Residential Lands at Coolagad, Greystones, Co. Wicklow

Traffic and Transport Assessment

29 March 2022

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Quality information

Prepared by	Checked by	Verified by	Approved by
			
Patrick McGeough Consultant	Tim Robinson Regional Director	Laura Shaughnessy Associate Director	Tim Robinson Regional Director

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0	March 2022	Planning Issue	TJR	Tim Robinson	Regional Director

Distribution List

# Hard Copies	PDF Required	Association / Company Name
8	Yes	Cairn Homes Properties Limited

Prepared for:

Cairn Homes PLC
7 Grand Canal
Grand Canal Street Lower, Dublin 2

Prepared by:

Patrick McGeough
Consultant
M: +4474 2564 6328
E: Patrick.McGeough@aecom.com

AECOM Ireland Limited
4th Floor
Adelphi Plaza
Georges Street Upper
Dun Laoghaire
Co. Dublin A96 T927
Ireland

T: +353 1 696 6220
aecom.com

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Table of Contents

Figures

Tables

1. Introduction

1.1 Background

AECOM has been commissioned by Cairn Homes Properties Limited to undertake a Traffic and Transport Assessment for a planning submission to An Bord Pleanála for a proposed residential development with creche and community facilities on a site located off the R761 Rathdown Road at Coolagad near Greystones in County Wicklow.

The lands on which the proposed development will be constructed is zoned for residential use, open space and active open space within the Greystones-Delgany and Kilcoole Local Area Plan 2013-2019. Figure 1.1 shows the site location.

Figure 1.1 – Proposed Site Location

1.2 Proposed Development

Cairn Homes Properties Limited, intend to apply to An Bord Pleanála for a 7 year planning permission for a strategic housing development at this site of c.26.03ha at 'Coolagad', Greystones, Co. Wicklow. The application site is generally located to the west of the R761 Rathdown Road, north of the Gate Lodge; north and west of Coolagad House, Temple Carrig School, Gaelscoil na gCloch Liath and Greystones Educate Together National School. The lands are bounded by Waverly Avenue and Seagreen Park residential areas to the east. Templecarrig Lower is located to the north of the lands and Kindlestown Upper to the west.

The proposed development consists of:

- 586 residential units including:
  - 351 two storey houses (207 no. 3 bed, 140 no. 4 bed, 4 no. 5 bed) comprising detached, semi-detached and terraced units
  - 203 no. apartments (65 no. 1 bed, 123 no. 2 bed, 15 no. 3 bed) provided within 6 no. blocks ranging from three to four-storey (over basement) with residential amenity facilities .
  - 32 no. duplex units within 2 no. three-storey blocks (16 no. 2 bed and 16 no. 3 bed units)
  - c. 5,192 sqm of communal open space is provided to serve the proposed apartment/duplex units;
- Community building (single storey) of 392 sq.m. with 29 car parking spaces, including changing rooms and a multipurpose room.
- Creche building of 734 sq.m. with 21 car parking spaces
- A new vehicular entrance, with signalised junction and pedestrian crossings, will be provided off the R761 (Rathdown Road). The new junction will be linked to the existing signalised junction at Blacklion Manor Road / Redford Park which has a planned upgrade by Wicklow County Council. Cycle lanes will be provided along this section of the R761 on both sides. A footpath will also be provided on its western side. Car parking will be provided to the east of the R761, in the front of Redford Cemetery.
- The new access will provide a distributor road as part of the long-term objective to provide a northern access route from Greystones to the N11.
- Car and bicycle parking spaces are provided as follows:
  - 702 on curtilage car parking spaces for the houses; 206 car parking spaces at basement level and 5 at surface level for the apartments; and 32 spaces for the duplex units and 10 visitor spaces at surface level;
  - 22 motorbike parking spaces;
  - 436 resident and 118 visitor bicycle parking spaces are proposed in a mix of basement and surface levels for the apartment blocks and duplex units; 12 bicycle spaces are proposed for the creche, 12 for the community centre and 10 at the sport field.
- The development also includes site development infrastructure, a hierarchy of internal streets including bridges, cycle paths & footpaths; new watermain connection and foul and surface water drainage; the development also provides for the construction of a new public foul sewer along the R761/R762 from the site entrance as far as the R762 in front of St. Kevin's National School, Rathdown Road, Greystones.
- c.10.43ha open space to include a sport field, a MUGA, private, communal and public open spaces incorporating an existing stream, formal and informal play areas, and new boundary treatments.
- ESB substations/switchrooms, lighting, site drainage works and all ancillary site development works above and below ground.

The application contains a statement setting out how the proposal will be consistent with the objectives of the relevant development plan (Wicklow County Development Plan, 2016-2022) and local area plan (Greystones-Delgany and Kilcoole Local Area Plan, 2013-2019).

The application contains a statement indicating why permission should be granted for the proposed development, having regard to a consideration specified in section 37(2)(b) of the Planning and Development Act, 2000, as amended, notwithstanding that the proposed development materially contravenes a relevant development plan or local area plan other than in relation to the zoning of the land.

The proposed site plan (McCrossan O'Rourke Manning Architects Drawing reference 20005 PL03) is provided in Appendix A.

The proposed development schedule of residential accommodation is shown in Table 1-1:

Table 1-1 – Schedule of Residential Accommodation

Land Use	Type	Quantum
Apartments	Standard – 1 Bed	65
	Standard – 2 Bed	123
	Standard – 3 Bed	15
	2 Bedroom Duplex	16
	3 Bedroom Duplex	16
Houses	3 Bedroom	207
	4 Bedroom	140
	5 Bedroom	4
Total		**586**

In addition to residential dwellings and creche / community space the development proposals also include for related internal road network, landscaping, open space and connection to the Coolagad Link Road.

1.3 Planning History

The site has previously been subject to a planning application for a mixed-use development and there has been various new developments in the surrounding area over recent years as detailed below.

1.3.1 Mixed Used Development, (Planning Ref. 964736)

The previous application (Planning Ref. 964736) consisted of car showrooms/offices/workshop, petrol filling station, incl. convenience store, toilets, forecourt, canopy, signs, car wash & ancillary works and was refused outline planning permission in 1998 for 4 No. conditions not cited in the schedule on 03/04/1998. No documents were made available on Wicklow County Councils Online Planning System.

1.3.2 Adjacent Recent Development

The Coolagad area at the edge of Greystones has been partially developed over the past 15 years through various planning permissions as described below. This information provides the planning context for the proposed development, which is a housing scheme within an area that has been zoned for significant residential development. The necessary infrastructure for road access such as Black Lion Manor Road has been provided in conjunction with the development.

In 2003, permission applications (Planning Ref. 027128 decision date 30/06/2003) were finalised for a Local distributor road with footpath and cycleway from signal controlled junction on Bray / Greystones Road extending west and south for 360 metres and all associated development works to provide access to proposed residential developments.

In 2015, planning applications were finalised (Planning Ref. 141925) for a residential scheme comprising 130 no. 2 storey houses and a 2 storey crèche of c244sqm. The residential element comprises 92 no. 3 bed houses, 34no 4 bed houses, and 4 no.5 bed houses, ranging in size from c109sqm to c165sqm. All associated site development access, landscaping, open spaces, boundary treatment works, car parking and infrastructural services provision.

In 2017, a planning application (Planning Ref. 17245) was granted conditional permission for a proposed residential development (Seagreen): Total 42 no. Dwellings (on a site that overlaps the site subject of planning ref. 14/1031) comprising of 1 no. 2 storey detached house, 37 no. 2 storey semi-detached townhouses & 4 no. 2 storey semi-detached house (all dwellings except Types C1 and K6 with optional attic conversions) & ancillary site development works including estate roads with access from the Blacklion By pass extension (now constructed), site services including surface water attenuation facilities, public open space, landscaping & boundary treatments.

1.4 Objectives

The main objective of this assessment is to examine the potential traffic impact of the proposed development and its access arrangements on the adjacent local road network. The net change in traffic on the network due to the additional traffic has been calculated and its influence on the adjacent local road network has been investigated.

In order to complete this report, AECOM has made reference to the following documents:

- Greystones-Delgany and Kilcoole Local Area Plan (2013-2019);
- Wicklow County Development Plan 2016 – 2022
- Sustainable Urban Housing Design Standards for New Apartments Guidelines for planning Authorities (Department of Housing, Planning and Local Government, March 2018);
- Design Manual for Urban Roads and Streets, DMURS (Department of Transport, Tourism and Sport, May 2019);
- Geometric Design of Junctions (priority junctions, direct accesses, roundabouts, grade separated, and compact grade separated junctions), DN-GEO-03060 (TII, June 2017); and
- Traffic and Transport Assessment Guidelines, PE-PDV-02045 (TII, May 2014).

1.5 Study Methodology

The methodology adopted for this report can be summarised as follows:

- **Existing Transport Infrastructure** – AECOM have collated information on the public transport, walking and cycling facilities in the surrounding area of the site.
- **Development Proposals** – Description of the proposed development and integration with existing and proposed transport networks.
- **Existing Traffic Flow Assessment** – Due to the ongoing Covid-19 pandemic traffic flow data for the AM and PM peak conditions was obtained from a previous study by Cairn Homes on the site from 2017.
- **Development Trip Generation** – Based on the quantum of the proposed development, AECOM have reviewed trip rate data for similar uses and developed anticipated traffic flows, by using the industry standard Trip Rate Information Computer System (TRICS) database. These flows were then assigned to the existing network having regard for the observed traffic patterns on the surrounding road network.
- **Impact Analysis** – Traffic modelling was completed where the need for this was identified using the industry standard Linsig software.

1.6 Report Structure

The remainder of this report is divided into the following sections:

- Section 2 details the existing site characteristics including the surrounding transport infrastructure and any future infrastructure proposals;
- Section 3 discusses the proposed development as part of this application and gives a brief outline of the proposed internal road network and site layout;
- Section 4 sets out the Design Manual for Urban Roads and Streets Statement of Compliance;
- Section 5 considers the traffic impact of the proposed development;
- Section 6 details the operational performance of the site access junctions for a range of different traffic scenarios following the commission of the development;
- Section 7 outlines the Mobility Management Plan for perspective residents of the site;
- Section 8 outlines the Construction Traffic Management Plan; and
- Section 9 provides a summary of AECOMs appraisal together with the main conclusions of the assessment.

2. Existing Conditions

2.1 Introduction

This section includes a review of the existing baseline conditions of the site including public transport provision, walking and cycling facilities and the current operation of the surrounding public network. AECOM undertook a desktop audit to identify the existing conditions in the vicinity of the site utilising resources such as Google Earth, public transport timetables and Wicklow County Council walking and cycling information. The findings from AECOM's analysis are presented within this section.

2.2 Location

The subject site is located to the west of the R761 Rathdown Road which travels through Greystones in County Wicklow. The site is bounded by Kindlestown Woods to the west, farmland to the north and south, and Templecarrig School and residential development to the east. Figure 2.1 shows the developments location.

Figure 2.1 – Development Location

2.3 Land use Zoning

The Land Are subject of AP1 Coolagad and are zoned R17, R22, OS and AOS in Wicklow County Council Land Use Zoning map. Lands designated as AP2, located south east of AP1 are subject of a separate Plan, namely the Black Lion Action Plan. This is shown in Figure 2.2.

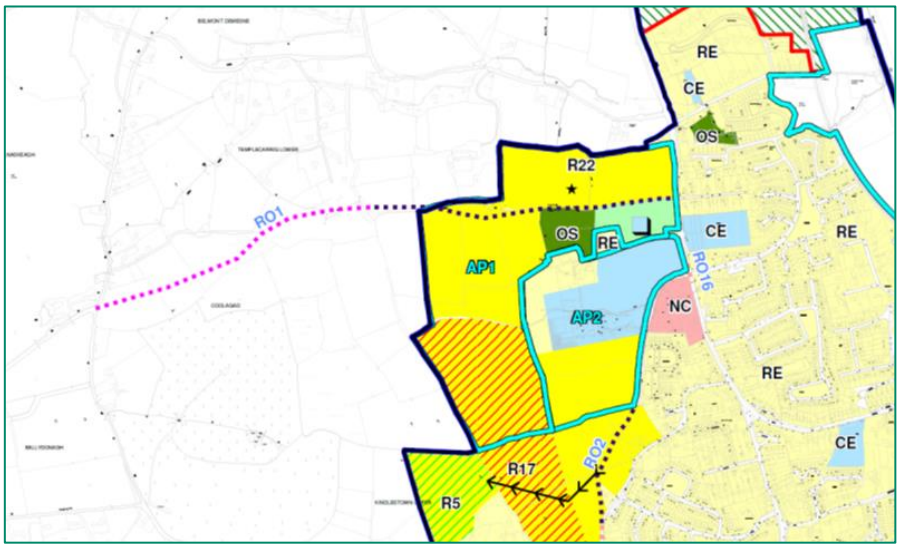


Figure 2.2 – Extract from Greystones Local Area Plan Zoning and Objectives Map

The site is located in the AP1 planning zone as illustrated above in the Greystones-Delgany Local Plan zoning and objectives map extract.

2.4 Existing Transportation Infrastructure

2.4.1 Background

An important stage in the development of a Traffic and Transport Assessment is the identification and appreciation of the local network's existing transport conditions and vehicle movement characteristics.

An audit of the local road network has therefore been undertaken to establish the existing transport conditions and vehicle movement patters across the existing network.

2.4.2 Existing Pedestrian / Cycle Environment

The local walking and cycling environment are displayed in Figure 2.3 and described in the following paragraphs.

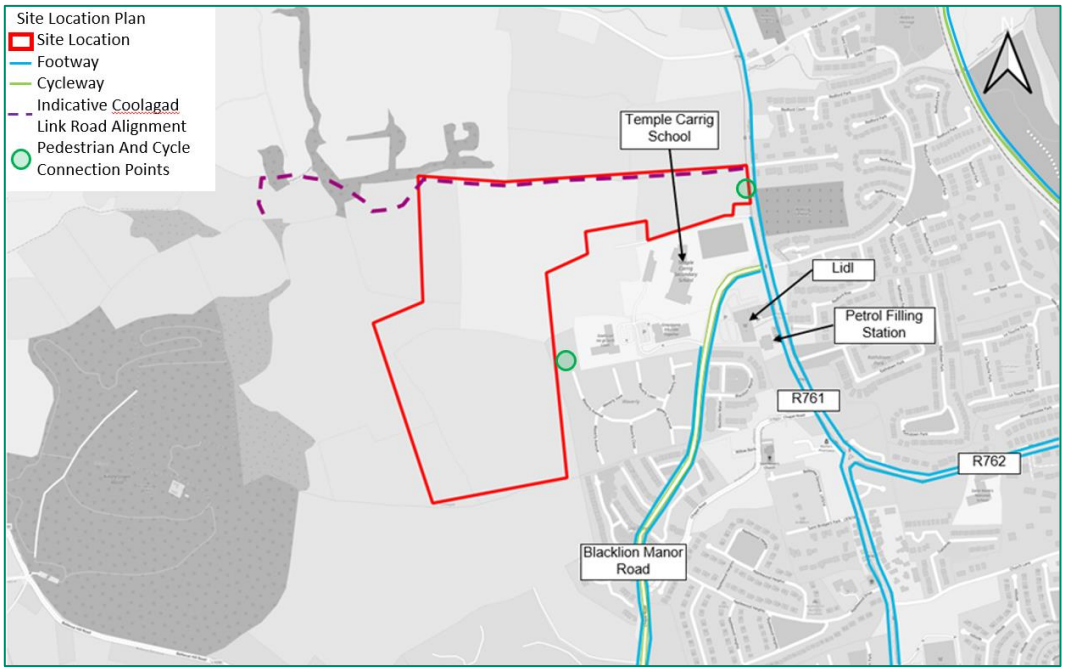


Figure 2.3 – Walking and Cycling Environment

2.4.2.1 R761 Rathdown Road

The R761 is a single carriageway road, of variable width between 6.2m and 7.2m in proximity to the site, with no hard shoulders or dedicated facilities for cyclists. There is a 2m wide footpath on the eastern side of the road for pedestrians running parallel to the site boundary and is continuous along the R761 to the south, connecting to the R761 approximately 700m south of the proposed R761 / Coolagad Link Road junction. An additional footpath approximately 2.0m in width is provided on the western side of the R761, along the frontage of the Templecarrig School and Lidl Store. In proximity to the proposed R761 / Coolagad Link Road junction there is no footpath provided on the western side of the R761.

A further signalised crossing point is provided at the R761 / Black Lion Manor Road / Redford Park junction, which has been subjected to improvements under the R761 Redford Park upgrade scheme by WCC, which also aims to upgrade sections of the R761 North as far as the Redford Cemetery.

2.4.2.2 Black Lion Manor Road

Black Lion Manor Road was constructed to support adjacent residential development and provide access to Templecarrig School. To the south it connects with Chapel Road and at its northern end connects with the R761 Rathdown Road and Redford Park at a signalised crossroads junction.

Future access for pedestrians and cyclists to existing facilities along Waverly Avenue is achieved from the site through a series of foot and cycle paths along the eastern boundary of the site that has the potential for future possible permeability connections conditioned under PA.Reg.Ref.141925. This would increase the connectivity for pedestrians and cyclists to the surrounding residential areas and pedestrian and cycle network. Alongside the road carriageway itself, cycle lanes (1.0m width) are provided on both sides and a footway is provided on the eastern side of the road (2.0m width). Black Lion Manor Road provides convenient access to Templecarrig School, as well as existing amenities fronting Rathdown Road including a Lidl Food Store and a petrol filling station with convenience store.

Walking and cycling facilities on Black Lion Manor are particularly well placed and convenient for active travel users travelling to and from the site, which will connect to pedestrian facilities along R761 providing pedestrians with routes to various modes of public transport and local amenities, ensuring residents are well connected. Further to this, the Green Route Delgany Heritage Trail connects between Chapel Road and Bellevue Hill Road providing pedestrian Linkages to the Kindlestown Woods and Kindlestown Hill walking routes.

Cyclists currently have to share the road with vehicles, as the existing cycle facilities within Greystones are sparse and limited, however Wicklow County Council has several proposed upgrades within the Greystones-Delgany & Kilcoole Local Area Plan 2013 – 2019 to deliver key cycle infrastructure connecting cyclists through key routes to Greystones town and further to the Bray-Greystones Cliff Walk route, providing connectivity further to Bray and towards destinations in County Dublin.

2.4.2.3 Extent of Walking and Cycling Network

As part of a previous study on the site by Cairn Homes for 400 dwellings at the site a set of walking and cycling isochrones were prepared to demonstrate the extent of the walking and cycling network surrounding the site. These are shown in Figure 2.4 and Figure 2.5.

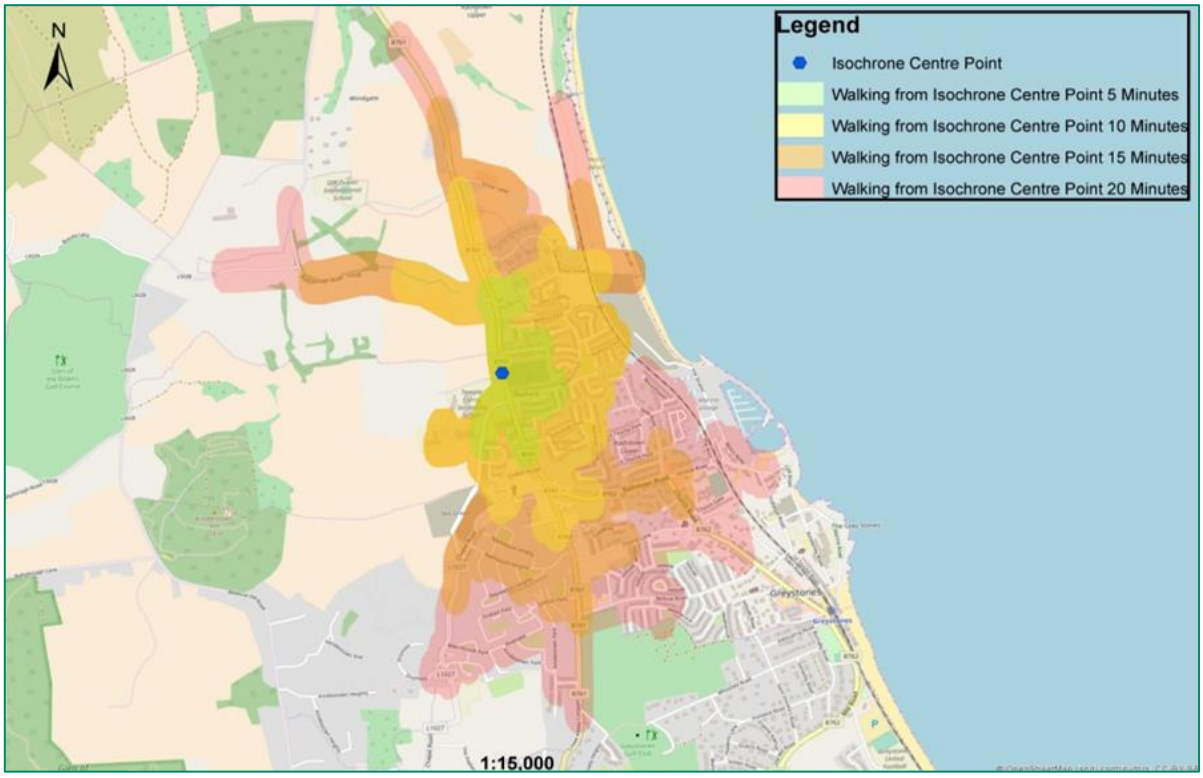


Figure 2.4 – Walking Isochrones

Source: TIA prepared by Roughan & O'Donovan Consulting Engineers

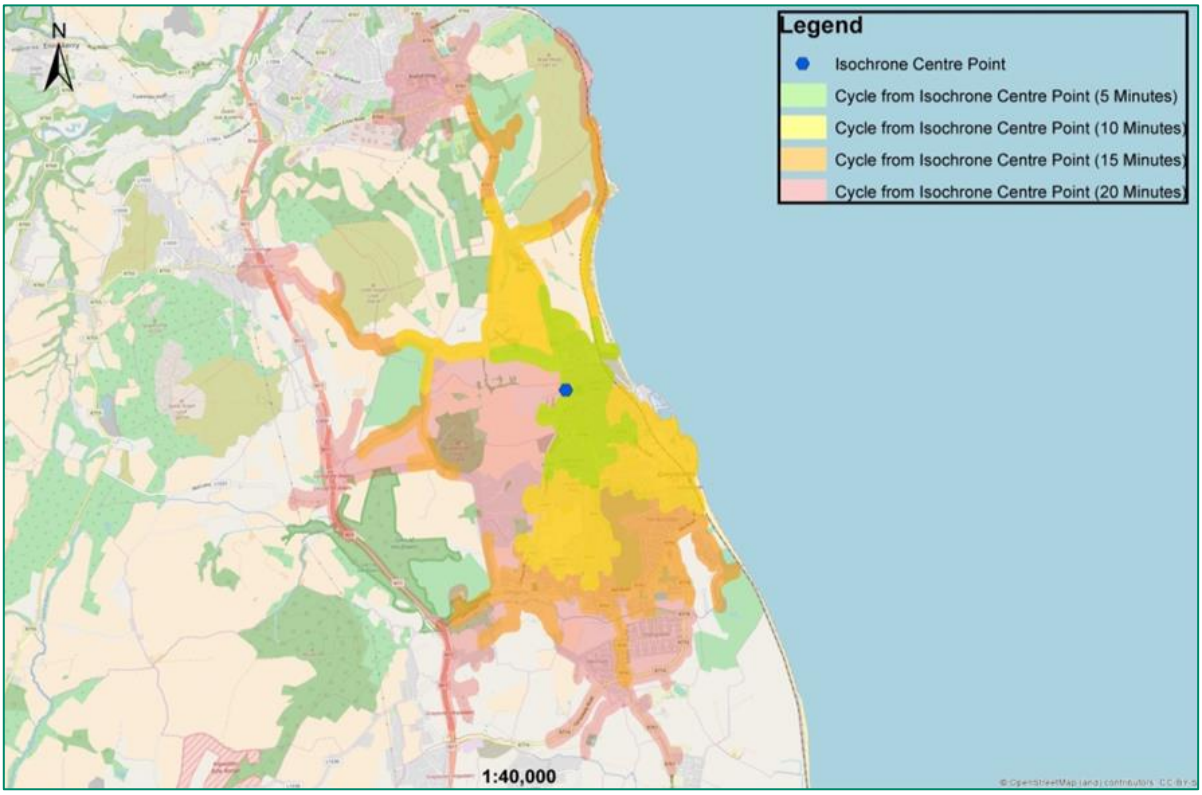


Figure 2.5 – Cycle Isochrone

Source: TIA prepared by Roughan & O'Donovan Consulting Engineers

The isochrones demonstrate that the majority of Greystones is accessible within a 20-minute walk and that southern areas of Bray town centre can be reached by cyclists within a 20-minute cycle.

2.4.3 Sustainable Transport – Bus

As graphically illustrated in Figure 2.6, the site benefits from good bus transport connections allowing residents to travel by this sustainable mode.

The closest bus stops are located along the R761 Rathdown Road. Two stops are located to the south of the R761 / Black Lion Manor Road / Redford Park junction adjacent to the Lidl store. These bus stops are operated by Dublin Bus, Go Ahead and Aircoach, who provide services to Dublin Airport. A further two bus stops are located approximately 70m north of the proposed R761 / Coolagad Link Road junction, although these are not serviced by the Aircoach service to Dublin Airport. Figure 2.6 illustrates the location of the bus stops in relation to the development with Table 2-1 to Table 2-5 detailing the number of services per day and the routes. These tables represent daily frequencies at each of the stops, for peak hour frequencies, please refer to the Bus Capacity Assessment Report attached as Appendix B.

Further to this, the existing bus network's current occupancy and reserve capacity has been assessed by AECOM as part of this proposal. The existing network's services were assessed for the assumed peak hours for commuter trips and existing bus occupancy in the vicinity of the subject site, and therefore no additional bus services or feeder buses are proposed under this development. The Public Transport Occupancy Survey has been shown in the Technical Note attached as Appendix C.

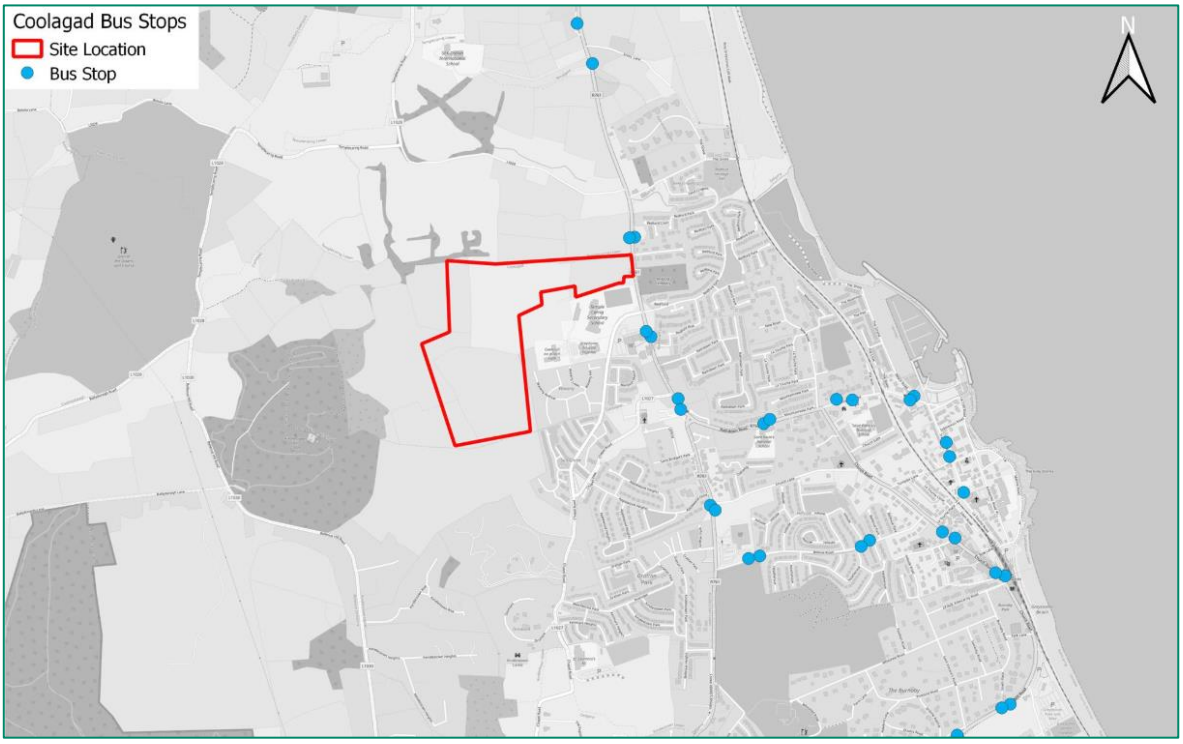


Figure 2.6 – Bus Stops in Vicinity of the Site

Table 2-1 – Bus Services Timetabling Summary at Greystones Redford Park

84	Dublin Bus	Temple Road – Newcastle Road (Sea Road)	Hourly Service (0520-2308)	Hourly Service (0535-2349)	Hourly Service (0919-2347)
84X	Dublin Bus	Trinity College - Beechdale Estate	7 Services (0633-1354)	No Service	No Service
184	Go-Ahead Ireland	Newtownmountkennedy - Bray Station	Half Hourly Service (0652-2321)	Half Hourly Service (0701-2321)	Half Hourly Service (0910-2340)
702	Aircoach	Dublin Airport - Greystones	8 Services (0419-1809)	8 Services (0419-1809)	8 Services (0419-1809)

Source: https://bustimes.org/map#16/53.1541/-6.082

Table 2-2 – Bus Services Timetabling Summary at Greystones Opposite Redford Park

84	Dublin Bus	Temple Road – Newcastle Road (Sea Road)	Hourly Service (0451-0020)	Hourly Service (0628-2336)	Hourly Service (0836-2336)
84N	Nitelink, Dublin Bus	Dublin – Delgany	No Service	2 Hourly Service (0054-0454)	2 Hourly Service (0054-0454)
84X	Dublin Bus	Trinity College - Beechdale Estate	12 Services (1250-1900)	No Service	No Service
184	Go-Ahead Ireland	Newtownmountkennedy - Bray Station	Half Hourly Service (0652-2331)	Half Hourly Service (0628-2336)	Half Hourly Service (0836-2336)
702	Aircoach	Dublin Airport - Greystones	8 Services (0419-1809)	8 Services (0419-1809)	8 Services (0419-1809)

Source: https://bustimes.org/map#16/53.1541/-6.082

Table 2-3 – Bus Services Timetabling Summary north of Sea View (northbound)

84	Dublin Bus	Temple Road – Newcastle Road (Sea Road)	Hourly Service (0520-2308)	Hourly Service (0535-2349)	Hourly Service (0919-2347)
184	Go-Ahead Ireland	Newtownmountkennedy - Bray Station	Half Hourly Service (0652-2331)	Half Hourly Service (0701-2321)	Half Hourly Service (0910-2340)

Source: https://bustimes.org/map#16/53.1541/-6.082

Table 2-4 – Bus Services Timetabling Summary north of Sea View (southbound)

84	Dublin Bus	Temple Road – Newcastle Road (Sea Road)	Hourly Service (0449-0020)	No Service	No Service
84N	Nitelink, Dublin Bus	Dublin – Delgany	No Service	2 Hourly Service (0053-0453)	2 Hourly Service (0053-0453)
184	Go-Ahead Ireland	Newtownmountkennedy - Bray Station	Half Hourly Service (0637-0002)	Half Hourly Service (0627-2335)	Half Hourly Service (0835-2335)

Source: https://bustimes.org/map#16/53.1541/-6.082

2.4.4 Sustainable Transport –Rail

The closest rail station to the site is Greystones Station, located approximately 2 km from the site to the southeast. The station is the southernmost terminus of the DART electrified rail network and also connects to the Irish Rail network, providing an interchange location for commuters to and from Dublin City Centre. Timetable information for Greystones Station is provided in Table 2-5.

Table 2-5 – Rail Services at Greystones Station

Operator	Route	Approximate Service Frequency		
		Mon – Fri	Saturday	Sunday
Irish Rail	Dublin Connolly – Rosslare	5 Services a day (1032-1932)	3 Services a day (0856-1928)	3 Services a day (1113-1937)
Irish Rail	Rosslare – Dublin Connolly	5 Services a day (0646-19320	4 Services a day (0753-1958)	3 Services a day (1143-2007)
DART	Dundalk/Howth - Dublin - Bray/Gorey	Half Hourly Service (0736-0032)	Half Hour-Hourly Service (0821-0025)	Half Hour-Hourly Service (0950-2354)
DART	Gorey/Bray - Dublin - Howth/Dundalk	Half Hourly Service (0544-2304)	Half Hour-Hourly Service (0630-2310)	Half Hour-Hourly Service (0920-2303)

Source: https://www.irishrail.ie/IrishRail/media/Timetable-PDF-s/Connolly-DART-timetables/4-_18-_dart_commuter.pdf

As demonstrated a half hourly service to Dublin city centre is available via the DART from Greystones Station. The location of the station is shown in Figure 2.7

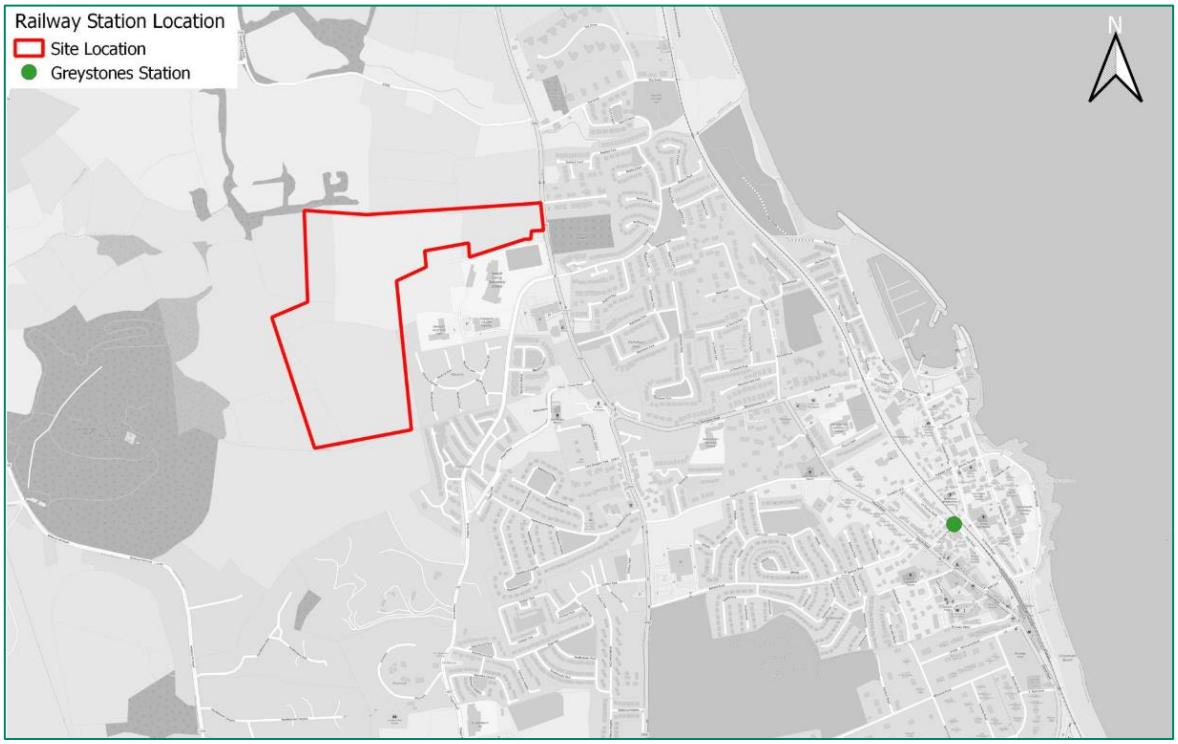


Figure 2.7 – Location of Greystones Station

2.5 Emerging Transportation infrastructure

2.5.1 Local Road, Cycle and Pedestrian Proposals

The Greystones – Delgany and Kilcoole Local Area Plan, has outlined both short (6 years) and long-term road network proposals for the local area.

In proximity to the site, the key local road proposal is for the construction of a new road from the R761 Rathdown Road at Sea View providing access to designated site AP1 – the proposed development site. The council's objective is for the road to be provided during the lifetime of the plan with a longer-term ambition to provide a northern access route to the N11 to the west. This is referred to as the Coolagad Link Road throughout this TTA.

Further road schemes are also highlighted as Road Objectives within the Development Plan, a number of which have cycle route or cycle track provisions as part of the proposed schemes, including the completed Black Lion

Manor Road connection from the R761 to Chapel Road. The majority are located south of Greystones and would not directly impact on the proposed development site though would support the wider area.

An extract form the Development plan is provided in Table 2-6 which outlines all identified transport improvements for the Greystones – Delgany and Kilcoole area.

Table 2-6 – Road Objectives for Greystones-Delgany and Kilcoole

Road Objective	Description
RO1	Reserve a land corridor to provide for a new road from the R761 at Sea View to lands within AP1: Coolagad Action Plan. The new road shall provide local access to zoned lands within the lifetime of the plan and shall, subject to feasibility, need and design, in the long term provide a northern access route from Greystones to the N11.
RO2	Completion of the new road from the R761 at Blacklion to Chapel Road, with an upgraded road continuing southward to link up with the alignment of road objective RO3.
RO3	Realignment of Chapel Road in the vicinity of St. Laurence's School as necessary, to provide a more direct and efficient route to Blacklion from Delgany.
RO4	Road improvements to facilitate the development of AP5: Killincarrig Action Plan and improvements as required to Convent Road.
RO5	Improve the pedestrian and traffic safety of the R761 junction and the entrance to Burnaby Heights.
RO6	Improvement of the R761 from Burnaby Heights to Kilcoole, as appropriate.
RO7	Provide for a local access road to facilitate the development of zoned lands and to provide for the development of a through road from Priory Road to R761.
RO8	To provide for the development of a Western Distributor Road to bypass Kilcoole. The northern section of the route shall be developed in the long term, with linkage to the R774. It is a long term objective to develop an additional link between R761 intersection with Lott Lane and the Western Distributor Road. To provide for the development of a local access road in conjunction with the development of zoned lands at AP9: Bullford Action Plan and to provide for the development of a through link road from Main Street to the Western Distributor Road. This section of the route is necessary for the opening up of zoned lands (AP9 and E lands at Bullford Farm). Only 50% of development on these lands shall be permitted before the southern part of this road is completed.
RO9	Provision of a local access road to facilitate the development of zoned lands at AP8: Ballydonarea Action Plan, in the form of a link road between Sea Road and Lott Lane.
RO10	Improvement of Bellevue Hill Road, to include a footpath.
RO11	Upgrading of Priory Road, including the development of a footpath.
RO12	Upgrading of Three Trouts Bridge, including widening of bridge and development of footpath.
RO13	Upgrading of Lott Lane, Kilcoole.
RO14	Improvement of Sea Road, Kilcoole, including the development of a footpath from Main Street to Kilcoole Train Station.
RO15	Improvement of the R761, from Kilcoole GAA Club to Kilcoole town centre, to include a footpath.
RO16	To improve, subject to further feasibility studies, detail design and traffic impact assessment, the capacity of the R761/new Blacklion junction.
RO17	The development of lands zoned R2.5 at / to the south of Stilebawn House shall provide for either substantial improvements to the junction of Blackberry Lane/Priory Road/ R762 or for an alternative (public) route from the R762 to Blackberry Lane.

Source: Greystones – Delgany and Kilcoole Local Area Plan

2.6 Road Collision Statistics

A review of the data provided by the Road Safety Authority (RSA) traffic collision statistics has been carried out in relation to the surrounding road network in proximity to the proposed development. This review will help identify any potential collision trends and implement safety measures in relation to the existing road network.

Traffic collision data was collated using the five most recent years available within the RSA website. Collision statistics from 2012 – 2016 were available on the RSA website however it is important to note that information relating to 2017 – present date is not yet available on the Road Safety Authority website. The collisions are categorised as minor, serious and major.

The collision locations are shown below in Figure 2.8. This includes 45 minor accidents, 10 serious accidents and 1 fatal accident. A collision trend could be categorised as a location with multiple accidents in close vicinity.

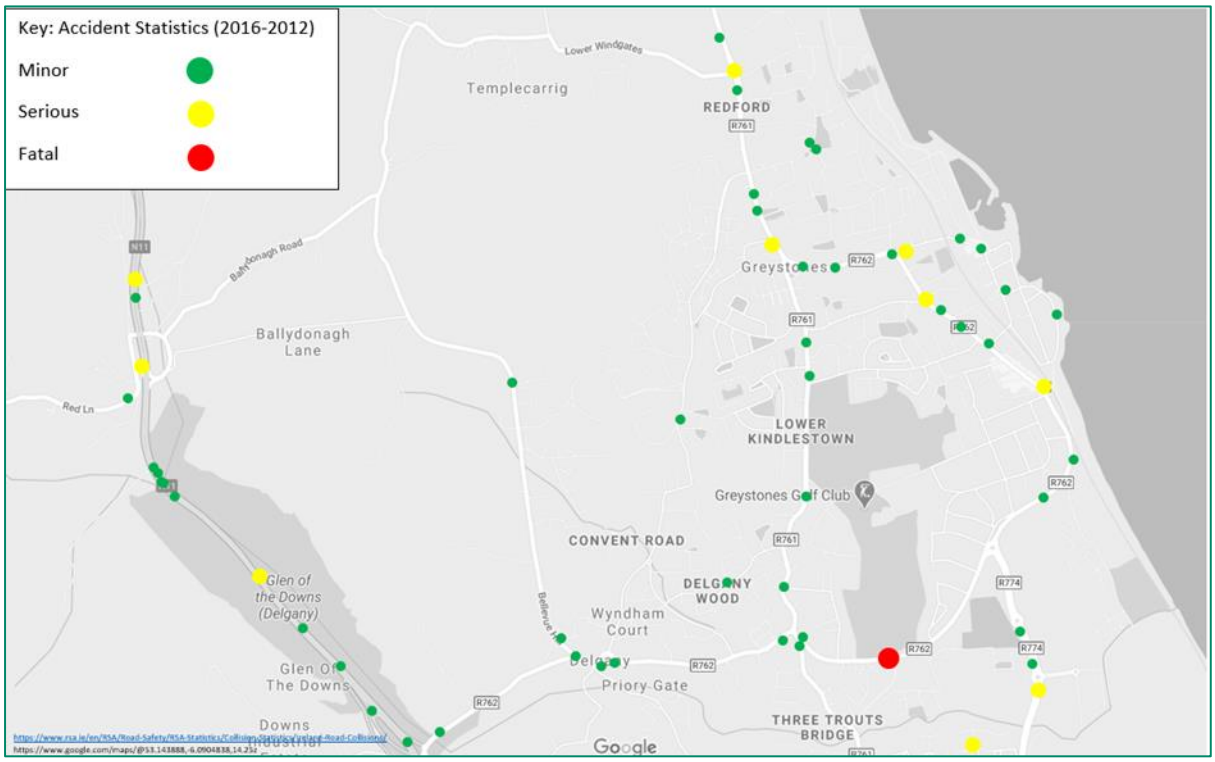


Figure 2.8 – Road Collisions (Source: www.rsa.ie)

Figure 2.8 demonstrates that there are no obvious accident blackspots in proximity to the site that could be exacerbated by the introduction of additional development related traffic.

2.7 Existing Conditions Summary

The subject site is positioned within the urban environment to benefit from access to / from the site utilising sustainable forms of travel including walking, cycling and public transport.

Walking and cycling facilities on Black Lion Manor are particularly well placed and convenient for active travel users travelling to and from the site, as the upgrade of the R761 Blacklion cycle track provision has been completed.

There are also available local walking green routes connecting Greystones to Kindlestown Hill using the Delgany Heritage Trail connecting via Chapel Road and Bellevue Hill road via Dromont and Kindlestown Heights.

The sites proximity to the nearby bus stops, a number of which are within a 1km walking catchment, give perspective residents access to the wider bus network.

Most notably are the bus services offered on the R761 Rathdown Road which travel towards Bray, Dublin and Dublin Airport on a frequent basis.

The site is also accessible to Greystones Rail Station which is served by both DART and Irish Rail services which further enhances the sustainability characteristics of the site. DART services travel towards Dublin City and will allow residents / staff to avail of the wider bus network or train services.

3. Proposed Development

3.1 Introduction

This section details the proposed development with regard to the transportation elements which include the internal roads layout, proposed pedestrian/ cycling infrastructure and parking provisions within the development area.

3.2 Proposed Development

The development proposed comprises a total of 586 dwellings split between 235 flatted dwellings and 351 houses over a site comprising an area of 26.03Ha. The proposed development schedule of residential accommodation is shown in Table 3-1:

Table 3-1 – Schedule of Residential Accommodation

Land Use	Type	Quantum
Apartments	Standard – 1 Bed	65
	Standard – 2 Bed	123
	Standard – 3 Bed	15
	2 Bedroom Duplex	16
	3 Bedroom Duplex	16
Houses	3 Bedroom	207
	4 Bedroom	140
	5 Bedroom	4
	Total	**586**

In addition to the residential provision, the site would also include a creche and community facility. The proposed site plan (McCrossan O'Rourke Manning Architects Drawing reference 20005 PL03) is provided in Appendix A and extracted below in Figure 3.1 for ease of reference.

Figure 3.1 – Proposed Site Plan

Source: McCrossan O'Rourke Manning Architects Drawing reference 20005 PL03

3.3 Site Access

Vehicular access to the site would be provided via the Coolagad Link Road, introduced in Section 2.5.1. It is proposed that the Coolagad Link Road would connect to the R761 via a new signalised junction, linked to the existing signalised junction at Black Lion Manor Road / Redford Park to the south. All off-site works would require agreement with Wicklow County Council in advance of the planning application. A letter of consent from WCC has been provided by Wicklow County Council to agree to works to be undertaken as part of this planning proposal.

A signalised junction is preferred as this would provide a safer and more convenient crossing route for pedestrians and cyclists than alternative junction arrangements such as a roundabout. DMURS states that "*Traffic Signals should generally be used at all junctions between Arterial and Link streets. Where pedestrian activity is particularly high*" and that roundabouts "*require a greater land take and are difficult for pedestrians and cyclists to navigate*". An indicative layout for the junction is provided on the site layout. The proposed Coolagad Link Road is proposed to provide a 6.5m wide carriageway which has been designed to support any future requirements for bus routes.

From this point, three access junctions are proposed to connect to the Coolagad Link Road connecting to the internal site. The eastern junction would be in the form of a three-arm roundabout, whilst the central and western access junctions would be priority controlled T-junctions.

From here, these would distribute traffic around the site. The three access junctions have been checked for compliance with DMURS and this is further detailed in Section 4.

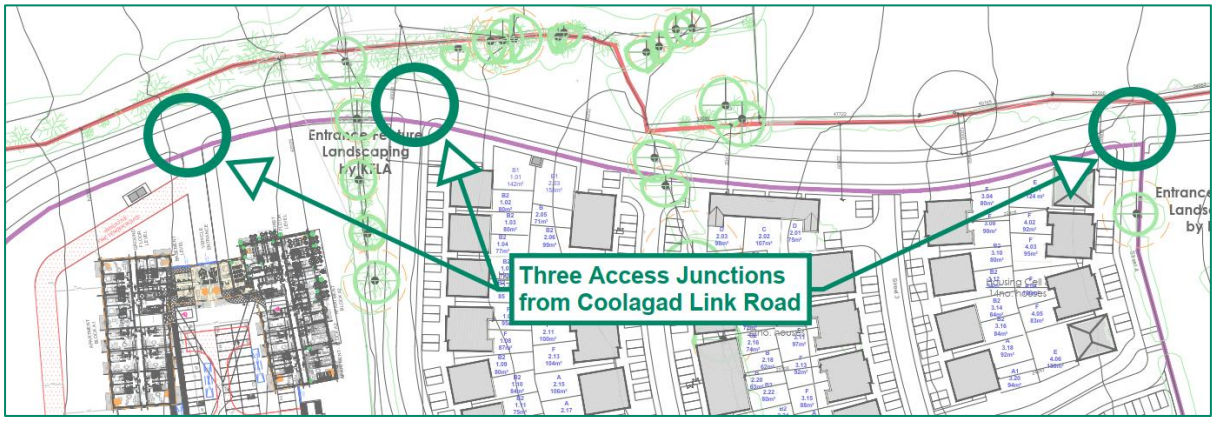


Figure 3.2 – Proposed Site Access

Source: McCrossan O'Rourke Manning Architects Drawing reference 20005 PL03

3.4 Internal Roads Layout

Proposed internal roads range from 5.5m wide to 4.8m wide in accordance with DMURS which will cater for the demand of the proposed development whilst also ensuring that vehicle speeds remain low, appropriate to a residential environment. Routes through the site tie into cul de sac streets providing access to the majority of residential dwellings. There are also seven no. open space green areas and a number of linear parks provided throughout the site bound by residential streets providing a green and open environment with key routes overlooked by houses throughout, adding to a sense of security.

3.5 Pedestrian and Cyclist Permeability

The subject site will be highly accessible to pedestrians from the R761 and Black Lion Manor Road. Pedestrians will be given priority within the internal site layout to ensure desire lines within the site are accommodated for providing a good level of service and ensures the risk of vehicle/ pedestrian conflict with vehicles is minimised.

The new link roadway has a 2m wide footpath proposed along its southern edge and a future provision along its northern edge for a 3.5m wide shared pedestrian and cycle pathway. These however are not accessible as the access road is following the existing lie of the land. An accessible 4m wide shared pedestrian and cycle route is however provided from the R761 site entrance to the internal development though the large open space area, which would provide for a safer cycle environment for users and improved pedestrian connectivity to the surrounding network.

Cyclists will currently have to share the road with vehicles, as the existing cycle facilities within Greystones are sparse and limited, however Wicklow County Council has several proposed upgrades within the Greystones-Delgany & Kilcoole Local Area Plan 2013 – 2019 to deliver key cycle infrastructure connecting cyclists through key routes to Greystones town and further to the Bray-Greystones Cliff Walk route, providing connectivity further to Bray and towards destinations in County Dublin. Cycle lanes are proposed as part of the new junction at the site entrance of the development and propose to link up to the cycle lanes which are being proposed as part of the Redford junction upgrade which is currently in planning by Wicklow County Council.

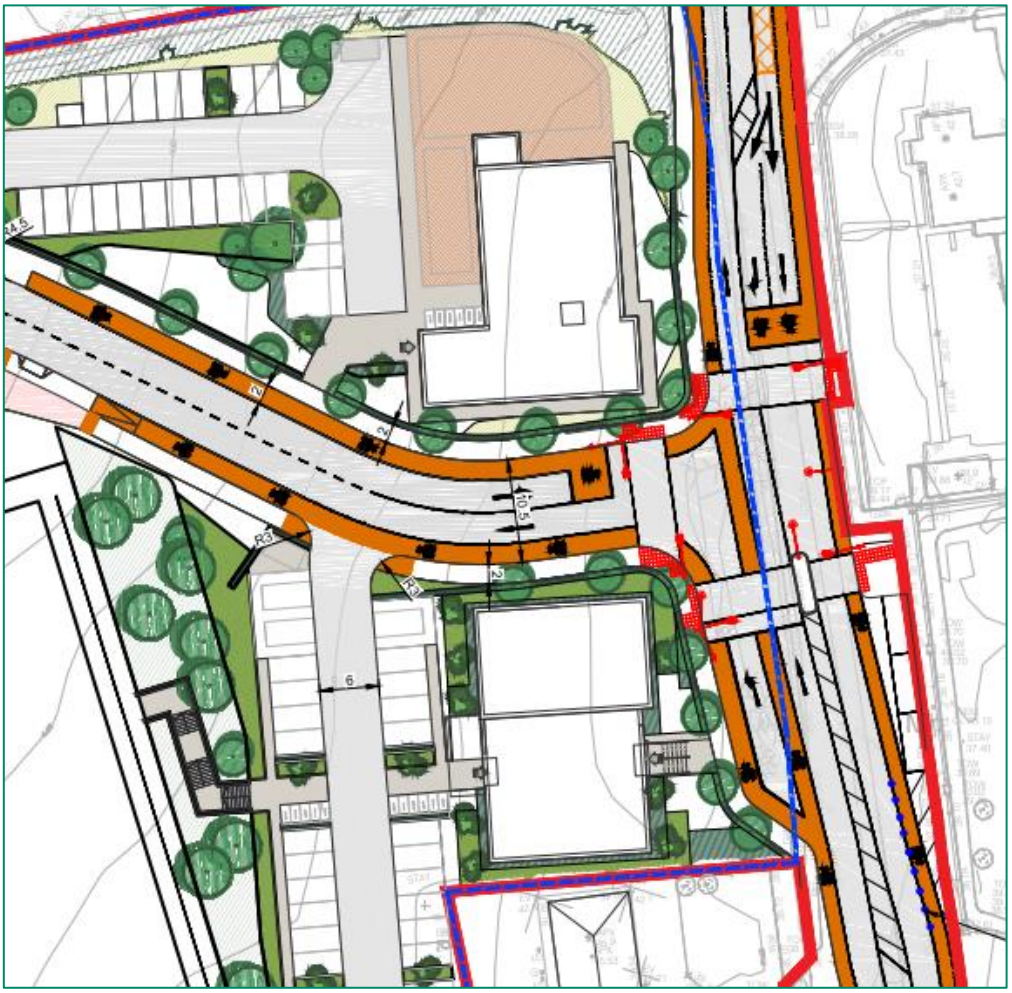


Figure 3.3 – Proposed Site Access Arrangements

3.6 Future Connectivity

Links to neighbouring residential development and Templecarrig School may also be provided, tying in with both the school and Waverley development, appropriate levels have been provided if it is deemed appropriate to provide connectivity to these areas of the local community at a later date. These are demonstrated within the site layout (Drawing Ref McCrossan O'Rourke Manning Architects Drawing reference 20005 PL03) shown in Figure 3.1.

Local streets within the sites internal roads layout have been designed such that they provide future provision for connection to the south for any future developments of surrounding lands, which are also zoned for residential development. This is shown at Local Street 17 and Street 18 within the proposed site layout.

The site's Connectivity Strategy aims to achieve for future permeability towards the North, South and East of the subject site. Connections to future residential zoned lands to the North and South will be achieved as the Link Road and Street 18 have levels which have been designed to easily facilitate future connections. Connections to the east with existing residential areas are likely to be provided as active travel links, with potential future connections to the School campus.

3.7 Servicing

Swept Path Analysis has been undertaken to demonstrate the capability of the development to cater of a 12.0m Fire Tender and 10.2m bin lorry. The results of the analysis shows that the layby can accommodate a 10.2m long bin accessing and egressing from site servicing all dwellings. Servicing arrangements are covered in further detail in the Coolagad DMURS Statement of Compliance report which is submitted in support of the planning application under separate cover.

