x
Author:	Roddy Beynon
Company:	
Address:	
Notes:	

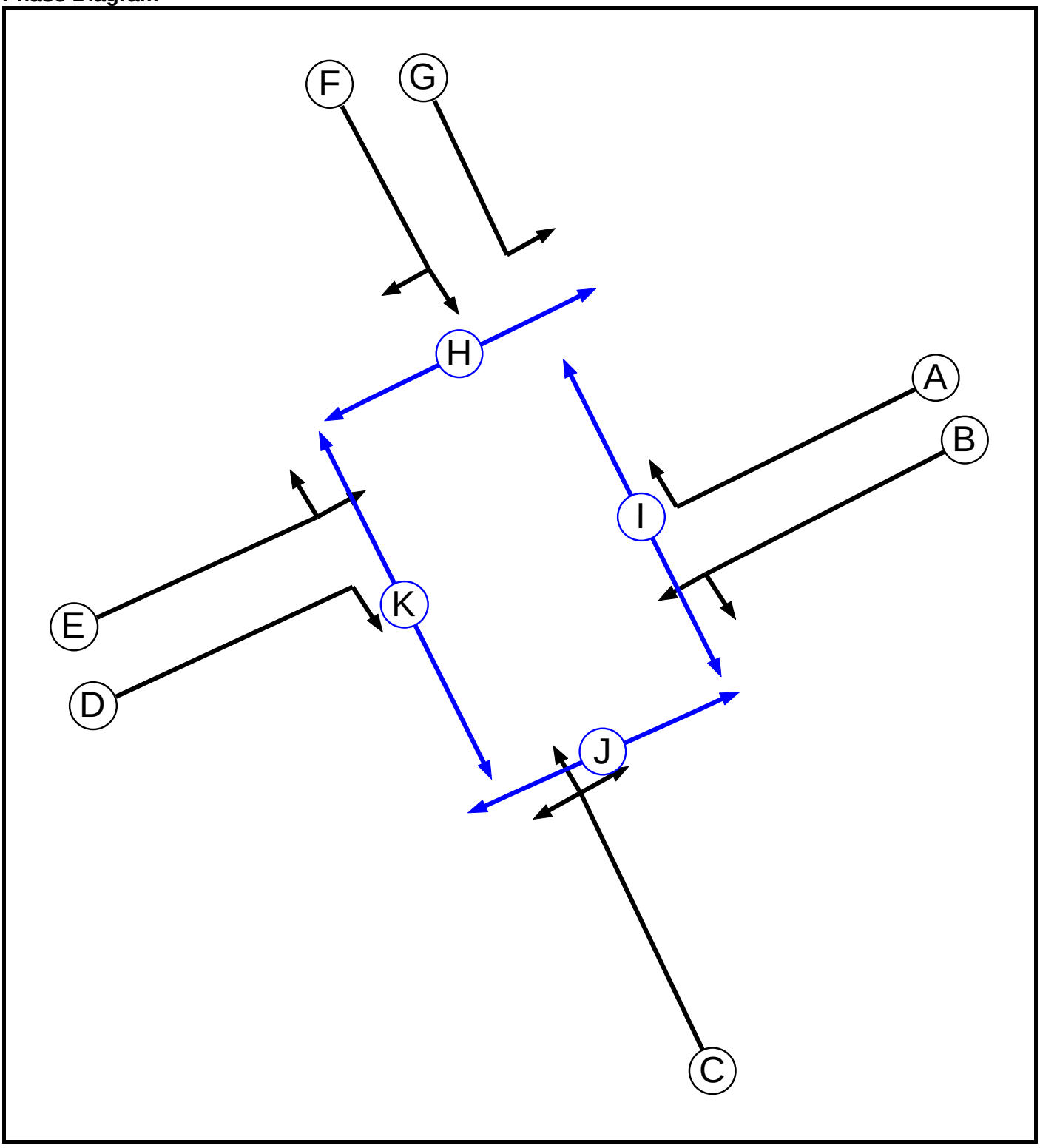
Full Input Data And Results

Network Layout Diagram



Full Input Data And Results

Phase Diagram



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	Traffic		7	7
D	Traffic		7	7
E	Traffic		7	7
F	Traffic		7	7
G	Traffic		7	7
H	Pedestrian		10	10
I	Pedestrian		11	11
J	Pedestrian		8	8
K	Pedestrian		11	11

Phase Intergreens Matrix

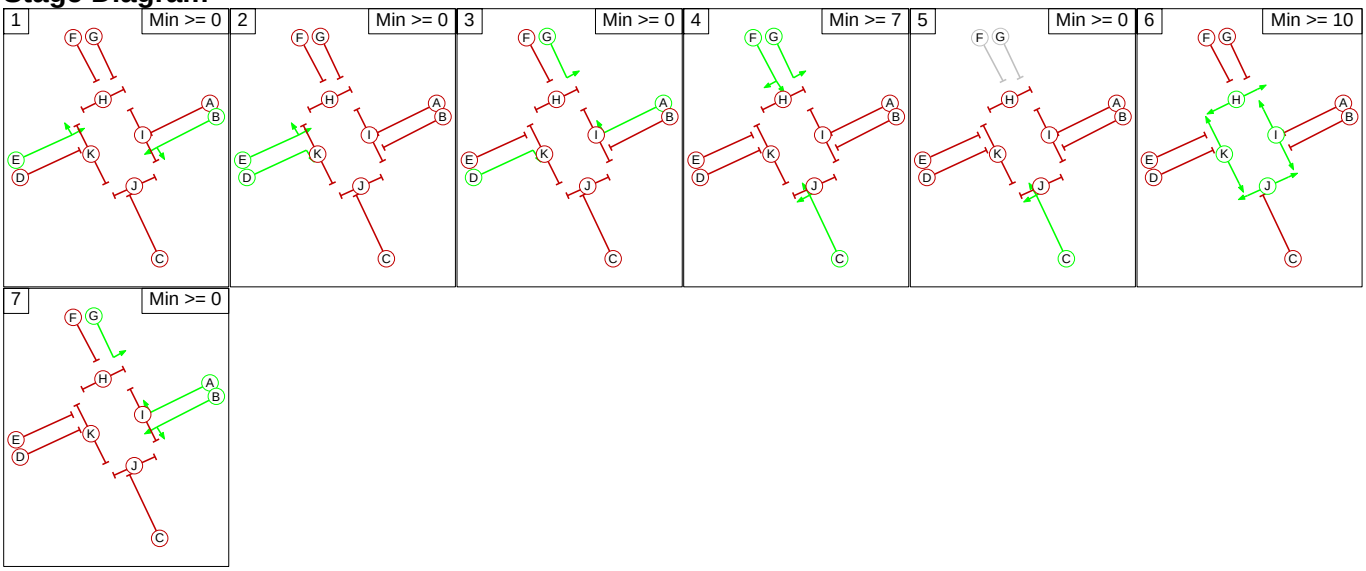
		Starting Phase										
		A	B	C	D	E	F	G	H	I	J	K
Terminating Phase	A		-	5	-	5	5	-	8	5	-	-
	B	-		5	5	-	5	-	-	5	7	8
	C	6	5		5	5	-	-	9	8	5	7
	D	-	5	5		-	5	-	-	-	7	5
	E	6	-	5	-		5	5	8	8	-	5
	F	5	6	-	7	5		-	5	-	8	9
	G	-	-	-	-	9	-		5	7	-	-
	H	10	-	10	-	10	10	10		-	-	-
	I	12	12	12	-	12	-	12	-		-	-
	J	-	7	7	7	-	7	-	-	-		-
	K	-	9	9	9	9	9	-	-	-	-	

Phases in Stage

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

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 Changes

From Stage \ To Stage	1	2	3	4	5	6	7
1		5	6	X	X	X	6
2	X		6	X	X	X	6
3	X	X		5	X	X	5
4	X	X	X		0	X	6
5	5	X	X	X		9	6
6	12	X	X	X	X		12
7	9	9	5	5	5	8	

Full Input Data And Results

Give-Way Lane Input Data

Junction: Unnamed Junction

Lane	Movement	Max 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)
2/2 (Murch Road)	5/1 (Right)	1400	4/2	1.10	4/2	1.00	-	0.50	1	2.00
			4/1	1.10	4/1					
4/2 (Millbrook Road)	8/1 (Right)	1440	2/1	1.09	2/1	2.00	2.00	0.50	2	2.00

Full Input Data And Results

Lane Input Data

Junction: Unnamed Junction

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 (Cardiff Road)	U	B	2	3	60.0	Geom	-	3.70	0.00	Y	Arm 6 Left	Inf
											Arm 8 Ahead	Inf
1/2 (Cardiff Road)	U	A	2	3	60.0	Geom	-	3.25	0.00	N	Arm 7 Right	20.00
2/1 (Murch Road)	U	C	2	3	60.0	Geom	-	3.70	0.00	Y	Arm 7 Ahead	Inf
											Arm 8 Left	13.50
2/2 (Murch Road)	O	C	2	3	1.0	Geom	-	3.70	0.00	Y	Arm 5 Right	19.00
3/1 (Cardiff Road (W))	U	E	2	3	60.0	Geom	-	3.30	0.00	Y	Arm 5 Ahead	Inf
											Arm 7 Left	6.20
3/2 (Cardiff Road (W))	U	D	2	3	60.0	Geom	-	3.00	0.00	N	Arm 6 Right	14.75
4/1 (Millbrook Road)	U	G	2	3	60.0	Geom	-	3.20	0.00	Y	Arm 5 Left	Inf
4/2 (Millbrook Road)	O	F	2	3	60.0	Geom	-	3.10	0.00	N	Arm 6 Ahead	Inf
											Arm 8 Right	16.00
5/1	U		2	3	60.0	Inf	-	-	-	-	-	-
6/1	U		2	3	60.0	Inf	-	-	-	-	-	-
7/1	U		2	3	60.0	Inf	-	-	-	-	-	-
8/1	U		2	3	60.0	Inf	-	-	-	-	-	-

Traffic Flow Groups

Flow Group	Start Time	End Time	Duration	Formula
1: '2008 AM Base'	08:30	09:30	01:00	
2: '2008 PM Base'	17:30	18:30	01:00	
3: '2020 AM Base'	08:30	09:30	01:00	
4: '2020 PM Base'	17:30	18:30	01:00	
5: '2020 AM Dev + BI'	08:30	09:30	01:00	
6: '2020 PM Dev + BI'	17:30	18:30	01:00	
7: '2020 PM Dev + BI + Tourism'	17:30	18:30	01:00	
8: '2020 PM Base + Tourism'	17:30	18:30	01:00	

Traffic Lane Flows

Lane	Scenario 1: 2008 AM Base
Junction: Unnamed Junction	
1/1	584
1/2	31
2/1 (with short)	288(In) 153(Out)
2/2 (short)	135
3/1	629
3/2	39
4/1	101
4/2	61
5/1	855
6/1	152
7/1	114
8/1	612

Full Input Data And Results

Scenario 1: '2008 AM Base' (FG1: '2008 AM Base', Plan 1: 'AM Staging')

Traffic Lane Flows

Junction: Unnamed Junction							
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat flow (PCU/Hr)**
1/1 (Cardiff Road)	3.70	0.00	Y	Arm 6 Left	Inf	12.3 %	1985
				Arm 8 Ahead	Inf	87.7 %	
1/2 (Cardiff Road)	3.25	0.00	N	Arm 7 Right	20.00	100.0 %	1935
2/1 (Murch Road)	3.70	0.00	Y	Arm 7 Ahead	Inf	47.7 %	1876
				Arm 8 Left	13.50	52.3 %	
2/2 (Murch Road)	3.70	0.00	Y	Arm 5 Right	19.00	100.0 %	1840
3/1 (Cardiff Road (W))	3.30	0.00	Y	Arm 5 Ahead	Inf	98.4 %	1938
				Arm 7 Left	6.20	1.6 %	
3/2 (Cardiff Road (W))	3.00	0.00	N	Arm 6 Right	14.75	100.0 %	1865
4/1 (Millbrook Road)	3.20	0.00	Y	Arm 5 Left	Inf	100.0 %	1935
4/2 (Millbrook Road)	3.10	0.00	N	Arm 6 Ahead	Inf	67.2 %	2003
				Arm 8 Right	16.00	32.8 %	
5/1	Infinite Saturation Flow						Inf
6/1	Infinite Saturation Flow						Inf
7/1	Infinite Saturation Flow						Inf
8/1	Infinite Saturation Flow						Inf

Traffic Lane Flows

Lane	Scenario 2: 2008 PM Base
Junction: Unnamed Junction	
1/1	866
1/2	27
2/1 (with short)	165(In) 68(Out)
2/2 (short)	97
3/1	602
3/2	34
4/1	64
4/2	167
5/1	757
6/1	295
7/1	58
8/1	815

Full Input Data And Results

Scenario 2: '2008 PM Base' (FG2: '2008 PM Base', Plan 2: 'PM Staging')

Traffic Lane Flows

Junction: Unnamed Junction							
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat flow (PCU/Hr)**
1/1 (Cardiff Road)	3.70	0.00	Y	Arm 6 Left	Inf	16.4 %	1985
				Arm 8 Ahead	Inf	83.6 %	
1/2 (Cardiff Road)	3.25	0.00	N	Arm 7 Right	20.00	100.0 %	1935
2/1 (Murch Road)	3.70	0.00	Y	Arm 7 Ahead	Inf	36.8 %	1855
				Arm 8 Left	13.50	63.2 %	
2/2 (Murch Road)	3.70	0.00	Y	Arm 5 Right	19.00	100.0 %	1840
3/1 (Cardiff Road (W))	3.30	0.00	Y	Arm 5 Ahead	Inf	99.0 %	1940
				Arm 7 Left	6.20	1.0 %	
3/2 (Cardiff Road (W))	3.00	0.00	N	Arm 6 Right	14.75	100.0 %	1865
4/1 (Millbrook Road)	3.20	0.00	Y	Arm 5 Left	Inf	100.0 %	1935
4/2 (Millbrook Road)	3.10	0.00	N	Arm 6 Ahead	Inf	71.3 %	2011
				Arm 8 Right	16.00	28.7 %	
5/1	Infinite Saturation Flow						Inf
6/1	Infinite Saturation Flow						Inf
7/1	Infinite Saturation Flow						Inf
8/1	Infinite Saturation Flow						Inf

Traffic Lane Flows

Lane	Scenario 3: 2020 AM Base
Junction: Unnamed Junction	
1/1	681
1/2	36
2/1 (with short)	335(In) 178(Out)
2/2 (short)	157
3/1	733
3/2	46
4/1	117
4/2	71
5/1	995
6/1	178
7/1	133
8/1	713

Full Input Data And Results

Scenario 3: '2020 AM Base' (FG3: '2020 AM Base', Plan 1: 'AM Staging')

Traffic Lane Flows

Junction: Unnamed Junction							
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat flow (PCU/Hr)**
1/1 (Cardiff Road)	3.70	0.00	Y	Arm 6 Left	Inf	12.3 %	1985
				Arm 8 Ahead	Inf	87.7 %	
1/2 (Cardiff Road)	3.25	0.00	N	Arm 7 Right	20.00	100.0 %	1935
2/1 (Murch Road)	3.70	0.00	Y	Arm 7 Ahead	Inf	47.8 %	1876
				Arm 8 Left	13.50	52.2 %	
2/2 (Murch Road)	3.70	0.00	Y	Arm 5 Right	19.00	100.0 %	1840
3/1 (Cardiff Road (W))	3.30	0.00	Y	Arm 5 Ahead	Inf	98.4 %	1937
				Arm 7 Left	6.20	1.6 %	
3/2 (Cardiff Road (W))	3.00	0.00	N	Arm 6 Right	14.75	100.0 %	1865
4/1 (Millbrook Road)	3.20	0.00	Y	Arm 5 Left	Inf	100.0 %	1935
4/2 (Millbrook Road)	3.10	0.00	N	Arm 6 Ahead	Inf	67.6 %	2004
				Arm 8 Right	16.00	32.4 %	
5/1	Infinite Saturation Flow						Inf
6/1	Infinite Saturation Flow						Inf
7/1	Infinite Saturation Flow						Inf
8/1	Infinite Saturation Flow						Inf

Traffic Lane Flows

Lane	Scenario 4: 2020 PM Base
Junction: Unnamed Junction	
1/1	1007
1/2	31
2/1 (with short)	191(In) 79(Out)
2/2 (short)	112
3/1	700
3/2	39
4/1	74
4/2	195
5/1	879
6/1	343
7/1	67
8/1	948

Full Input Data And Results

Scenario 4: '2020 PM Base' (FG4: '2020 PM Base', Plan 2: 'PM Staging')

Traffic Lane Flows

Junction: Unnamed Junction							
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat flow (PCU/Hr)**
1/1 (Cardiff Road)	3.70	0.00	Y	Arm 6 Left	Inf	16.4 %	1985
				Arm 8 Ahead	Inf	83.6 %	
1/2 (Cardiff Road)	3.25	0.00	N	Arm 7 Right	20.00	100.0 %	1935
2/1 (Murch Road)	3.70	0.00	Y	Arm 7 Ahead	Inf	36.7 %	1855
				Arm 8 Left	13.50	63.3 %	
2/2 (Murch Road)	3.70	0.00	Y	Arm 5 Right	19.00	100.0 %	1840
3/1 (Cardiff Road (W))	3.30	0.00	Y	Arm 5 Ahead	Inf	99.0 %	1940
				Arm 7 Left	6.20	1.0 %	
3/2 (Cardiff Road (W))	3.00	0.00	N	Arm 6 Right	14.75	100.0 %	1865
4/1 (Millbrook Road)	3.20	0.00	Y	Arm 5 Left	Inf	100.0 %	1935
4/2 (Millbrook Road)	3.10	0.00	N	Arm 6 Ahead	Inf	71.3 %	2011
				Arm 8 Right	16.00	28.7 %	
5/1	Infinite Saturation Flow						Inf
6/1	Infinite Saturation Flow						Inf
7/1	Infinite Saturation Flow						Inf
8/1	Infinite Saturation Flow						Inf

Traffic Lane Flows

Lane	Scenario 5: 2020 AM Dev + BI
Junction: Unnamed Junction	
1/1	713
1/2	36
2/1 (with short)	338(In) 181(Out)
2/2 (short)	157
3/1	887
3/2	48
4/1	117
4/2	73
5/1	1147
6/1	180
7/1	135
8/1	750

Full Input Data And Results

Scenario 5: '2020 AM Dev + BI' (FG5: '2020 AM Dev + BI', Plan 1: 'AM Staging')

Traffic Lane Flows

Junction: Unnamed Junction							
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat flow (PCU/Hr)**
1/1 (Cardiff Road)	3.70	0.00	Y	Arm 6 Left	Inf	11.8 %	1985
				Arm 8 Ahead	Inf	88.2 %	
1/2 (Cardiff Road)	3.25	0.00	N	Arm 7 Right	20.00	100.0 %	1935
2/1 (Murch Road)	3.70	0.00	Y	Arm 7 Ahead	Inf	47.0 %	1875
				Arm 8 Left	13.50	53.0 %	
2/2 (Murch Road)	3.70	0.00	Y	Arm 5 Right	19.00	100.0 %	1840
3/1 (Cardiff Road (W))	3.30	0.00	Y	Arm 5 Ahead	Inf	98.4 %	1938
				Arm 7 Left	6.20	1.6 %	
3/2 (Cardiff Road (W))	3.00	0.00	N	Arm 6 Right	14.75	100.0 %	1865
4/1 (Millbrook Road)	3.20	0.00	Y	Arm 5 Left	Inf	100.0 %	1935
4/2 (Millbrook Road)	3.10	0.00	N	Arm 6 Ahead	Inf	65.8 %	2001
				Arm 8 Right	16.00	34.2 %	
5/1	Infinite Saturation Flow						Inf
6/1	Infinite Saturation Flow						Inf
7/1	Infinite Saturation Flow						Inf
8/1	Infinite Saturation Flow						Inf

Traffic Lane Flows

Lane	Scenario 6: 2020 PM Dev + BI
Junction: Unnamed Junction	
1/1	1162
1/2	31
2/1 (with short)	194(In) 82(Out)
2/2 (short)	112
3/1	746
3/2	43
4/1	74
4/2	198
5/1	922
6/1	347
7/1	70
8/1	1109

Full Input Data And Results

Scenario 6: '2020 PM Dev + BI' (FG6: '2020 PM Dev + BI', Plan 2: 'PM Staging')

Traffic Lane Flows

Junction: Unnamed Junction							
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat flow (PCU/Hr)**
1/1 (Cardiff Road)	3.70	0.00	Y	Arm 6 Left	Inf	14.2 %	1985
				Arm 8 Ahead	Inf	85.8 %	
1/2 (Cardiff Road)	3.25	0.00	N	Arm 7 Right	20.00	100.0 %	1935
2/1 (Murch Road)	3.70	0.00	Y	Arm 7 Ahead	Inf	35.4 %	1852
				Arm 8 Left	13.50	64.6 %	
2/2 (Murch Road)	3.70	0.00	Y	Arm 5 Right	19.00	100.0 %	1840
3/1 (Cardiff Road (W))	3.30	0.00	Y	Arm 5 Ahead	Inf	98.7 %	1939
				Arm 7 Left	6.20	1.3 %	
3/2 (Cardiff Road (W))	3.00	0.00	N	Arm 6 Right	14.75	100.0 %	1865
4/1 (Millbrook Road)	3.20	0.00	Y	Arm 5 Left	Inf	100.0 %	1935
4/2 (Millbrook Road)	3.10	0.00	N	Arm 6 Ahead	Inf	70.2 %	2009
				Arm 8 Right	16.00	29.8 %	
5/1	Infinite Saturation Flow						Inf
6/1	Infinite Saturation Flow						Inf
7/1	Infinite Saturation Flow						Inf
8/1	Infinite Saturation Flow						Inf

Traffic Lane Flows

Lane	Scenario 7: 2020 PM Dev + BI + Tourism
Junction: Unnamed Junction	
1/1	1264
1/2	31
2/1 (with short)	194(In) 82(Out)
2/2 (short)	112
3/1	860
3/2	43
4/1	74
4/2	198
5/1	1036
6/1	347
7/1	70
8/1	1211

Full Input Data And Results

Scenario 7: '2020 PM Dev + BI + Tourism' (FG7: '2020 PM Dev + BI + Tourism', Plan 2: 'PM Staging')

Traffic Lane Flows

Junction: Unnamed Junction							
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat flow (PCU/Hr)**
1/1 (Cardiff Road)	3.70	0.00	Y	Arm 6 Left	Inf	13.1 %	1985
				Arm 8 Ahead	Inf	86.9 %	
1/2 (Cardiff Road)	3.25	0.00	N	Arm 7 Right	20.00	100.0 %	1935
2/1 (Murch Road)	3.70	0.00	Y	Arm 7 Ahead	Inf	35.4 %	1852
				Arm 8 Left	13.50	64.6 %	
2/2 (Murch Road)	3.70	0.00	Y	Arm 5 Right	19.00	100.0 %	1840
3/1 (Cardiff Road (W))	3.30	0.00	Y	Arm 5 Ahead	Inf	98.8 %	1940
				Arm 7 Left	6.20	1.2 %	
3/2 (Cardiff Road (W))	3.00	0.00	N	Arm 6 Right	14.75	100.0 %	1865
4/1 (Millbrook Road)	3.20	0.00	Y	Arm 5 Left	Inf	100.0 %	1935
4/2 (Millbrook Road)	3.10	0.00	N	Arm 6 Ahead	Inf	70.2 %	2009
				Arm 8 Right	16.00	29.8 %	
5/1	Infinite Saturation Flow						Inf
6/1	Infinite Saturation Flow						Inf
7/1	Infinite Saturation Flow						Inf
8/1	Infinite Saturation Flow						Inf

Traffic Lane Flows

Lane	Scenario 8: 2020 PM Base + Tourism
Junction: Unnamed Junction	
1/1	1109
1/2	31
2/1 (with short)	191(In) 79(Out)
2/2 (short)	112
3/1	814
3/2	39
4/1	74
4/2	195
5/1	993
6/1	343
7/1	67
8/1	1050

Full Input Data And Results

Scenario 8: '2020 PM Base + Tourism' (FG8: '2020 PM Base + Tourism', Plan 2: 'PM Staging')

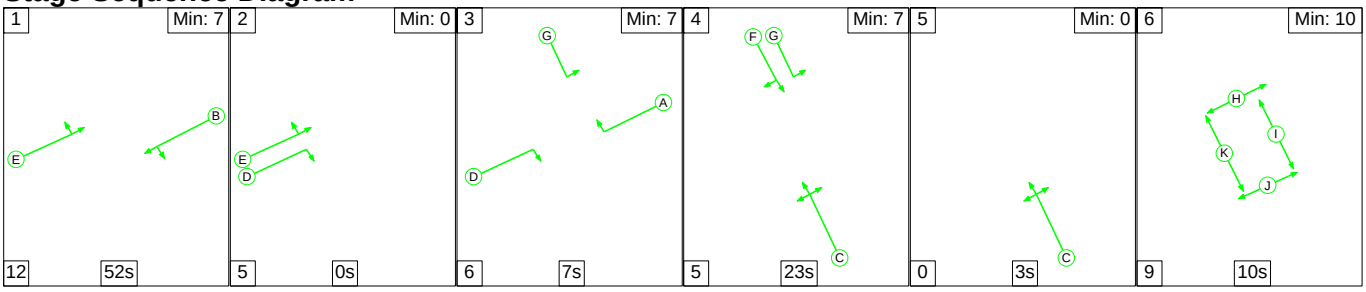
Traffic Lane Flows

Junction: Unnamed Junction

Lane	Lane Width (m)	Gradient	Nearside Lane	Allowed Turns	Turning Radius (m)	Turning Prop.	Sat flow (PCU/Hr)
1/1 (Cardiff Road)	3.70	0.00	Y	Arm 6 Left	Inf	14.9 %	1985
				Arm 8 Ahead	Inf	85.1 %	
1/2 (Cardiff Road)	3.25	0.00	N	Arm 7 Right	20.00	100.0 %	1935
2/1 (Murch Road)	3.70	0.00	Y	Arm 7 Ahead	Inf	36.7 %	1855
				Arm 8 Left	13.50	63.3 %	
2/2 (Murch Road)	3.70	0.00	Y	Arm 5 Right	19.00	100.0 %	1840
3/1 (Cardiff Road (W))	3.30	0.00	Y	Arm 5 Ahead	Inf	99.1 %	1941
				Arm 7 Left	6.20	0.9 %	
3/2 (Cardiff Road (W))	3.00	0.00	N	Arm 6 Right	14.75	100.0 %	1865
4/1 (Millbrook Road)	3.20	0.00	Y	Arm 5 Left	Inf	100.0 %	1935
4/2 (Millbrook Road)	3.10	0.00	N	Arm 6 Ahead	Inf	71.3 %	2011
				Arm 8 Right	16.00	28.7 %	
5/1	Infinite Saturation Flow						Inf
6/1	Infinite Saturation Flow						Inf
7/1	Infinite Saturation Flow						Inf
8/1	Infinite Saturation Flow						Inf

Scenario 1: '2008 AM Base' (FG1: '2008 AM Base', Plan 1: 'AM Staging')

Stage Sequence Diagram

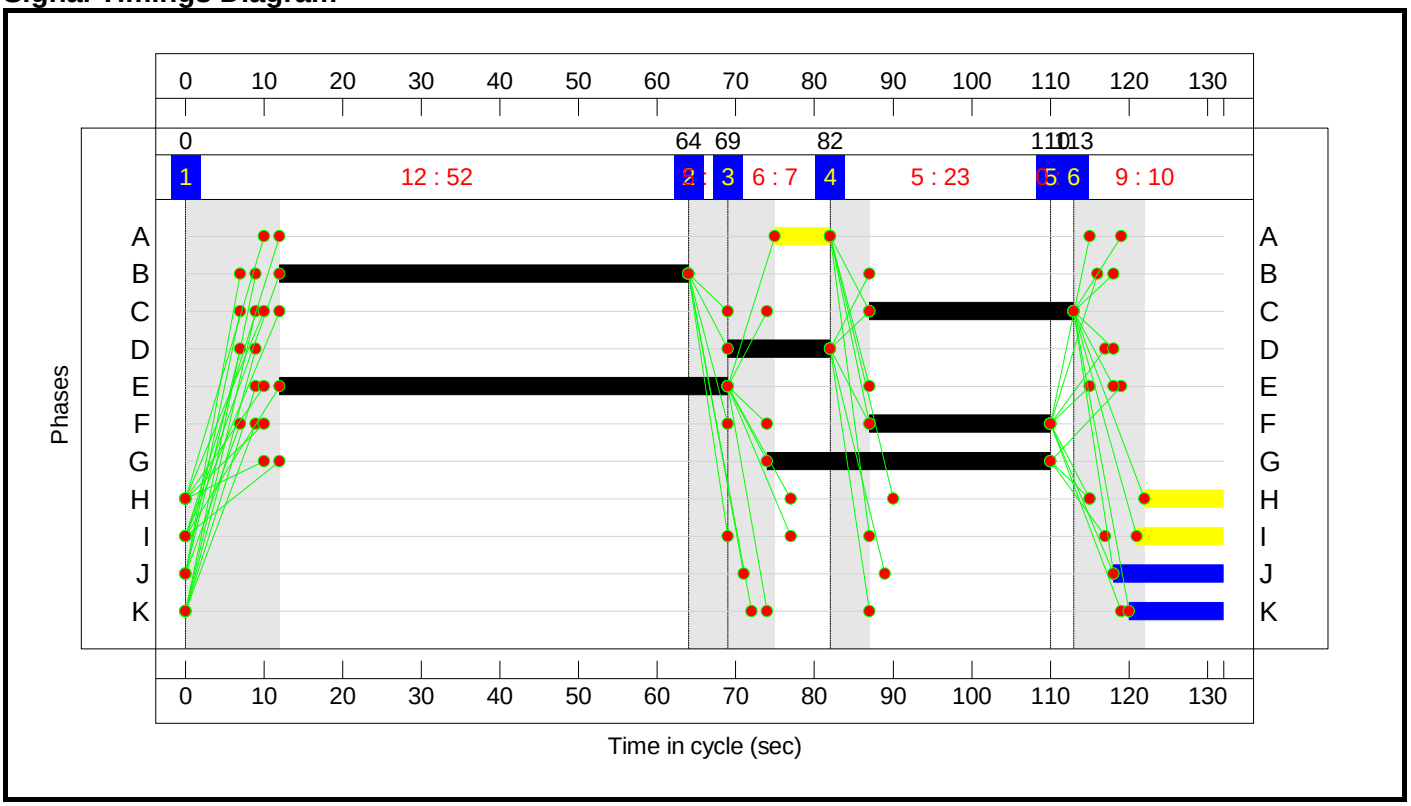


Stage Timings

Stage	1	2	3	4	5	6
Duration	52	0	7	23	3	10
Change Point	0	64	69	82	110	113

Full Input Data And Results

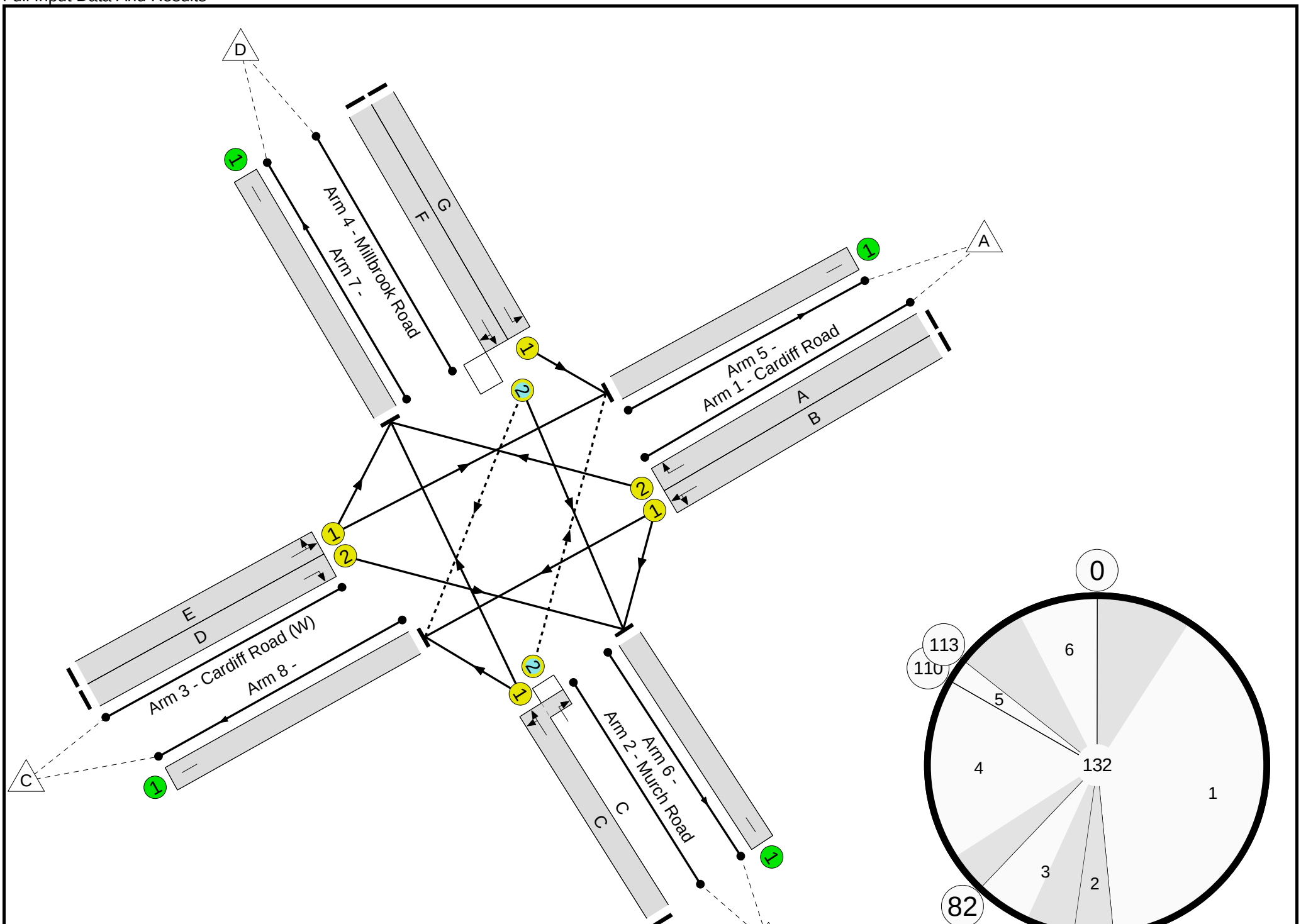
Signal Timings Diagram



Full Input Data And Results

Network Layout Diagram

Full Input Data And Results



Full Input Data And Results

Network Results

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network: Exisiting Situation	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**73.9%**
Unnamed Junction	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**73.9%**
1/1	Cardiff Road Left Ahead	U	N/A	N/A	B		1	52	-	584	1985	797	73.3%
1/2	Cardiff Road Right	U	N/A	N/A	A		1	7	-	31	1935	117	26.4%
2/1+2/2	Murch Road Right Ahead Left	U+O	N/A	N/A	C		1	26	-	288	1876:1840	402	71.7%
3/1	Cardiff Road (W) Ahead Left	U	N/A	N/A	E		1	57	-	629	1938	852	73.9%
3/2	Cardiff Road (W) Right	U	N/A	N/A	D		1	13	-	39	1865	198	19.7%
4/1	Millbrook Road Left	U	N/A	N/A	G		1	36	-	101	1935	542	18.6%
4/2	Millbrook Road Ahead Right	O	N/A	N/A	F		1	23	-	61	2003	355	17.2%
5/1		U	N/A	N/A	-		-	-	-	855	Inf	Inf	0.0%
6/1		U	N/A	N/A	-		-	-	-	152	Inf	Inf	0.0%
7/1		U	N/A	N/A	-		-	-	-	114	Inf	Inf	0.0%
8/1		U	N/A	N/A	-		-	-	-	612	Inf	Inf	0.0%

Full Input Data And Results

Item	Entering (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: Exisiting Situation	**-**	**-**	**153**	**1**	**1**	**17.5**	**4.5**	**0.1**	**22.1**	**-**	**-**	**-**	**-**
Unnamed Junction	**-**	**-**	**153**	**1**	**1**	**17.5**	**4.5**	**0.1**	**22.1**	**-**	**-**	**-**	**-**
1/1	584	584	-	-	-	5.4	1.4	-	6.8	41.8	18.0	1.4	19.4
1/2	31	31	-	-	-	0.5	0.2	-	0.7	80.0	1.1	0.2	1.3
2/1+2/2	288	288	133	1	1	3.9	1.2	0.1	5.1	64.3	8.9	1.2	10.1
3/1	629	629	-	-	-	5.4	1.4	-	6.8	38.7	19.0	1.4	20.4
3/2	39	39	-	-	-	0.6	0.1	-	0.7	65.2	1.3	0.1	1.4
4/1	101	101	-	-	-	1.0	0.1	-	1.1	40.2	2.8	0.1	2.9
4/2	61	61	20	0	0	0.8	0.1	0.0	0.9	52.7	1.9	0.1	2.0
5/1	855	855	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	152	152	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
7/1	114	114	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
8/1	612	612	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0

C1

PRC for Signalled Lanes (%): 21.8
PRC Over All Lanes (%): 21.8

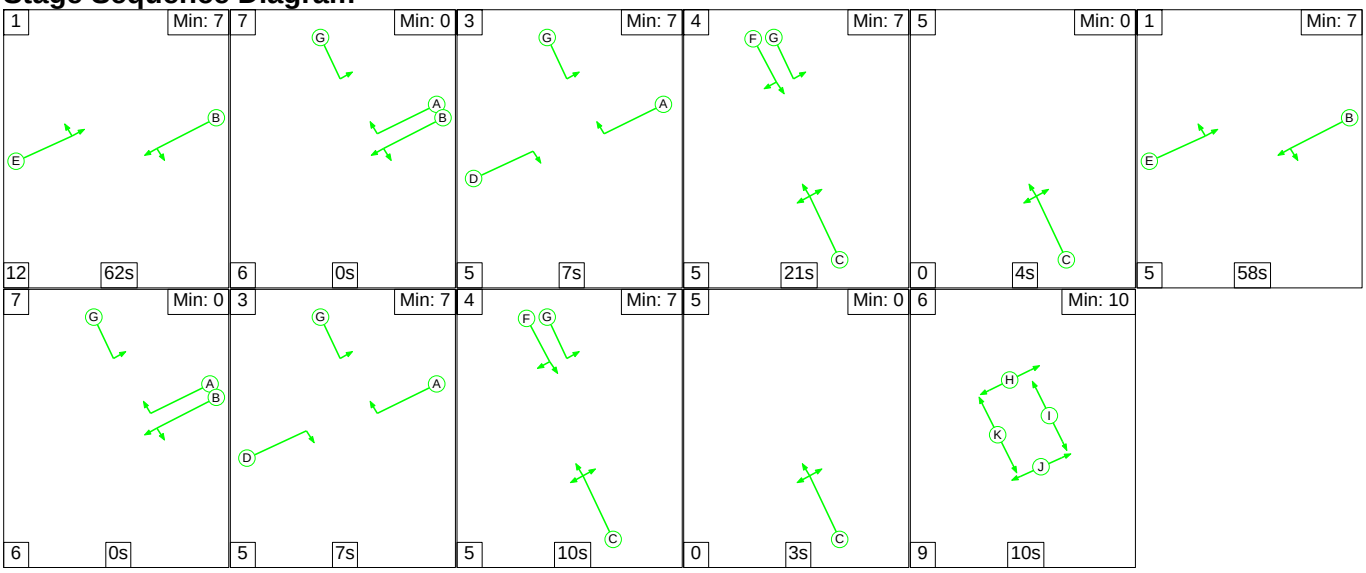
Total Delay for Signalled Lanes (pcuHr): 22.11
Total Delay Over All Lanes(pcuHr): 22.11

Cycle Time (s): 132

Full Input Data And Results

Scenario 2: '2008 PM Base' (FG2: '2008 PM Base', Plan 2: 'PM Staging')

Stage Sequence Diagram

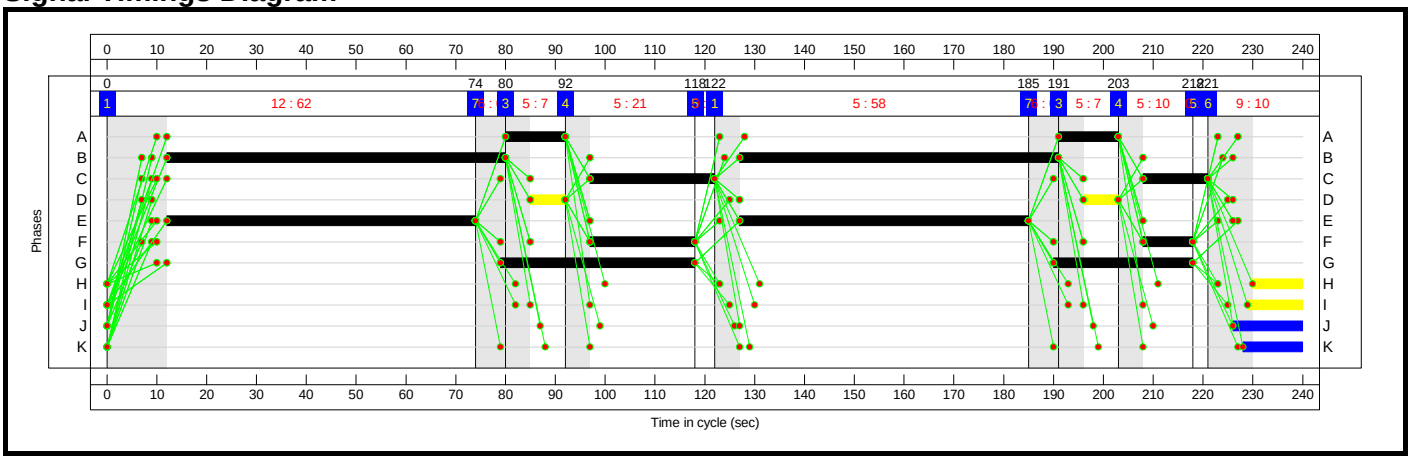


Stage Timings

Stage	1	7	3	4	5	1	7	3	4	5
Duration	62	0	7	21	4	58	0	7	10	3
Change Point	0	74	80	92	118	122	185	191	203	218

Stage	6									
Duration	10									
Change Point	221									

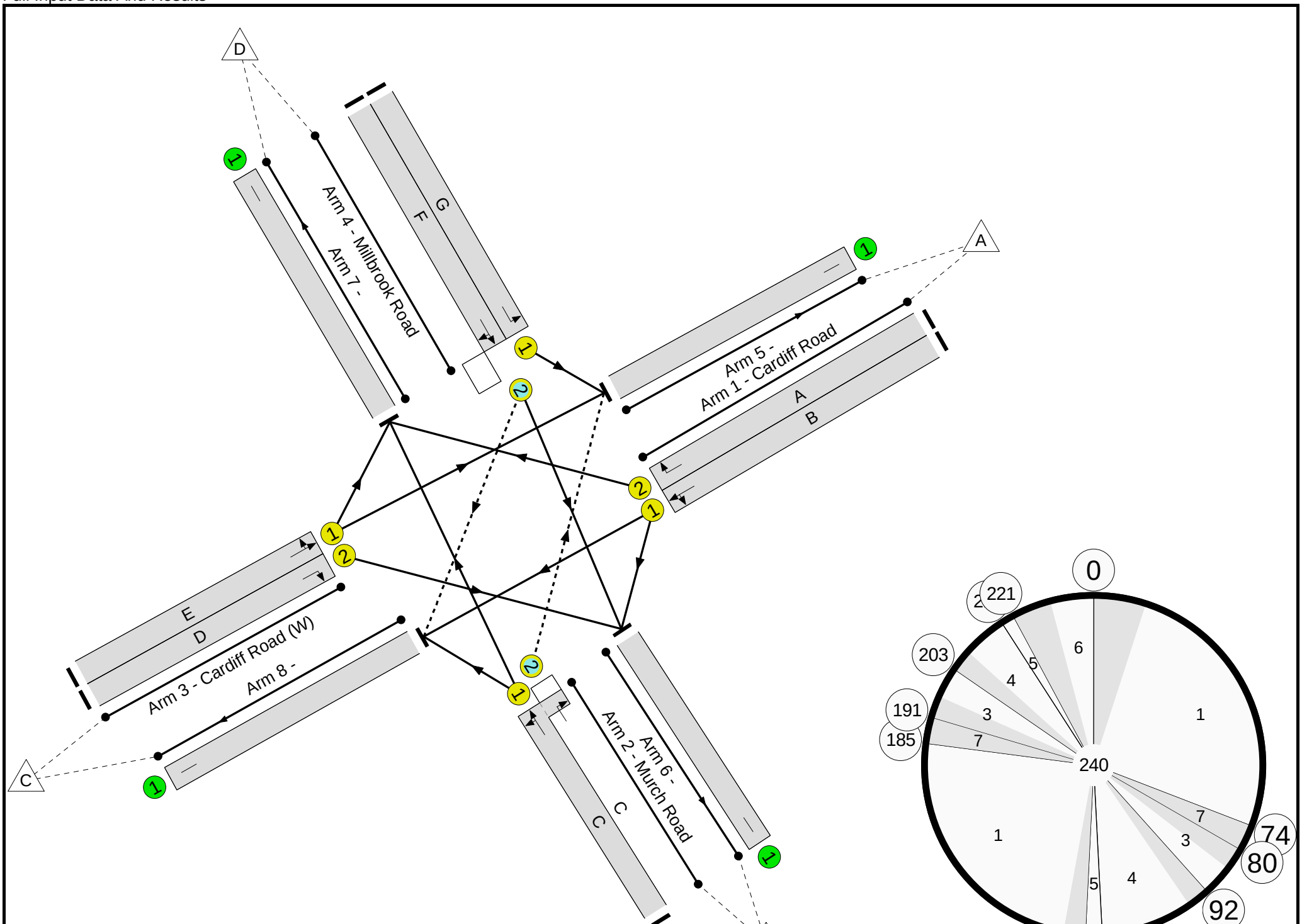
Signal Timings Diagram



Full Input Data And Results

Network Layout Diagram

Full Input Data And Results



Full Input Data And Results

Network Results

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network: Exisiting Situation	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**78.1%**
Unnamed Junction	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**78.1%**
1/1	Cardiff Road Left Ahead	U	N/A	N/A	B		2	132	-	866	1985	1108	78.1%
1/2	Cardiff Road Right	U	N/A	N/A	A		2	24	-	27	1935	210	12.9%
2/1+2/2	Murch Road Right Ahead Left	U+O	N/A	N/A	C		2	38	-	165	1855:1840	213	77.4%
3/1	Cardiff Road (W) Ahead Left	U	N/A	N/A	E		2	120	-	602	1940	986	61.0%
3/2	Cardiff Road (W) Right	U	N/A	N/A	D		2	14	-	34	1865	124	27.3%
4/1	Millbrook Road Left	U	N/A	N/A	G		2	67	-	64	1935	556	11.5%
4/2	Millbrook Road Ahead Right	O	N/A	N/A	F		2	31	-	167	2011	277	60.4%
5/1		U	N/A	N/A	-		-	-	-	757	Inf	Inf	0.0%
6/1		U	N/A	N/A	-		-	-	-	295	Inf	Inf	0.0%
7/1		U	N/A	N/A	-		-	-	-	58	Inf	Inf	0.0%
8/1		U	N/A	N/A	-		-	-	-	815	Inf	Inf	0.0%

Full Input Data And Results

Item	Entering (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: Exisiting Situation	**-**	**-**	**124**	**8**	**13**	**14.6**	**5.2**	**0.1**	**20.0**	**-**	**-**	**-**	**-**
Unnamed Junction	**-**	**-**	**124**	**8**	**13**	**14.6**	**5.2**	**0.1**	**20.0**	**-**	**-**	**-**	**-**
1/1	866	866	-	-	-	5.1	1.8	-	6.8	28.4	25.5	1.8	27.3
1/2	27	27	-	-	-	0.4	0.1	-	0.4	58.6	0.9	0.1	1.0
2/1+2/2	165	165	76	8	13	2.2	1.6	0.1	4.0	86.4	5.4	1.6	7.0
3/1	602	602	-	-	-	3.6	0.8	-	4.3	26.0	15.9	0.8	16.7
3/2	34	34	-	-	-	0.5	0.2	-	0.7	73.5	1.2	0.2	1.3
4/1	64	64	-	-	-	0.6	0.1	-	0.6	36.1	1.8	0.1	1.9
4/2	167	167	48	0	0	2.3	0.8	0.0	3.1	66.0	5.9	0.8	6.7
5/1	757	757	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	295	295	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
7/1	58	58	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
8/1	815	815	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0

