Volume III – Appendices to Environmental Impact Assessment Report



LARGE SCALE RESIDENTIAL DEVELOPMENT PLANNING APPLICATION

RESIDENTIAL & COMMERCIAL DEVELOPMENT

LANDS LOCATED OFF FLEMINGTON LANE, BALBRIGGAN, CO. DUBLIN

November 2023

SUBMITTED ON BEHALF OF:
Dean Swift Property Holdings
Unlimited Company,
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Dun Laoghaire,
Co. Dublin

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APPENDIX 4.1

Refurbishment Demolition Asbestos Survey

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Refurbishment Demolition Asbestos Survey



Client: Dean Swift Property Holdings
Unit 2C Fingal Bay Business Park
Balbriggan
Co. Dublin

Contact: Emma Conneely

Site Address: Flemington
Balrothery East
Balbriggan
Co. Dublin , K32 KR40

Date: 13/10/2023

Surveyor: Neal Christopher

Survey No.: A-02418

Report Issue: Final

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1. Executive Summary

A Refurbishment Demolition Asbestos Survey has been undertaken to Flemington, Balrothery East, Balbriggan, Co. Dublin, K32 KR40 by Asbestos Safe. The survey was intrusive and was limited to accessible areas.

The site consists of the main dwelling and 3 no. outbuildings.

The survey was carried out by Neal Christopher and completed on 13/10/2023.

During the survey the following Asbestos Containing Materials (ACMs) were identified:

Flemington				
Sample No.	**Relevant Report Section**	**Location – Description**	**Result**	**Material Assessment Algorithm**
S001	8	External Main House Roof (001) - Roof Slate - Cement Product	**Chrysotile**	3

No Other Asbestos Containing Materials (ACMs) were detected during the survey.

This report cannot be used for contractual or engineering purposes unless this sheet is signed where indicated by the surveyor. The report must also be designated 'final' on the cover sheet.

Please note that Asbestos Safe cannot be held responsible for the way in which a client interprets or acts upon the results.

This report must be read in its entirety including any appendices. Asbestos Safe accepts no responsibility for sub-division of this report.

This report is for the sole use of Dean Swift Property Holdings and can be assigned to any third party, with the expressed written consent of Asbestos Safe.

Signed:  Date: 18 October 2023

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2. Introduction

Asbestos Safe have carried out a Refurbishment Demolition Asbestos Survey to Flemington, Balrothery East, Balbriggan, Co. Dublin, K32 KR40 on 13/10/2023.

Asbestos Safe have been requested to provide the following services:

- To provide an experienced asbestos survey team to site to carry out a refurbishment demolition asbestos survey, as outlined in HSG 264 Asbestos: The Survey Guide.
- To take representative samples of any materials suspected of containing asbestos and to analyse these in accordance with HSE document HSG 248 – 'Asbestos: The analysts' guide for sampling, analysis and clearance procedures.
- To prepare a detailed written report showing the location, extent and condition of all identified asbestos installations along with any remedial recommendations necessary.
- The data from the reports will also be used to assist in the customer's duty to manage asbestos and to provide suitable & sufficient risk assessments for staff & contractors.

NOTE: Material risk assessment scores have been included in this report to assist the customer in future management plans.

This document was written by Neal Christopher on 18 October 2023.

This survey report must be read in conjunction with any other associated asbestos survey reports, and also read in conjunction with Section 1 Executive Summary, 8 Asbestos Data Sheets, 9 Laboratory Analysis Results, 10 Asbestos Register, 11 Specific Exclusions and Caveats, and 13 Conclusions and Recommendations.

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3. Survey Type

Refurbishment & Demolition Survey

A refurbishment and demolition survey is needed before any refurbishment or demolition work is carried out. This type of survey is used to locate and describe, as far as reasonably practicable, all ACMs in the area where the refurbishment work will take place or in the whole building if demolition is planned. The survey will be fully intrusive and involve destructive inspection, as necessary, to gain access to all areas, including those that may be difficult to reach. A refurbishment and demolition survey may also be required in other circumstances, eg when more intrusive maintenance and repair work will be carried out or for plant removal or dismantling.

In this type of survey, the asbestos is identified so it can be removed (rather than managed). This survey does not normally assess the condition of the asbestos, other than to indicate areas of damage or where additional asbestos debris may be present. Where the materials sampled are found to contain asbestos, other similar materials or components have been presumed to contain asbestos. As part of the Refurbishment & Demolition Survey the current condition of any proven or presumed ACMs will be recorded. Any urgent remedial works required to reduce the risk of exposure to airborne asbestos fibres will be highlighted. Any areas which need further investigation will also be highlighted.

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4. Survey Methodology

The external and internal areas were inspected to visually locate those materials suspected of containing asbestos. Where required, representative samples of materials suspected of containing asbestos were taken in a safe and controlled manner as per guidelines set out in HSG 264. Materials of a similar type were representatively sampled on the assumption that surfaces identical to a sampled location were of a similar composition.

5. Sample Analysis

Bulk samples of suspected Asbestos Containing Materials were taken to determine the nature and extent of the material, and the results of the laboratory analysis can be found in section 8. Laboratory Analysis Results. The bulk sampling was carried out in accordance HSG 248 Asbestos: The analysts' guide for sampling, analysis and clearance procedures. Samples were taken in grip seal bags and the sample location has been safely sealed to reduce the risk of airborne asbestos fibre release.

Sample analysis was carried out by UKAS accredited laboratory G&L Consultancy Ltd. The analysis of the bulk samples is conducted using polarised light microscopy.

Photographs were taken of all sample locations unless otherwise stated. Materials of a similar type were only occasionally sampled, as it was assumed that other similar materials visually inspected were of a similar composition.

6. Asbestos Containing Materials in Buildings (ACMs)

Sprayed coatings applied in Ireland were typically a mixture of hydrated asbestos cement containing up to 85% asbestos, mainly amosite but crocidolite and mixtures have been used. Primarily used for anti-condensation and acoustic control and fire protection to structural steelwork. It is a friable material but if in a good condition and unlikely to be disturbed presents no immediate danger, however it is likely to release fibres, if disturbed especially during repair and maintenance work. As it ages the binding medium of sprayed asbestos may degrade with the consequent release of more fibres.

Thermal insulation to boilers, vessels, pipe work, valves, pumps etc also known as hand applied lagging. Lagging may have a protective covering of cloth, tape, paper, metal or a surface coating of cement. All types of asbestos may be found in lagging and the content can vary between 15 and 85% asbestos with the protective papers being up to 100% chrysotile. The likelihood of fibre release depends upon its composition, friability and state of repair, but it is particularly susceptible to damage and disturbance through maintenance work or the action of water leaks.

Asbestos insulating boards usually contain between 16 to 40% amosite, although boards may be found to contain other types of asbestos and in other quantities. Insulating boards were developed in the 1950s to provide an economical, lightweight, fire resisting insulating material. As insulation board is semi-compressed it is more likely to release fibres as a result

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of damage or abrasion. Work on asbestos insulation board can give rise to high levels of asbestos fibre.

Asbestos cement products as in roofing slates, wall cladding, permanent shuttering, flue, rainwater and vent pipes generally contain 10 to 15% of asbestos fibre bounded in Portland cement, some flexible boards contain a small proportion of cellulose. All three types of asbestos have been used in the manufacture of asbestos cement. The asbestos fibres in asbestos cement are usually firmly bound in the cement matrix and will be released only if the material is mechanically damaged or as it deteriorates with age.

Ropes seals and yarns are usually high in asbestos content, approaching 100% and all three types of asbestos have been used in their manufacture. They were used as in the pipe lagging process and in pipe jointing and also for packing materials as in heat/fire resistant boiler, oven and flue sealing or anywhere thermal of fire protection was required. The risk of fibre release depends upon the structure of the material; bonded gasket material is unlikely to release asbestos but an unbonded woven material may give rise to high fibre release especially if when damaged or frayed.

Cloth, thermal insulation and lagging including fire resistant blankets, mattresses and protective curtains, gloves, aprons, overalls etc. All types of asbestos have been used in the manufacture but since the mid 60's the majority has been chrysotile, the content of which can be up to 100 %.

Millboard, paper and CAF gaskets usually have an asbestos content approaching 100% with all three types of asbestos being used in their manufacture. They were used for insulation of electrical equipment and for thermal insulation. Asbestos paper has been used as a laminate for fireproofing to various fibre panels. These materials are on some occasions not well bonded and will release asbestos fibres if subject to abrasion and wear.

Bitumen felts, coatings and sink pads may contain asbestos either bound in the bitumen matrix or as an asbestos paper liner. These materials are not likely to present a hazard during normal installation or use but, should be removed and disposed of in compliance with any regulation applicable.

Thermoplastic floor tiles can contain up to 25% asbestos usually chrysotile, PVC vinyl floor tiles and unbacked PVC flooring normally 7-10% chrysotile and asbestos paper backed PVC flooring the paper backing may contain up to 100% chrysotile. Fibre release is not normally an issue but may occur when the material is cut or subjected to abrasion.

Textured coatings or decorative coatings on walls and ceilings usually contain 3-5% chrysotile. Fibre release may occur when subjected to abrasion.

Mastics, sealants, putties and floor tile adhesives may contain small amounts of asbestos. The only possible risk is from sanding of hardened material when appropriate precautions should be taken.

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Reinforced plastic and resin composites, used for toilet cisterns, seats, banisters, window seals, lab bench tops, brakes and clutches in machines. The plastics usually contain 1-10% chrysotile and were used in for example car batteries to improve the acid resistance. Resins may contain between 20 and 50% amosite, but because of its composition fibre release is likely to be low.

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7. Material Assessment Algorithms

HSG 264 calls for all samples identified as being ACMs to be subject to a Material Assessment Algorithm, in order to assess the potential for fibre release when subject to a standard disturbance. The factors to be considered are;

A	Product Type	Scored 1-3
B	Extent of Damage or Deterioration	Scored 0-3
C	Surface Treatment	Scored 0-3
D	Asbestos Type	Scored 1-3

For each of these factors a score is allocated and the results are added together to give a result between 0 and 12. Scores are interpreted as follows:

<5:	Very Low
5-6:	Low
7-9:	Medium
>9:	High

This material assessment purely assesses the condition of the material. It identifies the materials that present a higher risk of fibre release if disturbed. This algorithm does not automatically mean that those materials with a higher score should be given a higher priority for remedial work. Rather, this score should be considered along with other factors involved, such as the location of the material (for example; outside, inside, in plant areas, by or in ventilation systems), its extent, occupancy and the type of activity likely to affect it. Factors effecting such activity are, for example, that it may be only accessed during major works or alternatively, occupants undertake actions which may easily disturb it during everyday activity.

Priority Assessment Algorithm

The priority assessment involves combining the materials assessment with the human exposure potential for the ACM's based on the likely use and maintenance activities in the locations where ACM's were found. Using these risk algorithms we can assign a priority action for dealing with the risk from the ACM's found.

A	Normal Occupant Activity	Main type of activity in the area	Scored 0-3
		Secondary activities for the area	Scored 0-3
	Average of score from main activity and secondary activity (max score of 3)		
B	Likelihood of Disturbance	Location	Scored 0-3
		Accessibility	Scored 0-3
		Extent/amount	Scored 0-3
	Average score from location, accessibility and extent/amount (max score of 3)		
C	Human Exposure Potential	Number of occupants	Scored 0-3
		Frequency of use of area	Scored 0-3
		Average time area is in use	Scored 0-3
	Average score from no. of occupants, frequency of use and average time (max score of 3)		
D	Maintenance Activity	Type of maintenance activity	Scored 0-3
		Frequency of maintenance activity	Scored 0-3
	Average score from type of maintenance and frequency of maintenance (max score of 3)		

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TOTAL PRIORITY ASSESSMENT SCORE
(this is the occupant activity score added together with the three average scores) (maximum score of 12)

TOTAL OVERALL SCORE
(this is the Material Assessment Score added to the Priority Assessment Score) (maximum score of 24)

The Total Overall Score can be interpreted as follows:

<11:	Very Low risk
12-17:	Medium risk
>18:	High risk

These are colour coded within our Asbestos Safety Data sheets as above.

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8. Asbestos Data Sheets

ASBESTOS SAFETY DATA SHEET

Survey No.	A-02418
Survey Type	RDAS
Survey Date	13/10/2023
Surveyor	Neal Christopher
Client Name	Dean Swift Property Holdings
Site Address	Flemington Balrothery East Balbriggan Co. Dublin , K32 KR40
Location	External Main House Roof (001) - Roof Slate
Sample Range	S001
Extent	





MATERIAL ASSESSMENT ALGORITHM

Product type	Cement Product	Score	1
Extent of damage/deterioration	Good condition	Score	0
Surface treatment	Sealed	Score	1
Asbestos type	Chrysotile	Score	1
		Total	**3**

RECOMMENDATIONS	Remove

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9. Laboratory Analysis Results

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Training & Asbestos Management

BULK MATERIAL SAMPLE REPORT

Reference No:	J679514	Client Order No:	N/A
Date Received:	17 Oct 2023		
Client Name and Address:	Asbestos Safe (IE), 66 Hollystown Park, Hollystown, Dublin D15 N8X0		
Site Address:	Flemington, Balrothery East, Co. Dublin		
Sampling Officer:	Asbestos Safe (IE)		
Date of Analysis:	17 Oct 2023		
Analyst:	Justin Proctor		
Approving Officer:	Becky Shaw	Signed:	BShaw
Issue Date:	17 Oct 2023		

ANALYSIS RESULTS

Sampling carried out by our own officers follows the procedures documented in our internal method M3: The Sampling of Bulk Materials, for Analysis to Determine the Presence of Asbestos. These samples have been analysed in accordance with internal method M2: The Identification of Asbestos, within Bulk Materials, by the Use of Optical Microscopy. Both these internal methods are based on the standard method as outlined in the HSE Document 'Asbestos: The Analysts' Guide. Any deviations from these standard methods will be recorded in this report. No responsibility is taken for sampling that is not carried out by own officers. Opinions and interpretations expressed herein are outside the scope of our UKAS accreditation. Any comments regarding percentage content is outside the scope of our UKAS accreditation. The material classification is the opinion of the analyst, based on the samples' appearance, as received, and may not accurately reflect the source material on site. Where 'Trace Asbestos' has been reported, only 1 or 2 fibres or fibre bundles have been identified and analysed as asbestos following a thorough examination of the sample. All samples are analysed at one of our UKAS accredited laboratories in Somerset or Northern Ireland. This report must not be reproduced, except in full, without the written permission of the laboratory. These samples will be retained within this laboratory for a period of six months prior to disposal at a licensed asbestos disposal site, unless the client makes alternative arrangements. Reports will be retained for a minimum of five years following the date of issue. For advice concerning these materials, risk assessments, removal procedures or information regarding the current legislation for work with asbestos containing materials, please contact G&L Consultancy Ltd.

Site Ref	Lab Ref	Description	Analysis Result	Classification
A-02418-S01	BS205952	Roof - Slate	Chrysotile	Asbestos Cement

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Company Directors: Mrs J Lewis and Mr P Lewis. VAT Registration Number 729 1092 34
Registered Office: Unit 5A, Castle Road, Chelston Business Park, Wellington, Somerset, TA21 9JQ
G&L Consultancy Ltd is a company registered in England and Wales with a Company Number: 3687929

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10. Asbestos Register

Flemington								
Sample No.	**Relevant Report Section**	**Location – Description**	**Qty**	**Result**	**Condition**	**Risk**	**Material Assessment Algorithm**	**Recommended Action**
S001	8	External Main House Roof (001) - Roof Slate - Cement Product		**Chrysotile**	Good condition	Very Low	3	Remove

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11. No Asbestos Detected Register

Sample No.	Location – Description	Photo
No non suspect items found		

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12. Specific Exclusions and Caveats

- No inspection was carried out on live internal electrical or mechanical plant
- No inspection was carried out of any areas outside the agreed scope of works
- Safe access was not available to all areas of main dwelling

All reasonable steps have been taken to ensure that the contents and findings of this report are accurate and true. Although every effort is made to locate all asbestos containing materials, it is impossible to rule out the likelihood that undiscovered asbestos containing materials may be present. If the building is to undergo major refurbishment/demolition, it is recommended that the persons carrying out the work are made aware of this and take sufficient precautions, as may be appropriate, to ensure the health and safety of themselves or their employees and any other parties who may be affected by the works.

13. Legislation and Code of Practice

The Safety, Health and Welfare at Work (Exposure to Asbestos) Regulations 2006 amended 2010, apply to work where there is or maybe asbestos fibres present. These regulations apply to any person or employer working with or removing asbestos.

In addition, The Safety, Health and Welfare at Work (Construction) Regulations 2013 also apply to any building, installation, repair, demolition and asbestos removal works.

14. Conclusions and Recommendations

The Asbestos Cement slate, located on the main house roof, contains Chrysotile asbestos.

The AC slate must be removed by a competent asbestos contractor prior to demolition. The resulting wasye must be disposed of as 'Asbestos Waste' at a licensed facility. On completion of the works a Certificate of Cleanliness must be issued by an independent asbestos analyst.

Safe access to the full property was not available at time of survey. Further investigation will be required at demolition stage. It must be presumed that there are further Asbestos Containing Materials within the main dwelling.

There are no Asbestos Containing Materials in the 3 x outbuildings.

No Other Asbestos Containing Materials (ACMs) were detected during the survey.

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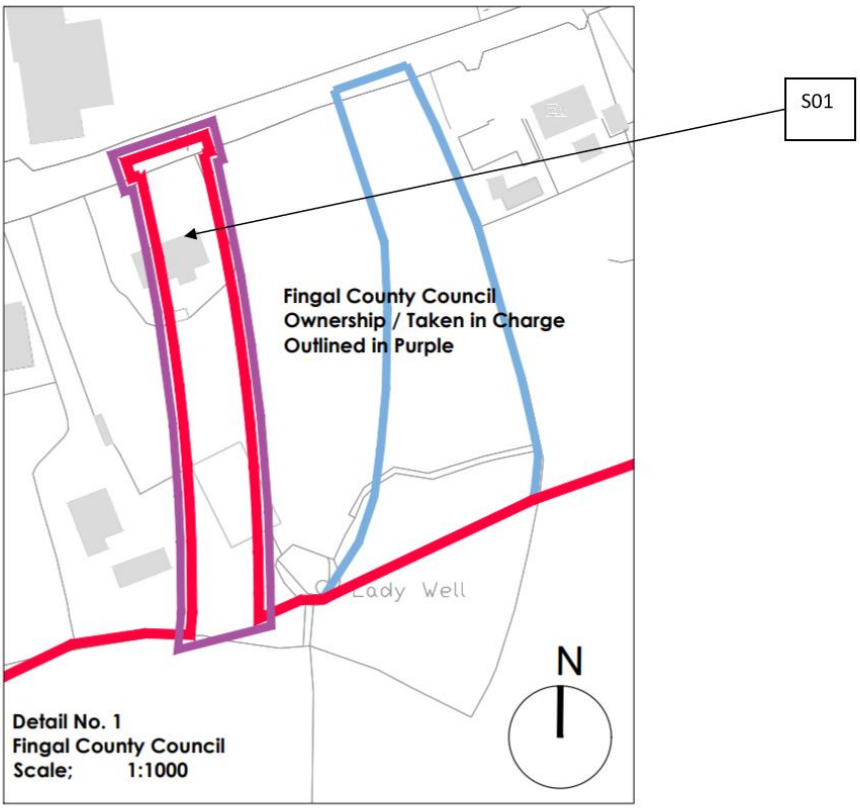
15. Drawings



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APPENDIX 5.1

Bat Fauna Assessment

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Appendix 5.1. Bat Fauna Assessment



26th June 2023

Prepared by: Bryan Deegan (MCIEEM) of Altemar Ltd.
On behalf of: Dean Swift Holdings Unlimited.

Altemar Ltd., 50 Templecarrig Upper, Delgany, Co. Wicklow. 00-353-1-2010713.
info@altemar.ie
Directors: Bryan Deegan and Sara Corcoran
Company No.427560 VAT No. 9649832U
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SUMMARY

Structure:	A single derelict bungalow is located at the north end of the site. A metal shed is also located on site.
Location:	A site located at Balbriggan, Co. Dublin.
Bat species present:	Common pipistrelle (*Pipistrellus pipistrellus*), soprano pipistrelle (Pipistrellus pygmaeus), and Leislers bat (*Nyctalus leisleri).*
Proposed work:	Residential Development.
Impact on bats:	Foraging activity of three bat species. Soprano pipistrelle (*Pipistrellus pygmaeus*), Common pipistrelle (*Pipistrellus pipistrellus*), and Lesser Noctule (*Nyctalus leisleri*). were noted along the hedgerows and in the grassland habitats on site. No trees of high bat roosting potential are to be felled. Lighting in the residential development has been designed to comply with bat lighting guidelines and no lighting is proposed in large open spaces on site. Approximately 1km of hedgerow will be planted. Foraging would be expected to continue on site. Mitigation measures are proposed. The overall impact following the implementation of mitigation be a Minor adverse / International / Negative Impact / Not significant / long term impact.
Survey by:	Bryan Deegan MCIEEM
Survey date:	20th April 2021, 08th June 2023, 13th June 2023, 27th June 2023.

Receiving Environment

Background

A ten-year permission for a Large-scale Residential Development (LRD) at this site at Lands off Flemington Lane, Balbriggan, Co. Dublin.

The proposed development will consist of the following:

(i) The demolition of an existing single storey dwelling (151sq.m) (Eircode K32 KR40), associated single-storey storage shed (14.9sq.m), and larger single-storey agricultural shed outbuilding (366sq.m), all of which are located to the south of Flemington Lane.

(ii) The construction of 564 no. dwelling units, consisting of 378 no. houses ranging in height from two to three storeys (127 no. terraced two-bedroom houses; 5 no. three-bedroom detached houses; 156 no. three-bedroom semi-detached houses; 76 no. three-bedroom terraced houses; and 14 no. four-bedroom detached houses); 28 no. duplex blocks, ranging in height from two to three storeys, comprising 84 no. duplex units (22 no. one-bedroom duplexes, 36 no. two-bedroom duplexes and 26 no. three-bedroom duplexes) and 10 no. apartment blocks (FM1, FM2, M1, M2, FP1, HN1, HC1, HC2, HC3, and HS1) ranging in height from three to five storeys, comprising 102 no. apartments (35 no. one-bedroom apartments and 67 no two-bedroom apartments). The proposed development is set out into 5 no. key Character Areas as follows; Hampton Park South (southern-most portion of the site), Hampton Park Central (central-western portion of the site), Tanners Lane (central-eastern portion of the site), Hampton Park North (north-western portion of the site) and Flemington Park (north-eastern portion of the site). The number and mix of units comprised within each of these Character Areas is detailed as follows:

(a) Hampton Park South Character Area - containing a total of 103 no. dwelling units, consisting of 71 no. houses, all of which are two storeys in height (46 no. three-bedroom semi-detached houses, 1 no. three-bedroom detached house, 8 no. three-bedroom terraced houses, and 16 no. two-bedroom terraced houses); 5 no. duplex blocks, ranging in height from two to three storeys, consisting of (5 no. one-bedroom duplexes; 9 no. two-bedroom duplexes and 4 no. three-bedroom duplex) and 1 no. apartment block (HS1) which is four storeys in height and consist of 14 no. apartments (6 no. one-bedroom units; 8 no. two-bedroom units).

(b) Hampton Park Central Character Area - containing a total of 142 no. dwelling units, consisting of 88 no. houses ranging in height from two to three storeys (26 no. three-bedroom semi-detached houses; 22 no. three-bedroom terraced houses, 4 no. three-bedroom detached houses and 36 no. two-bedroom terraced houses) 7 no. duplex blocks all of which are three storeys in height, consisting of 18 no. duplex units (2 no. one-bedroom duplexes, 9 no. two-bedroom duplexes and 7 no. three-bedroom duplexes) and 3 no. apartment blocks (HC1, HC2 and HC3) ranging in height from three to five storeys, consisting of 36 no. apartments (17 no. one-bedroom units and 19 no. two-bedroom units). The Hampton Park Central Character Area also comprises 1 no. two storey childcare facility with an area of 354sq.m.

(c) Tanner's Lane Character Area - containing a total of 54 no. dwelling units, consisting of 36 no. houses all of which are two storeys in height (26 no. three-bedroom semi-detached houses; 4 no. three-bedroom terraced houses and 6 no. two-bedroom terraced houses), 3 no. duplex blocks, all of which are three storeys in height, consisting of 12 no. duplex units (1 no. one-bedroom duplex, 6 no. two-bedroom duplexes and 5 no. three-bedroom duplexes) and 1 no. apartment block (M2) which is three storeys in height, consisting of 6 no. apartments (6 no. two-bedroom units).

(d) Hampton Park North Character Area - containing a total of 128 no. dwelling units, consisting of 84 no. houses ranging in height from two to three storeys (28 no. two-

bedroom terraced houses; 38 no. three-bedroom semi-detached houses and 18 no. three-bedroom terraced houses), 8 no. duplex blocks ranging in height from two to three storeys, consisting of 24 no. duplex units (7 no. one-bedroom duplexes; 9 no. two-bedroom duplexes and 8 no. three-bedroom duplexes) and 2 no. apartment blocks (HN1 and M1) ranging in height from three to four storeys, consisting of 20 no. apartments (6 no. one-bedroom units and 14 no. two-bedroom units). The Hampton Park North Character Area also comprises 1 no. two storey childcare facility with an area of 494.6sq.m.

(e) Flemington Park Character Area - containing a total of 137 no. dwelling units, consisting of 99 no. houses all of which are two storeys in height (41 no. two-bedroom terraced houses; 20 no. three-bedroom semi-detached houses, 24 no. three-bedroom terraced houses and 14 no. four-bedroom detached houses); 5 no. duplex blocks ranging in height from two to three storeys, consisting of 12 no. duplex units (7 no. one-bedroom duplexes, 3 no. two- bedroom duplexes and 2 no. three-bedroom duplexes) and 3 no. apartment blocks (FM1, FM2 and FP1) ranging in height from three to four storeys, consisting of 26 no. apartments (6 no. one-bedroom units and 20 no. two-bedroom units). The Flemington Park Character Area also comprises 1 no. two storey childcare facility with an area of 379 sq.m.

All ground floor apartments have access to private terraces; all upper-level apartments have access to private balconies, and all houses have access to private rear gardens.

The proposed development also includes:

(iii) the construction of 9 no. commercial units (totalling 593.2 sq.m.) and 6 No. communal units (totalling 315.1 sqm) all of which are located at the ground floor levels of apartment blocks HS1, HC1, HC2, HC3, HN1 and FP1).

(iv) the construction of 2 no. primary vehicular/pedestrian entrances, one from the southeast (upgrade of existing access from Boulevard Road (also known as Taylor Hill Boulevard)) and one from the north (off Flemington Lane), the construction of a secondary access route from the east (access from Hamlet Lane),the construction of 5 no. tertiary access routes (access from Flemington Park, Hastings Avenue, Hastings Drive, Hastings Lawn and Taylor Hill Grange) and the construction of a new main spine road through the site.

(v) the provision of Class 1 Public Open Space in the form of a playing pitch (c. 2.86ha) located to the east of Clonard Road (also known as Bridgefoot Road) (L1130 Local Road), within the western extent of the subject site, this public park is immediately west of an existing playing field which was approved under a separate application. A number of smaller Class 2 Public Open Space areas and communal open space areas to are also proposed throughout the site.

(vi) a total of 927 no. car parking spaces are proposed, this includes 806 no. resident parking spaces, 94 no. visitor spaces, 11 no. disabled parking spaces (numbers include 162 no. EV points), 7 no. spaces allocated to creche parking and 9 set down spaces. A total of 2,552 2 no. bicycle spaces are proposed, this includes 1,956 no. resident bicycle spaces, 596 no. visitor spaces and includes 48 no. spaces allocated to creche bicycle parking. Planning permission is also sought for landscaping and infrastructural works, foul and surface water drainage, bin storage, 2 no. ESB substations, open space areas including playgrounds, boundary treatments, internal roads, footpaths and cycle paths and all associated site works to facilitate the development. An Environmental Impact Assessment Report (EIAR, formerly known as an EIS) and a Natura Impact Statement (NIS) accompanies the application.

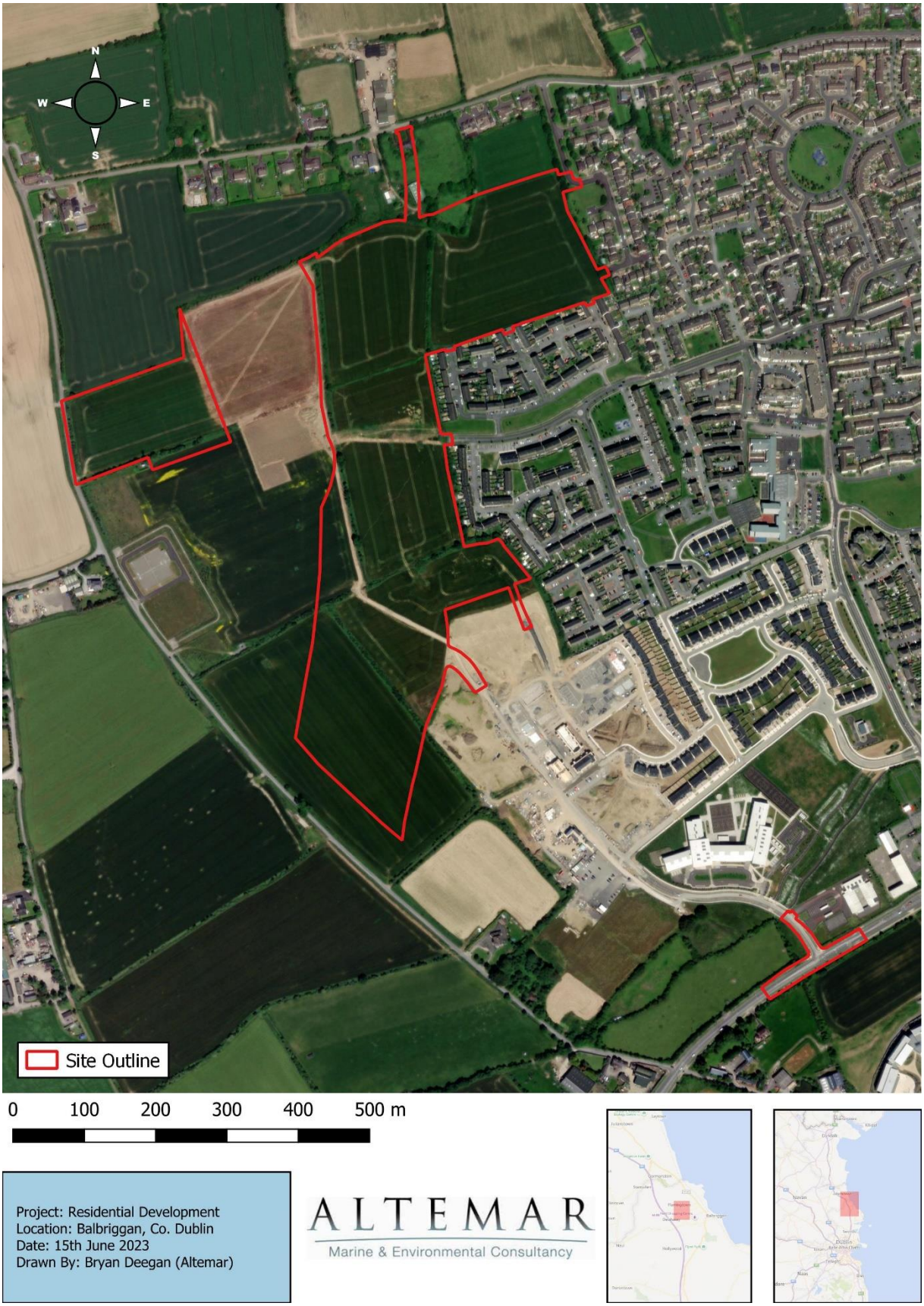

Figure 1. *Proposed site outline and location*

Arborist

An Arboricultural Report has been prepared by Charles McCorkell Arboricultural Consultancy to accompany this planning application. This report details the following arboricultural impact of the proposed development:

'***Loss of trees*** *– The proposed development will require the removal of 29 trees and 9 groups of trees/hedgerows and the partial removal of 8 groups of trees/hedgerows.*

Of the 46 survey entries to be removed or partially removed, 4 are of moderate quality and value (B Category), 39 are of low quality and value (C Category), and 3 are of poor quality (U Category).'

'The loss of trees and hedgerows will have an initial impact on canopy cover and the character and appearance of the surrounding local landscape. As the majority of these trees and hedgerows are of low quality and will be replaced with new high-quality planting, the overall extent of the impact is not considered to be significant.

Site access *– The proposed site access off Clonard Road can be used to facilitate construction works without adversely impacting retained trees and hedgerows.*

Compound area *– The proposed compound area has not yet been designed; however, there is sufficient space available throughout the site to avoid any unnecessary impacts to retained trees and hedgerows.*

Construction operations *– The proposal does not require construction operations within the RPAs of retained trees. No special measures of construction are therefore required.'*

*'**Tree protection measures** – All retained trees and hedgerows can be successfully protected during the proposed development works by using robust fencing measures*.'

The tree removals plan is demonstrated in Figure 2.

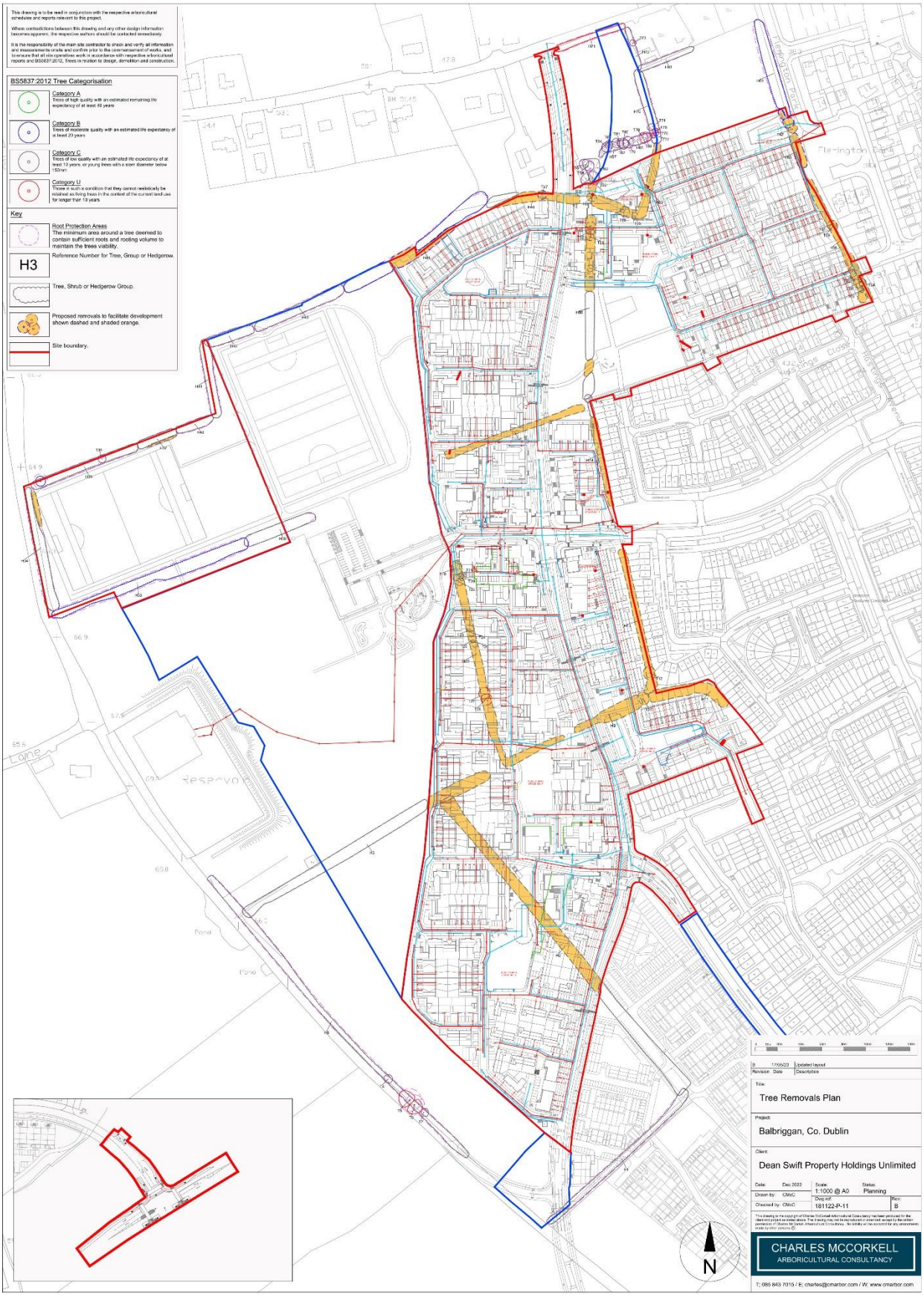

Figure 2. *Tree removals plan*

Lighting

An Outdoor Lighting Report has been prepared by Sabre Electrical Services Ltd. to accompany this planning application. It should be noted that discussions took place with Sabre and the lighting in residential areas is set to 2700ºK (in compliance with bat lighting guidelines). However, spine roads on site are set to 4000ºK (in line with exist road lighting). This report details the following lighting data for the proposed development: The proposed public lighting layout is demonstrated in Figures 3-6.

General Data

Dimensions in Metres Angles in Degrees

Calculation Grids

ID	Grid Name	X	Y	X' Length	Y' Length	X' Spacing	Y' Spacing
1	Grid 1	718164.87	764155.29	281.10	245.28	1.50	1.50
2	Grid 2	717983.10	764108.46	182.86	238.26	1.50	1.50
3	Grid 3	718004.14	763765.06	355.00	343.67	1.50	1.49
4	Grid 4	718004.03	763448.26	284.20	316.17	1.50	1.50
5	Grid 5	718094.69	764019.71	99.00	316.17	1.50	1.50
6	Grid 6	718122.95	763649.98	162.00	328.08	1.50	1.50
7	Grid 7	718111.59	763443.89	108.00	207.00	1.50	1.50
8	Grid 8	718165.56	763668.56	81.00	74.27	1.50	1.46
9	Grid 9	718095.49	764336.14	99.00	144.00	1.50	1.50
10	Grid 10	718121.60	764421.93	54.00	39.00	1.50	1.50

Luminaires



Luminaire A Data

Supplier	C U Phosco
Type	P863-128-R2E-740-W5-425-55W
Lamp(s)	740SS
Lamp Flux (klm)	8.55
File Name	P863-128-R2E-740-W5-425-55W.ies
Maintenance Factor	0.87
Imax70,80,90(cd/klm)	463.7, 84.3, 0.0
No. in Project	52



Luminaire C Data

Supplier	C U Phosco
Type	E950-28-P4A-727-C650-17W
Lamp(s)	727N
Lamp Flux (klm)	2.35
File Name	E950-28-P4A-727-C0650-17W.ies
Maintenance Factor	0.81
Imax70,80,90(cd/klm)	659.3, 183.1, 0.3
No. in Project	150



Luminaire D Data

Supplier	C U Phosco
Type	E950-28-A2A-727-C650-17W
Lamp(s)	727N
Lamp Flux (klm)	2.15
File Name	E950-28-A2A-727-C0650-17W.ies
Maintenance Factor	0.81
Imax70,80,90(cd/klm)	470.3, 22.7, 0.9
No. in Project	3



Luminaire E Data

Supplier	C U Phosco
Type	E950-28-P4A-727-C300-9W
Lamp(s)	727N
Lamp Flux (klm)	1.15
File Name	E950-28-P4A-727-C0300-9W.ies
Maintenance Factor	0.83
Imax70,80,90(cd/klm)	659.3, 183.1, 0.3
No. in Project	11



Luminaire F Data

Supplier	C U Phosco
Type	E950-28-F2A-727-C650-17W
Lamp(s)	727N
Lamp Flux (klm)	2.39
File Name	E950-28-F2A-727-C0650-17W.ies
Maintenance Factor	0.81
Imax70,80,90(cd/klm)	623.6, 113.9, 0.3
No. in Project	2



Luminaire G Data

Supplier	C U Phosco
Type	P863-128-R2E-740-W5-425-55W
Lamp(s)	740SS
Lamp Flux (klm)	8.55
File Name	P863-128-R2E-740-W5-425-55W.ies
Maintenance Factor	0.87
Imax70,80,90(cd/klm)	463.7, 84.3, 0.0
No. in Project	7



Luminaire H Data

Supplier	_Historic Lanterns
Type	MI 36 HF
Lamp(s)	SOX+ 55W
Lamp Flux (klm)	7.80
File Name	TM00067.CIB
Maintenance Factor	0.75
Imax70,80,90(cd/klm)	175.0, 140.0, 49.0
No. in Project	2



Luminaire I Data

Supplier	C U Phosco
Type	P863-128-R2E-740-W5-300-40W
Lamp(s)	740SS
Lamp Flux (klm)	6.11
File Name	P863-128-R2E-740-W5-300-40W.ies
Maintenance Factor	0.87
Imax70,80,90(cd/klm)	463.7, 84.3, 0.0
No. in Project	2

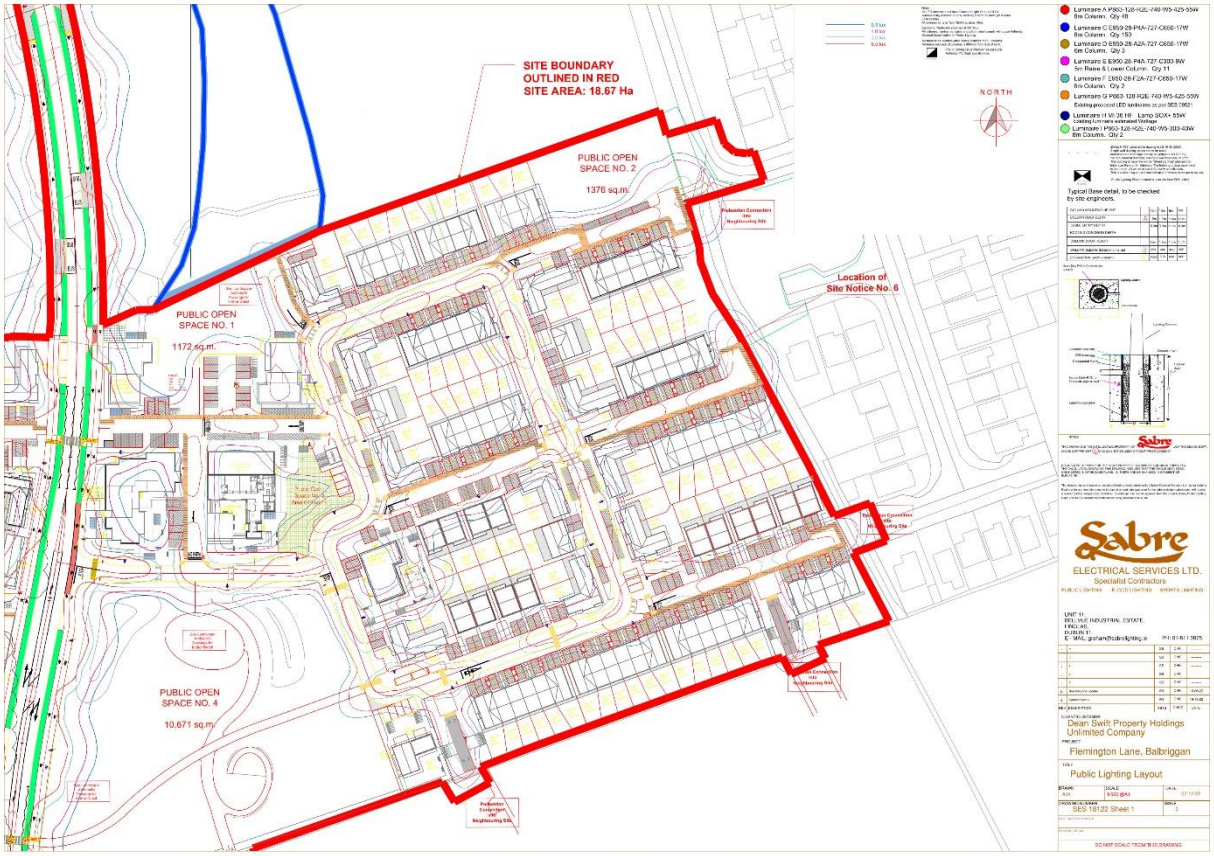

Figure 3. *Public lighting layout (sheet 1)*

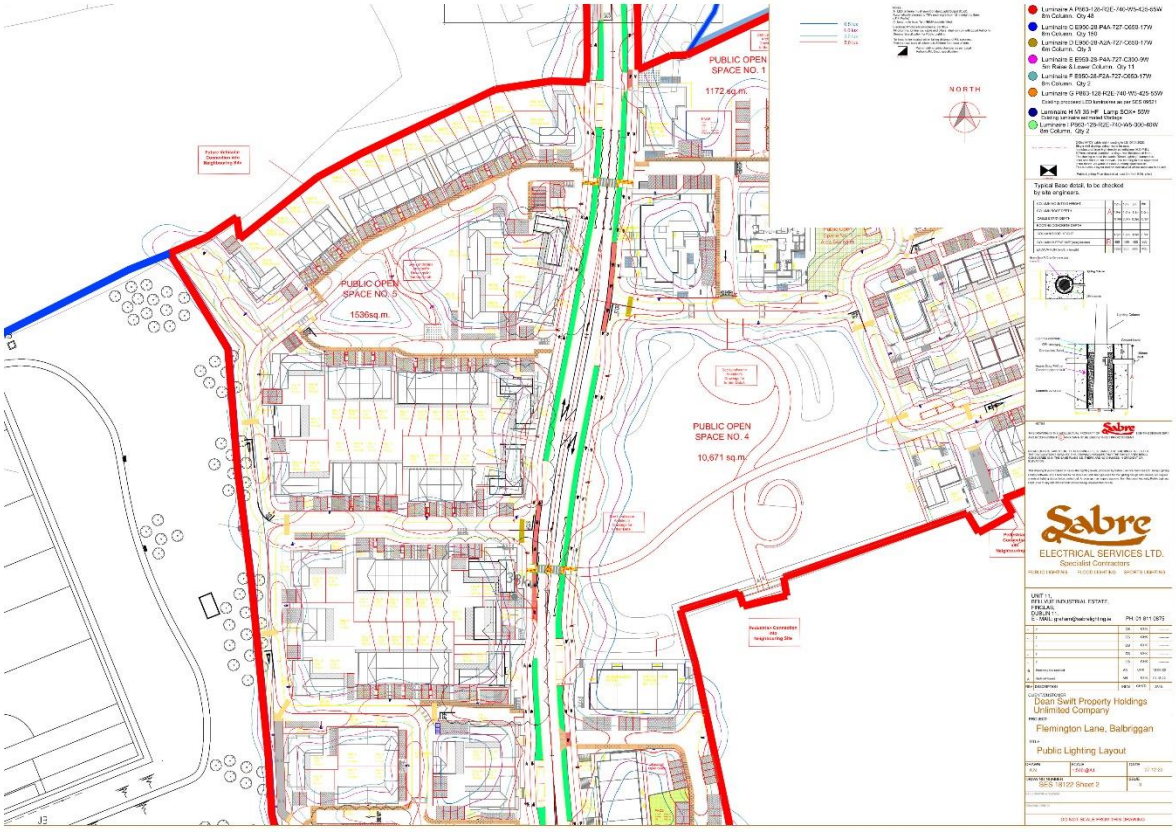

Figure 4. *Public lighting layout (sheet 2)*

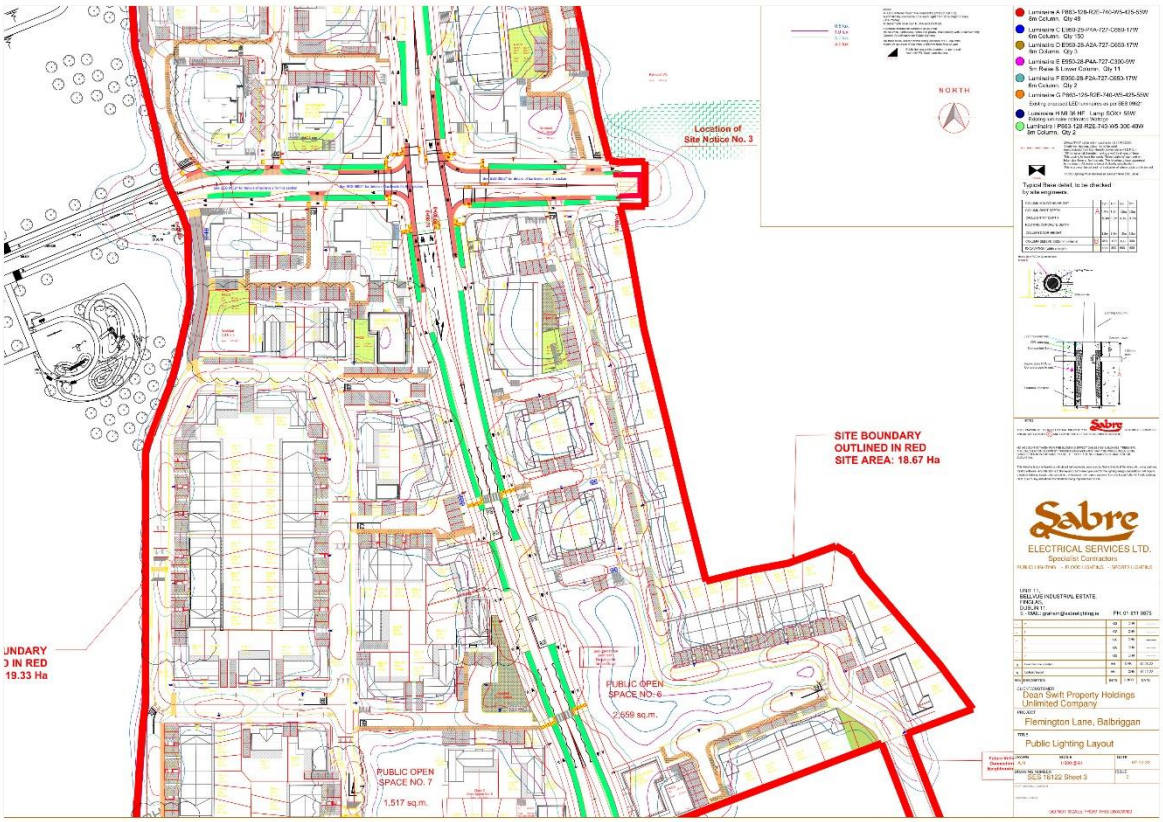

Figure 5. *Public lighting layout (sheet 3)*

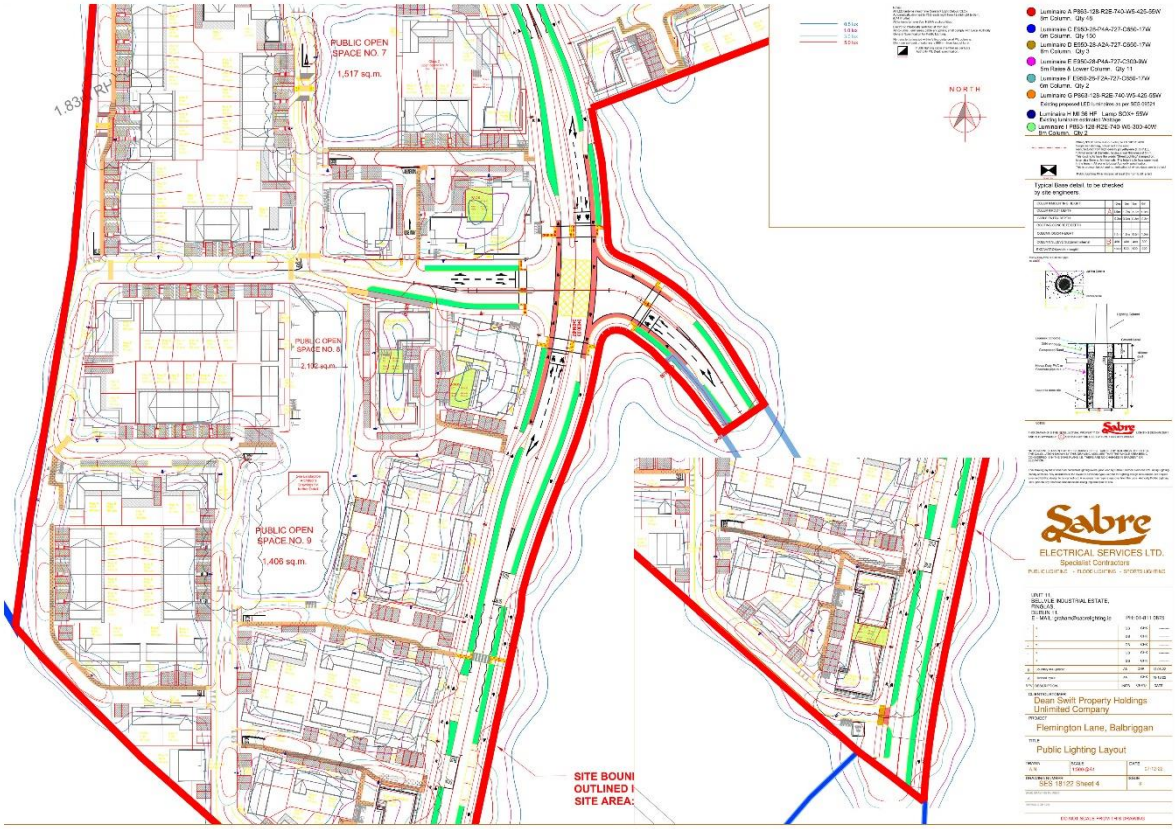

Figure 6. *Public lighting layout (sheet 4)*

Competency of Assessor

This report has been prepared by Bryan Deegan MSc, BSc (MCIEEM). Bryan has over 26 years of experience providing ecological consultancy services in Ireland. He has extensive experience in carrying out a wide range of bat surveys including dusk emergence, dawn re-entry and static detector surveys. He also has extensive experience reducing the potential impact of projects that involve external lighting on Bats. Bryan trained with Conor Kelleher author of the Bat Mitigation Guidelines for Ireland (Kelleher and Marnell (2022)) and Bryan is currently providing bat ecology (impact assessment and enhancement) services to Dun Laoghaire Rathdown County Council primarily on the Shanganagh Park Masterplan. The desk and field surveys were carried out having regard to the guidance: Bat Surveys for Professional Ecologists – Good Practice Guidelines 3rd Edition (Collins, J. (Ed.) 2016) and Marnell, Kelleher and Mullen (2022), Bat Mitigation Guidelines for Ireland V2 (which update and replace the Bat Mitigation Guidelines for Ireland published in 2006).

Legislative Context

Wildlife Act 1976 (as amended by, inter alia, the Wildlife (Amendment) Act 2000).

Bats in Ireland are protected by the Wildlife (Amendment) Act 2000. Based on this legislation it is an offence to wilfully interfere with or destroy the breeding or resting place of any species of bat. Under this legislation it is an offence to "*Intentionally kill, injure or take a bat, possess or control any live or dead specimen or anything derived from a bat, wilfully interfere with any structure or place used for breeding or resting by a bat, wilfully interfere with a bat while it is occupying a structure or place which it uses for that purpose. "*

Habitats Directive- Council Directive 92/43/EEC 1992 on the conservation of natural habitats and of wild fauna and flora has been transposed into Irish Law, including, via, *inter alia*, the European Communities (Birds and Natural Habitats) Regulations 2011 (as amended). See Art.73 of the 2011 Regulations which revokes the 1997 Regulations.

Annex II of the Council Directive 92/43/EEC 1992 on the conservation of natural habitats and of wild fauna and flora (EC Habitats Directive) lists animal and plant species of Community interest, the conservation of which requires the designation of Special Areas of Conservation (SACs); Annex IV lists animal and plant species of Community interest in need of strict protection. All bat species in Ireland are listed on Annex IV of the Directive, while the Lesser Horseshoe Bat (*Rhinolophus hipposideros*) is protected under Annex II which related to the designation of Special Areas of Conservation for a species.

Under the European Communities (Birds and Natural Habitats) Regulations 2011 (as amended), all bat species are listed under the First Schedule and, pursuant to, *inter alia*, Part 6 and Regulation 51, it is an offence to:

- Deliberately capture or kill a bat;
- Deliberately disturb a bat particularly during the period of breeding, hibernating or migrating;
- Damage or destroy a breeding site or resting place of a bat;
- Keep, sell, transport, exchange, offer for sale or offer for exchange any bat taken in the wild.

Bat survey

Onsite trees and walls were inspected for bats and/or their signs using a powerful torch (141 Lumens) – Petzl MYO RXP. The site survey was supplemented by a review of Bat Conservation Ireland's (BCIreland) National Bat Records Database. A bat detector and emergent survey was carried out by Bryan Deegan on the 20th April 2021, 08th June 2023, 13th June 2023 and the 27th June 2023.

Survey methodology

As outlined in Marnell et al. 2022 '*The presence of a large maternity roost can normally be determined on a single visit at any time of year, provided that the entire structure is accessible and that any signs of bats have not been removed by others. However, most roosts are less obvious. A visit during the summer or autumn has the advantage that bats may be seen or heard. Buildings (which for this definition exclude cellars and other underground structures) are rarely used for hibernation alone, so droppings deposited by active bats provide the best clues. Roosts of species which habitually enter roof voids are probably the easiest to detect as the droppings will normally be readily visible. Roosts of crevice-dwelling species may require careful searching and, in some situations, the opening up of otherwise inaccessible areas. If this is not possible, best judgement might have to be used and a precautionary approach adopted. Roosts used by a small number of bats, as opposed to large maternity sites, can be particularly difficult to detect and may require extensive searching backed up by bat detector surveys (including static detectors) or emergence counts.'* In relation to the factors influencing survey results the guidelines outlines the following *'During the winter, bats will move around to find sites that present the optimum environmental conditions for their age, sex and bodyweight and some species will only be found in underground sites when the weather is particularly cold. During the summer, bats may be reluctant to leave their roost during heavy rain or when the temperature is unseasonably low, so exit counts should record the conditions under which they were made. Similarly, there may be times when females with young do not emerge at all or emerge only briefly and return while other bats are still emerging thus confusing the count. Within roosts, bats will move around according to the temperature and may or may not be visible on any particular visit. Bats also react to disturbance, so a survey the day after a disturbance event, may give a misleading picture of roost usage.'*

The survey involved the methodologies outlined in Collins (2016) which included the roost inspection methodologies i.e. external methodology outlined in section 5.2.4.1 and the internal survey outlines in section 5.2.4.2 of the guidelines. In addition, the methodologies for Presence absence surveys (Section 7) was carried out for dust emergent surveys.'

As outlined in Collins (2016) 'The bat active period is generally considered to be between April and October inclusive (although the season is likely to be shorter in northern latitudes). However, because bats wake up during mild conditions, bat activity can also be recorded during winter months.'

Survey Results

Trees as potential bat roosts.

A ground level roost assessment was carried and used to examine the trees on site for features that could form bat roosts. Potential roosting features include heavy ivy growth, broken limbs, areas of decay, vertical or horizontal cracks, cracks in bark etc. There are no trees of high bat roosting potential on site. Several of the large ash neat the metal shed on site are considered to be of low-medium bat roosting potential, primarily as a result of dense ivy growth.

Buildings as potential bat roosts.

No evidence of bat roosting was noted in the buildings on site. No bats were noted emerging from the buildings on site during the site surveys.

Emergent/detector surveys.

Emergent/detector surveys were carried out by Bryan Deegan on the 20th April 2021, 08th June 2023, 13th June 2023, 27th June 2023. The detector surveys were undertaken within the active bat season and the transects covered the entire site multiple times during the night. Weather conditions were good with mild temperatures of greater than 10°C after sunset. Winds were light and there was no rainfall. Insects were observed in flight during both surveys.

As outlined in Collins (2016) in relation to weather conditions '*The aim should be to carry out surveys in conditions that are close to optimal (sunset temperature 10°C or above, no rain or strong wind.), particularly when only one survey is planned…. Where surveys are carried out when the temperature at sunset is below 10°C should be justified by the ecologist and the effect on bat behaviour considered.*' There were no constraints in relation to the surveys carried out. All areas of the site were accessible and weather conditions were optimal for bat assessments.

At dusk, bat detector surveys were carried out onsite using a*n Echo meter touch 2 Pro* detector to determine bat activity. Bats were identified by their ultrasonic calls coupled with behavioural and flight observations.

Foraging activity of three bat species (Common pipistrelle (*Pipistrellus pipistrellus*), soprano pipistrelle (*Pipistrellus pygmaeus*), and Leislers bat (Lesser Noctule) (*Nyctalus leisleri*) were noted on site. Foraging activity of all three species was noted in the vicinity of the hedgerows with some additional activity in the grassland area..

Bat assessment findings

Review of local bat records

The review of existing bat records (sourced from Bat Conservation Ireland's National Bat Records Database) within the four 2km^2 grids that encompass the site (Reference grids O16S, O16R, O16W, O16X) encompassing the study area reveals that five of the nine known Irish species have been observed locally (Table 1). The National Biodiversity Data Centre's online viewer was consulted in order to determine whether there have been recorded bat sightings in the wider area. This is visually represented in Figures 7-9. The following species were noted in the wider area: Daubenton's Bat (*Myotis daubentonii*), Brown Long-eared Bat (*Myotis daubentonii*), Nathusius's Pipistrelle (*Pipistrellus nathusii*), Soprano Pipistrelle (*Pipistrellus pygmaeus*), and Lesser Noctule (*Nyctalus leisleri*) (Figures 7-9).

Table 1: *Status of bat species within the four 2km^2 grids (O16S, O16R, O16W, O16X)*

Species Name	Record Count	Date of Last Record	Note
O16R			
None	*N/A*	*N/A*	*N/A*
O16S			
Brown Long-eared Bat (Plecotus auritus)	*1*	*26/07/2011*	*National Bat Database of Ireland*
Daubenton's Bat (Myotis daubentonii)	*14*	*05/09/2014*	*National Bat Database of Ireland*
Lesser Noctule (Nyctalus leisleri)	*7*	*10/08/2014*	*National Bat Database of Ireland*
Pipistrelle (Pipistrellus pipistrellus sensu lato)	*6*	*28/07/2014*	*National Bat Database of Ireland*
Soprano Pipistrelle (Pipistrellus pygmaeus)	*8*	*28/07/2014*	*National Bat Database of Ireland*
O16W			
None	*N/A*	*N/A*	*N/A*
O16X			
None	*N/A*	*N/A*	*N/A*



Figure 7. *Brown Long-eared Bat (Plecotus auritus) (purple) and Daubenton's Bat (Myotis daubentonii) (yellow) (Source NBDC) (Site location – red circle)*



Figure 8. *Nathusius's Pipistrelle (Pipistrellus nathusii) (yellow), Lesser Noctule (Nyctalus leisleri) (purple), and both Nathusius's Pipistrelle (Pipistrellus nathusii) and Lesser Noctule (Nyctalus leisleri) (orange) (Source NBDC) (Site location – red circle)*



Figure 9. *Soprano Pipistrelle (Pipistrellus pygmaeus) (purple) (Source NBDC) (Site location – red circle)*

Specifically, NBDC records show sightings of bat species in locations that are in close proximity to the subject site:

1. Soprano Pipistrelle (*Pipistrellus pygmaeus*) in grid reference O177643. Recorded on 15/08/2005 and located 185m North of the subject site.
2. Soprano Pipistrelle (*Pipistrellus pygmaeus*) in grid reference O177643. Recorded on 20/07/2006 and located 185m North of the subject site.
3. Soprano Pipistrelle (*Pipistrellus pygmaeus*) in grid reference O177643. Recorded on 29/07/2007 and located 185m North of the subject site.
4. Soprano Pipistrelle (*Pipistrellus pygmaeus*) in grid reference O177643. Recorded on 21/08/2008 and located 185m North of the subject site.
5. Soprano Pipistrelle (*Pipistrellus pygmaeus*) in grid reference O177643. Recorded on 28/07/2014 and located 185m North of the subject site.
6. Lesser Noctule (*Nyctalus leisleri)* in grid reference O177643. Recorded on 26/07/2009 and located 185m North of the subject site.
7. Lesser Noctule (*Nyctalus leisleri)* in grid reference O177643. Recorded on 09/08/2011 and located 185m North of the subject

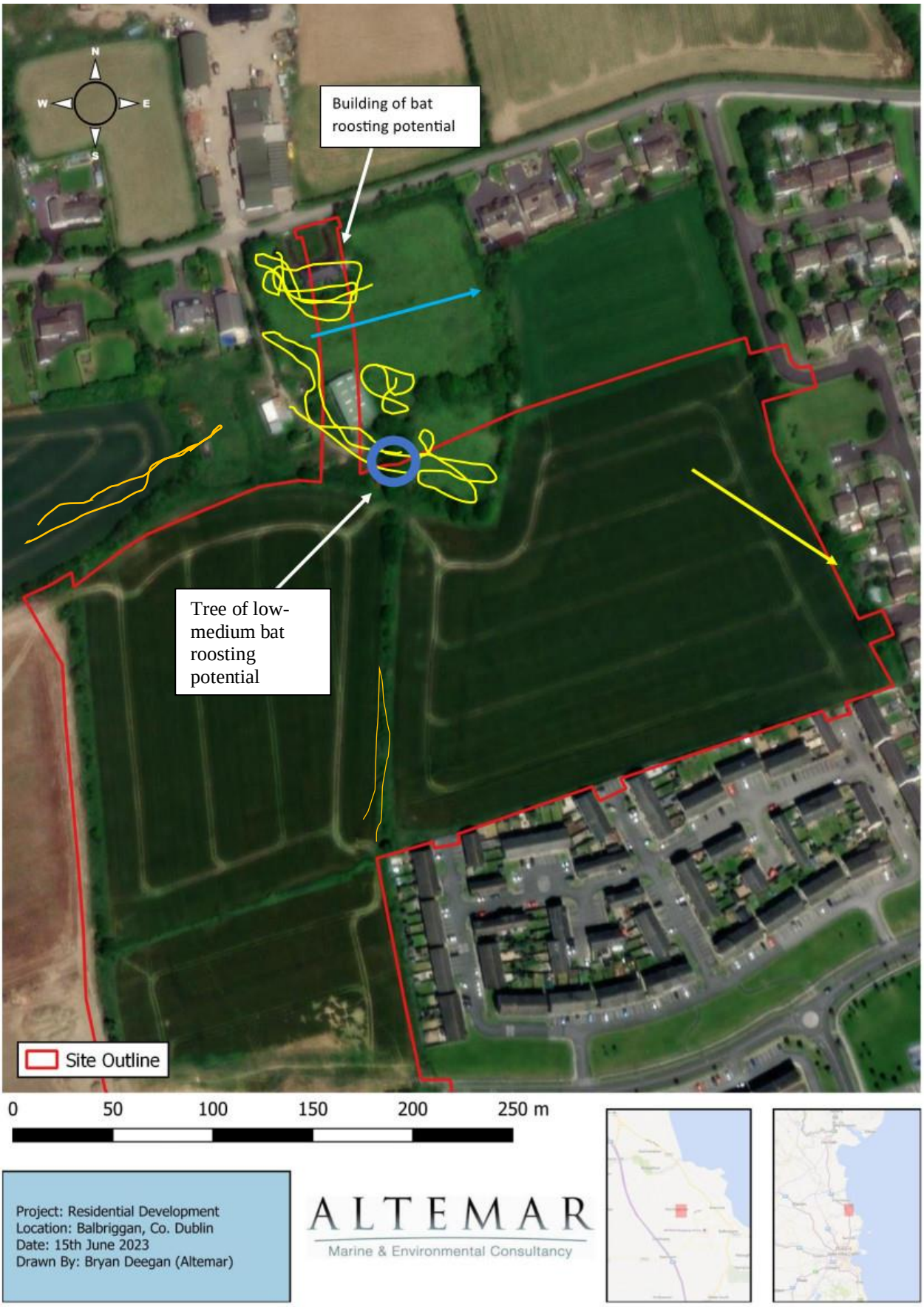

Figure 2. *Bat activity onsite. Common Pipistrelle foraging = yellow (yellow arrow indicates transiting). soprano pipistrelle = orange*

8. Potential Impact of the development on Bats



No definitive bat roosts will be lost due to this development and the species expected to occur onsite should persist in the area. However, in the absence of mitigation the development is likely to displace bats from foraging on the site during construction and operation. The potential for collision risk and impact on flight paths in relation to bats is considered is considered low as the buildings would be deemed to be clearly visible to bats.

Mitigation Measures

As outlined in Marnell et al. (2022) "*Mitigation should be proportionate. The level of mitigation required depends on the size and type of impact, and the importance of the population affected*." In addition as outlined in Marnell et. al (2022) '*Mitigation for bats normally comprises the following elements:*

- *Avoidance of deliberate, killing, injury or disturbance – taking all reasonable steps to ensure works do not harm individuals by altering working methods or timing to avoid bats. The seasonal occupation of most roosts provides good opportunities for this*
- *Roost creation, restoration or enhancement – to provide appropriate replacements for roosts to be lost or damaged*
- *Long-term habitat management and maintenance – to ensure the population will persist*
- *Post-development population monitoring – to assess the success of the scheme and to inform management or remedial operations.*'

No trees of high bat roosting potential to be lost as a result. Three bat species were noted onsite. As a result of the findings of the assessment, the following mitigation will be implemented:

Construction:

- Lighting at all construction stages will be done sensitively on site with no direct lighting of site boundaries and lands to the south of the proposed development.
- Prior to site clearance the ecologist and arborist will assess the site works and oversee habitat protection measures.
- Inspection of buildings on site by a bat ecologist prior to demolition and the control of light spillage on site into adjacent habitats to avoid light spill of the surrounding hedgerows.
- Lighting on site during construction will be subject to approval of the ecologist and will not involve the lighting of the hedgerows.

Operation:

- A project ecologist will be appointed to oversee completion of all landscape, lighting and drainage works.
- Lighting will be carried out as per lighting design.

Predicted Residual Impact of Planned Development on Bats

Foraging activity of three bat species. Soprano pipistrelle (*Pipistrellus pygmaeus*), Common pipistrelle (*Pipistrellus pipistrellus*), and Lesser Noctule (*Nyctalus leisleri*). were noted along the hedgerows and in the grassland habitats on site. No trees of high bat roosting potential are to be felled. Lighting in the residential development has been designed to comply with bat lighting guidelines and no lighting is proposed in large open spaces on site. Approximately 1km of hedgerow will be planted. Foraging would be expected to continue on site. Mitigation measures are proposed. The overall impact following the implementation of mitigation be a Minor adverse / International / Negative Impact / Not significant / long term impact.

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APPENDIX 5.2

Ornithological Survey

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HUGHES PLANNING
& DEVELOPMENT CONSULTANTS

Appendix 5.2a - Ornithological Survey of lands at Flemington Lane, Balbriggan, Co. Dublin.

1. Introduction

Joseph Adamson MCIEEM was appointed by Altemar Ltd. to conduct an ornithological survey of a parcel of land at Flemington Lane, located to the northwest of the town of Balbriggan, Co. Dublin. The purpose of the site visits was to survey the site to record species of birds that are frequenting the area.

2. Survey Area

The survey site, comprising of two parcels of land, lies to the west of a housing estate in an area of Balbriggan known as Flemington. The larger of the two parcels is bounded to the north by agricultural fields, to the south by a new residential housing estate, and to the east by a housing estate in an area of Balbriggan known as Tankardstown. A water treatment plant that serves the town of Balbriggan is located to the west of the site. A new road leading from the Tankardstown housing estate to the entrance to the water treatment plant bisects the site in an east-west direction. A dirt track trends from the south of the site through the centre of the site.

The second parcel is much smaller in size and is comprised of an agricultural field, bounded by a hedgerow to the south of it. This parcel is located west of the larger parcel and to the north of the water treatment plant

The survey site was dominated for the most part by agricultural fields containing Oil Seed Rape (OSR). There are very few hedgerows within the site, and those that are present are in poor condition with wide gaps. The larger parcel of the site was accessed from the south, through a new housing estate. The smaller parcel was accessed from a secondary road that borders the field to the west.

3. Methodology

The site was surveyed on the 27th and 28th February, and the 7th, 18th and 21st March 2023. Weather at the times of survey was suitable for recording, with bright and sunny spells for the most part, with occasional showers on the 18th and 21st March.

All areas within the sight boundary were surveyed by systematically walking and recording birds heard and observed. A list of birds observed during the site visit was then compiled for the entire site (Table 1).

A note was made of any species of conservation interest recorded at the site. Species highlighted in red represent species whose breeding population has declined by 50% over the last 25-30 years. Species highlighted in amber represent species that are of European

Conservation Concern. They are Amber-listed because of their unfavourable conservation status but not concentrated in Europe. The remaining species are Green-listed, species of favourable conservation status (Gilbert, G., Stanbury, A., and Lewis, I.) (Ref.1).

4. Results

Table 1: Bird species recorded within the site during the Winter Bird Survey, 2023, at Flemington Lane, Balbriggan, Co. Dublin

Species	Qualification Criteria	Comments
Common Buzzard *Buteo buteo*		Observed on four occasions throughout the site, usually seen commuting over the fields within the site. There are no suitable trees for breeding within the site.
Herring Gull *Larus argentatus*	SPEC2, BDMp1, BDMp2	Birds were frequently observed over the site due to the proximity of the survey site to the coast.
Woodpigeon *Columba palumbus*		Frequently observed overhead. Likely to breed in mature hedgerows and trees outside of the site.
Meadow Pipit *Anthus pratensis*	SPEC1	Occasionally flushed from the OSR fields. Likely to breed in small numbers within the site.
Pied Wagtail *Motacilla alba yarelli*		Observed along the track that runs in a northerly direction through the site and the new road leading to the water treatment plant.
Wren *Troglodytes troglodytes*		Distantly observed on one occasion. May breed in hedgerows at the north of the site.
Robin *Erithacus rubecula*		One heard singing in residential garden, east of the site.
Fieldfare *Turdus pilaris*		A flock of 15 was observed flying over the site on the 27th of March A Winter visitor to Ireland from Northern and Central Europe. Does not breed.
Blackbird *Turdus merula*		Frequently observed in small numbers within the site on all survey dates. Likely to breed within the site.
Magpie *Pica pica*		Infrequently observed over the site on all survey dates.
Jackdaw *Corvus monedula*		Occasionally observed flying overhead on all survey dates. Likely to breed in the housing estate east of the site.
Rook		Frequently observed flying overhead. No rookeries observed on the site.

Species	Qualification Criteria	Comments
Corvus frugilegus		
Raven ***Corvus corax***		Two observed flying overhead on the 27th of February.
Starling *Sturnus vulgaris*	SPEC 3	Occasionally observed flying over the site. Likely to breed in the housing estate east of the site.
Chaffinch ***Fringilla coelebs***		A flock of 6 was observed on waste ground, south of the site on the 21st March.
Redpoll ***Acanthis flammea***		Occasionally observed in single numbers over the site. May breed in hedgerows to the north of the site.
Linnet *Carduelis cannabina*	SPEC 2	Flocks of up to 15 individuals were observed on the waste ground south of the site during all survey dates. Flocks of Linnets are common on waste ground and open fields in Winter on the East coast of Ireland in and the birds may be immigrants from Scotland or the Northwest of England. May breed in hedgerows in small numbers, north of the site.
Goldfinch ***Carduelis carduelis***		Occasionally observed on all survey dates. Common in Ireland and may breed in hedgerows at the north of the site.
Yellowhammer ***Emberiza citrinella***	BDp2,BDr2	A single individual was flushed from one of the OSR fields on the 18th March. A male and female was observed on the 21st of March. A scarce bird in Ireland, but can be quite frequently observed in parts of North County Dublin and Meath. May breed within the site.

Qualifying criteria: Red List Criteria- SPEC1 (species that are of global conservation concern). SPEC3 (species are those for which the global population is concentrated outside EuropeBDp1 (breeding population decline over shorter time periods) BDp2 (breeding population decline over longer time periods).BDr2 (breeding range decline over longer time periods)Amber List Criteria- Categories that depict an unfavourable conservation status in Europe, but not necessarily of global concern. WI (Localised non-breeding population) WDMp1 (Moderate non-breeding population decline over the short term) BDMr1 and BDMr2 (Moderate breeding range decline over short term (1) and long term(2) BDMp1 (short-term decline in breeding population), BDMp2 (long-term decline in breeding population). SPEC 2 (species for which the global population is concentrated in Europe). SPEC 3 (species for which the global population is concentrated outside of Europe)

A total of nineteen bird species was observed during the Winter site visits. Two Red-Listed species, namely meadow pipit and yellowhammer were observed during the site visits. The two Red -Listed species may breed within the site. Three Amber-Listed species, herring gull, starling and linnet were observed during the site visits. The only Amber-Listed species that may breed within the site is linnet. All other species observed are Green-Listed, species of favourable conservation status.

5. Discussion

Birds observed at the Flemington Lane site are typical of the habitats present. The species assemblage is a reflection of the agricultural fields, hedgerows and overgrown waste ground habitats within and around the site and the birds observed are typical of birds occurring in these habitats in North County Dublin in Winter.

The agricultural grassland fields to the west of the site within the boundary of the water treatment plant were devoid of birds for the most part, with the exception of birds observed flying overhead.

6. Reference

Ref. 1 Gilbert, G, Stanbury, A. & Lewis, I K. Birds of Conservation Concern in Ireland 4: 2020–2026. Irish Birds 43: 1-23.

Appendix 5.2b - Ornithological Survey of lands at Flemington Lane, Balbriggan, Co. Dublin (Winter 2023).

Summary of 14th & 25th October and 4th November 2023 Winter Ornithological Survey of Flemington Lane, Balbriggan, Co. Dublin.

- To date, three site visits have been conducted at Flemington Lane for the winter 2023/2024 wintering bird assessments. The first visit was on 14th October and the second visit was on 25th October 2023 and the third on the 4th November 2023.
- Since the last visit in March 2023, the fields within the site are now fallow, with stubble dominating. Oil Seed Rape was the dominant crop in March 2023.
- These stubble fields have attracted a number of finch species, including Goldfinch, Linnet, Chaffinch and Greenfinch.
- These species regularly flock in winter, and flocks of Linnets and Goldfinches were observed on both visits. These flocks are likely to remain on the site, feeding in the stubble fields, throughout the course of the winter.
- A single Yellowhammer was observed during the 25th October site visit. Although it is a Red-Listed species, it is quite abundant on farmland in North County Dublin.
- Small numbers of Meadow Pipits and Skylarks were also observed. The latter species tends to be more frequent on coastal fields in Winter.
- A Kestrel was observed hunting on the site during the 25th October visit. The stubble fields will attract rodents, which will in turn attract raptors, such as Kestrel and Buzzard. Two Buzzards were noted overhead on the 4th November 2023.
- A small flock of House Sparrows was observed on both dates. This species is to be expected, due to the proximity of the site to the housing estate, to the east of the site.
- Twenty Herring gull were noted near the stubble fields on the 4th November 2023.
- The bird species assemblage is likely to remain as it currently stands, during the course of the Winter, if the current habitats remain as they are.

APPENDIX 6.1

Proposed Development Masterplan Drawing

85 Merrion Square, Dublin 2, D02 FX60
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HUGHES PLANNING
& DEVELOPMENT CONSULTANTS

Phase 3
Hampton Park North
128 Units + Creche

Phase 2
Class 1 Open Space

Phase 4
Flemington Park
137 Units + Creche

Phase 1
Tanner's Lane
54 Units

Phase 1
Hampton Park Central
142 Units + Creche

Phase 2
Hampton Park South
103 Units

Phase 1
Naul Road Junction

Grass pitch

Reservoir

Pond

Pond

Spring

Clonard Road

Flemington Park

Flemington Park

Hastings Close

Barons Hall Grove

Taylor Hill

SITE BOUNDARY

718038 E
763270 N

N

Phase 1	***Hampton Park Central***	***142 Units + Creche***
Phase 1	***Tanner's Lane***	***54 Units***
Phase 2	***Hampton Park South***	***103 Units***
Phase 4	***Hampton Park North***	***128 Units + Creche***
Phase 5	***Flemington Park***	***137 Units + Creche***
Total No.		***564 Units + 3 No. Creches***

OS Sheet Reference **2583-A, 2583-B, 2583-D**

ITN co-ords; **718,139; 763,374**
Ordnance Survey Licence Number **CYAL5031744**
Ordnance Survey Ireland, 2023

FURTHER INFORMATION

PROJECT TITLE:	Proposed Residential Development at Balbriggan Balbriggan, Co Dublin		
DRAWING TITLE:	Phasing Diagram		
PROJECT NO:	1902	DATE:	Oct 2023
SCALE:	1:3000 @A3	DRAWN BY:	
FILE NAME:	1902-FA-ZZ-00-M2-SITE-0025	CHECKED BY:	RC
DRAWING NO:	1902-SITE-0519-A	REVISION:	-

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APPENDIX 6.2

IGSL Site Investigation Report

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HUGHES PLANNING
& DEVELOPMENT CONSULTANTS

PROPOSED NEW
HOUSING DEVELOPMENT
NAUL ROAD BALBRIGGAN
MALLINCROSS LTD

MARTIN PETERS ASSOC.
CONSULTING ENGS

CONTENTS

I	INTRODUCTION
II	FIELDWORK
III	TESTING
III	DISCUSSION

APPENDICES

I	BORING RECORDS
II	TRIAL PIT LOGS AND PHOTOS
III	BRE DIGEST 365 TESTS
IV	LABORATORY
	a. Geotechnical
	b. Environmental
	c. Ground Water Analyses
V	SITE PLAN

FOREWORD

The following Conditions and Notes on Site Investigation Procedures should be read in conjunction with this report.

General.

Recommendations made, and opinions expressed in the report are based on the strata observed in the exploratory holes, together with the results of in-situ and laboratory tests. No responsibility can be held for conditions which have not been revealed by exploratory work, or which occur between exploratory hole locations. Whilst the report may suggest the likely configuration of strata, both between exploratory hole locations, or below the maximum depth of the investigation, this is only indicative, and liability cannot be accepted for its accuracy.

Unless specifically stated, no account has been taken of possible subsidence due to mineral extraction below or close to the site.

Standards

The ground investigation works for this project have been carried out by IGSL in accordance with Eurocode 7 - Part 2: Ground Investigation & Testing (EN 1997-2:2007). This has been used together with complementary documents such as BS 5930 (1999), BS 1377 (Parts 1 to 9) and Engineers Ireland Specification & Related Documents for Ground Investigation in Ireland (2006). The following Irish (IS) and European Standards or Norms are referenced:

- IS EN 1997-2 Eurocode 7: 2007 – Geotechnical Design – Part 2: Ground Investigation & Testing
- IS EN ISO 22475-1:2006 Geotechnical Investigation and Sampling – Sampling Methods & Groundwater Measurements
- IS EN ISO 14688-1:2002 Geotechnical Investigation and Testing – Identification and Classification of Soil, Part 1: Identification and Description
- IS EN ISO 14688-2:2004 Geotechnical Investigation and Testing – Identification and Classification of Soil, Part 2: Classification Principles

Routine Sampling.

Undisturbed samples of soils, predominantly cohesive in nature are obtained unless otherwise stated by a 104mm diameter open-drive tube sampler or Piston Sampler. In granular soils, and where undisturbed sampling is inappropriate, disturbed samples are collected. Smaller disturbed samples are also recovered at intervals to allow a visual examination of the full strata section.

In-Situ Testing.

Standard penetration tests were conducted strictly in accordance with Section 4.6 of IS EN 1997-2:2007. The SPT equipment (hammer energy test) has been calibrated in accordance with EN ISO 22476-3:2005 to obtain the Energy Ratio (E_r) of each hammer. A calibration certificate is available upon request. The E_r is defined as the ratio of the actual energy E_{meas} (measured energy during calibration) delivered to the drive weight assembly into the drive rod below the anvil, to the theoretical energy (E_{theor}) as calculated from the drive weight assembly. The recorded number of blows (N) reported on the engineering logs are uncorrected. In sands, the energy losses due to rod length and the effect of the overburden pressure should be taken into account (see IS EN ISO 22476-3:2005).

Groundwater

The depth of entry of any influx of groundwater is recorded during the course of boring operations. However, the normal rate of boring does not usually permit the recording of an equilibrium level for any one water strike. Where possible drilling is suspended for a period of twenty minutes to monitor the subsequent rise in water level. Groundwater conditions observed in the borings or pits are those appertaining to the period of investigation. It should be noted however, that groundwater levels are subject to diurnal, seasonal and climatic variations and can also be affected by drainage conditions, tidal variations etc.

Engineering Logging

Soil and rock identification has been based on the examination of the samples recovered and conforms with IS EN ISO 14688-1:2002 and IS EN ISO 14689-1:2004.

Where peat has been encountered during site works, samples have been logged in accordance with the Von Post Classification (ref. Von Post, L. 1992. Sveriges Gologiska Undersoknings torvinventering och nogra av dess hittils vunna resultat (SGU peat inventory and some preliminary results) Svenska Mosskulturforeningens Tidskrift, Jonkoping, Swedden, 36, 1-37 & Hobbs N. B. Mire morphology and the properties of some British and foreign peats. QJEG, Vol. 19, 1986).

Retention of Samples.

After satisfactory completion of all the scheduled laboratory tests on any sample, the remaining material is discarded unless a period of retention of samples is agreed, it is our normal practice to discard all soil samples one month after submission of our final report.

Reporting

Recommendations made and opinions expressed in this report are based on the strata observed in the exploratory holes, together with the results of in-situ and laboratory tests. No responsibility can be held by IGSL Ltd for ground conditions between exploratory hole locations.

The engineering logs provide ground profiles and configuration of strata relevant to the investigation depths achieved and caution should be taken when extrapolating between exploratory points. No liability is accepted for ground conditions extraneous to the investigation points. Unless specifically stated, no account has been taken of possible subsidence due to mineral extraction, mining works or karstification below or close to the site.

This report has been prepared for the project client and the information should not be used without prior written permission. Any recommendations developed in this report specifically relate to the proposed development. IGSL Ltd accepts no responsibility or liability for this document being used other than for the purposes for which it was intended.

REPORT ON A SITE INVESTIGATION
FOR A HOUSING DEVELOPMENT
AT NAUL ROAD
BALBRIGGAN
FOR
MALINCROSS LIMITED

MARTIN PETERS AND AASSOCIATES
CONSULTING ENGINEERS

Report No; 22009 **October 2019**

I Introduction

A new residential development is proposed for lands located at Naul Road, Balbriggan, County Dublin.

An investigation of sub soil conditions in the area of the new development has been carried out by IGSL for Martin Peters Associates (MPA), on behalf of the developers, Malincross Ltd.

The scheduled site investigation included the following elements:

- Boreholes with Standpipes 4 Nr.
- Trial Pit excavations 17 Nr.
- BRE Digest 365 Percolation 4 nr.
- Geotechnical Laboratory Testing
- Environmental Laboratory Testing

This report includes all factual data from field operations and laboratory and discusses these findings relative to the proposed new development.

II Fieldwork

The site and the proposed exploratory locations are noted on the drawings enclosed in Appendix V. This drawing was provided by MPA.

The development is located off the Naul Road on a sloping greenfield site with residential developments to the north and east.

The various elements of the investigation are detailed in the following paragraphs. All field works were supervised by an experienced geotechnical engineer who carefully recorded stratification, recovered samples as required and prepared detailed records.

Exploratory locations were accurately surveyed and referenced to National Grid Co-Ordinates. Prior to commencement each location was scanned electronically (CAT) to ensure that existing services were not damaged. An inspection pit was opened at each borehole to confirm the absence of services.

Boreholes

Four boreholes were scheduled. Borehole refusal was recorded at shallow depth in several locations and holes were re-bored to advance the investigation depth. Holes are referenced BH01 to BH04.

Detailed geotechnical records are contained in Appendix I to this report - the records give details of stratification, sampling, in-situ testing and groundwater. Note is also taken of any obstructions to normal boring requiring the use of the heavy chisel for advancement. It was not possible to recover undisturbed samples because of the high stone/cobble content of the strata encountered.

Topsoil with some soft sandy clay extends to depths between 0.20 and 0.50 metres. Firm brown sandy gravelly CLAY is then generally encountered and continues to depths ranging from 1.00 to 2.30 metres. The stratum then increases to stiff consistency and boreholes continued to final refusal depths ranging from 2.50 to 4.90 metres. A thin band of angular gravel was noted at the base of BH04A from 2.00 to 2.50 m.

The final refusal depths should not be taken as indicative of bedrock horizon. Proof core drilling to confirm bedrock parameters was not scheduled for this project.

No ground water ingress was observed during the course of borehole construction other than at 1.50 metres BGL in BH03. Standpipes were installed at each location to permit long-term ground water observation.

Trial Pits

Seventeen Trial Pits were opened using an 8 tonne excavator under engineering supervision. Detailed trial pit logs with photographs are enclosed in Appendix II.

The records reflect some variation in stratification. Topsoil (GL to 0.50 metres) overlies firm brown sandy gravelly SILT/CLAY. This stratum increases to stiff consistency in some locations.

Zones of gravelly SAND were noted in TP04. TP05, TP07, TP09and TPP17. Some FILL material was noted at TP04 and TP11. TP11 was terminated at 1.50 metres due to concerns regarding the possible presence of underground services.

The presence of weathered rock horizon has been indicated by shallow refusal in several trial pit locations and recovery of angular limestone fragments.

All trial pits were dry and stable during the course of the investigation with the exception of TP17 where water was noted at 2.00 metres BGL in weathered rock.

Samples were recovered during the trial pitting operation. These were sent to the laboratory for inspection and a schedule of testing was prepared.

Trial Pits were carefully backfilled with excavated material and the affected areas were reinstated on completion of the investigation.

The visual assessment of excavations by the experienced geotechnical engineer is used to determine the depth to a suitable founding medium. The brown gravelly SILT/CLAY stratum with firm / stiff consistency should be suitable for foundation construction with an allowable bearing pressure of the order of 125 KPa.

The depths to achieve this soil strength are summarised as follows in **TABLE A.**

Ref.No.	Firm Clay	Sand/Gravel	Weathered Rock	Final Depth
TP01	0.40 – 2.30		2.30 – 2.50	2.50
TP02	0.40 – 2.00		2.00 – 2.20	2.20
TP03	0.40 – 3.50			3.50
TP04	0.80 – 2.10	2.10 – 2.90	2.90 – 3.00	3.00
TP05	0.40 – 1.30	1.30 – 3.50		3.50
TP06	0.40 – 1.30		1.30 – 1.50	1.50
TP07	0.40 – 1.40	1.40 – 3.50		3.50
TP08	0.40 – 0.80		0.80 – 1.50	1.50
TP09	0.40 – 1.50	1.50 – 3.10	3.10 – 3.20	3.20
TP10	0.40 – 1.20		1.20 – 2.20	2.20
TP11	**0.00 – 1.50 (FILL)**			**1.50**
TP12	0.40 – 0.60		0.60 – 1.60	1.60
TP13	0.50 – 1.00		1.00 – 1.50	1.50
TP14	0.50 – 1.20		1.20 – 1.50	1.50
TP15	0.40 – 0.80		0.80 – 1.20	1.20
TP16	0.40 – 1.00		1.00 – 1.20	1.20
TP17	0.40 – 0.80	0.80 – 1.50	1.50 – 2.50	2.50

Percolation Test (BRE Digest 365)

Infiltration testing was performed in accordance with BRE Digest 365 'Soakaway Design' at four locations. Details are presented in Appendix III . The Test Pits were opened to approximately 2.00 metres deep and detailed Logs were prepared. The stratification in each instance consisted of firm to stiff gravelly CLAY or clayey sandy GRAVEL below surface topsoil with underlying weathered limestone in places.

To obtain a measure of the infiltration rate of the sub-soils, water is poured into the test pit, and records taken of the fall in water level against time. The test is carried out over two cycles following initial soakage. The infiltration rate is the volume of water dispersed per unit-exposed area per unit of time, and is generally expressed as metres/minute or metres/second. In these calculations the exposed area is the sum of the base area and the average internal area of the pit sides over the test duration.

In each location very slow infiltration was observed. The calculated infiltration rates at each location are as follows:

Location	**Infiltration Rate (f) metres / minute**
SAO1 (TP01)	2.8E-05
SA02 (TP05)	8.5E-05
SA03 (TP10)	2.9E-05
SA04 (TP17)	8.0E-05

III. Testing

(a) In Situ

Standard penetration tests were carried out at approximate 1.00 metre intervals in the geotechnical boreholes to measure relative in-situ soil strength. N values are noted in the right hand column of the boring records, representing the blow count required to drive the standard sampler 300mm into the soil, following initial seating blows. Where full test penetration was not achieved the blow count for a specific penetration is recorded, or refusal is indicated where appropriate.

The N values indicate an increasing strength depth trend in the gravelly SILT/CLAY overburden. Refusal of equipment was recorded in tests carried out at the base of the boreholes on the presumed bedrock horizon.

The SPT test data is summarised as follows:

Stratum	Depth BGL	N value Range	Comment
Brown Gravelly TILL	1.00	8 to 32	Firm to Stiff
	2.00	14 to 50	Firm to Very Stiff
	3.00	27 to 50	Stiff to Hard
	4.00	> 50	Hard

(b) Laboratory :

A programme of laboratory testing was scheduled following completion of site operations. Geotechnical soil testing was carried out by IGSL in its INAB-Accredited laboratory. Environmental testing to RILTA parameters was carried out in the UK by CHEMTEST Ltd. Test on the weathered bedrock to establish Sulphate concentration were carried out by Nicholls-Colton in the UK19

The overall test programme included the following elements:

*	Moisture Content	IGSL	19 Nr
•	Liquid and Plastic Limits and MC	IGSL	19 Nr
•	PSD Grading by wet sieve	IGSL	19 Nr
•	PSD Grading by Hydrometer	IGSL	6 Nr
•	CBR	IGSL	3 Nr
•	MCV	IGSL	8 Nr.
•	Dry Density / Moisture Content	IGSL	2 Nr
•	Pyrites	Nicholls Colton	5 Nr
•	RILTA Suite (WAC	CHEMTEST	5 Nr
•	Sulphate / Chloride / pH	CHEMTEST	10 Nr
•	Water Tests (Local Watercourse)	CHEMTEST	1 Nr

Individual test results are discussed in the following paragraphs and details presented in Appendix IVA and IVB.

Classification/ Moisture Content

The results reflect the wide variation in soil type over the site area. The upper gravelly TILL is generally classed in the CI Zone of the standard classification, indicative of low plasticity CLAY matrix material. This stratum occasionally grades to SILT dominant and is classified as non-plastic. The results are typical of glacial till or boulder clay deposition. Several samples from the base of the boreholes and trial pits are classified as clayey sandy GRAVEL (possibly weathered limestone bedrock).

Grading

Wet sieve and hydrometer analysis was used to establish PSD grading curves for nineteen samples. The graphs for the upper SILT/CLAY stratum generally reflect material smoothly graded from the clay to gravel fraction. The straight-line pattern of these graphs is typical of glacial till or boulder clay deposition.

Samples from the lower gravel / weathered rock reflect much coarser grading generally sandy gravel with up to 20% fines. A number of the graphs indicate sandy gravel with little or no fines.

CBR

CBR values were determined in the laboratory for three soil samples taken at shallow depth (0.50 to 1.00 metre). Values ranged from < 1% to 6.5%, with moisture contents ranging from 17 to 20%.

MCV

Eight samples of the brown gravelly SILT/CLAY had MCV values at Natural Moisture Content established. MCV values range from 1.3 to 12 with moisture content varying from 1.3 to 20%.

Dry Density / Moisture Content

Three samples of the TILL had Dry Density / Moisture Content relationship established in accordance with BS1377 Part 4 (1990). Maximum dry densities of 1.79, 1.81 and 1.82 Mg/cu.m. were established with optimum moisture contents of 14, 11 and 14%.

Pyrite Tests

Five samples were selected for preliminary analysis to determine if the weathered rock contained elevated acid soluble sulphate levels. Testing was carried out by Nicholls Colton and results confirm very low sulphate levels. No issues arise as to possible pyrite presence in the bedrock.

Sulphate and pH

Ten samples were tested to establish pH and Sulphate concentrations. Sulphate content was consistently less than 0.010 g/l and pH values ranged from 6.5 to 7.9. No special precautions are required to protect foundation concrete from sulphate aggression. A sulphate design class of DS-1 (ACEC Classification for Concrete) is indicated for concentrations less than 0.50 g/l.

Chloride Content

Chloride content was established for five samples with concentrations less than 0.010 g/l established. No issues arise as to protection of foundation concrete.

RILTA Suite Environmental

Five sample of soil from the site were submitted for detailed environmental analysis to RILTA (WAC) parameters. Results are presented in fill detail in Appendix IVB. The data confirms that the soils can be classified as INERT. No elevated contamination levels were found. Excavated material can be safely used within the site boundary or disposed of to a suitably licensed landfill facility.

No asbestos traces were found during routine screening of the submitted samples.

Water Analysis

A sample of water from an existing water-course on the site was submitted for analysis on the instructions of MPA. Testing was carried out to EPA recommendations.

Samples were also taken from standpipes (BH02A and BH04) at two intervals (27/11/2019 and 13/01/2020) and were sent to Chemtest for analysis again to EPA guidelines. Data is enclosed in Appendix IVC.

IV. Discussion:

The new housing development is to be carried out on a mainly green-field site located off the Naul Road in Balbriggan County Dublin.

A geotechnical and environmental investigation has been carried out under the direction of MPA Consulting Engineers on behalf of Malincross Developments Ltd.

Stratification

The geotechnical data reflects the general stratification of the Balbriggan and North County Dublin area.

Typically topsoil / soft sandy clay (0.30 to 0.50 metres) overlies GLACIAL TILL or BOULDER CLAY. This brown sandy gravelly SILT/CLAY is initially firm in consistency increasing in strength with depth. Some zones of gravelly SAND have been identified.

Rig and excavator refusal in several boreholes and trial pits has indicated the presence of relatively shallow weathered Limestone bedrock. Rock horizon has been noted at average depths between 1.00 and 3.00 metres.

Ground water was encountered in only at BH03A and TP17. Standpipes were installed in each borehole to allow future monitoring to take place.

Allowable Bearing Pressures

The glacial till or boulder clay noted in most locations below the surface topsoil has been described as firm to stiff consistency during trial excavations. The laboratory data confirms the classification and behavioural characteristics of the boulder clay. Standard penetration tests in the boreholes at 1.00 metre BGL would suggest an average value of N = 12. An average SPT value of N = 20 can be taken at 2.00 metres BGL.

The visual assessment of soil strength during excavation, the result of in-situ SPTs and extensive published data on the local glacial till would indicate an allowable bearing pressure of the order of 125 KPa at 1.00 metres BGL increasing to 200 KPa at 2.00 metres for the firm to stiff brown sandy gravelly CLAY/SILT.

Weathered limestone bedrock has been noted in both boreholes and trial pits. In approximately 10 locations the weathered rock horizon is within 1.50 metres of surface and will clearly become the founding medium for the new houses.

The weathered limestone can be treated as a dense gravel in assessing allowable bearing pressure. SPT values in the stratum are in excess of N = 50. An allowable bearing pressure of the order of 250 to 300 KPa can be taken for foundations placed on the weathered rock.

Foundations

The above data confirms that conventional reinforced strip of pad foundations will be appropriate for this site using a founding depths of about 1.00 metres, with a minimum allowable bearing pressure of 125 KPa. Allowable bearing pressures will increase with depth of penetration of the boulder clay and in the dense weathered limestone.

Settlement in the boulder clay under the above load will be of the order of 5 to 10 mm. Settlement should be uniform and differential movement is not expected. Settlement in the weathered limestone could be of the order of 15 mm but should be immediate.

Given the variations in soil composition noted in this report very careful visual inspection of excavated formation is advised to ensure uniformity and suitability of the founding medium. Any soft or suspect material and all made ground should be removed and replaced with low-grade concrete. In this regard the presence of FILL material at TP04 and TP11 should be noted.

Ideally foundations for individual houses or pairs of semis should be placed on a uniform founding medium to avoid any possibility of differential movement.

Ground Water

Ground water was noted only at BH03A and TP17. No problems are anticipated with water ingress into shallow foundation excavations. Water levels have been measured in the installed standpipes and details are included in Appendix I with the borehole records.

The glacial till or boulder clay is sensitive to moisture content variation and care should be taken to protect exposed surfaces from rainwater by blinding.

Excavation

Trial Pitting has indicated that excavations should be stable in the short term. Statutory safety regulations should however be noted. These prohibit personnel entering unsupported trench excavations greater than 1.20 metres deep, irrespective of apparent stability.

Refusal of excavator in the limestone was recorded. Some penetration of the weathered zone was possible with refusal on harder limestone. If deep trench excavations in rock are envisaged then penetration of shallow massive limestone may require hydraulic breaking. Rotary core drilling would be required to provide accurate parameters for the underlying limestone.

Re-use of Soils

A programme of testing has been carried out to provide data on the sub soils and weathered rock relative to re-use as engineered fill. The tests comprised CBR and MCV tests with compaction tests to assess soil suitability. The variations in CBR (1 to 6%) and in MCV (1.3 to 10.2) and the general variation in soil composition, suggests that re-use will not be practical.

Roads and Pavements

CBR values were established for three samples taken at depths of 0.50 and 1.00 metre. Results of 0.6 , 2.0 and 6.5% were obtained with moisture contents of up to 20%. Sampling was carried out following very wet weather conditions and this may have adversely affected the results. We would suggest that additional testing (using plate bearing apparatus) is scheduled to determine design CBR values at construction stage on the road network.

Percolation (BRE Digest 365)

The Results from BRE Digest 365 percolation tests confirm that the soils are of low permeability and not considered suitable for storm water dispersion in standard soakaways. The results are typical of the low permeability regional glacial till or boulder clay. Consideration should therefore be given to disposal of storm / surface water to either a local available watercourse or to utilising the local authority drainage system for this purpose.

Foundation Concrete

Sulphate, Chloride and pH testing has confirmed that no special precautions are required to protect below ground concrete.

Environmental

RILTA Suite tests confirm that the soils on site are INERT. Excavated material can safely be disposed of within the site or sent off site to a suitably accredited INERT landfill facility. No traces of asbestos were found.

Ground Water Sampling

A water sample, taken from an existing water-course was sent for analysis to CHEMTEST. Similarly water samples from borehole standpipes have been taken and also sent for analysis, all in accordance with MPA instructions.

Test data is enclosed in Appendix IVC.

Pyrite Testing of Rock

Five samples of weathered rock were sent for preliminary analysis to establish any possible Pyrite content. The results indicate a very low acid soluble sulphate content and very low total sulphur. These results indicate that the bedrock should be satisfactory for foundation construction.

IGSL/JC
October 2019

Appendix I Boring Records

GEOTECHNICAL BORING RECORD

REPORT NUMBER 22009

CONTRACT	Balbriggan, Co. Dublin	**BOREHOLE NO.**	**BH01**
		SHEET	Sheet 1 of 1
CO-ORDINATES	718,057.25 E 764,215.70 N	**RIG TYPE**	Dando 2000
		BOREHOLE DIAMETER (mm)	200
GROUND LEVEL (mOD)	55.50	**BOREHOLE DEPTH (m)**	4.90
		DATE COMMENCED	28/08/2019
		DATE COMPLETED	28/08/2019
CLIENT	Mallincross Ltd	**SPT HAMMER REF. NO.**	
ENGINEER	MPA	**ENERGY RATIO (%)**	
		BORED BY	P. Allan
		PROCESSED BY	L. Daniels

Depth (m)	Description	Legend	Elevation	Depth (m)	Samples: Ref. Number	Samples: Sample Type	Samples: Depth (m)	Samples: Recovery	Field Test Results	Standpipe Details
0	TOPSOIL		55.00	0.50						
	Firm brown slightly gravelly sandy CLAY				AA122746	B	0.50			
1					AA122747	B	1.00		N = 6 (1, 1, 1, 2, 2, 3)	
2			53.20	2.30	AA122748	B	2.00		N = 14 (2, 2, 3, 3, 3, 5)	
	Stiff to very stiff brown sandy gravelly CLAY with a medium cobble content									
3					AA122749	B	3.00		N = 27 (5, 4, 7, 7, 6, 7)	
4					AA122750	B	4.00		N = 49 (6, 10, 12, 12, 11, 14)	
			50.60	4.90						
5	Obstruction End of Borehole at 4.90 m								N = 50/75 mm (25, 25, 50)	
6										
7										
8										
9										

HARD STRATA BORING/CHISELLING

From (m)	To (m)	Time (h)	Comments
3.70	3.90	1	
4.70	4.90	2	

WATER STRIKE DETAILS

Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments
					No water strike

GROUNDWATER PROGRESS

Date	Hole Depth	Casing Depth	Depth to Water	Comments

INSTALLATION DETAILS

Date	Tip Depth	RZ Top	RZ Base	Type
28-08-19	4.90	1.00	4.90	50mm SP

REMARKS CAT scanned location and hand dug inspection pit carried out .

Sample Legend

D - Small Disturbed (tub)
B - Bulk Disturbed
LB - Large Bulk Disturbed
Env - Environmental Sample (Jar + Vial + Tub)
UT - Undisturbed 100mm Diameter Sample
P - Undisturbed Piston Sample
W - Water Sample

IGSL BH LOG 22006.GPJ IGSL.GDT 30/1/20

GEOTECHNICAL BORING RECORD

REPORT NUMBER 22009

CONTRACT	Balbriggan, Co. Dublin	**BOREHOLE NO.**	**BH02**
		SHEET	Sheet 1 of 1
CO-ORDINATES	718,055.08 E 764,034.80 N	**RIG TYPE**	Dando 2000
		BOREHOLE DIAMETER (mm)	200
GROUND LEVEL (mOD)	56.20	**BOREHOLE DEPTH (m)**	1.60
		DATE COMMENCED	29/08/2019
		DATE COMPLETED	29/08/2019
CLIENT	Mallincross Ltd	**SPT HAMMER REF. NO.**	
ENGINEER	MPA	**ENERGY RATIO (%)**	
		BORED BY	P. Allan
		PROCESSED BY	L. Daniels

Depth (m)	Description	Legend	Elevation	Depth (m)	Samples: Ref. Number	Samples: Sample Type	Samples: Depth (m)	Samples: Recovery	Field Test Results	Standpipe Details
0	TOPSOIL		55.80	0.40						
1	Firm brown sandy gravelly SILT/CLAY with occasional large cobbles/boulders				AA111709	B	1.00		N = 22 (2, 3, 4, 8, 5, 5)	
			54.60	1.60					N = 50/75 mm (25, 25, 50)	
2	Obstruction End of Borehole at 1.60 m									
3										
4										
5										
6										
7										
8										
9										

HARD STRATA BORING/CHISELLING

From (m)	To (m)	Time (h)	Comments
1.40	1.60	1	

WATER STRIKE DETAILS

Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments
					No water strike

GROUNDWATER PROGRESS

Date	Hole Depth	Casing Depth	Depth to Water	Comments

INSTALLATION DETAILS

Date	Tip Depth	RZ Top	RZ Base	Type

REMARKS CAT scanned location and hand dug inspection pit carried out . Obstruction encountered at 1.60m . Relocated to BH02A and attempted rebore.

Sample Legend
D - Small Disturbed (tub)
B - Bulk Disturbed
LB - Large Bulk Disturbed
Env - Environmental Sample (Jar + Vial + Tub)
UT - Undisturbed 100mm Diameter Sample
P - Undisturbed Piston Sample
W - Water Sample

IGSL BH LOG 22006.GPJ IGSL.GDT 30/1/20

GEOTECHNICAL BORING RECORD

REPORT NUMBER 22009

CONTRACT	Balbriggan, Co. Dublin	**BOREHOLE NO.**	**BH02A**
		SHEET	Sheet 1 of 1
CO-ORDINATES	718,186.10 E 764,068.70 N	**RIG TYPE**	Dando 2000
		BOREHOLE DIAMETER (mm)	200
GROUND LEVEL (mOD)	50.48	**BOREHOLE DEPTH (m)**	4.40
		DATE COMMENCED	29/08/2019
		DATE COMPLETED	29/08/2019
CLIENT	Mallincross Ltd	**SPT HAMMER REF. NO.**	
ENGINEER	MPA	**ENERGY RATIO (%)**	
		BORED BY	P. Allan
		PROCESSED BY	L. Daniels

Depth (m)	Description	Legend	Elevation	Depth (m)	Samples: Ref. Number	Samples: Sample Type	Samples: Depth (m)	Samples: Recovery	Field Test Results	Standpipe Details
0	TOPSOIL		50.08	0.40						
1	Firm brown sandy SILT/CLAY with some gravel and occasional boulders				AA127702	B	0.50		N = 12 (1, 2, 3, 3, 2, 4)	
					AA127703	B	1.50			
			48.58	1.90						
2	Stiff to very stiff brown gravelly (occasionally very gravelly) SILT/CLAY with occasional cobbles								N = 29 (4, 4, 5, 7, 7, 10)	
					AA127704	B	2.50			
3									N = 38 (5, 8, 8, 12, 7, 11)	
					AA127705	B	3.50			
4									N = 50/75 mm (25, 25, 50)	
			46.08	4.40						
	Obstruction End of Borehole at 4.40 m									
5										
6										
7										
8										
9										

HARD STRATA BORING/CHISELLING

From (m)	To (m)	Time (h)	Comments
2.40	2.60	1	
4.20	4.40	1.5	

WATER STRIKE DETAILS

Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments
					No water strike

GROUNDWATER PROGRESS

Date	Hole Depth	Casing Depth	Depth to Water	Comments

INSTALLATION DETAILS

Date	Tip Depth	RZ Top	RZ Base	Type
29-08-19	4.40	1.00	4.40	50mm SP

REMARKS CAT scanned location and hand dug inspection pit carried out .

Sample Legend

D - Small Disturbed (tub)
B - Bulk Disturbed
LB - Large Bulk Disturbed
Env - Environmental Sample (Jar + Vial + Tub)
UT - Undisturbed 100mm Diameter Sample
P - Undisturbed Piston Sample
W - Water Sample

IGSL BH LOG 22006.GPJ IGSL.GDT 30/1/20

GEOTECHNICAL BORING RECORD

REPORT NUMBER 22009

CONTRACT	Balbriggan, Co. Dublin	**BOREHOLE NO.**	**BH03**
		SHEET	Sheet 1 of 1
CO-ORDINATES	718,203.00 E 763,834.10 N	**RIG TYPE**	Dando 2000
		BOREHOLE DIAMETER (mm)	200
GROUND LEVEL (mOD)	45.10	**BOREHOLE DEPTH (m)**	1.20
		DATE COMMENCED	28/08/2019
		DATE COMPLETED	28/08/2019
CLIENT	Mallincross Ltd	**SPT HAMMER REF. NO.**	
ENGINEER	MPA	**ENERGY RATIO (%)**	
		BORED BY	P. Allan
		PROCESSED BY	L. Daniels

Depth (m)	Description	Legend	Elevation	Depth (m)	Samples: Ref. Number	Samples: Sample Type	Samples: Depth (m)	Samples: Recovery	Field Test Results	Standpipe Details
0	TOPSOIL		44.80	0.30						
	Firm brown sandy SILT/CLAY with occasional gravel and large cobbles				AA111710	B	0.50		N = 50/75 mm (25, 25, 50)	
1			43.90	1.20						
	Obstruction End of Borehole at 1.20 m									
2										
3										
4										
5										
6										
7										
8										
9										

HARD STRATA BORING/CHISELLING

From (m)	To (m)	Time (h)	Comments
1.00	1.20	1	

WATER STRIKE DETAILS

Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments
					No water strike

GROUNDWATER PROGRESS

Date	Hole Depth	Casing Depth	Depth to Water	Comments

INSTALLATION DETAILS

Date	Tip Depth	RZ Top	RZ Base	Type

REMARKS CAT scanned location and hand dug inspection pit carried out .Obstruction encountered at 1.20m.Relocated to BH03A and attempted rebore.

Sample Legend
D - Small Disturbed (tub)
B - Bulk Disturbed
LB - Large Bulk Disturbed
Env - Environmental Sample (Jar + Vial + Tub)
UT - Undisturbed 100mm Diameter Sample
P - Undisturbed Piston Sample
W - Water Sample

IGSL BH LOG 22006.GPJ IGSL.GDT 30/1/20

GEOTECHNICAL BORING RECORD

REPORT NUMBER 22009

CONTRACT	Balbriggan, Co. Dublin	**BOREHOLE NO.**	**BH03A**
		SHEET	Sheet 1 of 1
CO-ORDINATES	718,269.10 E 763,840.10 N	**RIG TYPE**	Dando 2000
		BOREHOLE DIAMETER (mm)	200
GROUND LEVEL (mOD)	43.11	**BOREHOLE DEPTH (m)**	3.30
		DATE COMMENCED	29/08/2019
		DATE COMPLETED	30/08/2019
CLIENT	Mallincross Ltd	**SPT HAMMER REF. NO.**	
ENGINEER	MPA	**ENERGY RATIO (%)**	
		BORED BY	P. Allan
		PROCESSED BY	L. Daniels

Depth (m)	Description	Legend	Elevation	Depth (m)	Samples: Ref. Number	Samples: Sample Type	Samples: Depth (m)	Samples: Recovery	Field Test Results	Standpipe Details
0	TOPSOIL		42.91	0.20						
	Firm sandy SILT/CLAY with some gravel and occasional cobbles		42.21	0.90						
1	Very stiff brown very gravelly silty CLAY with some cobbles				AA127700	B	1.00		N = 27 (1, 2, 3, 6, 8, 10)	
2					AA127701	B	2.00		N = 50 (6, 8, 10, 13, 15, 12)	
3			39.81	3.30	AA127702	B	3.00		N = 30/75 mm (25, 25, 30)	
	Obstruction End of Borehole at 3.30 m									
4										
5										
6										
7										
8										
9										

HARD STRATA BORING/CHISELLING

From (m)	To (m)	Time (h)	Comments
2.40	2.60	1	
3.10	3.30	1.5	

WATER STRIKE DETAILS

Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments
1.50	1.50		1.00	20	Moderate

INSTALLATION DETAILS

Date	Tip Depth	RZ Top	RZ Base	Type
30-08-19	3.30	1.00	3.30	50mm SP

GROUNDWATER PROGRESS

Date	Hole Depth	Casing Depth	Depth to Water	Comments

REMARKS CAT scanned location and hand dug inspection pit carried out .

Sample Legend
D - Small Disturbed (tub)
B - Bulk Disturbed
LB - Large Bulk Disturbed
Env - Environmental Sample (Jar + Vial + Tub)
UT - Undisturbed 100mm Diameter Sample
P - Undisturbed Piston Sample
W - Water Sample

IGSL BH LOG 22006.GPJ IGSL.GDT 30/1/20

GEOTECHNICAL BORING RECORD

REPORT NUMBER 22009

CONTRACT	Balbriggan, Co. Dublin	**BOREHOLE NO.**	**BH04**
		SHEET	Sheet 1 of 1
CO-ORDINATES	718,062.05 E 763,568.13 N	**RIG TYPE**	Dando 2000
		BOREHOLE DIAMETER (mm)	200
GROUND LEVEL (mOD)	58.02	**BOREHOLE DEPTH (m)**	2.20
		DATE COMMENCED	27/08/2019
		DATE COMPLETED	27/08/2019
CLIENT	Mallincross Ltd	**SPT HAMMER REF. NO.**	
ENGINEER	MPA	**ENERGY RATIO (%)**	
		BORED BY	P. Allan
		PROCESSED BY	L. Daniels

Depth (m)	Description	Legend	Elevation	Depth (m)	Samples: Ref. Number	Sample Type	Depth (m)	Recovery	Field Test Results	Standpipe Details
0	TOPSOIL		57.82	0.20						
	Firm brown sandy SILT/CLAY with occasional gravel		57.12	0.90	AA122743	B	0.50			
1	Very stiff brown gravelly CLAY with occasional cobbles				AA122744	B	1.00		N = 32 (2, 3, 4, 8, 10, 10)	
2			55.82	2.20	AA122745	B	2.00		N = 50/150 mm (12, 15, 22, 28)	
	Obstruction End of Borehole at 2.20 m									
3										
4										
5										
6										
7										
8										
9										

HARD STRATA BORING/CHISELLING

From (m)	To (m)	Time (h)	Comments
0.80	0.90	0.5	
2.10	2.20	1.5	

WATER STRIKE DETAILS

Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments
					No water strike

GROUNDWATER PROGRESS

Date	Hole Depth	Casing Depth	Depth to Water	Comments

INSTALLATION DETAILS

Date	Tip Depth	RZ Top	RZ Base	Type

REMARKS CAT scanned location and hand dug inspection pit carried out . Obstruction encountered at 2.20m.Relocated to BH04A and attempted rebore.

Sample Legend
D - Small Disturbed (tub)
B - Bulk Disturbed
LB - Large Bulk Disturbed
Env - Environmental Sample (Jar + Vial + Tub)
UT - Undisturbed 100mm Diameter Sample
P - Undisturbed Piston Sample
W - Water Sample

IGSL BH LOG 22006.GPJ IGSL.GDT 30/1/20

GEOTECHNICAL BORING RECORD

REPORT NUMBER 22009

CONTRACT	Balbriggan, Co. Dublin	**BOREHOLE NO.**	**BH04A**
		SHEET	Sheet 1 of 1
CO-ORDINATES		**RIG TYPE**	Dando 2000
		BOREHOLE DIAMETER (mm)	200
GROUND LEVEL (mOD)		**BOREHOLE DEPTH (m)**	2.50
		DATE COMMENCED	27/08/2019
		DATE COMPLETED	28/08/2019
CLIENT	Mallincross Ltd	**SPT HAMMER REF. NO.**	
ENGINEER	MPA	**ENERGY RATIO (%)**	
		BORED BY	P. Allan
		PROCESSED BY	L. Daniels

Depth (m)	Description	Legend	Elevation	Depth (m)	Samples: Ref. Number	Samples: Sample Type	Samples: Depth (m)	Samples: Recovery	Field Test Results	Standpipe Details
0	TOPSOIL			0.20						
	Soft to firm brown SILT/CLAY			0.60						
1	Stiff to very stiff brown sandy gravelly CLAY with some cobbles				AA111711	B	1.00		N = 26 (2, 3, 5, 5, 7, 9)	
2				2.00						
	Brown slightly sandy very clayey fine to coarse angular GRAVEL with cobbles				AA111712	B	2.00		N = 35 (8, 10, 9, 9, 8, 9)	
				2.50						
	Obstruction End of Borehole at 2.50 m									
3										
4										
5										
6										
7										
8										
9										

HARD STRATA BORING/CHISELLING

From (m)	To (m)	Time (h)	Comments
1.10	1.30	1	
2.40	2.50	1.5	

WATER STRIKE DETAILS

Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments
					No water strike

GROUNDWATER PROGRESS

Date	Hole Depth	Casing Depth	Depth to Water	Comments

INSTALLATION DETAILS

Date	Tip Depth	RZ Top	RZ Base	Type
28-08-19	2.50	1.00	2.50	50mm SP

REMARKS CAT scanned location and hand dug inspection pit carried out .

Sample Legend

D - Small Disturbed (tub)
B - Bulk Disturbed
LB - Large Bulk Disturbed
Env - Environmental Sample (Jar + Vial + Tub)
UT - Undisturbed 100mm Diameter Sample
P - Undisturbed Piston Sample
W - Water Sample

IGSL BH LOG 22006.GPJ IGSL.GDT 30/1/20

Groundwater Monitoring

Site Location	**Balbriggan, Co. Dublin**
Project No.	**22009**
Engineer	**MPA**
	**** - BH03A location vandalised - cover damaged and stick lodged into well.*

	Date of Reading					
	04.09.2019	**20.09.2019**	**22.10.2019**	**27.11.2019**	**13.01.2020**	
BH01	Dry	Dry	Dry	Dry	Dry	
BH02A	Dry	Dry	Dry	2.20m	2.70m	
BH03A	***	***	***	***	***	
BH04	1.95m	Dry	Dry	1.05m	1.40m	
COMMENTS		Water Sample taken from watercourse to south of site.		Water Sample taken from BH02A, BH04.	Water Sample taken from BH02A, BH04.	

Appendix II Trial Pit Records and Photographs

TRIAL PIT RECORD

REPORT NUMBER 22009

CONTRACT	Balbriggan, Co. Dublin	**TRIAL PIT NO.**	**TP01**
		SHEET	Sheet 1 of 1
LOGGED BY	L. Daniels	**CO-ORDINATES**	718,384.23 E 764,267.56 N
		DATE STARTED	30/08/2019
		DATE COMPLETED	30/08/2019
CLIENT	Mallincross Ltd	**GROUND LEVEL (m)**	42.28
ENGINEER	MPA	**EXCAVATION METHOD**	8 Ton Excavator

Geotechnical Description	Legend	Depth (m)	Elevation	Water Strike	Samples: Sample Ref	Samples: Type	Samples: Depth	Vane Test (KPa)	Hand Penetrometer (KPa)
0.0 TOPSOIL									
Firm brown slightly sandy slightly gravelly CLAY with a low cobble content		0.40	41.88		AA124219	B	0.50		
1.0									
					AA124220	B	1.50		
2.0									
OBSTRUCTION - Possible weathered head of rock recovered as brown slightly clayey medium to coarse angular GRAVEL with a high cobble content		2.30	39.98						
End of Trial Pit at 2.50m		2.50	39.78		AA124221	B	2.50		
3.0									
4.0									

Groundwater Conditions
Dry

Stability
Stable

General Remarks
CAT Scanned location for services.

TRIAL PIT RECORD

REPORT NUMBER 22009

CONTRACT	Balbriggan, Co. Dublin	**TRIAL PIT NO.**	**TP02**
		SHEET	Sheet 1 of 1
LOGGED BY	L. Daniels	**CO-ORDINATES**	718,231.81 E 764,284.01 N
		DATE STARTED	28/08/2019
		DATE COMPLETED	28/08/2019
CLIENT	Mallincross Ltd	**GROUND LEVEL (m)**	46.41
ENGINEER	MPA	**EXCAVATION METHOD**	8 Ton Excavator

Geotechnical Description	Legend	Depth (m)	Elevation	Water Strike	Samples: Sample Ref	Samples: Type	Samples: Depth	Vane Test (KPa)	Hand Penetrometer (KPa)
TOPSOIL									
Firm brown mottled grey slightly gravelly sandy CLAY with a low cobble content		0.40	46.01						
Firm brown gravelly sandy CLAY with a medium cobble content and a low boulder content (<250mm)		1.20	45.21	(Seepage)	AA124203	B	1.00		
					AA124204	B	1.80		
OBSTRUCTION - Possible weathered head of rock recovered as brown slightly clayey medium to coarse angular GRAVEL with a high cobble content		2.00	44.41						
End of Trial Pit at 2.20m		2.20	44.21						

Groundwater Conditions
Seepage at 1.20m

Stability
Stable

General Remarks
CAT Scanned location for services.

TRIAL PIT RECORD

REPORT NUMBER 22009

CONTRACT	Balbriggan, Co. Dublin	**TRIAL PIT NO.**	**TP03**
		SHEET	Sheet 1 of 1
LOGGED BY	L. Daniels	**CO-ORDINATES**	718,055.52 E 764,280.24 N
		DATE STARTED	28/08/2019
		DATE COMPLETED	28/08/2019
CLIENT	Mallincross Ltd	**GROUND LEVEL (m)**	53.23
ENGINEER	MPA	**EXCAVATION METHOD**	8 Ton Excavator

Geotechnical Description	Legend	Depth (m)	Elevation	Water Strike	Samples: Sample Ref	Samples: Type	Samples: Depth	Vane Test (KPa)	Hand Penetrometer (KPa)
0.0 TOPSOIL		0.40	52.83						
Firm brown slightly gravelly CLAY with a low cobble content		1.20	52.03		AA124205	B	1.00		
Firm brown gravelly sandy CLAY with a low cobble content		2.10	51.13		AA124206	B	2.00		
Firm brown gravelly very sandy CLAY with a low cobble content		3.50	49.73		AA124207	B	3.00		
End of Trial Pit at 3.50m									

1.0 2.0 3.0 4.0

Groundwater Conditions
Dry

Stability
Stable

General Remarks
CAT Scanned location for services.

IGSL TP LOG 22006.GPJ IGSL.GDT 30/1/20

TRIAL PIT RECORD

REPORT NUMBER 22009

CONTRACT	Balbriggan, Co. Dublin	**TRIAL PIT NO.**	**TP04**
		SHEET	Sheet 1 of 1
LOGGED BY	L. Daniels	**CO-ORDINATES**	718,060.15 E 764,182.82 N
		DATE STARTED	28/08/2019
		DATE COMPLETED	28/08/2019
CLIENT	Mallincross Ltd	**GROUND LEVEL (m)**	56.24
		EXCAVATION METHOD	8 Ton Excavator
ENGINEER	MPA		

Geotechnical Description	Legend	Depth (m)	Elevation	Water Strike	Samples: Sample Ref	Samples: Type	Samples: Depth	Vane Test (KPa)	Hand Penetrometer (KPa)
TOPSOIL		0.00							
Firm brown mottled gravelly sandy CLAY with a low cobble content (MADE GROUND)		0.40	55.84						
Firm brown gravelly very sandy CLAY with a low cobble content		0.80	55.44		AA124208	B	1.00		
Brown very gravelly clayey fine to coarse SAND		2.10	54.14	1 (Seepage)	AA124209	B	2.20		
OBSTRUCTION - Possible weathered head of rock recovered as brown slightly clayey medium to coarse angular GRAVEL with a high cobble content		2.90	53.34						
End of Trial Pit at 3.00m		3.00	53.24						

Groundwater Conditions
Dry

Stability
Stable

General Remarks
CAT Scanned location for services.

IGSL TP LOG 22006.GPJ IGSL.GDT 30/1/20

TRIAL PIT RECORD

REPORT NUMBER 22009

CONTRACT	Balbriggan, Co. Dublin	**TRIAL PIT NO.**	**TP05**
		SHEET	Sheet 1 of 1
LOGGED BY	L. Daniels	**CO-ORDINATES**	718,067.36 E 764,106.72 N
		DATE STARTED	30/08/2019
		DATE COMPLETED	30/08/2019
CLIENT	Mallincross Ltd	**GROUND LEVEL (m)**	55.86
ENGINEER	MPA	**EXCAVATION METHOD**	8 Ton Excavator

Geotechnical Description	Legend	Depth (m)	Elevation	Water Strike	Samples: Sample Ref	Samples: Type	Samples: Depth	Vane Test (KPa)	Hand Penetrometer (KPa)
0.0 TOPSOIL									
		0.40	55.46						
Firm brown gravelly sandy CLAY with a low cobble content					AA123912	B	0.50		
1.0									
		1.30	54.56						
Possible weathered head of rock recovered as brown moist very clayey very sandy fine to coarse angular GRAVEL with a medium cobble content					AA123913	B	1.50		
2.0									
					AA123914	B	2.50		
3.0									
		3.50	52.36						
End of Trial Pit at 3.50m									
4.0									

Groundwater Conditions
Seepage at 2.00m

Stability
Stable

General Remarks
CAT Scanned location for services.

TRIAL PIT RECORD

REPORT NUMBER 22009

CONTRACT	Balbriggan, Co. Dublin	**TRIAL PIT NO.**	**TP06**
		SHEET	Sheet 1 of 1
LOGGED BY	L. Daniels	**CO-ORDINATES**	718,067.47 E 764,056.32 N
		DATE STARTED	28/08/2019
		DATE COMPLETED	28/08/2019
CLIENT	Mallincross Ltd	**GROUND LEVEL (m)**	55.75
ENGINEER	MPA	**EXCAVATION METHOD**	8 Ton Excavator

Geotechnical Description	Legend	Depth (m)	Elevation	Water Strike	Samples: Sample Ref	Samples: Type	Samples: Depth	Vane Test (KPa)	Hand Penetrometer (KPa)
0.0 TOPSOIL									
Firm brown mottled grey slightly gravelly CLAY with a low cobble content		0.40	55.35						
1.0					AA124213	B	1.00		
OBSTRUCTION - Possible weathered head of rock recovered as brown slightly clayey medium to coarse angular GRAVEL with a high cobble content		1.30	54.45						
End of Trial Pit at 1.50m		1.50	54.25		AA124214	B	1.50		
2.0									
3.0									
4.0									

Groundwater Conditions
Dry

Stability
Stable

General Remarks
CAT Scanned location for services.

TRIAL PIT RECORD

REPORT NUMBER 22009

CONTRACT	Balbriggan, Co. Dublin	**TRIAL PIT NO.**	**TP07**
		SHEET	Sheet 1 of 1
LOGGED BY	L. Daniels	**CO-ORDINATES**	718,172.52 E 764,098.34 N
		DATE STARTED	28/08/2019
		DATE COMPLETED	28/08/2019
CLIENT	Mallincross Ltd	**GROUND LEVEL (m)**	50.87
ENGINEER	MPA	**EXCAVATION METHOD**	8 Ton Excavator

Geotechnical Description	Legend	Depth (m)	Elevation	Water Strike	Samples: Sample Ref	Samples: Type	Samples: Depth	Vane Test (KPa)	Hand Penetrometer (KPa)
0.0 TOPSOIL									
Firm brown mottled grey slightly gravelly sandy CLAY with a low cobble content		0.40	50.47						
1.0					AA124210	B	1.00		
Brown very gravelly clayey fine to coarse SAND with a medium cobble content		1.40	49.47						
2.0					AA124211	B	2.00		
3.0					AA124212	B	3.00		
End of Trial Pit at 3.50m		3.50	47.37						
4.0									

Groundwater Conditions
Dry

Stability
Stable

General Remarks
CAT Scanned location for services.

IGSL TP LOG 22006.GPJ IGSL.GDT 30/1/20

TRIAL PIT RECORD

REPORT NUMBER 22009

CONTRACT	Balbriggan, Co. Dublin	**TRIAL PIT NO.**	**TP08**
		SHEET	Sheet 1 of 1
LOGGED BY	L. Daniels	**CO-ORDINATES**	718,097.20 E 763,989.00 N
		DATE STARTED	28/08/2019
		DATE COMPLETED	28/08/2019
CLIENT	Mallincross Ltd	**GROUND LEVEL (m)**	52.00
ENGINEER	MPA	**EXCAVATION METHOD**	8 Ton Excavator

Geotechnical Description	Legend	Depth (m)	Elevation	Water Strike	Samples: Sample Ref	Samples: Type	Samples: Depth	Vane Test (KPa)	Hand Penetrometer (KPa)
0.0 TOPSOIL									
Firm brown mottled grey slightly gravelly CLAY with a low cobble content		0.40	51.60		AA124217	B	0.50		
OBSTRUCTION - Possible weathered head of rock recovered as brown slightly clayey medium to coarse angular GRAVEL with a high cobble content		0.80	51.20						
End of Trial Pit at 1.50m		1.50	50.50		AA124218	B	1.50		

1.0
2.0
3.0
4.0

Groundwater Conditions
Dry

Stability
Stable

General Remarks
CAT Scanned location for services.

TRIAL PIT RECORD

REPORT NUMBER 22009

CONTRACT	Balbriggan, Co. Dublin	TRIAL PIT NO.	TP09
		SHEET	Sheet 1 of 1
LOGGED BY	L. Daniels	CO-ORDINATES	718,196.00 E 763,962.30 N
		DATE STARTED	29/08/2019
		DATE COMPLETED	29/08/2019
CLIENT	Mallincross Ltd	GROUND LEVEL (m)	46.88
ENGINEER	MPA	EXCAVATION METHOD	8 Ton Excavator

Geotechnical Description	Legend	Depth (m)	Elevation	Water Strike	Samples: Sample Ref	Samples: Type	Samples: Depth	Vane Test (KPa)	Hand Penetrometer (KPa)
0.0 TOPSOIL									
Firm brown mottled grey slightly gravelly sandy CLAY with a low cobble content		0.40	46.48		AA124157	B	0.50		
Brown very gravelly clayey fine to coarse SAND		1.50	45.38		AA124158	B	1.50		
					AA124159	B	2.50		
OBSTRUCTION - Possible weathered head of rock recovered as brown slightly clayey medium to coarse angular GRAVEL with a high cobble content		3.10	43.78						
End of Trial Pit at 3.20m		3.20	43.68						

1.0 2.0 3.0 4.0

Groundwater Conditions
Dry

Stability
Stable

General Remarks
CAT Scanned location for services.

IGSL TP LOG 22006.GPJ IGSL.GDT 30/1/20

TRIAL PIT RECORD

REPORT NUMBER 22009

CONTRACT	Balbriggan, Co. Dublin	**TRIAL PIT NO.**	**TP10**
		SHEET	Sheet 1 of 1
LOGGED BY	L. Daniels	**CO-ORDINATES**	718,092.00 E 763,901.00 N
		DATE STARTED	29/08/2019
		DATE COMPLETED	29/08/2019
CLIENT	Mallincross Ltd	**GROUND LEVEL (m)**	51.78
ENGINEER	MPA	**EXCAVATION METHOD**	8 Ton Excavator

	Geotechnical Description	Legend	Depth (m)	Elevation	Water Strike	Samples: Sample Ref	Samples: Type	Samples: Depth	Vane Test (KPa)	Hand Penetrometer (KPa)
0.0	TOPSOIL									
	Firm brown slightly sandy slightly gravelly CLAY with a low cobble content		0.40	51.38		AA124155	B	0.50		
1.0	OBSTRUCTION - Possible weathered head of rock recovered as brown slightly clayey medium to coarse angular GRAVEL with a high cobble content		1.20	50.58		AA124156	B	1.50		
2.0	End of Trial Pit at 2.20m		2.20	49.58						
3.0										
4.0										

Groundwater Conditions
Dry

Stability
Stable

General Remarks
CAT Scanned location for services.

IGSL TP LOG 22006.GPJ IGSL.GDT 30/1/20

TRIAL PIT RECORD

REPORT NUMBER 22009

CONTRACT	Balbriggan, Co. Dublin	**TRIAL PIT NO.**	**TP11**
		SHEET	Sheet 1 of 1
LOGGED BY	L. Daniels	**CO-ORDINATES**	718,121.00 E 763,816.00 N
		DATE STARTED	29/08/2019
		DATE COMPLETED	29/08/2019
CLIENT	Mallincross Ltd	**GROUND LEVEL (m)**	55.12
ENGINEER	MPA	**EXCAVATION METHOD**	8 Ton Excavator

Geotechnical Description	Legend	Depth (m)	Elevation	Water Strike	Samples: Sample Ref	Samples: Type	Samples: Depth	Vane Test (KPa)	Hand Penetrometer (KPa)
TOPSOIL									
Soft to firm brown slightly sandy slightly gravelly CLAY with a low cobble content. Rare blue service warning tape (MADE GROUND)		0.40	54.72		AA124226	B	0.50		
Grey fine angular GRAVEL FILL (MADE GROUND). Pit ended due to probable presence of underground services		1.40	53.72		AA124227	B	1.40		
End of Trial Pit at 1.50m		1.50	53.62						

Groundwater Conditions
Dry

Stability
Stable

General Remarks
CAT Scanned location for services.

TRIAL PIT RECORD

REPORT NUMBER 22009

CONTRACT	Balbriggan, Co. Dublin	**TRIAL PIT NO.**	**TP12**
		SHEET	Sheet 1 of 1
LOGGED BY	L. Daniels	**CO-ORDINATES**	718,136.00 E 763,851.20 N
		DATE STARTED	28/08/2019
		DATE COMPLETED	28/08/2019
CLIENT	Mallincross Ltd	**GROUND LEVEL (m)**	50.55
ENGINEER	MPA	**EXCAVATION METHOD**	8 Ton Excavator

Geotechnical Description	Legend	Depth (m)	Elevation	Water Strike	Samples: Sample Ref	Samples: Type	Samples: Depth	Vane Test (KPa)	Hand Penetrometer (KPa)
TOPSOIL									
		0.40	50.15						
Firm brown mottled grey slightly gravelly CLAY with a low cobble content		0.60	49.95		AA124216	B	0.50		
OBSTRUCTION - Possible weathered head of rock recovered as brown slightly clayey medium to coarse angular GRAVEL with a high cobble content					AA124215	B	1.00		
		1.50	49.05						
End of Trial Pit at 1.50m									

0.0
1.0
2.0
3.0
4.0

Groundwater Conditions
Dry

Stability
Stable

General Remarks
CAT Scanned location for services.

IGSL TP LOG 22006.GPJ IGSL.GDT 30/1/20

TRIAL PIT RECORD

REPORT NUMBER 22009

CONTRACT	Balbriggan, Co. Dublin	**TRIAL PIT NO.**	**TP13**
		SHEET	Sheet 1 of 1
LOGGED BY	L. Daniels	**CO-ORDINATES**	718,203.00 E 763,837.00 N
		DATE STARTED	29/08/2019
		DATE COMPLETED	29/08/2019
CLIENT	Mallincross Ltd	**GROUND LEVEL (m)**	45.29
ENGINEER	MPA	**EXCAVATION METHOD**	8 Ton Excavator

Geotechnical Description	Legend	Depth (m)	Elevation	Water Strike	Samples: Sample Ref	Samples: Type	Samples: Depth	Vane Test (KPa)	Hand Penetrometer (KPa)
0.0 TOPSOIL									
Firm brown mottled grey slightly sandy slightly gravelly CLAY		0.50	44.79		AA124153	B	0.50		
1.0 OBSTRUCTION - Possible weathered head of rock recovered as brown slightly clayey medium to coarse angular GRAVEL with a high cobble content		1.00	44.29		AA124154	B	1.00		
End of Trial Pit at 1.50m		1.50	43.79						
2.0									
3.0									
4.0									

Groundwater Conditions
Dry

Stability
Stable

General Remarks
CAT Scanned location for services.

TRIAL PIT RECORD

REPORT NUMBER 22009

CONTRACT	Balbriggan, Co. Dublin	**TRIAL PIT NO.**	**TP14**
		SHEET	Sheet 1 of 1
LOGGED BY	L. Daniels	**CO-ORDINATES**	718,148.10 E 763,768.00 N
		DATE STARTED	29/08/2019
		DATE COMPLETED	29/08/2019
CLIENT	Mallincross Ltd	**GROUND LEVEL (m)**	55.11
ENGINEER	MPA	**EXCAVATION METHOD**	8 Ton Excavator

Geotechnical Description	Legend	Depth (m)	Elevation	Water Strike	Samples: Sample Ref	Samples: Type	Samples: Depth	Vane Test (KPa)	Hand Penetrometer (KPa)
0.0 TOPSOIL									
Firm brown mottled grey slightly sandy slightly gravelly CLAY		0.40	54.71		AA124224	B	0.50		
1.0					AA124225	B	1.00		
OBSTRUCTION - Possible weathered head of rock recovered as brown slightly clayey medium to coarse angular GRAVEL with a high cobble content		1.20	53.91						
End of Trial Pit at 1.50m		1.50	53.61						
2.0									
3.0									
4.0									

Groundwater Conditions
Dry

Stability
Stable

General Remarks
CAT Scanned location for services.

TRIAL PIT RECORD

REPORT NUMBER 22009

CONTRACT	Balbriggan, Co. Dublin	**TRIAL PIT NO.**	**TP15**
		SHEET	Sheet 1 of 1
LOGGED BY	L. Daniels	**CO-ORDINATES**	718,071.69 E 763,664.96 N
		DATE STARTED	30/08/2019
		DATE COMPLETED	30/08/2019
CLIENT	Mallincross Ltd	**GROUND LEVEL (m)**	57.79
ENGINEER	MPA	**EXCAVATION METHOD**	8 Ton Excavator

Geotechnical Description	Legend	Depth (m)	Elevation	Water Strike	Samples: Sample Ref	Samples: Type	Samples: Depth	Vane Test (KPa)	Hand Penetrometer (KPa)
TOPSOIL									
Firm brown gravelly CLAY with a low cobble content		0.40	57.39		AA123918	B	0.50		
OBSTRUCTION - Possible weathered head of rock recovered as brown slightly clayey medium to coarse angular GRAVEL with a high cobble content		0.80	56.99		AA123919	B	1.00		
End of Trial Pit at 1.20m		1.20	56.59						

Groundwater Conditions
Dry

Stability
Stable

General Remarks
CAT Scanned location for services.

IGSL TP LOG 22006.GPJ IGSL.GDT 30/1/20

TRIAL PIT RECORD

REPORT NUMBER 22009

CONTRACT	Balbriggan, Co. Dublin	**TRIAL PIT NO.**	**TP16**
		SHEET	Sheet 1 of 1
LOGGED BY	L. Daniels	**CO-ORDINATES**	718,191.00 E 763,747.00 N
		DATE STARTED	29/08/2019
		DATE COMPLETED	29/08/2019
CLIENT	Mallincross Ltd	**GROUND LEVEL (m)**	50.50
ENGINEER	MPA	**EXCAVATION METHOD**	8 Ton Excavator

Geotechnical Description	Legend	Depth (m)	Elevation	Water Strike	Samples: Sample Ref	Samples: Type	Samples: Depth	Vane Test (KPa)	Hand Penetrometer (KPa)
0.0 TOPSOIL									
Firm brown mottled grey slightly sandy slightly gravelly CLAY		0.40	50.10		AA124222	B	0.50		
1.0 OBSTRUCTION - Possible weathered head of rock recovered as brown slightly clayey medium to coarse angular GRAVEL with a high cobble content		1.00	49.50		AA124223	B	1.00		
End of Trial Pit at 1.20m		1.20	49.30						
2.0									
3.0									
4.0									

Groundwater Conditions
Dry

Stability
Stable

General Remarks
CAT Scanned location for services.

TRIAL PIT RECORD

REPORT NUMBER 22009

CONTRACT	Balbriggan, Co. Dublin	**TRIAL PIT NO.**	**TP17**
		SHEET	Sheet 1 of 1
LOGGED BY	L. Daniels	**CO-ORDINATES**	718,110.97 E 763,512.94 N
		DATE STARTED	30/08/2019
		DATE COMPLETED	30/08/2019
CLIENT	Mallincross Ltd	**GROUND LEVEL (m)**	55.19
ENGINEER	MPA	**EXCAVATION METHOD**	8 Ton Excavator

Geotechnical Description	Legend	Depth (m)	Elevation	Water Strike	Samples: Sample Ref	Samples: Type	Samples: Depth	Vane Test (KPa)	Hand Penetrometer (KPa)
0.0 TOPSOIL									
Firm brown mottled grey slightly gravelly sandy CLAY with a low cobble content		0.40	54.79		AA123915	B	0.50		
Brown gravelly very clayey fine to coarse SAND		0.80	54.39						
1.0									
Possible weathered head of rock recovered as wet brown sandy very clayey medium to coarse angular GRAVEL with a high cobble content		1.50	53.69	1 (Seepage) (Moderate)	AA123916	B	1.50		
2.0									
End of Trial Pit at 2.50m		2.50	52.69		AA123917	B	2.50		
3.0									
4.0									

Groundwater Conditions
Groundwater at 2.00m

Stability
Wall collapse from 0.80 to end of pit.

General Remarks
CAT Scanned location for services.

IGSL TP LOG 22006.GPJ IGSL.GDT 30/1/20

Appendix III Percolation Tests (BRE Digest 365)

Soakaway Design f -value from field test (F2C) IGSL

Contract: Balbriggan, Co. Dublin Contract No. 22009
Test No. SA01 (TP01)
Client MPA
Date: 30th August 2019

Summary of ground conditions

from	to	Description	Ground water
0.00	0.40	TOPSOIL	None observed
0.40	2.30	Brown sandy gravelly CLAY with cobbles	
2.30	2.50	Brown sandy very clayey angular GRAVEL with cobbles	

Notes: Two cycles completed with the final cycle noted below.

Field Data

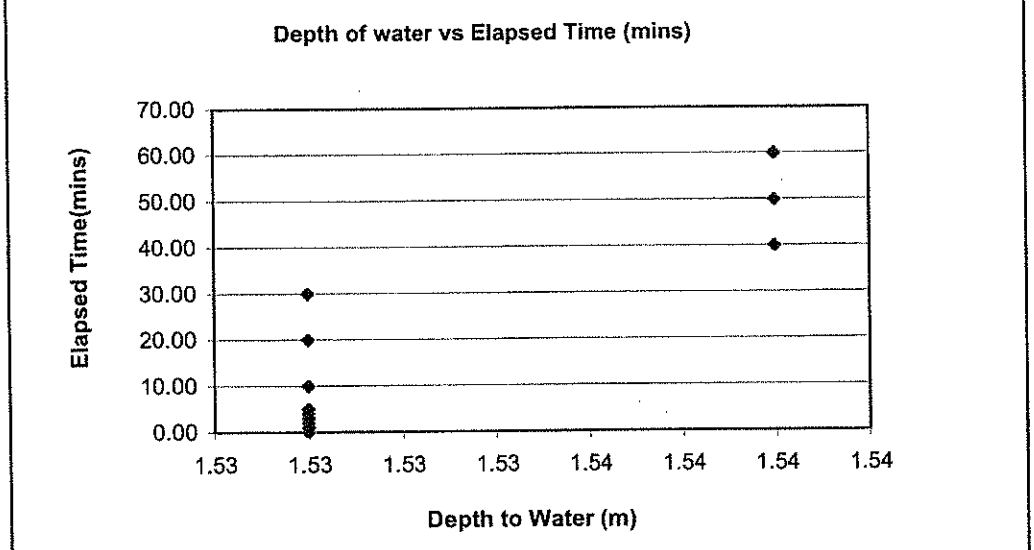
Depth to Water (m)	Elapsed Time (min)
1.53	0.00
1.53	1.00
1.53	2.00
1.53	3.00
1.53	4.00
1.53	5.00
1.53	10.00
1.53	20.00
1.53	30.00
1.54	40.00
1.54	50.00
1.54	60.00

Field Test

Depth of Pit (D)	2.50	m
Width of Pit (B)	0.50	m
Length of Pit (L)	1.70	m
Initial depth to Water =	1.53	m
Final depth to water =	1.54	m
Elapsed time (mins)=	60.00	
Top of permeable soil		m
Base of permeable soil		m
Base area=	0.85	m2
*Av. side area of permeable stratum over test p	4.246	m2
Total Exposed area =	5.096	m2

Infiltration rate (f) = Volume of water used/unit exposed area / unit time

f= 2.8E-05 m/min or 4.633E-07 m/sec



Soakaway Design f -value from field test(F2C) IGSL

Contract: Balbriggan, Co. Dublin Contract No. 22009
Test No. SA02 (TP05)
Client MPA
Date: 30th August 2019

Summary of ground conditions

from	to	Description	Ground water
0.00	0.40	TOPSOIL	Moist from 1.30m
0.40	1.30	Brown sandy gravelly CLAY with cobbles	
1.30	2.00	Moist brown sandy clayey GRAVEL with cobbles	

Notes: Two cycles completed with the final cycle noted below.

Field Data

Depth to Water (m)	Elapsed Time (min)
1.01	0.00
1.01	1.00
1.01	2.00
1.01	3.00
1.01	4.00
1.01	5.00
1.01	10.00
1.02	20.00
1.02	30.00
1.03	40.00
1.03	50.00
1.04	60.00

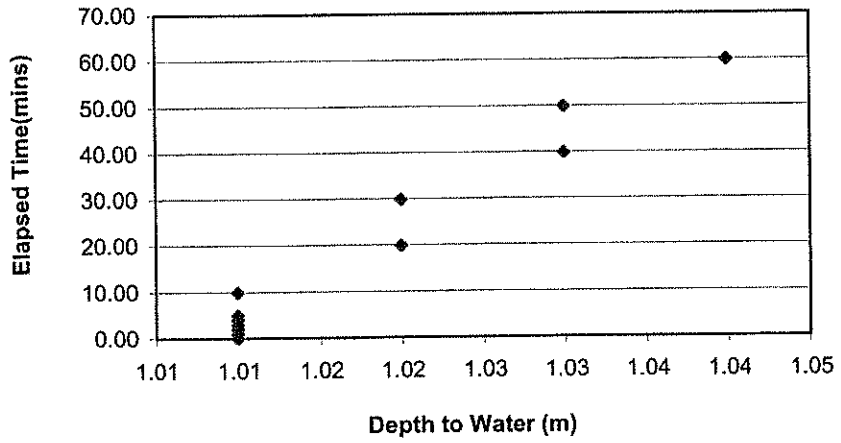
Field Test

Depth of Pit (D)	2.00	m
Width of Pit (B)	0.50	m
Length of Pit (L)	2.00	m
Initial depth to Water =	1.01	m
Final depth to water =	1.04	m
Elapsed time (mins)=	60.00	
Top of permeable soil		m
Base of permeable soil		m
Base area=	1	m2
*Av. side area of permeable stratum over test p	4.875	m2
Total Exposed area =	5.875	m2

Infiltration rate (f) = Volume of water used/unit exposed area / unit time

f= 8.5E-05 m/min or 1.418E-06 m/sec

Depth of water vs Elapsed Time (mins)



Soakaway Design f -value from field test (F2C) IGSL

Contract: Balbriggan, Co. Dublin Contract No. 22009
Test No. SA03 (TP10)
Client MPA
Date: 29th August 2019

Summary of ground conditions

from	to	Description	Ground water
0.00	0.40	TOPSOIL	None observed
0.40	1.20	Brown slightly sandy gravelly CLAY with cobbles	
1.20	2.20	Brown very clayey fine to coarse angular GRAVEL	

Notes: Two cycles completed with the final cycle noted below.

Field Data

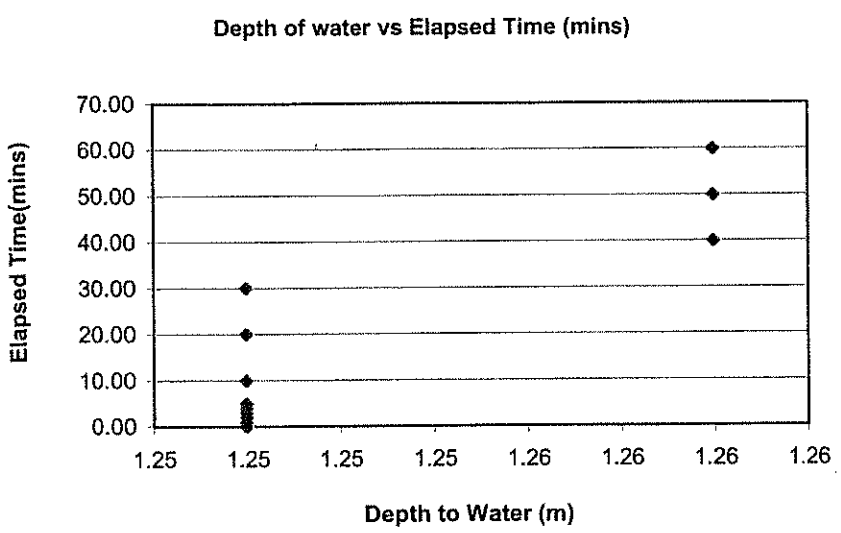
Depth to Water (m)	Elapsed Time (min)
1.25	0.00
1.25	1.00
1.25	2.00
1.25	3.00
1.25	4.00
1.25	5.00
1.25	10.00
1.25	20.00
1.25	30.00
1.26	40.00
1.26	50.00
1.26	60.00

Field Test

Depth of Pit (D)	2.20	m
Width of Pit (B)	0.50	m
Length of Pit (L)	1.80	m
Initial depth to Water =	1.25	m
Final depth to water =	1.26	m
Elapsed time (mins)=	60.00	
Top of permeable soil		m
Base of permeable soil		m
Base area=	0.9	m2
*Av. side area of permeable stratum over test p	4.347	m2
Total Exposed area =	5.247	m2

Infiltration rate (f) = Volume of water used/unit exposed area / unit time

f= 2.9E-05 m/min or 4.765E-07 m/sec



Soakaway Design f -value from field test (F2C) IGSL

Contract: Balbriggan, Co. Dublin Contract No. 22009
Test No. SA04 (TP17)
Client MPA
Date: 30th August 2019

Summary of ground conditions

from	to	Description	Ground water
0.00	0.40	TOPSOIL	Observed at 2.00m in TP17
0.40	1.50	Brown gravelly sandy CLAY with cobbles	

Notes: Two cycles completed with the final cycle noted below.

Field Data

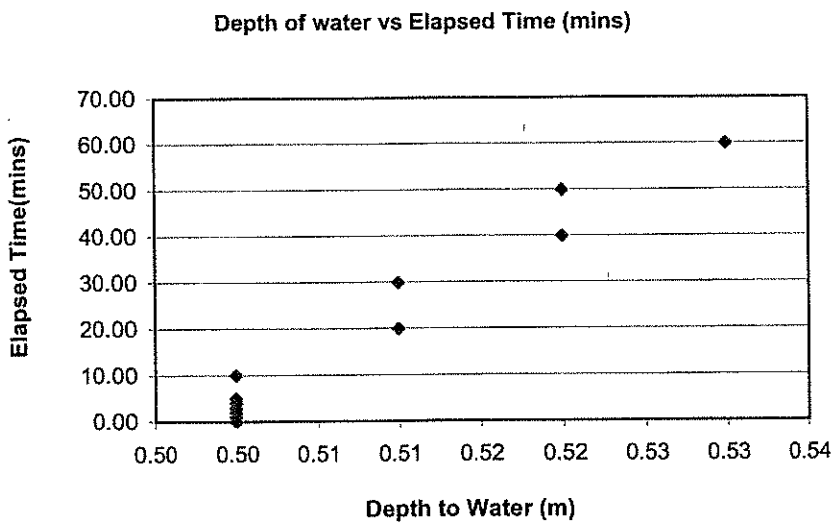
Depth to Water (m)	Elapsed Time (min)
0.50	0.00
0.50	1.00
0.50	2.00
0.50	3.00
0.50	4.00
0.50	5.00
0.50	10.00
0.51	20.00
0.51	30.00
0.52	40.00
0.52	50.00
0.53	60.00

Field Test

Depth of Pit (D)	1.50	m
Width of Pit (B)	0.50	m
Length of Pit (L)	1.50	m
Initial depth to Water =	0.50	m
Final depth to water =	0.53	m
Elapsed time (mins)=	60.00	
Top of permeable soil		m
Base of permeable soil		m
Base area=	0.75	m2
*Av. side area of permeable stratum over test p	3.94	m2
Total Exposed area =	4.69	m2

Infiltration rate (f) = Volume of water used/unit exposed area / unit time

f= 8E-05 m/min or 1.333E-06 m/sec



Appendix IVA Laboratory

Geotechnical

a. Moisture Content and PI
b. Grading
c. CBR
d. MCV
e. Compaction

IGSL Ltd
Materials Laboratory
Unit J5, M7 Business Park
Newhall, Naas
Co. Kildare
045 846176

Test Report

Determination of Moisture Content, Liquid & Plastic Limits

Tested in accordance with BS1377:Part 2:1990, clauses 3.2*, 4.3, 4.4 & 5.3

Report No. **R105320** Contract No. 22009 Contract Name: Balbriggan , Co.Dublin

Customer MPA

Samples Received: 11/09/19 Date Tested: 30/9/19

BH/TP	Sample No.	Depth (m)	Lab. Ref	Sample Type	Moisture Content %	Liquid Limit %	Plastic Limit %	Plasticity Index	% <425µm	Preparation	Liquid Limit Clause	Classification (BS5930)	Description
BH01	AA122746	0.5	A19/4411	B	18	422	NP	NP	62	WS	4.4		Brown sandy gravelly SILT
BH01	AA122749	3.0	A19/4412	B	11	33	NP	NP	27	WS	4.4		Brown silty, very sandy, GRAVEL
BH02A	AA127703	1.0	A19/4413	B	20	37	NP	NP	71	WS	4.4		Brown sandy gravelly SILT
BH02A	AA127705	3.0	A19/4414	B	12	35	NP	NP	33	WS	4.4		Dark brown silty, very sandy, GRAVEL
BH03A	AA127701	1.0	A19/4415	B	21	38	19	19	76	WS	4.4	C I	Brown slightly sandy, slightly gravelly, CLAY
TP01	AA124219	0.5	A19/4417	B	14	33	NP	NP	43	WS	4.4		Brown sandy gravelly SILT
TP01	AA124220	1.5	A19/4418	B	9.8	35	NP	NP	32	WS	4.4		Dark brown slightly sandy, gravelly, SILT
TP02	AA124204	1.8	A19/4420	B	14	32	NP	NP	53	WS	4.4		Brown slightly sandy, gravelly, SILT
TP03	AA124205	1.0	A19/4421	B	20	39	21	18	61	WS	4.4	C I	Brown sandy gravelly CLAY
TP03	AA124207	3.0	A19/4422	B	11	23	NP	NP	42	WS	4.4		Brown silty, very sandy, GRAVEL
TP04	AA124208	1.0	A19/4423	B	19	34	NP	NP	38	WS	4.4		Brown sandy, gravelly, SILT
TP05	AA123912	0.5	A19/4425	B	15	42	19	23	33	WS	4.4	C I	Brown sandy gravelly CLAY
TP06	AA124213	1.0	A19/4427	B	19	38	18	20	69	WS	4.4	C I	Brown sandy gravelly CLAY
TP07	AA124210	1.0	A19/4428	B	20	41	19	22	69	WS	4.4	C I	Brown sandy gravelly CLAY
TP09	AA124157	0.5	A19/4432	B	23	46	22	24	57	WS	4.4	C I	Brown sandy gravelly CLAY

Notes:
Preparation: WS - Wet sieved; AR - As received; NP - Non plastic
Liquid Limit Clause: 4.3 Cone Penetrometer definitive method; 4.4 Cone Penetrometer one point method
Sample Type: B - Bulk Disturbed; U - Undisturbed

Remarks:
Results apply to the sample as received.
NOTE: *Clause 3.2 of BS1377 is a "withdrawn" standard due to publication of ISO17892-1:2014
Opinions and interpretations are outside the scope of accreditation.
The results relate to the specimens tested. Any remaining material will be retained for one month.

IGSL Ltd Materials Laboratory

Persons authorized to approve reports
H Byrne (Laboratory Manager)

Approved by | Date: 16/10/19 | Page: 1 of 1

IGSL Ltd
Materials Laboratory
Unit J5, M7 Business Park
Newhall, Naas
Co. Kildare
045 846176

Test Report

Determination of Moisture Content, Liquid & Plastic Limits

Tested in accordance with BS1377:Part 2:1990, clauses 3.2*, 4.3, 4.4 & 5.3

Report No. **R105321** Contract No. 22009 Contract Name: Balbriggan , Co.Dublin

Customer MPA

Samples Received: 11/09/19 Date Tested: 30/9/19

BH/TP	Sample No.	Depth (m)	Lab. Ref	Sample Type	Moisture Content %	Liquid Limit %	Plastic Limit %	Plasticity Index	% <425µm	Preparation	Liquid Limit Clause	Classification (BS5930)	Description
TP10	AA124155	0.5	A19/4435	B	17	38	NP	NP	46	WS	4.4		Brown sandy gravelly SILT
TP13	AA124153	0.5	A19/4437	B	18	45	22	23	57	WS	4.4	C I	Brown slightly sandy, slightly gravelly, CLAY
TP16	AA124222	0.5	A19/4438	B	20	42	19	23	58	WS	4.4	C I	Brown sandy gravelly CLAY
TP17	AA123915	0.5	A19/4441	B	22	43	20	23	66	WS	4.4	C I	Brown sandy gravelly CLAY

Notes:
Preparation: WS - Wet sieved; AR - As received; NP - Non plastic
Liquid Limit Clause: 4.3 Cone Penetrometer definitive method; 4.4 Cone Penetrometer one point method
Sample Type: B - Bulk Disturbed; U - Undisturbed

Remarks:
Results apply to the sample as received.
NOTE: *Clause 3.2 of BS1377 is a "withdrawn" standard due to publication of ISO17892-1:2014
Opinions and interpretations are outside the scope of accreditation.
The results relate to the specimens tested. Any remaining material will be retained for one month.

IGSL Ltd Materials Laboratory

Persons authorized to approve reports
H Byrne (Laboratory Manager)

Approved by | Date: 16/10/19 | Page: 1 of 1

TEST REPORT

Determination of Particle Size Distribution

Tested in accordance with: BS1377:Part2:1990 , clause 9.2 & 9.5

(note: Sedimentation stage not accredited)

particle size	% passing	
75	100	COBBLES
63	100	
50	100	GRAVEL
37.5	98	
28	96	
20	90	
14	86	
10	81	
6.3	72	
5	67	
3.35	60	
2	52	
1.18	46	SAND
0.6	40	
0.425	37	
0.3	33	
0.15	26	
0.063	20	SILT/CLAY
0.037	18	
0.027	16	
0.017	14	
0.010	12	
0.007	10	
0.005	8	
0.002	6	

Contract No: 22009 Report No. R106012

Contract: Balbriggan , Co.Dublin

BH/TP : TP01

Sample No. AA124220 Lab. Sample No. A19/4418

Sample Type: B

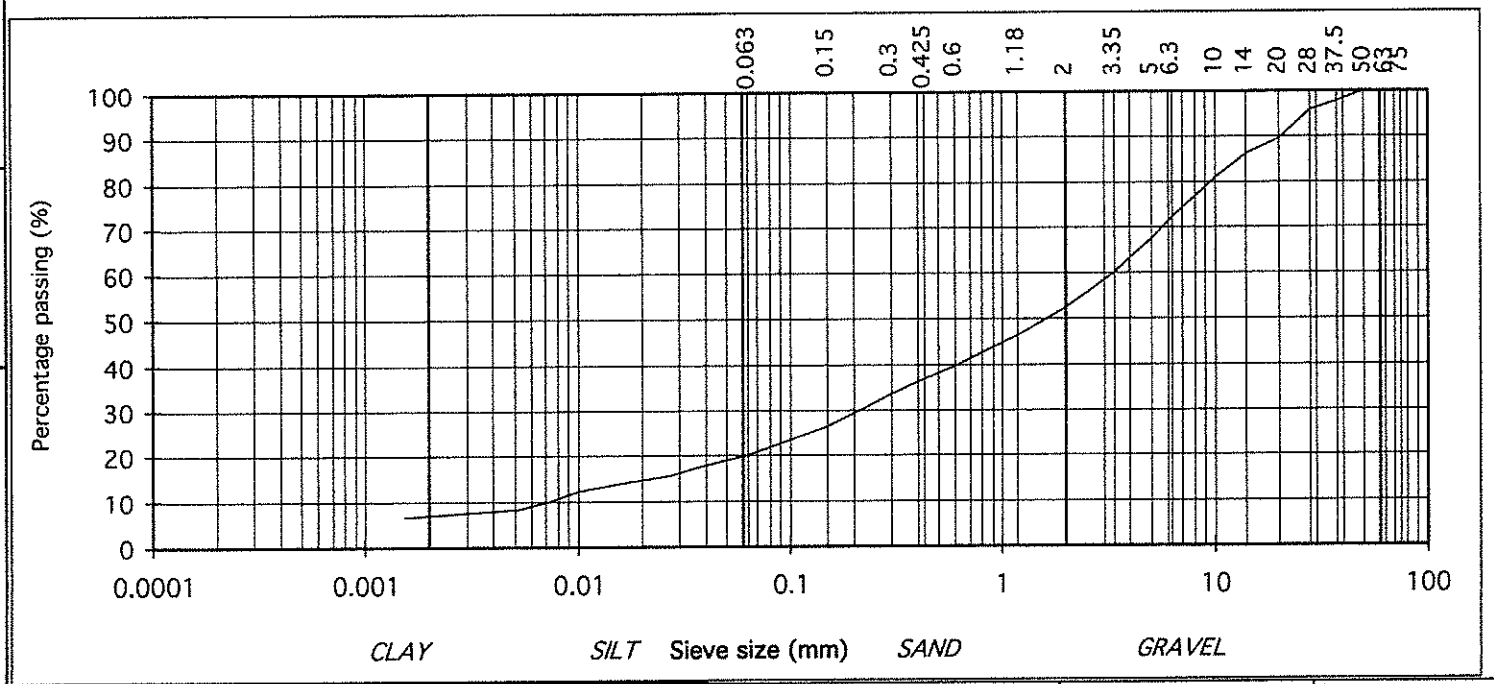
Depth (m) 1.50 Customer: MPA

Date Received 11/09/2019 Date Testing started 30/09/2019

Description: Dark brown slightly sandy, gravelly, SILT

Remarks

Note: Clause 9.2 and Clause 9.5 of BS1377:Part 2:1990 have been superseded by ISO17892-4:2016 . Results apply to sample as received.



IGSL Ltd Materials Laboratory

Approved by:	Date:	Page no:
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Persons authorised to approve report: J Barrett (Quality Manager) H Byrne (Laboratory Manager)

TEST REPORT

Determination of Particle Size Distribution

Tested in accordance with: BS1377:Part2:1990 , clause 9.2 & 9.5

(note: Sedimentation stage not accredited)

particle size	% passing	
75	93	COBBLES
63	81	
50	81	GRAVEL
37.5	79	
28	79	
20	73	
14	68	
10	62	
6.3	53	
5	49	
3.35	44	
2	37	
1.18	32	SAND
0.6	28	
0.425	26	
0.3	24	
0.15	19	
0.063	15	SILT/CLAY

Contract No: 22009 Report No. R106104

Contract: Balbriggan , Co.Dublin

BH/TP : TP01

Sample No. AA124221 Lab. Sample No. A19/4419

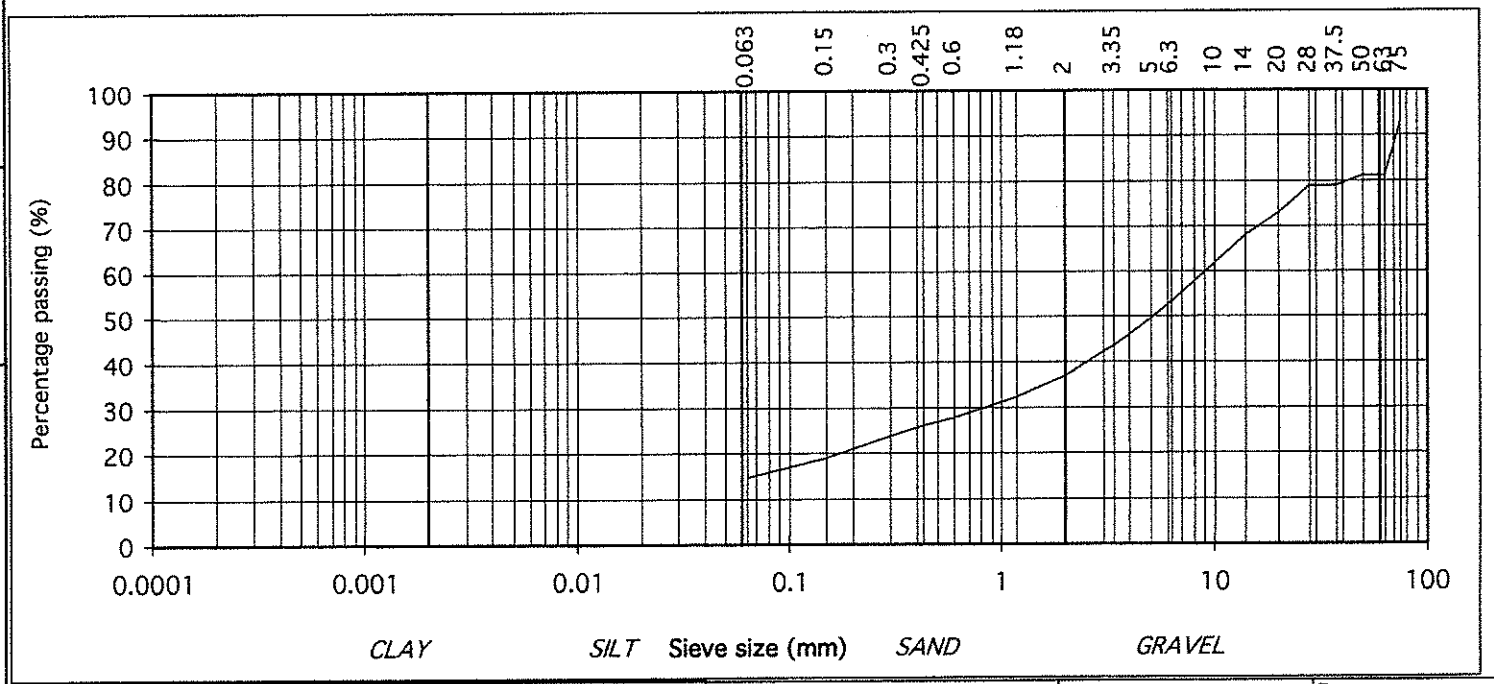
Sample Type: B

Depth (m) 2.50 Customer: MPA

Date Received 11/09/2019 Date Testing started 30/09/2019

Description: Brown clayey/silty, very sandy, GRAVEL with some cobbles

Remarks Note: Clause 9.2 and Clause 9.5 of BS1377:Part 2:1990 have been superseded by ISO17892-4:2016 . Results apply to sample as received.



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Approved by:	Date:	Page no:
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Persons authorised to approve report: J Barrett (Quality Manager) H Byrne (Laboratory Manager)

TEST REPORT

Determination of Particle Size Distribution

Tested in accordance with: BS1377:Part2:1990 , clause 9.2 & 9.5

(note: Sedimentation stage not accredited)

ISO 17025 INAB TESTING DETAILED IN SCOPE REG NO. 133T

particle size	% passing	
75	100	COBBLES
63	100	
50	100	GRAVEL
37.5	98	
28	91	
20	84	
14	80	
10	73	
6.3	65	
5	61	
3.35	56	
2	50	
1.18	46	SAND
0.6	41	
0.425	39	
0.3	36	
0.15	30	
0.063	22	SILT/CLAY
0.037	19	
0.026	18	
0.017	14	
0.010	11	
0.007	10	
0.005	8	
0.002	6	

Contract No: 22009 Report No. R106185

Contract: Balbriggan , Co.Dublin

BH/TP : TP02

Sample No. AA124204 Lab. Sample No. A19/4420

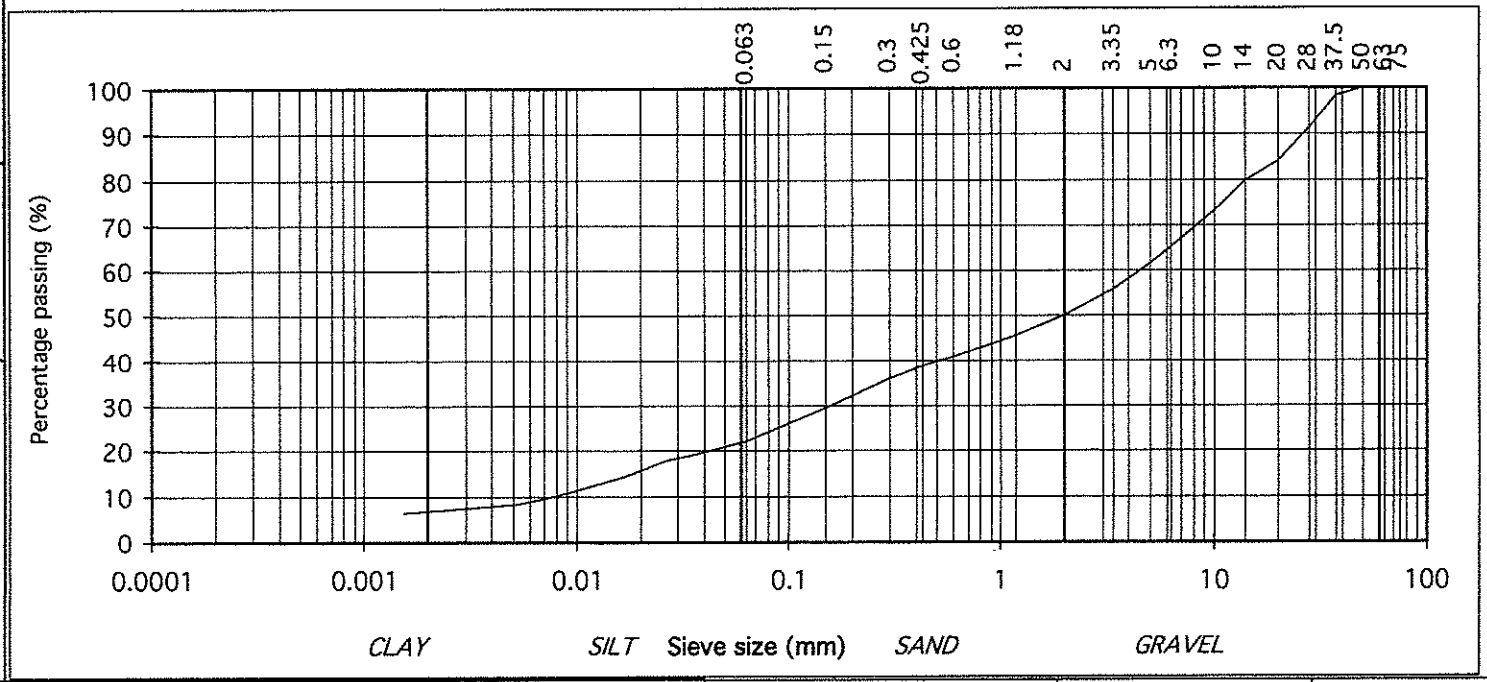
Sample Type: B

Depth (m) 1.80 Customer: MPA

Date Received 11/09/2019 Date Testing started 02/10/2019

Description: Brown slightly sandy, gravelly, SILT

Remarks Note: Clause 9.2 and Clause 9.5 of BS1377:Part 2:1990 have been superseded by ISO17892-4:2016 . Results apply to sample as received.



IGSL Ltd Materials Laboratory

Approved by:	Date:	Page no:
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Persons authorised to approve report: J Barrett (Quality Manager) H Byrne (Laboratory Manager)

TEST REPORT

Determination of Particle Size Distribution

Tested in accordance with: BS1377:Part2:1990 , clause 9.2 & 9.5

(note: Sedimentation stage not accredited)

particle size	% passing	
75	100	COBBLES
63	100	
50	100	GRAVEL
37.5	99	
28	94	
20	89	
14	85	
10	79	
6.3	71	
5	68	
3.35	63	
2	56	
1.18	49	SAND
0.6	41	
0.425	38	
0.3	34	
0.15	25	
0.063	18	SILT/CLAY

Contract No: 22009 Report No. R106487

Contract: Balbriggan , Co.Dublin

BH/TP : TP03

Sample No. AA124207 Lab. Sample No. A19/4422

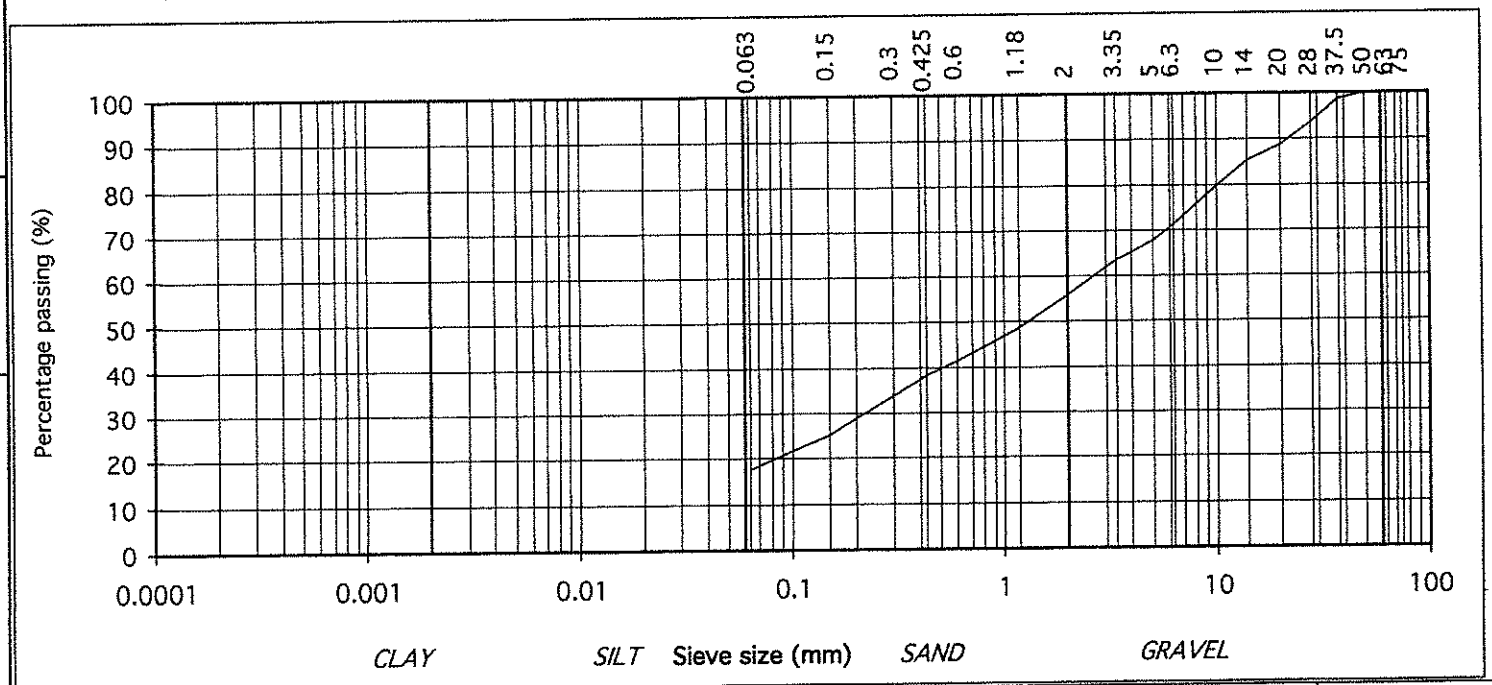
Sample Type: B

Depth (m) 3.00 Customer: MPA

Date Received 11/09/2019 Date Testing started 02/10/2019

Description: Brown silty, very sandy, GRAVEL

Remarks Note: Clause 9.2 and Clause 9.5 of BS1377:Part 2:1990 have been superseded by ISO17892-4:2016 . Results apply to sample as received.



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Persons authorised to approve report: J Barrett (Quality Manager) H Byrne (Laboratory Manager)

TEST REPORT

Determination of Particle Size Distribution

Tested in accordance with: BS1377:Part2:1990 , clause 9.2 & 9.5

(note: Sedimentation stage not accredited)

particle size	% passing	
75	100	COBBLES
63	100	
50	100	GRAVEL
37.5	98	
28	96	
20	90	
14	87	
10	82	
6.3	75	
5	72	
3.35	68	
2	62	
1.18	56	SAND
0.6	49	
0.425	46	
0.3	42	
0.15	33	
0.063	22	SILT/CLAY
0.037	17	
0.027	14	
0.018	11	
0.010	10	
0.007	8	
0.005	7	
0.002	5	

Contract No: 22009 Report No. R106488

Contract: Balbriggan , Co.Dublin

BH/TP : TP04

Sample No. AA124208 Lab. Sample No. A19/4423

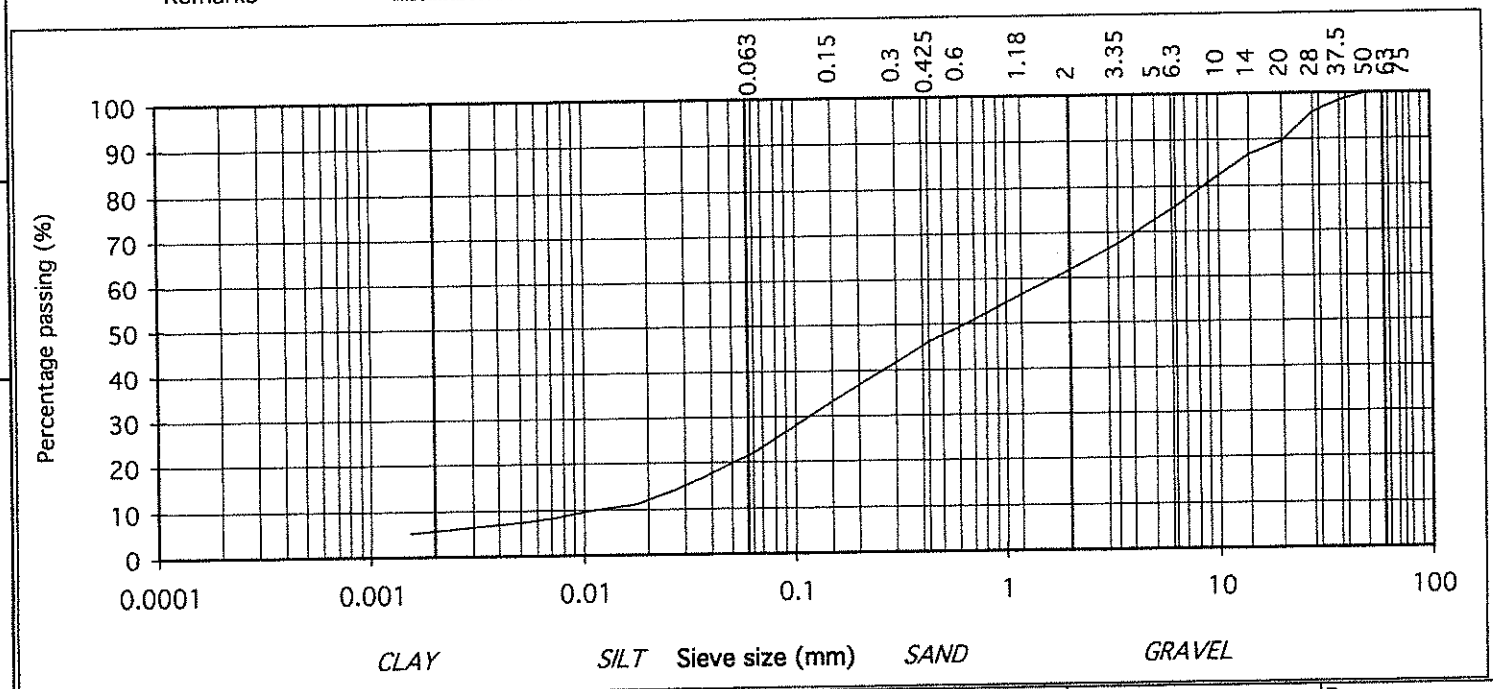
Sample Type: B

Depth (m) 1.00 Customer: MPA

Date Received 11/09/2019 Date Testing started 02/10/2019

Description: Brown sandy, gravelly, SILT

Remarks Note: Clause 9.2 and Clause 9.5 of BS1377:Part 2:1990 have been superseded by ISO17892-4:2016 . Results apply to sample as received.



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Persons authorised to approve report: J Barrett (Quality Manager) H Byrne (Laboratory Manager)

TEST REPORT

Determination of Particle Size Distribution

Tested in accordance with: BS1377:Part2:1990 , clause 9.2 & 9.5

(note: Sedimentation stage not accredited)

particle size	% passing	
75	100	COBBLES
63	91	
50	91	GRAVEL
37.5	91	
28	89	
20	87	
14	83	
10	76	
6.3	70	
5	67	
3.35	62	
2	55	
1.18	50	SAND
0.6	43	
0.425	39	
0.3	35	
0.15	26	
0.063	19	SILT/CLAY

Contract No: 22009 Report No. R106489

Contract: Balbriggan , Co.Dublin

BH/TP : TP04

Sample No. AA124209 Lab. Sample No. A19/4424

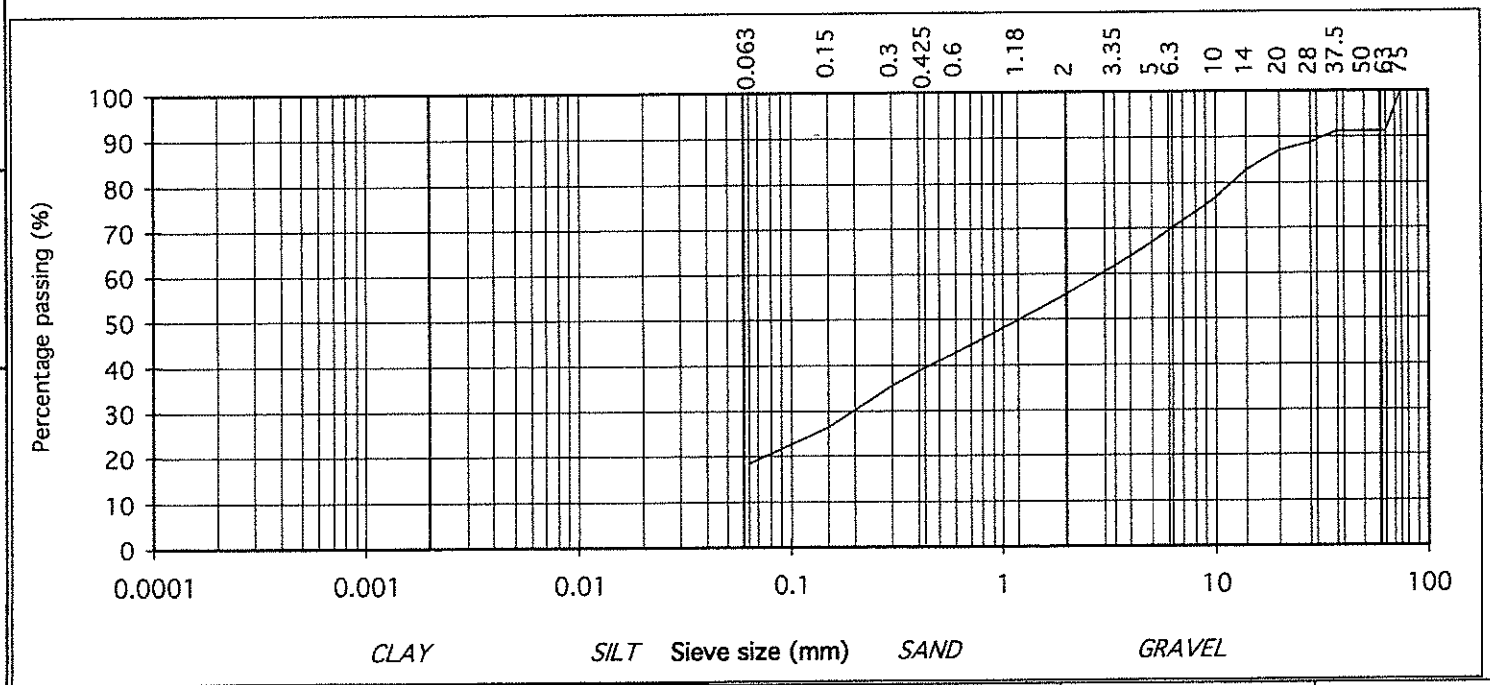
Sample Type: B

Depth (m) 2.20 Customer: MPA

Date Received 11/09/2019 Date Testing started 02/10/2019

Description: Brown silty, very sandy, GRAVEL with some cobbles

Remarks Note: Clause 9.2 and Clause 9.5 of BS1377:Part 2:1990 have been superseded by ISO17892-4:2016 . Results apply to sample as received.



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Persons authorised to approve report: J Barrett (Quality Manager) H Byrne (Laboratory Manager)

TEST REPORT

Determination of Particle Size Distribution

Tested in accordance with: BS1377:Part2:1990 , clause 9.2 & 9.5

(note: Sedimentation stage not accredited)

particle size	% passing	
75	88	COBBLES
63	88	
50	88	GRAVEL
37.5	83	
28	78	
20	67	
14	60	
10	53	
6.3	42	
5	38	
3.35	32	
2	27	
1.18	24	SAND
0.6	20	
0.425	18	
0.3	16	
0.15	12	
0.063	8	SILT/CLAY

Contract No: 22009 Report No. R106105

Contract: Balbriggan , Co.Dublin

BH/TP : TP05

Sample No. AA123914 Lab. Sample No. A19/4426

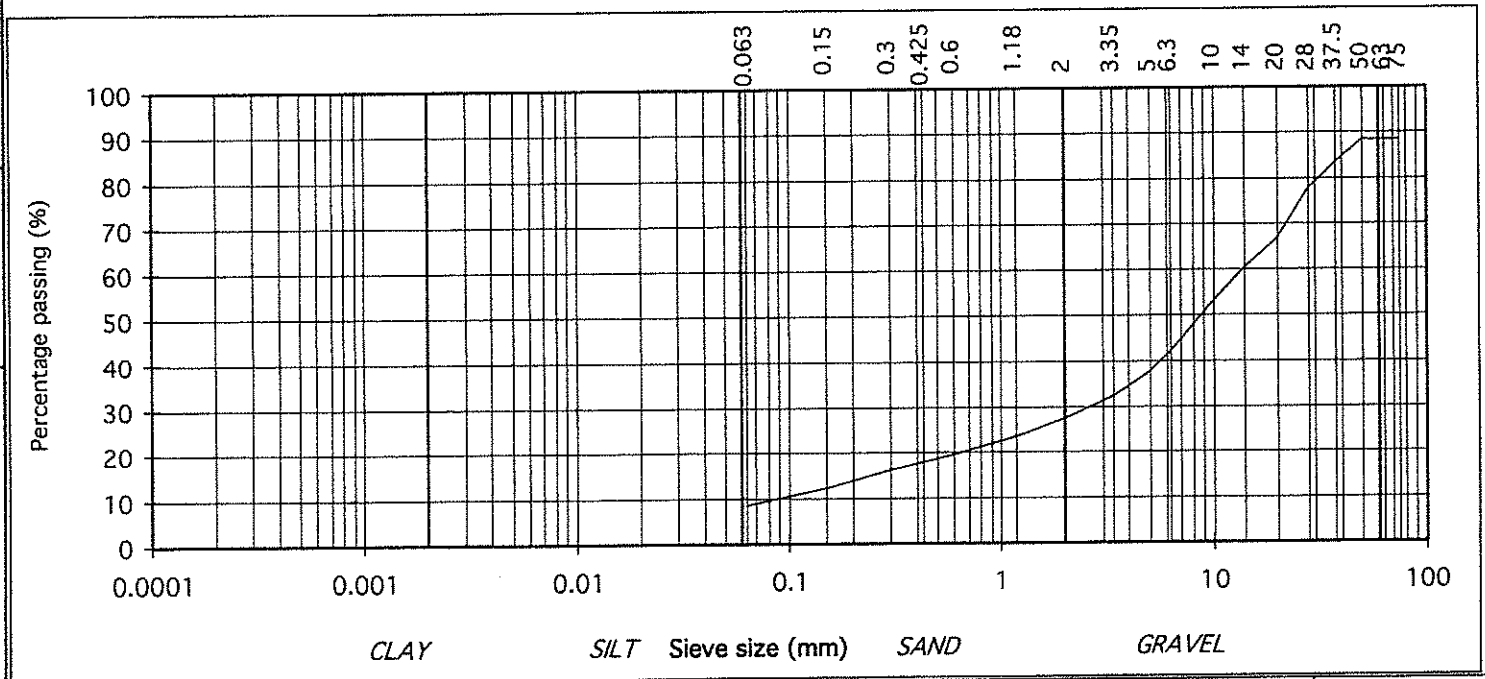
Sample Type: B

Depth (m) 2.50 Customer: MPA

Date Received 11/09/2019 Date Testing started 01/10/2019

Description: Brown clayey/silty, sandy, GRAVEL with some cobbles

Remarks Note: Clause 9.2 and Clause 9.5 of BS1377:Part 2:1990 have been superseded by ISO17892-4:2016 . Results apply to sample as received. Sample size did not meet the requirements of BS1377



IGSL Ltd Materials Laboratory

Approved by:	Date:	Page no:
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Persons authorised to approve report: J Barrett (Quality Manager) H Byrne (Laboratory Manager)

TEST REPORT

Determination of Particle Size Distribution

Tested in accordance with: BS1377:Part2:1990 , clause 9.2 & 9.5

(note: Sedimentation stage not accredited)

ISO 17025 IVNAB ACCREDITED TESTING DETAILED IN SCOPE REG NO. 133T

particle size	% passing	
75	100	COBBLES
63	100	
50	100	GRAVEL
37.5	92	
28	89	
20	77	
14	72	
10	65	
6.3	57	
5	53	
3.35	46	
2	40	
1.18	35	SAND
0.6	30	
0.425	28	
0.3	25	
0.15	20	
0.063	13	SILT/CLAY

Contract No: 22009 Report No. R106106

Contract: Balbriggan , Co.Dublin

BH/TP : TP07

Sample No. AA124211 Lab. Sample No. A19/4429

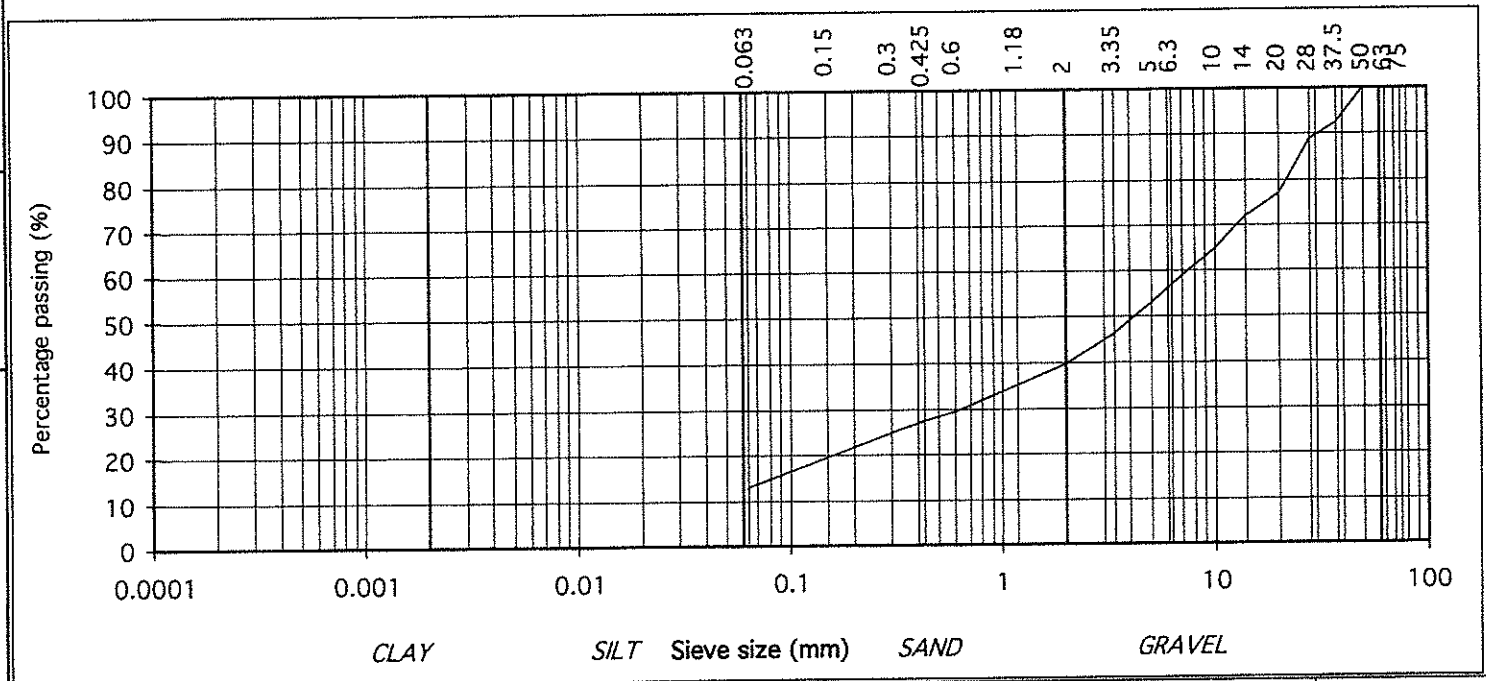
Sample Type: B

Depth (m) 2.00 Customer: MPA

Date Received 11/09/2019 Date Testing started 02/10/2019

Description: Brown clayey/silty, very sandy, GRAVEL

Remarks Note: Clause 9.2 and Clause 9.5 of BS1377:Part 2:1990 have been superseded by ISO17892-4:2016 . Results apply to sample as received.



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Approved by:	Date:	Page no:
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Persons authorised to approve report: J Barrett (Quality Manager) H Byrne (Laboratory Manager)

TEST REPORT

Determination of Particle Size Distribution

Tested in accordance with: BS1377:Part2:1990 , clause 9.2 & 9.5

(note: Sedimentation stage not accredited)

particle size	% passing	
75	100	COBBLES
63	100	
50	97	GRAVEL
37.5	92	
28	83	
20	76	
14	71	
10	65	
6.3	57	
5	53	
3.35	49	
2	42	
1.18	36	SAND
0.6	29	
0.425	27	
0.3	24	
0.15	19	
0.063	13	SILT/CLAY

Contract No: 22009 Report No. R106490

Contract: Balbriggan , Co.Dublin

BH/TP : TP07

Sample No. AA124212 Lab. Sample No. A19/4430

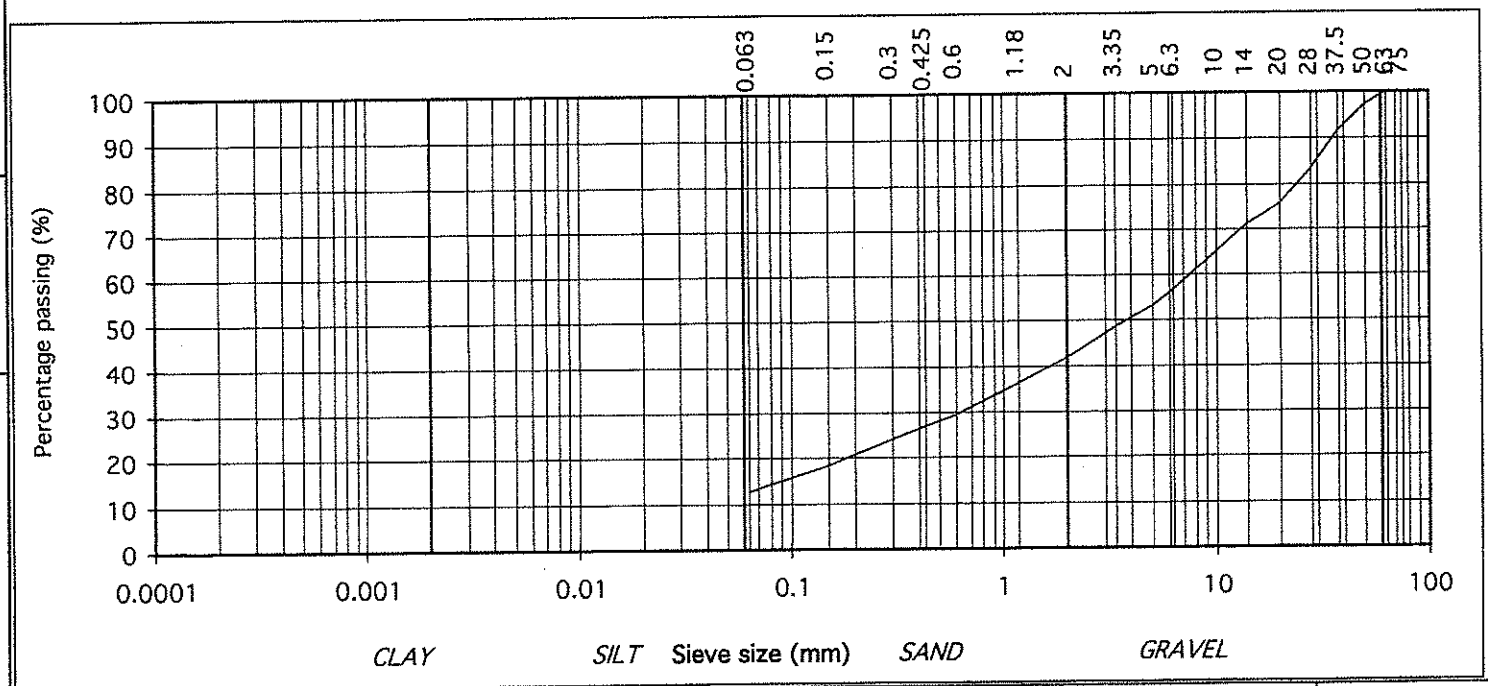
Sample Type: B

Depth (m) 3.00 Customer: MPA

Date Received 11/09/2019 Date Testing started 02/10/2019

Description: Brown clayey/silty, very sandy, GRAVEL

Remarks Note: Clause 9.2 and Clause 9.5 of BS1377:Part 2:1990 have been superseded by ISO17892-4:2016 . Results apply to sample as received.



IGSL Ltd Materials Laboratory

Approved by:	Date:	Page no:
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Persons authorised to approve report: J Barrett (Quality Manager) H Byrne (Laboratory Manager)

TEST REPORT

Determination of Particle Size Distribution

Tested in accordance with: BS1377:Part2:1990 , clause 9.2 & 9.5

(note: Sedimentation stage not accredited)

ISO 17025 INAB ACCREDITED TESTING DETAILED IN SCOPE REG NO. 133T

particle size	% passing	
75	100	COBBLES
63	100	
50	100	GRAVEL
37.5	94	
28	80	
20	61	
14	47	
10	39	
6.3	29	
5	25	
3.35	20	
2	14	
1.18	10	SAND
0.6	7	
0.425	7	
0.3	6	
0.15	5	
0.063	5	SILT/CLAY

Contract No: 22009 Report No. R106491

Contract: Balbriggan , Co.Dublin

BH/TP : TP08

Sample No. AA124218 Lab. Sample No. A19/4431

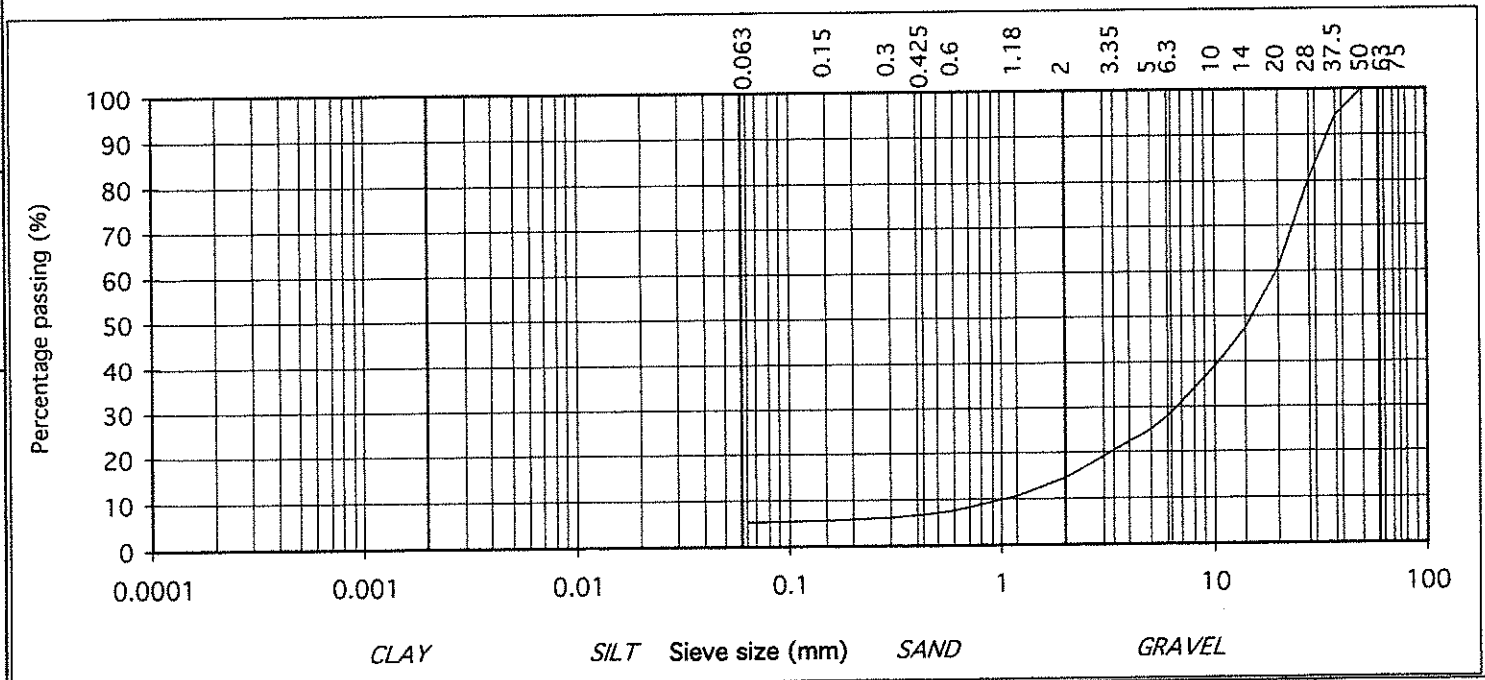
Sample Type: B

Depth (m) 1.50 Customer: MPA

Date Received 11/09/2019 Date Testing started 02/10/2019

Description: Brown clayey/silty, sandy, GRAVEL

Remarks Note: Clause 9.2 and Clause 9.5 of BS1377:Part 2:1990 have been superseded by ISO17892-4:2016 . Results apply to sample as received.



IGSL Ltd Materials Laboratory

Approved by:	Date:	Page no:
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Persons authorised to approve report: J Barrett (Quality Manager) H Byrne (Laboratory Manager)

TEST REPORT

Determination of Particle Size Distribution

Tested in accordance with: BS1377:Part2:1990 , clause 9.2 & 9.5

(note: Sedimentation stage not accredited)

ISO 17025 IVNAB ASSOCIATION TESTING DETAILED IN SCOPE REG NO. 1337

particle size	% passing	
75	78	COBBLES
63	78	
50	78	GRAVEL
37.5	78	
28	76	
20	73	
14	72	
10	70	
6.3	68	
5	66	
3.35	63	
2	60	
1.18	57	SAND
0.6	54	
0.425	52	
0.3	49	
0.15	42	
0.063	33	SILT/CLAY
0.036	26	
0.026	24	
0.017	21	
0.010	18	
0.007	14	
0.005	12	
0.002	8	

Contract No: 22009 Report No. R106110

Contract: Balbriggan , Co.Dublin

BH/TP : TP09

Sample No. AA124158 Lab. Sample No. A19/4433

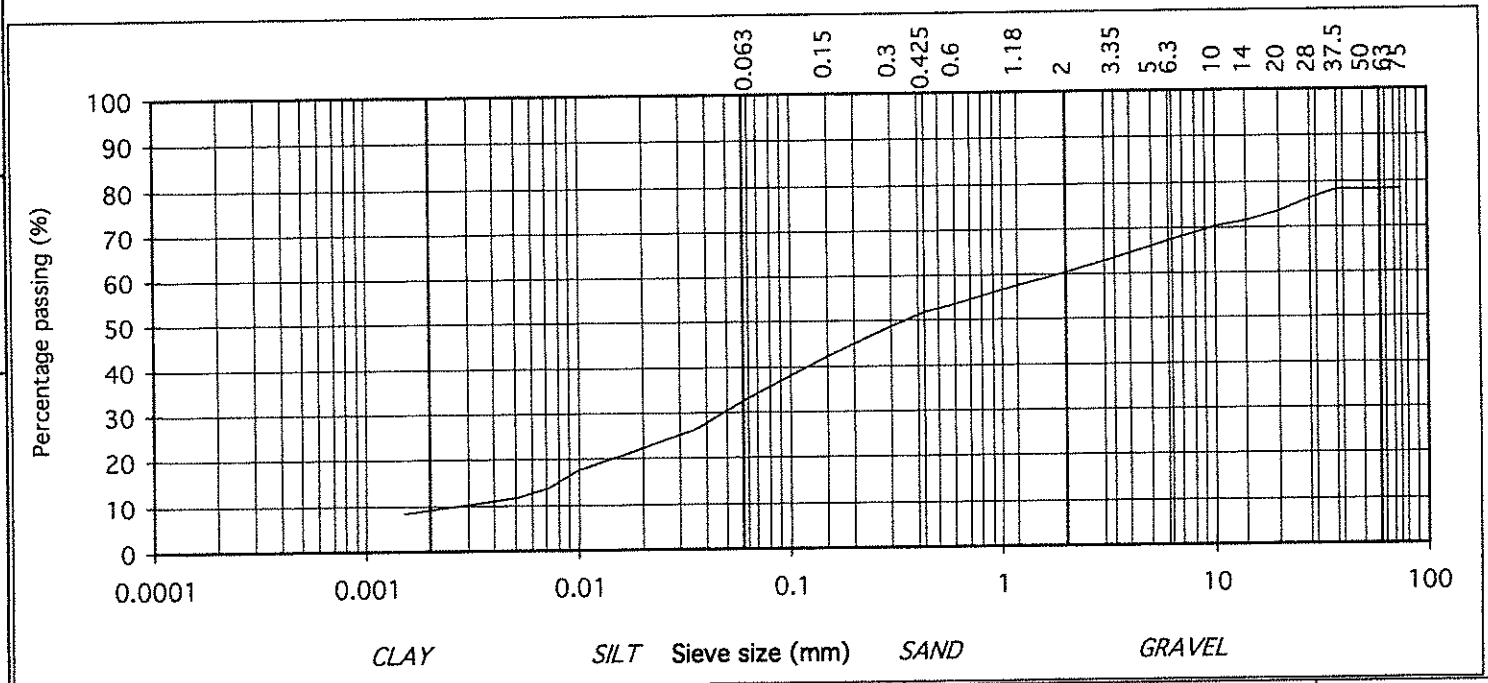
Sample Type: B

Depth (m) 1.50 Customer: MPA

Date Received 11/09/2019 Date Testing started 01/10/2019

Description: Brown slightly sandy, slightly gravelly, SILT/CLAY with many cobbles

Remarks Note: Clause 9.2 and Clause 9.5 of BS1377:Part 2:1990 have been superseded by ISO17892-4:2016 . Results apply to sample as received. Sample size did not meet the requirements of BS1377



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Approved by:	Date:	Page no:
H Byrne	14/10/19	1 of 1

Persons authorised to approve report: J Barrett (Quality Manager) H Byrne (Laboratory Manager)

TEST REPORT

Determination of Particle Size Distribution

Tested in accordance with: BS1377:Part2:1990 , clause 9.2 & 9.5

(note: Sedimentation stage not accredited)

particle size	% passing	
75	100	COBBLES
63	100	
50	95	GRAVEL
37.5	90	
28	82	
20	73	
14	71	
10	68	
6.3	63	
5	60	
3.35	55	
2	51	
1.18	48	SAND
0.6	43	
0.425	41	
0.3	37	
0.15	26	
0.063	14	SILT/CLAY

Contract No: 22009 Report No. R106074

Contract: Balbriggan , Co.Dublin

BH/TP : TP09

Sample No. AA124159 Lab. Sample No. A19/4434

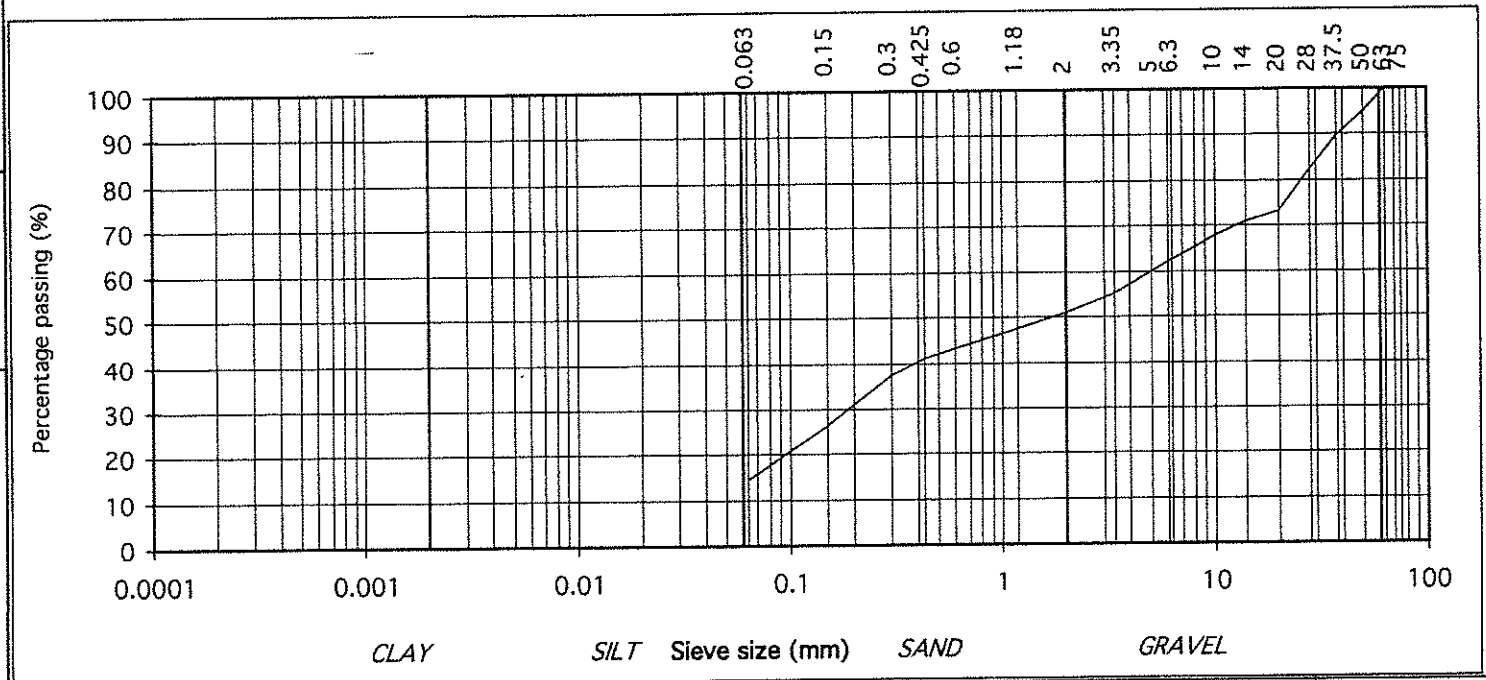
Sample Type: B

Depth (m) 2.50 Customer: MPA

Date Received 11/09/2019 Date Testing started 01/10/2019

Description: Dark brown clayey/silty, very sandy, GRAVEL

Remarks Note: Clause 9.2 and Clause 9.5 of BS1377:Part 2:1990 have been superseded by ISO17892-4:2016 . Results apply to sample as received.



IGSL Ltd Materials Laboratory

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Persons authorised to approve report: J Barrett (Quality Manager) H Byrne (Laboratory Manager)

TEST REPORT

Determination of Particle Size Distribution

Tested in accordance with: BS1377:Part2:1990 , clause 9.2 & 9.5

(note: Sedimentation stage not accredited)

ISO 17025 IVNAB ACCREDITED TESTING DETAILED IN SCOPE REG NO. 1337

Contract No: 22009 Report No. R106144

Contract: Balbriggan , Co.Dublin

BH/TP : TP13

Sample No. AA124153 Lab. Sample No. A19/4437

Sample Type: B

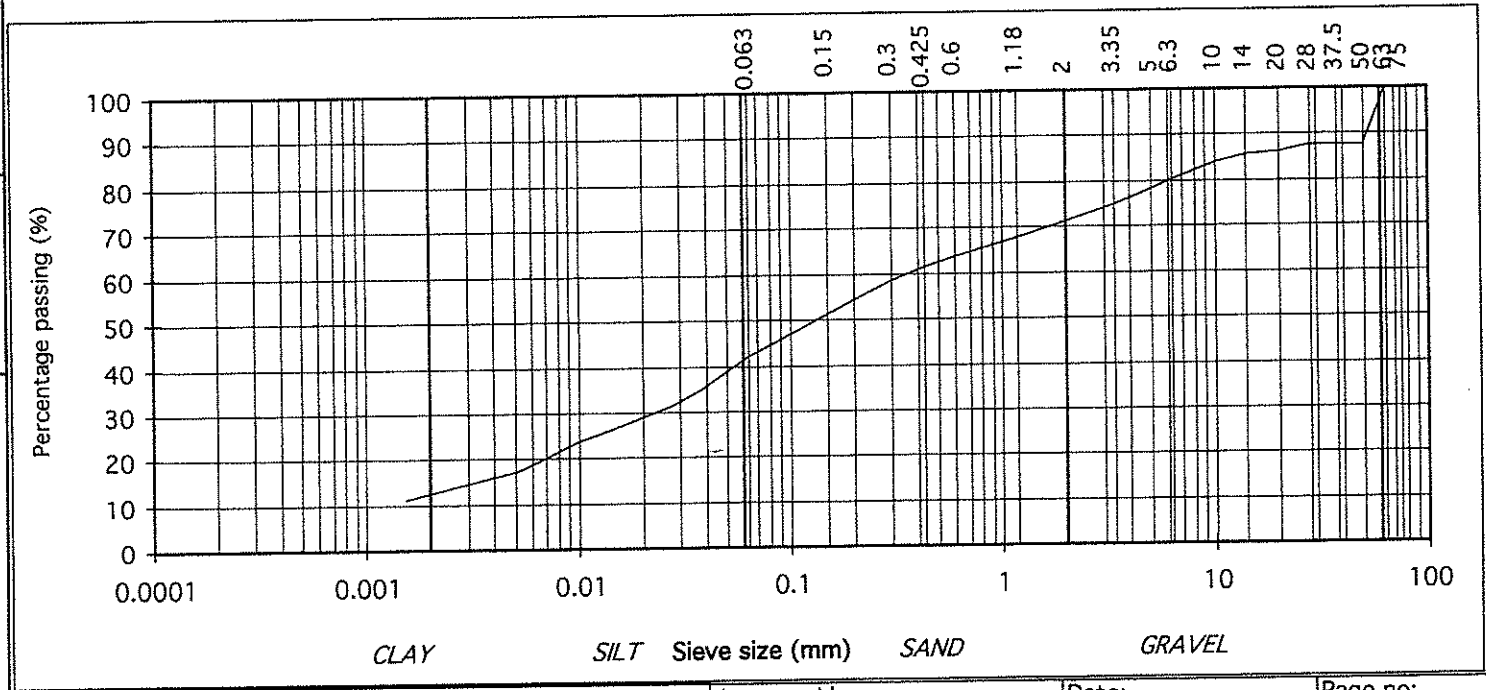
Depth (m) 0.50 Customer: MPA

Date Received 11/09/2019 Date Testing started 30/09/2019

Description: Brown slightly sandy, slightly gravelly, CLAY

Remarks Note: Clause 9.2 and Clause 9.5 of BS1377:Part 2:1990 have been superseded by ISO17892-4:2016 . Results apply to sample as received. Sample size did not meet the requirements of BS1377

particle size	% passing	
75	100	COBBLES
63	100	
50	88	GRAVEL
37.5	88	
28	88	
20	86	
14	86	
10	84	
6.3	80	
5	78	
3.35	75	
2	71	
1.18	68	SAND
0.6	64	
0.425	61	
0.3	59	
0.15	51	
0.063	42	SILT/CLAY
0.037	35	
0.027	31	
0.017	28	
0.010	24	
0.007	20	
0.005	17	
0.002	11	



IGSL Ltd Materials Laboratory

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Persons authorised to approve report: J Barrett (Quality Manager) H Byrne (Laboratory Manager)

TEST REPORT

Determination of Particle Size Distribution

Tested in accordance with: BS1377:Part2:1990 , clause 9.2 & 9.5

(note: Sedimentation stage not accredited)

particle size	% passing	
75	100	COBBLES
63	100	
50	97	GRAVEL
37.5	92	
28	87	
20	81	
14	75	
10	68	
6.3	59	
5	55	
3.35	50	
2	44	
1.18	40	SAND
0.6	35	
0.425	32	
0.3	29	
0.15	25	
0.063	21	SILT/CLAY

Contract No: 22009 Report No. R106016

Contract: Balbriggan , Co.Dublin

BH/TP : TP17

Sample No. AA123916 Lab. Sample No. A19/4440

Sample Type: B

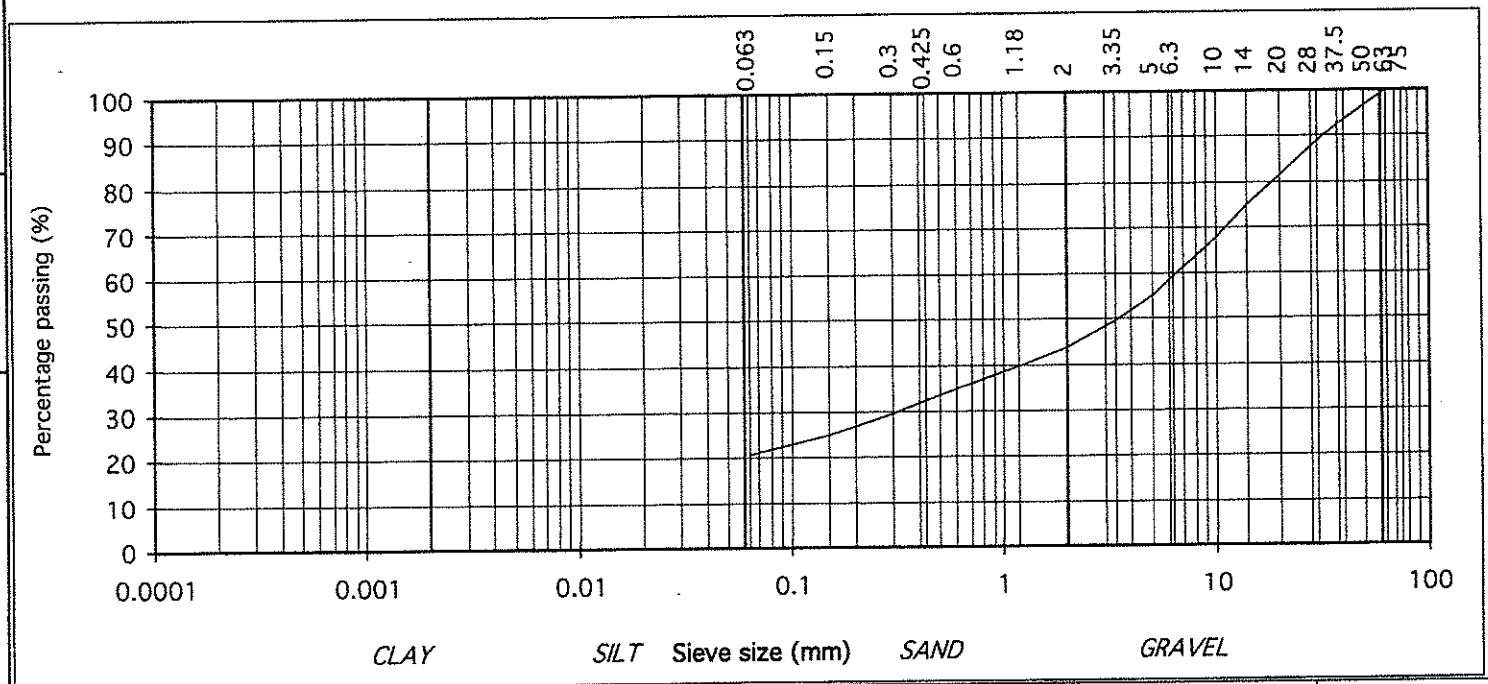
Depth (m) 1.50 Customer: MPA

Date Received 11/09/2019 Date Testing started 30/09/2019

Description: Dark brown slightly sandy, gravelly, SILT/CLAY

Remarks

Note: Clause 9.2 and Clause 9.5 of BS1377:Part 2:1990 have been superseded by ISO17892-4:2016 . Results apply to sample as received.



IGSL Ltd Materials Laboratory

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Persons authorised to approve report: J Barrett (Quality Manager) H Byrne (Laboratory Manager)

TEST REPORT

Determination of Particle Size Distribution

Tested in accordance with: BS1377:Part2:1990 , clause 9.2 & 9.5

(note: Sedimentation stage not accredited)

particle size	% passing	
75	100	COBBLES
63	100	
50	90	GRAVEL
37.5	88	
28	83	
20	73	
14	64	
10	60	
6.3	53	
5	50	
3.35	47	
2	45	
1.18	43	SAND
0.6	41	
0.425	40	
0.3	38	
0.15	35	
0.063	33	SILT/CLAY

Contract No: 22009 Report No. R106075

Contract: Balbriggan , Co.Dublin

BH/TP : TP17

Sample No. AA123917 Lab. Sample No. A19/4441

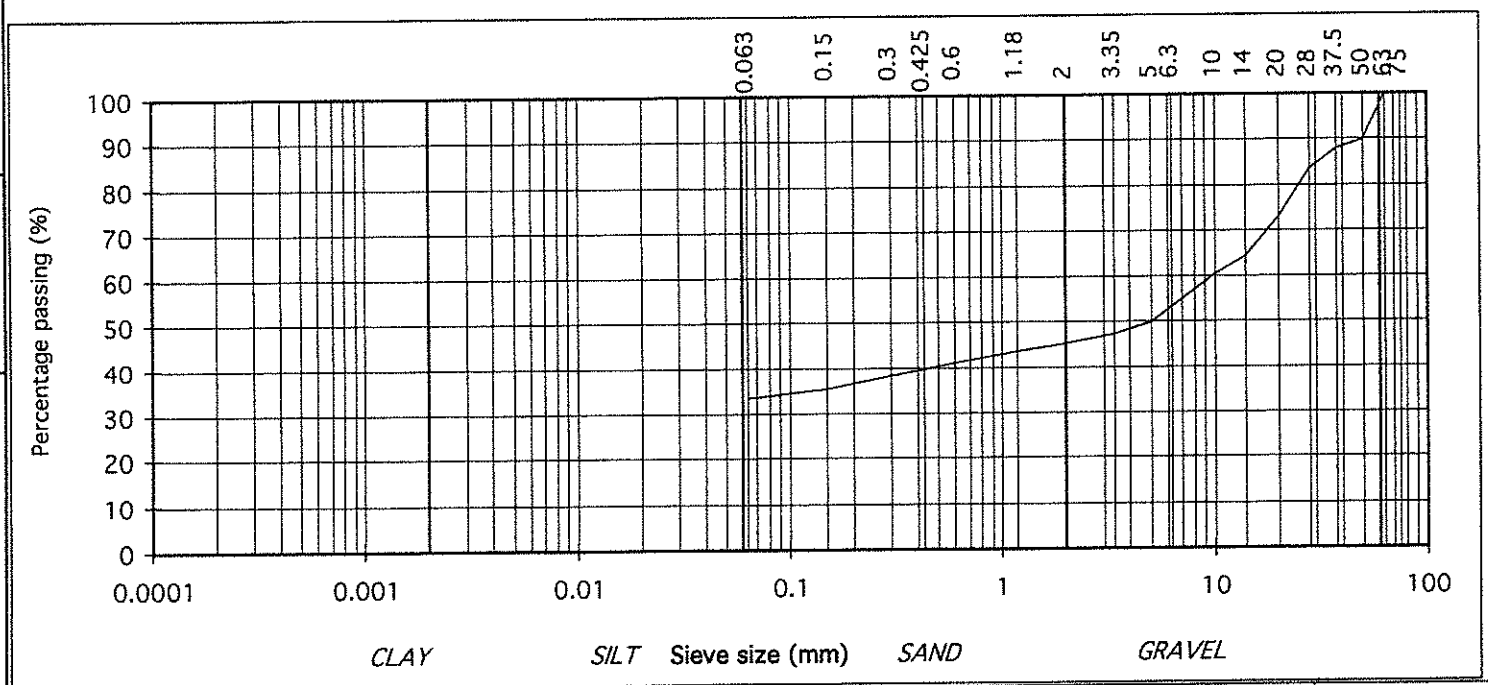
Sample Type: B

Depth (m) 2.50 Customer: MPA

Date Received 11/09/2019 Date Testing started 01/10/2019

Description: Brown slightly sandy, gravelly, SILT/CLAY

Remarks Note: Clause 9.2 and Clause 9.5 of BS1377:Part 2:1990 have been superseded by ISO17892-4:2016 . Results apply to sample as received.



IGSL Ltd Materials Laboratory

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Persons authorised to approve report: J Barrett (Quality Manager) H Byrne (Laboratory Manager)

TEST REPORT

Determination of Particle Size Distribution

Tested in accordance with: BS1377:Part2:1990 , clause 9.2 & 9.5

(note: Sedimentation stage not accredited)

ISO 17025 IVNAB ASSOCIATION TESTING DETAILED IN SCOPE REG NO. 1337

particle size	% passing	
75	100	COBBLES
63	100	
50	100	GRAVEL
37.5	100	
28	93	
20	88	
14	80	
10	71	
6.3	64	
5	60	
3.35	55	
2	49	
1.18	44	SAND
0.6	37	
0.425	34	
0.3	31	
0.15	24	
0.063	17	SILT/CLAY

Contract No: 22009 Report No. R106492

Contract: Balbriggan , Co.Dublin

BH/TP : BH01

Sample No. AA122749 Lab. Sample No. A19/4412

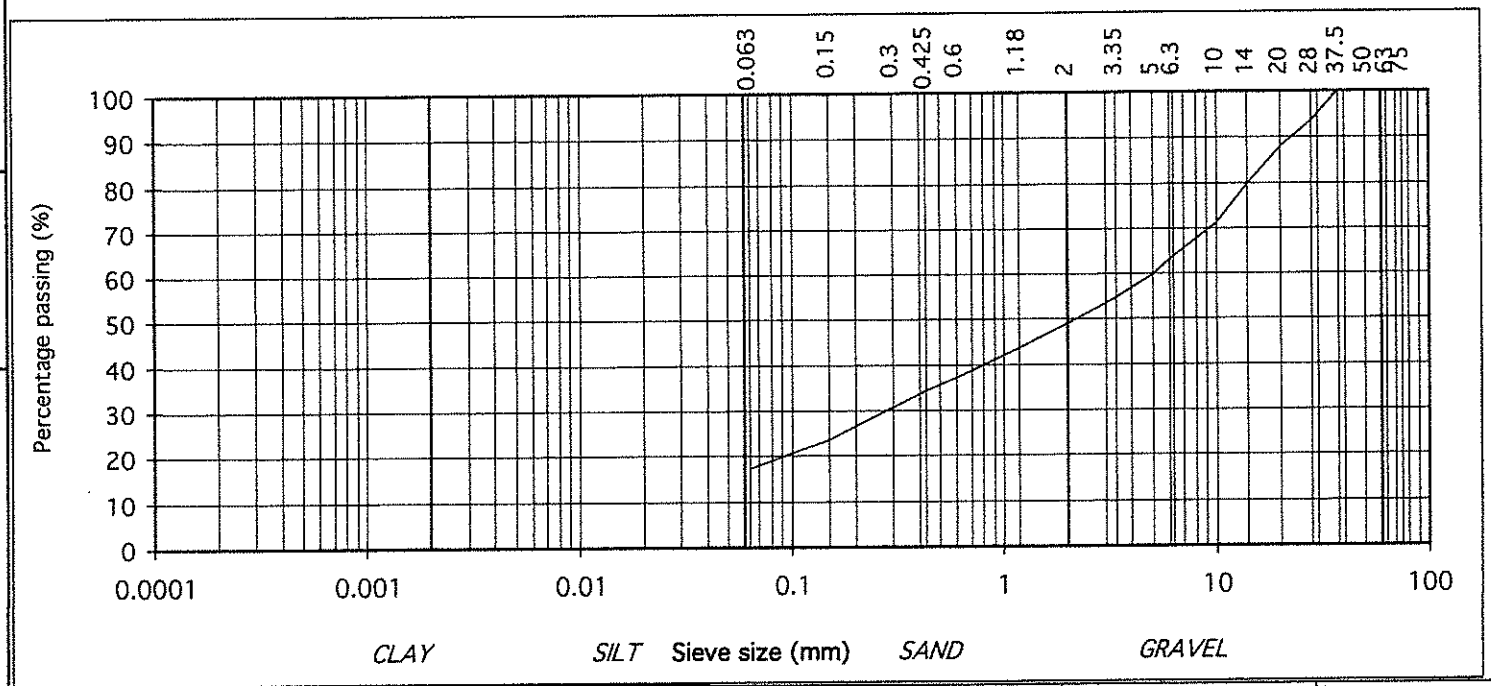
Sample Type: B

Depth (m) 3.00 Customer: MPA

Date Received 11/09/2019 Date Testing started 02/10/2019

Description: Brown silty, very sandy, GRAVEL

Remarks Note: Clause 9.2 and Clause 9.5 of BS1377:Part 2:1990 have been superseded by ISO17892-4:2016 . Results apply to sample as received.



IGSL Ltd Materials Laboratory

Approved by:	Date:	Page no:
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Persons authorised to approve report: J Barrett (Quality Manager) H Byrne (Laboratory Manager)

TEST REPORT

Determination of Particle Size Distribution

Tested in accordance with: BS1377:Part2:1990 , clause 9.2 & 9.5

(note: Sedimentation stage not accredited)

particle size	% passing	
75	100	COBBLES
63	100	
50	100	GRAVEL
37.5	98	
28	92	
20	87	
14	75	
10	69	
6.3	60	
5	57	
3.35	50	
2	45	
1.18	40	SAND
0.6	34	
0.425	32	
0.3	29	
0.15	23	
0.063	17	SILT/CLAY

Contract No: 22009 Report No. R106072

Contract: Balbriggan , Co.Dublin

BH/TP : BH02A

Sample No. AA127705 Lab. Sample No. A19/4414

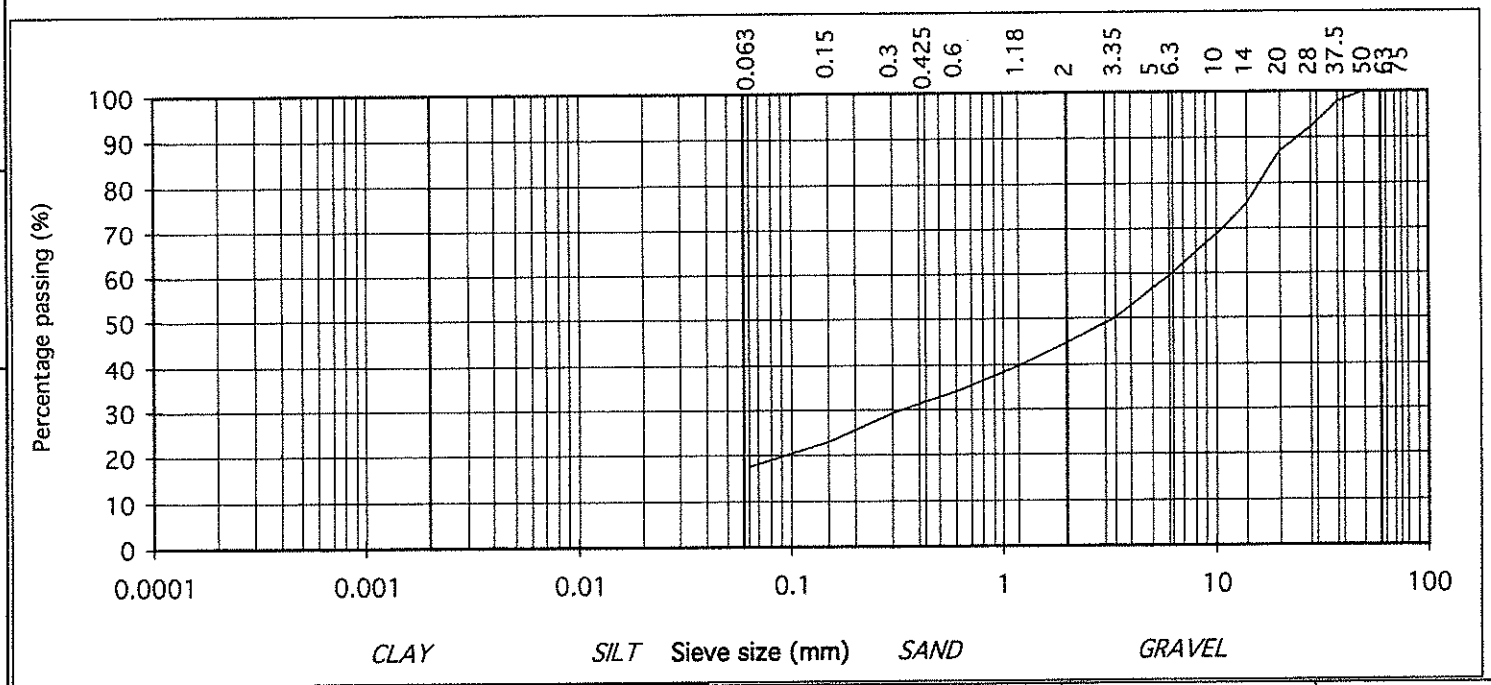
Sample Type: B

Depth (m) 3.00 Customer: MPA

Date Received 11/09/2019 Date Testing started 01/10/2019

Description: Dark brown silty, very sandy, GRAVEL

Remarks Note: Clause 9.2 and Clause 9.5 of BS1377:Part 2:1990 have been superseded by ISO17892-4:2016 . Results apply to sample as received.



IGSL Ltd Materials Laboratory

Approved by:	Date:	Page no:
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Persons authorised to approve report: J Barrett (Quality Manager) H Byrne (Laboratory Manager)

TEST REPORT

Determination of Particle Size Distribution

Tested in accordance with: BS1377:Part2:1990 , clause 9.2 & 9.5

(note: Sedimentation stage not accredited)

particle size	% passing	
75	100	COBBLES
63	100	
50	100	GRAVEL
37.5	100	
28	94	
20	93	
14	89	
10	86	
6.3	82	
5	80	
3.35	77	
2	74	
1.18	71	SAND
0.6	67	
0.425	65	
0.3	62	
0.15	54	
0.063	41	SILT/CLAY
0.038	33	
0.027	30	
0.018	23	
0.010	19	
0.007	17	
0.005	15	
0.002	12	

Contract No: 22009 Report No. R106103

Contract: Balbriggan , Co.Dublin

BH/TP : BH03A

Sample No. AA127701 Lab. Sample No. A19/4415

Sample Type: B

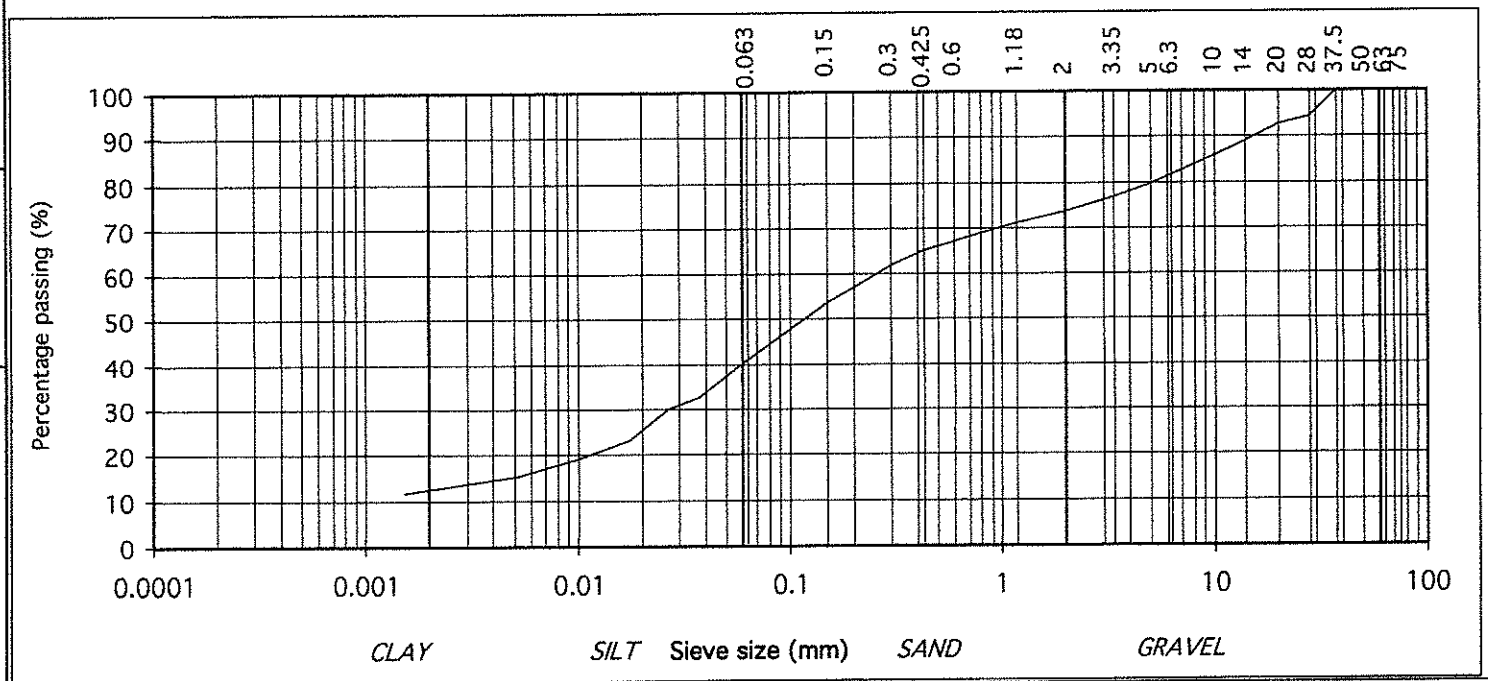
Depth (m) 1.00 Customer: MPA

Date Received 11/09/2019 Date Testing started 30/09/2019

Description: Brown slightly sandy, slightly gravelly, CLAY

Remarks

Note: Clause 9.2 and Clause 9.5 of BS1377:Part 2:1990 have been superseded by ISO17892-4:2016 . Results apply to sample as received.



IGSL Ltd Materials Laboratory

Approved by:	Date:	Page no:
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Persons authorised to approve report: J Barrett (Quality Manager) H Byrne (Laboratory Manager)

TEST REPORT

Determination of Particle Size Distribution

Tested in accordance with: BS1377:Part2:1990 , clause 9.2 & 9.5

(note: Sedimentation stage not accredited)

particle size	% passing	
75	100	COBBLES
63	100	
50	100	GRAVEL
37.5	91	
28	76	
20	68	
14	54	
10	46	
6.3	35	
5	30	
3.35	21	
2	14	
1.18	9	SAND
0.6	6	
0.425	6	
0.3	5	
0.15	3	
0.063	1	SILT/CLAY

Contract No: 22009 Report No. R106073

Contract: Balbriggan , Co.Dublin

BH/TP : BH04A

Sample No. AA122745 Lab. Sample No. A19/4416

Sample Type: B

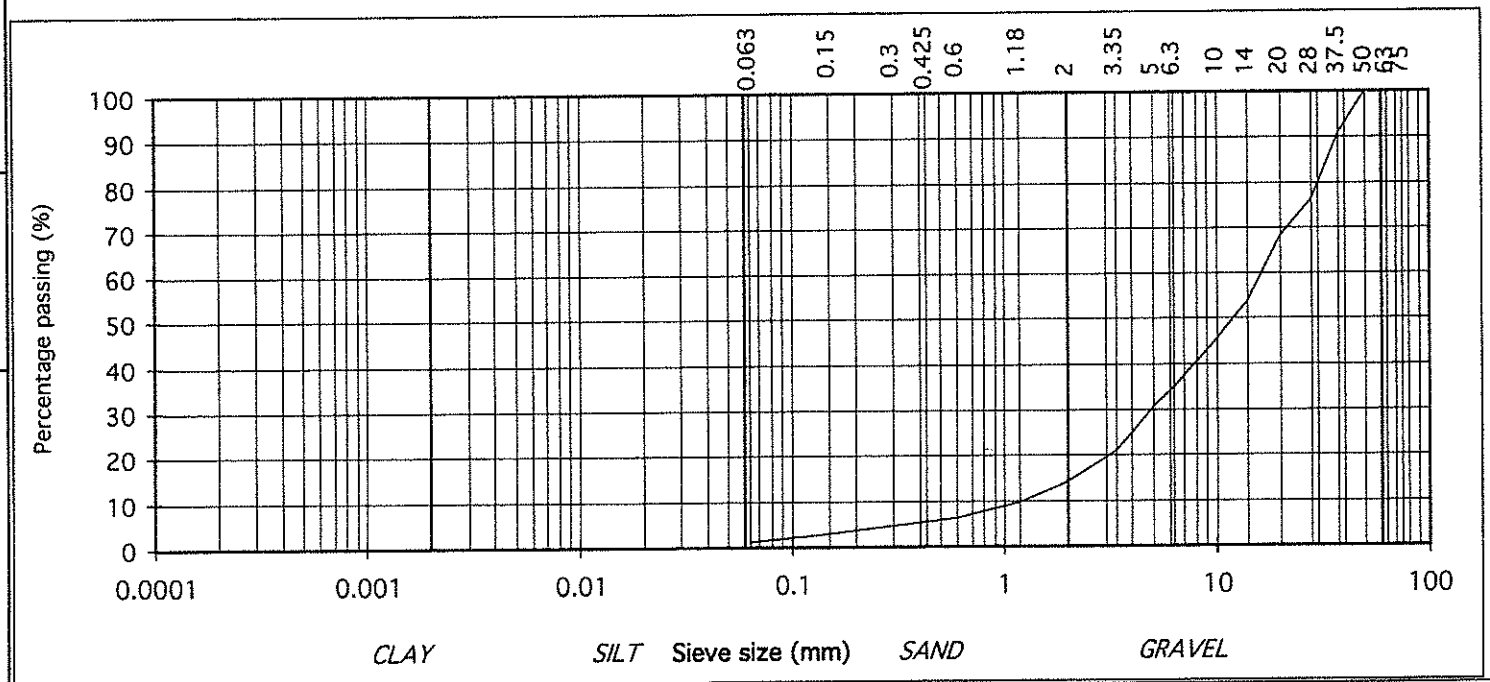
Depth (m) 2.00 Customer: MPA

Date Received 11/09/2019 Date Testing started 01/10/2019

Description: Dark brown slightly clayey/silty, sandy, GRAVEL

Remarks

Note: Clause 9.2 and Clause 9.5 of BS1377:Part 2:1990 have been superseded by ISO17892-4:2016 . Results apply to sample as received.



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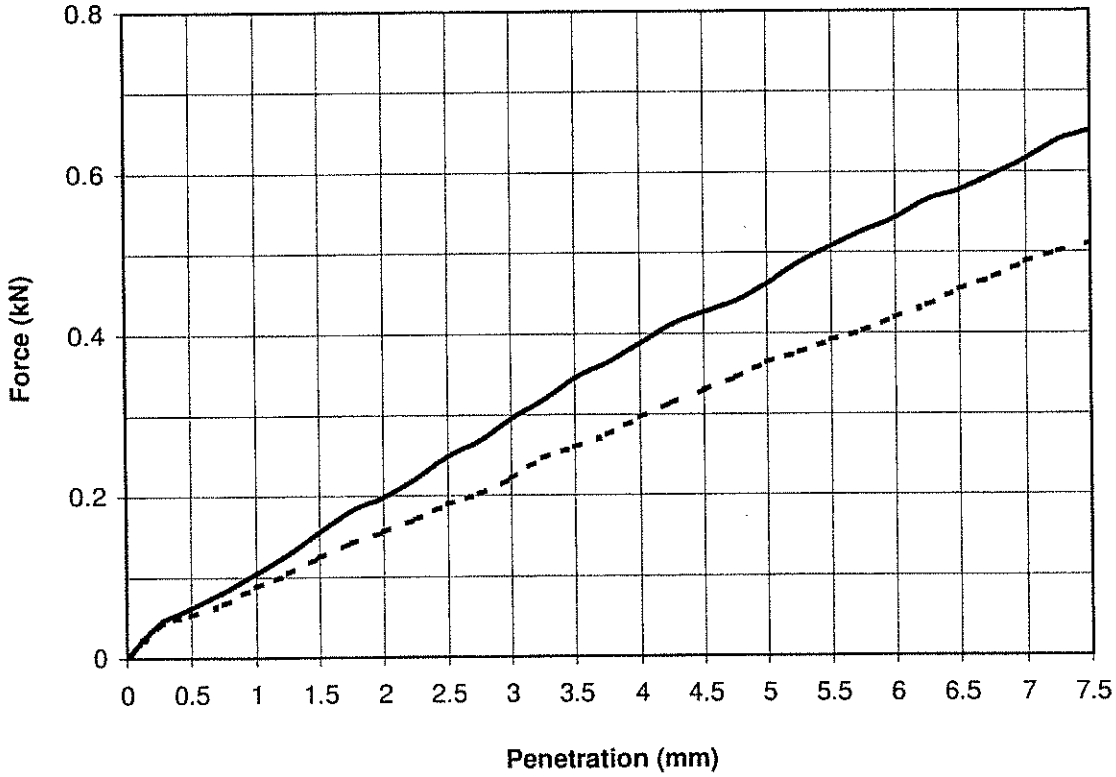
Persons authorised to approve report: J Barrett (Quality Manager) H Byrne (Laboratory Manager)

IGSL Ltd Materials Laboratory Unit J5,M7 Business Park Naas Co.Kildare 045 899324	TEST REPORT Determination of California Bearing Ratio (CBR) Tested in accordance with BS1377:Part 4:1990, clause 7	ISO 17025 INAB ACCREDITED TESTING DETAILED IN SCOPE REG NO. 153T

Report No.	R105947	Contract	Balbriggan , Co.Dublin
Contract No.	22009	Customer	MPA
Date received	11/09/19	Date Tested	02/10/19
BH/TP No.	TP03	Sample No.	AA124205 Type: B
Depth (m)	1.00	Lab sample No.	A19/4421



Key: ———— Top ---------- Base

Description:	Brown sandy gravelly CLAY		
Initial Condition:	Unsoaked		
Moisture Content (%):	20	Bulk Density (Mg/m^3):	2.08
Surcharge (kg):	4	Dry Density (Mg/m^3):	1.73
% Material >20mm:	6		
Method of compaction:	Static Compaction Method 2		

Test Result	Top	Base
CBR %	**2.3**	**1.8**
Moisture Content %	20	20

Results apply to sample as received.

Persons authorized to approve reports

J Barrett (Quality Manager)

H Byrne (Laboratory Manager)

IGSL Ltd Materials Laboratory	Approved by	Date	Page No.
	H Byrne	14/10/19	1 of 1

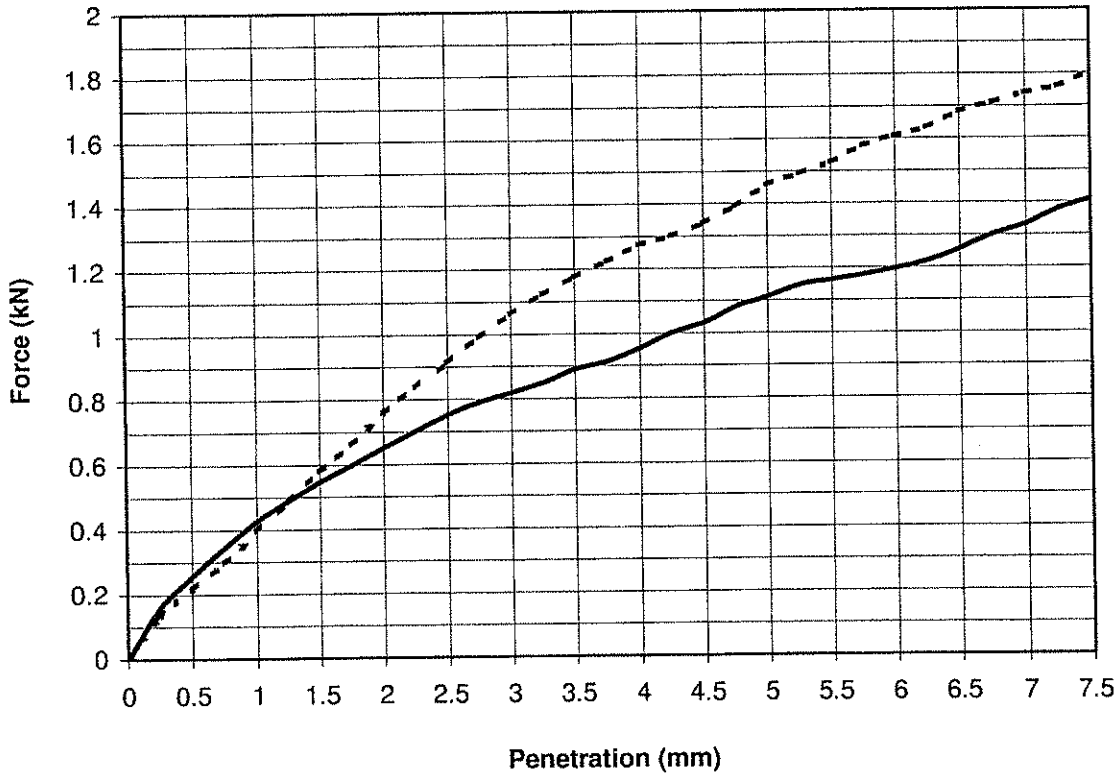
IGSL Ltd
Materials Laboratory
Unit J5,M7 Business Park
Naas Co.Kildare
045 899324

TEST REPORT
Determination of California Bearing Ratio (CBR)

Tested in accordance with BS1377:Part 4:1990, clause 7

ISO 17025 IVNAB ACCREDITED TESTING DETAILED IN SCOPE REG NO. 1351

Report No.	R105948	Contract	Balbriggan , Co.Dublin
Contract No.	22009	Customer	MPA
Date received	11/09/19	Date Tested	02/10/19
BH/TP No.	TP07	Sample No.	AA124210 Type: B
Depth (m)	1.00	Lab sample No.	A19/4428



Key: ———— Top ---------- Base

Description:	Brown sandy gravelly CLAY		
Initial Condition:	Unsoaked		
Moisture Content (%):	17	Bulk Density (Mg/m^3):	2.07
Surcharge (kg):	4	Dry Density (Mg/m^3):	1.77
% Material >20mm:	5.3		
Method of compaction:	Static Compaction Method 2		

Test Result	Top	Base
CBR %	**5.7**	**7.3**
Moisture Content %	17	17

Results apply to sample as received.

Persons authorized to approve reports

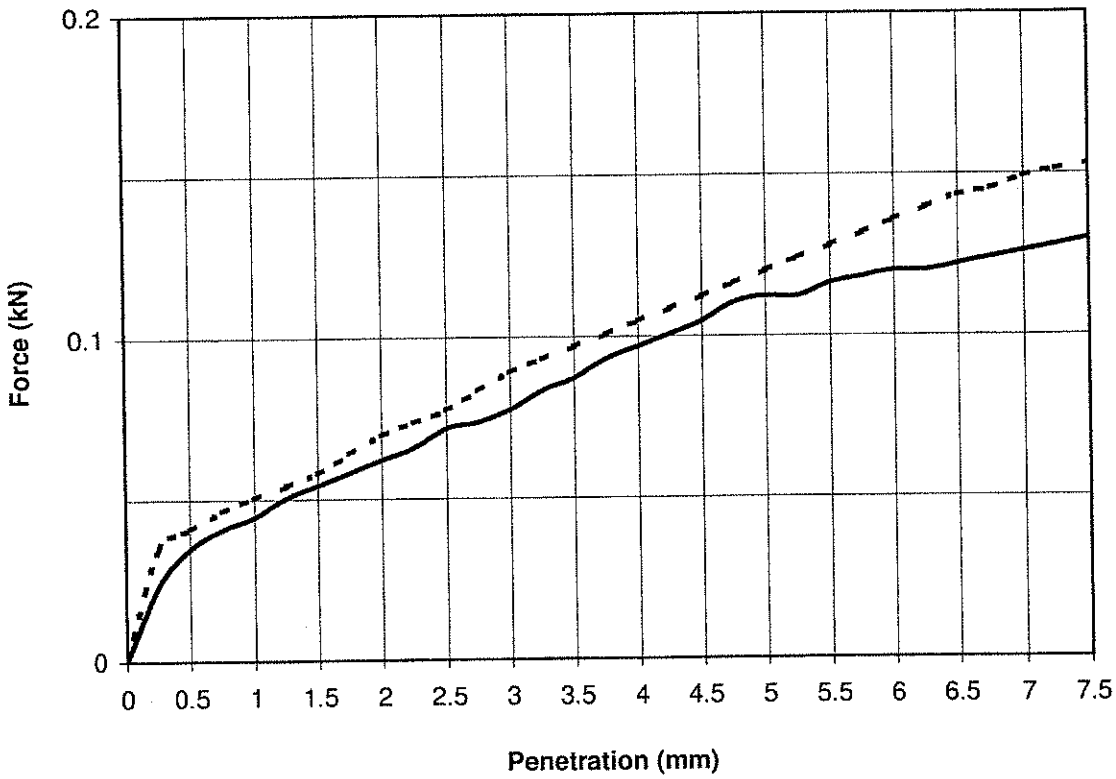
J Barrett (Quality Manager)
H Byrne (Laboratory Manager)

IGSL Ltd Materials Laboratory

Approved by	Date	Page No.
H Byrne	14/10/19	1 of 1

IGSL Ltd Materials Laboratory Unit J5,M7 Business Park Naas Co.Kildare 045 899324	TEST REPORT Determination of California Bearing Ratio (CBR) Tested in accordance with BS1377:Part 4:1990, clause 7	ISO 17025 IVNAB ACCREDITED TESTING DETAILED IN SCOPE REG NO. 137T

Report No.	R105949	Contract	Balbriggan , Co.Dublin
Contract No.	22009	Customer	MPA
Date received	11/09/19	Date Tested	01/10/19
BH/TP No.	TP13	Sample No. AA124153 Type:	B
Depth (m)	0.50	Lab sample No.	A19/4437



Key: ———— Top ---------- Base

Description:	Brown slightly sandy, slightly gravelly, CLAY		
Initial Condition:	Unsoaked		
Moisture Content (%):	20	Bulk Density (Mg/m^3):	2.05
Surcharge (kg):	4	Dry Density (Mg/m^3):	1.71
% Material >20mm:	44		
Method of compaction:	Static Compaction Method 2		

Test Result	Top	Base
CBR %	**0.6**	**0.6**
Moisture Content %	20	20

Results apply to sample as received.

Persons authorized to approve reports

J Barrett (Quality Manager)

H Byrne (Laboratory Manager)

IGSL Ltd Materials Laboratory

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IGSL Ltd
Materials Laboratory
Unit J5,M7 Business Park
Naas
Co. Kildare
045 899324

Test Report

Determination of Moisture Condition Value at Natural Moisture Content

Tested in accordance with BS1377:Part 4:1990, clause 5.4

Report No.	**R106007**
Contract No.	22009
Contract Name:	Balbriggan, Co.Dublin
Customer:	MPA
BH/TP	TP01
Sample No.	AA124219
Depth (m)	0.50
Sample Type:	B
Lab Sample No.	A19/4417
Source (if applicable)	unknown
Material Type (if applicable):	B
Sample Received:	11/09/19
Date Tested:	02/10/19
Sample Cert:	N/A
Moisture Content (%):	13
% Particles > 20mm (By dry mass):	8.8
MCV:	1.3
Interpretation of Plot:	Steepest Straight Line
Description of Soil:	Brown sandy gravelly SILT

The result applies to the sample as received.
Any remaining material will be retained for one month.
Sampling and opinions and interpretations are outside the scope of accreditation.

Persons authorised to approve reports
J Barrett (Quality Manager)
H Byrne (Laboratory Manager)

IGSL Ltd Materials Laboratory	Approved by	Date	Page
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IGSL Ltd
Materials Laboratory
Unit J5,M7 Business Park
Naas
Co. Kildare
045 899324

Test Report

Determination of Moisture Condition Value at Natural Moisture Content

Tested in accordance with BS1377:Part 4:1990, clause 5.4

ISO 17025 INAB ACCREDITED TESTING DETAILED IN SCOPE REG NO. 133T

Report No.	**R106008**
Contract No.	22009
Contract Name:	Balbriggan, Co.Dublin
Customer:	MPA
BH/TP	TP03
Sample No.	AA124205
Depth (m)	1.00
Sample Type:	B
Lab Sample No.	A19/4421
Source (if applicable)	unknown
Material Type (if applicable):	B
Sample Received:	11/09/19
Date Tested:	02/10/19
Sample Cert:	N/A
Moisture Content (%):	20
% Particles > 20mm (By dry mass):	7.1
MCV:	8
Interpretation of Plot:	Steepest Straight Line
Description of Soil:	Brown sandy gravelly CLAY

The result applies to the sample as received.
Any remaining material will be retained for one month.
Sampling and opinions and interpretations are outside the scope of accreditation.

Persons authorised to approve reports
J Barrett (Quality Manager)
H Byrne (Laboratory Manager)

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IGSL Ltd
Materials Laboratory
Unit J5,M7 Business Park
Naas
Co. Kildare
045 899324

Test Report

Determination of Moisture Condition Value at Natural Moisture Content

Tested in accordance with BS1377:Part 4:1990, clause 5.4

Report No.	**R105950**
Contract No.	22009
Contract Name:	Balbriggan, Co.Dublin
Customer:	MPA
BH/TP	TTP05
Sample No.	AA123912
Depth (m)	0.50
Sample Type:	B
Lab Sample No.	A19/4425
Source (if applicable)	unknown
Material Type (if applicable):	B
Sample Received:	11/09/19
Date Tested:	02/10/19
Sample Cert:	N/A
Moisture Content (%):	15
% Particles > 20mm (By dry mass):	16
MCV:	2.2
Interpretation of Plot:	Steepest Straight Line
Description of Soil:	Brown sandy gravelly CLAY

The result applies to the sample as received.
Any remaining material will be retained for one month.
Sampling and opinions and interpretations are outside the scope of accreditation.

Persons authorised to approve reports
J Barrett (Quality Manager)
H Byrne (Laboratory Manager)

IGSL Ltd Materials Laboratory	Approved by	Date	Page
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IGSL Ltd
Materials Laboratory
Unit J5,M7 Business Park
Naas
Co. Kildare
045 899324

Test Report

Determination of Moisture Condition Value at Natural Moisture Content

Tested in accordance with BS1377:Part 4:1990, clause 5.4

ISO 17025 INAB ACCREDITED TESTING DETAILED IN SCOPE REG NO. 133T

Report No.	**R106009**
Contract No.	22009
Contract Name:	Balbriggan, Co.Dublin
Customer:	MPA
BH/TP	TP06
Sample No.	AA124213
Depth (m)	1.00
Sample Type:	B
Lab Sample No.	A19/4427
Source (if applicable)	unknown
Material Type (if applicable):	B
Sample Received:	11/09/19
Date Tested:	02/10/19
Sample Cert:	N/A
Moisture Content (%):	20
% Particles > 20mm (By dry mass):	0
MCV:	5.6
Interpretation of Plot:	Steepest Straight Line
Description of Soil:	Brown sandy gravelly CLAY

The result applies to the sample as received.
Any remaining material will be retained for one month.
Sampling and opinions and interpretations are outside the scope of accreditation.

Persons authorised to approve reports
J Barrett (Quality Manager)
H Byrne (Laboratory Manager)

IGSL Ltd Materials Laboratory	Approved by	Date	Page
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IGSL Ltd
Materials Laboratory
Unit J5,M7 Business Park
Naas
Co. Kildare
045 899324

Test Report

Determination of Moisture Condition Value at Natural Moisture Content

Tested in accordance with BS1377:Part 4:1990, clause 5.4

Report No.	**R106010**
Contract No.	22009
Contract Name:	Balbriggan, Co.Dublin
Customer:	MPA
BH/TP	TP07
Sample No.	AA124210
Depth (m)	1.00
Sample Type:	B
Lab Sample No.	A19/4428
Source (if applicable)	unknown
Material Type (if applicable):	B
Sample Received:	11/09/19
Date Tested:	02/10/19
Sample Cert:	N/A
Moisture Content (%):	17
% Particles > 20mm (By dry mass):	6.2
MCV:	12
Interpretation of Plot:	Steepest Straight Line
Description of Soil:	Brown sandy gravelly CLAY

The result applies to the sample as received.
Any remaining material will be retained for one month.
Sampling and opinions and interpretations are outside the scope of accreditation.

Persons authorised to approve reports
J Barrett (Quality Manager)
H Byrne (Laboratory Manager)

IGSL Ltd Materials Laboratory	Approved by	Date	Page
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IGSL Ltd
Materials Laboratory
Unit J5,M7 Business Park
Naas
Co. Kildare
045 899324

Test Report

Determination of Moisture Condition Value at Natural Moisture Content

Tested in accordance with BS1377:Part 4:1990, clause 5.4

ISO 17025 INAB ACCREDITED TESTING DETAILED IN SCOPE REG NO. 133T

Report No.	**R105951**
Contract No.	22009
Contract Name:	Balbriggan, Co.Dublin
Customer:	MPA
BH/TP	TP10
Sample No.	AA124155
Depth (m)	0.50
Sample Type:	B
Lab Sample No.	A19/4435
Source (if applicable)	unknown
Material Type (if applicable):	B
Sample Received:	11/09/19
Date Tested:	01/10/19
Sample Cert:	N/A
Moisture Content (%):	15
% Particles > 20mm (By dry mass):	0
MCV:	10.2
Interpretation of Plot:	Steepest Straight Line
Description of Soil:	Brown sandy gravelly SILT

The result applies to the sample as received.
Any remaining material will be retained for one month.
Sampling and opinions and interpretations are outside the scope of accreditation.

Persons authorised to approve reports
J Barrett (Quality Manager)
H Byrne (Laboratory Manager)

IGSL Ltd Materials Laboratory	Approved by	Date	Page
	H Byrne	14/10/19	1 of 1

IGSL Ltd
Materials Laboratory
Unit J5,M7 Business Park
Naas
Co. Kildare
045 899324

Test Report

Determination of Moisture Condition Value at Natural Moisture Content

Tested in accordance with BS1377:Part 4:1990, clause 5.4

Report No.	**R105952**
Contract No.	22009
Contract Name:	Balbriggan, Co.Dublin
Customer:	MPA
BH/TP	TP13
Sample No.	AA124153
Depth (m)	0.50
Sample Type:	B
Lab Sample No.	A19/4437
Source (if applicable)	unknown
Material Type (if applicable):	B
Sample Received:	11/09/19
Date Tested:	01/10/19
Sample Cert:	N/A
Moisture Content (%):	20
% Particles > 20mm (By dry mass):	44
MCV:	3.2
Interpretation of Plot:	Steepest Straight Line
Description of Soil:	Brown slightly sandy, slightly gravelly, CLAY

The result applies to the sample as received.
Any remaining material will be retained for one month.
Sampling and opinions and interpretations are outside the scope of accreditation.

Persons authorised to approve reports
J Barrett (Quality Manager)
H Byrne (Laboratory Manager)

IGSL Ltd Materials Laboratory	Approved by	Date	Page
		14/10/19	1 of 1

IGSL Ltd
Materials Laboratory
Unit J5,M7 Business Park
Naas
Co. Kildare
045 899324

Test Report

Determination of Moisture Condition Value at Natural Moisture Content

Tested in accordance with BS1377:Part 4:1990, clause 5.4

Report No.	**R106011**
Contract No.	22009
Contract Name:	Balbriggan, Co.Dublin
Customer:	MPA
BH/TP	TP17
Sample No.	AA123913
Depth (m)	0.50
Sample Type:	B
Lab Sample No.	A19/4439
Source (if applicable)	unknown
Material Type (if applicable):	B
Sample Received:	11/09/19
Date Tested:	02/10/19
Sample Cert:	N/A
Moisture Content (%):	19
% Particles > 20mm (By dry mass):	0
MCV:	10
Interpretation of Plot:	Steepest Straight Line
Description of Soil:	Brown sandy gravelly CLAY

The result applies to the sample as received.
Any remaining material will be retained for one month.
Sampling and opinions and interpretations are outside the scope of accreditation.

Persons authorised to approve reports
J Barrett (Quality Manager)
H Byrne (Laboratory Manager)

IGSL Ltd Materials Laboratory	Approved by	Date	Page
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IGSL Ltd
Materials Laboratory
M7 Business Park
Naas
Co. Kildare

Test Report

Dry Density/Moisture Content Relationship

Tested in accordance with BS1377:Part 4:1990

ISO 17025 IVNAB ACCREDITED TESTING DETAILED IN SCOPE REG NO. 1337

Report No. R106076 Contract No. 22009

Contract Name: Balbriggan , Co.Dublin

Lab Contract No. 22009 Location: TP03

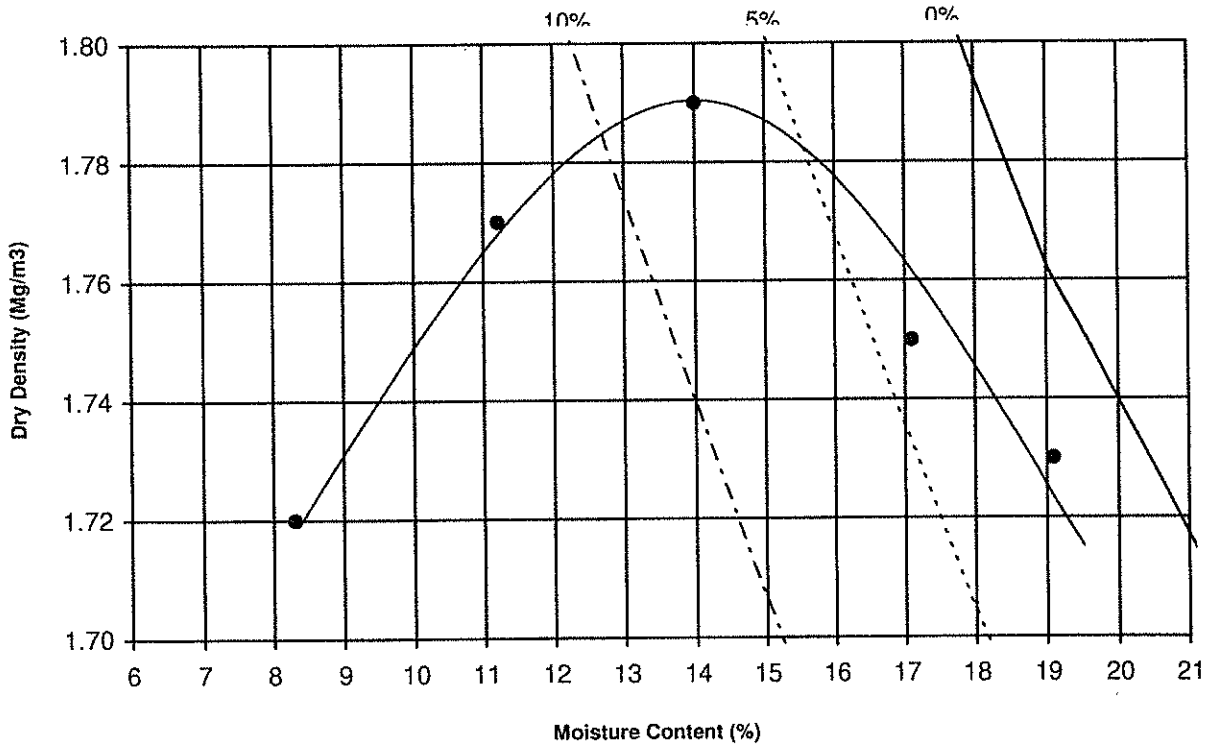
Sample No. AA124205 Depth (m) 1 Material Type B

Lab sample no. A19/4421 Customer: MPA

Date Received: 11/09/2019 Test Method: 2.5 KG Rammer

Date Tested: 02/10/2019 BS1377:Part 4:1990 3.3

Dry Density (Mg/m^3)	1.73	1.75	1.77	1.79	1.72	0.00	
Moisture Content (%)	19	17	11	14	8.3	0	



Maximum Dry Density (Mg/m^3): 1.79 Optimum Moisture Content (%): 14

Description: Brown sandy gravelly CLAY

Sample Preparation: Material passing 20mm ~~Single~~ / Separate samples used

Particle Density (Mg/m^3): 2.65 Particle Density: Assumed

% retained on 20/37.5mm sieve: 6

Persons authorised to approve reports
J Barrett (Quality Manager)
H Byrne (Laboratory Manager)

The result relates to the specimen tested.
Opinions and interpretations are outside the scope of accreditation

IGSL Materials Laboratory	Approved by	Date	Page
		08/10/19	1 of 1

IGSL Ltd Materials Laboratory M7 Business Park Naas Co. Kildare	Test Report Dry Density/Moisture Content Relationship Tested in accordance with BS1377:Part 4:1990	ISO 17025 INAB ACCREDITED TESTING DETAILED IN SCOPE REG NO. 133T

Report No. R106077 Contract No. 22009

Contract Name: Balbriggan , Co.Dublin

Lab Contract No. 22009 Location: TP07

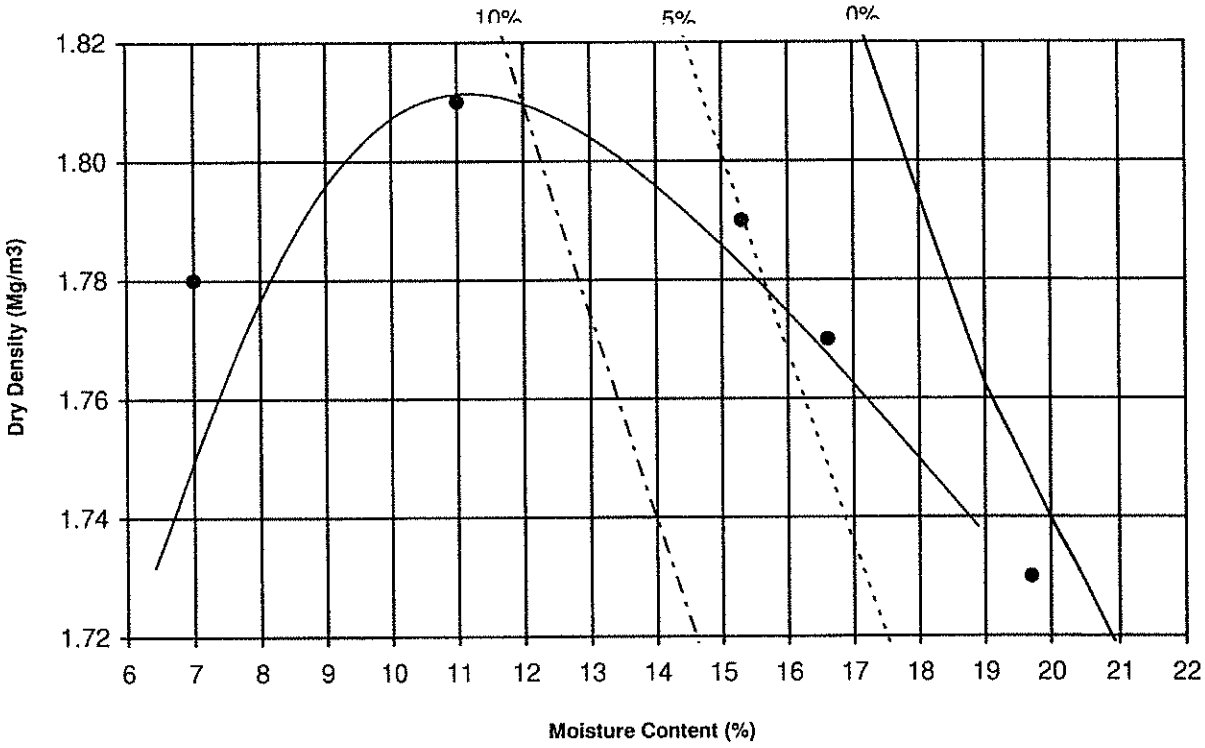
Sample No. AA124210 Depth (m) 1 Material Type B

Lab sample no. A19/4428 Customer: MPA

Date Received: 11/09/2019 Test Method: 2.5 KG Rammer

Date Tested: 02/10/2019 BS1377:Part 4:1990 3.3

Dry Density (Mg/m^3)	1.77	1.73	1.79	1.81	1.78	0.00	
Moisture Content (%)	17	20	15	11	7.0	0	



Maximum Dry Density (Mg/m^3): 1.81 Optimum Moisture Content (%): 11

Description: Brown sandy gravelly CLAY

Sample Preparation: Material passing 20mm ~~Single~~ / Separate samples used

Particle Density (Mg/m^3): 2.65 Particle Density: Assumed

% retained on 20/37.5mm sieve: 5.3

Persons authorised to approve reports
J Barrett (Quality Manager)
H Byrne (Laboratory Manager)

The result relates to the specimen tested.
Opinions and interpretations are outside the scope of accreditation

IGSL Materials Laboratory	Approved by	Date	Page
		14/10/19	1 of 1

IGSL Ltd
Materials Laboratory
M7 Business Park
Naas
Co. Kildare

Test Report

Dry Density/Moisture Content Relationship

Tested in accordance with BS1377:Part 4:1990

ISO 17025 INAB ACCREDITED TESTING DETAILED IN SCOPE REG NO.133T

Report No. R106078 Contract No. 22009

Contract Name: Balbriggan , Co.Dublin

Lab Contract No. 22009 Location: TP13

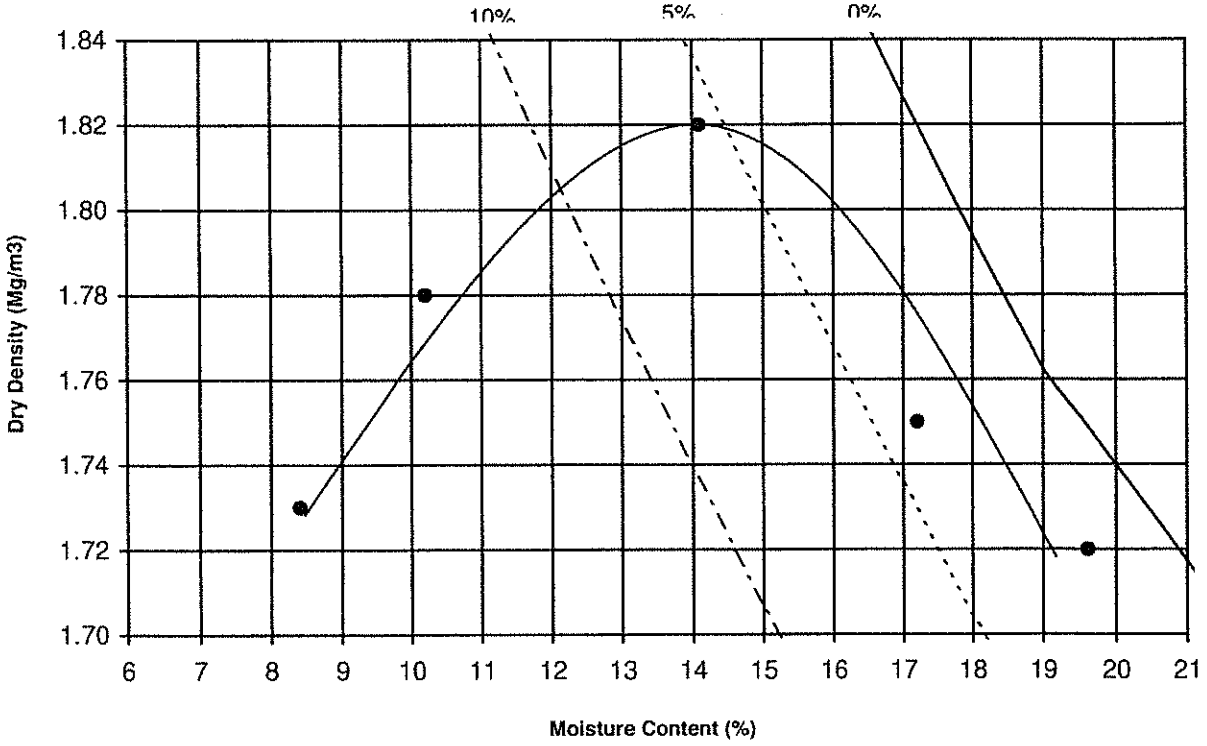
Sample No. AA124153 Depth (m) 0.5 Material Type B

Lab sample no. A19/4437 Customer: MPA

Date Received: 11/09/2019 Test Method: 2.5 KG Rammer

Date Tested: 01/10/2019 BS1377:Part 4:1990 3.3

Dry Density (Mg/m^3)	1.72	1.75	1.78	1.82	1.73	0.00	
Moisture Content (%)	20	17	10	14	8.4	0	



Maximum Dry Density (Mg/m^3): 1.82 Optimum Moisture Content (%): 14

Description: Brown slightly sandy, slightly gravelly, CLAY

Sample Preparation: Material passing 20mm ~~Single~~ / Separate samples used

Particle Density (Mg/m^3): 2.65 Particle Density: Assumed

% retained on 20/37.5mm sieve: 44

The result relates to the specimen tested.
Opinions and interpretations are outside the scope of accreditation

Persons authorised to approve reports
J Barrett (Quality Manager)
H Byrne (Laboratory Manager)

IGSL Materials Laboratory	Approved by	Date	Page
		08/10/19	1 of 1

Appendix IVB Laboratory

Chemical and Environmental

a. Sulphate - Chloride – pH
b. RILTA Suite
c. Pyrite Suite

Chemtest
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Chemtest Ltd.
Depot Road
Newmarket
CB8 0AL
Tel: 01638 606070
Email: info@chemtest.com

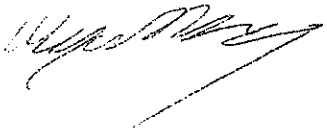
UKAS TESTING
2183

Final Report

Report No.:	19-33404-1
Initial Date of Issue:	15-Oct-2019
Client	IGSL
Client Address:	M7 Business Park Naas County Kildare Ireland
Contact(s):	Darren Keogh
Project	22009 Balbriggan

Quotation No.:		**Date Received:**	07-Oct-2019
Order No.:		**Date Instructed:**	07-Oct-2019
No. of Samples:	10		
Turnaround (Wkdays):	7	**Results Due:**	15-Oct-2019
Date Approved:	15-Oct-2019		

Approved By:



Details: Glynn Harvey, Laboratory Manager

Chemtest
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Results - Soil

Project: 22009 Balbriggan

Client: IGSL				Chemtest Job No.:	19-33404	19-33404	19-33404	19-33404	19-33404	19-33404	19-33404	19-33404	19-33404	19-33404
Quotation No.:				Chemtest Sample ID.:	900781	900782	900783	900784	900785	900787	900788	900789	900790	900791
Order No.:				Client Sample Ref.:	AA124219	AA124220	AA124207	AA123912	AA123914	AA124153	AA123917	AA122746	AA122749	AA127701
				Sample Location:	TP1	TP1	TP3	TP5	TP5	TP13	TP17	BH1	BH1	BH3A
				Sample Type:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
				Top Depth (m):	0.50	1.50	3.00	0.50	2.50	0.50	2.50	0.50	3.00	1.00
				Bottom Depth (m):								1.00	3.50	
Determinand	**Accred.**	**SOP**	**Units**	**LOD**										
Moisture	N	2030	%	0.020	9.8	7.2	9.0	11	7.1	13	19	18	13	17
pH	U	2010		N/A	[A] 7.9	[A] 7.9	[A] 7.6	[A] 7.6	[A] 7.5	[A] 6.6	[A] 7.8	[A] 7.0	[A] 7.5	[A] 6.5
Magnesium (Water Soluble)	N	2120	g/l	0.010	< 0.010		< 0.010		< 0.010	< 0.010		< 0.010		< 0.010
Sulphate (2:1 Water Soluble) as SO4	U	2120	g/l	0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Total Sulphur	U	2175	%	0.010	[A] < 0.010		[A] 0.013		[A] < 0.010	[A] 0.014		[A] 0.017		[A] 0.016
Chloride (Water Soluble)	U	2220	g/l	0.010	[A] < 0.010		[A] < 0.010		[A] < 0.010	[A] < 0.010		[A] < 0.010		[A] < 0.010
Nitrate (Water Soluble)	N	2220	g/l	0.010	< 0.010		< 0.010		< 0.010	< 0.010		< 0.010		< 0.010
Ammonium (Water Soluble)	U	2120	g/l	0.01	0.10		0.02		0.02	0.06		0.16		0.04
Sulphate (Acid Soluble)	U	2430	%	0.010	[A] 0.010		[A] < 0.010		[A] 0.095	[A] 0.023		[A] 0.025		[A] 0.018

Chemtest
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Deviations

In accordance with UKAS Policy on Deviating Samples TPS 63. Chemtest have a procedure to ensure 'upon receipt of each sample a competent laboratory shall assess whether the sample is suitable with regard to the requested test(s)'. This policy and the respective holding times applied, can be supplied upon request.The reason a sample is declared as deviating is detailed below. Where applicable the analysis remains UKAS/MCERTs accredited but the results may be compromised.

Sample:	Sample Ref:	Sample ID:	Sample Location:	Sampled Date:	Deviation Code(s):	Containers Received:
900781	AA124219		TP1		A	Plastic Tub 1000g
900782	AA124220		TP1		A	Amber Glass 60ml
900783	AA124207		TP3		A	Plastic Tub 1000g
900784	AA123912		TP5		A	Amber Glass 60ml
900785	AA123914		TP5		A	Plastic Tub 1000g
900787	AA124153		TP13		A	Plastic Tub 1000g
900788	AA123917		TP17		A	Amber Glass 60ml
900789	AA122746		BH1		A	Plastic Tub 1000g
900790	AA122749		BH1		A	Amber Glass 60ml
900791	AA127701		BH3A		A	Plastic Tub 1000g

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Test Methods

SOP	Title	Parameters included	Method summary
2010	pH Value of Soils	pH	pH Meter
2030	Moisture and Stone Content of Soils(Requirement of MCERTS)	Moisture content	Determination of moisture content of soil as a percentage of its as received mass obtained at <37°C.
2120	Water Soluble Boron, Sulphate, Magnesium & Chromium	Boron; Sulphate; Magnesium; Chromium	Aqueous extraction / ICP-OES
2175	Total Sulphur in Soils	Total Sulphur	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.
2220	Water soluble Chloride in Soils	Chloride	Aqueous extraction and measuremernt by 'Aquakem 600' Discrete Analyser using ferric nitrate / mercuric thiocyanate.
2430	Total Sulphate in soils	Total Sulphate	Acid digestion followed by determination of sulphate in extract by ICP-OES.

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Report Information

Key

U	UKAS accredited
M	MCERTS and UKAS accredited
N	Unaccredited
S	This analysis has been subcontracted to a UKAS accredited laboratory that is accredited for this analysis
SN	This analysis has been subcontracted to a UKAS accredited laboratory that is not accredited for this analysis
T	This analysis has been subcontracted to an unaccredited laboratory
I/S	Insufficient Sample
U/S	Unsuitable Sample
N/E	not evaluated
<	"less than"
>	"greater than"
$	This information has been supplied by the client and can affect the integrity of test data.