3.8 Visibility Splay

In accordance with DMURS, sightlines of 49m are required having regards to the speed limit along the proposed Coolagad Link Road (50 km/hr). The visibility splay requirement is achieved at all three subject site access points from a 2.4m setback to the centre of the road. Visibility requirements throughout the site are covered in further detail in the Coolagad DMURS Statement of Compliance report which is submitted in support of the planning application under separate cover.

3.9 Parking Strategy

3.9.1 Standard Vehicle Parking

In order to determine the appropriate quantum of vehicle parking for the proposed residential development, reference has been made to the following guidance:

- Chapter 4 of the Sustainable Urban Housing: Design Standards for New Apartments Guidelines for Planning Authorities, (Department of Housing Planning and Local Government, March 2018); and
- Section 7 of the Wicklow County Council Development Plan Development Design Standards (2016 – 2022).

3.9.1.1 Design Standards for New Apartments Guidelines

The Sustainable Urban Housing: Design Standards for New Apartments Guidelines identifies 3 different location categories that are used to assess how accessible a scheme is to the surrounding sustainable forms of transport which are as follows:

- *'Central and / or Accessible Urban Locations.*
- *Intermediate Urban Locations; and*
- *Peripheral and / or Less Accessible Urban Locations.'*

The Guidelines recognise that the range of locations outlined "is not exhaustive and will require local assessment that further considers these and other relevant planning factors".

Based upon the review of the existing transport facilities and taking cognisance of the proposed future works as detailed in Section 2.5, the applicable location standard as per the Design Standards for New Apartment Guidelines for this development would be somewhere between **'Intermediate Urban Location'** and '**Peripheral Urban Location**'. The Design Standards for New Apartment Guidelines defines an Intermediate Urban Location as follows:

- *Sites within or close to i.e. within reasonable walking distance (i.e. up to 10 minutes or 800-1,000m), of principal town or suburban centres or employment locations, that may include hospitals and third level institutions.*
- *Sites within walking distance (i.e. between 10-15 minutes or 1,000-1,500m) of high capacity urban public transport stops (such as DART, commuter rail or Luas) or within reasonable walking distance (i.e. between 5-10 minutes or up to 1,000m) of high frequency (i.e. min 10 minute peak hour frequency) urban bus services or where such services can be provided;*
- *Sites within easy walking distance (i.e. up to 5 minutes or 400-500m) of reasonably frequent (min 15-minute peak hour frequency) urban bus services.'*

In relation to car parking, within 'Intermediate Urban Locations' the document states 'In suburban/urban locations served by public transport or close to town centres or employment areas and particularly for housing schemes with more than 45 dwellings per hectare net (18 per acre), planning authorities must consider a reduced overall car parking standard and apply an appropriate maximum car parking standard.'

Accordingly, the subject site can be classified as an 'Intermediate Urban Location' in terms of parking as it is located within a reasonable walking distance of a suburban centre (Greystones), less than 1km walking distance from public transport facilities, although it should be noted that overall density would be lower than 45 dwellings per Ha.

AECOM believe the parking provision for the proposed residential units of the development should be provided in accordance with the Department of Housing, Planning and Local Government Sustainable Urban Housing Design Standards for New Apartment Guidelines as referred to above, and as such the quantum of vehicle parking provided on site should be a **'reduced overall car parking standard and apply an appropriate maximum car parking standard.'**

3.9.1.2 Wicklow County Council Development Plan 2016 – 2022

The Wicklow County Council Development Plan Development Design Standards 2016-2022 provides the following parking requirements outlined in Table 3-2 in relation to car parking with regard to the proposed development accommodation schedule.

The Wicklow County Development Plan Car Parking standards allow for a potential relaxation in car parking standards where public transport and sustainable modes of transport are readily available. Wicklow County Development plan also notes that between 1-2 spaces should be provided per unit, with 2 spaces per unit deemed the norm. Where less than 2 per unit is provided 0.2 visitor spaces are required, otherwise visitor parking is included for under the norm parking provisions.

Table 3-2 – Wicklow County Council Development Plan Vehicle Parking Maximum Requirements & Development Parking Provision

Description	Quantum	Parking Standard Rate		Proposed Parking Provision	
		Parking Required	Min. Parking to be Provided	Residential Parking	Visitor Parking
Standard Apartment	203	1 to 2 spaces per unit	203-406	211 Communal spaces across all units	
Duplex Units	32	1 to 2 spaces per unit	64	32	10
3 Bed House	207	2 Spaces per Unit	414	414	0
4 Bed House	140	2 Spaces per Unit	280	280	0
5 Bed House	4	2 Spaces per Unit	8	8	0
Creche	734sqm Floor Area	0.5 spaces per staff member + 1 space per 10 children	18	21	
Community Facility	393sqm Floor Area	No standard outlined in Wicklow County Council Development Plan	-	29	
	Total		**1003-1209**	**1005**	

In regard to the development proposals for the 586 residential units, it is noted that the car parking proposals for these units are in line with the Wicklow County Council requirements and the Apartment Guidelines for parking provision. Similarly, a total of 50 spaces are provided at the creche and community facilities. Creche parking based on 9 no. classes with 18 no. staff total.

For the Standard Apartments, the proposed development provides 206 car parking spaces at basement level for the apartment blocks and 5 spaces at surface level for apartments. The development also provides for car parking facilities at the Creche and Community Centre facility.

In Chapter 9 (infrastructure) of the Wicklow County Development Plan 2016-2022 Parking Objective TR35 states that new / expanded developments shall be accompanied by appropriate car parking provision, with particular regard being taken of the potential to reduce private car use in locations where public transport and parking enforcement are available.

Whilst the site is not in a town centre it is walking distance shops and others facilities so this helps reduce the need for a car. In addition, we have undertaken public transport studies to indicate that the provision of public transport services, their routes and their occupancy levels are such that services would be attractive for use by residents and visitors. In addition the Bus Connects future network proposals, planned by the NTA will serve to enhance bus capacity/frequency at the site further justifying the parking provision for apartments.

AECOM believe this level of car parking is acceptable given the sites public transport accessibility and proximity of local amenities within Greystones.

Mobility Impaired Parking

The appropriate level of mobility impaired parking for the proposed development will be provided in accordance with the Wicklow County Council Development Plan requirements.

The Development Plan requires that 15% of car parking spaces shall be suitable for use by disabled persons. Mobility Impaired Parking spaces have been indicated on the Site Layout Drawings attached with this planning application.

Electric Vehicle Parking

The appropriate level of Electric Vehicle parking for the proposed development will be provided in accordance with the Wicklow County Council Development Plan requirements.

The Development Plan outlines that a minimum of 10% of all car parking spaces should be provided with electric vehicle charging stations or points, and ducting shall be provided for all remaining car parking spaces facilitating the installation of electric vehicle charging points or stations at a later date. Therefore, 10% of all shared residential car parking areas shall be constructed including the provision of necessary wiring and ducting) as electric vehicle charging points. Electric Vehicle Parking spaces have been indicated on the Site Layout Drawings attached with this planning application.

Car Sharing Spaces

The proposed development provides 1no. car share space. This is being provided by GoCar, with the letter of intent included in Appendix D.

Motorcycle Parking

No requirement for motorcycle parking is provided in the Wicklow County Council Development Plan. However, a total of 22 no. Motorcycle parking spaces have been provided within the proposed development.

3.9.2 Cycle Parking

Section 7 of the Wicklow County Council Development Plan Development Design Standards cycle parking standards and the guidance put forward in the New Apartment Guidelines are detailed in Table 3-3. Cycle parking requirements for the houses are to be provided within the curtilage of each home, whilst Table 3-4 relates these standards to the proposed provision.

Table 3-3 – Wicklow County Development Plan Bicycle Parking Provisions

Description	Cycle Parking Requirement	
	Resident	Visitor
All Apartments	1 space per bedroom	1 space per 2 units

Table 3-4 – Cycle Parking Requirements & Development Provision

Description	Quantum	Cycle Parking Requirement		Cycle Parking Provision	
		Resident	Visitor	Resident	Visitor
1 Bed Apartment	65	65	33	436	118
2 Bed Apartment	123	246	61		
3 Bed Apartment	15	45	8		
2 Bed Duplex	16	32	8		
3 Bed Duplex	16	48	8		
Creche				12	
Community Centre				12	
Sports Field				10	
Totals		**436**	**118**	**588**	

In reference to Table 3-4 above, the proposals include the provision of 554 spaces on-site within the development servicing apartment dwellings. Cycle parking for homes would be provided in curtilage.

Wicklow County Council cycle parking requirements stipulate that:

"In residential developments without private gardens or wholly dependent on balconies for private open space, covered bicycle stands should be provided in private communal areas. Covered bicycle stands for use by visitors should be located to maximise convenience to the entrance of buildings and positioned so as to ensure safety, security and supervision."

As such, where applicable, covered cycle stands are provided on site. No cycle parking standards are provided for creche / community facility land uses, however a total of12 spaces are provided for the community centre and 12 spaces are provided for the creche, to support sustainable travel to these locations.

3.10 Summary

This section has detailed the development proposals for the site at Coolagad, including the internal road design and site access as well as car and cycle parking provision and how this relates to requirements set out in local and national policy.

The site would provide an active travel friendly environment with links to neighbouring residential development and local amenities in Greystones. Internal roads would be designed to accommodate vehicles safely whilst encouraging lower traffic speeds whilst refuse collection has also been considered throughout the site through the internal road design.

4. Statement of Compliance

4.1 General

This section summarises the findings of the Statement of Compliance report prepared in support of the proposed development. A full Statement of Compliance report has also been prepared by AECOM under separate cover.

4.2 Compliance with DMURS

AECOM have set out in the following sections how the proposed development is compliant with the DMURS guidelines.

Site Accesses / Internal Junction

The site would be accessed from a proposed new signalised junction connecting the R761 to the Coolagad Link Road which would bound the northern site boundary. The Coolagad Link Road would connect to the R761 Rathdown Road approximately 180m north of the R761 Rathdown Road junction with Black Lion Manor Road and Redford Park. From Coolagad Link Road, residential areas of the site are accessed via three T-junctions. Each of these access junctions have corner radii of 6m which is in keeping with DMURS requirements.

As above, at site access junctions, Corner radii should be kept between the following limits:

- 6m for vehicles turning between Arterial and/ or Link Streets;
- 4.5m for vehicles turning from an Arterial / Link Street to a Local Street; and
- 1 to 3m for low design speed and infrequent movement by larger vehicles.

Throughout the site, a maximum corner radius of 6m has been applied to all junctions, reducing the speed of approaching vehicles, thus increasing pedestrian and cycle safety. Only at the Site Access for ther North Western apartment block is the 6m radii not compliant for convenience of fire tender access as determined via swept path analysis.

There should be no landscaping, car parking or features (planters, walls, etc) which may impede visibility from a 2.4m setback at site entrances / internal junctions.

Tactile paving (blister strip) is proposed at all pedestrian crossings and raised tables are proposed at the shared pedestrian and cycle route crossings, and pedestrian thoroughfares which will also serve a dual-purpose allowing pedestrians to cross while serving as a traffic calming measure.

The application of DMURS first principles has been adopted to achieve adequate traffic calming throughout the site. The use of vertical deflections as traffic calming measures have been limited as best possible throughout the development.

Internal Roads

Internal carriageways should be the following widths:

- 5.5m for Central / Spine Arterial roads;
- 5.0m for Local Street roadways; and
- 4.8m for Shared Surface roads (Home Zones)

A review of the site layout has identified that all streets internal to the site are designed to be in accordance with the above widths, with the Coolagad Link Road connecting to the R761 Rathdown Road having a width of 6.5m, in order to accommodate any future bus routes or bus movements along the link road.

Streets which do not cater for through movement include a turning facility for large vehicles such as refuse collection vehicles. These are proposed to be provided throughout the site.

Pedestrian Facilities

All footways shown on the site layout are between 1.8-2m in width. All footways should be between 1.8 - 4m, therefore pedestrian footway widths are in accordance with DMURS.

Pedestrian permeability throughout the site and to adjacent residential sites is also considered. The site layout indicates a high level of pedestrian permeability through the site with footways and footpaths provided on pedestrian desire lines throughout.

Where pedestrian crossings are to be provided:

- 4m is the minimum crossing width for Centres, Arterial Streets and Toucan Crossings;
- 2m is the minimum width for all other crossings.

Vehicle Parking Provision

According to the Wicklow County Council Development Plan Development and Design Standards, parking should be provided off street at a rate of between 1 and 2 spaces. Section 3.9 provides further detail on parking provision.

According to DMURS, vehicle parking should follow the design parameters below:

- Parallel parking space should be 2.4m x 6m;
- Perpendicular parking space should be 2.4m x 4.8m (not including overhang). A 0.3m verge should be provided on footpaths at perpendicular spaces to allow for vehicle overhang;
- Perpendicular mobility impaired spaces to be 2.4m x 4.8m + 1.2m buffer at the sides and rear; and
- Loading bays should be 2.8m x 6m.

All parking spaces shown are 2.5m X 5m and are perpendicular to the road carriageway, in keeping with the standards shown above.

Cycle Parking Provision

The WCC Development Plan Development and Design Standards states that one space per bedroom plus one visitor space per two units should be provided at residential dwellings. For residential developments without private gardens or wholly dependent on balconies for private open space, covered bicycle stands should be provided in private communal areas. Cycle parking is covered in more detail in Section 3.9.

Cyclists may avail of the shared surface and cycle Track facilities provided along the proposed link street and connecting between the site access and the cycle lanes located along the R76.

4.2.1 Summary and Conclusions of DMURS Assessment

The proposed development is consistent with both the principles and guidance outlined within the Design Manual for Urban Roads and Streets (DMURS) 2019. The scheme proposals are the outcome of an integrated approach that seeks to implement a sustainable community connected by well-designed streets which deliver safe, convenient, and attractive networks in addition to promoting a real and viable alternative to car-based journeys.

As set out above, the entire site has access to pedestrian facilities which enable safe walking links to R761 road. The roads are also designed in a way not to facilitate high speeds and therefore, are suitable for cyclists. In addition cycle priority measure have been put in place at the junction of the R761 and the site access.

The adopted design approach successfully achieves the appropriate balance between the functional requirements of different network users whilst enhancing the sense of place. The implementation of self-regulating streets actively manages movement by offering real modal and route choices in a low speed, high quality residential environment.

5. Trip Generation and Distribution

5.1 Introduction

The purpose of this section is to determine the overall number of trips that will be generated by the proposed development in terms of vehicular traffic.

To understand the potential vehicular trip generation associated with the site, AECOM has undertaken a review of the existing traffic upon the adjoining road network against the proposed trip generation, outlined in the subsequent sections.

5.2 Traffic Surveys

Due to the ongoing Covid-19 pandemic there has been a reduction in traffic volumes on the road network which can be further attributed to localised lockdowns. Traffic surveys undertaken at this time may not be representative of the typical traffic conditions that would be anticipated along the R761 Rathdown Road. To determine the potential impact that the development will have on the surrounding road network, AECOM have made use of the traffic survey data undertaken for the Redford Park / Black Lion Manor Road scheme, south of the proposed development which were made available by Wicklow County Council.

These traffic surveys were carried out on Tuesday 26th November 2019 and identified the AM and PM peak hour periods between 08:00 – 09:00 and 16:00 – 17:00, respectively. To utilise these traffic flows as the baseline analysis for this development, the traffic surveys have been factored up in accordance with the TII traffic growth factors as detailed in the TII publication 'PE-PAG-02016 Unit 5.2 – Data Collection'. This approach was also discussed and agreed with WCC during the scoping period of this assessment. The data collected as part of these surveys have been illustrated in Figure 5.1 with Appendix E providing the full results.

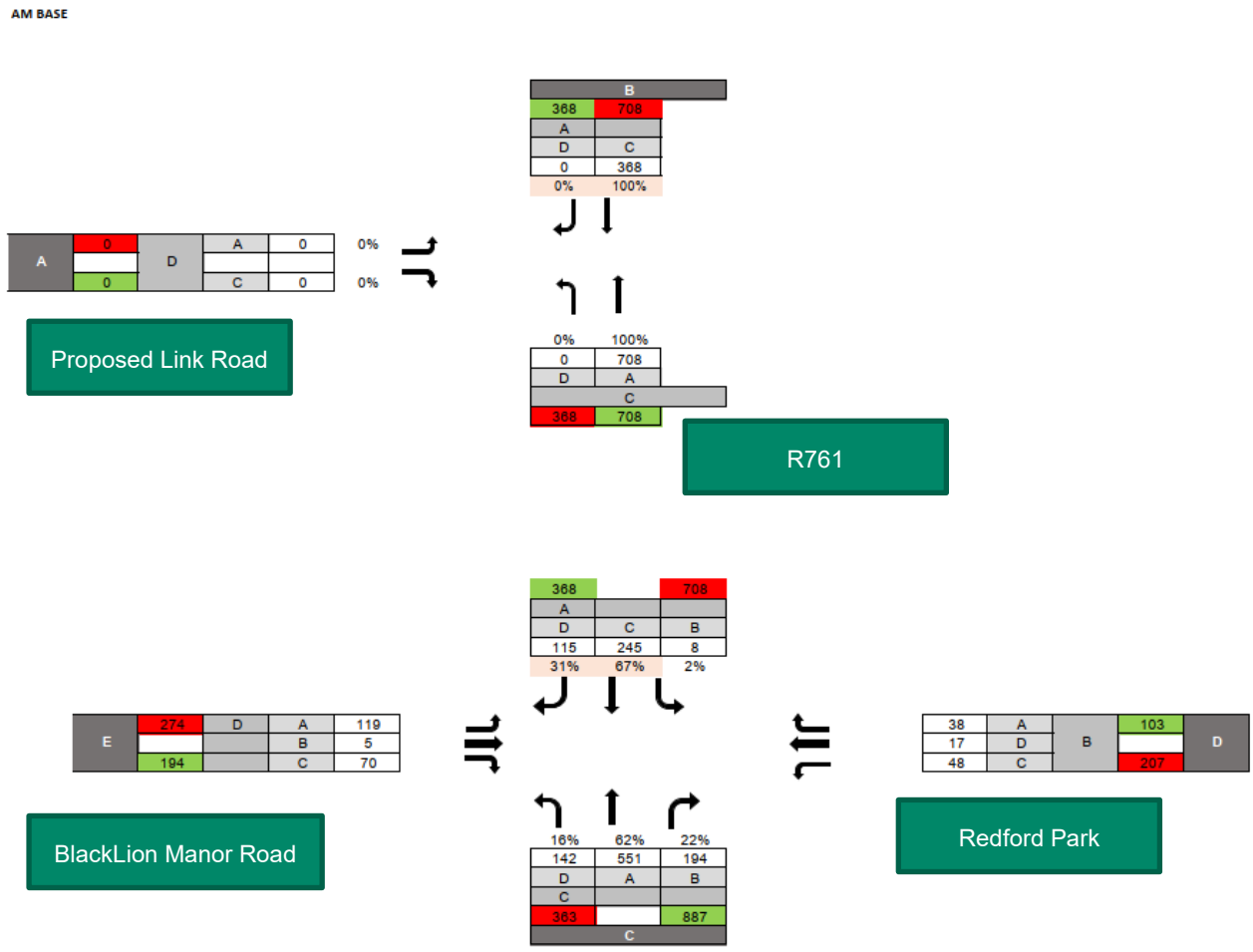


Figure 5.1 – 2019 Traffic Survey Results

5.3 Trip Generation

5.3.1 Previously Utilised Trip Generation

A Traffic Impact Assessment (TTA) was prepared by Roughan & O'Donovan Consulting Engineers on behalf of Cairn Homes to accompany a previous study on the proposed site. This application was for a total of 400 units.

The TIA outlined the quantum of vehicle trips likely to be generated by a development of the scale and type proposed at that time. The proposed trip rates and generation for the AM and PM peak hours are shown in Table 5-1.

Table 5-1 – Trips Generation of Previous Study

Development	AM Peak Hour (08:00 – 09:00)		PM Peak Hour (15:00 – 16:00)	
	Trip Rate	Trip Generation	Trip Rate	Trip Generation
Arrival	0.154	62	0.407	163
Departure	0.393	157	0.215	86
Total	**0.547**	**219**	**0.622**	**249**

Table 5-1 demonstrates that the anticipated trip generations associated with the permitted development is 219 trips during the morning (08:00-09:00) and 249 trips during the evening (17:00-18:00) peak hour periods for a 400 dwelling residential site.

5.3.2 Proposed Trip Generation

In order to compare the potential vehicle trip generation for the subject site, trip rates were taken from the industry standard TRICS (Trip Rate Information Computer System) for the proposed land uses using the latest version of the software (version 7.7.3). A multi-modal assessment was undertaken to determine the potential trip generation associated with various modes of travel such as pedestrian, cyclists, public transport and vehicles with the full outputs from this analysis included in Appendix F. Table 5-2 indicates the proposed trip rates for a mixed residential development comprising (private) houses and apartments with Table 5-3 showing the predicted trip generations for the various modes of travel to / from the proposed development during the AM (08:00 – 09:00) and PM (17:00 – 18:00) peak hour periods; whilst the PM peak period does not align with that surveyed, this hour represents the residential peak period and therefore presents a more robust and appropriate assessment of the development's peak trip generation. It is assumed that trips associated by the creche / community facility would originate from within the residential element of the site and are therefore also accounted for in Table 5-2.

Table 5-2 – Proposed Trip Rates

Mode of Travel	AM (08:00 - 09:00)		PM (17:00 - 18:00)	
	Arrivals	Departures	Arrivals	Departures
Vehicle	0.158	0.534	0.351	0.262
Vehicle Passenger	0.033	0.281	0.185	0.107
Cyclist	0.002	0.012	0.007	0.004
Pedestrian	0.018	0.065	0.067	0.051
Public Transport	0	0.039	0.032	0.002

Comparing the vehicle trip rates shown in Table 5-2 to those used for the previous study in Table 5-1 it can be determined that the trip rates in Table 5-2 are generally more robust with these and therefore considered appropriate.

When the above trip rates are used in conjunction with the schedule of accommodation of the proposed development (586 units), the resulting trip generations are shown in Table 5-3.

Table 5-3 – Proposed Trip Generation

Mode of Travel	AM (08:00 - 09:00)		PM (17:00 - 18:00)	
	Arrivals	Departures	Arrivals	Departures
Vehicle	93	315	207	154
Vehicle Passenger	19	166	109	63
Cyclist	1	7	4	2
Pedestrian	11	38	39	30
Public Transport	0	23	19	1

Table 5-3 outlines that the estimated total vehicular movements by the proposed development during the morning and evening peak hours is **408** and **361** two-way flows, respectively. Given the good level of walking, cycling and public transport availability in proximity to the site, it is considered that these figures are particularly robust and through adoption of a Mobility Management Plan it would be anticipated that the level of active travel and sustainable trips could be much higher than those calculated using TRICS. This would also result in a lower level of vehicle trips.

When assessing the proposed development, checks were made using the Wicklow County Council Planning Portal to assess if there were any committed developments which may have an impact upon the proposed road network being assessed as part of the proposed development. This assessment determined that there were no other developments which were deemed to have a significant impact upon the assessed road network north of Greystones.

5.4 Trip Distribution & Assignment

The base traffic surveys detailed in Figure 5.1 indicate the direction that motorists currently travel to / from when arriving onto the immediate road network immediately adjacent to the site at the R761 / Black Lion Manor / Redford Park junction during the typical peak periods. It has been assumed that turning proportions at the future R761 / Coolagad Link Road junction would largely mirror these flows and so these have been applied to the network. The R761 / Coolagad Link Road junction is proposed to be a signalised junction to benefit active travel users. Baseline traffic flows exiting and entering the northern arm of the R761 / Black Lion Manor Road / Redford Park Road have also been used to estimate flows at the future R761 / Coolagad Link Road junction. Flows on the Sea View arm have been estimated based on the number of dwellings present on Sea View which is a cul de sac with no through vehicle movement.

Figure 5.2 illustrates the proposed trip distribution patterns during the AM and PM Peak Hours respectively at both the future R761 / Coolagad Link Road junction and R761 / Black Lion Manor / Redford Park junction assuming existing turning proportions for development trips to and from the site.

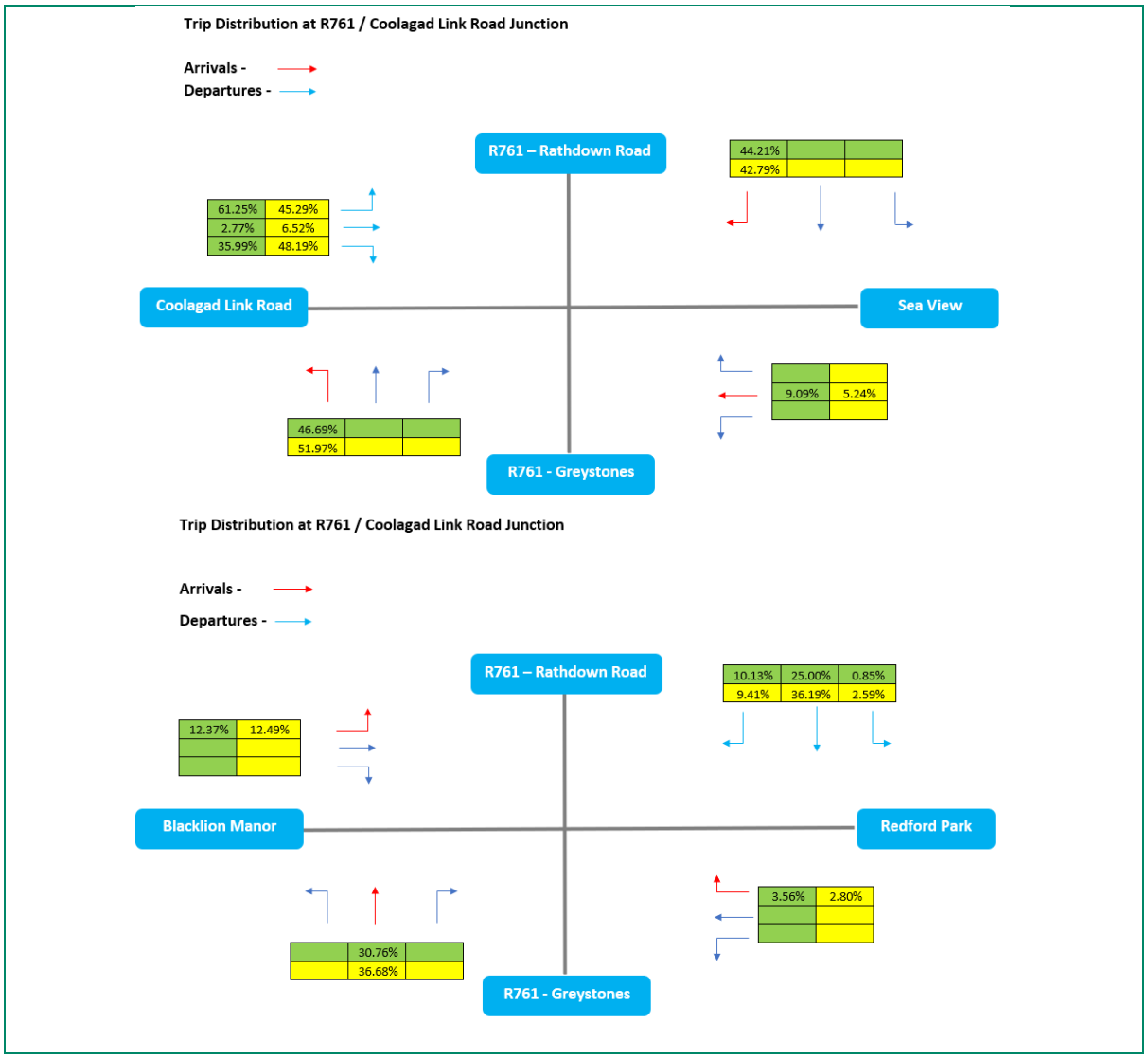


Figure 5.2 – Proposed Distribution of Development Trips on the R761 / Coolagad Link Road Junction and R761 / Black Lion Manor / Redford Park junction

5.5 Traffic Growth

The TTA will adopt an Opening Year of 2023. In accordance with TII Guidance, Future Design years (+5 and +15 years) of 2028 and 2038 will therefore be adopted.

The Transport Infrastructure Ireland (TII) 'Project Appraisal Guidelines for National Roads Unit 5.3 – Travel Demand Projections (May 2019)' sets out growth rates for forecasting future year traffic for use in scheme modelling and appraisal. It is noted that in respect of Wicklow, the growth during the period 2016 – 2030 is set at 1.57% per annum for Central Growth, reducing to 0.51% per annum from 2030 – 2040 (LV rates used).

The development will be assessed for the opening year (2023) and the two horizon year assessments (2028 and 2038), as per the TII Traffic Assessment Guidelines. The assessment years are as follows:

- 2017 to 2023 – 1.0942 (or 9.42%);
- 2017 to 2028 – 1.1727 (or 17.27%); and
- 2017 to 2038 – 1.3297 (or 32.97%).

5.6 Impact of the Proposed Development

5.6.1 Local Road Network

A comparison was made between the pre-development and post-development scenarios, to identify the percentage impact of the development on the R761.

The projected percentage impact of operational traffic on the surrounding road junctions in the year of opening (2023) is set out in Table 5-4.

It should be noted that the opening year of the development has been assessed only. Any future year base flows would be greater than the flows presented in Table 5-4, hence a smaller percentage impact in comparison to the development flows would be recorded.

Table 5-4 – Percentage Impact Assessment

Junction		AM Peak	PM Peak
		Opening Year 2023	
J1 – R761 / Coolagad Link Road junction	Base Flows at Junction	1144	1233
	Phased Development 2023	73	65
	% Impact	**6.4%**	**5.3%**
		Opening Year 2024	
J1 – R761 / Coolagad Link Road junction Phase 1	Base Flows at Junction	1160	1251
	Phased Development 2024	206	182
	% Impact	**17.8%**	**14.5%**
		Completion Year 2025	
J1 – R761 / Coolagad Link Road junction Phase 2 and Phase 3	Base Flows at Junction	1177	1269
	Full Development	408	361
	% Impact	**34.6%**	**28.4%**

On the basis of the TII Traffic and Transport Assessment Guidelines (May 2014), the proposed development achieves an impact greater than the 10% threshold for further detailed junction modelling, therefore further modelling has been carried out to assess the local road network.

To provide for a robust assessment of the proposed development, a traffic modelling analysis has been undertaken using the industry standard Linsig v3 to assess the future R761 / Coolagad Link Road with the development in place.

It should be noted that the above assessment assumes that the Coolagad Link Road does not connect to the N11 by the opening year of the development and therefore all development traffic enters and exits the site via the R761 Rathdown Road.

5.7 Summary

This section has estimated the expected trip generation by all travel modes and anticipated impact of the development in traffic terms on the R761. The site has been assessed for both the full development of the lands and for a phased development of the lands, which includes an assessment of each year during each year of the phased delivery of the development, outlining how the road network's performance may be impacted by the proposed development. It is estimated that for the full development of the lands, a total of 93 vehicles would arrive at the site during the morning peak hour and 315 would depart. During the evening peak hour 207 vehicles would arrive and 154 would depart.

6. Network Analysis

6.1 Introduction

This section presents the impact analysis to identify the potential effects of the proposed development upon the surrounding road network at the junctions identified in Section 5 of this report. As both junctions would be signal controlled junctions, they have been assessed using the industry standard Linsig v3 (3.2.39) software developed by JCT Consultancy.

6.2 Junction Analysis

The operational assessment of the local road network has been undertaken using Linsig v3 for signalised junctions. When considering signalised junctions, a Degree of Saturation (DoS) of greater than 90% would indicate a junction to be approaching capacity, as operation above this DoS value is poor and deteriorates quickly resulting in traffic congestion in the form of longer queues.

Linsig v3 is an industry standard software to model the capacity and queuing of signalised junctions. The meaning of the acronyms used within the capacity assessment results are discussed below.

- DoS Degree of Saturation
- MMQ Mean Max Queue length

It is generally accepted that DoS values of 90% and less are indicators that a junction is operating within capacity. Junctions are only identified as operating over capacity if these values are exceeded.

6.2.1 R761 / Coolagad Link Road

A model was completed using the aforementioned traffic surveys to assess the traffic volumes for the AM and PM peak period and future assessment years with and without the development in place at the R761 / Coolagad Link Road which is proposed to be signalised to benefit active travel users. A summary of the results is shown in Table 6-1 with the full Linsig outputs contained within Appendix G.

Table 6-1 – 6.2.1 R761 / Coolagad Link Road Junction Model Outputs

Assessment Year	Arm	AM (08:00 – 09:00)		PM (15:00 – 16:00)	
		MMQ	DoS (%)	MMQ	DoS (%)
2023 With Development	**R761 Southern Arm**	28.8	77.2%	6.9	39.3%
	R761 Northern Arm	9.8	36.5%	22.7	68.5%
	Coolagad Link Road	13.7	76.1%	7.4	68.5%
2028 With Development	**R761 Southern Arm**	31.8	79.8%	6.9	41.2%
	R761 Northern Arm	9.4	39.1%	26.6	71.9%
	Coolagad Link Road	14.6	79.8%	7.6	70.5%
2038 With Development	**R761 Southern Arm**	33.8	83.2%	8.5	42.9%
	R761 Northern Arm	11.0	40.9%	26.8	75.1%
	Coolagad Link Road	14.7	82.5%	8.4	74.9%

Based on the analysis of R761 / Coolagad Link Road junction, it is clear that with the inclusion of the junction along the R761 and addition of full development traffic, this would not result in unsatisfactory operation of the local road network. The junction will continue to operate within capacity throughout the 2023 (opening year) to the 2038 (opening year + 15) assessment with the development in place.

6.2.2 R761 / Black Lion Manor Road / Redford Park

In addition to the R761 / Coolagad Link Road junction, the signalised R761 / Black Lion Manor Road / Redford Park junction has also been assessed. A summary of the results is shown in Table 6-2 with the full Linsig outputs contained within Appendix G.

Table 6-2 – R761 / Black Lion Manor Road / Redford Park Junction Model Outputs

Assessment Year	Arm	AM (08:00 – 09:00)		PM (15:00 – 16:00)	
		MMQ	DoS (%)	MMQ	DoS (%)
2017 Baseline	R761 Southern Arm	22.9	65.4%	15.3	56.9%
	R761 Northern Arm	3.4	33.9%	9.6	40.0%
	Black Lion Manor road	6.4	65.6%	3.9	55.9%
	Redford Park	5.7	64.0%	4.3	55.9%
2023 Without Development	R761 Southern Arm	25.9	67.4%	10.7	46.8%
	R761 Northern Arm	5.2	39.9%	20.1	60.5%
	Black Lion Manor road	6.3	69.9%	4.4	59.4%
	Redford Park	5.3	67.7%	4.6	59.8%
2023 With Development	R761 Southern Arm	31.1	74.2%	12.8	49.2%
	R761 Northern Arm	5.0	57.3%	25.1	64.7%
	Black Lion Manor road	6.7	72.2%	4.6	68.4%
	Redford Park	6.2	69.8%	5.1	63.7%
2028 With Development	R761 Southern Arm	5.9	69.1%	14.2	58.3%
	R761 Northern Arm	34.6	78.1%	27.1	68.3%
	Black Lion Manor road	7.8	76.9%	4.9	70.5%
	Redford Park	6.7	74.3%	5.6	70.8%
2038 With Development	R761 Southern Arm	39.2	82.0%	16.1	71.9%
	R761 Northern Arm	7.8	83.3%	32.2	73.0%
	Black Lion Manor road	9.1	82.2%	5.4	73.2%
	Redford Park	8.0	83.9%	6.0	71.5%

Based on the analysis of junction, it is clear that the with the inclusion of the development traffic would not result in unsatisfactory operation. The junction will continue to operate within capacity throughout the 2023 (opening year) to the 2038 (opening year + 15) assessment with the development in place.

As demonstrated in the 2023 assessment year, the proposed site access will result in a maximum DoS value of 74.2% with a corresponding MMQ of 31.1 over two approach lanes during the AM Peak period whilst during the PM Peak it is anticipated that the maximum DoS will be 64.7% with a corresponding MMQ of 25.1. In comparison to the 2023 assessment without development trips this is considered to represent an insignificant impact on the junction.

6.3 Summary

Junction analysis at the future R761 / Coolagad Link Road junction has been undertaken for scenarios with the development in place under the proposed phasing programme. This has shown that the proposed development may be supported by the receiving road network.

Junction analysis has also been undertaken at the R761 / Black Lion Manor Road / Redford Park signalised junction for scenarios both without and including proposed development phasing scenarios' trip generations. The assessment of the phasing scenarios shows that the surrounding road network can support development for all design years without significant impacts on the road network or the requirement for mitigation measures.

Junction analysis of both signalised junctions has been undertaken using industry standard Linsig v3 and confirms that the development proposals would not significantly impact on the operation of the local road network.

7. Outline Mobility Management Plan

7.1 Introduction

This section will present an overview of the Mobility Management Measures for the proposed development. A review of the key measures and policies outlined in the existing Wicklow County Development Plan (2016 – 2022) has been undertaken.

Upon completion of the development, when the scheme is occupied it is recommended that an updated Mobility Management Plan is undertaken in unison with travel surveys for residents, staff and visitors, which will inform travel targets for site users.

7.2 Objectives

The objectives of this section are as follows:

- To discourage private car as a means of travel to and from the development.
- To increase and facilitate the number of people choosing to walk, cycle or travel by public transport to the development.
- To work with Wicklow County Council, the National Transport Authority and public transport providers to support and encourage resident and staff up take.
- To liaise and co-operate with adjacent developments in relation to a coordinated approach to Mobility Management between the various employment areas.
- To achieve the above targets, measures have been proposed for the specific modes of transport. These are based on existing infrastructure and public transport systems. These objectives are preliminary and will be further developed in the light of ongoing monitoring as the proposed development is occupied and information becomes available on future travel behaviour of residents and staff.

It is recommended that an Action Plan Coordinator is appointed, as someone who will take ownership of implementing the measures. Table 7-1 overleaf presents a list of recommended measures and actions.

7.3 Monitoring

A critical part of any MMP is ongoing monitoring. It is proposed that an initial evaluation of the operation of the plan will take place one year into the operation.

On occupation of the development, it would be proposed to undertake travel attitude surveys to establish baseline modal split of residents and staff. This would assist considerably in the setting of appropriate trip rate and modal share targets for the development.

An after study should then be undertaken following the operation of the MMP for a reasonable period of time. The two datasets could then be compared to review what changes are necessary after implementation of the various infrastructural measures and initiatives.

Campaigns and promotions would be run throughout the year to maintain public awareness of modes of travel other than the car and the benefits accrued to both the individual and the environment.

The occupiers of the proposed development will be encouraged to continually monitor the MMP initiatives in order to maximise on their success. Monitoring results could be included in the annual report or a separate environmental report. The results will also be forwarded to Wicklow County Council at intervals to be determined by agreement.

Table 7-1 – Recommended Mobility Management Measures and Actions

Walking		
Initiatives	**Responsibility / Ownership**	**Timescale**
Provision of details on how to access the site on foot. Details would include safe walking routes and location of the nearest bus stops/rail station for perspective residents. Promote walking events / lunchtime walks for perspective residents. Provide quarterly 'How to Travel' newsletter via email to residents. Distribute travel maps, leaflets and timetables, ensuring consistent accessible formats, health information for walking routes, signposting to website / apps. Provide umbrella for residents of development (in the apartment blocks) on wet days. As previously stated, the proposed design includes for a number of pedestrian facilities. A new pedestrian and cycling access will be provided at the south of the site, via Village Road, linking the development to the emerging cycle way link to the east.	The Action Plan Co-ordinator	To be commenced prior to occupation
Cycling		
Initiatives	**Responsibility / Ownership**	**Timescale**
Establish a Resident Bicycle User Group. Advertising the Bike to Work scheme for residents. Encourage establishment of a cycling club / society. Provision for cyclist equipment i.e. pump, allen keys, lights, puncture repairs. Display maps of local cycle network on resident notice boards. Participate in national cycle week. Survey and monitor cycle parking occupancy. Install good quality cycle parking provision on site.	The Action Plan Co-ordinator	To be commenced prior to occupation

Public Transport		
Initiatives	**Responsibility / Ownership**	**Timescale**
Provision of public transport maps and timetables in prominent locations on site. Information should be kept up to date. This information could also be available online. Provision of information to residents on savings that can be made by using Leap Card and details on where Leap Cards can be purchased. Re-advertise and promote the Tax saver monthly and annual commuter tickets for public transport to staff of the development. Display a local area map with public transport stops / route numbers marked. Publicise real time passenger information apps and websites where relevant. Publicise door-to-door multi modal journey planner website. Liaise with public transport operators regarding service frequencies to the residential development. Provide attractive, good quality walking routes to the existing public transport infrastructure.	The Action Plan Co-ordinator	To be commenced prior to occupation

Car Sharing		
Initiatives	**Responsibility / Ownership**	**Timescale**
Encouragement of residents and visitors of the development to use other modes of travel other than private car. Where it is necessary for car use to travel to and from work, residents and staff (of the apartment blocks) should be made aware of other people who are either within close proximity of their homes (for staff) or on their route into work (for residents). Hold a coffee morning / launch event for potential car sharers.	The Action Plan Co-ordinator	To be commenced prior to occupation

Construction Phase		
Initiatives	**Responsibility / Ownership**	**Timescale**
Provide a preliminary Construction Traffic Management Plan to provide detailed mitigation of construction traffic associated with the proposed development.	The Contractor / Wicklow County Council Roads & Traffic Department	To be commenced prior to occupation

8. Outline Construction Traffic Management Plan

8.1 Introduction

This section of the report deals directly with the impacts of construction of the subject development. As with any construction project, the contractor will be required to prepare a comprehensive traffic management plan for the construction phase. The purpose of such a plan is to outline measures to manage the expected construction traffic activity during the construction period.

This section will provide an overview of the likely routing of construction vehicles, based on a most likely scenario of construction. It should be noted that the impacts of the construction will be temporary, and it will be the contractor's responsibility to prepare a Traffic Management Plan for the approval of Wicklow County Council in advance of any works.

8.2 Policy Guidance

Guidance for the temporary control of traffic at road works to facilitate the safety of the public during the works is provided below:

- Traffic Signs Manual Chapter 8 Temporary Traffic Measures and Sign for Roadworks (2019);
- Traffic Management Guidelines, Department of Transport (2003); and
- Requirements of Wicklow County Council.

8.3 Likely Construction Programme & Phasing

The construction programme is expected to require up to four years to complete from occupation of the site. The proposed development is outlined to be phased in its delivery to provide a scheme which does not adversely impact the local road network. The completion of the full development of the site will rely on the opening of the N11 link between the N11 and R761 via the Coolagad Link Street. The proposed phasing of the development is in accordance with Table 8-1 below.

Table 8-1 – Proposed Programme of Phasing

Phase	Number of Units	Cumulative Units	Proposed Delivery Year
Phase 1	106	106	2023
Phase 2 and 3	191	297	2024
Phase 4 and 5	289	586	2025

8.4 Construction Route

To minimise construction impacts upon the surrounding road network, it is recommended that all construction traffic access and exits from the M11 Junction 5, then travels along the R761 before turning right into the site. This route is approximately 7.8 km in length and is shown via the red route in Figure 8.1. The alternative route recommended for construction traffic is along the M11 and continuing along the N11 until turning off onto the R762 at Delgany. Following the R762 until turning left on to the R761, then left into the site. This is approximately 14.7 km in length and is illustrated as the green route on the map below in Figure 8.1.

Figure 8.1 – Proposed Construction Routing (Source: Google Maps)

8.5 Parking

All contractors' vehicles will park within the development site area, it is recommended that as part of the construction management plan the contactor designates an area within the confines of the site dedicated to operative car parking. There will be no parking permitted on the surrounding road network or estate roads by the contractor or site operatives.

8.6 Mitigation Measures

A construction management plan will be developed by the contractor prior to the commencement of work on site and will be prepared in consultation with Wicklow County Council.

Construction debris particularly site clearance, spoil removal and dirty water run off can have a significant impact on footpaths and roads adjoining a construction site, if not adequately dealt with.

8.7 Hours of Operation

Site development and building works shall be carried out between the hours of operation recommended by Wicklow County Council to safeguard the residential amenities of properties in the vicinity. The typical hours of operation are as follows:

- Monday to Friday, 7am – 7pm, and no works on Saturdays, Sundays or Public holidays.

8.8 Traffic Management Measures

Below is a list of the proposed traffic management measures to be adopted during the construction works. Please note that this is not an exhaustive list, and that it will be the appointed contractor's responsibility to prepare a detailed construction management plan.

- Warning signs / Advanced warning signs will be installed at appropriate locations in advance of the construction access locations;
- Construction and delivery vehicles will be instructed to use only the approved and agreed means of access; and movement of construction vehicles will be restricted to these designated routes;
- Appropriate vehicles will be used to minimise environmental impacts from transporting construction material, for example the use of dust covers on trucks carrying dust producing material;
- Speed limits of construction vehicles to be managed by appropriate signage, to promote low vehicular speeds within the site;
- Parking of site vehicles will be managed and will not be permitted on public road, unless proposed within a designated area that is subject to traffic management measures and agreed with Wicklow County Council;
- A road sweeper will be employed to clean the public roads adjacent to the site of any residual debris that may be deposited on the public roads leading away from the construction works;
- On site wheel washing will be undertaken for construction trucks and vehicles to remove any debris prior to leaving the site, to remove any potential debris on the local roads;
- All vehicles will be suitably serviced and maintained to avoid any leaks or spillage of oil, petrol or diesel. Spill kits will be available on site. All scheduled maintenance carried out off-site will not be carried out on the public highway; and
- Safe and secure pedestrian facilities are to be provided where construction works obscure any existing pedestrian footways. Alternative pedestrian facilities will be provided in these instances, supported by physical barriers to segregate traffic and pedestrian movements, and to be identified by appropriate signage. Pedestrian facilities will cater for vulnerable users including mobility impaired persons.

The mitigation measures will therefore ensure that the presence of construction traffic will not lead to any significant environmental degradation or safety concerns in the vicinity of the proposed works. Furthermore, it is in the interests of the construction programme that deliveries, particularly concrete deliveries are not unduly hampered by traffic congestion, and as a result continuous review of haulage routes, delivery timings and access arrangements will be undertaken as construction progresses to ensure smooth operation.

9. Summary and Conclusions

9.1 Overview

AECOM has been commissioned by Cairn Homes to undertake a Traffic and Transport Assessment for a planning submission to Wicklow County Council for a proposed residential development on a site located off the R761 Rathdown Road at Coolagad near Greystones in County Wicklow.

An assessment was undertaken of potential developments that may come on stream and impact on the forecast traffic flows for this development. It was considered that the traffic associated with these would not impact on the assessed network as they were likely to use alternative routes for travel e.g using the N11 to travel north.

The proposed development entails 586 no. residential houses and apartments plus a creche and community facility. The scheme comprises 65 no. one-bedroom apartments, 123 no. two-bedroom apartments, 15 no. three bedroom apartments, a further 16 no. two-bedroom duplex units and 16 no. three-bedroom duplex units, 207 no. three-bedroom homes, 140no. four-bedroom homes and 4 no. five-bedroom homes. It is also proposed to provide associated landscaping, open space, and internal road network with three access junctions from the Coolagad Link Road.

The purpose of this TTA is to quantify the existing and future transport environment and to detail the results of the assessment to identify the potential level of traffic impact generated by the proposed development.

9.2 Conclusion

Based upon the information and analysis presented within this TTA the following subsections demonstrates how the scheme has been designed from a traffic and transport perspective to integrate within the existing network and to minimise potential impacts.

9.2.1 Existing Conditions

The subject site is positioned within the urban environment to benefit from access to / from the site utilising sustainable forms of travel including walking, cycling and public transport.

Walking and cycling facilities on Black Lion Manor are particularly well placed and convenient for active travel users travelling to and from the site.

The sites proximity to the nearby bus stops, a number of which are within a 1km walking catchment, give perspective residents access to the wider bus network.

Most notably are the bus services offered on the R761 Rathdown Road which travel towards Bray, Dublin and Dublin Airport on a frequent basis.

The site is also accessible to Greystones Rail Station which is served by both DART and Irish Rail services which further enhances the sustainability characteristics of the site. DART services travel towards Dublin City and will allow residents / staff to avail of the wider bus network or train services.

9.2.2 Proposed Development

The TTA has detailed the development proposals for the site at Coolagad, including the internal road design and site access as well as car and cycle parking provision and how this relates to requirements set out in local and national policy.

The site would provide an active travel friendly environment with links to neighbouring residential development and local amenities in Greystones. Internal roads would be designed to accommodate vehicles safely whilst encouraging lower traffic speeds whilst refuse collection has also been considered throughout the site through the internal road design.

The site would be accessed via the Coolagad Link Road which is proposed to connect to the existing R761 via a new signalised junction, which would benefit active travel users. From the Coolagad Link Road, three access T-junctions to the site would be provided.

9.2.3 Car Parking

It is proposed to provide 1005 no. car parking spaces to serve the respective development.

9.2.4 Cycle Parking

It is proposed to provide a total of 588 cycle parking spaces are proposed for the development. A total of 554 cycle parking spaces are proposed to serve the residential development, while 12 bicycle spaces are proposed for the creche, 12 for the community centre and 10 at the sport field.

9.2.5 DMURS Statement of Compliance

AECOM have prepared a DMURS statement of compliance which details how the proposed development complies with the requirements set out in DMURS under separate cover.

The proposed development is consistent with both the principles and guidance outlined within the Design Manual for Urban Roads and Streets (DMURS) 2019. The scheme proposals are the outcome of an integrated approach that seeks to implement a sustainable community connected by well-designed streets which deliver safe, convenient, and attractive networks in addition to promoting a real and viable alternative to car-based journeys.

The adopted design approach successfully achieves the appropriate balance between the functional requirements of different network users whilst enhancing the sense of place. The implementation of self-regulating streets actively manages movement by offering real modal and route choices in a low speed, high quality residential environment

9.2.6 Trip Generation

This section has estimated the expected trip generation by all travel modes and anticipated impact of the development in traffic terms on the R761. The site has been assessed for both the full development of the lands and for a phased development of the lands, which includes for the assessment of each phasing scenario, outlining how the road network's performance may be impacted by the proposed development. It is estimated that for the full development of the lands, a total of 93 vehicles would arrive at the site during the morning peak hour and 315 would depart. During the evening peak hour 207 vehicles would arrive and 154 would depart.

9.2.7 Operational Assessment

Junction analysis at the future R761 / Coolagad Link Road junction has been undertaken for scenarios with the development in place under the proposed phasing programme. This has shown that the proposed development may be supported by the receiving road network.

Junction analysis has also been undertaken at the R761 / Black Lion Manor Road / Redford Park signalised junction for scenarios both without and including proposed development phasing scenarios' trip generations. The assessment of the phasing scenarios shows that the surrounding road network can support development for all design years without significant impacts on the road network or the requirement for mitigation measures.

Junction analysis of both signalised junctions has been undertaken using industry standard Linsig v3 and confirms that the development proposals would not significantly impact on the operation of the local road network.

9.2.8 Outline Mobility Management Plan

An outline Mobility Management Plan has been submitted within this TTA. The Plan presents the key measures and policies to be undertaken by the Applicant in order to reduce the reliance on private vehicular modes of transport for future residents. Given that the site improves the accessibility via walking, cycling and public transport, the proposed development is well placed to promote sustainable travel from the onset.

9.2.9 Outline Construction Traffic Management Plan

An Outline Construction Traffic Management Plan has been submitted within this TTA in order to provide a range of key measures to be undertaken by the contractor in order to manage the expected construction traffic activity during the construction period. This Plan addresses such items as construction vehicle parking, mitigation measures and hours of operation in order to mitigate degradation to the surrounding environment and disruption to the surrounding road network, local residents of the existing developments in the local area.

It should be noted that the impacts of the construction will be the contractor's responsibility to prepare a Traffic Management Plan for the approval of Wicklow County Council in advance of any works.

9.3 Overall Conclusions

The TTA has considered the transport implications of the proposed development. It demonstrates that the location of the development benefits from existing walking, cycling and public transport infrastructure within the vicinity of the site. Proposals for walking and cycling facilities within the site would only enhance the existing active travel environment.

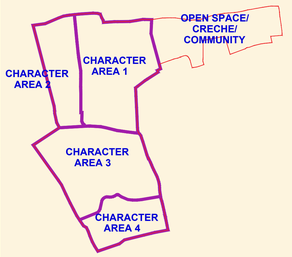
The proposed roads layout and access arrangements have been designed and outlined within this report to comply with DMURS, TII and Wicklow County Council requirements.

The proposed parking provision has been reviewed and has taken cognisance of the Sustainable Urban Housing Design of New Apartment Guidelines (March 2018) and Wicklow County Council Development Plan Development Design Guidance (2016-2022).

Based upon the information and analysis presented within this TTA, the assessment demonstrates how the scheme has been designed from a traffic and transport perspective, to integrate within the existing network and to minimise any potential impacts by the proposed development.

Appendix A Site Layout

GENERAL NOTES



KEY TO DWELLING REFERENCES

DWELLING TYPE A
STREET NUMBER 31|18 DWELLING NUMBER

##m² AREA OF INDIVIDUAL PRIVATE REAR GARDENS TO HOUSES

EXTENT OF PLANNING APPLICATION
CHARACTER AREA OUTLINE

THIS DRAWING TO BE READ IN CONJUNCTION WITH-
ARCHITECT'S DRAWINGS
CONSULTANT ENGINEER'S DRAWINGS AND SPECIFICATIONS
LANDSCAPE ARCHITECT'S DRAWINGS AND SPECIFICATIONS

O.S.I. MAP REFS:
1:1,000 | 3674-06
1:1,000 | 3674-11
1:2,500 | 3673-B

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NOTES:

DO NOT SCALE FROM DRAWINGS. WORK TO FIGURED DIMENSIONS ONLY. ARCHITECT TO BE NOTIFIED OF ALL DISCREPANCIES.

REVISIONS

DATE	DESCRIPTION	No.