C1

PRC for Signalled Lanes (%): 15.2
PRC Over All Lanes (%): 15.2

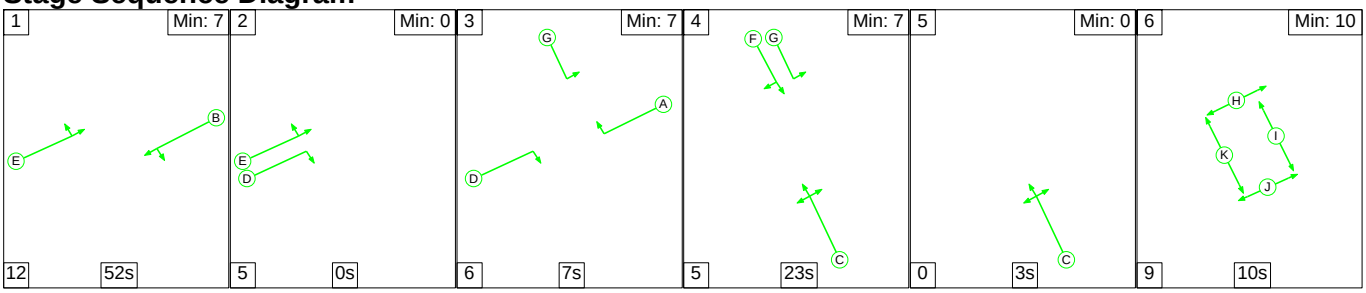
Total Delay for Signalled Lanes (pcuHr): 19.99
Total Delay Over All Lanes(pcuHr): 19.99

Cycle Time (s): 240

Full Input Data And Results

Scenario 3: '2020 AM Base' (FG3: '2020 AM Base', Plan 1: 'AM Staging')

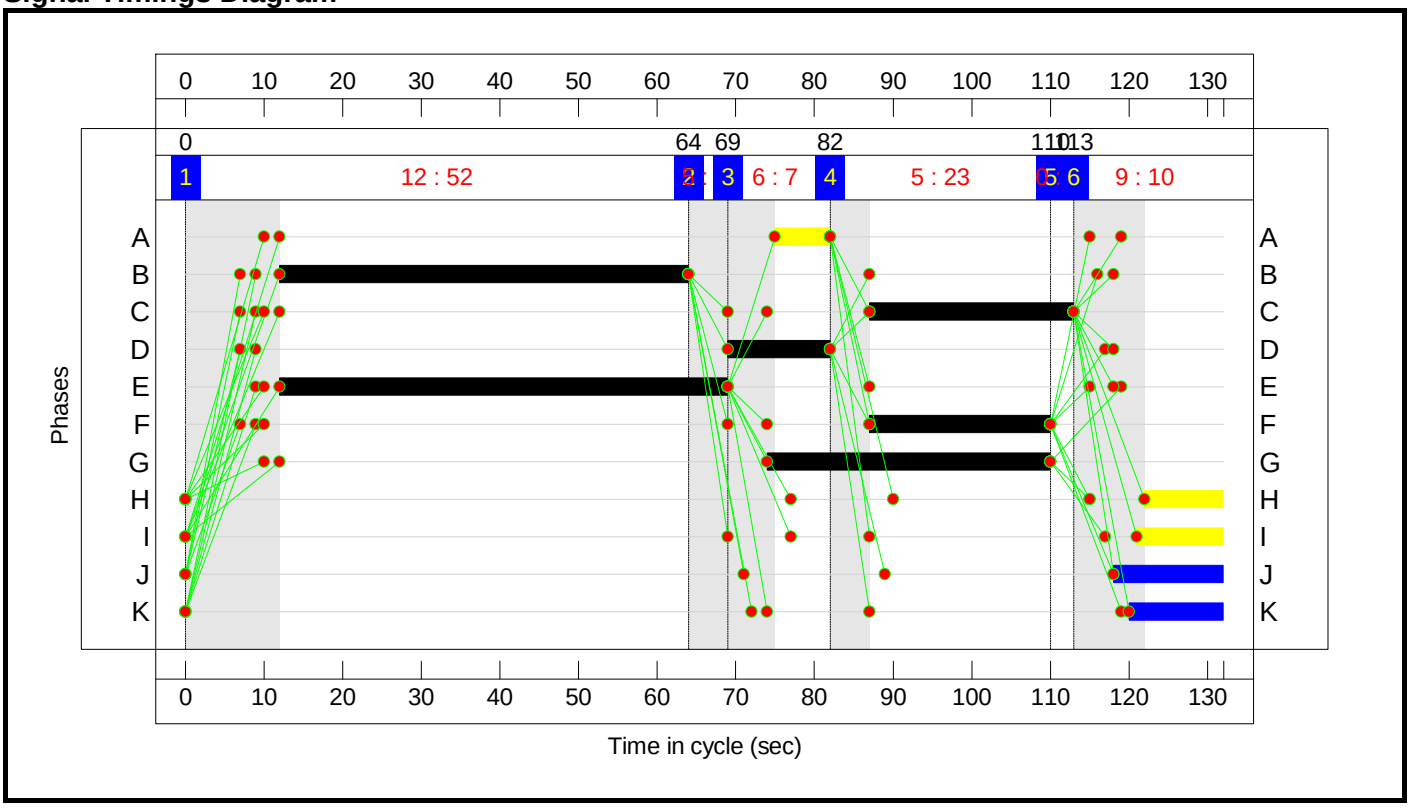
Stage Sequence Diagram



Stage Timings

Stage	1	2	3	4	5	6
Duration	52	0	7	23	3	10
Change Point	0	64	69	82	110	113

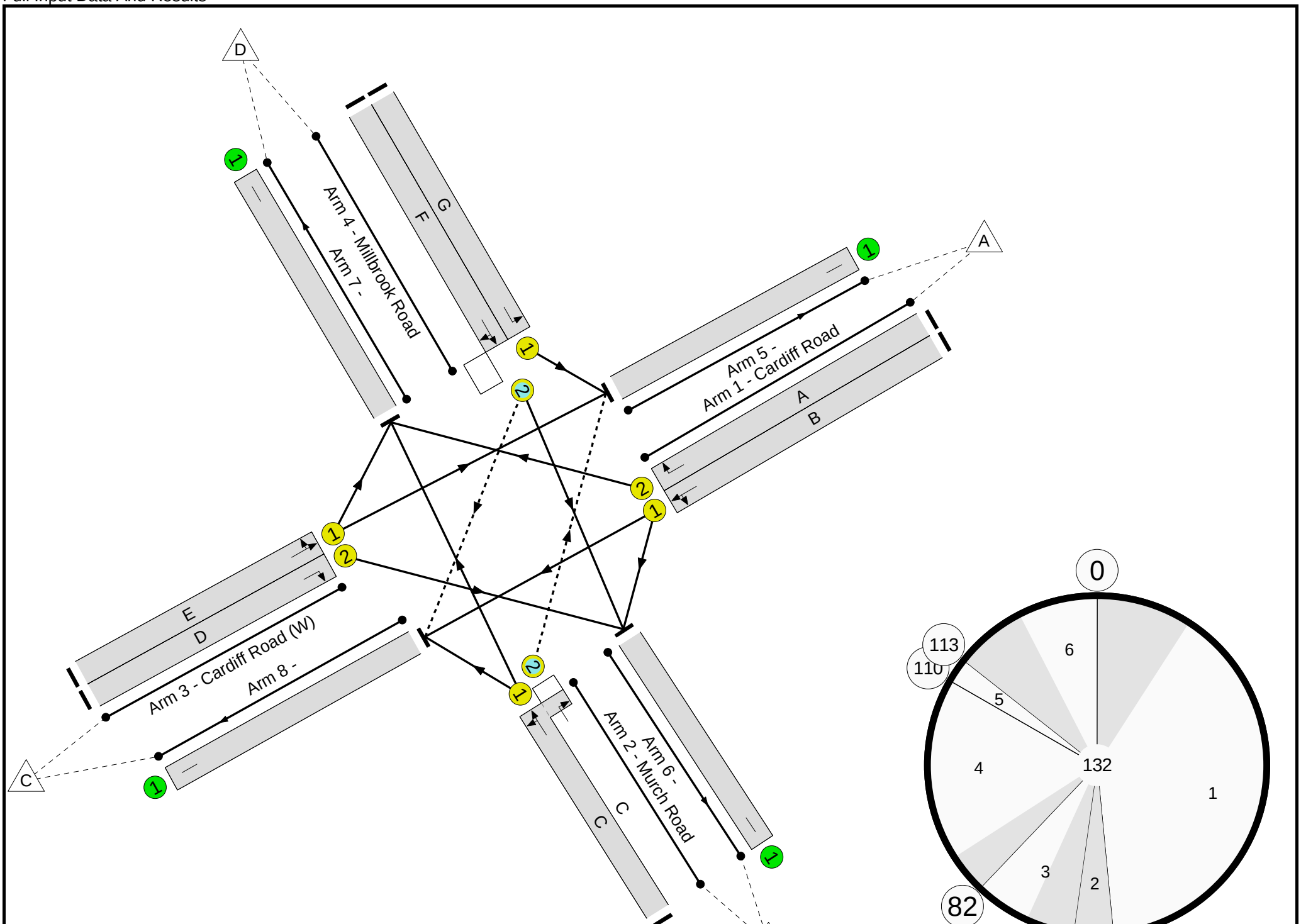
Signal Timings Diagram



Full Input Data And Results

Network Layout Diagram

Full Input Data And Results



Full Input Data And Results

Network Results

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network: Exisiting Situation	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**86.1%**
Unnamed Junction	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**86.1%**
1/1	Cardiff Road Left Ahead	U	N/A	N/A	B		1	52	-	681	1985	797	85.4%
1/2	Cardiff Road Right	U	N/A	N/A	A		1	7	-	36	1935	117	30.7%
2/1+2/2	Murch Road Right Ahead Left	U+O	N/A	N/A	C		1	26	-	335	1876:1840	391	85.6%
3/1	Cardiff Road (W) Ahead Left	U	N/A	N/A	E		1	57	-	733	1937	851	86.1%
3/2	Cardiff Road (W) Right	U	N/A	N/A	D		1	13	-	46	1865	198	23.3%
4/1	Millbrook Road Left	U	N/A	N/A	G		1	36	-	117	1935	542	21.6%
4/2	Millbrook Road Ahead Right	O	N/A	N/A	F		1	23	-	71	2004	347	20.4%
5/1		U	N/A	N/A	-		-	-	-	995	Inf	Inf	0.0%
6/1		U	N/A	N/A	-		-	-	-	178	Inf	Inf	0.0%
7/1		U	N/A	N/A	-		-	-	-	133	Inf	Inf	0.0%
8/1		U	N/A	N/A	-		-	-	-	713	Inf	Inf	0.0%

Full Input Data And Results

Item	Entering (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: Exisiting Situation	**-**	**-**	**178**	**1**	**1**	**21.6**	**9.1**	**0.1**	**30.8**	**-**	**-**	**-**	**-**
Unnamed Junction	**-**	**-**	**178**	**1**	**1**	**21.6**	**9.1**	**0.1**	**30.8**	**-**	**-**	**-**	**-**
1/1	681	681	-	-	-	6.8	2.8	-	9.6	50.8	22.7	2.8	25.5
1/2	36	36	-	-	-	0.6	0.2	-	0.8	81.4	1.3	0.2	1.5
2/1+2/2	335	335	155	1	1	4.7	2.7	0.1	7.4	79.8	10.8	2.7	13.6
3/1	733	733	-	-	-	6.8	3.0	-	9.7	47.9	24.2	3.0	27.2
3/2	46	46	-	-	-	0.7	0.2	-	0.8	65.9	1.5	0.2	1.7
4/1	117	117	-	-	-	1.2	0.1	-	1.3	40.6	3.3	0.1	3.4
4/2	71	71	23	0	0	0.9	0.1	0.0	1.1	53.3	2.2	0.1	2.3
5/1	995	995	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	178	178	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
7/1	133	133	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
8/1	713	713	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0

C1

PRC for Signalled Lanes (%): 4.5
PRC Over All Lanes (%): 4.5

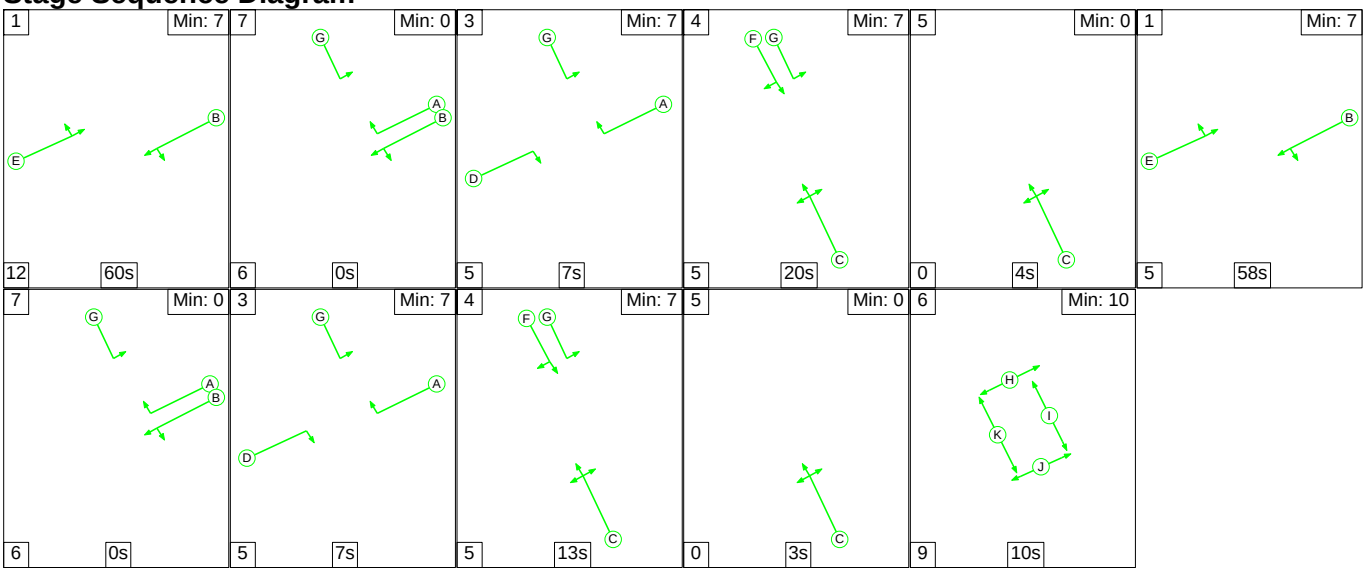
Total Delay for Signalled Lanes (pcuHr): 30.81
Total Delay Over All Lanes(pcuHr): 30.81

Cycle Time (s): 132

Full Input Data And Results

Scenario 4: '2020 PM Base' (FG4: '2020 PM Base', Plan 2: 'PM Staging')

Stage Sequence Diagram

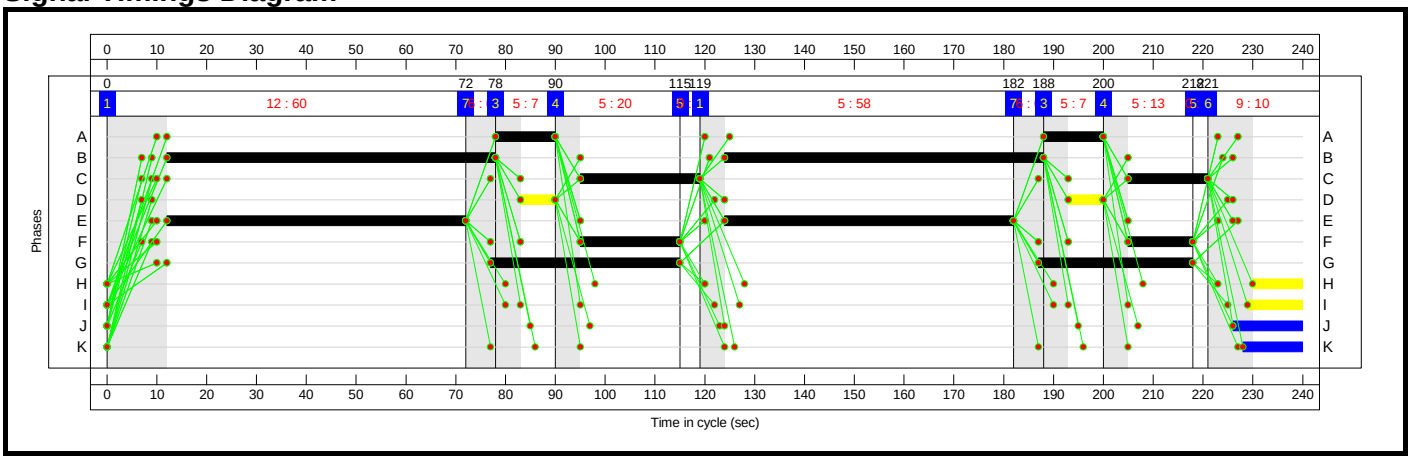


Stage Timings

Stage	1	7	3	4	5	1	7	3	4	5
Duration	60	0	7	20	4	58	0	7	13	3
Change Point	0	72	78	90	115	119	182	188	200	218

Stage	6									
Duration	10									
Change Point	221									

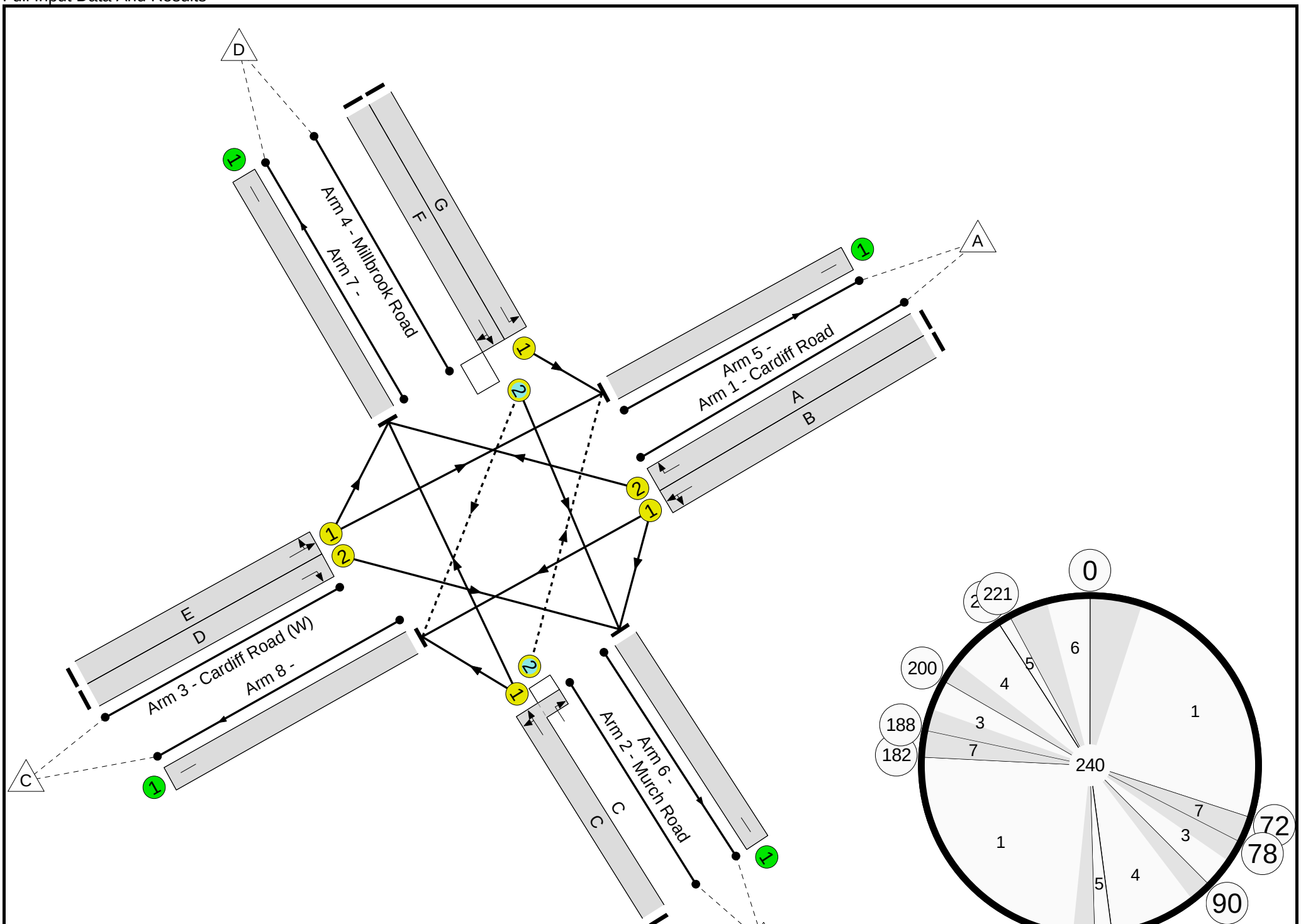
Signal Timings Diagram



Full Input Data And Results

Network Layout Diagram

Full Input Data And Results



Full Input Data And Results

Network Results

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network: Exisiting Situation	-	-	**N/A**	-	-		-	-	-	-	-	-	**92.9%**
Unnamed Junction	-	-	**N/A**	-	-		-	-	-	-	-	-	**92.9%**
1/1	Cardiff Road Left Ahead	U	N/A	N/A	B		2	130	-	1007	1985	1092	92.2%
1/2	Cardiff Road Right	U	N/A	N/A	A		2	24	-	31	1935	210	14.8%
2/1+2/2	Murch Road Right Ahead Left	U+O	N/A	N/A	C		2	40	-	191	1855:1840	206	92.9%
3/1	Cardiff Road (W) Ahead Left	U	N/A	N/A	E		2	118	-	700	1940	970	72.2%
3/2	Cardiff Road (W) Right	U	N/A	N/A	D		2	14	-	39	1865	124	31.4%
4/1	Millbrook Road Left	U	N/A	N/A	G		2	69	-	74	1935	572	12.9%
4/2	Millbrook Road Ahead Right	O	N/A	N/A	F		2	33	-	195	2011	293	66.5%
5/1		U	N/A	N/A	-		-	-	-	879	Inf	Inf	0.0%
6/1		U	N/A	N/A	-		-	-	-	343	Inf	Inf	0.0%
7/1		U	N/A	N/A	-		-	-	-	67	Inf	Inf	0.0%
8/1		U	N/A	N/A	-		-	-	-	948	Inf	Inf	0.0%

Full Input Data And Results

Item	Entering (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: Exisiting Situation	**-**	**-**	**129**	**23**	**16**	**18.7**	**12.1**	**0.1**	**31.0**	**-**	**-**	**-**	**-**
Unnamed Junction	**-**	**-**	**129**	**23**	**16**	**18.7**	**12.1**	**0.1**	**31.0**	**-**	**-**	**-**	**-**
1/1	1007	1007	-	-	-	7.1	5.3	-	12.4	44.2	35.5	5.3	40.8
1/2	31	31	-	-	-	0.4	0.1	-	0.5	59.0	1.0	0.1	1.1
2/1+2/2	191	191	73	23	16	2.7	4.2	0.1	6.9	130.9	6.5	4.2	10.7
3/1	700	700	-	-	-	4.7	1.3	-	6.0	30.6	20.8	1.3	22.1
3/2	39	39	-	-	-	0.6	0.2	-	0.8	74.8	1.3	0.2	1.6
4/1	74	74	-	-	-	0.7	0.1	-	0.7	35.3	2.1	0.1	2.2
4/2	195	195	56	0	0	2.7	1.0	0.0	3.7	67.4	6.9	1.0	7.9
5/1	879	879	-	-	-	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
7/1	67	67	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
8/1	948	948	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0

C1

PRC for Signalled Lanes (%): -3.2
PRC Over All Lanes (%): -3.2

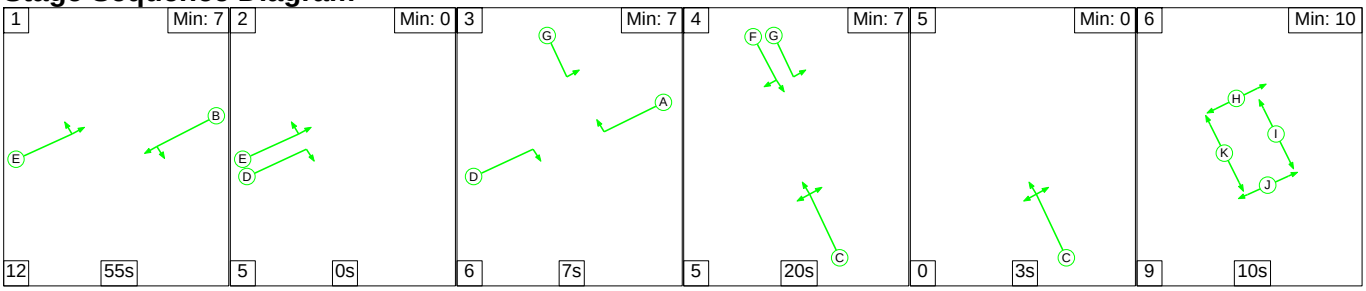
Total Delay for Signalled Lanes (pcuHr): 30.96
Total Delay Over All Lanes(pcuHr): 30.96

Cycle Time (s): 240

Full Input Data And Results

Scenario 5: '2020 AM Dev + BI' (FG5: '2020 AM Dev + BI', Plan 1: 'AM Staging')

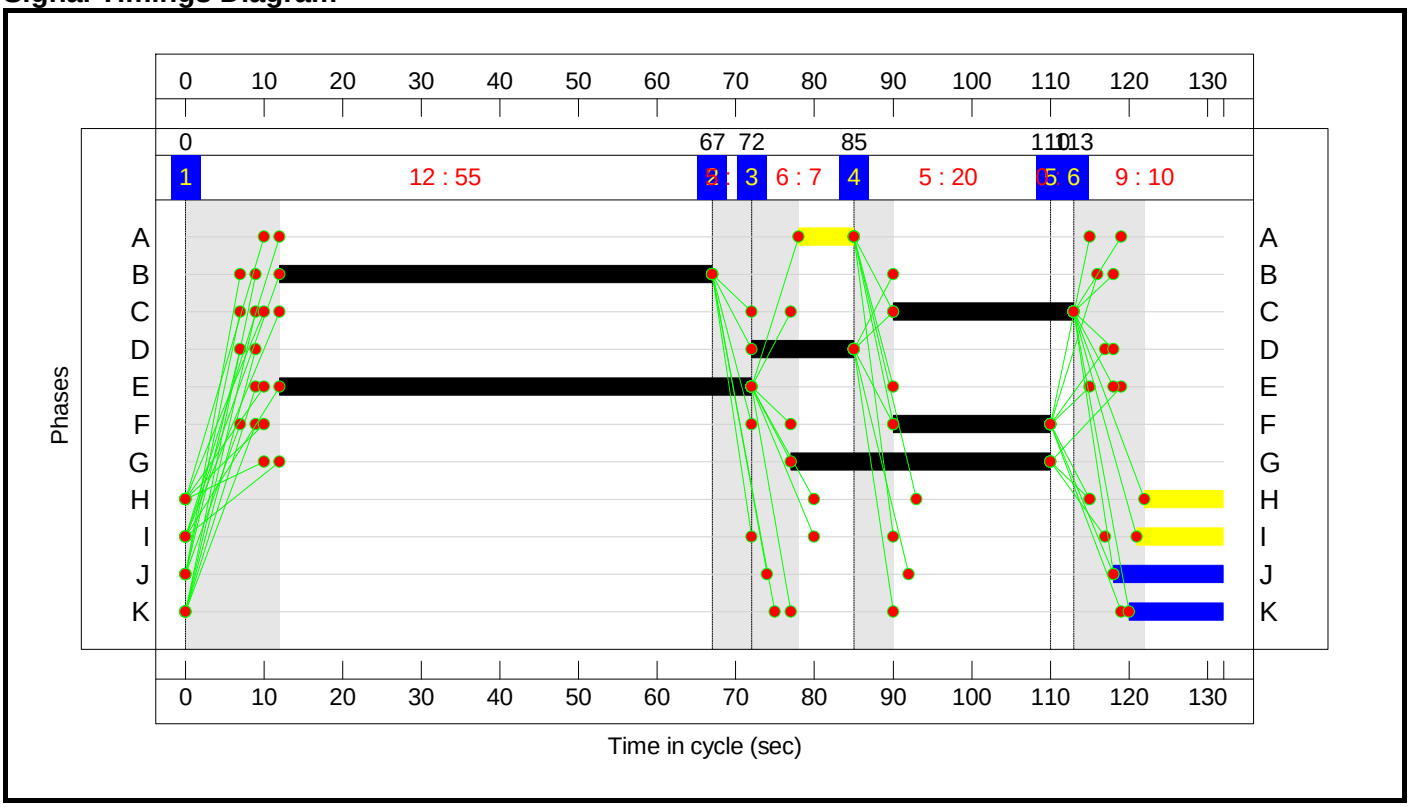
Stage Sequence Diagram



Stage Timings

Stage	1	2	3	4	5	6
Duration	55	0	7	20	3	10
Change Point	0	67	72	85	110	113

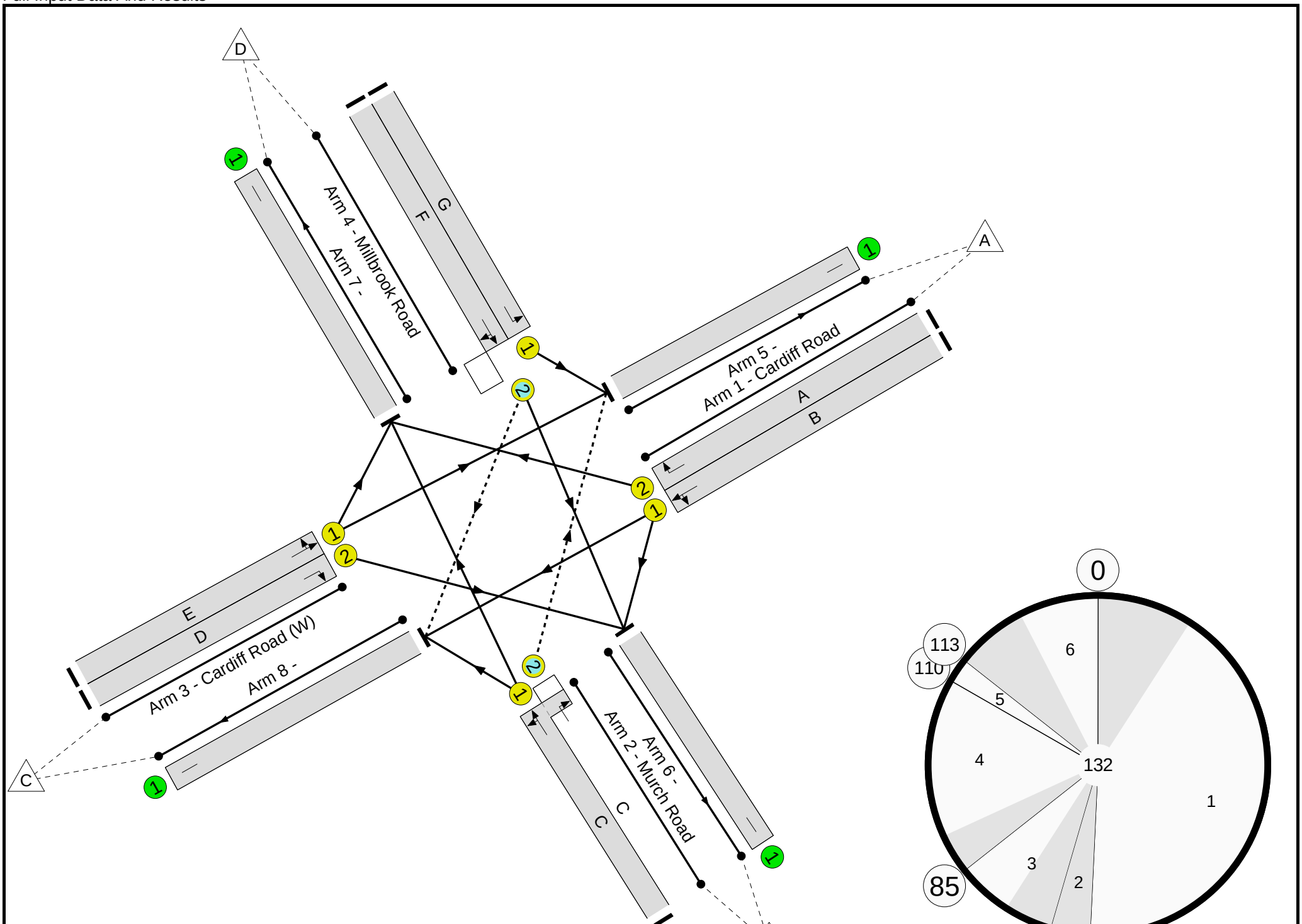
Signal Timings Diagram



Full Input Data And Results

Network Layout Diagram

Full Input Data And Results



Full Input Data And Results

Network Results

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network: Exisiting Situation	-	-	**N/A**	-	-		-	-	-	-	-	-	**99.0%**
Unnamed Junction	-	-	**N/A**	-	-		-	-	-	-	-	-	**99.0%**
1/1	Cardiff Road Left Ahead	U	N/A	N/A	B		1	55	-	713	1985	842	84.7%
1/2	Cardiff Road Right	U	N/A	N/A	A		1	7	-	36	1935	117	30.7%
2/1+2/2	Murch Road Right Ahead Left	U+O	N/A	N/A	C		1	23	-	338	1875:1840	350	96.6%
3/1	Cardiff Road (W) Ahead Left	U	N/A	N/A	E		1	60	-	887	1938	896	99.0%
3/2	Cardiff Road (W) Right	U	N/A	N/A	D		1	13	-	48	1865	198	24.3%
4/1	Millbrook Road Left	U	N/A	N/A	G		1	33	-	117	1935	498	23.5%
4/2	Millbrook Road Ahead Right	O	N/A	N/A	F		1	20	-	73	2001	300	24.4%
5/1		U	N/A	N/A	-		-	-	-	1147	Inf	Inf	0.0%
6/1		U	N/A	N/A	-		-	-	-	180	Inf	Inf	0.0%
7/1		U	N/A	N/A	-		-	-	-	135	Inf	Inf	0.0%
8/1		U	N/A	N/A	-		-	-	-	750	Inf	Inf	0.0%

Full Input Data And Results

Item	Entering (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: Exisiting Situation	**-**	**-**	**176**	**5**	**1**	**24.0**	**22.9**	**0.1**	**47.0**	**-**	**-**	**-**	**-**
Unnamed Junction	**-**	**-**	**176**	**5**	**1**	**24.0**	**22.9**	**0.1**	**47.0**	**-**	**-**	**-**	**-**
1/1	713	713	-	-	-	6.8	2.7	-	9.4	47.5	23.4	2.7	26.0
1/2	36	36	-	-	-	0.6	0.2	-	0.8	81.4	1.3	0.2	1.5
2/1+2/2	338	338	151	5	1	5.0	6.7	0.1	11.7	124.7	11.3	6.7	18.0
3/1	887	887	-	-	-	8.7	12.9	-	21.6	87.6	32.0	12.9	44.9
3/2	48	48	-	-	-	0.7	0.2	-	0.9	66.1	1.6	0.2	1.8
4/1	117	117	-	-	-	1.3	0.2	-	1.4	43.4	3.4	0.2	3.5
4/2	73	73	25	0	0	1.0	0.2	0.0	1.2	57.5	2.3	0.2	2.5
5/1	1147	1147	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	180	180	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
7/1	135	135	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
8/1	750	750	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0

C1

PRC for Signalled Lanes (%): -10.0
PRC Over All Lanes (%): -10.0

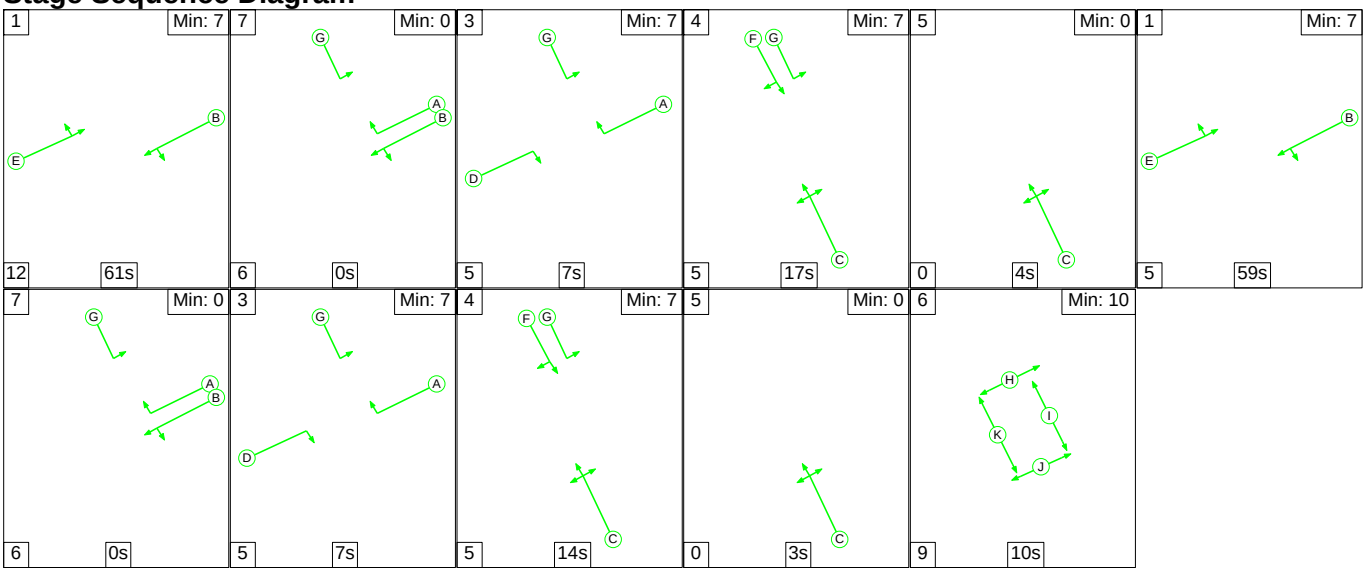
Total Delay for Signalled Lanes (pcuHr): 46.97
Total Delay Over All Lanes(pcuHr): 46.97

Cycle Time (s): 132

Full Input Data And Results

Scenario 6: '2020 PM Dev + BI' (FG6: '2020 PM Dev + BI', Plan 2: 'PM Staging')

Stage Sequence Diagram

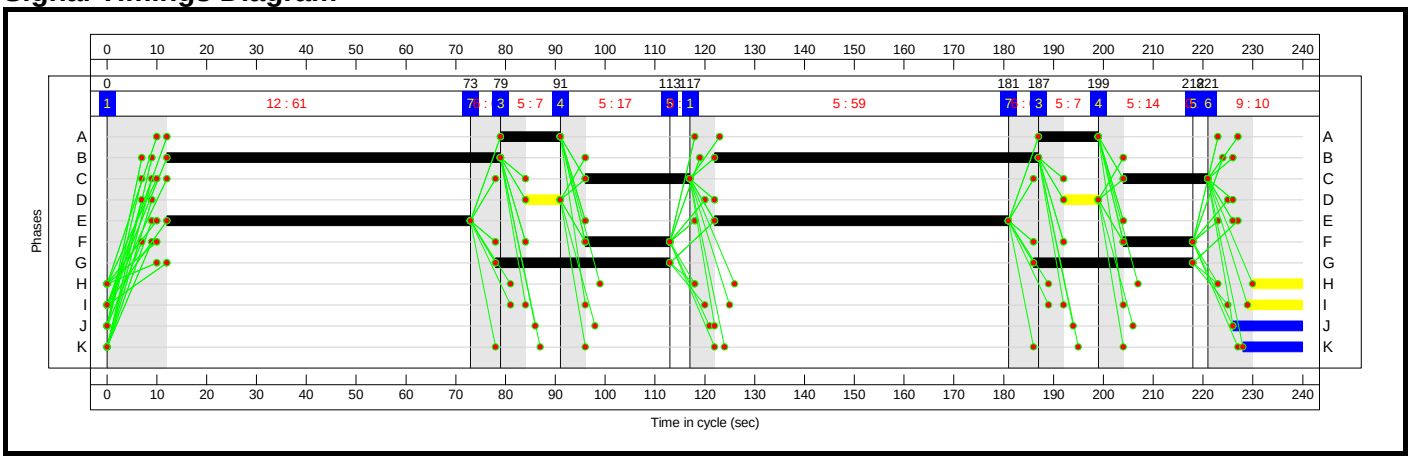


Stage Timings

Stage	1	7	3	4	5	1	7	3	4	5
Duration	61	0	7	17	4	59	0	7	14	3
Change Point	0	73	79	91	113	117	181	187	199	218

Stage	6									
Duration	10									
Change Point	221									

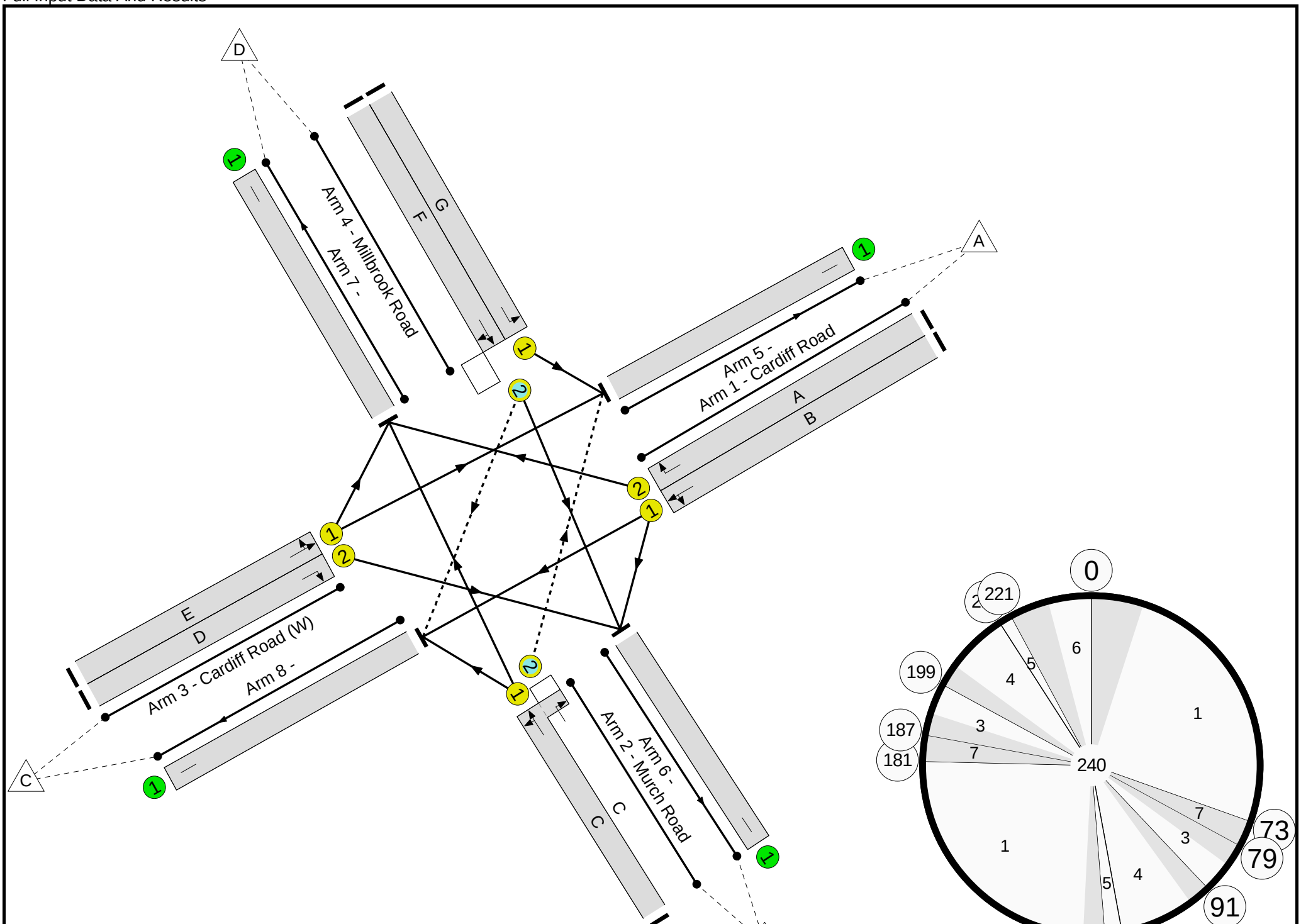
Signal Timings Diagram



Full Input Data And Results

Network Layout Diagram

Full Input Data And Results



Full Input Data And Results

Network Results

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network: Exisiting Situation	-	-	**N/A**	-	-		-	-	-	-	-	-	**105.2%**
Unnamed Junction	-	-	**N/A**	-	-		-	-	-	-	-	-	**105.2%**
1/1	Cardiff Road Left Ahead	U	N/A	N/A	B		2	132	-	1162	1985	1108	104.8%
1/2	Cardiff Road Right	U	N/A	N/A	A		2	24	-	31	1935	210	14.8%
2/1+2/2	Murch Road Right Ahead Left	U+O	N/A	N/A	C		2	38	-	194	1852:1840	184	105.2%
3/1	Cardiff Road (W) Ahead Left	U	N/A	N/A	E		2	120	-	746	1939	986	75.7%
3/2	Cardiff Road (W) Right	U	N/A	N/A	D		2	14	-	43	1865	124	34.6%
4/1	Millbrook Road Left	U	N/A	N/A	G		2	67	-	74	1935	556	13.3%
4/2	Millbrook Road Ahead Right	O	N/A	N/A	F		2	31	-	198	2009	276	71.7%
5/1		U	N/A	N/A	-		-	-	-	922	Inf	Inf	0.0%
6/1		U	N/A	N/A	-		-	-	-	347	Inf	Inf	0.0%
7/1		U	N/A	N/A	-		-	-	-	70	Inf	Inf	0.0%
8/1		U	N/A	N/A	-		-	-	-	1109	Inf	Inf	0.0%

Full Input Data And Results

Item	Entering (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: Exisiting Situation	**-**	**-**	**119**	**23**	**24**	**29.2**	**48.1**	**0.1**	**77.4**	**-**	**-**	**-**	**-**
Unnamed Junction	**-**	**-**	**119**	**23**	**24**	**29.2**	**48.1**	**0.1**	**77.4**	**-**	**-**	**-**	**-**
1/1	1162	1108	-	-	-	15.9	35.1	-	51.0	158.0	46.2	35.1	81.3
1/2	31	31	-	-	-	0.4	0.1	-	0.5	59.2	1.0	0.1	1.1
2/1+2/2	194	184	60	23	24	3.7	9.7	0.1	13.6	252.4	7.3	9.7	17.0
3/1	746	746	-	-	-	5.1	1.5	-	6.6	31.8	23.4	1.5	25.0
3/2	43	43	-	-	-	0.6	0.3	-	0.9	76.1	1.5	0.3	1.8
4/1	74	74	-	-	-	0.7	0.1	-	0.7	36.2	2.1	0.1	2.2
4/2	198	198	59	0	0	2.8	1.2	0.0	4.0	72.8	7.1	1.2	8.3
5/1	916	916	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	339	339	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
7/1	69	69	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
8/1	1060	1060	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0

C1

PRC for Signalled Lanes (%): -16.9
PRC Over All Lanes (%): -16.9

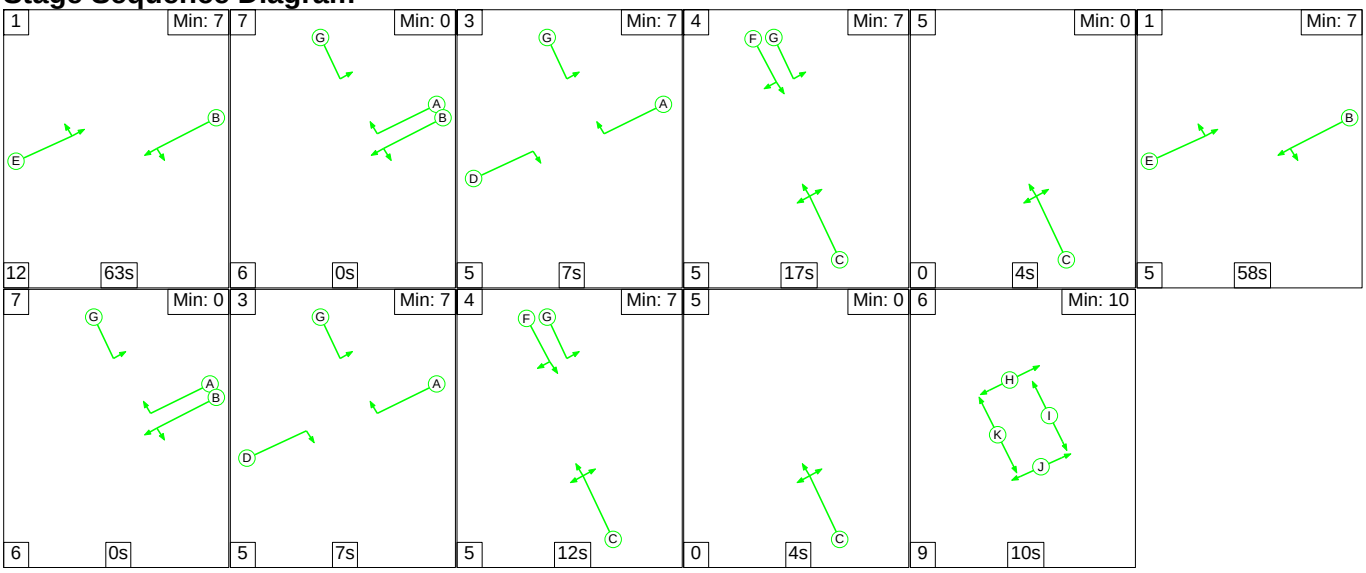
Total Delay for Signalled Lanes (pcuHr): 77.37
Total Delay Over All Lanes(pcuHr): 77.37

Cycle Time (s): 240

Full Input Data And Results

Scenario 7: '2020 PM Dev + BI + Tourism' (FG7: '2020 PM Dev + BI + Tourism', Plan 2: 'PM Staging')