Comments or interpretations are beyond the scope of UKAS accreditation
The results relate only to the items tested
Uncertainty of measurement for the determinands tested are available upon request
None of the results in this report have been recovery corrected
All results are expressed on a dry weight basis
The following tests were analysed on samples as received and the results subsequently corrected to a dry weight basis TPH, BTEX, VOCs, SVOCs, PCBs, Phenols
For all other tests the samples were dried at < 37°C prior to analysis
All Asbestos testing is performed at the indicated laboratory
Issue numbers are sequential starting with 1 all subsequent reports are incremented by 1

Sample Deviation Codes

A - Date of sampling not supplied
B - Sample age exceeds stability time (sampling to extraction)
C - Sample not received in appropriate containers
D - Broken Container
E - Insufficient Sample (Applies to LOI in Trommel Fines Only)

Sample Retention and Disposal

All soil samples will be retained for a period of 45 days from the date of receipt
All water samples will be retained for 14 days from the date of receipt
Charges may apply to extended sample storage

If you require extended retention of samples, please email your requirements to:
customerservices@chemtest.com

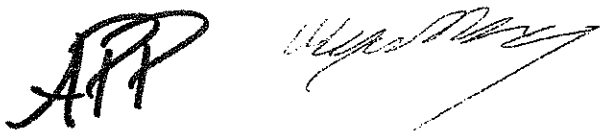
Chemtest
The right chemistry to deliver results
Chemtest Ltd.
Depot Road
Newmarket
CB8 0AL
Tel: 01638 606070
Email: info@chemtest.com

UKAS TESTING
2183

Amended Report

Report No.:	19-30911-2		
Initial Date of Issue:	20-Sep-2019	**Date of Re-Issue:**	27-Sep-2019
Client	IGSL		
Client Address:	M7 Business Park Naas County Kildare Ireland		
Contact(s):	Darren Keogh		
Project	Balbriggan Co. Dublin (MPA)		
Quotation No.:		**Date Received:**	13-Sep-2019
Order No.:	22009	**Date Instructed:**	13-Sep-2019
No. of Samples:	5		
Turnaround (Wkdays):	10	**Results Due:**	26-Sep-2019
Date Approved:	27-Sep-2019		

Approved By:



Details:

Amy Parekh-Pross, Technical Projects Manager
Glynn Harvey, Laboratory Manager

Chemtest
The right chemistry to deliver results

Results - Leachate

Project: Balbriggan Co. Dublin (MPA)

Client: IGSL						Chemtest Job No.:	19-30911	19-30911	19-30911	19-30911	19-30911
Quotation No.:						Chemtest Sample ID.:	888549	888550	888551	888552	888553
Order No.: 22009						Client Sample Ref.:	AA124205	AA124213	AA124218	AA124226	AA123915
						Sample Location:	TP03	TP06	TP08	TP11	TP17
						Sample Type:	SOIL	SOIL	SOIL	SOIL	SOIL
						Top Depth (m):	1.00	1.00	1.50	0.50	0.50
						Bottom Depth (m):	1.00	1.00	1.50	0.50	0.50
Determinand	**Accred.**	**SOP**	**Type**	**Units**	**LOD**						
pH	U	1010	10:1		N/A		5.9	6.3	9.4	6.5	6.7
Ammonium	U	1220	10:1	mg/l	0.050		0.16	0.13	0.48	0.19	0.15
Ammonium	N	1220	10:1	mg/kg	0.10		1.6	1.3	4.8	1.9	1.5
Boron (Dissolved)	U	1450	10:1	µg/l	20		< 20	< 20	25	< 20	< 20
Boron (Dissolved)	U	1450	10:1	mg/kg	0.20		< 0.20	< 0.20	0.25	< 0.20	< 0.20

Chemtest
The right chemistry to deliver results

Results - Soil

Project: Balbriggan Co. Dublin (MPA)

Client: IGSL				Chemtest Job No.:	19-30911	19-30911	19-30911	19-30911	19-30911
Quotation No.:				Chemtest Sample ID.:	888549	888550	888551	888552	888553
Order No.: 22009				Client Sample Ref.:	AA124205	AA124213	AA124218	AA124226	AA123915
				Sample Location:	TP03	TP06	TP08	TP11	TP17
				Sample Type:	SOIL	SOIL	SOIL	SOIL	SOIL
				Top Depth (m):	1.00	1.00	1.50	0.50	0.50
				Bottom Depth (m):	1.00	1.00	1.50	0.50	0.50
				Asbestos Lab:	COVENTRY	COVENTRY	DURHAM	COVENTRY	COVENTRY
Determinand	**Accred.**	**SOP**	**Units**	**LOD**					
ACM Type	U	2192		N/A	-	-	-	-	-
Asbestos Identification	U	2192	%	0.001	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected
ACM Detection Stage	U	2192		N/A	-	-	-	-	-
Moisture	N	2030	%	0.020	16	17	14	15	16
Stones and Removed Materials	N	2030	%	0.020			0.053		
pH	U	2010		N/A			[A] 8.5		
Boron (Hot Water Soluble)	U	2120	mg/kg	0.40	0.42	0.46	0.60	< 0.40	0.41
Magnesium (Water Soluble)	N	2120	g/l	0.010			< 0.010		
Sulphate (2:1 Water Soluble) as SO4	U	2120	g/l	0.010			0.051		
Total Sulphur	U	2175	%	0.010			[A] 0.010		
Sulphur (Elemental)	U	2180	mg/kg	1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0
Cyanide (Total)	U	2300	mg/kg	0.50	[A] < 0.50	[A] < 0.50	[A] < 0.50	[A] < 0.50	[A] < 0.50
Sulphide (Easily Liberatable)	N	2325	mg/kg	0.50	[A] 1.0	[A] 1.0	[A] 1.3	[A] 0.72	[A] 1.0
Sulphate (Acid Soluble)	U	2430	%	0.010	[A] 0.034	[A] 0.036	[A] 0.035	[A] < 0.010	[A] 0.016
Arsenic	U	2450	mg/kg	1.0	17	19	26	22	26
Barium	U	2450	mg/kg	10	63	61	120	100	120
Cadmium	U	2450	mg/kg	0.10	0.86	0.76	0.89	1.3	1.3
Chromium	U	2450	mg/kg	1.0	32	33	36	37	43
Molybdenum	U	2450	mg/kg	2.0	4.4	3.8	3.5	3.4	4.1
Antimony	N	2450	mg/kg	2.0	< 2.0	< 2.0	3.4	< 2.0	2.1
Copper	U	2450	mg/kg	0.50	23	25	43	41	47
Mercury	U	2450	mg/kg	0.10	< 0.10	< 0.10	0.14	< 0.10	0.10
Nickel	U	2450	mg/kg	0.50	40	34	49	54	58
Lead	U	2450	mg/kg	0.50	21	23	22	24	29
Selenium	U	2450	mg/kg	0.20	0.82	0.80	1.7	1.3	1.6
Zinc	U	2450	mg/kg	0.50	59	57	53	52	60
Chromium (Trivalent)	N	2490	mg/kg	1.0	32	33	36	37	43
Chromium (Hexavalent)	N	2490	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Total Organic Carbon	U	2625	%	0.20	[A] 0.97	[A] 0.88	[A] 0.50	[A] 0.37	[A] 0.51
Mineral Oil	N	2670	mg/kg	10	< 10	< 10	< 10	< 10	< 10
Aliphatic TPH >C5-C6	N	2680	mg/kg	1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0
Aliphatic TPH >C6-C8	N	2680	mg/kg	1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0
Aliphatic TPH >C8-C10	U	2680	mg/kg	1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0
Aliphatic TPH >C10-C12	U	2680	mg/kg	1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0
Aliphatic TPH >C12-C16	U	2680	mg/kg	1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0
Aliphatic TPH >C16-C21	U	2680	mg/kg	1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0
Aliphatic TPH >C21-C35	U	2680	mg/kg	1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0

Chemtest
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Results - Soil

Project: Balbriggan Co. Dublin (MPA)

Client: IGSL			Chemtest Job No.:		19-30911	19-30911	19-30911	19-30911	19-30911
Quotation No.:			Chemtest Sample ID.:		888549	888550	888551	888552	888553
Order No.: 22009			Client Sample Ref.:		AA124205	AA124213	AA124218	AA124226	AA123915
			Sample Location:		TP03	TP06	TP08	TP11	TP17
			Sample Type:		SOIL	SOIL	SOIL	SOIL	SOIL
			Top Depth (m):		1.00	1.00	1.50	0.50	0.50
			Bottom Depth (m):		1.00	1.00	1.50	0.50	0.50
			Asbestos Lab:		COVENTRY	COVENTRY	DURHAM	COVENTRY	COVENTRY
Determinand	**Accred.**	**SOP**	**Units**	**LOD**					
Aliphatic TPH >C35-C44	N	2680	mg/kg	1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0
Total Aliphatic Hydrocarbons	N	2680	mg/kg	5.0	[A] < 5.0	[A] < 5.0	[A] < 5.0	[A] < 5.0	[A] < 5.0
Aromatic TPH >C5-C7	N	2680	mg/kg	1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0
Aromatic TPH >C7-C8	N	2680	mg/kg	1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0
Aromatic TPH >C8-C10	U	2680	mg/kg	1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0
Aromatic TPH >C10-C12	U	2680	mg/kg	1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0
Aromatic TPH >C12-C16	U	2680	mg/kg	1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0
Aromatic TPH >C16-C21	U	2680	mg/kg	1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0
Aromatic TPH >C21-C35	U	2680	mg/kg	1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0
Aromatic TPH >C35-C44	N	2680	mg/kg	1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0
Total Aromatic Hydrocarbons	N	2680	mg/kg	5.0	[A] < 5.0	[A] < 5.0	[A] < 5.0	[A] < 5.0	[A] < 5.0
Total Petroleum Hydrocarbons	N	2680	mg/kg	10.0	[A] < 10	[A] < 10	[A] < 10	[A] < 10	[A] < 10
Benzene	U	2760	µg/kg	1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0
Toluene	U	2760	µg/kg	1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0
Ethylbenzene	U	2760	µg/kg	1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0
m & p-Xylene	U	2760	µg/kg	1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0
o-Xylene	U	2760	µg/kg	1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0
Methyl Tert-Butyl Ether	U	2760	µg/kg	1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0
Naphthalene	U	2800	mg/kg	0.10	< 0.10	< 0.10	0.66	< 0.10	< 0.10
Acenaphthylene	N	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Acenaphthene	U	2800	mg/kg	0.10	< 0.10	< 0.10	0.28	< 0.10	< 0.10
Fluorene	U	2800	mg/kg	0.10	< 0.10	< 0.10	0.30	< 0.10	< 0.10
Phenanthrene	U	2800	mg/kg	0.10	< 0.10	< 0.10	0.72	< 0.10	< 0.10
Benzo[j]fluoranthene	N	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Anthracene	U	2800	mg/kg	0.10	< 0.10	< 0.10	0.12	< 0.10	< 0.10
Fluoranthene	U	2800	mg/kg	0.10	< 0.10	< 0.10	0.25	< 0.10	< 0.10
Pyrene	U	2800	mg/kg	0.10	< 0.10	< 0.10	0.15	< 0.10	< 0.10
Benzo[a]anthracene	U	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Chrysene	U	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo[b]fluoranthene	U	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo[k]fluoranthene	U	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo[a]pyrene	U	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Indeno(1,2,3-c,d)Pyrene	U	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Dibenz(a,h)Anthracene	N	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo[g,h,i]perylene	U	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Coronene	N	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Total Of 17 PAH's	N	2800	mg/kg	2.0	< 2.0	< 2.0	2.5	< 2.0	< 2.0
PCB 28	U	2815	mg/kg	0.010	[A] < 0.010	[A] < 0.010	[A] < 0.010	[A] < 0.010	[A] < 0.010

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Results - Soil

Project: Balbriggan Co. Dublin (MPA)

Client: IGSL										
					Chemtest Job No.:	19-30911	19-30911	19-30911	19-30911	19-30911
Quotation No.:					Chemtest Sample ID.:	888549	888550	888551	888552	888553
Order No.: 22009					Client Sample Ref.:	AA124205	AA124213	AA124218	AA124226	AA123915
					Sample Location:	TP03	TP06	TP08	TP11	TP17
					Sample Type:	SOIL	SOIL	SOIL	SOIL	SOIL
					Top Depth (m):	1.00	1.00	1.50	0.50	0.50
					Bottom Depth (m):	1.00	1.00	1.50	0.50	0.50
					Asbestos Lab:	COVENTRY	COVENTRY	DURHAM	COVENTRY	COVENTRY
Determinand	**Accred.**	**SOP**	**Units**	**LOD**						
PCB 52	U	2815	mg/kg	0.010		[A] < 0.010	[A] < 0.010	[A] < 0.010	[A] < 0.010	[A] < 0.010
PCB 90+101	U	2815	mg/kg	0.010		[A] < 0.010	[A] < 0.010	[A] < 0.010	[A] < 0.010	[A] < 0.010
PCB 118	U	2815	mg/kg	0.010		[A] < 0.010	[A] < 0.010	[A] < 0.010	[A] < 0.010	[A] < 0.010
PCB 153	U	2815	mg/kg	0.010		[A] < 0.010	[A] < 0.010	[A] < 0.010	[A] < 0.010	[A] < 0.010
PCB 138	U	2815	mg/kg	0.010		[A] < 0.010	[A] < 0.010	[A] < 0.010	[A] < 0.010	[A] < 0.010
PCB 180	U	2815	mg/kg	0.010		[A] < 0.010	[A] < 0.010	[A] < 0.010	[A] < 0.010	[A] < 0.010
Total PCBs (7 Congeners)	N	2815	mg/kg	0.10		[A] < 0.10	[A] < 0.10	[A] < 0.10	[A] < 0.10	[A] < 0.10
Total Phenols	U	2920	mg/kg	0.30		< 0.30	< 0.30	< 0.30	< 0.30	< 0.30

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Results - Single Stage WAC

Project: Balbriggan Co. Dublin (MPA)

					Landfill Waste Acceptance Criteria Limits		
Chemtest Job No:	19-30911						
Chemtest Sample ID:	888549						
Sample Ref:	AA124205						
Sample ID:							
Sample Location:	TP03						
Top Depth(m):	1.00						
Bottom Depth(m):	1.00						
Sampling Date ($):							
Determinand	**SOP**	**Accred.**	**Units**		**Inert Waste Landfill**	**Stable, Non-reactive hazardous waste in non-hazardous Landfill**	**Hazardous Waste Landfill**
Total Organic Carbon	2625	U	%	[A] 0.97	3	5	6
Loss On Ignition	2610	U	%	3.7	--	--	10
Total BTEX	2760	U	mg/kg	[A] < 0.010	6	--	--
Total PCBs (7 Congeners)	2815	U	mg/kg	< 0.10	1	--	--
TPH Total WAC (Mineral Oil)	2670	U	mg/kg	[A] < 10	500	--	--
Total (Of 17) PAH's	2800	N	mg/kg	< 2.0	100	--	--
pH	2010	U		7.1	--	>6	--
Acid Neutralisation Capacity	2015	N	mol/kg	0.017	--	To evaluate	To evaluate
Eluate Analysis			**10:1 Eluate mg/l**	**10:1 Eluate mg/kg**	**Limit values for compliance leaching test using BS EN 12457 at L/S 10 l/kg**		
Arsenic	1450	U	0.0013	< 0.050	0.5	2	25
Barium	1450	U	0.0031	< 0.50	20	100	300
Cadmium	1450	U	< 0.00010	< 0.010	0.04	1	5
Chromium	1450	U	< 0.0010	< 0.050	0.5	10	70
Copper	1450	U	0.0016	< 0.050	2	50	100
Mercury	1450	U	< 0.00050	< 0.0050	0.01	0.2	2
Molybdenum	1450	U	0.0019	< 0.050	0.5	10	30
Nickel	1450	U	< 0.0010	< 0.050	0.4	10	40
Lead	1450	U	< 0.0010	< 0.010	0.5	10	50
Antimony	1450	U	< 0.0010	< 0.010	0.06	0.7	5
Selenium	1450	U	0.0022	0.022	0.1	0.5	7
Zinc	1450	U	< 0.0010	< 0.50	4	50	200
Chloride	1220	U	2.9	29	800	15000	25000
Fluoride	1220	U	0.35	3.5	10	150	500
Sulphate	1220	U	4.2	42	1000	20000	50000
Total Dissolved Solids	1020	N	52	520	4000	60000	100000
Phenol Index	1920	U	< 0.030	< 0.30	1	-	-
Dissolved Organic Carbon	1610	U	9.4	94	500	800	1000

Solid Information	
Dry mass of test portion/kg	0.090
Moisture (%)	16

Waste Acceptance Criteria

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes. This analysis is only applicable for hazardous waste landfill acceptance and does not give any indication as to whether a waste may be hazardous or non-hazardous.

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Results - Single Stage WAC

Project: Balbriggan Co. Dublin (MPA)

					Landfill Waste Acceptance Criteria Limits		
Chemtest Job No:	19-30911						
Chemtest Sample ID:	888550						
Sample Ref:	AA124213						
Sample ID:							
Sample Location:	TP06						
Top Depth(m):	1.00						
Bottom Depth(m):	1.00						
Sampling Date ($):							
Determinand	**SOP**	**Accred.**	**Units**		**Inert Waste Landfill**	**Stable, Non-reactive hazardous waste in non-hazardous Landfill**	**Hazardous Waste Landfill**
Total Organic Carbon	2625	U	%	[A] 0.88	3	5	6
Loss On Ignition	2610	U	%	4.0	--	--	10
Total BTEX	2760	U	mg/kg	[A] < 0.010	6	--	--
Total PCBs (7 Congeners)	2815	U	mg/kg	< 0.10	1	--	--
TPH Total WAC (Mineral Oil)	2670	U	mg/kg	[A] < 10	500	--	--
Total (Of 17) PAH's	2800	N	mg/kg	< 2.0	100	--	--
pH	2010	U		7.1	--	>6	--
Acid Neutralisation Capacity	2015	N	mol/kg	< 0.0020	--	To evaluate	To evaluate
Eluate Analysis			**10:1 Eluate mg/l**	**10:1 Eluate mg/kg**	**Limit values for compliance leaching test using BS EN 12457 at L/S 10 l/kg**		
Arsenic	1450	U	0.0013	< 0.050	0.5	2	25
Barium	1450	U	0.0036	< 0.50	20	100	300
Cadmium	1450	U	< 0.00010	< 0.010	0.04	1	5
Chromium	1450	U	< 0.0010	< 0.050	0.5	10	70
Copper	1450	U	0.0018	< 0.050	2	50	100
Mercury	1450	U	< 0.00050	< 0.0050	0.01	0.2	2
Molybdenum	1450	U	< 0.0010	< 0.050	0.5	10	30
Nickel	1450	U	< 0.0010	< 0.050	0.4	10	40
Lead	1450	U	0.0012	0.012	0.5	10	50
Antimony	1450	U	< 0.0010	< 0.010	0.06	0.7	5
Selenium	1450	U	0.0012	0.012	0.1	0.5	7
Zinc	1450	U	< 0.0010	< 0.50	4	50	200
Chloride	1220	U	3.0	30	800	15000	25000
Fluoride	1220	U	0.30	3.0	10	150	500
Sulphate	1220	U	3.5	35	1000	20000	50000
Total Dissolved Solids	1020	N	23	230	4000	60000	100000
Phenol Index	1920	U	< 0.030	< 0.30	1	-	-
Dissolved Organic Carbon	1610	U	8.1	81	500	800	1000

Solid Information	
Dry mass of test portion/kg	0.090
Moisture (%)	17

Waste Acceptance Criteria

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes. This analysis is only applicable for hazardous waste landfill acceptance and does not give any indication as to whether a waste may be hazardous or non-hazardous.

Results - Single Stage WAC

Project: Balbriggan Co. Dublin (MPA)

					Landfill Waste Acceptance Criteria Limits		
Chemtest Job No:	19-30911						
Chemtest Sample ID:	888551						
Sample Ref:	AA124218						
Sample ID:							
Sample Location:	TP08						
Top Depth(m):	1.50						
Bottom Depth(m):	1.50						
Sampling Date (S):							
Determinand	**SOP**	**Accred.**	**Units**		**Inert Waste Landfill**	**Stable, Non-reactive hazardous waste in non-hazardous Landfill**	**Hazardous Waste Landfill**
Total Organic Carbon	2625	U	%	[A] 0.50	3	5	6
Loss On Ignition	2610	U	%	4.0	--	--	10
Total BTEX	2760	U	mg/kg	[A] < 0.010	6	--	--
Total PCBs (7 Congeners)	2815	U	mg/kg	< 0.10	1	--	--
TPH Total WAC (Mineral Oil)	2670	U	mg/kg	[A] < 10	500	--	--
Total (Of 17) PAH's	2800	N	mg/kg	2.5	100	--	--
pH	2010	U		8.5	--	>6	--
Acid Neutralisation Capacity	2015	N	mol/kg	0.063	--	To evaluate	To evaluate
Eluate Analysis			**10:1 Eluate mg/l**	**10:1 Eluate mg/kg**	**Limit values for compliance leaching test using BS EN 12457 at L/S 10 l/kg**		
Arsenic	1450	U	0.0036	< 0.050	0.5	2	25
Barium	1450	U	0.0063	< 0.50	20	100	300
Cadmium	1450	U	0.00012	< 0.010	0.04	1	5
Chromium	1450	U	0.0039	< 0.050	0.5	10	70
Copper	1450	U	0.0095	0.095	2	50	100
Mercury	1450	U	< 0.00050	< 0.0050	0.01	0.2	2
Molybdenum	1450	U	0.0026	< 0.050	0.5	10	30
Nickel	1450	U	< 0.0010	< 0.050	0.4	10	40
Lead	1450	U	0.0076	0.076	0.5	10	50
Antimony	1450	U	0.0015	0.015	0.06	0.7	5
Selenium	1450	U	0.0016	0.016	0.1	0.5	7
Zinc	1450	U	0.0063	< 0.50	4	50	200
Chloride	1220	U	13	130	800	15000	25000
Fluoride	1220	U	0.35	3.5	10	150	500
Sulphate	1220	U	110	1100	1000	20000	50000
Total Dissolved Solids	1020	N	78	780	4000	60000	100000
Phenol Index	1920	U	< 0.030	< 0.30	1	-	-
Dissolved Organic Carbon	1610	U	32	320	500	800	1000

Solid Information	
Dry mass of test portion/kg	0.090
Moisture (%)	14

Waste Acceptance Criteria

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes. This analysis is only applicable for hazardous waste landfill acceptance and does not give any indication as to whether a waste may be hazardous or non-hazardous.

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Results - Single Stage WAC

Project: Balbriggan Co. Dublin (MPA)

					Landfill Waste Acceptance Criteria Limits		
Chemtest Job No:	19-30911						
Chemtest Sample ID:	888552						
Sample Ref:	AA124226						
Sample ID:							
Sample Location:	TP11						
Top Depth(m):	0.50						
Bottom Depth(m):	0.50						
Sampling Date ($):							
Determinand	**SOP**	**Accred.**	**Units**		**Inert Waste Landfill**	**Stable, Non-reactive hazardous waste in non-hazardous Landfill**	**Hazardous Waste Landfill**
Total Organic Carbon	2625	U	%	[A] 0.37	3	5	6
Loss On Ignition	2610	U	%	3.1	--	--	10
Total BTEX	2760	U	mg/kg	[A] < 0.010	6	--	--
Total PCBs (7 Congeners)	2815	U	mg/kg	< 0.10	1	--	--
TPH Total WAC (Mineral Oil)	2670	U	mg/kg	[A] < 10	500	--	--
Total (Of 17) PAH's	2800	N	mg/kg	< 2.0	100	--	--
pH	2010	U		7.4	--	>6	--
Acid Neutralisation Capacity	2015	N	mol/kg	< 0.0020	--	To evaluate	To evaluate
Eluate Analysis			**10:1 Eluate mg/l**	**10:1 Eluate mg/kg**	**Limit values for compliance leaching test using BS EN 12457 at L/S 10 l/kg**		
Arsenic	1450	U	0.0015	< 0.050	0.5	2	25
Barium	1450	U	0.0039	< 0.50	20	100	300
Cadmium	1450	U	< 0.00010	< 0.010	0.04	1	5
Chromium	1450	U	< 0.0010	< 0.050	0.5	10	70
Copper	1450	U	0.0014	< 0.050	2	50	100
Mercury	1450	U	< 0.00050	< 0.0050	0.01	0.2	2
Molybdenum	1450	U	< 0.0010	< 0.050	0.5	10	30
Nickel	1450	U	< 0.0010	< 0.050	0.4	10	40
Lead	1450	U	< 0.0010	< 0.010	0.5	10	50
Antimony	1450	U	< 0.0010	< 0.010	0.06	0.7	5
Selenium	1450	U	0.0013	0.013	0.1	0.5	7
Zinc	1450	U	< 0.0010	< 0.50	4	50	200
Chloride	1220	U	2.8	28	800	15000	25000
Fluoride	1220	U	0.32	3.2	10	150	500
Sulphate	1220	U	6.3	63	1000	20000	50000
Total Dissolved Solids	1020	N	22	210	4000	60000	100000
Phenol Index	1920	U	< 0.030	< 0.30	1	-	-
Dissolved Organic Carbon	1610	U	8.4	84	500	800	1000

Solid Information	
Dry mass of test portion/kg	0.090
Moisture (%)	15

Waste Acceptance Criteria

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes. This analysis is only applicable for hazardous waste landfill acceptance and does not give any indication as to whether a waste may be hazardous or non-hazardous.

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Results - Single Stage WAC

Project: Balbriggan Co. Dublin (MPA)

					Landfill Waste Acceptance Criteria Limits		
Chemtest Job No:	19-30911						
Chemtest Sample ID:	888553						
Sample Ref:	AA123915						
Sample ID:							
Sample Location:	TP17						
Top Depth(m):	0.50						
Bottom Depth(m):	0.50						
Sampling Date ($):							
Determinand	**SOP**	**Accred.**	**Units**		**Inert Waste Landfill**	**Stable, Non-reactive hazardous waste in non-hazardous Landfill**	**Hazardous Waste Landfill**
Total Organic Carbon	2625	U	%	[A] 0.51	3	5	6
Loss On Ignition	2610	U	%	2.7	--	--	10
Total BTEX	2760	U	mg/kg	[A] < 0.010	6	--	--
Total PCBs (7 Congeners)	2815	U	mg/kg	< 0.10	1	--	--
TPH Total WAC (Mineral Oil)	2670	U	mg/kg	[A] < 10	500	--	--
Total (Of 17) PAH's	2800	N	mg/kg	< 2.0	100	--	--
pH	2010	U		7.4	--	>6	--
Acid Neutralisation Capacity	2015	N	mol/kg	0.0020	--	To evaluate	To evaluate
Eluate Analysis			**10:1 Eluate mg/l**	**10:1 Eluate mg/kg**	**Limit values for compliance leaching test using BS EN 12457 at L/S 10 l/kg**		
Arsenic	1450	U	< 0.0010	< 0.050	0.5	2	25
Barium	1450	U	0.0073	< 0.50	20	100	300
Cadmium	1450	U	< 0.00010	< 0.010	0.04	1	5
Chromium	1450	U	< 0.0010	< 0.050	0.5	10	70
Copper	1450	U	< 0.0010	< 0.050	2	50	100
Mercury	1450	U	< 0.00050	< 0.0050	0.01	0.2	2
Molybdenum	1450	U	< 0.0010	< 0.050	0.5	10	30
Nickel	1450	U	< 0.0010	< 0.050	0.4	10	40
Lead	1450	U	< 0.0010	< 0.010	0.5	10	50
Antimony	1450	U	< 0.0010	< 0.010	0.06	0.7	5
Selenium	1450	U	0.0035	0.035	0.1	0.5	7
Zinc	1450	U	< 0.0010	< 0.50	4	50	200
Chloride	1220	U	2.9	29	800	15000	25000
Fluoride	1220	U	0.37	3.7	10	150	500
Sulphate	1220	U	5.5	55	1000	20000	50000
Total Dissolved Solids	1020	N	28	280	4000	60000	100000
Phenol Index	1920	U	< 0.030	< 0.30	1	-	-
Dissolved Organic Carbon	1610	U	9.5	95	500	800	1000

Solid Information	
Dry mass of test portion/kg	0.090
Moisture (%)	16

Waste Acceptance Criteria

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes. This analysis is only applicable for hazardous waste landfill acceptance and does not give any indication as to whether a waste may be hazardous or non-hazardous.

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Deviations

In accordance with UKAS Policy on Deviating Samples TPS 63. Chemtest have a procedure to ensure 'upon receipt of each sample a competent laboratory shall assess whether the sample is suitable with regard to the requested test(s)'. This policy and the respective holding times applied, can be supplied upon request.The reason a sample is declared as deviating is detailed below. Where applicable the analysis remains UKAS/MCERTs accredited but the results may be compromised.

Sample:	Sample Ref:	Sample ID:	Sample Location:	Sampled Date:	Deviation Code(s):	Containers Received:
888549	AA124205		TP03		A	Amber Glass 250ml
888549	AA124205		TP03		A	Amber Glass 60ml
888550	AA124213		TP06		A	Amber Glass 250ml
888550	AA124213		TP06		A	Amber Glass 60ml
888551	AA124218		TP08		A	Amber Glass 250ml
888551	AA124218		TP08		A	Amber Glass 60ml
888552	AA124226		TP11		A	Amber Glass 250ml
888552	AA124226		TP11		A	Amber Glass 60ml
888553	AA123915		TP17		A	Amber Glass 250ml
888553	AA123915		TP17		A	Amber Glass 60ml

Test Methods

SOP	Title	Parameters included	Method summary
1010	pH Value of Waters	pH	pH Meter
1020	Electrical Conductivity and Total Dissolved Solids (TDS) in Waters	Electrical Conductivity and Total Dissolved Solids (TDS) in Waters	Conductivity Meter
1220	Anions, Alkalinity & Ammonium in Waters	Fluoride; Chloride; Nitrite; Nitrate; Total; Oxidisable Nitrogen (TON); Sulfate; Phosphate; Alkalinity; Ammonium	Automated colorimetric analysis using 'Aquakem 600' Discrete Analyser.
1450	Metals in Waters by ICP-MS	Metals, including: Antimony; Arsenic; Barium; Beryllium; Boron; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Tin; Vanadium; Zinc	Filtration of samples followed by direct determination by inductively coupled plasma mass spectrometry (ICP-MS).
1610	Total/Dissolved Organic Carbon in Waters	Organic Carbon	TOC Analyser using Catalytic Oxidation
1920	Phenols in Waters by HPLC	Phenolic compounds including: Phenol, Cresols, Xylenols, Trimethylphenols Note: Chlorophenols are excluded.	Determination by High Performance Liquid Chromatography (HPLC) using electrochemical detection.
2010	pH Value of Soils	pH	pH Meter
2015	Acid Neutralisation Capacity	Acid Reserve	Titration
2030	Moisture and Stone Content of Soils(Requirement of MCERTS)	Moisture content	Determination of moisture content of soil as a percentage of its as received mass obtained at <37°C.
2120	Water Soluble Boron, Sulphate, Magnesium & Chromium	Boron; Sulphate; Magnesium; Chromium	Aqueous extraction / ICP-OES
2175	Total Sulphur in Soils	Total Sulphur	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.
2180	Sulphur (Elemental) in Soils by HPLC	Sulphur	Dichloromethane extraction / HPLC with UV detection
2192	Asbestos	Asbestos	Polarised light microscopy / Gravimetry
2300	Cyanides & Thiocyanate in Soils	Free (or easy liberatable) Cyanide; total Cyanide; complex Cyanide; Thiocyanate	Allkaline extraction followed by colorimetric determination using Automated Flow Injection Analyser.
2325	Sulphide in Soils	Sulphide	Steam distillation with sulphuric acid / analysis by 'Aquakem 600' Discrete Analyser, using N,N–dimethyl-p-phenylenediamine.
2430	Total Sulphate in soils	Total Sulphate	Acid digestion followed by determination of sulphate in extract by ICP-OES.
2450	Acid Soluble Metals in Soils	Metals, including: Arsenic; Barium; Beryllium; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Vanadium; Zinc	Acid digestion followed by determination of metals in extract by ICP-MS.
2490	Hexavalent Chromium in Soils	Chromium [VI]	Soil extracts are prepared by extracting dried and ground soil samples into boiling water. Chromium [VI] is determined by 'Aquakem 600' Discrete Analyser using 1,5-diphenylcarbazide.
2610	Loss on Ignition	loss on ignition (LOI)	Determination of the proportion by mass that is lost from a soil by ignition at 550°C.
2625	Total Organic Carbon in Soils	Total organic Carbon (TOC)	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.
2670	Total Petroleum Hydrocarbons (TPH) in Soils by GC-FID	TPH (C6–C40); optional carbon banding, e.g. 3-band – GRO, DRO & LRO*TPH C8–C40	Dichloromethane extraction / GC-FID
2680	TPH A/A Split	Aliphatics: >C5–C6, >C6–C8,>C8–C10, >C10–C12, >C12–C16, >C16–C21, >C21–C35, >C35– C44Aromatics: >C5–C7, >C7–C8, >C8– C10, >C10–C12, >C12–C16, >C16– C21, >C21– C35, >C35– C44	Dichloromethane extraction / GCxGC FID detection

Test Methods

SOP	Title	Parameters included	Method summary
2760	Volatile Organic Compounds (VOCs) in Soils by Headspace GC-MS	Volatile organic compounds, including BTEX and halogenated Aliphatic/Aromatics.(cf. USEPA Method 8260)*please refer to UKAS schedule	Automated headspace gas chromatographic (GC) analysis of a soil sample, as received, with mass spectrometric (MS) detection of volatile organic compounds.
2800	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Soil by GC-MS	Acenaphthene*; Acenaphthylene; Anthracene*; Benzo[a]Anthracene*; Benzo[a]Pyrene*; Benzo[b]Fluoranthene*; Benzo[ghi]Perylene*; Benzo[k]Fluoranthene; Chrysene*; Dibenz[ah]Anthracene; Fluoranthene*; Fluorene*; Indeno[123cd]Pyrene*; Naphthalene*; Phenanthrene*; Pyrene*	Dichloromethane extraction / GC-MS
2815	Polychlorinated Biphenyls (PCB) ICES7Congeners in Soils by GC-MS	ICES7 PCB congeners	Acetone/Hexane extraction / GC-MS
2920	Phenols in Soils by HPLC	Phenolic compounds including Resorcinol, Phenol, Methylphenols, Dimethylphenols, 1-Naphthol and TrimethylphenolsNote: chlorophenols are excluded.	60:40 methanol/water mixture extraction, followed by HPLC determination using electrochemical detection.
640	Characterisation of Waste (Leaching C10)	Waste material including soil, sludges and granular waste	ComplianceTest for Leaching of Granular Waste Material and Sludge

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Report Information

Key

U	UKAS accredited
M	MCERTS and UKAS accredited
N	Unaccredited
S	This analysis has been subcontracted to a UKAS accredited laboratory that is accredited for this analysis
SN	This analysis has been subcontracted to a UKAS accredited laboratory that is not accredited for this analysis
T	This analysis has been subcontracted to an unaccredited laboratory
I/S	Insufficient Sample
U/S	Unsuitable Sample
N/E	not evaluated
<	"less than"
>	"greater than"
$	This information has been supplied by the client and can affect the integrity of test data.

Comments or interpretations are beyond the scope of UKAS accreditation
The results relate only to the items tested
Uncertainty of measurement for the determinands tested are available upon request
None of the results in this report have been recovery corrected
All results are expressed on a dry weight basis
The following tests were analysed on samples as received and the results subsequently corrected to a dry weight basis TPH, BTEX, VOCs, SVOCs, PCBs, Phenols
For all other tests the samples were dried at < 37°C prior to analysis
All Asbestos testing is performed at the indicated laboratory
Issue numbers are sequential starting with 1 all subsequent reports are incremented by 1

Sample Deviation Codes

A - Date of sampling not supplied
B - Sample age exceeds stability time (sampling to extraction)
C - Sample not received in appropriate containers
D - Broken Container
E - Insufficient Sample (Applies to LOI in Trommel Fines Only)

Sample Retention and Disposal

All soil samples will be retained for a period of 45 days from the date of receipt
All water samples will be retained for 14 days from the date of receipt
Charges may apply to extended sample storage

If you require extended retention of samples, please email your requirements to:
customerservices@chemtest.com

NICHOLLS

Nicholls Colton Group
7 - 11 Harding Street
Leicester
LE1 4DH

IGSL
Unit F
M7 Business Park
Nass

Analytical Test Report: L19/02356/IGS/001

Your Project Reference:	**Balbriggan**	Samples Received on:	08/10/2019
Your Order Number:	16576	Testing Instruction Received:	08/10/2019
Report Issue Number:	1	Sample Tested:	08/10 to 16/10/2019
Samples Analysed:	5 aggregate samples	Report issued:	16/10/2019

Signed

James Gane
Group Data Manager
Nicholls Colton Group

Notes:

General

Please refer to Methodologies tab for details pertaining to the analytical methods undertaken.

Samples will be retained for 14 days after issue of this report unless otherwise requested.

Samples were supplied by customer, results are representative of the material provided

Accreditation Key

UKAS = UKAS Accreditation, u = Unaccredited

Date of issue 24.01.2017
Owned by Emily Blissett - Customer Services Supervisor
Authorised by James Gane - Commercial Manager
J:\Public\Projects\2019\L19\IGS\L19-2356-IGS\[L19-2356-IGS-001.xlsx]Cover Sheet

NICHOLLS

Nicholls Colton Group
7 - 11 Harding Street
Leicester
LE1 4DH

L19/02356/IGS/001

Project Reference - Balbriggan

Analytical Test Results - Aggregate Testing

NC Reference			56234	56235	56236	56237
Client Sample Reference			A19/4419	A19/4441	A19/4431	A19/4416
Material			Aggregate	Aggregate	Aggregate	Aggregate
Source/Client Ref			TP01 @ 2.5m	TP17 @ 2.5m	TP08 @ 1.5m	BH04A @ 2.0m
Sample Description			Brown crushed rock	Brown crushed rock	Brown crushed rock	Brown crushed rock
EN 1744 Determinations	**Units**	**Accreditation**				
Total Sulphur content (as S)	(%)	UKAS	0.03	0.02	0.03	0.03
Acid soluble sulphate content (as SO_3)	(%)	UKAS	< 0.01	0.01	< 0.01	< 0.01
Acid soluble sulphate content (as SO_4)	(%)	u	< 0.01	0.01	< 0.01	< 0.01

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7 - 11 Harding Street
Leicester
LE1 4DH

L19/02356/IGS/001

Project Reference - Balbriggan

Analytical Test Results - Aggregate Testing

NC Reference	**56238**
Client Sample Reference	A19/4426
Material	Aggregate
Source/Client Ref	TP05 @ 2.5m
Sample Description	Brown crushed rock

EN 1744 Determinations	**Units**	**Accreditation**	
Total Sulphur content (as S)	(%)	UKAS	0.03
Acid soluble sulphate content (as SO_3)	(%)	UKAS	< 0.01
Acid soluble sulphate content (as SO_4)	(%)	u	< 0.01

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Nicholls Colton Group
7 - 11 Harding Street
Leicester
LE1 4DH

L19/02356/IGS/001

Project Reference - Balbriggan

Analysis Methodologies and Notes

Determinant	Test method and notes
EN 1744 Total Sulphur	Testing was in accordance with BS EN 1744-1:2009 + A1:2012 clause 11.
EN 1744 Acid Soluble Sulphate	Testing was in accordance with BS EN 1744-1:2009 + A1:2012 clause 12.

Appendix IVC Laboratory

Ground Water Surface Sample
Ground Water Standpipes

Chemtest
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Chemtest Ltd.
Depot Road
Newmarket
CB8 0AL
Tel: 01638 606070
Email: info@chemtest.com

UKAS TESTING
2183

Final Report

Report No.:	19-32959-1
Initial Date of Issue:	15-Oct-2019
Client	IGSL
Client Address:	M7 Business Park Naas County Kildare Ireland
Contact(s):	Darren Keogh
Project	Balbriggan

Quotation No.:		**Date Received:**	02-Oct-2019
Order No.:		**Date Instructed:**	04-Oct-2019
No. of Samples:	1		
Turnaround (Wkdays):	7	**Results Due:**	14-Oct-2019
Date Approved:	14-Oct-2019		

Approved By:



Details: Robert Monk, Technical Manager

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Results - Water

Project: Balbriggan

Client: IGSL			Chemtest Job No.:		19-32959
Quotation No.:			Chemtest Sample ID.:		898627
			Sample Location:		S01
			Sample Type:		WATER
Determinand	**Accred.**	**SOP**	**Units**	**LOD**	
pH	U	1010		N/A	[A] 7.7
Electrical Conductivity	U	1020	µS/cm	1.0	[A] 630
Suspended Solids At 105C	U	1030	mg/l	5.0	[A] 2000
Dissolved Oxygen	N	1150	mg O2/l	0.50	9.0
Ammoniacal Nitrogen	U	1220	mg/l	0.050	[A] 1.3
Arsenic (Dissolved)	U	1450	µg/l	1.0	[A] 1.7
Cadmium (Dissolved)	U	1450	µg/l	0.080	[A] < 0.080
Chromium (Dissolved)	U	1450	µg/l	1.0	[A] < 1.0
Copper (Dissolved)	U	1450	µg/l	1.0	[A] < 1.0
Mercury (Dissolved)	U	1450	µg/l	0.50	[A] 0.90
Nickel (Dissolved)	U	1450	µg/l	1.0	[A] < 1.0
Lead (Dissolved)	U	1450	µg/l	1.0	[A] < 1.0
Selenium (Dissolved)	U	1450	µg/l	1.0	[A] 6.7
Zinc (Dissolved)	U	1450	µg/l	1.0	[A] < 1.0
Aliphatic TPH >C5-C6	N	1675	µg/l	0.10	[A] < 0.10
Aliphatic TPH >C6-C8	N	1675	µg/l	0.10	[A] < 0.10
Aliphatic TPH >C8-C10	N	1675	µg/l	0.10	[A] < 0.10
Aliphatic TPH >C10-C12	N	1675	µg/l	0.10	[A] < 0.10
Aliphatic TPH >C12-C16	N	1675	µg/l	0.10	[A] < 0.10
Aliphatic TPH >C16-C21	N	1675	µg/l	0.10	[A] < 0.10
Aliphatic TPH >C21-C35	N	1675	µg/l	0.10	[A] < 0.10
Aliphatic TPH >C35-C44	N	1675	µg/l	0.10	[A] < 0.10
Total Aliphatic Hydrocarbons	N	1675	µg/l	5.0	[A] < 5.0
Aromatic TPH >C5-C7	N	1675	µg/l	0.10	[A] < 0.10
Aromatic TPH >C7-C8	N	1675	µg/l	0.10	[A] < 0.10
Aromatic TPH >C8-C10	N	1675	µg/l	0.10	[A] < 0.10
Aromatic TPH >C10-C12	N	1675	µg/l	0.10	[A] < 0.10
Aromatic TPH >C12-C16	N	1675	µg/l	0.10	[A] < 0.10
Aromatic TPH >C16-C21	N	1675	µg/l	0.10	[A] < 0.10
Aromatic TPH >C21-C35	N	1675	µg/l	0.10	[A] < 0.10
Aromatic TPH >C35-C44	N	1675	µg/l	0.10	[A] < 0.10
Total Aromatic Hydrocarbons	N	1675	µg/l	5.0	[A] < 5.0
Total Petroleum Hydrocarbons	N	1675	µg/l	10	[A] < 10
Naphthalene	U	1700	µg/l	0.10	[A] < 0.10
Acenaphthylene	U	1700	µg/l	0.10	[A] < 0.10
Acenaphthene	U	1700	µg/l	0.10	[A] < 0.10
Fluorene	U	1700	µg/l	0.10	[A] < 0.10
Phenanthrene	U	1700	µg/l	0.10	[A] < 0.10
Anthracene	U	1700	µg/l	0.10	[A] < 0.10
Fluoranthene	U	1700	µg/l	0.10	[A] < 0.10
Pyrene	U	1700	µg/l	0.10	[A] < 0.10
Benzo[a]anthracene	U	1700	µg/l	0.10	[A] < 0.10

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Results - Water

Project: Balbriggan

Client: IGSL			**Chemtest Job No.:**		19-32959
Quotation No.:			**Chemtest Sample ID.:**		898627
			Sample Location:		S01
			Sample Type:		WATER
Determinand	**Accred.**	**SOP**	**Units**	**LOD**	
Chrysene	N	1700	µg/l	0.10	[A] < 0.10
Benzo[b]fluoranthene	U	1700	µg/l	0.10	[A] < 0.10
Benzo[k]fluoranthene	U	1700	µg/l	0.10	[A] < 0.10
Benzo[a]pyrene	U	1700	µg/l	0.10	[A] < 0.10
Indeno(1,2,3-c,d)Pyrene	U	1700	µg/l	0.10	[A] < 0.10
Dibenz(a,h)Anthracene	U	1700	µg/l	0.10	[A] < 0.10
Benzo[g,h,i]perylene	U	1700	µg/l	0.10	[A] < 0.10
Total Of 16 PAH's	N	1700	µg/l	2.0	[A] < 2.0
Benzene	U	1760	µg/l	1.0	[AC] < 1.0
Toluene	U	1760	µg/l	1.0	[AC] < 1.0
Ethylbenzene	U	1760	µg/l	1.0	[AC] < 1.0
m & p-Xylene	U	1760	µg/l	1.0	[AC] < 1.0
o-Xylene	U	1760	µg/l	1.0	[AC] < 1.0
Methyl Tert-Butyl Ether	N	1760	µg/l	1.0	[AC] < 1.0

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Deviations

In accordance with UKAS Policy on Deviating Samples TPS 63. Chemtest have a procedure to ensure 'upon receipt of each sample a competent laboratory shall assess whether the sample is suitable with regard to the requested test(s)'. This policy and the respective holding times applied, can be supplied upon request.The reason a sample is declared as deviating is detailed below. Where applicable the analysis remains UKAS/MCERTs accredited but the results may be compromised.

Sample:	Sample Ref:	Sample ID:	Sample Location:	Sampled Date:	Deviation Code(s):	Containers Received:
898627			S01		AC	Coloured Winchester 1000ml

Chemtest
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Test Methods

SOP	Title	Parameters included	Method summary
1010	pH Value of Waters	pH	pH Meter
1020	Electrical Conductivity and Total Dissolved Solids (TDS) in Waters	Electrical Conductivity and Total Dissolved Solids (TDS) in Waters	Conductivity Meter
1030	Total Suspended Solids	Total suspended solids	Filtration of a mixed sample through a standard glass fibre filter and determination of the mass of residue retained dried at 105°C.
1150	Dissolved Oxygen	Dissolved Oxygen (DO)	Electrometric determination (on site preferred), using oxygen sensitive membrane electrode.
1220	Anions, Alkalinity & Ammonium in Waters	Fluoride; Chloride; Nitrite; Nitrate; Total; Oxidisable Nitrogen (TON); Sulfate; Phosphate; Alkalinity; Ammonium	Automated colorimetric analysis using 'Aquakem 600' Discrete Analyser.
1450	Metals in Waters by ICP-MS	Metals, including: Antimony; Arsenic; Barium; Beryllium; Boron; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Tin; Vanadium; Zinc	Filtration of samples followed by direct determination by inductively coupled plasma mass spectrometry (ICP-MS).
1675	TPH Aliphatic/Aromatic split in Waters by GC-FID(cf. Texas Method 1006 / TPH CWG)	Aliphatics: >C5–C6, >C6–C8, >C8– C10, >C10–C12, >C12–C16, >C16–C21, >C21– C35, >C35– C44Aromatics: >C5–C7, >C7–C8, >C8– C10, >C10–C12, >C12–C16, >C16– C21, >C21– C35, >C35– C44	Pentane extraction / GCxGC FID detection
1700	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Waters by GC-FID	Acenaphthene; Acenaphthylene; Anthracene; Benzo[a]Anthracene; Benzo[a]Pyrene; Benzo[b]Fluoranthene; Benzo[ghi]Perylene; Benzo[k]Fluoranthene; Chrysene; Dibenz[ah]Anthracene; Fluoranthene; Fluorene; Indeno[123cd]Pyrene; Naphthalene; Phenanthrene; Pyrene	Dichloromethane extraction / GC-FID (GC-FID detection is non-selective and can be subject to interference from co-eluting compounds)
1760	Volatile Organic Compounds (VOCs) in Waters by Headspace GC-MS	Volatile organic compounds, including BTEX and halogenated Aliphatic/Aromatics. (cf. USEPA Method 8260)	Automated headspace gas chromatographic (GC) analysis of water samples with mass spectrometric (MS) detection of volatile organic compounds.

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Report Information

Key

U	UKAS accredited
M	MCERTS and UKAS accredited
N	Unaccredited
S	This analysis has been subcontracted to a UKAS accredited laboratory that is accredited for this analysis
SN	This analysis has been subcontracted to a UKAS accredited laboratory that is not accredited for this analysis
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U/S	Unsuitable Sample
N/E	not evaluated
<	"less than"
>	"greater than"
$	This information has been supplied by the client and can affect the integrity of test data.

Comments or interpretations are beyond the scope of UKAS accreditation
The results relate only to the items tested
Uncertainty of measurement for the determinands tested are available upon request
None of the results in this report have been recovery corrected
All results are expressed on a dry weight basis
The following tests were analysed on samples as received and the results subsequently corrected to a dry weight basis TPH, BTEX, VOCs, SVOCs, PCBs, Phenols
For all other tests the samples were dried at < 37°C prior to analysis
All Asbestos testing is performed at the indicated laboratory
Issue numbers are sequential starting with 1 all subsequent reports are incremented by 1

Sample Deviation Codes

A - Date of sampling not supplied
B - Sample age exceeds stability time (sampling to extraction)
C - Sample not received in appropriate containers
D - Broken Container
E - Insufficient Sample (Applies to LOI in Trommel Fines Only)

Sample Retention and Disposal

All soil samples will be retained for a period of 45 days from the date of receipt
All water samples will be retained for 14 days from the date of receipt
Charges may apply to extended sample storage

If you require extended retention of samples, please email your requirements to:
customerservices@chemtest.com

Certificate of Sampling

Sampled in Accordance with BS EN 932-1: 1997.

Client	Mallincross Ltd. (Engineer: MPA)		
Contract	Balbriggan, Co. Dublin		
Date/Time	Wednesday 27 November 2019		
Client Ref (sample #)	BH02A, BH04		
Chainage/Depth/Layer	Taken from 50mm well installation		
Material	Water Sample		
Source (ie In Situ)	BH Well		
Testing Required	Environmental		
Ticket Number	N/A		
Reason for Sampling	Environmental		
Method of Sampling ie S/Pile	Glass bottles, water bailer		
Number of Sample Increments	N/A		
Approx. Size of sample	2.0L		
Type of Sample (Bulk)	2x 1.0L glass bottles		
Sampled with	Bottles, latex gloves, water bailer		
Weather Conditions	Damp		
Sampler (Initials + Signature)	Luke Daniels		
Remarks/Drawing		Sample sizes: PSD 50Kg, PI 5Kg, PDWA 4Kg, LA 50Kg / TFV 30 Kg not sieved, large shear/Perm 100Kg,Small shearbox 5Kg MSSV 15Kg	PSD smaller agg 63=50Kg 50=35Kg 37.5=15Kg 20=2Kg Conical Ratio 1:7:19 Prismatic 1:3:5 Full Shovel approx 4.5Kg Full Scoop approx 2Kg
IGSL Ltd, M7 Business Park, Naas, County Kildare.			

Chemtest
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Chemtest Ltd.
Depot Road
Newmarket
CB8 0AL
Tel: 01638 606070
Email: info@chemtest.com

UKAS TESTING
2183

Amended Report

Report No.:	19-39995-2		
Initial Date of Issue:	11-Dec-2019	**Date of Re-Issue:**	13-Jan-2020
Client	IGSL		
Client Address:	M7 Business Park Naas County Kildare Ireland		
Contact(s):	Darren Keogh		
Project	22209 - Balbriggan, Co. Dublin		
Quotation No.:		**Date Received:**	28-Nov-2019
Order No.:		**Date Instructed:**	03-Dec-2019
No. of Samples:	2		
Turnaround (Wkdays):	7	**Results Due:**	11-Dec-2019
Date Approved:	11-Dec-2019		
Approved By:			
Details:	Amy Parekh-Pross, Technical Projects Manager		

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Results - Water

Project: 22209 - Balbriggan, Co. Dublin

Client: IGSL			**Chemtest Job No.:**		19-39995	19-39995
Quotation No.:			**Chemtest Sample ID.:**		934583	934584
			Sample Location:		BH02A	BH04
			Sample Type:		WATER	WATER
			Date Sampled:		27-Nov-2019	27-Nov-2019
Determinand	**Accred.**	**SOP**	**Units**	**LOD**		
pH	U	1010		N/A	8.6	8.3
Electrical Conductivity	U	1020	µS/cm	1.0	520	380
Suspended Solids At 105C	U	1030	mg/l	5.0	230	8100
Dissolved Oxygen	N	1150	mg O2/l	0.50	8.0	8.3
Calcium	U	1415	mg/l	5.0	93	48
Potassium	U	1415	mg/l	0.50	4.8	3.2
Magnesium	U	1415	mg/l	0.50	8.5	8.6
Sodium	U	1415	mg/l	0.50	17	23
Arsenic (Dissolved)	U	1450	µg/l	1.0	< 1.0	2.0
Boron (Dissolved)	U	1450	µg/l	20	31	37
Cadmium (Dissolved)	U	1450	µg/l	0.080	0.099	0.11
Copper (Dissolved)	U	1450	µg/l	1.0	2.8	2.3
Iron (Dissolved)	N	1450	µg/l	20	220	120
Mercury (Dissolved)	U	1450	µg/l	0.50	2.6	1.6
Manganese (Dissolved)	U	1450	µg/l	1.0	33	7600
Nickel (Dissolved)	U	1450	µg/l	1.0	4.7	2.3
Lead (Dissolved)	U	1450	µg/l	1.0	< 1.0	< 1.0
Selenium (Dissolved)	U	1450	µg/l	1.0	1.3	1.2
Zinc (Dissolved)	U	1450	µg/l	1.0	14	2.5
Chromium (Total)	N	1450	µg/l	1.0	8.1	1.0
Total Organic Carbon	U	1610	mg/l	2.0	9.2	12
Aliphatic TPH >C5-C6	N	1675	µg/l	0.10	< 0.10	< 0.10
Aliphatic TPH >C6-C8	N	1675	µg/l	0.10	< 0.10	< 0.10
Aliphatic TPH >C8-C10	N	1675	µg/l	0.10	< 0.10	< 0.10
Aliphatic TPH >C10-C12	N	1675	µg/l	0.10	< 0.10	< 0.10
Aliphatic TPH >C12-C16	N	1675	µg/l	0.10	< 0.10	< 0.10
Aliphatic TPH >C16-C21	N	1675	µg/l	0.10	< 0.10	< 0.10
Aliphatic TPH >C21-C35	N	1675	µg/l	0.10	< 0.10	< 0.10
Aliphatic TPH >C35-C44	N	1675	µg/l	0.10	< 0.10	< 0.10
Total Aliphatic Hydrocarbons	N	1675	µg/l	5.0	< 5.0	< 5.0
Aromatic TPH >C5-C7	N	1675	µg/l	0.10	< 0.10	< 0.10
Aromatic TPH >C7-C8	N	1675	µg/l	0.10	< 0.10	< 0.10
Aromatic TPH >C8-C10	N	1675	µg/l	0.10	< 0.10	< 0.10
Aromatic TPH >C10-C12	N	1675	µg/l	0.10	< 0.10	< 0.10
Aromatic TPH >C12-C16	N	1675	µg/l	0.10	< 0.10	< 0.10
Aromatic TPH >C16-C21	N	1675	µg/l	0.10	< 0.10	< 0.10
Aromatic TPH >C21-C35	N	1675	µg/l	0.10	< 0.10	< 0.10
Aromatic TPH >C35-C44	N	1675	µg/l	0.10	< 0.10	< 0.10
Total Aromatic Hydrocarbons	N	1675	µg/l	5.0	< 5.0	< 5.0
Total Petroleum Hydrocarbons	N	1675	µg/l	10	< 10	< 10
Naphthalene	U	1700	µg/l	0.10	< 0.10	< 0.10

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Results - Water

Project: 22209 - Balbriggan, Co. Dublin

Client: IGSL			Chemtest Job No.:		19-39995	19-39995
Quotation No.:			Chemtest Sample ID.:		934583	934584
			Sample Location:		BH02A	BH04
			Sample Type:		WATER	WATER
			Date Sampled:		27-Nov-2019	27-Nov-2019
Determinand	**Accred.**	**SOP**	**Units**	**LOD**		
Acenaphthylene	U	1700	µg/l	0.10	< 0.10	< 0.10
Acenaphthene	U	1700	µg/l	0.10	< 0.10	< 0.10
Fluorene	U	1700	µg/l	0.10	< 0.10	< 0.10
Phenanthrene	U	1700	µg/l	0.10	< 0.10	< 0.10
Anthracene	U	1700	µg/l	0.10	< 0.10	< 0.10
Fluoranthene	U	1700	µg/l	0.10	< 0.10	< 0.10
Pyrene	U	1700	µg/l	0.10	< 0.10	< 0.10
Benzo[a]anthracene	U	1700	µg/l	0.10	< 0.10	< 0.10
Chrysene	N	1700	µg/l	0.10	< 0.10	< 0.10
Benzo[b]fluoranthene	U	1700	µg/l	0.10	< 0.10	< 0.10
Benzo[k]fluoranthene	U	1700	µg/l	0.10	< 0.10	< 0.10
Benzo[a]pyrene	U	1700	µg/l	0.10	< 0.10	< 0.10
Indeno(1,2,3-c,d)Pyrene	U	1700	µg/l	0.10	< 0.10	< 0.10
Dibenz(a,h)Anthracene	U	1700	µg/l	0.10	< 0.10	< 0.10
Benzo[g,h,i]perylene	U	1700	µg/l	0.10	< 0.10	< 0.10
Total Of 16 PAH's	N	1700	µg/l	2.0	< 2.0	< 2.0
Benzene	U	1760	µg/l	1.0	[C] < 1.0	[C] < 1.0
Toluene	U	1760	µg/l	1.0	[C] < 1.0	[C] < 1.0
Ethylbenzene	U	1760	µg/l	1.0	[C] < 1.0	[C] < 1.0
m & p-Xylene	U	1760	µg/l	1.0	[C] < 1.0	[C] < 1.0
o-Xylene	U	1760	µg/l	1.0	[C] < 1.0	[C] < 1.0
Methyl Tert-Butyl Ether	N	1760	µg/l	1.0	[C] < 1.0	[C] < 1.0

Chemtest
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Deviations

In accordance with UKAS Policy on Deviating Samples TPS 63. Chemtest have a procedure to ensure 'upon receipt of each sample a competent laboratory shall assess whether the sample is suitable with regard to the requested test(s)'. This policy and the respective holding times applied, can be supplied upon request.The reason a sample is declared as deviating is detailed below. Where applicable the analysis remains UKAS/MCERTs accredited but the results may be compromised.

Sample:	Sample Ref:	Sample ID:	Sample Location:	Sampled Date:	Deviation Code(s):	Containers Received:
934583			BH02A	27-Nov-2019	C	Coloured Winchester 1000ml
934584			BH04	27-Nov-2019	C	Coloured Winchester 1000ml

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Test Methods

SOP	Title	Parameters included	Method summary
1010	pH Value of Waters	pH	pH Meter
1020	Electrical Conductivity and Total Dissolved Solids (TDS) in Waters	Electrical Conductivity and Total Dissolved Solids (TDS) in Waters	Conductivity Meter
1030	Total Suspended Solids	Total suspended solids	Filtration of a mixed sample through a standard glass fibre filter and determination of the mass of residue retained dried at 105°C.
1150	Dissolved Oxygen	Dissolved Oxygen (DO)	Electrometric determination (on site preferred), using oxygen sensitive membrane electrode.
1415	Cations in Waters by ICP-MS	Sodium; Potassium; Calcium; Magnesium	Direct determination by inductively coupled plasma - mass spectrometry (ICP-MS).
1450	Metals in Waters by ICP-MS	Metals, including: Antimony; Arsenic; Barium; Beryllium; Boron; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Tin; Vanadium; Zinc	Filtration of samples followed by direct determination by inductively coupled plasma mass spectrometry (ICP-MS).
1610	Total/Dissolved Organic Carbon in Waters	Organic Carbon	TOC Analyser using Catalytic Oxidation
1675	TPH Aliphatic/Aromatic split in Waters by GC-FID(cf. Texas Method 1006 / TPH CWG)	Aliphatics: >C5–C6, >C6–C8, >C8– C10, >C10–C12, >C12–C16, >C16–C21, >C21–C35, >C35– C44Aromatics: >C5–C7, >C7–C8, >C8– C10, >C10–C12, >C12–C16, >C16– C21, >C21– C35, >C35– C44	Pentane extraction / GCxGC FID detection
1700	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Waters by GC-FID	Acenaphthene; Acenaphthylene; Anthracene; Benzo[a]Anthracene; Benzo[a]Pyrene; Benzo[b]Fluoranthene; Benzo[ghi]Perylene; Benzo[k]Fluoranthene; Chrysene; Dibenz[ah]Anthracene; Fluoranthene; Fluorene; Indeno[123cd]Pyrene; Naphthalene; Phenanthrene; Pyrene	Dichloromethane extraction / GC-FID (GC-FID detection is non-selective and can be subject to interference from co-eluting compounds)
1760	Volatile Organic Compounds (VOCs) in Waters by Headspace GC-MS	Volatile organic compounds, including BTEX and halogenated Aliphatic/Aromatics. (cf. USEPA Method 8260)	Automated headspace gas chromatographic (GC) analysis of water samples with mass spectrometric (MS) detection of volatile organic compounds.

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Report Information

Key

U	UKAS accredited
M	MCERTS and UKAS accredited
N	Unaccredited
S	This analysis has been subcontracted to a UKAS accredited laboratory that is accredited for this analysis
SN	This analysis has been subcontracted to a UKAS accredited laboratory that is not accredited for this analysis
T	This analysis has been subcontracted to an unaccredited laboratory
I/S	Insufficient Sample
U/S	Unsuitable Sample
N/E	not evaluated
<	"less than"
>	"greater than"

Comments or interpretations are beyond the scope of UKAS accreditation
The results relate only to the items tested
Uncertainty of measurement for the determinands tested are available upon request
None of the results in this report have been recovery corrected
All results are expressed on a dry weight basis
The following tests were analysed on samples as received and the results subsequently corrected to a dry weight basis TPH, BTEX, VOCs, SVOCs, PCBs, Phenols
For all other tests the samples were dried at < 37°C prior to analysis
All Asbestos testing is performed at the indicated laboratory
Issue numbers are sequential starting with 1 all subsequent reports are incremented by 1

Sample Deviation Codes

A - Date of sampling not supplied
B - Sample age exceeds stability time (sampling to extraction)
C - Sample not received in appropriate containers
D - Broken Container
E - Insufficient Sample (Applies to LOI in Trommel Fines Only)

Sample Retention and Disposal

All soil samples will be retained for a period of 45 days from the date of receipt
All water samples will be retained for 14 days from the date of receipt
Charges may apply to extended sample storage

If you require extended retention of samples, please email your requirements to:
customerservices@chemtest.com

Certificate of Sampling

Sampled in Accordance with BS EN 932-1: 1997.

Client	Mallincross Ltd. (Engineer: MPA)
Contract	Balbriggan, Co. Dublin
Date/Time	13 January 2020
Client Ref (sample #)	BH02A, BH04
Chainage/Depth/Layer	Taken from 50mm well installation
Material	Water Sample
Source (ie In Situ)	BH Well
Testing Required	Environmental
Ticket Number	N/A
Reason for Sampling	Environmental
Method of Sampling ie S/Pile	Glass bottles, water bailer
Number of Sample Increments	N/A
Approx. Size of sample	2.0L
Type of Sample (Bulk)	2x 1.0L glass bottles
Sampled with	Bottles, latex gloves, water bailer
Weather Conditions	Damp
Sampler (Initials + Signature)	Luke Daniels
Remarks/Drawing	Sample sizes: PSD 50Kg, PI 5Kg, PDWA 4Kg, LA 50Kg / TFV 30 Kg not sieved, large shear/Perm 100Kg,Small shearbox 5Kg MSSV 15Kg PSD smaller agg 63=50Kg 50=35Kg 37.5=15Kg 20=2Kg Conical Ratio 1:7:19 Prismatic 1:3:5 Full Shovel approx 4.5Kg

UKAS TESTING
2183

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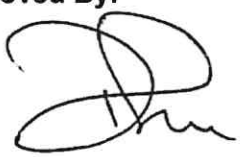
Chemtest Ltd.
Depot Road
Newmarket
CB8 0AL
Tel: 01638 606070
Email: info@chemtest.com

Final Report

Report No.:	20-01125-1		
Initial Date of Issue:	22-Jan-2020		
Client	IGSL		
Client Address:	M7 Business Park Naas County Kildare Ireland		
Contact(s):	Darren Keogh		
Project	Balbriggan		
Quotation No.:		**Date Received:**	15-Jan-2020
Order No.:		**Date Instructed:**	15-Jan-2020
No. of Samples:	2		
Turnaround (Wkdays):	5	**Results Due:**	21-Jan-2020
Date Approved:	22-Jan-2020		

Approved By:



Details: Darrell Hall, Director

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Results - Water

Project: Balbriggan

Client: IGSL			Chemtest Job No.:		20-01125	20-01125
Quotation No.:			Chemtest Sample ID.:		953446	953447
			Sample Location:		BH02	BH04
			Sample Type:		WATER	WATER
Determinand	**Accred.**	**SOP**	**Units**	**LOD**		
pH	U	1010		N/A	[A] 8.3	[A] 8.0
Electrical Conductivity	U	1020	µS/cm	1.0	[A] 560	[A] 570
Suspended Solids At 105C	U	1030	mg/l	5.0	[A] 180	[A] 6300
Dissolved Oxygen	N	1150	mg O2/l	0.50	8.9	8.9
Calcium	U	1415	mg/l	5.0	[A] 74	[A] 61
Potassium	U	1415	mg/l	0.50	[A] 0.97	[A] 2.7
Magnesium	U	1415	mg/l	0.50	[A] 6.4	[A] 12
Sodium	U	1415	mg/l	0.50	[A] 7.8	[A] 35
Arsenic (Dissolved)	U	1450	µg/l	1.0	[A] 1.0	[A] 3.5
Boron (Dissolved)	U	1450	µg/l	20	[A] 22	[A] 24
Cadmium (Dissolved)	U	1450	µg/l	0.080	[A] 0.15	[A] < 0.080
Copper (Dissolved)	U	1450	µg/l	1.0	[A] 1.5	[A] < 1.0
Iron (Dissolved)	N	1450	µg/l	20	95	83
Mercury (Dissolved)	U	1450	µg/l	0.50	[A] < 0.50	[A] < 0.50
Manganese (Dissolved)	U	1450	µg/l	1.0	[A] 54	[A] 19000
Nickel (Dissolved)	U	1450	µg/l	1.0	[A] 2.5	[A] 5.5
Lead (Dissolved)	U	1450	µg/l	1.0	[A] < 1.0	[A] < 1.0
Selenium (Dissolved)	U	1450	µg/l	1.0	[A] 2.1	[A] 2.0
Zinc (Dissolved)	U	1450	µg/l	1.0	[A] 4.0	[A] 3.5
Chromium (Total)	N	1450	µg/l	1.0	[A] 7.6	[A] 2.7
Total Organic Carbon	U	1610	mg/l	2.0	< 2.0	5.5
Aliphatic TPH >C5-C6	N	1675	µg/l	0.10	[A] < 0.10	[A] < 0.10
Aliphatic TPH >C6-C8	N	1675	µg/l	0.10	[A] < 0.10	[A] < 0.10
Aliphatic TPH >C8-C10	N	1675	µg/l	0.10	[A] < 0.10	[A] < 0.10
Aliphatic TPH >C10-C12	N	1675	µg/l	0.10	[A] < 0.10	[A] < 0.10
Aliphatic TPH >C12-C16	N	1675	µg/l	0.10	[A] < 0.10	[A] < 0.10
Aliphatic TPH >C16-C21	N	1675	µg/l	0.10	[A] < 0.10	[A] < 0.10
Aliphatic TPH >C21-C35	N	1675	µg/l	0.10	[A] < 0.10	[A] < 0.10
Aliphatic TPH >C35-C44	N	1675	µg/l	0.10	[A] < 0.10	[A] < 0.10
Total Aliphatic Hydrocarbons	N	1675	µg/l	5.0	[A] < 5.0	[A] < 5.0
Aromatic TPH >C5-C7	N	1675	µg/l	0.10	[A] < 0.10	[A] < 0.10
Aromatic TPH >C7-C8	N	1675	µg/l	0.10	[A] < 0.10	[A] < 0.10
Aromatic TPH >C8-C10	N	1675	µg/l	0.10	[A] < 0.10	[A] < 0.10
Aromatic TPH >C10-C12	N	1675	µg/l	0.10	[A] < 0.10	[A] < 0.10
Aromatic TPH >C12-C16	N	1675	µg/l	0.10	[A] < 0.10	[A] < 0.10
Aromatic TPH >C16-C21	N	1675	µg/l	0.10	[A] < 0.10	[A] < 0.10
Aromatic TPH >C21-C35	N	1675	µg/l	0.10	[A] < 0.10	[A] < 0.10
Aromatic TPH >C35-C44	N	1675	µg/l	0.10	[A] < 0.10	[A] < 0.10
Total Aromatic Hydrocarbons	N	1675	µg/l	5.0	[A] < 5.0	[A] < 5.0
Total Petroleum Hydrocarbons	N	1675	µg/l	10	[A] < 10	[A] < 10
Naphthalene	U	1700	µg/l	0.10	[A] < 0.10	[A] < 0.10
Acenaphthylene	U	1700	µg/l	0.10	[A] < 0.10	[A] < 0.10

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Results - Water

Project: Balbriggan

Client: IGSL			Chemtest Job No.:		20-01125	20-01125
Quotation No.:			Chemtest Sample ID.:		953446	953447
			Sample Location:		BH02	BH04
			Sample Type:		WATER	WATER
Determinand	**Accred.**	**SOP**	**Units**	**LOD**		
Acenaphthene	U	1700	µg/l	0.10	[A] < 0.10	[A] < 0.10
Fluorene	U	1700	µg/l	0.10	[A] < 0.10	[A] < 0.10
Phenanthrene	U	1700	µg/l	0.10	[A] < 0.10	[A] < 0.10
Anthracene	U	1700	µg/l	0.10	[A] < 0.10	[A] < 0.10
Fluoranthene	U	1700	µg/l	0.10	[A] < 0.10	[A] < 0.10
Pyrene	U	1700	µg/l	0.10	[A] < 0.10	[A] < 0.10
Benzo[a]anthracene	U	1700	µg/l	0.10	[A] < 0.10	[A] < 0.10
Chrysene	N	1700	µg/l	0.10	[A] < 0.10	[A] < 0.10
Benzo[b]fluoranthene	U	1700	µg/l	0.10	[A] < 0.10	[A] < 0.10
Benzo[k]fluoranthene	U	1700	µg/l	0.10	[A] < 0.10	[A] < 0.10
Benzo[a]pyrene	U	1700	µg/l	0.10	[A] < 0.10	[A] < 0.10
Indeno(1,2,3-c,d)Pyrene	U	1700	µg/l	0.10	[A] < 0.10	[A] < 0.10
Dibenz(a,h)Anthracene	U	1700	µg/l	0.10	[A] < 0.10	[A] < 0.10
Benzo[g,h,i]perylene	U	1700	µg/l	0.10	[A] < 0.10	[A] < 0.10
Total Of 16 PAH's	N	1700	µg/l	2.0	[A] < 2.0	[A] < 2.0
Benzene	U	1760	µg/l	1.0	[AC] < 1.0	[AC] < 1.0
Toluene	U	1760	µg/l	1.0	[AC] < 1.0	[AC] < 1.0
Ethylbenzene	U	1760	µg/l	1.0	[AC] < 1.0	[AC] < 1.0
m & p-Xylene	U	1760	µg/l	1.0	[AC] < 1.0	[AC] < 1.0
o-Xylene	U	1760	µg/l	1.0	[AC] < 1.0	[AC] < 1.0
Methyl Tert-Butyl Ether	N	1760	µg/l	1.0	[AC] < 1.0	[AC] < 1.0

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Deviations

In accordance with UKAS Policy on Deviating Samples TPS 63. Chemtest have a procedure to ensure 'upon receipt of each sample a competent laboratory shall assess whether the sample is suitable with regard to the requested test(s)'. This policy and the respective holding times applied, can be supplied upon request.The reason a sample is declared as deviating is detailed below. Where applicable the analysis remains UKAS/MCERTs accredited but the results may be compromised.

Sample:	Sample Ref:	Sample ID:	Sample Location:	Sampled Date:	Deviation Code(s):	Containers Received:
953446			BH02		AC	Coloured Winchester 1000ml
953447			BH04		AC	Coloured Winchester 1000ml

Chemtest
The right chemistry to deliver results

Test Methods

SOP	Title	Parameters included	Method summary
1010	pH Value of Waters	pH	pH Meter
1020	Electrical Conductivity and Total Dissolved Solids (TDS) in Waters	Electrical Conductivity and Total Dissolved Solids (TDS) in Waters	Conductivity Meter
1030	Total Suspended Solids	Total suspended solids	Filtration of a mixed sample through a standard glass fibre filter and determination of the mass of residue retained dried at 105°C.
1150	Dissolved Oxygen	Dissolved Oxygen (DO)	Electrometric determination (on site preferred), using oxygen sensitive membrane electrode.
1415	Cations in Waters by ICP-MS	Sodium; Potassium; Calcium; Magnesium	Direct determination by inductively coupled plasma - mass spectrometry (ICP-MS).
1450	Metals in Waters by ICP-MS	Metals, including: Antimony; Arsenic; Barium; Beryllium; Boron; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Tin; Vanadium; Zinc	Filtration of samples followed by direct determination by inductively coupled plasma mass spectrometry (ICP-MS).
1610	Total/Dissolved Organic Carbon in Waters	Organic Carbon	TOC Analyser using Catalytic Oxidation
1675	TPH Aliphatic/Aromatic split in Waters by GC-FID(cf. Texas Method 1006 / TPH CWG)	Aliphatics: >C5–C6, >C6–C8, >C8– C10, >C10–C12, >C12–C16, >C16–C21, >C21–C35, >C35– C44Aromatics: >C5–C7, >C7–C8, >C8– C10, >C10–C12, >C12–C16, >C16– C21, >C21– C35, >C35– C44	Pentane extraction / GCxGC FID detection
1700	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Waters by GC-FID	Acenaphthene; Acenaphthylene; Anthracene; Benzo[a]Anthracene; Benzo[a]Pyrene; Benzo[b]Fluoranthene; Benzo[ghi]Perylene; Benzo[k]Fluoranthene; Chrysene; Dibenz[ah]Anthracene; Fluoranthene; Fluorene; Indeno[123cd]Pyrene; Naphthalene; Phenanthrene; Pyrene	Dichloromethane extraction / GC-FID (GC-FID detection is non-selective and can be subject to interference from co-eluting compounds)
1760	Volatile Organic Compounds (VOCs) in Waters by Headspace GC-MS	Volatile organic compounds, including BTEX and halogenated Aliphatic/Aromatics. (cf. USEPA Method 8260)	Automated headspace gas chromatographic (GC) analysis of water samples with mass spectrometric (MS) detection of volatile organic compounds.

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The right chemistry to deliver results

Report Information

Key

U	UKAS accredited
M	MCERTS and UKAS accredited
N	Unaccredited
S	This analysis has been subcontracted to a UKAS accredited laboratory that is accredited for this analysis
SN	This analysis has been subcontracted to a UKAS accredited laboratory that is not accredited for this analysis
T	This analysis has been subcontracted to an unaccredited laboratory
I/S	Insufficient Sample
U/S	Unsuitable Sample
N/E	not evaluated
<	"less than"
>	"greater than"

Comments or interpretations are beyond the scope of UKAS accreditation
The results relate only to the items tested
Uncertainty of measurement for the determinands tested are available upon request
None of the results in this report have been recovery corrected
All results are expressed on a dry weight basis
The following tests were analysed on samples as received and the results subsequently corrected to a dry weight basis TPH, BTEX, VOCs, SVOCs, PCBs, Phenols
For all other tests the samples were dried at < 37°C prior to analysis
All Asbestos testing is performed at the indicated laboratory
Issue numbers are sequential starting with 1 all subsequent reports are incremented by 1

Sample Deviation Codes

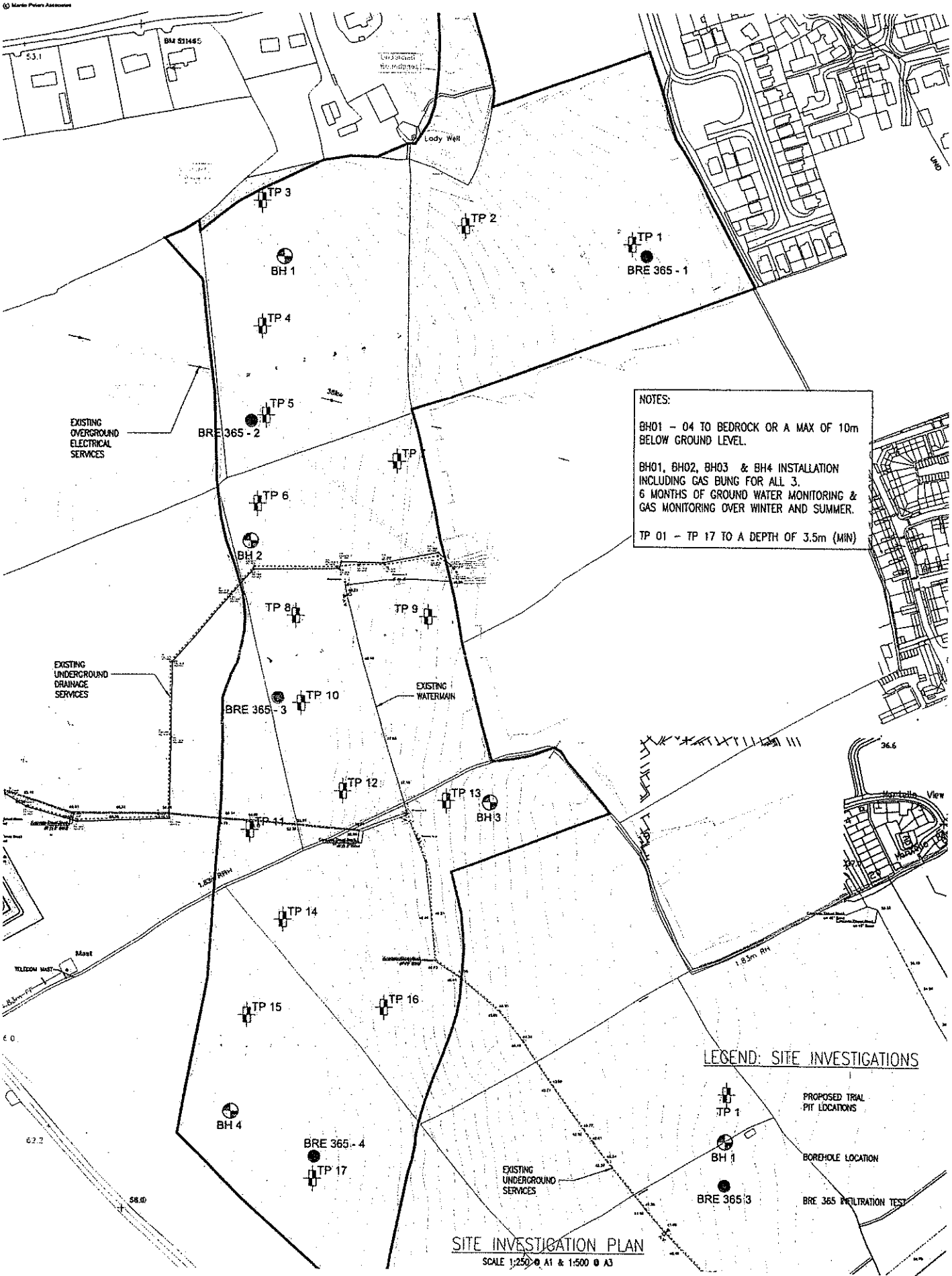
A - Date of sampling not supplied
B - Sample age exceeds stability time (sampling to extraction)
C - Sample not received in appropriate containers
D - Broken Container
E - Insufficient Sample (Applies to LOI in Trommel Fines Only)

Sample Retention and Disposal

All soil samples will be retained for a period of 45 days from the date of receipt
All water samples will be retained for 14 days from the date of receipt
Charges may apply to extended sample storage

If you require extended retention of samples, please email your requirements to:
customerservices@chemtest.com

Appendix V Site Plan



SITE INVESTIGATION PLAN

SCALE 1:250 @ A1 & 1:500 @ A3

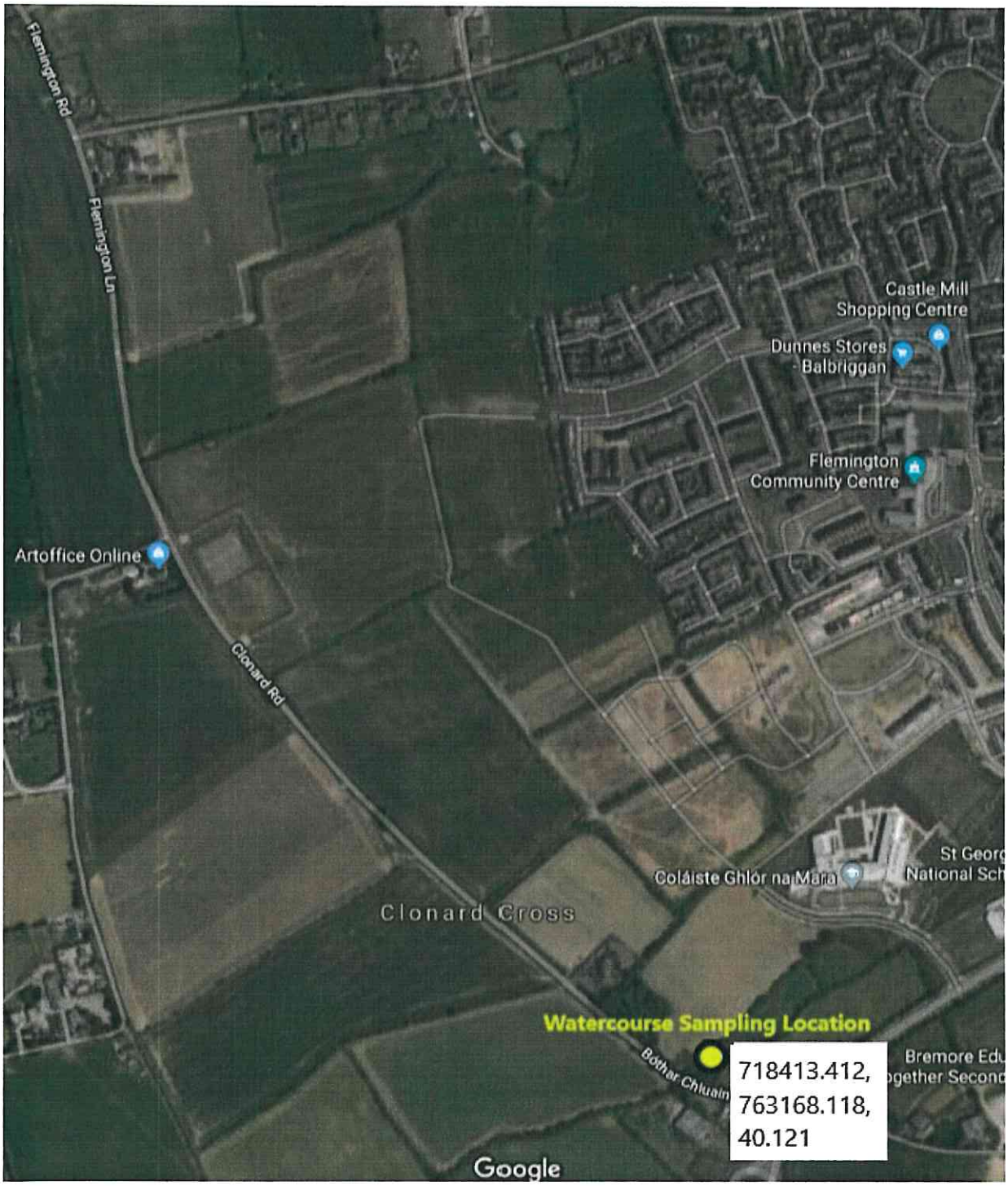
CLIENT: MALINCROSS LTD

PROJECT: PROPOSED RESIDENTIAL DEVELOPMENT, BALBRIGGAN, CO. DUBLIN

DRG. TITLE: SITE INVESTIGATIONS

DRG. No.: 191004-SK-009-REV 1 SCALE: A3 - 1: 25000 DATE: 03/05/19

Martin Peters Associates
Consulting Engineers
Ormonde Road, Kilkenny| T: +353 56 7702751| F: +353 56 7760728| E: info@mpa.ie | W: www.mpa.ie


Flemington Rd
Flemington Ln
Castle Mill
Shopping Centre
Dunnes Stores
- Balbriggan
Flemington
Community Centre
Artoffice Online
Clonard Rd
Coláiste Ghlór na Mara
Clonard Cross
Watercourse Sampling Location
Bothar Chluain
718413.412,
763168.118,
40.121
Google

APPENDIX 7.1

Proposed Development Masterplan Drawing

85 Merrion Square, Dublin 2, D02 FX60
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Phase 3
Hampton Park North
128 Units + Creche

Phase 2
Class 1 Open Space

Phase 4
Flemington Park
137 Units + Creche

Phase 1
Tanner's Lane
54 Units

Phase 1
Hampton Park Central
142 Units + Creche

Phase 2
Hampton Park South
103 Units

Phase 1
Naul Road Junction

Grass pitch

Reservoir

Pond

Pond

Spring

Clonard Road

Flemington Park

Flemington Park

Hastings Close

Barons Hall Grove

Taylor Hill

SITE BOUNDARY

718038 E
763270 N

N

Phase 1	***Hampton Park Central***	***142 Units + Creche***
Phase 1	***Tanner's Lane***	***54 Units***
Phase 2	***Hampton Park South***	***103 Units***
Phase 4	***Hampton Park North***	***128 Units + Creche***
Phase 5	***Flemington Park***	***137 Units + Creche***
Total No.		***564 Units + 3 No. Creches***

OS Sheet Reference **2583-A, 2583-B, 2583-D**

ITN co-ords; **718,139; 763,374**
Ordnance Survey Licence Number **CYAL5031744**
Ordnance Survey Ireland, 2023

FURTHER INFORMATION

PROJECT TITLE:	Proposed Residential Development at Balbriggan Balbriggan, Co Dublin		
DRAWING TITLE:	Phasing Diagram		
PROJECT NO:	1902	DATE:	Oct 2023
SCALE:	1:3000 @A3	DRAWN BY:	
FILE NAME:	1902-FA-ZZ-00-M2-SITE-0025	CHECKED BY:	RC
DRAWING NO:	1902-SITE-0519-A	REVISION:	-

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APPENDIX 7.2

Balbriggan Groundwater Body – Summary of Initial Characterisation

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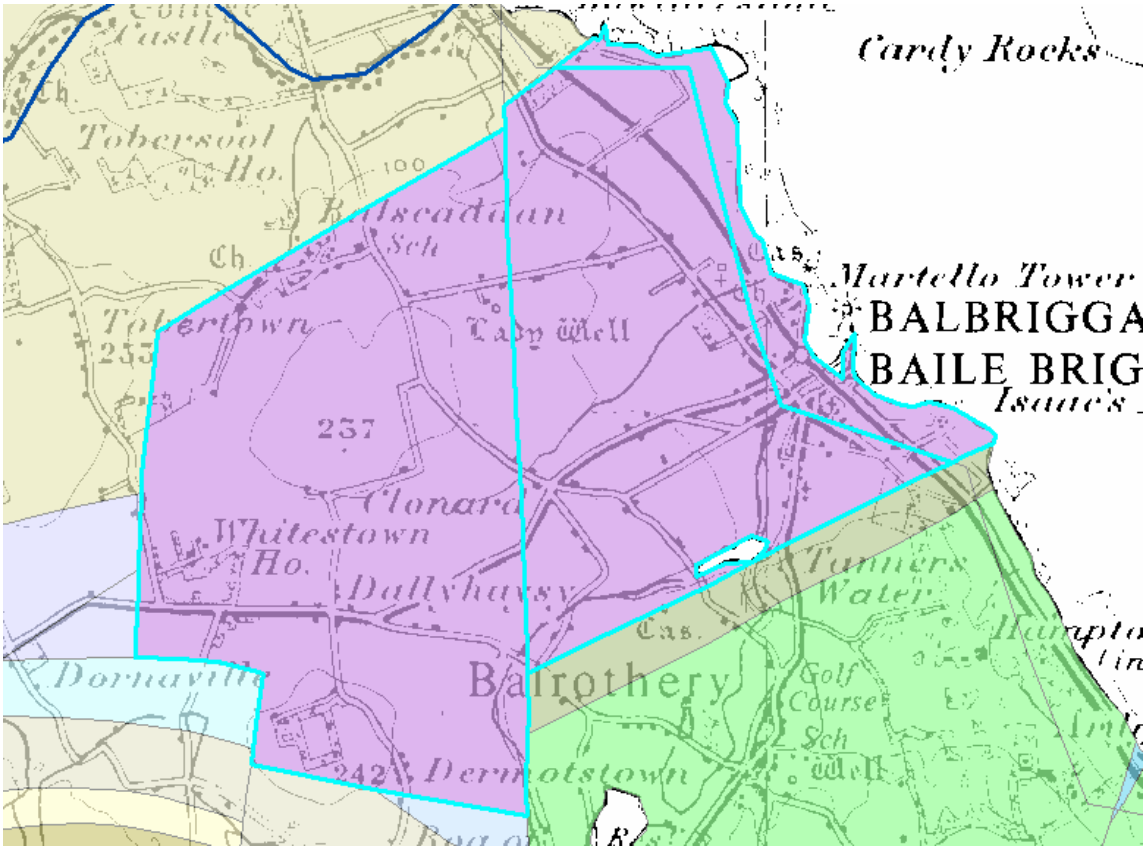
Balbriggan GWB: Summary of Initial Characterisation.

Hydrometric Area Local Authority	Associated surface water bodies	Associated terrestrial ecosystems	Area (km^2)
Dublin Co. Co. Hydrometric Area 08	Some small streams	None	16

Topography		This GWB is located in northern County Dublin around Balbriggan. The topography of the area slopes towards the coast with some small hills which act as sub-catchment divides.
Geology and Aquifers	Aquifer type(s) Main aquifer lithologies	**Lm:** Locally important aquifer, generally moderately productive Ordovician Volcanic Rocks.
	Key structures.	The dominant structural feature is the Balbriggan Inlier that contains faulting of approximate north-south and northeast-southwest trends. Evidence suggests that the faulting along the southern boundary of the GWB has intensely deformed the rocks in this area, which may lead to local areas of more permeable rocks.
	Key properties	Pumping tests in the Ordovician volcanic rocks at Balbriggan (Belcamp Formation) have shown this formation to have higher transmissivity than the surrounding Lower Paleozoic rocks (Cullen 1994). Estimated values of transmissivity are between 20 and 30 m^2/d. Similar instances of permeable volcanic rocks are known in Wexford and Limerick.
	Thickness	The majority of groundwater flow is expected to occur in the upper weathered zone (typically around 3 m thick). Drilling evidence suggests that there is deep groundwater flow occurring through fractures in the aquifer to depths of 20 m below the top of the rock.
Overlying Strata	Lithologies	There are a complex variety of subsoil lithologies in this area. The dominant type of subsoil is till: Irish Sea till in the east, which is surrounded in places by till derived from Lower Paleozoic rocks. These become less prevalent in the west where limestone-derived tills are more common.
	Thickness	The subsoil thickness is influenced by the topography, with tills thin or absent on the hills and thicker subsoils found between these hills and the coast, with subsoil thinning out towards the coast.
	% Area aquifer near surface	There are some small areas of exposure in the centre of the body.
	Vulnerability	There is currently no vulnerability mapping available for Dublin. However, there is an old (1979) map of subsoil thickness.
Recharge	Main recharge mechanisms	The primary process for recharge to enter the aquifer is by diffuse recharge. The most recharge will occur in areas of thin and/or permeable subsoils in the central area of the GWB where there is a topographic high. There is a low drainage density in this area, which may suggest a significant proportion of the effective rainfall recharges the aquifer.
	Est. recharge rates	*[Information to be added at a later date]*
Discharge	Springs and large known abstractions	There are high yielding wells in the Ordovician volcanic rocks near Balbriggan. Pumping tests indicate that wells in this area are capable of supplying up to 900 m^3/d. It is likely that in the near future a well in the Limestone to the south of this GWB may be used for public supply by Fingal Co. Co. Until long term monitoring is in place it is uncertain if this will have any impact on this GWB.
	Main discharge mechanisms	This aquifer will discharge to the overlying rivers and streams in the area as baseflow. There may be some transfer of groundwater to the limestones in the south, which may increase in the future if large scale pumping of the limestone aquifer is commenced. The GWB will also discharge directly to the Irish Sea in some areas.
	Hydrochemical Signature	Analysis of a trial well in the volcanics at Stephenstown, near Balbriggan, indicates moderately hard water with electrical conductivity vales of around 496 µS/cm. The data indicate a calcium bicarbonate signature.
Groundwater Flow Paths		The majority of groundwater flow in this area is considered to take place in the upper weathered zone of the aquifer. Groundwater will flow from the recharge mounds in the center of the body towards the coast and also to adjacent GWBs. Flow paths are not considered to extend further than the nearest surface water feature and will generally not be greater than 500 m. There is evidence of confined groundwater flow in the southern area of the GWB, at Stephenstown, where standing water levels in the rock rise above the top of the bedrock into the thick till that overlies this area.
Groundwater & surface water interactions		The drainage density is quite low in the centre of this body, which suggests that in this area, which is elevated and has thinner subsoil (as indicated by the location of outcrops in the area) there is a higher rate of recharge and little runoff. Away from this central high there is evidence to suggest that the subsoil thickness increases and there is the emergence of surface channels. The GWB is mostly surrounded by Lower Paleozoic rocks, which are of lower permeability and will act as a barrier to groundwater flow. Hence this may cause groundwater to be forced to the surface along this geological boundary, facilitating the development of surface water streams along this boundary.

Conceptual model	This GWB is located in northern county Dublin around Balbriggan. The topography of the area slopes towards the coast with some small hills contained within the GWB, which act as sub-catchment level drainage divides. The GWB is composed primarily of moderate permeability rocks, with localized zones of enhanced permeability. The extent of the GWB is defined by the location of the volcanic rocks around Balbriggan. The small areas of volcanic rocks may have a higher permeability. Recharge occurs diffusely through the subsoils and via outcrops. The aquifers within the GWB are generally unconfined, but they may be locally confined where the subsoil is thicker and/or less permeable. Most flow in this aquifer will occur in a zone near the surface. In general, majority of groundwater flow occurs in the upper 30 m, comprising a weathered zone of a few metres and a connected fractured zone below this. However, deep-water strikes in more isolated faults/ fractures can be encountered. Flow path lengths are relatively short, and in general are between 30 and 300 m. Groundwater discharges to the numerous small streams crossing the aquifer and also directly to the coast.
Attachments	
Instrumentation	Stream gauge: None Borehole Hydrograph: None EPA Representative Monitoring boreholes: None
Information Sources	K.T. Cullen & Co Ltd (1994) *Report on the Hydrogeological Investigation at the Bog of the Ring*. North County Dublin Groundwater Project. McConnell B, Philcox M & Geraghty M, 2001. *Geology of Meath: A geological description to accompany the bedrock geology 1:100,000 scale map series, Sheet 13,* Geological Survey of Ireland. 77 p.
Disclaimer	Note that all calculation and interpretations presented in this report represent estimations based on the information sources described above and established hydrogeological formulae

Formation Name	Code	Description	Rock Unit Group	Aquifer Classification
Belcamp Formation	BP	Andesite, pillow breccia, mudstone, tuff	Ordovician Volcanics	Pl



APPENDIX 7.3

OPW Coastal Flood Map - Balbriggan Tile 06

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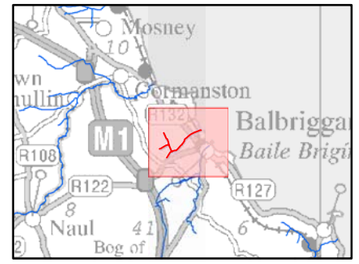
N

Fluvial flooding may also occur within the area shown on this map. Please refer to the fluvial flood extent map. Figure No. BNS/HPW/EXT/CURS/001

0.2 0.1 0 0.2
Kilometres

Location Plan :



EXTENT MAP

Legend:

- 10 % AEP Flood Extent (1 in 10 chance in any given year)
- 0.5 % AEP Flood Extent (1 in 200 chance in any given year)
- 0.1 % AEP Flood Extent (1 in 1000 chance in any given year)
- Defended area
- High Confidence (<20m) (10% AEP)
- Medium Confidence (<40m) (10% AEP)
- Low Confidence (> 40m) (10% and 0.1% AEP)
- High Confidence (<20m) (0.5% AEP)
- Medium Confidence (<40m) (0.5% AEP)
- Low Confidence (>40m) (0.5% AEP)
- Estimate route of existing drain
- Node Point
- 21Ma237 Node label with level data (refer to table)
- 21Ma237 Node level with flow & level data (refer to table)

High confidence
Medium confidence
Low confidence
refer to table

USER NOTE :

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Clients :

Fingal County Council
Meath County Council
OPW

Project :
FEM FRAMS

Map : BALBRIGGAN NORTH STREAM MODEL
FLOOD EXTENT MAP

Map Type :	FLOOD EXTENT
Source :	TIDAL FLOODING
Map area :	HIGH PRIORITY WATERCOURSE
Scenario :	CURRENT

Figure By :	Mara Ruiz	Date : 17 January 2011
Checked By :	Sergio Herbón	Date : 17 January 2011
Approved By :	Clare Dewar	Date : 17 January 2011

Figure No. : BNS/HPW/EXT/CURS/T/001
Revision 1

Drawing Scale : 1:10,000
Plot Scale : 1:1 @ A3

APPENDIX 7.4

OPW Fluvial Flood Map – Balbriggan Tile 06

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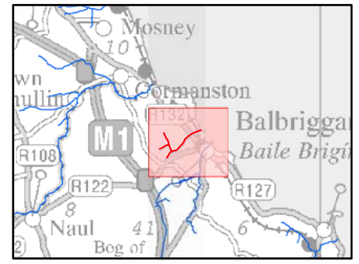
Tidal flooding may also occur within the area shown on this map. Please refer to the tidal flood extent map. Figure No. BNS/HPW/EXT/CURS/T/001

0.2 0.1 0 0.2
Kilometres

Location Plan :



EXTENT MAP

Legend:

- 10 % AEP Flood Extent (1 in 10 chance in any given year)
- 1 % AEP Flood Extent (1 in 100 chance in any given year)
- 0.1 % AEP Flood Extent (1 in 1000 chance in any given year)
- Defended area
- High Confidence (<20m) (10% AEP)
- Medium Confidence (<40m) (10% AEP)
- Low Confidence (>40m) (10% and 0.1% AEP)
- High Confidence (<20m) (1% AEP)
- Medium Confidence (<40m) (1% AEP)
- Low Confidence (>40m) (1% AEP)
- Estimate route of existing drain
- Node Point
- 21Ma237 Node label with level data (refer to table)
- 21Ma237 Node level with flow & level data (refer to table)

High confidence
Medium confidence
Low confidence
refer to table

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Clients :

Fingal County Council
Meath County Council
OPW

Project :
FEM FRAMS

Map : BALBRIGGAN NORTH STREAM MODEL
FLOOD EXTENT MAP

Map Type :	FLOOD EXTENT	
Source :	FLUVIAL FLOODING	
Map area :	HIGH PRIORITY WATERCOURSE	
Scenario :	CURRENT	
Figure By :	Mara Ruiz	Date : 8 August 2010
Checked By :	Sergio Herbón	Date : 8 August 2010
Approved By :	Clare Dewar	Date : 8 August 2010

Figure No. : BNS/HPW/EXT/CURS/001
Revision 0

Drawing Scale : 1:10,000
Plot Scale : 1:1 @ A3

APPENDIX 12.1

Traffic and Transport Assessment Report (Reference: 191004-TTA01)

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DEAN SWIFT PROPERTY HOLDINGS
Housing Development
Balbriggan,
Co. Dublin
Traffic and Transport Assessment Report (TTA01)

September 2021

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For and on behalf of
MPA Consulting Engineers

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DOCUMENT CONTROL SHEET

	Client	Dean Swift Property Holdings							
	Project Title	Housing Development							
	Project Ref.	191004							
	Document Title	Traffic and Transport Assessment Report							
	Document No.	191004-TAR01							
	This Document Comprises	DCS	TOC	LOT	LOG	LOF	LOD	Text	Appendices
		1	2	1	-	2	-	57	21
	Check								

Revision	Status	Author	Reviewed By	Approved By	Issue Dates
D01	Draft	BJC	MJP	MJP	04.08.2021
D02	Draft	BJC	MJP	MJP	14.09.2021
F01	**Final**	**BJC**	**MJP**	**MJP**	**23.09.2021**

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1 INTRODUCTION

1.1 Brief

1.1.1 MPA Consulting Engineers have been commissioned by Dean Swift Property Holdings (DSPH) to undertake a Traffic and Transport Assessment (TTA) for the proposed Housing Development in Balbriggan, County Dublin.

1.1.2 The location of the proposal is shown in **Figure 1.1** below.

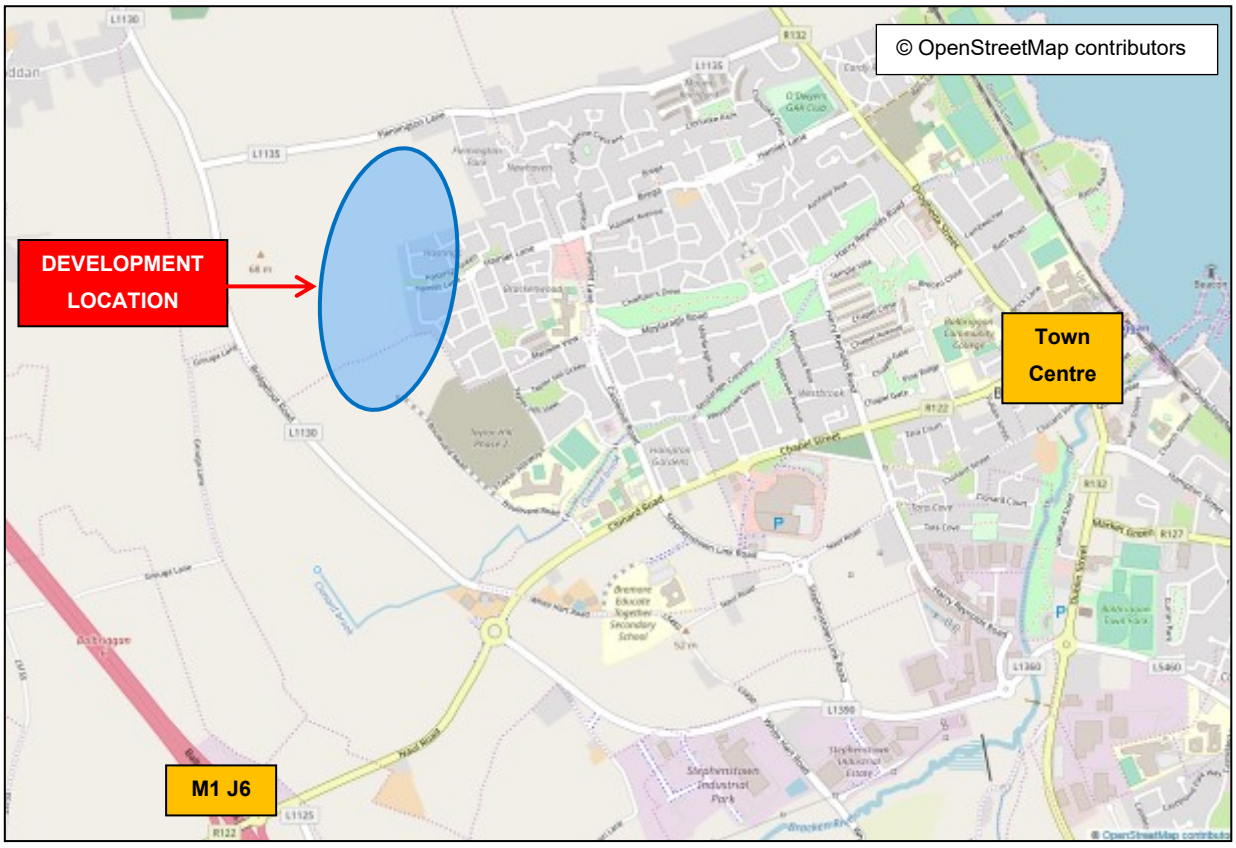

Figure 1.1: Site Location

1.2 Scope

1.2.1 This report has been prepared to assess the traffic and transportation aspects of the development and is structured as follows:

1.2.2 This report assesses the impact of the additional vehicle trips associated with the proposal at key junctions on the routes to/from the site.

1.2.3 The purpose of this Traffic and Transport Assessment Report is to set out the key facts, details and results of assessment work undertaken to identify the potential level of traffic and transport impact generated as a result of the proposed development.

1.2.4 This TTA builds upon preliminary work undertaken in 2018/19 to inform TTA scoping discussions with Fingal County Council (FCC) for proposed development in northwest Balbriggan as a whole.

1.3 Methodology

1.3.1 The approach to the study accords with policy and guidance both at a national and local level. The methodology adopted responds to best practice in addition to current and emerging guidance, exemplified by a series of publications, all of which advocate this method of analysis. Key publications consulted include;

- *'Smarter Travel'* Department of Transport Tourism & Sport (2009)
- '*Traffic & Transport Assessment Guidelines'* Transport Infrastructure Ireland (TII, May 2014).
- '*Design Manual for Urban Roads & Streets'* Department of Transport Tourism & Sport and Department of Environment, Community & Local Government (2012).
- 'Design Manual for Roads & Bridges' TII (2013)

1.3.2 Numerous site visits have been made between 2019 and 2021 to quantify existing road network issues and identify local traffic characteristics.

1.4 Structure of Report

1.4.1 As introduced above, this TTA seeks to set out the potential level of traffic and transport impact generated by the development and subsequently ascertain the existing and future operational performance of the local network. It also identifies the accessibility of the site to local facilities using sustainable modes of transport.

Section 2: Describes the existing conditions on the transportation network within the vicinity of the site.

Section 3: Provides an assessment of the baseline and outlines the committed development in this part of Balbriggan.

Section 4: Provides a summary of the existing accessibility of the site by non-car modes of travel.

Section 5: Outlines the relevant characteristics of the proposed redevelopment.

Section 6: Details the access arrangements and transport infrastructure proposed to serve the site.

Section 7: Estimates the number of additional trips that would be generated by the proposed development and identifies where these trips would be travelling to and from.

Section 8: Accesses the impact of these additional trips upon the surrounding transport network.

Section 9: Identifies the Smarter Travel initiatives and measures that could be delivered as part of the development.

Section 10: Presents a summary of the report and identifies the main conclusions that can be drawn.

2 EXISTING CONDITIONS

2.1 Site Location

2.1.1 The proposed site is located on the western side of Balbriggan, the proposed residential site measures some 18.9 hectares as shown in **Figure 2.1** below and the Class 1 park measures some 2.9 hectares.

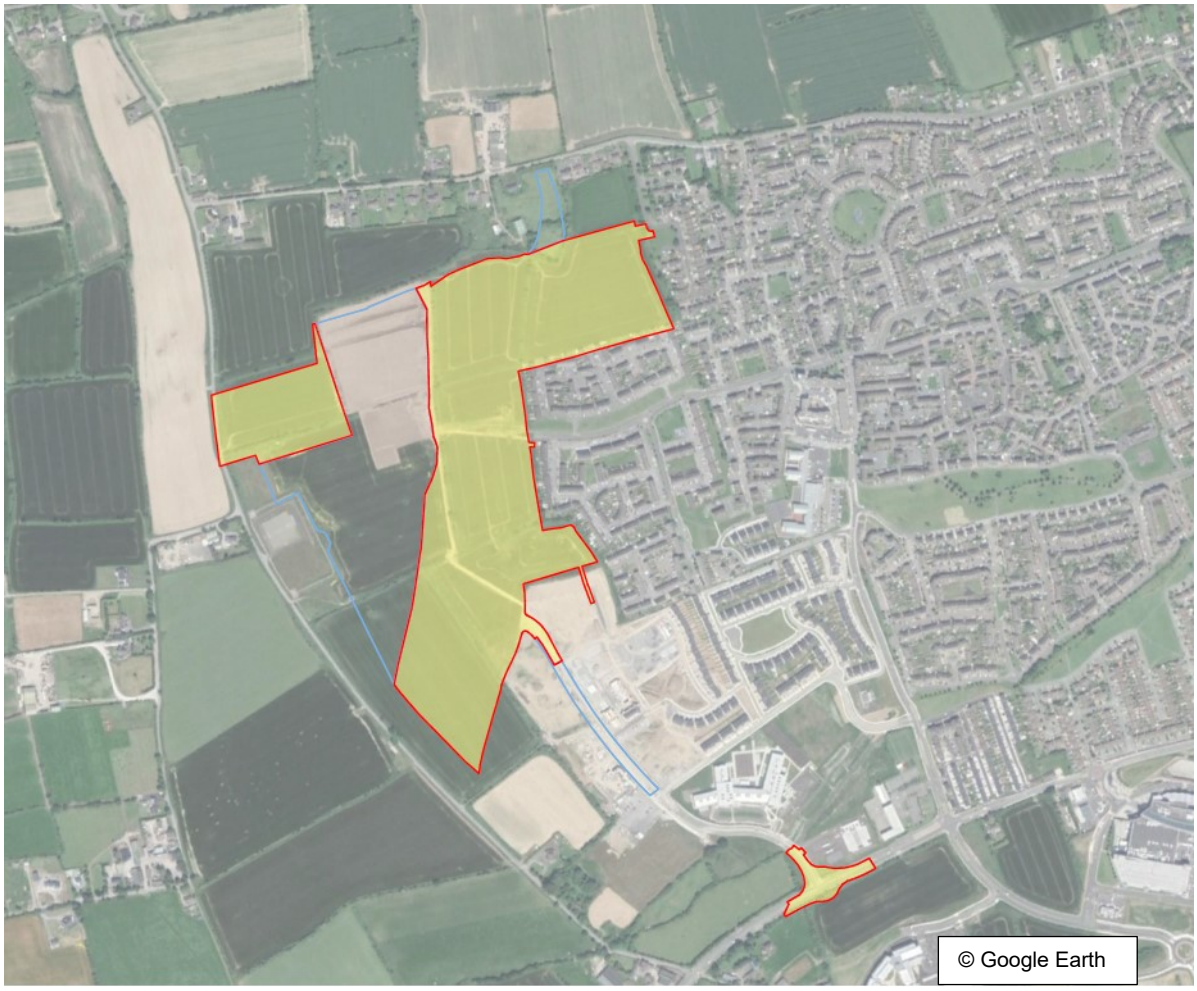

Figure 2.1: Proposed Site Area

2.1.2 The site is approximately 2.0km northwest of the town centre and 1.0km northeast of Junction 6 of the M1 Motorway (Dublin to Belfast).

2.1.3 The site is located north of Clonard Road (the R122) and east of Bridgefoot Road (the L1130) and is bounded by Boulevard Road/the Taylor Hill residential development to the east and zoned lands (North West Balbriggan Masterplan) to the north.

2.1.4 Balbriggan itself is located approximately 30km north of Dublin City in the northern part of the traditional County Dublin (now Fingal) and is home to a population of nearly 22,000 (2016 census).

2.1.5 Balbriggan is well connected due to the proximity of the M1 motorway that links south to the M50/Dublin (and beyond to the rest of the country) and north to Belfast. The main Belfast-Dublin railway line passes through Balbriggan station and several bus routes provide regular links to Dublin City and other local destinations. The accessibility of Balbriggan and the site in particular, is discussed in further detail in Section 4.

2.2 Local Road Network

2.2.1 The local road network is shown in **Figure 2.2** below.

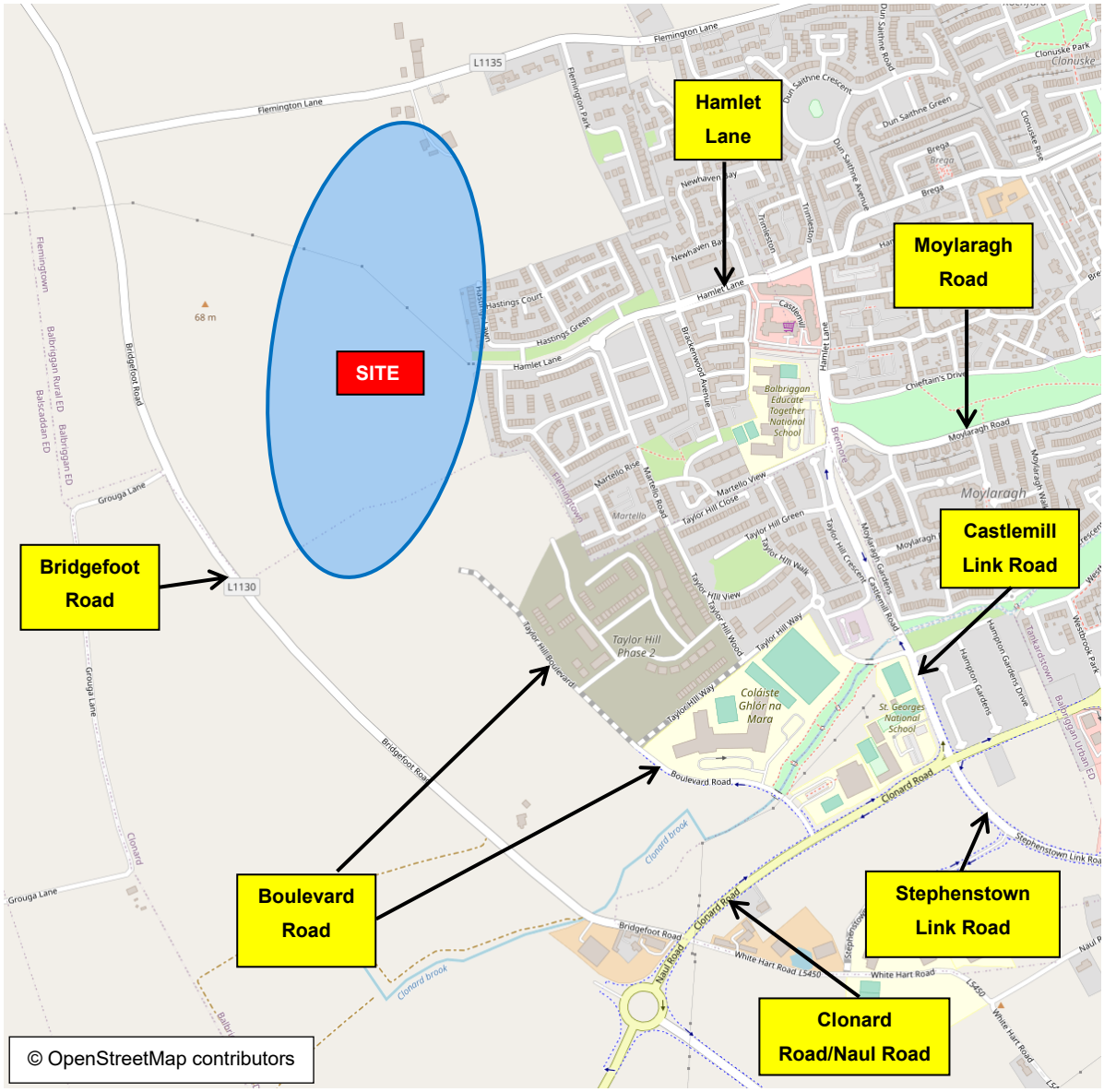

Figure 2.2: Local Road Network

Boulevard Road

2.2.2 Boulevard Road has been constructed over a length of approximately 680m from Clonard Road to a point northwest of the Taylor Hill Phase 2 as shown overleaf in **Figure 2.3**.

2.2.3 Boulevard Road provides a single lane carriageway width of 6.8m with a 2m verge, 1.5m cycleway and 2m footway on both sides.

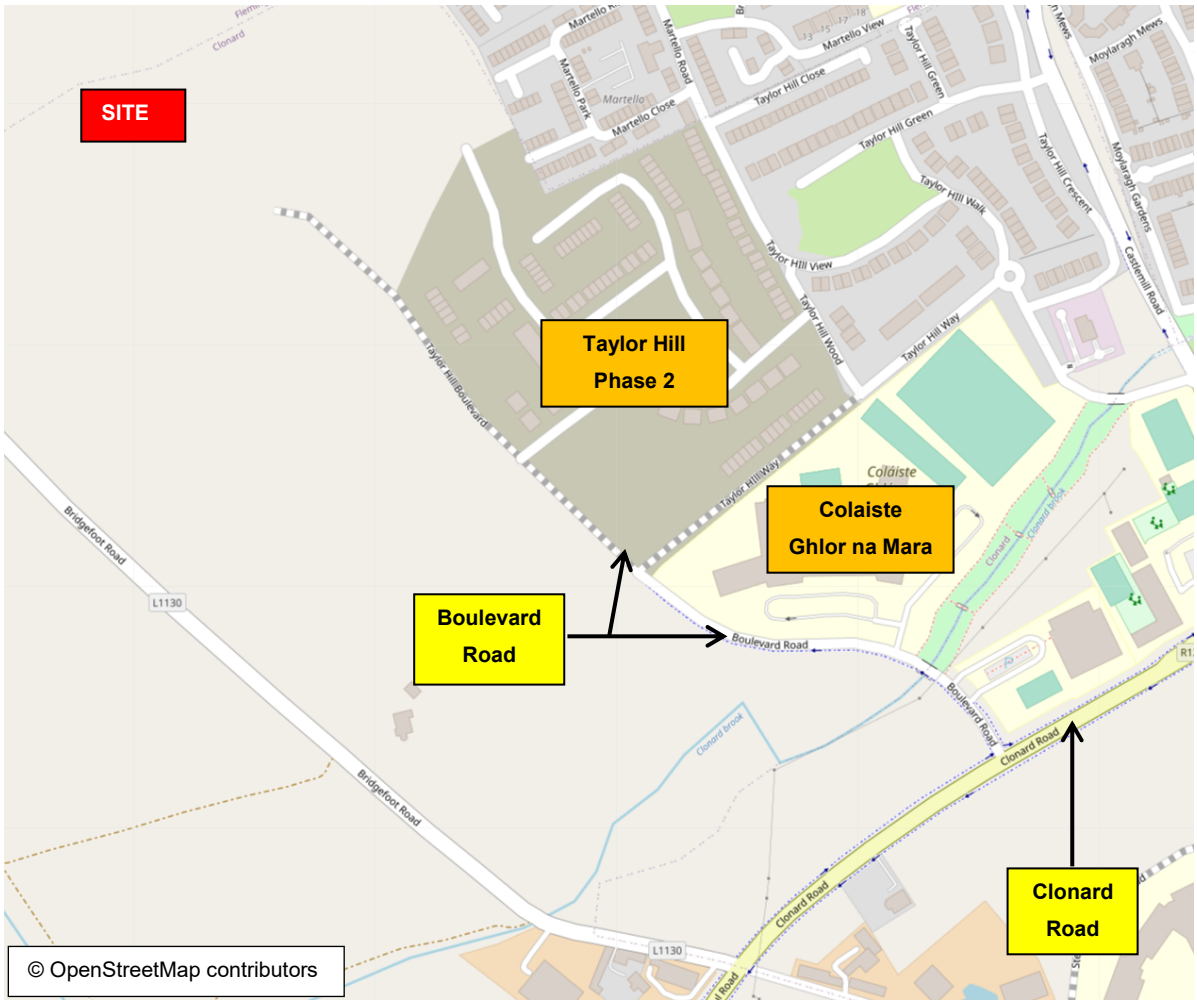

Figure 2.3: Boulevard Road

2.2.4 Boulevard Road continues to the northwest, to serve the proposed development and connect with the proposed Flemington Link Road (FLR), which was formerly referred to as part of the 'C Ring' Road around the northwest of Balbriggan. The future route of the FLR and the wider road hierarchy is shown in **Figure 2.4** overleaf.

2.2.5 Boulevard Road connects to Clonard Road to the south by way of a priority junction as shown in **Figure 2.5** overleaf. Vehicles existing Boulevard Road must presently STOP before entering Clonard Road. There is a separate right turning lane for vehicles turning right into Boulevard Road from Clonard Road.

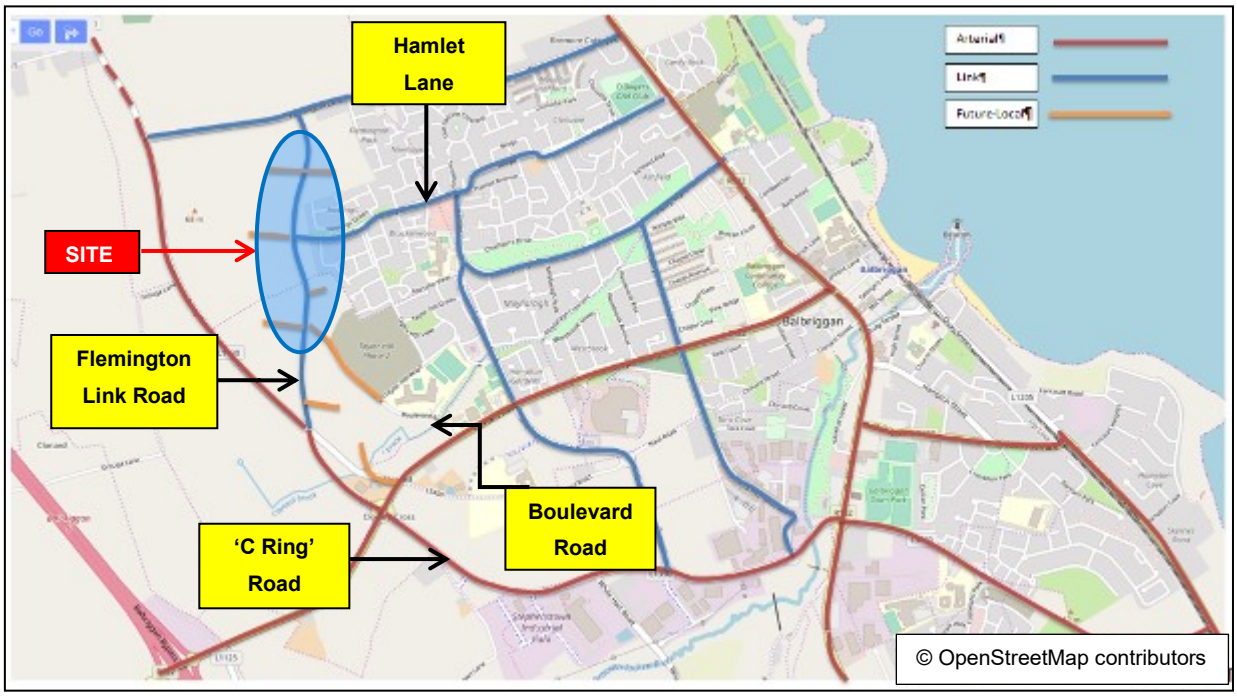

Figure 2.4: Balbriggan Future Road Hierarchy



Figure 2.5: Existing Clonard Road/Boulevard Road Junction

Clonard Road

2.2.6 The R122 provides a link between the M1 and Balbriggan town centre and is known as Clonard Road in the vicinity of Boulevard Road but becomes Naul Road west of Bridgefoot Road.

2.2.7 Naul Road connects to the existing 'C Ring' Road around the southern side of Balbriggan (the L1390) at a large three-armed roundabout as shown in **Figure 2.6** below.



Figure 2.6: Existing Naul Road/L1390 Roundabout

2.2.8 A fourth arm has been created that is intended to connect to the FLR ('C Ring' Road) when the North West Balbriggan Masterplan area is delivered as shown in **Figure 2.6** above.

2.2.9 The R122 Naul Road / Clonard Road provides a single lane in each direction and is widened at several key junctions along its route, which are provided as both traffic signals and roundabouts.

2.2.10 There is a footway/cycleway along both sides of the R122 between the Naul Road roundabout (in the west) and the junction with Harry Reynolds Road (in the east) where it becomes Chapel Street.

Castlemill Link Road

2.2.11 Castlemill Link Road runs north-south from Clonard Road and provides access to the existing residential areas of northwest Balbriggan (Moylaragh, Westbrook and Taylor Hill) before becoming The Park at the junction with Moylaragh Road.

2.2.12 The Junction of Clonard Road and the Castlemill Link Road is controlled by traffic signals as shown in **Figure 2.7** below, this junction includes a left turn slip lane from Clonard Road to Castlemill Link Road. The Stephenstown Link Road runs south from this junction to connect with the 'C Ring' Road at the Stephenstown Industrial Estate and also provides a southern access to the Millfield Shopping Centre.



Figure 2.7: Existing Clonard Road/Castlemill Link Road Junction

2.2.13 Castlemill Link Road provides a single lane in each direction and a footway/cycleway on both sides from just north of Moylaragh Road south to Clonard Road.

Hamlet Lane

2.2.14 Hamlet Lane runs east-west from Drogheda Road to the east of Balbriggan, to the development site and provides access to the existing residential areas of northwest Balbriggan (Newhaven, Clonuske and Barnwall Court). There is a 300m stretch of road between Barrons Hall Rise and Clonuske Rise where Hamlet Lane is known as Brega. For the purposes of this report the whole length of road is referred to as Hamlet Lane.

2.2.15 Hamlet Lane is typically over 7.0m wide from the site to its junction with Clonuske Drive and benefits from a footway / cycleway provided along its northern side. A footway and intermittent footway / cycleway are provided on the south side of the carriageway.

2.2.16 Between Clonuske Drive and Drogheda Road, Hamlet Lane is around 5.5m wide with a 1.5m wide footway along its southern side.

Other Existing Local Roads

2.2.17 **Moylaragh Road** extends east-west from Castlemill Link Road and connects with Harry Reynolds Road before joining Drogheda Street (R132) to the north of the town centre. It provides access to an existing residential area.

2.2.18 **Harry Reynolds Road** (HRR) extends east from its junction with Drogheda Road to Moylaragh Road at a three-arm roundabout. From there, HHR heads south to Clonard Road / Chapel Street and continues south to Stephenstown Industrial Estate.

2.2.19 **Bridgefoot Road** (the L1130) runs to the west of Balbriggan from Flemington Lane in the north (and beyond to Balscaddan and Gormanston) to the R122 Naul Road/Clonard Road in the south.

2.2.20 **Flemington Lane** provides a link across the northern edge of Balbriggan between Bridgefoot Road (in the west) and Drogheda Street (in the east).

Flemington Link Road

2.2.21 The Flemington Link Road (formerly known as the 'C Ring' Road) will provide a new route around the northwest of Balbriggan between Flemington Lane and Naul Road as identified in the Fingal Development Plan 2017 - 2023 as shown below in **Figure 2.8**.

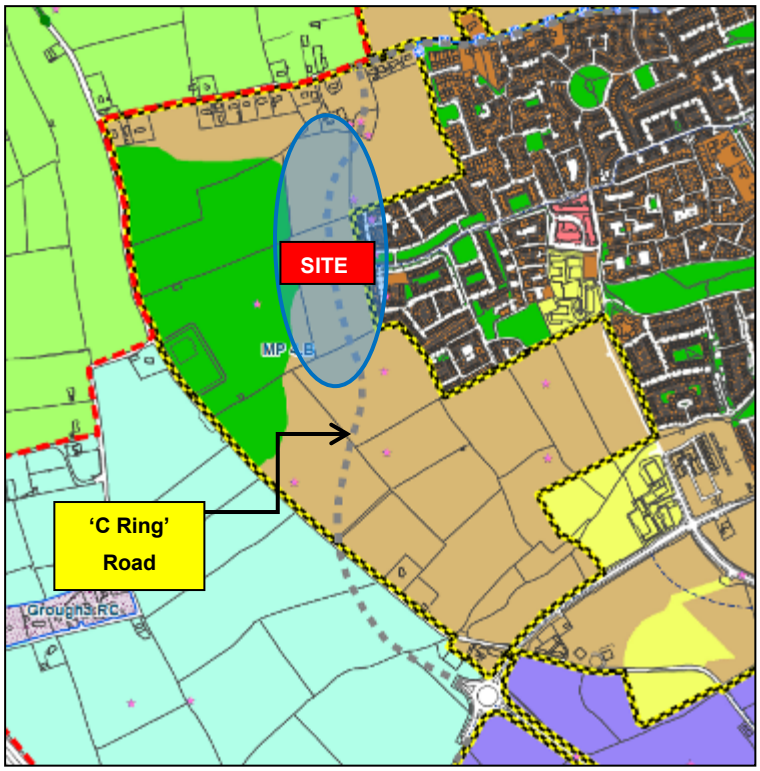

Figure 2.8: Indicative Route of 'C Ring' Road

2.2.22 The C-Ring road is a long standing objective of the County Development Plan (CDP) as part of the development of the lands of North-West Balbriggan. The alignment of the Road runs in a north -south direction from Flemington Lane in the North to the Naul road Roundabout in the south. Part of the southern section of the road is outside the masterplan boundary on unzoned land in third party ownership. It is understood from FCC that it is not envisaged that this road would be delivered by Fingal County Council in the short term and is not included on the Capital Works programme, therefore these proposals include the delivery of those portions of FLR within the site, with allowance for future connections to Flemington Lane & Naul road roundabout in line with the CDP objectives.

2.2.23 This TTA has been framed and prepared in the context that only those portions of the FLR within the site are delivered and the area wide traffic assessment assumes that this portion of the FLR only links to Boulevard Road & Hamlet Lane.

2.3 Traffic Volumes

2.3.1 Nationwide Data Collection (NDC) were instructed by MPA to undertake turning count surveys at six junctions as identified below and shown in green in **Figure 2.9** below.

1. Trimleston/The Rise (W)/Barons Hall Rise/The Rise (E)
2. The Park (N)/The Park (S)/Moylaragh Road

3. Castlemill Link Road (N)/Unnamed Road/Castlemill Link Road (S)/Hampton Gardens Drive
4. Boulevard Road/Clonard Road (W)/Clonard Road (E)
5. Castlemill Link Road/Clonard Road (W)/Unnamed Road/Clonard Road (E)
6. Westbrook Park/Clonard Road/Millfield Shopping Centre/Chapel Street

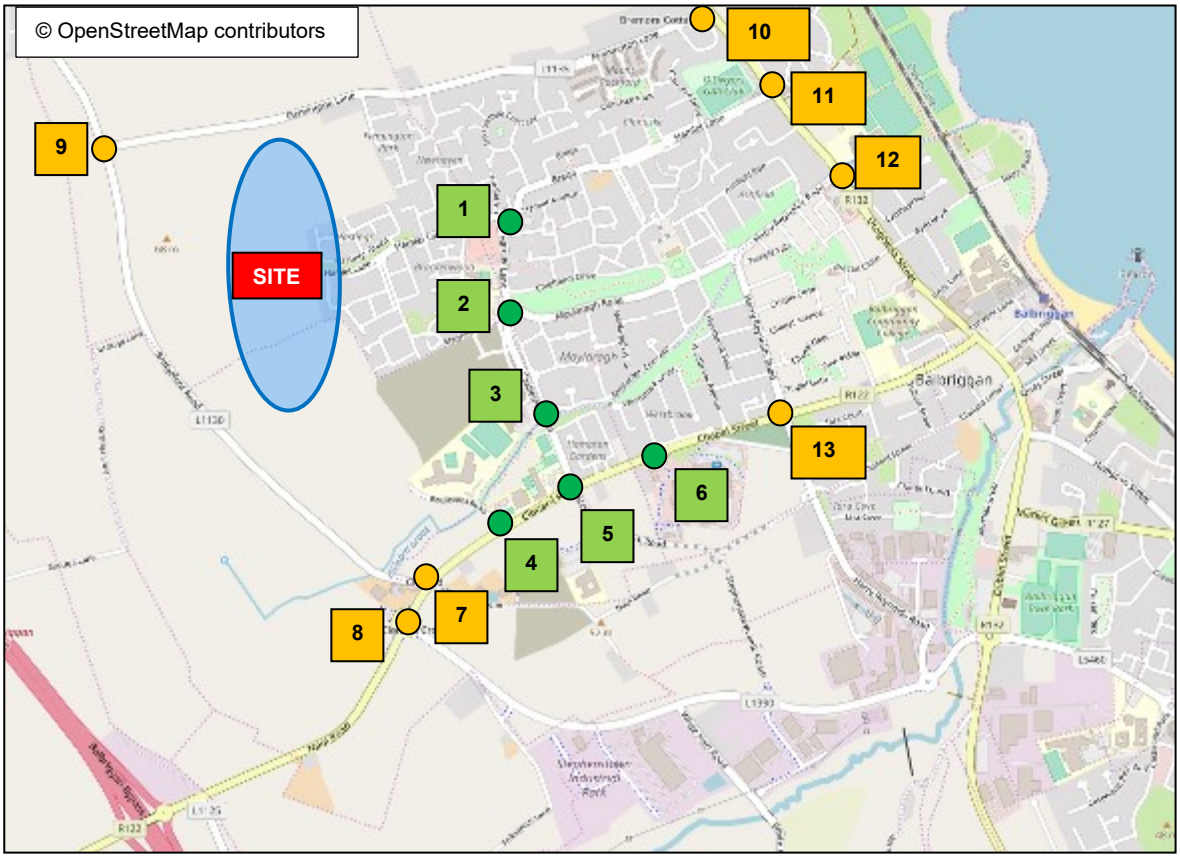

Figure 2.9: Traffic Survey Locations

2.3.2 All sites were surveyed on Wednesday the 28th November 2018 using telescopically mounted video cameras from which the information was subsequently extracted. The survey was carried out with survey hours of 07:00 to 19:00. All information was collected in 15-minute intervals and has been tabulated with both hourly and period totals.

2.3.3 Two-way pedestrian crossing counts were undertaken in 15-minute intervals and tabulated with both hourly and period totals.

2.3.4 The 2018 Traffic Survey results are attached as **Appendix A**

2.3.5 Additional traffic data was obtained from previous studies undertaken by MPA in Balbriggan at seven further junctions as shown marked in orange in **Figure 2.9** and summarised below:

7. Clonard Road / Bridgefoot Road / White Hart Road
8. Clonard Road / Naul Road / L1390
9. Bridgefoot Road / Flemington Lane
10. Drogheda Road / Flemington Lane

11. Drogheda Road / Hamlet Lane
12. Drogheda Road / Harry Reynolds Road
13. Chapel Street / Harry Reynolds Road

2.3.6 This enabled an Area Wide Traffic Model to be built to identify the percentage impact of the proposed development at each of these junctions. This is detailed further in Section 8.

2.3.7 In accordance with the TII's '*Traffic & Transport Assessment Guidelines'* (TTAG), the TTA focusses on the junctions that will experience more than a 5/10% increase due to the traffic associated with the proposed development. In these locations, detailed junction modelling has been undertaken as detailed further in Section 8.

2.4 Accident Analysis

2.4.1 The Road Safety Authority's website has been interrogated to identify the number of collisions/accidents that have occurred along the Clonard Road corridor to the west of the Castlemill Link Road. This reveals that there have been no accidents at Junction 4 (Boulevard Road).

2.4.2 There have been two accidents at Junction 5 (Castlemill Link Road) and further accidents at the Bridgefoot Road junction and Naul Road roundabout as shown below in **Figure 2.10**.

2.4.3 The two accidents at the Castlemill Link Road junction resulted in slight or serious injuries. All injuries at the Bridgefoot Road and Naul Road roundabout resulted in slight injuries.

2.4.4 This is considered to be a low number of accidents over a 12-year period and demonstrates a good safety record on this part of the R122 (Clonard/Naul Road).

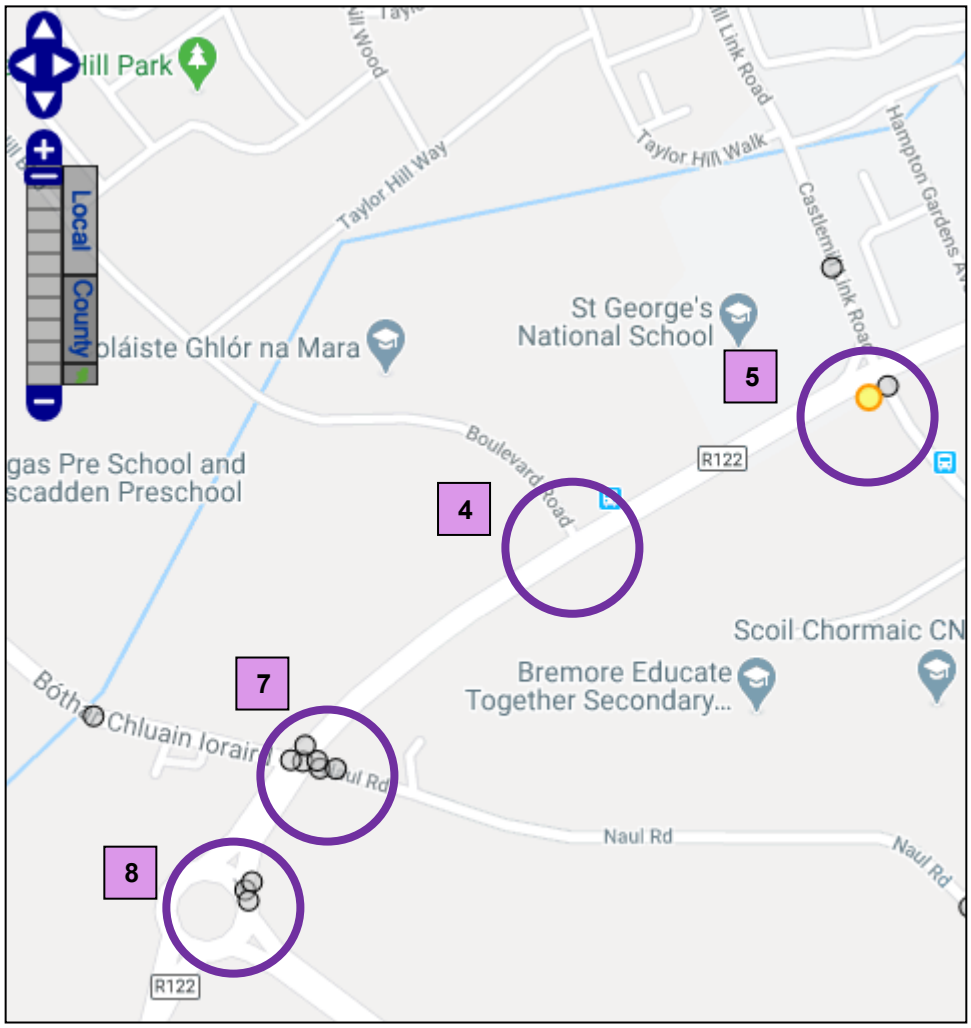

Figure 2.10: Part 1 - Location of Collisions (RSA 2005 – 2016)

2.4.5 Further east along Clonard Road, there has been one minor accidents recorded at Junction 6 (Millfield Shopping Centre Roundabout). This is shown on **Figure 2.11** below.

2.4.6 At Junction 13 (Chapel Street / HRR signalised cross-roads), there has two minor accidents. None of the accidents have involved vulnerable road users such as pedestrians or cyclists.

2.4.7 Based on the above, it is not considered that there is an existing road safety problem with these two junctions.

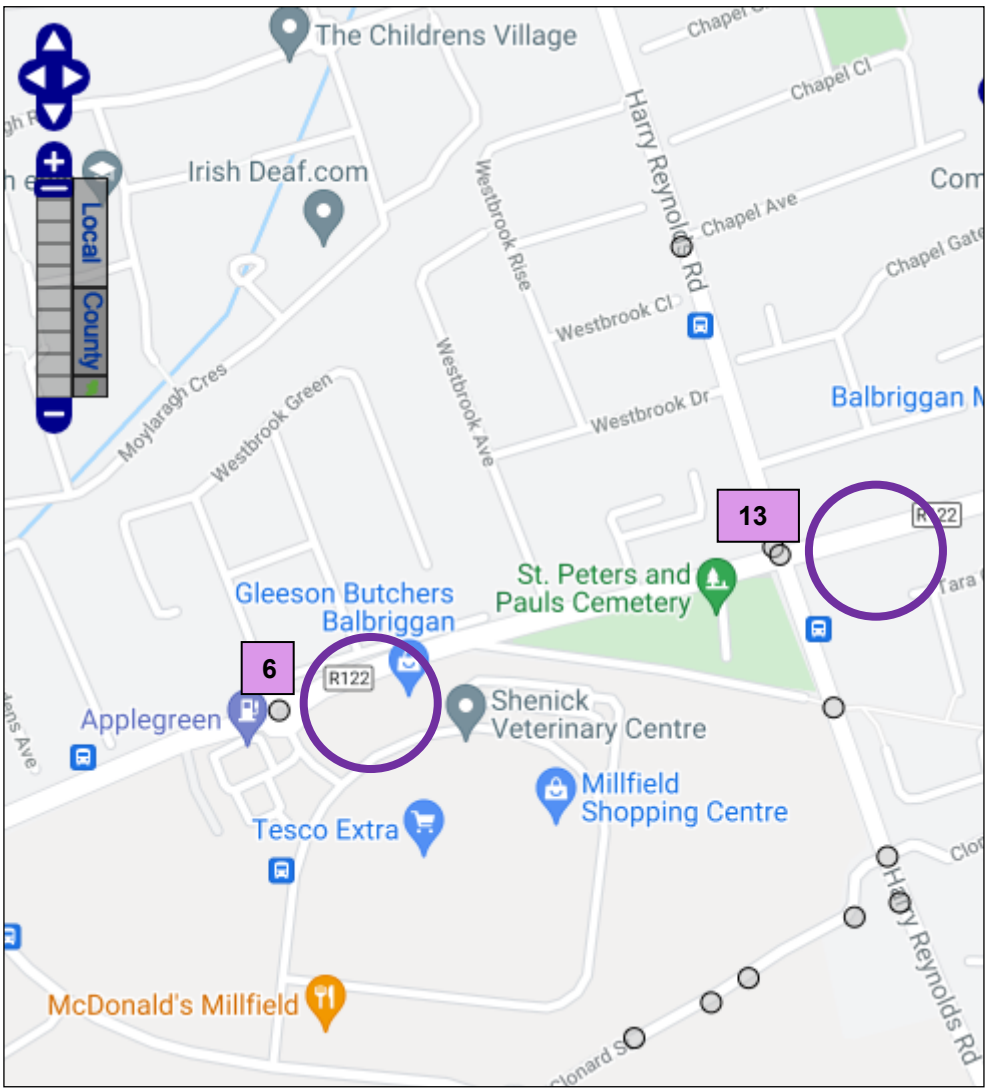

Figure 2.11: Part 2 - Location of Collisions (RSA 2005 – 2016)

2.4.8 At Junction 11 (Drogheda Road / Hamlet Lane) there have been eight accidents recorded between 2005 and 2016 as shown in **Figure 2.12** overleaf. One of these was serious and involved a motorcycle. The other six were all minor incidents, two of which involved pedestrians and one involved a pedal cycle.

2.4.9 There are two minor accidents recorded at Junction 12 (Drogheda Road / HRR) one of which involved a pedal cycle.

2.4.10 Given the frequency of the accidents at Junction 11, approximately one incident every other year, it is not considered that there is a road safety problem with this junction, nor Junction 12.

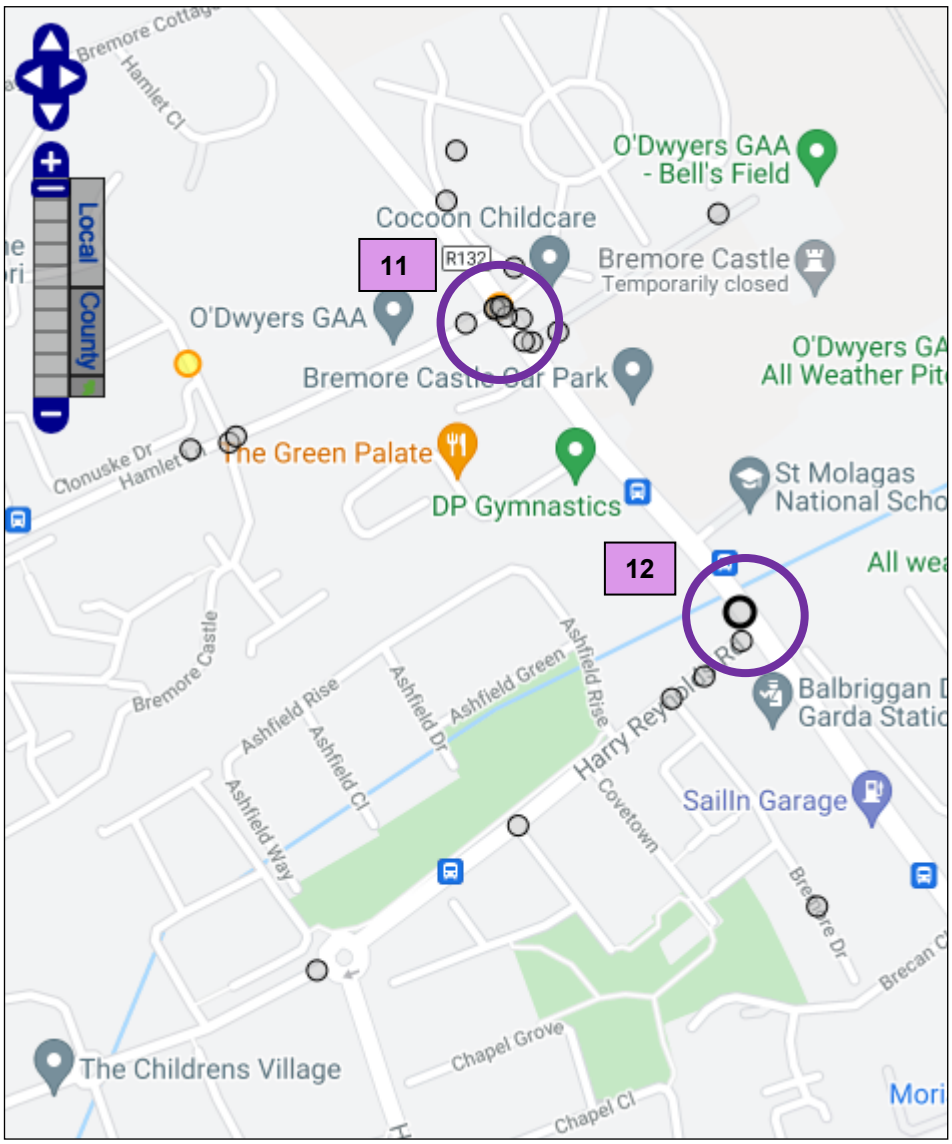

Figure 2.12: Part 3 – Location of Collisions (RSA 2005 – 2016)

3 COMMITTED DEVELOPMENT

3.1.1 Before the impact of any additional residential development can be assessed, the trips associated with the existing schools and the permitted residential development at Taylor Hill Phases 1 and 2, and the Glenveagh Homes Ladywell site (the committed residential development (PP Ref. No. F21A/0055) need to be assessed.

3.1.2 The additional traffic associated with the various schools in the area and the trips arising from the committed residential development is detailed in the remainder of this section of the TTA.

Schools

3.1.3 There are five schools operating in the area as shown below in **Figure 3.1** (note - school 2 is no longer in operation).



Figure 3.1: School Locations

3.1.4 The schools that are still operational are as follows:

- 1 – Colaiste Ghlor na Mara
- 3 – St George's National School
- 4 – Balbriggan Educate Together National School
- 5 – Scoil Chormaic Community National School
- 6 – Bremore Educate Together Secondary School

3.1.5 The existing number of pupils enrolled, staff employed and the capacity of these schools in February

2019 is set out in **Appendix B**.

3.1.6 Schools 3 and 4 are already operating at or near to capacity and so no further trips need to be added to the network.

3.1.7 However, schools 1, 5 and 6 are operating well below their capacity and so additional trips need to be added to the network to assess the traffic impact when these schools are full.

3.1.8 Trip rates have been taken from the TRICS database (see **Appendix C**) and applied to the remaining capacity (pupils plus staff) at each of these schools.

3.1.9 **Table 3.1** below identifies that there could potentially be an additional 875/163 trips spread across the local road network in the AM / PM peak hours as these schools fill up.

School	Capacity	Occupancy	Remaining Capacity	AM Trips	PM Trips
1	860	266	594	337	63
5	753	594	159	90	16
6	1,070	277	793	448	84
TOTAL	2,683	1,137	1,546	875	163

Table 3.1: Gross Additional School Trips

3.1.10 These will not all be new trips as many of these vehicles will already be on the network travelling to other schools or as part of a journey to work. Furthermore, the location of School 1 in close proximity to the existing, committed and proposed residential development will mean that many of these trips will be made on foot or by cycle. For Schools 5 and 6, it is likely that a significant proportion of the additional trips will be made from the south and east and so will route via the 'C Ring' Road and Stephenstown.

3.1.11 Therefore, in order to avoid over estimating the impact of the additional school traffic on the junctions along Clonard Road, it has been assumed that only 20% of the trips associated with schools 1 and 6 will actually be added to these junctions due to a combination of some of the trips already being on the network, the close proximity to residential development and the introduction of Smarter Travel measures as well as the routing of trips away from Clonard Road to the south and east. This is the same approach adopted by MPA in the assessment of school trips in this area for PP Ref. No. F21A/0055)

3.1.12 The additional school trips have been assigned on to the road network using the distribution surveyed for School 1 in 2018.

3.1.13 The resultant additional number of trips associated with the schools is contained as **Appendix D**.

Residential

3.1.14 Glenveagh Homes presently have planning consent for three parcels of land as follows:

- Taylor Hill Phase 1 (F15A/0437) – 137 units with permission, of which 88 were occupied when the traffic surveys were undertaken.
- Taylor Hill Phase 2 (F15A/0550) – 248 units to be delivered.

- Ladywell (F21A/0055) – 328 units to be delivered, with 99 included in Phase 3A.

3.1.15 Thus, there are 713 residential units with permission that will be delivered, (i.e. the committed residential development that has not been captured by the traffic surveys). The locations of Taylor Hill Phases 1 and 2, Ladywell are shown in **Figure 3.2**.

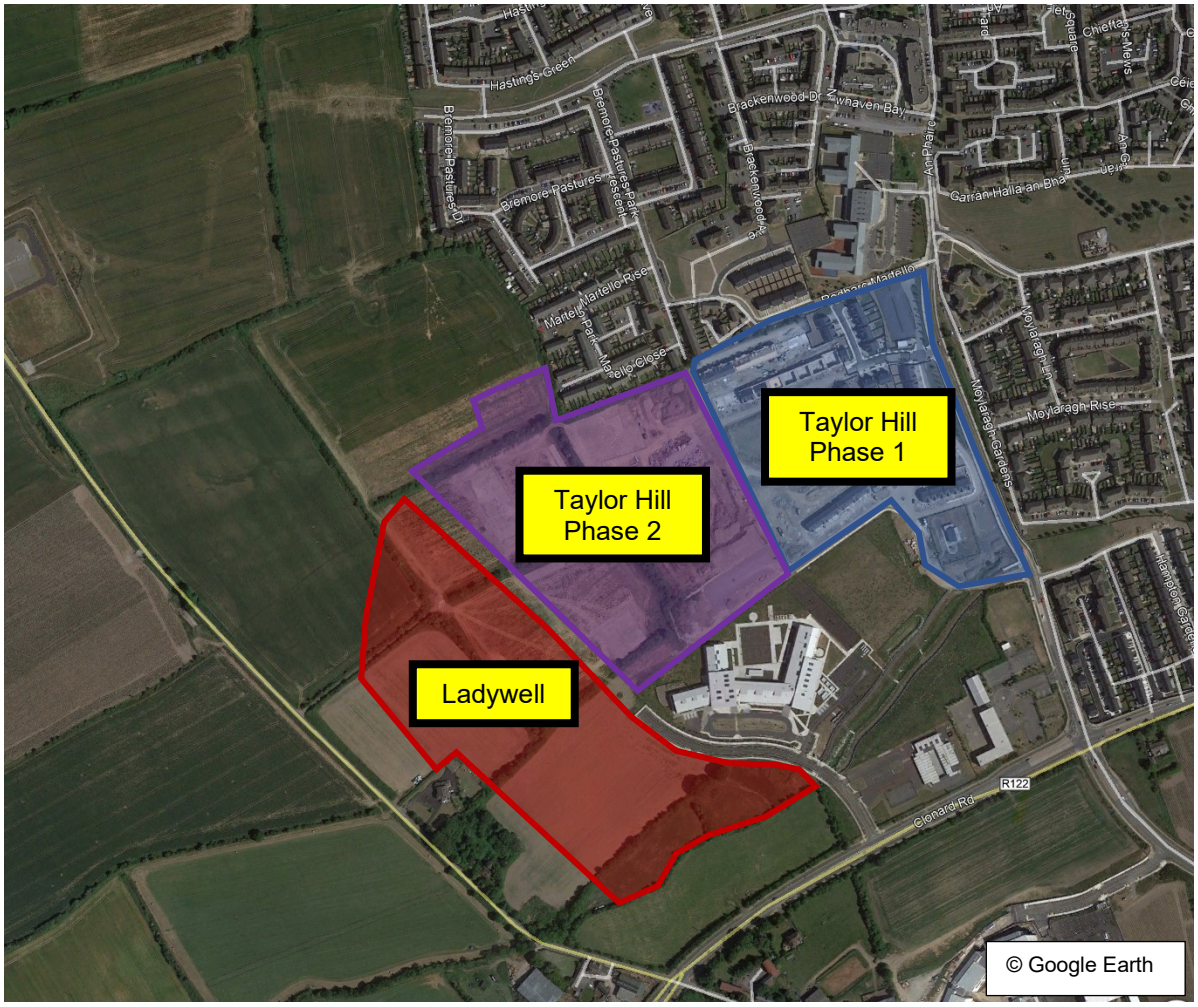

Figure 3.2: Taylor Hill & Ladywell Committed Residential Development

3.1.16 Trip rates for the committed residential development have been taken from the TRICS database (see **Appendix E**), which results in the number of trips shown in **Table 3.2** below.

	AM Peak Hour		PM Peak Hour	
	Arrivals	Deps	Arrivals	Deps
Trip Rate (per unit)	0.168	0.433	0.399	0.241
713 units	120	309	284	172

Table 3.2: Committed Residential Trips

3.1.17 The committed residential development trips have been assigned on to the road network using the distribution surveyed at Castlemill Link Road, i.e. for traffic entering and exiting the residential area

north of Clonard Road, in 2018.

3.1.18 Since the traffic surveys have been carried out there is a vehicular link between Phases 1 and 2 and the traffic associated with the 225 Taylor Hill committed residential units is assumed to split evenly (50/50) between Boulevard Road and Castlemill Link Road.

3.1.19 The Ladywell development will be accessed from Boulevard Road, and it is assumed that all Ladywell development trips will use Boulevard Road to reach Clonard Road. The Ladywell trip distribution at Boulevard Road will replicate the turning proportions observed at Castlemill Link Road.

3.1.20 The resultant additional number of trips associated with the committed residential development is contained as **Appendix F**.

4 ACCESSIBILITY OF THE SITE

4.1 Introduction

4.1.1 This section of the report reviews the accessibility of the site by sustainable modes of transport for future residents and visitors to the site.

4.1.2 Walking is the most important mode of travel at the local level and offers the greatest potential to replace short car trips, particularly those under 2km. Cycling also has the potential to substitute for short car trips, particularly those under 5km. Both modes of travel have the potential to form part of a longer journey by public transport.

4.2 Local Facilities

4.2.1 The location of the site in relation to surrounding local facilities within Balbriggan is shown in **Figure 4.1** below.



Figure 4.1: Location of Local Facilities

4.2.2 It can be seen that the site is very well located for future residents and visitors to access these by sustainable modes of travel, such as walking, cycling, bus, and train.

4.2.3 These facilities include numerous schools, shops, bus routes, community facilities and recreational areas within 2km of the site.

4.3 Walking

4.3.1 Walking journeys to and from the various local facilities is likely to be a genuine travel choice for the majority of residents of the proposed development.

4.3.2 Acceptable walking distances will vary considerably depending on various factors such as fitness and land topography; however, the 'Providing for Journeys on Foot' guidelines produced by the Chartered

Institution of Highways and Transportation (CIHT) identifies suggested acceptable walking distances for different types of journey as shown below in **Figure 4.2**.

Table 3.2: Suggested Acceptable Walking Distance.

	Town centres (m)	Commuting/School Sight-seeing (m)	Elsewhere (m)
Desirable	200	500	400
Acceptable	400	1000	800
Preferred maximum	800	2000	1200

Figure 4.2: Suggested Acceptable Walking Distances (CIHT)

4.3.3 These distances can be applied to the site as shown in **Table 4.1**.

4.3.4 **Table 4.1** shows that based on a walking speed of 1.4 m/sec, all schools are within a 10-minute walk of the site and that there are a range of shops and community facilities within an 11-minute walk.

4.3.5 The nearest bus stops are marginally above the target 400m distance but are still within a 5-minute walk of the site. With the future development of the FLR and its links to the existing bus rates it is expected that new bus routes through the site will be developed and walkway distance to bus stops will be well below 400m.

Facility	Distance	Walking Time	CIHT Maximum Guidance
Bus Stops (Hamlet Lane)	400m	5 mins	400m
Colaiste Ghlor na Mara	900m	11 mins	2,000m
St George's National School	1,200m	14 mins	2,000m
Scoil Chormaic Community National School	1,700m	20 mins	2,000m
Bremore Educate Together Secondary School	1,800m	21.5 mins	2,000m
Balbriggan Educate Together National School	1,000m	12 mins	2,000m
Millfield Shopping Centre	1,800m	21.5 Mins	1,200m
Castlemill Shopping Centre	900m	11 mins	1,200m
Community Centre	950m	11.5 mins	1,200m
Class 1 Public Open Space	150m	2 mins	2,000m
Town Centre	3,000m	36 mins	2,000m
Train Station	2,800m	33 mins	2,000m
Stephenstown Industrial Estate	2,500m	30 mins	2,000m

Table 4.1: Walking Distances and Times versus CIHT Guidance

4.3.6 In any event, the CIHT recognises that 'Providing for Journeys on Foot (2000) requires updating as stated in their document "Planning for Walking" (2015). Research presented to the PTRC in 2015 used data collected in the UK National Travel Survey (NTS), which has been consistently collected since 1988. This research identified average and 85th percentile walking distances for journeys for the UK (inside and outside of London). This research showed that the average/85th percentile walking distances (outside of London) to a bus stop are 580m and 800m respectively. The equivalent distance for a general walking trip (commuting, shopping etc) is 1,150m and 1,950m respectively. It is therefore evident that the site is extremely well located and that an extensive range of local facilities can easily be accessed on foot.

4.3.7 The development itself will be designed to include high quality pedestrian routes throughout that link through to the existing off-site routes.

4.4 Cycling

4.4.1 The CIHT state that three quarters of journeys by all modes are less than five miles (8km) and half are less than two miles (3.2km). These are distances that can be cycled comfortably by a reasonably fit person. The whole of Balbriggan is within 3.2km of the development site as shown below in **Figure 4.3.**



© Google Earth

Figure 4.3: 3.2Km Cycling Catchment Around Site

4.4.2 Therefore, cycling to and from the development is a viable option as residents and visitors alike can make use of the extensive network of cycle infrastructure already in place around the site, which includes dedicated off-road cycleways and those provided as a segregated facility along Hamlet Lane, the R122, and Castlemill Link Road.

4.5 Bus

4.5.1 Balbriggan is served by the Balbriggan Town Service (B1), which operates on two routes around the town as shown in green and purple below in **Figure 4.4**.

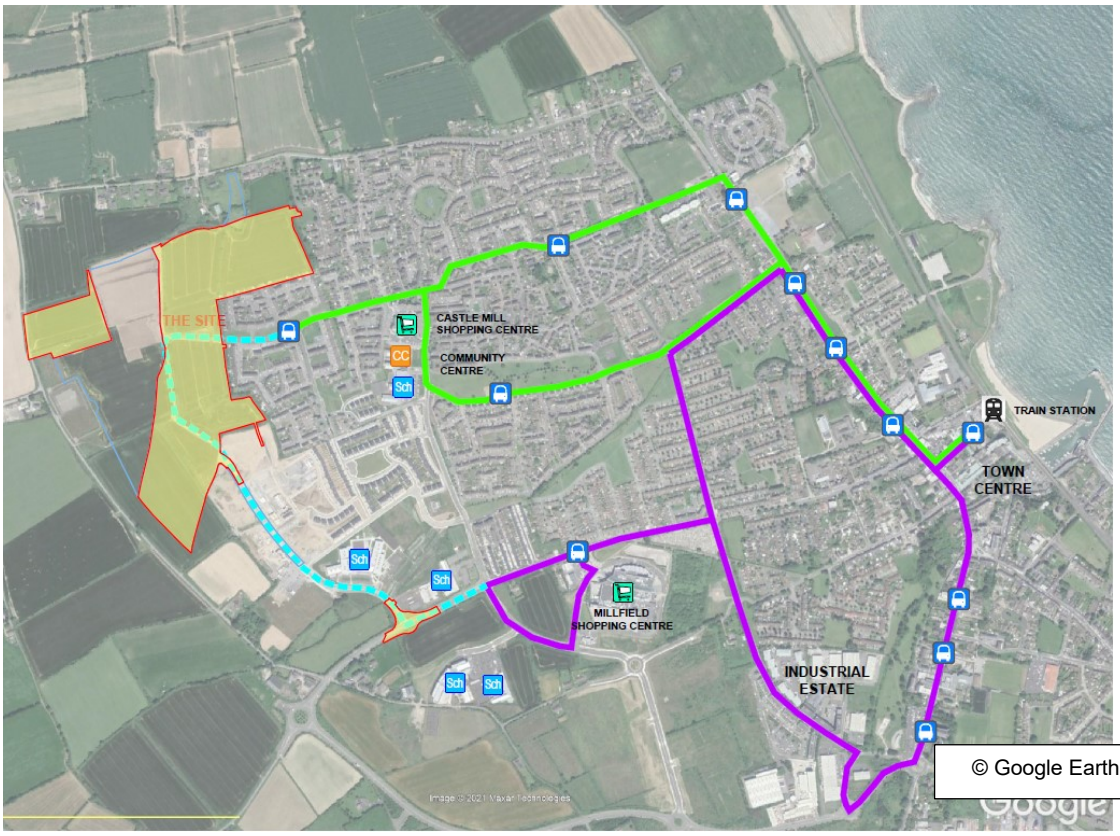

Figure 4.4: B1 Balbriggan Town Bus Service

4.5.2 The green route presently serves the northern and western parts of Balbriggan via Moylaragh Road and Hamlet Lane, whilst the pink route serves the southern and western parts of the town via the R132, Harry Reynolds Road and Clonard Road.

4.5.3 The closest bus stops to the site are located on Hamlet Lane as shown in **Figure 4.4**, which is a 5-minute walk from the centre of the site.

4.5.4 The B1 currently operates on an hourly frequency as shown in the current timetable attached as **Appendix G**.

4.5.5 As part of the proposed developments, a road link will be provided between Boulevard Road and Hamlet Lane. This would enable the extension of the B1 service to form a loop as shown by the dashed blue line in **Figure 4.4**.

4.6 Rail

4.6.1 Balbriggan train station is located just north of the town centre and is served directly by the B1 bus service (a 9-minute journey).

4.6.2 This station is on the Dublin-Dundalk commuter line as shown below in **Figure 4.5**.

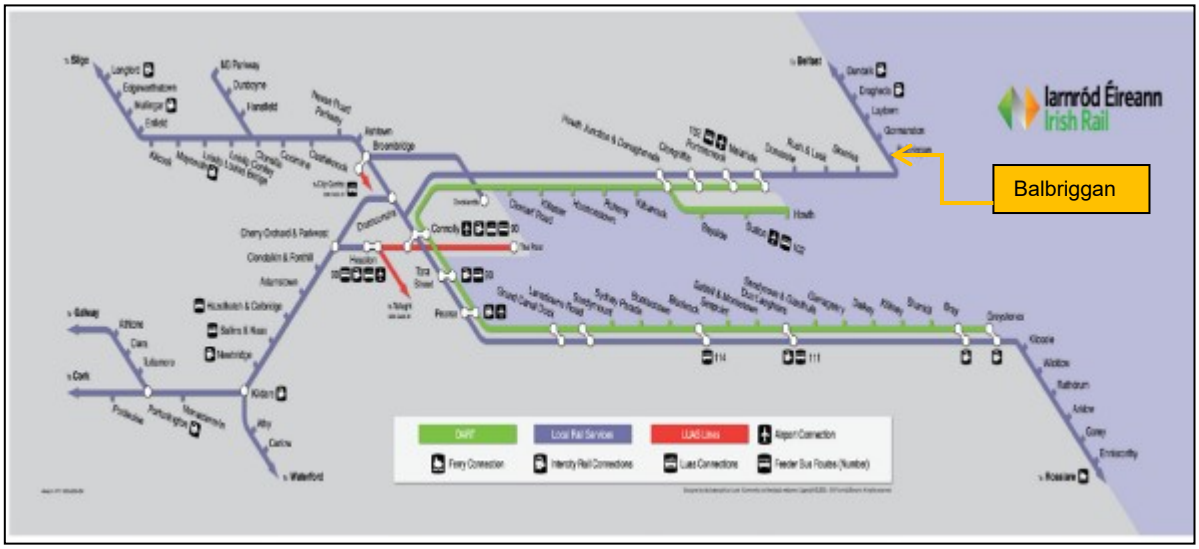

Figure 4.5: Irish Rail Network

4.6.3 Train services to Dublin Connolly are regular with a 15 to 35-minute frequency during the week between 06:19 and 22:21. This frequency reduces to 30-60 minute on Saturdays and hourly on Sundays. The northbound route to Drogheda runs to a similar frequency.

4.6.4 Thus, residents of the site can easily use a combination of bus and train to journey into Dublin to work or for other purposes.

4.7 Future DART+ Rail Services

4.7.1 Plans for the extension of DART services from Dublin to Drogheda have recently been published by the National Transport Authority. The expansion program, rebranded DART+, aims to double peak hour capacity with more trains and new stations, to create a full metropolitan area DART network for Dublin. A delivery date and funding for the DART+ Coastal North line has yet to be announced, however the DART+ program is seen as key project and is included in the *National Development Plan 2018-2027*, *Transport Strategy for the Greater Dublin Area 2016 – 2035* and *The Climate Action Plan 2019.*

4.7.2 When delivered, the project (DART+ Coastal North) will provide a modern and frequent rail service that will connect Balbriggan to Dublin City and Drogheda.

4.7.3 A succinct description of the project is presented overleaf in **Figure 4.6**.

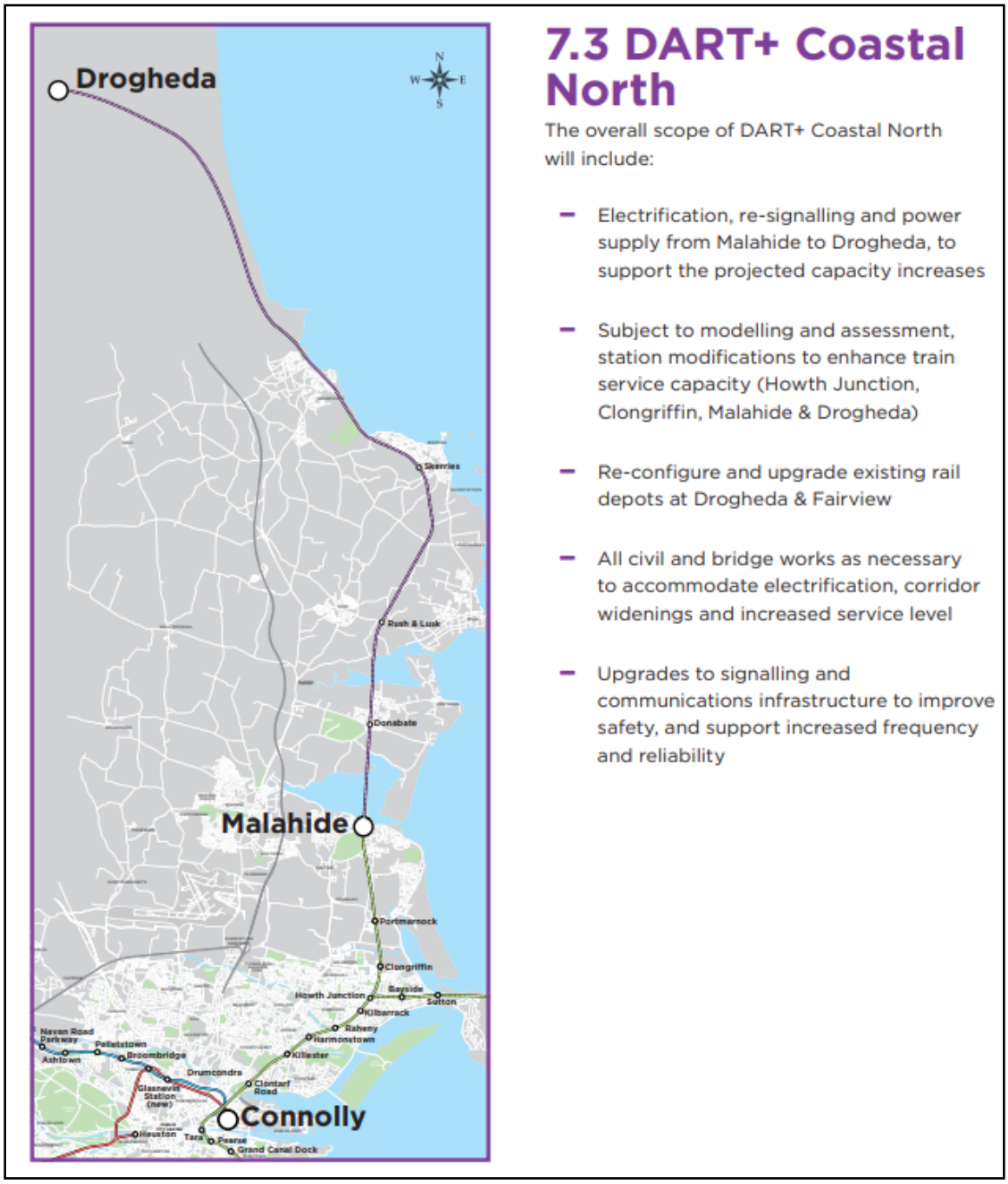

Figure 4.6: DART+ Coastal North Project

4.8 Summary

4.8.1 This section clearly demonstrates that the proposed site is accessible by non-car modes of travel including walking, cycling, bus and train.

5 PROPOSED DEVELOPMENT

5.1 Proposed Development

5.1.1 The proposed Masterplan Layout for the site is attached as **Appendix H** and is shown in **Figure 5.1** below. The Masterplan comprises 593 dwellings and three creches.

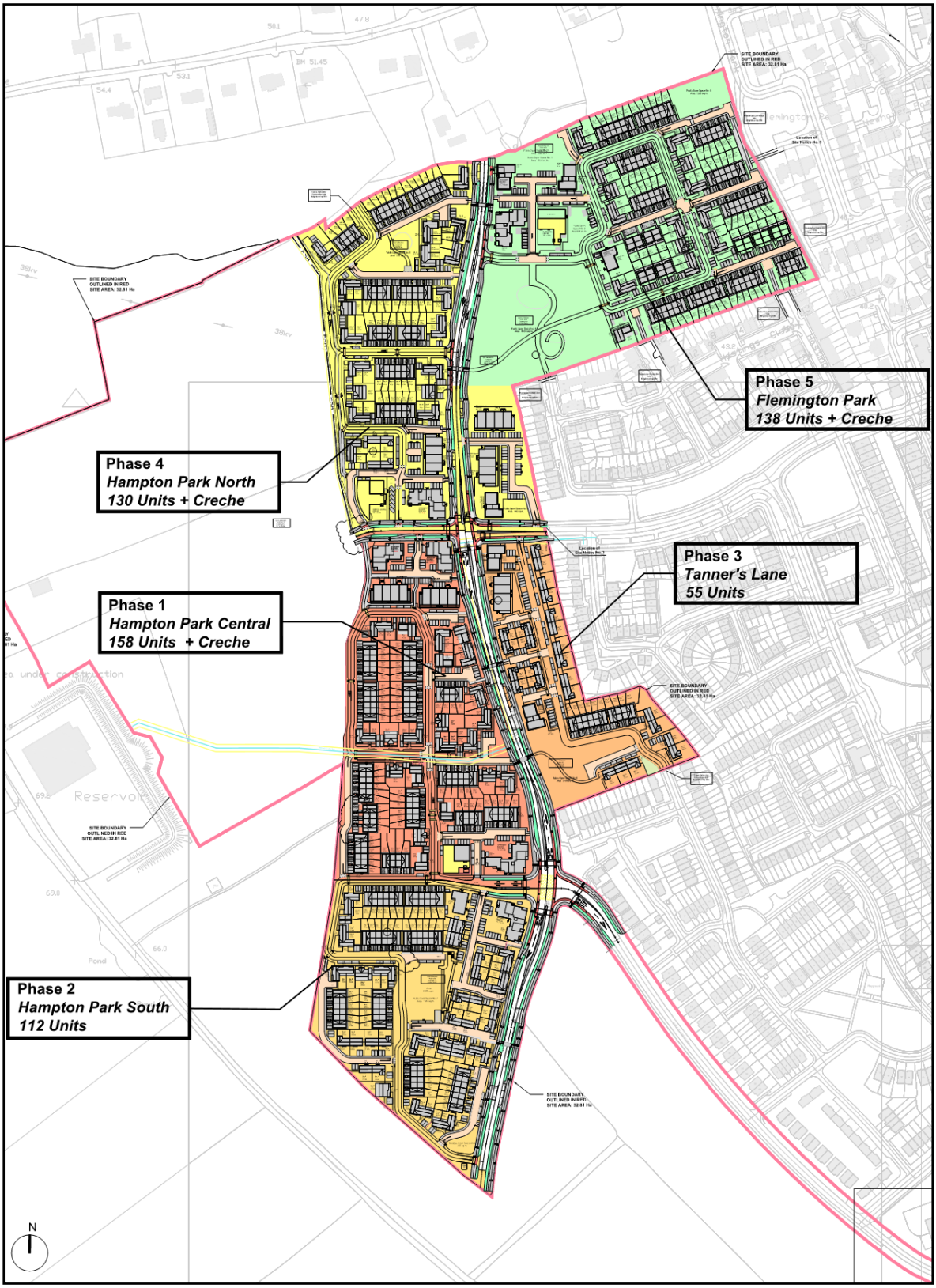

Figure 5.1: Proposed Masterplan Layout

5.1.2 The development site is proposed to be provided across five Character Areas (CA) / Phases as summarise below in **Table 5.1**.

Phase	Houses	Duplexes	Apartments	Overall No. of Dwellings
Phase 1	94	28	36	158
Phase 2	84	10	18	112
Phase 3	35	8	12	55
Phase 4	80	30	20	130
Phase 5	100	12	26	138
Total	**393**	**88**	**112**	**593**

Table 5.1: Proposed Character Areas and Mix

5.2 Car Parking

Residential Car Parking Requirements

5.2.1 Residential car parking provision for proposed residential developments are contained in the Fingal Development Plan 2017-2023 (FDP). However, as part of pre-application discussions, the Transport Planning Section (TPS) of FCC suggested that for one and two-bedroom dwellings, one parking space would be acceptable, and for three+ bedroom dwellings, two car parking spaces would be acceptable. The FDP suggests that visitor parking be provided as one space per five dwellings.

5.2.2 The combined TPS and FDP parking requirements are summarised in **Table 5.2** below:

Dwelling Type	Parking per Dwelling	Number of Dwellings	Number of Spaces
1 or 2 Bed House	1	154	154
3 or more Bed House	2	239	478
1 Bed Apartment	1	54	54
2 Bed Apartment	1	113	113
3+ Bed Apartment	2	33	66
Visitor Parking	0.2	593	119
Total			**984**

Table 5.2: Residential Car Parking Requirement

5.2.3 The proposed development would require a total of 984 parking spaces.

Creche Car Parking / Set Down Requirements

5.2.4 Car parking requirements for creches are set out in Table 12.8 for the Fingal Development Plan 2017-

2023 (FDP) as 0.5 spaces per classroom. The previous pre-application feedback from TPS also suggested that creches should be provided with parallel or one way circulatory drop off systems.

5.2.5 The creche parking requirements are set out in **Table 5.3** below.

Creche	Parking per Classroom	Number of Classrooms	Number of Spaces
Hampton South	0.5	3	2
Hampton Central	0.5	3	2
Flemington	0.5	3	2

Table 5.3: Creche Car Parking Requirements

Proposed Residential Car Parking Provision

5.2.6 As part of the proposals, the development will provide car parking as set out in **Table 5.4** below:

Phase	Number of Dwellings	Number of Spaces
Phase 1	158	227*
Phase 2	112	184
Phase 3	55	95
Phase 4	130	221*
Phase 5	138	232*
Total	**593**	**959**

* 3 no. set down spaces at each creche not counted in parking

Table 5.4: Proposed Residential Car Parking Provision Per Phase

5.2.7 The proposed parking provision shown in **Table 5.4** is 959 car parking spaces. This is 25 spaces less than suggested by the TPS in their pre-application response. Nevertheless, whilst the proposed parking provision is slightly less than suggested by the TPS, it is still considered appropriate for the proposed development.

5.2.8 The car parking provision is provided as follows, (this does not include 9 no. set down spaces at creches):

- Residential Allocated 832
- Creche 6
- Visitor 121 (incl 11 no. accessible or 9.1% and 13 EV spaces or 11%)

Creche Car Parking / Set Down Provision

5.2.9 There are 3 no. creches proposed on site, each creche has 3 no. classrooms and 2 no. parking spaces have been assigned per creche.

5.2.10 Each creche is also provided with parallel set down and one way circulatory drop off systems as

required by the TPS, the creches are provided with 3 set down spaces as set out in **Table 5.5** below.

Creche	Parking	Set Down
Hampton South	2	3
Hampton Central	2	3
Flemington	2	3

Table 5.5: Proposed Creche Car Parking & Set Down Provision

5.3 Cycle Parking

5.3.1 In their previous pre-application response for this project, the TPS suggested that two cycle parking spaces be provided per apartment or duplex and the FDP suggests an additional one space per 5 units for visitors as shown in an extract of Table 12.9 of the FDP below.

5.3.2 While the TPS did not provide any details on the cycle parking provision for houses it is assumed that a similar provision of minimum 2 spaces house is required with an allowance for visitors.

5.3.3 Table 12.9 of The Fingal Development Plan 2017-2023 (FDP) suggests 0.5 bike space per classroom for creches as shown in an extract of Table 12.9 of the FDP below:

Table 12.9 - Bicycle Parking Standards

Land Use	Criterion	Bike	Notes	Category	Norm or Max
Apartment, townhouse 1 bedroom	Unit	1	Plus 1 visitor space per 5 units	Residential	Norm
Hotel, Motel, Motor Inn, Guest House	Bedroom	0.1		Residential	Norm
Pre-school facilities / creche	Classroom	0.5		Education	Norm

5.3.4 The cycle parking requirement is calculated as shown in **Table 5.6** below at 1,305 cycle spaces which includes 786 spaces for houses, 400 spaces for apartments & duplexes and 119 visitor spaces.

Dwelling Type	Cycle Parking per Dwelling	Number of Dwellings	Number of Spaces
1 or 2 Bed House	2	154	308
3 or more Bed House	2	239	478
1 Bed Apartment	2	54	108
2 Bed Apartment	2	113	226
3+ Bed Apartment	2	33	66
Visitor Parking	0.2	593	119
Total			**1,305**

Table 5.6: Cycle Parking Requirement

5.3.5 To make the most of the site's location relative to the town centre, along with the existing cycle infrastructure in Balbriggan and the slight shortfall in car parking spaces, the development will provide in excess of the required cycle parking provision.

5.3.6 With two cycle spaces provided per house - 786 spaces, plus 616 spaces provided to serve apartments, duplexes, creches and visitors. This results in a provision of 1,402 cycles spaces for the proposed site.

5.3.7 Cycle parking facilities will be incorporated into the design of the various residential units with bike hoops provided to the front of terraced dwelling and to the rear of semi detached and end terraced dwellings, to provide a minimum of 786 spaces.

5.3.8 A total of 16 secured covered spaces are being provide per creche (48 total). The remaining 568 spaces are provided as follows 400 secure covered bicycle parking spaces, in the form of bicycle shelters, around the 'Duplex' and 'Apartment' type dwellings and 168 visitor cycle parking dispersed around the site will consist of bike hoops such as Sheffield stands.

5.4 Accessible Parking

5.4.1 The FDP states that one (or more) per 100 spaces should be reserved for accessible parking bays.

5.4.2 This results in a requirement for ten (10) accessible parking bays for the proposed development, based on a total site wide provision of 959 spaces.

5.4.3 The development will provide a total of 121 designated visitor car parking spaces of which 11 will be designated accessible spaces (9.1%).

5.5 Electric Vehicle Charging Points

5.5.1 The FDP states that one (or more) per 100 spaces should be reserved for electric vehicles with charging facilities.

5.5.2 With 959 spaces provided in total a minimum of 10 EV spaces are required to comply with the development plan standards.

5.5.3 In order to futureproof the development, all houses will be fully wired for electric vehicle charging with a blanked off panel at the output ready for subsequent installation by future occupants, if desired.

5.5.4 Additionally, of the 121 visitor spaces provided a total of 13 electric vehicle charging spaces are proposed. These will be provided spread out through the development as indicated on the architects drawings.

6 SITE ACCESS AND INTERNAL LAYOUT

6.1 Internal Layout

6.1.1 The facilities proposed to provide access to the development site by each of the three main modes of travel identified; namely car, walking and cycling are detailed separately in the remainder of this section. Interaction between these three modes is essential in order to achieve an integrated package that will provide easy and safe access to the site for all modes of transport. It is important to note that an integrated approach to transport does not specifically exclude provision for the private car in favour of more environmentally friendly modes. Indeed, the mainstay of an integrated approach is to ensure that the different modes of travel compliment rather than exclude each other.

6.2 Facilities for Cars

6.2.1 The access to the proposed site will be from an extension of the under-construction Boulevard Road and existing Hamlet Lane as per shown in **Figure 6.1** below.

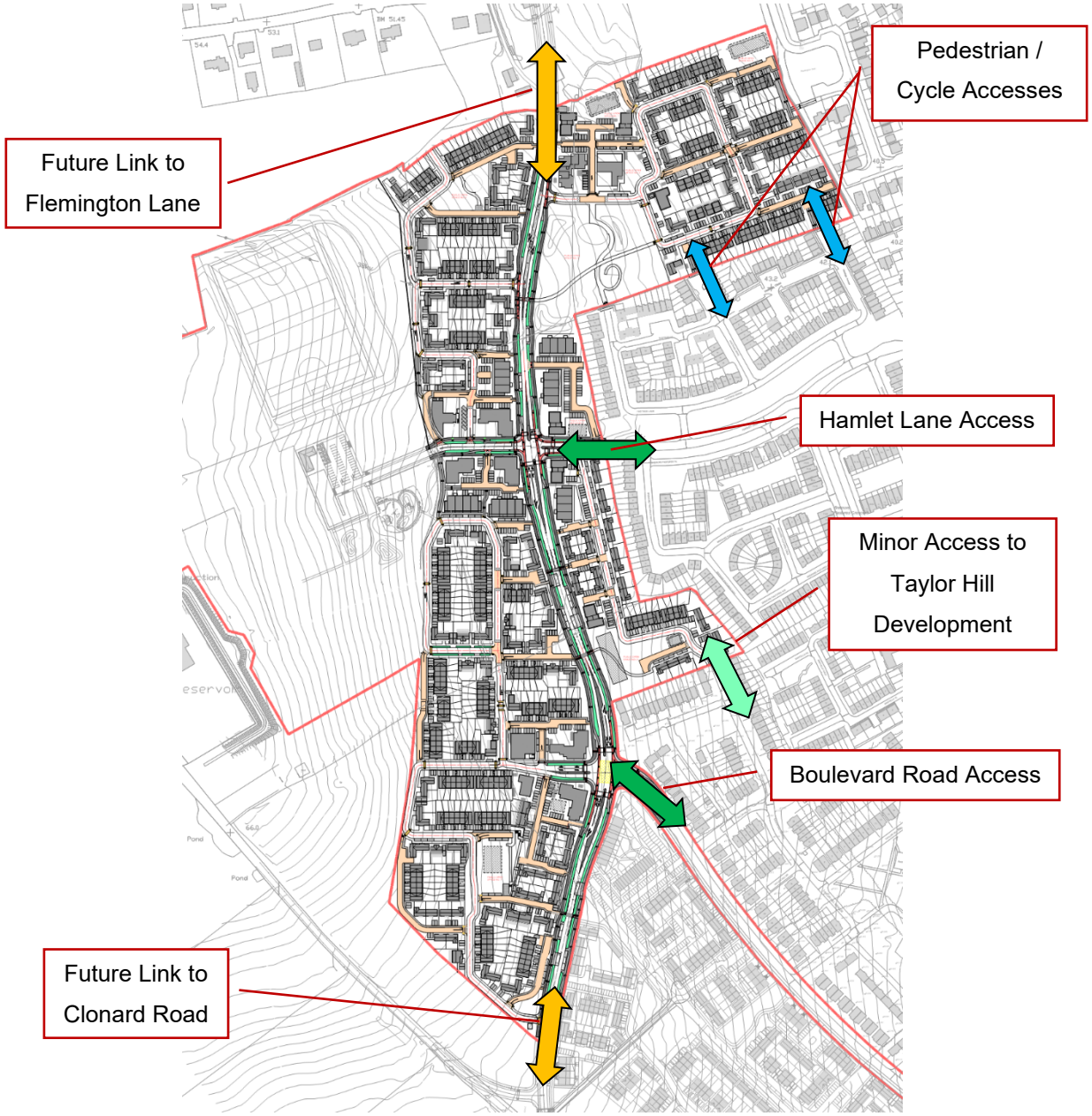

Figure 6.1: Proposed Site Access Locations

6.2.2 The proposed development will also enable future links to Flemington Lane and Clonard Road to the north and south of the site respectively. This will form the completion of the 'C' Ring Road. These works will be undertaken by others at some point in the future.

6.2.3 The proposed access arrangement and internal road network accords with DMURS and is appropriate to serve the proposed housing scheme.

6.2.4 A DMURS Compliance Statement for the proposed development has been prepared by MPA Consulting Engineers (Document Ref. 191004-DMURS-F01) and has been submitted to FCC as part of the wider planning application documents.

6.3 Facilities for Pedestrian and Cyclists

6.3.1 The main vehicular accesses from Boulevard Road and Hamlet Lane will include segregated 3.75m footways / cycleways on both sides of the carriageway. These will connect to the existing pedestrian / cycle network in the area.

6.3.2 The main Spine Road through the development will also incorporate segregated 3.75m wide footways / cycleways to be provided on both sides of the carriageway.

6.3.3 Main junctions along the Spine Road will include pedestrian crossings and cycle friendly infrastructure as shown in **Figure 6.2** below:

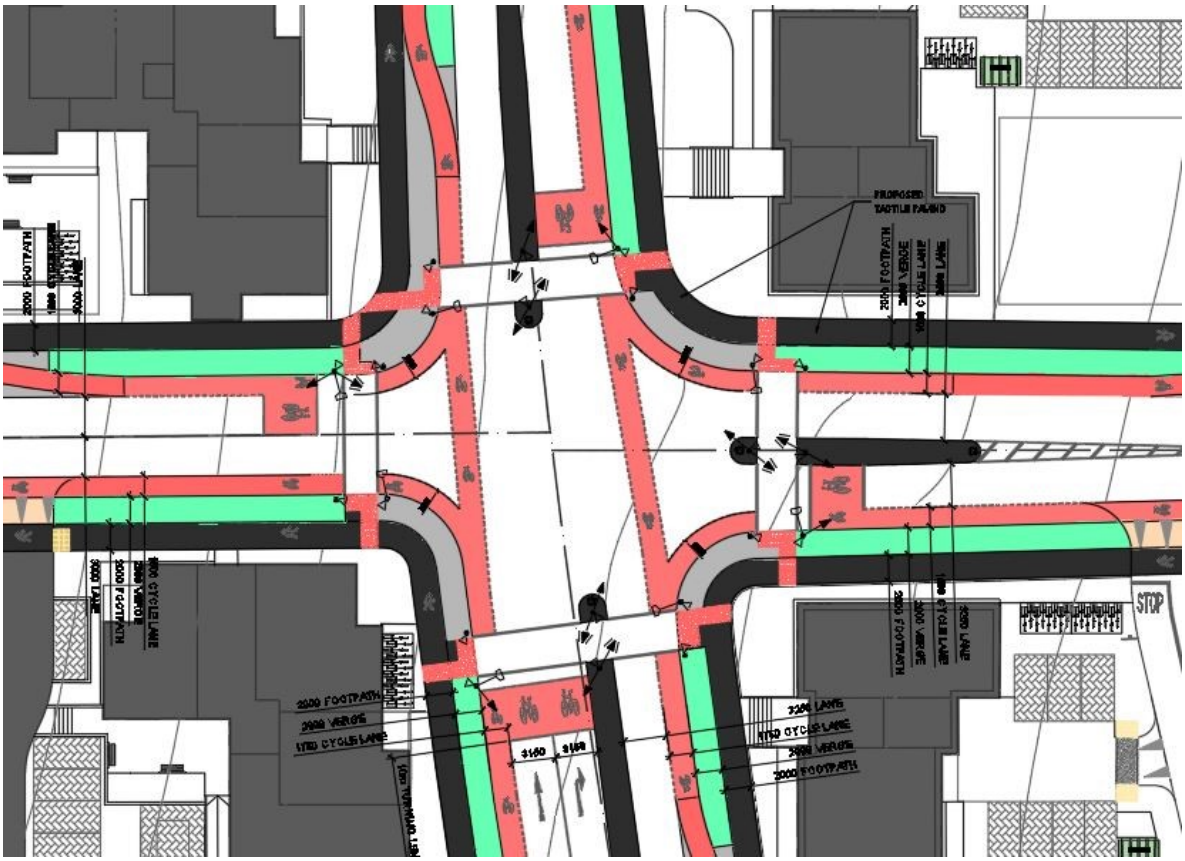

Figure 6.2: Typical Internal Spine Road Junction with Pedestrian and Cycle Infrastructure

6.3.4 In addition to the crossing facilities at the signalised junctions, zebra crossing will be provided across the Spine Road between the junctions to aid safe pedestrian / cycle crossing of the Spine Road.

6.3.5 Furthermore, it is expected that the traffic flows on the minor roads within the development will be relatively low and so cyclists will therefore be able to travel quite safely on-street within the development site.

6.3.6 Thus, there will be a safe pedestrian and cycle links between the site and the various local facilities.

7 TRIP GENERATION AND DISTRIBUTION

7.1 Trip Rates

7.1.1 Whilst the proposed development includes two creches, these are likely to serve the residents of the proposed development rather than the wider Balbriggan area, which already benefits from around 15 existing creches and childcare establishments. Therefore, creche trips associated with the proposed development will be linked with the proposed residential development trips. To avoid double counting trips, creche trips are not considered as impacting on the wider transport network.

7.1.2 The TRICS trip rate database has been interrogated to identify the likely vehicle trip generation associated with residential developments in a similar location to the site.

7.1.3 The assessment is based upon three standard network time periods; namely, the AM peak hour (08.00 to 09.00), the PM peak hour (17.00 to 18.00) and over a day.

7.1.4 The TRICS database was examined for similar developments, using the 'Houses Privately Owned', and 'Flats Privately Owned' categories for all appropriate sites in Ireland.

7.1.5 The 'Houses Privately Owned' category has been used for the proposed houses and the 'Flats Privately Owned' category for the proposed apartments. The trip rate for the Duplexes is an average of the 'Houses Privately Owned' and 'Flats Privately Owned' trip rates.

7.1.6 The average trip rates generated from the above are identified in **Table 7.1** below with the TRICS output being attached as **Appendix I**.

	Morning Peak Hour (08:00 – 09:00)		Evening Peak Hour (17:00 – 18:00)		Daily
	Arrivals	Deps	Arrivals	Deps	Two-Way
'Houses Privately Owned' Trip per dwelling Rate	0.164	0.534	0.446	0.271	6.294
'Flats Privately Owned' Trip Rate per Dwelling	0.041	0.142	0.193	0.101	2.009
Duplex Trip Rate	0.103	0.338	0.320	0.186	4.152

Table 7.1: Vehicle Trip Rates

7.2 Trip Generation

7.2.1 These trip rates have been applied to the proposed development and the resultant number of trips is shown overleaf in **Table 7.2.**

	Morning Peak Hour (08:00 – 09:00)		Evening Peak Hour (17:00 – 18:00)		Daily
	Arrivals	Deps	Arrivals	Deps	Two-Way
'Houses Privately Owned' 393 Dwellings	64	210	175	107	2,474
'Flats Privately Owned' 88 Dwellings	4	12	17	9	177
Duplex 112 Dwellings	13	41	39	23	507
TOTAL (593 Dwellings)	**81**	**263**	**231**	**139**	**3,158**

Table 7.2: Proposed Trip Generation

7.2.2 The proposed development will generate 344 and 370 two-way trips in the morning and evening peak hours respectively and 3,169 two-way trips per day.

7.3 Class 1 Lands

7.3.1 Additional trips have not been added for the Class 1 Lands as it is anticipated that these recreational trips will already be taking place on the road network and so are included in the base traffic data.

7.3.2 Furthermore, the residential trip rates taken from the TRICS database covers journeys undertaken for all purposes, including recreation, and so will also include some trips to/from the Class 1 Lands.

7.4 Trip Distribution

7.4.1 Whilst the proposed development has two points of access to the road network, the major trip destinations, such as the town centre and the M1 Motorway, are accessed via roads to the south of the site. The trip distribution has therefore been assigned as 80% of development trips using Boulevard Road whilst the remaining 20% of development trips would use Hamlet Road.

7.4.2 At Junction 4 (Clonard Road / Boulevard Road), the 80% of residential development trips have been assigned on to the road network using the distribution surveyed at Junction 5 (Clonard Road /Castlemill Link Road), i.e. for traffic entering and exiting the residential area north of Clonard Road, in 2018. This distribution has then been applied to the Boulevard Road/Clonard junction as shown in **Figure 7.1** overleaf.

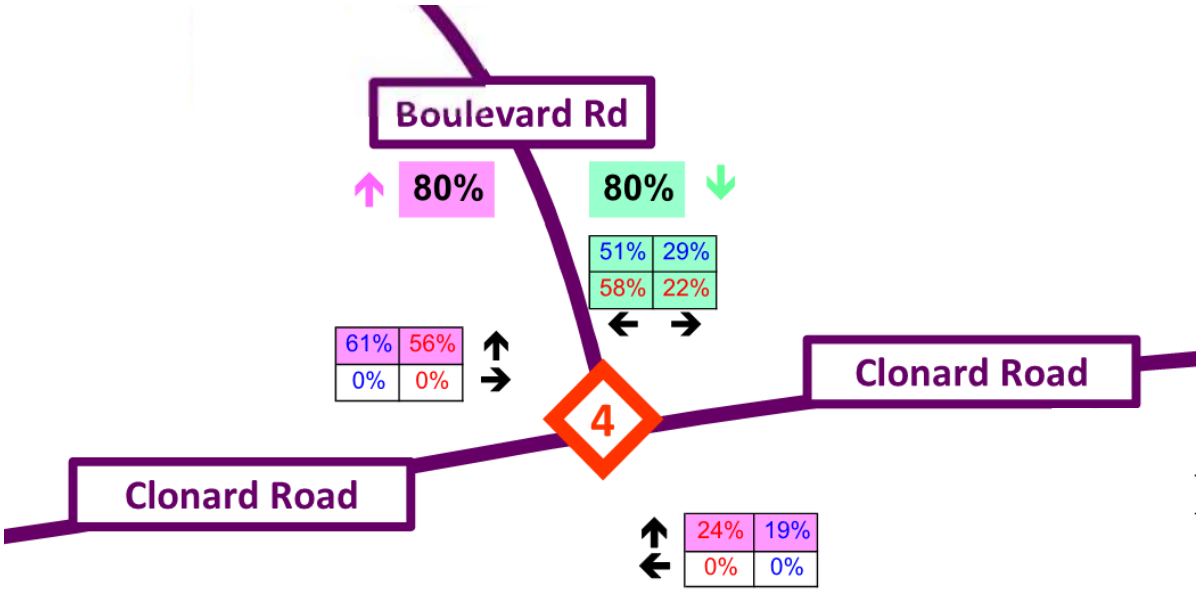

Figure 7.1: Trip Distribution at Junction 5 – Clonard Road / Boulevard Road

7.4.3 The trips generated by the development have been assigned on to the wider road network using the distributions identified in the traffic surveys.

8 TRAFFIC IMPACT

8.1 Introduction

8.1.1 As already mentioned, an Area Wide Traffic Model has been built to identify the percentage impact of the proposed development at each of these junctions, as shown below in **Figure 8.1** and included in **Appendix J**.

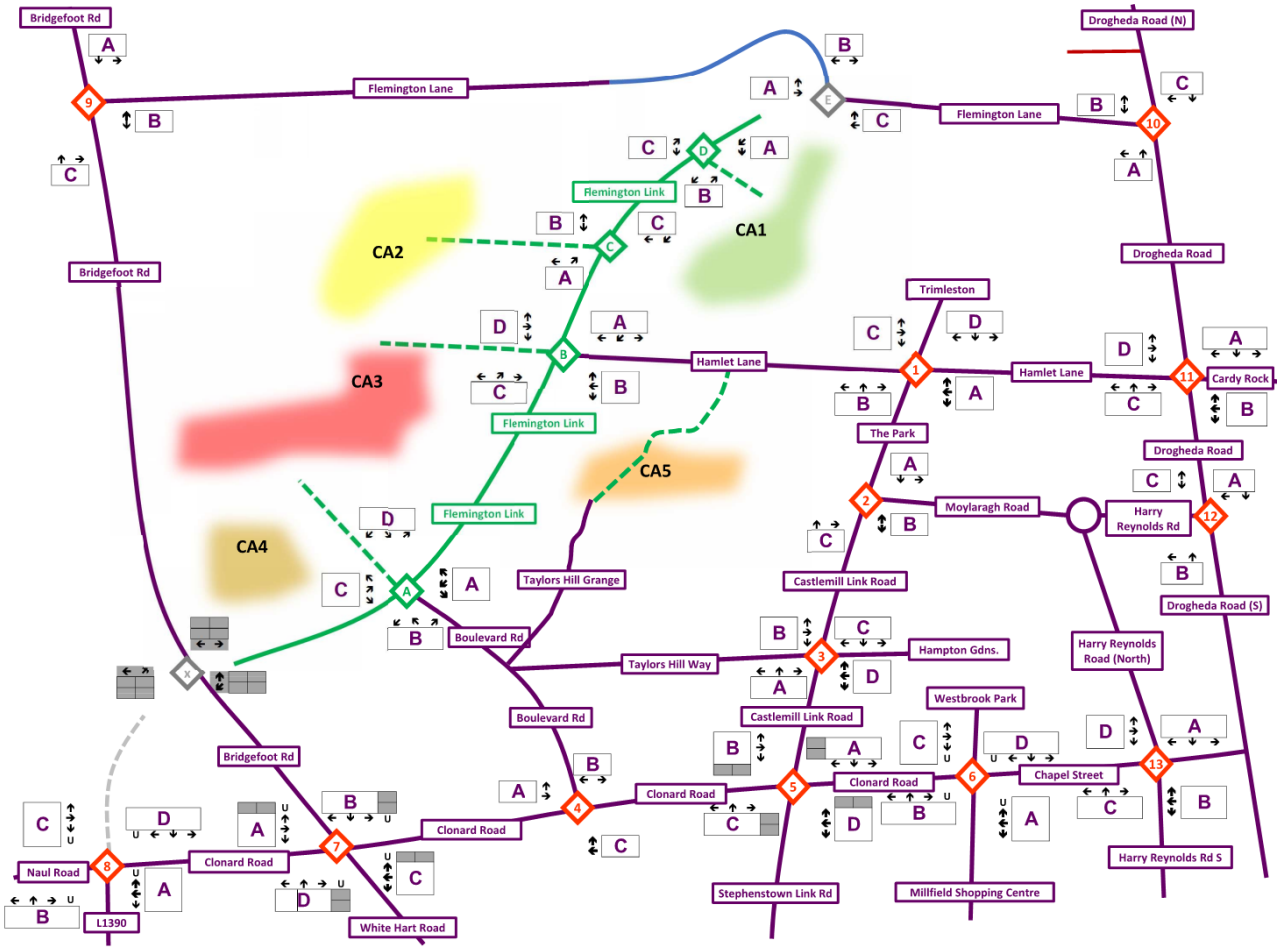

Figure 8.1: Area Wide Traffic Model

8.2 Area Wide Traffic Impact

8.2.1 In accordance with the TII's '*Traffic & Transport Assessment Guidelines*' (TTAG), the proportional increase in traffic levels at the junctions on the R122 corridor has been assessed using the Area Wide Traffic Model.

8.2.2 **Table 8.1** overleaf shows the percentage increase in traffic flows at the 13 junctions within the study area as a result of the proposed development.

8.2.3 Details of the development scenarios, traffic growth and committed development, which inform **Table 8.1**, are detailed later in this Section.

Junction	2025 + Committed Development Base Junction Traffic Flow		2025 + Com Dev + Development Base Junction Traffic Flow		% Increase	
	AM	PM	AM	PM	AM	PM
1	637	534	704	606	10%	13%
2	786	690	836	743	6%	8%
3	902	748	902	748	0%	0%
4	1,905	1,729	2,172	2,017	14%	17%
5	1,953	1,789	2,027	1,871	4%	5%
6	1,302	1,313	1,376	1,394	6%	6%
7	1,889	1,868	2,082	2,074	10%	11%
8	2,210	2,115	2,403	2,320	9%	10%
9	544	431	544	431	0%	0%
10	502	733	518	751	3%	2%
11	1,063	1,076	1,080	1,094	2%	2%
12	1,201	1,199	1,228	1,228	2%	2%
13	1,404	1,220	1,485	1,298	6%	6%

Table 8.1: Proportional Increase in Traffic Volumes at Junctions within Study Area

8.2.4 The TTAG identifies that junctions with an increase of 5% and over should be assessed in further detail. What is more, FCC have referenced that junctions experiencing a 2.5% increase should be assessed further.

8.2.5 As such, junctions 1, 2, 4, 5, 6, 7, 8, 12 and 13 have been assessed using computer models as outlined in the remainder of this section.

8.2.6 However, Junction 7 (Bridgefoot Road / White Hart Lane) and Junction 10 (Drogheda Road / Flemington Lane) have not been assessed further even though the percentage increase is greater than 2.5%. This is because the increase in traffic volumes at these junction takes place on the through routes and does not involve any turning movements. Therefore, the junctions are unlikely to suffer any adverse effects. Furthermore, Junction 7 will only serve the existing properties at the southern end of Bridgefoot Road in the future as once the FLR is delivered the road will be for access only.

8.3 Junction Modelling Assessments

8.3.1 As already stated, eight external junctions have been assessed in detail using industry standard junction modelling software. These junctions are listed below and also shown in **Figure 8.2** overleaf:

- Junction 1 – Hamlet Lane / The Park / Trimleston (PICADY)
- Junction 2 – Castlemill Link Road / Moylaragh Road / The Park (LINSIG)
- Junction 4 – Clonard Road / Boulevard Road Junction (PICADY and ARCADY)
- Junction 5 – Clonard Road / Castlemill Link Road Junction (LINSIG)
- Junction 6 – Clonard Road / Millfield Shopping Centre Roundabout (ARCADY)
- Junction 8 – Naul Road / L1390 Roundabout (ARCADY)
- Junction 12 – Drogheda Road / Harry Reynolds Road (LINSIG)
- Junction 13 – Chapel Street / Harry Reynolds Road (LINSIG)

8.3.2 These junctions have been assessed using the Junctions 9 software package that includes ARCADY 9 and PICADY 9 as the 'Roundabout' and 'Priority Intersection' modules to assess the operational capacity of roundabouts and priority junctions respectively and using LINSIG to assesses the operational performance of signalised junctions.

8.3.3 The model parameters and measurements have been compiled using Topographic Survey data, Ordnance Survey data and aerial photographs.

8.3.4 Along with the external junctions, two proposed internal junctions have also been assessed. These are known as Junctions A and B and are both signalised 4 arm cross-roads. These junctions are assessed by the LINSIG computer programme.

8.4 Assessment Scenario

8.4.1 These ten junctions have been assessed in the following scenarios:

- Scenario 1: 2025 Base + Committed Development;
- Scenario 2: 2025 Base + Committed Development + Proposed Development;
- Scenario 3: 2040 Base + Committed Development; and
- Scenario 4: 2040 Base + Committed Development + Proposed Development.

8.5 Traffic Growth

8.5.1 Traffic growth has been calculated using the growth factors contained in the TII 'Project Appraisal Guidelines for National Roads Unit 5.3 - Travel Demand Projections PE-PAG-02017' (May 2019).

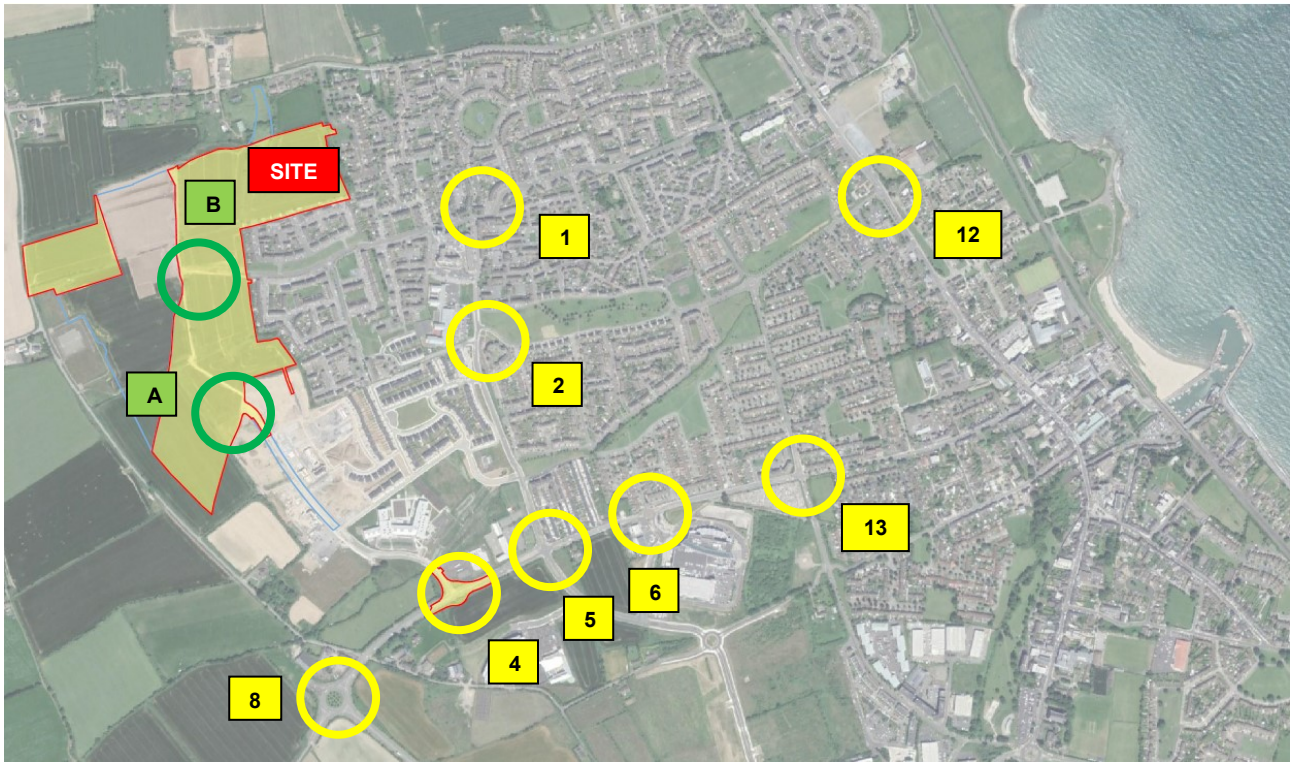

Figure 8.2: Location of Junction Assessments

8.5.2 Balbriggan is located in non-metropolitan County Dublin in the Project Appraisal Guidelines, as shown in **Figure 8.3** overleaf.

8.5.3 The low growth rate factor has been used to determine traffic growth due to the large amount of development traffic already being added to avoid double-counting as development is an important component of traffic growth along with car ownership and other economic factors.

8.5.4 Therefore, an annual growth rate of 1.0163 for light vehicles will be used in the Transport Assessment, using the rates contained in Table 6.2 (for 2016-2030) of the Project Appraisal Guidelines.

8.5.5 For this modelling exercise, traffic growth has been applied to factor the surveyed flows to 2025 to reflect the opening year of the development.

8.5.6 Further growth of 15 years after the opening year, as stated in the TTAG, has also been applied to the surveyed traffic flows. It should be noted that the future implementation of the FLR and further development, as part of the North West Balbriggan Masterplan, means that assessing the existing network in 2040 would not be representative of the future road network and traffic flows. Nevertheless, 2040 assessments have been undertaken to give some indication of the development impact should delivery of the planned road infrastructure is delayed.

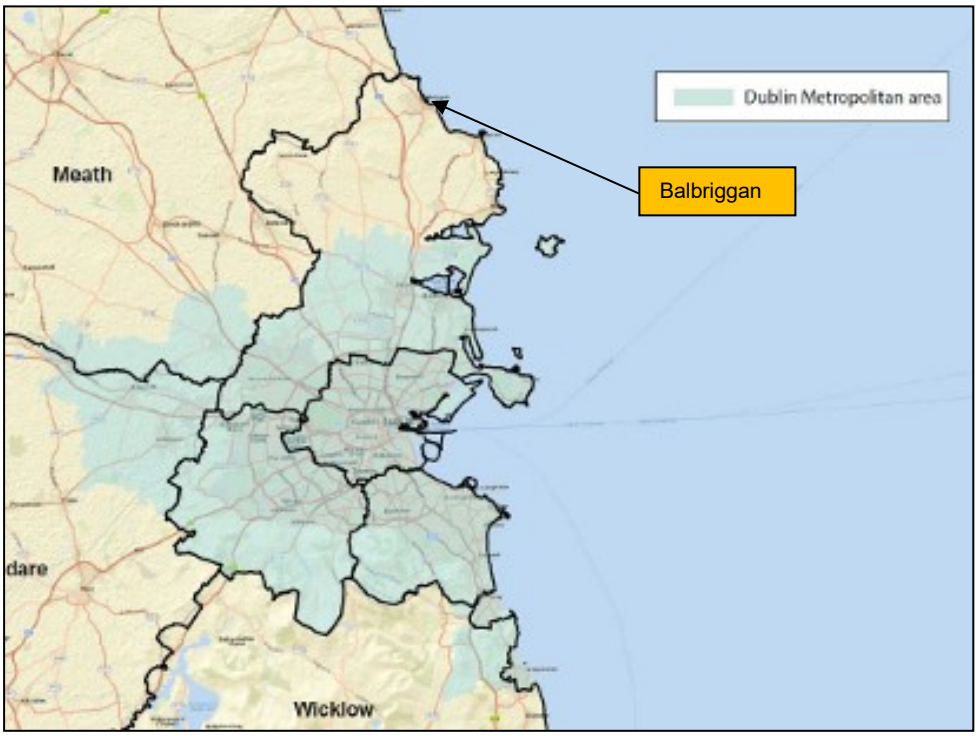

Figure 8.3: Dublin Metropolitan Area (Traffic Growth)

8.5.7 The traffic flows used in the junction assessments are contained in **Appendix J**.

8.6 Junction 1 – Hamlet Lane / The Park / Trimleston (PICADY)

8.6.1 **Table 8.2** below provides a summary of the PICADY assessment of the existing priority junction of Hamlet Lane / The Park / Trimleston with full results in **Appendix K**.

	AM				PM			
	Queue (PCU)	Delay (s)	RFC	LOS	Queue (PCU)	Delay (s)	RFC	LOS
	2025 + Com Dev							
Stream B-ACD	0.5	12.35	0.33	B	1	15.7	0.51	C
Stream A-BCD	0	6.46	0.01	A	0	6.27	0.01	A
Stream D-ABC	0.1	9.25	0.06	A	0	0	0	A
Stream C-ABD	0.2	8.31	0.16	A	0.1	6.98	0.1	A
	2040 + Com Dev							
Stream B-ACD	0.6	13.72	0.38	B	1.4	18.62	0.58	C
Stream A-BCD	0	6.56	0.01	A	0	6.34	0.01	A
Stream D-ABC	0.1	9.62	0.07	A	0	0	0	A
Stream C-ABD	0.3	8.68	0.19	A	0.1	7.11	0.11	A
	2025 + Com Dev + Proposed Development							
Stream B-ACD	0.6	13.01	0.36	B	1.4	18.13	0.58	C
Stream A-BCD	0	6.68	0.01	A	0	6.37	0.01	A
Stream D-ABC	0.1	9.51	0.06	A	0	0	0	A
Stream C-ABD	0.4	8.74	0.24	A	0.2	7.27	0.14	A

	AM				PM			
	Queue (PCU)	Delay (s)	Queue (PCU)	LOS	Queue (PCU)	Delay (s)	Queue (PCU)	LOS
	2040 + Com Dev + Proposed Development							
Stream B-ACD	0.7	14.65	0.41	B	1.8	22.35	0.65	C
Stream A-BCD	0	6.77	0.01	A	0	6.44	0.01	A
Stream D-ABC	0.1	9.89	0.08	A	0	0	0	A
Stream C-ABD	0.4	9.14	0.27	A	0.2	7.95	0.15	A

Table 8.2: PICADY Results for the Hamlet Lane / The Park / Trimleston Priority Crossroads

Where:
Arm A – Hamlet Lane (East)
Arm B – The Park
Arm C – Hamlet Lane (West)
Arm D - Trimleston

8.6.2 This table demonstrates that the junction operates within capacity for all assessment scenarios with acceptable levels of queuing and delays.

8.7 Junction 2 – Castlemill Link Road / Moylaragh Road / The Park (LINSIG)

8.7.1 **Table 8.3** below provides a summary of the LINSIG assessment of the existing signalised junction of Castlemill Link Road / Moylaragh Road / The Park based on a 90-second cycle time. The full results are included in **Appendix L**.

8.7.2 This table demonstrates that the signalised junction will continue to operate within capacity for all scenarios assessed.

	AM			PM		
	Queue (PCU)	Delay (s/PCU)	Deg of Sat (DoS) %	Queue (PCU)	Delay (s/PCU)	Deg of Sat (DoS) %
	2025 + Com Dev					
The Park	8.0	35.8	60.8	5.1	42.6	53.9
Moylaragh Road	4.8	48.4	59.2	3.5	50.5	51.8
Castlemill Link Road	6.8	41.8	62.0	7.6	28.8	53.3
	2040 + Com Dev					
The Park	9.5	38.7	68.9	5.8	44.7	60.3
Moylaragh Road	5.8	52.2	67.1	4.1	53.0	58.2
Castlemill Link Road	8.0	45.0	69.7	8.9	30.4	60.0
	2025 + Com Dev + Proposed Development					
The Park	9.1	36.7	66.0	5.6	52.2	56.5
Moylaragh Road	5.2	49.9	62.8	4.4	48.7	56.5
Castlemill Link Road	7.0	44.2	65.1	8.2	32.6	58.9
	2040 + Com Dev + Proposed Development					
The Park	10.7	40.0	73.6	6.6	47.2	66.0
Moylaragh Road	6.2	54.4	70.6	4.9	51.1	62.1
Castlemill Link Road	8.3	48.4	73.1	9.4	33.3	64.0

Table 8.3: LINSIG Results for the Existing Castlemill Link Road / Moylaragh Road / The Park

8.8 Junction 4 – Clonard Road / Boulevard Road (PICADY & ARCADY)

Existing Priority Junction

8.8.1 **Table 8.4** below provides a summary of the PICADY assessment of the existing priority junction of Clonard Road/Boulevard Road whilst the full outputs are included in **Appendix M.**

	AM				PM			
	Queue (PCU)	Delay (s)	RFC	LOS	Queue (PCU)	Delay (s)	RFC	LOS
	2025 Base + Com Dev							
Stream B-AC	65.2	712.28	1.46	F	2.9	65.59	0.77	F
Stream C-AB	0.2	7.84	0.16	A	0.1	8.73	0.12	A
	2040 Base + Com Dev							
Stream B-AC	106.2	1345.79	1.81	F	7.8	164.71	0.97	F
Stream C-AB	0.2	8.48	0.18	A	0.2	9.48	0.13	A
	2025 Base + Com Dev + Proposed Development							
Stream B-AC	303.8	3110.5	2.51	F	53	684.39	1.49	F
Stream C-AB	0.3	8.49	0.2	A	0.3	11.22	0.25	B
	2040 Base + Com Dev + Proposed Development							
Stream B-AC	368.5	4037.22	3.1	F	80.8	1472.67	1.92	F
Stream C-AB	0.3	9.21	0.23	A	0.4	12.51	0.27	B

Table 8.4: PICADY Results for the Existing Clonard Road/Boulevard Road Junction

Where:
Arm A – Clonard Road (West)
Arm B – Boulevard Road
Arm C – Clonard Road (East))

8.8.2 This table demonstrates that the existing junction would operate over capacity in 2025 with committed development during the morning peak hour with queues and delay experienced on Boulevard Road (the minor). In the evening peak hour, whilst the Ratio of Flow to Capacity (RFC) is shown to be acceptable, the level of delays would still be excessive on Boulevard Road. The situation is exacerbated by 2040. The inclusion of development trips sees a significant increase in queue lengths and delay on Boulevard Road.

Proposed Roundabout Junction

8.8.3 It is proposed that the Clonard Road/Boulevard Road junction is improved by the provision of a three-arm roundabout as shown below in **Figure 8.4** and also in **Appendix M**.

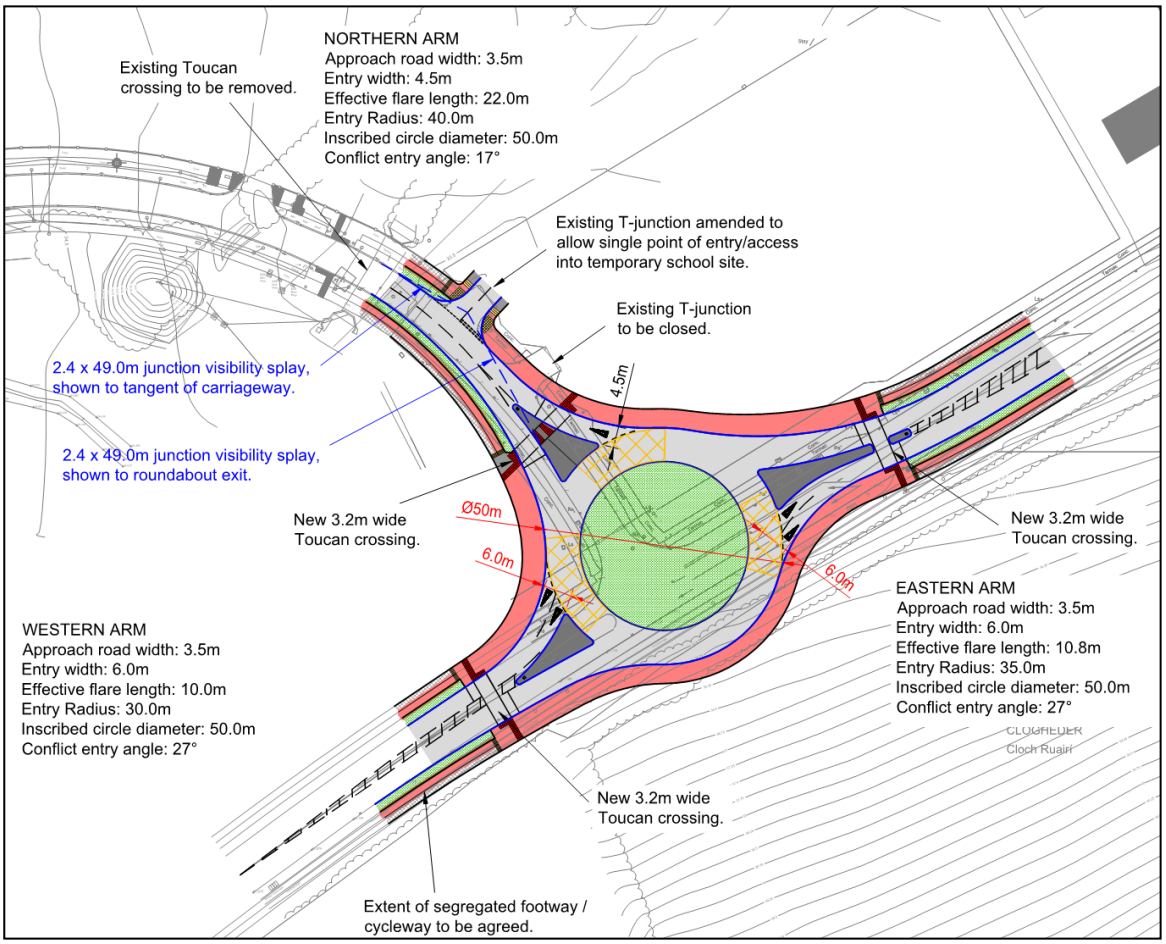

Figure 8.4: Proposed Clonard Road / Boulevard Road Three-Arm Roundabout

8.8.4 The proposed roundabout has Toucan Crossings on the 2 arms on Clonard Road and a raised Zebra Crossing on Boulevard Road and is designed largely in line with recommendations in the National Cycle Manual. It is of the same geometry proposed by FCC for the proposed Harry Reynolds Road scheme roundabout at the Harry Reynolds Road / R132 junction.

8.8.5 Whilst the proposed roundabout arrangement would provide Toucan Crossing on all arms, the proposed roundabout is designed to be attractive to pedal cyclists by slowing vehicle speeds through the roundabout. This has been achieved by having narrow approach road half widths and entry widths where possible and reducing the circulatory width.

8.8.6 **Table 8.5** below summarises the ARCADY assessment of the proposed roundabout:

	AM				PM			
	Queue (PCU)	Delay (s)	RFC	LOS	Queue (PCU)	Delay (s)	RFC	LOS
	2025 Base + Com Dev							
Clonard Road (West)	1.3	5.7	0.55	A	2.5	8.7	0.72	A
Boulevard Road	0.5	5.41	0.35	A	0.2	5	0.19	A
Clonard Road (East)	1.9	7.65	0.66	A	0.8	4.49	0.45	A
	2040 Base + Com Dev							
Clonard Road (West)	1.7	6.71	0.62	A	3.8	11.78	0.79	B
Boulevard Road	0.6	5.99	0.38	A	0.3	5.53	0.21	A
Clonard Road (East)	2.8	9.94	0.74	A	1	4.95	0.5	A
	2025 Base + Com Dev + Proposed Development							
Clonard Road (West)	1.5	6.26	0.59	A	4.9	14.97	0.84	B
Boulevard Road	1.3	8.04	0.57	A	0.5	5.98	0.33	A
Clonard Road (East)	2.6	10.12	0.72	B	1	5.06	0.5	A
	2040 Base + Com Dev + Proposed Development							
Clonard Road (West)	2	7.49	0.66	A	9.1	26.07	0.91	D
Boulevard Road	1.6	9.38	0.61	A	0.5	6.73	0.36	A
Clonard Road (East)	4.1	14.44	0.81	B	1.2	5.65	0.55	A

Table 8.5: ARCADY Results for the Proposed Clonard Road / Boulevard Road Roundabout

8.8.7 The results in **Table 8.5** show that the proposed roundabout would result in improvement in the operational performance of the junctions. All approaches, with the exception of Clonard Road (West), would have an RFC of less than 0.90. 0.91 and queues of less than 10 vehicles.

8.8.8 Clonard Road (West) would operate with an RFC of 0.91. It should be noted that an RFC of 0.91 (91%) is considered acceptable in this case and is lower than the 93% capacity suggested in 3.4.2 of DMURS where the creation of more compact roundabouts in favour of capacity is recommended.

8.8.9 Thus, the proposed implementation of a three-arm roundabout of the Clonard Road/Boulevard Road junction enables all of the traffic associated with the proposed development and committed development.

8.8.10 The ARCADY output data for Junction 4 is contained in **Appendix N**.

8.9 Junction 5 – Clonard Road / Castlemill Link Road (LINSIG)

8.9.1 **Table 8.6** overleaf provides a summary of the LINSIG assessment of the existing signalised junction of Clonard Road/Castlemill Link Road based on a 90-second cycle time.

8.9.2 This table demonstrates that the signalised junction will continue to operate within capacity for all scenarios assessed with the exception of Scenario 4 in the AM peak. During this scenario, Castlemill Link would operate at 94.1% of capacity.

	AM			PM		
	Queue (PCU)	Delay (s/PCU)	Deg of Sat (DoS) %	Queue (PCU)	Delay (s/PCU)	Deg of Sat (DoS) %
	2025 + Com Dev					
Castlemill Link Road	8.2	43.3	74.8	3.4	43.4	52.5
Clonard Rd East	10.0	41.0	72.4	4.9	31.1	53.5
Retail Park Access	2.7	40.8	55.0	3.9	38.4	43.8
Clonard Rd West	6.5	23.6	56.7	7.1	16.2	53.1
	2040 + Com Dev					
Castlemill Link Road	10.3	49.8	84.1	4.0	44.8	59.4
Clonard Rd East	12.4	47.0	81.9	5.7	32.5	59.6
Retail Park Access	3.0	41.3	61.6	4.4	38.3	46.7
Clonard Rd West	7.6	25.0	64.1	8.3	17.1	59.6
	2025 + Com Dev + Proposed Development					
Castlemill Link Road	10.4	50.4	84.6	4.1	45.0	61.5
Clonard Rd East	12.6	47.9	82.8	7.1	30.8	58.4
Retail Park Access	2.9	41.0	58.9	4.1	40.7	49.2
Clonard Rd West	11.6	35.9	82.7	9.6	19.1	66.1
	2040 + Com Dev + Proposed Development					
Castlemill Link Road	15.0	70.1	94.2	4.8	46.7	68.8
Clonard Rd East	16.8	63.7	92.2	7.9	31.8	64.5
Retail Park Access	3.3	41.6	65.5	4.7	41.8	55.1
Clonard Rd West	14.4	44.6	90.0	11.1	20.5	72.7

Table 8.6: LINSIG Results for the Existing Clonard Road/Castlemill Link Road Junction

8.9.3 To address Scenario 4 capacity concern, if the signal timings are changed to a 120 second cycle, the junction would operate within capacity for Scenario 4 as shown in **Table 8.7** below:

	AM			PM		
	Queue (PCU)	Delay (s/PCU)	Deg of Sat (DoS) %	Queue (PCU)	Delay (s/PCU)	Deg of Sat (DoS) %
	2040 + Com Dev + Proposed Development					
Castlemill Link Road	12.9	49.6	77.0	6.1	59.0	68.0
Clonard Rd East	15.7	45.9	76.6	9.0	34.2	62.6
Retail Park Access	4.5	60.2	77.6	6.3	55.8	65.4
Clonard Rd West	13.8	31.9	75.7	11.9	18.3	68.7

Table 8.7: LINSIG Results for the Clonard Road/Castlemill Link Road Junction with Amended 120 Second Cycle Time

8.9.4 The LINSIG output data for Junction 5 is contained in **Appendix O**.

8.10 Junction 6 – Clonard Road/Millfield Shopping Centre Roundabout (ARCADY)

8.10.1 **Table 8.8** overleaf provides a summary of the ARCADY assessment of the Clonard Road/Millfield Shopping Centre Roundabout.

	AM				PM			
	Queue (PCU)	Delay (s)	RFC	LOS	Queue (PCU)	Delay (s)	RFC	LOS
	2025 + Com Dev							
Clonard Road (East)	1.2	6.57	0.54	A	0.8	5.46	0.44	A
Tesco Access	0.3	5.56	0.22	A	0.8	6.53	0.43	A
Clonard Road (West)	0.8	5.84	0.44	A	0.8	6.55	0.45	A
Westbrook Park	0.1	5.62	0.13	A	0.1	5.81	0.07	A
	2040 + Com Dev							
Clonard Road (East)	1.5	7.55	0.6	A	1	6.01	0.49	A
Tesco Access	0.4	6.05	0.26	A	1	7.42	0.49	A
Clonard Road (West)	1	6.5	0.49	A	1.1	7.53	0.52	A
Westbrook Park	0.2	6.01	0.15	A	0.1	6.22	0.08	A
	2025 + Com Dev + Proposed Development							
Clonard Road (East)	1.3	6.8	0.56	A	0.9	5.7	0.46	A
Tesco Access	0.3	5.63	0.23	A	0.8	6.94	0.45	A
Clonard Road (West)	1	6.46	0.49	A	1	7.1	0.5	A
Westbrook Park	0.2	5.89	0.13	A	0.1	5.98	0.07	A
	2040 + Com Dev + Proposed Development							
Clonard Road (East)	1.6	7.85	0.62	A	1.1	6.33	0.51	A
Tesco Access	0.4	6.16	0.26	A	1.1	8	0.52	A
Clonard Road (West)	1.2	7.22	0.54	A	1.3	8.24	0.56	A
Westbrook Park	0.2	6.3	0.16	A	0.1	6.45	0.08	A

Table 8.8: ARCADY Results for the Clonard Road/Millfield Shopping Centre Roundabout

8.10.2 **Table 8.8** shows that the roundabout will continue to operate within capacity with negligible levels of queuing and delays in 2025 and 2040 with and without the proposed development.

8.10.3 The ARCADY output data for Junction 6 is contained in **Appendix P**.

8.11 Junction 8 – Naul Road/C-Ring (L1390) Roundabout (ARCADY)

8.11.1 **Table 8.9** below and overleaf provides a summary of the ARCADY assessment of the existing Naul Road/C-Ring (L1390) Roundabout.

	AM				PM			
	Queue (PCU)	Delay (s)	RFC	LOS	Queue (PCU)	Delay (s)	RFC	LOS
	2025 Base + Com Dev							
Naul Road (North)	1.1	3.45	0.53	A	0.4	2.22	0.3	A
L1390	0.3	2.66	0.2	A	0.3	2.41	0.24	A
Naul Road (South)	0.7	2.69	0.39	A	1	3.2	0.49	A
	2040 Base + Com Dev							
Naul Road (North)	1.5	4.05	0.59	A	0.5	2.35	0.34	A
L1390	0.3	2.92	0.23	A	0.4	2.59	0.27	A
Naul Road (South)	0.8	2.95	0.43	A	1.2	3.63	0.55	A

	2025 Base + Com Dev + Proposed Development							
Naul Road (North)	1.5	4.07	0.6	A	0.5	2.3	0.34	A
L1390	0.3	2.85	0.22	A	0.4	2.51	0.25	A
Naul Road (South)	0.7	2.78	0.4	A	1.3	3.64	0.55	A
	2040 Base + Com Dev + Proposed Development							
Naul Road (North)	2	4.9	0.66	A	0.6	2.46	0.37	A
L1390	0.4	3.13	0.25	A	0.4	2.69	0.29	A
Naul Road (South)	0.9	3.05	0.45	A	1.6	4.22	0.61	A

Table 8.9: ARCADY Results for the Existing Naul Road /L1390 Roundabout

8.11.2 The ARCADY output data for Junction 8 is contained in **Appendix Q**.

8.12 Junction 12 – Drogheda Road / Harry Reynolds Road (LINSIG)

8.12.1 **Table 8.10** below provides a summary of the LINSIG assessment of the existing signalised junction of Drogheda Road / Harry Reynolds Road.

8.12.2 This table demonstrates that the signalised junction will continue to operate within capacity for all scenarios assessed.

	AM			PM		
	Queue (PCU)	Delay (s/PCU)	Deg of Sat (DoS) %	Queue (PCU)	Delay (s/PCU)	Deg of Sat (DoS) %
	2025 + Com Dev					
Drogheda Road (North)	9.4	20.8	59.0	5.5	22.7	41.9
Drogheda Road (South)	5.8	17.1	36.3	10.7	24.5	59.4
Harry Reynolds Road	5.9	41.6	57.6	6.9	36.4	57.9
	2040 + Com Dev					
Drogheda Road (North)	9.6	21.8	60.2	5.5	22.9	41.9
Drogheda Road (South)	6.1	17.9	37.8	11.2	25.0	61.6
Harry Reynolds Road	6.4	41.1	59.5	7.3	37.0	60.0
	2025 + Com Dev + Proposed Deveolopment					
Drogheda Road (North)	11.3	22.4	65.4	6.4	24.0	46.8
Drogheda Road (South)	6.7	17.6	40.2	12.6	26.3	66.4
Harry Reynolds Road	6.7	44.0	64.0	8.1	38.7	64.8
	2040 + Com Dev + Proposed Development					
Drogheda Road (North)	11.7	23.5	68.8	6.4	24.2	46.8
Drogheda Road (South)	6.9	18.5	41.9	13.2	27.0	68.6
Harry Reynolds Road	7.3	43.5	65.9	8.4	39.5	61.0

Table 8.10: LINSIG Results for the Drogheda Road / Harry Reynolds Road Junction

8.12.3 The LINSIG output data for Junction 12 is contained in **Appendix R.**

8.13 Junction 13 – Chapel Street / Harry Reynolds Road (LINSIG)

8.13.1 **Table 8.11** below provides a summary of the LINSIG assessment of the existing signalised junction of Chapel Street and HRR based on a 90 second cycle time.

	AM			PM		
	Queue (PCU)	Delay (s/PCU)	Deg of Sat (DoS) %	Queue (PCU)	Delay (s/PCU)	Deg of Sat (DoS) %
	2025 + Com Dev					
Harry Reynolds Road (N)	21.0	107.4	100.0	4.4	61.3	75.3
Chapel Street (East)	11.7	162.2	99.4	14.9	261.3	107.5
Harry Reynolds Road (S)	11.0	163.6	99.0	19.6	161.2	102.3
Chapel Street (West)	23.4	178.2	104.4	36.3	230.8	109.0
	2040 + Com Dev					
Harry Reynolds Road (N)	46.7	248.8	111.2	4.8	63.7	80.6
Chapel Street (East)	14.0	194.9	102.8	20.7	354.1	115.3
Harry Reynolds Road (S)	15.5	236.7	105.9	32.4	277.0	111.4
Chapel Street (West)	25.4	173.1	104.4	44.3	273.2	112.2
	2025 + Com Dev + Proposed Development					
Harry Reynolds Road (N)	53.4	258.4	112.0	5.7	71.3	84.8
Chapel Street (East)	20.4	283.0	110.4	24.0	403.7	119.3
Harry Reynolds Road (S)	18.6	281.1	109.6	36.4	309.5	113.9
Chapel Street (West)	41.9	310.7	114.5	62.6	384.1	120.6
	2040 + Com Dev + Proposed Development					
Harry Reynolds Road (N)	69.6	325.0	117.0	6.4	76.6	90.6
Chapel Street (East)	23.6	324.6	113.8	30.8	494.2	127.1
Harry Reynolds Road (S)	25.1	372.8	117.0	51.6	425.0	123.0
Chapel Street (West)	57.4	397.9	121.4	71.9	425.5	124.0

Table 8.11: LINSIG Results for the Existing Chapel Street / Harry Reynolds Road Junction

8.13.2 The results in **Table 8.11** show that the existing Chapel Street / HRR signalised junction would operate over capacity for all assessment scenarios in the morning and evening peak hours.

8.13.3 The current phasing of the junction has each approach having its own green phase as shown in the phasing diagram in **Figure 8.5** below:

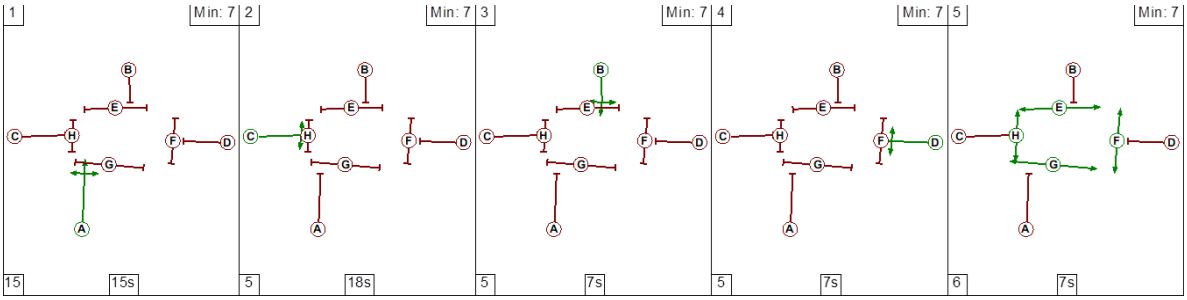

Figure 8.5: Existing Junction 13 Phasing Diagram

8.13.4 However, capacity can be greatly increased at the junction by changing the phasing so that HRR north and south run concurrently. As there a few HHR (south) to Chapel Street (east) movements, this will operate as 'opposed turners'. An Indicative Right Turn Arrow will be provided for HRR (north) to Chapel Street (west). The provision of a Filter Arrow for Chapel Street (west) to HRR (north) would also improve the efficiency of the signals. The proposed Phasing Diagram is shown in **Figure 8.6** below:

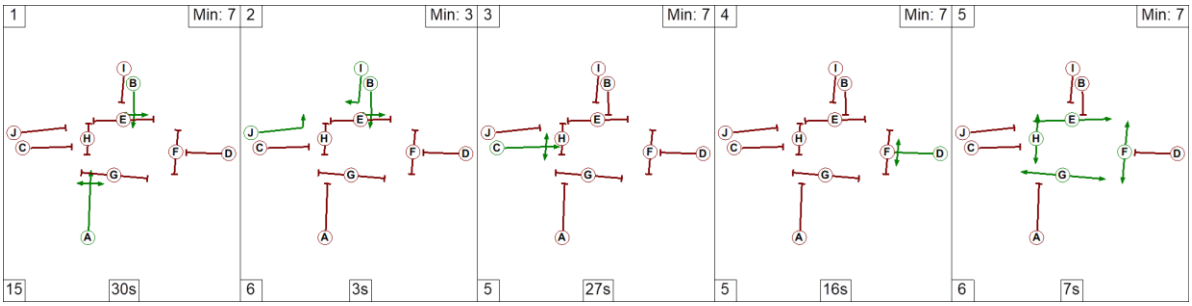

Figure 8.6: Proposed Junction 13 Phasing Diagram

8.13.5 The capacity of the junction can also be improved by changing the cycle time from 90 seconds to 120 seconds. The proposed change in phasing and cycle time can be achieved without altering the physical geometry of the junction, although a new signal controller and signal heads would be required along with changes to the existing road markings.

8.13.6 The results of the revised LINSIG modelling are summarised in **Table 8.12** below and demonstrate that the proposed changes to the junction would mean that it would operate within capacity in 2040 with the proposed development.

	AM			PM		
	Queue (PCU)	Delay (s/PCU)	Deg of Sat (DoS) %	Queue (PCU)	Delay (s/PCU)	Deg of Sat (DoS) %
	2040 + Com Dev + Proposed Development					
Harry Reynolds Road (N)	16.5	57.4	86.7	5.1	50.4	62.3
Chapel Street (East)	9.8	87.7	84.3	8.4	82.2	79.8
Harry Reynolds Road (S)	7.8	62.5	66.8	15.1	65.4	84.6
Chapel Street (West)	14.9	58.2	84.7	11.9	53.5	82.7

Table 8.12: LINSIG Results for the Proposed Chapel Street / Harry Reynolds Road Junction with Amended Phasing and 120 Second Cycle Time

8.13.7 The LINSIG output data for Junction 13 is contained in **Appendix S**.

8.14 Junction A – Southern Internal Cross Road Junction (LINSIG)

8.14.1 **Table 8.13** overleaf provides a summary of the LINSIG assessment of the proposed signalised internal junction with Boulevard Road. The results demonstrates that the proposed signalised junction would operate within capacity for all scenarios assessed.

8.14.2 The predicted 2025 and 2040 traffic flows are based on development trip generation which would be identical for both scenarios, as it is assumed for worst case assessment purposes on the wider network, further lines to the FLR are not provided. Thus, the LINSIG results are also identical for both scenarios.

	AM			PM		
	Queue (PCU)	Delay (s/PCU)	Deg of Sat (DoS) %	Queue (PCU)	Delay (s/PCU)	Deg of Sat (DoS) %
	2025 + Com Dev + Proposed Development					
Flemington Link (North)	2.4	39.7	32.8	1.5	45.7	28.3
Boulevard Road	0.8	45.2	18.3	2.0	34.1	30.4
Flemington Link (South)	0.5	47.7	12.1	0.3	47.0	6.7
Internal Access	2.1	44.5	31.9	1.2	53.7	27.5
	2040 + Com Dev + Proposed Development					
Flemington Link (North)	2.4	39.7	32.8	1.5	45.7	28.3
Boulevard Road	0.8	45.2	18.3	2.0	34.1	30.4
Flemington Link (South)	0.5	47.7	12.1	0.3	47.0	6.7
Internal Access	2.1	44.5	31.9	1.2	53.7	27.5

Table 8.13: LINSIG Results for Junction A – Southern Internal Cross Road Junction

8.14.3 The LINSIG output data for Junction A is contained in **Appendix T**. The results show that the junction as part of a local road will operate at between just 12 – 33% in the AM and 6 – 30% in the PM for 2040 meaning the junction has adequate capacity for all scenarios including if it forms part of the future extension of the C-Ring around Balbriggan.

8.15 Junction B – Northern Internal Cross Road Junction (LINSIG)

8.15.1 **Table 8.14** below provides a summary of the LINSIG assessment of the proposed signalised junction of the Flemington Link Road and Hamlet Lane.

	AM			PM		
	Queue (PCU)	Delay (s/PCU)	Deg of Sat (DoS)	Queue (PCU)	Delay (s/PCU)	Deg of Sat (DoS)
	2025 + Com Dev + Proposed Development					
Flemington Link (North)	1.6	22.7	13.3	0.8	25.3	7.8
Hamlet Lane	0.3	39.7	5.3	0.9	35.6	12.1
Flemington Link (South)	0.4	15.5	5.2	1.4	18.9	12.3
Internal Access	0.8	40.3	12.5	0.4	34.6	5.1
	2040 + Com Dev + Proposed Development					
Flemington Link (North)	1.6	22.7	13.3	0.8	25.3	7.8
Hamlet Lane	0.3	39.7	5.3	0.9	35.6	12.1
Flemington Link (South)	0.4	15.5	5.2	1.4	18.9	12.3
Internal Access	0.8	40.3	12.5	0.4	34.6	5.1

Table 8.14: LINSIG Results for Junction B – Northern Internal Cross Road Junction

8.15.2 The results in **Table 8.14** show the proposed Internal junction with Hamlet Lane would operate within capacity in all scenarios.

8.15.3 The LINSIG output data for Junction B is contained in **Appendix U**. The results show that the junction as part of a local road will operate at between just 5 - 13% in the AM and 5 – 12% in the PM for 2040 meaning the junction has adequate capacity for all scenarios including if it forms part of the future

extension of the C-Ring around Balbriggan.

8.16 Road Safety

8.16.1 The predicted increase in traffic flows along the R122 will not have an adverse effect upon the existing road safety record in this part of Balbriggan.

8.16.2 Furthermore, safety will be improved at Junction 4 with the proposed construction of three-arm roundabout with segregate cycle routes and signal-controlled crossings on all approaches.

9 SMARTER TRAVEL INITIATIVES

9.1 Introduction

9.1.1 Smarter Travel aims to make people think about how and why we make travel choices for all the trips we make. It's about considering the impact our travel decisions have on others and on ourselves.

9.1.2 Smarter Travel is the transport policy for Ireland that sets out how the vision of a sustainable travel and transport system can be achieved.

9.1.3 Smarter Travel initiatives could play an important role in affecting existing and future traffic conditions in Balbriggan, particularly along the Naul Road/Clonard Road corridor. Changes in travel behaviour can avoid costly physical infrastructure improvements being required to address congestion that, in reality, will only occur during a very limited part of the day.

9.1.4 The application of Smarter Travel initiatives would reduce overall traffic levels in Balbriggan and enable improvements to sustainable modes of transport, rather than to physical infrastructure, and accords with national policy.

9.2 National Policy

9.2.1 Smarter Travel – A Sustainable Transport Future 2009-2020 aims to deliver a sustainable transport system as an important dimension of the climate change agenda.

9.2.2 In this document the Government reaffirms its vision for sustainability in transport and sets out five key goals:

- to reduce overall travel demand,
- to maximise the efficiency of the transport network,
- to reduce reliance on fossil fuels,
- to reduce transport emissions, and
- to improve accessibility to transport and improve our quality of life.

9.2.3 The Design Manual for Urban Roads and Streets (DMURS) sets out design standards for urban roads and streets which balance the “place function” (i.e. the needs of residents and visitors) with the “transport function” (i.e. the needs of pedestrians, cyclists, public transport, cars, and goods vehicles). The manual gives guidance on the layout of new developments (with a view to maximising permeability for sustainable modes), and on the design of individual roads and streets considering streetscape, and urban design as well as engineering. The focus is on providing streets that are good places to live, work and play in, while providing appropriate capacity for pedestrians, cyclists, public transport and cars.

9.2.4 The use of DMURS is mandatory for all Local Authorities. A DMURS Compliance Statement has been prepare by MPA Consulting Engineers (Document Ref: 191004-DMURS-F01).

9.3 Fingal County Development Plan

9.3.1 The Development Plan 2017 – 2023 identifies that the function of the transport system is to cater for the travel needs of people and businesses, consistent with the broader policies of the Plan. A safe, efficient, effective and sustainable transportation system is essential to the future economic, social and physical development of Fingal. While it is clear that walking, cycling, and public transport are the most sustainable modes of transport, it is also clear that some essential travel will continue to be made by cars and goods vehicles.

9.3.2 The Development Plan includes a Statement of Policy that commits to:

- Promote and facilitate movement to, from, and within the County of Fingal, by integrating land use with a high quality, sustainable transport system that prioritises walking, cycling and public transport.
- Provide an appropriate level of safe road infrastructure and traffic management, in particular to support commercial and industrial activity and new development.
- Work with all relevant stakeholders to seek a reduction in greenhouse gas emissions from transport.

9.3.3 Objective MT03 in the Development Plan commits to implement the Smarter Travel policy and work to achieve the Key Goals set out in this policy. Objective MT04 states that at locations where higher density development is being provided, the Council will encourage the development of car-free neighbourhoods, where non-motorised transport is allowed and motorised vehicles have access only for deliveries but must park outside the neighbourhood, creating a much better-quality public realm with green infrastructure, public health, economic and community benefits.

9.3.4 The Development Plan goes on to say that the integration of land-use and transport involves locating trip intensive land uses (such as high-density housing, offices, and comparison retail) near high-capacity public transport (such as DART, Metro, Luas, and Bus Rapid Transit). It benefits the land uses by providing high quality public transport for the greatest number of residents and employees. It benefits public transport by providing sufficient numbers of customers within its catchment to sustain the high cost of public transport infrastructure and services.

9.3.5 The Development Plan states that this approach will ensure that the places where people live are either close to, or are connected by public transport to, their places of work or education, thereby allowing people to use the most sustainable modes of transport, namely walking, cycling, and public transport. The private car is an inefficient use of scarce and valuable road space, especially single occupancy cars during congested peak periods in urban areas. Allowing higher density development to occur along public transport corridors increases the number of people within the walking catchment of the public transport service, which in turn increases the patronage of the service, and leads to an increase in its financial and economic viability and positive environmental impact. The provision of an integrated approach with a well-designed public realm will help secure the modal shift to more sustainable modes of transport, i.e. walking and cycling.

9.4 Smarter Travel Initiatives

Green Schools

9.4.1 The transport component of the Green Schools programme is funded by the Department of Transport, Tourism and Sport.

9.4.2 While creating their Action Plan, participating schools set Travel targets, with the ultimate aim of increasing the number of pupils walking, cycling, scooting, carpooling, using public transport or using park 'n' stride instead of the private car on the school run.

9.4.3 By promoting these sustainable transport modes, schools will also improve pupils' safety, health and fitness. The journey to school is an ideal way for children to take part in regular physical activity, to interact with their peers, and to develop the road sense children need as pedestrians and cyclists. Alternative modes of transport also improve children's alertness. The schools will also lessen their overall impact on the environment, by reducing emissions and pollution.

9.4.4 Green - Schools Travel was rolled out nationally in September 2008 after a successful pilot programme in the Greater Dublin area.

Mobility Management Plans

9.4.5 Mobility Management Plans (MMPs) set out measures which promote sustainable transport for particular places of work or education. The measures normally include:

- The appointment of a Mobility Manager at senior level within the organisation who is responsible for implementing the Plan.
- Conducting a survey of travel patterns of residents, staff and visitors.
- Setting targets for the share of trips made by sustainable modes.
- Making available showers and locker rooms for cyclists and walkers.
- Provide adequate bicycle parking.
- Enabling staff to avail of Government tax-saver schemes for the purchase of bicycles and public transport tickets.
- Providing information on walking routes, cycle routes and public transport services.
- Flexible working hours.
- Promotion of car sharing (e.g. by assigning priority car parking spaces).
- Promotion of cycle trains and walking buses, especially for schools.

9.4.6 The MMP prepared for this development (MPA Ref. 191004-MMP-F01) seeks to promote the use of non-car modes. This will be achieved primarily by providing detailed information on the availability of non-car travel options together with the provision of facilities that will encourage their use.

9.4.7 A MMP Co-ordinator will be appointed to promote, implement, monitor and develop the MMP. The role will include offering travel plan information and advice to all site users and the promotion of MMP measures. This person will act as a focal point for information for residents.

9.4.8 A resident's Welcome Pack will be provided for first time residents of each dwelling. This Welcome Pack will include detailed and specific travel information such as the following:

- Walking and cycling maps showing local walking and cycling routes;
- Site specific public transport information identifying the location of nearby bus stops and which services are available from them;
- Appropriate contact details for public transport enquiries and car share websites;
- Leaflets explaining the health and financial benefits associated with reducing car use; and
- A summary of the objectives, benefits and targets associated with the MMP.

9.4.9 A Mobility Plan Framework has been prepared by MPA Consulting Engineers (Reference Document: 191004-MMP-F01). The Framework document is submitted to Fingal County Council in support of the proposed development.

Smarter Travel Initiatives for Balbriggan

9.4.10 It is suggested that the following Smarter Travel measures and initiatives are investigated in the short term as part of the proposed development:

- Ascertain whether the five schools located in the west of Balbriggan have a functioning Green Schools Travel Plan (GSTP) in place as it is believed that a large number of the trips currently made to/from school in cars can very easily be transferred to other more sustainable modes of travel, such as walking and cycling.
- Help the schools to prepare/update their GSTP in order to reduce the number of vehicular trips to/from schools.

9.4.11 In the medium term it is suggested that the following Smarter Travel measures and initiatives are investigated as part of development in the wider North West Balbriggan Masterplan Area:

- Convert the B1 bus service into a single circular route by routing buses along the FLR when it is delivered. This will effectively link the Hamlet Lane and Clonard Road parts of the route.
- Increase the frequency of the B1 bus service to provide better linkages to the town centre and train station.

10 SUMMARY AND CONCLUSIONS

10.1 Summary

10.1.1 The report has been prepared to examine the traffic and transportation considerations associated with the proposals and to demonstrate the accessibility of the site by a range of transport modes.

10.1.2 In summary, this report demonstrates that:

- The site is very well located for future residents and visitors to access an extensive range of local facilities by sustainable modes of travel, such as walking, cycling, bus and train.
- The trips associated with the existing schools and the permitted residential development at Taylor Hill Phases 1 and 2, and Ladywell (the committed residential development) have been added to provide the base traffic flows for the area.
- The development assessed in this TTA comprises 593 residential dwellings and three creches;
- Residential car and cycle parking provision is based upon requirements suggested by FCC in their pre-application response.
- The site will be accessed through the extension of Boulevard Road and Hamlet Lane.
- The proposed road layout will enable the completion of the 'C' Ring Road in the future.
- The proposed access arrangement and internal road network accords with DMURS and the layout is deemed to be appropriate to serve the proposed housing development.
- There will be safe pedestrian and cycle links between the site and various local facilities.
- The additional residential development trips associated with the proposed development have been assigned on to the road network using the distribution surveyed at the Castlemill Link Road / Clonard Road junction. This distribution has then been applied to the Boulevard Road/Clonard junction.
- An Area Wide Traffic Model has been built to identify the percentage impact of the proposed development at each of the key junctions within the study area.
- As requested by FCC, junctions with an increase in traffic of 2.5% and over as a result of the proposed development should be assessed in further detail.
- As such, junctions 1, 2, 4, 5, 6, 8, 12 and 13 have been assessed using computer models in this TTA.
- Junction 7 has not been assessed further, even though the percentage increase is above 2.5% as the increase in traffic volumes at junction 7 takes place on the R122 and does not involve any turning movements and thus is unlikely to suffer any adverse effects. Furthermore, junction 7 will only serve the existing properties at the southern end in the future as the FLR is delivered.
- Traffic growth has been calculated using the growth factors contained in the TII Project Appraisal Guidelines using the low growth rate factor due to the large amount of development traffic already being added to avoid double-counting.
- Traffic growth has been applied to factor the surveyed flows to 2025 to reflect the envisioned opening year of the development.
- Further growth (up to 15 years after the opening year as stated in the TTAG) has been applied as the development for a design year of 2040. However, it is noted the subsequent introduction

of the FLR and further development as part of the North West Balbriggan Masterplan means that the 2040 assessments would not be reflective of actual traffic and travel patterns.

- The existing priority junction at Boulevard Road/Clonard Road should be improved by the provision of a three-arm compact roundabout. Once this is completed, the roundabout will operate within capacity for all scenarios assessed.
- The existing signalised junction of Clonard Road/Castlemill Link Road, existing Millfield Shopping Centre roundabout and existing Naul Road/L1390 Roundabout will operate within capacity with negligible levels of queuing and delays in 2025 with all of the development traffic added.
- The existing junction between Chapel Road and Harry Reynolds Road operates over capacity for all assessment scenarios. However, amendments to the signal phases and cycle time would result in the junction operating within capacity for all assessment scenarios.
- The predicted increase in traffic flows along the R122 is not expected to adversely impact on road safety in this part of Balbriggan.
- A Mobility Management Plan Framework has been prepared to promote the use of non-car modes. The Framework document is submitted to Fingal County Council as part of the planning application.
- It is recommended that Dean Swift Property Holdings in conjunction with Glenveagh, who are developing the southern part of the masterplan site, should ascertain whether the five schools located in the west of Balbriggan have a functioning Green Schools Travel Plan (GSTP) in place and help the schools to prepare/update their GSTP in order to reduce the number of vehicular trips to/from schools.
- In the medium term, it is suggested that the following Smarter Travel measures and initiatives are investigated as part of development in the wider North West Balbriggan Masterplan Area:
  - ❖ Convert the B1 bus service into a single circular route by routing buses along Boulevard Road or the FLR, when it is delivered. This will effectively link the Hamlet Lane and Clonard Road parts of the route.
  - ❖ Increase the frequency of the B1 bus service to provide better linkages to the town centre and train station.

10.2 Conclusion

10.2.1 It is concluded that there will be no adverse impacts associated with the proposed housing development and, as such, there is no traffic or transportation reason why this development should not be permitted.

APPENDIX A

2018 Traffic Survey Data



NDC NATIONWIDE DATA COLLECTION	**Site / Location:**	Sites 1 to 6 / Balbriggan	**Project No:**	9486	**Diagram No:**	9486-01	**Drawn By:**	AC
	Survey Date:	Wednesday 28th November 2018	**Project Name:**	BALBRIGGAN				
	Survey Times:	07:00 to 19:00	**Diagram Title:**	General Location Plan				

Site No. 1
Location Trimleston / The Rise(W) / Barons Hall Rise / The Rise(E)
Date Wednesday 28 November 2018

Time	A to D - Trimleston to The Rise(E)						Veh. Total	A to C - Trimleston to Barons Hall Rise						Veh. Total
	CAR	LGV	HGV	PSV	M/C	P/C		CAR	LGV	HGV	PSV	M/C	P/C	
07:00	0	0	0	0	0	0	0	1	0	0	0	0	0	1
07:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:30	1	0	0	0	0	0	1	4	1	0	0	0	0	5
07:45	0	0	0	0	0	0	0	1	1	0	0	0	0	2
Hour	1	0	0	0	0	0	1	6	2	0	0	0	0	8
08:00	1	0	0	1	0	0	2	3	0	0	0	0	0	3
08:15	2	0	0	0	0	0	2	2	0	0	0	0	0	2
08:30	1	1	0	0	0	0	2	6	0	0	0	0	0	6
08:45	2	0	0	0	0	0	2	2	0	0	0	0	0	2
Hour	6	1	0	1	0	0	8	13	0	0	0	0	0	13
09:00	2	0	0	0	0	0	2	1	0	0	0	0	0	1
09:15	1	0	0	0	0	0	1	0	0	0	0	0	0	0
09:30	0	0	0	0	0	0	0	1	0	0	0	0	0	1
09:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hour	3	0	0	0	0	0	3	2	0	0	0	0	0	2
10:00	0	0	0	0	0	0	0	2	0	0	0	0	0	2
10:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:30	2	0	0	0	0	0	2	0	0	0	0	0	0	0
10:45	1	0	0	0	0	0	1	2	0	0	0	0	0	2
Hour	3	0	0	0	0	0	3	4	0	0	0	0	0	4
11:00	0	0	0	0	0	0	0	1	0	0	0	0	0	1
11:15	1	0	0	0	0	0	1	0	0	0	0	0	0	0
11:30	0	0	0	0	0	0	0	1	0	0	0	0	0	1
11:45	0	0	0	0	0	0	0	2	0	0	0	0	0	2
Hour	1	0	0	0	0	0	1	4	0	0	0	0	0	4
12:00	1	0	0	0	0	0	1	1	0	0	0	0	0	1
12:15	0	1	0	0	0	0	1	1	0	0	0	0	0	1
12:30	1	1	0	0	0	0	2	2	0	0	0	0	0	2
12:45	0	2	0	0	0	0	2	0	0	0	0	0	0	0
Hour	2	4	0	0	0	0	6	4	0	0	0	0	0	4
13:00	0	0	0	0	0	0	0	1	0	0	0	0	0	1
13:15	0	0	0	0	0	0	0	1	0	0	0	0	0	1
13:30	1	0	0	0	0	0	1	4	0	0	0	0	0	4
13:45	0	0	0	0	0	0	0	2	1	0	0	0	0	3
Hour	1	0	0	0	0	0	1	8	1	0	0	0	0	9
14:00	1	0	0	0	0	0	1	4	0	0	0	0	0	4
14:15	0	0	0	0	0	0	0	1	1	0	0	0	0	2
14:30	1	0	0	0	0	0	1	2	0	0	0	0	0	2
14:45	0	0	0	0	0	0	0	4	0	0	0	0	0	4
Hour	2	0	0	0	0	0	2	11	1	0	0	0	0	12
15:00	1	0	0	0	0	0	1	6	0	0	0	0	0	6
15:15	2	0	0	0	0	0	2	0	0	0	0	0	0	0
15:30	1	0	0	0	0	0	1	2	0	0	0	0	0	2
15:45	0	0	0	0	0	0	0	5	0	0	0	0	0	5
Hour	4	0	0	0	0	0	4	13	0	0	0	0	0	13
16:00	2	0	0	0	0	0	2	2	0	0	0	0	0	2
16:15	0	0	0	1	0	0	1	1	0	0	0	0	0	1
16:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:45	0	0	0	0	0	0	0	1	0	0	0	0	0	1
Hour	2	0	0	1	0	0	3	4	0	0	0	0	0	4
17:00	0	0	0	0	0	0	0	1	0	0	0	0	0	1
17:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:45	2	0	0	0	0	0	2	0	1	0	0	0	0	1
Hour	2	0	0	0	0	0	2	1	1	0	0	0	0	2
18:00	1	0	0	0	0	0	1	4	0	0	0	0	0	4
18:15	2	0	0	0	0	0	2	0	0	0	0	0	0	0
18:30	0	0	0	0	0	0	0	5	1	0	0	0	0	6
18:45	2	0	0	0	0	0	2	4	0	0	0	0	0	4
Hour	5	0	0	0	0	0	5	13	1	0	0	0	0	14
Total	32	5	0	2	0	0	39	83	6	0	0	0	0	89

Site No. 1
Location Trimleston / The Rise(W) / Barons Hall Rise / The Rise(E)
Date Wednesday 28 November 2018

Time	A to B - Trimleston to The Rise(W)						Veh. Total	B to A - The Rise(W) to Trimleston						Veh. Total
	CAR	LGV	HGV	PSV	M/C	P/C		CAR	LGV	HGV	PSV	M/C	P/C	
07:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:45	1	0	0	0	0	0	1	0	0	0	0	0	0	0
Hour	1	0	0	0	0	0	1	0	0	0	0	0	0	0
08:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:30	1	0	0	0	0	0	1	0	0	0	0	0	0	0
08:45	0	0	0	0	0	0	0	1	0	0	0	0	0	1
Hour	1	0	0	0	0	0	1	1	0	0	0	0	0	1
09:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
09:15	1	0	0	0	0	0	1	0	0	0	0	0	0	0
09:30	1	0	0	0	0	0	1	0	0	0	0	0	0	0
09:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hour	2	0	0	0	0	0	2	0	0	0	0	0	0	0
10:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:45	0	0	0	0	0	0	0	1	0	0	0	0	0	1
Hour	0	0	0	0	0	0	0	1	0	0	0	0	0	1
11:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hour	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:15	0	0	0	0	0	0	0	1	1	0	0	0	0	2
12:30	1	0	0	0	0	0	1	1	1	0	0	0	0	2
12:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hour	1	0	0	0	0	0	1	2	2	0	0	0	0	4
13:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13:15	0	1	0	0	0	0	1	0	1	0	0	0	0	1
13:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13:45	2	0	0	0	0	0	2	0	0	0	0	0	0	0
Hour	2	1	0	0	0	0	3	0	1	0	0	0	0	1
14:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14:15	1	0	0	0	0	0	1	1	0	0	0	0	0	1
14:30	2	0	0	0	0	0	2	0	0	0	0	0	0	0
14:45	0	0	0	0	0	0	0	1	0	0	0	0	0	1
Hour	3	0	0	0	0	0	3	2	0	0	0	0	0	2
15:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15:30	0	1	0	0	0	0	1	0	0	0	0	0	0	0
15:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hour	0	1	0	0	0	0	1	0	0	0	0	0	0	0
16:00	1	0	0	0	0	0	1	3	0	0	0	0	0	3
16:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:45	0	0	0	0	0	0	0	1	0	0	0	0	0	1
Hour	1	0	0	0	0	0	1	4	0	0	0	0	0	4
17:00	1	0	0	0	0	0	1	0	0	0	0	0	0	0
17:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:45	1	0	0	0	0	0	1	0	0	0	0	0	0	0
Hour	2	0	0	0	0	0	2	0	0	0	0	0	0	0
18:00	0	0	0	0	0	0	0	1	0	0	0	0	0	1
18:15	0	0	0	0	0	0	0	1	0	0	0	0	0	1
18:30	0	0	0	0	0	0	0	1	0	0	0	0	0	1
18:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hour	0	0	0	0	0	0	0	3	0	0	0	0	0	3
Total	13	2	0	0	0	0	15	13	3	0	0	0	0	16

Site No. 1
Location Trimleston / The Rise(W) / Barons Hall Rise / The Rise(E)
Date Wednesday 28 November 2018

Time	B to D - The Rise(W) to The Rise(E)						Veh. Total	B to C - The Rise(W) to Barons Hall Rise						Veh. Total
	CAR	LGV	HGV	PSV	M/C	P/C		CAR	LGV	HGV	PSV	M/C	P/C	
07:00	7	2	0	2	0	1	12	10	1	0	0	0	0	11
07:15	10	1	0	0	0	0	11	7	2	0	0	0	0	9
07:30	11	1	0	1	0	1	14	16	1	0	0	0	0	17
07:45	11	1	0	4	0	0	16	27	2	1	0	0	0	30
Hour	39	5	0	7	0	2	53	60	6	1	0	0	0	67
08:00	13	2	0	2	0	0	17	15	0	0	1	0	0	16
08:15	15	0	0	1	0	2	18	16	2	1	1	0	0	20
08:30	15	0	0	1	0	0	16	14	2	0	2	0	0	18
08:45	46	1	0	1	0	1	49	11	1	0	0	0	0	12
Hour	89	3	0	5	0	3	100	56	5	1	4	0	0	66
09:00	22	0	0	1	0	0	23	16	0	0	0	0	0	16
09:15	16	1	0	1	0	0	18	2	1	0	0	0	0	3
09:30	14	1	0	0	0	0	15	9	0	0	0	0	0	9
09:45	13	1	0	1	0	0	15	9	2	0	0	0	0	11
Hour	65	3	0	3	0	0	71	36	3	0	0	0	0	39
10:00	5	0	0	0	0	1	6	3	0	0	0	0	0	3
10:15	2	0	0	1	0	0	3	5	0	2	1	0	0	8
10:30	9	0	0	0	0	0	9	7	0	0	0	0	0	7
10:45	7	0	0	1	0	0	8	3	1	1	0	0	0	5
Hour	23	0	0	2	0	1	26	18	1	3	1	0	0	23
11:00	7	0	0	0	0	0	7	2	1	0	0	0	0	3
11:15	11	0	0	1	0	0	12	5	0	1	0	0	0	6
11:30	9	1	0	0	0	0	10	6	0	0	0	0	0	6
11:45	16	1	0	1	0	0	18	4	0	0	0	0	0	4
Hour	43	2	0	2	0	0	47	17	1	1	0	0	0	19
12:00	20	1	0	0	0	0	21	32	2	0	0	0	0	34
12:15	16	1	0	1	0	0	18	5	0	0	0	0	0	5
12:30	5	2	0	0	0	0	7	4	0	0	0	0	0	4
12:45	16	3	0	1	0	0	20	5	0	0	1	0	0	6
Hour	57	7	0	2	0	0	66	46	2	0	1	0	0	49
13:00	9	1	0	0	0	0	10	6	2	0	0	0	0	8
13:15	16	1	0	2	0	0	19	9	0	0	0	0	0	9
13:30	17	4	0	1	0	1	23	13	0	0	0	0	0	13
13:45	13	2	0	2	0	0	17	14	2	1	0	0	0	17
Hour	55	8	0	5	0	1	69	42	4	1	0	0	0	47
14:00	16	2	0	1	0	0	19	12	0	0	1	0	0	13
14:15	16	2	0	1	0	0	19	14	0	0	0	0	0	14
14:30	15	0	0	3	0	0	18	7	0	0	0	0	0	7
14:45	30	1	0	0	0	0	31	12	1	0	0	0	0	13
Hour	77	5	0	5	0	0	87	45	1	0	1	0	0	47
15:00	13	1	0	2	0	0	16	8	0	0	2	0	0	10
15:15	13	4	0	1	0	0	18	7	1	0	1	0	0	9
15:30	20	2	0	0	0	0	22	7	1	0	1	0	0	9
15:45	18	3	0	1	0	0	22	7	1	0	0	0	0	8
Hour	64	10	0	4	0	0	78	29	3	0	4	0	0	36
16:00	14	2	0	1	0	0	17	6	3	0	0	0	0	9
16:15	16	2	0	1	0	0	19	10	0	0	0	0	0	10
16:30	12	2	0	0	0	0	14	6	0	0	0	0	0	6
16:45	19	3	0	1	0	0	23	17	0	0	0	0	0	17
Hour	61	9	0	3	0	0	73	39	3	0	0	0	0	42
17:00	14	3	1	0	0	0	18	9	2	0	0	0	0	11
17:15	20	1	0	1	0	0	22	8	0	0	0	0	0	8
17:30	17	2	0	0	0	0	19	10	0	0	0	0	0	10
17:45	26	2	0	1	0	0	29	8	1	0	0	0	0	9
Hour	77	8	1	2	0	0	88	35	3	0	0	0	0	38
18:00	23	1	0	0	0	0	24	6	0	0	0	0	0	6
18:15	15	1	0	1	0	0	17	11	0	0	0	0	0	11
18:30	13	0	0	0	0	0	13	4	0	0	0	0	0	4
18:45	16	3	0	1	0	0	20	9	0	0	0	0	0	9
Hour	67	5	0	2	0	0	74	30	0	0	0	0	0	30
Total	717	65	1	42	0	7	832	453	32	7	11	0	0	503

Site No. 1
Location Trimleston / The Rise(W) / Barons Hall Rise / The Rise(E)
Date Wednesday 28 November 2018

Time	C to B - Barons Hall Rise to The Rise(W)						Veh. Total	C to A - Barons Hall Rise to Trimleston						Veh. Total
	CAR	LGV	HGV	PSV	M/C	P/C		CAR	LGV	HGV	PSV	M/C	P/C	
07:00	4	0	0	1	0	0	5	0	0	0	0	0	0	0
07:15	1	0	0	0	0	0	1	0	0	0	0	0	0	0
07:30	5	0	0	1	0	0	6	0	0	0	0	0	0	0
07:45	2	2	0	3	0	0	7	1	0	0	0	0	0	1
Hour	12	2	0	5	0	0	19	1	0	0	0	0	0	1
08:00	4	0	0	1	0	0	5	0	0	0	0	0	0	0
08:15	7	0	0	2	0	0	9	3	0	0	0	0	0	3
08:30	12	0	0	0	0	0	12	2	0	0	0	0	0	2
08:45	6	2	0	2	0	0	10	4	0	0	0	0	0	4
Hour	29	2	0	5	0	0	36	9	0	0	0	0	0	9
09:00	12	1	0	0	0	0	13	5	0	0	0	0	0	5
09:15	10	3	0	1	0	0	14	1	0	0	0	0	0	1
09:30	3	1	0	0	0	0	4	0	0	0	0	0	0	0
09:45	4	0	0	1	0	0	5	0	0	0	0	0	0	0
Hour	29	5	0	2	0	0	36	6	0	0	0	0	0	6
10:00	2	0	1	0	0	0	3	0	0	0	0	0	0	0
10:15	3	0	0	1	0	0	4	0	0	0	0	0	0	0
10:30	5	0	0	0	0	0	5	2	0	0	0	0	0	2
10:45	4	1	0	1	0	0	6	0	0	0	0	0	0	0
Hour	14	1	1	2	0	0	18	2	0	0	0	0	0	2
11:00	6	0	0	0	0	0	6	0	0	0	0	0	0	0
11:15	6	1	0	1	0	0	8	1	0	0	0	0	0	1
11:30	3	1	0	0	0	0	4	1	0	0	0	0	0	1
11:45	5	2	0	1	0	0	8	1	0	0	0	0	0	1
Hour	20	4	0	2	0	0	26	3	0	0	0	0	0	3
12:00	7	1	0	0	0	0	8	1	0	0	0	0	0	1
12:15	13	0	0	1	0	0	14	2	1	0	0	0	0	3
12:30	4	1	1	0	0	0	6	1	0	0	0	0	0	1
12:45	6	0	0	1	0	0	7	1	0	0	0	0	0	1
Hour	30	2	1	2	0	0	35	5	1	0	0	0	0	6
13:00	5	0	0	0	0	0	5	0	0	0	0	0	0	0
13:15	7	1	0	2	0	0	10	2	0	0	0	0	0	2
13:30	7	2	0	1	0	0	10	1	0	0	0	0	0	1
13:45	11	1	0	3	0	0	15	4	0	0	0	0	0	4
Hour	30	4	0	6	0	0	40	7	0	0	0	0	0	7
14:00	4	2	0	1	0	0	7	0	0	0	0	0	0	0
14:15	7	0	0	1	0	0	8	2	1	0	0	0	0	3
14:30	13	0	0	2	0	0	15	5	0	0	0	0	0	5
14:45	16	1	0	2	0	0	19	2	0	0	0	0	0	2
Hour	40	3	0	6	0	0	49	9	1	0	0	0	0	10
15:00	9	2	0	0	0	0	11	3	0	0	0	0	0	3
15:15	12	0	0	1	0	0	13	1	0	0	0	0	0	1
15:30	11	3	0	1	0	0	15	5	1	0	0	0	0	6
15:45	18	1	0	1	0	0	20	0	0	0	0	0	0	0
Hour	50	6	0	3	0	0	59	9	1	0	0	0	0	10
16:00	13	3	0	1	0	0	17	2	0	0	0	0	0	2
16:15	9	1	0	1	0	0	11	1	0	0	0	0	0	1
16:30	10	3	0	0	0	0	13	3	0	0	0	0	0	3
16:45	10	2	0	1	0	0	13	0	0	0	0	0	0	0
Hour	42	9	0	3	0	0	54	6	0	0	0	0	0	6
17:00	11	2	0	0	0	0	13	1	0	0	0	0	0	1
17:15	7	2	0	1	0	0	10	1	1	0	0	0	0	2
17:30	12	2	0	0	0	0	14	4	0	0	0	0	0	4
17:45	11	0	0	1	0	0	12	2	1	0	0	0	0	3
Hour	41	6	0	2	0	0	49	8	2	0	0	0	0	10
18:00	8	2	0	0	0	0	10	0	1	0	0	0	0	1
18:15	18	1	0	1	0	0	20	5	0	0	0	0	0	5
18:30	11	0	0	0	0	0	11	3	0	0	0	0	0	3
18:45	9	2	0	1	0	0	12	1	0	0	0	0	0	1
Hour	46	5	0	2	0	0	53	9	1	0	0	0	0	10
Total	383	49	2	40	0	0	474	74	6	0	0	0	0	80

Site No. 1
Location Trimleston / The Rise(W) / Barons Hall Rise / The Rise(E)
Date Wednesday 28 November 2018

Time	C to D - Barons Hall Rise to The Rise(E)						Veh. Total	D to C - The Rise(E) to Barons Hall Rise						Veh. Total
	CAR	LGV	HGV	PSV	M/C	P/C		CAR	LGV	HGV	PSV	M/C	P/C	
07:00	2	0	0	0	0	0	2	20	1	0	0	0	0	21
07:15	3	0	1	0	0	0	4	26	2	0	0	0	0	28
07:30	4	0	0	0	0	1	5	33	3	0	0	0	0	36
07:45	5	2	0	1	0	0	8	42	3	0	1	0	1	47
Hour	14	2	1	1	0	1	19	121	9	0	1	0	1	132
08:00	7	1	0	0	0	0	8	48	1	0	1	0	8	58
08:15	21	0	0	1	0	0	22	45	1	0	2	0	1	49
08:30	17	2	0	0	0	0	19	45	4	0	0	0	2	51
08:45	18	2	1	0	0	0	21	30	0	0	1	0	0	31
Hour	63	5	1	1	0	0	70	168	6	0	4	0	11	189
09:00	26	1	1	0	0	0	28	19	0	1	1	0	0	21
09:15	14	0	0	0	0	0	14	13	1	0	0	0	0	14
09:30	10	0	0	0	0	0	10	11	3	0	0	0	0	14
09:45	12	2	1	1	0	0	16	9	3	1	0	0	0	13
Hour	62	3	2	1	0	0	68	52	7	2	1	0	0	62
10:00	6	1	0	0	0	0	7	16	2	0	0	0	0	18
10:15	8	1	0	0	0	0	9	11	1	0	0	0	0	12
10:30	10	0	0	0	0	0	10	5	1	0	0	0	0	6
10:45	2	3	1	0	0	0	6	13	1	0	0	0	0	14
Hour	26	5	1	0	0	0	32	45	5	0	0	0	0	50
11:00	5	3	0	0	0	0	8	11	3	0	0	0	0	14
11:15	6	1	2	0	0	0	9	14	0	0	0	0	0	14
11:30	14	0	0	0	0	0	14	12	1	1	0	0	0	14
11:45	8	0	1	0	0	0	9	15	0	1	0	0	0	16
Hour	33	4	3	0	0	0	40	52	4	2	0	0	0	58
12:00	11	0	0	0	0	0	11	16	0	0	0	0	0	16
12:15	11	1	0	0	0	0	12	8	1	0	0	0	1	10
12:30	14	0	0	0	0	0	14	8	1	0	0	0	0	9
12:45	12	1	0	0	0	0	13	1	1	1	0	0	0	3
Hour	48	2	0	0	0	0	50	33	3	1	0	0	1	38
13:00	16	0	0	0	0	0	16	15	0	0	0	0	0	15
13:15	17	0	0	0	0	1	18	16	1	0	0	0	0	17
13:30	8	2	0	0	0	0	10	17	0	0	0	0	0	17
13:45	33	1	1	1	0	0	36	9	2	1	0	0	0	12
Hour	74	3	1	1	0	1	80	57	3	1	0	0	0	61
14:00	16	0	1	0	0	0	17	20	4	0	0	0	0	24
14:15	15	3	0	0	0	0	18	27	0	0	0	0	0	27
14:30	18	2	0	1	0	0	21	23	2	0	0	0	0	25
14:45	51	1	0	1	0	0	53	15	2	0	0	0	0	17
Hour	100	6	1	2	0	0	109	85	8	0	0	0	0	93
15:00	22	1	0	1	0	0	24	18	1	0	0	0	0	19
15:15	23	1	0	0	0	1	25	26	1	0	1	0	0	28
15:30	40	2	1	0	0	5	48	10	1	0	1	0	0	12
15:45	31	1	0	3	0	5	40	20	1	0	0	0	0	21
Hour	116	5	1	4	0	11	137	74	4	0	2	0	0	80
16:00	19	3	0	0	0	0	22	18	2	0	0	0	0	20
16:15	19	5	0	0	0	0	24	17	2	0	0	0	0	19
16:30	31	2	0	0	1	0	34	11	1	0	0	0	1	13
16:45	31	3	0	0	0	0	34	23	1	0	0	0	0	24
Hour	100	13	0	0	1	0	114	69	6	0	0	0	1	76
17:00	33	4	0	0	0	0	37	13	2	0	0	0	0	15
17:15	32	2	0	0	0	0	34	13	1	0	0	0	0	14
17:30	30	3	0	0	0	0	33	10	0	0	0	0	0	10
17:45	41	2	0	0	0	0	43	19	0	0	0	0	0	19
Hour	136	11	0	0	0	0	147	55	3	0	0	0	0	58
18:00	26	3	0	0	0	1	30	14	0	1	0	0	0	15
18:15	34	1	0	0	0	0	35	13	2	0	0	0	0	15
18:30	35	6	0	0	0	0	41	19	0	1	0	0	0	20
18:45	34	0	0	0	0	1	35	12	2	0	0	0	0	14
Hour	129	10	0	0	0	2	141	58	4	2	0	0	0	64
Total	901	69	11	10	1	15	1007	869	62	8	8	0	14	961

Site No. 1
Location Trimleston / The Rise(W) / Barons Hall Rise / The Rise(E)
Date Wednesday 28 November 2018

Time	D to B - The Rise(E) to The Rise(W)						Veh. Total	D to A - The Rise(E) to Trimleston						Veh. Total
	CAR	LGV	HGV	PSV	M/C	P/C		CAR	LGV	HGV	PSV	M/C	P/C	
07:00	2	0	0	0	0	0	2	0	0	0	0	0	0	0
07:15	2	0	0	0	0	0	2	0	0	0	0	0	0	0
07:30	7	1	0	0	0	0	8	2	0	0	0	0	0	2
07:45	2	0	0	2	0	0	4	0	0	0	1	0	0	1
Hour	13	1	0	2	0	0	16	2	0	0	1	0	0	3
08:00	7	2	0	1	0	0	10	0	0	0	0	0	0	0
08:15	8	0	0	2	0	0	10	1	0	0	0	0	0	1
08:30	15	2	0	2	0	0	19	2	0	0	0	0	0	2
08:45	11	0	0	0	0	0	11	2	0	0	0	0	0	2
Hour	41	4	0	5	0	0	50	5	0	0	0	0	0	5
09:00	24	0	0	0	0	0	24	2	0	0	0	0	0	2
09:15	13	0	0	0	0	0	13	1	0	0	0	0	0	1
09:30	23	1	0	1	0	1	26	0	0	0	0	0	0	0
09:45	14	1	0	0	0	0	15	0	0	0	0	0	0	0
Hour	74	2	0	1	0	1	78	3	0	0	0	0	0	3
10:00	12	2	0	0	0	0	14	0	0	0	0	0	0	0
10:15	3	0	0	0	0	0	3	0	0	0	0	0	0	0
10:30	8	1	0	0	0	0	9	2	0	0	0	0	0	2
10:45	11	2	0	0	0	0	13	0	0	0	0	0	0	0
Hour	34	5	0	0	0	0	39	2	0	0	0	0	0	2
11:00	11	1	1	0	0	0	13	0	0	0	0	0	0	0
11:15	6	0	0	0	0	0	6	0	0	0	0	0	0	0
11:30	5	0	0	0	0	1	6	0	0	0	0	0	0	0
11:45	11	1	1	0	0	0	13	0	0	0	0	0	0	0
Hour	33	2	2	0	0	1	38	0	0	0	0	0	0	0
12:00	18	1	1	0	0	0	20	1	1	0	0	0	0	2
12:15	14	2	0	0	0	0	16	0	0	0	0	0	0	0
12:30	12	3	0	0	0	0	15	1	0	0	0	0	0	1
12:45	15	2	0	0	0	0	17	1	0	0	0	0	0	1
Hour	59	8	1	0	0	0	68	3	1	0	0	0	0	4
13:00	12	1	1	0	0	0	14	0	0	0	0	0	0	0
13:15	12	3	0	0	0	0	15	1	0	0	0	0	0	1
13:30	12	1	0	0	0	0	13	0	0	0	0	0	0	0
13:45	23	0	0	0	0	0	23	0	0	0	0	0	0	0
Hour	59	5	1	0	0	0	65	1	0	0	0	0	0	1
14:00	21	1	0	0	0	0	22	0	0	0	0	0	1	1
14:15	10	4	0	0	0	0	14	1	0	0	0	0	0	1
14:30	12	1	0	0	0	0	13	1	0	0	0	0	0	1
14:45	25	1	0	0	0	0	26	2	0	0	0	0	0	2
Hour	68	7	0	0	0	0	75	4	0	0	0	0	1	5
15:00	25	3	0	2	0	1	31	1	0	0	0	0	0	1
15:15	16	1	0	1	0	0	18	2	0	0	1	0	0	3
15:30	16	3	0	0	0	1	20	4	0	0	0	0	0	4
15:45	22	2	0	0	0	0	24	2	0	0	0	0	0	2
Hour	79	9	0	3	0	2	93	9	0	0	1	0	0	10
16:00	12	4	0	0	0	0	16	2	0	0	0	0	0	2
16:15	27	4	0	0	0	0	31	0	0	0	0	0	0	0
16:30	16	4	0	0	0	1	21	0	0	0	0	0	0	0
16:45	19	1	0	0	0	0	20	0	0	0	0	0	0	0
Hour	74	13	0	0	0	1	88	2	0	0	0	0	0	2
17:00	18	1	0	0	0	0	19	1	0	0	0	0	0	1
17:15	23	1	0	0	0	0	24	0	0	0	0	0	1	1
17:30	22	2	0	0	0	0	24	1	0	0	0	0	0	1
17:45	22	1	0	0	0	1	24	1	0	0	0	0	0	1
Hour	85	5	0	0	0	1	91	3	0	0	0	0	1	4
18:00	25	3	0	0	0	0	28	0	0	0	0	0	0	0
18:15	20	1	0	0	0	0	21	2	0	0	0	0	0	2
18:30	18	2	0	0	0	2	22	2	0	0	0	0	0	2
18:45	14	0	0	0	0	0	14	1	0	0	0	0	0	1
Hour	77	6	0	0	0	2	85	5	0	0	0	0	0	5
Total	696	67	4	11	0	8	786	39	1	0	2	0	2	44

Site No. 1
Location Trimleston / The Rise(W) / Barons Hall Rise / The Rise(E)
Date Wednesday 28 November 2018

Time	To Arm A - Trimleston						Veh. Total	From Arm A - Trimleston						Veh. Total
	CAR	LGV	HGV	PSV	M/C	P/C		CAR	LGV	HGV	PSV	M/C	P/C	
07:00	0	0	0	0	0	0	0	1	0	0	0	0	0	1
07:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:30	2	0	0	0	0	0	2	5	1	0	0	0	0	6
07:45	1	0	0	1	0	0	2	2	1	0	0	0	0	3
Hour	3	0	0	1	0	0	4	8	2	0	0	0	0	10
08:00	0	0	0	0	0	0	0	4	0	0	1	0	0	5
08:15	4	0	0	0	0	0	4	4	0	0	0	0	0	4
08:30	4	0	0	0	0	0	4	8	1	0	0	0	0	9
08:45	7	0	0	0	0	0	7	4	0	0	0	0	0	4
Hour	15	0	0	0	0	0	15	20	1	0	1	0	0	22
09:00	7	0	0	0	0	0	7	3	0	0	0	0	0	3
09:15	2	0	0	0	0	0	2	2	0	0	0	0	0	2
09:30	0	0	0	0	0	0	0	2	0	0	0	0	0	2
09:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hour	9	0	0	0	0	0	9	7	0	0	0	0	0	7
10:00	0	0	0	0	0	0	0	2	0	0	0	0	0	2
10:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:30	4	0	0	0	0	0	4	2	0	0	0	0	0	2
10:45	1	0	0	0	0	0	1	3	0	0	0	0	0	3
Hour	5	0	0	0	0	0	5	7	0	0	0	0	0	7
11:00	0	0	0	0	0	0	0	1	0	0	0	0	0	1
11:15	1	0	0	0	0	0	1	1	0	0	0	0	0	1
11:30	1	0	0	0	0	0	1	1	0	0	0	0	0	1
11:45	1	0	0	0	0	0	1	2	0	0	0	0	0	2
Hour	3	0	0	0	0	0	3	5	0	0	0	0	0	5
12:00	2	1	0	0	0	0	3	2	0	0	0	0	0	2
12:15	3	2	0	0	0	0	5	1	1	0	0	0	0	2
12:30	3	1	0	0	0	0	4	4	1	0	0	0	0	5
12:45	2	0	0	0	0	0	2	0	2	0	0	0	0	2
Hour	10	4	0	0	0	0	14	7	4	0	0	0	0	11
13:00	0	0	0	0	0	0	0	1	0	0	0	0	0	1
13:15	3	1	0	0	0	0	4	1	1	0	0	0	0	2
13:30	1	0	0	0	0	0	1	5	0	0	0	0	0	5
13:45	4	0	0	0	0	0	4	4	1	0	0	0	0	5
Hour	8	1	0	0	0	0	9	11	2	0	0	0	0	13
14:00	0	0	0	0	0	1	1	5	0	0	0	0	0	5
14:15	4	1	0	0	0	0	5	2	1	0	0	0	0	3
14:30	6	0	0	0	0	0	6	5	0	0	0	0	0	5
14:45	5	0	0	0	0	0	5	4	0	0	0	0	0	4
Hour	15	1	0	0	0	1	17	16	1	0	0	0	0	17
15:00	4	0	0	0	0	0	4	7	0	0	0	0	0	7
15:15	3	0	0	1	0	0	4	2	0	0	0	0	0	2
15:30	9	1	0	0	0	0	10	3	1	0	0	0	0	4
15:45	2	0	0	0	0	0	2	5	0	0	0	0	0	5
Hour	18	1	0	1	0	0	20	17	1	0	0	0	0	18
16:00	7	0	0	0	0	0	7	5	0	0	0	0	0	5
16:15	1	0	0	0	0	0	1	1	0	0	1	0	0	2
16:30	3	0	0	0	0	0	3	0	0	0	0	0	0	0
16:45	1	0	0	0	0	0	1	1	0	0	0	0	0	1
Hour	12	0	0	0	0	0	12	7	0	0	1	0	0	8
17:00	2	0	0	0	0	0	2	2	0	0	0	0	0	2
17:15	1	1	0	0	0	1	3	0	0	0	0	0	0	0
17:30	5	0	0	0	0	0	5	0	0	0	0	0	0	0
17:45	3	1	0	0	0	0	4	3	1	0	0	0	0	4
Hour	11	2	0	0	0	1	14	5	1	0	0	0	0	6
18:00	1	1	0	0	0	0	2	5	0	0	0	0	0	5
18:15	8	0	0	0	0	0	8	2	0	0	0	0	0	2
18:30	6	0	0	0	0	0	6	5	1	0	0	0	0	6
18:45	2	0	0	0	0	0	2	6	0	0	0	0	0	6
Hour	17	1	0	0	0	0	18	18	1	0	0	0	0	19
Total	126	10	0	2	0	2	140	128	13	0	2	0	0	143

Site No. 1
Location Trimleston / The Rise(W) / Barons Hall Rise / The Rise(E)
Date Wednesday 28 November 2018

Time	To Arm B - The Rise(W)						Veh. Total	From Arm B - The Rise(W)						Veh. Total
	CAR	LGV	HGV	PSV	M/C	P/C		CAR	LGV	HGV	PSV	M/C	P/C	
07:00	6	0	0	1	0	0	7	17	3	0	2	0	1	23
07:15	3	0	0	0	0	0	3	17	3	0	0	0	0	20
07:30	12	1	0	1	0	0	14	27	2	0	1	0	1	31
07:45	5	2	0	5	0	0	12	38	3	1	4	0	0	46
Hour	26	3	0	7	0	0	36	99	11	1	7	0	2	120
08:00	11	2	0	2	0	0	15	28	2	0	3	0	0	33
08:15	15	0	0	4	0	0	19	31	2	1	2	0	2	38
08:30	28	2	0	2	0	0	32	29	2	0	3	0	0	34
08:45	17	2	0	2	0	0	21	58	2	0	1	0	1	62
Hour	71	6	0	10	0	0	87	146	8	1	9	0	3	167
09:00	36	1	0	0	0	0	37	38	0	0	1	0	0	39
09:15	24	3	0	1	0	0	28	18	2	0	1	0	0	21
09:30	27	2	0	1	0	1	31	23	1	0	0	0	0	24
09:45	18	1	0	1	0	0	20	22	3	0	1	0	0	26
Hour	105	7	0	3	0	1	116	101	6	0	3	0	0	110
10:00	14	2	1	0	0	0	17	8	0	0	0	0	1	9
10:15	6	0	0	1	0	0	7	7	0	2	2	0	0	11
10:30	13	1	0	0	0	0	14	16	0	0	0	0	0	16
10:45	15	3	0	1	0	0	19	11	1	1	1	0	0	14
Hour	48	6	1	2	0	0	57	42	1	3	3	0	1	50
11:00	17	1	1	0	0	0	19	9	1	0	0	0	0	10
11:15	12	1	0	1	0	0	14	16	0	1	1	0	0	18
11:30	8	1	0	0	0	1	10	15	1	0	0	0	0	16
11:45	16	3	1	1	0	0	21	20	1	0	1	0	0	22
Hour	53	6	2	2	0	1	64	60	3	1	2	0	0	66
12:00	25	2	1	0	0	0	28	52	3	0	0	0	0	55
12:15	27	2	0	1	0	0	30	22	2	0	1	0	0	25
12:30	17	4	1	0	0	0	22	10	3	0	0	0	0	13
12:45	21	2	0	1	0	0	24	21	3	0	2	0	0	26
Hour	90	10	2	2	0	0	104	105	11	0	3	0	0	119
13:00	17	1	1	0	0	0	19	15	3	0	0	0	0	18
13:15	19	5	0	2	0	0	26	25	2	0	2	0	0	29
13:30	19	3	0	1	0	0	23	30	4	0	1	0	1	36
13:45	36	1	0	3	0	0	40	27	4	1	2	0	0	34
Hour	91	10	1	6	0	0	108	97	13	1	5	0	1	117
14:00	25	3	0	1	0	0	29	28	2	0	2	0	0	32
14:15	18	4	0	1	0	0	23	31	2	0	1	0	0	34
14:30	27	1	0	2	0	0	30	22	0	0	3	0	0	25
14:45	41	2	0	2	0	0	45	43	2	0	0	0	0	45
Hour	111	10	0	6	0	0	127	124	6	0	6	0	0	136
15:00	34	5	0	2	0	1	42	21	1	0	4	0	0	26
15:15	28	1	0	2	0	0	31	20	5	0	2	0	0	27
15:30	27	7	0	1	0	1	36	27	3	0	1	0	0	31
15:45	40	3	0	1	0	0	44	25	4	0	1	0	0	30
Hour	129	16	0	6	0	2	153	93	13	0	8	0	0	114
16:00	26	7	0	1	0	0	34	23	5	0	1	0	0	29
16:15	36	5	0	1	0	0	42	26	2	0	1	0	0	29
16:30	26	7	0	0	0	1	34	18	2	0	0	0	0	20
16:45	29	3	0	1	0	0	33	37	3	0	1	0	0	41
Hour	117	22	0	3	0	1	143	104	12	0	3	0	0	119
17:00	30	3	0	0	0	0	33	23	5	1	0	0	0	29
17:15	30	3	0	1	0	0	34	28	1	0	1	0	0	30
17:30	34	4	0	0	0	0	38	27	2	0	0	0	0	29
17:45	34	1	0	1	0	1	37	34	3	0	1	0	0	38
Hour	128	11	0	2	0	1	142	112	11	1	2	0	0	126
18:00	33	5	0	0	0	0	38	30	1	0	0	0	0	31
18:15	38	2	0	1	0	0	41	27	1	0	1	0	0	29
18:30	29	2	0	0	0	2	33	18	0	0	0	0	0	18
18:45	23	2	0	1	0	0	26	25	3	0	1	0	0	29
Hour	123	11	0	2	0	2	138	100	5	0	2	0	0	107
Total	1092	118	6	51	0	8	1275	1183	100	8	53	0	7	1351

Site No. 1
Location Trimleston / The Rise(W) / Barons Hall Rise / The Rise(E)
Date Wednesday 28 November 2018

Time	To Arm C - Barons Hall Rise						Veh. Total	From Arm C - Barons Hall Rise						Veh. Total
	CAR	LGV	HGV	PSV	M/C	P/C		CAR	LGV	HGV	PSV	M/C	P/C	
07:00	31	2	0	0	0	0	33	6	0	0	1	0	0	7
07:15	33	4	0	0	0	0	37	4	0	1	0	0	0	5
07:30	53	5	0	0	0	0	58	9	0	0	1	0	1	11
07:45	70	6	1	1	0	1	79	8	4	0	4	0	0	16
Hour	187	17	1	1	0	1	207	27	4	1	6	0	1	39
08:00	66	1	0	2	0	8	77	11	1	0	1	0	0	13
08:15	63	3	1	3	0	1	71	31	0	0	3	0	0	34
08:30	65	6	0	2	0	2	75	31	2	0	0	0	0	33
08:45	43	1	0	1	0	0	45	28	4	1	2	0	0	35
Hour	237	11	1	8	0	11	268	101	7	1	6	0	0	115
09:00	36	0	1	1	0	0	38	43	2	1	0	0	0	46
09:15	15	2	0	0	0	0	17	25	3	0	1	0	0	29
09:30	21	3	0	0	0	0	24	13	1	0	0	0	0	14
09:45	18	5	1	0	0	0	24	16	2	1	2	0	0	21
Hour	90	10	2	1	0	0	103	97	8	2	3	0	0	110
10:00	21	2	0	0	0	0	23	8	1	1	0	0	0	10
10:15	16	1	2	1	0	0	20	11	1	0	1	0	0	13
10:30	12	1	0	0	0	0	13	17	0	0	0	0	0	17
10:45	18	2	1	0	0	0	21	6	4	1	1	0	0	12
Hour	67	6	3	1	0	0	77	42	6	2	2	0	0	52
11:00	14	4	0	0	0	0	18	11	3	0	0	0	0	14
11:15	19	0	1	0	0	0	20	13	2	2	1	0	0	18
11:30	19	1	1	0	0	0	21	18	1	0	0	0	0	19
11:45	21	0	1	0	0	0	22	14	2	1	1	0	0	18
Hour	73	5	3	0	0	0	81	56	8	3	2	0	0	69
12:00	49	2	0	0	0	0	51	19	1	0	0	0	0	20
12:15	14	1	0	0	0	1	16	26	2	0	1	0	0	29
12:30	14	1	0	0	0	0	15	19	1	1	0	0	0	21
12:45	6	1	1	1	0	0	9	19	1	0	1	0	0	21
Hour	83	5	1	1	0	1	91	83	5	1	2	0	0	91
13:00	22	2	0	0	0	0	24	21	0	0	0	0	0	21
13:15	26	1	0	0	0	0	27	26	1	0	2	0	1	30
13:30	34	0	0	0	0	0	34	16	4	0	1	0	0	21
13:45	25	5	2	0	0	0	32	48	2	1	4	0	0	55
Hour	107	8	2	0	0	0	117	111	7	1	7	0	1	127
14:00	36	4	0	1	0	0	41	20	2	1	1	0	0	24
14:15	42	1	0	0	0	0	43	24	4	0	1	0	0	29
14:30	32	2	0	0	0	0	34	36	2	0	3	0	0	41
14:45	31	3	0	0	0	0	34	69	2	0	3	0	0	74
Hour	141	10	0	1	0	0	152	149	10	1	8	0	0	168
15:00	32	1	0	2	0	0	35	34	3	0	1	0	0	38
15:15	33	2	0	2	0	0	37	36	1	0	1	0	1	39
15:30	19	2	0	2	0	0	23	56	6	1	1	0	5	69
15:45	32	2	0	0	0	0	34	49	2	0	4	0	5	60
Hour	116	7	0	6	0	0	129	175	12	1	7	0	11	206
16:00	26	5	0	0	0	0	31	34	6	0	1	0	0	41
16:15	28	2	0	0	0	0	30	29	6	0	1	0	0	36
16:30	17	1	0	0	0	1	19	44	5	0	0	1	0	50
16:45	41	1	0	0	0	0	42	41	5	0	1	0	0	47
Hour	112	9	0	0	0	1	122	148	22	0	3	1	0	174
17:00	23	4	0	0	0	0	27	45	6	0	0	0	0	51
17:15	21	1	0	0	0	0	22	40	5	0	1	0	0	46
17:30	20	0	0	0	0	0	20	46	5	0	0	0	0	51
17:45	27	2	0	0	0	0	29	54	3	0	1	0	0	58
Hour	91	7	0	0	0	0	98	185	19	0	2	0	0	206
18:00	24	0	1	0	0	0	25	34	6	0	0	0	1	41
18:15	24	2	0	0	0	0	26	57	2	0	1	0	0	60
18:30	28	1	1	0	0	0	30	49	6	0	0	0	0	55
18:45	25	2	0	0	0	0	27	44	2	0	1	0	1	48
Hour	101	5	2	0	0	0	108	184	16	0	2	0	2	204
Total	1405	100	15	19	0	14	1553	1358	124	13	50	1	15	1561

Site No. 1
Location Trimleston / The Rise(W) / Barons Hall Rise / The Rise(E)
Date Wednesday 28 November 2018