MCORM
M°CROSSAN O'ROURKE MANNING **ARCHITECTS**
1 Grantham Street, Dublin 8, D08 A4PY Ireland.
Tel: 01-4788700 Fax: 01-4788711 E-Mail: arch@mcorm.com

PROJECT TITLE:	Coolagad, Greystones
DRAWING TITLE:	Site Layout Plan - Overall
DATE:	MAR '22
DRAWN BY:	PMCN
SCALE:	1:1000@A0
REVISION:	-
JOB NO:	20005
DRAWING NO:	PL03

Appendix B Bus Capacity Assessment Report

Public Transport Capacity Assessment

Cairn Homes,Coolagad Site, Greystones, Co Wicklow

DERRY O'LEARY

TRANSPORT CONSULTANT

MARCH 2020

OLEARYDERRY@GMAIL.COM

COOLAGAD SITE - BUS CAPACITY ASSESSMENT REPORT

1. Introduction.

Cairn Homes Properties Limited intend to apply to An Bord Pleanala for planning permission for a strategic housing development (SHD) at Coolagad, Greystones, Co Wicklow. This report, by Derry O'Leary, Transport Consultant, has been commissioned by Cairn to estimate the available spare capacity in the current bus network. The author, a Civil Engineer, qualified as a Traffic Engineer and has over 40 years experience. He has spent nearly 30 years in both planning and operations in Dublin Bus. This report work will supplements the Traffic and Transport Assessment, and in particular Appendix E, undertaken by Aecom on the subject site.

Site Location and Description

Figure 1. Coolagad Site Map.

In summary, the proposed development consists of 586 residential units (351 houses; 203 apartments and 32 duplex units) at a site c. 26.03 ha at Coolagad, Greystones. The development will also include the provision of a community building, a creche, a sport field and a MUGA. A proposed new vehicular entrance with signalised junction from the R761 Rathdown Road to the north of Gate Lodge, Rathdown Road opposite Sea View and Redford Cemetery, providing a distributor road as part of the long-term objective to provide a northern access route from Greystones to the N11 is also proposed.

The development also includes site development infrastructure, a hierarchy of internal streets including bridges, cycle paths & footpaths; new watermain connection and foul and surface water drainage; the development also provides for the upgrading of the public sewer within the wayleave of the R761/R762 (Rathdown Road) from the site entrance as far as the R762 in front of St. Kevin's National School , Rathdown Road, Greystones.

2. Background to Dublin's Public Transport Network

2.1 While the customer-facing bus network serving the Greater Dublin Area has been relatively stable in recent years, the organisation of these operations has undergone significant structural change in the last decade or so. The National Transport Authority (NTA), established in 2009, is now the public transport Regulator. The planning of bus and rail services nationwide has moved from the CIE Group of companies to the NTA. Responsibility for the network and individual route designs, fares and timetable details, etc. now lies solely with the Regulator. Under this new regime even the smallest modification to any bus route or timetable must be agreed with the NTA in advance of implementation. The Authority also allocates State funding to meet the Public Service Obligation (PSO) benefits provided by the public transport network. The NTA also approves and allocates licences to commercial bus operators, subject to agreed routes, timetables and conditions.

2.2 In 2015, the Authority commenced a root and branch review of the efficiency and effectiveness of the Dublin Bus Network, branded as Bus Connects. In parallel, it also began a Bus Market Opening (BMO) process to open the Irish bus market to competition. These two developments are now briefly outlined below in sections 3 and 4 respectively.

3. Bus Market Opening (BMO)

3.1 In order to open the bus market to competition to more than the incumbent State-owned operators (Dublin Bus and Bus Eireann) the NTA first tendered a package of orbital bus routes operated by Dublin Bus in 2016. The group of 24 routes, and total fleet of 125 buses, represented 10% of the bus market in the Greater Dublin Area. Following the competitive tendering process, the Go-Ahead Group (a largely UK-based bus and rail operator with significant overseas businesses) was selected to operate these routes. The seamless transfer of routes, in stages, from Dublin Bus to Go-Ahead Ireland (GAI) took place over a 12-month period in 2018/2019. The switch was barely noticed by the general public and passengers alike, as the new operations were introduced under the NTA's Transport for Ireland (TFI) brand. Route 184 which operates between Newtownmountkennedy and Bray DART Station, past the Coolagad site, is operated by Go-Ahead Ireland on behalf of the NTA.

3.2 All PSO operators, whether commercially or State-owned, operate bus services under contract to the NTA and must meet a set of key performance indicators (KPIs) covering reliability, timekeeping and vehicle maintenance. The same standards are expected of all contracted operators and failure to meet the targets will result in fines or contract cessation. Both the performance standards expected of contractors and the level of fines exacted for not meeting those standards are in the public domain.

3.3 The NTA owns the fleet deployed by GAI to operate its routes in the GDA. It appears that, over time, the entire public transport fleet will be owned by the NTA as the fleet is renewed and the Authority obtains the capital funding to buy and replace buses for use in the PSO networks across Ireland. The next batch of buses ordered by the NTA for the Dublin urban market are fully-electric traction. The delivery of the first of these EV buses is expected in 2024.

4. Bus Connects Project Overview

4.1 This comprehensive root and branch redesign of the urban bus network in the Greater Dublin Area (GDA), including the North Wicklow services, was commenced by the NTA in 2015. In tandem with the service re-designs, the main bus route alignments (see Figure 1 below) will be upgraded to radically enhance bus priority measures. This investment is required to protect the enhanced operation from the adverse impacts on reliability caused by traffic congestion. These Core Bus Corridors (CBCs) along which the high-frequent Spine routes will run, and the revised bus routes themselves, have been through a series of extensive consultation phases with the general public and key stakeholders. Local Authorities have been directly involved in both the bus route and CBC design process. The final bus route network, modified following the review of thousands of submissions by members of the public and key stakeholders, has now been agreed. The CBC designs will shortly be entered by the NTA into the formal planning process.

1.	Clongriffin to City Centre
2.	Swords to City Centre
3.	Ballymun/Finglas to City Centre
4.	Blanchardstown to City Centre
5.	Lucan to City to Centre
6.	Liffey Valley to City Centre
7.	Tallaght/Clondalkin to City Centre
8.	Kimmage to City Centre
9.	Templeogue/Rathfarnham to City Centre
10.	Bray to City Centre
11.	Belfield/Blackrock to City Centre
12.	Ringsend to City Centre

Figure 1. The GDA Core Bus Corridor (CBC) Network from the NTA . Bray to City Centre is Corridor 10.

4.2 Phased implementation of new Spine routes has started. To date, only two of the phases required to modify the bus network in the Greater Dublin Area, which also encompasses north Wicklow, have been introduced. The C-Spine and H-Spine changes have been introduced in parts of the west and north suburbs of Dublin. Further phases have been designed and planned but will take a number of years to implement. The whole network of services is expected to be implemented by 2024. No changes to the North Wicklow Network have yet taken place, and the specific bus route changes planned for the Greystones area in 2023 are outlined later.

5 Existing Public Transport Network Serving the Coolagad Site

5.1 The Coolagad site is well-located on the main bus routes serving the North Wicklow area between Greystones and Bray. It is c. 2km from Greystones DART Station. The public service obligation (PSO) routes operated under contract to the NTA that serve the site are as follows

Route	Origin	Destination	Frequency (Peak) Mins
84	Newcastle	Blackrock	30
84X	Newcastle/Kilcoole	City Centre	10
184	Newtownmountkennedy	Bray DART Station	30

5.2 There are two northbound bus stops and a corresponding southbound pair that serve the site. All four stops are well within standard walking distance of the site. Stop 4297, the closest to the development, is only 80m from the site entrance and it is served by Routes 84 and 184. The second, stop 4296, is 260m to the south of the development entrance. This second northbound stop, while further away, has additional routes stopping there. The stop is served by scheduled routes 84 and 184, by the popular route 84X (which operates to Dublin City at peak times only) and the Route 702 Aircoach service to Dublin Airport.

5.3 Routes 84 (to Blackrock) and 184 (to Bray DART Station) are operated under contract to the NTA by Dublin Bus and Go-Ahead Ireland, respectively. They operate the typical 18–hour day, 7 days / week, with reduced frequencies in the off-peak and weekends. By contrast, route 84X, popular with commuters because of the limited number of stops, consists of a series on peak-only Monday-Friday services that operate to/from Dublin City Centre. The 84X express, or limited-stop route, is also run by Dublin Bus. It quickly accesses UCD and Dublin via the N11 QBC and the Southern Cross routes (avoiding deviating to serve Bray) which significantly improves the end-to-end journey times for passengers. Aircoach Airport Express Route 702 provides good, direct linkage between the area and Dublin Airport.

5.4 The DART station in Greystones is circa 2 kilometres from the site. DART offers residents a very attractive 30-minute frequency across the entire week from Greystones to Dublin City Centre and beyond to Malahide and Howth. The potential to materially increase the frequency of the DART service is constrained by the limitations imposed by single line working south of Bray. Routes 84 and 184 also serve as DART feeder routes to the station in Greystones in the southern direction on their way to Newcastle/Kilcoole and Newtownmountkennedy, respectively from the Redford stops 4214 or 4215. Passengers of route 184 also have the option to transfer to the DART at Bray Station, where the route terminates.

5.5 The transport network fares and ticketing products are designed by the NTA to encourage bus/rail/LUAS transfers, e.g. via the LEAP card and other ticketing products. The current DART frequency northwards from Bray, is now, post-pandemic, operating at 10 minute headways and is very attractive for bus passengers wishing to interchange on their way towards Dublin.

5.6 The nature of the bus fleet operating on any given route often gives a useful insight into the scale of demand anticipated by the NTA and the operator of that route, all other things being equal. If the service is operated by single deck buses this indicates that demand on the route is relatively low and that the level of peak patronage rarely, if ever, exceeded the capacity of that bus type. Many orbital routes serving local areas have single deck operation. Route 84 and 84X are double-deck routes, reflecting the strong peak nature of their loadings. Route 84X is a limited stop service that is designed to be tidal in nature, in that the demand for transport is almost exclusively in the northbound direction towards UCD, Donnybrook and Dublin City Centre in the morning, and the opposite in the evening. The service offers 12 northbound morning trips but only 7 return services in the afternoon/evening peak. The parent route 84, also a double-deck operation, only operates as far as Blackrock village. On the other hand, route 184 forms the backbone of the North Wicklow bus network in that it links Bray with Greystones (past the subject site), before serving Delgany and Newtownmountkennedy. It interchanges with the DART network at two locations, Bray and Greystones. While predominantly a single-deck operation (as specified in the NTA contract), a small number of scheduled trips have double-deckers allocated to them to meet the demands of schoolchildren for transport, arising from the many schools in the Vevay Road area of Bray.

5.7 There is a new NTA-funded Bus Interchange proposed for Bray DART Station. This proposal has been put through the Part 8 planning process by Wicklow County Council and is scheduled for construction in 2022, subject to funding, etc,. The new layout to the front of Bray station will radically improve the public domain, enhance public safety and increase the operational efficiency of the Interchange in time for the route upgrades and alterations anticipated with the Bus Connects project.

6. Public Transport Capacity Assessment.

6.1 The purpose of this analysis is to determine whether or not the demand for public transport, here primarily bus services, generated by developing the Coolagad site will not put the existing bus (or rail) services under undue pressure. A series of surveys have been undertaken at nearby bus stops to demonstrate that the additional demand will not overload the existing levels of public transport services.

6.2 The demand profile for public transport services, like road traffic, is quite seasonal in nature.

- Demand for bus services, in general, is materially lower in the Summer and school holiday periods.

- Demand tends to be somewhat higher in the late Autumn and in the run up to the busy Christmas holiday. Surveying in the none-holiday weeks in the opening four months of the year, and early Autumn, represent a reliable indication of base-level pre-development expressed demand for transport.

- Demand also varies by day of the week, with traffic demand generally lower on Mondays and Fridays, with some exceptions. Public transport usage on Saturdays and Sundays (in particular) are materially lower than mid-week demand.

- Demand for bus travel varies throughout the standard weekday but morning peak-hour levels are shorter but higher than the corresponding evening peak flows.

6.3 In determining whether spare capacity is available to meet increasing demand from any development site it is best to undertake surveys and test the midweek morning peaks prior to the Summer period when schools are open. The, perhaps, temporary negative implications for public transport demand due to the reduced commuter travel caused by Covid-19 related restrictions is addressed later in section 6.10.

6.4 Surveys of public transport usage were undertaken by Aecom on Wednesday, 9th February, 2022 to establish the current level of bus patronage at the Coolagad site. These have been undertaken at a suitably representative time of the year, as identified in 6.2 above. The relevant data have been reproduced here. The northbound buses were surveyed at stop 4297, the bus stop closest to the site entrance. Bus capacity for the purposes of this analysis is taken, conservatively, as the seated capacity only, which understates true bus capacity.

Time	Route	Bus Type	Passengers	Bus capacity	% Spare Capacity
6.54	184	Single	2	40	95
7.16	84	Double	10	67	85
7.24	184	Single	2	40	95
7.48	84	Double	10	67	85
7.52	184	Double	15	67	78
Average			8		88

Table 1. Northbound Buses (Stop 4297) in the AM Peak (towards Bray/Dublin)

The corresponding surveys taken at southbound stop 4214 show similar low levels of passengers loading on these key commuter and local bus routes:

Time	Route	Bus Type	Passengers	Seated Bus Capacity	% Spare Capacity
7.10	184	Single	10	40	75
7.23	84	Double	10	67	85
7.39	184	Single	5	40	88
8.09	184	Single	15	40	63
Average			10		78

Table 2. Southbound Buses in the AM Peak (towards Greystones/Newtownmountkennedy)

6.5 In order to get a more complete picture of the demand for buses in this area it was decided to undertake a second survey at bus stop 4296, which, as indicated above, is only 260m from the site entrance. Under the “generalised cost” concept it is widely recognised in traffic engineering that potential bus users at this more distant stop from the Coolagad site would trade-off the slightly longer walk in order to access the benefits of the more frequent and faster commuter route 84X. This second survey of passenger usage, on Tuesday March 8, 2022 yielded the following data

Time	Route	Bus Type	Passengers	Bus capacity	% Spare Capacity
7.09	84X	Double	15	67	78
7.13	84	Double	12	67	82
7.20	84X	Double	10	67	85
7.22	184	Single	7	40	85
7.29	84X	Double	21	67	78
7.37	84X	Double	10	67	85
7.47	84	Double	10	67	85
7.49	184	Double	13	67	81
7.52	84X	Double	31	67	54
8.06	84X	Double	32	67	52
8.09	84X	Double	13	67	81
8.13	702	Coach	N/A	N/A	-
8.21	184	Single	28	40	30
8.22	84	Double	47	67	30
TOTAL			249		70

Table 3. Northbound Buses (Stop 4296) in the AM Peak (towards Bray/Dublin)

Passenger loadings of the buses stopping at this second stop (4296) are materially higher than those at the next stop, 4297. Nevertheless, there is more than adequate spare capacity on all the routes.

6.6 It was clear from observing passengers arrive at this stop that they were targeting specific buses, particularly route 84X. This was by far the busier route with seven of the thirteen PSO buses at his stop. The route 84X also accounted for 53% of passengers surveyed. This service is tailored for commuters to Dublin city centre and UCD-bound students. The departures are designed to reach these key destinations in time for 09.00 (or earlier) starts. The departures on route 84X either side of 08.00 were noticeably busier as can be seen in Table 3 above. The passenger loadings on the shoulder of this peak are lower. Future residents in Coolagad would prefer walking to stop 4296 to avail of this express service. The current footpath infrastructure also favours this stop. It has both a good shelter and re-assuring Real Time Passenger Information (RTPI) unit. The local 184 service was used by many schoolchildren, many of whom alighted at this stop for the local schools. Like route 84, it also carried commuters towards Bray.

6.7 The surveys and analysis clearly show that there is a significant level of spare capacity in the current bus service in the peak hour in both directions at the point in the network adjacent to the Coolagad site. In addition, survey data of this nature suggests that there is more than adequate spare capacity on buses in both directions to meet the increased demand arising from the public transport trips generated from the TRICS analysis, as outlined in the Aecom Transport and Traffic Assessment (TTA). This same bus capacity analysis, post planned construction, with the generated public transport trips is now assessed in 6.8.

6.8 The output of the TRICS analysis undertaken by Aecom (in their sister report as part of the Coolagad TTA) was an additional 24 public transport generated trips leaving the site in the am peak. This was assumed to be distributed roughly 80/20 northbound/southbound, broadly in line with Dublin-bound commuter patterns. This resulted in each of the surveyed five northbound bus trips allocated an additional four passengers. The balance of four generated passengers were allocated, one each, to the four southbound bus trips.

Time	Route	Bus Type	Passengers	Bus capacity	% Spare Capacity
6.54	184	Single	6	40	85
7.16	84	Double	14	67	79
7.24	184	Single	6	40	85
7.48	84	Double	14	67	79
7.52	184	Double	19	67	72
Average			12		80

Table 4. Northbound Buses (Stop 4297), with generated trips, AM Peak (towards Bray/Dublin)

Time	Route	Bus Type	Passengers	Seated Bus Capacity	% Spare Capacity
7.10	184	Single	11	40	72
7.23	84	Double	11	67	84
7.39	184	Single	6	40	85
8.09	184	Single	16	40	60
Average			11		75

Table 5. Southbound Buses, with generated trips, in the AM Peak (towards Greystones)

Repeating the analysis completed in Tables 1 and 2 in 6.4 above, the spare capacity, including TRICS generated passengers, northbound and southbound, is shown in Table 4 and Table 5 respectively.

As can be seen from the summary Table 6, spare bus capacity, with generated passengers included, remains high at 80% and 75% respectively.

Direction	Average passengers	TRICS increase/bus	Existing Spare Bus Capacity	Future Spare Bus Capacity
Northbound	8	4	88	80
Southbound	10	1	78	75

Table 6. Spare Capacity (Stop 4297), post development, remains high.

The output of the second survey at stop 4296 suggests a lower level of spare capacity, especially on route 84X, but it remains high by industry standards. The effects of the distribution of the generated trips to buses are also very marginal when spread over the higher number of buses from stop 4296. The negative impacts of Covid-19 are clear to see. The extent to which this suppressed demand might return is discussed in 6.10 below.

Sensitivity Test

6.9 The assumptions about bus modal split inherent in the TRICS data in the Aecom TTA (Appendix E, Table 3), and outlined in 6.8 above, were subjected to a sensitivity test. This was undertaken to further test the resilience of the bus network. For this test it was assumed that

- 15% of the trips leaving the site in the AM peak hour are made by bus, a marked increase on the TRICS output.

- The bus trips are again split 80:20 into northbound:southbound direction, as above.

- 60% of these trips are assigned to buses in the busiest 30 minutes, as determined in the survey (part of the peak hour for bus travel), recognising a “peak within a peak”.

- The trips are then spread evenly over the buses in this busy 30 minute time-band.

- The base data is from the busiest northbound stop (4296)

The generated TRICS data from the Aecom TTA totalled 576 leaving the site in the peak hour. Under the test the bus share of site departures was increased to 15%. This equates to 86 person trips which were assumed to travel by bus. This reduces to 69 passengers travelling northbound only following the 80/20 split. Allocating these trips using the above assumptions increases passengers on all five scheduled buses between 07.52 and 08.22, the busiest 30-minute time-band. Each bus is allocated an additional fourteen passengers.

The sensitivity test, shown in Table 7 below, takes the form of the heaviest loaded buses, at the busiest bus stop, each being allocated an extra fourteen passengers. This represents a material increase in bus patronage.

Time	Route	Bus Type	(Revised) Passengers	Seated Bus Capacity	% Spare Capacity
7.52	84X	Double	45	67	33
8.06	84X	Double	46	67	31
8.09	84X	Double	27	67	60
8.21	184	Single	42	40	(5)
8.21	84	Double	61	67	9

Table 7. Sensitivity Test Results. Higher allocation of generated trips to buses.

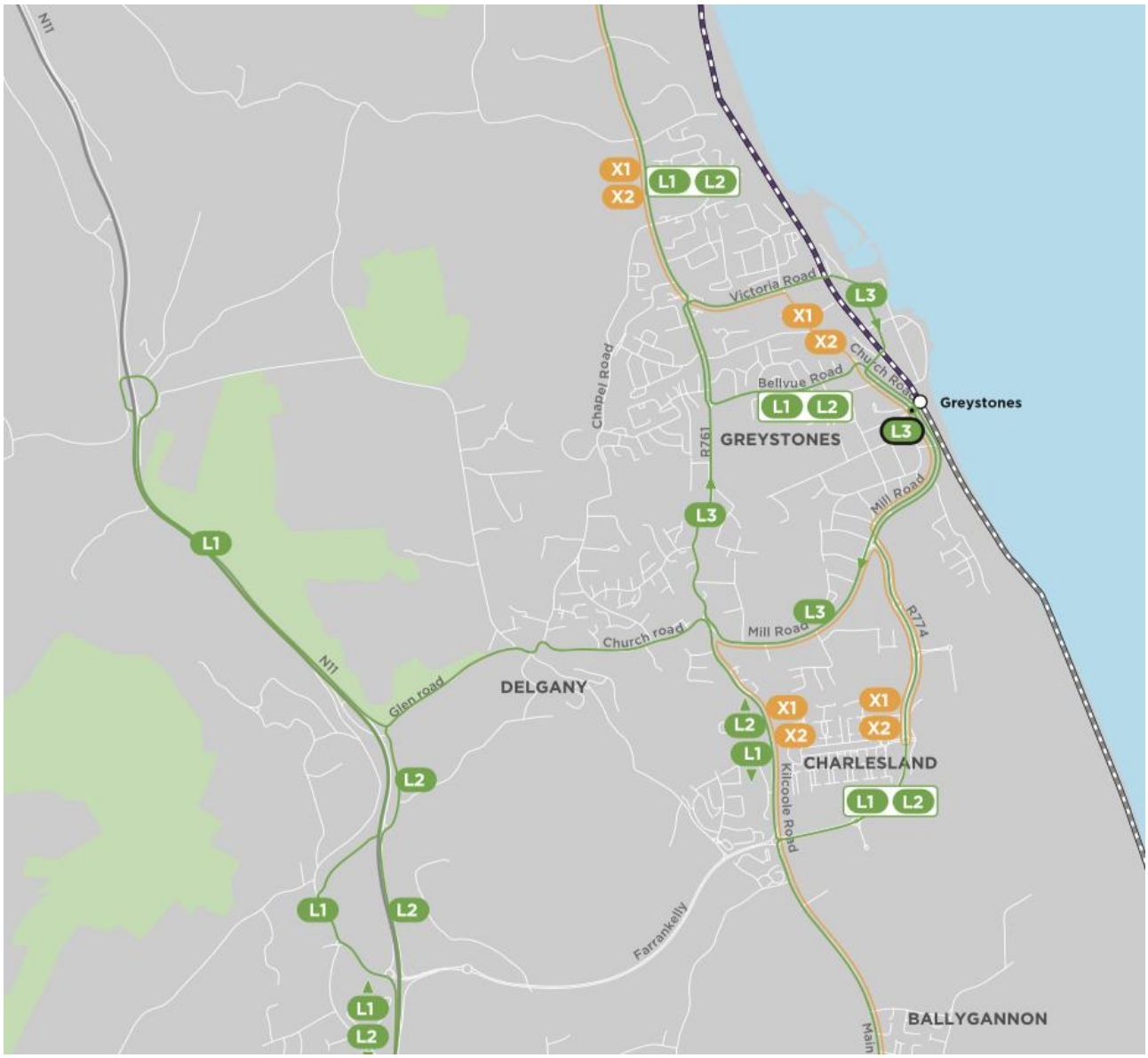
These quite onerous modal share assumptions, involving a significantly higher allocation to the bus mode. Yet this sensitivity test indicates more than adequate spare capacity passing the subject site. While the single decker bus on route 184 in table 7 requires two passengers to stand under this scenario, this is still well within the overall design capacity of 68 passengers (40 seated, 28 standing) for this bus type. Under the Bus Connects proposals for this area, expected to be implemented in 2023, frequency on the equivalent route(s) will significantly increase in any case. This is detailed in section 7 below.

6.10 The artificially low volumes of commuters due to the impacts of Covid-19 are partly reflected in the survey data. The extent to which they will recover back to “normal” levels is unclear. Bus patronage generally in Ireland is at approximately 70 - 75% of pre-Covid levels. This is similar to the trend in the Uk also. Factoring up the surveyIncreasing numbers by 33%, to get them to approximate “normal” levels, does not suggest any capacity impact of any consequence. There is, of course, no guarantee that commuter levels will ever fully recover with increased levels of WFH becoming more established, and being legislated for. The data from the surveys show that capacity utilisation is quite low at this peripheral point in the network. In addition, should the need arise, the first service alteration would likely be the full conversion of single deck buses on route 184 to double-deckers, leaving aside any Bus Connects changes. This fleet change increases seated capacity from 40 to 67 passengers, or by 68% and total capacity, including standees, still further. There is no suggestion from our survey data that this capacity upgrade is required any time soon. The Bus Connects proposals will likely be the next material change to services in the North Wicklow area. These are now discussed.

7. Bus Connects in Greystones and North Wicklow.

7.1 While the Bus Connects project largely covers the built up area of Dublin it does extend as far south as Greystones and beyond to take in the operational areas of the routes under consideration here. The network of services arising from the major review in North Wicklow is shown in Figure 1 below.

Figure 1. Bus Connects Map for North Wicklow.



The output from figure 1 is best illustrated in Table 8 below.

Existing Route	Bus Connects Replacement	Frequency
84	None	N/A
84X	X1 and X2	Reduced in am peak
184	L1 and L2 combined	Increased Mon/Fri
None	New L3	Every 30 minutes

Table 8. Comparison of Current and Proposed Bus Connects Network.

7.2 In the proposed Bus Connects network, expected to be introduced ahead of the planned Coolagad development, the most significant alterations to the network are as follows

- The removal of route 84 which currently operates towards Blackrock Village.

- The existing route 184 is replicated by a combination of L1 and L2 (which operate clockwise and anti-clockwise loops between Greystones and Newcastle, via Newtownmountkennedy). This revised design, in effect, results in two material changes. Firstly, it extends the current 184 route to Newcastle and secondly, critically, increases its frequency from every 30 to every 20 minutes past the Applicant's site during each weekday. While the resultant increased frequency between Newcastle and Bray may account for the removal of route 84, it also means that nearly all buses interchange with both Greystones and Bray DART Station, in both directions.

- Direct connections to Dublin in the peaks only are maintained with the X1 and X2 services. There is no direct link to Dublin in the off-peak periods, or at weekends. These express routes are designated by the NTA as direct replacements for the 84X. Both services are nearly identical but route X1 operates to/from Kilcoole, while X2 extends further south to Newcastle. The Bus Connects "frequency table", when compared with the existing Dublin Bus website, suggests that the number of AM peak buses will reduce from 12 to 9 while the evening peak service increases from 7 to 9 buses. The current imbalance between am and pm peak services is eliminated.

- The novel element of the Bus Connects plan for North Wicklow is the proposed introduction of the clockwise only internal loop service around Greystones. It starts and finishes at Greystones DART Station. One of the "Public Transport Objective" of the current Wicklow County Development Plan requires that

“developers of large-scale new employment and residential developments in the designated key towns in the County that are distant (more than 2km) from train/Luas stations to fund/provide feeder bus services for an initial period of at least three years”.

- This strongly suggests that the NTA (and Wicklow County County) wish to actively encourage more bus/rail interchange at Greystones DART Station. The proposed L3 frequency, every 30 minutes, matches the current DART frequency and one would anticipate that the timetable will be designed accordingly. This planned route, in my view, is likely to be extended to better serve the newer residential areas, including Coolagad. In this case the frequency is likely to be improved to enhance connectivity throughout the Greystones hinterland.

7.3 The above analysis strongly suggests that the revised bus network will strengthen internal public transport linkages and facilitate bus/rail interchange within North Wicklow with both improved frequencies on the L1/L2 routes past the subject site and the new L3 service. The proposed X1 and X2 peak services can easily be expanded, if required, with the addition of extra buses. While the new circular route, as can be seen from the graphic in Figure 1 above, does not currently serve the Coolagad site, it opens up the possibility of it being extended close to the site (possible along the Blacklion Manor Road) when implemented in 2023. The proposed pedestrian linkages eastwards towards Blacklion Manor Road will facilitate access to this extended L3, were it to happen. The net effect of three existing routes (84, 84X, 184) being replaced by the two combinations of L1/L2 and X1/X2 and an entirely new local Greystones feeder route is extremely positive for potential residents of Coolagad.

8 Conclusions.

8.1 The likely impact of the planned development of the Coolagad site in Greystones on the capacity of the existing bus network has been assessed. There are two key conclusions.

Firstly, surveys undertaken by Aecom and the report writer, and the subsequent analysis of bus capacity above, strongly suggest that there is more than enough existing spare capacity in the local North Wicklow bus network. A further sensitivity test, allocating significantly more trips to public transport, confirms this position. Secondly, the Bus Connects future network proposals, planned by the NTA to commence in 2023 will serve to enhance bus capacity through increased frequency past the site and positively impact buses' attractiveness to residents in the Coolagad site. Any proposal to extend the planned local, circular bus route close to the site will enhance connectivity with the DART Station in Greystones and further facilitate the important modal split objectives of the NTA. Good access from the subject site to the two existing sheltered bus stops, together with the range of services, will encourage more use of the bus network.

Appendix C AECOM Public Transport Occupancy Survey

Project:	**Coolagad**	Job No:	**60641912**
Subject:	**Bus Service Occupancy**		
Prepared by:	**Hilary Herlihy**	Date:	**10 February 2022**
Checked by:	**Patrick McGeough**	Date:	**14 February 2022**
Approved by:	**Tim Robinson**	Date:	**23 February 2022**

Introduction

Cairn Homes Properties Limited, intend to apply to An Bord Pleanála for planning permission for a strategic housing development at this site of c.26.03ha at 'Coolagad', Greystones, Co. Wicklow. As part of this proposed planning application, AECOM has been commissioned by Cairn Homes Properties Limited to undertake a Traffic and Transport Assessment for the subject site.

As part of the Traffic and Transport Assessment, this note has been compiled in order to assess the existing public transport routes available and the associated carrying capacity for expected peak times for public transport use, in order to assess if the existing public transport network may adequately support the proposed development's public transport requirements.

Figure 1 – Proposed Site Location

Proposed Development

The proposed development consists of:

- 586 residential units including:
  - 351 two storey houses (207 no. 3 bed, 140 no. 4 bed, 4 no. 5 bed) comprising detached, semi detached and terrace units
  - no. apartments (65 no. 1 bed, 123 no. 2 bed, 15 no. 3 bed) provided within 6 no. blocks ranging from three to four-storey (over basement) with residential amenity facilities.
  - 32 no. duplex units (16 no. 2 bed and 16 no. 3 bed units) c. 5,192 sqm of communal open space is provided to serve the proposed apartment/duplex units;
- Community building (single storey) of 393 sq.m. with 29 car parking spaces, which includes changing rooms and multipurpose room and ancillary facilities.
- Creche building of 734 sq.m. with 21 car parking spaces
- Provision of a new vehicular entrance with signalised junction from the R761 (Rathdown Road), to the north of Gate Lodge, Rathdown Road opposite Sea View and Redford Cemetery, providing a distributor road (and future vehicular connection to lands to the west) as part of the long-term objective to provide a northern access route from Greystones to the N11 and provision for future vehicular connection to lands to the south
- Provision of pedestrian and cycle connections to the site boundary with land to the east and south.
- Car parking spaces is provided in a mix of basement level for the apartments and off-street for the houses and duplexes. This includes:
  - 702 on curtilage car parking spaces for the houses;
  - 206 car parking spaces at basement level and 5 at surface level for the apartments;
  - 32 spaces for the duplex unit and 10 visitor spaces at surface level
  - 22 motorbike parking spaces and 422 cycle spaces (310 secure spaces and 112 visitor spaces) are also provided.
  - The development also includes site development infrastructure, a hierarchy of internal streets including bridges, cycle paths & footpaths; new watermain connection and foul and surface water drainage; the development also provides for the construction of a new public sewer along the R761/R762 from the site entrance as far as the R762 in front of St. Kevin's National School, Rathdown Road, Greystones.
  - c.10.43ha open space to include a sport field, a MUGA, private, communal and public open spaces (including enhancement of an existing stream), formal and informal play areas, and new boundary treatments.
  - ESB substations/switchrooms, lighting, site drainage works and all ancillary site development works above and below ground.

The proposed development schedule of residential accommodation is shown in Table 1:

Table 1 – Schedule of Residential Accommodation

Land Use	Type	Quantum
Apartments	Standard – 1 Bed	65
	Standard – 2 Bed	123
	Standard – 3 Bed	15
	2 Bedroom Duplex	16
	3 Bedroom Duplex	16
Houses	3 Bedroom	207
	4 Bedroom	140
	5 Bedroom	4
Total		**586**

In addition to residential dwellings and creche / community space the development proposals also include for related internal road network, landscaping, open space and connection to the Coolagad Link Road.

Proposed Trip Generation

In order to compare the potential vehicle trip generation for the subject site, trip rates were taken from the industry standard TRICS (Trip Rate Information Computer System) for the proposed land uses using the latest version of the software (version 7.7.3). A multi-modal assessment was undertaken to determine the potential trip generation associated with various modes of travel such as pedestrian, cyclists, public transport and vehicles. Table 2 indicates the proposed trip rates for a mixed residential development comprising (private) houses and apartments with Table 3 showing the predicted trip generations for the various modes of travel to / from the proposed development during the AM (08:00 – 09:00) and PM (15:00 – 16:00) peak hour periods.

It is assumed that trips associated by the creche / community facility would originate from within the residential element of the site and are therefore also accounted for in Table 2.

Table 2 Proposed Trip Rates

Mode of Travel	AM (08:00 - 09:00)		PM (15:00 - 16:00)	
	Arrivals	Departures	Arrivals	Departures
Vehicle	0.158	0.534	0.351	0.262
Vehicle Passenger	0.033	0.281	0.185	0.107
Cyclist	0.002	0.012	0.007	0.004
Pedestrian	0.018	0.065	0.067	0.051
Public Transport	0	0.039	0.032	0.002

It can be determined that the trip rates in Table 3 are generally more robust and therefore considered most applicable.

When the above trip rates are used in conjunction with the schedule of accommodation of the proposed development (619 units), the resulting trip generations are shown in Table 3.

Table 3 – Proposed Trip Generation

Mode of Travel	AM (08:00 - 09:00)		PM (17:00 - 18:00)	
	Arrivals	Departures	Arrivals	Departures
Vehicle	98	331	217	162
Vehicle Passenger	20	174	115	66
Cyclist	1	7	4	2
Pedestrian	11	40	41	32
Public Transport	0	24	20	1

Table 3 outlines that the estimated total vehicular movements by the proposed development during the morning and evening peak hours is **428** and **379** two-way flows, respectively. Given the good level of walking, cycling and public transport availability in proximity to the site, it is considered that these figures are particularly robust and through adoption of a Mobility Management Plan it would be anticipated that the level of active travel and sustainable trips could be much higher than those calculated using TRICS. This would also result in a lower level of vehicle trips.

Sustainable Transport – Bus Services

As graphically illustrated in Figure 2, the site benefits from good bus transport connections shown by the bus stops along Rathdown Road, allowing residents to travel by this sustainable mode.

The closest bus stops are located along the R761 Rathdown Road approximately 100m north of the proposed edge of site and approximately 800 m walk (6min) from the centre of the site. Two stops are located to the south of the R761 / Black Lion Manor Road / Redford Park junction adjacent to the Lidl store. These bus stops are operated by Dublin Bus, Go Ahead and Aircoach, who provide services to Dublin Airport. A further two bus stops are located approximately 70m north of the proposed R761 / Coolagad Link Road junction, although these are not serviced by the Aircoach service to Dublin Airport. Figure 2 illustrates the location of the bus stops in relation to the development with Table 4 to Table 7 detailing the number of services per day and the routes.

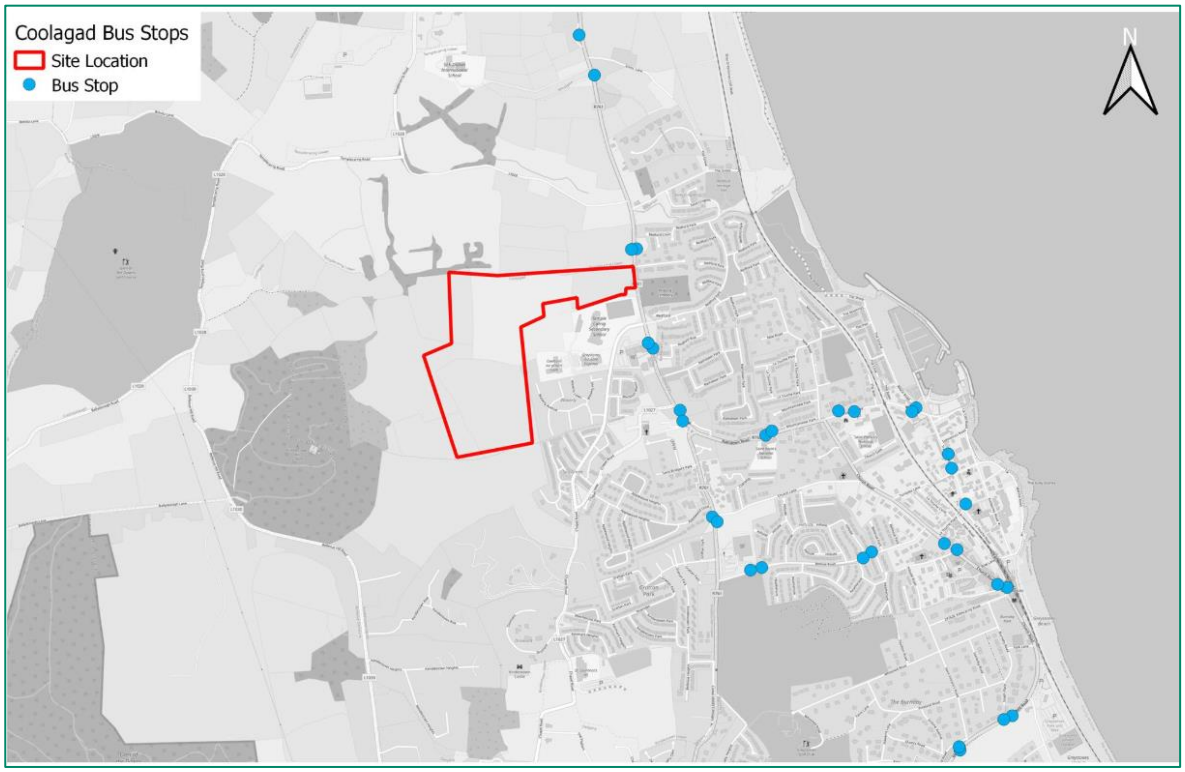


Figure 2 – Bus Stops in Vicinity of the Site

Table 4 – Bus Services Timetabling Summary at Greystones Redford Park

Service Number	Service Provider	Route	Monday - Friday	Saturday	Sunday
84	Dublin Bus	Temple Road – Newcastle Road (Sea Road)	Hourly Service (0520-2308)	Hourly Service (0535-2349)	Hourly Service (0919-2347)
184	Go-Ahead Ireland	Newtownmountkennedy - Bray Station	Half Hourly Service (0652-2321)	Half Hourly Service (0701-2321)	Half Hourly Service (0910-2340)
702	Aircoach	Dublin Airport - Greystones	8 Services (0419-1809)	8 Services (0419-1809)	8 Services (0419-1809)

Source: https://bustimes.org/map#16/53.1541/-6.082

Table 5 – Bus Services Timetabling Summary at Greystones Opposite Redford Park

Service Number	Service Provider	Route	Monday - Friday	Saturday	Sunday
84	Dublin Bus	Temple Road – Newcastle Road (Sea Road)	Hourly Service (0439-0019)	Hourly Service (0740-0031)	Hourly Service (1127-0020)
84N	Nitelink, Dublin Bus	Dublin – Delgany	No Service	2 Hourly Service (0054-0454)	2 Hourly Service (0054-0454)
84X	Dublin Bus	Trinity College - Beechdale Estate	5 Services (1657-1840)	No Service	No Service
184	Go-Ahead Ireland	Newtownmountkennedy - Bray Station	Half Hourly Service (0638-0003)	Half Hourly Service (0628-2336)	Half Hourly Service (0836-2336)
702	Aircoach	Dublin Airport - Greystones	8 Services (0419-1809)	8 Services (0419-1809)	8 Services (0419-1809)

Source: https://bustimes.org/map#16/53.1541/-6.082

Table 6 – Bus Services Timetabling Summary north of Sea View (northbound)

Service Number	Service Provider	Route	Monday - Friday	Saturday	Sunday
84	Dublin Bus	Temple Road – Newcastle Road (Sea Road)	Hourly Service (0520-2308)	Hourly Service (0535-2349)	Hourly Service (0919-2347)
184	Go-Ahead Ireland	Newtownmountkennedy - Bray Station	Half Hourly Service (0652-2321)	Half Hourly Service (0701-2321)	Half Hourly Service (0910-2340)

Source: https://bustimes.org/map#16/53.1541/-6.082

Table 7 – Bus Services Timetabling Summary north of Sea View (southbound)

Service Number	Service Provider	Route	Monday - Friday	Saturday	Sunday
84	Dublin Bus	Temple Road – Newcastle Road (Sea Road)	Hourly Service (0520-2308)	Hourly Service (0535-2349)	Hourly Service (0919-2347)
84N	Nitelink, Dublin Bus	Dublin – Delgany	No Service	2 Hourly Service (0054-0454)	2 Hourly Service (0054-0454)
184	Go-Ahead Ireland	Newtownmountkennedy - Bray Station	Half Hourly Service (0652-2321)	Half Hourly Service (0701-2321)	Half Hourly Service (0910-2340)

Source: https://bustimes.org/map#16/53.1541/-6.082

Site Observations - AM and PM Peaks

On February 9th 2022, AECOM went on site to the R761 to bus stops number 4297 (city bound) and 4214 (Greystones Bound). Observations were taken from 06:50 to 08:10 as this was estimated to be the time that would take commuters to travel from the proposed subject site towards key employment destinations via public transport such as Dublin city centre, Greystones and Bray and various stops along public transport services. With travel time to Dublin by bus being 1 hour and 20 mins, commuters would therefore need to be on the bus at Redford (R761) for 07:00 to 07:30 to reach their place of work or education by 08:30 – 09:00.

The subject site's nearest bus stop is located along the R761, near Redford. There is pedestrian footway on the southbound side of the road only. On the northbound side of the road (proposed site side) there is no pedestrian footway and public street lighting.

Figure 3 below illustrates the bus stop and location in relation to the subject site that was monitored during the morning peak hour of February 9th 2022.

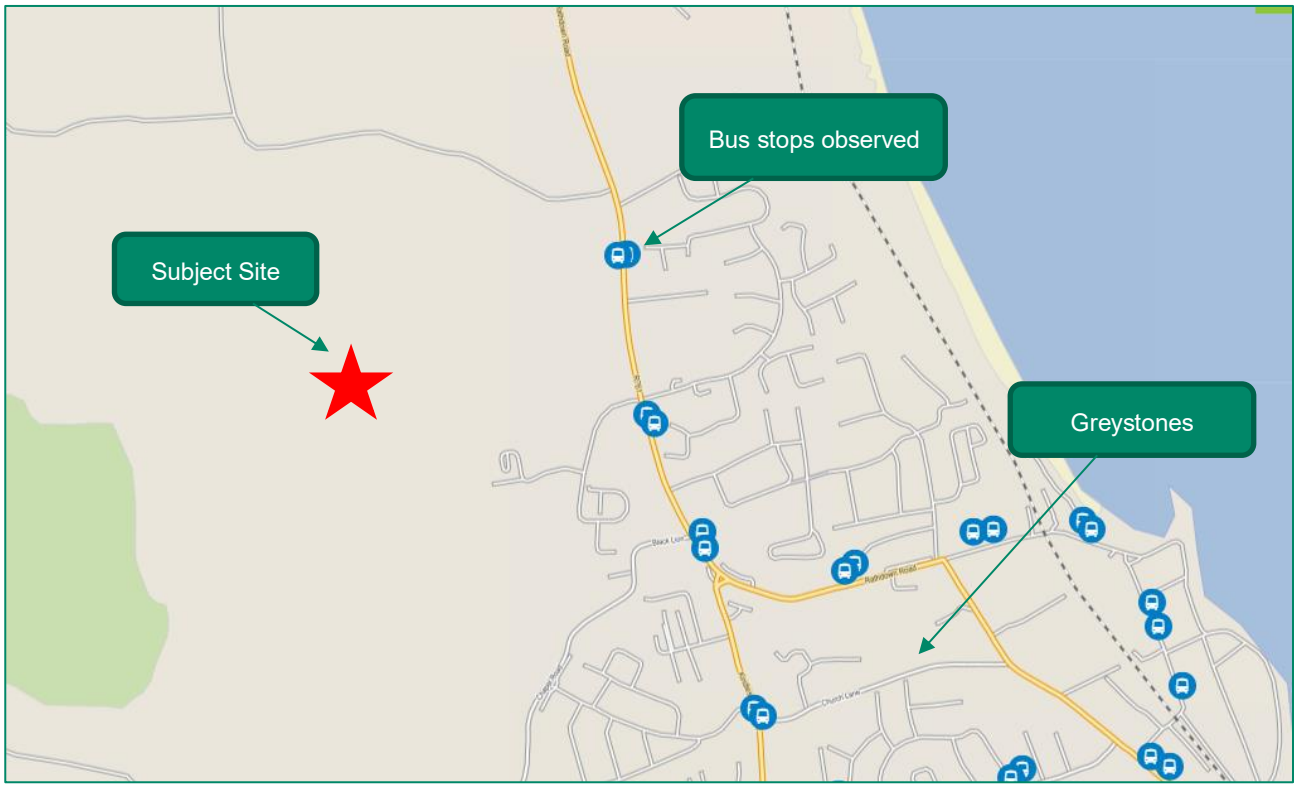


Figure 3 Bus stop locations in the relation to the subject site.

Greystones AM Peak

During the site visit, the bus occupancy and services were recorded, as per Table 6 below. As seen in the tables below, the peak period there is reserve capacity within the bus services operating at the subject site along the R761.

Table 8 North Bound Bus Service Observations Redford

North Bound (to Dublin City and Bray)					
Time	Service Number	Scheduled to stop	Deck	No. of Passengers aboard service	Reserve Capacity available?
06:54	184	yes	Single	2	Yes
07:16	84	Yes	Double	10	Yes
07:24	184	Yes	Single	2	Yes
07:48	84	Yes	Double	10	Yes
07:52	184	Yes	Double	15	Yes

Table 9 South Bound AM Observations Redford

South Bound (to Greystones)					
Time	Service Number	Scheduled to stop	Deck	No. of Passengers aboard service	Reserve Capacity available?
07:10	184	yes	Single	10	Yes
07:23	84	yes	Double	10	Yes
07:39	184	yes	Single	5	Yes
08:09	184	yes	Single	15	Yes

It is noted that whilst services were scheduled to stop at the Redford Bus Stop, services did stop, as there were no boarding or alighting passengers across the AM peak period. It is also noted that there is adequate capacity for all buses which were scheduled to stop at the site in the AM peak period, meaning the existing public transport network should be able to support the proposed development's public transport trips in the AM Peak period.

Bray DART Station PM Peak

On February 9th 2022, AECOM attended at Bray Train Station to observe the bus services and the capacity levels of specific routes that would go to the proposed development location for a return journey for Dublin or Bray in the PM peak when commuters are returning home from, work. The site visit began at 5:15pm and Finished at 7pm. The rationale for the site visit timing was based off an assumed peak period for commuters, workers and students leaving Dublin city at 5:30pm or earlier to catch a DART to Bray train station and further to proceed onto the bus system to get to their desired location. It was observed that although many arrived at the train station by way of DART that a large percentage went on foot for the next portion of their journey, or they were being collected outside the train station by vehicles. Of those that did use the bus system the table below outlines the bus service number, the time it departed the train station and the number of passengers aboard the service

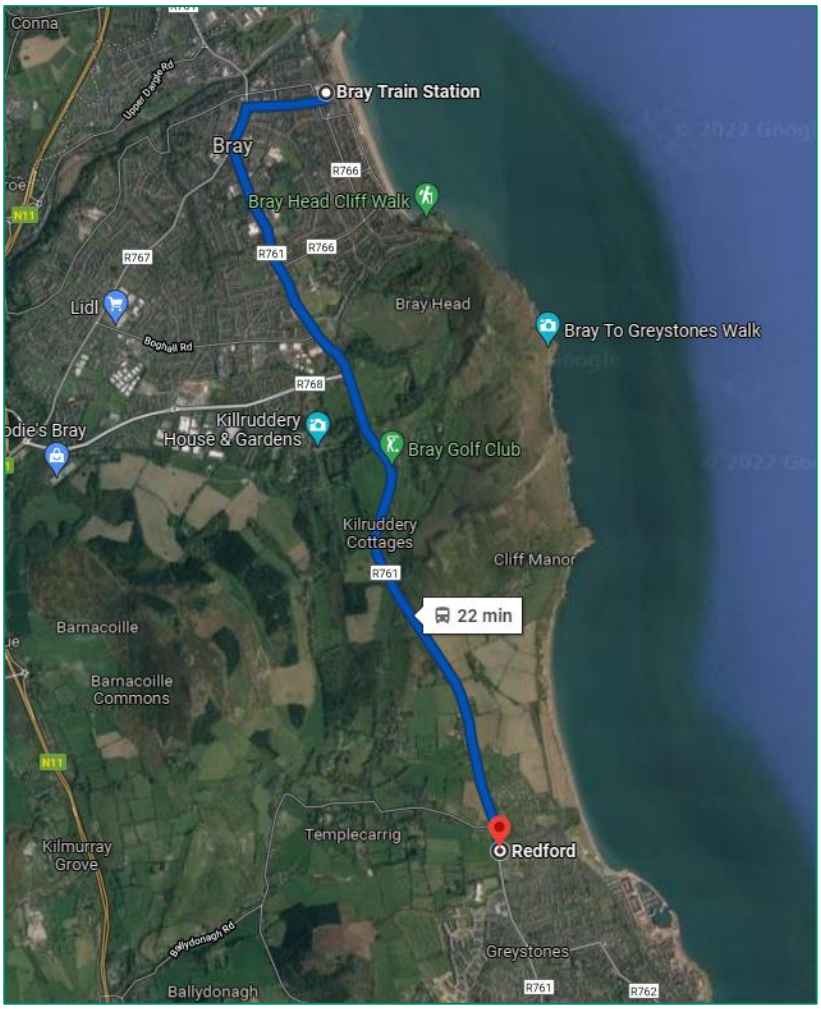


Figure 4 Route From Bray Train Station to the proposed site via the bus service no. 184.

Table 10 Bray DART Station PM peak observations

Bray Dart Station stop number 4168 PM					
Time	Service Number	Destination	Deck	No. of Passengers	Reserve capacity
17:24	84	Newcastle	Single	3	yes
17:38	84	Blackrock	Double	1	yes
17:40	184	Newtown Mountkennedy	Single	8	yes
17:49	84	Blackrock	Double	3	yes
17:50	84	Blackrock	Double	8	yes
18:06	184	Newtown Mountkennedy	Double	3	yes
18:40	84	Blackrock	Double	2	yes
18:47	84	Newcastle	Double	8	yes

The above services show that the bus services running between Bray Dart Station and the Subject site to the south operate with reserve capacity, even with additional trips departing from the DART and alighting for southbound journeys towards the proposed development site where DART journeys terminate at Bray and do not continue on towards Greystones.

It is also noted that there is adequate passenger capacity on all buses which were scheduled to stop at the site in the PM peak period, meaning the existing public transport network should be able to support the proposed development's public transport trips in the PM Peak period.

Summary and Conclusions

AECOM undertook an on-site survey on 9th February 2022 to assess the existing public transport services, their existing occupancy and reserve capacity as part of the Traffic and Transport Assessment for the proposed development site at Coolagad, Greystones, Co. Wicklow. As presented in the note above, there are adequate services and capacity to support the proposed development and to suggest that commuters travelling via public transport from the proposed development site should not have significant effects on the existing public transport network available to the proposed development site.

A part of the TTA AECOM have identified 3 no. of developments that have planning permission and are developed and operational or partially developed within the area. The additional trip generation impact on public transport from these developments is considered to be negligible.

It was observed that commuting trips via public transport were being undertaken at the time of surveys being carried out. However, it was observed and assumed that passenger levels had not quite returned to pre covid levels, and therefore it would be assumed that whilst the number of commuters may rise, however there would still be expected to be reserve capacity for commuters availing of public transport services for the proposed development site based on surveys carried out.

Appendix D GoCar Letter of Intent

Cairn Homes
7 Grand Canal
Grand Canal Street Lower
Dublin 2

28/03/2022

To Whom It May Concern,

This is a letter to confirm that GoCar intends to provide a car sharing service in the "Coolagad" residential development located at Greystones, Wicklow. GoCar representatives have discussed the project with representatives of Cairn Homes and are excited to provide a car sharing service at this location. The development consists of approximately 586 dwellings within the Coolagad area of Wicklow. The developer proposes to have available 1 vehicle for public service at surface level within the development.

GoCar is Ireland's leading car sharing service with over 60,000 members and over 850 cars and vans on fleet. Each GoCar which is placed in a community has the potential to replace the journeys of up to 15 private cars. The Department of Housing's Design Standards for New Apartments - Guidelines for Planning Authorities 2018 outline: "For all types of location, where it is sought to eliminate or reduce car parking provision, it is necessary to ensure... provision is also to be made for alternative mobility solutions including facilities for car sharing club vehicles."

Carsharing is a sustainable service. By allowing multiple people to use the same vehicle at different times, car sharing reduces car ownership, car dependency, congestion, noise, and air pollution. It frees up land which would otherwise be used for additional parking spaces. Most GoCar users only use a car when necessary and walk and use public transport more often than car owners.

By having GoCar car sharing vehicles in a development such as this, the residents therein will have access to pay-as-you-go driving, in close proximity to their homes, which will increase usership of the service.