Stage Sequence Diagram

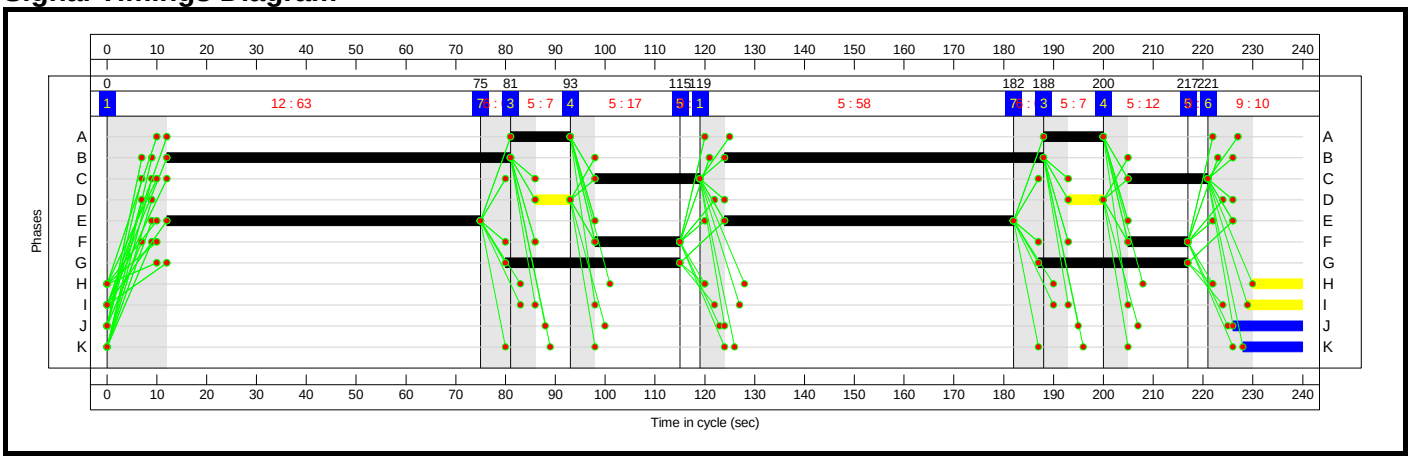


Stage Timings

Stage	1	7	3	4	5	1	7	3	4	5
Duration	63	0	7	17	4	58	0	7	12	4
Change Point	0	75	81	93	115	119	182	188	200	217

Stage	6									
Duration	10									
Change Point	221									

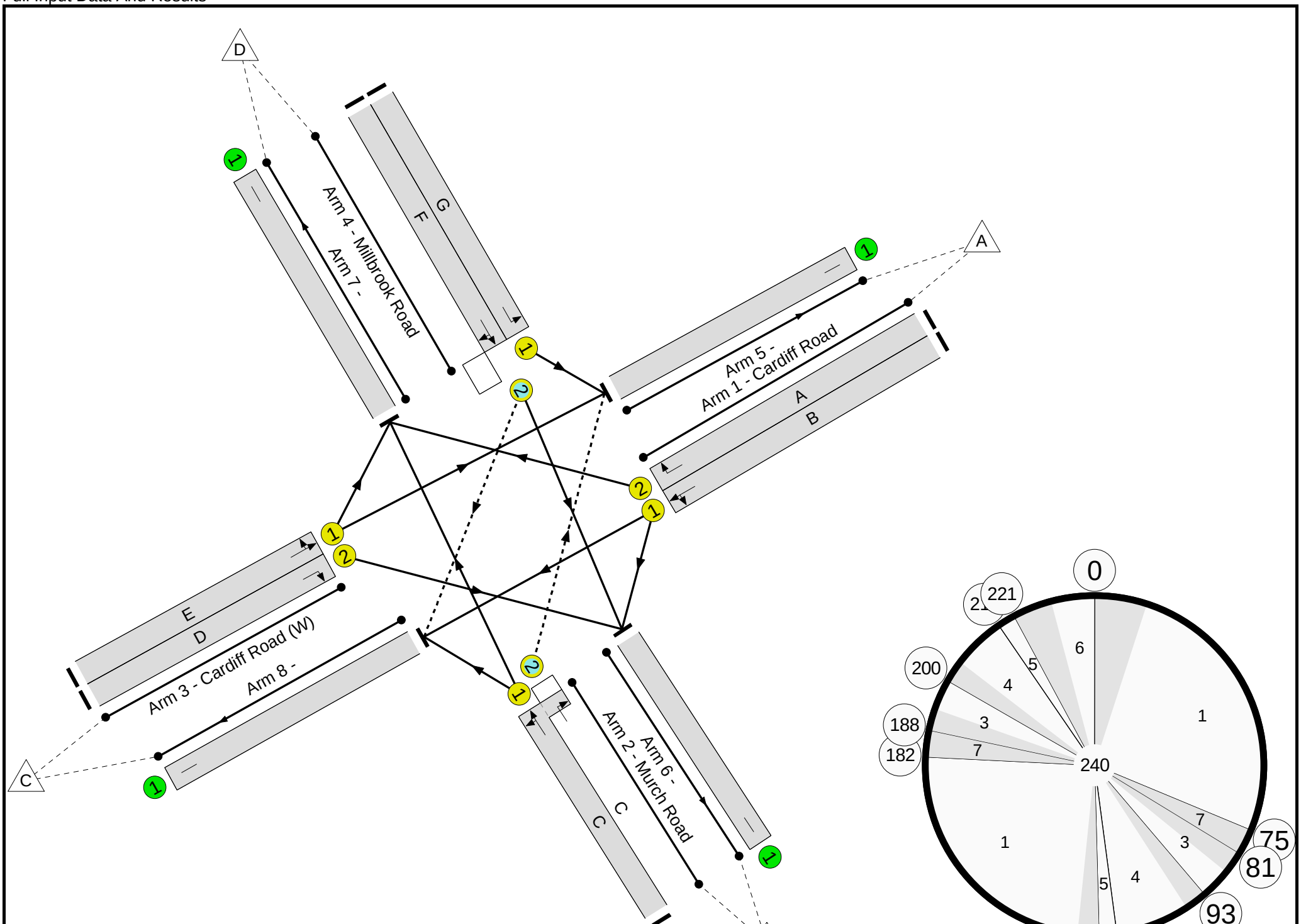
Signal Timings Diagram



Full Input Data And Results

Network Layout Diagram

Full Input Data And Results



Full Input Data And Results

Network Results

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network: Exisiting Situation	-	-	**N/A**	-	-		-	-	-	-	-	-	**113.2%**
Unnamed Junction	-	-	**N/A**	-	-		-	-	-	-	-	-	**113.2%**
1/1	Cardiff Road Left Ahead	U	N/A	N/A	B		2	133	-	1264	1985	1117	113.2%
1/2	Cardiff Road Right	U	N/A	N/A	A		2	24	-	31	1935	210	14.8%
2/1+2/2	Murch Road Right Ahead Left	U+O	N/A	N/A	C		2	37	-	194	1852:1840	177	109.7%
3/1	Cardiff Road (W) Ahead Left	U	N/A	N/A	E		2	121	-	860	1940	994	86.5%
3/2	Cardiff Road (W) Right	U	N/A	N/A	D		2	14	-	43	1865	124	34.6%
4/1	Millbrook Road Left	U	N/A	N/A	G		2	65	-	74	1935	540	13.7%
4/2	Millbrook Road Ahead Right	O	N/A	N/A	F		2	29	-	198	2009	259	76.3%
5/1		U	N/A	N/A	-		-	-	-	1036	Inf	Inf	0.0%
6/1		U	N/A	N/A	-		-	-	-	347	Inf	Inf	0.0%
7/1		U	N/A	N/A	-		-	-	-	70	Inf	Inf	0.0%
8/1		U	N/A	N/A	-		-	-	-	1211	Inf	Inf	0.0%

Full Input Data And Results

Item	Entering (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: Exisiting Situation	**-**	**-**	**109**	**31**	**22**	**43.7**	**95.3**	**0.1**	**139.2**	**-**	**-**	**-**	**-**
Unnamed Junction	**-**	**-**	**109**	**31**	**22**	**43.7**	**95.3**	**0.1**	**139.2**	**-**	**-**	**-**	**-**
1/1	1264	1117	-	-	-	28.0	77.8	-	105.8	301.4	58.3	77.8	136.0
1/2	31	31	-	-	-	0.4	0.1	-	0.5	59.3	1.0	0.1	1.1
2/1+2/2	194	177	50	31	22	4.8	12.5	0.1	17.4	323.4	8.1	12.5	20.6
3/1	860	860	-	-	-	6.3	3.1	-	9.4	39.3	29.4	3.1	32.4
3/2	43	43	-	-	-	0.6	0.3	-	0.9	76.2	1.5	0.3	1.8
4/1	74	74	-	-	-	0.7	0.1	-	0.8	37.3	2.2	0.1	2.3
4/2	198	198	59	0	0	2.8	1.5	0.0	4.4	79.6	7.3	1.5	8.8
5/1	1026	1026	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	328	328	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
7/1	67	67	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
8/1	1078	1078	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0

C1

PRC for Signalled Lanes (%): -25.8
PRC Over All Lanes (%): -25.8

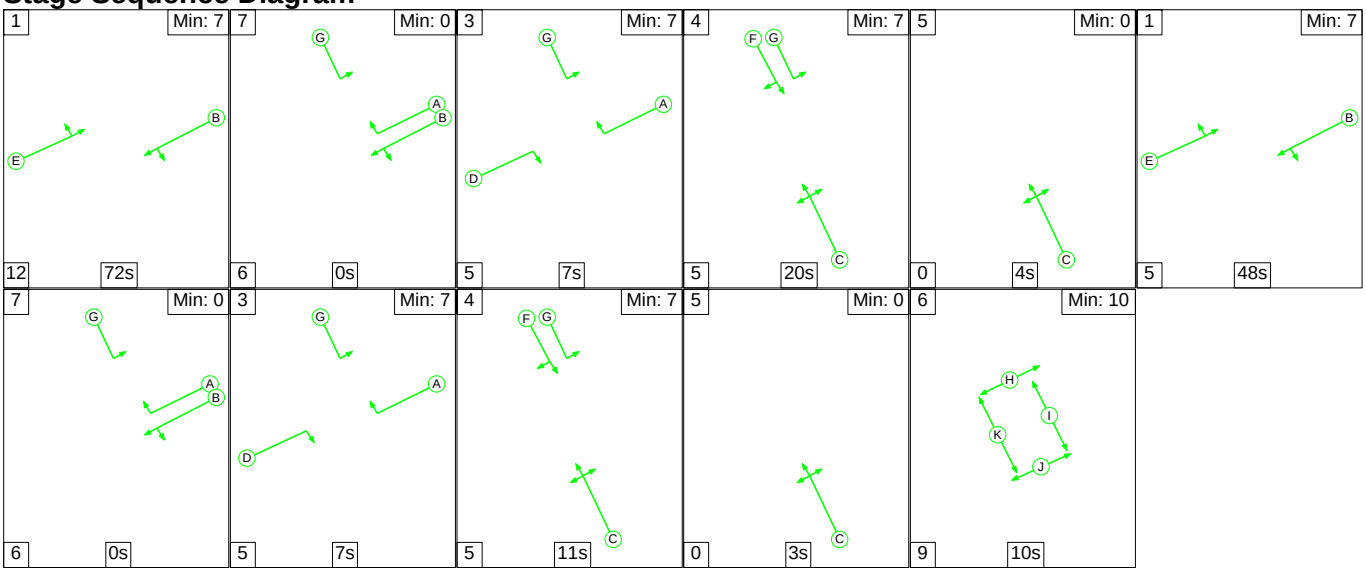
Total Delay for Signalled Lanes (pcuHr): 139.18
Total Delay Over All Lanes(pcuHr): 139.18

Cycle Time (s): 240

Full Input Data And Results

Scenario 8: '2020 PM Base + Tourism' (FG8: '2020 PM Base + Tourism', Plan 2: 'PM Staging')

Stage Sequence Diagram

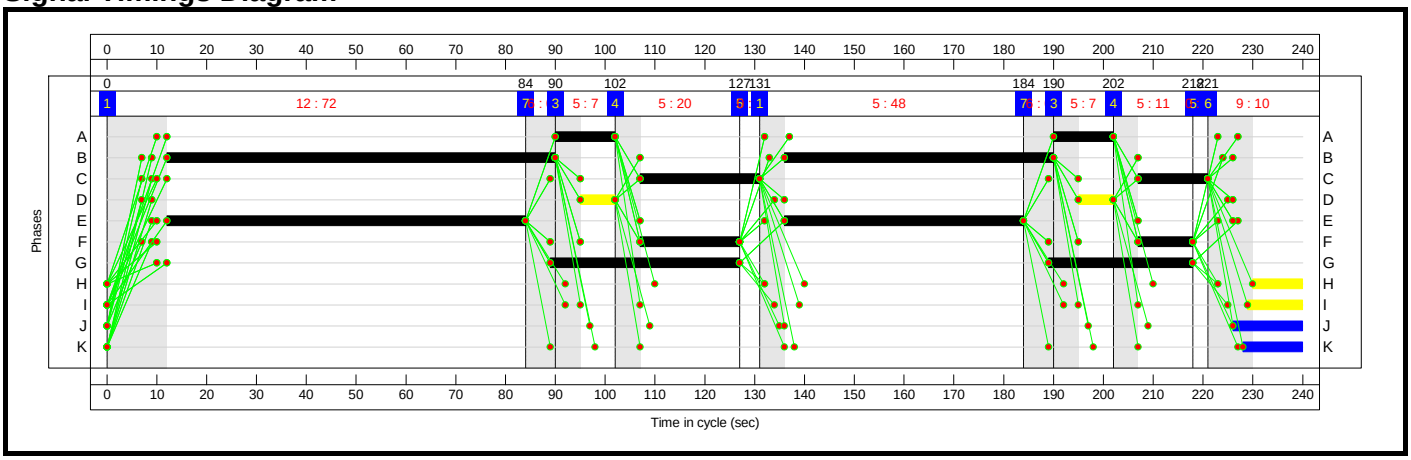


Stage Timings

Stage	1	7	3	4	5	1	7	3	4	5
Duration	72	0	7	20	4	48	0	7	11	3
Change Point	0	84	90	102	127	131	184	190	202	218

Stage	6									
Duration	10									
Change Point	221									

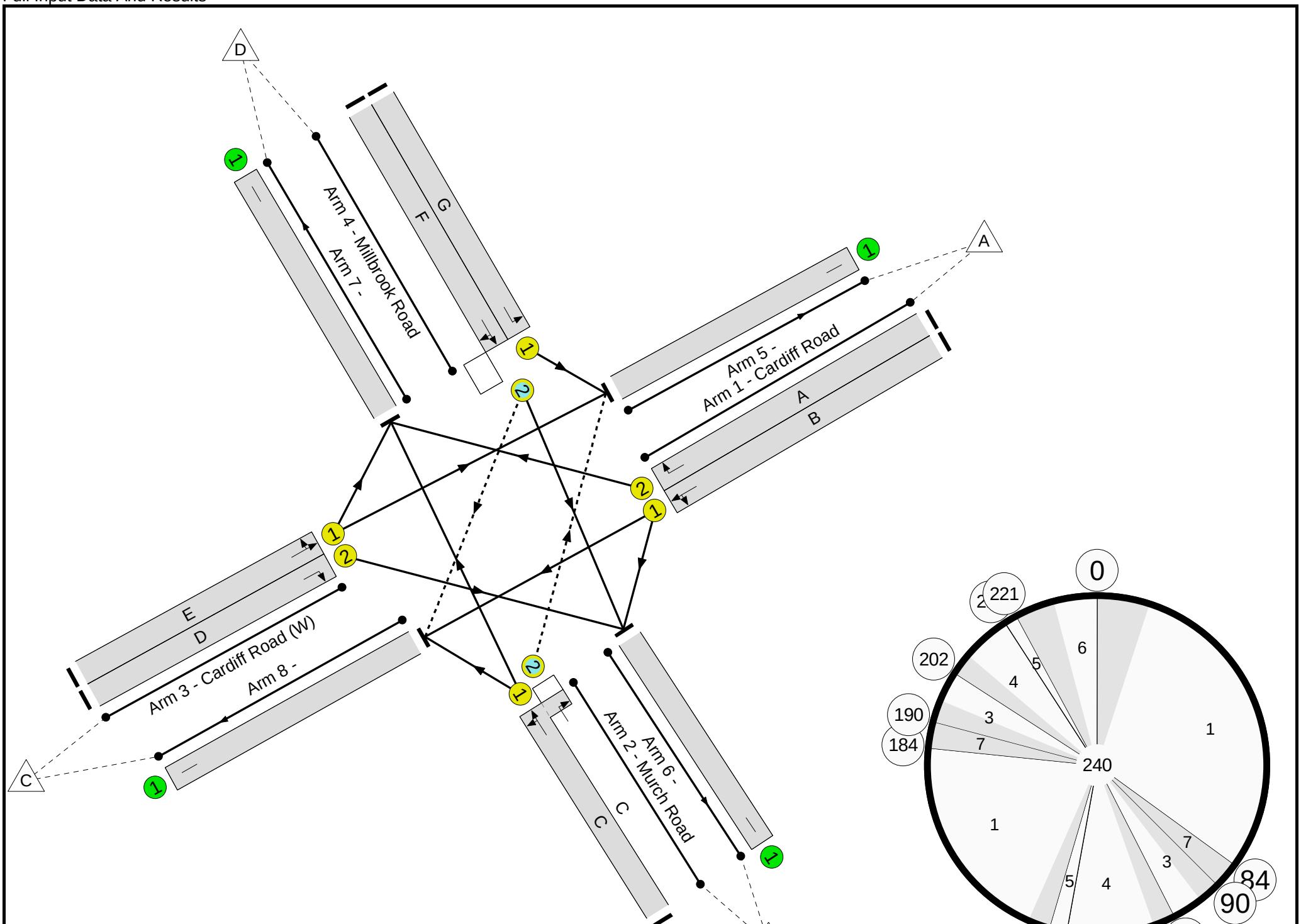
Signal Timings Diagram



Full Input Data And Results

Network Layout Diagram

Full Input Data And Results



Full Input Data And Results

Network Results

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network: Exisiting Situation	-	-	**N/A**	-	-		-	-	-	-	-	-	**100.4%**
Unnamed Junction	-	-	**N/A**	-	-		-	-	-	-	-	-	**100.4%**
1/1	Cardiff Road Left Ahead	U	N/A	N/A	B		2	132	-	1109	1985	1108	100.1%
1/2	Cardiff Road Right	U	N/A	N/A	A		2	24	-	31	1935	210	14.8%
2/1+2/2	Murch Road Right Ahead Left	U+O	N/A	N/A	C		2	38	-	191	1855:1840	190	100.4%
3/1	Cardiff Road (W) Ahead Left	U	N/A	N/A	E		2	120	-	814	1941	987	82.5%
3/2	Cardiff Road (W) Right	U	N/A	N/A	D		2	14	-	39	1865	124	31.4%
4/1	Millbrook Road Left	U	N/A	N/A	G		2	67	-	74	1935	556	13.3%
4/2	Millbrook Road Ahead Right	O	N/A	N/A	F		2	31	-	195	2011	277	70.5%
5/1		U	N/A	N/A	-		-	-	-	993	Inf	Inf	0.0%
6/1		U	N/A	N/A	-		-	-	-	343	Inf	Inf	0.0%
7/1		U	N/A	N/A	-		-	-	-	67	Inf	Inf	0.0%
8/1		U	N/A	N/A	-		-	-	-	1050	Inf	Inf	0.0%

Full Input Data And Results

Item	Entering (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: Exisiting Situation	**-**	**-**	**118**	**23**	**27**	**22.0**	**27.8**	**0.1**	**49.9**	**-**	**-**	**-**	**-**
Unnamed Junction	**-**	**-**	**118**	**23**	**27**	**22.0**	**27.8**	**0.1**	**49.9**	**-**	**-**	**-**	**-**
1/1	1109	1108	-	-	-	8.7	16.8	-	25.5	82.9	43.7	16.8	60.5
1/2	31	31	-	-	-	0.4	0.1	-	0.5	60.3	1.1	0.1	1.2
2/1+2/2	191	190	62	23	27	3.0	7.1	0.1	10.2	192.9	7.3	7.1	14.4
3/1	814	814	-	-	-	5.8	2.3	-	8.0	35.6	26.0	2.3	28.3
3/2	39	39	-	-	-	0.6	0.2	-	0.8	76.1	1.5	0.2	1.7
4/1	74	74	-	-	-	0.7	0.1	-	0.8	38.0	2.3	0.1	2.4
4/2	195	195	56	0	0	2.8	1.2	0.0	4.0	73.8	7.6	1.2	8.8
5/1	993	993	-	-	-	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
7/1	67	67	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
8/1	1049	1049	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0

C1

PRC for Signalled Lanes (%): -11.5
PRC Over All Lanes (%): -11.5

Total Delay for Signalled Lanes (pcuHr): 49.94
Total Delay Over All Lanes(pcuHr): 49.94

Cycle Time (s): 240

Appendix C

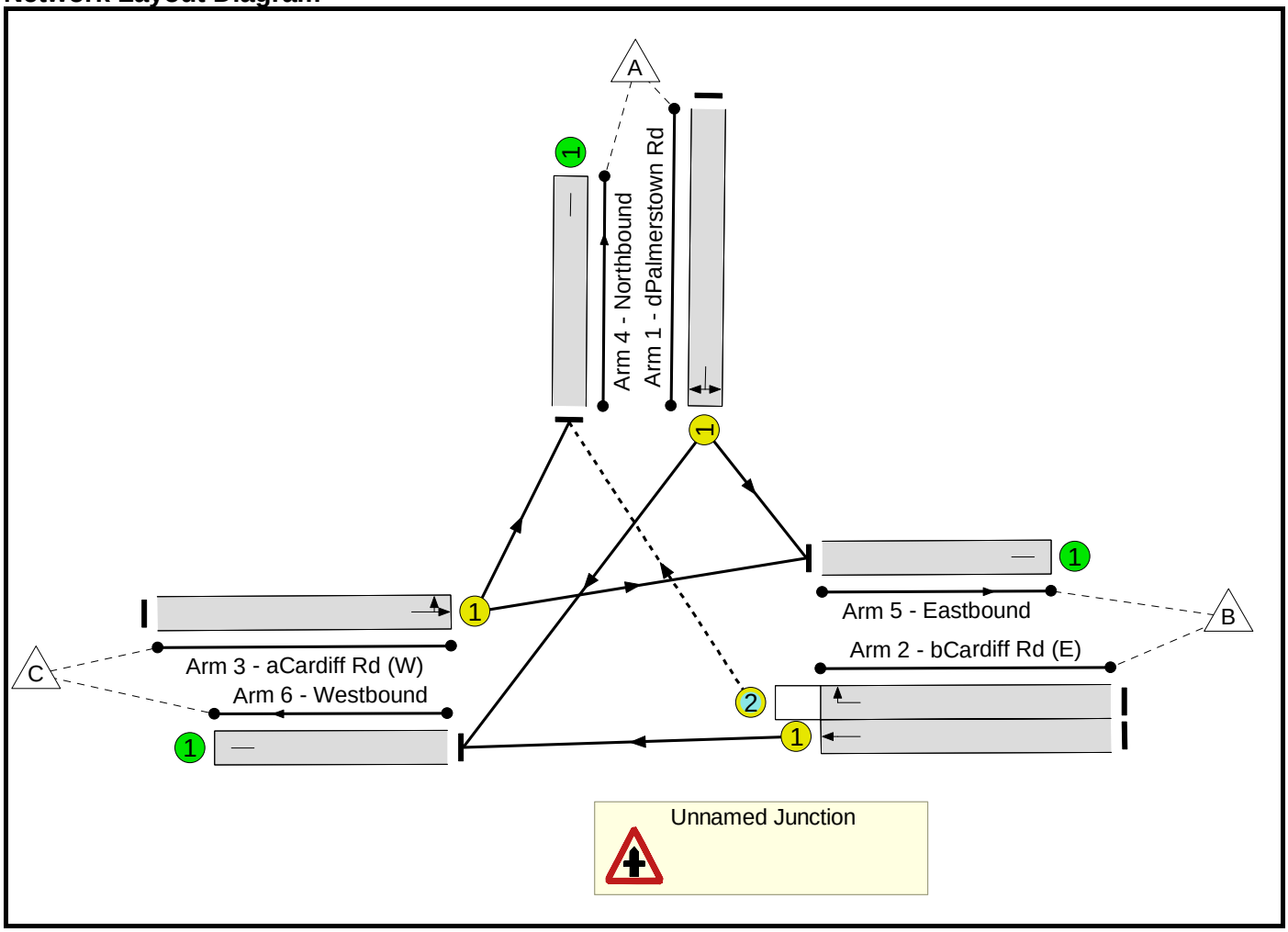
Palmerston Road / Cardiff Road

Full Input Data And Results

User and Project Details

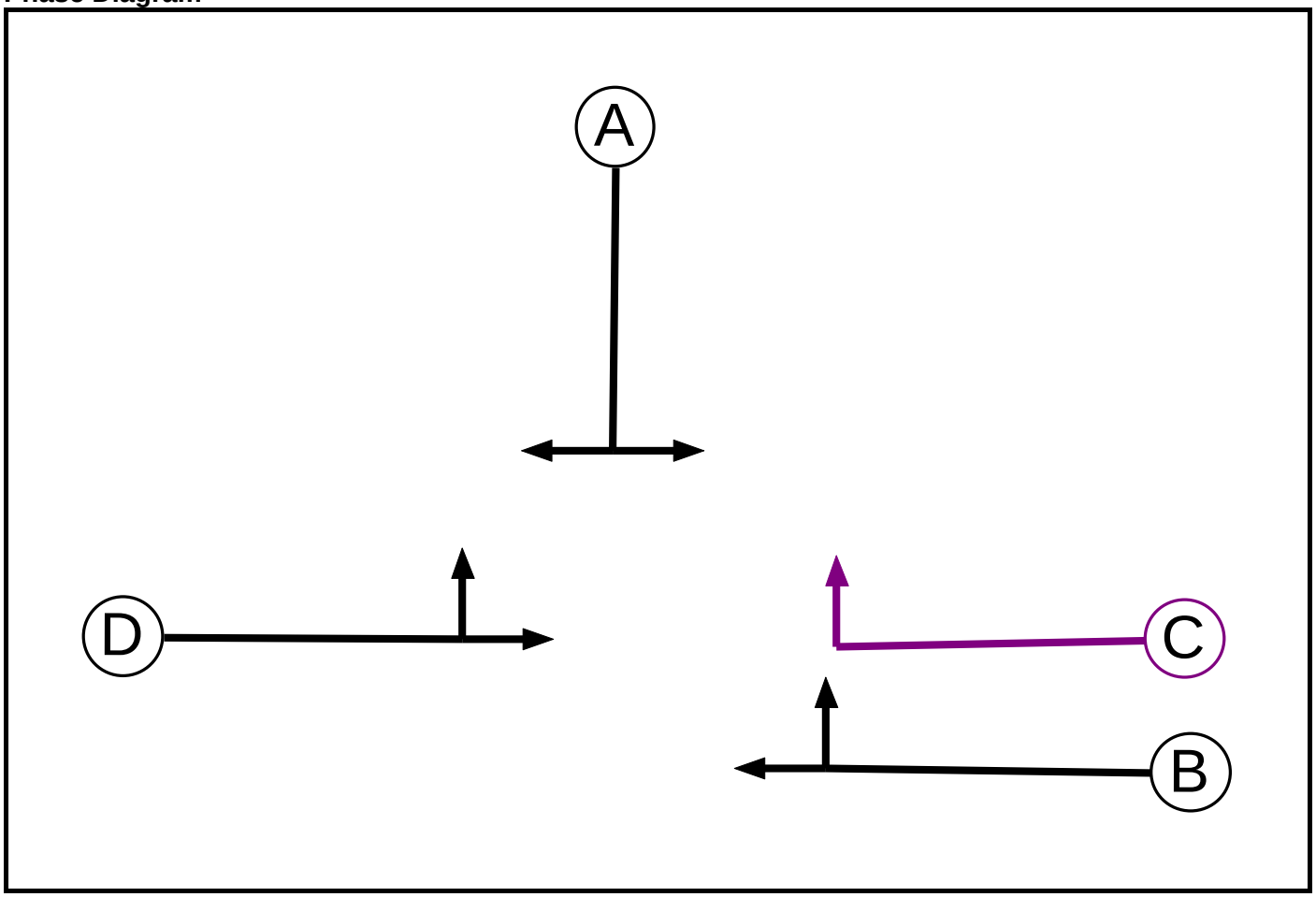
Project:	**Waterfront Barry**
Title:	
Location:	Palmerston Road, Barry
File name:	Palmerston Rd_Cardiff Rd Signals.lsg3x
Author:	Ryan Hopkins
Company:	Arup
Address:	
Notes:	

Network Layout Diagram



Full Input Data And Results

Phase Diagram



Phase Input Data

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

Phase Intergreens Matrix

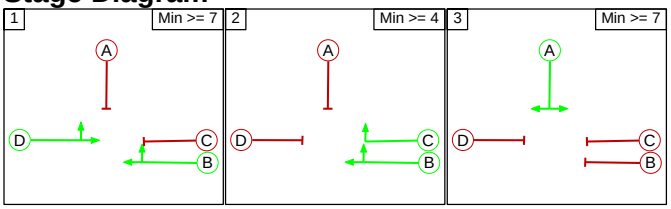
Terminating Phase	Starting Phase				
		A	B	C	D
	A		6	6	6
	B	6		-	-
	C	6	-		6
	D	6	-	6	

Phases in Stage

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

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 Changes

	To Stage			
		1	2	3
From Stage	1		6	6
	2	6		6
	3	6	6	

Full Input Data And Results

Give-Way Lane Input Data

Junction: Unnamed Junction

Lane	Movement	Max 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)
2/2 (bCardiff Rd (E))	4/1 (Right)	1400	3/1	1.10	3/1	2.00	-	0.50	2	2.00

Full Input Data And Results

Lane Input Data

Junction: Unnamed Junction

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 (dPalmerstown Rd)	U	A	2	3	60.0	Geom	-	3.50	0.00	Y	Arm 5 Left Arm 6 Right	19.00 8.00
2/1 (bCardiff Rd (E))	U	B	2	3	60.0	Geom	-	3.50	0.00	Y	Arm 6 Ahead	Inf
2/2 (bCardiff Rd (E))	O	B C	2	3	60.0	Geom	-	3.50	0.00	N	Arm 4 Right	11.00
3/1 (aCardiff Rd (W))	U	D	2	3	60.0	Geom	-	3.00	0.00	Y	Arm 4 Left Arm 5 Ahead	5.70 Inf
4/1 (Northbound)	U		2	3	60.0	Inf	-	-	-	-	-	-
5/1 (Eastbound)	U		2	3	60.0	Inf	-	-	-	-	-	-
6/1 (Westbound)	U		2	3	60.0	Inf	-	-	-	-	-	-

Traffic Flow Groups

Flow Group	Start Time	End Time	Duration	Formula
1: 'AM 2008 Base'	08:30	09:30	01:00	
2: 'PM 2008 Base'	16:30	17:30	01:00	
3: 'AM 2020 Base+Dev'	08:30	09:30	01:00	
4: 'PM 2020 Base+Dev'	16:30	17:30	01:00	
5: 'AM Base 2020'	08:30	09:30	01:00	
6: 'PM Base 2020'	16:30	17:30	01:00	
7: 'PM 2020 Base+Dev+tour'	16:30	17:30	01:00	
8: 'PM 2020 Base+tourism'	16:30	17:30	01:00	

Traffic Lane Flows

Lane	Scenario 1: AM 2008 Base
Junction: Unnamed Junction	
1/1	332
2/1	916
2/2	91
3/1	963
4/1	110
5/1	1089
6/1	1103

Scenario 1: 'AM 2008 Base' (FG1: 'AM 2008 Base', Plan 2: 'Staging Plan No. 2')

Traffic Lane Flows

Junction: Unnamed Junction

Lane	Lane Width (m)	Gradient	Nearside Lane	Allowed Turns	Turning Radius (m)	Turning Prop.	Sat flow (PCU/Hr)
1/1 (dPalmerstown Rd)	3.50	0.00	Y	Arm 5 Left	19.00	43.7 %	1724
				Arm 6 Right	8.00	56.3 %	
2/1 (bCardiff Rd (E))	3.50	0.00	Y	Arm 6 Ahead	Inf	100.0 %	1965
2/2 (bCardiff Rd (E))	3.50	0.00	N	Arm 4 Right	11.00	100.0 %	1852
3/1 (aCardiff Rd (W))	3.00	0.00	Y	Arm 4 Left	5.70	2.0 %	1905
				Arm 5 Ahead	Inf	98.0 %	
4/1 (Northbound Lane 1)	Infinite Saturation Flow						Inf
5/1 (Eastbound Lane 1)	Infinite Saturation Flow						Inf
6/1 (Westbound Lane 1)	Infinite Saturation Flow						Inf

Full Input Data And Results

Traffic Lane Flows

Lane	Scenario 2: PM 2008 Base
Junction: Unnamed Junction	
1/1	298
2/1	1125
2/2	121
3/1	868
4/1	149
5/1	992
6/1	1271

Scenario 2: 'PM 2008 Base' (FG2: 'PM 2008 Base', Plan 1: 'Staging Plan No. 1')

Traffic Lane Flows

Junction: Unnamed Junction							
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat flow (PCU/Hr)**
1/1 (dPalmerstown Rd)	3.50	0.00	Y	Arm 5 Left	19.00	51.0 %	1736
				Arm 6 Right	8.00	49.0 %	
2/1 (bCardiff Rd (E))	3.50	0.00	Y	Arm 6 Ahead	Inf	100.0 %	1965
2/2 (bCardiff Rd (E))	3.50	0.00	N	Arm 4 Right	11.00	100.0 %	1852
3/1 (aCardiff Rd (W))	3.00	0.00	Y	Arm 4 Left	5.70	3.2 %	1899
				Arm 5 Ahead	Inf	96.8 %	
4/1 (Northbound Lane 1)	Infinite Saturation Flow						Inf
5/1 (Eastbound Lane 1)	Infinite Saturation Flow						Inf
6/1 (Westbound Lane 1)	Infinite Saturation Flow						Inf

Traffic Lane Flows

Lane	Scenario 3: AM 2020 Base+Dev
Junction: Unnamed Junction	
1/1	391
2/1	1213
2/2	106
3/1	1451
4/1	132
5/1	1594
6/1	1435

Full Input Data And Results

Scenario 3: 'AM 2020 Base+Dev' (FG3: 'AM 2020 Base+Dev', Plan 1: 'Staging Plan No. 1')

Traffic Lane Flows

Junction: Unnamed Junction							
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat flow (PCU/Hr)**
1/1 (dPalmerstown Rd)	3.50	0.00	Y	Arm 5 Left	19.00	43.2 %	1723
				Arm 6 Right	8.00	56.8 %	
2/1 (bCardiff Rd (E))	3.50	0.00	Y	Arm 6 Ahead	Inf	100.0 %	1965
2/2 (bCardiff Rd (E))	3.50	0.00	N	Arm 4 Right	11.00	100.0 %	1852
3/1 (aCardiff Rd (W))	3.00	0.00	Y	Arm 4 Left	5.70	1.8 %	1906
				Arm 5 Ahead	Inf	98.2 %	
4/1 (Northbound Lane 1)	Infinite Saturation Flow						Inf
5/1 (Eastbound Lane 1)	Infinite Saturation Flow						Inf
6/1 (Westbound Lane 1)	Infinite Saturation Flow						Inf

Traffic Lane Flows

Lane	**Scenario 4: PM 2020 Base+Dev**
Junction: Unnamed Junction	
1/1	350
2/1	1637
2/2	140
3/1	1206
4/1	180
5/1	1343
6/1	1810

Full Input Data And Results

Scenario 4: 'PM 2020 Base+Dev' (FG4: 'PM 2020 Base+Dev', Plan 1: 'Staging Plan No. 1')

Traffic Lane Flows

Junction: Unnamed Junction							
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat flow (PCU/Hr)**
1/1 (dPalmerstown Rd)	3.50	0.00	Y	Arm 5 Left	19.00	50.6 %	1735
				Arm 6 Right	8.00	49.4 %	
2/1 (bCardiff Rd (E))	3.50	0.00	Y	Arm 6 Ahead	Inf	100.0 %	1965
2/2 (bCardiff Rd (E))	3.50	0.00	N	Arm 4 Right	11.00	100.0 %	1852
3/1 (aCardiff Rd (W))	3.00	0.00	Y	Arm 4 Left	5.70	3.3 %	1898
				Arm 5 Ahead	Inf	96.7 %	
4/1 (Northbound Lane 1)	Infinite Saturation Flow						Inf
5/1 (Eastbound Lane 1)	Infinite Saturation Flow						Inf
6/1 (Westbound Lane 1)	Infinite Saturation Flow						Inf

Traffic Lane Flows

Lane	Scenario 5: AM 2020 Base
Junction: Unnamed Junction	
1/1	387
2/1	1068
2/2	106
3/1	1123
4/1	128
5/1	1270
6/1	1286

Full Input Data And Results

Scenario 5: 'AM 2020 Base' (FG5: 'AM Base 2020', Plan 1: 'Staging Plan No. 1')

Traffic Lane Flows

Junction: Unnamed Junction							
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat flow (PCU/Hr)**
1/1 (dPalmerstown Rd)	3.50	0.00	Y	Arm 5 Left	19.00	43.7 %	1724
				Arm 6 Right	8.00	56.3 %	
2/1 (bCardiff Rd (E))	3.50	0.00	Y	Arm 6 Ahead	Inf	100.0 %	1965
2/2 (bCardiff Rd (E))	3.50	0.00	N	Arm 4 Right	11.00	100.0 %	1852
3/1 (aCardiff Rd (W))	3.00	0.00	Y	Arm 4 Left	5.70	2.0 %	1905
				Arm 5 Ahead	Inf	98.0 %	
4/1 (Northbound Lane 1)	Infinite Saturation Flow						Inf
5/1 (Eastbound Lane 1)	Infinite Saturation Flow						Inf
6/1 (Westbound Lane 1)	Infinite Saturation Flow						Inf

Traffic Lane Flows

Lane	Scenario 6: PM 2020 Base
Junction: Unnamed Junction	
1/1	347
2/1	1308
2/2	140
3/1	1010
4/1	173
5/1	1154
6/1	1478

Full Input Data And Results

Scenario 6: 'PM 2020 Base' (FG6: 'PM Base 2020', Plan 1: 'Staging Plan No. 1')

Traffic Lane Flows

Junction: Unnamed Junction							
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat flow (PCU/Hr)**
1/1 (dPalmerstown Rd)	3.50	0.00	Y	Arm 5 Left	19.00	51.0 %	1736
				Arm 6 Right	8.00	49.0 %	
2/1 (bCardiff Rd (E))	3.50	0.00	Y	Arm 6 Ahead	Inf	100.0 %	1965
2/2 (bCardiff Rd (E))	3.50	0.00	N	Arm 4 Right	11.00	100.0 %	1852
3/1 (aCardiff Rd (W))	3.00	0.00	Y	Arm 4 Left	5.70	3.3 %	1899
				Arm 5 Ahead	Inf	96.7 %	
4/1 (Northbound Lane 1)	Infinite Saturation Flow						Inf
5/1 (Eastbound Lane 1)	Infinite Saturation Flow						Inf
6/1 (Westbound Lane 1)	Infinite Saturation Flow						Inf

Traffic Lane Flows

Lane	Scenario 7: PM 2020 Base+Dev+tour
Junction: Unnamed Junction	
1/1	350
2/1	1739
2/2	140
3/1	1319
4/1	180
5/1	1456
6/1	1912

Full Input Data And Results

Scenario 7: 'PM 2020 Base+Dev+tour' (FG7: 'PM 2020 Base+Dev+tour', Plan 1: 'Staging Plan No. 1')

Traffic Lane Flows

Junction: Unnamed Junction							
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat flow (PCU/Hr)**
1/1 (dPalmerstown Rd)	3.50	0.00	Y	Arm 5 Left	19.00	50.6 %	1735
				Arm 6 Right	8.00	49.4 %	
2/1 (bCardiff Rd (E))	3.50	0.00	Y	Arm 6 Ahead	Inf	100.0 %	1965
2/2 (bCardiff Rd (E))	3.50	0.00	N	Arm 4 Right	11.00	100.0 %	1852
3/1 (aCardiff Rd (W))	3.00	0.00	Y	Arm 4 Left	5.70	3.0 %	1900
				Arm 5 Ahead	Inf	97.0 %	
4/1 (Northbound Lane 1)	Infinite Saturation Flow						Inf
5/1 (Eastbound Lane 1)	Infinite Saturation Flow						Inf
6/1 (Westbound Lane 1)	Infinite Saturation Flow						Inf

Traffic Lane Flows

Lane	**Scenario 8: PM 2020 Base+tourism**
Junction: Unnamed Junction	
1/1	347
2/1	1410
2/2	140
3/1	1122
4/1	173
5/1	1266
6/1	1580

Full Input Data And Results

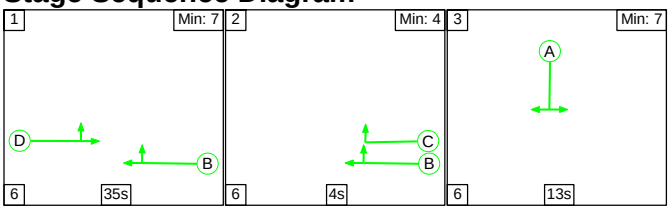
Scenario 8: 'PM 2020 Base+tourism' (FG8: 'PM 2020 Base+tourism', Plan 1: 'Staging Plan No. 1')

Traffic Lane Flows

Junction: Unnamed Junction							
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat flow (PCU/Hr)**
1/1 (dPalmerstown Rd)	3.50	0.00	Y	Arm 5 Left	19.00	51.0 %	1736
				Arm 6 Right	8.00	49.0 %	
2/1 (bCardiff Rd (E))	3.50	0.00	Y	Arm 6 Ahead	Inf	100.0 %	1965
2/2 (bCardiff Rd (E))	3.50	0.00	N	Arm 4 Right	11.00	100.0 %	1852
3/1 (aCardiff Rd (W))	3.00	0.00	Y	Arm 4 Left	5.70	2.9 %	1900
				Arm 5 Ahead	Inf	97.1 %	
4/1 (Northbound Lane 1)	Infinite Saturation Flow						Inf
5/1 (Eastbound Lane 1)	Infinite Saturation Flow						Inf
6/1 (Westbound Lane 1)	Infinite Saturation Flow						Inf

Scenario 1: 'AM 2008 Base' (FG1: 'AM 2008 Base', Plan 2: 'Staging Plan No. 2')

Stage Sequence Diagram

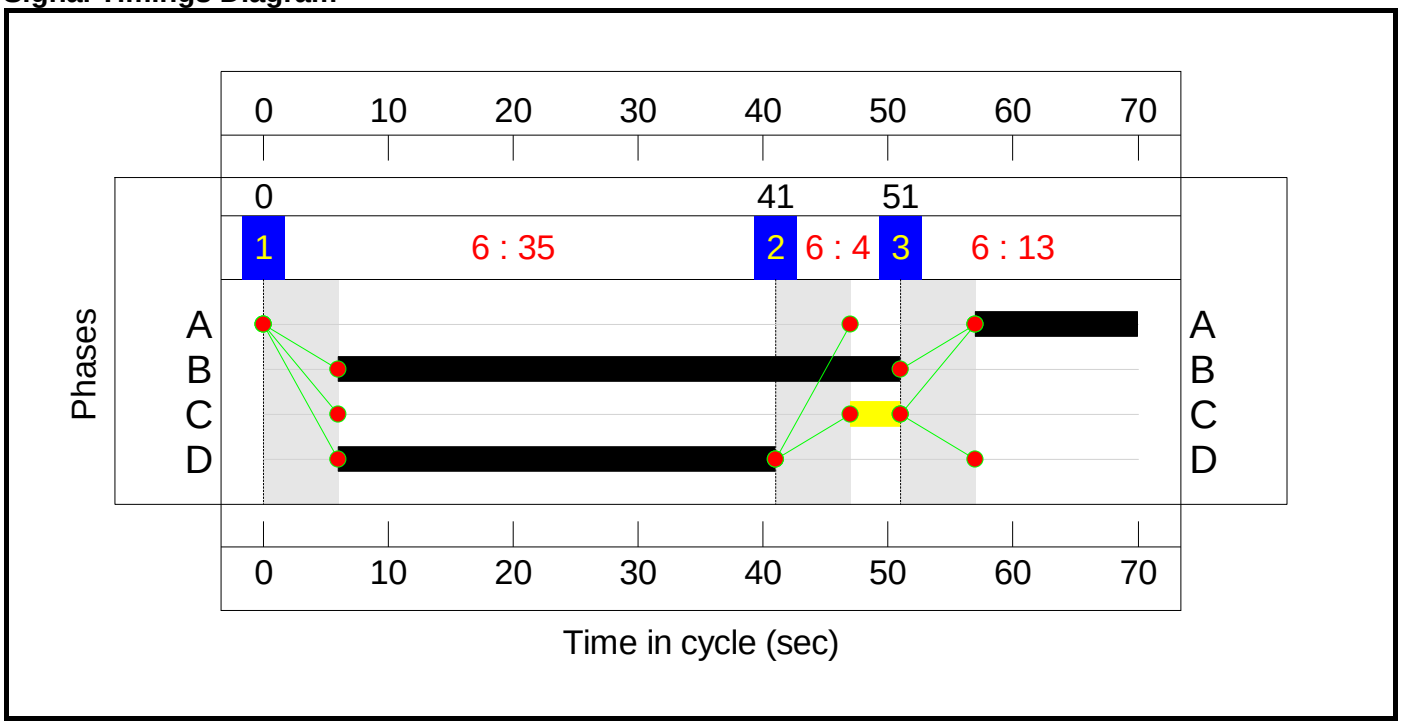


Stage Timings

Stage	1	2	3
Duration	35	4	13
Change Point	0	41	51

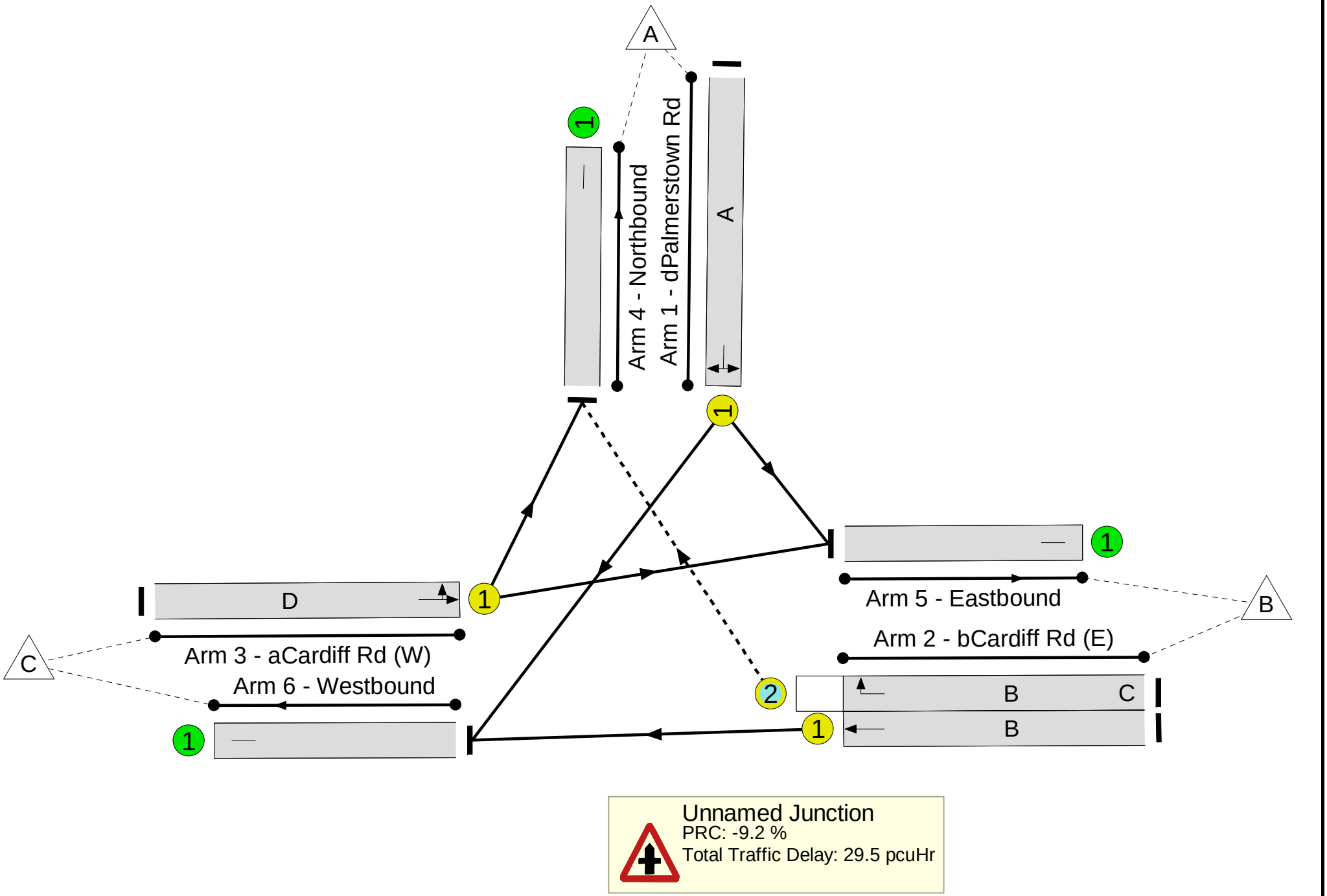
Full Input Data And Results

Signal Timings Diagram



Full Input Data And Results

Network Layout Diagram


A
1
Arm 4 - Northbound
Arm 1 - dPalmerstown Rd
A
1
1
D
Arm 3 - aCardiff Rd (W)
Arm 6 - Westbound
1
C
1
Arm 5 - Eastbound
B
Arm 2 - bCardiff Rd (E)
2
B
C
B
1
Unnamed Junction
PRC: -9.2 %
Total Traffic Delay: 29.5 pcuHr