Time	To Arm D - The Rise(E)						Veh. Total	From Arm D - The Rise(E)						Veh. Total
	CAR	LGV	HGV	PSV	M/C	P/C		CAR	LGV	HGV	PSV	M/C	P/C	
07:00	9	2	0	2	0	1	14	22	1	0	0	0	0	23
07:15	13	1	1	0	0	0	15	28	2	0	0	0	0	30
07:30	16	1	0	1	0	2	20	42	4	0	0	0	0	46
07:45	16	3	0	5	0	0	24	44	3	0	4	0	1	52
Hour	54	7	1	8	0	3	73	136	10	0	4	0	1	151
08:00	21	3	0	3	0	0	27	55	3	0	2	0	8	68
08:15	38	0	0	2	0	2	42	54	1	0	4	0	1	60
08:30	33	3	0	1	0	0	37	62	6	0	2	0	2	72
08:45	66	3	1	1	0	1	72	43	0	0	1	0	0	44
Hour	158	9	1	7	0	3	178	214	10	0	9	0	11	244
09:00	50	1	1	1	0	0	53	45	0	1	1	0	0	47
09:15	31	1	0	1	0	0	33	27	1	0	0	0	0	28
09:30	24	1	0	0	0	0	25	34	4	0	1	0	1	40
09:45	25	3	1	2	0	0	31	23	4	1	0	0	0	28
Hour	130	6	2	4	0	0	142	129	9	2	2	0	1	143
10:00	11	1	0	0	0	1	13	28	4	0	0	0	0	32
10:15	10	1	0	1	0	0	12	14	1	0	0	0	0	15
10:30	21	0	0	0	0	0	21	15	2	0	0	0	0	17
10:45	10	3	1	1	0	0	15	24	3	0	0	0	0	27
Hour	52	5	1	2	0	1	61	81	10	0	0	0	0	91
11:00	12	3	0	0	0	0	15	22	4	1	0	0	0	27
11:15	18	1	2	1	0	0	22	20	0	0	0	0	0	20
11:30	23	1	0	0	0	0	24	17	1	1	0	0	1	20
11:45	24	1	1	1	0	0	27	26	1	2	0	0	0	29
Hour	77	6	3	2	0	0	88	85	6	4	0	0	1	96
12:00	32	1	0	0	0	0	33	35	2	1	0	0	0	38
12:15	27	3	0	1	0	0	31	22	3	0	0	0	1	26
12:30	20	3	0	0	0	0	23	21	4	0	0	0	0	25
12:45	28	6	0	1	0	0	35	17	3	1	0	0	0	21
Hour	107	13	0	2	0	0	122	95	12	2	0	0	1	110
13:00	25	1	0	0	0	0	26	27	1	1	0	0	0	29
13:15	33	1	0	2	0	1	37	29	4	0	0	0	0	33
13:30	26	6	0	1	0	1	34	29	1	0	0	0	0	30
13:45	46	3	1	3	0	0	53	32	2	1	0	0	0	35
Hour	130	11	1	6	0	2	150	117	8	2	0	0	0	127
14:00	33	2	1	1	0	0	37	41	5	0	0	0	1	47
14:15	31	5	0	1	0	0	37	38	4	0	0	0	0	42
14:30	34	2	0	4	0	0	40	36	3	0	0	0	0	39
14:45	81	2	0	1	0	0	84	42	3	0	0	0	0	45
Hour	179	11	1	7	0	0	198	157	15	0	0	0	1	173
15:00	36	2	0	3	0	0	41	44	4	0	2	0	1	51
15:15	38	5	0	1	0	1	45	44	2	0	3	0	0	49
15:30	61	4	1	0	0	5	71	30	4	0	1	0	1	36
15:45	49	4	0	4	0	5	62	44	3	0	0	0	0	47
Hour	184	15	1	8	0	11	219	162	13	0	6	0	2	183
16:00	35	5	0	1	0	0	41	32	6	0	0	0	0	38
16:15	35	7	0	2	0	0	44	44	6	0	0	0	0	50
16:30	43	4	0	0	1	0	48	27	5	0	0	0	2	34
16:45	50	6	0	1	0	0	57	42	2	0	0	0	0	44
Hour	163	22	0	4	1	0	190	145	19	0	0	0	2	166
17:00	47	7	1	0	0	0	55	32	3	0	0	0	0	35
17:15	52	3	0	1	0	0	56	36	2	0	0	0	1	39
17:30	47	5	0	0	0	0	52	33	2	0	0	0	0	35
17:45	69	4	0	1	0	0	74	42	1	0	0	0	1	44
Hour	215	19	1	2	0	0	237	143	8	0	0	0	2	153
18:00	50	4	0	0	0	1	55	39	3	1	0	0	0	43
18:15	51	2	0	1	0	0	54	35	3	0	0	0	0	38
18:30	48	6	0	0	0	0	54	39	2	1	0	0	2	44
18:45	52	3	0	1	0	1	57	27	2	0	0	0	0	29
Hour	201	15	0	2	0	2	220	140	10	2	0	0	2	154
Total	1650	139	12	54	1	22	1878	1604	130	12	21	0	24	1791

Site No. 2
Location The Park(N) / The Park(S) / Moylaragh Road
Date Wednesday 28 November 2018

Time	A to C - The Park(N) to Moylaragh Road						Veh. Total	A to B - The Park(N) to The Park(S)						Veh. Total
	CAR	LGV	HGV	PSV	M/C	P/C		CAR	LGV	HGV	PSV	M/C	P/C	
07:00	0	0	0	0	0	0	0	31	2	0	0	0	0	33
07:15	2	1	0	0	0	0	3	33	3	0	0	0	0	36
07:30	4	0	0	0	0	1	5	54	4	0	0	0	0	58
07:45	2	1	0	2	0	0	5	58	8	1	0	0	1	68
Hour	8	2	0	2	0	1	13	176	17	1	0	0	1	195
08:00	2	0	0	1	0	1	4	75	1	0	1	0	7	84
08:15	6	0	0	2	0	1	9	48	4	1	1	0	3	57
08:30	3	0	0	2	0	1	6	62	6	0	2	0	1	71
08:45	18	1	0	0	0	0	19	44	2	0	0	0	0	46
Hour	29	1	0	5	0	3	38	229	13	1	4	0	11	258
09:00	10	0	0	0	0	1	11	40	1	0	1	0	0	42
09:15	5	0	0	0	0	0	5	17	4	0	4	1	0	26
09:30	10	0	0	0	0	1	11	17	4	1	0	0	0	22
09:45	7	0	0	0	0	0	7	25	4	2	0	0	0	31
Hour	32	0	0	0	0	2	34	99	13	3	5	1	0	121
10:00	5	0	0	0	0	0	5	24	2	0	0	0	0	26
10:15	4	3	0	1	0	0	8	25	4	1	1	0	0	31
10:30	12	1	0	0	0	0	13	19	0	1	0	0	0	20
10:45	7	0	0	0	0	0	7	24	1	1	0	0	0	26
Hour	28	4	0	1	0	0	33	92	7	3	1	0	0	103
11:00	8	0	0	0	0	0	8	19	4	0	0	0	1	24
11:15	11	2	0	0	0	0	13	25	1	1	0	0	0	27
11:30	6	0	0	0	0	0	6	24	1	1	0	0	0	26
11:45	5	1	0	0	0	0	6	27	2	1	0	0	0	30
Hour	30	3	0	0	0	0	33	95	8	3	0	0	1	107
12:00	16	1	0	0	0	0	17	25	1	0	0	0	0	26
12:15	9	1	0	0	0	1	11	20	2	0	0	0	0	22
12:30	10	2	0	0	0	0	12	20	1	0	0	0	0	21
12:45	11	0	0	0	0	0	11	19	3	1	2	0	0	25
Hour	46	4	0	0	0	1	51	84	7	1	2	0	0	94
13:00	13	2	0	0	0	0	15	33	3	3	0	0	0	39
13:15	9	0	0	0	0	0	9	33	2	0	0	0	0	35
13:30	11	0	0	0	0	0	11	41	1	0	1	0	0	43
13:45	13	0	0	0	0	0	13	24	7	2	1	0	0	34
Hour	46	2	0	0	0	0	48	131	13	5	2	0	0	151
14:00	13	0	0	0	0	0	13	44	5	0	1	0	0	50
14:15	16	0	0	0	0	1	17	48	3	0	0	0	0	51
14:30	15	1	0	0	0	0	16	51	3	0	0	0	0	54
14:45	17	1	0	0	0	0	18	33	4	1	0	0	0	38
Hour	61	2	0	0	0	1	64	176	15	1	1	0	0	193
15:00	8	1	0	1	0	0	10	31	1	0	1	0	0	33
15:15	17	1	0	1	0	0	19	44	2	0	1	0	0	47
15:30	10	3	0	2	0	0	15	27	0	0	0	0	0	27
15:45	15	3	0	0	0	0	18	36	1	0	0	0	0	37
Hour	50	8	0	4	0	0	62	138	4	0	2	0	0	144
16:00	19	2	0	0	0	0	21	42	5	0	0	0	0	47
16:15	15	2	0	0	0	0	17	25	4	0	0	0	0	29
16:30	9	1	0	0	0	1	11	33	5	0	0	0	0	38
16:45	17	1	0	0	0	0	18	34	4	0	0	0	0	38
Hour	60	6	0	0	0	1	67	134	18	0	0	0	0	152
17:00	22	0	0	0	0	0	22	31	4	0	0	0	0	35
17:15	16	1	0	0	0	0	17	17	2	0	0	0	0	19
17:30	11	1	0	0	0	0	12	20	0	1	0	0	0	21
17:45	13	2	0	0	0	0	15	32	1	0	0	0	1	34
Hour	62	4	0	0	0	0	66	100	7	1	0	0	1	109
18:00	18	1	1	0	0	0	20	41	1	0	0	0	1	43
18:15	15	2	0	0	0	0	17	25	2	0	0	0	0	27
18:30	17	0	0	0	0	0	17	32	1	0	0	0	0	33
18:45	12	1	0	0	0	0	13	30	2	0	0	0	0	32
Hour	62	4	1	0	0	0	67	128	6	0	0	0	1	135
Total	514	40	1	12	0	9	576	1582	128	19	17	1	15	1762

Site No. 2
Location The Park(N) / The Park(S) / Moylaragh Road
Date Wednesday 28 November 2018

Time	B to A - The Park(S) to The Park(N)						Veh. Total	B to C - The Park(S) to Moylaragh Road						Veh. Total
	CAR	LGV	HGV	PSV	M/C	P/C		CAR	LGV	HGV	PSV	M/C	P/C	
07:00	5	1	1	0	0	0	7	3	0	0	0	0	0	3
07:15	6	2	1	0	0	0	9	3	0	0	0	0	1	4
07:30	10	1	0	0	0	0	11	7	0	0	0	0	0	7
07:45	14	2	0	1	0	0	17	12	4	0	1	0	0	17
Hour	35	6	2	1	0	0	44	25	4	0	1	0	1	31
08:00	21	3	0	1	0	0	25	21	1	0	0	0	0	22
08:15	45	0	0	0	0	0	45	15	1	0	1	0	0	17
08:30	40	4	0	0	0	0	44	15	2	2	0	0	0	19
08:45	33	4	0	0	0	1	38	26	1	1	0	0	0	28
Hour	139	11	0	1	0	1	152	77	5	3	1	0	0	86
09:00	53	1	2	3	0	0	59	34	1	0	0	0	0	35
09:15	29	3	1	0	0	0	33	13	0	0	0	0	0	13
09:30	16	1	0	0	0	0	17	8	1	0	0	0	0	9
09:45	24	1	1	1	0	0	27	7	1	0	0	0	0	8
Hour	122	6	4	4	0	0	136	62	3	0	0	0	0	65
10:00	15	4	0	0	0	0	19	3	0	0	0	0	0	3
10:15	16	1	0	1	0	0	18	5	0	1	0	0	0	6
10:30	18	1	2	0	0	0	21	5	0	0	0	0	0	5
10:45	21	2	0	0	0	0	23	6	0	0	0	0	0	6
Hour	70	8	2	1	0	0	81	19	0	1	0	0	0	20
11:00	19	1	1	0	0	0	21	4	2	0	0	0	0	6
11:15	27	3	0	0	0	0	30	2	0	1	0	0	0	3
11:30	25	2	0	0	0	0	27	7	0	0	0	0	0	7
11:45	21	1	0	0	0	0	22	8	0	0	0	0	0	8
Hour	92	7	1	0	0	0	100	21	2	1	0	0	0	24
12:00	25	4	0	0	0	0	29	10	2	0	0	0	0	12
12:15	25	2	0	0	0	0	27	12	1	0	0	0	0	13
12:30	22	1	2	1	0	0	26	9	2	0	0	0	0	11
12:45	27	2	0	0	0	0	29	11	0	0	0	0	0	11
Hour	99	9	2	1	0	0	111	42	5	0	0	0	0	47
13:00	31	0	2	0	0	0	33	10	0	1	0	0	0	11
13:15	32	3	0	0	0	1	36	11	0	0	0	0	0	11
13:30	26	3	0	2	0	0	31	8	3	0	0	0	0	11
13:45	61	3	1	3	0	0	68	20	1	1	0	0	0	22
Hour	150	9	3	5	0	1	168	49	4	2	0	0	0	55
14:00	35	2	1	0	0	0	38	6	2	0	0	0	0	8
14:15	28	4	0	1	0	0	33	14	0	0	0	0	0	14
14:30	40	4	0	0	0	0	44	10	4	0	0	0	0	14
14:45	76	2	0	1	0	2	81	25	1	0	1	0	0	27
Hour	179	12	1	2	0	2	196	55	7	0	1	0	0	63
15:00	36	4	0	1	0	0	41	16	2	1	0	0	0	19
15:15	41	1	0	1	0	0	43	13	1	0	0	0	0	14
15:30	54	6	1	1	0	8	70	25	0	0	0	0	0	25
15:45	56	2	0	3	0	4	65	18	4	0	0	0	3	25
Hour	187	13	1	6	0	12	219	72	7	1	0	0	3	83
16:00	33	8	0	0	0	0	41	17	2	0	0	0	0	19
16:15	29	9	0	0	0	0	38	20	1	0	0	0	0	21
16:30	52	6	0	0	1	0	59	18	4	0	0	0	0	22
16:45	51	5	1	0	0	0	57	16	2	0	0	0	0	18
Hour	165	28	1	0	1	0	195	71	9	0	0	0	0	80
17:00	49	11	1	0	0	0	61	13	2	0	0	0	0	15
17:15	50	5	0	0	0	0	55	23	2	0	0	0	0	25
17:30	66	9	0	0	0	0	75	15	3	0	0	0	0	18
17:45	69	4	0	0	0	0	73	20	1	0	0	0	0	21
Hour	234	29	1	0	0	0	264	71	8	0	0	0	0	79
18:00	46	6	0	0	0	1	53	26	0	0	0	0	0	26
18:15	60	4	0	0	0	0	64	20	3	1	0	0	0	24
18:30	60	5	0	0	0	0	65	21	1	0	0	0	0	22
18:45	60	4	0	0	0	1	65	11	2	0	0	0	0	13
Hour	226	19	0	0	0	2	247	78	6	1	0	0	0	85
Total	1698	157	18	21	1	18	1913	642	60	9	3	0	4	718

Site No. 2
Location The Park(N) / The Park(S) / Moylaragh Road
Date Wednesday 28 November 2018

Time	C to B - Moylaragh Road to The Park(S)						Veh. Total	C to A - Moylaragh Road to The Park(N)						Veh. Total
	CAR	LGV	HGV	PSV	M/C	P/C		CAR	LGV	HGV	PSV	M/C	P/C	
07:00	11	2	0	0	0	0	13	1	1	0	1	0	1	4
07:15	12	3	0	0	0	0	15	2	0	0	0	0	0	2
07:30	16	3	0	0	0	0	19	2	1	1	0	0	0	4
07:45	20	2	0	0	0	0	22	4	0	0	4	0	0	8
Hour	59	10	0	0	0	0	69	9	2	1	5	0	1	18
08:00	16	1	0	0	0	2	19	6	0	0	1	0	0	7
08:15	20	1	0	1	0	0	22	4	1	0	3	0	0	8
08:30	30	3	0	0	0	0	33	11	0	0	0	0	0	11
08:45	40	2	0	0	0	0	42	11	0	1	1	0	0	13
Hour	106	7	0	1	0	2	116	32	1	1	5	0	0	39
09:00	19	0	0	0	0	0	19	14	0	0	0	0	0	14
09:15	18	3	1	0	0	0	22	14	3	0	1	1	0	19
09:30	12	2	0	0	0	0	14	6	0	1	0	0	0	7
09:45	13	1	0	0	0	0	14	4	1	0	1	0	0	6
Hour	62	6	1	0	0	0	69	38	4	1	2	1	0	46
10:00	7	1	0	0	0	0	8	0	0	1	0	0	0	1
10:15	9	1	0	0	0	0	10	4	1	0	1	0	0	6
10:30	3	1	0	0	0	0	4	8	0	0	0	0	0	8
10:45	7	3	0	0	0	0	10	5	1	0	1	0	0	7
Hour	26	6	0	0	0	0	32	17	2	1	2	0	0	22
11:00	5	1	0	0	0	0	6	4	1	0	0	0	0	5
11:15	1	2	1	0	0	0	4	10	1	0	1	0	0	12
11:30	7	0	1	0	0	0	8	6	0	0	0	0	0	6
11:45	8	1	0	0	0	0	9	16	2	0	1	0	0	19
Hour	21	4	2	0	0	0	27	36	4	0	2	0	0	42
12:00	10	1	0	0	0	0	11	17	0	0	0	0	0	17
12:15	6	0	0	0	0	0	6	11	3	0	1	0	0	15
12:30	8	2	0	0	0	0	10	10	0	0	0	0	0	10
12:45	9	0	0	0	0	0	9	9	2	0	1	0	0	12
Hour	33	3	0	0	0	0	36	47	5	0	2	0	0	54
13:00	13	1	0	1	0	0	15	8	1	1	0	0	0	10
13:15	8	1	0	0	0	0	9	11	0	0	2	0	1	14
13:30	18	2	0	1	0	0	21	7	1	0	0	0	1	9
13:45	19	0	1	0	0	0	20	14	0	0	2	0	0	16
Hour	58	4	1	2	0	0	65	40	2	1	4	0	2	49
14:00	5	2	0	0	0	0	7	7	0	0	1	0	0	8
14:15	16	3	0	0	0	0	19	13	2	1	2	0	0	18
14:30	18	0	0	0	0	0	18	17	0	0	1	0	0	18
14:45	9	3	0	0	0	0	12	11	1	0	2	0	1	15
Hour	48	8	0	0	0	0	56	48	3	1	6	0	1	59
15:00	19	0	0	0	0	0	19	19	0	0	0	0	0	19
15:15	20	2	0	1	0	0	23	13	1	0	1	0	0	15
15:30	18	0	0	0	0	0	18	17	1	0	0	0	0	18
15:45	9	0	0	0	0	0	9	16	4	0	1	0	0	21
Hour	66	2	0	1	0	0	69	65	6	0	2	0	0	73
16:00	22	3	0	0	0	0	25	12	1	0	1	0	1	15
16:15	9	2	1	0	0	0	12	11	2	0	1	0	0	14
16:30	10	1	0	0	0	0	11	9	1	0	0	0	0	10
16:45	15	2	0	0	0	0	17	15	0	0	1	0	0	16
Hour	56	8	1	0	0	0	65	47	4	0	3	0	1	55
17:00	10	0	0	0	0	0	10	12	0	0	0	0	0	12
17:15	11	0	0	0	0	0	11	15	3	0	1	0	0	19
17:30	13	0	0	0	0	0	13	14	2	0	0	0	1	17
17:45	13	1	1	0	0	0	15	14	1	0	1	0	1	17
Hour	47	1	1	0	0	0	49	55	6	0	2	0	2	65
18:00	10	0	0	0	0	0	10	13	0	0	0	0	0	13
18:15	7	2	1	0	0	0	10	16	0	0	1	0	0	17
18:30	10	0	0	0	0	0	10	12	0	0	0	0	1	13
18:45	10	1	1	0	0	0	12	14	2	0	1	0	0	17
Hour	37	3	2	0	0	0	42	55	2	0	2	0	1	60
Total	619	62	8	4	0	2	695	489	41	6	37	1	8	582

Site No. 2
Location The Park(N) / The Park(S) / Moylaragh Road
Date Wednesday 28 November 2018

Time	To Arm A - The Park(N)						Veh. Total	From Arm A - The Park(N)						Veh. Total
	CAR	LGV	HGV	PSV	M/C	P/C		CAR	LGV	HGV	PSV	M/C	P/C	
07:00	6	2	1	1	0	1	11	31	2	0	0	0	0	33
07:15	8	2	1	0	0	0	11	35	4	0	0	0	0	39
07:30	12	2	1	0	0	0	15	58	4	0	0	0	1	63
07:45	18	2	0	5	0	0	25	60	9	1	2	0	1	73
Hour	44	8	3	6	0	1	62	184	19	1	2	0	2	208
08:00	27	3	0	2	0	0	32	77	1	0	2	0	8	88
08:15	49	1	0	3	0	0	53	54	4	1	3	0	4	66
08:30	51	4	0	0	0	0	55	65	6	0	4	0	2	77
08:45	44	4	1	1	0	1	51	62	3	0	0	0	0	65
Hour	171	12	1	6	0	1	191	258	14	1	9	0	14	296
09:00	67	1	2	3	0	0	73	50	1	0	1	0	1	53
09:15	43	6	1	1	1	0	52	22	4	0	4	1	0	31
09:30	22	1	1	0	0	0	24	27	4	1	0	0	1	33
09:45	28	2	1	2	0	0	33	32	4	2	0	0	0	38
Hour	160	10	5	6	1	0	182	131	13	3	5	1	2	155
10:00	15	4	1	0	0	0	20	29	2	0	0	0	0	31
10:15	20	2	0	2	0	0	24	29	7	1	2	0	0	39
10:30	26	1	2	0	0	0	29	31	1	1	0	0	0	33
10:45	26	3	0	1	0	0	30	31	1	1	0	0	0	33
Hour	87	10	3	3	0	0	103	120	11	3	2	0	0	136
11:00	23	2	1	0	0	0	26	27	4	0	0	0	1	32
11:15	37	4	0	1	0	0	42	36	3	1	0	0	0	40
11:30	31	2	0	0	0	0	33	30	1	1	0	0	0	32
11:45	37	3	0	1	0	0	41	32	3	1	0	0	0	36
Hour	128	11	1	2	0	0	142	125	11	3	0	0	1	140
12:00	42	4	0	0	0	0	46	41	2	0	0	0	0	43
12:15	36	5	0	1	0	0	42	29	3	0	0	0	1	33
12:30	32	1	2	1	0	0	36	30	3	0	0	0	0	33
12:45	36	4	0	1	0	0	41	30	3	1	2	0	0	36
Hour	146	14	2	3	0	0	165	130	11	1	2	0	1	145
13:00	39	1	3	0	0	0	43	46	5	3	0	0	0	54
13:15	43	3	0	2	0	2	50	42	2	0	0	0	0	44
13:30	33	4	0	2	0	1	40	52	1	0	1	0	0	54
13:45	75	3	1	5	0	0	84	37	7	2	1	0	0	47
Hour	190	11	4	9	0	3	217	177	15	5	2	0	0	199
14:00	42	2	1	1	0	0	46	57	5	0	1	0	0	63
14:15	41	6	1	3	0	0	51	64	3	0	0	0	1	68
14:30	57	4	0	1	0	0	62	66	4	0	0	0	0	70
14:45	87	3	0	3	0	3	96	50	5	1	0	0	0	56
Hour	227	15	2	8	0	3	255	237	17	1	1	0	1	257
15:00	55	4	0	1	0	0	60	39	2	0	2	0	0	43
15:15	54	2	0	2	0	0	58	61	3	0	2	0	0	66
15:30	71	7	1	1	0	8	88	37	3	0	2	0	0	42
15:45	72	6	0	4	0	4	86	51	4	0	0	0	0	55
Hour	252	19	1	8	0	12	292	188	12	0	6	0	0	206
16:00	45	9	0	1	0	1	56	61	7	0	0	0	0	68
16:15	40	11	0	1	0	0	52	40	6	0	0	0	0	46
16:30	61	7	0	0	1	0	69	42	6	0	0	0	1	49
16:45	66	5	1	1	0	0	73	51	5	0	0	0	0	56
Hour	212	32	1	3	1	1	250	194	24	0	0	0	1	219
17:00	61	11	1	0	0	0	73	53	4	0	0	0	0	57
17:15	65	8	0	1	0	0	74	33	3	0	0	0	0	36
17:30	80	11	0	0	0	1	92	31	1	1	0	0	0	33
17:45	83	5	0	1	0	1	90	45	3	0	0	0	1	49
Hour	289	35	1	2	0	2	329	162	11	1	0	0	1	175
18:00	59	6	0	0	0	1	66	59	2	1	0	0	1	63
18:15	76	4	0	1	0	0	81	40	4	0	0	0	0	44
18:30	72	5	0	0	0	1	78	49	1	0	0	0	0	50
18:45	74	6	0	1	0	1	82	42	3	0	0	0	0	45
Hour	281	21	0	2	0	3	307	190	10	1	0	0	1	202
Total	2187	198	24	58	2	26	2495	2096	168	20	29	1	24	2338

Site No. 2
Location The Park(N) / The Park(S) / Moylaragh Road
Date Wednesday 28 November 2018

Time	To Arm B - The Park(S)						Veh. Total	From Arm B - The Park(S)						Veh. Total
	CAR	LGV	HGV	PSV	M/C	P/C		CAR	LGV	HGV	PSV	M/C	P/C	
07:00	42	4	0	0	0	0	46	8	1	1	0	0	0	10
07:15	45	6	0	0	0	0	51	9	2	1	0	0	1	13
07:30	70	7	0	0	0	0	77	17	1	0	0	0	0	18
07:45	78	10	1	0	0	1	90	26	6	0	2	0	0	34
Hour	235	27	1	0	0	1	264	60	10	2	2	0	1	75
08:00	91	2	0	1	0	9	103	42	4	0	1	0	0	47
08:15	68	5	1	2	0	3	79	60	1	0	1	0	0	62
08:30	92	9	0	2	0	1	104	55	6	2	0	0	0	63
08:45	84	4	0	0	0	0	88	59	5	1	0	0	1	66
Hour	335	20	1	5	0	13	374	216	16	3	2	0	1	238
09:00	59	1	0	1	0	0	61	87	2	2	3	0	0	94
09:15	35	7	1	4	1	0	48	42	3	1	0	0	0	46
09:30	29	6	1	0	0	0	36	24	2	0	0	0	0	26
09:45	38	5	2	0	0	0	45	31	2	1	1	0	0	35
Hour	161	19	4	5	1	0	190	184	9	4	4	0	0	201
10:00	31	3	0	0	0	0	34	18	4	0	0	0	0	22
10:15	34	5	1	1	0	0	41	21	1	1	1	0	0	24
10:30	22	1	1	0	0	0	24	23	1	2	0	0	0	26
10:45	31	4	1	0	0	0	36	27	2	0	0	0	0	29
Hour	118	13	3	1	0	0	135	89	8	3	1	0	0	101
11:00	24	5	0	0	0	1	30	23	3	1	0	0	0	27
11:15	26	3	2	0	0	0	31	29	3	1	0	0	0	33
11:30	31	1	2	0	0	0	34	32	2	0	0	0	0	34
11:45	35	3	1	0	0	0	39	29	1	0	0	0	0	30
Hour	116	12	5	0	0	1	134	113	9	2	0	0	0	124
12:00	35	2	0	0	0	0	37	35	6	0	0	0	0	41
12:15	26	2	0	0	0	0	28	37	3	0	0	0	0	40
12:30	28	3	0	0	0	0	31	31	3	2	1	0	0	37
12:45	28	3	1	2	0	0	34	38	2	0	0	0	0	40
Hour	117	10	1	2	0	0	130	141	14	2	1	0	0	158
13:00	46	4	3	1	0	0	54	41	0	3	0	0	0	44
13:15	41	3	0	0	0	0	44	43	3	0	0	0	1	47
13:30	59	3	0	2	0	0	64	34	6	0	2	0	0	42
13:45	43	7	3	1	0	0	54	81	4	2	3	0	0	90
Hour	189	17	6	4	0	0	216	199	13	5	5	0	1	223
14:00	49	7	0	1	0	0	57	41	4	1	0	0	0	46
14:15	64	6	0	0	0	0	70	42	4	0	1	0	0	47
14:30	69	3	0	0	0	0	72	50	8	0	0	0	0	58
14:45	42	7	1	0	0	0	50	101	3	0	2	0	2	108
Hour	224	23	1	1	0	0	249	234	19	1	3	0	2	259
15:00	50	1	0	1	0	0	52	52	6	1	1	0	0	60
15:15	64	4	0	2	0	0	70	54	2	0	1	0	0	57
15:30	45	0	0	0	0	0	45	79	6	1	1	0	8	95
15:45	45	1	0	0	0	0	46	74	6	0	3	0	7	90
Hour	204	6	0	3	0	0	213	259	20	2	6	0	15	302
16:00	64	8	0	0	0	0	72	50	10	0	0	0	0	60
16:15	34	6	1	0	0	0	41	49	10	0	0	0	0	59
16:30	43	6	0	0	0	0	49	70	10	0	0	1	0	81
16:45	49	6	0	0	0	0	55	67	7	1	0	0	0	75
Hour	190	26	1	0	0	0	217	236	37	1	0	1	0	275
17:00	41	4	0	0	0	0	45	62	13	1	0	0	0	76
17:15	28	2	0	0	0	0	30	73	7	0	0	0	0	80
17:30	33	0	1	0	0	0	34	81	12	0	0	0	0	93
17:45	45	2	1	0	0	1	49	89	5	0	0	0	0	94
Hour	147	8	2	0	0	1	158	305	37	1	0	0	0	343
18:00	51	1	0	0	0	1	53	72	6	0	0	0	1	79
18:15	32	4	1	0	0	0	37	80	7	1	0	0	0	88
18:30	42	1	0	0	0	0	43	81	6	0	0	0	0	87
18:45	40	3	1	0	0	0	44	71	6	0	0	0	1	78
Hour	165	9	2	0	0	1	177	304	25	1	0	0	2	332
Total	2201	190	27	21	1	17	2457	2340	217	27	24	1	22	2631

Site No. 2
Location The Park(N) / The Park(S) / Moylaragh Road
Date Wednesday 28 November 2018

Time	To Arm C - Moylaragh Road						Veh. Total	From Arm C - Moylaragh Road						Veh. Total
	CAR	LGV	HGV	PSV	M/C	P/C		CAR	LGV	HGV	PSV	M/C	P/C	
07:00	3	0	0	0	0	0	3	12	3	0	1	0	1	17
07:15	5	1	0	0	0	1	7	14	3	0	0	0	0	17
07:30	11	0	0	0	0	1	12	18	4	1	0	0	0	23
07:45	14	5	0	3	0	0	22	24	2	0	4	0	0	30
Hour	33	6	0	3	0	2	44	68	12	1	5	0	1	87
08:00	23	1	0	1	0	1	26	22	1	0	1	0	2	26
08:15	21	1	0	3	0	1	26	24	2	0	4	0	0	30
08:30	18	2	2	2	0	1	25	41	3	0	0	0	0	44
08:45	44	2	1	0	0	0	47	51	2	1	1	0	0	55
Hour	106	6	3	6	0	3	124	138	8	1	6	0	2	155
09:00	44	1	0	0	0	1	46	33	0	0	0	0	0	33
09:15	18	0	0	0	0	0	18	32	6	1	1	1	0	41
09:30	18	1	0	0	0	1	20	18	2	1	0	0	0	21
09:45	14	1	0	0	0	0	15	17	2	0	1	0	0	20
Hour	94	3	0	0	0	2	99	100	10	2	2	1	0	115
10:00	8	0	0	0	0	0	8	7	1	1	0	0	0	9
10:15	9	3	1	1	0	0	14	13	2	0	1	0	0	16
10:30	17	1	0	0	0	0	18	11	1	0	0	0	0	12
10:45	13	0	0	0	0	0	13	12	4	0	1	0	0	17
Hour	47	4	1	1	0	0	53	43	8	1	2	0	0	54
11:00	12	2	0	0	0	0	14	9	2	0	0	0	0	11
11:15	13	2	1	0	0	0	16	11	3	1	1	0	0	16
11:30	13	0	0	0	0	0	13	13	0	1	0	0	0	14
11:45	13	1	0	0	0	0	14	24	3	0	1	0	0	28
Hour	51	5	1	0	0	0	57	57	8	2	2	0	0	69
12:00	26	3	0	0	0	0	29	27	1	0	0	0	0	28
12:15	21	2	0	0	0	1	24	17	3	0	1	0	0	21
12:30	19	4	0	0	0	0	23	18	2	0	0	0	0	20
12:45	22	0	0	0	0	0	22	18	2	0	1	0	0	21
Hour	88	9	0	0	0	1	98	80	8	0	2	0	0	90
13:00	23	2	1	0	0	0	26	21	2	1	1	0	0	25
13:15	20	0	0	0	0	0	20	19	1	0	2	0	1	23
13:30	19	3	0	0	0	0	22	25	3	0	1	0	1	30
13:45	33	1	1	0	0	0	35	33	0	1	2	0	0	36
Hour	95	6	2	0	0	0	103	98	6	2	6	0	2	114
14:00	19	2	0	0	0	0	21	12	2	0	1	0	0	15
14:15	30	0	0	0	0	1	31	29	5	1	2	0	0	37
14:30	25	5	0	0	0	0	30	35	0	0	1	0	0	36
14:45	42	2	0	1	0	0	45	20	4	0	2	0	1	27
Hour	116	9	0	1	0	1	127	96	11	1	6	0	1	115
15:00	24	3	1	1	0	0	29	38	0	0	0	0	0	38
15:15	30	2	0	1	0	0	33	33	3	0	2	0	0	38
15:30	35	3	0	2	0	0	40	35	1	0	0	0	0	36
15:45	33	7	0	0	0	3	43	25	4	0	1	0	0	30
Hour	122	15	1	4	0	3	145	131	8	0	3	0	0	142
16:00	36	4	0	0	0	0	40	34	4	0	1	0	1	40
16:15	35	3	0	0	0	0	38	20	4	1	1	0	0	26
16:30	27	5	0	0	0	1	33	19	2	0	0	0	0	21
16:45	33	3	0	0	0	0	36	30	2	0	1	0	0	33
Hour	131	15	0	0	0	1	147	103	12	1	3	0	1	120
17:00	35	2	0	0	0	0	37	22	0	0	0	0	0	22
17:15	39	3	0	0	0	0	42	26	3	0	1	0	0	30
17:30	26	4	0	0	0	0	30	27	2	0	0	0	1	30
17:45	33	3	0	0	0	0	36	27	2	1	1	0	1	32
Hour	133	12	0	0	0	0	145	102	7	1	2	0	2	114
18:00	44	1	1	0	0	0	46	23	0	0	0	0	0	23
18:15	35	5	1	0	0	0	41	23	2	1	1	0	0	27
18:30	38	1	0	0	0	0	39	22	0	0	0	0	1	23
18:45	23	3	0	0	0	0	26	24	3	1	1	0	0	29
Hour	140	10	2	0	0	0	152	92	5	2	2	0	1	102
Total	1156	100	10	15	0	13	1294	1108	103	14	41	1	10	1277

Site No. 3
Location Castlemill Link Road(N) / Unnamed Road / Castlemill Link Road(S) / Hampton Gardens Drive
Date Wednesday 28 November 2018

Time	A to D - Castlemill Link Road(N) to Hampton Gardens Drive						Veh. Total	A to C - Castlemill Link Road(N) to Castlemill Link Road(S)						Veh. Total
	CAR	LGV	HGV	PSV	M/C	P/C		CAR	LGV	HGV	PSV	M/C	P/C	
07:00	0	0	0	0	0	0	0	56	8	0	0	0	0	64
07:15	0	0	0	0	0	0	0	59	6	0	1	1	1	68
07:30	0	0	0	0	0	0	0	87	9	0	0	0	0	96
07:45	1	0	0	0	0	0	1	94	12	1	0	1	2	110
Hour	1	0	0	0	0	0	1	296	35	1	1	2	3	338
08:00	1	0	0	0	0	0	1	113	7	1	1	0	2	124
08:15	0	0	0	0	0	0	0	87	4	1	1	0	8	101
08:30	1	1	0	0	0	0	2	102	10	0	3	0	2	117
08:45	2	0	0	0	0	0	2	81	6	0	0	0	2	89
Hour	4	1	0	0	0	0	5	383	27	2	5	0	14	431
09:00	2	0	0	0	0	0	2	79	3	0	1	0	1	84
09:15	0	0	0	0	0	0	0	47	7	1	4	1	0	60
09:30	0	0	0	0	0	0	0	38	10	2	0	0	0	50
09:45	1	0	0	0	0	0	1	39	4	2	0	0	0	45
Hour	3	0	0	0	0	0	3	203	24	5	5	1	1	239
10:00	2	0	0	0	0	0	2	43	6	0	0	0	0	49
10:15	1	0	0	0	0	0	1	38	4	1	1	0	0	44
10:30	0	0	0	0	0	0	0	29	2	1	0	0	0	32
10:45	1	0	0	0	0	0	1	34	6	1	0	0	0	41
Hour	4	0	0	0	0	0	4	144	18	3	1	0	0	166
11:00	0	0	0	0	0	0	0	29	4	0	0	0	0	33
11:15	0	1	0	0	0	0	1	39	4	2	0	0	1	46
11:30	1	0	0	0	0	0	1	36	3	2	0	0	0	41
11:45	1	0	0	0	0	0	1	50	3	1	0	0	0	54
Hour	2	1	0	0	0	0	3	154	14	5	0	0	1	174
12:00	2	0	0	0	0	0	2	40	1	0	0	0	0	41
12:15	0	0	0	0	0	0	0	32	3	1	0	0	0	36
12:30	0	0	0	0	0	0	0	36	1	0	0	0	0	37
12:45	2	0	0	0	0	0	2	40	5	1	2	0	0	48
Hour	4	0	0	0	0	0	4	148	10	2	2	0	0	162
13:00	3	0	0	0	0	0	3	48	4	4	1	0	0	57
13:15	0	0	0	0	0	0	0	53	4	0	0	0	0	57
13:30	2	0	0	1	0	0	3	70	4	0	0	0	0	74
13:45	0	0	0	0	0	0	0	53	7	0	1	0	0	61
Hour	5	0	0	1	0	0	6	224	19	4	2	0	0	249
14:00	1	0	0	0	0	0	1	57	7	1	1	0	0	66
14:15	1	0	0	0	0	0	1	75	6	0	0	0	0	81
14:30	3	0	0	0	0	0	3	83	5	0	0	0	0	88
14:45	2	0	0	0	0	0	2	49	6	1	0	0	0	56
Hour	7	0	0	0	0	0	7	264	24	2	1	0	0	291
15:00	1	0	0	0	0	0	1	52	3	0	1	0	0	56
15:15	1	0	0	0	0	0	1	71	3	0	0	0	0	74
15:30	2	0	0	0	0	0	2	56	5	0	0	0	0	61
15:45	0	0	0	0	0	0	0	59	3	0	0	0	0	62
Hour	4	0	0	0	0	0	4	238	14	0	1	0	0	253
16:00	0	0	0	0	0	0	0	67	8	0	0	0	0	75
16:15	0	0	0	0	0	0	0	41	5	1	0	0	0	47
16:30	0	0	0	0	0	0	0	51	8	0	0	0	0	59
16:45	1	0	0	0	0	0	1	55	8	0	0	0	0	63
Hour	1	0	0	0	0	0	1	214	29	1	0	0	0	244
17:00	0	0	0	0	0	0	0	53	7	0	0	0	0	60
17:15	0	0	0	0	0	0	0	31	2	0	0	0	0	33
17:30	1	0	0	0	0	0	1	37	1	1	0	0	0	39
17:45	3	0	0	0	0	0	3	46	1	0	0	0	1	48
Hour	4	0	0	0	0	0	4	167	11	1	0	0	1	180
18:00	2	0	0	0	0	0	2	51	2	0	0	0	0	53
18:15	2	0	0	0	0	0	2	38	6	0	0	1	0	45
18:30	1	0	0	0	0	0	1	46	2	0	0	1	0	49
18:45	1	0	0	0	0	0	1	45	3	0	0	0	0	48
Hour	6	0	0	0	0	0	6	180	13	0	0	2	0	195
Total	45	2	0	1	0	0	48	2615	238	26	18	5	20	2922

Site No. 3
Location Castlemill Link Road(N) / Unnamed Road / Castlemill Link Road(S) / Hampton Gardens Drive
Date Wednesday 28 November 2018

Time	A to B - Castlemill Link Road(N) to Unnamed Road						Veh. Total	B to A - Unnamed Road to Castlemill Link Road(N)						Veh. Total
	CAR	LGV	HGV	PSV	M/C	P/C		CAR	LGV	HGV	PSV	M/C	P/C	
07:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hour	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:00	0	0	0	0	2	1	3	0	0	0	0	0	0	0
08:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:45	3	0	0	0	0	1	4	3	0	0	0	0	0	3
Hour	3	0	0	0	2	2	7	3	0	0	0	0	0	3
09:00	3	0	0	0	0	2	5	6	0	0	0	0	0	6
09:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0
09:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0
09:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hour	3	0	0	0	0	2	5	6	0	0	0	0	0	6
10:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hour	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hour	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:30	0	0	0	0	0	1	1	0	0	0	0	0	0	0
12:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hour	0	0	0	0	0	1	1	0	0	0	0	0	0	0
13:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13:30	5	0	0	0	0	0	5	1	0	0	0	0	0	1
13:45	0	0	0	0	0	0	0	3	0	0	0	0	0	3
Hour	5	0	0	0	0	0	5	4	0	0	0	0	0	4
14:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14:15	1	0	0	0	0	0	1	0	0	0	0	0	0	0
14:30	3	0	0	0	0	0	3	0	0	0	0	0	0	0
14:45	1	0	0	0	0	0	1	5	0	0	0	0	0	5
Hour	5	0	0	0	0	0	5	5	0	0	0	0	0	5
15:00	2	0	0	0	0	0	2	1	0	0	0	0	0	1
15:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hour	2	0	0	0	0	0	2	1	0	0	0	0	0	1
16:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hour	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hour	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hour	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	18	0	0	0	2	5	25	19	0	0	0	0	0	19

Site No. 3
Location Castlemill Link Road(N) / Unnamed Road / Castlemill Link Road(S) / Hampton Gardens Drive
Date Wednesday 28 November 2018

Time	B to D - Unnamed Road to Hampton Gardens Drive						Veh. Total	B to C - Unnamed Road to Castlemill Link Road(S)						Veh. Total
	CAR	LGV	HGV	PSV	M/C	P/C		CAR	LGV	HGV	PSV	M/C	P/C	
07:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hour	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:45	0	0	0	0	0	0	0	2	0	0	0	0	0	2
Hour	0	0	0	0	0	0	0	2	0	0	0	0	0	2
09:00	0	0	0	0	0	0	0	1	0	0	0	0	0	1
09:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0
09:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0
09:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hour	0	0	0	0	0	0	0	1	0	0	0	0	0	1
10:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hour	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hour	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hour	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13:45	0	0	0	0	0	0	0	2	0	0	0	0	0	2
Hour	0	0	0	0	0	0	0	2	0	0	0	0	0	2
14:00	0	0	0	0	0	0	0	1	0	0	0	0	0	1
14:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hour	0	0	0	0	0	0	0	1	0	0	0	0	0	1
15:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15:30	0	0	0	0	0	0	0	1	0	0	0	0	0	1
15:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hour	0	0	0	0	0	0	0	1	0	0	0	0	0	1
16:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:30	0	0	0	0	0	0	0	1	0	0	0	0	0	1
16:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hour	0	0	0	0	0	0	0	1	0	0	0	0	0	1
17:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hour	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hour	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	8	0	0	0	0	0	8

Site No. 3
Location Castlemill Link Road(N) / Unnamed Road / Castlemill Link Road(S) / Hampton Gardens Drive
Date Wednesday 28 November 2018

Time	C to B - Castlemill Link Road(S) to Unnamed Road						Veh. Total	C to A - Castlemill Link Road(S) to Castlemill Link Road(N)						Veh. Total
	CAR	LGV	HGV	PSV	M/C	P/C		CAR	LGV	HGV	PSV	M/C	P/C	
07:00	0	0	0	0	0	0	0	12	1	0	1	0	0	14
07:15	0	0	0	0	0	0	0	15	0	0	0	0	0	15
07:30	0	0	0	0	0	0	0	17	3	1	0	0	0	21
07:45	0	0	0	0	0	0	0	28	6	1	1	0	0	36
Hour	0	0	0	0	0	0	0	72	10	2	2	0	0	86
08:00	0	0	0	0	0	0	0	31	5	0	1	0	1	38
08:15	0	0	0	0	0	0	0	73	1	2	1	0	2	79
08:30	5	0	0	0	0	0	5	47	5	0	1	0	0	53
08:45	2	0	0	0	0	0	2	48	4	2	1	0	0	55
Hour	7	0	0	0	0	0	7	199	15	4	4	0	3	225
09:00	3	0	0	0	0	0	3	90	3	0	3	0	0	96
09:15	0	0	0	0	0	0	0	43	4	1	0	0	0	48
09:30	0	0	0	0	0	0	0	32	5	0	0	0	0	37
09:45	0	0	0	0	0	0	0	28	1	1	1	0	0	31
Hour	3	0	0	0	0	0	3	193	13	2	4	0	0	212
10:00	0	0	0	0	0	0	0	22	4	0	0	0	0	26
10:15	0	0	0	0	0	0	0	23	2	1	1	0	0	27
10:30	0	0	0	0	0	0	0	26	1	2	0	0	0	29
10:45	0	0	0	0	0	0	0	30	5	0	0	0	0	35
Hour	0	0	0	0	0	0	0	101	12	3	1	0	0	117
11:00	0	0	0	0	0	0	0	26	3	1	0	0	0	30
11:15	0	0	0	0	0	0	0	32	4	1	0	0	0	37
11:30	0	0	0	0	0	0	0	38	2	0	0	0	0	40
11:45	0	0	0	0	0	0	0	35	3	0	0	0	0	38
Hour	0	0	0	0	0	0	0	131	12	2	0	0	0	145
12:00	0	0	0	0	0	0	0	43	9	0	0	0	0	52
12:15	0	0	0	0	0	0	0	41	4	0	0	0	0	45
12:30	0	0	0	0	0	0	0	37	2	2	1	0	0	42
12:45	0	0	0	0	0	0	0	33	1	0	0	0	0	34
Hour	0	0	0	0	0	0	0	154	16	2	1	0	0	173
13:00	0	0	0	0	0	0	0	53	0	3	0	0	0	56
13:15	0	0	0	0	0	0	0	49	4	0	0	0	0	53
13:30	1	0	0	0	0	0	1	51	6	1	1	0	0	59
13:45	0	0	0	0	0	0	0	80	3	2	3	0	0	88
Hour	1	0	0	0	0	0	1	233	13	6	4	0	0	256
14:00	1	0	0	0	0	0	1	50	3	1	0	0	0	54
14:15	0	0	0	0	0	0	0	51	6	0	1	0	0	58
14:30	1	0	0	0	0	0	1	59	9	0	1	0	0	69
14:45	0	0	0	0	0	0	0	117	4	0	2	0	0	123
Hour	2	0	0	0	0	0	2	277	22	1	4	0	0	304
15:00	0	0	0	0	0	0	0	65	7	1	1	0	0	74
15:15	0	0	0	0	0	0	0	66	6	0	0	0	0	72
15:30	1	0	0	0	0	0	1	100	6	1	2	0	0	109
15:45	0	0	0	0	0	0	0	72	6	0	2	0	0	80
Hour	1	0	0	0	0	0	1	303	25	2	5	0	0	335
16:00	0	0	0	0	0	0	0	65	9	1	0	1	0	76
16:15	1	0	0	0	0	0	1	69	10	0	0	0	0	79
16:30	0	0	0	0	0	0	0	82	9	0	0	1	0	92
16:45	0	0	0	0	0	0	0	79	10	1	0	0	0	90
Hour	1	0	0	0	0	0	1	295	38	2	0	2	0	337
17:00	0	0	0	0	0	0	0	72	14	1	0	0	0	87
17:15	0	0	0	0	0	0	0	92	7	0	0	0	0	99
17:30	0	0	0	0	0	0	0	90	13	0	0	0	0	103
17:45	0	0	0	0	0	0	0	101	4	0	0	1	0	106
Hour	0	0	0	0	0	0	0	355	38	1	0	1	0	395
18:00	0	0	0	0	0	0	0	100	6	0	0	0	0	106
18:15	0	0	0	0	0	0	0	93	9	1	0	1	0	104
18:30	0	0	0	0	0	0	0	91	9	0	0	0	0	100
18:45	0	0	0	0	0	0	0	97	7	0	0	0	0	104
Hour	0	0	0	0	0	0	0	381	31	1	0	1	0	414
Total	15	0	0	0	0	0	15	2694	245	28	25	4	3	2999

Site No. 3
Location Castlemill Link Road(N) / Unnamed Road / Castlemill Link Road(S) / Hampton Gardens Drive
Date Wednesday 28 November 2018

Time	C to D - Castlemill Link Road(S) to Hampton Gardens Drive						Veh. Total	D to C - Hampton Gardens Drive to Castlemill Link Road(S)						Veh. Total
	CAR	LGV	HGV	PSV	M/C	P/C		CAR	LGV	HGV	PSV	M/C	P/C	
07:00	0	0	0	0	0	0	0	10	1	0	0	0	0	11
07:15	2	0	0	1	0	0	3	6	1	0	0	0	0	7
07:30	2	0	0	0	0	0	2	4	0	0	0	0	0	4
07:45	2	0	0	0	0	0	2	7	0	0	0	0	0	7
Hour	6	0	0	1	0	0	7	27	2	0	0	0	0	29
08:00	1	0	0	0	0	0	1	3	0	0	0	0	1	4
08:15	4	0	0	0	0	0	4	8	2	0	0	0	0	10
08:30	0	0	0	0	0	0	0	4	0	0	0	0	0	4
08:45	4	0	0	0	0	0	4	9	0	0	0	0	0	9
Hour	9	0	0	0	0	0	9	24	2	0	0	0	1	27
09:00	4	0	0	0	0	0	4	7	1	0	0	0	0	8
09:15	3	0	0	0	0	0	3	3	0	0	0	0	0	3
09:30	2	0	0	0	0	0	2	3	0	0	0	0	1	4
09:45	1	0	0	0	0	0	1	2	0	0	0	0	0	2
Hour	10	0	0	0	0	0	10	15	1	0	0	0	1	17
10:00	2	0	0	0	0	0	2	5	0	0	0	0	0	5
10:15	1	0	0	0	0	0	1	0	0	0	0	0	0	0
10:30	2	0	0	0	0	0	2	2	0	0	0	0	0	2
10:45	0	0	0	0	0	0	0	4	0	0	0	0	0	4
Hour	5	0	0	0	0	0	5	11	0	0	0	0	0	11
11:00	1	0	0	0	0	0	1	1	0	0	0	0	1	2
11:15	2	0	0	0	0	0	2	0	1	0	0	0	0	1
11:30	2	0	0	0	0	0	2	6	0	0	0	0	0	6
11:45	3	0	0	0	0	0	3	1	1	0	0	0	0	2
Hour	8	0	0	0	0	0	8	8	2	0	0	0	1	11
12:00	3	0	0	0	0	0	3	2	0	0	0	0	0	2
12:15	1	1	0	0	0	0	2	2	0	0	0	0	0	2
12:30	2	0	0	0	0	0	2	2	1	0	0	0	0	3
12:45	2	0	0	0	0	0	2	3	0	0	0	0	0	3
Hour	8	1	0	0	0	0	9	9	1	0	0	0	0	10
13:00	2	0	0	0	0	0	2	2	0	0	0	0	0	2
13:15	2	0	0	0	0	0	2	4	0	0	0	0	0	4
13:30	5	0	0	0	0	0	5	3	0	0	0	0	0	3
13:45	4	0	1	0	0	0	5	2	0	1	0	0	0	3
Hour	13	0	1	0	0	0	14	11	0	1	0	0	0	12
14:00	3	1	0	0	0	0	4	3	0	0	0	0	0	3
14:15	2	0	0	0	0	0	2	3	0	0	0	0	0	3
14:30	7	0	0	0	0	0	7	7	0	0	0	0	0	7
14:45	8	0	0	0	0	0	8	7	0	0	0	0	0	7
Hour	20	1	0	0	0	0	21	20	0	0	0	0	0	20
15:00	6	1	0	0	0	0	7	3	0	0	0	0	0	3
15:15	3	1	0	0	0	0	4	3	0	0	0	0	0	3
15:30	2	0	0	0	0	0	2	3	0	0	0	0	0	3
15:45	1	0	0	0	0	0	1	2	1	0	0	0	0	3
Hour	12	2	0	0	0	0	14	11	1	0	0	0	0	12
16:00	5	2	0	0	0	0	7	3	0	0	0	0	0	3
16:15	6	1	1	0	0	0	8	2	0	0	0	0	0	2
16:30	1	0	0	0	0	0	1	1	0	1	0	0	0	2
16:45	2	0	0	0	0	0	2	1	0	0	0	0	0	1
Hour	14	3	1	0	0	0	18	7	0	1	0	0	0	8
17:00	5	2	0	0	0	0	7	1	0	0	0	0	0	1
17:15	3	0	0	0	0	0	3	0	1	0	0	0	0	1
17:30	5	1	0	0	0	0	6	3	0	0	0	0	0	3
17:45	9	2	0	0	0	0	11	3	0	0	0	0	0	3
Hour	22	5	0	0	0	0	27	7	1	0	0	0	0	8
18:00	9	2	0	0	0	0	11	1	0	0	0	0	0	1
18:15	5	1	0	0	0	0	6	6	1	0	0	0	0	7
18:30	3	1	0	0	0	0	4	4	0	0	0	0	0	4
18:45	7	0	0	0	0	0	7	3	0	0	0	0	0	3
Hour	24	4	0	0	0	0	28	14	1	0	0	0	0	15
Total	151	16	2	1	0	0	170	164	11	2	0	0	3	180

Site No. 3
Location Castlemill Link Road(N) / Unnamed Road / Castlemill Link Road(S) / Hampton Gardens Drive
Date Wednesday 28 November 2018

Time	D to B - Hampton Gardens Drive to Unnamed Road						Veh. Total	D to A - Hampton Gardens Drive to Castlemill Link Road(N)						Veh. Total
	CAR	LGV	HGV	PSV	M/C	P/C		CAR	LGV	HGV	PSV	M/C	P/C	
07:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:15	0	0	0	0	0	0	0	0	0	1	0	0	0	1
07:30	0	0	0	0	0	0	0	1	0	0	0	0	0	1
07:45	0	0	0	0	0	0	0	1	0	0	1	0	0	2
Hour	0	0	0	0	0	0	0	2	0	1	1	0	0	4
08:00	0	0	0	0	0	0	0	1	0	0	0	0	0	1
08:15	0	0	0	0	0	0	0	2	0	0	0	0	0	2
08:30	0	0	0	0	0	0	0	2	0	0	0	0	0	2
08:45	0	0	0	0	0	0	0	1	0	0	0	0	0	1
Hour	0	0	0	0	0	0	0	6	0	0	0	0	0	6
09:00	0	0	0	0	0	0	0	4	0	0	0	0	0	4
09:15	0	0	0	0	0	0	0	2	0	0	0	0	0	2
09:30	0	0	0	0	0	0	0	1	0	0	0	0	0	1
09:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hour	0	0	0	0	0	0	0	7	0	0	0	0	0	7
10:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:30	0	0	0	0	0	0	0	1	0	0	0	0	0	1
10:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hour	0	0	0	0	0	0	0	1	0	0	0	0	0	1
11:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:30	0	0	0	0	0	0	0	1	0	0	0	0	0	1
11:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hour	0	0	0	0	0	0	0	1	0	0	0	0	0	1
12:00	0	0	0	0	0	0	0	2	0	0	0	0	0	2
12:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:30	0	0	0	0	0	0	0	1	0	0	0	0	0	1
12:45	0	0	0	0	0	0	0	3	0	0	0	0	0	3
Hour	0	0	0	0	0	0	0	6	0	0	0	0	0	6
13:00	0	0	0	0	0	0	0	1	0	0	0	0	0	1
13:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13:30	0	0	0	0	0	0	0	0	0	0	1	0	0	1
13:45	0	0	0	0	0	0	0	3	1	0	0	0	0	4
Hour	0	0	0	0	0	0	0	4	1	0	1	0	0	6
14:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14:15	0	0	0	0	0	0	0	1	0	0	0	0	0	1
14:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14:45	0	0	0	0	0	0	0	6	1	0	0	0	0	7
Hour	0	0	0	0	0	0	0	7	1	0	0	0	0	8
15:00	0	0	0	0	0	0	0	1	0	0	0	0	0	1
15:15	0	0	0	0	0	0	0	1	0	0	0	0	0	1
15:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hour	0	0	0	0	0	0	0	2	0	0	0	0	0	2
16:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hour	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:15	0	0	0	0	0	0	0	2	0	0	0	0	0	2
17:30	0	0	0	0	0	0	0	1	0	0	0	0	0	1
17:45	0	0	0	0	0	0	0	1	0	0	0	0	0	1
Hour	0	0	0	0	0	0	0	4	0	0	0	0	0	4
18:00	0	0	0	0	0	0	0	2	0	0	0	0	0	2
18:15	0	0	0	0	0	0	0	1	0	0	0	0	0	1
18:30	0	0	0	0	0	0	0	1	0	0	0	0	0	1
18:45	0	0	0	0	0	0	0	1	0	0	0	0	0	1
Hour	0	0	0	0	0	0	0	5	0	0	0	0	0	5
Total	0	0	0	0	0	0	0	45	2	1	2	0	0	50

Site No. 3
Location Castlemill Link Road(N) / Unnamed Road / Castlemill Link Road(S) / Hampton Gardens Drive
Date Wednesday 28 November 2018

Time	To Arm A - Castlemill Link Road(N)						Veh. Total	From Arm A - Castlemill Link Road(N)						Veh. Total
	CAR	LGV	HGV	PSV	M/C	P/C		CAR	LGV	HGV	PSV	M/C	P/C	
07:00	12	1	0	1	0	0	14	56	8	0	0	0	0	64
07:15	15	0	1	0	0	0	16	59	6	0	1	1	1	68
07:30	18	3	1	0	0	0	22	87	9	0	0	0	0	96
07:45	29	6	1	2	0	0	38	95	12	1	0	1	2	111
Hour	74	10	3	3	0	0	90	297	35	1	1	2	3	339
08:00	32	5	0	1	0	1	39	114	7	1	1	2	3	128
08:15	75	1	2	1	0	2	81	87	4	1	1	0	8	101
08:30	49	5	0	1	0	0	55	103	11	0	3	0	2	119
08:45	52	4	2	1	0	0	59	86	6	0	0	0	3	95
Hour	208	15	4	4	0	3	234	390	28	2	5	2	16	443
09:00	100	3	0	3	0	0	106	84	3	0	1	0	3	91
09:15	45	4	1	0	0	0	50	47	7	1	4	1	0	60
09:30	33	5	0	0	0	0	38	38	10	2	0	0	0	50
09:45	28	1	1	1	0	0	31	40	4	2	0	0	0	46
Hour	206	13	2	4	0	0	225	209	24	5	5	1	3	247
10:00	22	4	0	0	0	0	26	45	6	0	0	0	0	51
10:15	23	2	1	1	0	0	27	39	4	1	1	0	0	45
10:30	27	1	2	0	0	0	30	29	2	1	0	0	0	32
10:45	30	5	0	0	0	0	35	35	6	1	0	0	0	42
Hour	102	12	3	1	0	0	118	148	18	3	1	0	0	170
11:00	26	3	1	0	0	0	30	29	4	0	0	0	0	33
11:15	32	4	1	0	0	0	37	39	5	2	0	0	1	47
11:30	39	2	0	0	0	0	41	37	3	2	0	0	0	42
11:45	35	3	0	0	0	0	38	51	3	1	0	0	0	55
Hour	132	12	2	0	0	0	146	156	15	5	0	0	1	177
12:00	45	9	0	0	0	0	54	42	1	0	0	0	0	43
12:15	41	4	0	0	0	0	45	32	3	1	0	0	0	36
12:30	38	2	2	1	0	0	43	36	1	0	0	0	1	38
12:45	36	1	0	0	0	0	37	42	5	1	2	0	0	50
Hour	160	16	2	1	0	0	179	152	10	2	2	0	1	167
13:00	54	0	3	0	0	0	57	51	4	4	1	0	0	60
13:15	49	4	0	0	0	0	53	53	4	0	0	0	0	57
13:30	52	6	1	2	0	0	61	77	4	0	1	0	0	82
13:45	86	4	2	3	0	0	95	53	7	0	1	0	0	61
Hour	241	14	6	5	0	0	266	234	19	4	3	0	0	260
14:00	50	3	1	0	0	0	54	58	7	1	1	0	0	67
14:15	52	6	0	1	0	0	59	77	6	0	0	0	0	83
14:30	59	9	0	1	0	0	69	89	5	0	0	0	0	94
14:45	128	5	0	2	0	0	135	52	6	1	0	0	0	59
Hour	289	23	1	4	0	0	317	276	24	2	1	0	0	303
15:00	67	7	1	1	0	0	76	55	3	0	1	0	0	59
15:15	67	6	0	0	0	0	73	72	3	0	0	0	0	75
15:30	100	6	1	2	0	0	109	58	5	0	0	0	0	63
15:45	72	6	0	2	0	0	80	59	3	0	0	0	0	62
Hour	306	25	2	5	0	0	338	244	14	0	1	0	0	259
16:00	65	9	1	0	1	0	76	67	8	0	0	0	0	75
16:15	69	10	0	0	0	0	79	41	5	1	0	0	0	47
16:30	82	9	0	0	1	0	92	51	8	0	0	0	0	59
16:45	79	10	1	0	0	0	90	56	8	0	0	0	0	64
Hour	295	38	2	0	2	0	337	215	29	1	0	0	0	245
17:00	72	14	1	0	0	0	87	53	7	0	0	0	0	60
17:15	94	7	0	0	0	0	101	31	2	0	0	0	0	33
17:30	91	13	0	0	0	0	104	38	1	1	0	0	0	40
17:45	102	4	0	0	1	0	107	49	1	0	0	0	1	51
Hour	359	38	1	0	1	0	399	171	11	1	0	0	1	184
18:00	102	6	0	0	0	0	108	53	2	0	0	0	0	55
18:15	94	9	1	0	1	0	105	40	6	0	0	1	0	47
18:30	92	9	0	0	0	0	101	47	2	0	0	1	0	50
18:45	98	7	0	0	0	0	105	46	3	0	0	0	0	49
Hour	386	31	1	0	1	0	419	186	13	0	0	2	0	201
Total	2758	247	29	27	4	3	3068	2678	240	26	19	7	25	2995

Site No. 3
Location Castlemill Link Road(N) / Unnamed Road / Castlemill Link Road(S) / Hampton Gardens Drive
Date Wednesday 28 November 2018

Time	To Arm B - Unnamed Road						Veh. Total	From Arm B - Unnamed Road						Veh. Total
	CAR	LGV	HGV	PSV	M/C	P/C		CAR	LGV	HGV	PSV	M/C	P/C	
07:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hour	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:00	0	0	0	0	2	1	3	0	0	0	0	0	0	0
08:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:30	5	0	0	0	0	0	5	0	0	0	0	0	0	0
08:45	5	0	0	0	0	1	6	5	0	0	0	0	0	5
Hour	10	0	0	0	2	2	14	5	0	0	0	0	0	5
09:00	6	0	0	0	0	2	8	7	0	0	0	0	0	7
09:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0
09:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0
09:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hour	6	0	0	0	0	2	8	7	0	0	0	0	0	7
10:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hour	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hour	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:30	0	0	0	0	0	1	1	0	0	0	0	0	0	0
12:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hour	0	0	0	0	0	1	1	0	0	0	0	0	0	0
13:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13:30	6	0	0	0	0	0	6	1	0	0	0	0	0	1
13:45	0	0	0	0	0	0	0	5	0	0	0	0	0	5
Hour	6	0	0	0	0	0	6	6	0	0	0	0	0	6
14:00	1	0	0	0	0	0	1	1	0	0	0	0	0	1
14:15	1	0	0	0	0	0	1	0	0	0	0	0	0	0
14:30	4	0	0	0	0	0	4	0	0	0	0	0	0	0
14:45	1	0	0	0	0	0	1	5	0	0	0	0	0	5
Hour	7	0	0	0	0	0	7	6	0	0	0	0	0	6
15:00	2	0	0	0	0	0	2	1	0	0	0	0	0	1
15:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15:30	1	0	0	0	0	0	1	1	0	0	0	0	0	1
15:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hour	3	0	0	0	0	0	3	2	0	0	0	0	0	2
16:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:15	1	0	0	0	0	0	1	0	0	0	0	0	0	0
16:30	0	0	0	0	0	0	0	1	0	0	0	0	0	1
16:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hour	1	0	0	0	0	0	1	1	0	0	0	0	0	1
17:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hour	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hour	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	33	0	0	0	2	5	40	27	0	0	0	0	0	27

Site No. 3
Location Castlemill Link Road(N) / Unnamed Road / Castlemill Link Road(S) / Hampton Gardens Drive
Date Wednesday 28 November 2018

Time	To Arm C - Castlemill Link Road(S)						Veh. Total	From Arm C - Castlemill Link Road(S)						Veh. Total
	CAR	LGV	HGV	PSV	M/C	P/C		CAR	LGV	HGV	PSV	M/C	P/C	
07:00	66	9	0	0	0	0	75	12	1	0	1	0	0	14
07:15	65	7	0	1	1	1	75	17	0	0	1	0	0	18
07:30	91	9	0	0	0	0	100	19	3	1	0	0	0	23
07:45	101	12	1	0	1	2	117	30	6	1	1	0	0	38
Hour	323	37	1	1	2	3	367	78	10	2	3	0	0	93
08:00	116	7	1	1	0	3	128	32	5	0	1	0	1	39
08:15	95	6	1	1	0	8	111	77	1	2	1	0	2	83
08:30	106	10	0	3	0	2	121	52	5	0	1	0	0	58
08:45	92	6	0	0	0	2	100	54	4	2	1	0	0	61
Hour	409	29	2	5	0	15	460	215	15	4	4	0	3	241
09:00	87	4	0	1	0	1	93	97	3	0	3	0	0	103
09:15	50	7	1	4	1	0	63	46	4	1	0	0	0	51
09:30	41	10	2	0	0	1	54	34	5	0	0	0	0	39
09:45	41	4	2	0	0	0	47	29	1	1	1	0	0	32
Hour	219	25	5	5	1	2	257	206	13	2	4	0	0	225
10:00	48	6	0	0	0	0	54	24	4	0	0	0	0	28
10:15	38	4	1	1	0	0	44	24	2	1	1	0	0	28
10:30	31	2	1	0	0	0	34	28	1	2	0	0	0	31
10:45	38	6	1	0	0	0	45	30	5	0	0	0	0	35
Hour	155	18	3	1	0	0	177	106	12	3	1	0	0	122
11:00	30	4	0	0	0	1	35	27	3	1	0	0	0	31
11:15	39	5	2	0	0	1	47	34	4	1	0	0	0	39
11:30	42	3	2	0	0	0	47	40	2	0	0	0	0	42
11:45	51	4	1	0	0	0	56	38	3	0	0	0	0	41
Hour	162	16	5	0	0	2	185	139	12	2	0	0	0	153
12:00	42	1	0	0	0	0	43	46	9	0	0	0	0	55
12:15	34	3	1	0	0	0	38	42	5	0	0	0	0	47
12:30	38	2	0	0	0	0	40	39	2	2	1	0	0	44
12:45	43	5	1	2	0	0	51	35	1	0	0	0	0	36
Hour	157	11	2	2	0	0	172	162	17	2	1	0	0	182
13:00	50	4	4	1	0	0	59	55	0	3	0	0	0	58
13:15	57	4	0	0	0	0	61	51	4	0	0	0	0	55
13:30	73	4	0	0	0	0	77	57	6	1	1	0	0	65
13:45	57	7	1	1	0	0	66	84	3	3	3	0	0	93
Hour	237	19	5	2	0	0	263	247	13	7	4	0	0	271
14:00	61	7	1	1	0	0	70	54	4	1	0	0	0	59
14:15	78	6	0	0	0	0	84	53	6	0	1	0	0	60
14:30	90	5	0	0	0	0	95	67	9	0	1	0	0	77
14:45	56	6	1	0	0	0	63	125	4	0	2	0	0	131
Hour	285	24	2	1	0	0	312	299	23	1	4	0	0	327
15:00	55	3	0	1	0	0	59	71	8	1	1	0	0	81
15:15	74	3	0	0	0	0	77	69	7	0	0	0	0	76
15:30	60	5	0	0	0	0	65	103	6	1	2	0	0	112
15:45	61	4	0	0	0	0	65	73	6	0	2	0	0	81
Hour	250	15	0	1	0	0	266	316	27	2	5	0	0	350
16:00	70	8	0	0	0	0	78	70	11	1	0	1	0	83
16:15	43	5	1	0	0	0	49	76	11	1	0	0	0	88
16:30	53	8	1	0	0	0	62	83	9	0	0	1	0	93
16:45	56	8	0	0	0	0	64	81	10	1	0	0	0	92
Hour	222	29	2	0	0	0	253	310	41	3	0	2	0	356
17:00	54	7	0	0	0	0	61	77	16	1	0	0	0	94
17:15	31	3	0	0	0	0	34	95	7	0	0	0	0	102
17:30	40	1	1	0	0	0	42	95	14	0	0	0	0	109
17:45	49	1	0	0	0	1	51	110	6	0	0	1	0	117
Hour	174	12	1	0	0	1	188	377	43	1	0	1	0	422
18:00	52	2	0	0	0	0	54	109	8	0	0	0	0	117
18:15	44	7	0	0	1	0	52	98	10	1	0	1	0	110
18:30	50	2	0	0	1	0	53	94	10	0	0	0	0	104
18:45	48	3	0	0	0	0	51	104	7	0	0	0	0	111
Hour	194	14	0	0	2	0	210	405	35	1	0	1	0	442
Total	2787	249	28	18	5	23	3110	2860	261	30	26	4	3	3184

Site No. 3
Location Castlemill Link Road(N) / Unnamed Road / Castlemill Link Road(S) / Hampton Gardens Drive
Date Wednesday 28 November 2018

Time	To Arm D - Hampton Gardens Drive						Veh. Total	From Arm D - Hampton Gardens Drive						Veh. Total
	CAR	LGV	HGV	PSV	M/C	P/C		CAR	LGV	HGV	PSV	M/C	P/C	
07:00	0	0	0	0	0	0	0	10	1	0	0	0	0	11
07:15	2	0	0	1	0	0	3	6	1	1	0	0	0	8
07:30	2	0	0	0	0	0	2	5	0	0	0	0	0	5
07:45	3	0	0	0	0	0	3	8	0	0	1	0	0	9
Hour	7	0	0	1	0	0	8	29	2	1	1	0	0	33
08:00	2	0	0	0	0	0	2	4	0	0	0	0	1	5
08:15	4	0	0	0	0	0	4	10	2	0	0	0	0	12
08:30	1	1	0	0	0	0	2	6	0	0	0	0	0	6
08:45	6	0	0	0	0	0	6	10	0	0	0	0	0	10
Hour	13	1	0	0	0	0	14	30	2	0	0	0	1	33
09:00	6	0	0	0	0	0	6	11	1	0	0	0	0	12
09:15	3	0	0	0	0	0	3	5	0	0	0	0	0	5
09:30	2	0	0	0	0	0	2	4	0	0	0	0	1	5
09:45	2	0	0	0	0	0	2	2	0	0	0	0	0	2
Hour	13	0	0	0	0	0	13	22	1	0	0	0	1	24
10:00	4	0	0	0	0	0	4	5	0	0	0	0	0	5
10:15	2	0	0	0	0	0	2	0	0	0	0	0	0	0
10:30	2	0	0	0	0	0	2	3	0	0	0	0	0	3
10:45	1	0	0	0	0	0	1	4	0	0	0	0	0	4
Hour	9	0	0	0	0	0	9	12	0	0	0	0	0	12
11:00	1	0	0	0	0	0	1	1	0	0	0	0	1	2
11:15	2	1	0	0	0	0	3	0	1	0	0	0	0	1
11:30	3	0	0	0	0	0	3	7	0	0	0	0	0	7
11:45	4	0	0	0	0	0	4	1	1	0	0	0	0	2
Hour	10	1	0	0	0	0	11	9	2	0	0	0	1	12
12:00	5	0	0	0	0	0	5	4	0	0	0	0	0	4
12:15	1	1	0	0	0	0	2	2	0	0	0	0	0	2
12:30	2	0	0	0	0	0	2	3	1	0	0	0	0	4
12:45	4	0	0	0	0	0	4	6	0	0	0	0	0	6
Hour	12	1	0	0	0	0	13	15	1	0	0	0	0	16
13:00	5	0	0	0	0	0	5	3	0	0	0	0	0	3
13:15	2	0	0	0	0	0	2	4	0	0	0	0	0	4
13:30	7	0	0	1	0	0	8	3	0	0	1	0	0	4
13:45	4	0	1	0	0	0	5	5	1	1	0	0	0	7
Hour	18	0	1	1	0	0	20	15	1	1	1	0	0	18
14:00	4	1	0	0	0	0	5	3	0	0	0	0	0	3
14:15	3	0	0	0	0	0	3	4	0	0	0	0	0	4
14:30	10	0	0	0	0	0	10	7	0	0	0	0	0	7
14:45	10	0	0	0	0	0	10	13	1	0	0	0	0	14
Hour	27	1	0	0	0	0	28	27	1	0	0	0	0	28
15:00	7	1	0	0	0	0	8	4	0	0	0	0	0	4
15:15	4	1	0	0	0	0	5	4	0	0	0	0	0	4
15:30	4	0	0	0	0	0	4	3	0	0	0	0	0	3
15:45	1	0	0	0	0	0	1	2	1	0	0	0	0	3
Hour	16	2	0	0	0	0	18	13	1	0	0	0	0	14
16:00	5	2	0	0	0	0	7	3	0	0	0	0	0	3
16:15	6	1	1	0	0	0	8	2	0	0	0	0	0	2
16:30	1	0	0	0	0	0	1	1	0	1	0	0	0	2
16:45	3	0	0	0	0	0	3	1	0	0	0	0	0	1
Hour	15	3	1	0	0	0	19	7	0	1	0	0	0	8
17:00	5	2	0	0	0	0	7	1	0	0	0	0	0	1
17:15	3	0	0	0	0	0	3	2	1	0	0	0	0	3
17:30	6	1	0	0	0	0	7	4	0	0	0	0	0	4
17:45	12	2	0	0	0	0	14	4	0	0	0	0	0	4
Hour	26	5	0	0	0	0	31	11	1	0	0	0	0	12
18:00	11	2	0	0	0	0	13	3	0	0	0	0	0	3
18:15	7	1	0	0	0	0	8	7	1	0	0	0	0	8
18:30	4	1	0	0	0	0	5	5	0	0	0	0	0	5
18:45	8	0	0	0	0	0	8	4	0	0	0	0	0	4
Hour	30	4	0	0	0	0	34	19	1	0	0	0	0	20
Total	196	18	2	2	0	0	218	209	13	3	2	0	3	230

Site No. 4
Location Access Road / Clonard Road(W) / Clonard Road(E)
Date Wednesday 28 November 2018

Time	A to C - Access Road to Clonard Road(E)						Veh. Total	A to B - Access Road to Clonard Road(W)						Veh. Total
	CAR	LGV	HGV	PSV	M/C	P/C		CAR	LGV	HGV	PSV	M/C	P/C	
07:00	0	1	0	0	0	0	1	0	0	0	0	0	0	0
07:15	1	0	0	0	0	0	1	0	0	0	0	0	0	0
07:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:45	2	0	0	0	0	0	2	3	0	1	0	0	0	4
Hour	3	1	0	0	0	0	4	3	0	1	0	0	0	4
08:00	14	3	0	0	0	0	17	13	2	0	2	0	0	17
08:15	14	0	0	1	0	0	15	19	2	0	0	0	0	21
08:30	1	1	0	0	0	0	2	6	0	0	0	0	0	6
08:45	1	0	0	0	0	0	1	0	0	2	0	0	0	2
Hour	30	4	0	1	0	0	35	38	4	2	2	0	0	46
09:00	0	2	0	0	0	0	2	1	0	1	0	0	0	2
09:15	0	0	0	0	0	0	0	0	0	2	0	0	0	2
09:30	0	1	0	0	0	0	1	1	0	0	0	0	0	1
09:45	3	1	0	0	0	0	4	0	1	0	0	0	0	1
Hour	3	4	0	0	0	0	7	2	1	3	0	0	0	6
10:00	3	4	0	0	0	0	7	0	0	2	0	0	0	2
10:15	2	0	0	0	0	0	2	0	0	0	0	0	0	0
10:30	3	1	0	0	0	0	4	0	1	0	0	0	0	1
10:45	0	2	0	0	0	0	2	0	0	0	0	0	0	0
Hour	8	7	0	0	0	0	15	0	1	2	0	0	0	3
11:00	0	0	0	0	0	0	0	3	1	2	0	0	0	6
11:15	1	0	0	0	0	0	1	1	2	0	0	0	0	3
11:30	0	0	0	0	0	0	0	0	1	0	0	0	0	1
11:45	0	2	0	0	0	0	2	0	0	0	0	0	0	0
Hour	1	2	0	0	0	0	3	4	4	2	0	0	0	10
12:00	1	0	0	0	0	0	1	1	1	0	0	0	0	2
12:15	0	0	0	0	0	0	0	0	0	2	0	0	0	2
12:30	0	0	0	0	0	0	0	2	0	1	0	0	0	3
12:45	5	0	0	0	0	0	5	3	1	1	0	0	0	5
Hour	6	0	0	0	0	0	6	6	2	4	0	0	0	12
13:00	2	0	0	0	0	0	2	0	0	0	0	0	0	0
13:15	0	1	0	0	0	0	1	1	0	2	0	0	0	3
13:30	3	1	0	0	0	0	4	1	0	0	0	0	0	1
13:45	0	0	0	0	0	0	0	2	0	0	0	0	0	2
Hour	5	2	0	0	0	0	7	4	0	2	0	0	0	6
14:00	1	1	0	0	0	0	2	0	0	3	0	0	0	3
14:15	0	0	0	0	0	0	0	2	0	1	0	0	0	3
14:30	1	3	0	0	0	0	4	2	0	2	0	0	0	4
14:45	1	0	0	0	0	0	1	0	0	0	0	0	0	0
Hour	3	4	0	0	0	0	7	4	0	6	0	0	0	10
15:00	2	0	1	0	0	0	3	2	0	0	0	0	0	2
15:15	1	0	0	0	0	0	1	4	3	1	0	0	0	8
15:30	38	0	0	0	0	2	40	20	1	2	3	0	0	26
15:45	3	0	0	0	0	0	3	8	2	0	0	0	0	10
Hour	44	0	1	0	0	2	47	34	6	3	3	0	0	46
16:00	0	0	0	0	0	0	0	0	5	0	0	0	0	5
16:15	1	1	0	0	0	0	2	0	1	0	0	0	0	1
16:30	10	1	0	0	0	2	13	8	3	2	0	0	0	13
16:45	0	0	0	0	0	0	0	7	2	0	0	0	0	9
Hour	11	2	0	0	0	2	15	15	11	2	0	0	0	28
17:00	5	1	0	0	0	0	6	7	4	0	0	0	0	11
17:15	0	0	0	0	0	0	0	1	4	0	0	0	0	5
17:30	1	0	0	0	0	0	1	1	0	0	0	0	0	1
17:45	0	0	0	0	0	0	0	3	0	0	0	0	0	3
Hour	6	1	0	0	0	0	7	12	8	0	0	0	0	20
18:00	0	0	0	0	0	0	0	1	0	0	0	0	0	1
18:15	1	0	0	0	0	0	1	2	0	0	0	0	0	2
18:30	0	0	0	0	0	0	0	1	0	0	0	0	0	1
18:45	0	0	0	0	0	0	0	1	0	0	0	0	0	1
Hour	1	0	0	0	0	0	1	5	0	0	0	0	0	5
Total	121	27	1	1	0	4	154	127	37	27	5	0	0	196

Site No. 4
Location Access Road / Clonard Road(W) / Clonard Road(E)
Date Wednesday 28 November 2018

Time	B to A - Clonard Road(W) to Access Road						Veh. Total	B to C - Clonard Road(W) to Clonard Road(E)						Veh. Total
	CAR	LGV	HGV	PSV	M/C	P/C		CAR	LGV	HGV	PSV	M/C	P/C	
07:00	4	2	0	0	0	0	6	29	5	1	1	0	0	36
07:15	2	7	0	0	0	0	9	43	5	0	1	0	0	49
07:30	6	4	1	0	0	0	11	47	8	3	2	0	0	60
07:45	10	3	0	2	0	0	15	60	10	1	2	0	0	73
Hour	22	16	1	2	0	0	41	179	28	5	6	0	0	218
08:00	27	4	1	0	0	0	32	83	9	0	1	0	0	93
08:15	15	3	0	1	0	0	19	119	7	3	2	0	1	132
08:30	4	0	1	0	0	0	5	139	10	3	4	0	0	156
08:45	2	2	2	0	0	0	6	92	14	3	3	0	0	112
Hour	48	9	4	1	0	0	62	433	40	9	10	0	1	493
09:00	0	1	1	0	0	0	2	103	4	2	1	0	0	110
09:15	1	2	0	0	0	0	3	65	11	3	1	0	0	80
09:30	0	1	0	0	0	0	1	81	7	2	0	0	0	90
09:45	0	0	2	0	0	0	2	61	5	2	1	0	1	70
Hour	1	4	3	0	0	0	8	310	27	9	3	0	1	350
10:00	0	0	1	0	0	0	1	58	10	2	2	0	0	72
10:15	0	3	0	0	0	0	3	55	8	3	0	0	0	66
10:30	1	0	0	0	0	0	1	53	10	3	0	0	0	66
10:45	1	0	1	0	0	0	2	61	8	0	0	1	0	70
Hour	2	3	2	0	0	0	7	227	36	8	2	1	0	274
11:00	1	1	0	0	0	0	2	51	9	3	0	0	0	63
11:15	2	1	0	0	0	0	3	61	10	4	1	0	0	76
11:30	0	1	0	0	0	0	1	73	2	3	1	0	0	79
11:45	1	0	0	0	0	0	1	55	13	1	0	0	0	69
Hour	4	3	0	0	0	0	7	240	34	11	2	0	0	287
12:00	1	0	1	0	0	0	2	79	14	2	1	0	0	96
12:15	0	0	3	0	0	0	3	91	10	3	0	0	0	104
12:30	1	0	0	0	0	0	1	82	9	3	2	0	0	96
12:45	0	0	0	0	0	0	0	85	12	2	0	0	0	99
Hour	2	0	4	0	0	0	6	337	45	10	3	0	0	395
13:00	1	1	2	0	0	0	4	107	10	5	0	0	0	122
13:15	2	0	2	0	0	0	4	93	7	6	1	0	0	107
13:30	3	1	1	0	0	0	5	92	11	2	3	0	0	108
13:45	0	0	0	0	0	0	0	91	8	2	2	0	0	103
Hour	6	2	5	0	0	0	13	383	36	15	6	0	0	440
14:00	0	0	1	0	0	0	1	79	7	1	2	0	0	89
14:15	1	0	2	0	0	0	3	99	12	4	0	0	0	115
14:30	2	1	1	0	0	0	4	112	16	0	5	0	0	133
14:45	0	0	1	0	0	0	1	130	8	0	0	0	0	138
Hour	3	1	5	0	0	0	9	420	43	5	7	0	0	475
15:00	2	0	1	0	0	0	3	111	11	1	3	0	0	126
15:15	16	0	0	0	0	0	16	111	11	7	1	0	0	130
15:30	7	0	0	3	0	0	10	137	12	1	3	0	0	153
15:45	6	0	0	0	0	0	6	129	11	2	1	0	0	143
Hour	31	0	1	3	0	0	35	488	45	11	8	0	0	552
16:00	0	0	2	0	0	0	2	111	17	2	2	1	0	133
16:15	5	0	0	0	0	0	5	132	13	4	1	0	0	150
16:30	2	0	0	0	0	0	2	135	18	1	0	0	0	154
16:45	0	0	0	0	0	0	0	155	17	2	0	0	0	174
Hour	7	0	2	0	0	0	9	533	65	9	3	1	0	611
17:00	0	0	0	0	0	0	0	167	13	2	0	1	1	184
17:15	1	0	0	0	0	0	1	163	14	1	0	0	0	178
17:30	3	0	0	0	0	0	3	158	19	2	1	0	0	180
17:45	0	0	0	0	0	0	0	154	15	0	0	0	1	170
Hour	4	0	0	0	0	0	4	642	61	5	1	1	2	712
18:00	0	0	0	0	0	0	0	173	9	1	0	2	0	185
18:15	4	1	0	0	0	0	5	170	10	2	0	1	0	183
18:30	1	0	0	0	0	0	1	148	15	0	0	0	0	163
18:45	0	0	0	0	0	0	0	146	18	2	1	0	0	167
Hour	5	1	0	0	0	0	6	637	52	5	1	3	0	698
Total	135	39	27	6	0	0	207	4829	512	102	52	6	4	5505

Site No. 4
Location Access Road / Clonard Road(W) / Clonard Road(E)
Date Wednesday 28 November 2018

Time	C to B - Clonard Road(E) to Clonard Road(W)						Veh. Total	C to A - Clonard Road(E) to Access Road						Veh. Total
	CAR	LGV	HGV	PSV	M/C	P/C		CAR	LGV	HGV	PSV	M/C	P/C	
07:00	109	12	1	0	0	0	122	1	2	0	0	0	0	3
07:15	102	13	0	1	1	0	117	1	0	0	0	0	0	1
07:30	141	11	0	1	0	1	154	1	0	0	0	0	0	1
07:45	133	19	3	3	0	2	160	8	2	0	0	0	1	11
Hour	485	55	4	5	1	3	553	11	4	0	0	0	1	16
08:00	161	18	1	0	1	0	181	18	2	0	0	0	2	22
08:15	145	13	4	1	0	0	163	13	1	0	0	0	1	15
08:30	136	15	2	2	0	0	155	3	0	0	0	0	0	3
08:45	113	13	2	1	0	0	129	1	0	0	0	0	0	1
Hour	555	59	9	4	1	0	628	35	3	0	0	0	3	41
09:00	121	10	1	2	0	0	134	0	0	0	0	0	0	0
09:15	115	14	3	3	1	0	136	1	0	0	0	0	0	1
09:30	82	16	3	1	0	0	102	0	0	0	0	0	0	0
09:45	87	8	5	1	0	0	101	1	1	0	0	0	0	2
Hour	405	48	12	7	1	0	473	2	1	0	0	0	0	3
10:00	70	13	2	0	0	0	85	1	3	0	0	0	0	4
10:15	70	9	3	1	0	0	83	5	1	0	0	0	0	6
10:30	59	6	5	1	0	0	71	1	2	0	0	0	0	3
10:45	73	9	5	0	0	0	87	0	3	0	0	0	0	3
Hour	272	37	15	2	0	0	326	7	9	0	0	0	0	16
11:00	66	11	0	2	0	0	79	2	0	0	0	0	0	2
11:15	91	8	2	0	0	0	101	0	0	0	0	0	0	0
11:30	72	11	2	0	0	0	85	0	0	0	0	0	0	0
11:45	78	7	3	2	0	0	90	0	0	0	0	0	0	0
Hour	307	37	7	4	0	0	355	2	0	0	0	0	0	2
12:00	88	10	2	1	0	0	101	0	0	0	0	0	0	0
12:15	80	6	3	0	1	0	90	0	0	0	0	0	0	0
12:30	84	6	1	0	0	0	91	0	0	0	0	0	0	0
12:45	82	10	2	2	0	0	96	2	1	0	0	0	0	3
Hour	334	32	8	3	1	0	378	2	1	0	0	0	0	3
13:00	90	9	2	1	0	0	102	3	1	0	0	0	0	4
13:15	89	9	1	1	0	0	100	1	0	1	0	0	0	2
13:30	102	11	2	1	0	0	116	2	2	0	0	0	0	4
13:45	97	14	6	2	0	0	119	1	0	0	0	0	0	1
Hour	378	43	11	5	0	0	437	7	3	1	0	0	0	11
14:00	96	14	3	1	1	1	116	2	0	0	0	0	0	2
14:15	75	20	3	0	0	0	98	1	0	0	0	0	0	1
14:30	120	10	4	0	0	0	134	1	1	0	0	0	0	2
14:45	98	10	3	0	0	0	111	1	2	0	0	0	0	3
Hour	389	54	13	1	1	1	459	5	3	0	0	0	0	8
15:00	97	15	2	3	0	0	117	6	0	0	0	0	0	6
15:15	103	7	2	3	0	0	115	15	1	0	0	0	0	16
15:30	100	15	1	2	0	0	118	9	0	0	0	0	0	9
15:45	112	14	4	1	0	1	132	0	0	0	0	0	0	0
Hour	412	51	9	9	0	1	482	30	1	0	0	0	0	31
16:00	123	18	3	3	0	0	147	3	0	0	0	0	0	3
16:15	113	11	0	0	0	0	124	4	2	0	0	0	0	6
16:30	98	16	1	0	0	0	115	0	0	0	0	0	0	0
16:45	113	14	2	0	0	0	129	0	0	0	0	0	0	0
Hour	447	59	6	3	0	0	515	7	2	0	0	0	0	9
17:00	105	8	1	0	0	0	114	0	0	0	0	0	0	0
17:15	119	8	1	0	0	0	128	1	0	0	0	0	0	1
17:30	87	10	1	1	0	0	99	0	0	0	0	0	0	0
17:45	83	5	1	0	0	0	89	4	0	0	0	0	0	4
Hour	394	31	4	1	0	0	430	5	0	0	0	0	0	5
18:00	100	7	1	2	0	0	110	0	0	0	0	0	0	0
18:15	87	3	1	0	0	0	91	3	0	0	0	0	0	3
18:30	95	7	0	0	3	0	105	5	0	0	0	0	0	5
18:45	81	4	0	1	0	0	86	2	0	0	0	0	0	2
Hour	363	21	2	3	3	0	392	10	0	0	0	0	0	10
Total	4741	527	100	47	8	5	5428	123	27	1	0	0	4	155

Site No. 4
Location Access Road / Clonard Road(W) / Clonard Road(E)
Date Wednesday 28 November 2018

Time	To Arm A - Access Road						Veh. Total	From Arm A - Access Road						Veh. Total
	CAR	LGV	HGV	PSV	M/C	P/C		CAR	LGV	HGV	PSV	M/C	P/C	
07:00	5	4	0	0	0	0	9	0	1	0	0	0	0	1
07:15	3	7	0	0	0	0	10	1	0	0	0	0	0	1
07:30	7	4	1	0	0	0	12	0	0	0	0	0	0	0
07:45	18	5	0	2	0	1	26	5	0	1	0	0	0	6
Hour	33	20	1	2	0	1	57	6	1	1	0	0	0	8
08:00	45	6	1	0	0	2	54	27	5	0	2	0	0	34
08:15	28	4	0	1	0	1	34	33	2	0	1	0	0	36
08:30	7	0	1	0	0	0	8	7	1	0	0	0	0	8
08:45	3	2	2	0	0	0	7	1	0	2	0	0	0	3
Hour	83	12	4	1	0	3	103	68	8	2	3	0	0	81
09:00	0	1	1	0	0	0	2	1	2	1	0	0	0	4
09:15	2	2	0	0	0	0	4	0	0	2	0	0	0	2
09:30	0	1	0	0	0	0	1	1	1	0	0	0	0	2
09:45	1	1	2	0	0	0	4	3	2	0	0	0	0	5
Hour	3	5	3	0	0	0	11	5	5	3	0	0	0	13
10:00	1	3	1	0	0	0	5	3	4	2	0	0	0	9
10:15	5	4	0	0	0	0	9	2	0	0	0	0	0	2
10:30	2	2	0	0	0	0	4	3	2	0	0	0	0	5
10:45	1	3	1	0	0	0	5	0	2	0	0	0	0	2
Hour	9	12	2	0	0	0	23	8	8	2	0	0	0	18
11:00	3	1	0	0	0	0	4	3	1	2	0	0	0	6
11:15	2	1	0	0	0	0	3	2	2	0	0	0	0	4
11:30	0	1	0	0	0	0	1	0	1	0	0	0	0	1
11:45	1	0	0	0	0	0	1	0	2	0	0	0	0	2
Hour	6	3	0	0	0	0	9	5	6	2	0	0	0	13
12:00	1	0	1	0	0	0	2	2	1	0	0	0	0	3
12:15	0	0	3	0	0	0	3	0	0	2	0	0	0	2
12:30	1	0	0	0	0	0	1	2	0	1	0	0	0	3
12:45	2	1	0	0	0	0	3	8	1	1	0	0	0	10
Hour	4	1	4	0	0	0	9	12	2	4	0	0	0	18
13:00	4	2	2	0	0	0	8	2	0	0	0	0	0	2
13:15	3	0	3	0	0	0	6	1	1	2	0	0	0	4
13:30	5	3	1	0	0	0	9	4	1	0	0	0	0	5
13:45	1	0	0	0	0	0	1	2	0	0	0	0	0	2
Hour	13	5	6	0	0	0	24	9	2	2	0	0	0	13
14:00	2	0	1	0	0	0	3	1	1	3	0	0	0	5
14:15	2	0	2	0	0	0	4	2	0	1	0	0	0	3
14:30	3	2	1	0	0	0	6	3	3	2	0	0	0	8
14:45	1	2	1	0	0	0	4	1	0	0	0	0	0	1
Hour	8	4	5	0	0	0	17	7	4	6	0	0	0	17
15:00	8	0	1	0	0	0	9	4	0	1	0	0	0	5
15:15	31	1	0	0	0	0	32	5	3	1	0	0	0	9
15:30	16	0	0	3	0	0	19	58	1	2	3	0	2	66
15:45	6	0	0	0	0	0	6	11	2	0	0	0	0	13
Hour	61	1	1	3	0	0	66	78	6	4	3	0	2	93
16:00	3	0	2	0	0	0	5	0	5	0	0	0	0	5
16:15	9	2	0	0	0	0	11	1	2	0	0	0	0	3
16:30	2	0	0	0	0	0	2	18	4	2	0	0	2	26
16:45	0	0	0	0	0	0	0	7	2	0	0	0	0	9
Hour	14	2	2	0	0	0	18	26	13	2	0	0	2	43
17:00	0	0	0	0	0	0	0	12	5	0	0	0	0	17
17:15	2	0	0	0	0	0	2	1	4	0	0	0	0	5
17:30	3	0	0	0	0	0	3	2	0	0	0	0	0	2
17:45	4	0	0	0	0	0	4	3	0	0	0	0	0	3
Hour	9	0	0	0	0	0	9	18	9	0	0	0	0	27
18:00	0	0	0	0	0	0	0	1	0	0	0	0	0	1
18:15	7	1	0	0	0	0	8	3	0	0	0	0	0	3
18:30	6	0	0	0	0	0	6	1	0	0	0	0	0	1
18:45	2	0	0	0	0	0	2	1	0	0	0	0	0	1
Hour	15	1	0	0	0	0	16	6	0	0	0	0	0	6
Total	258	66	28	6	0	4	362	248	64	28	6	0	4	350

Site No. 4
Location Access Road / Clonard Road(W) / Clonard Road(E)
Date Wednesday 28 November 2018

Time	To Arm B - Clonard Road(W)						Veh. Total	From Arm B - Clonard Road(W)						Veh. Total
	CAR	LGV	HGV	PSV	M/C	P/C		CAR	LGV	HGV	PSV	M/C	P/C	
07:00	109	12	1	0	0	0	122	33	7	1	1	0	0	42
07:15	102	13	0	1	1	0	117	45	12	0	1	0	0	58
07:30	141	11	0	1	0	1	154	53	12	4	2	0	0	71
07:45	136	19	4	3	0	2	164	70	13	1	4	0	0	88
Hour	488	55	5	5	1	3	557	201	44	6	8	0	0	259
08:00	174	20	1	2	1	0	198	110	13	1	1	0	0	125
08:15	164	15	4	1	0	0	184	134	10	3	3	0	1	151
08:30	142	15	2	2	0	0	161	143	10	4	4	0	0	161
08:45	113	13	4	1	0	0	131	94	16	5	3	0	0	118
Hour	593	63	11	6	1	0	674	481	49	13	11	0	1	555
09:00	122	10	2	2	0	0	136	103	5	3	1	0	0	112
09:15	115	14	5	3	1	0	138	66	13	3	1	0	0	83
09:30	83	16	3	1	0	0	103	81	8	2	0	0	0	91
09:45	87	9	5	1	0	0	102	61	5	4	1	0	1	72
Hour	407	49	15	7	1	0	479	311	31	12	3	0	1	358
10:00	70	13	4	0	0	0	87	58	10	3	2	0	0	73
10:15	70	9	3	1	0	0	83	55	11	3	0	0	0	69
10:30	59	7	5	1	0	0	72	54	10	3	0	0	0	67
10:45	73	9	5	0	0	0	87	62	8	1	0	1	0	72
Hour	272	38	17	2	0	0	329	229	39	10	2	1	0	281
11:00	69	12	2	2	0	0	85	52	10	3	0	0	0	65
11:15	92	10	2	0	0	0	104	63	11	4	1	0	0	79
11:30	72	12	2	0	0	0	86	73	3	3	1	0	0	80
11:45	78	7	3	2	0	0	90	56	13	1	0	0	0	70
Hour	311	41	9	4	0	0	365	244	37	11	2	0	0	294
12:00	89	11	2	1	0	0	103	80	14	3	1	0	0	98
12:15	80	6	5	0	1	0	92	91	10	6	0	0	0	107
12:30	86	6	2	0	0	0	94	83	9	3	2	0	0	97
12:45	85	11	3	2	0	0	101	85	12	2	0	0	0	99
Hour	340	34	12	3	1	0	390	339	45	14	3	0	0	401
13:00	90	9	2	1	0	0	102	108	11	7	0	0	0	126
13:15	90	9	3	1	0	0	103	95	7	8	1	0	0	111
13:30	103	11	2	1	0	0	117	95	12	3	3	0	0	113
13:45	99	14	6	2	0	0	121	91	8	2	2	0	0	103
Hour	382	43	13	5	0	0	443	389	38	20	6	0	0	453
14:00	96	14	6	1	1	1	119	79	7	2	2	0	0	90
14:15	77	20	4	0	0	0	101	100	12	6	0	0	0	118
14:30	122	10	6	0	0	0	138	114	17	1	5	0	0	137
14:45	98	10	3	0	0	0	111	130	8	1	0	0	0	139
Hour	393	54	19	1	1	1	469	423	44	10	7	0	0	484
15:00	99	15	2	3	0	0	119	113	11	2	3	0	0	129
15:15	107	10	3	3	0	0	123	127	11	7	1	0	0	146
15:30	120	16	3	5	0	0	144	144	12	1	6	0	0	163
15:45	120	16	4	1	0	1	142	135	11	2	1	0	0	149
Hour	446	57	12	12	0	1	528	519	45	12	11	0	0	587
16:00	123	23	3	3	0	0	152	111	17	4	2	1	0	135
16:15	113	12	0	0	0	0	125	137	13	4	1	0	0	155
16:30	106	19	3	0	0	0	128	137	18	1	0	0	0	156
16:45	120	16	2	0	0	0	138	155	17	2	0	0	0	174
Hour	462	70	8	3	0	0	543	540	65	11	3	1	0	620
17:00	112	12	1	0	0	0	125	167	13	2	0	1	1	184
17:15	120	12	1	0	0	0	133	164	14	1	0	0	0	179
17:30	88	10	1	1	0	0	100	161	19	2	1	0	0	183
17:45	86	5	1	0	0	0	92	154	15	0	0	0	1	170
Hour	406	39	4	1	0	0	450	646	61	5	1	1	2	716
18:00	101	7	1	2	0	0	111	173	9	1	0	2	0	185
18:15	89	3	1	0	0	0	93	174	11	2	0	1	0	188
18:30	96	7	0	0	3	0	106	149	15	0	0	0	0	164
18:45	82	4	0	1	0	0	87	146	18	2	1	0	0	167
Hour	368	21	2	3	3	0	397	642	53	5	1	3	0	704
Total	4868	564	127	52	8	5	5624	4964	551	129	58	6	4	5712

Site No. 4
Location Access Road / Clonard Road(W) / Clonard Road(E)
Date Wednesday 28 November 2018

Time	To Arm C - Clonard Road(E)						Veh. Total	From Arm C - Clonard Road(E)						Veh. Total
	CAR	LGV	HGV	PSV	M/C	P/C		CAR	LGV	HGV	PSV	M/C	P/C	
07:00	29	6	1	1	0	0	37	110	14	1	0	0	0	125
07:15	44	5	0	1	0	0	50	103	13	0	1	1	0	118
07:30	47	8	3	2	0	0	60	142	11	0	1	0	1	155
07:45	62	10	1	2	0	0	75	141	21	3	3	0	3	171
Hour	182	29	5	6	0	0	222	496	59	4	5	1	4	569
08:00	97	12	0	1	0	0	110	179	20	1	0	1	2	203
08:15	133	7	3	3	0	1	147	158	14	4	1	0	1	178
08:30	140	11	3	4	0	0	158	139	15	2	2	0	0	158
08:45	93	14	3	3	0	0	113	114	13	2	1	0	0	130
Hour	463	44	9	11	0	1	528	590	62	9	4	1	3	669
09:00	103	6	2	1	0	0	112	121	10	1	2	0	0	134
09:15	65	11	3	1	0	0	80	116	14	3	3	1	0	137
09:30	81	8	2	0	0	0	91	82	16	3	1	0	0	102
09:45	64	6	2	1	0	1	74	88	9	5	1	0	0	103
Hour	313	31	9	3	0	1	357	407	49	12	7	1	0	476
10:00	61	14	2	2	0	0	79	71	16	2	0	0	0	89
10:15	57	8	3	0	0	0	68	75	10	3	1	0	0	89
10:30	56	11	3	0	0	0	70	60	8	5	1	0	0	74
10:45	61	10	0	0	1	0	72	73	12	5	0	0	0	90
Hour	235	43	8	2	1	0	289	279	46	15	2	0	0	342
11:00	51	9	3	0	0	0	63	68	11	0	2	0	0	81
11:15	62	10	4	1	0	0	77	91	8	2	0	0	0	101
11:30	73	2	3	1	0	0	79	72	11	2	0	0	0	85
11:45	55	15	1	0	0	0	71	78	7	3	2	0	0	90
Hour	241	36	11	2	0	0	290	309	37	7	4	0	0	357
12:00	80	14	2	1	0	0	97	88	10	2	1	0	0	101
12:15	91	10	3	0	0	0	104	80	6	3	0	1	0	90
12:30	82	9	3	2	0	0	96	84	6	1	0	0	0	91
12:45	90	12	2	0	0	0	104	84	11	2	2	0	0	99
Hour	343	45	10	3	0	0	401	336	33	8	3	1	0	381
13:00	109	10	5	0	0	0	124	93	10	2	1	0	0	106
13:15	93	8	6	1	0	0	108	90	9	2	1	0	0	102
13:30	95	12	2	3	0	0	112	104	13	2	1	0	0	120
13:45	91	8	2	2	0	0	103	98	14	6	2	0	0	120
Hour	388	38	15	6	0	0	447	385	46	12	5	0	0	448
14:00	80	8	1	2	0	0	91	98	14	3	1	1	1	118
14:15	99	12	4	0	0	0	115	76	20	3	0	0	0	99
14:30	113	19	0	5	0	0	137	121	11	4	0	0	0	136
14:45	131	8	0	0	0	0	139	99	12	3	0	0	0	114
Hour	423	47	5	7	0	0	482	394	57	13	1	1	1	467
15:00	113	11	2	3	0	0	129	103	15	2	3	0	0	123
15:15	112	11	7	1	0	0	131	118	8	2	3	0	0	131
15:30	175	12	1	3	0	2	193	109	15	1	2	0	0	127
15:45	132	11	2	1	0	0	146	112	14	4	1	0	1	132
Hour	532	45	12	8	0	2	599	442	52	9	9	0	1	513
16:00	111	17	2	2	1	0	133	126	18	3	3	0	0	150
16:15	133	14	4	1	0	0	152	117	13	0	0	0	0	130
16:30	145	19	1	0	0	2	167	98	16	1	0	0	0	115
16:45	155	17	2	0	0	0	174	113	14	2	0	0	0	129
Hour	544	67	9	3	1	2	626	454	61	6	3	0	0	524
17:00	172	14	2	0	1	1	190	105	8	1	0	0	0	114
17:15	163	14	1	0	0	0	178	120	8	1	0	0	0	129
17:30	159	19	2	1	0	0	181	87	10	1	1	0	0	99
17:45	154	15	0	0	0	1	170	87	5	1	0	0	0	93
Hour	648	62	5	1	1	2	719	399	31	4	1	0	0	435
18:00	173	9	1	0	2	0	185	100	7	1	2	0	0	110
18:15	171	10	2	0	1	0	184	90	3	1	0	0	0	94
18:30	148	15	0	0	0	0	163	100	7	0	0	3	0	110
18:45	146	18	2	1	0	0	167	83	4	0	1	0	0	88
Hour	638	52	5	1	3	0	699	373	21	2	3	3	0	402
Total	4950	539	103	53	6	8	5659	4864	554	101	47	8	9	5583

Site No. 5
Location Castlemills Link Road / Clonard Road(W) / Unnamed Road / Clonard Road(E)
Date Wednesday 28 November 2018

Time	A to D - Castlemills Link Road to Clonard Road(E)						Veh. Total	A to C - Castlemills Link Road to Unnamed Road						Veh. Total
	CAR	LGV	HGV	PSV	M/C	P/C		CAR	LGV	HGV	PSV	M/C	P/C	
07:00	9	0	0	0	0	0	9	3	0	0	0	0	0	3
07:15	6	0	0	0	0	0	6	4	0	0	0	0	0	4
07:30	8	0	0	0	0	0	8	7	0	0	0	0	0	7
07:45	12	0	0	0	0	0	12	9	0	1	0	0	0	10
Hour	35	0	0	0	0	0	35	23	0	1	0	0	0	24
08:00	13	1	0	0	0	0	14	11	0	0	1	0	1	13
08:15	13	1	0	0	0	0	14	28	2	0	0	0	2	32
08:30	17	0	0	0	0	0	17	17	0	0	0	0	0	17
08:45	16	1	0	0	0	0	17	46	2	0	2	0	1	51
Hour	59	3	0	0	0	0	62	102	4	0	3	0	4	113
09:00	28	0	0	1	0	0	29	24	1	0	1	0	1	27
09:15	12	1	0	0	0	0	13	11	0	0	1	0	0	12
09:30	7	1	1	0	0	1	10	5	1	0	0	0	0	6
09:45	12	2	1	0	0	0	15	5	1	0	0	0	0	6
Hour	59	4	2	1	0	1	67	45	3	0	2	0	1	51
10:00	11	0	0	0	0	0	11	10	0	0	0	0	0	10
10:15	4	0	0	0	0	0	4	3	1	0	0	0	0	4
10:30	10	0	0	0	0	0	10	9	1	0	0	0	0	10
10:45	11	0	0	0	0	0	11	7	0	0	0	0	0	7
Hour	36	0	0	0	0	0	36	29	2	0	0	0	0	31
11:00	9	0	0	0	0	0	9	4	0	0	0	0	0	4
11:15	12	0	0	0	0	0	12	9	2	0	0	0	0	11
11:30	12	0	0	0	0	0	12	9	2	0	0	0	0	11
11:45	13	1	0	1	0	0	15	10	1	0	0	0	0	11
Hour	46	1	0	1	0	0	48	32	5	0	0	0	0	37
12:00	7	1	0	0	0	1	9	8	1	0	0	0	0	9
12:15	12	4	0	0	0	0	16	17	2	0	0	0	0	19
12:30	13	0	0	0	0	0	13	8	0	0	0	0	0	8
12:45	12	1	0	0	0	0	13	6	0	0	0	0	0	6
Hour	44	6	0	0	0	1	51	39	3	0	0	0	0	42
13:00	6	2	0	0	0	0	8	11	2	0	0	0	0	13
13:15	22	0	0	0	0	0	22	6	0	0	0	0	0	6
13:30	16	1	0	0	0	0	17	26	0	0	0	0	0	26
13:45	22	0	0	0	0	0	22	19	1	0	1	0	0	21
Hour	66	3	0	0	0	0	69	62	3	0	1	0	0	66
14:00	14	1	0	0	0	0	15	7	2	0	0	0	0	9
14:15	13	0	1	0	0	0	14	23	0	0	0	0	0	23
14:30	22	0	0	0	0	0	22	30	1	0	0	0	0	31
14:45	22	1	0	0	0	0	23	16	0	0	1	0	0	17
Hour	71	2	1	0	0	0	74	76	3	0	1	0	0	80
15:00	5	0	0	0	0	0	5	6	1	0	1	0	0	8
15:15	13	0	0	0	0	0	13	14	0	0	0	0	0	14
15:30	13	1	0	0	1	0	15	19	1	0	0	0	0	20
15:45	30	1	0	0	0	0	31	18	0	0	0	0	0	18
Hour	61	2	0	0	1	0	64	57	2	0	1	0	0	60
16:00	12	1	0	0	0	0	13	10	1	0	0	0	0	11
16:15	14	0	0	0	0	0	14	13	1	0	0	0	0	14
16:30	13	2	0	0	0	0	15	6	0	0	0	0	0	6
16:45	7	1	0	0	0	0	8	12	3	0	0	0	0	15
Hour	46	4	0	0	0	0	50	41	5	0	0	0	0	46
17:00	20	2	0	0	0	0	22	9	2	0	0	0	0	11
17:15	10	1	0	0	0	0	11	8	0	0	0	0	0	8
17:30	17	1	0	0	0	0	18	7	1	0	0	0	0	8
17:45	16	1	0	0	0	0	17	9	0	0	0	0	0	9
Hour	63	5	0	0	0	0	68	33	3	0	0	0	0	36
18:00	15	0	0	0	0	0	15	7	1	0	0	0	0	8
18:15	7	1	0	0	0	0	8	6	0	0	0	0	0	6
18:30	13	1	0	0	0	0	14	8	0	0	0	0	0	8
18:45	17	3	0	0	1	0	21	12	0	0	0	0	0	12
Hour	52	5	0	0	1	0	58	33	1	0	0	0	0	34
Total	638	35	3	2	2	2	682	572	34	1	8	0	5	620

Site No. 5
Location Castlemills Link Road / Clonard Road(W) / Unnamed Road / Clonard Road(E)
Date Wednesday 28 November 2018

Time	A to B - Castlemills Link Road to Clonard Road(W)						Veh. Total	B to A - Clonard Road(W) to Castlemills Link Road						Veh. Total
	CAR	LGV	HGV	PSV	M/C	P/C		CAR	LGV	HGV	PSV	M/C	P/C	
07:00	56	8	0	0	0	0	64	12	1	1	0	0	0	14
07:15	53	9	0	0	1	0	63	13	0	0	0	0	0	13
07:30	76	7	0	0	0	0	83	13	3	1	1	0	0	18
07:45	76	12	0	0	0	1	89	24	7	1	0	0	0	32
Hour	261	36	0	0	1	1	299	62	11	3	1	0	0	77
08:00	85	8	1	0	0	0	94	26	5	0	0	0	0	31
08:15	64	4	1	1	0	0	70	44	2	2	1	0	0	49
08:30	51	6	0	1	0	0	58	48	5	0	1	0	0	54
08:45	30	6	0	0	0	0	36	22	3	2	1	0	0	28
Hour	230	24	2	2	0	0	258	140	15	4	3	0	0	162
09:00	55	4	0	1	0	0	60	31	2	0	1	0	0	34
09:15	34	5	1	3	1	0	44	21	4	1	0	0	0	26
09:30	22	7	1	0	0	0	30	19	3	0	0	0	0	22
09:45	27	2	1	0	0	0	30	16	1	0	1	0	0	18
Hour	138	18	3	4	1	0	164	87	10	1	2	0	0	100
10:00	26	7	0	0	0	0	33	14	3	0	0	0	0	17
10:15	28	3	1	1	0	0	33	10	2	1	0	0	0	13
10:30	17	1	1	0	0	0	19	17	1	2	0	0	0	20
10:45	17	4	1	0	0	0	22	17	5	0	0	0	0	22
Hour	88	15	3	1	0	0	107	58	11	3	0	0	0	72
11:00	16	8	0	0	0	0	24	15	4	1	0	0	0	20
11:15	19	4	0	0	0	0	23	22	4	2	0	0	0	28
11:30	23	1	0	0	0	0	24	13	0	0	0	0	0	13
11:45	27	3	1	0	0	0	31	22	1	0	0	0	0	23
Hour	85	16	1	0	0	0	102	72	9	3	0	0	0	84
12:00	20	3	1	1	0	0	25	19	1	1	0	0	0	21
12:15	27	2	1	0	0	0	30	25	4	0	0	0	0	29
12:30	16	3	0	0	0	0	19	25	2	3	0	0	0	30
12:45	28	7	0	1	0	0	36	21	2	0	0	0	0	23
Hour	91	15	2	2	0	0	110	90	9	4	0	0	0	103
13:00	24	2	0	0	0	0	26	32	7	0	0	0	0	39
13:15	32	5	0	0	0	0	37	28	5	0	0	0	0	33
13:30	23	5	1	0	0	0	29	35	3	1	1	0	0	40
13:45	37	4	2	0	0	0	43	22	4	1	0	0	0	27
Hour	116	16	3	0	0	0	135	117	19	2	1	0	0	139
14:00	32	4	2	0	0	0	38	30	5	0	0	0	0	35
14:15	22	4	1	0	0	0	27	32	2	1	0	0	0	35
14:30	35	2	2	0	0	0	39	39	4	0	1	0	0	44
14:45	34	3	3	0	0	0	40	33	3	0	0	0	0	36
Hour	123	13	8	0	0	0	144	134	14	1	1	0	0	150
15:00	33	3	0	0	0	0	36	42	7	0	0	0	0	49
15:15	42	2	0	1	0	0	45	42	2	0	1	0	0	45
15:30	35	3	0	0	0	0	38	47	5	1	1	0	0	54
15:45	39	5	1	1	0	0	46	40	6	2	0	0	0	48
Hour	149	13	1	2	0	0	165	171	20	3	2	0	0	196
16:00	22	3	1	1	0	0	27	48	7	2	0	0	0	57
16:15	25	2	0	0	0	0	27	47	6	0	0	0	0	53
16:30	27	4	0	0	0	0	31	60	6	1	0	0	0	67
16:45	18	4	1	0	0	0	23	59	8	1	0	0	0	68
Hour	92	13	2	1	0	0	108	214	27	4	0	0	0	245
17:00	28	4	1	0	0	0	33	64	8	1	0	1	0	74
17:15	30	2	1	0	0	0	33	64	13	1	0	0	0	78
17:30	22	2	0	0	0	0	24	77	11	0	0	0	0	88
17:45	37	1	0	0	0	0	38	61	8	0	0	0	0	69
Hour	117	9	2	0	0	0	128	266	40	2	0	1	0	309
18:00	23	3	0	0	0	0	26	88	7	0	0	0	0	95
18:15	33	0	1	0	0	0	34	75	9	0	0	0	0	84
18:30	39	4	0	0	0	0	43	89	7	0	0	0	0	96
18:45	23	0	0	0	0	0	23	56	9	0	0	0	0	65
Hour	118	7	1	0	0	0	126	308	32	0	0	0	0	340
Total	1608	195	28	12	2	1	1846	1719	217	30	10	1	0	1977

Site No. 5
Location Castlemills Link Road / Clonard Road(W) / Unnamed Road / Clonard Road(E)
Date Wednesday 28 November 2018

Time	B to D - Clonard Road(W) to Clonard Road(E)						Veh. Total	B to C - Clonard Road(W) to Unnamed Road						Veh. Total
	CAR	LGV	HGV	PSV	M/C	P/C		CAR	LGV	HGV	PSV	M/C	P/C	
07:00	15	5	0	0	0	0	20	2	0	0	1	0	0	3
07:15	22	5	0	0	0	0	27	9	0	0	1	0	0	10
07:30	20	4	2	1	0	0	27	14	1	0	0	0	0	15
07:45	31	3	0	2	0	0	36	7	0	0	0	0	0	7
Hour	88	17	2	3	0	0	110	32	1	0	2	0	0	35
08:00	43	4	0	1	0	0	48	28	3	0	0	0	0	31
08:15	44	5	0	2	0	1	52	45	0	1	0	0	0	46
08:30	71	5	3	2	0	0	81	21	1	0	1	0	0	23
08:45	42	10	1	0	0	0	53	29	1	0	2	0	0	32
Hour	200	24	4	5	0	1	234	123	5	1	3	0	0	132
09:00	44	2	2	0	0	0	48	28	2	0	0	0	0	30
09:15	24	5	1	1	0	0	31	20	2	1	0	0	0	23
09:30	38	5	1	0	0	0	44	24	0	1	0	0	0	25
09:45	33	4	2	0	0	1	40	15	1	0	0	0	0	16
Hour	139	16	6	1	0	1	163	87	5	2	0	0	0	94
10:00	28	9	1	1	0	0	39	19	2	1	1	0	0	23
10:15	30	6	1	0	0	0	37	17	0	1	0	0	0	18
10:30	26	6	1	0	0	0	33	13	4	0	0	0	0	17
10:45	23	4	0	0	1	0	28	21	1	0	0	0	0	22
Hour	107	25	3	1	1	0	137	70	7	2	1	0	0	80
11:00	27	5	2	0	0	0	34	9	0	0	0	0	0	9
11:15	17	4	2	1	0	0	24	23	2	0	0	0	0	25
11:30	36	1	2	0	0	0	39	24	1	1	1	0	0	27
11:45	14	9	0	0	0	0	23	19	5	1	0	0	0	25
Hour	94	19	6	1	0	0	120	75	8	2	1	0	0	86
12:00	38	9	0	0	0	0	47	23	4	1	1	0	0	29
12:15	45	6	3	0	0	0	54	21	0	0	0	0	0	21
12:30	35	4	0	2	0	0	41	22	3	0	0	0	0	25
12:45	42	8	2	0	0	0	52	27	2	0	0	0	0	29
Hour	160	27	5	2	0	0	194	93	9	1	1	0	0	104
13:00	46	1	4	0	0	0	51	31	2	1	0	0	0	34
13:15	45	2	4	1	0	0	52	20	1	2	0	0	0	23
13:30	35	9	0	0	0	0	44	25	0	1	2	0	0	28
13:45	38	3	1	2	0	0	44	31	1	0	0	0	0	32
Hour	164	15	9	3	0	0	191	107	4	4	2	0	0	117
14:00	22	1	0	1	0	0	24	28	2	1	1	0	0	32
14:15	40	10	2	0	0	0	52	27	0	1	0	0	0	28
14:30	40	14	0	0	0	0	54	34	1	0	4	0	0	39
14:45	72	5	0	0	0	0	77	26	0	0	0	0	0	26
Hour	174	30	2	1	0	0	207	115	3	2	5	0	0	125
15:00	54	2	2	3	0	0	61	17	2	0	0	0	0	19
15:15	36	6	6	0	0	0	48	34	3	1	0	0	0	38
15:30	81	5	0	1	0	2	89	47	2	0	1	0	0	50
15:45	51	1	0	0	0	0	52	41	4	0	1	0	0	46
Hour	222	14	8	4	0	2	250	139	11	1	2	0	0	153
16:00	34	8	0	1	1	0	44	29	2	0	1	0	0	32
16:15	53	6	4	1	0	0	64	33	2	0	0	0	0	35
16:30	47	9	0	0	0	2	58	38	4	0	0	0	0	42
16:45	72	7	1	0	0	0	80	24	2	0	0	0	0	26
Hour	206	30	5	2	1	2	246	124	10	0	1	0	0	135
17:00	72	4	1	0	0	1	78	36	2	0	0	0	0	38
17:15	71	1	0	0	0	0	72	28	0	0	0	0	0	28
17:30	54	6	1	0	0	0	61	28	2	1	1	0	0	32
17:45	67	6	0	0	0	1	74	26	1	0	0	0	0	27
Hour	264	17	2	0	0	2	285	118	5	1	1	0	0	125
18:00	55	1	0	0	2	0	58	30	1	1	0	0	0	32
18:15	79	0	0	0	1	0	80	17	1	2	0	0	0	20
18:30	43	6	0	0	0	0	49	16	2	0	0	0	0	18
18:45	65	9	2	1	0	0	77	25	0	0	0	0	0	25
Hour	242	16	2	1	3	0	264	88	4	3	0	0	0	95
Total	2060	250	54	24	5	8	2401	1171	72	19	19	0	0	1281

Site No. 5
Location Castlemills Link Road / Clonard Road(W) / Unnamed Road / Clonard Road(E)
Date Wednesday 28 November 2018

Time	C to B - Unnamed Road to Clonard Road(W)						Veh. Total	C to A - Unnamed Road to Castlemills Link Road						Veh. Total
	CAR	LGV	HGV	PSV	M/C	P/C		CAR	LGV	HGV	PSV	M/C	P/C	
07:00	1	0	0	0	0	0	1	0	0	0	0	0	0	0
07:15	2	0	0	0	0	0	2	0	0	0	0	0	0	0
07:30	6	0	0	0	0	0	6	2	0	0	0	0	0	2
07:45	11	2	1	1	0	0	15	1	0	0	0	0	0	1
Hour	20	2	1	1	0	0	24	3	0	0	0	0	0	3
08:00	7	1	0	0	0	0	8	2	0	0	1	0	0	3
08:15	24	2	1	0	0	0	27	21	0	0	0	0	0	21
08:30	18	0	0	0	0	0	18	5	0	0	0	0	0	5
08:45	32	3	0	1	0	0	36	31	1	0	1	0	0	33
Hour	81	6	1	1	0	0	89	59	1	0	2	0	0	62
09:00	15	2	0	0	0	0	17	36	0	0	0	0	0	36
09:15	17	0	0	0	0	0	17	10	0	0	0	0	0	10
09:30	13	0	0	1	0	0	14	4	0	0	0	0	0	4
09:45	14	1	1	0	0	0	16	8	0	1	0	0	0	9
Hour	59	3	1	1	0	0	64	58	0	1	0	0	0	59
10:00	12	4	0	0	0	0	16	2	0	0	0	0	0	2
10:15	9	2	0	0	0	0	11	8	0	0	0	0	0	8
10:30	17	0	0	0	0	0	17	5	0	0	0	0	0	5
10:45	24	4	0	0	0	0	28	4	0	0	0	0	0	4
Hour	62	10	0	0	0	0	72	19	0	0	0	0	0	19
11:00	16	0	0	2	0	0	18	5	0	0	0	0	0	5
11:15	30	1	0	0	0	0	31	2	1	0	0	0	0	3
11:30	14	3	1	0	0	0	18	4	0	0	0	0	0	4
11:45	20	1	1	0	0	0	22	6	0	0	0	0	0	6
Hour	80	5	2	2	0	0	89	17	1	0	0	0	0	18
12:00	24	0	1	0	0	0	25	6	0	0	0	0	0	6
12:15	12	2	1	0	0	0	15	8	0	0	0	0	0	8
12:30	21	1	1	0	0	0	23	3	1	0	0	0	0	4
12:45	23	2	0	0	0	0	25	7	1	0	0	0	0	8
Hour	80	5	3	0	0	0	88	24	2	0	0	0	0	26
13:00	26	0	0	0	0	0	26	6	1	0	0	0	0	7
13:15	29	1	0	0	0	0	30	5	0	0	0	0	0	5
13:30	39	2	1	0	0	0	42	28	1	0	1	0	0	30
13:45	24	2	0	1	0	0	27	9	1	0	2	0	0	12
Hour	118	5	1	1	0	0	125	48	3	0	3	0	0	54
14:00	21	1	1	1	0	0	24	8	0	0	0	0	0	8
14:15	28	0	1	0	0	0	29	10	0	1	0	0	0	11
14:30	41	1	0	0	0	0	42	21	1	0	0	0	0	22
14:45	24	1	0	0	0	0	25	48	0	0	1	0	0	49
Hour	114	3	2	1	0	0	120	87	1	1	1	0	0	90
15:00	35	0	1	0	0	0	36	10	0	0	1	0	0	11
15:15	30	1	0	0	0	0	31	9	0	0	0	0	0	9
15:30	35	1	0	1	0	0	37	15	0	0	0	0	0	15
15:45	29	5	0	0	0	0	34	20	1	0	1	0	0	22
Hour	129	7	1	1	0	0	138	54	1	0	2	0	0	57
16:00	32	0	0	0	0	0	32	29	1	0	0	0	0	30
16:15	27	4	0	0	0	0	31	7	0	0	0	0	0	7
16:30	30	3	0	0	0	0	33	12	1	0	0	0	0	13
16:45	35	6	0	0	0	0	41	10	1	0	0	0	0	11
Hour	124	13	0	0	0	0	137	58	3	0	0	0	0	61
17:00	34	1	0	0	0	0	35	12	0	0	0	0	0	12
17:15	38	3	0	0	0	0	41	20	0	0	0	0	0	20
17:30	30	4	0	0	0	0	34	18	1	0	0	0	0	19
17:45	21	0	0	0	0	0	21	17	0	0	0	0	0	17
Hour	123	8	0	0	0	0	131	67	1	0	0	0	0	68
18:00	21	0	0	0	0	0	21	12	1	0	0	0	0	13
18:15	36	2	0	0	0	0	38	14	2	0	0	0	0	16
18:30	23	0	0	0	0	0	23	14	0	0	0	0	0	14
18:45	21	1	0	0	0	0	22	35	0	0	0	0	0	35
Hour	101	3	0	0	0	0	104	75	3	0	0	0	0	78
Total	1091	70	12	8	0	0	1181	569	16	2	8	0	0	595

Site No. 5
Location Castlemills Link Road / Clonard Road(W) / Unnamed Road / Clonard Road(E)
Date Wednesday 28 November 2018

Time	C to D - Unnamed Road to Clonard Road(E)						Veh. Total	D to C - Clonard Road(E) to Unnamed Road						Veh. Total
	CAR	LGV	HGV	PSV	M/C	P/C		CAR	LGV	HGV	PSV	M/C	P/C	
07:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:15	0	0	0	0	0	0	0	0	0	0	1	0	0	1
07:30	1	0	0	0	0	0	1	0	0	0	3	0	0	3
07:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hour	1	0	0	0	0	0	1	0	0	0	4	0	0	4
08:00	0	0	0	0	0	0	0	3	0	0	1	0	0	4
08:15	3	0	0	0	0	0	3	1	0	0	0	0	2	3
08:30	4	0	0	0	0	0	4	3	0	0	0	0	0	3
08:45	18	0	0	0	0	0	18	3	1	0	3	0	0	7
Hour	25	0	0	0	0	0	25	10	1	0	4	0	2	17
09:00	13	0	0	0	0	0	13	0	0	0	0	0	0	0
09:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0
09:30	0	0	0	0	0	0	0	0	0	0	1	0	0	1
09:45	1	0	1	0	0	0	2	0	0	0	0	0	0	0
Hour	14	0	1	0	0	0	15	0	0	0	1	0	0	1
10:00	1	0	0	0	0	0	1	0	0	0	0	0	0	0
10:15	0	0	0	0	0	0	0	1	0	0	0	0	0	1
10:30	0	0	0	0	0	0	0	0	0	0	1	0	0	1
10:45	0	1	0	0	0	0	1	0	0	0	0	0	0	0
Hour	1	1	0	0	0	0	2	1	0	0	1	0	0	2
11:00	1	0	0	0	0	0	1	1	0	0	0	0	0	1
11:15	1	0	0	0	0	0	1	1	0	0	0	0	0	1
11:30	0	0	0	0	0	0	0	1	0	0	0	0	0	1
11:45	1	0	0	0	0	0	1	0	0	0	2	0	0	2
Hour	3	0	0	0	0	0	3	3	0	0	2	0	0	5
12:00	1	0	0	0	0	0	1	0	0	0	0	0	0	0
12:15	0	0	0	0	0	0	0	1	0	0	0	0	0	1
12:30	1	0	0	0	0	0	1	1	0	0	0	0	0	1
12:45	1	0	0	0	0	0	1	0	0	0	1	0	0	1
Hour	3	0	0	0	0	0	3	2	0	0	1	0	0	3
13:00	1	0	0	0	0	0	1	0	0	0	1	0	0	1
13:15	1	0	0	0	0	0	1	0	0	0	0	0	0	0
13:30	11	0	0	1	0	0	12	5	0	0	1	0	0	6
13:45	2	1	0	0	0	0	3	2	0	0	0	0	0	2
Hour	15	1	0	1	0	0	17	7	0	0	2	0	0	9
14:00	1	0	0	0	0	0	1	1	0	0	0	0	0	1
14:15	0	0	0	0	0	0	0	2	0	0	0	0	0	2
14:30	3	0	0	0	0	0	3	1	0	0	0	0	0	1
14:45	12	1	0	0	0	0	13	2	0	0	2	0	0	4
Hour	16	1	0	0	0	0	17	6	0	0	2	0	0	8
15:00	1	0	0	0	0	0	1	2	0	0	1	0	0	3
15:15	1	0	0	0	0	0	1	5	0	0	0	0	0	5
15:30	2	0	0	0	0	0	2	0	0	0	0	0	0	0
15:45	3	0	0	0	0	0	3	0	0	0	1	0	0	1
Hour	7	0	0	0	0	0	7	7	0	0	2	0	0	9
16:00	3	0	0	0	0	0	3	2	0	0	0	1	0	3
16:15	1	0	0	0	0	0	1	1	0	0	0	0	0	1
16:30	1	0	0	0	0	0	1	1	0	0	0	0	0	1
16:45	1	0	0	0	0	0	1	0	0	0	1	0	0	1
Hour	6	0	0	0	0	0	6	4	0	0	1	1	0	6
17:00	1	0	0	0	0	0	1	0	0	0	0	0	0	0
17:15	2	0	0	0	0	0	2	0	0	0	1	0	0	1
17:30	1	0	0	0	0	0	1	0	0	0	1	0	0	1
17:45	0	0	0	0	0	0	0	0	0	0	2	0	0	2
Hour	4	0	0	0	0	0	4	0	0	0	4	0	0	4
18:00	0	0	0	0	0	0	0	0	0	0	1	0	0	1
18:15	0	0	0	0	0	0	0	0	0	0	1	0	0	1
18:30	1	0	0	0	0	0	1	0	0	0	1	0	0	1
18:45	0	0	0	0	0	0	0	0	0	0	1	0	0	1
Hour	1	0	0	0	0	0	1	0	0	0	4	0	0	4
Total	96	3	1	1	0	0	101	40	1	0	28	1	2	72

Site No. 5
Location Castlemills Link Road / Clonard Road(W) / Unnamed Road / Clonard Road(E)
Date Wednesday 28 November 2018

Time	D to B - Clonard Road(E) to Clonard Road(W)						Veh. Total	D to A - Clonard Road(E) to Castlemills Link Road						Veh. Total
	CAR	LGV	HGV	PSV	M/C	P/C		CAR	LGV	HGV	PSV	M/C	P/C	
07:00	53	6	1	0	0	0	60	2	1	0	0	0	0	3
07:15	48	4	0	1	0	0	53	2	1	0	0	0	0	3
07:30	60	4	0	1	0	1	66	1	1	0	1	0	0	3
07:45	54	7	2	2	0	2	67	6	0	0	0	0	0	6
Hour	215	21	3	4	0	3	246	11	3	0	1	0	0	15
08:00	87	11	0	0	1	2	101	11	4	0	0	0	1	16
08:15	70	8	2	0	0	1	81	12	0	0	0	0	0	12
08:30	70	9	2	1	0	0	82	13	0	0	0	0	0	13
08:45	52	4	2	0	0	0	58	15	0	0	0	0	0	15
Hour	279	32	6	1	1	3	322	51	4	0	0	0	1	56
09:00	51	4	1	1	0	0	57	20	1	0	2	0	2	25
09:15	65	9	2	0	0	0	76	15	0	0	0	0	0	15
09:30	47	9	2	0	0	0	58	12	1	0	0	0	0	13
09:45	47	6	3	1	0	0	57	6	0	0	0	0	0	6
Hour	210	28	8	2	0	0	248	53	2	0	2	0	2	59
10:00	33	5	2	0	0	0	40	7	1	0	0	0	0	8
10:15	38	5	2	0	0	0	45	6	0	0	1	0	0	7
10:30	26	7	4	1	0	0	38	8	0	0	0	0	0	8
10:45	32	4	4	0	0	0	40	9	0	0	0	0	0	9
Hour	129	21	12	1	0	0	163	30	1	0	1	0	0	32
11:00	36	3	0	0	0	0	39	7	0	0	0	0	0	7
11:15	42	3	2	0	0	0	47	4	1	0	0	0	0	5
11:30	35	7	1	0	0	0	43	10	1	0	0	0	0	11
11:45	31	3	1	2	0	0	37	11	0	0	0	0	0	11
Hour	144	16	4	2	0	0	166	32	2	0	0	0	0	34
12:00	44	7	0	0	0	0	51	21	1	0	0	0	0	22
12:15	41	2	1	0	1	0	45	16	2	0	0	0	0	18
12:30	47	2	0	0	0	0	49	12	1	0	0	0	0	13
12:45	33	2	2	1	0	0	38	17	0	0	0	0	0	17
Hour	165	13	3	1	1	0	183	66	4	0	0	0	0	70
13:00	43	8	2	1	0	0	54	12	1	0	0	0	0	13
13:15	29	3	2	1	0	0	35	11	3	0	0	0	0	14
13:30	42	6	0	1	0	0	49	16	3	0	0	0	0	19
13:45	37	8	4	1	0	0	50	25	0	0	0	0	1	26
Hour	151	25	8	4	0	0	188	64	7	0	0	0	1	72
14:00	45	9	0	0	1	1	56	15	1	0	0	0	0	16
14:15	26	16	1	0	0	0	43	14	0	0	0	0	0	14
14:30	45	8	2	0	0	0	55	21	0	0	1	0	0	22
14:45	41	8	0	0	0	0	49	16	1	0	0	0	1	18
Hour	157	41	3	0	1	1	203	66	2	0	1	0	1	70
15:00	35	12	1	3	0	0	51	11	1	0	0	0	0	12
15:15	46	5	2	2	0	0	55	20	2	0	1	0	0	23
15:30	39	11	1	1	0	0	52	13	0	0	0	0	1	14
15:45	44	4	3	0	0	1	52	24	0	0	0	0	0	24
Hour	164	32	7	6	0	1	210	68	3	0	1	0	1	73
16:00	72	15	2	2	0	0	91	19	0	0	0	0	0	19
16:15	65	7	0	0	0	0	72	15	2	0	0	0	0	17
16:30	41	9	1	0	0	0	51	19	1	0	0	0	1	21
16:45	60	4	1	0	0	0	65	20	4	0	0	0	0	24
Hour	238	35	4	2	0	0	279	73	7	0	0	0	1	81
17:00	43	3	0	0	0	0	46	13	2	0	0	0	0	15
17:15	52	3	0	0	0	0	55	19	1	0	0	0	1	21
17:30	35	4	1	1	0	0	41	18	1	0	0	0	0	19
17:45	29	4	1	0	0	0	34	20	0	0	0	0	0	20
Hour	159	14	2	1	0	0	176	70	4	0	0	0	1	75
18:00	56	4	1	2	0	0	63	13	1	0	0	0	1	15
18:15	21	1	0	0	0	0	22	23	0	0	0	1	0	24
18:30	38	3	0	0	3	0	44	21	3	0	0	0	0	24
18:45	39	3	0	1	0	0	43	18	1	0	0	0	0	19
Hour	154	11	1	3	3	0	172	75	5	0	0	1	1	82
Total	2165	289	61	27	6	8	2556	659	44	0	6	1	9	719

Site No. 5
Location Castlemills Link Road / Clonard Road(W) / Unnamed Road / Clonard Road(E)
Date Wednesday 28 November 2018

Time	To Arm A - Castlemills Link Road						Veh. Total	From Arm A - Castlemills Link Road						Veh. Total
	CAR	LGV	HGV	PSV	M/C	P/C		CAR	LGV	HGV	PSV	M/C	P/C	
07:00	14	2	1	0	0	0	17	68	8	0	0	0	0	76
07:15	15	1	0	0	0	0	16	63	9	0	0	1	0	73
07:30	16	4	1	2	0	0	23	91	7	0	0	0	0	98
07:45	31	7	1	0	0	0	39	97	12	1	0	0	1	111
Hour	76	14	3	2	0	0	95	319	36	1	0	1	1	358
08:00	39	9	0	1	0	1	50	109	9	1	1	0	1	121
08:15	77	2	2	1	0	0	82	105	7	1	1	0	2	116
08:30	66	5	0	1	0	0	72	85	6	0	1	0	0	92
08:45	68	4	2	2	0	0	76	92	9	0	2	0	1	104
Hour	250	20	4	5	0	1	280	391	31	2	5	0	4	433
09:00	87	3	0	3	0	2	95	107	5	0	3	0	1	116
09:15	46	4	1	0	0	0	51	57	6	1	4	1	0	69
09:30	35	4	0	0	0	0	39	34	9	2	0	0	1	46
09:45	30	1	1	1	0	0	33	44	5	2	0	0	0	51
Hour	198	12	2	4	0	2	218	242	25	5	7	1	2	282
10:00	23	4	0	0	0	0	27	47	7	0	0	0	0	54
10:15	24	2	1	1	0	0	28	35	4	1	1	0	0	41
10:30	30	1	2	0	0	0	33	36	2	1	0	0	0	39
10:45	30	5	0	0	0	0	35	35	4	1	0	0	0	40
Hour	107	12	3	1	0	0	123	153	17	3	1	0	0	174
11:00	27	4	1	0	0	0	32	29	8	0	0	0	0	37
11:15	28	6	2	0	0	0	36	40	6	0	0	0	0	46
11:30	27	1	0	0	0	0	28	44	3	0	0	0	0	47
11:45	39	1	0	0	0	0	40	50	5	1	1	0	0	57
Hour	121	12	3	0	0	0	136	163	22	1	1	0	0	187
12:00	46	2	1	0	0	0	49	35	5	1	1	0	1	43
12:15	49	6	0	0	0	0	55	56	8	1	0	0	0	65
12:30	40	4	3	0	0	0	47	37	3	0	0	0	0	40
12:45	45	3	0	0	0	0	48	46	8	0	1	0	0	55
Hour	180	15	4	0	0	0	199	174	24	2	2	0	1	203
13:00	50	9	0	0	0	0	59	41	6	0	0	0	0	47
13:15	44	8	0	0	0	0	52	60	5	0	0	0	0	65
13:30	79	7	1	2	0	0	89	65	6	1	0	0	0	72
13:45	56	5	1	2	0	1	65	78	5	2	1	0	0	86
Hour	229	29	2	4	0	1	265	244	22	3	1	0	0	270
14:00	53	6	0	0	0	0	59	53	7	2	0	0	0	62
14:15	56	2	2	0	0	0	60	58	4	2	0	0	0	64
14:30	81	5	0	2	0	0	88	87	3	2	0	0	0	92
14:45	97	4	0	1	0	1	103	72	4	3	1	0	0	80
Hour	287	17	2	3	0	1	310	270	18	9	1	0	0	298
15:00	63	8	0	1	0	0	72	44	4	0	1	0	0	49
15:15	71	4	0	2	0	0	77	69	2	0	1	0	0	72
15:30	75	5	1	1	0	1	83	67	5	0	0	1	0	73
15:45	84	7	2	1	0	0	94	87	6	1	1	0	0	95
Hour	293	24	3	5	0	1	326	267	17	1	3	1	0	289
16:00	96	8	2	0	0	0	106	44	5	1	1	0	0	51
16:15	69	8	0	0	0	0	77	52	3	0	0	0	0	55
16:30	91	8	1	0	0	1	101	46	6	0	0	0	0	52
16:45	89	13	1	0	0	0	103	37	8	1	0	0	0	46
Hour	345	37	4	0	0	1	387	179	22	2	1	0	0	204
17:00	89	10	1	0	1	0	101	57	8	1	0	0	0	66
17:15	103	14	1	0	0	1	119	48	3	1	0	0	0	52
17:30	113	13	0	0	0	0	126	46	4	0	0	0	0	50
17:45	98	8	0	0	0	0	106	62	2	0	0	0	0	64
Hour	403	45	2	0	1	1	452	213	17	2	0	0	0	232
18:00	113	9	0	0	0	1	123	45	4	0	0	0	0	49
18:15	112	11	0	0	1	0	124	46	1	1	0	0	0	48
18:30	124	10	0	0	0	0	134	60	5	0	0	0	0	65
18:45	109	10	0	0	0	0	119	52	3	0	0	1	0	56
Hour	458	40	0	0	1	1	500	203	13	1	0	1	0	218
Total	2947	277	32	24	2	9	3291	2818	264	32	22	4	8	3148

Site No. 5
Location Castlemills Link Road / Clonard Road(W) / Unnamed Road / Clonard Road(E)
Date Wednesday 28 November 2018

Time	To Arm B - Clonard Road(W)						Veh. Total	From Arm B - Clonard Road(W)						Veh. Total
	CAR	LGV	HGV	PSV	M/C	P/C		CAR	LGV	HGV	PSV	M/C	P/C	
07:00	110	14	1	0	0	0	125	29	6	1	1	0	0	37
07:15	103	13	0	1	1	0	118	44	5	0	1	0	0	50
07:30	142	11	0	1	0	1	155	47	8	3	2	0	0	60
07:45	141	21	3	3	0	3	171	62	10	1	2	0	0	75
Hour	496	59	4	5	1	4	569	182	29	5	6	0	0	222
08:00	179	20	1	0	1	2	203	97	12	0	1	0	0	110
08:15	158	14	4	1	0	1	178	133	7	3	3	0	1	147
08:30	139	15	2	2	0	0	158	140	11	3	4	0	0	158
08:45	114	13	2	1	0	0	130	93	14	3	3	0	0	113
Hour	590	62	9	4	1	3	669	463	44	9	11	0	1	528
09:00	121	10	1	2	0	0	134	103	6	2	1	0	0	112
09:15	116	14	3	3	1	0	137	65	11	3	1	0	0	80
09:30	82	16	3	1	0	0	102	81	8	2	0	0	0	91
09:45	88	9	5	1	0	0	103	64	6	2	1	0	1	74
Hour	407	49	12	7	1	0	476	313	31	9	3	0	1	357
10:00	71	16	2	0	0	0	89	61	14	2	2	0	0	79
10:15	75	10	3	1	0	0	89	57	8	3	0	0	0	68
10:30	60	8	5	1	0	0	74	56	11	3	0	0	0	70
10:45	73	12	5	0	0	0	90	61	10	0	0	1	0	72
Hour	279	46	15	2	0	0	342	235	43	8	2	1	0	289
11:00	68	11	0	2	0	0	81	51	9	3	0	0	0	63
11:15	91	8	2	0	0	0	101	62	10	4	1	0	0	77
11:30	72	11	2	0	0	0	85	73	2	3	1	0	0	79
11:45	78	7	3	2	0	0	90	55	15	1	0	0	0	71
Hour	309	37	7	4	0	0	357	241	36	11	2	0	0	290
12:00	88	10	2	1	0	0	101	80	14	2	1	0	0	97
12:15	80	6	3	0	1	0	90	91	10	3	0	0	0	104
12:30	84	6	1	0	0	0	91	82	9	3	2	0	0	96
12:45	84	11	2	2	0	0	99	90	12	2	0	0	0	104
Hour	336	33	8	3	1	0	381	343	45	10	3	0	0	401
13:00	93	10	2	1	0	0	106	109	10	5	0	0	0	124
13:15	90	9	2	1	0	0	102	93	8	6	1	0	0	108
13:30	104	13	2	1	0	0	120	95	12	2	3	0	0	112
13:45	98	14	6	2	0	0	120	91	8	2	2	0	0	103
Hour	385	46	12	5	0	0	448	388	38	15	6	0	0	447
14:00	98	14	3	1	1	1	118	80	8	1	2	0	0	91
14:15	76	20	3	0	0	0	99	99	12	4	0	0	0	115
14:30	121	11	4	0	0	0	136	113	19	0	5	0	0	137
14:45	99	12	3	0	0	0	114	131	8	0	0	0	0	139
Hour	394	57	13	1	1	1	467	423	47	5	7	0	0	482
15:00	103	15	2	3	0	0	123	113	11	2	3	0	0	129
15:15	118	8	2	3	0	0	131	112	11	7	1	0	0	131
15:30	109	15	1	2	0	0	127	175	12	1	3	0	2	193
15:45	112	14	4	1	0	1	132	132	11	2	1	0	0	146
Hour	442	52	9	9	0	1	513	532	45	12	8	0	2	599
16:00	126	18	3	3	0	0	150	111	17	2	2	1	0	133
16:15	117	13	0	0	0	0	130	133	14	4	1	0	0	152
16:30	98	16	1	0	0	0	115	145	19	1	0	0	2	167
16:45	113	14	2	0	0	0	129	155	17	2	0	0	0	174
Hour	454	61	6	3	0	0	524	544	67	9	3	1	2	626
17:00	105	8	1	0	0	0	114	172	14	2	0	1	1	190
17:15	120	8	1	0	0	0	129	163	14	1	0	0	0	178
17:30	87	10	1	1	0	0	99	159	19	2	1	0	0	181
17:45	87	5	1	0	0	0	93	154	15	0	0	0	1	170
Hour	399	31	4	1	0	0	435	648	62	5	1	1	2	719
18:00	100	7	1	2	0	0	110	173	9	1	0	2	0	185
18:15	90	3	1	0	0	0	94	171	10	2	0	1	0	184
18:30	100	7	0	0	3	0	110	148	15	0	0	0	0	163
18:45	83	4	0	1	0	0	88	146	18	2	1	0	0	167
Hour	373	21	2	3	3	0	402	638	52	5	1	3	0	699
Total	4864	554	101	47	8	9	5583	4950	539	103	53	6	8	5659

Site No. 5
Location Castlemills Link Road / Clonard Road(W) / Unnamed Road / Clonard Road(E)
Date Wednesday 28 November 2018

Time	To Arm C - Unnamed Road						Veh. Total	From Arm C - Unnamed Road						Veh. Total
	CAR	LGV	HGV	PSV	M/C	P/C		CAR	LGV	HGV	PSV	M/C	P/C	
07:00	5	0	0	1	0	0	6	1	0	0	0	0	0	1
07:15	13	0	0	2	0	0	15	2	0	0	0	0	0	2
07:30	21	1	0	3	0	0	25	9	0	0	0	0	0	9
07:45	16	0	1	0	0	0	17	12	2	1	1	0	0	16
Hour	55	1	1	6	0	0	63	24	2	1	1	0	0	28
08:00	42	3	0	2	0	1	48	9	1	0	1	0	0	11
08:15	74	2	1	0	0	4	81	48	2	1	0	0	0	51
08:30	41	1	0	1	0	0	43	27	0	0	0	0	0	27
08:45	78	4	0	7	0	1	90	81	4	0	2	0	0	87
Hour	235	10	1	10	0	6	262	165	7	1	3	0	0	176
09:00	52	3	0	1	0	1	57	64	2	0	0	0	0	66
09:15	31	2	1	1	0	0	35	27	0	0	0	0	0	27
09:30	29	1	1	1	0	0	32	17	0	0	1	0	0	18
09:45	20	2	0	0	0	0	22	23	1	3	0	0	0	27
Hour	132	8	2	3	0	1	146	131	3	3	1	0	0	138
10:00	29	2	1	1	0	0	33	15	4	0	0	0	0	19
10:15	21	1	1	0	0	0	23	17	2	0	0	0	0	19
10:30	22	5	0	1	0	0	28	22	0	0	0	0	0	22
10:45	28	1	0	0	0	0	29	28	5	0	0	0	0	33
Hour	100	9	2	2	0	0	113	82	11	0	0	0	0	93
11:00	14	0	0	0	0	0	14	22	0	0	2	0	0	24
11:15	33	4	0	0	0	0	37	33	2	0	0	0	0	35
11:30	34	3	1	1	0	0	39	18	3	1	0	0	0	22
11:45	29	6	1	2	0	0	38	27	1	1	0	0	0	29
Hour	110	13	2	3	0	0	128	100	6	2	2	0	0	110
12:00	31	5	1	1	0	0	38	31	0	1	0	0	0	32
12:15	39	2	0	0	0	0	41	20	2	1	0	0	0	23
12:30	31	3	0	0	0	0	34	25	2	1	0	0	0	28
12:45	33	2	0	1	0	0	36	31	3	0	0	0	0	34
Hour	134	12	1	2	0	0	149	107	7	3	0	0	0	117
13:00	42	4	1	1	0	0	48	33	1	0	0	0	0	34
13:15	26	1	2	0	0	0	29	35	1	0	0	0	0	36
13:30	56	0	1	3	0	0	60	78	3	1	2	0	0	84
13:45	52	2	0	1	0	0	55	35	4	0	3	0	0	42
Hour	176	7	4	5	0	0	192	181	9	1	5	0	0	196
14:00	36	4	1	1	0	0	42	30	1	1	1	0	0	33
14:15	52	0	1	0	0	0	53	38	0	2	0	0	0	40
14:30	65	2	0	4	0	0	71	65	2	0	0	0	0	67
14:45	44	0	0	3	0	0	47	84	2	0	1	0	0	87
Hour	197	6	2	8	0	0	213	217	5	3	2	0	0	227
15:00	25	3	0	2	0	0	30	46	0	1	1	0	0	48
15:15	53	3	1	0	0	0	57	40	1	0	0	0	0	41
15:30	66	3	0	1	0	0	70	52	1	0	1	0	0	54
15:45	59	4	0	2	0	0	65	52	6	0	1	0	0	59
Hour	203	13	1	5	0	0	222	190	8	1	3	0	0	202
16:00	41	3	0	1	1	0	46	64	1	0	0	0	0	65
16:15	47	3	0	0	0	0	50	35	4	0	0	0	0	39
16:30	45	4	0	0	0	0	49	43	4	0	0	0	0	47
16:45	36	5	0	1	0	0	42	46	7	0	0	0	0	53
Hour	169	15	0	2	1	0	187	188	16	0	0	0	0	204
17:00	45	4	0	0	0	0	49	47	1	0	0	0	0	48
17:15	36	0	0	1	0	0	37	60	3	0	0	0	0	63
17:30	35	3	1	2	0	0	41	49	5	0	0	0	0	54
17:45	35	1	0	2	0	0	38	38	0	0	0	0	0	38
Hour	151	8	1	5	0	0	165	194	9	0	0	0	0	203
18:00	37	2	1	1	0	0	41	33	1	0	0	0	0	34
18:15	23	1	2	1	0	0	27	50	4	0	0	0	0	54
18:30	24	2	0	1	0	0	27	38	0	0	0	0	0	38
18:45	37	0	0	1	0	0	38	56	1	0	0	0	0	57
Hour	121	5	3	4	0	0	133	177	6	0	0	0	0	183
Total	1783	107	20	55	1	7	1973	1756	89	15	17	0	0	1877

Site No. 5
Location Castlemills Link Road / Clonard Road(W) / Unnamed Road / Clonard Road(E)
Date Wednesday 28 November 2018

Time	To Arm D - Clonard Road(E)						Veh. Total	From Arm D - Clonard Road(E)						Veh. Total
	CAR	LGV	HGV	PSV	M/C	P/C		CAR	LGV	HGV	PSV	M/C	P/C	
07:00	24	5	0	0	0	0	29	55	7	1	0	0	0	63
07:15	28	5	0	0	0	0	33	50	5	0	2	0	0	57
07:30	29	4	2	1	0	0	36	61	5	0	5	0	1	72
07:45	43	3	0	2	0	0	48	60	7	2	2	0	2	73
Hour	124	17	2	3	0	0	146	226	24	3	9	0	3	265
08:00	56	5	0	1	0	0	62	101	15	0	1	1	3	121
08:15	60	6	0	2	0	1	69	83	8	2	0	0	3	96
08:30	92	5	3	2	0	0	102	86	9	2	1	0	0	98
08:45	76	11	1	0	0	0	88	70	5	2	3	0	0	80
Hour	284	27	4	5	0	1	321	340	37	6	5	1	6	395
09:00	85	2	2	1	0	0	90	71	5	1	3	0	2	82
09:15	36	6	1	1	0	0	44	80	9	2	0	0	0	91
09:30	45	6	2	0	0	1	54	59	10	2	1	0	0	72
09:45	46	6	4	0	0	1	57	53	6	3	1	0	0	63
Hour	212	20	9	2	0	2	245	263	30	8	5	0	2	308
10:00	40	9	1	1	0	0	51	40	6	2	0	0	0	48
10:15	34	6	1	0	0	0	41	45	5	2	1	0	0	53
10:30	36	6	1	0	0	0	43	34	7	4	2	0	0	47
10:45	34	5	0	0	1	0	40	41	4	4	0	0	0	49
Hour	144	26	3	1	1	0	175	160	22	12	3	0	0	197
11:00	37	5	2	0	0	0	44	44	3	0	0	0	0	47
11:15	30	4	2	1	0	0	37	47	4	2	0	0	0	53
11:30	48	1	2	0	0	0	51	46	8	1	0	0	0	55
11:45	28	10	0	1	0	0	39	42	3	1	4	0	0	50
Hour	143	20	6	2	0	0	171	179	18	4	4	0	0	205
12:00	46	10	0	0	0	1	57	65	8	0	0	0	0	73
12:15	57	10	3	0	0	0	70	58	4	1	0	1	0	64
12:30	49	4	0	2	0	0	55	60	3	0	0	0	0	63
12:45	55	9	2	0	0	0	66	50	2	2	2	0	0	56
Hour	207	33	5	2	0	1	248	233	17	3	2	1	0	256
13:00	53	3	4	0	0	0	60	55	9	2	2	0	0	68
13:15	68	2	4	1	0	0	75	40	6	2	1	0	0	49
13:30	62	10	0	1	0	0	73	63	9	0	2	0	0	74
13:45	62	4	1	2	0	0	69	64	8	4	1	0	1	78
Hour	245	19	9	4	0	0	277	222	32	8	6	0	1	269
14:00	37	2	0	1	0	0	40	61	10	0	0	1	1	73
14:15	53	10	3	0	0	0	66	42	16	1	0	0	0	59
14:30	65	14	0	0	0	0	79	67	8	2	1	0	0	78
14:45	106	7	0	0	0	0	113	59	9	0	2	0	1	71
Hour	261	33	3	1	0	0	298	229	43	3	3	1	2	281
15:00	60	2	2	3	0	0	67	48	13	1	4	0	0	66
15:15	50	6	6	0	0	0	62	71	7	2	3	0	0	83
15:30	96	6	0	1	1	2	106	52	11	1	1	0	1	66
15:45	84	2	0	0	0	0	86	68	4	3	1	0	1	77
Hour	290	16	8	4	1	2	321	239	35	7	9	0	2	292
16:00	49	9	0	1	1	0	60	93	15	2	2	1	0	113
16:15	68	6	4	1	0	0	79	81	9	0	0	0	0	90
16:30	61	11	0	0	0	2	74	61	10	1	0	0	1	73
16:45	80	8	1	0	0	0	89	80	8	1	1	0	0	90
Hour	258	34	5	2	1	2	302	315	42	4	3	1	1	366
17:00	93	6	1	0	0	1	101	56	5	0	0	0	0	61
17:15	83	2	0	0	0	0	85	71	4	0	1	0	1	77
17:30	72	7	1	0	0	0	80	53	5	1	2	0	0	61
17:45	83	7	0	0	0	1	91	49	4	1	2	0	0	56
Hour	331	22	2	0	0	2	357	229	18	2	5	0	1	255
18:00	70	1	0	0	2	0	73	69	5	1	3	0	1	79
18:15	86	1	0	0	1	0	88	44	1	0	1	1	0	47
18:30	57	7	0	0	0	0	64	59	6	0	1	3	0	69
18:45	82	12	2	1	1	0	98	57	4	0	2	0	0	63
Hour	295	21	2	1	4	0	323	229	16	1	7	4	1	258
Total	2794	288	58	27	7	10	3184	2864	334	61	61	8	19	3347

Site No. 6
Location Westbrook Lawn / Clonard Road / Millfield Shopping Centre / Chapel Street
Date Wednesday 28 November 2018

Time	A to D - Westbrook Lawn to Chapel Street						Veh. Total	A to C - Westbrook Lawn to Millfield Shopping Centre						Veh. Total
	CAR	LGV	HGV	PSV	M/C	P/C		CAR	LGV	HGV	PSV	M/C	P/C	
07:00	1	0	0	0	0	3	4	1	0	0	0	0	0	1
07:15	0	0	0	0	0	1	1	2	0	0	0	0	0	2
07:30	5	0	0	1	0	1	7	2	0	0	0	0	0	2
07:45	4	0	0	1	0	0	5	1	0	0	0	0	1	2
Hour	10	0	0	2	0	5	17	6	0	0	0	0	1	7
08:00	6	0	0	0	0	1	7	2	0	0	0	0	0	2
08:15	10	0	0	1	0	1	12	3	0	0	0	0	0	3
08:30	6	0	0	0	0	0	6	0	0	0	0	0	0	0
08:45	13	0	0	0	0	1	14	4	0	0	0	0	0	4
Hour	35	0	0	1	0	3	39	9	0	0	0	0	0	9
09:00	5	0	0	0	0	0	5	0	0	0	0	0	0	0
09:15	5	1	0	0	0	0	6	1	0	0	0	0	0	1
09:30	3	0	0	0	0	0	3	0	0	0	0	0	0	0
09:45	2	0	0	0	0	1	3	2	0	0	0	0	0	2
Hour	15	1	0	0	0	1	17	3	0	0	0	0	0	3
10:00	1	1	0	0	0	0	2	0	0	0	0	0	0	0
10:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:30	4	0	0	0	0	0	4	1	0	0	0	0	0	1
10:45	1	0	0	0	0	0	1	1	0	0	0	0	0	1
Hour	6	1	0	0	0	0	7	2	0	0	0	0	0	2
11:00	2	0	1	0	0	0	3	0	0	0	0	0	0	0
11:15	1	0	0	0	0	0	1	0	0	0	0	0	0	0
11:30	1	1	0	0	0	0	2	1	0	0	0	0	0	1
11:45	5	0	0	0	0	0	5	1	0	0	0	0	0	1
Hour	9	1	1	0	0	0	11	2	0	0	0	0	0	2
12:00	2	1	0	0	0	0	3	1	0	0	0	0	0	1
12:15	8	0	0	0	0	0	8	0	0	0	0	0	0	0
12:30	3	0	0	0	0	0	3	1	0	0	0	0	0	1
12:45	2	0	0	0	0	0	2	2	0	0	0	0	0	2
Hour	15	1	0	0	0	0	16	4	0	0	0	0	0	4
13:00	1	0	0	0	0	0	1	0	0	0	0	0	0	0
13:15	4	1	0	0	0	0	5	0	0	0	0	0	0	0
13:30	5	1	1	0	0	0	7	2	0	0	0	0	0	2
13:45	3	1	0	0	0	0	4	0	0	0	0	0	0	0
Hour	13	3	1	0	0	0	17	2	0	0	0	0	0	2
14:00	4	0	1	0	0	0	5	4	0	0	0	0	0	4
14:15	7	1	0	1	0	0	9	2	0	0	0	0	0	2
14:30	4	0	0	0	0	1	5	1	0	0	0	0	0	1
14:45	5	0	0	0	0	0	5	2	0	0	0	0	0	2
Hour	20	1	1	1	0	1	24	9	0	0	0	0	0	9
15:00	6	0	0	1	0	0	7	3	0	0	0	0	0	3
15:15	3	0	0	0	0	0	3	2	0	0	0	0	0	2
15:30	4	0	1	0	0	1	6	1	0	0	0	0	0	1
15:45	6	0	0	0	0	0	6	0	0	0	0	0	0	0
Hour	19	0	1	1	0	1	22	6	0	0	0	0	0	6
16:00	2	1	0	0	0	0	3	2	0	0	0	0	0	2
16:15	6	0	0	0	0	0	6	1	0	0	0	0	0	1
16:30	6	0	0	0	0	0	6	0	0	0	0	0	0	0
16:45	6	0	0	0	0	0	6	0	0	0	0	0	0	0
Hour	20	1	0	0	0	0	21	3	0	0	0	0	0	3
17:00	3	0	0	0	0	0	3	0	0	0	0	0	0	0
17:15	2	0	0	0	0	0	2	1	0	0	0	0	0	1
17:30	3	1	0	0	0	0	4	3	0	0	0	0	0	3
17:45	3	0	0	0	0	0	3	1	1	0	0	0	0	2
Hour	11	1	0	0	0	0	12	5	1	0	0	0	0	6
18:00	7	1	0	0	0	0	8	2	0	0	0	0	0	2
18:15	10	0	0	0	0	0	10	1	0	0	0	0	0	1
18:30	2	0	0	0	0	0	2	1	0	0	0	0	0	1
18:45	6	1	0	0	0	0	7	1	0	0	0	0	0	1
Hour	25	2	0	0	0	0	27	5	0	0	0	0	0	5
Total	198	12	4	5	0	11	230	56	1	0	0	0	1	58

Site No. 6
Location Westbrook Lawn / Clonard Road / Millfield Shopping Centre / Chapel Street
Date Wednesday 28 November 2018

Time	A to B - Westbrook Lawn to Clonard Road						Veh. Total	A to A - Westbrook Lawn to Westbrook Lawn						Veh. Total
	CAR	LGV	HGV	PSV	M/C	P/C		CAR	LGV	HGV	PSV	M/C	P/C	
07:00	4	1	0	0	0	0	5	0	0	0	0	0	0	0
07:15	3	0	0	0	0	0	3	0	0	0	0	0	0	0
07:30	7	0	0	0	0	0	7	0	0	0	0	0	0	0
07:45	4	0	0	0	0	0	4	0	0	0	0	0	0	0
Hour	18	1	0	0	0	0	19	0	0	0	0	0	0	0
08:00	2	1	0	0	0	1	4	0	0	0	0	0	0	0
08:15	7	2	0	0	0	1	10	0	0	0	0	0	0	0
08:30	7	0	0	0	0	0	7	0	0	0	0	0	0	0
08:45	4	1	0	0	0	0	5	0	0	0	0	0	0	0
Hour	20	4	0	0	0	2	26	0	0	0	0	0	0	0
09:00	6	1	0	0	0	2	9	0	0	0	0	0	0	0
09:15	8	0	0	0	0	0	8	0	0	0	0	0	0	0
09:30	0	1	0	0	0	0	1	0	0	0	0	0	0	0
09:45	2	0	0	0	0	0	2	0	0	0	0	0	0	0
Hour	16	2	0	0	0	2	20	0	0	0	0	0	0	0
10:00	2	0	0	0	0	0	2	0	0	0	0	0	0	0
10:15	3	0	0	0	0	0	3	0	0	0	0	0	0	0
10:30	1	0	0	0	0	0	1	0	0	0	0	0	0	0
10:45	2	0	0	0	0	0	2	0	0	0	0	0	0	0
Hour	8	0	0	0	0	0	8	0	0	0	0	0	0	0
11:00	1	0	0	0	0	0	1	0	0	0	0	0	0	0
11:15	2	1	0	0	0	0	3	0	0	0	0	0	0	0
11:30	3	1	0	0	0	0	4	0	0	0	0	0	0	0
11:45	1	0	0	0	0	0	1	0	0	0	0	0	0	0
Hour	7	2	0	0	0	0	9	0	0	0	0	0	0	0
12:00	2	0	0	0	0	0	2	0	0	0	0	0	0	0
12:15	1	0	0	0	0	0	1	0	0	0	0	0	0	0
12:30	2	0	0	0	0	0	2	0	0	0	0	0	0	0
12:45	4	0	0	0	0	0	4	0	0	0	0	0	0	0
Hour	9	0	0	0	0	0	9	0	0	0	0	0	0	0
13:00	3	0	0	0	0	0	3	0	0	0	0	0	0	0
13:15	3	0	0	0	0	0	3	0	0	0	0	0	0	0
13:30	1	0	0	0	0	0	1	0	0	0	0	0	0	0
13:45	0	1	0	0	0	0	1	0	0	0	0	0	0	0
Hour	7	1	0	0	0	0	8	0	0	0	0	0	0	0
14:00	3	0	0	0	0	0	3	0	0	0	0	0	0	0
14:15	1	0	0	0	0	0	1	0	0	0	0	0	0	0
14:30	1	0	0	0	0	0	1	0	0	0	0	0	0	0
14:45	5	0	0	0	0	0	5	0	0	0	0	0	0	0
Hour	10	0	0	0	0	0	10	0	0	0	0	0	0	0
15:00	1	0	0	0	0	0	1	0	0	0	0	0	0	0
15:15	3	0	0	0	0	0	3	0	0	0	0	0	0	0
15:30	2	1	0	1	0	1	5	0	0	0	0	0	0	0
15:45	4	0	0	0	0	0	4	0	0	0	0	0	0	0
Hour	10	1	0	1	0	1	13	0	0	0	0	0	0	0
16:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:15	5	0	0	0	0	0	5	0	0	0	0	0	0	0
16:30	5	0	1	0	0	0	6	0	0	0	0	0	0	0
16:45	4	1	0	0	0	0	5	0	0	0	0	0	0	0
Hour	14	1	1	0	0	0	16	0	0	0	0	0	0	0
17:00	2	0	0	0	0	0	2	0	0	0	0	0	0	0
17:15	3	0	1	0	0	1	5	0	0	0	0	0	0	0
17:30	2	0	0	0	0	0	2	0	0	0	0	0	0	0
17:45	3	0	0	0	0	0	3	0	0	0	0	0	0	0
Hour	10	0	1	0	0	1	12	0	0	0	0	0	0	0
18:00	1	0	0	0	0	0	1	0	0	0	0	0	0	0
18:15	4	0	0	0	0	0	4	0	0	0	0	0	0	0
18:30	2	0	0	0	0	1	3	0	0	0	0	0	0	0
18:45	4	0	0	0	0	0	4	0	0	0	0	0	0	0
Hour	11	0	0	0	0	1	12	0	0	0	0	0	0	0
Total	140	12	2	1	0	7	162	0	0	0	0	0	0	0

Site No. 6
Location Westbrook Lawn / Clonard Road / Millfield Shopping Centre / Chapel Street
Date Wednesday 28 November 2018

Time	B to A - Clonard Road to Westbrook Lawn						Veh. Total	B to D - Clonard Road to Chapel Street						Veh. Total
	CAR	LGV	HGV	PSV	M/C	P/C		CAR	LGV	HGV	PSV	M/C	P/C	
07:00	0	0	0	0	0	0	0	18	3	0	0	0	1	22
07:15	0	0	0	0	0	0	0	20	2	0	0	0	1	23
07:30	1	0	0	1	0	0	2	17	4	2	0	0	1	24
07:45	0	0	0	1	0	0	1	30	1	0	1	0	2	34
Hour	1	0	0	2	0	0	3	85	10	2	1	0	5	103
08:00	3	0	0	0	0	1	4	48	5	0	1	0	0	54
08:15	3	0	0	0	0	0	3	40	6	0	1	0	0	47
08:30	2	0	0	0	0	0	2	75	4	3	1	0	0	83
08:45	1	1	0	0	0	0	2	61	9	1	0	0	0	71
Hour	9	1	0	0	0	1	11	224	24	4	3	0	0	255
09:00	4	0	0	0	0	0	4	63	4	2	1	0	0	70
09:15	3	1	0	0	0	0	4	25	5	0	1	0	0	31
09:30	2	0	0	0	0	0	2	25	4	2	0	0	1	32
09:45	0	1	0	0	0	0	1	32	3	2	0	0	0	37
Hour	9	2	0	0	0	0	11	145	16	6	2	0	1	170
10:00	1	0	0	0	0	0	1	28	6	1	0	0	0	35
10:15	2	0	0	0	0	0	2	19	6	1	0	0	0	26
10:30	0	0	0	0	0	0	0	21	2	0	0	0	0	23
10:45	2	0	0	0	0	0	2	22	8	0	0	1	0	31
Hour	5	0	0	0	0	0	5	90	22	2	0	1	0	115
11:00	1	1	0	0	0	0	2	25	3	1	0	0	0	29
11:15	0	0	0	0	0	0	0	21	6	4	0	0	0	31
11:30	0	0	0	0	0	0	0	32	3	2	0	0	0	37
11:45	2	1	0	0	0	0	3	32	8	1	0	0	0	41
Hour	3	2	0	0	0	0	5	110	20	8	0	0	0	138
12:00	3	0	0	0	0	0	3	32	9	0	0	0	0	41
12:15	3	0	0	0	0	0	3	34	6	1	0	0	0	41
12:30	1	0	0	0	0	0	1	34	5	2	1	0	0	42
12:45	4	0	0	0	0	0	4	30	10	1	0	0	0	41
Hour	11	0	0	0	0	0	11	130	30	4	1	0	0	165
13:00	2	0	0	0	0	0	2	35	8	3	0	0	0	46
13:15	3	0	1	0	0	0	4	26	5	3	1	0	0	35
13:30	4	0	0	0	0	0	4	25	3	0	1	0	0	29
13:45	2	0	0	0	0	0	2	46	9	0	1	0	0	56
Hour	11	0	1	0	0	0	12	132	25	6	3	0	0	166
14:00	3	0	0	0	0	0	3	30	4	2	0	0	0	36
14:15	3	0	0	0	0	0	3	30	4	1	0	0	0	35
14:30	3	0	0	0	0	0	3	42	6	1	1	0	0	50
14:45	3	0	0	0	0	0	3	53	6	0	1	0	0	60
Hour	12	0	0	0	0	0	12	155	20	4	2	0	0	181
15:00	5	0	0	1	0	0	6	43	6	1	1	0	0	51
15:15	3	0	1	0	0	0	4	42	3	6	1	0	0	52
15:30	3	1	0	1	0	0	5	62	3	1	0	0	1	67
15:45	7	0	0	0	0	0	7	65	3	2	0	0	0	70
Hour	18	1	1	2	0	0	22	212	15	10	2	0	1	240
16:00	3	0	0	0	0	0	3	49	7	1	0	0	0	57
16:15	6	1	0	0	0	0	7	48	4	1	0	0	0	53
16:30	3	1	1	0	0	0	5	54	8	0	0	0	0	62
16:45	2	0	0	0	0	0	2	47	12	1	0	0	0	60
Hour	14	2	1	0	0	0	17	198	31	3	0	0	0	232
17:00	9	0	0	0	0	0	9	53	1	0	0	1	0	55
17:15	4	2	0	0	0	0	6	49	11	0	0	0	0	60
17:30	4	1	0	0	0	0	5	51	7	2	0	0	0	60
17:45	5	2	0	0	0	0	7	57	5	0	0	0	1	63
Hour	22	5	0	0	0	0	27	210	24	2	0	1	1	238
18:00	10	0	0	0	0	0	10	52	1	0	0	0	0	53
18:15	10	0	0	0	0	0	10	67	4	0	0	0	0	71
18:30	3	0	0	0	0	0	3	56	5	0	0	0	0	61
18:45	5	0	1	0	0	0	6	49	6	0	1	0	0	56
Hour	28	0	1	0	0	0	29	224	16	0	1	0	0	241
Total	143	13	4	4	0	1	165	1915	253	51	15	2	8	2244

Site No. 6
Location Westbrook Lawn / Clonard Road / Millfield Shopping Centre / Chapel Street
Date Wednesday 28 November 2018

Time	B to C - Clonard Road to Millfield Shopping Centre						Veh. Total	B to B - Clonard Road to Clonard Road						Veh. Total
	CAR	LGV	HGV	PSV	M/C	P/C		CAR	LGV	HGV	PSV	M/C	P/C	
07:00	8	1	0	0	0	0	9	0	0	0	0	0	0	0
07:15	9	1	0	0	0	0	10	0	0	0	0	0	0	0
07:30	10	0	0	0	0	0	10	0	0	0	0	0	0	0
07:45	11	1	0	0	0	0	12	0	0	0	0	0	0	0
Hour	38	3	0	0	0	0	41	0	0	0	0	0	0	0
08:00	10	1	0	0	0	0	11	0	0	0	0	0	0	0
08:15	8	1	0	1	0	1	11	0	0	0	0	0	0	0
08:30	13	0	0	0	0	0	13	0	0	0	0	0	0	0
08:45	16	1	0	0	0	0	17	2	0	0	0	0	0	2
Hour	47	3	0	1	0	1	52	2	0	0	0	0	0	2
09:00	20	2	0	0	0	0	22	0	0	0	0	0	0	0
09:15	11	0	0	0	0	0	11	0	0	0	0	0	0	0
09:30	13	1	1	0	0	0	15	1	0	0	0	0	0	1
09:45	11	2	1	0	0	1	15	1	0	0	0	0	0	1
Hour	55	5	2	0	0	1	63	2	0	0	0	0	0	2
10:00	16	3	1	1	0	0	21	0	1	0	0	0	0	1
10:15	14	1	0	0	0	0	15	0	0	0	0	0	0	0
10:30	12	4	1	0	0	0	17	0	0	0	0	0	0	0
10:45	10	0	0	0	0	0	10	0	0	0	0	0	0	0
Hour	52	8	2	1	0	0	63	0	1	0	0	0	0	1
11:00	6	1	0	0	0	0	7	0	0	0	0	0	0	0
11:15	7	4	0	1	0	0	12	1	0	0	0	0	0	1
11:30	10	0	0	0	0	0	10	0	0	0	0	0	0	0
11:45	8	2	0	0	0	0	10	0	0	0	0	0	0	0
Hour	31	7	0	1	0	0	39	1	0	0	0	0	0	1
12:00	10	0	1	0	0	0	11	0	0	0	0	0	0	0
12:15	12	2	0	0	0	0	14	0	0	0	0	0	0	0
12:30	12	1	0	0	0	0	13	0	0	0	0	0	0	0
12:45	14	2	0	0	0	0	16	0	1	0	0	0	0	1
Hour	48	5	1	0	0	0	54	0	1	0	0	0	0	1
13:00	21	2	0	0	0	0	23	0	0	0	0	0	0	0
13:15	16	1	0	0	0	0	17	0	0	0	0	0	0	0
13:30	18	1	0	0	0	0	19	0	0	0	0	0	0	0
13:45	11	1	0	0	0	0	12	0	0	0	0	0	0	0
Hour	66	5	0	0	0	0	71	0	0	0	0	0	0	0
14:00	12	0	0	0	0	0	12	0	0	0	0	0	0	0
14:15	18	3	0	0	0	0	21	0	0	0	0	0	0	0
14:30	22	1	0	0	0	0	23	2	1	0	0	0	0	3
14:45	18	3	0	1	0	0	22	0	0	0	0	0	0	0
Hour	70	7	0	1	0	0	78	2	1	0	0	0	0	3
15:00	32	0	0	0	0	0	32	0	0	0	0	0	0	0
15:15	13	1	0	0	0	0	14	0	0	0	0	0	0	0
15:30	19	2	0	0	0	0	21	1	0	0	0	0	0	1
15:45	19	1	0	0	0	0	20	0	0	0	0	0	0	0
Hour	83	4	0	0	0	0	87	1	0	0	0	0	0	1
16:00	14	2	0	0	0	0	16	0	1	0	0	0	0	1
16:15	22	1	1	0	0	0	24	1	0	0	0	0	0	1
16:30	19	0	0	0	0	0	19	0	0	0	0	0	0	0
16:45	13	2	0	0	0	0	15	1	0	0	0	0	0	1
Hour	68	5	1	0	0	0	74	2	1	0	0	0	0	3
17:00	17	2	0	0	0	1	20	1	0	0	0	0	0	1
17:15	19	4	0	0	0	0	23	0	0	0	0	0	0	0
17:30	15	4	0	0	0	0	19	0	0	0	0	0	0	0
17:45	9	1	0	0	0	0	10	0	0	0	0	0	0	0
Hour	60	11	0	0	0	1	72	1	0	0	0	0	0	1
18:00	17	0	0	0	1	0	18	0	0	0	0	0	0	0
18:15	19	0	0	0	0	0	19	0	0	0	0	0	0	0
18:30	12	1	0	0	0	0	13	2	0	0	0	0	0	2
18:45	17	3	0	0	0	0	20	0	0	0	0	0	0	0
Hour	65	4	0	0	1	0	70	2	0	0	0	0	0	2
Total	683	67	6	4	1	3	764	13	4	0	0	0	0	17

Site No. 6
Location Westbrook Lawn / Clonard Road / Millfield Shopping Centre / Chapel Street
Date Wednesday 28 November 2018

Time	C to B - Millfield Shopping Centre to Clonard Road						Veh. Total	C to A - Millfield Shopping Centre to Westbrook Lawn						Veh. Total
	CAR	LGV	HGV	PSV	M/C	P/C		CAR	LGV	HGV	PSV	M/C	P/C	
07:00	3	3	0	0	0	0	6	2	0	0	0	0	0	2
07:15	11	3	0	0	0	0	14	0	0	0	0	0	0	0
07:30	11	2	0	1	0	0	14	1	0	0	0	0	0	1
07:45	10	1	0	1	0	1	13	0	0	0	0	0	0	0
Hour	35	9	0	2	0	1	47	3	0	0	0	0	0	3
08:00	15	1	0	0	0	0	16	0	0	0	0	0	0	0
08:15	16	1	1	0	0	1	19	0	0	0	0	0	0	0
08:30	11	3	2	1	0	0	17	1	0	0	0	0	0	1
08:45	9	1	0	1	0	1	12	1	0	0	0	0	0	1
Hour	51	6	3	2	0	2	64	2	0	0	0	0	0	2
09:00	22	0	0	2	0	0	24	1	0	0	0	0	0	1
09:15	20	3	0	0	0	0	23	1	0	0	0	0	1	2
09:30	12	2	1	0	0	0	15	2	0	0	0	0	0	2
09:45	13	1	1	1	0	0	16	0	0	0	0	0	0	0
Hour	67	6	2	3	0	0	78	4	0	0	0	0	1	5
10:00	17	1	0	0	0	0	18	1	0	0	0	0	0	1
10:15	17	5	2	1	0	0	25	0	0	0	0	0	0	0
10:30	13	5	2	0	0	0	20	2	0	0	0	0	0	2
10:45	12	2	3	0	0	0	17	0	1	0	0	0	0	1
Hour	59	13	7	1	0	0	80	3	1	0	0	0	0	4
11:00	20	3	0	0	0	0	23	0	0	0	0	0	0	0
11:15	22	1	0	0	0	0	23	0	0	0	0	0	0	0
11:30	17	5	0	0	0	0	22	0	1	0	0	0	0	1
11:45	22	2	0	1	0	0	25	0	0	0	0	0	0	0
Hour	81	11	0	1	0	0	93	0	1	0	0	0	0	1
12:00	21	0	0	0	0	0	21	1	0	0	0	0	0	1
12:15	24	0	0	0	1	0	25	2	0	0	0	0	0	2
12:30	19	0	0	0	0	0	19	0	0	0	0	0	0	0
12:45	23	2	0	0	0	0	25	1	0	0	0	0	0	1
Hour	87	2	0	0	1	0	90	4	0	0	0	0	0	4
13:00	23	1	0	1	0	0	25	2	0	0	0	0	0	2
13:15	17	2	0	1	0	0	20	0	0	0	0	0	0	0
13:30	15	2	2	0	0	0	19	1	1	0	0	0	0	2
13:45	25	1	0	0	0	0	26	1	0	0	0	0	0	1
Hour	80	6	2	2	0	0	90	4	1	0	0	0	0	5
14:00	17	2	0	0	0	0	19	2	0	0	0	0	0	2
14:15	18	0	1	1	0	0	20	2	1	0	0	0	0	3
14:30	26	2	0	0	0	0	28	1	0	0	0	0	0	1
14:45	14	0	0	0	0	0	14	1	0	0	0	0	0	1
Hour	75	4	1	1	0	0	81	6	1	0	0	0	0	7
15:00	24	2	0	3	0	0	29	1	0	0	0	0	0	1
15:15	21	0	1	0	0	0	22	0	0	0	0	0	0	0
15:30	20	3	2	0	0	0	25	3	0	0	0	0	0	3
15:45	22	1	0	1	0	1	25	2	0	0	0	0	0	2
Hour	87	6	3	4	0	1	101	6	0	0	0	0	0	6
16:00	23	2	2	1	0	0	28	2	0	0	0	0	0	2
16:15	37	1	0	0	0	0	38	3	0	0	0	0	0	3
16:30	25	2	0	0	0	0	27	1	0	0	0	0	0	1
16:45	24	1	0	0	0	0	25	0	0	0	0	0	0	0
Hour	109	6	2	1	0	0	118	6	0	0	0	0	0	6
17:00	18	3	0	0	0	0	21	2	0	0	0	0	0	2
17:15	23	1	0	1	0	0	25	0	0	0	0	0	1	1
17:30	24	6	0	0	0	0	30	2	0	0	0	0	0	2
17:45	25	3	0	1	1	0	30	3	0	0	0	0	0	3
Hour	90	13	0	2	1	0	106	7	0	0	0	0	1	8
18:00	27	2	2	1	0	1	33	2	1	0	0	0	0	3
18:15	21	1	0	0	1	0	23	4	0	0	0	0	0	4
18:30	23	1	0	0	0	0	24	0	0	0	0	0	0	0
18:45	18	1	2	0	0	0	21	0	0	0	0	0	0	0
Hour	89	5	4	1	1	1	101	6	1	0	0	0	0	7
Total	910	87	24	20	3	5	1049	51	5	0	0	0	2	58

Site No. 6
Location Westbrook Lawn / Clonard Road / Millfield Shopping Centre / Chapel Street
Date Wednesday 28 November 2018

Time	C to D - Millfield Shopping Centre to Chapel Street						Veh. Total	C to C - Millfield Shopping Centre to Millfield Shopping Centre						Veh. Total
	CAR	LGV	HGV	PSV	M/C	P/C		CAR	LGV	HGV	PSV	M/C	P/C	
07:00	1	0	0	3	0	0	4	0	0	0	0	0	0	0
07:15	2	1	0	0	0	0	3	0	0	0	0	0	0	0
07:30	5	0	0	0	0	0	5	0	0	0	0	0	0	0
07:45	15	0	0	2	0	0	17	0	0	0	0	0	0	0
Hour	23	1	0	5	0	0	29	0	0	0	0	0	0	0
08:00	10	2	2	0	0	0	14	0	0	0	0	0	0	0
08:15	7	1	0	1	0	0	9	0	0	0	0	0	0	0
08:30	19	0	1	1	0	0	21	0	0	0	0	0	0	0
08:45	30	2	0	2	0	0	34	0	0	0	0	0	0	0
Hour	66	5	3	4	0	0	78	0	0	0	0	0	0	0
09:00	24	1	0	1	0	0	26	0	0	0	0	0	0	0
09:15	26	0	0	0	0	0	26	1	0	0	0	0	0	1
09:30	31	0	0	0	0	0	31	0	0	0	0	0	0	0
09:45	27	2	1	1	0	0	31	0	0	0	0	0	0	0
Hour	108	3	1	2	0	0	114	1	0	0	0	0	0	1
10:00	22	3	0	1	0	0	26	0	0	0	0	0	0	0
10:15	25	0	0	0	0	0	25	0	0	0	0	0	0	0
10:30	23	5	0	2	0	0	30	0	0	0	0	0	0	0
10:45	16	2	0	0	0	0	18	0	0	0	0	0	0	0
Hour	86	10	0	3	0	0	99	0	0	0	0	0	0	0
11:00	32	0	0	0	0	0	32	0	0	0	0	0	0	0
11:15	32	1	0	1	0	0	34	0	0	0	0	0	0	0
11:30	33	1	1	2	0	0	37	0	0	0	0	0	0	0
11:45	28	3	0	0	0	0	31	0	0	0	0	0	0	0
Hour	125	5	1	3	0	0	134	0	0	0	0	0	0	0
12:00	43	0	1	1	0	0	45	0	0	0	0	0	0	0
12:15	35	0	0	1	0	0	36	0	0	0	0	0	0	0
12:30	43	6	0	1	0	0	50	2	0	0	0	0	0	2
12:45	42	2	0	0	0	0	44	0	0	0	0	0	0	0
Hour	163	8	1	3	0	0	175	2	0	0	0	0	0	2
13:00	36	5	0	0	0	0	41	0	0	0	0	0	0	0
13:15	45	1	0	1	0	0	47	0	0	0	0	0	0	0
13:30	40	6	0	0	0	0	46	0	0	0	0	0	0	0
13:45	68	1	0	1	0	0	70	1	0	0	0	0	0	1
Hour	189	13	0	2	0	0	204	1	0	0	0	0	0	1
14:00	46	1	0	1	0	0	48	0	0	0	0	0	0	0
14:15	47	4	0	0	0	0	51	0	0	0	0	0	0	0
14:30	45	3	0	2	0	0	50	0	1	0	0	0	0	1
14:45	59	2	0	2	0	0	63	0	0	0	0	0	0	0
Hour	197	10	0	5	0	0	212	0	1	0	0	0	0	1
15:00	47	3	0	1	0	0	51	0	0	0	0	0	0	0
15:15	48	0	0	0	0	0	48	0	0	0	0	0	0	0
15:30	42	1	2	0	0	0	45	1	0	0	0	0	0	1
15:45	57	3	0	2	0	0	62	0	0	0	0	0	0	0
Hour	194	7	2	3	0	0	206	1	0	0	0	0	0	1
16:00	57	4	0	1	0	0	62	0	0	0	0	0	0	0
16:15	40	2	0	0	0	0	42	0	0	0	0	0	0	0
16:30	46	2	0	1	0	0	49	0	0	0	0	0	0	0
16:45	58	0	0	0	0	0	58	0	0	0	0	0	0	0
Hour	201	8	0	2	0	0	211	0	0	0	0	0	0	0
17:00	50	2	0	0	0	0	52	0	0	0	0	0	0	0
17:15	49	4	0	1	0	0	54	0	0	0	0	0	0	0
17:30	50	1	0	2	0	0	53	0	0	0	0	0	0	0
17:45	45	2	0	0	1	0	48	0	0	0	0	0	0	0
Hour	194	9	0	3	1	0	207	0	0	0	0	0	0	0
18:00	41	3	0	1	2	0	47	1	0	0	0	0	0	1
18:15	38	2	1	0	0	0	41	0	0	0	0	0	0	0
18:30	40	2	0	1	0	0	43	0	0	0	0	0	0	0
18:45	31	2	0	1	0	0	34	0	0	0	0	0	0	0
Hour	150	9	1	3	2	0	165	1	0	0	0	0	0	1
Total	1696	88	9	38	3	0	1834	6	1	0	0	0	0	7

Site No. 6
Location Westbrook Lawn / Clonard Road / Millfield Shopping Centre / Chapel Street
Date Wednesday 28 November 2018

Time	D to C - Chapel Street to Millfield Shopping Centre						Veh. Total	D to B - Chapel Street to Clonard Road						Veh. Total
	CAR	LGV	HGV	PSV	M/C	P/C		CAR	LGV	HGV	PSV	M/C	P/C	
07:00	7	1	0	0	0	0	8	43	8	2	0	0	0	53
07:15	16	1	0	0	0	0	17	34	6	0	2	0	0	42
07:30	12	1	1	0	0	0	14	41	1	0	4	0	0	46
07:45	19	2	0	0	0	0	21	54	9	2	1	0	0	66
Hour	54	5	1	0	0	0	60	172	24	4	7	0	0	207
08:00	20	2	0	0	0	0	22	83	10	0	1	0	1	95
08:15	38	1	0	1	0	0	40	65	5	1	0	0	0	71
08:30	36	2	0	2	0	0	40	63	6	0	0	0	0	69
08:45	84	3	0	0	0	0	87	56	2	1	3	0	0	62
Hour	178	8	0	3	0	0	189	267	23	3	4	0	1	297
09:00	57	1	0	0	0	0	58	46	4	1	0	0	0	51
09:15	51	4	0	0	0	0	55	55	4	2	0	0	0	61
09:30	28	1	1	1	0	0	31	35	7	1	1	0	0	44
09:45	43	2	0	0	0	0	45	39	4	2	0	0	0	45
Hour	179	8	1	1	0	0	189	175	19	7	1	0	0	201
10:00	29	2	0	0	0	0	31	19	5	2	0	0	0	26
10:15	39	4	1	1	0	0	45	26	0	0	0	0	0	26
10:30	43	5	0	0	0	0	48	22	3	2	2	0	0	29
10:45	50	4	0	0	0	0	54	25	1	1	0	0	0	27
Hour	161	15	1	1	0	0	178	92	9	6	2	0	0	108
11:00	43	2	1	1	0	0	47	26	3	0	0	0	0	29
11:15	46	5	0	0	0	0	51	29	4	1	0	0	0	34
11:30	36	2	1	0	0	0	39	22	0	1	2	0	0	25
11:45	41	3	0	0	1	0	45	21	2	3	1	0	0	27
Hour	166	12	2	1	1	0	182	98	9	7	3	0	0	115
12:00	39	3	0	1	0	0	43	32	7	1	1	0	0	41
12:15	50	4	0	1	0	0	55	25	4	2	0	0	0	31
12:30	31	3	0	0	0	0	34	30	5	0	1	0	0	36
12:45	43	12	0	0	0	0	55	25	2	2	1	0	0	30
Hour	163	22	0	2	0	0	187	112	18	9	3	0	0	138
13:00	57	6	1	0	0	0	64	28	6	0	1	0	0	35
13:15	53	2	1	2	0	0	58	36	4	1	1	0	1	43
13:30	59	0	0	0	0	0	59	43	5	1	1	0	0	50
13:45	67	1	0	2	0	0	70	34	5	2	0	0	0	41
Hour	236	9	2	4	0	0	251	141	20	6	3	0	1	169
14:00	33	2	0	2	0	0	37	25	7	2	0	1	0	35
14:15	69	5	2	0	0	0	76	34	10	2	0	0	0	46
14:30	54	3	0	0	0	0	57	37	1	3	2	0	0	43
14:45	46	2	0	1	0	0	49	33	4	2	2	0	0	41
Hour	202	12	2	3	0	0	219	129	22	13	4	1	0	165
15:00	44	2	0	1	0	0	47	41	11	1	1	0	0	54
15:15	56	3	0	0	0	0	59	43	5	0	2	0	0	50
15:30	48	2	0	0	0	0	50	43	9	3	0	0	0	55
15:45	51	5	0	0	0	0	56	35	5	2	3	0	0	45
Hour	199	12	0	1	0	0	212	162	30	6	6	0	0	204
16:00	53	3	1	0	0	0	57	41	8	2	1	0	0	52
16:15	40	1	0	0	0	0	41	49	7	0	0	0	0	56
16:30	39	3	0	0	0	0	42	29	4	1	1	0	0	35
16:45	40	3	0	0	0	1	44	35	6	2	0	0	0	43
Hour	172	10	1	0	0	1	184	154	25	5	2	0	0	186
17:00	41	2	1	0	0	0	44	41	1	1	0	0	0	43
17:15	44	3	0	0	0	0	47	42	3	1	1	0	0	47
17:30	43	2	1	0	2	0	48	35	6	1	1	0	0	43
17:45	31	0	0	0	1	0	32	35	3	0	1	0	0	39
Hour	159	7	2	0	3	0	171	153	13	3	3	0	0	172
18:00	45	1	0	0	0	1	47	29	1	0	0	0	0	30
18:15	38	2	1	0	0	0	41	33	3	0	0	0	0	36
18:30	35	1	1	0	0	0	37	37	2	0	1	0	0	40
18:45	35	0	0	0	0	0	35	29	0	0	2	0	0	31
Hour	153	4	2	0	0	1	160	128	6	0	3	0	0	137
Total	2022	124	14	16	4	2	2182	1783	218	69	41	1	2	2099

Site No. 6
Location Westbrook Lawn / Clonard Road / Millfield Shopping Centre / Chapel Street
Date Wednesday 28 November 2018

Time	D to A - Chapel Street to Westbrook Lawn						Veh. Total	D to D - Chapel Street to Chapel Street						Veh. Total
	CAR	LGV	HGV	PSV	M/C	P/C		CAR	LGV	HGV	PSV	M/C	P/C	
07:00	3	0	0	0	0	0	3	0	0	0	0	0	0	0
07:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:30	6	0	0	0	0	0	6	0	0	0	0	0	0	0
07:45	1	0	0	0	0	0	1	0	0	0	0	0	0	0
Hour	10	0	0	0	0	0	10	0	0	0	0	0	0	0
08:00	0	0	0	1	0	0	1	0	0	0	0	0	0	0
08:15	3	0	0	0	0	0	3	0	0	0	0	0	0	0
08:30	4	0	0	0	0	0	4	0	0	0	0	0	0	0
08:45	5	0	0	0	0	0	5	0	0	0	0	0	0	0
Hour	12	0	0	1	0	0	13	0	0	0	0	0	0	0
09:00	5	0	0	0	0	0	5	0	0	0	0	0	0	0
09:15	6	0	0	0	0	0	6	0	0	0	0	0	0	0
09:30	4	1	1	0	0	0	6	1	0	0	0	0	0	1
09:45	2	0	0	0	0	0	2	1	0	0	0	0	0	1
Hour	17	1	1	0	0	0	19	2	0	0	0	0	0	2
10:00	2	0	0	0	0	0	2	0	0	0	0	0	0	0
10:15	1	0	0	0	0	0	1	0	0	0	0	0	0	0
10:30	0	1	0	0	0	0	1	0	0	0	0	0	0	0
10:45	2	0	0	0	0	0	2	0	0	0	0	0	0	0
Hour	5	1	0	0	0	0	6	0	0	0	0	0	0	0
11:00	1	0	0	0	0	0	1	0	0	0	0	0	0	0
11:15	1	0	0	0	0	0	1	0	0	0	0	0	0	0
11:30	3	0	0	0	0	0	3	0	0	0	0	0	0	0
11:45	3	0	0	0	0	0	3	0	0	0	0	0	0	0
Hour	8	0	0	0	0	0	8	0	0	0	0	0	0	0
12:00	1	0	0	0	0	0	1	0	0	0	0	0	0	0
12:15	3	0	0	0	0	0	3	0	0	0	0	0	0	0
12:30	3	1	0	0	0	0	4	0	1	0	0	0	0	1
12:45	3	0	0	0	0	0	3	1	0	0	0	0	0	1
Hour	10	1	0	0	0	0	11	1	1	0	0	0	0	2
13:00	2	0	0	0	0	0	2	1	0	0	0	0	0	1
13:15	3	0	1	0	0	0	4	1	0	0	0	0	0	1
13:30	2	1	0	0	0	0	3	0	0	0	0	0	0	0
13:45	8	1	0	0	0	0	9	0	0	0	0	0	0	0
Hour	15	2	1	0	0	0	18	2	0	0	0	0	0	2
14:00	3	0	0	0	0	0	3	0	0	0	0	0	0	0
14:15	6	0	0	1	0	0	7	0	0	0	0	0	0	0
14:30	4	0	0	0	0	0	4	0	0	0	0	0	0	0
14:45	9	1	0	0	0	0	10	0	0	0	0	0	0	0
Hour	22	1	0	1	0	0	24	0	0	0	0	0	0	0
15:00	7	0	0	0	0	0	7	0	1	0	0	0	0	1
15:15	2	0	0	0	0	0	2	0	0	0	0	0	0	0
15:30	7	1	0	0	0	0	8	0	0	0	0	0	0	0
15:45	5	0	0	0	0	0	5	0	0	0	0	0	0	0
Hour	21	1	0	0	0	0	22	0	1	0	0	0	0	1
16:00	9	1	0	0	0	0	10	0	0	0	0	0	0	0
16:15	5	1	0	0	0	0	6	1	1	0	0	0	0	2
16:30	8	0	0	0	0	0	8	0	0	0	0	0	0	0
16:45	6	0	0	0	0	0	6	0	0	0	0	0	0	0
Hour	28	2	0	0	0	0	30	1	1	0	0	0	0	2
17:00	4	0	0	0	0	0	4	0	0	0	0	0	0	0
17:15	5	1	0	0	0	0	6	0	0	0	0	0	0	0
17:30	9	0	0	0	0	0	9	0	0	0	0	0	0	0
17:45	4	0	0	0	0	0	4	0	0	0	0	0	0	0
Hour	22	1	0	0	0	0	23	0	0	0	0	0	0	0
18:00	5	2	0	0	0	0	7	0	0	0	0	0	0	0
18:15	6	0	0	0	0	1	7	0	0	0	0	0	0	0
18:30	4	0	0	0	0	0	4	0	0	0	0	0	0	0
18:45	7	1	0	0	0	0	8	1	0	0	0	0	0	1
Hour	22	3	0	0	0	1	26	1	0	0	0	0	0	1
Total	192	13	2	2	0	1	210	7	3	0	0	0	0	10

Site No. 6
Location Westbrook Lawn / Clonard Road / Millfield Shopping Centre / Chapel Street
Date Wednesday 28 November 2018

Time	To Arm A - Westbrook Lawn						Veh. Total	From Arm A - Westbrook Lawn						Veh. Total
	CAR	LGV	HGV	PSV	M/C	P/C		CAR	LGV	HGV	PSV	M/C	P/C	
07:00	5	0	0	0	0	0	5	6	1	0	0	0	3	10
07:15	0	0	0	0	0	0	0	5	0	0	0	0	1	6
07:30	8	0	0	1	0	0	9	14	0	0	1	0	1	16
07:45	1	0	0	1	0	0	2	9	0	0	1	0	1	11
Hour	14	0	0	2	0	0	16	34	1	0	2	0	6	43
08:00	3	0	0	1	0	1	5	10	1	0	0	0	2	13
08:15	6	0	0	0	0	0	6	20	2	0	1	0	2	25
08:30	7	0	0	0	0	0	7	13	0	0	0	0	0	13
08:45	7	1	0	0	0	0	8	21	1	0	0	0	1	23
Hour	23	1	0	1	0	1	26	64	4	0	1	0	5	74
09:00	10	0	0	0	0	0	10	11	1	0	0	0	2	14
09:15	10	1	0	0	0	1	12	14	1	0	0	0	0	15
09:30	8	1	1	0	0	0	10	3	1	0	0	0	0	4
09:45	2	1	0	0	0	0	3	6	0	0	0	0	1	7
Hour	30	3	1	0	0	1	35	34	3	0	0	0	3	40
10:00	4	0	0	0	0	0	4	3	1	0	0	0	0	4
10:15	3	0	0	0	0	0	3	3	0	0	0	0	0	3
10:30	2	1	0	0	0	0	3	6	0	0	0	0	0	6
10:45	4	1	0	0	0	0	5	4	0	0	0	0	0	4
Hour	13	2	0	0	0	0	15	16	1	0	0	0	0	17
11:00	2	1	0	0	0	0	3	3	0	1	0	0	0	4
11:15	1	0	0	0	0	0	1	3	1	0	0	0	0	4
11:30	3	1	0	0	0	0	4	5	2	0	0	0	0	7
11:45	5	1	0	0	0	0	6	7	0	0	0	0	0	7
Hour	11	3	0	0	0	0	14	18	3	1	0	0	0	22
12:00	5	0	0	0	0	0	5	5	1	0	0	0	0	6
12:15	8	0	0	0	0	0	8	9	0	0	0	0	0	9
12:30	4	1	0	0	0	0	5	6	0	0	0	0	0	6
12:45	8	0	0	0	0	0	8	8	0	0	0	0	0	8
Hour	25	1	0	0	0	0	26	28	1	0	0	0	0	29
13:00	6	0	0	0	0	0	6	4	0	0	0	0	0	4
13:15	6	0	2	0	0	0	8	7	1	0	0	0	0	8
13:30	7	2	0	0	0	0	9	8	1	1	0	0	0	10
13:45	11	1	0	0	0	0	12	3	2	0	0	0	0	5
Hour	30	3	2	0	0	0	35	22	4	1	0	0	0	27
14:00	8	0	0	0	0	0	8	11	0	1	0	0	0	12
14:15	11	1	0	1	0	0	13	10	1	0	1	0	0	12
14:30	8	0	0	0	0	0	8	6	0	0	0	0	1	7
14:45	13	1	0	0	0	0	14	12	0	0	0	0	0	12
Hour	40	2	0	1	0	0	43	39	1	1	1	0	1	43
15:00	13	0	0	1	0	0	14	10	0	0	1	0	0	11
15:15	5	0	1	0	0	0	6	8	0	0	0	0	0	8
15:30	13	2	0	1	0	0	16	7	1	1	1	0	2	12
15:45	14	0	0	0	0	0	14	10	0	0	0	0	0	10
Hour	45	2	1	2	0	0	50	35	1	1	2	0	2	41
16:00	14	1	0	0	0	0	15	4	1	0	0	0	0	5
16:15	14	2	0	0	0	0	16	12	0	0	0	0	0	12
16:30	12	1	1	0	0	0	14	11	0	1	0	0	0	12
16:45	8	0	0	0	0	0	8	10	1	0	0	0	0	11
Hour	48	4	1	0	0	0	53	37	2	1	0	0	0	40
17:00	15	0	0	0	0	0	15	5	0	0	0	0	0	5
17:15	9	3	0	0	0	1	13	6	0	1	0	0	1	8
17:30	15	1	0	0	0	0	16	8	1	0	0	0	0	9
17:45	12	2	0	0	0	0	14	7	1	0	0	0	0	8
Hour	51	6	0	0	0	1	58	26	2	1	0	0	1	30
18:00	17	3	0	0	0	0	20	10	1	0	0	0	0	11
18:15	20	0	0	0	0	1	21	15	0	0	0	0	0	15
18:30	7	0	0	0	0	0	7	5	0	0	0	0	1	6
18:45	12	1	1	0	0	0	14	11	1	0	0	0	0	12
Hour	56	4	1	0	0	1	62	41	2	0	0	0	1	44
Total	386	31	6	6	0	4	433	394	25	6	6	0	19	450

Site No. 6
Location Westbrook Lawn / Clonard Road / Millfield Shopping Centre / Chapel Street
Date Wednesday 28 November 2018

Time	To Arm B - Clonard Road						Veh. Total	From Arm B - Clonard Road						Veh. Total
	CAR	LGV	HGV	PSV	M/C	P/C		CAR	LGV	HGV	PSV	M/C	P/C	
07:00	50	12	2	0	0	0	64	26	4	0	0	0	1	31
07:15	48	9	0	2	0	0	59	29	3	0	0	0	1	33
07:30	59	3	0	5	0	0	67	28	4	2	1	0	1	36
07:45	68	10	2	2	0	1	83	41	2	0	2	0	2	47
Hour	225	34	4	9	0	1	273	124	13	2	3	0	5	147
08:00	100	12	0	1	0	2	115	61	6	0	1	0	1	69
08:15	88	8	2	0	0	2	100	51	7	0	2	0	1	61
08:30	81	9	2	1	0	0	93	90	4	3	1	0	0	98
08:45	71	4	1	4	0	1	81	80	11	1	0	0	0	92
Hour	340	33	5	6	0	5	389	282	28	4	4	0	2	320
09:00	74	5	1	2	0	2	84	87	6	2	1	0	0	96
09:15	83	7	2	0	0	0	92	39	6	0	1	0	0	46
09:30	48	10	2	1	0	0	61	41	5	3	0	0	1	50
09:45	55	5	3	1	0	0	64	44	6	3	0	0	1	54
Hour	260	27	8	4	0	2	301	211	23	8	2	0	2	246
10:00	38	7	2	0	0	0	47	45	10	2	1	0	0	58
10:15	46	5	2	1	0	0	54	35	7	1	0	0	0	43
10:30	36	8	4	2	0	0	50	33	6	1	0	0	0	40
10:45	39	3	4	0	0	0	46	34	8	0	0	1	0	43
Hour	159	23	12	3	0	0	197	147	31	4	1	1	0	184
11:00	47	6	0	0	0	0	53	32	5	1	0	0	0	38
11:15	54	6	1	0	0	0	61	29	10	4	1	0	0	44
11:30	42	6	1	2	0	0	51	42	3	2	0	0	0	47
11:45	44	4	3	2	0	0	53	42	11	1	0	0	0	54
Hour	187	22	5	4	0	0	218	145	29	8	1	0	0	183
12:00	55	7	1	1	0	0	64	45	9	1	0	0	0	55
12:15	50	4	2	0	1	0	57	49	8	1	0	0	0	58
12:30	51	5	0	1	0	0	57	47	6	2	1	0	0	56
12:45	52	5	2	1	0	0	60	48	13	1	0	0	0	62
Hour	208	21	5	3	1	0	238	189	36	5	1	0	0	231
13:00	54	7	0	2	0	0	63	58	10	3	0	0	0	71
13:15	56	6	1	2	0	1	66	45	6	4	1	0	0	56
13:30	59	7	3	1	0	0	70	47	4	0	1	0	0	52
13:45	59	7	2	0	0	0	68	59	10	0	1	0	0	70
Hour	228	27	6	5	0	1	267	209	30	7	3	0	0	249
14:00	45	9	2	0	1	0	57	45	4	2	0	0	0	51
14:15	53	10	3	1	0	0	67	51	7	1	0	0	0	59
14:30	66	4	3	2	0	0	75	69	8	1	1	0	0	79
14:45	52	4	2	2	0	0	60	74	9	0	2	0	0	85
Hour	216	27	10	5	1	0	259	239	28	4	3	0	0	274
15:00	66	13	1	4	0	0	84	80	6	1	2	0	0	89
15:15	67	5	1	2	0	0	75	58	4	7	1	0	0	70
15:30	66	13	5	1	0	1	86	85	6	1	1	0	1	94
15:45	61	6	2	4	0	1	74	91	4	2	0	0	0	97
Hour	260	37	9	11	0	2	319	314	20	11	4	0	1	350
16:00	64	11	4	2	0	0	81	66	10	1	0	0	0	77
16:15	92	8	0	0	0	0	100	77	6	2	0	0	0	85
16:30	59	6	2	1	0	0	68	76	9	1	0	0	0	86
16:45	64	8	2	0	0	0	74	63	14	1	0	0	0	78
Hour	279	33	8	3	0	0	323	282	39	5	0	0	0	326
17:00	62	4	1	0	0	0	67	80	3	0	0	1	1	85
17:15	68	4	2	2	0	1	77	72	17	0	0	0	0	89
17:30	61	12	1	1	0	0	75	70	12	2	0	0	0	84
17:45	63	6	0	2	1	0	72	71	8	0	0	0	1	80
Hour	254	26	4	5	1	1	291	293	40	2	0	1	2	338
18:00	57	3	2	1	0	1	64	79	1	0	0	1	0	81
18:15	58	4	0	0	1	0	63	96	4	0	0	0	0	100
18:30	64	3	0	1	0	1	69	73	6	0	0	0	0	79
18:45	51	1	2	2	0	0	56	71	9	1	1	0	0	82
Hour	230	11	4	4	1	2	252	319	20	1	1	1	0	342
Total	2846	321	80	62	4	14	3327	2754	337	61	23	3	12	3190

Site No. 6
Location Westbrook Lawn / Clonard Road / Millfield Shopping Centre / Chapel Street
Date Wednesday 28 November 2018

Time	To Arm C - Millfield Shopping Centre						Veh. Total	From Arm C - Millfield Shopping Centre						Veh. Total
	CAR	LGV	HGV	PSV	M/C	P/C		CAR	LGV	HGV	PSV	M/C	P/C	
07:00	16	2	0	0	0	0	18	6	3	0	3	0	0	12
07:15	27	2	0	0	0	0	29	13	4	0	0	0	0	17
07:30	24	1	1	0	0	0	26	17	2	0	1	0	0	20
07:45	31	3	0	0	0	1	35	25	1	0	3	0	1	30
Hour	98	8	1	0	0	1	108	61	10	0	7	0	1	79
08:00	32	3	0	0	0	0	35	25	3	2	0	0	0	30
08:15	49	2	0	2	0	1	54	23	2	1	1	0	1	28
08:30	49	2	0	2	0	0	53	31	3	3	2	0	0	39
08:45	104	4	0	0	0	0	108	40	3	0	3	0	1	47
Hour	234	11	0	4	0	1	250	119	11	6	6	0	2	144
09:00	77	3	0	0	0	0	80	47	1	0	3	0	0	51
09:15	64	4	0	0	0	0	68	48	3	0	0	0	1	52
09:30	41	2	2	1	0	0	46	45	2	1	0	0	0	48
09:45	56	4	1	0	0	1	62	40	3	2	2	0	0	47
Hour	238	13	3	1	0	1	256	180	9	3	5	0	1	198
10:00	45	5	1	1	0	0	52	40	4	0	1	0	0	45
10:15	53	5	1	1	0	0	60	42	5	2	1	0	0	50
10:30	56	9	1	0	0	0	66	38	10	2	2	0	0	52
10:45	61	4	0	0	0	0	65	28	5	3	0	0	0	36
Hour	215	23	3	2	0	0	243	148	24	7	4	0	0	183
11:00	49	3	1	1	0	0	54	52	3	0	0	0	0	55
11:15	53	9	0	1	0	0	63	54	2	0	1	0	0	57
11:30	47	2	1	0	0	0	50	50	7	1	2	0	0	60
11:45	50	5	0	0	1	0	56	50	5	0	1	0	0	56
Hour	199	19	2	2	1	0	223	206	17	1	4	0	0	228
12:00	50	3	1	1	0	0	55	65	0	1	1	0	0	67
12:15	62	6	0	1	0	0	69	61	0	0	1	1	0	63
12:30	46	4	0	0	0	0	50	64	6	0	1	0	0	71
12:45	59	14	0	0	0	0	73	66	4	0	0	0	0	70
Hour	217	27	1	2	0	0	247	256	10	1	3	1	0	271
13:00	78	8	1	0	0	0	87	61	6	0	1	0	0	68
13:15	69	3	1	2	0	0	75	62	3	0	2	0	0	67
13:30	79	1	0	0	0	0	80	56	9	2	0	0	0	67
13:45	79	2	0	2	0	0	83	95	2	0	1	0	0	98
Hour	305	14	2	4	0	0	325	274	20	2	4	0	0	300
14:00	49	2	0	2	0	0	53	65	3	0	1	0	0	69
14:15	89	8	2	0	0	0	99	67	5	1	1	0	0	74
14:30	77	5	0	0	0	0	82	72	6	0	2	0	0	80
14:45	66	5	0	2	0	0	73	74	2	0	2	0	0	78
Hour	281	20	2	4	0	0	307	278	16	1	6	0	0	301
15:00	79	2	0	1	0	0	82	72	5	0	4	0	0	81
15:15	71	4	0	0	0	0	75	69	0	1	0	0	0	70
15:30	69	4	0	0	0	0	73	66	4	4	0	0	0	74
15:45	70	6	0	0	0	0	76	81	4	0	3	0	1	89
Hour	289	16	0	1	0	0	306	288	13	5	7	0	1	314
16:00	69	5	1	0	0	0	75	82	6	2	2	0	0	92
16:15	63	2	1	0	0	0	66	80	3	0	0	0	0	83
16:30	58	3	0	0	0	0	61	72	4	0	1	0	0	77
16:45	53	5	0	0	0	1	59	82	1	0	0	0	0	83
Hour	243	15	2	0	0	1	261	316	14	2	3	0	0	335
17:00	58	4	1	0	0	1	64	70	5	0	0	0	0	75
17:15	64	7	0	0	0	0	71	72	5	0	2	0	1	80
17:30	61	6	1	0	2	0	70	76	7	0	2	0	0	85
17:45	41	2	0	0	1	0	44	73	5	0	1	2	0	81
Hour	224	19	2	0	3	1	249	291	22	0	5	2	1	321
18:00	65	1	0	0	1	1	68	71	6	2	2	2	1	84
18:15	58	2	1	0	0	0	61	63	3	1	0	1	0	68
18:30	48	2	1	0	0	0	51	63	3	0	1	0	0	67
18:45	53	3	0	0	0	0	56	49	3	2	1	0	0	55
Hour	224	8	2	0	1	1	236	246	15	5	4	3	1	274
Total	2767	193	20	20	5	6	3011	2663	181	33	58	6	7	2948

Site No. 6
Location Westbrook Lawn / Clonard Road / Millfield Shopping Centre / Chapel Street
Date Wednesday 28 November 2018

Time	To Arm D - Chapel Street						Veh. Total	From Arm D - Chapel Street						Veh. Total
	CAR	LGV	HGV	PSV	M/C	P/C		CAR	LGV	HGV	PSV	M/C	P/C	
07:00	20	3	0	3	0	4	30	53	9	2	0	0	0	64
07:15	22	3	0	0	0	2	27	50	7	0	2	0	0	59
07:30	27	4	2	1	0	2	36	59	2	1	4	0	0	66
07:45	49	1	0	4	0	2	56	74	11	2	1	0	0	88
Hour	118	11	2	8	0	10	149	236	29	5	7	0	0	277
08:00	64	7	2	1	0	1	75	103	12	0	2	0	1	118
08:15	57	7	0	3	0	1	68	106	6	1	1	0	0	114
08:30	100	4	4	2	0	0	110	103	8	0	2	0	0	113
08:45	104	11	1	2	0	1	119	145	5	1	3	0	0	154
Hour	325	29	7	8	0	3	372	457	31	2	8	0	1	499
09:00	92	5	2	2	0	0	101	108	5	1	0	0	0	114
09:15	56	6	0	1	0	0	63	112	8	2	0	0	0	122
09:30	60	4	2	0	0	1	67	68	9	3	2	0	0	82
09:45	62	5	3	1	0	1	72	85	6	2	0	0	0	93
Hour	270	20	7	4	0	2	303	373	28	8	2	0	0	411
10:00	51	10	1	1	0	0	63	50	7	2	0	0	0	59
10:15	44	6	1	0	0	0	51	66	4	1	1	0	0	72
10:30	48	7	0	2	0	0	57	65	9	2	2	0	0	78
10:45	39	10	0	0	1	0	50	77	5	1	0	0	0	83
Hour	182	33	2	3	1	0	221	258	25	6	3	0	0	292
11:00	59	3	2	0	0	0	64	70	5	1	1	0	0	77
11:15	54	7	4	1	0	0	66	76	9	1	0	0	0	86
11:30	66	5	3	2	0	0	76	61	2	2	2	0	0	67
11:45	65	11	1	0	0	0	77	65	5	3	1	1	0	75
Hour	244	26	10	3	0	0	283	272	21	7	4	1	0	305
12:00	77	10	1	1	0	0	89	72	10	1	2	0	0	85
12:15	77	6	1	1	0	0	85	78	8	2	1	0	0	89
12:30	80	12	2	2	0	0	96	64	10	0	1	0	0	75
12:45	75	12	1	0	0	0	88	72	14	2	1	0	0	89
Hour	309	40	5	4	0	0	358	286	42	5	5	0	0	338
13:00	73	13	3	0	0	0	89	88	12	1	1	0	0	102
13:15	76	7	3	2	0	0	88	93	6	3	3	0	1	106
13:30	70	10	1	1	0	0	82	104	6	1	1	0	0	112
13:45	117	11	0	2	0	0	130	109	7	2	2	0	0	120
Hour	336	41	7	5	0	0	389	394	31	7	7	0	1	440
14:00	80	5	3	1	0	0	89	61	9	2	2	1	0	75
14:15	84	9	1	1	0	0	95	109	15	4	1	0	0	129
14:30	91	9	1	3	0	1	105	95	4	3	2	0	0	104
14:45	117	8	0	3	0	0	128	88	7	2	3	0	0	100
Hour	372	31	5	8	0	1	417	353	35	11	8	1	0	408
15:00	96	10	1	3	0	0	110	92	14	1	2	0	0	109
15:15	93	3	6	1	0	0	103	101	8	0	2	0	0	111
15:30	108	4	4	0	0	2	118	98	12	3	0	0	0	113
15:45	128	6	2	2	0	0	138	91	10	2	3	0	0	106
Hour	425	23	13	6	0	2	469	382	44	6	7	0	0	439
16:00	108	12	1	1	0	0	122	103	12	3	1	0	0	119
16:15	95	7	1	0	0	0	103	95	10	0	0	0	0	105
16:30	106	10	0	1	0	0	117	76	7	1	1	0	0	85
16:45	111	12	1	0	0	0	124	81	9	2	0	0	1	93
Hour	420	41	3	2	0	0	466	355	38	6	2	0	1	402
17:00	106	3	0	0	1	0	110	86	3	2	0	0	0	91
17:15	100	15	0	1	0	0	116	91	7	1	1	0	0	100
17:30	104	9	2	2	0	0	117	87	8	2	1	2	0	100
17:45	105	7	0	0	1	1	114	70	3	0	1	1	0	75
Hour	415	34	2	3	2	1	457	334	21	5	3	3	0	366
18:00	100	5	0	1	2	0	108	79	4	0	0	0	1	84
18:15	115	6	1	0	0	0	122	77	5	1	0	0	1	84
18:30	98	7	0	1	0	0	106	76	3	1	1	0	0	81
18:45	87	9	0	2	0	0	98	72	1	0	2	0	0	75
Hour	400	27	1	4	2	0	434	304	13	2	3	0	2	324
Total	3816	356	64	58	5	19	4318	4004	358	70	59	5	5	4501

Site No. 1
Location Trimleston / The Rise(W) / Barons Hall Rise / The Rise(E)
Date Wednesday 28 November 2018

Time	ARM A		Ped. Total	ARM B		Ped. Total
	Eastbound	Westbound		Northbound	Southbound	
07:00	0	0	0	0	1	1
07:15	3	1	4	0	0	0
07:30	1	1	2	0	0	0
07:45	1	2	3	0	4	4
Hour	5	4	9	0	5	5
08:00	0	2	2	1	1	2
08:15	0	2	2	0	9	9
08:30	4	10	14	0	19	19
08:45	3	3	6	4	8	12
Hour	7	17	24	5	37	42
09:00	1	3	4	4	2	6
09:15	0	0	0	0	3	3
09:30	1	0	1	0	3	3
09:45	0	0	0	1	1	2
Hour	2	3	5	5	9	14
10:00	2	1	3	1	0	1
10:15	1	2	3	1	2	3
10:30	1	2	3	2	1	3
10:45	1	1	2	3	2	5
Hour	5	6	11	7	5	12
11:00	0	0	0	1	0	1
11:15	1	0	1	0	2	2
11:30	1	0	1	4	1	5
11:45	0	2	2	1	1	2
Hour	2	2	4	6	4	10
12:00	0	0	0	2	1	3
12:15	1	1	2	2	2	4
12:30	0	0	0	3	0	3
12:45	0	0	0	1	0	1
Hour	1	1	2	8	3	11
13:00	2	0	2	4	3	7
13:15	0	1	1	0	1	1
13:30	1	0	1	1	2	3
13:45	6	3	9	2	2	4
Hour	9	4	13	7	8	15
14:00	1	5	6	2	1	3
14:15	3	2	5	8	3	11
14:30	16	1	17	22	1	23
14:45	9	3	12	15	1	16
Hour	29	11	40	47	6	53
15:00	2	6	8	6	1	7
15:15	4	1	5	3	0	3
15:30	3	0	3	3	0	3
15:45	7	2	9	10	3	13
Hour	16	9	25	22	4	26
16:00	3	2	5	2	0	2
16:15	4	0	4	7	0	7
16:30	5	3	8	5	2	7
16:45	3	1	4	5	1	6
Hour	15	6	21	19	3	22
17:00	8	4	12	9	2	11
17:15	4	1	5	3	1	4
17:30	1	0	1	4	3	7
17:45	2	2	4	3	1	4
Hour	15	7	22	19	7	26
18:00	5	1	6	3	1	4
18:15	3	3	6	4	1	5
18:30	2	5	7	6	3	9
18:45	3	5	8	3	7	10
Hour	13	14	27	16	12	28
Total	119	84	203	161	103	264

9486 / Balbriggan
November 2018
Pedestrian Crossing Count

Site No. 1
Location Trimleston / The Rise(W) / Barons Hall Rise / The Rise(E)
Date Wednesday 28 November 2018

Time	ARM C		Ped. Total	ARM D		Ped. Total
	Eastbound	Westbound		Northbound	Southbound	
07:00	1	0	1	0	0	0
07:15	1	0	1	0	0	0
07:30	1	0	1	0	0	0
07:45	1	0	1	0	0	0
Hour	4	0	4	0	0	0
08:00	0	4	4	0	0	0
08:15	0	3	3	0	0	0
08:30	3	3	6	0	0	0
08:45	0	0	0	0	0	0
Hour	3	10	13	0	0	0
09:00	5	0	5	0	0	0
09:15	1	3	4	0	0	0
09:30	1	4	5	0	0	0
09:45	1	0	1	0	0	0
Hour	8	7	15	0	0	0
10:00	1	3	4	0	0	0
10:15	0	2	2	0	0	0
10:30	1	2	3	0	0	0
10:45	1	3	4	0	0	0
Hour	3	10	13	0	0	0
11:00	2	1	3	0	0	0
11:15	1	4	5	0	0	0
11:30	3	2	5	0	0	0
11:45	0	3	3	0	0	0
Hour	6	10	16	0	0	0
12:00	2	2	4	0	0	0
12:15	1	3	4	0	0	0
12:30	2	3	5	0	0	0
12:45	4	2	6	0	0	0
Hour	9	10	19	0	0	0
13:00	2	2	4	0	0	0
13:15	0	2	2	0	0	0
13:30	1	6	7	0	0	0
13:45	6	0	6	2	0	2
Hour	9	10	19	2	0	2
14:00	1	3	4	0	0	0
14:15	1	3	4	0	0	0
14:30	1	8	9	3	0	3
14:45	2	1	3	0	0	0
Hour	5	15	20	3	0	3
15:00	1	3	4	0	0	0
15:15	0	2	2	0	0	0
15:30	3	2	5	2	0	2
15:45	3	1	4	2	0	2
Hour	7	8	15	4	0	4
16:00	1	2	3	3	0	3
16:15	0	3	3	1	0	1
16:30	2	2	4	0	1	1
16:45	1	1	2	2	0	2
Hour	4	8	12	6	1	7
17:00	1	2	3	1	0	1
17:15	0	1	1	0	1	1
17:30	0	4	4	1	0	1
17:45	2	4	6	1	1	2
Hour	3	11	14	3	2	5
18:00	0	1	1	1	0	1
18:15	1	1	2	3	0	3
18:30	1	5	6	3	1	4
18:45	1	2	3	0	0	0
Hour	3	9	12	7	1	8
Total	64	108	172	25	4	29

9486 / Balbriggan
November 2018
Pedestrian Crossing Count

Site No. 2
Location The Park(N) / The Park(S) / Moylaragh Road
Date Wednesday 28 November 2018

Time	ARM A		Ped. Total	ARM B		Ped. Total
	Eastbound	Westbound		Eastbound	Westbound	
07:00	0	0	0	3	0	3
07:15	0	2	2	1	2	3
07:30	0	0	0	1	0	1
07:45	2	3	5	5	2	7
Hour	2	5	7	10	4	14
08:00	0	6	6	3	1	4
08:15	0	4	4	3	20	23
08:30	0	9	9	17	57	74
08:45	0	7	7	18	2	20
Hour	0	26	26	41	80	121
09:00	1	2	3	1	0	1
09:15	0	0	0	1	1	2
09:30	0	1	1	1	0	1
09:45	0	0	0	2	1	3
Hour	1	3	4	5	2	7
10:00	1	0	1	1	2	3
10:15	1	0	1	0	0	0
10:30	0	3	3	1	0	1
10:45	0	1	1	1	1	2
Hour	2	4	6	3	3	6
11:00	0	0	0	1	3	4
11:15	0	0	0	0	1	1
11:30	1	1	2	5	2	7
11:45	0	0	0	2	3	5
Hour	1	1	2	8	9	17
12:00	0	0	0	0	2	2
12:15	0	1	1	0	1	1
12:30	0	0	0	4	0	4
12:45	0	0	0	0	3	3
Hour	0	1	1	4	6	10
13:00	0	2	2	1	0	1
13:15	0	1	1	13	7	20
13:30	0	0	0	0	1	1
13:45	0	0	0	0	0	0
Hour	0	3	3	14	8	22
14:00	0	1	1	3	8	11
14:15	0	1	1	45	10	55
14:30	0	0	0	12	4	16
14:45	9	6	15	4	8	12
Hour	9	8	17	64	30	94
15:00	0	3	3	0	7	7
15:15	0	0	0	17	4	21
15:30	3	0	3	0	1	1
15:45	5	0	5	5	4	9
Hour	8	3	11	22	16	38
16:00	2	0	2	6	8	14
16:15	0	0	0	4	9	13
16:30	0	0	0	5	1	6
16:45	0	2	2	0	2	2
Hour	2	2	4	15	20	35
17:00	0	0	0	5	0	5
17:15	0	0	0	2	1	3
17:30	0	2	2	0	3	3
17:45	0	0	0	2	2	4
Hour	0	2	2	9	6	15
18:00	0	2	2	2	0	2
18:15	0	3	3	0	1	1
18:30	1	0	1	0	5	5
18:45	0	0	0	7	3	10
Hour	1	5	6	9	9	18
Total	26	63	89	204	193	397

Site No. 2
Location The Park(N) / The Park(S) / Moylaragh Road
Date Wednesday 28 November 2018

Time	ARM C		Ped. Total
	Northbound	Southbound	
07:00	0	2	2
07:15	2	2	4
07:30	1	4	5
07:45	2	7	9
Hour	5	15	20
08:00	0	4	4
08:15	0	3	3
08:30	1	9	10
08:45	1	5	6
Hour	2	21	23
09:00	3	1	4
09:15	2	0	2
09:30	1	0	1
09:45	2	2	4
Hour	8	3	11
10:00	2	4	6
10:15	1	2	3
10:30	1	2	3
10:45	3	3	6
Hour	7	11	18
11:00	1	1	2
11:15	2	4	6
11:30	4	4	8
11:45	0	1	1
Hour	7	10	17
12:00	4	2	6
12:15	2	0	2
12:30	1	2	3
12:45	2	2	4
Hour	9	6	15
13:00	3	4	7
13:15	1	3	4
13:30	0	3	3
13:45	7	1	8
Hour	11	11	22
14:00	3	0	3
14:15	2	6	8
14:30	1	4	5
14:45	14	0	14
Hour	20	10	30
15:00	2	1	3
15:15	3	2	5
15:30	1	3	4
15:45	8	0	8
Hour	14	6	20
16:00	6	4	10
16:15	8	2	10
16:30	4	8	12
16:45	4	3	7
Hour	22	17	39
17:00	10	2	12
17:15	3	2	5
17:30	6	2	8
17:45	7	0	7
Hour	26	6	32
18:00	6	5	11
18:15	3	6	9
18:30	5	0	5
18:45	3	3	6
Hour	17	14	31
Total	148	130	278

Site No. 3
Location Castlemill Link Road(N) / Unnamed Road / Castlemill Link Road(S) / Hampton Gardens Drive
Date Wednesday 28 November 2018

Time	ARM A		Ped. Total	ARM B		Ped. Total
	Eastbound	Westbound		Northbound	Southbound	
07:00	0	0	0	1	0	1
07:15	0	0	0	0	5	5
07:30	0	0	0	1	2	3
07:45	0	4	4	0	5	5
Hour	0	4	4	2	12	14
08:00	0	4	4	1	19	20
08:15	0	1	1	0	26	26
08:30	0	0	0	1	54	55
08:45	1	0	1	12	130	142
Hour	1	5	6	14	229	243
09:00	0	0	0	29	24	53
09:15	0	1	1	3	10	13
09:30	0	0	0	0	1	1
09:45	0	0	0	0	0	0
Hour	0	1	1	32	35	67
10:00	0	0	0	1	1	2
10:15	0	0	0	0	1	1
10:30	0	0	0	1	3	4
10:45	0	0	0	1	0	1
Hour	0	0	0	3	5	8
11:00	0	0	0	1	1	2
11:15	0	0	0	0	1	1
11:30	0	0	0	1	2	3
11:45	1	0	1	0	0	0
Hour	1	0	1	2	4	6
12:00	1	0	1	0	0	0
12:15	0	0	0	0	0	0
12:30	0	1	1	1	0	1
12:45	0	0	0	0	1	1
Hour	1	1	2	1	1	2
13:00	0	0	0	0	1	1
13:15	0	0	0	0	2	2
13:30	0	0	0	7	15	22
13:45	0	0	0	31	0	31
Hour	0	0	0	38	18	56
14:00	0	1	1	0	3	3
14:15	0	0	0	0	1	1
14:30	0	0	0	15	17	32
14:45	0	0	0	106	3	109
Hour	0	1	1	121	24	145
15:00	0	0	0	2	0	2
15:15	0	1	1	0	2	2
15:30	2	1	3	27	8	35
15:45	0	0	0	42	5	47
Hour	2	2	4	71	15	86
16:00	2	0	2	14	2	16
16:15	0	0	0	3	0	3
16:30	2	0	2	0	0	0
16:45	0	0	0	0	0	0
Hour	4	0	4	17	2	19
17:00	1	1	2	3	0	3
17:15	0	0	0	0	0	0
17:30	0	0	0	0	0	0
17:45	0	1	1	3	0	3
Hour	1	2	3	6	0	6
18:00	0	0	0	2	1	3
18:15	0	1	1	0	1	1
18:30	0	1	1	0	0	0
18:45	0	0	0	3	1	4
Hour	0	2	2	5	3	8
Total	10	18	28	312	348	660

9486 / Balbriggan
November 2018
Pedestrian Crossing Count

Site No. 3
Location Castlemill Link Road(N) / Unnamed Road / Castlemill Link Road(S) / Hampton Gardens Drive
Date Wednesday 28 November 2018

Time	ARM C		Ped. Total	ARM D		Ped. Total
	Eastbound	Westbound		Northbound	Southbound	
07:00	0	0	0	0	0	0
07:15	2	0	2	0	0	0
07:30	1	0	1	2	3	5
07:45	2	1	3	1	0	1
Hour	5	1	6	3	3	6
08:00	0	4	4	0	10	10
08:15	2	5	7	0	2	2
08:30	0	8	8	2	12	14
08:45	13	88	101	1	19	20
Hour	15	105	120	3	43	46
09:00	16	46	62	1	12	13
09:15	3	0	3	3	2	5
09:30	0	1	1	0	3	3
09:45	0	0	0	0	3	3
Hour	19	47	66	4	20	24
10:00	0	1	1	1	0	1
10:15	1	0	1	0	2	2
10:30	0	0	0	0	1	1
10:45	0	0	0	0	3	3
Hour	1	1	2	1	6	7
11:00	0	0	0	1	2	3
11:15	0	0	0	1	0	1
11:30	1	0	1	0	1	1
11:45	0	0	0	0	1	1
Hour	1	0	1	2	4	6
12:00	0	0	0	0	3	3
12:15	0	0	0	0	0	0
12:30	0	0	0	4	0	4
12:45	0	0	0	0	1	1
Hour	0	0	0	4	4	8
13:00	2	0	2	2	2	4
13:15	2	4	6	0	0	0
13:30	4	9	13	0	1	1
13:45	29	3	32	6	4	10
Hour	37	16	53	8	7	15
14:00	1	0	1	3	0	3
14:15	0	1	1	0	5	5
14:30	10	14	24	1	2	3
14:45	56	3	59	27	5	32
Hour	67	18	85	31	12	43
15:00	0	0	0	4	0	4
15:15	4	0	4	3	1	4
15:30	5	5	10	0	2	2
15:45	14	0	14	5	1	6
Hour	23	5	28	12	4	16
16:00	0	0	0	1	0	1
16:15	0	0	0	4	1	5
16:30	0	2	2	3	4	7
16:45	0	1	1	1	2	3
Hour	0	3	3	9	7	16
17:00	0	0	0	1	0	1
17:15	0	0	0	0	0	0
17:30	0	0	0	0	1	1
17:45	0	0	0	2	2	4
Hour	0	0	0	3	3	6
18:00	2	2	4	1	2	3
18:15	1	0	1	1	1	2
18:30	0	1	1	0	0	0
18:45	0	1	1	0	0	0
Hour	3	4	7	2	3	5
Total	171	200	371	82	116	198

Site No. 4
Location Access Road / Clonard Road(W) / Clonard Road(E)
Date Wednesday 28 November 2018

Time	ARM A		Ped. Total	ARM B		Ped. Total
	Eastbound	Westbound		Northbound	Southbound	
07:00	0	1	1	0	0	0
07:15	0	0	0	0	0	0
07:30	1	0	1	0	2	2
07:45	0	0	0	0	1	1
Hour	1	1	2	0	3	3
08:00	0	2	2	0	0	0
08:15	0	1	1	0	0	0
08:30	0	0	0	0	0	0
08:45	0	0	0	0	0	0
Hour	0	3	3	0	0	0
09:00	1	0	1	0	0	0
09:15	0	0	0	0	0	0
09:30	0	4	4	0	0	0
09:45	1	0	1	0	0	0
Hour	2	4	6	0	0	0
10:00	0	0	0	0	1	1
10:15	1	0	1	0	0	0
10:30	0	1	1	0	0	0
10:45	1	0	1	1	0	1
Hour	2	1	3	1	1	2
11:00	1	1	2	0	0	0
11:15	1	0	1	0	0	0
11:30	0	1	1	0	0	0
11:45	0	0	0	0	0	0
Hour	2	2	4	0	0	0
12:00	0	0	0	0	0	0
12:15	0	0	0	0	0	0
12:30	1	0	1	0	0	0
12:45	0	0	0	0	0	0
Hour	1	0	1	0	0	0
13:00	0	0	0	0	0	0
13:15	0	0	0	0	0	0
13:30	0	0	0	0	0	0
13:45	0	0	0	0	0	0
Hour	0	0	0	0	0	0
14:00	0	0	0	0	0	0
14:15	0	1	1	0	0	0
14:30	0	0	0	0	0	0
14:45	0	0	0	0	0	0
Hour	0	1	1	0	0	0
15:00	0	0	0	0	0	0
15:15	0	0	0	0	0	0
15:30	0	0	0	0	0	0
15:45	1	0	1	0	0	0
Hour	1	0	1	0	0	0
16:00	0	0	0	0	0	0
16:15	0	0	0	0	0	0
16:30	0	0	0	0	0	0
16:45	0	0	0	0	0	0
Hour	0	0	0	0	0	0
17:00	0	0	0	0	0	0
17:15	0	0	0	0	0	0
17:30	0	0	0	0	0	0
17:45	0	0	0	0	0	0
Hour	0	0	0	0	0	0
18:00	1	1	2	0	0	0
18:15	0	2	2	0	0	0
18:30	1	0	1	0	0	0
18:45	0	0	0	0	0	0
Hour	2	3	5	0	0	0
Total	11	15	26	1	4	5

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November 2018
Pedestrian Crossing Count

Site No. 4
Location Access Road / Clonard Road(W) / Clonard Road(E)
Date Wednesday 28 November 2018

Time	ARM C		Ped. Total
	Northbound	Southbound	
07:00	0	0	0
07:15	0	0	0
07:30	0	0	0
07:45	0	0	0
Hour	0	0	0
08:00	0	0	0
08:15	0	0	0
08:30	0	0	0
08:45	0	0	0
Hour	0	0	0
09:00	0	0	0
09:15	0	0	0
09:30	0	0	0
09:45	0	0	0
Hour	0	0	0
10:00	0	0	0
10:15	0	0	0
10:30	0	0	0
10:45	0	0	0
Hour	0	0	0
11:00	0	0	0
11:15	0	0	0
11:30	0	0	0
11:45	0	0	0
Hour	0	0	0
12:00	0	0	0
12:15	0	0	0
12:30	0	0	0
12:45	0	0	0
Hour	0	0	0
13:00	0	0	0
13:15	0	0	0
13:30	0	0	0
13:45	0	0	0
Hour	0	0	0
14:00	0	0	0
14:15	0	0	0
14:30	0	0	0
14:45	0	0	0
Hour	0	0	0
15:00	0	0	0
15:15	0	0	0
15:30	0	0	0
15:45	0	0	0
Hour	0	0	0
16:00	0	0	0
16:15	0	0	0
16:30	0	0	0
16:45	0	0	0
Hour	0	0	0
17:00	0	0	0
17:15	0	0	0
17:30	0	0	0
17:45	0	0	0
Hour	0	0	0
18:00	0	0	0
18:15	0	0	0
18:30	0	0	0
18:45	0	0	0
Hour	0	0	0
Total	0	0	0

Site No. 5
Location Castlemills Link Road / Clonard Road(W) / Unnamed Road / Clonard Road(E)
Date Wednesday 28 November 2018

Time	ARM A		Ped. Total	ARM B		Ped. Total
	Eastbound	Westbound		Northbound	Southbound	
07:00	0	0	0	0	0	0
07:15	0	0	0	0	1	1
07:30	0	0	0	0	0	0
07:45	0	0	0	0	5	5
Hour	0	0	0	0	6	6
08:00	0	2	2	2	11	13
08:15	0	3	3	0	38	38
08:30	0	3	3	0	25	25
08:45	0	3	3	13	61	74
Hour	0	11	11	15	135	150
09:00	2	0	2	6	9	15
09:15	0	0	0	0	0	0
09:30	0	0	0	0	0	0
09:45	0	0	0	0	0	0
Hour	2	0	2	6	9	15
10:00	1	0	1	0	0	0
10:15	0	0	0	0	0	0
10:30	0	0	0	0	1	1
10:45	0	0	0	0	0	0
Hour	1	0	1	0	1	1
11:00	0	1	1	0	0	0
11:15	0	0	0	0	0	0
11:30	0	0	0	0	0	0
11:45	0	0	0	0	0	0
Hour	0	1	1	0	0	0
12:00	0	0	0	0	1	1
12:15	0	0	0	0	0	0
12:30	0	0	0	0	0	0
12:45	0	0	0	0	0	0
Hour	0	0	0	0	1	1
13:00	0	0	0	0	1	1
13:15	0	0	0	0	6	6
13:30	0	3	3	7	3	10
13:45	0	0	0	22	2	24
Hour	0	3	3	29	12	41
14:00	0	0	0	0	0	0
14:15	0	0	0	0	8	8
14:30	1	0	1	5	6	11
14:45	0	0	0	48	0	48
Hour	1	0	1	53	14	67
15:00	0	0	0	2	0	2
15:15	0	0	0	0	1	1
15:30	3	0	3	17	2	19
15:45	1	0	1	46	3	49
Hour	4	0	4	65	6	71
16:00	0	1	1	12	2	14
16:15	0	0	0	2	4	6
16:30	0	0	0	5	0	5
16:45	0	0	0	2	2	4
Hour	0	1	1	21	8	29
17:00	1	2	3	3	0	3
17:15	0	0	0	2	0	2
17:30	0	0	0	0	0	0
17:45	0	0	0	0	0	0
Hour	1	2	3	5	0	5
18:00	0	0	0	2	0	2
18:15	0	0	0	0	0	0
18:30	0	0	0	0	0	0
18:45	0	2	2	0	0	0
Hour	0	2	2	2	0	2
Total	9	20	29	196	192	388

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November 2018
Pedestrian Crossing Count

Site No. 5
Location Castlemills Link Road / Clonard Road(W) / Unnamed Road / Clonard Road(E)
Date Wednesday 28 November 2018

Time	ARM C		Ped. Total	ARM D		Ped. Total
	Eastbound	Westbound		Northbound	Southbound	
07:00	1	0	1	0	0	0
07:15	0	0	0	0	2	2
07:30	1	1	2	0	1	1
07:45	0	0	0	0	2	2
Hour	2	1	3	0	5	5
08:00	0	12	12	3	13	16
08:15	0	9	9	0	3	3
08:30	0	0	0	2	4	6
08:45	0	0	0	0	6	6
Hour	0	21	21	5	26	31
09:00	0	0	0	0	3	3
09:15	0	0	0	1	0	1
09:30	0	2	2	0	2	2
09:45	0	0	0	1	0	1
Hour	0	2	2	2	5	7
10:00	2	0	2	0	0	0
10:15	1	0	1	0	0	0
10:30	2	0	2	0	1	1
10:45	1	0	1	0	0	0
Hour	6	0	6	0	1	1
11:00	1	0	1	0	0	0
11:15	0	2	2	2	1	3
11:30	2	0	2	1	0	1
11:45	1	1	2	2	0	2
Hour	4	3	7	5	1	6
12:00	0	1	1	0	0	0
12:15	3	0	3	0	0	0
12:30	0	0	0	6	0	6
12:45	0	0	0	5	0	5
Hour	3	1	4	11	0	11
13:00	0	0	0	2	0	2
13:15	2	0	2	0	0	0
13:30	0	1	1	3	3	6
13:45	5	0	5	8	0	8
Hour	7	1	8	13	3	16
14:00	0	0	0	0	0	0
14:15	1	0	1	2	2	4
14:30	0	2	2	1	8	9
14:45	2	1	3	3	11	14
Hour	3	3	6	6	21	27
15:00	1	2	3	2	1	3
15:15	1	0	1	0	0	0
15:30	6	2	8	1	9	10
15:45	11	4	15	9	2	11
Hour	19	8	27	12	12	24
16:00	6	0	6	2	1	3
16:15	0	0	0	0	0	0
16:30	4	0	4	2	0	2
16:45	1	0	1	0	0	0
Hour	11	0	11	4	1	5
17:00	1	2	3	1	2	3
17:15	0	1	1	0	5	5
17:30	1	0	1	1	0	1
17:45	1	5	6	0	0	0
Hour	3	8	11	2	7	9
18:00	0	0	0	6	0	6
18:15	2	0	2	0	0	0
18:30	0	0	0	2	1	3
18:45	3	1	4	2	0	2
Hour	5	1	6	10	1	11
Total	63	49	112	70	83	153

Site No. 6
Location Westbrook Lawn / Clonard Road / Millfield Shopping Centre / Chapel Street
Date Wednesday 28 November 2018

Time	ARM A		Ped. Total	ARM B		Ped. Total
	Eastbound	Westbound		Northbound	Southbound	
07:00	0	0	0	0	0	0
07:15	0	0	0	0	1	1
07:30	0	0	0	0	1	1
07:45	0	0	0	0	0	0
Hour	0	0	0	0	2	2
08:00	0	1	1	0	0	0
08:15	0	0	0	0	0	0
08:30	4	4	8	0	0	0
08:45	7	10	17	0	0	0
Hour	11	15	26	0	0	0
09:00	3	3	6	0	0	0
09:15	1	2	3	0	0	0
09:30	0	0	0	0	0	0
09:45	0	0	0	0	0	0
Hour	4	5	9	0	0	0
10:00	3	0	3	2	0	2
10:15	4	0	4	0	0	0
10:30	3	1	4	0	0	0
10:45	1	0	1	0	2	2
Hour	11	1	12	2	2	4
11:00	0	0	0	0	0	0
11:15	1	0	1	0	0	0
11:30	0	1	1	0	0	0
11:45	2	0	2	0	0	0
Hour	3	1	4	0	0	0
12:00	0	2	2	0	0	0
12:15	0	1	1	0	0	0
12:30	0	0	0	1	0	1
12:45	0	1	1	0	0	0
Hour	0	4	4	1	0	1
13:00	0	0	0	0	0	0
13:15	0	0	0	0	0	0
13:30	1	0	1	0	0	0
13:45	0	0	0	0	7	7
Hour	1	0	1	0	7	7
14:00	1	0	1	1	0	1
14:15	0	0	0	2	0	2
14:30	0	1	1	0	2	2
14:45	8	0	8	6	4	10
Hour	9	1	10	9	6	15
15:00	1	0	1	0	0	0
15:15	0	0	0	0	0	0
15:30	3	1	4	1	2	3
15:45	7	0	7	6	0	6
Hour	11	1	12	7	2	9
16:00	0	0	0	0	0	0
16:15	0	0	0	5	0	5
16:30	0	0	0	0	1	1
16:45	0	0	0	0	0	0
Hour	0	0	0	5	1	6
17:00	0	0	0	0	0	0
17:15	1	0	1	0	0	0
17:30	0	0	0	5	0	5
17:45	0	0	0	2	0	2
Hour	1	0	1	7	0	7
18:00	0	0	0	6	1	7
18:15	0	1	1	0	0	0
18:30	0	0	0	3	0	3
18:45	0	0	0	3	0	3
Hour	0	1	1	12	1	13
Total	51	29	80	43	21	64

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November 2018
Pedestrian Crossing Count

Site No. 6
Location Westbrook Lawn / Clonard Road / Millfield Shopping Centre / Chapel Street
Date Wednesday 28 November 2018

Time	ARM C		Ped. Total	ARM D		Ped. Total
	Eastbound	Westbound		Northbound	Southbound	
07:00	1	0	1	1	5	6
07:15	0	0	0	1	8	9
07:30	0	0	0	4	9	13
07:45	0	0	0	2	9	11
Hour	1	0	1	8	31	39
08:00	0	4	4	0	13	13
08:15	0	5	5	9	6	15
08:30	0	3	3	2	4	6
08:45	3	3	6	4	11	15
Hour	3	15	18	15	34	49
09:00	1	0	1	12	10	22
09:15	0	1	1	10	5	15
09:30	0	2	2	4	8	12
09:45	4	1	5	9	14	23
Hour	5	4	9	35	37	72
10:00	0	2	2	5	7	12
10:15	1	2	3	3	9	12
10:30	1	0	1	4	4	8
10:45	0	2	2	5	5	10
Hour	2	6	8	17	25	42
11:00	3	2	5	6	5	11
11:15	1	1	2	6	10	16
11:30	2	0	2	5	5	10
11:45	0	0	0	3	9	12
Hour	6	3	9	20	29	49
12:00	0	2	2	9	3	12
12:15	0	2	2	2	8	10
12:30	0	0	0	5	4	9
12:45	0	0	0	5	6	11
Hour	0	4	4	21	21	42
13:00	0	0	0	7	1	8
13:15	0	0	0	10	5	15
13:30	1	2	3	8	4	12
13:45	5	1	6	4	7	11
Hour	6	3	9	29	17	46
14:00	2	0	2	5	3	8
14:15	2	0	2	4	3	7
14:30	5	2	7	9	7	16
14:45	5	0	5	6	6	12
Hour	14	2	16	24	19	43
15:00	0	1	1	10	3	13
15:15	0	0	0	11	5	16
15:30	1	4	5	7	6	13
15:45	10	2	12	8	5	13
Hour	11	7	18	36	19	55
16:00	0	0	0	12	6	18
16:15	1	2	3	19	4	23
16:30	2	1	3	7	5	12
16:45	1	1	2	12	9	21
Hour	4	4	8	50	24	74
17:00	0	0	0	9	9	18
17:15	0	0	0	15	9	24
17:30	0	0	0	12	7	19
17:45	0	1	1	4	5	9
Hour	0	1	1	40	30	70
18:00	0	0	0	12	12	24
18:15	0	0	0	13	3	16
18:30	2	0	2	8	9	17
18:45	0	1	1	3	3	6
Hour	2	1	3	36	27	63
Total	54	50	104	331	313	644

APPENDIX B

School Roll February 2019

DRAFT

Name	Address	Contact No.	Enrolment Pupils & Staff	Capacity
1. Colaiste Ghlor na Mara	Naul Rd, Clogheder, Balbriggan, Co. Dublin	01 841 6269	Pupils 239 Staff 27	800 60
2. Temporary Prefab Accommodation for Colaiste Ghlor na Mara and then for Bremore ETSS – Not in use now.				
3. St. Georges National School	Naul Road, Balbriggan Co. Dublin	01 841 0107	Pupils 418 Staff 43	430 45
4. Balbriggan Educate Together National School	Hamlet Lane Maylaragh Balbriggan, Co. Dublin	01 690 4635	Pupils 399 Staff 41	400 41
5. Scoil Chormaic Community National School	Stephenstown, Balbriggan, Co. Dublin, K32 AX94	01 841 6948	Pupils 554 Staff 40	700 53
6. Bremore Educate Together Secondary School	Clogheder, Co. Dublin	01 841 5897	Pupils 245 Only 2nd and 3rd years so far Staff 32	1000 70

APPENDIX C

School TRICS Data

DRAFT

Calculation Reference: AUDIT-464201-190123-0104

TRIP RATE CALCULATION SELECTION PARAMETERS:

Land Use : 04 - EDUCATION
Category : B - SECONDARY
VEHICLES

Selected regions and areas:

14	LEINSTER		
	KK	KILKENNY	1 days
	WC	WICKLOW	1 days
15	GREATER DUBLIN		
	DL	DUBLIN	2 days

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

Secondary Filtering selection:

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

Parameter: Number of pupils
Actual Range: 265 to 726 (units:)
Range Selected by User: 265 to 726 (units:)

Parking Spaces Range: Selected: 32 to 70 Actual: 32 to 70

Public Transport Provision:
Selection by: Include all surveys

Date Range: 01/01/10 to 26/10/17

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

Selected survey days:

Monday	2 days
Tuesday	1 days
Thursday	1 days

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

Selected survey types:

Manual count	4 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:

Edge of Town Centre	1
Suburban Area (PPS6 Out of Centre)	2
Edge of Town	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	2
No Sub Category	2

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

Secondary Filtering selection:

Use Class:

D1	4 days

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

Secondary Filtering selection (Cont.):

Population within 1 mile:

1,001 to 5,000	2 days
20,001 to 25,000	1 days
100,001 or More	1 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
25,001 to 50,000	1 days
500,001 or More	2 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	3 days
1.1 to 1.5	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	4 days

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

PTAL Rating:

No PTAL Present	4 days

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

LIST OF SITES relevant to selection parameters

1 DL-04-B-01 SECONDARY SCHOOL DUBLIN
SANDFORD ROAD
DUBLIN
RANELAGH
Suburban Area (PPS6 Out of Centre)
Residential Zone
Total Number of pupils: 265
Survey date: TUESDAY *27/09/11* *Survey Type: MANUAL*

2 DL-04-B-02 SECONDARY SCHOOL DUBLIN
ZION ROAD
DUBLIN
RATHFARNHAM
Suburban Area (PPS6 Out of Centre)
Residential Zone
Total Number of pupils: 726
Survey date: MONDAY *19/10/15* *Survey Type: MANUAL*

3 KK-04-B-02 SECONDARY SCHOOL KILKENNY
LADY'S WELL STREET
THOMASTOWN

Edge of Town Centre
No Sub Category
Total Number of pupils: 265
Survey date: THURSDAY *26/10/17* *Survey Type: MANUAL*

4 WC-04-B-01 SECONDARY SCHOOL WICKLOW
NEWCASTLE ROAD
KILCOOLE

Edge of Town
No Sub Category
Total Number of pupils: 586
Survey date: MONDAY *18/10/10* *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 04 - EDUCATION/B - SECONDARY
VEHICLES
Calculation factor: 1 PUPILS
BOLD print indicates peak (busiest) period

	ARRIVALS			DEPARTURES			TOTALS		
Time Range	No. Days	Ave. PUPILS	Trip Rate	No. Days	Ave. PUPILS	Trip Rate	No. Days	Ave. PUPILS	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	4	461	0.035	4	461	0.012	4	461	0.047
08:00 - 09:00	4	461	0.321	4	461	0.245	4	461	0.566
09:00 - 10:00	4	461	0.041	4	461	0.043	4	461	0.084
10:00 - 11:00	4	461	0.015	4	461	0.010	4	461	0.025
11:00 - 12:00	4	461	0.019	4	461	0.015	4	461	0.034
12:00 - 13:00	4	461	0.011	4	461	0.019	4	461	0.030
13:00 - 14:00	4	461	0.012	4	461	0.015	4	461	0.027
14:00 - 15:00	4	461	0.029	4	461	0.021	4	461	0.050
15:00 - 16:00	4	461	0.188	4	461	0.204	4	461	0.392
16:00 - 17:00	4	461	0.053	4	461	0.104	4	461	0.157
17:00 - 18:00	4	461	0.040	4	461	0.065	4	461	0.105
18:00 - 19:00	4	461	0.026	4	461	0.023	4	461	0.049
19:00 - 20:00	1	586	0.060	1	586	0.007	1	586	0.067
20:00 - 21:00	1	586	0.000	1	586	0.000	1	586	0.000
21:00 - 22:00	1	586	0.005	1	586	0.067	1	586	0.072
22:00 - 23:00									
23:00 - 24:00									
Total Rates:			0.855			0.850			1.705

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:	265 - 726 (units:)
Survey date date range:	01/01/10 - 26/10/17
Number of weekdays (Monday-Friday):	4
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.

APPENDIX D

School Trips

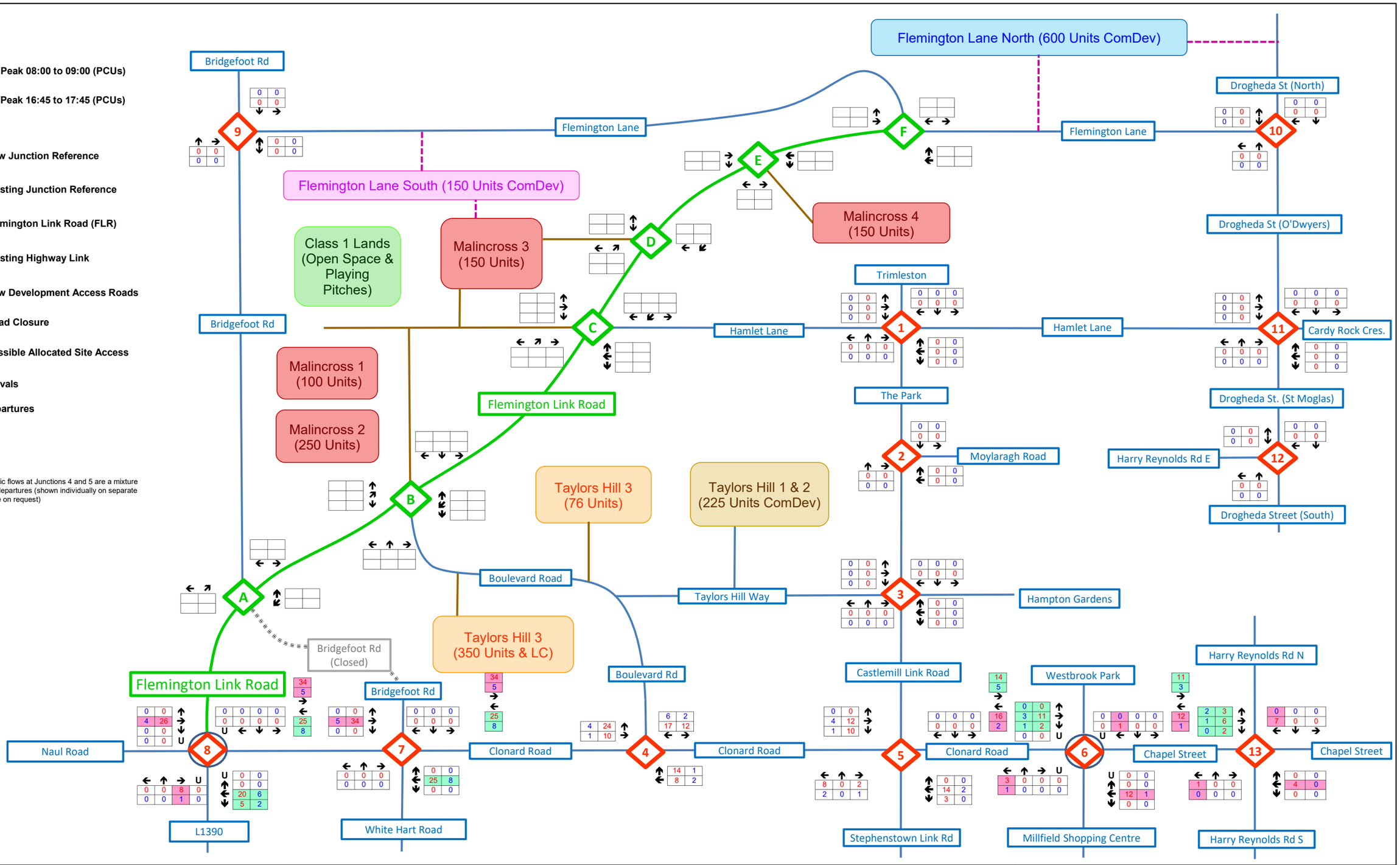
DRAFT

Key

- X — AM Peak 08:00 to 09:00 (PCUs)
- X — PM Peak 16:45 to 17:45 (PCUs)
- X — New Junction Reference
- X — Existing Junction Reference
- Flemington Link Road (FLR)
- Existing Highway Link
- New Development Access Roads
- Road Closure
- Possible Allocated Site Access
- Arrivals
- Departures

Notes:

1) School traffic flows at Junctions 4 and 5 are a mixture of arrivals and departures (shown individually on separate sheets available on request)



Martin Peters Associates Consulting Engineers 26 Upper Pembroke Street, Dublin 2 | T: +353 1 649 9001 | E: info@mpa.ie | W: www.mpa.ie	Drawing Title: School Commmitted Development Flows (total PCU): Junctions 4, 5, 6, 7, 8 & 13			REVISION:		Project Title	NW Balbriggan
						Project Number	191004
						Test Scenario	School Commmitted Development Flows (total PCU): Junctions 4, 5, 6, 7, 8 & 13
						Model Periods	AM (08:00-09:00) / PM (16:45-17:45)
	Drawn By:	AE	**Checked By:**	RJW	**Issue Date:**	Apr 2020	Drawing Number: Appendix D

APPENDIX E

Committed Residential TRICS Data

DRAFT

Calculation Reference: AUDIT-464201-190123-0159

TRIP RATE CALCULATION SELECTION PARAMETERS:

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

Selected regions and areas:

13	MUNSTER		
	WA	WATERFORD	1 days
15	GREATER DUBLIN		
	DL	DUBLIN	2 days
16	ULSTER (REPUBLIC OF IRELAND)		
	DN	DONEGAL	1 days

Secondary Filtering selection:

Parameter:	Number of dwellings
Actual Range:	146 to 280 (units:)
Range Selected by User:	100 to 500 (units:)

Parking Spaces Range: Selected: 16 to 982 Actual: 16 to 982

Percentage of dwellings privately owned: All Surveys Included

Public Transport Provision:
Selection by: Include all surveys

Date Range: 01/01/10 to 03/09/14

Selected survey days:

Tuesday	2 days
Wednesday	1 days
Friday	1 days

Selected survey types:

Manual count	4 days
Directional ATC Count	0 days

Selected Locations:

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

Selected Location Sub Categories:

Residential Zone	4

Secondary Filtering selection:

Use Class:

C3	4 days

Population within 1 mile:

10,001 to 15,000	2 days
25,001 to 50,000	2 days

Population within 5 miles:

5,001 to 25,000	1 days
50,001 to 75,000	1 days
500,001 or More	2 days

Car ownership within 5 miles:

1.1 to 1.5	4 days

Travel Plan:

No	4 days

PTAL Rating:

No PTAL Present	4 days

LIST OF SITES relevant to selection parameters

1 DL-03-A-03 TERRACED/SEMI-DET. DUBLIN
RAHENY ROAD
DUBLIN
RAHENY
Neighbourhood Centre (PPS6 Local Centre)
Residential Zone
Total Number of dwellings: 206
Survey date: TUESDAY *20/04/10* *Survey Type: MANUAL*

2 DL-03-A-06 DETACHED DUBLIN
UPPER KILMACUD ROAD
DUBLIN
DUNDRUM
Edge of Town
Residential Zone
Total Number of dwellings: 147
Survey date: FRIDAY *30/04/10* *Survey Type: MANUAL*

3 DN-03-A-05 DETACHED/SEMI-DETACHED DONEGAL
GORTLEE ROAD
LETTERKENNY
GORTLEE
Suburban Area (PPS6 Out of Centre)
Residential Zone
Total Number of dwellings: 146
Survey date: WEDNESDAY *03/09/14* *Survey Type: MANUAL*

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

Edge of Town
Residential Zone
Total Number of dwellings: 280
Survey date: TUESDAY *24/06/14* *Survey Type: MANUAL*

TRIP RATE for Land Use 03 - RESIDENTIAL/A - HOUSES PRIVATELY OWNED
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	4	195	0.047	4	195	0.187	4	195	0.234
08:00 - 09:00	4	195	0.168	4	195	0.433	4	195	0.601
09:00 - 10:00	4	195	0.168	4	195	0.243	4	195	0.411
10:00 - 11:00	4	195	0.168	4	195	0.189	4	195	0.357
11:00 - 12:00	4	195	0.184	4	195	0.227	4	195	0.411
12:00 - 13:00	4	195	0.272	4	195	0.258	4	195	0.530
13:00 - 14:00	4	195	0.241	4	195	0.218	4	195	0.459
14:00 - 15:00	4	195	0.280	4	195	0.263	4	195	0.543
15:00 - 16:00	4	195	0.297	4	195	0.228	4	195	0.525
16:00 - 17:00	4	195	0.308	4	195	0.211	4	195	0.519
17:00 - 18:00	4	195	0.399	4	195	0.241	4	195	0.640
18:00 - 19:00	4	195	0.298	4	195	0.263	4	195	0.561
19:00 - 20:00									
20:00 - 21:00									
21:00 - 22:00									
22:00 - 23:00									
23:00 - 24:00									
Total Rates:			2.830			2.961			5.791

Parameter summary

Trip rate parameter range selected:	146 - 280 (units:)
Survey date date range:	01/01/10 - 03/09/14
Number of weekdays (Monday-Friday):	4
Number of Saturdays:	0
Number of Sundays:	0
Surveys automatically removed from selection:	0
Surveys manually removed from selection:	0

APPENDIX F

Committed Residential Trips

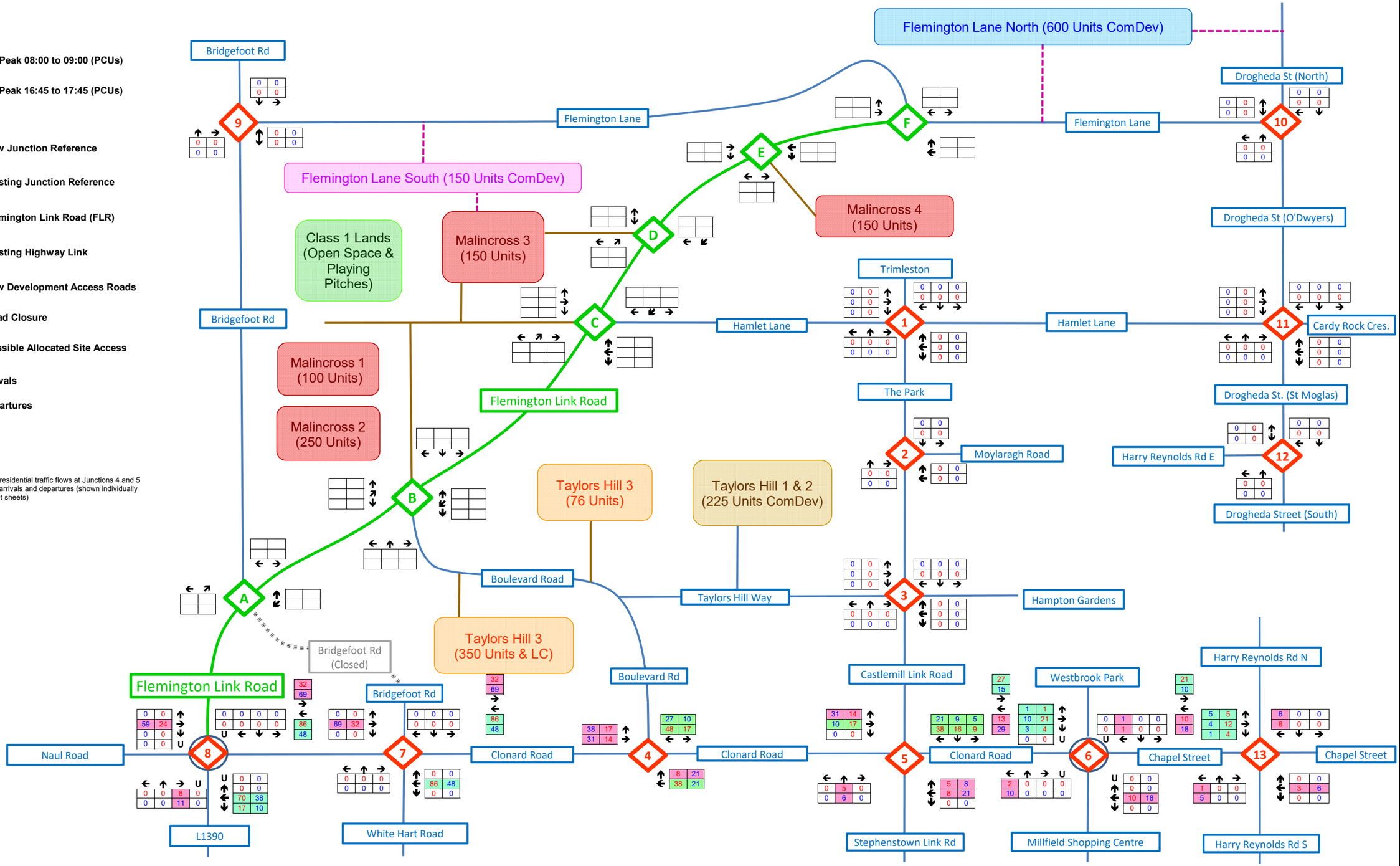
DRAFT

Key

- AM Peak 08:00 to 09:00 (PCUs)
- PM Peak 16:45 to 17:45 (PCUs)
- New Junction Reference
- Existing Junction Reference
- Flemington Link Road (FLR)
- Existing Highway Link
- New Development Access Roads
- Road Closure
- Possible Allocated Site Access
- Arrivals
- Departures

Notes:

1) School and residential traffic flows at Junctions 4 and 5 are a mixture of arrivals and departures (shown individually on separate inset sheets)



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Drawing Title:

Residential Commmitted Development Flows (total PCU): Junctions 4, 5, 6, 7, 8 & 13

REVISION:

Drawn By:	AE	**Checked By:**	RJW	**Issue Date:**	Apr 2020

Project Title	NW Balbriggan
Project Number	191004
Test Scenario	Residential Commmitted Development Flows (total PCU): Junctions 4, 5, 6, 7, 8 & 13
Model Periods	AM (08:00-09:00) / PM (16:45-17:45)
Drawing Number	Appendix F

APPENDIX G

B1 Bus Timetable

DRAFT

Table No.

BALBRIGGAN TOWN SERVICE B1

MONDAY TO FRIDAY

ROUTE	B1	B1	B1	B1	B1	B1	B1	B1	B1	B1	B1	B1	B1	B1	B1	B1	B1	B1	B1	B1	B1	B1	B1	B1	B1	B1	B1	B1	B1	B1	B1	B1	B1	B1	B1	B1	B1
Millfield Shopping Centre				07:40			08:40			09:40			10:40			11:40			12:40			13:40			14:40			15:40			16:40			17:40			18:40		
Harry Reynolds Rd (Westbrook Drive)				07:41			08:41			09:41			10:41			11:41			12:41			13:41			14:41			15:41			16:41			17:41			18:41		
Harry Reynolds Rd (Ashfield Green)				07:42			08:42			09:42			10:42			11:42			12:42			13:42			14:42			15:42			16:42			17:42			18:42		
Hastings Green Roundabout	06:42	06:56	07:11	-	07:56	08:21	-	08:56	09:21	-	09:56	10:21	-	10:56	11:21	-	11:56	12:21	-	12:56	13:21	-	13:56	14:21	-	14:56	15:21	-	15:56	16:21	-	16:56	17:21	-	18:06	18:21	-	18:56	19:21
Brega	06:43	06:57	07:12	-	07:57	08:22	-	08:57	09:22	-	09:57	10:22	-	10:57	11:22	-	11:57	12:22	-	12:57	13:22	-	13:57	14:22	-	14:57	15:22	-	15:57	16:22	-	16:57	17:22	-	18:07	18:22	-	18:57	19:22
Hamlet Lane	06:44	06:58	07:13	-	07:58	08:23	-	08:58	09:23	-	09:58	10:23	-	10:58	11:23	-	11:58	12:23	-	12:58	13:23	-	13:58	14:23	-	14:58	15:23	-	15:58	16:23	-	16:58	17:23	-	18:08	18:23	-	18:58	19:23
Balbriggan (Opposite Garda Station)	06:45	06:59	07:14	-	07:59	08:24	-	08:59	09:24	-	09:59	10:24	-	10:59	11:24	-	11:59	12:24	-	12:59	13:24	-	13:59	14:24	-	14:59	15:24	-	15:59	16:24	-	16:59	17:24	-	18:09	18:24	-	18:59	19:24
Balbriggan (Bath Road)	06:46	07:00	07:15	07:44	08:00	08:25	08:44	09:00	09:25	09:44	10:00	10:25	10:44	11:00	11:25	11:44	12:00	12:25	12:44	13:00	13:25	13:44	14:00	14:25	14:44	15:00	15:25	15:44	16:00	16:25	16:44	17:00	17:25	17:44	18:10	18:25	18:44	19:00	19:25
Balbriggan (Apache Pizza)	06:47	07:01	07:16	07:46	08:01	08:26	08:46	09:01	09:26	09:46	10:01	10:26	10:46	11:01	11:26	11:46	12:01	12:26	12:46	13:01	13:26	13:46	14:01	14:26	14:46	15:01	15:26	15:46	16:01	16:26	16:46	17:01	17:26	17:46	18:11	18:26	18:46	19:01	19:26
Balbriggan (Rail Station)	06:48	07:02	07:17	07:48	08:02	08:27	08:48	09:02	09:27	09:48	10:02	10:27	10:48	11:02	11:27	11:48	12:02	12:27	12:48	13:02	13:27	13:48	14:02	14:27	14:48	15:02	15:27	15:48	16:02	16:27	16:48	17:02	17:27	17:48	18:12	18:27	18:48	19:02	19:27

MONDAY TO FRIDAY

ROUTE	B1	B1	B1	B1	B1	B1	B1	B1	B1	B1	B1	B1	B1	B1	B1	B1	B1	B1	B1	B1	B1	B1	B1	B1	B1	B1	B1	B1	B1	B1	B1	B1	B1	B1	B1	B1	B1
Balbriggan (Rail Station)		06:50	07:05	07:30	07:50	08:15	08:30	08:50	09:15	09:30	09:50	10:15	10:30	10:50	11:15	11:30	11:50	12:15	12:30	12:50	13:15	13:30	13:50	14:15	14:30	14:50	15:15	15:30	15:50	16:15	16:30	16:50	17:15	17:30	18:00	18:15	18:30	18:50	19:15
Balbriggan (Bank of Ireland)		-	-	07:32	-	-	08:32	-	-	09:32	-	-	10:32	-	-	11:32	-	-	12:32	-	-	13:32	-	-	14:32	-	-	15:32	-	-	16:32	-	-	17:32	-	-	18:32	-	-
Balbriggan (St Peter and Paul Church)		-	-	07:34	-	-	08:34	-	-	09:34	-	-	10:34	-	-	11:34	-	-	12:34	-	-	13:34	-	-	14:34	-	-	15:34	-	-	16:34	-	-	17:34	-	-	18:34	-	-
Balbriggan (Community College)		06:51	07:06	-	07:51	08:16	-	08:51	09:16	-	09:51	10:16	-	10:51	11:16	-	11:51	12:16	-	12:51	13:16	-	13:51	14:16	-	14:51	15:16	-	15:51	16:16	-	16:51	17:16	-	18:01	18:16	-	18:51	19:16
Balbriggan (Bath Rd Service Station)		06:52	07:07	-	07:52	08:17	-	08:52	09:17	-	09:52	10:17	-	10:52	11:17	-	11:52	12:17	-	12:52	13:17	-	13:52	14:17	-	14:52	15:17	-	15:52	16:17	-	16:52	17:17	-	18:02	18:17	-	18:52	19:17
Castleland Roundabout		-	-	07:36	-	-	08:36	-	-	09:36	-	-	10:36	-	-	11:36	-	-	12:36	-	-	13:36	-	-	14:36	-	-	15:36	-	-	16:36	-	-	17:36	-	-	18:36	-	-
Harry Reynolds Rd (Opp Jaffa's)		-	-	07:37	-	-	08:37	-	-	09:37	-	-	10:37	-	-	11:37	-	-	12:37	-	-	13:37	-	-	14:37	-	-	15:37	-	-	16:37	-	-	17:37	-	-	18:37	-	-
Harry Reynolds Rd (Graveyard)		-	-	07:38	-	-	08:38	-	-	09:38	-	-	10:38	-	-	11:38	-	-	12:38	-	-	13:38	-	-	14:38	-	-	15:38	-	-	16:38	-	-	17:38	-	-	18:38	-	-
Clonard Rd (Opp St George's N.S)		-	-	07:39	-	-	08:39	-	-	09:39	-	-	10:39	-	-	11:39	-	-	12:39	-	-	13:39	-	-	14:39	-	-	15:39	-	-	16:39	-	-	17:39	-	-	18:39	-	-
Millfield Shopping Centre		-	-	07:40	-	-	08:40	-	-	09:40	-	-	10:40	-	-	11:40	-	-	12:40	-	-	13:40	-	-	14:40	-	-	15:40	-	-	16:40	-	-	17:40	-	-	18:40	-	-
Moylaragh Park	06:40	06:54	07:09		07:54	08:19		08:54	09:19		09:54	10:19		10:54	11:19		11:54	12:19		12:54	13:19		13:54	14:19		14:54	15:19		15:54	16:19		16:54	17:19		18:04	18:19		18:54	19:19
Barons Hill Rise	06:41	06:55	07:10		07:55	08:20		08:55	09:20		09:55	10:20		10:55	11:20		11:55	12:20		12:55	13:20		13:55	14:20		14:55	15:20		15:55	16:20		16:55	17:20		18:05	18:20		18:55	19:20
Hastings Green Roundabout	06:42	06:56	07:11		07:56	08:21		08:56	09:21		09:56	10:21		10:56	11:21		11:56	12:21		12:56	13:21		13:56	14:21		14:56	15:21		15:56	16:21		16:56	17:21		18:06	18:21		18:56	19:21

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Table No.

BALBRIGGAN TOWN SERVICE B1

SATURDAY

SERVICE NUMBER	B1	B1	B1	B1	B1	B1	B1	B1	B1	B1	B1	B1	B1	B1	B1	B1	B1	B1	B1	B1	B1	B1	B1	B1
Balbriggan (Rail Station)	09:15	09:30	09:50	10:15	10:30	10:50	11:15	12:30	12:50	13:15	13:30	13:50	14:15	14:30	14:50	15:15	16:30	16:50	17:15	17:30	17:50	18:15	18:30	18:50
Balbriggan (Community College)	09:16	I	09:51	10:16	I	10:51	11:16	I	12:51	13:16	I	13:51	14:16	I	14:51	15:16	I	16:51	17:16	I	17:51	18:16	I	18:51
Balbriggan (Bath Rd Service Station)	09:17	I	09:52	10:17	I	10:52	11:17	I	12:52	13:17	I	13:52	14:17	I	14:52	15:17	I	16:52	17:17	I	17:52	18:17	I	18:52
Moylaragh Park	09:19	I	09:54	10:19	I	10:54	11:19	I	12:54	13:19	I	13:54	14:19	I	14:54	15:19	I	16:54	17:19	I	17:54	18:19	I	18:54
Barons Hill Rise	09:20	I	09:55	10:20	I	10:55	11:20	I	12:55	13:20	I	13:55	14:20	I	14:55	15:20	I	16:55	17:20	I	17:55	18:20	I	18:55
Hastings Green Roundabout	09:21	I	09:56	10:21	I	10:56	11:21	I	12:56	13:21	I	13:56	14:21	I	14:56	15:21	I	16:56	17:21	I	17:56	18:21	I	18:56
Brega	09:22	I	09:57	10:22	I	10:57	11:22	I	12:57	13:22	I	13:57	14:22	I	14:57	15:22	I	16:57	17:22	I	17:57	18:22	I	18:57
Hamlet Lane	09:23	I	09:58	10:23	I	10:58	11:23	I	12:58	13:23	I	13:58	14:23	I	14:58	15:23	I	16:58	17:23	I	17:58	18:23	I	18:58
Balbriggan (Opposite Garda Station)	09:24	I	09:59	10:24	I	10:59	11:24	I	12:59	13:24	I	13:59	14:24	I	14:59	15:24	I	16:59	17:24	I	17:59	18:24	I	18:59
Balbriggan (Bank of Ireland)	I	09:32	I	I	10:32	I	I	12:32	I	I	13:32	I	I	14:32	I	I	16:32	I	I	17:32	I	I	18:32	I	
Balbriggan (St Peter and Paul Church)	I	09:34	I	I	10:34	I	I	12:34	I	I	13:34	I	I	14:34	I	I	16:34	I	I	17:34	I	I	18:34	I	
Castleland Roundabout	I	09:36	I	I	10:36	I	I	12:36	I	I	13:36	I	I	14:36	I	I	16:36	I	I	17:36	I	I	18:36	I	
Harry Reynolds Rd (Opp Jaffa's)	I	09:37	I	I	10:37	I	I	12:37	I	I	13:37	I	I	14:37	I	I	16:37	I	I	17:37	I	I	18:37	I	
Harry Reynolds Rd (Graveyard)	I	09:38	I	I	10:38	I	I	12:38	I	I	13:38	I	I	14:38	I	I	16:38	I	I	17:38	I	I	18:38	I	
Clonard Rd (Opp St George's N.S)	I	09:39	I	I	10:39	I	I	12:39	I	I	13:39	I	I	14:39	I	I	16:39	I	I	17:39	I	I	18:39	I	
Millfield Shopping Centre	I	09:40	I	I	10:40	I	I	12:40	I	I	13:40	I	I	14:40	I	I	16:40	I	I	17:40	I	I	18:40	I	
Harry Reynolds Rd (Westbrook Drive)	I	09:41	I	I	10:41	I	I	12:41	I	I	13:41	I	I	14:41	I	I	16:41	I	I	17:41	I	I	18:41	I	
Harry Reynolds Rd (Ashfield Green)	I	09:42	I	I	10:42	I	I	12:42	I	I	13:42	I	I	14:42	I	I	16:42	I	I	17:42	I	I	18:42	I	
Balbriggan (Bath Road)	09:25	09:44	10:00	10:25	10:44	11:00	11:25	12:44	13:00	13:25	13:44	14:00	14:25	14:44	15:00	15:25	16:44	17:00	17:25	17:44	18:00	18:25	18:44	19:00
Balbriggan (Apache Pizza)	09:26	09:46	10:01	10:26	10:46	11:01	11:26	12:46	13:01	13:26	13:46	14:01	14:26	14:46	15:01	15:26	16:46	17:01	17:26	17:46	18:01	18:26	18:46	19:01
Balbriggan (Rail Station)	09:27	09:48	10:02	10:27	10:48	11:02	11:27	12:48	13:02	13:27	13:48	14:02	14:27	14:48	15:02	15:27	16:48	17:02	17:27	17:48	18:02	18:27	18:48	19:02

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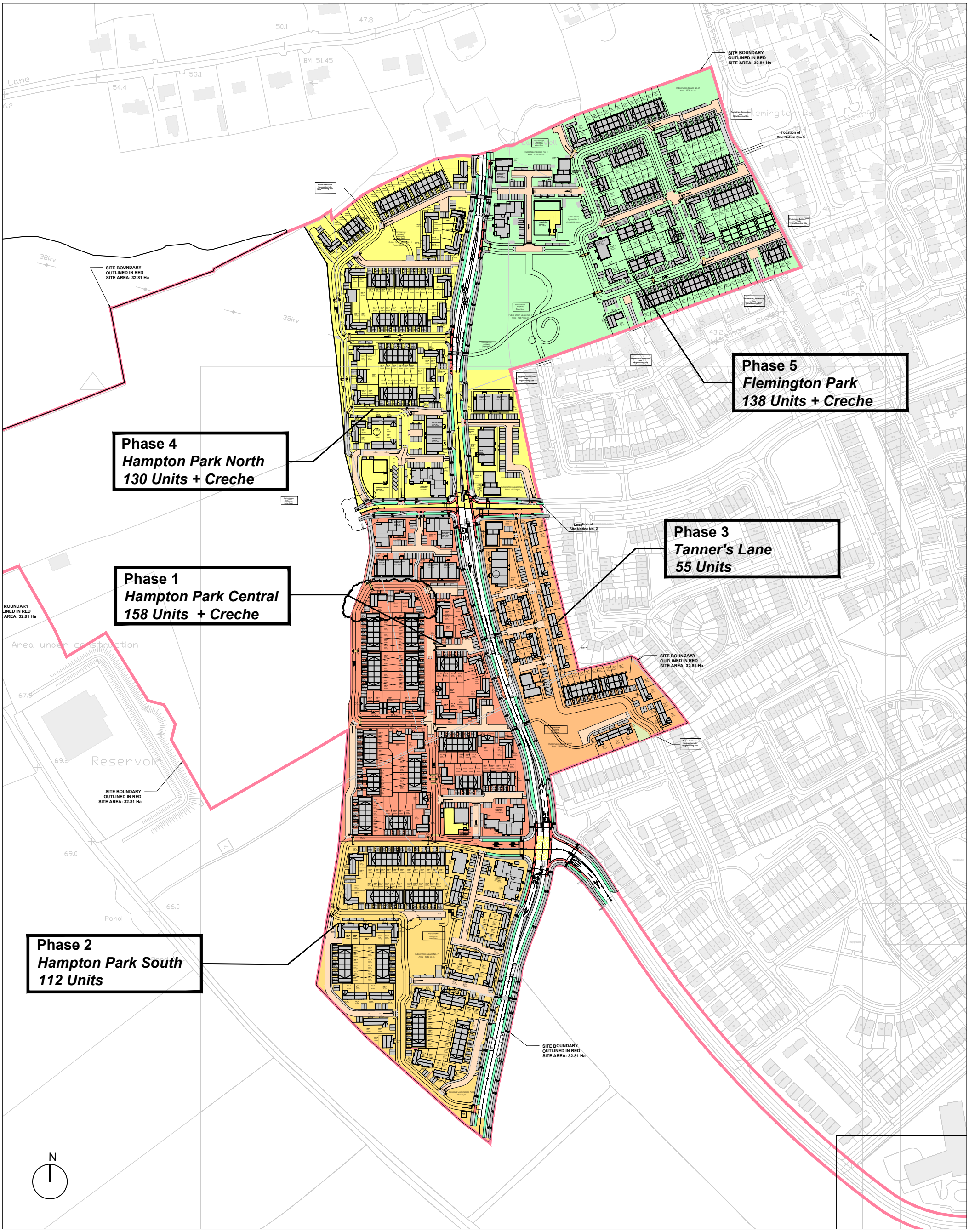
APPENDIX H

Proposed Masterplan Layout

DRAFT



Phase 1	*Hampton Park Central*	*158 Units + Creche*
Phase 2	*Hampton Park South*	*112 Units*
Phase 3	*Tanner's Lane*	*55 Units*
Phase 4	*Hampton Park North*	*130 Units + Creche*
Phase 5	*Flemington Park*	*138 Units + Creche*

OS Sheet Reference 2583-A, 2583-B, 2583-D

ITN co-ords; 718,139; 763,374
Ordnance Survey Licence Number AR0102221
Ordnance Survey Ireland, 2021

PLANNING

PROJECT TITLE:	Proposed Residential Development at Balbriggan Balbriggan, Co Dublin		
DRAWING TITLE:	Phasing Diagram		
PROJECT NO:	1902	DATE:	July 2021
SCALE:	1:3000 @A3	DRAWN BY:	
FILE NAME:	1902-FA-ZZ-00-M2-SITE-0025	CHECKED BY:	RC
DRAWING NO:	1902-SITE-0519	REVISION:	-

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APPENDIX I

TRICS Data

DRAFT

Calculation Reference: AUDIT-464201-200205-0212

TRIP RATE CALCULATION SELECTION PARAMETERS:

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

VEHICLES

Selected regions and areas:

12	**CONNAUGHT**		
	CS	SLIGO	2 days
	GA	GALWAY	1 days
	LT	LEITRIM	2 days
	MA	MAYO	1 days
	RO	ROSCOMMON	3 days
13	**MUNSTER**		
	WA	WATERFORD	1 days
14	**LEINSTER**		
	CC	CARLOW	1 days
	WC	WICKLOW	2 days
	WX	WEXFORD	1 days
15	**GREATER DUBLIN**		
	DL	DUBLIN	1 days
16	**ULSTER (REPUBLIC OF IRELAND)**		
	CV	CAVAN	2 days
	DN	DONEGAL	5 days

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

Secondary Filtering selection:

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

Parameter: Number of dwellings
Actual Range: 6 to 280 (units:)
Range Selected by User: 4 to 437 (units:)

Parking Spaces 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: 01/01/11 to 29/05/19

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	6 days
Tuesday	2 days
Wednesday	5 days
Thursday	5 days
Friday	4 days

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

Selected survey types:

Manual count	22 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:

Edge of Town Centre	4
Suburban Area (PPS6 Out of Centre)	6
Edge of Town	10
Neighbourhood Centre (PPS6 Local Centre)	2

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	15
Village	2

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

Secondary Filtering selection:

Use Class:

C3	22 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 1 mile:

1,000 or Less	2 days
1,001 to 5,000	8 days
5,001 to 10,000	6 days
10,001 to 15,000	5 days
15,001 to 20,000	1 days

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

Population within 5 miles:

5,000 or Less	5 days
5,001 to 25,000	13 days
25,001 to 50,000	3 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	7 days
1.1 to 1.5	12 days
1.6 to 2.0	3 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	22 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	22 days

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

LIST OF SITES relevant to selection parameters

1 **CC-03-A-01** **DETACHED HOUSES** **CARLOW**
R417 ANTHY ROAD
CARLOW

Edge of Town
Residential Zone
Total Number of dwellings: 23
Survey date: WEDNESDAY *25/05/16* *Survey Type: MANUAL*

2 **CS-03-A-03** **MIXED HOUSES** **SLIGO**
TOP ROAD
STRANDHILL
STRANDHILL
Neighbourhood Centre (PPS6 Local Centre)
Village
Total Number of dwellings: 30
Survey date: THURSDAY *27/10/16* *Survey Type: MANUAL*

3 **CS-03-A-04** **DETACHED & SEMI-DETACHED** **SLIGO**
R292
STRANDHILL

Neighbourhood Centre (PPS6 Local Centre)
Village
Total Number of dwellings: 63
Survey date: THURSDAY *27/10/16* *Survey Type: MANUAL*

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

5 **CV-03-A-03** **DETACHED HOUSES** **CAVAN**
R212 DUBLIN ROAD
CAVAN
PULLAMORE NEAR
Edge of Town
No Sub Category
Total Number of dwellings: 37
Survey date: MONDAY *22/05/17* *Survey Type: MANUAL*

6 **DL-03-A-10** **SEMI DETACHED & DETACHED** **DUBLIN**
R124
MALAHIDE
SAINT HELENS
Edge of Town
Residential Zone
Total Number of dwellings: 65
Survey date: WEDNESDAY *20/06/18* *Survey Type: MANUAL*

7 **DN-03-A-03** **DETACHED/SEMI-DETACHED** **DONEGAL**
THE GRANGE
LETTERKENNY
GLENCAR IRISH
Edge of Town
Residential Zone
Total Number of dwellings: 50
Survey date: MONDAY *01/09/14* *Survey Type: MANUAL*

8 **DN-03-A-04** **SEMI-DETACHED** **DONEGAL**
GORTLEE ROAD
LETTERKENNY
GORTLEE
Edge of Town
Residential Zone
Total Number of dwellings: 83
Survey date: FRIDAY *26/09/14* *Survey Type: MANUAL*

LIST OF SITES relevant to selection parameters (Cont.)

9 **DN-03-A-05** **DETACHED/SEMI-DETACHED** **DONEGAL**
GORTLEE ROAD
LETTERKENNY
GORTLEE
Suburban Area (PPS6 Out of Centre)
Residential Zone
Total Number of dwellings: 146
Survey date: WEDNESDAY *03/09/14* *Survey Type: MANUAL*

10 **DN-03-A-06** **DETACHED HOUSING** **DONEGAL**
GLENFIN ROAD
BALLYBOFEY

Edge of Town
Residential Zone
Total Number of dwellings: 6
Survey date: WEDNESDAY *10/10/18* *Survey Type: MANUAL*

11 **DN-03-A-07** **DETACHED & SEMI-DETACHED** **DONEGAL**
ST ORANS ROAD
BUNCRANA

Edge of Town Centre
Residential Zone
Total Number of dwellings: 9
Survey date: WEDNESDAY *29/05/19* *Survey Type: MANUAL*

12 **GA-03-A-04** **SEMi DET. & BUNGALOWS** **GALWAY**
R347 CAHEROYN ROAD
ATHENRY

Edge of Town Centre
Residential Zone
Total Number of dwellings: 21
Survey date: TUESDAY *09/10/12* *Survey Type: MANUAL*

13 **LT-03-A-01** **SEMI-DETACHED & DETACHED** **LEITRIM**
ARD NA SI
CARRICK-ON-SHANNON
ATTIRORY
Suburban Area (PPS6 Out of Centre)
Residential Zone
Total Number of dwellings: 90
Survey date: FRIDAY *24/04/15* *Survey Type: MANUAL*

14 **LT-03-A-02** **BUNGALOWS** **LEITRIM**
ARD ÁLAINN
CARRICK-ON-SHANNON
GALLOW'S HILL
Edge of Town Centre
Residential Zone
Total Number of dwellings: 10
Survey date: MONDAY *22/05/17* *Survey Type: MANUAL*

15 **MA-03-A-01** **SEMI-DET. & TERRACED** **MAYO**
N26 STATION ROAD
BALLINA

Suburban Area (PPS6 Out of Centre)
Residential Zone
Total Number of dwellings: 74
Survey date: FRIDAY *15/07/11* *Survey Type: MANUAL*

16 **RO-03-A-02** **SEMI DET. & BUNGALOWS** **ROSCOMMON**
SLIGO ROAD
BALLAGHADERREEN

Suburban Area (PPS6 Out of Centre)
Residential Zone
Total Number of dwellings: 31
Survey date: THURSDAY *14/07/11* *Survey Type: MANUAL*

17 **RO-03-A-03** **DETACHED HOUSES** **ROSCOMMON**
N61
BOYLE
GREATMEADOW
Edge of Town
No Sub Category
Total Number of dwellings: 23
Survey date: THURSDAY *25/09/14* *Survey Type: MANUAL*

LIST OF SITES relevant to selection parameters (Cont.)

18 **RO-03-A-04** **SEMI DET. & BUNGALOWS** **ROSCOMMON**
EAGLE COURT
ROSCOMMON
ARDNANAGH
Suburban Area (PPS6 Out of Centre)
Residential Zone
Total Number of dwellings: 39
Survey date: FRIDAY *26/09/14* *Survey Type: MANUAL*

19 **WA-03-A-04** **DETACHED** **WATERFORD**
MAYPARK LANE
WATERFORD

Edge of Town
Residential Zone
Total Number of dwellings: 280
Survey date: TUESDAY *24/06/14* *Survey Type: MANUAL*

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

21 **WC-03-A-02** **DETACHED HOUSES** **WICKLOW**
MARLTON ROAD
WICKLOW
FRIARSHILL
Edge of Town Centre
Residential Zone
Total Number of dwellings: 45
Survey date: MONDAY *28/05/18* *Survey Type: MANUAL*

22 **WX-03-A-01** **SEMI-DETACHED** **WEXFORD**
CLONARD ROAD
WEXFORD

Suburban Area (PPS6 Out of Centre)
No Sub Category
Total Number of dwellings: 34
Survey date: THURSDAY *25/09/14* *Survey Type: MANUAL*

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

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

VEHICLES

Calculation factor: 1 DWELLS

BOLD print indicates peak (busiest) period

Time Range	ARRIVALS			DEPARTURES			TOTALS		
	No. Days	Ave. DWELLS	Trip Rate	No. Days	Ave. DWELLS	Trip Rate	No. Days	Ave. DWELLS	Trip Rate
00:00 - 01:00									
01:00 - 02:00									
02:00 - 03:00									
03:00 - 04:00									
04:00 - 05:00									
05:00 - 06:00									
06:00 - 07:00									
07:00 - 08:00	22	59	0.050	22	59	0.193	22	59	0.243
08:00 - 09:00	22	59	0.164	**22**	**59**	**0.534**	22	59	0.698
09:00 - 10:00	22	59	0.218	22	59	0.268	22	59	0.486
10:00 - 11:00	22	59	0.162	22	59	0.188	22	59	0.350
11:00 - 12:00	22	59	0.166	22	59	0.207	22	59	0.373
12:00 - 13:00	22	59	0.250	22	59	0.244	22	59	0.494
13:00 - 14:00	22	59	0.268	22	59	0.259	22	59	0.527
14:00 - 15:00	22	59	0.301	22	59	0.294	22	59	0.595
15:00 - 16:00	22	59	0.341	22	59	0.252	22	59	0.593
16:00 - 17:00	22	59	0.344	22	59	0.235	22	59	0.579
17:00 - 18:00	**22**	**59**	**0.446**	22	59	0.271	**22**	**59**	**0.717**
18:00 - 19:00	22	59	0.368	22	59	0.271	22	59	0.639
19:00 - 20:00									
20:00 - 21:00									
21:00 - 22:00									
22:00 - 23:00									
23:00 - 24:00									
Total Rates:			3.078			3.216			6.294

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:	6 - 280 (units:)
Survey date date range:	01/01/11 - 29/05/19
Number of weekdays (Monday-Friday):	22
Number of Saturdays:	0
Number of Sundays:	0
Surveys automatically removed from selection:	2
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.