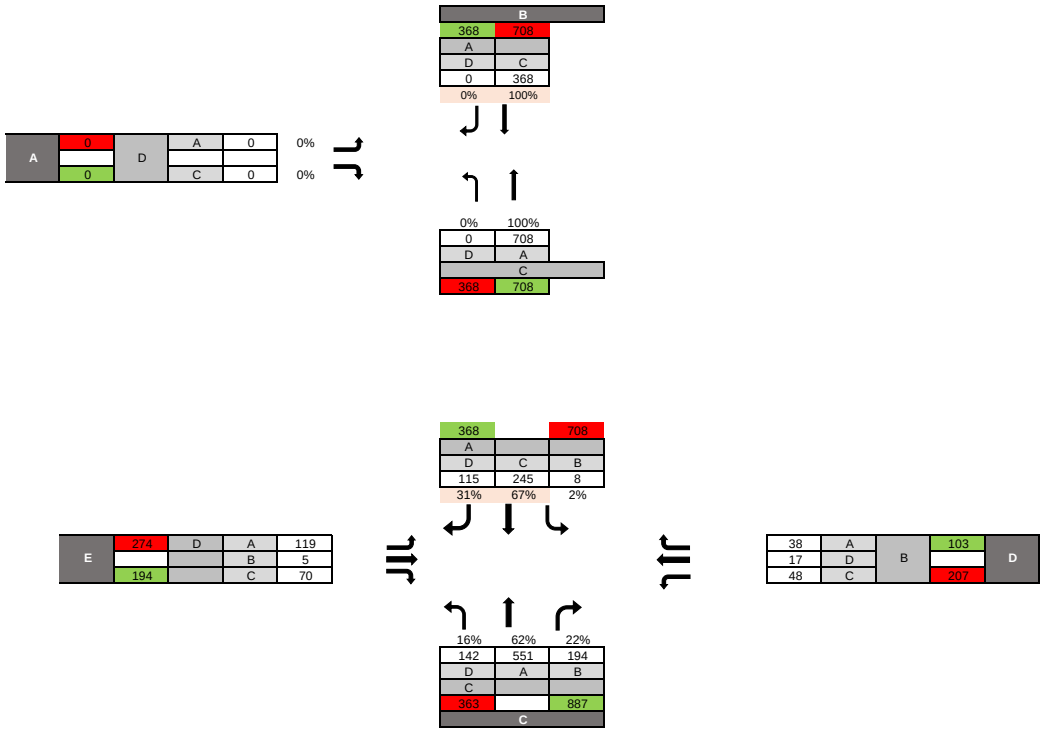
I trust that this information is satisfactory. For any queries, please do not hesitate to contact me.

D Ralston

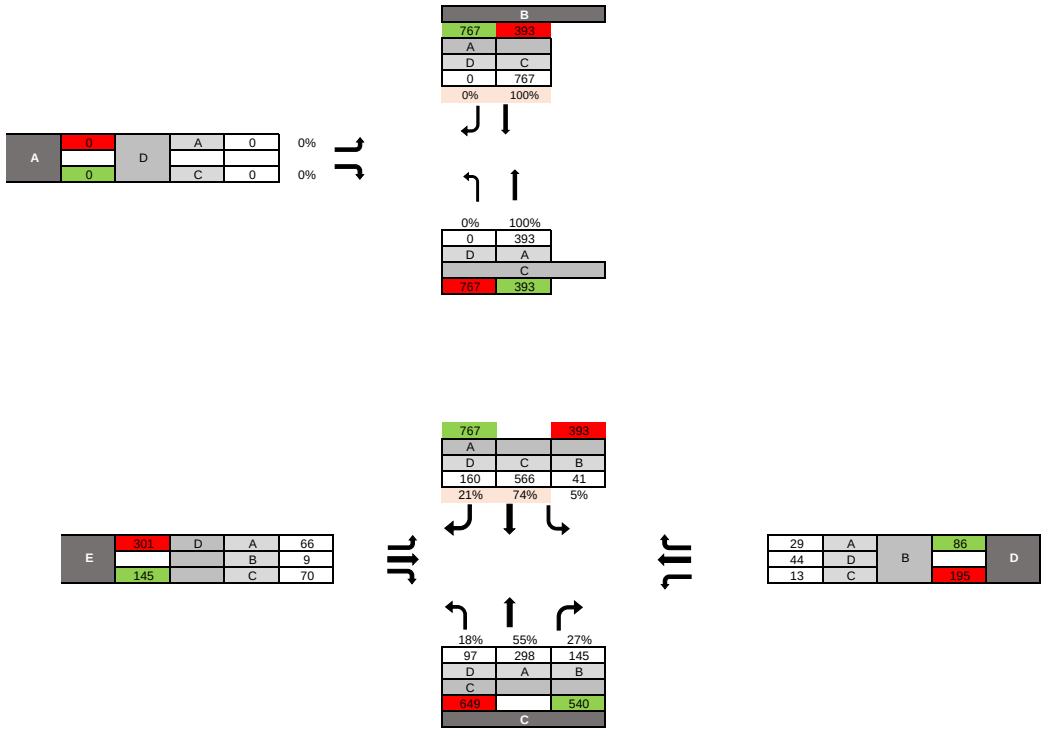
Daniel Ralston
Business Manager
GoCar Carsharing Ltd
Mobile: 086 0414 991
E: daniel.ralston@gocar.ie

Appendix E Traffic Modelling

AM BASE



PM BASE



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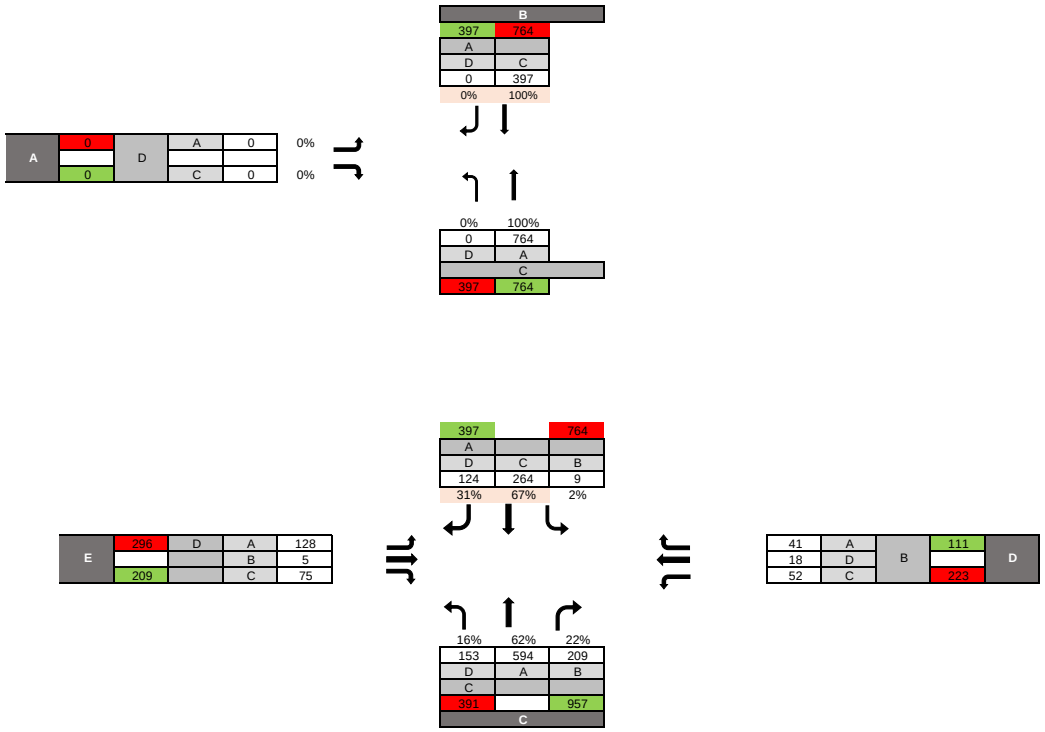
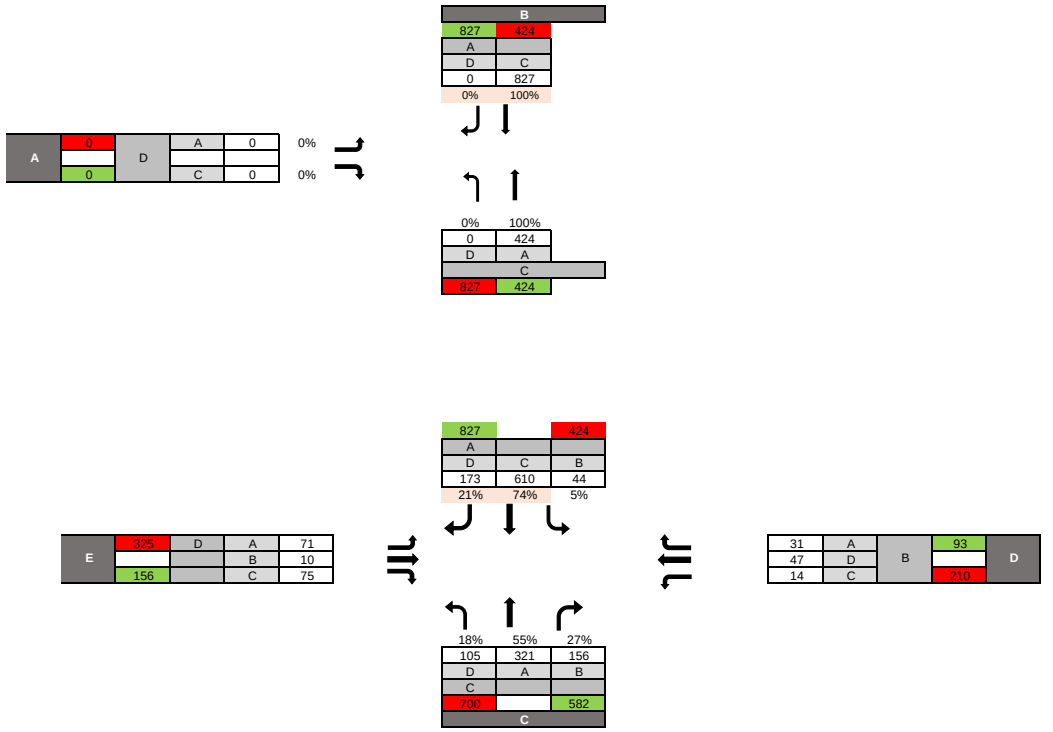
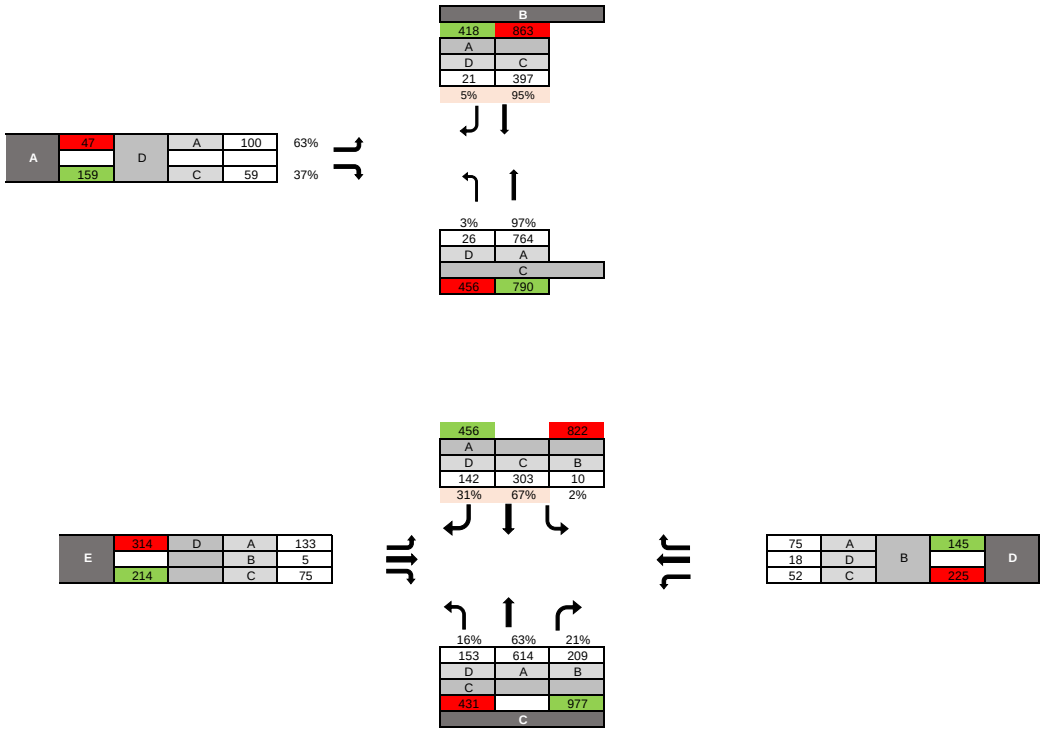


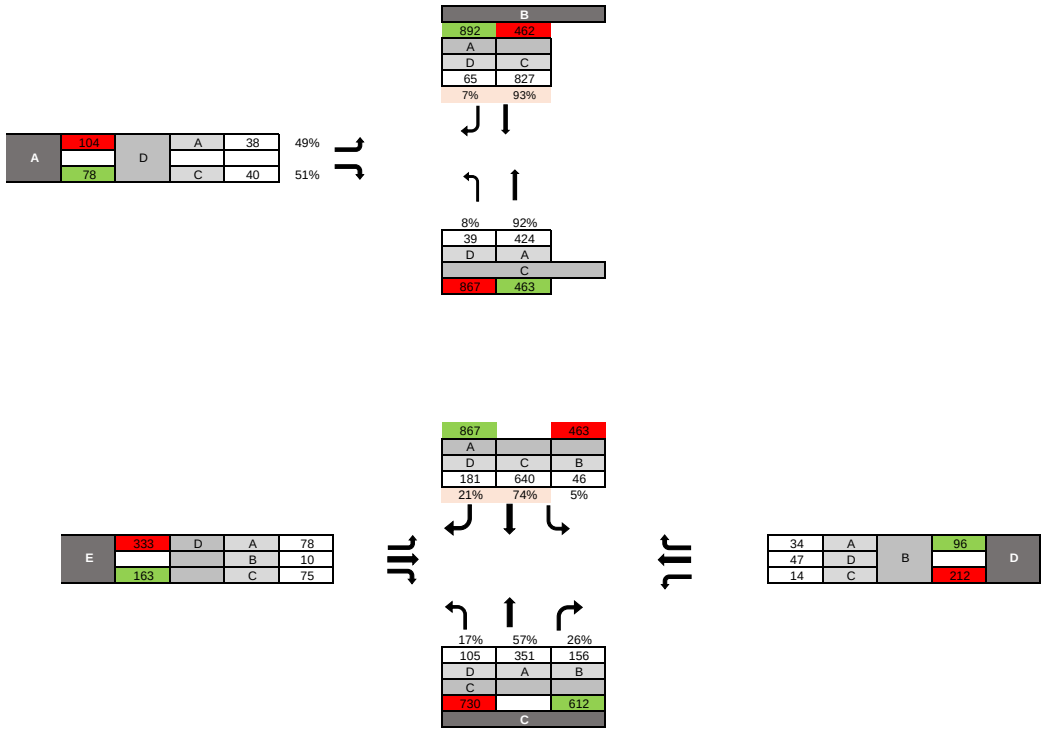
2023 PM BASE



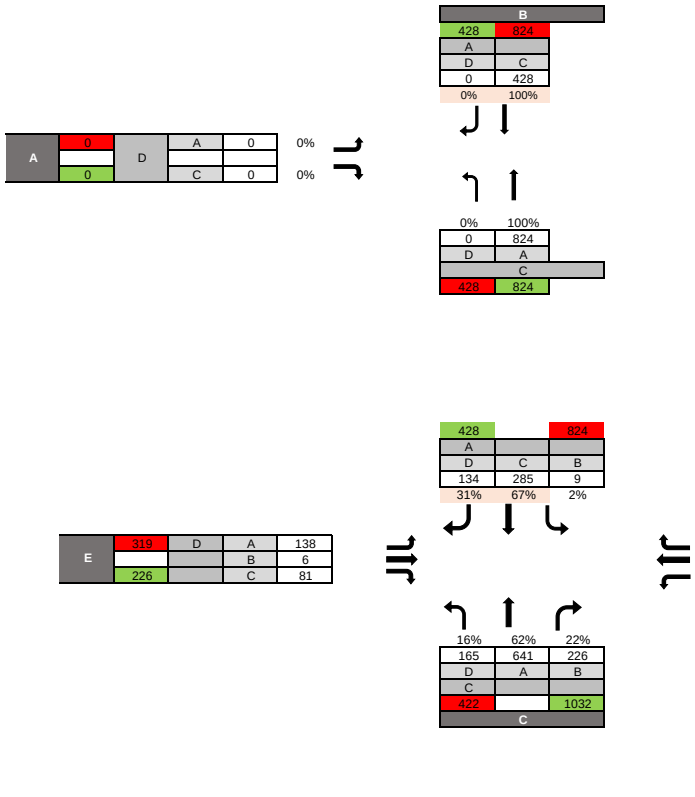
2023 AM BASE + Dev



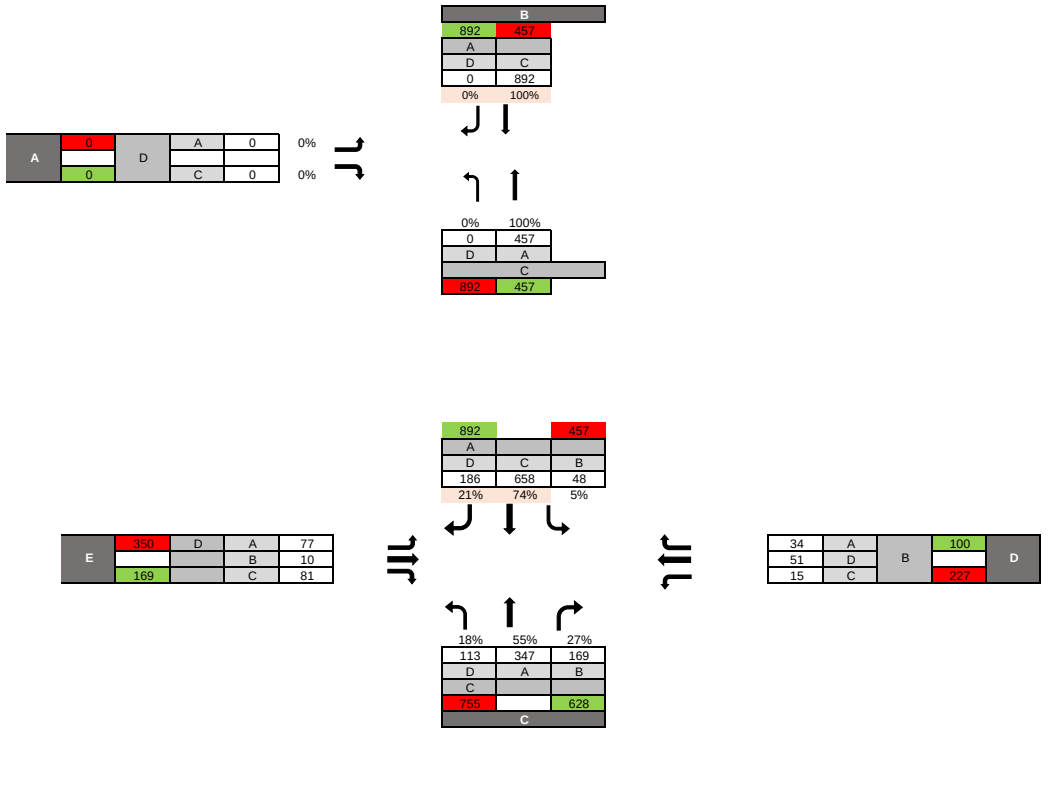
2023 PM BASE + dev



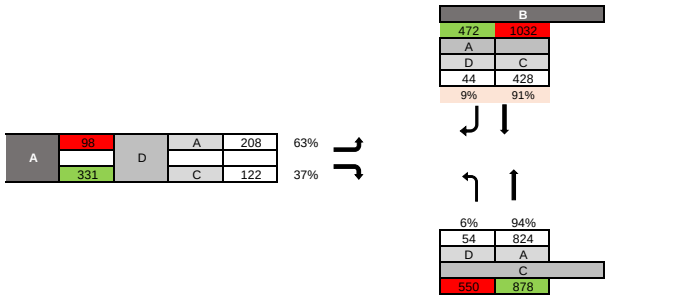
2028 AM BASE

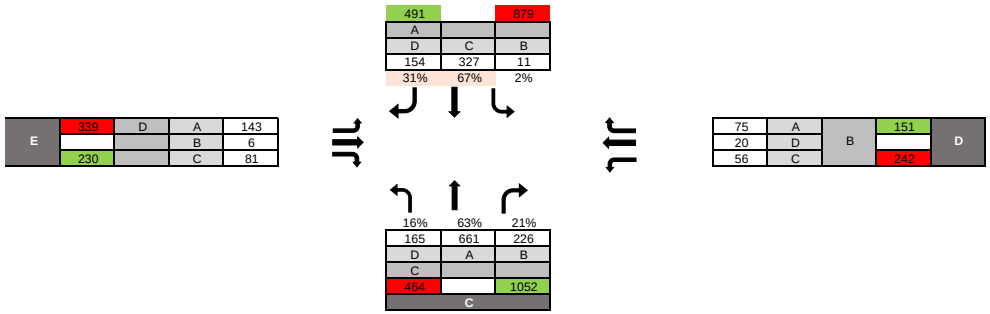


2028 PM BASE



2028 AM BASE + DEV





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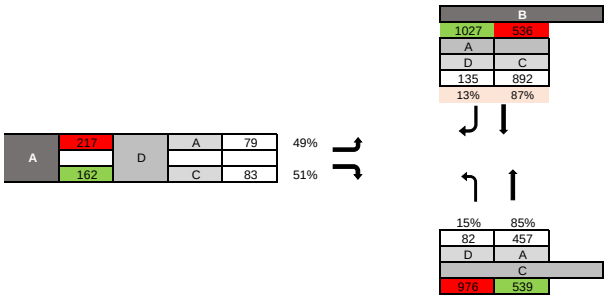
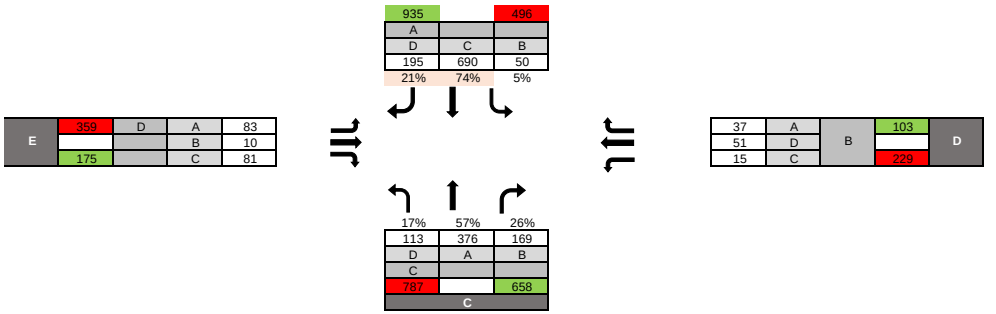
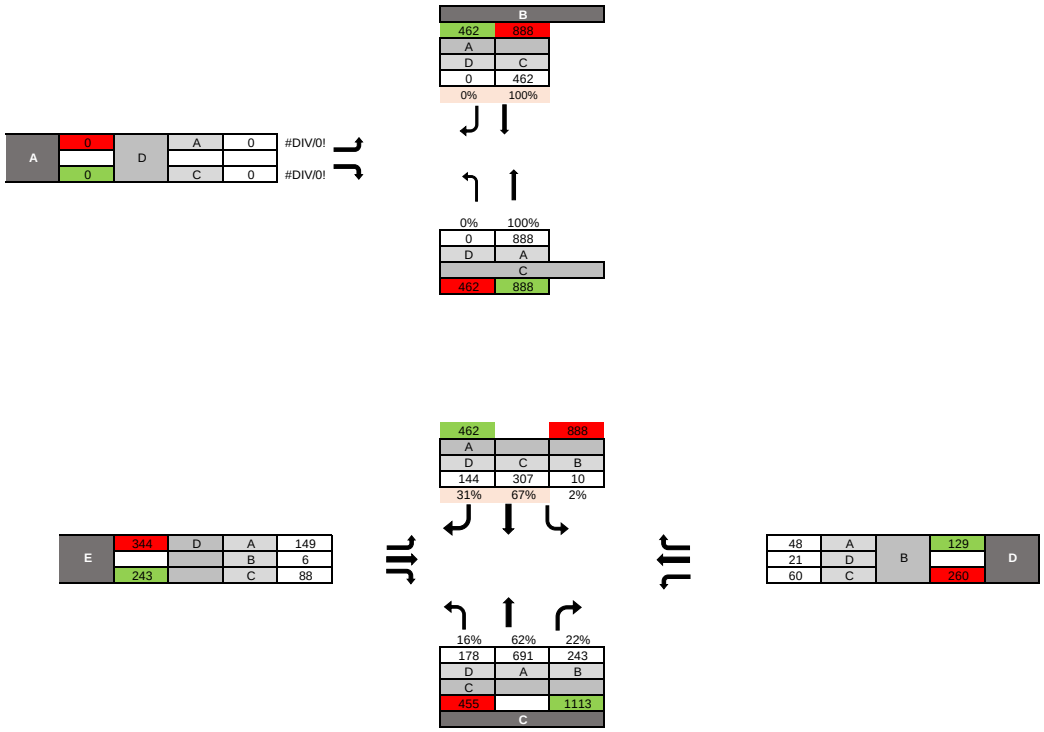
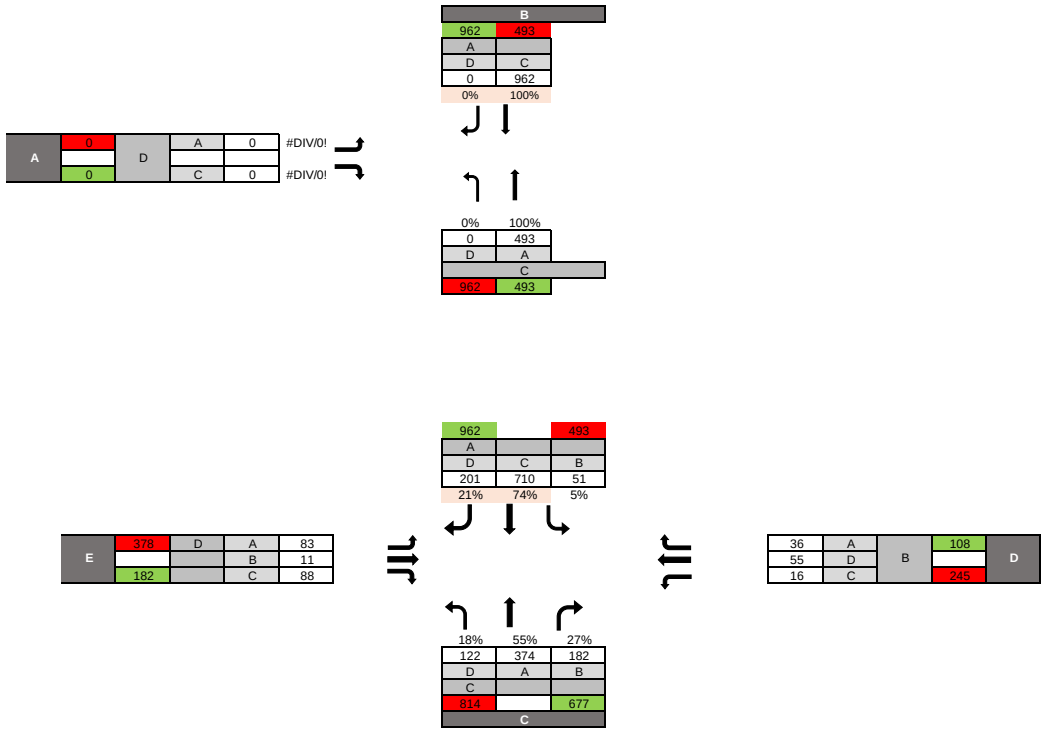




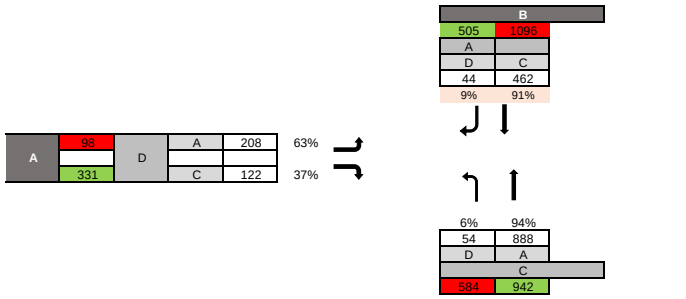
2038 AM BASE

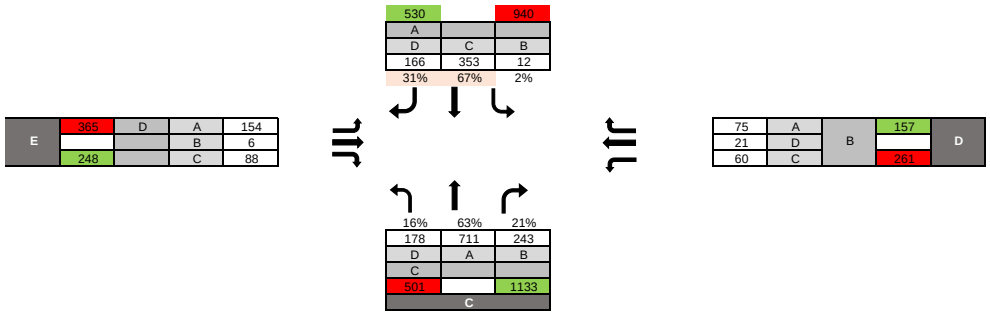


2038 PM BASE



2038 AM BASE + Dev





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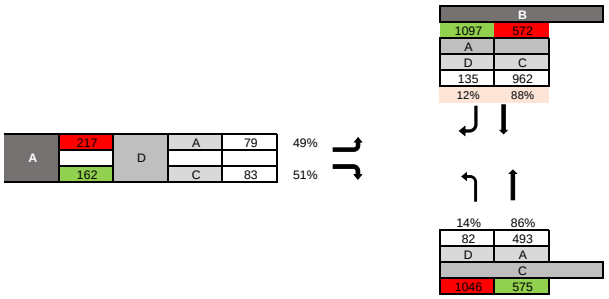

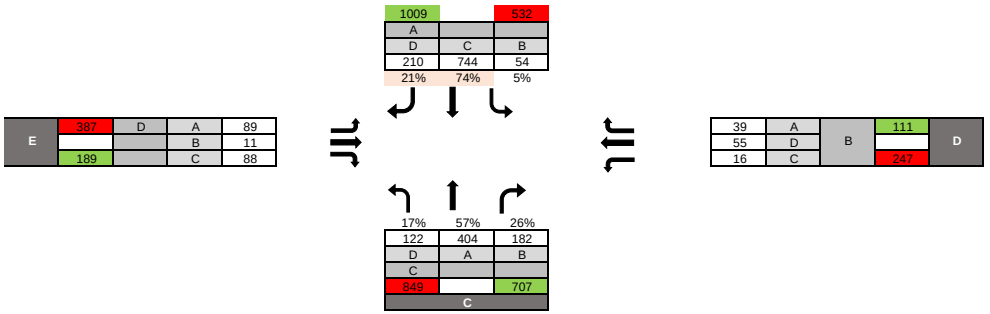

Appendix F TRICS Outputs

Calculation Reference: AUDIT-204601-201209-1253

TRIP RATE CALCULATION SELECTION PARAMETERS:

Land Use : 03 - RESIDENTIAL
Category : A - HOUSES PRIVATELY OWNED
MULTI-MODAL TOTAL VEHICLES

Selected regions and areas:

12	CONNAUGHT		
	CS	SLIGO	1 days
	LT	LEITRIM	1 days
13	MUNSTER		
	WA	WATERFORD	1 days
14	LEINSTER		
	WC	WICKLOW	1 days
15	GREATER DUBLIN		
	DL	DUBLIN	1 days
16	ULSTER (REPUBLIC OF IRELAND)		
	CV	CAVAN	1 days
	DN	DONEGAL	3 days

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

Primary Filtering selection:

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

Parameter: No of Dwellings
Actual Range: 50 to 280 (units:)
Range Selected by User: 50 to 437 (units:)

Parking Spaces Range: All Surveys Included

Parking Spaces per Dwelling Range: All Surveys Included

Bedrooms per Dwelling Range: All Surveys Included

Percentage of dwellings privately owned: All Surveys Included

Public Transport Provision:
Selection by: Include all surveys

Date Range: 01/01/12 to 20/06/18

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

Selected survey days:

Monday	3 days
Tuesday	1 days
Wednesday	2 days
Thursday	1 days
Friday	2 days

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

Selected survey types:

Manual count	9 days
Directional ATC Count	0 days

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

Selected Locations:

Suburban Area (PPS6 Out of Centre)	2
Edge of Town	6
Neighbourhood Centre (PPS6 Local Centre)	1

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

Selected Location Sub Categories:

Residential Zone	6
Village	1
No Sub Category	2

This data displays the number of surveys per location sub-category within the selected set. The location sub-categories consist of Commercial Zone, Industrial Zone, Development Zone, Residential Zone, Retail Zone, Built-Up Zone, Village,

Secondary Filtering selection:

Use Class:

C3	9 days

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

Population within 500m Range:

All Surveys Included

Population within 1 mile:

1,000 or Less	1 days
1,001 to 5,000	2 days
5,001 to 10,000	1 days
10,001 to 15,000	5 days

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

Population within 5 miles:

5,000 or Less	1 days
5,001 to 25,000	6 days
25,001 to 50,000	1 days
50,001 to 75,000	1 days

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

Car ownership within 5 miles:

0.6 to 1.0	2 days
1.1 to 1.5	6 days
1.6 to 2.0	1 days

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

Travel Plan:

No	9 days

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

PTAL Rating:

No PTAL Present	9 days

This data displays the number of selected surveys with PTAL Ratings.

LIST OF SITES relevant to selection parameters

1 CS-03-A-04 DETACHED & SEMI-DETACHED SLIGO
R292
STRANDHILL

Neighbourhood Centre (PPS6 Local Centre)
Village
Total No of Dwellings: 63
Survey date: THURSDAY *27/10/16* *Survey Type: MANUAL*

2 CV-03-A-02 DETACHED & SEMI DETACHED CAVAN
R212 DUBLIN ROAD
CAVAN
KILLYNEBBER
Edge of Town
No Sub Category
Total No of Dwellings: 80
Survey date: MONDAY *22/05/17* *Survey Type: MANUAL*

3 DL-03-A-10 SEMI DETACHED & DETACHED DUBLIN
R124
MALAHIDE
SAINT HELENS
Edge of Town
Residential Zone
Total No of Dwellings: 65
Survey date: WEDNESDAY *20/06/18* *Survey Type: MANUAL*

4 DN-03-A-03 DETACHED/SEMI-DETACHED DONEGAL
THE GRANGE
LETTERKENNY
GLENCAR IRISH
Edge of Town
Residential Zone
Total No of Dwellings: 50
Survey date: MONDAY *01/09/14* *Survey Type: MANUAL*

5 DN-03-A-04 SEMI-DETACHED DONEGAL
GORTLEE ROAD
LETTERKENNY
GORTLEE
Edge of Town
Residential Zone
Total No of Dwellings: 83
Survey date: FRIDAY *26/09/14* *Survey Type: MANUAL*

6 DN-03-A-05 DETACHED/SEMI-DETACHED DONEGAL
GORTLEE ROAD
LETTERKENNY
GORTLEE
Suburban Area (PPS6 Out of Centre)
Residential Zone
Total No of Dwellings: 146
Survey date: WEDNESDAY *03/09/14* *Survey Type: MANUAL*

7 LT-03-A-01 SEMI-DETACHED & DETACHED LEITRIM
ARD NA SI
CARRICK-ON-SHANNON
ATTIRORY
Suburban Area (PPS6 Out of Centre)
Residential Zone
Total No of Dwellings: 90
Survey date: FRIDAY *24/04/15* *Survey Type: MANUAL*

8 WA-03-A-04 DETACHED WATERFORD
MAYPARK LANE
WATERFORD

Edge of Town
Residential Zone
Total No of Dwellings: 280
Survey date: TUESDAY *24/06/14* *Survey Type: MANUAL*

LIST OF SITES relevant to selection parameters (Cont.)

9	WC-03-A-01	DETACHED HOUSES	WICKLOW
	STATION ROAD		
	WICKLOW		
	CORPORATION MURRAGH		
	Edge of Town		
	No Sub Category		
	Total No of Dwellings:	50	
	Survey date: MONDAY	*28/05/18*	*Survey Type: MANUAL*

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

TRIP RATE for Land Use 03 - RESIDENTIAL/A - HOUSES PRIVATELY OWNED
MULTI-MODAL TOTAL VEHICLES
Calculation factor: 1 DWELLS
BOLD print indicates peak (busiest) period

	ARRIVALS			DEPARTURES			TOTALS		
Time Range	No. Days	Ave. DWELLS	Trip Rate	No. Days	Ave. DWELLS	Trip Rate	No. Days	Ave. DWELLS	Trip Rate
00:00 - 01:00									
01:00 - 02:00									
02:00 - 03:00									
03:00 - 04:00									
04:00 - 05:00									
05:00 - 06:00									
06:00 - 07:00									
07:00 - 08:00	9	101	0.045	9	101	0.175	9	101	0.220
08:00 - 09:00	9	101	0.158	9	101	0.534	9	101	0.692
09:00 - 10:00	9	101	0.227	9	101	0.258	9	101	0.485
10:00 - 11:00	9	101	0.161	9	101	0.176	9	101	0.337
11:00 - 12:00	9	101	0.159	9	101	0.215	9	101	0.374
12:00 - 13:00	9	101	0.264	9	101	0.269	9	101	0.533
13:00 - 14:00	9	101	0.254	9	101	0.238	9	101	0.492
14:00 - 15:00	9	101	0.311	9	101	0.299	9	101	0.610
15:00 - 16:00	9	101	0.351	9	101	0.262	9	101	0.613
16:00 - 17:00	9	101	0.334	9	101	0.230	9	101	0.564
17:00 - 18:00	9	101	0.442	9	101	0.271	9	101	0.713
18:00 - 19:00	9	101	0.366	9	101	0.272	9	101	0.638
19:00 - 20:00									
20:00 - 21:00									
21:00 - 22:00									
22:00 - 23:00									
23:00 - 24:00									
Total Rates:			3.072			3.199			6.271

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

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

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Parameter summary

Trip rate parameter range selected:	50 - 280 (units:)
Survey date date range:	01/01/12 - 20/06/18
Number of weekdays (Monday-Friday):	9
Number of Saturdays:	0
Number of Sundays:	0
Surveys automatically removed from selection:	0
Surveys manually removed from selection:	0

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

TRIP RATE for Land Use 03 - RESIDENTIAL/A - HOUSES PRIVATELY OWNED
MULTI-MODAL CYCLISTS
Calculation factor: 1 DWELLS
BOLD print indicates peak (busiest) period

	ARRIVALS			DEPARTURES			TOTALS		
Time Range	No. Days	Ave. DWELLS	Trip Rate	No. Days	Ave. DWELLS	Trip Rate	No. Days	Ave. DWELLS	Trip Rate
00:00 - 01:00									
01:00 - 02:00									
02:00 - 03:00									
03:00 - 04:00									
04:00 - 05:00									
05:00 - 06:00									
06:00 - 07:00									
07:00 - 08:00	9	101	0.002	9	101	0.003	9	101	0.005
08:00 - 09:00	9	101	0.002	9	101	0.012	9	101	0.014
09:00 - 10:00	9	101	0.003	9	101	0.004	9	101	0.007
10:00 - 11:00	9	101	0.002	9	101	0.004	9	101	0.006
11:00 - 12:00	9	101	0.006	9	101	0.001	9	101	0.007
12:00 - 13:00	9	101	0.000	9	101	0.002	9	101	0.002
13:00 - 14:00	9	101	0.002	9	101	0.004	9	101	0.006
14:00 - 15:00	9	101	0.001	9	101	0.002	9	101	0.003
15:00 - 16:00	9	101	0.007	9	101	0.004	9	101	0.011
16:00 - 17:00	9	101	0.009	9	101	0.002	9	101	0.011
17:00 - 18:00	9	101	0.004	9	101	0.003	9	101	0.007
18:00 - 19:00	9	101	0.004	9	101	0.002	9	101	0.006
19:00 - 20:00									
20:00 - 21:00									
21:00 - 22:00									
22:00 - 23:00									
23:00 - 24:00									
Total Rates:			0.042			0.043			0.085

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

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

TRIP RATE for Land Use 03 - RESIDENTIAL/A - HOUSES PRIVATELY OWNED
MULTI-MODAL VEHICLE OCCUPANTS
Calculation factor: 1 DWELLS
BOLD print indicates peak (busiest) period

	ARRIVALS			DEPARTURES			TOTALS		
Time Range	No. Days	Ave. DWELLS	Trip Rate	No. Days	Ave. DWELLS	Trip Rate	No. Days	Ave. DWELLS	Trip Rate
00:00 - 01:00									
01:00 - 02:00									
02:00 - 03:00									
03:00 - 04:00									
04:00 - 05:00									
05:00 - 06:00									
06:00 - 07:00									
07:00 - 08:00	9	101	0.053	9	101	0.207	9	101	0.260
08:00 - 09:00	9	101	0.191	9	101	0.815	9	101	1.006
09:00 - 10:00	9	101	0.266	9	101	0.372	9	101	0.638
10:00 - 11:00	9	101	0.186	9	101	0.223	9	101	0.409
11:00 - 12:00	9	101	0.190	9	101	0.265	9	101	0.455
12:00 - 13:00	9	101	0.319	9	101	0.336	9	101	0.655
13:00 - 14:00	9	101	0.305	9	101	0.310	9	101	0.615
14:00 - 15:00	9	101	0.447	9	101	0.379	9	101	0.826
15:00 - 16:00	9	101	0.536	9	101	0.369	9	101	0.905
16:00 - 17:00	9	101	0.498	9	101	0.300	9	101	0.798
17:00 - 18:00	9	101	0.620	9	101	0.396	9	101	1.016
18:00 - 19:00	9	101	0.514	9	101	0.378	9	101	0.892
19:00 - 20:00									
20:00 - 21:00									
21:00 - 22:00									
22:00 - 23:00									
23:00 - 24:00									
Total Rates:			4.125			4.350			8.475

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

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

TRIP RATE for Land Use 03 - RESIDENTIAL/A - HOUSES PRIVATELY OWNED
MULTI-MODAL PEDESTRIANS
Calculation factor: 1 DWELLS
BOLD print indicates peak (busiest) period

	ARRIVALS			DEPARTURES			TOTALS		
Time Range	No. Days	Ave. DWELLS	Trip Rate	No. Days	Ave. DWELLS	Trip Rate	No. Days	Ave. DWELLS	Trip Rate
00:00 - 01:00									
01:00 - 02:00									
02:00 - 03:00									
03:00 - 04:00									
04:00 - 05:00									
05:00 - 06:00									
06:00 - 07:00									
07:00 - 08:00	9	101	0.012	9	101	0.028	9	101	0.040
08:00 - 09:00	9	101	0.018	9	101	0.065	9	101	0.083
09:00 - 10:00	9	101	0.023	9	101	0.064	9	101	0.087
10:00 - 11:00	9	101	0.047	9	101	0.050	9	101	0.097
11:00 - 12:00	9	101	0.042	9	101	0.037	9	101	0.079
12:00 - 13:00	9	101	0.033	9	101	0.033	9	101	0.066
13:00 - 14:00	9	101	0.071	9	101	0.063	9	101	0.134
14:00 - 15:00	9	101	0.075	9	101	0.039	9	101	0.114
15:00 - 16:00	9	101	0.067	9	101	0.051	9	101	0.118
16:00 - 17:00	9	101	0.077	9	101	0.039	9	101	0.116
17:00 - 18:00	9	101	0.054	9	101	0.028	9	101	0.082
18:00 - 19:00	9	101	0.045	9	101	0.057	9	101	0.102
19:00 - 20:00									
20:00 - 21:00									
21:00 - 22:00									
22:00 - 23:00									
23:00 - 24:00									
Total Rates:			0.564			0.554			1.118

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

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

TRIP RATE for Land Use 03 - RESIDENTIAL/A - HOUSES PRIVATELY OWNED
MULTI-MODAL PUBLIC TRANSPORT USERS
Calculation factor: 1 DWELLS
BOLD print indicates peak (busiest) period

	ARRIVALS			DEPARTURES			TOTALS		
Time Range	No. Days	Ave. DWELLS	Trip Rate	No. Days	Ave. DWELLS	Trip Rate	No. Days	Ave. DWELLS	Trip Rate
00:00 - 01:00									
01:00 - 02:00									
02:00 - 03:00									
03:00 - 04:00									
04:00 - 05:00									
05:00 - 06:00									
06:00 - 07:00									
07:00 - 08:00	9	101	0.000	9	101	0.004	9	101	0.004
08:00 - 09:00	9	101	0.000	9	101	0.039	9	101	0.039
09:00 - 10:00	9	101	0.001	9	101	0.004	9	101	0.005
10:00 - 11:00	9	101	0.000	9	101	0.002	9	101	0.002
11:00 - 12:00	9	101	0.001	9	101	0.002	9	101	0.003
12:00 - 13:00	9	101	0.000	9	101	0.000	9	101	0.000
13:00 - 14:00	9	101	0.003	9	101	0.001	9	101	0.004
14:00 - 15:00	9	101	0.006	9	101	0.001	9	101	0.007
15:00 - 16:00	9	101	0.032	9	101	0.002	9	101	0.034
16:00 - 17:00	9	101	0.006	9	101	0.001	9	101	0.007
17:00 - 18:00	9	101	0.002	9	101	0.000	9	101	0.002
18:00 - 19:00	9	101	0.000	9	101	0.001	9	101	0.001
19:00 - 20:00									
20:00 - 21:00									
21:00 - 22:00									
22:00 - 23:00									
23:00 - 24:00									
Total Rates:			0.051			0.057			0.108

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

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

TRIP RATE for Land Use 03 - RESIDENTIAL/A - HOUSES PRIVATELY OWNED
MULTI-MODAL TOTAL PEOPLE
Calculation factor: 1 DWELLS
BOLD print indicates peak (busiest) period

	ARRIVALS			DEPARTURES			TOTALS		
Time Range	No. Days	Ave. DWELLS	Trip Rate	No. Days	Ave. DWELLS	Trip Rate	No. Days	Ave. DWELLS	Trip Rate
00:00 - 01:00									
01:00 - 02:00									
02:00 - 03:00									
03:00 - 04:00									
04:00 - 05:00									
05:00 - 06:00									
06:00 - 07:00									
07:00 - 08:00	9	101	0.067	9	101	0.243	9	101	0.310
08:00 - 09:00	9	101	0.211	9	101	0.931	9	101	1.142
09:00 - 10:00	9	101	0.293	9	101	0.444	9	101	0.737
10:00 - 11:00	9	101	0.236	9	101	0.279	9	101	0.515
11:00 - 12:00	9	101	0.238	9	101	0.305	9	101	0.543
12:00 - 13:00	9	101	0.352	9	101	0.372	9	101	0.724
13:00 - 14:00	9	101	0.381	9	101	0.378	9	101	0.759
14:00 - 15:00	9	101	0.528	9	101	0.421	9	101	0.949
15:00 - 16:00	9	101	0.642	9	101	0.427	9	101	1.069
16:00 - 17:00	9	101	0.590	9	101	0.342	9	101	0.932
17:00 - 18:00	9	101	0.680	9	101	0.427	9	101	1.107
18:00 - 19:00	9	101	0.563	9	101	0.439	9	101	1.002
19:00 - 20:00									
20:00 - 21:00									
21:00 - 22:00									
22:00 - 23:00									
23:00 - 24:00									
Total Rates:			4.781			5.008			9.789

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

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

Appendix G Linsig Outputs

Basic Results Summary

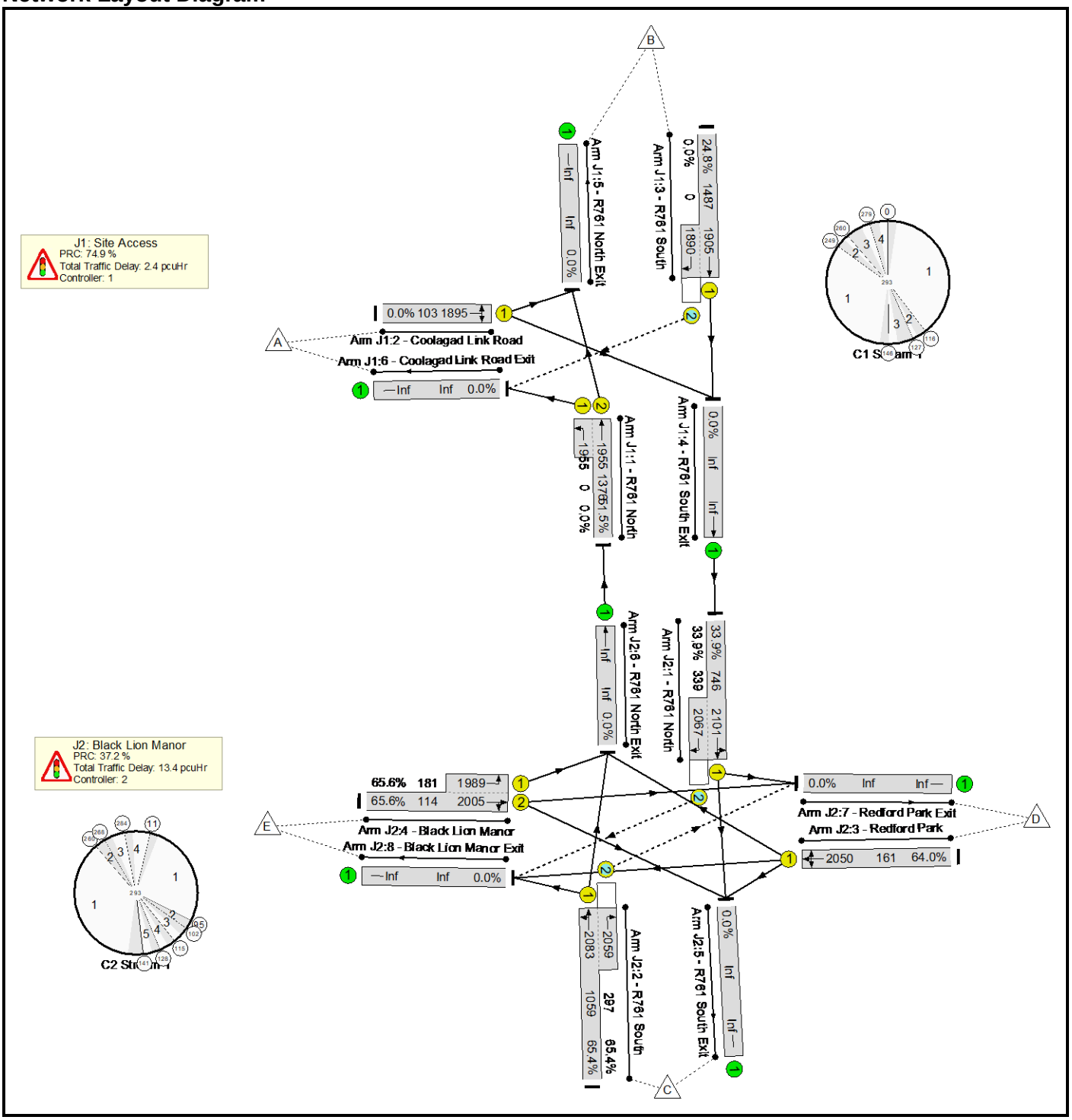
User and Project Details

Project:	
Title:	
Location:	
Additional detail:	
File name:	Linsig Network Black Lion Manor and Site Access Rev 4c Base.lsg3x
Author:	
Company:	
Address:	

Basic Results Summary

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

Network Layout Diagram



Basic Results Summary

Network Results

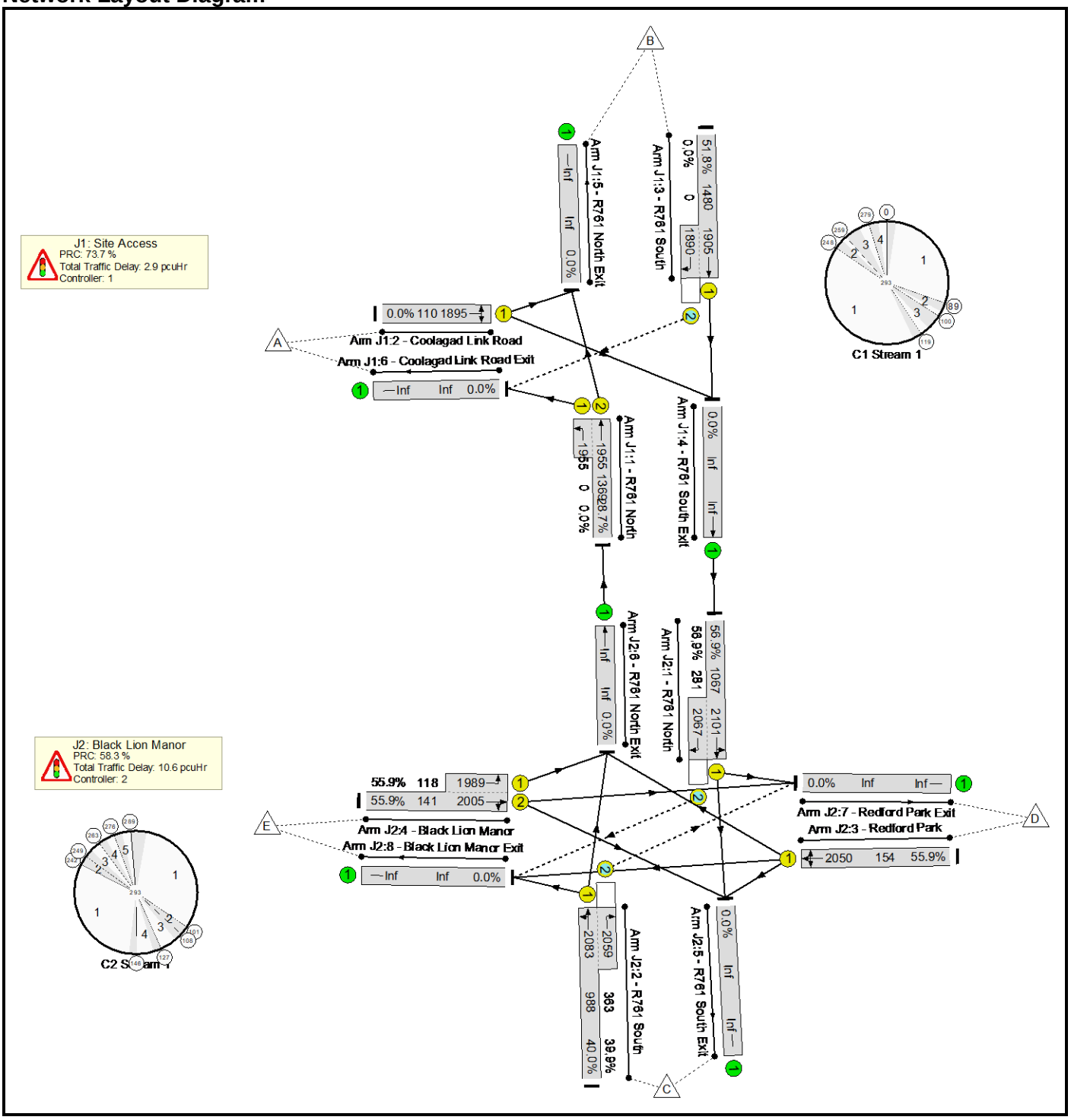
Item	Lane Description	Lane Type	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Mean Max Queue (pcu)
Network	**-**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**65.6%**	**309**	**0**	**0**	**15.9**	**-**	**-**
J1: Site Access	**-**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**51.5%**	**0**	**0**	**0**	**2.4**	**-**	**-**
1/2+1/1	R761 North Ahead Left	U	C1:A		2	205	-	708	1955:1955	1376+0	51.5 : 0.0%	-	-	-	1.8	9.1	15.7
2/1	Coolagad Link Road Right Left	U	C1:B		2	14	-	0	1895	103	0.0%	-	-	-	0.0	0.0	0.0
3/1+3/2	R761 South Ahead Right	U+O	C1:C	C1:E	2	227	8	368	1905:1890	1487+0	24.8 : 0.0%	0	0	0	0.6	6.2	5.1
J2: Black Lion Manor	**-**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**65.6%**	**309**	**0**	**0**	**13.4**	**-**	**-**
1/1+1/2	R761 North Ahead Left Right	U+O	C2:C C2:D		2	185:200	-	368	2101:2067	746+339	33.9 : 33.9%	115	0	0	1.5	14.6	3.4
2/1+2/2	R761 South Ahead Right Left	U+O	C2:A C2:B		2	185:200	-	887	2083:2059	1059+297	65.4 : 65.4%	194	0	0	4.7	19.0	22.9
3/1	Redford Park Left Right Ahead	U	C2:G		2	21	-	103	2050	161	64.0%	-	-	-	2.8	98.1	5.7
4/2+4/1	Black Lion Manor Right Left Ahead	U	C2:F C2:E		2	17:30	-	194	2005:1989	114+181	65.6 : 65.6%	-	-	-	4.5	82.6	6.4