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**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**98.3%**
Unnamed Junction	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**98.3%**
1/1	dPalmerstown Rd Left Right	U	N/A	N/A	A		1	13	-	332	1724	345	96.3%
2/1	bCardiff Rd (E) Ahead	U	N/A	N/A	B		1	45	-	916	1965	1291	70.9%
2/2	bCardiff Rd (E) Right	O	N/A	N/A	B	C	1	45	4	91	1852	288	31.6%
3/1	aCardiff Rd (W) Left Ahead	U	N/A	N/A	D		1	35	-	963	1905	980	98.3%
4/1	Northbound	U	N/A	N/A	-		-	-	-	110	Inf	Inf	0.0%
5/1	Eastbound	U	N/A	N/A	-		-	-	-	1089	Inf	Inf	0.0%
6/1	Westbound	U	N/A	N/A	-		-	-	-	1103	Inf	Inf	0.0%

Item	Entering (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	**-**	**-**	**5**	**84**	**3**	**9.1**	**19.8**	**0.6**	**29.5**	**-**	**-**	**-**	**-**
Unnamed Junction	**-**	**-**	**5**	**84**	**3**	**9.1**	**19.8**	**0.6**	**29.5**	**-**	**-**	**-**	**-**
1/1	332	332	-	-	-	2.6	6.5	-	9.0	97.8	6.4	6.5	12.8
2/1	916	916	-	-	-	2.0	1.2	-	3.2	12.5	11.2	1.2	12.4
2/2	91	91	5	84	3	0.1	0.2	0.6	0.9	36.0	0.6	0.2	0.9
3/1	963	963	-	-	-	4.5	11.9	-	16.4	61.1	18.2	11.9	30.1
4/1	110	110	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
5/1	1089	1089	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	1103	1103	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0

C1

PRC for Signalled Lanes (%): -9.2
PRC Over All Lanes (%): -9.2

Total Delay for Signalled Lanes (pcuHr): 29.46
Total Delay Over All Lanes(pcuHr): 29.46

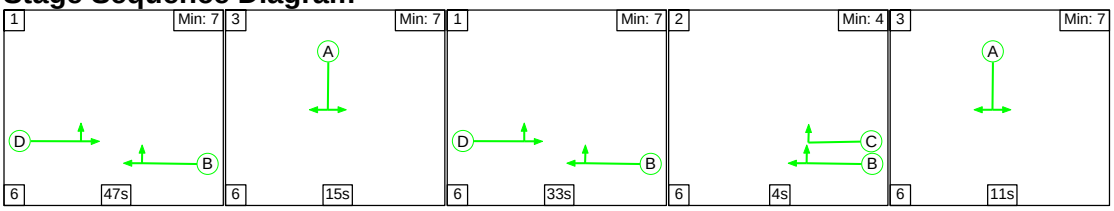
Cycle Time (s): 70

Full Input Data And Results

Full Input Data And Results

Scenario 2: 'PM 2008 Base' (FG2: 'PM 2008 Base', Plan 1: 'Staging Plan No. 1')

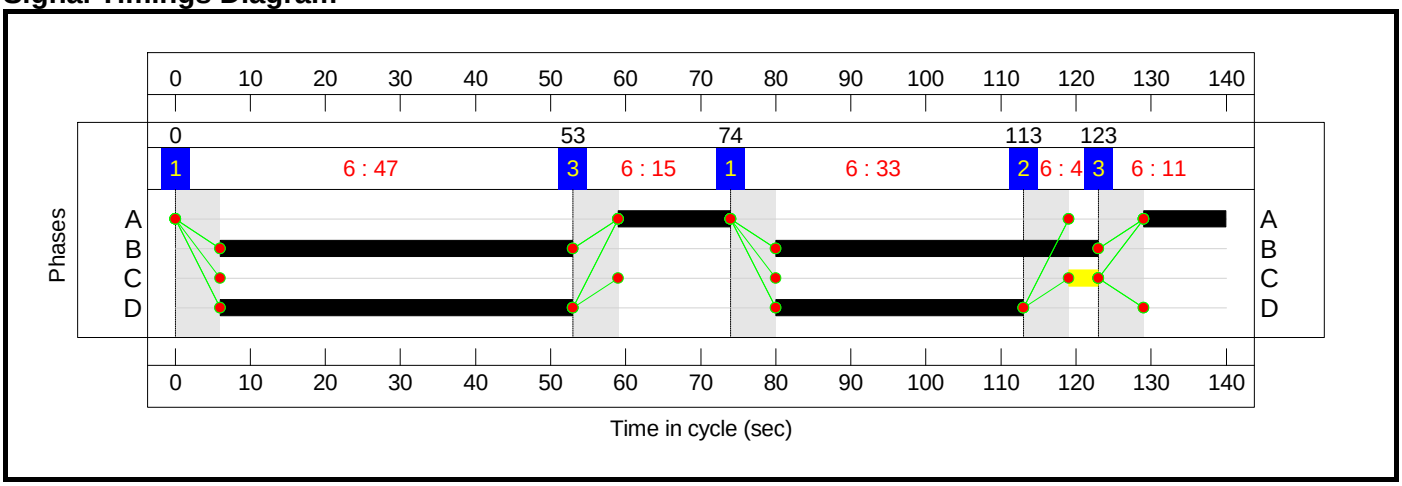
Stage Sequence Diagram



Stage Timings

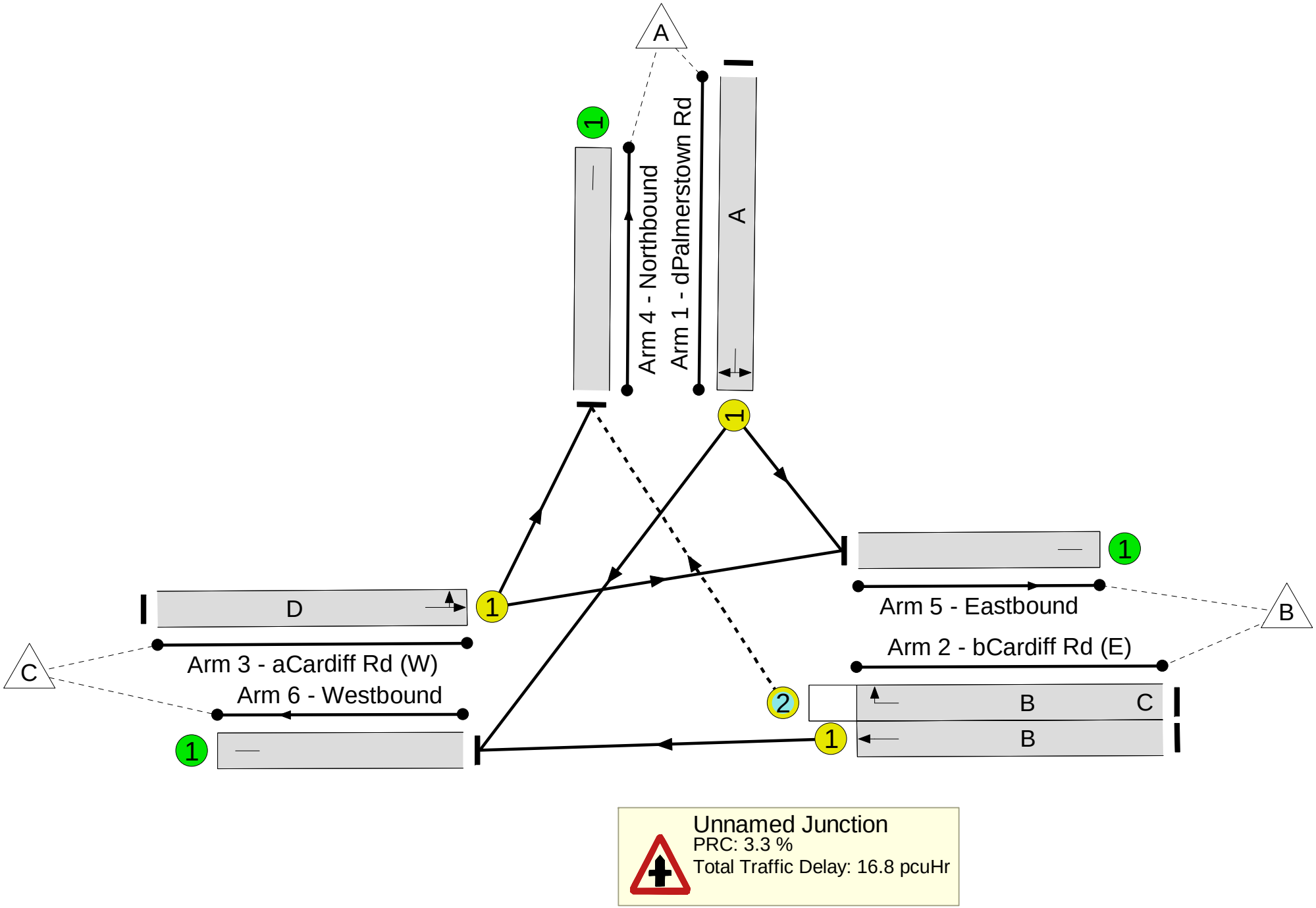
Stage	1	3	1	2	3
Duration	47	15	33	4	11
Change Point	0	53	74	113	123

Signal Timings Diagram



Full Input Data And Results

Network Layout Diagram


A
1
Arm 4 - Northbound
Arm 1 - dPalmerstown Rd
A
1
1
D
Arm 3 - aCardiff Rd (W)
Arm 6 - Westbound
1
C
1
Arm 5 - Eastbound
B
Arm 2 - bCardiff Rd (E)
2
B
C
B
1
Unnamed Junction
PRC: 3.3 %
Total Traffic Delay: 16.8 pcuHr

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**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**87.1%**
Unnamed Junction	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**87.1%**
1/1	dPalmerstown Rd Left Right	U	N/A	N/A	A		2	26	-	298	1736	347	85.8%
2/1	bCardiff Rd (E) Ahead	U	N/A	N/A	B		2	90	-	1125	1965	1291	87.1%
2/2	bCardiff Rd (E) Right	O	N/A	N/A	B	C	2	90	4	121	1852	307	39.4%
3/1	aCardiff Rd (W) Left Ahead	U	N/A	N/A	D		2	80	-	868	1899	1112	78.0%
4/1	Northbound	U	N/A	N/A	-		-	-	-	149	Inf	Inf	0.0%
5/1	Eastbound	U	N/A	N/A	-		-	-	-	992	Inf	Inf	0.0%
6/1	Westbound	U	N/A	N/A	-		-	-	-	1271	Inf	Inf	0.0%

Item	Entering (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	**-**	**-**	**99**	**21**	**2**	**8.1**	**8.1**	**0.6**	**16.8**	**-**	**-**	**-**	**-**
Unnamed Junction	**-**	**-**	**99**	**21**	**2**	**8.1**	**8.1**	**0.6**	**16.8**	**-**	**-**	**-**	**-**
1/1	298	298	-	-	-	2.2	2.7	-	5.0	60.0	5.8	2.7	8.5
2/1	1125	1125	-	-	-	3.0	3.3	-	6.3	20.1	18.7	3.3	22.0
2/2	121	121	99	21	2	0.1	0.3	0.6	1.1	32.4	0.9	0.3	1.2
3/1	868	868	-	-	-	2.7	1.8	-	4.4	18.4	14.0	1.8	15.7
4/1	149	149	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
5/1	992	992	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	1271	1271	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0

C1

PRC for Signalled Lanes (%): 3.3
PRC Over All Lanes (%): 3.3

Total Delay for Signalled Lanes (pcuHr): 16.79
Total Delay Over All Lanes(pcuHr): 16.79

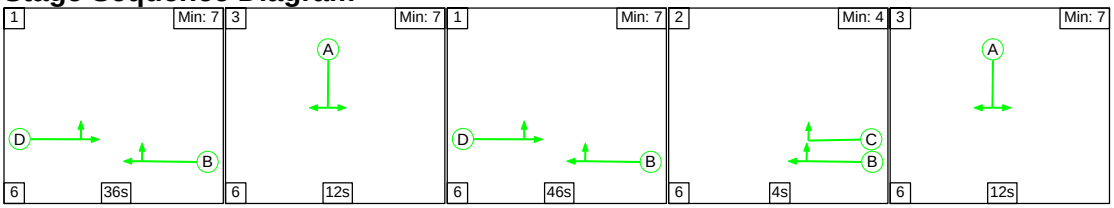
Cycle Time (s): 140

Full Input Data And Results

Full Input Data And Results

Scenario 3: 'AM 2020 Base+Dev' (FG3: 'AM 2020 Base+Dev', Plan 1: 'Staging Plan No. 1')

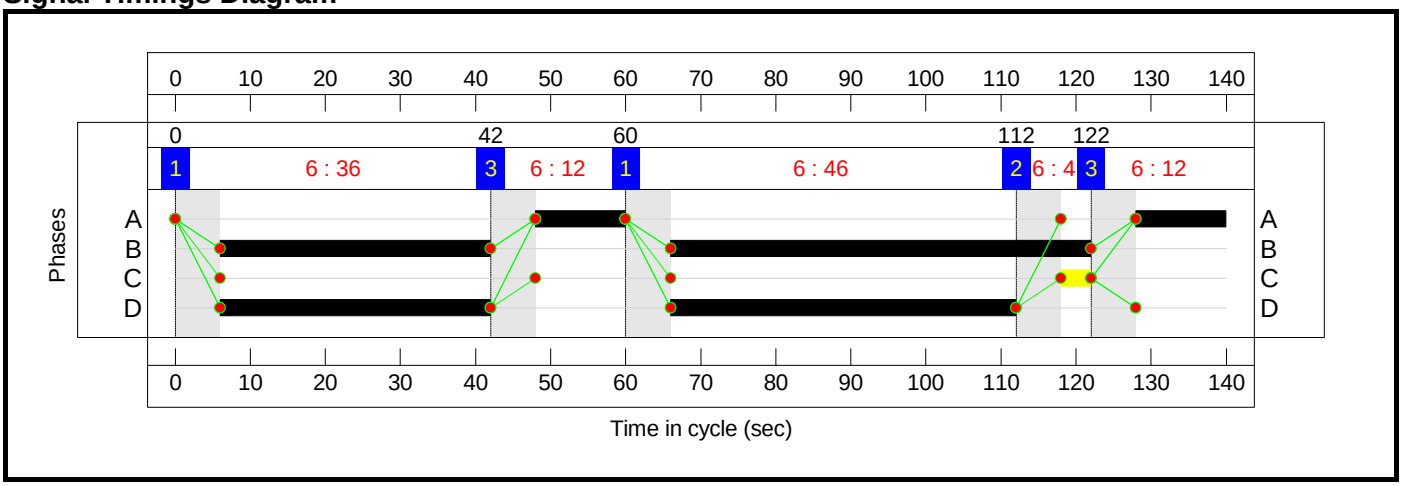
Stage Sequence Diagram



Stage Timings

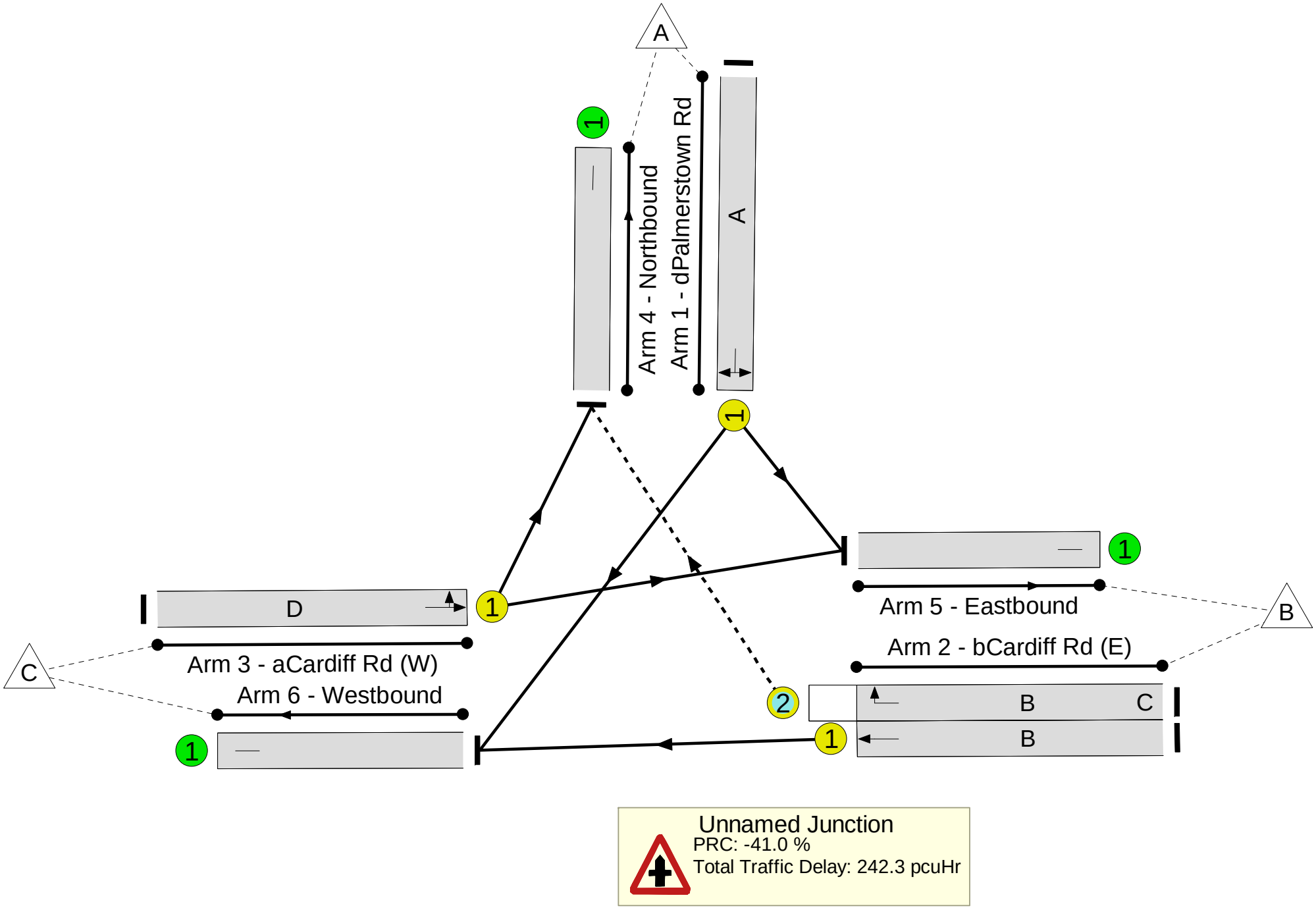
Stage	1	3	1	2	3
Duration	36	12	46	4	12
Change Point	0	42	60	112	122

Signal Timings Diagram



Full Input Data And Results

Network Layout Diagram


A
1
Arm 4 - Northbound
Arm 1 - dPalmerstown Rd
A
1
1
D
Arm 3 - aCardiff Rd (W)
Arm 6 - Westbound
1
C
1
Arm 5 - Eastbound
B
Arm 2 - bCardiff Rd (E)
2
B
C
B
1
Unnamed Junction
PRC: -41.0 %
Total Traffic Delay: 242.3 pcuHr

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**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**126.9%**
Unnamed Junction	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**126.9%**
1/1	dPalmerstown Rd Left Right	U	N/A	N/A	A		2	24	-	391	1723	320	122.2%
2/1	bCardiff Rd (E) Ahead	U	N/A	N/A	B		2	92	-	1213	1965	1319	91.9%
2/2	bCardiff Rd (E) Right	O	N/A	N/A	B	C	2	92	4	106	1852	182	58.2%
3/1	aCardiff Rd (W) Left Ahead	U	N/A	N/A	D		2	82	-	1451	1906	1144	126.9%
4/1	Northbound	U	N/A	N/A	-		-	-	-	132	Inf	Inf	0.0%
5/1	Eastbound	U	N/A	N/A	-		-	-	-	1594	Inf	Inf	0.0%
6/1	Westbound	U	N/A	N/A	-		-	-	-	1435	Inf	Inf	0.0%

Item	Entering (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	**-**	**-**	**0**	**59**	**47**	**41.5**	**200.0**	**0.8**	**242.3**	**-**	**-**	**-**	**-**
Unnamed Junction	**-**	**-**	**0**	**59**	**47**	**41.5**	**200.0**	**0.8**	**242.3**	**-**	**-**	**-**	**-**
1/1	391	320	-	-	-	8.9	38.1	-	47.0	432.9	14.2	38.1	52.3
2/1	1213	1213	-	-	-	3.3	5.2	-	8.5	25.3	20.2	5.2	25.4
2/2	106	106	0	59	47	0.1	0.7	0.8	1.6	55.4	0.7	0.7	1.4
3/1	1451	1144	-	-	-	29.1	156.0	-	185.1	459.3	52.1	156.0	208.1
4/1	126	126	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
5/1	1261	1261	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	1395	1395	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0

C1

PRC for Signalled Lanes (%): -41.0
PRC Over All Lanes (%): -41.0

Total Delay for Signalled Lanes (pcuHr): 242.32
Total Delay Over All Lanes(pcuHr): 242.32

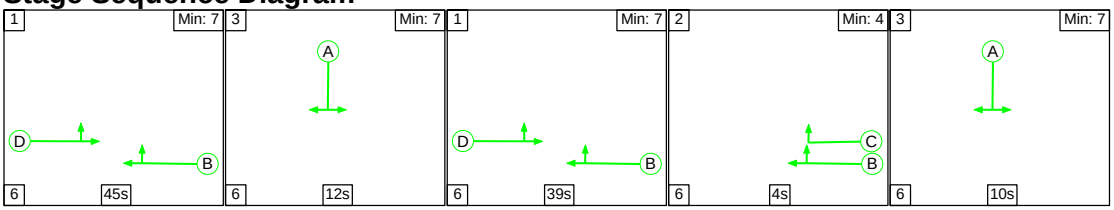
Cycle Time (s): 140

Full Input Data And Results

Full Input Data And Results

Scenario 4: 'PM 2020 Base+Dev' (FG4: 'PM 2020 Base+Dev', Plan 1: 'Staging Plan No. 1')

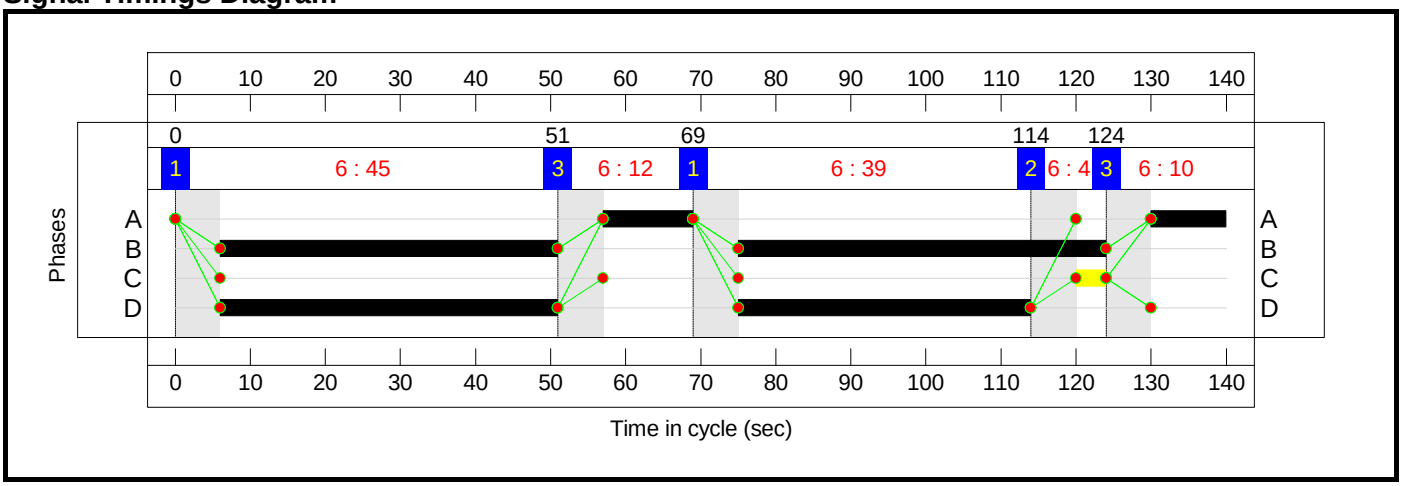
Stage Sequence Diagram



Stage Timings

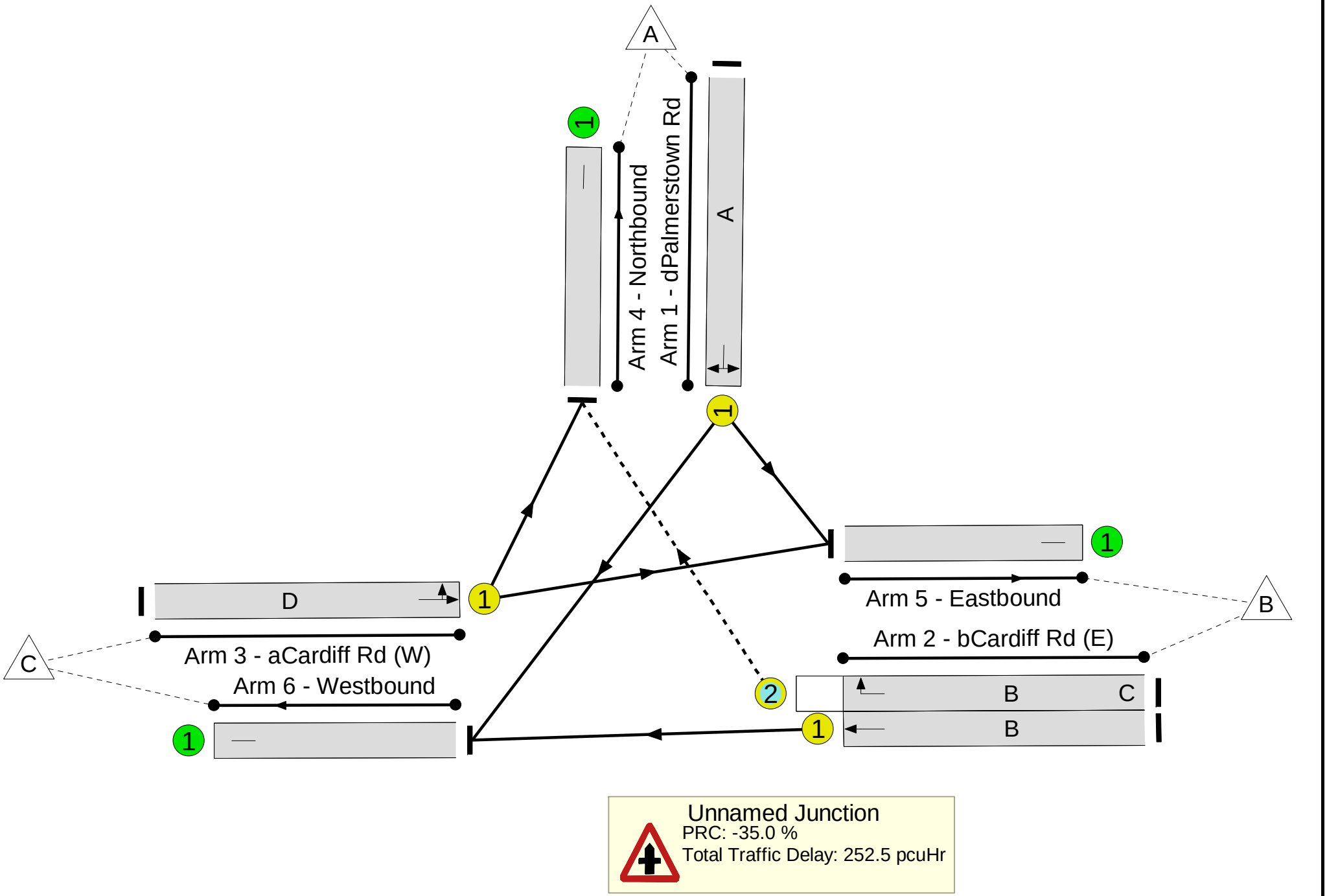
Stage	1	3	1	2	3
Duration	45	12	39	4	10
Change Point	0	51	69	114	124

Signal Timings Diagram



Full Input Data And Results

Network Layout Diagram


A
1
Arm 4 - Northbound
Arm 1 - dPalmerstown Rd
A
1
1
D
Arm 3 - aCardiff Rd (W)
Arm 6 - Westbound
1
C
1
Arm 5 - Eastbound
B
Arm 2 - bCardiff Rd (E)
2
B
C
B
1
Unnamed Junction
PRC: -35.0 %
Total Traffic Delay: 252.5 pcuHr

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**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**121.5%**
Unnamed Junction	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**121.5%**
1/1	dPalmerstown Rd Left Right	U	N/A	N/A	A		2	22	-	350	1735	297	117.7%
2/1	bCardiff Rd (E) Ahead	U	N/A	N/A	B		2	94	-	1637	1965	1347	121.5%
2/2	bCardiff Rd (E) Right	O	N/A	N/A	B	C	2	94	4	140	1852	182	76.8%
3/1	aCardiff Rd (W) Left Ahead	U	N/A	N/A	D		2	84	-	1206	1898	1166	103.4%
4/1	Northbound	U	N/A	N/A	-		-	-	-	180	Inf	Inf	0.0%
5/1	Eastbound	U	N/A	N/A	-		-	-	-	1343	Inf	Inf	0.0%
6/1	Westbound	U	N/A	N/A	-		-	-	-	1810	Inf	Inf	0.0%

Item	Entering (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	**-**	**-**	**0**	**87**	**53**	**43.0**	**208.4**	**1.1**	**252.5**	**-**	**-**	**-**	**-**
Unnamed Junction	**-**	**-**	**0**	**87**	**53**	**43.0**	**208.4**	**1.1**	**252.5**	**-**	**-**	**-**	**-**
1/1	350	297	-	-	-	7.2	29.3	-	36.5	375.0	11.1	29.3	40.4
2/1	1637	1347	-	-	-	28.0	147.6	-	175.5	386.1	55.7	147.6	203.3
2/2	140	140	0	87	53	0.4	1.5	1.1	3.1	79.5	1.6	1.5	3.2
3/1	1206	1166	-	-	-	7.4	30.1	-	37.4	111.8	27.4	30.1	57.4
4/1	179	179	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
5/1	1278	1278	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	1494	1494	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0

C1

PRC for Signalled Lanes (%): -35.0
PRC Over All Lanes (%): -35.0

Total Delay for Signalled Lanes (pcuHr): 252.54
Total Delay Over All Lanes(pcuHr): 252.54

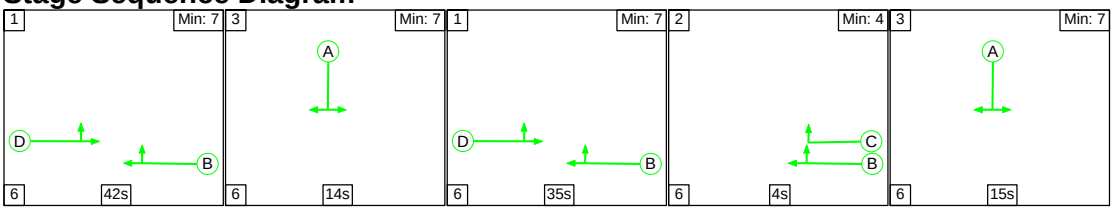
Cycle Time (s): 140

Full Input Data And Results

Full Input Data And Results

Scenario 5: 'AM 2020 Base' (FG5: 'AM Base 2020', Plan 1: 'Staging Plan No. 1')

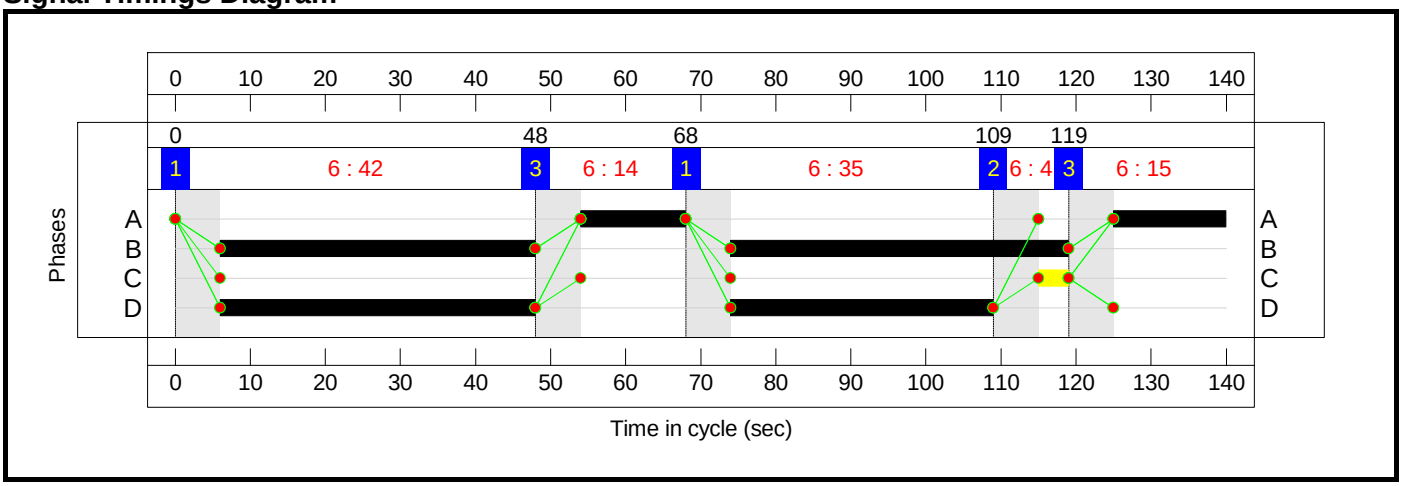
Stage Sequence Diagram



Stage Timings

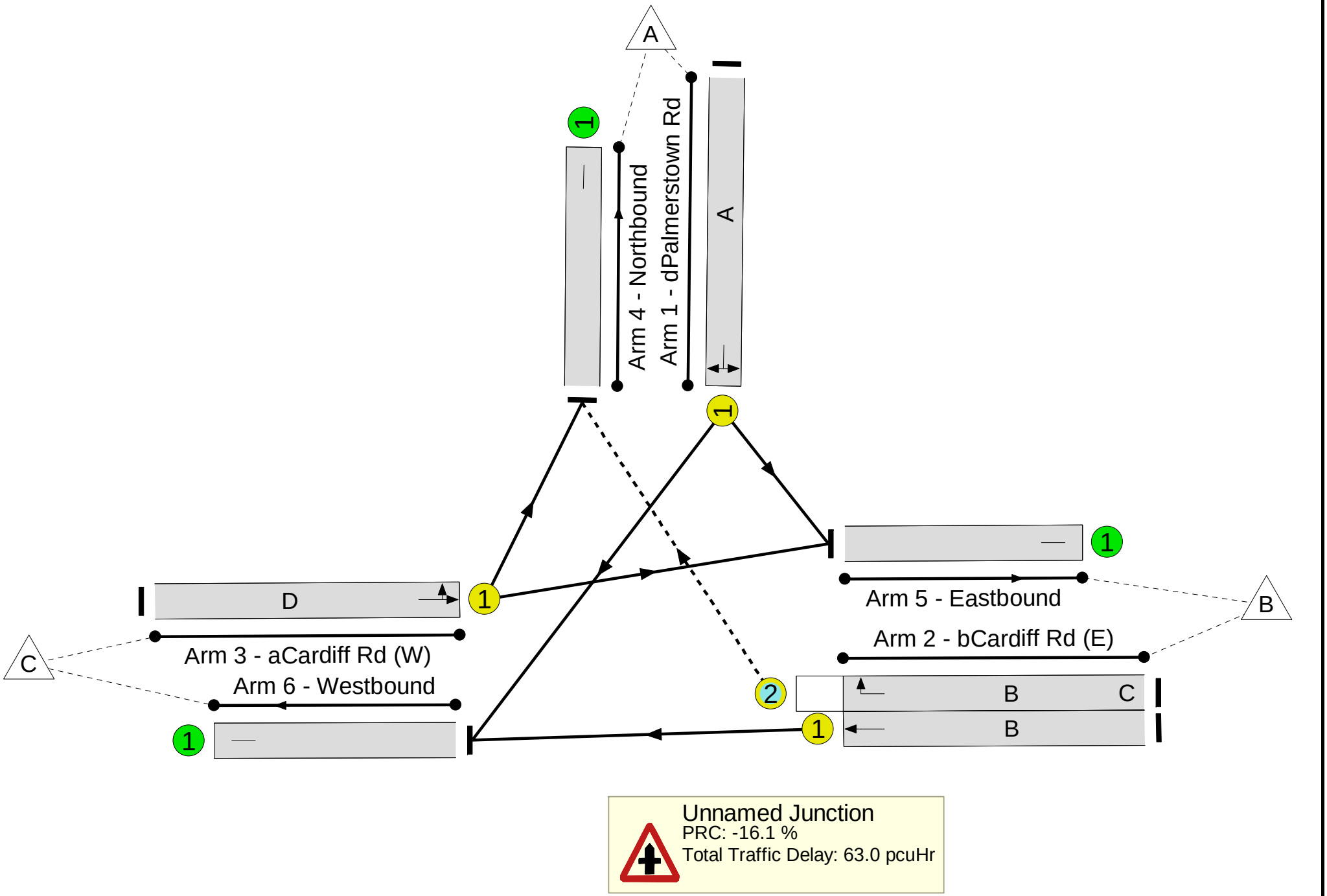
Stage	1	3	1	2	3
Duration	42	14	35	4	15
Change Point	0	48	68	109	119

Signal Timings Diagram



Full Input Data And Results

Network Layout Diagram


A
1
Arm 4 - Northbound
Arm 1 - dPalmerstown Rd
A
1
1
D
1
Arm 5 - Eastbound
B
Arm 3 - aCardiff Rd (W)
Arm 2 - bCardiff Rd (E)
C
Arm 6 - Westbound
2
B
C
1
B
1
Unnamed Junction
PRC: -16.1 %
Total Traffic Delay: 63.0 pcuHr

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**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**104.5%**
Unnamed Junction	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**104.5%**
1/1	dPalmerstown Rd Left Right	U	N/A	N/A	A		2	29	-	387	1724	382	101.4%
2/1	bCardiff Rd (E) Ahead	U	N/A	N/A	B		2	87	-	1068	1965	1249	85.5%
2/2	bCardiff Rd (E) Right	O	N/A	N/A	B	C	2	87	4	106	1852	182	58.2%
3/1	aCardiff Rd (W) Left Ahead	U	N/A	N/A	D		2	77	-	1123	1905	1075	104.5%
4/1	Northbound	U	N/A	N/A	-		-	-	-	128	Inf	Inf	0.0%
5/1	Eastbound	U	N/A	N/A	-		-	-	-	1270	Inf	Inf	0.0%
6/1	Westbound	U	N/A	N/A	-		-	-	-	1286	Inf	Inf	0.0%

Item	Entering (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	**-**	**-**	**0**	**53**	**53**	**14.8**	**47.4**	**0.8**	**63.0**	**-**	**-**	**-**	**-**
Unnamed Junction	**-**	**-**	**0**	**53**	**53**	**14.8**	**47.4**	**0.8**	**63.0**	**-**	**-**	**-**	**-**
1/1	387	382	-	-	-	3.4	11.2	-	14.7	136.3	8.1	11.2	19.3
2/1	1068	1068	-	-	-	3.0	2.9	-	5.9	19.8	16.6	2.9	19.5
2/2	106	106	0	53	53	0.2	0.7	0.8	1.6	55.8	0.8	0.7	1.5
3/1	1123	1075	-	-	-	8.2	32.6	-	40.9	131.0	26.5	32.6	59.1
4/1	127	127	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
5/1	1221	1221	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	1283	1283	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0

C1

PRC for Signalled Lanes (%): -16.1
PRC Over All Lanes (%): -16.1

Total Delay for Signalled Lanes (pcuHr): 63.02
Total Delay Over All Lanes(pcuHr): 63.02

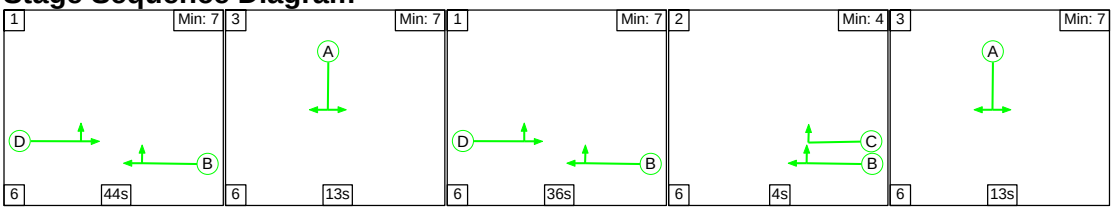
Cycle Time (s): 140

Full Input Data And Results

Full Input Data And Results

Scenario 6: 'PM 2020 Base' (FG6: 'PM Base 2020', Plan 1: 'Staging Plan No. 1')

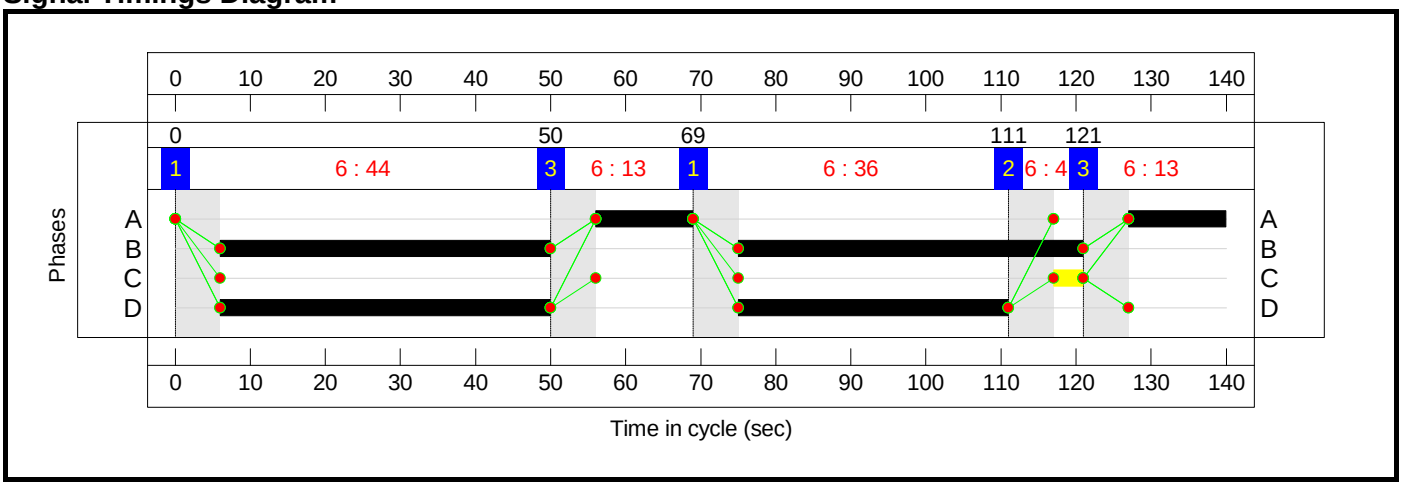
Stage Sequence Diagram



Stage Timings

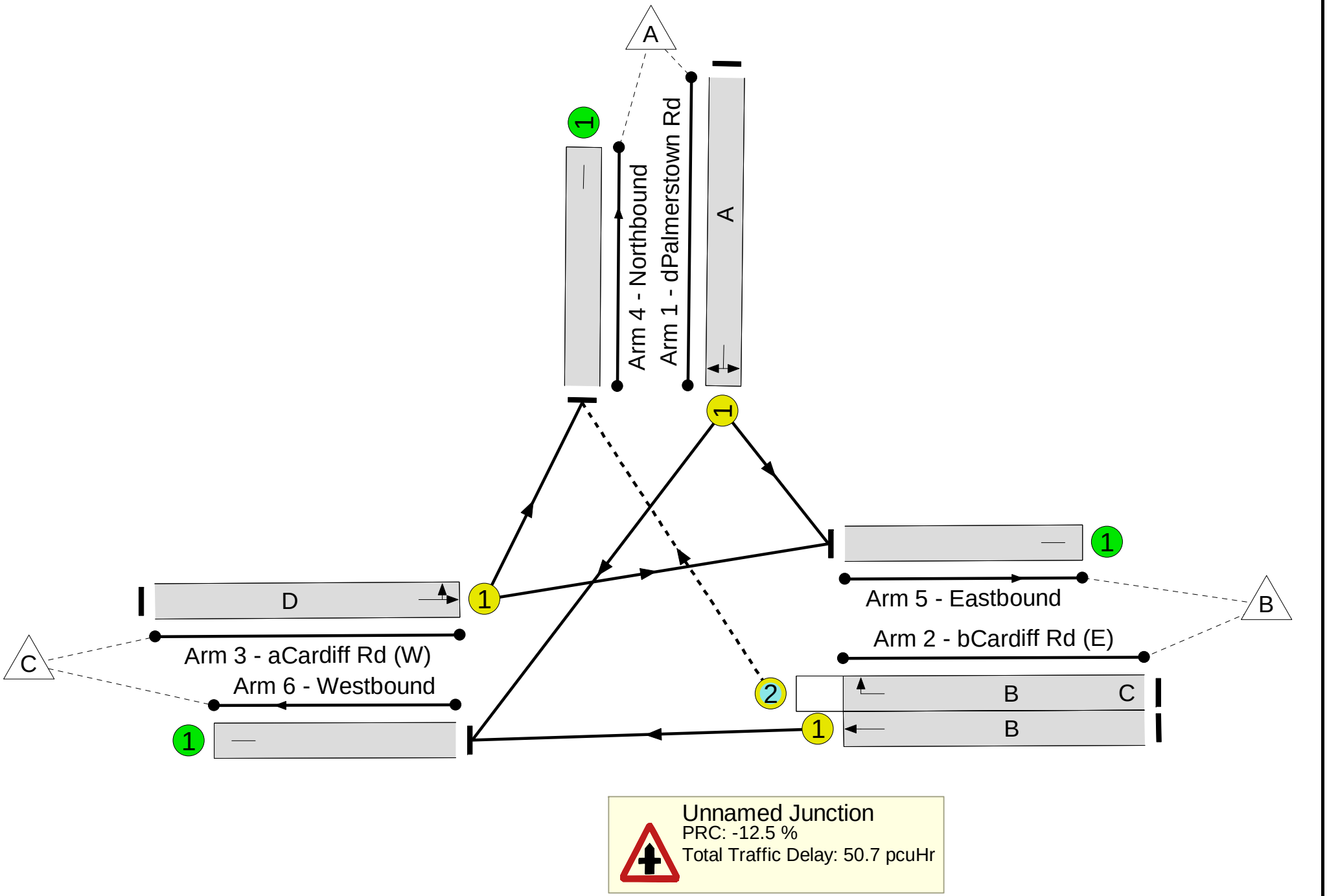
Stage	1	3	1	2	3
Duration	44	13	36	4	13
Change Point	0	50	69	111	121

Signal Timings Diagram



Full Input Data And Results

Network Layout Diagram


A
1
Arm 4 - Northbound
Arm 1 - dPalmerstown Rd
A
1
1
D
Arm 3 - aCardiff Rd (W)
Arm 6 - Westbound
1
C
1
Arm 5 - Eastbound
B
Arm 2 - bCardiff Rd (E)
2
B
C
B
1
Unnamed Junction
PRC: -12.5 %
Total Traffic Delay: 50.7 pcuHr

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**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**101.3%**
Unnamed Junction	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**101.3%**
1/1	dPalmerstown Rd Left Right	U	N/A	N/A	A		2	26	-	347	1736	347	99.9%
2/1	bCardiff Rd (E) Ahead	U	N/A	N/A	B		2	90	-	1308	1965	1291	101.3%
2/2	bCardiff Rd (E) Right	O	N/A	N/A	B	C	2	90	4	140	1852	236	59.4%
3/1	aCardiff Rd (W) Left Ahead	U	N/A	N/A	D		2	80	-	1010	1899	1112	90.8%
4/1	Northbound	U	N/A	N/A	-		-	-	-	173	Inf	Inf	0.0%
5/1	Eastbound	U	N/A	N/A	-		-	-	-	1154	Inf	Inf	0.0%
6/1	Westbound	U	N/A	N/A	-		-	-	-	1478	Inf	Inf	0.0%

Item	Entering (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	**-**	**-**	**31**	**60**	**49**	**12.4**	**37.3**	**1.0**	**50.7**	**-**	**-**	**-**	**-**
Unnamed Junction	**-**	**-**	**31**	**60**	**49**	**12.4**	**37.3**	**1.0**	**50.7**	**-**	**-**	**-**	**-**
1/1	347	347	-	-	-	2.7	9.3	-	12.0	124.6	6.8	9.3	16.1
2/1	1308	1291	-	-	-	5.6	22.7	-	28.3	78.0	27.1	22.7	49.8
2/2	140	140	31	60	49	0.3	0.7	1.0	2.1	53.4	1.4	0.7	2.1
3/1	1010	1010	-	-	-	3.7	4.5	-	8.2	29.4	20.2	4.5	24.7
4/1	173	173	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
5/1	1154	1154	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	1461	1461	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0