Calculation Reference: AUDIT-464201-200205-0247

TRIP RATE CALCULATION SELECTION PARAMETERS:

Land Use : 03 - RESIDENTIAL
Category : C - FLATS PRIVATELY OWNED

VEHICLES

Selected regions and areas:

12	**CONNAUGHT**		
	GA	GALWAY	1 days
13	**MUNSTER**		
	WA	WATERFORD	1 days
14	**LEINSTER**		
	LU	LOUTH	3 days
16	**ULSTER (REPUBLIC OF IRELAND)**		
	MG	MONAGHAN	1 days

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

Secondary Filtering selection:

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

Parameter: Number of dwellings
Actual Range: 20 to 52 (units:)
Range Selected by User: 18 to 372 (units:)

Parking Spaces 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: 01/01/11 to 22/11/16

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	2 days
Tuesday	1 days
Thursday	2 days
Friday	1 days

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

Selected survey types:

Manual count	6 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:

Edge of Town Centre	4
Suburban Area (PPS6 Out of Centre)	2

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	4
No Sub Category	2

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

Secondary Filtering selection:

Use Class:

C3	6 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 1 mile:

1,001 to 5,000	1 days
5,001 to 10,000	3 days
15,001 to 20,000	2 days

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

Population within 5 miles:

5,001 to 25,000	1 days
25,001 to 50,000	3 days
50,001 to 75,000	2 days

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

Car ownership within 5 miles:

0.6 to 1.0	1 days
1.1 to 1.5	5 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	6 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	6 days

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

LIST OF SITES relevant to selection parameters

1 **GA-03-C-01** **FLATS** **GALWAY**
BALLYLOUGHANE ROAD
GALWAY

Suburban Area (PPS6 Out of Centre)
No Sub Category
Total Number of dwellings: 34
Survey date: THURSDAY *31/10/13* *Survey Type: MANUAL*

2 **LU-03-C-01** **BLOCKS OF FLATS** **LOUTH**
DONORE ROAD
DROGHEDA

Edge of Town Centre
Residential Zone
Total Number of dwellings: 52
Survey date: THURSDAY *12/09/13* *Survey Type: MANUAL*

3 **LU-03-C-02** **BLOCK OF FLATS** **LOUTH**
NICHOLAS STREET
DUNDALK

Edge of Town Centre
Residential Zone
Total Number of dwellings: 33
Survey date: MONDAY *16/09/13* *Survey Type: MANUAL*

4 **LU-03-C-03** **BLOCK OF FLATS** **LOUTH**
NICHOLAS STREET
DUNDALK

Edge of Town Centre
Residential Zone
Total Number of dwellings: 20
Survey date: MONDAY *16/09/13* *Survey Type: MANUAL*

5 **MG-03-C-01** **BLOCK OF FLATS** **MONAGHAN**
MALL ROAD
MONAGHAN

Edge of Town Centre
No Sub Category
Total Number of dwellings: 28
Survey date: FRIDAY *06/09/13* *Survey Type: MANUAL*

6 **WA-03-C-01** **BLOCKS OF FLATS** **WATERFORD**
UPPER YELLOW ROAD
WATERFORD

Suburban Area (PPS6 Out of Centre)
Residential Zone
Total Number of dwellings: 51
Survey date: TUESDAY *12/05/15* *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/C - FLATS PRIVATELY OWNED

VEHICLES

Calculation factor: 1 DWELLS

BOLD print indicates peak (busiest) period

Time Range	ARRIVALS			DEPARTURES			TOTALS		
	No. Days	Ave. DWELLS	Trip Rate	No. Days	Ave. DWELLS	Trip Rate	No. Days	Ave. DWELLS	Trip Rate
00:00 - 01:00									
01:00 - 02:00									
02:00 - 03:00									
03:00 - 04:00									
04:00 - 05:00									
05:00 - 06:00									
06:00 - 07:00									
07:00 - 08:00	6	36	0.023	6	36	0.073	6	36	0.096
08:00 - 09:00	6	36	0.041	**6**	**36**	**0.142**	6	36	0.183
09:00 - 10:00	6	36	0.069	6	36	0.106	6	36	0.175
10:00 - 11:00	6	36	0.023	6	36	0.055	6	36	0.078
11:00 - 12:00	6	36	0.078	6	36	0.073	6	36	0.151
12:00 - 13:00	6	36	0.078	6	36	0.087	6	36	0.165
13:00 - 14:00	6	36	0.087	6	36	0.060	6	36	0.147
14:00 - 15:00	6	36	0.078	6	36	0.064	6	36	0.142
15:00 - 16:00	6	36	0.083	6	36	0.087	6	36	0.170
16:00 - 17:00	6	36	0.078	6	36	0.096	6	36	0.174
17:00 - 18:00	**6**	**36**	**0.193**	6	36	0.101	**6**	**36**	**0.294**
18:00 - 19:00	6	36	0.138	6	36	0.096	6	36	0.234
19:00 - 20:00									
20:00 - 21:00									
21:00 - 22:00									
22:00 - 23:00									
23:00 - 24:00									
Total Rates:			0.969			1.040			2.009

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

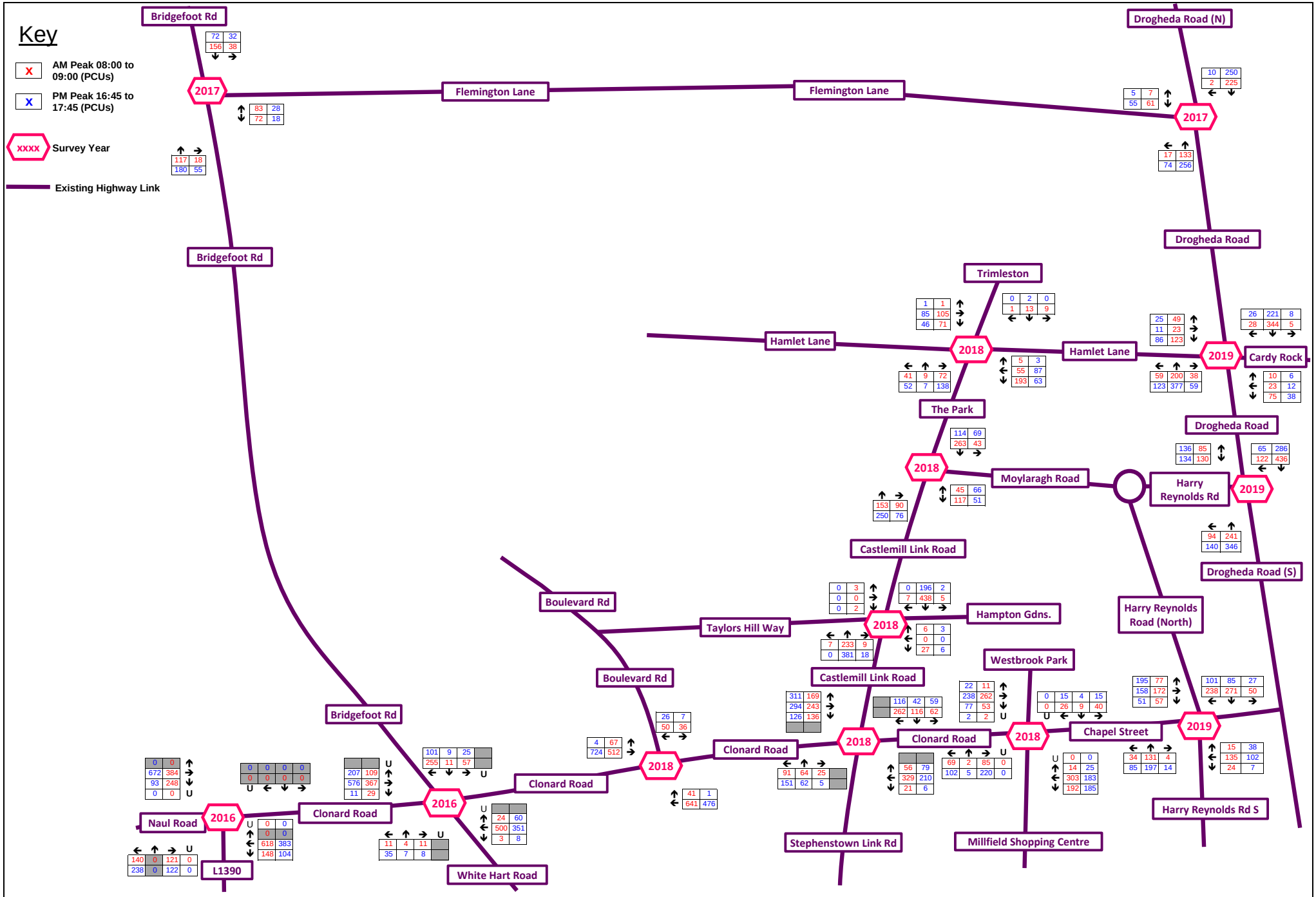
Trip rate parameter range selected:	20 - 52 (units:)
Survey date date range:	01/01/11 - 22/11/16
Number of weekdays (Monday-Friday):	6
Number of Saturdays:	0
Number of Sundays:	0
Surveys automatically removed from selection:	0
Surveys manually removed from selection:	0

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.

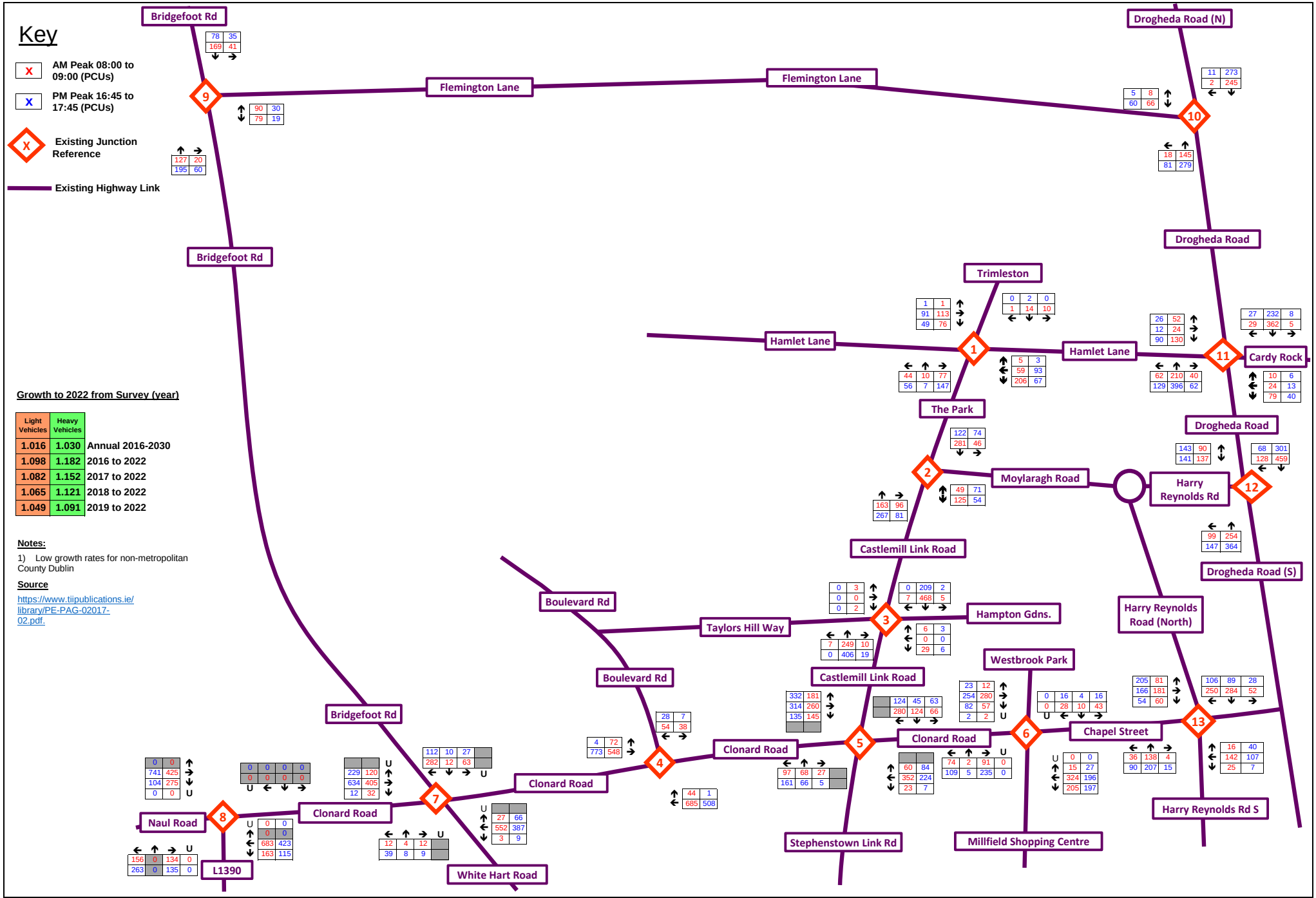
APPENDIX J

Area Wide Traffic Model

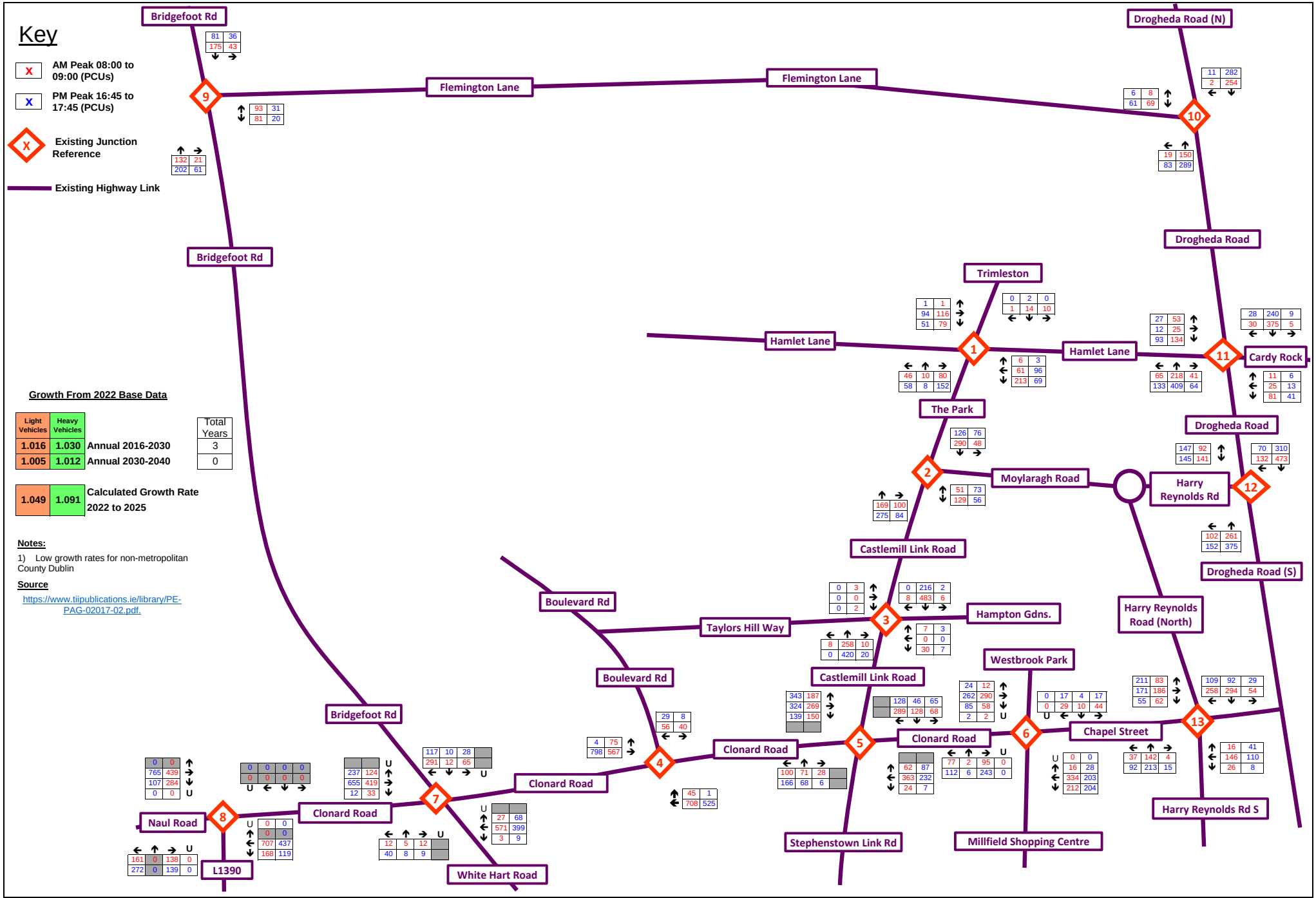
DRAFT



Martin Peters Associates Consulting Engineers 26 Upper Pembroke Street, Dublin 2 | T: +353 1 649 9001 | E: info@mpa.ie | W: www.mpa.ie	Drawing Title: 2016 / 2017 / 2018 / 2019 Survey Data AM & PM Peak Hours (PCU's)	**Drawn By:** AE **Checked By:** RJW **Issue Date:** Jan 2021	Project Title: Malincross SHD Project Number: 191004 Drawing Number: 191004-TAR-001



Martin Peters Associates Consulting Engineers 26 Upper Pembroke Street, Dublin 2 | T: +353 1 649 9001 | E: info@mpa.ie | W: www.mpa.ie	Drawing Title: 2022 Base Traffic Flows	**Drawn By:** AE	Project Title: Malincross SHD
		Checked By: RJW	Project Number: 191004
		Issue Date: Jan 2021	Drawing Number: 191004-TAR-002



Martin Peters Associates Consulting Engineers 26 Upper Pembroke Street, Dublin 2 | T: +353 1 649 9001 | E: info@mpa.ie | W: www.mpa.ie	Drawing Title: 2025 Base Traffic Flows	**Drawn By:** AE	Project Title: Malincross SHD
		Checked By: RJW	Project Number: 191004
		Issue Date: Jan 2021	Drawing Number: 191004-TAR-003

Key

X — AM Peak 08:00 to 09:00 (PCUs)

X — PM Peak 16:45 to 17:45 (PCUs)

X — Existing Junction Reference

Existing Highway Link

Growth From 2022 Base Data

Light Vehicles	Heavy Vehicles		Total Years
1.016	1.030	Annual 2016-2030	8
1.005	1.012	Annual 2030-2040	10
1.176	1.365	Calculated Growth Rate 2022 to 2040	

Notes:

1) Low growth rates for non-metropolitan County Dublin

Source

https://www.tiipublications.ie/library/PE-PAG-02017-02.pdf.

Bridgefoot Rd
Flemington Lane
Flemington Lane
Drogheda Road (N)
Drogheda Road
Bridgefoot Rd
Trimleston
Hamlet Lane
Hamlet Lane
Cardy Rock
The Park
Drogheda Road
Moylaragh Road
Harry Reynolds Rd
Castlemill Link Road
Drogheda Road (S)
Harry Reynolds Road (North)
Boulevard Rd
Taylors Hill Way
Hampton Gdns.
Westbrook Park
Boulevard Rd
Castlemill Link Road
Bridgefoot Rd
Clonard Road
Clonard Road
Clonard Road
Chapel Street
Naul Road
Clonard Road
Stephenstown Link Rd
Millfield Shopping Centre
L1390
White Hart Road
Harry Reynolds Rd S

Martin Peters Associates Consulting Engineers 26 Upper Pembroke Street, Dublin 2 | T: +353 1 649 9001 | E: info@mpa.ie | W: www.mpa.ie	Drawing Title: 2040 Base Traffic Flows	**Drawn By:** AE	Project Title: Malincross SHD
		Checked By: BJC	Project Number: 191004
		Issue Date: Jun 2021	Drawing Number: 191004-TAR-004

Key

- X — AM Peak 08:00 to 09:00 (PCUs)
- X — PM Peak 16:45 to 17:45 (PCUs)
- X — New Primary Junction Reference
- X — Existing Junction Reference
- Flemington Link Road (FLR)
- Existing Highway Link
- Road Closure

PCU Arrivals*

PCU Departures*

*NOTE: In Pink & Green cells
Excludes coloured directional flows at J4 & J5 due to complexities of School & Residential Traffic being mixed, but matches the approved Ladywell TA

Zx — Distribution Zone No.

Malincross Development Total Trips

Trips PCUs	AM Arr	AM Dep	PM Arr	PM Dep
Total	78	256	225	134

Arrivals
Departures

Bridgefoot Rd
Flemington Lane
Drogheda Road (N)
z.8
Flemington Link Rd
Drogheda Road
Trimleston
Hamlet Lane
Cardy Rock
The Park
Moylaragh Road
Harry Reynolds Rd
Harry Reynolds Road (North)
Drogheda Road (S)
Castlemill Link Road
Hampton Gdns.
Taylors Hill (297 Units ComDev)
Taylors Hill Way
Ladywell (311 Units & LC ComDev)
Boulevard Rd
Flemington Link
Clonard Road
Chapel Street
Harry Reynolds Rd S
Naul Road
White Hart Road
Stephenstown Link Rd
Millfield Shopping Centre
z.1
z.2
z.3
z.4
z.5
z.6
z.7

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Drawing Title:

Ladywell Committed Development Trip Assignment (PCU's)

Drawn By:	AE	Project Title	Malincross SHD
Checked By:	BJC	Project Number	191004
Issue Date:	Jun 2021	Drawing Number	191004-TAR-005

Key

- X — AM Peak 08:00 to 09:00 (PCUs)
- X — PM Peak 16:45 to 17:45 (PCUs)
- X — New Primary Junction Reference
- X — Existing Junction Reference
- Flemington Link Road (FLR)
- Existing Highway Link
- Road Closure

PCU Arrivals*

PCU Departures*

*NOTE: In Pink & Green cells
Excludes coloured directional flows at J4 & J5 due to complexities of School & Residential Traffic being mixed/ovelapping, but matches the approved Ladywell TA

Zx — Distribution Zone No.

Malincross Development Total Trips

Trips PCUs	AM Arr	AM Dep	PM Arr	PM Dep
Total	78	256	225	134

Arrivals
Departures

Bridgefoot Rd
Flemington Lane
Drogheda Road (N)
z.8
Flemington Link Rd
Drogheda Road
Trimleston
Hamlet Lane
Cardy Rock
The Park
Moylaragh Road
Harry Reynolds Rd
Harry Reynolds Road (North)
Drogheda Road (S)
Castlemill Link Road
Hampton Gdns.
Taylors Hill (297 Units ComDev)
Taylors Hill Way
Ladywell (311 Units & LC ComDev)
Boulevard Rd
Flemington Link
Clonard Road
Chapel Street
Harry Reynolds Rd S
Naul Road
White Hart Road
Stephenstown Link Rd
Millfield Shopping Centre
z.1
z.2
z.3
z.4
z.5
z.6
z.7

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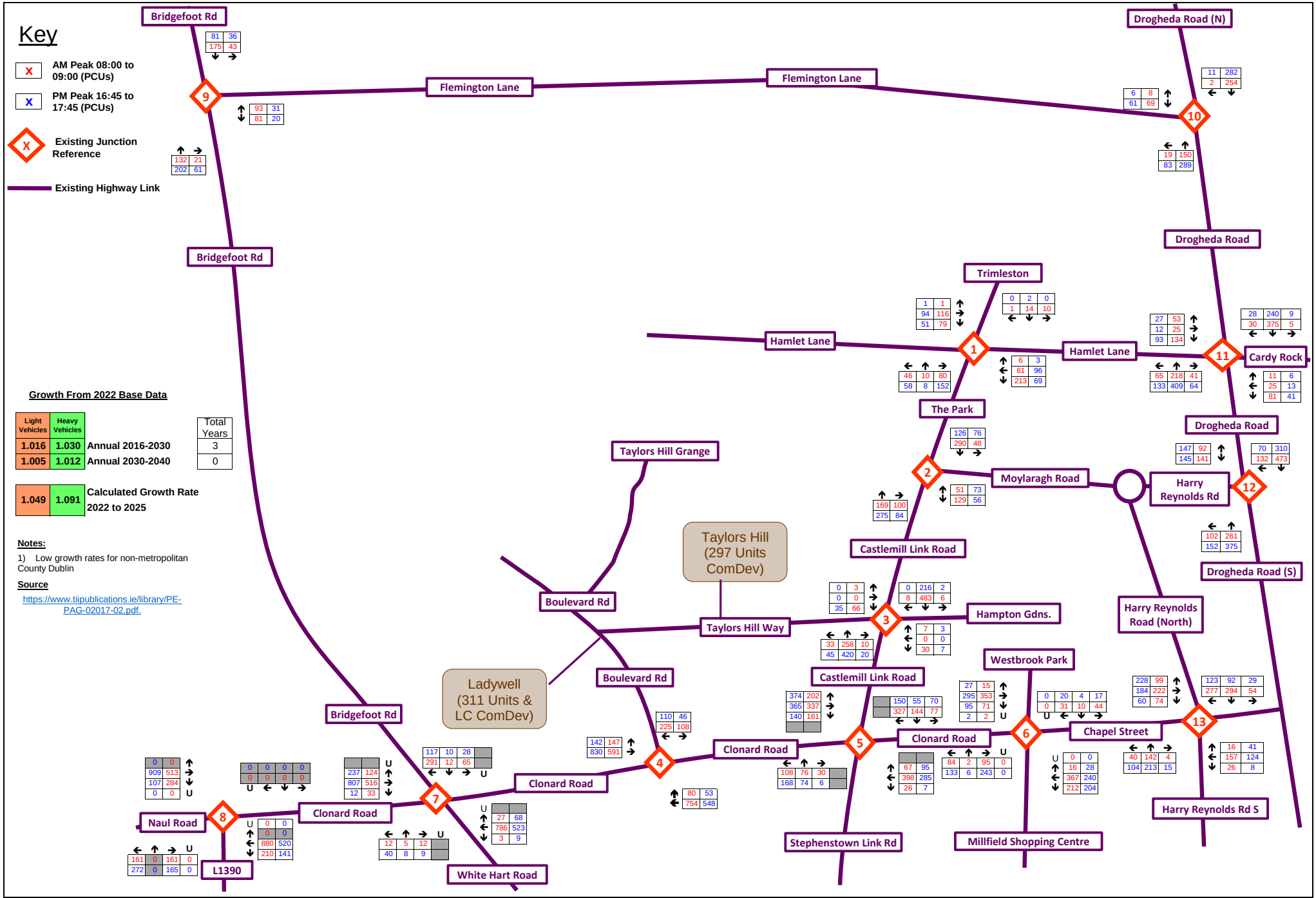
Drawing Title:

Taylors Hill & School Committed Development Trip Assignment (PCU's)

Drawn By:	AE	Project Title	Malincross SHD
Checked By:	BJC	Project Number	191004
Issue Date:	Jun 2021	Drawing Number	191004-TAR-006



Martin Peters Associates Consulting Engineers 26 Upper Pembroke Street, Dublin 2 | T: +353 1 649 9001 | E: info@mpa.ie | W: www.mpa.ie	Drawing Title: 2025 Base + Committed Development Traffic Flows (inc. Ladywell, Schools & Taylors Hill)	**Drawn By:** AE **Checked By:** RJW **Issue Date:** Jul 2021	Project Title: Malincross SHD Project Number: 191004 Drawing Number: 191004-TAR-007

Key

- X — AM Peak 08:00 to 09:00 (PCUs)
- X — PM Peak 16:45 to 17:45 (PCUs)
- X — Existing Junction Reference
- Existing Highway Link

Growth From 2022 Base Data

Light Vehicles	Heavy Vehicles		Total Years
1.016	1.030	Annual 2016-2030	8
1.005	1.012	Annual 2030-2040	10

1.176	1.365	Calculated Growth Rate 2022 to 2040

Notes:

1) Low growth rates for non-metropolitan County Dublin

Source

https://www.tiipublications.ie/library/PE-PAG-02017-02.pdf.

Bridgefoot Rd
Flemington Lane
Flemington Lane
Drogheda Road (N)
Bridgefoot Rd
Drogheda Road
Trimleston
Hamlet Lane
Hamlet Lane
Cardy Rock
The Park
Drogheda Road
Taylors Hill Grange
Moylaragh Road
Harry Reynolds Rd
Drogheda Road
Taylors Hill (297 Units ComDev)
Castlemill Link Road
Drogheda Road (S)
Boulevard Rd
Taylors Hill Way
Hampton Gdns.
Harry Reynolds Road (North)
Ladywell (311 Units & LC ComDev)
Boulevard Rd
Castlemill Link Road
Westbrook Park
Bridgefoot Rd
Clonard Road
Clonard Road
Chapel Street
Harry Reynolds Rd S
Clonard Road
Naul Road
L1390
White Hart Road
Stephenstown Link Rd
Millfield Shopping Centre

Martin Peters Associates Consulting Engineers 26 Upper Pembroke Street, Dublin 2 | T: +353 1 649 9001 | E: info@mpa.ie | W: www.mpa.ie	Drawing Title: 2040 Base + Committed Development Traffic Flows (inc. Ladywell, Schools & Taylors Hill)		
		Drawn By:	AE
		Checked By:	BJC
		Issue Date:	Jun 2021
		Project Title	Malincross SHD
		Project Number	191004
		Drawing Number	191004-TAR-008

Key

- X — AM Peak 08:00 to 09:00 (PCUs) %
- X — PM Peak 16:45 to 17:45 (PCUs) %
- X — New Primary Junction Reference
- X — Existing Junction Reference
- Flemington Link Road (FLR)
- Existing Highway Link
- Road Closure
- Allocated Site Access
- % — Arrivals*
- % — Departures*

NOTE: In Pink & Green % cells
Red text indicates AM Distribution
Blue text indicates PM Distribution
Black text indicates same in both peaks

Zx — Distribution Zone No.

Bridgefoot Rd
Flemington Lane
Drogheda Road (N)
Flemington Link Rd
Bridgefoot Rd
Drogheda Road
Trimleston
Hamlet Lane
Hamlet Lane
Cardy Rock
Flemington Link
Taylors Hill Grange
The Park
Drogheda Road
Flemington Link
Moylaragh Road
Harry Reynolds Rd
Castlemill Link Road
Harry Reynolds Road (North)
Drogheda Road (S)
Taylors Hill Way
Hampton Gdns.
Boulevard Rd
Castlemill Link Road
Chapel Street
Bridgefoot Rd
Clonard Road
Clonard Road
Clonard Road
Naul Road
White Hart Road
Stephenstown Link Rd
Millfield Shopping Centre
Harry Reynolds Rd S

z.1 z.2 z.3 z.4 z.5 z.6 z.7 z.8

A B C D E X 1 2 3 4 5 6 7 8 9 10 11 12 13

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Drawing Title:

Malincross Development
Trip Distribution Calcs

Drawn By:	AE	Project Title	Malincross SHD
Checked By:	BJC	Project Number	191004
Issue Date:	Jun 2021	Drawing Number	191004-TAR-009

Key

- AM Peak 08:00 to 09:00 (PCUs)
- PM Peak 16:45 to 17:45 (PCUs)
- New Primary Junction Reference
- Existing Junction Reference
- Flemington Link Road (FLR)
- Existing Highway Link
- Road Closure

PCU Arrivals*

PCU Departures*

*NOTE: In Pink & Green cells
Red text indicates AM Distribution
Blue text indicates PM Distribution
Black text indicates same in both peaks

Zx Distribution Zone No.

Malincross Development Total Trips

Trips PCUs	AM Arr	AM Dep	PM Arr	PM Dep
Total	78	256	225	134

Arrivals
Departures

Bridgefoot Rd
Flemington Lane
Drogheda Road (N)
z.8
Flemington Link Rd
Drogheda Road
Trimleston
Hamlet Lane
Cardy Rock
The Park
Flemington Link
Taylors Hill Grange
Moylaragh Road
Harry Reynolds Rd
Drogheda Road
Taylors Hill (297 Units ComDev)
Castlemill Link Road
Hampton Gdns.
Harry Reynolds Road (North)
Drogheda Road (S)
Taylors Hill Way
Ladywell (311 Units & LC ComDev)
Boulevard Rd
Clonard Road
Chapel Street
Naul Road
Harry Reynolds Rd S
Stephenstown Link Rd
Millfield Shopping Centre
White Hart Road
z.1
z.2
z.3
z.4
z.5
z.6
z.7

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Drawing Title:

Malincross Development Trip Assignment (PCU's)

Drawn By:	AE	Project Title	Malincross SHD
Checked By:	BJC	Project Number	191004
Issue Date:	Jun 2021	Drawing Number	191004-TAR-010

Malincross Development (595 units)

Key

- X — AM Peak 08:00 to 09:00 (PCUs)
- X — PM Peak 16:45 to 17:45 (PCUs)
- X — New Primary Junction Reference
- X — Existing Junction Reference
- Flemington Link Road (FLR)
- Existing Highway Link
- Proposed New Road
- Road Closure

Malincross Development Total Trips

Trips PCUs	AM Arr	AM Dep	PM Arr	PM Dep
Total	78	256	225	134

Growth to 2022 from Survey (year)

Light Vehicles	Heavy Vehicles		Total Years
1.016	1.030	Annual 2016-2030	3
1.005	1.012	Annual 2030-2040	0
1.049	1.091	Calculated Growth Rate 2022 to 2025	

Notes:

1) Low growth rates for non-metropolitan County Dublin

Source

https://www.tiipublications.ie/library/PE-PAG-02017-02.pdf.

Bridgefoot Rd
Flemington Lane
Drogheda Road (N)
Flemington Link
Drogheda Road
Trimleston
Hamlet Lane
Cardy Rock
The Park
Moylaragh Road
Harry Reynolds Rd
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Hampton Gdns.
Taylors Hill Way
Boulevard Rd
Ladywell (311 Units & LC ComDev)
Westbrook Park
Harry Reynolds Road (North)
Clonard Road
Chapel Street
Drogheda Road (S)
Naul Road
L1390
White Hart Road
Stephenstown Link Rd
Millfield Shopping Centre
Harry Reynolds Rd S

Drawn By:	AE	Project Title	Malincross SHD
Checked By:	RJW	Project Number	191004
Issue Date:	Jul 2021	Drawing Number	191004-TAR-011

Drawing Title:

2025 Base + Committed Development + Full Malincross Development Traffic Flows

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Malincross Development (595 units)

Key

- X — AM Peak 08:00 to 09:00 (PCUs)
- X — PM Peak 16:45 to 17:45 (PCUs)
- X — New Primary Junction Reference
- X — Existing Junction Reference
- Flemington Link Road (FLR)
- Existing Highway Link
- Proposed New Road
- Road Closure

Malincross Development Total Trips

Trips PCUs	AM Arr	AM Dep	PM Arr	PM Dep
Total	78	256	225	134

Growth to 2022 from Survey (year)

Light Vehicles	Heavy Vehicles		Total Years
1.016	1.030	Annual 2016-2030	8
1.005	1.012	Annual 2030-2040	10
1.176	1.365	Calculated Growth Rate 2022 to 2040	

Notes:

1) Low growth rates for non-metropolitan County Dublin

Source

https://www.tiipublications.ie/library/PE-PAG-02017-02.pdf.

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Drogheda Road (N)
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Clonard Road
Chapel Street
Drogheda Road (S)
Naul Road
L1390
White Hart Road
Stephenstown Link Rd
Millfield Shopping Centre
Harry Reynolds Rd S

Martin Peters Associates Consulting Engineers	Drawing Title: 2040 Base + Committed Development + Full Malincross Development Traffic Flows	**Drawn By:** AE	Project Title: Malincross SHD
26 Upper Pembroke Street, Dublin 2 | T: +353 1 649 9001 | E: info@mpa.ie | W: www.mpa.ie		**Checked By:** RJW	Project Number: 191004
		Issue Date: Jun 2021	Drawing Number: 191004-TAR-012

APPENDIX K

PICADY Output (Junction 1)

DRAFT

Junctions 9

PICADY 9 - Priority Intersection Module

Version: 9.0.2.5947
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Filename: 2021-07-19 Jct 1 - Hamlet Lane v12.0.j9
Path: C:\Users\brian.condon\Condondrew Associates\Condon Drew Associates Ltd. - Documents\CDA Projects\1200-1299\1224-Balbriggan, Ireland\02-Analysis\Junctions9\Malincross
Report generation date: 22/07/2021 10:12:17

»2025 + Com Dev, AM
»2025 + Com Dev, PM
»2040 + Com Dev, AM
»2040 + Com Dev, PM
»2025 + Com Dev + Malincross, AM
»2025 + Com Dev + Malincross, PM
»2040 + Com Dev + Malincross, AM
»2040 + Com Dev + Malincross, PM

Summary of junction performance

	AM				PM			
	Queue (PCU)	Delay (s)	RFC	LOS	Queue (PCU)	Delay (s)	RFC	LOS
	2025 + Com Dev							
Stream B-ACD	0.5	12.35	0.33	B	1.0	15.70	0.51	C
Stream A-BCD	0.0	6.46	0.01	A	0.0	6.27	0.01	A
Stream D-ABC	0.1	9.25	0.06	A	0.0	0.00	0.00	A
Stream C-ABD	0.2	8.31	0.16	A	0.1	6.98	0.10	A
	2040 + Com Dev							
Stream B-ACD	0.6	13.72	0.38	B	1.4	18.62	0.58	C
Stream A-BCD	0.0	6.56	0.01	A	0.0	6.34	0.01	A
Stream D-ABC	0.1	9.62	0.07	A	0.0	0.00	0.00	A
Stream C-ABD	0.3	8.68	0.19	A	0.1	7.11	0.11	A
	2025 + Com Dev + Malincross							
Stream B-ACD	0.6	13.01	0.36	B	1.4	18.13	0.58	C
Stream A-BCD	0.0	6.68	0.01	A	0.0	6.37	0.01	A
Stream D-ABC	0.1	9.51	0.06	A	0.0	0.00	0.00	A
Stream C-ABD	0.4	8.74	0.24	A	0.2	7.27	0.14	A
	2040 + Com Dev + Malincross							
Stream B-ACD	0.7	14.65	0.41	B	1.8	22.35	0.65	C
Stream A-BCD	0.0	6.77	0.01	A	0.0	6.44	0.01	A
Stream D-ABC	0.1	9.89	0.08	A	0.0	0.00	0.00	A
Stream C-ABD	0.4	9.14	0.27	A	0.2	7.95	0.15	A

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

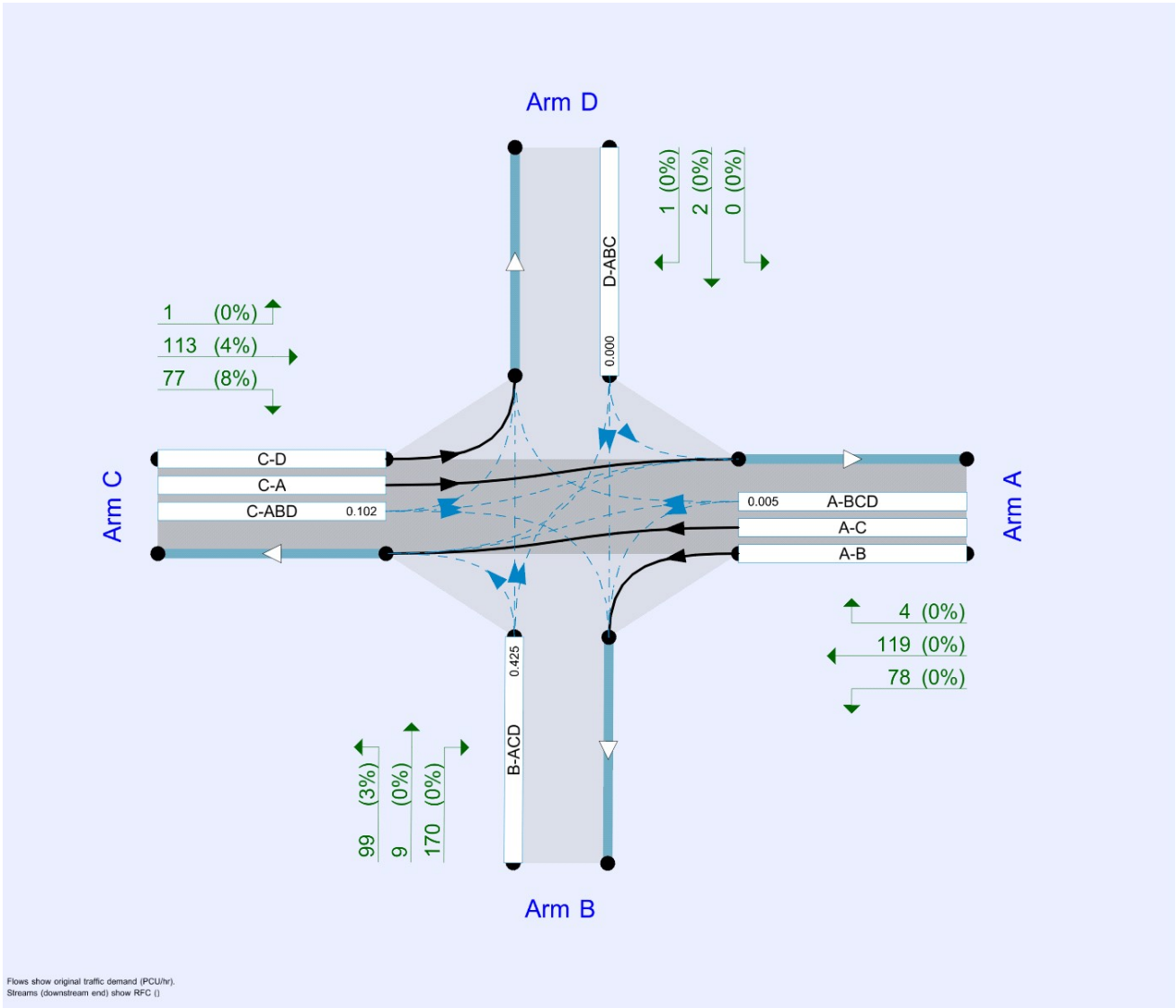
File summary

File Description

Title	Balbriggan, Ireland
Location	The Rise / Barons Hall Rise
Site number	Junction 1
Date	17/12/2018
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	181103
Enumerator	briancondon-PC\brian.condon
Description	

Units

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



The junction diagram reflects the last run of Junctions.

Analysis Options

Calculate Queue Percentiles	Calculate residual capacity	RFC Threshold	Average Delay threshold (s)	Queue threshold (PCU)
		0.85	36.00	20.00

Demand Set Summary

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D1	2025 + Com Dev	AM	ONE HOUR	08:00	09:30	15
D2	2025 + Com Dev	PM	ONE HOUR	15:00	16:30	15
D3	2040 + Com Dev	AM	ONE HOUR	08:00	09:30	15
D4	2040 + Com Dev	PM	ONE HOUR	15:00	16:30	15
D5	2025 + Com Dev + Malincross	AM	ONE HOUR	08:00	09:30	15
D6	2025 + Com Dev + Malincross	PM	ONE HOUR	15:00	16:30	15
D7	2040 + Com Dev + Malincross	AM	ONE HOUR	08:00	09:30	15
D8	2040 + Com Dev + Malincross	PM	ONE HOUR	15:00	16:30	15

Analysis Set Details

ID	Network flow scaling factor (%)
A1	100.000

2025 + Com Dev, AM

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction Type	Major road direction	Junction Delay (s)	Junction LOS
1	Junction 1	Crossroads	Two-way	4.12	A

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Arms

Arms

Arm	Name	Description	Arm type
A	Hamley Lane (East)		Major
B	Barons Hall Rise		Minor
C	Hamlet Lane (West)		Major
D	Trimleston		Minor

Major Arm Geometry

Arm	Width of carriageway (m)	Has kerbed central reserve	Has right turn bay	Visibility for right turn (m)	Blocks?	Blocking queue (PCU)
A	6.30			80.0	✓	1.00
C	6.30			56.0	✓	1.00

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

Minor Arm Geometry

Arm	Minor arm type	Lane width (m)	Visibility to left (m)	Visibility to right (m)
B	One lane	3.20	18	14
D	One lane	2.50	16	10

Slope / Intercept / Capacity

Priority Intersection Slopes and Intercepts

Junction	Stream	Intercept (PCU/hr)	Slope for A-B	Slope for A-C	Slope for A-D	Slope for B-A	Slope for B-C	Slope for B-D	Slope for C-A	Slope for C-B	Slope for C-D	Slope for D-A	Slope for D-B	Slope for D-C
1	A-D	620	-	-	-	-	-	-	0.237	0.339	0.237	-	-	-
1	B-A	500	0.090	0.227	0.227	-	-	-	0.143	0.325	-	0.227	0.227	0.114
1	B-C	645	0.098	0.247	-	-	-	-	-	-	-	-	-	-
1	B-D, nearside lane	500	0.090	0.227	0.227	-	-	-	0.143	0.325	0.143	-	-	-
1	B-D, offside lane	500	0.090	0.227	0.227	-	-	-	0.143	0.325	0.143	-	-	-
1	C-B	606	0.232	0.232	0.331	-	-	-	-	-	-	-	-	-
1	D-A	599	-	-	-	-	-	-	0.229	-	0.091	-	-	-
1	D-B, nearside lane	463	0.132	0.132	0.301	-	-	-	0.211	0.211	0.083	-	-	-
1	D-B, offside lane	463	0.132	0.132	0.301	-	-	-	0.211	0.211	0.083	-	-	-
1	D-C	463	-	0.132	0.301	0.105	0.211	0.211	0.211	0.211	0.083	-	-	-

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

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

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

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D1	2025 + Com Dev	AM	ONE HOUR	08:00	09:30	15

Vehicle mix source	PCU Factor for a HV (PCU)
HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
A		✓	280	100.000
B		✓	136	100.000
C		✓	196	100.000
D		✓	25	100.000

Origin-Destination Data

Demand (PCU/hr)

		To			
		A	B	C	D
From	A	0	213	61	6
	B	80	0	46	10
	C	116	79	0	1
	D	10	14	1	0

Vehicle Mix

Heavy Vehicle Percentages

		To			
		A	B	C	D
From	A	0	2	11	0
	B	3	0	15	0
	C	5	8	0	0
	D	13	0	0	0

Results

Results Summary for whole modelled period

Stream	Max RFC	Max delay (s)	Max Queue (PCU)	Max LOS
B-ACD	0.33	12.35	0.5	B
A-BCD	0.01	6.46	0.0	A
A-B				
A-C				
D-ABC	0.06	9.25	0.1	A
C-ABD	0.16	8.31	0.2	A
C-D				
C-A				

Main Results for each time segment

08:00 - 08:15

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-ACD	102	486	0.210	101	0.3	9.927	A
A-BCD	5	581	0.008	4	0.0	6.246	A
A-B	160			160			
A-C	46			46			
D-ABC	19	460	0.041	19	0.0	8.553	A
C-ABD	61	568	0.107	60	0.1	7.640	A
C-D	0.74			0.74			
C-A	86			86			

08:15 - 08:30

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-ACD	122	475	0.257	122	0.4	10.838	B
A-BCD	5	573	0.009	5	0.0	6.338	A
A-B	191			191			
A-C	55			55			
D-ABC	22	449	0.050	22	0.1	8.835	A
C-ABD	73	563	0.130	73	0.2	7.920	A
C-D	0.88			0.88			
C-A	102			102			

08:30 - 08:45

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-ACD	150	460	0.325	149	0.5	12.300	B
A-BCD	7	564	0.012	7	0.0	6.464	A
A-B	234			234			
A-C	67			67			
D-ABC	28	436	0.063	27	0.1	9.247	A
C-ABD	91	558	0.163	91	0.2	8.306	A
C-D	1			1			
C-A	124			124			

08:45 - 09:00

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-ACD	150	460	0.325	150	0.5	12.346	B
A-BCD	7	564	0.012	7	0.0	6.465	A
A-B	234			234			
A-C	67			67			
D-ABC	28	435	0.063	28	0.1	9.249	A
C-ABD	91	558	0.163	91	0.2	8.311	A
C-D	1			1			
C-A	124			124			

09:00 - 09:15

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-ACD	122	475	0.257	123	0.4	10.895	B
A-BCD	5	573	0.009	5	0.0	6.342	A
A-B	191			191			
A-C	55			55			
D-ABC	22	449	0.050	23	0.1	8.842	A
C-ABD	73	563	0.130	73	0.2	7.932	A
C-D	0.88			0.88			
C-A	102			102			

09:15 - 09:30

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-ACD	102	486	0.211	103	0.3	10.009	B
A-BCD	5	581	0.008	5	0.0	6.251	A
A-B	160			160			
A-C	46			46			
D-ABC	19	459	0.041	19	0.0	8.568	A
C-ABD	61	568	0.107	61	0.1	7.663	A
C-D	0.74			0.74			
C-A	86			86			

2025 + Com Dev, PM

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction Type	Major road direction	Junction Delay (s)	Junction LOS
1	Junction 1	Crossroads	Two-way	7.15	A

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D2	2025 + Com Dev	PM	ONE HOUR	15:00	16:30	15

Vehicle mix source	PCU Factor for a HV (PCU)
HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
A		✓	168	100.000
B		✓	218	100.000
C		✓	146	100.000
D		✓	3	100.000

Origin-Destination Data

Demand (PCU/hr)

		To			
		A	B	C	D
From	A	0	69	96	3
	B	152	0	58	8
	C	94	51	0	1
	D	0	2	1	0

Vehicle Mix

Heavy Vehicle Percentages

		To			
		A	B	C	D
From	A	0	0	0	0
	B	0	0	4	0
	C	4	0	0	0
	D	0	0	0	0

Results

Results Summary for whole modelled period

Stream	Max RFC	Max delay (s)	Max Queue (PCU)	Max LOS
B-ACD	0.51	15.70	1.0	C
A-BCD	0.01	6.27	0.0	A
A-B				
A-C				
D-ABC	0.00	0.00	0.0	A
C-ABD	0.10	6.98	0.1	A
C-D				
C-A				

Main Results for each time segment

15:00 - 15:15

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-ACD	164	491	0.334	162	0.5	11.002	B
A-BCD	2	591	0.004	2	0.0	6.116	A
A-B	52			52			
A-C	72			72			
D-ABC	0	450	0.000	0	0.0	0.000	A
C-ABD	39	582	0.067	38	0.1	6.627	A
C-D	0.75			0.75			
C-A	70			70			

15:15 - 15:30

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-ACD	196	483	0.406	195	0.7	12.620	B
A-BCD	3	585	0.005	3	0.0	6.180	A
A-B	62			62			
A-C	86			86			
D-ABC	0	441	0.000	0	0.0	0.000	A
C-ABD	46	578	0.080	46	0.1	6.774	A
C-D	0.89			0.89			
C-A	84			84			

15:30 - 15:45

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-ACD	240	472	0.509	239	1.0	15.526	C
A-BCD	3	577	0.006	3	0.0	6.270	A
A-B	76			76			
A-C	106			106			
D-ABC	0	430	0.000	0	0.0	0.000	A
C-ABD	57	574	0.100	57	0.1	6.975	A
C-D	1			1			
C-A	102			102			

15:45 - 16:00

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-ACD	240	471	0.509	240	1.0	15.697	C
A-BCD	3	577	0.006	3	0.0	6.270	A
A-B	76			76			
A-C	106			106			
D-ABC	0	430	0.000	0	0.0	0.000	A
C-ABD	57	574	0.100	57	0.1	6.978	A
C-D	1			1			
C-A	102			102			

16:00 - 16:15

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-ACD	196	483	0.406	197	0.7	12.805	B
A-BCD	3	585	0.005	3	0.0	6.183	A
A-B	62			62			
A-C	86			86			
D-ABC	0	441	0.000	0	0.0	0.000	A
C-ABD	46	578	0.080	46	0.1	6.777	A
C-D	0.89			0.89			
C-A	84			84			

16:15 - 16:30

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-ACD	164	491	0.334	165	0.5	11.188	B
A-BCD	2	591	0.004	2	0.0	6.119	A
A-B	52			52			
A-C	72			72			
D-ABC	0	449	0.000	0	0.0	0.000	A
C-ABD	39	582	0.067	39	0.1	6.636	A
C-D	0.75			0.75			
C-A	70			70			

2040 + Com Dev, AM

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction Type	Major road direction	Junction Delay (s)	Junction LOS
1	Junction 1	Crossroads	Two-way	4.50	A

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D3	2040 + Com Dev	AM	ONE HOUR	08:00	09:30	15

Vehicle mix source	PCU Factor for a HV (PCU)
HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
A		✓	316	100.000
B		✓	154	100.000
C		✓	223	100.000
D		✓	29	100.000

Origin-Destination Data

Demand (PCU/hr)

		To			
		A	B	C	D
From	A	0	240	70	6
	B	90	0	53	11
	C	132	90	0	1
	D	12	16	1	0

Vehicle Mix

Heavy Vehicle Percentages

		To			
		A	B	C	D
From	A	0	3	12	0
	B	3	0	16	0
	C	6	9	0	0
	D	15	0	0	0

Results

Results Summary for whole modelled period

Stream	Max RFC	Max delay (s)	Max Queue (PCU)	Max LOS
B-ACD	0.38	13.72	0.6	B
A-BCD	0.01	6.56	0.0	A
A-B				
A-C				
D-ABC	0.07	9.62	0.1	A
C-ABD	0.19	8.68	0.3	A
C-D				
C-A				

Main Results for each time segment

08:00 - 08:15

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-ACD	116	480	0.242	115	0.3	10.500	B
A-BCD	5	575	0.008	4	0.0	6.306	A
A-B	181			181			
A-C	53			53			
D-ABC	22	455	0.048	22	0.1	8.778	A
C-ABD	70	565	0.123	69	0.2	7.888	A
C-D	0.74			0.74			
C-A	98			98			

08:15 - 08:30

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-ACD	138	467	0.296	138	0.4	11.672	B
A-BCD	5	567	0.010	5	0.0	6.411	A
A-B	216			216			
A-C	63			63			
D-ABC	26	444	0.059	26	0.1	9.113	A
C-ABD	84	561	0.150	84	0.2	8.214	A
C-D	0.88			0.88			
C-A	116			116			

08:30 - 08:45

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-ACD	170	450	0.377	169	0.6	13.646	B
A-BCD	7	556	0.012	7	0.0	6.557	A
A-B	264			264			
A-C	77			77			
D-ABC	32	428	0.075	32	0.1	9.610	A
C-ABD	105	557	0.189	105	0.3	8.666	A
C-D	1			1			
C-A	139			139			

08:45 - 09:00

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-ACD	170	450	0.377	170	0.6	13.720	B
A-BCD	7	556	0.012	7	0.0	6.558	A
A-B	264			264			
A-C	77			77			
D-ABC	32	428	0.075	32	0.1	9.616	A
C-ABD	105	557	0.189	105	0.3	8.676	A
C-D	1			1			
C-A	139			139			

09:00 - 09:15

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-ACD	138	467	0.296	139	0.5	11.759	B
A-BCD	5	567	0.010	5	0.0	6.413	A
A-B	216			216			
A-C	63			63			
D-ABC	26	443	0.059	26	0.1	9.120	A
C-ABD	84	561	0.150	84	0.2	8.229	A
C-D	0.88			0.88			
C-A	116			116			

09:15 - 09:30

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-ACD	116	480	0.242	116	0.3	10.611	B
A-BCD	5	575	0.008	5	0.0	6.309	A
A-B	181			181			
A-C	53			53			
D-ABC	22	455	0.048	22	0.1	8.792	A
C-ABD	70	565	0.123	70	0.2	7.913	A
C-D	0.74			0.74			
C-A	98			98			

2040 + Com Dev, PM

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction Type	Major road direction	Junction Delay (s)	Junction LOS
1	Junction 1	Crossroads	Two-way	8.34	A

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D4	2040 + Com Dev	PM	ONE HOUR	15:00	16:30	15

Vehicle mix source	PCU Factor for a HV (PCU)
HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
A		✓	189	100.000
B		✓	244	100.000
C		✓	164	100.000
D		✓	3	100.000

Origin-Destination Data

Demand (PCU/hr)

		To			
		A	B	C	D
From	A	0	78	107	4
	B	170	0	65	9
	C	106	57	0	1
	D	0	2	1	0

Vehicle Mix

Heavy Vehicle Percentages

		To			
		A	B	C	D
From	A	0	0	0	0
	B	0	0	5	0
	C	4	0	0	0
	D	0	0	0	0

Results

Results Summary for whole modelled period

Stream	Max RFC	Max delay (s)	Max Queue (PCU)	Max LOS
B-ACD	0.58	18.62	1.4	C
A-B-C-D	0.01	6.34	0.0	A
A-B				
A-C				
D-ABC	0.00	0.00	0.0	A
C-ABD	0.11	7.11	0.1	A
C-D				
C-A				

Main Results for each time segment

15:00 - 15:15

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-ACD	184	486	0.378	181	0.6	11.884	B
A-B-C-D	3	587	0.005	3	0.0	6.160	A
A-B	59			59			
A-C	81			81			
D-ABC	0	444	0.000	0	0.0	0.000	A
C-ABD	43	579	0.075	43	0.1	6.713	A
C-D	0.75			0.75			
C-A	79			79			

15:15 - 15:30

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-ACD	219	477	0.460	218	0.8	14.064	B
A-B-C-D	4	581	0.006	4	0.0	6.233	A
A-B	70			70			
A-C	96			96			
D-ABC	0	435	0.000	0	0.0	0.000	A
C-ABD	52	575	0.090	52	0.1	6.882	A
C-D	0.89			0.89			
C-A	95			95			

15:30 - 15:45

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-ACD	269	464	0.579	267	1.3	18.281	C
A-B-C-D	4	573	0.008	4	0.0	6.336	A
A-B	86			86			
A-C	118			118			
D-ABC	0	422	0.000	0	0.0	0.000	A
C-ABD	64	571	0.113	64	0.1	7.107	A
C-D	1			1			
C-A	115			115			

15:45 - 16:00

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-ACD	269	464	0.579	269	1.4	18.617	C
A-BCD	4	572	0.008	4	0.0	6.336	A
A-B	86			86			
A-C	118			118			
D-ABC	0	422	0.000	0	0.0	0.000	A
C-ABD	64	571	0.113	64	0.1	7.110	A
C-D	1			1			
C-A	115			115			

16:00 - 16:15

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-ACD	219	477	0.460	221	0.9	14.385	B
A-BCD	4	581	0.006	4	0.0	6.237	A
A-B	70			70			
A-C	96			96			
D-ABC	0	435	0.000	0	0.0	0.000	A
C-ABD	52	575	0.090	52	0.1	6.888	A
C-D	0.89			0.89			
C-A	95			95			

16:15 - 16:30

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-ACD	184	486	0.378	185	0.6	12.157	B
A-BCD	3	587	0.005	3	0.0	6.161	A
A-B	59			59			
A-C	81			81			
D-ABC	0	444	0.000	0	0.0	0.000	A
C-ABD	43	579	0.075	43	0.1	6.725	A
C-D	0.75			0.75			
C-A	79			79			

2025 + Com Dev + Malincross, AM

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction Type	Major road direction	Junction Delay (s)	Junction LOS
1	Junction 1	Crossroads	Two-way	4.66	A

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D5	2025 + Com Dev + Malincross	AM	ONE HOUR	08:00	09:30	15

Vehicle mix source	PCU Factor for a HV (PCU)
HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
A		✓	284	100.000
B		✓	148	100.000
C		✓	247	100.000
D		✓	25	100.000

Origin-Destination Data

Demand (PCU/hr)

		To			
		A	B	C	D
From	A	0	213	65	6
	B	80	0	58	10
	C	129	117	0	1
	D	10	14	1	0

Vehicle Mix

Heavy Vehicle Percentages

		To			
		A	B	C	D
From	A	0	2	10	0
	B	3	0	11	0
	C	5	5	0	0
	D	13	0	0	0

Results

Results Summary for whole modelled period

Stream	Max RFC	Max delay (s)	Max Queue (PCU)	Max LOS
B-ACD	0.36	13.01	0.6	B
A-BCD	0.01	6.68	0.0	A
A-B				
A-C				
D-ABC	0.06	9.51	0.1	A
C-ABD	0.24	8.74	0.4	A
C-D				
C-A				

Main Results for each time segment

08:00 - 08:15

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-ACD	111	486	0.229	110	0.3	10.100	B
A-BCD	5	569	0.008	4	0.0	6.378	A
A-B	160			160			
A-C	49			49			
D-ABC	19	452	0.042	19	0.0	8.699	A
C-ABD	91	573	0.158	90	0.2	7.809	A
C-D	0.73			0.73			
C-A	94			94			

08:15 - 08:30

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-ACD	133	473	0.281	133	0.4	11.162	B
A-BCD	5	559	0.010	5	0.0	6.502	A
A-B	191			191			
A-C	58			58			
D-ABC	22	441	0.051	22	0.1	9.022	A
C-ABD	110	571	0.192	110	0.3	8.190	A
C-D	0.86			0.86			
C-A	111			111			

08:30 - 08:45

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-ACD	163	456	0.358	162	0.6	12.944	B
A-BCD	7	546	0.012	7	0.0	6.674	A
A-B	234			234			
A-C	72			72			
D-ABC	28	425	0.065	27	0.1	9.503	A
C-ABD	138	570	0.242	137	0.4	8.728	A
C-D	1			1			
C-A	133			133			

08:45 - 09:00

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-ACD	163	456	0.358	163	0.6	13.007	B
A-BCD	7	546	0.012	7	0.0	6.676	A
A-B	234			234			
A-C	72			72			
D-ABC	28	424	0.065	28	0.1	9.507	A
C-ABD	138	570	0.242	138	0.4	8.744	A
C-D	1			1			
C-A	133			133			

09:00 - 09:15

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-ACD	133	473	0.281	134	0.4	11.242	B
A-BCD	5	559	0.010	5	0.0	6.504	A
A-B	191			191			
A-C	58			58			
D-ABC	22	441	0.051	23	0.1	9.029	A
C-ABD	110	571	0.192	110	0.3	8.211	A
C-D	0.86			0.86			
C-A	111			111			

09:15 - 09:30

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-ACD	111	486	0.229	112	0.3	10.198	B
A-BCD	5	569	0.008	5	0.0	6.382	A
A-B	160			160			
A-C	49			49			
D-ABC	19	452	0.042	19	0.0	8.711	A
C-ABD	91	573	0.158	91	0.2	7.843	A
C-D	0.73			0.73			
C-A	94			94			

2025 + Com Dev + Malincross, PM

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction Type	Major road direction	Junction Delay (s)	Junction LOS
1	Junction 1	Crossroads	Two-way	8.45	A

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D6	2025 + Com Dev + Malincross	PM	ONE HOUR	15:00	16:30	15

Vehicle mix source	PCU Factor for a HV (PCU)
HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
A		✓	179	100.000
B		✓	251	100.000
C		✓	173	100.000
D		✓	3	100.000

Origin-Destination Data

Demand (PCU/hr)

		To			
		A	B	C	D
From	A	0	69	107	3
	B	152	0	91	8
	C	101	71	0	1
	D	0	2	1	0

Vehicle Mix

Heavy Vehicle Percentages

		To			
		A	B	C	D
From	A	0	0	0	0
	B	0	0	3	0
	C	4	0	0	0
	D	0	0	0	0

Results

Results Summary for whole modelled period

Stream	Max RFC	Max delay (s)	Max Queue (PCU)	Max LOS
B-ACD	0.58	18.13	1.4	C
A-BCD	0.01	6.37	0.0	A
A-B				
A-C				
D-ABC	0.00	0.00	0.0	A
C-ABD	0.14	7.27	0.2	A
C-D				
C-A				

Main Results for each time segment

15:00 - 15:15

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-ACD	189	498	0.379	187	0.6	11.578	B
A-BCD	2	584	0.004	2	0.0	6.182	A
A-B	52			52			
A-C	81			81			
D-ABC	0	443	0.000	0	0.0	0.000	A
C-ABD	54	582	0.093	54	0.1	6.813	A
C-D	0.75			0.75			
C-A	75			75			

15:15 - 15:30

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-ACD	226	489	0.461	225	0.8	13.695	B
A-BCD	3	578	0.005	3	0.0	6.262	A
A-B	62			62			
A-C	96			96			
D-ABC	0	433	0.000	0	0.0	0.000	A
C-ABD	65	579	0.112	65	0.1	7.006	A
C-D	0.89			0.89			
C-A	90			90			

15:30 - 15:45

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-ACD	276	477	0.580	274	1.3	17.805	C
A-BCD	3	568	0.006	3	0.0	6.373	A
A-B	76			76			
A-C	118			118			
D-ABC	0	420	0.000	0	0.0	0.000	A
C-ABD	80	576	0.140	80	0.2	7.266	A
C-D	1			1			
C-A	109			109			

15:45 - 16:00

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-ACD	276	477	0.580	276	1.4	18.128	C
A-BCD	3	568	0.006	3	0.0	6.373	A
A-B	76			76			
A-C	118			118			
D-ABC	0	420	0.000	0	0.0	0.000	A
C-ABD	80	576	0.140	80	0.2	7.272	A
C-D	1			1			
C-A	109			109			

16:00 - 16:15

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-ACD	226	489	0.461	228	0.9	14.002	B
A-BCD	3	577	0.005	3	0.0	6.265	A
A-B	62			62			
A-C	96			96			
D-ABC	0	433	0.000	0	0.0	0.000	A
C-ABD	65	579	0.112	65	0.1	7.013	A
C-D	0.89			0.89			
C-A	90			90			

16:15 - 16:30

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-ACD	189	498	0.379	190	0.6	11.839	B
A-BCD	2	584	0.004	2	0.0	6.184	A
A-B	52			52			
A-C	81			81			
D-ABC	0	443	0.000	0	0.0	0.000	A
C-ABD	54	582	0.093	54	0.1	6.826	A
C-D	0.75			0.75			
C-A	75			75			

2040 + Com Dev + Malincross, AM

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction Type	Major road direction	Junction Delay (s)	Junction LOS
1	Junction 1	Crossroads	Two-way	5.08	A

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D7	2040 + Com Dev + Malincross	AM	ONE HOUR	08:00	09:30	15

Vehicle mix source	PCU Factor for a HV (PCU)
HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
A		✓	320	100.000
B		✓	166	100.000
C		✓	274	100.000
D		✓	29	100.000

Origin-Destination Data

Demand (PCU/hr)

		To			
		A	B	C	D
From	A	0	240	74	6
	B	90	0	65	11
	C	145	128	0	1
	D	12	16	1	0

Vehicle Mix

Heavy Vehicle Percentages

		To			
		A	B	C	D
From	A	0	3	11	0
	B	3	0	13	0
	C	5	6	0	0
	D	15	0	0	0

Results

Results Summary for whole modelled period

Stream	Max RFC	Max delay (s)	Max Queue (PCU)	Max LOS
B-ACD	0.41	14.65	0.7	B
A-BCD	0.01	6.77	0.0	A
A-B				
A-C				
D-ABC	0.08	9.89	0.1	A
C-ABD	0.27	9.14	0.4	A
C-D				
C-A				

Main Results for each time segment

08:00 - 08:15

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-ACD	125	478	0.261	123	0.4	10.758	B
A-BCD	5	563	0.008	5	0.0	6.441	A
A-B	181			181			
A-C	56			56			
D-ABC	22	448	0.049	22	0.1	8.926	A
C-ABD	100	571	0.175	99	0.2	8.064	A
C-D	0.73			0.73			
C-A	105			105			

08:15 - 08:30

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-ACD	149	464	0.322	149	0.5	12.135	B
A-BCD	5	553	0.010	5	0.0	6.579	A
A-B	216			216			
A-C	67			67			
D-ABC	26	435	0.060	26	0.1	9.310	A
C-ABD	122	570	0.213	121	0.3	8.502	A
C-D	0.85			0.85			
C-A	124			124			

08:30 - 08:45

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-ACD	183	444	0.411	182	0.7	14.550	B
A-BCD	7	538	0.012	7	0.0	6.773	A
A-B	264			264			
A-C	81			81			
D-ABC	32	417	0.077	32	0.1	9.887	A
C-ABD	153	571	0.269	153	0.4	9.126	A
C-D	1			1			
C-A	147			147			

08:45 - 09:00

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-ACD	183	444	0.411	183	0.7	14.655	B
A-BCD	7	538	0.012	7	0.0	6.775	A
A-B	264			264			
A-C	81			81			
D-ABC	32	417	0.077	32	0.1	9.893	A
C-ABD	153	571	0.269	153	0.4	9.145	A
C-D	1			1			
C-A	147			147			

09:00 - 09:15

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-ACD	149	464	0.322	150	0.5	12.252	B
A-BCD	5	552	0.010	5	0.0	6.585	A
A-B	216			216			
A-C	67			67			
D-ABC	26	435	0.060	26	0.1	9.320	A
C-ABD	122	570	0.213	122	0.3	8.530	A
C-D	0.85			0.85			
C-A	124			124			

09:15 - 09:30

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-ACD	125	478	0.261	126	0.4	10.890	B
A-BCD	5	563	0.008	5	0.0	6.448	A
A-B	181			181			
A-C	56			56			
D-ABC	22	447	0.049	22	0.1	8.944	A
C-ABD	100	571	0.175	100	0.2	8.105	A
C-D	0.73			0.73			
C-A	105			105			

2040 + Com Dev + Malincross, PM

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction Type	Major road direction	Junction Delay (s)	Junction LOS
1	Junction 1	Crossroads	Two-way	10.25	B

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D8	2040 + Com Dev + Malincross	PM	ONE HOUR	15:00	16:30	15

Vehicle mix source	PCU Factor for a HV (PCU)
HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
A		✓	201	100.000
B		✓	278	100.000
C		✓	191	100.000
D		✓	3	100.000

Origin-Destination Data

Demand (PCU/hr)

		To			
		A	B	C	D
From	A	0	78	119	4
	B	170	0	99	9
	C	113	77	0	1
	D	0	2	1	0

Vehicle Mix

Heavy Vehicle Percentages

		To			
		A	B	C	D
From	A	0	0	0	0
	B	0	0	3	0
	C	4	8	0	0
	D	0	0	0	0

Results

Results Summary for whole modelled period

Stream	Max RFC	Max delay (s)	Max Queue (PCU)	Max LOS
B-ACD	0.65	22.35	1.8	C
A-BCD	0.01	6.44	0.0	A
A-B				
A-C				
D-ABC	0.00	0.00	0.0	A
C-ABD	0.15	7.95	0.2	A
C-D				
C-A				

Main Results for each time segment

15:00 - 15:15

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-ACD	209	492	0.425	206	0.7	12.595	B
A-BCD	3	581	0.005	3	0.0	6.227	A
A-B	59			59			
A-C	90			90			
D-ABC	0	438	0.000	0	0.0	0.000	A
C-ABD	59	581	0.102	59	0.1	7.426	A
C-D	0.74			0.74			
C-A	84			84			

15:15 - 15:30

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-ACD	250	482	0.518	249	1.1	15.486	C
A-BCD	4	573	0.006	4	0.0	6.316	A
A-B	70			70			
A-C	107			107			
D-ABC	0	427	0.000	0	0.0	0.000	A
C-ABD	71	579	0.123	71	0.2	7.645	A
C-D	0.88			0.88			
C-A	100			100			

15:30 - 15:45

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-ACD	306	468	0.654	303	1.8	21.655	C
A-BCD	4	563	0.008	4	0.0	6.440	A
A-B	86			86			
A-C	131			131			
D-ABC	0	412	0.000	0	0.0	0.000	A
C-ABD	88	577	0.153	88	0.2	7.941	A
C-D	1			1			
C-A	121			121			

15:45 - 16:00

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-ACD	306	468	0.654	306	1.8	22.354	C
A-BCD	4	563	0.008	4	0.0	6.441	A
A-B	86			86			
A-C	131			131			
D-ABC	0	412	0.000	0	0.0	0.000	A
C-ABD	88	577	0.153	88	0.2	7.948	A
C-D	1			1			
C-A	121			121			

16:00 - 16:15

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-ACD	250	482	0.518	253	1.1	16.062	C
A-BCD	4	573	0.006	4	0.0	6.317	A
A-B	70			70			
A-C	107			107			
D-ABC	0	427	0.000	0	0.0	0.000	A
C-ABD	71	579	0.123	71	0.2	7.657	A
C-D	0.88			0.88			
C-A	100			100			

16:15 - 16:30

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-ACD	209	492	0.425	211	0.8	12.988	B
A-BCD	3	581	0.005	3	0.0	6.231	A
A-B	59			59			
A-C	90			90			
D-ABC	0	437	0.000	0	0.0	0.000	A
C-ABD	59	581	0.102	59	0.1	7.444	A
C-D	0.74			0.74			
C-A	84			84			

APPENDIX L

LINSIG Output (Junction 2)

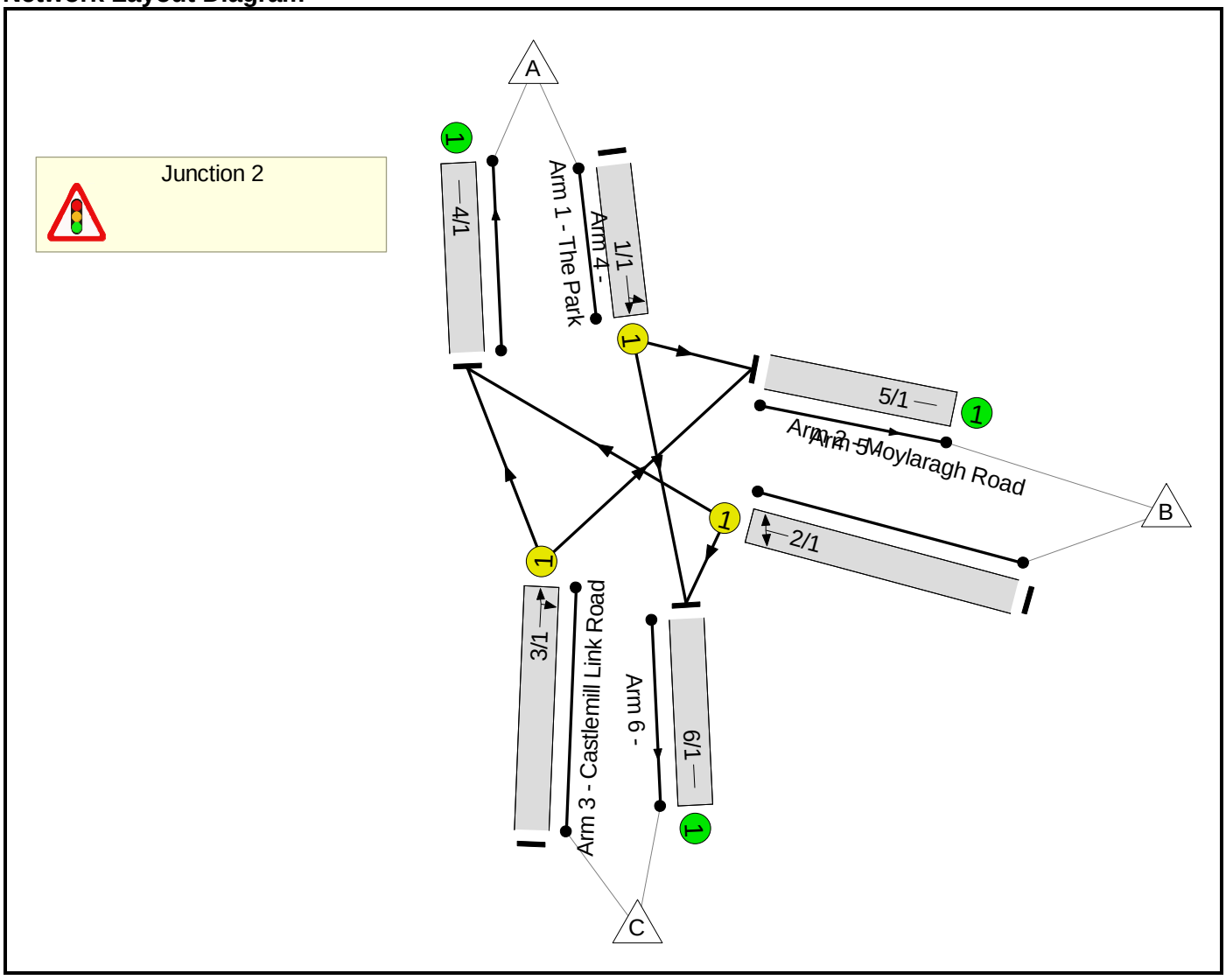
DRAFT

Full Input Data And Results

User and Project Details

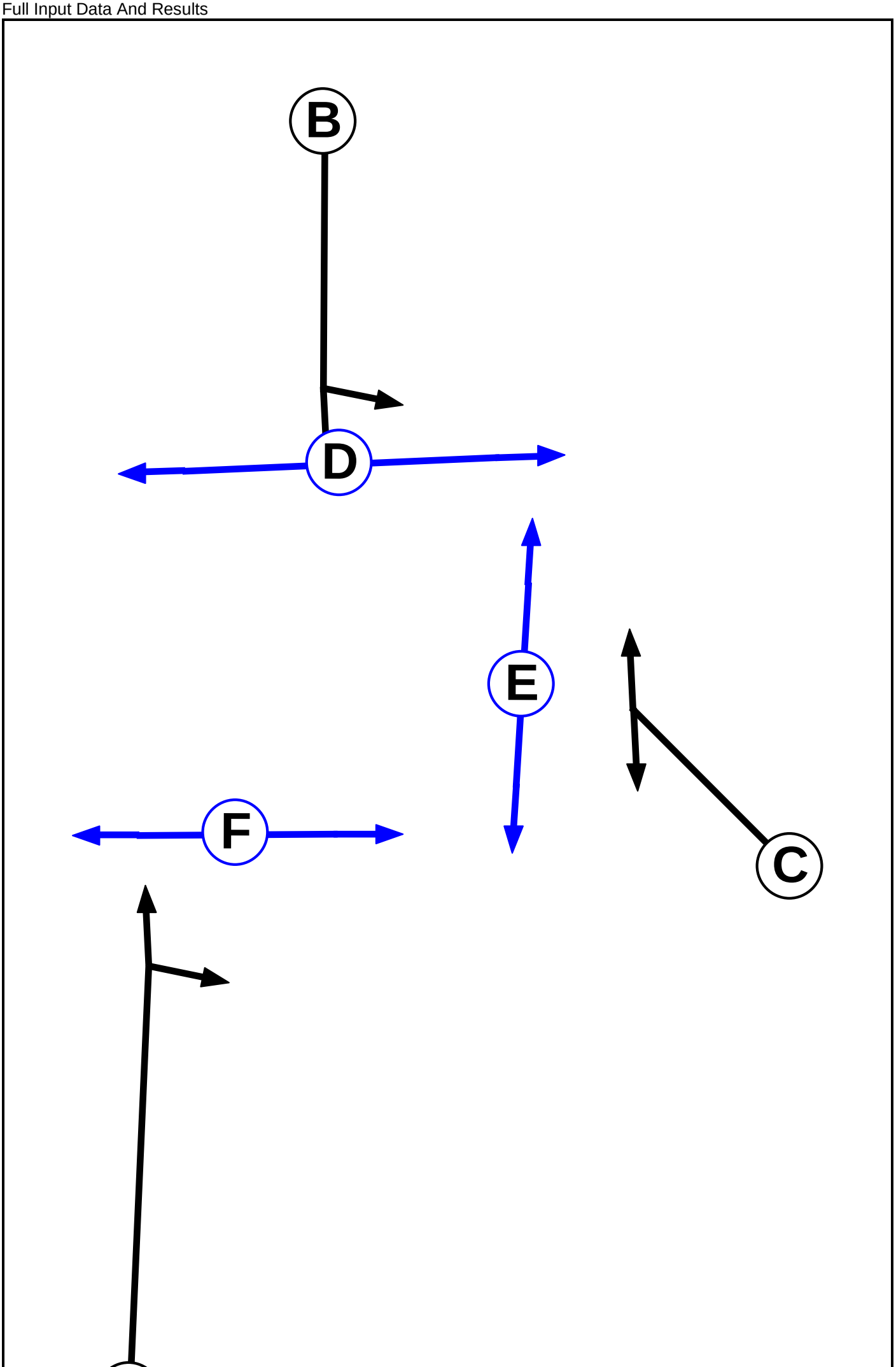
Project:	
Title:	
Location:	
Additional detail:	
File name:	JUNCTION 2.lsg3x
Author:	
Company:	
Address:	

Network Layout Diagram



Full Input Data And Results

Phase Diagram


B
D
E
C
F

Full Input Data And Results

Phase Input Data

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

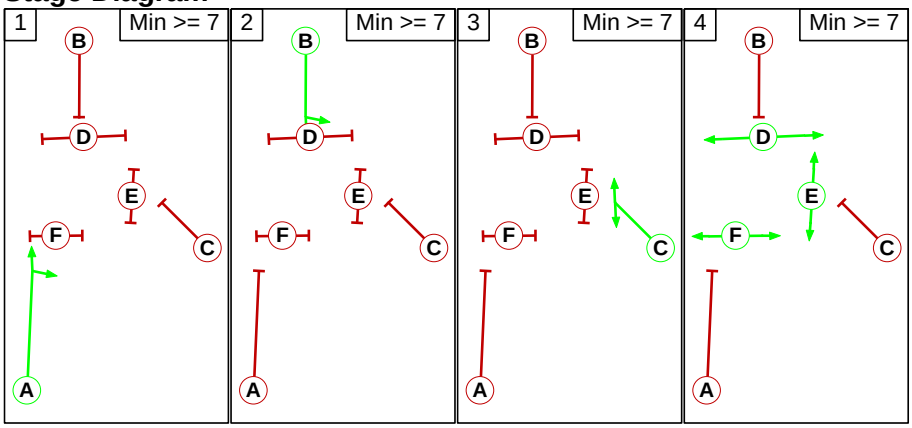
Phase Intergreens Matrix

		Starting Phase					
		A	B	C	D	E	F
Terminating Phase	A		6	6	7	7	7
	B	6		6	7	7	7
	C	6	6		-	-	-
	D	11	11	11		-	-
	E	11	11	11	-		-
	F	11	11	11	-	-	

Phases in Stage

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

Stage Diagram



Phase Delays

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

Full Input Data And Results

Prohibited Stage Change

From Stage \ To Stage	1	2	3	4
1		6	6	7
2	6		6	7
3	6	6		0
4	11	11	11	

Full Input Data And Results

Give-Way Lane Input Data

Junction: Junction 2
There are no Opposed Lanes in this Junction

Full Input Data And Results

Lane Input Data

Junction: Junction 2												
Lane	**Lane Type**	**Phases**	**Start Disp.**	**End Disp.**	**Physical Length (PCU)**	**Sat Flow Type**	**Def User Saturation Flow (PCU/Hr)**	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Turns**	**Turning Radius (m)**
1/1 (The Park)	U	B	2	3	60.0	Geom	-	3.40	0.00	Y	Arm 5 Left	13.00
											Arm 6 Ahead	Inf
2/1 (Moylaragh Road)	U	C	2	3	60.0	Geom	-	3.35	0.00	Y	Arm 4 Right	13.00
											Arm 6 Left	10.00
3/1 (Castlemill Link Road)	U	A	2	3	60.0	Geom	-	3.38	0.00	Y	Arm 4 Ahead	Inf
											Arm 5 Right	11.00
4/1	U		2	3	60.0	Inf	-	-	-	-	-	-
5/1	U		2	3	60.0	Inf	-	-	-	-	-	-
6/1	U		2	3	60.0	Inf	-	-	-	-	-	-

Traffic Flow Groups

Flow Group	Start Time	End Time	Duration	Formula
1: '2025 Base + CD AM'	08:00	09:00	01:00	
2: '2025 Base + CD PM'	17:00	18:00	01:00	
3: '2025 Base + CD + Malincross AM'	08:00	09:00	01:00	
4: '2025 Base + CD + Malincross PM'	17:00	18:00	01:00	
5: '2040 Base + CD AM'	08:00	09:00	01:00	
6: '2040 Base + CD PM'	17:00	18:00	01:00	
7: '2040 Base + CD +Malincross AM'	08:00	09:00	01:00	
8: '2040 Base + CD + Malincross PM'	17:00	18:00	01:00	

Scenario 1: '2025 Base + CD AM' (FG1: '2025 Base + CD AM', Plan 1: 'Network Control Plan 1')

Traffic Flows, Desired

Desired Flow :

		Destination			
		A	B	C	Tot.
Origin	A	0	48	290	338
	B	51	0	129	180
	C	169	100	0	269
	Tot.	220	148	419	787

Full Input Data And Results

Traffic Lane Flows

Lane	Scenario 1: 2025 Base + CD AM
Junction: Junction 2	
1/1	338
2/1	180
3/1	269
4/1	220
5/1	148
6/1	419

Lane Saturation Flows

Junction: Junction 2								
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat Flow (PCU/Hr)**	**Flared Sat Flow (PCU/Hr)**
1/1 (The Park)	3.40	0.00	Y	Arm 5 Left	13.00	14.2 %	1923	1923
				Arm 6 Ahead	Inf	85.8 %		
2/1 (Moylaragh Road)	3.35	0.00	Y	Arm 4 Right	13.00	28.3 %	1710	1710
				Arm 6 Left	10.00	71.7 %		
3/1 (Castlemill Link Road)	3.38	0.00	Y	Arm 4 Ahead	Inf	62.8 %	1859	1859
				Arm 5 Right	11.00	37.2 %		
4/1	Infinite Saturation Flow						Inf	Inf
5/1	Infinite Saturation Flow						Inf	Inf
6/1	Infinite Saturation Flow						Inf	Inf

Scenario 2: '2025 Base + CD PM' (FG2: '2025 Base + CD PM', Plan 1: 'Network Control Plan 1')

Traffic Flows, Desired

Desired Flow :

		Destination			
		A	B	C	Tot.
Origin	A	0	76	126	202
	B	73	0	56	129
	C	275	84	0	359
	Tot.	348	160	182	690

Full Input Data And Results

Traffic Lane Flows

Lane	Scenario 2: 2025 Base + CD PM
Junction: Junction 2	
1/1	202
2/1	129
3/1	359
4/1	348
5/1	160
6/1	182

Lane Saturation Flows

Junction: Junction 2								
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat Flow (PCU/Hr)**	**Flared Sat Flow (PCU/Hr)**
1/1 (The Park)	3.40	0.00	Y	Arm 5 Left	13.00	37.6 %	1874	1874
				Arm 6 Ahead	Inf	62.4 %		
2/1 (Moylaragh Road)	3.35	0.00	Y	Arm 4 Right	13.00	56.6 %	1725	1725
				Arm 6 Left	10.00	43.4 %		
3/1 (Castlemill Link Road)	3.38	0.00	Y	Arm 4 Ahead	Inf	76.6 %	1893	1893
				Arm 5 Right	11.00	23.4 %		
4/1	Infinite Saturation Flow						Inf	Inf
5/1	Infinite Saturation Flow						Inf	Inf
6/1	Infinite Saturation Flow						Inf	Inf

Scenario 3: '2025 Base + CD + Malincross AM' (FG3: '2025 Base + CD + Malincross AM', Plan 1: 'Network Control Plan 1')

Traffic Flows, Desired

Desired Flow :

		Destination			
		A	B	C	Tot.
Origin	A	0	87	290	377
	B	62	0	129	191
	C	169	100	0	269
	Tot.	231	187	419	837

Full Input Data And Results

Traffic Lane Flows

Lane	Scenario 3: 2025 Base + CD + Malincross AM
Junction: Junction 2	
1/1	377
2/1	191
3/1	269
4/1	231
5/1	187
6/1	419

Lane Saturation Flows

Junction: Junction 2								
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat Flow (PCU/Hr)**	**Flared Sat Flow (PCU/Hr)**
1/1 (The Park)	3.40	0.00	Y	Arm 5 Left	13.00	23.1 %	1904	1904
				Arm 6 Ahead	Inf	76.9 %		
2/1 (Moylaragh Road)	3.35	0.00	Y	Arm 4 Right	13.00	32.5 %	1712	1712
				Arm 6 Left	10.00	67.5 %		
3/1 (Castlemill Link Road)	3.38	0.00	Y	Arm 4 Ahead	Inf	62.8 %	1859	1859
				Arm 5 Right	11.00	37.2 %		
4/1	Infinite Saturation Flow						Inf	Inf
5/1	Infinite Saturation Flow						Inf	Inf
6/1	Infinite Saturation Flow						Inf	Inf

Scenario 4: '2025 Base + CD + Malincross PM' (FG4: '2025 Base + CD + Malincross PM', Plan 1: 'Network Control Plan 1')

Traffic Flows, Desired

Desired Flow :

		Destination			
		A	B	C	Tot.
Origin	A	0	96	126	222
	B	107	0	56	163
	C	275	84	0	359
	Tot.	382	180	182	744

Full Input Data And Results

Traffic Lane Flows

Lane	Scenario 4: 2025 Base + CD + Malincross PM
Junction: Junction 2	
1/1	222
2/1	163
3/1	359
4/1	382
5/1	180
6/1	182

Lane Saturation Flows

Junction: Junction 2								
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat Flow (PCU/Hr)**	**Flared Sat Flow (PCU/Hr)**
1/1 (The Park)	3.40	0.00	Y	Arm 5 Left	13.00	43.2 %	1862	1862
				Arm 6 Ahead	Inf	56.8 %		
2/1 (Moylaragh Road)	3.35	0.00	Y	Arm 4 Right	13.00	65.6 %	1730	1730
				Arm 6 Left	10.00	34.4 %		
3/1 (Castlemill Link Road)	3.38	0.00	Y	Arm 4 Ahead	Inf	76.6 %	1893	1893
				Arm 5 Right	11.00	23.4 %		
4/1	Infinite Saturation Flow						Inf	Inf
5/1	Infinite Saturation Flow						Inf	Inf
6/1	Infinite Saturation Flow						Inf	Inf

Scenario 5: '2040 Base + CD AM' (FG5: '2040 Base + CD AM', Plan 1: 'Network Control Plan 1')

Traffic Flows, Desired

Desired Flow :

		Destination			
		A	B	C	Tot.
Origin	A	0	56	327	383
	B	59	0	145	204
	C	189	113	0	302
	Tot.	248	169	472	889

Full Input Data And Results

Traffic Lane Flows

Lane	Scenario 5: 2040 Base + CD AM
Junction: Junction 2	
1/1	383
2/1	204
3/1	302
4/1	248
5/1	169
6/1	472

Lane Saturation Flows

Junction: Junction 2								
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat Flow (PCU/Hr)**	**Flared Sat Flow (PCU/Hr)**
1/1 (The Park)	3.40	0.00	Y	Arm 5 Left	13.00	14.6 %	1923	1923
				Arm 6 Ahead	Inf	85.4 %		
2/1 (Moylaragh Road)	3.35	0.00	Y	Arm 4 Right	13.00	28.9 %	1711	1711
				Arm 6 Left	10.00	71.1 %		
3/1 (Castlemill Link Road)	3.38	0.00	Y	Arm 4 Ahead	Inf	62.6 %	1858	1858
				Arm 5 Right	11.00	37.4 %		
4/1	Infinite Saturation Flow						Inf	Inf
5/1	Infinite Saturation Flow						Inf	Inf
6/1	Infinite Saturation Flow						Inf	Inf

Scenario 6: '2040 Base + CD PM' (FG6: '2040 Base + CD PM', Plan 1: 'Network Control Plan 1')

Traffic Flows, Desired

Desired Flow :

		Destination			
		A	B	C	Tot.
Origin	A	0	85	141	226
	B	82	0	63	145
	C	310	94	0	404
	Tot.	392	179	204	775

Full Input Data And Results

Traffic Lane Flows

Lane	Scenario 6: 2040 Base + CD PM
Junction: Junction 2	
1/1	226
2/1	145
3/1	404
4/1	392
5/1	179
6/1	204

Lane Saturation Flows

Junction: Junction 2								
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat Flow (PCU/Hr)**	**Flared Sat Flow (PCU/Hr)**
1/1 (The Park)	3.40	0.00	Y	Arm 5 Left	13.00	37.6 %	1874	1874
				Arm 6 Ahead	Inf	62.4 %		
2/1 (Moylaragh Road)	3.35	0.00	Y	Arm 4 Right	13.00	56.6 %	1725	1725
				Arm 6 Left	10.00	43.4 %		
3/1 (Castlemill Link Road)	3.38	0.00	Y	Arm 4 Ahead	Inf	76.7 %	1893	1893
				Arm 5 Right	11.00	23.3 %		
4/1	Infinite Saturation Flow						Inf	Inf
5/1	Infinite Saturation Flow						Inf	Inf
6/1	Infinite Saturation Flow						Inf	Inf

Scenario 7: '2040 Base + CD + Malincross AM' (FG7: '2040 Base + CD +Malincross AM', Plan 1: 'Network Control Plan 1')

Traffic Flows, Desired

Desired Flow :

		Destination			
		A	B	C	Tot.
Origin	A	0	94	327	421
	B	70	0	145	215
	C	189	113	0	302
	Tot.	259	207	472	938

Full Input Data And Results

Traffic Lane Flows

Lane	Scenario 7: 2040 Base + CD + Malincross AM
Junction: Junction 2	
1/1	421
2/1	215
3/1	302
4/1	259
5/1	207
6/1	472

Lane Saturation Flows

Junction: Junction 2								
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat Flow (PCU/Hr)**	**Flared Sat Flow (PCU/Hr)**
1/1 (The Park)	3.40	0.00	Y	Arm 5 Left	13.00	22.3 %	1906	1906
				Arm 6 Ahead	Inf	77.7 %		
2/1 (Moylaragh Road)	3.35	0.00	Y	Arm 4 Right	13.00	32.6 %	1712	1712
				Arm 6 Left	10.00	67.4 %		
3/1 (Castlemill Link Road)	3.38	0.00	Y	Arm 4 Ahead	Inf	62.6 %	1858	1858
				Arm 5 Right	11.00	37.4 %		
4/1	Infinite Saturation Flow						Inf	Inf
5/1	Infinite Saturation Flow						Inf	Inf
6/1	Infinite Saturation Flow						Inf	Inf

Scenario 8: '2040 Base + CD + Malincross PM' (FG8: '2040 Base + CD + Malincross PM', Plan 1: 'Network Control Plan 1')

Traffic Flows, Desired

Desired Flow :

		Destination			
		A	B	C	Tot.
Origin	A	0	105	141	246
	B	116	0	63	179
	C	310	94	0	404
	Tot.	426	199	204	829

Full Input Data And Results

Traffic Lane Flows

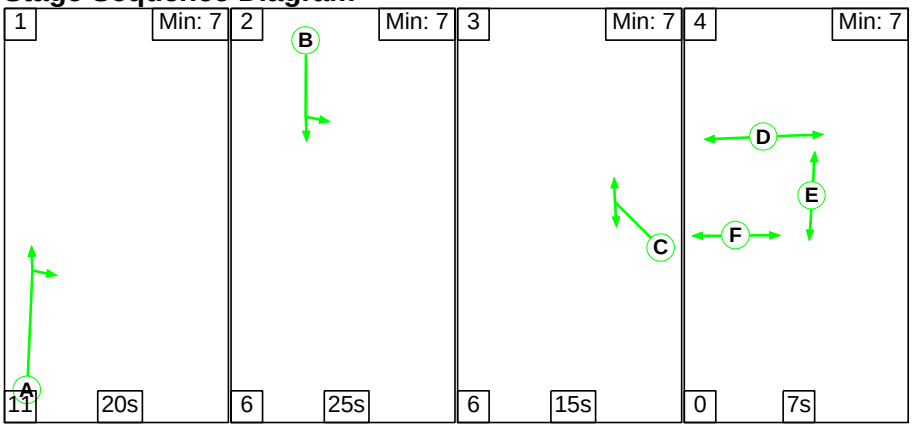
Lane	Scenario 8: 2040 Base + CD + Malincross PM
Junction: Junction 2	
1/1	246
2/1	179
3/1	404
4/1	426
5/1	199
6/1	204

Lane Saturation Flows

Junction: Junction 2								
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat Flow (PCU/Hr)**	**Flared Sat Flow (PCU/Hr)**
1/1 (The Park)	3.40	0.00	Y	Arm 5 Left	13.00	42.7 %	1863	1863
				Arm 6 Ahead	Inf	57.3 %		
2/1 (Moylaragh Road)	3.35	0.00	Y	Arm 4 Right	13.00	64.8 %	1729	1729
				Arm 6 Left	10.00	35.2 %		
3/1 (Castlemill Link Road)	3.38	0.00	Y	Arm 4 Ahead	Inf	76.7 %	1893	1893
				Arm 5 Right	11.00	23.3 %		
4/1	Infinite Saturation Flow						Inf	Inf
5/1	Infinite Saturation Flow						Inf	Inf
6/1	Infinite Saturation Flow						Inf	Inf

Scenario 1: '2025 Base + CD AM' (FG1: '2025 Base + CD AM', Plan 1: 'Network Control Plan 1')

Stage Sequence Diagram

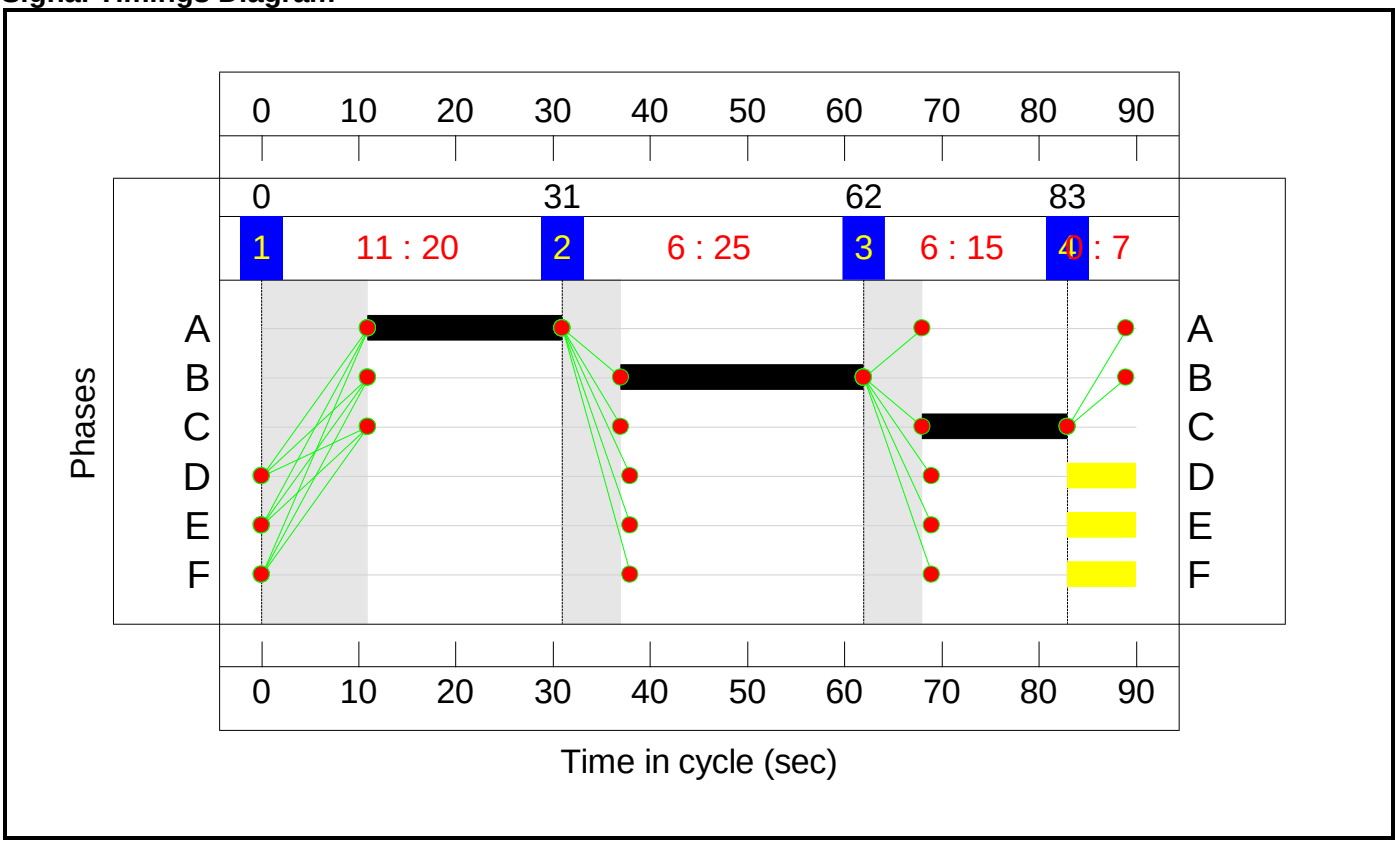


Stage Timings

Stage	1	2	3	4
Duration	20	25	15	7
Change Point	0	31	62	83

Full Input Data And Results

Signal Timings Diagram



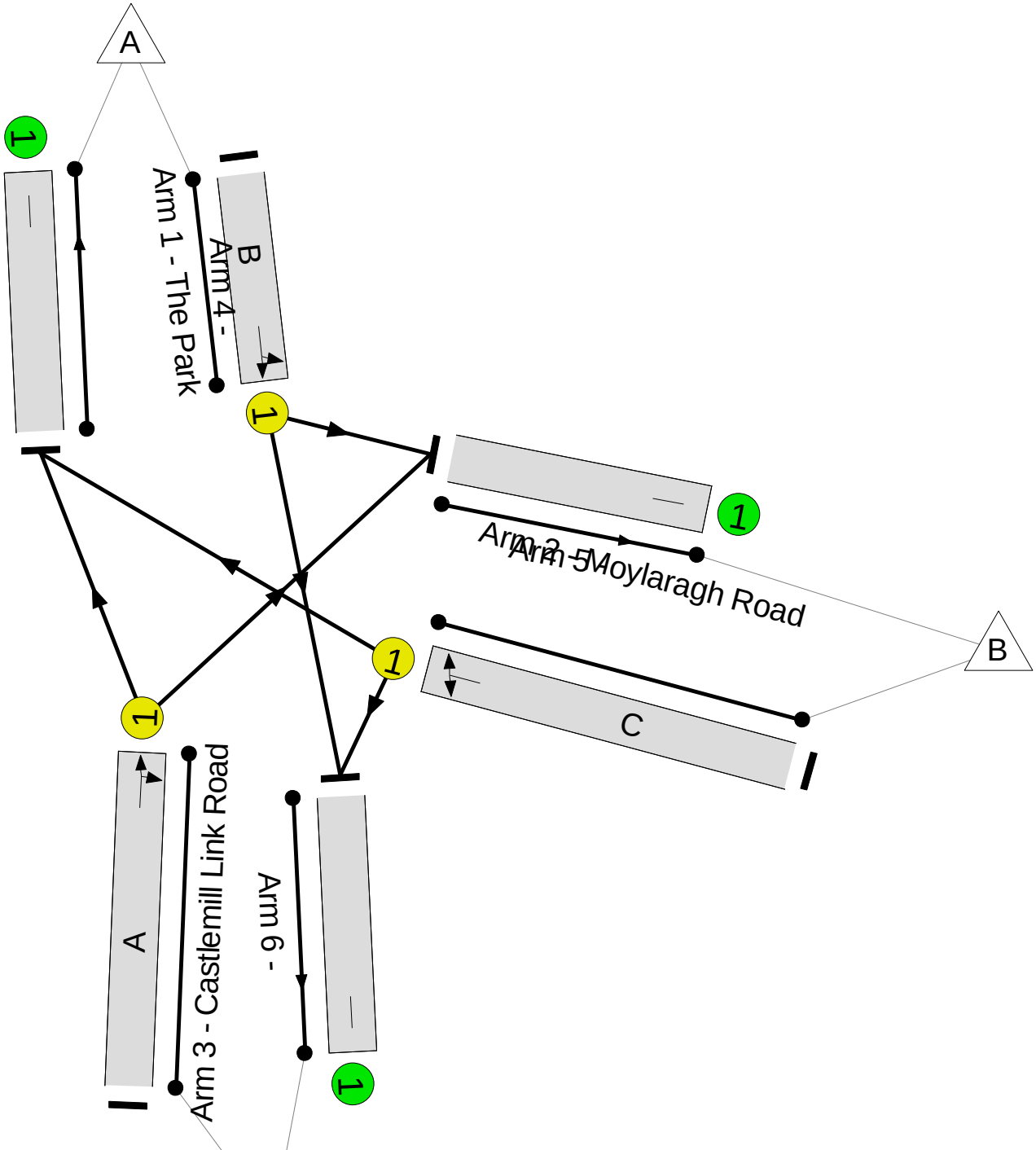
Full Input Data And Results

Network Layout Diagram

Junction 2

PRC: 45.1 %

Total Traffic Delay: 8.9 pcuHr



Network Results

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**62.0%**
Junction 2	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**62.0%**
1/1	The Park Left Ahead	U	N/A	N/A	B		1	25	-	338	1923	556	60.8%
2/1	Moylaragh Road Right Left	U	N/A	N/A	C		1	15	-	180	1710	304	59.2%
3/1	Castlemill Link Road Ahead Right	U	N/A	N/A	A		1	20	-	269	1859	434	62.0%
4/1		U	N/A	N/A	-		-	-	-	220	Inf	Inf	0.0%
5/1		U	N/A	N/A	-		-	-	-	148	Inf	Inf	0.0%
6/1		U	N/A	N/A	-		-	-	-	419	Inf	Inf	0.0%

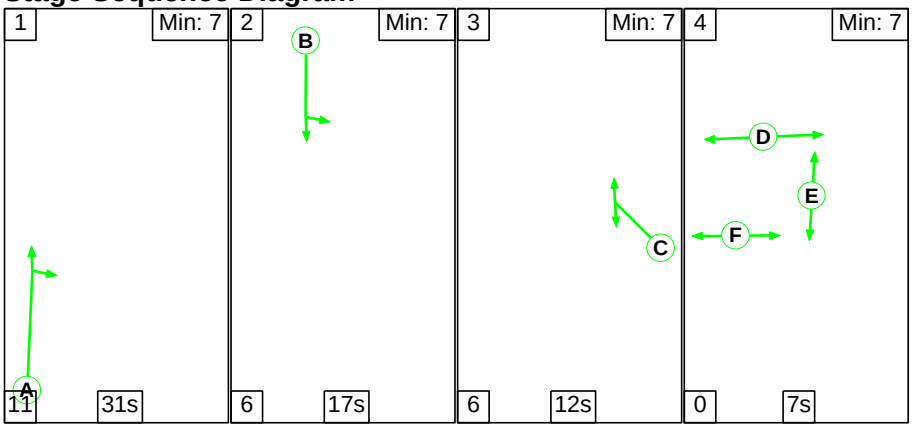
Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network	**-**	**-**	**0**	**0**	**0**	**6.6**	**2.3**	**0.0**	**8.9**	**-**	**-**	**-**	**-**
Junction 2	**-**	**-**	**0**	**0**	**0**	**6.6**	**2.3**	**0.0**	**8.9**	**-**	**-**	**-**	**-**
1/1	338	338	-	-	-	2.6	0.8	-	3.4	35.8	7.2	0.8	8.0
2/1	180	180	-	-	-	1.7	0.7	-	2.4	48.4	4.1	0.7	4.8
3/1	269	269	-	-	-	2.3	0.8	-	3.1	41.8	6.0	0.8	6.8
4/1	220	220	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
5/1	148	148	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	419	419	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0

C1 PRC for Signalled Lanes (%): 45.1 Total Delay for Signalled Lanes (pcuHr): 8.90 Cycle Time (s): 90
PRC Over All Lanes (%): 45.1 Total Delay Over All Lanes(pcuHr): 8.90

Full Input Data And Results

Scenario 2: '2025 Base + CD PM' (FG2: '2025 Base + CD PM', Plan 1: 'Network Control Plan 1')

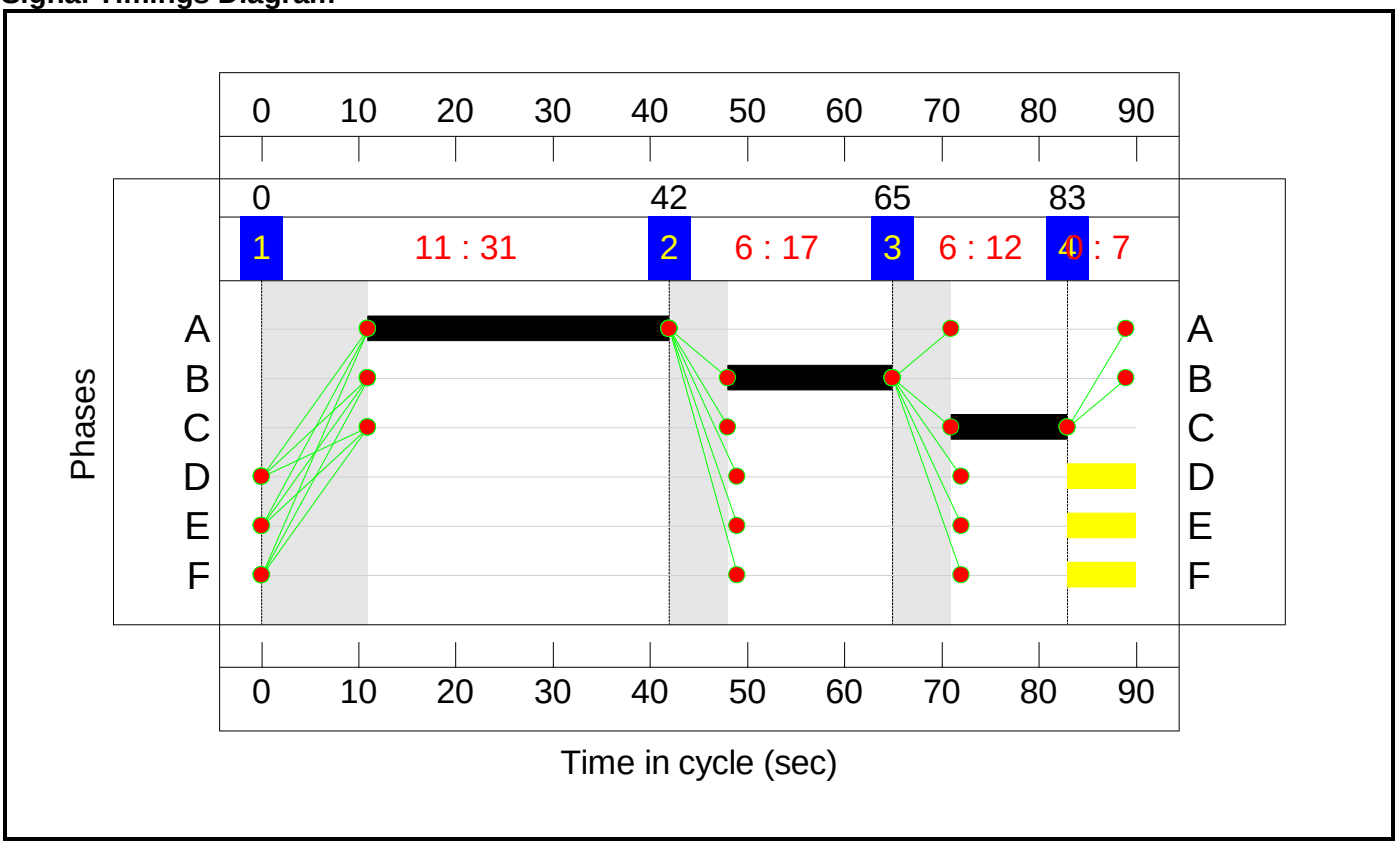
Stage Sequence Diagram



Stage Timings

Stage	1	2	3	4
Duration	31	17	12	7
Change Point	0	42	65	83

Signal Timings Diagram



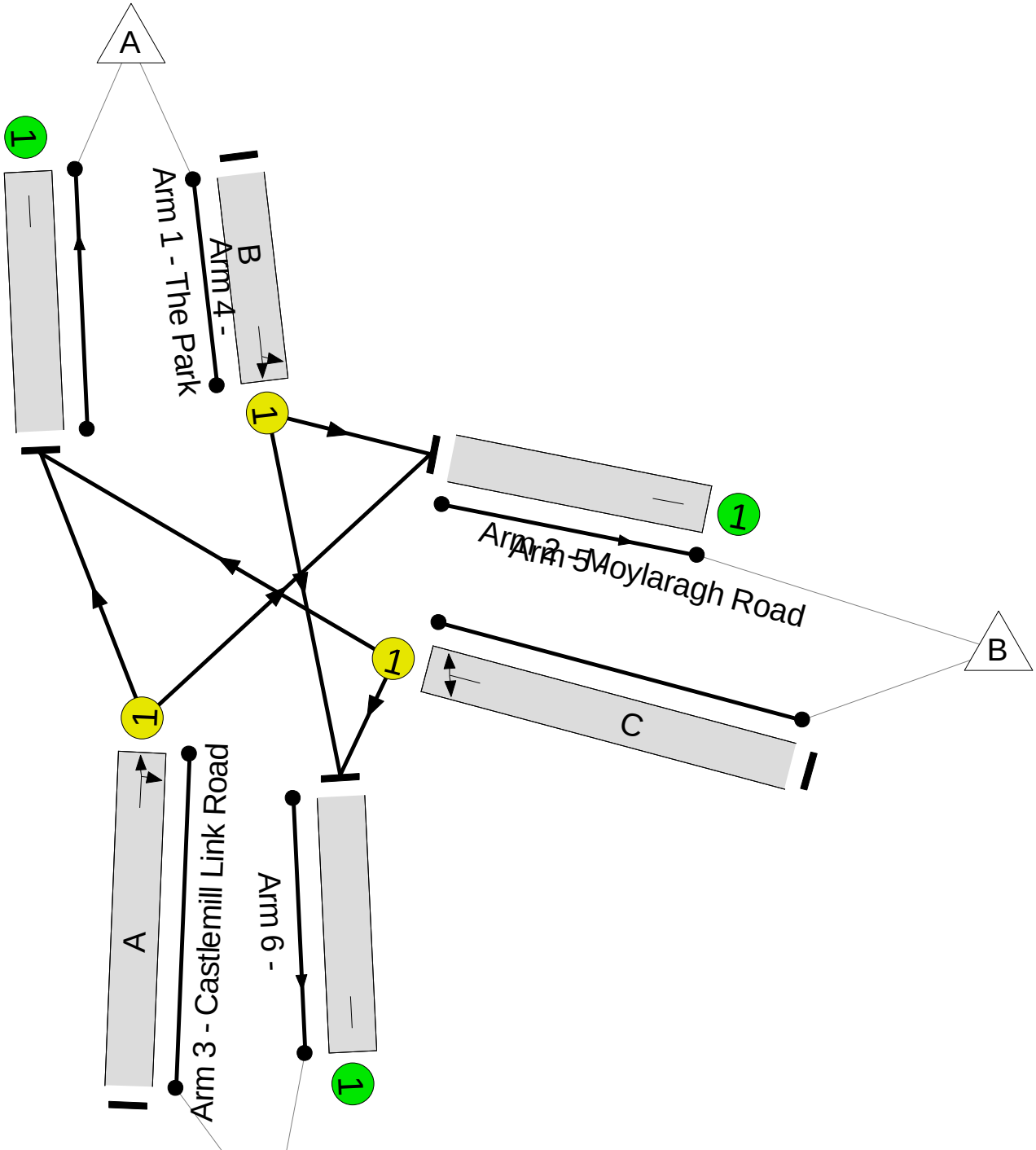
Full Input Data And Results

Network Layout Diagram

Junction 2

PRC: 67.0 %

Total Traffic Delay: 7.1 pcuHr



Network Results

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**53.9%**
Junction 2	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**53.9%**
1/1	The Park Left Ahead	U	N/A	N/A	B		1	17	-	202	1874	375	53.9%
2/1	Moylaragh Road Right Left	U	N/A	N/A	C		1	12	-	129	1725	249	51.8%
3/1	Castlemill Link Road Ahead Right	U	N/A	N/A	A		1	31	-	359	1893	673	53.3%
4/1		U	N/A	N/A	-		-	-	-	348	Inf	Inf	0.0%
5/1		U	N/A	N/A	-		-	-	-	160	Inf	Inf	0.0%
6/1		U	N/A	N/A	-		-	-	-	182	Inf	Inf	0.0%

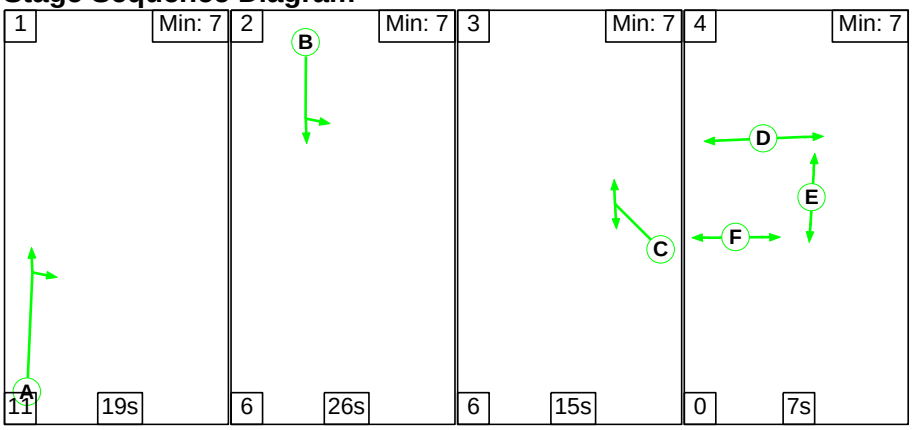
Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network	**-**	**-**	**0**	**0**	**0**	**5.4**	**1.7**	**0.0**	**7.1**	**-**	**-**	**-**	**-**
Junction 2	**-**	**-**	**0**	**0**	**0**	**5.4**	**1.7**	**0.0**	**7.1**	**-**	**-**	**-**	**-**
1/1	202	202	-	-	-	1.8	0.6	-	2.4	42.6	4.5	0.6	5.1
2/1	129	129	-	-	-	1.3	0.5	-	1.8	50.5	3.0	0.5	3.5
3/1	359	359	-	-	-	2.3	0.6	-	2.9	28.8	7.1	0.6	7.6
4/1	348	348	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
5/1	160	160	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	182	182	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0

C1 PRC for Signalled Lanes (%): 67.0 Total Delay for Signalled Lanes (pcuHr): 7.07 Cycle Time (s): 90
PRC Over All Lanes (%): 67.0 Total Delay Over All Lanes(pcuHr): 7.07

Full Input Data And Results

Scenario 3: '2025 Base + CD + Malincross AM' (FG3: '2025 Base + CD + Malincross AM', Plan 1: 'Network Control Plan 1')

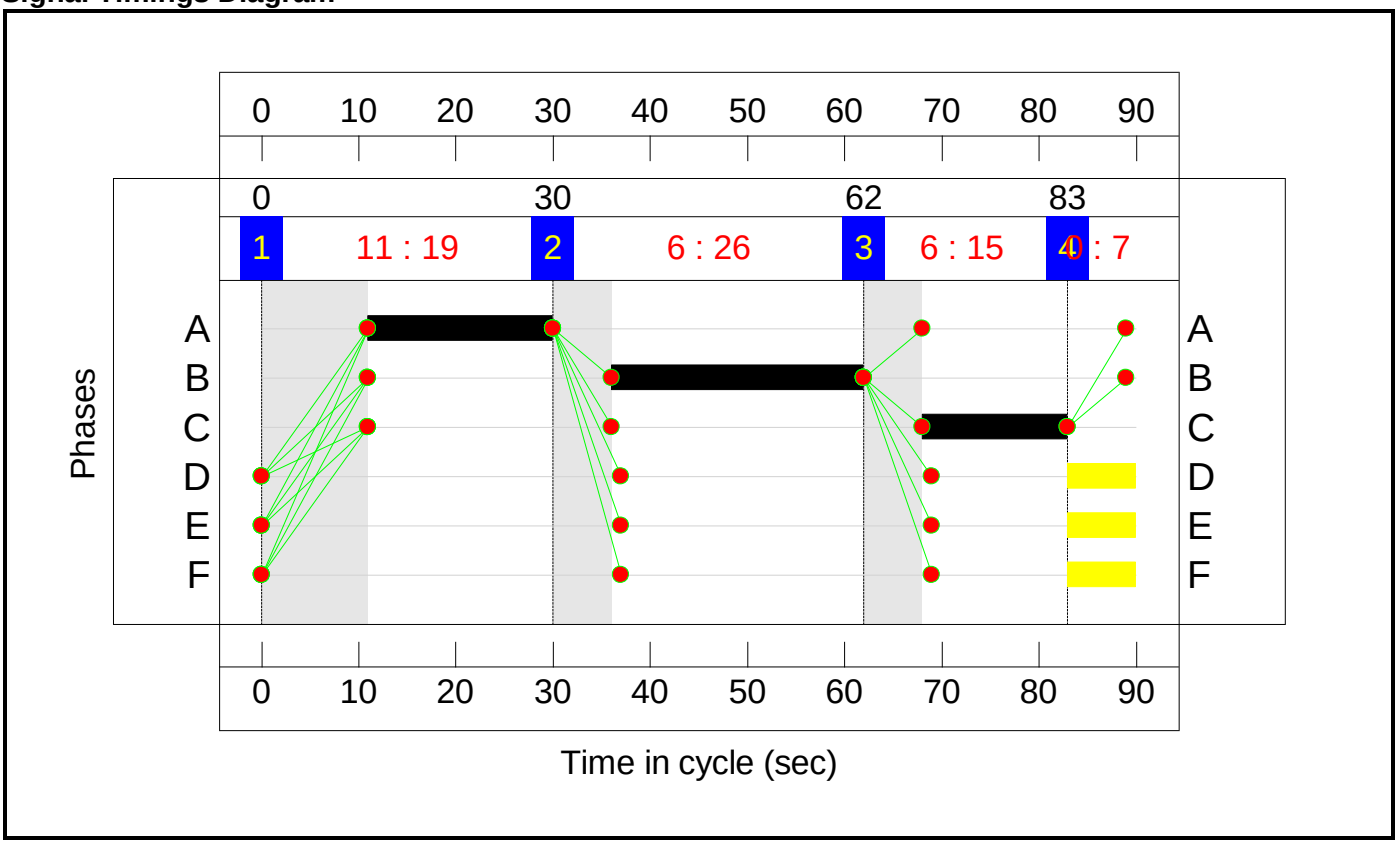
Stage Sequence Diagram



Stage Timings

Stage	1	2	3	4
Duration	19	26	15	7
Change Point	0	30	62	83

Signal Timings Diagram



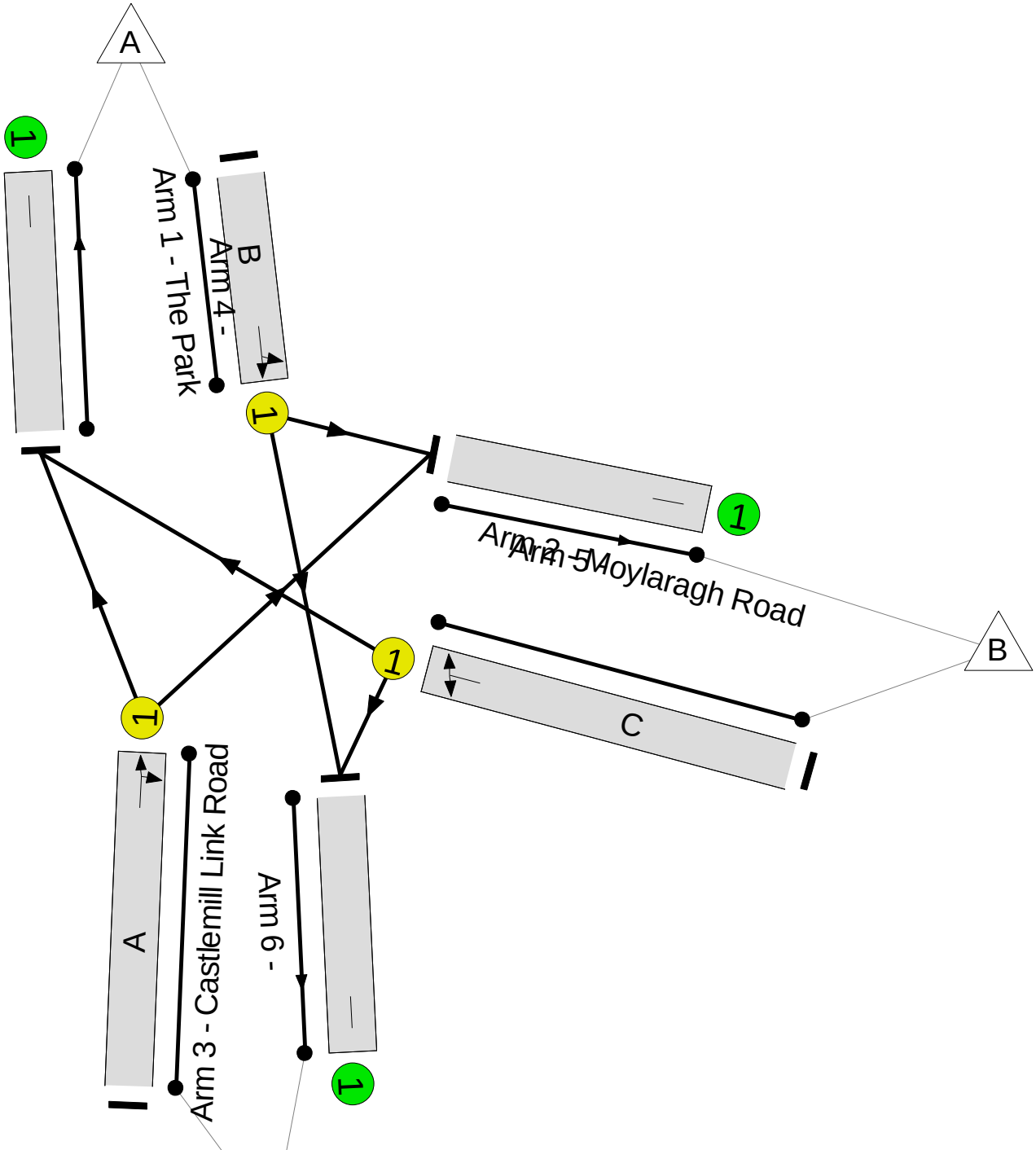
Full Input Data And Results

Network Layout Diagram

Junction 2

PRC: 36.4 %

Total Traffic Delay: 9.8 pcuHr



Network Results

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**66.0%**
Junction 2	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**66.0%**
1/1	The Park Left Ahead	U	N/A	N/A	B		1	26	-	377	1904	571	66.0%
2/1	Moylaragh Road Right Left	U	N/A	N/A	C		1	15	-	191	1712	304	62.8%
3/1	Castlemill Link Road Ahead Right	U	N/A	N/A	A		1	19	-	269	1859	413	65.1%
4/1		U	N/A	N/A	-		-	-	-	231	Inf	Inf	0.0%
5/1		U	N/A	N/A	-		-	-	-	187	Inf	Inf	0.0%
6/1		U	N/A	N/A	-		-	-	-	419	Inf	Inf	0.0%

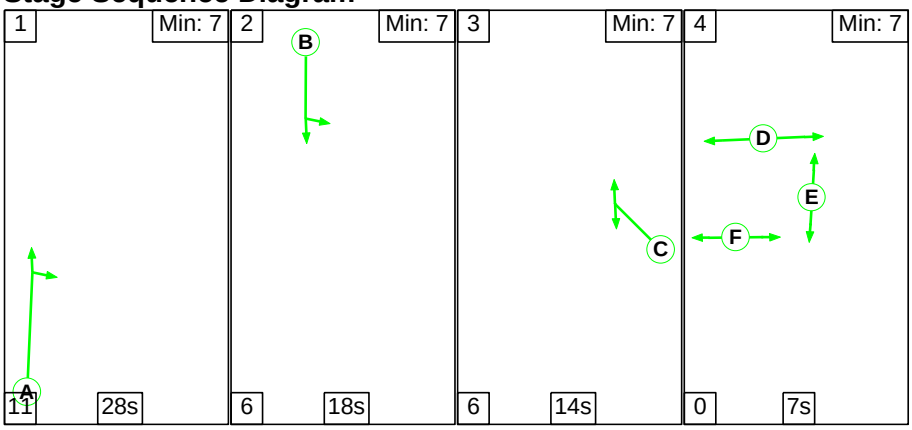
Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network	**-**	**-**	**0**	**0**	**0**	**7.1**	**2.7**	**0.0**	**9.8**	**-**	**-**	**-**	**-**
Junction 2	**-**	**-**	**0**	**0**	**0**	**7.1**	**2.7**	**0.0**	**9.8**	**-**	**-**	**-**	**-**
1/1	377	377	-	-	-	2.9	1.0	-	3.8	36.7	8.2	1.0	9.1
2/1	191	191	-	-	-	1.8	0.8	-	2.6	49.9	4.4	0.8	5.2
3/1	269	269	-	-	-	2.4	0.9	-	3.3	44.2	6.1	0.9	7.0
4/1	231	231	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
5/1	187	187	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	419	419	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0

C1 PRC for Signalled Lanes (%): 36.4 Total Delay for Signalled Lanes (pcuHr): 9.79 Cycle Time (s): 90
PRC Over All Lanes (%): 36.4 Total Delay Over All Lanes(pcuHr): 9.79

Full Input Data And Results

Scenario 4: '2025 Base + CD + Malincross PM' (FG4: '2025 Base + CD + Malincross PM', Plan 1: 'Network Control Plan 1')

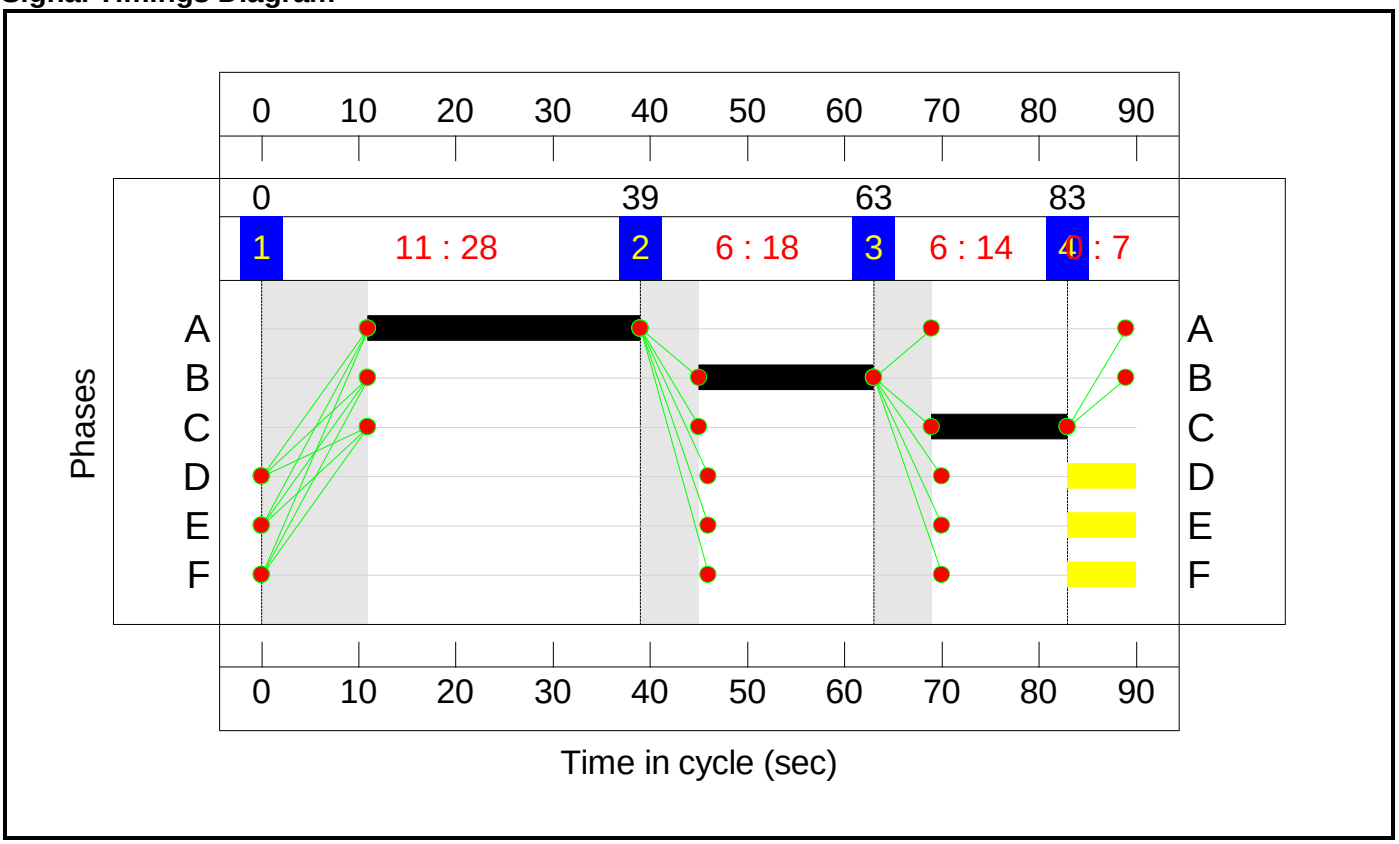
Stage Sequence Diagram



Stage Timings

Stage	1	2	3	4
Duration	28	18	14	7
Change Point	0	39	63	83

Signal Timings Diagram



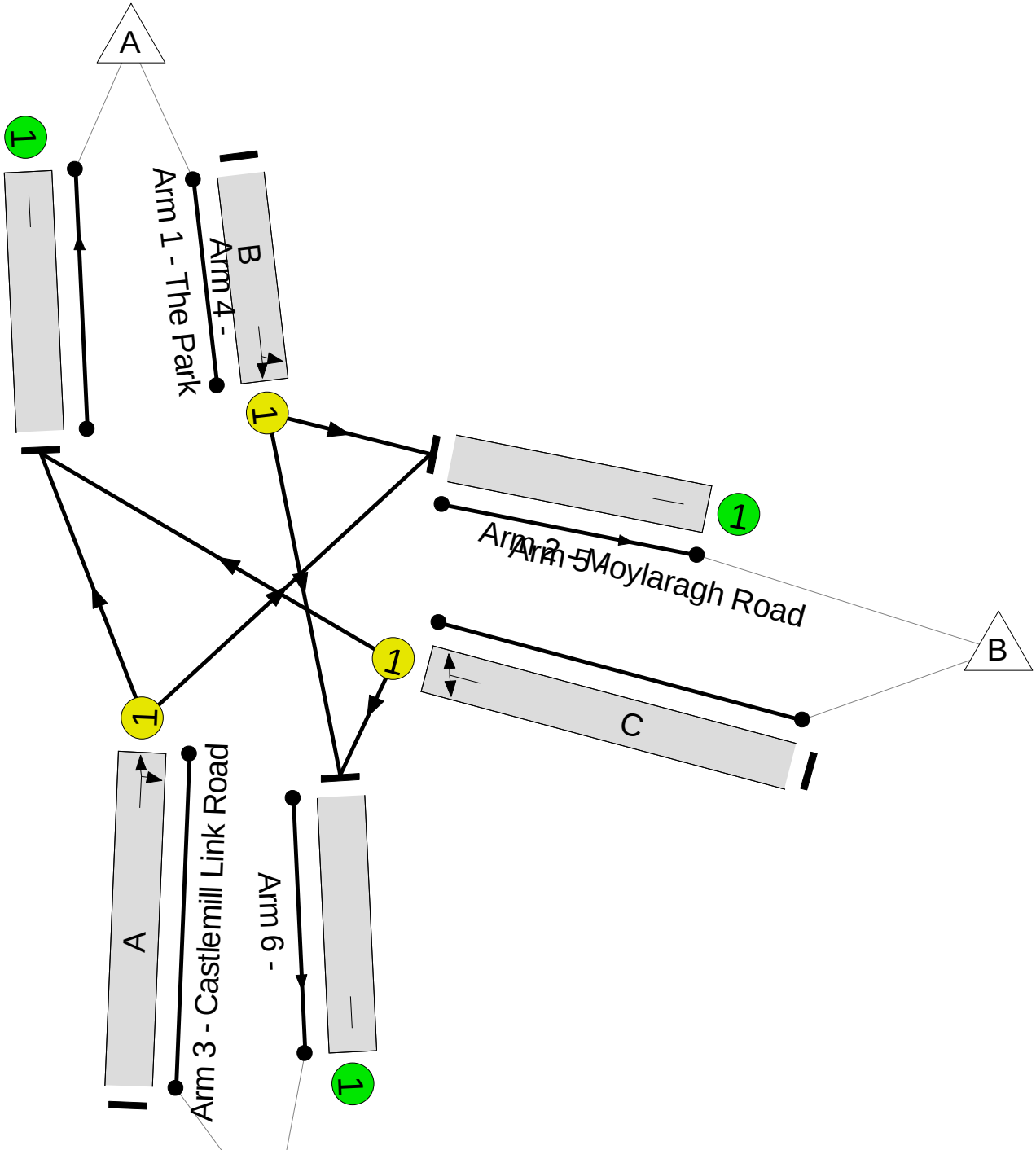
Full Input Data And Results

Network Layout Diagram

Junction 2

PRC: 52.9 %

Total Traffic Delay: 8.1 pcuHr



Network Results

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**58.9%**
Junction 2	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**58.9%**
1/1	The Park Left Ahead	U	N/A	N/A	B		1	18	-	222	1862	393	56.5%
2/1	Moylaragh Road Right Left	U	N/A	N/A	C		1	14	-	163	1730	288	56.5%
3/1	Castlemill Link Road Ahead Right	U	N/A	N/A	A		1	28	-	359	1893	610	58.9%
4/1		U	N/A	N/A	-		-	-	-	382	Inf	Inf	0.0%
5/1		U	N/A	N/A	-		-	-	-	180	Inf	Inf	0.0%
6/1		U	N/A	N/A	-		-	-	-	182	Inf	Inf	0.0%

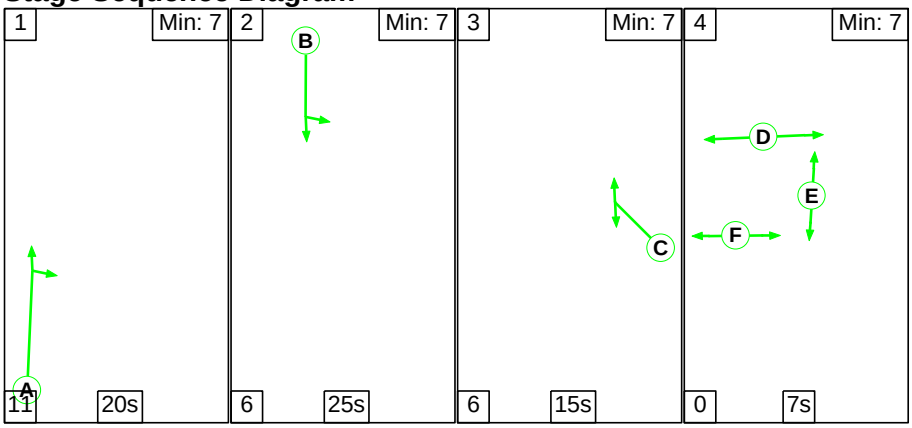
Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network	**-**	**-**	**0**	**0**	**0**	**6.1**	**2.0**	**0.0**	**8.1**	**-**	**-**	**-**	**-**
Junction 2	**-**	**-**	**0**	**0**	**0**	**6.1**	**2.0**	**0.0**	**8.1**	**-**	**-**	**-**	**-**
1/1	222	222	-	-	-	2.0	0.6	-	2.6	42.2	4.9	0.6	5.6
2/1	163	163	-	-	-	1.6	0.6	-	2.2	48.7	3.7	0.6	4.4
3/1	359	359	-	-	-	2.5	0.7	-	3.3	32.6	7.5	0.7	8.2
4/1	382	382	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
5/1	180	180	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	182	182	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0

C1 PRC for Signalled Lanes (%): 52.9 Total Delay for Signalled Lanes (pcuHr): 8.07 Cycle Time (s): 90
PRC Over All Lanes (%): 52.9 Total Delay Over All Lanes(pcuHr): 8.07

Full Input Data And Results

Scenario 5: '2040 Base + CD AM' (FG5: '2040 Base + CD AM', Plan 1: 'Network Control Plan 1')

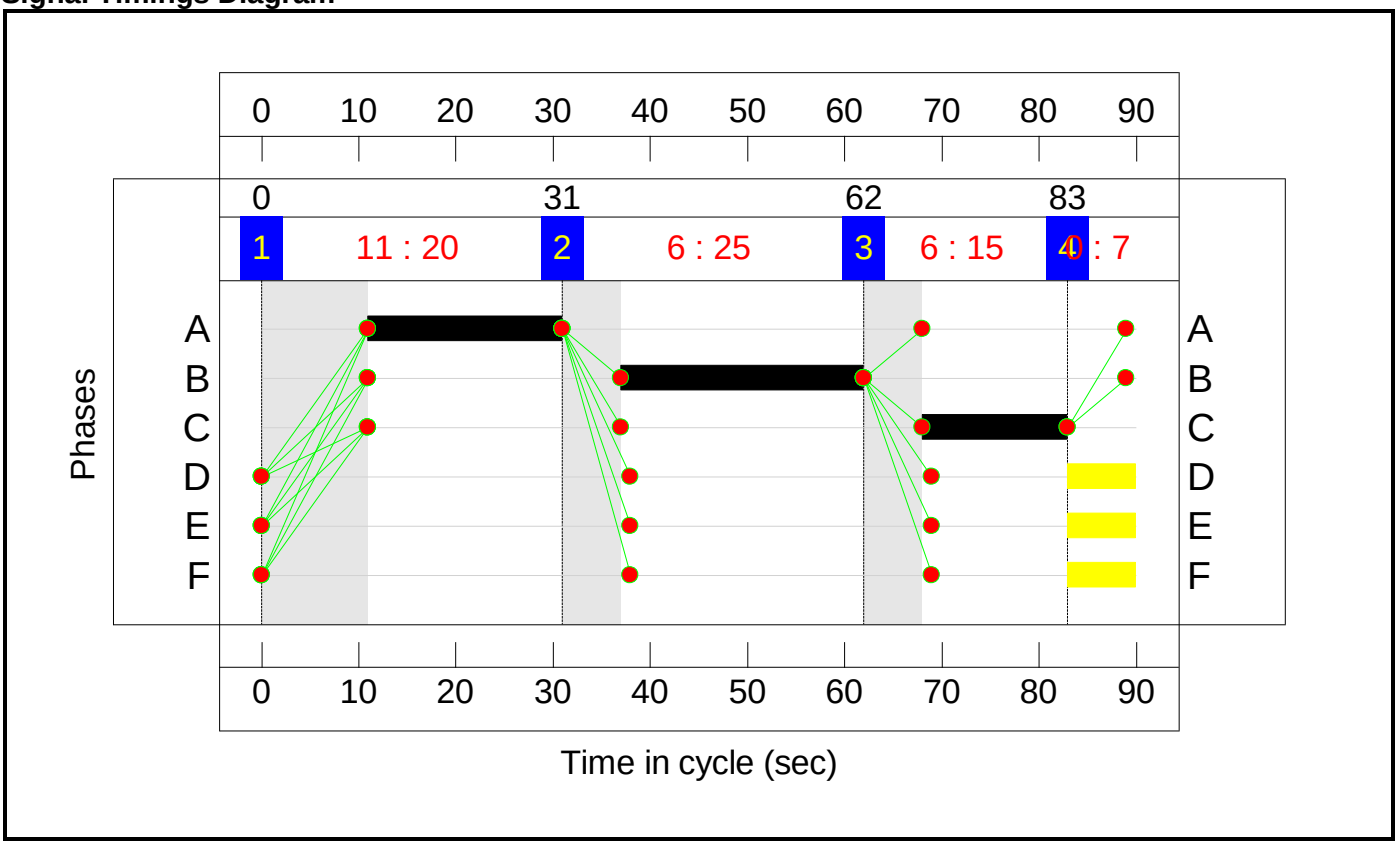
Stage Sequence Diagram



Stage Timings

Stage	1	2	3	4
Duration	20	25	15	7
Change Point	0	31	62	83

Signal Timings Diagram



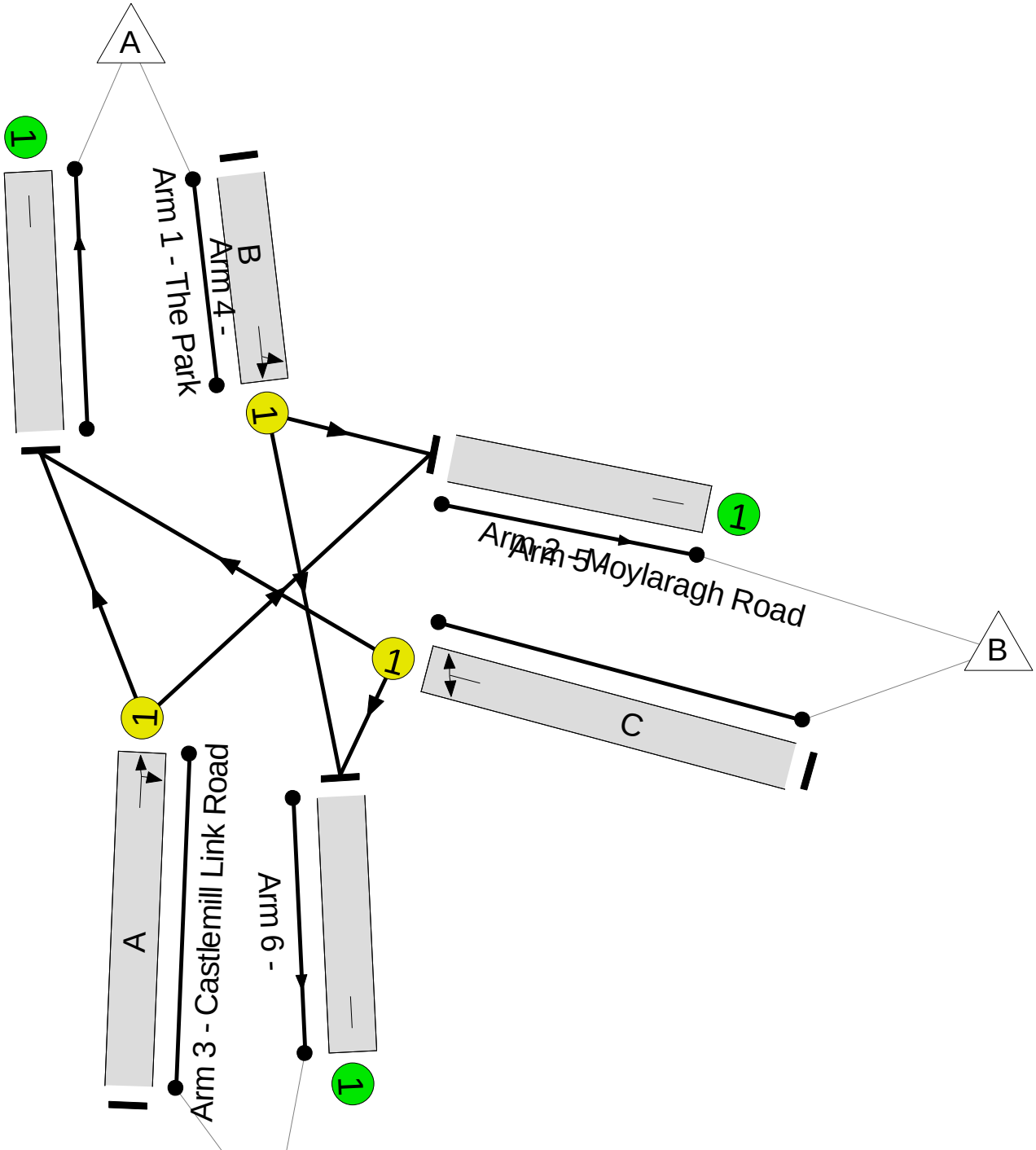
Full Input Data And Results

Network Layout Diagram

Junction 2

PRC: 29.2 %

Total Traffic Delay: 10.9 pcuHr



Network Results

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**69.7%**
Junction 2	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**69.7%**
1/1	The Park Left Ahead	U	N/A	N/A	B		1	25	-	383	1923	556	68.9%
2/1	Moylaragh Road Right Left	U	N/A	N/A	C		1	15	-	204	1711	304	67.1%
3/1	Castlemill Link Road Ahead Right	U	N/A	N/A	A		1	20	-	302	1858	434	69.7%
4/1		U	N/A	N/A	-		-	-	-	248	Inf	Inf	0.0%
5/1		U	N/A	N/A	-		-	-	-	169	Inf	Inf	0.0%
6/1		U	N/A	N/A	-		-	-	-	472	Inf	Inf	0.0%

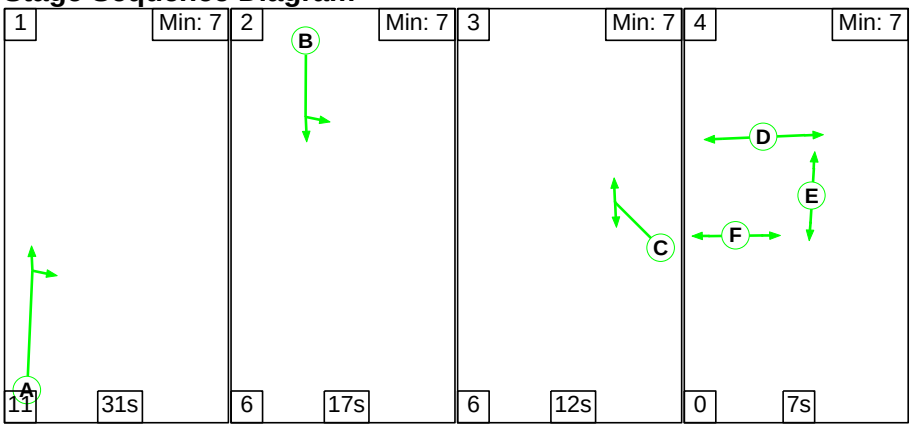
Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network	**-**	**-**	**0**	**0**	**0**	**7.6**	**3.2**	**0.0**	**10.9**	**-**	**-**	**-**	**-**
Junction 2	**-**	**-**	**0**	**0**	**0**	**7.6**	**3.2**	**0.0**	**10.9**	**-**	**-**	**-**	**-**
1/1	383	383	-	-	-	3.0	1.1	-	4.1	38.7	8.4	1.1	9.5
2/1	204	204	-	-	-	2.0	1.0	-	3.0	52.2	4.8	1.0	5.8
3/1	302	302	-	-	-	2.7	1.1	-	3.8	45.0	6.9	1.1	8.0
4/1	248	248	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
5/1	169	169	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	472	472	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0

C1 PRC for Signalled Lanes (%): 29.2 Total Delay for Signalled Lanes (pcuHr): 10.85 Cycle Time (s): 90
PRC Over All Lanes (%): 29.2 Total Delay Over All Lanes(pcuHr): 10.85

Full Input Data And Results

Scenario 6: '2040 Base + CD PM' (FG6: '2040 Base + CD PM', Plan 1: 'Network Control Plan 1')

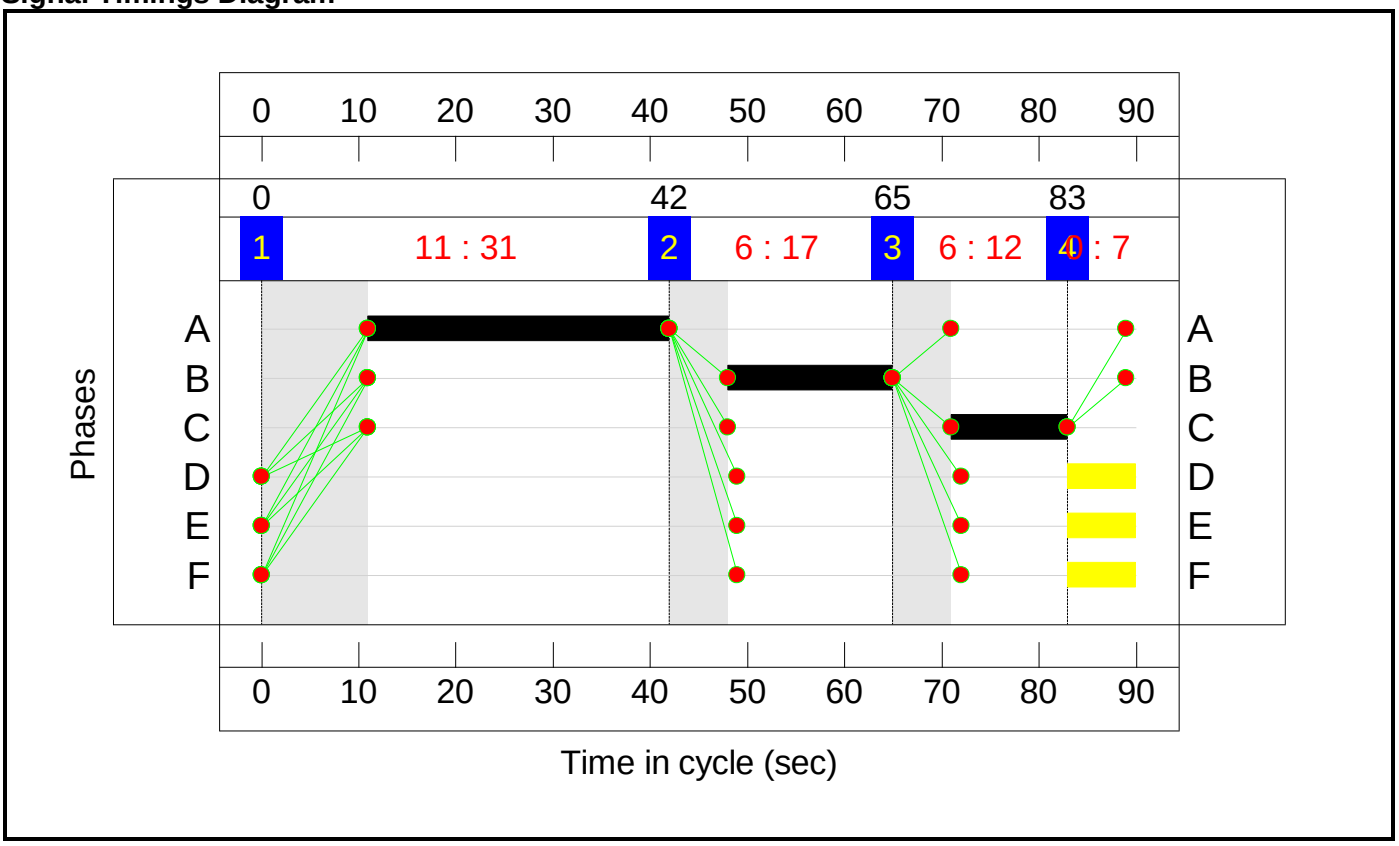
Stage Sequence Diagram



Stage Timings

Stage	1	2	3	4
Duration	31	17	12	7
Change Point	0	42	65	83

Signal Timings Diagram



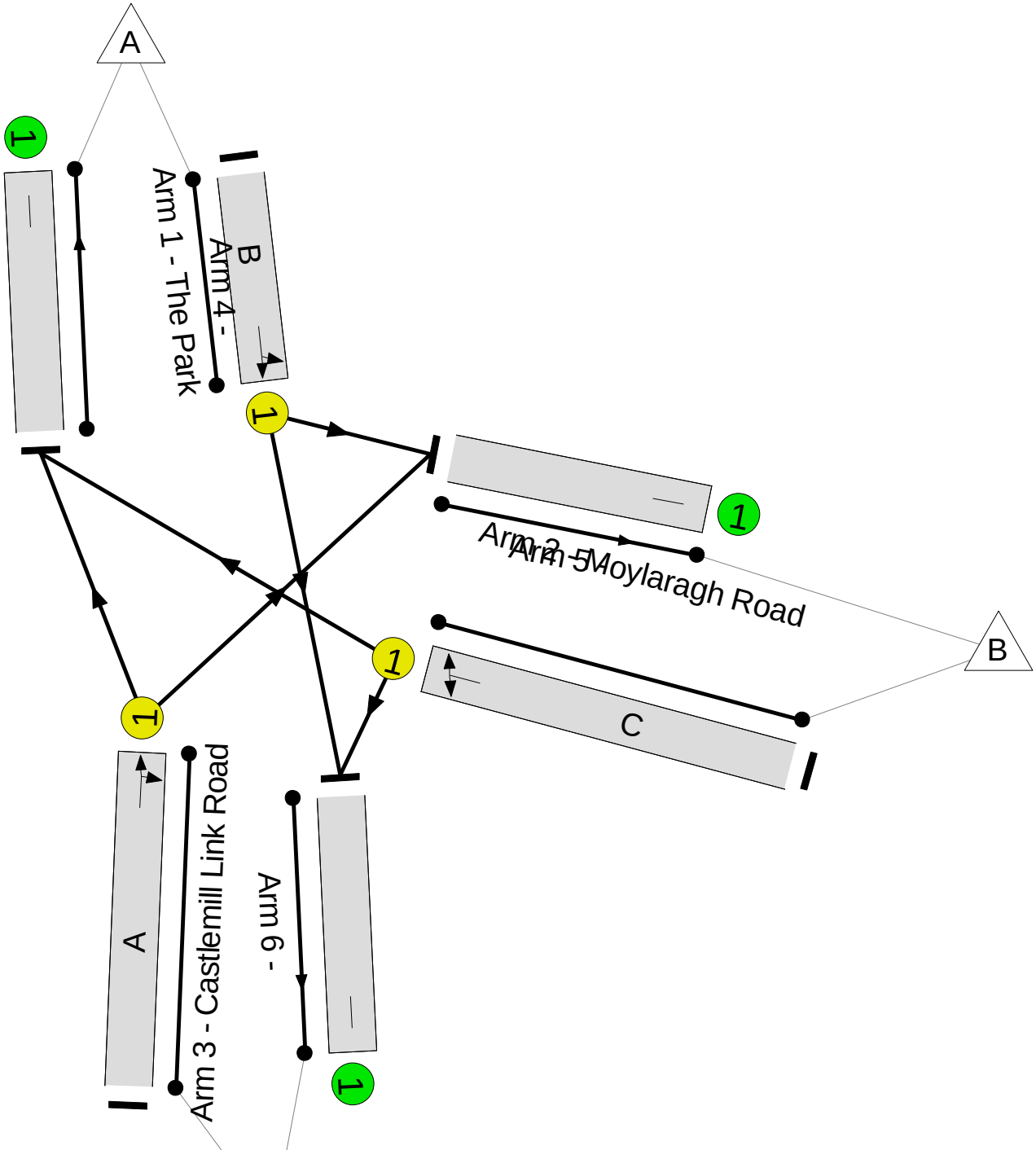
Full Input Data And Results

Network Layout Diagram

Junction 2

PRC: 49.3 %

Total Traffic Delay: 8.4 pcuHr



Network Results

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**60.3%**
Junction 2	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**60.3%**
1/1	The Park Left Ahead	U	N/A	N/A	B		1	17	-	226	1874	375	60.3%
2/1	Moylaragh Road Right Left	U	N/A	N/A	C		1	12	-	145	1725	249	58.2%
3/1	Castlemill Link Road Ahead Right	U	N/A	N/A	A		1	31	-	404	1893	673	60.0%
4/1		U	N/A	N/A	-		-	-	-	392	Inf	Inf	0.0%
5/1		U	N/A	N/A	-		-	-	-	179	Inf	Inf	0.0%
6/1		U	N/A	N/A	-		-	-	-	204	Inf	Inf	0.0%

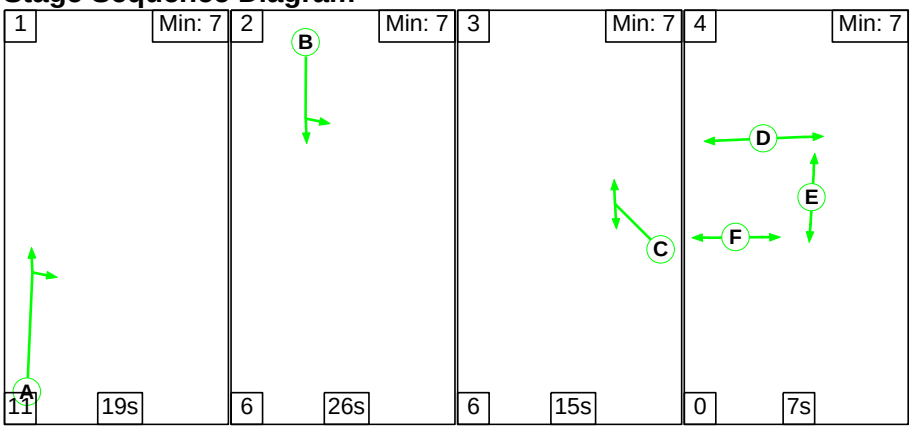
Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network	**-**	**-**	**0**	**0**	**0**	**6.2**	**2.2**	**0.0**	**8.4**	**-**	**-**	**-**	**-**
Junction 2	**-**	**-**	**0**	**0**	**0**	**6.2**	**2.2**	**0.0**	**8.4**	**-**	**-**	**-**	**-**
1/1	226	226	-	-	-	2.1	0.8	-	2.8	44.7	5.1	0.8	5.8
2/1	145	145	-	-	-	1.4	0.7	-	2.1	53.0	3.4	0.7	4.1
3/1	404	404	-	-	-	2.7	0.7	-	3.4	30.4	8.2	0.7	8.9
4/1	392	392	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
5/1	179	179	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	204	204	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0

C1 PRC for Signalled Lanes (%): 49.3 Total Delay for Signalled Lanes (pcuHr): 8.36 Cycle Time (s): 90
PRC Over All Lanes (%): 49.3 Total Delay Over All Lanes(pcuHr): 8.36

Full Input Data And Results

Scenario 7: '2040 Base + CD + Malincross AM' (FG7: '2040 Base + CD +Malincross AM', Plan 1: 'Network Control Plan 1')

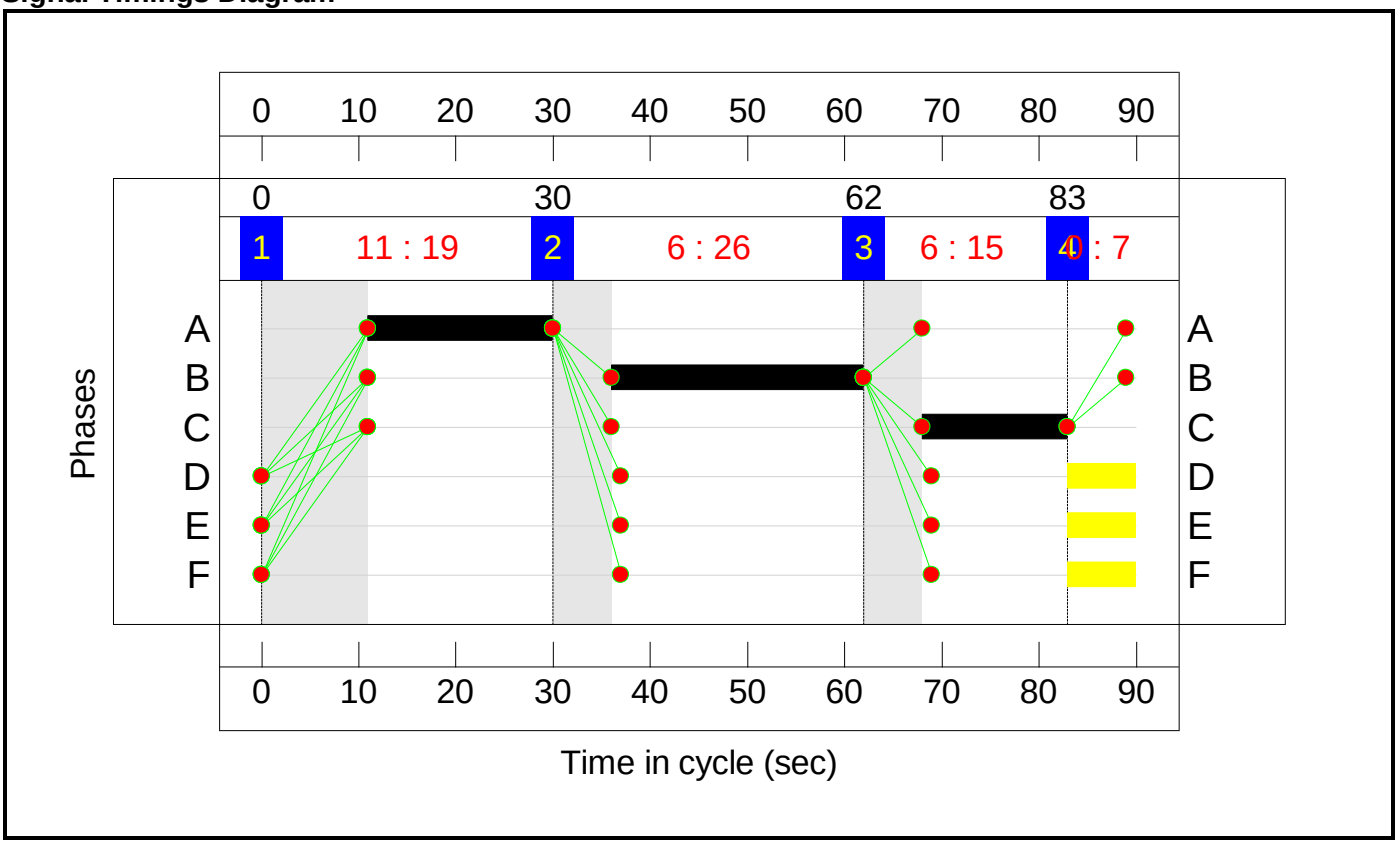
Stage Sequence Diagram



Stage Timings

Stage	1	2	3	4
Duration	19	26	15	7
Change Point	0	30	62	83

Signal Timings Diagram



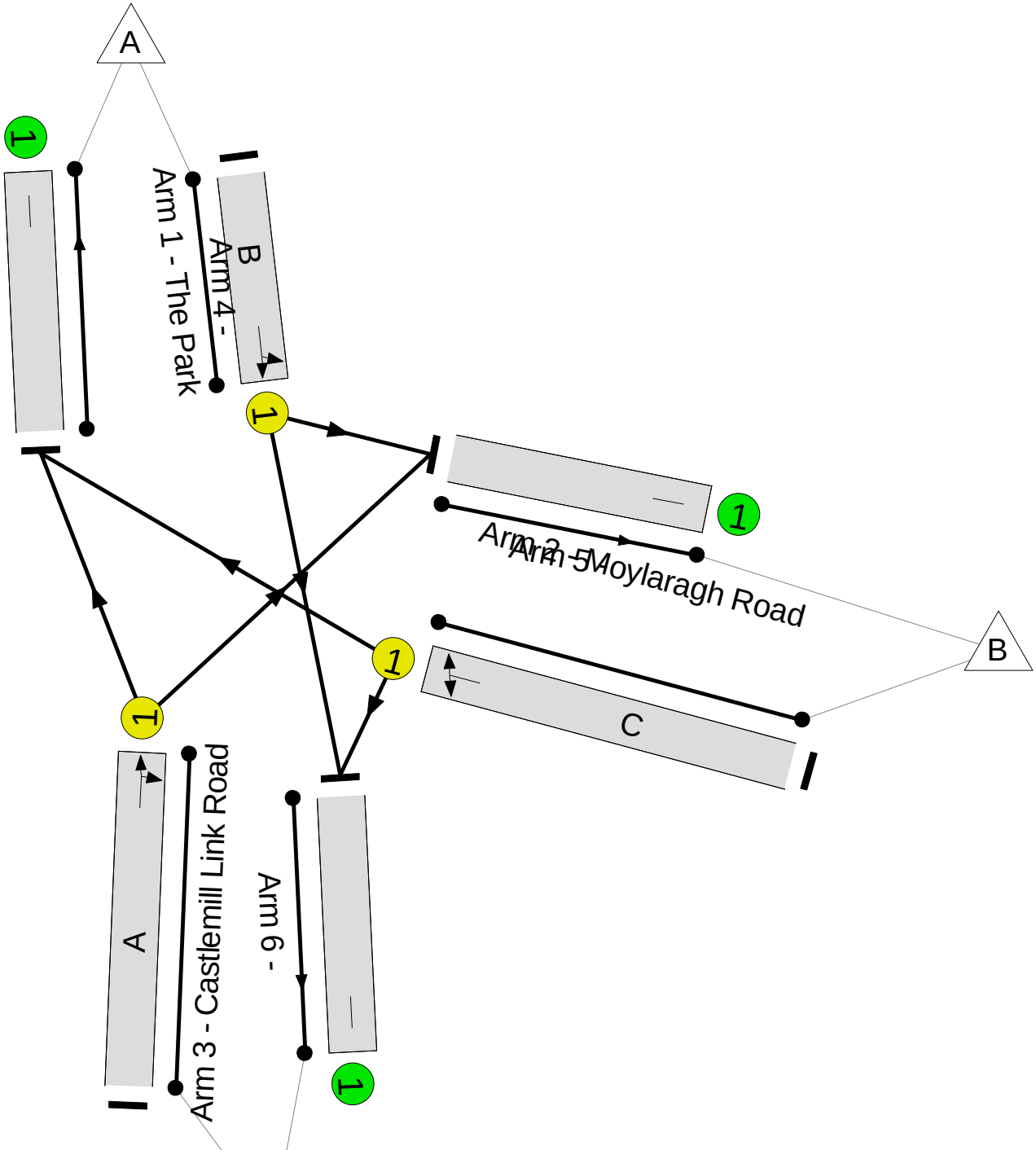
Full Input Data And Results

Network Layout Diagram

Junction 2

PRC: 22.2 %

Total Traffic Delay: 12.0 pcuHr



Network Results

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**73.6%**
Junction 2	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**73.6%**
1/1	The Park Left Ahead	U	N/A	N/A	B		1	26	-	421	1906	572	73.6%
2/1	Moylaragh Road Right Left	U	N/A	N/A	C		1	15	-	215	1712	304	70.6%
3/1	Castlemill Link Road Ahead Right	U	N/A	N/A	A		1	19	-	302	1858	413	73.1%
4/1		U	N/A	N/A	-		-	-	-	259	Inf	Inf	0.0%
5/1		U	N/A	N/A	-		-	-	-	207	Inf	Inf	0.0%
6/1		U	N/A	N/A	-		-	-	-	472	Inf	Inf	0.0%

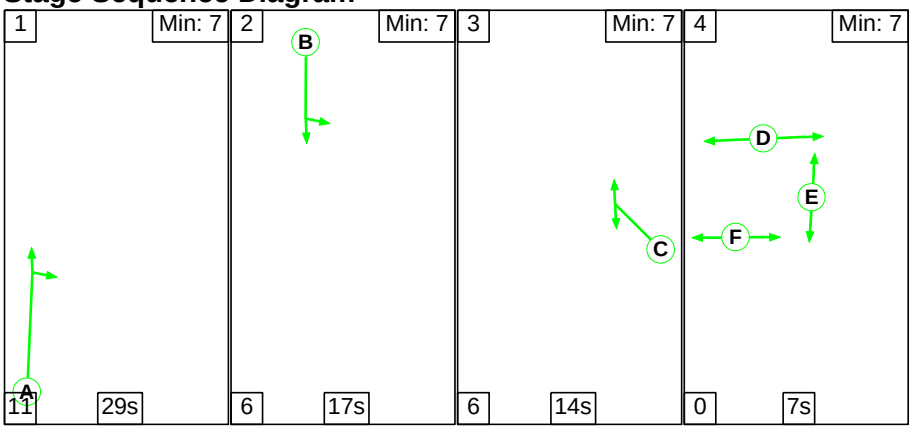
Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network	**-**	**-**	**0**	**0**	**0**	**8.1**	**3.9**	**0.0**	**12.0**	**-**	**-**	**-**	**-**
Junction 2	**-**	**-**	**0**	**0**	**0**	**8.1**	**3.9**	**0.0**	**12.0**	**-**	**-**	**-**	**-**
1/1	421	421	-	-	-	3.3	1.4	-	4.7	40.0	9.4	1.4	10.7
2/1	215	215	-	-	-	2.1	1.2	-	3.3	54.4	5.0	1.2	6.2
3/1	302	302	-	-	-	2.7	1.3	-	4.1	48.4	7.0	1.3	8.3
4/1	259	259	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
5/1	207	207	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	472	472	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0

C1 PRC for Signalled Lanes (%): 22.2 Total Delay for Signalled Lanes (pcuHr): 11.99 Cycle Time (s): 90
PRC Over All Lanes (%): 22.2 Total Delay Over All Lanes(pcuHr): 11.99

Full Input Data And Results

Scenario 8: '2040 Base + CD + Malincross PM' (FG8: '2040 Base + CD + Malincross PM', Plan 1: 'Network Control Plan 1')

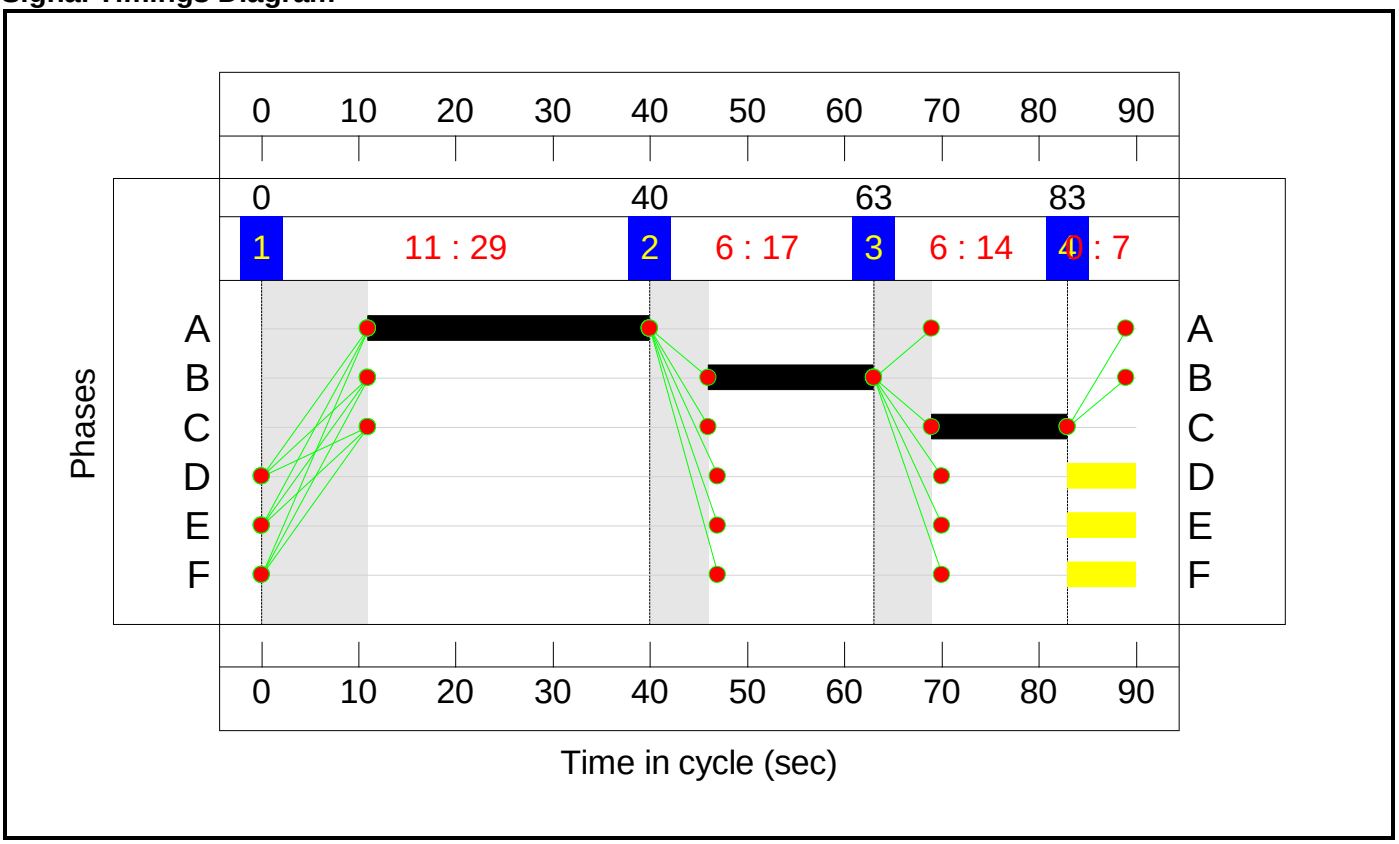
Stage Sequence Diagram



Stage Timings

Stage	1	2	3	4
Duration	29	17	14	7
Change Point	0	40	63	83

Signal Timings Diagram



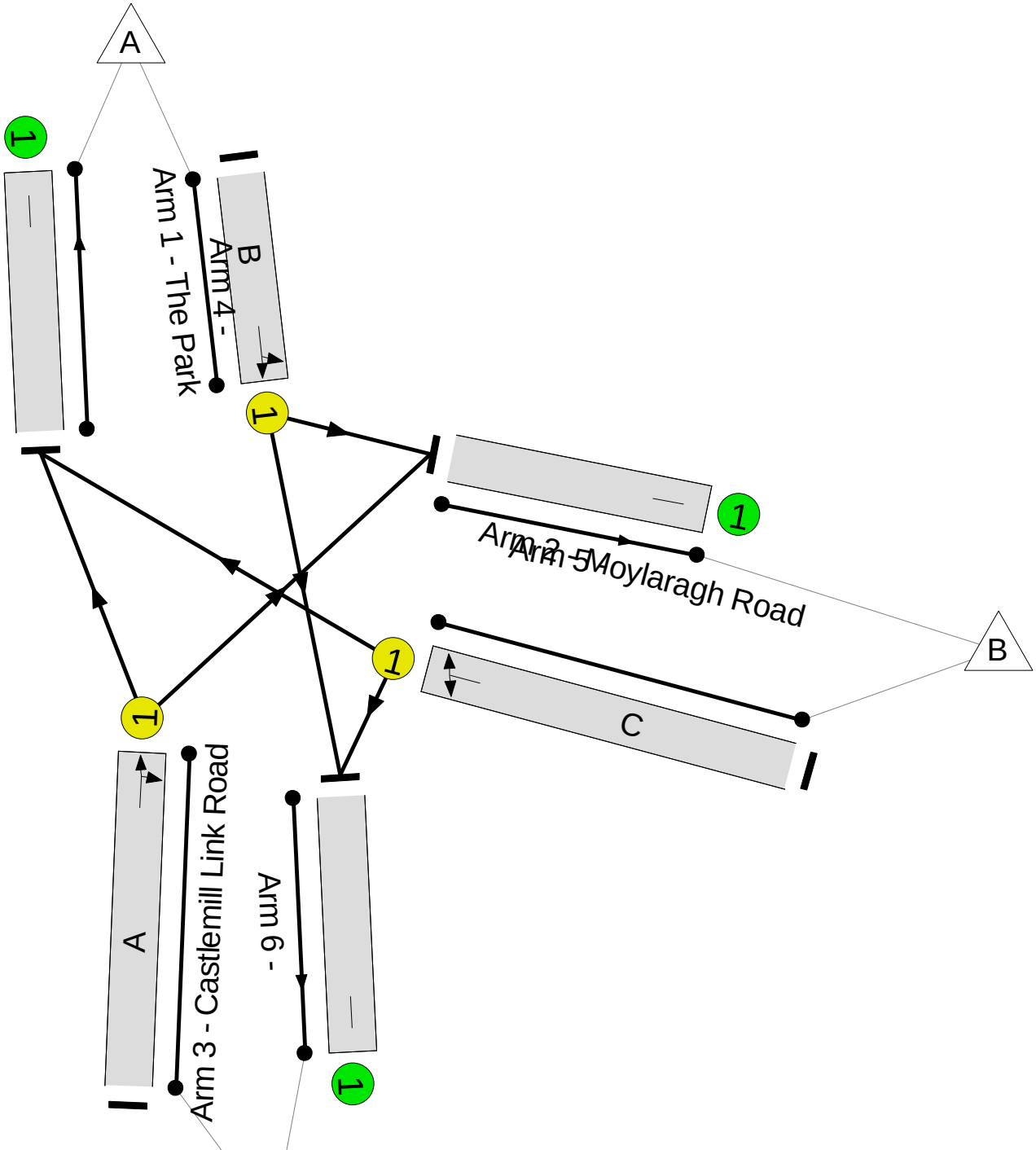
Full Input Data And Results

Network Layout Diagram

Junction 2

PRC: 36.3 %

Total Traffic Delay: 9.5 pcuHr



Network Results

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**66.0%**
Junction 2	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**66.0%**
1/1	The Park Left Ahead	U	N/A	N/A	B		1	17	-	246	1863	373	66.0%
2/1	Moylaragh Road Right Left	U	N/A	N/A	C		1	14	-	179	1729	288	62.1%
3/1	Castlemill Link Road Ahead Right	U	N/A	N/A	A		1	29	-	404	1893	631	64.0%
4/1		U	N/A	N/A	-		-	-	-	426	Inf	Inf	0.0%
5/1		U	N/A	N/A	-		-	-	-	199	Inf	Inf	0.0%
6/1		U	N/A	N/A	-		-	-	-	204	Inf	Inf	0.0%

Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network	**-**	**-**	**0**	**0**	**0**	**6.9**	**2.6**	**0.0**	**9.5**	**-**	**-**	**-**	**-**
Junction 2	**-**	**-**	**0**	**0**	**0**	**6.9**	**2.6**	**0.0**	**9.5**	**-**	**-**	**-**	**-**
1/1	246	246	-	-	-	2.3	1.0	-	3.2	47.2	5.6	1.0	6.6
2/1	179	179	-	-	-	1.7	0.8	-	2.5	51.1	4.1	0.8	4.9
3/1	404	404	-	-	-	2.9	0.9	-	3.7	33.3	8.5	0.9	9.4
4/1	426	426	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
5/1	199	199	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	204	204	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0

C1 PRC for Signalled Lanes (%): 36.3 Total Delay for Signalled Lanes (pcuHr): 9.50 Cycle Time (s): 90
PRC Over All Lanes (%): 36.3 Total Delay Over All Lanes(pcuHr): 9.50

APPENDIX M

PICADY Output (Junction 4)

DRAFT

Junctions 9

PICADY 9 - Priority Intersection Module

Version: 9.0.2.5947
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Filename: 2021-07-19 Jct 4 - Bloulevard Rd T v12.0.j9
Path: C:\Users\brian.condon\Condondrew Associates\Condon Drew Associates Ltd. - Documents\CDA Projects\1200-1299\1224-Balbriggan, Ireland\02-Analysis\Junctions9\Malincross
Report generation date: 22/07/2021 10:14:11

»2025 Base + Com Dev, AM
»2025 Base + Com Dev, PM
»2040 Base + Com Dev, AM
»2040 Base + Com Dev, PM
»2025 Base + Com Dev + Malincross, AM
»2025 Base + Com Dev + Malincross, PM
»2040 Base + Com Dev + Malincross, AM
»2040 Base + Com Dev + Malincross, PM

Summary of junction performance

	AM				PM			
	Queue (PCU)	Delay (s)	RFC	LOS	Queue (PCU)	Delay (s)	RFC	LOS
	2025 Base + Com Dev							
Stream B-AC	65.2	712.28	1.46	F	2.9	65.59	0.77	F
Stream C-AB	0.2	7.84	0.16	A	0.1	8.73	0.12	A
	2040 Base + Com Dev							
Stream B-AC	106.2	1345.79	1.81	F	7.8	164.71	0.97	F
Stream C-AB	0.2	8.48	0.18	A	0.2	9.48	0.13	A
	2025 Base + Com Dev + Malincross							
Stream B-AC	303.8	3110.50	2.51	F	53.0	684.39	1.49	F
Stream C-AB	0.3	8.49	0.20	A	0.3	11.22	0.25	B
	2040 Base + Com Dev + Malincross							
Stream B-AC	368.5	4037.22	3.10	F	80.8	1472.67	1.92	F
Stream C-AB	0.3	9.21	0.23	A	0.4	12.51	0.27	B

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

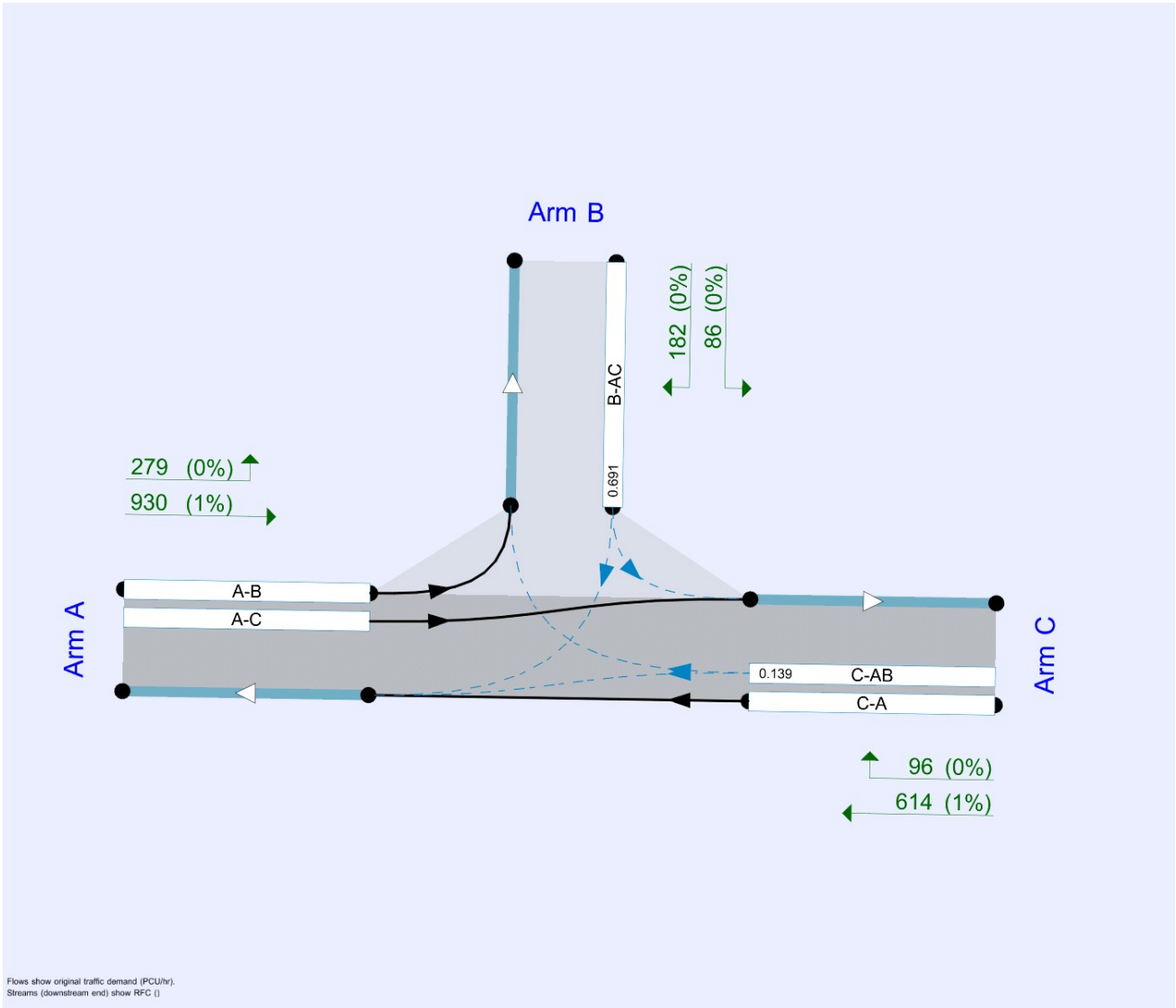
File summary

File Description

Title	Balbriggan, Ireland
Location	Clonard Road
Site number	Jct 4
Date	12/12/2018
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	1219
Enumerator	briancondon-PC\brian.condon
Description	

Units

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



The junction diagram reflects the last run of Junctions.

Analysis Options

Calculate Queue Percentiles	Calculate residual capacity	RFC Threshold	Average Delay threshold (s)	Queue threshold (PCU)
		0.85	36.00	20.00

Demand Set Summary

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D1	2025 Base + Com Dev	AM	ONE HOUR	08:00	09:30	15
D2	2025 Base + Com Dev	PM	ONE HOUR	15:00	16:30	15
D3	2040 Base + Com Dev	AM	ONE HOUR	08:00	09:30	15
D4	2040 Base + Com Dev	PM	ONE HOUR	15:00	16:30	15
D5	2025 Base + Com Dev + Malincross	AM	ONE HOUR	08:00	09:30	15
D6	2025 Base + Com Dev + Malincross	PM	ONE HOUR	15:00	16:30	15
D7	2040 Base + Com Dev + Malincross	AM	ONE HOUR	08:00	09:30	15
D8	2040 Base + Com Dev + Malincross	PM	ONE HOUR	15:00	16:30	15

Analysis Set Details

ID	Network flow scaling factor (%)
A1	100.000

2025 Base + Com Dev, AM

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction Type	Major road direction	Junction Delay (s)	Junction LOS
1	untitled	T-Junction	Two-way	124.84	F

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Arms

Arms

Arm	Name	Description	Arm type
A	Clonard Road (West)		Major
B	School Access Road		Minor
C	Clonard Road (East)		Major

Major Arm Geometry

Arm	Width of carriageway (m)	Has kerbed central reserve	Has right turn bay	Width for right turn (m)	Visibility for right turn (m)	Blocks?	Blocking queue (PCU)
C	6.65		✓	3.30	225.0	✓	7.00

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

Minor Arm Geometry

Arm	Minor arm type	Lane width (m)	Visibility to left (m)	Visibility to right (m)
B	One lane	3.20	48	42

Slope / Intercept / Capacity

Priority Intersection Slopes and Intercepts

Junction	Stream	Intercept (PCU/hr)	Slope for A-B	Slope for A-C	Slope for C-A	Slope for C-B
1	B-A	524	0.093	0.234	0.148	0.335
1	B-C	663	0.099	0.250	-	-
1	C-B	789	0.297	0.297	-	-

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

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

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

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D1	2025 Base + Com Dev	AM	ONE HOUR	08:00	09:30	15

Vehicle mix source	PCU Factor for a HV (PCU)
HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
A		✓	738	100.000
B		✓	333	100.000
C		✓	834	100.000

Origin-Destination Data

Demand (PCU/hr)

		To		
		A	B	C
From	A	0	147	591
	B	225	0	108
	C	754	80	0

Vehicle Mix

Heavy Vehicle Percentages

		To		
		A	B	C
From	A	0	4	4
	B	2	0	1
	C	2	0	0

Results

Results Summary for whole modelled period

Stream	Max RFC	Max delay (s)	Max Queue (PCU)	Max LOS
B-AC	1.46	712.28	65.2	F
C-AB	0.16	7.84	0.2	A
C-A				
A-B				
A-C				

Main Results for each time segment

08:00 - 08:15

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-AC	251	356	0.704	242	2.2	30.252	D
C-AB	60	624	0.097	60	0.1	6.381	A
C-A	568			568			
A-B	111			111			
A-C	445			445			

08:15 - 08:30

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-AC	299	313	0.956	280	7.1	81.494	F
C-AB	72	592	0.122	72	0.1	6.923	A
C-A	678			678			
A-B	132			132			
A-C	531			531			

08:30 - 08:45

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-AC	367	252	1.457	250	36.3	340.658	F
C-AB	88	547	0.161	88	0.2	7.832	A
C-A	830			830			
A-B	162			162			
A-C	651			651			

08:45 - 09:00

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-AC	367	252	1.458	251	65.2	681.492	F
C-AB	88	547	0.161	88	0.2	7.838	A
C-A	830			830			
A-B	162			162			
A-C	651			651			

09:00 - 09:15

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-AC	299	313	0.957	308	63.0	712.278	F
C-AB	72	592	0.122	72	0.1	6.934	A
C-A	678			678			
A-B	132			132			
A-C	531			531			

09:15 - 09:30

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-AC	251	356	0.705	350	38.2	523.911	F
C-AB	60	624	0.097	60	0.1	6.394	A
C-A	568			568			
A-B	111			111			
A-C	445			445			

2025 Base + Com Dev, PM

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction Type	Major road direction	Junction Delay (s)	Junction LOS
1	untitled	T-Junction	Two-way	6.19	A

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D2	2025 Base + Com Dev	PM	ONE HOUR	15:00	16:30	15

Vehicle mix source	PCU Factor for a HV (PCU)
HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
A		✓	972	100.000
B		✓	156	100.000
C		✓	601	100.000

Origin-Destination Data

Demand (PCU/hr)

		To		
		A	B	C
From	A	0	142	830
	B	110	0	46
	C	548	53	0

Vehicle Mix

Heavy Vehicle Percentages

		To		
		A	B	C
From	A	0	0	1
	B	0	0	0
	C	1	0	0

Results

Results Summary for whole modelled period

Stream	Max RFC	Max delay (s)	Max Queue (PCU)	Max LOS
B-AC	0.77	65.59	2.9	F
C-AB	0.12	8.73	0.1	A
C-A				
A-B				
A-C				

Main Results for each time segment

15:00 - 15:15

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-AC	117	334	0.352	115	0.5	16.331	C
C-AB	40	571	0.070	40	0.1	6.768	A
C-A	413			413			
A-B	107			107			
A-C	625			625			

15:15 - 15:30

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-AC	140	288	0.487	139	0.9	23.857	C
C-AB	48	529	0.090	48	0.1	7.472	A
C-A	493			493			
A-B	128			128			
A-C	746			746			

15:30 - 15:45

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-AC	172	223	0.769	165	2.6	56.162	F
C-AB	58	471	0.124	58	0.1	8.720	A
C-A	603			603			
A-B	156			156			
A-C	914			914			

15:45 - 16:00

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-AC	172	223	0.770	171	2.9	65.589	F
C-AB	58	471	0.124	58	0.1	8.727	A
C-A	603			603			
A-B	156			156			
A-C	914			914			

16:00 - 16:15

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-AC	140	288	0.487	148	1.0	26.919	D
C-AB	48	529	0.090	48	0.1	7.483	A
C-A	493			493			
A-B	128			128			
A-C	746			746			

16:15 - 16:30

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-AC	117	334	0.352	119	0.6	16.921	C
C-AB	40	571	0.070	40	0.1	6.776	A
C-A	413			413			
A-B	107			107			
A-C	625			625			

2040 Base + Com Dev, AM

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction Type	Major road direction	Junction Delay (s)	Junction LOS
1	untitled	T-Junction	Two-way	222.08	F

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D3	2040 Base + Com Dev	AM	ONE HOUR	08:00	09:30	15

Vehicle mix source	PCU Factor for a HV (PCU)
HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
A		✓	824	100.000
B		✓	346	100.000
C		✓	930	100.000

Origin-Destination Data

Demand (PCU/hr)

		To		
		A	B	C
From	A	0	158	666
	B	233	0	113
	C	844	86	0

Vehicle Mix

Heavy Vehicle Percentages

		To		
		A	B	C
From	A	0	5	4
	B	3	0	1
	C	2	0	0

Results

Results Summary for whole modelled period

Stream	Max RFC	Max delay (s)	Max Queue (PCU)	Max LOS
B-AC	1.81	1345.79	106.2	F
C-AB	0.18	8.48	0.2	A
C-A				
A-B				
A-C				

Main Results for each time segment

08:00 - 08:15

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-AC	260	331	0.788	248	3.1	40.243	E
C-AB	65	604	0.107	64	0.1	6.659	A
C-A	635			635			
A-B	119			119			
A-C	501			501			

08:15 - 08:30

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-AC	311	282	1.104	269	13.7	147.045	F
C-AB	77	569	0.136	77	0.2	7.323	A
C-A	759			759			
A-B	142			142			
A-C	599			599			

08:30 - 08:45

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-AC	381	211	1.804	211	56.3	625.047	F
C-AB	95	519	0.182	94	0.2	8.469	A
C-A	929			929			
A-B	174			174			
A-C	733			733			

08:45 - 09:00

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-AC	381	211	1.805	211	98.8	1345.787	F
C-AB	95	519	0.182	95	0.2	8.479	A
C-A	929			929			
A-B	174			174			
A-C	733			733			

09:00 - 09:15

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-AC	311	282	1.104	281	106.2	1264.207	F
C-AB	77	569	0.136	78	0.2	7.333	A
C-A	759			759			
A-B	142			142			
A-C	599			599			

09:15 - 09:30

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-AC	260	330	0.788	327	89.5	1077.434	F
C-AB	65	604	0.107	65	0.1	6.676	A
C-A	635			635			
A-B	119			119			
A-C	501			501			

2040 Base + Com Dev, PM

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction Type	Major road direction	Junction Delay (s)	Junction LOS
1	untitled	T-Junction	Two-way	14.22	B

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D4	2040 Base + Com Dev	PM	ONE HOUR	15:00	16:30	15

Vehicle mix source	PCU Factor for a HV (PCU)
HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
A		✓	1072	100.000
B		✓	161	100.000
C		✓	667	100.000

Origin-Destination Data

Demand (PCU/hr)

		To		
		A	B	C
From	A	0	142	930
	B	114	0	47
	C	614	53	0

Vehicle Mix

Heavy Vehicle Percentages

		To		
		A	B	C
From	A	0	0	1
	B	0	0	0
	C	1	0	0

Results

Results Summary for whole modelled period

Stream	Max RFC	Max delay (s)	Max Queue (PCU)	Max LOS
B-AC	0.97	164.71	7.8	F
C-AB	0.13	9.48	0.2	A
C-A				
A-B				
A-C				

Main Results for each time segment

15:00 - 15:15

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-AC	121	308	0.394	119	0.6	18.795	C
C-AB	40	549	0.073	40	0.1	7.062	A
C-A	462			462			
A-B	107			107			
A-C	700			700			

15:15 - 15:30

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-AC	145	257	0.564	142	1.2	30.906	D
C-AB	48	502	0.095	48	0.1	7.912	A
C-A	552			552			
A-B	128			128			
A-C	836			836			

15:30 - 15:45

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-AC	177	183	0.968	159	5.7	109.599	F
C-AB	58	438	0.133	58	0.2	9.469	A
C-A	676			676			
A-B	156			156			
A-C	1024			1024			

15:45 - 16:00

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-AC	177	183	0.968	169	7.8	164.706	F
C-AB	58	438	0.133	58	0.2	9.478	A
C-A	676			676			
A-B	156			156			
A-C	1024			1024			

16:00 - 16:15

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-AC	145	257	0.564	170	1.4	50.923	F
C-AB	48	502	0.095	48	0.1	7.921	A
C-A	552			552			
A-B	128			128			
A-C	836			836			

16:15 - 16:30

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-AC	121	308	0.394	124	0.7	19.906	C
C-AB	40	549	0.073	40	0.1	7.076	A
C-A	462			462			
A-B	107			107			
A-C	700			700			

2025 Base + Com Dev + Malincross, AM

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction Type	Major road direction	Junction Delay (s)	Junction LOS
1	untitled	T-Junction	Two-way	769.42	F

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D5	2025 Base + Com Dev + Malincross	AM	ONE HOUR	08:00	09:30	15

Vehicle mix source	PCU Factor for a HV (PCU)
HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
A		✓	782	100.000
B		✓	537	100.000
C		✓	853	100.000

Origin-Destination Data

Demand (PCU/hr)

		To		
		A	B	C
From	A	0	191	591
	B	374	0	163
	C	754	99	0

Vehicle Mix

Heavy Vehicle Percentages

		To		
		A	B	C
From	A	0	3	4
	B	1	0	1
	C	2	0	0

Results

Results Summary for whole modelled period

Stream	Max RFC	Max delay (s)	Max Queue (PCU)	Max LOS
B-AC	2.51	3110.50	303.8	F
C-AB	0.20	8.49	0.3	A
C-A				
A-B				
A-C				

Main Results for each time segment

08:00 - 08:15

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-AC	404	344	1.174	327	19.2	129.248	F
C-AB	75	614	0.121	74	0.1	6.662	A
C-A	568			568			
A-B	144			144			
A-C	445			445			

08:15 - 08:30

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-AC	483	300	1.611	299	65.1	588.363	F
C-AB	89	580	0.153	89	0.2	7.330	A
C-A	678			678			
A-B	172			172			
A-C	531			531			

08:30 - 08:45

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-AC	591	236	2.509	236	154.1	1691.251	F
C-AB	109	533	0.205	109	0.3	8.479	A
C-A	830			830			
A-B	210			210			
A-C	651			651			

08:45 - 09:00

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-AC	591	236	2.510	236	243.0	2489.461	F
C-AB	109	533	0.205	109	0.3	8.491	A
C-A	830			830			
A-B	210			210			
A-C	651			651			

09:00 - 09:15

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-AC	483	300	1.612	300	288.8	2909.462	F
C-AB	89	580	0.153	89	0.2	7.344	A
C-A	678			678			
A-B	172			172			
A-C	531			531			

09:15 - 09:30

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-AC	404	344	1.174	344	303.8	3110.500	F
C-AB	75	614	0.121	75	0.1	6.679	A
C-A	568			568			
A-B	144			144			
A-C	445			445			

2025 Base + Com Dev + Malincross, PM

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction Type	Major road direction	Junction Delay (s)	Junction LOS
1	untitled	T-Junction	Two-way	90.16	F

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D6	2025 Base + Com Dev + Malincross	PM	ONE HOUR	15:00	16:30	15

Vehicle mix source	PCU Factor for a HV (PCU)
HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
A		✓	1108	100.000
B		✓	264	100.000
C		✓	644	100.000

Origin-Destination Data

Demand (PCU/hr)

		To		
		A	B	C
From	A	0	278	830
	B	179	0	85
	C	548	96	0

Vehicle Mix

Heavy Vehicle Percentages

		To		
		A	B	C
From	A	0	0	1
	B	0	0	0
	C	1	0	0

Results

Results Summary for whole modelled period

Stream	Max RFC	Max delay (s)	Max Queue (PCU)	Max LOS
B-AC	1.49	684.39	53.0	F
C-AB	0.25	11.22	0.3	B
C-A				
A-B				
A-C				

Main Results for each time segment

15:00 - 15:15

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-AC	199	318	0.625	193	1.5	27.525	D
C-AB	72	541	0.134	72	0.2	7.661	A
C-A	413			413			
A-B	209			209			
A-C	625			625			

15:15 - 15:30

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-AC	237	268	0.887	225	4.6	69.779	F
C-AB	86	493	0.175	86	0.2	8.846	A
C-A	493			493			
A-B	250			250			
A-C	746			746			

15:30 - 15:45

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-AC	291	195	1.488	193	29.1	347.490	F
C-AB	106	426	0.248	105	0.3	11.193	B
C-A	603			603			
A-B	306			306			
A-C	914			914			

15:45 - 16:00

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-AC	291	195	1.489	195	53.0	684.389	F
C-AB	106	426	0.248	106	0.3	11.224	B
C-A	603			603			
A-B	306			306			
A-C	914			914			

16:00 - 16:15

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-AC	237	267	0.887	263	46.8	645.856	F
C-AB	86	493	0.175	87	0.2	8.875	A
C-A	493			493			
A-B	250			250			
A-C	746			746			

16:15 - 16:30

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-AC	199	318	0.625	311	18.7	385.541	F
C-AB	72	541	0.134	73	0.2	7.690	A
C-A	413			413			
A-B	209			209			
A-C	625			625			

2040 Base + Com Dev + Malincross, AM

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction Type	Major road direction	Junction Delay (s)	Junction LOS
1	untitled	T-Junction	Two-way	939.29	F

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D7	2040 Base + Com Dev + Malincross	AM	ONE HOUR	08:00	09:30	15

Vehicle mix source	PCU Factor for a HV (PCU)
HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
A		✓	867	100.000
B		✓	550	100.000
C		✓	948	100.000

Origin-Destination Data

Demand (PCU/hr)

		To		
		A	B	C
From	A	0	201	666
	B	382	0	168
	C	844	104	0

Vehicle Mix

Heavy Vehicle Percentages

		To		
		A	B	C
From	A	0	4	4
	B	2	0	1
	C	2	0	0

Results

Results Summary for whole modelled period

Stream	Max RFC	Max delay (s)	Max Queue (PCU)	Max LOS
B-AC	3.10	4037.22	368.5	F
C-AB	0.23	9.21	0.3	A
C-A				
A-B				
A-C				

Main Results for each time segment

08:00 - 08:15

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-AC	414	319	1.297	308	26.6	182.019	F
C-AB	78	595	0.132	78	0.2	6.955	A
C-A	635			635			
A-B	151			151			
A-C	501			501			

08:15 - 08:30

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-AC	494	269	1.841	268	83.1	901.715	F
C-AB	93	557	0.168	93	0.2	7.757	A
C-A	759			759			
A-B	181			181			
A-C	599			599			

08:30 - 08:45

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-AC	606	195	3.100	195	185.7	2463.851	F
C-AB	115	505	0.227	114	0.3	9.198	A
C-A	929			929			
A-B	221			221			
A-C	733			733			

08:45 - 09:00

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-AC	606	195	3.102	195	288.3	3179.312	F
C-AB	115	505	0.227	115	0.3	9.214	A
C-A	929			929			
A-B	221			221			
A-C	733			733			

09:00 - 09:15

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-AC	494	268	1.842	268	344.8	3727.296	F
C-AB	93	557	0.168	94	0.2	7.777	A
C-A	759			759			
A-B	181			181			
A-C	599			599			

09:15 - 09:30

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-AC	414	319	1.298	319	368.5	4037.225	F
C-AB	78	595	0.132	78	0.2	6.974	A
C-A	635			635			
A-B	151			151			
A-C	501			501			

2040 Base + Com Dev + Malincross, PM

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction Type	Major road direction	Junction Delay (s)	Junction LOS
1	untitled	T-Junction	Two-way	181.01	F

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D8	2040 Base + Com Dev + Malincross	PM	ONE HOUR	15:00	16:30	15

Vehicle mix source	PCU Factor for a HV (PCU)
HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
A		✓	1209	100.000
B		✓	268	100.000
C		✓	710	100.000

Origin-Destination Data

Demand (PCU/hr)

		To		
		A	B	C
From	A	0	279	930
	B	182	0	86
	C	614	96	0

Vehicle Mix

Heavy Vehicle Percentages

		To		
		A	B	C
From	A	0	0	1
	B	0	0	0
	C	1	0	0

Results

Results Summary for whole modelled period

Stream	Max RFC	Max delay (s)	Max Queue (PCU)	Max LOS
B-AC	1.92	1472.67	80.8	F
C-AB	0.27	12.51	0.4	B
C-A				
A-B				
A-C				

Main Results for each time segment

15:00 - 15:15

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-AC	202	292	0.691	194	2.0	34.391	D
C-AB	72	518	0.139	72	0.2	8.048	A
C-A	462			462			
A-B	210			210			
A-C	700			700			

15:15 - 15:30

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-AC	241	236	1.022	216	8.3	120.557	F
C-AB	86	466	0.185	86	0.2	9.470	A
C-A	552			552			
A-B	251			251			
A-C	836			836			

15:30 - 15:45

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-AC	295	154	1.919	153	43.8	645.472	F
C-AB	106	393	0.269	105	0.4	12.465	B
C-A	676			676			
A-B	307			307			
A-C	1024			1024			

15:45 - 16:00

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-AC	295	154	1.922	153	79.2	1472.666	F
C-AB	106	393	0.269	106	0.4	12.511	B
C-A	676			676			
A-B	307			307			
A-C	1024			1024			

16:00 - 16:15

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-AC	241	235	1.023	235	80.8	1176.515	F
C-AB	86	466	0.185	87	0.2	9.510	A
C-A	552			552			
A-B	251			251			
A-C	836			836			

16:15 - 16:30

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-AC	202	292	0.691	288	59.2	876.245	F
C-AB	72	518	0.139	73	0.2	8.081	A
C-A	462			462			
A-B	210			210			
A-C	700			700			

APPENDIX N

ARCADY Output (Junction 4)

DRAFT

Junctions 9

ARCADY 9 - Roundabout Module

Version: 9.0.2.5947
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Filename: 2021-07-19 Jct 4 - Bloulevard Rd RBT v12.0.j9
Path: C:\Users\brian.condon\Condondrew Associates\Condon Drew Associates Ltd. - Documents\CDA Projects\1200-1299\1224-Balbriggan, Ireland\02-Analysis\Junctions9\Malincross
Report generation date: 22/07/2021 10:40:57

»2025 Base + Com Dev, AM
»2025 Base + Com Dev, PM
»2040 Base + Com Dev, AM
»2040 Base + Com Dev, PM
»2025 Base + Com Dev + Malincross, AM
»2025 Base + Com Dev + Malincross, PM
»2040 Base + Com Dev + Malincross, AM
»2040 Base + Com Dev + Malincross, PM

Summary of junction performance

	AM				PM			
	Queue (PCU)	Delay (s)	RFC	LOS	Queue (PCU)	Delay (s)	RFC	LOS
	2025 Base + Com Dev							
Arm A	1.3	5.70	0.55	A	2.5	8.70	0.72	A
Arm B	0.5	5.41	0.35	A	0.2	5.00	0.19	A
Arm C	1.9	7.65	0.66	A	0.8	4.49	0.45	A
	2040 Base + Com Dev							
Arm A	1.7	6.71	0.62	A	3.8	11.78	0.79	B
Arm B	0.6	5.99	0.38	A	0.3	5.53	0.21	A
Arm C	2.8	9.94	0.74	A	1.0	4.95	0.50	A
	2025 Base + Com Dev + Malincross							
Arm A	1.5	6.26	0.59	A	4.9	14.97	0.84	B
Arm B	1.3	8.04	0.57	A	0.5	5.98	0.33	A
Arm C	2.6	10.12	0.72	B	1.0	5.06	0.50	A
	2040 Base + Com Dev + Malincross							
Arm A	2.0	7.49	0.66	A	9.1	26.07	0.91	D
Arm B	1.6	9.38	0.61	A	0.5	6.73	0.36	A
Arm C	4.1	14.44	0.81	B	1.2	5.65	0.55	A

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

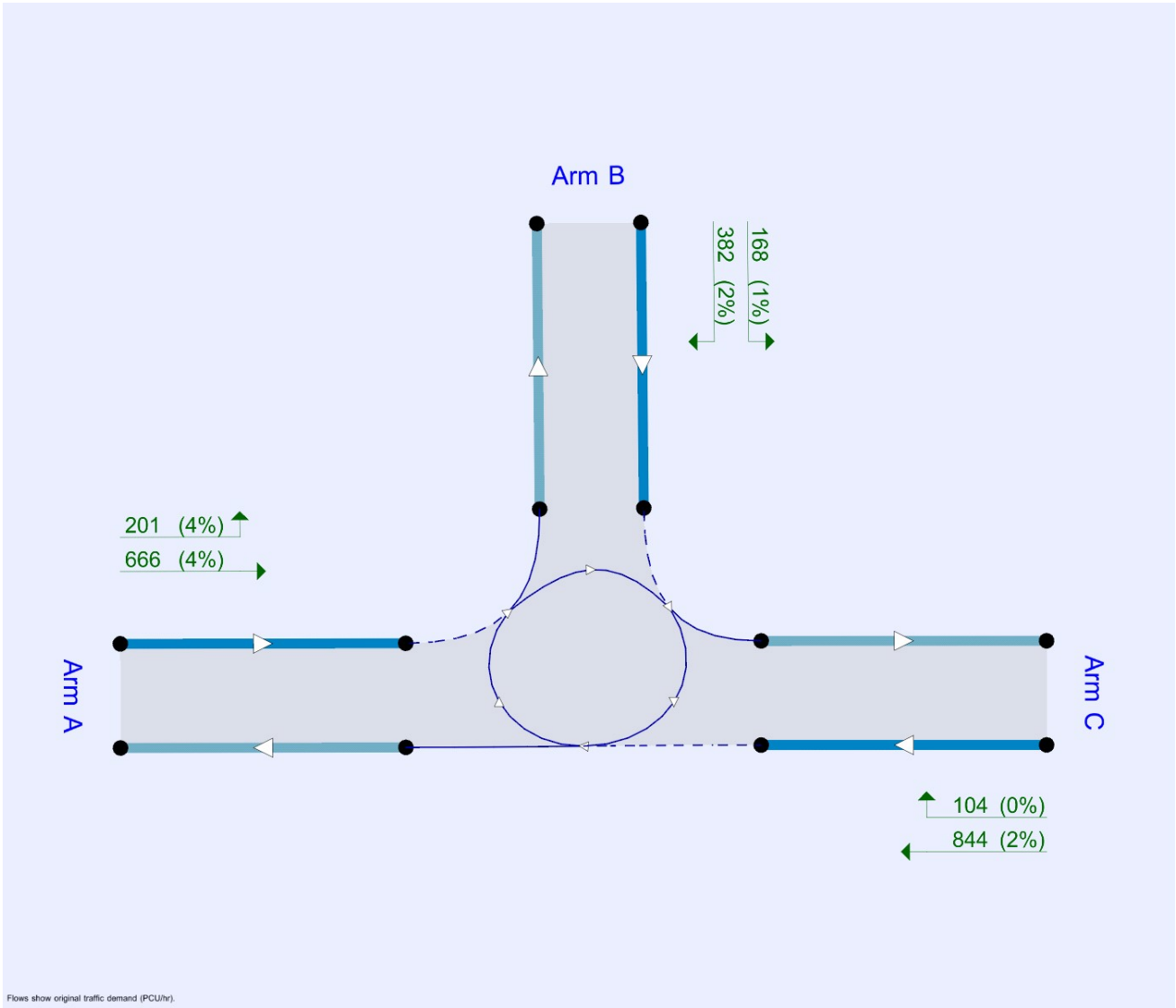
File summary

File Description

Title	Balbriggan, Ireland
Location	Clonard Road
Site number	Jct 4
Date	12/12/2018
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	1219
Enumerator	briancondon-PC\brian.condon
Description	

Units

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



The junction diagram reflects the last run of Junctions.

Analysis Options

Calculate Queue Percentiles	Calculate residual capacity	RFC Threshold	Average Delay threshold (s)	Queue threshold (PCU)
		0.85	36.00	20.00

Demand Set Summary

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D1	2025 Base + Com Dev	AM	ONE HOUR	08:00	09:30	15
D2	2025 Base + Com Dev	PM	ONE HOUR	15:00	16:30	15
D3	2040 Base + Com Dev	AM	ONE HOUR	08:00	09:30	15
D4	2040 Base + Com Dev	PM	ONE HOUR	15:00	16:30	15
D5	2025 Base + Com Dev + Malincross	AM	ONE HOUR	08:00	09:30	15
D6	2025 Base + Com Dev + Malincross	PM	ONE HOUR	15:00	16:30	15
D7	2040 Base + Com Dev + Malincross	AM	ONE HOUR	08:00	09:30	15
D8	2040 Base + Com Dev + Malincross	PM	ONE HOUR	15:00	16:30	15

Analysis Set Details

ID	Network flow scaling factor (%)
A1	100.000

2025 Base + Com Dev, AM

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction Type	Arm order	Junction Delay (s)	Junction LOS
1	untitled	Standard Roundabout	A, B, C	6.50	A

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Arms

Arms

Arm	Name	Description
A	Clonard Road (West)	
B	Boulevard Road	
C	Clonard Road (East)	

Roundabout Geometry

Arm	V - Approach road half-width (m)	E - Entry width (m)	l' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit only
A	3.50	6.00	10.0	30.0	50.0	27.0	
B	3.50	4.50	22.0	40.0	50.0	17.0	
C	3.50	6.00	10.8	35.0	50.0	27.0	

Slope / Intercept / Capacity

Roundabout Slope and Intercept used in model

Arm	Final slope	Final intercept (PCU/hr)
A	0.582	1521
B	0.575	1417
C	0.588	1543

The slope and intercept shown above include any corrections and adjustments.

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D1	2025 Base + Com Dev	AM	ONE HOUR	08:00	09:30	15

Vehicle mix source	PCU Factor for a HV (PCU)
HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
A		✓	738	100.000
B		✓	333	100.000
C		✓	834	100.000

Origin-Destination Data

Demand (PCU/hr)

		To		
		A	B	C
From	A	0	147	591
	B	225	0	108
	C	754	80	0

Vehicle Mix

Heavy Vehicle Percentages

		To		
		A	B	C
From	A	0	4	4
	B	2	0	1
	C	2	0	0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max delay (s)	Max Queue (PCU)	Max LOS
A	0.55	5.70	1.3	A
B	0.35	5.41	0.5	A
C	0.66	7.65	1.9	A

Main Results for each time segment

08:00 - 08:15

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
A	556	60	1486	0.374	553	0.6	4.003	A
B	251	443	1163	0.216	250	0.3	4.004	A
C	628	169	1443	0.435	625	0.8	4.459	A

08:15 - 08:30

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
A	663	72	1479	0.449	663	0.8	4.580	A
B	299	531	1112	0.269	299	0.4	4.499	A
C	750	202	1424	0.527	748	1.1	5.415	A

08:30 - 08:45

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
A	813	88	1470	0.553	811	1.3	5.667	A
B	367	649	1044	0.351	366	0.5	5.393	A
C	918	247	1397	0.657	915	1.9	7.551	A

08:45 - 09:00

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
A	813	88	1470	0.553	813	1.3	5.697	A
B	367	651	1043	0.352	367	0.5	5.410	A
C	918	248	1397	0.657	918	1.9	7.651	A

09:00 - 09:15

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
A	663	72	1479	0.449	665	0.9	4.612	A
B	299	533	1111	0.269	300	0.4	4.519	A
C	750	203	1423	0.527	753	1.1	5.492	A

09:15 - 09:30

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
A	556	60	1486	0.374	557	0.6	4.032	A
B	251	446	1161	0.216	251	0.3	4.024	A
C	628	170	1443	0.435	629	0.8	4.512	A

2025 Base + Com Dev, PM

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction Type	Arm order	Junction Delay (s)	Junction LOS
1	untitled	Standard Roundabout	A, B, C	6.90	A

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D2	2025 Base + Com Dev	PM	ONE HOUR	15:00	16:30	15

Vehicle mix source	PCU Factor for a HV (PCU)
HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
A		✓	972	100.000
B		✓	156	100.000
C		✓	601	100.000

Origin-Destination Data

Demand (PCU/hr)

		To		
		A	B	C
From	A	0	142	830
	B	110	0	46
	C	548	53	0

Vehicle Mix

Heavy Vehicle Percentages

		To		
		A	B	C
From	A	0	0	1
	B	0	0	0
	C	1	0	0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max delay (s)	Max Queue (PCU)	Max LOS
A	0.72	8.70	2.5	A
B	0.19	5.00	0.2	A
C	0.45	4.49	0.8	A

Main Results for each time segment

15:00 - 15:15

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
A	732	40	1498	0.489	728	1.0	4.695	A
B	117	622	1060	0.111	117	0.1	3.816	A
C	452	82	1494	0.303	451	0.4	3.475	A

15:15 - 15:30

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
A	874	48	1493	0.585	872	1.4	5.829	A
B	140	745	989	0.142	140	0.2	4.240	A
C	540	99	1485	0.364	540	0.6	3.842	A

15:30 - 15:45

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
A	1070	58	1487	0.720	1066	2.5	8.528	A
B	172	910	894	0.192	171	0.2	4.980	A
C	662	121	1472	0.450	661	0.8	4.475	A

15:45 - 16:00

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
A	1070	58	1487	0.720	1070	2.5	8.700	A
B	172	914	892	0.193	172	0.2	4.998	A
C	662	121	1471	0.450	662	0.8	4.486	A

16:00 - 16:15

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
A	874	48	1493	0.585	878	1.4	5.947	A
B	140	750	986	0.142	141	0.2	4.260	A
C	540	99	1484	0.364	541	0.6	3.857	A

16:15 - 16:30

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
A	732	40	1498	0.489	734	1.0	4.765	A
B	117	626	1057	0.111	118	0.1	3.834	A
C	452	83	1494	0.303	453	0.4	3.491	A

2040 Base + Com Dev, AM

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction Type	Arm order	Junction Delay (s)	Junction LOS
1	untitled	Standard Roundabout	A, B, C	8.02	A

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D3	2040 Base + Com Dev	AM	ONE HOUR	08:00	09:30	15

Vehicle mix source	PCU Factor for a HV (PCU)
HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
A		✓	824	100.000
B		✓	346	100.000
C		✓	930	100.000

Origin-Destination Data

Demand (PCU/hr)

		To		
		A	B	C
From	A	0	158	666
	B	233	0	113
	C	844	86	0

Vehicle Mix

Heavy Vehicle Percentages

		To		
		A	B	C
From	A	0	5	4
	B	3	0	1
	C	2	0	0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max delay (s)	Max Queue (PCU)	Max LOS
A	0.62	6.71	1.7	A
B	0.38	5.99	0.6	A
C	0.74	9.94	2.8	A

Main Results for each time segment

08:00 - 08:15

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
A	620	64	1483	0.418	617	0.7	4.316	A
B	260	499	1130	0.230	259	0.3	4.223	A
C	700	175	1440	0.486	696	1.0	4.905	A

08:15 - 08:30

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
A	741	77	1476	0.502	740	1.0	5.085	A
B	311	598	1074	0.290	311	0.4	4.827	A
C	836	209	1420	0.589	834	1.4	6.238	A

08:30 - 08:45

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
A	907	94	1466	0.619	905	1.7	6.653	A
B	381	731	997	0.382	380	0.6	5.965	A
C	1024	256	1392	0.736	1019	2.7	9.684	A

08:45 - 09:00

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
A	907	95	1466	0.619	907	1.7	6.712	A
B	381	733	996	0.383	381	0.6	5.993	A
C	1024	257	1392	0.736	1024	2.8	9.941	A

09:00 - 09:15

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
A	741	78	1476	0.502	743	1.1	5.140	A
B	311	601	1072	0.290	312	0.4	4.852	A
C	836	210	1419	0.589	841	1.5	6.396	A

09:15 - 09:30

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
A	620	65	1483	0.418	622	0.8	4.359	A
B	260	502	1128	0.231	261	0.3	4.249	A
C	700	176	1439	0.486	702	1.0	4.987	A

2040 Base + Com Dev, PM

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction Type	Arm order	Junction Delay (s)	Junction LOS
1	untitled	Standard Roundabout	A, B, C	8.85	A

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D4	2040 Base + Com Dev	PM	ONE HOUR	15:00	16:30	15

Vehicle mix source	PCU Factor for a HV (PCU)
HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
A		✓	1072	100.000
B		✓	161	100.000
C		✓	667	100.000

Origin-Destination Data

Demand (PCU/hr)

		To		
		A	B	C
From	A	0	142	930
	B	114	0	47
	C	614	53	0

Vehicle Mix

Heavy Vehicle Percentages

		To		
		A	B	C
From	A	0	0	1
	B	0	0	0
	C	1	0	0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max delay (s)	Max Queue (PCU)	Max LOS
A	0.79	11.78	3.8	B
B	0.21	5.53	0.3	A
C	0.50	4.95	1.0	A

Main Results for each time segment

15:00 - 15:15

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
A	807	40	1498	0.539	802	1.2	5.188	A
B	121	696	1017	0.119	121	0.1	4.014	A
C	502	85	1492	0.336	500	0.5	3.653	A

15:15 - 15:30

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
A	964	48	1493	0.645	961	1.8	6.792	A
B	145	834	938	0.154	145	0.2	4.537	A
C	600	102	1482	0.404	599	0.7	4.108	A

15:30 - 15:45

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
A	1180	58	1487	0.794	1173	3.7	11.293	B
B	177	1017	832	0.213	177	0.3	5.491	A
C	734	125	1469	0.500	733	1.0	4.930	A

15:45 - 16:00

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
A	1180	58	1487	0.794	1180	3.8	11.783	B
B	177	1024	829	0.214	177	0.3	5.525	A
C	734	126	1469	0.500	734	1.0	4.946	A

16:00 - 16:15

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
A	964	48	1493	0.645	971	1.9	7.058	A
B	145	843	933	0.155	145	0.2	4.572	A
C	600	103	1482	0.405	601	0.7	4.127	A

16:15 - 16:30

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
A	807	40	1498	0.539	810	1.2	5.301	A
B	121	703	1013	0.120	121	0.1	4.038	A
C	502	86	1492	0.337	503	0.5	3.677	A

2025 Base + Com Dev + Malincross, AM

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction Type	Arm order	Junction Delay (s)	Junction LOS
1	untitled	Standard Roundabout	A, B, C	8.22	A

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D5	2025 Base + Com Dev + Malincross	AM	ONE HOUR	08:00	09:30	15

Vehicle mix source	PCU Factor for a HV (PCU)
HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
A		✓	782	100.000
B		✓	537	100.000
C		✓	853	100.000

Origin-Destination Data

Demand (PCU/hr)

		To		
		A	B	C
From	A	0	191	591
	B	374	0	163
	C	754	99	0

Vehicle Mix

Heavy Vehicle Percentages

		To		
		A	B	C
From	A	0	3	4
	B	1	0	1
	C	2	0	0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max delay (s)	Max Queue (PCU)	Max LOS
A	0.59	6.26	1.5	A
B	0.57	8.04	1.3	A
C	0.72	10.12	2.6	B

Main Results for each time segment

08:00 - 08:15

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
A	589	74	1478	0.398	586	0.7	4.176	A
B	404	443	1163	0.348	402	0.5	4.768	A
C	642	280	1378	0.466	639	0.9	4.940	A

08:15 - 08:30

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
A	703	89	1469	0.478	702	0.9	4.861	A
B	483	531	1112	0.434	482	0.8	5.760	A
C	767	336	1345	0.570	765	1.3	6.273	A

08:30 - 08:45

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
A	861	108	1458	0.591	859	1.5	6.214	A
B	591	649	1044	0.566	589	1.3	7.957	A
C	939	410	1301	0.722	934	2.5	9.850	A

08:45 - 09:00

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
A	861	109	1457	0.591	861	1.5	6.261	A
B	591	651	1043	0.567	591	1.3	8.043	A
C	939	412	1301	0.722	939	2.6	10.116	B

09:00 - 09:15

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
A	703	90	1469	0.479	705	1.0	4.905	A
B	483	533	1111	0.435	485	0.8	5.829	A
C	767	338	1344	0.571	772	1.4	6.455	A

09:15 - 09:30

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
A	589	75	1477	0.399	590	0.7	4.214	A
B	404	446	1161	0.348	405	0.5	4.817	A
C	642	282	1377	0.466	644	0.9	5.015	A

2025 Base + Com Dev + Malincross, PM

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction Type	Arm order	Junction Delay (s)	Junction LOS
1	untitled	Standard Roundabout	A, B, C	10.63	B

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D6	2025 Base + Com Dev + Malincross	PM	ONE HOUR	15:00	16:30	15

Vehicle mix source	PCU Factor for a HV (PCU)
HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
A		✓	1108	100.000
B		✓	264	100.000
C		✓	644	100.000

Origin-Destination Data

Demand (PCU/hr)

		To		
		A	B	C
From	A	0	278	830
	B	179	0	85
	C	548	96	0

Vehicle Mix

Heavy Vehicle Percentages

		To		
		A	B	C
From	A	0	0	1
	B	0	0	0
	C	1	0	0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max delay (s)	Max Queue (PCU)	Max LOS
A	0.84	14.97	4.9	B
B	0.33	5.98	0.5	A
C	0.50	5.06	1.0	A

Main Results for each time segment

15:00 - 15:15

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
A	834	72	1479	0.564	829	1.3	5.538	A
B	199	621	1060	0.187	198	0.2	4.170	A
C	485	134	1464	0.331	483	0.5	3.693	A

15:15 - 15:30

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
A	996	86	1471	0.677	993	2.1	7.541	A
B	237	744	990	0.240	237	0.3	4.781	A
C	579	161	1448	0.400	578	0.7	4.170	A

15:30 - 15:45

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
A	1220	106	1459	0.836	1209	4.7	13.939	B
B	291	906	896	0.324	290	0.5	5.931	A
C	709	197	1427	0.497	708	1.0	5.038	A

15:45 - 16:00

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
A	1220	106	1459	0.836	1219	4.9	14.967	B
B	291	913	892	0.326	291	0.5	5.984	A
C	709	197	1427	0.497	709	1.0	5.058	A

16:00 - 16:15

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
A	996	86	1471	0.677	1007	2.2	8.000	A
B	237	754	983	0.241	238	0.3	4.834	A
C	579	161	1448	0.400	580	0.7	4.190	A

16:15 - 16:30

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
A	834	72	1479	0.564	838	1.3	5.687	A
B	199	627	1056	0.188	199	0.2	4.201	A
C	485	135	1463	0.331	486	0.5	3.718	A

2040 Base + Com Dev + Malincross, AM

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction Type	Arm order	Junction Delay (s)	Junction LOS
1	untitled	Standard Roundabout	A, B, C	10.71	B

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D7	2040 Base + Com Dev + Malincross	AM	ONE HOUR	08:00	09:30	15

Vehicle mix source	PCU Factor for a HV (PCU)
HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
A		✓	867	100.000
B		✓	550	100.000
C		✓	948	100.000

Origin-Destination Data

Demand (PCU/hr)

		To		
		A	B	C
From	A	0	201	666
	B	382	0	168
	C	844	104	0

Vehicle Mix

Heavy Vehicle Percentages

		To		
		A	B	C
From	A	0	4	4
	B	2	0	1
	C	2	0	0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max delay (s)	Max Queue (PCU)	Max LOS
A	0.66	7.49	2.0	A
B	0.61	9.38	1.6	A
C	0.81	14.44	4.1	B

Main Results for each time segment

08:00 - 08:15

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
A	653	78	1476	0.442	649	0.8	4.511	A
B	414	499	1130	0.366	412	0.6	5.078	A
C	714	286	1374	0.519	709	1.1	5.474	A

08:15 - 08:30

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
A	779	93	1467	0.531	778	1.2	5.426	A
B	494	598	1074	0.461	493	0.9	6.298	A
C	852	343	1341	0.635	850	1.7	7.413	A

08:30 - 08:45

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
A	955	114	1455	0.656	951	1.9	7.393	A
B	606	731	997	0.607	603	1.5	9.225	A
C	1044	419	1296	0.805	1035	3.9	13.580	B

08:45 - 09:00

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
A	955	114	1454	0.656	954	2.0	7.488	A
B	606	733	996	0.608	605	1.6	9.377	A
C	1044	421	1295	0.806	1043	4.1	14.436	B

09:00 - 09:15

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
A	779	94	1466	0.532	782	1.2	5.502	A
B	494	601	1072	0.461	497	0.9	6.401	A
C	852	345	1340	0.636	861	1.8	7.795	A

09:15 - 09:30

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
A	653	79	1475	0.442	654	0.8	4.570	A
B	414	503	1128	0.367	415	0.6	5.141	A
C	714	288	1373	0.520	717	1.1	5.605	A

2040 Base + Com Dev + Malincross, PM

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction Type	Arm order	Junction Delay (s)	Junction LOS
1	untitled	Standard Roundabout	A, B, C	17.07	C

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D8	2040 Base + Com Dev + Malincross	PM	ONE HOUR	15:00	16:30	15

Vehicle mix source	PCU Factor for a HV (PCU)
HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
A		✓	1209	100.000
B		✓	268	100.000
C		✓	710	100.000

Origin-Destination Data

Demand (PCU/hr)

		To		
		A	B	C
From	A	0	279	930
	B	182	0	86
	C	614	96	0

Vehicle Mix

Heavy Vehicle Percentages

		To		
		A	B	C
From	A	0	0	1
	B	0	0	0
	C	1	0	0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max delay (s)	Max Queue (PCU)	Max LOS
A	0.91	26.07	9.1	D
B	0.36	6.73	0.5	A
C	0.55	5.65	1.2	A

Main Results for each time segment

15:00 - 15:15

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
A	910	72	1479	0.615	904	1.6	6.242	A
B	202	695	1017	0.198	201	0.2	4.402	A
C	535	136	1462	0.366	532	0.6	3.894	A

15:15 - 15:30

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
A	1087	86	1471	0.739	1082	2.7	9.225	A
B	241	832	939	0.257	241	0.3	5.155	A
C	638	163	1447	0.441	637	0.8	4.483	A

15:30 - 15:45

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
A	1331	105	1459	0.912	1309	8.2	21.563	C
B	295	1007	838	0.352	294	0.5	6.610	A
C	782	200	1425	0.549	780	1.2	5.614	A

15:45 - 16:00

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
A	1331	106	1459	0.912	1328	9.1	26.069	D
B	295	1021	830	0.356	295	0.5	6.729	A
C	782	200	1425	0.549	782	1.2	5.645	A

16:00 - 16:15

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
A	1087	87	1471	0.739	1111	3.0	10.727	B
B	241	855	926	0.260	242	0.4	5.268	A
C	638	164	1446	0.441	640	0.8	4.512	A

16:15 - 16:30

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
A	910	72	1479	0.616	916	1.6	6.499	A
B	202	704	1012	0.199	202	0.3	4.445	A
C	535	137	1462	0.366	535	0.6	3.924	A

APPENDIX O

LINSIG Output (Junction 5)

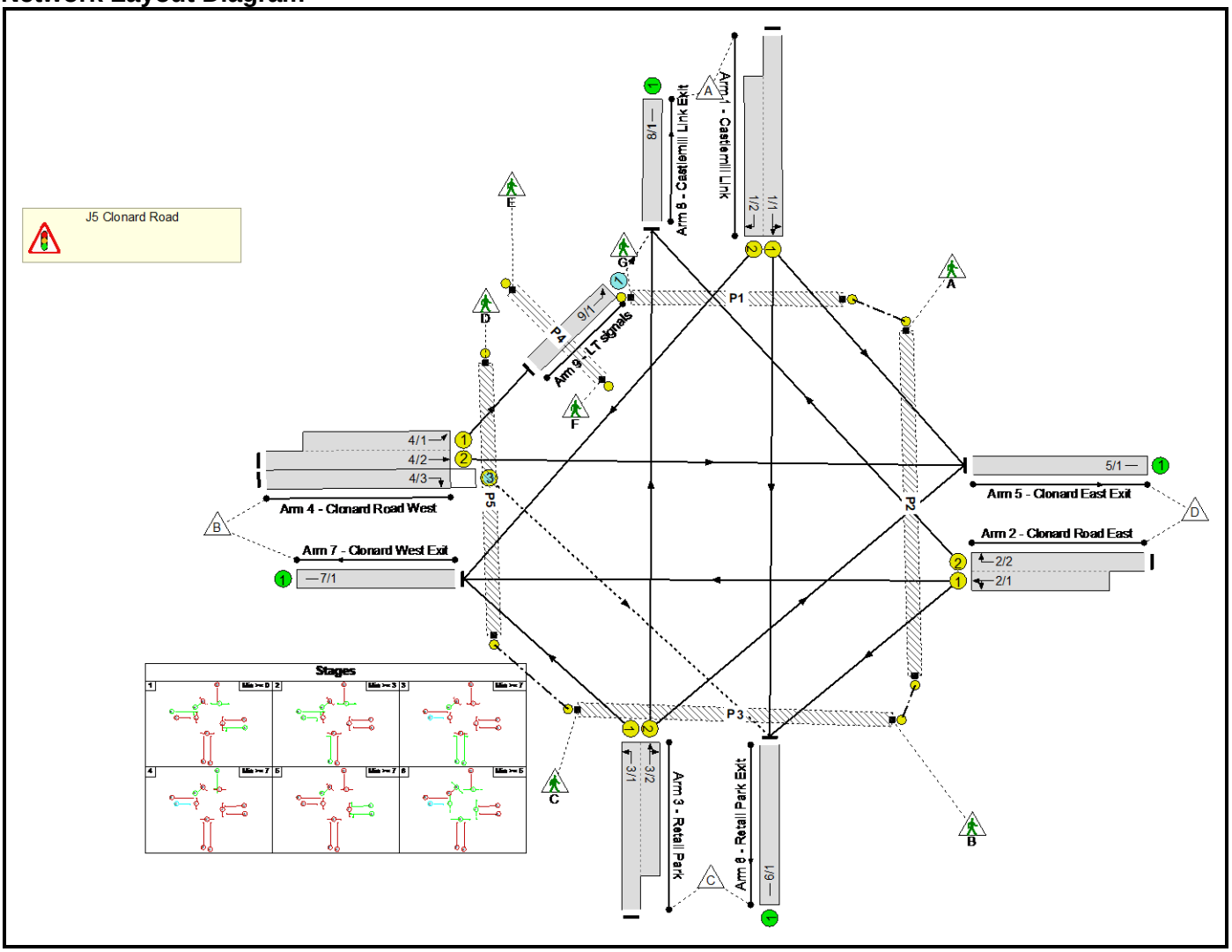
DRAFT

Full Input Data And Results

User and Project Details

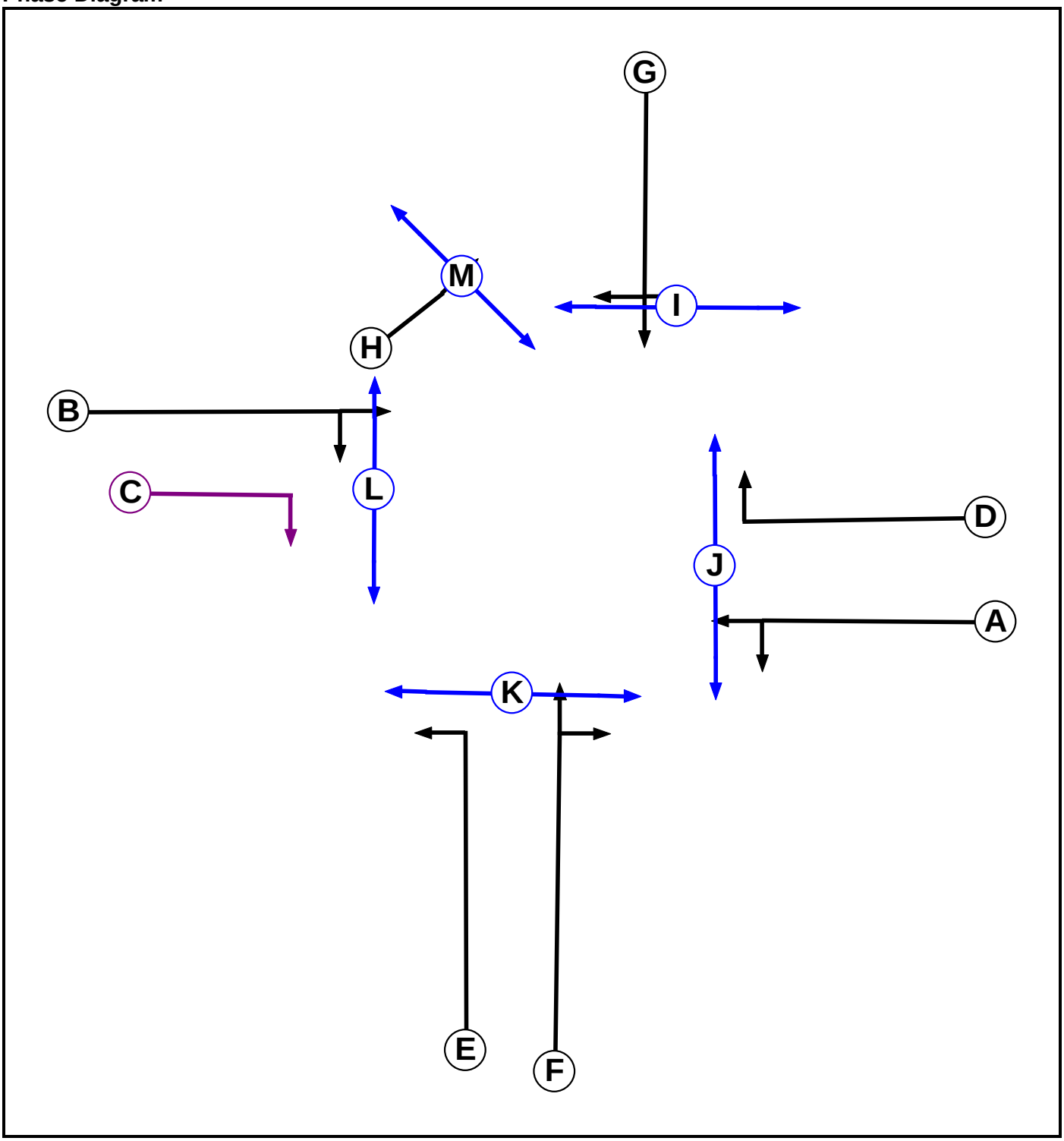
Project:	
Title:	
Location:	
Additional detail:	
File name:	JUNCTION 5.lsg3x
Author:	
Company:	
Address:	

Network Layout Diagram



Full Input Data And Results

Phase Diagram



Full Input Data And Results

Phase Input Data

Phase Name	Phase Type	Assoc. Phase	Street Min	Cont Min
A	Traffic		7	7
B	Traffic		7	7
C	Ind. Arrow	B	4	4
D	Traffic		7	7
E	Traffic		7	7
F	Traffic		7	7
G	Traffic		7	7
H	Traffic		7	7
I	Pedestrian		6	6
J	Pedestrian		6	6
K	Pedestrian		6	6
L	Pedestrian		6	6
M	Pedestrian		5	5

Phase Intergreens Matrix

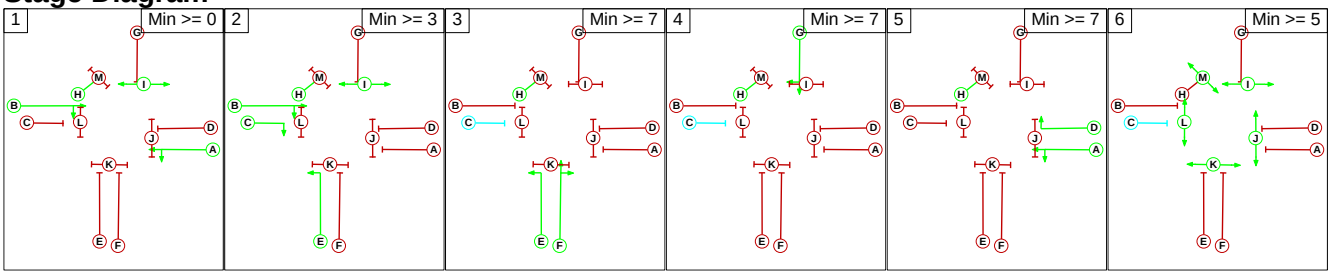
		Starting Phase												
		A	B	C	D	E	F	G	H	I	J	K	L	M
Terminating Phase	A		-	5	-	6	5	5	-	-	6	8	9	-
	B	-		-	5	-	5	5	-	-	8	-	6	-
	C	5	-		-	-	-	-	-	-	-	-	-	-
	D	-	6	-		-	6	5	-	7	6	-	-	-
	E	5	-	-	-		-	5	-	-	-	5	7	-
	F	5	6	-	5	-		6	-	8	7	5	-	-
	G	5	5	-	6	5	5		-	5	8	8	8	-
	H	-	-	-	-	-	-	-		-	-	-	-	5
	I	-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

Phases in Stage

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

Full Input Data And Results

Stage Diagram



Phase Delays

Term. Stage	Start Stage	Phase	Type	Value	Cont value
2	3	B	Losing	1	1
3	4	E	Losing	1	1
6	1	J	Losing	1	1
6	5	J	Losing	1	1

Prohibited Stage Change

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

Full Input Data And Results

Give-Way Lane Input Data

Junction: J5 Clonard Road											
Lane	**Movement**	**Max Flow when Giving Way (PCU/Hr)**	**Min Flow when Giving Way (PCU/Hr)**	**Opposing Lane**	**Opp. Lane Coeff.**	**Opp. Mvmnts.**	**Right Turn Storage (PCU)**	**Non-Blocking Storage (PCU)**	**RTF**	**Right Turn Move up (s)**	**Max Turns in Intergreen (PCU)**
4/3 (Clonard Road West)	6/1 (Right)	1439	0	2/1	1.09	All	2.00	-	0.50	2	2.00
9/1 (LT signals)	8/1 (Left)	715	0	2/2	0.22	All	-	-	-	-	-
				3/2	0.22	To 8/1 (Ahead)					

Full Input Data And Results

Lane Input Data

Junction: J5 Clonard Road												
Lane	**Lane Type**	**Phases**	**Start Disp.**	**End Disp.**	**Physical Length (PCU)**	**Sat Flow Type**	**Def User Saturation Flow (PCU/Hr)**	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Turns**	**Turning Radius (m)**
1/1 (Castlemill Link)	U	G	2	3	60.0	Geom	-	3.25	0.00	Y	Arm 5 Left	13.00
											Arm 6 Ahead	Inf
1/2 (Castlemill Link)	U	G	2	3	18.0	Geom	-	3.25	0.00	N	Arm 7 Right	11.00
2/1 (Clonard Road East)	U	A	2	3	15.0	Geom	-	3.25	0.00	Y	Arm 6 Left	12.00
											Arm 7 Ahead	Inf
2/2 (Clonard Road East)	U	D	2	3	60.0	Geom	-	3.25	0.00	N	Arm 8 Right	11.00
3/1 (Retail Park)	U	E	2	3	60.0	Geom	-	3.25	0.00	Y	Arm 7 Left	11.00
3/2 (Retail Park)	U	F	2	3	16.0	Geom	-	3.25	0.00	N	Arm 5 Right	16.00
											Arm 8 Ahead	Inf
4/1 (Clonard Road West)	U	H	2	3	15.0	Geom	-	3.25	0.00	Y	Arm 9 Ahead	32.00
4/2 (Clonard Road West)	U	B	2	3	60.0	Geom	-	3.25	0.00	Y	Arm 5 Ahead	Inf
4/3 (Clonard Road West)	O	B C	2	3	25.0	Geom	-	3.25	0.00	N	Arm 6 Right	11.50
5/1 (Clonard East Exit)	U		2	3	60.0	Inf	-	-	-	-	-	-
6/1 (Retail Park Exit)	U		2	3	60.0	Inf	-	-	-	-	-	-
7/1 (Clonard West Exit)	U		2	3	60.0	Inf	-	-	-	-	-	-
8/1 (Castlemill Link Exit)	U		2	3	60.0	Inf	-	-	-	-	-	-
9/1 (LT signals)	O		2	3	2.0	Geom	-	3.25	0.00	Y	Arm 8 Left	32.00

Full Input Data And Results

Traffic Flow Groups

Flow Group	Start Time	End Time	Duration	Formula
1: '2025 Base + CD AM'	08:00	09:00	01:00	
2: '2025 Base + CD PM'	17:00	18:00	01:00	
3: '2025 Base + CD + Malincross AM'	08:00	09:00	01:00	
4: '2025 Base + CD + Malincross PM'	17:00	18:00	01:00	
5: '2040 Base + CD AM'	08:00	09:00	01:00	
6: '2040 Base + CD PM'	17:00	18:00	01:00	
7: '2040 Base + CD + Malincross AM'	08:00	09:00	01:00	
8: '2040 Base + CD + Malincross PM'	17:00	18:00	01:00	

Scenario 1: '2025 Base + CD AM' (FG1: '2025 Base + CD AM', Plan 1: 'Network Control Plan 1')

Traffic Flows, Desired

Desired Flow :

		Destination				
		A	B	C	D	Tot.
Origin	A	0	289	128	68	485
	B	187	0	150	269	606
	C	71	100	0	28	199
	D	62	363	24	0	449
	Tot.	320	752	302	365	1739

Full Input Data And Results

Traffic Lane Flows

Lane	Scenario 1: 2025 Base + CD AM
Junction: J5 Clonard Road	
1/1 (with short)	485(In) 196(Out)
1/2 (short)	289
2/1 (short)	387
2/2 (with short)	449(In) 62(Out)
3/1 (with short)	199(In) 100(Out)
3/2 (short)	99
4/1 (short)	187
4/2 (with short)	456(In) 269(Out)
4/3	150
5/1	365
6/1	302
7/1	752
8/1	320
9/1	187

Full Input Data And Results

Lane Saturation Flows

Junction: J5 Clonard Road								
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat Flow (PCU/Hr)**	**Flared Sat Flow (PCU/Hr)**
1/1 (Castlemill Link)	3.25	0.00	Y	Arm 5 Left	13.00	34.7 %	1865	1865
				Arm 6 Ahead	Inf	65.3 %		
1/2 (Castlemill Link)	3.25	0.00	N	Arm 7 Right	11.00	100.0 %	1830	1830
2/1 (Clonard Road East)	3.25	0.00	Y	Arm 6 Left	12.00	6.2 %	1925	1925
				Arm 7 Ahead	Inf	93.8 %		
2/2 (Clonard Road East)	3.25	0.00	N	Arm 8 Right	11.00	100.0 %	1830	1830
3/1 (Retail Park)	3.25	0.00	Y	Arm 7 Left	11.00	100.0 %	1707	1707
3/2 (Retail Park)	3.25	0.00	N	Arm 5 Right	16.00	28.3 %	2026	2026
				Arm 8 Ahead	Inf	71.7 %		
4/1 (Clonard Road West)	3.25	0.00	Y	Arm 9 Ahead	32.00	100.0 %	1853	1853
4/2 (Clonard Road West)	3.25	0.00	Y	Arm 5 Ahead	Inf	100.0 %	1940	1940
4/3 (Clonard Road West)	3.25	0.00	N	Arm 6 Right	11.50	100.0 %	1840	1840
5/1 (Clonard East Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
6/1 (Retail Park Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
7/1 (Clonard West Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
8/1 (Castlemill Link Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
9/1 (LT signals)	3.25	0.00	Y	Arm 8 Left	32.00	100.0 %	1853	1853

Scenario 2: '2025 Base + CD PM' (FG2: '2025 Base + CD PM', Plan 1: 'Network Control Plan 1')

Traffic Flows, Desired

Desired Flow :

	Destination					
		A	B	C	D	Tot.
Origin	A	0	128	46	65	239
	B	343	0	139	324	806
	C	68	166	0	6	240
	D	87	232	7	0	326
	Tot.	498	526	192	395	1611

Full Input Data And Results

Traffic Lane Flows

Lane	Scenario 2: 2025 Base + CD PM
Junction: J5 Clonard Road	
1/1 (with short)	239(In) 111(Out)
1/2 (short)	128
2/1 (short)	239
2/2 (with short)	326(In) 87(Out)
3/1 (with short)	240(In) 166(Out)
3/2 (short)	74
4/1 (short)	343
4/2 (with short)	667(In) 324(Out)
4/3	139
5/1	395
6/1	192
7/1	526
8/1	498
9/1	343

Full Input Data And Results

Lane Saturation Flows

Junction: J5 Clonard Road								
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat Flow (PCU/Hr)**	**Flared Sat Flow (PCU/Hr)**
1/1 (Castlemill Link)	3.25	0.00	Y	Arm 5 Left	13.00	58.6 %	1817	1817
				Arm 6 Ahead	Inf	41.4 %		
1/2 (Castlemill Link)	3.25	0.00	N	Arm 7 Right	11.00	100.0 %	1830	1830
2/1 (Clonard Road East)	3.25	0.00	Y	Arm 6 Left	12.00	2.9 %	1933	1933
				Arm 7 Ahead	Inf	97.1 %		
2/2 (Clonard Road East)	3.25	0.00	N	Arm 8 Right	11.00	100.0 %	1830	1830
3/1 (Retail Park)	3.25	0.00	Y	Arm 7 Left	11.00	100.0 %	1707	1707
3/2 (Retail Park)	3.25	0.00	N	Arm 5 Right	16.00	8.1 %	2064	2064
				Arm 8 Ahead	Inf	91.9 %		
4/1 (Clonard Road West)	3.25	0.00	Y	Arm 9 Ahead	32.00	100.0 %	1853	1853
4/2 (Clonard Road West)	3.25	0.00	Y	Arm 5 Ahead	Inf	100.0 %	1940	1940
4/3 (Clonard Road West)	3.25	0.00	N	Arm 6 Right	11.50	100.0 %	1840	1840
5/1 (Clonard East Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
6/1 (Retail Park Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
7/1 (Clonard West Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
8/1 (Castlemill Link Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
9/1 (LT signals)	3.25	0.00	Y	Arm 8 Left	32.00	100.0 %	1853	1853

Scenario 3: '2025 Base + CD + Malincross AM' (FG3: '2025 Base + CD + Malincross AM', Plan 1: 'Network Control Plan 1')

Traffic Flows, Desired

Desired Flow :

		Destination				
		A	B	C	D	Tot.
Origin	A	0	327	144	77	548
	B	202	0	161	392	755
	C	76	108	0	30	214
	D	67	417	26	0	510
	Tot.	345	852	331	499	2027

Full Input Data And Results

Traffic Lane Flows

Lane	Scenario 3: 2025 Base + CD + Malincross AM
Junction: J5 Clonard Road	
1/1 (with short)	548(In) 221(Out)
1/2 (short)	327
2/1 (short)	443
2/2 (with short)	510(In) 67(Out)
3/1 (with short)	214(In) 108(Out)
3/2 (short)	106
4/1 (short)	202
4/2 (with short)	594(In) 392(Out)
4/3	161
5/1	499
6/1	331
7/1	852
8/1	345
9/1	202

Full Input Data And Results

Lane Saturation Flows

Junction: J5 Clonard Road								
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat Flow (PCU/Hr)**	**Flared Sat Flow (PCU/Hr)**
1/1 (Castlemill Link)	3.25	0.00	Y	Arm 5 Left	13.00	34.8 %	1865	1865
				Arm 6 Ahead	Inf	65.2 %		
1/2 (Castlemill Link)	3.25	0.00	N	Arm 7 Right	11.00	100.0 %	1830	1830
2/1 (Clonard Road East)	3.25	0.00	Y	Arm 6 Left	12.00	5.9 %	1926	1926
				Arm 7 Ahead	Inf	94.1 %		
2/2 (Clonard Road East)	3.25	0.00	N	Arm 8 Right	11.00	100.0 %	1830	1830
3/1 (Retail Park)	3.25	0.00	Y	Arm 7 Left	11.00	100.0 %	1707	1707
3/2 (Retail Park)	3.25	0.00	N	Arm 5 Right	16.00	28.3 %	2026	2026
				Arm 8 Ahead	Inf	71.7 %		
4/1 (Clonard Road West)	3.25	0.00	Y	Arm 9 Ahead	32.00	100.0 %	1853	1853
4/2 (Clonard Road West)	3.25	0.00	Y	Arm 5 Ahead	Inf	100.0 %	1940	1940
4/3 (Clonard Road West)	3.25	0.00	N	Arm 6 Right	11.50	100.0 %	1840	1840
5/1 (Clonard East Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
6/1 (Retail Park Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
7/1 (Clonard West Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
8/1 (Castlemill Link Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
9/1 (LT signals)	3.25	0.00	Y	Arm 8 Left	32.00	100.0 %	1853	1853

Scenario 4: '2025 Base + CD + Malincross PM' (FG4: '2025 Base + CD + Malincross PM', Plan 1: 'Network Control Plan 1')

Traffic Flows, Desired

Desired Flow :

		Destination				
		A	B	C	D	Tot.
Origin	A	0	150	55	70	275
	B	374	0	140	404	918
	C	74	168	0	6	248
	D	95	328	7	0	430
	Tot.	543	646	202	480	1871

Full Input Data And Results

Traffic Lane Flows

Lane	Scenario 4: 2025 Base + CD + Malincross PM
Junction: J5 Clonard Road	
1/1 (with short)	275(In) 125(Out)
1/2 (short)	150
2/1 (short)	335
2/2 (with short)	430(In) 95(Out)
3/1 (with short)	248(In) 168(Out)
3/2 (short)	80
4/1 (short)	374
4/2 (with short)	778(In) 404(Out)
4/3	140
5/1	480
6/1	202
7/1	646
8/1	543
9/1	374

Full Input Data And Results

Lane Saturation Flows

Junction: J5 Clonard Road								
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat Flow (PCU/Hr)**	**Flared Sat Flow (PCU/Hr)**
1/1 (Castlemill Link)	3.25	0.00	Y	Arm 5 Left	13.00	56.0 %	1822	1822
				Arm 6 Ahead	Inf	44.0 %		
1/2 (Castlemill Link)	3.25	0.00	N	Arm 7 Right	11.00	100.0 %	1830	1830
2/1 (Clonard Road East)	3.25	0.00	Y	Arm 6 Left	12.00	2.1 %	1935	1935
				Arm 7 Ahead	Inf	97.9 %		
2/2 (Clonard Road East)	3.25	0.00	N	Arm 8 Right	11.00	100.0 %	1830	1830
3/1 (Retail Park)	3.25	0.00	Y	Arm 7 Left	11.00	100.0 %	1707	1707
3/2 (Retail Park)	3.25	0.00	N	Arm 5 Right	16.00	7.5 %	2065	2065
				Arm 8 Ahead	Inf	92.5 %		
4/1 (Clonard Road West)	3.25	0.00	Y	Arm 9 Ahead	32.00	100.0 %	1853	1853
4/2 (Clonard Road West)	3.25	0.00	Y	Arm 5 Ahead	Inf	100.0 %	1940	1940
4/3 (Clonard Road West)	3.25	0.00	N	Arm 6 Right	11.50	100.0 %	1840	1840
5/1 (Clonard East Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
6/1 (Retail Park Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
7/1 (Clonard West Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
8/1 (Castlemill Link Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
9/1 (LT signals)	3.25	0.00	Y	Arm 8 Left	32.00	100.0 %	1853	1853

Scenario 5: '2040 Base + CD AM' (FG5: '2040 Base + CD AM', Plan 1: 'Network Control Plan 1')

Traffic Flows, Desired

Desired Flow :

		Destination				
		A	B	C	D	Tot.
Origin	A	0	325	145	77	547
	B	212	0	170	304	686
	C	80	113	0	31	224
	D	69	410	28	0	507
	Tot.	361	848	343	412	1964

Full Input Data And Results

Traffic Lane Flows

Lane	Scenario 5: 2040 Base + CD AM
Junction: J5 Clonard Road	
1/1 (with short)	547(In) 222(Out)
1/2 (short)	325
2/1 (short)	438
2/2 (with short)	507(In) 69(Out)
3/1 (with short)	224(In) 113(Out)
3/2 (short)	111
4/1 (short)	212
4/2 (with short)	516(In) 304(Out)
4/3	170
5/1	412
6/1	343
7/1	848
8/1	361
9/1	212

Full Input Data And Results

Lane Saturation Flows

Junction: J5 Clonard Road								
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat Flow (PCU/Hr)**	**Flared Sat Flow (PCU/Hr)**
1/1 (Castlemill Link)	3.25	0.00	Y	Arm 5 Left	13.00	34.7 %	1865	1865
				Arm 6 Ahead	Inf	65.3 %		
1/2 (Castlemill Link)	3.25	0.00	N	Arm 7 Right	11.00	100.0 %	1830	1830
2/1 (Clonard Road East)	3.25	0.00	Y	Arm 6 Left	12.00	6.4 %	1925	1925
				Arm 7 Ahead	Inf	93.6 %		
2/2 (Clonard Road East)	3.25	0.00	N	Arm 8 Right	11.00	100.0 %	1830	1830
3/1 (Retail Park)	3.25	0.00	Y	Arm 7 Left	11.00	100.0 %	1707	1707
3/2 (Retail Park)	3.25	0.00	N	Arm 5 Right	16.00	27.9 %	2027	2027
				Arm 8 Ahead	Inf	72.1 %		
4/1 (Clonard Road West)	3.25	0.00	Y	Arm 9 Ahead	32.00	100.0 %	1853	1853
4/2 (Clonard Road West)	3.25	0.00	Y	Arm 5 Ahead	Inf	100.0 %	1940	1940
4/3 (Clonard Road West)	3.25	0.00	N	Arm 6 Right	11.50	100.0 %	1840	1840
5/1 (Clonard East Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
6/1 (Retail Park Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
7/1 (Clonard West Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
8/1 (Castlemill Link Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
9/1 (LT signals)	3.25	0.00	Y	Arm 8 Left	32.00	100.0 %	1853	1853

Scenario 6: '2040 Base + CD PM' (FG6: '2040 Base + CD PM', Plan 1: 'Network Control Plan 1')

Traffic Flows, Desired

Desired Flow :

		Destination				
		A	B	C	D	Tot.
Origin	A	0	145	52	73	270
	B	385	0	156	364	905
	C	77	186	0	6	269
	D	97	261	9	0	367
	Tot.	559	592	217	443	1811

Full Input Data And Results

Traffic Lane Flows

Lane	Scenario 6: 2040 Base + CD PM
Junction: J5 Clonard Road	
1/1 (with short)	270(In) 125(Out)
1/2 (short)	145
2/1 (short)	270
2/2 (with short)	367(In) 97(Out)
3/1 (with short)	269(In) 186(Out)
3/2 (short)	83
4/1 (short)	385
4/2 (with short)	749(In) 364(Out)
4/3	156
5/1	443
6/1	217
7/1	592
8/1	559
9/1	385

Full Input Data And Results

Lane Saturation Flows

Junction: J5 Clonard Road								
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat Flow (PCU/Hr)**	**Flared Sat Flow (PCU/Hr)**
1/1 (Castlemill Link)	3.25	0.00	Y	Arm 5 Left	13.00	58.4 %	1818	1818
				Arm 6 Ahead	Inf	41.6 %		
1/2 (Castlemill Link)	3.25	0.00	N	Arm 7 Right	11.00	100.0 %	1830	1830
2/1 (Clonard Road East)	3.25	0.00	Y	Arm 6 Left	12.00	3.3 %	1932	1932
				Arm 7 Ahead	Inf	96.7 %		
2/2 (Clonard Road East)	3.25	0.00	N	Arm 8 Right	11.00	100.0 %	1830	1830
3/1 (Retail Park)	3.25	0.00	Y	Arm 7 Left	11.00	100.0 %	1707	1707
3/2 (Retail Park)	3.25	0.00	N	Arm 5 Right	16.00	7.2 %	2066	2066
				Arm 8 Ahead	Inf	92.8 %		
4/1 (Clonard Road West)	3.25	0.00	Y	Arm 9 Ahead	32.00	100.0 %	1853	1853
4/2 (Clonard Road West)	3.25	0.00	Y	Arm 5 Ahead	Inf	100.0 %	1940	1940
4/3 (Clonard Road West)	3.25	0.00	N	Arm 6 Right	11.50	100.0 %	1840	1840
5/1 (Clonard East Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
6/1 (Retail Park Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
7/1 (Clonard West Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
8/1 (Castlemill Link Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
9/1 (LT signals)	3.25	0.00	Y	Arm 8 Left	32.00	100.0 %	1853	1853

Scenario 7: '2040 Base + CD + Malincross AM' (FG7: '2040 Base + CD + Malincross AM', Plan 1: 'Network Control Plan 1')

Traffic Flows, Desired

Desired Flow :

		Destination				
		A	B	C	D	Tot.
Origin	A	0	364	161	86	611
	B	227	0	180	427	834
	C	85	121	0	33	239
	D	74	463	30	0	567
	Tot.	386	948	371	546	2251

Full Input Data And Results

Traffic Lane Flows

Lane	Scenario 7: 2040 Base + CD + Malincross AM
Junction: J5 Clonard Road	
1/1 (with short)	611(In) 247(Out)
1/2 (short)	364
2/1 (short)	493
2/2 (with short)	567(In) 74(Out)
3/1 (with short)	239(In) 121(Out)
3/2 (short)	118
4/1 (short)	227
4/2 (with short)	654(In) 427(Out)
4/3	180
5/1	546
6/1	371
7/1	948
8/1	386
9/1	227

Full Input Data And Results

Lane Saturation Flows

Junction: J5 Clonard Road								
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat Flow (PCU/Hr)**	**Flared Sat Flow (PCU/Hr)**
1/1 (Castlemill Link)	3.25	0.00	Y	Arm 5 Left	13.00	34.8 %	1865	1865
				Arm 6 Ahead	Inf	65.2 %		
1/2 (Castlemill Link)	3.25	0.00	N	Arm 7 Right	11.00	100.0 %	1830	1830
2/1 (Clonard Road East)	3.25	0.00	Y	Arm 6 Left	12.00	6.1 %	1925	1925
				Arm 7 Ahead	Inf	93.9 %		
2/2 (Clonard Road East)	3.25	0.00	N	Arm 8 Right	11.00	100.0 %	1830	1830
3/1 (Retail Park)	3.25	0.00	Y	Arm 7 Left	11.00	100.0 %	1707	1707
3/2 (Retail Park)	3.25	0.00	N	Arm 5 Right	16.00	28.0 %	2027	2027
				Arm 8 Ahead	Inf	72.0 %		
4/1 (Clonard Road West)	3.25	0.00	Y	Arm 9 Ahead	32.00	100.0 %	1853	1853
4/2 (Clonard Road West)	3.25	0.00	Y	Arm 5 Ahead	Inf	100.0 %	1940	1940
4/3 (Clonard Road West)	3.25	0.00	N	Arm 6 Right	11.50	100.0 %	1840	1840
5/1 (Clonard East Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
6/1 (Retail Park Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
7/1 (Clonard West Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
8/1 (Castlemill Link Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
9/1 (LT signals)	3.25	0.00	Y	Arm 8 Left	32.00	100.0 %	1853	1853

Scenario 8: '2040 Base + CD + Malincross PM' (FG8: '2040 Base + CD + Malincross PM', Plan 1: 'Network Control Plan 1')

Traffic Flows, Desired

Desired Flow :

		Destination				
		A	B	C	D	Tot.
Origin	A	0	166	61	78	305
	B	416	0	158	444	1018
	C	83	188	0	7	278
	D	105	357	9	0	471
	Tot.	604	711	228	529	2072

Full Input Data And Results

Traffic Lane Flows

Lane	Scenario 8: 2040 Base + CD + Malincross PM
Junction: J5 Clonard Road	
1/1 (with short)	305(In) 139(Out)
1/2 (short)	166
2/1 (short)	366
2/2 (with short)	471(In) 105(Out)
3/1 (with short)	278(In) 188(Out)
3/2 (short)	90
4/1 (short)	416
4/2 (with short)	860(In) 444(Out)
4/3	158
5/1	529
6/1	228
7/1	711
8/1	604
9/1	416

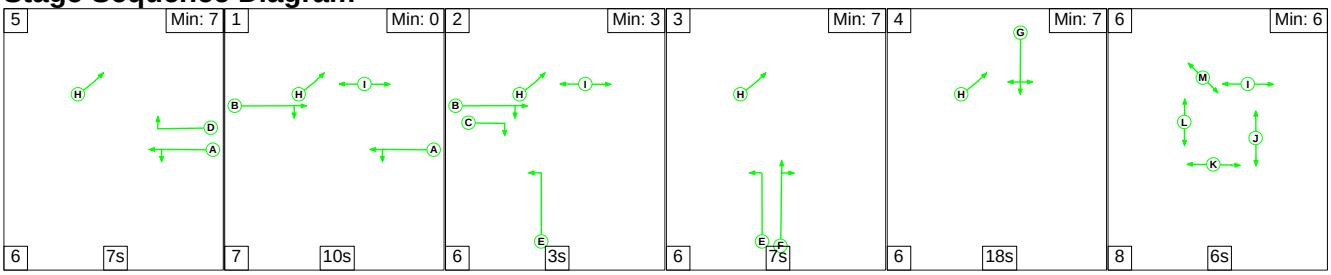
Full Input Data And Results

Lane Saturation Flows

Junction: J5 Clonard Road								
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat Flow (PCU/Hr)**	**Flared Sat Flow (PCU/Hr)**
1/1 (Castlemill Link)	3.25	0.00	Y	Arm 5 Left	13.00	56.1 %	1822	1822
				Arm 6 Ahead	Inf	43.9 %		
1/2 (Castlemill Link)	3.25	0.00	N	Arm 7 Right	11.00	100.0 %	1830	1830
2/1 (Clonard Road East)	3.25	0.00	Y	Arm 6 Left	12.00	2.5 %	1934	1934
				Arm 7 Ahead	Inf	97.5 %		
2/2 (Clonard Road East)	3.25	0.00	N	Arm 8 Right	11.00	100.0 %	1830	1830
3/1 (Retail Park)	3.25	0.00	Y	Arm 7 Left	11.00	100.0 %	1707	1707
3/2 (Retail Park)	3.25	0.00	N	Arm 5 Right	16.00	7.8 %	2065	2065
				Arm 8 Ahead	Inf	92.2 %		
4/1 (Clonard Road West)	3.25	0.00	Y	Arm 9 Ahead	32.00	100.0 %	1853	1853
4/2 (Clonard Road West)	3.25	0.00	Y	Arm 5 Ahead	Inf	100.0 %	1940	1940
4/3 (Clonard Road West)	3.25	0.00	N	Arm 6 Right	11.50	100.0 %	1840	1840
5/1 (Clonard East Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
6/1 (Retail Park Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
7/1 (Clonard West Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
8/1 (Castlemill Link Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
9/1 (LT signals)	3.25	0.00	Y	Arm 8 Left	32.00	100.0 %	1853	1853

Scenario 1: '2025 Base + CD AM' (FG1: '2025 Base + CD AM', Plan 1: 'Network Control Plan 1')

Stage Sequence Diagram

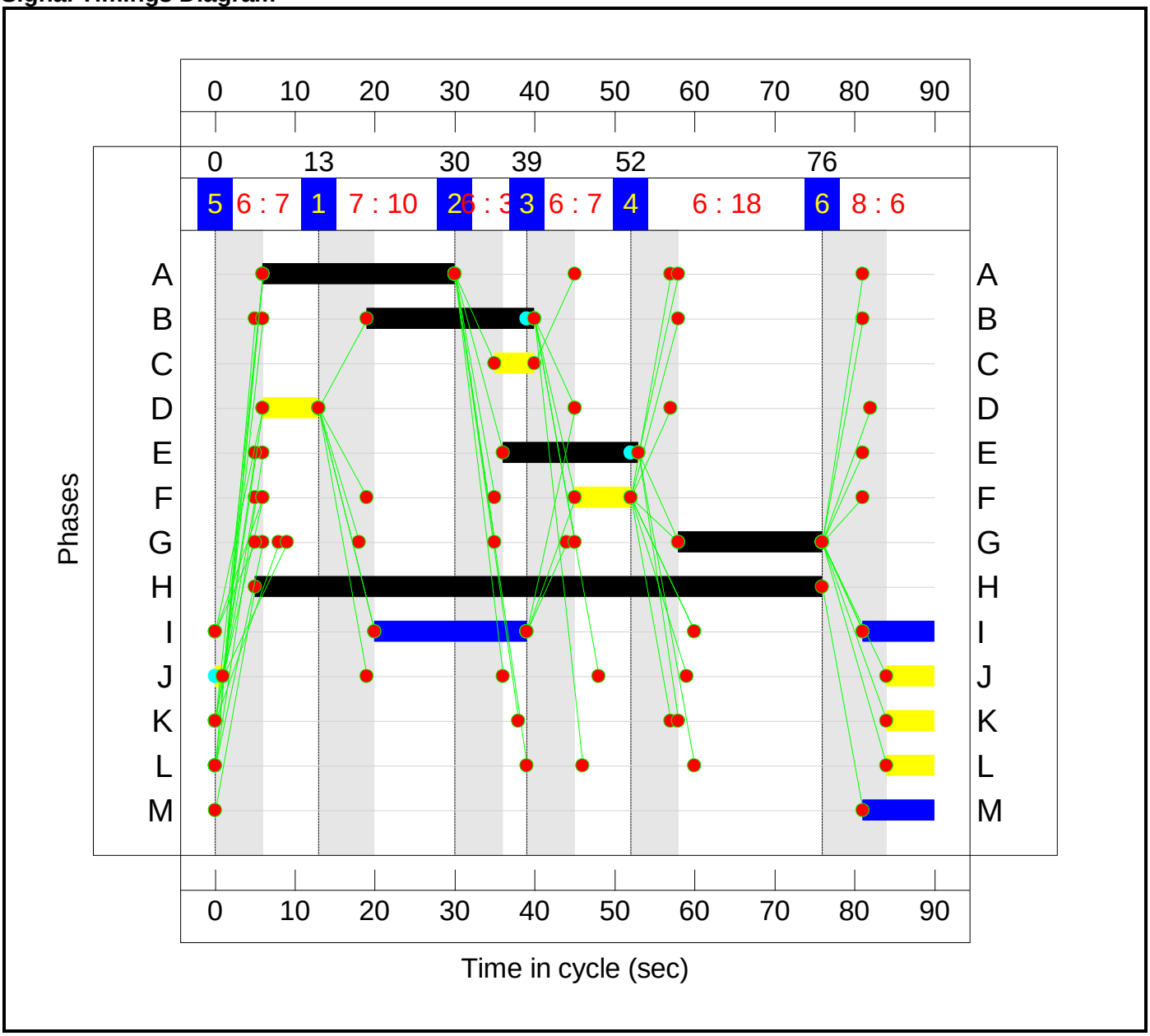


Stage Timings

Stage	5	1	2	3	4	6
Duration	7	10	3	7	18	6
Change Point	0	13	30	39	52	76

Full Input Data And Results

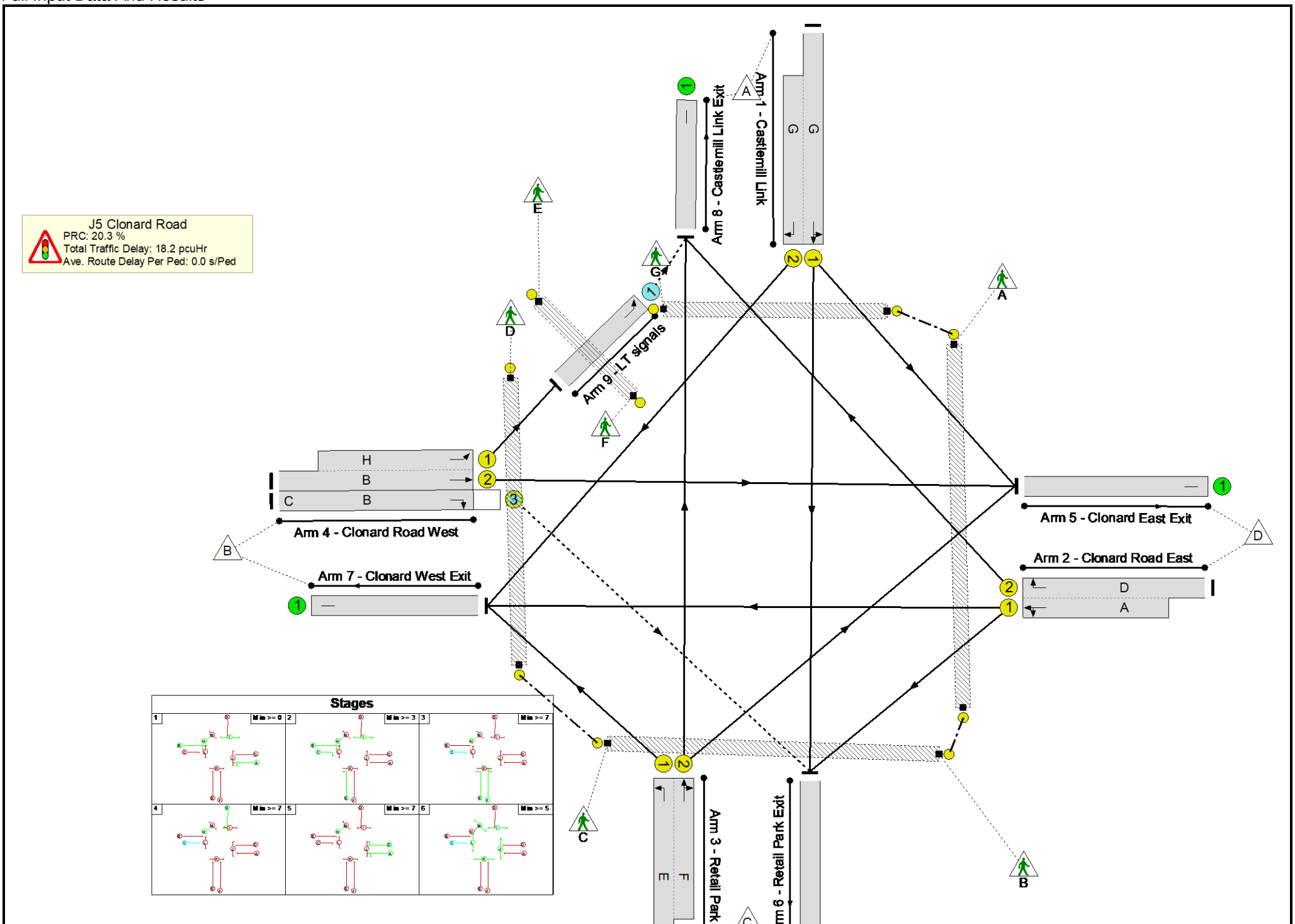
Signal Timings Diagram



Full Input Data And Results

Network Layout Diagram

Full Input Data And Results



Network Results

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**74.8%**
J5 Clonard Road	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**74.8%**
1/1+1/2	Castlemill Link Left Ahead Right	U	N/A	N/A	G		1	18	-	485	1865:1830	262+386	74.8 : 74.8%
2/2+2/1	Clonard Road East Left Ahead Right	U	N/A	N/A	D A		1	7:24	-	449	1830:1925	86+535	72.4 : 72.4%
3/1+3/2	Retail Park Right Left Ahead	U	N/A	N/A	E F		1	17:7	-	199	1707:2026	327+180	30.5 : 55.0%
4/2+4/1	Clonard Road West Ahead Ahead2	U	N/A	N/A	B H		1	21:71	-	456	1940:1853	474+330	56.7 : 56.7%
4/3	Clonard Road West Right	O	N/A	N/A	B	C	1	21	5	150	1840	339	44.3%
5/1	Clonard East Exit	U	N/A	N/A	-		-	-	-	365	Inf	Inf	0.0%
6/1	Retail Park Exit	U	N/A	N/A	-		-	-	-	302	Inf	Inf	0.0%
7/1	Clonard West Exit	U	N/A	N/A	-		-	-	-	752	Inf	Inf	0.0%
8/1	Castlemill Link Exit	U	N/A	N/A	-		-	-	-	320	Inf	Inf	0.0%
9/1	LT signals Left	O	N/A	N/A	-		-	-	-	187	1853	686	27.3%
Ped Link: P1	Unnamed Ped Link	-	N/A	-	I		2	28	-	0	-	22400	0.0%
Ped Link: P2	Unnamed Ped Link	-	N/A	-	J		1	7	-	0	-	5600	0.0%
Ped Link: P3	Unnamed Ped Link	-	N/A	-	K		1	6	-	0	-	4800	0.0%
Ped Link: P4	Unnamed Ped Link	-	N/A	-	M		1	9	-	0	-	7200	0.0%
Ped Link: P5	Unnamed Ped Link	-	N/A	-	L		1	6	-	0	-	4800	0.0%

Full Input Data And Results

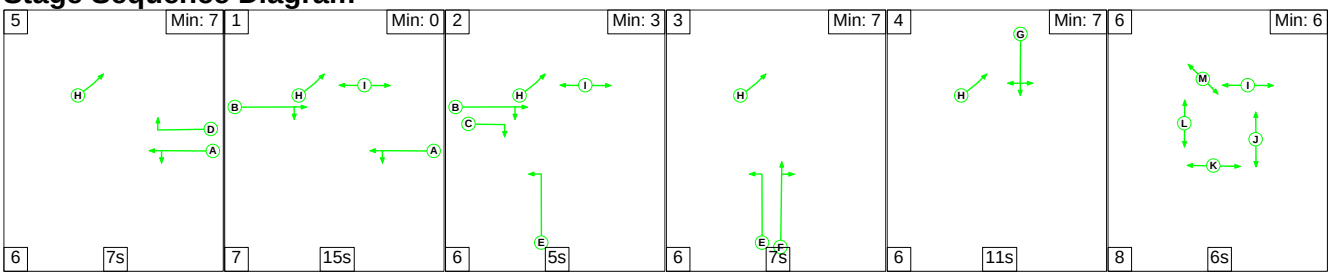
Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network	**-**	**-**	**158**	**175**	**3**	**13.7**	**4.3**	**0.2**	**18.2**	**-**	**-**	**-**	**-**
J5 Clonard Road	**-**	**-**	**158**	**175**	**3**	**13.7**	**4.3**	**0.2**	**18.2**	**-**	**-**	**-**	**-**
1/1+1/2	485	485	-	-	-	4.4	1.5	-	5.8	43.3	6.7	1.5	8.2
2/2+2/1	449	449	-	-	-	3.8	1.3	-	5.1	41.0	8.7	1.3	10.0
3/1+3/2	199	199	-	-	-	1.9	0.3	-	2.3	40.8	2.4	0.3	2.7
4/2+4/1	456	456	-	-	-	2.3	0.7	-	3.0	23.6	5.8	0.7	6.5
4/3	150	150	95	52	3	1.2	0.4	0.2	1.8	42.6	3.3	0.4	3.6
5/1	365	365	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	302	302	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
7/1	752	752	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
8/1	320	320	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
9/1	187	187	63	124	0	0.0	0.2	-	0.2	4.2	1.3	0.2	1.5
Ped Link: P1	0	0	-	-	-	-	-	-	0.0	0.0	-	-	0.0
Ped Link: P2	0	0	-	-	-	-	-	-	0.0	0.0	-	-	0.0
Ped Link: P3	0	0	-	-	-	-	-	-	0.0	0.0	-	-	0.0
Ped Link: P4	0	0	-	-	-	-	-	-	0.0	0.0	-	-	0.0
Ped Link: P5	0	0	-	-	-	-	-	-	0.0	0.0	-	-	0.0

C1 PRC for Signalled Lanes (%): 20.3 Total Delay for Signalled Lanes (pcuHr): 17.96 Cycle Time (s): 90
PRC Over All Lanes (%): 20.3 Total Delay Over All Lanes(pcuHr): 18.18

Full Input Data And Results

Scenario 2: '2025 Base + CD PM' (FG2: '2025 Base + CD PM', Plan 1: 'Network Control Plan 1')

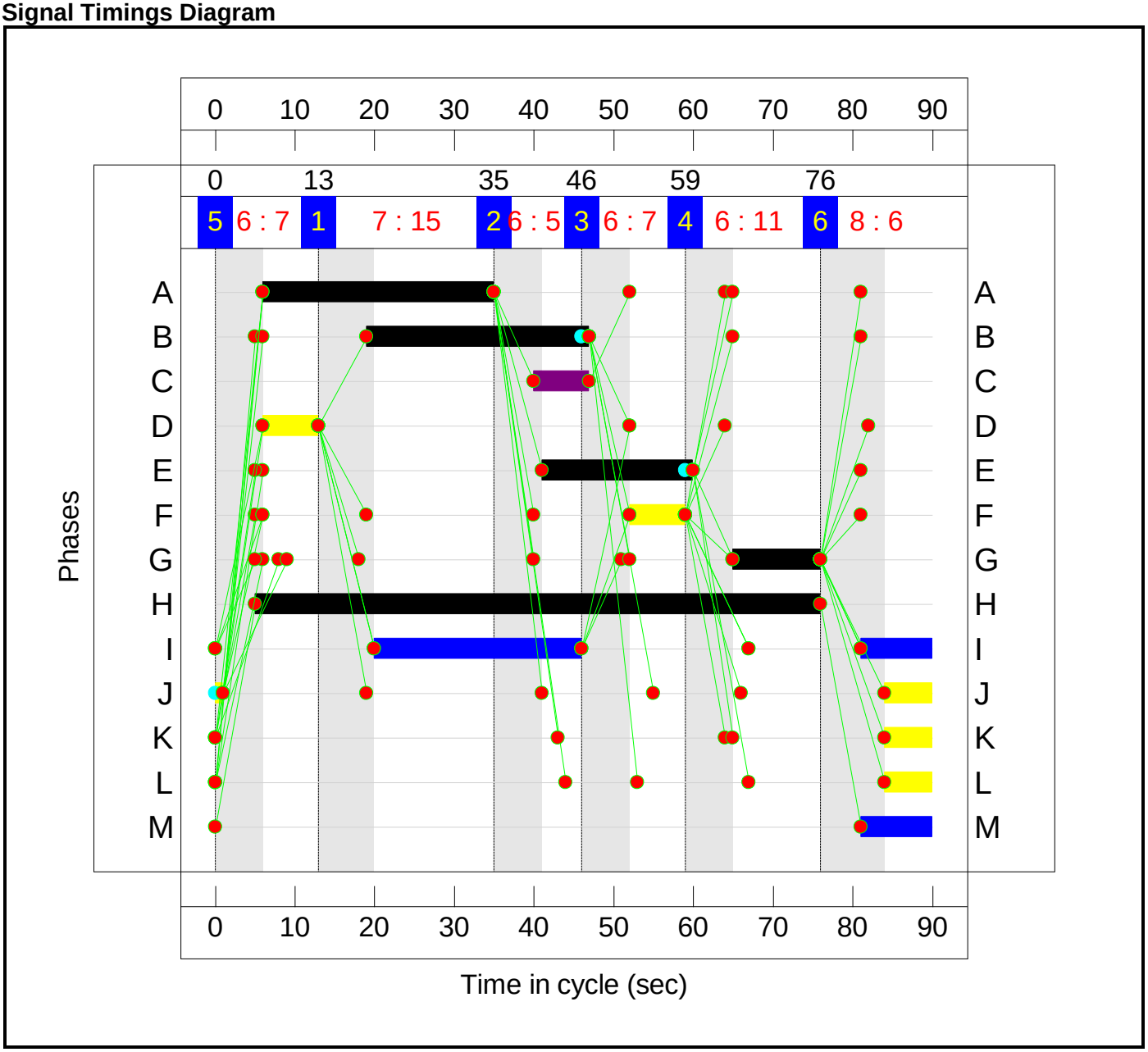
Stage Sequence Diagram



Stage Timings

Stage	5	1	2	3	4	6
Duration	7	15	5	7	11	6
Change Point	0	13	35	46	59	76

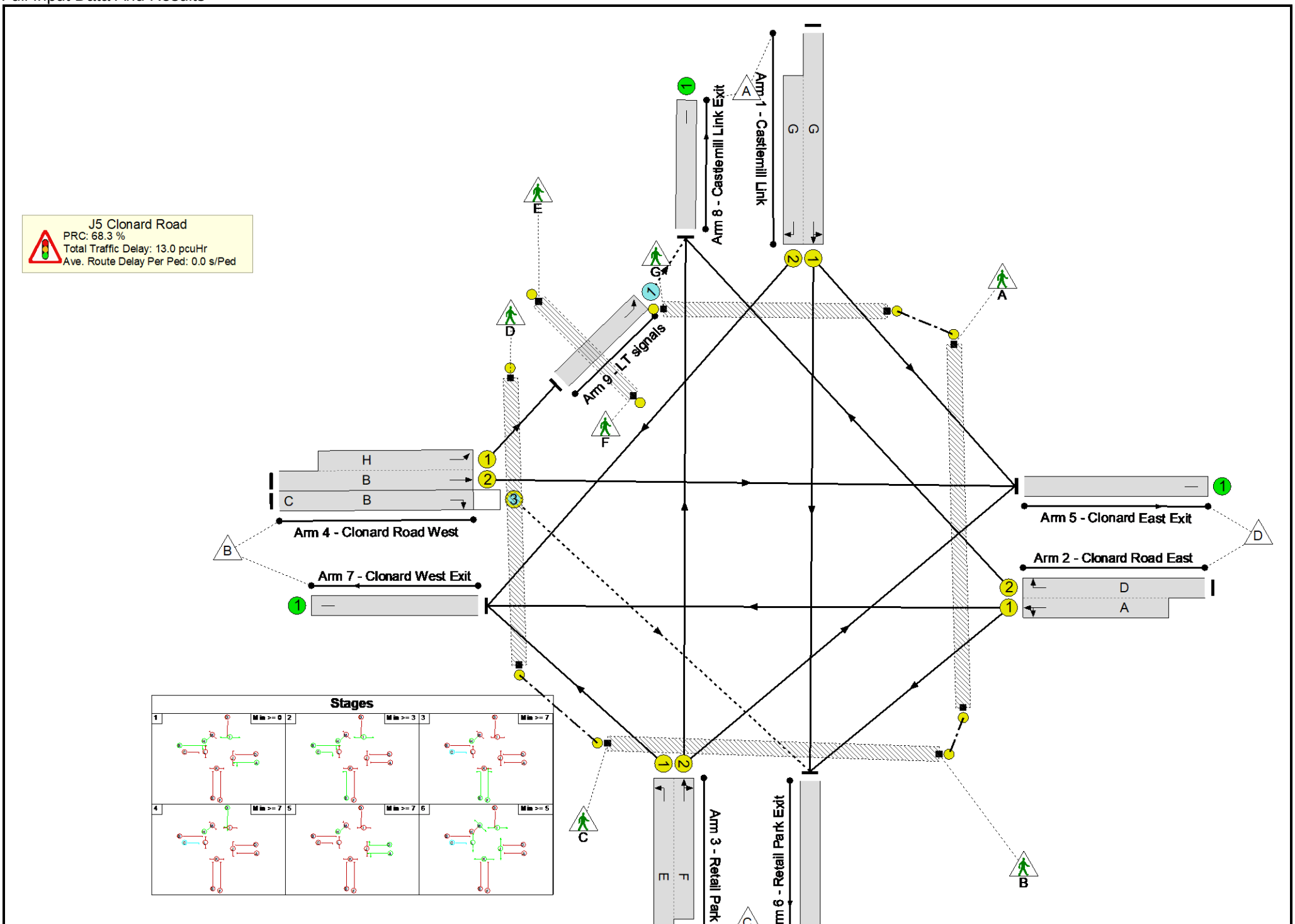
Signal Timings Diagram



Full Input Data And Results

Network Layout Diagram

Full Input Data And Results



Network Results

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**53.5%**
J5 Clonard Road	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**53.5%**
1/1+1/2	Castlemill Link Left Ahead Right	U	N/A	N/A	G		1	11	-	239	1817:1830	242+244	45.8 : 52.5%
2/2+2/1	Clonard Road East Left Ahead Right	U	N/A	N/A	D A		1	7:29	-	326	1830:1933	163+631	53.5 : 37.9%
3/1+3/2	Retail Park Right Left Ahead	U	N/A	N/A	E F		1	19:7	-	240	1707:2064	379+183	43.8 : 40.3%
4/2+4/1	Clonard Road West Ahead Ahead2	U	N/A	N/A	B H		1	28:71	-	667	1940:1853	610+646	53.1 : 53.1%
4/3	Clonard Road West Right	O	N/A	N/A	B	C	1	28	7	139	1840	507	27.4%
5/1	Clonard East Exit	U	N/A	N/A	-		-	-	-	395	Inf	Inf	0.0%
6/1	Retail Park Exit	U	N/A	N/A	-		-	-	-	192	Inf	Inf	0.0%
7/1	Clonard West Exit	U	N/A	N/A	-		-	-	-	526	Inf	Inf	0.0%
8/1	Castlemill Link Exit	U	N/A	N/A	-		-	-	-	498	Inf	Inf	0.0%
9/1	LT signals Left	O	N/A	N/A	-		-	-	-	343	1853	681	50.4%
Ped Link: P1	Unnamed Ped Link	-	N/A	-	I		2	35	-	0	-	28000	0.0%
Ped Link: P2	Unnamed Ped Link	-	N/A	-	J		1	7	-	0	-	5600	0.0%
Ped Link: P3	Unnamed Ped Link	-	N/A	-	K		1	6	-	0	-	4800	0.0%
Ped Link: P4	Unnamed Ped Link	-	N/A	-	M		1	9	-	0	-	7200	0.0%
Ped Link: P5	Unnamed Ped Link	-	N/A	-	L		1	6	-	0	-	4800	0.0%

Full Input Data And Results

Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network	**-**	**-**	**195**	**284**	**3**	**10.5**	**2.5**	**0.0**	**13.0**	**-**	**-**	**-**	**-**
J5 Clonard Road	**-**	**-**	**195**	**284**	**3**	**10.5**	**2.5**	**0.0**	**13.0**	**-**	**-**	**-**	**-**
1/1+1/2	239	239	-	-	-	2.4	0.5	-	2.9	43.4	3.0	0.5	3.4
2/2+2/1	326	326	-	-	-	2.5	0.3	-	2.8	31.1	4.5	0.3	4.9
3/1+3/2	240	240	-	-	-	2.2	0.4	-	2.6	38.4	3.6	0.4	3.9
4/2+4/1	667	667	-	-	-	2.4	0.6	-	3.0	16.2	6.6	0.6	7.1
4/3	139	139	120	15	3	0.9	0.2	0.0	1.1	28.3	2.5	0.2	2.7
5/1	395	395	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	192	192	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
7/1	526	526	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
8/1	498	498	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
9/1	343	343	75	268	0	0.2	0.5	-	0.7	7.2	3.6	0.5	4.1
Ped Link: P1	0	0	-	-	-	-	-	-	0.0	0.0	-	-	0.0
Ped Link: P2	0	0	-	-	-	-	-	-	0.0	0.0	-	-	0.0
Ped Link: P3	0	0	-	-	-	-	-	-	0.0	0.0	-	-	0.0
Ped Link: P4	0	0	-	-	-	-	-	-	0.0	0.0	-	-	0.0
Ped Link: P5	0	0	-	-	-	-	-	-	0.0	0.0	-	-	0.0

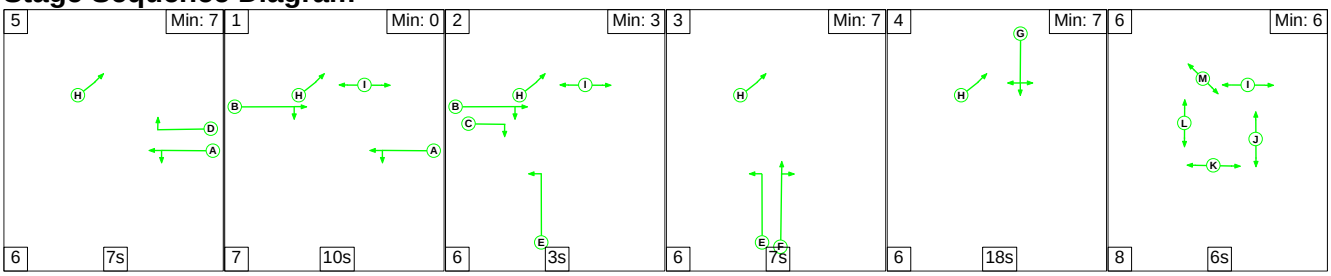
C1 PRC for Signalled Lanes (%): 68.3 Total Delay for Signalled Lanes (pcuHr): 12.36 Cycle Time (s): 90

PRC Over All Lanes (%): 68.3 Total Delay Over All Lanes(pcuHr): 13.04

Full Input Data And Results

Scenario 3: '2025 Base + CD + Malincross AM' (FG3: '2025 Base + CD + Malincross AM', Plan 1: 'Network Control Plan 1')