C1	Stream: 1 PRC for Signalled Lanes (%):	74.9	Total Delay for Signalled Lanes (pcuHr):	2.43	Cycle Time (s): 293
C2	Stream: 1 PRC for Signalled Lanes (%):	37.2	Total Delay for Signalled Lanes (pcuHr):	13.44	Cycle Time (s): 293
	PRC Over All Lanes (%):	37.2	Total Delay Over All Lanes(pcuHr):	15.86	

Basic Results Summary

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

Network Layout Diagram



Basic Results Summary

Network Results

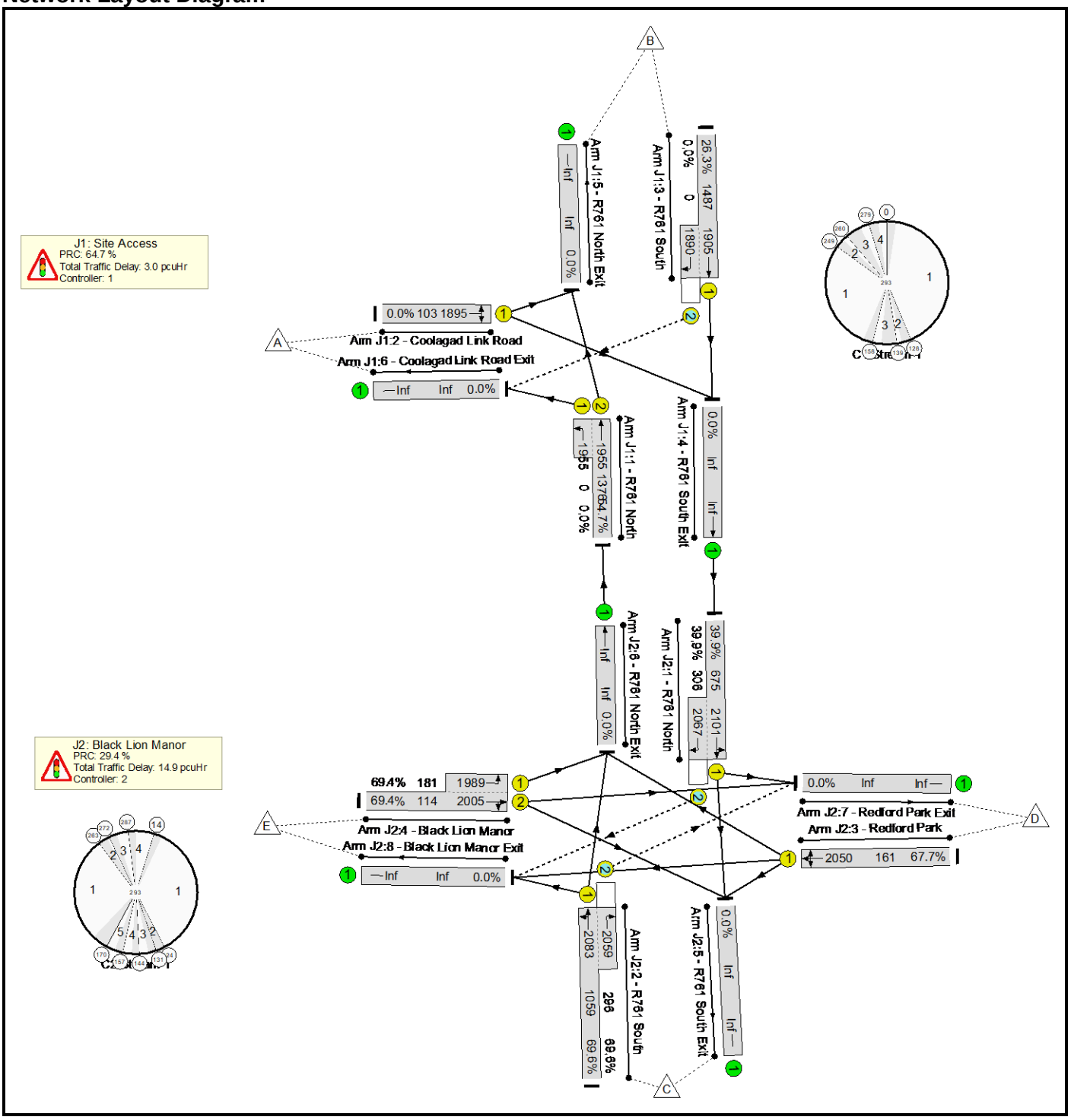
Item	Lane Description	Lane Type	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Mean Max Queue (pcu)
Network	**-**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**56.9%**	**305**	**0**	**0**	**13.5**	**-**	**-**
J1: Site Access	**-**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**51.8%**	**0**	**0**	**0**	**2.9**	**-**	**-**
1/2+1/1	R761 North Ahead Left	U	C1:A		2	204	-	393	1955:1955	1369+0	28.7 : 0.0%	-	-	-	1.0	8.9	4.5
2/1	Coolagad Link Road Right Left	U	C1:B		2	15	-	0	1895	110	0.0%	-	-	-	0.0	0.0	0.0
3/1+3/2	R761 South Ahead Right	U+O	C1:C	C1:E	2	226	8	767	1905:1890	1480+0	51.8 : 0.0%	0	0	0	1.9	8.9	14.8
J2: Black Lion Manor	**-**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**56.9%**	**305**	**0**	**0**	**10.6**	**-**	**-**
1/1+1/2	R761 North Ahead Left Right	U+O	C2:C C2:D		2	183:197	-	767	2101:2067	1067+281	56.9 : 56.9%	160	0	0	2.5	11.8	15.3
2/1+2/2	R761 South Ahead Right Left	U+O	C2:A C2:B		2	183:197	-	540	2083:2059	988+363	40.0 : 39.9%	145	0	0	2.8	18.7	9.6
3/1	Redford Park Left Right Ahead	U	C2:G		2	20	-	86	2050	154	55.9%	-	-	-	2.2	92.1	4.3
4/2+4/1	Black Lion Manor Right Left Ahead	U	C2:F C2:E		2	21:33	-	145	2005:1989	141+118	55.9 : 55.9%	-	-	-	3.1	77.8	3.9

C1	Stream: 1 PRC for Signalled Lanes (%):	73.7	Total Delay for Signalled Lanes (pcuHr):	2.87	Cycle Time (s): 293
C2	Stream: 1 PRC for Signalled Lanes (%):	58.3	Total Delay for Signalled Lanes (pcuHr):	10.65	Cycle Time (s): 293
	PRC Over All Lanes (%):	58.3	Total Delay Over All Lanes(pcuHr):	13.52	

Basic Results Summary

Scenario 3: 'AM 2023 Base' (FG3: 'AM 2023 Base', Plan 1: 'Network Control Plan 1')

Network Layout Diagram



Basic Results Summary

Network Results

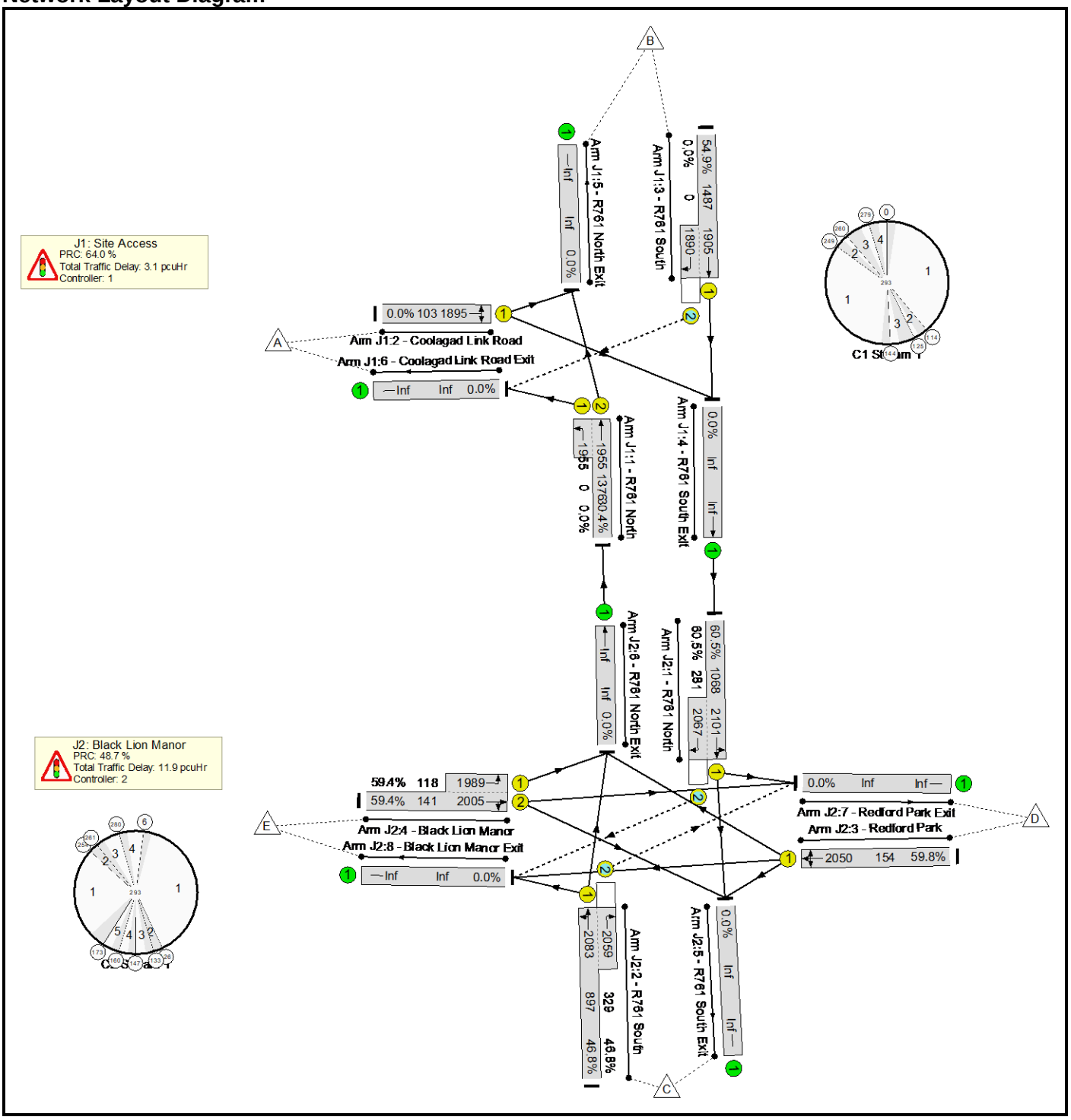
Item	Lane Description	Lane Type	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Mean Max Queue (pcu)
Network	-	-	-		-	-	-	-	-	-	**69.6%**	**328**	**0**	**0**	**17.9**	-	-
J1: Site Access	-	-	-		-	-	-	-	-	-	**54.7%**	**0**	**0**	**0**	**3.0**	-	-
1/2+1/1	R761 North Ahead Left	U	C1:A		2	205	-	752	1955:1955	1376+0	54.7 : 0.0%	-	-	-	2.3	11.1	10.8
2/1	Coolagad Link Road Right Left	U	C1:B		2	14	-	0	1895	103	0.0%	-	-	-	0.0	0.0	0.0
3/1+3/2	R761 South Ahead Right	U+O	C1:C	C1:E	2	227	8	391	1905:1890	1487+0	26.3 : 0.0%	0	0	0	0.7	6.3	5.5
J2: Black Lion Manor	-	-	-		-	-	-	-	-	-	**69.6%**	**328**	**0**	**0**	**14.9**	-	-
1/1+1/2	R761 North Ahead Left Right	U+O	C2:C C2:D		2	185:201	-	391	2101:2067	675+306	39.9 : 39.9%	122	0	0	1.8	16.3	5.2
2/1+2/2	R761 South Ahead Right Left	U+O	C2:A C2:B		2	185:201	-	943	2083:2059	1059+296	69.6 : 69.6%	206	0	0	5.3	20.3	25.9
3/1	Redford Park Left Right Ahead	U	C2:G		2	21	-	109	2050	161	67.7%	-	-	-	3.0	99.1	5.3
4/2+4/1	Black Lion Manor Right Left Ahead	U	C2:F C2:E		2	16:30	-	205	2005:1989	114+181	69.4 : 69.4%	-	-	-	4.8	83.6	6.3

C1	Stream: 1 PRC for Signalled Lanes (%):	64.7	Total Delay for Signalled Lanes (pcuHr):	3.00	Cycle Time (s): 293
C2	Stream: 1 PRC for Signalled Lanes (%):	29.4	Total Delay for Signalled Lanes (pcuHr):	14.85	Cycle Time (s): 293
	PRC Over All Lanes (%):	29.4	Total Delay Over All Lanes(pcuHr):	17.85	

Basic Results Summary

Scenario 4: 'PM 2023 Base' (FG4: 'PM 2023 Base', Plan 1: 'Network Control Plan 1')

Network Layout Diagram



Basic Results Summary

Network Results

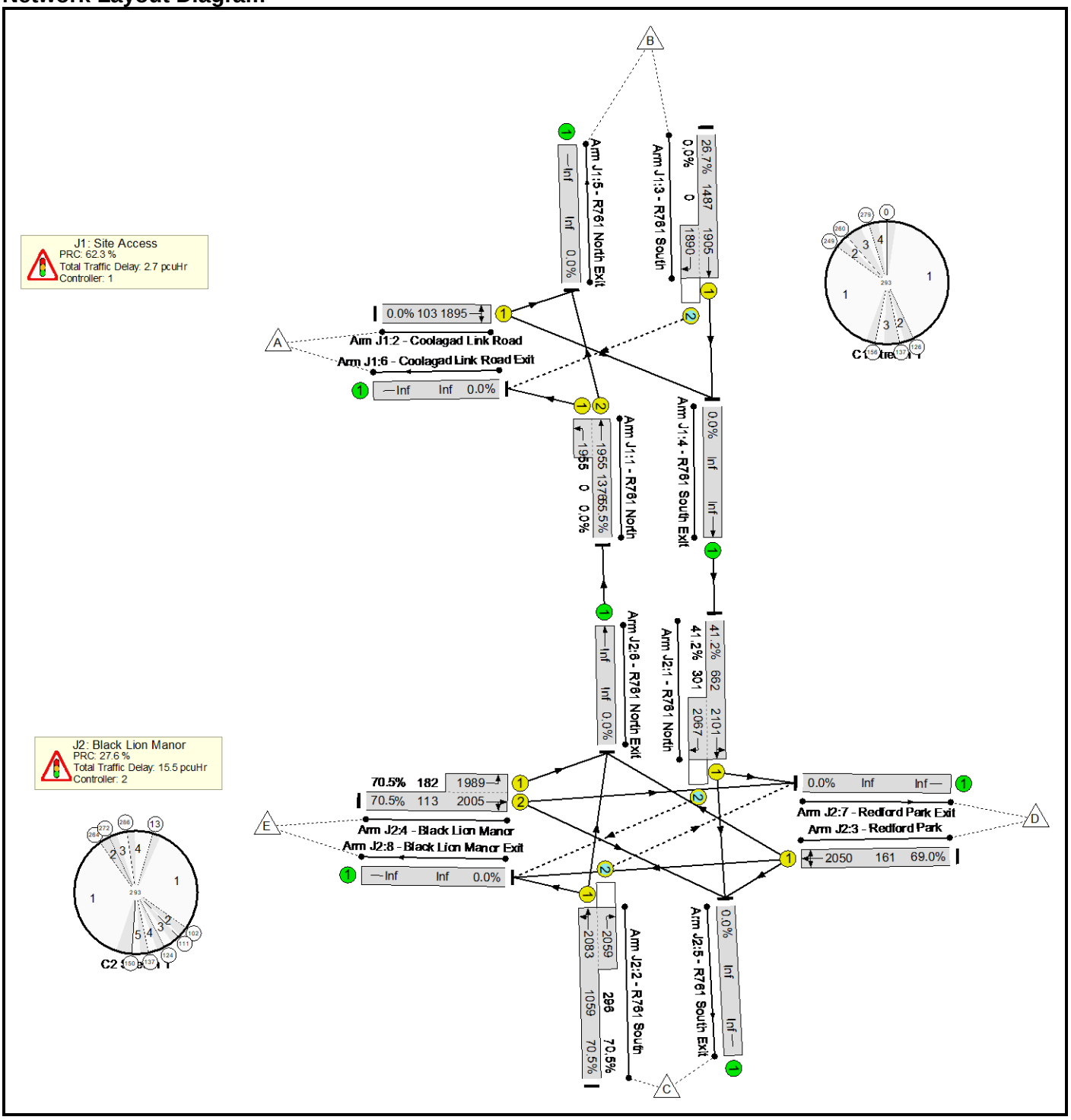
Item	Lane Description	Lane Type	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Mean Max Queue (pcu)
Network	-	-	-		-	-	-	-	-	-	**60.5%**	**324**	**0**	**0**	**15.0**	-	-
J1: Site Access	-	-	-		-	-	-	-	-	-	**54.9%**	**0**	**0**	**0**	**3.1**	-	-
1/2+1/1	R761 North Ahead Left	U	C1:A		2	205	-	418	1955:1955	1376+0	30.4 : 0.0%	-	-	-	1.0	8.9	5.2
2/1	Coolagad Link Road Right Left	U	C1:B		2	14	-	0	1895	103	0.0%	-	-	-	0.0	0.0	0.0
3/1+3/2	R761 South Ahead Right	U+O	C1:C	C1:E	2	227	8	816	1905:1890	1487+0	54.9 : 0.0%	0	0	0	2.1	9.1	16.0
J2: Black Lion Manor	-	-	-		-	-	-	-	-	-	**60.5%**	**324**	**0**	**0**	**11.9**	-	-
1/1+1/2	R761 North Ahead Left Right	U+O	C2:C C2:D		2	183:197	-	816	2101:2067	1068+281	60.5 : 60.5%	170	0	0	2.9	12.6	20.1
2/1+2/2	R761 South Ahead Right Left	U+O	C2:A C2:B		2	183:197	-	574	2083:2059	897+329	46.8 : 46.8%	154	0	0	3.2	20.3	10.7
3/1	Redford Park Left Right Ahead	U	C2:G		2	20	-	92	2050	154	59.8%	-	-	-	2.4	94.4	4.6
4/2+4/1	Black Lion Manor Right Left Ahead	U	C2:F C2:E		2	21:33	-	154	2005:1989	141+118	59.4 : 59.4%	-	-	-	3.4	79.9	4.4

C1	Stream: 1 PRC for Signalled Lanes (%):	64.0	Total Delay for Signalled Lanes (pcuHr):	3.10	Cycle Time (s): 293
C2	Stream: 1 PRC for Signalled Lanes (%):	48.7	Total Delay for Signalled Lanes (pcuHr):	11.93	Cycle Time (s): 293
	PRC Over All Lanes (%):	48.7	Total Delay Over All Lanes(pcuHr):	15.03	

Basic Results Summary

Scenario 5: 'AM 2024 Base' (FG5: 'AM 2024 Base', Plan 1: 'Network Control Plan 1')

Network Layout Diagram



Basic Results Summary

Network Results

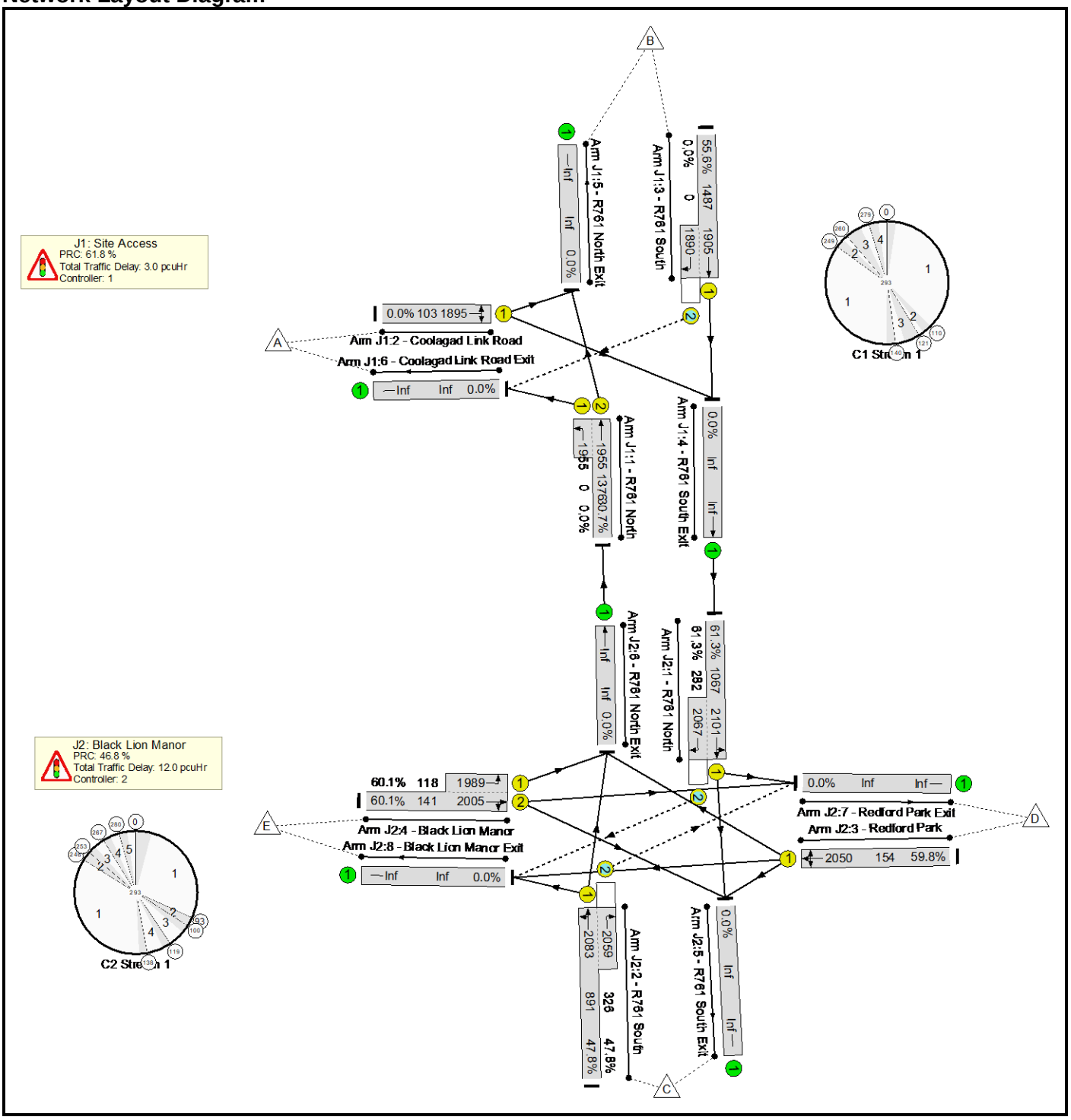
Item	Lane Description	Lane Type	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Mean Max Queue (pcu)
Network	-	-	-		-	-	-	-	-	-	**70.5%**	**333**	**0**	**0**	**18.1**	-	-
J1: Site Access	-	-	-		-	-	-	-	-	-	**55.5%**	**0**	**0**	**0**	**2.7**	-	-
1/2+1/1	R761 North Ahead Left	U	C1:A		2	205	-	763	1955:1955	1376+0	55.5 : 0.0%	-	-	-	2.0	9.4	16.9
2/1	Coolagad Link Road Right Left	U	C1:B		2	14	-	0	1895	103	0.0%	-	-	-	0.0	0.0	0.0
3/1+3/2	R761 South Ahead Right	U+O	C1:C	C1:E	2	227	8	397	1905:1890	1487+0	26.7 : 0.0%	0	0	0	0.7	6.3	5.6
J2: Black Lion Manor	-	-	-		-	-	-	-	-	-	**70.5%**	**333**	**0**	**0**	**15.5**	-	-
1/1+1/2	R761 North Ahead Left Right	U+O	C2:C C2:D		2	185:202	-	397	2101:2067	662+301	41.2 : 41.2%	124	0	0	1.9	17.2	4.2
2/1+2/2	R761 South Ahead Right Left	U+O	C2:A C2:B		2	185:202	-	956	2083:2059	1059+296	70.5 : 70.5%	209	0	0	5.5	20.7	27.7
3/1	Redford Park Left Right Ahead	U	C2:G		2	21	-	111	2050	161	69.0%	-	-	-	3.1	101.7	6.1
4/2+4/1	Black Lion Manor Right Left Ahead	U	C2:F C2:E		2	15:30	-	208	2005:1989	113+182	70.5 : 70.5%	-	-	-	4.9	85.3	7.1

C1	Stream: 1 PRC for Signalled Lanes (%):	62.3	Total Delay for Signalled Lanes (pcuHr):	2.69	Cycle Time (s): 293
C2	Stream: 1 PRC for Signalled Lanes (%):	27.6	Total Delay for Signalled Lanes (pcuHr):	15.45	Cycle Time (s): 293
	PRC Over All Lanes (%):	27.6	Total Delay Over All Lanes(pcuHr):	18.14	

Basic Results Summary

Scenario 6: 'PM 2024 Base' (FG6: 'PM 2024 Base', Plan 1: 'Network Control Plan 1')

Network Layout Diagram



Basic Results Summary

Network Results

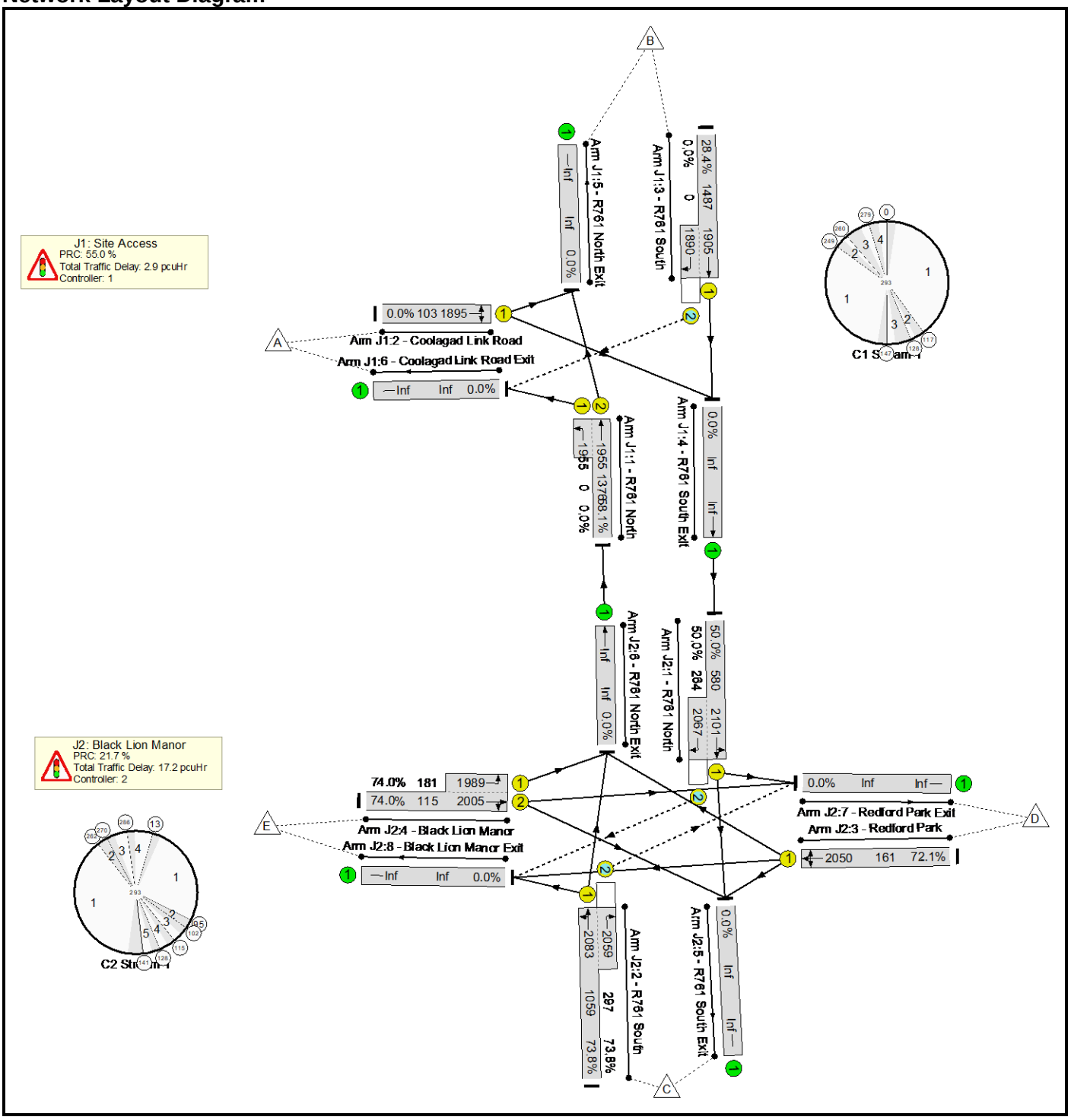
Item	Lane Description	Lane Type	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Mean Max Queue (pcu)
Network	-	-	-		-	-	-	-	-	-	**61.3%**	**329**	**0**	**0**	**15.0**	-	-
J1: Site Access	-	-	-		-	-	-	-	-	-	**55.6%**	**0**	**0**	**0**	**3.0**	-	-
1/2+1/1	R761 North Ahead Left	U	C1:A		2	205	-	423	1955:1955	1376+0	30.7 : 0.0%	-	-	-	0.9	7.6	4.6
2/1	Coolagad Link Road Right Left	U	C1:B		2	14	-	0	1895	103	0.0%	-	-	-	0.0	0.0	0.0
3/1+3/2	R761 South Ahead Right	U+O	C1:C	C1:E	2	227	8	827	1905:1890	1487+0	55.6 : 0.0%	0	0	0	2.1	9.2	16.5
J2: Black Lion Manor	-	-	-		-	-	-	-	-	-	**61.3%**	**329**	**0**	**0**	**12.0**	-	-
1/1+1/2	R761 North Ahead Left Right	U+O	C2:C C2:D		2	183:197	-	827	2101:2067	1067+282	61.3 : 61.3%	173	0	0	2.9	12.6	20.7
2/1+2/2	R761 South Ahead Right Left	U+O	C2:A C2:B		2	183:197	-	582	2083:2059	891+326	47.8 : 47.8%	156	0	0	3.3	20.3	10.9
3/1	Redford Park Left Right Ahead	U	C2:G		2	20	-	92	2050	154	59.8%	-	-	-	2.4	94.0	4.4
4/2+4/1	Black Lion Manor Right Left Ahead	U	C2:F C2:E		2	21:33	-	156	2005:1989	141+118	60.1 : 60.1%	-	-	-	3.4	79.4	4.2

C1	Stream: 1 PRC for Signalled Lanes (%):	61.8	Total Delay for Signalled Lanes (pcuHr):	3.01	Cycle Time (s): 293
C2	Stream: 1 PRC for Signalled Lanes (%):	46.8	Total Delay for Signalled Lanes (pcuHr):	12.02	Cycle Time (s): 293
	PRC Over All Lanes (%):	46.8	Total Delay Over All Lanes(pcuHr):	15.03	

Basic Results Summary

Scenario 7: 'AM 2028 Base' (FG7: 'AM 2028 Base', Plan 1: 'Network Control Plan 1')

Network Layout Diagram



Basic Results Summary

Network Results

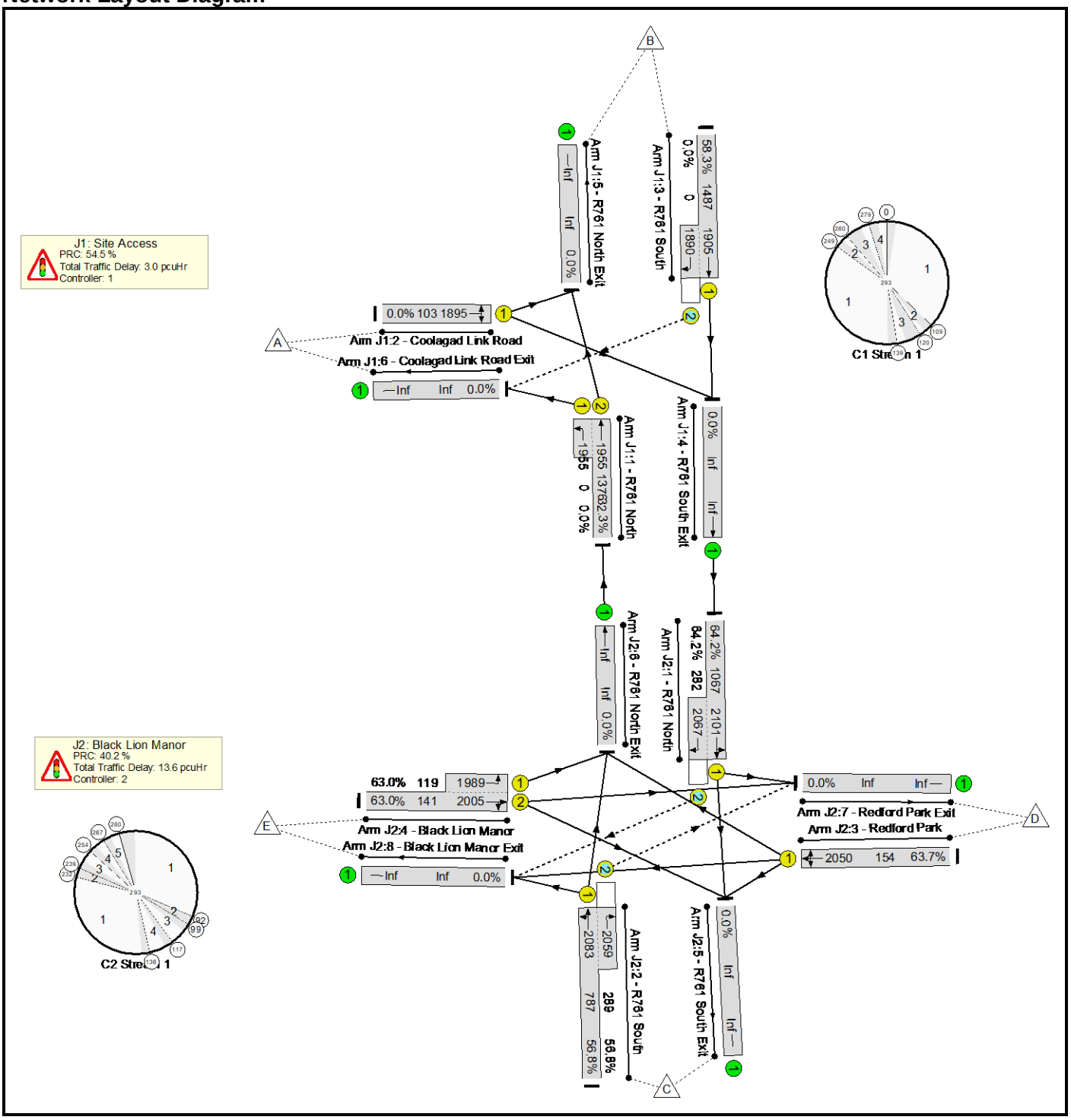
Item	Lane Description	Lane Type	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Mean Max Queue (pcu)
Network	-	-	-		-	-	-	-	-	-	**74.0%**	**351**	**0**	**0**	**20.2**	-	-
J1: Site Access	-	-	-		-	-	-	-	-	-	**58.1%**	**0**	**0**	**0**	**2.9**	-	-
1/2+1/1	R761 North Ahead Left	U	C1:A		2	205	-	799	1955:1955	1376+0	58.1 : 0.0%	-	-	-	2.2	9.8	19.0
2/1	Coolagad Link Road Right Left	U	C1:B		2	14	-	0	1895	103	0.0%	-	-	-	0.0	0.0	0.0
3/1+3/2	R761 South Ahead Right	U+O	C1:C	C1:E	2	227	8	422	1905:1890	1487+0	28.4 : 0.0%	0	0	0	0.8	6.4	6.1
J2: Black Lion Manor	-	-	-		-	-	-	-	-	-	**74.0%**	**351**	**0**	**0**	**17.2**	-	-
1/1+1/2	R761 North Ahead Left Right	U+O	C2:C C2:D		2	185:200	-	422	2101:2067	580+264	50.0 : 50.0%	132	0	0	2.3	19.7	4.8
2/1+2/2	R761 South Ahead Right Left	U+O	C2:A C2:B		2	185:200	-	1001	2083:2059	1059+297	73.8 : 73.8%	219	0	0	6.1	21.9	29.2
3/1	Redford Park Left Right Ahead	U	C2:G		2	21	-	116	2050	161	72.1%	-	-	-	3.4	106.8	6.8
4/2+4/1	Black Lion Manor Right Left Ahead	U	C2:F C2:E		2	17:30	-	219	2005:1989	115+181	74.0 : 74.0%	-	-	-	5.4	88.5	8.2

C1	Stream: 1 PRC for Signalled Lanes (%):	55.0	Total Delay for Signalled Lanes (pcuHr):	2.93	Cycle Time (s): 293
C2	Stream: 1 PRC for Signalled Lanes (%):	21.7	Total Delay for Signalled Lanes (pcuHr):	17.22	Cycle Time (s): 293
	PRC Over All Lanes (%):	21.7	Total Delay Over All Lanes(pcuHr):	20.15	

Basic Results Summary

Scenario 8: 'PM 2028 Base' (FG8: 'PM 2028 Base', Plan 1: 'Network Control Plan 1')

Network Layout Diagram



Basic Results Summary

Network Results

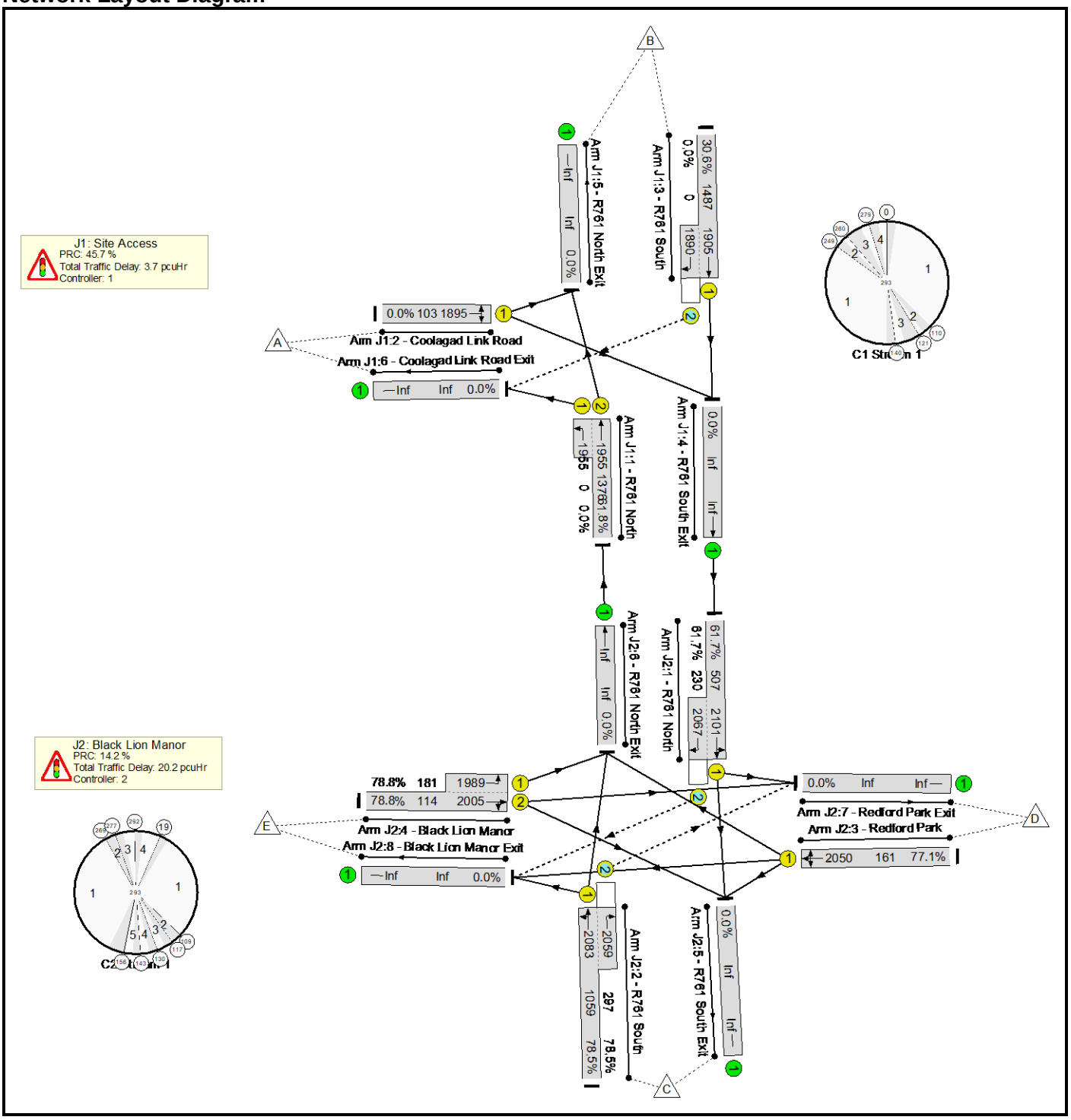
Item	Lane Description	Lane Type	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Mean Max Queue (pcu)
Network	**-**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**64.2%**	**345**	**0**	**0**	**16.6**	**-**	**-**
J1: Site Access	**-**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**58.3%**	**0**	**0**	**0**	**3.0**	**-**	**-**
1/2+1/1	R761 North Ahead Left	U	C1:A		2	205	-	445	1955:1955	1376+0	32.3 : 0.0%	-	-	-	0.7	5.3	8.2
2/1	Coolagad Link Road Right Left	U	C1:B		2	14	-	0	1895	103	0.0%	-	-	-	0.0	0.0	0.0
3/1+3/2	R761 South Ahead Right	U+O	C1:C	C1:E	2	227	8	866	1905:1890	1487+0	58.3 : 0.0%	0	0	0	2.3	9.7	17.8
J2: Black Lion Manor	**-**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**64.2%**	**345**	**0**	**0**	**13.6**	**-**	**-**
1/1+1/2	R761 North Ahead Left Right	U+O	C2:C C2:D		2	183:197	-	866	2101:2067	1067+282	64.2 : 64.2%	181	0	0	3.4	14.2	12.9
2/1+2/2	R761 South Ahead Right Left	U+O	C2:A C2:B		2	183:197	-	611	2083:2059	787+289	56.8 : 56.8%	164	0	0	3.9	22.7	12.2
3/1	Redford Park Left Right Ahead	U	C2:G		2	20	-	98	2050	154	63.7%	-	-	-	2.7	97.6	5.1
4/2+4/1	Black Lion Manor Right Left Ahead	U	C2:F C2:E		2	21:33	-	164	2005:1989	141+119	63.0 : 63.0%	-	-	-	3.7	80.9	4.5

C1	Stream: 1 PRC for Signalled Lanes (%):	54.5	Total Delay for Signalled Lanes (pcuHr):	2.98	Cycle Time (s): 293
C2	Stream: 1 PRC for Signalled Lanes (%):	40.2	Total Delay for Signalled Lanes (pcuHr):	13.61	Cycle Time (s): 293
	PRC Over All Lanes (%):	40.2	Total Delay Over All Lanes(pcuHr):	16.59	

Basic Results Summary

Scenario 9: 'AM 2038 Base' (FG9: 'AM 2038 Base', Plan 1: 'Network Control Plan 1')

Network Layout Diagram



Basic Results Summary

Network Results

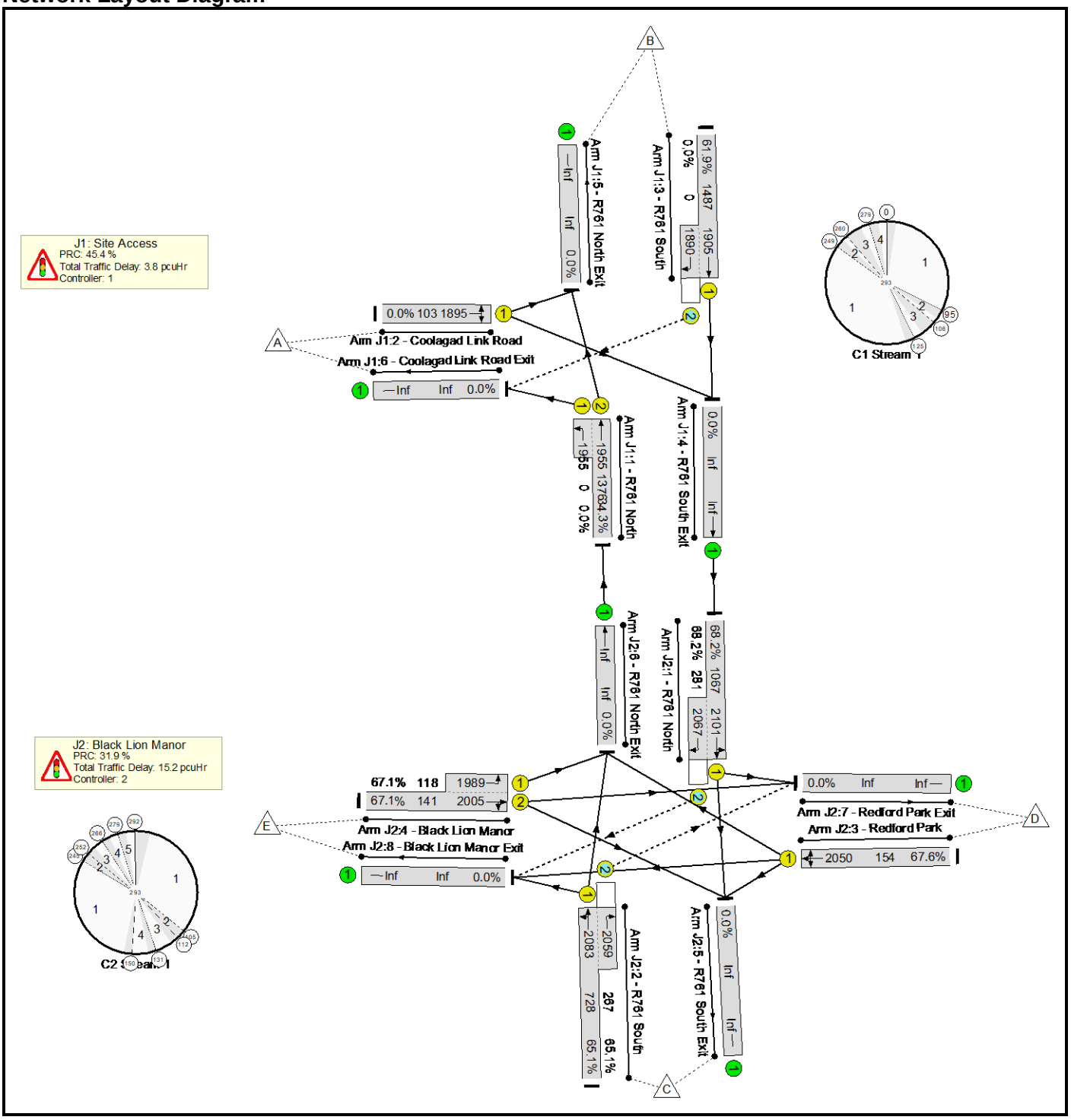
Item	Lane Description	Lane Type	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Mean Max Queue (pcu)
Network	-	-	-		-	-	-	-	-	-	**78.8%**	**375**	**0**	**0**	**23.8**	-	-
J1: Site Access	-	-	-		-	-	-	-	-	-	**61.8%**	**0**	**0**	**0**	**3.7**	-	-
1/2+1/1	R761 North Ahead Left	U	C1:A		2	205	-	850	1955:1955	1376+0	61.8 : 0.0%	-	-	-	2.8	12.1	17.5
2/1	Coolagad Link Road Right Left	U	C1:B		2	14	-	0	1895	103	0.0%	-	-	-	0.0	0.0	0.0
3/1+3/2	R761 South Ahead Right	U+O	C1:C	C1:E	2	227	8	455	1905:1890	1487+0	30.6 : 0.0%	0	0	0	0.8	6.6	6.7
J2: Black Lion Manor	-	-	-		-	-	-	-	-	-	**78.8%**	**375**	**0**	**0**	**20.2**	-	-
1/1+1/2	R761 North Ahead Left Right	U+O	C2:C C2:D		2	185:201	-	455	2101:2067	507+230	61.7 : 61.7%	142	0	0	3.2	25.0	7.3
2/1+2/2	R761 South Ahead Right Left	U+O	C2:A C2:B		2	185:201	-	1064	2083:2059	1059+297	78.5 : 78.5%	233	0	0	7.1	24.1	34.1
3/1	Redford Park Left Right Ahead	U	C2:G		2	21	-	124	2050	161	77.1%	-	-	-	3.9	112.5	7.2
4/2+4/1	Black Lion Manor Right Left Ahead	U	C2:F C2:E		2	16:30	-	233	2005:1989	114+181	78.8 : 78.8%	-	-	-	6.0	92.6	8.8

C1	Stream: 1 PRC for Signalled Lanes (%):	45.7	Total Delay for Signalled Lanes (pcuHr):	3.68	Cycle Time (s): 293
C2	Stream: 1 PRC for Signalled Lanes (%):	14.2	Total Delay for Signalled Lanes (pcuHr):	20.15	Cycle Time (s): 293
	PRC Over All Lanes (%):	14.2	Total Delay Over All Lanes(pcuHr):	23.83	

Basic Results Summary

Scenario 10: 'PM 2038 Base' (FG10: 'PM 2038 Base', Plan 1: 'Network Control Plan 1')

Network Layout Diagram



Basic Results Summary

Network Results

Item	Lane Description	Lane Type	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Mean Max Queue (pcu)
Network	-	-	-		-	-	-	-	-	-	**68.2%**	**366**	**0**	**0**	**19.0**	-	-
J1: Site Access	-	-	-		-	-	-	-	-	-	**61.9%**	**0**	**0**	**0**	**3.8**	-	-
1/2+1/1	R761 North Ahead Left	U	C1:A		2	205	-	472	1955:1955	1376+0	34.3 : 0.0%	-	-	-	1.2	9.0	5.3
2/1	Coolagad Link Road Right Left	U	C1:B		2	14	-	0	1895	103	0.0%	-	-	-	0.0	0.0	0.0
3/1+3/2	R761 South Ahead Right	U+O	C1:C	C1:E	2	227	8	920	1905:1890	1487+0	61.9 : 0.0%	0	0	0	2.6	10.3	20.0
J2: Black Lion Manor	-	-	-		-	-	-	-	-	-	**68.2%**	**366**	**0**	**0**	**15.2**	-	-
1/1+1/2	R761 North Ahead Left Right	U+O	C2:C C2:D		2	183:197	-	920	2101:2067	1067+281	68.2 : 68.2%	192	0	0	3.6	14.0	25.1
2/1+2/2	R761 South Ahead Right Left	U+O	C2:A C2:B		2	183:197	-	648	2083:2059	728+267	65.1 : 65.1%	174	0	0	4.6	25.7	13.5
3/1	Redford Park Left Right Ahead	U	C2:G		2	20	-	104	2050	154	67.6%	-	-	-	2.9	101.4	5.6
4/2+4/1	Black Lion Manor Right Left Ahead	U	C2:F C2:E		2	21:33	-	174	2005:1989	141+118	67.1 : 67.1%	-	-	-	4.0	83.5	5.0

C1	Stream: 1 PRC for Signalled Lanes (%):	45.4	Total Delay for Signalled Lanes (pcuHr):	3.82	Cycle Time (s): 293
C2	Stream: 1 PRC for Signalled Lanes (%):	31.9	Total Delay for Signalled Lanes (pcuHr):	15.16	Cycle Time (s): 293
	PRC Over All Lanes (%):	31.9	Total Delay Over All Lanes(pcuHr):	18.98	