C1

PRC for Signalled Lanes (%): -12.5
PRC Over All Lanes (%): -12.5

Total Delay for Signalled Lanes (pcuHr): 50.66
Total Delay Over All Lanes(pcuHr): 50.66

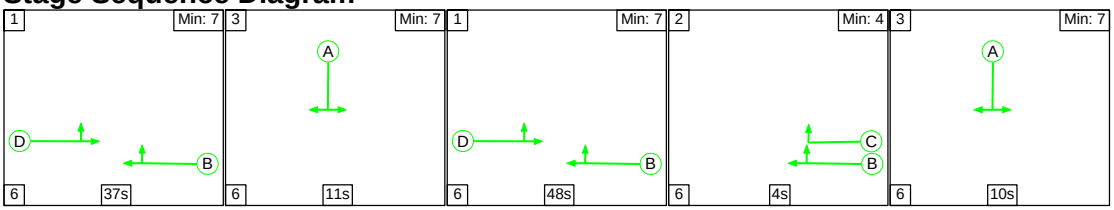
Cycle Time (s): 140

Full Input Data And Results

Full Input Data And Results

Scenario 7: 'PM 2020 Base+Dev+tour' (FG7: 'PM 2020 Base+Dev+tour', Plan 1: 'Staging Plan No. 1')

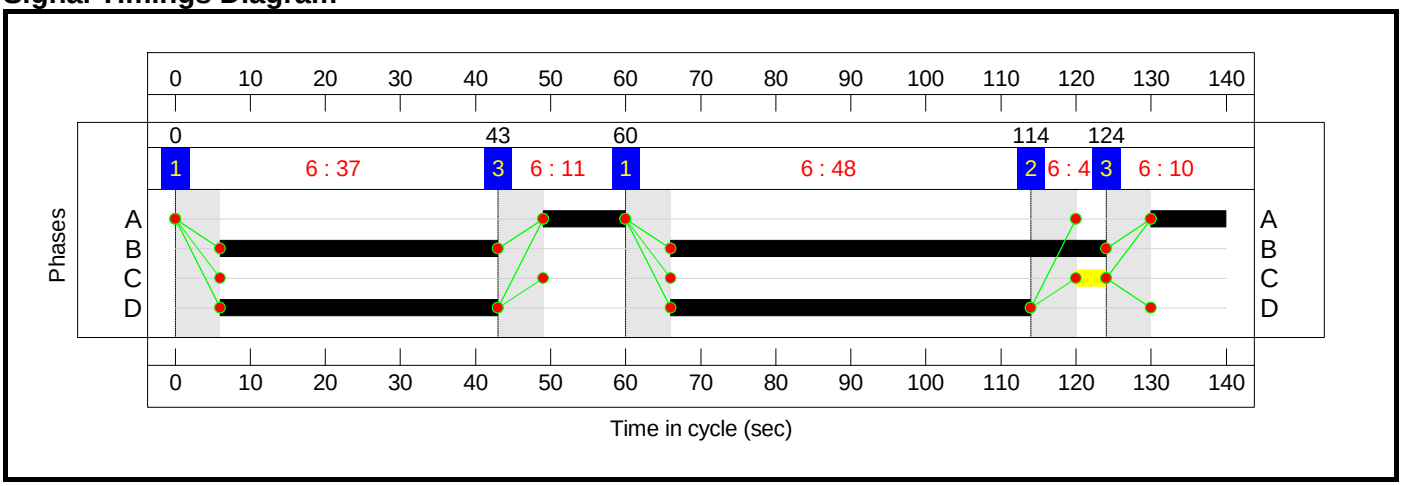
Stage Sequence Diagram



Stage Timings

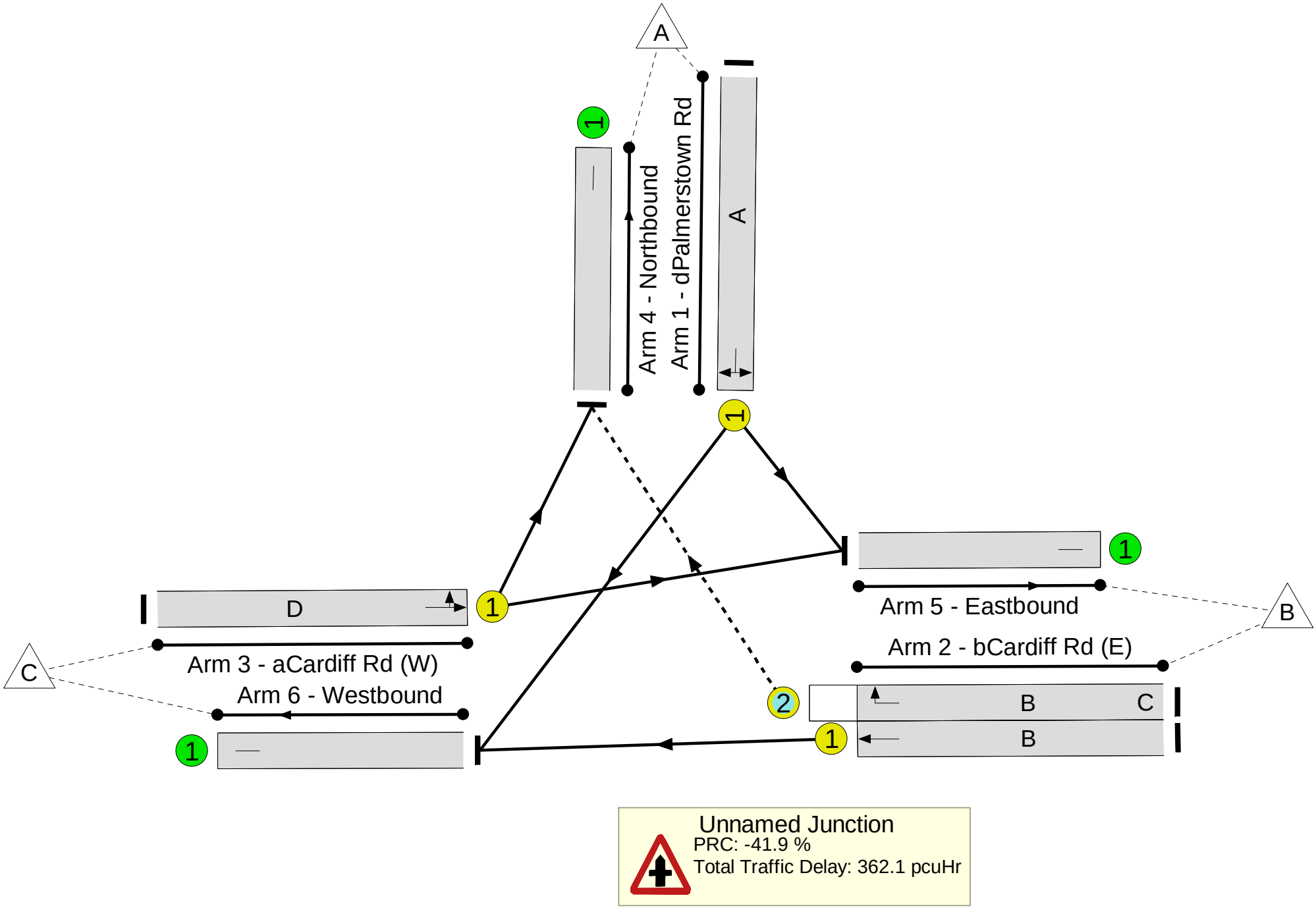
Stage	1	3	1	2	3
Duration	37	11	48	4	10
Change Point	0	43	60	114	124

Signal Timings Diagram



Full Input Data And Results

Network Layout Diagram


A
1
Arm 4 - Northbound
Arm 1 - dPalmerstown Rd
A
1
1
D
Arm 3 - aCardiff Rd (W)
Arm 6 - Westbound
1
C
1
Arm 5 - Eastbound
B
Arm 2 - bCardiff Rd (E)
2
B
C
B
1
Unnamed Junction
PRC: -41.9 %
Total Traffic Delay: 362.1 pcuHr

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**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**127.7%**
Unnamed Junction	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**127.7%**
1/1	dPalmerstown Rd Left Right	U	N/A	N/A	A		2	21	-	350	1735	285	122.8%
2/1	bCardiff Rd (E) Ahead	U	N/A	N/A	B		2	95	-	1739	1965	1361	127.7%
2/2	bCardiff Rd (E) Right	O	N/A	N/A	B	C	2	95	4	140	1852	182	76.8%
3/1	aCardiff Rd (W) Left Ahead	U	N/A	N/A	D		2	85	-	1319	1900	1181	111.7%
4/1	Northbound	U	N/A	N/A	-		-	-	-	180	Inf	Inf	0.0%
5/1	Eastbound	U	N/A	N/A	-		-	-	-	1456	Inf	Inf	0.0%
6/1	Westbound	U	N/A	N/A	-		-	-	-	1912	Inf	Inf	0.0%

Item	Entering (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	**-**	**-**	**0**	**87**	**53**	**59.8**	**301.2**	**1.1**	**362.1**	**-**	**-**	**-**	**-**
Unnamed Junction	**-**	**-**	**0**	**87**	**53**	**59.8**	**301.2**	**1.1**	**362.1**	**-**	**-**	**-**	**-**
1/1	350	285	-	-	-	8.1	35.0	-	43.0	442.7	12.6	35.0	47.6
2/1	1739	1361	-	-	-	36.7	191.0	-	227.8	471.5	70.0	191.0	261.0
2/2	140	140	0	87	53	0.3	1.5	1.1	3.0	76.6	1.3	1.5	2.9
3/1	1319	1181	-	-	-	14.7	73.6	-	88.3	241.0	36.8	73.6	110.4
4/1	176	176	-	-	-	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	1502	1502	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0

C1

PRC for Signalled Lanes (%): -41.9
PRC Over All Lanes (%): -41.9

Total Delay for Signalled Lanes (pcuHr): 362.05
Total Delay Over All Lanes(pcuHr): 362.05

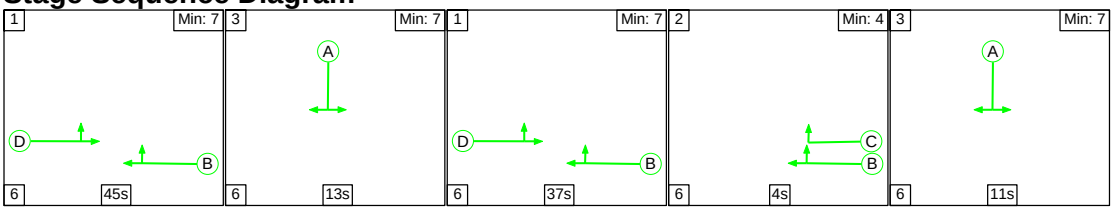
Cycle Time (s): 140

Full Input Data And Results

Full Input Data And Results

Scenario 8: 'PM 2020 Base+tourism' (FG8: 'PM 2020 Base+tourism', Plan 1: 'Staging Plan No. 1')

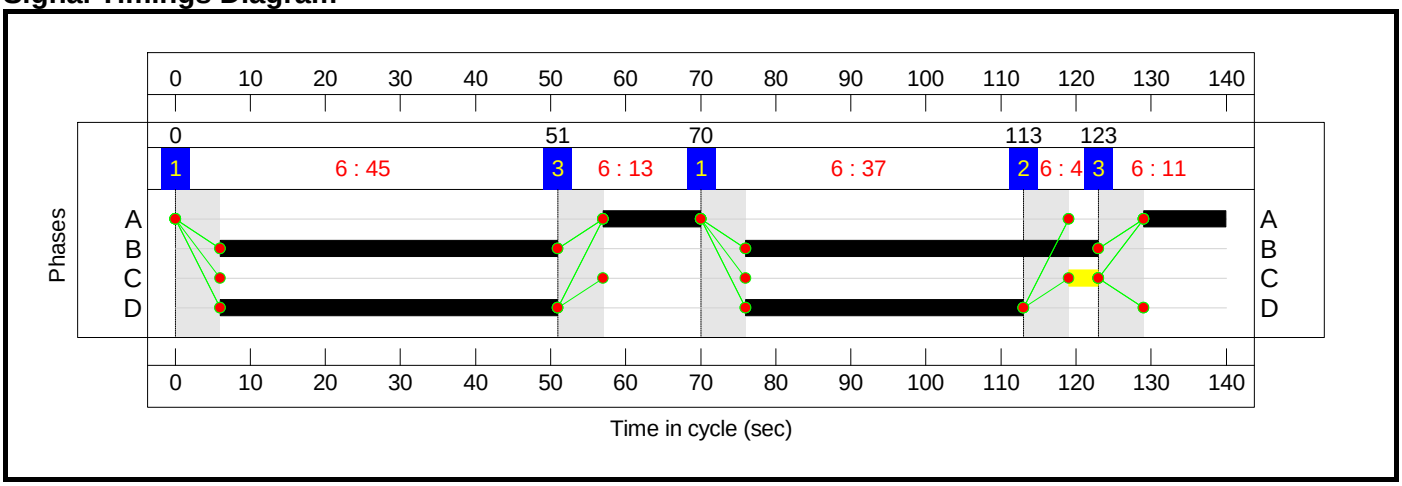
Stage Sequence Diagram



Stage Timings

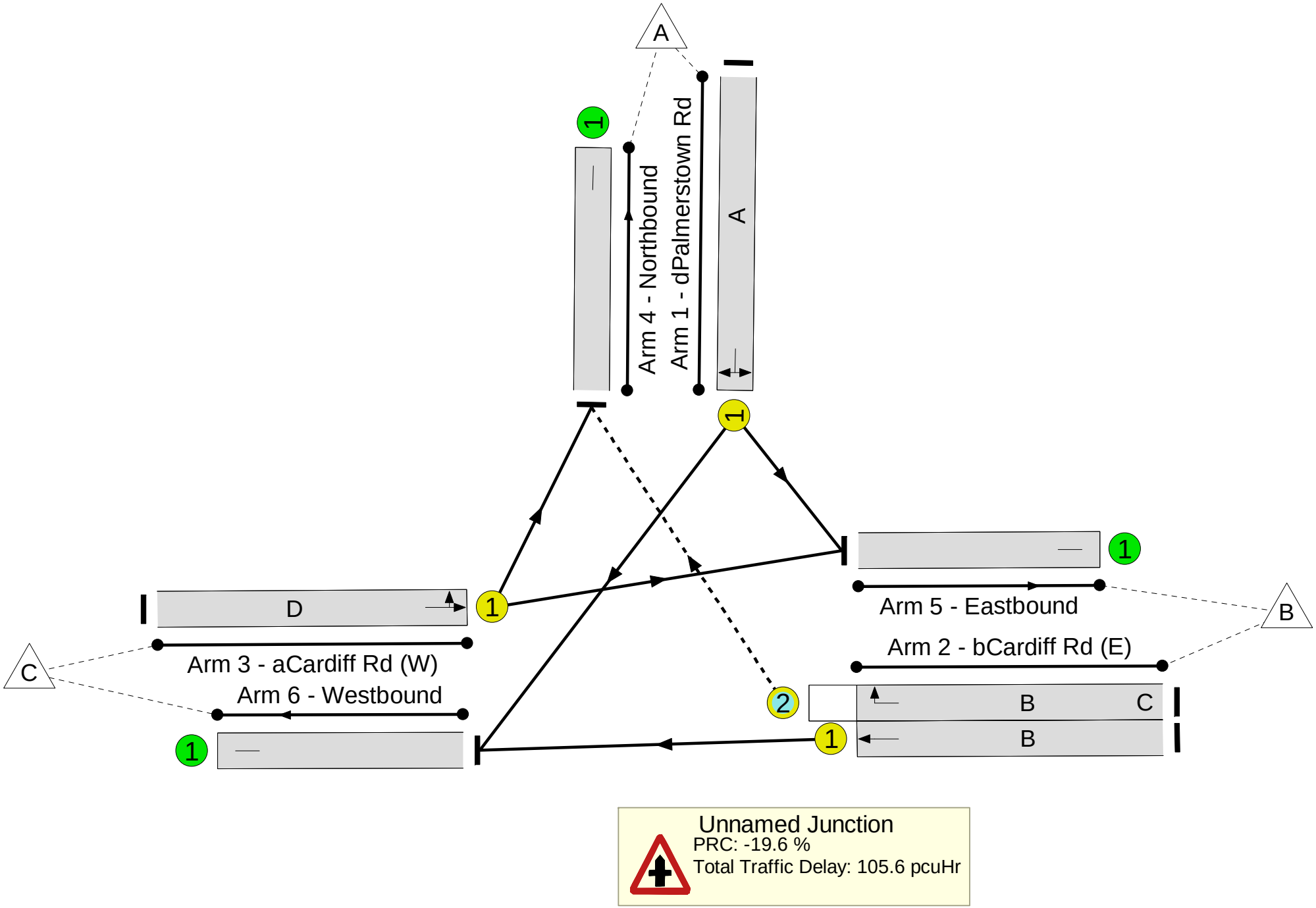
Stage	1	3	1	2	3
Duration	45	13	37	4	11
Change Point	0	51	70	113	123

Signal Timings Diagram



Full Input Data And Results

Network Layout Diagram


A
1
Arm 4 - Northbound
Arm 1 - dPalmerstown Rd
A
1
1
D
1
Arm 5 - Eastbound
B
Arm 3 - aCardiff Rd (W)
Arm 2 - bCardiff Rd (E)
C
Arm 6 - Westbound
2
B
C
1
B
1
Unnamed Junction
PRC: -19.6 %
Total Traffic Delay: 105.6 pcuHr

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**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**107.6%**
Unnamed Junction	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**107.6%**
1/1	dPalmerstown Rd Left Right	U	N/A	N/A	A		2	24	-	347	1736	322	107.6%
2/1	bCardiff Rd (E) Ahead	U	N/A	N/A	B		2	92	-	1410	1965	1319	106.9%
2/2	bCardiff Rd (E) Right	O	N/A	N/A	B	C	2	92	4	140	1852	212	66.0%
3/1	aCardiff Rd (W) Left Ahead	U	N/A	N/A	D		2	82	-	1122	1900	1140	98.4%
4/1	Northbound	U	N/A	N/A	-		-	-	-	173	Inf	Inf	0.0%
5/1	Eastbound	U	N/A	N/A	-		-	-	-	1266	Inf	Inf	0.0%
6/1	Westbound	U	N/A	N/A	-		-	-	-	1580	Inf	Inf	0.0%

Item	Entering (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	**-**	**-**	**4**	**83**	**53**	**21.3**	**83.2**	**1.1**	**105.6**	**-**	**-**	**-**	**-**
Unnamed Junction	**-**	**-**	**4**	**83**	**53**	**21.3**	**83.2**	**1.1**	**105.6**	**-**	**-**	**-**	**-**
1/1	347	322	-	-	-	4.7	17.3	-	22.0	228.2	8.7	17.3	26.0
2/1	1410	1319	-	-	-	11.8	52.1	-	63.9	163.1	35.3	52.1	87.3
2/2	140	140	4	83	53	0.4	0.9	1.1	2.5	64.2	1.7	0.9	2.6
3/1	1122	1122	-	-	-	4.4	12.8	-	17.2	55.2	24.3	12.8	37.2
4/1	173	173	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
5/1	1253	1253	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	1477	1477	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0

C1

PRC for Signalled Lanes (%): -19.6
PRC Over All Lanes (%): -19.6

Total Delay for Signalled Lanes (pcuHr): 105.57
Total Delay Over All Lanes(pcuHr): 105.57

Cycle Time (s): 140

Full Input Data And Results

Appendix D

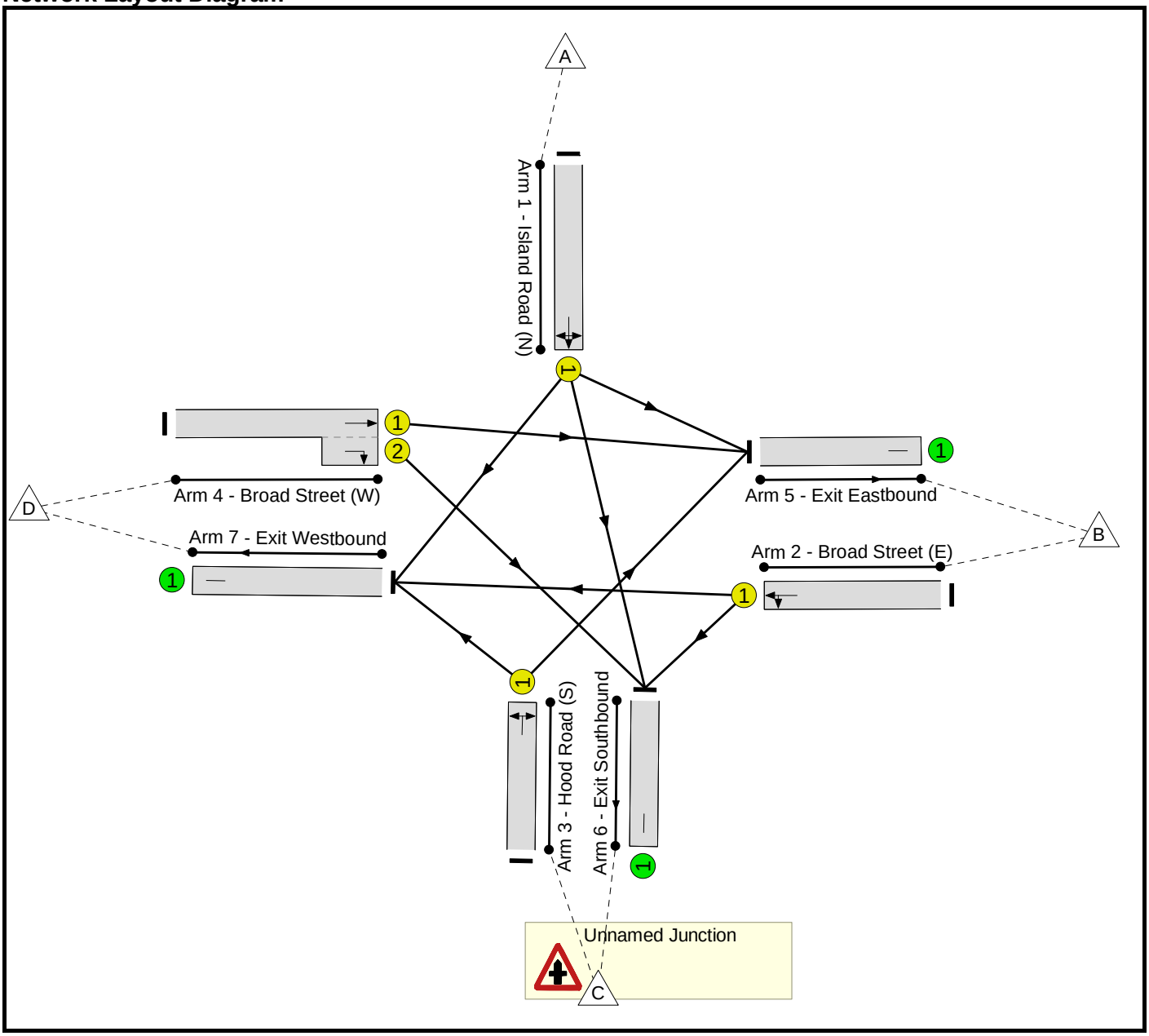
Hood Road / Broad Street

Full Input Data And Results

User and Project Details

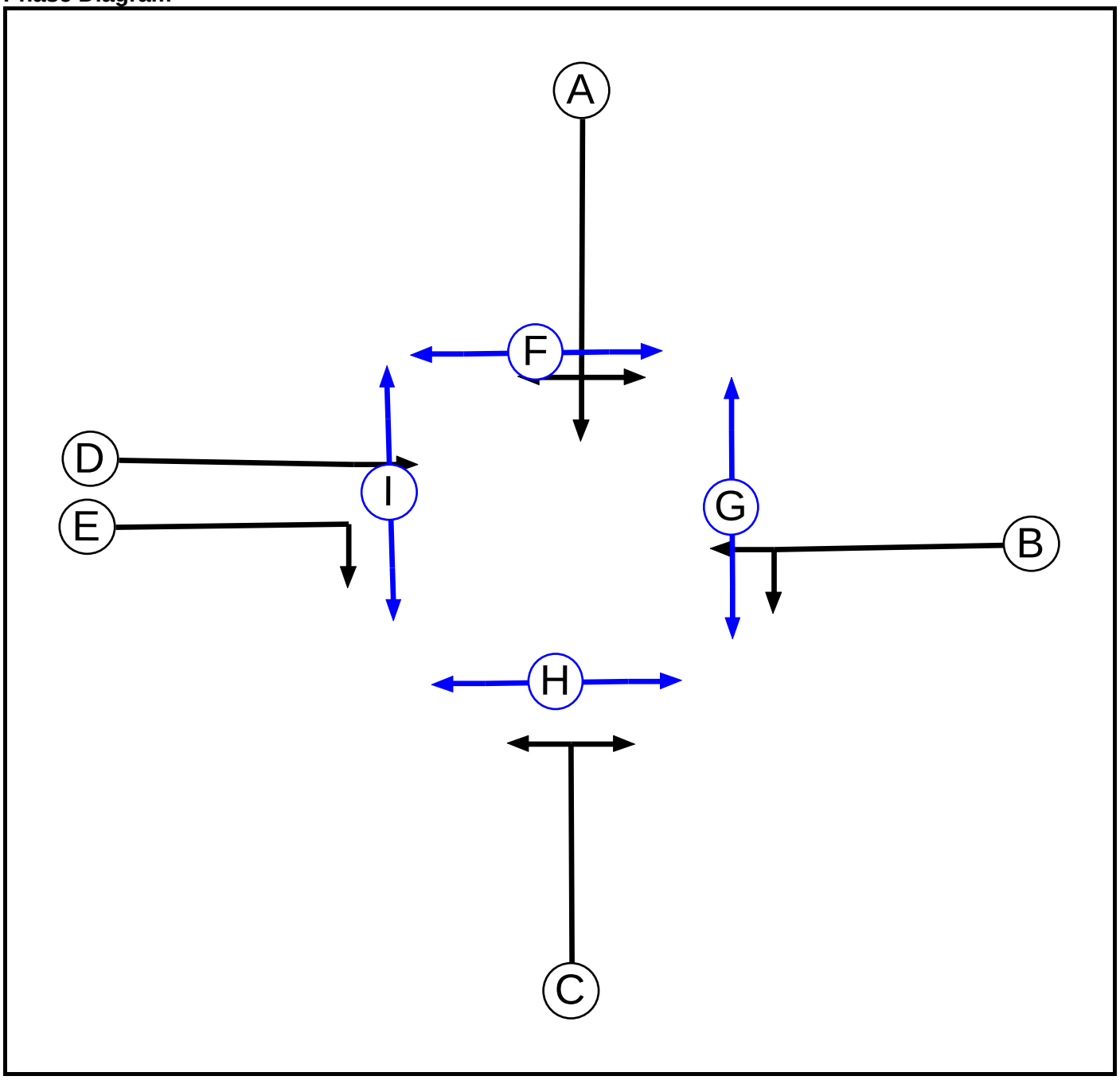
Project:	**Waterfront Barry**
Title:	
Location:	Broad Street / Hood Road, Barry
File name:	Broad Street_Hood Road.lsg3x
Author:	Ryan Hopkins
Company:	Arup
Address:	
Notes:	

Network Layout Diagram



Full Input Data And Results

Phase Diagram



Phase Input Data

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

Full Input Data And Results

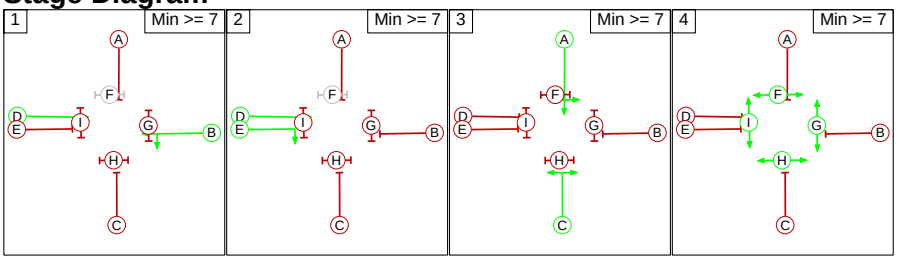
Phase Intergreens Matrix

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

Phases in Stage

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

Stage Diagram



Phase Delays

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

Prohibited Stage Changes

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

Full Input Data And Results

Give-Way Lane Input Data

Junction: Unnamed Junction
There are no Opposed Lanes in this Junction

Full Input Data And Results

Lane Input Data

Junction: Unnamed Junction

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 (Island Road (N))	U	A	2	3	60.0	Geom	-	3.70	0.00	Y	Arm 5 Left	7.00
											Arm 6 Ahead	Inf
											Arm 7 Right	16.50
2/1 (Broad Street (E))	U	B	2	3	60.0	Geom	-	4.30	0.00	Y	Arm 6 Left	7.90
											Arm 7 Ahead	Inf
3/1 (Hood Road (S))	U	C	2	3	60.0	Geom	-	3.15	0.00	Y	Arm 5 Right	15.30
											Arm 7 Left	10.12
4/1 (Broad Street (W))	U	D	2	3	60.0	Geom	-	3.05	0.00	Y	Arm 5 Ahead	Inf
4/2 (Broad Street (W))	U	E	2	3	3.0	Geom	-	3.05	0.00	Y	Arm 6 Right	14.00
5/1 (Exit Eastbound)	U		2	3	60.0	Inf	-	-	-	-	-	-
6/1 (Exit Southbound)	U		2	3	60.0	Inf	-	-	-	-	-	-
7/1 (Exit Westbound)	U		2	3	60.0	Inf	-	-	-	-	-	-

Traffic Flow Groups

Flow Group	Start Time	End Time	Duration	Formula
1: 'AM 2008 Base'	08:30	09:30	01:00	
2: 'PM 2008 Base'	16:30	17:30	01:00	
3: 'AM 2020 Base'	08:30	09:30	01:00	
4: 'PM 2020 Base'	16:30	17:30	01:00	
5: 'AM 2020 Dev + BI'	08:30	09:30	01:00	
6: 'PM 2020 Dev + BI'	16:30	17:30	01:00	
7: '2020 Dev + Tour'	16:30	17:30	01:00	
8: 'PM 2020 Base + Tourism'	16:30	17:30	01:00	

Traffic Lane Flows

Lane	Scenario 1: AM 2008 Base
Junction: Unnamed Junction	
1/1	68
2/1	419
3/1	107
4/1 (with short)	697(In) 633(Out)
4/2 (short)	64
5/1	658
6/1	93
7/1	540

Scenario 1: 'AM 2008 Base' (FG1: 'AM 2008 Base', Plan 1: 'Staging Plan No. 1')

Traffic Lane Flows

Junction: Unnamed Junction

Lane	Lane Width (m)	Gradient	Nearside Lane	Allowed Turns	Turning Radius (m)	Turning Prop.	Sat flow (PCU/Hr)
1/1 (Island Road (N))	3.70	0.00	Y	Arm 5 Left	7.00	27.9 %	1816
				Arm 6 Ahead	Inf	35.3 %	
				Arm 7 Right	16.50	36.8 %	
2/1 (Broad Street (E))	4.30	0.00	Y	Arm 6 Left	7.90	1.2 %	2040
				Arm 7 Ahead	Inf	98.8 %	
3/1 (Hood Road (S))	3.15	0.00	Y	Arm 5 Right	15.30	5.6 %	1685
				Arm 7 Left	10.12	94.4 %	
4/1 (Broad Street (W))	3.05	0.00	Y	Arm 5 Ahead	Inf	100.0 %	1920
4/2 (Broad Street (W))	3.05	0.00	Y	Arm 6 Right	14.00	100.0 %	1734
5/1 (Exit Eastbound Lane 1)	Infinite Saturation Flow						Inf
6/1 (Exit Southbound Lane 1)	Infinite Saturation Flow						Inf
7/1 (Exit Westbound Lane 1)	Infinite Saturation Flow						Inf

Full Input Data And Results

Traffic Lane Flows

Lane	Scenario 2: PM 2008 Base
Junction: Unnamed Junction	
1/1	75
2/1	640
3/1	305
4/1 (with short)	585(In) 529(Out)
4/2 (short)	56
5/1	562
6/1	82
7/1	961

Scenario 2: 'PM 2008 Base' (FG2: 'PM 2008 Base', Plan 1: 'Staging Plan No. 1')

Traffic Lane Flows

Junction: Unnamed Junction

Lane	Lane Width (m)	Gradient	Nearside Lane	Allowed Turns	Turning Radius (m)	Turning Prop.	Sat flow (PCU/Hr)
1/1 (Island Road (N))	3.70	0.00	Y	Arm 5 Left	7.00	37.3 %	1778
				Arm 6 Ahead	Inf	22.7 %	
				Arm 7 Right	16.50	40.0 %	
2/1 (Broad Street (E))	4.30	0.00	Y	Arm 6 Left	7.90	1.4 %	2040
				Arm 7 Ahead	Inf	98.6 %	
3/1 (Hood Road (S))	3.15	0.00	Y	Arm 5 Right	15.30	1.6 %	1682
				Arm 7 Left	10.12	98.4 %	
4/1 (Broad Street (W))	3.05	0.00	Y	Arm 5 Ahead	Inf	100.0 %	1920
4/2 (Broad Street (W))	3.05	0.00	Y	Arm 6 Right	14.00	100.0 %	1734
5/1 (Exit Eastbound Lane 1)	Infinite Saturation Flow						Inf
6/1 (Exit Southbound Lane 1)	Infinite Saturation Flow						Inf
7/1 (Exit Westbound Lane 1)	Infinite Saturation Flow						Inf

Full Input Data And Results

Traffic Lane Flows

Lane	Scenario 3: AM 2020 Base
Junction: Unnamed Junction	
1/1	79
2/1	488
3/1	124
4/1 (with short)	811(In) 737(Out)
4/2 (short)	74
5/1	766
6/1	108
7/1	628

Scenario 3: 'AM 2020 Base' (FG3: 'AM 2020 Base', Plan 1: 'Staging Plan No. 1')

Traffic Lane Flows

Junction: Unnamed Junction

Lane	Lane Width (m)	Gradient	Nearside Lane	Allowed Turns	Turning Radius (m)	Turning Prop.	Sat flow (PCU/Hr)
1/1 (Island Road (N))	3.70	0.00	Y	Arm 5 Left	7.00	27.8 %	1816
				Arm 6 Ahead	Inf	35.4 %	
				Arm 7 Right	16.50	36.7 %	
2/1 (Broad Street (E))	4.30	0.00	Y	Arm 6 Left	7.90	1.2 %	2040
				Arm 7 Ahead	Inf	98.8 %	
3/1 (Hood Road (S))	3.15	0.00	Y	Arm 5 Right	15.30	5.6 %	1685
				Arm 7 Left	10.12	94.4 %	
4/1 (Broad Street (W))	3.05	0.00	Y	Arm 5 Ahead	Inf	100.0 %	1920
4/2 (Broad Street (W))	3.05	0.00	Y	Arm 6 Right	14.00	100.0 %	1734
5/1 (Exit Eastbound Lane 1)	Infinite Saturation Flow						Inf
6/1 (Exit Southbound Lane 1)	Infinite Saturation Flow						Inf
7/1 (Exit Westbound Lane 1)	Infinite Saturation Flow						Inf

Full Input Data And Results

Traffic Lane Flows

Lane	Scenario 4: PM 2020 Base
Junction: Unnamed Junction	
1/1	87
2/1	745
3/1	354
4/1 (with short)	680(In) 615(Out)
4/2 (short)	65
5/1	654
6/1	95
7/1	1117

Scenario 4: 'PM 2020 Base' (FG4: 'PM 2020 Base', Plan 1: 'Staging Plan No. 1')

Traffic Lane Flows

Junction: Unnamed Junction

Lane	Lane Width (m)	Gradient	Nearside Lane	Allowed Turns	Turning Radius (m)	Turning Prop.	Sat flow (PCU/Hr)
1/1 (Island Road (N))	3.70	0.00	Y	Arm 5 Left	7.00	37.9 %	1776
				Arm 6 Ahead	Inf	21.8 %	
				Arm 7 Right	16.50	40.2 %	
2/1 (Broad Street (E))	4.30	0.00	Y	Arm 6 Left	7.90	1.5 %	2039
				Arm 7 Ahead	Inf	98.5 %	
3/1 (Hood Road (S))	3.15	0.00	Y	Arm 5 Right	15.30	1.7 %	1682
				Arm 7 Left	10.12	98.3 %	
4/1 (Broad Street (W))	3.05	0.00	Y	Arm 5 Ahead	Inf	100.0 %	1920
4/2 (Broad Street (W))	3.05	0.00	Y	Arm 6 Right	14.00	100.0 %	1734
5/1 (Exit Eastbound Lane 1)	Infinite Saturation Flow						Inf
6/1 (Exit Southbound Lane 1)	Infinite Saturation Flow						Inf
7/1 (Exit Westbound Lane 1)	Infinite Saturation Flow						Inf

Full Input Data And Results

Traffic Lane Flows

Lane	Scenario 5: AM 2020 Dev + BI
Junction: Unnamed Junction	
1/1	79
2/1	401
3/1	161
4/1 (with short)	646(In) 548(Out)
4/2 (short)	98
5/1	577
6/1	132
7/1	578

Scenario 5: 'AM 2020 Dev + BI' (FG5: 'AM 2020 Dev + BI', Plan 1: 'Staging Plan No. 1')

Traffic Lane Flows

Junction: Unnamed Junction							
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat flow (PCU/Hr)**
1/1 (Island Road (N))	3.70	0.00	Y	Arm 5 Left	7.00	27.8 %	1816
				Arm 6 Ahead	Inf	35.4 %	
				Arm 7 Right	16.50	36.7 %	
2/1 (Broad Street (E))	4.30	0.00	Y	Arm 6 Left	7.90	1.5 %	2039
				Arm 7 Ahead	Inf	98.5 %	
3/1 (Hood Road (S))	3.15	0.00	Y	Arm 5 Right	15.30	4.3 %	1684
				Arm 7 Left	10.12	95.7 %	
4/1 (Broad Street (W))	3.05	0.00	Y	Arm 5 Ahead	Inf	100.0 %	1920
4/2 (Broad Street (W))	3.05	0.00	Y	Arm 6 Right	14.00	100.0 %	1734
5/1 (Exit Eastbound Lane 1)	Infinite Saturation Flow						Inf
6/1 (Exit Southbound Lane 1)	Infinite Saturation Flow						Inf
7/1 (Exit Westbound Lane 1)	Infinite Saturation Flow						Inf

Full Input Data And Results

Traffic Lane Flows

Lane	Scenario 6: PM 2020 Dev + BI
Junction: Unnamed Junction	
1/1	87
2/1	524
3/1	387
4/1 (with short)	598(In) 494(Out)
4/2 (short)	104
5/1	533
6/1	134
7/1	929

Scenario 6: 'PM 2020 Dev + BI' (FG6: 'PM 2020 Dev + BI', Plan 1: 'Staging Plan No. 1')

Traffic Lane Flows

Junction: Unnamed Junction							
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat flow (PCU/Hr)**
1/1 (Island Road (N))	3.70	0.00	Y	Arm 5 Left	7.00	37.9 %	1776
				Arm 6 Ahead	Inf	21.8 %	
				Arm 7 Right	16.50	40.2 %	
2/1 (Broad Street (E))	4.30	0.00	Y	Arm 6 Left	7.90	2.1 %	2037
				Arm 7 Ahead	Inf	97.9 %	
3/1 (Hood Road (S))	3.15	0.00	Y	Arm 5 Right	15.30	1.6 %	1682
				Arm 7 Left	10.12	98.4 %	
4/1 (Broad Street (W))	3.05	0.00	Y	Arm 5 Ahead	Inf	100.0 %	1920
4/2 (Broad Street (W))	3.05	0.00	Y	Arm 6 Right	14.00	100.0 %	1734
5/1 (Exit Eastbound Lane 1)	Infinite Saturation Flow						Inf
6/1 (Exit Southbound Lane 1)	Infinite Saturation Flow						Inf
7/1 (Exit Westbound Lane 1)	Infinite Saturation Flow						Inf

Full Input Data And Results

Traffic Lane Flows

Lane	Scenario 7: PM 2020 Dev + Tourism
Junction: Unnamed Junction	
1/1	87
2/1	524
3/1	387
4/1 (with short)	598(In) 494(Out)
4/2 (short)	104
5/1	533
6/1	134
7/1	929

Scenario 7: 'PM 2020 Dev + Tourism' (FG7: '2020 Dev + Tour', Plan 1: 'Staging Plan No. 1')

Traffic Lane Flows

Junction: Unnamed Junction							
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat flow (PCU/Hr)**
1/1 (Island Road (N))	3.70	0.00	Y	Arm 5 Left	7.00	37.9 %	1776
				Arm 6 Ahead	Inf	21.8 %	
				Arm 7 Right	16.50	40.2 %	
2/1 (Broad Street (E))	4.30	0.00	Y	Arm 6 Left	7.90	2.1 %	2037
				Arm 7 Ahead	Inf	97.9 %	
3/1 (Hood Road (S))	3.15	0.00	Y	Arm 5 Right	15.30	1.6 %	1682
				Arm 7 Left	10.12	98.4 %	
4/1 (Broad Street (W))	3.05	0.00	Y	Arm 5 Ahead	Inf	100.0 %	1920
4/2 (Broad Street (W))	3.05	0.00	Y	Arm 6 Right	14.00	100.0 %	1734
5/1 (Exit Eastbound Lane 1)	Infinite Saturation Flow						Inf
6/1 (Exit Southbound Lane 1)	Infinite Saturation Flow						Inf
7/1 (Exit Westbound Lane 1)	Infinite Saturation Flow						Inf

Full Input Data And Results

Traffic Lane Flows

Lane	Scenario 8: PM 2020 Base + Tourism
Junction: Unnamed Junction	
1/1	87
2/1	846
3/1	354
4/1 (with short)	795(In) 730(Out)
4/2 (short)	65
5/1	769
6/1	95
7/1	1218

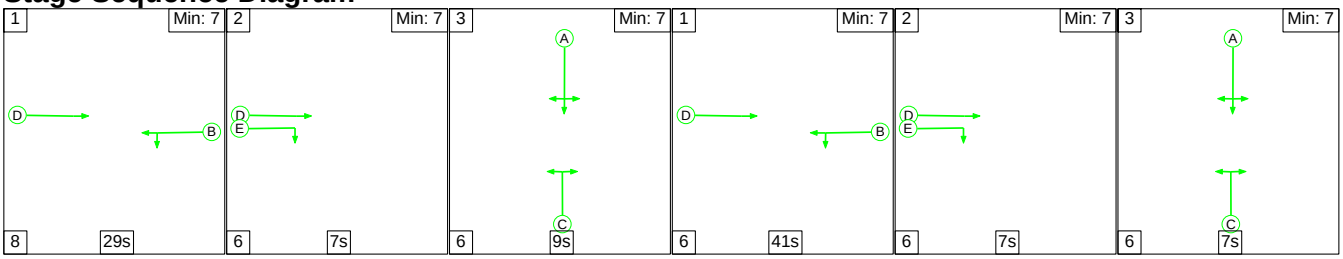
Scenario 8: 'PM 2020 Base + Tourism' (FG8: 'PM 2020 Base + Tourism', Plan 1: 'Staging Plan No. 1')

Traffic Lane Flows

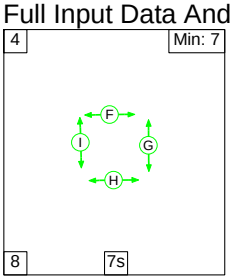
Junction: Unnamed Junction							
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat flow (PCU/Hr)**
1/1 (Island Road (N))	3.70	0.00	Y	Arm 5 Left	7.00	37.9 %	1776
				Arm 6 Ahead	Inf	21.8 %	
				Arm 7 Right	16.50	40.2 %	
2/1 (Broad Street (E))	4.30	0.00	Y	Arm 6 Left	7.90	1.3 %	2040
				Arm 7 Ahead	Inf	98.7 %	
3/1 (Hood Road (S))	3.15	0.00	Y	Arm 5 Right	15.30	1.7 %	1682
				Arm 7 Left	10.12	98.3 %	
4/1 (Broad Street (W))	3.05	0.00	Y	Arm 5 Ahead	Inf	100.0 %	1920
4/2 (Broad Street (W))	3.05	0.00	Y	Arm 6 Right	14.00	100.0 %	1734
5/1 (Exit Eastbound Lane 1)	Infinite Saturation Flow						Inf
6/1 (Exit Southbound Lane 1)	Infinite Saturation Flow						Inf
7/1 (Exit Westbound Lane 1)	Infinite Saturation Flow						Inf

Scenario 1: 'AM 2008 Base' (FG1: 'AM 2008 Base', Plan 1: 'Staging Plan No. 1')

Stage Sequence Diagram



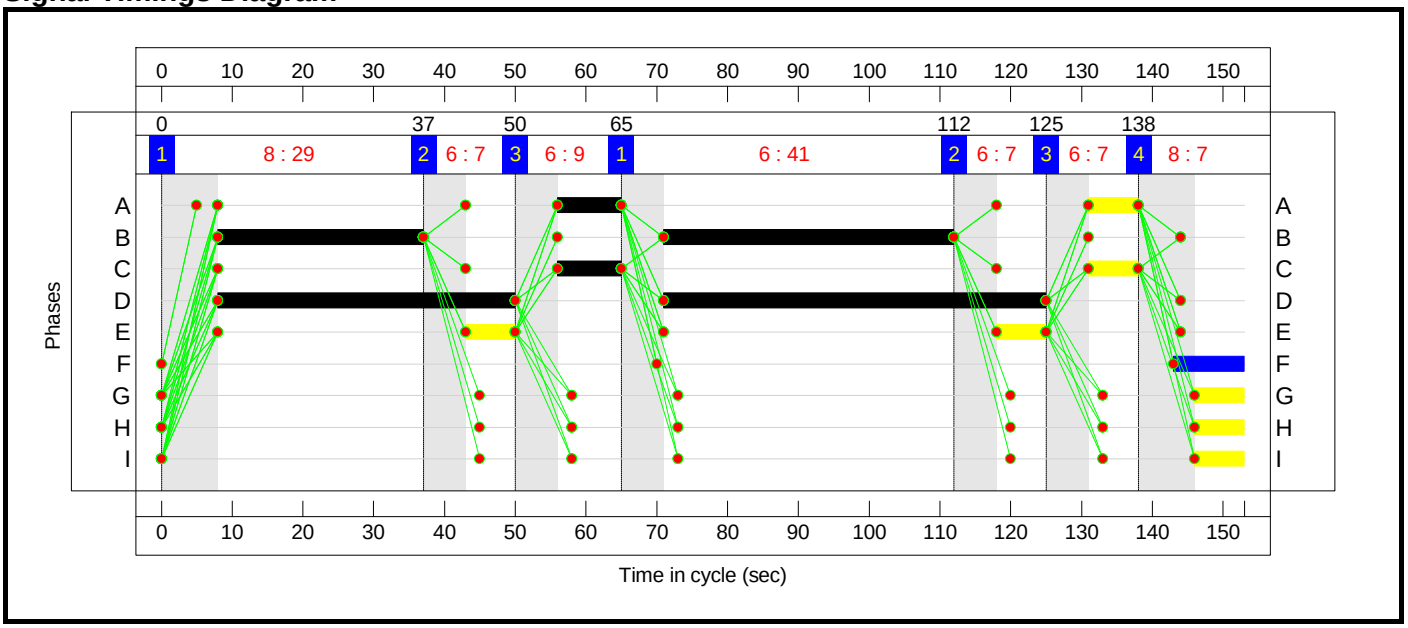
Full Input Data And Results



Stage Timings

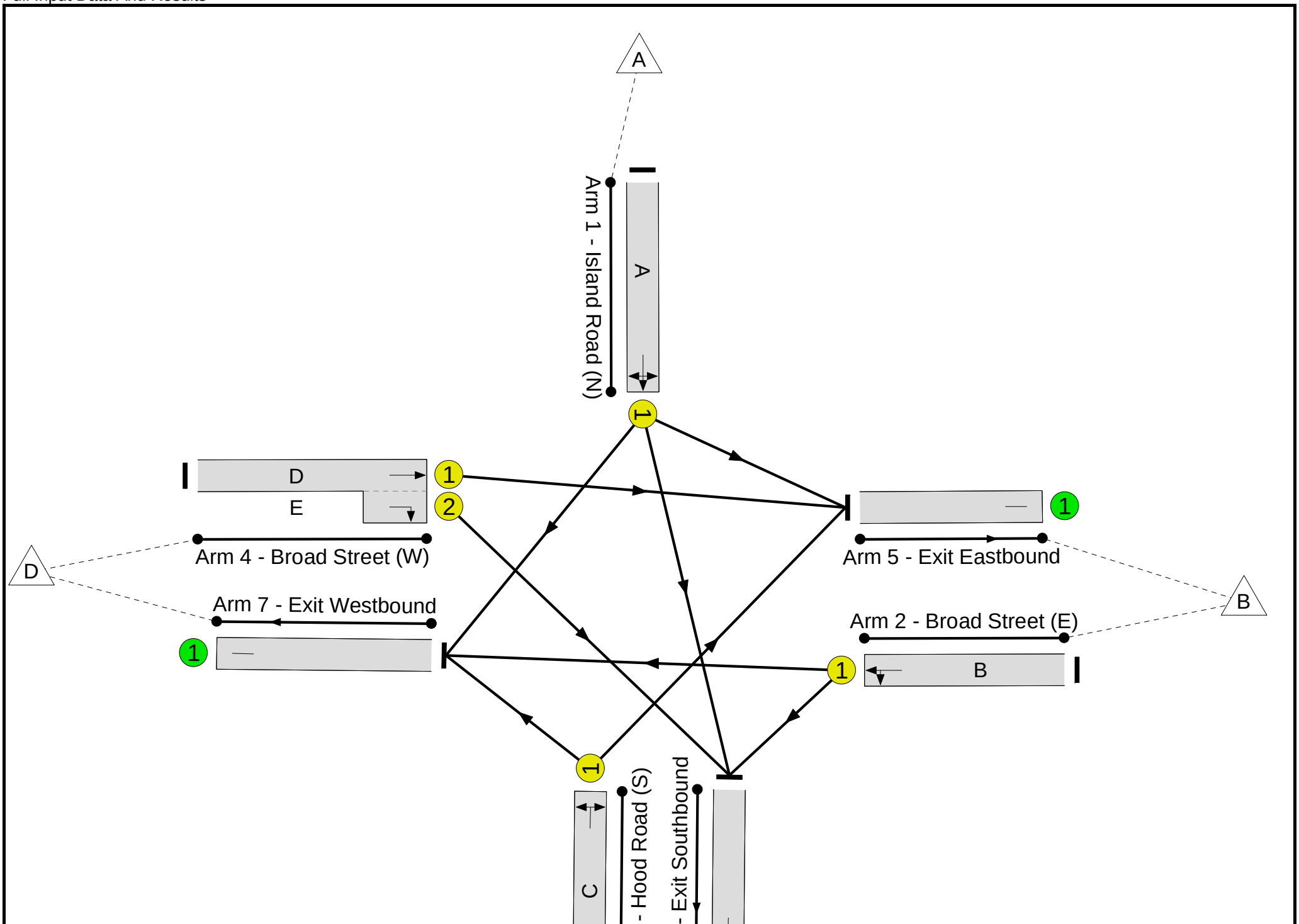
Stage	1	2	3	1	2	3	4
Duration	29	7	9	41	7	7	7
Change Point	0	37	50	65	112	125	138