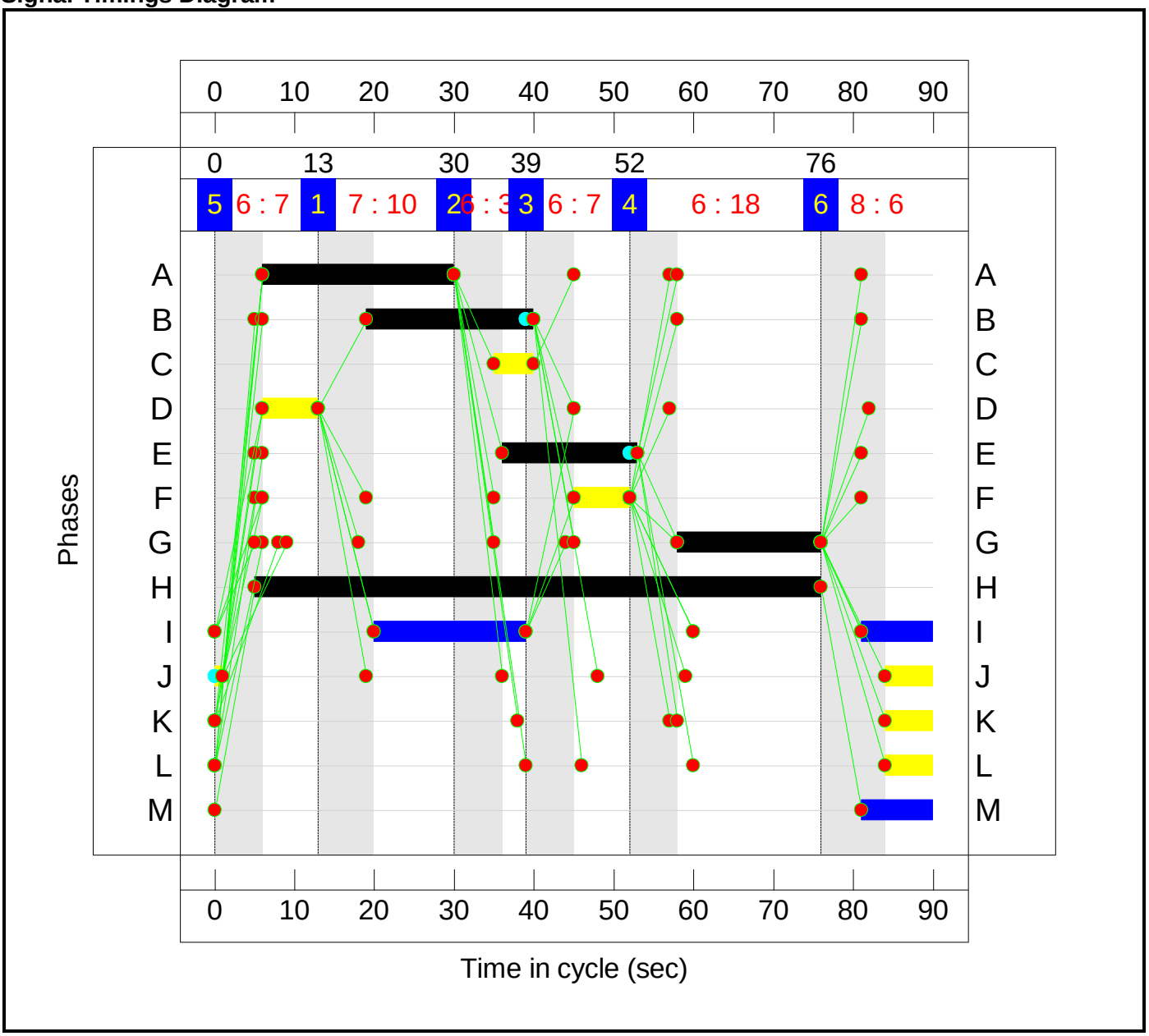
Stage Sequence Diagram



Stage Timings

Stage	5	1	2	3	4	6
Duration	7	10	3	7	18	6
Change Point	0	13	30	39	52	76

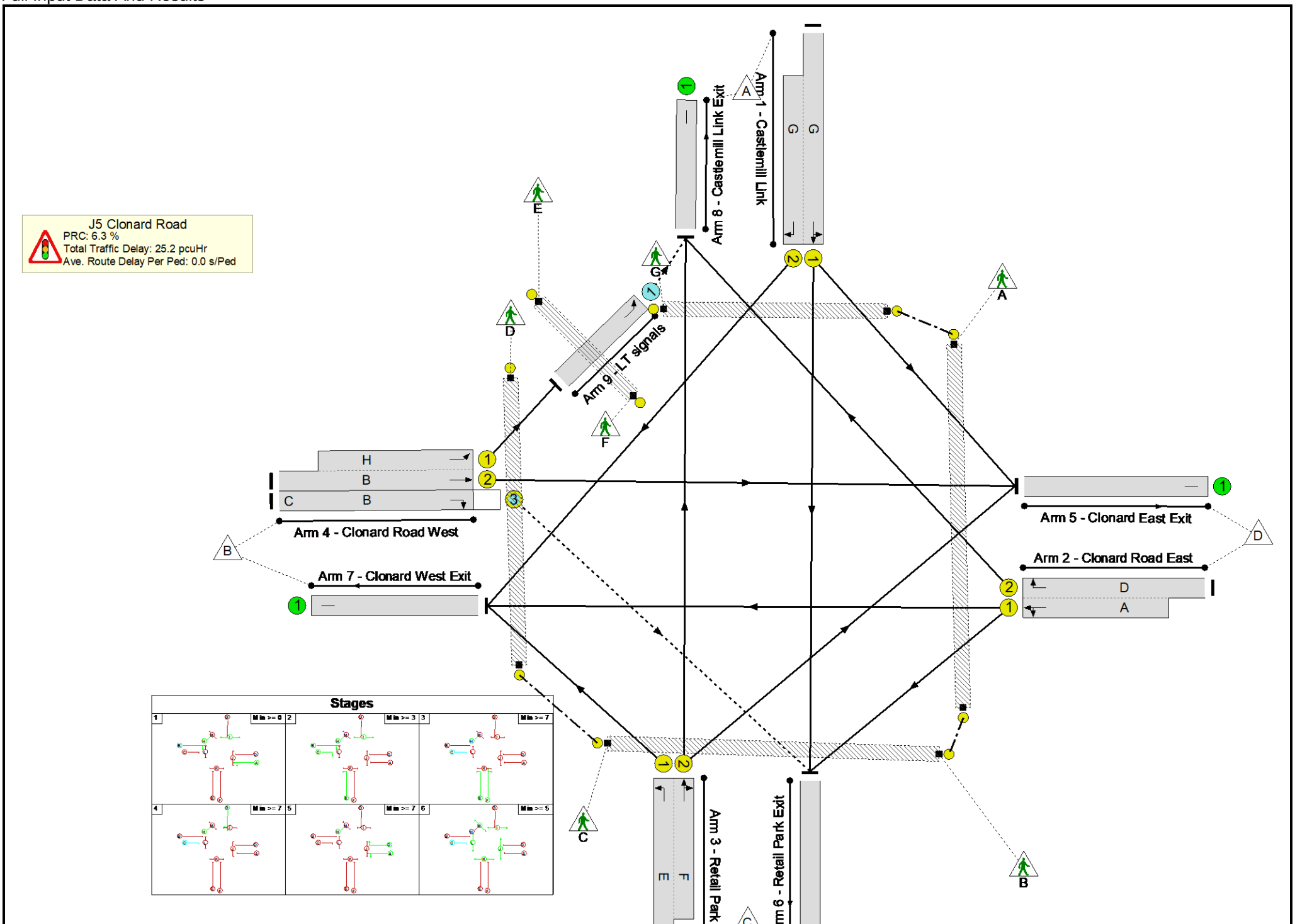
Signal Timings Diagram



Full Input Data And Results

Network Layout Diagram

Full Input Data And Results



Network Results

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**84.6%**
J5 Clonard Road	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**84.6%**
1/1+1/2	Castlemill Link Left Ahead Right	U	N/A	N/A	G		1	18	-	548	1865:1830	261+386	84.6 : 84.6%
2/2+2/1	Clonard Road East Left Ahead Right	U	N/A	N/A	D A		1	7:24	-	510	1830:1926	81+535	82.8 : 82.8%
3/1+3/2	Retail Park Right Left Ahead	U	N/A	N/A	E F		1	17:7	-	214	1707:2026	336+180	32.1 : 58.9%
4/2+4/1	Clonard Road West Ahead Ahead2	U	N/A	N/A	B H		1	21:71	-	594	1940:1853	474+244	82.7 : 82.7%
4/3	Clonard Road West Right	O	N/A	N/A	B	C	1	21	5	161	1840	300	53.7%
5/1	Clonard East Exit	U	N/A	N/A	-		-	-	-	499	Inf	Inf	0.0%
6/1	Retail Park Exit	U	N/A	N/A	-		-	-	-	331	Inf	Inf	0.0%
7/1	Clonard West Exit	U	N/A	N/A	-		-	-	-	852	Inf	Inf	0.0%
8/1	Castlemill Link Exit	U	N/A	N/A	-		-	-	-	345	Inf	Inf	0.0%
9/1	LT signals Left	O	N/A	N/A	-		-	-	-	202	1853	684	29.6%
Ped Link: P1	Unnamed Ped Link	-	N/A	-	I		2	28	-	0	-	22400	0.0%
Ped Link: P2	Unnamed Ped Link	-	N/A	-	J		1	7	-	0	-	5600	0.0%
Ped Link: P3	Unnamed Ped Link	-	N/A	-	K		1	6	-	0	-	4800	0.0%
Ped Link: P4	Unnamed Ped Link	-	N/A	-	M		1	9	-	0	-	7200	0.0%
Ped Link: P5	Unnamed Ped Link	-	N/A	-	L		1	6	-	0	-	4800	0.0%

Full Input Data And Results

Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network	**-**	**-**	**123**	**236**	**4**	**16.6**	**8.4**	**0.2**	**25.2**	**-**	**-**	**-**	**-**
J5 Clonard Road	**-**	**-**	**123**	**236**	**4**	**16.6**	**8.4**	**0.2**	**25.2**	**-**	**-**	**-**	**-**
1/1+1/2	548	548	-	-	-	5.0	2.6	-	7.7	50.4	7.8	2.6	10.4
2/2+2/1	510	510	-	-	-	4.5	2.3	-	6.8	47.9	10.3	2.3	12.6
3/1+3/2	214	214	-	-	-	2.1	0.4	-	2.4	41.0	2.5	0.4	2.9
4/2+4/1	594	594	-	-	-	3.6	2.3	-	5.9	35.9	9.3	2.3	11.6
4/3	161	161	56	101	4	1.4	0.6	0.2	2.2	48.8	3.7	0.6	4.2
5/1	499	499	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	331	331	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
7/1	852	852	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
8/1	345	345	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
9/1	202	202	67	135	0	0.0	0.2	-	0.2	4.4	1.5	0.2	1.7
Ped Link: P1	0	0	-	-	-	-	-	-	0.0	0.0	-	-	0.0
Ped Link: P2	0	0	-	-	-	-	-	-	0.0	0.0	-	-	0.0
Ped Link: P3	0	0	-	-	-	-	-	-	0.0	0.0	-	-	0.0
Ped Link: P4	0	0	-	-	-	-	-	-	0.0	0.0	-	-	0.0
Ped Link: P5	0	0	-	-	-	-	-	-	0.0	0.0	-	-	0.0

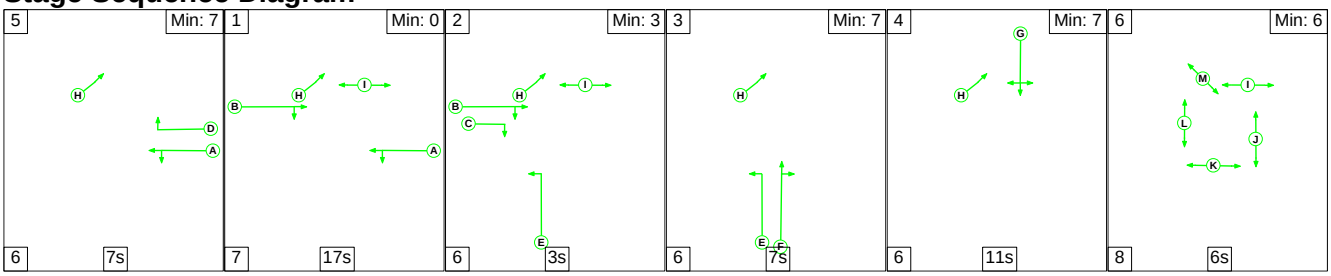
C1 PRC for Signalled Lanes (%): 6.3 Total Delay for Signalled Lanes (pcuHr): 24.98 Cycle Time (s): 90

PRC Over All Lanes (%): 6.3 Total Delay Over All Lanes(pcuHr): 25.23

Full Input Data And Results

Scenario 4: '2025 Base + CD + Malincross PM' (FG4: '2025 Base + CD + Malincross PM', Plan 1: 'Network Control Plan 1')

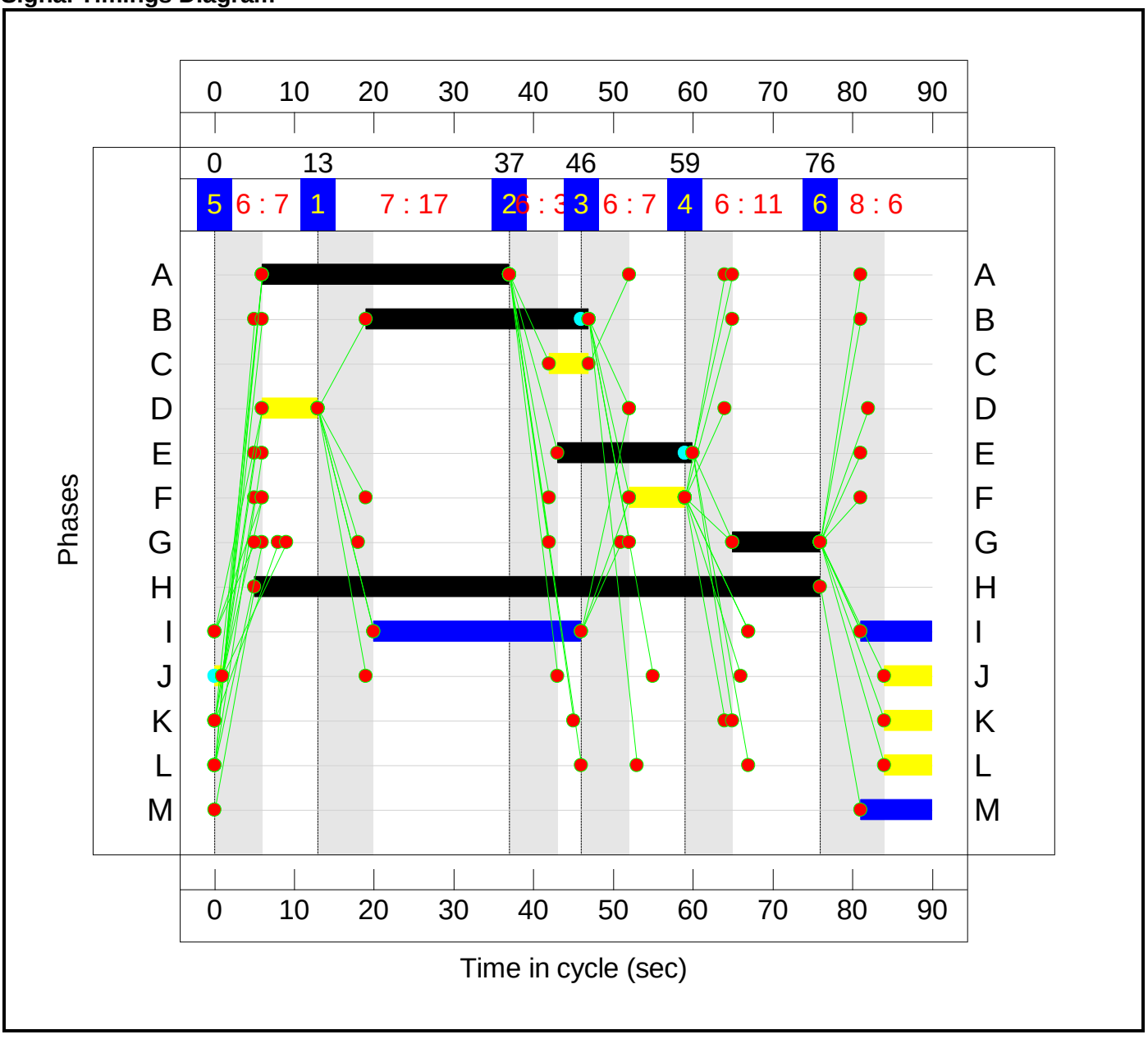
Stage Sequence Diagram



Stage Timings

Stage	5	1	2	3	4	6
Duration	7	17	3	7	11	6
Change Point	0	13	37	46	59	76

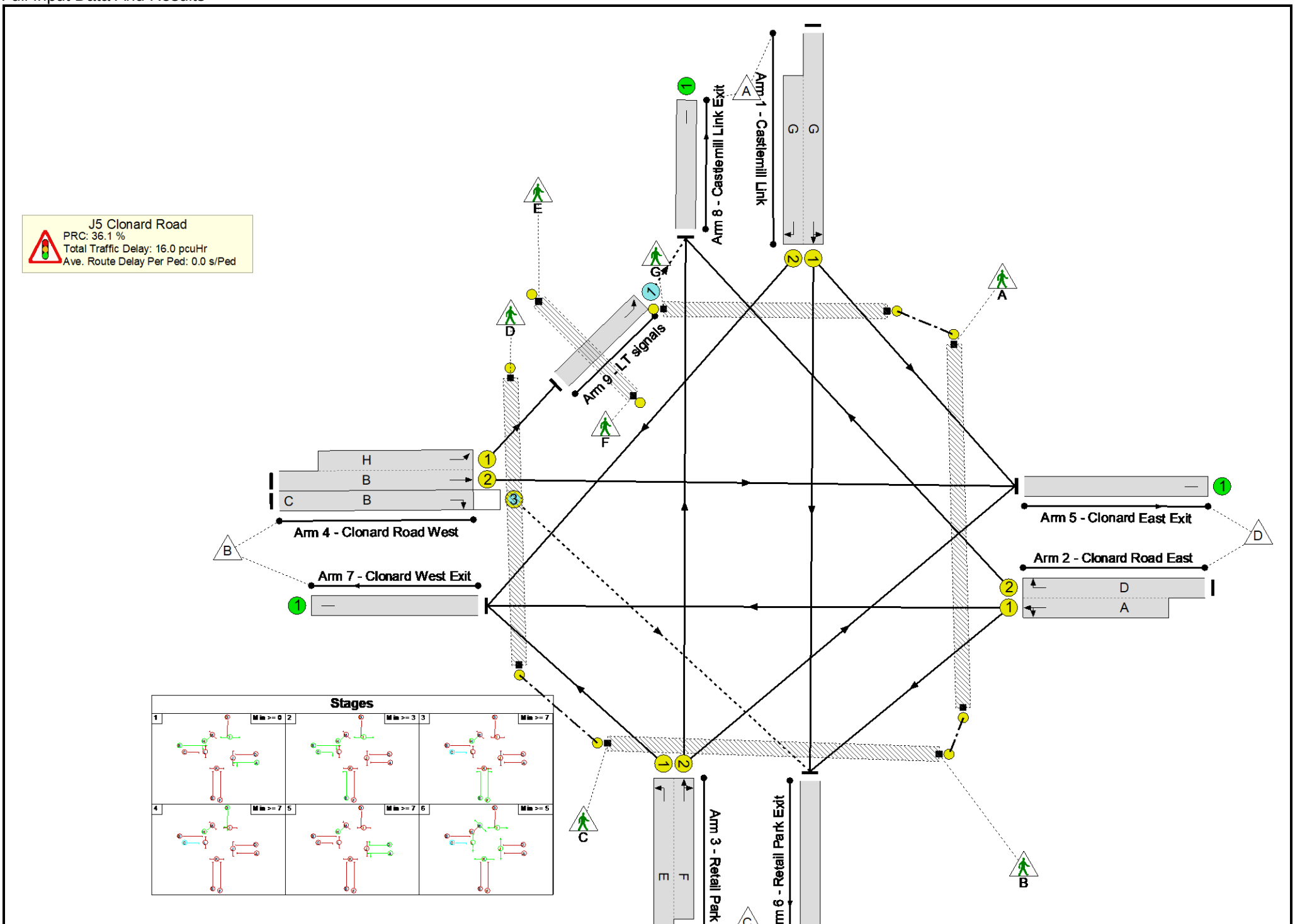
Signal Timings Diagram



Full Input Data And Results

Network Layout Diagram

Full Input Data And Results



Network Results

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**66.1%**
J5 Clonard Road	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**66.1%**
1/1+1/2	Castlemill Link Left Ahead Right	U	N/A	N/A	G		1	11	-	275	1822:1830	243+244	51.5 : 61.5%
2/2+2/1	Clonard Road East Left Ahead Right	U	N/A	N/A	D A		1	7:31	-	430	1830:1935	163+666	58.4 : 50.3%
3/1+3/2	Retail Park Right Left Ahead	U	N/A	N/A	E F		1	17:7	-	248	1707:2065	341+184	49.2 : 43.6%
4/2+4/1	Clonard Road West Ahead Ahead2	U	N/A	N/A	B H		1	28:71	-	778	1940:1853	611+566	66.1 : 66.1%
4/3	Clonard Road West Right	O	N/A	N/A	B	C	1	28	5	140	1840	470	29.8%
5/1	Clonard East Exit	U	N/A	N/A	-		-	-	-	480	Inf	Inf	0.0%
6/1	Retail Park Exit	U	N/A	N/A	-		-	-	-	202	Inf	Inf	0.0%
7/1	Clonard West Exit	U	N/A	N/A	-		-	-	-	646	Inf	Inf	0.0%
8/1	Castlemill Link Exit	U	N/A	N/A	-		-	-	-	543	Inf	Inf	0.0%
9/1	LT signals Left	O	N/A	N/A	-		-	-	-	374	1853	678	55.2%
Ped Link: P1	Unnamed Ped Link	-	N/A	-	I		2	35	-	0	-	28000	0.0%
Ped Link: P2	Unnamed Ped Link	-	N/A	-	J		1	7	-	0	-	5600	0.0%
Ped Link: P3	Unnamed Ped Link	-	N/A	-	K		1	6	-	0	-	4800	0.0%
Ped Link: P4	Unnamed Ped Link	-	N/A	-	M		1	9	-	0	-	7200	0.0%
Ped Link: P5	Unnamed Ped Link	-	N/A	-	L		1	6	-	0	-	4800	0.0%

Full Input Data And Results

Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network	**-**	**-**	**200**	**311**	**3**	**12.6**	**3.4**	**0.1**	**16.0**	**-**	**-**	**-**	**-**
J5 Clonard Road	**-**	**-**	**200**	**311**	**3**	**12.6**	**3.4**	**0.1**	**16.0**	**-**	**-**	**-**	**-**
1/1+1/2	275	275	-	-	-	2.8	0.6	-	3.4	45.0	3.5	0.6	4.1
2/2+2/1	430	430	-	-	-	3.1	0.5	-	3.7	30.8	6.5	0.5	7.1
3/1+3/2	248	248	-	-	-	2.4	0.4	-	2.8	40.7	3.7	0.4	4.1
4/2+4/1	778	778	-	-	-	3.2	1.0	-	4.1	19.1	8.6	1.0	9.6
4/3	140	140	124	12	3	0.9	0.2	0.1	1.1	29.2	2.6	0.2	2.8
5/1	480	480	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	202	202	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
7/1	646	646	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
8/1	543	543	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
9/1	374	374	76	298	0	0.2	0.6	-	0.8	8.2	4.3	0.6	4.9
Ped Link: P1	0	0	-	-	-	-	-	-	0.0	0.0	-	-	0.0
Ped Link: P2	0	0	-	-	-	-	-	-	0.0	0.0	-	-	0.0
Ped Link: P3	0	0	-	-	-	-	-	-	0.0	0.0	-	-	0.0
Ped Link: P4	0	0	-	-	-	-	-	-	0.0	0.0	-	-	0.0
Ped Link: P5	0	0	-	-	-	-	-	-	0.0	0.0	-	-	0.0

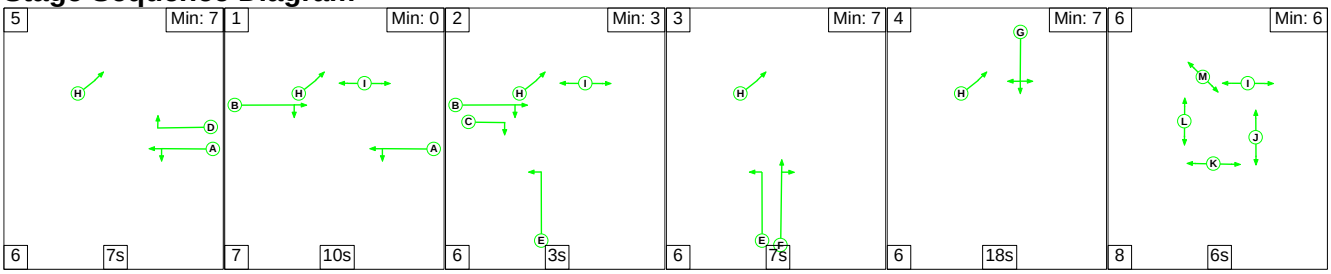
C1 PRC for Signalled Lanes (%): 36.1 Total Delay for Signalled Lanes (pcuHr): 15.20 Cycle Time (s): 90

PRC Over All Lanes (%): 36.1 Total Delay Over All Lanes(pcuHr): 16.04

Full Input Data And Results

Scenario 5: '2040 Base + CD AM' (FG5: '2040 Base + CD AM', Plan 1: 'Network Control Plan 1')

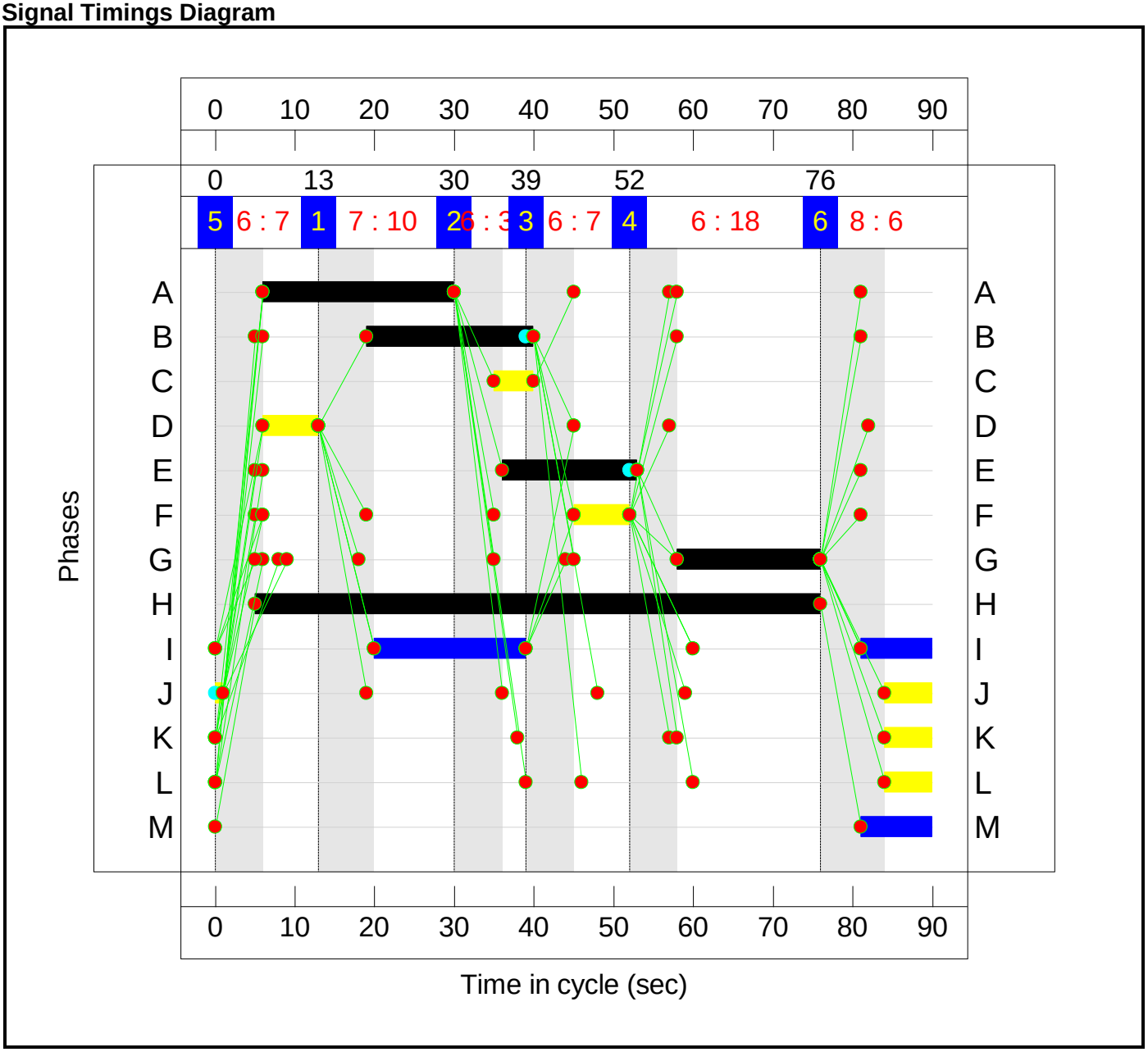
Stage Sequence Diagram



Stage Timings

Stage	5	1	2	3	4	6
Duration	7	10	3	7	18	6
Change Point	0	13	30	39	52	76

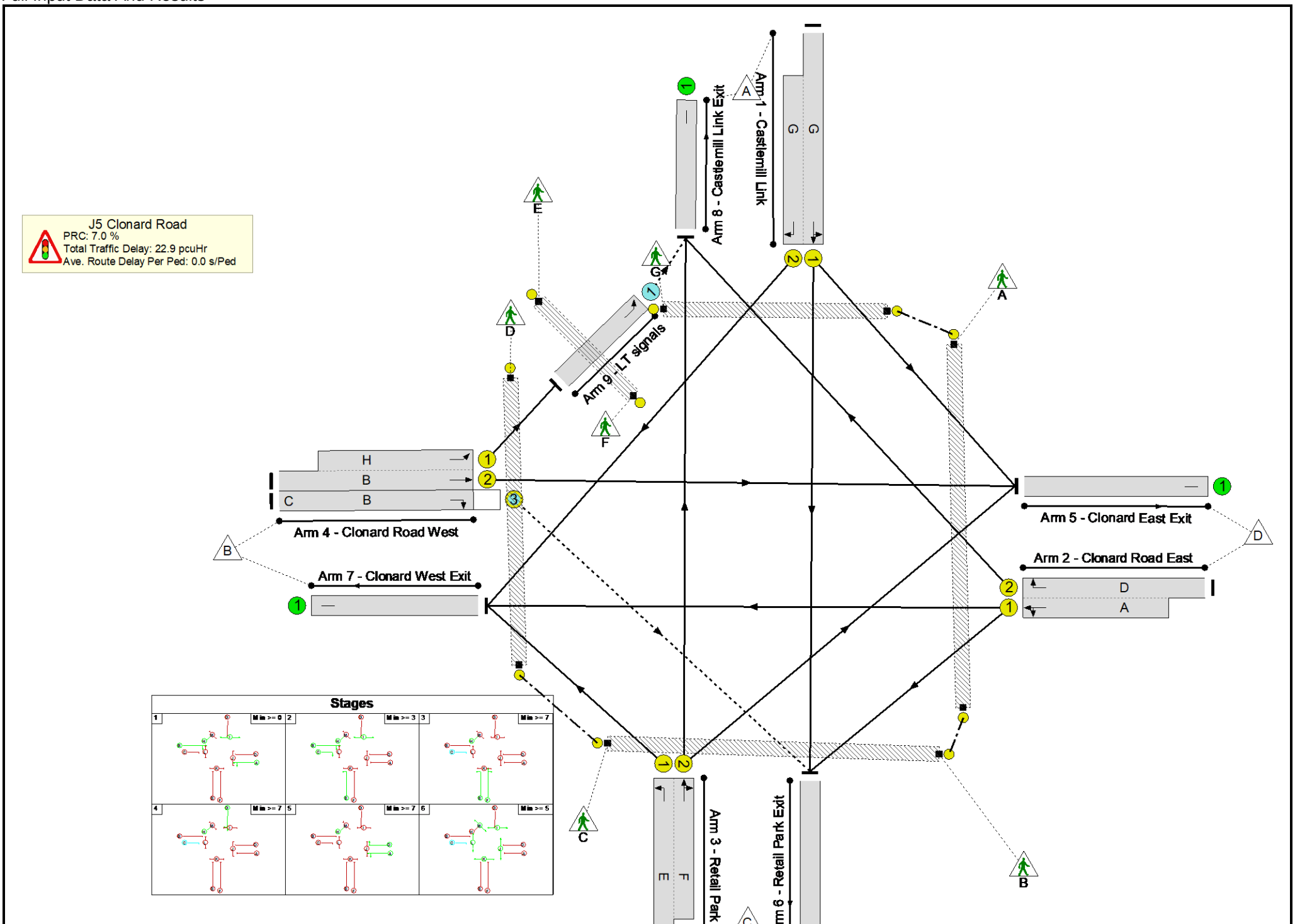
Signal Timings Diagram



Full Input Data And Results

Network Layout Diagram

Full Input Data And Results



Network Results

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**84.1%**
J5 Clonard Road	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**84.1%**
1/1+1/2	Castlemill Link Left Ahead Right	U	N/A	N/A	G		1	18	-	547	1865:1830	264+386	84.1 : 84.1%
2/2+2/1	Clonard Road East Left Ahead Right	U	N/A	N/A	D A		1	7:24	-	507	1830:1925	84+535	81.9 : 81.9%
3/1+3/2	Retail Park Right Left Ahead	U	N/A	N/A	E F		1	17:7	-	224	1707:2027	336+180	33.7 : 61.6%
4/2+4/1	Clonard Road West Ahead Ahead2	U	N/A	N/A	B H		1	21:71	-	516	1940:1853	474+331	64.1 : 64.1%
4/3	Clonard Road West Right	O	N/A	N/A	B	C	1	21	5	170	1840	305	55.7%
5/1	Clonard East Exit	U	N/A	N/A	-		-	-	-	412	Inf	Inf	0.0%
6/1	Retail Park Exit	U	N/A	N/A	-		-	-	-	343	Inf	Inf	0.0%
7/1	Clonard West Exit	U	N/A	N/A	-		-	-	-	848	Inf	Inf	0.0%
8/1	Castlemill Link Exit	U	N/A	N/A	-		-	-	-	361	Inf	Inf	0.0%
9/1	LT signals Left	O	N/A	N/A	-		-	-	-	212	1853	682	31.1%
Ped Link: P1	Unnamed Ped Link	-	N/A	-	I		2	28	-	0	-	22400	0.0%
Ped Link: P2	Unnamed Ped Link	-	N/A	-	J		1	7	-	0	-	5600	0.0%
Ped Link: P3	Unnamed Ped Link	-	N/A	-	K		1	6	-	0	-	4800	0.0%
Ped Link: P4	Unnamed Ped Link	-	N/A	-	M		1	9	-	0	-	7200	0.0%
Ped Link: P5	Unnamed Ped Link	-	N/A	-	L		1	6	-	0	-	4800	0.0%

Full Input Data And Results

Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network	**-**	**-**	**129**	**250**	**4**	**15.9**	**6.8**	**0.2**	**22.9**	**-**	**-**	**-**	**-**
J5 Clonard Road	**-**	**-**	**129**	**250**	**4**	**15.9**	**6.8**	**0.2**	**22.9**	**-**	**-**	**-**	**-**
1/1+1/2	547	547	-	-	-	5.0	2.5	-	7.6	49.8	7.8	2.5	10.3
2/2+2/1	507	507	-	-	-	4.4	2.2	-	6.6	47.0	10.2	2.2	12.4
3/1+3/2	224	224	-	-	-	2.2	0.4	-	2.6	41.3	2.7	0.4	3.0
4/2+4/1	516	516	-	-	-	2.7	0.9	-	3.6	25.0	6.8	0.9	7.6
4/3	170	170	61	105	4	1.5	0.6	0.2	2.3	49.0	3.9	0.6	4.5
5/1	412	412	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	343	343	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
7/1	848	848	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
8/1	361	361	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
9/1	212	212	67	145	0	0.0	0.2	-	0.3	4.6	1.6	0.2	1.8
Ped Link: P1	0	0	-	-	-	-	-	-	0.0	0.0	-	-	0.0
Ped Link: P2	0	0	-	-	-	-	-	-	0.0	0.0	-	-	0.0
Ped Link: P3	0	0	-	-	-	-	-	-	0.0	0.0	-	-	0.0
Ped Link: P4	0	0	-	-	-	-	-	-	0.0	0.0	-	-	0.0
Ped Link: P5	0	0	-	-	-	-	-	-	0.0	0.0	-	-	0.0

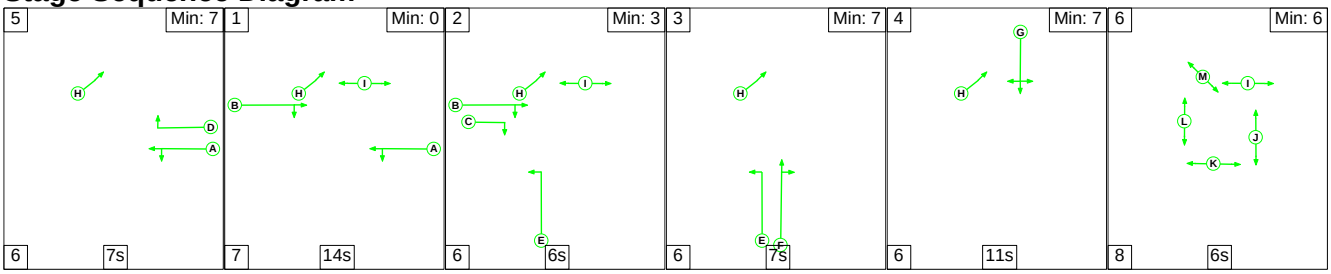
C1 PRC for Signalled Lanes (%): 7.0 Total Delay for Signalled Lanes (pcuHr): 22.65 Cycle Time (s): 90

PRC Over All Lanes (%): 7.0 Total Delay Over All Lanes(pcuHr): 22.92

Full Input Data And Results

Scenario 6: '2040 Base + CD PM' (FG6: '2040 Base + CD PM', Plan 1: 'Network Control Plan 1')

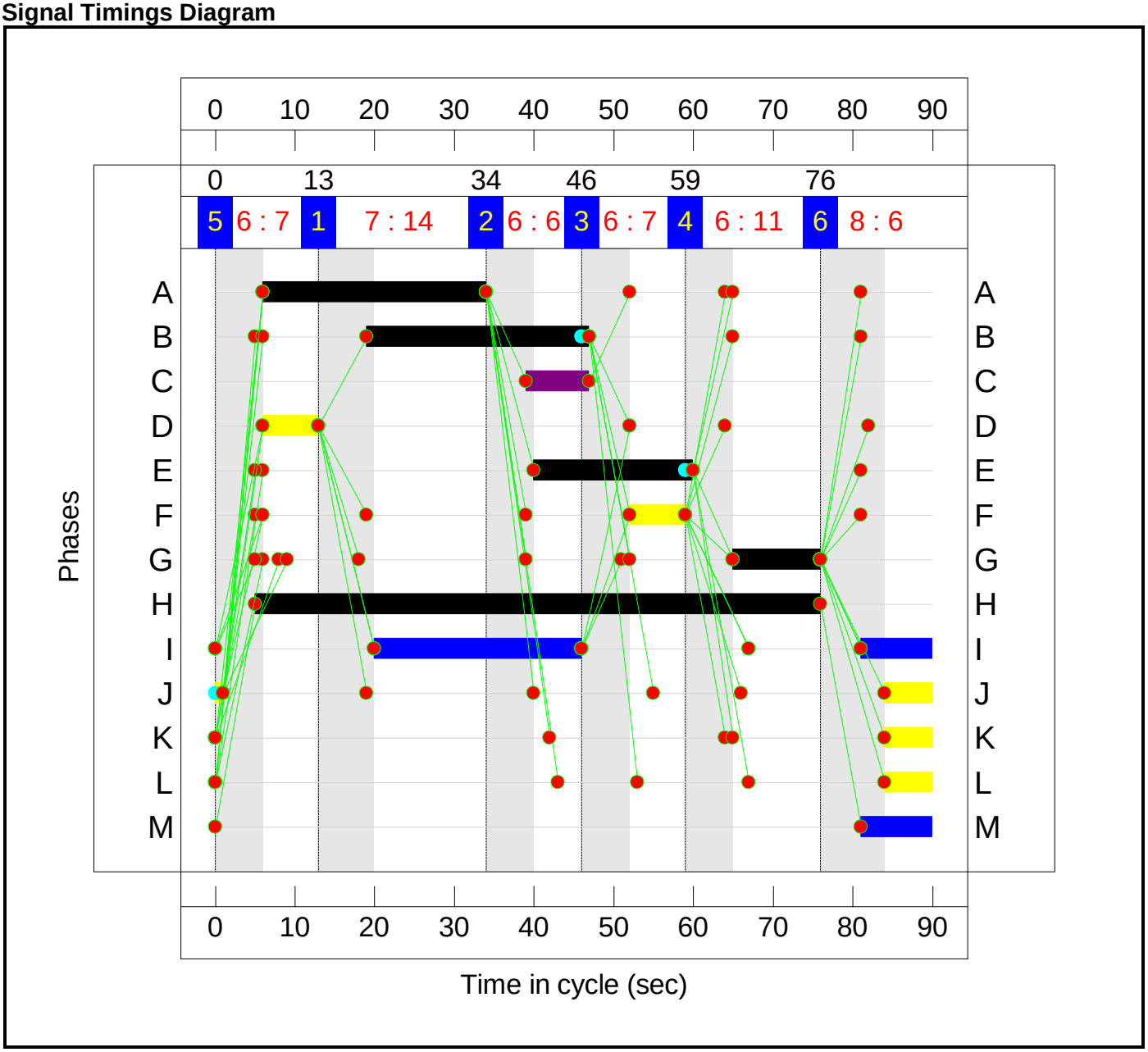
Stage Sequence Diagram



Stage Timings

Stage	5	1	2	3	4	6
Duration	7	14	6	7	11	6
Change Point	0	13	34	46	59	76

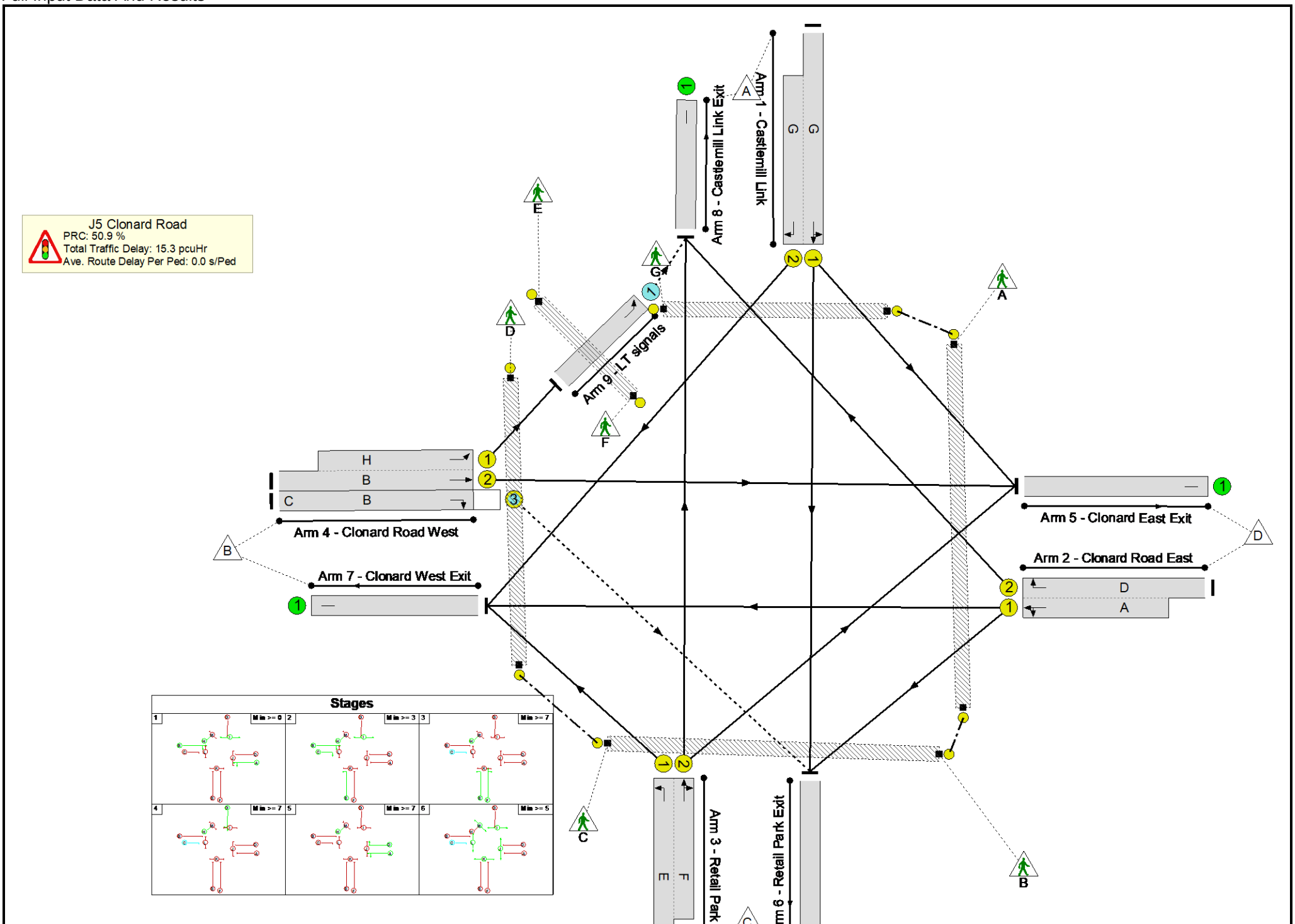
Signal Timings Diagram



Full Input Data And Results

Network Layout Diagram

Full Input Data And Results



Network Results

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**59.6%**
J5 Clonard Road	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**59.6%**
1/1+1/2	Castlemill Link Left Ahead Right	U	N/A	N/A	G		1	11	-	270	1818:1830	242+244	51.6 : 59.4%
2/2+2/1	Clonard Road East Left Ahead Right	U	N/A	N/A	D A		1	7:28	-	367	1830:1932	163+616	59.6 : 43.9%
3/1+3/2	Retail Park Right Left Ahead	U	N/A	N/A	E F		1	20:7	-	269	1707:2066	398+184	46.7 : 45.2%
4/2+4/1	Clonard Road West Ahead Ahead2	U	N/A	N/A	B H		1	28:71	-	749	1940:1853	610+645	59.6 : 59.6%
4/3	Clonard Road West Right	O	N/A	N/A	B	C	1	28	8	156	1840	508	30.7%
5/1	Clonard East Exit	U	N/A	N/A	-		-	-	-	443	Inf	Inf	0.0%
6/1	Retail Park Exit	U	N/A	N/A	-		-	-	-	217	Inf	Inf	0.0%
7/1	Clonard West Exit	U	N/A	N/A	-		-	-	-	592	Inf	Inf	0.0%
8/1	Castlemill Link Exit	U	N/A	N/A	-		-	-	-	559	Inf	Inf	0.0%
9/1	LT signals Left	O	N/A	N/A	-		-	-	-	385	1853	677	56.9%
Ped Link: P1	Unnamed Ped Link	-	N/A	-	I		2	35	-	0	-	28000	0.0%
Ped Link: P2	Unnamed Ped Link	-	N/A	-	J		1	7	-	0	-	5600	0.0%
Ped Link: P3	Unnamed Ped Link	-	N/A	-	K		1	6	-	0	-	4800	0.0%
Ped Link: P4	Unnamed Ped Link	-	N/A	-	M		1	9	-	0	-	7200	0.0%
Ped Link: P5	Unnamed Ped Link	-	N/A	-	L		1	6	-	0	-	4800	0.0%

Full Input Data And Results

Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network	**-**	**-**	**210**	**328**	**3**	**12.1**	**3.1**	**0.1**	**15.3**	**-**	**-**	**-**	**-**
J5 Clonard Road	**-**	**-**	**210**	**328**	**3**	**12.1**	**3.1**	**0.1**	**15.3**	**-**	**-**	**-**	**-**
1/1+1/2	270	270	-	-	-	2.7	0.6	-	3.4	44.8	3.4	0.6	4.0
2/2+2/1	367	367	-	-	-	2.9	0.4	-	3.3	32.5	5.3	0.4	5.7
3/1+3/2	269	269	-	-	-	2.4	0.4	-	2.9	38.3	4.0	0.4	4.4
4/2+4/1	749	749	-	-	-	2.8	0.7	-	3.6	17.1	7.6	0.7	8.3
4/3	156	156	133	19	3	1.0	0.2	0.1	1.3	29.0	2.9	0.2	3.1
5/1	443	443	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	217	217	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
7/1	592	592	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
8/1	559	559	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
9/1	385	385	76	309	0	0.3	0.7	-	0.9	8.6	4.6	0.7	5.3
Ped Link: P1	0	0	-	-	-	-	-	-	0.0	0.0	-	-	0.0
Ped Link: P2	0	0	-	-	-	-	-	-	0.0	0.0	-	-	0.0
Ped Link: P3	0	0	-	-	-	-	-	-	0.0	0.0	-	-	0.0
Ped Link: P4	0	0	-	-	-	-	-	-	0.0	0.0	-	-	0.0
Ped Link: P5	0	0	-	-	-	-	-	-	0.0	0.0	-	-	0.0

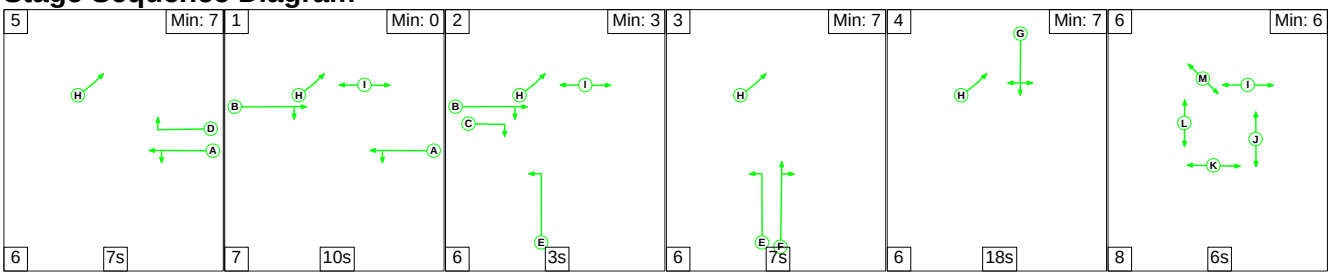
C1 PRC for Signalled Lanes (%): 50.9 Total Delay for Signalled Lanes (pcuHr): 14.34 Cycle Time (s): 90

PRC Over All Lanes (%): 50.9 Total Delay Over All Lanes(pcuHr): 15.26

Full Input Data And Results

Scenario 7: '2040 Base + CD + Malincross AM' (FG7: '2040 Base + CD + Malincross AM', Plan 1: 'Network Control Plan 1')

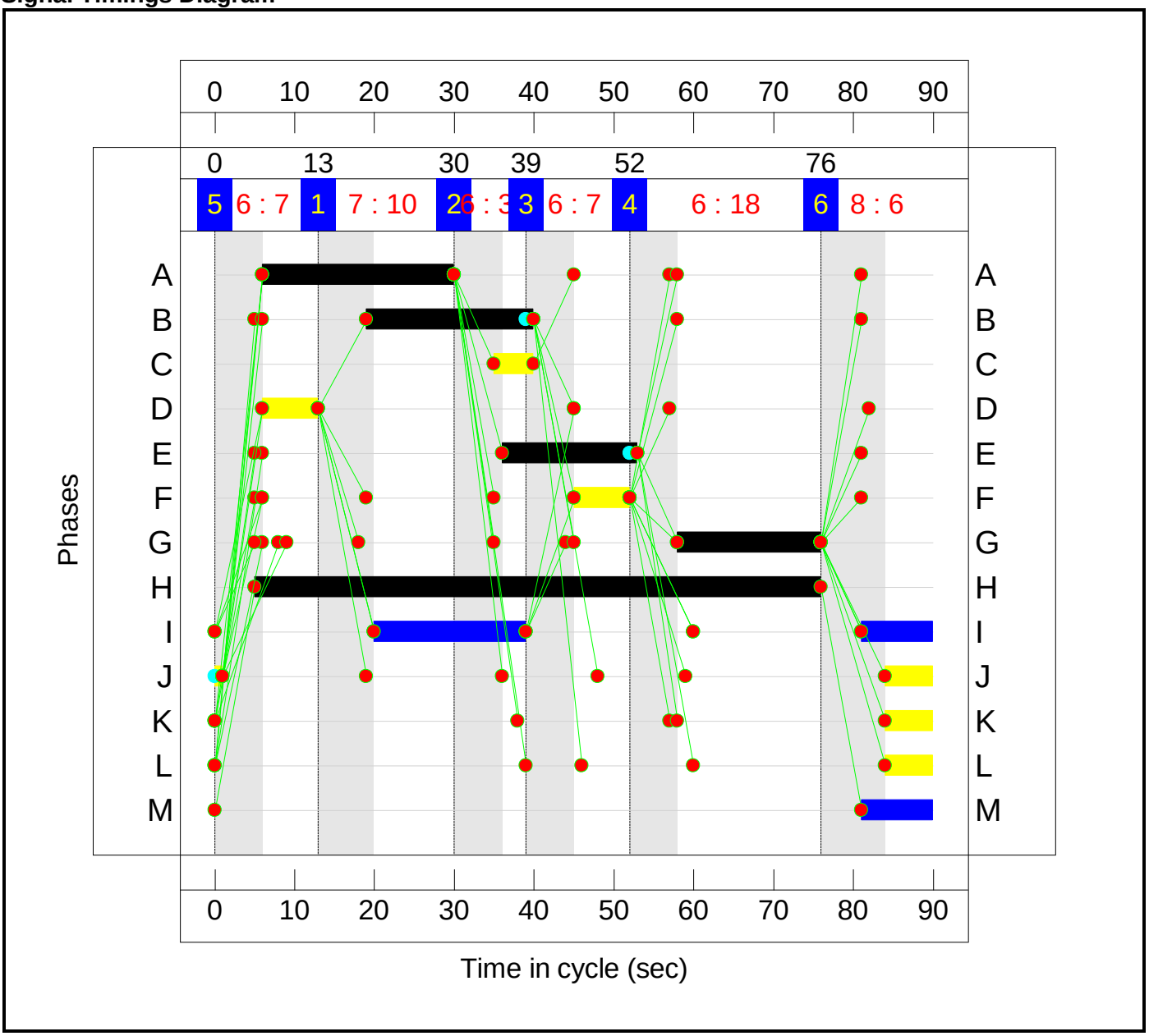
Stage Sequence Diagram



Stage Timings

Stage	5	1	2	3	4	6
Duration	7	10	3	7	18	6
Change Point	0	13	30	39	52	76

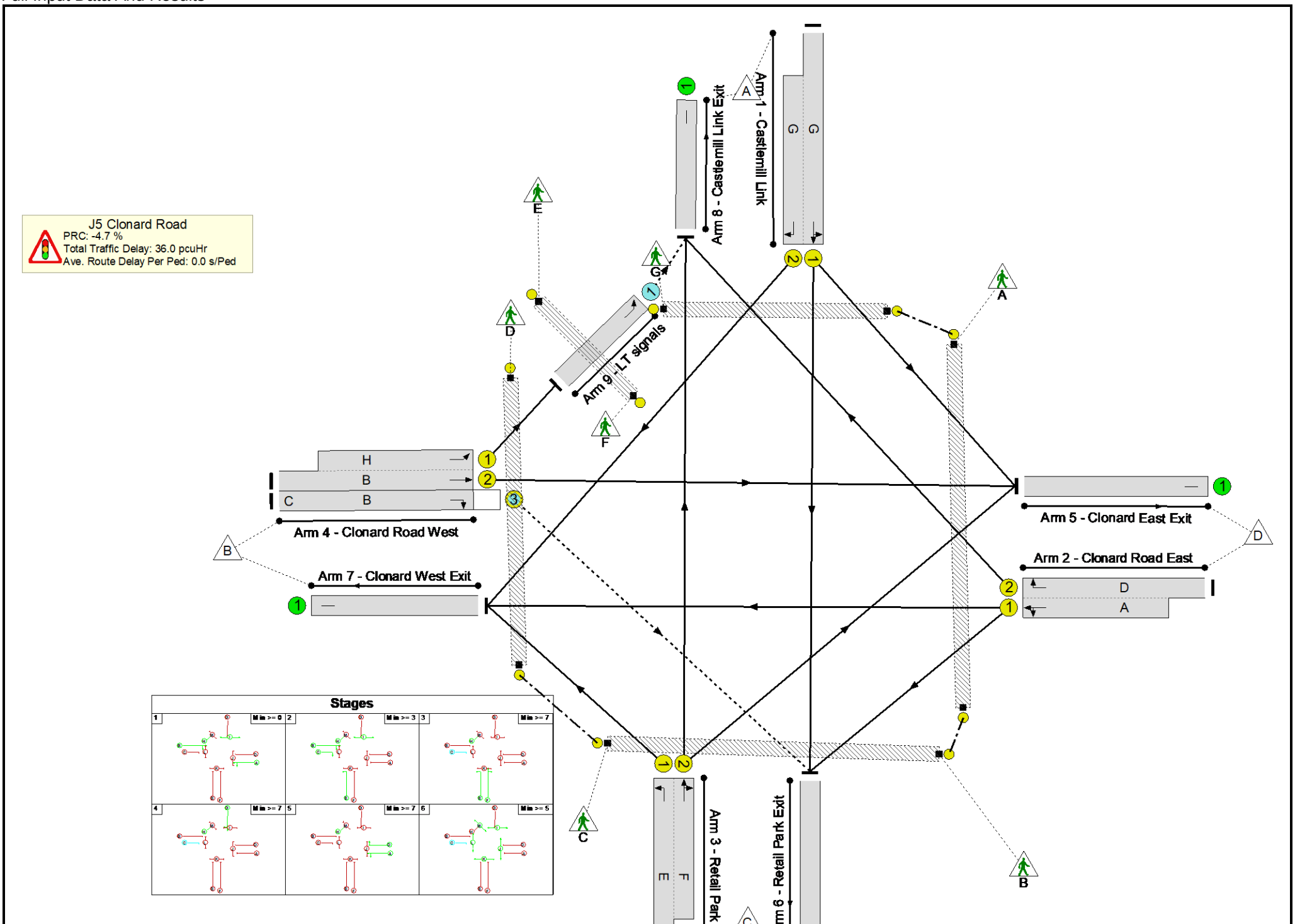
Signal Timings Diagram



Full Input Data And Results

Network Layout Diagram

Full Input Data And Results



Full Input Data And Results

Network Results

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**94.2%**
J5 Clonard Road	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**94.2%**
1/1+1/2	Castlemill Link Left Ahead Right	U	N/A	N/A	G		1	18	-	611	1865:1830	262+386	94.2 : 94.2%
2/2+2/1	Clonard Road East Left Ahead Right	U	N/A	N/A	D A		1	7:24	-	567	1830:1925	80+535	92.2 : 92.2%
3/1+3/2	Retail Park Right Left Ahead	U	N/A	N/A	E F		1	17:7	-	239	1707:2027	341+180	35.4 : 65.5%
4/2+4/1	Clonard Road West Ahead Ahead2	U	N/A	N/A	B H		1	21:71	-	654	1940:1853	474+252	90.0 : 90.0%
4/3	Clonard Road West Right	O	N/A	N/A	B	C	1	21	5	180	1840	264	68.2%
5/1	Clonard East Exit	U	N/A	N/A	-		-	-	-	546	Inf	Inf	0.0%
6/1	Retail Park Exit	U	N/A	N/A	-		-	-	-	371	Inf	Inf	0.0%
7/1	Clonard West Exit	U	N/A	N/A	-		-	-	-	948	Inf	Inf	0.0%
8/1	Castlemill Link Exit	U	N/A	N/A	-		-	-	-	386	Inf	Inf	0.0%
9/1	LT signals Left	O	N/A	N/A	-		-	-	-	227	1853	680	33.4%
Ped Link: P1	Unnamed Ped Link	-	N/A	-	I		2	28	-	0	-	22400	0.0%
Ped Link: P2	Unnamed Ped Link	-	N/A	-	J		1	7	-	0	-	5600	0.0%
Ped Link: P3	Unnamed Ped Link	-	N/A	-	K		1	6	-	0	-	4800	0.0%
Ped Link: P4	Unnamed Ped Link	-	N/A	-	M		1	9	-	0	-	7200	0.0%
Ped Link: P5	Unnamed Ped Link	-	N/A	-	L		1	6	-	0	-	4800	0.0%

Full Input Data And Results

Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network	**-**	**-**	**91**	**312**	**4**	**18.9**	**16.8**	**0.3**	**36.0**	**-**	**-**	**-**	**-**
J5 Clonard Road	**-**	**-**	**91**	**312**	**4**	**18.9**	**16.8**	**0.3**	**36.0**	**-**	**-**	**-**	**-**
1/1+1/2	611	611	-	-	-	5.8	6.1	-	11.9	70.1	8.9	6.1	15.0
2/2+2/1	567	567	-	-	-	5.1	4.9	-	10.0	63.7	11.9	4.9	16.8
3/1+3/2	239	239	-	-	-	2.3	0.4	-	2.8	41.6	2.9	0.4	3.3
4/2+4/1	654	654	-	-	-	4.0	4.1	-	8.1	44.6	10.3	4.1	14.4
4/3	180	180	23	153	4	1.6	1.0	0.3	3.0	59.1	4.3	1.0	5.3
5/1	546	546	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	371	371	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
7/1	948	948	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
8/1	386	386	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
9/1	227	227	67	160	0	0.1	0.3	-	0.3	4.8	1.8	0.3	2.0
Ped Link: P1	0	0	-	-	-	-	-	-	0.0	0.0	-	-	0.0
Ped Link: P2	0	0	-	-	-	-	-	-	0.0	0.0	-	-	0.0
Ped Link: P3	0	0	-	-	-	-	-	-	0.0	0.0	-	-	0.0
Ped Link: P4	0	0	-	-	-	-	-	-	0.0	0.0	-	-	0.0
Ped Link: P5	0	0	-	-	-	-	-	-	0.0	0.0	-	-	0.0

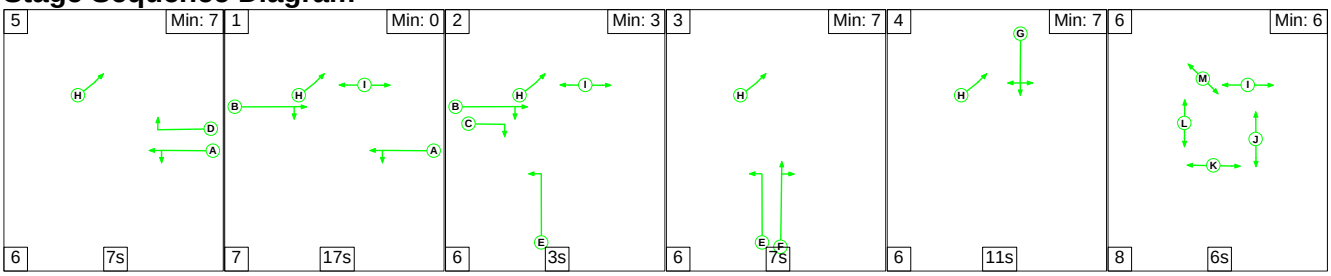
C1 PRC for Signalled Lanes (%): -4.7 Total Delay for Signalled Lanes (pcuHr): 35.74 Cycle Time (s): 90

PRC Over All Lanes (%): -4.7 Total Delay Over All Lanes(pcuHr): 36.04

Full Input Data And Results

Scenario 8: '2040 Base + CD + Malincross PM' (FG8: '2040 Base + CD + Malincross PM', Plan 1: 'Network Control Plan 1')

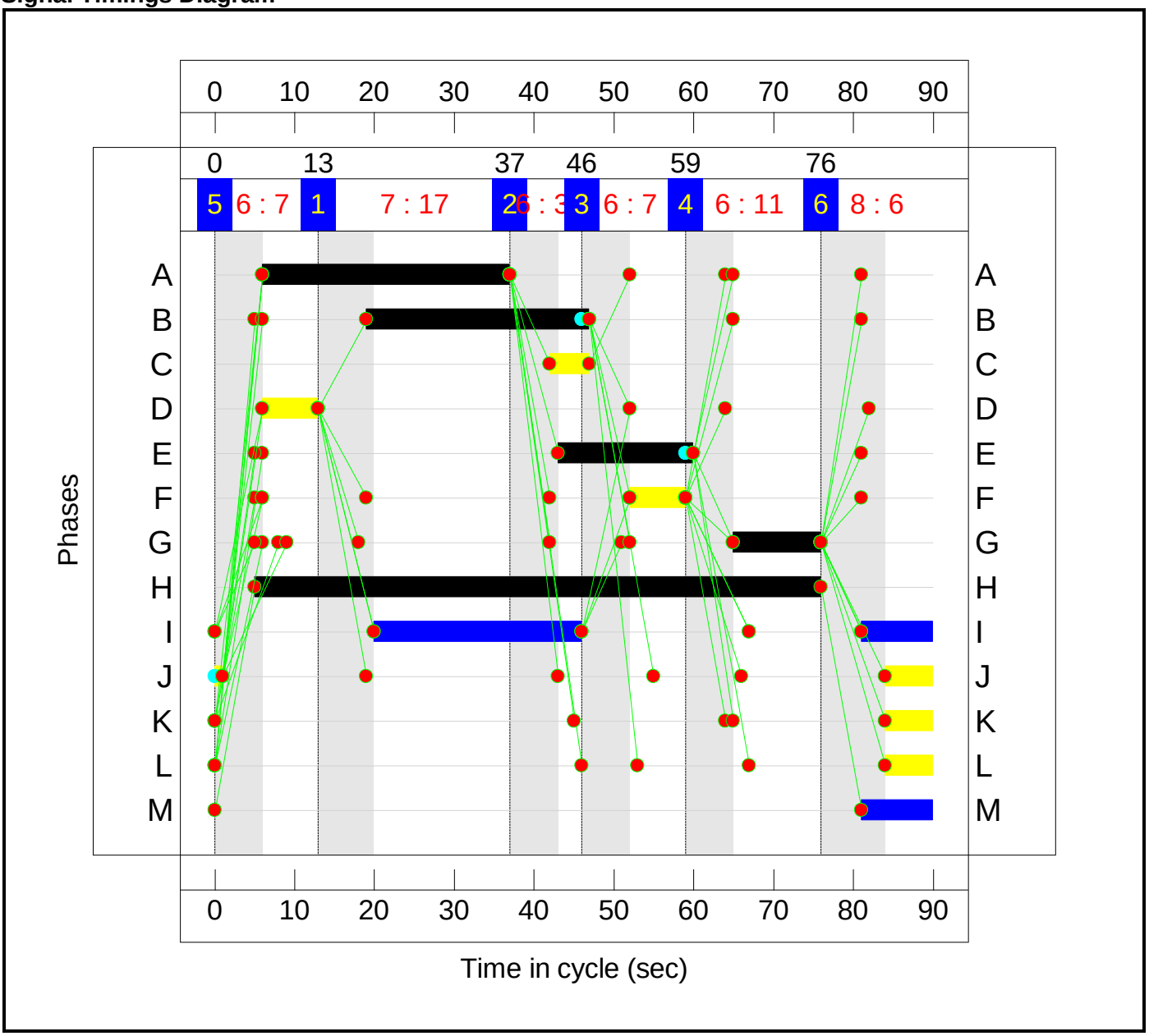
Stage Sequence Diagram



Stage Timings

Stage	5	1	2	3	4	6
Duration	7	17	3	7	11	6
Change Point	0	13	37	46	59	76

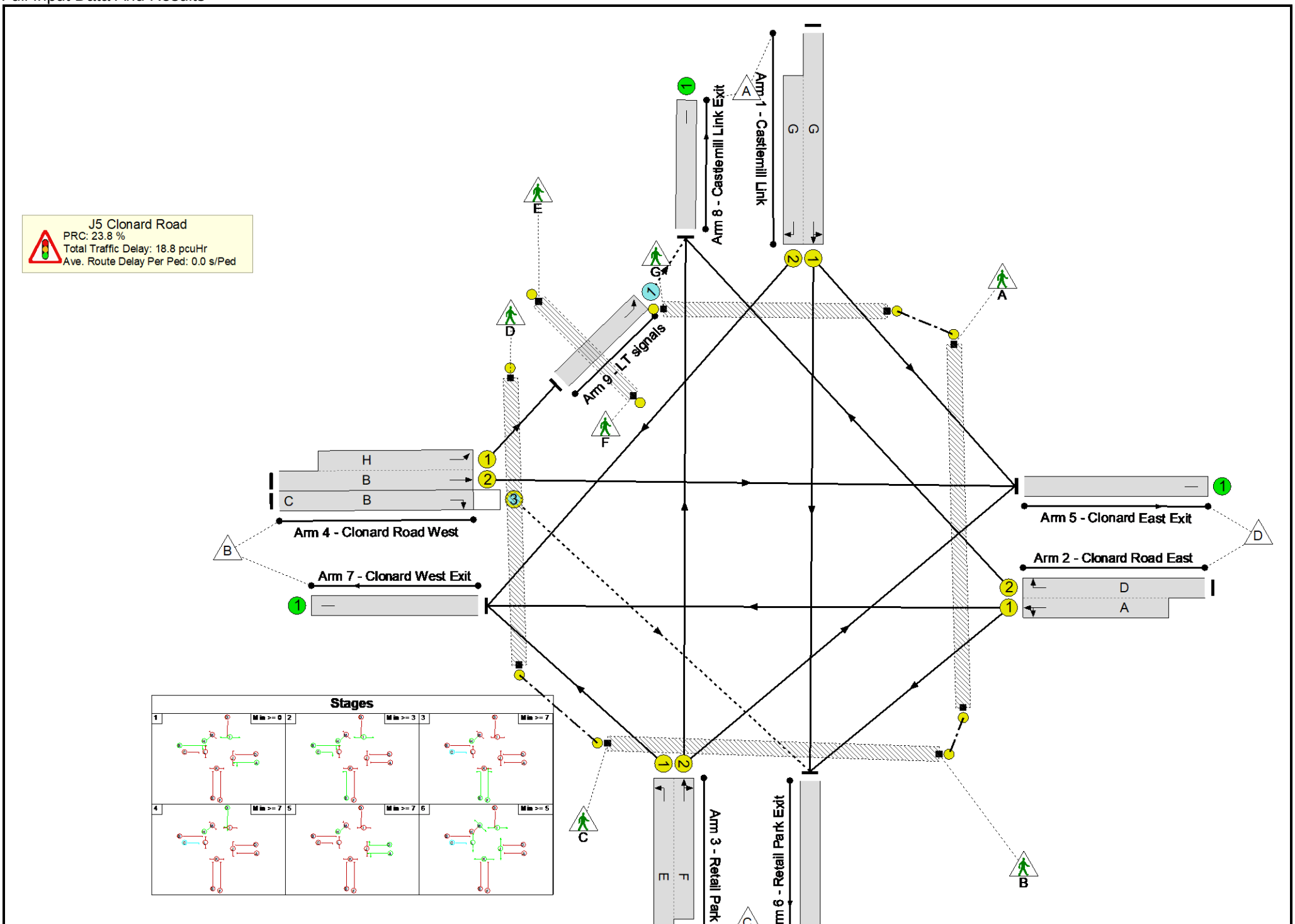
Signal Timings Diagram



Full Input Data And Results

Network Layout Diagram

Full Input Data And Results



Network Results

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**72.7%**
J5 Clonard Road	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**72.7%**
1/1+1/2	Castlemill Link Left Ahead Right	U	N/A	N/A	G		1	11	-	305	1822:1830	243+244	57.2 : 68.0%
2/2+2/1	Clonard Road East Left Ahead Right	U	N/A	N/A	D A		1	7:31	-	471	1830:1934	163+666	64.5 : 55.0%
3/1+3/2	Retail Park Right Left Ahead	U	N/A	N/A	E F		1	17:7	-	278	1707:2065	341+184	55.1 : 49.0%
4/2+4/1	Clonard Road West Ahead Ahead2	U	N/A	N/A	B H		1	28:71	-	860	1940:1853	611+572	72.7 : 72.7%
4/3	Clonard Road West Right	O	N/A	N/A	B	C	1	28	5	158	1840	453	34.9%
5/1	Clonard East Exit	U	N/A	N/A	-		-	-	-	529	Inf	Inf	0.0%
6/1	Retail Park Exit	U	N/A	N/A	-		-	-	-	228	Inf	Inf	0.0%
7/1	Clonard West Exit	U	N/A	N/A	-		-	-	-	711	Inf	Inf	0.0%
8/1	Castlemill Link Exit	U	N/A	N/A	-		-	-	-	604	Inf	Inf	0.0%
9/1	LT signals Left	O	N/A	N/A	-		-	-	-	416	1853	674	61.8%
Ped Link: P1	Unnamed Ped Link	-	N/A	-	I		2	35	-	0	-	28000	0.0%
Ped Link: P2	Unnamed Ped Link	-	N/A	-	J		1	7	-	0	-	5600	0.0%
Ped Link: P3	Unnamed Ped Link	-	N/A	-	K		1	6	-	0	-	4800	0.0%
Ped Link: P4	Unnamed Ped Link	-	N/A	-	M		1	9	-	0	-	7200	0.0%
Ped Link: P5	Unnamed Ped Link	-	N/A	-	L		1	6	-	0	-	4800	0.0%

Full Input Data And Results

Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network	**-**	**-**	**218**	**353**	**4**	**14.2**	**4.4**	**0.1**	**18.8**	**-**	**-**	**-**	**-**
J5 Clonard Road	**-**	**-**	**218**	**353**	**4**	**14.2**	**4.4**	**0.1**	**18.8**	**-**	**-**	**-**	**-**
1/1+1/2	305	305	-	-	-	3.1	0.8	-	4.0	46.7	3.9	0.8	4.8
2/2+2/1	471	471	-	-	-	3.5	0.7	-	4.2	31.8	7.2	0.7	7.9
3/1+3/2	278	278	-	-	-	2.7	0.6	-	3.2	41.8	4.2	0.6	4.7
4/2+4/1	860	860	-	-	-	3.6	1.3	-	4.9	20.5	9.7	1.3	11.1
4/3	158	158	140	14	4	1.0	0.3	0.1	1.4	31.2	2.9	0.3	3.2
5/1	529	529	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	228	228	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
7/1	711	711	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
8/1	604	604	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
9/1	416	416	77	339	0	0.3	0.8	-	1.2	10.0	5.6	0.8	6.4
Ped Link: P1	0	0	-	-	-	-	-	-	0.0	0.0	-	-	0.0
Ped Link: P2	0	0	-	-	-	-	-	-	0.0	0.0	-	-	0.0
Ped Link: P3	0	0	-	-	-	-	-	-	0.0	0.0	-	-	0.0
Ped Link: P4	0	0	-	-	-	-	-	-	0.0	0.0	-	-	0.0
Ped Link: P5	0	0	-	-	-	-	-	-	0.0	0.0	-	-	0.0

C1 PRC for Signalled Lanes (%): 23.8 Total Delay for Signalled Lanes (pcuHr): 17.61 Cycle Time (s): 90

PRC Over All Lanes (%): 23.8 Total Delay Over All Lanes(pcuHr): 18.76

APPENDIX P

ARCADY Output (Junction 6)

DRAFT

Junctions 9

ARCADY 9 - Roundabout Module

Version: 9.0.2.5947
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Filename: 2021-07-19 Jct 6 - Tesco Rbt v12.0.j9
Path: C:\Users\brian.condon\Condondrew Associates\Condon Drew Associates Ltd. - Documents\CDA Projects\1200-1299\1224-Balbriggan, Ireland\02-Analysis\Junctions9\Malincross
Report generation date: 22/07/2021 10:44:49

»2025 + Com Dev, AM
»2025 + Com Dev, PM
»2040 + Com Dev, AM
»2040 + Com Dev, PM
»2025 + Com Dev + Malincross, AM
»2025 + Com Dev + Malincross, PM
»2040 + Com Dev + Malincross, AM
»2040 + Com Dev + Malincross, PM

Summary of junction performance

	AM				PM			
	Queue (PCU)	Delay (s)	RFC	LOS	Queue (PCU)	Delay (s)	RFC	LOS
	2025 + Com Dev							
Arm 1	1.2	6.57	0.54	A	0.8	5.46	0.44	A
Arm 2	0.3	5.56	0.22	A	0.8	6.53	0.43	A
Arm 3	0.8	5.84	0.44	A	0.8	6.55	0.45	A
Arm 4	0.1	5.62	0.13	A	0.1	5.81	0.07	A
	2040 + Com Dev							
Arm 1	1.5	7.55	0.60	A	1.0	6.01	0.49	A
Arm 2	0.4	6.05	0.26	A	1.0	7.42	0.49	A
Arm 3	1.0	6.50	0.49	A	1.1	7.53	0.52	A
Arm 4	0.2	6.01	0.15	A	0.1	6.22	0.08	A
	2025 + Com Dev + Malincross							
Arm 1	1.3	6.80	0.56	A	0.9	5.70	0.46	A
Arm 2	0.3	5.63	0.23	A	0.8	6.94	0.45	A
Arm 3	1.0	6.46	0.49	A	1.0	7.10	0.50	A
Arm 4	0.2	5.89	0.13	A	0.1	5.98	0.07	A
	2040 + Com Dev + Malincross							
Arm 1	1.6	7.85	0.62	A	1.1	6.33	0.51	A
Arm 2	0.4	6.16	0.26	A	1.1	8.00	0.52	A
Arm 3	1.2	7.22	0.54	A	1.3	8.24	0.56	A
Arm 4	0.2	6.30	0.16	A	0.1	6.45	0.08	A

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

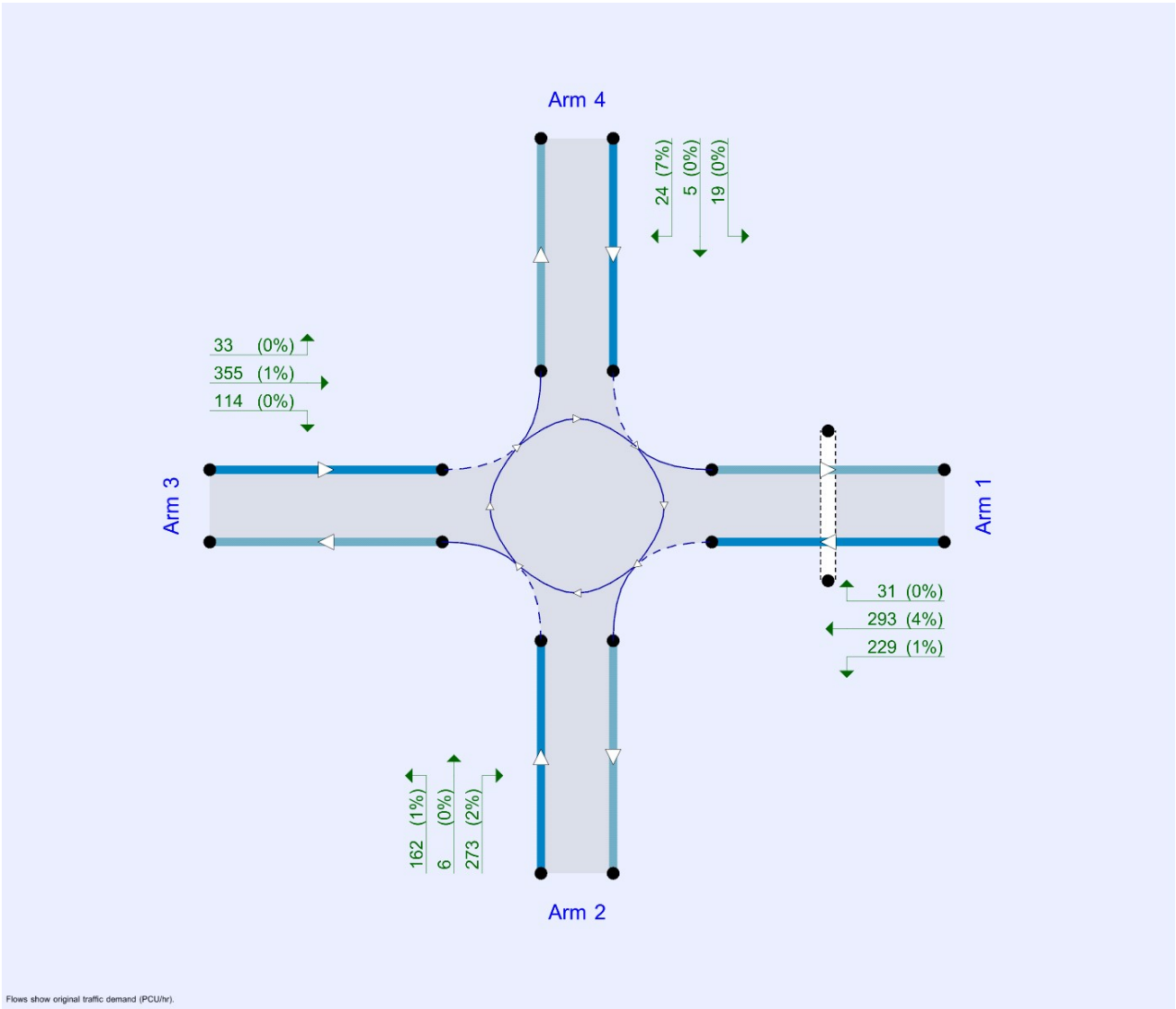
File summary

File Description

Title	(untitled)
Location	
Site number	
Date	12/12/2018
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Enumerator	briancondon-PC\brian.condon
Description	

Units

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



The junction diagram reflects the last run of Junctions.

Analysis Options

Calculate Queue Percentiles	Calculate residual capacity	RFC Threshold	Average Delay threshold (s)	Queue threshold (PCU)
		0.85	36.00	20.00

Demand Set Summary

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D1	2025 + Com Dev	AM	ONE HOUR	08:00	09:30	15
D2	2025 + Com Dev	PM	ONE HOUR	17:00	18:30	15
D3	2040 + Com Dev	AM	ONE HOUR	08:00	09:30	15
D4	2040 + Com Dev	PM	ONE HOUR	17:00	18:30	15
D5	2025 + Com Dev + Malincross	AM	ONE HOUR	08:00	09:30	15
D6	2025 + Com Dev + Malincross	PM	ONE HOUR	17:00	18:30	15
D7	2040 + Com Dev + Malincross	AM	ONE HOUR	08:00	09:30	15
D8	2040 + Com Dev + Malincross	PM	ONE HOUR	17:00	18:30	15

Analysis Set Details

ID	Network flow scaling factor (%)
A2	100.000

2025 + Com Dev, AM

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction Type	Arm order	Junction Delay (s)	Junction LOS
1	untitled	Standard Roundabout	1, 2, 3, 4	6.12	A

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Arms

Arms

Arm	Name	Description
1	Chapel Street	
2	Tesco Access	
3	Clonard Road	
4	Westbrook Park	

Roundabout Geometry

Arm	V - Approach road half-width (m)	E - Entry width (m)	l' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit only
1	3.50	4.90	15.9	18.4	30.1	32.0	
2	4.00	4.10	3.3	10.6	30.1	40.0	
3	3.50	4.10	4.3	18.9	30.1	30.0	
4	3.60	4.10	12.8	5.1	30.1	40.0	

Pelican/Puffin Crossings

Arm	Space between crossing and junction entry (Signalised) (PCU)	Amber time preceding red (s)	Amber time regarded as green (s)	Time from traffic red start to green man start (s)	Time period green man shown (s)	Clearance Period (s)	Traffic minimum green (s)
1	3.00	3.00	2.90	1.00	7.00	6.00	45.00

Slope / Intercept / Capacity

Roundabout Slope and Intercept used in model

Arm	Final slope	Final intercept (PCU/hr)
1	0.588	1376
2	0.520	1143
3	0.551	1183
4	0.461	1008

The slope and intercept shown above include any corrections and adjustments.

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D1	2025 + Com Dev	AM	ONE HOUR	08:00	09:30	15

Vehicle mix source	PCU Factor for a HV (PCU)
HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
1		✓	595	100.000
2		✓	181	100.000
3		✓	441	100.000
4		✓	85	100.000

Demand overview (Pedestrians)

Arm	Average pedestrian flow (Ped/hr)
1	60.00
2	
3	
4	

Origin-Destination Data

Demand (PCU/hr)

		To			
		1	2	3	4
From	1	0	212	367	16
	2	95	0	84	2
	3	353	71	2	15
	4	44	10	31	0

Vehicle Mix

Heavy Vehicle Percentages

		To			
		1	2	3	4
From	1	0	2	2	8
	2	10	0	8	0
	3	2	2	0	0
	4	3	0	0	1

Results

Results Summary for whole modelled period

Arm	Max RFC	Max delay (s)	Max Queue (PCU)	Max LOS
1	0.54	6.57	1.2	A
2	0.22	5.56	0.3	A
3	0.44	5.84	0.8	A
4	0.13	5.62	0.1	A

Main Results for each time segment

08:00 - 08:15

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Pedestrian demand (Ped/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
1	448	85	45.17	1229	0.365	446	0.6	4.682	A
2	136	312		981	0.139	136	0.2	4.635	A
3	332	85		1136	0.292	330	0.4	4.544	A
4	64	390		828	0.077	64	0.1	4.780	A

08:15 - 08:30

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Pedestrian demand (Ped/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
1	535	102	53.94	1223	0.437	534	0.8	5.334	A
2	163	373		949	0.171	163	0.2	4.986	A
3	396	101		1127	0.352	396	0.5	5.016	A
4	76	468		792	0.096	76	0.1	5.106	A

08:30 - 08:45

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Pedestrian demand (Ped/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
1	655	125	66.06	1212	0.541	654	1.2	6.572	A
2	199	457		905	0.220	199	0.3	5.549	A
3	486	124		1114	0.436	485	0.8	5.818	A
4	94	573		744	0.126	93	0.1	5.618	A

08:45 - 09:00

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Pedestrian demand (Ped/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
1	655	126	66.06	1220	0.537	655	1.2	6.509	A
2	199	458		905	0.220	199	0.3	5.557	A
3	486	124		1114	0.436	486	0.8	5.835	A
4	94	574		743	0.126	94	0.1	5.624	A

09:00 - 09:15

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Pedestrian demand (Ped/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
1	535	103	53.94	1234	0.433	536	0.8	5.282	A
2	163	375		948	0.172	163	0.2	5.000	A
3	396	102		1127	0.352	397	0.6	5.038	A
4	76	469		791	0.097	77	0.1	5.113	A

09:15 - 09:30

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Pedestrian demand (Ped/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
1	448	86	45.17	1242	0.361	449	0.6	4.640	A
2	136	314		980	0.139	136	0.2	4.651	A
3	332	85		1136	0.292	333	0.4	4.572	A
4	64	393		827	0.077	64	0.1	4.793	A

2025 + Com Dev, PM

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction Type	Arm order	Junction Delay (s)	Junction LOS
1	untitled	Standard Roundabout	1, 2, 3, 4	6.13	A

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D2	2025 + Com Dev	PM	ONE HOUR	17:00	18:30	15

Vehicle mix source	PCU Factor for a HV (PCU)
HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
1		✓	472	100.000
2		✓	382	100.000
3		✓	419	100.000
4		✓	41	100.000

Demand overview (Pedestrians)

Arm	Average pedestrian flow (Ped/hr)
1	60.00
2	
3	
4	

Origin-Destination Data

Demand (PCU/hr)

		To			
		1	2	3	4
From	1	0	204	240	28
	2	243	0	133	6
	3	295	95	2	27
	4	17	4	20	0

Vehicle Mix

Heavy Vehicle Percentages

		To			
		1	2	3	4
From	1	0	1	4	0
	2	1	0	1	0
	3	1	0	0	0
	4	0	0	7	0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max delay (s)	Max Queue (PCU)	Max LOS
1	0.44	5.46	0.8	A
2	0.43	6.53	0.8	A
3	0.45	6.55	0.8	A
4	0.07	5.81	0.1	A

Main Results for each time segment

17:00 - 17:15

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Pedestrian demand (Ped/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
1	355	91	45.17	1223	0.291	354	0.4	4.235	A
2	288	217		1030	0.279	286	0.4	4.877	A
3	315	207		1068	0.295	314	0.4	4.793	A
4	31	476		789	0.039	31	0.0	4.905	A

17:15 - 17:30

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Pedestrian demand (Ped/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
1	424	109	53.94	1211	0.350	424	0.5	4.679	A
2	343	260		1008	0.341	343	0.5	5.464	A
3	377	249		1046	0.360	376	0.6	5.409	A
4	37	570		745	0.049	37	0.1	5.250	A

17:30 - 17:45

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Pedestrian demand (Ped/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
1	520	133	66.06	1194	0.435	519	0.8	5.456	A
2	421	319		977	0.430	420	0.8	6.509	A
3	461	304		1015	0.454	460	0.8	6.522	A
4	45	698		686	0.066	45	0.1	5.800	A

17:45 - 18:00

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Pedestrian demand (Ped/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
1	520	133	66.06	1199	0.434	520	0.8	5.431	A
2	421	319		977	0.431	421	0.8	6.533	A
3	461	305		1015	0.455	461	0.8	6.550	A
4	45	699		685	0.066	45	0.1	5.806	A

18:00 - 18:15

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Pedestrian demand (Ped/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
1	424	109	53.94	1218	0.348	425	0.6	4.654	A
2	343	261		1007	0.341	344	0.5	5.492	A
3	377	250		1045	0.360	378	0.6	5.439	A
4	37	572		744	0.050	37	0.1	5.262	A

18:15 - 18:30

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Pedestrian demand (Ped/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
1	355	91	45.17	1232	0.288	356	0.4	4.210	A
2	288	219		1029	0.279	288	0.4	4.910	A
3	315	209		1068	0.295	316	0.4	4.826	A
4	31	479		787	0.039	31	0.0	4.918	A

2040 + Com Dev, AM

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction Type	Arm order	Junction Delay (s)	Junction LOS
1	untitled	Standard Roundabout	1, 2, 3, 4	6.88	A

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D3	2040 + Com Dev	AM	ONE HOUR	08:00	09:30	15

Vehicle mix source	PCU Factor for a HV (PCU)
HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
1		✓	665	100.000
2		✓	205	100.000
3		✓	487	100.000
4		✓	96	100.000

Demand overview (Pedestrians)

Arm	Average pedestrian flow (Ped/hr)
1	60.00
2	
3	
4	

Origin-Destination Data

Demand (PCU/hr)

		To			
		1	2	3	4
From	1	0	238	409	18
	2	108	0	95	2
	3	390	79	2	16
	4	50	11	35	0

Vehicle Mix

Heavy Vehicle Percentages

		To			
		1	2	3	4
From	1	0	2	2	9
	2	11	0	8	0
	3	3	2	0	0
	4	3	0	0	1

Results

Results Summary for whole modelled period

Arm	Max RFC	Max delay (s)	Max Queue (PCU)	Max LOS
1	0.60	7.55	1.5	A
2	0.26	6.05	0.4	A
3	0.49	6.50	1.0	A
4	0.15	6.01	0.2	A

Main Results for each time segment

08:00 - 08:15

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Pedestrian demand (Ped/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
1	501	95	45.17	1225	0.409	498	0.7	5.036	A
2	154	347		962	0.160	154	0.2	4.867	A
3	367	96		1130	0.324	365	0.5	4.821	A
4	72	434		808	0.089	72	0.1	4.964	A

08:15 - 08:30

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Pedestrian demand (Ped/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
1	598	114	53.94	1222	0.489	597	1.0	5.872	A
2	184	416		926	0.199	184	0.3	5.307	A
3	438	115		1119	0.391	437	0.7	5.413	A
4	86	520		768	0.112	86	0.1	5.360	A

08:30 - 08:45

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Pedestrian demand (Ped/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
1	732	140	66.06	1215	0.603	730	1.5	7.547	A
2	226	509		878	0.257	225	0.4	6.032	A
3	536	141		1105	0.485	535	1.0	6.471	A
4	106	636		715	0.148	106	0.2	6.000	A

08:45 - 09:00

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Pedestrian demand (Ped/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
1	732	140	66.06	1227	0.597	732	1.5	7.439	A
2	226	511		877	0.257	226	0.4	6.046	A
3	536	141		1105	0.485	536	1.0	6.499	A
4	106	637		714	0.148	106	0.2	6.009	A

09:00 - 09:15

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Pedestrian demand (Ped/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
1	598	114	53.94	1238	0.483	600	1.0	5.787	A
2	184	419		925	0.199	185	0.3	5.325	A
3	438	115		1119	0.391	439	0.7	5.447	A
4	86	522		767	0.112	86	0.1	5.370	A

09:15 - 09:30

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Pedestrian demand (Ped/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
1	501	96	45.17	1242	0.403	502	0.7	4.979	A
2	154	350		961	0.161	155	0.2	4.888	A
3	367	97		1130	0.325	367	0.5	4.855	A
4	72	437		806	0.090	72	0.1	4.979	A

2040 + Com Dev, PM

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction Type	Arm order	Junction Delay (s)	Junction LOS
1	untitled	Standard Roundabout	1, 2, 3, 4	6.91	A

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D4	2040 + Com Dev	PM	ONE HOUR	17:00	18:30	15

Vehicle mix source	PCU Factor for a HV (PCU)
HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
1		✓	527	100.000
2		✓	426	100.000
3		✓	466	100.000
4		✓	46	100.000

Demand overview (Pedestrians)

Arm	Average pedestrian flow (Ped/hr)
1	60.00
2	
3	
4	

Origin-Destination Data

Demand (PCU/hr)

		To			
		1	2	3	4
From	1	0	229	267	31
	2	273	0	147	6
	3	328	106	2	30
	4	19	5	22	0

Vehicle Mix

Heavy Vehicle Percentages

		To			
		1	2	3	4
From	1	0	1	4	0
	2	1	0	1	0
	3	1	0	0	0
	4	0	0	7	0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max delay (s)	Max Queue (PCU)	Max LOS
1	0.49	6.01	1.0	A
2	0.49	7.42	1.0	A
3	0.52	7.53	1.1	A
4	0.08	6.22	0.1	A

Main Results for each time segment

17:00 - 17:15

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Pedestrian demand (Ped/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
1	397	101	45.17	1219	0.326	395	0.5	4.465	A
2	321	241		1018	0.315	319	0.5	5.190	A
3	351	232		1055	0.333	349	0.5	5.120	A
4	35	531		763	0.045	34	0.0	5.098	A

17:15 - 17:30

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Pedestrian demand (Ped/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
1	474	121	53.94	1208	0.392	473	0.7	5.012	A
2	383	289		993	0.386	382	0.6	5.950	A
3	419	278		1029	0.407	418	0.7	5.923	A
4	41	636		714	0.058	41	0.1	5.520	A

17:30 - 17:45

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Pedestrian demand (Ped/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
1	580	148	66.06	1192	0.487	579	1.0	6.006	A
2	469	354		959	0.489	468	1.0	7.380	A
3	513	340		995	0.516	512	1.1	7.474	A
4	51	778		649	0.078	51	0.1	6.211	A

17:45 - 18:00

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Pedestrian demand (Ped/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
1	580	149	66.06	1198	0.484	580	1.0	5.967	A
2	469	355		959	0.489	469	1.0	7.424	A
3	513	341		995	0.516	513	1.1	7.525	A
4	51	781		648	0.078	51	0.1	6.221	A

18:00 - 18:15

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Pedestrian demand (Ped/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
1	474	122	53.94	1217	0.389	475	0.7	4.976	A
2	383	290		992	0.386	384	0.6	5.995	A
3	419	280		1029	0.407	420	0.7	5.975	A
4	41	640		713	0.058	41	0.1	5.534	A

18:15 - 18:30

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Pedestrian demand (Ped/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
1	397	102	45.17	1230	0.323	397	0.5	4.434	A
2	321	243		1017	0.315	321	0.5	5.235	A
3	351	234		1054	0.333	352	0.5	5.169	A
4	35	535		761	0.046	35	0.0	5.115	A

2025 + Com Dev + Malincross, AM

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction Type	Arm order	Junction Delay (s)	Junction LOS
1	untitled	Standard Roundabout	1, 2, 3, 4	6.46	A

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D5	2025 + Com Dev + Malincross	AM	ONE HOUR	08:00	09:30	15

Vehicle mix source	PCU Factor for a HV (PCU)
HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
1		✓	609	100.000
2		✓	184	100.000
3		✓	496	100.000
4		✓	87	100.000

Demand overview (Pedestrians)

Arm	Average pedestrian flow (Ped/hr)
1	60.00
2	
3	
4	

Origin-Destination Data

Demand (PCU/hr)

		To			
		1	2	3	4
From	1	0	212	381	16
	2	95	0	87	2
	3	397	80	2	17
	4	44	10	33	0

Vehicle Mix

Heavy Vehicle Percentages

		To			
		1	2	3	4
From	1	0	2	2	8
	2	10	0	7	0
	3	2	2	0	0
	4	3	0	0	1

Results

Results Summary for whole modelled period

Arm	Max RFC	Max delay (s)	Max Queue (PCU)	Max LOS
1	0.56	6.80	1.3	A
2	0.23	5.63	0.3	A
3	0.49	6.46	1.0	A
4	0.13	5.89	0.2	A

Main Results for each time segment

08:00 - 08:15

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Pedestrian demand (Ped/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
1	458	94	45.17	1225	0.374	456	0.6	4.784	A
2	139	324		975	0.142	138	0.2	4.660	A
3	373	85		1136	0.329	371	0.5	4.785	A
4	65	430		810	0.081	65	0.1	4.905	A

08:15 - 08:30

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Pedestrian demand (Ped/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
1	547	112	53.94	1219	0.449	547	0.8	5.466	A
2	165	388		941	0.176	165	0.2	5.028	A
3	446	101		1127	0.396	445	0.7	5.376	A
4	78	515		770	0.102	78	0.1	5.279	A

08:30 - 08:45

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Pedestrian demand (Ped/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
1	671	137	66.06	1207	0.555	669	1.3	6.804	A
2	203	474		896	0.226	202	0.3	5.622	A
3	546	124		1114	0.490	545	1.0	6.428	A
4	96	631		717	0.134	96	0.2	5.878	A

08:45 - 09:00

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Pedestrian demand (Ped/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
1	671	138	66.06	1217	0.551	671	1.3	6.732	A
2	203	476		896	0.226	203	0.3	5.631	A
3	546	124		1114	0.490	546	1.0	6.457	A
4	96	632		716	0.134	96	0.2	5.886	A

09:00 - 09:15

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Pedestrian demand (Ped/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
1	547	113	53.94	1231	0.445	549	0.8	5.406	A
2	165	390		940	0.176	166	0.2	5.041	A
3	446	102		1127	0.396	447	0.7	5.407	A
4	78	517		769	0.102	78	0.1	5.289	A

09:15 - 09:30

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Pedestrian demand (Ped/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
1	458	94	45.17	1239	0.370	459	0.6	4.724	A
2	139	326		974	0.142	139	0.2	4.677	A
3	373	85		1136	0.329	374	0.5	4.820	A
4	65	433		808	0.081	66	0.1	4.920	A

2025 + Com Dev + Malincross, PM

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction Type	Arm order	Junction Delay (s)	Junction LOS
1	untitled	Standard Roundabout	1, 2, 3, 4	6.52	A

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D6	2025 + Com Dev + Malincross	PM	ONE HOUR	17:00	18:30	15

Vehicle mix source	PCU Factor for a HV (PCU)
HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
1		✓	498	100.000
2		✓	397	100.000
3		✓	458	100.000
4		✓	43	100.000

Demand overview (Pedestrians)

Arm	Average pedestrian flow (Ped/hr)
1	60.00
2	
3	
4	

Origin-Destination Data

Demand (PCU/hr)

		To			
		1	2	3	4
From	1	0	204	266	28
	2	243	0	148	6
	3	322	104	2	30
	4	17	4	22	0

Vehicle Mix

Heavy Vehicle Percentages

		To			
		1	2	3	4
From	1	0	1	3	0
	2	1	0	1	0
	3	1	0	0	0
	4	0	0	6	0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max delay (s)	Max Queue (PCU)	Max LOS
1	0.46	5.70	0.9	A
2	0.45	6.94	0.8	A
3	0.50	7.10	1.0	A
4	0.07	5.98	0.1	A

Main Results for each time segment

17:00 - 17:15

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Pedestrian demand (Ped/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
1	375	99	45.17	1219	0.308	373	0.4	4.332	A
2	299	238		1019	0.293	297	0.4	5.025	A
3	345	207		1069	0.323	343	0.5	4.983	A
4	32	502		776	0.042	32	0.0	4.981	A

17:15 - 17:30

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Pedestrian demand (Ped/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
1	448	118	53.94	1208	0.371	447	0.6	4.827	A
2	357	286		995	0.359	356	0.6	5.692	A
3	412	249		1046	0.394	411	0.6	5.705	A
4	39	602		730	0.053	39	0.1	5.360	A

17:30 - 17:45

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Pedestrian demand (Ped/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
1	548	145	66.06	1190	0.461	547	0.9	5.703	A
2	437	349		961	0.455	436	0.8	6.907	A
3	504	304		1015	0.497	503	1.0	7.059	A
4	47	737		668	0.071	47	0.1	5.972	A

17:45 - 18:00

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Pedestrian demand (Ped/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
1	548	145	66.06	1196	0.459	548	0.9	5.672	A
2	437	350		961	0.455	437	0.8	6.939	A
3	504	305		1015	0.497	504	1.0	7.100	A
4	47	739		667	0.071	47	0.1	5.980	A

18:00 - 18:15

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Pedestrian demand (Ped/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
1	448	119	53.94	1216	0.368	449	0.6	4.796	A
2	357	287		994	0.359	358	0.6	5.725	A
3	412	250		1045	0.394	413	0.7	5.746	A
4	39	605		729	0.053	39	0.1	5.374	A

18:15 - 18:30

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Pedestrian demand (Ped/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
1	375	100	45.17	1229	0.305	376	0.5	4.306	A
2	299	240		1018	0.294	299	0.4	5.063	A
3	345	209		1068	0.323	346	0.5	5.026	A
4	32	506		774	0.042	32	0.0	4.998	A

2040 + Com Dev + Malincross, AM

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction Type	Arm order	Junction Delay (s)	Junction LOS
1	untitled	Standard Roundabout	1, 2, 3, 4	7.30	A

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D7	2040 + Com Dev + Malincross	AM	ONE HOUR	08:00	09:30	15

Vehicle mix source	PCU Factor for a HV (PCU)
HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
1		✓	680	100.000
2		✓	208	100.000
3		✓	542	100.000
4		✓	97	100.000

Demand overview (Pedestrians)

Arm	Average pedestrian flow (Ped/hr)
1	60.00
2	
3	
4	

Origin-Destination Data

Demand (PCU/hr)

		To			
		1	2	3	4
From	1	0	238	424	18
	2	108	0	98	2
	3	434	88	2	18
	4	50	11	36	0

Vehicle Mix

Heavy Vehicle Percentages

		To			
		1	2	3	4
From	1	0	2	2	9
	2	11	0	8	0
	3	2	2	0	0
	4	3	0	0	1

Results

Results Summary for whole modelled period

Arm	Max RFC	Max delay (s)	Max Queue (PCU)	Max LOS
1	0.62	7.85	1.6	A
2	0.26	6.16	0.4	A
3	0.54	7.22	1.2	A
4	0.16	6.30	0.2	A

Main Results for each time segment

08:00 - 08:15

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Pedestrian demand (Ped/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
1	512	103	45.17	1222	0.419	509	0.7	5.139	A
2	157	359		956	0.164	156	0.2	4.917	A
3	408	96		1130	0.361	406	0.6	5.052	A
4	73	473		790	0.092	73	0.1	5.095	A

08:15 - 08:30

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Pedestrian demand (Ped/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
1	611	123	53.94	1219	0.502	610	1.0	6.031	A
2	187	431		919	0.203	187	0.3	5.379	A
3	487	115		1119	0.435	486	0.8	5.789	A
4	87	567		746	0.117	87	0.1	5.544	A

08:30 - 08:45

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Pedestrian demand (Ped/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
1	749	150	66.06	1212	0.618	746	1.6	7.849	A
2	229	527		869	0.264	229	0.4	6.147	A
3	597	141		1105	0.540	595	1.2	7.169	A
4	107	694		688	0.155	107	0.2	6.287	A

08:45 - 09:00

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Pedestrian demand (Ped/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
1	749	151	66.06	1225	0.611	749	1.6	7.722	A
2	229	528		868	0.264	229	0.4	6.163	A
3	597	141		1105	0.540	597	1.2	7.216	A
4	107	696		687	0.155	107	0.2	6.298	A

09:00 - 09:15

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Pedestrian demand (Ped/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
1	611	124	53.94	1236	0.495	614	1.0	5.938	A
2	187	433		918	0.204	187	0.3	5.399	A
3	487	115		1119	0.435	489	0.8	5.834	A
4	87	570		745	0.117	87	0.1	5.558	A

09:15 - 09:30

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Pedestrian demand (Ped/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
1	512	103	45.17	1239	0.413	513	0.7	5.074	A
2	157	362		955	0.164	157	0.2	4.941	A
3	408	97		1130	0.361	409	0.6	5.096	A
4	73	477		788	0.093	73	0.1	5.113	A

2040 + Com Dev + Malincross, PM

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction Type	Arm order	Junction Delay (s)	Junction LOS
1	untitled	Standard Roundabout	1, 2, 3, 4	7.43	A

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D8	2040 + Com Dev + Malincross	PM	ONE HOUR	17:00	18:30	15

Vehicle mix source	PCU Factor for a HV (PCU)
HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
1		✓	553	100.000
2		✓	441	100.000
3		✓	504	100.000
4		✓	48	100.000

Demand overview (Pedestrians)

Arm	Average pedestrian flow (Ped/hr)
1	60.00
2	
3	
4	

Origin-Destination Data

Demand (PCU/hr)

		To			
		1	2	3	4
From	1	0	229	293	31
	2	273	0	162	6
	3	355	114	2	33
	4	19	5	24	0

Vehicle Mix

Heavy Vehicle Percentages

		To			
		1	2	3	4
From	1	0	1	4	0
	2	2	0	1	0
	3	1	0	0	0
	4	0	0	7	0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max delay (s)	Max Queue (PCU)	Max LOS
1	0.51	6.33	1.1	A
2	0.52	8.00	1.1	A
3	0.56	8.24	1.3	A
4	0.08	6.45	0.1	A

Main Results for each time segment

17:00 - 17:15

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Pedestrian demand (Ped/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
1	416	109	45.17	1215	0.343	414	0.5	4.594	A
2	332	262		1007	0.330	330	0.5	5.391	A
3	379	232		1055	0.360	377	0.6	5.332	A
4	36	557		751	0.048	36	0.1	5.202	A

17:15 - 17:30

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Pedestrian demand (Ped/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
1	497	130	53.94	1205	0.412	496	0.7	5.199	A
2	396	314		980	0.405	396	0.7	6.256	A
3	453	278		1030	0.440	452	0.8	6.279	A
4	43	668		700	0.062	43	0.1	5.665	A

17:30 - 17:45

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Pedestrian demand (Ped/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
1	609	159	66.06	1189	0.512	607	1.1	6.326	A
2	486	384		943	0.515	484	1.1	7.942	A
3	555	340		995	0.558	553	1.2	8.163	A
4	53	816		631	0.084	53	0.1	6.432	A

17:45 - 18:00

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Pedestrian demand (Ped/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
1	609	160	66.06	1197	0.509	609	1.1	6.277	A
2	486	385		943	0.515	486	1.1	8.000	A
3	555	341		995	0.558	555	1.3	8.239	A
4	53	819		630	0.084	53	0.1	6.445	A

18:00 - 18:15

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Pedestrian demand (Ped/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
1	497	131	53.94	1215	0.409	499	0.7	5.157	A
2	396	316		979	0.405	398	0.7	6.313	A
3	453	280		1029	0.440	455	0.8	6.340	A
4	43	671		698	0.062	43	0.1	5.684	A

18:15 - 18:30

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Pedestrian demand (Ped/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
1	416	109	45.17	1227	0.339	417	0.5	4.558	A
2	332	264		1006	0.330	333	0.5	5.443	A
3	379	234		1054	0.360	380	0.6	5.391	A
4	36	561		749	0.048	36	0.1	5.221	A

APPENDIX Q

ARCADY Output (Junction 8)

DRAFT

Junctions 9

ARCADY 9 - Roundabout Module

Version: 9.0.2.5947
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Filename: 2021-07-19 Jct 8 Naul Rd RBT v12.0.j9
Path: C:\Users\brian.condon\Condondrew Associates\Condon Drew Associates Ltd. - Documents\CDA Projects\1200-1299\1224-Balbriggan, Ireland\02-Analysis\Junctions9\Malincross
Report generation date: 22/07/2021 10:43:22

»2025 Base + Com Dev, AM
»2025 Base + Com Dev, PM
»2040 Base + Com Dev, AM
»2040 Base + Com Dev, PM
»2025 Base + Com Dev + Malincross, AM
»2025 Base + Com Dev + Malincross, PM
»2040 Base + Com Dev + Malincross, AM
»2040 Base + Com Dev + Malincross, PM

Summary of junction performance

	AM				PM			
	Queue (PCU)	Delay (s)	RFC	LOS	Queue (PCU)	Delay (s)	RFC	LOS
	2025 Base + Com Dev							
Arm A	1.1	3.45	0.53	A	0.4	2.22	0.30	A
Arm B	0.3	2.66	0.20	A	0.3	2.41	0.24	A
Arm C	0.7	2.69	0.39	A	1.0	3.20	0.49	A
	2040 Base + Com Dev							
Arm A	1.5	4.05	0.59	A	0.5	2.35	0.34	A
Arm B	0.3	2.92	0.23	A	0.4	2.59	0.27	A
Arm C	0.8	2.95	0.43	A	1.2	3.63	0.55	A
	2025 Base + Com Dev + Malincross							
Arm A	1.5	4.07	0.60	A	0.5	2.30	0.34	A
Arm B	0.3	2.85	0.22	A	0.4	2.51	0.25	A
Arm C	0.7	2.78	0.40	A	1.3	3.64	0.55	A
	2040 Base + Com Dev + Malincross							
Arm A	2.0	4.90	0.66	A	0.6	2.46	0.37	A
Arm B	0.4	3.13	0.25	A	0.4	2.69	0.29	A
Arm C	0.9	3.05	0.45	A	1.6	4.22	0.61	A

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

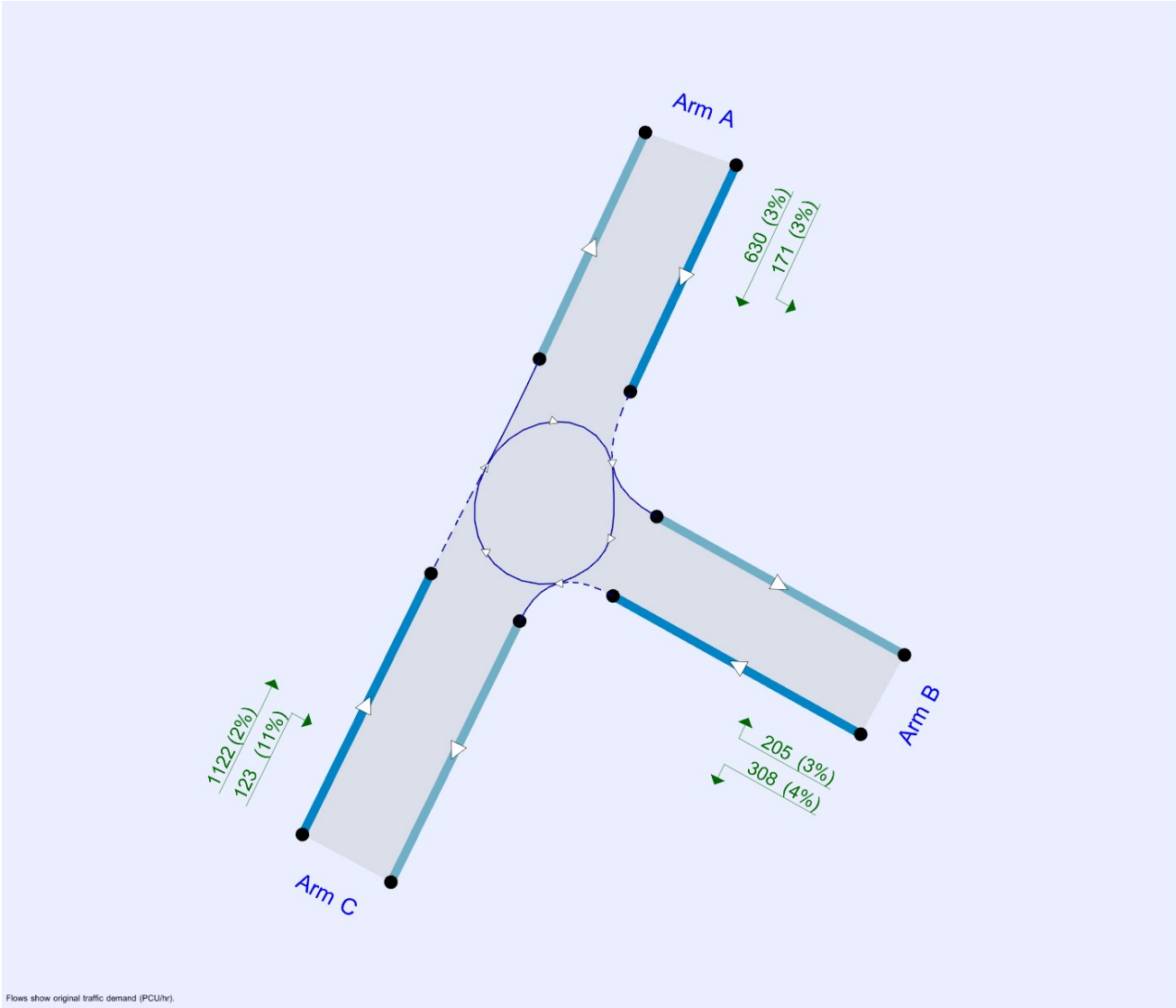
File summary

File Description

Title	(untitled)
Location	
Site number	
Date	24/03/2020
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Enumerator	briancondon-PC\brian.condon
Description	

Units

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



The junction diagram reflects the last run of Junctions.

Analysis Options

Calculate Queue Percentiles	Calculate residual capacity	RFC Threshold	Average Delay threshold (s)	Queue threshold (PCU)
		0.85	36.00	20.00

Demand Set Summary

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D1	2025 Base + Com Dev	AM	ONE HOUR	08:00	09:30	15
D2	2025 Base + Com Dev	PM	ONE HOUR	17:00	18:30	15
D3	2040 Base + Com Dev	AM	ONE HOUR	08:00	09:30	15
D4	2040 Base + Com Dev	PM	ONE HOUR	17:00	18:30	15
D5	2025 Base + Com Dev + Malincross	AM	ONE HOUR	08:00	09:30	15
D6	2025 Base + Com Dev + Malincross	PM	ONE HOUR	17:00	18:30	15
D7	2040 Base + Com Dev + Malincross	AM	ONE HOUR	08:00	09:30	15
D8	2040 Base + Com Dev + Malincross	PM	ONE HOUR	17:00	18:30	15

Analysis Set Details

ID	Network flow scaling factor (%)
A1	100.000

2025 Base + Com Dev, AM

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction Type	Arm order	Junction Delay (s)	Junction LOS
1	untitled	Standard Roundabout	A, B, C	3.06	A

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Arms

Arms

Arm	Name	Description
A	Naul Road (North)	
B	L1390	
C	untitled	

Roundabout Geometry

Arm	V - Approach road half-width (m)	E - Entry width (m)	l' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit only
A	5.72	8.68	16.8	67.0	70.0	19.0	
B	5.37	8.63	17.8	43.0	70.0	20.0	
C	4.56	10.67	21.8	66.0	70.0	36.0	

Slope / Intercept / Capacity

Roundabout Slope and Intercept used in model

Arm	Final slope	Final intercept (PCU/hr)
A	0.644	2473
B	0.628	2386
C	0.617	2388

The slope and intercept shown above include any corrections and adjustments.

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D1	2025 Base + Com Dev	AM	ONE HOUR	08:00	09:30	15

Vehicle mix source	PCU Factor for a HV (PCU)
HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
A		✓	1090	100.000
B		✓	322	100.000
C		✓	797	100.000

Origin-Destination Data

Demand (PCU/hr)

		To		
		A	B	C
From	A	0	210	880
	B	161	0	161
	C	513	284	0

Vehicle Mix

Heavy Vehicle Percentages

		To		
		A	B	C
From	A	0	1	3
	B	2	0	9
	C	4	6	0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max delay (s)	Max Queue (PCU)	Max LOS
A	0.53	3.45	1.1	A
B	0.20	2.66	0.3	A
C	0.39	2.69	0.7	A

Main Results for each time segment

08:00 - 08:15

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
A	821	213	2336	0.351	818	0.6	2.431	A
B	242	661	1971	0.123	242	0.1	2.194	A
C	600	121	2313	0.259	599	0.4	2.196	A

08:15 - 08:30

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
A	980	255	2309	0.424	979	0.8	2.776	A
B	289	790	1890	0.153	289	0.2	2.370	A
C	716	145	2299	0.312	716	0.5	2.382	A

08:30 - 08:45

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
A	1200	312	2272	0.528	1199	1.1	3.437	A
B	355	968	1778	0.199	354	0.3	2.663	A
C	878	177	2279	0.385	877	0.7	2.687	A

08:45 - 09:00

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
A	1200	313	2272	0.528	1200	1.1	3.445	A
B	355	969	1778	0.199	355	0.3	2.665	A
C	878	177	2279	0.385	878	0.7	2.689	A

09:00 - 09:15

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
A	980	256	2309	0.424	981	0.8	2.788	A
B	289	792	1889	0.153	290	0.2	2.372	A
C	716	145	2298	0.312	717	0.5	2.384	A

09:15 - 09:30

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
A	821	214	2335	0.351	821	0.6	2.442	A
B	242	663	1970	0.123	243	0.1	2.196	A
C	600	121	2313	0.259	600	0.4	2.201	A

2025 Base + Com Dev, PM

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction Type	Arm order	Junction Delay (s)	Junction LOS
1	untitled	Standard Roundabout	A, B, C	2.73	A

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D2	2025 Base + Com Dev	PM	ONE HOUR	17:00	18:30	15

Vehicle mix source	PCU Factor for a HV (PCU)
HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
A		✓	661	100.000
B		✓	437	100.000
C		✓	1016	100.000

Origin-Destination Data

Demand (PCU/hr)

		To		
		A	B	C
From	A	0	141	520
	B	165	0	272
	C	909	107	0

Vehicle Mix

Heavy Vehicle Percentages

		To		
		A	B	C
From	A	0	3	3
	B	3	0	4
	C	2	10	0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max delay (s)	Max Queue (PCU)	Max LOS
A	0.30	2.22	0.4	A
B	0.24	2.41	0.3	A
C	0.49	3.20	1.0	A

Main Results for each time segment

17:00 - 17:15

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
A	498	80	2422	0.206	497	0.3	1.925	A
B	329	391	2141	0.154	328	0.2	2.056	A
C	765	124	2311	0.331	763	0.5	2.386	A

17:15 - 17:30

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
A	594	96	2411	0.246	594	0.3	2.040	A
B	393	467	2093	0.188	393	0.2	2.194	A
C	913	148	2296	0.398	913	0.7	2.672	A

17:30 - 17:45

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
A	728	118	2397	0.304	727	0.4	2.220	A
B	481	572	2027	0.237	481	0.3	2.412	A
C	1119	182	2276	0.492	1117	1.0	3.191	A

17:45 - 18:00

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
A	728	118	2397	0.304	728	0.4	2.220	A
B	481	573	2027	0.237	481	0.3	2.413	A
C	1119	182	2276	0.492	1119	1.0	3.197	A

18:00 - 18:15

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
A	594	96	2411	0.246	595	0.3	2.042	A
B	393	468	2092	0.188	393	0.2	2.195	A
C	913	148	2296	0.398	915	0.7	2.679	A

18:15 - 18:30

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
A	498	81	2421	0.206	498	0.3	1.927	A
B	329	392	2140	0.154	329	0.2	2.061	A
C	765	124	2311	0.331	766	0.5	2.394	A

2040 Base + Com Dev, AM

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction Type	Arm order	Junction Delay (s)	Junction LOS
1	untitled	Standard Roundabout	A, B, C	3.48	A

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D3	2040 Base + Com Dev	AM	ONE HOUR	08:00	09:30	15

Vehicle mix source	PCU Factor for a HV (PCU)
HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
A		✓	1204	100.000
B		✓	364	100.000
C		✓	894	100.000

Origin-Destination Data

Demand (PCU/hr)

		To		
		A	B	C
From	A	0	230	974
	B	179	0	185
	C	571	323	0

Vehicle Mix

Heavy Vehicle Percentages

		To		
		A	B	C
From	A	0	1	4
	B	3	0	10
	C	4	7	0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max delay (s)	Max Queue (PCU)	Max LOS
A	0.59	4.05	1.5	A
B	0.23	2.92	0.3	A
C	0.43	2.95	0.8	A

Main Results for each time segment

08:00 - 08:15

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
A	906	243	2317	0.391	904	0.7	2.630	A
B	274	731	1927	0.142	273	0.2	2.316	A
C	673	134	2305	0.292	671	0.4	2.313	A

08:15 - 08:30

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
A	1082	290	2286	0.473	1081	0.9	3.086	A
B	327	875	1837	0.178	327	0.2	2.537	A
C	804	161	2289	0.351	803	0.6	2.546	A

08:30 - 08:45

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
A	1326	355	2244	0.591	1323	1.5	4.032	A
B	401	1071	1714	0.234	400	0.3	2.917	A
C	984	197	2266	0.434	983	0.8	2.947	A

08:45 - 09:00

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
A	1326	356	2244	0.591	1326	1.5	4.052	A
B	401	1072	1713	0.234	401	0.3	2.920	A
C	984	197	2266	0.434	984	0.8	2.949	A

09:00 - 09:15

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
A	1082	291	2286	0.473	1085	0.9	3.103	A
B	327	877	1835	0.178	328	0.2	2.543	A
C	804	161	2288	0.351	805	0.6	2.552	A

09:15 - 09:30

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
A	906	243	2316	0.391	908	0.7	2.645	A
B	274	734	1925	0.142	274	0.2	2.322	A
C	673	135	2305	0.292	674	0.4	2.321	A

2040 Base + Com Dev, PM

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction Type	Arm order	Junction Delay (s)	Junction LOS
1	untitled	Standard Roundabout	A, B, C	3.01	A

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D4	2040 Base + Com Dev	PM	ONE HOUR	17:00	18:30	15

Vehicle mix source	PCU Factor for a HV (PCU)
HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
A		✓	733	100.000
B		✓	492	100.000
C		✓	1129	100.000

Origin-Destination Data

Demand (PCU/hr)

		To		
		A	B	C
From	A	0	157	576
	B	184	0	308
	C	1006	123	0

Vehicle Mix

Heavy Vehicle Percentages

		To		
		A	B	C
From	A	0	3	3
	B	4	0	4
	C	2	11	0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max delay (s)	Max Queue (PCU)	Max LOS
A	0.34	2.35	0.5	A
B	0.27	2.59	0.4	A
C	0.55	3.63	1.2	A

Main Results for each time segment

17:00 - 17:15

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
A	552	92	2414	0.229	551	0.3	1.989	A
B	370	433	2114	0.175	370	0.2	2.144	A
C	850	138	2303	0.369	848	0.6	2.541	A

17:15 - 17:30

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
A	659	110	2402	0.274	659	0.4	2.126	A
B	442	518	2061	0.215	442	0.3	2.312	A
C	1015	165	2286	0.444	1014	0.8	2.912	A

17:30 - 17:45

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
A	807	135	2386	0.338	807	0.5	2.347	A
B	542	634	1988	0.272	541	0.4	2.587	A
C	1243	202	2263	0.549	1241	1.2	3.620	A

17:45 - 18:00

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
A	807	135	2386	0.338	807	0.5	2.347	A
B	542	634	1988	0.273	542	0.4	2.588	A
C	1243	203	2263	0.549	1243	1.2	3.631	A

18:00 - 18:15

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
A	659	111	2402	0.274	659	0.4	2.128	A
B	442	518	2061	0.215	443	0.3	2.314	A
C	1015	166	2286	0.444	1017	0.8	2.924	A

18:15 - 18:30

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
A	552	93	2414	0.229	552	0.3	1.993	A
B	370	434	2114	0.175	371	0.2	2.149	A
C	850	139	2302	0.369	851	0.6	2.553	A

2025 Base + Com Dev + Malincross, AM

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction Type	Arm order	Junction Delay (s)	Junction LOS
1	untitled	Standard Roundabout	A, B, C	3.45	A

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D5	2025 Base + Com Dev + Malincross	AM	ONE HOUR	08:00	09:30	15

Vehicle mix source	PCU Factor for a HV (PCU)
HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
A		✓	1239	100.000
B		✓	333	100.000
C		✓	830	100.000

Origin-Destination Data

Demand (PCU/hr)

		To		
		A	B	C
From	A	0	238	1001
	B	172	0	161
	C	546	284	0

Vehicle Mix

Heavy Vehicle Percentages

		To		
		A	B	C
From	A	0	1	3
	B	2	0	9
	C	4	6	0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max delay (s)	Max Queue (PCU)	Max LOS
A	0.60	4.07	1.5	A
B	0.22	2.85	0.3	A
C	0.40	2.78	0.7	A

Main Results for each time segment

08:00 - 08:15

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
A	933	213	2336	0.399	930	0.7	2.623	A
B	251	751	1914	0.131	250	0.2	2.277	A
C	625	129	2308	0.271	623	0.4	2.234	A

08:15 - 08:30

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
A	1114	255	2309	0.482	1113	1.0	3.085	A
B	299	899	1822	0.164	299	0.2	2.489	A
C	746	155	2293	0.325	746	0.5	2.436	A

08:30 - 08:45

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
A	1364	312	2272	0.600	1362	1.5	4.049	A
B	367	1100	1695	0.216	366	0.3	2.851	A
C	914	189	2271	0.402	913	0.7	2.773	A

08:45 - 09:00

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
A	1364	313	2272	0.600	1364	1.5	4.069	A
B	367	1102	1694	0.216	367	0.3	2.854	A
C	914	189	2271	0.402	914	0.7	2.775	A

09:00 - 09:15

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
A	1114	256	2309	0.482	1116	1.0	3.102	A
B	299	902	1820	0.164	300	0.2	2.492	A
C	746	155	2292	0.325	747	0.5	2.441	A

09:15 - 09:30

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
A	933	214	2335	0.399	934	0.7	2.637	A
B	251	755	1912	0.131	251	0.2	2.280	A
C	625	130	2308	0.271	625	0.4	2.241	A

2025 Base + Com Dev + Malincross, PM

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction Type	Arm order	Junction Delay (s)	Junction LOS
1	untitled	Standard Roundabout	A, B, C	3.00	A

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D6	2025 Base + Com Dev + Malincross	PM	ONE HOUR	17:00	18:30	15

Vehicle mix source	PCU Factor for a HV (PCU)
HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
A		✓	730	100.000
B		✓	459	100.000
C		✓	1132	100.000

Origin-Destination Data

Demand (PCU/hr)

		To		
		A	B	C
From	A	0	156	574
	B	187	0	272
	C	1025	107	0

Vehicle Mix

Heavy Vehicle Percentages

		To		
		A	B	C
From	A	0	2	2
	B	3	0	4
	C	2	10	0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max delay (s)	Max Queue (PCU)	Max LOS
A	0.34	2.30	0.5	A
B	0.25	2.51	0.4	A
C	0.55	3.64	1.3	A

Main Results for each time segment

17:00 - 17:15

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
A	550	80	2422	0.227	548	0.3	1.959	A
B	346	431	2115	0.163	345	0.2	2.105	A
C	852	140	2301	0.370	850	0.6	2.543	A

17:15 - 17:30

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
A	656	96	2411	0.272	656	0.4	2.091	A
B	413	516	2062	0.200	412	0.3	2.260	A
C	1018	168	2284	0.446	1017	0.8	2.916	A

17:30 - 17:45

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
A	804	118	2398	0.335	803	0.5	2.303	A
B	505	632	1990	0.254	505	0.4	2.512	A
C	1246	206	2261	0.551	1245	1.3	3.631	A

17:45 - 18:00

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
A	804	118	2397	0.335	804	0.5	2.303	A
B	505	632	1989	0.254	505	0.4	2.512	A
C	1246	206	2261	0.551	1246	1.3	3.643	A

18:00 - 18:15

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
A	656	96	2411	0.272	657	0.4	2.094	A
B	413	516	2062	0.200	413	0.3	2.261	A
C	1018	168	2284	0.446	1019	0.8	2.929	A

18:15 - 18:30

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
A	550	81	2421	0.227	550	0.3	1.963	A
B	346	432	2115	0.163	346	0.2	2.108	A
C	852	141	2301	0.370	853	0.6	2.556	A

2040 Base + Com Dev + Malincross, AM

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction Type	Arm order	Junction Delay (s)	Junction LOS
1	untitled	Standard Roundabout	A, B, C	4.00	A

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D7	2040 Base + Com Dev + Malincross	AM	ONE HOUR	08:00	09:30	15

Vehicle mix source	PCU Factor for a HV (PCU)
HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
A		✓	1353	100.000
B		✓	374	100.000
C		✓	927	100.000

Origin-Destination Data

Demand (PCU/hr)

		To		
		A	B	C
From	A	0	259	1094
	B	189	0	185
	C	604	323	0

Vehicle Mix

Heavy Vehicle Percentages

		To		
		A	B	C
From	A	0	1	3
	B	2	0	10
	C	4	7	0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max delay (s)	Max Queue (PCU)	Max LOS
A	0.66	4.90	2.0	A
B	0.25	3.13	0.4	A
C	0.45	3.05	0.9	A

Main Results for each time segment

08:00 - 08:15

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
A	1019	243	2317	0.440	1015	0.8	2.831	A
B	282	821	1871	0.151	281	0.2	2.394	A
C	698	142	2300	0.303	696	0.5	2.355	A

08:15 - 08:30

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
A	1216	290	2286	0.532	1215	1.2	3.443	A
B	336	982	1769	0.190	336	0.2	2.657	A
C	833	170	2283	0.365	833	0.6	2.605	A

08:30 - 08:45

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
A	1490	355	2244	0.664	1486	2.0	4.852	A
B	412	1202	1631	0.252	411	0.4	3.122	A
C	1021	208	2260	0.452	1020	0.9	3.046	A

08:45 - 09:00

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
A	1490	356	2244	0.664	1490	2.0	4.895	A
B	412	1204	1630	0.253	412	0.4	3.126	A
C	1021	208	2259	0.452	1021	0.9	3.051	A

09:00 - 09:15

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
A	1216	291	2286	0.532	1220	1.2	3.474	A
B	336	986	1767	0.190	337	0.2	2.663	A
C	833	170	2283	0.365	834	0.6	2.613	A

09:15 - 09:30

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
A	1019	243	2316	0.440	1020	0.8	2.852	A
B	282	825	1868	0.151	282	0.2	2.402	A
C	698	142	2300	0.303	698	0.5	2.361	A

2040 Base + Com Dev + Malincross, PM

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction Type	Arm order	Junction Delay (s)	Junction LOS
1	untitled	Standard Roundabout	A, B, C	3.36	A

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D8	2040 Base + Com Dev + Malincross	PM	ONE HOUR	17:00	18:30	15

Vehicle mix source	PCU Factor for a HV (PCU)
HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
A		✓	801	100.000
B		✓	513	100.000
C		✓	1245	100.000

Origin-Destination Data

Demand (PCU/hr)

		To		
		A	B	C
From	A	0	171	630
	B	205	0	308
	C	1122	123	0

Vehicle Mix

Heavy Vehicle Percentages

		To		
		A	B	C
From	A	0	3	3
	B	3	0	4
	C	2	11	0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max delay (s)	Max Queue (PCU)	Max LOS
A	0.37	2.46	0.6	A
B	0.29	2.69	0.4	A
C	0.61	4.22	1.6	A

Main Results for each time segment

17:00 - 17:15

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
A	603	92	2414	0.250	602	0.3	2.045	A
B	386	473	2089	0.185	385	0.2	2.188	A
C	937	154	2293	0.409	934	0.7	2.719	A

17:15 - 17:30

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
A	720	110	2402	0.300	720	0.4	2.204	A
B	461	566	2031	0.227	461	0.3	2.375	A
C	1119	184	2274	0.492	1118	1.0	3.199	A

17:30 - 17:45

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
A	882	135	2386	0.370	881	0.6	2.462	A
B	565	693	1951	0.290	564	0.4	2.690	A
C	1371	226	2249	0.610	1368	1.6	4.194	A

17:45 - 18:00

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
A	882	135	2386	0.370	882	0.6	2.464	A
B	565	694	1951	0.290	565	0.4	2.690	A
C	1371	226	2249	0.610	1371	1.6	4.216	A

18:00 - 18:15

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
A	720	111	2402	0.300	721	0.4	2.207	A
B	461	567	2030	0.227	462	0.3	2.378	A
C	1119	184	2274	0.492	1122	1.0	3.217	A

18:15 - 18:30

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
A	603	93	2414	0.250	603	0.3	2.048	A
B	386	475	2088	0.185	386	0.2	2.193	A
C	937	154	2293	0.409	938	0.7	2.737	A

APPENDIX R

LINSIG Output (Junction 12)

DRAFT

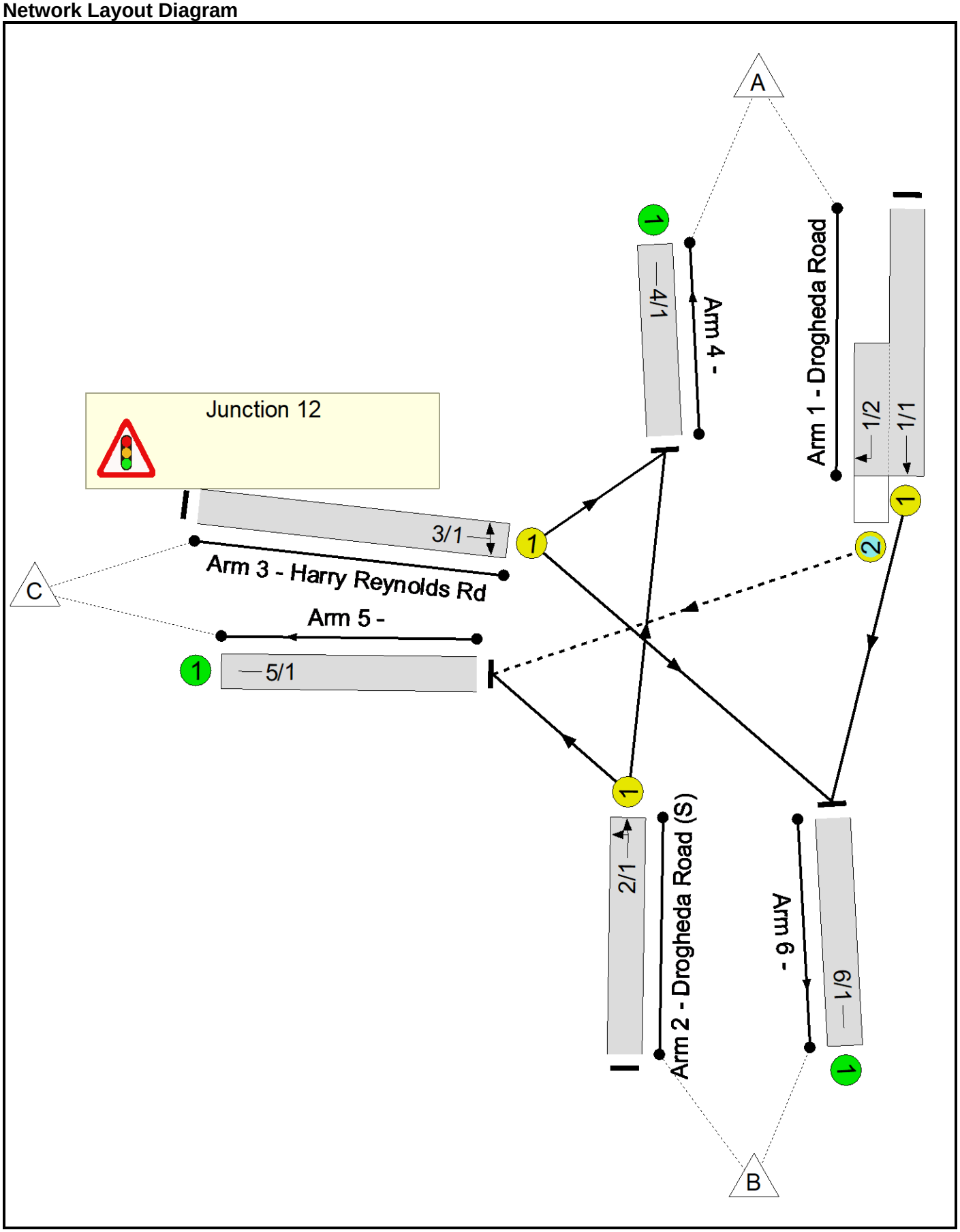
Full Input Data And Results

User and Project Details

Project:	
Title:	
Location:	
Additional detail:	
File name:	JUNCTION 12.lsg3x
Author:	
Company:	
Address:	

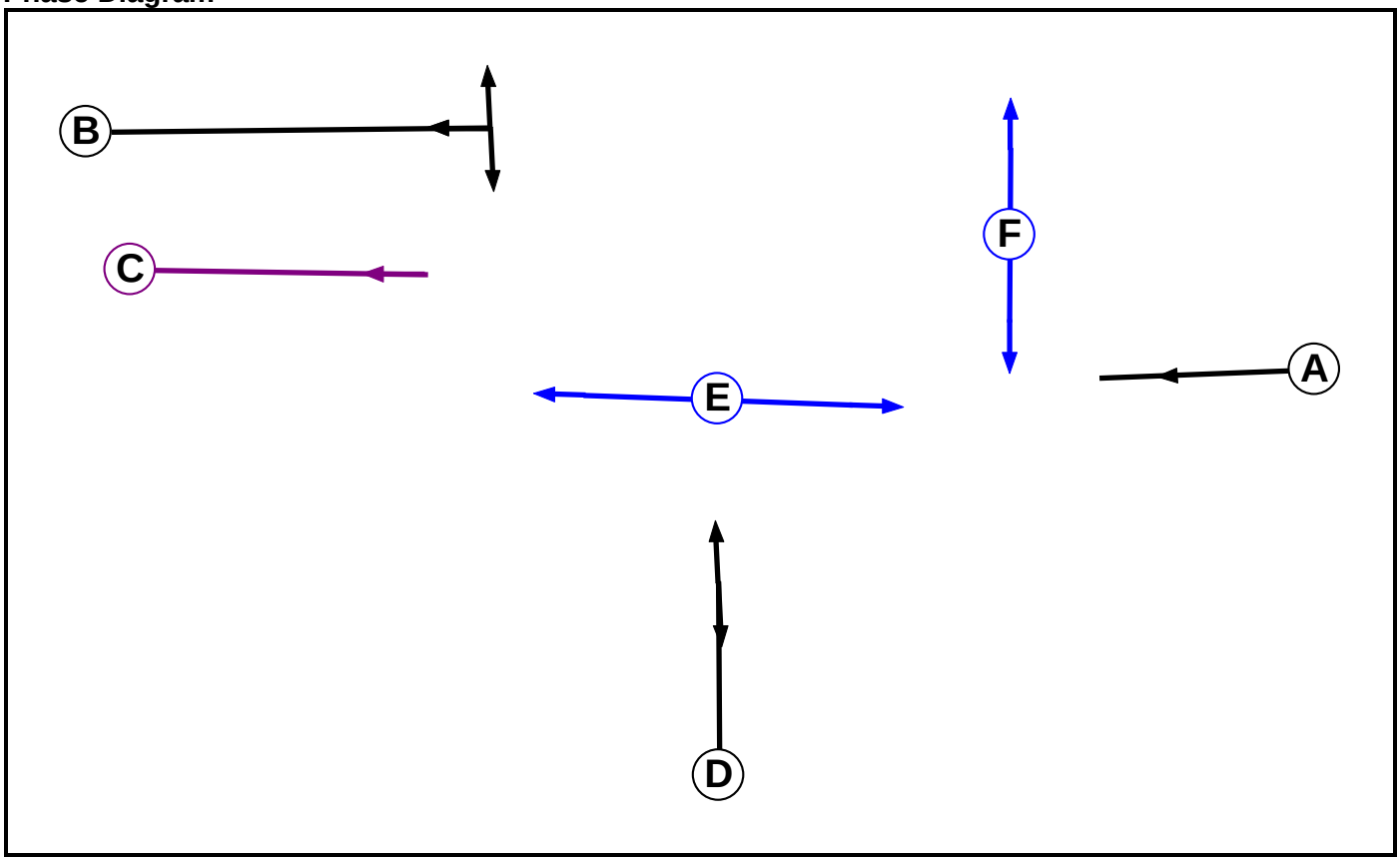
Full Input Data And Results

Network Layout Diagram



Full Input Data And Results

Phase Diagram



Phase Input Data

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

Full Input Data And Results

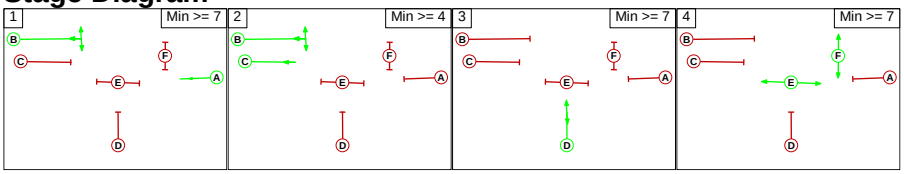
Phase Intergreens Matrix

Terminating Phase \ Starting Phase	A	B	C	D	E	F
A		-	5	5	6	6
B	-		-	5	6	6
C	5	-		5	6	6
D	5	5	5		6	6
E	10	10	10	10		-
F	10	10	10	10	-	

Phases in Stage

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

Stage Diagram



Phase Delays

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

Prohibited Stage Change

From Stage \ To Stage	1	2	3	4
1		5	5	6
2	5		5	6
3	5	5		6
4	10	10	10	

Full Input Data And Results

Give-Way Lane Input Data

Junction: Junction 12											
Lane	**Movement**	**Max Flow when Giving Way (PCU/Hr)**	**Min Flow when Giving Way (PCU/Hr)**	**Opposing Lane**	**Opp. Lane Coeff.**	**Opp. Mvmnts.**	**Right Turn Storage (PCU)**	**Non-Blocking Storage (PCU)**	**RTF**	**Right Turn Move up (s)**	**Max Turns in Intergreen (PCU)**
1/2 (Drogheda Road)	5/1 (Right)	1439	0	2/1	1.09	All	2.00	-	0.50	2	2.00

Full Input Data And Results

Lane Input Data

Junction: Junction 12												
Lane	**Lane Type**	**Phases**	**Start Disp.**	**End Disp.**	**Physical Length (PCU)**	**Sat Flow Type**	**Def User Saturation Flow (PCU/Hr)**	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Turns**	**Turning Radius (m)**
1/1 (Drogheda Road)	U	B	2	3	60.0	Geom	-	3.30	0.00	Y	Arm 6 Ahead	Inf
1/2 (Drogheda Road)	O	B C	2	3	5.7	Geom	-	3.30	0.00	N	Arm 5 Right	12.00
2/1 (Drogheda Road (S))	U	B	2	3	60.0	Geom	-	4.90	0.00	Y	Arm 4 Ahead	Inf
											Arm 5 Left	15.00
3/1 (Harry Reynolds Rd)	U	D	2	3	60.0	Geom	-	3.70	0.00	Y	Arm 4 Left	14.00
											Arm 6 Right	19.00
4/1	U		2	3	60.0	Inf	-	-	-	-	-	-
5/1	U		2	3	60.0	Inf	-	-	-	-	-	-
6/1	U		2	3	60.0	Inf	-	-	-	-	-	-

Traffic Flow Groups

Flow Group	Start Time	End Time	Duration	Formula
1: '2025 Base + CD AM'	08:00	09:00	01:00	
2: '2025 Base + CD PM'	17:00	18:00	01:00	
3: '2025 Base + CD + Malincross AM'	08:00	09:00	01:00	
4: '2025 Base + CD + Malincross PM'	17:00	18:00	01:00	
5: '2040 Base + CD AM'	08:00	09:00	01:00	
6: '2040 Base + CD PM'	17:00	18:00	01:00	
7: '2040 Base + CD + Malincross AM'	08:00	09:00	01:00	
8: '2040 Base + CD + Malincross PM'	17:00	18:00	01:00	

Scenario 1: '2025 Base + CD AM' (FG1: '2025 Base + CD AM', Plan 1: 'Network Control Plan 1')

Traffic Flows, Desired

Desired Flow :

		Destination			
		A	B	C	Tot.
Origin	A	0	473	132	605
	B	261	0	102	363
	C	92	141	0	233
	Tot.	353	614	234	1201

Full Input Data And Results

Traffic Lane Flows

Lane	Scenario 1: 2025 Base + CD AM
Junction: Junction 12	
1/1 (with short)	605(In) 473(Out)
1/2 (short)	132
2/1	363
3/1	233
4/1	353
5/1	234
6/1	614

Lane Saturation Flows

Junction: Junction 12								
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat Flow (PCU/Hr)**	**Flared Sat Flow (PCU/Hr)**
1/1 (Drogheda Road)	3.30	0.00	Y	Arm 6 Ahead	Inf	100.0 %	1945	1945
1/2 (Drogheda Road)	3.30	0.00	N	Arm 5 Right	12.00	100.0 %	1853	1853
2/1 (Drogheda Road (S))	4.90	0.00	Y	Arm 4 Ahead	Inf	71.9 %	2047	2047
				Arm 5 Left	15.00	28.1 %		
3/1 (Harry Reynolds Rd)	3.70	0.00	Y	Arm 4 Left	14.00	39.5 %	1821	1821
				Arm 6 Right	19.00	60.5 %		
4/1	Infinite Saturation Flow						Inf	Inf
5/1	Infinite Saturation Flow						Inf	Inf
6/1	Infinite Saturation Flow						Inf	Inf

Scenario 2: '2025 Base + CD PM' (FG2: '2025 Base + CD PM', Plan 1: 'Network Control Plan 1')

Traffic Flows, Desired

Desired Flow :

		Destination			
		A	B	C	Tot.
Origin	A	0	310	70	380
	B	375	0	152	527
	C	147	145	0	292
	Tot.	522	455	222	1199

Full Input Data And Results

Traffic Lane Flows

Lane	Scenario 2: 2025 Base + CD PM
Junction: Junction 12	
1/1 (with short)	380(In) 310(Out)
1/2 (short)	70
2/1	527
3/1	292
4/1	522
5/1	222
6/1	455

Lane Saturation Flows

Junction: Junction 12								
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat Flow (PCU/Hr)**	**Flared Sat Flow (PCU/Hr)**
1/1 (Drogheda Road)	3.30	0.00	Y	Arm 6 Ahead	Inf	100.0 %	1945	1945
1/2 (Drogheda Road)	3.30	0.00	N	Arm 5 Right	12.00	100.0 %	1853	1853
2/1 (Drogheda Road (S))	4.90	0.00	Y	Arm 4 Ahead	Inf	71.2 %	2046	2046
				Arm 5 Left	15.00	28.8 %		
3/1 (Harry Reynolds Rd)	3.70	0.00	Y	Arm 4 Left	14.00	50.3 %	1816	1816
				Arm 6 Right	19.00	49.7 %		
4/1	Infinite Saturation Flow						Inf	Inf
5/1	Infinite Saturation Flow						Inf	Inf
6/1	Infinite Saturation Flow						Inf	Inf

Scenario 3: '2025 Base + CD + Malincross AM' (FG3: '2025 Base + CD + Malincross AM', Plan 1: 'Network Control Plan 1')

Traffic Flows, Desired

Desired Flow :

		Destination			
		A	B	C	Tot.
Origin	A	0	524	148	672
	B	290	0	113	403
	C	102	157	0	259
	Tot.	392	681	261	1334

Full Input Data And Results

Traffic Lane Flows

Lane	Scenario 3: 2025 Base + CD + Malincross AM
Junction: Junction 12	
1/1 (with short)	672(In) 524(Out)
1/2 (short)	148
2/1	403
3/1	259
4/1	392
5/1	261
6/1	681

Lane Saturation Flows

Junction: Junction 12

Lane	Lane Width (m)	Gradient	Nearside Lane	Allowed Turns	Turning Radius (m)	Turning Prop.	Sat Flow (PCU/Hr)	Flared Sat Flow (PCU/Hr)
1/1 (Drogheda Road)	3.30	0.00	Y	Arm 6 Ahead	Inf	100.0 %	1945	1945
1/2 (Drogheda Road)	3.30	0.00	N	Arm 5 Right	12.00	100.0 %	1853	1853
2/1 (Drogheda Road (S))	4.90	0.00	Y	Arm 4 Ahead	Inf	72.0 %	2048	2048
				Arm 5 Left	15.00	28.0 %		
3/1 (Harry Reynolds Rd)	3.70	0.00	Y	Arm 4 Left	14.00	39.4 %	1821	1821
				Arm 6 Right	19.00	60.6 %		
4/1	Infinite Saturation Flow						Inf	Inf
5/1	Infinite Saturation Flow						Inf	Inf
6/1	Infinite Saturation Flow						Inf	Inf

Scenario 4: '2025 Base + CD + Malincross PM' (FG4: '2025 Base + CD + Malincross PM', Plan 1: 'Network Control Plan 1')

Traffic Flows, Desired

Desired Flow :

		Destination			
		A	B	C	Tot.
Origin	A	0	346	79	425
	B	419	0	170	589
	C	164	163	0	327
	Tot.	583	509	249	1341

Full Input Data And Results

Traffic Lane Flows

Lane	Scenario 4: 2025 Base + CD + Malincross PM
Junction: Junction 12	
1/1 (with short)	425(In) 346(Out)
1/2 (short)	79
2/1	589
3/1	327
4/1	583
5/1	249
6/1	509

Lane Saturation Flows

Junction: Junction 12

Lane	Lane Width (m)	Gradient	Nearside Lane	Allowed Turns	Turning Radius (m)	Turning Prop.	Sat Flow (PCU/Hr)	Flared Sat Flow (PCU/Hr)
1/1 (Drogheda Road)	3.30	0.00	Y	Arm 6 Ahead	Inf	100.0 %	1945	1945
1/2 (Drogheda Road)	3.30	0.00	N	Arm 5 Right	12.00	100.0 %	1853	1853
2/1 (Drogheda Road (S))	4.90	0.00	Y	Arm 4 Ahead	Inf	71.1 %	2046	2046
				Arm 5 Left	15.00	28.9 %		
3/1 (Harry Reynolds Rd)	3.70	0.00	Y	Arm 4 Left	14.00	50.2 %	1816	1816
				Arm 6 Right	19.00	49.8 %		
4/1	Infinite Saturation Flow						Inf	Inf
5/1	Infinite Saturation Flow						Inf	Inf
6/1	Infinite Saturation Flow						Inf	Inf

Scenario 5: '2040 Base + CD AM' (FG5: '2040 Base + CD AM', Plan 1: 'Network Control Plan 1')

Traffic Flows, Desired

Desired Flow :

		Destination			
		A	B	C	Tot.
Origin	A	0	473	132	605
	B	261	0	108	369
	C	92	161	0	253
	Tot.	353	634	240	1227

Full Input Data And Results

Traffic Lane Flows

Lane	Scenario 5: 2040 Base + CD AM
Junction: Junction 12	
1/1 (with short)	605(In) 473(Out)
1/2 (short)	132
2/1	369
3/1	253
4/1	353
5/1	240
6/1	634

Lane Saturation Flows

Junction: Junction 12								
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat Flow (PCU/Hr)**	**Flared Sat Flow (PCU/Hr)**
1/1 (Drogheda Road)	3.30	0.00	Y	Arm 6 Ahead	Inf	100.0 %	1945	1945
1/2 (Drogheda Road)	3.30	0.00	N	Arm 5 Right	12.00	100.0 %	1853	1853
2/1 (Drogheda Road (S))	4.90	0.00	Y	Arm 4 Ahead	Inf	70.7 %	2045	2045
				Arm 5 Left	15.00	29.3 %		
3/1 (Harry Reynolds Rd)	3.70	0.00	Y	Arm 4 Left	14.00	36.4 %	1822	1822
				Arm 6 Right	19.00	63.6 %		
4/1	Infinite Saturation Flow						Inf	Inf
5/1	Infinite Saturation Flow						Inf	Inf
6/1	Infinite Saturation Flow						Inf	Inf

Scenario 6: '2040 Base + CD PM' (FG6: '2040 Base + CD PM', Plan 1: 'Network Control Plan 1')

Traffic Flows, Desired

Desired Flow :

		Destination			
		A	B	C	Tot.
Origin	A	0	310	70	380
	B	375	0	170	545
	C	147	156	0	303
	Tot.	522	466	240	1228

Full Input Data And Results

Traffic Lane Flows

Lane	Scenario 6: 2040 Base + CD PM
Junction: Junction 12	
1/1 (with short)	380(In) 310(Out)
1/2 (short)	70
2/1	545
3/1	303
4/1	522
5/1	240
6/1	466

Lane Saturation Flows

Junction: Junction 12								
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat Flow (PCU/Hr)**	**Flared Sat Flow (PCU/Hr)**
1/1 (Drogheda Road)	3.30	0.00	Y	Arm 6 Ahead	Inf	100.0 %	1945	1945
1/2 (Drogheda Road)	3.30	0.00	N	Arm 5 Right	12.00	100.0 %	1853	1853
2/1 (Drogheda Road (S))	4.90	0.00	Y	Arm 4 Ahead	Inf	68.8 %	2041	2041
				Arm 5 Left	15.00	31.2 %		
3/1 (Harry Reynolds Rd)	3.70	0.00	Y	Arm 4 Left	14.00	48.5 %	1817	1817
				Arm 6 Right	19.00	51.5 %		
4/1	Infinite Saturation Flow						Inf	Inf
5/1	Infinite Saturation Flow						Inf	Inf
6/1	Infinite Saturation Flow						Inf	Inf

Scenario 7: '2040 Base + CD + Malincross AM' (FG7: '2040 Base + CD + Malincross AM', Plan 1: 'Network Control Plan 1')

Traffic Flows, Desired

Desired Flow :

		Destination			
		A	B	C	Tot.
Origin	A	0	524	148	672
	B	290	0	119	409
	C	102	178	0	280
	Tot.	392	702	267	1361

Full Input Data And Results

Traffic Lane Flows

Lane	Scenario 7: 2040 Base + CD + Malincross AM
Junction: Junction 12	
1/1 (with short)	672(In) 524(Out)
1/2 (short)	148
2/1	409
3/1	280
4/1	392
5/1	267
6/1	702

Lane Saturation Flows

Junction: Junction 12

Lane	Lane Width (m)	Gradient	Nearside Lane	Allowed Turns	Turning Radius (m)	Turning Prop.	Sat Flow (PCU/Hr)	Flared Sat Flow (PCU/Hr)
1/1 (Drogheda Road)	3.30	0.00	Y	Arm 6 Ahead	Inf	100.0 %	1945	1945
1/2 (Drogheda Road)	3.30	0.00	N	Arm 5 Right	12.00	100.0 %	1853	1853
2/1 (Drogheda Road (S))	4.90	0.00	Y	Arm 4 Ahead	Inf	70.9 %	2045	2045
				Arm 5 Left	15.00	29.1 %		
3/1 (Harry Reynolds Rd)	3.70	0.00	Y	Arm 4 Left	14.00	36.4 %	1822	1822
				Arm 6 Right	19.00	63.6 %		
4/1	Infinite Saturation Flow						Inf	Inf
5/1	Infinite Saturation Flow						Inf	Inf
6/1	Infinite Saturation Flow						Inf	Inf

Scenario 8: '2040 Base + CD + Malincross PM' (FG8: '2040 Base + CD + Malincross PM', Plan 1: 'Network Control Plan 1')

Traffic Flows, Desired

Desired Flow :

		Destination			
		A	B	C	Tot.
Origin	A	0	346	79	425
	B	419	0	188	607
	C	164	174	0	338
	Tot.	583	520	267	1370

Full Input Data And Results

Traffic Lane Flows

Lane	Scenario 8: 2040 Base + CD + Malincross PM
Junction: Junction 12	
1/1 (with short)	425(In) 346(Out)
1/2 (short)	79
2/1	607
3/1	338
4/1	583
5/1	267
6/1	520

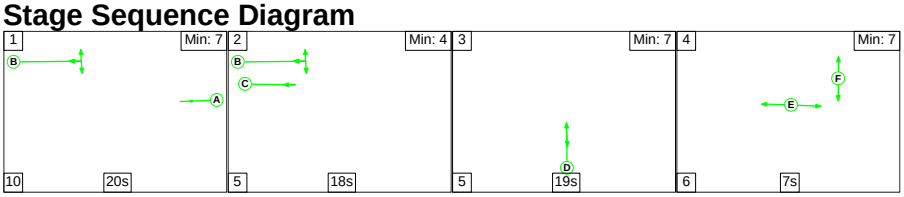
Lane Saturation Flows

Junction: Junction 12

Lane	Lane Width (m)	Gradient	Nearside Lane	Allowed Turns	Turning Radius (m)	Turning Prop.	Sat Flow (PCU/Hr)	Flared Sat Flow (PCU/Hr)
1/1 (Drogheda Road)	3.30	0.00	Y	Arm 6 Ahead	Inf	100.0 %	1945	1945
1/2 (Drogheda Road)	3.30	0.00	N	Arm 5 Right	12.00	100.0 %	1853	1853
2/1 (Drogheda Road (S))	4.90	0.00	Y	Arm 4 Ahead	Inf	69.0 %	2042	2042
				Arm 5 Left	15.00	31.0 %		
3/1 (Harry Reynolds Rd)	3.70	0.00	Y	Arm 4 Left	14.00	48.5 %	1817	1817
				Arm 6 Right	19.00	51.5 %		
4/1	Infinite Saturation Flow						Inf	Inf
5/1	Infinite Saturation Flow						Inf	Inf
6/1	Infinite Saturation Flow						Inf	Inf

Scenario 1: '2025 Base + CD AM' (FG1: '2025 Base + CD AM', Plan 1: 'Network Control Plan 1')

Stage Sequence Diagram

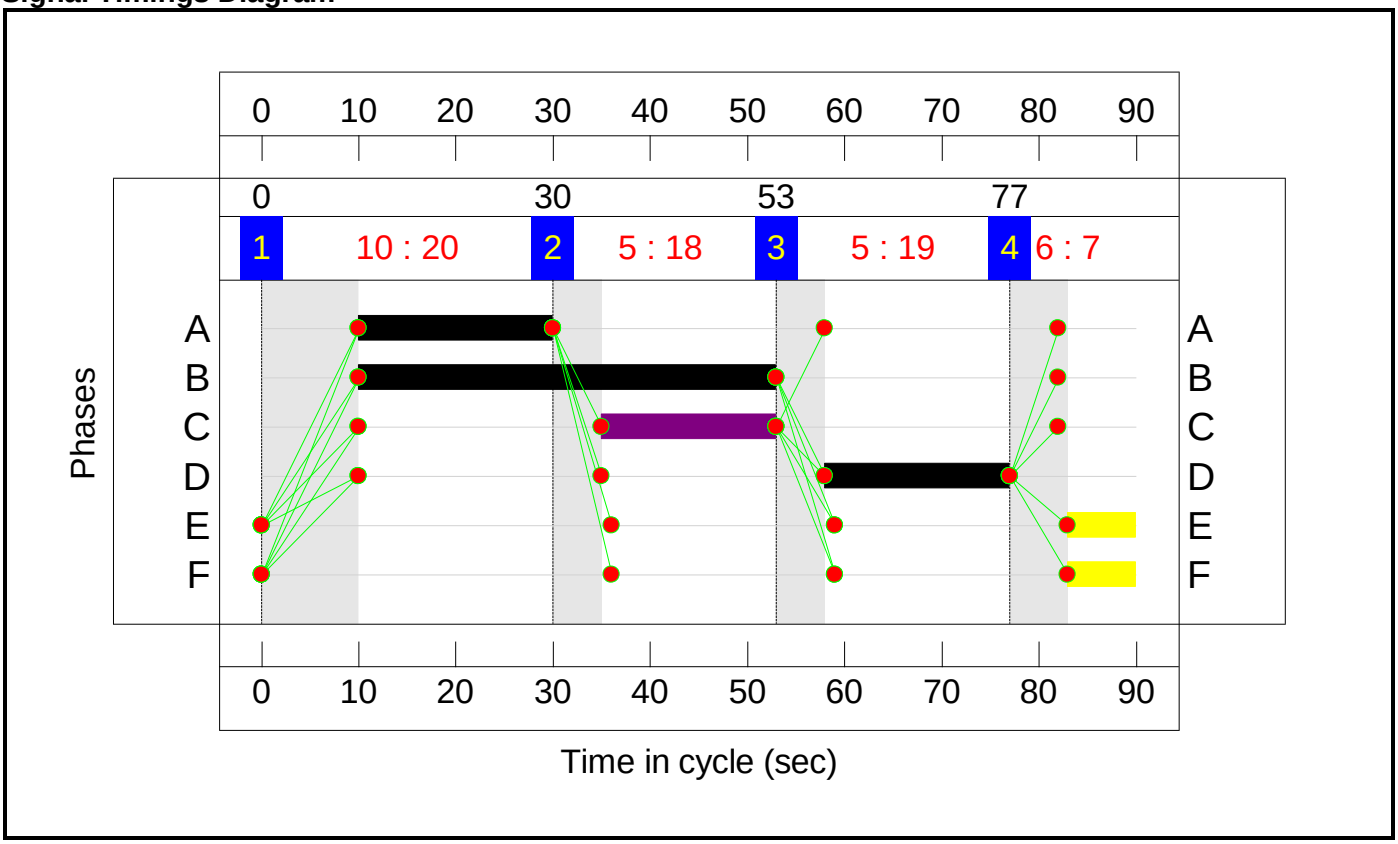


Stage Timings

Stage	1	2	3	4
Duration	20	18	19	7
Change Point	0	30	53	77

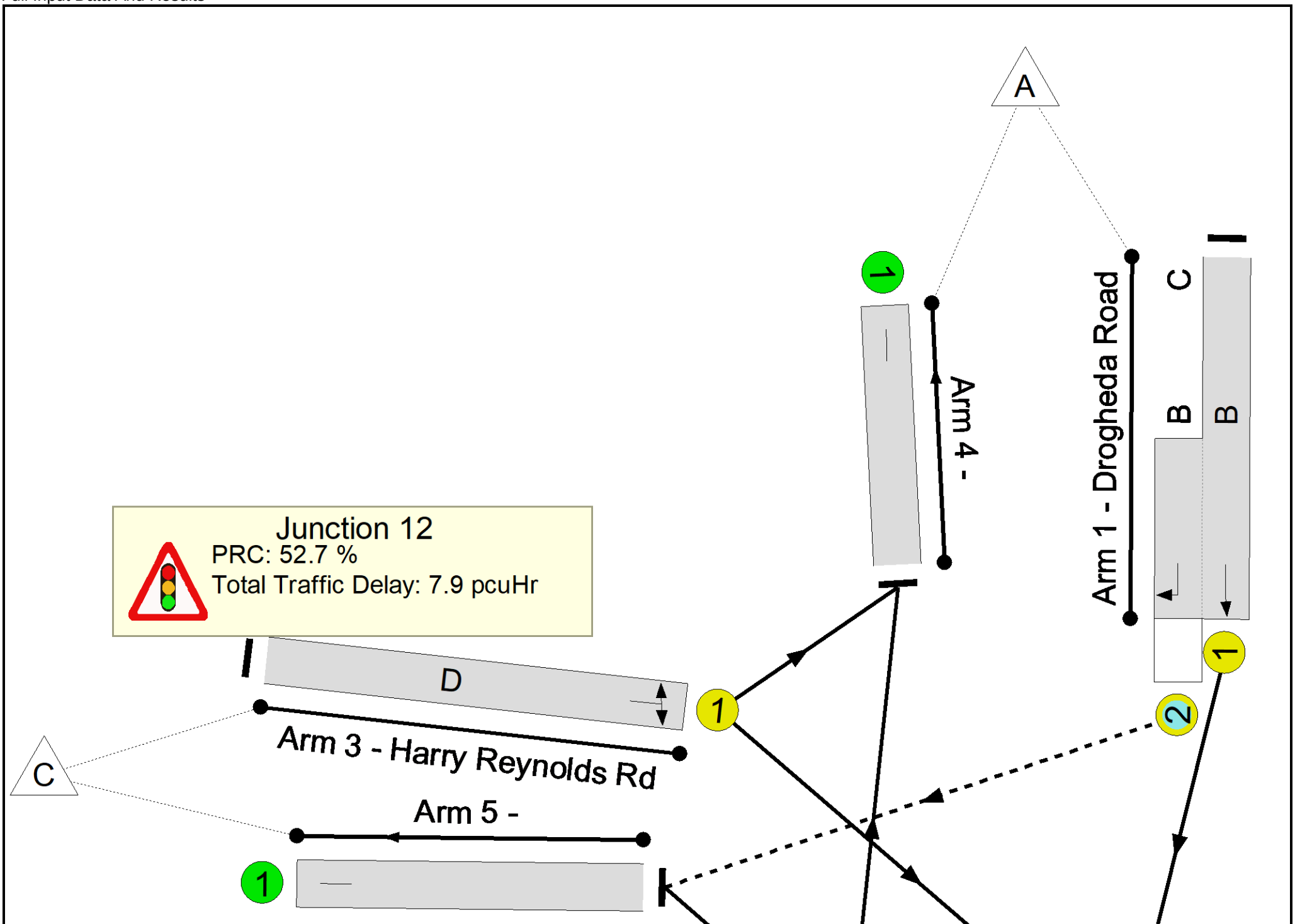
Full Input Data And Results

Signal Timings Diagram



Full Input Data And Results

Network Layout Diagram


A
1
Arm 4 -
Arm 1 - Drogheda Road
C
B
B
Junction 12
PRC: 52.7 %
Total Traffic Delay: 7.9 pcuHr
D
1
1
2
Arm 3 - Harry Reynolds Rd
C
Arm 5 -
1

Full Input Data And Results

Network Results

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**59.0%**
Junction 12	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**59.0%**
1/1+1/2	Drogheda Road Right Ahead	U+O	N/A	N/A	B	C	1	43	18	605	1945:1853	802+224	59.0 : 59.0%
2/1	Drogheda Road (S) Ahead Left	U	N/A	N/A	B		1	43	-	363	2047	1001	36.3%
3/1	Harry Reynolds Rd Left Right	U	N/A	N/A	D		1	19	-	233	1821	405	57.6%
4/1		U	N/A	N/A	-		-	-	-	353	Inf	Inf	0.0%
5/1		U	N/A	N/A	-		-	-	-	234	Inf	Inf	0.0%
6/1		U	N/A	N/A	-		-	-	-	614	Inf	Inf	0.0%

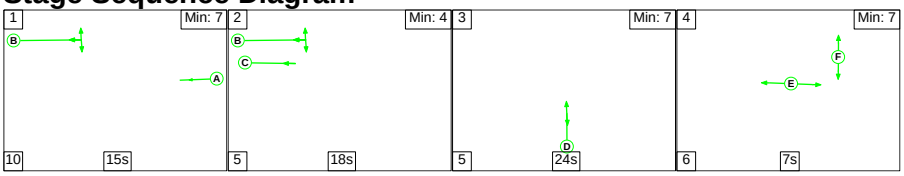
Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network	**-**	**-**	**132**	**0**	**0**	**6.0**	**1.7**	**0.2**	**7.9**	**-**	**-**	**-**	**-**
Junction 12	**-**	**-**	**132**	**0**	**0**	**6.0**	**1.7**	**0.2**	**7.9**	**-**	**-**	**-**	**-**
1/1+1/2	605	605	132	0	0	2.5	0.7	0.2	3.5	20.8	8.7	0.7	9.4
2/1	363	363	-	-	-	1.4	0.3	-	1.7	17.1	5.5	0.3	5.8
3/1	233	233	-	-	-	2.0	0.7	-	2.7	41.6	5.2	0.7	5.9
4/1	353	353	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
5/1	234	234	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	614	614	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0

C1 PRC for Signalled Lanes (%): 52.7 Total Delay for Signalled Lanes (pcuHr): 7.91 Cycle Time (s): 90
PRC Over All Lanes (%): 52.7 Total Delay Over All Lanes(pcuHr): 7.91

Full Input Data And Results

Scenario 2: '2025 Base + CD PM' (FG2: '2025 Base + CD PM', Plan 1: 'Network Control Plan 1')

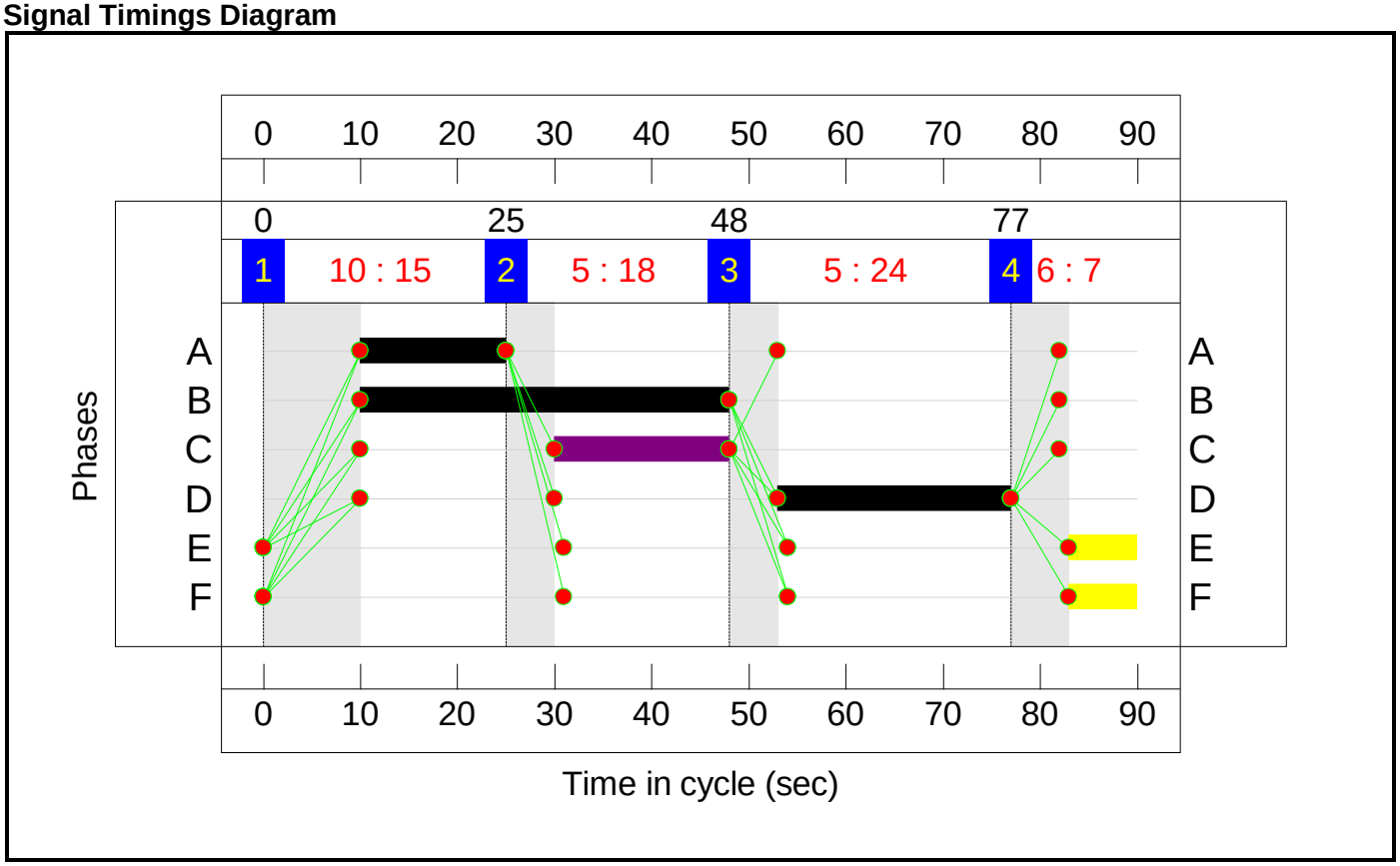
Stage Sequence Diagram



Stage Timings

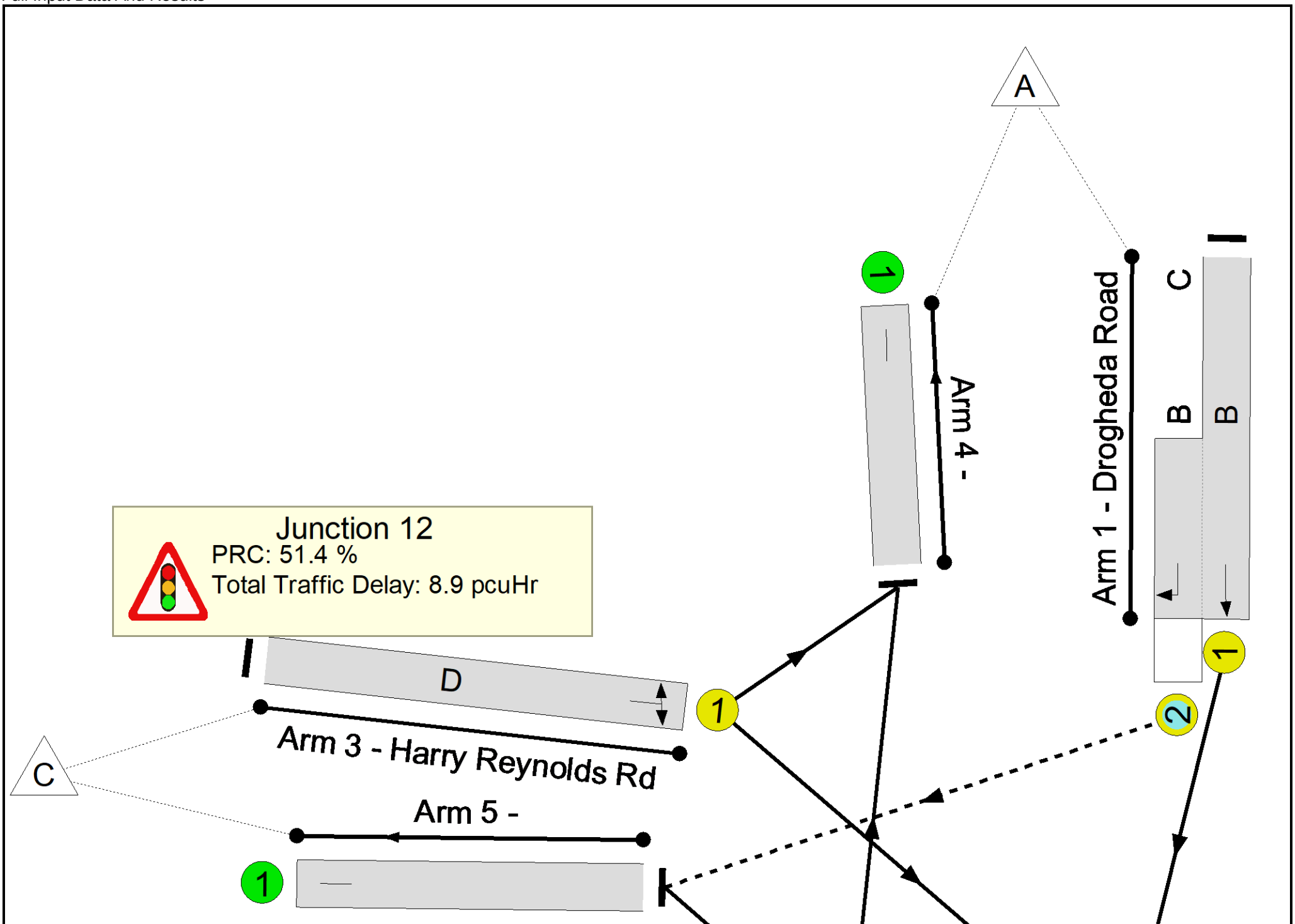
Stage	1	2	3	4
Duration	15	18	24	7
Change Point	0	25	48	77

Signal Timings Diagram



Full Input Data And Results

Network Layout Diagram


A
1
Arm 4 -
Arm 1 - Drogheda Road
C
B
B
Junction 12
PRC: 51.4 %
Total Traffic Delay: 8.9 pcuHr
D
1
1
2
Arm 3 - Harry Reynolds Rd
C
Arm 5 -
1

Full Input Data And Results

Network Results

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**59.4%**
Junction 12	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**59.4%**
1/1+1/2	Drogheda Road Right Ahead	U+O	N/A	N/A	B	C	1	38	18	380	1945:1853	741+167	41.9 : 41.9%
2/1	Drogheda Road (S) Ahead Left	U	N/A	N/A	B		1	38	-	527	2046	887	59.4%
3/1	Harry Reynolds Rd Left Right	U	N/A	N/A	D		1	24	-	292	1816	504	57.9%
4/1		U	N/A	N/A	-		-	-	-	522	Inf	Inf	0.0%
5/1		U	N/A	N/A	-		-	-	-	222	Inf	Inf	0.0%
6/1		U	N/A	N/A	-		-	-	-	455	Inf	Inf	0.0%

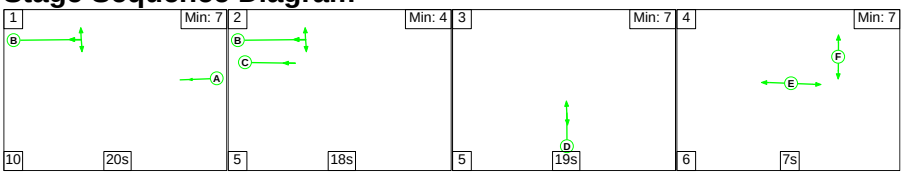
Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network	**-**	**-**	**70**	**0**	**0**	**6.9**	**1.8**	**0.3**	**8.9**	**-**	**-**	**-**	**-**
Junction 12	**-**	**-**	**70**	**0**	**0**	**6.9**	**1.8**	**0.3**	**8.9**	**-**	**-**	**-**	**-**
1/1+1/2	380	380	70	0	0	1.8	0.4	0.3	2.4	22.7	5.2	0.4	5.5
2/1	527	527	-	-	-	2.8	0.7	-	3.6	24.5	10.0	0.7	10.7
3/1	292	292	-	-	-	2.3	0.7	-	3.0	36.4	6.2	0.7	6.9
4/1	522	522	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
5/1	222	222	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	455	455	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0

C1 PRC for Signalled Lanes (%): 51.4 Total Delay for Signalled Lanes (pcuHr): 8.93 Cycle Time (s): 90
PRC Over All Lanes (%): 51.4 Total Delay Over All Lanes(pcuHr): 8.93

Full Input Data And Results

Scenario 3: '2025 Base + CD + Malincross AM' (FG3: '2025 Base + CD + Malincross AM', Plan 1: 'Network Control Plan 1')

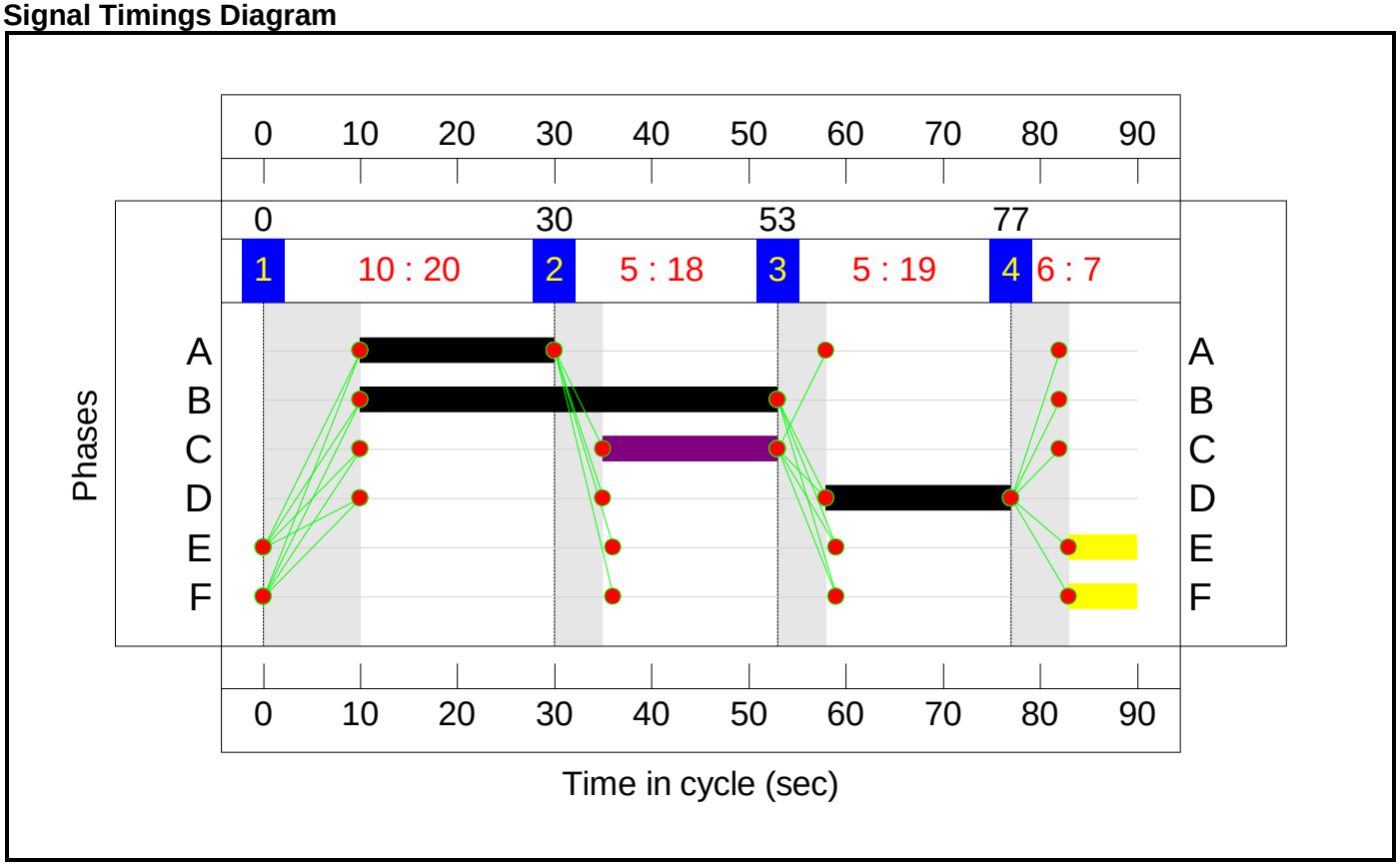
Stage Sequence Diagram



Stage Timings

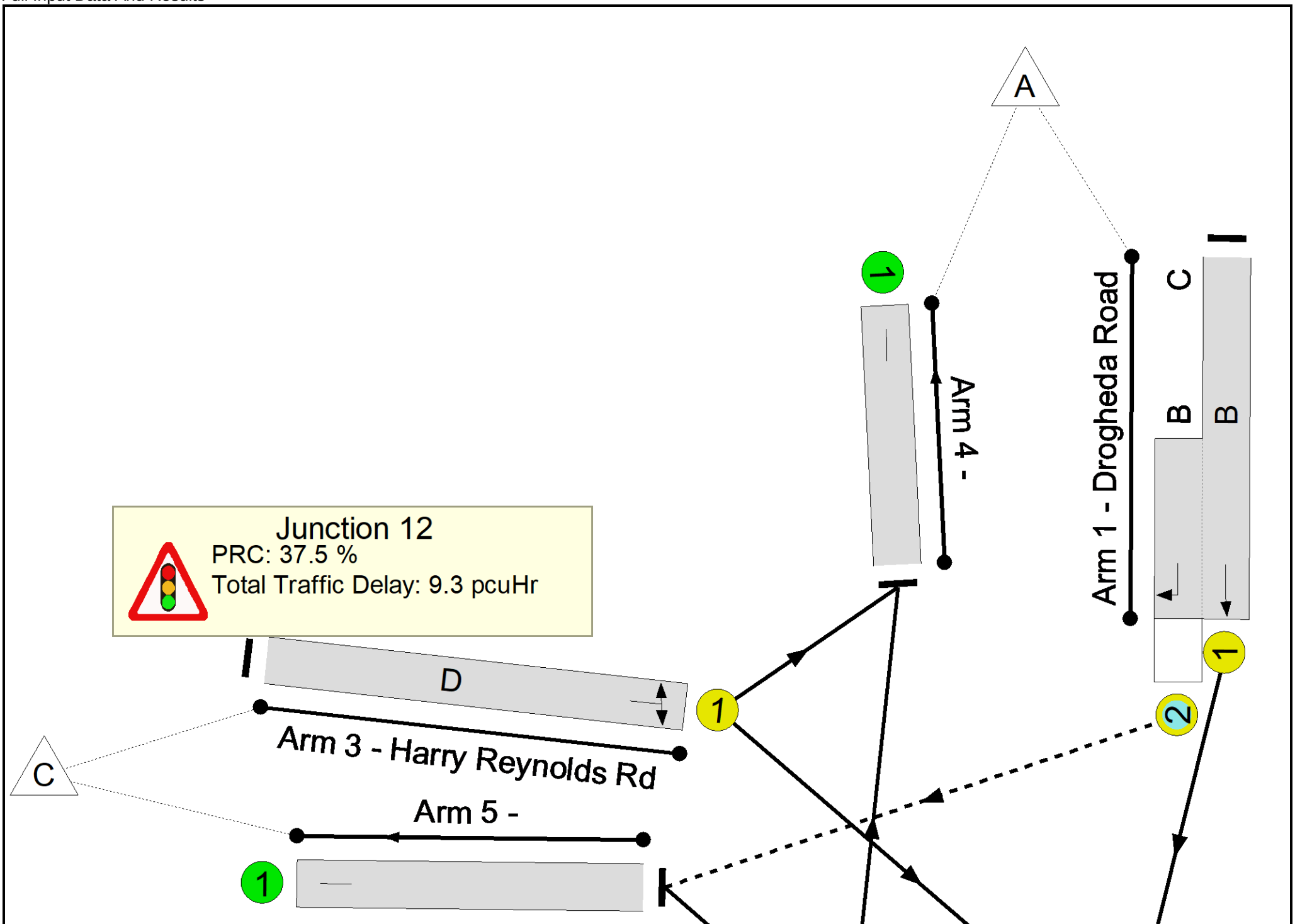
Stage	1	2	3	4
Duration	20	18	19	7
Change Point	0	30	53	77

Signal Timings Diagram



Full Input Data And Results

Network Layout Diagram


A
1
Arm 4 -
Arm 1 - Drogheda Road
C
B
B
Junction 12
PRC: 37.5 %
Total Traffic Delay: 9.3 pcuHr
D
1
1
2
C
Arm 3 - Harry Reynolds Rd
Arm 5 -
1

Full Input Data And Results

Network Results

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**65.4%**
Junction 12	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**65.4%**
1/1+1/2	Drogheda Road Right Ahead	U+O	N/A	N/A	B	C	1	43	18	672	1945:1853	801+226	65.4 : 65.4%
2/1	Drogheda Road (S) Ahead Left	U	N/A	N/A	B		1	43	-	403	2048	1001	40.2%
3/1	Harry Reynolds Rd Left Right	U	N/A	N/A	D		1	19	-	259	1821	405	64.0%
4/1		U	N/A	N/A	-		-	-	-	392	Inf	Inf	0.0%
5/1		U	N/A	N/A	-		-	-	-	261	Inf	Inf	0.0%
6/1		U	N/A	N/A	-		-	-	-	681	Inf	Inf	0.0%

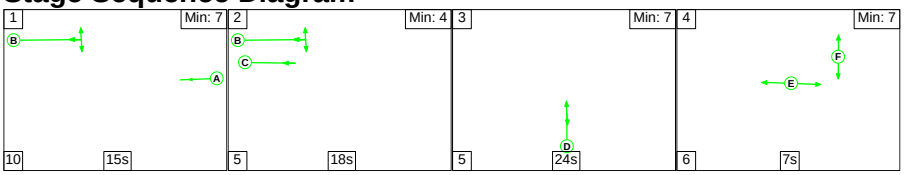
Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network	**-**	**-**	**148**	**0**	**0**	**6.9**	**2.2**	**0.3**	**9.3**	**-**	**-**	**-**	**-**
Junction 12	**-**	**-**	**148**	**0**	**0**	**6.9**	**2.2**	**0.3**	**9.3**	**-**	**-**	**-**	**-**
1/1+1/2	672	672	148	0	0	3.0	0.9	0.3	4.2	22.4	10.3	0.9	11.3
2/1	403	403	-	-	-	1.6	0.3	-	2.0	17.6	6.4	0.3	6.7
3/1	259	259	-	-	-	2.3	0.9	-	3.2	44.0	5.8	0.9	6.7
4/1	392	392	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
5/1	261	261	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	681	681	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0

C1 PRC for Signalled Lanes (%): 37.5 Total Delay for Signalled Lanes (pcuHr): 9.32 Cycle Time (s): 90
PRC Over All Lanes (%): 37.5 Total Delay Over All Lanes(pcuHr): 9.32

Full Input Data And Results

Scenario 4: '2025 Base + CD + Malincross PM' (FG4: '2025 Base + CD + Malincross PM', Plan 1: 'Network Control Plan 1')

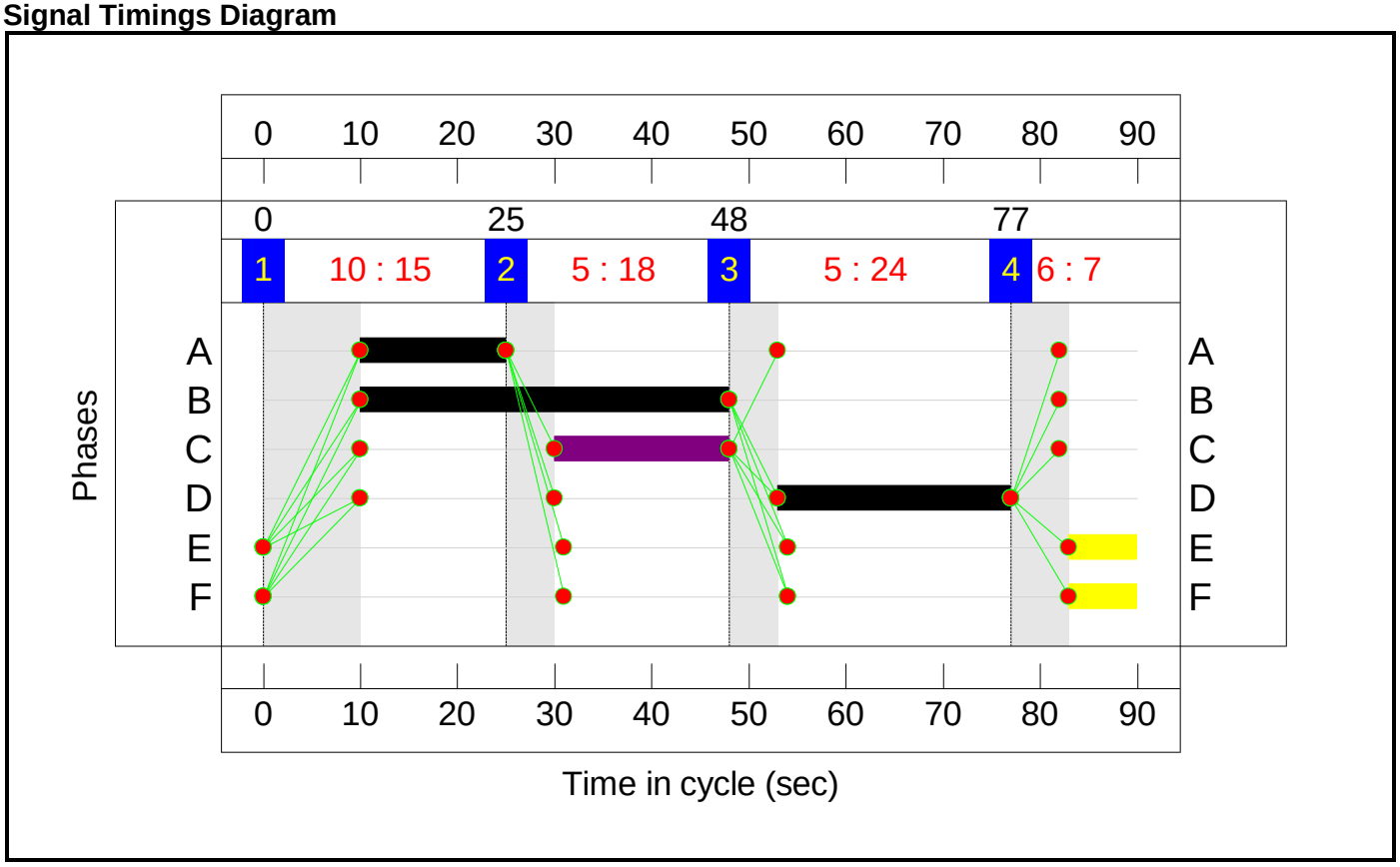
Stage Sequence Diagram



Stage Timings

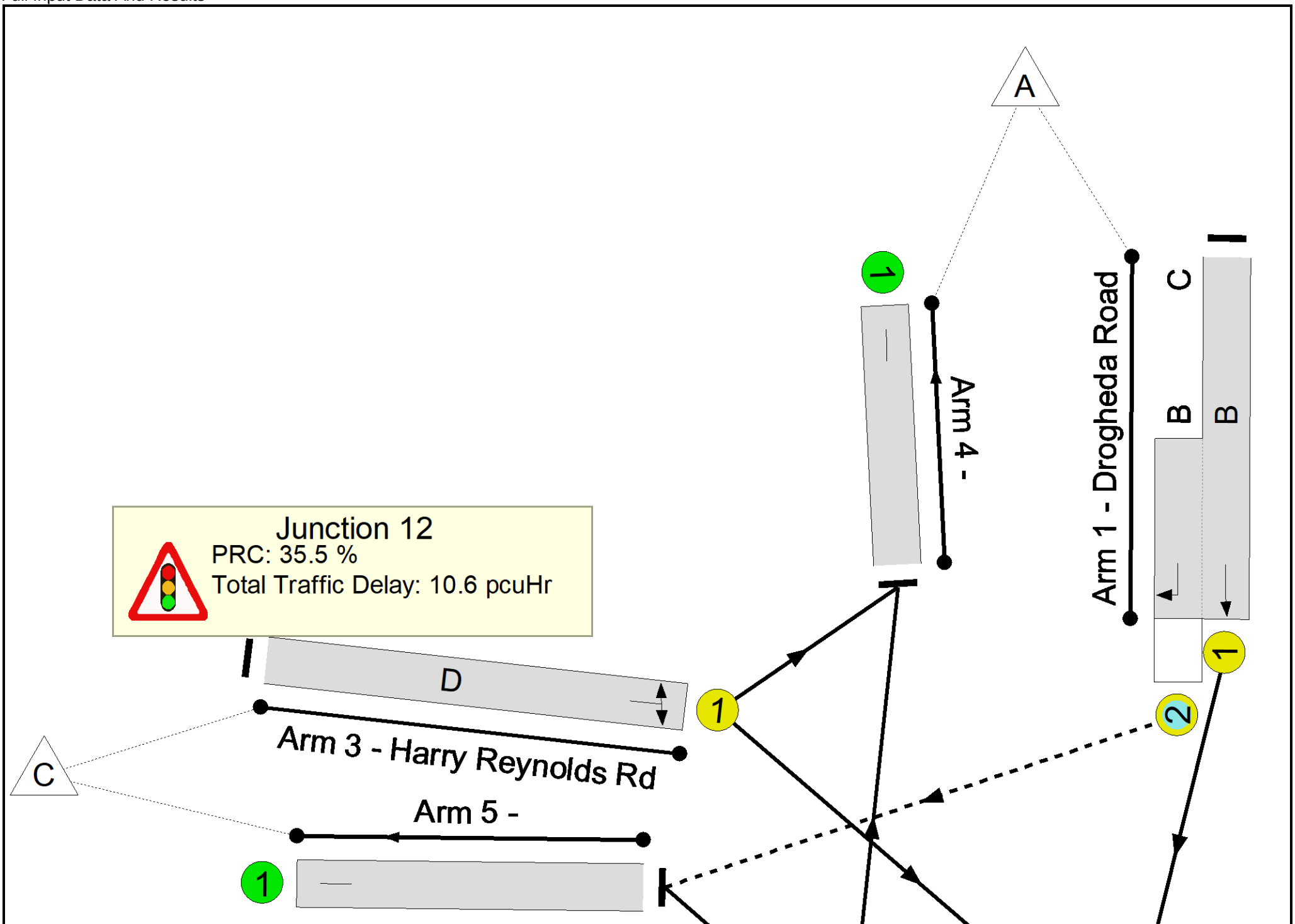
Stage	1	2	3	4
Duration	15	18	24	7
Change Point	0	25	48	77

Signal Timings Diagram



Full Input Data And Results

Network Layout Diagram


A
1
Arm 4 -
Arm 1 - Drogheda Road
C
B
B
Junction 12
PRC: 35.5 %
Total Traffic Delay: 10.6 pcuHr
D
1
1
2
C
Arm 3 - Harry Reynolds Rd
Arm 5 -
1

Full Input Data And Results

Network Results

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**66.4%**
Junction 12	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**66.4%**
1/1+1/2	Drogheda Road Right Ahead	U+O	N/A	N/A	B	C	1	38	18	425	1945:1853	740+169	46.8 : 46.8%
2/1	Drogheda Road (S) Ahead Left	U	N/A	N/A	B		1	38	-	589	2046	887	66.4%
3/1	Harry Reynolds Rd Left Right	U	N/A	N/A	D		1	24	-	327	1816	504	64.8%
4/1		U	N/A	N/A	-		-	-	-	583	Inf	Inf	0.0%
5/1		U	N/A	N/A	-		-	-	-	249	Inf	Inf	0.0%
6/1		U	N/A	N/A	-		-	-	-	509	Inf	Inf	0.0%

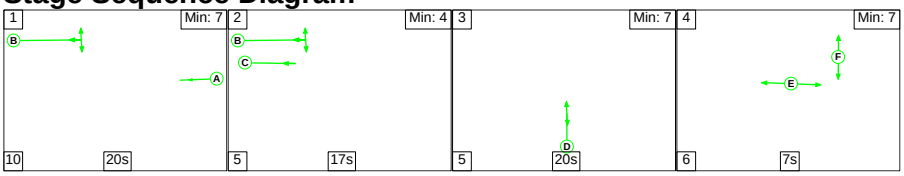
Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network	**-**	**-**	**79**	**0**	**0**	**7.9**	**2.3**	**0.4**	**10.6**	**-**	**-**	**-**	**-**
Junction 12	**-**	**-**	**79**	**0**	**0**	**7.9**	**2.3**	**0.4**	**10.6**	**-**	**-**	**-**	**-**
1/1+1/2	425	425	79	0	0	2.0	0.4	0.4	2.8	24.0	6.0	0.4	6.4
2/1	589	589	-	-	-	3.3	1.0	-	4.3	26.3	11.6	1.0	12.6
3/1	327	327	-	-	-	2.6	0.9	-	3.5	38.7	7.2	0.9	8.1
4/1	583	583	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
5/1	249	249	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	509	509	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0

C1 PRC for Signalled Lanes (%): 35.5 Total Delay for Signalled Lanes (pcuHr): 10.65 Cycle Time (s): 90
PRC Over All Lanes (%): 35.5 Total Delay Over All Lanes(pcuHr): 10.65

Full Input Data And Results

Scenario 5: '2040 Base + CD AM' (FG5: '2040 Base + CD AM', Plan 1: 'Network Control Plan 1')

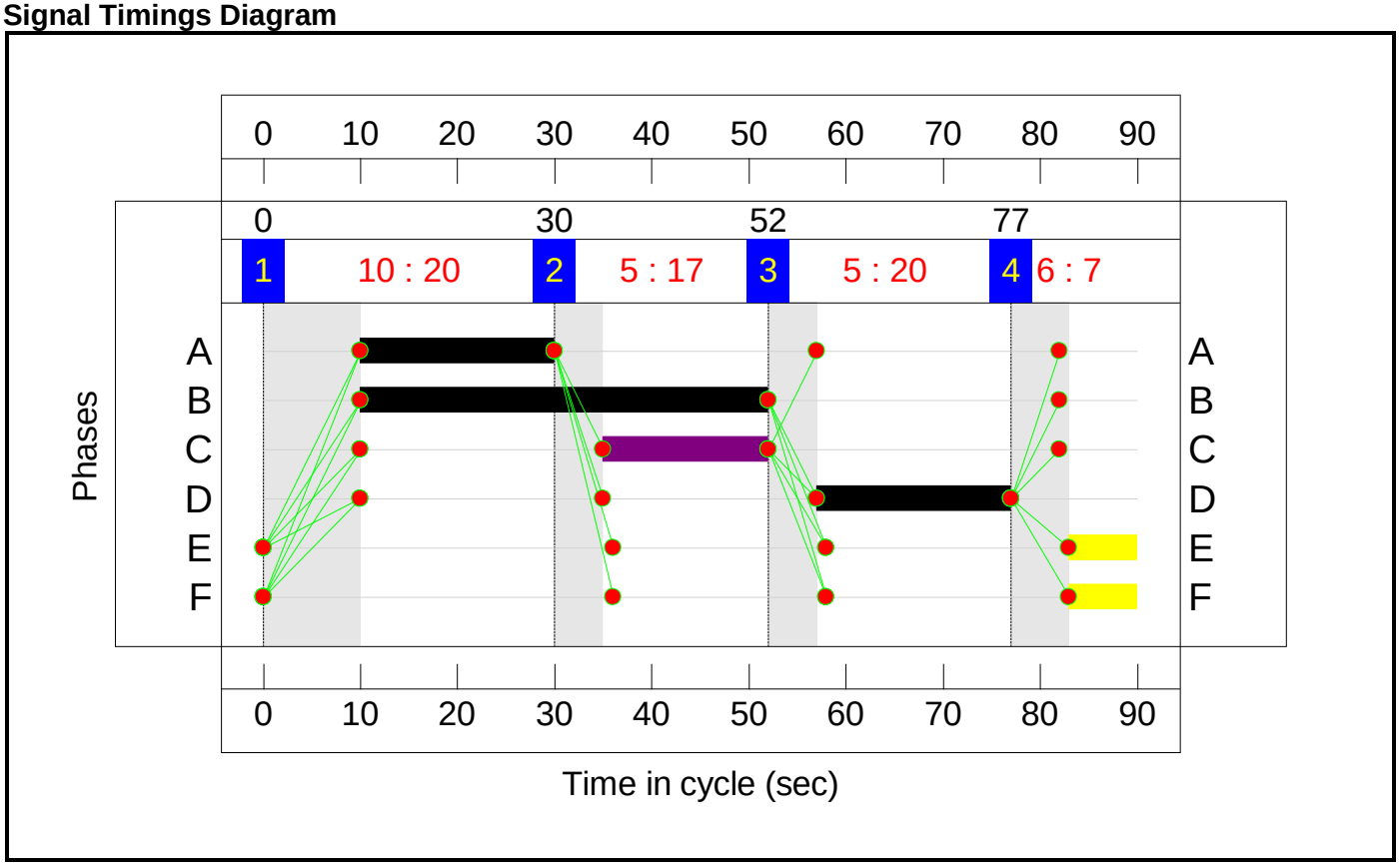
Stage Sequence Diagram



Stage Timings

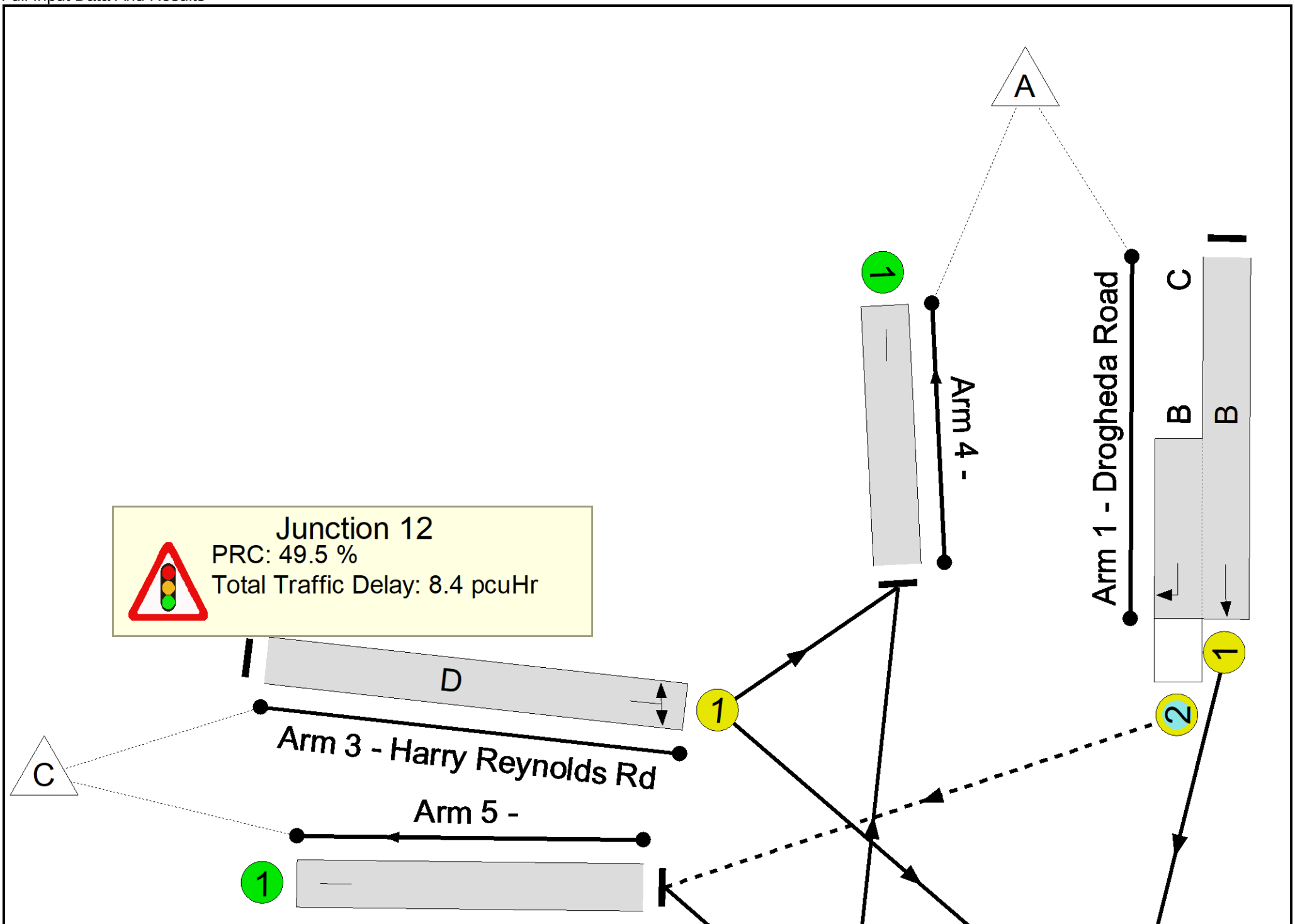
Stage	1	2	3	4
Duration	20	17	20	7
Change Point	0	30	52	77

Signal Timings Diagram



Full Input Data And Results

Network Layout Diagram


A
1
Arm 4 -
Arm 1 - Drogheda Road
C
B
B
Junction 12
PRC: 49.5 %
Total Traffic Delay: 8.4 pcuHr
D
1
1
2
Arm 3 - Harry Reynolds Rd
C
Arm 5 -
1

Full Input Data And Results

Network Results

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**60.2%**
Junction 12	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**60.2%**
1/1+1/2	Drogheda Road Right Ahead	U+O	N/A	N/A	B	C	1	42	17	605	1945:1853	786+219	60.2 : 60.2%
2/1	Drogheda Road (S) Ahead Left	U	N/A	N/A	B		1	42	-	369	2045	977	37.8%
3/1	Harry Reynolds Rd Left Right	U	N/A	N/A	D		1	20	-	253	1822	425	59.5%
4/1		U	N/A	N/A	-		-	-	-	353	Inf	Inf	0.0%
5/1		U	N/A	N/A	-		-	-	-	240	Inf	Inf	0.0%
6/1		U	N/A	N/A	-		-	-	-	634	Inf	Inf	0.0%

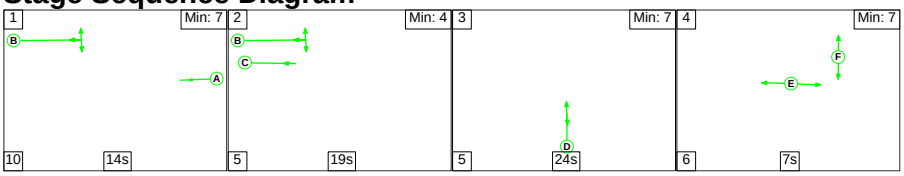
Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network	**-**	**-**	**132**	**0**	**0**	**6.4**	**1.8**	**0.2**	**8.4**	**-**	**-**	**-**	**-**
Junction 12	**-**	**-**	**132**	**0**	**0**	**6.4**	**1.8**	**0.2**	**8.4**	**-**	**-**	**-**	**-**
1/1+1/2	605	605	132	0	0	2.7	0.8	0.2	3.7	21.8	8.8	0.8	9.6
2/1	369	369	-	-	-	1.5	0.3	-	1.8	17.9	5.8	0.3	6.1
3/1	253	253	-	-	-	2.2	0.7	-	2.9	41.1	5.6	0.7	6.4
4/1	353	353	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
5/1	240	240	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	634	634	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0

C1 PRC for Signalled Lanes (%): 49.5 Total Delay for Signalled Lanes (pcuHr): 8.39 Cycle Time (s): 90
PRC Over All Lanes (%): 49.5 Total Delay Over All Lanes(pcuHr): 8.39

Full Input Data And Results

Scenario 6: '2040 Base + CD PM' (FG6: '2040 Base + CD PM', Plan 1: 'Network Control Plan 1')

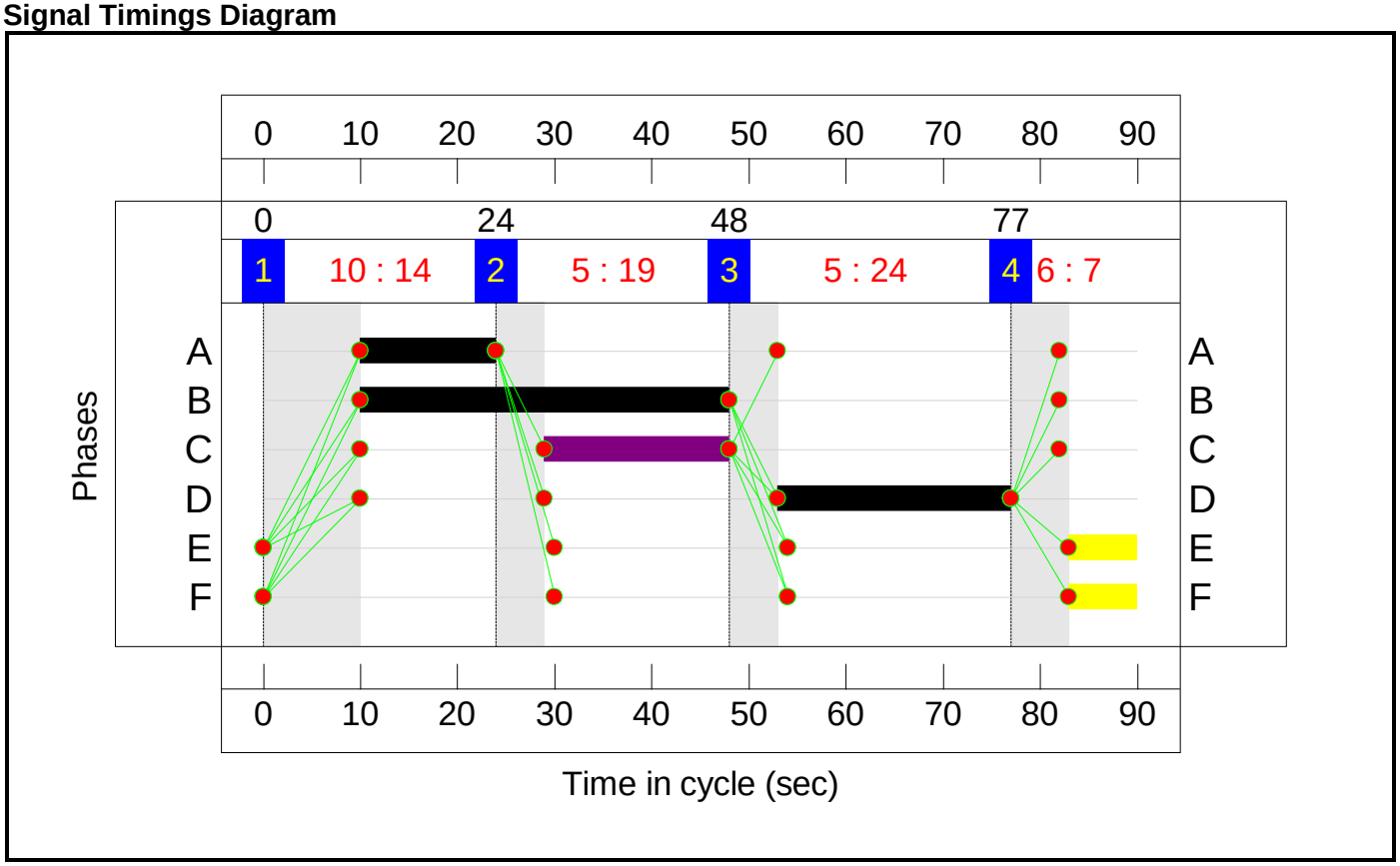
Stage Sequence Diagram



Stage Timings

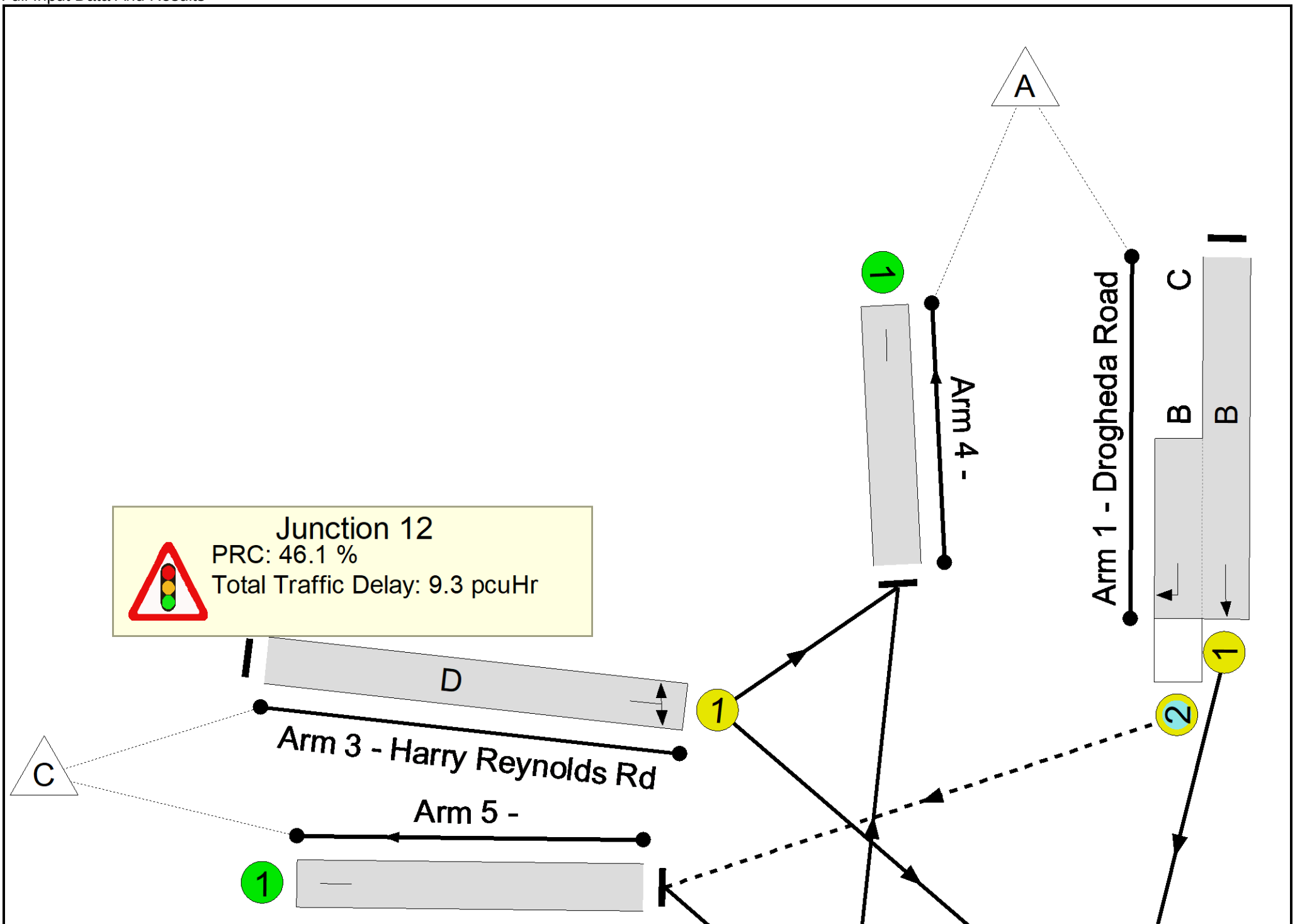
Stage	1	2	3	4
Duration	14	19	24	7
Change Point	0	24	48	77

Signal Timings Diagram



Full Input Data And Results

Network Layout Diagram


A
1
Arm 4 -
Arm 1 - Drogheda Road
C
B
B
Junction 12
PRC: 46.1 %
Total Traffic Delay: 9.3 pcuHr
D
1
1
2
Arm 3 - Harry Reynolds Rd
C
Arm 5 -
1

Full Input Data And Results

Network Results

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**61.6%**
Junction 12	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**61.6%**
1/1+1/2	Drogheda Road Right Ahead	U+O	N/A	N/A	B	C	1	38	19	380	1945:1853	741+167	41.9 : 41.9%
2/1	Drogheda Road (S) Ahead Left	U	N/A	N/A	B		1	38	-	545	2041	884	61.6%
3/1	Harry Reynolds Rd Left Right	U	N/A	N/A	D		1	24	-	303	1817	505	60.0%
4/1		U	N/A	N/A	-		-	-	-	522	Inf	Inf	0.0%
5/1		U	N/A	N/A	-		-	-	-	240	Inf	Inf	0.0%
6/1		U	N/A	N/A	-		-	-	-	466	Inf	Inf	0.0%

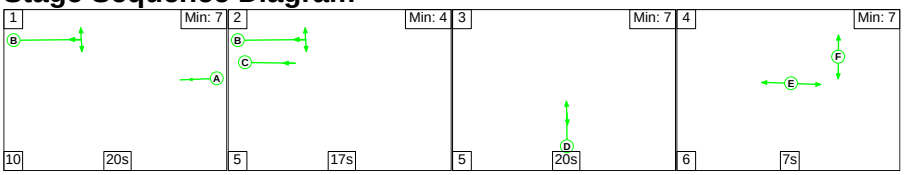
Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network	**-**	**-**	**70**	**0**	**0**	**7.1**	**1.9**	**0.3**	**9.3**	**-**	**-**	**-**	**-**
Junction 12	**-**	**-**	**70**	**0**	**0**	**7.1**	**1.9**	**0.3**	**9.3**	**-**	**-**	**-**	**-**
1/1+1/2	380	380	70	0	0	1.8	0.4	0.3	2.4	22.9	5.2	0.4	5.5
2/1	545	545	-	-	-	3.0	0.8	-	3.8	25.0	10.4	0.8	11.2
3/1	303	303	-	-	-	2.4	0.7	-	3.1	37.0	6.6	0.7	7.3
4/1	522	522	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
5/1	240	240	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	466	466	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0

C1 PRC for Signalled Lanes (%): 46.1 Total Delay for Signalled Lanes (pcuHr): 9.32 Cycle Time (s): 90
PRC Over All Lanes (%): 46.1 Total Delay Over All Lanes(pcuHr): 9.32

Full Input Data And Results

Scenario 7: '2040 Base + CD + Malincross AM' (FG7: '2040 Base + CD + Malincross AM', Plan 1: 'Network Control Plan 1')

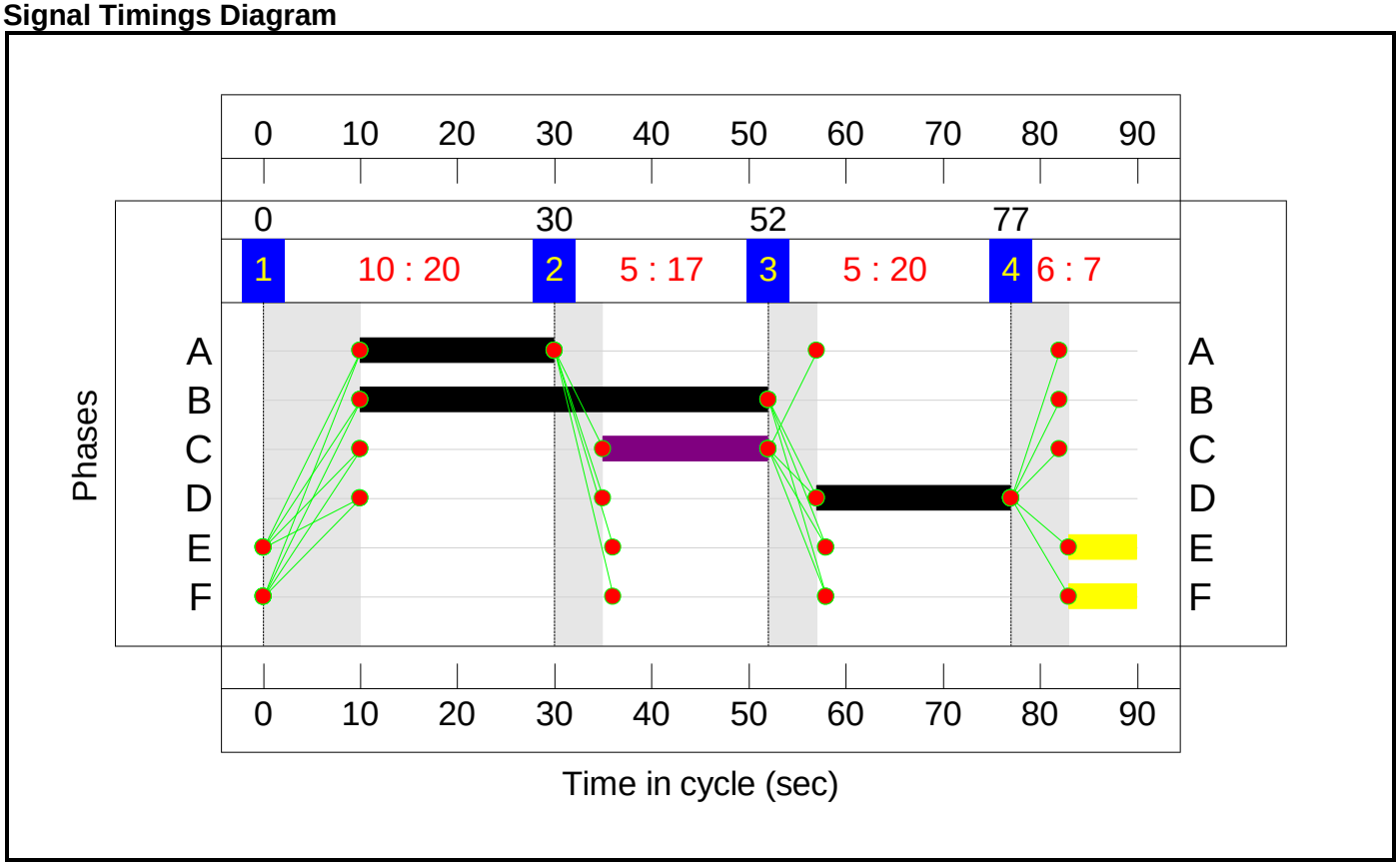
Stage Sequence Diagram



Stage Timings

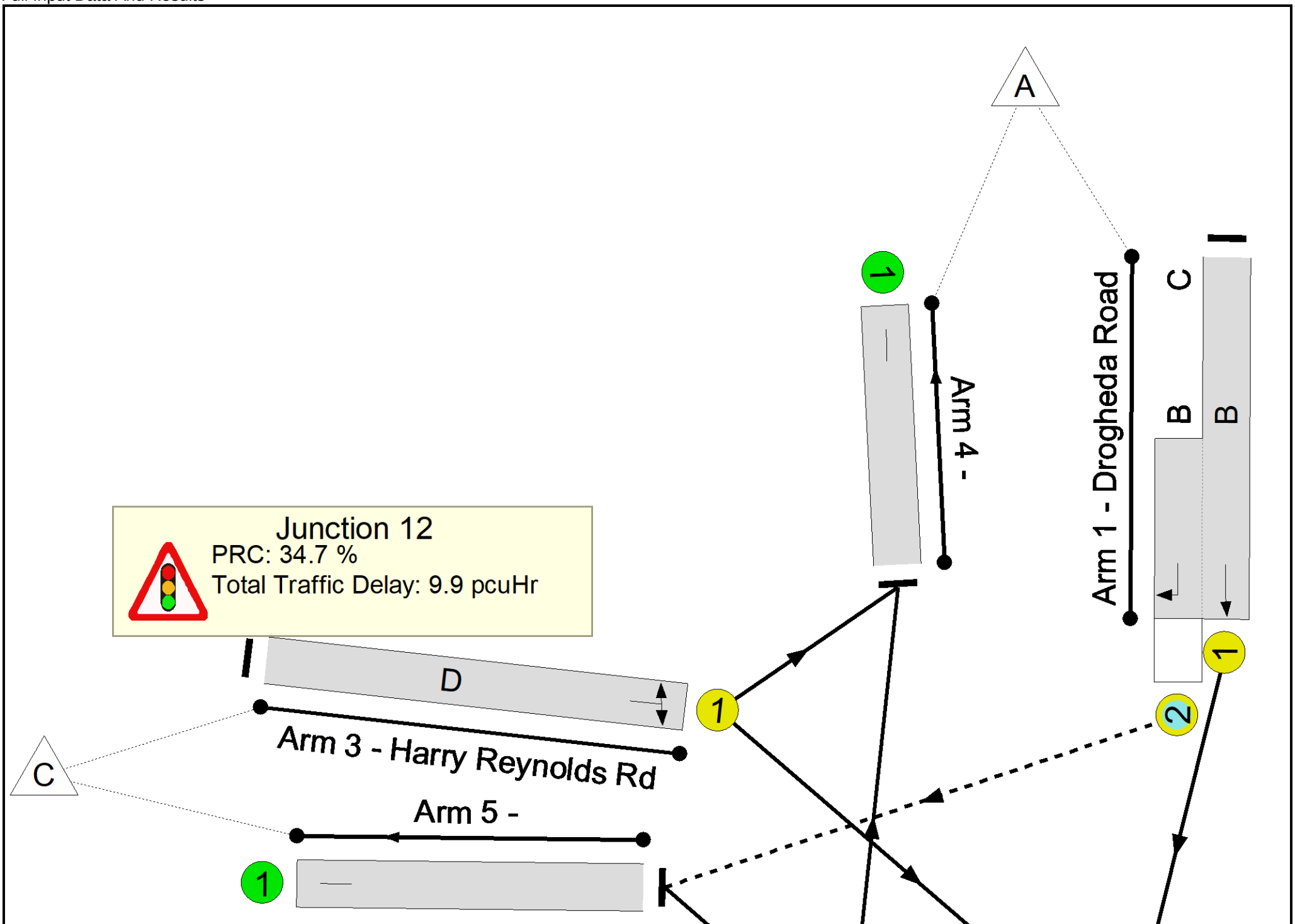
Stage	1	2	3	4
Duration	20	17	20	7
Change Point	0	30	52	77

Signal Timings Diagram



Full Input Data And Results

Network Layout Diagram


A
1
Arm 4 -
Arm 1 - Drogheda Road
C
B
B
Junction 12
PRC: 34.7 %
Total Traffic Delay: 9.9 pcuHr
D
1
1
2
Arm 3 - Harry Reynolds Rd
C
Arm 5 -
1

Full Input Data And Results

Network Results

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**66.8%**
Junction 12	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**66.8%**
1/1+1/2	Drogheda Road Right Ahead	U+O	N/A	N/A	B	C	1	42	17	672	1945:1853	784+221	66.8 : 66.8%
2/1	Drogheda Road (S) Ahead Left	U	N/A	N/A	B		1	42	-	409	2045	977	41.9%
3/1	Harry Reynolds Rd Left Right	U	N/A	N/A	D		1	20	-	280	1822	425	65.9%
4/1		U	N/A	N/A	-		-	-	-	392	Inf	Inf	0.0%
5/1		U	N/A	N/A	-		-	-	-	267	Inf	Inf	0.0%
6/1		U	N/A	N/A	-		-	-	-	702	Inf	Inf	0.0%

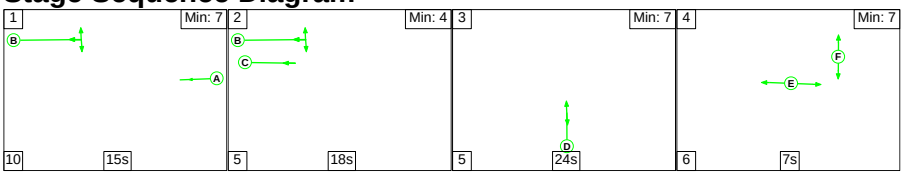
Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network	**-**	**-**	**148**	**0**	**0**	**7.3**	**2.3**	**0.3**	**9.9**	**-**	**-**	**-**	**-**
Junction 12	**-**	**-**	**148**	**0**	**0**	**7.3**	**2.3**	**0.3**	**9.9**	**-**	**-**	**-**	**-**
1/1+1/2	672	672	148	0	0	3.1	1.0	0.3	4.4	23.5	10.7	1.0	11.7
2/1	409	409	-	-	-	1.7	0.4	-	2.1	18.5	6.6	0.4	6.9
3/1	280	280	-	-	-	2.4	1.0	-	3.4	43.5	6.3	1.0	7.3
4/1	392	392	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
5/1	267	267	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	702	702	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0

C1 PRC for Signalled Lanes (%): 34.7 Total Delay for Signalled Lanes (pcuHr): 9.88 Cycle Time (s): 90
PRC Over All Lanes (%): 34.7 Total Delay Over All Lanes(pcuHr): 9.88

Full Input Data And Results

Scenario 8: '2040 Base + CD + Malincross PM' (FG8: '2040 Base + CD + Malincross PM', Plan 1: 'Network Control Plan 1')

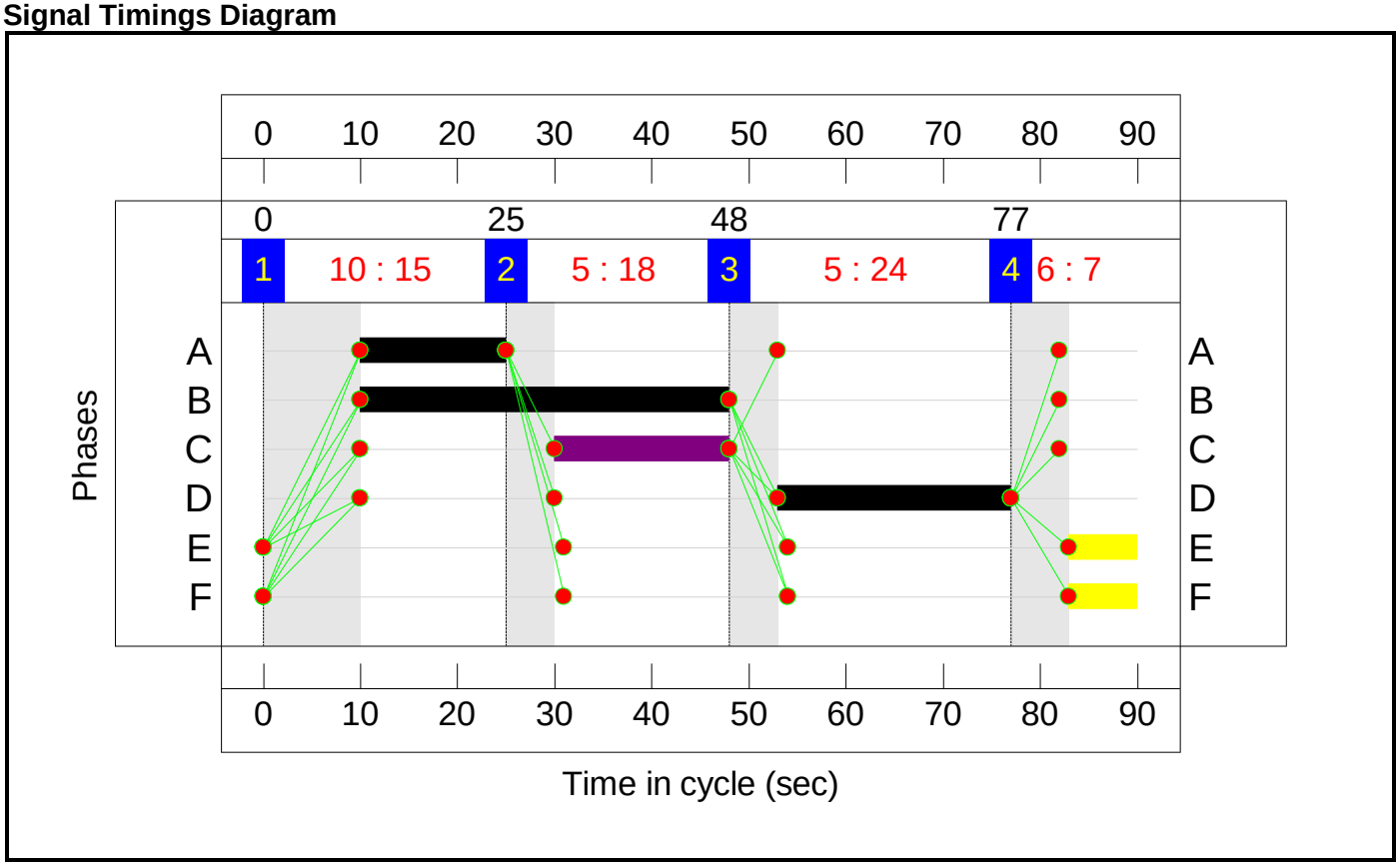
Stage Sequence Diagram



Stage Timings

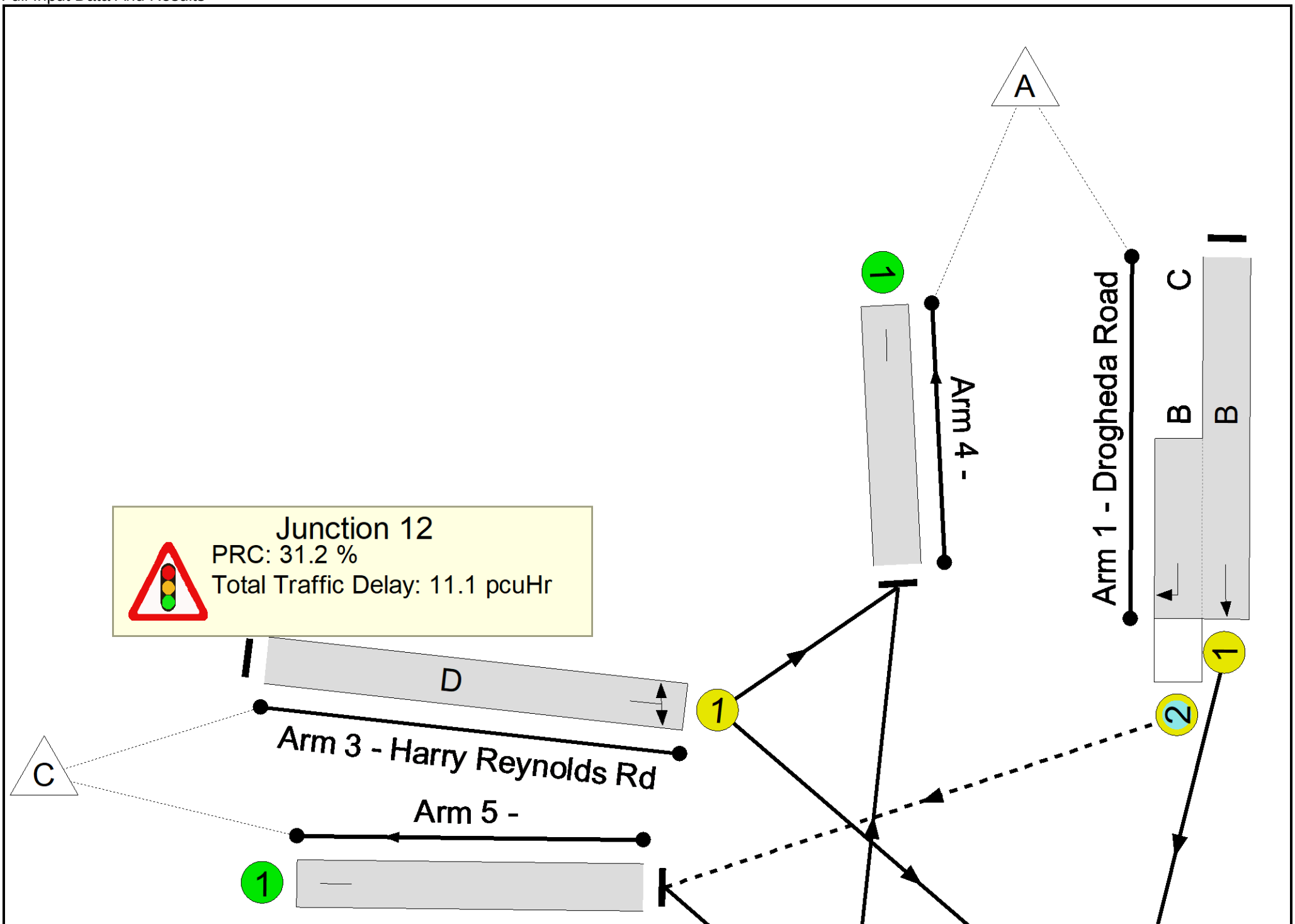
Stage	1	2	3	4
Duration	15	18	24	7
Change Point	0	25	48	77

Signal Timings Diagram



Full Input Data And Results

Network Layout Diagram


A
1
Arm 4 -
Arm 1 - Drogheda Road
C
B
B
Junction 12
PRC: 31.2 %
Total Traffic Delay: 11.1 pcuHr
D
1
1
2
C
Arm 3 - Harry Reynolds Rd
Arm 5 -
1

Full Input Data And Results

Network Results

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**68.6%**
Junction 12	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**68.6%**
1/1+1/2	Drogheda Road Right Ahead	U+O	N/A	N/A	B	C	1	38	18	425	1945:1853	740+169	46.8 : 46.8%
2/1	Drogheda Road (S) Ahead Left	U	N/A	N/A	B		1	38	-	607	2042	885	68.6%
3/1	Harry Reynolds Rd Left Right	U	N/A	N/A	D		1	24	-	338	1817	505	67.0%
4/1		U	N/A	N/A	-		-	-	-	583	Inf	Inf	0.0%
5/1		U	N/A	N/A	-		-	-	-	267	Inf	Inf	0.0%
6/1		U	N/A	N/A	-		-	-	-	520	Inf	Inf	0.0%

Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network	**-**	**-**	**79**	**0**	**0**	**8.2**	**2.5**	**0.4**	**11.1**	**-**	**-**	**-**	**-**
Junction 12	**-**	**-**	**79**	**0**	**0**	**8.2**	**2.5**	**0.4**	**11.1**	**-**	**-**	**-**	**-**
1/1+1/2	425	425	79	0	0	2.0	0.4	0.4	2.9	24.2	6.0	0.4	6.4
2/1	607	607	-	-	-	3.5	1.1	-	4.6	27.0	12.1	1.1	13.2
3/1	338	338	-	-	-	2.7	1.0	-	3.7	39.5	7.4	1.0	8.4
4/1	583	583	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
5/1	267	267	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	520	520	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0

C1 PRC for Signalled Lanes (%): 31.2 Total Delay for Signalled Lanes (pcuHr): 11.11 Cycle Time (s): 90
PRC Over All Lanes (%): 31.2 Total Delay Over All Lanes(pcuHr): 11.11

APPENDIX S

LINSIG Output (Junction 13)

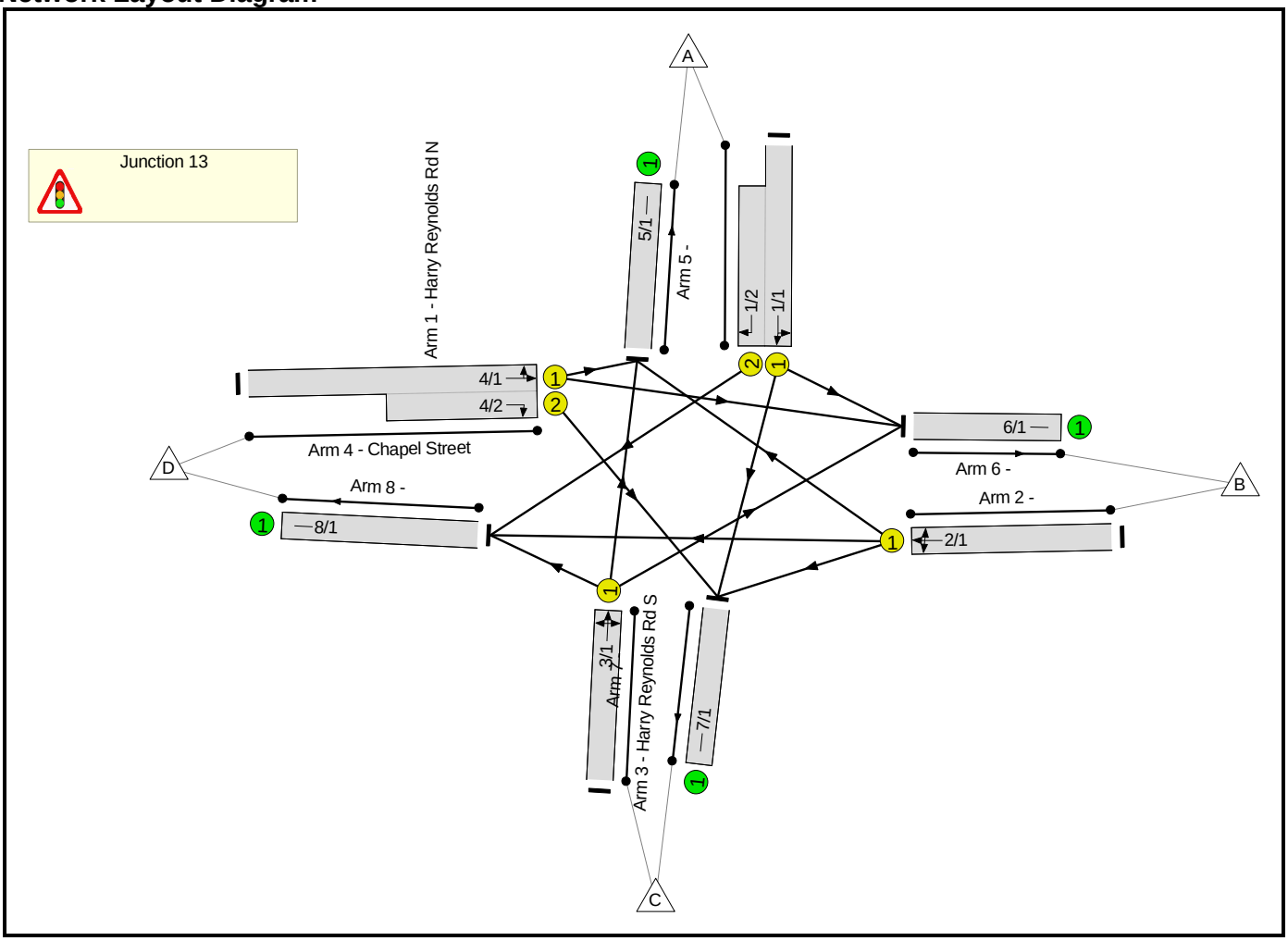
DRAFT

Full Input Data And Results

User and Project Details

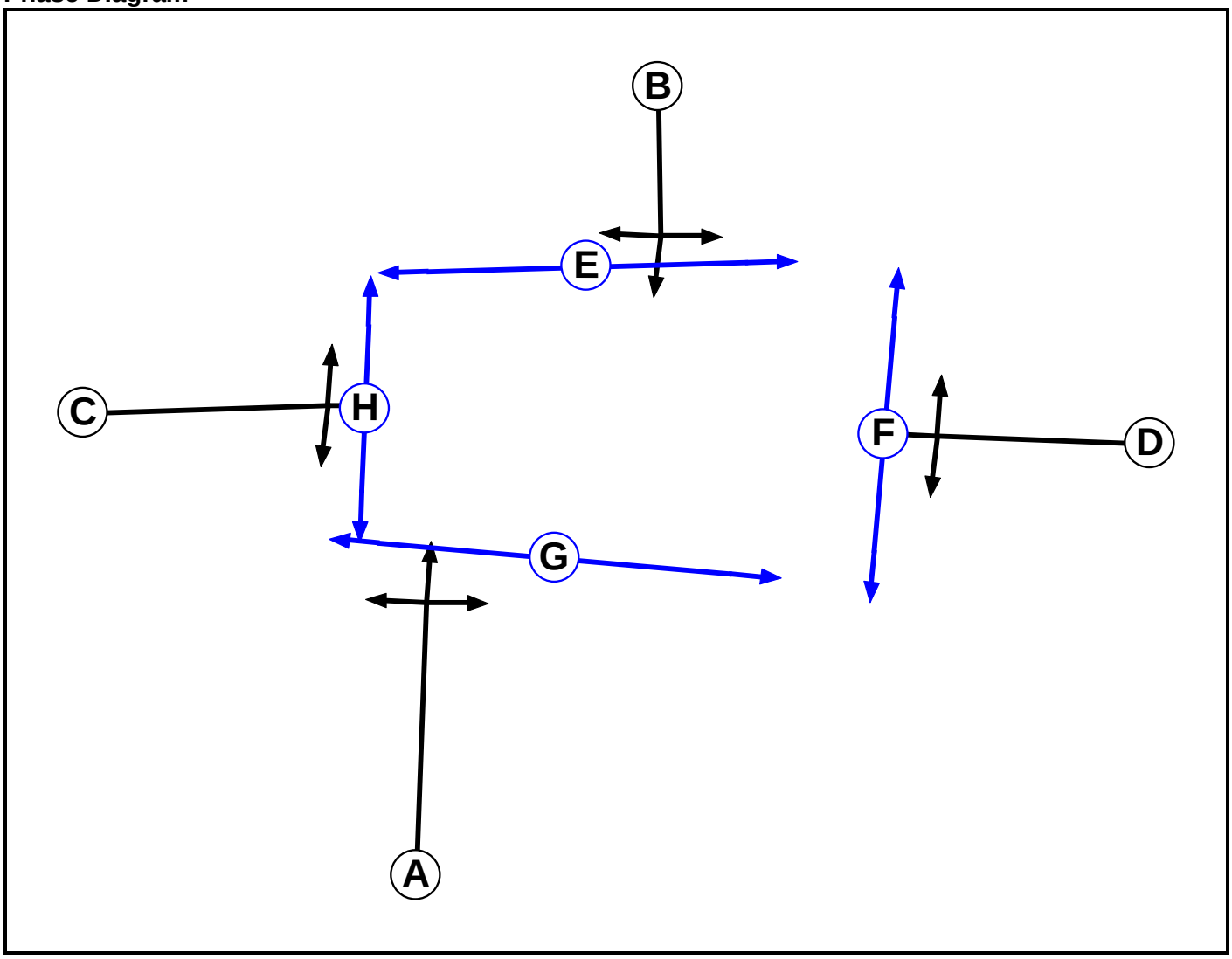
Project:	
Title:	
Location:	
Additional detail:	
File name:	JUNCTION 13.lsg3x
Author:	
Company:	
Address:	

Network Layout Diagram



Full Input Data And Results

Phase Diagram



Phase Input Data

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

Full Input Data And Results

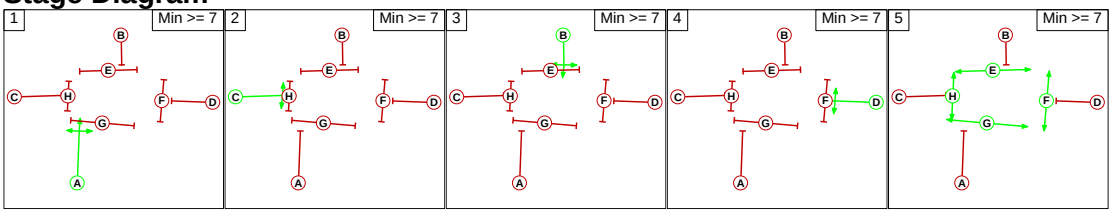
Phase Intergreens Matrix

Terminating Phase	Starting Phase								
		A	B	C	D	E	F	G	H
	A		5	5	5	6	6	6	6
	B	5		5	5	6	6	6	6
	C	5	5		5	6	6	6	6
	D	5	5	5		6	6	6	6
	E	15	15	15	15		-	-	-
	F	15	15	15	15	-		-	-
	G	15	15	15	15	-	-		-
	H	15	15	15	15	-	-	-	

Phases in Stage

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

Stage Diagram



Phase Delays

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

Prohibited Stage Change

From Stage	To Stage					
		1	2	3	4	5
	1		5	5	5	6
	2	5		5	5	6
	3	5	5		5	6
	4	5	5	5		6
	5	15	15	15	15	

Full Input Data And Results

Give-Way Lane Input Data

Junction: Junction 13
There are no Opposed Lanes in this Junction

Full Input Data And Results

Lane Input Data

Junction: Junction 13												
Lane	**Lane Type**	**Phases**	**Start Disp.**	**End Disp.**	**Physical Length (PCU)**	**Sat Flow Type**	**Def User Saturation Flow (PCU/Hr)**	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Turns**	**Turning Radius (m)**
1/1 (Harry Reynolds Rd N)	U	B	2	3	60.0	Geom	-	3.00	0.00	Y	Arm 6 Left	6.00
											Arm 7 Ahead	Inf
1/2 (Harry Reynolds Rd N)	U	B	2	3	11.0	Geom	-	3.00	0.00	N	Arm 8 Right	14.00
2/1	U	D	2	3	60.0	Geom	-	2.60	0.00	Y	Arm 5 Right	15.00
											Arm 7 Left	6.00
											Arm 8 Ahead	Inf
											Arm 5 Ahead	Inf
3/1 (Harry Reynolds Rd S)	U	A	2	3	60.0	Geom	-	3.75	0.00	Y	Arm 6 Right	6.00
											Arm 8 Left	6.00
4/1 (Chapel Street)	U	C	2	3	60.0	Geom	-	3.00	0.00	Y	Arm 5 Left	12.00
											Arm 6 Ahead	Inf
4/2 (Chapel Street)	U	C	2	3	8.5	Geom	-	3.00	0.00	N	Arm 7 Right	10.00
5/1	U		2	3	60.0	Inf	-	-	-	-	-	-
6/1	U		2	3	60.0	Inf	-	-	-	-	-	-
7/1	U		2	3	60.0	Inf	-	-	-	-	-	-
8/1	U		2	3	60.0	Inf	-	-	-	-	-	-

Traffic Flow Groups

Flow Group	Start Time	End Time	Duration	Formula
1: '2025 Base + CD AM'	08:00	09:00	01:00	
2: '2025 Base + CD PM'	17:00	18:00	01:00	
3: '2025 Base + CD + Malincross AM'	08:00	09:00	01:00	
4: '2025 Base + CD + Malincross PM'	17:00	18:00	01:00	
5: '2040 Base + CD AM'	08:00	09:00	01:00	
6: '2040 Base + CD PM'	17:00	18:00	01:00	
7: '2040 Base + CD + Malincross AM'	08:00	09:00	01:00	
8: '2040 Base + CD + Malincross PM'	17:00	18:00	01:00	

Scenario 1: '2025 Base + CD AM' (FG1: '2025 Base + CD AM', Plan 1: 'Network Control Plan 1')

Traffic Flows, Desired

Desired Flow :

		Destination				
		A	B	C	D	Tot.
Origin	A	0	54	294	277	625
	B	16	0	26	157	199
	C	142	4	0	40	186
	D	99	222	74	0	395
	Tot.	257	280	394	474	1405

Traffic Lane Flows

Lane	Scenario 1: 2025 Base + CD AM
Junction: Junction 13	
1/1 (with short)	625(In) 348(Out)
1/2 (short)	277
2/1	199
3/1	186
4/1 (with short)	395(In) 321(Out)
4/2 (short)	74
5/1	257
6/1	280
7/1	394
8/1	474

Full Input Data And Results

Lane Saturation Flows

Junction: Junction 13								
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat Flow (PCU/Hr)**	**Flared Sat Flow (PCU/Hr)**
1/1 (Harry Reynolds Rd N)	3.00	0.00	Y	Arm 6 Left	6.00	15.5 %	1843	1843
				Arm 7 Ahead	Inf	84.5 %		
1/2 (Harry Reynolds Rd N)	3.00	0.00	N	Arm 8 Right	14.00	100.0 %	1856	1856
2/1	2.60	0.00	Y	Arm 5 Right	15.00	8.0 %	1802	1802
				Arm 7 Left	6.00	13.1 %		
				Arm 8 Ahead	Inf	78.9 %		
3/1 (Harry Reynolds Rd S)	3.75	0.00	Y	Arm 5 Ahead	Inf	76.3 %	1879	1879
				Arm 6 Right	6.00	2.2 %		
				Arm 8 Left	6.00	21.5 %		
4/1 (Chapel Street)	3.00	0.00	Y	Arm 5 Left	12.00	30.8 %	1844	1844
				Arm 6 Ahead	Inf	69.2 %		
4/2 (Chapel Street)	3.00	0.00	N	Arm 7 Right	10.00	100.0 %	1787	1787
5/1	Infinite Saturation Flow						Inf	Inf
6/1	Infinite Saturation Flow						Inf	Inf
7/1	Infinite Saturation Flow						Inf	Inf
8/1	Infinite Saturation Flow						Inf	Inf

Scenario 2: '2025 Base + CD PM' (FG2: '2025 Base + CD PM', Plan 1: 'Network Control Plan 1')

Traffic Flows, Desired

Desired Flow :

		Destination				
		A	B	C	D	Tot.
Origin	A	0	29	92	123	244
	B	41	0	8	124	173
	C	213	15	0	104	332
	D	228	184	60	0	472
	Tot.	482	228	160	351	1221

Full Input Data And Results

Traffic Lane Flows

Lane	Scenario 2: 2025 Base + CD PM
Junction: Junction 13	
1/1 (with short)	244(In) 121(Out)
1/2 (short)	123
2/1	173
3/1	332
4/1 (with short)	472(In) 412(Out)
4/2 (short)	60
5/1	482
6/1	228
7/1	160
8/1	351

Lane Saturation Flows

Junction: Junction 13								
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat Flow (PCU/Hr)**	**Flared Sat Flow (PCU/Hr)**
1/1 (Harry Reynolds Rd N)	3.00	0.00	Y	Arm 6 Left	6.00	24.0 %	1807	1807
				Arm 7 Ahead	Inf	76.0 %		
1/2 (Harry Reynolds Rd N)	3.00	0.00	N	Arm 8 Right	14.00	100.0 %	1856	1856
2/1	2.60	0.00	Y	Arm 5 Right	15.00	23.7 %	1811	1811
				Arm 7 Left	6.00	4.6 %		
				Arm 8 Ahead	Inf	71.7 %		
3/1 (Harry Reynolds Rd S)	3.75	0.00	Y	Arm 5 Ahead	Inf	64.2 %	1826	1826
				Arm 6 Right	6.00	4.5 %		
				Arm 8 Left	6.00	31.3 %		
4/1 (Chapel Street)	3.00	0.00	Y	Arm 5 Left	12.00	55.3 %	1791	1791
				Arm 6 Ahead	Inf	44.7 %		
4/2 (Chapel Street)	3.00	0.00	N	Arm 7 Right	10.00	100.0 %	1787	1787
5/1	Infinite Saturation Flow						Inf	Inf
6/1	Infinite Saturation Flow						Inf	Inf
7/1	Infinite Saturation Flow						Inf	Inf
8/1	Infinite Saturation Flow						Inf	Inf

Full Input Data And Results

Scenario 3: '2025 Base + CD + Malincross AM' (FG3: '2025 Base + CD + Malincross AM', Plan 1: 'Network Control Plan 1')

Traffic Flows, Desired

Desired Flow :

Origin	Destination					
		A	B	C	D	Tot.
	A	0	61	329	307	697
	B	18	0	29	174	221
	C	158	5	0	43	206
	D	109	243	80	0	432
	Tot.	285	309	438	524	1556

Traffic Lane Flows

Lane	Scenario 3: 2025 Base + CD + Malincross AM
Junction: Junction 13	
1/1 (with short)	697(In) 390(Out)
1/2 (short)	307
2/1	221
3/1	206
4/1 (with short)	432(In) 352(Out)
4/2 (short)	80
5/1	285
6/1	309
7/1	438
8/1	524

Full Input Data And Results

Lane Saturation Flows

Junction: Junction 13								
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat Flow (PCU/Hr)**	**Flared Sat Flow (PCU/Hr)**
1/1 (Harry Reynolds Rd N)	3.00	0.00	Y	Arm 6 Left	6.00	15.6 %	1843	1843
				Arm 7 Ahead	Inf	84.4 %		
1/2 (Harry Reynolds Rd N)	3.00	0.00	N	Arm 8 Right	14.00	100.0 %	1856	1856
2/1	2.60	0.00	Y	Arm 5 Right	15.00	8.1 %	1801	1801
				Arm 7 Left	6.00	13.1 %		
				Arm 8 Ahead	Inf	78.7 %		
3/1 (Harry Reynolds Rd S)	3.75	0.00	Y	Arm 5 Ahead	Inf	76.7 %	1880	1880
				Arm 6 Right	6.00	2.4 %		
				Arm 8 Left	6.00	20.9 %		
4/1 (Chapel Street)	3.00	0.00	Y	Arm 5 Left	12.00	31.0 %	1844	1844
				Arm 6 Ahead	Inf	69.0 %		
4/2 (Chapel Street)	3.00	0.00	N	Arm 7 Right	10.00	100.0 %	1787	1787
5/1	Infinite Saturation Flow						Inf	Inf
6/1	Infinite Saturation Flow						Inf	Inf
7/1	Infinite Saturation Flow						Inf	Inf
8/1	Infinite Saturation Flow						Inf	Inf

Scenario 4: '2025 Base + CD + Malincross PM' (FG4: '2025 Base + CD + Malincross PM', Plan 1: 'Network Control Plan 1')

Traffic Flows, Desired

Desired Flow :

		Destination				
		A	B	C	D	Tot.
Origin	A	0	33	103	136	272
	B	46	0	9	137	192
	C	239	17	0	114	370
	D	252	204	66	0	522
	Tot.	537	254	178	387	1356

Full Input Data And Results

Traffic Lane Flows

Lane	Scenario 4: 2025 Base + CD + Malincross PM
Junction: Junction 13	
1/1 (with short)	272(In) 136(Out)
1/2 (short)	136
2/1	192
3/1	370
4/1 (with short)	522(In) 456(Out)
4/2 (short)	66
5/1	537
6/1	254
7/1	178
8/1	387

Lane Saturation Flows

Junction: Junction 13								
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat Flow (PCU/Hr)**	**Flared Sat Flow (PCU/Hr)**
1/1 (Harry Reynolds Rd N)	3.00	0.00	Y	Arm 6 Left	6.00	24.3 %	1805	1805
				Arm 7 Ahead	Inf	75.7 %		
1/2 (Harry Reynolds Rd N)	3.00	0.00	N	Arm 8 Right	14.00	100.0 %	1856	1856
2/1	2.60	0.00	Y	Arm 5 Right	15.00	24.0 %	1810	1810
				Arm 7 Left	6.00	4.7 %		
				Arm 8 Ahead	Inf	71.4 %		
3/1 (Harry Reynolds Rd S)	3.75	0.00	Y	Arm 5 Ahead	Inf	64.6 %	1828	1828
				Arm 6 Right	6.00	4.6 %		
				Arm 8 Left	6.00	30.8 %		
4/1 (Chapel Street)	3.00	0.00	Y	Arm 5 Left	12.00	55.3 %	1791	1791
				Arm 6 Ahead	Inf	44.7 %		
4/2 (Chapel Street)	3.00	0.00	N	Arm 7 Right	10.00	100.0 %	1787	1787
5/1	Infinite Saturation Flow						Inf	Inf
6/1	Infinite Saturation Flow						Inf	Inf
7/1	Infinite Saturation Flow						Inf	Inf
8/1	Infinite Saturation Flow						Inf	Inf

Full Input Data And Results

Scenario 5: '2040 Base + CD AM' (FG5: '2040 Base + CD AM', Plan 1: 'Network Control Plan 1')

Traffic Flows, Desired

Desired Flow :

		Destination				
		A	B	C	D	Tot.
Origin	A	0	54	311	277	642
	B	16	0	26	164	206
	C	147	4	0	47	198
	D	99	244	96	0	439
	Tot.	262	302	433	488	1485

Traffic Lane Flows

Lane	Scenario 5: 2040 Base + CD AM
Junction: Junction 13	
1/1 (with short)	642(In) 365(Out)
1/2 (short)	277
2/1	206
3/1	198
4/1 (with short)	439(In) 343(Out)
4/2 (short)	96
5/1	262
6/1	302
7/1	433
8/1	488

Full Input Data And Results

Lane Saturation Flows

Junction: Junction 13								
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat Flow (PCU/Hr)**	**Flared Sat Flow (PCU/Hr)**
1/1 (Harry Reynolds Rd N)	3.00	0.00	Y	Arm 6 Left	6.00	14.8 %	1847	1847
				Arm 7 Ahead	Inf	85.2 %		
1/2 (Harry Reynolds Rd N)	3.00	0.00	N	Arm 8 Right	14.00	100.0 %	1856	1856
2/1	2.60	0.00	Y	Arm 5 Right	15.00	7.8 %	1804	1804
				Arm 7 Left	6.00	12.6 %		
				Arm 8 Ahead	Inf	79.6 %		
3/1 (Harry Reynolds Rd S)	3.75	0.00	Y	Arm 5 Ahead	Inf	74.2 %	1870	1870
				Arm 6 Right	6.00	2.0 %		
				Arm 8 Left	6.00	23.7 %		
4/1 (Chapel Street)	3.00	0.00	Y	Arm 5 Left	12.00	28.9 %	1848	1848
				Arm 6 Ahead	Inf	71.1 %		
4/2 (Chapel Street)	3.00	0.00	N	Arm 7 Right	10.00	100.0 %	1787	1787
5/1	Infinite Saturation Flow						Inf	Inf
6/1	Infinite Saturation Flow						Inf	Inf
7/1	Infinite Saturation Flow						Inf	Inf
8/1	Infinite Saturation Flow						Inf	Inf

Scenario 6: '2040 Base + CD PM' (FG6: '2040 Base + CD PM', Plan 1: 'Network Control Plan 1')

Traffic Flows, Desired

Desired Flow :

		Destination				
		A	B	C	D	Tot.
Origin	A	0	29	101	123	253
	B	41	0	8	137	186
	C	229	15	0	117	361
	D	228	197	73	0	498
	Tot.	498	241	182	377	1298

Full Input Data And Results

Traffic Lane Flows

Lane	Scenario 6: 2040 Base + CD PM
Junction: Junction 13	
1/1 (with short)	253(In) 130(Out)
1/2 (short)	123
2/1	186
3/1	361
4/1 (with short)	498(In) 425(Out)
4/2 (short)	73
5/1	498
6/1	241
7/1	182
8/1	377

Lane Saturation Flows

Junction: Junction 13								
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat Flow (PCU/Hr)**	**Flared Sat Flow (PCU/Hr)**
1/1 (Harry Reynolds Rd N)	3.00	0.00	Y	Arm 6 Left	6.00	22.3 %	1814	1814
				Arm 7 Ahead	Inf	77.7 %		
1/2 (Harry Reynolds Rd N)	3.00	0.00	N	Arm 8 Right	14.00	100.0 %	1856	1856
2/1	2.60	0.00	Y	Arm 5 Right	15.00	22.0 %	1815	1815
				Arm 7 Left	6.00	4.3 %		
				Arm 8 Ahead	Inf	73.7 %		
3/1 (Harry Reynolds Rd S)	3.75	0.00	Y	Arm 5 Ahead	Inf	63.4 %	1823	1823
				Arm 6 Right	6.00	4.2 %		
				Arm 8 Left	6.00	32.4 %		
4/1 (Chapel Street)	3.00	0.00	Y	Arm 5 Left	12.00	53.6 %	1795	1795
				Arm 6 Ahead	Inf	46.4 %		
4/2 (Chapel Street)	3.00	0.00	N	Arm 7 Right	10.00	100.0 %	1787	1787
5/1	Infinite Saturation Flow						Inf	Inf
6/1	Infinite Saturation Flow						Inf	Inf
7/1	Infinite Saturation Flow						Inf	Inf
8/1	Infinite Saturation Flow						Inf	Inf

Full Input Data And Results

Scenario 7: '2040 Base + CD + Malincross AM' (FG7: '2040 Base + CD + Malincross AM', Plan 1: 'Network Control Plan 1')

Traffic Flows, Desired

Desired Flow :

Origin	Destination					
		A	B	C	D	Tot.
	A	0	61	347	307	715
	B	18	0	29	181	228
	C	164	5	0	50	219
	D	109	265	102	0	476
	Tot.	291	331	478	538	1638

Traffic Lane Flows

Lane	Scenario 7: 2040 Base + CD + Malincross AM
Junction: Junction 13	
1/1 (with short)	715(In) 408(Out)
1/2 (short)	307
2/1	228
3/1	219
4/1 (with short)	476(In) 374(Out)
4/2 (short)	102
5/1	291
6/1	331
7/1	478
8/1	538

Full Input Data And Results

Lane Saturation Flows

Junction: Junction 13								
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat Flow (PCU/Hr)**	**Flared Sat Flow (PCU/Hr)**
1/1 (Harry Reynolds Rd N)	3.00	0.00	Y	Arm 6 Left	6.00	15.0 %	1846	1846
				Arm 7 Ahead	Inf	85.0 %		
1/2 (Harry Reynolds Rd N)	3.00	0.00	N	Arm 8 Right	14.00	100.0 %	1856	1856
2/1	2.60	0.00	Y	Arm 5 Right	15.00	7.9 %	1803	1803
				Arm 7 Left	6.00	12.7 %		
				Arm 8 Ahead	Inf	79.4 %		
3/1 (Harry Reynolds Rd S)	3.75	0.00	Y	Arm 5 Ahead	Inf	74.9 %	1872	1872
				Arm 6 Right	6.00	2.3 %		
				Arm 8 Left	6.00	22.8 %		
4/1 (Chapel Street)	3.00	0.00	Y	Arm 5 Left	12.00	29.1 %	1848	1848
				Arm 6 Ahead	Inf	70.9 %		
4/2 (Chapel Street)	3.00	0.00	N	Arm 7 Right	10.00	100.0 %	1787	1787
5/1	Infinite Saturation Flow						Inf	Inf
6/1	Infinite Saturation Flow						Inf	Inf
7/1	Infinite Saturation Flow						Inf	Inf
8/1	Infinite Saturation Flow						Inf	Inf

Scenario 8: '2040 Base + CD + Malincross PM' (FG8: '2040 Base + CD + Malincross PM', Plan 1: 'Network Control Plan 1')

Traffic Flows, Desired

Desired Flow :

		Destination				
		A	B	C	D	Tot.
Origin	A	0	33	113	136	282
	B	46	0	9	150	205
	C	255	17	0	127	399
	D	252	218	80	0	550
	Tot.	553	268	202	413	1436

Full Input Data And Results

Traffic Lane Flows

Lane	Scenario 8: 2040 Base + CD + Malincross PM
Junction: Junction 13	
1/1 (with short)	282(In) 146(Out)
1/2 (short)	136
2/1	205
3/1	399
4/1 (with short)	550(In) 470(Out)
4/2 (short)	80
5/1	553
6/1	268
7/1	202
8/1	413

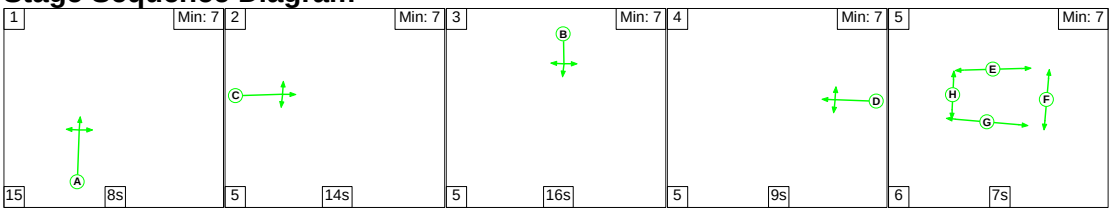
Lane Saturation Flows

Junction: Junction 13								
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat Flow (PCU/Hr)**	**Flared Sat Flow (PCU/Hr)**
1/1 (Harry Reynolds Rd N)	3.00	0.00	Y	Arm 6 Left	6.00	22.6 %	1813	1813
				Arm 7 Ahead	Inf	77.4 %		
1/2 (Harry Reynolds Rd N)	3.00	0.00	N	Arm 8 Right	14.00	100.0 %	1856	1856
2/1	2.60	0.00	Y	Arm 5 Right	15.00	22.4 %	1814	1814
				Arm 7 Left	6.00	4.4 %		
				Arm 8 Ahead	Inf	73.2 %		
3/1 (Harry Reynolds Rd S)	3.75	0.00	Y	Arm 5 Ahead	Inf	63.9 %	1825	1825
				Arm 6 Right	6.00	4.3 %		
				Arm 8 Left	6.00	31.8 %		
4/1 (Chapel Street)	3.00	0.00	Y	Arm 5 Left	12.00	53.6 %	1795	1795
				Arm 6 Ahead	Inf	46.4 %		
4/2 (Chapel Street)	3.00	0.00	N	Arm 7 Right	10.00	100.0 %	1787	1787
5/1	Infinite Saturation Flow						Inf	Inf
6/1	Infinite Saturation Flow						Inf	Inf
7/1	Infinite Saturation Flow						Inf	Inf
8/1	Infinite Saturation Flow						Inf	Inf

Full Input Data And Results

Scenario 1: '2025 Base + CD AM' (FG1: '2025 Base + CD AM', Plan 1: 'Network Control Plan 1')

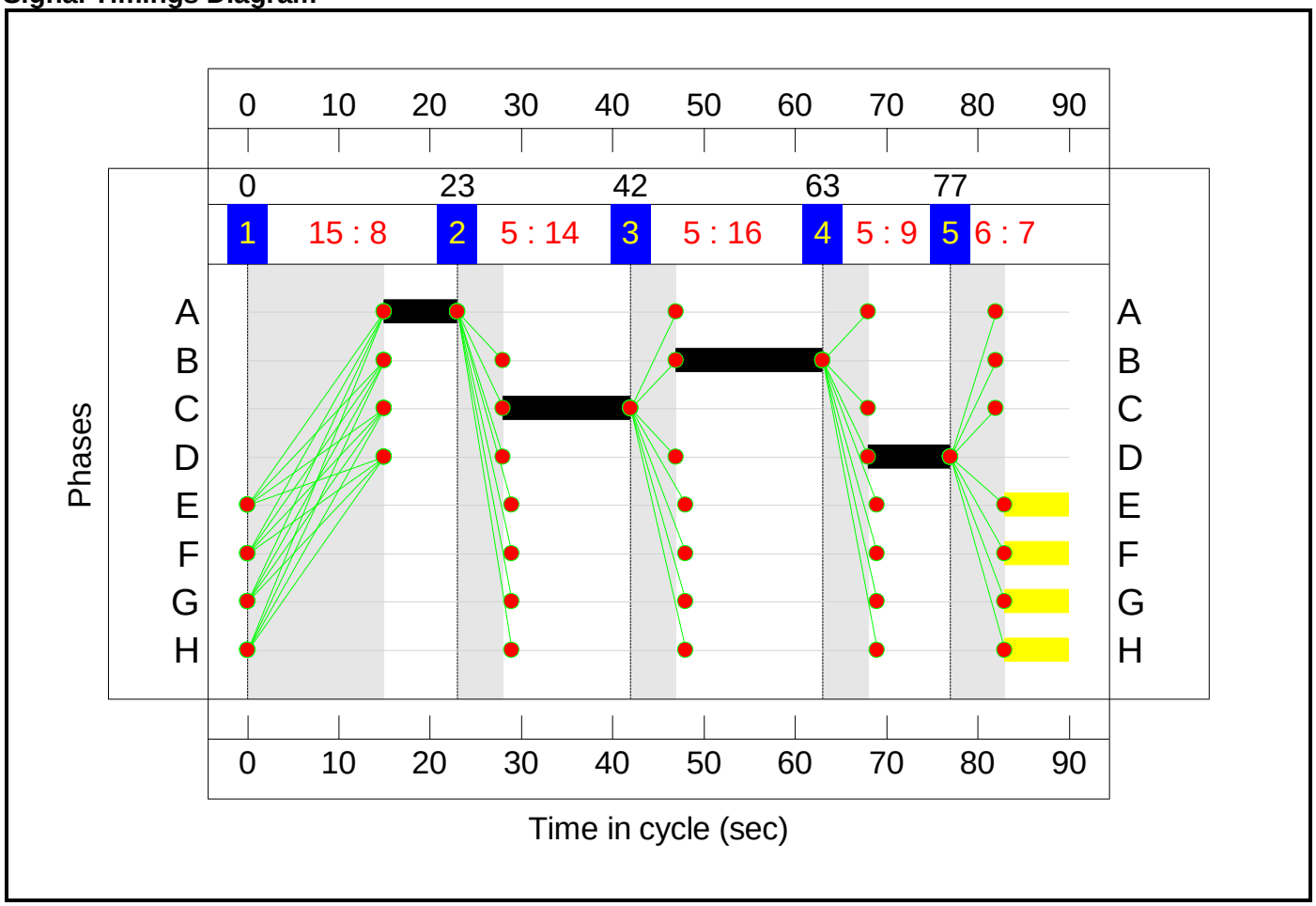
Stage Sequence Diagram



Stage Timings

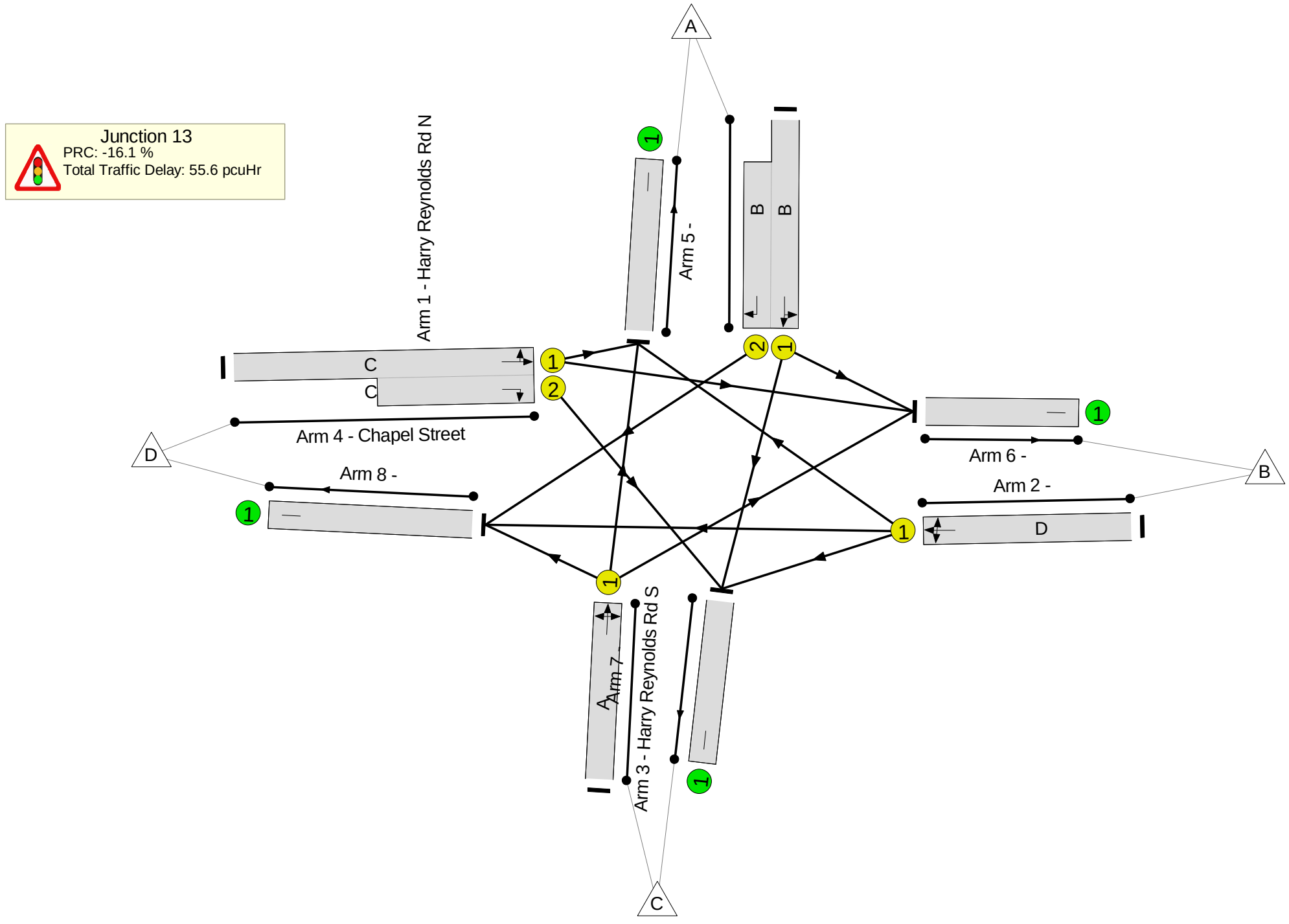
Stage	1	2	3	4	5
Duration	8	14	16	9	7
Change Point	0	23	42	63	77

Signal Timings Diagram



Full Input Data And Results

Network Layout Diagram


Junction 13
PRC: -16.1 %
Total Traffic Delay: 55.6 pcuHr
A
B
C
D
Arm 1 - Harry Reynolds Rd N
Arm 2 -
Arm 3 - Harry Reynolds Rd S
Arm 4 - Chapel Street
Arm 5 -
Arm 6 -
Arm 7 -
Arm 8 -
C
C
B
B
D

Full Input Data And Results

Network Results

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**104.4%**
Junction 13	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**104.4%**
1/1+1/2	Harry Reynolds Rd N Left Ahead Right	U	N/A	N/A	B		1	16	-	625	1843:1856	348+277	100.0 : 100.0%
2/1	Right Left Ahead	U	N/A	N/A	D		1	9	-	199	1802	200	99.4%
3/1	Harry Reynolds Rd S Ahead Right Left	U	N/A	N/A	A		1	8	-	186	1879	188	99.0%
4/1+4/2	Chapel Street Left Ahead Right	U	N/A	N/A	C		1	14	-	395	1844:1787	307+71	104.4 : 104.4%
5/1		U	N/A	N/A	-		-	-	-	257	Inf	Inf	0.0%
6/1		U	N/A	N/A	-		-	-	-	280	Inf	Inf	0.0%
7/1		U	N/A	N/A	-		-	-	-	394	Inf	Inf	0.0%
8/1		U	N/A	N/A	-		-	-	-	474	Inf	Inf	0.0%

Full Input Data And Results

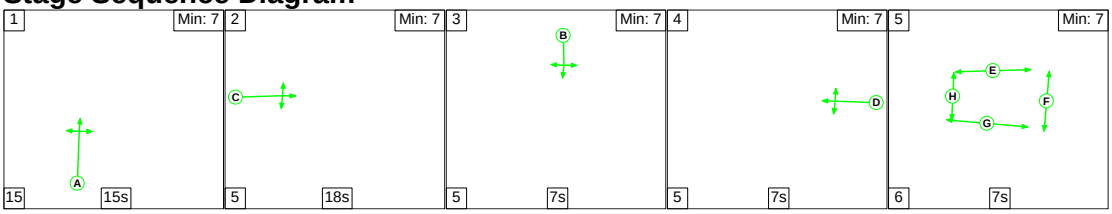
Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network	**-**	**-**	**0**	**0**	**0**	**15.1**	**40.6**	**0.0**	**55.6**	**-**	**-**	**-**	**-**
Junction 13	**-**	**-**	**0**	**0**	**0**	**15.1**	**40.6**	**0.0**	**55.6**	**-**	**-**	**-**	**-**
1/1+1/2	625	625	-	-	-	6.2	12.4	-	18.7	107.4	8.6	12.4	21.0
2/1	199	199	-	-	-	2.2	6.8	-	9.0	162.2	4.9	6.8	11.7
3/1	186	186	-	-	-	2.1	6.4	-	8.5	163.6	4.6	6.4	11.0
4/1+4/2	395	381	-	-	-	4.6	15.0	-	19.6	178.2	8.4	15.0	23.4
5/1	253	253	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	271	271	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
7/1	394	394	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
8/1	474	474	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0

C1 PRC for Signalled Lanes (%): -16.1 Total Delay for Signalled Lanes (pcuHr): 55.62 Cycle Time (s): 90
PRC Over All Lanes (%): -16.1 Total Delay Over All Lanes(pcuHr): 55.62

Full Input Data And Results

Scenario 2: '2025 Base + CD PM' (FG2: '2025 Base + CD PM', Plan 1: 'Network Control Plan 1')

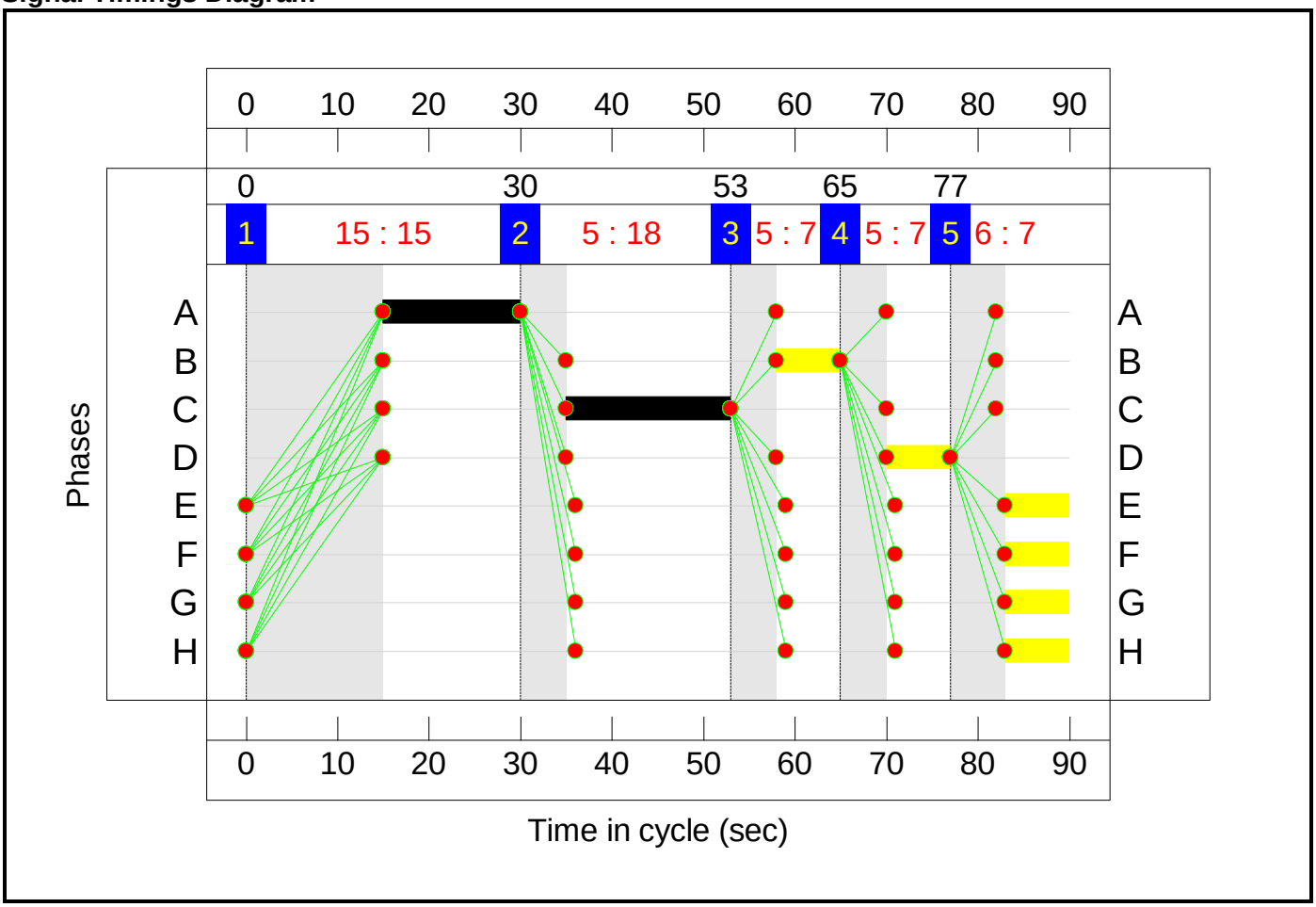
Stage Sequence Diagram



Stage Timings

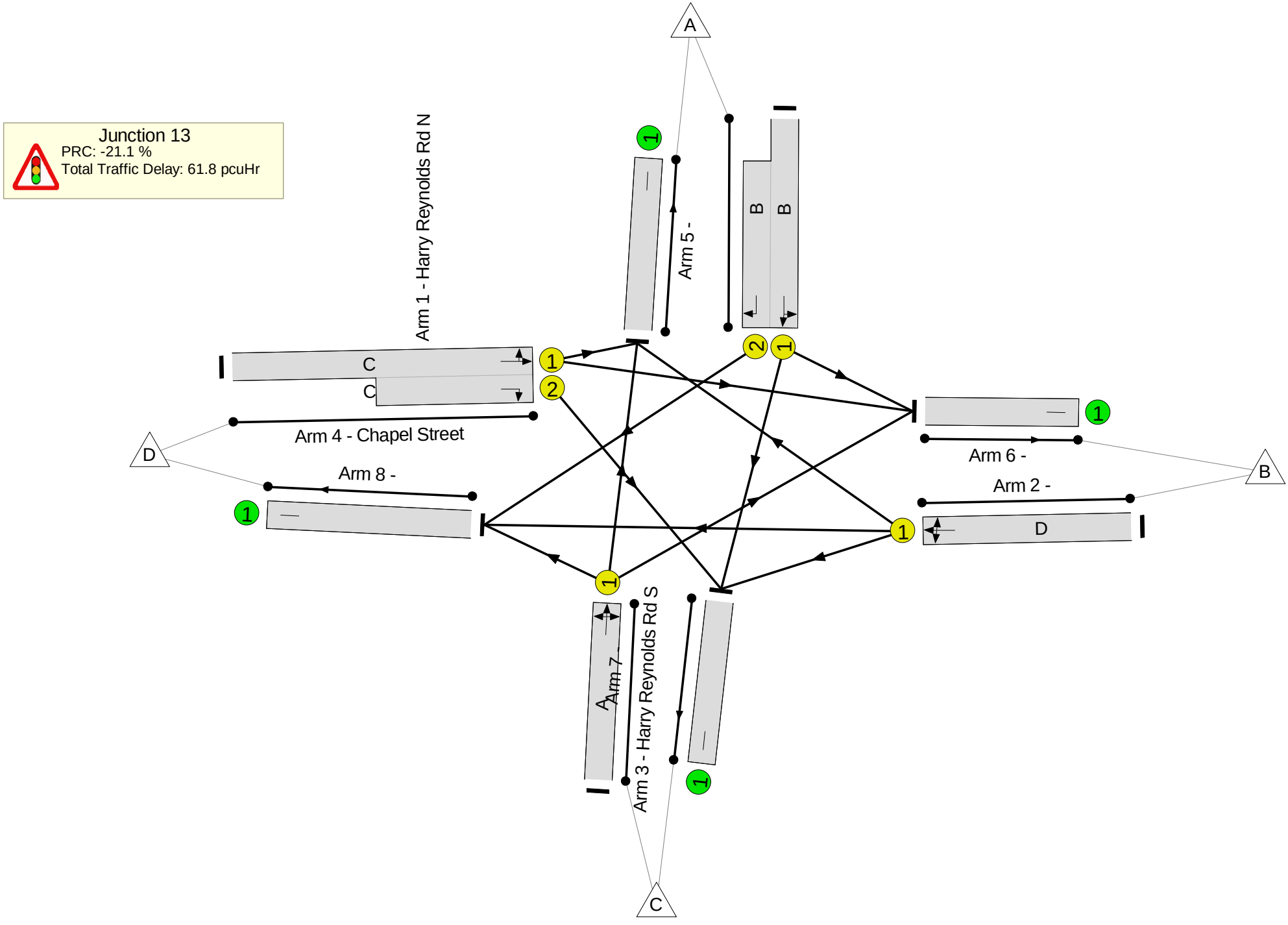
Stage	1	2	3	4	5
Duration	15	18	7	7	7
Change Point	0	30	53	65	77

Signal Timings Diagram



Full Input Data And Results

Network Layout Diagram


Junction 13
PRC: -21.1 %
Total Traffic Delay: 61.8 pcuHr
A
B
C
D
Arm 1 - Harry Reynolds Rd N
Arm 2 -
Arm 3 - Harry Reynolds Rd S
Arm 4 - Chapel Street
Arm 5 -
Arm 6 -
Arm 7 -
Arm 8 -
C
C
B
B
D

Full Input Data And Results

Network Results

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**109.0%**
Junction 13	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**109.0%**
1/1+1/2	Harry Reynolds Rd N Left Ahead Right	U	N/A	N/A	B		1	7	-	244	1807:1856	161+165	75.3 : 74.6%
2/1	Right Left Ahead	U	N/A	N/A	D		1	7	-	173	1811	161	107.5%
3/1	Harry Reynolds Rd S Ahead Right Left	U	N/A	N/A	A		1	15	-	332	1826	325	102.3%
4/1+4/2	Chapel Street Left Ahead Right	U	N/A	N/A	C		1	18	-	472	1791:1787	378+55	109.0 : 109.0%
5/1		U	N/A	N/A	-		-	-	-	482	Inf	Inf	0.0%
6/1		U	N/A	N/A	-		-	-	-	228	Inf	Inf	0.0%
7/1		U	N/A	N/A	-		-	-	-	160	Inf	Inf	0.0%
8/1		U	N/A	N/A	-		-	-	-	351	Inf	Inf	0.0%

Full Input Data And Results

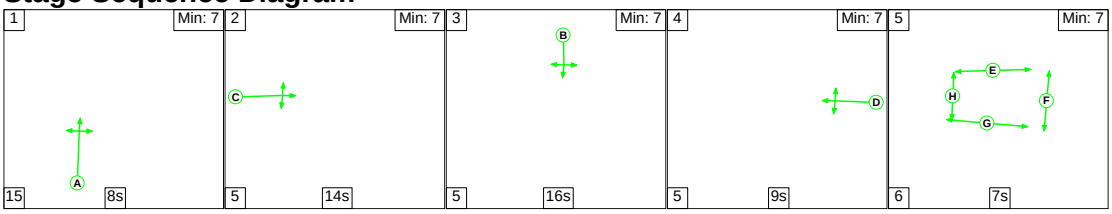
Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network	**-**	**-**	**0**	**0**	**0**	**14.7**	**47.1**	**0.0**	**61.8**	**-**	**-**	**-**	**-**
Junction 13	**-**	**-**	**0**	**0**	**0**	**14.7**	**47.1**	**0.0**	**61.8**	**-**	**-**	**-**	**-**
1/1+1/2	244	244	-	-	-	2.7	1.4	-	4.2	61.3	3.0	1.4	4.4
2/1	173	161	-	-	-	2.3	10.2	-	12.6	261.3	4.6	10.2	14.9
3/1	332	325	-	-	-	3.7	11.1	-	14.9	161.2	8.5	11.1	19.6
4/1+4/2	472	433	-	-	-	6.0	24.3	-	30.3	230.8	12.1	24.3	36.3
5/1	456	456	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	213	213	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
7/1	155	155	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
8/1	340	340	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0