Basic Results Summary

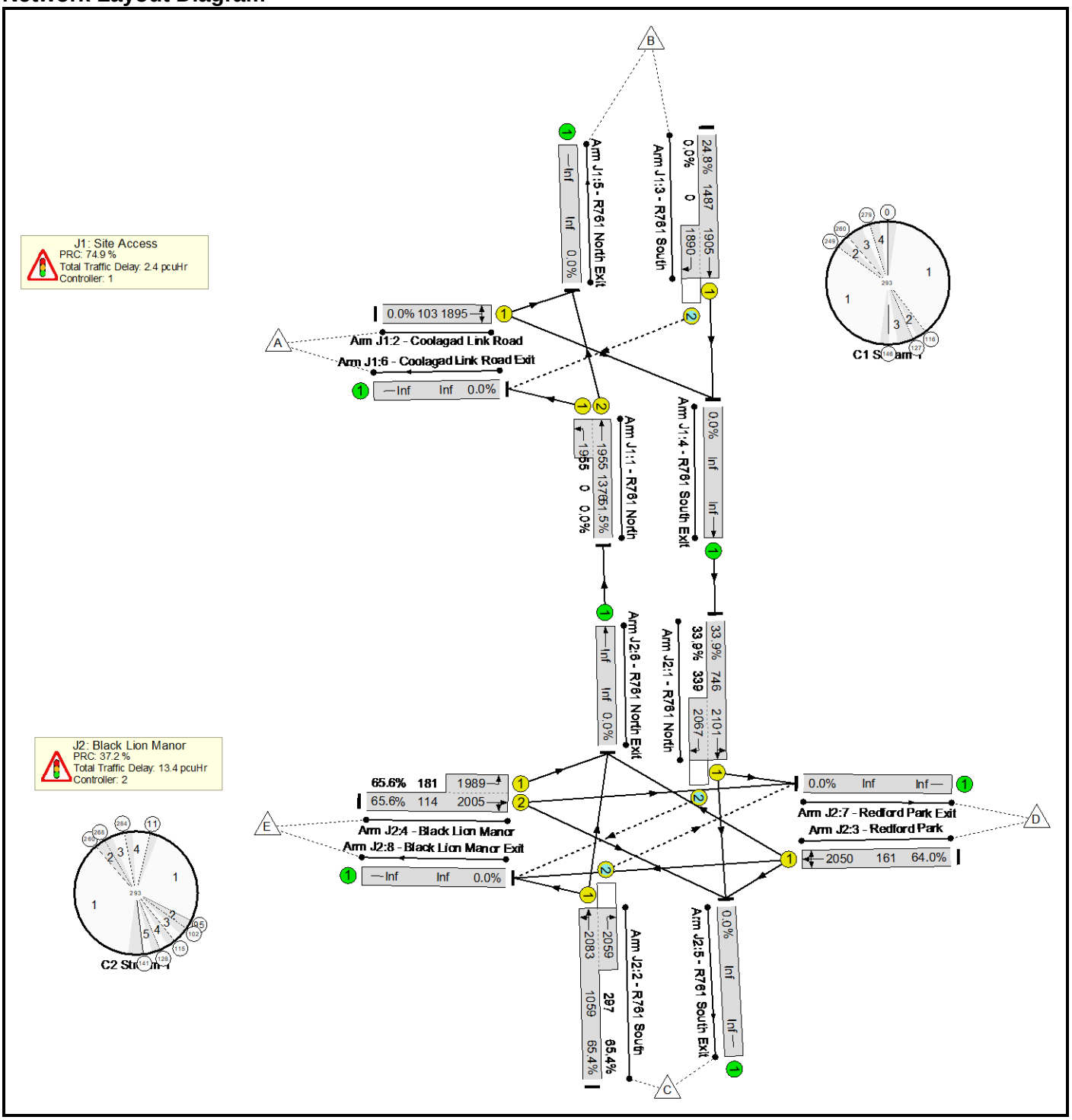
User and Project Details

Project:	
Title: **Location:** **Additional detail:** **File name:** **Author:**	Linsig Network Black Lion Manor and Site Access Rev 4D Full Dev.lsg3x
Company: **Address:**	

Basic Results Summary

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

Network Layout Diagram



Basic Results Summary

Network Results

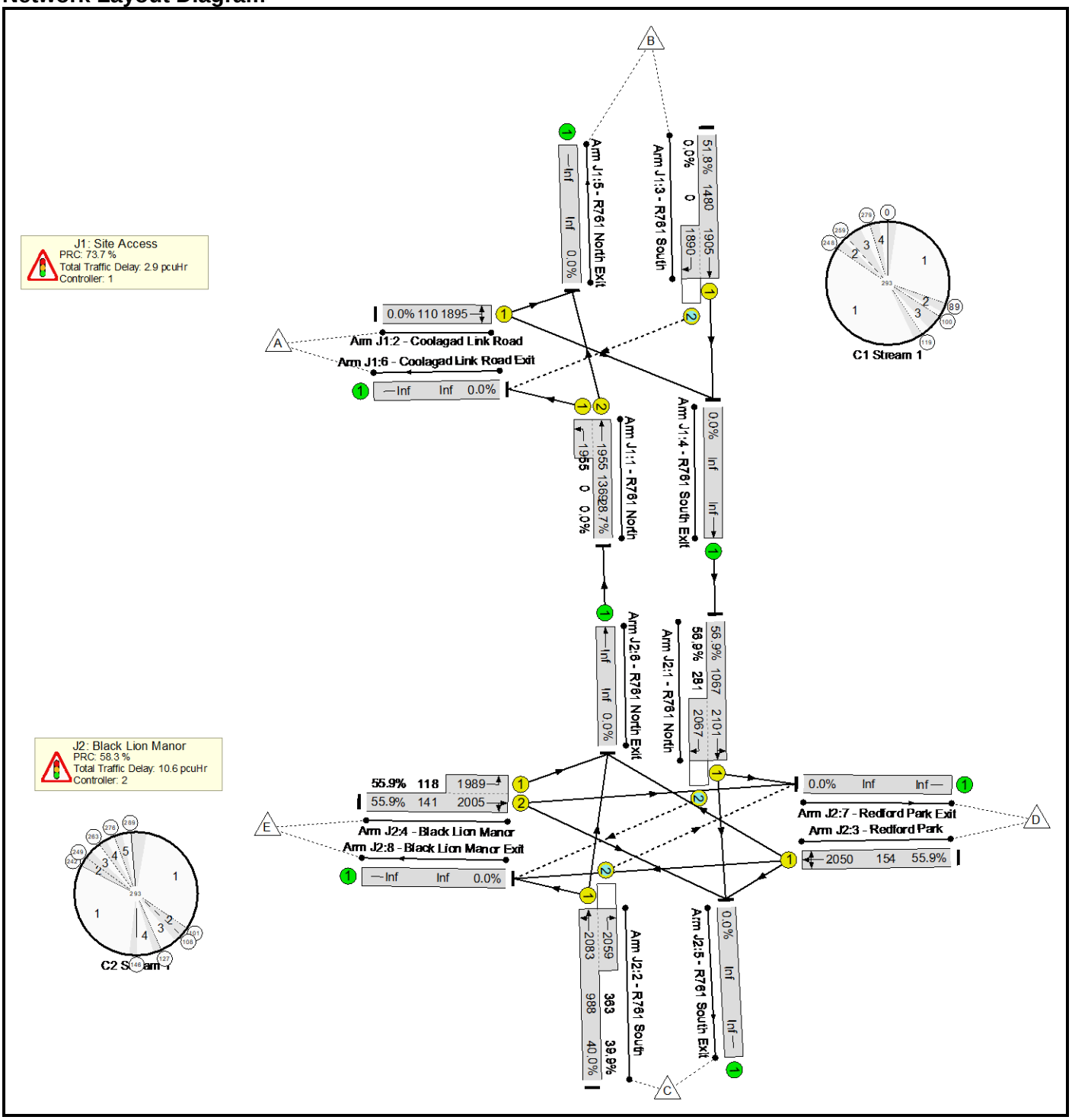
Item	Lane Description	Lane Type	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Mean Max Queue (pcu)
Network	-	-	-		-	-	-	-	-	-	**65.6%**	**309**	**0**	**0**	**15.9**	-	-
J1: Site Access	-	-	-		-	-	-	-	-	-	**51.5%**	**0**	**0**	**0**	**2.4**	-	-
1/2+1/1	R761 North Ahead Left	U	C1:A		2	205	-	708	1955:1955	1376+0	51.5 : 0.0%	-	-	-	1.8	9.1	15.7
2/1	Coolagad Link Road Right Left	U	C1:B		2	14	-	0	1895	103	0.0%	-	-	-	0.0	0.0	0.0
3/1+3/2	R761 South Ahead Right	U+O	C1:C	C1:E	2	227	8	368	1905:1890	1487+0	24.8 : 0.0%	0	0	0	0.6	6.2	5.1
J2: Black Lion Manor	-	-	-		-	-	-	-	-	-	**65.6%**	**309**	**0**	**0**	**13.4**	-	-
1/1+1/2	R761 North Ahead Left Right	U+O	C2:C C2:D		2	185:200	-	368	2101:2067	746+339	33.9 : 33.9%	115	0	0	1.5	14.6	3.4
2/1+2/2	R761 South Ahead Right Left	U+O	C2:A C2:B		2	185:200	-	887	2083:2059	1059+297	65.4 : 65.4%	194	0	0	4.7	19.0	22.9
3/1	Redford Park Left Right Ahead	U	C2:G		2	21	-	103	2050	161	64.0%	-	-	-	2.8	98.1	5.7
4/2+4/1	Black Lion Manor Right Left Ahead	U	C2:F C2:E		2	17:30	-	194	2005:1989	114+181	65.6 : 65.6%	-	-	-	4.5	82.6	6.4

C1	Stream: 1 PRC for Signalled Lanes (%):	74.9	Total Delay for Signalled Lanes (pcuHr):	2.43	Cycle Time (s): 293
C2	Stream: 1 PRC for Signalled Lanes (%):	37.2	Total Delay for Signalled Lanes (pcuHr):	13.44	Cycle Time (s): 293
	PRC Over All Lanes (%):	37.2	Total Delay Over All Lanes(pcuHr):	15.86	

Basic Results Summary

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

Network Layout Diagram



Basic Results Summary

Network Results

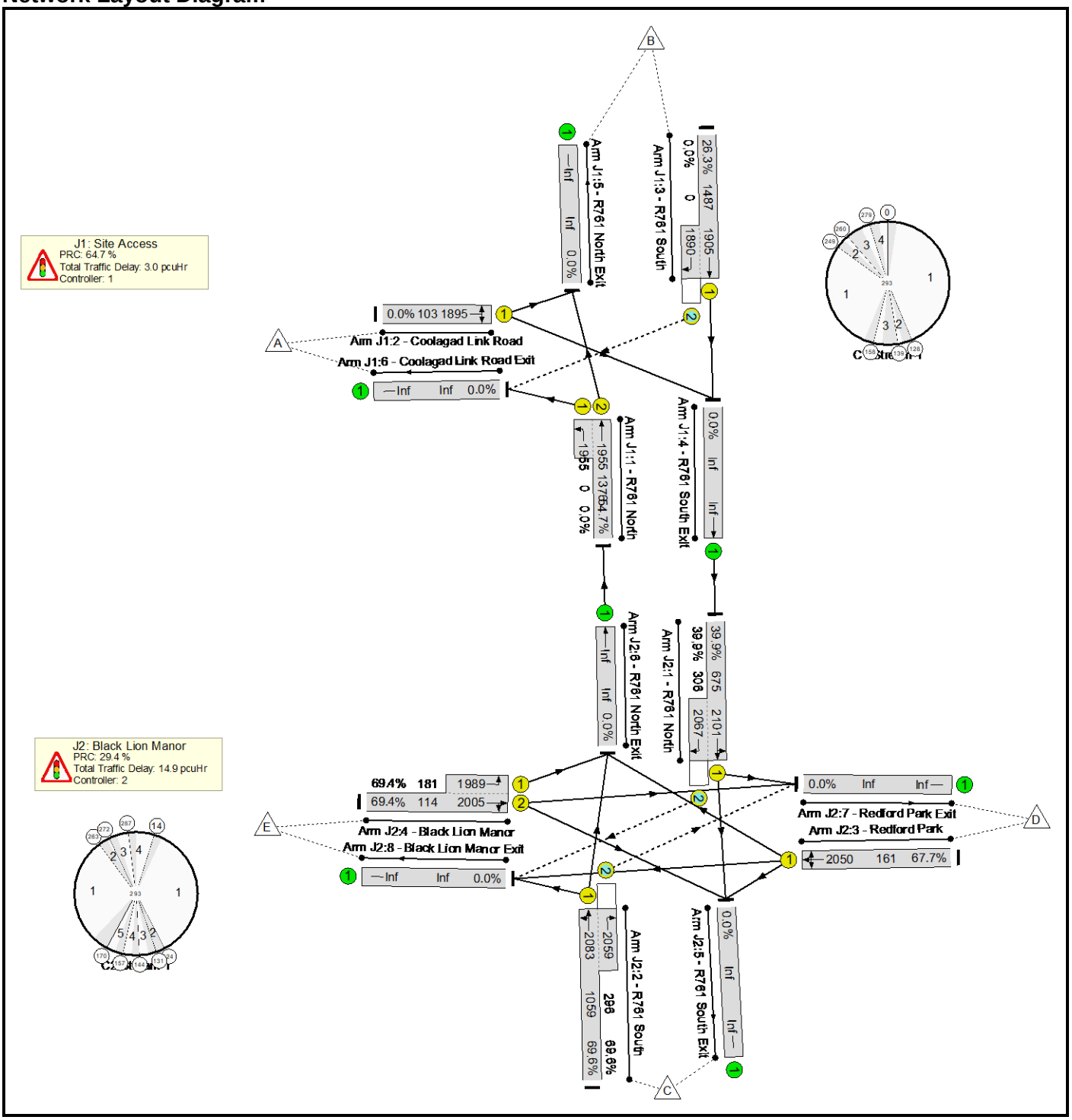
Item	Lane Description	Lane Type	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Mean Max Queue (pcu)
Network	**-**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**56.9%**	**305**	**0**	**0**	**13.5**	**-**	**-**
J1: Site Access	**-**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**51.8%**	**0**	**0**	**0**	**2.9**	**-**	**-**
1/2+1/1	R761 North Ahead Left	U	C1:A		2	204	-	393	1955:1955	1369+0	28.7 : 0.0%	-	-	-	1.0	8.9	4.5
2/1	Coolagad Link Road Right Left	U	C1:B		2	15	-	0	1895	110	0.0%	-	-	-	0.0	0.0	0.0
3/1+3/2	R761 South Ahead Right	U+O	C1:C	C1:E	2	226	8	767	1905:1890	1480+0	51.8 : 0.0%	0	0	0	1.9	8.9	14.8
J2: Black Lion Manor	**-**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**56.9%**	**305**	**0**	**0**	**10.6**	**-**	**-**
1/1+1/2	R761 North Ahead Left Right	U+O	C2:C C2:D		2	183:197	-	767	2101:2067	1067+281	56.9 : 56.9%	160	0	0	2.5	11.8	15.3
2/1+2/2	R761 South Ahead Right Left	U+O	C2:A C2:B		2	183:197	-	540	2083:2059	988+363	40.0 : 39.9%	145	0	0	2.8	18.7	9.6
3/1	Redford Park Left Right Ahead	U	C2:G		2	20	-	86	2050	154	55.9%	-	-	-	2.2	92.1	4.3
4/2+4/1	Black Lion Manor Right Left Ahead	U	C2:F C2:E		2	21:33	-	145	2005:1989	141+118	55.9 : 55.9%	-	-	-	3.1	77.8	3.9

C1	Stream: 1 PRC for Signalled Lanes (%):	73.7	Total Delay for Signalled Lanes (pcuHr):	2.87	Cycle Time (s): 293
C2	Stream: 1 PRC for Signalled Lanes (%):	58.3	Total Delay for Signalled Lanes (pcuHr):	10.65	Cycle Time (s): 293
	PRC Over All Lanes (%):	58.3	Total Delay Over All Lanes(pcuHr):	13.52	

Basic Results Summary

Scenario 3: 'AM 2023 Base' (FG3: 'AM 2023 Base', Plan 1: 'Network Control Plan 1')

Network Layout Diagram



Basic Results Summary

Network Results

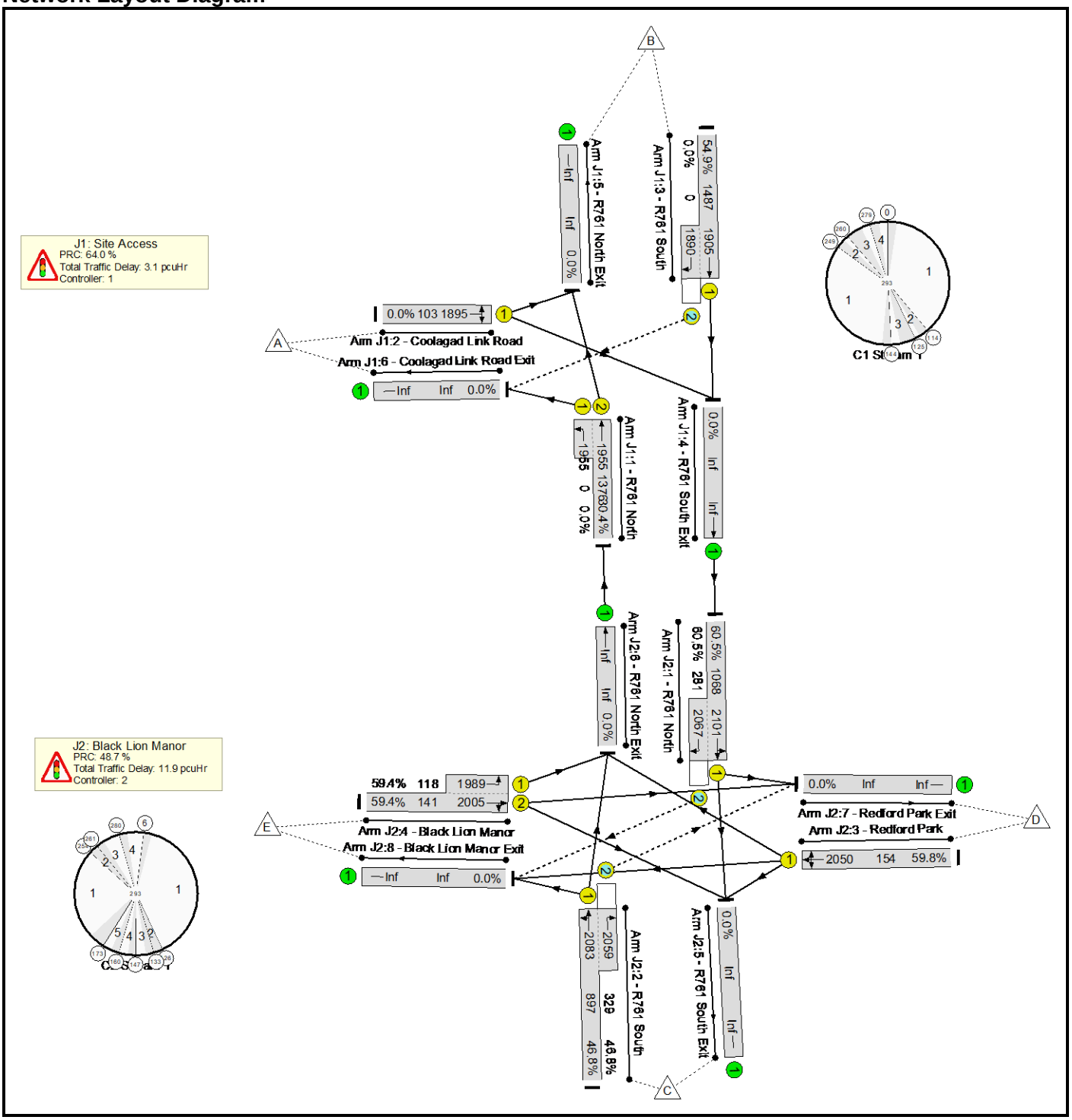
Item	Lane Description	Lane Type	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Mean Max Queue (pcu)
Network	-	-	-		-	-	-	-	-	-	**69.6%**	**328**	**0**	**0**	**17.9**	-	-
J1: Site Access	-	-	-		-	-	-	-	-	-	**54.7%**	**0**	**0**	**0**	**3.0**	-	-
1/2+1/1	R761 North Ahead Left	U	C1:A		2	205	-	752	1955:1955	1376+0	54.7 : 0.0%	-	-	-	2.3	11.1	10.8
2/1	Coolagad Link Road Right Left	U	C1:B		2	14	-	0	1895	103	0.0%	-	-	-	0.0	0.0	0.0
3/1+3/2	R761 South Ahead Right	U+O	C1:C	C1:E	2	227	8	391	1905:1890	1487+0	26.3 : 0.0%	0	0	0	0.7	6.3	5.5
J2: Black Lion Manor	-	-	-		-	-	-	-	-	-	**69.6%**	**328**	**0**	**0**	**14.9**	-	-
1/1+1/2	R761 North Ahead Left Right	U+O	C2:C C2:D		2	185:201	-	391	2101:2067	675+306	39.9 : 39.9%	122	0	0	1.8	16.3	5.2
2/1+2/2	R761 South Ahead Right Left	U+O	C2:A C2:B		2	185:201	-	943	2083:2059	1059+296	69.6 : 69.6%	206	0	0	5.3	20.3	25.9
3/1	Redford Park Left Right Ahead	U	C2:G		2	21	-	109	2050	161	67.7%	-	-	-	3.0	99.1	5.3
4/2+4/1	Black Lion Manor Right Left Ahead	U	C2:F C2:E		2	16:30	-	205	2005:1989	114+181	69.4 : 69.4%	-	-	-	4.8	83.6	6.3

C1	Stream: 1 PRC for Signalled Lanes (%):	64.7	Total Delay for Signalled Lanes (pcuHr):	3.00	Cycle Time (s): 293
C2	Stream: 1 PRC for Signalled Lanes (%):	29.4	Total Delay for Signalled Lanes (pcuHr):	14.85	Cycle Time (s): 293
	PRC Over All Lanes (%):	29.4	Total Delay Over All Lanes(pcuHr):	17.85	

Basic Results Summary

Scenario 4: 'PM 2023 Base' (FG4: 'PM 2023 Base', Plan 1: 'Network Control Plan 1')

Network Layout Diagram



Basic Results Summary

Network Results

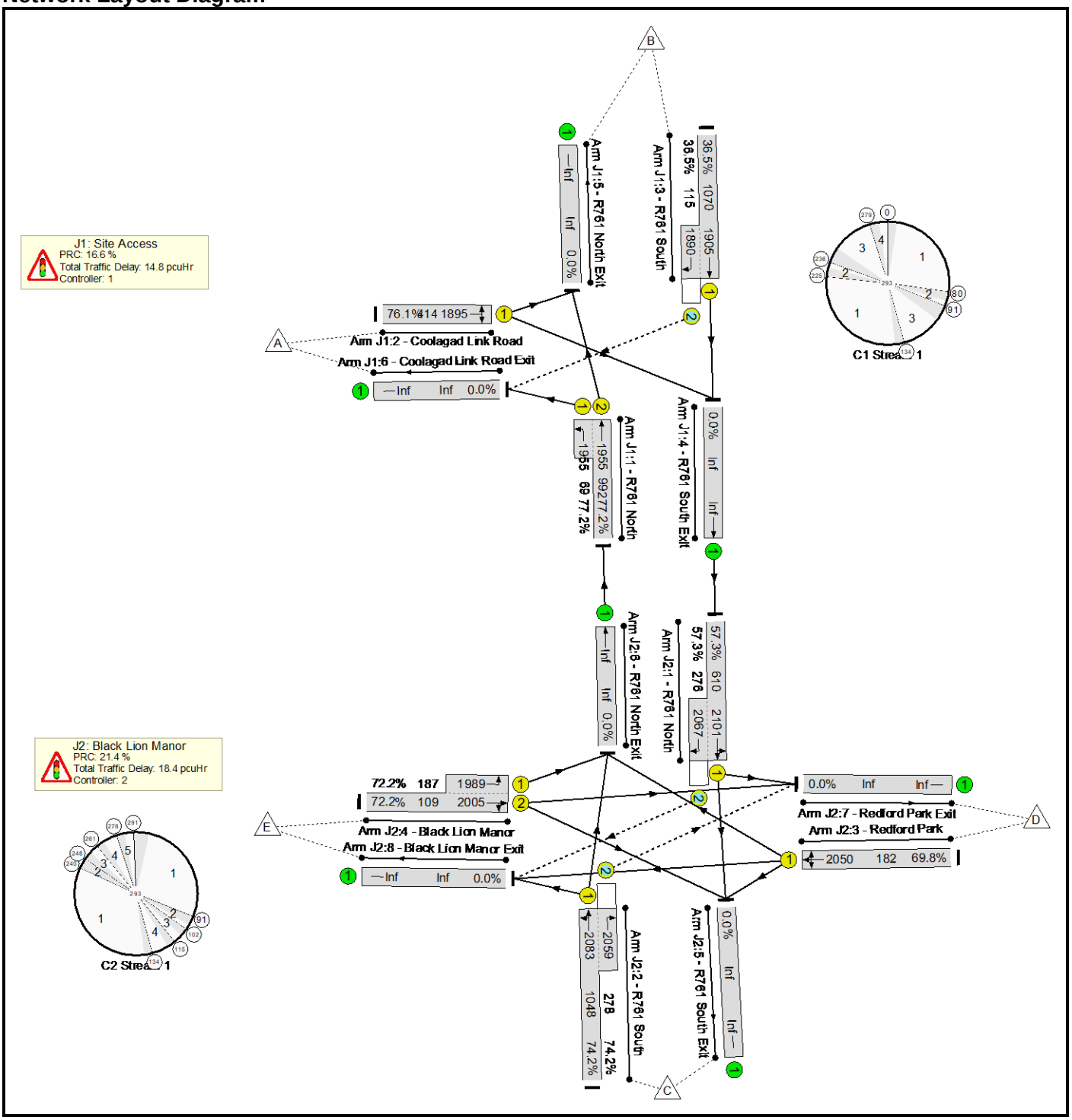
Item	Lane Description	Lane Type	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Mean Max Queue (pcu)
Network	-	-	-		-	-	-	-	-	-	**60.5%**	**324**	**0**	**0**	**15.0**	-	-
J1: Site Access	-	-	-		-	-	-	-	-	-	**54.9%**	**0**	**0**	**0**	**3.1**	-	-
1/2+1/1	R761 North Ahead Left	U	C1:A		2	205	-	418	1955:1955	1376+0	30.4 : 0.0%	-	-	-	1.0	8.9	5.2
2/1	Coolagad Link Road Right Left	U	C1:B		2	14	-	0	1895	103	0.0%	-	-	-	0.0	0.0	0.0
3/1+3/2	R761 South Ahead Right	U+O	C1:C	C1:E	2	227	8	816	1905:1890	1487+0	54.9 : 0.0%	0	0	0	2.1	9.1	16.0
J2: Black Lion Manor	-	-	-		-	-	-	-	-	-	**60.5%**	**324**	**0**	**0**	**11.9**	-	-
1/1+1/2	R761 North Ahead Left Right	U+O	C2:C C2:D		2	183:197	-	816	2101:2067	1068+281	60.5 : 60.5%	170	0	0	2.9	12.6	20.1
2/1+2/2	R761 South Ahead Right Left	U+O	C2:A C2:B		2	183:197	-	574	2083:2059	897+329	46.8 : 46.8%	154	0	0	3.2	20.3	10.7
3/1	Redford Park Left Right Ahead	U	C2:G		2	20	-	92	2050	154	59.8%	-	-	-	2.4	94.4	4.6
4/2+4/1	Black Lion Manor Right Left Ahead	U	C2:F C2:E		2	21:33	-	154	2005:1989	141+118	59.4 : 59.4%	-	-	-	3.4	79.9	4.4

C1	Stream: 1 PRC for Signalled Lanes (%):	64.0	Total Delay for Signalled Lanes (pcuHr):	3.10	Cycle Time (s): 293
C2	Stream: 1 PRC for Signalled Lanes (%):	48.7	Total Delay for Signalled Lanes (pcuHr):	11.93	Cycle Time (s): 293
	PRC Over All Lanes (%):	48.7	Total Delay Over All Lanes(pcuHr):	15.03	

Basic Results Summary

Scenario 5: 'AM 2023 + Dev' (FG5: 'AM 2023 + Dev', Plan 1: 'Network Control Plan 1')

Network Layout Diagram



Basic Results Summary

Network Results

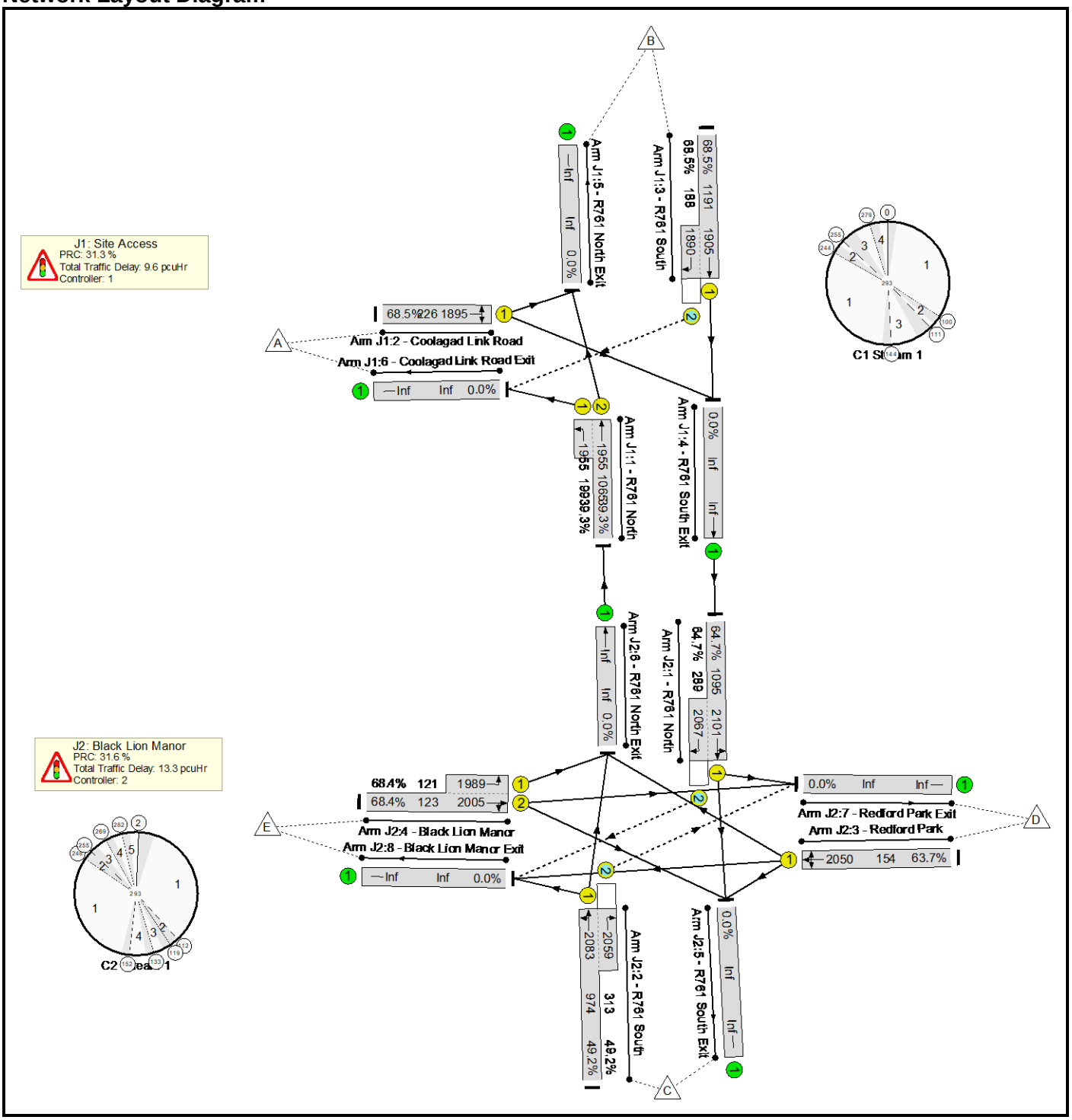
Item	Lane Description	Lane Type	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Mean Max Queue (pcu)
Network	-	-	-		-	-	-	-	-	-	**77.2%**	**403**	**3**	**1**	**33.3**	-	-
J1: Site Access	-	-	-		-	-	-	-	-	-	**77.2%**	**39**	**3**	**1**	**14.8**	-	-
1/2+1/1	R761 North Ahead Left	U	C1:A		2	157	-	819	1955:1955	992+69	77.2 : 77.2%	-	-	-	6.3	27.7	28.8
2/1	Coolagad Link Road Right Left	U	C1:B		2	62	-	315	1895	414	76.1%	-	-	-	6.2	71.3	13.7
3/1+3/2	R761 South Ahead Right	U+O	C1:C	C1:E	2	179	8	433	1905:1890	1070+115	36.5 : 36.5%	39	3	1	2.3	19.2	9.4
J2: Black Lion Manor	-	-	-		-	-	-	-	-	-	**74.2%**	**364**	**0**	**0**	**18.4**	-	-
1/1+1/2	R761 North Ahead Left Right	U+O	C2:C C2:D		2	181:200	-	508	2101:2067	610+276	57.3 : 57.3%	158	0	0	3.5	24.6	5.0
2/1+2/2	R761 South Ahead Right Left	U+O	C2:A C2:B		2	181:200	-	983	2083:2059	1048+278	74.2 : 74.2%	206	0	0	6.5	23.7	31.0
3/1	Redford Park Left Right Ahead	U	C2:G		2	24	-	127	2050	182	69.8%	-	-	-	3.4	96.4	6.2
4/2+4/1	Black Lion Manor Right Left Ahead	U	C2:F C2:E		2	14:31	-	214	2005:1989	109+187	72.2 : 72.2%	-	-	-	5.1	85.4	6.7

C1	Stream: 1 PRC for Signalled Lanes (%):	16.6	Total Delay for Signalled Lanes (pcuHr):	14.85	Cycle Time (s): 293
C2	Stream: 1 PRC for Signalled Lanes (%):	21.4	Total Delay for Signalled Lanes (pcuHr):	18.42	Cycle Time (s): 293
	PRC Over All Lanes (%):	16.6	Total Delay Over All Lanes(pcuHr):	33.27	

Basic Results Summary

Scenario 6: 'PM 2023 + Dev' (FG6: 'PM 2023 + Dev', Plan 1: 'Network Control Plan 1')

Network Layout Diagram



Basic Results Summary

Network Results

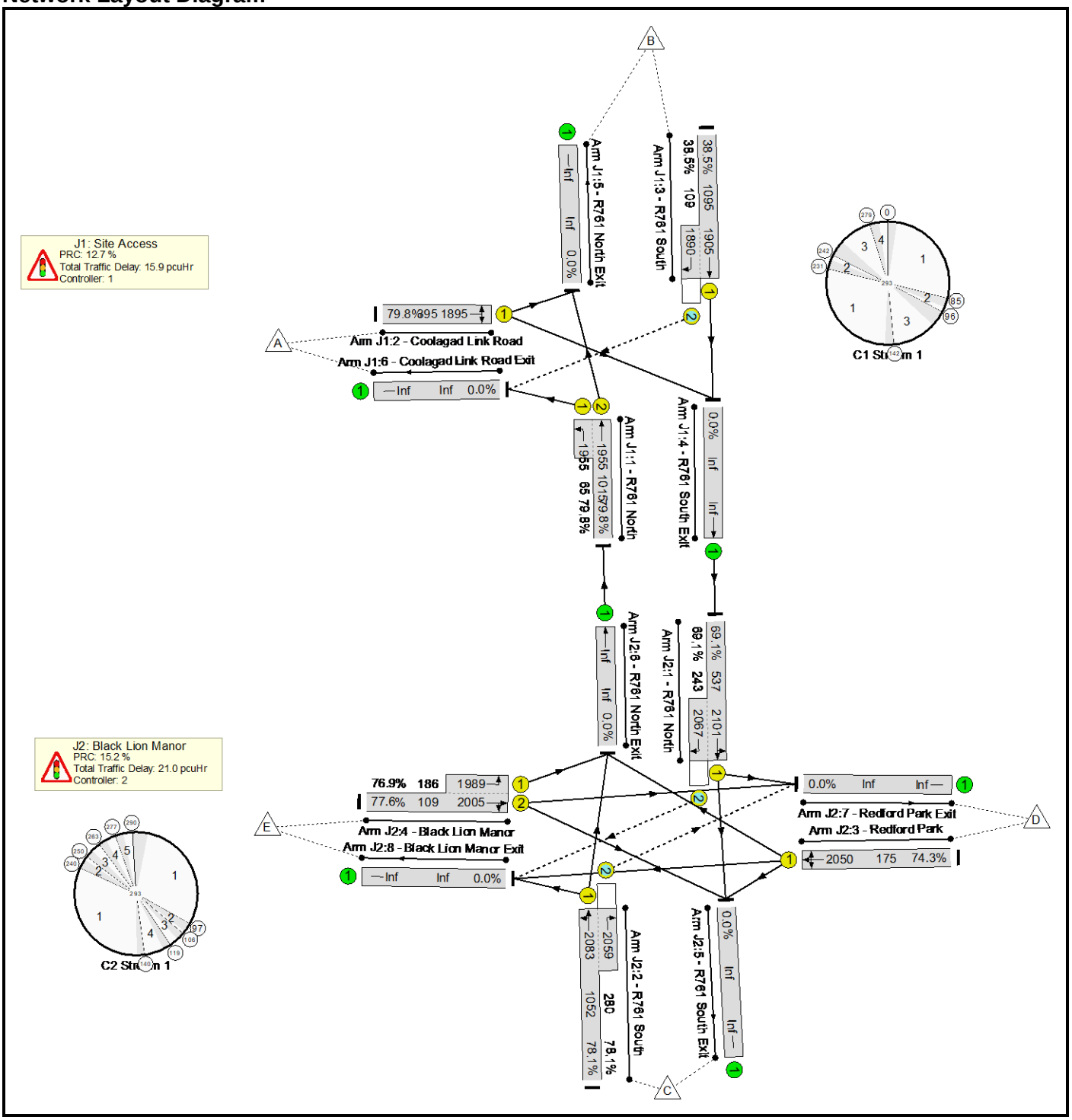
Item	Lane Description	Lane Type	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Mean Max Queue (pcu)
Network	-	-	-		-	-	-	-	-	-	**68.5%**	**460**	**8**	**2**	**22.9**	-	-
J1: Site Access	-	-	-		-	-	-	-	-	-	**68.5%**	**119**	**8**	**2**	**9.6**	-	-
1/2+1/1	R761 North Ahead Left	U	C1:A		2	186	-	496	1955:1955	1065+199	39.3 : 39.3%	-	-	-	1.7	12.6	6.9
2/1	Coolagad Link Road Right Left	U	C1:B		2	33	-	155	1895	226	68.5%	-	-	-	3.7	86.5	7.4
3/1+3/2	R761 South Ahead Right	U+O	C1:C	C1:E	2	208	8	945	1905:1890	1191+188	68.5 : 68.5%	119	8	2	4.2	15.8	22.7
J2: Black Lion Manor	-	-	-		-	-	-	-	-	-	**68.4%**	**341**	**0**	**0**	**13.3**	-	-
1/1+1/2	R761 North Ahead Left Right	U+O	C2:C C2:D		2	188:202	-	896	2101:2067	1095+289	64.7 : 64.7%	187	0	0	3.0	12.0	25.1
2/1+2/2	R761 South Ahead Right Left	U+O	C2:A C2:B		2	188:202	-	633	2083:2059	974+313	49.2 : 49.2%	154	0	0	3.5	20.2	12.8
3/1	Redford Park Left Right Ahead	U	C2:G		2	20	-	98	2050	154	63.7%	-	-	-	2.7	97.7	5.1
4/2+4/1	Black Lion Manor Right Left Ahead	U	C2:F C2:E		2	16:28	-	167	2005:1989	123+121	68.4 : 68.4%	-	-	-	4.1	87.6	4.6

C1	Stream: 1 PRC for Signalled Lanes (%):	31.3	Total Delay for Signalled Lanes (pcuHr):	9.61	Cycle Time (s): 293
C2	Stream: 1 PRC for Signalled Lanes (%):	31.6	Total Delay for Signalled Lanes (pcuHr):	13.27	Cycle Time (s): 293
	PRC Over All Lanes (%):	31.3	Total Delay Over All Lanes(pcuHr):	22.88	

Basic Results Summary

Scenario 7: 'AM 2028 + Dev' (FG7: 'AM 2028 + Dev', Plan 1: 'Network Control Plan 1')

Network Layout Diagram



Basic Results Summary

Network Results

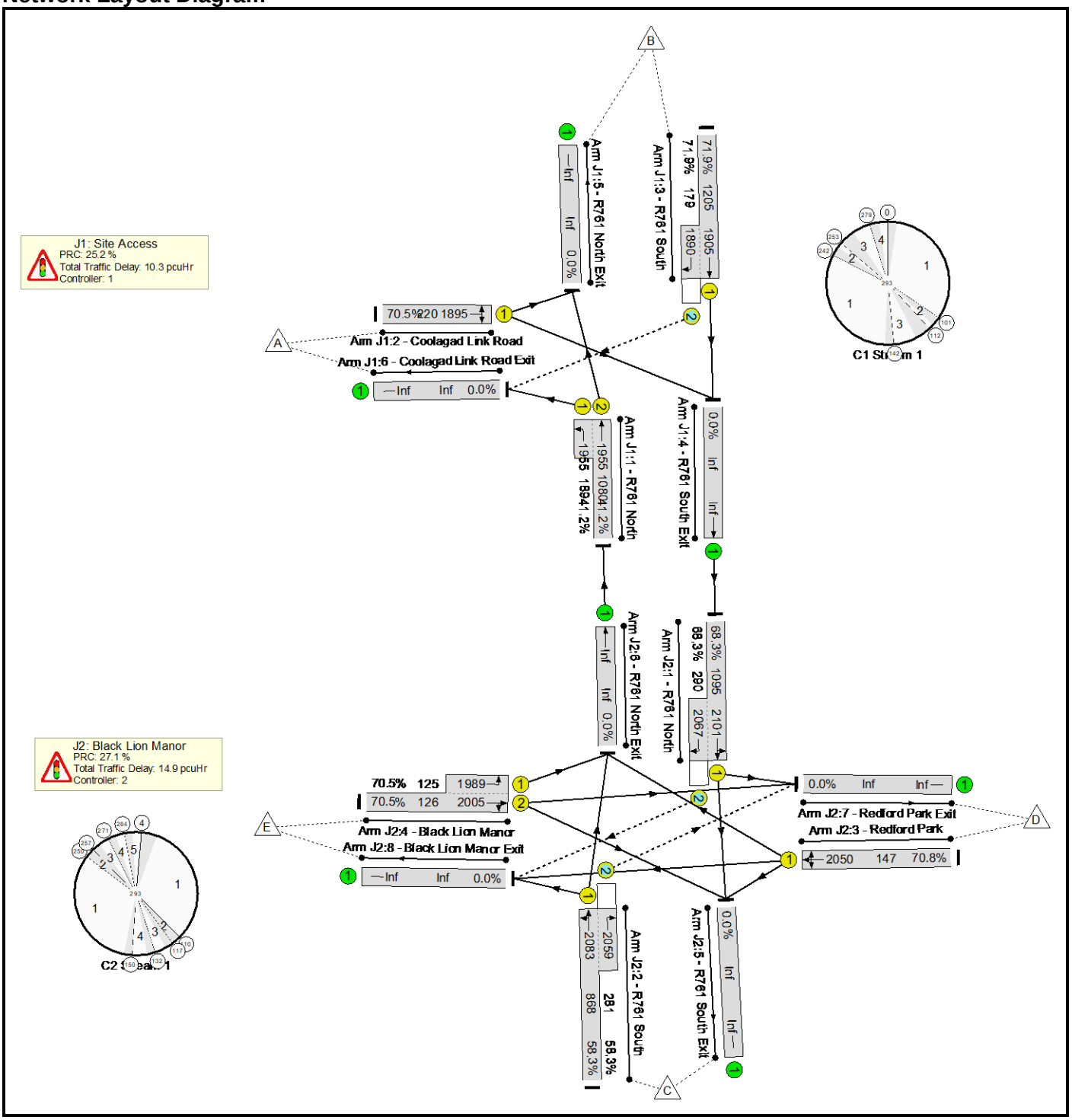
Item	Lane Description	Lane Type	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Mean Max Queue (pcu)
Network	-	-	-		-	-	-	-	-	-	**79.8%**	**424**	**3**	**3**	**36.9**	-	-
J1: Site Access	-	-	-		-	-	-	-	-	-	**79.8%**	**39**	**3**	**1**	**15.9**	-	-
1/2+1/1	R761 North Ahead Left	U	C1:A		2	160	-	862	1955:1955	1015+65	79.8 : 79.8%	-	-	-	6.8	28.3	31.8
2/1	Coolagad Link Road Right Left	U	C1:B		2	59	-	315	1895	395	79.8%	-	-	-	6.7	76.8	14.6
3/1+3/2	R761 South Ahead Right	U+O	C1:C	C1:E	2	182	8	464	1905:1890	1095+109	38.5 : 38.5%	39	3	1	2.4	18.6	9.4
J2: Black Lion Manor	-	-	-		-	-	-	-	-	-	**78.1%**	**385**	**0**	**2**	**21.0**	-	-
1/1+1/2	R761 North Ahead Left Right	U+O	C2:C C2:D		2	182:201	-	539	2101:2067	537+243	69.1 : 69.1%	168	0	0	4.3	28.5	5.9
2/1+2/2	R761 South Ahead Right Left	U+O	C2:A C2:B		2	182:201	-	1041	2083:2059	1052+280	78.1 : 78.1%	217	0	2	7.3	25.2	34.6
3/1	Redford Park Left Right Ahead	U	C2:G		2	23	-	130	2050	175	74.3%	-	-	-	3.7	103.4	6.7
4/2+4/1	Black Lion Manor Right Left Ahead	U	C2:F C2:E		2	14:31	-	228	2005:1989	109+186	77.6 : 76.9%	-	-	-	5.7	90.0	7.8

C1	Stream: 1 PRC for Signalled Lanes (%):	12.7	Total Delay for Signalled Lanes (pcuHr):	15.88	Cycle Time (s): 293
C2	Stream: 1 PRC for Signalled Lanes (%):	15.2	Total Delay for Signalled Lanes (pcuHr):	20.98	Cycle Time (s): 293
	PRC Over All Lanes (%):	12.7	Total Delay Over All Lanes(pcuHr):	36.86	

Basic Results Summary

Scenario 8: 'PM 2028 + Dev' (FG8: 'PM 2028 + Dev', Plan 1: 'Network Control Plan 1')

Network Layout Diagram



Basic Results Summary

Network Results

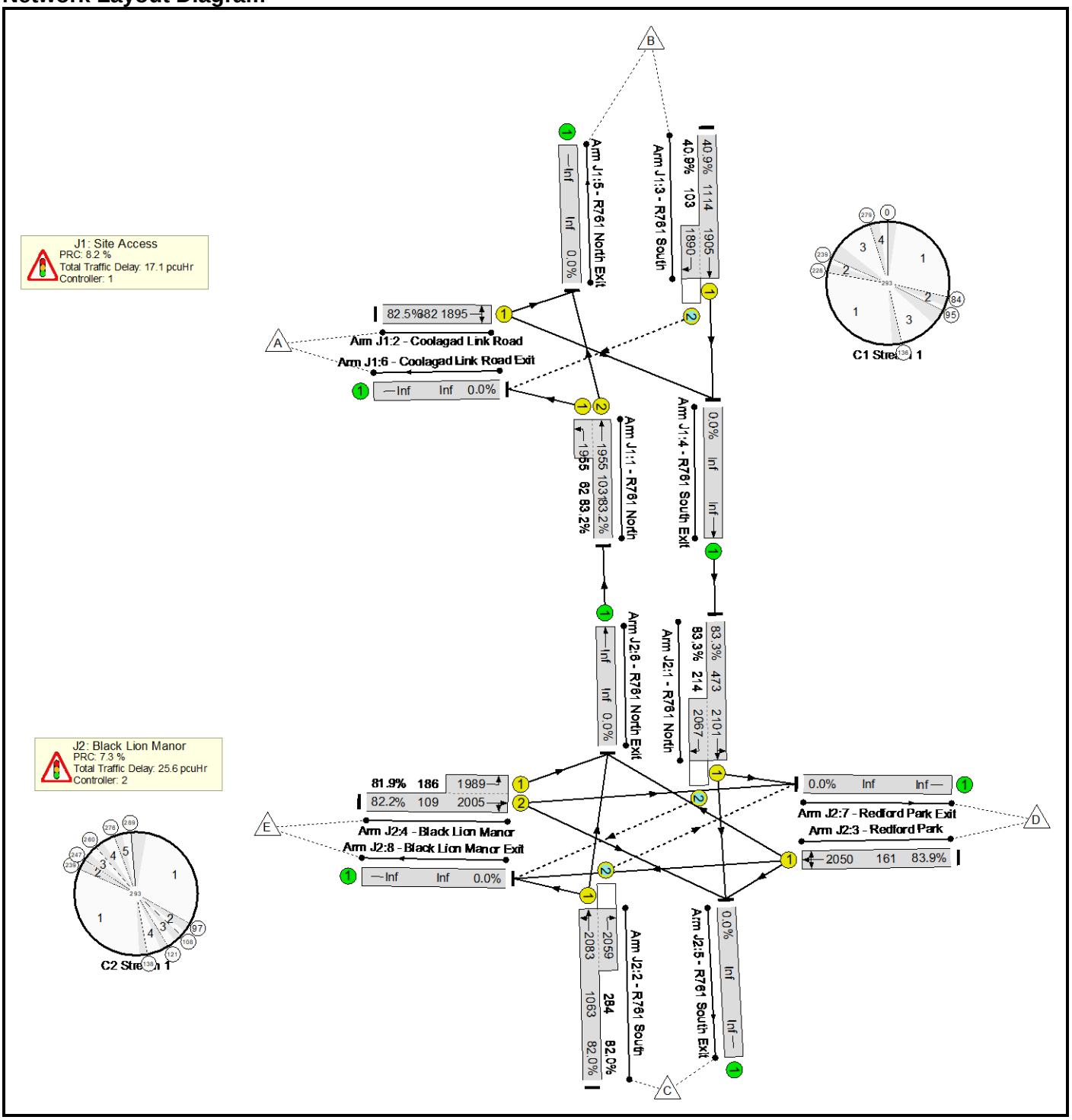
Item	Lane Description	Lane Type	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Mean Max Queue (pcu)
Network	-	-	-		-	-	-	-	-	-	**71.9%**	**481**	**8**	**2**	**25.3**	-	-
J1: Site Access	-	-	-		-	-	-	-	-	-	**71.9%**	**119**	**8**	**2**	**10.3**	-	-
1/2+1/1	R761 North Ahead Left	U	C1:A		2	187	-	523	1955:1955	1080+189	41.2 : 41.2%	-	-	-	1.8	12.6	6.9
2/1	Coolagad Link Road Right Left	U	C1:B		2	32	-	155	1895	220	70.5%	-	-	-	3.8	89.3	7.6
3/1+3/2	R761 South Ahead Right	U+O	C1:C	C1:E	2	209	8	995	1905:1890	1205+179	71.9 : 71.9%	119	8	2	4.6	16.8	26.6
J2: Black Lion Manor	-	-	-		-	-	-	-	-	-	**70.8%**	**362**	**0**	**0**	**14.9**	-	-
1/1+1/2	R761 North Ahead Left Right	U+O	C2:C C2:D		2	188:202	-	946	2101:2067	1095+290	68.3 : 68.3%	198	0	0	3.3	12.6	27.1
2/1+2/2	R761 South Ahead Right Left	U+O	C2:A C2:B		2	188:202	-	670	2083:2059	868+281	58.3 : 58.3%	164	0	0	4.2	22.6	14.2
3/1	Redford Park Left Right Ahead	U	C2:G		2	19	-	104	2050	147	70.8%	-	-	-	3.1	106.7	5.6
4/2+4/1	Black Lion Manor Right Left Ahead	U	C2:F C2:E		2	17:29	-	177	2005:1989	126+125	70.5 : 70.5%	-	-	-	4.3	87.9	4.9

C1	Stream: 1 PRC for Signalled Lanes (%):	25.2	Total Delay for Signalled Lanes (pcuHr):	10.32	Cycle Time (s): 293
C2	Stream: 1 PRC for Signalled Lanes (%):	27.1	Total Delay for Signalled Lanes (pcuHr):	14.94	Cycle Time (s): 293
	PRC Over All Lanes (%):	25.2	Total Delay Over All Lanes(pcuHr):	25.26	

Basic Results Summary

Scenario 9: 'AM 2038 + Dev' (FG9: 'AM 2038 + Dev', Plan 1: 'Network Control Plan 1')

Network Layout Diagram



Basic Results Summary

Network Results

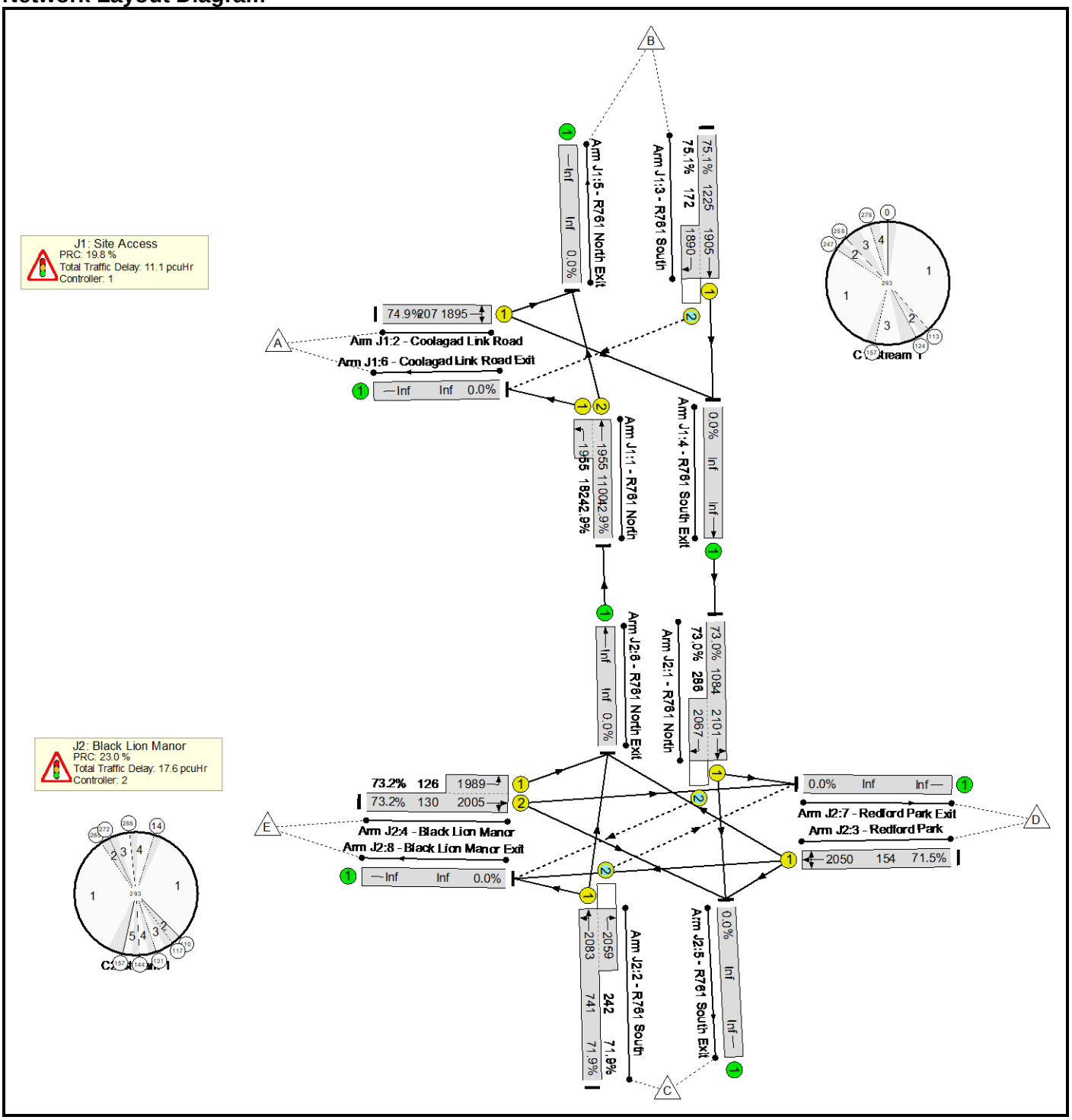
Item	Lane Description	Lane Type	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Mean Max Queue (pcu)
Network	-	-	-		-	-	-	-	-	-	**83.9%**	**437**	**3**	**13**	**42.7**	-	-
J1: Site Access	-	-	-		-	-	-	-	-	-	**83.2%**	**39**	**3**	**1**	**17.1**	-	-
1/2+1/1	R761 North Ahead Left	U	C1:A		2	162	-	910	1955:1955	1031+62	83.2 : 83.2%	-	-	-	7.4	29.4	33.8
2/1	Coolagad Link Road Right Left	U	C1:B		2	57	-	315	1895	382	82.5%	-	-	-	7.1	81.4	14.7
3/1+3/2	R761 South Ahead Right	U+O	C1:C	C1:E	2	184	8	497	1905:1890	1114+103	40.9 : 40.9%	39	3	1	2.6	18.8	11.0
J2: Black Lion Manor	-	-	-		-	-	-	-	-	-	**83.9%**	**398**	**0**	**13**	**25.6**	-	-
1/1+1/2	R761 North Ahead Left Right	U+O	C2:C C2:D		2	184:203	-	572	2101:2067	473+214	83.3 : 83.3%	168	0	10	6.0	38.0	7.8
2/1+2/2	R761 South Ahead Right Left	U+O	C2:A C2:B		2	184:203	-	1104	2083:2059	1063+284	82.0 : 82.0%	230	0	3	8.3	27.2	39.2
3/1	Redford Park Left Right Ahead	U	C2:G		2	21	-	135	2050	161	83.9%	-	-	-	4.7	126.1	8.0
4/2+4/1	Black Lion Manor Right Left Ahead	U	C2:F C2:E		2	14:31	-	242	2005:1989	109+186	82.2 : 81.9%	-	-	-	6.5	96.3	9.1