Signal Timings Diagram



Full Input Data And Results

Network Layout Diagram


A
Arm 1 - Island Road (N)
A
1
D
E
1
2
Arm 4 - Broad Street (W)
D
Arm 7 - Exit Westbound
1
1
Arm 5 - Exit Eastbound
B
Arm 2 - Broad Street (E)
1
B
1
C
- Hood Road (S)
- Exit Southbound

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**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**56.9%**
Unnamed Junction	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**56.9%**
1/1	Island Road (N) Left Ahead Right	U	N/A	N/A	A		2	16	-	68	1816	214	31.8%
2/1	Broad Street (E) Left Ahead	U	N/A	N/A	B		2	70	-	419	2040	960	43.6%
3/1	Hood Road (S) Right Left	U	N/A	N/A	C		2	16	-	107	1685	198	54.0%
4/1+4/2	Broad Street (W) Ahead Right	U	N/A	N/A	D E		2	96:14	-	697	1920:1734	1224	56.9%
5/1	Exit Eastbound	U	N/A	N/A	-		-	-	-	658	Inf	Inf	0.0%
6/1	Exit Southbound	U	N/A	N/A	-		-	-	-	93	Inf	Inf	0.0%
7/1	Exit Westbound	U	N/A	N/A	-		-	-	-	540	Inf	Inf	0.0%

Item	Entering (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	**-**	**-**	**0**	**0**	**0**	**5.2**	**1.9**	**0.0**	**7.0**	**-**	**-**	**-**	**-**
Unnamed Junction	**-**	**-**	**0**	**0**	**0**	**5.2**	**1.9**	**0.0**	**7.0**	**-**	**-**	**-**	**-**
1/1	68	68	-	-	-	0.6	0.2	-	0.8	43.3	1.4	0.2	1.6
2/1	419	419	-	-	-	1.6	0.4	-	2.0	17.3	7.0	0.4	7.4
3/1	107	107	-	-	-	0.9	0.6	-	1.5	51.3	2.2	0.6	2.8
4/1+4/2	697	697	-	-	-	2.0	0.7	-	2.7	13.8	10.2	0.7	10.8
5/1	658	658	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	93	93	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
7/1	540	540	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0

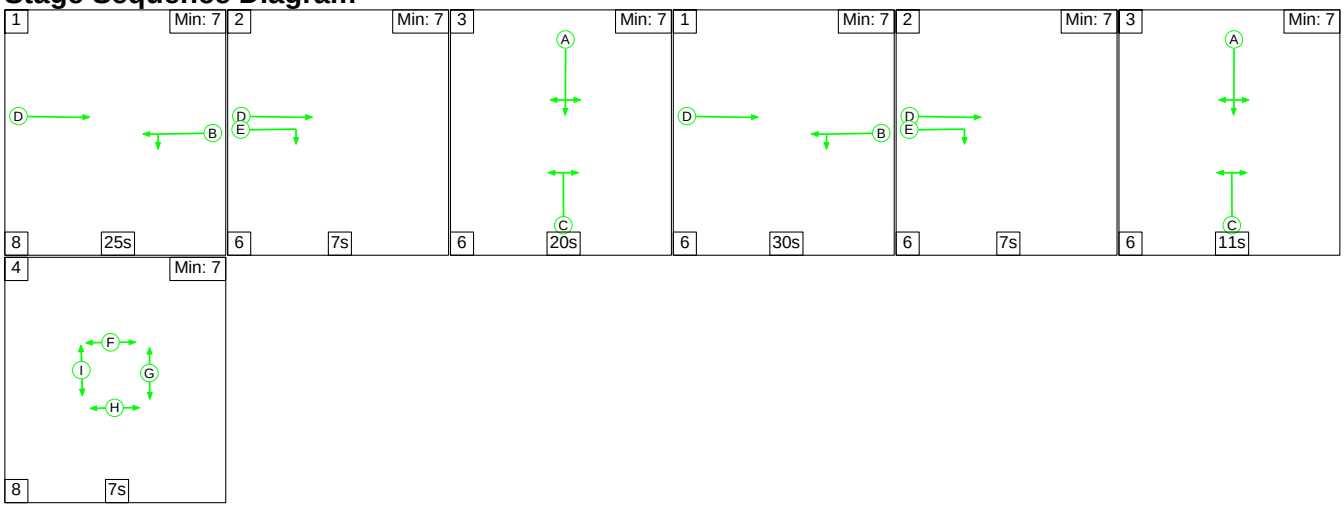
C1 PRC for Signalled Lanes (%): 58.1 Total Delay for Signalled Lanes (pcuHr): 7.03
PRC Over All Lanes (%): 58.1 Total Delay Over All Lanes(pcuHr): 7.03 Cycle Time (s): 153

Full Input Data And Results

Full Input Data And Results

Scenario 2: 'PM 2008 Base' (FG2: 'PM 2008 Base', Plan 1: 'Staging Plan No. 1')

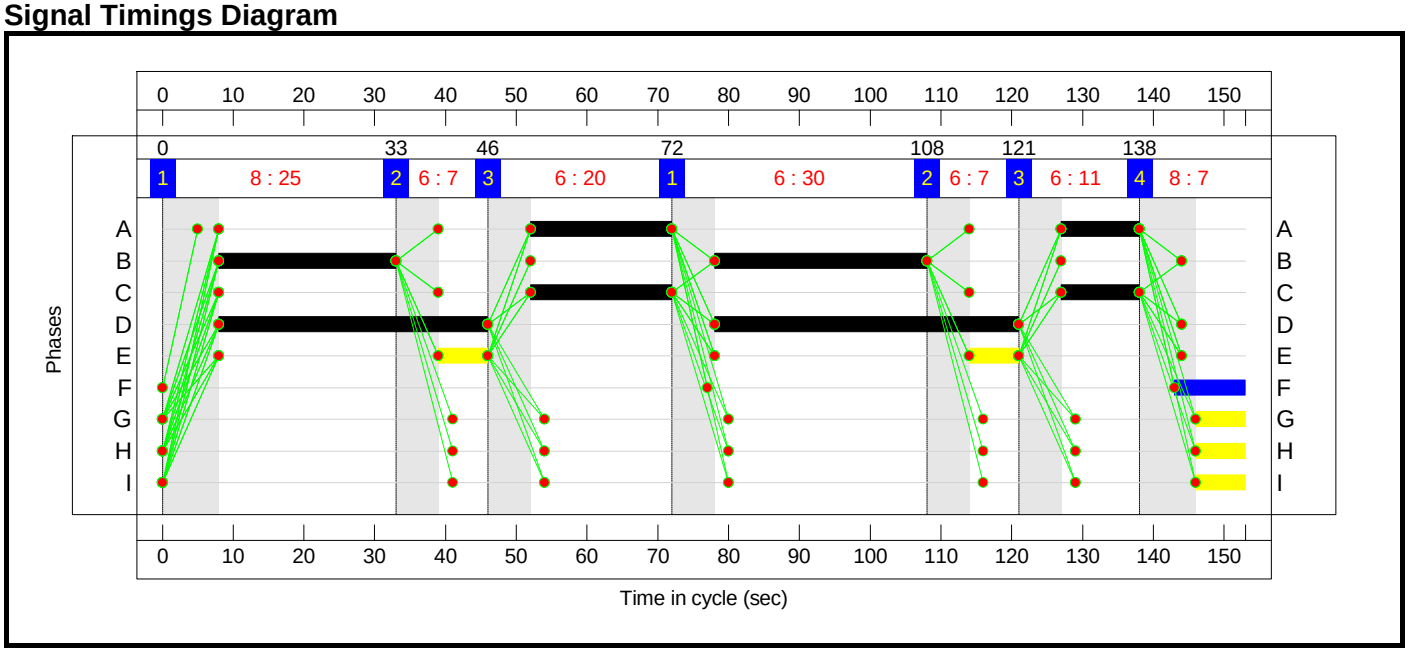
Stage Sequence Diagram



Stage Timings

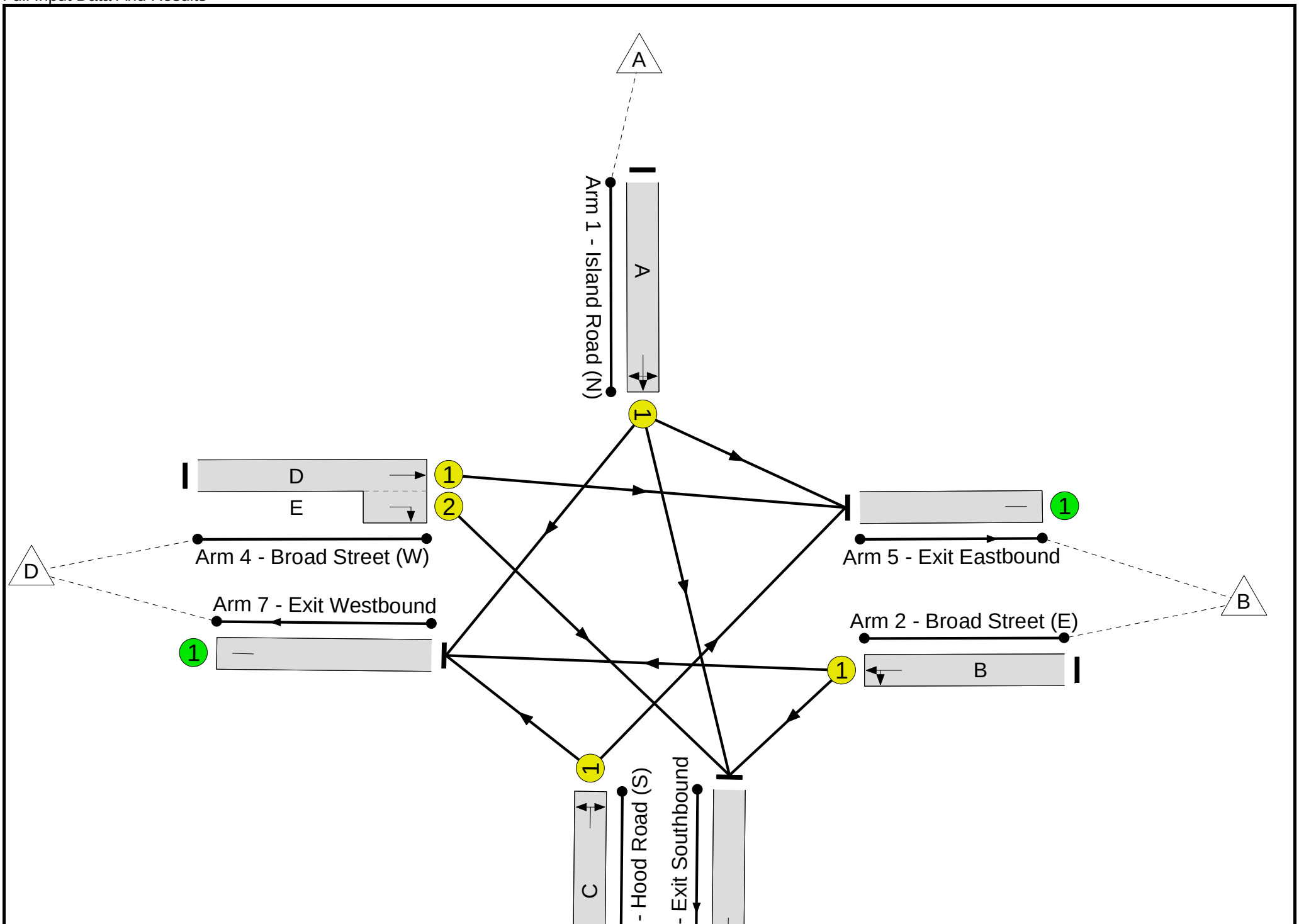
Stage	1	2	3	1	2	3	4
Duration	25	7	20	30	7	11	7
Change Point	0	33	46	72	108	121	138

Signal Timings Diagram



Full Input Data And Results

Network Layout Diagram


A
Arm 1 - Island Road (N)
A
1
D
E
1
2
Arm 4 - Broad Street (W)
D
Arm 7 - Exit Westbound
1
1
Arm 5 - Exit Eastbound
B
Arm 2 - Broad Street (E)
1
B
1
C
- Hood Road (S)
- Exit Southbound

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**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**84.2%**
Unnamed Junction	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**84.2%**
1/1	Island Road (N) Left Ahead Right	U	N/A	N/A	A		2	31	-	75	1778	383	19.6%
2/1	Broad Street (E) Left Ahead	U	N/A	N/A	B		2	55	-	640	2040	760	84.2%
3/1	Hood Road (S) Right Left	U	N/A	N/A	C		2	31	-	305	1682	363	84.1%
4/1+4/2	Broad Street (W) Ahead Right	U	N/A	N/A	D E		2	81:14	-	585	1920:1734	1038	56.4%
5/1	Exit Eastbound	U	N/A	N/A	-		-	-	-	562	Inf	Inf	0.0%
6/1	Exit Southbound	U	N/A	N/A	-		-	-	-	82	Inf	Inf	0.0%
7/1	Exit Westbound	U	N/A	N/A	-		-	-	-	961	Inf	Inf	0.0%

Item	Entering (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	**-**	**-**	**0**	**0**	**0**	**9.1**	**5.8**	**0.0**	**14.9**	**-**	**-**	**-**	**-**
Unnamed Junction	**-**	**-**	**0**	**0**	**0**	**9.1**	**5.8**	**0.0**	**14.9**	**-**	**-**	**-**	**-**
1/1	75	75	-	-	-	0.5	0.1	-	0.6	30.7	1.4	0.1	1.5
2/1	640	640	-	-	-	3.9	2.6	-	6.5	36.5	13.3	2.6	15.9
3/1	305	305	-	-	-	2.5	2.4	-	4.9	57.8	6.8	2.4	9.2
4/1+4/2	585	585	-	-	-	2.2	0.6	-	2.8	17.4	8.6	0.6	9.3
5/1	562	562	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	82	82	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
7/1	961	961	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0

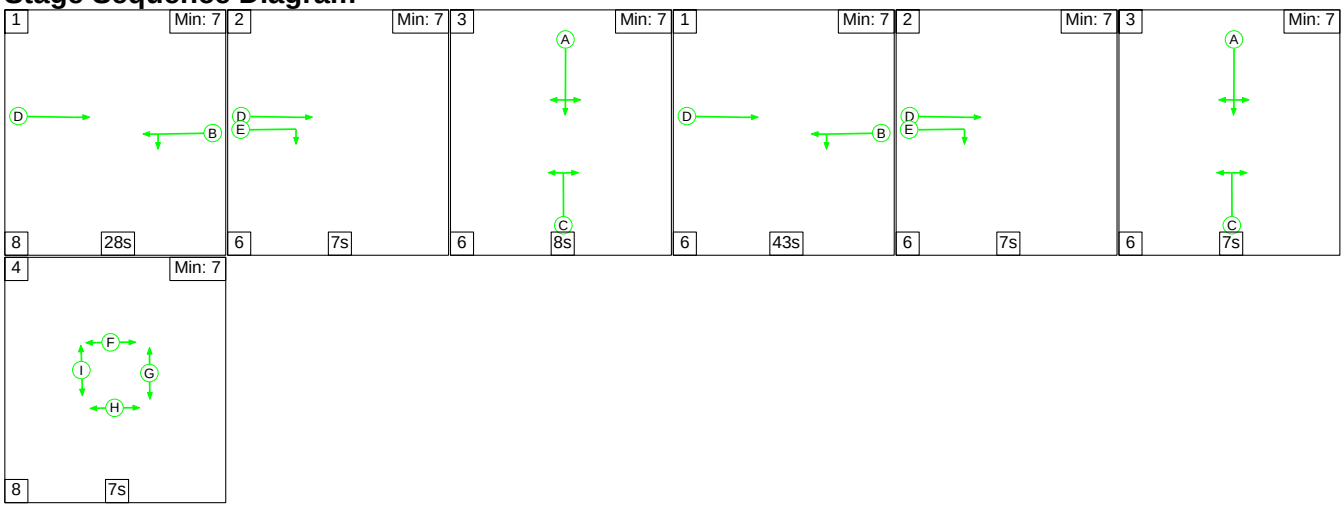
C1 PRC for Signalled Lanes (%): 6.9 Total Delay for Signalled Lanes (pcuHr): 14.85
PRC Over All Lanes (%): 6.9 Total Delay Over All Lanes(pcuHr): 14.85 Cycle Time (s): 153

Full Input Data And Results

Full Input Data And Results

Scenario 3: 'AM 2020 Base' (FG3: 'AM 2020 Base', Plan 1: 'Staging Plan No. 1')

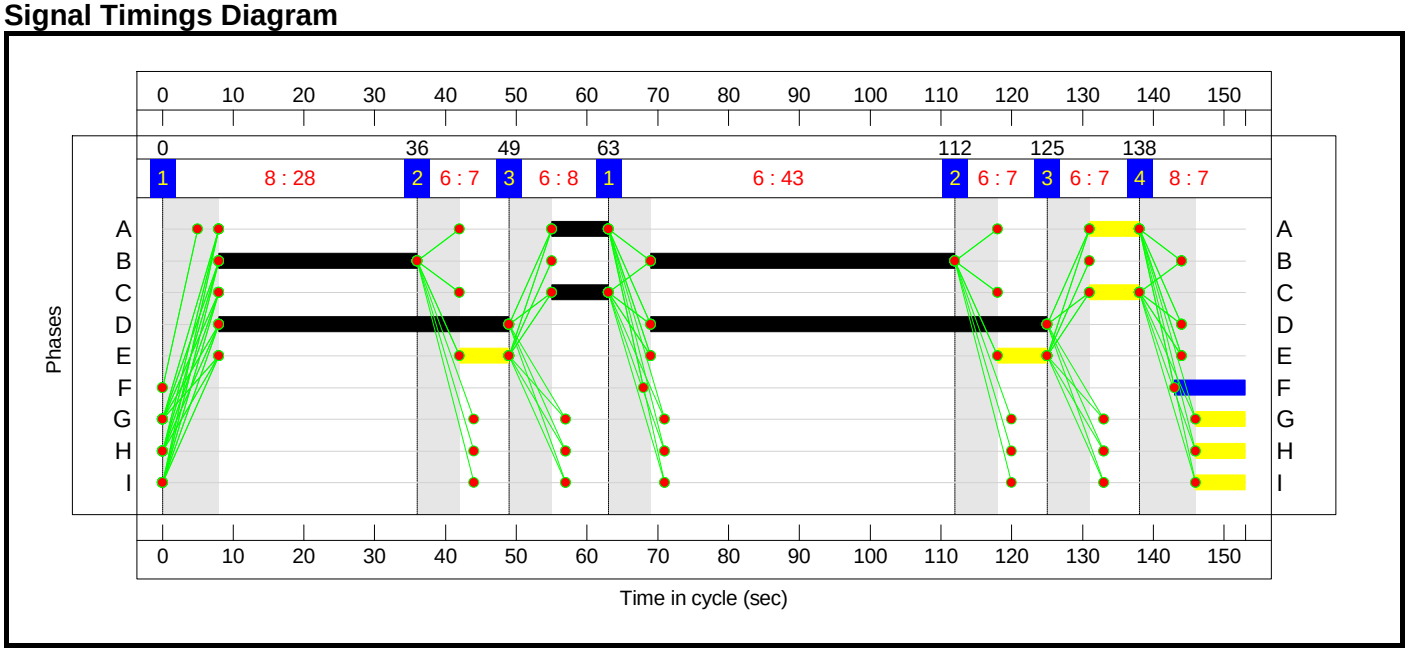
Stage Sequence Diagram



Stage Timings

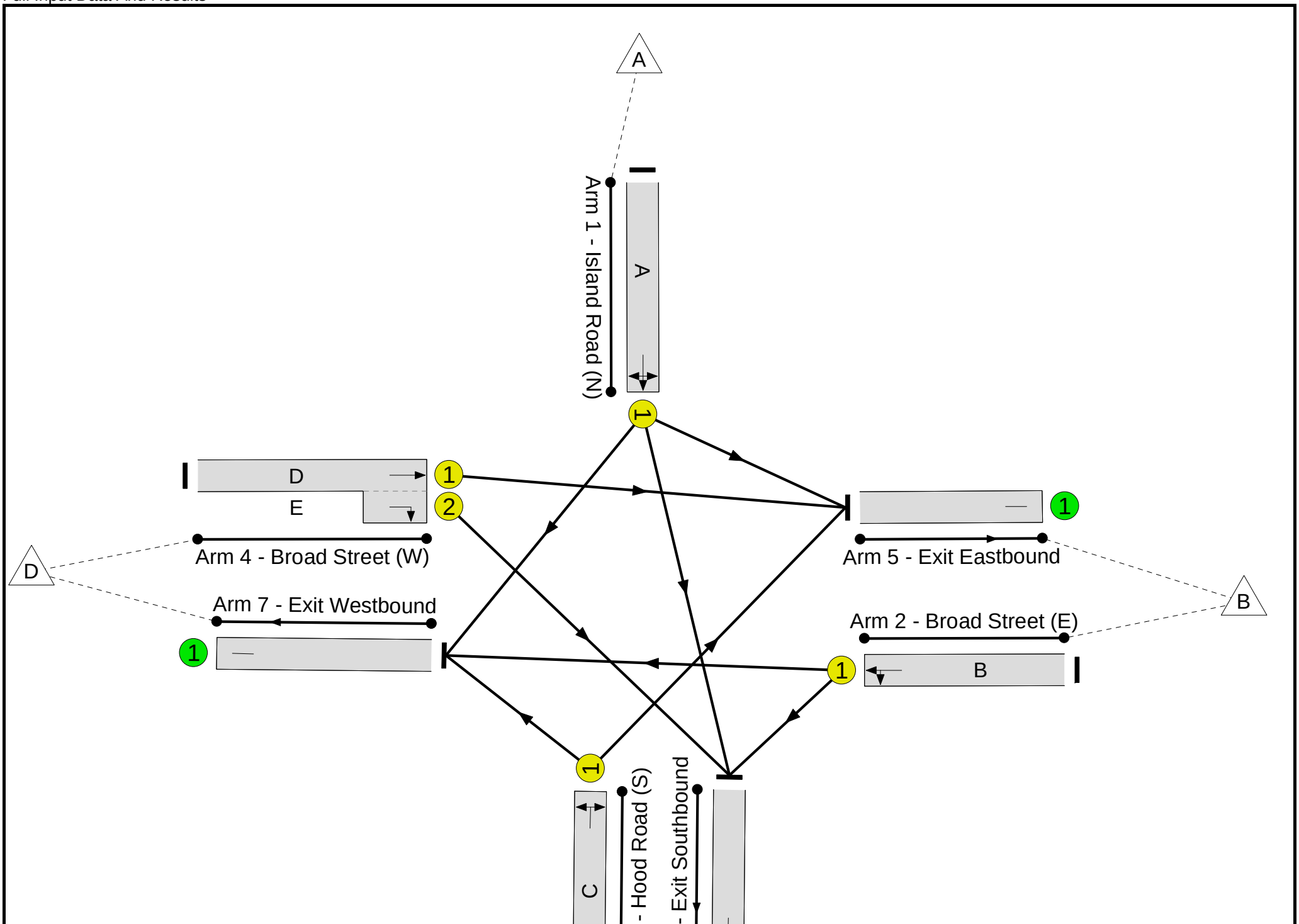
Stage	1	2	3	1	2	3	4
Duration	28	7	8	43	7	7	7
Change Point	0	36	49	63	112	125	138

Signal Timings Diagram



Full Input Data And Results

Network Layout Diagram


A
Arm 1 - Island Road (N)
A
1
D
E
1
2
Arm 4 - Broad Street (W)
D
Arm 7 - Exit Westbound
1
1
Arm 5 - Exit Eastbound
B
Arm 2 - Broad Street (E)
1
B
1
C
- Hood Road (S)
- Exit Southbound

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**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**66.2%**
Unnamed Junction	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**66.2%**
1/1	Island Road (N) Left Ahead Right	U	N/A	N/A	A		2	15	-	79	1816	202	39.2%
2/1	Broad Street (E) Left Ahead	U	N/A	N/A	B		2	71	-	488	2040	973	50.1%
3/1	Hood Road (S) Right Left	U	N/A	N/A	C		2	15	-	124	1685	187	66.2%
4/1+4/2	Broad Street (W) Ahead Right	U	N/A	N/A	D E		2	97:14	-	811	1920:1734	1236	65.6%
5/1	Exit Eastbound	U	N/A	N/A	-		-	-	-	766	Inf	Inf	0.0%
6/1	Exit Southbound	U	N/A	N/A	-		-	-	-	108	Inf	Inf	0.0%
7/1	Exit Westbound	U	N/A	N/A	-		-	-	-	628	Inf	Inf	0.0%

Item	Entering (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	**-**	**-**	**0**	**0**	**0**	**6.2**	**2.7**	**0.0**	**9.0**	**-**	**-**	**-**	**-**
Unnamed Junction	**-**	**-**	**0**	**0**	**0**	**6.2**	**2.7**	**0.0**	**9.0**	**-**	**-**	**-**	**-**
1/1	79	79	-	-	-	0.7	0.3	-	1.0	46.2	1.6	0.3	1.9
2/1	488	488	-	-	-	1.9	0.5	-	2.4	18.0	8.5	0.5	9.0
3/1	124	124	-	-	-	1.1	1.0	-	2.1	60.3	2.5	1.0	3.5
4/1+4/2	811	811	-	-	-	2.5	0.9	-	3.4	15.2	13.2	0.9	14.2
5/1	766	766	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	108	108	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
7/1	628	628	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0

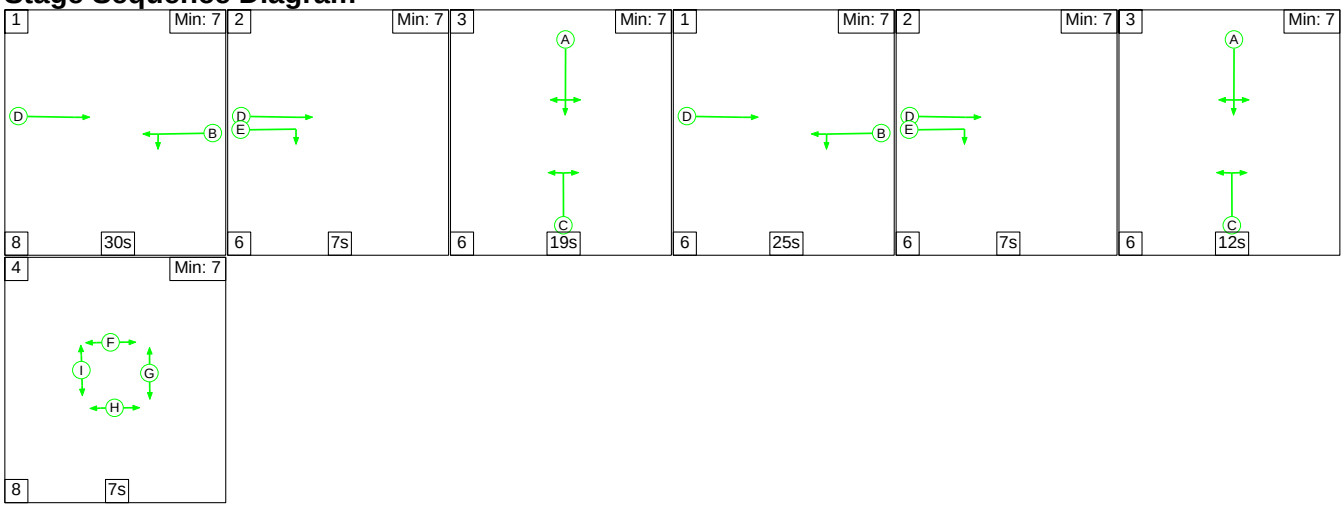
C1 PRC for Signalled Lanes (%): 35.9 Total Delay for Signalled Lanes (pcuHr): 8.96
PRC Over All Lanes (%): 35.9 Total Delay Over All Lanes(pcuHr): 8.96 Cycle Time (s): 153

Full Input Data And Results

Full Input Data And Results

Scenario 4: 'PM 2020 Base' (FG4: 'PM 2020 Base', Plan 1: 'Staging Plan No. 1')

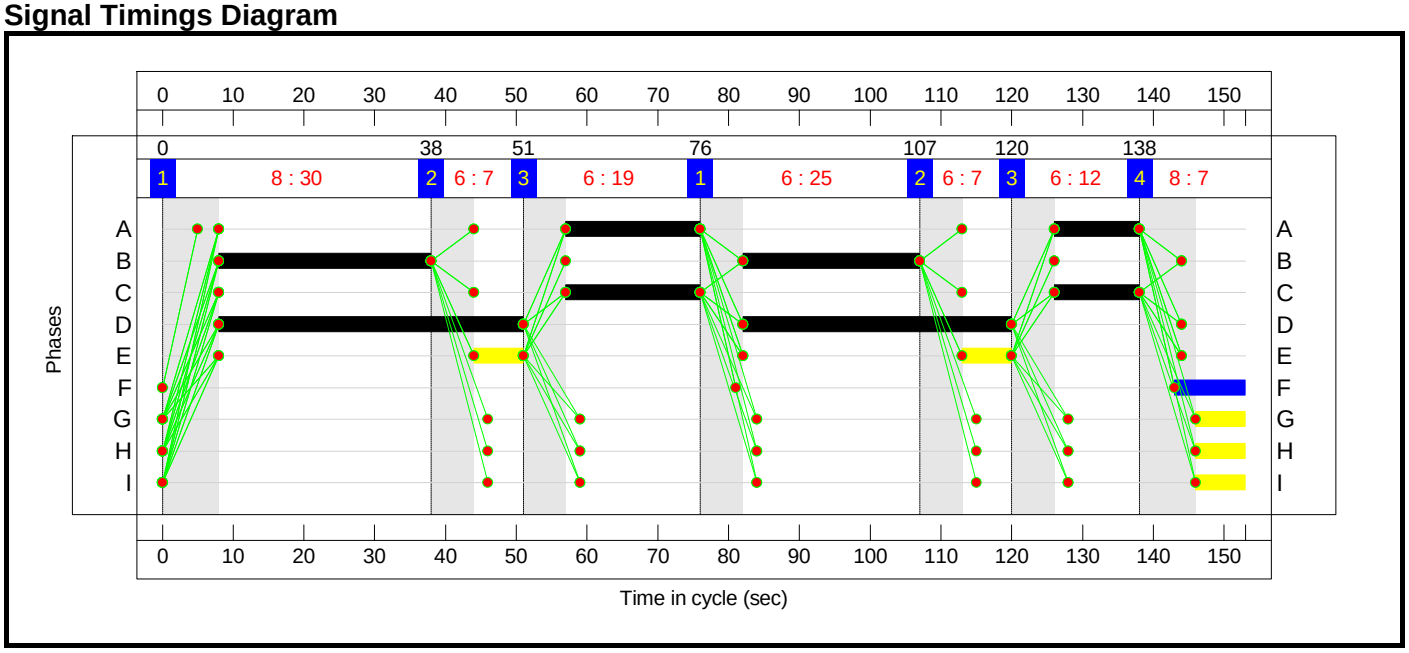
Stage Sequence Diagram



Stage Timings

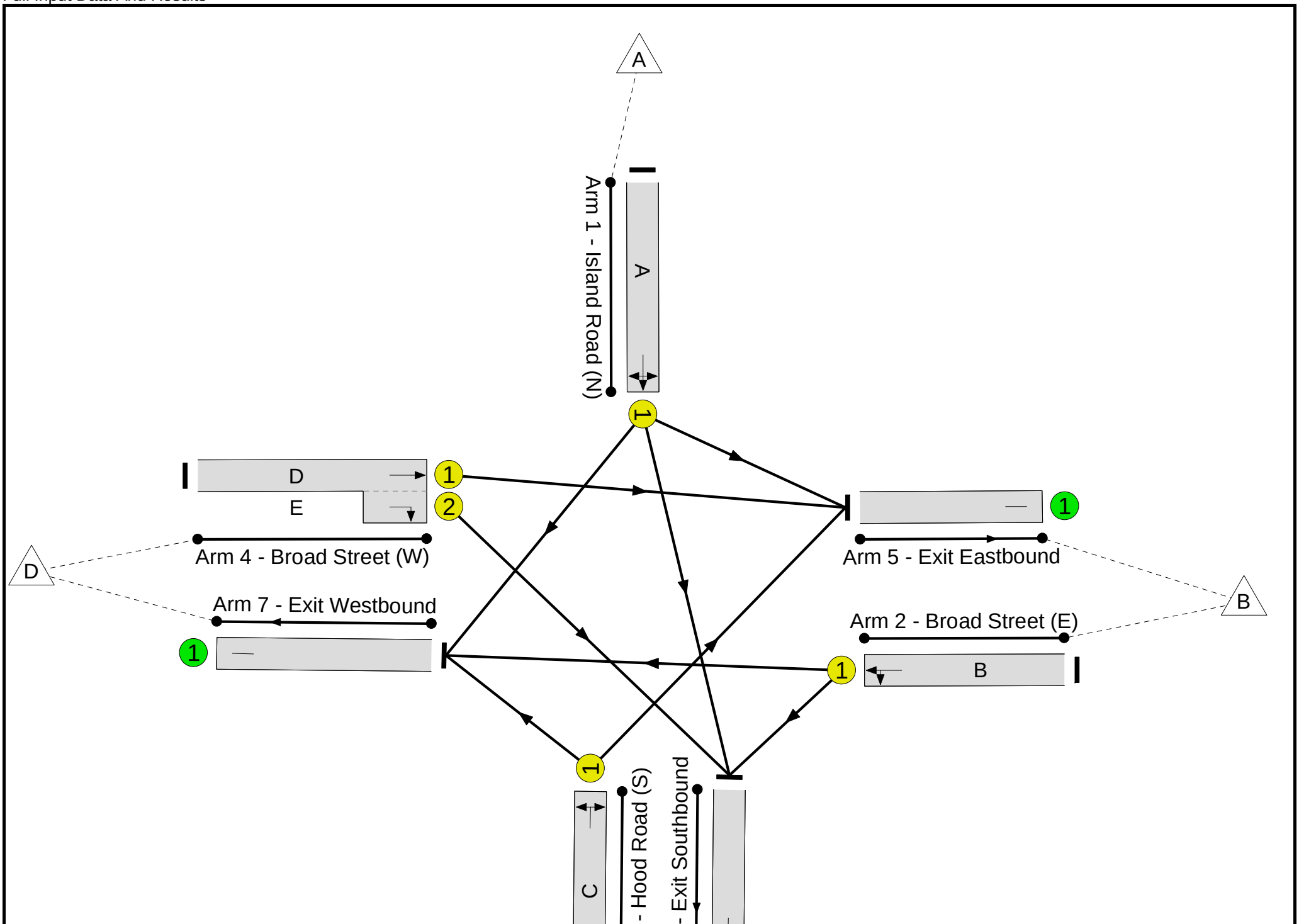
Stage	1	2	3	1	2	3	4
Duration	30	7	19	25	7	12	7
Change Point	0	38	51	76	107	120	138

Signal Timings Diagram



Full Input Data And Results

Network Layout Diagram


A
Arm 1 - Island Road (N)
A
1
D
E
1
2
Arm 4 - Broad Street (W)
D
Arm 7 - Exit Westbound
1
1
Arm 5 - Exit Eastbound
B
Arm 2 - Broad Street (E)
1
B
1
C
- Hood Road (S)
- Exit Southbound

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**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**98.1%**
Unnamed Junction	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**98.1%**
1/1	Island Road (N) Left Ahead Right	U	N/A	N/A	A		2	31	-	87	1776	383	22.7%
2/1	Broad Street (E) Left Ahead	U	N/A	N/A	B		2	55	-	745	2039	760	98.1%
3/1	Hood Road (S) Right Left	U	N/A	N/A	C		2	31	-	354	1682	363	97.6%
4/1+4/2	Broad Street (W) Ahead Right	U	N/A	N/A	D E		2	81:14	-	680	1920:1734	1038	65.5%
5/1	Exit Eastbound	U	N/A	N/A	-		-	-	-	654	Inf	Inf	0.0%
6/1	Exit Southbound	U	N/A	N/A	-		-	-	-	95	Inf	Inf	0.0%
7/1	Exit Westbound	U	N/A	N/A	-		-	-	-	1117	Inf	Inf	0.0%

Item	Entering (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	**-**	**-**	**0**	**0**	**0**	**11.3**	**19.0**	**0.0**	**30.4**	**-**	**-**	**-**	**-**
Unnamed Junction	**-**	**-**	**0**	**0**	**0**	**11.3**	**19.0**	**0.0**	**30.4**	**-**	**-**	**-**	**-**
1/1	87	87	-	-	-	0.6	0.1	-	0.8	31.7	1.8	0.1	1.9
2/1	745	745	-	-	-	5.0	10.5	-	15.4	74.6	17.2	10.5	27.6
3/1	354	354	-	-	-	3.0	7.5	-	10.5	106.8	8.8	7.5	16.2
4/1+4/2	680	680	-	-	-	2.7	0.9	-	3.7	19.4	11.2	0.9	12.1
5/1	654	654	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	95	95	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
7/1	1117	1117	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0

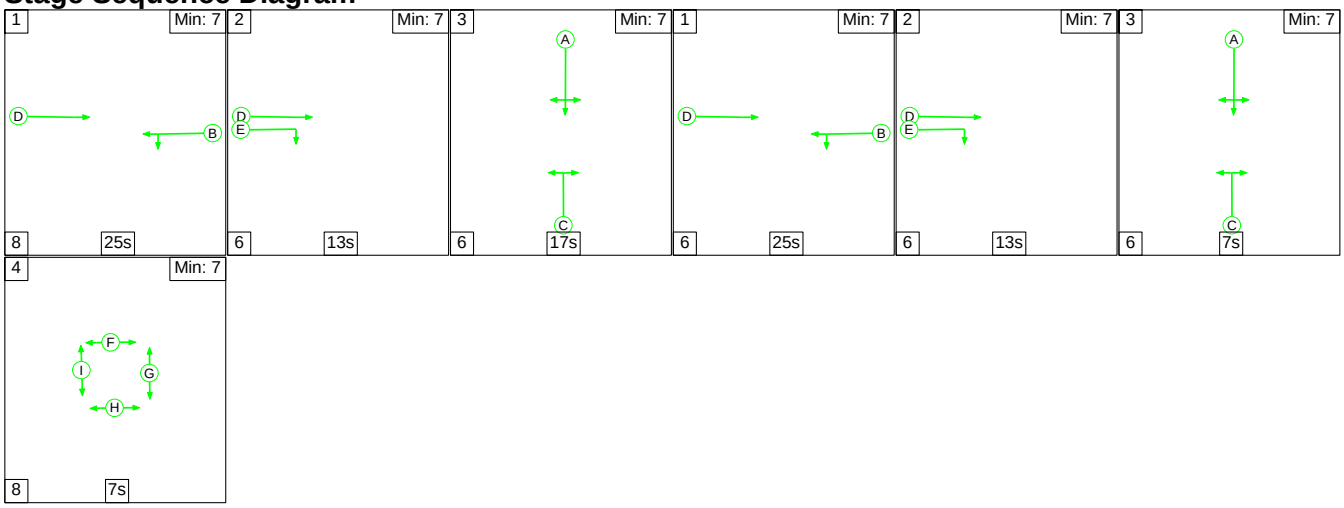
C1 PRC for Signalled Lanes (%): -9.0 Total Delay for Signalled Lanes (pcuHr): 30.37
PRC Over All Lanes (%): -9.0 Total Delay Over All Lanes(pcuHr): 30.37 Cycle Time (s): 153

Full Input Data And Results

Full Input Data And Results

Scenario 5: 'AM 2020 Dev + BI' (FG5: 'AM 2020 Dev + BI', Plan 1: 'Staging Plan No. 1')

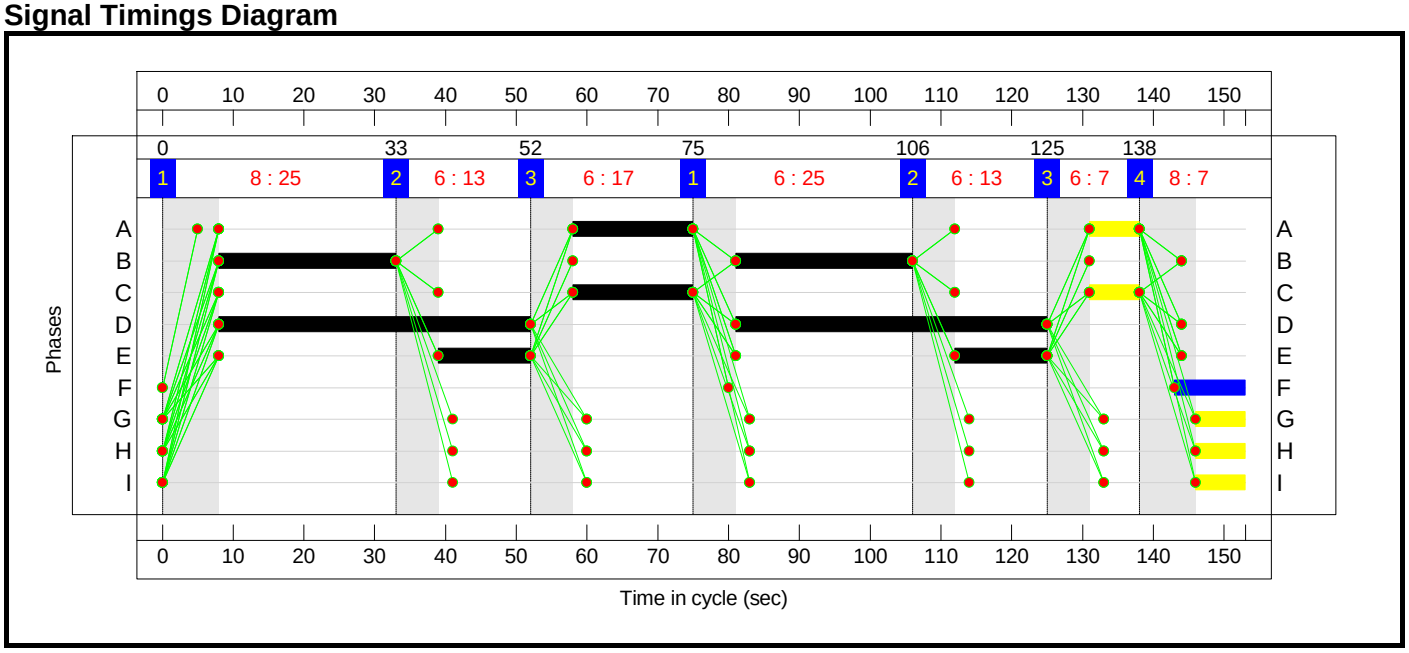
Stage Sequence Diagram



Stage Timings

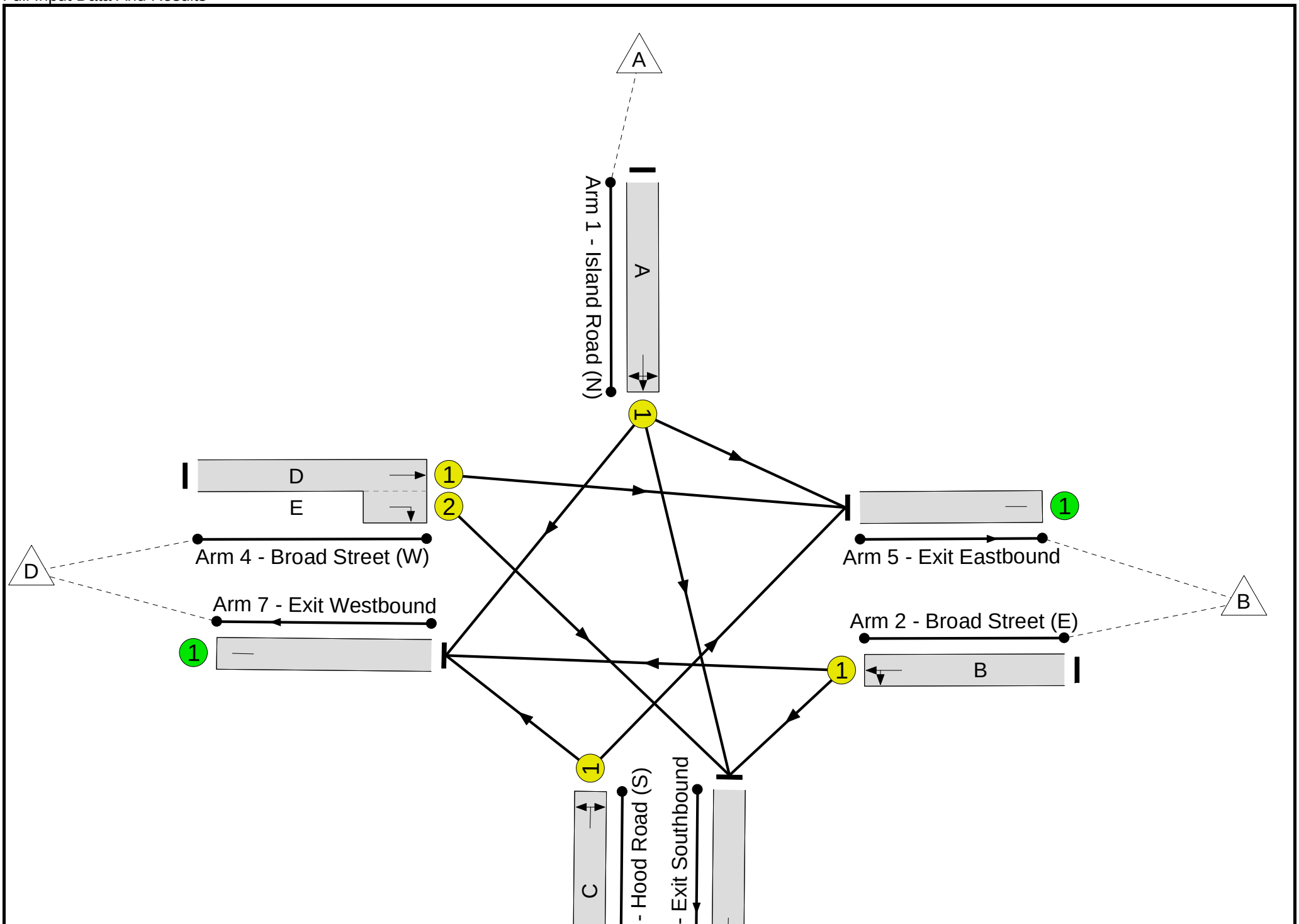
Stage	1	2	3	1	2	3	4
Duration	25	13	17	25	13	7	7
Change Point	0	33	52	75	106	125	138

Signal Timings Diagram



Full Input Data And Results

Network Layout Diagram


A
Arm 1 - Island Road (N)
A
1
D
E
1
2
Arm 4 - Broad Street (W)
D
Arm 7 - Exit Westbound
1
1
Arm 5 - Exit Eastbound
B
Arm 2 - Broad Street (E)
1
B
1
C
- Hood Road (S)
- Exit Southbound