C1 PRC for Signalled Lanes (%): -21.1 Total Delay for Signalled Lanes (pcuHr): 61.84 Cycle Time (s): 90
PRC Over All Lanes (%): -21.1 Total Delay Over All Lanes(pcuHr): 61.84

Full Input Data And Results

Scenario 3: '2025 Base + CD + Malincross AM' (FG3: '2025 Base + CD + Malincross AM', Plan 1: 'Network Control Plan 1')

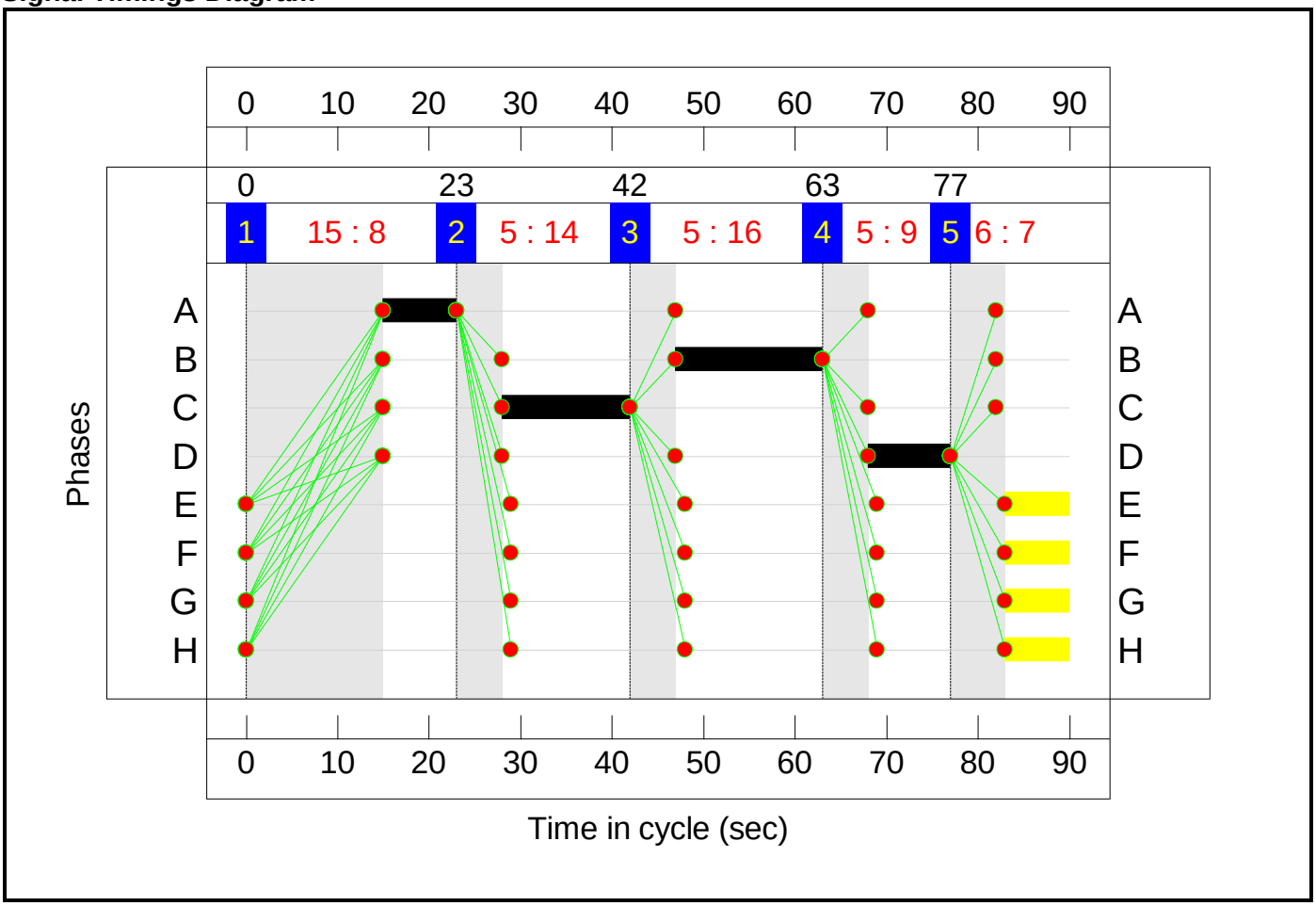
Stage Sequence Diagram



Stage Timings

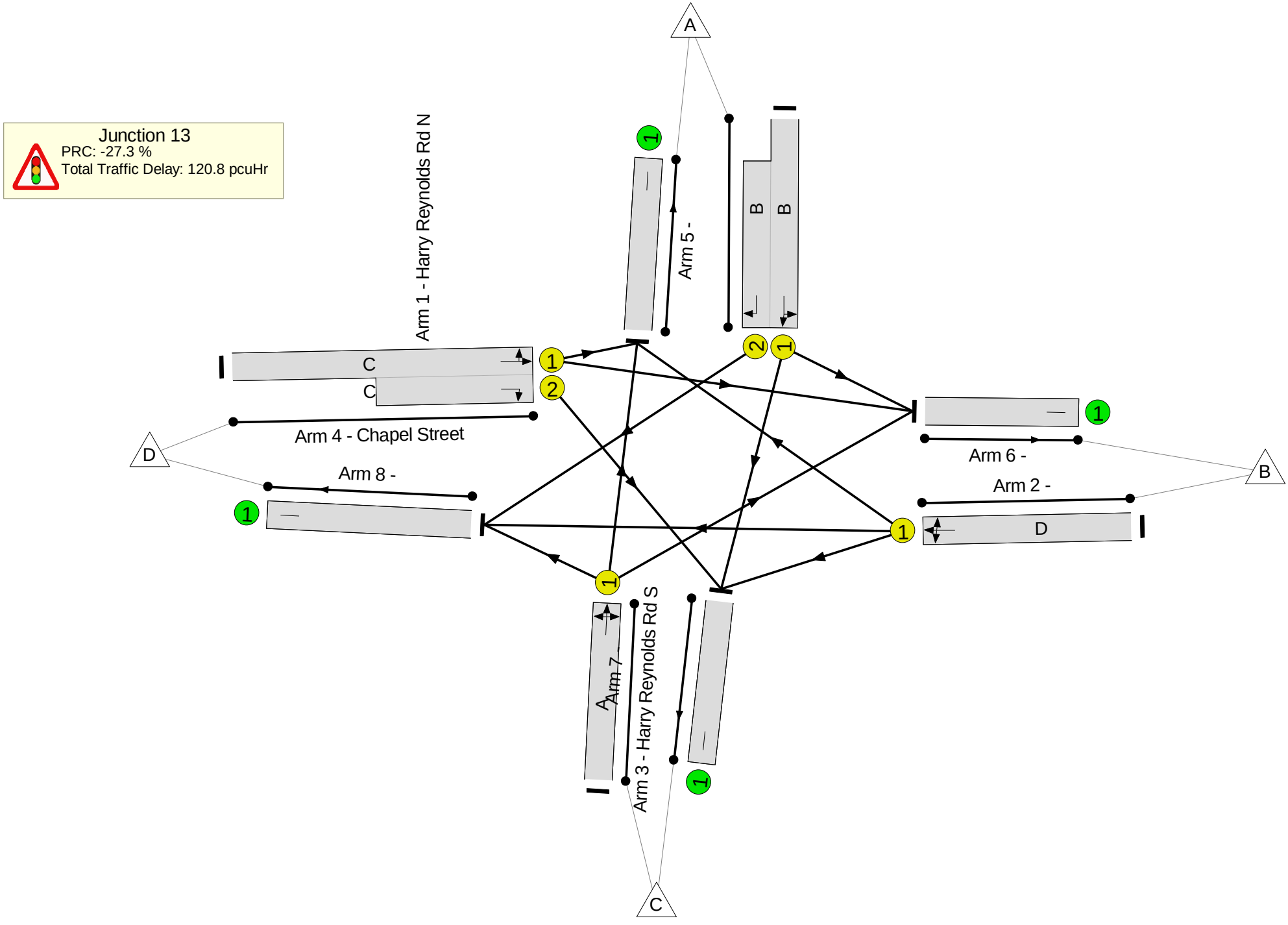
Stage	1	2	3	4	5
Duration	8	14	16	9	7
Change Point	0	23	42	63	77

Signal Timings Diagram



Full Input Data And Results

Network Layout Diagram


Junction 13
PRC: -27.3 %
Total Traffic Delay: 120.8 pcuHr
A
B
C
D
Arm 1 - Harry Reynolds Rd N
Arm 2 -
Arm 3 - Harry Reynolds Rd S
Arm 4 - Chapel Street
Arm 5 -
Arm 6 -
Arm 7 -
Arm 8 -
B
B
C
C
D

Full Input Data And Results

Network Results

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**114.5%**
Junction 13	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**114.5%**
1/1+1/2	Harry Reynolds Rd N Left Ahead Right	U	N/A	N/A	B		1	16	-	697	1843:1856	348+274	112.0 : 112.0%
2/1	Right Left Ahead	U	N/A	N/A	D		1	9	-	221	1801	200	110.4%
3/1	Harry Reynolds Rd S Ahead Right Left	U	N/A	N/A	A		1	8	-	206	1880	188	109.6%
4/1+4/2	Chapel Street Left Ahead Right	U	N/A	N/A	C		1	14	-	432	1844:1787	307+70	114.5 : 114.5%
5/1		U	N/A	N/A	-		-	-	-	285	Inf	Inf	0.0%
6/1		U	N/A	N/A	-		-	-	-	309	Inf	Inf	0.0%
7/1		U	N/A	N/A	-		-	-	-	438	Inf	Inf	0.0%
8/1		U	N/A	N/A	-		-	-	-	524	Inf	Inf	0.0%

Full Input Data And Results

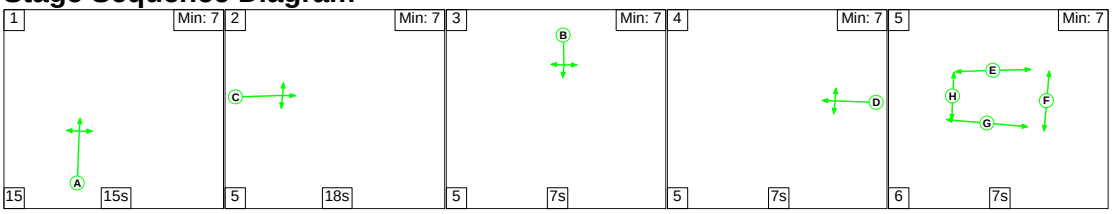
Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network	**-**	**-**	**0**	**0**	**0**	**21.0**	**99.8**	**0.0**	**120.8**	**-**	**-**	**-**	**-**
Junction 13	**-**	**-**	**0**	**0**	**0**	**21.0**	**99.8**	**0.0**	**120.8**	**-**	**-**	**-**	**-**
1/1+1/2	697	655	-	-	-	8.4	41.6	-	50.0	258.4	11.8	41.6	53.4
2/1	221	200	-	-	-	3.1	14.3	-	17.4	283.0	6.0	14.3	20.4
3/1	206	188	-	-	-	3.1	13.0	-	16.1	281.1	5.6	13.0	18.6
4/1+4/2	432	377	-	-	-	6.4	30.9	-	37.3	310.7	11.0	30.9	41.9
5/1	256	256	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	271	271	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
7/1	390	390	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
8/1	504	504	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0

C1 PRC for Signalled Lanes (%): -27.3 Total Delay for Signalled Lanes (pcuHr): 120.76 Cycle Time (s): 90
PRC Over All Lanes (%): -27.3 Total Delay Over All Lanes(pcuHr): 120.76

Full Input Data And Results

Scenario 4: '2025 Base + CD + Malincross PM' (FG4: '2025 Base + CD + Malincross PM', Plan 1: 'Network Control Plan 1')

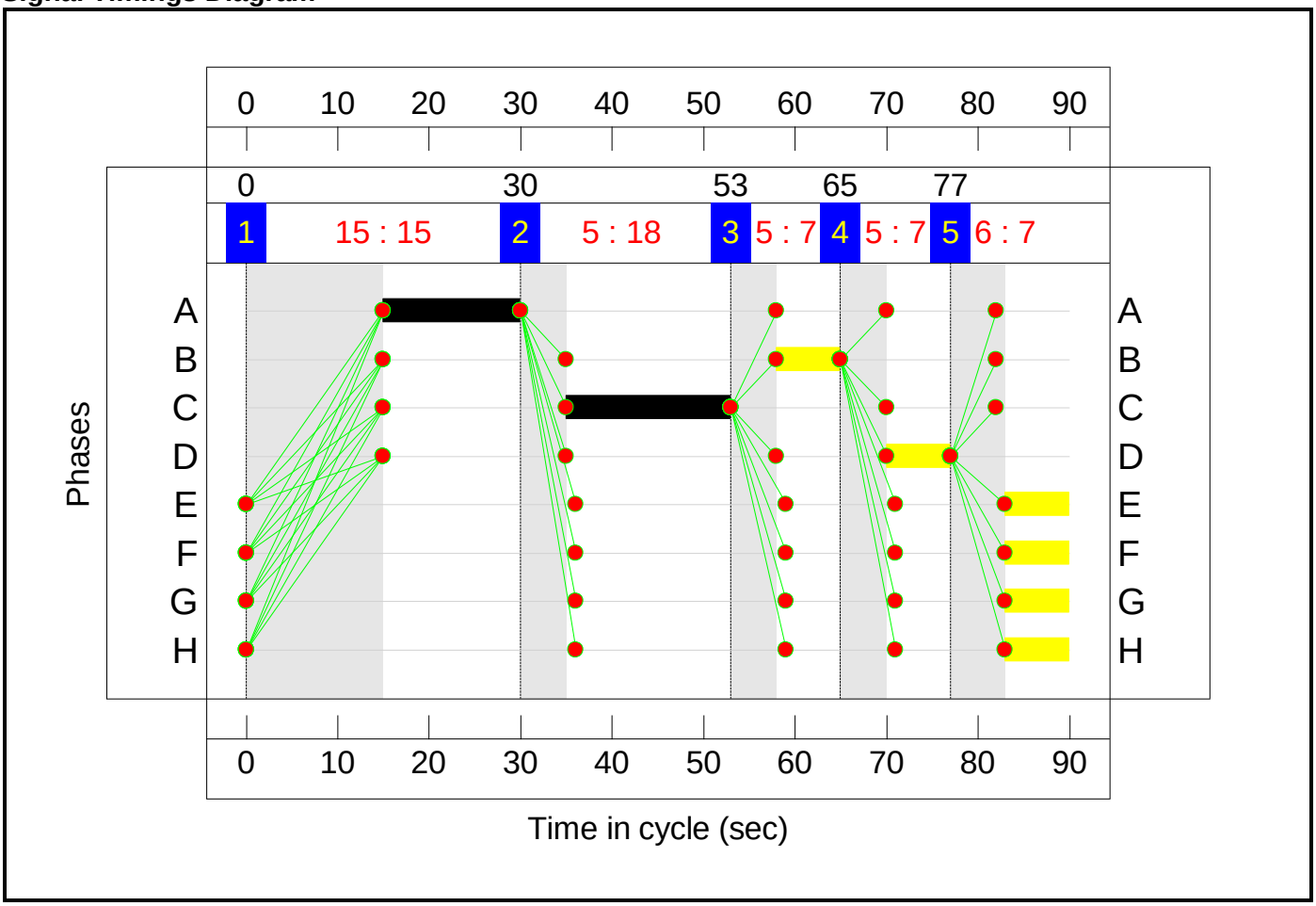
Stage Sequence Diagram



Stage Timings

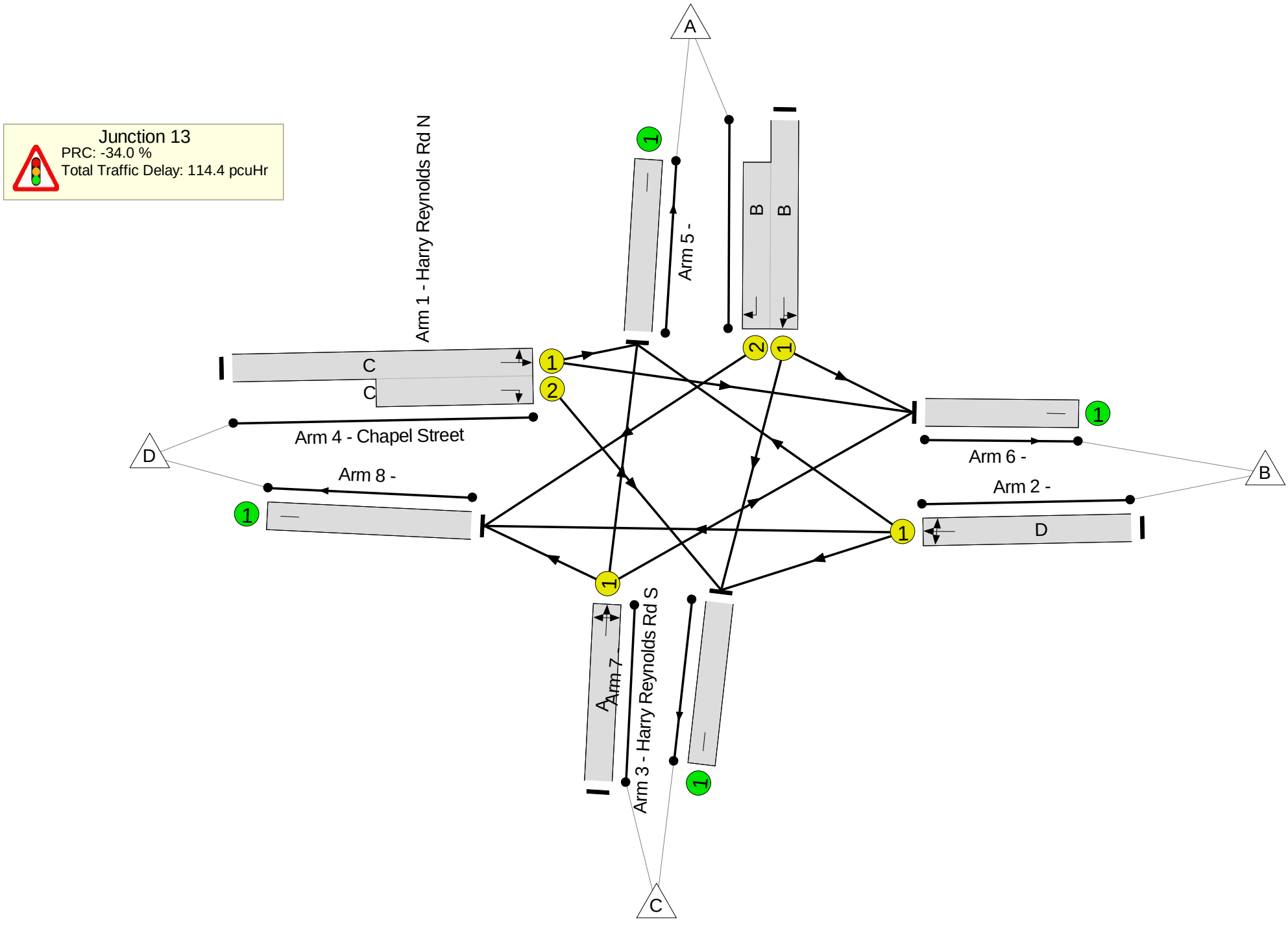
Stage	1	2	3	4	5
Duration	15	18	7	7	7
Change Point	0	30	53	65	77

Signal Timings Diagram



Full Input Data And Results

Network Layout Diagram


Junction 13
PRC: -34.0 %
Total Traffic Delay: 114.4 pcuHr
A
B
C
D
Arm 1 - Harry Reynolds Rd N
Arm 2 -
Arm 3 - Harry Reynolds Rd S
Arm 4 - Chapel Street
Arm 5 -
Arm 6 -
Arm 7 -
Arm 8 -
B
B
C
C
D

Full Input Data And Results

Network Results

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**120.6%**
Junction 13	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**120.6%**
1/1+1/2	Harry Reynolds Rd N Left Ahead Right	U	N/A	N/A	B		1	7	-	272	1805:1856	160+165	84.8 : 82.4%
2/1	Right Left Ahead	U	N/A	N/A	D		1	7	-	192	1810	161	119.3%
3/1	Harry Reynolds Rd S Ahead Right Left	U	N/A	N/A	A		1	15	-	370	1828	325	113.9%
4/1+4/2	Chapel Street Left Ahead Right	U	N/A	N/A	C		1	18	-	522	1791:1787	378+55	120.6 : 120.6%
5/1		U	N/A	N/A	-		-	-	-	537	Inf	Inf	0.0%
6/1		U	N/A	N/A	-		-	-	-	254	Inf	Inf	0.0%
7/1		U	N/A	N/A	-		-	-	-	178	Inf	Inf	0.0%
8/1		U	N/A	N/A	-		-	-	-	387	Inf	Inf	0.0%

Full Input Data And Results

Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network	**-**	**-**	**0**	**0**	**0**	**20.5**	**93.9**	**0.0**	**114.4**	**-**	**-**	**-**	**-**
Junction 13	**-**	**-**	**0**	**0**	**0**	**20.5**	**93.9**	**0.0**	**114.4**	**-**	**-**	**-**	**-**
1/1+1/2	272	272	-	-	-	3.1	2.3	-	5.4	71.3	3.3	2.3	5.7
2/1	192	161	-	-	-	3.3	18.2	-	21.5	403.7	5.8	18.2	24.0
3/1	370	325	-	-	-	5.7	26.1	-	31.8	309.5	10.4	26.1	36.4
4/1+4/2	522	433	-	-	-	8.3	47.3	-	55.7	384.1	15.2	47.3	62.6
5/1	457	457	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	217	217	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
7/1	165	165	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
8/1	351	351	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0

C1

PRC for Signalled Lanes (%): -34.0
PRC Over All Lanes (%): -34.0

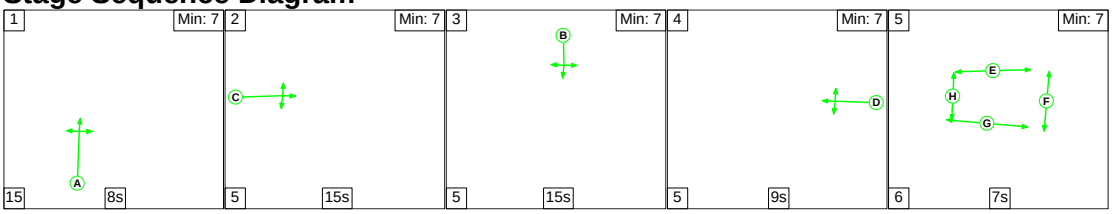
Total Delay for Signalled Lanes (pcuHr): 114.42
Total Delay Over All Lanes(pcuHr): 114.42

Cycle Time (s): 90

Full Input Data And Results

Scenario 5: '2040 Base + CD AM' (FG5: '2040 Base + CD AM', Plan 1: 'Network Control Plan 1')

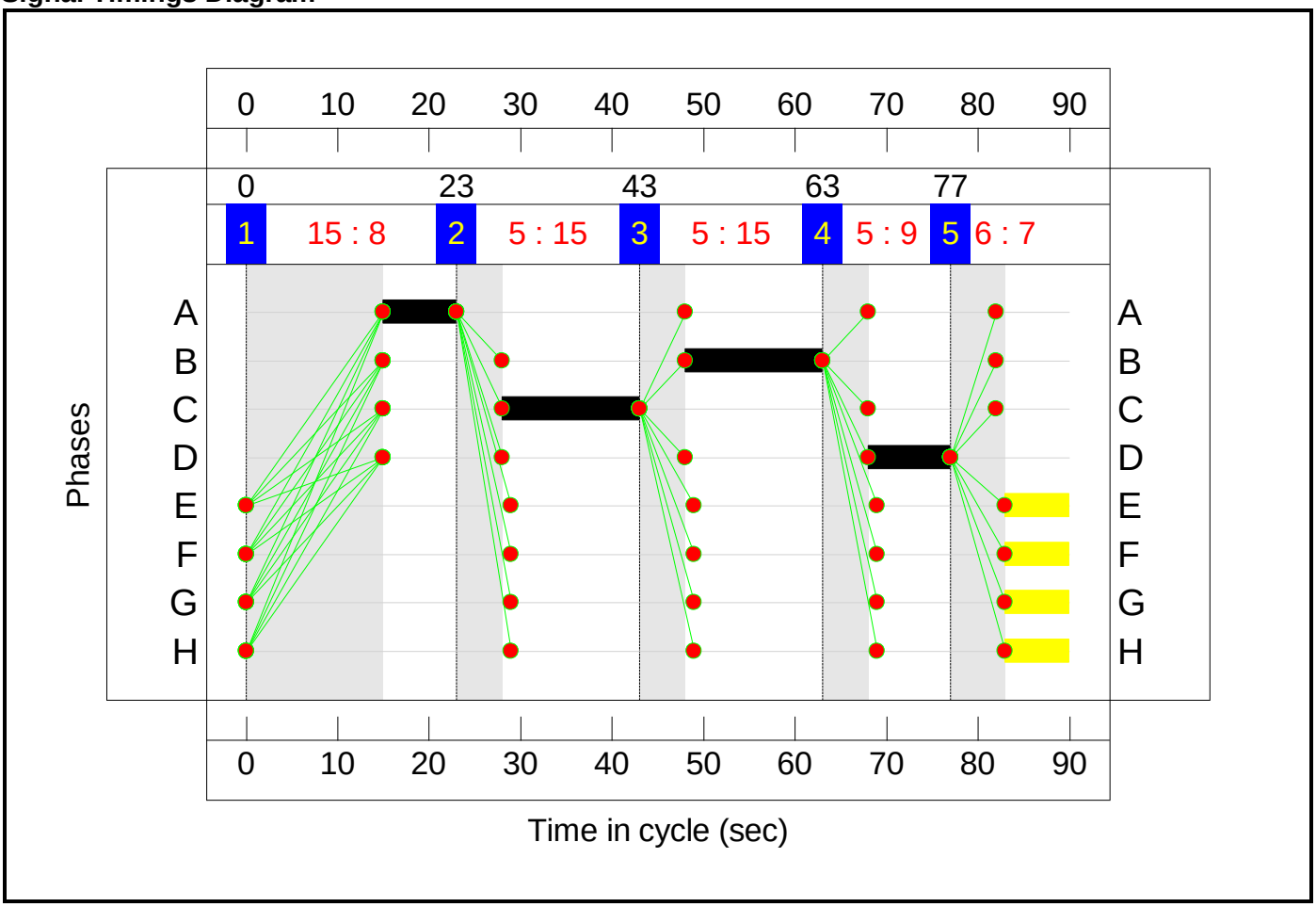
Stage Sequence Diagram



Stage Timings

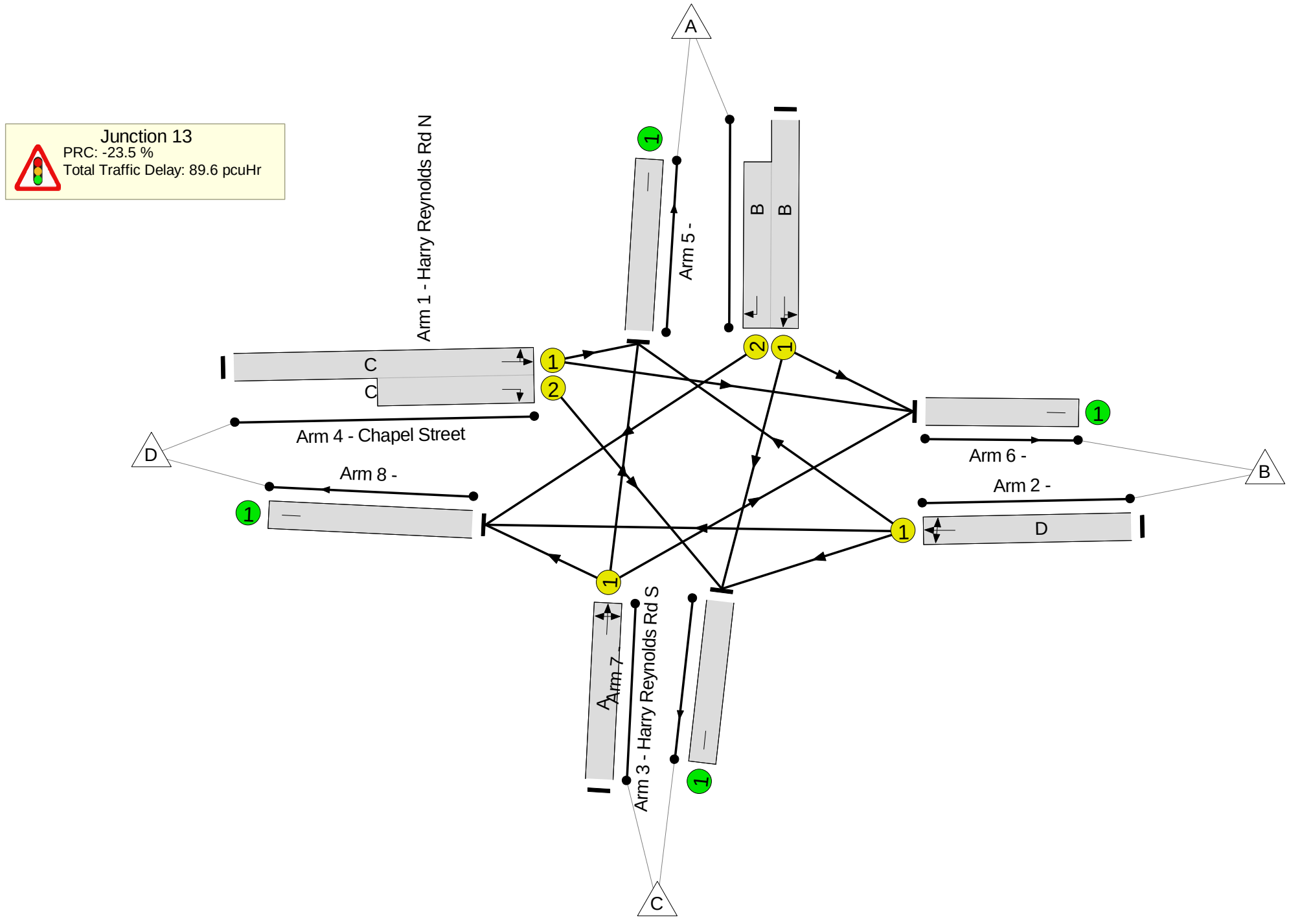
Stage	1	2	3	4	5
Duration	8	15	15	9	7
Change Point	0	23	43	63	77

Signal Timings Diagram



Full Input Data And Results

Network Layout Diagram


Junction 13
PRC: -23.5 %
Total Traffic Delay: 89.6 pcuHr
A
B
C
D
Arm 1 - Harry Reynolds Rd N
Arm 2 -
Arm 3 - Harry Reynolds Rd S
Arm 4 - Chapel Street
Arm 5 -
Arm 6 -
Arm 7 -
Arm 8 -
C
C
B
B
D

Full Input Data And Results

Network Results

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**111.2%**
Junction 13	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**111.2%**
1/1+1/2	Harry Reynolds Rd N Left Ahead Right	U	N/A	N/A	B		1	15	-	642	1847:1856	328+249	111.2 : 111.2%
2/1	Right Left Ahead	U	N/A	N/A	D		1	9	-	206	1804	200	102.8%
3/1	Harry Reynolds Rd S Ahead Right Left	U	N/A	N/A	A		1	8	-	198	1870	187	105.9%
4/1+4/2	Chapel Street Left Ahead Right	U	N/A	N/A	C		1	15	-	439	1848:1787	329+92	104.4 : 104.4%
5/1		U	N/A	N/A	-		-	-	-	262	Inf	Inf	0.0%
6/1		U	N/A	N/A	-		-	-	-	302	Inf	Inf	0.0%
7/1		U	N/A	N/A	-		-	-	-	433	Inf	Inf	0.0%
8/1		U	N/A	N/A	-		-	-	-	488	Inf	Inf	0.0%

Full Input Data And Results

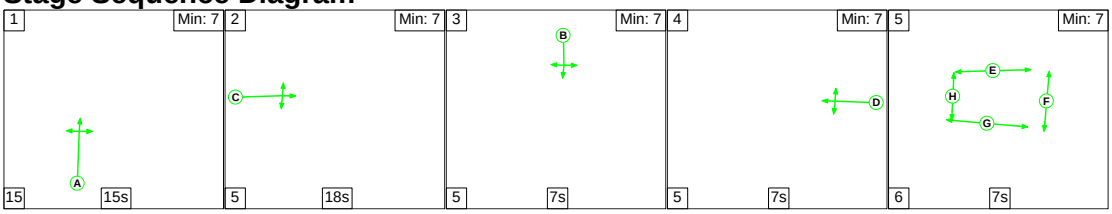
Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network	**-**	**-**	**0**	**0**	**0**	**17.9**	**71.7**	**0.0**	**89.6**	**-**	**-**	**-**	**-**
Junction 13	**-**	**-**	**0**	**0**	**0**	**17.9**	**71.7**	**0.0**	**89.6**	**-**	**-**	**-**	**-**
1/1+1/2	642	605	-	-	-	7.7	36.6	-	44.4	248.8	10.0	36.6	46.7
2/1	206	200	-	-	-	2.5	8.7	-	11.2	194.9	5.3	8.7	14.0
3/1	198	187	-	-	-	2.7	10.3	-	13.0	236.7	5.2	10.3	15.5
4/1+4/2	439	420	-	-	-	5.0	16.1	-	21.1	173.1	9.4	16.1	25.4
5/1	249	249	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	286	286	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
7/1	397	397	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
8/1	481	481	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0

C1 PRC for Signalled Lanes (%): -23.5 Total Delay for Signalled Lanes (pcuHr): 89.64 Cycle Time (s): 90
PRC Over All Lanes (%): -23.5 Total Delay Over All Lanes(pcuHr): 89.64

Full Input Data And Results

Scenario 6: '2040 Base + CD PM' (FG6: '2040 Base + CD PM', Plan 1: 'Network Control Plan 1')

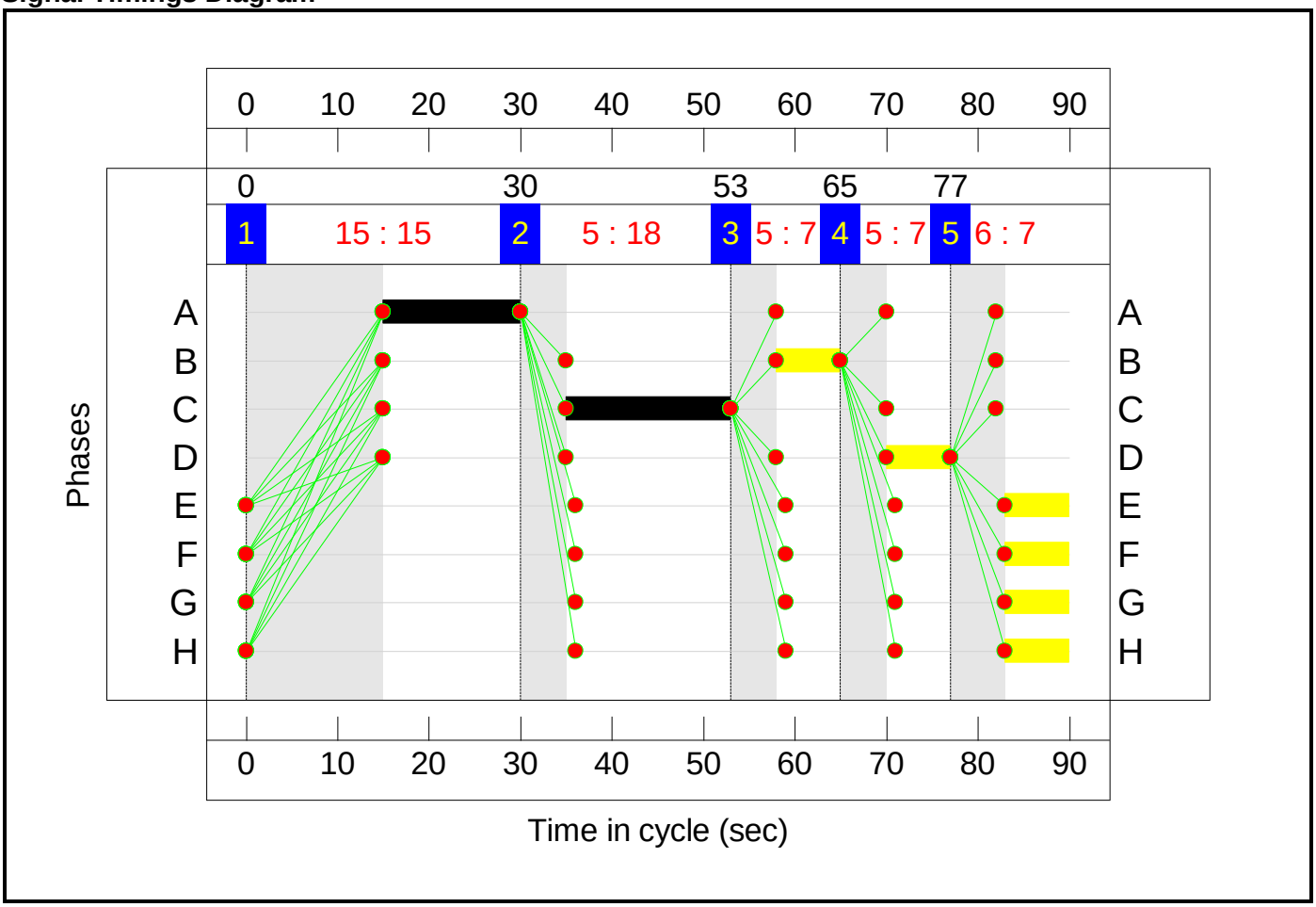
Stage Sequence Diagram



Stage Timings

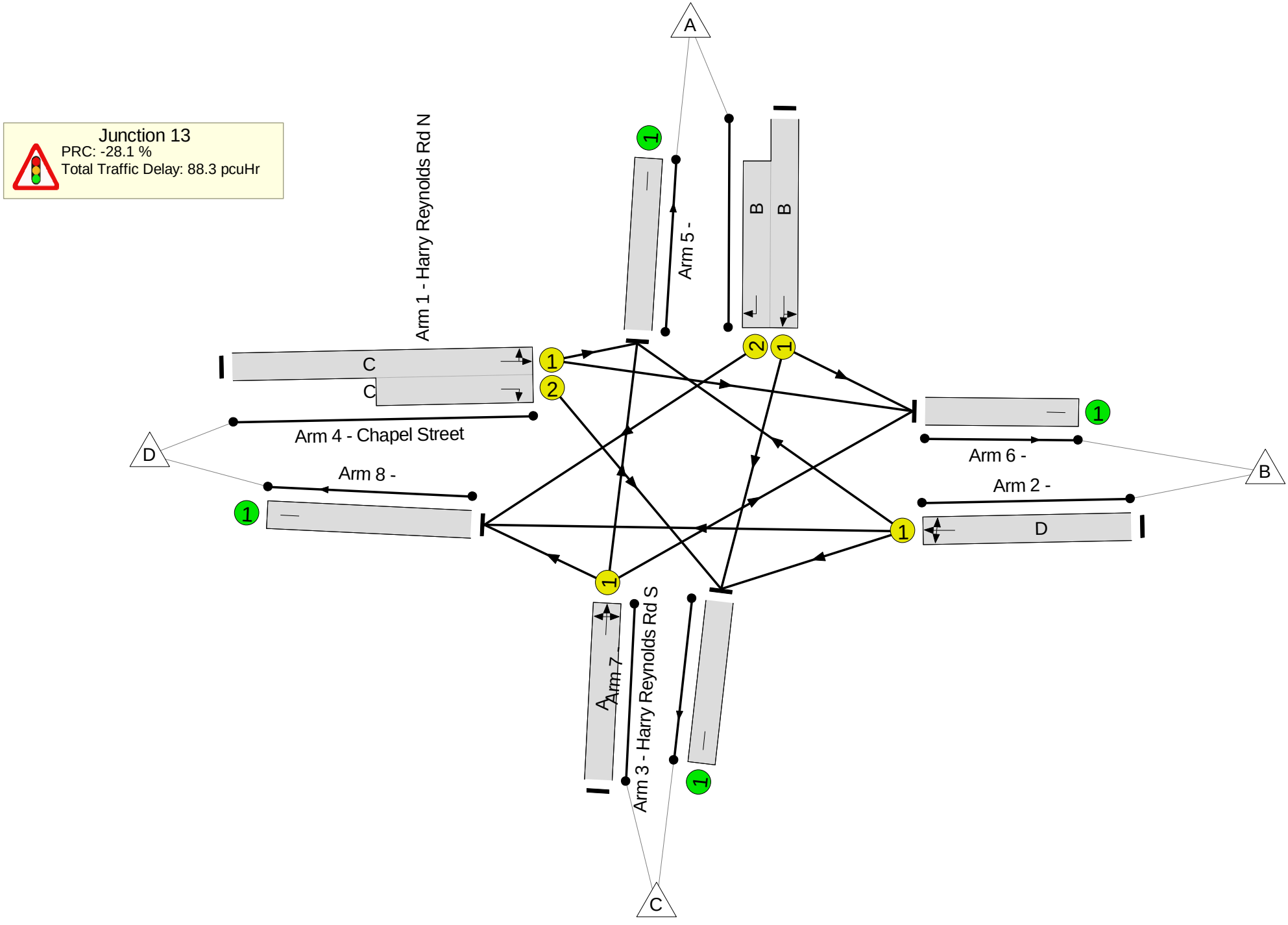
Stage	1	2	3	4	5
Duration	15	18	7	7	7
Change Point	0	30	53	65	77

Signal Timings Diagram



Full Input Data And Results

Network Layout Diagram


Junction 13
PRC: -28.1 %
Total Traffic Delay: 88.3 pcuHr
A
B
C
D
Arm 1 - Harry Reynolds Rd N
Arm 2 -
Arm 3 - Harry Reynolds Rd S
Arm 4 - Chapel Street
Arm 5 -
Arm 6 -
Arm 7 -
Arm 8 -
C
C
B
B
D

Full Input Data And Results

Network Results

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**115.3%**
Junction 13	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**115.3%**
1/1+1/2	Harry Reynolds Rd N Left Ahead Right	U	N/A	N/A	B		1	7	-	253	1814:1856	161+165	80.6 : 74.6%
2/1	Right Left Ahead	U	N/A	N/A	D		1	7	-	186	1815	161	115.3%
3/1	Harry Reynolds Rd S Ahead Right Left	U	N/A	N/A	A		1	15	-	361	1823	324	111.4%
4/1+4/2	Chapel Street Left Ahead Right	U	N/A	N/A	C		1	18	-	498	1795:1787	379+65	112.2 : 112.2%
5/1		U	N/A	N/A	-		-	-	-	498	Inf	Inf	0.0%
6/1		U	N/A	N/A	-		-	-	-	241	Inf	Inf	0.0%
7/1		U	N/A	N/A	-		-	-	-	182	Inf	Inf	0.0%
8/1		U	N/A	N/A	-		-	-	-	377	Inf	Inf	0.0%

Full Input Data And Results

Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network	**-**	**-**	**0**	**0**	**0**	**17.8**	**70.5**	**0.0**	**88.3**	**-**	**-**	**-**	**-**
Junction 13	**-**	**-**	**0**	**0**	**0**	**17.8**	**70.5**	**0.0**	**88.3**	**-**	**-**	**-**	**-**
1/1+1/2	253	253	-	-	-	2.8	1.7	-	4.5	63.7	3.2	1.7	4.8
2/1	186	161	-	-	-	2.9	15.4	-	18.3	354.1	5.4	15.4	20.7
3/1	361	324	-	-	-	5.3	22.5	-	27.8	277.0	9.9	22.5	32.4
4/1+4/2	498	444	-	-	-	6.8	31.0	-	37.8	273.2	13.3	31.0	44.3
5/1	444	444	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	218	218	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
7/1	173	173	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
8/1	347	347	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0

C1

PRC for Signalled Lanes (%): -28.1

PRC Over All Lanes (%): -28.1

Total Delay for Signalled Lanes (pcuHr): 88.33

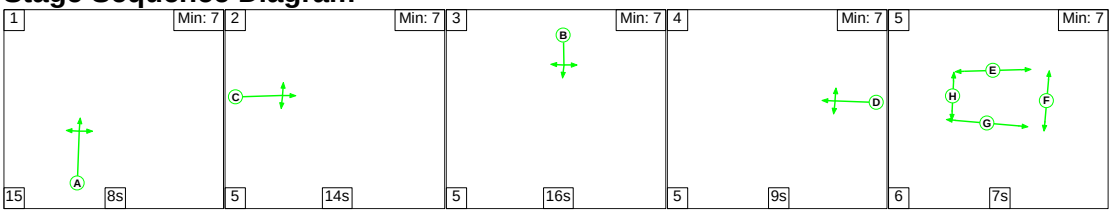
Total Delay Over All Lanes(pcuHr): 88.33

Cycle Time (s): 90

Full Input Data And Results

Scenario 7: '2040 Base + CD + Malincross AM' (FG7: '2040 Base + CD + Malincross AM', Plan 1: 'Network Control Plan 1')

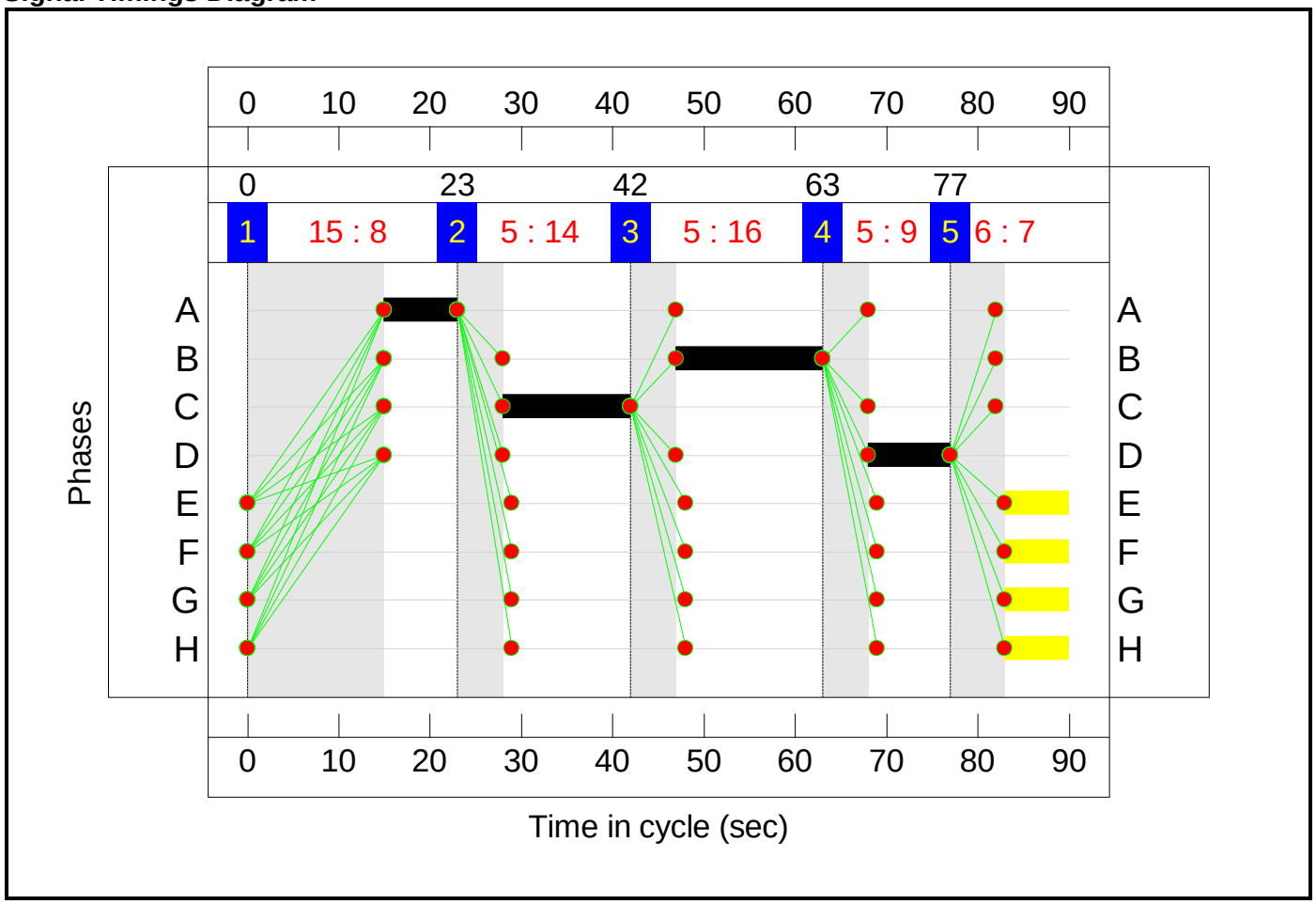
Stage Sequence Diagram



Stage Timings

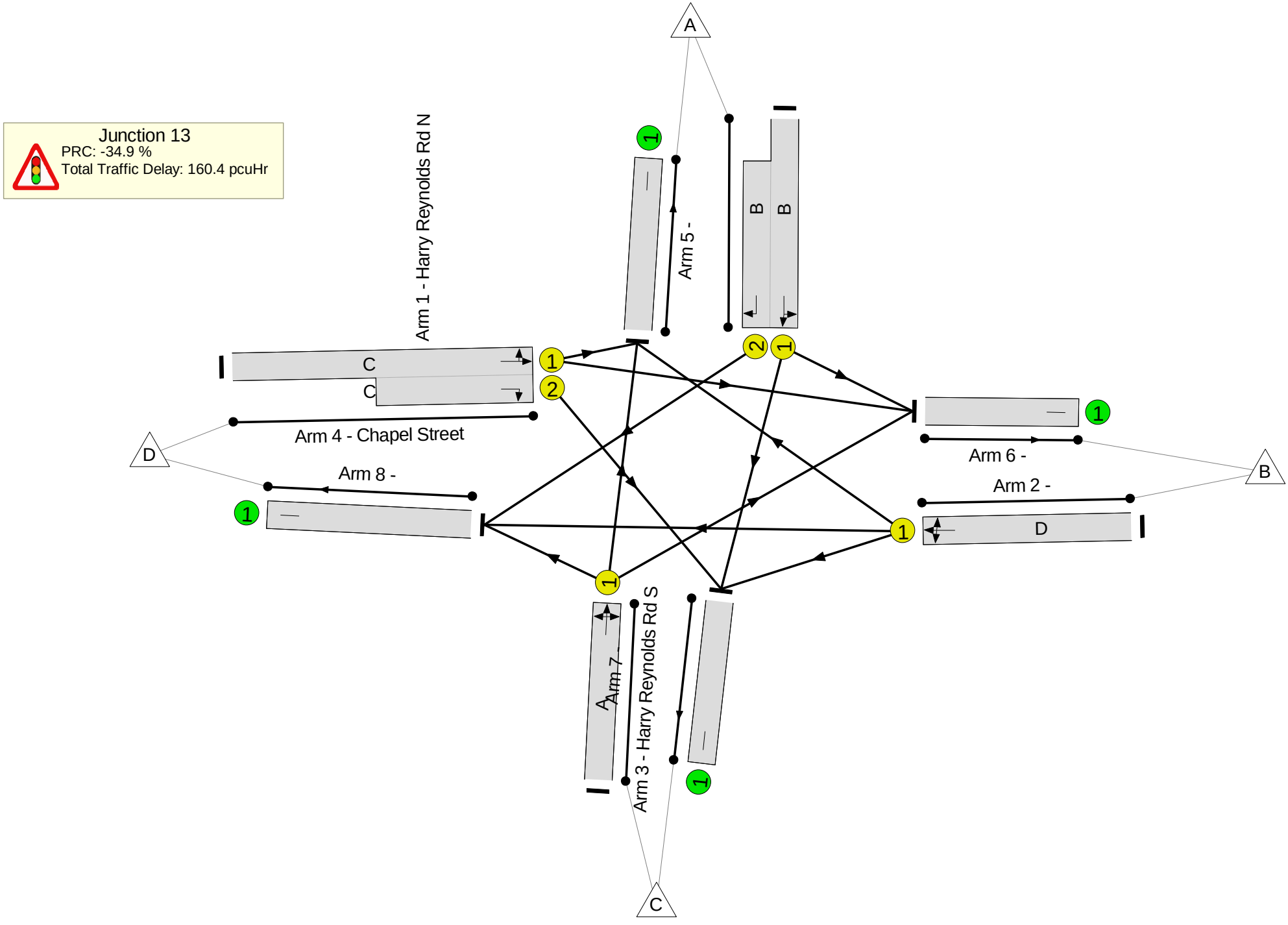
Stage	1	2	3	4	5
Duration	8	14	16	9	7
Change Point	0	23	42	63	77

Signal Timings Diagram



Full Input Data And Results

Network Layout Diagram


Junction 13
PRC: -34.9 %
Total Traffic Delay: 160.4 pcuHr
A
B
C
D
Arm 1 - Harry Reynolds Rd N
Arm 2 -
Arm 3 - Harry Reynolds Rd S
Arm 4 - Chapel Street
Arm 5 -
Arm 6 -
Arm 7 -
Arm 8 -
B
B
C
C
D

Full Input Data And Results

Network Results

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**121.4%**
Junction 13	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**121.4%**
1/1+1/2	Harry Reynolds Rd N Left Ahead Right	U	N/A	N/A	B		1	16	-	715	1846:1856	349+262	117.0 : 117.0%
2/1	Right Left Ahead	U	N/A	N/A	D		1	9	-	228	1803	200	113.8%
3/1	Harry Reynolds Rd S Ahead Right Left	U	N/A	N/A	A		1	8	-	219	1872	187	117.0%
4/1+4/2	Chapel Street Left Ahead Right	U	N/A	N/A	C		1	14	-	476	1848:1787	308+84	121.4 : 121.4%
5/1		U	N/A	N/A	-		-	-	-	291	Inf	Inf	0.0%
6/1		U	N/A	N/A	-		-	-	-	331	Inf	Inf	0.0%
7/1		U	N/A	N/A	-		-	-	-	478	Inf	Inf	0.0%
8/1		U	N/A	N/A	-		-	-	-	538	Inf	Inf	0.0%

Full Input Data And Results

Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network	**-**	**-**	**0**	**0**	**0**	**24.6**	**135.8**	**0.0**	**160.4**	**-**	**-**	**-**	**-**
Junction 13	**-**	**-**	**0**	**0**	**0**	**24.6**	**135.8**	**0.0**	**160.4**	**-**	**-**	**-**	**-**
1/1+1/2	715	635	-	-	-	9.3	55.2	-	64.5	325.0	14.4	55.2	69.6
2/1	228	200	-	-	-	3.4	17.2	-	20.6	324.6	6.4	17.2	23.6
3/1	219	187	-	-	-	3.9	18.8	-	22.7	372.8	6.3	18.8	25.1
4/1+4/2	476	392	-	-	-	8.0	44.7	-	52.6	397.9	12.7	44.7	57.4
5/1	246	246	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	275	275	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
7/1	406	406	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
8/1	488	488	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0

C1

PRC for Signalled Lanes (%): -34.9
PRC Over All Lanes (%): -34.9

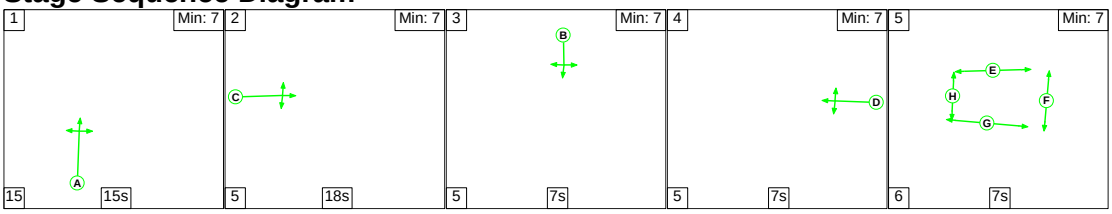
Total Delay for Signalled Lanes (pcuHr): 160.40
Total Delay Over All Lanes(pcuHr): 160.40

Cycle Time (s): 90

Full Input Data And Results

Scenario 8: '2040 Base + CD + Malincross PM' (FG8: '2040 Base + CD + Malincross PM', Plan 1: 'Network Control Plan 1')

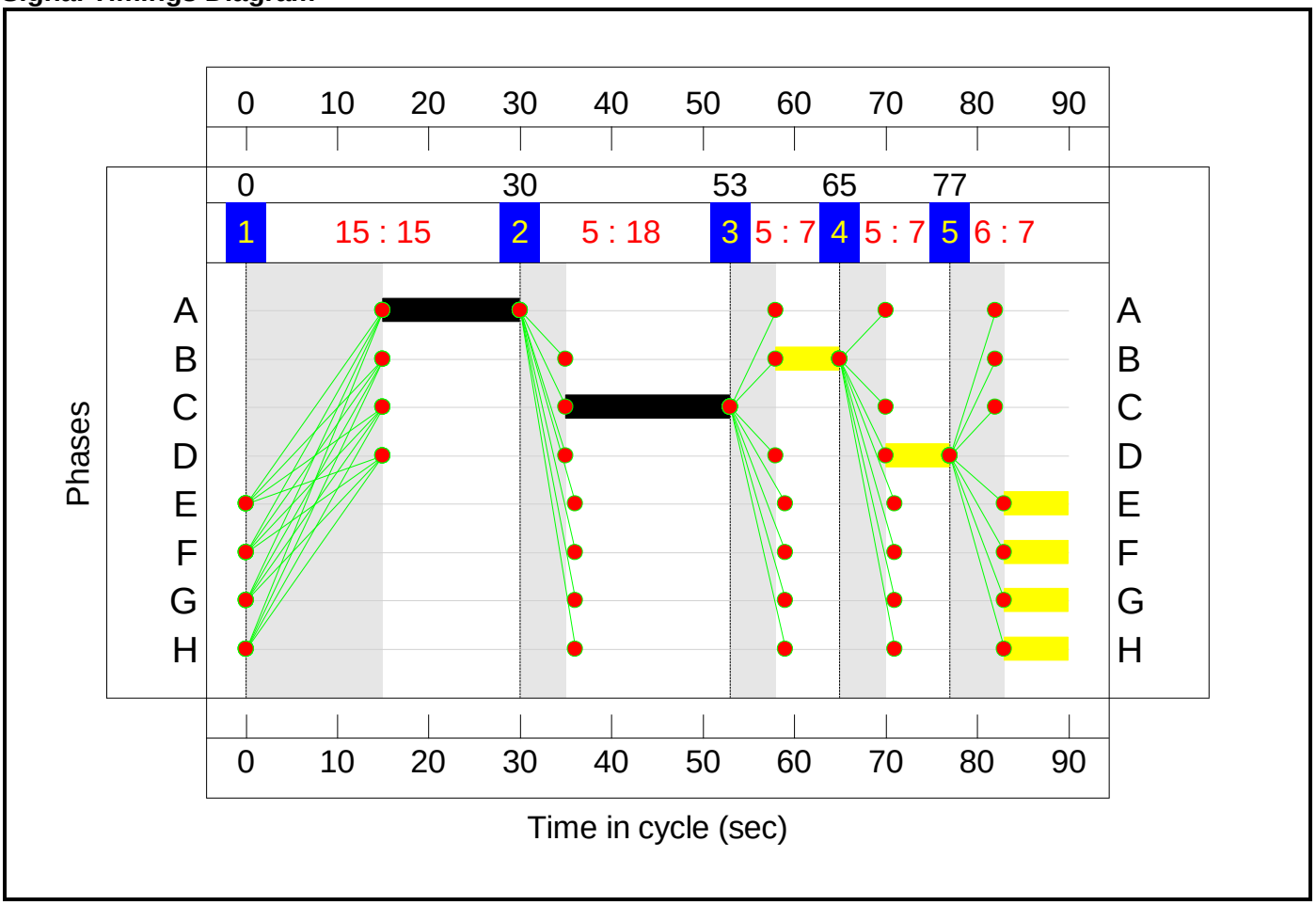
Stage Sequence Diagram



Stage Timings

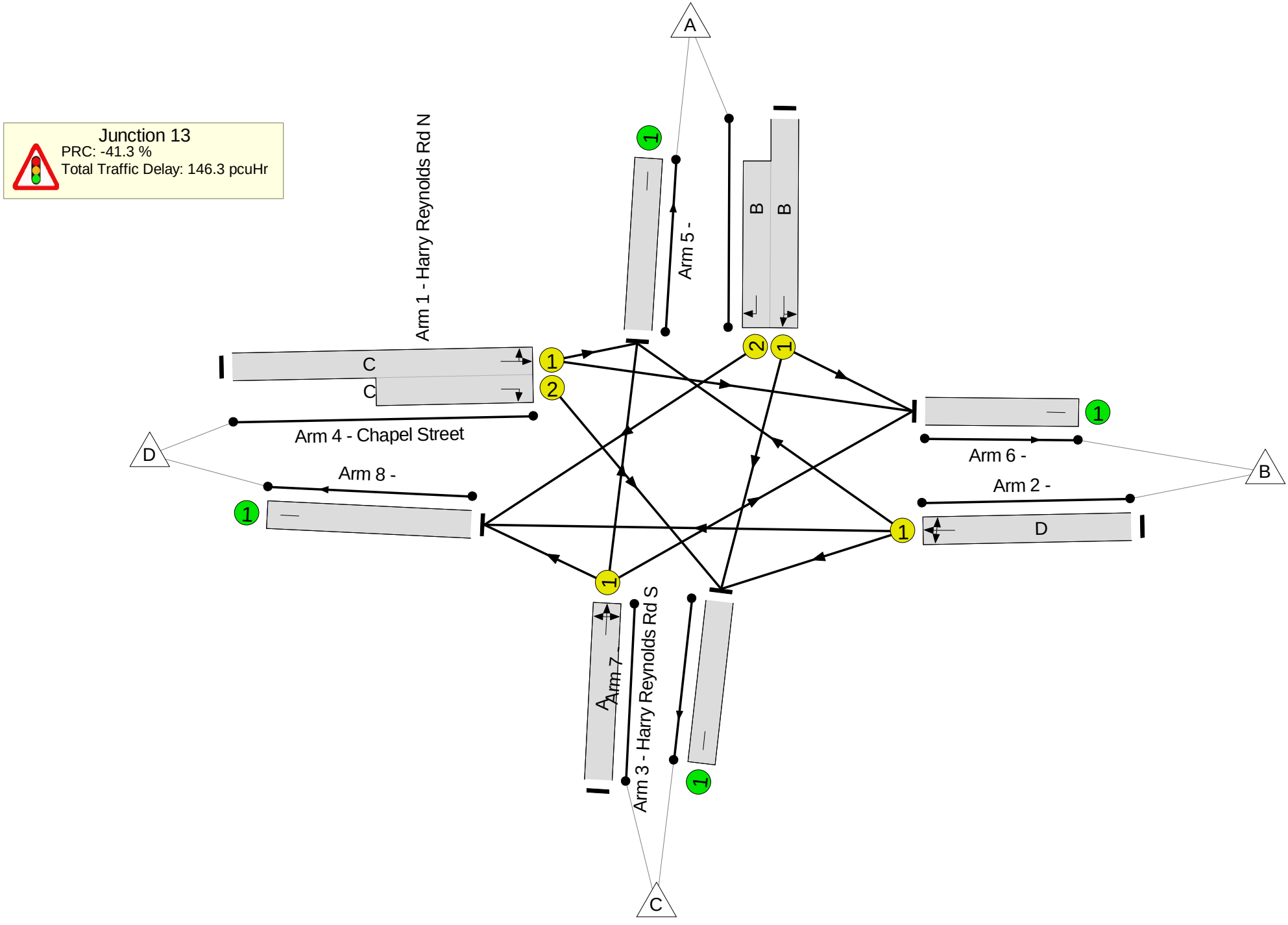
Stage	1	2	3	4	5
Duration	15	18	7	7	7
Change Point	0	30	53	65	77

Signal Timings Diagram



Full Input Data And Results

Network Layout Diagram


Junction 13
PRC: -41.3 %
Total Traffic Delay: 146.3 pcuHr
A
B
C
D
Arm 1 - Harry Reynolds Rd N
Arm 2 -
Arm 3 - Harry Reynolds Rd S
Arm 4 - Chapel Street
Arm 5 -
Arm 6 -
Arm 7 -
Arm 8 -
C
C
B
B
D

Full Input Data And Results

Network Results

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**127.1%**
Junction 13	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**127.1%**
1/1+1/2	Harry Reynolds Rd N Left Ahead Right	U	N/A	N/A	B		1	7	-	282	1813:1856	161+165	90.6 : 82.4%
2/1	Right Left Ahead	U	N/A	N/A	D		1	7	-	205	1814	161	127.1%
3/1	Harry Reynolds Rd S Ahead Right Left	U	N/A	N/A	A		1	15	-	399	1825	324	123.0%
4/1+4/2	Chapel Street Left Ahead Right	U	N/A	N/A	C		1	18	-	550	1795:1787	379+65	124.0 : 124.0%
5/1		U	N/A	N/A	-		-	-	-	553	Inf	Inf	0.0%
6/1		U	N/A	N/A	-		-	-	-	268	Inf	Inf	0.0%
7/1		U	N/A	N/A	-		-	-	-	202	Inf	Inf	0.0%
8/1		U	N/A	N/A	-		-	-	-	413	Inf	Inf	0.0%

Full Input Data And Results

Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network	**-**	**-**	**0**	**0**	**0**	**23.9**	**122.4**	**0.0**	**146.3**	**-**	**-**	**-**	**-**
Junction 13	**-**	**-**	**0**	**0**	**0**	**23.9**	**122.4**	**0.0**	**146.3**	**-**	**-**	**-**	**-**
1/1+1/2	282	282	-	-	-	3.2	2.8	-	6.0	76.6	3.6	2.8	6.4
2/1	205	161	-	-	-	4.1	24.0	-	28.1	494.2	6.7	24.0	30.8
3/1	399	324	-	-	-	7.3	39.8	-	47.1	425.0	11.8	39.8	51.6
4/1+4/2	550	443	-	-	-	9.3	55.7	-	65.0	425.5	16.2	55.7	71.9
5/1	447	447	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	223	223	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
7/1	185	185	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
8/1	357	357	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0

C1

PRC for Signalled Lanes (%): -41.3
PRC Over All Lanes (%): -41.3

Total Delay for Signalled Lanes (pcuHr): 146.26
Total Delay Over All Lanes(pcuHr): 146.26

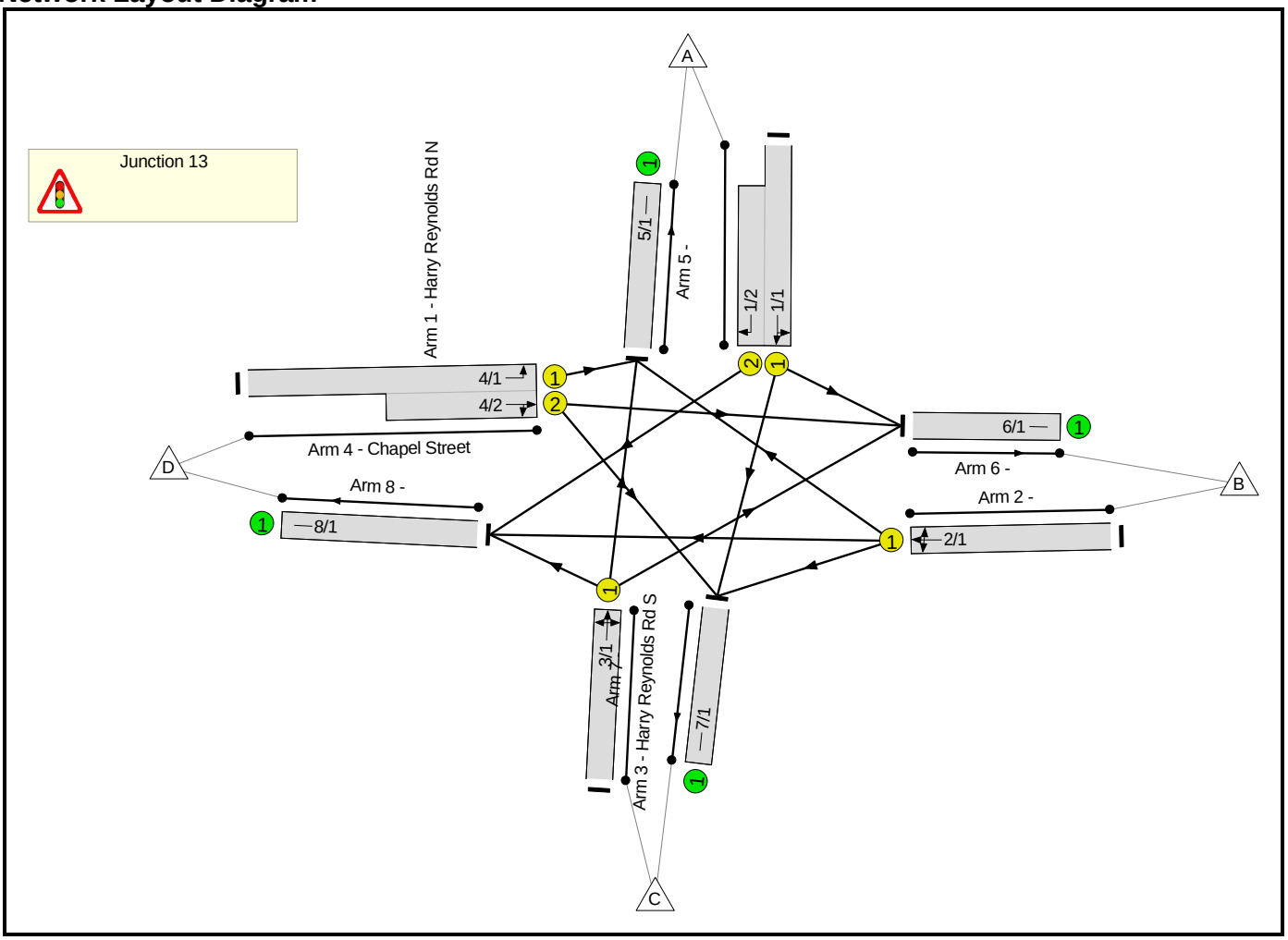
Cycle Time (s): 90

Full Input Data And Results

User and Project Details

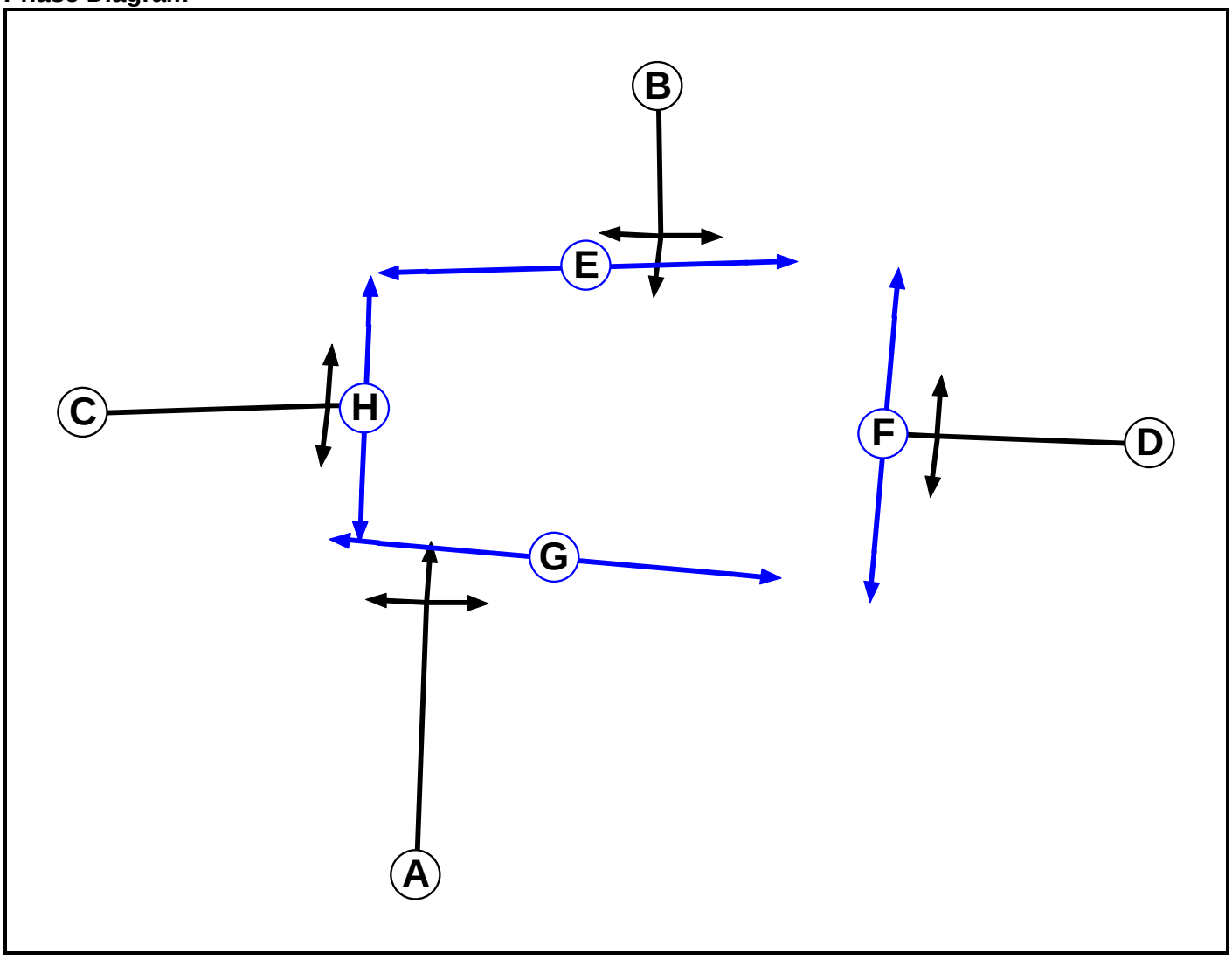
Project:	
Title:	
Location:	
Additional detail:	
File name:	JUNCTION 13 120s.lsg3x
Author:	
Company:	
Address:	

Network Layout Diagram



Full Input Data And Results

Phase Diagram



Phase Input Data

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

Full Input Data And Results

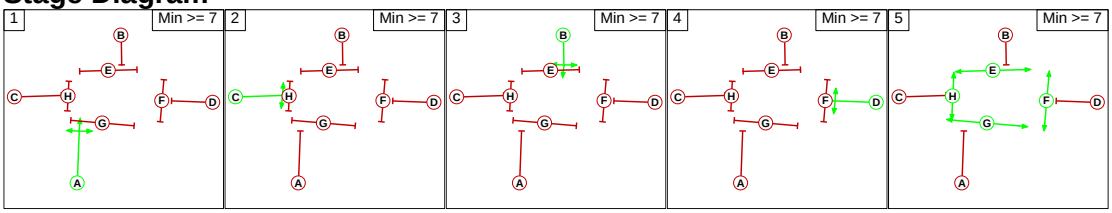
Phase Intergreens Matrix

Terminating Phase	Starting Phase								
		A	B	C	D	E	F	G	H
	A		5	5	5	6	6	6	6
	B	5		5	5	6	6	6	6
	C	5	5		5	6	6	6	6
	D	5	5	5		6	6	6	6
	E	15	15	15	15		-	-	-
	F	15	15	15	15	-		-	-
	G	15	15	15	15	-	-		-
	H	15	15	15	15	-	-	-	

Phases in Stage

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

Stage Diagram



Phase Delays

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

Prohibited Stage Change

From Stage	To Stage					
		1	2	3	4	5
	1		5	5	5	6
	2	5		5	5	6
	3	5	5		5	6
	4	5	5	5		6
	5	15	15	15	15	

Full Input Data And Results

Give-Way Lane Input Data

Junction: Junction 13
There are no Opposed Lanes in this Junction

Full Input Data And Results

Lane Input Data

Junction: Junction 13												
Lane	**Lane Type**	**Phases**	**Start Disp.**	**End Disp.**	**Physical Length (PCU)**	**Sat Flow Type**	**Def User Saturation Flow (PCU/Hr)**	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Turns**	**Turning Radius (m)**
1/1 (Harry Reynolds Rd N)	U	B	2	3	60.0	Geom	-	3.00	0.00	Y	Arm 6 Left	6.00
											Arm 7 Ahead	Inf
1/2 (Harry Reynolds Rd N)	U	B	2	3	11.0	Geom	-	3.00	0.00	N	Arm 8 Right	14.00
2/1	U	D	2	3	60.0	Geom	-	2.60	0.00	Y	Arm 5 Right	15.00
											Arm 7 Left	6.00
											Arm 8 Ahead	Inf
											Arm 5 Ahead	Inf
3/1 (Harry Reynolds Rd S)	U	A	2	3	60.0	Geom	-	3.75	0.00	Y	Arm 6 Right	6.00
											Arm 8 Left	6.00
4/1 (Chapel Street)	U	C	2	3	60.0	Geom	-	3.00	0.00	Y	Arm 5 Left	12.00
4/2 (Chapel Street)	U	C	2	3	8.5	Geom	-	3.00	0.00	N	Arm 6 Ahead	Inf
											Arm 7 Right	10.00
5/1	U		2	3	60.0	Inf	-	-	-	-	-	-
6/1	U		2	3	60.0	Inf	-	-	-	-	-	-
7/1	U		2	3	60.0	Inf	-	-	-	-	-	-
8/1	U		2	3	60.0	Inf	-	-	-	-	-	-

Traffic Flow Groups

Flow Group	Start Time	End Time	Duration	Formula
1: '2025 Base + CD AM'	08:00	09:00	01:00	
2: '2025 Base + CD PM'	17:00	18:00	01:00	
3: '2025 Base + CD + Malincross AM'	08:00	09:00	01:00	
4: '2025 Base + CD + Malincross PM'	17:00	18:00	01:00	
5: '2040 Base + CD AM'	08:00	09:00	01:00	
6: '2040 Base + CD PM'	17:00	18:00	01:00	
7: '2040 Base + CD + Malincross AM'	08:00	09:00	01:00	
8: '2040 Base + CD + Malincross PM'	17:00	18:00	01:00	

Scenario 1: '2025 Base + CD AM' (FG1: '2025 Base + CD AM', Plan 1: 'Network Control Plan 1')

Traffic Flows, Desired

Desired Flow :

		Destination				
		A	B	C	D	Tot.
Origin	A	0	54	294	277	625
	B	16	0	26	157	199
	C	142	4	0	40	186
	D	99	222	74	0	395
	Tot.	257	280	394	474	1405

Traffic Lane Flows

Lane	Scenario 1: 2025 Base + CD AM
Junction: Junction 13	
1/1 (with short)	625(In) 348(Out)
1/2 (short)	277
2/1	199
3/1	186
4/1 (with short)	395(In) 99(Out)
4/2 (short)	296
5/1	257
6/1	280
7/1	394
8/1	474

Full Input Data And Results

Lane Saturation Flows

Junction: Junction 13								
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat Flow (PCU/Hr)**	**Flared Sat Flow (PCU/Hr)**
1/1 (Harry Reynolds Rd N)	3.00	0.00	Y	Arm 6 Left	6.00	15.5 %	1843	1843
				Arm 7 Ahead	Inf	84.5 %		
1/2 (Harry Reynolds Rd N)	3.00	0.00	N	Arm 8 Right	14.00	100.0 %	1856	1856
2/1	2.60	0.00	Y	Arm 5 Right	15.00	8.0 %	1802	1802
				Arm 7 Left	6.00	13.1 %		
				Arm 8 Ahead	Inf	78.9 %		
3/1 (Harry Reynolds Rd S)	3.75	0.00	Y	Arm 5 Ahead	Inf	76.3 %	1879	1879
				Arm 6 Right	6.00	2.2 %		
				Arm 8 Left	6.00	21.5 %		
4/1 (Chapel Street)	3.00	0.00	Y	Arm 5 Left	12.00	100.0 %	1702	1702
4/2 (Chapel Street)	3.00	0.00	N	Arm 6 Ahead	Inf	75.0 %	1981	1981
				Arm 7 Right	10.00	25.0 %		
5/1	Infinite Saturation Flow						Inf	Inf
6/1	Infinite Saturation Flow						Inf	Inf
7/1	Infinite Saturation Flow						Inf	Inf
8/1	Infinite Saturation Flow						Inf	Inf

Scenario 2: '2025 Base + CD PM' (FG2: '2025 Base + CD PM', Plan 1: 'Network Control Plan 1')

Traffic Flows, Desired

Desired Flow :

		Destination				
		A	B	C	D	Tot.
Origin	A	0	29	92	123	244
	B	41	0	8	124	173
	C	213	15	0	104	332
	D	228	184	60	0	472
	Tot.	482	228	160	351	1221

Full Input Data And Results

Traffic Lane Flows

Lane	Scenario 2: 2025 Base + CD PM
Junction: Junction 13	
1/1 (with short)	244(In) 121(Out)
1/2 (short)	123
2/1	173
3/1	332
4/1 (with short)	472(In) 228(Out)
4/2 (short)	244
5/1	482
6/1	228
7/1	160
8/1	351

Lane Saturation Flows

Junction: Junction 13								
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat Flow (PCU/Hr)**	**Flared Sat Flow (PCU/Hr)**
1/1 (Harry Reynolds Rd N)	3.00	0.00	Y	Arm 6 Left	6.00	24.0 %	1807	1807
				Arm 7 Ahead	Inf	76.0 %		
1/2 (Harry Reynolds Rd N)	3.00	0.00	N	Arm 8 Right	14.00	100.0 %	1856	1856
2/1	2.60	0.00	Y	Arm 5 Right	15.00	23.7 %	1811	1811
				Arm 7 Left	6.00	4.6 %		
				Arm 8 Ahead	Inf	71.7 %		
3/1 (Harry Reynolds Rd S)	3.75	0.00	Y	Arm 5 Ahead	Inf	64.2 %	1826	1826
				Arm 6 Right	6.00	4.5 %		
				Arm 8 Left	6.00	31.3 %		
4/1 (Chapel Street)	3.00	0.00	Y	Arm 5 Left	12.00	100.0 %	1702	1702
4/2 (Chapel Street)	3.00	0.00	N	Arm 6 Ahead	Inf	75.4 %	1982	1982
				Arm 7 Right	10.00	24.6 %		
5/1	Infinite Saturation Flow						Inf	Inf
6/1	Infinite Saturation Flow						Inf	Inf
7/1	Infinite Saturation Flow						Inf	Inf
8/1	Infinite Saturation Flow						Inf	Inf

Full Input Data And Results

Scenario 3: '2025 Base + CD + Malincross AM' (FG3: '2025 Base + CD + Malincross AM', Plan 1: 'Network Control Plan 1')

Traffic Flows, Desired

Desired Flow :

Origin	Destination					
		A	B	C	D	Tot.
	A	0	61	329	307	697
	B	18	0	29	174	221
	C	158	5	0	43	206
	D	109	243	80	0	432
	Tot.	285	309	438	524	1556

Traffic Lane Flows

Lane	Scenario 3: 2025 Base + CD + Malincross AM
Junction: Junction 13	
1/1 (with short)	697(In) 390(Out)
1/2 (short)	307
2/1	221
3/1	206
4/1 (with short)	432(In) 109(Out)
4/2 (short)	323
5/1	285
6/1	309
7/1	438
8/1	524

Full Input Data And Results

Lane Saturation Flows

Junction: Junction 13								
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat Flow (PCU/Hr)**	**Flared Sat Flow (PCU/Hr)**
1/1 (Harry Reynolds Rd N)	3.00	0.00	Y	Arm 6 Left	6.00	15.6 %	1843	1843
				Arm 7 Ahead	Inf	84.4 %		
1/2 (Harry Reynolds Rd N)	3.00	0.00	N	Arm 8 Right	14.00	100.0 %	1856	1856
2/1	2.60	0.00	Y	Arm 5 Right	15.00	8.1 %	1801	1801
				Arm 7 Left	6.00	13.1 %		
				Arm 8 Ahead	Inf	78.7 %		
3/1 (Harry Reynolds Rd S)	3.75	0.00	Y	Arm 5 Ahead	Inf	76.7 %	1880	1880
				Arm 6 Right	6.00	2.4 %		
				Arm 8 Left	6.00	20.9 %		
4/1 (Chapel Street)	3.00	0.00	Y	Arm 5 Left	12.00	100.0 %	1702	1702
4/2 (Chapel Street)	3.00	0.00	N	Arm 6 Ahead	Inf	75.2 %	1981	1981
				Arm 7 Right	10.00	24.8 %		
5/1	Infinite Saturation Flow						Inf	Inf
6/1	Infinite Saturation Flow						Inf	Inf
7/1	Infinite Saturation Flow						Inf	Inf
8/1	Infinite Saturation Flow						Inf	Inf

Scenario 4: '2025 Base + CD + Malincross PM' (FG4: '2025 Base + CD + Malincross PM', Plan 1: 'Network Control Plan 1')

Traffic Flows, Desired

Desired Flow :

		Destination				
		A	B	C	D	Tot.
Origin	A	0	33	103	136	272
	B	46	0	9	137	192
	C	239	17	0	114	370
	D	252	204	66	0	522
	Tot.	537	254	178	387	1356

Full Input Data And Results

Traffic Lane Flows

Lane	Scenario 4: 2025 Base + CD + Malincross PM
Junction: Junction 13	
1/1 (with short)	272(In) 136(Out)
1/2 (short)	136
2/1	192
3/1	370
4/1 (with short)	522(In) 252(Out)
4/2 (short)	270
5/1	537
6/1	254
7/1	178
8/1	387

Lane Saturation Flows

Junction: Junction 13								
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat Flow (PCU/Hr)**	**Flared Sat Flow (PCU/Hr)**
1/1 (Harry Reynolds Rd N)	3.00	0.00	Y	Arm 6 Left	6.00	24.3 %	1805	1805
				Arm 7 Ahead	Inf	75.7 %		
1/2 (Harry Reynolds Rd N)	3.00	0.00	N	Arm 8 Right	14.00	100.0 %	1856	1856
2/1	2.60	0.00	Y	Arm 5 Right	15.00	24.0 %	1810	1810
				Arm 7 Left	6.00	4.7 %		
				Arm 8 Ahead	Inf	71.4 %		
3/1 (Harry Reynolds Rd S)	3.75	0.00	Y	Arm 5 Ahead	Inf	64.6 %	1828	1828
				Arm 6 Right	6.00	4.6 %		
				Arm 8 Left	6.00	30.8 %		
4/1 (Chapel Street)	3.00	0.00	Y	Arm 5 Left	12.00	100.0 %	1702	1702
4/2 (Chapel Street)	3.00	0.00	N	Arm 6 Ahead	Inf	75.6 %	1982	1982
				Arm 7 Right	10.00	24.4 %		
5/1	Infinite Saturation Flow						Inf	Inf
6/1	Infinite Saturation Flow						Inf	Inf
7/1	Infinite Saturation Flow						Inf	Inf
8/1	Infinite Saturation Flow						Inf	Inf

Full Input Data And Results

Scenario 5: '2040 Base + CD AM' (FG5: '2040 Base + CD AM', Plan 1: 'Network Control Plan 1')

Traffic Flows, Desired

Desired Flow :

		Destination				
		A	B	C	D	Tot.
Origin	A	0	54	311	277	642
	B	16	0	26	164	206
	C	147	4	0	47	198
	D	99	244	96	0	439
	Tot.	262	302	433	488	1485

Traffic Lane Flows

Lane	Scenario 5: 2040 Base + CD AM
Junction: Junction 13	
1/1 (with short)	642(In) 365(Out)
1/2 (short)	277
2/1	206
3/1	198
4/1 (with short)	439(In) 99(Out)
4/2 (short)	340
5/1	262
6/1	302
7/1	433
8/1	488

Full Input Data And Results

Lane Saturation Flows

Junction: Junction 13								
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat Flow (PCU/Hr)**	**Flared Sat Flow (PCU/Hr)**
1/1 (Harry Reynolds Rd N)	3.00	0.00	Y	Arm 6 Left	6.00	14.8 %	1847	1847
				Arm 7 Ahead	Inf	85.2 %		
1/2 (Harry Reynolds Rd N)	3.00	0.00	N	Arm 8 Right	14.00	100.0 %	1856	1856
2/1	2.60	0.00	Y	Arm 5 Right	15.00	7.8 %	1804	1804
				Arm 7 Left	6.00	12.6 %		
				Arm 8 Ahead	Inf	79.6 %		
3/1 (Harry Reynolds Rd S)	3.75	0.00	Y	Arm 5 Ahead	Inf	74.2 %	1870	1870
				Arm 6 Right	6.00	2.0 %		
				Arm 8 Left	6.00	23.7 %		
4/1 (Chapel Street)	3.00	0.00	Y	Arm 5 Left	12.00	100.0 %	1702	1702
4/2 (Chapel Street)	3.00	0.00	N	Arm 6 Ahead	Inf	71.8 %	1972	1972
				Arm 7 Right	10.00	28.2 %		
5/1	Infinite Saturation Flow						Inf	Inf
6/1	Infinite Saturation Flow						Inf	Inf
7/1	Infinite Saturation Flow						Inf	Inf
8/1	Infinite Saturation Flow						Inf	Inf

Scenario 6: '2040 Base + CD PM' (FG6: '2040 Base + CD PM', Plan 1: 'Network Control Plan 1')

Traffic Flows, Desired

Desired Flow :

Origin	Destination					
		A	B	C	D	Tot.
	A	0	29	101	123	253
	B	41	0	8	137	186
	C	229	15	0	117	361
	D	228	197	73	0	498
	Tot.	498	241	182	377	1298

Full Input Data And Results

Traffic Lane Flows

Lane	Scenario 6: 2040 Base + CD PM
Junction: Junction 13	
1/1 (with short)	253(In) 130(Out)
1/2 (short)	123
2/1	186
3/1	361
4/1 (with short)	498(In) 228(Out)
4/2 (short)	270
5/1	498
6/1	241
7/1	182
8/1	377

Lane Saturation Flows

Junction: Junction 13								
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat Flow (PCU/Hr)**	**Flared Sat Flow (PCU/Hr)**
1/1 (Harry Reynolds Rd N)	3.00	0.00	Y	Arm 6 Left	6.00	22.3 %	1814	1814
				Arm 7 Ahead	Inf	77.7 %		
1/2 (Harry Reynolds Rd N)	3.00	0.00	N	Arm 8 Right	14.00	100.0 %	1856	1856
2/1	2.60	0.00	Y	Arm 5 Right	15.00	22.0 %	1815	1815
				Arm 7 Left	6.00	4.3 %		
				Arm 8 Ahead	Inf	73.7 %		
3/1 (Harry Reynolds Rd S)	3.75	0.00	Y	Arm 5 Ahead	Inf	63.4 %	1823	1823
				Arm 6 Right	6.00	4.2 %		
				Arm 8 Left	6.00	32.4 %		
4/1 (Chapel Street)	3.00	0.00	Y	Arm 5 Left	12.00	100.0 %	1702	1702
4/2 (Chapel Street)	3.00	0.00	N	Arm 6 Ahead	Inf	73.0 %	1975	1975
				Arm 7 Right	10.00	27.0 %		
5/1	Infinite Saturation Flow						Inf	Inf
6/1	Infinite Saturation Flow						Inf	Inf
7/1	Infinite Saturation Flow						Inf	Inf
8/1	Infinite Saturation Flow						Inf	Inf

Full Input Data And Results

Scenario 7: '2040 Base + CD + Malincross AM' (FG7: '2040 Base + CD + Malincross AM', Plan 1: 'Network Control Plan 1')

Traffic Flows, Desired

Desired Flow :

Origin	Destination					
		A	B	C	D	Tot.
	A	0	61	347	307	715
	B	18	0	29	181	228
	C	164	5	0	50	219
	D	109	265	102	0	476
	Tot.	291	331	478	538	1638

Traffic Lane Flows

Lane	Scenario 7: 2040 Base + CD + Malincross AM
Junction: Junction 13	
1/1 (with short)	715(In) 408(Out)
1/2 (short)	307
2/1	228
3/1	219
4/1 (with short)	476(In) 109(Out)
4/2 (short)	367
5/1	291
6/1	331
7/1	478
8/1	538

Full Input Data And Results

Lane Saturation Flows

Junction: Junction 13								
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat Flow (PCU/Hr)**	**Flared Sat Flow (PCU/Hr)**
1/1 (Harry Reynolds Rd N)	3.00	0.00	Y	Arm 6 Left	6.00	15.0 %	1846	1846
				Arm 7 Ahead	Inf	85.0 %		
1/2 (Harry Reynolds Rd N)	3.00	0.00	N	Arm 8 Right	14.00	100.0 %	1856	1856
2/1	2.60	0.00	Y	Arm 5 Right	15.00	7.9 %	1803	1803
				Arm 7 Left	6.00	12.7 %		
				Arm 8 Ahead	Inf	79.4 %		
3/1 (Harry Reynolds Rd S)	3.75	0.00	Y	Arm 5 Ahead	Inf	74.9 %	1872	1872
				Arm 6 Right	6.00	2.3 %		
				Arm 8 Left	6.00	22.8 %		
4/1 (Chapel Street)	3.00	0.00	Y	Arm 5 Left	12.00	100.0 %	1702	1702
4/2 (Chapel Street)	3.00	0.00	N	Arm 6 Ahead	Inf	72.2 %	1973	1973
				Arm 7 Right	10.00	27.8 %		
5/1	Infinite Saturation Flow						Inf	Inf
6/1	Infinite Saturation Flow						Inf	Inf
7/1	Infinite Saturation Flow						Inf	Inf
8/1	Infinite Saturation Flow						Inf	Inf

Scenario 8: '2040 Base + CD + Malincross PM' (FG8: '2040 Base + CD + Malincross PM', Plan 1: 'Network Control Plan 1')

Traffic Flows, Desired

Desired Flow :

		Destination				
		A	B	C	D	Tot.
Origin	A	0	33	113	136	282
	B	46	0	9	150	205
	C	255	17	0	127	399
	D	252	218	80	0	550
	Tot.	553	268	202	413	1436

Full Input Data And Results

Traffic Lane Flows

Lane	Scenario 8: 2040 Base + CD + Malincross PM
Junction: Junction 13	
1/1 (with short)	282(In) 146(Out)
1/2 (short)	136
2/1	205
3/1	399
4/1 (with short)	550(In) 252(Out)
4/2 (short)	298
5/1	553
6/1	268
7/1	202
8/1	413

Lane Saturation Flows

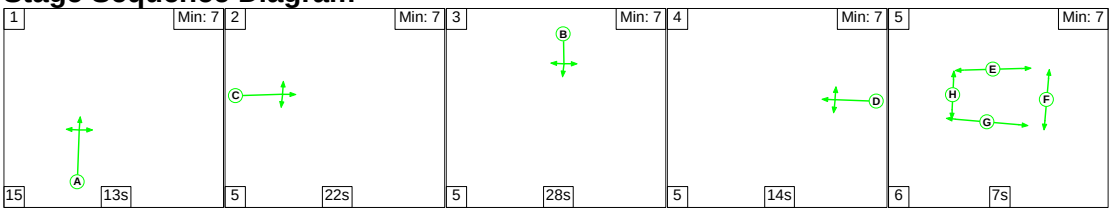
Junction: Junction 13

Lane	Lane Width (m)	Gradient	Nearside Lane	Allowed Turns	Turning Radius (m)	Turning Prop.	Sat Flow (PCU/Hr)	Flared Sat Flow (PCU/Hr)
1/1 (Harry Reynolds Rd N)	3.00	0.00	Y	Arm 6 Left	6.00	22.6 %	1813	1813
				Arm 7 Ahead	Inf	77.4 %		
1/2 (Harry Reynolds Rd N)	3.00	0.00	N	Arm 8 Right	14.00	100.0 %	1856	1856
2/1	2.60	0.00	Y	Arm 5 Right	15.00	22.4 %	1814	1814
				Arm 7 Left	6.00	4.4 %		
				Arm 8 Ahead	Inf	73.2 %		
3/1 (Harry Reynolds Rd S)	3.75	0.00	Y	Arm 5 Ahead	Inf	63.9 %	1825	1825
				Arm 6 Right	6.00	4.3 %		
				Arm 8 Left	6.00	31.8 %		
4/1 (Chapel Street)	3.00	0.00	Y	Arm 5 Left	12.00	100.0 %	1702	1702
4/2 (Chapel Street)	3.00	0.00	N	Arm 6 Ahead	Inf	73.2 %	1975	1975
				Arm 7 Right	10.00	26.8 %		
5/1	Infinite Saturation Flow						Inf	Inf
6/1	Infinite Saturation Flow						Inf	Inf
7/1	Infinite Saturation Flow						Inf	Inf
8/1	Infinite Saturation Flow						Inf	Inf

Full Input Data And Results

Scenario 1: '2025 Base + CD AM' (FG1: '2025 Base + CD AM', Plan 1: 'Network Control Plan 1')

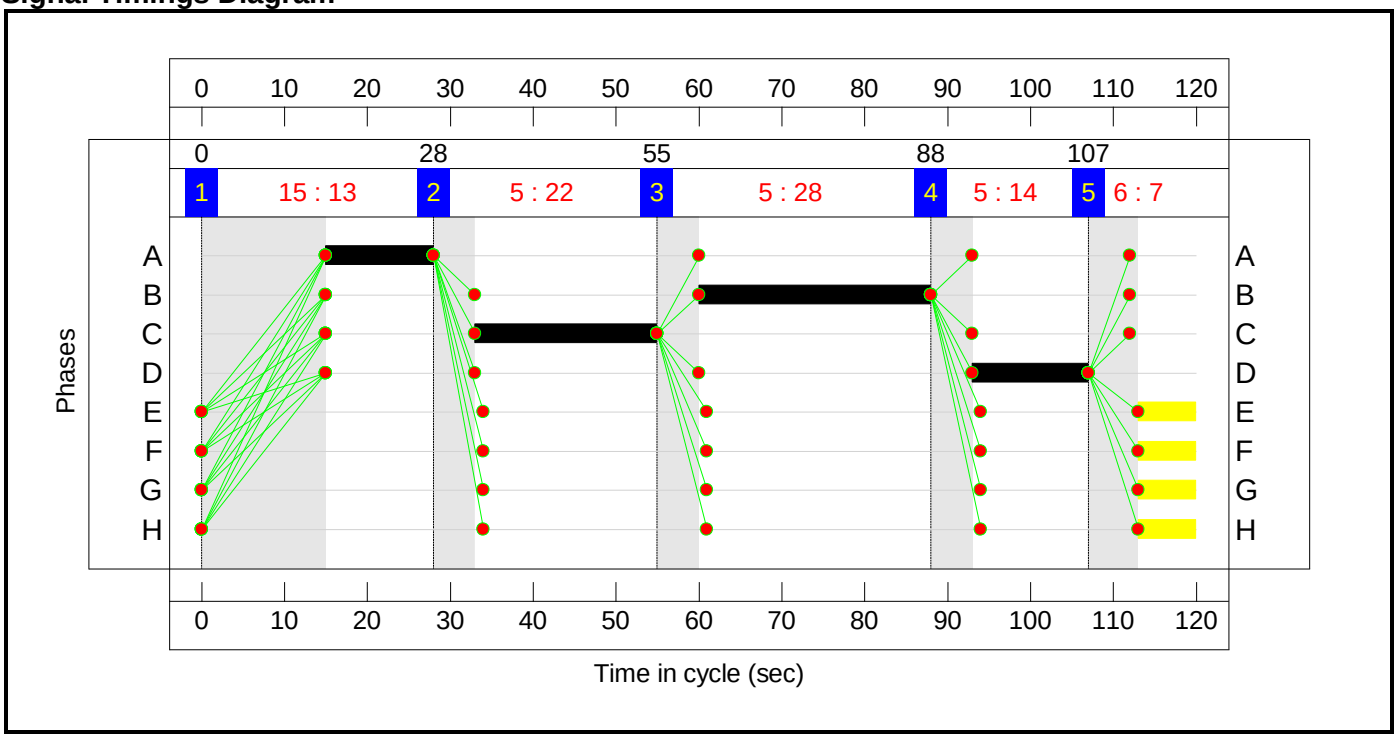
Stage Sequence Diagram



Stage Timings

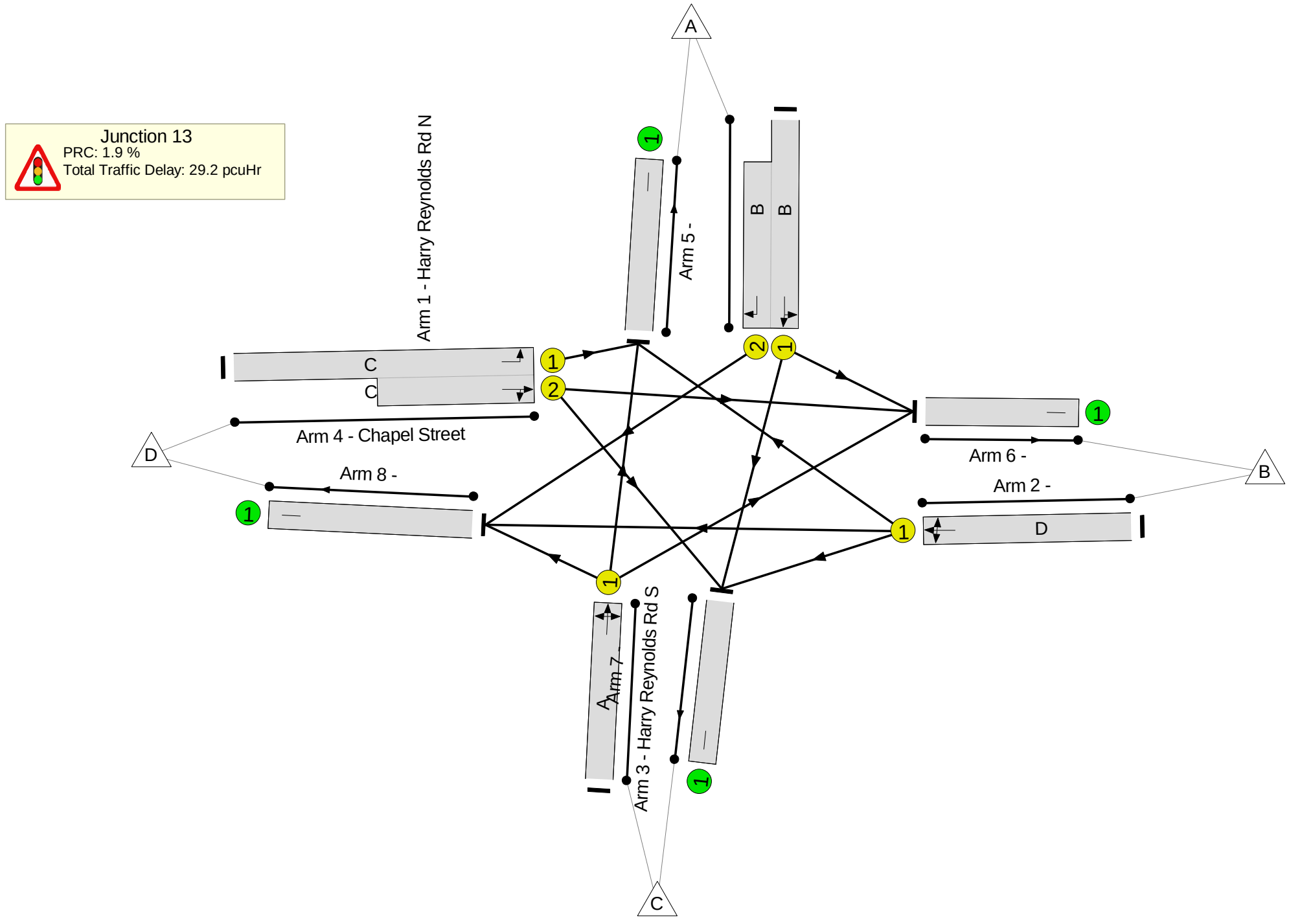
Stage	1	2	3	4	5
Duration	13	22	28	14	7
Change Point	0	28	55	88	107

Signal Timings Diagram



Full Input Data And Results

Network Layout Diagram


Junction 13
PRC: 1.9 %
Total Traffic Delay: 29.2 pcuHr
A
B
C
D
Arm 1 - Harry Reynolds Rd N
Arm 2 -
Arm 3 - Harry Reynolds Rd S
Arm 4 - Chapel Street
Arm 5 -
Arm 6 -
Arm 7 -
Arm 8 -
C
C
B
B
D

Full Input Data And Results

Network Results

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**88.3%**
Junction 13	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**88.3%**
1/1+1/2	Harry Reynolds Rd N Left Ahead Right	U	N/A	N/A	B		1	28	-	625	1843:1856	399+317	87.3 : 87.3%
2/1	Right Left Ahead	U	N/A	N/A	D		1	14	-	199	1802	225	88.3%
3/1	Harry Reynolds Rd S Ahead Right Left	U	N/A	N/A	A		1	13	-	186	1879	219	84.8%
4/1+4/2	Chapel Street Left Ahead Right	U	N/A	N/A	C		1	22	-	395	1702:1981	115+345	85.8 : 85.8%
5/1		U	N/A	N/A	-		-	-	-	257	Inf	Inf	0.0%
6/1		U	N/A	N/A	-		-	-	-	280	Inf	Inf	0.0%
7/1		U	N/A	N/A	-		-	-	-	394	Inf	Inf	0.0%
8/1		U	N/A	N/A	-		-	-	-	474	Inf	Inf	0.0%

Full Input Data And Results

Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network	**-**	**-**	**0**	**0**	**0**	**17.7**	**11.5**	**0.0**	**29.2**	**-**	**-**	**-**	**-**
Junction 13	**-**	**-**	**0**	**0**	**0**	**17.7**	**11.5**	**0.0**	**29.2**	**-**	**-**	**-**	**-**
1/1+1/2	625	625	-	-	-	7.2	3.2	-	10.4	60.2	10.8	3.2	14.0
2/1	199	199	-	-	-	2.9	3.1	-	5.9	107.2	6.5	3.1	9.6
3/1	186	186	-	-	-	2.7	2.4	-	5.1	99.2	6.0	2.4	8.5
4/1+4/2	395	395	-	-	-	4.9	2.8	-	7.7	70.4	9.7	2.8	12.4
5/1	257	257	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	280	280	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
7/1	394	394	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
8/1	474	474	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0

C1

PRC for Signalled Lanes (%): 1.9

PRC Over All Lanes (%): 1.9

Total Delay for Signalled Lanes (pcuHr): 29.22

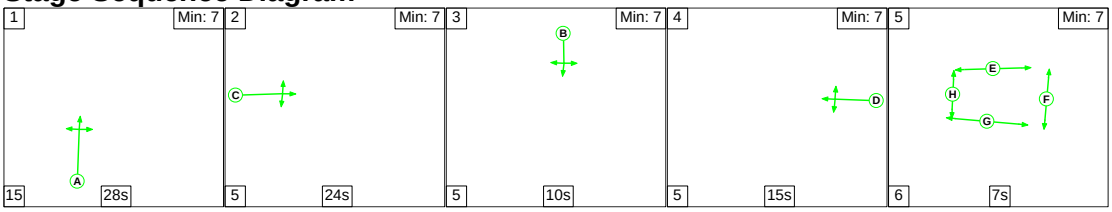
Total Delay Over All Lanes(pcuHr): 29.22

Cycle Time (s): 120

Full Input Data And Results

Scenario 2: '2025 Base + CD PM' (FG2: '2025 Base + CD PM', Plan 1: 'Network Control Plan 1')

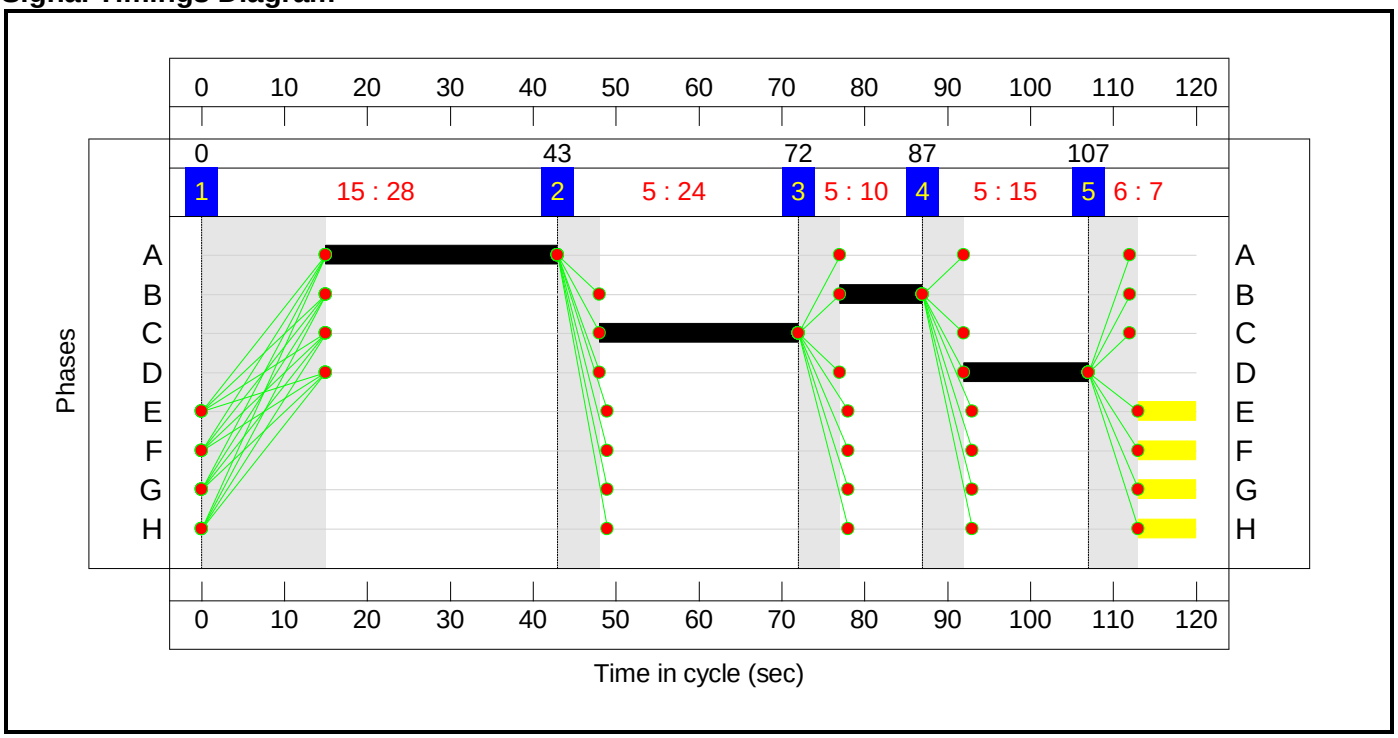
Stage Sequence Diagram



Stage Timings

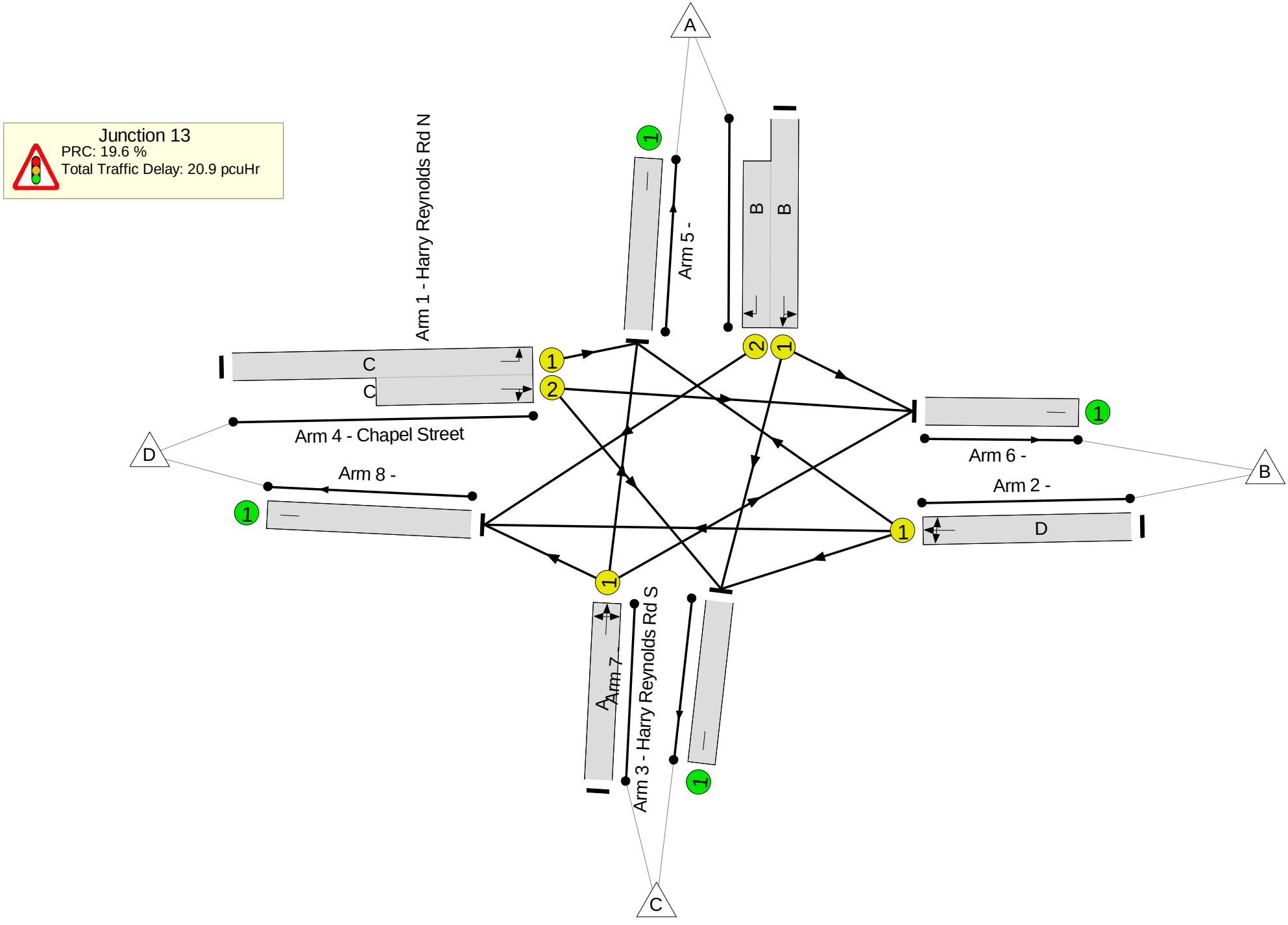
Stage	1	2	3	4	5
Duration	28	24	10	15	7
Change Point	0	43	72	87	107

Signal Timings Diagram



Full Input Data And Results

Network Layout Diagram


Junction 13
PRC: 19.6 %
Total Traffic Delay: 20.9 pcuHr
A
B
C
D
Arm 1 - Harry Reynolds Rd N
Arm 2 -
Arm 3 - Harry Reynolds Rd S
Arm 4 - Chapel Street
Arm 5 -
Arm 6 -
Arm 7 -
Arm 8 -
C
C
B
B
D

Full Input Data And Results

Network Results

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**75.2%**
Junction 13	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**75.2%**
1/1+1/2	Harry Reynolds Rd N Left Ahead Right	U	N/A	N/A	B		1	10	-	244	1807:1856	166+170	73.0 : 72.3%
2/1	Right Left Ahead	U	N/A	N/A	D		1	15	-	173	1811	241	71.6%
3/1	Harry Reynolds Rd S Ahead Right Left	U	N/A	N/A	A		1	28	-	332	1826	441	75.2%
4/1+4/2	Chapel Street Left Ahead Right	U	N/A	N/A	C		1	24	-	472	1702:1982	309+331	73.8 : 73.8%
5/1		U	N/A	N/A	-		-	-	-	482	Inf	Inf	0.0%
6/1		U	N/A	N/A	-		-	-	-	228	Inf	Inf	0.0%
7/1		U	N/A	N/A	-		-	-	-	160	Inf	Inf	0.0%
8/1		U	N/A	N/A	-		-	-	-	351	Inf	Inf	0.0%

Full Input Data And Results

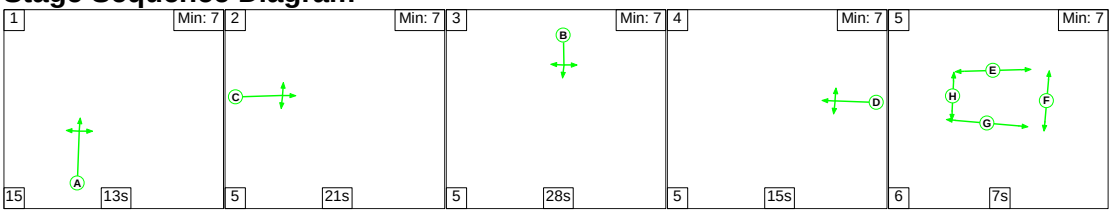
Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network	**-**	**-**	**0**	**0**	**0**	**15.5**	**5.4**	**0.0**	**20.9**	**-**	**-**	**-**	**-**
Junction 13	**-**	**-**	**0**	**0**	**0**	**15.5**	**5.4**	**0.0**	**20.9**	**-**	**-**	**-**	**-**
1/1+1/2	244	244	-	-	-	3.6	1.3	-	4.9	72.1	4.0	1.3	5.3
2/1	173	173	-	-	-	2.4	1.2	-	3.6	75.2	5.5	1.2	6.7
3/1	332	332	-	-	-	3.9	1.5	-	5.4	58.2	10.2	1.5	11.7
4/1+4/2	472	472	-	-	-	5.7	1.4	-	7.0	53.7	7.3	1.4	8.7
5/1	482	482	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	228	228	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
7/1	160	160	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
8/1	351	351	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0

C1 PRC for Signalled Lanes (%): 19.6 Total Delay for Signalled Lanes (pcuHr): 20.91 Cycle Time (s): 120
PRC Over All Lanes (%): 19.6 Total Delay Over All Lanes(pcuHr): 20.91

Full Input Data And Results

Scenario 3: '2025 Base + CD + Malincross AM' (FG3: '2025 Base + CD + Malincross AM', Plan 1: 'Network Control Plan 1')

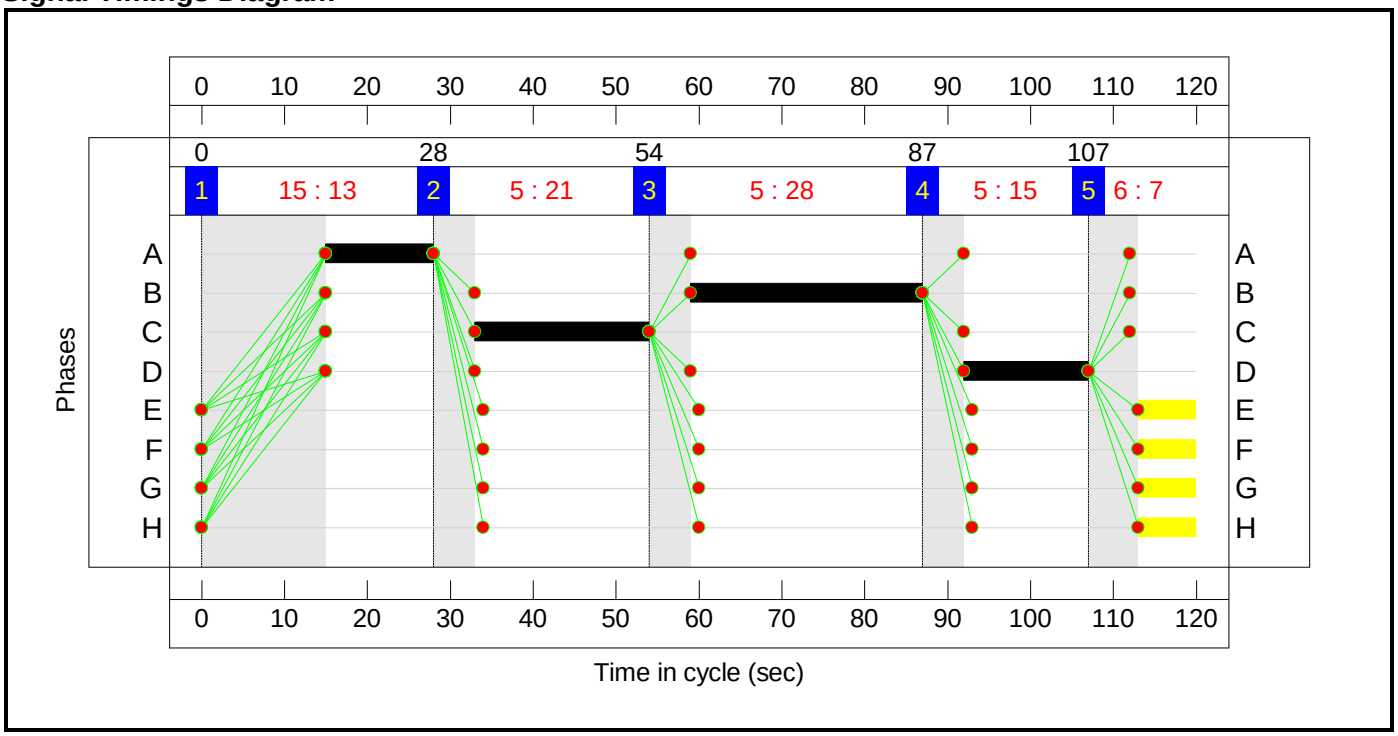
Stage Sequence Diagram



Stage Timings

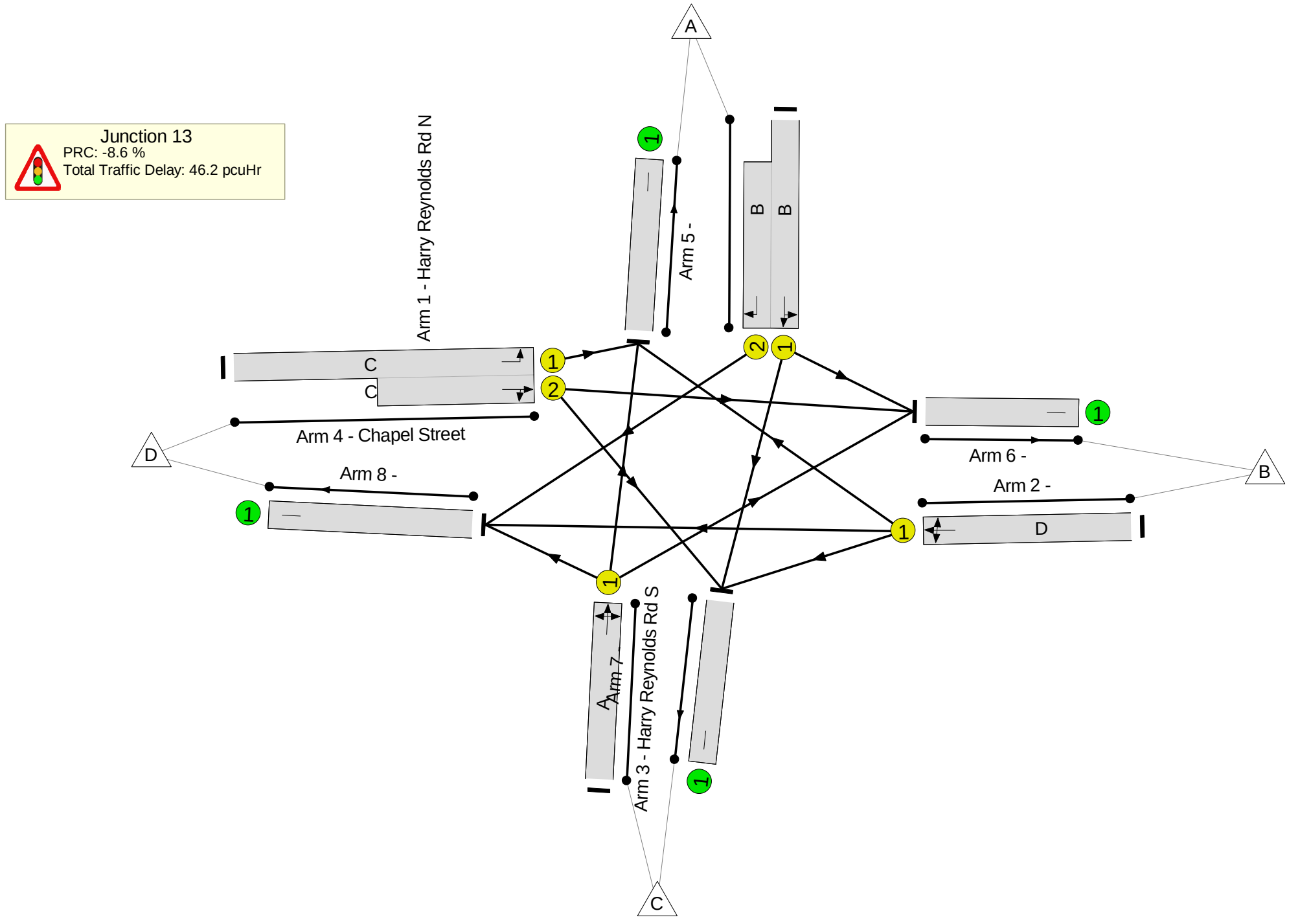
Stage	1	2	3	4	5
Duration	13	21	28	15	7
Change Point	0	28	54	87	107

Signal Timings Diagram



Full Input Data And Results

Network Layout Diagram


Junction 13
PRC: -8.6 %
Total Traffic Delay: 46.2 pcuHr
A
B
C
D
Arm 1 - Harry Reynolds Rd N
Arm 2 -
Arm 3 - Harry Reynolds Rd S
Arm 4 - Chapel Street
Arm 5 -
Arm 6 -
Arm 7 -
Arm 8 -
C
C
B
B
D

Full Input Data And Results

Network Results

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**97.8%**
Junction 13	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**97.8%**
1/1+1/2	Harry Reynolds Rd N Left Ahead Right	U	N/A	N/A	B		1	28	-	697	1843:1856	399+314	97.8 : 97.8%
2/1	Right Left Ahead	U	N/A	N/A	D		1	15	-	221	1801	240	92.0%
3/1	Harry Reynolds Rd S Ahead Right Left	U	N/A	N/A	A		1	13	-	206	1880	219	93.9%
4/1+4/2	Chapel Street Left Ahead Right	U	N/A	N/A	C		1	21	-	432	1702:1981	112+333	97.0 : 97.0%
5/1		U	N/A	N/A	-		-	-	-	285	Inf	Inf	0.0%
6/1		U	N/A	N/A	-		-	-	-	309	Inf	Inf	0.0%
7/1		U	N/A	N/A	-		-	-	-	438	Inf	Inf	0.0%
8/1		U	N/A	N/A	-		-	-	-	524	Inf	Inf	0.0%

Full Input Data And Results

Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network	**-**	**-**	**0**	**0**	**0**	**20.2**	**26.0**	**0.0**	**46.2**	**-**	**-**	**-**	**-**
Junction 13	**-**	**-**	**0**	**0**	**0**	**20.2**	**26.0**	**0.0**	**46.2**	**-**	**-**	**-**	**-**
1/1+1/2	697	697	-	-	-	8.3	9.8	-	18.1	93.6	14.3	9.8	24.1
2/1	221	221	-	-	-	3.2	4.1	-	7.2	117.4	7.2	4.1	11.3
3/1	206	206	-	-	-	3.0	4.6	-	7.6	132.6	6.8	4.6	11.4
4/1+4/2	432	432	-	-	-	5.7	7.6	-	13.3	110.8	11.3	7.6	18.9
5/1	285	285	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	309	309	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
7/1	438	438	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
8/1	524	524	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0

C1

PRC for Signalled Lanes (%): -8.6
PRC Over All Lanes (%): -8.6

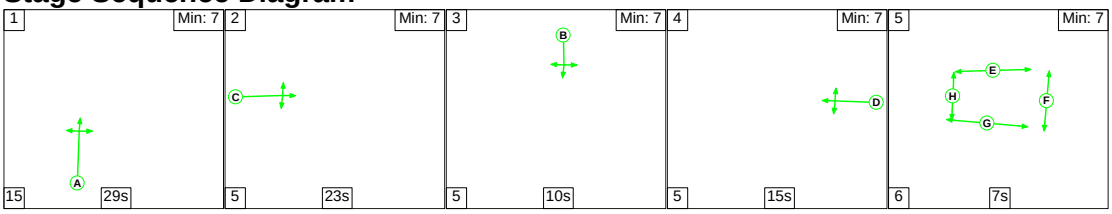
Total Delay for Signalled Lanes (pcuHr): 46.21
Total Delay Over All Lanes(pcuHr): 46.21

Cycle Time (s): 120

Full Input Data And Results

Scenario 4: '2025 Base + CD + Malincross PM' (FG4: '2025 Base + CD + Malincross PM', Plan 1: 'Network Control Plan 1')

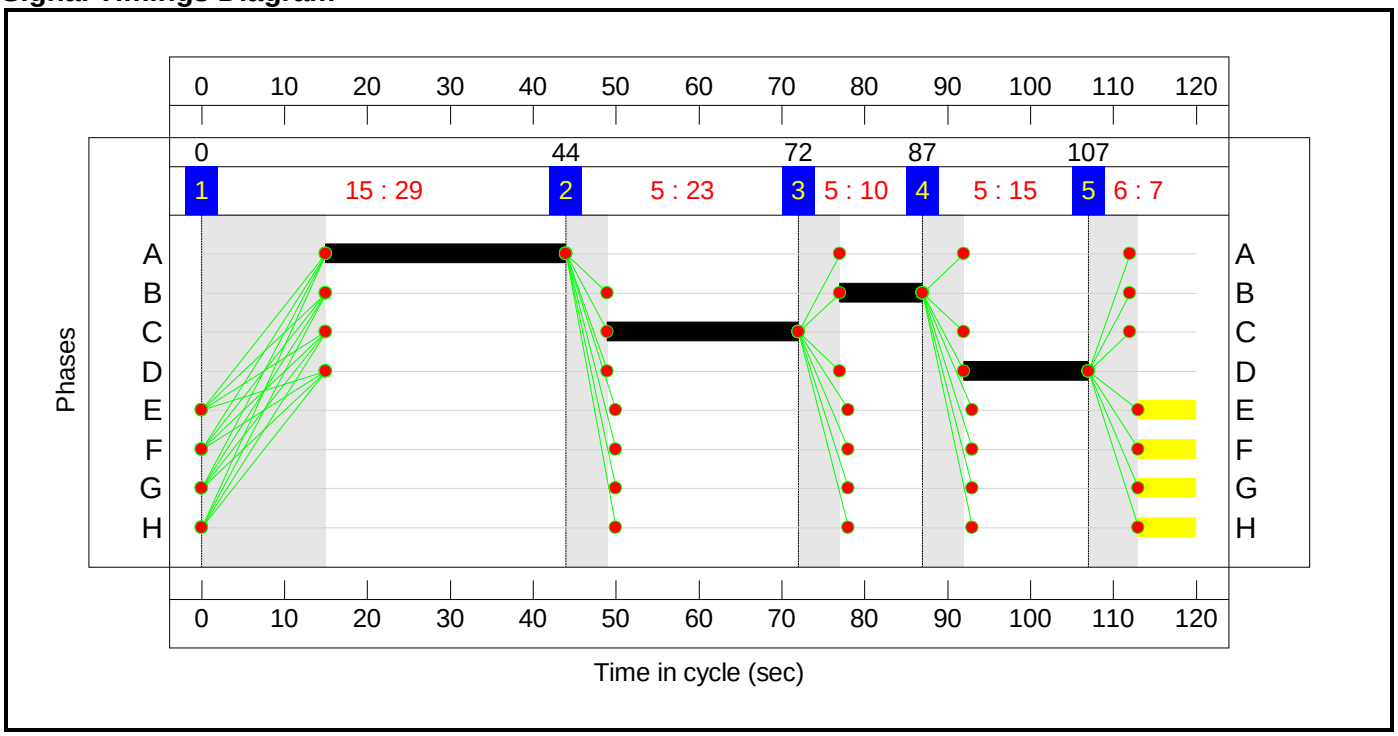
Stage Sequence Diagram



Stage Timings

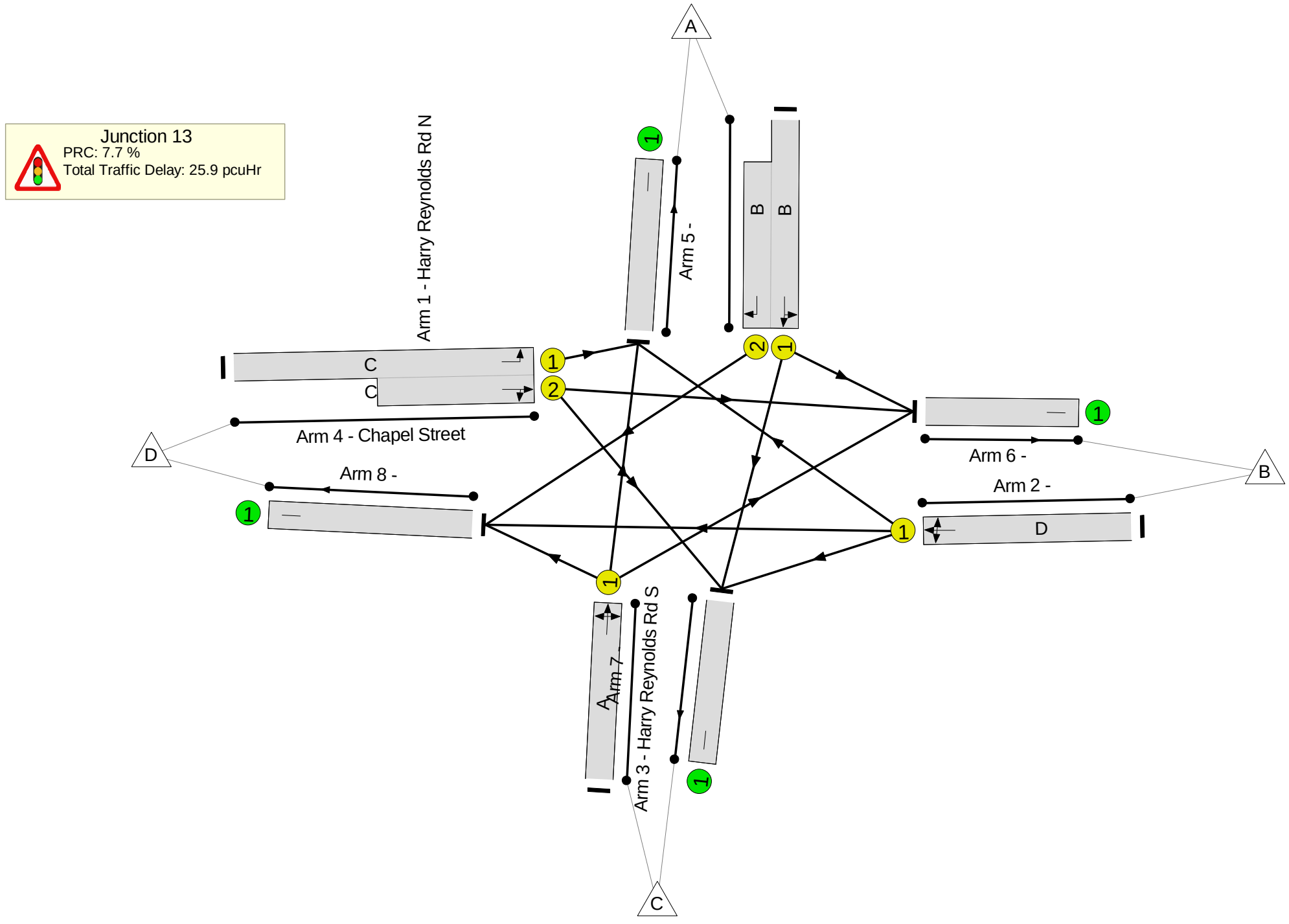
Stage	1	2	3	4	5
Duration	29	23	10	15	7
Change Point	0	44	72	87	107

Signal Timings Diagram



Full Input Data And Results

Network Layout Diagram


Junction 13
PRC: 7.7 %
Total Traffic Delay: 25.9 pcuHr
A
B
C
D
Arm 1 - Harry Reynolds Rd N
Arm 2 -
Arm 3 - Harry Reynolds Rd S
Arm 4 - Chapel Street
Arm 5 -
Arm 6 -
Arm 7 -
Arm 8 -
C
C
B
B
D

Full Input Data And Results

Network Results

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**83.6%**
Junction 13	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**83.6%**
1/1+1/2	Harry Reynolds Rd N Left Ahead Right	U	N/A	N/A	B		1	10	-	272	1805:1856	165+170	82.2 : 79.9%
2/1	Right Left Ahead	U	N/A	N/A	D		1	15	-	192	1810	241	79.6%
3/1	Harry Reynolds Rd S Ahead Right Left	U	N/A	N/A	A		1	29	-	370	1828	457	81.0%
4/1+4/2	Chapel Street Left Ahead Right	U	N/A	N/A	C		1	23	-	522	1702:1982	302+323	83.6 : 83.6%
5/1		U	N/A	N/A	-		-	-	-	537	Inf	Inf	0.0%
6/1		U	N/A	N/A	-		-	-	-	254	Inf	Inf	0.0%
7/1		U	N/A	N/A	-		-	-	-	178	Inf	Inf	0.0%
8/1		U	N/A	N/A	-		-	-	-	387	Inf	Inf	0.0%

Full Input Data And Results

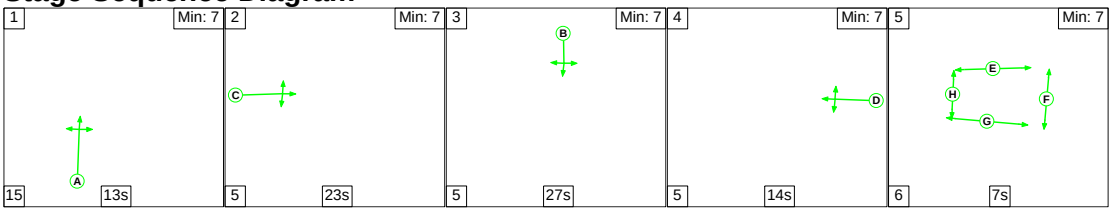
Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network	**-**	**-**	**0**	**0**	**0**	**17.6**	**8.3**	**0.0**	**25.9**	**-**	**-**	**-**	**-**
Junction 13	**-**	**-**	**0**	**0**	**0**	**17.6**	**8.3**	**0.0**	**25.9**	**-**	**-**	**-**	**-**
1/1+1/2	272	272	-	-	-	4.0	2.0	-	6.1	80.1	4.4	2.0	6.4
2/1	192	192	-	-	-	2.7	1.8	-	4.5	84.4	6.2	1.8	8.0
3/1	370	370	-	-	-	4.3	2.0	-	6.4	62.1	11.5	2.0	13.5
4/1+4/2	522	522	-	-	-	6.5	2.4	-	8.9	61.5	8.3	2.4	10.8
5/1	537	537	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	254	254	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
7/1	178	178	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
8/1	387	387	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0

C1 PRC for Signalled Lanes (%): 7.7 Total Delay for Signalled Lanes (pcuHr): 25.85 Cycle Time (s): 120
PRC Over All Lanes (%): 7.7 Total Delay Over All Lanes(pcuHr): 25.85

Full Input Data And Results

Scenario 5: '2040 Base + CD AM' (FG5: '2040 Base + CD AM', Plan 1: 'Network Control Plan 1')

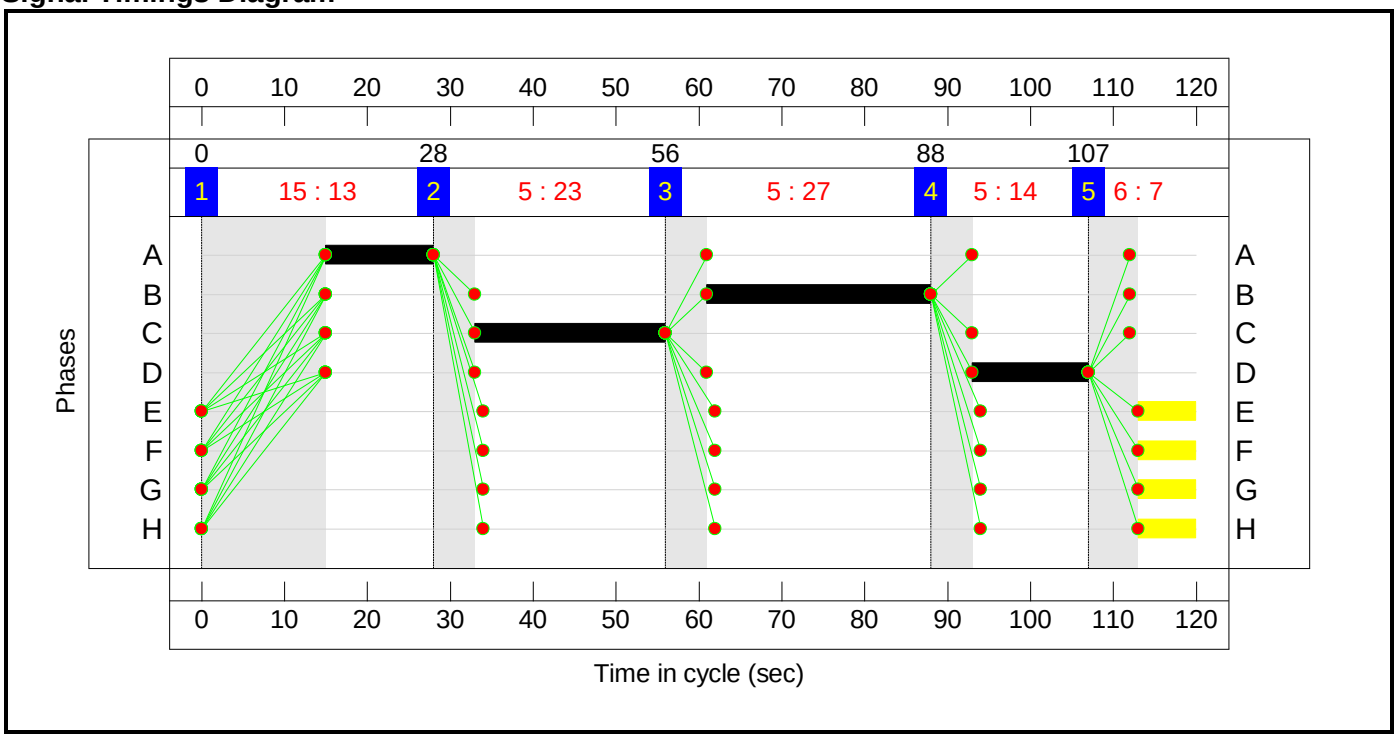
Stage Sequence Diagram



Stage Timings

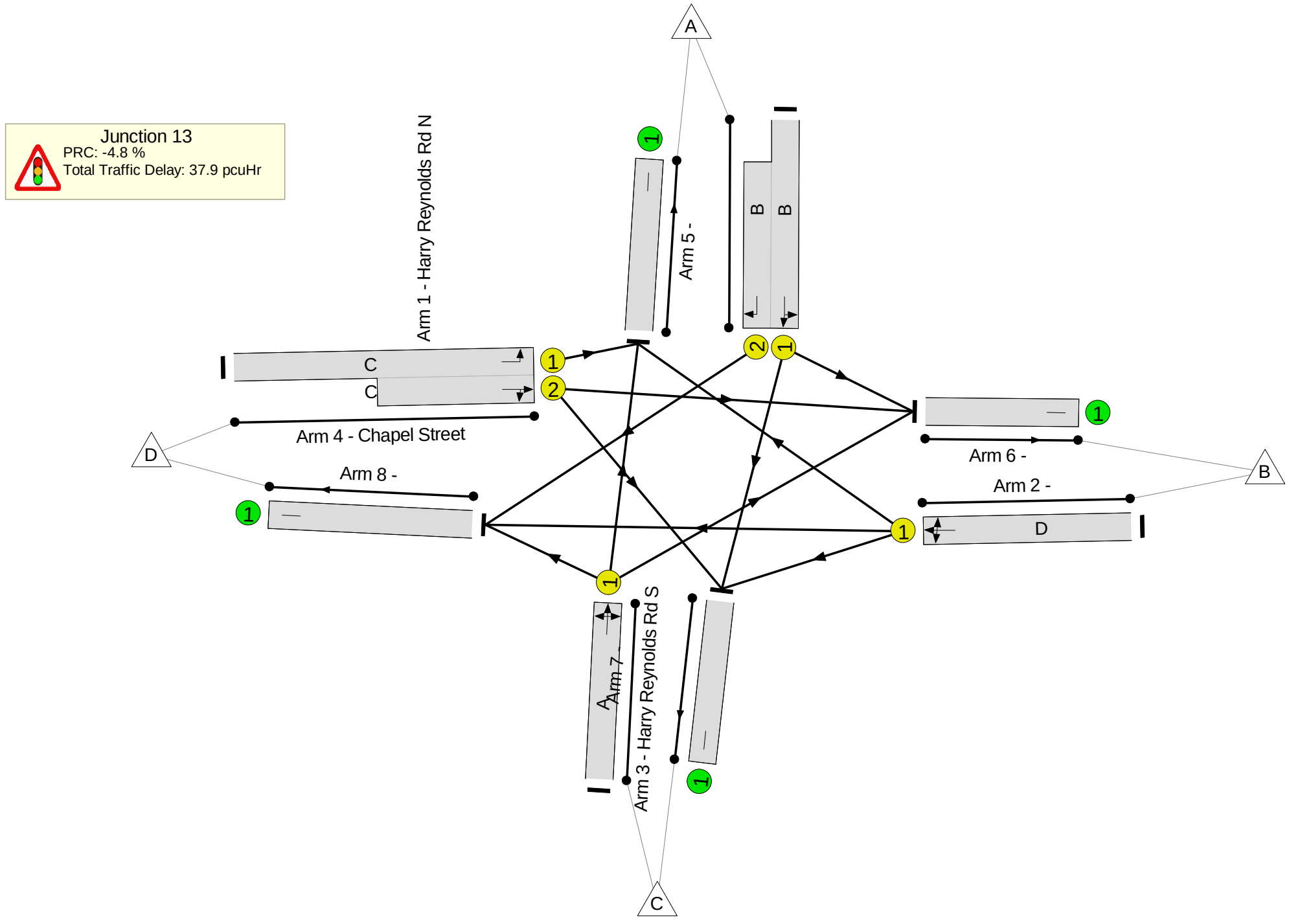
Stage	1	2	3	4	5
Duration	13	23	27	14	7
Change Point	0	28	56	88	107

Signal Timings Diagram



Full Input Data And Results

Network Layout Diagram


Junction 13
PRC: -4.8 %
Total Traffic Delay: 37.9 pcuHr
A
B
C
D
Arm 1 - Harry Reynolds Rd N
Arm 2 -
Arm 3 - Harry Reynolds Rd S
Arm 4 - Chapel Street
Arm 5 -
Arm 6 -
Arm 7 -
Arm 8 -
C
C
B
B
D

Full Input Data And Results

Network Results

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**94.4%**
Junction 13	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**94.4%**
1/1+1/2	Harry Reynolds Rd N Left Ahead Right	U	N/A	N/A	B		1	27	-	642	1847:1856	391+297	93.3 : 93.3%
2/1	Right Left Ahead	U	N/A	N/A	D		1	14	-	206	1804	226	91.4%
3/1	Harry Reynolds Rd S Ahead Right Left	U	N/A	N/A	A		1	13	-	198	1870	218	90.8%
4/1+4/2	Chapel Street Left Ahead Right	U	N/A	N/A	C		1	23	-	439	1702:1972	105+360	94.4 : 94.4%
5/1		U	N/A	N/A	-		-	-	-	262	Inf	Inf	0.0%
6/1		U	N/A	N/A	-		-	-	-	302	Inf	Inf	0.0%
7/1		U	N/A	N/A	-		-	-	-	433	Inf	Inf	0.0%
8/1		U	N/A	N/A	-		-	-	-	488	Inf	Inf	0.0%

Full Input Data And Results

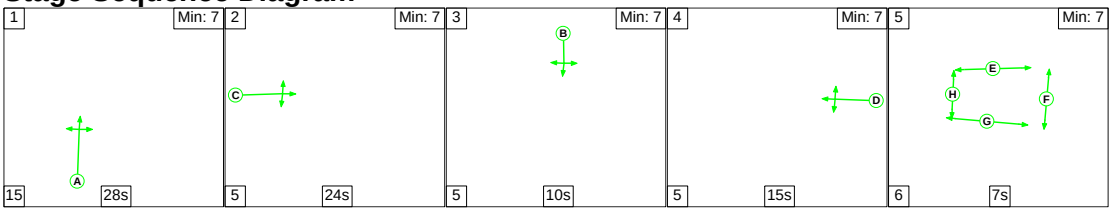
Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network	**-**	**-**	**0**	**0**	**0**	**19.1**	**18.8**	**0.0**	**37.9**	**-**	**-**	**-**	**-**
Junction 13	**-**	**-**	**0**	**0**	**0**	**19.1**	**18.8**	**0.0**	**37.9**	**-**	**-**	**-**	**-**
1/1+1/2	642	642	-	-	-	7.7	5.6	-	13.2	74.2	12.2	5.6	17.8
2/1	206	206	-	-	-	3.0	3.8	-	6.8	118.3	6.8	3.8	10.6
3/1	198	198	-	-	-	2.9	3.6	-	6.5	118.1	6.5	3.6	10.1
4/1+4/2	439	439	-	-	-	5.6	5.8	-	11.4	93.3	11.8	5.8	17.6
5/1	262	262	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	302	302	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
7/1	433	433	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
8/1	488	488	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0

C1 PRC for Signalled Lanes (%): -4.8 Total Delay for Signalled Lanes (pcuHr): 37.87 Cycle Time (s): 120
PRC Over All Lanes (%): -4.8 Total Delay Over All Lanes(pcuHr): 37.87

Full Input Data And Results

Scenario 6: '2040 Base + CD PM' (FG6: '2040 Base + CD PM', Plan 1: 'Network Control Plan 1')

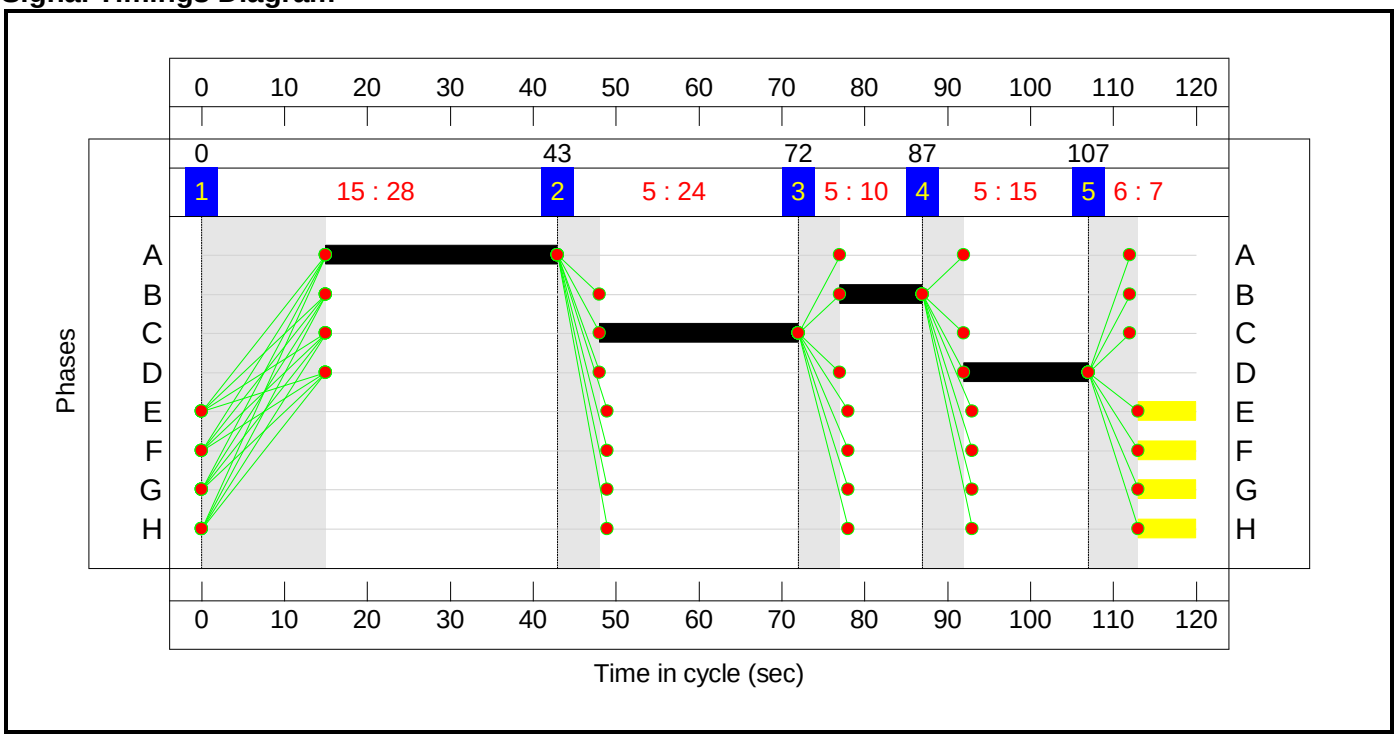
Stage Sequence Diagram



Stage Timings

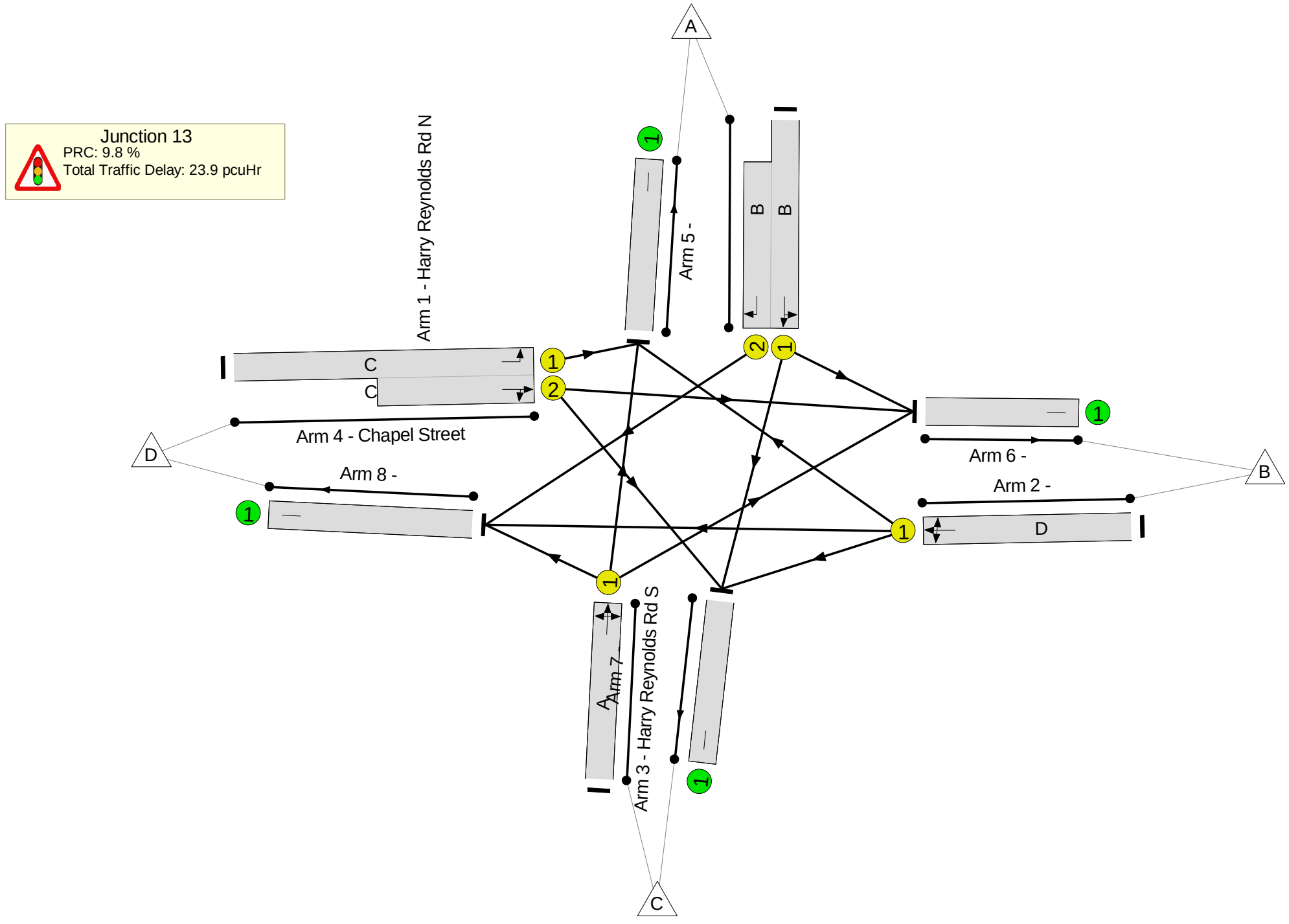
Stage	1	2	3	4	5
Duration	28	24	10	15	7
Change Point	0	43	72	87	107

Signal Timings Diagram



Full Input Data And Results

Network Layout Diagram


Junction 13
PRC: 9.8 %
Total Traffic Delay: 23.9 pcuHr
A
B
C
D
Arm 1 - Harry Reynolds Rd N
Arm 2 -
Arm 3 - Harry Reynolds Rd S
Arm 4 - Chapel Street
Arm 5 -
Arm 6 -
Arm 7 -
Arm 8 -
B
B
C
C
D

Full Input Data And Results

Network Results

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**81.9%**
Junction 13	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**81.9%**
1/1+1/2	Harry Reynolds Rd N Left Ahead Right	U	N/A	N/A	B		1	10	-	253	1814:1856	166+170	78.2 : 72.3%
2/1	Right Left Ahead	U	N/A	N/A	D		1	15	-	186	1815	242	76.9%
3/1	Harry Reynolds Rd S Ahead Right Left	U	N/A	N/A	A		1	28	-	361	1823	441	81.9%
4/1+4/2	Chapel Street Left Ahead Right	U	N/A	N/A	C		1	24	-	498	1702:1975	283+335	80.5 : 80.5%
5/1		U	N/A	N/A	-		-	-	-	498	Inf	Inf	0.0%
6/1		U	N/A	N/A	-		-	-	-	241	Inf	Inf	0.0%
7/1		U	N/A	N/A	-		-	-	-	182	Inf	Inf	0.0%
8/1		U	N/A	N/A	-		-	-	-	377	Inf	Inf	0.0%

Full Input Data And Results

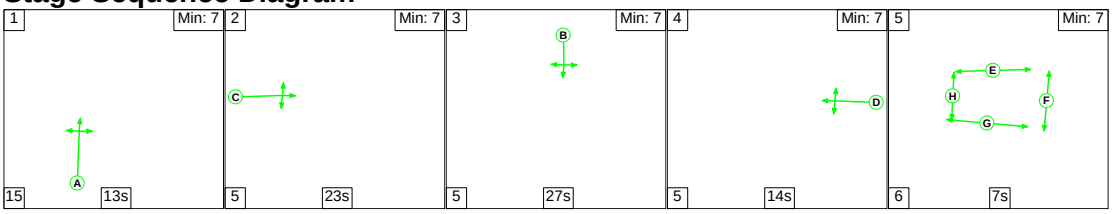
Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network	**-**	**-**	**0**	**0**	**0**	**16.7**	**7.2**	**0.0**	**23.9**	**-**	**-**	**-**	**-**
Junction 13	**-**	**-**	**0**	**0**	**0**	**16.7**	**7.2**	**0.0**	**23.9**	**-**	**-**	**-**	**-**
1/1+1/2	253	253	-	-	-	3.7	1.5	-	5.2	74.0	4.2	1.5	5.7
2/1	186	186	-	-	-	2.6	1.6	-	4.2	80.7	5.9	1.6	7.5
3/1	361	361	-	-	-	4.3	2.2	-	6.5	64.5	11.3	2.2	13.5
4/1+4/2	498	498	-	-	-	6.0	2.0	-	8.0	58.0	8.3	2.0	10.2
5/1	498	498	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	241	241	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
7/1	182	182	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
8/1	377	377	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0

C1 PRC for Signalled Lanes (%): 9.8 Total Delay for Signalled Lanes (pcuHr): 23.85 Cycle Time (s): 120
PRC Over All Lanes (%): 9.8 Total Delay Over All Lanes(pcuHr): 23.85

Full Input Data And Results

Scenario 7: '2040 Base + CD + Malincross AM' (FG7: '2040 Base + CD + Malincross AM', Plan 1: 'Network Control Plan 1')

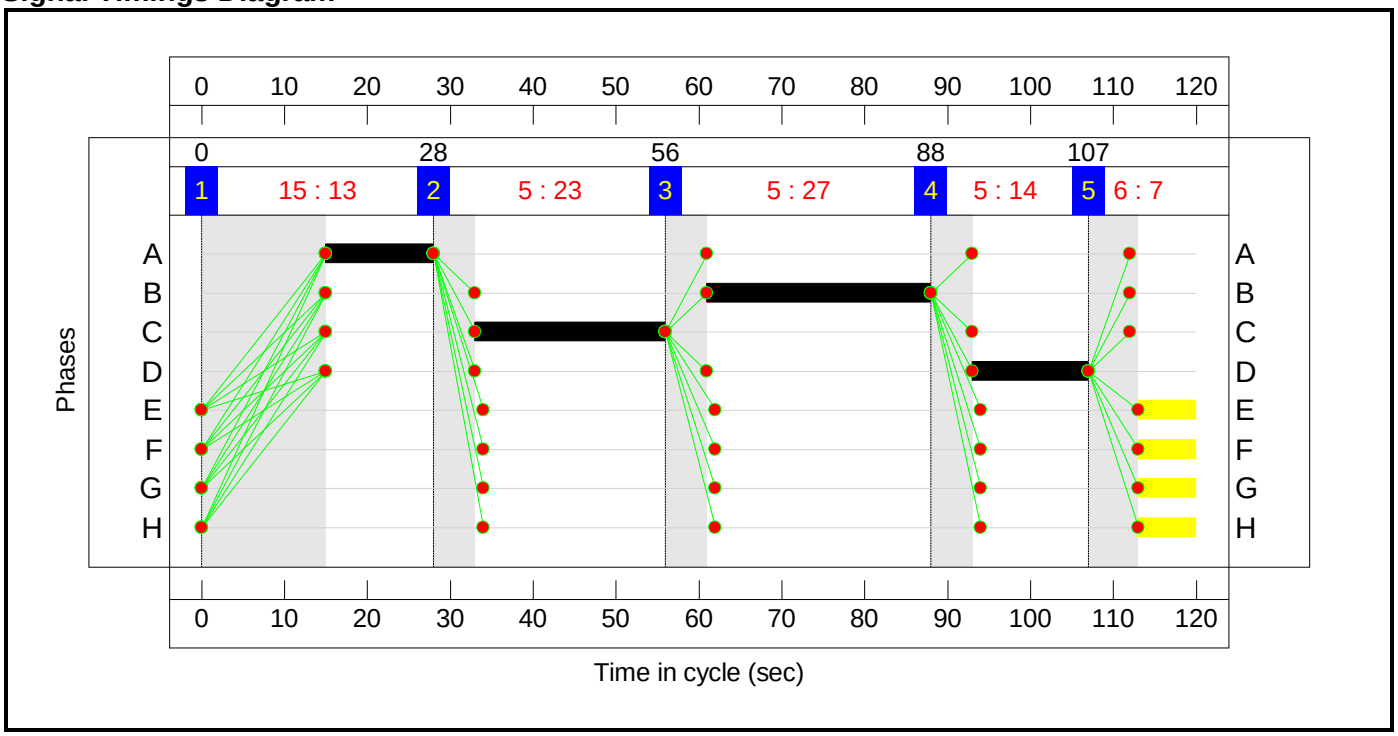
Stage Sequence Diagram



Stage Timings

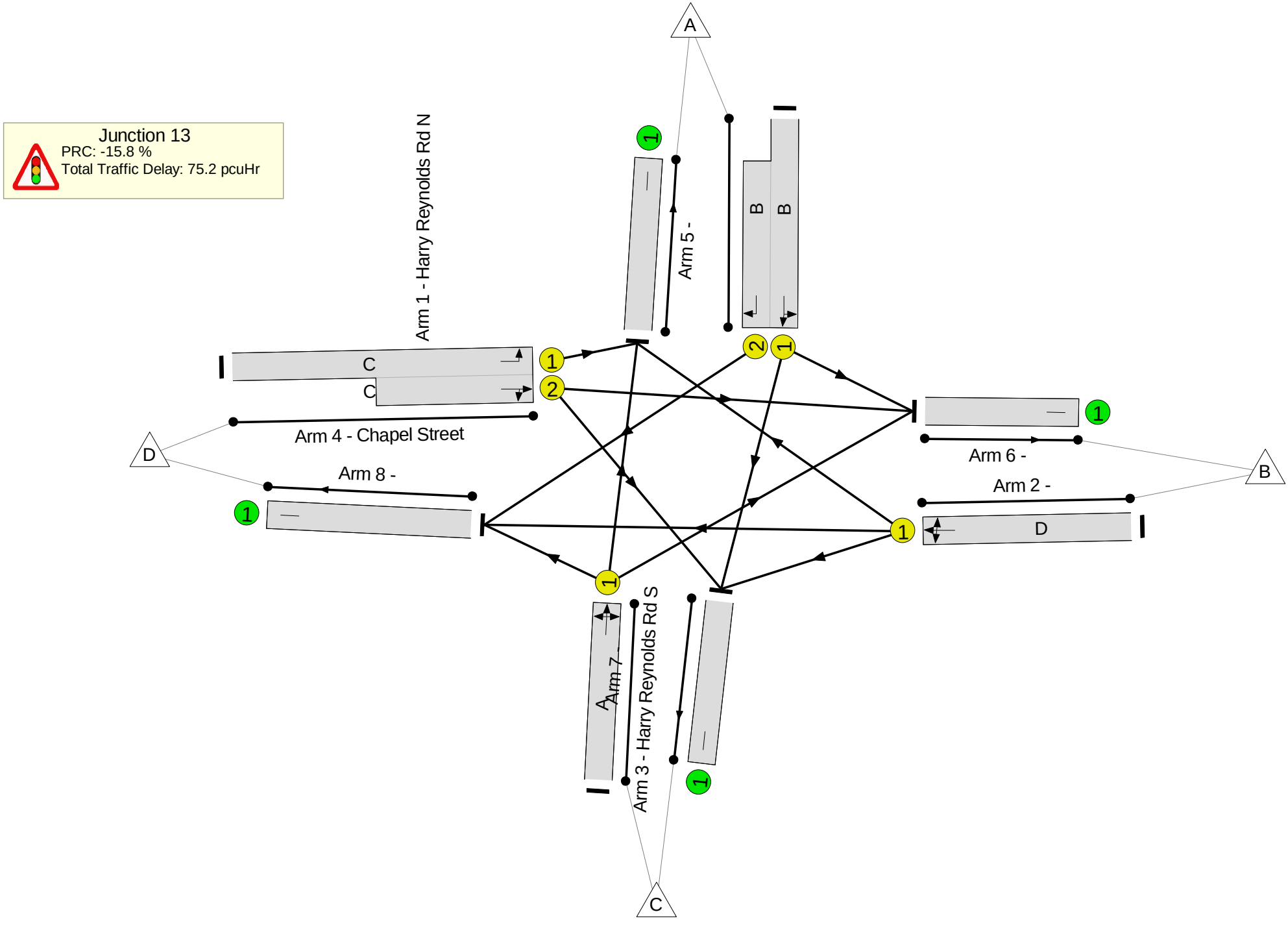
Stage	1	2	3	4	5
Duration	13	23	27	14	7
Change Point	0	28	56	88	107

Signal Timings Diagram



Full Input Data And Results

Network Layout Diagram


Junction 13
PRC: -15.8 %
Total Traffic Delay: 75.2 pcuHr
A
B
C
D
Arm 1 - Harry Reynolds Rd N
Arm 2 -
Arm 3 - Harry Reynolds Rd S
Arm 4 - Chapel Street
Arm 5 -
Arm 6 -
Arm 7 -
Arm 8 -
C
C
B
B
D

Full Input Data And Results

Network Results

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**104.2%**
Junction 13	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**104.2%**
1/1+1/2	Harry Reynolds Rd N Left Ahead Right	U	N/A	N/A	B		1	27	-	715	1846:1856	392+295	104.2 : 104.2%
2/1	Right Left Ahead	U	N/A	N/A	D		1	14	-	228	1803	225	101.2%
3/1	Harry Reynolds Rd S Ahead Right Left	U	N/A	N/A	A		1	13	-	219	1872	218	100.3%
4/1+4/2	Chapel Street Left Ahead Right	U	N/A	N/A	C		1	23	-	476	1702:1973	107+360	102.0 : 102.0%
5/1		U	N/A	N/A	-		-	-	-	291	Inf	Inf	0.0%
6/1		U	N/A	N/A	-		-	-	-	331	Inf	Inf	0.0%
7/1		U	N/A	N/A	-		-	-	-	478	Inf	Inf	0.0%
8/1		U	N/A	N/A	-		-	-	-	538	Inf	Inf	0.0%

Full Input Data And Results

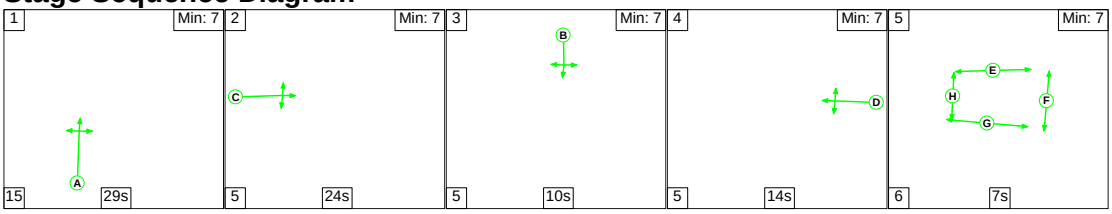
Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network	**-**	**-**	**0**	**0**	**0**	**23.5**	**51.6**	**0.0**	**75.2**	**-**	**-**	**-**	**-**
Junction 13	**-**	**-**	**0**	**0**	**0**	**23.5**	**51.6**	**0.0**	**75.2**	**-**	**-**	**-**	**-**
1/1+1/2	715	686	-	-	-	10.0	22.4	-	32.4	163.2	17.7	22.4	40.1
2/1	228	225	-	-	-	3.4	8.2	-	11.7	184.1	7.7	8.2	15.9
3/1	219	218	-	-	-	3.3	7.6	-	10.8	177.7	7.3	7.6	14.9
4/1+4/2	476	467	-	-	-	6.8	13.5	-	20.3	153.3	13.8	13.5	27.3
5/1	288	288	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	323	323	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
7/1	462	462	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
8/1	523	523	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0

C1 PRC for Signalled Lanes (%): -15.8 Total Delay for Signalled Lanes (pcuHr): 75.15 Cycle Time (s): 120
PRC Over All Lanes (%): -15.8 Total Delay Over All Lanes(pcuHr): 75.15

Full Input Data And Results

Scenario 8: '2040 Base + CD + Malincross PM' (FG8: '2040 Base + CD + Malincross PM', Plan 1: 'Network Control Plan 1')

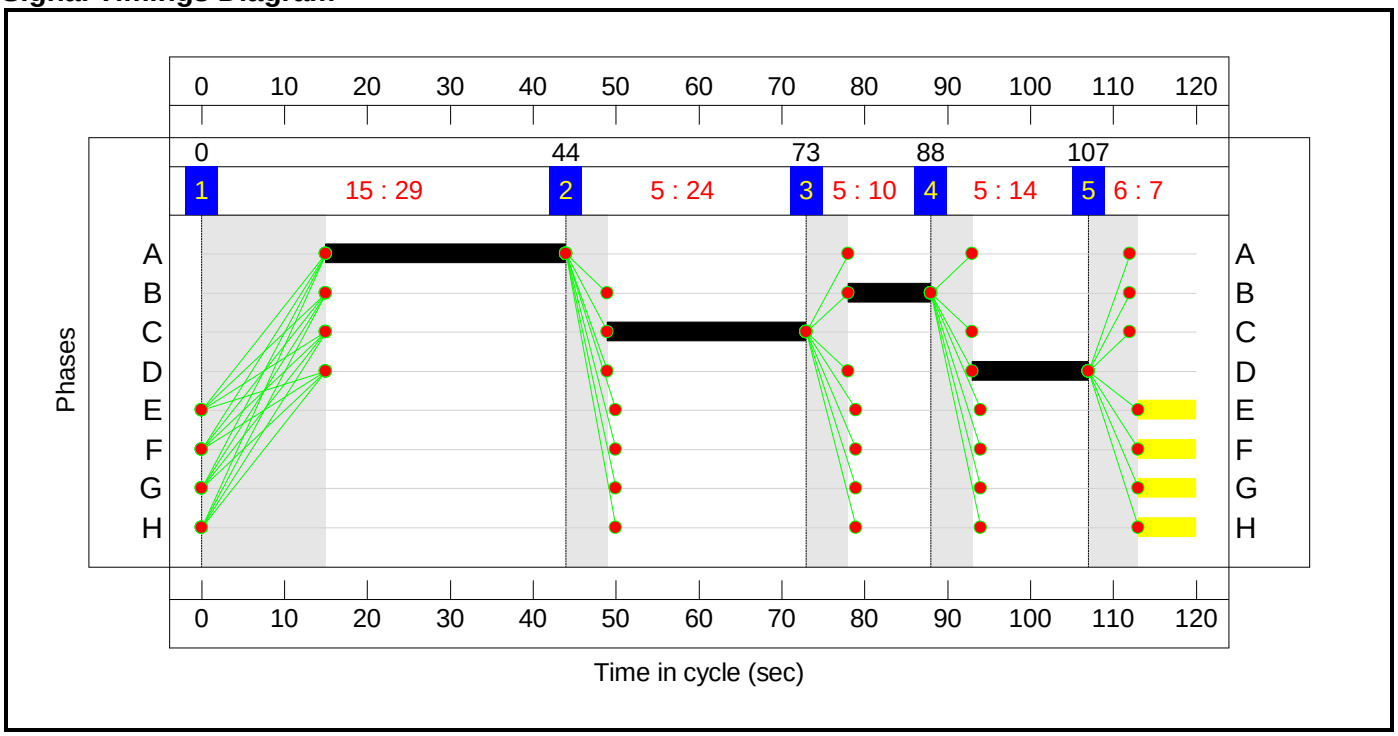
Stage Sequence Diagram



Stage Timings

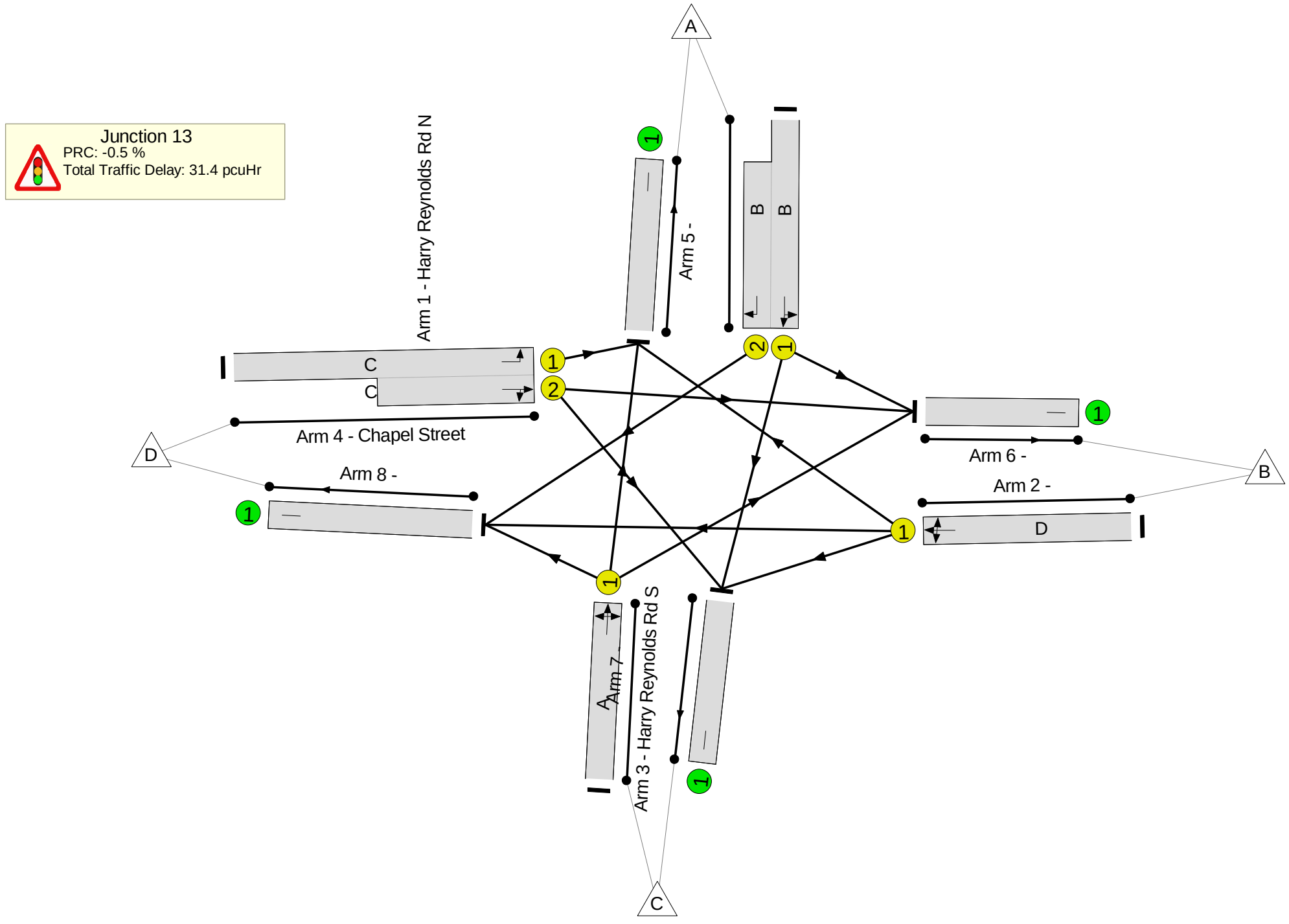
Stage	1	2	3	4	5
Duration	29	24	10	14	7
Change Point	0	44	73	88	107

Signal Timings Diagram



Full Input Data And Results

Network Layout Diagram


Junction 13
PRC: -0.5 %
Total Traffic Delay: 31.4 pcuHr
A
B
C
D
Arm 1 - Harry Reynolds Rd N
Arm 2 -
Arm 3 - Harry Reynolds Rd S
Arm 4 - Chapel Street
Arm 5 -
Arm 6 -
Arm 7 -
Arm 8 -
C
C
B
B
D

Full Input Data And Results

Network Results

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**90.4%**
Junction 13	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**90.4%**
1/1+1/2	Harry Reynolds Rd N Left Ahead Right	U	N/A	N/A	B		1	10	-	282	1813:1856	166+170	87.9 : 79.9%
2/1	Right Left Ahead	U	N/A	N/A	D		1	14	-	205	1814	227	90.4%
3/1	Harry Reynolds Rd S Ahead Right Left	U	N/A	N/A	A		1	29	-	399	1825	456	87.5%
4/1+4/2	Chapel Street Left Ahead Right	U	N/A	N/A	C		1	24	-	550	1702:1975	284+335	88.9 : 88.9%
5/1		U	N/A	N/A	-		-	-	-	553	Inf	Inf	0.0%
6/1		U	N/A	N/A	-		-	-	-	268	Inf	Inf	0.0%
7/1		U	N/A	N/A	-		-	-	-	202	Inf	Inf	0.0%
8/1		U	N/A	N/A	-		-	-	-	413	Inf	Inf	0.0%

Full Input Data And Results

Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network	**-**	**-**	**0**	**0**	**0**	**18.7**	**12.7**	**0.0**	**31.4**	**-**	**-**	**-**	**-**
Junction 13	**-**	**-**	**0**	**0**	**0**	**18.7**	**12.7**	**0.0**	**31.4**	**-**	**-**	**-**	**-**
1/1+1/2	282	282	-	-	-	4.2	2.4	-	6.6	84.1	4.8	2.4	7.2
2/1	205	205	-	-	-	2.9	3.6	-	6.5	114.2	6.7	3.6	10.3
3/1	399	399	-	-	-	4.8	3.1	-	7.9	71.5	12.7	3.1	15.9
4/1+4/2	550	550	-	-	-	6.8	3.6	-	10.4	68.0	10.2	3.6	13.8
5/1	553	553	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	268	268	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
7/1	202	202	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
8/1	413	413	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0

C1 PRC for Signalled Lanes (%): -0.5 Total Delay for Signalled Lanes (pcuHr): 31.41 Cycle Time (s): 120
PRC Over All Lanes (%): -0.5 Total Delay Over All Lanes(pcuHr): 31.41

APPENDIX T

LINSIG Output (Junction A)

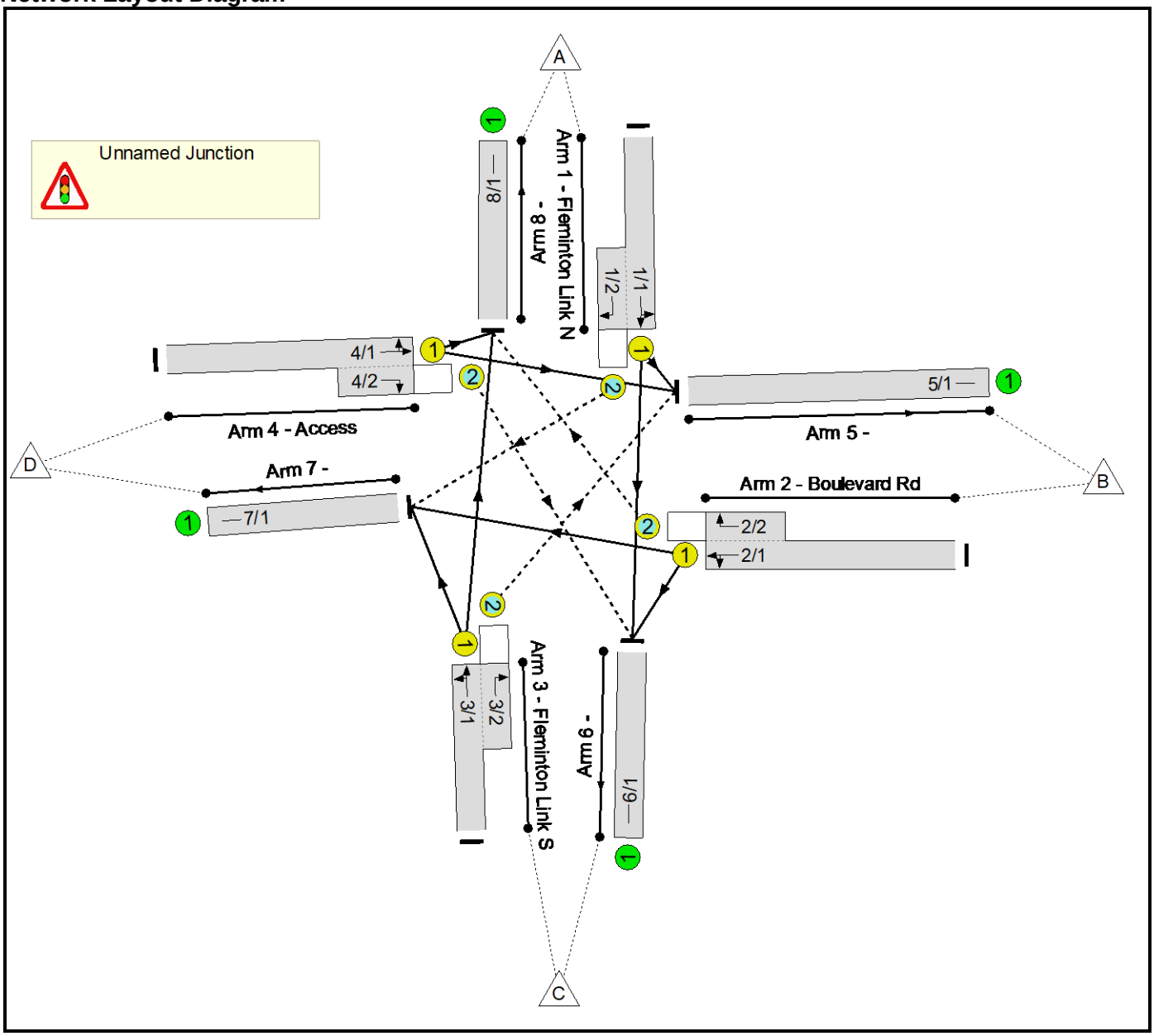
DRAFT

Full Input Data And Results

User and Project Details

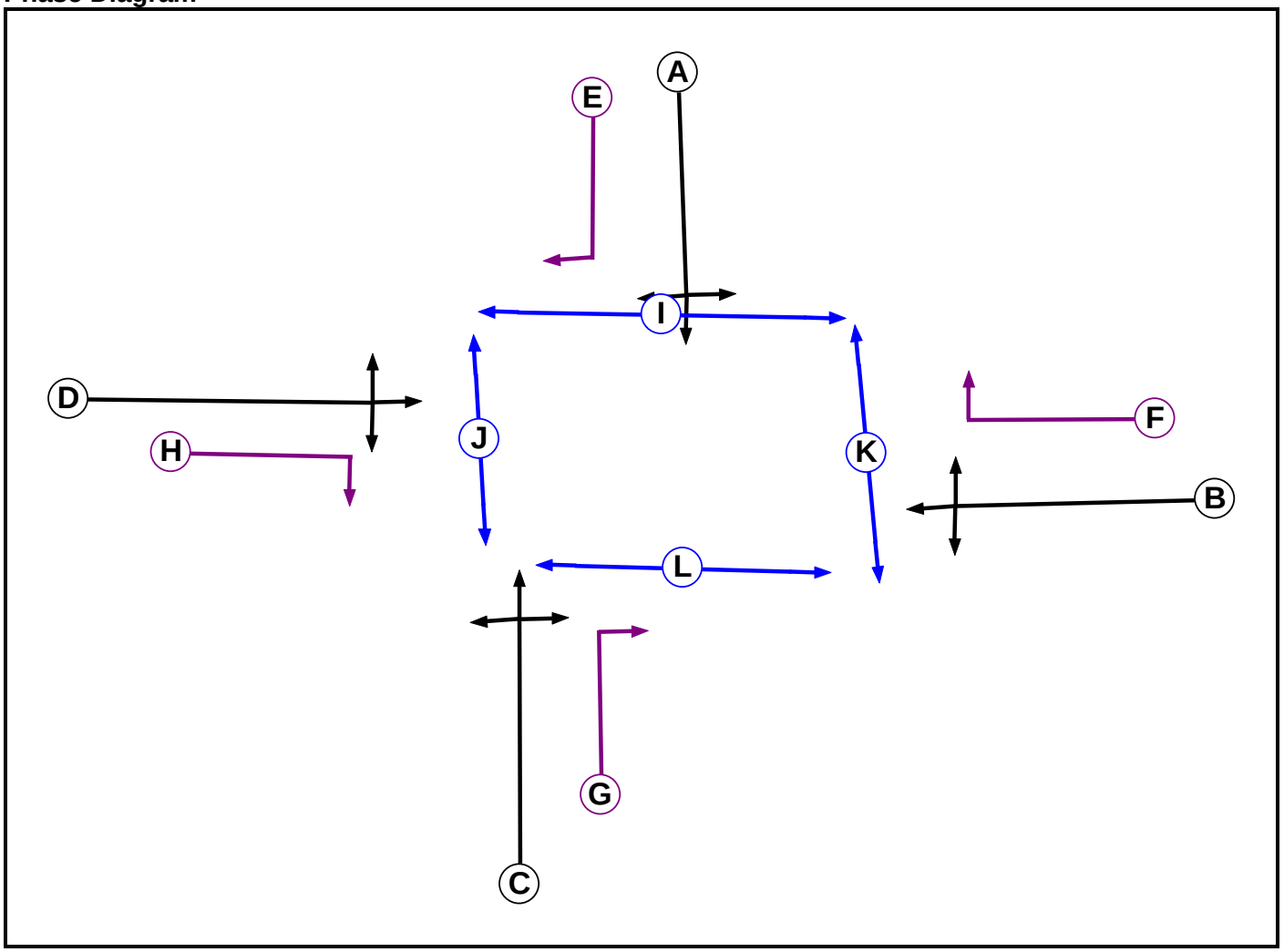
Project:	
Title:	
Location:	
Additional detail:	
File name:	JUNCTION A.lsg3x
Author:	
Company:	
Address:	

Network Layout Diagram



Full Input Data And Results

Phase Diagram



Phase Input Data

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

Full Input Data And Results

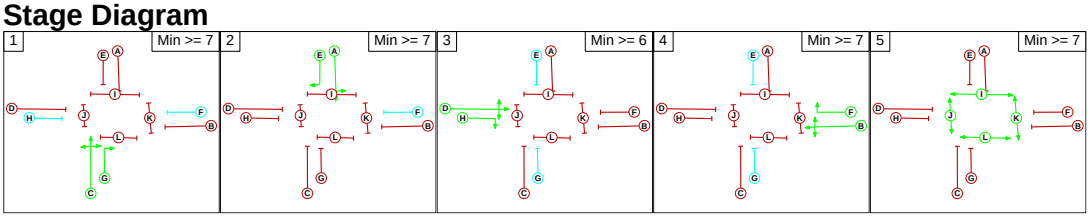
Phase Intergreens Matrix

Terminating Phase \ Starting Phase	A	B	C	D	E	F	G	H	I	J	K	L
A		5	-	5	-	-	5	6	5	10	9	10
B	5		6	-	-	-	-	5	11	10	5	9
C	-	5		5	5	-	-	-	10	8	10	9
D	5	-	5		-	5	-	-	8	5	10	9
E	-	-	5	-		-	-	-	-	-	-	-
F	-	-	-	5	-		-	-	-	-	-	-
G	5	-	-	-	-	-		-	-	-	-	-
H	5	5	-	-	-	-	-		-	-	-	-
I	14	14	14	14	14	14	14	14		-	-	-
J	12	12	12	12	12	12	12	12	-		-	-
K	15	15	15	15	15	15	15	15	-	-		-
L	14	14	14	14	14	14	14	14	-	-	-	

Phases in Stage

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

Stage Diagram



Phase Delays

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

Prohibited Stage Change

From Stage \ To Stage	1	2	3	4	5
1		5	X	X	10
2	5		6	X	10
3	X	X		5	10
4	X	X	5		11
5	15	15	15	15	

Full Input Data And Results

Full Input Data And Results

Give-Way Lane Input Data

Junction: Unnamed Junction											
Lane	**Movement**	**Max Flow when Giving Way (PCU/Hr)**	**Min Flow when Giving Way (PCU/Hr)**	**Opposing Lane**	**Opp. Lane Coeff.**	**Opp. Mvmnts.**	**Right Turn Storage (PCU)**	**Non-Blocking Storage (PCU)**	**RTF**	**Right Turn Move up (s)**	**Max Turns in Intergreen (PCU)**
1/2 (Fleminton Link N)	7/1 (Right)	1439	0	3/1	1.09	All	2.00	-	0.50	2	2.00
2/2 (Boulevard Rd)	8/1 (Right)	1439	0	4/1	1.09	All	2.00	-	0.50	2	2.00
3/2 (Fleminton Link S)	5/1 (Right)	1439	0	1/1	1.09	All	2.00	-	0.50	2	2.00
4/2 (Access)	6/1 (Right)	1439	0	2/1	1.09	All	2.00	-	0.50	2	2.00

Full Input Data And Results

Lane Input Data

Junction: Unnamed Junction												
Lane	**Lane Type**	**Phases**	**Start Disp.**	**End Disp.**	**Physical Length (PCU)**	**Sat Flow Type**	**Def User Saturation Flow (PCU/Hr)**	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Turns**	**Turning Radius (m)**
1/1 (Fleminton Link N)	U	A	2	3	60.0	Geom	-	2.90	0.00	Y	Arm 5 Left	10.00
											Arm 6 Ahead	Inf
1/2 (Fleminton Link N)	O	A E	2	3	4.3	Geom	-	2.90	0.00	N	Arm 7 Right	14.00
2/1 (Boulevard Rd)	U	B	2	3	60.0	Geom	-	2.90	0.00	Y	Arm 6 Left	10.00
											Arm 7 Ahead	Inf
2/2 (Boulevard Rd)	O	B F	2	3	4.2	Geom	-	2.90	0.00	N	Arm 8 Right	14.00
3/1 (Fleminton Link S)	U	C	2	3	60.0	Geom	-	3.00	0.00	Y	Arm 7 Left	10.00
											Arm 8 Ahead	Inf
3/2 (Fleminton Link S)	O	C G	2	3	4.5	Geom	-	3.00	0.00	N	Arm 5 Right	14.00
4/1 (Access)	U	D	2	3	60.0	Geom	-	3.00	0.00	Y	Arm 5 Ahead	Inf
											Arm 8 Left	10.00
4/2 (Access)	O	D H	2	3	4.0	Geom	-	3.00	0.00	N	Arm 6 Right	14.00
5/1	U		2	3	60.0	Inf	-	-	-	-	-	-
6/1	U		2	3	60.0	Inf	-	-	-	-	-	-
7/1	U		2	3	60.0	Inf	-	-	-	-	-	-
8/1	U		2	3	60.0	Inf	-	-	-	-	-	-

Traffic Flow Groups

Flow Group	Start Time	End Time	Duration	Formula
1: '2025 Base + CD + Malincross AM'	08:00	09:00	01:00	
2: '2025 Base + CD + Malincross PM'	17:00	18:00	01:00	
3: '2040 Base + CD + Malincross AM'	08:00	09:00	01:00	
4: '2040 Base + CD + Malincross PM'	17:00	18:00	01:00	

Scenario 1: '2025 Base + CD + Malincross AM' (FG1: '2025 Base + CD + Malincross AM', Plan 1: 'Network Control Plan 1')

Traffic Flows, Desired

Desired Flow :

		Destination				
		A	B	C	D	Tot.
Origin	A	0	99	2	5	106
	B	30	0	6	20	56
	C	5	20	0	0	25
	D	17	67	0	0	84
	Tot.	52	186	8	25	271

Traffic Lane Flows

Lane	Scenario 1: 2025 Base + CD + Malincross AM
Junction: Unnamed Junction	
1/1 (with short)	106(In) 101(Out)
1/2 (short)	5
2/1 (with short)	56(In) 26(Out)
2/2 (short)	30
3/1 (with short)	25(In) 5(Out)
3/2 (short)	20
4/1 (with short)	84(In) 84(Out)
4/2 (short)	0
5/1	186
6/1	8
7/1	25
8/1	52

Full Input Data And Results

Lane Saturation Flows

Junction: Unnamed Junction								
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat Flow (PCU/Hr)**	**Flared Sat Flow (PCU/Hr)**
1/1 (Fleminton Link N)	2.90	0.00	Y	Arm 5 Left	10.00	98.0 %	1661	1661
				Arm 6 Ahead	Inf	2.0 %		
1/2 (Fleminton Link N)	2.90	0.00	N	Arm 7 Right	14.00	100.0 %	1847	1847
2/1 (Boulevard Rd)	2.90	0.00	Y	Arm 6 Left	10.00	23.1 %	1841	1841
				Arm 7 Ahead	Inf	76.9 %		
2/2 (Boulevard Rd)	2.90	0.00	N	Arm 8 Right	14.00	100.0 %	1847	1847
3/1 (Fleminton Link S)	3.00	0.00	Y	Arm 7 Left	10.00	0.0 %	1915	1915
				Arm 8 Ahead	Inf	100.0 %		
3/2 (Fleminton Link S)	3.00	0.00	N	Arm 5 Right	14.00	100.0 %	1856	1856
4/1 (Access)	3.00	0.00	Y	Arm 5 Ahead	Inf	79.8 %	1859	1859
				Arm 8 Left	10.00	20.2 %		
4/2 (Access)	3.00	0.00	N	Arm 6 Right	14.00	0.0 %	2055	2055
5/1	Infinite Saturation Flow						Inf	Inf
6/1	Infinite Saturation Flow						Inf	Inf
7/1	Infinite Saturation Flow						Inf	Inf
8/1	Infinite Saturation Flow						Inf	Inf

Scenario 2: '2025 Base + CD + Malincross PM' (FG2: '2025 Base + CD + Malincross PM', Plan 1: 'Network Control Plan 1')

Traffic Flows, Desired

Desired Flow :

		Destination				
		A	B	C	D	Tot.
Origin	A	0	52	4	15	71
	B	87	0	18	59	164
	C	3	11	0	0	14
	D	9	35	0	0	44
	Tot.	99	98	22	74	293

Full Input Data And Results

Traffic Lane Flows

Lane	Scenario 2: 2025 Base + CD + Malincross PM
Junction: Unnamed Junction	
1/1 (with short)	71(In) 56(Out)
1/2 (short)	15
2/1 (with short)	164(In) 77(Out)
2/2 (short)	87
3/1 (with short)	14(In) 3(Out)
3/2 (short)	11
4/1 (with short)	44(In) 44(Out)
4/2 (short)	0
5/1	98
6/1	22
7/1	74
8/1	99

Full Input Data And Results

Lane Saturation Flows

Junction: Unnamed Junction								
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat Flow (PCU/Hr)**	**Flared Sat Flow (PCU/Hr)**
1/1 (Fleminton Link N)	2.90	0.00	Y	Arm 5 Left	10.00	92.9 %	1672	1672
				Arm 6 Ahead	Inf	7.1 %		
1/2 (Fleminton Link N)	2.90	0.00	N	Arm 7 Right	14.00	100.0 %	1847	1847
2/1 (Boulevard Rd)	2.90	0.00	Y	Arm 6 Left	10.00	23.4 %	1840	1840
				Arm 7 Ahead	Inf	76.6 %		
2/2 (Boulevard Rd)	2.90	0.00	N	Arm 8 Right	14.00	100.0 %	1847	1847
3/1 (Fleminton Link S)	3.00	0.00	Y	Arm 7 Left	10.00	0.0 %	1915	1915
				Arm 8 Ahead	Inf	100.0 %		
3/2 (Fleminton Link S)	3.00	0.00	N	Arm 5 Right	14.00	100.0 %	1856	1856
4/1 (Access)	3.00	0.00	Y	Arm 5 Ahead	Inf	79.5 %	1858	1858
				Arm 8 Left	10.00	20.5 %		
4/2 (Access)	3.00	0.00	N	Arm 6 Right	14.00	0.0 %	2055	2055
5/1	Infinite Saturation Flow						Inf	Inf
6/1	Infinite Saturation Flow						Inf	Inf
7/1	Infinite Saturation Flow						Inf	Inf
8/1	Infinite Saturation Flow						Inf	Inf

Scenario 3: '2040 Base + CD + Malincross AM' (FG3: '2040 Base + CD + Malincross AM', Plan 1: 'Network Control Plan 1')

Traffic Flows, Desired

Desired Flow :

		Destination				
		A	B	C	D	Tot.
Origin	A	0	99	2	5	106
	B	30	0	6	20	56
	C	5	20	0	0	25
	D	17	67	0	0	84
	Tot.	52	186	8	25	271

Full Input Data And Results

Traffic Lane Flows

Lane	Scenario 3: 2040 Base + CD + Malincross AM
Junction: Unnamed Junction	
1/1 (with short)	106(In) 101(Out)
1/2 (short)	5
2/1 (with short)	56(In) 26(Out)
2/2 (short)	30
3/1 (with short)	25(In) 5(Out)
3/2 (short)	20
4/1 (with short)	84(In) 84(Out)
4/2 (short)	0
5/1	186
6/1	8
7/1	25
8/1	52

Full Input Data And Results

Lane Saturation Flows

Junction: Unnamed Junction								
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat Flow (PCU/Hr)**	**Flared Sat Flow (PCU/Hr)**
1/1 (Fleminton Link N)	2.90	0.00	Y	Arm 5 Left	10.00	98.0 %	1661	1661
				Arm 6 Ahead	Inf	2.0 %		
1/2 (Fleminton Link N)	2.90	0.00	N	Arm 7 Right	14.00	100.0 %	1847	1847
2/1 (Boulevard Rd)	2.90	0.00	Y	Arm 6 Left	10.00	23.1 %	1841	1841
				Arm 7 Ahead	Inf	76.9 %		
2/2 (Boulevard Rd)	2.90	0.00	N	Arm 8 Right	14.00	100.0 %	1847	1847
3/1 (Fleminton Link S)	3.00	0.00	Y	Arm 7 Left	10.00	0.0 %	1915	1915
				Arm 8 Ahead	Inf	100.0 %		
3/2 (Fleminton Link S)	3.00	0.00	N	Arm 5 Right	14.00	100.0 %	1856	1856
4/1 (Access)	3.00	0.00	Y	Arm 5 Ahead	Inf	79.8 %	1859	1859
				Arm 8 Left	10.00	20.2 %		
4/2 (Access)	3.00	0.00	N	Arm 6 Right	14.00	0.0 %	2055	2055
5/1	Infinite Saturation Flow						Inf	Inf
6/1	Infinite Saturation Flow						Inf	Inf
7/1	Infinite Saturation Flow						Inf	Inf
8/1	Infinite Saturation Flow						Inf	Inf

Scenario 4: '2040 Base + CD + Malincross PM' (FG4: '2040 Base + CD + Malincross PM', Plan 1: 'Network Control Plan 1')

Traffic Flows, Desired

Desired Flow :

		Destination				
		A	B	C	D	Tot.
Origin	A	0	52	4	15	71
	B	87	0	18	59	164
	C	3	11	0	0	14
	D	9	35	0	0	44
	Tot.	99	98	22	74	293

Full Input Data And Results

Traffic Lane Flows

Lane	Scenario 4: 2040 Base + CD + Malincross PM
Junction: Unnamed Junction	
1/1 (with short)	71(In) 56(Out)
1/2 (short)	15
2/1 (with short)	164(In) 77(Out)
2/2 (short)	87
3/1 (with short)	14(In) 3(Out)
3/2 (short)	11
4/1 (with short)	44(In) 44(Out)
4/2 (short)	0
5/1	98
6/1	22
7/1	74
8/1	99

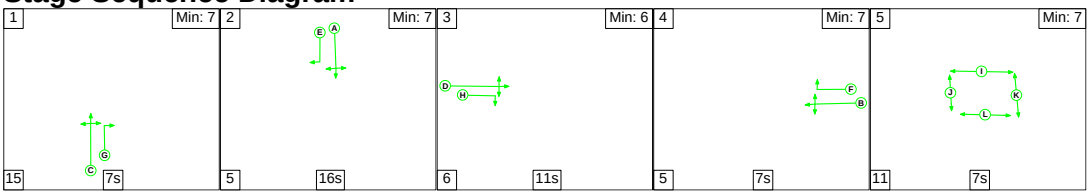
Full Input Data And Results

Lane Saturation Flows

Junction: Unnamed Junction								
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat Flow (PCU/Hr)**	**Flared Sat Flow (PCU/Hr)**
1/1 (Fleminton Link N)	2.90	0.00	Y	Arm 5 Left	10.00	92.9 %	1672	1672
				Arm 6 Ahead	Inf	7.1 %		
1/2 (Fleminton Link N)	2.90	0.00	N	Arm 7 Right	14.00	100.0 %	1847	1847
2/1 (Boulevard Rd)	2.90	0.00	Y	Arm 6 Left	10.00	23.4 %	1840	1840
				Arm 7 Ahead	Inf	76.6 %		
2/2 (Boulevard Rd)	2.90	0.00	N	Arm 8 Right	14.00	100.0 %	1847	1847
3/1 (Fleminton Link S)	3.00	0.00	Y	Arm 7 Left	10.00	0.0 %	1915	1915
				Arm 8 Ahead	Inf	100.0 %		
3/2 (Fleminton Link S)	3.00	0.00	N	Arm 5 Right	14.00	100.0 %	1856	1856
4/1 (Access)	3.00	0.00	Y	Arm 5 Ahead	Inf	79.5 %	1858	1858
				Arm 8 Left	10.00	20.5 %		
4/2 (Access)	3.00	0.00	N	Arm 6 Right	14.00	0.0 %	2055	2055
5/1	Infinite Saturation Flow						Inf	Inf
6/1	Infinite Saturation Flow						Inf	Inf
7/1	Infinite Saturation Flow						Inf	Inf
8/1	Infinite Saturation Flow						Inf	Inf

Scenario 1: '2025 Base + CD + Malincross AM' (FG1: '2025 Base + CD + Malincross AM', Plan 1: 'Network Control Plan 1')

Stage Sequence Diagram

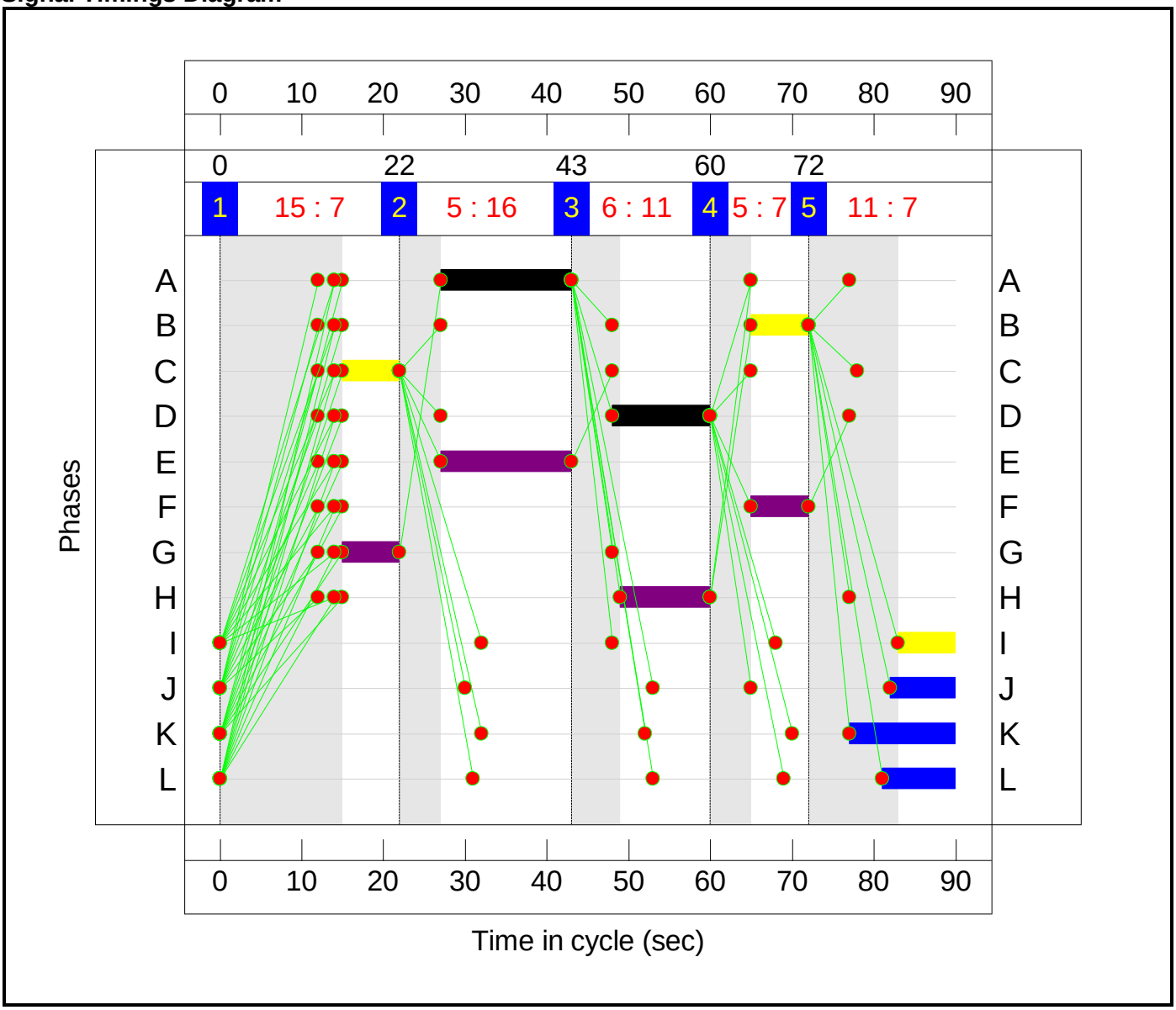


Stage Timings

Stage	1	2	3	4	5
Duration	7	16	11	7	7
Change Point	0	22	43	60	72

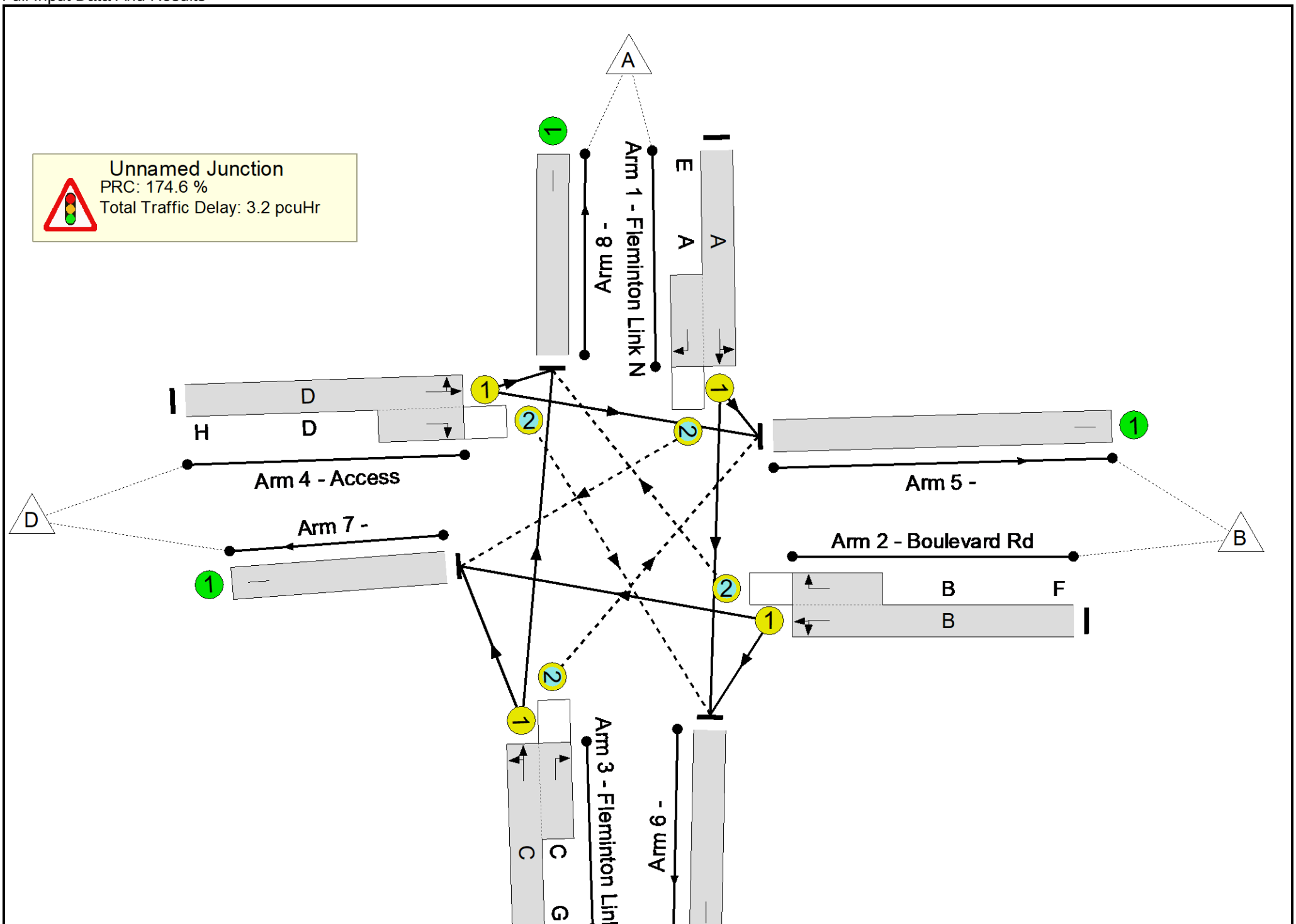
Full Input Data And Results

Signal Timings Diagram



Full Input Data And Results

Network Layout Diagram


Unnamed Junction
PRC: 174.6 %
Total Traffic Delay: 3.2 pcuHr
A
B
D
Arm 1 - Fleminton Link N
Arm 8 -
E
A
A
H
D
D
Arm 4 - Access
Arm 7 -
Arm 5 -
Arm 2 - Boulevard Rd
B
F
B
C
C
G
Arm 3 - Fleminton Link
Arm 6 -

Network Results

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**32.8%**
Unnamed Junction	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**32.8%**
1/1+1/2	Fleminton Link N Left Ahead Right	U+O	N/A	N/A	A	E	1	16	16	106	1661:1847	308+15	32.8 : 32.8%
2/1+2/2	Boulevard Rd Left Ahead Right	U+O	N/A	N/A	B	F	1	7	7	56	1841:1847	142+164	18.3 : 18.3%
3/1+3/2	Fleminton Link S Right Left Ahead	U+O	N/A	N/A	C	G	1	7	7	25	1915:1856	41+165	12.1 : 12.1%
4/1+4/2	Access Ahead Right Left	U+O	N/A	N/A	D	H	1	12	11	84	1859:2055	263+0	31.9 : 0.0%
5/1		U	N/A	N/A	-		-	-	-	186	Inf	Inf	0.0%
6/1		U	N/A	N/A	-		-	-	-	8	Inf	Inf	0.0%
7/1		U	N/A	N/A	-		-	-	-	25	Inf	Inf	0.0%
8/1		U	N/A	N/A	-		-	-	-	52	Inf	Inf	0.0%

Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network	**-**	**-**	**0**	**54**	**1**	**2.6**	**0.7**	**0.0**	**3.2**	**-**	**-**	**-**	**-**
Unnamed Junction	**-**	**-**	**0**	**54**	**1**	**2.6**	**0.7**	**0.0**	**3.2**	**-**	**-**	**-**	**-**
1/1+1/2	106	106	0	5	0	0.9	0.2	0.0	1.2	39.7	2.2	0.2	2.4
2/1+2/2	56	56	0	29	1	0.6	0.1	0.0	0.7	45.2	0.7	0.1	0.8
3/1+3/2	25	25	0	20	0	0.3	0.1	0.0	0.3	47.7	0.5	0.1	0.5
4/1+4/2	84	84	0	0	0	0.8	0.2	0.0	1.0	44.5	1.9	0.2	2.1
5/1	186	186	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	8	8	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
7/1	25	25	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
8/1	52	52	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0

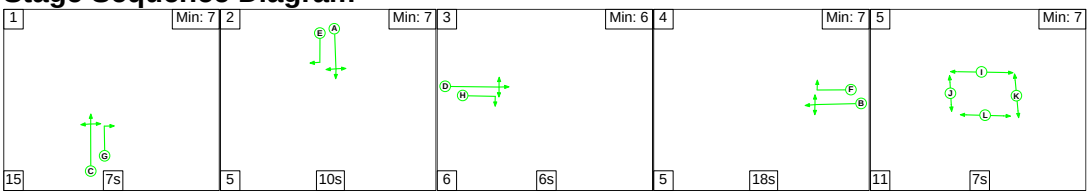
Full Input Data And Results

C1	PRC for Signalled Lanes (%):	174.6	Total Delay for Signalled Lanes (pcuHr):	3.24	Cycle Time (s):	90	
	PRC Over All Lanes (%):	174.6	Total Delay Over All Lanes(pcuHr):	3.24			

Full Input Data And Results

Scenario 2: '2025 Base + CD + Malincross PM' (FG2: '2025 Base + CD + Malincross PM', Plan 1: 'Network Control Plan 1')

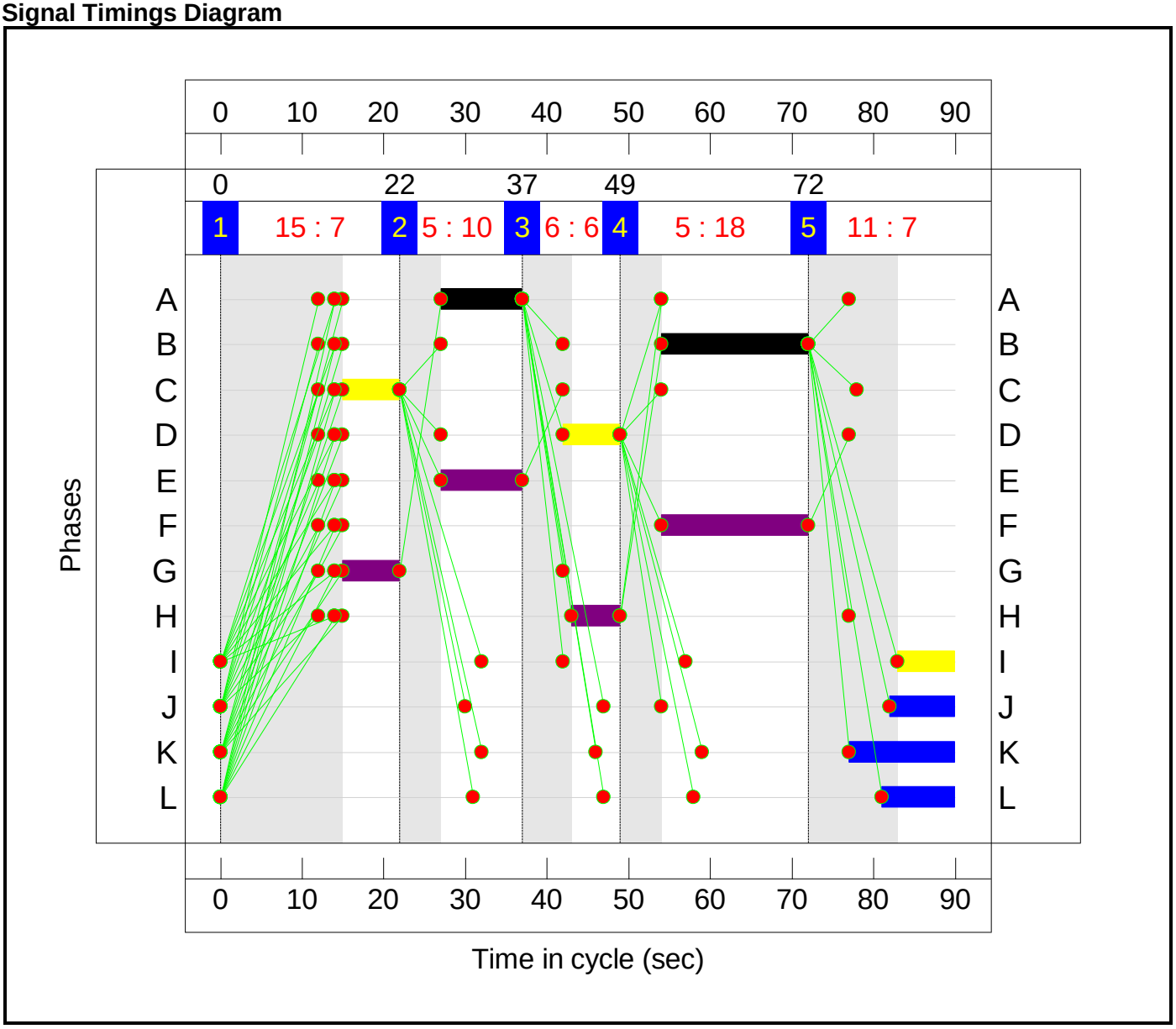
Stage Sequence Diagram



Stage Timings

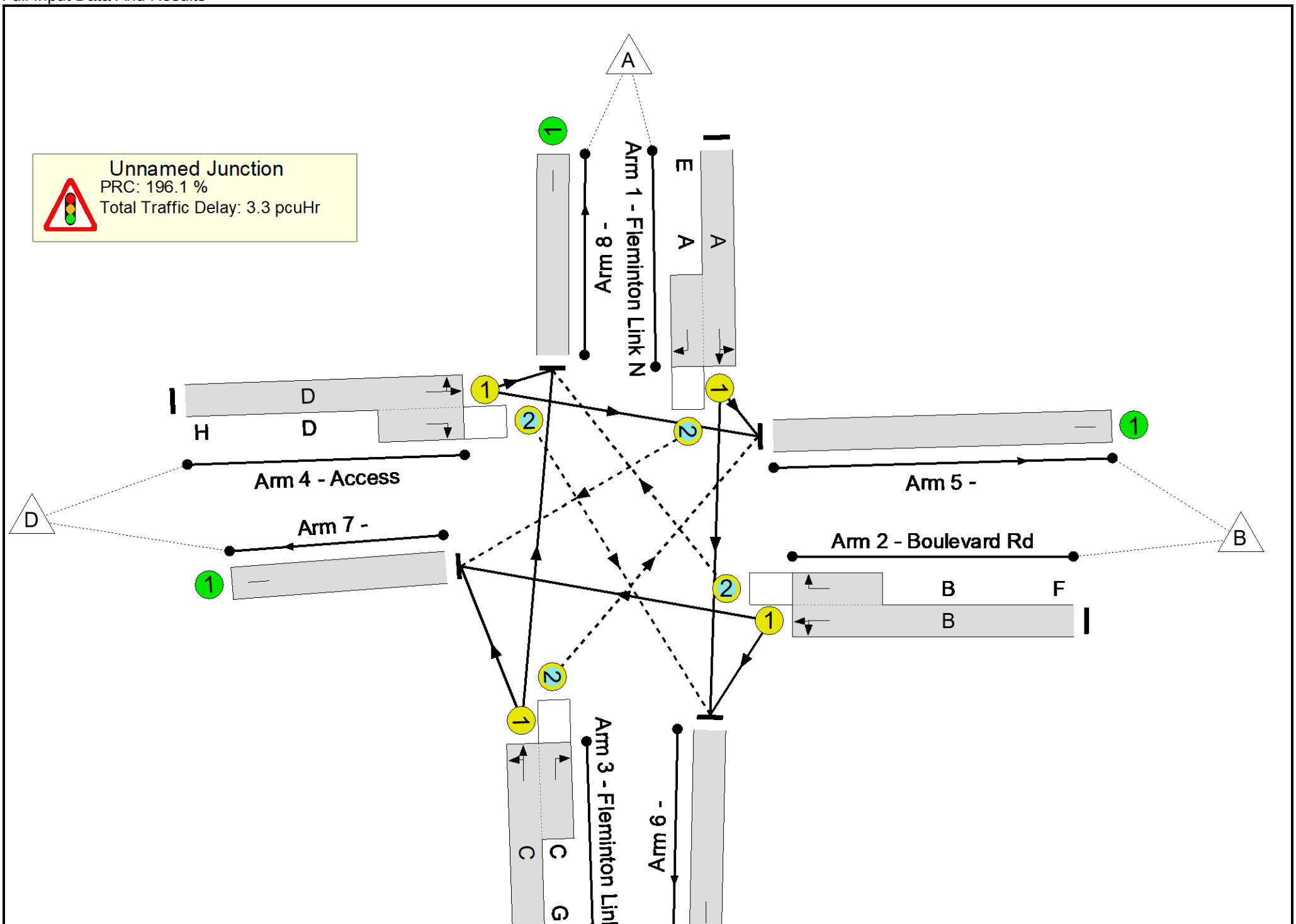
Stage	1	2	3	4	5
Duration	7	10	6	18	7
Change Point	0	22	37	49	72

Signal Timings Diagram



Full Input Data And Results

Network Layout Diagram


Unnamed Junction
PRC: 196.1 %
Total Traffic Delay: 3.3 pcuHr
A
B
D
Arm 1 - Fleminton Link N
Arm 8 -
E
A
A
H
D
D
Arm 4 - Access
Arm 5 -
Arm 7 -
Arm 2 - Boulevard Rd
B
F
B
C
C
G
Arm 3 - Fleminton Link
Arm 6 -

Network Results

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**30.4%**
Unnamed Junction	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**30.4%**
1/1+1/2	Fleminton Link N Left Ahead Right	U+O	N/A	N/A	A	E	1	10	10	71	1672:1847	198+53	28.3 : 28.3%
2/1+2/2	Boulevard Rd Left Ahead Right	U+O	N/A	N/A	B	F	1	18	18	164	1840:1847	253+286	30.4 : 30.4%
3/1+3/2	Fleminton Link S Right Left Ahead	U+O	N/A	N/A	C	G	1	7	7	14	1915:1856	45+165	6.7 : 6.7%
4/1+4/2	Access Ahead Right Left	U+O	N/A	N/A	D	H	1	7	6	44	1858:2055	160+0	27.5 : 0.0%
5/1		U	N/A	N/A	-		-	-	-	98	Inf	Inf	0.0%
6/1		U	N/A	N/A	-		-	-	-	22	Inf	Inf	0.0%
7/1		U	N/A	N/A	-		-	-	-	74	Inf	Inf	0.0%
8/1		U	N/A	N/A	-		-	-	-	99	Inf	Inf	0.0%

Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network	**-**	**-**	**0**	**110**	**3**	**2.7**	**0.6**	**0.0**	**3.3**	**-**	**-**	**-**	**-**
Unnamed Junction	**-**	**-**	**0**	**110**	**3**	**2.7**	**0.6**	**0.0**	**3.3**	**-**	**-**	**-**	**-**
1/1+1/2	71	71	0	15	0	0.7	0.2	0.0	0.9	45.7	1.3	0.2	1.5
2/1+2/2	164	164	0	85	2	1.3	0.2	0.0	1.6	34.1	1.8	0.2	2.0
3/1+3/2	14	14	0	11	0	0.1	0.0	0.0	0.2	47.0	0.3	0.0	0.3
4/1+4/2	44	44	0	0	0	0.5	0.2	0.0	0.7	53.7	1.0	0.2	1.2
5/1	98	98	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	22	22	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
7/1	74	74	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
8/1	99	99	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0

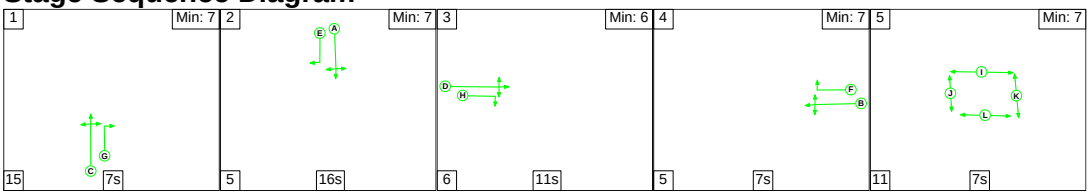
Full Input Data And Results

C1	PRC for Signalled Lanes (%):	196.1	Total Delay for Signalled Lanes (pcuHr):	3.30	Cycle Time (s):	90	
	PRC Over All Lanes (%):	196.1	Total Delay Over All Lanes(pcuHr):	3.30			

Full Input Data And Results

Scenario 3: '2040 Base + CD + Malincross AM' (FG3: '2040 Base + CD + Malincross AM', Plan 1: 'Network Control Plan 1')

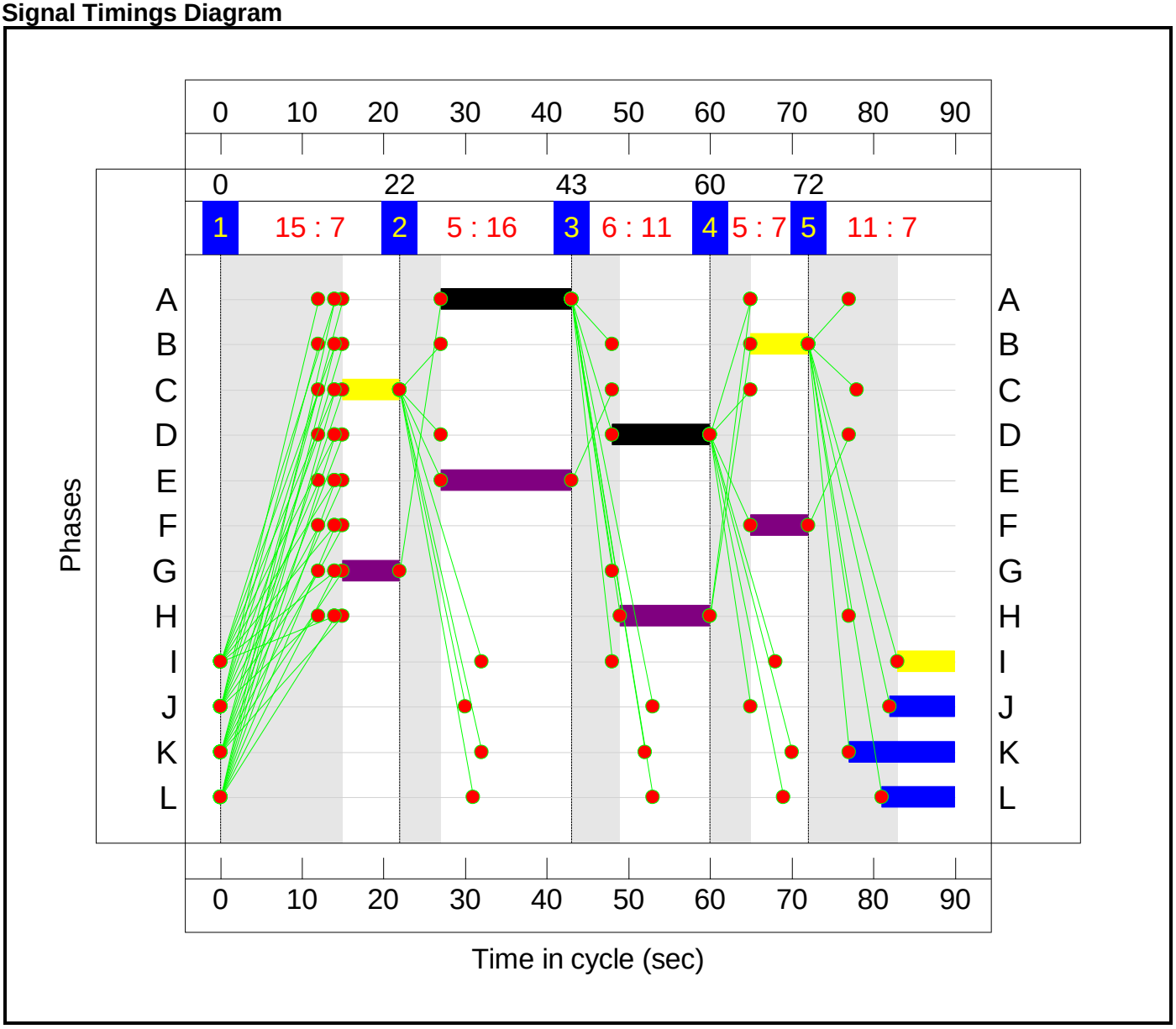
Stage Sequence Diagram



Stage Timings

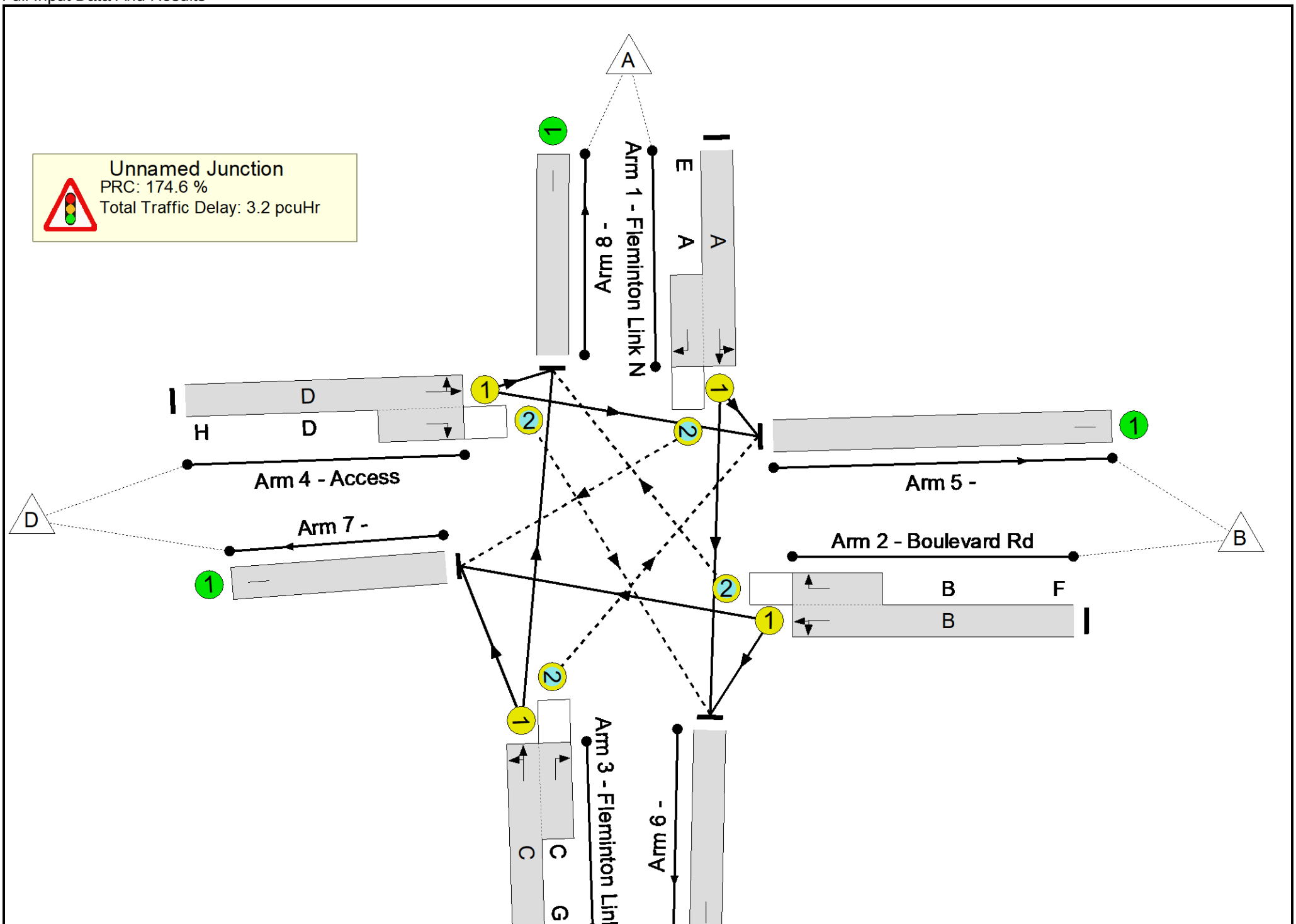
Stage	1	2	3	4	5
Duration	7	16	11	7	7
Change Point	0	22	43	60	72

Signal Timings Diagram



Full Input Data And Results

Network Layout Diagram


Unnamed Junction
PRC: 174.6 %
Total Traffic Delay: 3.2 pcuHr
A
B
D
Arm 1 - Fleminton Link N
Arm 8 -
E
A
A
H
D
D
Arm 4 - Access
Arm 7 -
Arm 5 -
Arm 2 - Boulevard Rd
B
F
B
C
C
G
Arm 3 - Fleminton Link
Arm 6 -

Network Results

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**32.8%**
Unnamed Junction	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**32.8%**
1/1+1/2	Fleminton Link N Left Ahead Right	U+O	N/A	N/A	A	E	1	16	16	106	1661:1847	308+15	32.8 : 32.8%
2/1+2/2	Boulevard Rd Left Ahead Right	U+O	N/A	N/A	B	F	1	7	7	56	1841:1847	142+164	18.3 : 18.3%
3/1+3/2	Fleminton Link S Right Left Ahead	U+O	N/A	N/A	C	G	1	7	7	25	1915:1856	41+165	12.1 : 12.1%
4/1+4/2	Access Ahead Right Left	U+O	N/A	N/A	D	H	1	12	11	84	1859:2055	263+0	31.9 : 0.0%
5/1		U	N/A	N/A	-		-	-	-	186	Inf	Inf	0.0%
6/1		U	N/A	N/A	-		-	-	-	8	Inf	Inf	0.0%
7/1		U	N/A	N/A	-		-	-	-	25	Inf	Inf	0.0%
8/1		U	N/A	N/A	-		-	-	-	52	Inf	Inf	0.0%

Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network	**-**	**-**	**0**	**54**	**1**	**2.6**	**0.7**	**0.0**	**3.2**	**-**	**-**	**-**	**-**
Unnamed Junction	**-**	**-**	**0**	**54**	**1**	**2.6**	**0.7**	**0.0**	**3.2**	**-**	**-**	**-**	**-**
1/1+1/2	106	106	0	5	0	0.9	0.2	0.0	1.2	39.7	2.2	0.2	2.4
2/1+2/2	56	56	0	29	1	0.6	0.1	0.0	0.7	45.2	0.7	0.1	0.8
3/1+3/2	25	25	0	20	0	0.3	0.1	0.0	0.3	47.7	0.5	0.1	0.5
4/1+4/2	84	84	0	0	0	0.8	0.2	0.0	1.0	44.5	1.9	0.2	2.1
5/1	186	186	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	8	8	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
7/1	25	25	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
8/1	52	52	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0

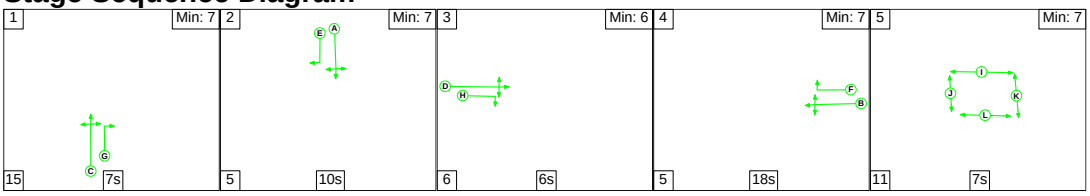
Full Input Data And Results

C1	PRC for Signalled Lanes (%):	174.6	Total Delay for Signalled Lanes (pcuHr):	3.24	Cycle Time (s):	90	
	PRC Over All Lanes (%):	174.6	Total Delay Over All Lanes(pcuHr):	3.24			

Full Input Data And Results

Scenario 4: '2040 Base + CD + Malincross PM' (FG4: '2040 Base + CD + Malincross PM', Plan 1: 'Network Control Plan 1')

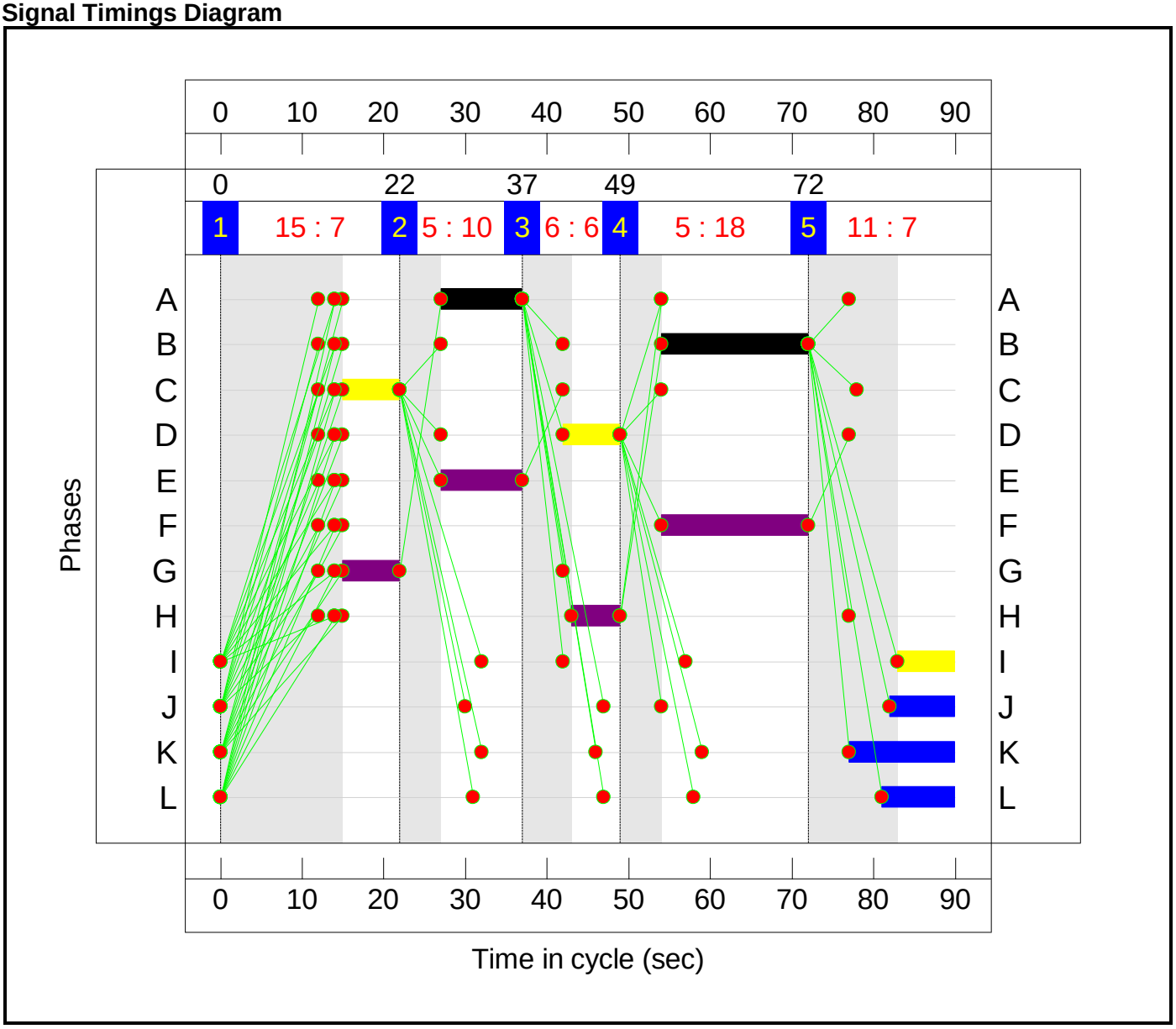
Stage Sequence Diagram



Stage Timings

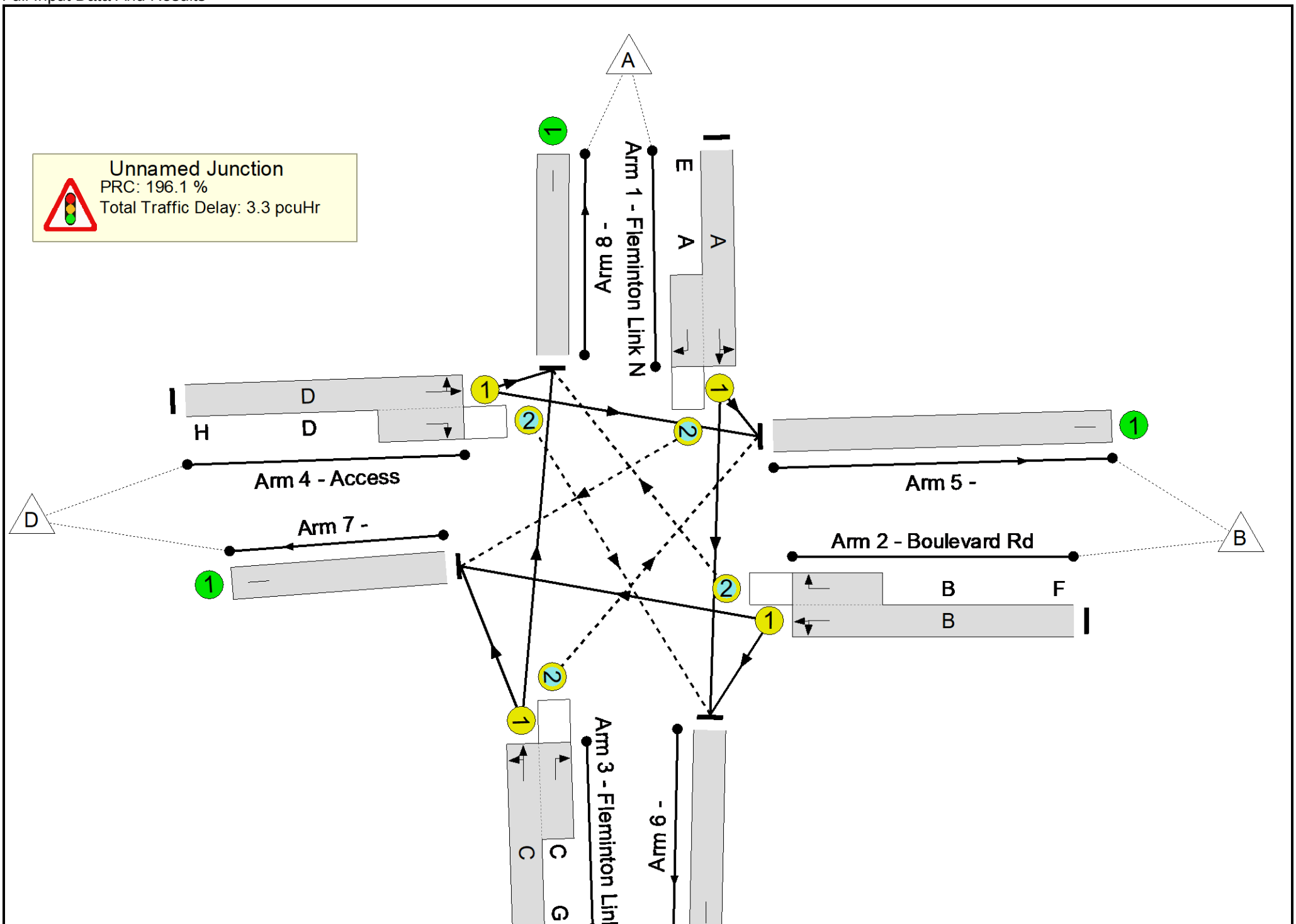
Stage	1	2	3	4	5
Duration	7	10	6	18	7
Change Point	0	22	37	49	72

Signal Timings Diagram



Full Input Data And Results

Network Layout Diagram


Unnamed Junction
PRC: 196.1 %
Total Traffic Delay: 3.3 pcuHr
A
B
D
Arm 1 - Fleminton Link N
Arm 8 -
E
A
A
H
D
D
Arm 4 - Access
Arm 5 -
Arm 7 -
Arm 2 - Boulevard Rd
B
F
B
C
C
G
Arm 3 - Fleminton Link
Arm 6 -

Network Results

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**30.4%**
Unnamed Junction	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**30.4%**
1/1+1/2	Fleminton Link N Left Ahead Right	U+O	N/A	N/A	A	E	1	10	10	71	1672:1847	198+53	28.3 : 28.3%
2/1+2/2	Boulevard Rd Left Ahead Right	U+O	N/A	N/A	B	F	1	18	18	164	1840:1847	253+286	30.4 : 30.4%
3/1+3/2	Fleminton Link S Right Left Ahead	U+O	N/A	N/A	C	G	1	7	7	14	1915:1856	45+165	6.7 : 6.7%
4/1+4/2	Access Ahead Right Left	U+O	N/A	N/A	D	H	1	7	6	44	1858:2055	160+0	27.5 : 0.0%
5/1		U	N/A	N/A	-		-	-	-	98	Inf	Inf	0.0%
6/1		U	N/A	N/A	-		-	-	-	22	Inf	Inf	0.0%
7/1		U	N/A	N/A	-		-	-	-	74	Inf	Inf	0.0%
8/1		U	N/A	N/A	-		-	-	-	99	Inf	Inf	0.0%

Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network	**-**	**-**	**0**	**110**	**3**	**2.7**	**0.6**	**0.0**	**3.3**	**-**	**-**	**-**	**-**
Unnamed Junction	**-**	**-**	**0**	**110**	**3**	**2.7**	**0.6**	**0.0**	**3.3**	**-**	**-**	**-**	**-**
1/1+1/2	71	71	0	15	0	0.7	0.2	0.0	0.9	45.7	1.3	0.2	1.5
2/1+2/2	164	164	0	85	2	1.3	0.2	0.0	1.6	34.1	1.8	0.2	2.0
3/1+3/2	14	14	0	11	0	0.1	0.0	0.0	0.2	47.0	0.3	0.0	0.3
4/1+4/2	44	44	0	0	0	0.5	0.2	0.0	0.7	53.7	1.0	0.2	1.2
5/1	98	98	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	22	22	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
7/1	74	74	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
8/1	99	99	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0

Full Input Data And Results

C1	PRC for Signalled Lanes (%):	196.1	Total Delay for Signalled Lanes (pcuHr):	3.30	Cycle Time (s):	90	
	PRC Over All Lanes (%):	196.1	Total Delay Over All Lanes(pcuHr):	3.30			

APPENDIX U

LINSIG Output (Junction B)

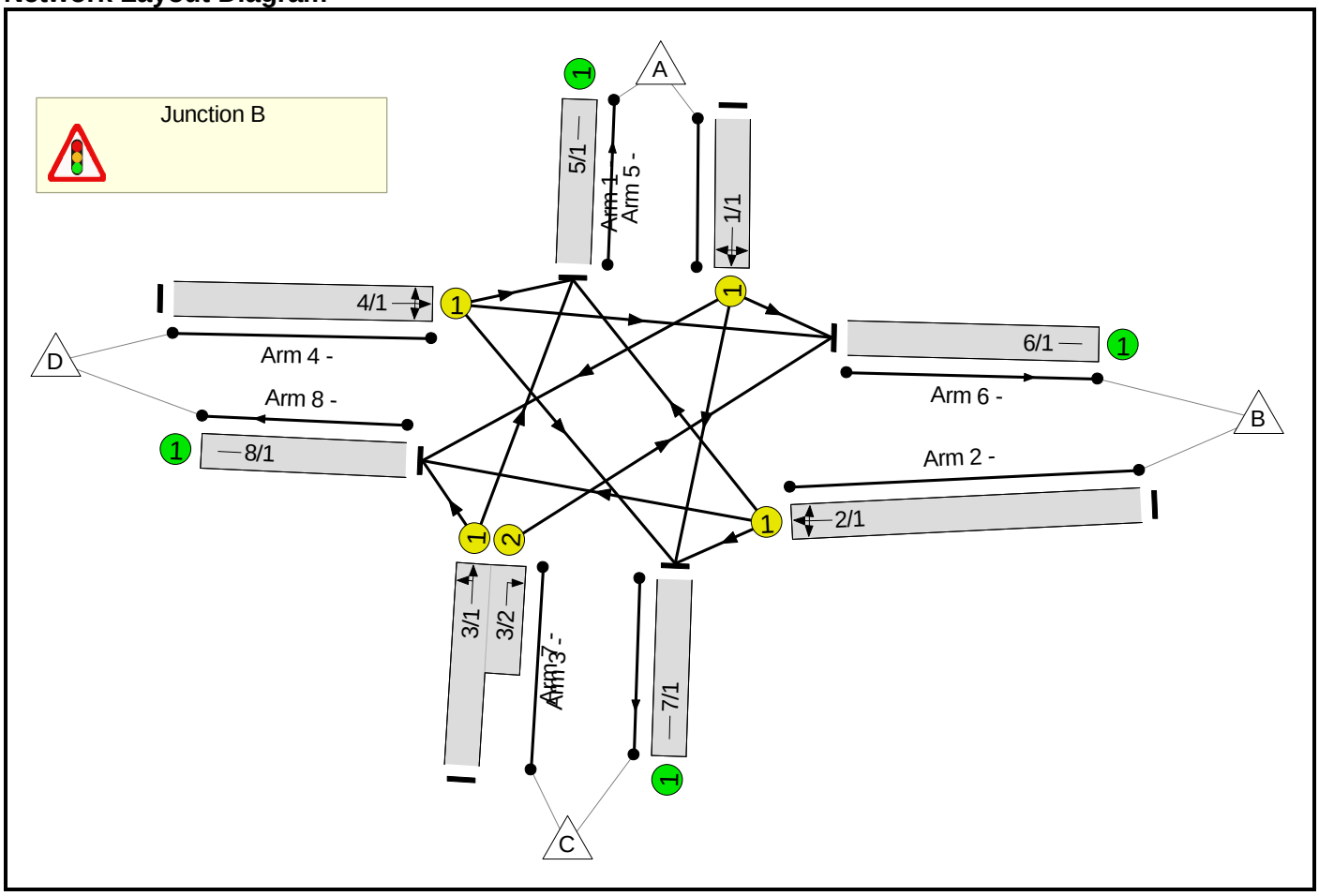
DRAFT

Full Input Data And Results

User and Project Details

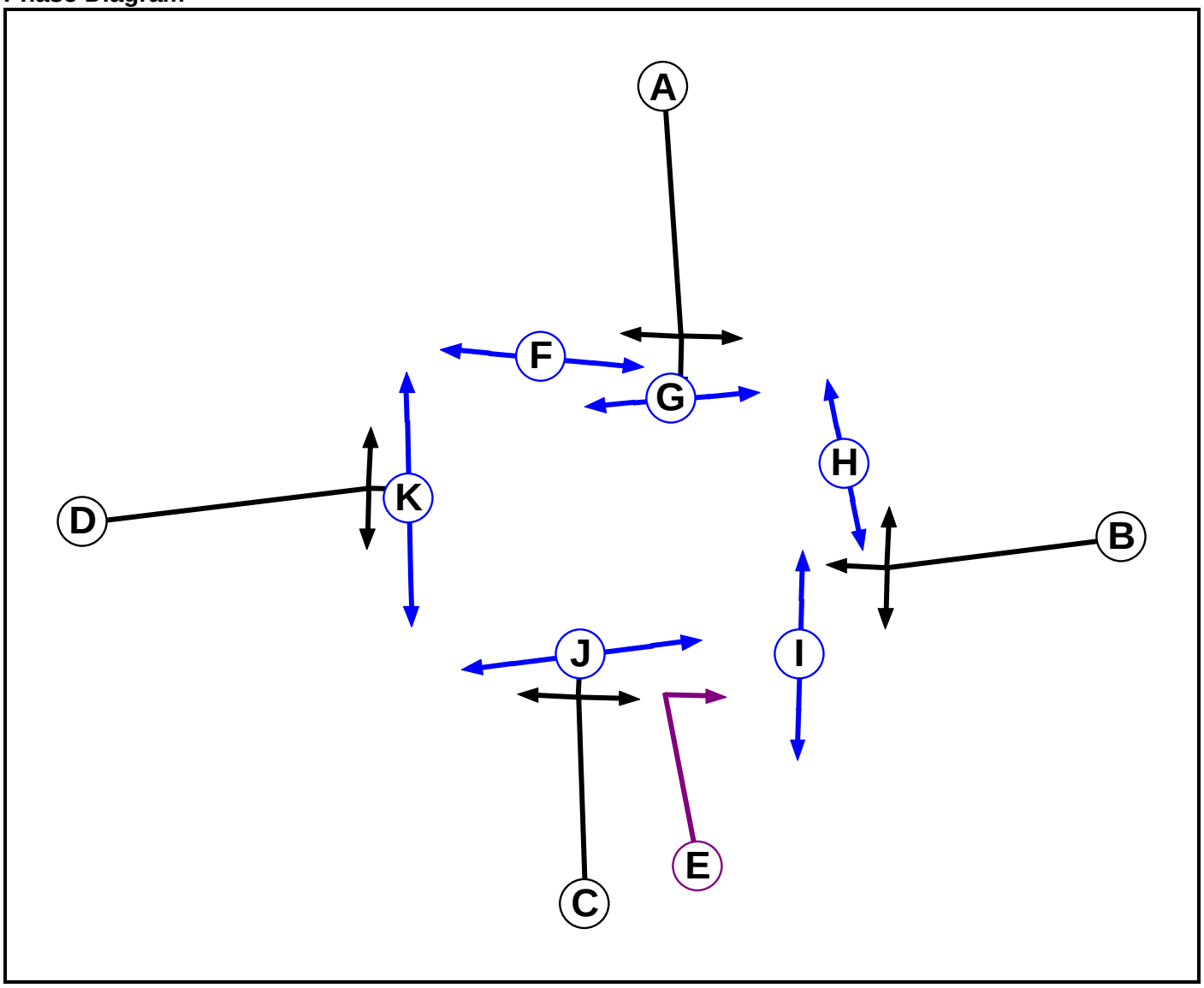
Project:	
Title:	
Location:	
Additional detail:	
File name:	JUNCTION B.lsg3x
Author:	
Company:	
Address:	

Network Layout Diagram



Full Input Data And Results

Phase Diagram



Phase Input Data

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

Full Input Data And Results

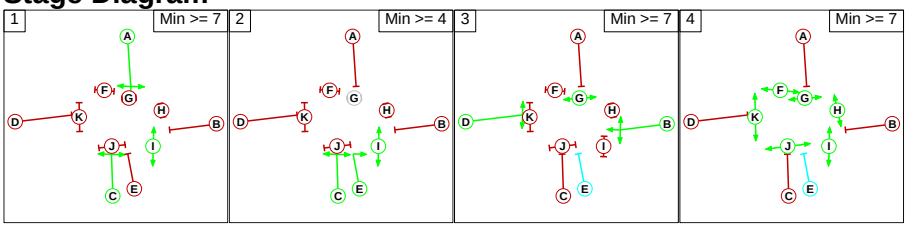
Phase Intergreens Matrix

Terminating Phase \ Starting Phase	A	B	C	D	E	F	G	H	I	J	K
A		5	-	5	5	-	5	8	-	8	8
B	5		5	-	-	8	-	-	5	7	9
C	-	5		6	-	8	-	9	-	5	8
D	5	-	5		-	7	-	9	-	8	5
E	5	-	-	-		-	-	-	-	-	-
F	-	6	6	6	-		-	-	-	-	-
G	7	-	-	-	-	-		-	-	-	-
H	6	-	6	6	-	-	-		-	-	-
I	-	6	-	-	-	-	-	-		-	-
J	15	15	15	15	-	-	-	-	-		-
K	10	10	10	10	-	-	-	-	-	-	

Phases in Stage

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

Stage Diagram



Phase Delays

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

Prohibited Stage Change

From Stage \ To Stage	1	2	3	4
1		5	6	9
2	5		6	9
3	7	X		9
4	15	X	15	

Full Input Data And Results

Give-Way Lane Input Data

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

Full Input Data And Results

Lane Input Data

Junction: Junction B												
Lane	**Lane Type**	**Phases**	**Start Disp.**	**End Disp.**	**Physical Length (PCU)**	**Sat Flow Type**	**Def User Saturation Flow (PCU/Hr)**	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Turns**	**Turning Radius (m)**
1/1	U	A	2	3	60.0	Geom	-	3.50	0.00	Y	Arm 6 Left	7.00
											Arm 7 Ahead	Inf
											Arm 8 Right	13.00
2/1	U	B	2	3	60.0	Geom	-	3.30	0.00	Y	Arm 5 Right	13.00
											Arm 7 Left	7.00
											Arm 8 Ahead	Inf
3/1	U	C	2	3	60.0	Geom	-	3.25	0.00	Y	Arm 5 Ahead	Inf
											Arm 8 Left	7.00
3/2	U	C E	2	3	4.7	Geom	-	3.25	0.00	N	Arm 6 Right	13.00
4/1	U	D	2	3	60.0	Geom	-	3.00	0.00	Y	Arm 5 Left	7.00
											Arm 6 Ahead	Inf
											Arm 7 Right	13.00
5/1	U		2	3	60.0	Inf	-	-	-	-	-	-
6/1	U		2	3	60.0	Inf	-	-	-	-	-	-
7/1	U		2	3	60.0	Inf	-	-	-	-	-	-
8/1	U		2	3	60.0	Inf	-	-	-	-	-	-

Traffic Flow Groups

Flow Group	Start Time	End Time	Duration	Formula
1: '2025 Base + CD + Malincross AM'	08:00	09:00	01:00	
2: '2025 Base + CD + Malincross PM'	17:00	18:00	01:00	
3: '2040 Base + CD + Malincross AM'	08:00	09:00	01:00	
4: '2040 Base + CD + Malincross PM'	17:00	18:00	01:00	

Scenario 1: '2025 Base + CD + Malincross AM' (FG1: '2025 Base + CD + Malincross AM', Plan 1: 'Network Control Plan 1')

Traffic Flows, Desired

Desired Flow :

		Destination				
		A	B	C	D	Tot.
Origin	A	0	18	71	0	89
	B	5	0	7	2	14
	C	22	22	0	8	52
	D	0	7	27	0	34
	Tot.	27	47	105	10	189

Full Input Data And Results

Traffic Lane Flows

Lane	Scenario 1: 2025 Base + CD + Malincross AM
Junction: Junction B	
1/1	89
2/1	14
3/1 (with short)	52(In) 30(Out)
3/2 (short)	22
4/1	34
5/1	27
6/1	47
7/1	105
8/1	10

Lane Saturation Flows

Junction: Junction B								
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat Flow (PCU/Hr)**	**Flared Sat Flow (PCU/Hr)**
1/1	3.50	0.00	Y	Arm 6 Left	7.00	20.2 %	1883	1883
				Arm 7 Ahead	Inf	79.8 %		
				Arm 8 Right	13.00	0.0 %		
2/1	3.30	0.00	Y	Arm 5 Right	13.00	35.7 %	1694	1694
				Arm 7 Left	7.00	50.0 %		
				Arm 8 Ahead	Inf	14.3 %		
3/1	3.25	0.00	Y	Arm 5 Ahead	Inf	73.3 %	1835	1835
				Arm 8 Left	7.00	26.7 %		
3/2	3.25	0.00	N	Arm 6 Right	13.00	100.0 %	1865	1865
4/1	3.00	0.00	Y	Arm 5 Left	7.00	0.0 %	1754	1754
				Arm 6 Ahead	Inf	20.6 %		
				Arm 7 Right	13.00	79.4 %		
5/1	Infinite Saturation Flow						Inf	Inf
6/1	Infinite Saturation Flow						Inf	Inf
7/1	Infinite Saturation Flow						Inf	Inf
8/1	Infinite Saturation Flow						Inf	Inf

Full Input Data And Results

Scenario 2: '2025 Base + CD + Malincross PM' (FG2: '2025 Base + CD + Malincross PM', Plan 1: 'Network Control Plan 1')

Traffic Flows, Desired

Desired Flow :

Origin	Destination					
		A	B	C	D	Tot.
	A	0	9	37	0	46
	B	16	0	19	6	41
	C	62	11	0	24	97
	D	0	4	14	0	18
	Tot.	78	24	70	30	202

Traffic Lane Flows

Lane	Scenario 2: 2025 Base + CD + Malincross PM
Junction: Junction B	
1/1	46
2/1	41
3/1 (with short)	97(In) 86(Out)
3/2 (short)	11
4/1	18
5/1	78
6/1	24
7/1	70
8/1	30

Full Input Data And Results

Lane Saturation Flows

Junction: Junction B								
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat Flow (PCU/Hr)**	**Flared Sat Flow (PCU/Hr)**
1/1	3.50	0.00	Y	Arm 6 Left	7.00	19.6 %	1886	1886
				Arm 7 Ahead	Inf	80.4 %		
				Arm 8 Right	13.00	0.0 %		
2/1	3.30	0.00	Y	Arm 5 Right	13.00	39.0 %	1700	1700
				Arm 7 Left	7.00	46.3 %		
				Arm 8 Ahead	Inf	14.6 %		
3/1	3.25	0.00	Y	Arm 5 Ahead	Inf	72.1 %	1831	1831
				Arm 8 Left	7.00	27.9 %		
3/2	3.25	0.00	N	Arm 6 Right	13.00	100.0 %	1865	1865
4/1	3.00	0.00	Y	Arm 5 Left	7.00	0.0 %	1757	1757
				Arm 6 Ahead	Inf	22.2 %		
				Arm 7 Right	13.00	77.8 %		
5/1	Infinite Saturation Flow						Inf	Inf
6/1	Infinite Saturation Flow						Inf	Inf
7/1	Infinite Saturation Flow						Inf	Inf
8/1	Infinite Saturation Flow						Inf	Inf

Scenario 3: '2040 Base + CD + Malincross AM' (FG3: '2040 Base + CD + Malincross AM', Plan 1: 'Network Control Plan 1')

Traffic Flows, Desired

Desired Flow :

		Destination				
		A	B	C	D	Tot.
Origin	A	0	18	71	0	89
	B	5	0	7	2	14
	C	22	22	0	8	52
	D	0	7	27	0	34
	Tot.	27	47	105	10	189

Full Input Data And Results

Traffic Lane Flows

Lane	Scenario 3: 2040 Base + CD + Malincross AM
Junction: Junction B	
1/1	89
2/1	14
3/1 (with short)	52(In) 30(Out)
3/2 (short)	22
4/1	34
5/1	27
6/1	47
7/1	105
8/1	10

Lane Saturation Flows

Junction: Junction B								
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat Flow (PCU/Hr)**	**Flared Sat Flow (PCU/Hr)**
1/1	3.50	0.00	Y	Arm 6 Left	7.00	20.2 %	1883	1883
				Arm 7 Ahead	Inf	79.8 %		
				Arm 8 Right	13.00	0.0 %		
2/1	3.30	0.00	Y	Arm 5 Right	13.00	35.7 %	1694	1694
				Arm 7 Left	7.00	50.0 %		
				Arm 8 Ahead	Inf	14.3 %		
3/1	3.25	0.00	Y	Arm 5 Ahead	Inf	73.3 %	1835	1835
				Arm 8 Left	7.00	26.7 %		
3/2	3.25	0.00	N	Arm 6 Right	13.00	100.0 %	1865	1865
4/1	3.00	0.00	Y	Arm 5 Left	7.00	0.0 %	1754	1754
				Arm 6 Ahead	Inf	20.6 %		
				Arm 7 Right	13.00	79.4 %		
5/1	Infinite Saturation Flow						Inf	Inf
6/1	Infinite Saturation Flow						Inf	Inf
7/1	Infinite Saturation Flow						Inf	Inf
8/1	Infinite Saturation Flow						Inf	Inf

Full Input Data And Results

Scenario 4: '2040 Base + CD + Malincross PM' (FG4: '2040 Base + CD + Malincross PM', Plan 1: 'Network Control Plan 1')

Traffic Flows, Desired

Desired Flow :

Origin	Destination					
		A	B	C	D	Tot.
	A	0	9	37	0	46
	B	16	0	19	6	41
	C	62	11	0	24	97
	D	0	4	14	0	18
	Tot.	78	24	70	30	202

Traffic Lane Flows

Lane	Scenario 4: 2040 Base + CD + Malincross PM
Junction: Junction B	
1/1	46
2/1	41
3/1 (with short)	97(In) 86(Out)
3/2 (short)	11
4/1	18
5/1	78
6/1	24
7/1	70
8/1	30

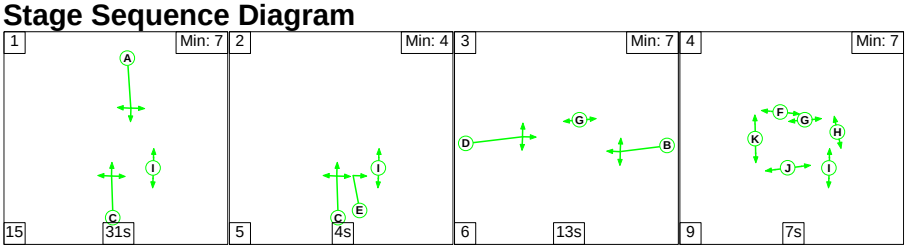
Full Input Data And Results

Lane Saturation Flows

Junction: Junction B								
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat Flow (PCU/Hr)**	**Flared Sat Flow (PCU/Hr)**
1/1	3.50	0.00	Y	Arm 6 Left	7.00	19.6 %	1886	1886
				Arm 7 Ahead	Inf	80.4 %		
				Arm 8 Right	13.00	0.0 %		
2/1	3.30	0.00	Y	Arm 5 Right	13.00	39.0 %	1700	1700
				Arm 7 Left	7.00	46.3 %		
				Arm 8 Ahead	Inf	14.6 %		
3/1	3.25	0.00	Y	Arm 5 Ahead	Inf	72.1 %	1831	1831
				Arm 8 Left	7.00	27.9 %		
3/2	3.25	0.00	N	Arm 6 Right	13.00	100.0 %	1865	1865
4/1	3.00	0.00	Y	Arm 5 Left	7.00	0.0 %	1757	1757
				Arm 6 Ahead	Inf	22.2 %		
				Arm 7 Right	13.00	77.8 %		
5/1	Infinite Saturation Flow						Inf	Inf
6/1	Infinite Saturation Flow						Inf	Inf
7/1	Infinite Saturation Flow						Inf	Inf
8/1	Infinite Saturation Flow						Inf	Inf

Scenario 1: '2025 Base + CD + Malincross AM' (FG1: '2025 Base + CD + Malincross AM', Plan 1: 'Network Control Plan 1')

Stage Sequence Diagram

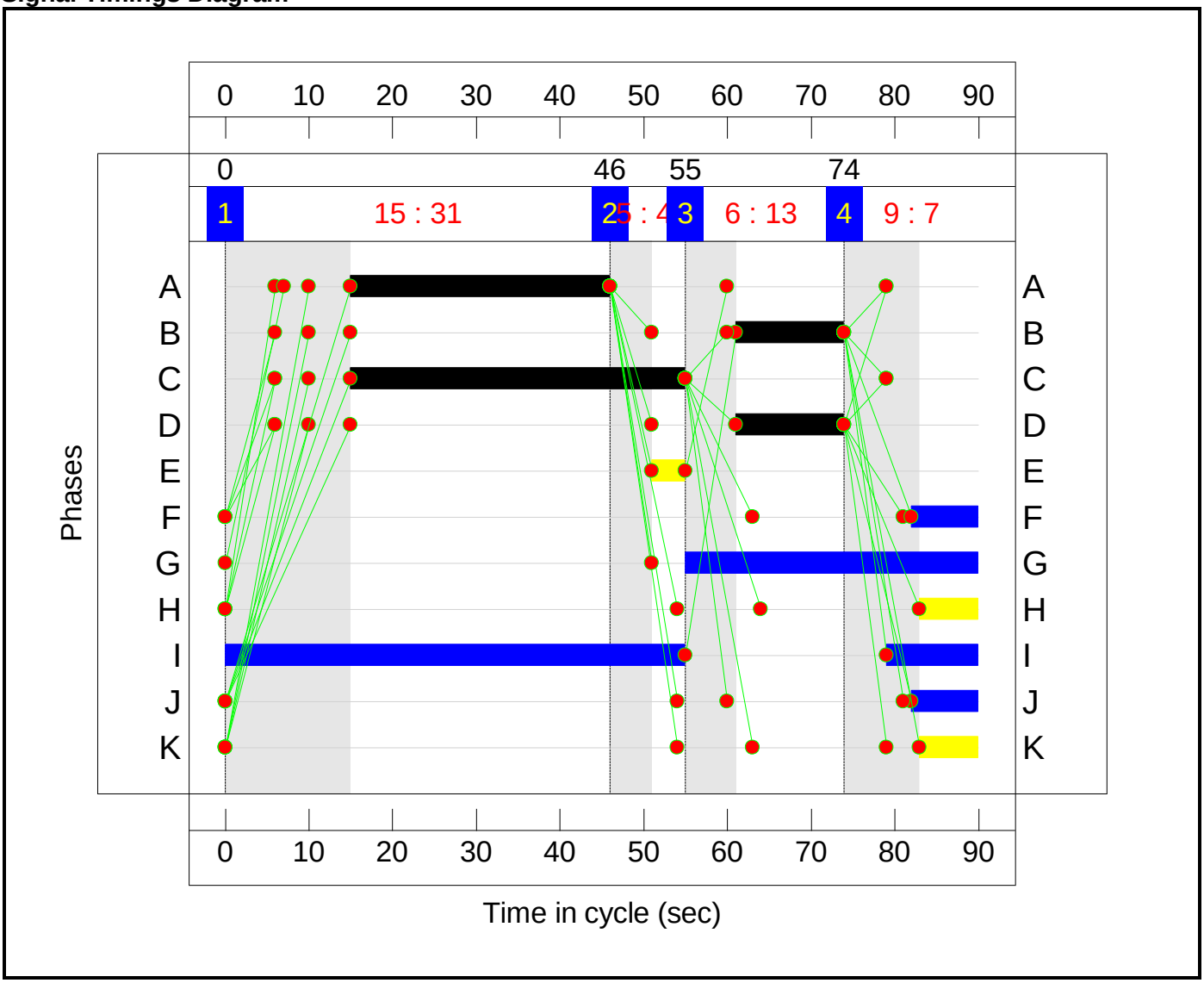


Stage Timings

Stage	1	2	3	4
Duration	31	4	13	7
Change Point	0	46	55	74

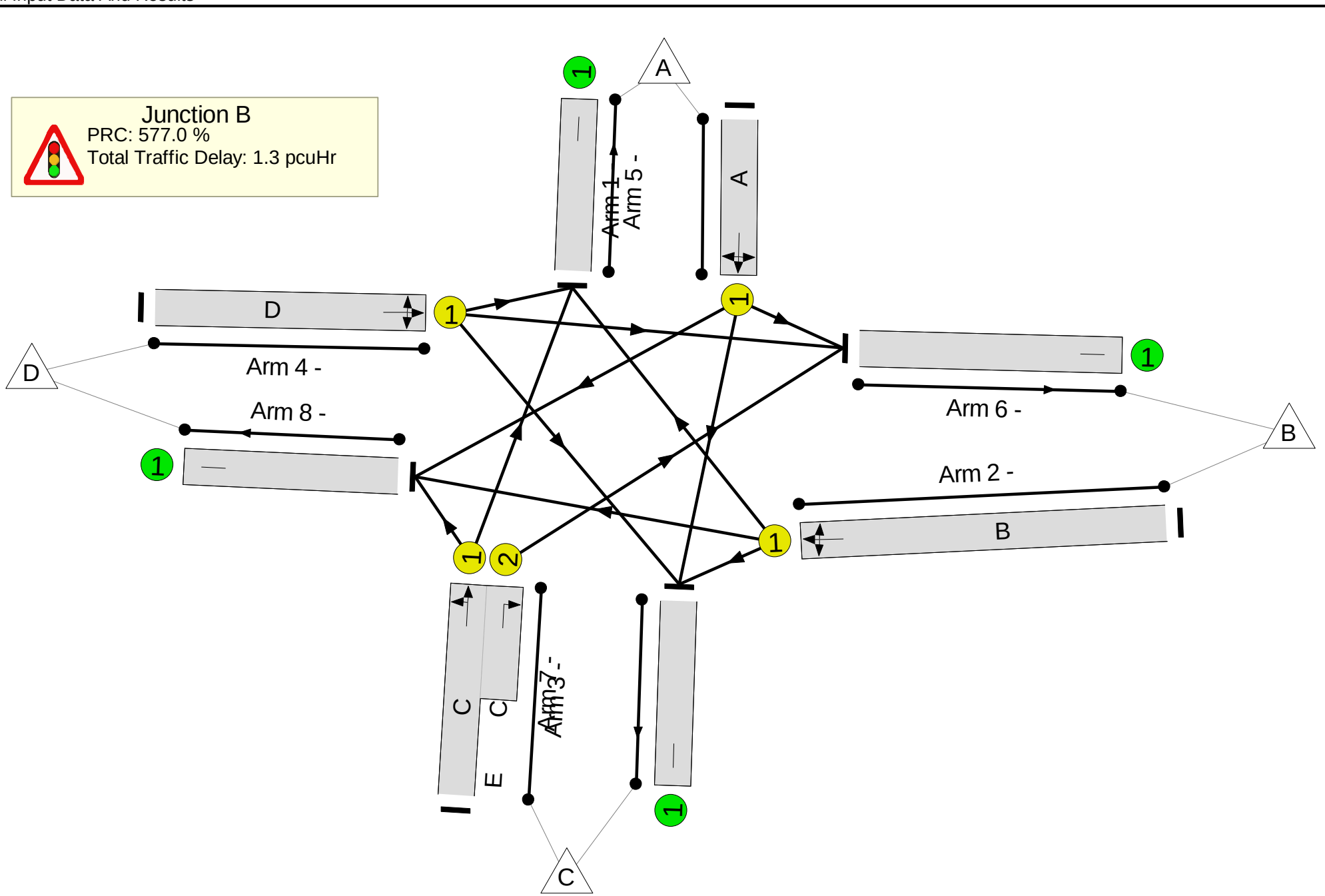
Full Input Data And Results

Signal Timings Diagram



Full Input Data And Results

Network Layout Diagram


Junction B
PRC: 577.0 %
Total Traffic Delay: 1.3 pcuHr
A
B
C
D
Arm 1
Arm 2 -
Arm 3 -
Arm 4 -
Arm 5 -
Arm 6 -
Arm 7 -
Arm 8 -
E

Network Results

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**13.3%**
Junction B	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**13.3%**
1/1	Left Ahead Right	U	N/A	N/A	A		1	31	-	89	1883	670	13.3%
2/1	Right Left Ahead	U	N/A	N/A	B		1	13	-	14	1694	264	5.3%
3/1+3/2	Ahead Right Left	U	N/A	N/A	C	E	1	40	4	52	1835:1865	572+419	5.2 : 5.2%
4/1	Left Ahead Right	U	N/A	N/A	D		1	13	-	34	1754	273	12.5%
5/1		U	N/A	N/A	-		-	-	-	27	Inf	Inf	0.0%
6/1		U	N/A	N/A	-		-	-	-	47	Inf	Inf	0.0%
7/1		U	N/A	N/A	-		-	-	-	105	Inf	Inf	0.0%
8/1		U	N/A	N/A	-		-	-	-	10	Inf	Inf	0.0%

Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network	**-**	**-**	**0**	**0**	**0**	**1.1**	**0.2**	**0.0**	**1.3**	**-**	**-**	**-**	**-**
Junction B	**-**	**-**	**0**	**0**	**0**	**1.1**	**0.2**	**0.0**	**1.3**	**-**	**-**	**-**	**-**
1/1	89	89	-	-	-	0.5	0.1	-	0.6	22.7	1.5	0.1	1.6
2/1	14	14	-	-	-	0.1	0.0	-	0.2	39.7	0.3	0.0	0.3
3/1+3/2	52	52	-	-	-	0.2	0.0	-	0.2	15.5	0.4	0.0	0.4
4/1	34	34	-	-	-	0.3	0.1	-	0.4	40.3	0.7	0.1	0.8
5/1	27	27	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	47	47	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
7/1	105	105	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
8/1	10	10	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0

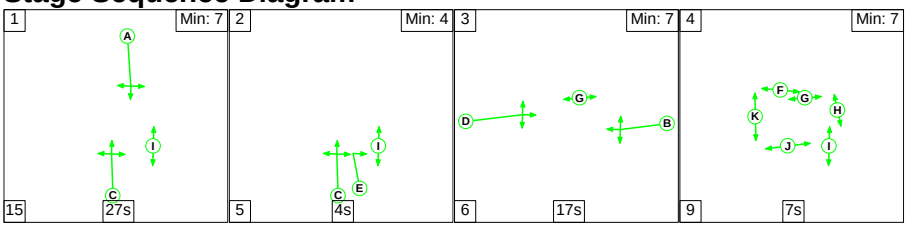
Full Input Data And Results

C1	PRC for Signalled Lanes (%):	577.0	Total Delay for Signalled Lanes (pcuHr):	1.32	Cycle Time (s):	90
	PRC Over All Lanes (%):	577.0	Total Delay Over All Lanes(pcuHr):	1.32		

Full Input Data And Results

Scenario 2: '2025 Base + CD + Malincross PM' (FG2: '2025 Base + CD + Malincross PM', Plan 1: 'Network Control Plan 1')

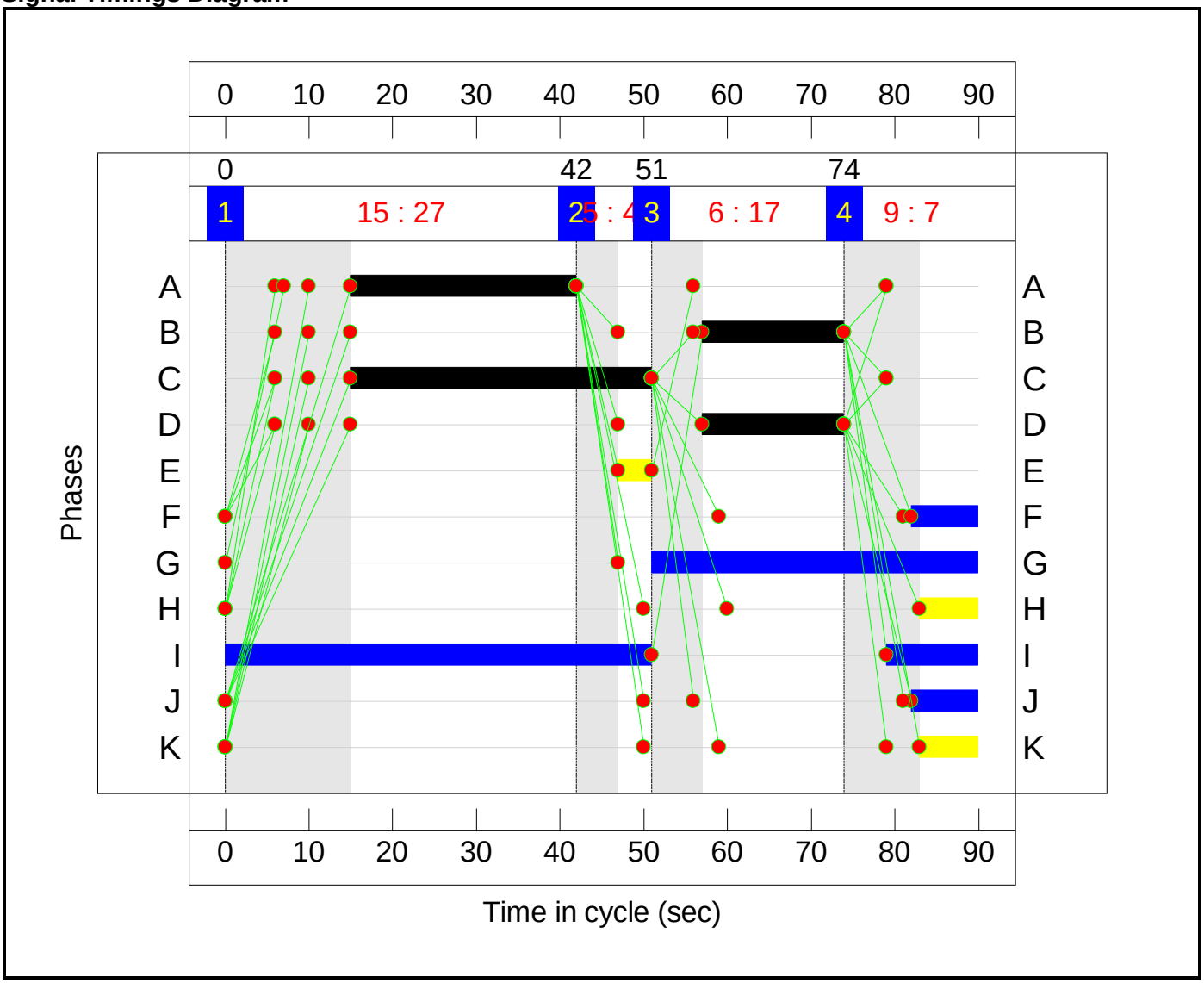
Stage Sequence Diagram



Stage Timings

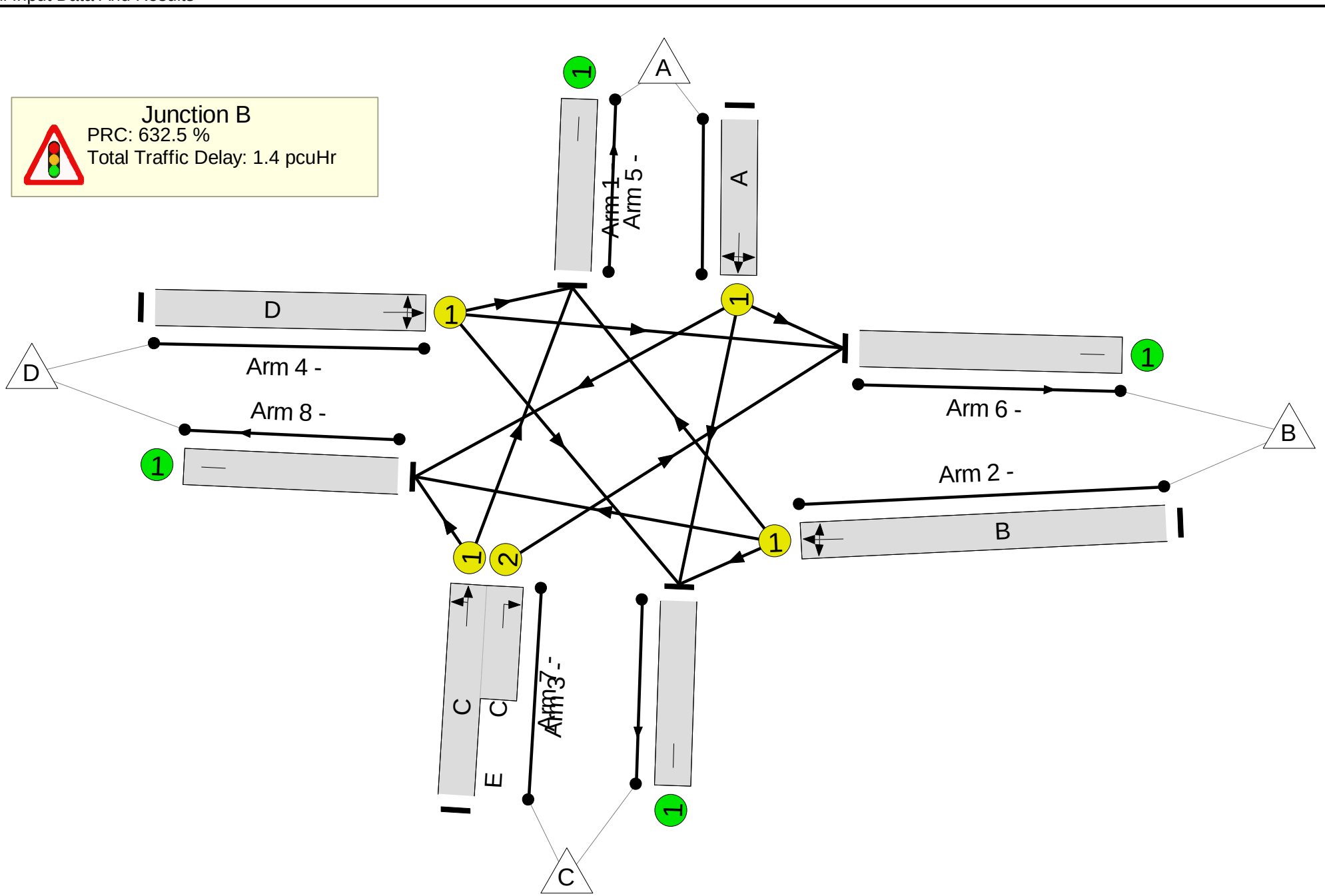
Stage	1	2	3	4
Duration	27	4	17	7
Change Point	0	42	51	74

Signal Timings Diagram



Full Input Data And Results

Network Layout Diagram


Junction B
PRC: 632.5 %
Total Traffic Delay: 1.4 pcuHr
A
B
C
D
Arm 1
Arm 2 -
Arm 3 -
Arm 4 -
Arm 5 -
Arm 6 -
Arm 7 -
Arm 8 -
E
1
2

Network Results

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**12.3%**
Junction B	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**12.3%**
1/1	Left Ahead Right	U	N/A	N/A	A		1	27	-	46	1886	587	7.8%
2/1	Right Left Ahead	U	N/A	N/A	B		1	17	-	41	1700	340	12.1%
3/1+3/2	Ahead Right Left	U	N/A	N/A	C	E	1	36	4	97	1831:1865	700+90	12.3 : 12.3%
4/1	Left Ahead Right	U	N/A	N/A	D		1	17	-	18	1757	351	5.1%
5/1		U	N/A	N/A	-		-	-	-	78	Inf	Inf	0.0%
6/1		U	N/A	N/A	-		-	-	-	24	Inf	Inf	0.0%
7/1		U	N/A	N/A	-		-	-	-	70	Inf	Inf	0.0%
8/1		U	N/A	N/A	-		-	-	-	30	Inf	Inf	0.0%

Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network	**-**	**-**	**0**	**0**	**0**	**1.2**	**0.2**	**0.0**	**1.4**	**-**	**-**	**-**	**-**
Junction B	**-**	**-**	**0**	**0**	**0**	**1.2**	**0.2**	**0.0**	**1.4**	**-**	**-**	**-**	**-**
1/1	46	46	-	-	-	0.3	0.0	-	0.3	25.3	0.8	0.0	0.8
2/1	41	41	-	-	-	0.3	0.1	-	0.4	35.6	0.8	0.1	0.9
3/1+3/2	97	97	-	-	-	0.4	0.1	-	0.5	18.9	1.3	0.1	1.4
4/1	18	18	-	-	-	0.1	0.0	-	0.2	34.6	0.4	0.0	0.4
5/1	78	78	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	24	24	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
7/1	70	70	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
8/1	30	30	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0

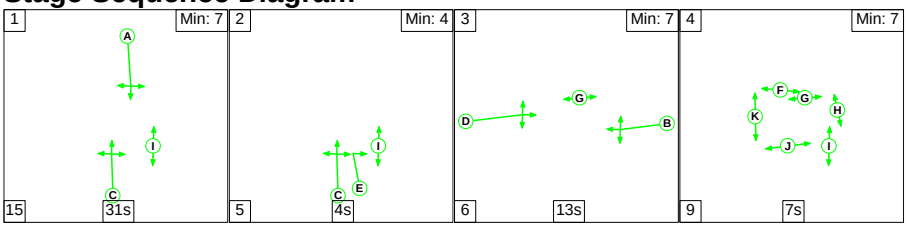
Full Input Data And Results

C1	PRC for Signalled Lanes (%):	632.5	Total Delay for Signalled Lanes (pcuHr):	1.41	Cycle Time (s):	90
	PRC Over All Lanes (%):	632.5	Total Delay Over All Lanes(pcuHr):	1.41		

Full Input Data And Results

Scenario 3: '2040 Base + CD + Malincross AM' (FG3: '2040 Base + CD + Malincross AM', Plan 1: 'Network Control Plan 1')

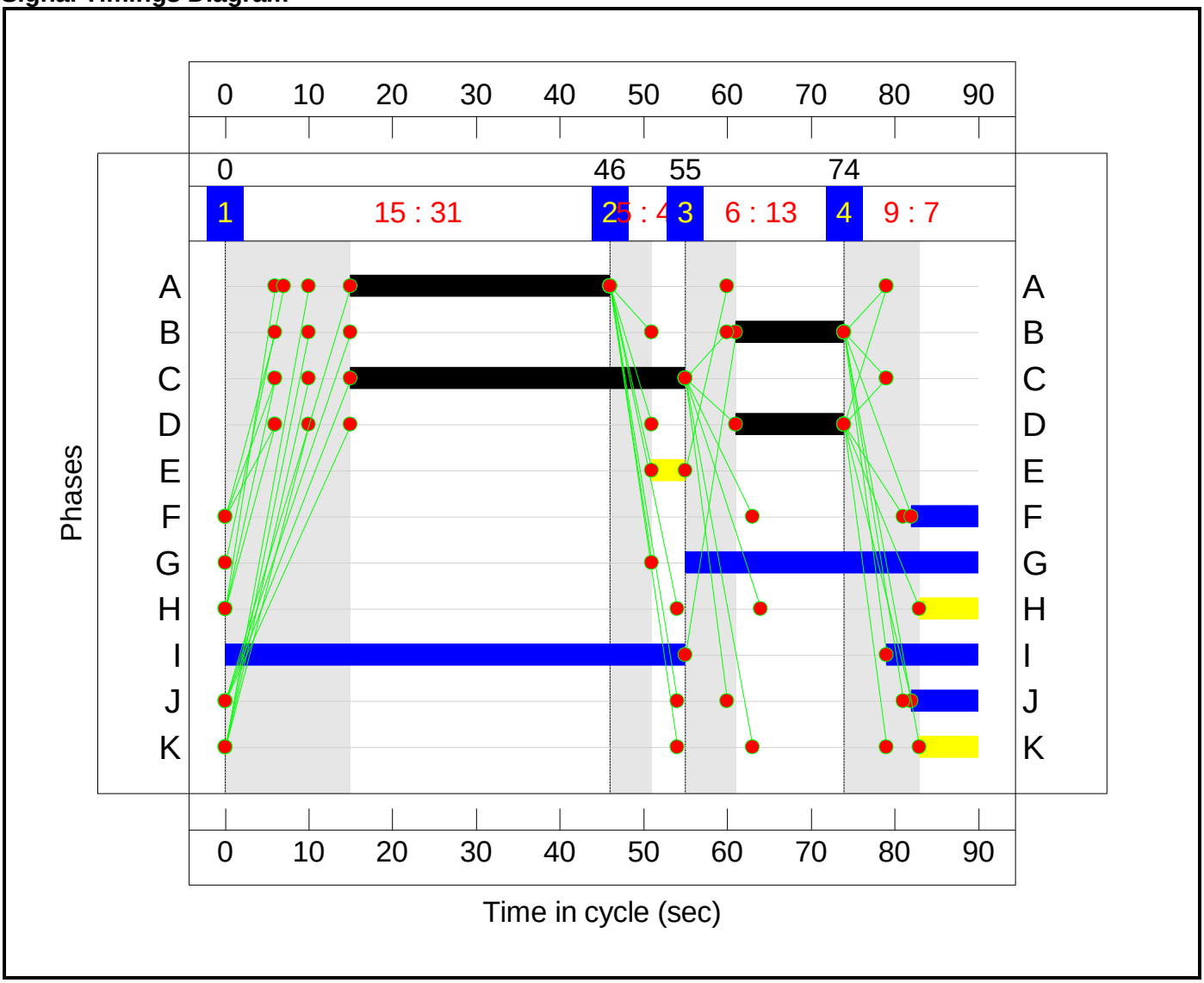
Stage Sequence Diagram



Stage Timings

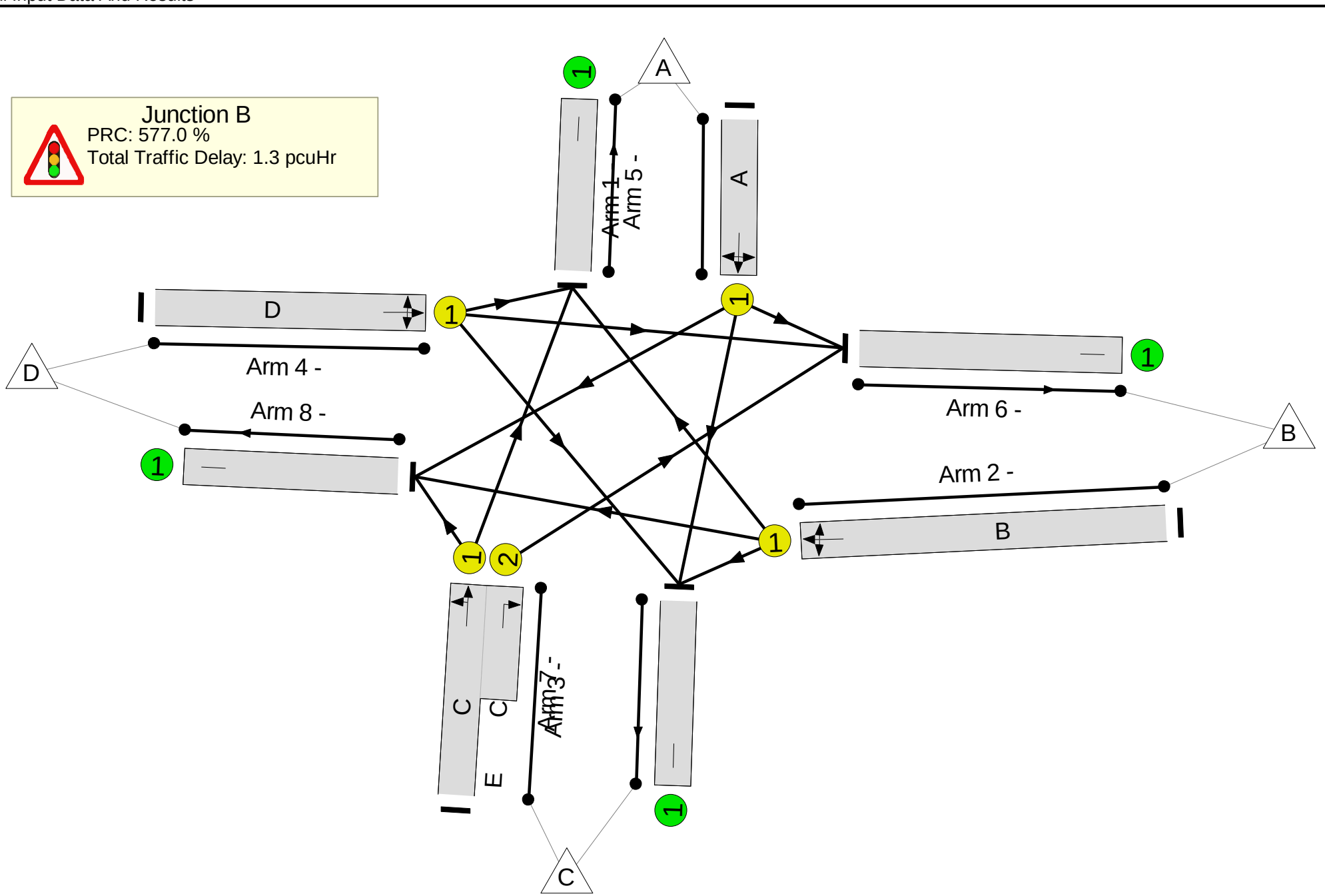
Stage	1	2	3	4
Duration	31	4	13	7
Change Point	0	46	55	74

Signal Timings Diagram



Full Input Data And Results

Network Layout Diagram


Junction B
PRC: 577.0 %
Total Traffic Delay: 1.3 pcuHr
A
B
C
D
Arm 1
Arm 2 -
Arm 3 -
Arm 4 -
Arm 5 -
Arm 6 -
Arm 7 -
Arm 8 -
E

Network Results

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**13.3%**
Junction B	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**13.3%**
1/1	Left Ahead Right	U	N/A	N/A	A		1	31	-	89	1883	670	13.3%
2/1	Right Left Ahead	U	N/A	N/A	B		1	13	-	14	1694	264	5.3%
3/1+3/2	Ahead Right Left	U	N/A	N/A	C	E	1	40	4	52	1835:1865	572+419	5.2 : 5.2%
4/1	Left Ahead Right	U	N/A	N/A	D		1	13	-	34	1754	273	12.5%
5/1		U	N/A	N/A	-		-	-	-	27	Inf	Inf	0.0%
6/1		U	N/A	N/A	-		-	-	-	47	Inf	Inf	0.0%
7/1		U	N/A	N/A	-		-	-	-	105	Inf	Inf	0.0%
8/1		U	N/A	N/A	-		-	-	-	10	Inf	Inf	0.0%

Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network	**-**	**-**	**0**	**0**	**0**	**1.1**	**0.2**	**0.0**	**1.3**	**-**	**-**	**-**	**-**
Junction B	**-**	**-**	**0**	**0**	**0**	**1.1**	**0.2**	**0.0**	**1.3**	**-**	**-**	**-**	**-**
1/1	89	89	-	-	-	0.5	0.1	-	0.6	22.7	1.5	0.1	1.6
2/1	14	14	-	-	-	0.1	0.0	-	0.2	39.7	0.3	0.0	0.3
3/1+3/2	52	52	-	-	-	0.2	0.0	-	0.2	15.5	0.4	0.0	0.4
4/1	34	34	-	-	-	0.3	0.1	-	0.4	40.3	0.7	0.1	0.8
5/1	27	27	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	47	47	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
7/1	105	105	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
8/1	10	10	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0

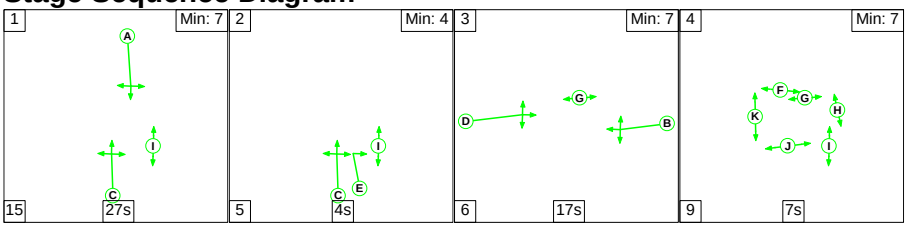
Full Input Data And Results

C1	PRC for Signalled Lanes (%):	577.0	Total Delay for Signalled Lanes (pcuHr):	1.32	Cycle Time (s):	90
	PRC Over All Lanes (%):	577.0	Total Delay Over All Lanes(pcuHr):	1.32		

Full Input Data And Results

Scenario 4: '2040 Base + CD + Malincross PM' (FG4: '2040 Base + CD + Malincross PM', Plan 1: 'Network Control Plan 1')

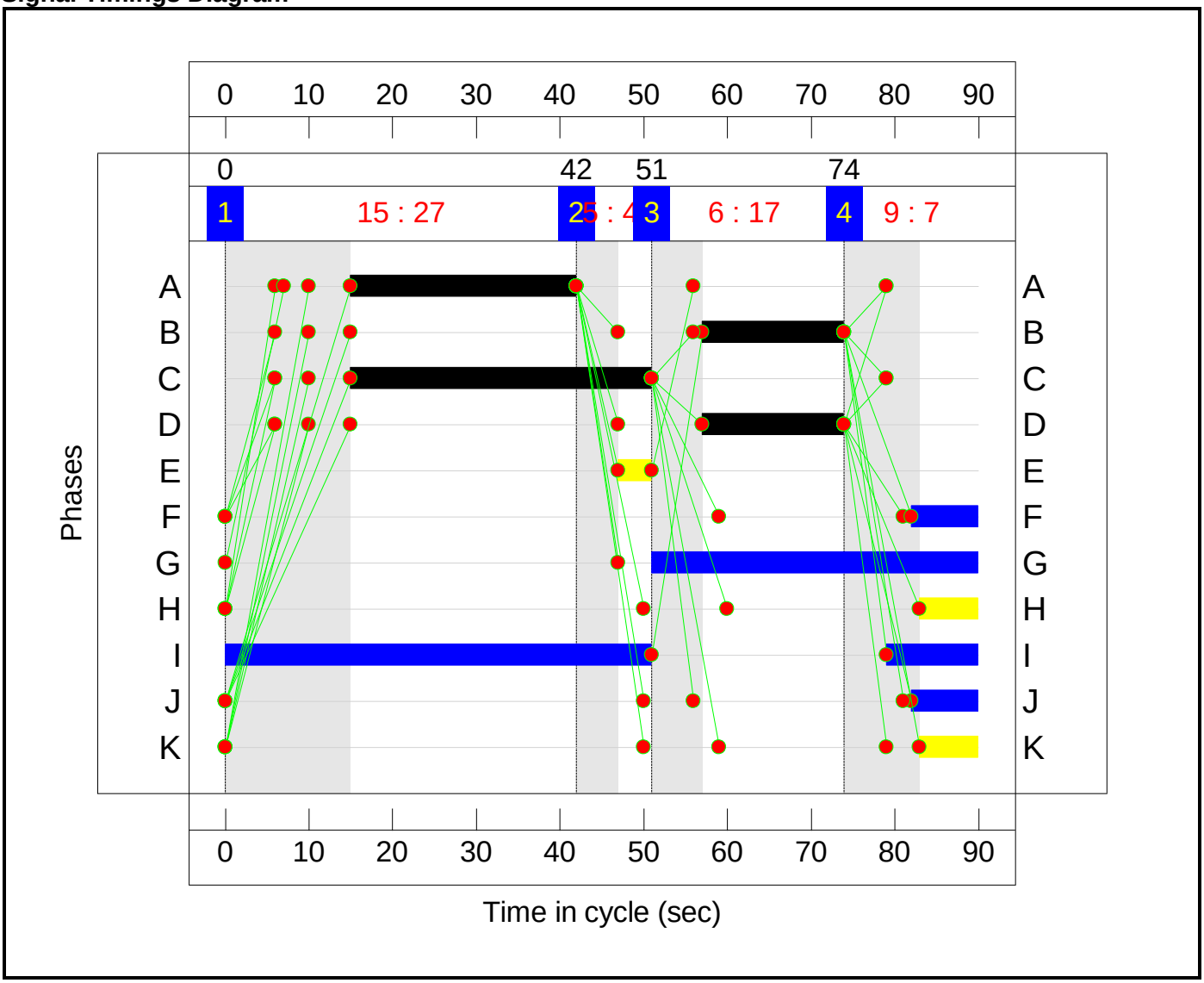
Stage Sequence Diagram



Stage Timings

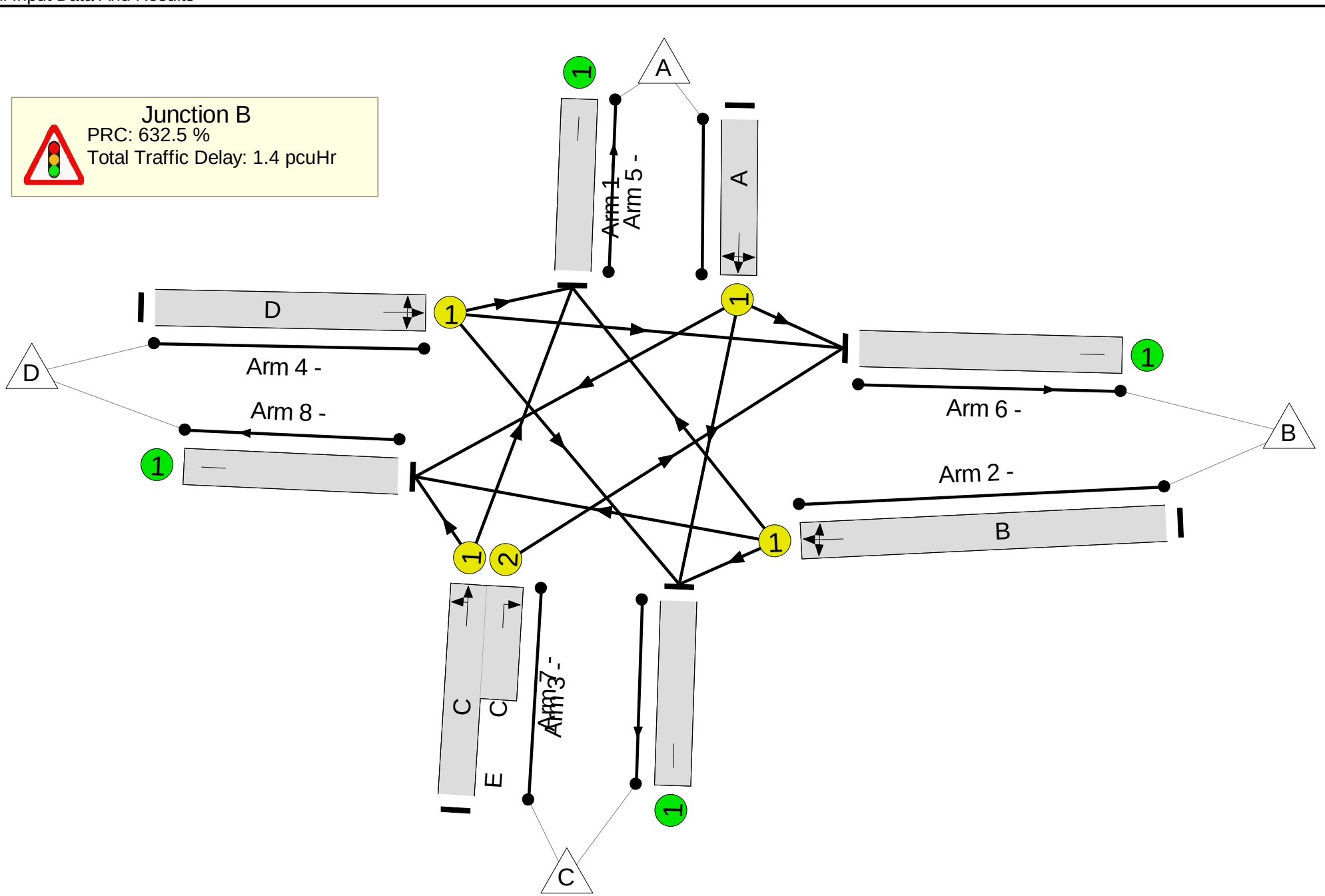
Stage	1	2	3	4
Duration	27	4	17	7
Change Point	0	42	51	74

Signal Timings Diagram



Full Input Data And Results

Network Layout Diagram


Junction B
PRC: 632.5 %
Total Traffic Delay: 1.4 pcuHr
A
B
C
D
Arm 1
Arm 2 -
Arm 3 -
Arm 4 -
Arm 5 -
Arm 6 -
Arm 7 -
Arm 8 -
E
1
2

Network Results

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**12.3%**
Junction B	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**12.3%**
1/1	Left Ahead Right	U	N/A	N/A	A		1	27	-	46	1886	587	7.8%
2/1	Right Left Ahead	U	N/A	N/A	B		1	17	-	41	1700	340	12.1%
3/1+3/2	Ahead Right Left	U	N/A	N/A	C	E	1	36	4	97	1831:1865	700+90	12.3 : 12.3%
4/1	Left Ahead Right	U	N/A	N/A	D		1	17	-	18	1757	351	5.1%
5/1		U	N/A	N/A	-		-	-	-	78	Inf	Inf	0.0%
6/1		U	N/A	N/A	-		-	-	-	24	Inf	Inf	0.0%
7/1		U	N/A	N/A	-		-	-	-	70	Inf	Inf	0.0%
8/1		U	N/A	N/A	-		-	-	-	30	Inf	Inf	0.0%

Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network	**-**	**-**	**0**	**0**	**0**	**1.2**	**0.2**	**0.0**	**1.4**	**-**	**-**	**-**	**-**
Junction B	**-**	**-**	**0**	**0**	**0**	**1.2**	**0.2**	**0.0**	**1.4**	**-**	**-**	**-**	**-**
1/1	46	46	-	-	-	0.3	0.0	-	0.3	25.3	0.8	0.0	0.8
2/1	41	41	-	-	-	0.3	0.1	-	0.4	35.6	0.8	0.1	0.9
3/1+3/2	97	97	-	-	-	0.4	0.1	-	0.5	18.9	1.3	0.1	1.4
4/1	18	18	-	-	-	0.1	0.0	-	0.2	34.6	0.4	0.0	0.4
5/1	78	78	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	24	24	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
7/1	70	70	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
8/1	30	30	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0

Full Input Data And Results

C1	PRC for Signalled Lanes (%):	632.5	Total Delay for Signalled Lanes (pcuHr):	1.41	Cycle Time (s):	90
	PRC Over All Lanes (%):	632.5	Total Delay Over All Lanes(pcuHr):	1.41		

APPENDIX 12.2

Traffic and Transport Assessment Update Report (Reference: 191004-TTA02)

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Traffic and Transport Assessment Update Report (TTA02)

November 2023

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DOCUMENT CONTROL SHEET

	Client	Dean Swift Property Holdings							
	Project Title	Housing Development							
	Project Ref.	191004							
	Document Title	Traffic and Transport Assessment Report							
	Document No.	191004-TTA02							
	This Document Comprises	DCS	TOC	LOT	LOG	LOF	LOD	Text	Appendices
		1	1	1	-	1	-	12	2
	Check								

Revision	Status	Author	Reviewed By	Approved By	Issue Dates
D01	Draft	BJC	MJP	MJP	24.05.2023
F01	Final	BJC	MJP	MJP	26.05.2023
F02	Final	BJC	MJP	MJP	30.06.2023
F03	**Final**	**BJC**	**MJP**	**MJP**	**20.11.2023**

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1 INTRODUCTION

1.1 General

1.1.1 MPA Consulting Engineers have been commissioned by Dean Swift Property Holdings (DSPH) to provide traffic engineering and transport planning advice in relation to lands in Northwest Balbriggan, Co. Dublin. The broad location of the site is shown below in **Figure 1.1**.