C1	Stream: 1 PRC for Signalled Lanes (%):	8.2	Total Delay for Signalled Lanes (pcuHr):	17.14	Cycle Time (s): 293
C2	Stream: 1 PRC for Signalled Lanes (%):	7.3	Total Delay for Signalled Lanes (pcuHr):	25.58	Cycle Time (s): 293
	PRC Over All Lanes (%):	7.3	Total Delay Over All Lanes(pcuHr):	42.71	

Basic Results Summary

Scenario 10: 'PM 2038 + Dev' (FG10: 'PM 2038 + Dev', Plan 1: 'Network Control Plan 1')

Network Layout Diagram



Basic Results Summary

Network Results

Item	Lane Description	Lane Type	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Mean Max Queue (pcu)
Network	-	-	-		-	-	-	-	-	-	**75.1%**	**502**	**8**	**2**	**28.7**	-	-
J1: Site Access	-	-	-		-	-	-	-	-	-	**75.1%**	**119**	**8**	**2**	**11.1**	-	-
1/2+1/1	R761 North Ahead Left	U	C1:A		2	189	-	550	1955:1955	1100+182	42.9 : 42.9%	-	-	-	1.9	12.1	8.5
2/1	Coolagad Link Road Right Left	U	C1:B		2	30	-	155	1895	207	74.9%	-	-	-	4.2	97.4	8.4
3/1+3/2	R761 South Ahead Right	U+O	C1:C	C1:E	2	211	8	1049	1905:1890	1225+172	75.1 : 75.1%	119	8	2	5.0	17.2	26.8
J2: Black Lion Manor	-	-	-		-	-	-	-	-	-	**73.2%**	**383**	**0**	**0**	**17.6**	-	-
1/1+1/2	R761 North Ahead Left Right	U+O	C2:C C2:D		2	186:200	-	1000	2101:2067	1084+286	73.0 : 73.0%	209	0	0	4.2	15.1	32.2
2/1+2/2	R761 South Ahead Right Left	U+O	C2:A C2:B		2	186:200	-	707	2083:2059	741+242	71.9 : 71.9%	174	0	0	5.5	28.1	16.1
3/1	Redford Park Left Right Ahead	U	C2:G		2	20	-	110	2050	154	71.5%	-	-	-	3.2	105.8	6.0
4/2+4/1	Black Lion Manor Right Left Ahead	U	C2:F C2:E		2	18:30	-	187	2005:1989	130+126	73.2 : 73.2%	-	-	-	4.7	89.5	5.4

C1	Stream: 1 PRC for Signalled Lanes (%):	19.8	Total Delay for Signalled Lanes (pcuHr):	11.06	Cycle Time (s): 293
C2	Stream: 1 PRC for Signalled Lanes (%):	23.0	Total Delay for Signalled Lanes (pcuHr):	17.60	Cycle Time (s): 293
	PRC Over All Lanes (%):	19.8	Total Delay Over All Lanes(pcuHr):	28.66	

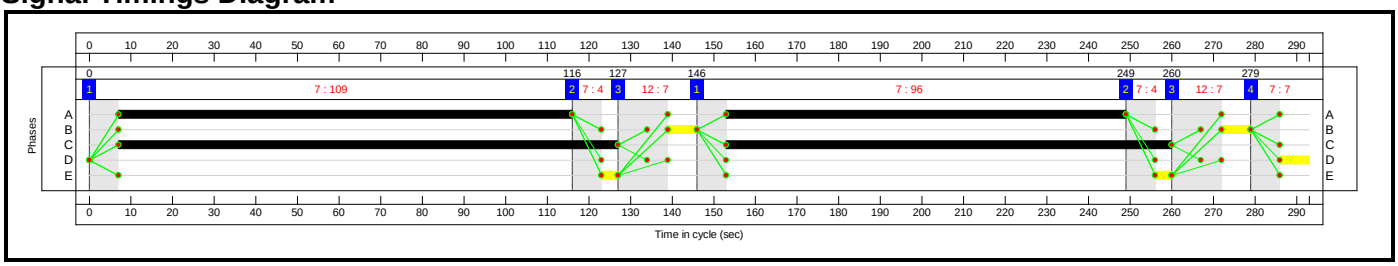
Basic Results Summary

User and Project Details

Project:	
Title:	
Location:	
Additional detail:	
File name:	Linsig Network Black Lion Manor and Site Access Rev 4D Full Dev.lsg3x
Author:	
Company:	
Address:	

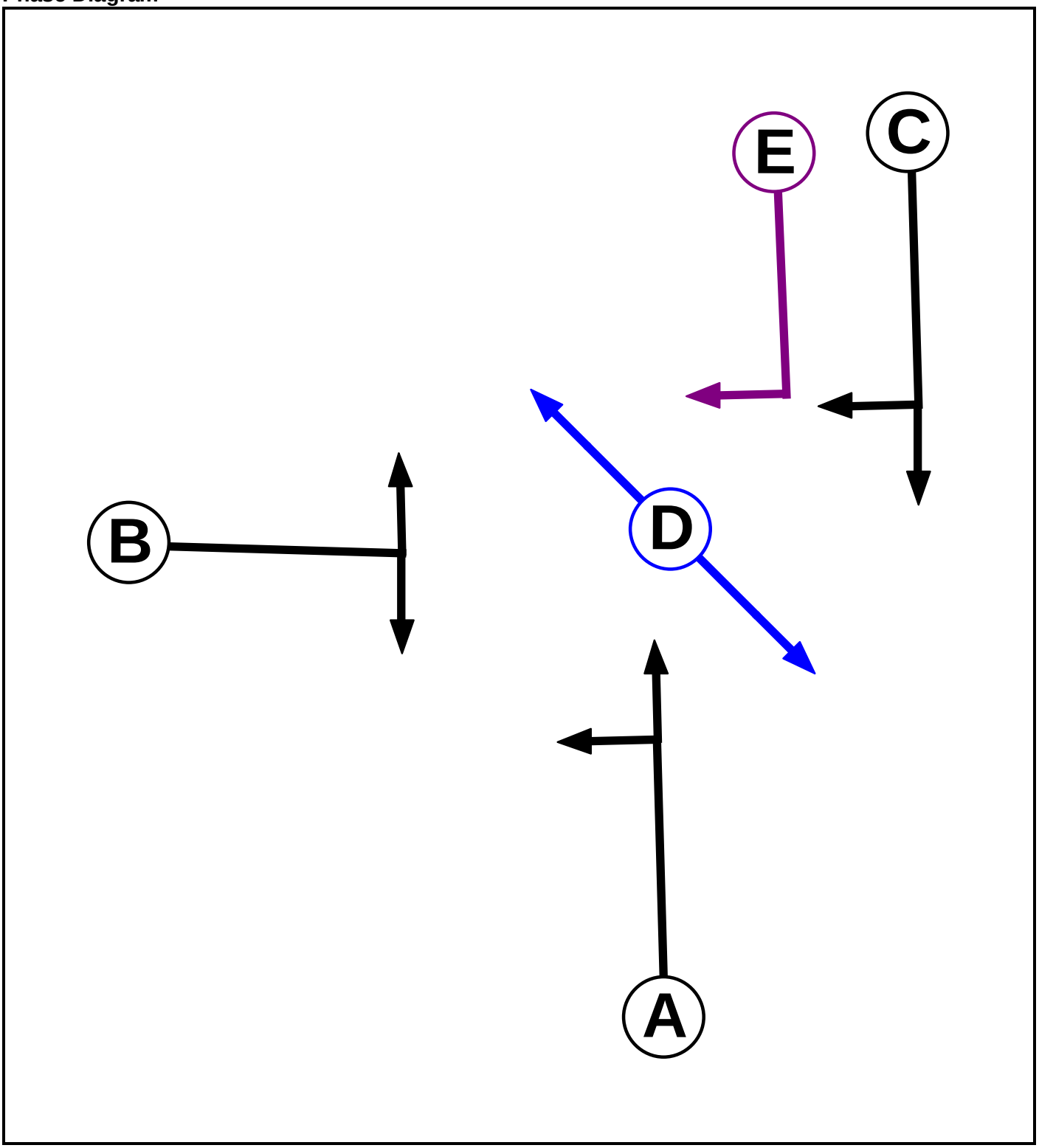
Scenario 1: 'AM Base' (FG1: 'AM Base', Plan 1: 'Network Control Plan 1')
C1

Signal Timings Diagram



Basic Results Summary

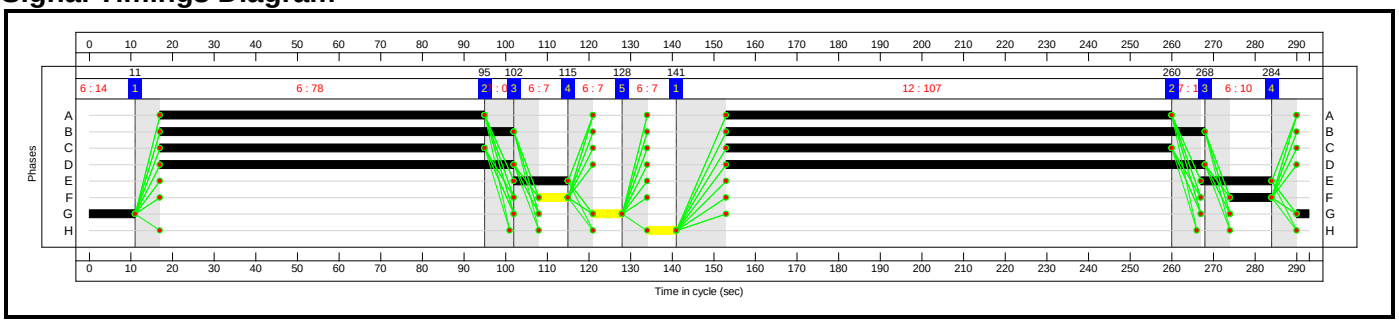
Phase Diagram



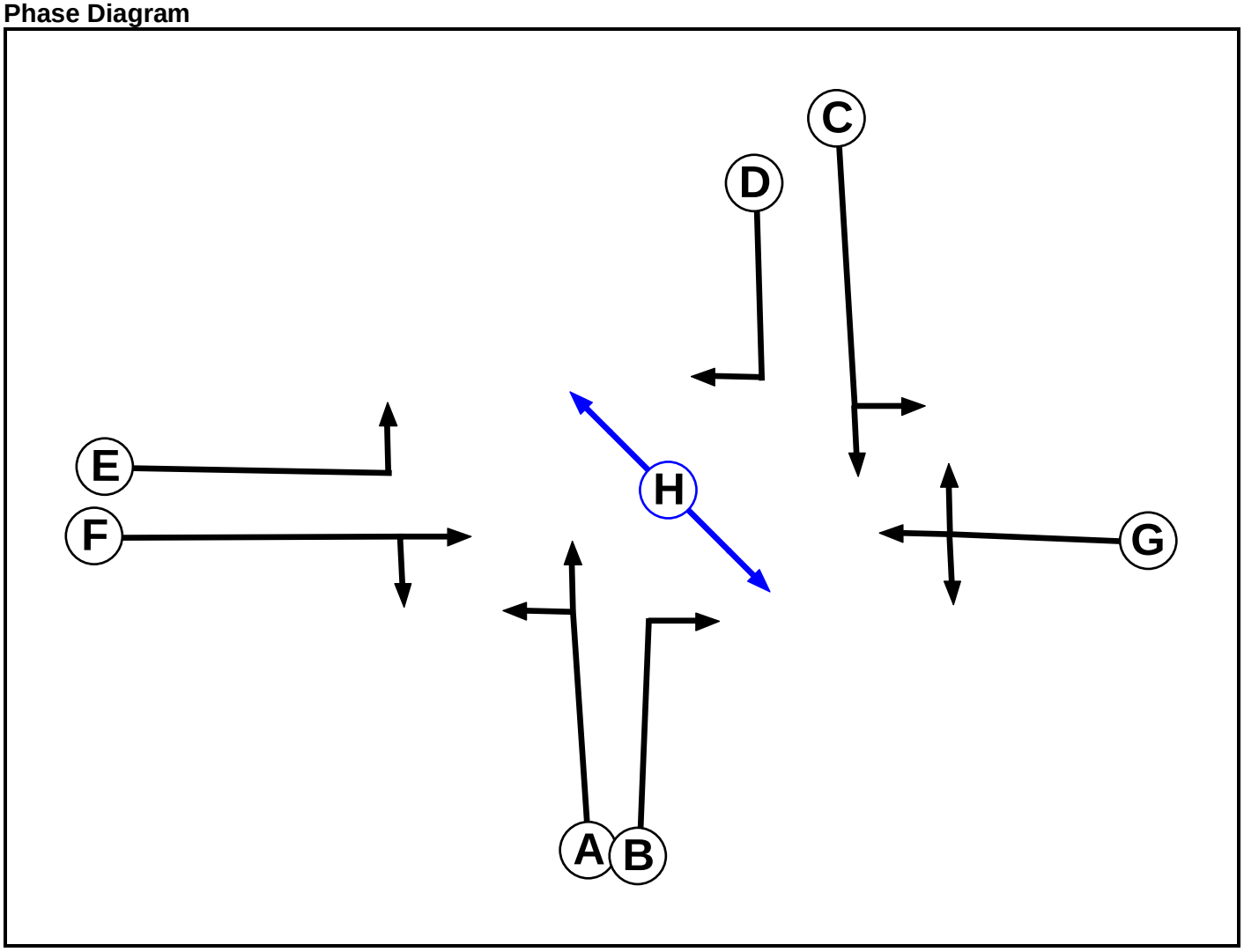
Basic Results Summary

C2

Signal Timings Diagram



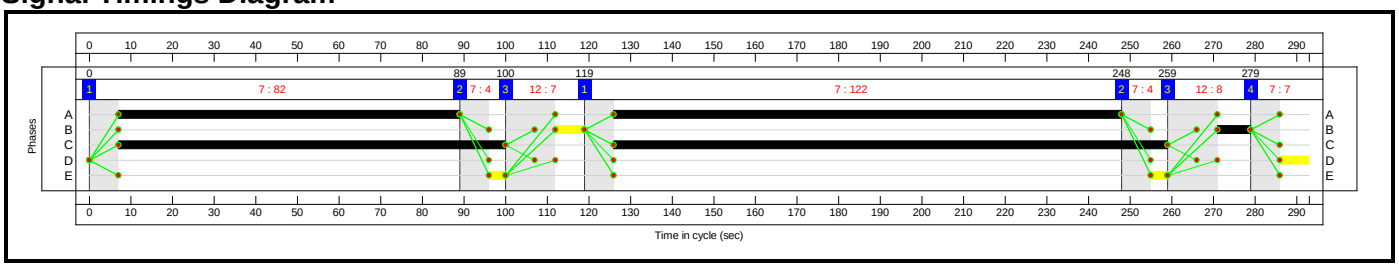
Phase Diagram



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

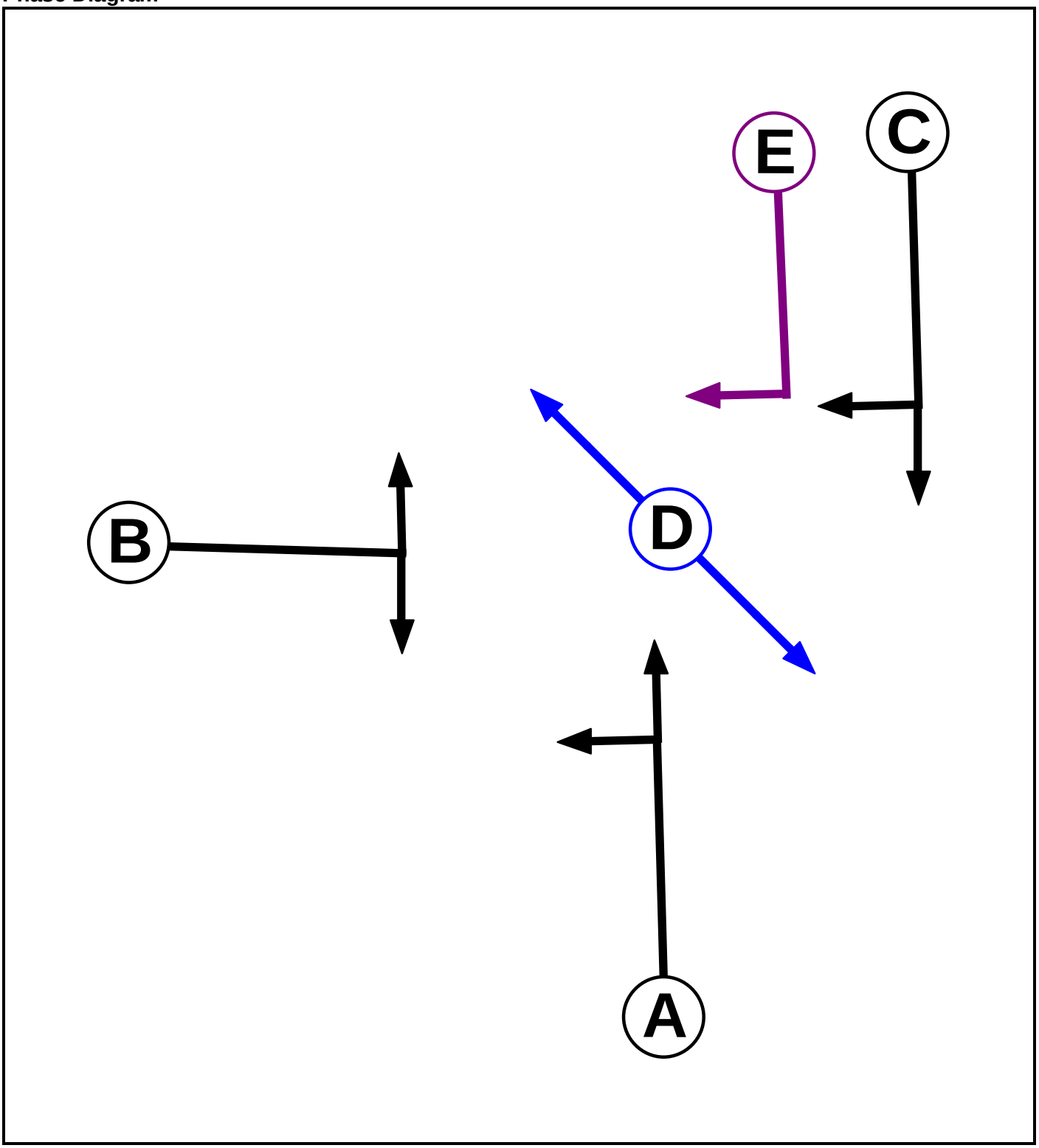
C1

Signal Timings Diagram



Basic Results Summary

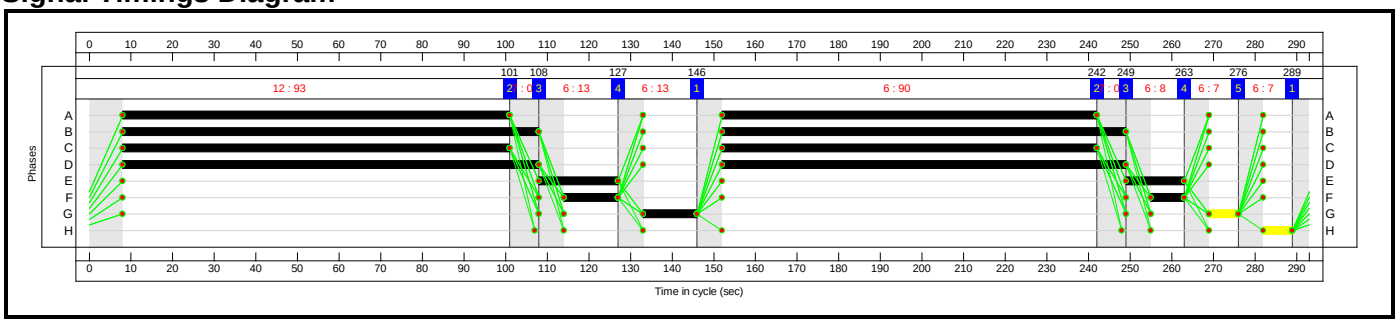
Phase Diagram



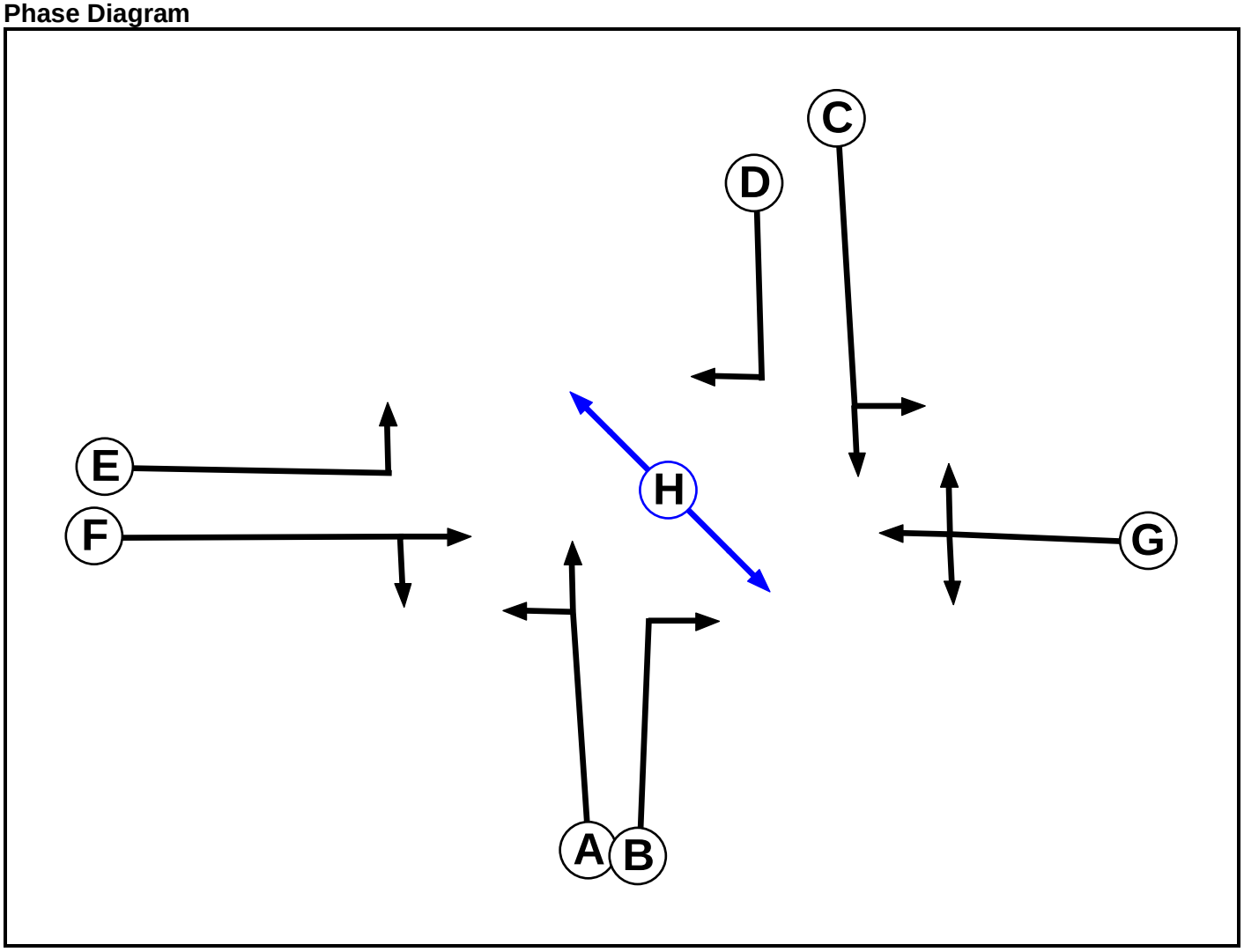
Basic Results Summary

C2

Signal Timings Diagram



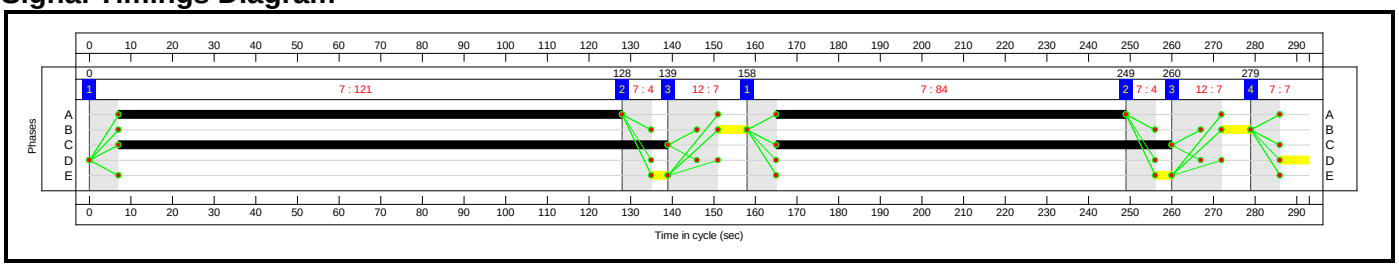
Phase Diagram



Scenario 3: 'AM 2023 Base' (FG3: 'AM 2023 Base', Plan 1: 'Network Control Plan 1')

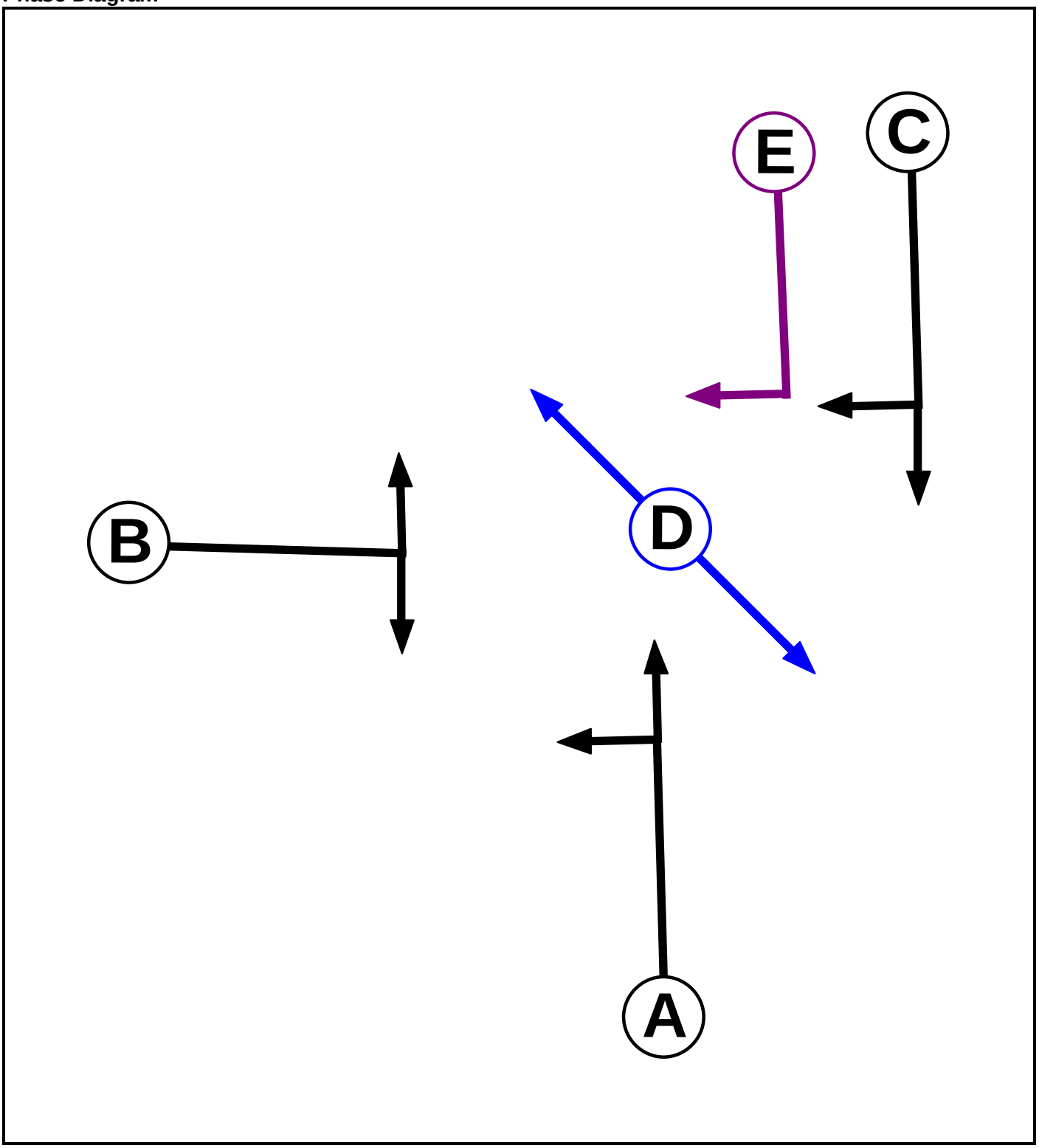
C1

Signal Timings Diagram



Basic Results Summary

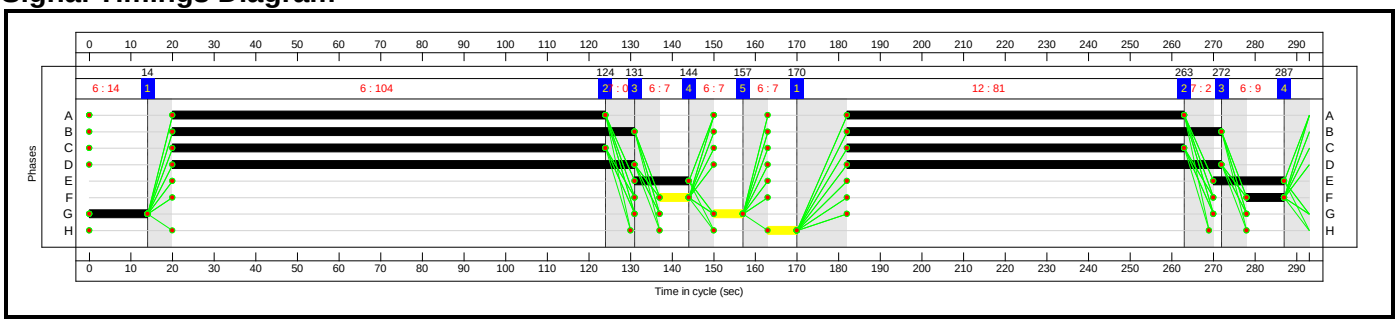
Phase Diagram



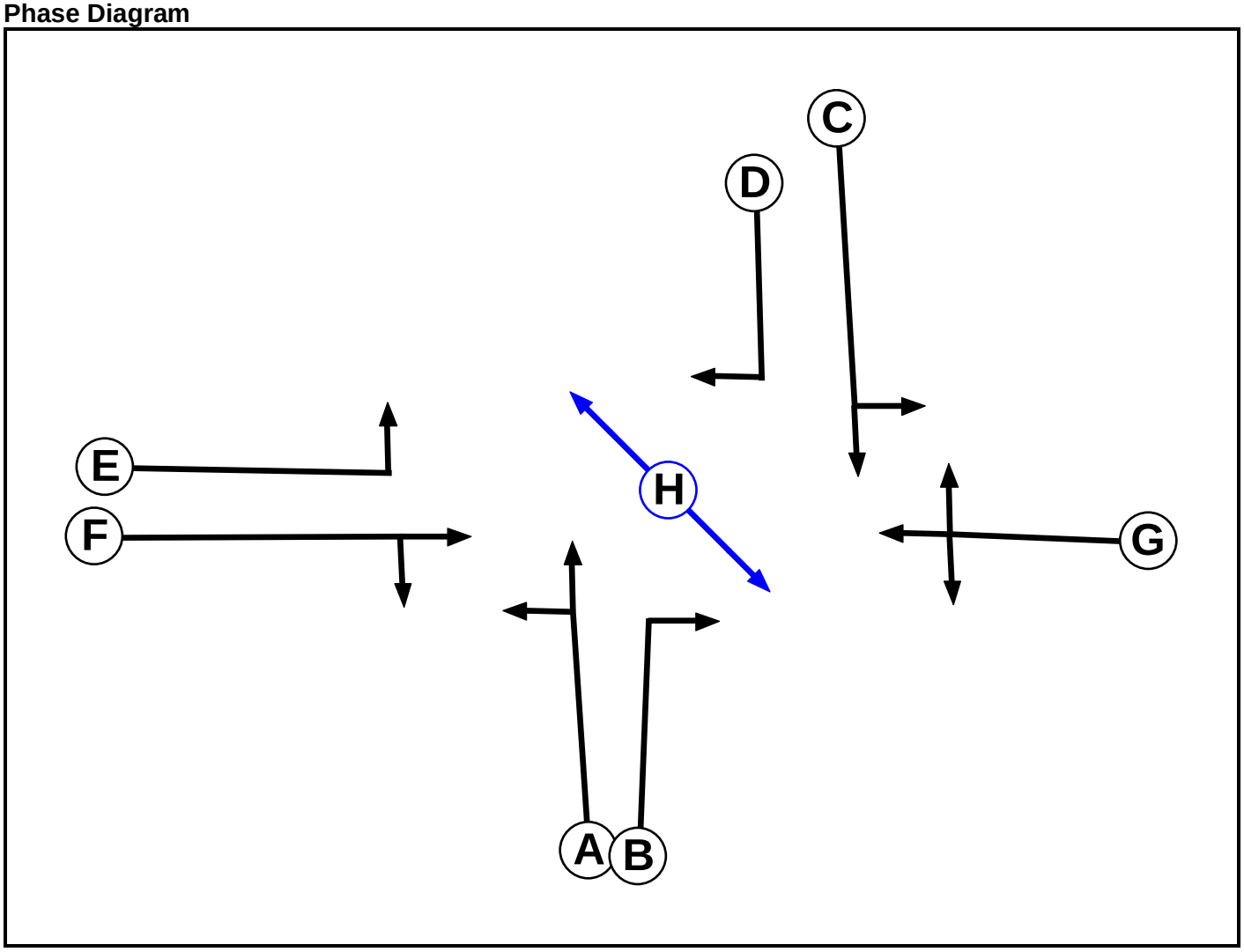
Basic Results Summary

C2

Signal Timings Diagram



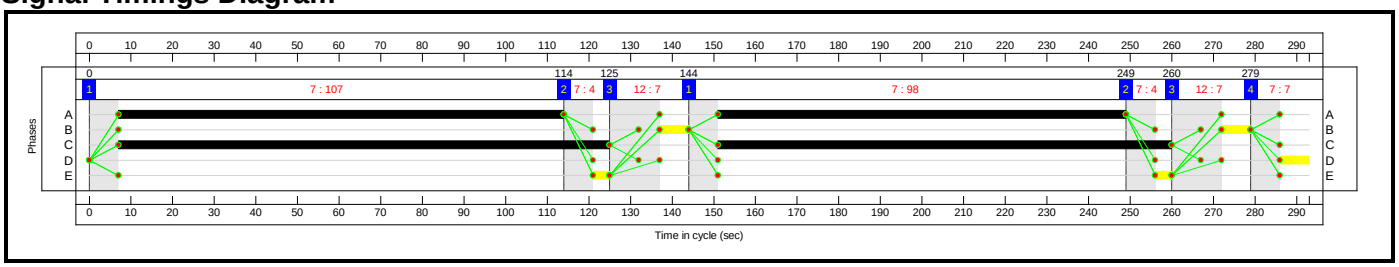
Phase Diagram



Scenario 4: 'PM 2023 Base' (FG4: 'PM 2023 Base', Plan 1: 'Network Control Plan 1')

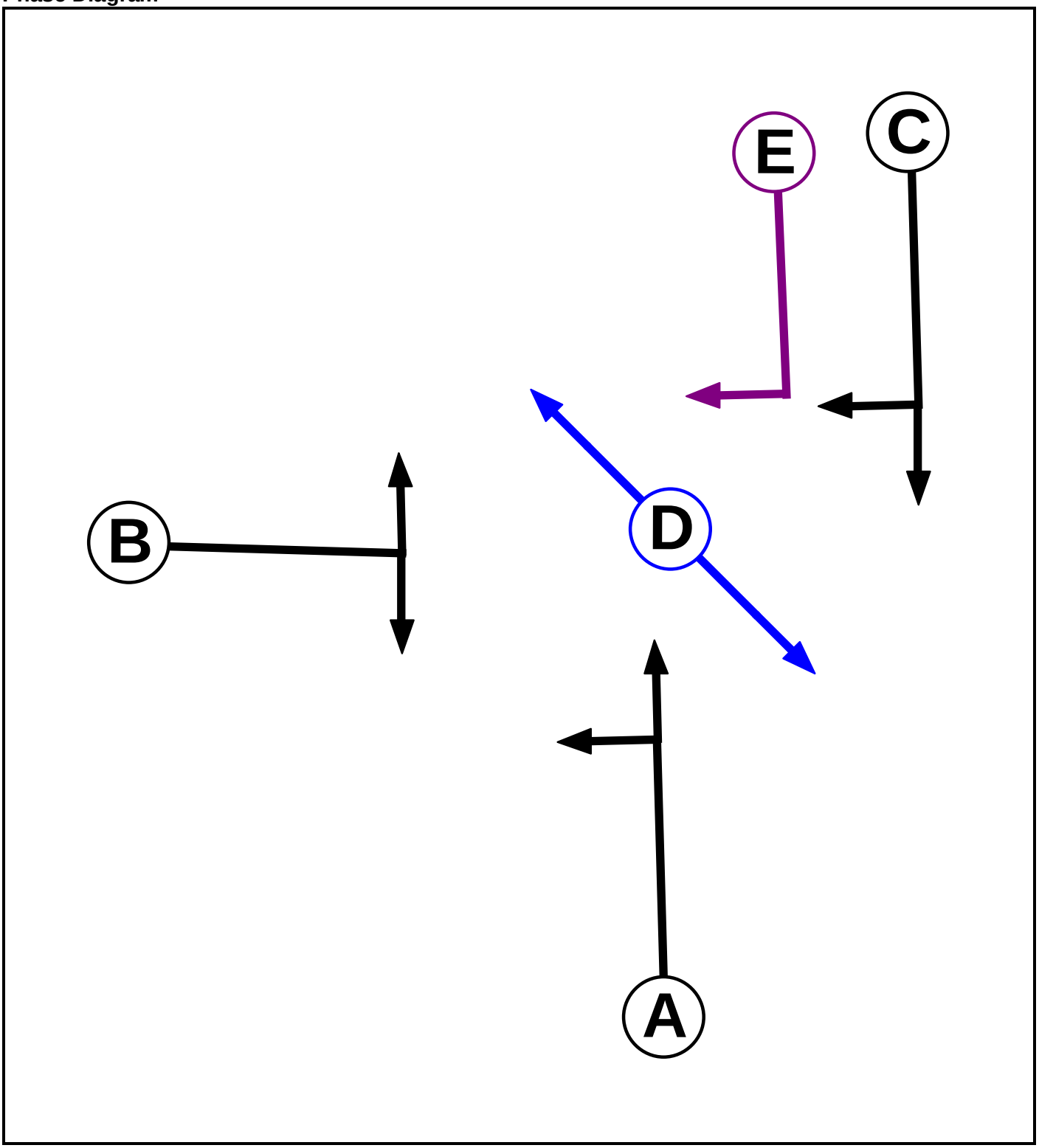
C1

Signal Timings Diagram



Basic Results Summary

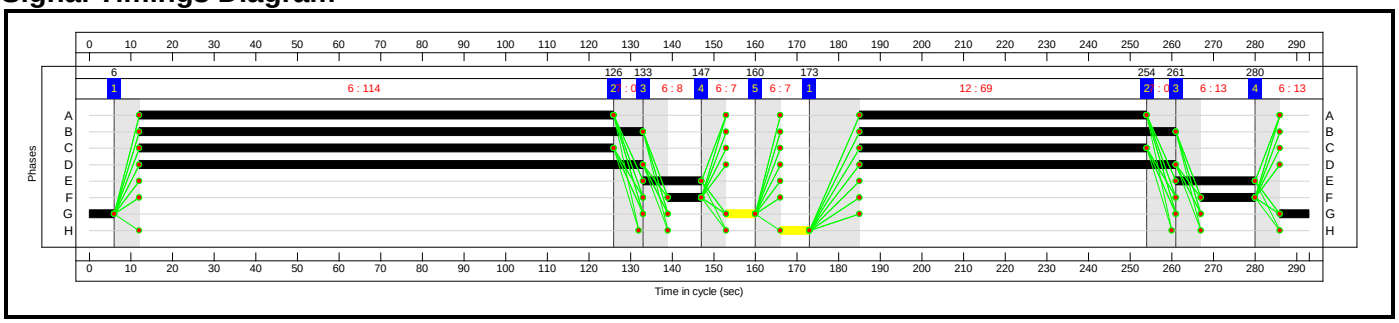
Phase Diagram



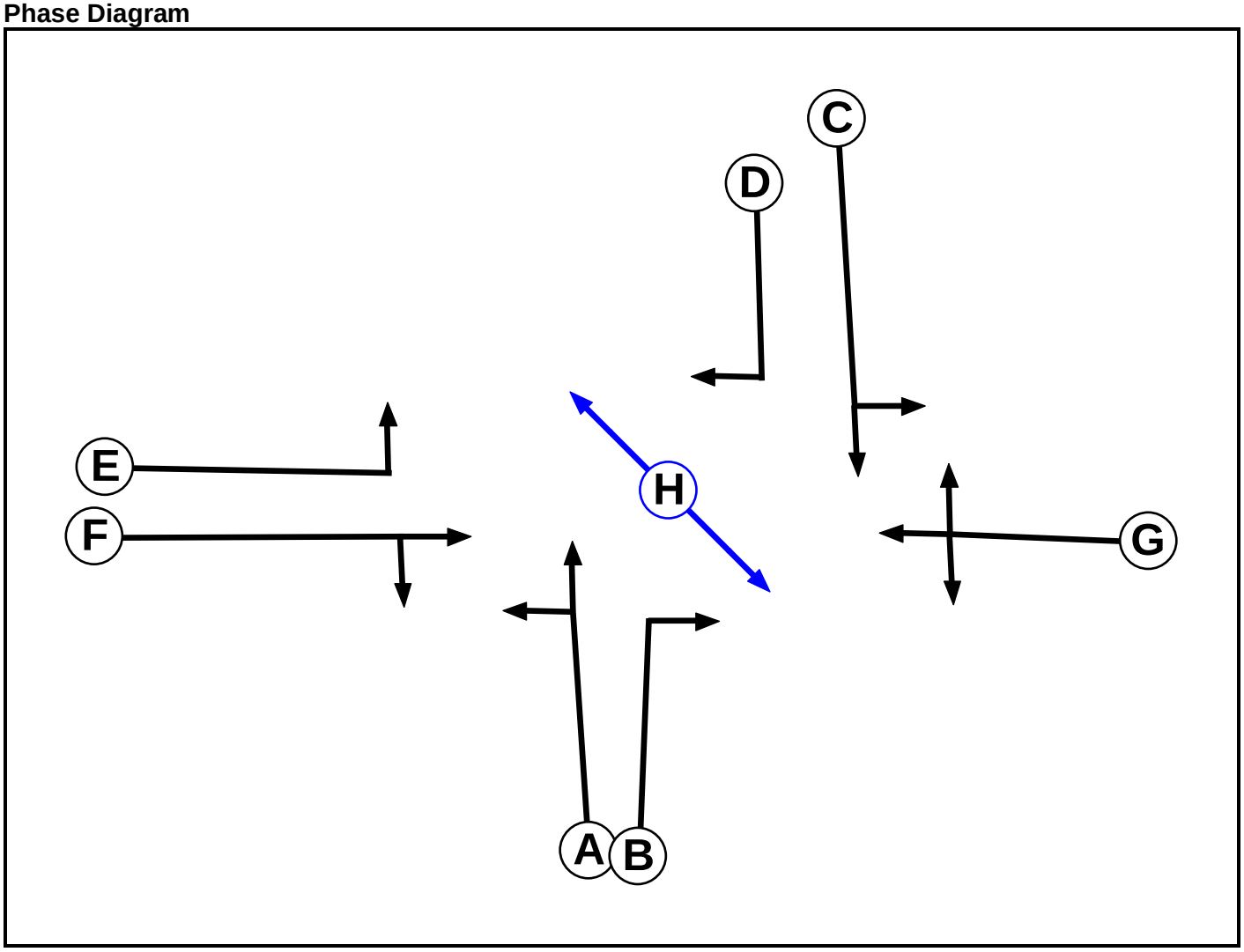
Basic Results Summary

C2

Signal Timings Diagram



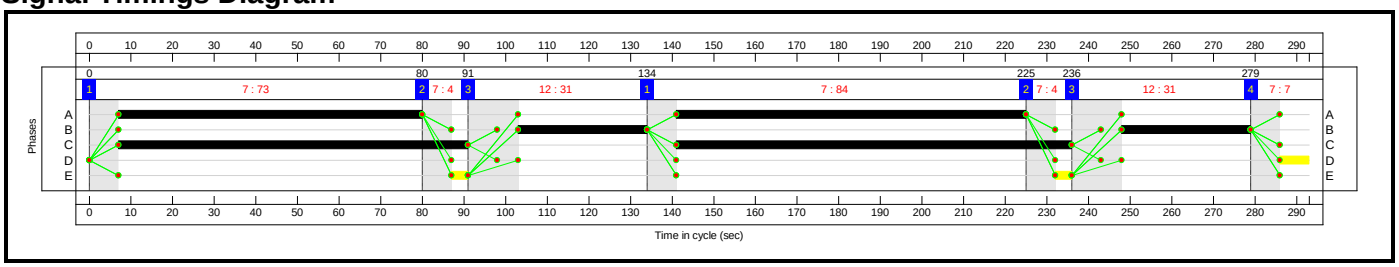
Phase Diagram



Scenario 5: 'AM 2023 + Dev' (FG5: 'AM 2023 + Dev', Plan 1: 'Network Control Plan 1')

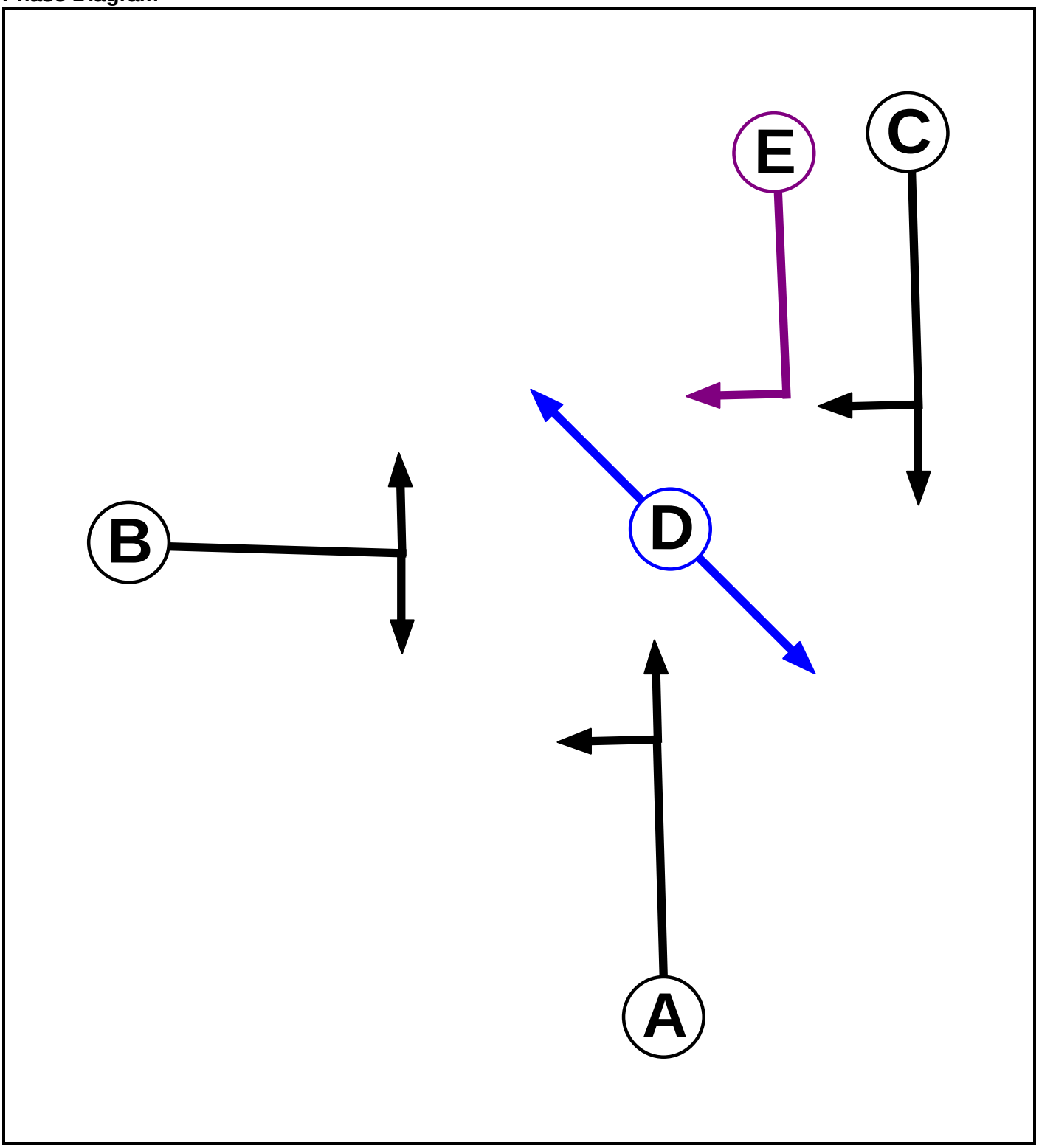
C1

Signal Timings Diagram



Basic Results Summary

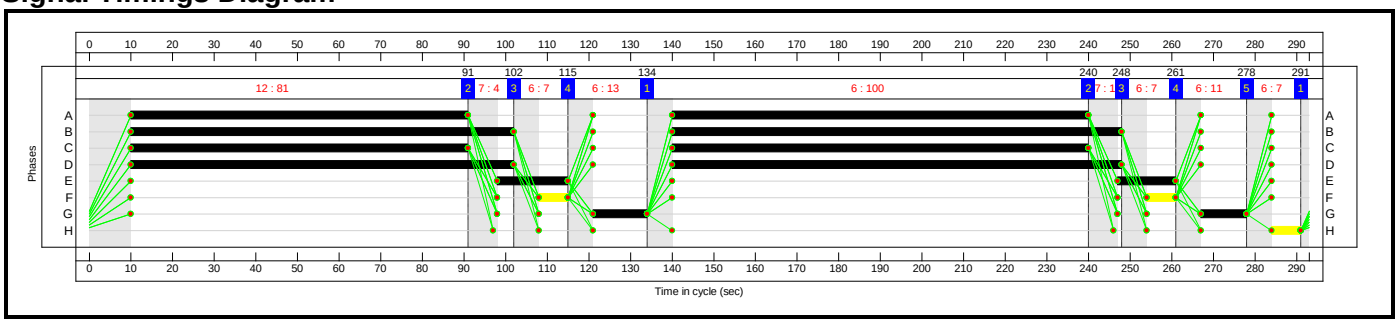
Phase Diagram



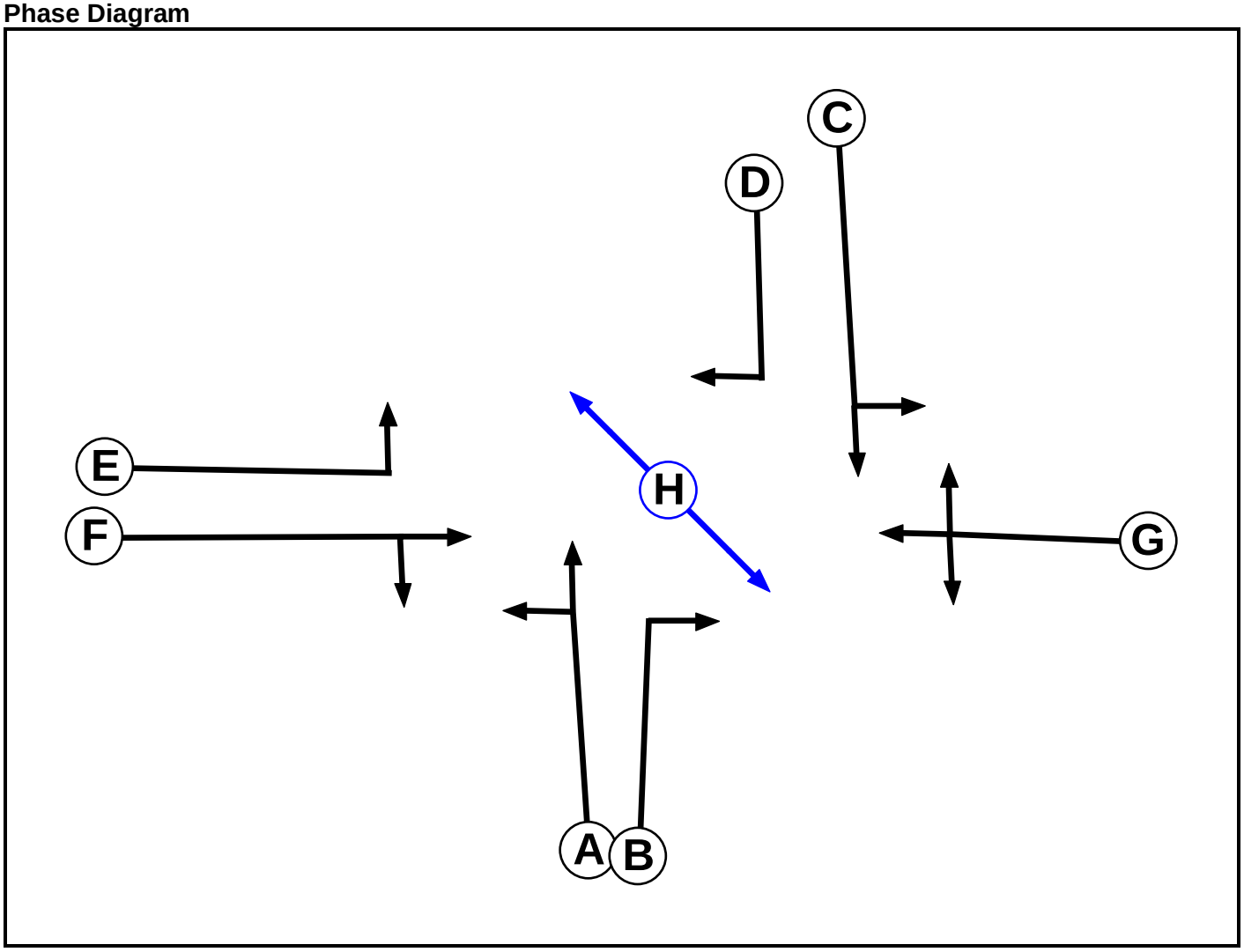
Basic Results Summary

C2

Signal Timings Diagram



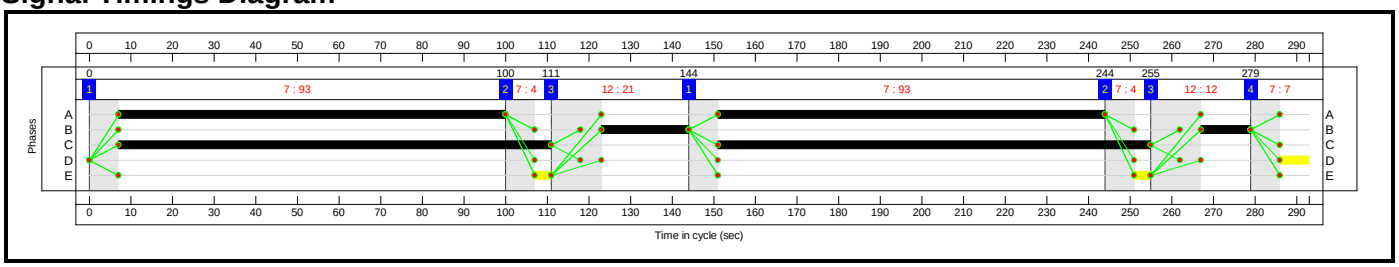
Phase Diagram



Scenario 6: 'PM 2023 + Dev' (FG6: 'PM 2023 + Dev', Plan 1: 'Network Control Plan 1')