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**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**58.1%**
Unnamed Junction	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**58.1%**
1/1	Island Road (N) Left Ahead Right	U	N/A	N/A	A		2	24	-	79	1816	309	25.6%
2/1	Broad Street (E) Left Ahead	U	N/A	N/A	B		2	50	-	401	2039	693	57.9%
3/1	Hood Road (S) Right Left	U	N/A	N/A	C		2	24	-	161	1684	286	56.3%
4/1+4/2	Broad Street (W) Ahead Right	U	N/A	N/A	D E		2	88:26	-	646	1920:1734	1112	58.1%
5/1	Exit Eastbound	U	N/A	N/A	-		-	-	-	577	Inf	Inf	0.0%
6/1	Exit Southbound	U	N/A	N/A	-		-	-	-	132	Inf	Inf	0.0%
7/1	Exit Westbound	U	N/A	N/A	-		-	-	-	578	Inf	Inf	0.0%

Item	Entering (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	**-**	**-**	**0**	**0**	**0**	**6.5**	**2.2**	**0.0**	**8.6**	**-**	**-**	**-**	**-**
Unnamed Junction	**-**	**-**	**0**	**0**	**0**	**6.5**	**2.2**	**0.0**	**8.6**	**-**	**-**	**-**	**-**
1/1	79	79	-	-	-	0.6	0.2	-	0.8	35.9	1.6	0.2	1.8
2/1	401	401	-	-	-	2.3	0.7	-	3.0	27.0	7.5	0.7	8.1
3/1	161	161	-	-	-	1.3	0.6	-	2.0	43.9	3.5	0.6	4.2
4/1+4/2	646	646	-	-	-	2.2	0.7	-	2.9	16.1	8.8	0.7	9.5
5/1	577	577	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	132	132	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
7/1	578	578	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0

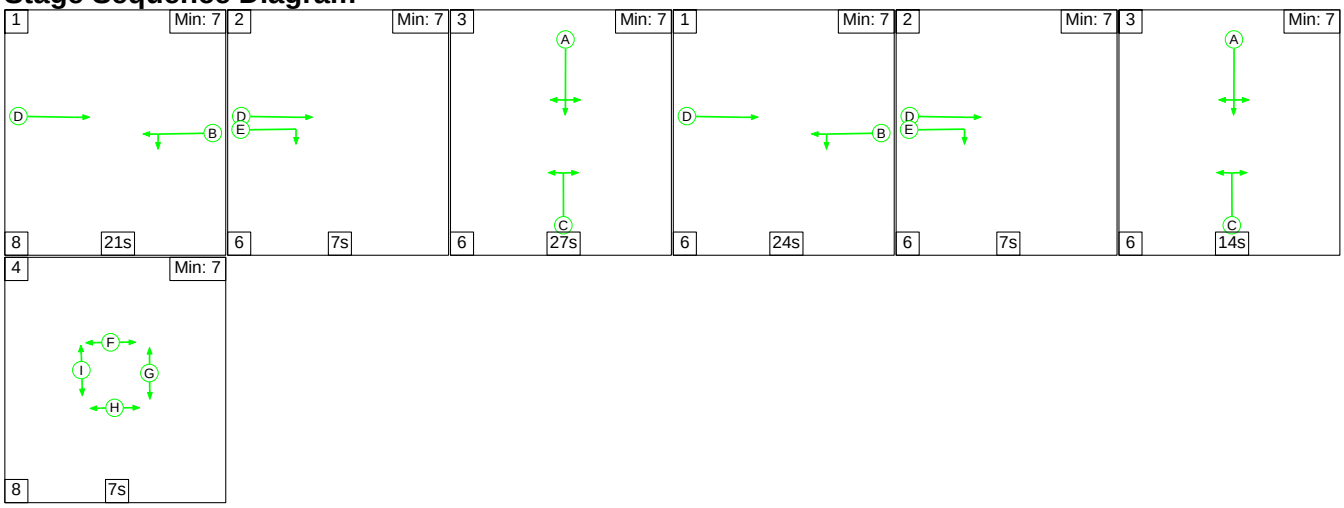
C1 PRC for Signalled Lanes (%): 54.9 Total Delay for Signalled Lanes (pcuHr): 8.65
PRC Over All Lanes (%): 54.9 Total Delay Over All Lanes(pcuHr): 8.65 Cycle Time (s): 153

Full Input Data And Results

Full Input Data And Results

Scenario 6: 'PM 2020 Dev + BI' (FG6: 'PM 2020 Dev + BI', Plan 1: 'Staging Plan No. 1')

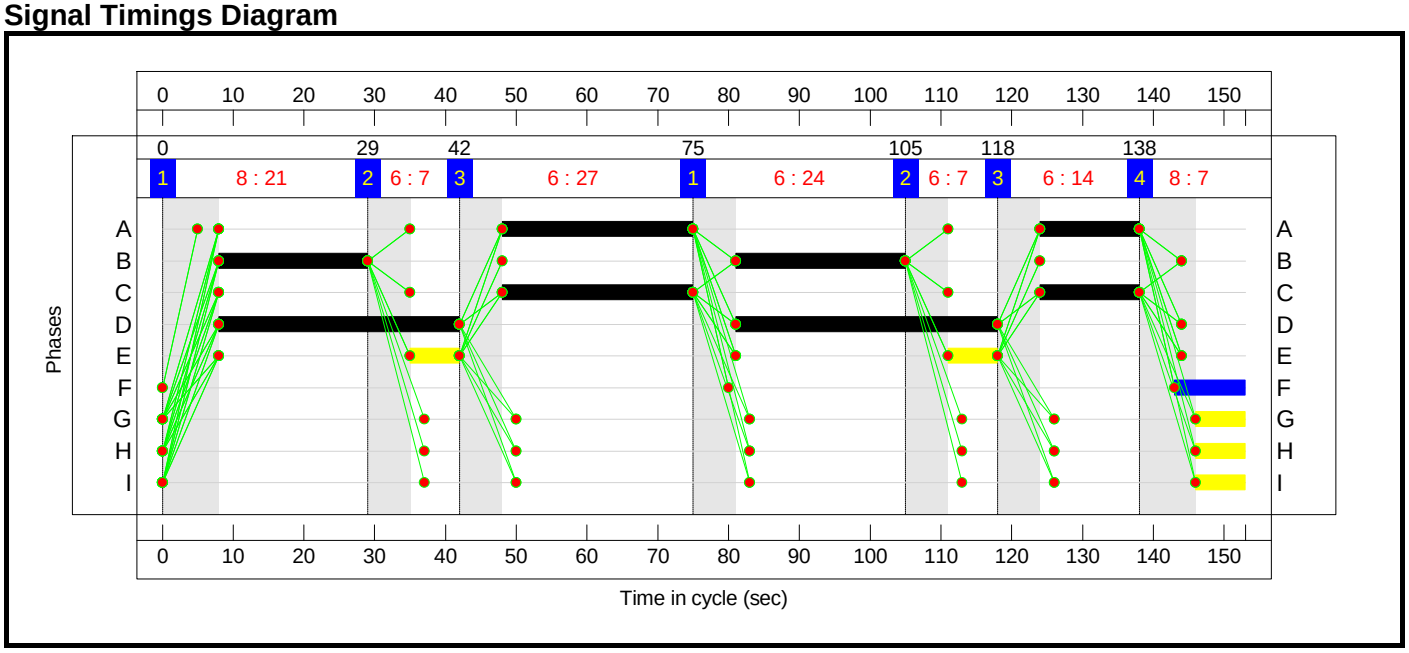
Stage Sequence Diagram



Stage Timings

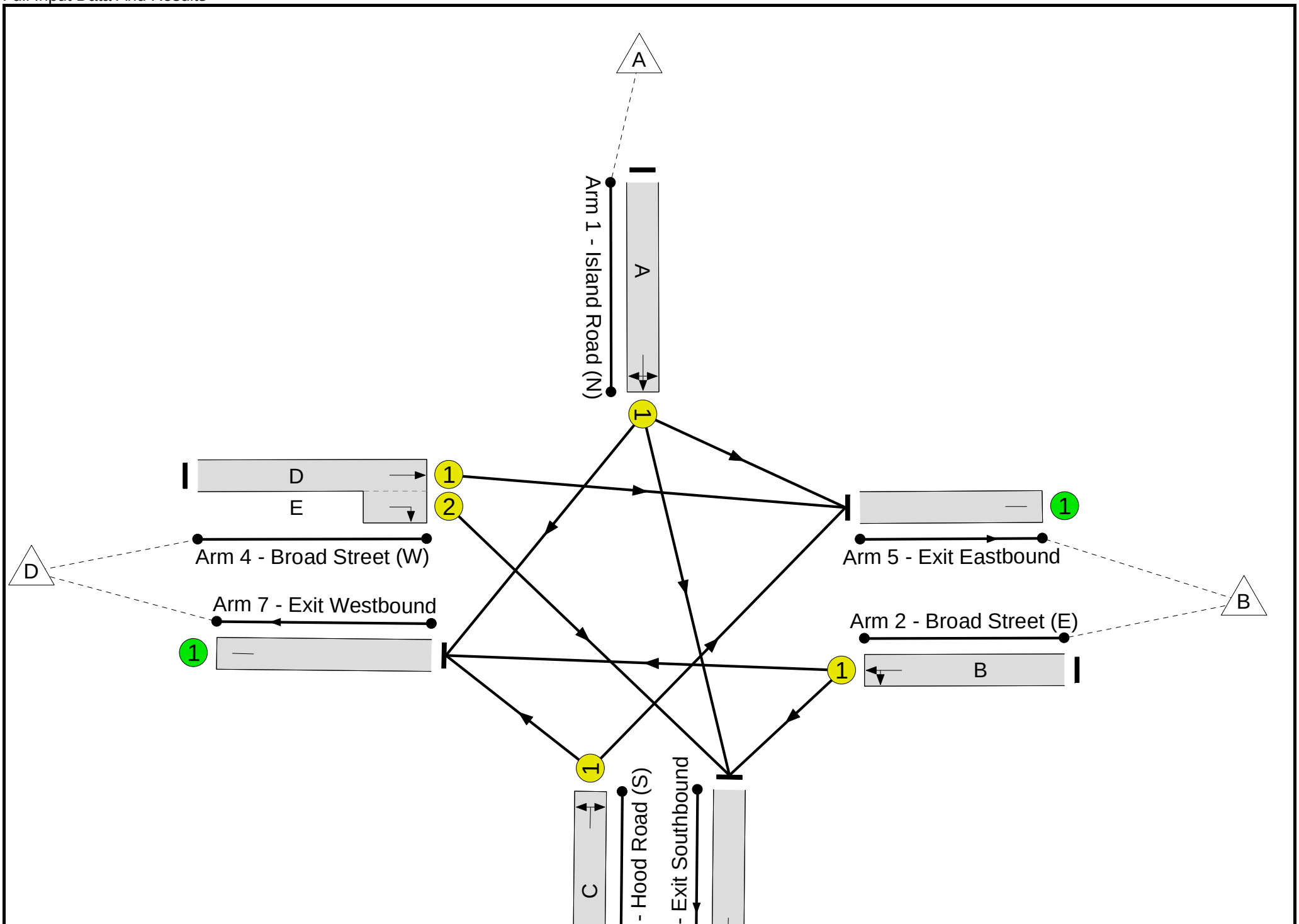
Stage	1	2	3	1	2	3	4
Duration	21	7	27	24	7	14	7
Change Point	0	29	42	75	105	118	138

Signal Timings Diagram



Full Input Data And Results

Network Layout Diagram


A
Arm 1 - Island Road (N)
A
1
D
E
1
2
Arm 4 - Broad Street (W)
D
Arm 7 - Exit Westbound
1
1
Arm 5 - Exit Eastbound
B
Arm 2 - Broad Street (E)
1
B
1
C
- Hood Road (S)
- Exit Southbound

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**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**83.7%**
Unnamed Junction	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**83.7%**
1/1	Island Road (N) Left Ahead Right	U	N/A	N/A	A		2	41	-	87	1776	499	17.4%
2/1	Broad Street (E) Left Ahead	U	N/A	N/A	B		2	45	-	524	2037	626	83.7%
3/1	Hood Road (S) Right Left	U	N/A	N/A	C		2	41	-	387	1682	473	81.9%
4/1+4/2	Broad Street (W) Ahead Right	U	N/A	N/A	D E		2	71:14	-	598	1920:1734	860	69.5%
5/1	Exit Eastbound	U	N/A	N/A	-		-	-	-	533	Inf	Inf	0.0%
6/1	Exit Southbound	U	N/A	N/A	-		-	-	-	134	Inf	Inf	0.0%
7/1	Exit Westbound	U	N/A	N/A	-		-	-	-	929	Inf	Inf	0.0%

Item	Entering (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	**-**	**-**	**0**	**0**	**0**	**9.9**	**5.8**	**0.0**	**15.7**	**-**	**-**	**-**	**-**
Unnamed Junction	**-**	**-**	**0**	**0**	**0**	**9.9**	**5.8**	**0.0**	**15.7**	**-**	**-**	**-**	**-**
1/1	87	87	-	-	-	0.5	0.1	-	0.6	25.5	1.6	0.1	1.7
2/1	524	524	-	-	-	3.6	2.5	-	6.1	41.6	10.8	2.5	13.2
3/1	387	387	-	-	-	2.8	2.1	-	5.0	46.1	8.6	2.1	10.7
4/1+4/2	598	598	-	-	-	3.0	1.1	-	4.1	24.7	9.3	1.1	10.5
5/1	533	533	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	134	134	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
7/1	929	929	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0

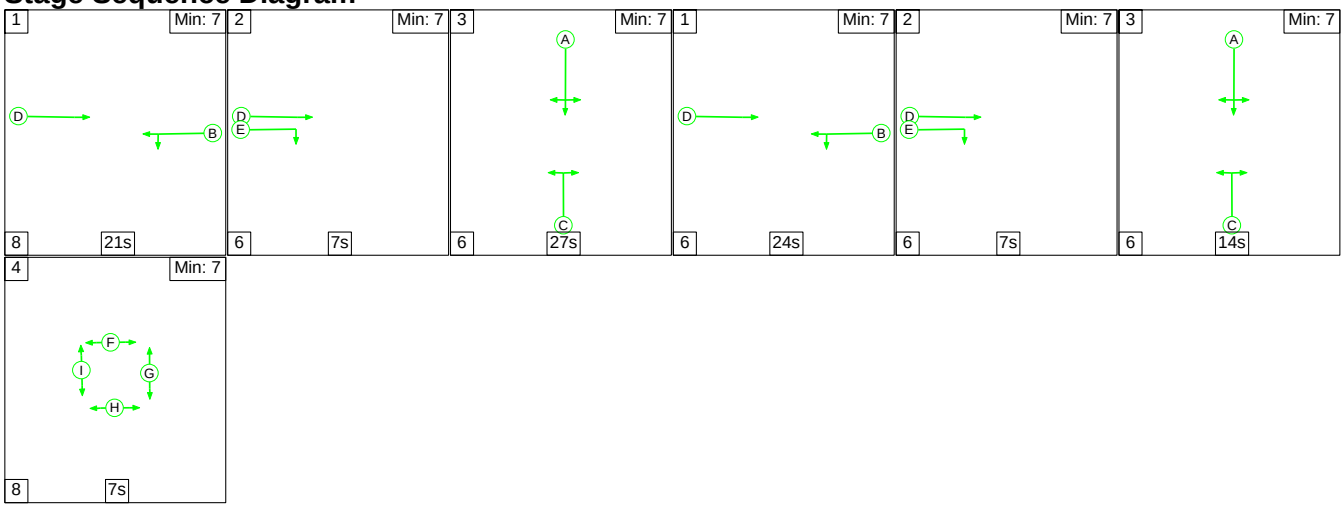
C1 PRC for Signalled Lanes (%): 7.5 Total Delay for Signalled Lanes (pcuHr): 15.73
PRC Over All Lanes (%): 7.5 Total Delay Over All Lanes(pcuHr): 15.73 Cycle Time (s): 153

Full Input Data And Results

Full Input Data And Results

Scenario 7: 'PM 2020 Dev + Tourism' (FG7: '2020 Dev + Tour', Plan 1: 'Staging Plan No. 1')

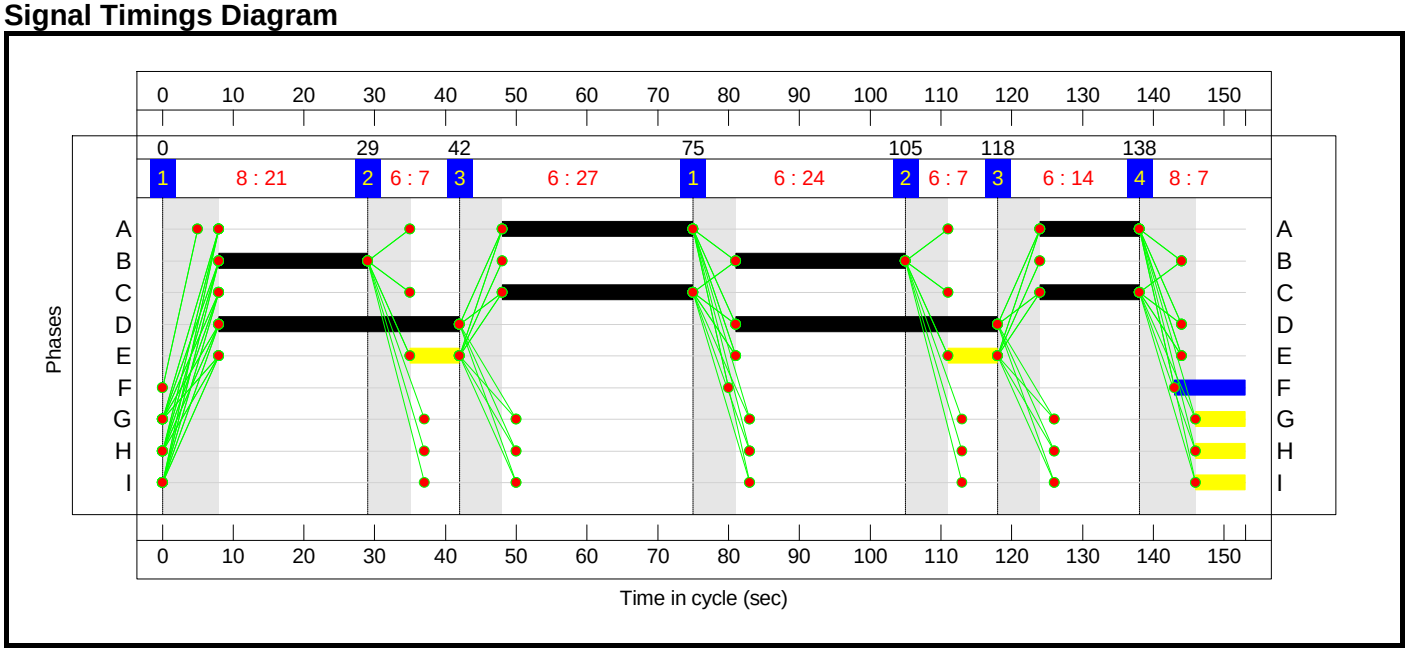
Stage Sequence Diagram



Stage Timings

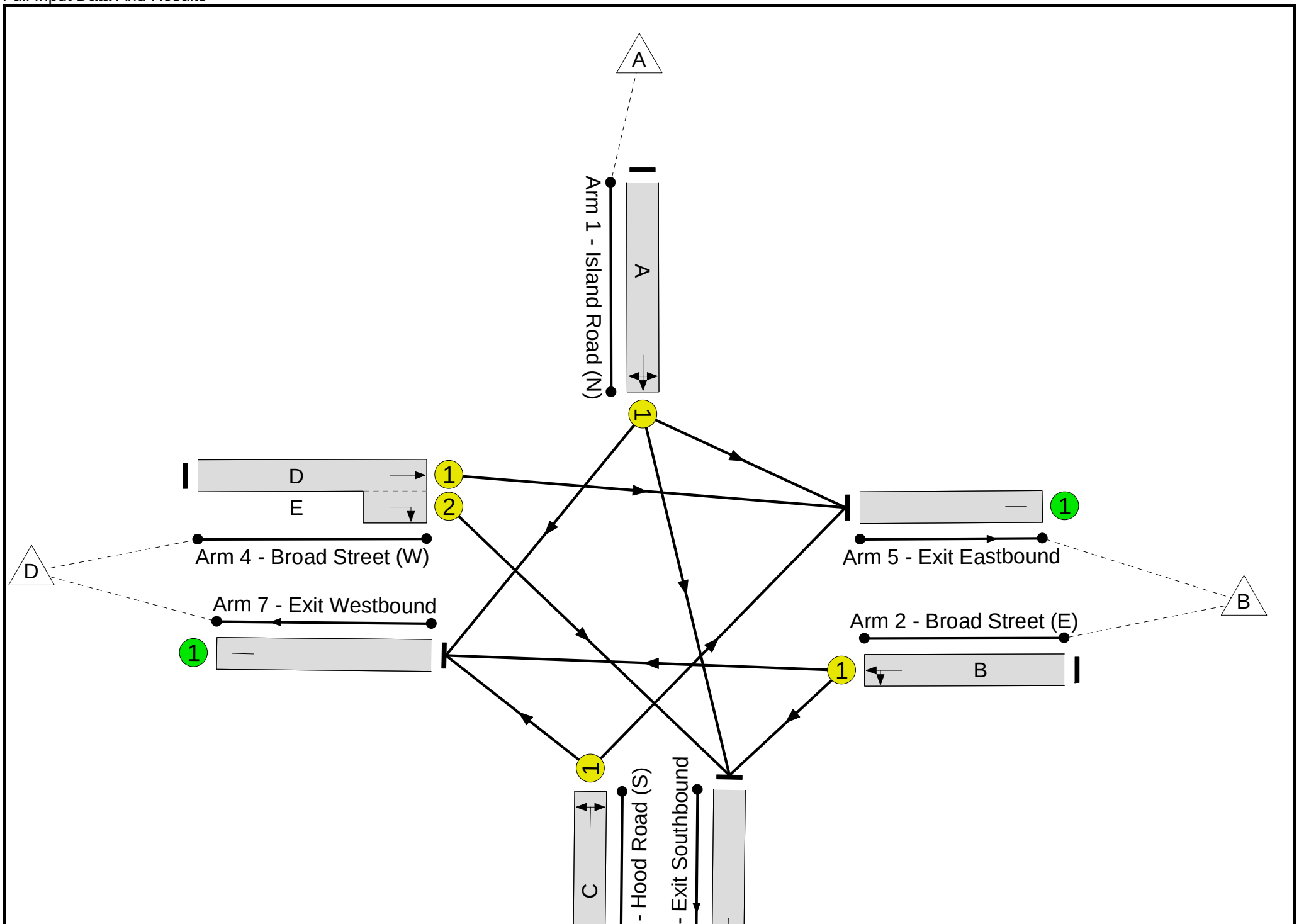
Stage	1	2	3	1	2	3	4
Duration	21	7	27	24	7	14	7
Change Point	0	29	42	75	105	118	138

Signal Timings Diagram



Full Input Data And Results

Network Layout Diagram


A
Arm 1 - Island Road (N)
A
1
D
E
1
2
Arm 4 - Broad Street (W)
D
Arm 7 - Exit Westbound
1
1
Arm 5 - Exit Eastbound
B
Arm 2 - Broad Street (E)
1
B
1
C
- Hood Road (S)
- Exit Southbound

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**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**83.7%**
Unnamed Junction	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**83.7%**
1/1	Island Road (N) Left Ahead Right	U	N/A	N/A	A		2	41	-	87	1776	499	17.4%
2/1	Broad Street (E) Left Ahead	U	N/A	N/A	B		2	45	-	524	2037	626	83.7%
3/1	Hood Road (S) Right Left	U	N/A	N/A	C		2	41	-	387	1682	473	81.9%
4/1+4/2	Broad Street (W) Ahead Right	U	N/A	N/A	D E		2	71:14	-	598	1920:1734	860	69.5%
5/1	Exit Eastbound	U	N/A	N/A	-		-	-	-	533	Inf	Inf	0.0%
6/1	Exit Southbound	U	N/A	N/A	-		-	-	-	134	Inf	Inf	0.0%
7/1	Exit Westbound	U	N/A	N/A	-		-	-	-	929	Inf	Inf	0.0%

Item	Entering (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	**-**	**-**	**0**	**0**	**0**	**9.9**	**5.8**	**0.0**	**15.7**	**-**	**-**	**-**	**-**
Unnamed Junction	**-**	**-**	**0**	**0**	**0**	**9.9**	**5.8**	**0.0**	**15.7**	**-**	**-**	**-**	**-**
1/1	87	87	-	-	-	0.5	0.1	-	0.6	25.5	1.6	0.1	1.7
2/1	524	524	-	-	-	3.6	2.5	-	6.1	41.6	10.8	2.5	13.2
3/1	387	387	-	-	-	2.8	2.1	-	5.0	46.1	8.6	2.1	10.7
4/1+4/2	598	598	-	-	-	3.0	1.1	-	4.1	24.7	9.3	1.1	10.5
5/1	533	533	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	134	134	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
7/1	929	929	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0

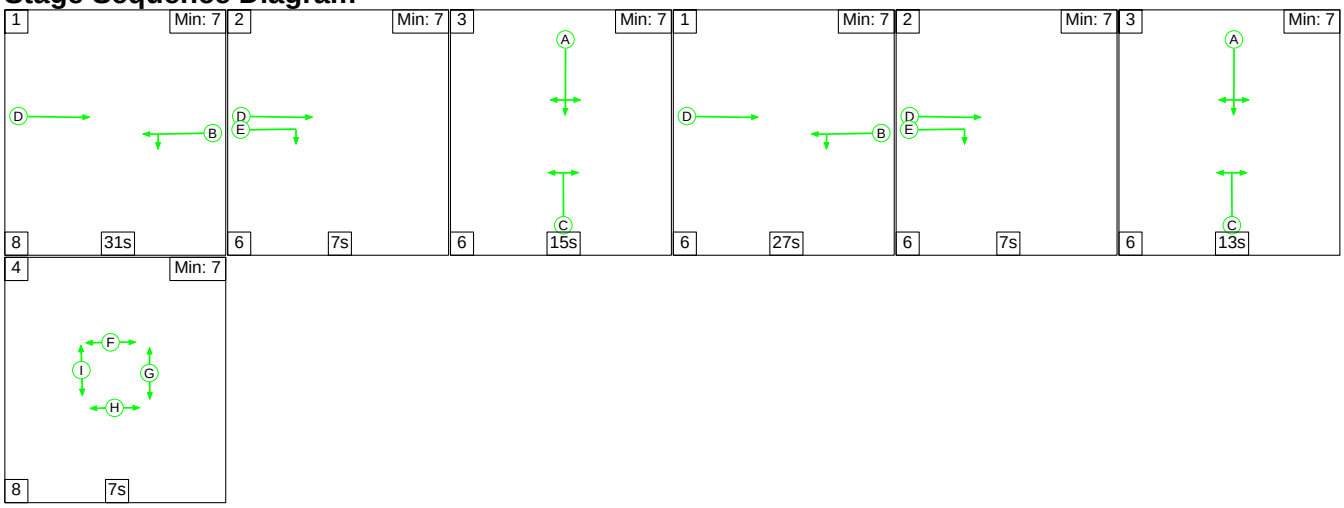
C1 PRC for Signalled Lanes (%): 7.5 Total Delay for Signalled Lanes (pcuHr): 15.73
PRC Over All Lanes (%): 7.5 Total Delay Over All Lanes(pcuHr): 15.73 Cycle Time (s): 153

Full Input Data And Results

Full Input Data And Results

Scenario 8: 'PM 2020 Base + Tourism' (FG8: 'PM 2020 Base + Tourism', Plan 1: 'Staging Plan No. 1')

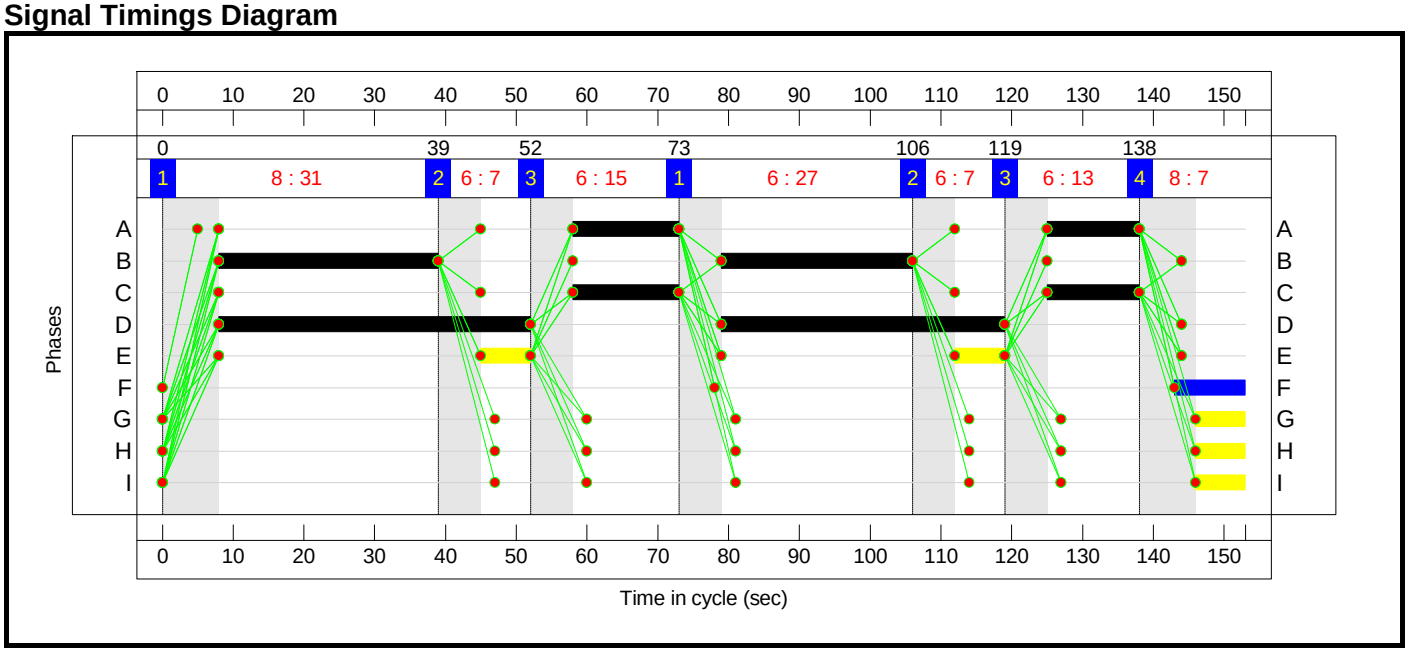
Stage Sequence Diagram



Stage Timings

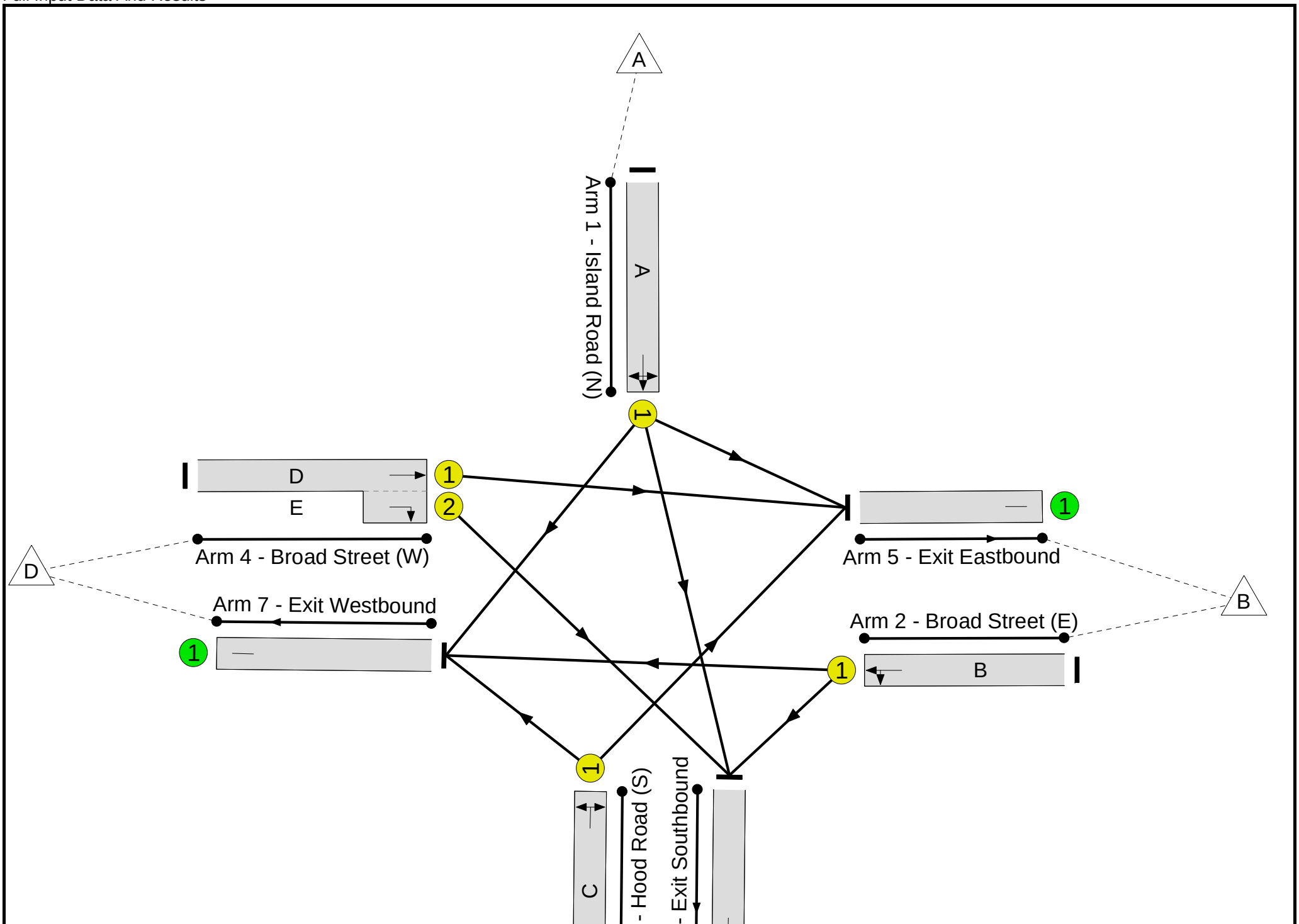
Stage	1	2	3	1	2	3	4
Duration	31	7	15	27	7	13	7
Change Point	0	39	52	73	106	119	138

Signal Timings Diagram



Full Input Data And Results

Network Layout Diagram


A
Arm 1 - Island Road (N)
A
1
D
E
1
2
Arm 4 - Broad Street (W)
D
Arm 7 - Exit Westbound
1
1
Arm 5 - Exit Eastbound
B
Arm 2 - Broad Street (E)
1
B
1
C
- Hood Road (S)
- Exit Southbound

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**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**107.3%**
Unnamed Junction	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**107.3%**
1/1	Island Road (N) Left Ahead Right	U	N/A	N/A	A		2	28	-	87	1776	348	25.0%
2/1	Broad Street (E) Left Ahead	U	N/A	N/A	B		2	58	-	846	2040	800	105.8%
3/1	Hood Road (S) Right Left	U	N/A	N/A	C		2	28	-	354	1682	330	107.3%
4/1+4/2	Broad Street (W) Ahead Right	U	N/A	N/A	D E		2	84:14	-	795	1920:1734	1074	74.0%
5/1	Exit Eastbound	U	N/A	N/A	-		-	-	-	769	Inf	Inf	0.0%
6/1	Exit Southbound	U	N/A	N/A	-		-	-	-	95	Inf	Inf	0.0%
7/1	Exit Westbound	U	N/A	N/A	-		-	-	-	1218	Inf	Inf	0.0%

Item	Entering (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	**-**	**-**	**0**	**0**	**0**	**17.9**	**48.8**	**0.0**	**66.7**	**-**	**-**	**-**	**-**
Unnamed Junction	**-**	**-**	**0**	**0**	**0**	**17.9**	**48.8**	**0.0**	**66.7**	**-**	**-**	**-**	**-**
1/1	87	87	-	-	-	0.6	0.2	-	0.8	33.7	1.8	0.2	2.0
2/1	846	800	-	-	-	9.2	30.0	-	39.3	167.0	22.2	30.0	52.2
3/1	354	330	-	-	-	4.8	17.2	-	22.0	223.8	9.7	17.2	26.9
4/1+4/2	795	795	-	-	-	3.2	1.4	-	4.6	21.0	15.2	1.4	16.6
5/1	769	769	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	94	94	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
7/1	1149	1149	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0

C1 PRC for Signalled Lanes (%): -19.3 Total Delay for Signalled Lanes (pcuHr): 66.72
PRC Over All Lanes (%): -19.3 Total Delay Over All Lanes(pcuHr): 66.72 Cycle Time (s): 153

Full Input Data And Results

Appendix E

Harbour Road / Station Approach Road

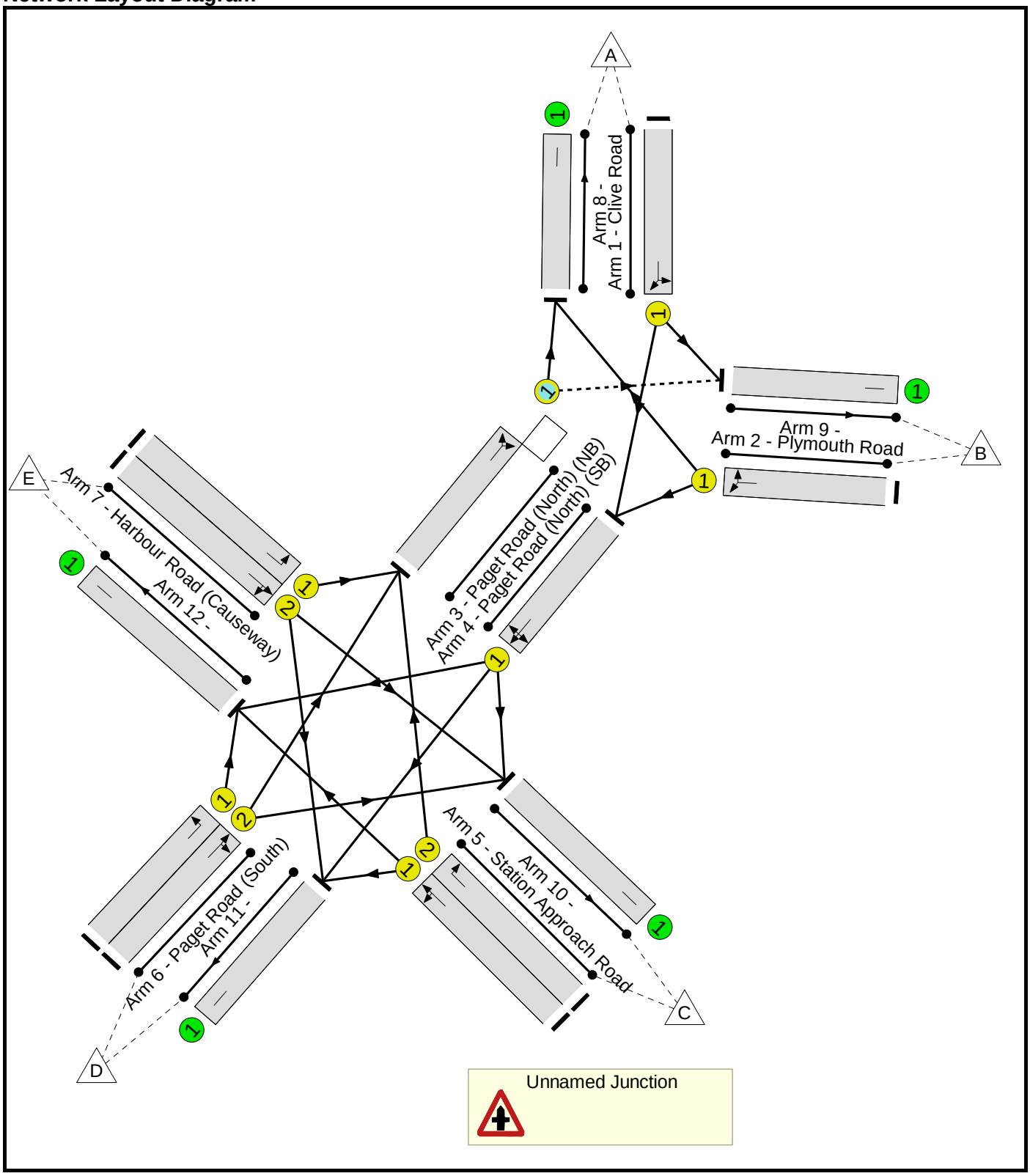
Full Input Data And Results

User and Project Details

Project:	**Waterfront barry**
Title:	
Location:	Harbour Road / Paget Road, Barry
File name:	HarbourPaget.lsg3x
Author:	Ryan Hopkins
Company:	Arup
Address:	
Notes:	

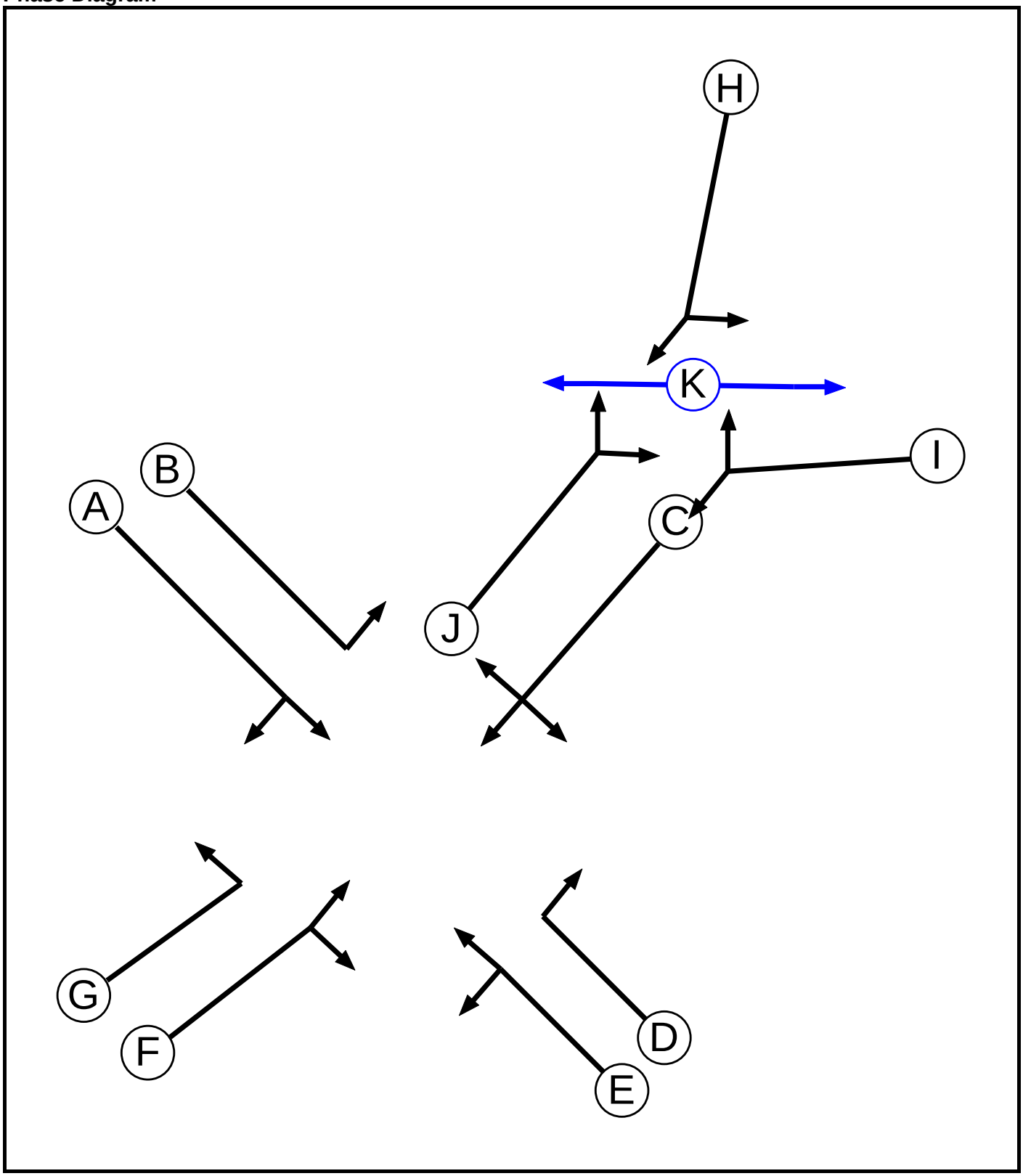
Full Input Data And Results

Network Layout Diagram



Full Input Data And Results

Phase Diagram



Full Input Data And Results

Phase Input Data

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

Phase Intergreens Matrix

Terminating Phase \ Starting Phase	A	B	C	D	E	F	G	H	I	J	K
A		-	7	7	7	7	7	-	-	-	-
B	-		-	7	-	-	7	-	-	-	-
C	7	-		7	7	7	7	-	-	-	-
D	7	7	7		-	7	7	-	-	-	-
E	7	-	7	-		7	7	-	-	-	-
F	7	-	7	7	7		-	-	-	-	-
G	7	7	7	7	7	-		-	-	-	-
H	-	-	-	-	-	-	-		7	-	7
I	-	-	-	-	-	-	-	7		7	7
J	-	-	-	-	-	-	-	-	7		7
K	-	-	-	-	-	-	-	7	7	7	

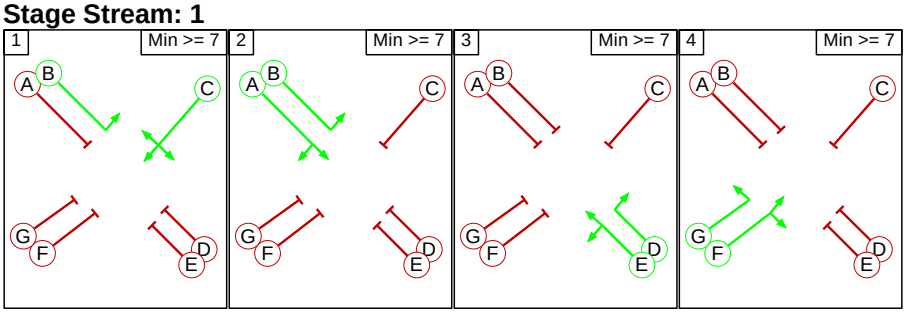
Phases in Stage

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

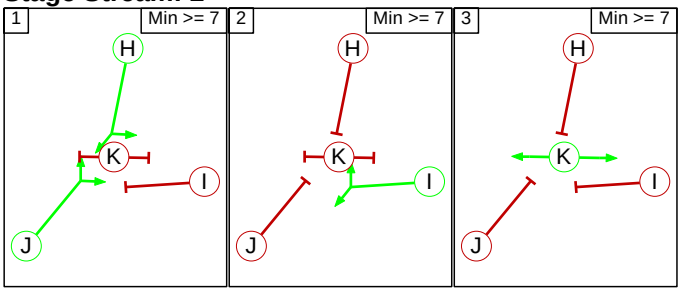
Full Input Data And Results

Stage Diagram

Stage Stream: 1



Stage Stream: 2



Phase Delays

Stage Stream: 1

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

Stage Stream: 2

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

Prohibited Stage Changes

Stage Stream: 1

From Stage \ To Stage	1	2	3	4
1		7	7	7
2	7		7	7
3	7	7		7
4	7	7	7	

Stage Stream: 2

From Stage \ To Stage	1	2	3
1		7	7
2	7		7
3	7	7	

Full Input Data And Results

Give-Way Lane Input Data

Junction: Unnamed Junction

Lane	Movement	Max 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)
3/1 (Paget Road (North) (NB))	9/1 (Right)	1400	1/1	0.01	1/1	2.00	2.00	0.50	2	2.00

Full Input Data And Results

Lane Input Data

Junction: Unnamed Junction

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 (Clive Road)	U	H	2	3	60.0	Geom	-	3.50	0.00	Y	Arm 4 Ahead	Inf
											Arm 9 Left	13.50
2/1 (Plymouth Road)	U	I	2	3	60.0	Geom	-	4.00	0.00	Y	Arm 4 Left	13.50
											Arm 8 Right	Inf
3/1 (Paget Road (North) (NB))	O	J	2	3	60.0	Geom	-	3.50	0.00	Y	Arm 8 Ahead	Inf
											Arm 9 Right	16.50
4/1 (Paget Road (North) (SB))	U	C	2	3	60.0	Geom	-	3.50	0.00	Y	Arm 10 Left	16.50
											Arm 11 Ahead	Inf
											Arm 12 Right	16.50
5/1 (Station Approach Road)	U	E	2	3	60.0	Geom	-	3.00	0.00	Y	Arm 11 Left	16.50
											Arm 12 Ahead	Inf
5/2 (Station Approach Road)	U	D	2	3	60.0	Geom	-	3.00	0.00	N	Arm 3 Right	16.50
6/1 (Paget Road (South))	U	G	2	3	60.0	Geom	-	3.50	0.00	Y	Arm 12 Left	56.50
6/2 (Paget Road (South))	U	F	2	3	60.0	Geom	-	3.50	0.00	N	Arm 3 Ahead	Inf
											Arm 10 Right	16.50
7/1 (Harbour Road (Causeway))	U	B	2	3	60.0	Geom	-	3.00	0.00	Y	Arm 3 Left	16.50
7/2 (Harbour Road (Causeway))	U	A	2	3	60.0	Geom	-	3.00	0.00	N	Arm 10 Ahead	Inf
											Arm 11 Right	15.00
8/1	U		2	3	60.0	Inf	-	-	-	-	-	-
9/1	U		2	3	60.0	Inf	-	-	-	-	-	-
10/1	U		2	3	60.0	Inf	-	-	-	-	-	-
11/1	U		2	3	60.0	Inf	-	-	-	-	-	-
12/1	U		2	3	60.0	Inf	-	-	-	-	-	-

Full Input Data And Results

Traffic Flow Groups

Flow Group	Start Time	End Time	Duration	Formula
1: 'AM 2020 inc Dev+BI'	08:30	09:30	01:00	
2: 'PM 2020 in Dev+BI'	16:30	17:30	01:00	
3: '2020 Dev and Tour'	16:30	17:30	01:00	

Traffic Lane Flows

Lane	Scenario 1: AM 2020 inc Dev+BI
Junction: Unnamed Junction	
1/1	463
2/1	121
3/1	369
4/1	452
5/1	24
5/2	72
6/1	13
6/2	44
7/1	260
7/2	53
8/1	411
9/1	90
10/1	95
11/1	46
12/1	408

Full Input Data And Results

Scenario 1: 'AM 2020 inc Dev+BI' (FG1: 'AM 2020 inc Dev+BI', Plan 1: 'Standard')

Traffic Lane Flows

Junction: Unnamed Junction

Lane	Lane Width (m)	Gradient	Nearside Lane	Allowed Turns	Turning Radius (m)	Turning Prop.	Sat flow (PCU/Hr)
1/1 (Clive Road)	3.50	0.00	Y	Arm 4 Ahead	Inf	89.8 %	1943
				Arm 9 Left	13.50	10.2 %	
2/1 (Plymouth Road)	4.00	0.00	Y	Arm 4 Left	13.50	29.8 %	1951
				Arm 8 Right	Inf	70.2 %	
3/1 (Paget Road (North) (NB))	3.50	0.00	Y	Arm 8 Ahead	Inf	88.3 %	1944
				Arm 9 Right	16.50	11.7 %	
4/1 (Paget Road (North) (SB))	3.50	0.00	Y	Arm 10 Left	16.50	11.7 %	1811
				Arm 11 Ahead	Inf	6.2 %	
				Arm 12 Right	16.50	82.1 %	
5/1 (Station Approach Road)	3.00	0.00	Y	Arm 11 Left	16.50	0.0 %	1915
				Arm 12 Ahead	Inf	100.0 %	
5/2 (Station Approach Road)	3.00	0.00	N	Arm 3 Right	16.50	100.0 %	1884
6/1 (Paget Road (South))	3.50	0.00	Y	Arm 12 Left	56.50	100.0 %	1914
6/2 (Paget Road (South))	3.50	0.00	N	Arm 3 Ahead	Inf	84.1 %	2075
				Arm 10 Right	16.50	15.9 %	
7/1 (Harbour Road (Causeway))	3.00	0.00	Y	Arm 3 Left	16.50	100.0 %	1755
7/2 (Harbour Road (Causeway))	3.00	0.00	N	Arm 10 Ahead	Inf	66.0 %	1988
				Arm 11 Right	15.00	34.0 %	
8/1	Infinite Saturation Flow						Inf
9/1	Infinite Saturation Flow						Inf
10/1	Infinite Saturation Flow						Inf
11/1	Infinite Saturation Flow						Inf
12/1	Infinite Saturation Flow						Inf

Full Input Data And Results

Traffic Lane Flows

Lane	Scenario 2: PM 2020 inc Dev+BI
Junction: Unnamed Junction	
1/1	568
2/1	135
3/1	528
4/1	582
5/1	86
5/2	39
6/1	129
6/2	84
7/1	422
7/2	122
8/1	502
9/1	147
10/1	234
11/1	68
12/1	634

Full Input Data And Results

Scenario 2: 'PM 2020 inc Dev+BI' (FG2: 'PM 2020 in Dev+BI', Plan 1: 'Standard')

Traffic Lane Flows

Junction: Unnamed Junction

Lane	Lane Width (m)	Gradient	Nearside Lane	Allowed Turns	Turning Radius (m)	Turning Prop.	Sat flow (PCU/Hr)
1/1 (Clive Road)	3.50	0.00	Y	Arm 4 Ahead	Inf	85.9 %	1935
				Arm 9 Left	13.50	14.1 %	
2/1 (Plymouth Road)	4.00	0.00	Y	Arm 4 Left	13.50	69.6 %	1870
				Arm 8 Right	Inf	30.4 %	
3/1 (Paget Road (North) (NB))	3.50	0.00	Y	Arm 8 Ahead	Inf	87.3 %	1943
				Arm 9 Right	16.50	12.7 %	
4/1 (Paget Road (North) (SB))	3.50	0.00	Y	Arm 10 Left	16.50	20.8 %	1810
				Arm 11 Ahead	Inf	5.5 %	
				Arm 12 Right	16.50	73.7 %	
5/1 (Station Approach Road)	3.00	0.00	Y	Arm 11 Left	16.50	11.6 %	1895
				Arm 12 Ahead	Inf	88.4 %	
5/2 (Station Approach Road)	3.00	0.00	N	Arm 3 Right	16.50	100.0 %	1884
6/1 (Paget Road (South))	3.50	0.00	Y	Arm 12 Left	56.50	100.0 %	1914
6/2 (Paget Road (South))	3.50	0.00	N	Arm 3 Ahead	Inf	79.8 %	2067
				Arm 10 Right	16.50	20.2 %	
7/1 (Harbour Road (Causeway))	3.00	0.00	Y	Arm 3 Left	16.50	100.0 %	1755
7/2 (Harbour Road (Causeway))	3.00	0.00	N	Arm 10 Ahead	Inf	78.7 %	2012
				Arm 11 Right	15.00	21.3 %	
8/1	Infinite Saturation Flow						Inf
9/1	Infinite Saturation Flow						Inf
10/1	Infinite Saturation Flow						Inf
11/1	Infinite Saturation Flow						Inf
12/1	Infinite Saturation Flow						Inf

Full Input Data And Results

Traffic Lane Flows

Lane	Scenario 3: PM 2020 Dev + Tourism
Junction: Unnamed Junction	
1/1	671
2/1	202
3/1	635
4/1	689
5/1	110
5/2	60
6/1	181
6/2	129
7/1	463
7/2	187
8/1	611
9/1	208
10/1	326
11/1	97
12/1	761

Full Input Data And Results

Scenario 3: 'PM 2020 Dev + Tourism' (FG3: '2020 Dev and Tour', Plan 1: 'Standard')

Traffic Lane Flows

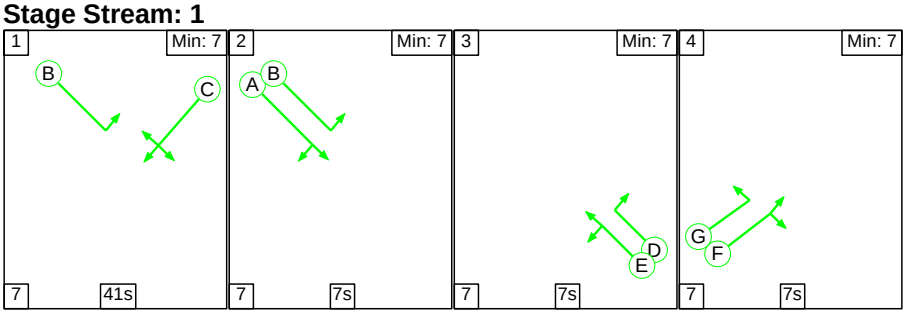
Junction: Unnamed Junction

Lane	Lane Width (m)	Gradient	Nearside Lane	Allowed Turns	Turning Radius (m)	Turning Prop.	Sat flow (PCU/Hr)
1/1 (Clive Road)	3.50	0.00	Y	Arm 4 Ahead	Inf	83.3 %	1929
				Arm 9 Left	13.50	16.7 %	
2/1 (Plymouth Road)	4.00	0.00	Y	Arm 4 Left	13.50	64.4 %	1881
				Arm 8 Right	Inf	35.6 %	
3/1 (Paget Road (North) (NB))	3.50	0.00	Y	Arm 8 Ahead	Inf	84.9 %	1938
				Arm 9 Right	16.50	15.1 %	
4/1 (Paget Road (North) (SB))	3.50	0.00	Y	Arm 10 Left	16.50	23.7 %	1811
				Arm 11 Ahead	Inf	6.7 %	
				Arm 12 Right	16.50	69.7 %	
5/1 (Station Approach Road)	3.00	0.00	Y	Arm 11 Left	16.50	9.1 %	1899
				Arm 12 Ahead	Inf	90.9 %	
5/2 (Station Approach Road)	3.00	0.00	N	Arm 3 Right	16.50	100.0 %	1884
6/1 (Paget Road (South))	3.50	0.00	Y	Arm 12 Left	56.50	100.0 %	1914
6/2 (Paget Road (South))	3.50	0.00	N	Arm 3 Ahead	Inf	86.8 %	2080
				Arm 10 Right	16.50	13.2 %	
7/1 (Harbour Road (Causeway))	3.00	0.00	Y	Arm 3 Left	16.50	100.0 %	1755
7/2 (Harbour Road (Causeway))	3.00	0.00	N	Arm 10 Ahead	Inf	78.1 %	2011
				Arm 11 Right	15.00	21.9 %	
8/1	Infinite Saturation Flow						Inf
9/1	Infinite Saturation Flow						Inf
10/1	Infinite Saturation Flow						Inf
11/1	Infinite Saturation Flow						Inf
12/1	Infinite Saturation Flow						Inf

Scenario 1: 'AM 2020 inc Dev+BI' (FG1: 'AM 2020 inc Dev+BI', Plan 1: 'Standard')

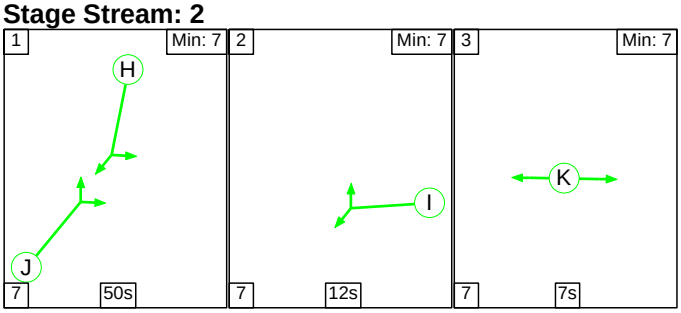
Stage Sequence Diagram

Stage Stream: 1



Full Input Data And Results

Stage Stream: 2



Stage Timings

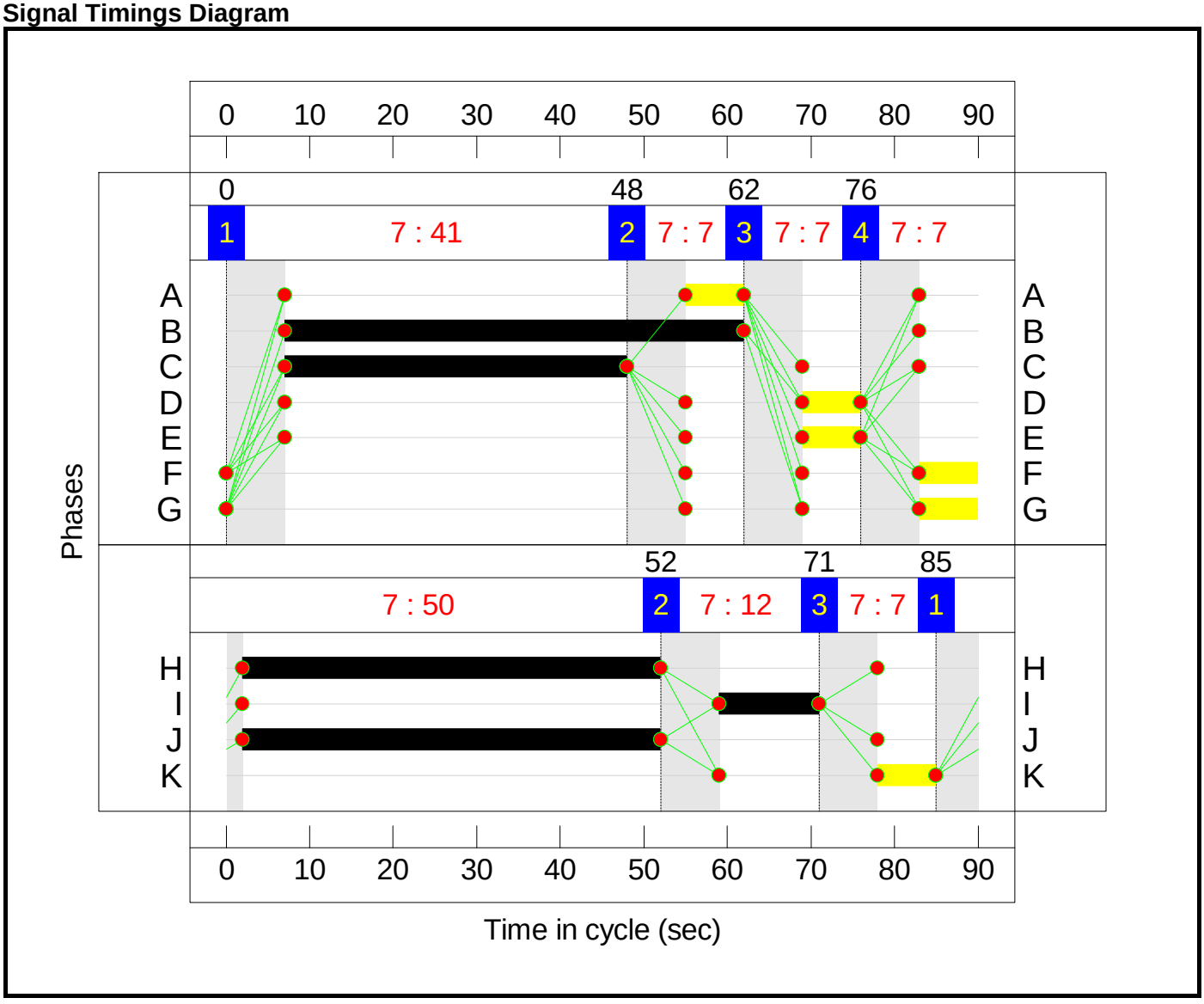
Stage Stream: 1

Stage	1	2	3	4
Duration	41	7	7	7
Change Point	0	48	62	76

Stage Stream: 2

Stage	1	2	3
Duration	50	12	7
Change Point	85	52	71

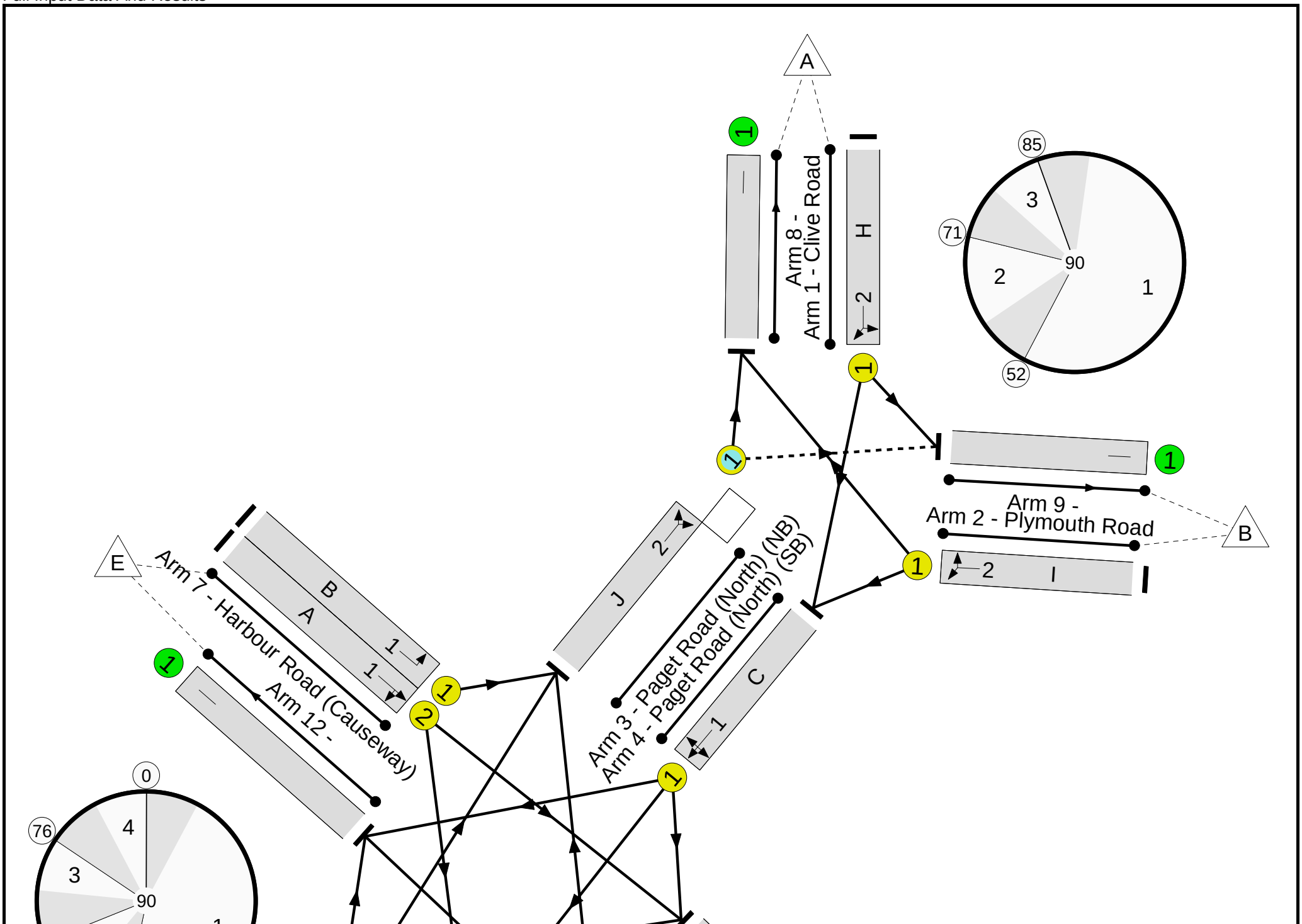
Signal Timings Diagram



Full Input Data And Results

Full Input Data And Results

Network Layout Diagram


A
1
Arm 8 -
Arm 1 - Clive Road
H
2
85
3
71
90
2
1
52
1
1
1
Arm 9 -
Arm 2 - Plymouth Road
B
2
I
E
Arm 7 - Harbour Road (Causeway)
Arm 12 -
B
A
1
1
1
2
J
2
Arm 3 - Paget Road (North) (NB)
Arm 4 - Paget Road (North) (SB)
C
1
1
0
4
76
3
90
1

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**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**53.5%**
Unnamed Junction	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**53.5%**
1/1	Clive Road Ahead Left	U	2	N/A	H		1	50	-	463	1943	1101	42.1%
2/1	Plymouth Road Left Right	U	2	N/A	I		1	12	-	121	1951	282	42.9%
3/1	Paget Road (North) (NB) Ahead Right	O	2	N/A	J		1	50	-	369	1944	1102	33.5%
4/1	Paget Road (North) (SB) Left Ahead Right	U	1	N/A	C		1	41	-	452	1811	845	53.5%
5/1	Station Approach Road Left Ahead	U	1	N/A	E		1	7	-	24	1915	170	14.1%
5/2	Station Approach Road Right	U	1	N/A	D		1	7	-	72	1884	167	43.0%
6/1	Paget Road (South) Left	U	1	N/A	G		1	7	-	13	1914	170	7.6%
6/2	Paget Road (South) Ahead Right	U	1	N/A	F		1	7	-	44	2075	184	23.9%
7/1	Harbour Road (Causeway) Left	U	1	N/A	B		1	55	-	260	1755	1092	23.8%
7/2	Harbour Road (Causeway) Ahead Right	U	1	N/A	A		1	7	-	53	1988	177	30.0%
8/1		U	N/A	N/A	-		-	-	-	411	Inf	Inf	0.0%
9/1		U	N/A	N/A	-		-	-	-	90	Inf	Inf	0.0%
10/1		U	N/A	N/A	-		-	-	-	95	Inf	Inf	0.0%
11/1		U	N/A	N/A	-		-	-	-	46	Inf	Inf	0.0%
12/1		U	N/A	N/A	-		-	-	-	408	Inf	Inf	0.0%

Full Input Data And Results

Item	Entering (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	**-**	**-**	**43**	**0**	**0**	**7.2**	**2.6**	**0.0**	**9.8**	**-**	**-**	**-**	**-**
Unnamed Junction	**-**	**-**	**43**	**0**	**0**	**7.2**	**2.6**	**0.0**	**9.8**	**-**	**-**	**-**	**-**
1/1	463	463	-	-	-	1.4	0.4	-	1.8	13.9	6.6	0.4	6.9
2/1	121	121	-	-	-	1.2	0.4	-	1.6	46.3	2.8	0.4	3.1
3/1	369	369	43	0	0	0.7	0.3	0.0	1.0	9.6	3.9	0.3	4.1
4/1	452	452	-	-	-	1.1	0.6	-	1.7	13.4	3.6	0.6	4.2
5/1	24	24	-	-	-	0.3	0.1	-	0.3	50.1	0.6	0.1	0.6
5/2	72	72	-	-	-	0.8	0.4	-	1.2	57.6	1.7	0.4	2.1
6/1	13	13	-	-	-	0.1	0.0	-	0.2	49.3	0.3	0.0	0.3
6/2	44	44	-	-	-	0.5	0.2	-	0.6	51.0	1.0	0.2	1.2
7/1	260	260	-	-	-	0.5	0.2	-	0.7	9.7	2.8	0.2	3.0
7/2	53	53	-	-	-	0.6	0.2	-	0.8	52.9	1.2	0.2	1.5
8/1	411	411	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
9/1	90	90	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
10/1	95	95	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
11/1	46	46	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
12/1	408	408	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0

C1 Stream: 1 PRC for Signalled Lanes (%): 68.3
C1 Stream: 2 PRC for Signalled Lanes (%): 109.6
PRC Over All Lanes (%): 68.3

Total Delay for Signalled Lanes (pcuHr): 5.44
Total Delay for Signalled Lanes (pcuHr): 4.33
Total Delay Over All Lanes(pcuHr): 9.77

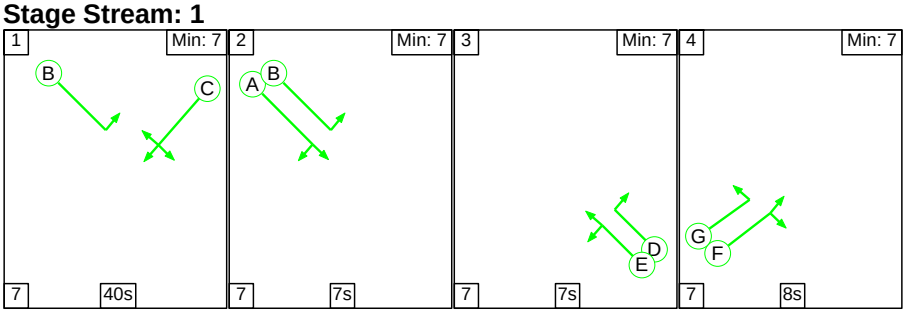
Cycle Time (s): 90

Full Input Data And Results

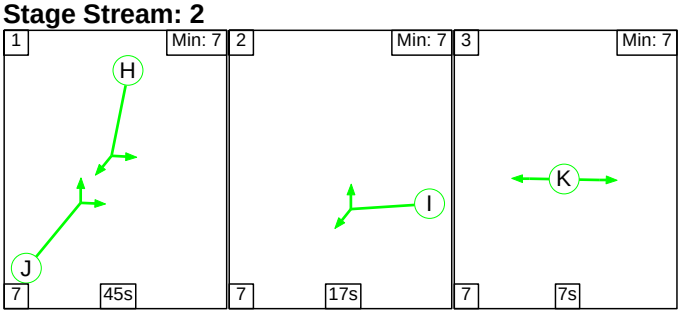
Scenario 2: 'PM 2020 inc Dev+BI' (FG2: 'PM 2020 in Dev+BI', Plan 1: 'Standard')

Stage Sequence Diagram

Stage Stream: 1



Stage Stream: 2



Stage Timings

Stage Stream: 1

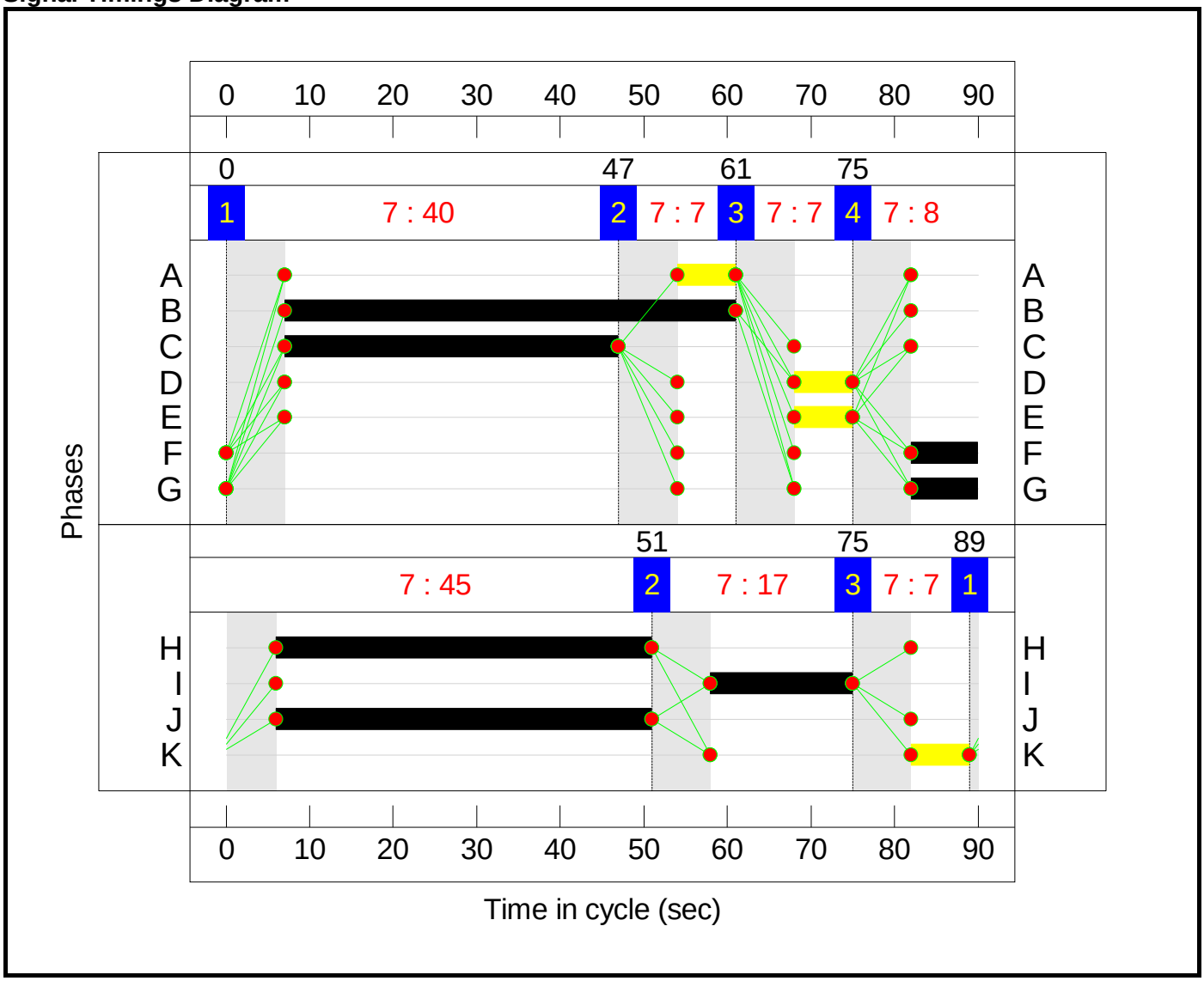
Stage	1	2	3	4
Duration	40	7	7	8
Change Point	0	47	61	75

Stage Stream: 2

Stage	1	2	3
Duration	45	17	7
Change Point	89	51	75

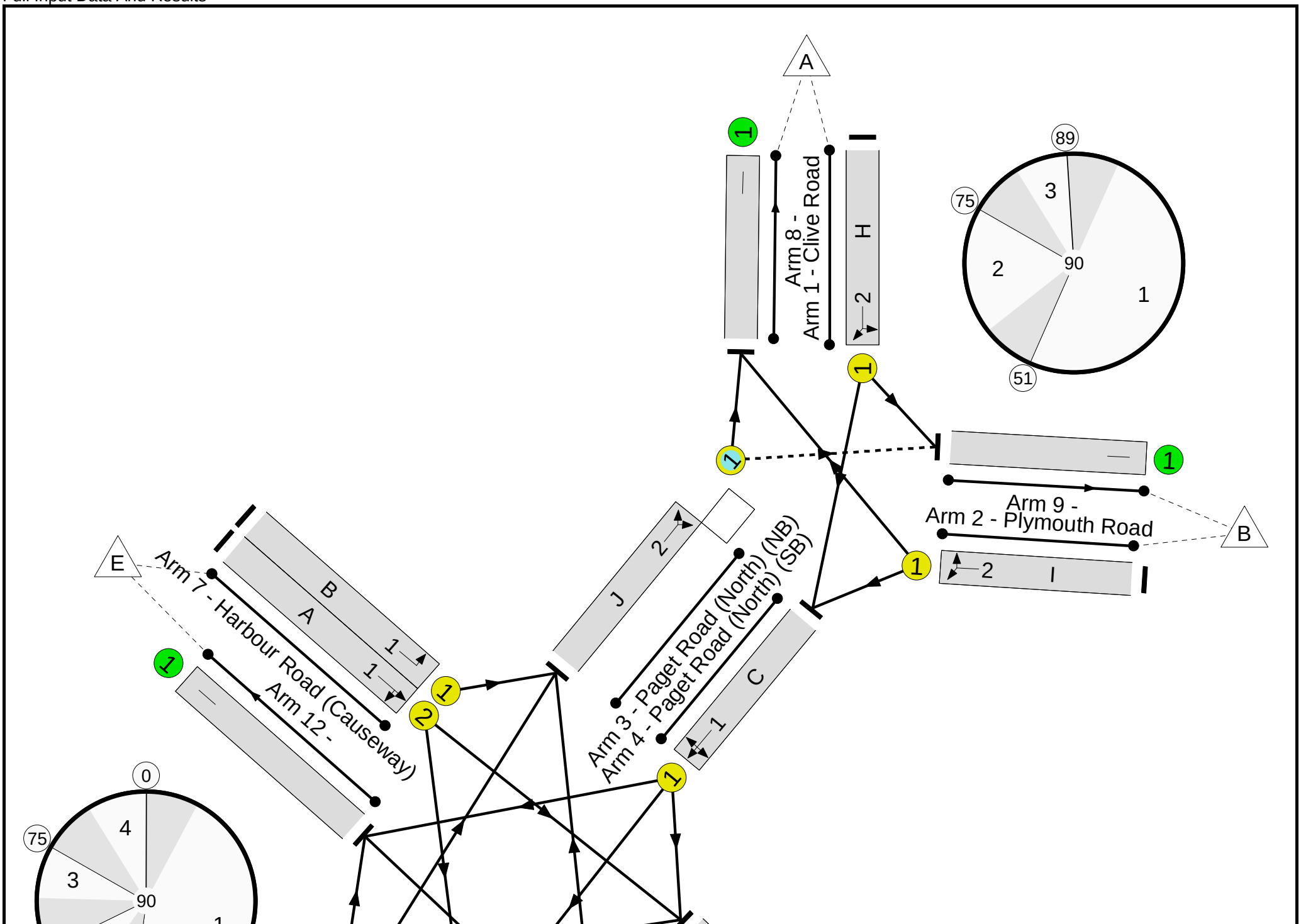
Full Input Data And Results

Signal Timings Diagram



Full Input Data And Results

Network Layout Diagram


A
B
E
Arm 8 -
Arm 1 - Clive Road
Arm 9 -
Arm 2 - Plymouth Road
Arm 7 - Harbour Road (Causeway)
Arm 12 -
Arm 3 - Paget Road (North) (NB)
Arm 4 - Paget Road (North) (SB)
H
I
J
A
B
C
89
3
75
2
90
1
51
0
4
75
3
90
1

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**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**70.6%**
Unnamed Junction	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**70.6%**
1/1	Clive Road Ahead Left	U	2	N/A	H		1	45	-	568	1935	989	57.4%
2/1	Plymouth Road Left Right	U	2	N/A	I		1	17	-	135	1870	374	36.1%
3/1	Paget Road (North) (NB) Ahead Right	O	2	N/A	J		1	45	-	528	1943	993	53.2%
4/1	Paget Road (North) (SB) Left Ahead Right	U	1	N/A	C		1	40	-	582	1810	825	70.6%
5/1	Station Approach Road Left Ahead	U	1	N/A	E		1	7	-	86	1895	168	51.1%
5/2	Station Approach Road Right	U	1	N/A	D		1	7	-	39	1884	167	23.3%
6/1	Paget Road (South) Left	U	1	N/A	G		1	8	-	129	1914	191	67.4%
6/2	Paget Road (South) Ahead Right	U	1	N/A	F		1	8	-	84	2067	207	40.6%
7/1	Harbour Road (Causeway) Left	U	1	N/A	B		1	54	-	422	1755	1073	39.3%
7/2	Harbour Road (Causeway) Ahead Right	U	1	N/A	A		1	7	-	122	2012	179	68.2%
8/1		U	N/A	N/A	-		-	-	-	502	Inf	Inf	0.0%
9/1		U	N/A	N/A	-		-	-	-	147	Inf	Inf	0.0%
10/1		U	N/A	N/A	-		-	-	-	234	Inf	Inf	0.0%
11/1		U	N/A	N/A	-		-	-	-	68	Inf	Inf	0.0%
12/1		U	N/A	N/A	-		-	-	-	634	Inf	Inf	0.0%

Full Input Data And Results

Item	Entering (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	**-**	**-**	**67**	**0**	**0**	**12.6**	**6.1**	**0.0**	**18.7**	**-**	**-**	**-**	**-**
Unnamed Junction	**-**	**-**	**67**	**0**	**0**	**12.6**	**6.1**	**0.0**	**18.7**	**-**	**-**	**-**	**-**
1/1	568	568	-	-	-	2.4	0.7	-	3.1	19.5	9.8	0.7	10.5
2/1	135	135	-	-	-	1.2	0.3	-	1.4	38.6	2.9	0.3	3.2
3/1	528	528	67	0	0	1.2	0.6	0.0	1.8	12.3	5.0	0.6	5.5
4/1	582	582	-	-	-	1.8	1.2	-	3.0	18.5	4.7	1.2	5.9
5/1	86	86	-	-	-	0.9	0.5	-	1.5	60.7	2.0	0.5	2.5
5/2	39	39	-	-	-	0.4	0.2	-	0.6	52.2	0.9	0.2	1.1
6/1	129	129	-	-	-	1.4	1.0	-	2.4	67.0	3.1	1.0	4.1
6/2	84	84	-	-	-	0.9	0.3	-	1.2	52.6	2.0	0.3	2.3
7/1	422	422	-	-	-	1.1	0.3	-	1.4	11.7	5.4	0.3	5.7
7/2	122	122	-	-	-	1.3	1.0	-	2.4	70.3	2.9	1.0	4.0
8/1	502	502	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
9/1	147	147	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
10/1	234	234	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
11/1	68	68	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
12/1	634	634	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0

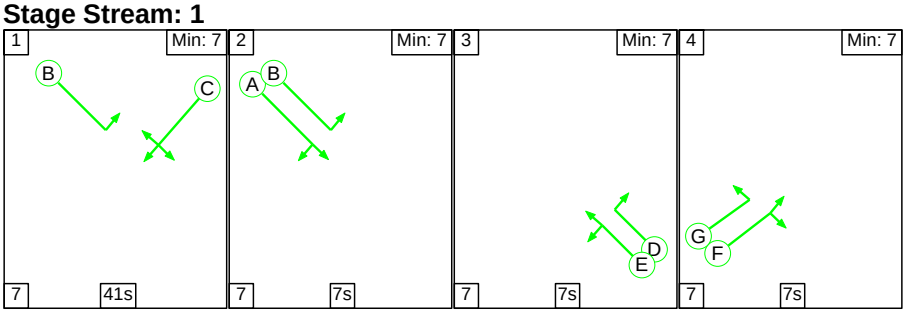
C1 Stream: 1 PRC for Signalled Lanes (%): 27.5 Total Delay for Signalled Lanes (pcuHr): 12.39
C1 Stream: 2 PRC for Signalled Lanes (%): 56.7 Total Delay for Signalled Lanes (pcuHr): 6.32
PRC Over All Lanes (%): 27.5 Total Delay Over All Lanes(pcuHr): 18.72 Cycle Time (s): 90

Full Input Data And Results

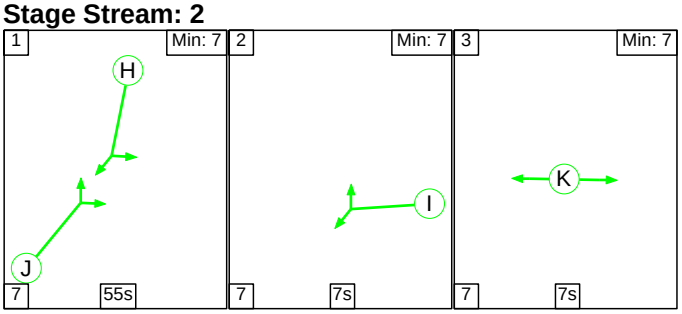
Scenario 3: 'PM 2020 Dev + Tourism' (FG3: '2020 Dev and Tour', Plan 1: 'Standard')

Stage Sequence Diagram

Stage Stream: 1



Stage Stream: 2



Stage Timings

Stage Stream: 1

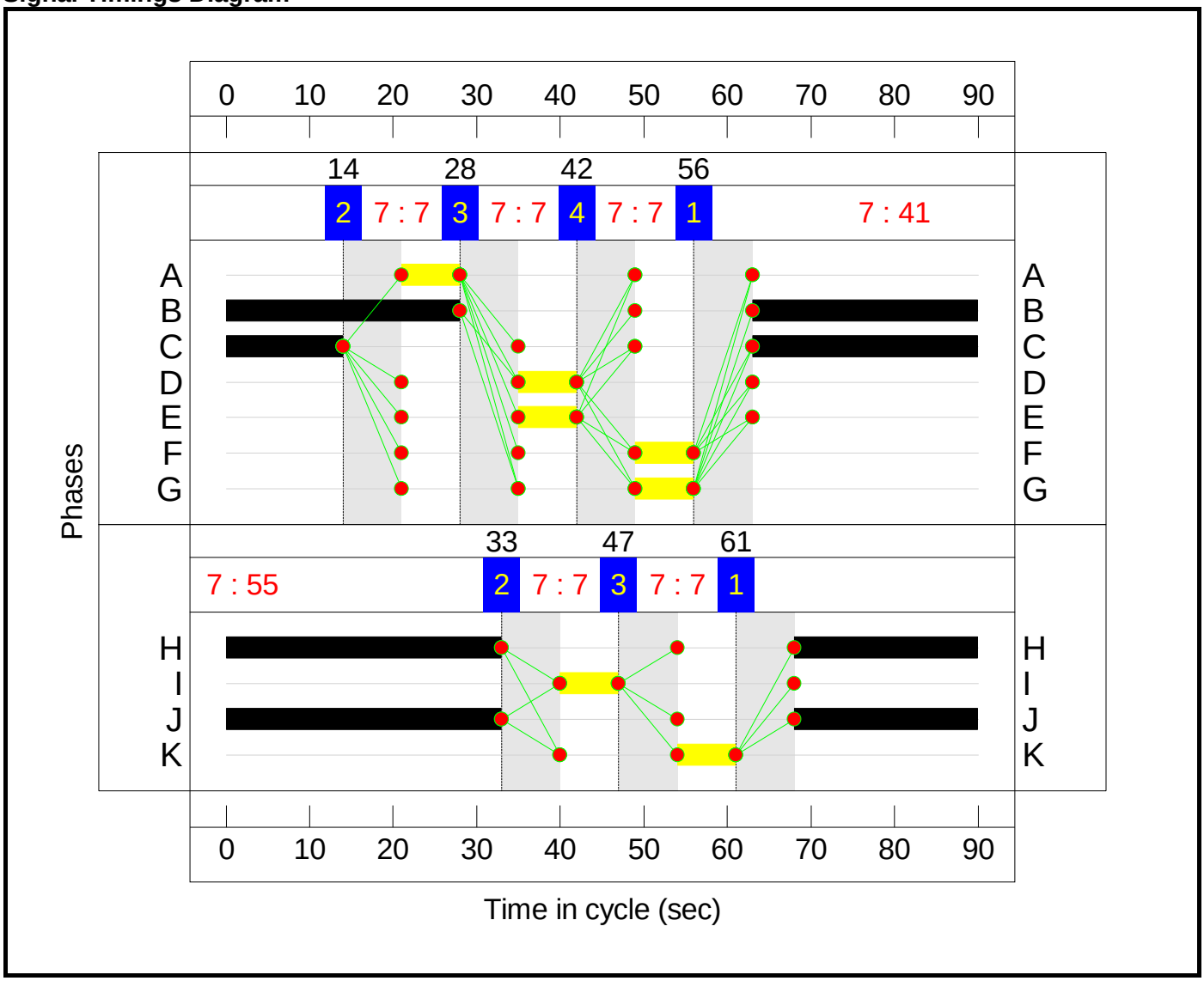
Stage	1	2	3	4
Duration	41	7	7	7
Change Point	56	14	28	42

Stage Stream: 2

Stage	1	2	3
Duration	55	7	7
Change Point	61	33	47

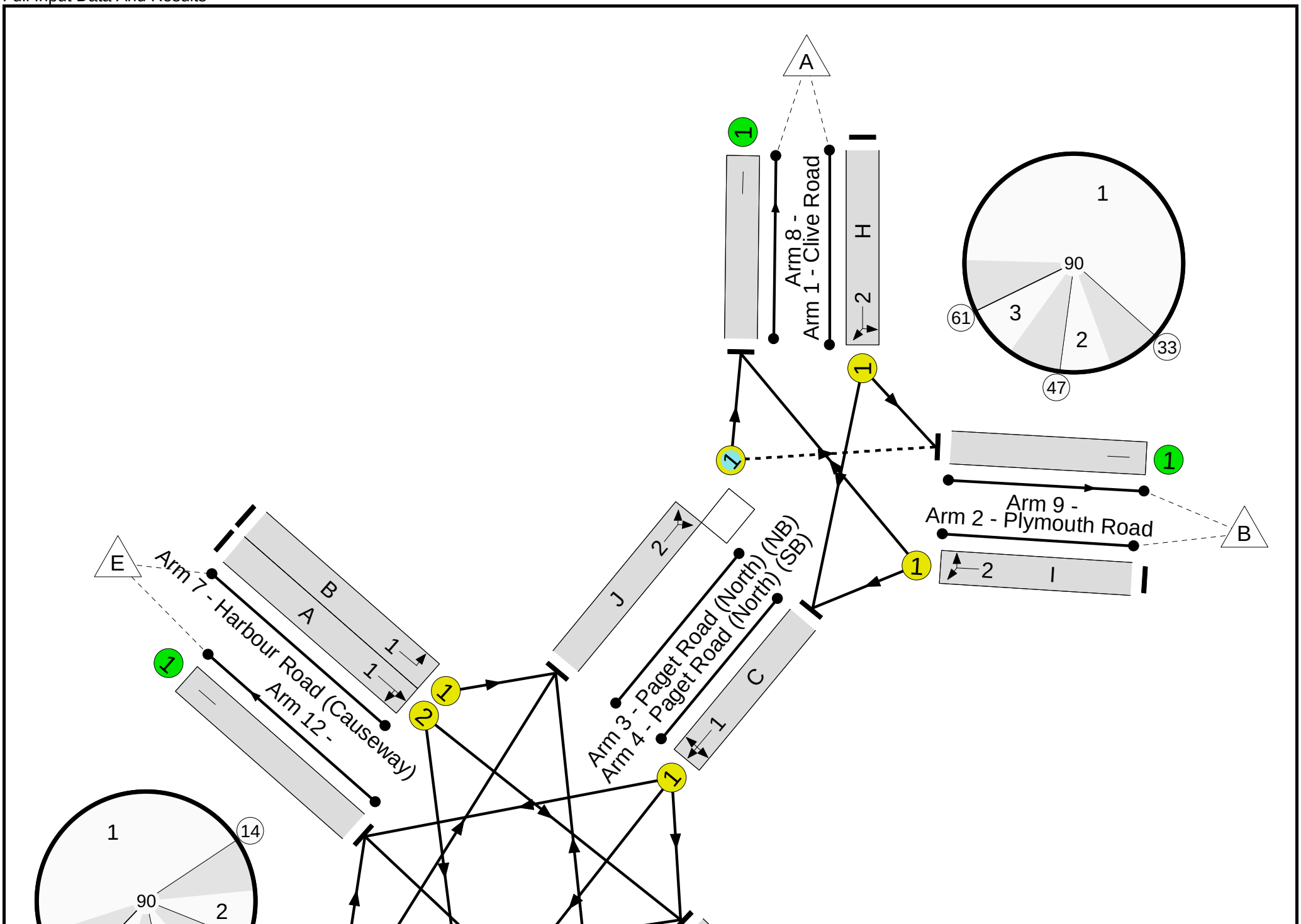
Full Input Data And Results

Signal Timings Diagram



Full Input Data And Results

Network Layout Diagram


A
Arm 8 -
Arm 1 - Clive Road
H
2
1
90
61
3
2
33
47
1
Arm 9 -
Arm 2 - Plymouth Road
B
2
I
E
Arm 7 - Harbour Road (Causeway)
Arm 12 -
B
A
1
1
J
2
Arm 3 - Paget Road (North) (NB)
Arm 4 - Paget Road (North) (SB)
C
1
1
90
14
2

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**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**120.8%**
Unnamed Junction	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**120.8%**
1/1	Clive Road Ahead Left	U	2	N/A	H		1	55	-	671	1929	1200	55.9%
2/1	Plymouth Road Left Right	U	2	N/A	I		1	7	-	202	1881	167	120.8%
3/1	Paget Road (North) (NB) Ahead Right	O	2	N/A	J		1	55	-	635	1938	1206	52.7%
4/1	Paget Road (North) (SB) Left Ahead Right	U	1	N/A	C		1	41	-	689	1811	845	78.9%
5/1	Station Approach Road Left Ahead	U	1	N/A	E		1	7	-	110	1899	169	65.2%
5/2	Station Approach Road Right	U	1	N/A	D		1	7	-	60	1884	167	35.8%
6/1	Paget Road (South) Left	U	1	N/A	G		1	7	-	181	1914	170	106.4%
6/2	Paget Road (South) Ahead Right	U	1	N/A	F		1	7	-	129	2080	185	69.8%
7/1	Harbour Road (Causeway) Left	U	1	N/A	B		1	55	-	463	1755	1092	42.4%
7/2	Harbour Road (Causeway) Ahead Right	U	1	N/A	A		1	7	-	187	2011	179	104.6%
8/1		U	N/A	N/A	-		-	-	-	611	Inf	Inf	0.0%
9/1		U	N/A	N/A	-		-	-	-	208	Inf	Inf	0.0%
10/1		U	N/A	N/A	-		-	-	-	326	Inf	Inf	0.0%
11/1		U	N/A	N/A	-		-	-	-	97	Inf	Inf	0.0%
12/1		U	N/A	N/A	-		-	-	-	761	Inf	Inf	0.0%

Full Input Data And Results

Item	Entering (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	**-**	**-**	**96**	**0**	**0**	**18.5**	**44.8**	**0.0**	**63.2**	**-**	**-**	**-**	**-**
Unnamed Junction	**-**	**-**	**96**	**0**	**0**	**18.5**	**44.8**	**0.0**	**63.2**	**-**	**-**	**-**	**-**
1/1	671	671	-	-	-	1.8	0.6	-	2.5	13.2	9.7	0.6	10.3
2/1	202	167	-	-	-	3.6	19.9	-	23.5	419.4	5.9	19.9	25.9
3/1	635	635	96	0	0	1.1	0.6	0.0	1.7	9.4	11.1	0.6	11.7
4/1	667	667	-	-	-	2.6	1.8	-	4.4	23.9	7.7	1.8	9.5
5/1	110	110	-	-	-	1.2	0.9	-	2.1	69.4	2.7	0.9	3.6
5/2	60	60	-	-	-	0.6	0.3	-	0.9	55.3	1.4	0.3	1.7
6/1	181	170	-	-	-	2.4	10.0	-	12.4	246.9	4.8	10.0	14.8
6/2	129	129	-	-	-	1.4	1.1	-	2.5	70.8	3.1	1.1	4.2
7/1	463	463	-	-	-	1.1	0.4	-	1.5	11.6	5.9	0.4	6.3
7/2	187	179	-	-	-	2.5	9.2	-	11.7	224.9	4.9	9.2	14.1
8/1	599	599	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
9/1	208	208	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
10/1	314	314	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
11/1	94	94	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
12/1	735	735	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0

C1 Stream: 1 PRC for Signalled Lanes (%): -18.2 Total Delay for Signalled Lanes (pcuHr): 35.58
C1 Stream: 2 PRC for Signalled Lanes (%): -34.2 Total Delay for Signalled Lanes (pcuHr): 27.66
PRC Over All Lanes (%): -34.2 Total Delay Over All Lanes(pcuHr): 63.25 Cycle Time (s): 90

Nathaniel Lichfield & Partners
Planning. Design. Economics.

APPENDIX 4

Arup Technical Note (31 May 2011)

(Bound Separately)