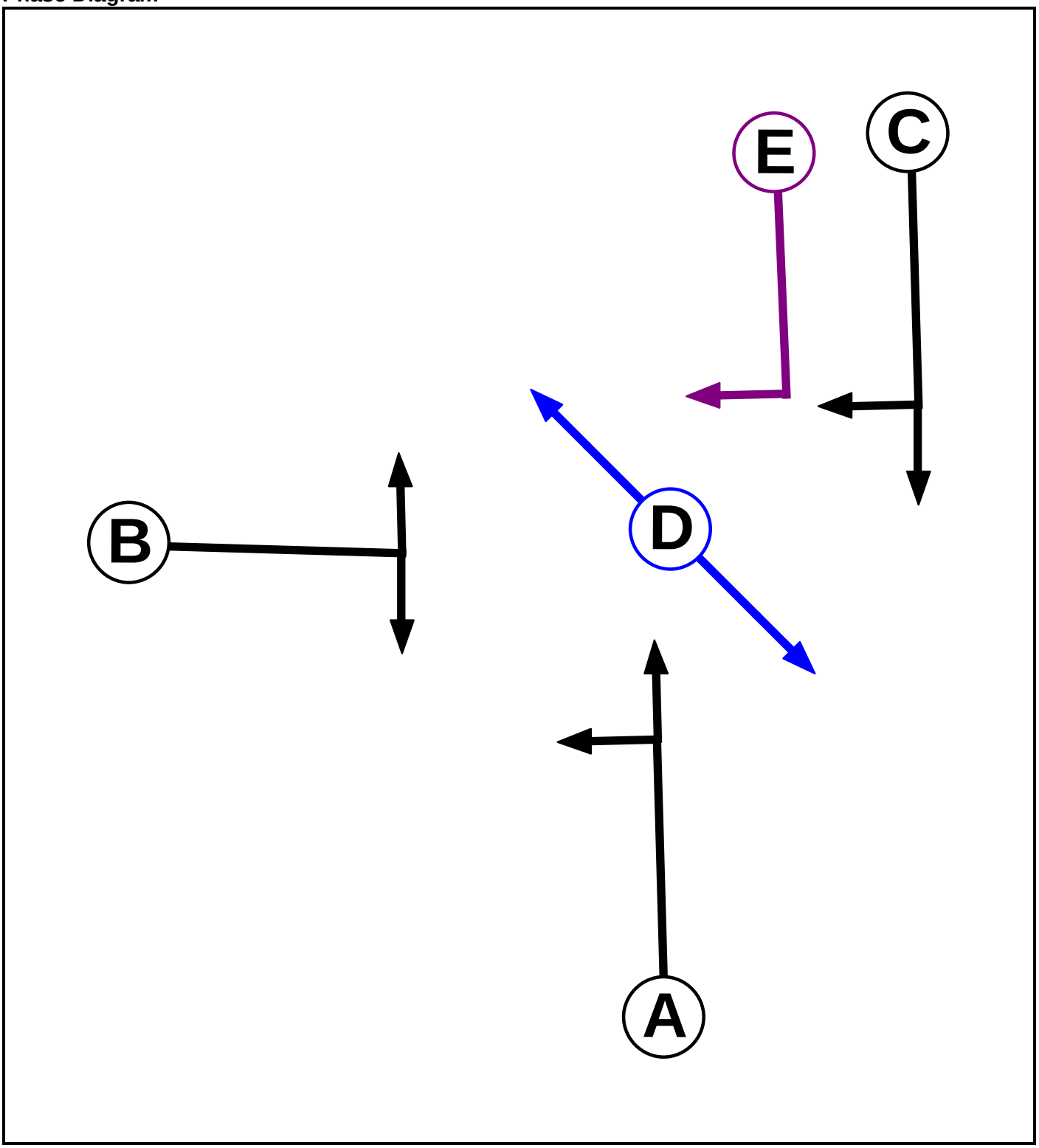
C1

Signal Timings Diagram



Basic Results Summary

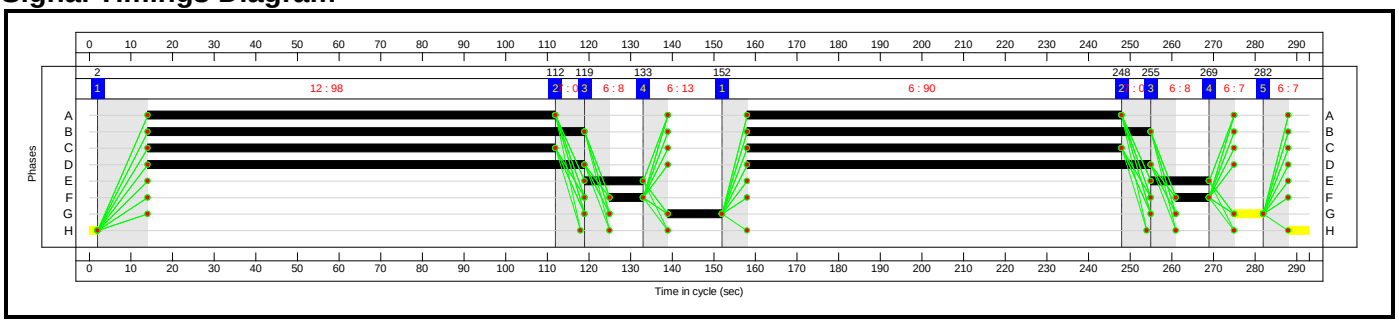
Phase Diagram



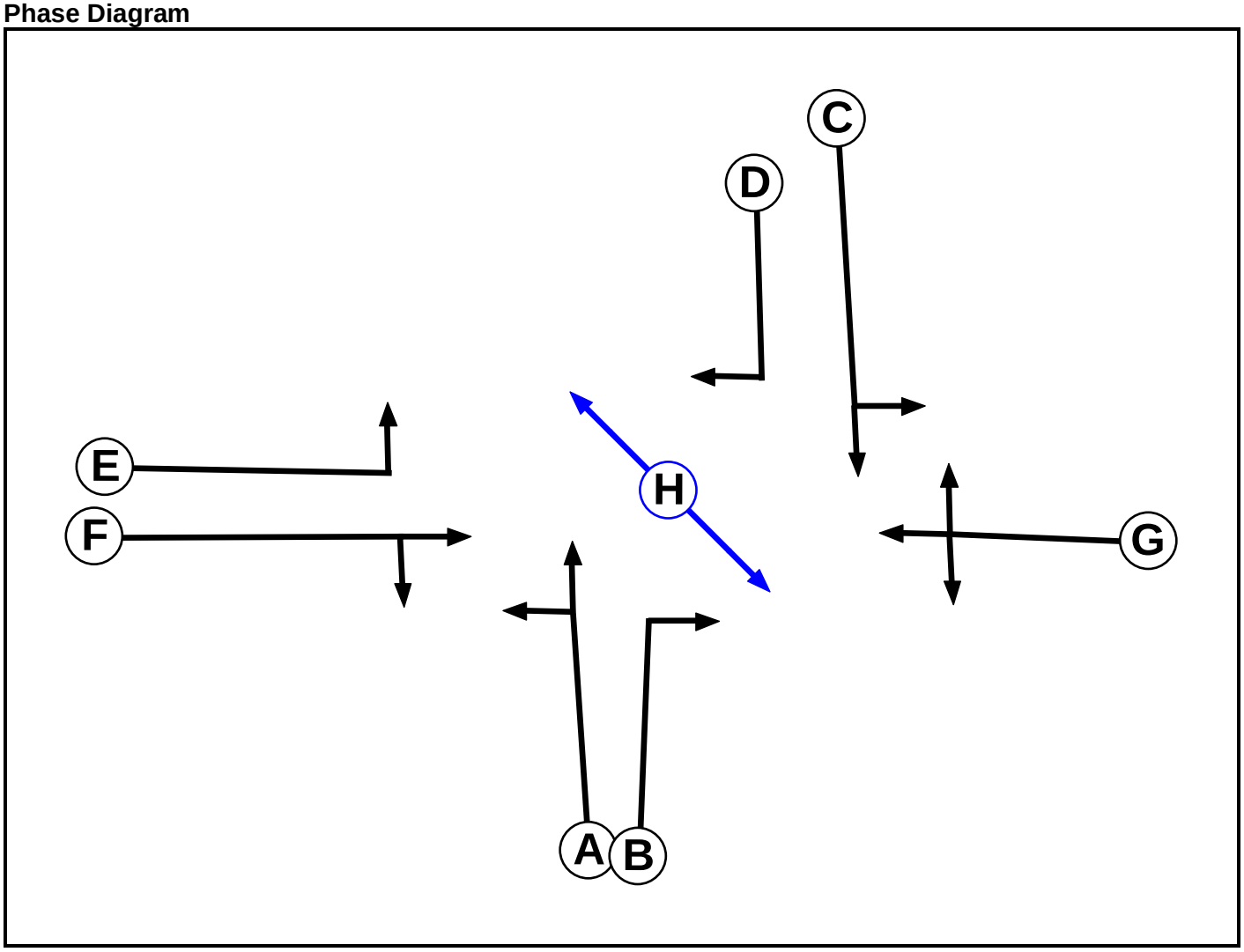
Basic Results Summary

C2

Signal Timings Diagram



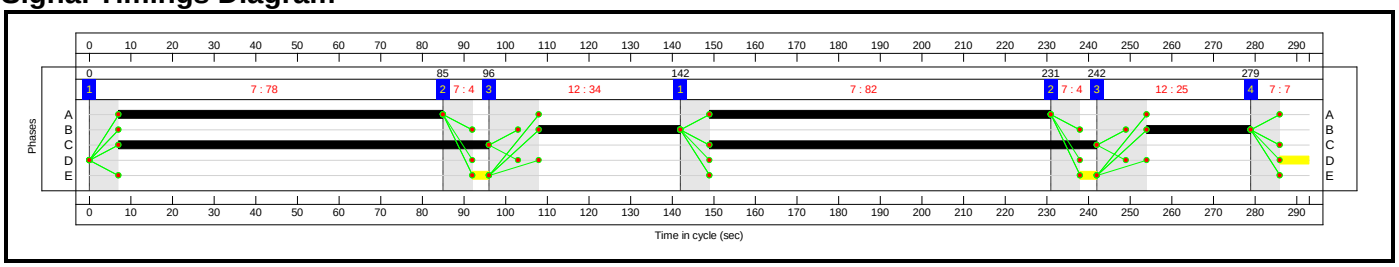
Phase Diagram



Scenario 7: 'AM 2028 + Dev' (FG7: 'AM 2028 + Dev', Plan 1: 'Network Control Plan 1')

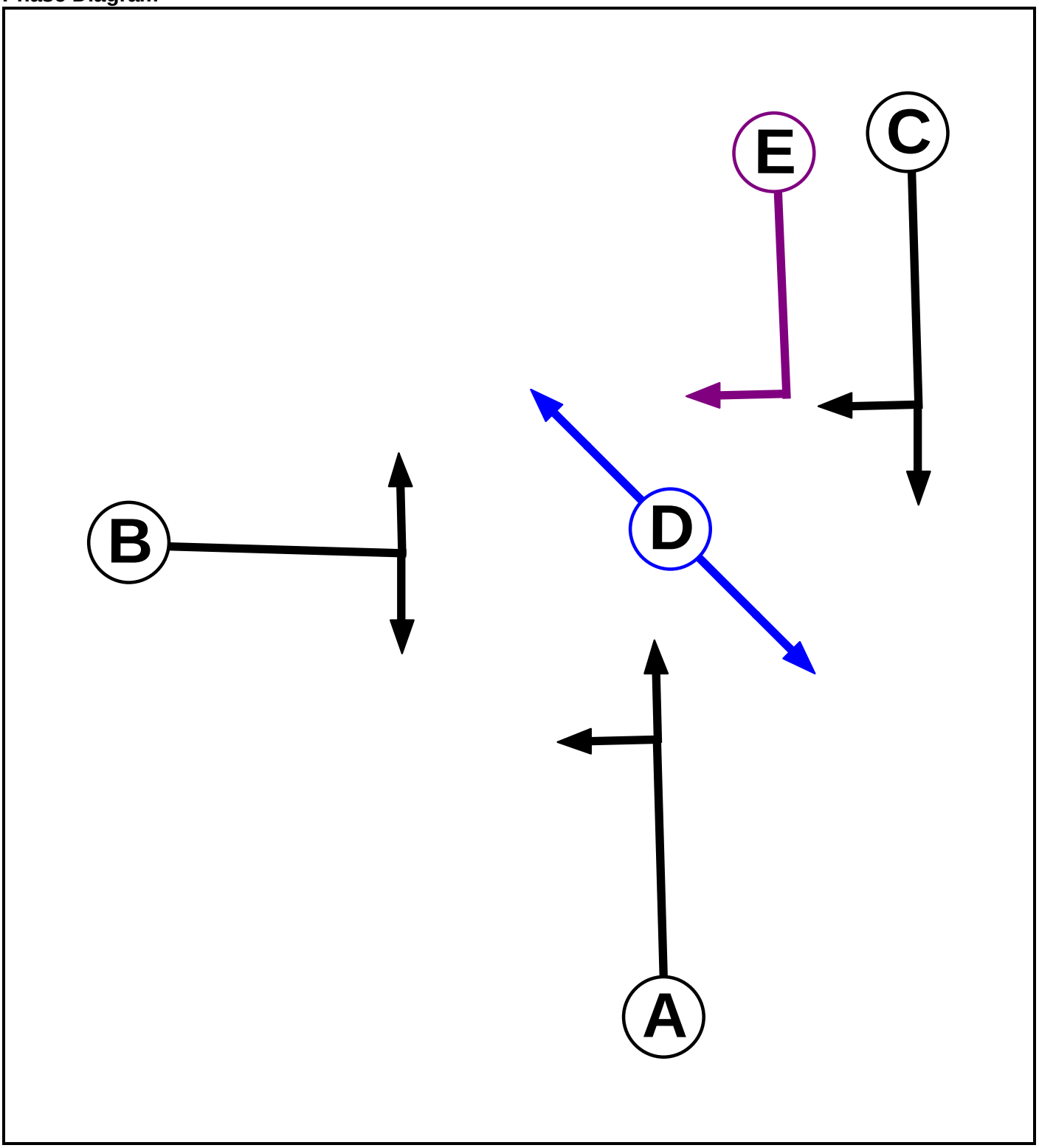
C1

Signal Timings Diagram



Basic Results Summary

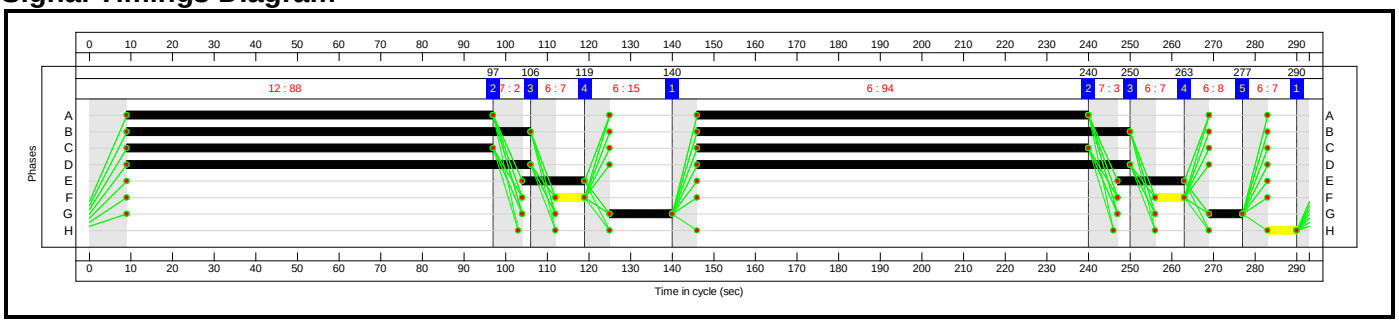
Phase Diagram



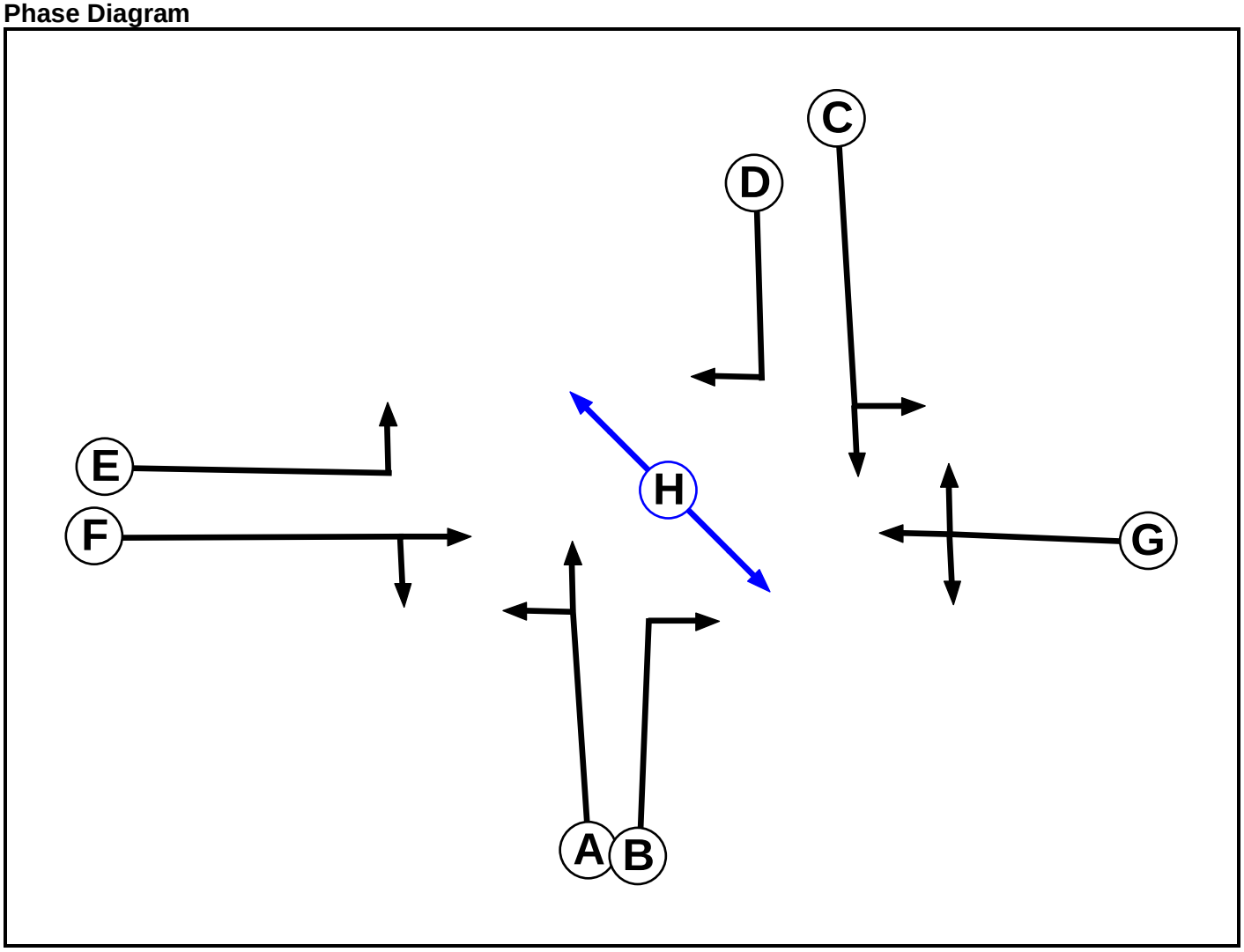
Basic Results Summary

C2

Signal Timings Diagram



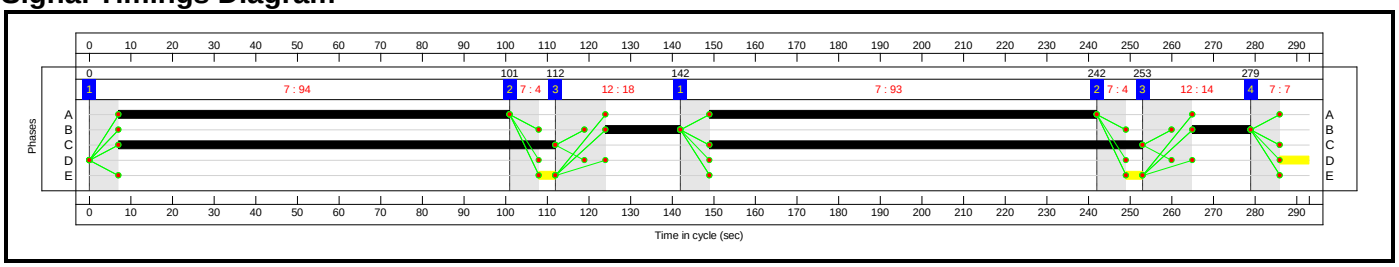
Phase Diagram



Scenario 8: 'PM 2028 + Dev' (FG8: 'PM 2028 + Dev', Plan 1: 'Network Control Plan 1')

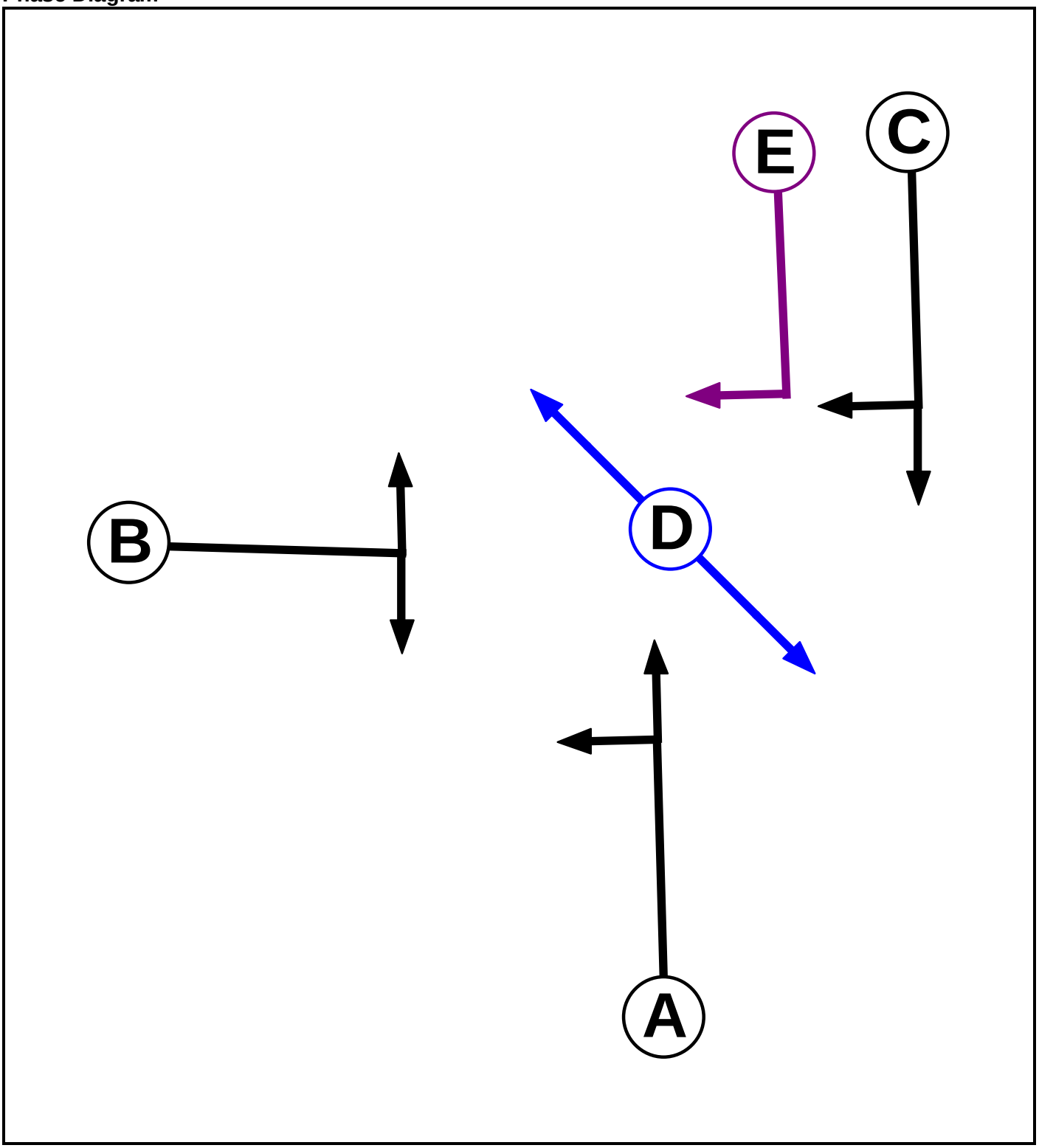
C1

Signal Timings Diagram



Basic Results Summary

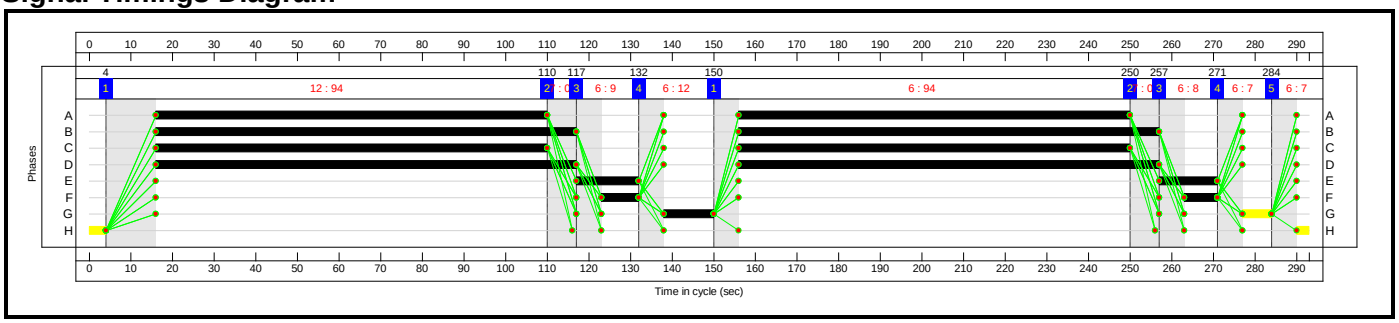
Phase Diagram



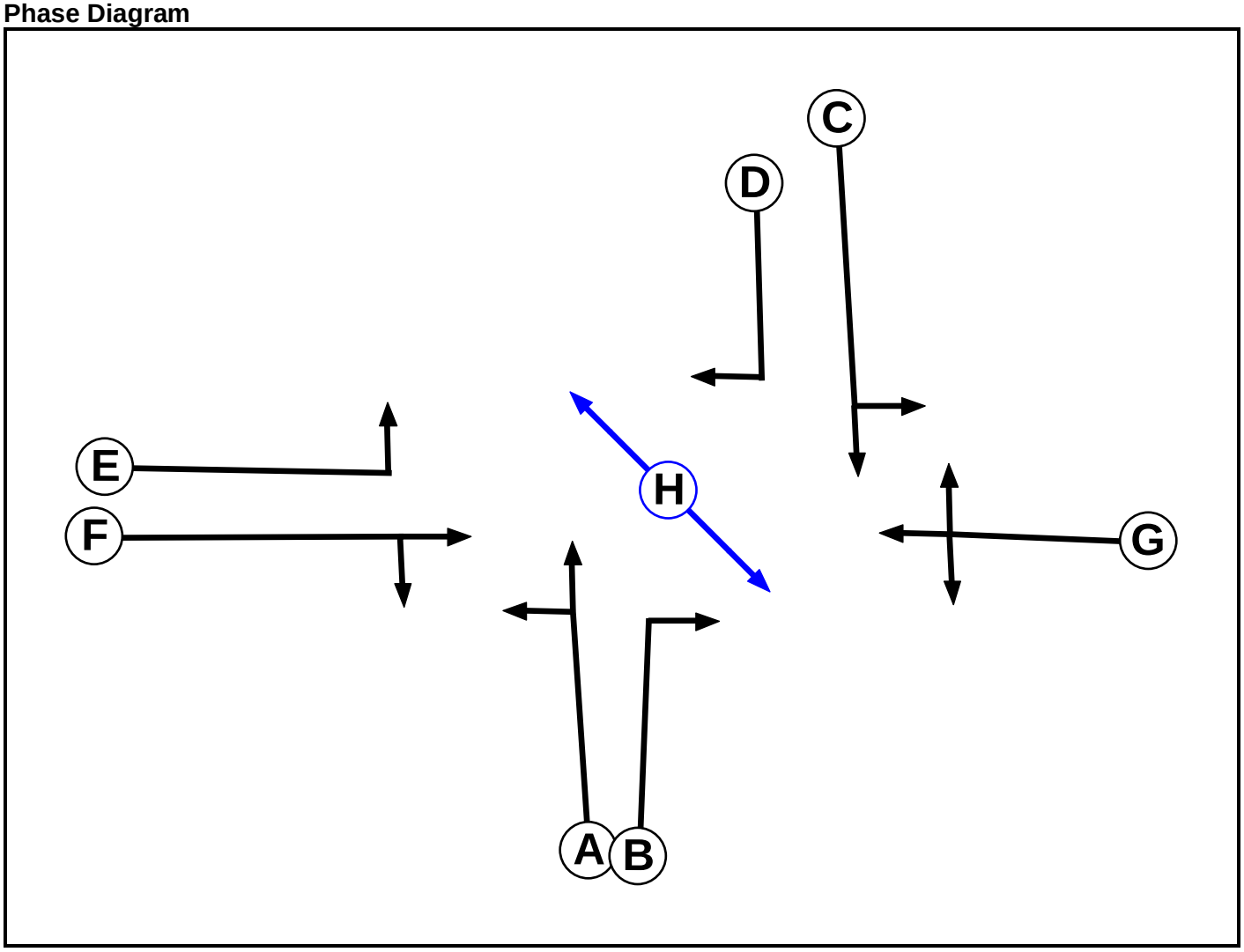
Basic Results Summary

C2

Signal Timings Diagram



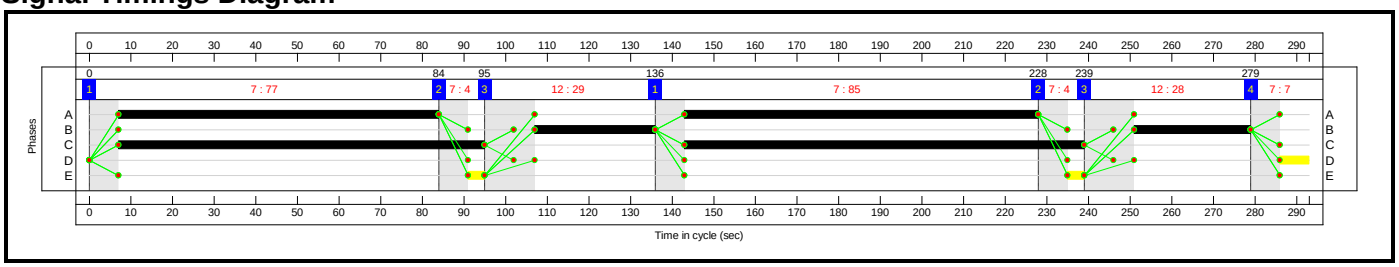
Phase Diagram



Scenario 9: 'AM 2038 + Dev' (FG9: 'AM 2038 + Dev', Plan 1: 'Network Control Plan 1')

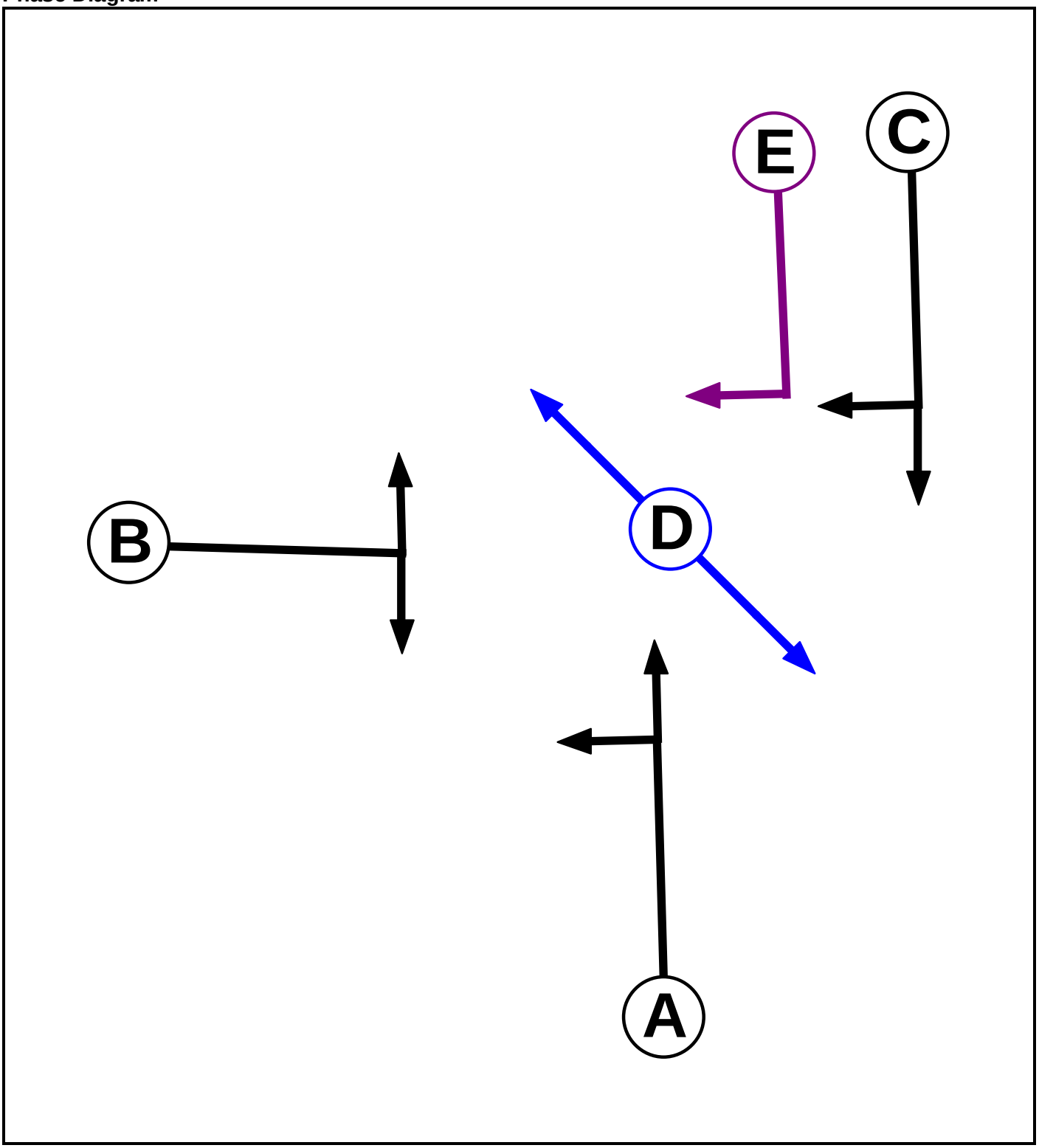
C1

Signal Timings Diagram



Basic Results Summary

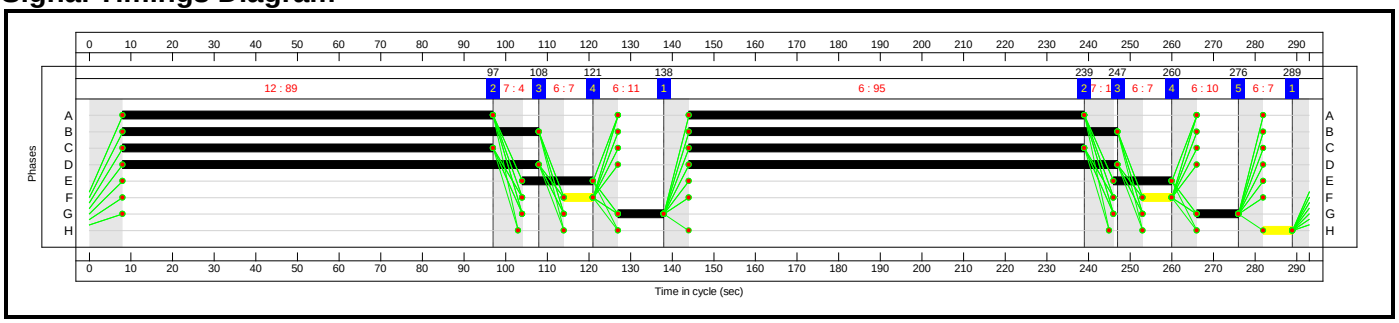
Phase Diagram



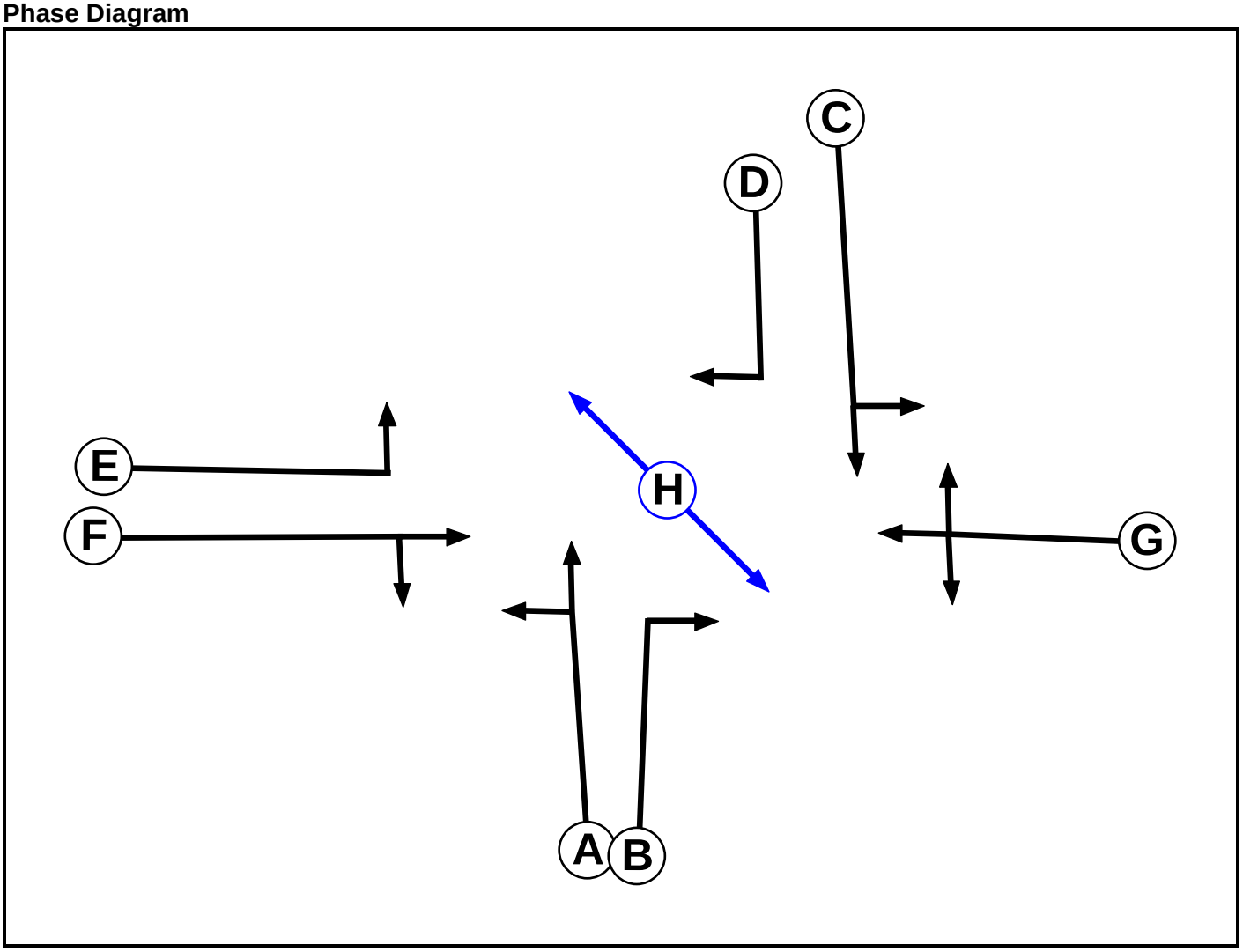
Basic Results Summary

C2

Signal Timings Diagram



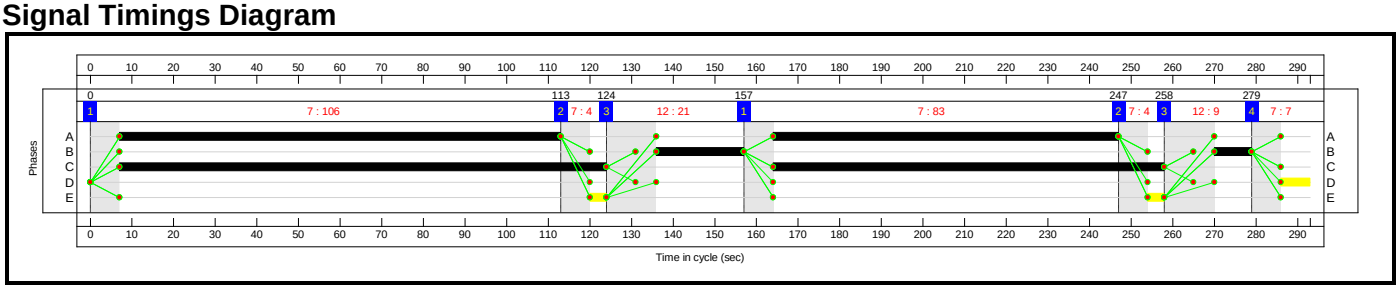
Phase Diagram



Scenario 10: 'PM 2038 + Dev' (FG10: 'PM 2038 + Dev', Plan 1: 'Network Control Plan 1')

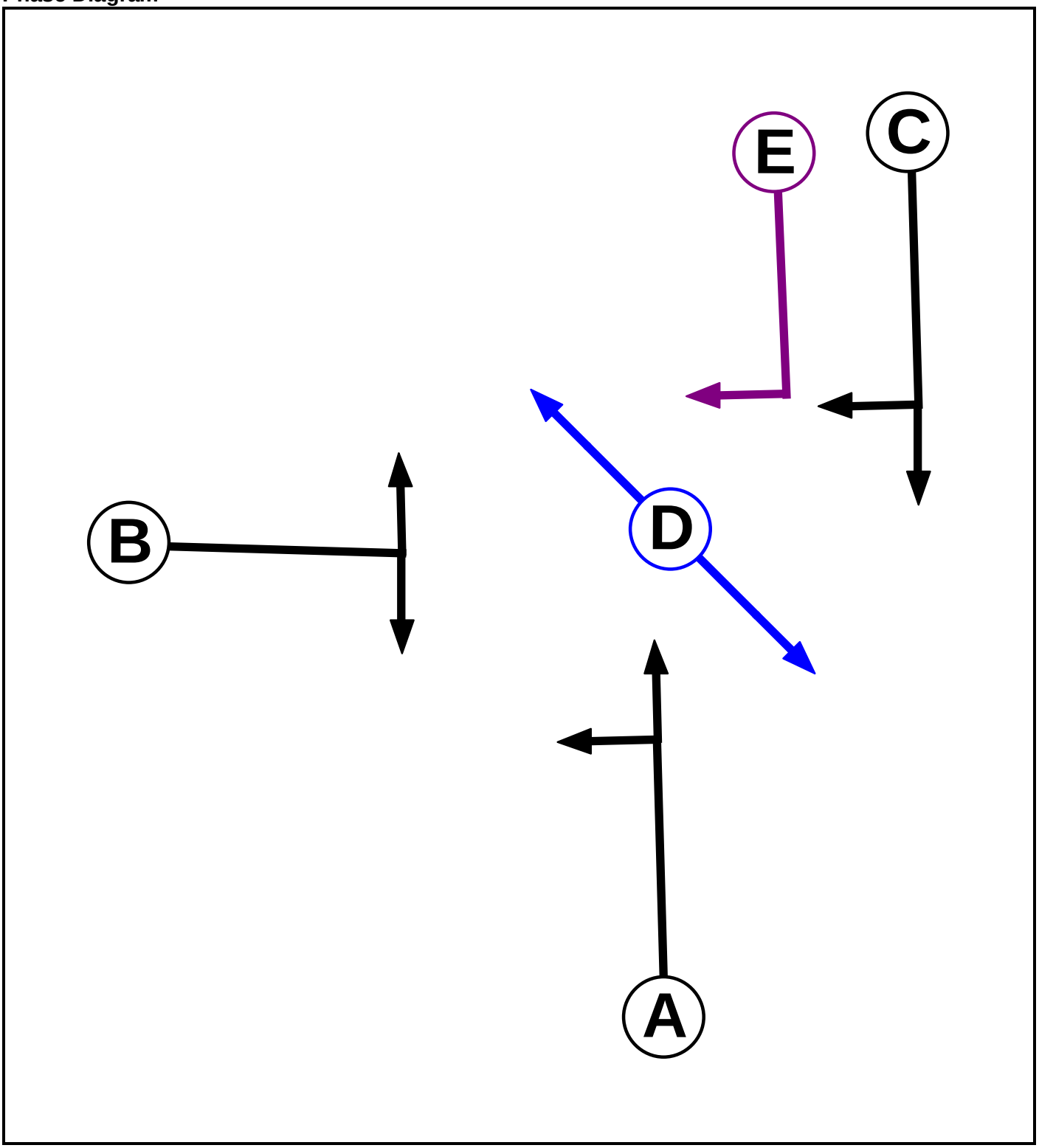
C1

Signal Timings Diagram



Basic Results Summary

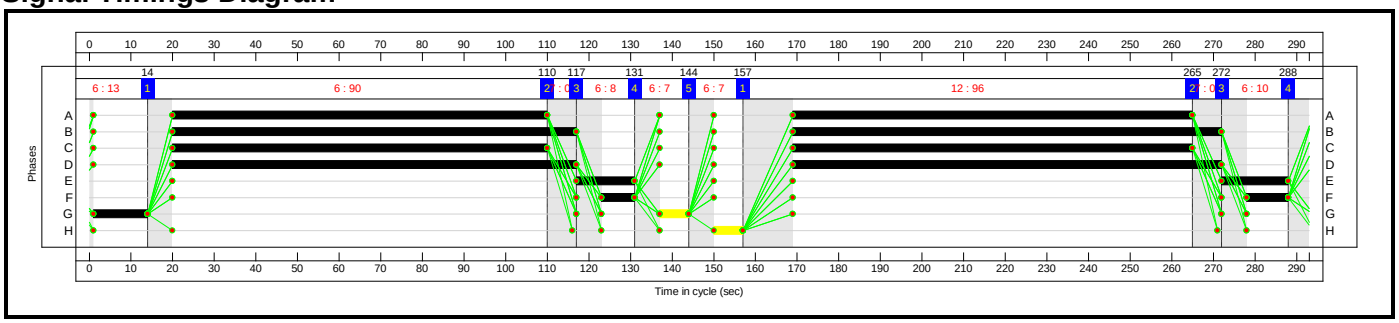
Phase Diagram



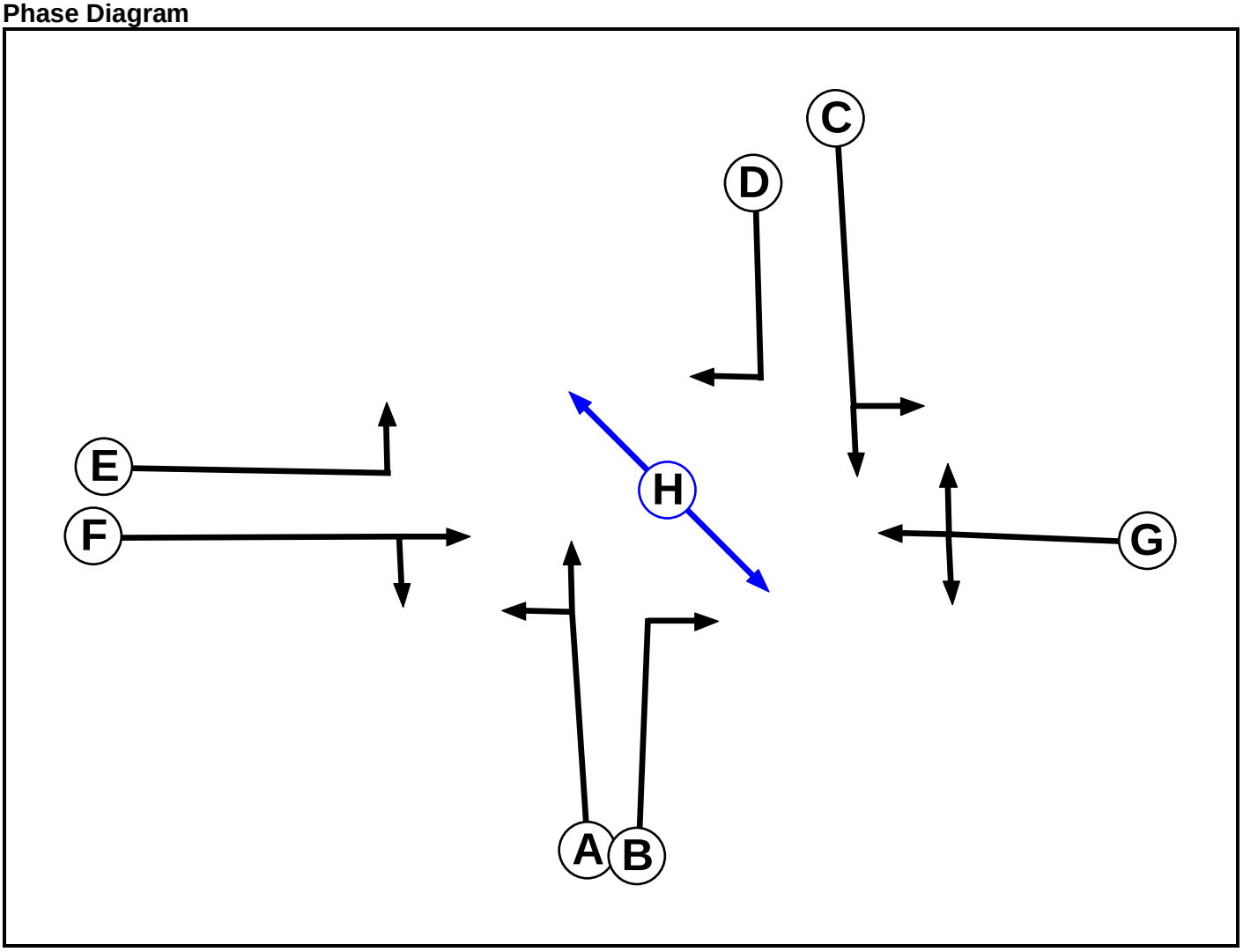
Basic Results Summary

C2

Signal Timings Diagram



Phase Diagram



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