FIGURE 1.1: SITE LOCATION

1.1.2 In September 2021, MPA prepared a Traffic and Transport Assessment Report (191004-TTA01) to support the proposed development. The TTA was prepared following intensive pre-application discussion with the Fingal County Council (FCC).

1.1.3 Since the preparation of the original TTA in September 2021, the development proposals have been amended resulting in the following changes:

- A less intensive development mix;
- Boulevard Road / Clonard (Naul) Road proposed junction design from roundabout to signals controlled junction with cycle infrastructure;
- Flemington Lane Link;
- Improved cycle infrastructure through the site.

1.1.4 What's more, further discussions have been had with FCC regarding the development site and TTA01. These discussions have resulted in Technical Notes (TN) 06 and 07 being prepared to support the development.

1.1.5 This TTA Update Report has been prepared to outline the development mix changes and the reduction in Trips generated as well as summarise those additional TN's as an update to the original TTA.

2 REVISED DEVELOPMENT PROPOSALS

2.1 Development Mix

2.1.1 The proposed development comprises the construction of 564 no. dwelling units across five distinct character areas and four phases, as shown in **Figure 2.1** below and summarised in **Table 2.1** overleaf:

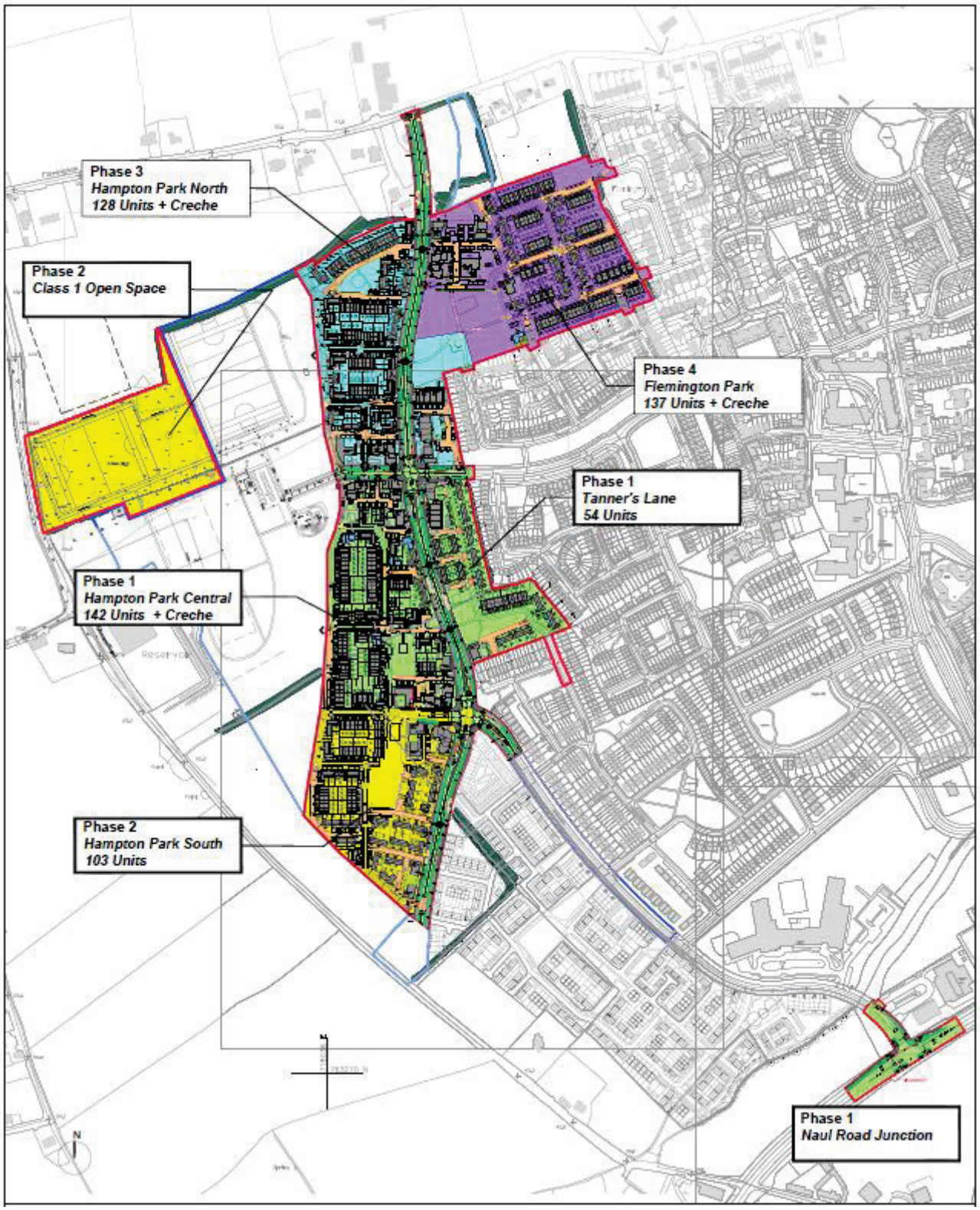

FIGURE 2.1: PROPOSED MASTERPLAN LAYOUT

Phase	Houses	Duplexes	Apartments	Overall No. of Dwellings
Phase 1: Hampton Park Central	88	18	36	142
Phase 1: Tanner's Lane	36	12	6	54
Phase 2: Hampton Park South	71	18	14	103
Phase 3: Hampton Park North	84	24	20	128
Phase 4: Flemington Park	99	12	26	137
Total	**378**	**84**	**102**	**564**

TABLE 2.1: PROPOSED CHARACTER AREAS / PHASES AND MIX

2.1.2 The proposed development also includes construction of 9 no. commercial units (totalling 574.4 sq.m.) and 6 No. communal units (totalling 329.5 sqm).

2.1.3 The revised development mix provides a less intensive development than assessed as part of the September 2021 TTAR (TTA01). Therefore the junction modelling assessments within TTA01 are considered 'Worst Case' and no further junction modelling is required as a result of the revised development mix.

2.2 Trip Generation

2.2.1 The TTAR (191004-TTA-01) prepared for Malincross is based on a development mix comprising 393 houses, 88 duplexes and 112 apartments providing a total of 593 dwellings.

2.2.2 The trip generation is provided in **Table 2.2** below (and Table 7.2 of the report 191004-TTA-01):

	Morning Peak Hour (08:00 – 09:00)		Evening Peak Hour (17:00 – 18:00)		Daily
	Arrivals	Deps	Arrivals	Deps	Two-Way
'Houses Privately Owned' 393 Dwellings	64	210	175	107	2,474
'Flats Privately Owned' 88 Dwellings	4	12	17	9	177
Duplex 112 Dwellings	13	41	39	23	507
TOTAL (593 Dwellings)	**81**	**263**	**231**	**139**	**3,158**

TABLE 2.2: ORIGINAL TTAR TRIP GENERATION

2.2.3 Since the writing the TTA-01 Report, the development mix has changed as set out above in **Table 2.1**.

2.2.4 **Table 2.3** below shows the revised Trip Generation based on the new residential mix.

2.2.5 **Tables 2.2 & 2.3** demonstrate that the revised development mix would generate fewer trips in the peak hours and across the day, almost 6% less, than what has been assessed within the September 2021

TTAR. Thus the September 2021 TTAR provides a "worst case" assessment of development vehicle trips.

	Morning Peak Hour (08:00 – 09:00)		Evening Peak Hour (17:00 – 18:00)		Daily
	Arrivals	Deps	Arrivals	Deps	Two-Way
'Houses Privately Owned' 378 Dwellings	62	202	169	102	2,379
'Flats Privately Owned' 84 Dwellings	3	12	16	8	169
Duplex 102 Dwellings	11	34	33	19	424
TOTAL (564 Dwellings)	**76**	**248**	**218**	**129**	**2,972**

TABLE 2.3: CURRENT DEVELOPMENT MIX TRIP GENERATION

2.2.6 What's more, the committed development at Ladywell (F21A-0055) is also providing fewer dwellings, 7% less, than allowed for within the TTAR of September 2021 (TTAR01).

2.3 Parking Provision

2.3.1 A total of 927 no. car parking spaces are proposed, this includes:

- 811 no. resident parking spaces (including 162 EV charging points);
- 89 no. visitor spaces (including 23 no. EV points);
- 11 no. visitor accessible spaces;
- 7 no. spaces allocated to creche parking;
- 9 no. set down spaces for creches.

2.3.2 A total of 36 motorcycle spaces (based on 6 spaces per 100 units).

2.3.3 The creche parking provision is set out in **Table 2.4** below.

Creche	Number of Spaces	Number of Set-Down Spaces
Hampton South	3	3
Hampton Central	2	3
Flemington	2	3

TABLE 2.4: CRECHE CAR PARKING PROVISION

2.3.4 As part of pre-application discussions, the Transport Planning Section (TPS) of Fingal County Council suggested the following for parking requirements:

- One car parking space for one and two-bedroom dwellings, and
- Two car parking spaces three+ bedroom dwellings.

2.3.5 This results in a parking requirement of 954 spaces as set out in **Table 2.5** below:

Dwelling Type	Parking per Dwelling	Number of Dwellings	Number of Spaces
1 or 2 Bed House	1	127	127
3 or more Bed House	2	251	502
1 Bed Duplex/Apartment	1	57	57
2 Bed Duplex/Apartment	1	103	103
3+ Duplex/Apartment	2	26	52
Visitor Parking	0.2	564	113
Total	**-**	**564**	**954**

TABLE 2.5: CURRENT DEVELOPMENT MIX PARKING REQUIREMENTS

2.3.6 The proposed parking provision above is 927 car parking spaces. This is 27 spaces or just 2.8% less than suggested by the TPS in their pre-application response.

2.3.7 Nevertheless, whilst the proposed parking provision is marginally lower than suggested by the TPS, it is still considered appropriate for the proposed development as the reduced car parking will encourage travel by more sustainable modes.

2.3.8 This is particularly true given the increased cycle parking proposed along with the improved cycle infrastructure on site (detailed in section 2.4 below) and the number of proposed walking and cycling access points being provided as part of the development. The walking and cycling permeability of the site to other urban areas of Balbriggan along with improved infrastructure will encourage travel by foot and cycle by both future residents and visitors alike.

2.4 Cycle Provision

2.4.1 Through on-going discussions with FCC, the cycle parking provision on the site has been increased substantially and now includes, a total of 2014 no. bicycle spaces as follows:

- 2552 no. resident bicycle spaces;
- 596 no. visitor spaces; which includes
- 48 no. spaces allocated to creche bicycle parking.

2.4.2 This is well above the requirement set out by FCC in their pre-application response where the Transport Planning Section (TPS) of Fingal County Council (FCC) suggested that two cycle parking spaces be provided per apartment or duplex.

2.4.3 To make the most of the site's location to the town centre, along the existing cycle infrastructure in Balbriggan, the development has been provided with minimum two – three cycle spaces per dwelling (5 no. with each detached and semi-detached dwelling) plus in excess of one visitor space per dwelling, along with 48 cycle spaces for creches.

2.4.4 Along with the increased cycle parking there has been a redesign of the proposed internal road junctions and the Clonard Rd / Boulevard Road junction to provide enhanced cycle infrastructure. This

includes pedestrian / cycle priority crossovers at simple T-junctions and dedicated cycle turning and manoeuvring space at the main signalised junctions. The proposed arrangements are shown in **Figures 2.2** to **2.6** below:

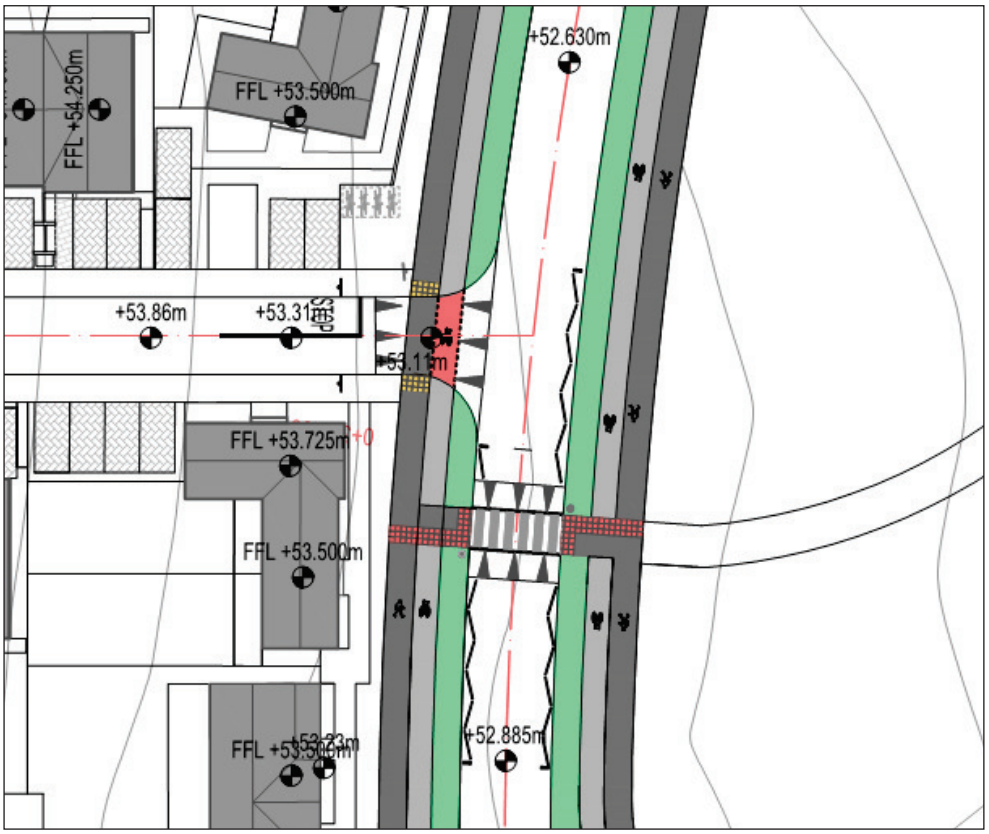

FIGURE 2.2: PROPOSED PRIORITY T-JUNCTION WITH FOOTWAY AND CYCLEWAY CROSSOVER

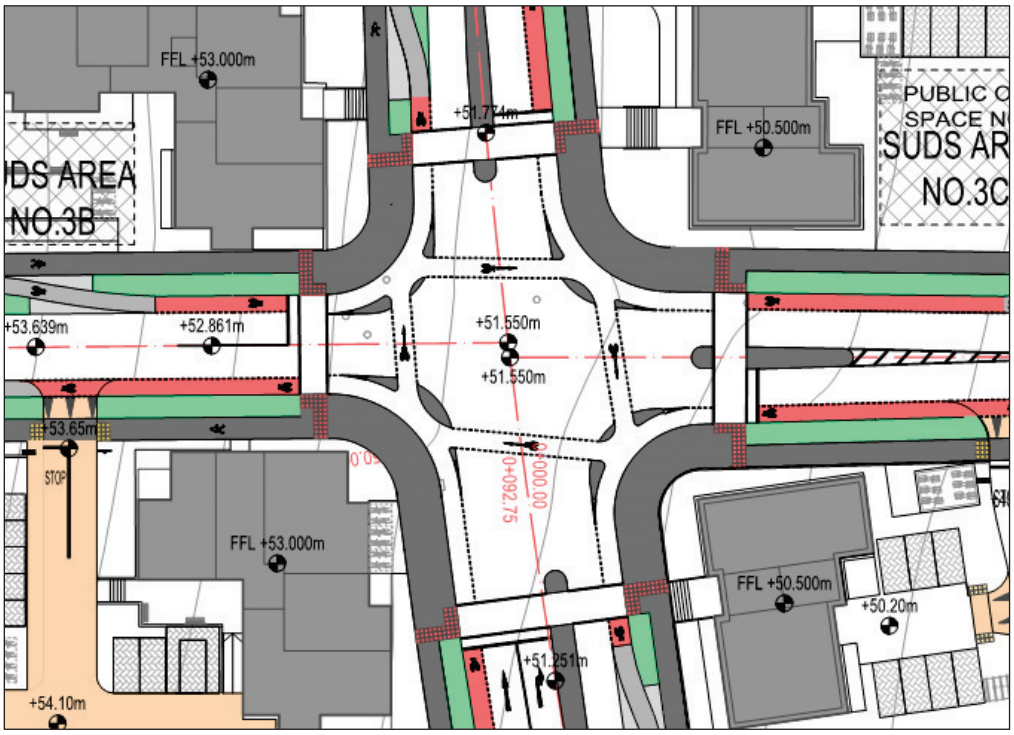

FIGURE 2.3: HAMLET LANE SIGNALISED CROSSROADS WITH CYCLE PROTECTED INFRASTRUCTURE

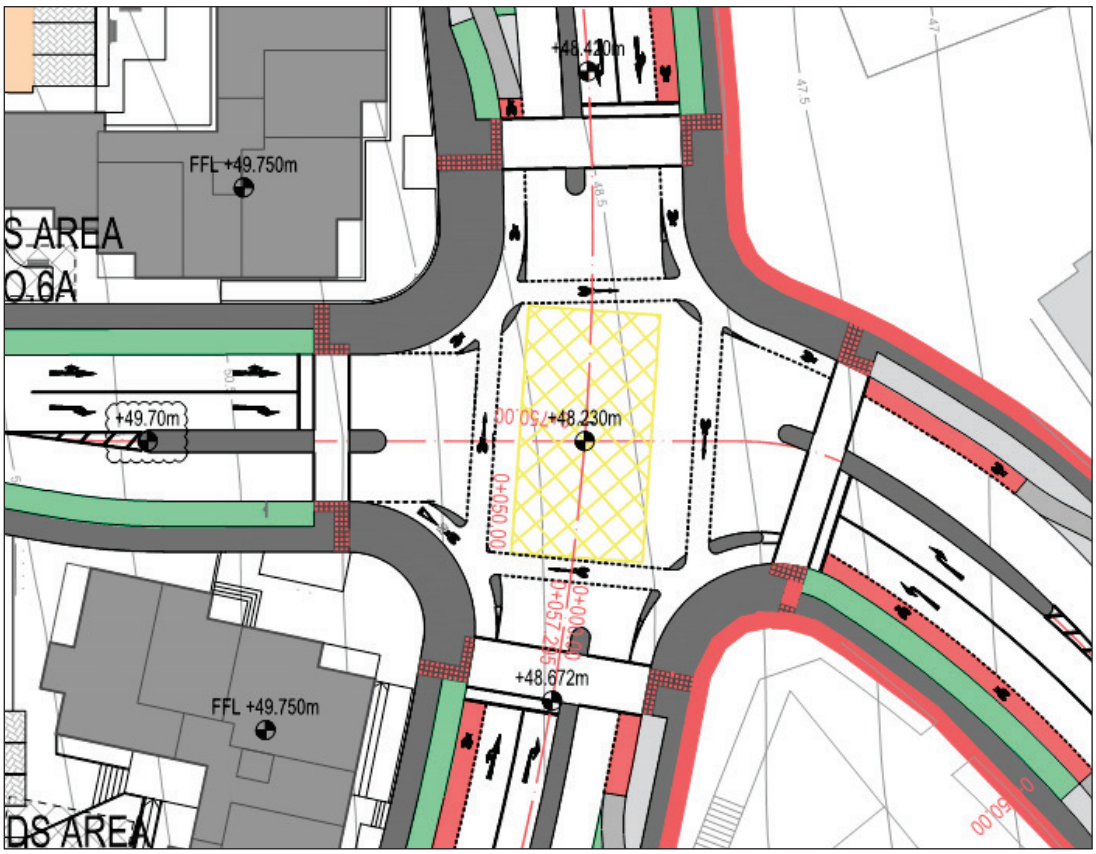

FIGURE 2.4: BOULEVARD RD SIGNALISED CROSSROADS WITH CYCLE PROTECTED INFRASTRUCTURE

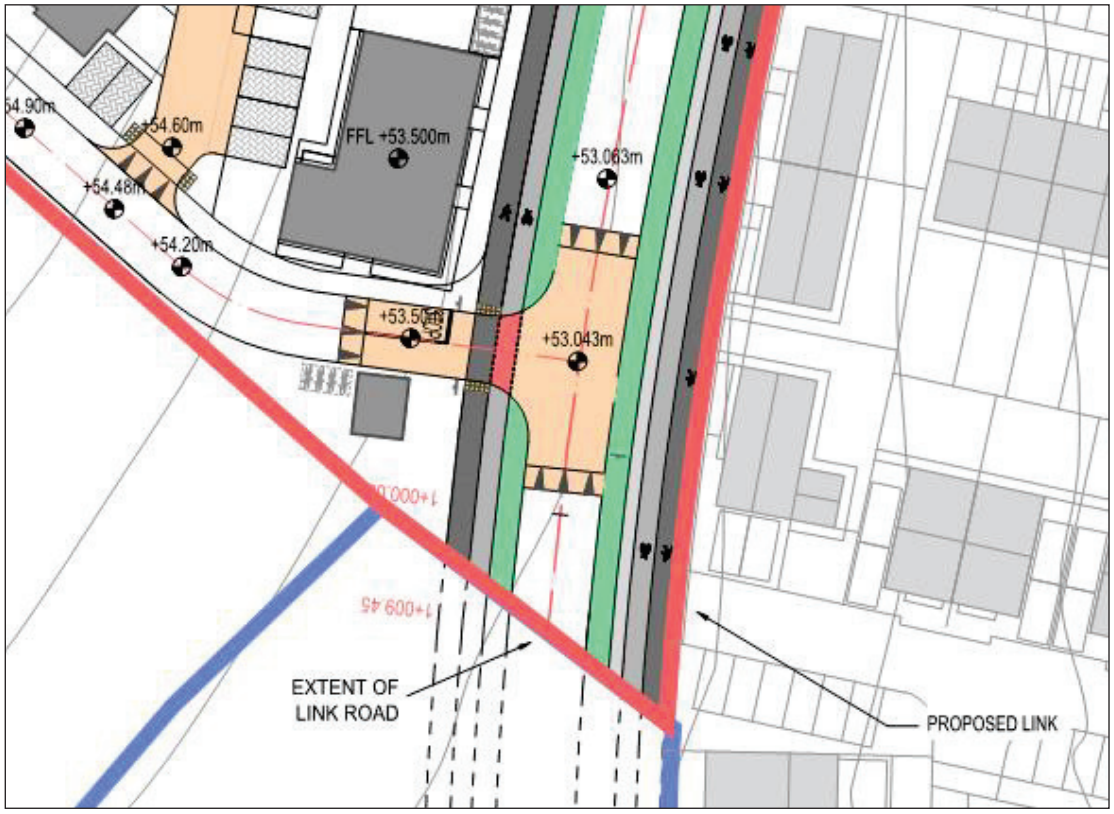

FIGURE 2.5: PROPOSED PRIORITY T-JUNCTION WITH FOOTWAY AND CYCLEWAY CROSSOVER

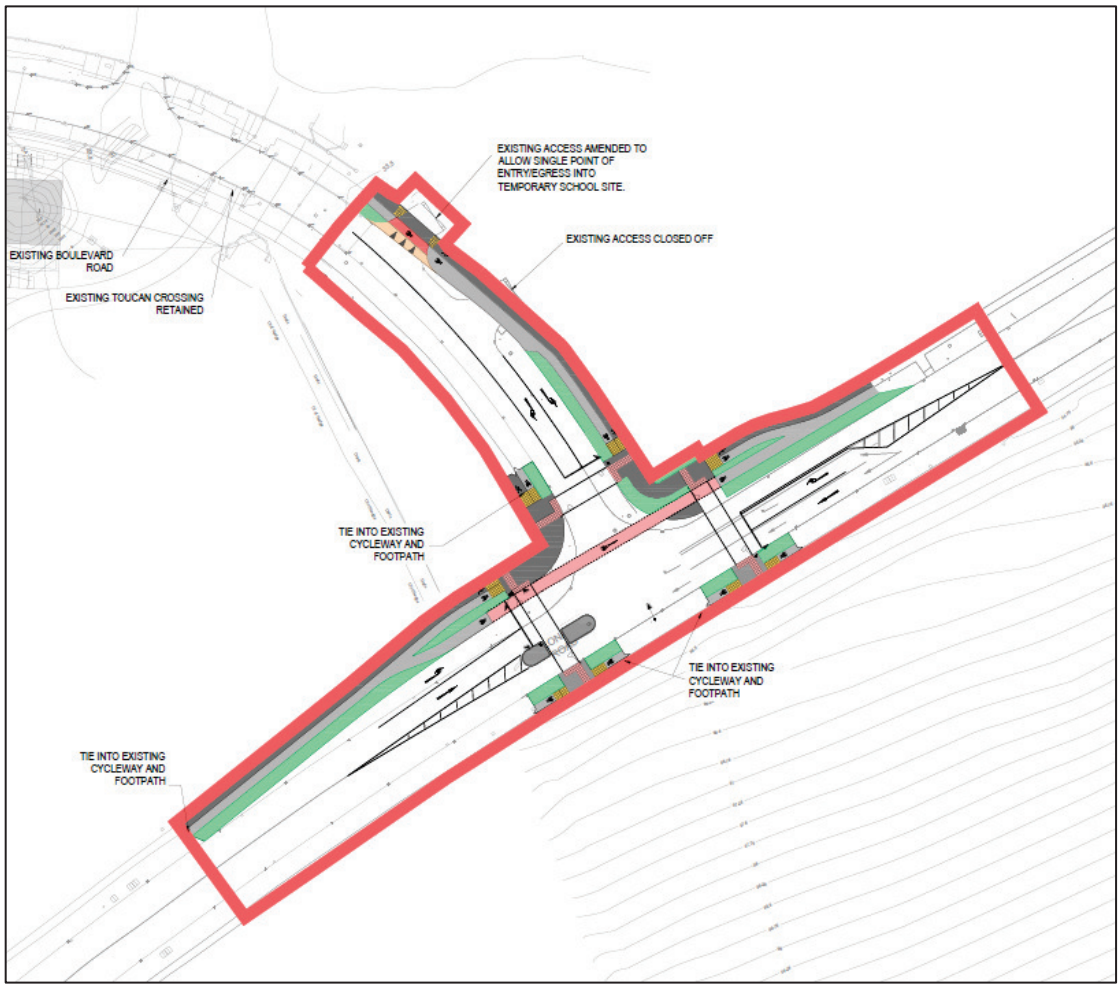

FIGURE 2.6: PROPOSED BOULEVARD ROAD AND CLONARD ROAD SIGNAL IMPROVEMENTS WITH CYCLE INFRASTRUCTURE

3 TRAFFIC ASSESSMENT UPDATE

3.1 Clonard Road / Boulevard Road Junction Signals Redesign

3.1.1 At the request of FCC, the proposed junction between Clonard Road and Boulevard Road assessed as a Roundabout within the 2021 Assessment Report 191004-TTA-01 was amended to a signalised T-junction.

3.1.2 TN06 has been prepared to outline the design amendments and assess the junction capacity of a proposed three arm signalised T-junction between Clonard Road and Boulevard Road, known as Junction 4 (J4) to the east of the town of Balbriggan. The full TN06 is included here as **Appendix A**.

3.1.3 The TN investigates the capacity of the consented signalisation of the junction associated with the Ladywell development (Ref: F21/A0055) between Clonard Road and Boulevard Road. The investigation established the number of additional Malincross development trips that could pass through this junction before further road infrastructure or other improvements are required.

3.1.4 Any improvements are considered to be interim measures until such time as the provision of the Balbriggan 'C' Ring Road, also known as the Flemington Link Road (FLR), is completed. If this road is completed the upgrade measures would not be necessary.

3.1.5 TN06 demonstrated that the consented junction would operate at 100% capacity with around 60% of Malincross development trips.

3.1.6 Proposed improvements to the consented scheme have been investigated, these include flared approaches on Boulevard Road and Clonard / Naul Road as well as the provision of cycle continuity at the junction along Clonard / Naul Road.

3.1.7 The additional improvements allow the junction to operate under 100% capacity for all development scenarios in 2025 & 2030.

3.1.8 In the event that the FLR is not completed, the threshold to complete the flared approaches, from a Traffic Engineering perspective, is prior to 60% occupation of the Malincross development.

3.1.9 TN06 Concluded that suitable phased improvements can be provided to the junction between Clonard Road and Boulevard Road in the event that the Flemington Link Road is not completed prior to completion of the Malincross development, however at the request of FCC it is now proposed to deliver this upgrade as part of Phase 1 of the development.

3.2 2022 Traffic Survey Comparison

1.1.1 Following the Stage 1 – Section 247 meeting, FCC raised concerns about the traffic counts undertaken for the September 2021 Assessment (191004-TTA-01) and this issue has been addressed.

1.1.2 TN07 had been prepared to compare traffic volumes through the local network based on traffic count data available from March 2022 from IDASO's database for 3 no. junctions along Clonard Road. TN07 is included in **Appendix B**.

3.2.1 The TN compares 2022 traffic volumes calculated within the TTAR dated September 2021 with junction survey counts undertaken in March 2022. In order to establish if the assessments and modelling in the TTAR (191004-TTA-01), which are based on counts carried out over several years, are reflective

of current traffic flows. The junctions assessed along the critical Clonard / Naul Road corridor are shown below in **Figure 3.1**.



FIGURE 3.1: SITE AND JUNCTION LOCATIONS

3.2.2 TN07 demonstrated that the difference between 2022 Base traffic volumes calculated in the TTA, and the 2022 Surveyed traffic volumes is negligible. The difference in the total traffic volumes across the three junctions and individually the junctions are generally within +/- 5%. **Table 3.1** below provides a comparison of the TTAR and Surveyed traffic volumes through the junctions:

	IDASO 2022 Surveyed Flows (PCUs)	2022 Base Malincross LRD (PCUs)	Difference (PCUs)
Junction 5: Clonard Road / Castlemill Link Road / Stephenstown Link Road			
AM Peak	1,704	1,683	-21
PM Peak	1,558	1,559	1
Junction 8: Clonard Road / Naul Road / L1390			
AM Peak	1,863	1,835	-28
PM Peak	1,712	1,780	68
Junction 13: Chapel Street / Harry Reynolds Road			
AM Peak	1,215	1,270	55
PM Peak	1,185	1,113	-71
ALL Junctions			
AM Peak	4,782	4788	6
PM Peak	4,454	4453	-2

TABLE 3.1: COMPARISON OF 2022 TRAFFIC VOLUMES

3.2.3 It is also noted as set out above that the latest development proposals would provide fewer dwellings

and fewer trips than assessed in the TTAR (191004-TTA-01), 6% less and the committed development at Ladywell is also providing fewer dwellings, 7% less, than allowed for within the TTAR.

3.2.4 As a result, the junction capacity assessment within TTAR (191004-TTA-01) provide a robust assessment of the background traffic and the development impact.

3.2.5 TN07 concluded:

- That the calculated 2022 Base traffic flows within the TTAR (191004-TTA-01) are in line with the up-to-date flows on the network.
- The proposed junction capacity assessments are based on a greater development mix for both the Malincross and consented Ladywell developments.
- As such, the TTAR (191004-TTA-01) junction capacity assessments are appropriate whilst using robust calculations. Therefore, additional traffic surveys and further junction modelling is not required.

4 SUMMARY AND CONCLUSIONS

4.1 Summary

4.1.1 This TTA Update Report has been prepared to update the TTAR of September 2021 (191004-TTA-01) prepared for this site and presents details of a revised development mix and compiles and summarises the additional transport Technical Notes that have been prepared since publication of the original Traffic and Transport Assessment Report for a proposed housing development at Northwest Balbriggan, Co. Dublin.

4.1.2 The revised development mix is less intensive than that assessed within the September 2021 TTA. Therefore, no additional junction modelling is required.

4.1.3 Technical Note 06 reviewed the proposed junction improvement options for cycle friendly signal junction for the Clonard Road / Boulevard Road junction.

4.1.4 Technical Note 07 provided a comparison of 2022 surveyed data with 2022 traffic flows calculated with the TTA.

4.2 Conclusion

4.2.1 In conclusion, it is considered that the original findings of the TTAR dated September 2021 are still valid. There will be no adverse impacts associated with the proposed housing development and, as such, there is no traffic or transportation reason why this development should not be permitted.

APPENDIX A

TN06 – Clonard Road / Boulevard Road Junction Signals Redesign

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TECHNICAL NOTE (TN06 – Clonard Road / Boulevard Road Junction Signals Redesign)

Dean Swift Property Holdings

Proposed SHD Site

North West Balbriggan

Co. Dublin

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File Ref.: 191004 Document No.: 191004/TN06 Date: 20th Nov 2023 Revision: Final02

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Appendix E – LinSig Outputs – Consented Junction with Flare Approaches & Cycle Continuity

1.0 INTRODUCTION

1.1 General

1.1.1 MPA Consulting Engineers have been commissioned by Dean Swift Property Holdings (DSPH) to provide traffic engineering and transport planning advice in relation to lands in Northwest Balbriggan, Co. Dublin. The broad location of the site is shown below in **Figure 1.1**.



FIGURE 1.1: SITE LOCATION

1.1.2 This Technical Note (TN) has been prepared to outline the design amendments and assess the junction capacity of a proposed three arm signalised T-junction between Clonard Road and Boulevard Road, known as Junction 4 (J4) to the east of the town of Balbriggan in Co. Dublin as shown in **Figure 1.1**.

1.1.3 The TN investigates the capacity of the consented signalisation of the junction (F21/A0055) between Clonard Road and Boulevard Road. The investigation established the number of additional quantum of Malincross development trips that could pass through this junction before additional road infrastructure or other improvements are required.

1.1.4 Any improvements are considered to be interim measures until such time as the provision of the 'C' Ring Road (see below) is completed.

2.0 BACKGROUND

2.1 Northwest Balbriggan Masterplan Area (NWBMA)

2.1.1 The Fingal Development Plan 2023 - 2029 identifies the Northwest Balbriggan area as a residential area with the provision of the 'C' Ring Road (referred to here as the Flemington Link Road - FLR) included. The FLR will provide a new route around the northwest of Balbriggan between Flemington Lane and the R122 Naul Road, and also provide access to the NWBMA.

2.1.2 Whilst the NWBMA identifies the provision of the FLR, this TN considers the interim impact of traffic movements at the junction of Boulevard Road and Clonard Road and identifies suitable mitigation that could be provided in advance of the FLR's completion.

2.2 Boulevard Road Existing Junction

2.2.1 Boulevard Road is proposed to continue to the northwest in the future to serve the proposed development in the NWBMA and connect with the proposed FLR.

2.2.2 Boulevard Road currently connects to Clonard Road to the south by way of a priority junction. Vehicles exiting Boulevard Road must presently STOP before entering Clonard Road. There is a separate right turning lane for vehicles turning right into Boulevard Road from Clonard Road.

2.2.3 This junction will need to be improved for the early phases of the NWBMA development, prior to the FLR being delivered.

2.3 Boulevard Road Junction – Consented Signals

2.3.1 As part of the Glenveagh Home planning permission, known as Ladywell, it is proposed that the junction be converted to a signalised T-junction as shown in **Figure 2.1** overleaf and in drawing 191004-SK101 Rev P1 included in **Appendix A.**

2.3.2 The proposed junction arrangement includes signal-controlled crossings on all arms including a central island on the Clonard Road (west) approach. An 'all red' traffic phase is called to allow pedestrians and cyclists to cross all arms of the junction.

2.3.3 As part of the Ladywell planning application, the supporting TIA identified that the proposed signalisation of the Clonard Road/Boulevard Road junction enables all of the traffic associated with the Ladywell development to be satisfactorily accommodated in advance of the delivery of the FLR.

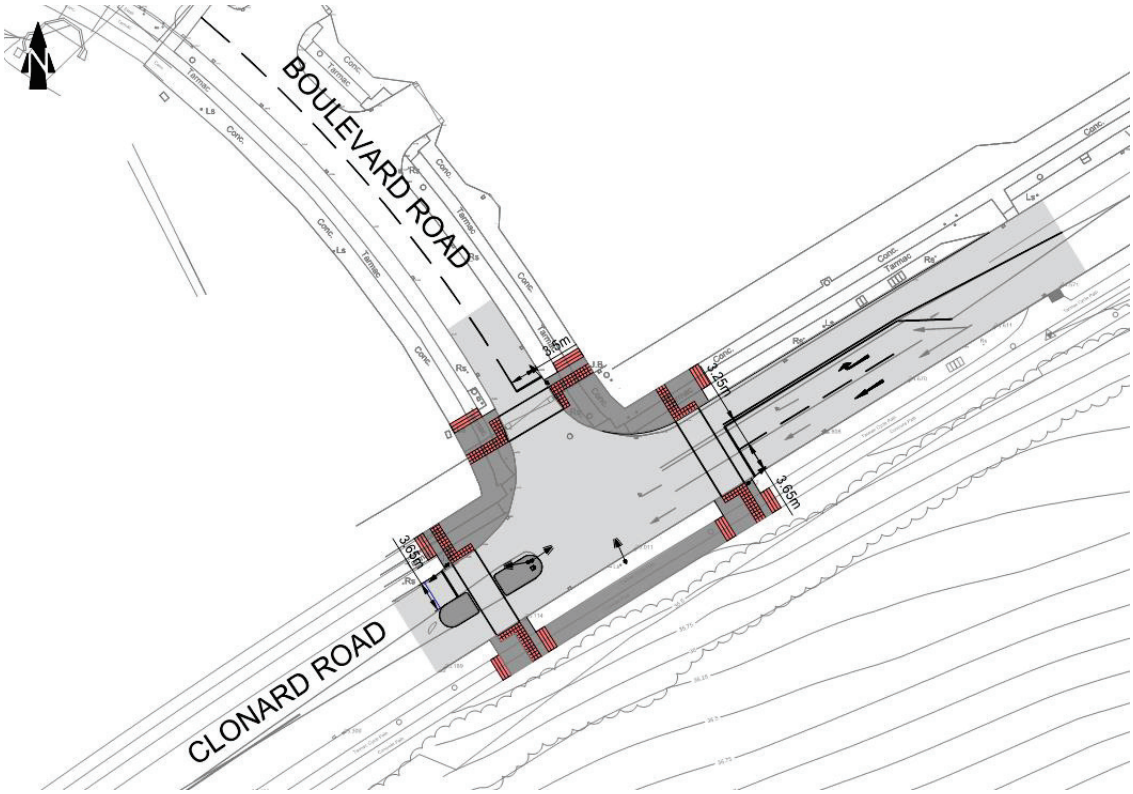

FIGURE 2.1 – EXTRACT OF DRAWING 191004-SK101 REV P1

3.0 CAPACITY ASSESSMENT

3.1 Methodology

3.1.1 As mentioned above the, the proposed signalisation of the junction (J4 in TTAR01) would accommodate the Ladywell development trips ahead of the completion of the FLR.

3.1.2 This assessment has been prepared to determine how many Malincross development trips, based on 595 units (mixed dwelling, duplex & apartments), could be accommodated by the consented J4 signalisation scheme. The assessment goes on to suggest further improvements to the consented signals scheme to provide additional capacity through the junction.

3.1.3 Trip assignment associated with the Malincross development assigns 80% of total development trips through J4. To determine what quantum of the Malincross development could be accommodated through the junction, assessments have been run based in incremental increases in the development as summarised in Table 3.1 below with flow diagrams included in **Appendix B**:

Scenario	Percentage of Malincross Development
A	0%
B	20%
C	40%
D	60%
E	80%
F	100%

TABLE 3.1: JUNCTION 4 ASSESSMENT SCENARIOS

3.1.4 The assessment years are taken to be 2025 and 2030

3.2 LinSig Assessment: Consented Junction Arrangement (F21A/0055)

3.2.1 The full LinSig outputs for the consented scheme are included in **Appendix C** with a summary of the results provided in Table 3.2 below. The results displayed are maximum Degree of Saturation (DoS) on the most congested arm for that time period assessed.

Malincross Development Trips	Maximum DoS (Various Arms)			
	2025		2030	
Scenario	AM	PM	AM	PM
Scenario A 0%	89.6%	90.4%	93.8%	95.9%
Scenario B 20%	92.8%	93.7%	97.7%	99.4%
Scenario C 40%	96.2%	97.3%	100.7%	103.0%
Scenario D 60%	99.3%	100.8%	104.6%	106.6%
Scenario E 80%	102.0%	104.4%	106.8%	110.5%
Scenario F 100%	106.2%	108.3%	110.9%	112.9%

TABLE 3.2: CONSENTED LAYOUT: LINSIG RESULTS (BUSIEST ARM)

3.2.2 Table 3.2 shows that for Scenario A, i.e. no Malincross trips, the junction would operate at around 90% of capacity in 2025. In 2030, this goes up to nearly 96%. As would be expected, as the proportion of Malincross trips increases, the maximum DoS increases. In Scenario B, the maximum DoS is below 100% in both 2025 and 2030. For Scenario C, the DoS is over 100% in 2030 only. In Scenario E, the maximum DoS is around 100% in 2025 and marginally over in 2030. For Scenarios E and F, the maximum DoS is over 100% for both design years.

3.2.3 It should be noted that the assessment is based on the peak hours. At other times of the day the junction would operate satisfactorily.

3.3 Boulevard Road Junction – Consented Signals with Flared Approaches and Cycle Continuity

3.3.1 The consented scheme is not able to accommodate the full Malincross development prior to completion of the FLR. Therefore an interim scheme has been designed which modifies the consented scheme to provide flared approaches on Clonard Road (West) and Boulevard Road as well as cycle continuity along Clonard road. The full drawing, 191004/C/004.6 – Junction Details & Sightlines is included in **Appendix D** with an extract included in **Figure 3.1** below. The flares are 30m long and can accommodate five cars.

3.3.2 The use of flared approaches allows the use of green light filter arrows which improve capacity at each approach.

3.3.3 Similar to the consented scheme, the junction would be kept compact without the need for provision of slip lanes or additional central pedestrian / cyclist islands. An 'all red' phase is included in the junction phasing to allow safe pedestrian and cyclist movements through the junction.

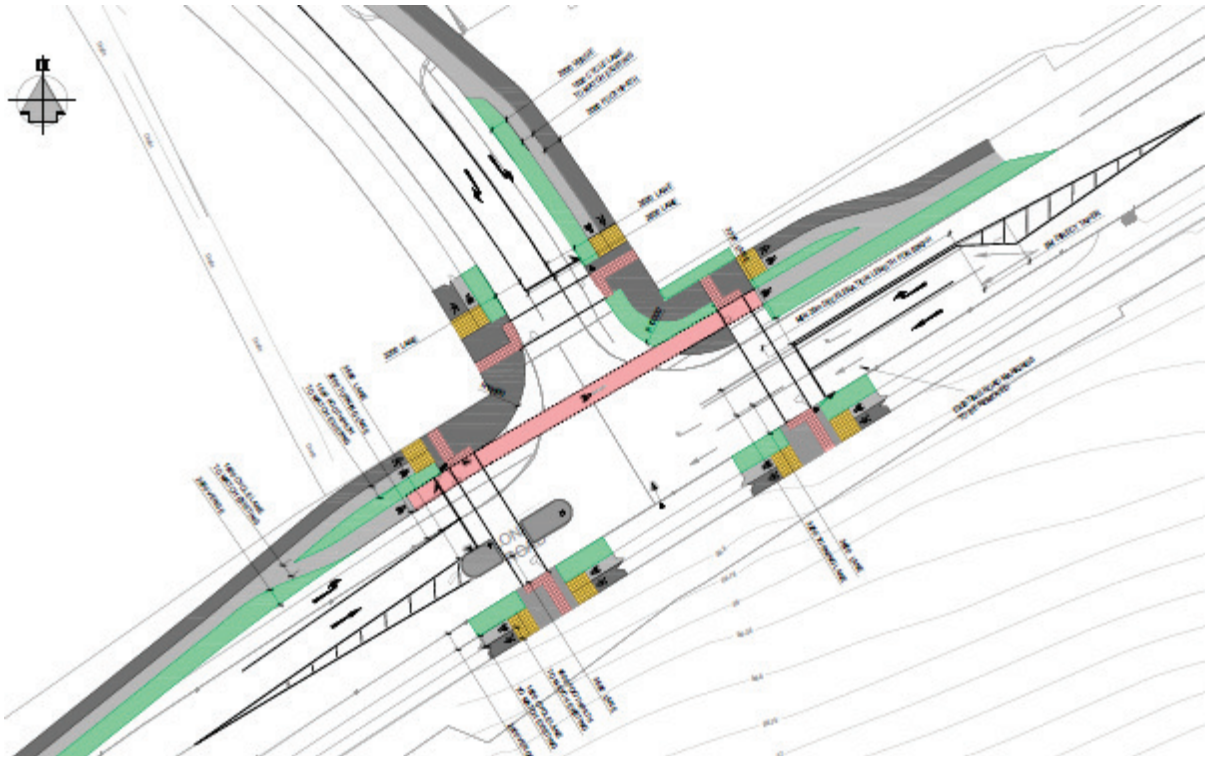

FIGURE 3.1: CONSENTED SIGNALS WITH FLARED APPROACHES

3.4 LinSig Assessment: Consented Signals with Flared Approaches and Cycle Continuity

3.4.1 The revised junction arrangement has been modelled using LinSig for the same assessment scenarios. The full LinSig outputs are in included in **Appendix E** with the results summarised below:

Malincross Development Trips	Maximum DoS (Various Arms)			
	2025		2030	
Scenario	AM	PM	AM	PM
Scenario A 0%	78.2%	83.2%	82.6%	87.8%
Scenario B 20%	81.4%	85.5%	85.6%	89.8%
Scenario C 40%	84.6%	86.8%	89.1%	92.2%
Scenario D 60%	87.4%	89.2%	92.1%	94.7%
Scenario E 80%	90.3%	91.5%	94.7%	95.8%
Scenario F 100%	92.8%	93.0%	96.8%	98.2%

TABLE 3.3: CONSENTED LAYOUT WITH FLARED APPROACHED: LINSIG RESULTS (BUSIEST ARM)

3.4.2 The results in **Table 3.3** demonstrate that Boulevard Road would operate within 93% capacity in 2030 with 40% of Malincross developed. In 2025, the junction operates at 90.3% DoS and increases to around 96% DoS in 2030 for Scenario E (80% Malincross development).

3.4.3 With 100% Malincross development (Scenario F), the junction would operate with DoS between 92.8% and 98.2% for the 2025 and 2030 assessment years respectively.

3.4.4 As noted previously, the assessments are based on the worst-case peak hour assessments which account for only a proportion of the day and daily traffic movements. Outside of the peak hours the junction would operate satisfactorily.

3.5 Phasing the Proposed Flared Approaches & Cycle Continuity

3.5.1 Section 3.4.2 **Traffic Congestion** of the Design Manual for Urban Roads (DMURS) notes:

"A primary function of all transport policies has been to reduce the waste of resources caused by congestion. National and regional transport policies and plans have recognised that it is not feasible or sustainable to accommodate continued demand for car use. In contrast, sustainable modes (walking, cycling and public transport) can cater for very high volumes of movement in a far more efficient manner. Policies and plans, therefore, promote sustainable modes of travel and acknowledge that, in the absence of demand management, a certain level of car congestion is inevitable."

3.5.2 DMURS goes on to state that:

"The creation of more compact junctions that minimise pedestrian and cyclist waiting times, will place additional pressures on junction performance. In areas where pedestrian activity is high (such as in Neighbourhoods and Centres) junctions may have to operate at saturation levels for

short periods (i.e. above 93% during peak periods).

3.5.3 When considering the above, it is obvious that DMURS acknowledges that car congestion is inevitable on some junctions during peak periods, particularly where pedestrian and cyclist movements are favoured through a junction.

3.5.4 In this respect, the consented Signals scheme for Junction 4 would operate over 93% capacity in 2025 in Scenario B and for all scenarios in 2030, as per **Table 3.2** above.

3.5.5 If 100% is considered as maximum preferred capacity during the peak periods, the consented junction would reach this threshold for Scenario E in 2025 and Scenario D in 2030, as per **Table 3.2** above. This is on the basis that the FLR is not completed by those assessment years.

3.5.6 Therefore from a Traffic Engineering perspective, it is has been shown that the proposed improved junction arrangement with flared approaches and cycle continuity could be implemented prior to occupation of 60% of the Malincross development should the FLR not already be completed by others.

3.5.7 The proposed signal junction improvements would provide extra capacity through the junction to allow the completion and full occupation of the Malincross development.

3.5.8 At the request of FCC this junction upgrade will be carried out as part of the Phase 1 works.

4.0 SUMMARY AND CONCLUSIONS

4.1 Summary

4.1.1 This Technical Note has been prepared to outline the design amendments and assess junction capacity performance of the proposed three arm signalised T-junction between Clonard Road and Boulevard Road in Balbriggan. Co. Dublin.

4.1.2 As part of the consented Ladywell development, it is proposed that the junction be converted to a signalised T-junction.

4.1.3 This assessment has been prepared to determine how many Malincross development trips could be accommodated by the consented J4 signalisation scheme prior to completion of the Flemington Link Road (FLR).

4.1.4 The assessment goes on to suggest further improvements to the consented signals scheme to provide additional capacity through the junction.

4.1.5 The proposed signalised junctions have been assessed using the LinSig computer programme for design years of 2025 and 2030 with 20% incremental increase of Malincross development trips.

4.1.6 The Design Manual for Urban Roads (DMURS) accepts that some peak hour congestion is inevitable. Therefore, designing junctions for vehicular capacity is neither feasible nor sustainable.

4.1.7 The assessments demonstrate that the consented junction would operate at 100% capacity with around 60% of Malincross development trips.

4.1.8 Proposed improvements to the consented scheme include flared approaches on Boulevard Road and Clonard Road and with and cycle continuity along Clonard Road.

4.1.9 The additional improvements allow the junction to operate under 100% for all development scenarios, 2025 & 2030.

4.1.10 In the event that the FLR is not completed, the threshold to complete the flare approaches and cycle continuity, from a Traffic Engineering perspective, is prior to 60% occupation of the Malincross development, however it is now proposed that the phasing of the delivery of this junction upgrade will be with the Phase 1 works as requested by FCC.

4.2 Conclusion

4.2.1 In conclusion, it is considered that this Technical Note demonstrates that suitable phased improvements can be provided to the junction between Clonard Road and Boulevard Road in the event that the Flemington Link Road is not completed prior to completion of the Malincross development.

APPENDIX A

Drawing 191004-SK101

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A3



Issue Register

No.	Date	Description	Drawn	Checked	Approved
P1	11/02/2022	Preliminary issue.	NH	RW	MP
--	--	--	--	--	--

General notes:-

1. This drawing to be read in conjunction with all relevant architects & engineers drawings & specifications.
2. Do not scale. use figured dimensions only.
3. All dimensions on drawings are in metres unless otherwise noted.

PRELIMINARY

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Client: Dean Swift Property Holdings

Project: Malincross, Balbriggan, Co. Dublin

Drawing Title: Proposed Clonard Rd / Boulevard Signals Junction

Project No:	Scale @ A3:
191004	1:500
Drawing No: SK101	Rev: P1
Drawn: NH / Checked: RW	Date: 11/02/2022

APPENDIX B

Traffic Flow Diagrams

Key

X	AM Peak 08:00 to 09:00 (PCUs) & Assigned Turn Proportions %
X	PM Peak 16:45 to 17:45 (PCUs) & Assigned Turn Proportions %
X	Arrivals via J7
X	Departures via J7
X	Arrivals via J4
X	Departures via J4

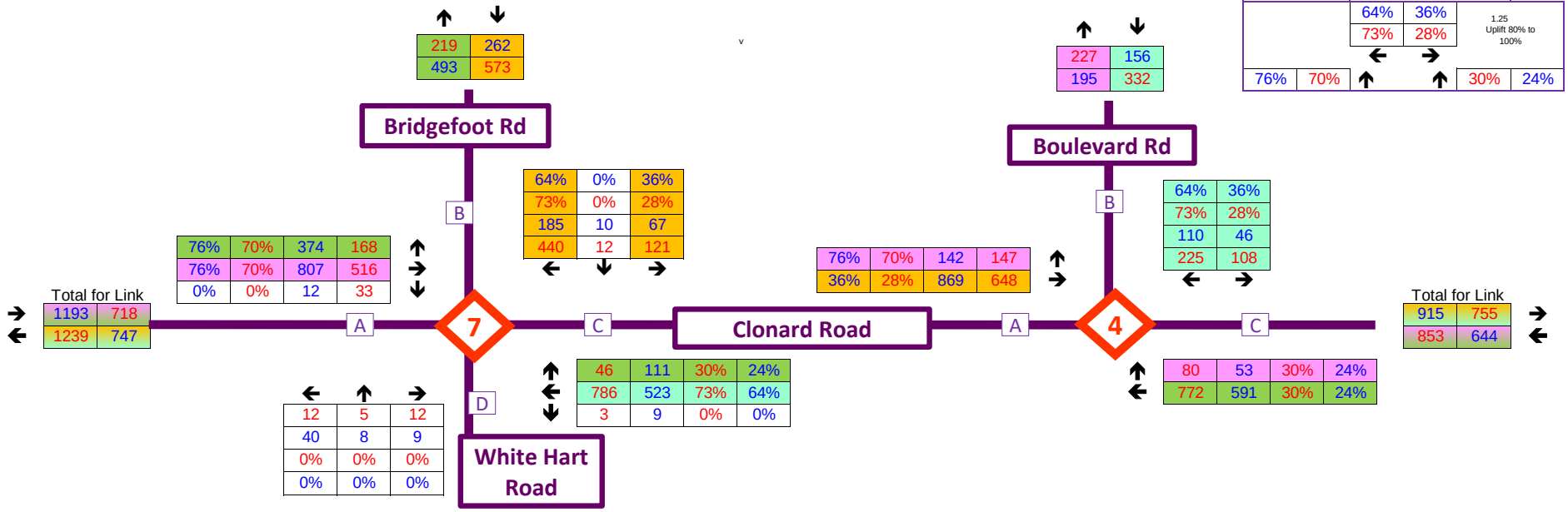
Malincross Development Trips

Trips PCUs		AM Arr	AM Dep	PM Arr	PM Dep
Full Dev. (100%)		78	256	225	134
80% traffic Junct 4 & 7		62	205	180	107
J4%	0%	0	0	0	0
J7%	100%	62	205	180	107

*NOTE:Development Trip Distributon and Assignment at Junction 7 for this assessment uses the surveyed turning proportion % from J4 (shown below) to ensure the network balances and to provide a robust assessment

		64%	36%
		73%	28%
76%	70%		
		30%	24%

1.25 Uplift 80% to 100%



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Drawing Title:

Malincross Junctions 4 & 7: Sub-Assessment Distribution

A **2025 + CD + DEV**

J7 = 100% **J4 = 0%**

Drawn By: AE	**Project Title:** Malincross, Balbriggan
Checked By: BC	**Project No:** 1046A
Date: 28/01/2022	**Drawing Number:** 1046A - 001

Key

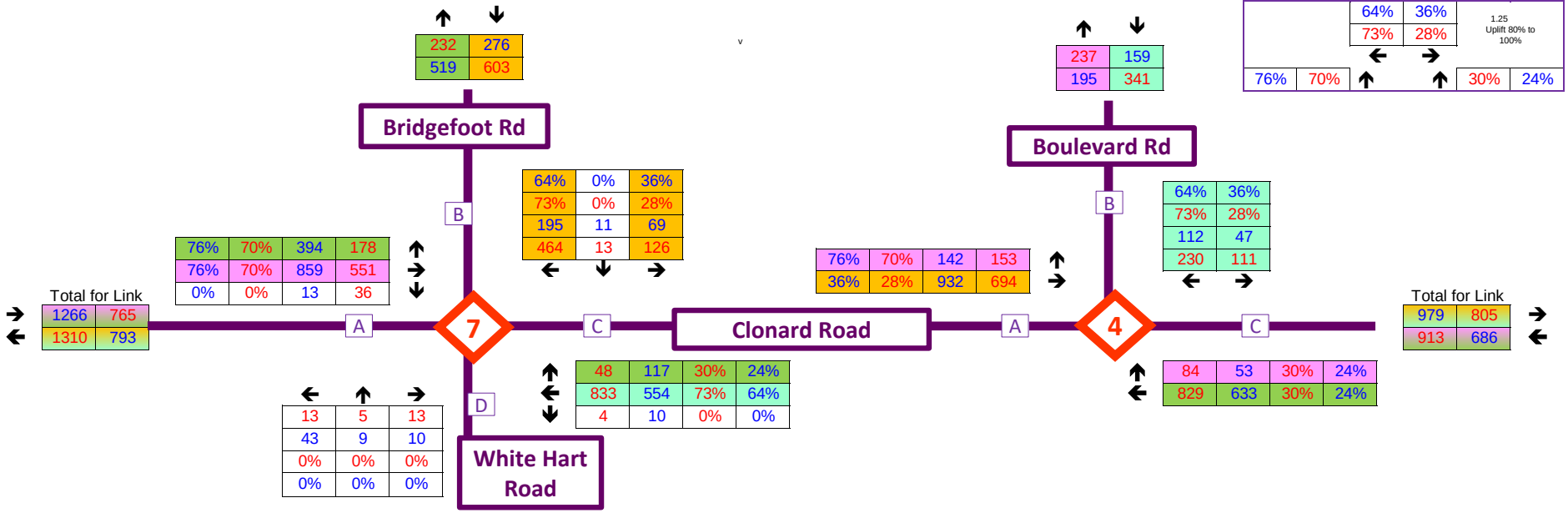
X	AM Peak 08:00 to 09:00 (PCUs) & Assigned Turn Proportions %		
X	PM Peak 16:45 to 17:45 (PCUs) & Assigned Turn Proportions %		
X	Arrivals via J7	X	Arrivals via J4
X	Departures via J7	X	Departures via J4

Malincross Development Trips

Trips PCUs		AM Arr	AM Dep	PM Arr	PM Dep
Full Dev. (100%)		78	256	225	134
80% traffic Junct 4 & 7		62	205	180	107
J4%	0%	0	0	0	0
J7%	100%	62	205	180	107

*NOTE:Development Trip Distributon and Assignment at Junction 7 for this assessment uses the surveyed turning proportion % from J4 (shown below) to ensure the network balances and to provide a robust assessment

		64%	36%	1.25 Uplift 80% to 100%
		73%	28%	
76%	70%			30%	24%



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Drawing Title:

Malincross Junctions 4 & 7: Sub-Assessment Distribution

A **2030 + CD + DEV**

J7 = 100% **J4 = 0%**

Drawn By: AE	**Project Title:** Malincross, Balbriggan
Checked By: BC	**Project No:** 1046A
Date: 28/01/2022	**Drawing Number:** 1046A - 002

Key

X	AM Peak 08:00 to 09:00 (PCUs) & Assigned Turn Proportions %
X	PM Peak 16:45 to 17:45 (PCUs) & Assigned Turn Proportions %
X	Arrivals via J7
X	Departures via J7
X	Arrivals via J4
X	Departures via J4

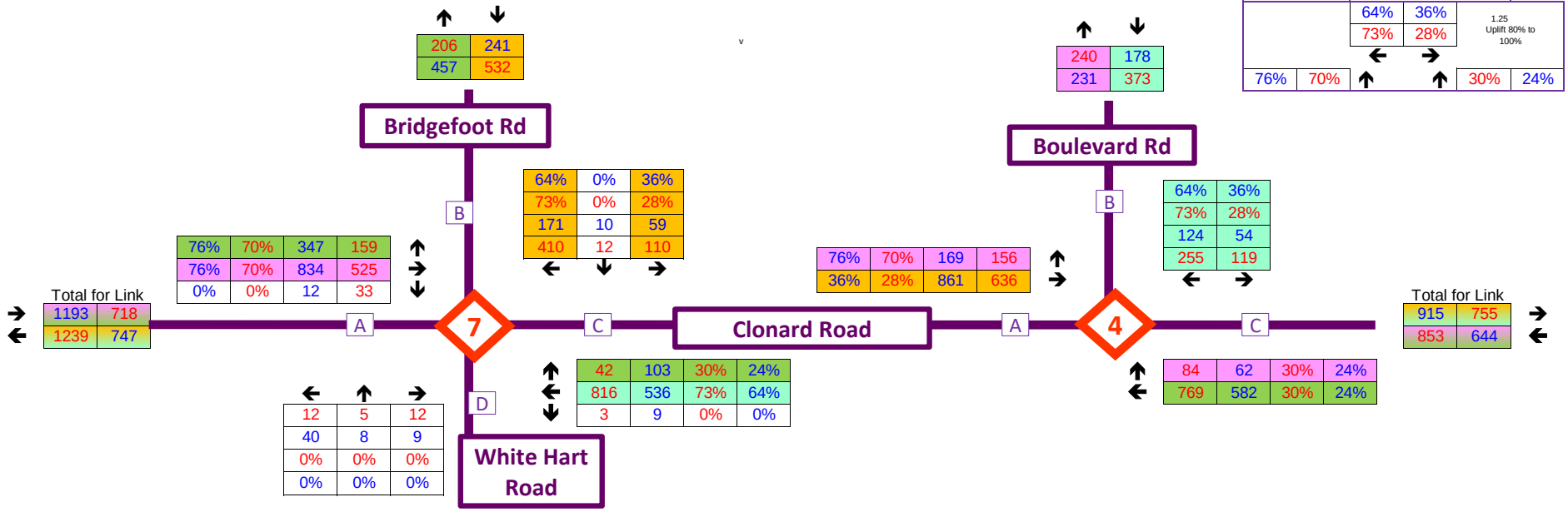
Malincross Development Trips

Trips PCUs		AM Arr	AM Dep	PM Arr	PM Dep
Full Dev. (100%)		78	256	225	134
80% traffic Junct 4 & 7		62	205	180	107
J4%	20%	12	41	36	21
J7%	80%	50	164	144	86

*NOTE:Development Trip Distributon and Assignment at Junction 7 for this assessment uses the surveyed turning proportion % from J4 (shown below) to ensure the network balances and to provide a robust assessment

		64%	36%
		73%	28%
76%	70%		
		30%	24%

1.25 Uplift 80% to 100%



Martin Peters Associates Consulting Engineers 26 Upper Pembroke Street, Dublin 2 | T: +353 1 649 9001 | E: info@mpa.ie | W: www.mpa.ie	**Drawing Title:** **Malincross Junctions 4 & 7: Sub-Assessment Distribution** **B** **2025 + CD + DEV** **J7 = 80%** **J4 = 20%**	**Drawn By:** AE **Checked By:** BC **Date:** 28/01/2022	**Project Title:** Malincross, Balbriggan **Project No:** 1046A **Drawing Number:** 1046A - 003

Key

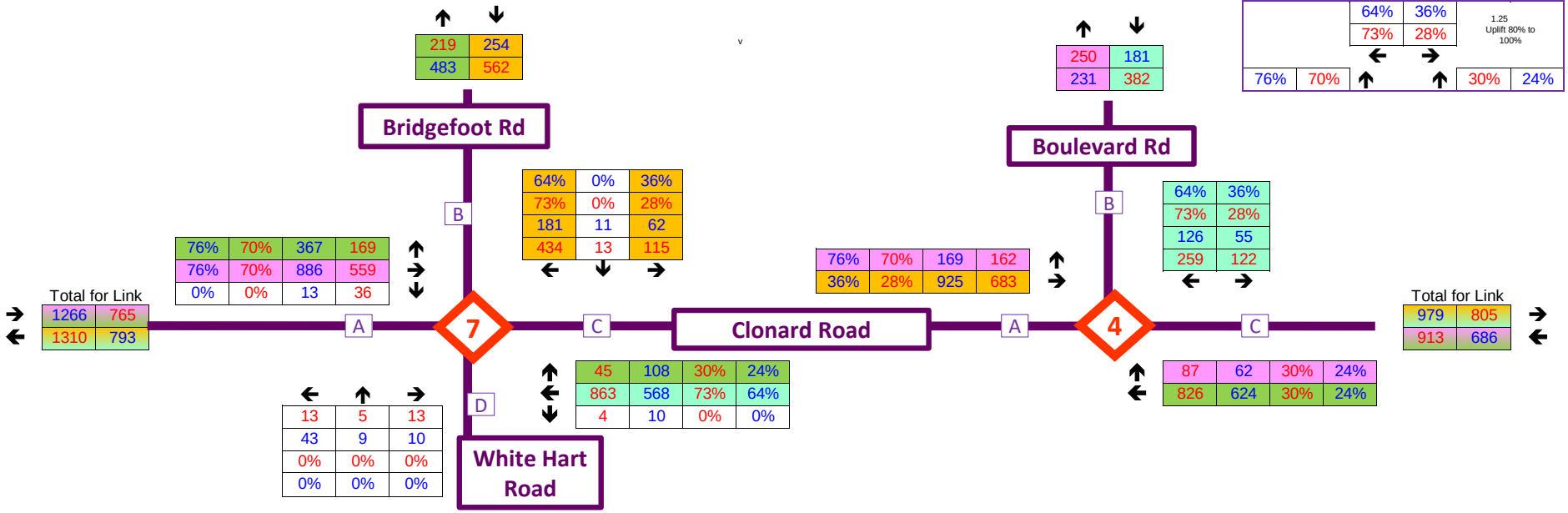
X	AM Peak 08:00 to 09:00 (PCUs) & Assigned Turn Proportions %
X	PM Peak 16:45 to 17:45 (PCUs) & Assigned Turn Proportions %
X	Arrivals via J7
X	Departures via J7
X	Arrivals via J4
X	Departures via J4

Malincross Development Trips

Trips PCUs		AM Arr	AM Dep	PM Arr	PM Dep
Full Dev. (100%)		78	256	225	134
80% traffic Junct 4 & 7		62	205	180	107
J4%	20%	12	41	36	21
J7%	80%	50	164	144	86

*NOTE:Development Trip Distributon and Assignment at Junction 7 for this assessment uses the surveyed turning proportion % from J4 (shown below) to ensure the network balances and to provide a robust assessment

		64%	36%	1.25 Uplift 80% to 100%
		73%	28%	
76%	70%			30%	24%



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Drawing Title:

Malincross Junctions 4 & 7: Sub-Assessment Distribution

B **2030 + CD + DEV**

J7 = 80% **J4 = 20%**

Drawn By: AE	**Project Title:** Malincross, Balbriggan
Checked By: BC	**Project No:** 1046A
Date: 28/01/2022	**Drawing Number:** 1046A - 004

Key

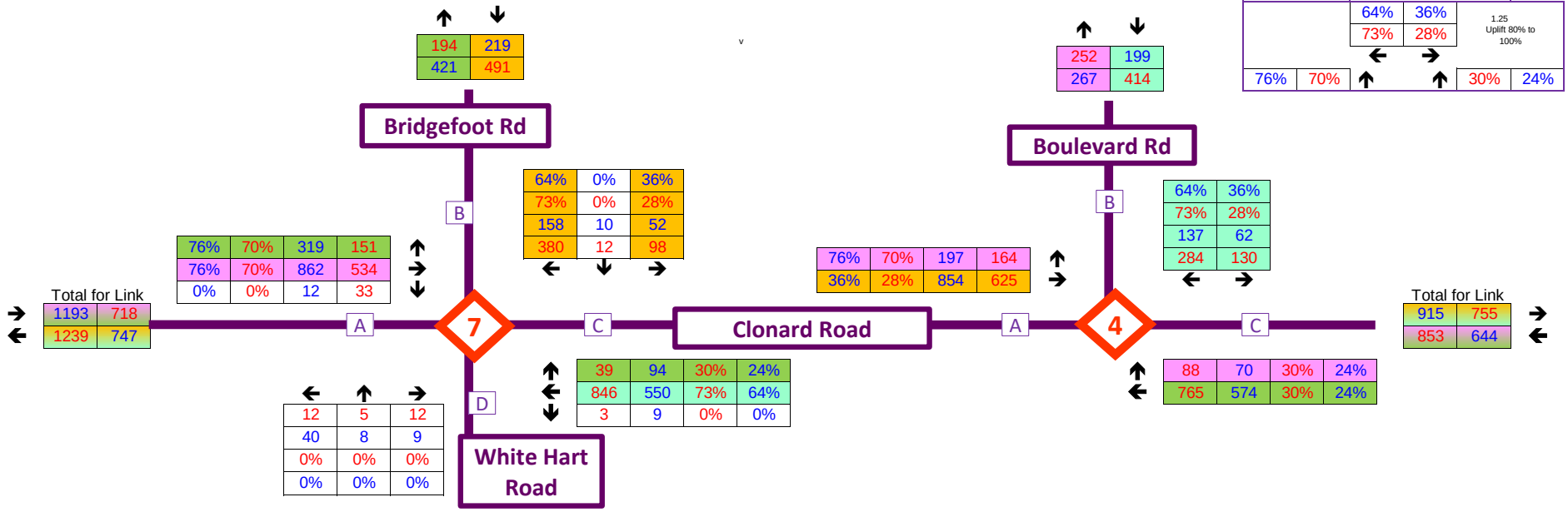
X	AM Peak 08:00 to 09:00 (PCUs) & Assigned Turn Proportions %
X	PM Peak 16:45 to 17:45 (PCUs) & Assigned Turn Proportions %
X	Arrivals via J7
X	Departures via J7
X	Arrivals via J4
X	Departures via J4

Malincross Development Trips

Trips PCUs		AM Arr	AM Dep	PM Arr	PM Dep
Full Dev. (100%)		78	256	225	134
80% traffic Junct 4 & 7		62	205	180	107
J4%	40%	25	82	72	43
J7%	60%	37	123	108	64

*NOTE:Development Trip Distributon and Assignment at Junction 7 for this assessment uses the surveyed turning proportion % from J4 (shown below) to ensure the network balances and to provide a robust assessment

		64%	36%
		73%	28%
76%	70%	1.25 Uplift 80% to 100%	
		30%	24%



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Drawing Title:

Malincross Junctions 4 & 7: Sub-Assessment Distribution

C **2025 + CD + DEV**

J7 = 60% **J4 = 40%**

Drawn By: AE	**Project Title:** Malincross, Balbriggan
Checked By: BC	**Project No:** 1046A
Date: 28/01/2022	**Drawing Number:** 1046A - 005

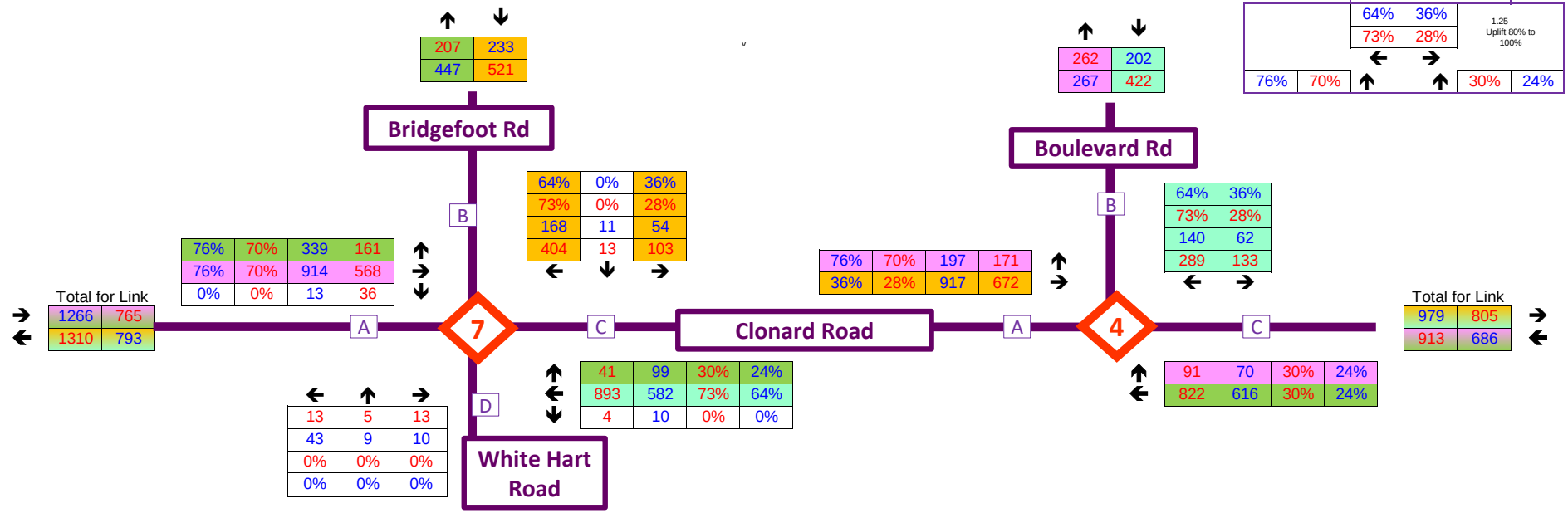
Key

X	AM Peak 08:00 to 09:00 (PCUs) & Assigned Turn Proportions %
X	PM Peak 16:45 to 17:45 (PCUs) & Assigned Turn Proportions %
X	Arrivals via J7
X	Departures via J7
X	Arrivals via J4
X	Departures via J4

Malincross Development Trips

Trips PCUs		AM Arr	AM Dep	PM Arr	PM Dep
Full Dev. (100%)		78	256	225	134
80% traffic Junct 4 & 7		62	205	180	107
J4%	40%	25	82	72	43
J7%	60%	37	123	108	64

*NOTE:Development Trip Distributon and Assignment at Junction 7 for this assessment uses the surveyed turning proportion % from J4 (shown below) to ensure the network balances and to provide a robust assessment



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Drawing Title:

Malincross Junctions 4 & 7: Sub-Assessment Distribution

C **2030 + CD + DEV**

J7 = 60% **J4 = 40%**

Drawn By: AE	**Project Title:** Malincross, Balbriggan
Checked By: BC	**Project No:** 1046A
Date: 28/01/2022	**Drawing Number:** 1046A - 006

Key

X	AM Peak 08:00 to 09:00 (PCUs) & Assigned Turn Proportions %
X	PM Peak 16:45 to 17:45 (PCUs) & Assigned Turn Proportions %
X	Arrivals via J7
X	Arrivals via J4
X	Departures via J7
X	Departures via J4

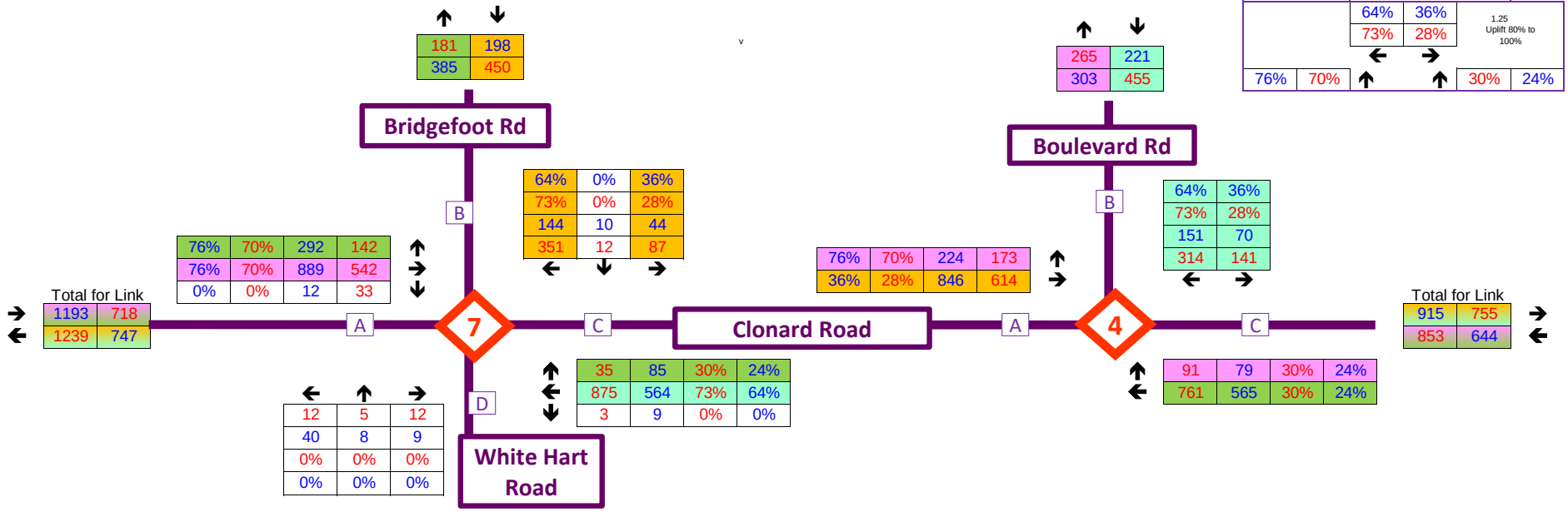
Malincross Development Trips

Trips PCUs		AM Arr	AM Dep	PM Arr	PM Dep
Full Dev. (100%)		78	256	225	134
80% traffic Junct 4 & 7		62	205	180	107
J4%	60%	37	123	108	64
J7%	40%	25	82	72	43

*NOTE:Development Trip Distributon and Assignment at Junction 7 for this assessment uses the surveyed turning proportion % from J4 (shown below) to ensure the network balances and to provide a robust assessment

		64%	36%
		73%	28%
76%	70%		
		30%	24%

1.25 Uplift 80% to 100%



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Drawing Title:

Malincross Junctions 4 & 7: Sub-Assessment Distribution

D **2025 + CD + DEV**

J7 = 40% **J4 = 60%**

Drawn By: AE	**Project Title:** Malincross, Balbriggan
Checked By: BC	**Project No:** 1046A
Date: 28/01/2022	**Drawing Number:** 1046A - 007

Key

X	AM Peak 08:00 to 09:00 (PCUs) & Assigned Turn Proportions %		
X	PM Peak 16:45 to 17:45 (PCUs) & Assigned Turn Proportions %		
X	Arrivals via J7	X	Arrivals via J4
X	Departures via J7	X	Departures via J4

Malincross Development Trips

Trips PCUs		AM Arr	AM Dep	PM Arr	PM Dep
Full Dev. (100%)		78	256	225	134
80% traffic Junct 4 & 7		62	205	180	107
J4%	60%	37	123	108	64
J7%	40%	25	82	72	43

*NOTE:Development Trip Distributon and Assignment at Junction 7 for this assessment uses the surveyed turning proportion % from J4 (shown below) to ensure the network balances and to provide a robust assessment

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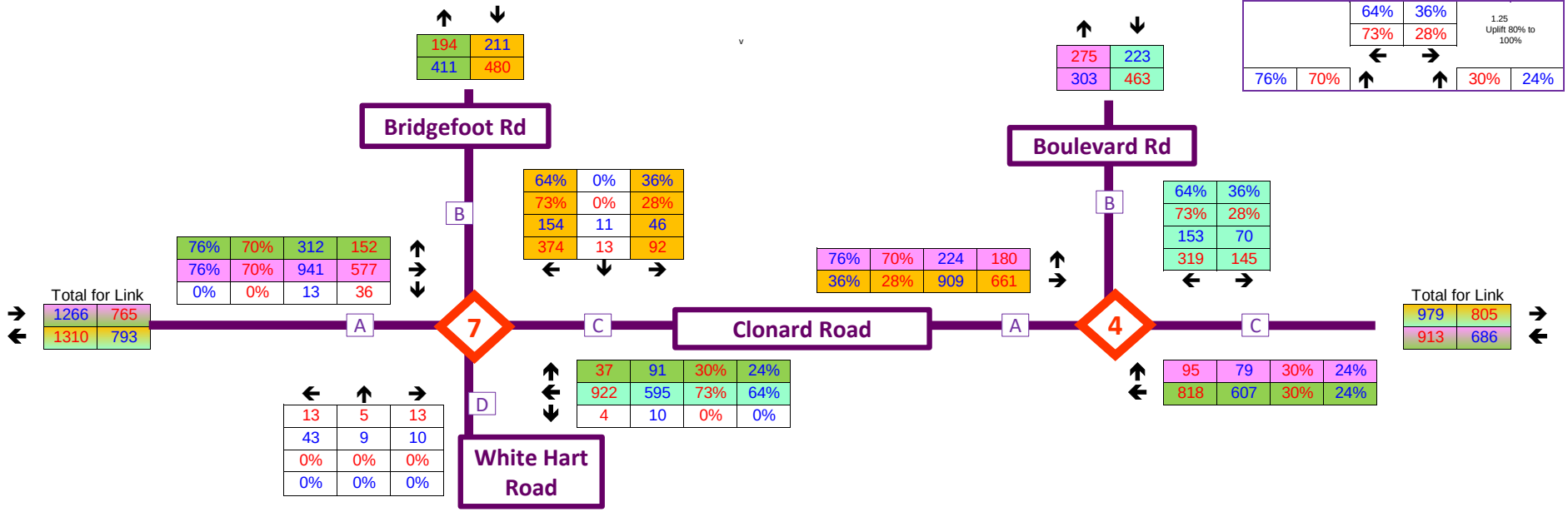
		73%	28%
76%	70%		
		30%	24%

1.25 Uplift 80% to 100%



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Drawing Title:

Malincross Junctions 4 & 7: Sub-Assessment Distribution

D **2030 + CD + DEV**

J7 = 40% **J4 = 60%**

Drawn By: AE	**Project Title:** Malincross, Balbriggan
Checked By: BC	**Project No:** 1046A
Date: 28/01/2022	**Drawing Number:** 1046A - 008

Key

X	AM Peak 08:00 to 09:00 (PCUs) & Assigned Turn Proportions %
X	PM Peak 16:45 to 17:45 (PCUs) & Assigned Turn Proportions %
X	Arrivals via J7
X	Arrivals via J4
X	Departures via J7
X	Departures via J4

Malincross Development Trips

Trips PCUs		AM Arr	AM Dep	PM Arr	PM Dep
Full Dev. (100%)		78	256	225	134
80% traffic Junct 4 & 7		62	205	180	107
J4%	80%	50	164	144	86
J7%	20%	12	41	36	21

*NOTE:Development Trip Distributon and Assignment at Junction 7 for this assessment uses the surveyed turning proportion % from J4 (shown below) to ensure the network balances and to provide a robust assessment

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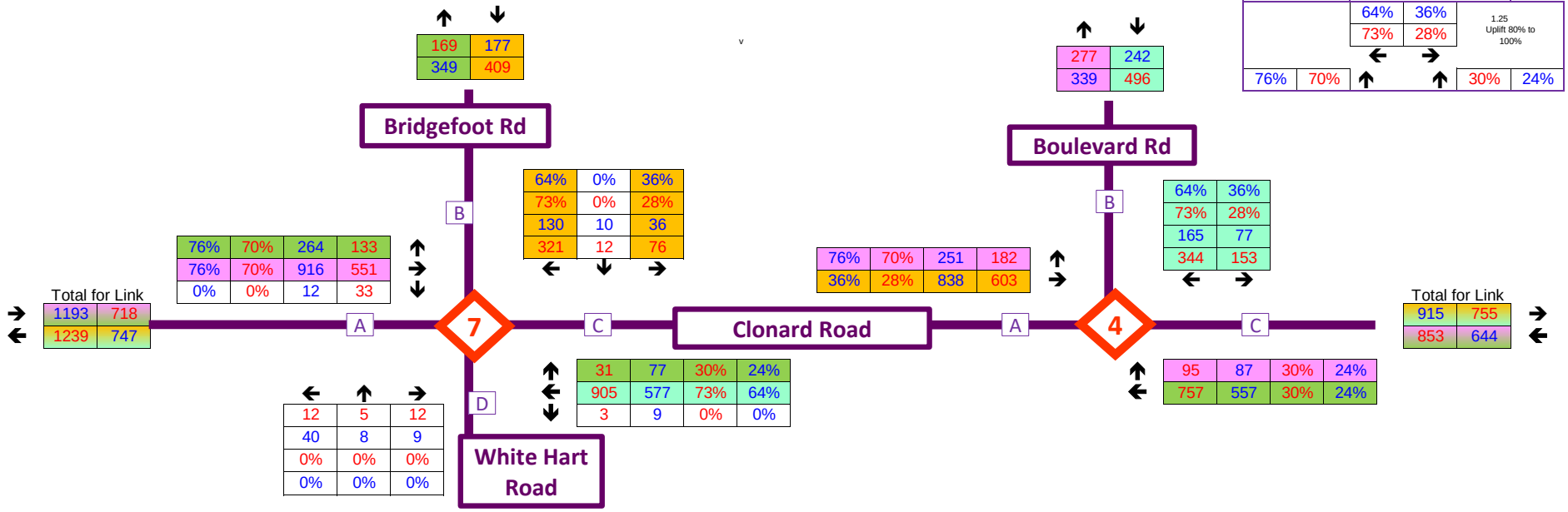
		73%	28%
76%	70%		
		30%	24%

1.25 Uplift 80% to 100%



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Drawing Title:

Malincross Junctions 4 & 7: Sub-Assessment Distribution

E **2025 + CD + DEV**

J7 = 20% **J4 = 80%**

Drawn By: AE	**Project Title:** Malincross, Balbriggan
Checked By: BC	**Project No:** 1046A
Date: 28/01/2022	**Drawing Number:** 1046A - 009

Key

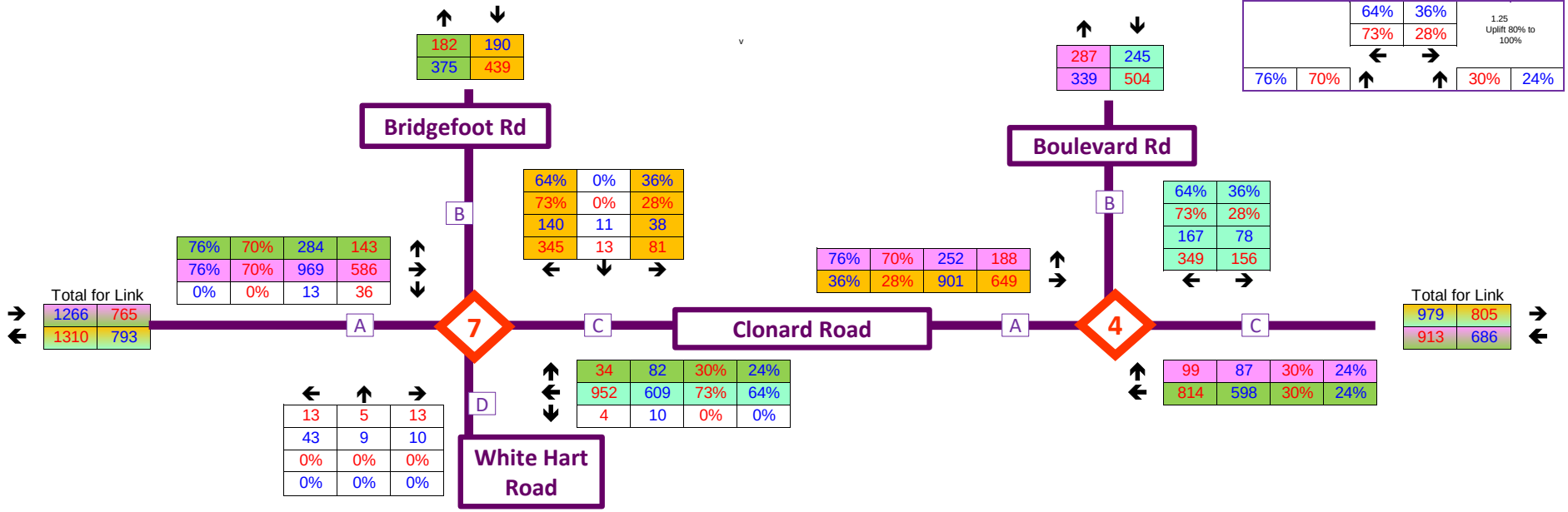
X	AM Peak 08:00 to 09:00 (PCUs) & Assigned Turn Proportions %
X	PM Peak 16:45 to 17:45 (PCUs) & Assigned Turn Proportions %
X	Arrivals via J7
X	Arrivals via J4
X	Departures via J7
X	Departures via J4

Malincross Development Trips

Trips PCUs		AM Arr	AM Dep	PM Arr	PM Dep
Full Dev. (100%)		78	256	225	134
80% traffic Junct 4 & 7		62	205	180	107
J4%	80%	50	164	144	86
J7%	20%	12	41	36	21

*NOTE:Development Trip Distributon and Assignment at Junction 7 for this assessment uses the surveyed turning proportion % from J4 (shown below) to ensure the network balances and to provide a robust assessment

		64%	36%	1.25 Uplift 80% to 100%
		73%	28%	
76%	70%			30%	24%



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Drawing Title:

Malincross Junctions 4 & 7: Sub-Assessment Distribution

E **2030 + CD + DEV**

J7 = 20% **J4 = 80%**

Drawn By: AE	**Project Title:** Malincross, Balbriggan
Checked By: BC	**Project No:** 1046A
Date: 28/01/2022	**Drawing Number:** 1046A - 010

Key

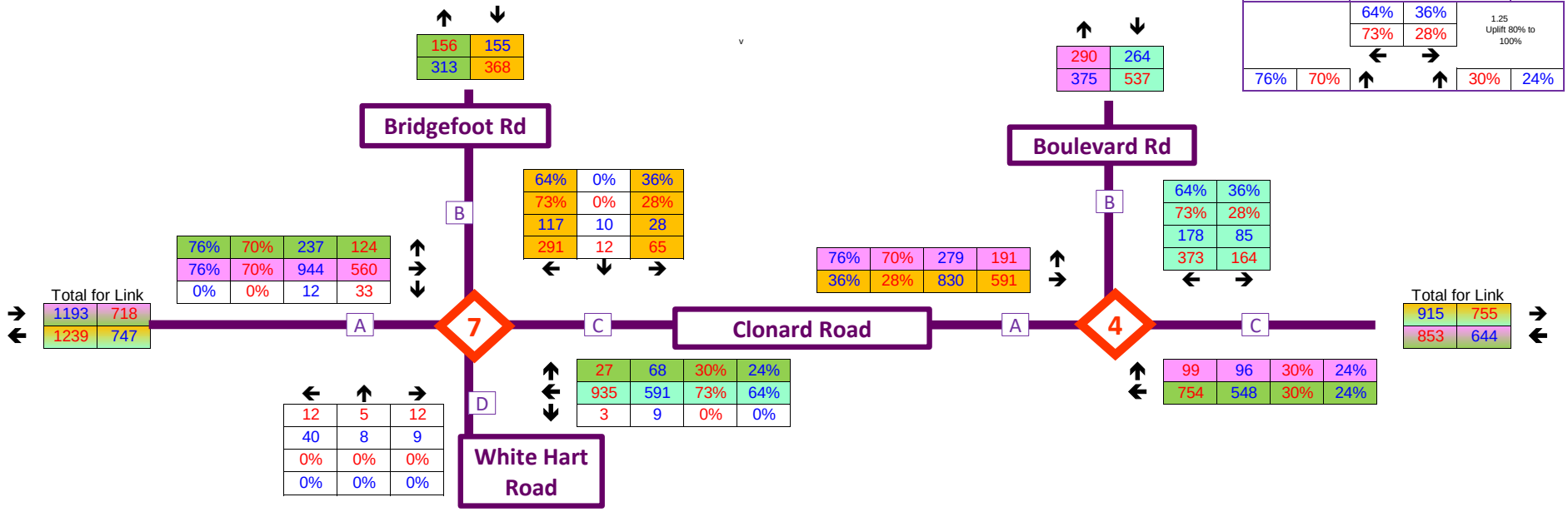
X	AM Peak 08:00 to 09:00 (PCUs) & Assigned Turn Proportions %
X	PM Peak 16:45 to 17:45 (PCUs) & Assigned Turn Proportions %
X	Arrivals via J7
X	Arrivals via J4
X	Departures via J7
X	Departures via J4

Malincross Development Trips

Trips PCUs		AM Arr	AM Dep	PM Arr	PM Dep
Full Dev. (100%)		78	256	225	134
80% traffic Junct 4 & 7		62	205	180	107
J4%	100%	62	205	180	107
J7%	0%	0	0	0	0

*NOTE:Development Trip Distributon and Assignment at Junction 7 for this assessment uses the surveyed turning proportion % from J4 (shown below) to ensure the network balances and to provide a robust assessment

		64%	36%	1.25 Uplift 80% to 100%
		73%	28%	
76%	70%			30%	24%



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Drawing Title:

Malincross Junctions 4 & 7: Sub-Assessment Distribution

F **2025 + CD + DEV**

J7 = 0% **J4 = 100%**

Drawn By: AE	**Project Title:** Malincross, Balbriggan
Checked By: BC	**Project No:** 1046A
Date: 28/01/2022	**Drawing Number:** 1046A - 011

Key

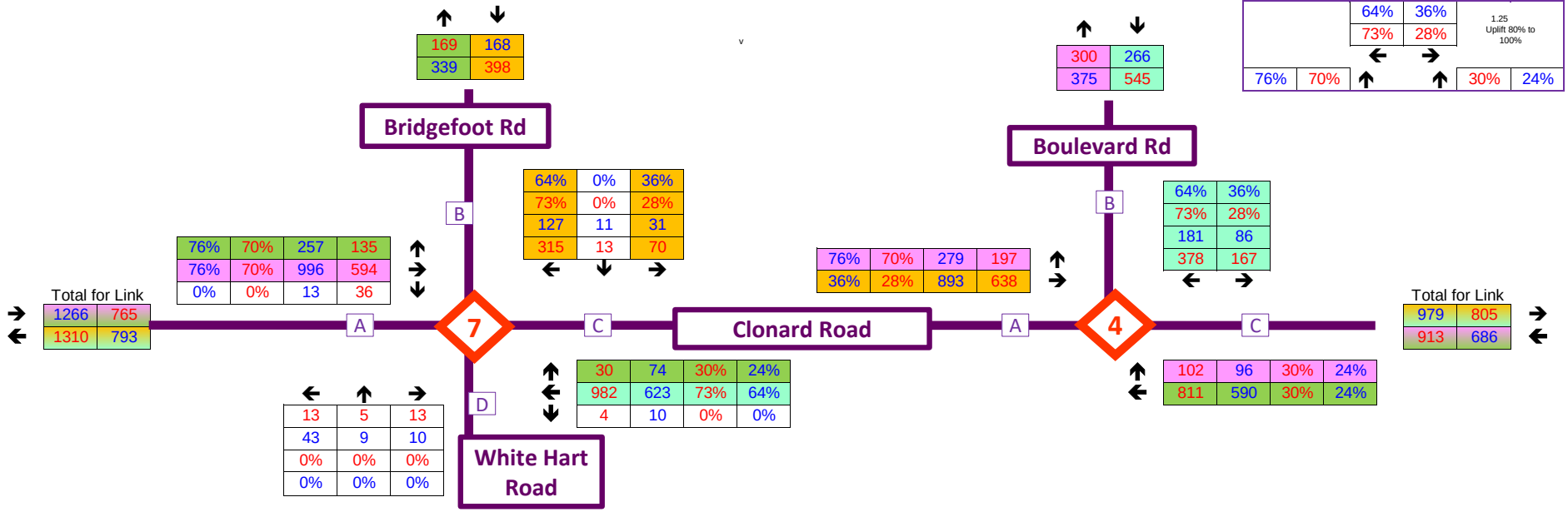
X	AM Peak 08:00 to 09:00 (PCUs) & Assigned Turn Proportions %
X	PM Peak 16:45 to 17:45 (PCUs) & Assigned Turn Proportions %
X	Arrivals via J7
X	Arrivals via J4
X	Departures via J7
X	Departures via J4

Malincross Development Trips

Trips PCUs		AM Arr	AM Dep	PM Arr	PM Dep
Full Dev. (100%)		78	256	225	134
80% traffic Junct 4 & 7		62	205	180	107
J4%	100%	62	205	180	107
J7%	0%	0	0	0	0

*NOTE:Development Trip Distributon and Assignment at Junction 7 for this assessment uses the surveyed turning proportion % from J4 (shown below) to ensure the network balances and to provide a robust assessment

		64%	36%	1.25 Uplift 80% to 100%
		73%	28%	
76%	70%			30%	24%



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Drawing Title:

Malincross Junctions 4 & 7: Sub-Assessment Distribution

F **2030 + CD + DEV**

J7 = 0% **J4 = 100%**

Drawn By: AE	**Project Title:** Malincross, Balbriggan
Checked By: BC	**Project No:** 1046A
Date: 28/01/2022	**Drawing Number:** 1046A - 012

APPENDIX C

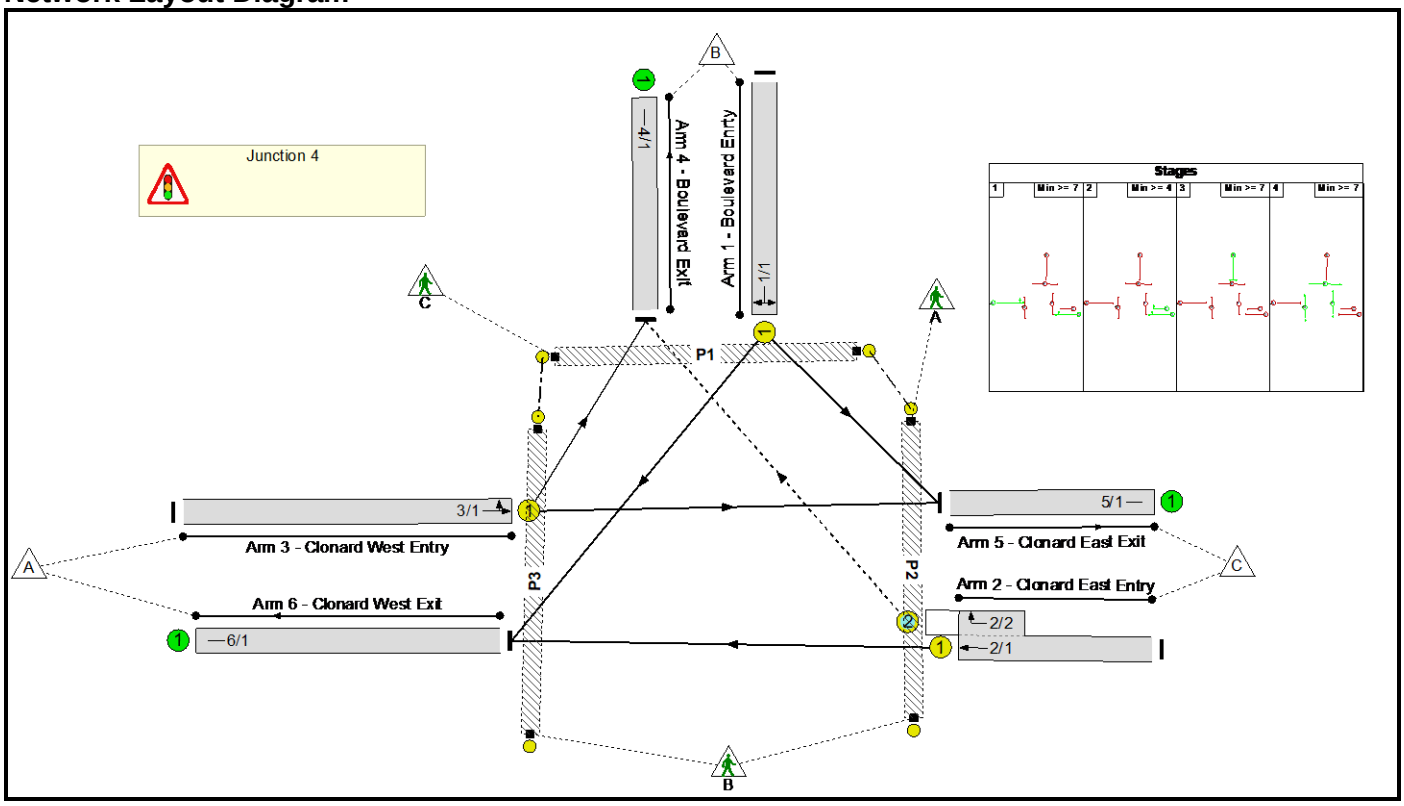
LinSig Outputs – Consented Junction

Full Input Data And Results

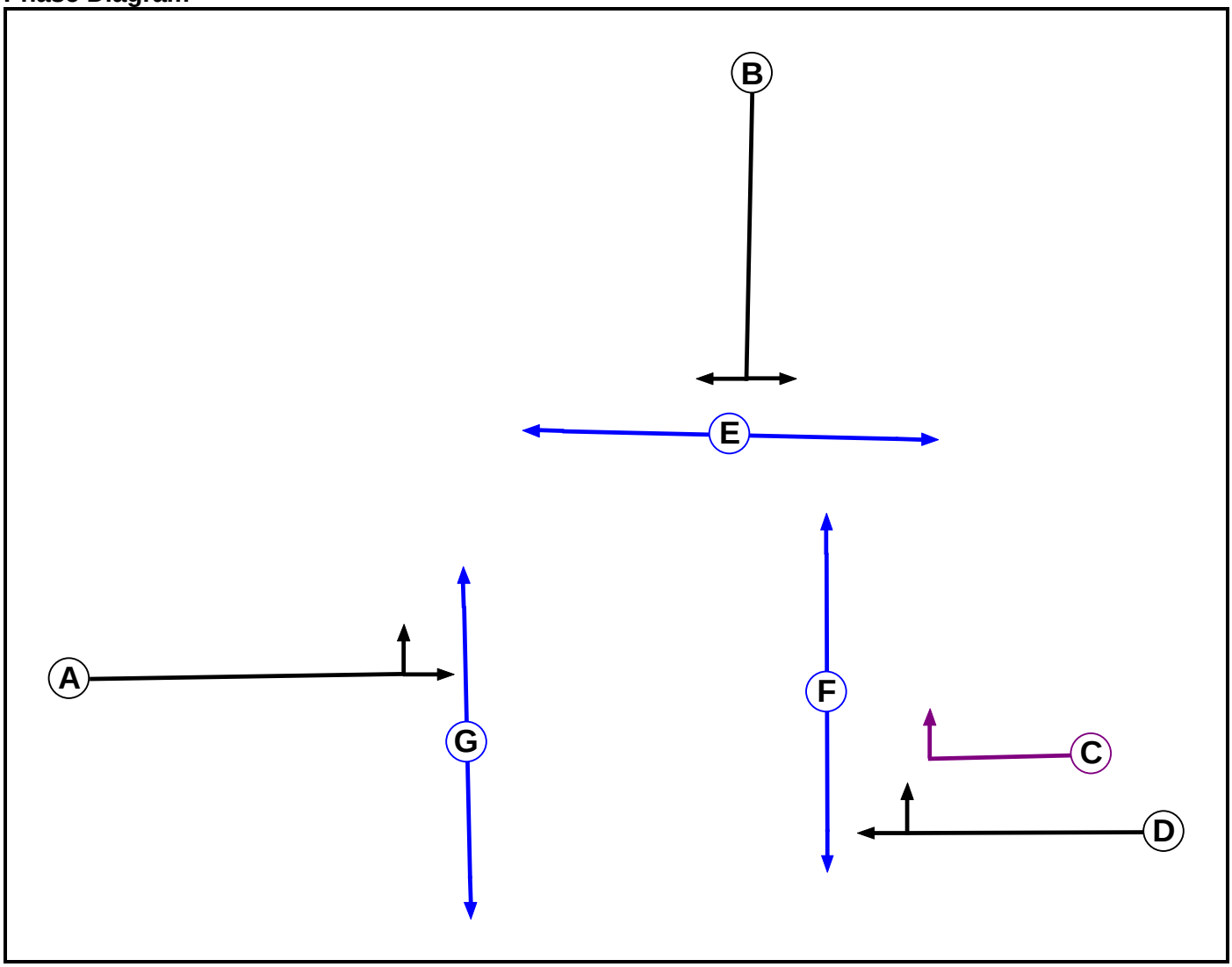
User and Project Details

Project:	
Title:	
Location:	
Additional detail:	
File name:	J4 Boulevard v8 - Ladywell TA.lsg3x
Author:	
Company:	
Address:	

Network Layout Diagram



Phase Diagram



Phase Input Data

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

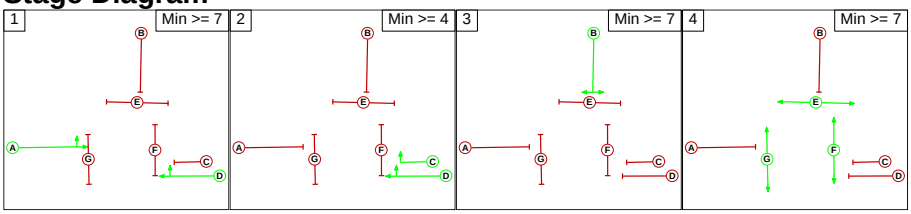
Phase Intergreens Matrix

Terminating Phase	Starting Phase							
		A	B	C	D	E	F	G
	A		6	5	-	7	8	6
	B	6		6	6	6	8	8
	C	5	6		-	6	6	8
	D	-	6	-		7	6	8
	E	11	11	11	11		-	-
	F	11	11	11	11	-		-
	G	11	11	11	11	-	-	

Phases in Stage

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

Stage Diagram



Phase Delays

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

Prohibited Stage Change

From Stage	To Stage				
		1	2	3	4
	1		5	6	8
	2	5		6	8
	3	6	6		8
	4	11	11	11	

Give-Way Lane Input Data

Junction: Junction 4											
Lane	**Movement**	**Max Flow when Giving Way (PCU/Hr)**	**Min Flow when Giving Way (PCU/Hr)**	**Opposing Lane**	**Opp. Lane Coeff.**	**Opp. Mvmnts.**	**Right Turn Storage (PCU)**	**Non-Blocking Storage (PCU)**	**RTF**	**Right Turn Move up (s)**	**Max Turns in Intergreen (PCU)**
2/2 (Clonard East Entry)	4/1 (Right)	1439	0	3/1	1.09	All	2.00	-	0.50	2	2.00

Lane Input Data

Junction: Junction 4

Lane	Lane Type	Phases	Start Disp.	End Disp.	Physical Length (PCU)	Sat Flow Type	Def User Saturation Flow (PCU/Hr)	Lane Width (m)	Gradient	Nearside Lane	Turns	Turning Radius (m)
1/1 (Boulevard Enrty)	U	B	2	3	60.0	Geom	-	3.50	0.00	Y	Arm 5 Left	12.00
											Arm 6 Right	15.00
2/1 (Clonard East Entry)	U	D	2	3	60.0	Geom	-	3.65	0.00	Y	Arm 6 Ahead	Inf
2/2 (Clonard East Entry)	O	D C	2	3	4.0	Geom	-	3.25	0.00	N	Arm 4 Right	15.00
3/1 (Clonard West Entry)	U	A	2	3	60.0	Geom	-	3.65	0.00	Y	Arm 4 Left	12.00
											Arm 5 Ahead	Inf
4/1 (Boulevard Exit)	U		2	3	60.0	Inf	-	-	-	-	-	-
5/1 (Clonard East Exit)	U		2	3	60.0	Inf	-	-	-	-	-	-
6/1 (Clonard West Exit)	U		2	3	60.0	Inf	-	-	-	-	-	-

Traffic Flow Groups

Flow Group	Start Time	End Time	Duration	Formula
1: 'Scenario A 2025 - AM'	08:00	09:00	01:00	
2: 'Scenario A 2025 - PM'	16:45	17:45	01:00	
3: 'Scenario A 2030 - AM'	08:00	09:00	01:00	
4: 'Scenario A 2030 - PM'	16:45	17:45	01:00	
5: 'Scenario B 2025 - AM'	08:00	09:00	01:00	
6: 'Scenario B 2025 - PM'	16:45	17:45	01:00	
7: 'Scenario B 2030 - AM'	08:00	09:00	01:00	
8: 'Scenario B 2030 - PM'	16:45	17:45	01:00	
9: 'Scenario C 2025 - AM'	08:00	09:00	01:00	
10: 'Scenario C 2025 - PM'	16:45	17:45	01:00	
11: 'Scenario C 2030 - AM'	08:00	09:00	01:00	
12: 'Scenario C 2030 - PM'	16:45	17:45	01:00	
13: 'Scenario D 2025 - AM'	08:00	09:00	01:00	
14: 'Scenario D 2025 - PM'	16:45	17:45	01:00	
15: 'Scenario D 2030 - AM'	08:00	09:00	01:00	
16: 'Scenario D 2030 - PM'	16:45	17:45	01:00	
17: 'Scenario E 2025 - AM'	08:00	09:00	01:00	
18: 'Scenario E 2025 - PM'	16:45	17:45	01:00	
19: 'Scenario E 2030 - AM'	08:00	09:00	01:00	
20: 'Scenario E 2030 - PM'	16:45	17:45	01:00	
21: 'Scenario F 2025 - AM'	08:00	09:00	01:00	
22: 'Scenario F 2025 - PM'	16:45	17:45	01:00	
23: 'Scenario F 2030 - AM'	08:00	09:00	01:00	
24: 'Scenario F 2030 - PM'	16:45	17:45	01:00	

Scenario 1: 'Scenario A 2025 AM ' (FG1: 'Scenario A 2025 - AM', Plan 1: 'Network Control Plan 1')

Traffic Flows, Desired

Desired Flow :

		Destination			
		A	B	C	Tot.
Origin	A	0	147	648	795
	B	225	0	108	333
	C	772	80	0	852
	Tot.	997	227	756	1980

Traffic Lane Flows

Lane	Scenario 1: Scenario A 2025 AM
Junction: Junction 4	
1/1	333
2/1 (with short)	852(In) 772(Out)
2/2 (short)	80
3/1	795
4/1	227
5/1	756
6/1	997

Lane Saturation Flows

Junction: Junction 4								
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat Flow (PCU/Hr)**	**Flared Sat Flow (PCU/Hr)**
1/1 (Boulevard Enrty)	3.50	0.00	Y	Arm 5 Left	12.00	32.4 %	1773	1773
				Arm 6 Right	15.00	67.6 %		
2/1 (Clonard East Entry)	3.65	0.00	Y	Arm 6 Ahead	Inf	100.0 %	1980	1980
2/2 (Clonard East Entry)	3.25	0.00	N	Arm 4 Right	15.00	100.0 %	1891	1891
3/1 (Clonard West Entry)	3.65	0.00	Y	Arm 4 Left	12.00	18.5 %	1935	1935
				Arm 5 Ahead	Inf	81.5 %		
4/1 (Boulevard Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
5/1 (Clonard East Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
6/1 (Clonard West Exit Lane 1)	Infinite Saturation Flow						Inf	Inf

Scenario 2: 'Scenario A 2025 PM ' (FG2: 'Scenario A 2025 - PM', Plan 1: 'Network Control Plan 1')

Traffic Flows, Desired

Desired Flow :

		Destination			
		A	B	C	Tot.
Origin	A	0	142	869	1011
	B	110	0	46	156
	C	591	53	0	644
	Tot.	701	195	915	1811

Traffic Lane Flows

Lane	Scenario 2: Scenario A 2025 PM
Junction: Junction 4	
1/1	156
2/1 (with short)	644(In) 591(Out)
2/2 (short)	53
3/1	1011
4/1	195
5/1	915
6/1	701

Lane Saturation Flows

Junction: Junction 4								
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat Flow (PCU/Hr)**	**Flared Sat Flow (PCU/Hr)**
1/1 (Boulevard Enrty)	3.50	0.00	Y	Arm 5 Left	12.00	29.5 %	1774	1774
				Arm 6 Right	15.00	70.5 %		
2/1 (Clonard East Entry)	3.65	0.00	Y	Arm 6 Ahead	Inf	100.0 %	1980	1980
2/2 (Clonard East Entry)	3.25	0.00	N	Arm 4 Right	15.00	100.0 %	1891	1891
3/1 (Clonard West Entry)	3.65	0.00	Y	Arm 4 Left	12.00	14.0 %	1946	1946
				Arm 5 Ahead	Inf	86.0 %		
4/1 (Boulevard Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
5/1 (Clonard East Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
6/1 (Clonard West Exit Lane 1)	Infinite Saturation Flow						Inf	Inf

Scenario 3: 'Scenario A 2030 AM ' (FG3: 'Scenario A 2030 - AM', Plan 1: 'Network Control Plan 1')

Traffic Flows, Desired

Desired Flow :

		Destination			
		A	B	C	Tot.
Origin	A	0	153	694	847
	B	230	0	111	341
	C	829	84	0	913
	Tot.	1059	237	805	2101

Traffic Lane Flows

Lane	Scenario 3: Scenario A 2030 AM
Junction: Junction 4	
1/1	341
2/1 (with short)	913(In) 829(Out)
2/2 (short)	84
3/1	847
4/1	237
5/1	805
6/1	1059

Lane Saturation Flows

Junction: Junction 4								
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat Flow (PCU/Hr)**	**Flared Sat Flow (PCU/Hr)**
1/1 (Boulevard Enrty)	3.50	0.00	Y	Arm 5 Left	12.00	32.6 %	1773	1773
				Arm 6 Right	15.00	67.4 %		
2/1 (Clonard East Entry)	3.65	0.00	Y	Arm 6 Ahead	Inf	100.0 %	1980	1980
2/2 (Clonard East Entry)	3.25	0.00	N	Arm 4 Right	15.00	100.0 %	1891	1891
3/1 (Clonard West Entry)	3.65	0.00	Y	Arm 4 Left	12.00	18.1 %	1936	1936
				Arm 5 Ahead	Inf	81.9 %		
4/1 (Boulevard Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
5/1 (Clonard East Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
6/1 (Clonard West Exit Lane 1)	Infinite Saturation Flow						Inf	Inf

Scenario 4: 'Scenario A 2030 PM ' (FG4: 'Scenario A 2030 - PM', Plan 1: 'Network Control Plan 1')

Traffic Flows, Desired

Desired Flow :

		Destination			
		A	B	C	Tot.
Origin	A	0	142	932	1074
	B	112	0	47	159
	C	633	53	0	686
	Tot.	745	195	979	1919

Traffic Lane Flows

Lane	Scenario 4: Scenario A 2030 PM
Junction: Junction 4	
1/1	159
2/1 (with short)	686(In) 633(Out)
2/2 (short)	53
3/1	1074
4/1	195
5/1	979
6/1	745

Lane Saturation Flows

Junction: Junction 4								
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat Flow (PCU/Hr)**	**Flared Sat Flow (PCU/Hr)**
1/1 (Boulevard Enrty)	3.50	0.00	Y	Arm 5 Left	12.00	29.6 %	1774	1774
				Arm 6 Right	15.00	70.4 %		
2/1 (Clonard East Entry)	3.65	0.00	Y	Arm 6 Ahead	Inf	100.0 %	1980	1980
2/2 (Clonard East Entry)	3.25	0.00	N	Arm 4 Right	15.00	100.0 %	1891	1891
3/1 (Clonard West Entry)	3.65	0.00	Y	Arm 4 Left	12.00	13.2 %	1948	1948
				Arm 5 Ahead	Inf	86.8 %		
4/1 (Boulevard Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
5/1 (Clonard East Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
6/1 (Clonard West Exit Lane 1)	Infinite Saturation Flow						Inf	Inf

Scenario 5: 'Scenario B 2025 AM ' (FG5: 'Scenario B 2025 - AM', Plan 1: 'Network Control Plan 1')

Traffic Flows, Desired

Desired Flow :

		Destination			
		A	B	C	Tot.
Origin	A	0	156	636	792
	B	255	0	119	374
	C	769	84	0	853
	Tot.	1024	240	755	2019

Traffic Lane Flows

Lane	Scenario 5: Scenario B 2025 AM
Junction: Junction 4	
1/1	374
2/1 (with short)	853(In) 769(Out)
2/2 (short)	84
3/1	792
4/1	240
5/1	755
6/1	1024

Lane Saturation Flows

Junction: Junction 4								
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat Flow (PCU/Hr)**	**Flared Sat Flow (PCU/Hr)**
1/1 (Boulevard Enrty)	3.50	0.00	Y	Arm 5 Left	12.00	31.8 %	1774	1774
				Arm 6 Right	15.00	68.2 %		
2/1 (Clonard East Entry)	3.65	0.00	Y	Arm 6 Ahead	Inf	100.0 %	1980	1980
2/2 (Clonard East Entry)	3.25	0.00	N	Arm 4 Right	15.00	100.0 %	1891	1891
3/1 (Clonard West Entry)	3.65	0.00	Y	Arm 4 Left	12.00	19.7 %	1932	1932
				Arm 5 Ahead	Inf	80.3 %		
4/1 (Boulevard Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
5/1 (Clonard East Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
6/1 (Clonard West Exit Lane 1)	Infinite Saturation Flow						Inf	Inf

Scenario 6: 'Scenario B 2025 PM ' (FG6: 'Scenario B 2025 - PM', Plan 1: 'Network Control Plan 1')

Traffic Flows, Desired

Desired Flow :

		Destination			
		A	B	C	Tot.
Origin	A	0	169	861	1030
	B	124	0	54	178
	C	582	62	0	644
	Tot.	706	231	915	1852

Traffic Lane Flows

Lane	Scenario 6: Scenario B 2025 PM
Junction: Junction 4	
1/1	178
2/1 (with short)	644(In) 582(Out)
2/2 (short)	62
3/1	1030
4/1	231
5/1	915
6/1	706

Lane Saturation Flows

Junction: Junction 4								
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat Flow (PCU/Hr)**	**Flared Sat Flow (PCU/Hr)**
1/1 (Boulevard Enrty)	3.50	0.00	Y	Arm 5 Left	12.00	30.3 %	1774	1774
				Arm 6 Right	15.00	69.7 %		
2/1 (Clonard East Entry)	3.65	0.00	Y	Arm 6 Ahead	Inf	100.0 %	1980	1980
2/2 (Clonard East Entry)	3.25	0.00	N	Arm 4 Right	15.00	100.0 %	1891	1891
3/1 (Clonard West Entry)	3.65	0.00	Y	Arm 4 Left	12.00	16.4 %	1940	1940
				Arm 5 Ahead	Inf	83.6 %		
4/1 (Boulevard Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
5/1 (Clonard East Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
6/1 (Clonard West Exit Lane 1)	Infinite Saturation Flow						Inf	Inf

Scenario 7: 'Scenario B 2030 AM ' (FG7: 'Scenario B 2030 - AM', Plan 1: 'Network Control Plan 1')

Traffic Flows, Desired

Desired Flow :

		Destination			
		A	B	C	Tot.
Origin	A	0	162	683	845
	B	259	0	122	381
	C	826	87	0	913
	Tot.	1085	249	805	2139

Traffic Lane Flows

Lane	Scenario 7: Scenario B 2030 AM
Junction: Junction 4	
1/1	381
2/1 (with short)	913(In) 826(Out)
2/2 (short)	87
3/1	845
4/1	249
5/1	805
6/1	1085

Lane Saturation Flows

Junction: Junction 4								
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat Flow (PCU/Hr)**	**Flared Sat Flow (PCU/Hr)**
1/1 (Boulevard Enrty)	3.50	0.00	Y	Arm 5 Left	12.00	32.0 %	1773	1773
				Arm 6 Right	15.00	68.0 %		
2/1 (Clonard East Entry)	3.65	0.00	Y	Arm 6 Ahead	Inf	100.0 %	1980	1980
2/2 (Clonard East Entry)	3.25	0.00	N	Arm 4 Right	15.00	100.0 %	1891	1891
3/1 (Clonard West Entry)	3.65	0.00	Y	Arm 4 Left	12.00	19.2 %	1934	1934
				Arm 5 Ahead	Inf	80.8 %		
4/1 (Boulevard Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
5/1 (Clonard East Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
6/1 (Clonard West Exit Lane 1)	Infinite Saturation Flow						Inf	Inf

Scenario 8: ' Scenario B 2030 PM ' (FG8: 'Scenario B 2030 - PM', Plan 1: 'Network Control Plan 1')

Traffic Flows, Desired

Desired Flow :

		Destination			
		A	B	C	Tot.
Origin	A	0	169	925	1094
	B	126	0	55	181
	C	624	62	0	686
	Tot.	750	231	980	1961

Traffic Lane Flows

Lane	Scenario 8: Scenario B 2030 PM
Junction: Junction 4	
1/1	181
2/1 (with short)	686(In) 624(Out)
2/2 (short)	62
3/1	1094
4/1	231
5/1	980
6/1	750

Lane Saturation Flows

Junction: Junction 4								
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat Flow (PCU/Hr)**	**Flared Sat Flow (PCU/Hr)**
1/1 (Boulevard Enrty)	3.50	0.00	Y	Arm 5 Left	12.00	30.4 %	1774	1774
				Arm 6 Right	15.00	69.6 %		
2/1 (Clonard East Entry)	3.65	0.00	Y	Arm 6 Ahead	Inf	100.0 %	1980	1980
2/2 (Clonard East Entry)	3.25	0.00	N	Arm 4 Right	15.00	100.0 %	1891	1891
3/1 (Clonard West Entry)	3.65	0.00	Y	Arm 4 Left	12.00	15.4 %	1942	1942
				Arm 5 Ahead	Inf	84.6 %		
4/1 (Boulevard Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
5/1 (Clonard East Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
6/1 (Clonard West Exit Lane 1)	Infinite Saturation Flow						Inf	Inf

Scenario 9: 'Scenario C 2025 AM ' (FG9: 'Scenario C 2025 - AM', Plan 1: 'Network Control Plan 1')

Traffic Flows, Desired

Desired Flow :

		Destination			
		A	B	C	Tot.
Origin	A	0	164	625	789
	B	284	0	130	414
	C	765	88	0	853
	Tot.	1049	252	755	2056

Traffic Lane Flows

Lane	Scenario 9: Scenario C 2025 AM
Junction: Junction 4	
1/1	414
2/1 (with short)	853(In) 765(Out)
2/2 (short)	88
3/1	789
4/1	252
5/1	755
6/1	1049

Lane Saturation Flows

Junction: Junction 4								
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat Flow (PCU/Hr)**	**Flared Sat Flow (PCU/Hr)**
1/1 (Boulevard Enrty)	3.50	0.00	Y	Arm 5 Left	12.00	31.4 %	1774	1774
				Arm 6 Right	15.00	68.6 %		
2/1 (Clonard East Entry)	3.65	0.00	Y	Arm 6 Ahead	Inf	100.0 %	1980	1980
2/2 (Clonard East Entry)	3.25	0.00	N	Arm 4 Right	15.00	100.0 %	1891	1891
3/1 (Clonard West Entry)	3.65	0.00	Y	Arm 4 Left	12.00	20.8 %	1930	1930
				Arm 5 Ahead	Inf	79.2 %		
4/1 (Boulevard Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
5/1 (Clonard East Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
6/1 (Clonard West Exit Lane 1)	Infinite Saturation Flow						Inf	Inf

Scenario 10: 'Scenario C 2025 PM ' (FG10: 'Scenario C 2025 - PM', Plan 1: 'Network Control Plan 1')

Traffic Flows, Desired

Desired Flow :

		Destination			
		A	B	C	Tot.
Origin	A	0	197	854	1051
	B	137	0	62	199
	C	574	70	0	644
	Tot.	711	267	916	1894

Traffic Lane Flows

Lane	**Scenario 10: Scenario C 2025 PM**
Junction: Junction 4	
1/1	199
2/1 (with short)	644(In) 574(Out)
2/2 (short)	70
3/1	1051
4/1	267
5/1	916
6/1	711

Lane Saturation Flows

Junction: Junction 4								
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat Flow (PCU/Hr)**	**Flared Sat Flow (PCU/Hr)**
1/1 (Boulevard Enrty)	3.50	0.00	Y	Arm 5 Left	12.00	31.2 %	1774	1774
				Arm 6 Right	15.00	68.8 %		
2/1 (Clonard East Entry)	3.65	0.00	Y	Arm 6 Ahead	Inf	100.0 %	1980	1980
2/2 (Clonard East Entry)	3.25	0.00	N	Arm 4 Right	15.00	100.0 %	1891	1891
3/1 (Clonard West Entry)	3.65	0.00	Y	Arm 4 Left	12.00	18.7 %	1935	1935
				Arm 5 Ahead	Inf	81.3 %		
4/1 (Boulevard Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
5/1 (Clonard East Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
6/1 (Clonard West Exit Lane 1)	Infinite Saturation Flow						Inf	Inf

Scenario 11: 'Scenario C 2030 AM ' (FG11: 'Scenario C 2030 - AM', Plan 1: 'Network Control Plan 1')

Traffic Flows, Desired

Desired Flow :

		Destination			
		A	B	C	Tot.
Origin	A	0	171	672	843
	B	289	0	133	422
	C	822	91	0	913
	Tot.	1111	262	805	2178

Traffic Lane Flows

Lane	**Scenario 11: Scenario C 2030 AM**
Junction: Junction 4	
1/1	422
2/1 (with short)	913(In) 822(Out)
2/2 (short)	91
3/1	843
4/1	262
5/1	805
6/1	1111

Lane Saturation Flows

Junction: Junction 4								
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat Flow (PCU/Hr)**	**Flared Sat Flow (PCU/Hr)**
1/1 (Boulevard Enrty)	3.50	0.00	Y	Arm 5 Left	12.00	31.5 %	1774	1774
				Arm 6 Right	15.00	68.5 %		
2/1 (Clonard East Entry)	3.65	0.00	Y	Arm 6 Ahead	Inf	100.0 %	1980	1980
2/2 (Clonard East Entry)	3.25	0.00	N	Arm 4 Right	15.00	100.0 %	1891	1891
3/1 (Clonard West Entry)	3.65	0.00	Y	Arm 4 Left	12.00	20.3 %	1931	1931
				Arm 5 Ahead	Inf	79.7 %		
4/1 (Boulevard Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
5/1 (Clonard East Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
6/1 (Clonard West Exit Lane 1)	Infinite Saturation Flow						Inf	Inf

Scenario 12: 'Scenario C 2030 PM ' (FG12: 'Scenario C 2030 - PM', Plan 1: 'Network Control Plan 1')

Traffic Flows, Desired

Desired Flow :

		Destination			
		A	B	C	Tot.
Origin	A	0	197	917	1114
	B	140	0	62	202
	C	616	70	0	686
	Tot.	756	267	979	2002

Traffic Lane Flows

Lane	**Scenario 12: Scenario C 2030 PM**
Junction: Junction 4	
1/1	202
2/1 (with short)	686(In) 616(Out)
2/2 (short)	70
3/1	1114
4/1	267
5/1	979
6/1	756

Lane Saturation Flows

Junction: Junction 4								
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat Flow (PCU/Hr)**	**Flared Sat Flow (PCU/Hr)**
1/1 (Boulevard Enrty)	3.50	0.00	Y	Arm 5 Left	12.00	30.7 %	1774	1774
				Arm 6 Right	15.00	69.3 %		
2/1 (Clonard East Entry)	3.65	0.00	Y	Arm 6 Ahead	Inf	100.0 %	1980	1980
2/2 (Clonard East Entry)	3.25	0.00	N	Arm 4 Right	15.00	100.0 %	1891	1891
3/1 (Clonard West Entry)	3.65	0.00	Y	Arm 4 Left	12.00	17.7 %	1937	1937
				Arm 5 Ahead	Inf	82.3 %		
4/1 (Boulevard Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
5/1 (Clonard East Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
6/1 (Clonard West Exit Lane 1)	Infinite Saturation Flow						Inf	Inf

Scenario 13: 'Scenario D 2025 AM ' (FG13: 'Scenario D 2025 - AM', Plan 1: 'Network Control Plan 1')

Traffic Flows, Desired

Desired Flow :

		Destination			
		A	B	C	Tot.
Origin	A	0	173	614	787
	B	314	0	141	455
	C	761	91	0	852
	Tot.	1075	264	755	2094

Traffic Lane Flows

Lane	Scenario 13: Scenario D 2025 AM
Junction: Junction 4	
1/1	455
2/1 (with short)	852(In) 761(Out)
2/2 (short)	91
3/1	787
4/1	264
5/1	755
6/1	1075

Lane Saturation Flows

Junction: Junction 4								
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat Flow (PCU/Hr)**	**Flared Sat Flow (PCU/Hr)**
1/1 (Boulevard Enrty)	3.50	0.00	Y	Arm 5 Left	12.00	31.0 %	1774	1774
				Arm 6 Right	15.00	69.0 %		
2/1 (Clonard East Entry)	3.65	0.00	Y	Arm 6 Ahead	Inf	100.0 %	1980	1980
2/2 (Clonard East Entry)	3.25	0.00	N	Arm 4 Right	15.00	100.0 %	1891	1891
3/1 (Clonard West Entry)	3.65	0.00	Y	Arm 4 Left	12.00	22.0 %	1927	1927
				Arm 5 Ahead	Inf	78.0 %		
4/1 (Boulevard Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
5/1 (Clonard East Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
6/1 (Clonard West Exit Lane 1)	Infinite Saturation Flow						Inf	Inf

Scenario 14: 'Scenario D 2025 PM ' (FG14: 'Scenario D 2025 - PM', Plan 1: 'Network Control Plan 1')

Traffic Flows, Desired

Desired Flow :

		Destination			
		A	B	C	Tot.
Origin	A	0	224	846	1070
	B	151	0	70	221
	C	565	79	0	644
	Tot.	716	303	916	1935

Traffic Lane Flows

Lane	Scenario 14: Scenario D 2025 PM
Junction: Junction 4	
1/1	221
2/1 (with short)	644(In) 565(Out)
2/2 (short)	79
3/1	1070
4/1	303
5/1	916
6/1	716

Lane Saturation Flows

Junction: Junction 4								
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat Flow (PCU/Hr)**	**Flared Sat Flow (PCU/Hr)**
1/1 (Boulevard Enrty)	3.50	0.00	Y	Arm 5 Left	12.00	31.7 %	1774	1774
				Arm 6 Right	15.00	68.3 %		
2/1 (Clonard East Entry)	3.65	0.00	Y	Arm 6 Ahead	Inf	100.0 %	1980	1980
2/2 (Clonard East Entry)	3.25	0.00	N	Arm 4 Right	15.00	100.0 %	1891	1891
3/1 (Clonard West Entry)	3.65	0.00	Y	Arm 4 Left	12.00	20.9 %	1930	1930
				Arm 5 Ahead	Inf	79.1 %		
4/1 (Boulevard Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
5/1 (Clonard East Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
6/1 (Clonard West Exit Lane 1)	Infinite Saturation Flow						Inf	Inf

Scenario 15: 'Scenario D 2030 AM ' (FG15: 'Scenario D 2030 - AM', Plan 1: 'Network Control Plan 1')

Traffic Flows, Desired

Desired Flow :

		Destination			
		A	B	C	Tot.
Origin	A	0	180	661	841
	B	319	0	145	464
	C	818	95	0	913
	Tot.	1137	275	806	2218

Traffic Lane Flows

Lane	**Scenario 15: Scenario D 2030 AM**
Junction: Junction 4	
1/1	464
2/1 (with short)	913(In) 818(Out)
2/2 (short)	95
3/1	841
4/1	275
5/1	806
6/1	1137

Lane Saturation Flows

Junction: Junction 4								
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat Flow (PCU/Hr)**	**Flared Sat Flow (PCU/Hr)**
1/1 (Boulevard Enrty)	3.50	0.00	Y	Arm 5 Left	12.00	31.3 %	1774	1774
				Arm 6 Right	15.00	68.8 %		
2/1 (Clonard East Entry)	3.65	0.00	Y	Arm 6 Ahead	Inf	100.0 %	1980	1980
2/2 (Clonard East Entry)	3.25	0.00	N	Arm 4 Right	15.00	100.0 %	1891	1891
3/1 (Clonard West Entry)	3.65	0.00	Y	Arm 4 Left	12.00	21.4 %	1928	1928
				Arm 5 Ahead	Inf	78.6 %		
4/1 (Boulevard Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
5/1 (Clonard East Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
6/1 (Clonard West Exit Lane 1)	Infinite Saturation Flow						Inf	Inf

Scenario 16: 'Scenario D 2030 PM ' (FG16: 'Scenario D 2030 - PM', Plan 1: 'Network Control Plan 1')

Traffic Flows, Desired

Desired Flow :

		Destination			
		A	B	C	Tot.
Origin	A	0	224	909	1133
	B	153	0	70	223
	C	607	79	0	686
	Tot.	760	303	979	2042

Traffic Lane Flows

Lane	**Scenario 16: Scenario D 2030 PM**
Junction: Junction 4	
1/1	223
2/1 (with short)	686(In) 607(Out)
2/2 (short)	79
3/1	1133
4/1	303
5/1	979
6/1	760

Lane Saturation Flows

Junction: Junction 4								
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat Flow (PCU/Hr)**	**Flared Sat Flow (PCU/Hr)**
1/1 (Boulevard Enrty)	3.50	0.00	Y	Arm 5 Left	12.00	31.4 %	1774	1774
				Arm 6 Right	15.00	68.6 %		
2/1 (Clonard East Entry)	3.65	0.00	Y	Arm 6 Ahead	Inf	100.0 %	1980	1980
2/2 (Clonard East Entry)	3.25	0.00	N	Arm 4 Right	15.00	100.0 %	1891	1891
3/1 (Clonard West Entry)	3.65	0.00	Y	Arm 4 Left	12.00	19.8 %	1932	1932
				Arm 5 Ahead	Inf	80.2 %		
4/1 (Boulevard Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
5/1 (Clonard East Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
6/1 (Clonard West Exit Lane 1)	Infinite Saturation Flow						Inf	Inf

Scenario 17: 'Scenario E 2025 AM ' (FG17: 'Scenario E 2025 - AM', Plan 1: 'Network Control Plan 1')

Traffic Flows, Desired

Desired Flow :

		Destination			
		A	B	C	Tot.
Origin	A	0	182	603	785
	B	344	0	153	497
	C	757	95	0	852
	Tot.	1101	277	756	2134

Traffic Lane Flows

Lane	**Scenario 17: Scenario E 2025 AM**
Junction: Junction 4	
1/1	497
2/1 (with short)	852(In) 757(Out)
2/2 (short)	95
3/1	785
4/1	277
5/1	756
6/1	1101

Lane Saturation Flows

Junction: Junction 4								
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat Flow (PCU/Hr)**	**Flared Sat Flow (PCU/Hr)**
1/1 (Boulevard Enrty)	3.50	0.00	Y	Arm 5 Left	12.00	30.8 %	1774	1774
				Arm 6 Right	15.00	69.2 %		
2/1 (Clonard East Entry)	3.65	0.00	Y	Arm 6 Ahead	Inf	100.0 %	1980	1980
2/2 (Clonard East Entry)	3.25	0.00	N	Arm 4 Right	15.00	100.0 %	1891	1891
3/1 (Clonard West Entry)	3.65	0.00	Y	Arm 4 Left	12.00	23.2 %	1924	1924
				Arm 5 Ahead	Inf	76.8 %		
4/1 (Boulevard Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
5/1 (Clonard East Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
6/1 (Clonard West Exit Lane 1)	Infinite Saturation Flow						Inf	Inf

Scenario 18: 'Scenario E 2025 PM ' (FG18: 'Scenario E 2025 - PM', Plan 1: 'Network Control Plan 1')

Traffic Flows, Desired

Desired Flow :

		Destination			
		A	B	C	Tot.
Origin	A	0	251	838	1089
	B	165	0	77	242
	C	557	87	0	644
	Tot.	722	338	915	1975

Traffic Lane Flows

Lane	Scenario 18: Scenario E 2025 PM
Junction: Junction 4	
1/1	242
2/1 (with short)	644(In) 557(Out)
2/2 (short)	87
3/1	1089
4/1	338
5/1	915
6/1	722

Lane Saturation Flows

Junction: Junction 4								
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat Flow (PCU/Hr)**	**Flared Sat Flow (PCU/Hr)**
1/1 (Boulevard Enrty)	3.50	0.00	Y	Arm 5 Left	12.00	31.8 %	1774	1774
				Arm 6 Right	15.00	68.2 %		
2/1 (Clonard East Entry)	3.65	0.00	Y	Arm 6 Ahead	Inf	100.0 %	1980	1980
2/2 (Clonard East Entry)	3.25	0.00	N	Arm 4 Right	15.00	100.0 %	1891	1891
3/1 (Clonard West Entry)	3.65	0.00	Y	Arm 4 Left	12.00	23.0 %	1925	1925
				Arm 5 Ahead	Inf	77.0 %		
4/1 (Boulevard Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
5/1 (Clonard East Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
6/1 (Clonard West Exit Lane 1)	Infinite Saturation Flow						Inf	Inf

Scenario 19: 'Scenario E 2030 AM ' (FG19: 'Scenario E 2030 - AM', Plan 1: 'Network Control Plan 1')

Traffic Flows, Desired

Desired Flow :

		Destination			
		A	B	C	Tot.
Origin	A	0	188	649	837
	B	349	0	156	505
	C	814	99	0	913
	Tot.	1163	287	805	2255

Traffic Lane Flows

Lane	Scenario 19: Scenario E 2030 AM
Junction: Junction 4	
1/1	505
2/1 (with short)	913(In) 814(Out)
2/2 (short)	99
3/1	837
4/1	287
5/1	805
6/1	1163

Lane Saturation Flows

Junction: Junction 4								
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat Flow (PCU/Hr)**	**Flared Sat Flow (PCU/Hr)**
1/1 (Boulevard Enrty)	3.50	0.00	Y	Arm 5 Left	12.00	30.9 %	1774	1774
				Arm 6 Right	15.00	69.1 %		
2/1 (Clonard East Entry)	3.65	0.00	Y	Arm 6 Ahead	Inf	100.0 %	1980	1980
2/2 (Clonard East Entry)	3.25	0.00	N	Arm 4 Right	15.00	100.0 %	1891	1891
3/1 (Clonard West Entry)	3.65	0.00	Y	Arm 4 Left	12.00	22.5 %	1926	1926
				Arm 5 Ahead	Inf	77.5 %		
4/1 (Boulevard Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
5/1 (Clonard East Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
6/1 (Clonard West Exit Lane 1)	Infinite Saturation Flow						Inf	Inf

Scenario 20: 'Scenario E 2030 PM ' (FG20: 'Scenario E 2030 - PM', Plan 1: 'Network Control Plan 1')

Traffic Flows, Desired

Desired Flow :

		Destination			
		A	B	C	Tot.
Origin	A	0	252	901	1153
	B	167	0	78	245
	C	598	87	0	685
	Tot.	765	339	979	2083

Traffic Lane Flows

Lane	**Scenario 20: Scenario E 2030 PM**
Junction: Junction 4	
1/1	245
2/1 (with short)	685(In) 598(Out)
2/2 (short)	87
3/1	1153
4/1	339
5/1	979
6/1	765

Lane Saturation Flows

Junction: Junction 4								
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat Flow (PCU/Hr)**	**Flared Sat Flow (PCU/Hr)**
1/1 (Boulevard Enrty)	3.50	0.00	Y	Arm 5 Left	12.00	31.8 %	1774	1774
				Arm 6 Right	15.00	68.2 %		
2/1 (Clonard East Entry)	3.65	0.00	Y	Arm 6 Ahead	Inf	100.0 %	1980	1980
2/2 (Clonard East Entry)	3.25	0.00	N	Arm 4 Right	15.00	100.0 %	1891	1891
3/1 (Clonard West Entry)	3.65	0.00	Y	Arm 4 Left	12.00	21.9 %	1927	1927
				Arm 5 Ahead	Inf	78.1 %		
4/1 (Boulevard Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
5/1 (Clonard East Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
6/1 (Clonard West Exit Lane 1)	Infinite Saturation Flow						Inf	Inf

Scenario 21: 'Scenario F 2025 AM ' (FG21: 'Scenario F 2025 - AM', Plan 1: 'Network Control Plan 1')

Traffic Flows, Desired

Desired Flow :

		Destination			
		A	B	C	Tot.
Origin	A	0	191	591	782
	B	373	0	164	537
	C	754	99	0	853
	Tot.	1127	290	755	2172

Traffic Lane Flows

Lane	Scenario 21: Scenario F 2025 AM
Junction: Junction 4	
1/1	537
2/1 (with short)	853(In) 754(Out)
2/2 (short)	99
3/1	782
4/1	290
5/1	755
6/1	1127

Lane Saturation Flows

Junction: Junction 4								
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat Flow (PCU/Hr)**	**Flared Sat Flow (PCU/Hr)**
1/1 (Boulevard Enrty)	3.50	0.00	Y	Arm 5 Left	12.00	30.5 %	1774	1774
				Arm 6 Right	15.00	69.5 %		
2/1 (Clonard East Entry)	3.65	0.00	Y	Arm 6 Ahead	Inf	100.0 %	1980	1980
2/2 (Clonard East Entry)	3.25	0.00	N	Arm 4 Right	15.00	100.0 %	1891	1891
3/1 (Clonard West Entry)	3.65	0.00	Y	Arm 4 Left	12.00	24.4 %	1921	1921
				Arm 5 Ahead	Inf	75.6 %		
4/1 (Boulevard Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
5/1 (Clonard East Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
6/1 (Clonard West Exit Lane 1)	Infinite Saturation Flow						Inf	Inf

Scenario 22: 'Scenario F 2025 PM ' (FG22: 'Scenario F 2025 - PM', Plan 1: 'Network Control Plan 1')

Traffic Flows, Desired

Desired Flow :

		Destination			
		A	B	C	Tot.
Origin	A	0	279	830	1109
	B	178	0	85	263
	C	548	96	0	644
	Tot.	726	375	915	2016

Traffic Lane Flows

Lane	Scenario 22: Scenario F 2025 PM
Junction: Junction 4	
1/1	263
2/1 (with short)	644(In) 548(Out)
2/2 (short)	96
3/1	1109
4/1	375
5/1	915
6/1	726

Lane Saturation Flows

Junction: Junction 4								
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat Flow (PCU/Hr)**	**Flared Sat Flow (PCU/Hr)**
1/1 (Boulevard Enrty)	3.50	0.00	Y	Arm 5 Left	12.00	32.3 %	1773	1773
				Arm 6 Right	15.00	67.7 %		
2/1 (Clonard East Entry)	3.65	0.00	Y	Arm 6 Ahead	Inf	100.0 %	1980	1980
2/2 (Clonard East Entry)	3.25	0.00	N	Arm 4 Right	15.00	100.0 %	1891	1891
3/1 (Clonard West Entry)	3.65	0.00	Y	Arm 4 Left	12.00	25.2 %	1920	1920
				Arm 5 Ahead	Inf	74.8 %		
4/1 (Boulevard Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
5/1 (Clonard East Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
6/1 (Clonard West Exit Lane 1)	Infinite Saturation Flow						Inf	Inf

Scenario 23: 'Scenario F 2030 AM ' (FG23: 'Scenario F 2030 - AM', Plan 1: 'Network Control Plan 1')

Traffic Flows, Desired

Desired Flow :

		Destination			
		A	B	C	Tot.
Origin	A	0	197	638	835
	B	378	0	167	545
	C	811	102	0	913
	Tot.	1189	299	805	2293

Traffic Lane Flows

Lane	Scenario 23: Scenario F 2030 AM
Junction: Junction 4	
1/1	545
2/1 (with short)	913(In) 811(Out)
2/2 (short)	102
3/1	835
4/1	299
5/1	805
6/1	1189

Lane Saturation Flows

Junction: Junction 4								
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat Flow (PCU/Hr)**	**Flared Sat Flow (PCU/Hr)**
1/1 (Boulevard Enrty)	3.50	0.00	Y	Arm 5 Left	12.00	30.6 %	1774	1774
				Arm 6 Right	15.00	69.4 %		
2/1 (Clonard East Entry)	3.65	0.00	Y	Arm 6 Ahead	Inf	100.0 %	1980	1980
2/2 (Clonard East Entry)	3.25	0.00	N	Arm 4 Right	15.00	100.0 %	1891	1891
3/1 (Clonard West Entry)	3.65	0.00	Y	Arm 4 Left	12.00	23.6 %	1923	1923
				Arm 5 Ahead	Inf	76.4 %		
4/1 (Boulevard Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
5/1 (Clonard East Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
6/1 (Clonard West Exit Lane 1)	Infinite Saturation Flow						Inf	Inf

Scenario 24: 'Scenario F 2030 PM ' (FG24: 'Scenario F 2030 - PM', Plan 1: 'Network Control Plan 1')

Traffic Flows, Desired

Desired Flow :

		Destination			
		A	B	C	Tot.
Origin	A	0	279	893	1172
	B	181	0	86	267
	C	590	96	0	686
	Tot.	771	375	979	2125

Traffic Lane Flows

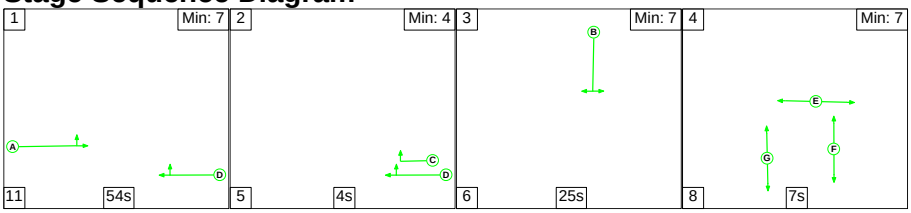
Lane	Scenario 24: Scenario F 2030 PM
Junction: Junction 4	
1/1	267
2/1 (with short)	686(In) 590(Out)
2/2 (short)	96
3/1	1172
4/1	375
5/1	979
6/1	771

Lane Saturation Flows

Junction: Junction 4								
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat Flow (PCU/Hr)**	**Flared Sat Flow (PCU/Hr)**
1/1 (Boulevard Enrty)	3.50	0.00	Y	Arm 5 Left	12.00	32.2 %	1773	1773
				Arm 6 Right	15.00	67.8 %		
2/1 (Clonard East Entry)	3.65	0.00	Y	Arm 6 Ahead	Inf	100.0 %	1980	1980
2/2 (Clonard East Entry)	3.25	0.00	N	Arm 4 Right	15.00	100.0 %	1891	1891
3/1 (Clonard West Entry)	3.65	0.00	Y	Arm 4 Left	12.00	23.8 %	1923	1923
				Arm 5 Ahead	Inf	76.2 %		
4/1 (Boulevard Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
5/1 (Clonard East Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
6/1 (Clonard West Exit Lane 1)	Infinite Saturation Flow						Inf	Inf

Scenario 1: 'Scenario A 2025 AM ' (FG1: 'Scenario A 2025 - AM', Plan 1: 'Network Control Plan 1')

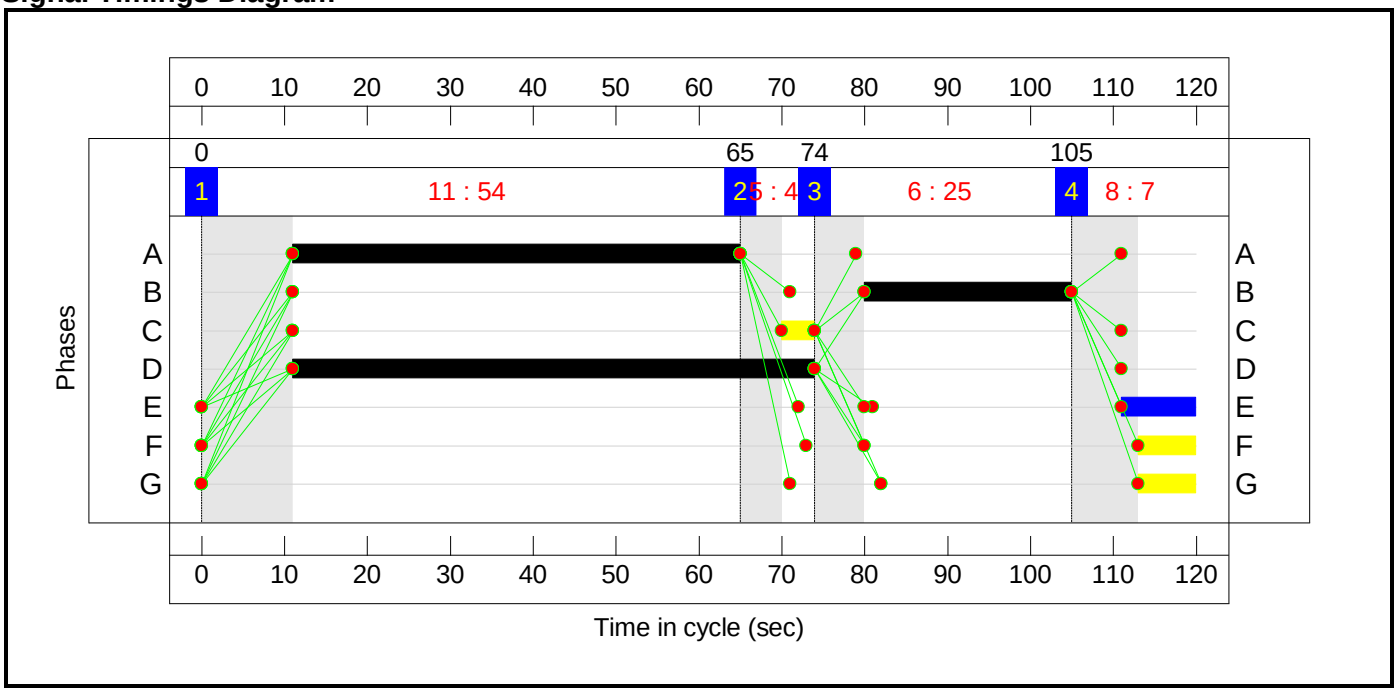
Stage Sequence Diagram



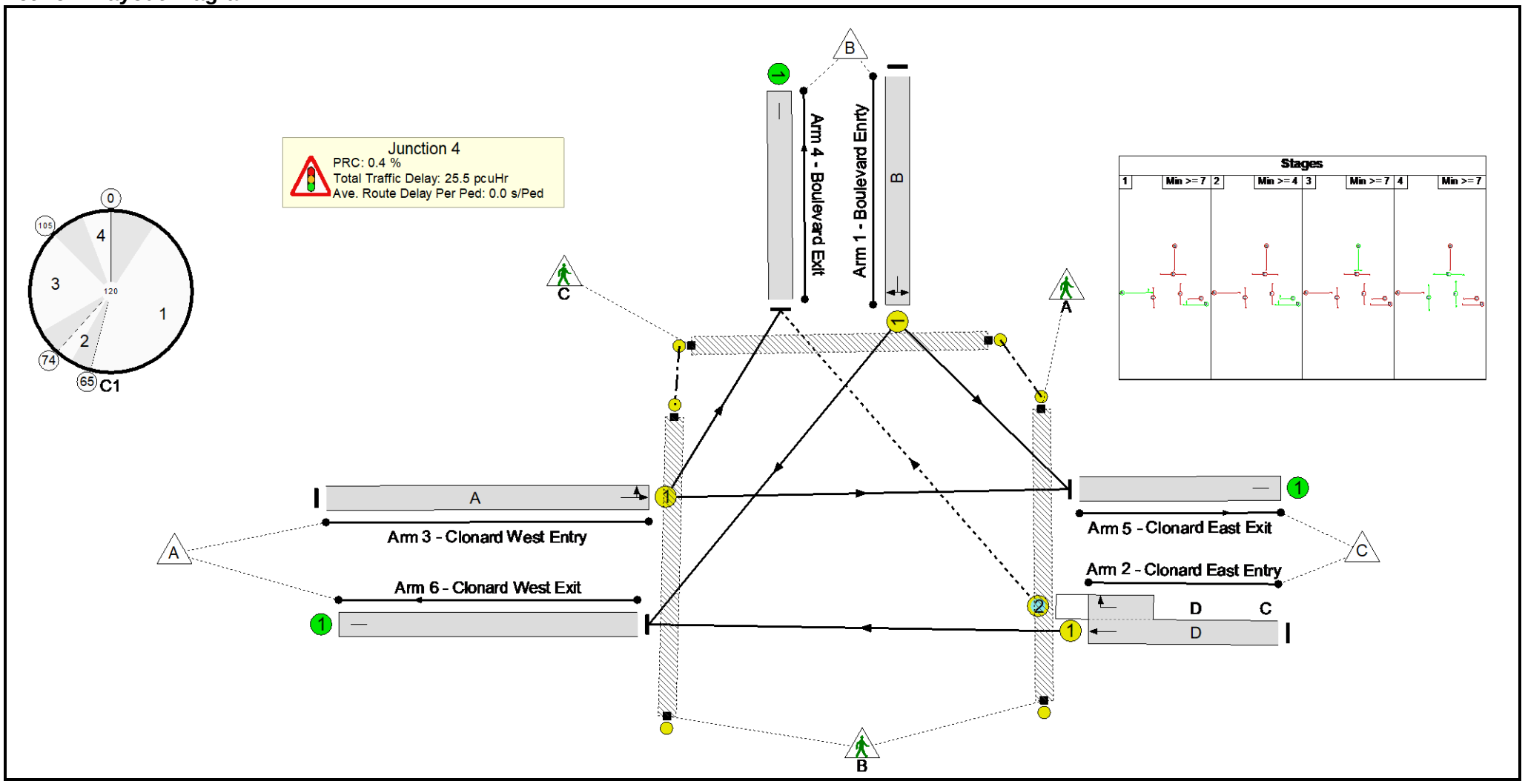
Stage Timings

Stage	1	2	3	4
Duration	54	4	25	7
Change Point	0	65	74	105

Signal Timings Diagram



Network Layout Diagram



Network Results

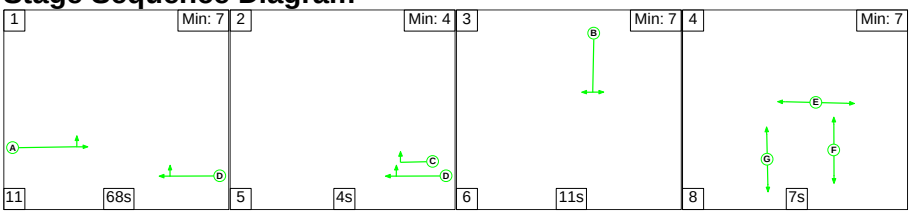
Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**89.6%**
Junction 4	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**89.6%**
1/1	Boulevard Enrty Left Right	U	N/A	N/A	B		1	25	-	333	1773	384	86.7%
2/1+2/2	Clonard East Entry Right Ahead	U+O	N/A	N/A	D	C	1	63	4	852	1980:1891	968+100	79.7 : 79.7%
3/1	Clonard West Entry Left Ahead	U	N/A	N/A	A		1	54	-	795	1935	887	89.6%
4/1	Boulevard Exit	U	N/A	N/A	-		-	-	-	227	Inf	Inf	0.0%
5/1	Clonard East Exit	U	N/A	N/A	-		-	-	-	756	Inf	Inf	0.0%
6/1	Clonard West Exit	U	N/A	N/A	-		-	-	-	997	Inf	Inf	0.0%
Ped Link: P1	Unnamed Ped Link	-	N/A	-	E		1	9	-	0	-	5400	0.0%
Ped Link: P2	Unnamed Ped Link	-	N/A	-	F		1	7	-	0	-	4200	0.0%
Ped Link: P3	Unnamed Ped Link	-	N/A	-	G		1	7	-	0	-	0	0.0%

Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network	**-**	**-**	**44**	**34**	**1**	**16.1**	**8.8**	**0.6**	**25.5**	**-**	**-**	**-**	**-**
Junction 4	**-**	**-**	**44**	**34**	**1**	**16.1**	**8.8**	**0.6**	**25.5**	**-**	**-**	**-**	**-**
1/1	333	333	-	-	-	4.2	2.9	-	7.1	76.9	10.6	2.9	13.6
2/1+2/2	852	852	44	34	1	5.3	1.9	0.6	7.8	32.9	22.3	1.9	24.2
3/1	795	795	-	-	-	6.6	4.0	-	10.6	47.9	24.3	4.0	28.3
4/1	227	227	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
5/1	756	756	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	997	997	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
Ped Link: P1	0	0	-	-	-	-	-	-	0.0	0.0	-	-	0.0
Ped Link: P2	0	0	-	-	-	-	-	-	0.0	0.0	-	-	0.0
Ped Link: P3	0	0	-	-	-	-	-	-	-	-	-	-	-

C1 PRC for Signalled Lanes (%): 0.4 Total Delay for Signalled Lanes (pcuHr): 25.49 Cycle Time (s): 120
PRC Over All Lanes (%): 0.4 Total Delay Over All Lanes(pcuHr): 25.49

Scenario 2: 'Scenario A 2025 PM ' (FG2: 'Scenario A 2025 - PM', Plan 1: 'Network Control Plan 1')

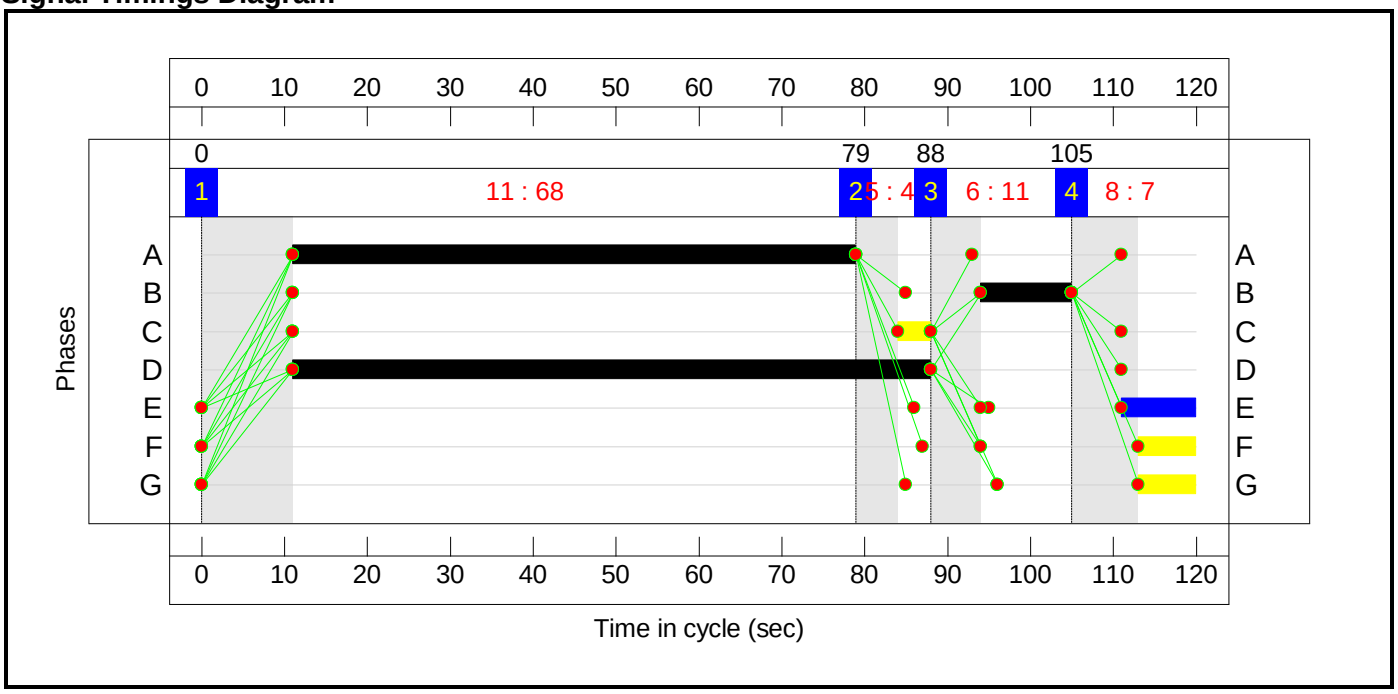
Stage Sequence Diagram



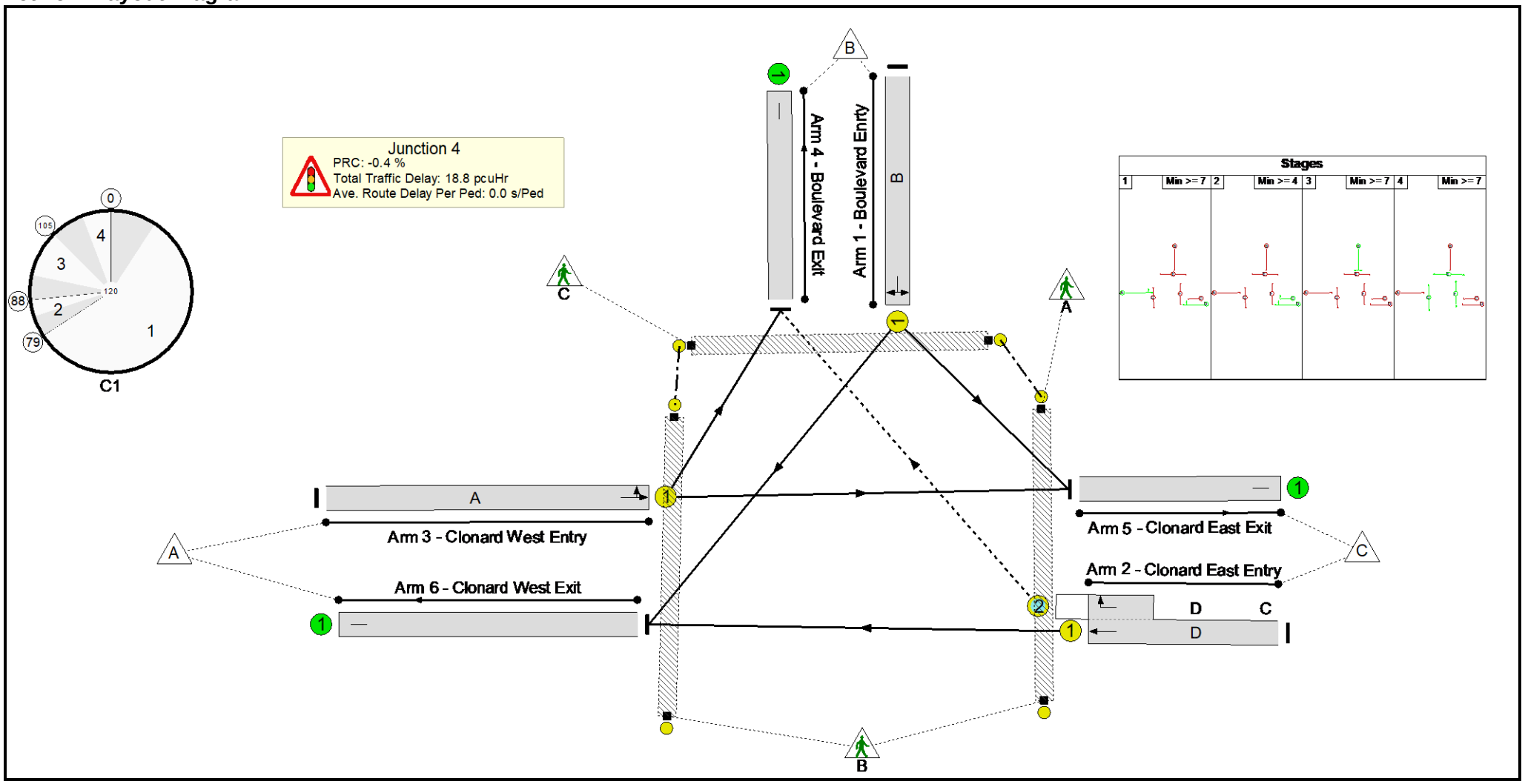
Stage Timings

Stage	1	2	3	4
Duration	68	4	11	7
Change Point	0	79	88	105

Signal Timings Diagram



Network Layout Diagram



Network Results

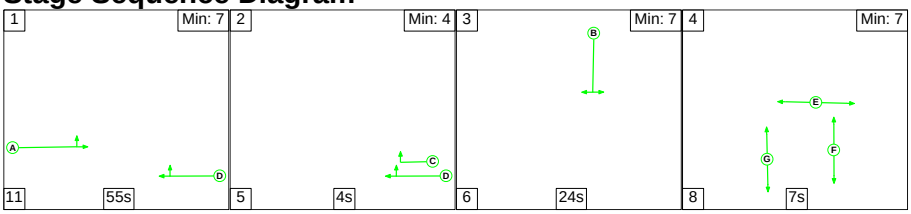
Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**90.4%**
Junction 4	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**90.4%**
1/1	Boulevard Enrty Left Right	U	N/A	N/A	B		1	11	-	156	1774	177	87.9%
2/1+2/2	Clonard East Entry Right Ahead	U+O	N/A	N/A	D	C	1	77	4	644	1980:1891	1191+107	49.6 : 49.6%
3/1	Clonard West Entry Left Ahead	U	N/A	N/A	A		1	68	-	1011	1946	1119	90.4%
4/1	Boulevard Exit	U	N/A	N/A	-		-	-	-	195	Inf	Inf	0.0%
5/1	Clonard East Exit	U	N/A	N/A	-		-	-	-	915	Inf	Inf	0.0%
6/1	Clonard West Exit	U	N/A	N/A	-		-	-	-	701	Inf	Inf	0.0%
Ped Link: P1	Unnamed Ped Link	-	N/A	-	E		1	9	-	0	-	5400	0.0%
Ped Link: P2	Unnamed Ped Link	-	N/A	-	F		1	7	-	0	-	4200	0.0%
Ped Link: P3	Unnamed Ped Link	-	N/A	-	G		1	7	-	0	-	0	0.0%

Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network	**-**	**-**	**38**	**14**	**1**	**10.5**	**7.7**	**0.5**	**18.8**	**-**	**-**	**-**	**-**
Junction 4	**-**	**-**	**38**	**14**	**1**	**10.5**	**7.7**	**0.5**	**18.8**	**-**	**-**	**-**	**-**
1/1	156	156	-	-	-	2.3	2.9	-	5.2	119.6	5.1	2.9	8.0
2/1+2/2	644	644	38	14	1	1.9	0.5	0.5	2.9	16.3	10.4	0.5	10.9
3/1	1011	1011	-	-	-	6.3	4.3	-	10.7	38.0	29.8	4.3	34.1
4/1	195	195	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
5/1	915	915	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	701	701	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
Ped Link: P1	0	0	-	-	-	-	-	-	0.0	0.0	-	-	0.0
Ped Link: P2	0	0	-	-	-	-	-	-	0.0	0.0	-	-	0.0
Ped Link: P3	0	0	-	-	-	-	-	-	-	-	-	-	-

C1 PRC for Signalled Lanes (%): -0.4 Total Delay for Signalled Lanes (pcuHr): 18.76 Cycle Time (s): 120
PRC Over All Lanes (%): -0.4 Total Delay Over All Lanes(pcuHr): 18.76

Scenario 3: 'Scenario A 2030 AM ' (FG3: 'Scenario A 2030 - AM', Plan 1: 'Network Control Plan 1')

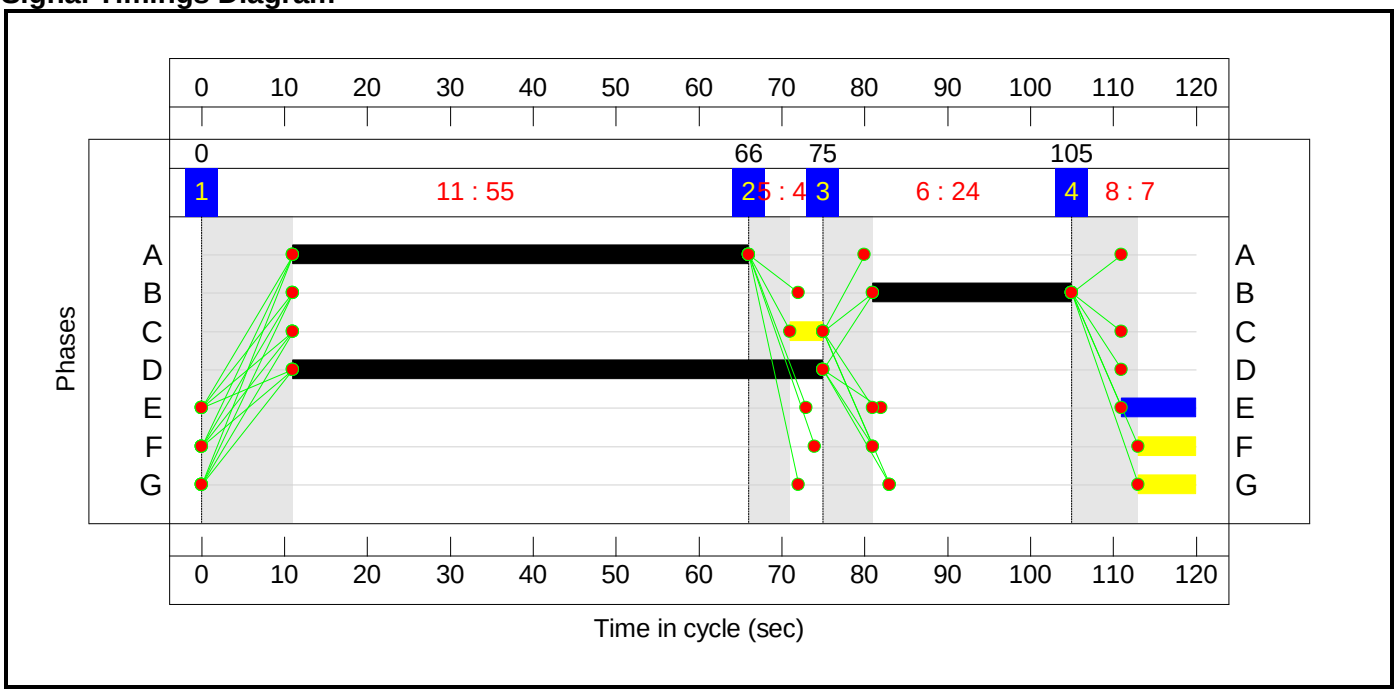
Stage Sequence Diagram



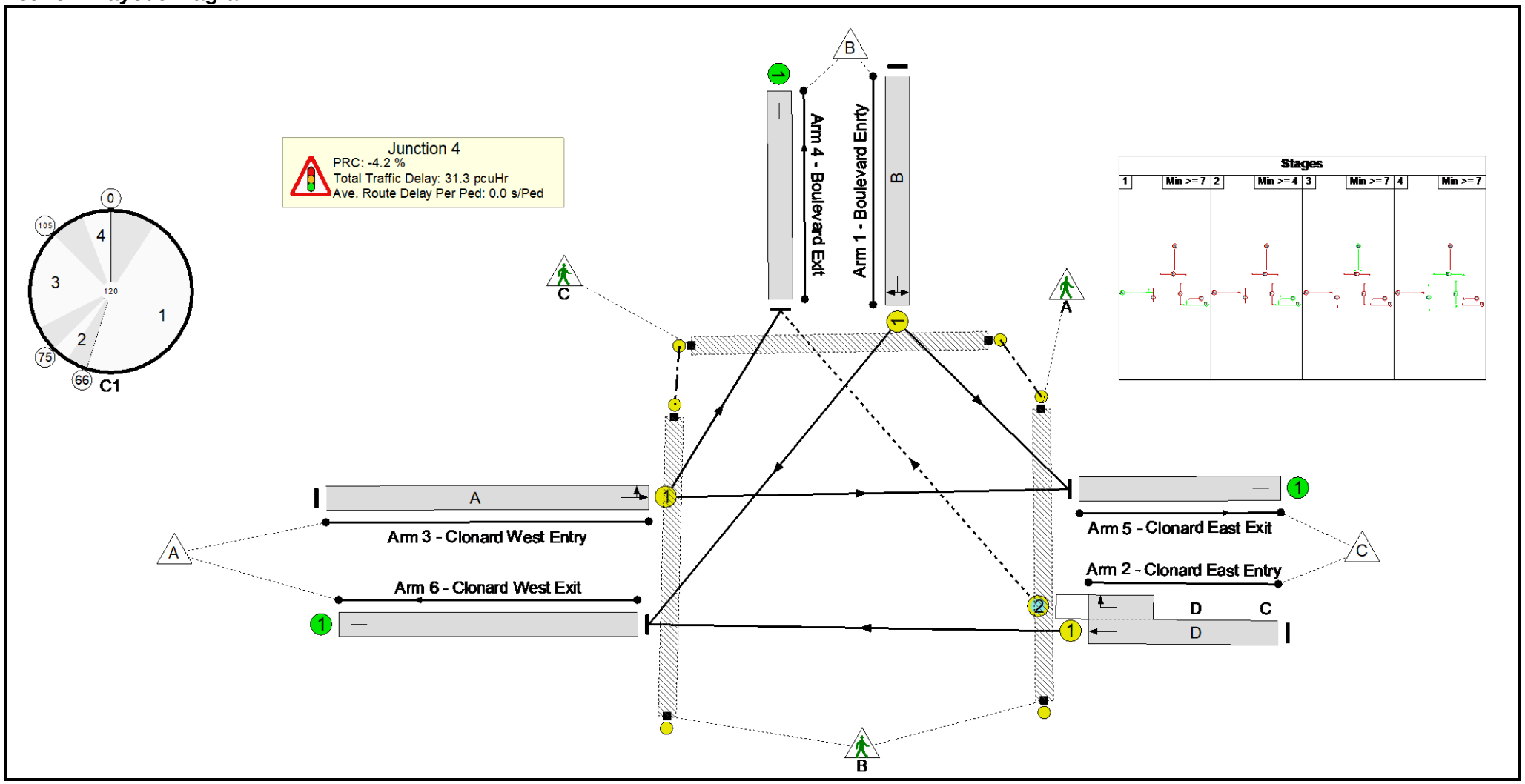
Stage Timings

Stage	1	2	3	4
Duration	55	4	24	7
Change Point	0	66	75	105

Signal Timings Diagram



Network Layout Diagram



Network Results

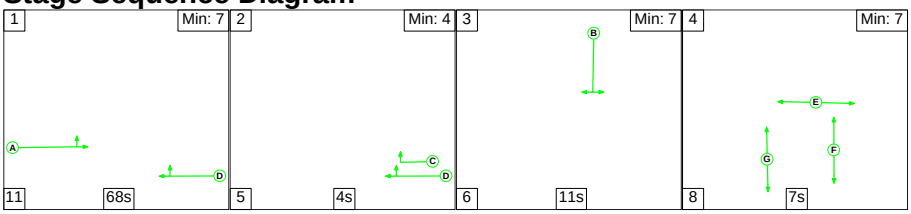
Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**93.8%**
Junction 4	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**93.8%**
1/1	Boulevard Enrty Left Right	U	N/A	N/A	B		1	24	-	341	1773	369	92.3%
2/1+2/2	Clonard East Entry Right Ahead	U+O	N/A	N/A	D	C	1	64	4	913	1980:1891	985+100	84.1 : 84.1%
3/1	Clonard West Entry Left Ahead	U	N/A	N/A	A		1	55	-	847	1936	903	93.8%
4/1	Boulevard Exit	U	N/A	N/A	-		-	-	-	237	Inf	Inf	0.0%
5/1	Clonard East Exit	U	N/A	N/A	-		-	-	-	805	Inf	Inf	0.0%
6/1	Clonard West Exit	U	N/A	N/A	-		-	-	-	1059	Inf	Inf	0.0%
Ped Link: P1	Unnamed Ped Link	-	N/A	-	E		1	9	-	0	-	5400	0.0%
Ped Link: P2	Unnamed Ped Link	-	N/A	-	F		1	7	-	0	-	4200	0.0%
Ped Link: P3	Unnamed Ped Link	-	N/A	-	G		1	7	-	0	-	0	0.0%

Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network	**-**	**-**	**26**	**57**	**1**	**17.3**	**13.3**	**0.6**	**31.3**	**-**	**-**	**-**	**-**
Junction 4	**-**	**-**	**26**	**57**	**1**	**17.3**	**13.3**	**0.6**	**31.3**	**-**	**-**	**-**	**-**
1/1	341	341	-	-	-	4.4	4.5	-	9.0	94.6	11.1	4.5	15.6
2/1+2/2	913	913	26	57	1	5.8	2.6	0.6	9.0	35.5	25.0	2.6	27.5
3/1	847	847	-	-	-	7.1	6.2	-	13.3	56.5	26.6	6.2	32.7
4/1	237	237	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
5/1	805	805	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	1059	1059	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
Ped Link: P1	0	0	-	-	-	-	-	-	0.0	0.0	-	-	0.0
Ped Link: P2	0	0	-	-	-	-	-	-	0.0	0.0	-	-	0.0
Ped Link: P3	0	0	-	-	-	-	-	-	-	-	-	-	-

C1 PRC for Signalled Lanes (%): -4.2 Total Delay for Signalled Lanes (pcuHr): 31.26 Cycle Time (s): 120
PRC Over All Lanes (%): -4.2 Total Delay Over All Lanes(pcuHr): 31.26

Scenario 4: 'Scenario A 2030 PM ' (FG4: 'Scenario A 2030 - PM', Plan 1: 'Network Control Plan 1')

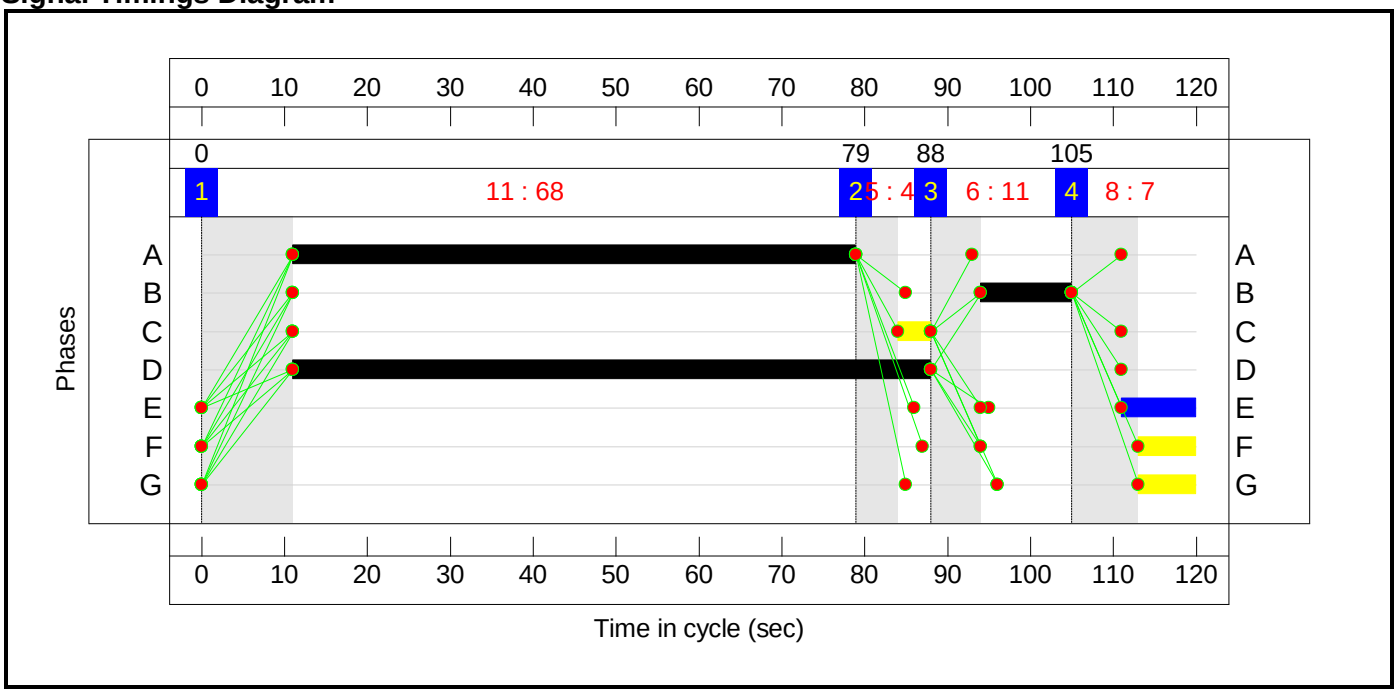
Stage Sequence Diagram



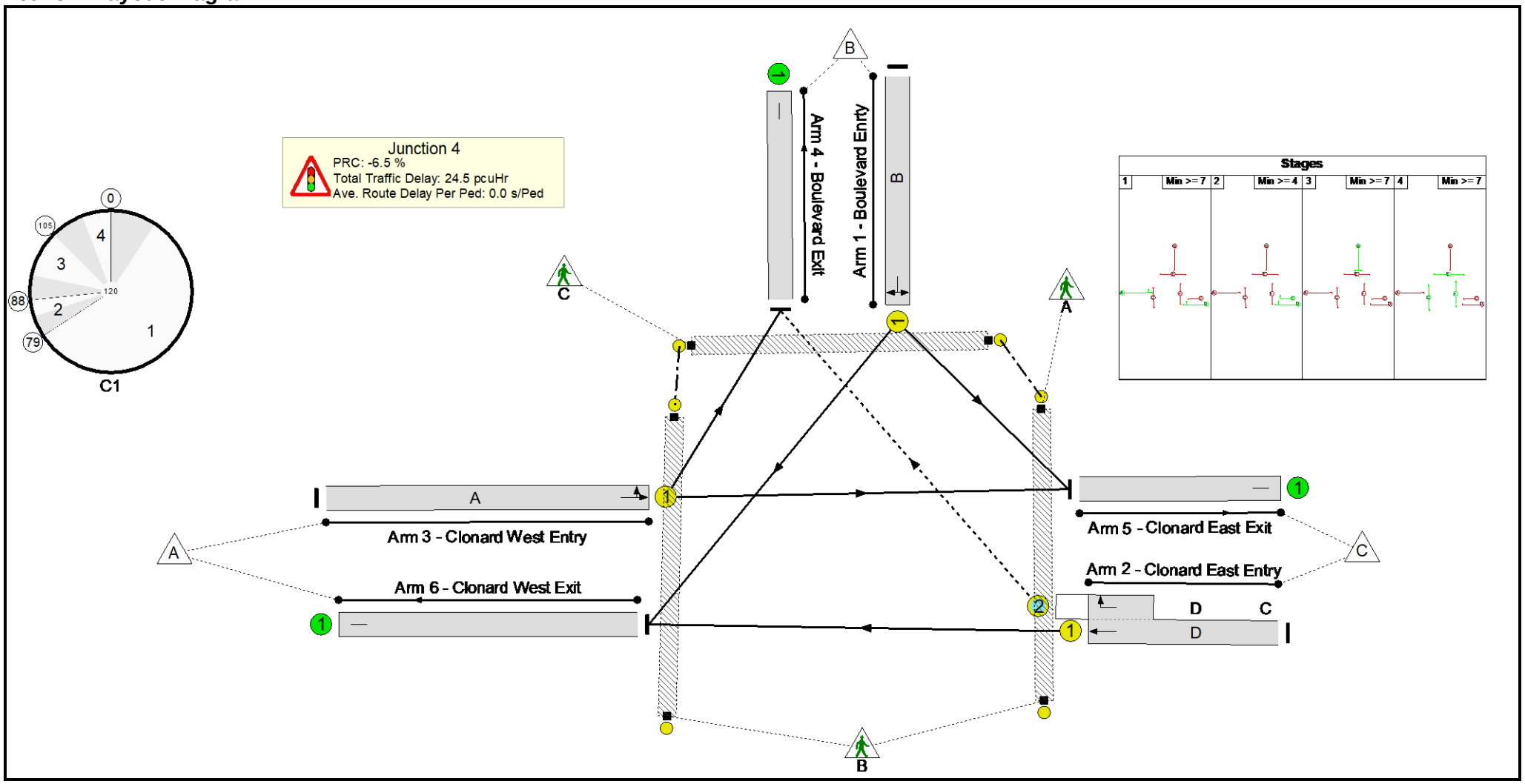
Stage Timings

Stage	1	2	3	4
Duration	68	4	11	7
Change Point	0	79	88	105

Signal Timings Diagram



Network Layout Diagram



Network Results

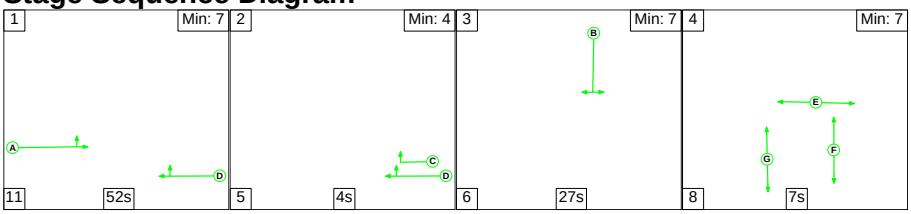
Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**95.9%**
Junction 4	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**95.9%**
1/1	Boulevard Enrty Left Right	U	N/A	N/A	B		1	11	-	159	1774	177	89.6%
2/1+2/2	Clonard East Entry Right Ahead	U+O	N/A	N/A	D	C	1	77	4	686	1980:1891	1197+100	52.9 : 52.9%
3/1	Clonard West Entry Left Ahead	U	N/A	N/A	A		1	68	-	1074	1948	1120	95.9%
4/1	Boulevard Exit	U	N/A	N/A	-		-	-	-	195	Inf	Inf	0.0%
5/1	Clonard East Exit	U	N/A	N/A	-		-	-	-	979	Inf	Inf	0.0%
6/1	Clonard West Exit	U	N/A	N/A	-		-	-	-	745	Inf	Inf	0.0%
Ped Link: P1	Unnamed Ped Link	-	N/A	-	E		1	9	-	0	-	5400	0.0%
Ped Link: P2	Unnamed Ped Link	-	N/A	-	F		1	7	-	0	-	4200	0.0%
Ped Link: P3	Unnamed Ped Link	-	N/A	-	G		1	7	-	0	-	0	0.0%

Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network	**-**	**-**	**13**	**39**	**1**	**11.6**	**12.3**	**0.6**	**24.5**	**-**	**-**	**-**	**-**
Junction 4	**-**	**-**	**13**	**39**	**1**	**11.6**	**12.3**	**0.6**	**24.5**	**-**	**-**	**-**	**-**
1/1	159	159	-	-	-	2.4	3.2	-	5.6	125.9	5.2	3.2	8.4
2/1+2/2	686	686	13	39	1	2.1	0.6	0.6	3.2	17.0	11.5	0.6	12.0
3/1	1074	1074	-	-	-	7.2	8.5	-	15.7	52.7	33.7	8.5	42.2
4/1	195	195	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
5/1	979	979	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	745	745	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
Ped Link: P1	0	0	-	-	-	-	-	-	0.0	0.0	-	-	0.0
Ped Link: P2	0	0	-	-	-	-	-	-	0.0	0.0	-	-	0.0
Ped Link: P3	0	0	-	-	-	-	-	-	-	-	-	-	-

C1 PRC for Signalled Lanes (%): -6.5 Total Delay for Signalled Lanes (pcuHr): 24.51 Cycle Time (s): 120
PRC Over All Lanes (%): -6.5 Total Delay Over All Lanes(pcuHr): 24.51

Scenario 5: 'Scenario B 2025 AM ' (FG5: 'Scenario B 2025 - AM', Plan 1: 'Network Control Plan 1')

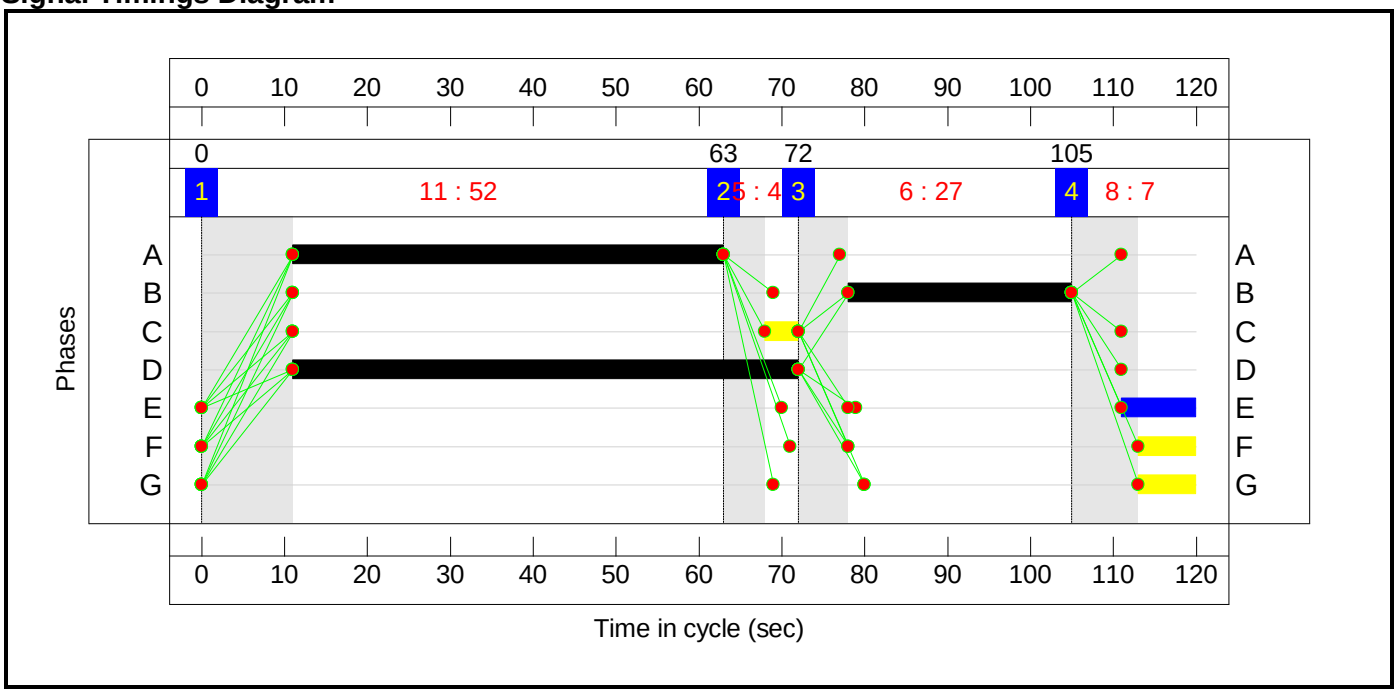
Stage Sequence Diagram



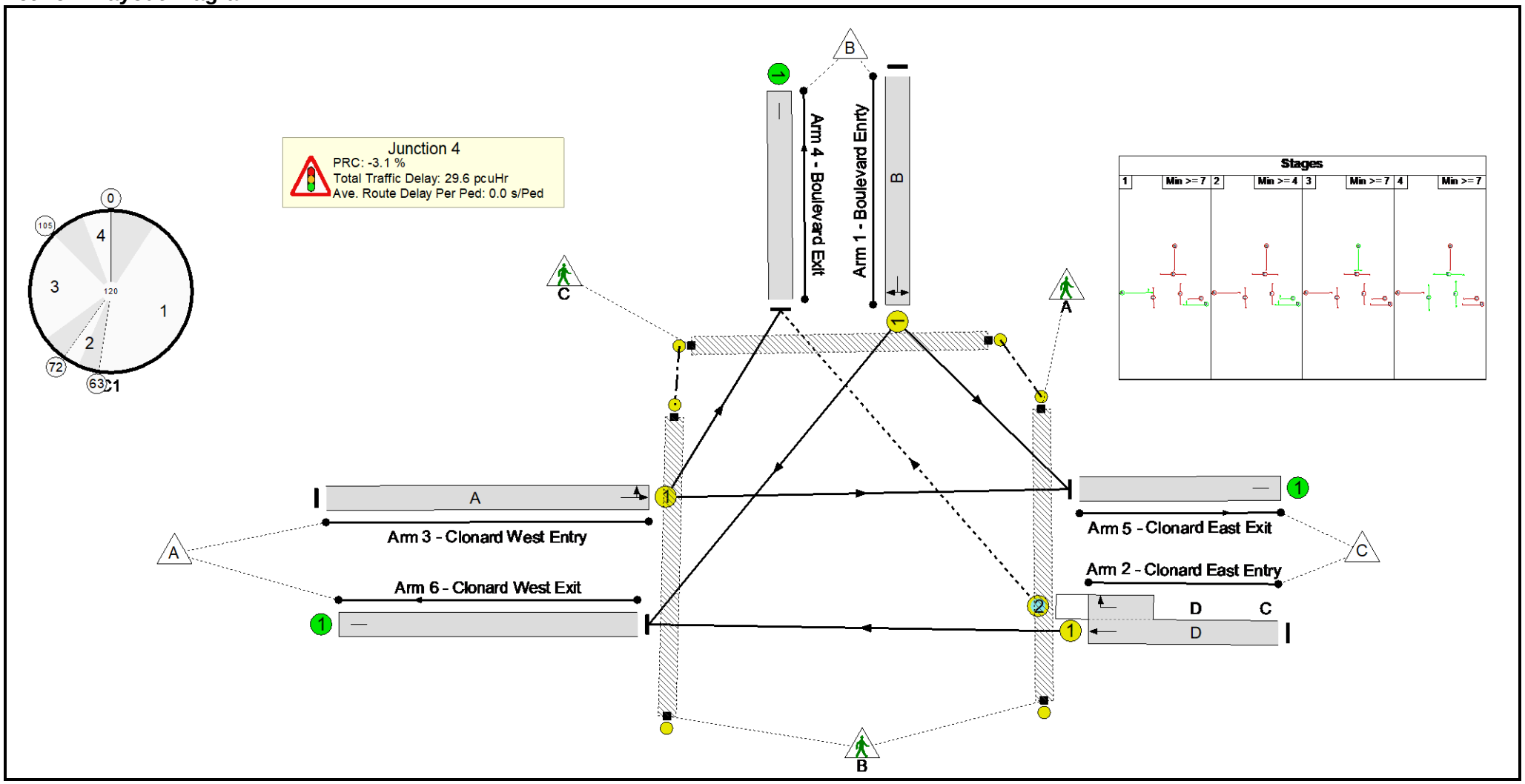
Stage Timings

Stage	1	2	3	4
Duration	52	4	27	7
Change Point	0	63	72	105

Signal Timings Diagram



Network Layout Diagram



Network Results

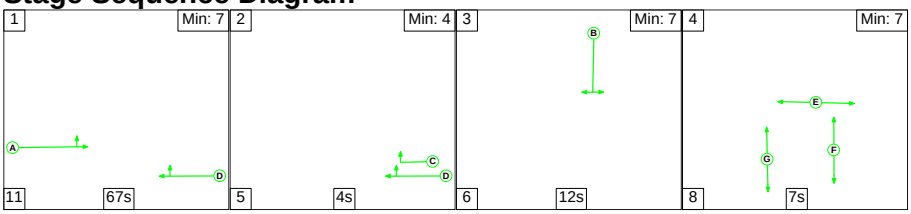
Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**92.8%**
Junction 4	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**92.8%**
1/1	Boulevard Enrty Left Right	U	N/A	N/A	B		1	27	-	374	1774	414	90.4%
2/1+2/2	Clonard East Entry Right Ahead	U+O	N/A	N/A	D	C	1	61	4	853	1980:1891	934+102	82.3 : 82.3%
3/1	Clonard West Entry Left Ahead	U	N/A	N/A	A		1	52	-	792	1932	853	92.8%
4/1	Boulevard Exit	U	N/A	N/A	-		-	-	-	240	Inf	Inf	0.0%
5/1	Clonard East Exit	U	N/A	N/A	-		-	-	-	755	Inf	Inf	0.0%
6/1	Clonard West Exit	U	N/A	N/A	-		-	-	-	1024	Inf	Inf	0.0%
Ped Link: P1	Unnamed Ped Link	-	N/A	-	E		1	9	-	0	-	5400	0.0%
Ped Link: P2	Unnamed Ped Link	-	N/A	-	F		1	7	-	0	-	4200	0.0%
Ped Link: P3	Unnamed Ped Link	-	N/A	-	G		1	7	-	0	-	0	0.0%

Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network	**-**	**-**	**29**	**54**	**1**	**17.3**	**11.7**	**0.6**	**29.6**	**-**	**-**	**-**	**-**
Junction 4	**-**	**-**	**29**	**54**	**1**	**17.3**	**11.7**	**0.6**	**29.6**	**-**	**-**	**-**	**-**
1/1	374	374	-	-	-	4.6	3.9	-	8.6	82.4	12.1	3.9	16.0
2/1+2/2	853	853	29	54	1	5.7	2.3	0.6	8.6	36.2	23.3	2.3	25.5
3/1	792	792	-	-	-	7.0	5.5	-	12.5	56.6	24.9	5.5	30.3
4/1	240	240	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
5/1	755	755	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	1024	1024	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
Ped Link: P1	0	0	-	-	-	-	-	-	0.0	0.0	-	-	0.0
Ped Link: P2	0	0	-	-	-	-	-	-	0.0	0.0	-	-	0.0
Ped Link: P3	0	0	-	-	-	-	-	-	-	-	-	-	-

C1 PRC for Signalled Lanes (%): -3.1 Total Delay for Signalled Lanes (pcuHr): 29.58 Cycle Time (s): 120
PRC Over All Lanes (%): -3.1 Total Delay Over All Lanes(pcuHr): 29.58

Scenario 6: 'Scenario B 2025 PM ' (FG6: 'Scenario B 2025 - PM', Plan 1: 'Network Control Plan 1')

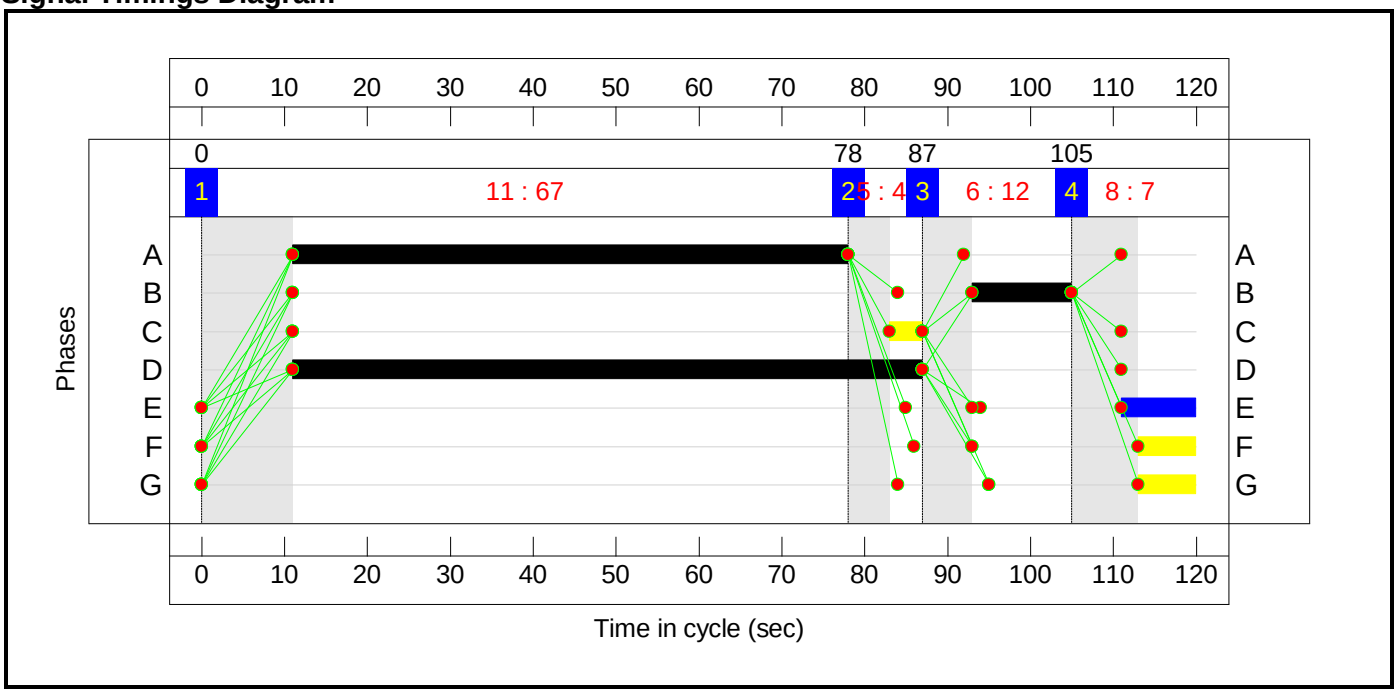
Stage Sequence Diagram



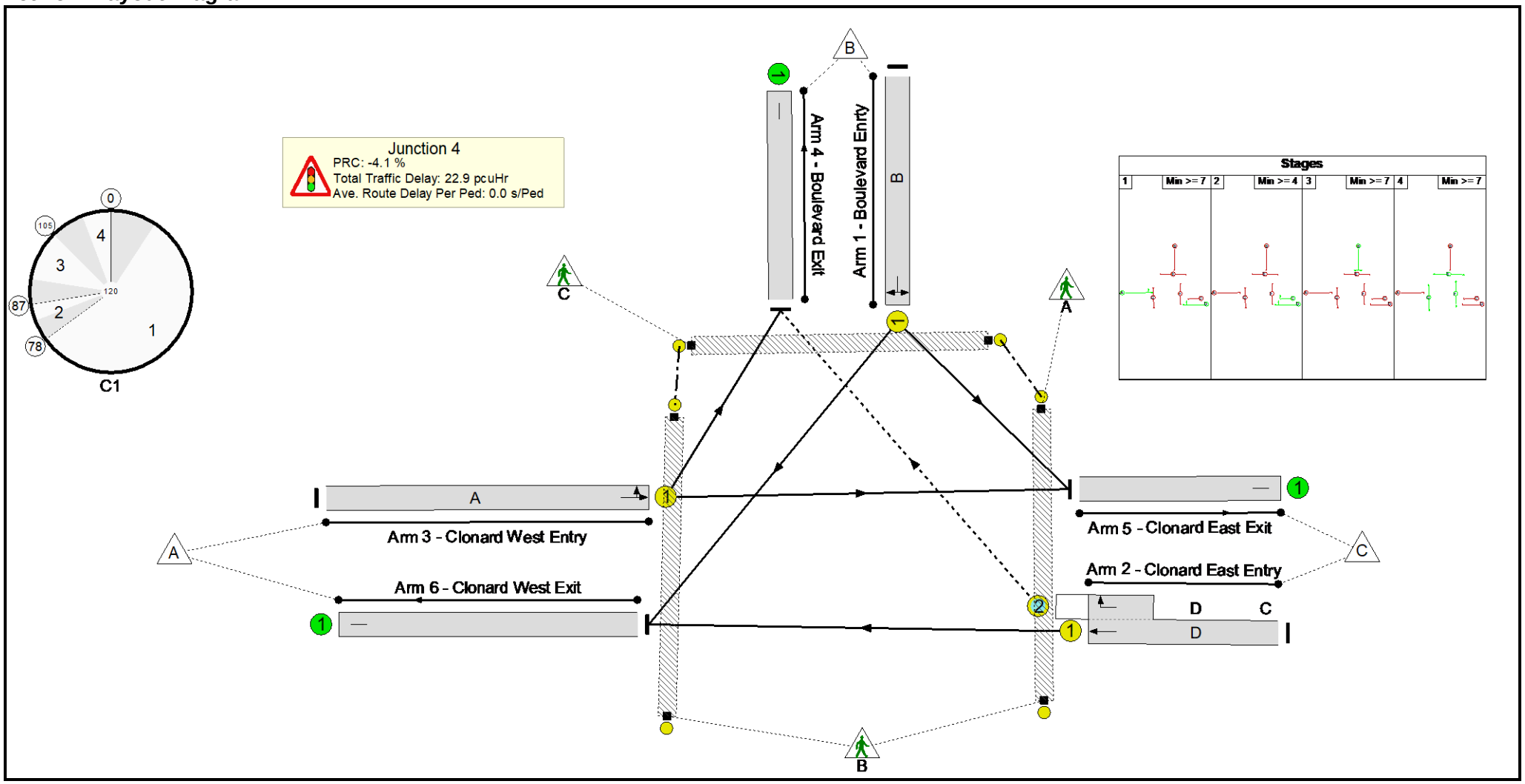
Stage Timings

Stage	1	2	3	4
Duration	67	4	12	7
Change Point	0	78	87	105

Signal Timings Diagram



Network Layout Diagram



Network Results

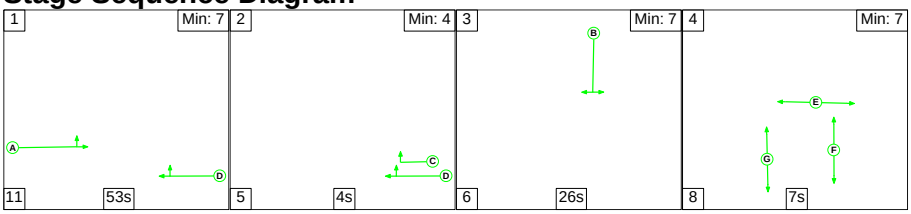
Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**93.7%**
Junction 4	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**93.7%**
1/1	Boulevard Enrty Left Right	U	N/A	N/A	B		1	12	-	178	1774	192	92.6%
2/1+2/2	Clonard East Entry Right Ahead	U+O	N/A	N/A	D	C	1	76	4	644	1980:1891	1159+123	50.2 : 50.2%
3/1	Clonard West Entry Left Ahead	U	N/A	N/A	A		1	67	-	1030	1940	1099	93.7%
4/1	Boulevard Exit	U	N/A	N/A	-		-	-	-	231	Inf	Inf	0.0%
5/1	Clonard East Exit	U	N/A	N/A	-		-	-	-	915	Inf	Inf	0.0%
6/1	Clonard West Exit	U	N/A	N/A	-		-	-	-	706	Inf	Inf	0.0%
Ped Link: P1	Unnamed Ped Link	-	N/A	-	E		1	9	-	0	-	5400	0.0%
Ped Link: P2	Unnamed Ped Link	-	N/A	-	F		1	7	-	0	-	4200	0.0%
Ped Link: P3	Unnamed Ped Link	-	N/A	-	G		1	7	-	0	-	0	0.0%

Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network	**-**	**-**	**24**	**37**	**1**	**11.5**	**10.8**	**0.7**	**22.9**	**-**	**-**	**-**	**-**
Junction 4	**-**	**-**	**24**	**37**	**1**	**11.5**	**10.8**	**0.7**	**22.9**	**-**	**-**	**-**	**-**
1/1	178	178	-	-	-	2.6	4.0	-	6.6	134.1	5.8	4.0	9.8
2/1+2/2	644	644	24	37	1	2.0	0.5	0.7	3.2	17.6	10.7	0.5	11.2
3/1	1030	1030	-	-	-	6.9	6.3	-	13.2	46.0	31.5	6.3	37.8
4/1	231	231	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
5/1	915	915	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	706	706	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
Ped Link: P1	0	0	-	-	-	-	-	-	0.0	0.0	-	-	0.0
Ped Link: P2	0	0	-	-	-	-	-	-	0.0	0.0	-	-	0.0
Ped Link: P3	0	0	-	-	-	-	-	-	-	-	-	-	-

C1 PRC for Signalled Lanes (%): -4.1 Total Delay for Signalled Lanes (pcuHr): 22.94 Cycle Time (s): 120
PRC Over All Lanes (%): -4.1 Total Delay Over All Lanes(pcuHr): 22.94

Scenario 7: 'Scenario B 2030 AM ' (FG7: 'Scenario B 2030 - AM', Plan 1: 'Network Control Plan 1')

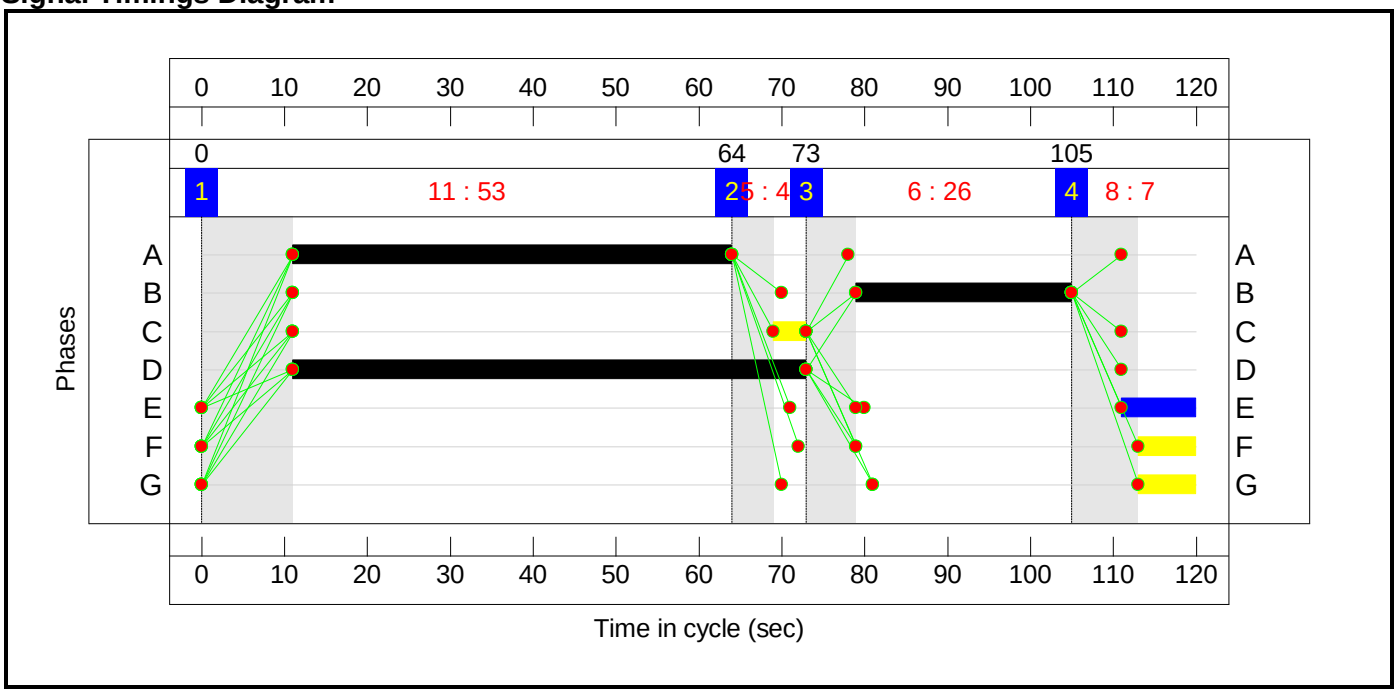
Stage Sequence Diagram



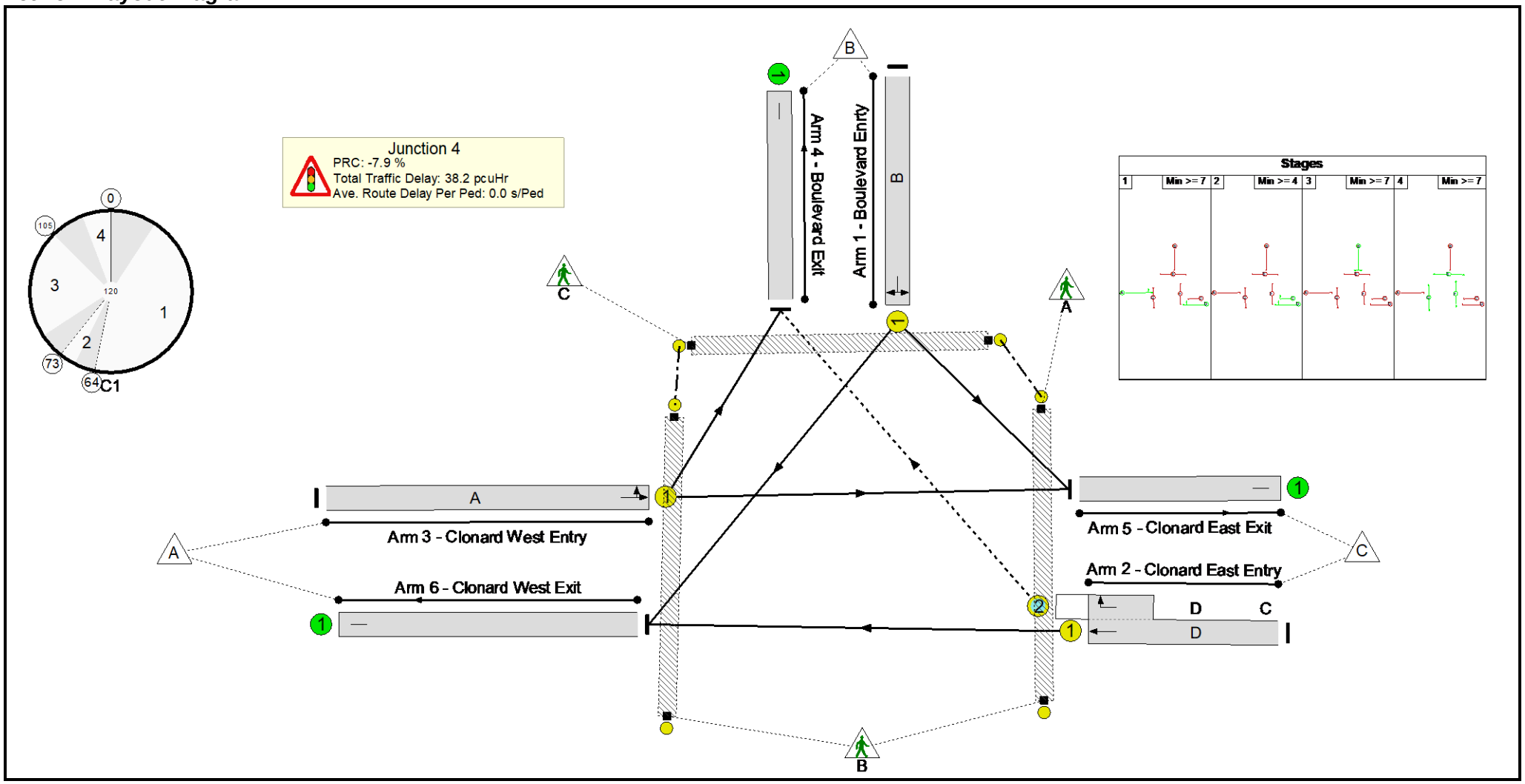
Stage Timings

Stage	1	2	3	4
Duration	53	4	26	7
Change Point	0	64	73	105

Signal Timings Diagram



Network Layout Diagram



Network Results

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**97.1%**
Junction 4	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**97.1%**
1/1	Boulevard Enrty Left Right	U	N/A	N/A	B		1	26	-	381	1773	399	95.5%
2/1+2/2	Clonard East Entry Right Ahead	U+O	N/A	N/A	D	C	1	62	4	913	1980:1891	952+100	86.7 : 86.7%
3/1	Clonard West Entry Left Ahead	U	N/A	N/A	A		1	53	-	845	1934	870	97.1%
4/1	Boulevard Exit	U	N/A	N/A	-		-	-	-	249	Inf	Inf	0.0%
5/1	Clonard East Exit	U	N/A	N/A	-		-	-	-	805	Inf	Inf	0.0%
6/1	Clonard West Exit	U	N/A	N/A	-		-	-	-	1085	Inf	Inf	0.0%
Ped Link: P1	Unnamed Ped Link	-	N/A	-	E		1	9	-	0	-	5400	0.0%
Ped Link: P2	Unnamed Ped Link	-	N/A	-	F		1	7	-	0	-	4200	0.0%
Ped Link: P3	Unnamed Ped Link	-	N/A	-	G		1	7	-	0	-	0	0.0%

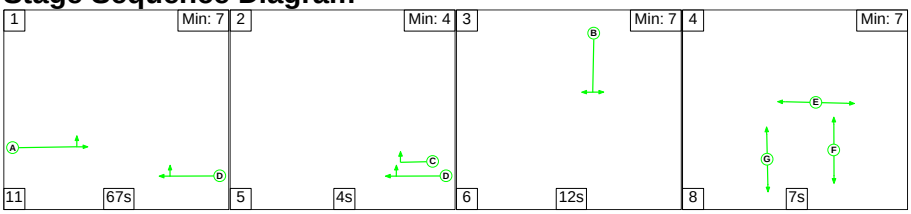
Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network	**-**	**-**	**11**	**75**	**1**	**18.7**	**18.9**	**0.6**	**38.2**	**-**	**-**	**-**	**-**
Junction 4	**-**	**-**	**11**	**75**	**1**	**18.7**	**18.9**	**0.6**	**38.2**	**-**	**-**	**-**	**-**
1/1	381	381	-	-	-	4.9	6.3	-	11.1	105.0	12.5	6.3	18.7
2/1+2/2	913	913	11	75	1	6.2	3.1	0.6	10.0	39.5	26.0	3.1	29.1
3/1	845	845	-	-	-	7.6	9.5	-	17.1	72.8	27.5	9.5	37.0
4/1	249	249	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
5/1	805	805	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	1085	1085	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
Ped Link: P1	0	0	-	-	-	-	-	-	0.0	0.0	-	-	0.0
Ped Link: P2	0	0	-	-	-	-	-	-	0.0	0.0	-	-	0.0
Ped Link: P3	0	0	-	-	-	-	-	-	-	-	-	-	-

C1 PRC for Signalled Lanes (%): -7.9 Total Delay for Signalled Lanes (pcuHr): 38.22 Cycle Time (s): 120

PRC Over All Lanes (%): -7.9 Total Delay Over All Lanes(pcuHr): 38.22

Scenario 8: ' Scenario B 2030 PM ' (FG8: 'Scenario B 2030 - PM', Plan 1: 'Network Control Plan 1')

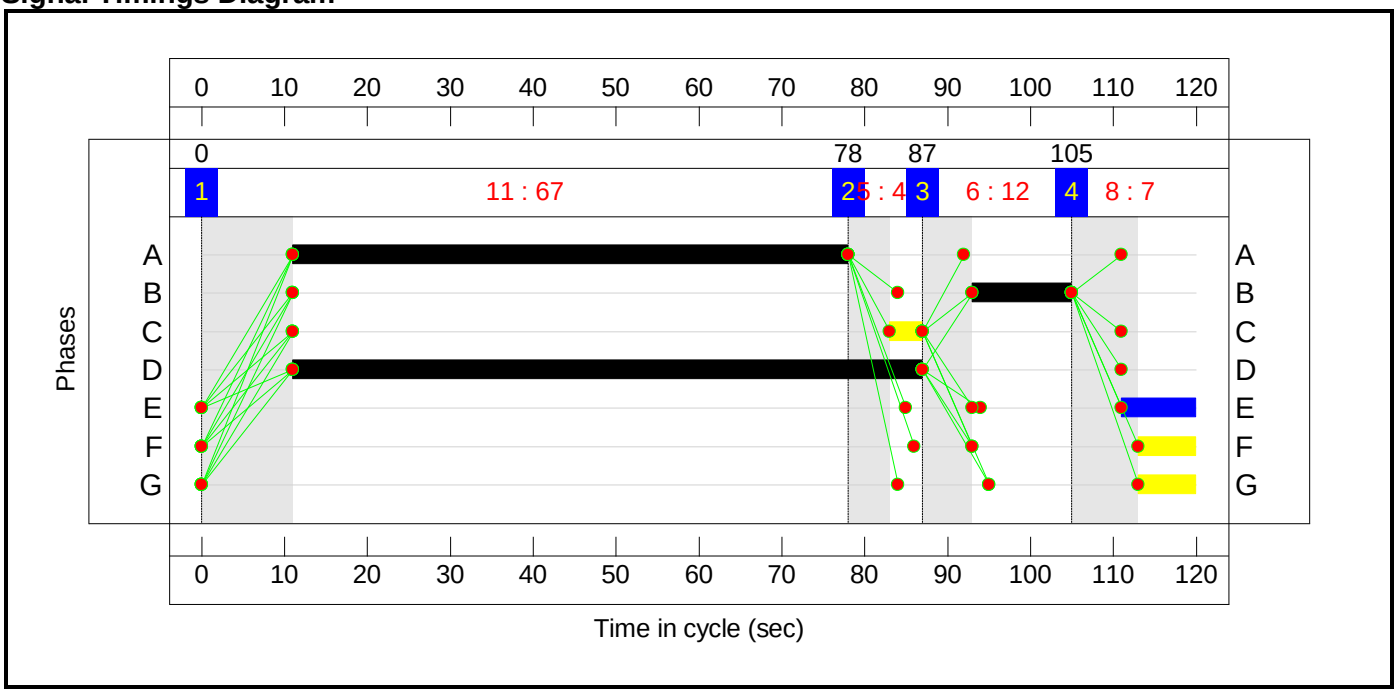
Stage Sequence Diagram



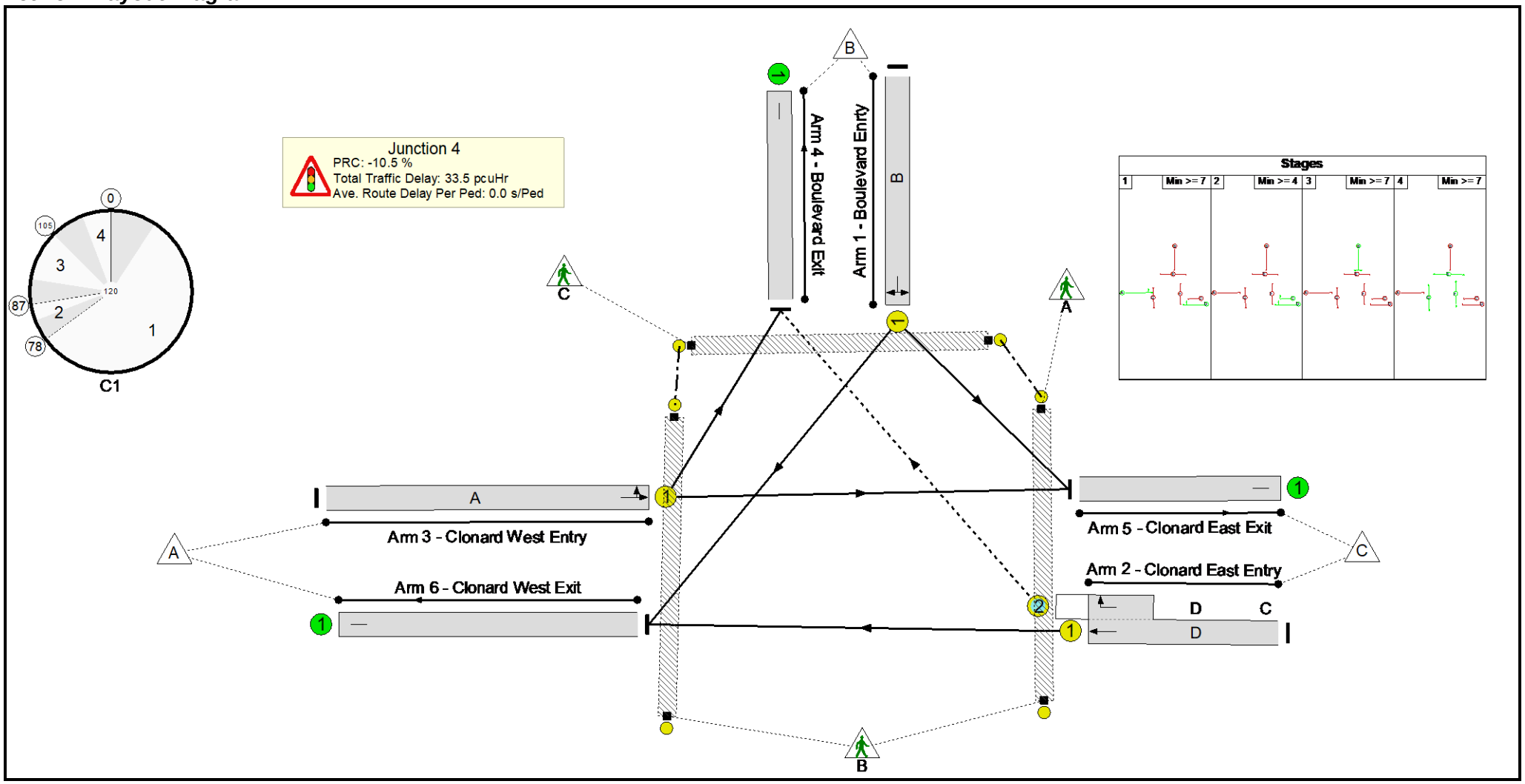
Stage Timings

Stage	1	2	3	4
Duration	67	4	12	7
Change Point	0	78	87	105

Signal Timings Diagram



Network Layout Diagram



Network Results

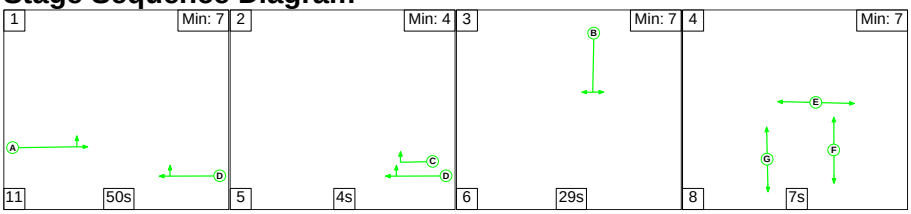
Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**99.4%**
Junction 4	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**99.4%**
1/1	Boulevard Enrty Left Right	U	N/A	N/A	B		1	12	-	181	1774	192	94.2%
2/1+2/2	Clonard East Entry Right Ahead	U+O	N/A	N/A	D	C	1	76	4	686	1980:1891	1166+116	53.5 : 53.5%
3/1	Clonard West Entry Left Ahead	U	N/A	N/A	A		1	67	-	1094	1942	1100	99.4%
4/1	Boulevard Exit	U	N/A	N/A	-		-	-	-	231	Inf	Inf	0.0%
5/1	Clonard East Exit	U	N/A	N/A	-		-	-	-	980	Inf	Inf	0.0%
6/1	Clonard West Exit	U	N/A	N/A	-		-	-	-	750	Inf	Inf	0.0%
Ped Link: P1	Unnamed Ped Link	-	N/A	-	E		1	9	-	0	-	5400	0.0%
Ped Link: P2	Unnamed Ped Link	-	N/A	-	F		1	7	-	0	-	4200	0.0%
Ped Link: P3	Unnamed Ped Link	-	N/A	-	G		1	7	-	0	-	0	0.0%

Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network	**-**	**-**	**1**	**60**	**1**	**12.7**	**20.1**	**0.7**	**33.5**	**-**	**-**	**-**	**-**
Junction 4	**-**	**-**	**1**	**60**	**1**	**12.7**	**20.1**	**0.7**	**33.5**	**-**	**-**	**-**	**-**
1/1	181	181	-	-	-	2.7	4.5	-	7.2	142.4	6.0	4.5	10.5
2/1+2/2	686	686	1	60	1	2.2	0.6	0.7	3.5	18.2	11.8	0.6	12.4
3/1	1094	1094	-	-	-	7.8	15.0	-	22.8	75.2	36.2	15.0	51.2
4/1	231	231	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
5/1	980	980	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	750	750	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
Ped Link: P1	0	0	-	-	-	-	-	-	0.0	0.0	-	-	0.0
Ped Link: P2	0	0	-	-	-	-	-	-	0.0	0.0	-	-	0.0
Ped Link: P3	0	0	-	-	-	-	-	-	-	-	-	-	-

C1 PRC for Signalled Lanes (%): -10.5 Total Delay for Signalled Lanes (pcuHr): 33.46 Cycle Time (s): 120
PRC Over All Lanes (%): -10.5 Total Delay Over All Lanes(pcuHr): 33.46

Scenario 9: 'Scenario C 2025 AM ' (FG9: 'Scenario C 2025 - AM', Plan 1: 'Network Control Plan 1')

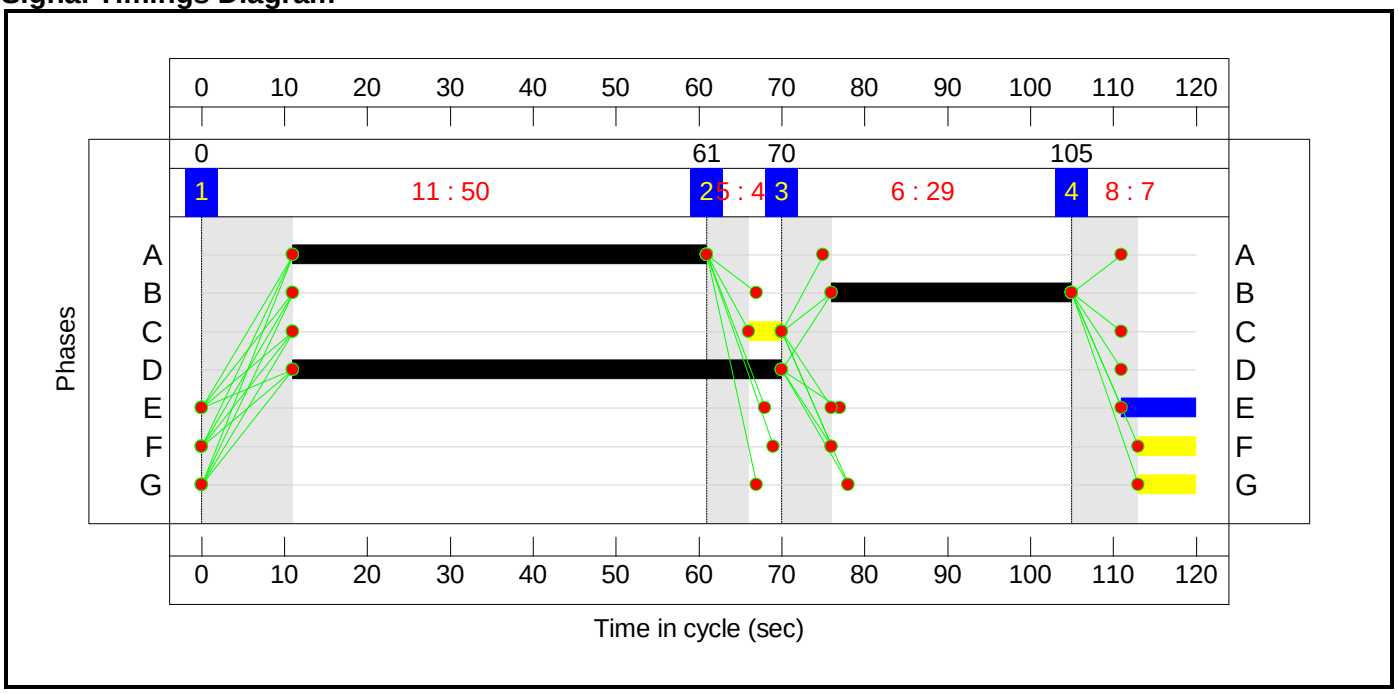
Stage Sequence Diagram



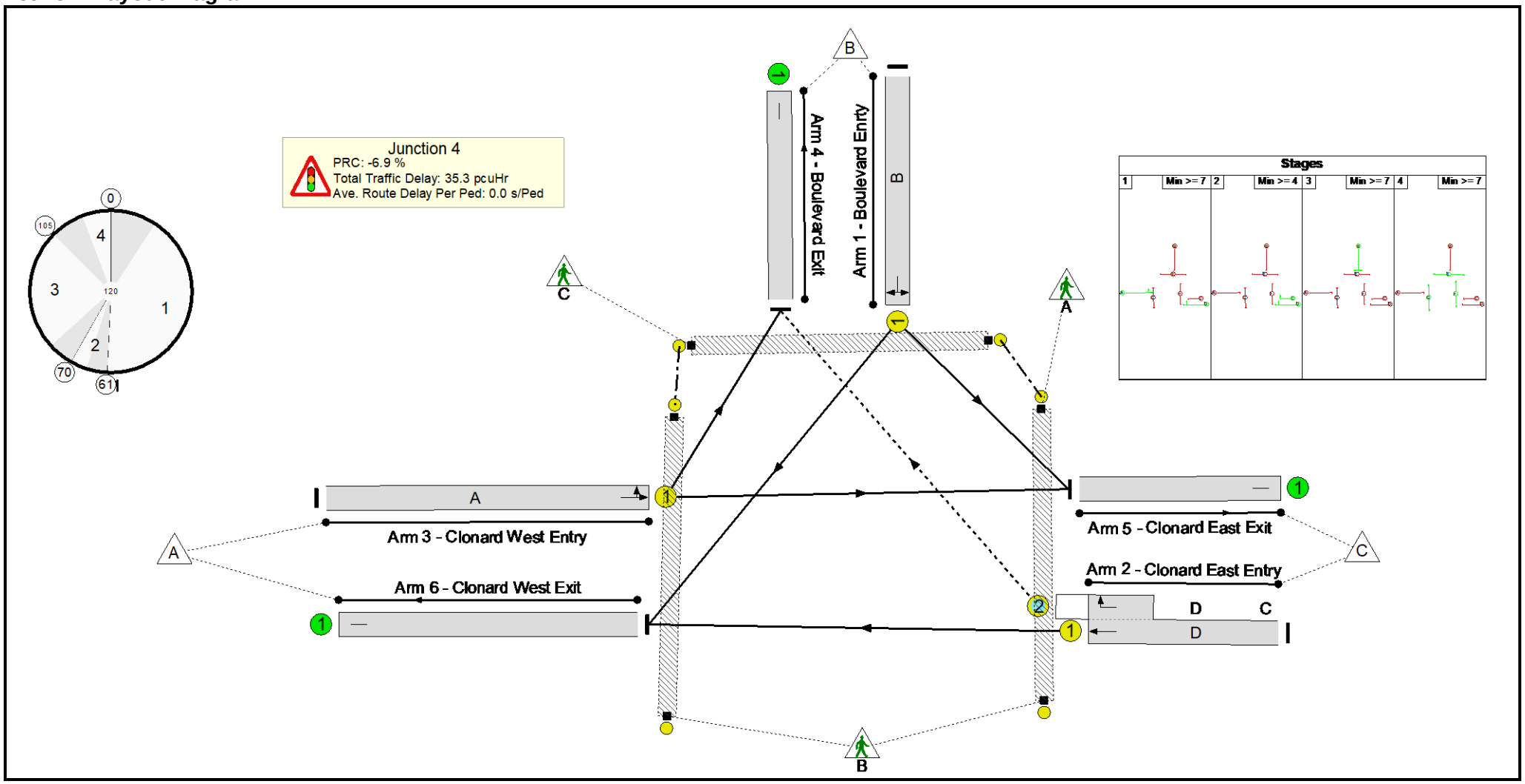
Stage Timings

Stage	1	2	3	4
Duration	50	4	29	7
Change Point	0	61	70	105

Signal Timings Diagram



Network Layout Diagram



Network Results

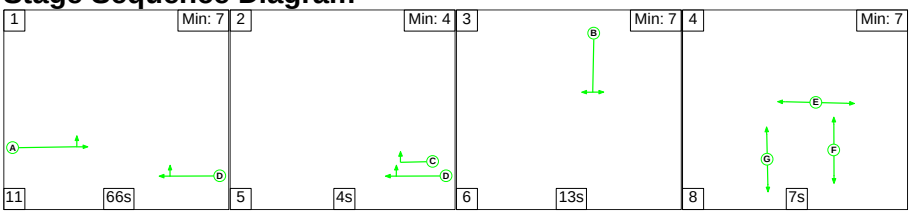
Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**96.2%**
Junction 4	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**96.2%**
1/1	Boulevard Enrty Left Right	U	N/A	N/A	B		1	29	-	414	1774	444	93.3%
2/1+2/2	Clonard East Entry Right Ahead	U+O	N/A	N/A	D	C	1	59	4	853	1980:1891	900+104	85.0 : 85.0%
3/1	Clonard West Entry Left Ahead	U	N/A	N/A	A		1	50	-	789	1930	820	96.2%
4/1	Boulevard Exit	U	N/A	N/A	-		-	-	-	252	Inf	Inf	0.0%
5/1	Clonard East Exit	U	N/A	N/A	-		-	-	-	755	Inf	Inf	0.0%
6/1	Clonard West Exit	U	N/A	N/A	-		-	-	-	1049	Inf	Inf	0.0%
Ped Link: P1	Unnamed Ped Link	-	N/A	-	E		1	9	-	0	-	5400	0.0%
Ped Link: P2	Unnamed Ped Link	-	N/A	-	F		1	7	-	0	-	4200	0.0%
Ped Link: P3	Unnamed Ped Link	-	N/A	-	G		1	7	-	0	-	0	0.0%

Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network	**-**	**-**	**14**	**72**	**1**	**18.5**	**16.2**	**0.6**	**35.3**	**-**	**-**	**-**	**-**
Junction 4	**-**	**-**	**14**	**72**	**1**	**18.5**	**16.2**	**0.6**	**35.3**	**-**	**-**	**-**	**-**
1/1	414	414	-	-	-	5.1	5.2	-	10.3	89.2	13.5	5.2	18.6
2/1+2/2	853	853	14	72	1	6.1	2.7	0.6	9.4	39.9	23.9	2.7	26.7
3/1	789	789	-	-	-	7.4	8.3	-	15.6	71.2	25.4	8.3	33.7
4/1	252	252	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
5/1	755	755	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	1049	1049	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
Ped Link: P1	0	0	-	-	-	-	-	-	0.0	0.0	-	-	0.0
Ped Link: P2	0	0	-	-	-	-	-	-	0.0	0.0	-	-	0.0
Ped Link: P3	0	0	-	-	-	-	-	-	-	-	-	-	-

C1 PRC for Signalled Lanes (%): -6.9 Total Delay for Signalled Lanes (pcuHr): 35.32 Cycle Time (s): 120
PRC Over All Lanes (%): -6.9 Total Delay Over All Lanes(pcuHr): 35.32

Scenario 10: 'Scenario C 2025 PM ' (FG10: 'Scenario C 2025 - PM', Plan 1: 'Network Control Plan 1')

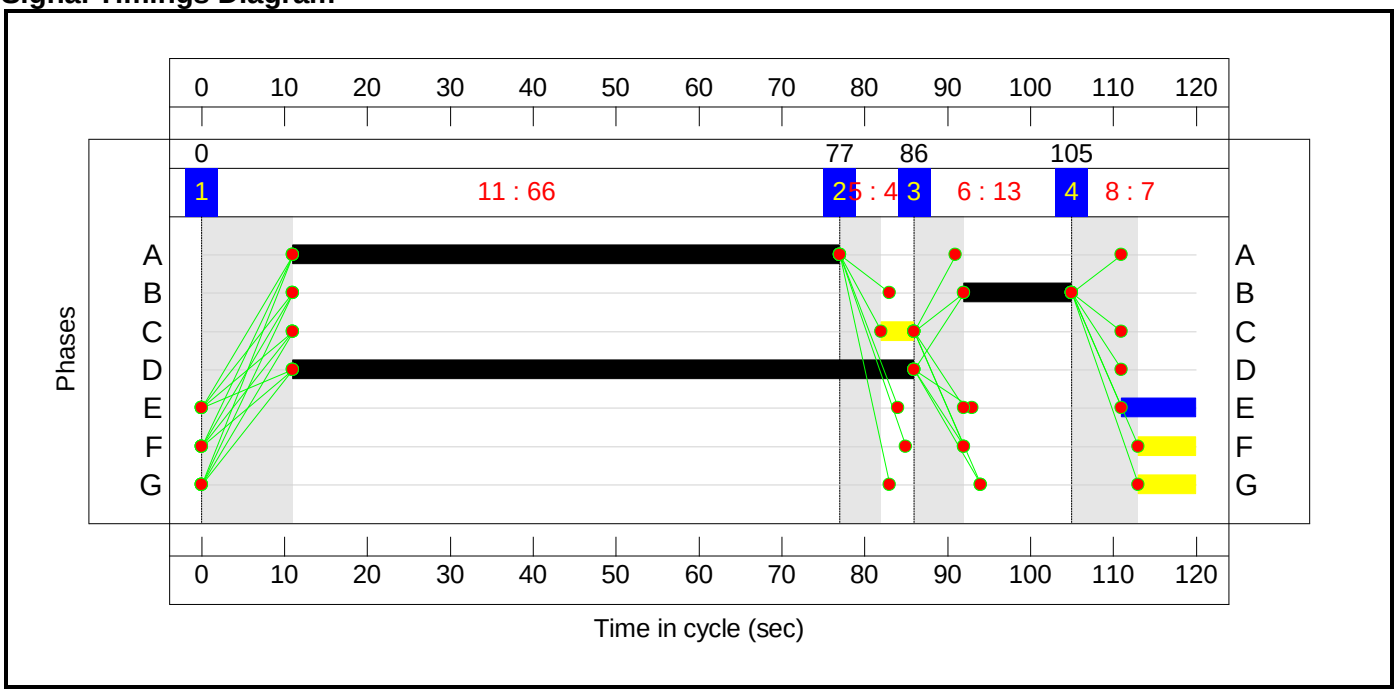
Stage Sequence Diagram



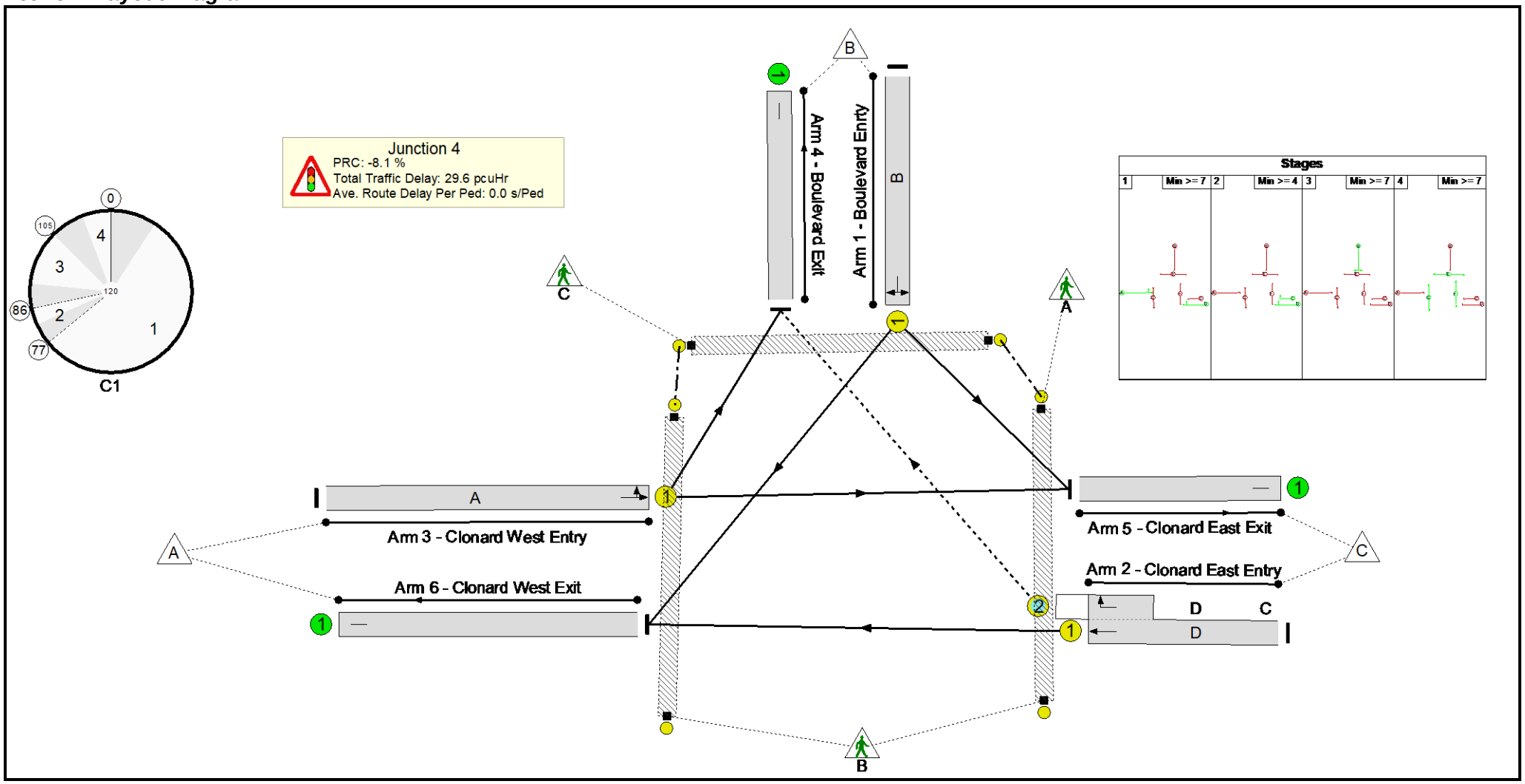
Stage Timings

Stage	1	2	3	4
Duration	66	4	13	7
Change Point	0	77	86	105

Signal Timings Diagram



Network Layout Diagram



Network Results

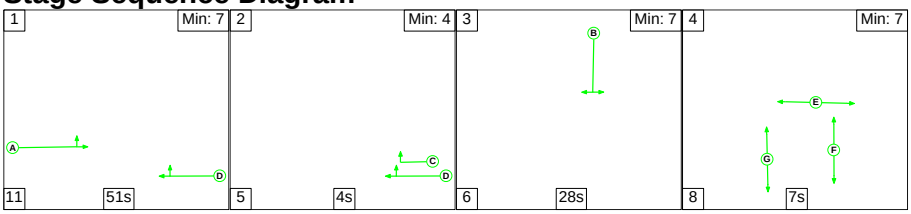
Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**97.3%**
Junction 4	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**97.3%**
1/1	Boulevard Enrty Left Right	U	N/A	N/A	B		1	13	-	199	1774	207	96.2%
2/1+2/2	Clonard East Entry Right Ahead	U+O	N/A	N/A	D	C	1	75	4	644	1980:1891	1130+138	50.8 : 50.8%
3/1	Clonard West Entry Left Ahead	U	N/A	N/A	A		1	66	-	1051	1935	1080	97.3%
4/1	Boulevard Exit	U	N/A	N/A	-		-	-	-	267	Inf	Inf	0.0%
5/1	Clonard East Exit	U	N/A	N/A	-		-	-	-	916	Inf	Inf	0.0%
6/1	Clonard West Exit	U	N/A	N/A	-		-	-	-	711	Inf	Inf	0.0%
Ped Link: P1	Unnamed Ped Link	-	N/A	-	E		1	9	-	0	-	5400	0.0%
Ped Link: P2	Unnamed Ped Link	-	N/A	-	F		1	7	-	0	-	4200	0.0%
Ped Link: P3	Unnamed Ped Link	-	N/A	-	G		1	7	-	0	-	0	0.0%

Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network	**-**	**-**	**10**	**59**	**1**	**12.4**	**16.3**	**0.8**	**29.6**	**-**	**-**	**-**	**-**
Junction 4	**-**	**-**	**10**	**59**	**1**	**12.4**	**16.3**	**0.8**	**29.6**	**-**	**-**	**-**	**-**
1/1	199	199	-	-	-	2.9	5.3	-	8.3	149.3	6.6	5.3	11.9
2/1+2/2	644	644	10	59	1	2.1	0.5	0.8	3.4	18.8	10.8	0.5	11.3
3/1	1051	1051	-	-	-	7.5	10.5	-	17.9	61.4	33.9	10.5	44.3
4/1	267	267	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
5/1	916	916	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	711	711	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
Ped Link: P1	0	0	-	-	-	-	-	-	0.0	0.0	-	-	0.0
Ped Link: P2	0	0	-	-	-	-	-	-	0.0	0.0	-	-	0.0
Ped Link: P3	0	0	-	-	-	-	-	-	-	-	-	-	-

C1 PRC for Signalled Lanes (%): -8.1 Total Delay for Signalled Lanes (pcuHr): 29.56 Cycle Time (s): 120
PRC Over All Lanes (%): -8.1 Total Delay Over All Lanes(pcuHr): 29.56

Scenario 11: 'Scenario C 2030 AM ' (FG11: 'Scenario C 2030 - AM', Plan 1: 'Network Control Plan 1')

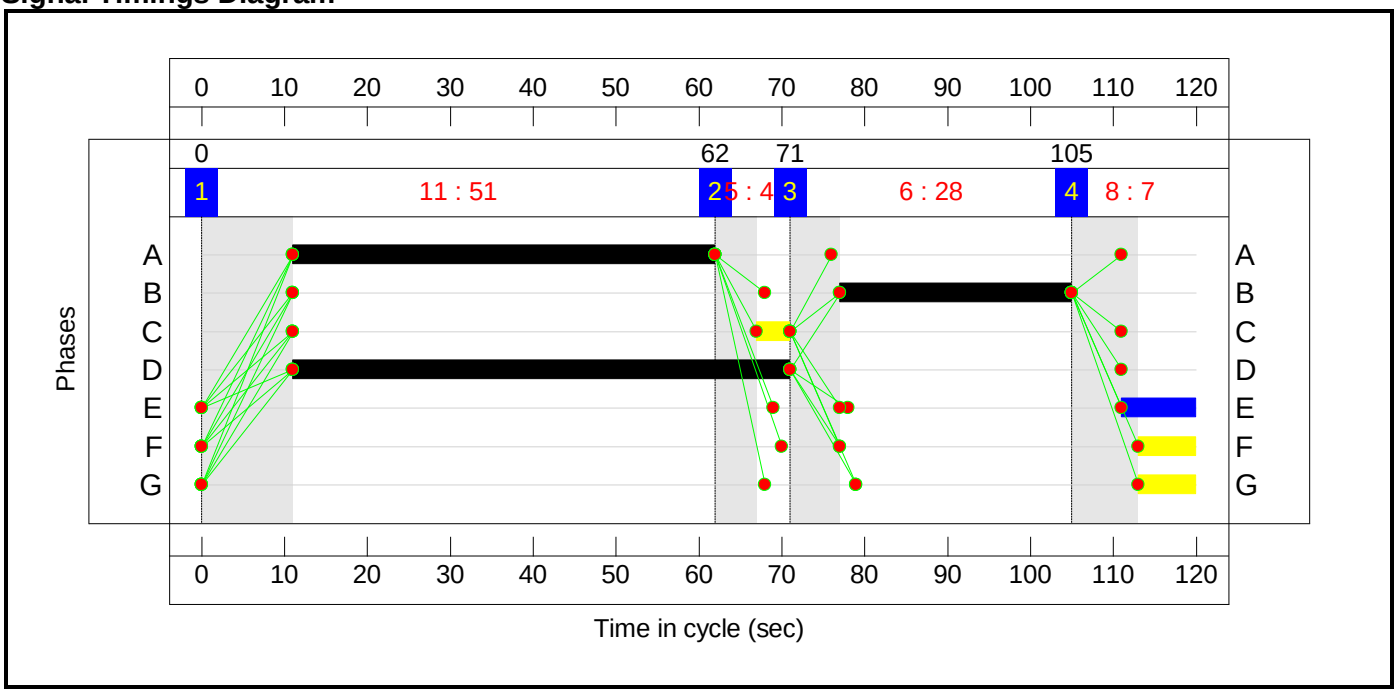
Stage Sequence Diagram



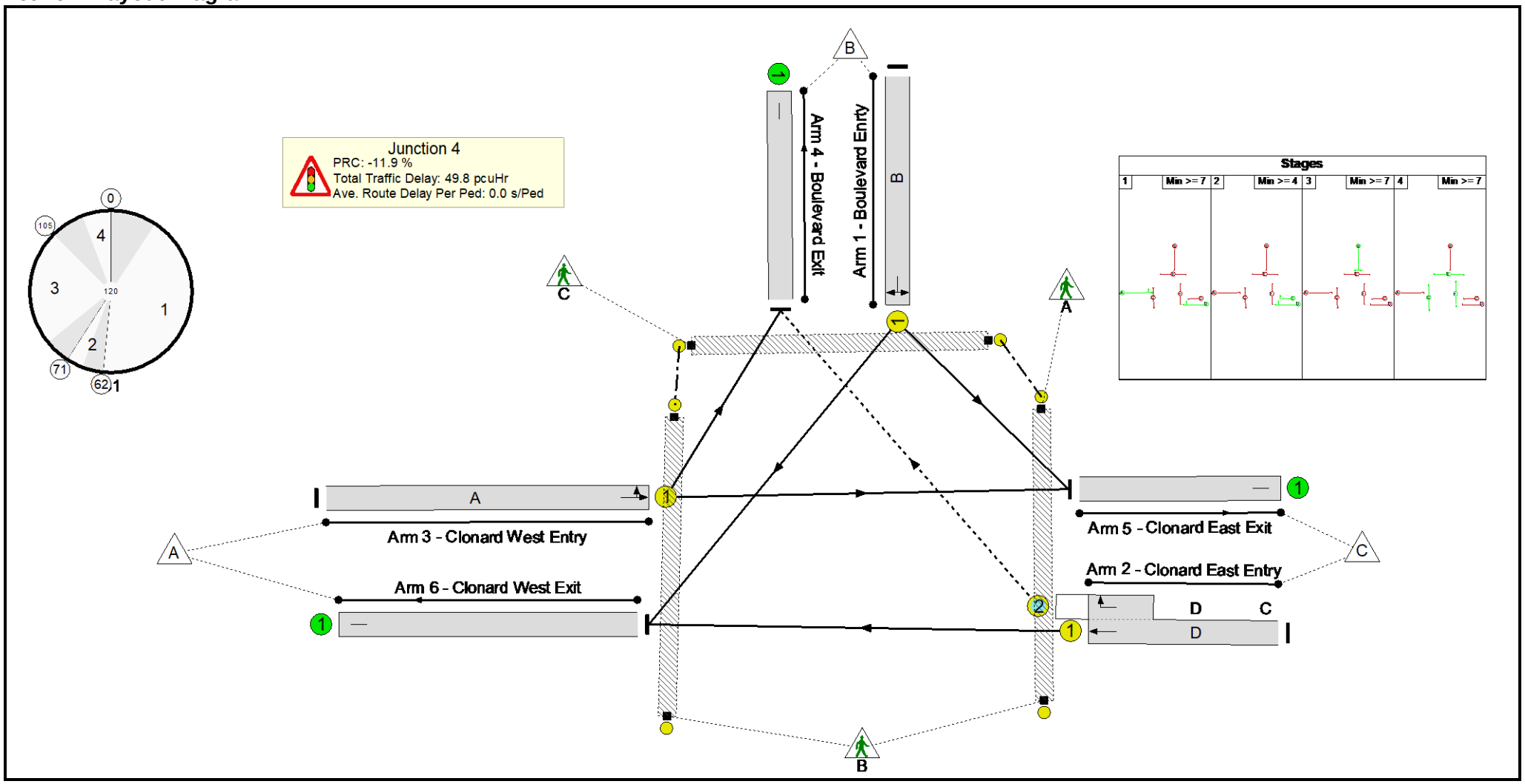
Stage Timings

Stage	1	2	3	4
Duration	51	4	28	7
Change Point	0	62	71	105

Signal Timings Diagram



Network Layout Diagram



Network Results

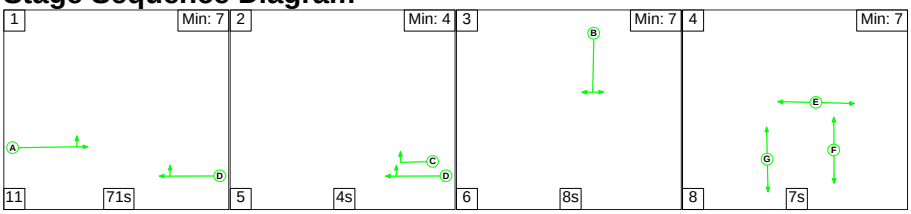
Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**100.7%**
Junction 4	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**100.7%**
1/1	Boulevard Enrty Left Right	U	N/A	N/A	B		1	28	-	422	1774	429	98.4%
2/1+2/2	Clonard East Entry Right Ahead	U+O	N/A	N/A	D	C	1	60	4	913	1980:1891	918+102	89.5 : 89.5%
3/1	Clonard West Entry Left Ahead	U	N/A	N/A	A		1	51	-	843	1931	837	100.7%
4/1	Boulevard Exit	U	N/A	N/A	-		-	-	-	262	Inf	Inf	0.0%
5/1	Clonard East Exit	U	N/A	N/A	-		-	-	-	805	Inf	Inf	0.0%
6/1	Clonard West Exit	U	N/A	N/A	-		-	-	-	1111	Inf	Inf	0.0%
Ped Link: P1	Unnamed Ped Link	-	N/A	-	E		1	9	-	0	-	5400	0.0%
Ped Link: P2	Unnamed Ped Link	-	N/A	-	F		1	7	-	0	-	4200	0.0%
Ped Link: P3	Unnamed Ped Link	-	N/A	-	G		1	7	-	0	-	0	0.0%

Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network	**-**	**-**	**0**	**89**	**2**	**20.3**	**28.9**	**0.6**	**49.8**	**-**	**-**	**-**	**-**
Junction 4	**-**	**-**	**0**	**89**	**2**	**20.3**	**28.9**	**0.6**	**49.8**	**-**	**-**	**-**	**-**
1/1	422	422	-	-	-	5.3	8.7	-	14.0	119.7	13.9	8.7	22.7
2/1+2/2	913	913	0	89	2	6.7	4.0	0.6	11.3	44.5	26.7	4.0	30.7
3/1	843	837	-	-	-	8.3	16.2	-	24.5	104.5	28.3	16.2	44.5
4/1	261	261	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
5/1	800	800	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	1111	1111	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
Ped Link: P1	0	0	-	-	-	-	-	-	0.0	0.0	-	-	0.0
Ped Link: P2	0	0	-	-	-	-	-	-	0.0	0.0	-	-	0.0
Ped Link: P3	0	0	-	-	-	-	-	-	-	-	-	-	-

C1 PRC for Signalled Lanes (%): -11.9 Total Delay for Signalled Lanes (pcuHr): 49.80 Cycle Time (s): 120
PRC Over All Lanes (%): -11.9 Total Delay Over All Lanes(pcuHr): 49.80

Scenario 12: 'Scenario C 2030 PM ' (FG12: 'Scenario C 2030 - PM', Plan 1: 'Network Control Plan 1')

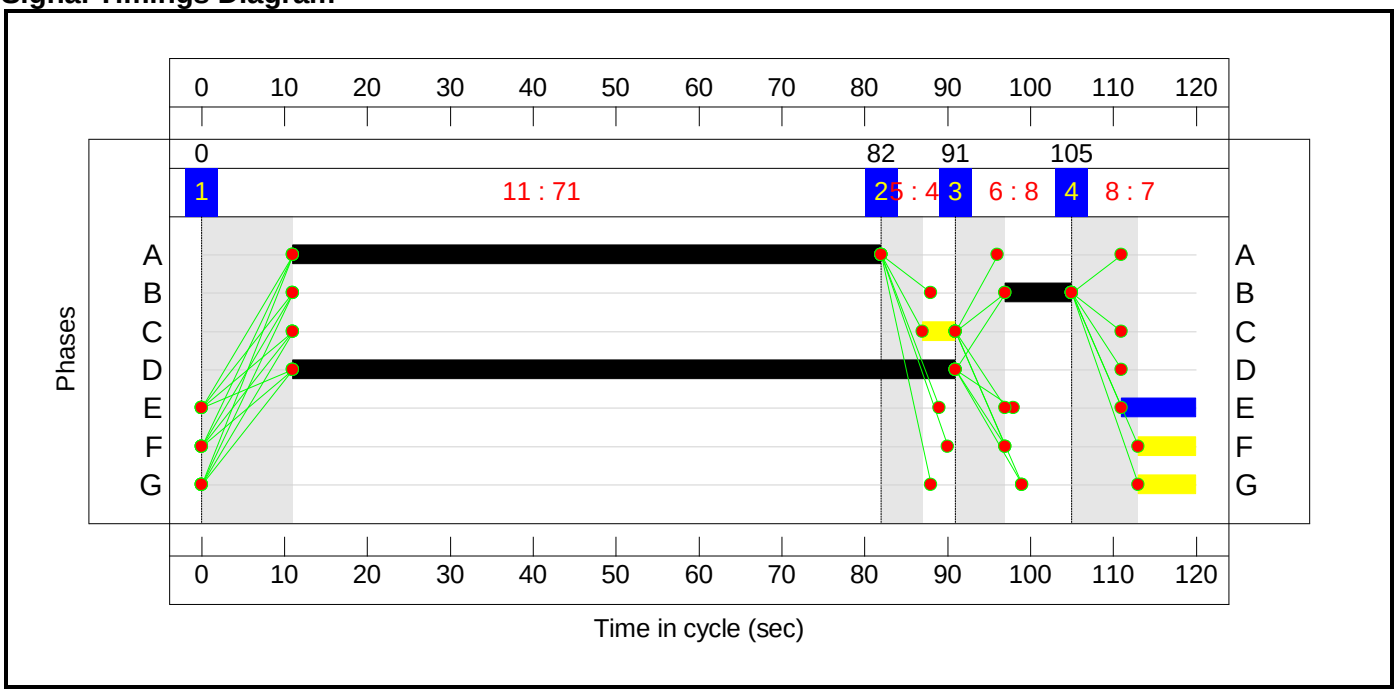
Stage Sequence Diagram



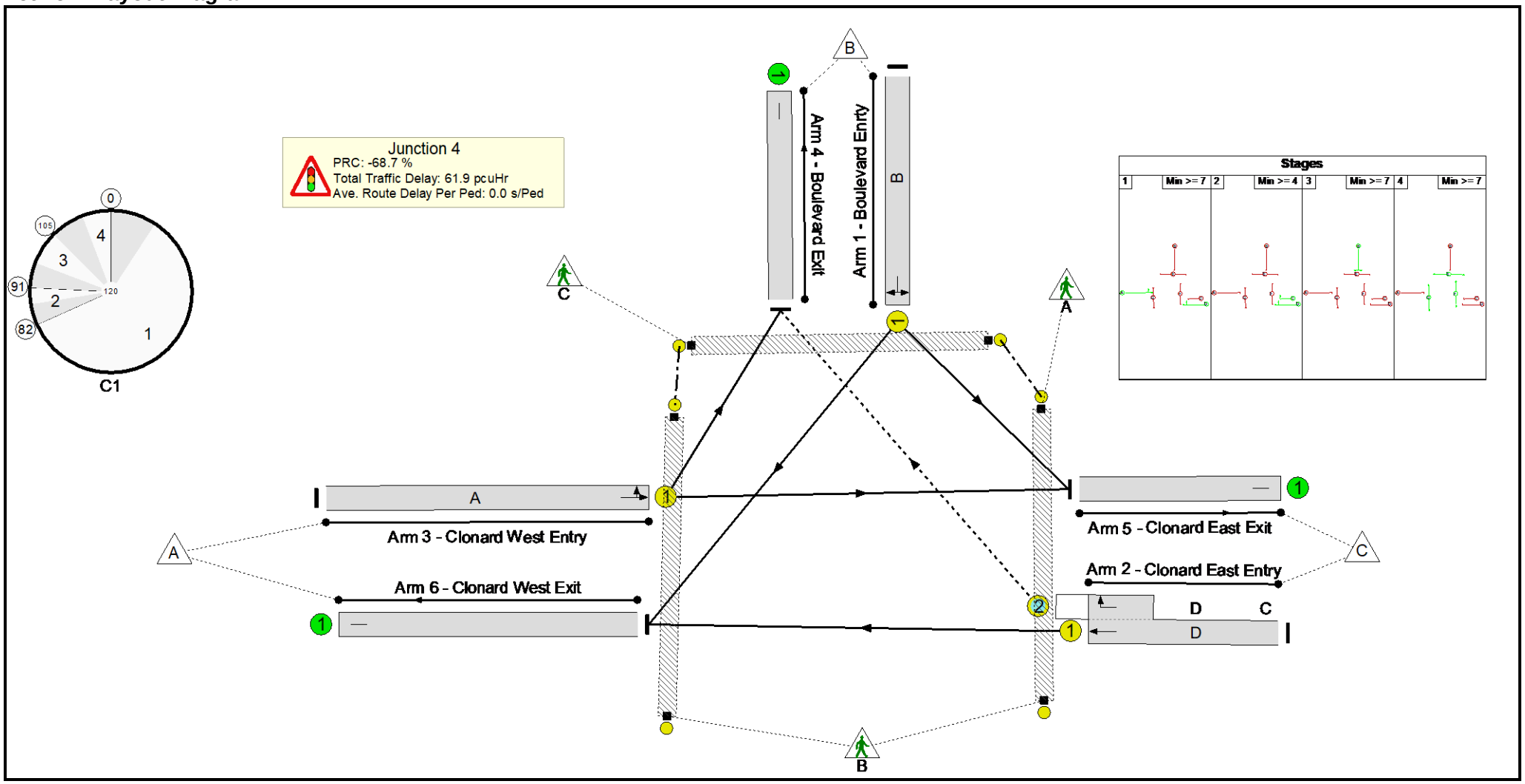
Stage Timings

Stage	1	2	3	4
Duration	71	4	8	7
Change Point	0	82	91	105

Signal Timings Diagram



Network Layout Diagram



Network Results

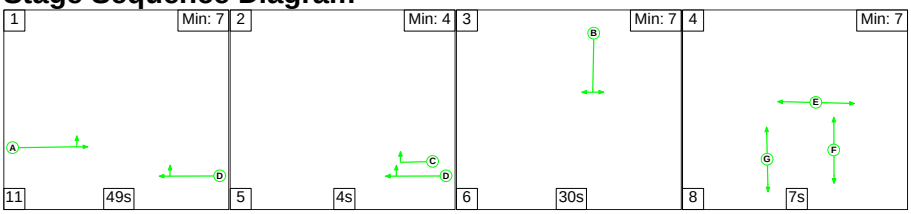
Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**151.8%**
Junction 4	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**151.8%**
1/1	Boulevard Enrty Left Right	U	N/A	N/A	B		1	8	-	202	1774	133	151.8%
2/1+2/2	Clonard East Entry Right Ahead	U+O	N/A	N/A	D	C	1	80	4	686	1980:1891	1211+138	50.9 : 50.9%
3/1	Clonard West Entry Left Ahead	U	N/A	N/A	A		1	71	-	1114	1937	1162	95.9%
4/1	Boulevard Exit	U	N/A	N/A	-		-	-	-	267	Inf	Inf	0.0%
5/1	Clonard East Exit	U	N/A	N/A	-		-	-	-	979	Inf	Inf	0.0%
6/1	Clonard West Exit	U	N/A	N/A	-		-	-	-	756	Inf	Inf	0.0%
Ped Link: P1	Unnamed Ped Link	-	N/A	-	E		1	9	-	0	-	5400	0.0%
Ped Link: P2	Unnamed Ped Link	-	N/A	-	F		1	7	-	0	-	4200	0.0%
Ped Link: P3	Unnamed Ped Link	-	N/A	-	G		1	7	-	0	-	0	0.0%

Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network	**-**	**-**	**13**	**56**	**1**	**16.1**	**44.9**	**0.8**	**61.9**	**-**	**-**	**-**	**-**
Junction 4	**-**	**-**	**13**	**56**	**1**	**16.1**	**44.9**	**0.8**	**61.9**	**-**	**-**	**-**	**-**
1/1	202	133	-	-	-	7.4	35.9	-	43.2	770.7	10.7	35.9	46.5
2/1+2/2	686	686	13	56	1	1.8	0.5	0.8	3.1	16.4	10.6	0.5	11.1
3/1	1114	1114	-	-	-	7.0	8.5	-	15.5	50.2	34.7	8.5	43.2
4/1	267	267	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
5/1	958	958	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	708	708	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
Ped Link: P1	0	0	-	-	-	-	-	-	0.0	0.0	-	-	0.0
Ped Link: P2	0	0	-	-	-	-	-	-	0.0	0.0	-	-	0.0
Ped Link: P3	0	0	-	-	-	-	-	-	-	-	-	-	-

C1 PRC for Signalled Lanes (%): -68.7 Total Delay for Signalled Lanes (pcuHr): 61.89 Cycle Time (s): 120
PRC Over All Lanes (%): -68.7 Total Delay Over All Lanes(pcuHr): 61.89

Scenario 13: 'Scenario D 2025 AM ' (FG13: 'Scenario D 2025 - AM', Plan 1: 'Network Control Plan 1')

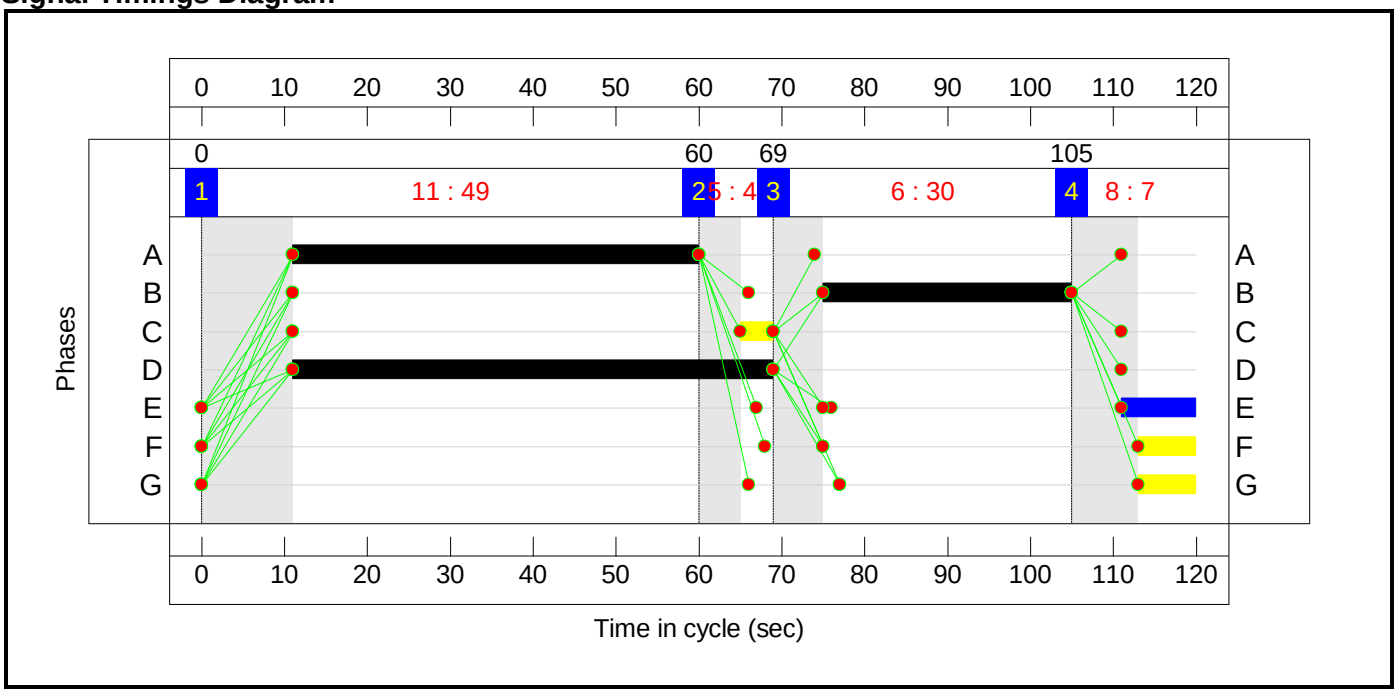
Stage Sequence Diagram



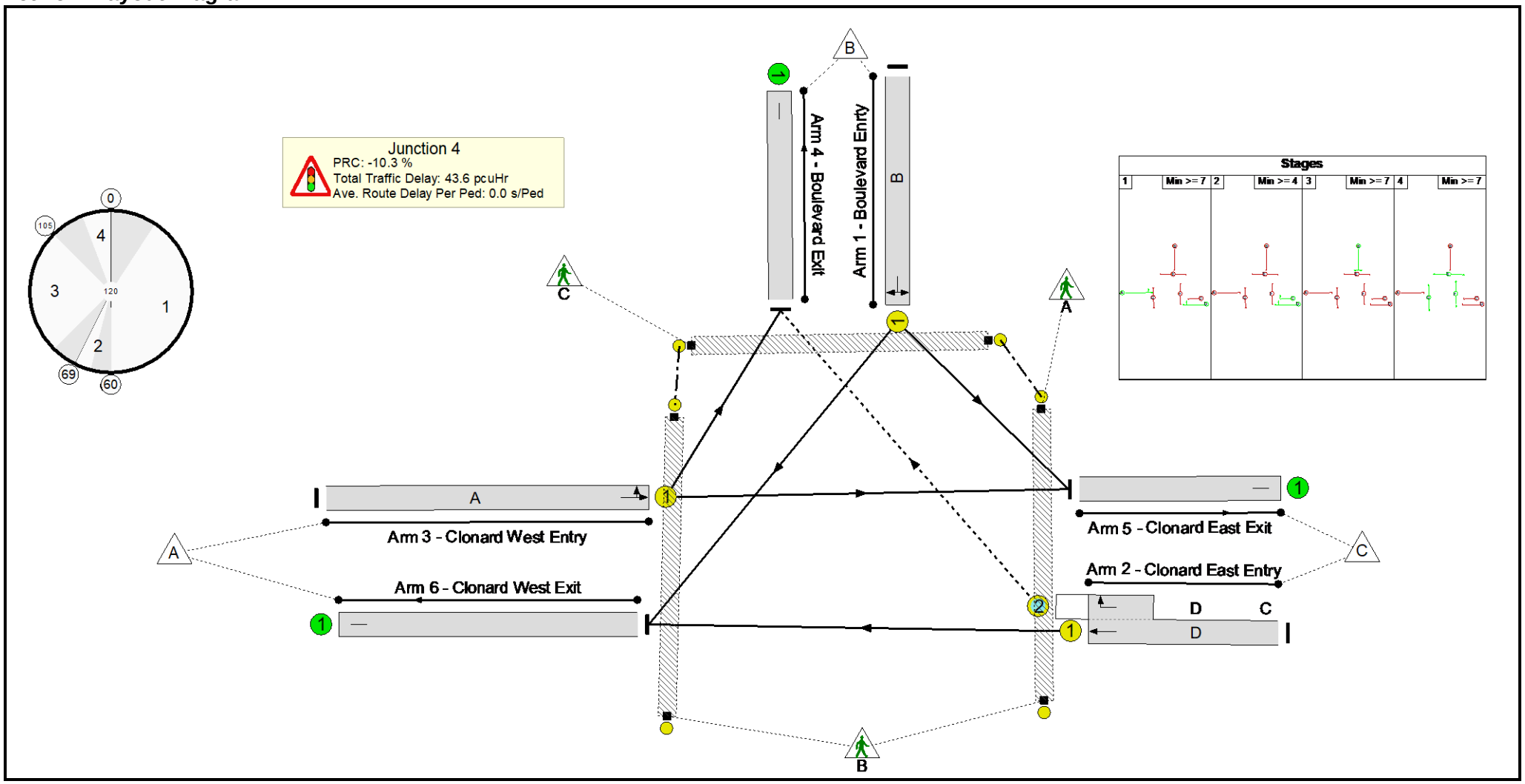
Stage Timings

Stage	1	2	3	4
Duration	49	4	30	7
Change Point	0	60	69	105

Signal Timings Diagram



Network Layout Diagram



Network Results

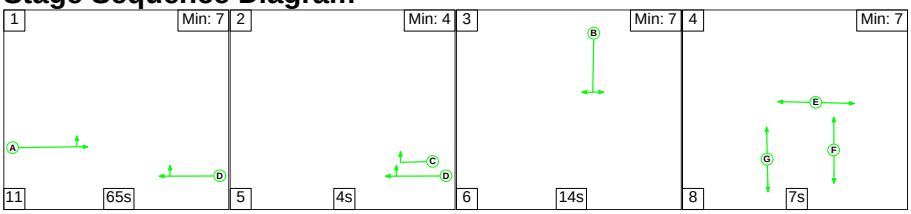
Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**99.3%**
Junction 4	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**99.3%**
1/1	Boulevard Enrty Left Right	U	N/A	N/A	B		1	30	-	455	1774	458	99.3%
2/1+2/2	Clonard East Entry Right Ahead	U+O	N/A	N/A	D	C	1	58	4	852	1980:1891	883+106	86.2 : 86.2%
3/1	Clonard West Entry Left Ahead	U	N/A	N/A	A		1	49	-	787	1927	803	98.0%
4/1	Boulevard Exit	U	N/A	N/A	-		-	-	-	264	Inf	Inf	0.0%
5/1	Clonard East Exit	U	N/A	N/A	-		-	-	-	755	Inf	Inf	0.0%
6/1	Clonard West Exit	U	N/A	N/A	-		-	-	-	1075	Inf	Inf	0.0%
Ped Link: P1	Unnamed Ped Link	-	N/A	-	E		1	9	-	0	-	5400	0.0%
Ped Link: P2	Unnamed Ped Link	-	N/A	-	F		1	7	-	0	-	4200	0.0%
Ped Link: P3	Unnamed Ped Link	-	N/A	-	G		1	7	-	0	-	0	0.0%

Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network	**-**	**-**	**6**	**83**	**2**	**19.5**	**23.5**	**0.6**	**43.6**	**-**	**-**	**-**	**-**
Junction 4	**-**	**-**	**6**	**83**	**2**	**19.5**	**23.5**	**0.6**	**43.6**	**-**	**-**	**-**	**-**
1/1	455	455	-	-	-	5.6	9.9	-	15.5	122.5	15.0	9.9	24.9
2/1+2/2	852	852	6	83	2	6.3	3.0	0.6	9.9	42.0	24.4	3.0	27.4
3/1	787	787	-	-	-	7.5	10.6	-	18.1	83.0	25.8	10.6	36.4
4/1	264	264	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
5/1	755	755	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	1075	1075	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
Ped Link: P1	0	0	-	-	-	-	-	-	0.0	0.0	-	-	0.0
Ped Link: P2	0	0	-	-	-	-	-	-	0.0	0.0	-	-	0.0
Ped Link: P3	0	0	-	-	-	-	-	-	-	-	-	-	-

C1 PRC for Signalled Lanes (%): -10.3 Total Delay for Signalled Lanes (pcuHr): 43.56 Cycle Time (s): 120
PRC Over All Lanes (%): -10.3 Total Delay Over All Lanes(pcuHr): 43.56

Scenario 14: 'Scenario D 2025 PM ' (FG14: 'Scenario D 2025 - PM', Plan 1: 'Network Control Plan 1')

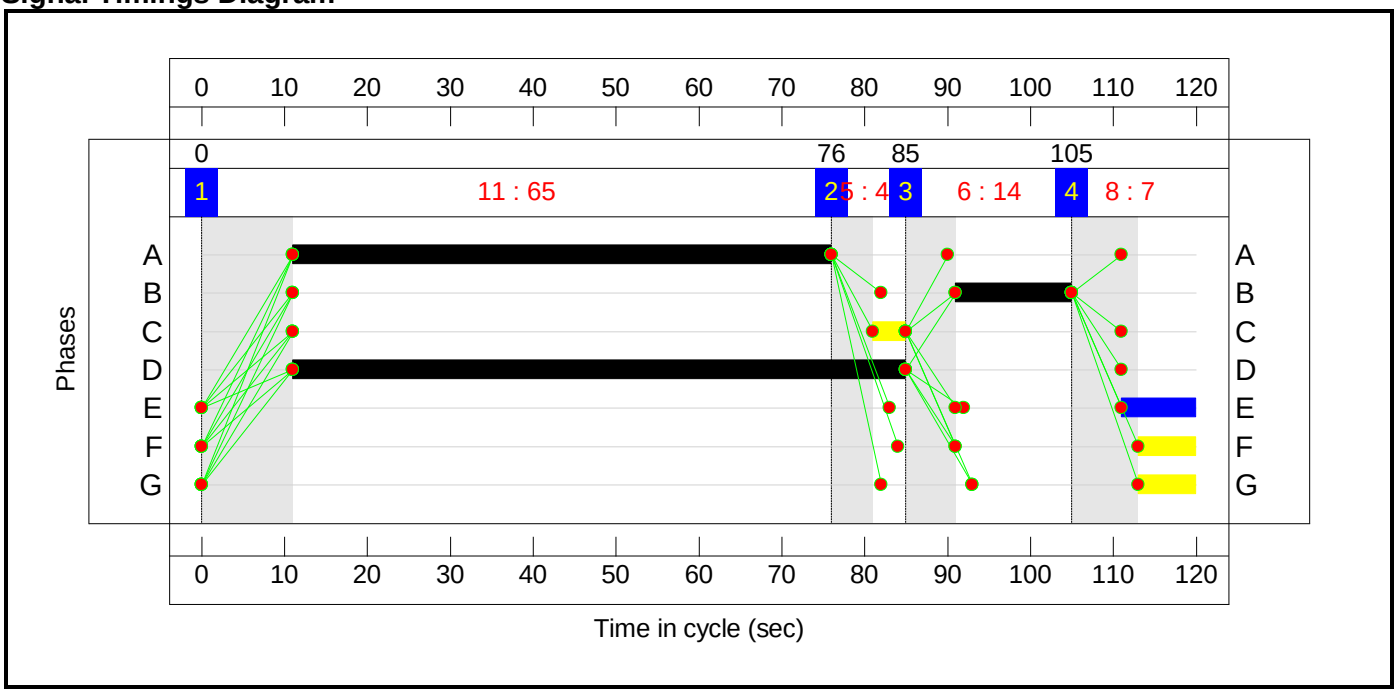
Stage Sequence Diagram



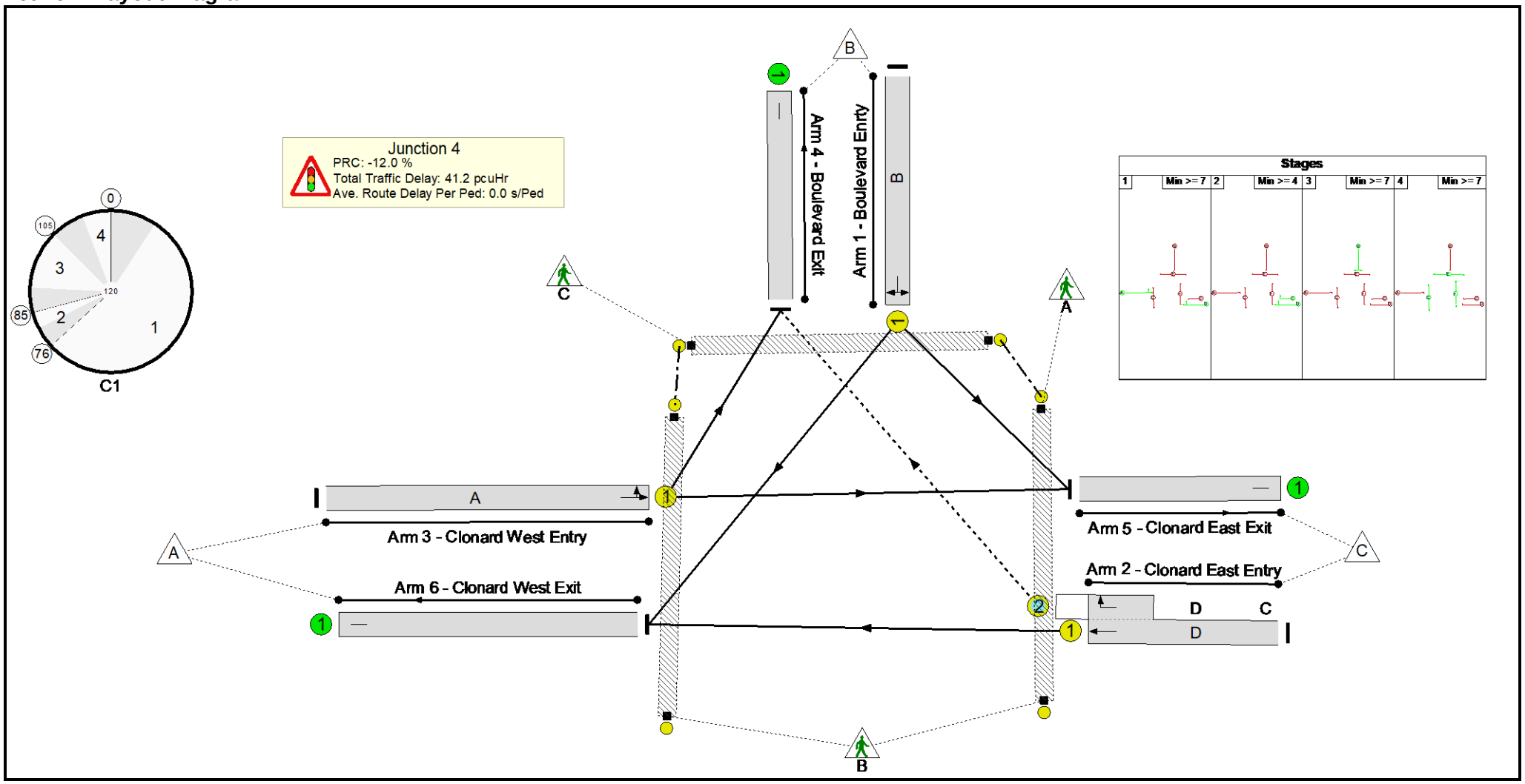
Stage Timings

Stage	1	2	3	4
Duration	65	4	14	7
Change Point	0	76	85	105

Signal Timings Diagram



Network Layout Diagram



Network Results

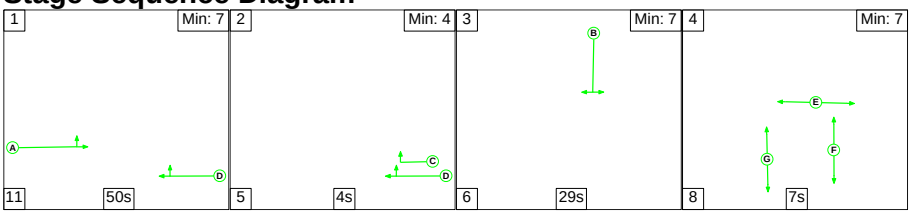
Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**100.8%**
Junction 4	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**100.8%**
1/1	Boulevard Enrty Left Right	U	N/A	N/A	B		1	14	-	221	1774	222	99.7%
2/1+2/2	Clonard East Entry Right Ahead	U+O	N/A	N/A	D	C	1	74	4	644	1980:1891	1073+139	52.7 : 56.9%
3/1	Clonard West Entry Left Ahead	U	N/A	N/A	A		1	65	-	1070	1930	1061	100.8%
4/1	Boulevard Exit	U	N/A	N/A	-		-	-	-	303	Inf	Inf	0.0%
5/1	Clonard East Exit	U	N/A	N/A	-		-	-	-	916	Inf	Inf	0.0%
6/1	Clonard West Exit	U	N/A	N/A	-		-	-	-	716	Inf	Inf	0.0%
Ped Link: P1	Unnamed Ped Link	-	N/A	-	E		1	9	-	0	-	5400	0.0%
Ped Link: P2	Unnamed Ped Link	-	N/A	-	F		1	7	-	0	-	4200	0.0%
Ped Link: P3	Unnamed Ped Link	-	N/A	-	G		1	7	-	0	-	0	0.0%

Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network	**-**	**-**	**0**	**78**	**1**	**13.9**	**26.4**	**0.9**	**41.2**	**-**	**-**	**-**	**-**
Junction 4	**-**	**-**	**0**	**78**	**1**	**13.9**	**26.4**	**0.9**	**41.2**	**-**	**-**	**-**	**-**
1/1	221	221	-	-	-	3.2	7.2	-	10.5	170.5	7.3	7.2	14.6
2/1+2/2	644	644	0	78	1	2.2	0.6	0.9	3.6	20.3	10.9	0.6	11.5
3/1	1070	1061	-	-	-	8.5	18.6	-	27.1	91.2	35.9	18.6	54.6
4/1	301	301	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
5/1	909	909	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	716	716	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
Ped Link: P1	0	0	-	-	-	-	-	-	0.0	0.0	-	-	0.0
Ped Link: P2	0	0	-	-	-	-	-	-	0.0	0.0	-	-	0.0
Ped Link: P3	0	0	-	-	-	-	-	-	-	-	-	-	-

C1 PRC for Signalled Lanes (%): -12.0 Total Delay for Signalled Lanes (pcuHr): 41.20 Cycle Time (s): 120
PRC Over All Lanes (%): -12.0 Total Delay Over All Lanes(pcuHr): 41.20

Scenario 15: 'Scenario D 2030 AM ' (FG15: 'Scenario D 2030 - AM', Plan 1: 'Network Control Plan 1')

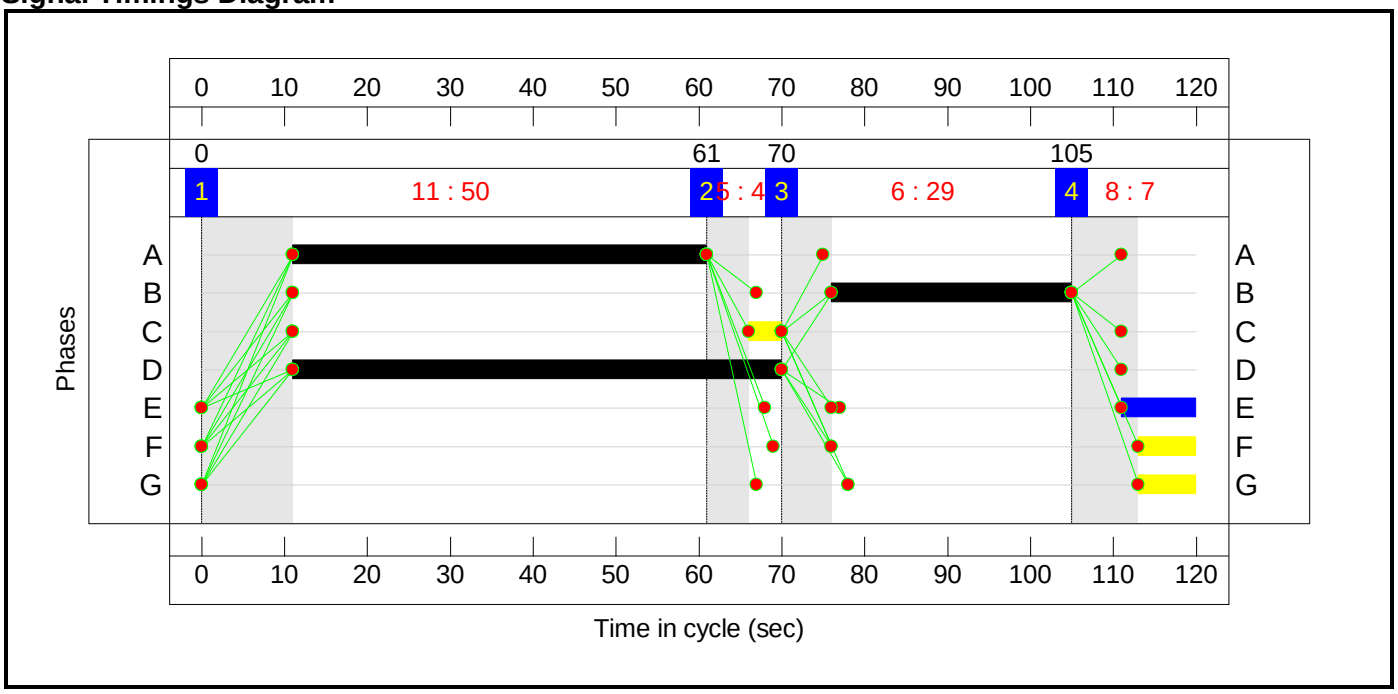
Stage Sequence Diagram



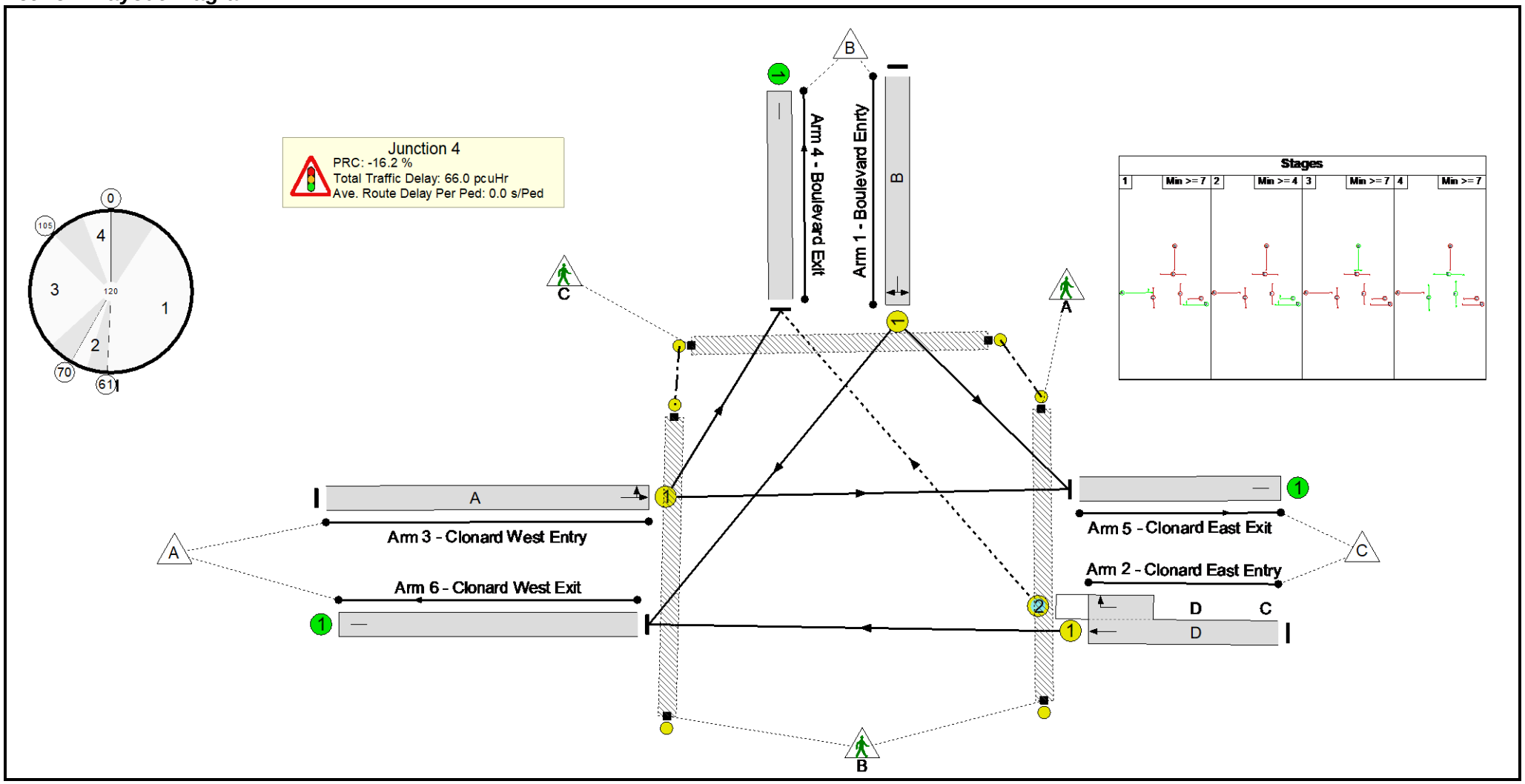
Stage Timings

Stage	1	2	3	4
Duration	50	4	29	7
Change Point	0	61	70	105

Signal Timings Diagram



Network Layout Diagram



Network Results

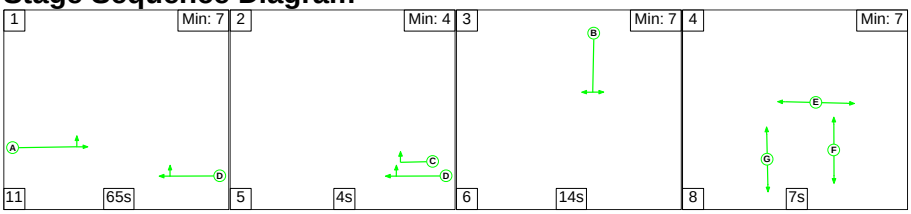
Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**104.6%**
Junction 4	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**104.6%**
1/1	Boulevard Enrty Left Right	U	N/A	N/A	B		1	29	-	464	1774	444	104.6%
2/1+2/2	Clonard East Entry Right Ahead	U+O	N/A	N/A	D	C	1	59	4	913	1980:1891	900+104	90.9 : 90.9%
3/1	Clonard West Entry Left Ahead	U	N/A	N/A	A		1	50	-	841	1928	819	102.6%
4/1	Boulevard Exit	U	N/A	N/A	-		-	-	-	275	Inf	Inf	0.0%
5/1	Clonard East Exit	U	N/A	N/A	-		-	-	-	806	Inf	Inf	0.0%
6/1	Clonard West Exit	U	N/A	N/A	-		-	-	-	1137	Inf	Inf	0.0%
Ped Link: P1	Unnamed Ped Link	-	N/A	-	E		1	9	-	0	-	5400	0.0%
Ped Link: P2	Unnamed Ped Link	-	N/A	-	F		1	7	-	0	-	4200	0.0%
Ped Link: P3	Unnamed Ped Link	-	N/A	-	G		1	7	-	0	-	0	0.0%

Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network	**-**	**-**	**0**	**93**	**2**	**22.9**	**42.5**	**0.6**	**66.0**	**-**	**-**	**-**	**-**
Junction 4	**-**	**-**	**0**	**93**	**2**	**22.9**	**42.5**	**0.6**	**66.0**	**-**	**-**	**-**	**-**
1/1	464	444	-	-	-	6.6	17.1	-	23.7	183.8	16.2	17.1	33.2
2/1+2/2	913	913	0	93	2	7.0	4.6	0.6	12.1	47.8	27.2	4.6	31.7
3/1	841	819	-	-	-	9.3	20.9	-	30.1	129.0	28.8	20.9	49.6
4/1	270	270	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
5/1	783	783	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	1123	1123	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
Ped Link: P1	0	0	-	-	-	-	-	-	0.0	0.0	-	-	0.0
Ped Link: P2	0	0	-	-	-	-	-	-	0.0	0.0	-	-	0.0
Ped Link: P3	0	0	-	-	-	-	-	-	-	-	-	-	-

C1 PRC for Signalled Lanes (%): -16.2 Total Delay for Signalled Lanes (pcuHr): 65.95 Cycle Time (s): 120
PRC Over All Lanes (%): -16.2 Total Delay Over All Lanes(pcuHr): 65.95

Scenario 16: 'Scenario D 2030 PM ' (FG16: 'Scenario D 2030 - PM', Plan 1: 'Network Control Plan 1')

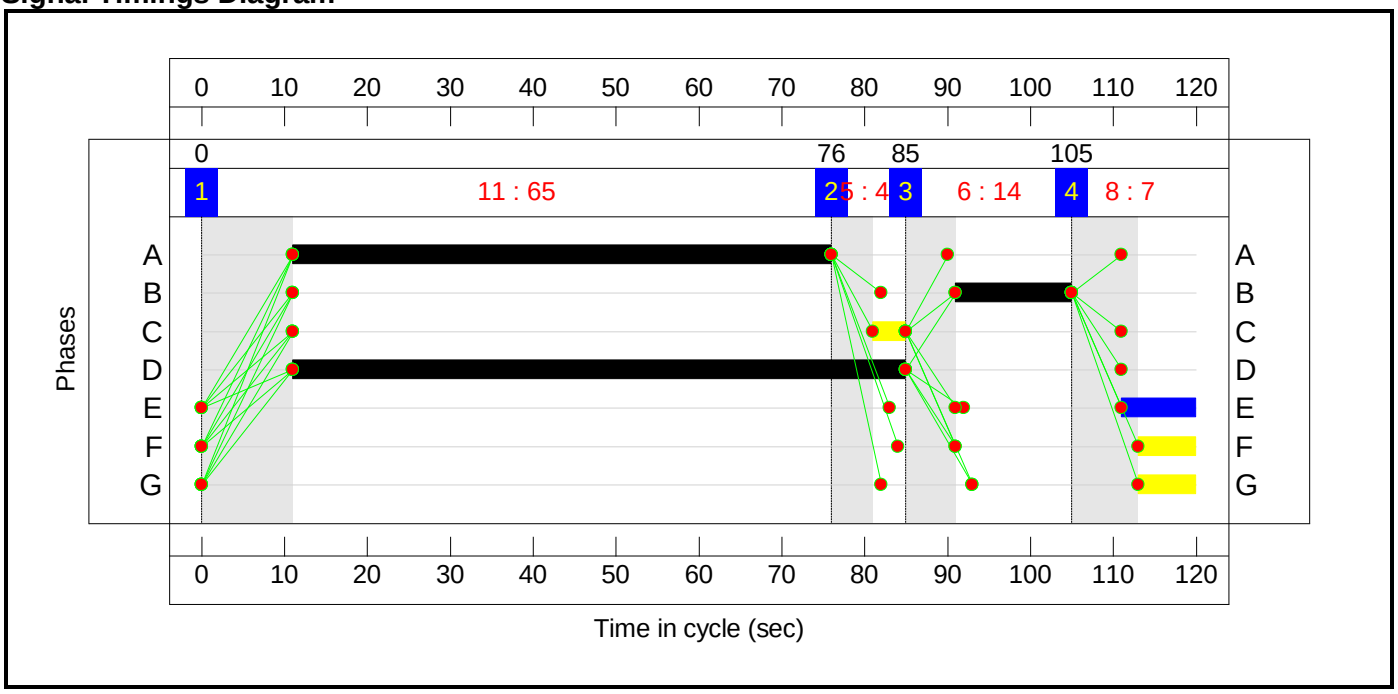
Stage Sequence Diagram



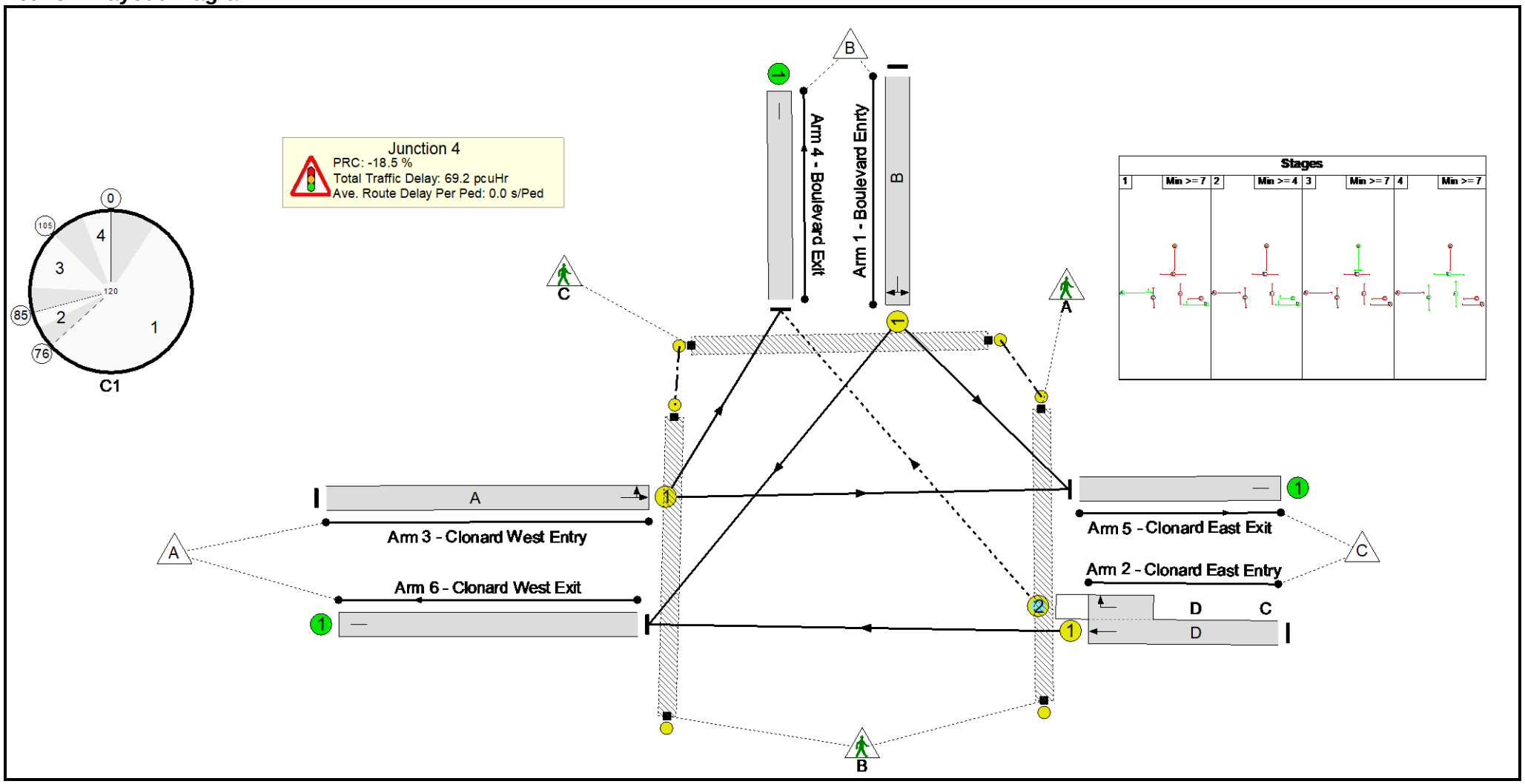
Stage Timings

Stage	1	2	3	4
Duration	65	4	14	7
Change Point	0	76	85	105

Signal Timings Diagram



Network Layout Diagram



Network Results

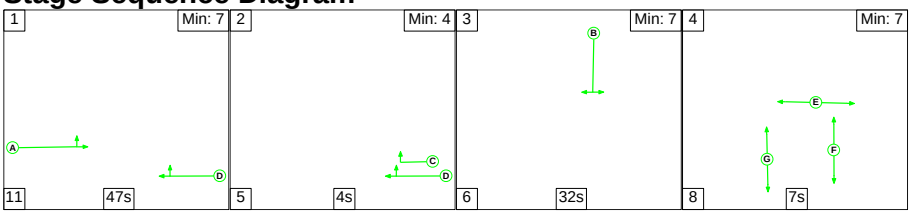
Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**106.6%**
Junction 4	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**106.6%**
1/1	Boulevard Enrty Left Right	U	N/A	N/A	B		1	14	-	223	1774	222	100.6%
2/1+2/2	Clonard East Entry Right Ahead	U+O	N/A	N/A	D	C	1	74	4	686	1980:1891	1107+139	54.8 : 56.9%
3/1	Clonard West Entry Left Ahead	U	N/A	N/A	A		1	65	-	1133	1932	1063	106.6%
4/1	Boulevard Exit	U	N/A	N/A	-		-	-	-	303	Inf	Inf	0.0%
5/1	Clonard East Exit	U	N/A	N/A	-		-	-	-	979	Inf	Inf	0.0%
6/1	Clonard West Exit	U	N/A	N/A	-		-	-	-	760	Inf	Inf	0.0%
Ped Link: P1	Unnamed Ped Link	-	N/A	-	E		1	9	-	0	-	5400	0.0%
Ped Link: P2	Unnamed Ped Link	-	N/A	-	F		1	7	-	0	-	4200	0.0%
Ped Link: P3	Unnamed Ped Link	-	N/A	-	G		1	7	-	0	-	0	0.0%

Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network	**-**	**-**	**0**	**78**	**1**	**18.0**	**50.3**	**0.9**	**69.2**	**-**	**-**	**-**	**-**
Junction 4	**-**	**-**	**0**	**78**	**1**	**18.0**	**50.3**	**0.9**	**69.2**	**-**	**-**	**-**	**-**
1/1	223	222	-	-	-	3.3	7.8	-	11.1	179.0	7.5	7.8	15.3
2/1+2/2	686	686	0	78	1	2.4	0.6	0.9	3.9	20.3	12.2	0.6	12.9
3/1	1133	1063	-	-	-	12.3	42.0	-	54.3	172.4	40.1	42.0	82.1
4/1	289	289	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
5/1	922	922	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	759	759	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
Ped Link: P1	0	0	-	-	-	-	-	-	0.0	0.0	-	-	0.0
Ped Link: P2	0	0	-	-	-	-	-	-	0.0	0.0	-	-	0.0
Ped Link: P3	0	0	-	-	-	-	-	-	-	-	-	-	-

C1 PRC for Signalled Lanes (%): -18.5 Total Delay for Signalled Lanes (pcuHr): 69.22 Cycle Time (s): 120
PRC Over All Lanes (%): -18.5 Total Delay Over All Lanes(pcuHr): 69.22

Scenario 17: 'Scenario E 2025 AM ' (FG17: 'Scenario E 2025 - AM', Plan 1: 'Network Control Plan 1')

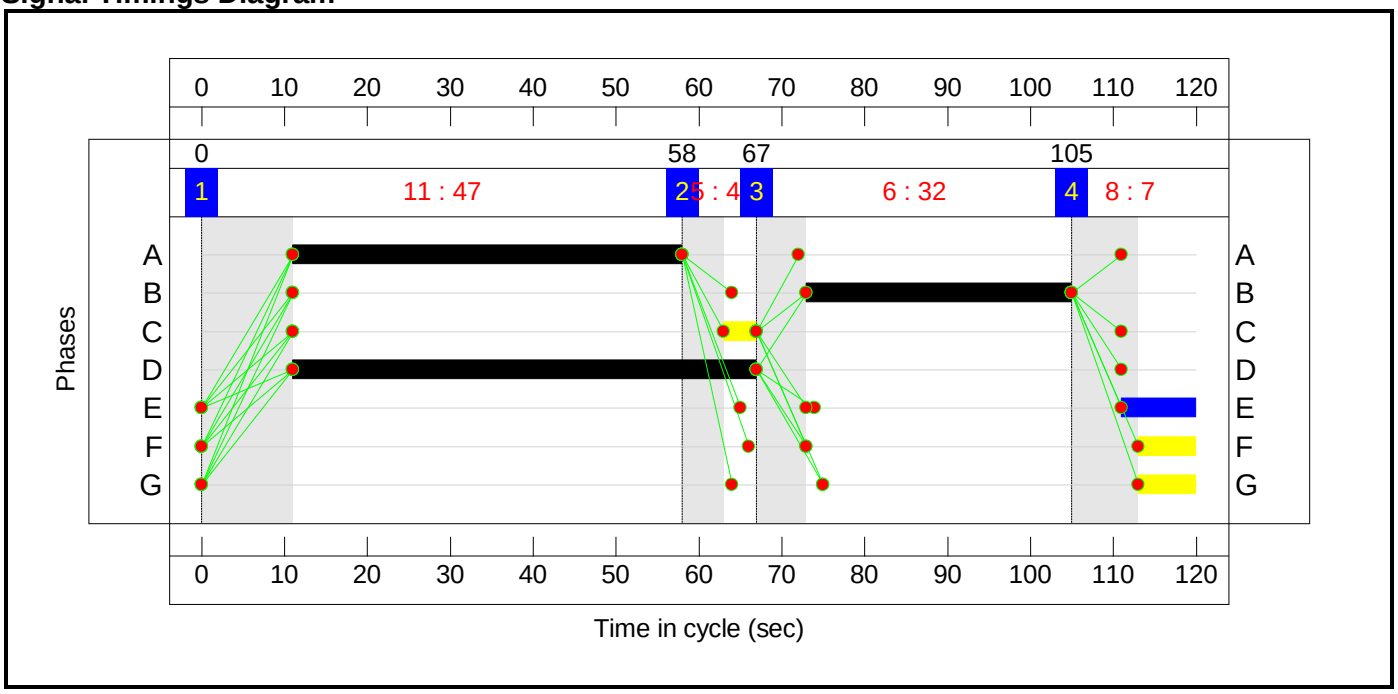
Stage Sequence Diagram



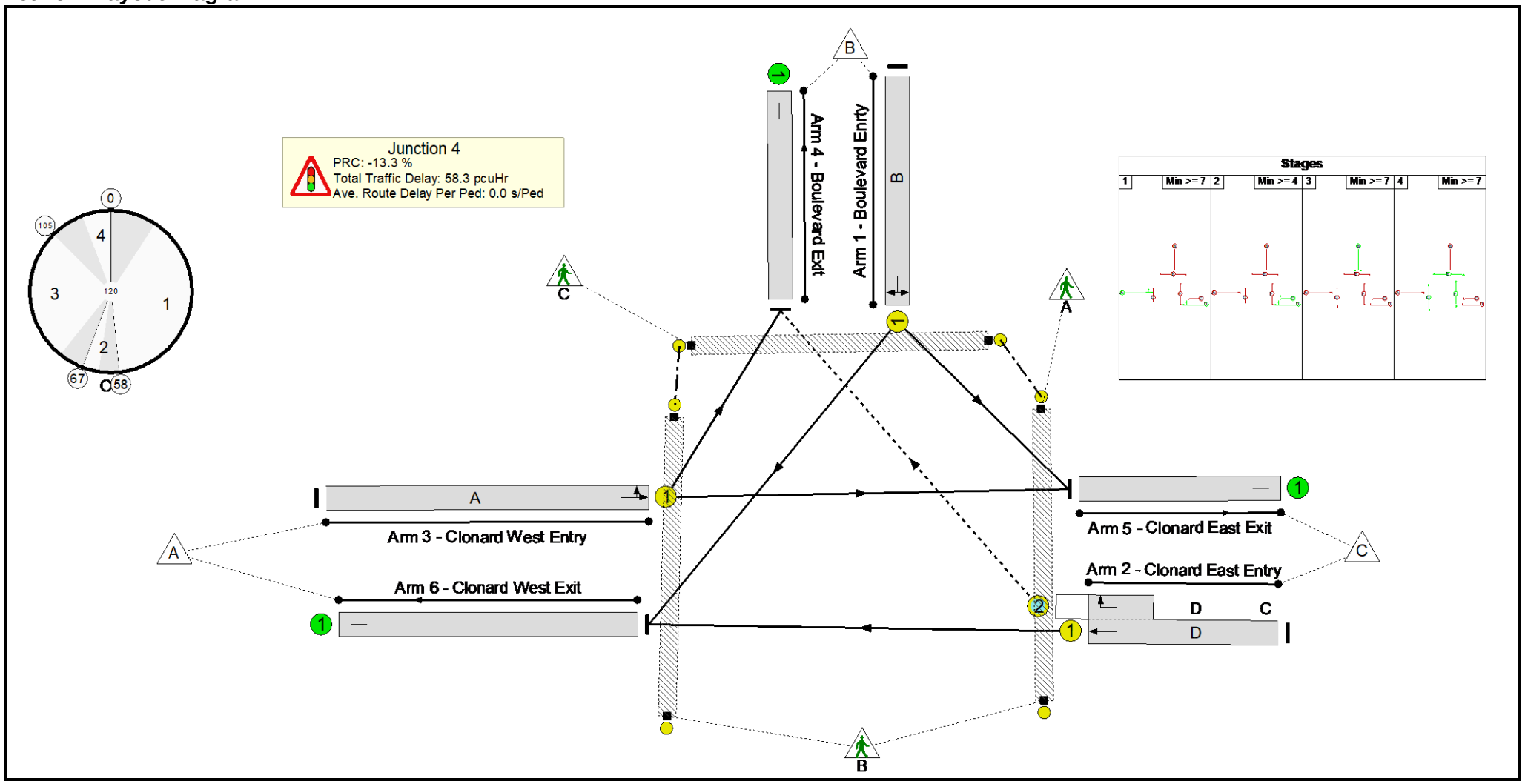
Stage Timings

Stage	1	2	3	4
Duration	47	4	32	7
Change Point	0	58	67	105

Signal Timings Diagram



Network Layout Diagram



Network Results

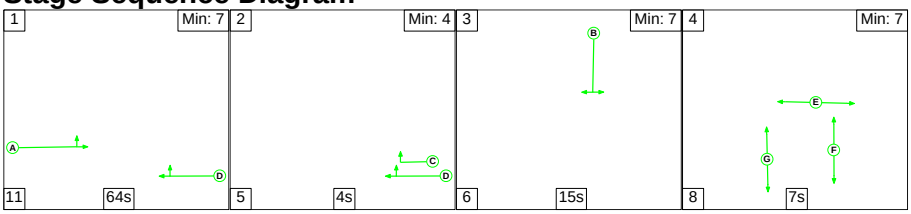
Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**102.0%**
Junction 4	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**102.0%**
1/1	Boulevard Enrty Left Right	U	N/A	N/A	B		1	32	-	497	1774	488	101.9%
2/1+2/2	Clonard East Entry Right Ahead	U+O	N/A	N/A	D	C	1	56	4	852	1980:1891	849+107	89.1 : 89.1%
3/1	Clonard West Entry Left Ahead	U	N/A	N/A	A		1	47	-	785	1924	770	102.0%
4/1	Boulevard Exit	U	N/A	N/A	-		-	-	-	277	Inf	Inf	0.0%
5/1	Clonard East Exit	U	N/A	N/A	-		-	-	-	756	Inf	Inf	0.0%
6/1	Clonard West Exit	U	N/A	N/A	-		-	-	-	1101	Inf	Inf	0.0%
Ped Link: P1	Unnamed Ped Link	-	N/A	-	E		1	9	-	0	-	5400	0.0%
Ped Link: P2	Unnamed Ped Link	-	N/A	-	F		1	7	-	0	-	4200	0.0%
Ped Link: P3	Unnamed Ped Link	-	N/A	-	G		1	7	-	0	-	0	0.0%

Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network	**-**	**-**	**0**	**93**	**2**	**21.9**	**35.9**	**0.6**	**58.3**	**-**	**-**	**-**	**-**
Junction 4	**-**	**-**	**0**	**93**	**2**	**21.9**	**35.9**	**0.6**	**58.3**	**-**	**-**	**-**	**-**
1/1	497	488	-	-	-	6.4	13.7	-	20.1	145.2	16.9	13.7	30.5
2/1+2/2	852	852	0	93	2	6.8	3.8	0.6	11.2	47.2	25.1	3.8	28.9
3/1	785	770	-	-	-	8.7	18.4	-	27.1	124.3	26.7	18.4	45.1
4/1	273	273	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
5/1	741	741	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	1095	1095	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
Ped Link: P1	0	0	-	-	-	-	-	-	0.0	0.0	-	-	0.0
Ped Link: P2	0	0	-	-	-	-	-	-	0.0	0.0	-	-	0.0
Ped Link: P3	0	0	-	-	-	-	-	-	-	-	-	-	-

C1 PRC for Signalled Lanes (%): -13.3 Total Delay for Signalled Lanes (pcuHr): 58.32 Cycle Time (s): 120
PRC Over All Lanes (%): -13.3 Total Delay Over All Lanes(pcuHr): 58.32

Scenario 18: 'Scenario E 2025 PM ' (FG18: 'Scenario E 2025 - PM', Plan 1: 'Network Control Plan 1')

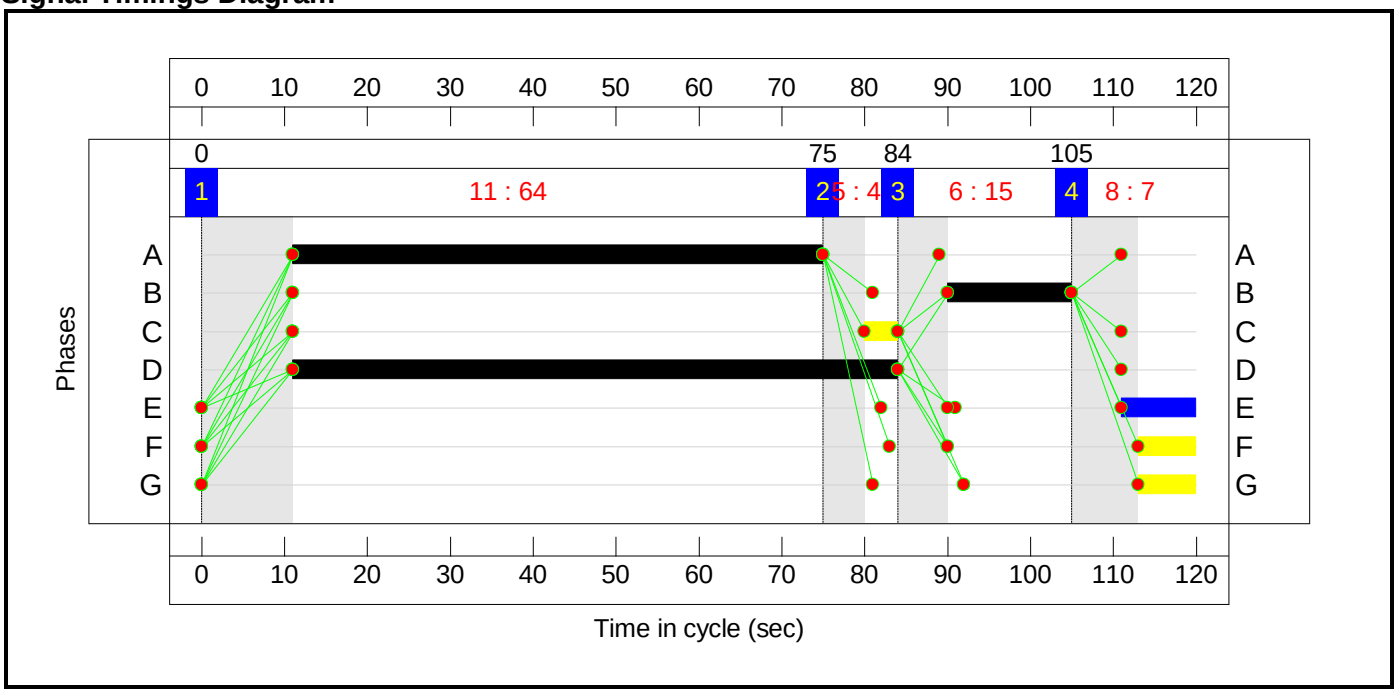
Stage Sequence Diagram



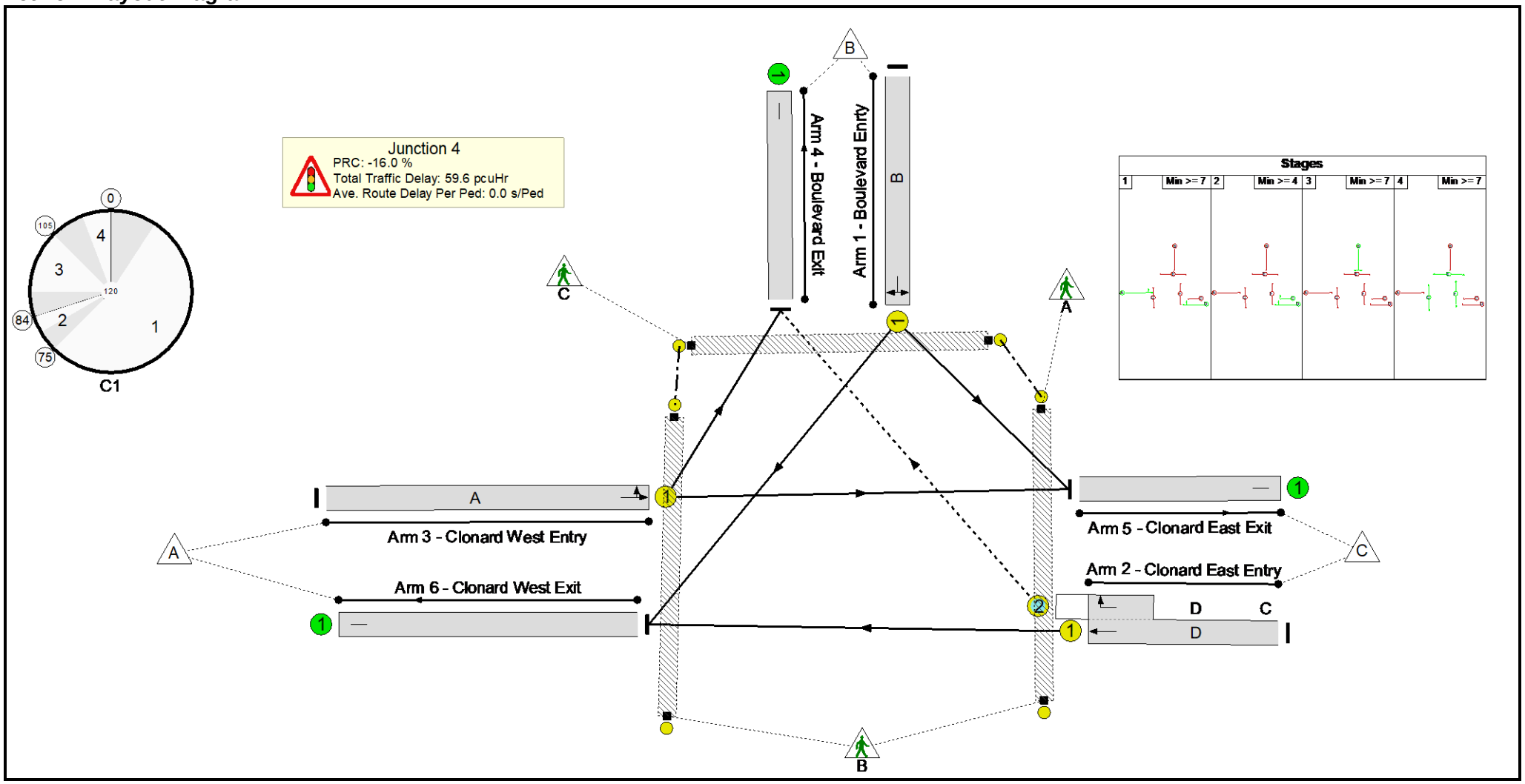
Stage Timings

Stage	1	2	3	4
Duration	64	4	15	7
Change Point	0	75	84	105

Signal Timings Diagram



Network Layout Diagram



Network Results

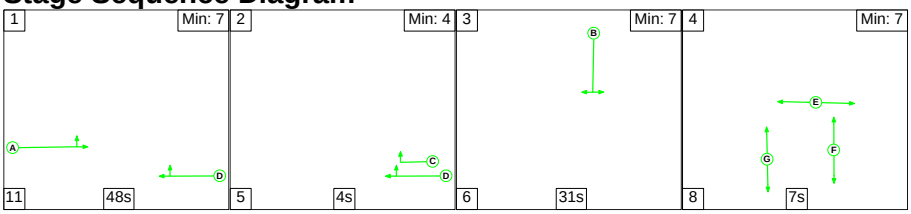
Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**104.4%**
Junction 4	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**104.4%**
1/1	Boulevard Enrty Left Right	U	N/A	N/A	B		1	15	-	242	1774	237	102.3%
2/1+2/2	Clonard East Entry Right Ahead	U+O	N/A	N/A	D	C	1	73	4	644	1980:1891	889+139	62.7 : 62.7%
3/1	Clonard West Entry Left Ahead	U	N/A	N/A	A		1	64	-	1089	1925	1043	104.4%
4/1	Boulevard Exit	U	N/A	N/A	-		-	-	-	338	Inf	Inf	0.0%
5/1	Clonard East Exit	U	N/A	N/A	-		-	-	-	915	Inf	Inf	0.0%
6/1	Clonard West Exit	U	N/A	N/A	-		-	-	-	722	Inf	Inf	0.0%
Ped Link: P1	Unnamed Ped Link	-	N/A	-	E		1	9	-	0	-	5400	0.0%
Ped Link: P2	Unnamed Ped Link	-	N/A	-	F		1	7	-	0	-	4200	0.0%
Ped Link: P3	Unnamed Ped Link	-	N/A	-	G		1	7	-	0	-	0	0.0%

Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network	**-**	**-**	**0**	**86**	**1**	**16.9**	**41.8**	**0.9**	**59.6**	**-**	**-**	**-**	**-**
Junction 4	**-**	**-**	**0**	**86**	**1**	**16.9**	**41.8**	**0.9**	**59.6**	**-**	**-**	**-**	**-**
1/1	242	237	-	-	-	3.7	9.3	-	13.0	193.0	8.2	9.3	17.5
2/1+2/2	644	644	0	86	1	2.3	0.8	0.9	4.1	22.8	11.2	0.8	12.0
3/1	1089	1043	-	-	-	10.8	31.7	-	42.6	140.7	37.8	31.7	69.6
4/1	327	327	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
5/1	878	878	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	718	718	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
Ped Link: P1	0	0	-	-	-	-	-	-	0.0	0.0	-	-	0.0
Ped Link: P2	0	0	-	-	-	-	-	-	0.0	0.0	-	-	0.0
Ped Link: P3	0	0	-	-	-	-	-	-	-	-	-	-	-

C1 PRC for Signalled Lanes (%): -16.0 Total Delay for Signalled Lanes (pcuHr): 59.60 Cycle Time (s): 120
PRC Over All Lanes (%): -16.0 Total Delay Over All Lanes(pcuHr): 59.60

Scenario 19: 'Scenario E 2030 AM ' (FG19: 'Scenario E 2030 - AM', Plan 1: 'Network Control Plan 1')

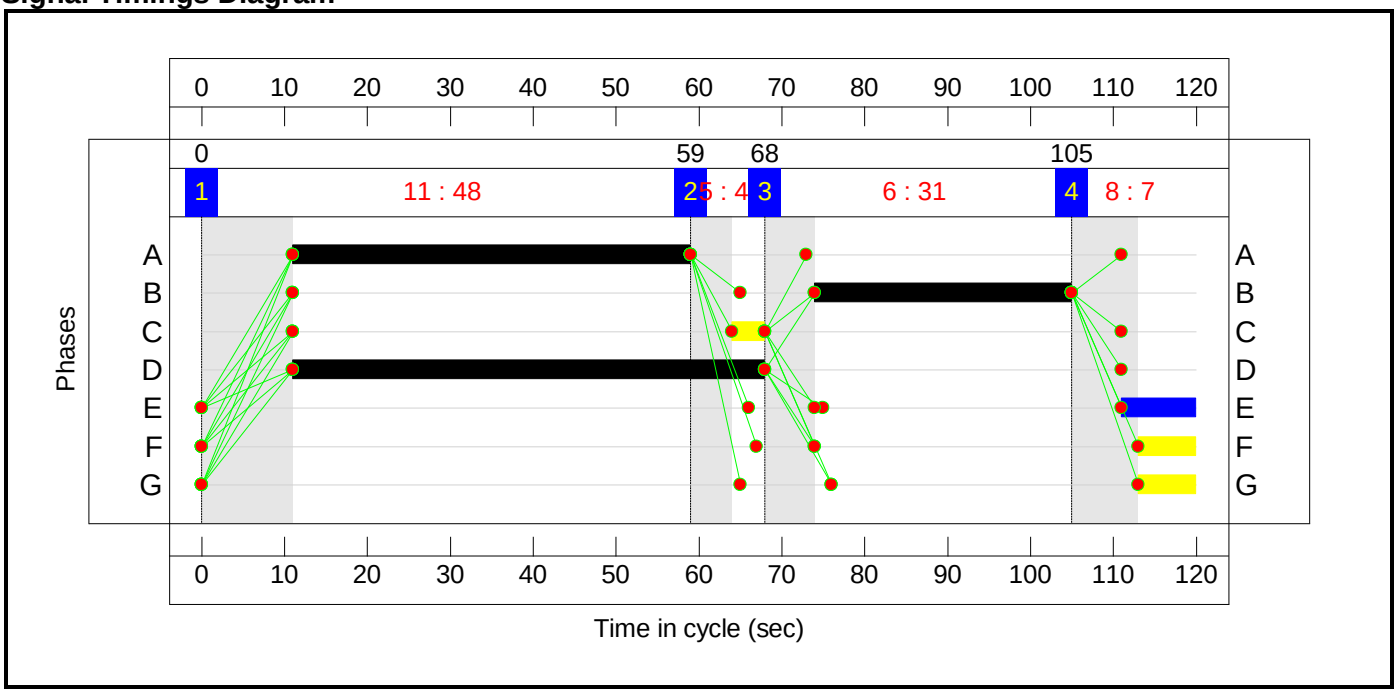
Stage Sequence Diagram



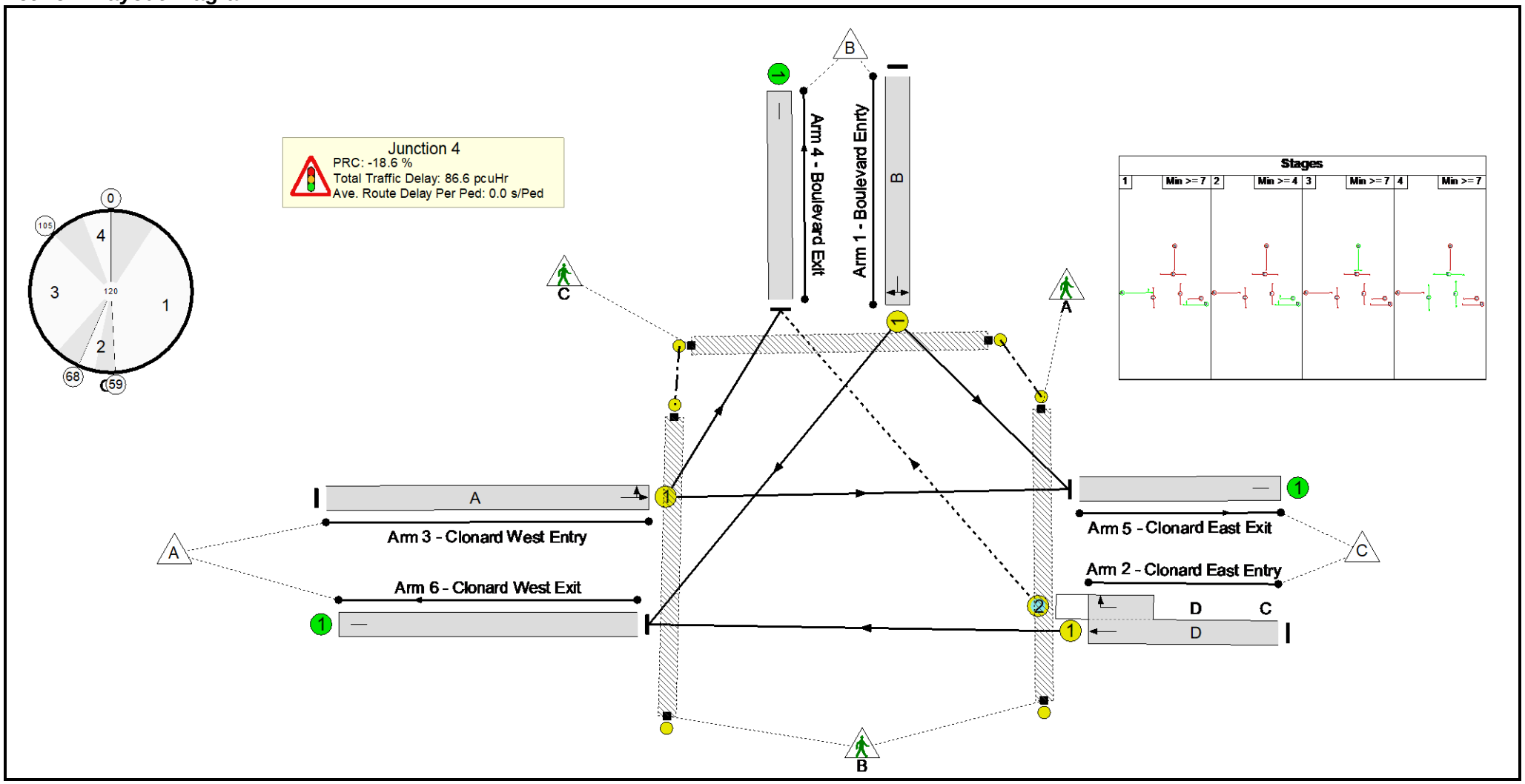
Stage Timings

Stage	1	2	3	4
Duration	48	4	31	7
Change Point	0	59	68	105

Signal Timings Diagram



Network Layout Diagram



Network Results

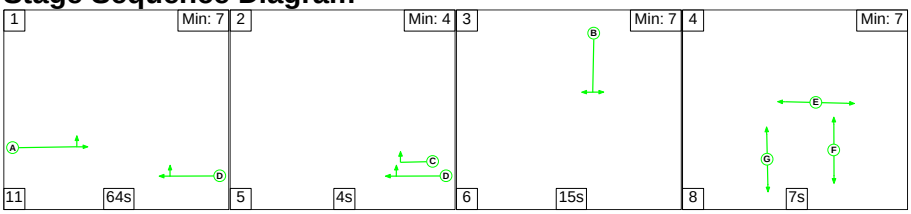
Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**106.8%**
Junction 4	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**106.8%**
1/1	Boulevard Enrty Left Right	U	N/A	N/A	B		1	31	-	505	1774	473	106.8%
2/1+2/2	Clonard East Entry Right Ahead	U+O	N/A	N/A	D	C	1	57	4	913	1980:1891	866+105	93.9 : 93.9%
3/1	Clonard West Entry Left Ahead	U	N/A	N/A	A		1	48	-	837	1926	786	106.4%
4/1	Boulevard Exit	U	N/A	N/A	-		-	-	-	287	Inf	Inf	0.0%
5/1	Clonard East Exit	U	N/A	N/A	-		-	-	-	805	Inf	Inf	0.0%
6/1	Clonard West Exit	U	N/A	N/A	-		-	-	-	1163	Inf	Inf	0.0%
Ped Link: P1	Unnamed Ped Link	-	N/A	-	E		1	9	-	0	-	5400	0.0%
Ped Link: P2	Unnamed Ped Link	-	N/A	-	F		1	7	-	0	-	4200	0.0%
Ped Link: P3	Unnamed Ped Link	-	N/A	-	G		1	7	-	0	-	0	0.0%

Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network	**-**	**-**	**0**	**97**	**2**	**26.0**	**60.0**	**0.6**	**86.6**	**-**	**-**	**-**	**-**
Junction 4	**-**	**-**	**0**	**97**	**2**	**26.0**	**60.0**	**0.6**	**86.6**	**-**	**-**	**-**	**-**
1/1	505	473	-	-	-	7.5	21.8	-	29.3	208.6	17.9	21.8	39.7
2/1+2/2	913	913	0	97	2	7.4	6.4	0.6	14.4	56.7	28.2	6.4	34.5
3/1	837	786	-	-	-	11.1	31.8	-	42.9	184.7	29.6	31.8	61.4
4/1	276	276	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
5/1	756	756	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	1141	1141	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
Ped Link: P1	0	0	-	-	-	-	-	-	0.0	0.0	-	-	0.0
Ped Link: P2	0	0	-	-	-	-	-	-	0.0	0.0	-	-	0.0
Ped Link: P3	0	0	-	-	-	-	-	-	-	-	-	-	-

C1 PRC for Signalled Lanes (%): -18.6 Total Delay for Signalled Lanes (pcuHr): 86.59 Cycle Time (s): 120
PRC Over All Lanes (%): -18.6 Total Delay Over All Lanes(pcuHr): 86.59

Scenario 20: 'Scenario E 2030 PM ' (FG20: 'Scenario E 2030 - PM', Plan 1: 'Network Control Plan 1')

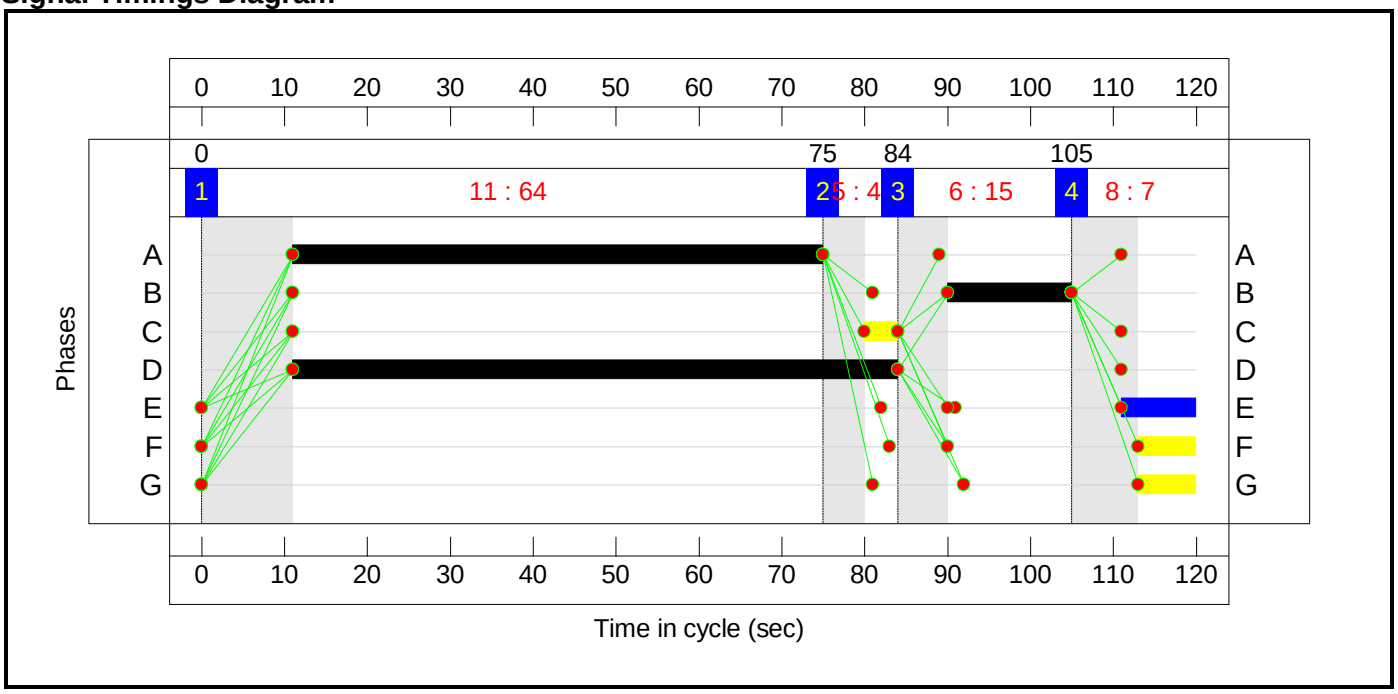
Stage Sequence Diagram



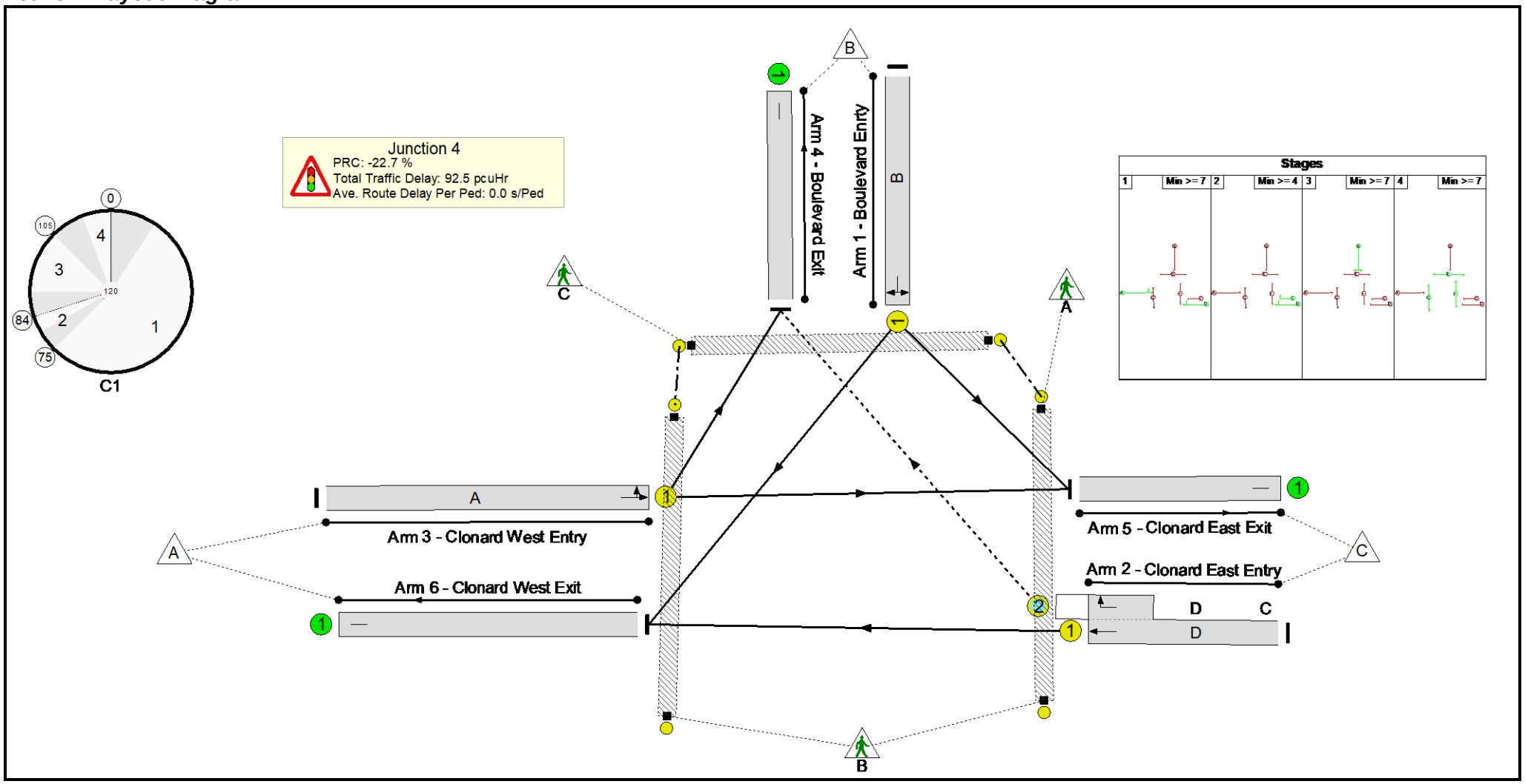
Stage Timings

Stage	1	2	3	4
Duration	64	4	15	7
Change Point	0	75	84	105

Signal Timings Diagram



Network Layout Diagram



Network Results

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**110.5%**
Junction 4	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**110.5%**
1/1	Boulevard Enrty Left Right	U	N/A	N/A	B		1	15	-	245	1774	237	103.6%
2/1+2/2	Clonard East Entry Right Ahead	U+O	N/A	N/A	D	C	1	73	4	685	1980:1891	991+139	60.3 : 62.7%
3/1	Clonard West Entry Left Ahead	U	N/A	N/A	A		1	64	-	1153	1927	1044	110.5%
4/1	Boulevard Exit	U	N/A	N/A	-		-	-	-	339	Inf	Inf	0.0%
5/1	Clonard East Exit	U	N/A	N/A	-		-	-	-	979	Inf	Inf	0.0%
6/1	Clonard West Exit	U	N/A	N/A	-		-	-	-	765	Inf	Inf	0.0%
Ped Link: P1	Unnamed Ped Link	-	N/A	-	E		1	9	-	0	-	5400	0.0%
Ped Link: P2	Unnamed Ped Link	-	N/A	-	F		1	7	-	0	-	4200	0.0%
Ped Link: P3	Unnamed Ped Link	-	N/A	-	G		1	7	-	0	-	0	0.0%

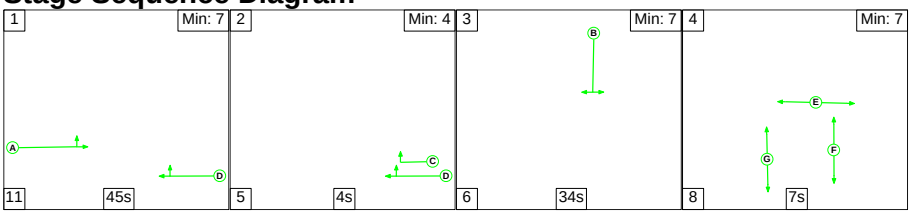
Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network	**-**	**-**	**0**	**86**	**1**	**21.1**	**70.4**	**0.9**	**92.5**	**-**	**-**	**-**	**-**
Junction 4	**-**	**-**	**0**	**86**	**1**	**21.1**	**70.4**	**0.9**	**92.5**	**-**	**-**	**-**	**-**
1/1	245	237	-	-	-	3.9	10.2	-	14.1	207.1	8.4	10.2	18.7
2/1+2/2	685	685	0	86	1	2.6	0.8	0.9	4.2	22.1	12.4	0.8	13.1
3/1	1153	1044	-	-	-	14.7	59.5	-	74.2	231.6	42.1	59.5	101.5
4/1	315	315	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
5/1	891	891	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	759	759	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
Ped Link: P1	0	0	-	-	-	-	-	-	0.0	0.0	-	-	0.0
Ped Link: P2	0	0	-	-	-	-	-	-	0.0	0.0	-	-	0.0
Ped Link: P3	0	0	-	-	-	-	-	-	-	-	-	-	-

C1 PRC for Signalled Lanes (%): -22.7 Total Delay for Signalled Lanes (pcuHr): 92.48 Cycle Time (s): 120

PRC Over All Lanes (%): -22.7 Total Delay Over All Lanes(pcuHr): 92.48

Scenario 21: 'Scenario F 2025 AM ' (FG21: 'Scenario F 2025 - AM', Plan 1: 'Network Control Plan 1')

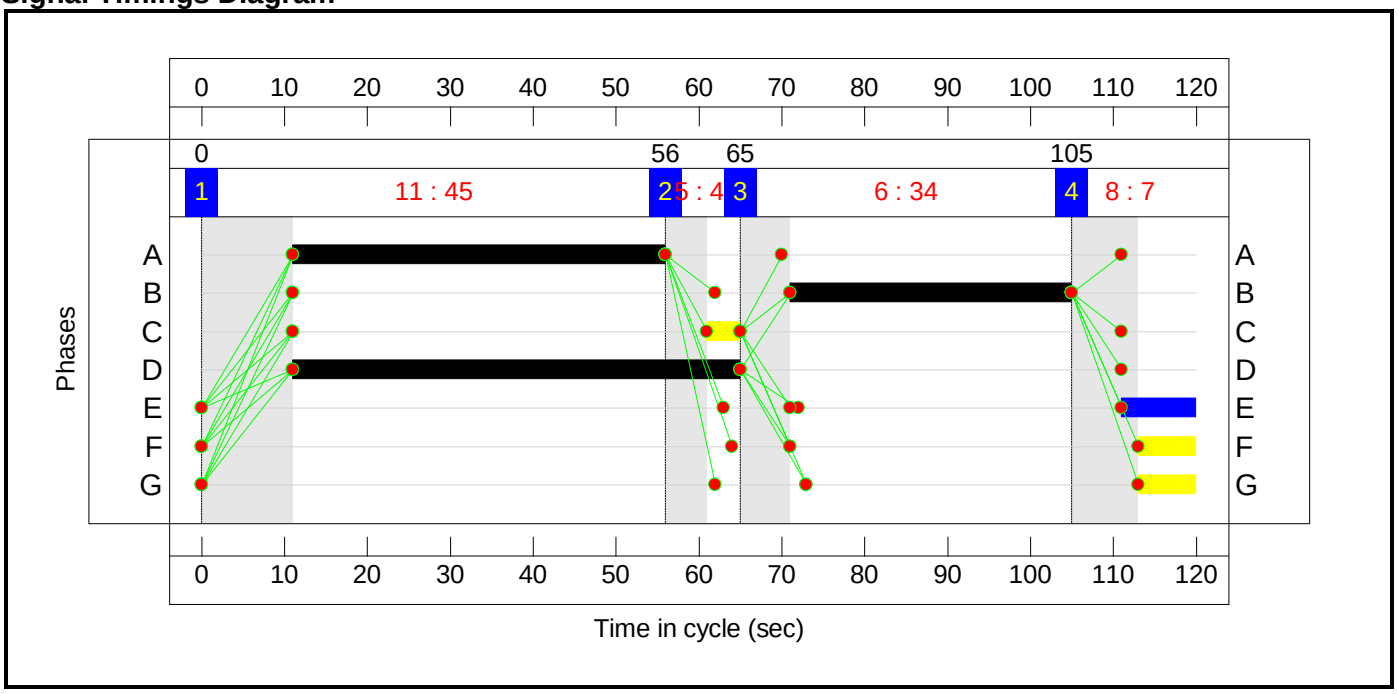
Stage Sequence Diagram



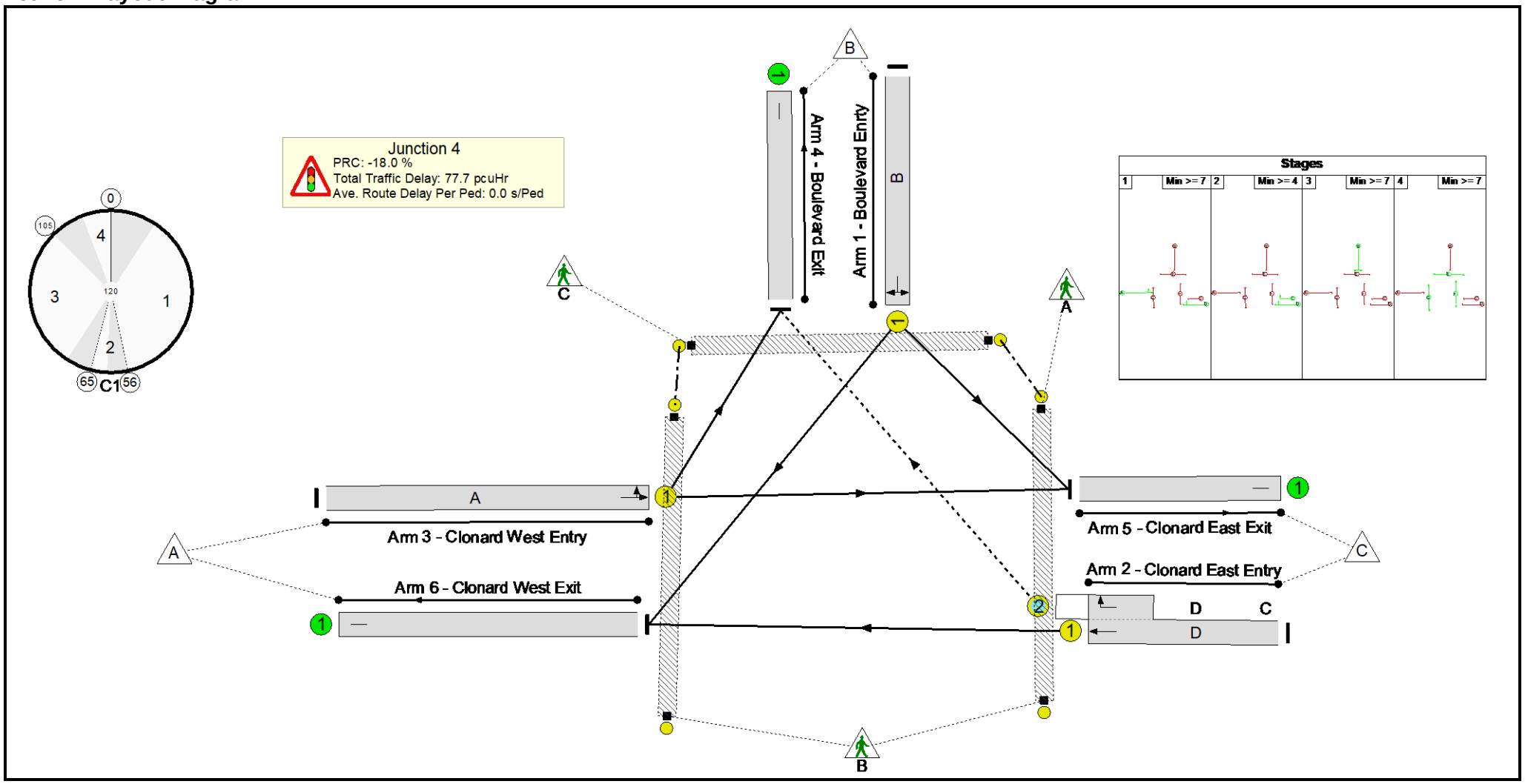
Stage Timings

Stage	1	2	3	4
Duration	45	4	34	7
Change Point	0	56	65	105

Signal Timings Diagram



Network Layout Diagram



Network Results

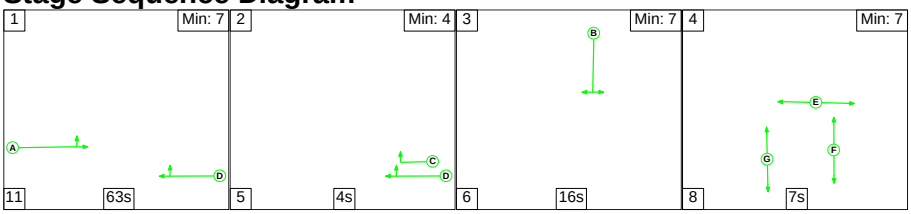
Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network	-	-	**N/A**	-	-		-	-	-	-	-	-	**106.2%**
Junction 4	-	-	**N/A**	-	-		-	-	-	-	-	-	**106.2%**
1/1	Boulevard Enrty Left Right	U	N/A	N/A	B		1	34	-	537	1774	517	103.8%
2/1+2/2	Clonard East Entry Right Ahead	U+O	N/A	N/A	D	C	1	54	4	853	1980:1891	816+107	92.4 : 92.4%
3/1	Clonard West Entry Left Ahead	U	N/A	N/A	A		1	45	-	782	1921	736	106.2%
4/1	Boulevard Exit	U	N/A	N/A	-		-	-	-	290	Inf	Inf	0.0%
5/1	Clonard East Exit	U	N/A	N/A	-		-	-	-	755	Inf	Inf	0.0%
6/1	Clonard West Exit	U	N/A	N/A	-		-	-	-	1127	Inf	Inf	0.0%
Ped Link: P1	Unnamed Ped Link	-	N/A	-	E		1	9	-	0	-	5400	0.0%
Ped Link: P2	Unnamed Ped Link	-	N/A	-	F		1	7	-	0	-	4200	0.0%
Ped Link: P3	Unnamed Ped Link	-	N/A	-	G		1	7	-	0	-	0	0.0%

Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network	**-**	**-**	**0**	**97**	**2**	**25.0**	**52.2**	**0.6**	**77.7**	**-**	**-**	**-**	**-**
Junction 4	**-**	**-**	**0**	**97**	**2**	**25.0**	**52.2**	**0.6**	**77.7**	**-**	**-**	**-**	**-**
1/1	537	517	-	-	-	7.2	17.5	-	24.6	165.1	18.6	17.5	36.0
2/1+2/2	853	853	0	97	2	7.2	5.3	0.6	13.0	55.0	26.0	5.3	31.3
3/1	782	736	-	-	-	10.6	29.4	-	40.1	184.5	27.6	29.4	57.0
4/1	279	279	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
5/1	715	715	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	1113	1113	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
Ped Link: P1	0	0	-	-	-	-	-	-	0.0	0.0	-	-	0.0
Ped Link: P2	0	0	-	-	-	-	-	-	0.0	0.0	-	-	0.0
Ped Link: P3	0	0	-	-	-	-	-	-	-	-	-	-	-

C1 PRC for Signalled Lanes (%): -18.0 Total Delay for Signalled Lanes (pcuHr): 77.74 Cycle Time (s): 120
PRC Over All Lanes (%): -18.0 Total Delay Over All Lanes(pcuHr): 77.74

Scenario 22: 'Scenario F 2025 PM ' (FG22: 'Scenario F 2025 - PM', Plan 1: 'Network Control Plan 1')

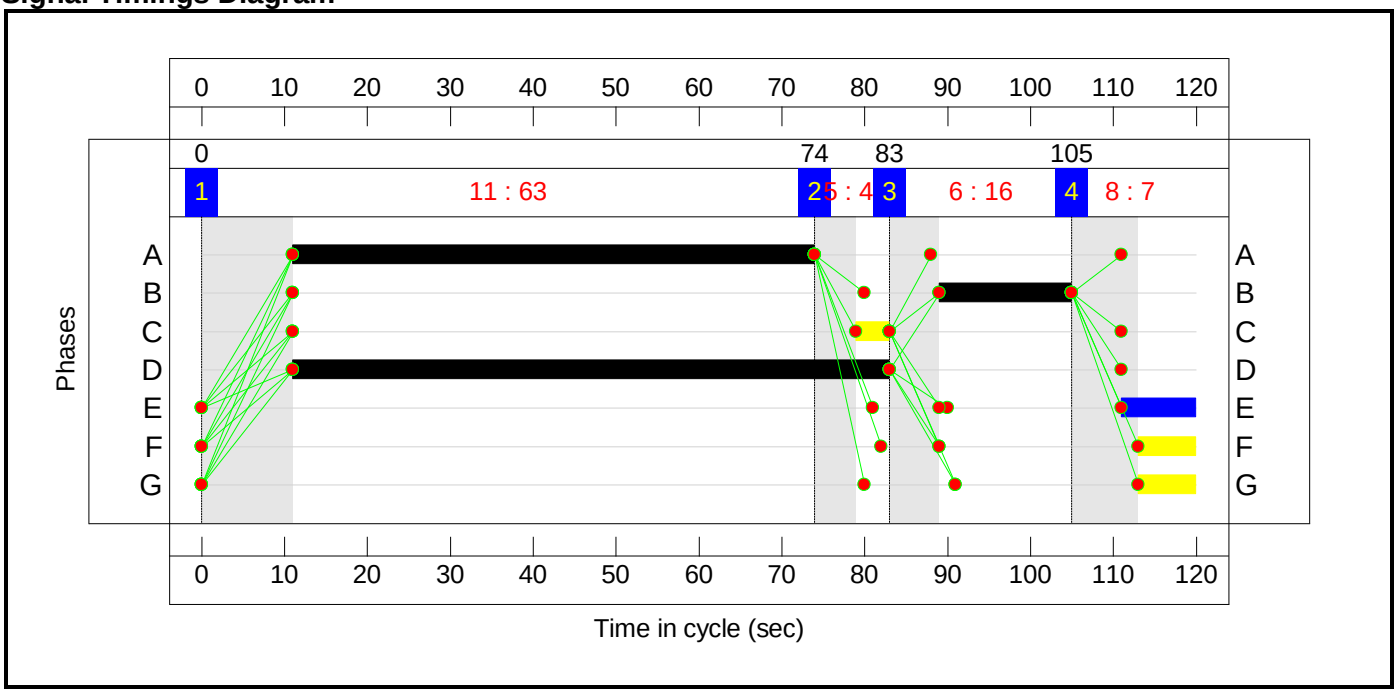
Stage Sequence Diagram



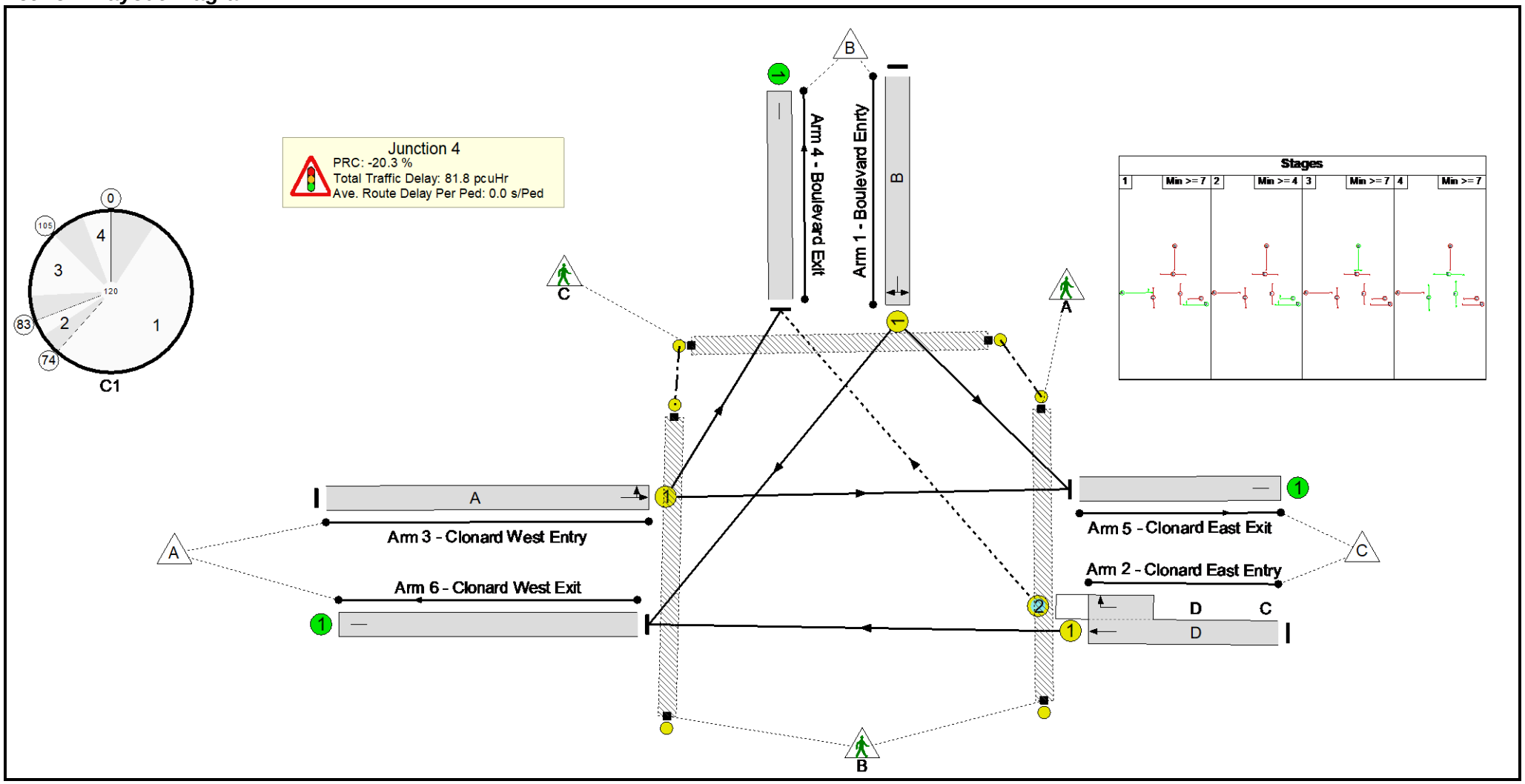
Stage Timings

Stage	1	2	3	4
Duration	63	4	16	7
Change Point	0	74	83	105

Signal Timings Diagram



Network Layout Diagram



Network Results

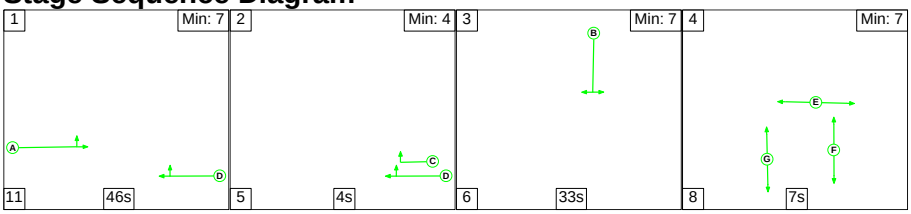
Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**108.3%**
Junction 4	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**108.3%**
1/1	Boulevard Enrty Left Right	U	N/A	N/A	B		1	16	-	263	1773	251	104.7%
2/1+2/2	Clonard East Entry Right Ahead	U+O	N/A	N/A	D	C	1	72	4	644	1980:1891	792+139	69.2 : 69.2%
3/1	Clonard West Entry Left Ahead	U	N/A	N/A	A		1	63	-	1109	1920	1024	108.3%
4/1	Boulevard Exit	U	N/A	N/A	-		-	-	-	375	Inf	Inf	0.0%
5/1	Clonard East Exit	U	N/A	N/A	-		-	-	-	915	Inf	Inf	0.0%
6/1	Clonard West Exit	U	N/A	N/A	-		-	-	-	726	Inf	Inf	0.0%
Ped Link: P1	Unnamed Ped Link	-	N/A	-	E		1	9	-	0	-	5400	0.0%
Ped Link: P2	Unnamed Ped Link	-	N/A	-	F		1	7	-	0	-	4200	0.0%
Ped Link: P3	Unnamed Ped Link	-	N/A	-	G		1	7	-	0	-	0	0.0%

Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network	**-**	**-**	**0**	**94**	**2**	**20.0**	**60.9**	**0.9**	**81.8**	**-**	**-**	**-**	**-**
Junction 4	**-**	**-**	**0**	**94**	**2**	**20.0**	**60.9**	**0.9**	**81.8**	**-**	**-**	**-**	**-**
1/1	263	251	-	-	-	4.2	11.6	-	15.8	216.4	9.2	11.6	20.7
2/1+2/2	644	644	0	94	2	2.5	1.1	0.9	4.5	25.3	11.3	1.1	12.4
3/1	1109	1024	-	-	-	13.2	48.2	-	61.5	199.6	39.8	48.2	88.0
4/1	354	354	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
5/1	848	848	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	718	718	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
Ped Link: P1	0	0	-	-	-	-	-	-	0.0	0.0	-	-	0.0
Ped Link: P2	0	0	-	-	-	-	-	-	0.0	0.0	-	-	0.0
Ped Link: P3	0	0	-	-	-	-	-	-	-	-	-	-	-

C1 PRC for Signalled Lanes (%): -20.3 Total Delay for Signalled Lanes (pcuHr): 81.83 Cycle Time (s): 120
PRC Over All Lanes (%): -20.3 Total Delay Over All Lanes(pcuHr): 81.83

Scenario 23: 'Scenario F 2030 AM ' (FG23: 'Scenario F 2030 - AM', Plan 1: 'Network Control Plan 1')

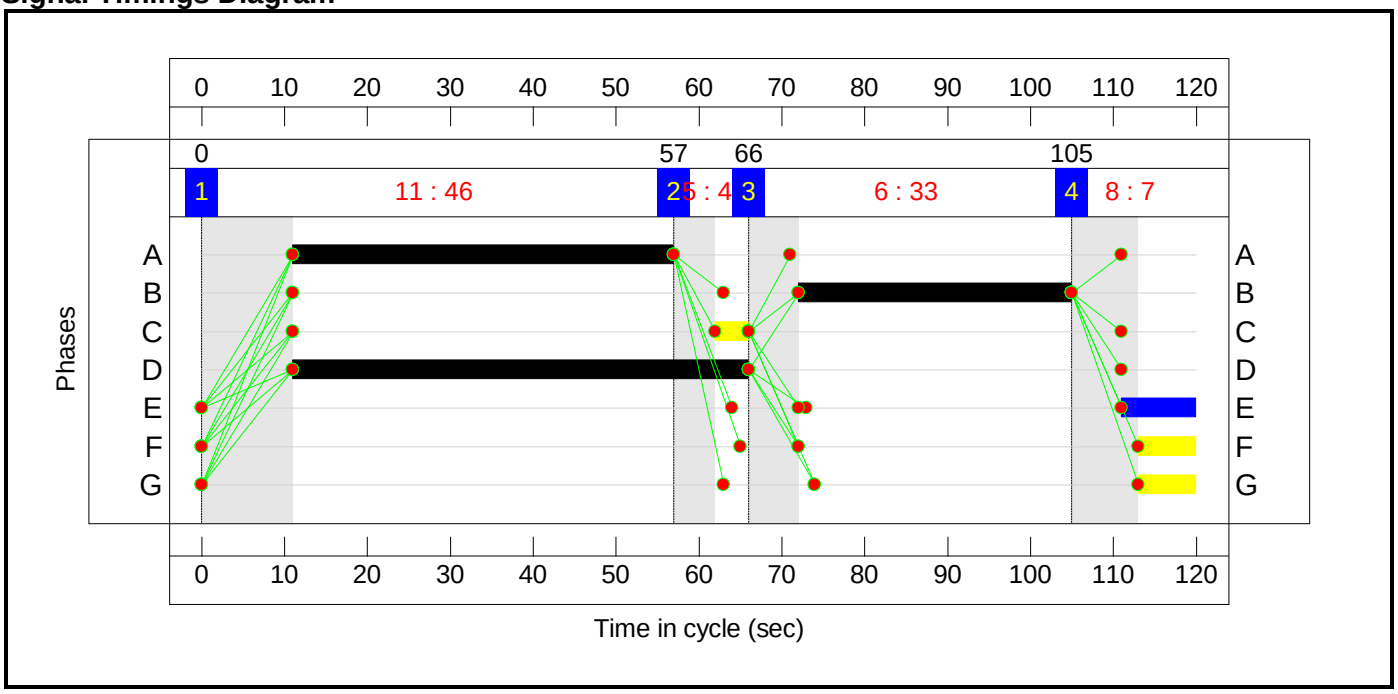
Stage Sequence Diagram



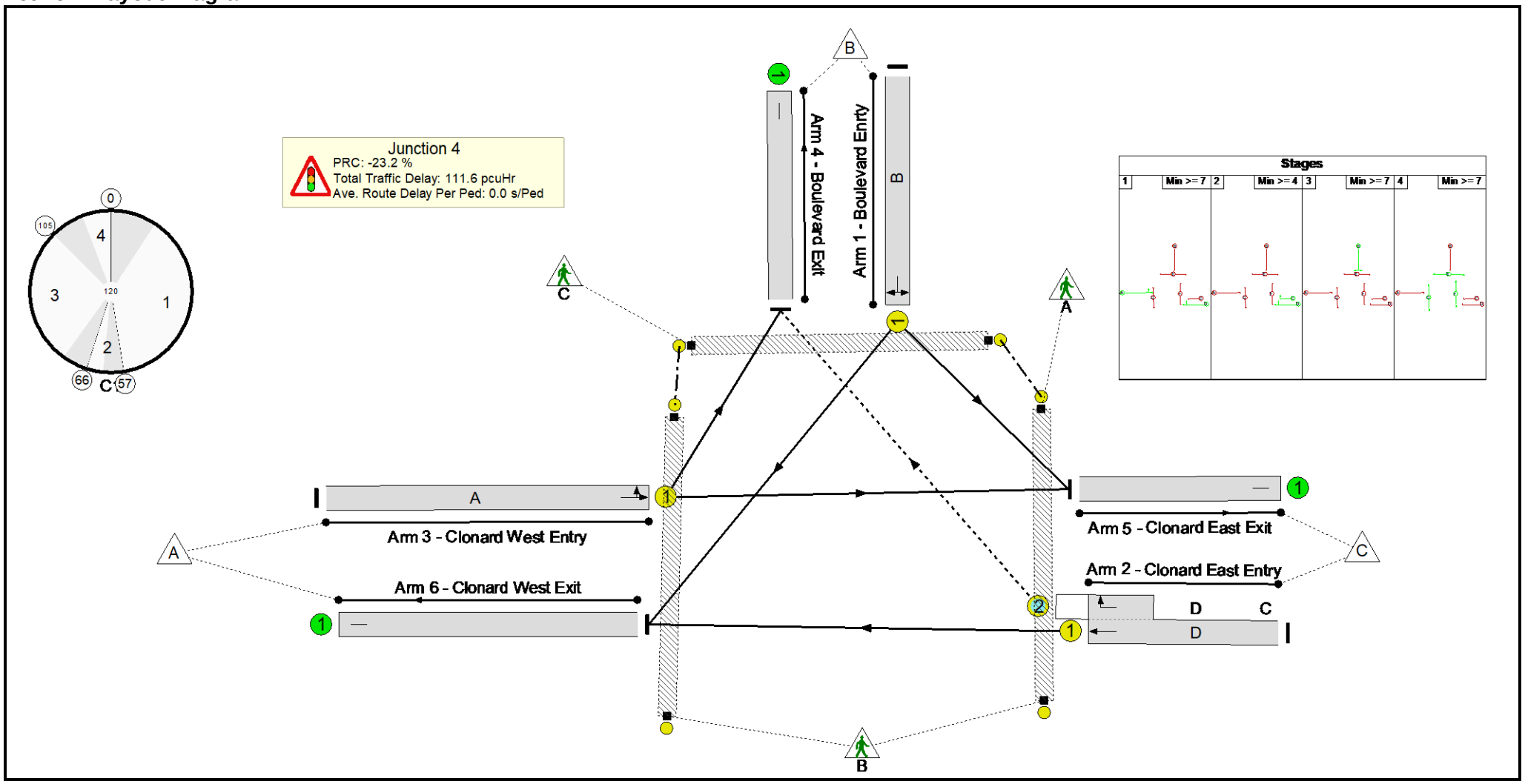
Stage Timings

Stage	1	2	3	4
Duration	46	4	33	7
Change Point	0	57	66	105

Signal Timings Diagram



Network Layout Diagram



Network Results

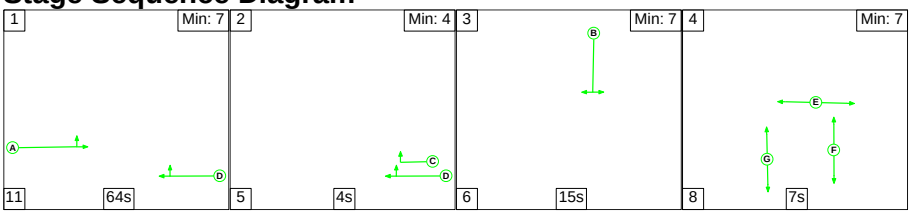
Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**110.9%**
Junction 4	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**110.9%**
1/1	Boulevard Enrty Left Right	U	N/A	N/A	B		1	33	-	545	1774	503	108.4%
2/1+2/2	Clonard East Entry Right Ahead	U+O	N/A	N/A	D	C	1	55	4	913	1980:1891	834+105	97.2 : 97.2%
3/1	Clonard West Entry Left Ahead	U	N/A	N/A	A		1	46	-	835	1923	753	110.9%
4/1	Boulevard Exit	U	N/A	N/A	-		-	-	-	299	Inf	Inf	0.0%
5/1	Clonard East Exit	U	N/A	N/A	-		-	-	-	805	Inf	Inf	0.0%
6/1	Clonard West Exit	U	N/A	N/A	-		-	-	-	1189	Inf	Inf	0.0%
Ped Link: P1	Unnamed Ped Link	-	N/A	-	E		1	9	-	0	-	5400	0.0%
Ped Link: P2	Unnamed Ped Link	-	N/A	-	F		1	7	-	0	-	4200	0.0%
Ped Link: P3	Unnamed Ped Link	-	N/A	-	G		1	7	-	0	-	0	0.0%

Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network	**-**	**-**	**0**	**100**	**2**	**29.3**	**81.7**	**0.6**	**111.6**	**-**	**-**	**-**	**-**
Junction 4	**-**	**-**	**0**	**100**	**2**	**29.3**	**81.7**	**0.6**	**111.6**	**-**	**-**	**-**	**-**
1/1	545	503	-	-	-	8.3	26.4	-	34.6	228.7	19.6	26.4	45.9
2/1+2/2	913	913	0	100	2	7.9	9.9	0.6	18.4	72.4	29.2	9.9	39.1
3/1	835	753	-	-	-	13.1	45.5	-	58.6	252.7	30.6	45.5	76.1
4/1	280	280	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
5/1	729	729	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	1160	1160	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
Ped Link: P1	0	0	-	-	-	-	-	-	0.0	0.0	-	-	0.0
Ped Link: P2	0	0	-	-	-	-	-	-	0.0	0.0	-	-	0.0
Ped Link: P3	0	0	-	-	-	-	-	-	-	-	-	-	-

C1 PRC for Signalled Lanes (%): -23.2 Total Delay for Signalled Lanes (pcuHr): 111.58 Cycle Time (s): 120
PRC Over All Lanes (%): -23.2 Total Delay Over All Lanes(pcuHr): 111.58

Scenario 24: 'Scenario F 2030 PM ' (FG24: 'Scenario F 2030 - PM', Plan 1: 'Network Control Plan 1')

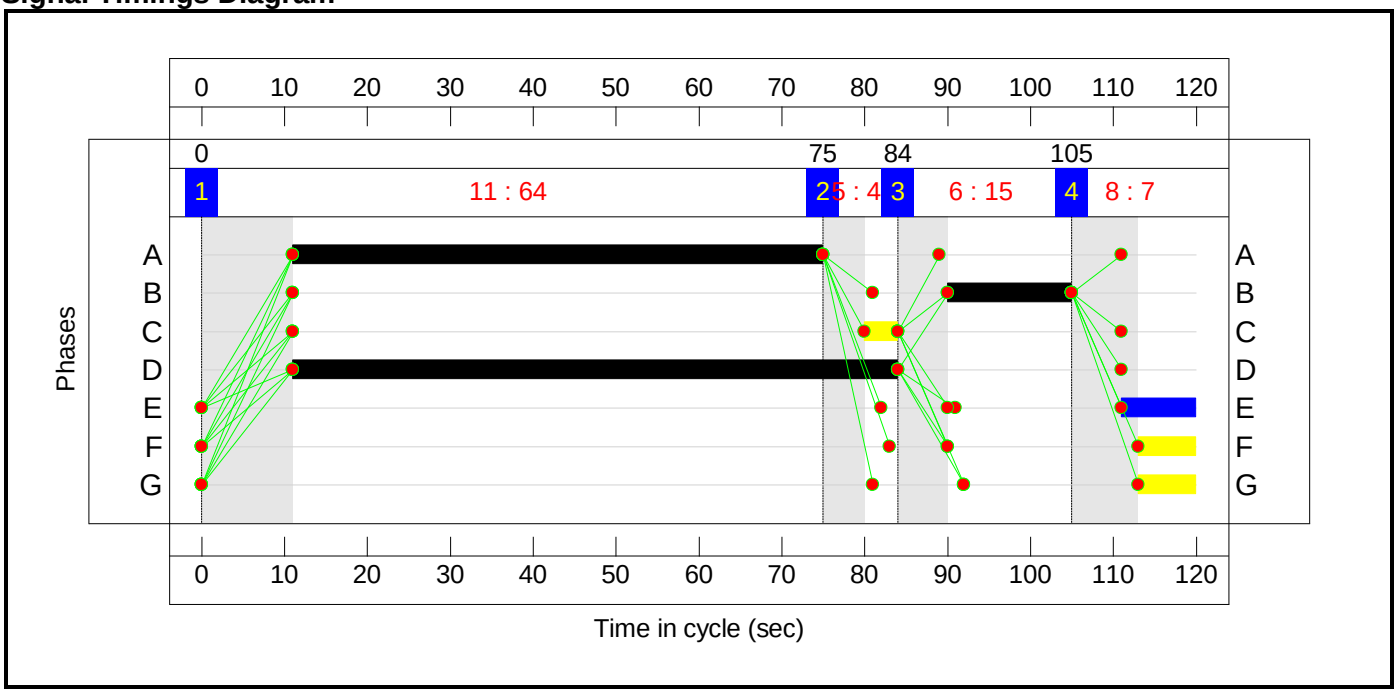
Stage Sequence Diagram



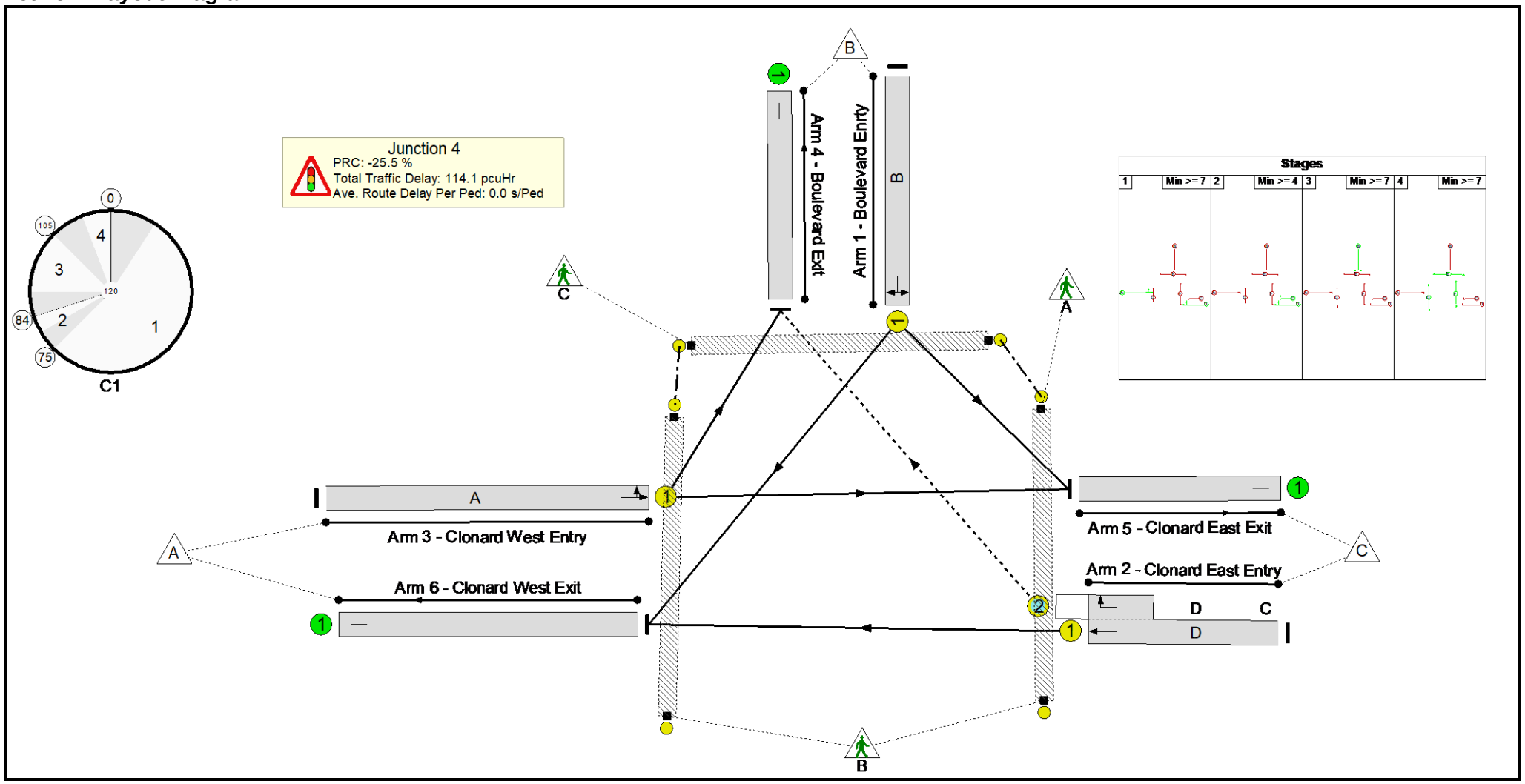
Stage Timings

Stage	1	2	3	4
Duration	64	4	15	7
Change Point	0	75	84	105

Signal Timings Diagram



Network Layout Diagram



Network Results

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**112.9%**
Junction 4	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**112.9%**
1/1	Boulevard Enrty Left Right	U	N/A	N/A	B		1	15	-	267	1773	236	112.9%
2/1+2/2	Clonard East Entry Right Ahead	U+O	N/A	N/A	D	C	1	73	4	686	1980:1891	853+139	69.2 : 69.2%
3/1	Clonard West Entry Left Ahead	U	N/A	N/A	A		1	64	-	1172	1923	1042	112.5%
4/1	Boulevard Exit	U	N/A	N/A	-		-	-	-	375	Inf	Inf	0.0%
5/1	Clonard East Exit	U	N/A	N/A	-		-	-	-	979	Inf	Inf	0.0%
6/1	Clonard West Exit	U	N/A	N/A	-		-	-	-	771	Inf	Inf	0.0%
Ped Link: P1	Unnamed Ped Link	-	N/A	-	E		1	9	-	0	-	5400	0.0%
Ped Link: P2	Unnamed Ped Link	-	N/A	-	F		1	7	-	0	-	4200	0.0%
Ped Link: P3	Unnamed Ped Link	-	N/A	-	G		1	7	-	0	-	0	0.0%

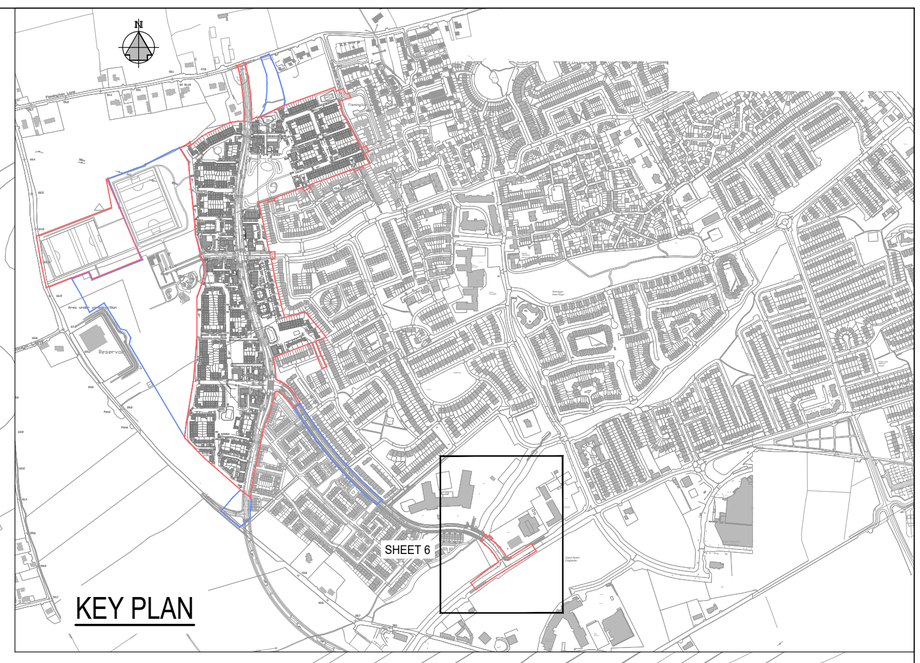
Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network	**-**	**-**	**0**	**94**	**2**	**23.8**	**89.4**	**0.9**	**114.1**	**-**	**-**	**-**	**-**
Junction 4	**-**	**-**	**0**	**94**	**2**	**23.8**	**89.4**	**0.9**	**114.1**	**-**	**-**	**-**	**-**
1/1	267	236	-	-	-	5.2	18.8	-	24.0	323.9	10.1	18.8	28.9
2/1+2/2	686	686	0	94	2	2.6	1.1	0.9	4.7	24.5	12.3	1.1	13.4
3/1	1172	1042	-	-	-	16.0	69.4	-	85.4	262.4	43.4	69.4	112.8
4/1	344	344	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
5/1	870	870	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	750	750	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
Ped Link: P1	0	0	-	-	-	-	-	-	0.0	0.0	-	-	0.0
Ped Link: P2	0	0	-	-	-	-	-	-	0.0	0.0	-	-	0.0
Ped Link: P3	0	0	-	-	-	-	-	-	-	-	-	-	-

C1 PRC for Signalled Lanes (%): -25.5 Total Delay for Signalled Lanes (pcuHr): 114.11 Cycle Time (s): 120
PRC Over All Lanes (%): -25.5 Total Delay Over All Lanes(pcuHr): 114.11

APPENDIX D

Drawings 191004-C-004.6

© Martin Peters Associates



EXISTING T-JUNCTION AMENDED TO ALLOW SINGLE POINT OF ENTRY/ACCESS INTO TEMPORARY SCHOOL SITE.

EXISTING ACCESS CLOSED OFF

EXISTING BOULEVARD ROAD

49m SIGHT LINE FOR 50kph AS PER TABLE 4.2 OF DMURS MANUAL

2400 SET-BACK

49m SIGHT LINE FOR 50kph AS PER TABLE 4.2 OF DMURS MANUAL

JUNCTION SIGHTLINES LAYOUT - SHEET 6 OF 7

SCALE 1:500 @ A1

2000 VERGE

1500 CYCLE LANE TO MATCH EXISTING

2000 FOOTHPATH

3500 LANE

3500 LANE

3370 LANE

5M DIRECT TAPER

MIN 25m DECELERATION LENGTH FOR 50KPH

R10000

3200 LANE

R10000

3500 LANE

3500 TURNING LANE

1500 FOOTHPATH TO MATCH EXISTING

1500 CYCLE LANE TO MATCH EXISTING

2000 VERGE

EXISTING ROAD MARKINGS TO BE REMOVED

3250 TURNING LANE

3650 LANE

1500 FOOTHPATH TO MATCH EXISTING

3500 LANE

1500 CYCLE LANE TO MATCH EXISTING

2000 VERGE

JUNCTION DETAILS - SHEET 6 OF 7

SCALE 1:250 @ A1

Issue Register

No.	Date	Revision	Drawn	Checked	Approved
--	--	--	--	--	--
PL5	20/10/23	STAGE 4 - LRD FUTHER INFORMATION SUBMISSION	RF	MJP	MJP
PL4	30/06/23	STAGE 4 - LRD APPLICATION SUBMISSION	JM	MJP	MJP
PL3	09/12/22	STAGE 2 - LRD MEETING SUBMISSION TO FCC	MT	MJP	MJP
PL2	01/07/22	S247 MEETING AMENDMENTS	PAC	MJP	MJP
PL1	23/09/21	PRE PLANNING ISSUE TO FINGAL COUNTY COUNCIL	NRQ	MV	MJP

GENERAL NOTES:-

1. THIS DRAWING TO BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECTS & ENGINEERS DRAWINGS & SPECIFICATIONS.
2. DO NOT SCALE. USE FIGURED DIMENSIONS ONLY.
3. THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS & ELEVATIONS WITH ARCHITECTURAL DRAWINGS PRIOR TO START OF CONSTRUCTION. ALL DISCREPANCIES TO BE NOTIFIED, IN WRITING TO ENGINEERS & ARCHITECTS FOR RESOLUTION.
4. ALL DIMENSIONS ON DRAWINGS ARE IN MILLIMETRES UNLESS OTHERWISE NOTED.
5. FOR DETAILS AND SETTING OUT OF RWP, SVP, WVP & ALL OPENINGS SEE THE RELEVANT ARCHITECTS DRAWINGS.
6. FOR RADON BARRIER, D.P.C. & INSULATION DETAILS REFER TO ARCHITECTS DRAWINGS.

ALL SETTING OUT DIMENSIONS TO BE CHECKED AGAINST ARCHITECTS DRAWINGS. ARCHITECTS DRAWINGS TO TAKE PRECEDENCE.

SIGHT VISIBILITY TRIANGLE

GENERAL LEGEND:-

- DENOTES SITE BOUNDARY
- DENOTES LAND OWNERSHIP BOUNDARY
- DENOTES EXISTING BUILDING
- DENOTES PROPOSED BUILDING
- 54.5 DENOTES EXISTING CONTOUR LEVELS
- +1.000m DENOTES PROPOSED GROUND LEVEL
- FFL +0.000m DENOTES FINISHED FLOOR LEVEL

DRAWING LEGEND:-

- DENOTES PROPOSED CYCLE LANE
- DENOTES PROPOSED GRASS VERGE
- DENOTES PROPOSED FOOTPATH / ISLAND
- DENOTES TACTILE PAVING
- DENOTES JUNCTION INTERVISIBILITY ZONE
- DENOTES PRIMARY SIGNAL
- DENOTES SECONDARY SIGNAL
- DENOTES PEDESTRIAN CROSSING SIGNAL

PLANNING

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E: info@mpa.ie

Client: DEAN SWIFT PROPERTY HOLDINGS

Project: PROPOSED RESIDENTIAL DEVELOPMENT BALBRIGGAN, CO. DUBLIN

Drawing Title: JUNCTION DETAILS AND SIGHTLINES- SHEET 6 OF 7

Project No: 191004 | Scale: AS SHOWN

Drawing No: 191004/C/004.6 | Rev: PL5

Drawn: GOC | Checked: MP | Date: 09/10/20

APPENDIX E

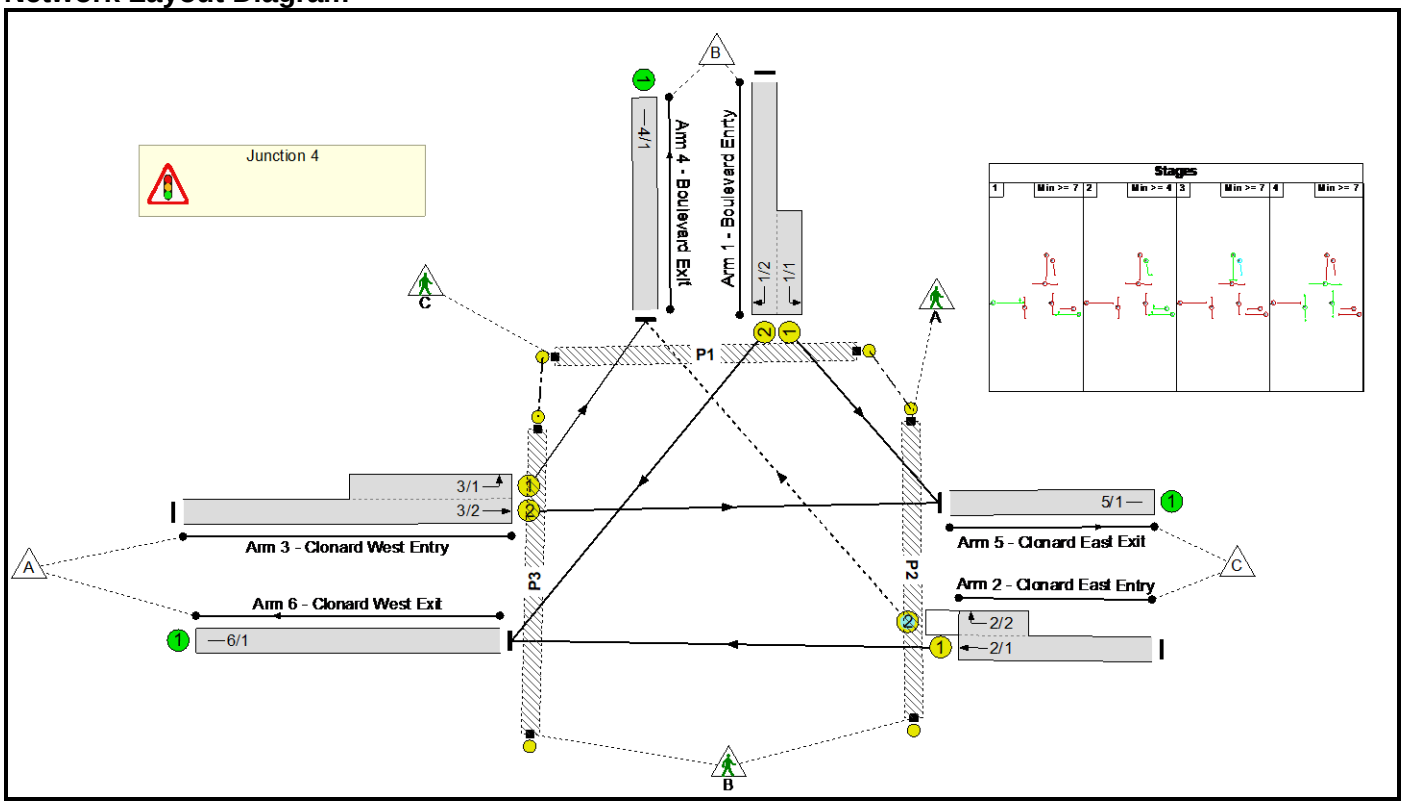
LinSig Outputs – Consented Junction with Flare Approaches & Cycle Continuity

Full Input Data And Results

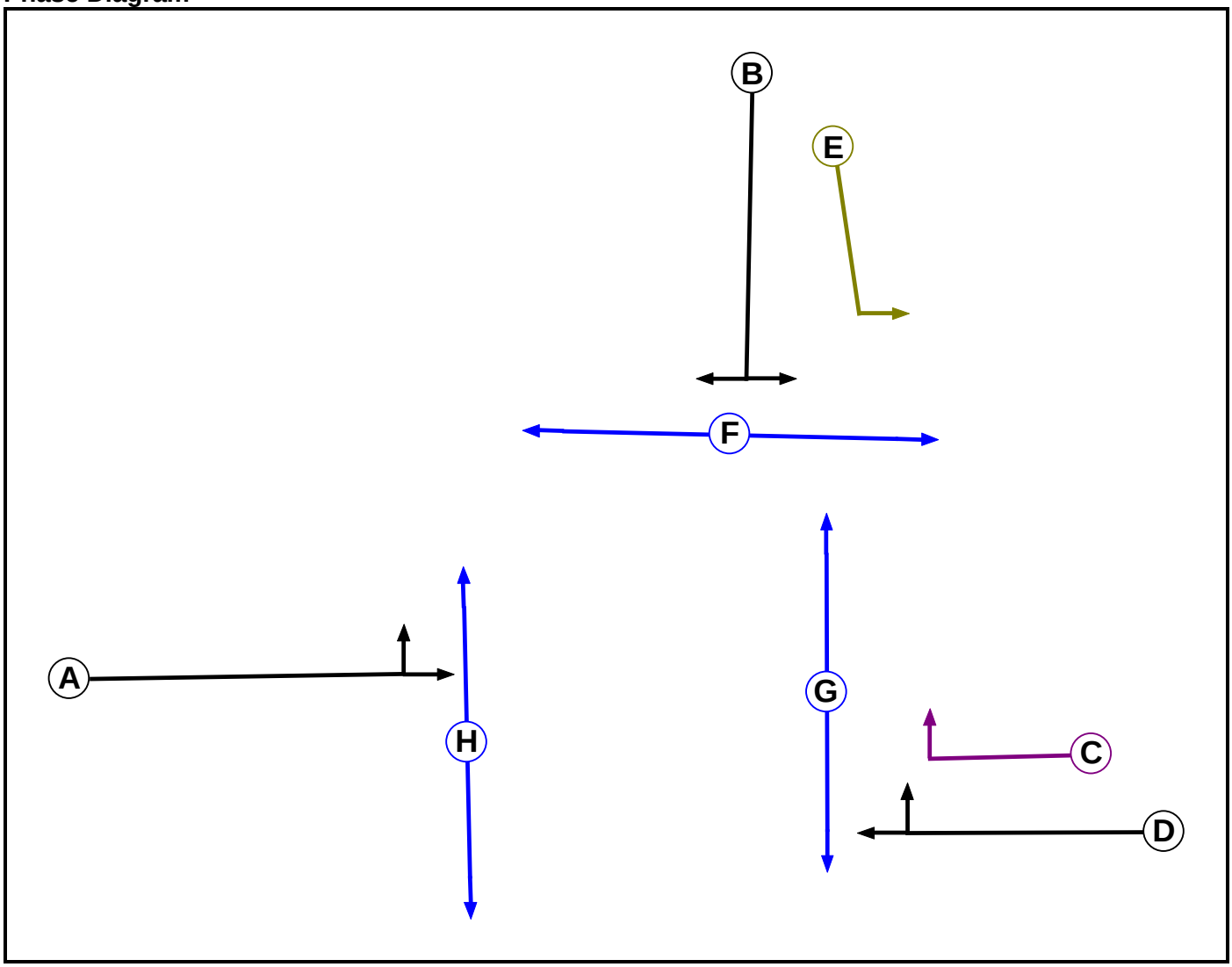
User and Project Details

Project:	
Title:	
Location:	
Additional detail:	
File name:	J4 Boulevard v8 - Ladywell TA Option.lsg3x
Author:	
Company:	
Address:	

Network Layout Diagram



Phase Diagram



Phase Input Data

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

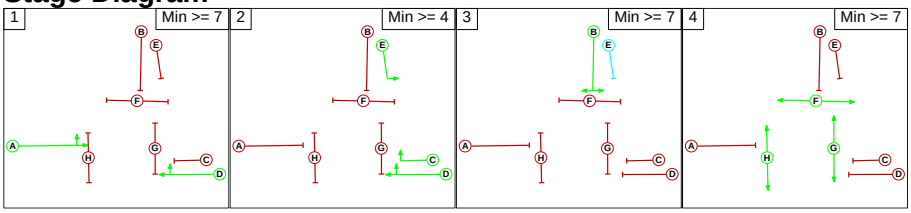
Phase Intergreens Matrix

Terminating Phase \ Starting Phase	A	B	C	D	E	F	G	H
A		5	6	-	6	7	9	5
B	5		5	5	-	5	8	9
C	6	5		-	-	8	5	-
D	-	5	-		-	-	5	9
E	6	-	-	-		5	8	-
F	11	11	11	-	11		-	-
G	15	15	15	15	15	-		-
H	15	15	-	15	15	-	-	

Phases in Stage

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

Stage Diagram



Phase Delays

Term. Stage	Start Stage	Phase	Type	Value	Cont value
4	1	F	Losing	4	4

Prohibited Stage Change

From Stage \ To Stage	1	2	3	4
1		6	5	9
2	X		5	X
3	5	5		9
4	15	15	15	

Give-Way Lane Input Data

Junction: Junction 4											
Lane	**Movement**	**Max Flow when Giving Way (PCU/Hr)**	**Min Flow when Giving Way (PCU/Hr)**	**Opposing Lane**	**Opp. Lane Coeff.**	**Opp. Mvmnts.**	**Right Turn Storage (PCU)**	**Non-Blocking Storage (PCU)**	**RTF**	**Right Turn Move up (s)**	**Max Turns in Intergreen (PCU)**
2/2 (Clonard East Entry)	4/1 (Right)	1439	0	3/2	1.09	All	2.00	-	0.50	2	2.00

Lane Input Data

Junction: Junction 4

Lane	Lane Type	Phases	Start Disp.	End Disp.	Physical Length (PCU)	Sat Flow Type	Def User Saturation Flow (PCU/Hr)	Lane Width (m)	Gradient	Nearside Lane	Turns	Turning Radius (m)
1/1 (Boulevard Enrty)	U	B E	2	3	6.3	Geom	-	3.50	0.00	Y	Arm 5 Left	12.00
1/2 (Boulevard Enrty)	U	B	2	3	60.0	Geom	-	3.50	0.00	N	Arm 6 Right	15.00
2/1 (Clonard East Entry)	U	D	2	3	60.0	Geom	-	3.65	0.00	Y	Arm 6 Ahead	Inf
2/2 (Clonard East Entry)	O	D C	2	3	4.2	Geom	-	3.25	0.00	N	Arm 4 Right	15.00
3/1 (Clonard West Entry)	U	A	2	3	9.8	Geom	-	3.50	0.00	Y	Arm 4 Left	12.00
3/2 (Clonard West Entry)	U	A	2	3	60.0	Geom	-	3.50	0.00	N	Arm 5 Ahead	Inf
4/1 (Boulevard Exit)	U		2	3	60.0	Inf	-	-	-	-	-	-
5/1 (Clonard East Exit)	U		2	3	60.0	Inf	-	-	-	-	-	-
6/1 (Clonard West Exit)	U		2	3	60.0	Inf	-	-	-	-	-	-

Traffic Flow Groups

Flow Group	Start Time	End Time	Duration	Formula
1: 'Scenario A 2025 - AM'	08:00	09:00	01:00	
2: 'Scenario A 2025 - PM'	16:45	17:45	01:00	
3: 'Scenario A 2030 - AM'	08:00	09:00	01:00	
4: 'Scenario A 2030 - PM'	16:45	17:45	01:00	
5: 'Scenario B 2025 - AM'	08:00	09:00	01:00	
6: 'Scenario B 2025 - PM'	16:45	17:45	01:00	
7: 'Scenario B 2030 - AM'	08:00	09:00	01:00	
8: 'Scenario B 2030 - PM'	16:45	17:45	01:00	
9: 'Scenario C 2025 - AM'	08:00	09:00	01:00	
10: 'Scenario C 2025 - PM'	16:45	17:45	01:00	
11: 'Scenario C 2030 - AM'	08:00	09:00	01:00	
12: 'Scenario C 2030 - PM'	16:45	17:45	01:00	
13: 'Scenario D 2025 - AM'	08:00	09:00	01:00	
14: 'Scenario D 2025 - PM'	16:45	17:45	01:00	
15: 'Scenario D 2030 - AM'	08:00	09:00	01:00	
16: 'Scenario D 2030 - PM'	16:45	17:45	01:00	
17: 'Scenario E 2025 - AM'	08:00	09:00	01:00	
18: 'Scenario E 2025 - PM'	16:45	17:45	01:00	
19: 'Scenario E 2030 - AM'	08:00	09:00	01:00	
20: 'Scenario E 2030 - PM'	16:45	17:45	01:00	
21: 'Scenario F 2025 - AM'	08:00	09:00	01:00	
22: 'Scenario F 2025 - PM'	16:45	17:45	01:00	
23: 'Scenario F 2030 - AM'	08:00	09:00	01:00	
24: 'Scenario F 2030 - PM'	16:45	17:45	01:00	

Scenario 1: 'Scenario A 2025 AM ' (FG1: 'Scenario A 2025 - AM', Plan 1: 'Network Control Plan 1')

Traffic Flows, Desired

Desired Flow :

		Destination			
		A	B	C	Tot.
Origin	A	0	147	648	795
	B	225	0	108	333
	C	772	80	0	852
	Tot.	997	227	756	1980

Traffic Lane Flows

Lane	Scenario 1: Scenario A 2025 AM
Junction: Junction 4	
1/1 (short)	108
1/2 (with short)	333(In) 225(Out)
2/1 (with short)	852(In) 772(Out)
2/2 (short)	80
3/1 (short)	147
3/2 (with short)	795(In) 648(Out)
4/1	227
5/1	756
6/1	997

Lane Saturation Flows

Junction: Junction 4								
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat Flow (PCU/Hr)**	**Flared Sat Flow (PCU/Hr)**
1/1 (Boulevard Enrty)	3.50	0.00	Y	Arm 5 Left	12.00	100.0 %	1747	1747
1/2 (Boulevard Enrty)	3.50	0.00	N	Arm 6 Right	15.00	100.0 %	1914	1914
2/1 (Clonard East Entry)	3.65	0.00	Y	Arm 6 Ahead	Inf	100.0 %	1980	1980
2/2 (Clonard East Entry)	3.25	0.00	N	Arm 4 Right	15.00	100.0 %	1891	1891
3/1 (Clonard West Entry)	3.50	0.00	Y	Arm 4 Left	12.00	100.0 %	1747	1747
3/2 (Clonard West Entry)	3.50	0.00	N	Arm 5 Ahead	Inf	100.0 %	2105	2105
4/1 (Boulevard Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
5/1 (Clonard East Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
6/1 (Clonard West Exit Lane 1)	Infinite Saturation Flow						Inf	Inf

Scenario 2: 'Scenario A 2025 PM ' (FG2: 'Scenario A 2025 - PM', Plan 1: 'Network Control Plan 1')

Traffic Flows, Desired

Desired Flow :

		Destination			
		A	B	C	Tot.
Origin	A	0	142	869	1011
	B	110	0	46	156
	C	591	53	0	644
	Tot.	701	195	915	1811

Traffic Lane Flows

Lane	Scenario 2: Scenario A 2025 PM
Junction: Junction 4	
1/1 (short)	46
1/2 (with short)	156(In) 110(Out)
2/1 (with short)	644(In) 591(Out)
2/2 (short)	53
3/1 (short)	142
3/2 (with short)	1011(In) 869(Out)
4/1	195
5/1	915
6/1	701

Lane Saturation Flows

Junction: Junction 4								
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat Flow (PCU/Hr)**	**Flared Sat Flow (PCU/Hr)**
1/1 (Boulevard Enrty)	3.50	0.00	Y	Arm 5 Left	12.00	100.0 %	1747	1747
1/2 (Boulevard Enrty)	3.50	0.00	N	Arm 6 Right	15.00	100.0 %	1914	1914
2/1 (Clonard East Entry)	3.65	0.00	Y	Arm 6 Ahead	Inf	100.0 %	1980	1980
2/2 (Clonard East Entry)	3.25	0.00	N	Arm 4 Right	15.00	100.0 %	1891	1891
3/1 (Clonard West Entry)	3.50	0.00	Y	Arm 4 Left	12.00	100.0 %	1747	1747
3/2 (Clonard West Entry)	3.50	0.00	N	Arm 5 Ahead	Inf	100.0 %	2105	2105
4/1 (Boulevard Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
5/1 (Clonard East Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
6/1 (Clonard West Exit Lane 1)	Infinite Saturation Flow						Inf	Inf

Scenario 3: 'Scenario A 2030 AM ' (FG3: 'Scenario A 2030 - AM', Plan 1: 'Network Control Plan 1')

Traffic Flows, Desired

Desired Flow :

		Destination			
		A	B	C	Tot.
Origin	A	0	153	694	847
	B	230	0	111	341
	C	829	84	0	913
	Tot.	1059	237	805	2101

Traffic Lane Flows

Lane	Scenario 3: Scenario A 2030 AM
Junction: Junction 4	
1/1 (short)	111
1/2 (with short)	341(In) 230(Out)
2/1 (with short)	913(In) 829(Out)
2/2 (short)	84
3/1 (short)	153
3/2 (with short)	847(In) 694(Out)
4/1	237
5/1	805
6/1	1059

Lane Saturation Flows

Junction: Junction 4								
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat Flow (PCU/Hr)**	**Flared Sat Flow (PCU/Hr)**
1/1 (Boulevard Enrty)	3.50	0.00	Y	Arm 5 Left	12.00	100.0 %	1747	1747
1/2 (Boulevard Enrty)	3.50	0.00	N	Arm 6 Right	15.00	100.0 %	1914	1914
2/1 (Clonard East Entry)	3.65	0.00	Y	Arm 6 Ahead	Inf	100.0 %	1980	1980
2/2 (Clonard East Entry)	3.25	0.00	N	Arm 4 Right	15.00	100.0 %	1891	1891
3/1 (Clonard West Entry)	3.50	0.00	Y	Arm 4 Left	12.00	100.0 %	1747	1747
3/2 (Clonard West Entry)	3.50	0.00	N	Arm 5 Ahead	Inf	100.0 %	2105	2105
4/1 (Boulevard Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
5/1 (Clonard East Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
6/1 (Clonard West Exit Lane 1)	Infinite Saturation Flow						Inf	Inf

Scenario 4: 'Scenario A 2030 PM ' (FG4: 'Scenario A 2030 - PM', Plan 1: 'Network Control Plan 1')

Traffic Flows, Desired

Desired Flow :

		Destination			
		A	B	C	Tot.
Origin	A	0	142	932	1074
	B	112	0	47	159
	C	633	53	0	686
	Tot.	745	195	979	1919

Traffic Lane Flows

Lane	Scenario 4: Scenario A 2030 PM
Junction: Junction 4	
1/1 (short)	47
1/2 (with short)	159(In) 112(Out)
2/1 (with short)	686(In) 633(Out)
2/2 (short)	53
3/1 (short)	142
3/2 (with short)	1074(In) 932(Out)
4/1	195
5/1	979
6/1	745

Lane Saturation Flows

Junction: Junction 4								
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat Flow (PCU/Hr)**	**Flared Sat Flow (PCU/Hr)**
1/1 (Boulevard Enrty)	3.50	0.00	Y	Arm 5 Left	12.00	100.0 %	1747	1747
1/2 (Boulevard Enrty)	3.50	0.00	N	Arm 6 Right	15.00	100.0 %	1914	1914
2/1 (Clonard East Entry)	3.65	0.00	Y	Arm 6 Ahead	Inf	100.0 %	1980	1980
2/2 (Clonard East Entry)	3.25	0.00	N	Arm 4 Right	15.00	100.0 %	1891	1891
3/1 (Clonard West Entry)	3.50	0.00	Y	Arm 4 Left	12.00	100.0 %	1747	1747
3/2 (Clonard West Entry)	3.50	0.00	N	Arm 5 Ahead	Inf	100.0 %	2105	2105
4/1 (Boulevard Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
5/1 (Clonard East Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
6/1 (Clonard West Exit Lane 1)	Infinite Saturation Flow						Inf	Inf

Scenario 5: 'Scenario B 2025 AM ' (FG5: 'Scenario B 2025 - AM', Plan 1: 'Network Control Plan 1')

Traffic Flows, Desired

Desired Flow :

		Destination			
		A	B	C	Tot.
Origin	A	0	156	636	792
	B	255	0	119	374
	C	769	84	0	853
	Tot.	1024	240	755	2019

Traffic Lane Flows

Lane	Scenario 5: Scenario B 2025 AM
Junction: Junction 4	
1/1 (short)	119
1/2 (with short)	374(In) 255(Out)
2/1 (with short)	853(In) 769(Out)
2/2 (short)	84
3/1 (short)	156
3/2 (with short)	792(In) 636(Out)
4/1	240
5/1	755
6/1	1024

Lane Saturation Flows

Junction: Junction 4								
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat Flow (PCU/Hr)**	**Flared Sat Flow (PCU/Hr)**
1/1 (Boulevard Enrty)	3.50	0.00	Y	Arm 5 Left	12.00	100.0 %	1747	1747
1/2 (Boulevard Enrty)	3.50	0.00	N	Arm 6 Right	15.00	100.0 %	1914	1914
2/1 (Clonard East Entry)	3.65	0.00	Y	Arm 6 Ahead	Inf	100.0 %	1980	1980
2/2 (Clonard East Entry)	3.25	0.00	N	Arm 4 Right	15.00	100.0 %	1891	1891
3/1 (Clonard West Entry)	3.50	0.00	Y	Arm 4 Left	12.00	100.0 %	1747	1747
3/2 (Clonard West Entry)	3.50	0.00	N	Arm 5 Ahead	Inf	100.0 %	2105	2105
4/1 (Boulevard Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
5/1 (Clonard East Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
6/1 (Clonard West Exit Lane 1)	Infinite Saturation Flow						Inf	Inf

Scenario 6: 'Scenario B 2025 PM ' (FG6: 'Scenario B 2025 - PM', Plan 1: 'Network Control Plan 1')

Traffic Flows, Desired

Desired Flow :

		Destination			
		A	B	C	Tot.
Origin	A	0	169	861	1030
	B	124	0	54	178
	C	582	62	0	644
	Tot.	706	231	915	1852

Traffic Lane Flows

Lane	Scenario 6: Scenario B 2025 PM
Junction: Junction 4	
1/1 (short)	54
1/2 (with short)	178(In) 124(Out)
2/1 (with short)	644(In) 582(Out)
2/2 (short)	62
3/1 (short)	169
3/2 (with short)	1030(In) 861(Out)
4/1	231
5/1	915
6/1	706

Lane Saturation Flows

Junction: Junction 4								
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat Flow (PCU/Hr)**	**Flared Sat Flow (PCU/Hr)**
1/1 (Boulevard Enrty)	3.50	0.00	Y	Arm 5 Left	12.00	100.0 %	1747	1747
1/2 (Boulevard Enrty)	3.50	0.00	N	Arm 6 Right	15.00	100.0 %	1914	1914
2/1 (Clonard East Entry)	3.65	0.00	Y	Arm 6 Ahead	Inf	100.0 %	1980	1980
2/2 (Clonard East Entry)	3.25	0.00	N	Arm 4 Right	15.00	100.0 %	1891	1891
3/1 (Clonard West Entry)	3.50	0.00	Y	Arm 4 Left	12.00	100.0 %	1747	1747
3/2 (Clonard West Entry)	3.50	0.00	N	Arm 5 Ahead	Inf	100.0 %	2105	2105
4/1 (Boulevard Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
5/1 (Clonard East Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
6/1 (Clonard West Exit Lane 1)	Infinite Saturation Flow						Inf	Inf

Scenario 7: 'Scenario B 2030 AM ' (FG7: 'Scenario B 2030 - AM', Plan 1: 'Network Control Plan 1')

Traffic Flows, Desired

Desired Flow :

		Destination			
		A	B	C	Tot.
Origin	A	0	162	683	845
	B	259	0	122	381
	C	826	87	0	913
	Tot.	1085	249	805	2139

Traffic Lane Flows

Lane	Scenario 7: Scenario B 2030 AM
Junction: Junction 4	
1/1 (short)	122
1/2 (with short)	381(In) 259(Out)
2/1 (with short)	913(In) 826(Out)
2/2 (short)	87
3/1 (short)	162
3/2 (with short)	845(In) 683(Out)
4/1	249
5/1	805
6/1	1085

Lane Saturation Flows

Junction: Junction 4								
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat Flow (PCU/Hr)**	**Flared Sat Flow (PCU/Hr)**
1/1 (Boulevard Enrty)	3.50	0.00	Y	Arm 5 Left	12.00	100.0 %	1747	1747
1/2 (Boulevard Enrty)	3.50	0.00	N	Arm 6 Right	15.00	100.0 %	1914	1914
2/1 (Clonard East Entry)	3.65	0.00	Y	Arm 6 Ahead	Inf	100.0 %	1980	1980
2/2 (Clonard East Entry)	3.25	0.00	N	Arm 4 Right	15.00	100.0 %	1891	1891
3/1 (Clonard West Entry)	3.50	0.00	Y	Arm 4 Left	12.00	100.0 %	1747	1747
3/2 (Clonard West Entry)	3.50	0.00	N	Arm 5 Ahead	Inf	100.0 %	2105	2105
4/1 (Boulevard Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
5/1 (Clonard East Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
6/1 (Clonard West Exit Lane 1)	Infinite Saturation Flow						Inf	Inf

Scenario 8: ' Scenario B 2030 PM ' (FG8: 'Scenario B 2030 - PM', Plan 1: 'Network Control Plan 1')

Traffic Flows, Desired

Desired Flow :

		Destination			
		A	B	C	Tot.
Origin	A	0	169	925	1094
	B	126	0	55	181
	C	624	62	0	686
	Tot.	750	231	980	1961

Traffic Lane Flows

Lane	Scenario 8: Scenario B 2030 PM
Junction: Junction 4	
1/1 (short)	55
1/2 (with short)	181(In) 126(Out)
2/1 (with short)	686(In) 624(Out)
2/2 (short)	62
3/1 (short)	169
3/2 (with short)	1094(In) 925(Out)
4/1	231
5/1	980
6/1	750

Lane Saturation Flows

Junction: Junction 4								
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat Flow (PCU/Hr)**	**Flared Sat Flow (PCU/Hr)**
1/1 (Boulevard Enrty)	3.50	0.00	Y	Arm 5 Left	12.00	100.0 %	1747	1747
1/2 (Boulevard Enrty)	3.50	0.00	N	Arm 6 Right	15.00	100.0 %	1914	1914
2/1 (Clonard East Entry)	3.65	0.00	Y	Arm 6 Ahead	Inf	100.0 %	1980	1980
2/2 (Clonard East Entry)	3.25	0.00	N	Arm 4 Right	15.00	100.0 %	1891	1891
3/1 (Clonard West Entry)	3.50	0.00	Y	Arm 4 Left	12.00	100.0 %	1747	1747
3/2 (Clonard West Entry)	3.50	0.00	N	Arm 5 Ahead	Inf	100.0 %	2105	2105
4/1 (Boulevard Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
5/1 (Clonard East Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
6/1 (Clonard West Exit Lane 1)	Infinite Saturation Flow						Inf	Inf

Scenario 9: 'Scenario C 2025 AM ' (FG9: 'Scenario C 2025 - AM', Plan 1: 'Network Control Plan 1')

Traffic Flows, Desired

Desired Flow :

		Destination			
		A	B	C	Tot.
Origin	A	0	164	625	789
	B	284	0	130	414
	C	765	88	0	853
	Tot.	1049	252	755	2056

Traffic Lane Flows

Lane	Scenario 9: Scenario C 2025 AM
Junction: Junction 4	
1/1 (short)	130
1/2 (with short)	414(In) 284(Out)
2/1 (with short)	853(In) 765(Out)
2/2 (short)	88
3/1 (short)	164
3/2 (with short)	789(In) 625(Out)
4/1	252
5/1	755
6/1	1049

Lane Saturation Flows

Junction: Junction 4								
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat Flow (PCU/Hr)**	**Flared Sat Flow (PCU/Hr)**
1/1 (Boulevard Enrty)	3.50	0.00	Y	Arm 5 Left	12.00	100.0 %	1747	1747
1/2 (Boulevard Enrty)	3.50	0.00	N	Arm 6 Right	15.00	100.0 %	1914	1914
2/1 (Clonard East Entry)	3.65	0.00	Y	Arm 6 Ahead	Inf	100.0 %	1980	1980
2/2 (Clonard East Entry)	3.25	0.00	N	Arm 4 Right	15.00	100.0 %	1891	1891
3/1 (Clonard West Entry)	3.50	0.00	Y	Arm 4 Left	12.00	100.0 %	1747	1747
3/2 (Clonard West Entry)	3.50	0.00	N	Arm 5 Ahead	Inf	100.0 %	2105	2105
4/1 (Boulevard Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
5/1 (Clonard East Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
6/1 (Clonard West Exit Lane 1)	Infinite Saturation Flow						Inf	Inf

Scenario 10: 'Scenario C 2025 PM ' (FG10: 'Scenario C 2025 - PM', Plan 1: 'Network Control Plan 1')

Traffic Flows, Desired

Desired Flow :

		Destination			
		A	B	C	Tot.
Origin	A	0	197	854	1051
	B	137	0	62	199
	C	574	70	0	644
	Tot.	711	267	916	1894

Traffic Lane Flows

Lane	Scenario 10: Scenario C 2025 PM
Junction: Junction 4	
1/1 (short)	62
1/2 (with short)	199(In) 137(Out)
2/1 (with short)	644(In) 574(Out)
2/2 (short)	70
3/1 (short)	197
3/2 (with short)	1051(In) 854(Out)
4/1	267
5/1	916
6/1	711

Lane Saturation Flows

Junction: Junction 4

Lane	Lane Width (m)	Gradient	Nearside Lane	Allowed Turns	Turning Radius (m)	Turning Prop.	Sat Flow (PCU/Hr)	Flared Sat Flow (PCU/Hr)
1/1 (Boulevard Enrty)	3.50	0.00	Y	Arm 5 Left	12.00	100.0 %	1747	1747
1/2 (Boulevard Enrty)	3.50	0.00	N	Arm 6 Right	15.00	100.0 %	1914	1914
2/1 (Clonard East Entry)	3.65	0.00	Y	Arm 6 Ahead	Inf	100.0 %	1980	1980
2/2 (Clonard East Entry)	3.25	0.00	N	Arm 4 Right	15.00	100.0 %	1891	1891
3/1 (Clonard West Entry)	3.50	0.00	Y	Arm 4 Left	12.00	100.0 %	1747	1747
3/2 (Clonard West Entry)	3.50	0.00	N	Arm 5 Ahead	Inf	100.0 %	2105	2105
4/1 (Boulevard Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
5/1 (Clonard East Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
6/1 (Clonard West Exit Lane 1)	Infinite Saturation Flow						Inf	Inf

Scenario 11: 'Scenario C 2030 AM ' (FG11: 'Scenario C 2030 - AM', Plan 1: 'Network Control Plan 1')

Traffic Flows, Desired

Desired Flow :

		Destination			
		A	B	C	Tot.
Origin	A	0	171	672	843
	B	289	0	133	422
	C	822	91	0	913
	Tot.	1111	262	805	2178

Traffic Lane Flows

Lane	Scenario 11: Scenario C 2030 AM
Junction: Junction 4	
1/1 (short)	133
1/2 (with short)	422(In) 289(Out)
2/1 (with short)	913(In) 822(Out)
2/2 (short)	91
3/1 (short)	171
3/2 (with short)	843(In) 672(Out)
4/1	262
5/1	805
6/1	1111

Lane Saturation Flows

Junction: Junction 4								
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat Flow (PCU/Hr)**	**Flared Sat Flow (PCU/Hr)**
1/1 (Boulevard Enrty)	3.50	0.00	Y	Arm 5 Left	12.00	100.0 %	1747	1747
1/2 (Boulevard Enrty)	3.50	0.00	N	Arm 6 Right	15.00	100.0 %	1914	1914
2/1 (Clonard East Entry)	3.65	0.00	Y	Arm 6 Ahead	Inf	100.0 %	1980	1980
2/2 (Clonard East Entry)	3.25	0.00	N	Arm 4 Right	15.00	100.0 %	1891	1891
3/1 (Clonard West Entry)	3.50	0.00	Y	Arm 4 Left	12.00	100.0 %	1747	1747
3/2 (Clonard West Entry)	3.50	0.00	N	Arm 5 Ahead	Inf	100.0 %	2105	2105
4/1 (Boulevard Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
5/1 (Clonard East Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
6/1 (Clonard West Exit Lane 1)	Infinite Saturation Flow						Inf	Inf

Scenario 12: 'Scenario C 2030 PM ' (FG12: 'Scenario C 2030 - PM', Plan 1: 'Network Control Plan 1')

Traffic Flows, Desired

Desired Flow :

		Destination			
		A	B	C	Tot.
Origin	A	0	197	917	1114
	B	140	0	62	202
	C	616	70	0	686
	Tot.	756	267	979	2002

Traffic Lane Flows

Lane	Scenario 12: Scenario C 2030 PM
Junction: Junction 4	
1/1 (short)	62
1/2 (with short)	202(In) 140(Out)
2/1 (with short)	686(In) 616(Out)
2/2 (short)	70
3/1 (short)	197
3/2 (with short)	1114(In) 917(Out)
4/1	267
5/1	979
6/1	756

Lane Saturation Flows

Junction: Junction 4

Lane	Lane Width (m)	Gradient	Nearside Lane	Allowed Turns	Turning Radius (m)	Turning Prop.	Sat Flow (PCU/Hr)	Flared Sat Flow (PCU/Hr)
1/1 (Boulevard Enrty)	3.50	0.00	Y	Arm 5 Left	12.00	100.0 %	1747	1747
1/2 (Boulevard Enrty)	3.50	0.00	N	Arm 6 Right	15.00	100.0 %	1914	1914
2/1 (Clonard East Entry)	3.65	0.00	Y	Arm 6 Ahead	Inf	100.0 %	1980	1980
2/2 (Clonard East Entry)	3.25	0.00	N	Arm 4 Right	15.00	100.0 %	1891	1891
3/1 (Clonard West Entry)	3.50	0.00	Y	Arm 4 Left	12.00	100.0 %	1747	1747
3/2 (Clonard West Entry)	3.50	0.00	N	Arm 5 Ahead	Inf	100.0 %	2105	2105
4/1 (Boulevard Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
5/1 (Clonard East Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
6/1 (Clonard West Exit Lane 1)	Infinite Saturation Flow						Inf	Inf

Scenario 13: 'Scenario D 2025 AM ' (FG13: 'Scenario D 2025 - AM', Plan 1: 'Network Control Plan 1')

Traffic Flows, Desired

Desired Flow :

		Destination			
		A	B	C	Tot.
Origin	A	0	173	614	787
	B	314	0	141	455
	C	761	91	0	852
	Tot.	1075	264	755	2094

Traffic Lane Flows

Lane	Scenario 13: Scenario D 2025 AM
Junction: Junction 4	
1/1 (short)	141
1/2 (with short)	455(In) 314(Out)
2/1 (with short)	852(In) 761(Out)
2/2 (short)	91
3/1 (short)	173
3/2 (with short)	787(In) 614(Out)
4/1	264
5/1	755
6/1	1075

Lane Saturation Flows

Junction: Junction 4								
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat Flow (PCU/Hr)**	**Flared Sat Flow (PCU/Hr)**
1/1 (Boulevard Enrty)	3.50	0.00	Y	Arm 5 Left	12.00	100.0 %	1747	1747
1/2 (Boulevard Enrty)	3.50	0.00	N	Arm 6 Right	15.00	100.0 %	1914	1914
2/1 (Clonard East Entry)	3.65	0.00	Y	Arm 6 Ahead	Inf	100.0 %	1980	1980
2/2 (Clonard East Entry)	3.25	0.00	N	Arm 4 Right	15.00	100.0 %	1891	1891
3/1 (Clonard West Entry)	3.50	0.00	Y	Arm 4 Left	12.00	100.0 %	1747	1747
3/2 (Clonard West Entry)	3.50	0.00	N	Arm 5 Ahead	Inf	100.0 %	2105	2105
4/1 (Boulevard Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
5/1 (Clonard East Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
6/1 (Clonard West Exit Lane 1)	Infinite Saturation Flow						Inf	Inf

Scenario 14: 'Scenario D 2025 PM ' (FG14: 'Scenario D 2025 - PM', Plan 1: 'Network Control Plan 1')

Traffic Flows, Desired

Desired Flow :

		Destination			
		A	B	C	Tot.
Origin	A	0	224	846	1070
	B	151	0	70	221
	C	565	79	0	644
	Tot.	716	303	916	1935

Traffic Lane Flows

Lane	Scenario 14: Scenario D 2025 PM
Junction: Junction 4	
1/1 (short)	70
1/2 (with short)	221(In) 151(Out)
2/1 (with short)	644(In) 565(Out)
2/2 (short)	79
3/1 (short)	224
3/2 (with short)	1070(In) 846(Out)
4/1	303
5/1	916
6/1	716

Lane Saturation Flows

Junction: Junction 4

Lane	Lane Width (m)	Gradient	Nearside Lane	Allowed Turns	Turning Radius (m)	Turning Prop.	Sat Flow (PCU/Hr)	Flared Sat Flow (PCU/Hr)
1/1 (Boulevard Enrty)	3.50	0.00	Y	Arm 5 Left	12.00	100.0 %	1747	1747
1/2 (Boulevard Enrty)	3.50	0.00	N	Arm 6 Right	15.00	100.0 %	1914	1914
2/1 (Clonard East Entry)	3.65	0.00	Y	Arm 6 Ahead	Inf	100.0 %	1980	1980
2/2 (Clonard East Entry)	3.25	0.00	N	Arm 4 Right	15.00	100.0 %	1891	1891
3/1 (Clonard West Entry)	3.50	0.00	Y	Arm 4 Left	12.00	100.0 %	1747	1747
3/2 (Clonard West Entry)	3.50	0.00	N	Arm 5 Ahead	Inf	100.0 %	2105	2105
4/1 (Boulevard Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
5/1 (Clonard East Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
6/1 (Clonard West Exit Lane 1)	Infinite Saturation Flow						Inf	Inf

Scenario 15: 'Scenario D 2030 AM ' (FG15: 'Scenario D 2030 - AM', Plan 1: 'Network Control Plan 1')

Traffic Flows, Desired

Desired Flow :

		Destination			
		A	B	C	Tot.
Origin	A	0	180	661	841
	B	319	0	145	464
	C	818	95	0	913
	Tot.	1137	275	806	2218

Traffic Lane Flows

Lane	Scenario 15: Scenario D 2030 AM
Junction: Junction 4	
1/1 (short)	145
1/2 (with short)	464(In) 319(Out)
2/1 (with short)	913(In) 818(Out)
2/2 (short)	95
3/1 (short)	180
3/2 (with short)	841(In) 661(Out)
4/1	275
5/1	806
6/1	1137

Lane Saturation Flows

Junction: Junction 4								
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat Flow (PCU/Hr)**	**Flared Sat Flow (PCU/Hr)**
1/1 (Boulevard Enrty)	3.50	0.00	Y	Arm 5 Left	12.00	100.0 %	1747	1747
1/2 (Boulevard Enrty)	3.50	0.00	N	Arm 6 Right	15.00	100.0 %	1914	1914
2/1 (Clonard East Entry)	3.65	0.00	Y	Arm 6 Ahead	Inf	100.0 %	1980	1980
2/2 (Clonard East Entry)	3.25	0.00	N	Arm 4 Right	15.00	100.0 %	1891	1891
3/1 (Clonard West Entry)	3.50	0.00	Y	Arm 4 Left	12.00	100.0 %	1747	1747
3/2 (Clonard West Entry)	3.50	0.00	N	Arm 5 Ahead	Inf	100.0 %	2105	2105
4/1 (Boulevard Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
5/1 (Clonard East Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
6/1 (Clonard West Exit Lane 1)	Infinite Saturation Flow						Inf	Inf

Scenario 16: 'Scenario D 2030 PM ' (FG16: 'Scenario D 2030 - PM', Plan 1: 'Network Control Plan 1')

Traffic Flows, Desired

Desired Flow :

		Destination			
		A	B	C	Tot.
Origin	A	0	224	909	1133
	B	153	0	70	223
	C	607	79	0	686
	Tot.	760	303	979	2042

Traffic Lane Flows

Lane	Scenario 16: Scenario D 2030 PM
Junction: Junction 4	
1/1 (short)	70
1/2 (with short)	223(In) 153(Out)
2/1 (with short)	686(In) 607(Out)
2/2 (short)	79
3/1 (short)	224
3/2 (with short)	1133(In) 909(Out)
4/1	303
5/1	979
6/1	760

Lane Saturation Flows

Junction: Junction 4

Lane	Lane Width (m)	Gradient	Nearside Lane	Allowed Turns	Turning Radius (m)	Turning Prop.	Sat Flow (PCU/Hr)	Flared Sat Flow (PCU/Hr)
1/1 (Boulevard Enrty)	3.50	0.00	Y	Arm 5 Left	12.00	100.0 %	1747	1747
1/2 (Boulevard Enrty)	3.50	0.00	N	Arm 6 Right	15.00	100.0 %	1914	1914
2/1 (Clonard East Entry)	3.65	0.00	Y	Arm 6 Ahead	Inf	100.0 %	1980	1980
2/2 (Clonard East Entry)	3.25	0.00	N	Arm 4 Right	15.00	100.0 %	1891	1891
3/1 (Clonard West Entry)	3.50	0.00	Y	Arm 4 Left	12.00	100.0 %	1747	1747
3/2 (Clonard West Entry)	3.50	0.00	N	Arm 5 Ahead	Inf	100.0 %	2105	2105
4/1 (Boulevard Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
5/1 (Clonard East Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
6/1 (Clonard West Exit Lane 1)	Infinite Saturation Flow						Inf	Inf

Scenario 17: 'Scenario E 2025 AM ' (FG17: 'Scenario E 2025 - AM', Plan 1: 'Network Control Plan 1')

Traffic Flows, Desired

Desired Flow :

		Destination			
		A	B	C	Tot.
Origin	A	0	182	603	785
	B	344	0	153	497
	C	757	95	0	852
	Tot.	1101	277	756	2134

Traffic Lane Flows

Lane	Scenario 17: Scenario E 2025 AM
Junction: Junction 4	
1/1 (short)	153
1/2 (with short)	497(In) 344(Out)
2/1 (with short)	852(In) 757(Out)
2/2 (short)	95
3/1 (short)	182
3/2 (with short)	785(In) 603(Out)
4/1	277
5/1	756
6/1	1101

Lane Saturation Flows

Junction: Junction 4								
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat Flow (PCU/Hr)**	**Flared Sat Flow (PCU/Hr)**
1/1 (Boulevard Enrty)	3.50	0.00	Y	Arm 5 Left	12.00	100.0 %	1747	1747
1/2 (Boulevard Enrty)	3.50	0.00	N	Arm 6 Right	15.00	100.0 %	1914	1914
2/1 (Clonard East Entry)	3.65	0.00	Y	Arm 6 Ahead	Inf	100.0 %	1980	1980
2/2 (Clonard East Entry)	3.25	0.00	N	Arm 4 Right	15.00	100.0 %	1891	1891
3/1 (Clonard West Entry)	3.50	0.00	Y	Arm 4 Left	12.00	100.0 %	1747	1747
3/2 (Clonard West Entry)	3.50	0.00	N	Arm 5 Ahead	Inf	100.0 %	2105	2105
4/1 (Boulevard Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
5/1 (Clonard East Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
6/1 (Clonard West Exit Lane 1)	Infinite Saturation Flow						Inf	Inf

Scenario 18: 'Scenario E 2025 PM ' (FG18: 'Scenario E 2025 - PM', Plan 1: 'Network Control Plan 1')

Traffic Flows, Desired

Desired Flow :

		Destination			
		A	B	C	Tot.
Origin	A	0	251	838	1089
	B	165	0	77	242
	C	557	87	0	644
	Tot.	722	338	915	1975

Traffic Lane Flows

Lane	Scenario 18: Scenario E 2025 PM
Junction: Junction 4	
1/1 (short)	77
1/2 (with short)	242(In) 165(Out)
2/1 (with short)	644(In) 557(Out)
2/2 (short)	87
3/1 (short)	251
3/2 (with short)	1089(In) 838(Out)
4/1	338
5/1	915
6/1	722

Lane Saturation Flows

Junction: Junction 4

Lane	Lane Width (m)	Gradient	Nearside Lane	Allowed Turns	Turning Radius (m)	Turning Prop.	Sat Flow (PCU/Hr)	Flared Sat Flow (PCU/Hr)
1/1 (Boulevard Enrty)	3.50	0.00	Y	Arm 5 Left	12.00	100.0 %	1747	1747
1/2 (Boulevard Enrty)	3.50	0.00	N	Arm 6 Right	15.00	100.0 %	1914	1914
2/1 (Clonard East Entry)	3.65	0.00	Y	Arm 6 Ahead	Inf	100.0 %	1980	1980
2/2 (Clonard East Entry)	3.25	0.00	N	Arm 4 Right	15.00	100.0 %	1891	1891
3/1 (Clonard West Entry)	3.50	0.00	Y	Arm 4 Left	12.00	100.0 %	1747	1747
3/2 (Clonard West Entry)	3.50	0.00	N	Arm 5 Ahead	Inf	100.0 %	2105	2105
4/1 (Boulevard Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
5/1 (Clonard East Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
6/1 (Clonard West Exit Lane 1)	Infinite Saturation Flow						Inf	Inf

Scenario 19: 'Scenario E 2030 AM ' (FG19: 'Scenario E 2030 - AM', Plan 1: 'Network Control Plan 1')

Traffic Flows, Desired

Desired Flow :

		Destination			
		A	B	C	Tot.
Origin	A	0	188	649	837
	B	349	0	156	505
	C	814	99	0	913
	Tot.	1163	287	805	2255

Traffic Lane Flows

Lane	Scenario 19: Scenario E 2030 AM
Junction: Junction 4	
1/1 (short)	156
1/2 (with short)	505(In) 349(Out)
2/1 (with short)	913(In) 814(Out)
2/2 (short)	99
3/1 (short)	188
3/2 (with short)	837(In) 649(Out)
4/1	287
5/1	805
6/1	1163

Lane Saturation Flows

Junction: Junction 4								
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat Flow (PCU/Hr)**	**Flared Sat Flow (PCU/Hr)**
1/1 (Boulevard Enrty)	3.50	0.00	Y	Arm 5 Left	12.00	100.0 %	1747	1747
1/2 (Boulevard Enrty)	3.50	0.00	N	Arm 6 Right	15.00	100.0 %	1914	1914
2/1 (Clonard East Entry)	3.65	0.00	Y	Arm 6 Ahead	Inf	100.0 %	1980	1980
2/2 (Clonard East Entry)	3.25	0.00	N	Arm 4 Right	15.00	100.0 %	1891	1891
3/1 (Clonard West Entry)	3.50	0.00	Y	Arm 4 Left	12.00	100.0 %	1747	1747
3/2 (Clonard West Entry)	3.50	0.00	N	Arm 5 Ahead	Inf	100.0 %	2105	2105
4/1 (Boulevard Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
5/1 (Clonard East Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
6/1 (Clonard West Exit Lane 1)	Infinite Saturation Flow						Inf	Inf

Scenario 20: 'Scenario E 2030 PM ' (FG20: 'Scenario E 2030 - PM', Plan 1: 'Network Control Plan 1')

Traffic Flows, Desired

Desired Flow :

		Destination			
		A	B	C	Tot.
Origin	A	0	252	901	1153
	B	167	0	78	245
	C	598	87	0	685
	Tot.	765	339	979	2083

Traffic Lane Flows

Lane	Scenario 20: Scenario E 2030 PM
Junction: Junction 4	
1/1 (short)	78
1/2 (with short)	245(In) 167(Out)
2/1 (with short)	685(In) 598(Out)
2/2 (short)	87
3/1 (short)	252
3/2 (with short)	1153(In) 901(Out)
4/1	339
5/1	979
6/1	765

Lane Saturation Flows

Junction: Junction 4

Lane	Lane Width (m)	Gradient	Nearside Lane	Allowed Turns	Turning Radius (m)	Turning Prop.	Sat Flow (PCU/Hr)	Flared Sat Flow (PCU/Hr)
1/1 (Boulevard Enrty)	3.50	0.00	Y	Arm 5 Left	12.00	100.0 %	1747	1747
1/2 (Boulevard Enrty)	3.50	0.00	N	Arm 6 Right	15.00	100.0 %	1914	1914
2/1 (Clonard East Entry)	3.65	0.00	Y	Arm 6 Ahead	Inf	100.0 %	1980	1980
2/2 (Clonard East Entry)	3.25	0.00	N	Arm 4 Right	15.00	100.0 %	1891	1891
3/1 (Clonard West Entry)	3.50	0.00	Y	Arm 4 Left	12.00	100.0 %	1747	1747
3/2 (Clonard West Entry)	3.50	0.00	N	Arm 5 Ahead	Inf	100.0 %	2105	2105
4/1 (Boulevard Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
5/1 (Clonard East Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
6/1 (Clonard West Exit Lane 1)	Infinite Saturation Flow						Inf	Inf

Scenario 21: 'Scenario F 2025 AM ' (FG21: 'Scenario F 2025 - AM', Plan 1: 'Network Control Plan 1')

Traffic Flows, Desired

Desired Flow :

		Destination			
		A	B	C	Tot.
Origin	A	0	191	591	782
	B	373	0	164	537
	C	754	99	0	853
	Tot.	1127	290	755	2172

Traffic Lane Flows

Lane	Scenario 21: Scenario F 2025 AM
Junction: Junction 4	
1/1 (short)	164
1/2 (with short)	537(In) 373(Out)
2/1 (with short)	853(In) 754(Out)
2/2 (short)	99
3/1 (short)	191
3/2 (with short)	782(In) 591(Out)
4/1	290
5/1	755
6/1	1127

Lane Saturation Flows

Junction: Junction 4								
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat Flow (PCU/Hr)**	**Flared Sat Flow (PCU/Hr)**
1/1 (Boulevard Enrty)	3.50	0.00	Y	Arm 5 Left	12.00	100.0 %	1747	1747
1/2 (Boulevard Enrty)	3.50	0.00	N	Arm 6 Right	15.00	100.0 %	1914	1914
2/1 (Clonard East Entry)	3.65	0.00	Y	Arm 6 Ahead	Inf	100.0 %	1980	1980
2/2 (Clonard East Entry)	3.25	0.00	N	Arm 4 Right	15.00	100.0 %	1891	1891
3/1 (Clonard West Entry)	3.50	0.00	Y	Arm 4 Left	12.00	100.0 %	1747	1747
3/2 (Clonard West Entry)	3.50	0.00	N	Arm 5 Ahead	Inf	100.0 %	2105	2105
4/1 (Boulevard Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
5/1 (Clonard East Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
6/1 (Clonard West Exit Lane 1)	Infinite Saturation Flow						Inf	Inf

Scenario 22: 'Scenario F 2025 PM ' (FG22: 'Scenario F 2025 - PM', Plan 1: 'Network Control Plan 1')

Traffic Flows, Desired

Desired Flow :

		Destination			
		A	B	C	Tot.
Origin	A	0	279	830	1109
	B	178	0	85	263
	C	548	96	0	644
	Tot.	726	375	915	2016

Traffic Lane Flows

Lane	Scenario 22: Scenario F 2025 PM
Junction: Junction 4	
1/1 (short)	85
1/2 (with short)	263(In) 178(Out)
2/1 (with short)	644(In) 548(Out)
2/2 (short)	96
3/1 (short)	279
3/2 (with short)	1109(In) 830(Out)
4/1	375
5/1	915
6/1	726

Lane Saturation Flows

Junction: Junction 4

Lane	Lane Width (m)	Gradient	Nearside Lane	Allowed Turns	Turning Radius (m)	Turning Prop.	Sat Flow (PCU/Hr)	Flared Sat Flow (PCU/Hr)
1/1 (Boulevard Enrty)	3.50	0.00	Y	Arm 5 Left	12.00	100.0 %	1747	1747
1/2 (Boulevard Enrty)	3.50	0.00	N	Arm 6 Right	15.00	100.0 %	1914	1914
2/1 (Clonard East Entry)	3.65	0.00	Y	Arm 6 Ahead	Inf	100.0 %	1980	1980
2/2 (Clonard East Entry)	3.25	0.00	N	Arm 4 Right	15.00	100.0 %	1891	1891
3/1 (Clonard West Entry)	3.50	0.00	Y	Arm 4 Left	12.00	100.0 %	1747	1747
3/2 (Clonard West Entry)	3.50	0.00	N	Arm 5 Ahead	Inf	100.0 %	2105	2105
4/1 (Boulevard Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
5/1 (Clonard East Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
6/1 (Clonard West Exit Lane 1)	Infinite Saturation Flow						Inf	Inf

Scenario 23: 'Scenario F 2030 AM ' (FG23: 'Scenario F 2030 - AM', Plan 1: 'Network Control Plan 1')

Traffic Flows, Desired

Desired Flow :

		Destination			
		A	B	C	Tot.
Origin	A	0	197	638	835
	B	378	0	167	545
	C	811	102	0	913
	Tot.	1189	299	805	2293

Traffic Lane Flows

Lane	Scenario 23: Scenario F 2030 AM
Junction: Junction 4	
1/1 (short)	167
1/2 (with short)	545(In) 378(Out)
2/1 (with short)	913(In) 811(Out)
2/2 (short)	102
3/1 (short)	197
3/2 (with short)	835(In) 638(Out)
4/1	299
5/1	805
6/1	1189

Lane Saturation Flows

Junction: Junction 4								
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat Flow (PCU/Hr)**	**Flared Sat Flow (PCU/Hr)**
1/1 (Boulevard Enrty)	3.50	0.00	Y	Arm 5 Left	12.00	100.0 %	1747	1747
1/2 (Boulevard Enrty)	3.50	0.00	N	Arm 6 Right	15.00	100.0 %	1914	1914
2/1 (Clonard East Entry)	3.65	0.00	Y	Arm 6 Ahead	Inf	100.0 %	1980	1980
2/2 (Clonard East Entry)	3.25	0.00	N	Arm 4 Right	15.00	100.0 %	1891	1891
3/1 (Clonard West Entry)	3.50	0.00	Y	Arm 4 Left	12.00	100.0 %	1747	1747
3/2 (Clonard West Entry)	3.50	0.00	N	Arm 5 Ahead	Inf	100.0 %	2105	2105
4/1 (Boulevard Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
5/1 (Clonard East Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
6/1 (Clonard West Exit Lane 1)	Infinite Saturation Flow						Inf	Inf

Scenario 24: 'Scenario F 2030 PM ' (FG24: 'Scenario F 2030 - PM', Plan 1: 'Network Control Plan 1')

Traffic Flows, Desired

Desired Flow :

		Destination			
		A	B	C	Tot.
Origin	A	0	279	893	1172
	B	181	0	86	267
	C	590	96	0	686
	Tot.	771	375	979	2125

Traffic Lane Flows

Lane	Scenario 24: Scenario F 2030 PM
Junction: Junction 4	
1/1 (short)	86
1/2 (with short)	267(In) 181(Out)
2/1 (with short)	686(In) 590(Out)
2/2 (short)	96
3/1 (short)	279
3/2 (with short)	1172(In) 893(Out)
4/1	375
5/1	979
6/1	771

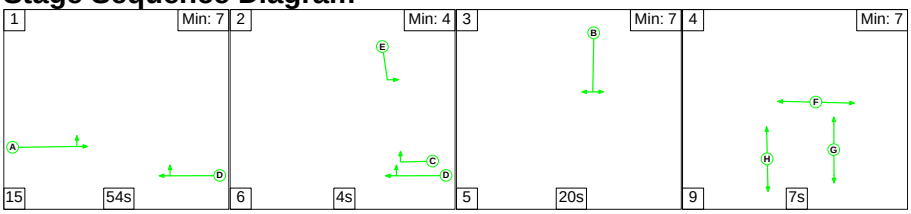
Lane Saturation Flows

Junction: Junction 4

Lane	Lane Width (m)	Gradient	Nearside Lane	Allowed Turns	Turning Radius (m)	Turning Prop.	Sat Flow (PCU/Hr)	Flared Sat Flow (PCU/Hr)
1/1 (Boulevard Enrty)	3.50	0.00	Y	Arm 5 Left	12.00	100.0 %	1747	1747
1/2 (Boulevard Enrty)	3.50	0.00	N	Arm 6 Right	15.00	100.0 %	1914	1914
2/1 (Clonard East Entry)	3.65	0.00	Y	Arm 6 Ahead	Inf	100.0 %	1980	1980
2/2 (Clonard East Entry)	3.25	0.00	N	Arm 4 Right	15.00	100.0 %	1891	1891
3/1 (Clonard West Entry)	3.50	0.00	Y	Arm 4 Left	12.00	100.0 %	1747	1747
3/2 (Clonard West Entry)	3.50	0.00	N	Arm 5 Ahead	Inf	100.0 %	2105	2105
4/1 (Boulevard Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
5/1 (Clonard East Exit Lane 1)	Infinite Saturation Flow						Inf	Inf
6/1 (Clonard West Exit Lane 1)	Infinite Saturation Flow						Inf	Inf

Scenario 1: 'Scenario A 2025 AM ' (FG1: 'Scenario A 2025 - AM', Plan 1: 'Network Control Plan 1')

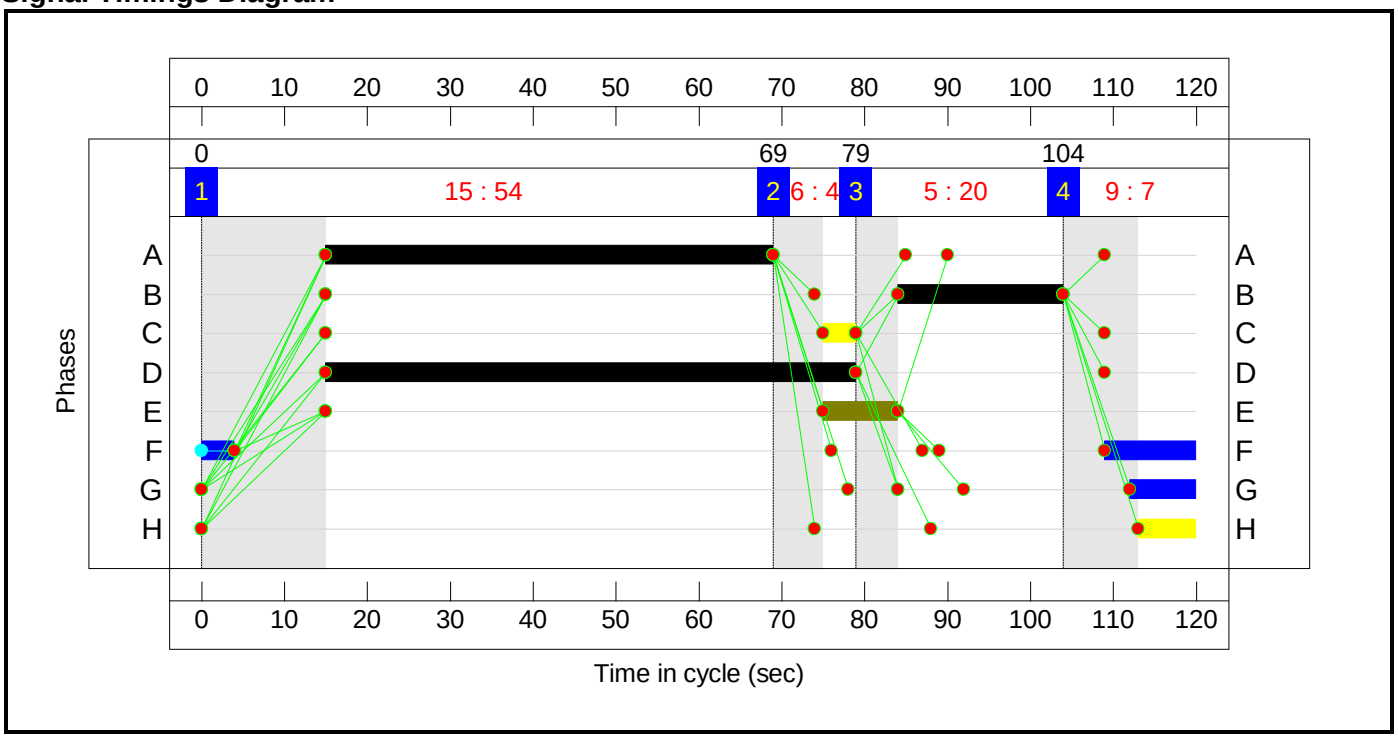
Stage Sequence Diagram



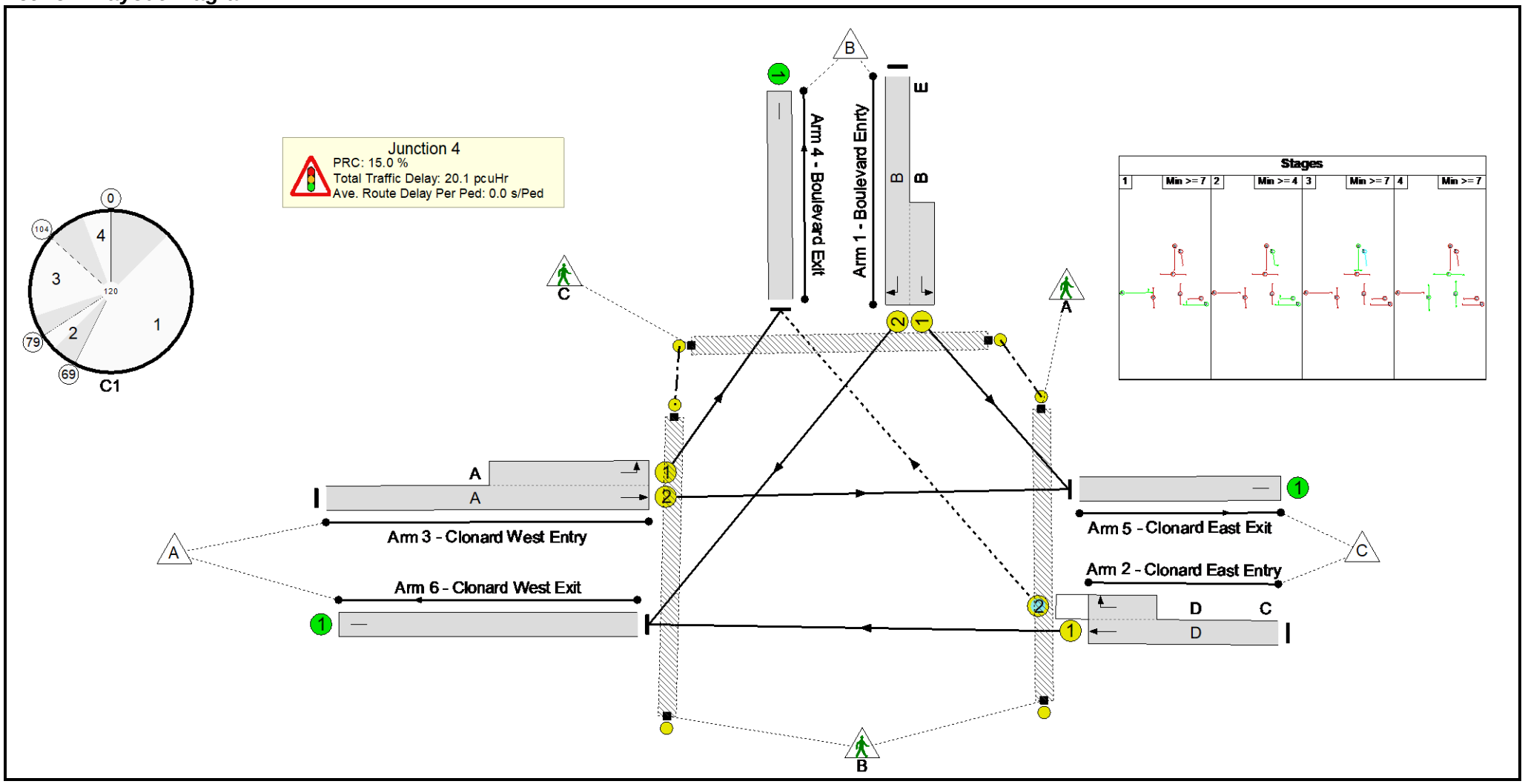
Stage Timings

Stage	1	2	3	4
Duration	54	4	20	7
Change Point	0	69	79	104

Signal Timings Diagram



Network Layout Diagram



Network Results

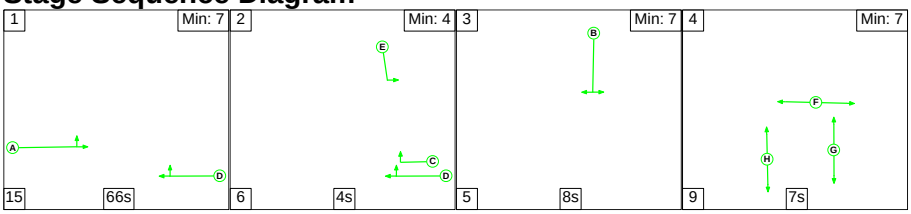
Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**78.2%**
Junction 4	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**78.2%**
1/2+1/1	Boulevard Enrty Left Right	U	N/A	N/A	B	E	1	20:29	9	333	1914:1747	291+140	77.3 : 77.3%
2/1+2/2	Clonard East Entry Right Ahead	U+O	N/A	N/A	D	C	1	64	4	852	1980:1891	987+102	78.2 : 78.2%
3/2+3/1	Clonard West Entry Left Ahead	U	N/A	N/A	A		1	54	-	795	2105:1747	835+189	77.6 : 77.6%
4/1	Boulevard Exit	U	N/A	N/A	-		-	-	-	227	Inf	Inf	0.0%
5/1	Clonard East Exit	U	N/A	N/A	-		-	-	-	756	Inf	Inf	0.0%
6/1	Clonard West Exit	U	N/A	N/A	-		-	-	-	997	Inf	Inf	0.0%
Ped Link: P1	Unnamed Ped Link	-	N/A	-	F		1	15	-	0	-	9000	0.0%
Ped Link: P2	Unnamed Ped Link	-	N/A	-	G		1	8	-	0	-	4800	0.0%
Ped Link: P3	Unnamed Ped Link	-	N/A	-	H		1	7	-	0	-	0	0.0%

Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network	**-**	**-**	**73**	**5**	**1**	**14.6**	**5.1**	**0.3**	**20.1**	**-**	**-**	**-**	**-**
Junction 4	**-**	**-**	**73**	**5**	**1**	**14.6**	**5.1**	**0.3**	**20.1**	**-**	**-**	**-**	**-**
1/2+1/1	333	333	-	-	-	4.0	1.6	-	5.6	60.9	7.4	1.6	9.1
2/1+2/2	852	852	73	5	1	5.0	1.8	0.3	7.2	30.2	21.8	1.8	23.6
3/2+3/1	795	795	-	-	-	5.6	1.7	-	7.3	33.0	19.2	1.7	20.9
4/1	227	227	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
5/1	756	756	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	997	997	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
Ped Link: P1	0	0	-	-	-	-	-	-	0.0	0.0	-	-	0.0
Ped Link: P2	0	0	-	-	-	-	-	-	0.0	0.0	-	-	0.0
Ped Link: P3	0	0	-	-	-	-	-	-	-	-	-	-	-

C1 PRC for Signalled Lanes (%): 15.0 Total Delay for Signalled Lanes (pcuHr): 20.08 Cycle Time (s): 120
PRC Over All Lanes (%): 15.0 Total Delay Over All Lanes(pcuHr): 20.08

Scenario 2: 'Scenario A 2025 PM ' (FG2: 'Scenario A 2025 - PM', Plan 1: 'Network Control Plan 1')

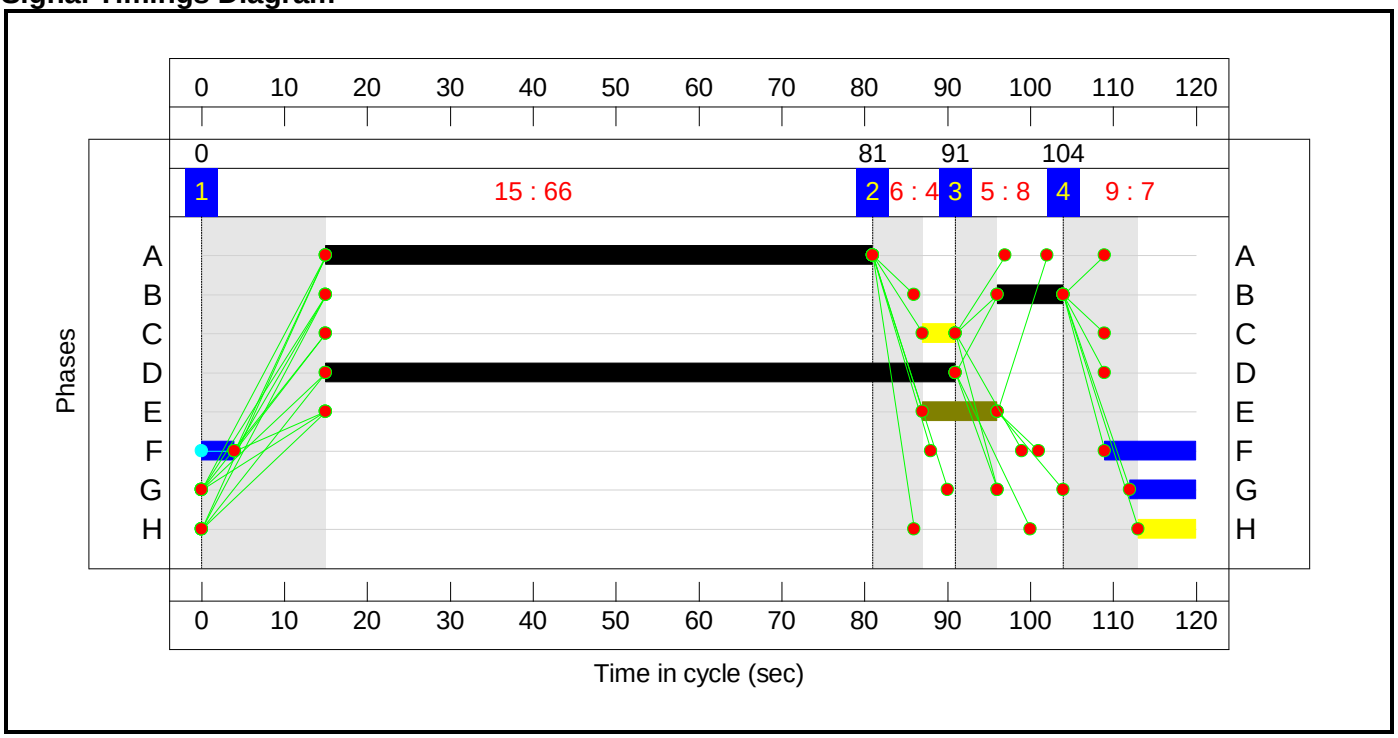
Stage Sequence Diagram



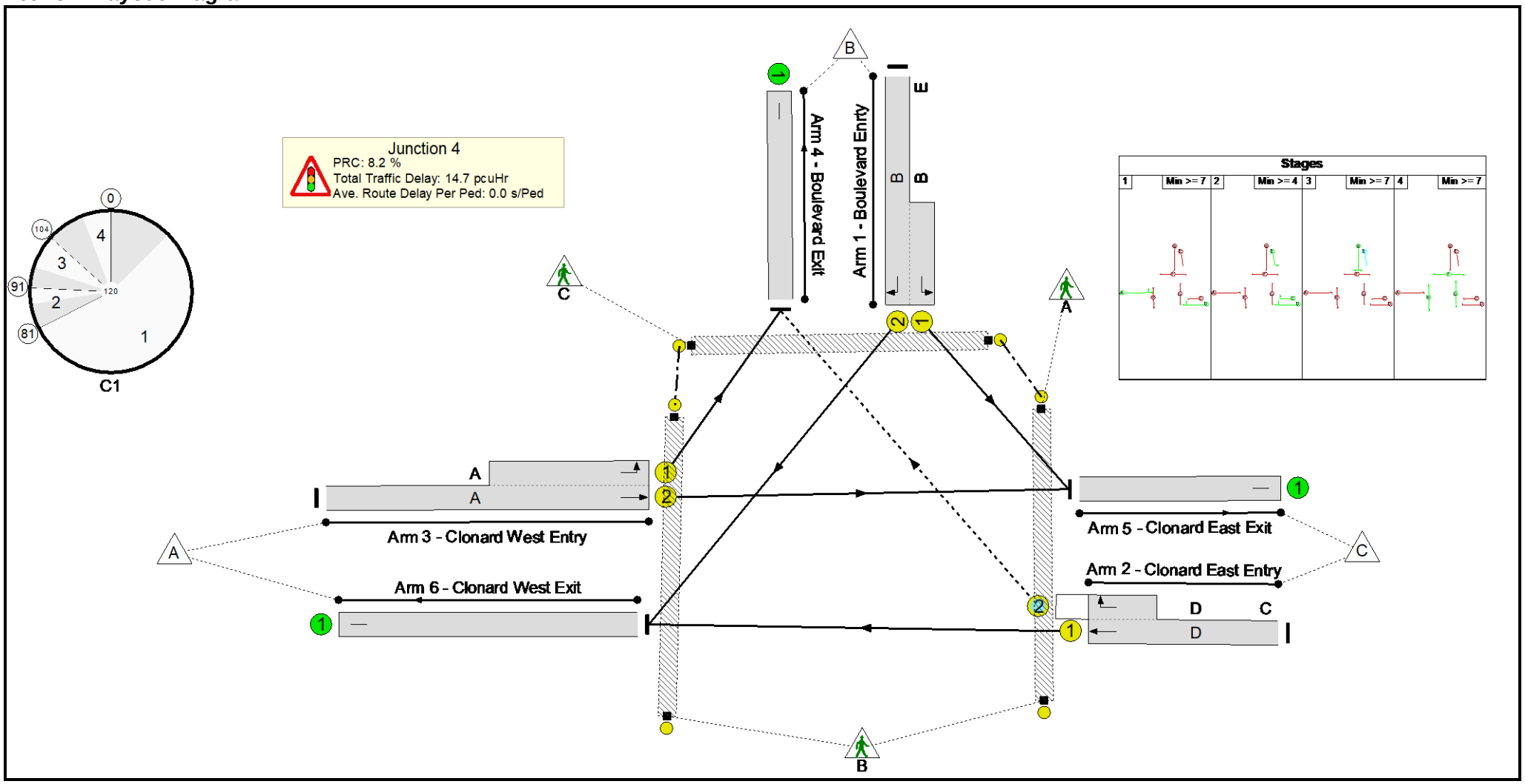
Stage Timings

Stage	1	2	3	4
Duration	66	4	8	7
Change Point	0	81	91	104

Signal Timings Diagram



Network Layout Diagram



Network Results

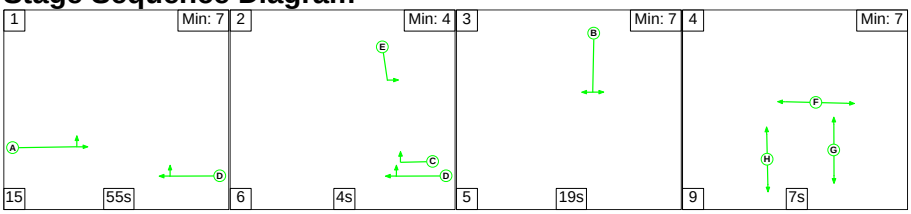
Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**83.2%**
Junction 4	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**83.2%**
1/2+1/1	Boulevard Enrty Left Right	U	N/A	N/A	B	E	1	8:17	9	156	1914:1747	144+60	76.6 : 76.6%
2/1+2/2	Clonard East Entry Right Ahead	U+O	N/A	N/A	D	C	1	76	4	644	1980:1891	1179+106	50.1 : 50.1%
3/2+3/1	Clonard West Entry Left Ahead	U	N/A	N/A	A		1	66	-	1011	2105:1747	1045+171	83.2 : 83.2%
4/1	Boulevard Exit	U	N/A	N/A	-		-	-	-	195	Inf	Inf	0.0%
5/1	Clonard East Exit	U	N/A	N/A	-		-	-	-	915	Inf	Inf	0.0%
6/1	Clonard West Exit	U	N/A	N/A	-		-	-	-	701	Inf	Inf	0.0%
Ped Link: P1	Unnamed Ped Link	-	N/A	-	F		1	15	-	0	-	9000	0.0%
Ped Link: P2	Unnamed Ped Link	-	N/A	-	G		1	8	-	0	-	4800	0.0%
Ped Link: P3	Unnamed Ped Link	-	N/A	-	H		1	7	-	0	-	0	0.0%

Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network	**-**	**-**	**49**	**4**	**1**	**9.9**	**4.5**	**0.4**	**14.7**	**-**	**-**	**-**	**-**
Junction 4	**-**	**-**	**49**	**4**	**1**	**9.9**	**4.5**	**0.4**	**14.7**	**-**	**-**	**-**	**-**
1/2+1/1	156	156	-	-	-	2.2	1.5	-	3.8	87.1	3.6	1.5	5.1
2/1+2/2	644	644	49	4	1	2.0	0.5	0.4	2.8	15.8	10.7	0.5	11.2
3/2+3/1	1011	1011	-	-	-	5.7	2.4	-	8.1	28.8	25.4	2.4	27.8
4/1	195	195	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
5/1	915	915	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	701	701	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
Ped Link: P1	0	0	-	-	-	-	-	-	0.0	0.0	-	-	0.0
Ped Link: P2	0	0	-	-	-	-	-	-	0.0	0.0	-	-	0.0
Ped Link: P3	0	0	-	-	-	-	-	-	-	-	-	-	-

C1 PRC for Signalled Lanes (%): 8.2 Total Delay for Signalled Lanes (pcuHr): 14.70 Cycle Time (s): 120
PRC Over All Lanes (%): 8.2 Total Delay Over All Lanes(pcuHr): 14.70

Scenario 3: 'Scenario A 2030 AM ' (FG3: 'Scenario A 2030 - AM', Plan 1: 'Network Control Plan 1')

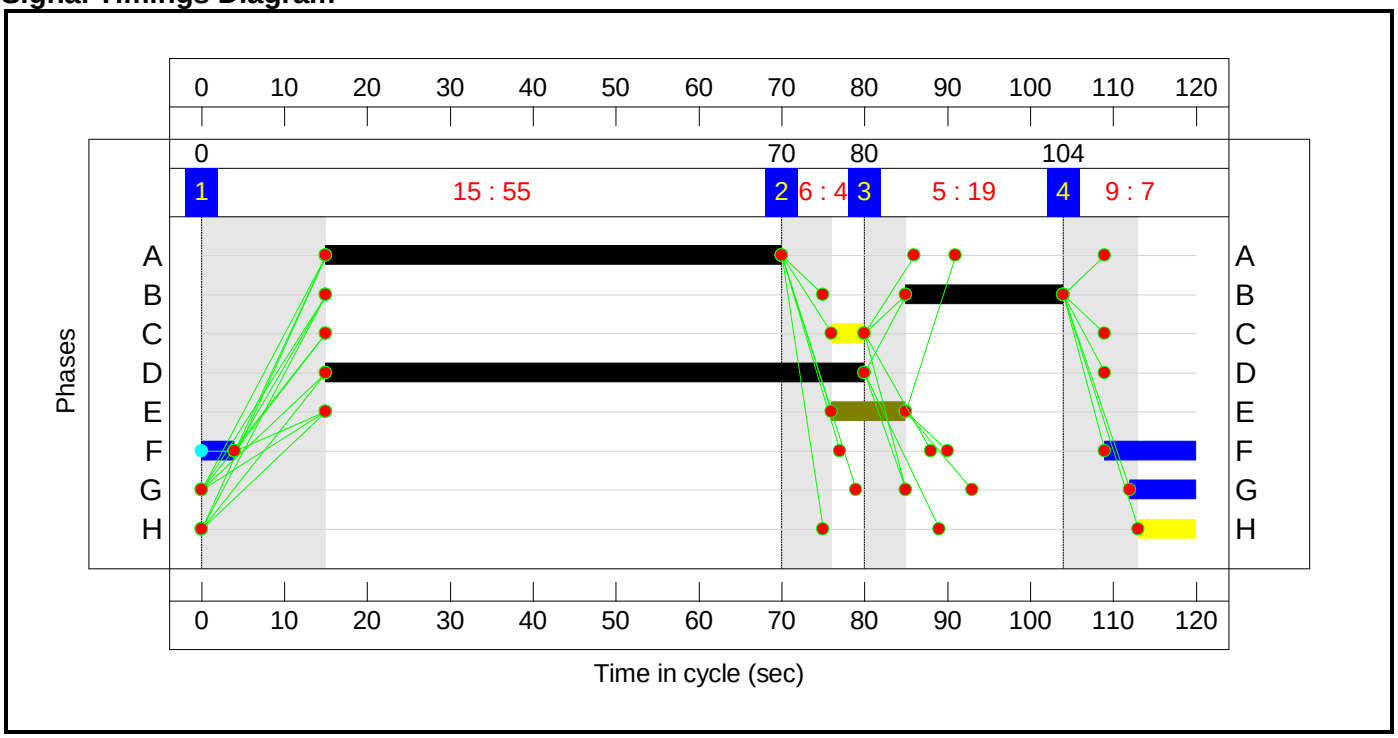
Stage Sequence Diagram



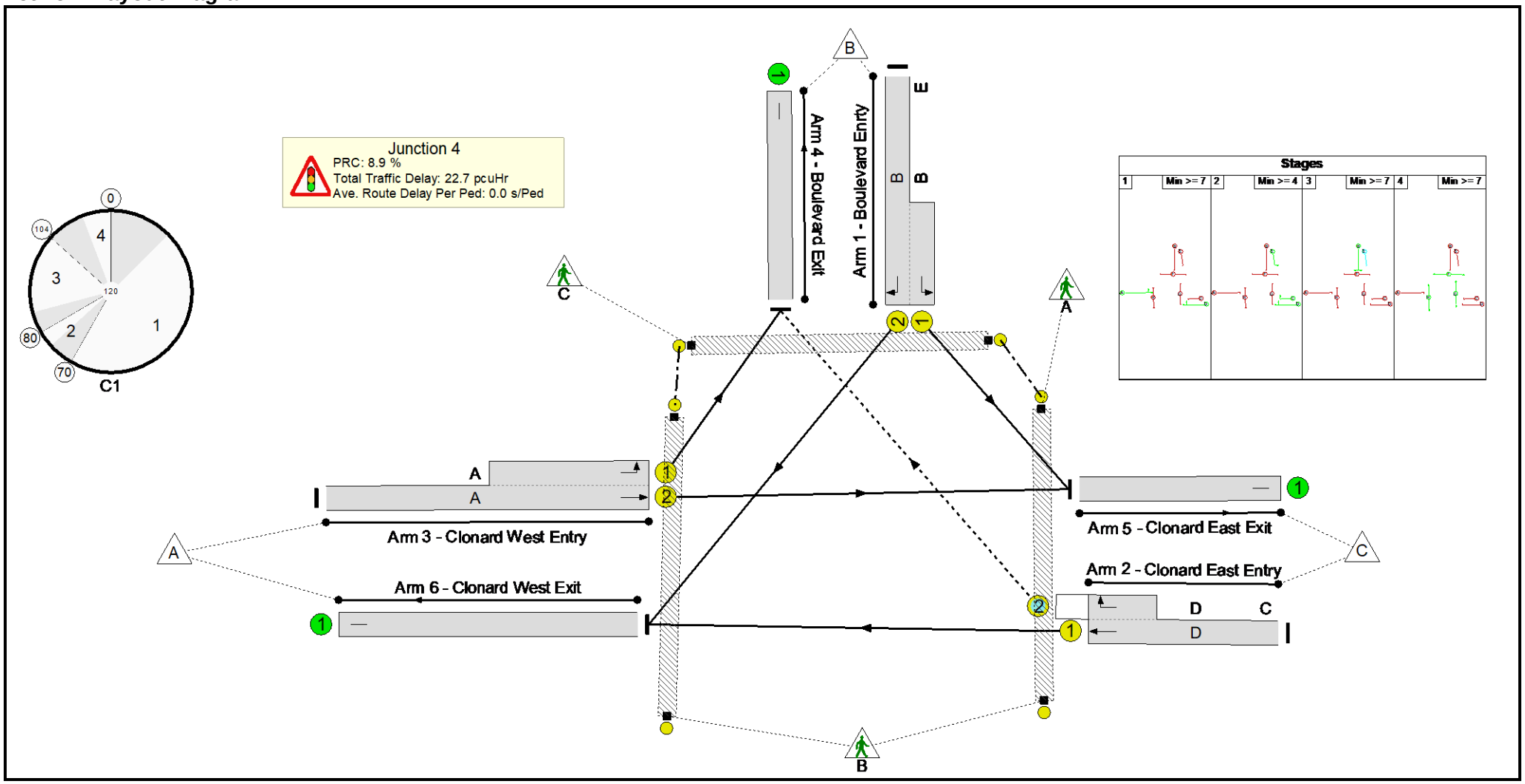
Stage Timings

Stage	1	2	3	4
Duration	55	4	19	7
Change Point	0	70	80	104

Signal Timings Diagram



Network Layout Diagram



Network Results

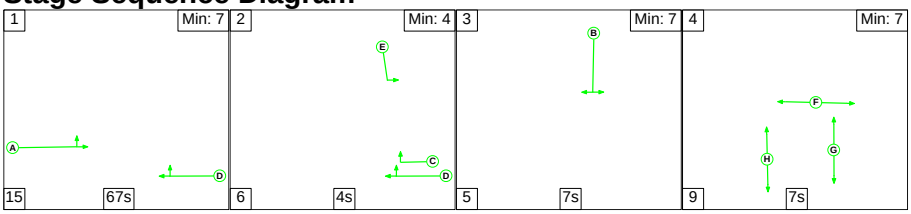
Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**82.6%**
Junction 4	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**82.6%**
1/2+1/1	Boulevard Enrty Left Right	U	N/A	N/A	B	E	1	19:28	9	341	1914:1747	281+135	82.0 : 82.0%
2/1+2/2	Clonard East Entry Right Ahead	U+O	N/A	N/A	D	C	1	65	4	913	1980:1891	1003+102	82.6 : 82.6%
3/2+3/1	Clonard West Entry Left Ahead	U	N/A	N/A	A		1	55	-	847	2105:1747	852+188	81.5 : 81.5%
4/1	Boulevard Exit	U	N/A	N/A	-		-	-	-	237	Inf	Inf	0.0%
5/1	Clonard East Exit	U	N/A	N/A	-		-	-	-	805	Inf	Inf	0.0%
6/1	Clonard West Exit	U	N/A	N/A	-		-	-	-	1059	Inf	Inf	0.0%
Ped Link: P1	Unnamed Ped Link	-	N/A	-	F		1	15	-	0	-	9000	0.0%
Ped Link: P2	Unnamed Ped Link	-	N/A	-	G		1	8	-	0	-	4800	0.0%
Ped Link: P3	Unnamed Ped Link	-	N/A	-	H		1	7	-	0	-	0	0.0%

Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network	**-**	**-**	**77**	**6**	**1**	**15.7**	**6.6**	**0.4**	**22.7**	**-**	**-**	**-**	**-**
Junction 4	**-**	**-**	**77**	**6**	**1**	**15.7**	**6.6**	**0.4**	**22.7**	**-**	**-**	**-**	**-**
1/2+1/1	341	341	-	-	-	4.2	2.1	-	6.3	66.9	7.8	2.1	10.0
2/1+2/2	913	913	77	6	1	5.5	2.3	0.4	8.2	32.5	24.4	2.3	26.7
3/2+3/1	847	847	-	-	-	6.0	2.2	-	8.2	34.7	21.4	2.2	23.5
4/1	237	237	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
5/1	805	805	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	1059	1059	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
Ped Link: P1	0	0	-	-	-	-	-	-	0.0	0.0	-	-	0.0
Ped Link: P2	0	0	-	-	-	-	-	-	0.0	0.0	-	-	0.0
Ped Link: P3	0	0	-	-	-	-	-	-	-	-	-	-	-

C1 PRC for Signalled Lanes (%): 8.9 Total Delay for Signalled Lanes (pcuHr): 22.74 Cycle Time (s): 120
PRC Over All Lanes (%): 8.9 Total Delay Over All Lanes(pcuHr): 22.74

Scenario 4: 'Scenario A 2030 PM ' (FG4: 'Scenario A 2030 - PM', Plan 1: 'Network Control Plan 1')

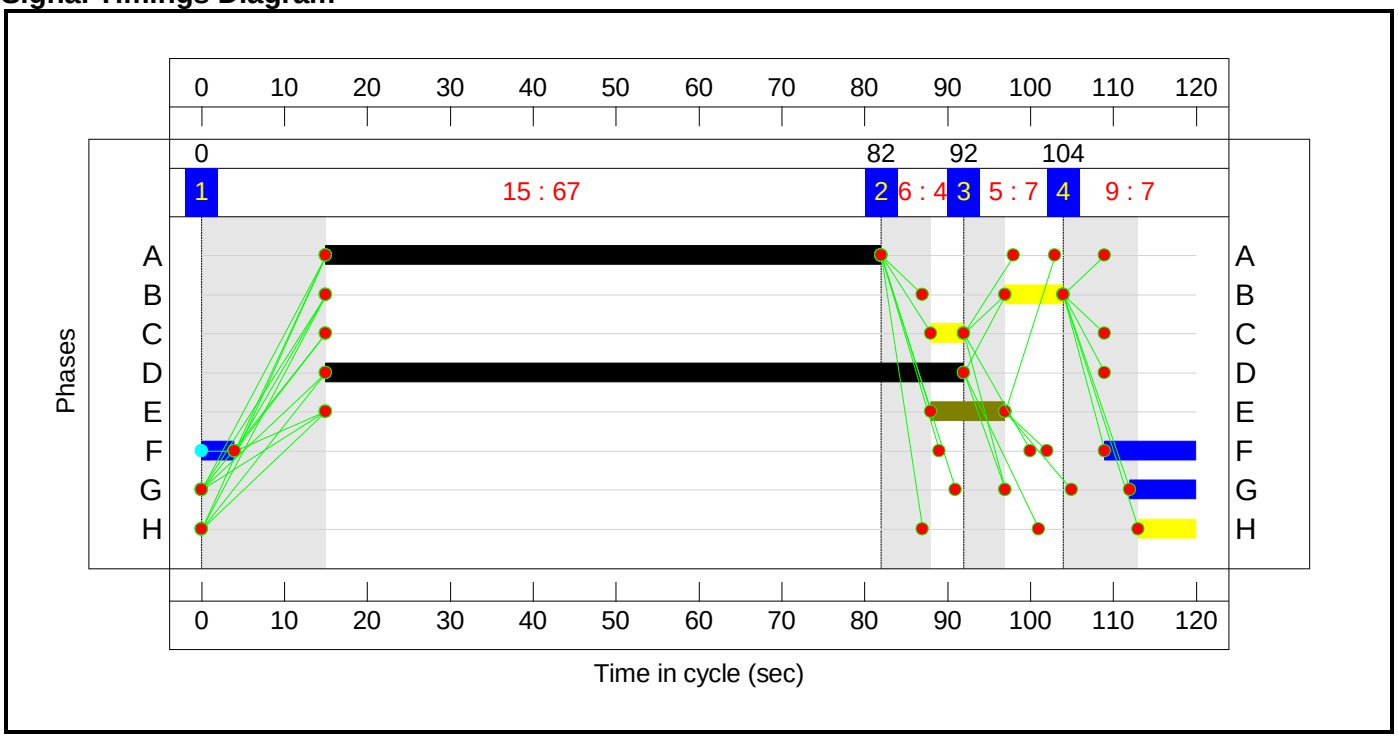
Stage Sequence Diagram



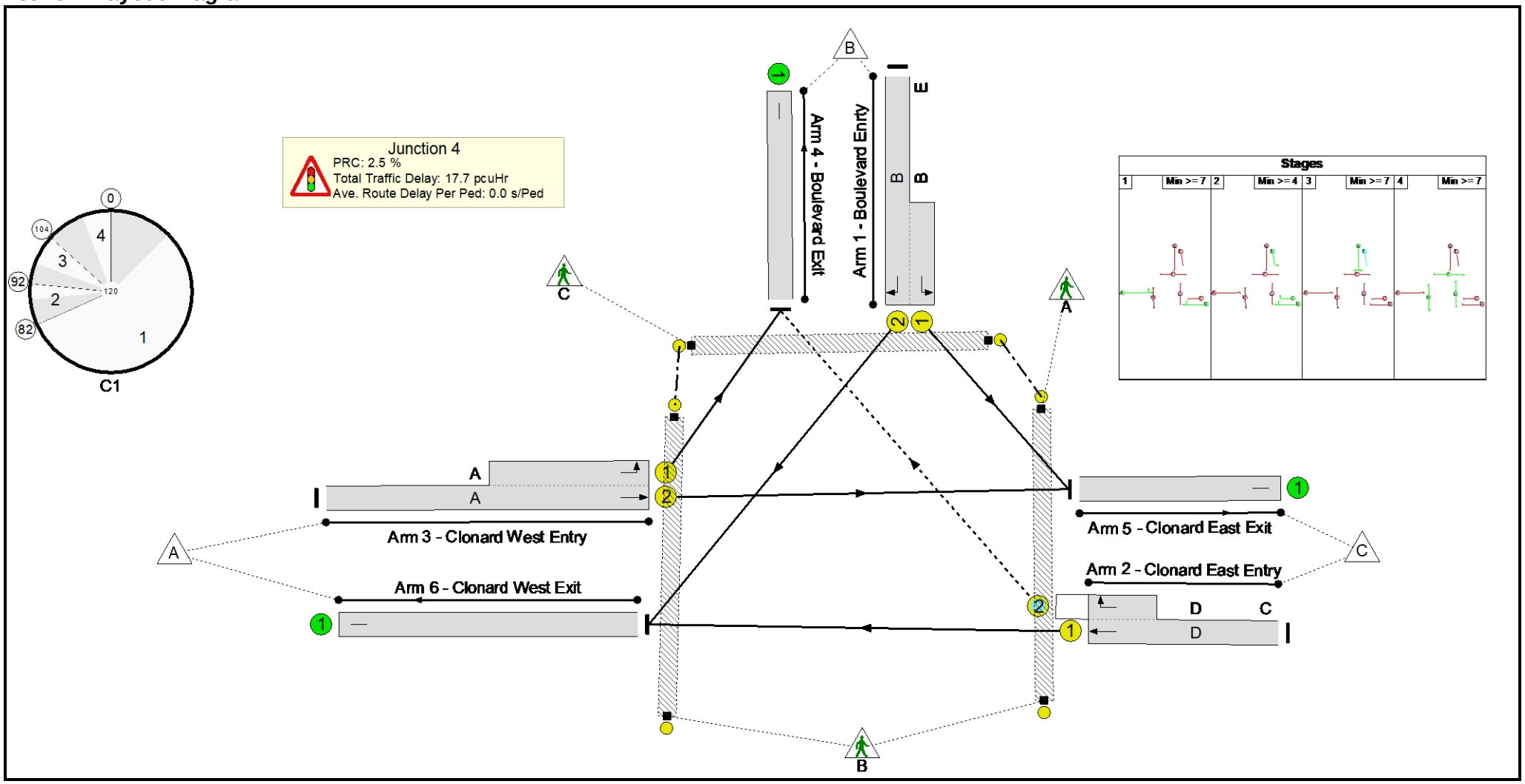
Stage Timings

Stage	1	2	3	4
Duration	67	4	7	7
Change Point	0	82	92	104

Signal Timings Diagram



Network Layout Diagram



Network Results

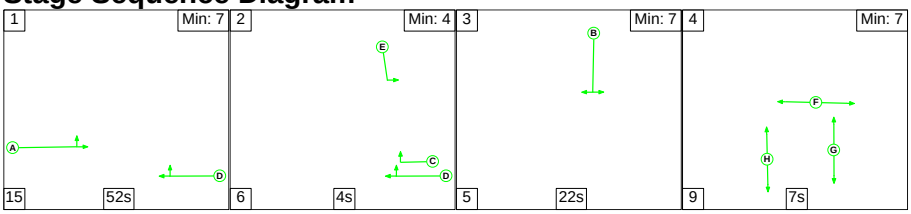
Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**87.8%**
Junction 4	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**87.8%**
1/2+1/1	Boulevard Enrty Left Right	U	N/A	N/A	B	E	1	7:16	9	159	1914:1747	128+54	87.8 : 87.8%
2/1+2/2	Clonard East Entry Right Ahead	U+O	N/A	N/A	D	C	1	77	4	686	1980:1891	1200+100	52.7 : 52.7%
3/2+3/1	Clonard West Entry Left Ahead	U	N/A	N/A	A		1	67	-	1074	2105:1747	1068+163	87.3 : 87.3%
4/1	Boulevard Exit	U	N/A	N/A	-		-	-	-	195	Inf	Inf	0.0%
5/1	Clonard East Exit	U	N/A	N/A	-		-	-	-	979	Inf	Inf	0.0%
6/1	Clonard West Exit	U	N/A	N/A	-		-	-	-	745	Inf	Inf	0.0%
Ped Link: P1	Unnamed Ped Link	-	N/A	-	F		1	15	-	0	-	9000	0.0%
Ped Link: P2	Unnamed Ped Link	-	N/A	-	G		1	8	-	0	-	4800	0.0%
Ped Link: P3	Unnamed Ped Link	-	N/A	-	H		1	7	-	0	-	0	0.0%

Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network	**-**	**-**	**49**	**4**	**1**	**10.6**	**6.7**	**0.4**	**17.7**	**-**	**-**	**-**	**-**
Junction 4	**-**	**-**	**49**	**4**	**1**	**10.6**	**6.7**	**0.4**	**17.7**	**-**	**-**	**-**	**-**
1/2+1/1	159	159	-	-	-	2.3	2.9	-	5.2	117.2	3.7	2.9	6.5
2/1+2/2	686	686	49	4	1	2.1	0.6	0.4	3.0	16.0	11.5	0.6	12.0
3/2+3/1	1074	1074	-	-	-	6.2	3.3	-	9.5	31.8	28.3	3.3	31.6
4/1	195	195	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
5/1	979	979	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	745	745	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
Ped Link: P1	0	0	-	-	-	-	-	-	0.0	0.0	-	-	0.0
Ped Link: P2	0	0	-	-	-	-	-	-	0.0	0.0	-	-	0.0
Ped Link: P3	0	0	-	-	-	-	-	-	-	-	-	-	-

C1 PRC for Signalled Lanes (%): 2.5 Total Delay for Signalled Lanes (pcuHr): 17.70 Cycle Time (s): 120
PRC Over All Lanes (%): 2.5 Total Delay Over All Lanes(pcuHr): 17.70

Scenario 5: 'Scenario B 2025 AM ' (FG5: 'Scenario B 2025 - AM', Plan 1: 'Network Control Plan 1')

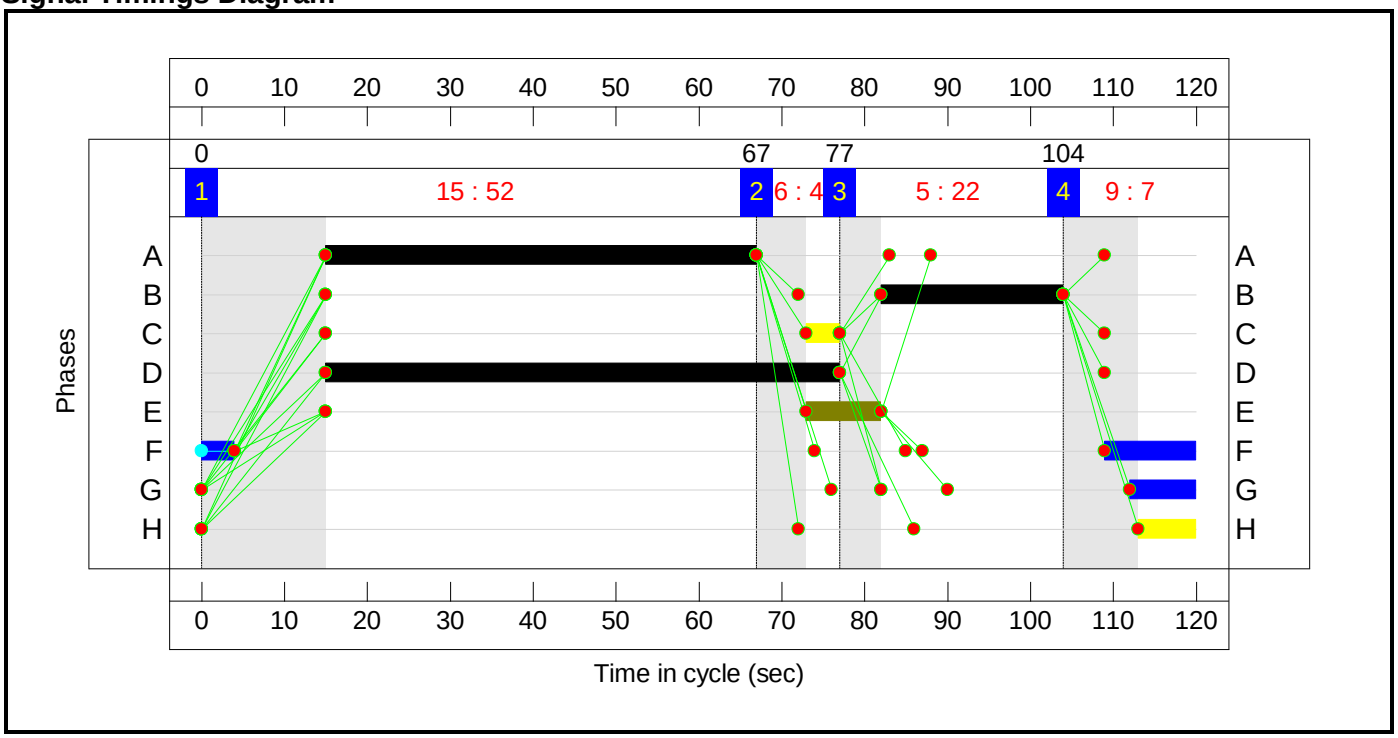
Stage Sequence Diagram



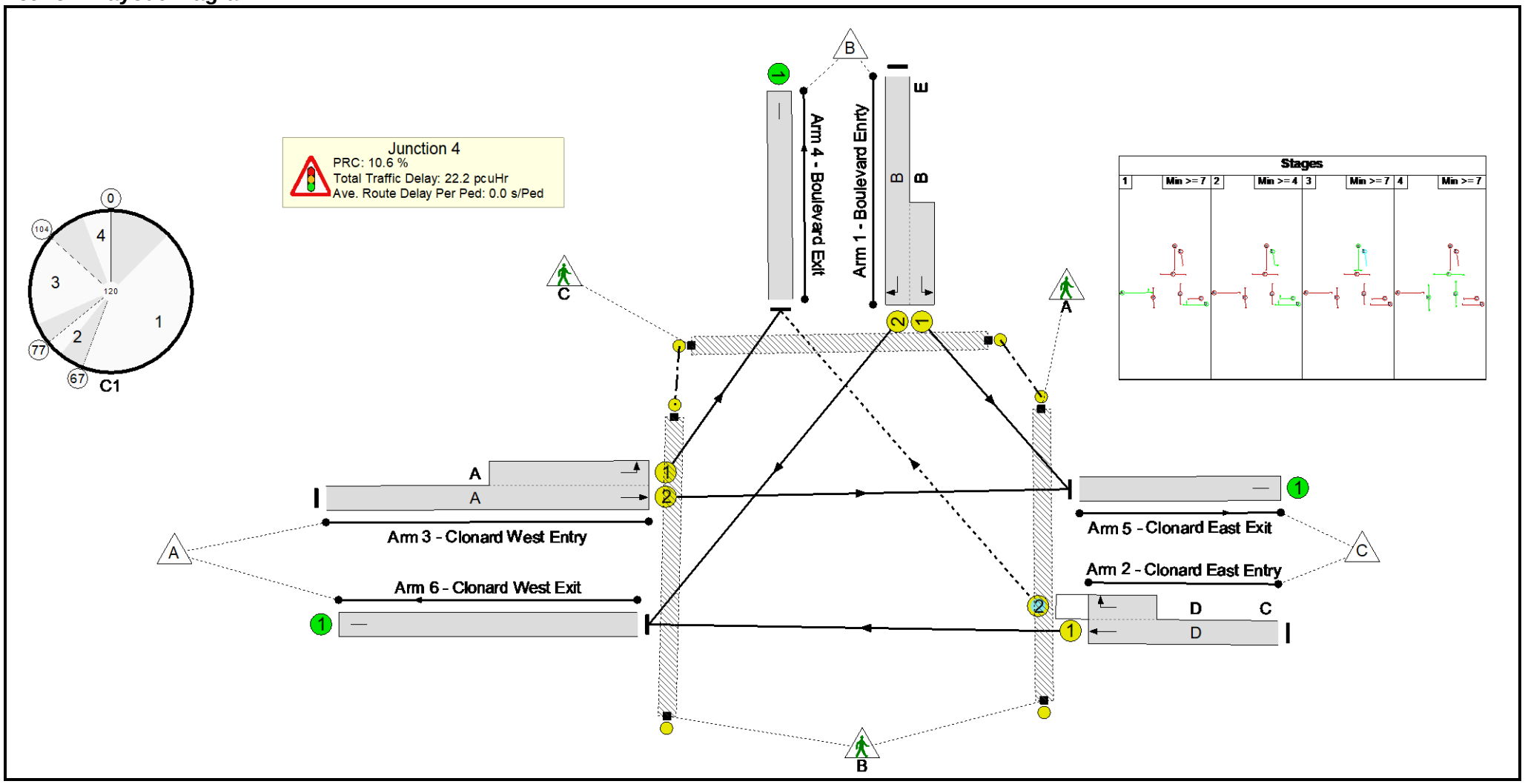
Stage Timings

Stage	1	2	3	4
Duration	52	4	22	7
Change Point	0	67	77	104

Signal Timings Diagram



Network Layout Diagram



Network Results

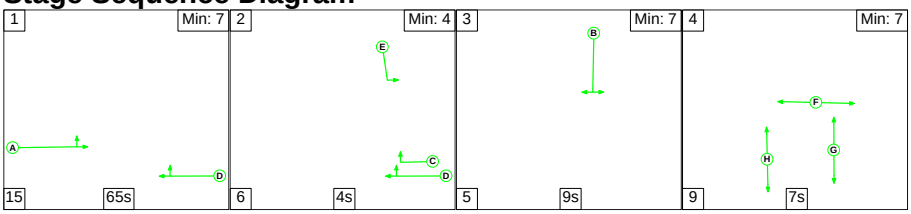
Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**81.4%**
Junction 4	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**81.4%**
1/2+1/1	Boulevard Enrty Left Right	U	N/A	N/A	B	E	1	22:31	9	374	1914:1747	313+146	81.4 : 81.4%
2/1+2/2	Clonard East Entry Right Ahead	U+O	N/A	N/A	D	C	1	62	4	853	1980:1891	952+104	80.7 : 80.7%
3/2+3/1	Clonard West Entry Left Ahead	U	N/A	N/A	A		1	52	-	792	2105:1747	798+196	79.7 : 79.7%
4/1	Boulevard Exit	U	N/A	N/A	-		-	-	-	240	Inf	Inf	0.0%
5/1	Clonard East Exit	U	N/A	N/A	-		-	-	-	755	Inf	Inf	0.0%
6/1	Clonard West Exit	U	N/A	N/A	-		-	-	-	1024	Inf	Inf	0.0%
Ped Link: P1	Unnamed Ped Link	-	N/A	-	F		1	15	-	0	-	9000	0.0%
Ped Link: P2	Unnamed Ped Link	-	N/A	-	G		1	8	-	0	-	4800	0.0%
Ped Link: P3	Unnamed Ped Link	-	N/A	-	H		1	7	-	0	-	0	0.0%

Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network	**-**	**-**	**77**	**6**	**1**	**15.7**	**6.1**	**0.4**	**22.2**	**-**	**-**	**-**	**-**
Junction 4	**-**	**-**	**77**	**6**	**1**	**15.7**	**6.1**	**0.4**	**22.2**	**-**	**-**	**-**	**-**
1/2+1/1	374	374	-	-	-	4.4	2.1	-	6.5	62.6	8.8	2.1	10.9
2/1+2/2	853	853	77	6	1	5.4	2.1	0.4	7.8	33.1	22.8	2.1	24.8
3/2+3/1	792	792	-	-	-	5.9	1.9	-	7.8	35.5	19.6	1.9	21.5
4/1	240	240	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
5/1	755	755	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	1024	1024	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
Ped Link: P1	0	0	-	-	-	-	-	-	0.0	0.0	-	-	0.0
Ped Link: P2	0	0	-	-	-	-	-	-	0.0	0.0	-	-	0.0
Ped Link: P3	0	0	-	-	-	-	-	-	-	-	-	-	-

C1 PRC for Signalled Lanes (%): 10.6 Total Delay for Signalled Lanes (pcuHr): 22.15 Cycle Time (s): 120
PRC Over All Lanes (%): 10.6 Total Delay Over All Lanes(pcuHr): 22.15

Scenario 6: 'Scenario B 2025 PM ' (FG6: 'Scenario B 2025 - PM', Plan 1: 'Network Control Plan 1')

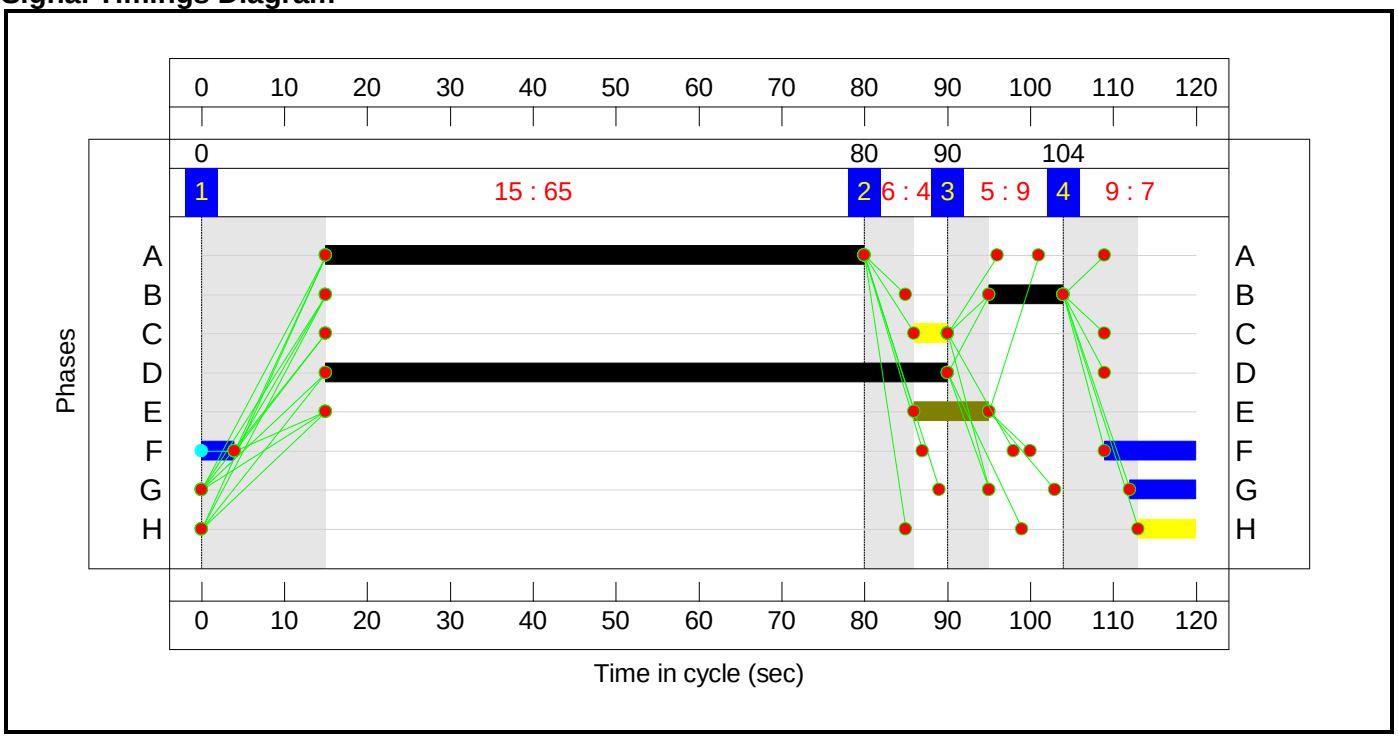
Stage Sequence Diagram



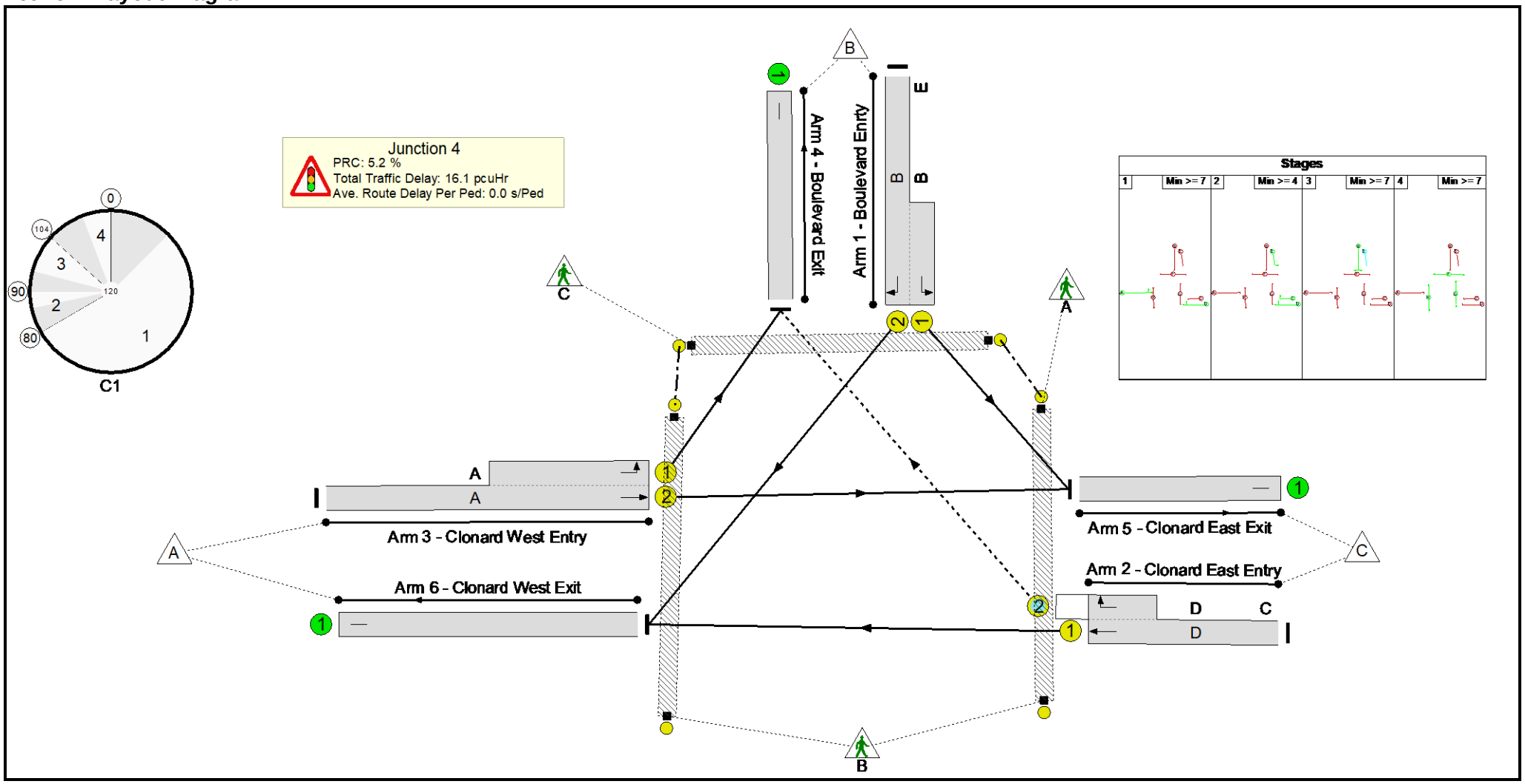
Stage Timings

Stage	1	2	3	4
Duration	65	4	9	7
Change Point	0	80	90	104

Signal Timings Diagram



Network Layout Diagram



Network Results

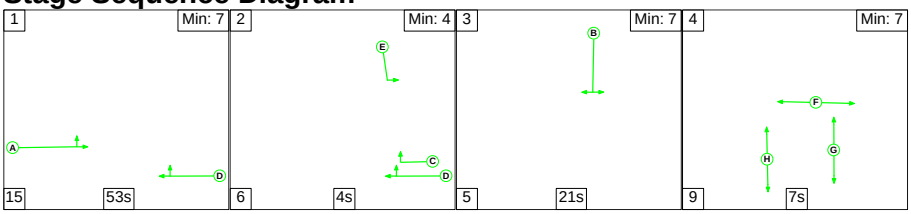
Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**85.5%**
Junction 4	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**85.5%**
1/2+1/1	Boulevard Enrty Left Right	U	N/A	N/A	B	E	1	9:18	9	178	1914:1747	160+69	77.7 : 77.7%
2/1+2/2	Clonard East Entry Right Ahead	U+O	N/A	N/A	D	C	1	75	4	644	1980:1891	1148+122	50.7 : 50.7%
3/2+3/1	Clonard West Entry Left Ahead	U	N/A	N/A	A		1	65	-	1030	2105:1747	1007+198	85.5 : 85.5%
4/1	Boulevard Exit	U	N/A	N/A	-		-	-	-	231	Inf	Inf	0.0%
5/1	Clonard East Exit	U	N/A	N/A	-		-	-	-	915	Inf	Inf	0.0%
6/1	Clonard West Exit	U	N/A	N/A	-		-	-	-	706	Inf	Inf	0.0%
Ped Link: P1	Unnamed Ped Link	-	N/A	-	F		1	15	-	0	-	9000	0.0%
Ped Link: P2	Unnamed Ped Link	-	N/A	-	G		1	8	-	0	-	4800	0.0%
Ped Link: P3	Unnamed Ped Link	-	N/A	-	H		1	7	-	0	-	0	0.0%

Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network	**-**	**-**	**57**	**4**	**1**	**10.6**	**5.0**	**0.5**	**16.1**	**-**	**-**	**-**	**-**
Junction 4	**-**	**-**	**57**	**4**	**1**	**10.6**	**5.0**	**0.5**	**16.1**	**-**	**-**	**-**	**-**
1/2+1/1	178	178	-	-	-	2.5	1.6	-	4.2	84.1	4.0	1.6	5.7
2/1+2/2	644	644	57	4	1	2.0	0.5	0.5	3.0	16.9	10.8	0.5	11.3
3/2+3/1	1030	1030	-	-	-	6.0	2.9	-	8.9	31.1	26.4	2.9	29.3
4/1	231	231	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
5/1	915	915	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	706	706	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
Ped Link: P1	0	0	-	-	-	-	-	-	0.0	0.0	-	-	0.0
Ped Link: P2	0	0	-	-	-	-	-	-	0.0	0.0	-	-	0.0
Ped Link: P3	0	0	-	-	-	-	-	-	-	-	-	-	-

C1 PRC for Signalled Lanes (%): 5.2 Total Delay for Signalled Lanes (pcuHr): 16.07 Cycle Time (s): 120
PRC Over All Lanes (%): 5.2 Total Delay Over All Lanes(pcuHr): 16.07

Scenario 7: 'Scenario B 2030 AM ' (FG7: 'Scenario B 2030 - AM', Plan 1: 'Network Control Plan 1')

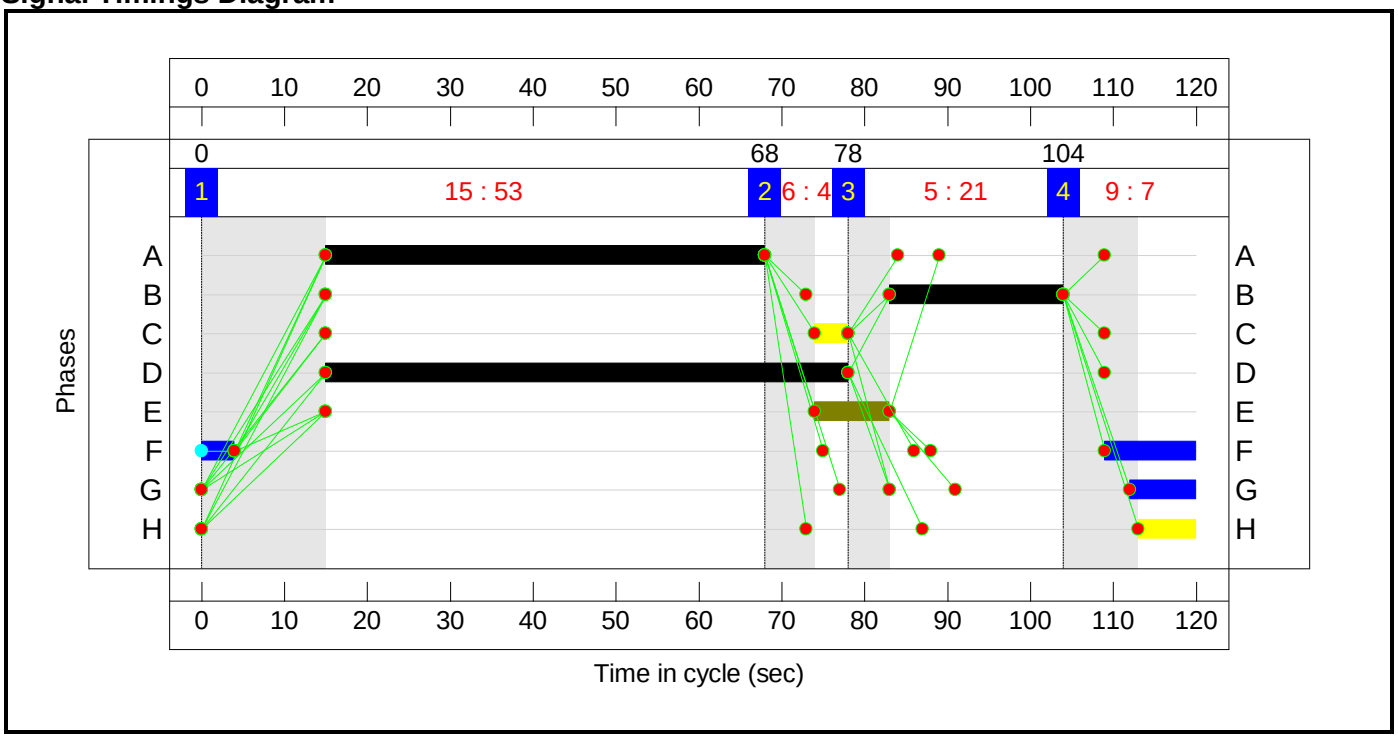
Stage Sequence Diagram



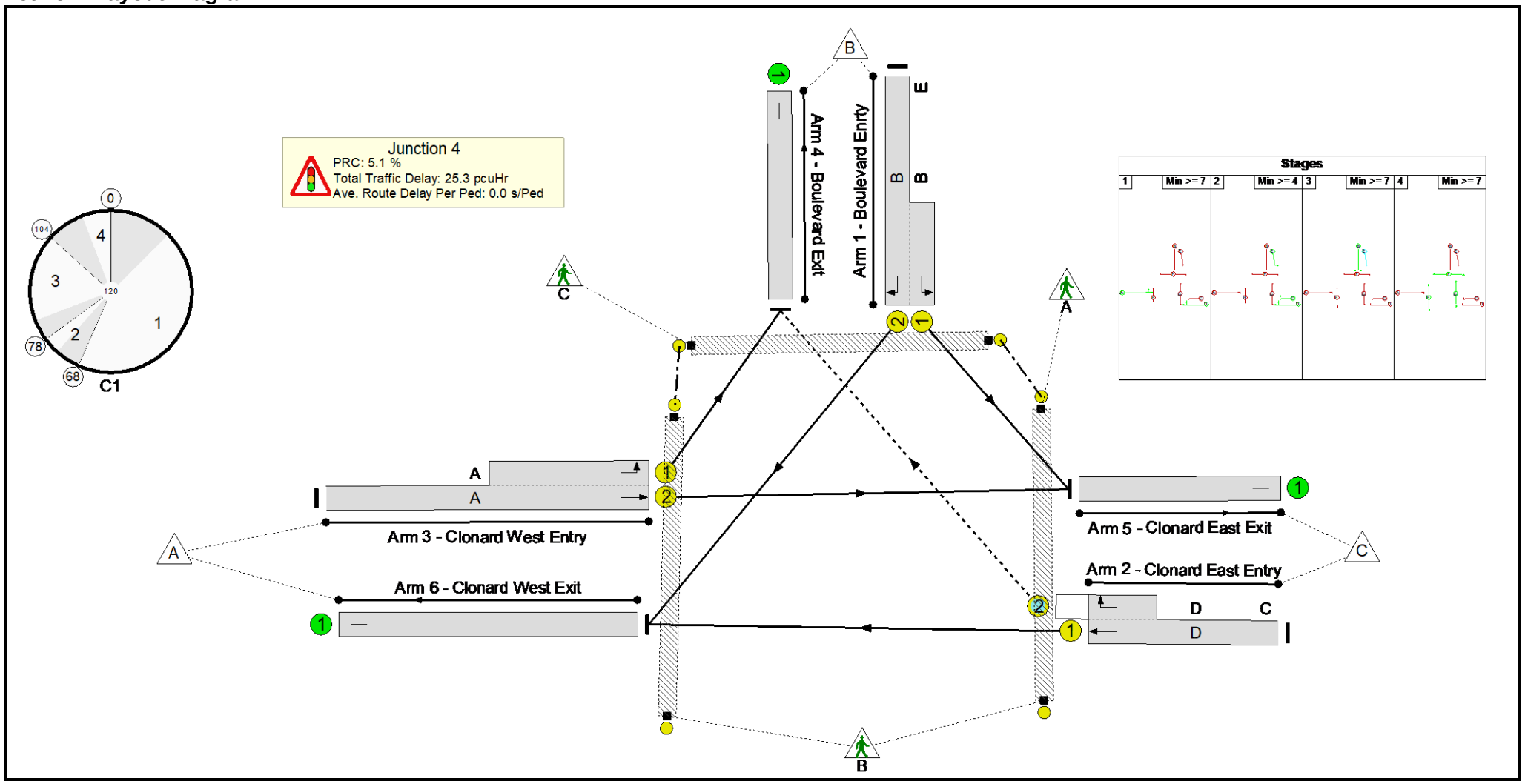
Stage Timings

Stage	1	2	3	4
Duration	53	4	21	7
Change Point	0	68	78	104

Signal Timings Diagram



Network Layout Diagram



Network Results

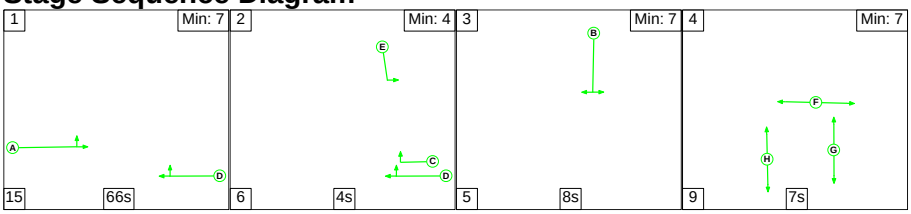
Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**85.6%**
Junction 4	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**85.6%**
1/2+1/1	Boulevard Enrty Left Right	U	N/A	N/A	B	E	1	21:30	9	381	1914:1747	302+142	85.6 : 85.6%
2/1+2/2	Clonard East Entry Right Ahead	U+O	N/A	N/A	D	C	1	63	4	913	1980:1891	970+102	85.1 : 85.1%
3/2+3/1	Clonard West Entry Left Ahead	U	N/A	N/A	A		1	53	-	845	2105:1747	816+193	83.7 : 83.7%
4/1	Boulevard Exit	U	N/A	N/A	-		-	-	-	249	Inf	Inf	0.0%
5/1	Clonard East Exit	U	N/A	N/A	-		-	-	-	805	Inf	Inf	0.0%
6/1	Clonard West Exit	U	N/A	N/A	-		-	-	-	1085	Inf	Inf	0.0%
Ped Link: P1	Unnamed Ped Link	-	N/A	-	F		1	15	-	0	-	9000	0.0%
Ped Link: P2	Unnamed Ped Link	-	N/A	-	G		1	8	-	0	-	4800	0.0%
Ped Link: P3	Unnamed Ped Link	-	N/A	-	H		1	7	-	0	-	0	0.0%

Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network	**-**	**-**	**80**	**6**	**1**	**16.9**	**8.0**	**0.4**	**25.3**	**-**	**-**	**-**	**-**
Junction 4	**-**	**-**	**80**	**6**	**1**	**16.9**	**8.0**	**0.4**	**25.3**	**-**	**-**	**-**	**-**
1/2+1/1	381	381	-	-	-	4.6	2.7	-	7.4	69.6	9.1	2.7	11.8
2/1+2/2	913	913	80	6	1	5.9	2.8	0.4	9.1	36.0	25.2	2.8	27.9
3/2+3/1	845	845	-	-	-	6.3	2.5	-	8.8	37.7	21.9	2.5	24.3
4/1	249	249	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
5/1	805	805	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	1085	1085	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
Ped Link: P1	0	0	-	-	-	-	-	-	0.0	0.0	-	-	0.0
Ped Link: P2	0	0	-	-	-	-	-	-	0.0	0.0	-	-	0.0
Ped Link: P3	0	0	-	-	-	-	-	-	-	-	-	-	-

C1 PRC for Signalled Lanes (%): 5.1 Total Delay for Signalled Lanes (pcuHr): 25.34 Cycle Time (s): 120
PRC Over All Lanes (%): 5.1 Total Delay Over All Lanes(pcuHr): 25.34

Scenario 8: ' Scenario B 2030 PM ' (FG8: 'Scenario B 2030 - PM', Plan 1: 'Network Control Plan 1')

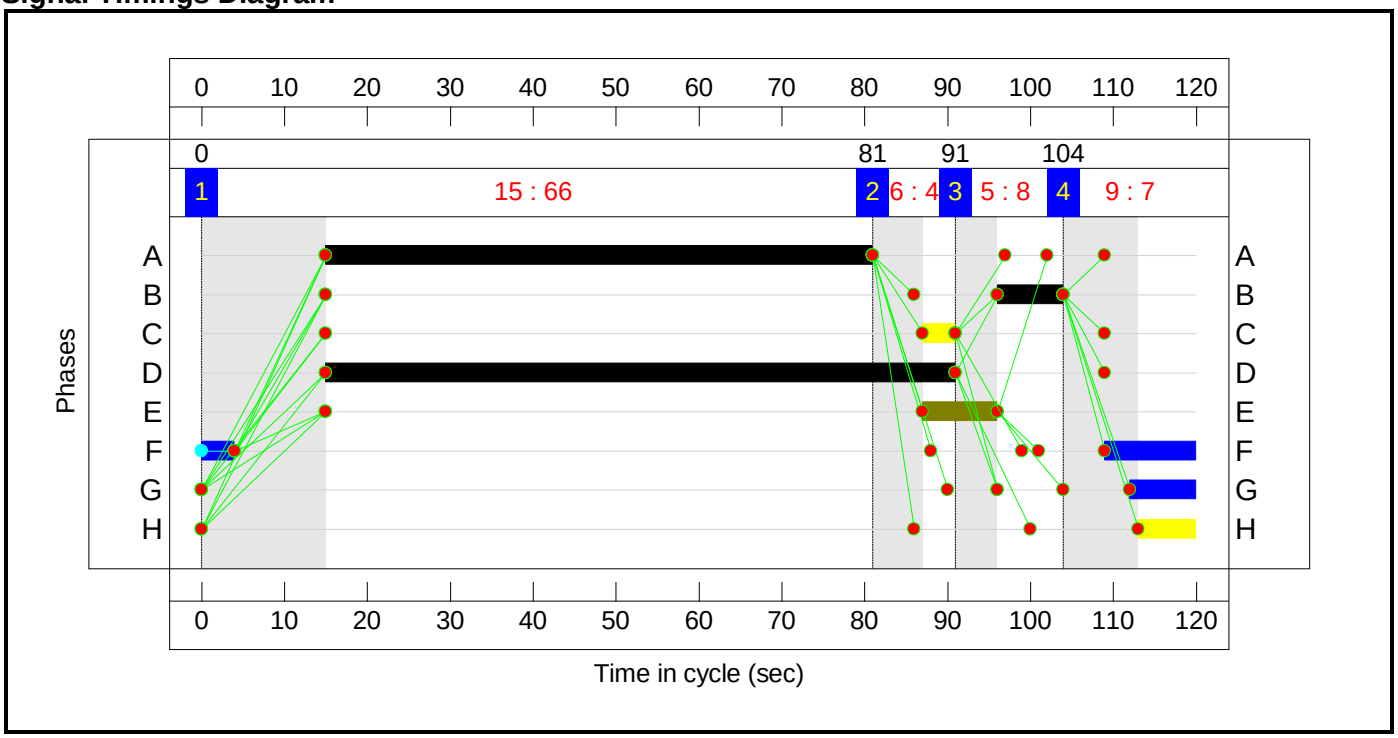
Stage Sequence Diagram



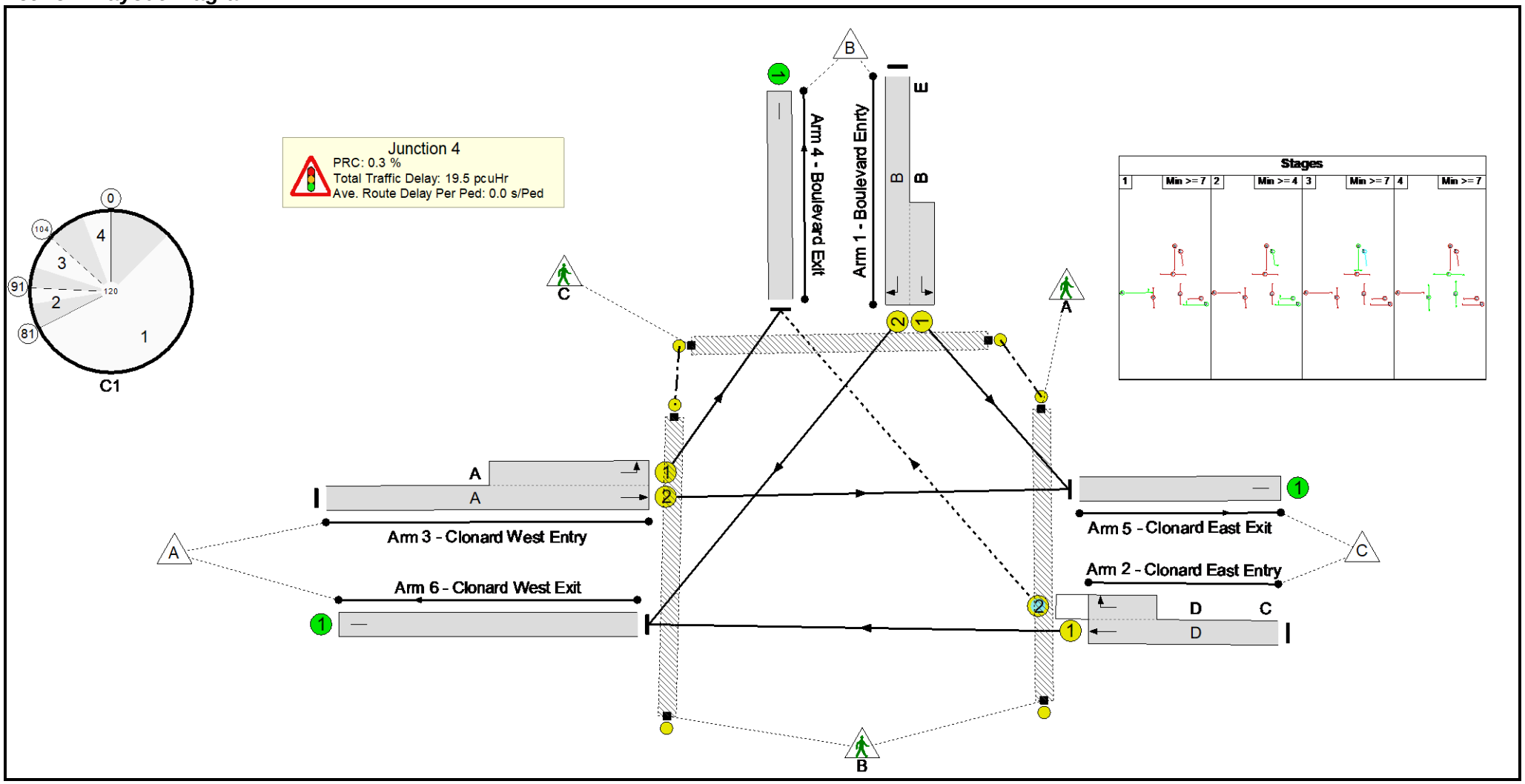
Stage Timings

Stage	1	2	3	4
Duration	66	4	8	7
Change Point	0	81	91	104

Signal Timings Diagram



Network Layout Diagram



Network Results

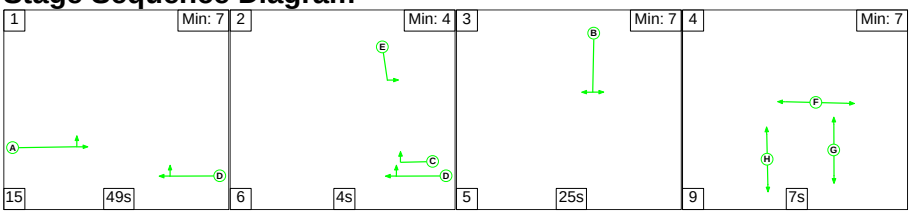
Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**89.8%**
Junction 4	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**89.8%**
1/2+1/1	Boulevard Enrty Left Right	U	N/A	N/A	B	E	1	8:17	9	181	1914:1747	144+63	87.8 : 87.8%
2/1+2/2	Clonard East Entry Right Ahead	U+O	N/A	N/A	D	C	1	76	4	686	1980:1891	1169+116	53.4 : 53.4%
3/2+3/1	Clonard West Entry Left Ahead	U	N/A	N/A	A		1	66	-	1094	2105:1747	1031+188	89.8 : 89.8%
4/1	Boulevard Exit	U	N/A	N/A	-		-	-	-	231	Inf	Inf	0.0%
5/1	Clonard East Exit	U	N/A	N/A	-		-	-	-	980	Inf	Inf	0.0%
6/1	Clonard West Exit	U	N/A	N/A	-		-	-	-	750	Inf	Inf	0.0%
Ped Link: P1	Unnamed Ped Link	-	N/A	-	F		1	15	-	0	-	9000	0.0%
Ped Link: P2	Unnamed Ped Link	-	N/A	-	G		1	8	-	0	-	4800	0.0%
Ped Link: P3	Unnamed Ped Link	-	N/A	-	H		1	7	-	0	-	0	0.0%

Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network	**-**	**-**	**56**	**5**	**1**	**11.3**	**7.6**	**0.6**	**19.5**	**-**	**-**	**-**	**-**
Junction 4	**-**	**-**	**56**	**5**	**1**	**11.3**	**7.6**	**0.6**	**19.5**	**-**	**-**	**-**	**-**
1/2+1/1	181	181	-	-	-	2.6	2.9	-	5.5	109.9	4.1	2.9	7.0
2/1+2/2	686	686	56	5	1	2.2	0.6	0.6	3.3	17.2	11.8	0.6	12.3
3/2+3/1	1094	1094	-	-	-	6.6	4.1	-	10.7	35.2	29.8	4.1	33.9
4/1	231	231	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
5/1	980	980	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	750	750	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
Ped Link: P1	0	0	-	-	-	-	-	-	0.0	0.0	-	-	0.0
Ped Link: P2	0	0	-	-	-	-	-	-	0.0	0.0	-	-	0.0
Ped Link: P3	0	0	-	-	-	-	-	-	-	-	-	-	-

C1 PRC for Signalled Lanes (%): 0.3 Total Delay for Signalled Lanes (pcuHr): 19.50 Cycle Time (s): 120
PRC Over All Lanes (%): 0.3 Total Delay Over All Lanes(pcuHr): 19.50

Scenario 9: 'Scenario C 2025 AM ' (FG9: 'Scenario C 2025 - AM', Plan 1: 'Network Control Plan 1')

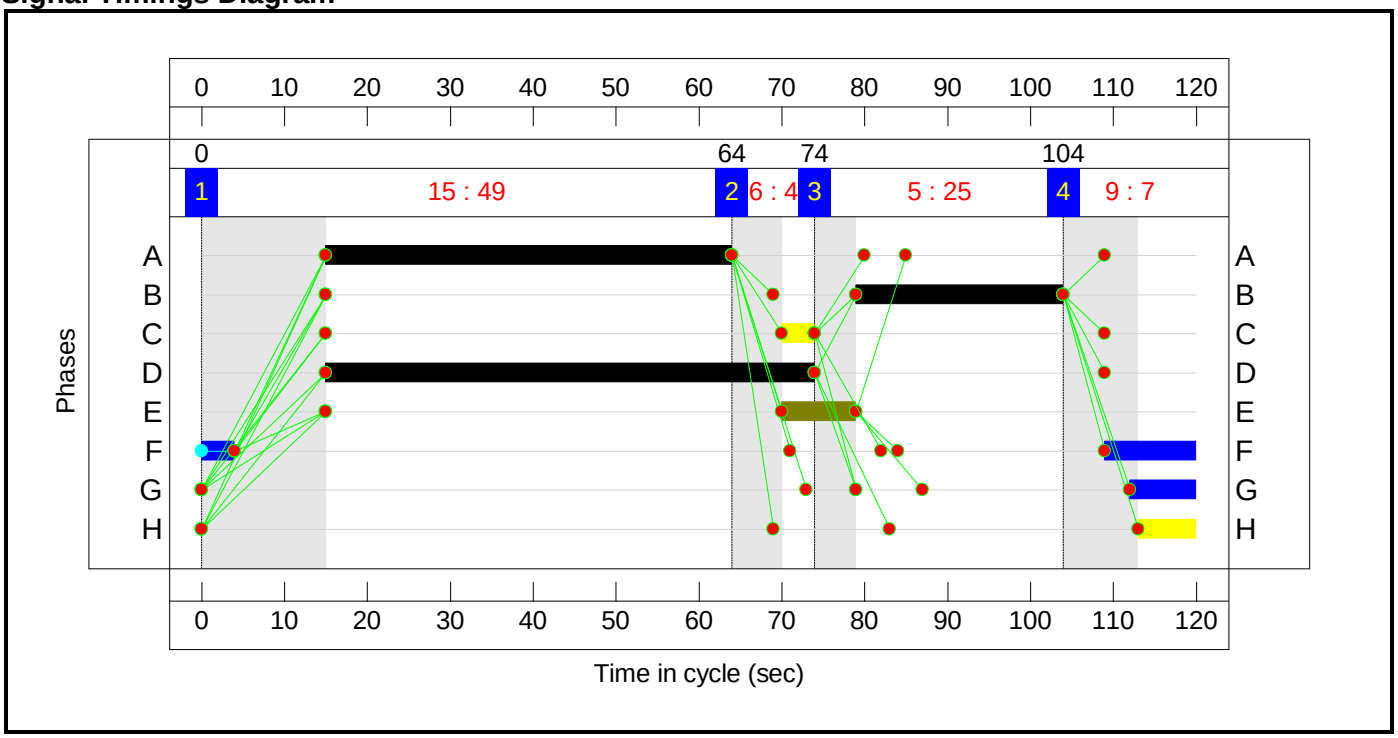
Stage Sequence Diagram



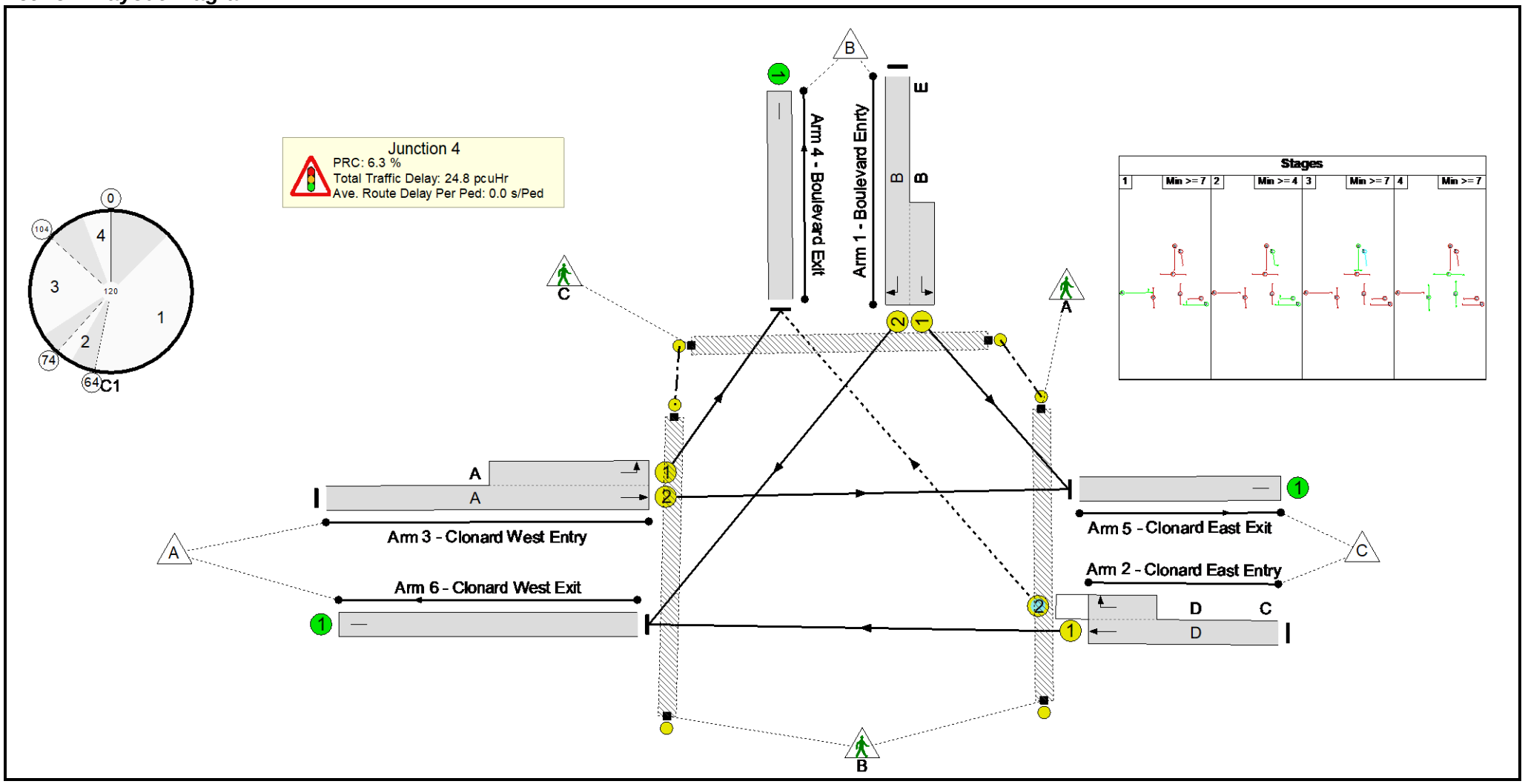
Stage Timings

Stage	1	2	3	4
Duration	49	4	25	7
Change Point	0	64	74	104

Signal Timings Diagram



Network Layout Diagram



Network Results

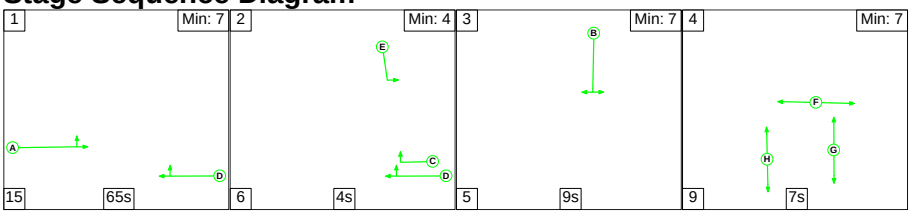
Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**84.6%**
Junction 4	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**84.6%**
1/2+1/1	Boulevard Enrty Left Right	U	N/A	N/A	B	E	1	25:34	9	414	1914:1747	346+158	82.1 : 82.1%
2/1+2/2	Clonard East Entry Right Ahead	U+O	N/A	N/A	D	C	1	59	4	853	1980:1891	904+104	84.6 : 84.6%
3/2+3/1	Clonard West Entry Left Ahead	U	N/A	N/A	A		1	49	-	789	2105:1747	750+197	83.3 : 83.3%
4/1	Boulevard Exit	U	N/A	N/A	-		-	-	-	252	Inf	Inf	0.0%
5/1	Clonard East Exit	U	N/A	N/A	-		-	-	-	755	Inf	Inf	0.0%
6/1	Clonard West Exit	U	N/A	N/A	-		-	-	-	1049	Inf	Inf	0.0%
Ped Link: P1	Unnamed Ped Link	-	N/A	-	F		1	15	-	0	-	9000	0.0%
Ped Link: P2	Unnamed Ped Link	-	N/A	-	G		1	8	-	0	-	4800	0.0%
Ped Link: P3	Unnamed Ped Link	-	N/A	-	H		1	7	-	0	-	0	0.0%

Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network	**-**	**-**	**81**	**6**	**1**	**17.1**	**7.3**	**0.4**	**24.8**	**-**	**-**	**-**	**-**
Junction 4	**-**	**-**	**81**	**6**	**1**	**17.1**	**7.3**	**0.4**	**24.8**	**-**	**-**	**-**	**-**
1/2+1/1	414	414	-	-	-	4.7	2.2	-	6.9	59.9	10.0	2.2	12.2
2/1+2/2	853	853	81	6	1	6.0	2.7	0.4	9.1	38.4	23.9	2.7	26.6
3/2+3/1	789	789	-	-	-	6.4	2.4	-	8.8	40.1	20.2	2.4	22.6
4/1	252	252	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
5/1	755	755	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	1049	1049	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
Ped Link: P1	0	0	-	-	-	-	-	-	0.0	0.0	-	-	0.0
Ped Link: P2	0	0	-	-	-	-	-	-	0.0	0.0	-	-	0.0
Ped Link: P3	0	0	-	-	-	-	-	-	-	-	-	-	-

C1 PRC for Signalled Lanes (%): 6.3 Total Delay for Signalled Lanes (pcuHr): 24.78 Cycle Time (s): 120
PRC Over All Lanes (%): 6.3 Total Delay Over All Lanes(pcuHr): 24.78

Scenario 10: 'Scenario C 2025 PM ' (FG10: 'Scenario C 2025 - PM', Plan 1: 'Network Control Plan 1')

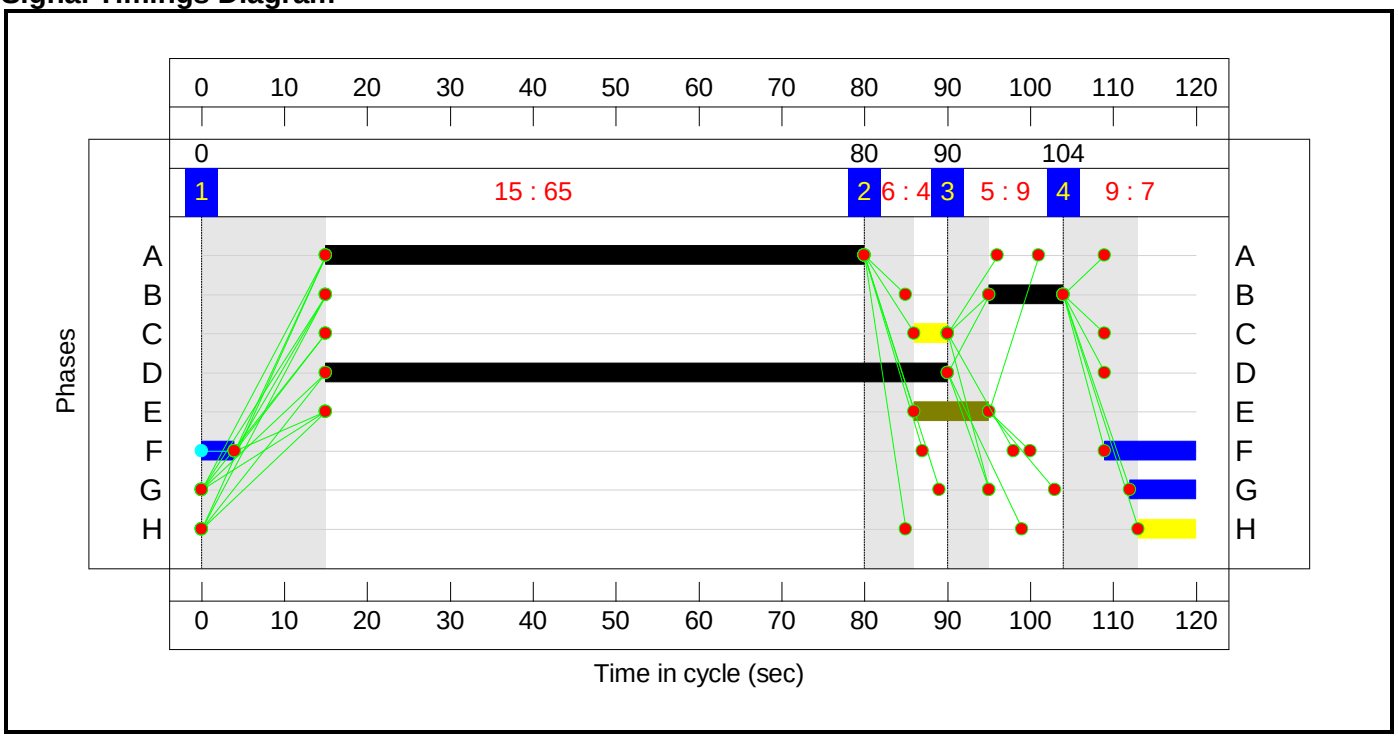
Stage Sequence Diagram



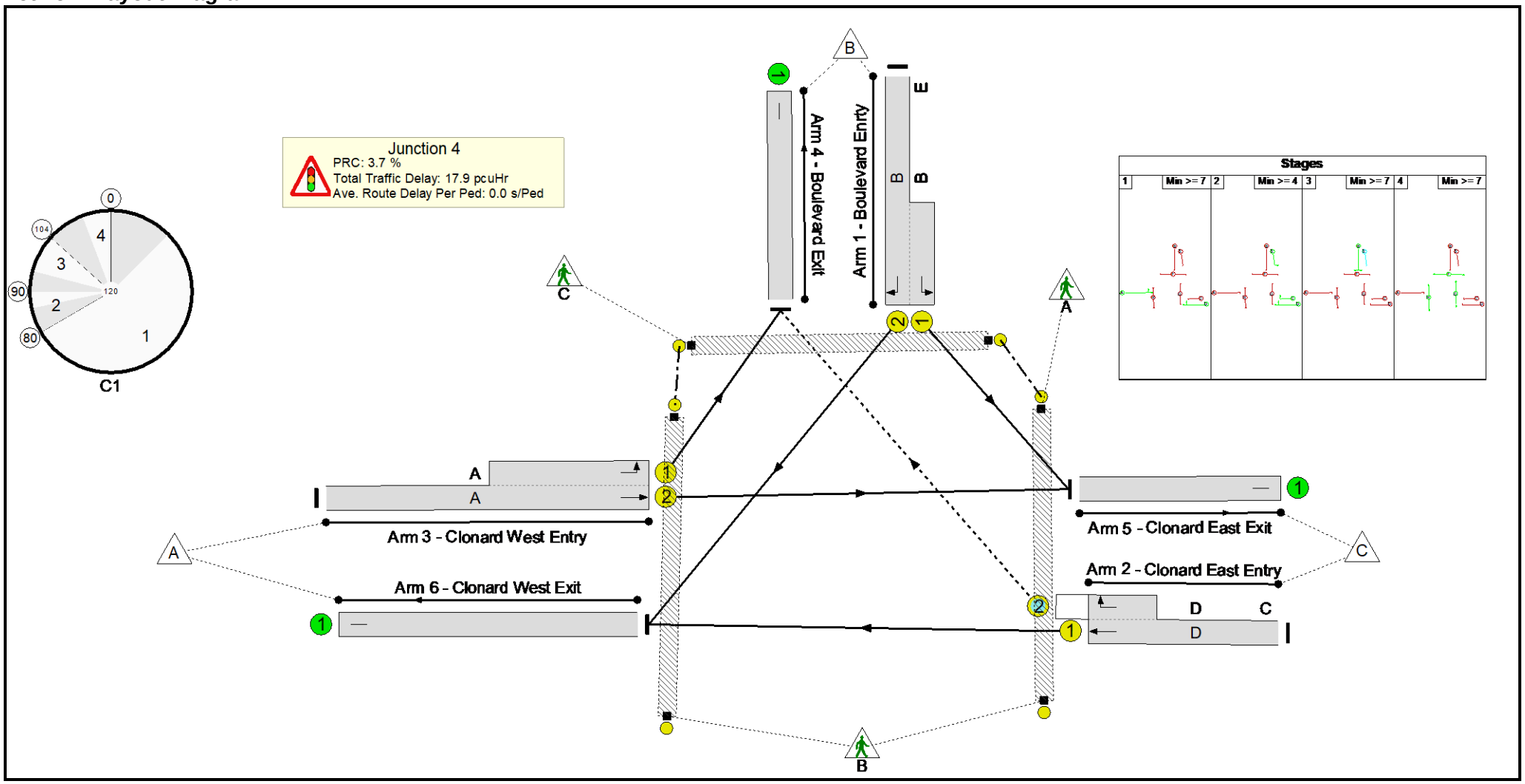
Stage Timings

Stage	1	2	3	4
Duration	65	4	9	7
Change Point	0	80	90	104

Signal Timings Diagram



Network Layout Diagram



Network Results

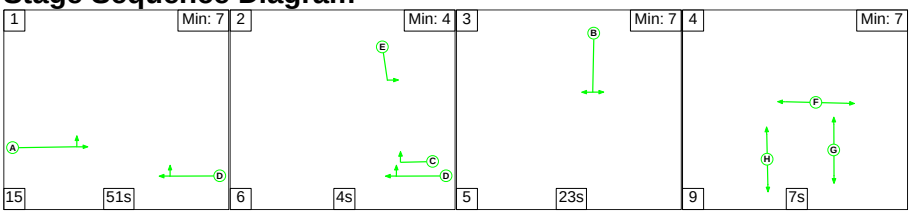
Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**86.8%**
Junction 4	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**86.8%**
1/2+1/1	Boulevard Enrty Left Right	U	N/A	N/A	B	E	1	9:18	9	199	1914:1747	160+72	85.9 : 85.9%
2/1+2/2	Clonard East Entry Right Ahead	U+O	N/A	N/A	D	C	1	75	4	644	1980:1891	1133+138	50.7 : 50.7%
3/2+3/1	Clonard West Entry Left Ahead	U	N/A	N/A	A		1	65	-	1051	2105:1747	984+227	86.8 : 86.8%
4/1	Boulevard Exit	U	N/A	N/A	-		-	-	-	267	Inf	Inf	0.0%
5/1	Clonard East Exit	U	N/A	N/A	-		-	-	-	916	Inf	Inf	0.0%
6/1	Clonard West Exit	U	N/A	N/A	-		-	-	-	711	Inf	Inf	0.0%
Ped Link: P1	Unnamed Ped Link	-	N/A	-	F		1	15	-	0	-	9000	0.0%
Ped Link: P2	Unnamed Ped Link	-	N/A	-	G		1	8	-	0	-	4800	0.0%
Ped Link: P3	Unnamed Ped Link	-	N/A	-	H		1	7	-	0	-	0	0.0%

Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network	**-**	**-**	**64**	**5**	**1**	**11.0**	**6.3**	**0.6**	**17.9**	**-**	**-**	**-**	**-**
Junction 4	**-**	**-**	**64**	**5**	**1**	**11.0**	**6.3**	**0.6**	**17.9**	**-**	**-**	**-**	**-**
1/2+1/1	199	199	-	-	-	2.8	2.6	-	5.4	98.6	4.5	2.6	7.1
2/1+2/2	644	644	64	5	1	2.0	0.5	0.6	3.1	17.4	10.8	0.5	11.3
3/2+3/1	1051	1051	-	-	-	6.2	3.2	-	9.3	32.0	26.9	3.2	30.1
4/1	267	267	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
5/1	916	916	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	711	711	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
Ped Link: P1	0	0	-	-	-	-	-	-	0.0	0.0	-	-	0.0
Ped Link: P2	0	0	-	-	-	-	-	-	0.0	0.0	-	-	0.0
Ped Link: P3	0	0	-	-	-	-	-	-	-	-	-	-	-

C1 PRC for Signalled Lanes (%): 3.7 Total Delay for Signalled Lanes (pcuHr): 17.89 Cycle Time (s): 120
PRC Over All Lanes (%): 3.7 Total Delay Over All Lanes(pcuHr): 17.89

Scenario 11: 'Scenario C 2030 AM ' (FG11: 'Scenario C 2030 - AM', Plan 1: 'Network Control Plan 1')

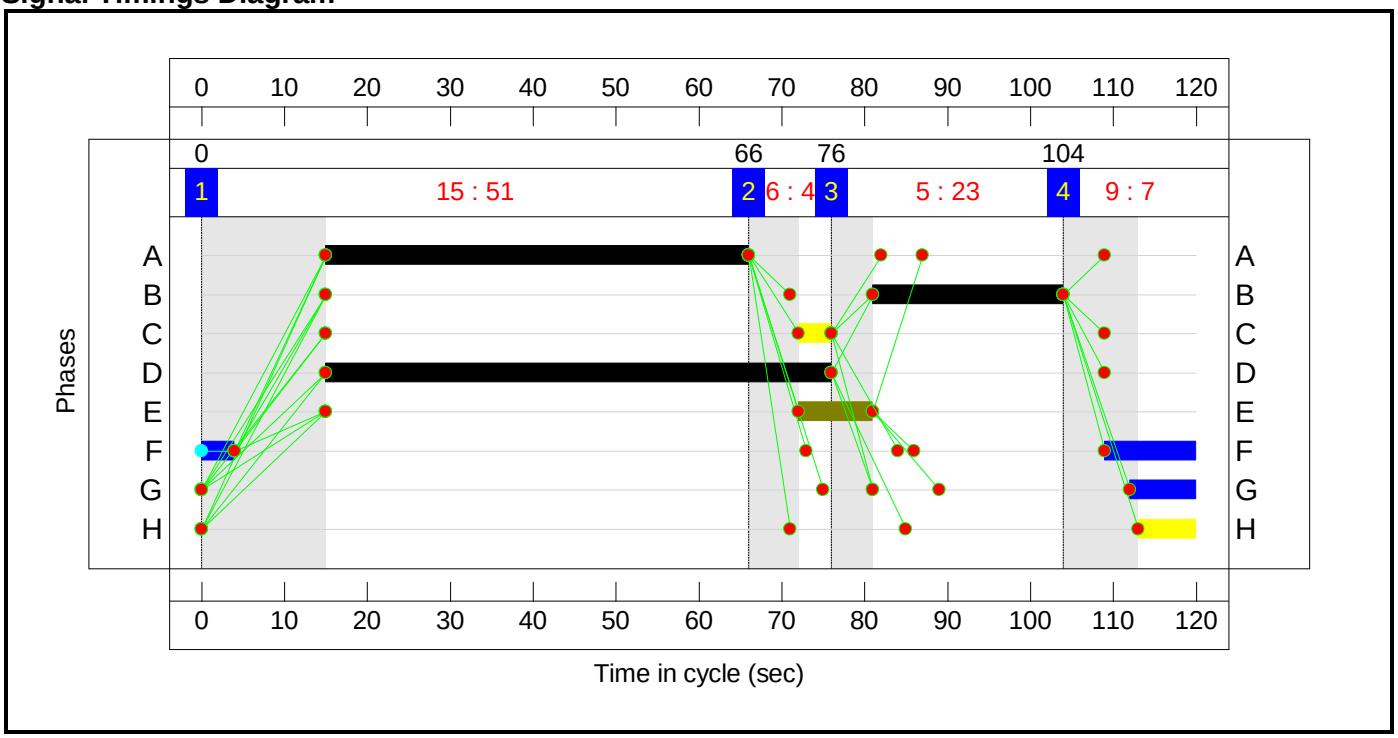
Stage Sequence Diagram



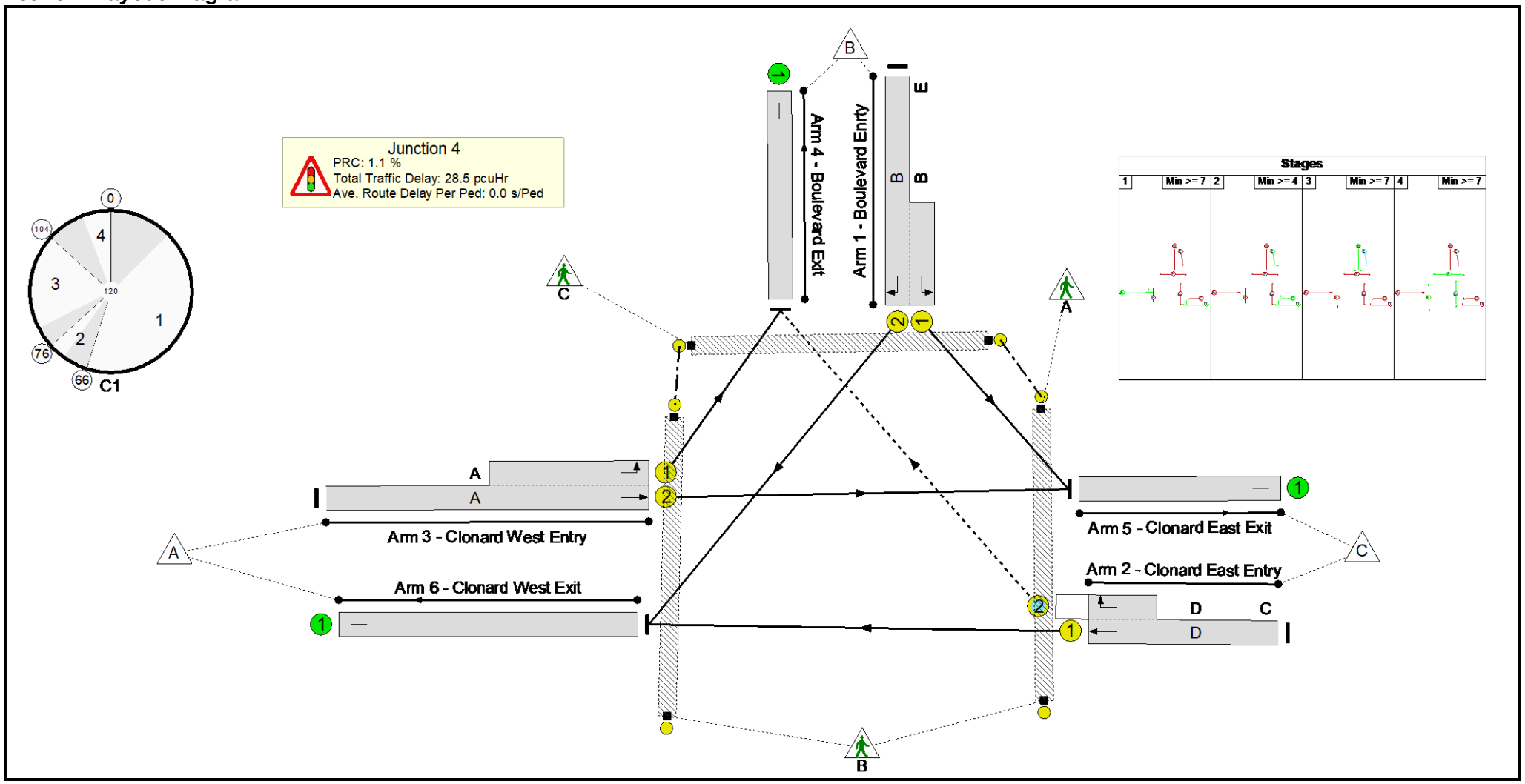
Stage Timings

Stage	1	2	3	4
Duration	51	4	23	7
Change Point	0	66	76	104

Signal Timings Diagram



Network Layout Diagram



Network Results

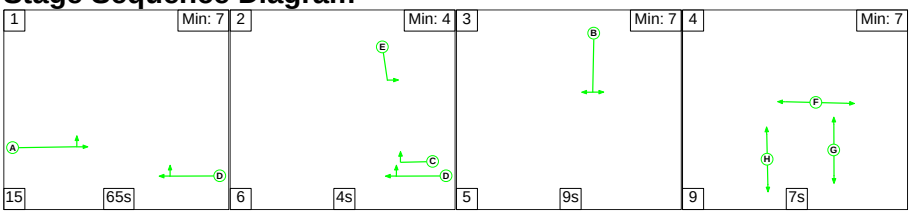
Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**89.1%**
Junction 4	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**89.1%**
1/2+1/1	Boulevard Enrty Left Right	U	N/A	N/A	B	E	1	23:32	9	422	1914:1747	324+149	89.1 : 89.1%
2/1+2/2	Clonard East Entry Right Ahead	U+O	N/A	N/A	D	C	1	61	4	913	1980:1891	937+104	87.8 : 87.8%
3/2+3/1	Clonard West Entry Left Ahead	U	N/A	N/A	A		1	51	-	843	2105:1747	781+199	86.1 : 86.1%
4/1	Boulevard Exit	U	N/A	N/A	-		-	-	-	262	Inf	Inf	0.0%
5/1	Clonard East Exit	U	N/A	N/A	-		-	-	-	805	Inf	Inf	0.0%
6/1	Clonard West Exit	U	N/A	N/A	-		-	-	-	1111	Inf	Inf	0.0%
Ped Link: P1	Unnamed Ped Link	-	N/A	-	F		1	15	-	0	-	9000	0.0%
Ped Link: P2	Unnamed Ped Link	-	N/A	-	G		1	8	-	0	-	4800	0.0%
Ped Link: P3	Unnamed Ped Link	-	N/A	-	H		1	7	-	0	-	0	0.0%

Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network	**-**	**-**	**81**	**8**	**2**	**18.1**	**9.9**	**0.5**	**28.5**	**-**	**-**	**-**	**-**
Junction 4	**-**	**-**	**81**	**8**	**2**	**18.1**	**9.9**	**0.5**	**28.5**	**-**	**-**	**-**	**-**
1/2+1/1	422	422	-	-	-	5.0	3.6	-	8.6	73.6	10.6	3.6	14.2
2/1+2/2	913	913	81	8	2	6.4	3.4	0.5	10.3	40.4	26.2	3.4	29.6
3/2+3/1	843	843	-	-	-	6.7	3.0	-	9.7	41.2	22.3	3.0	25.3
4/1	262	262	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
5/1	805	805	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	1111	1111	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
Ped Link: P1	0	0	-	-	-	-	-	-	0.0	0.0	-	-	0.0
Ped Link: P2	0	0	-	-	-	-	-	-	0.0	0.0	-	-	0.0
Ped Link: P3	0	0	-	-	-	-	-	-	-	-	-	-	-

C1 PRC for Signalled Lanes (%): 1.1 Total Delay for Signalled Lanes (pcuHr): 28.53 Cycle Time (s): 120
PRC Over All Lanes (%): 1.1 Total Delay Over All Lanes(pcuHr): 28.53

Scenario 12: 'Scenario C 2030 PM ' (FG12: 'Scenario C 2030 - PM', Plan 1: 'Network Control Plan 1')

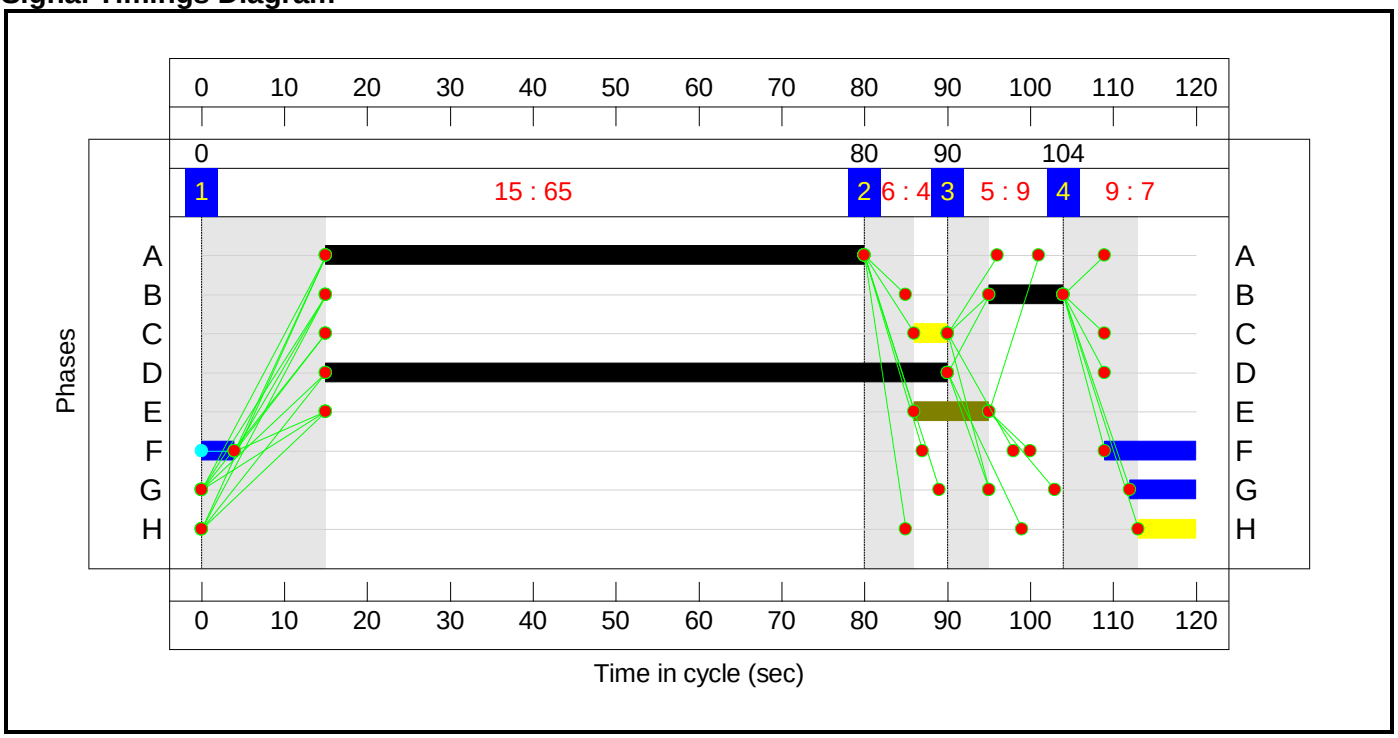
Stage Sequence Diagram



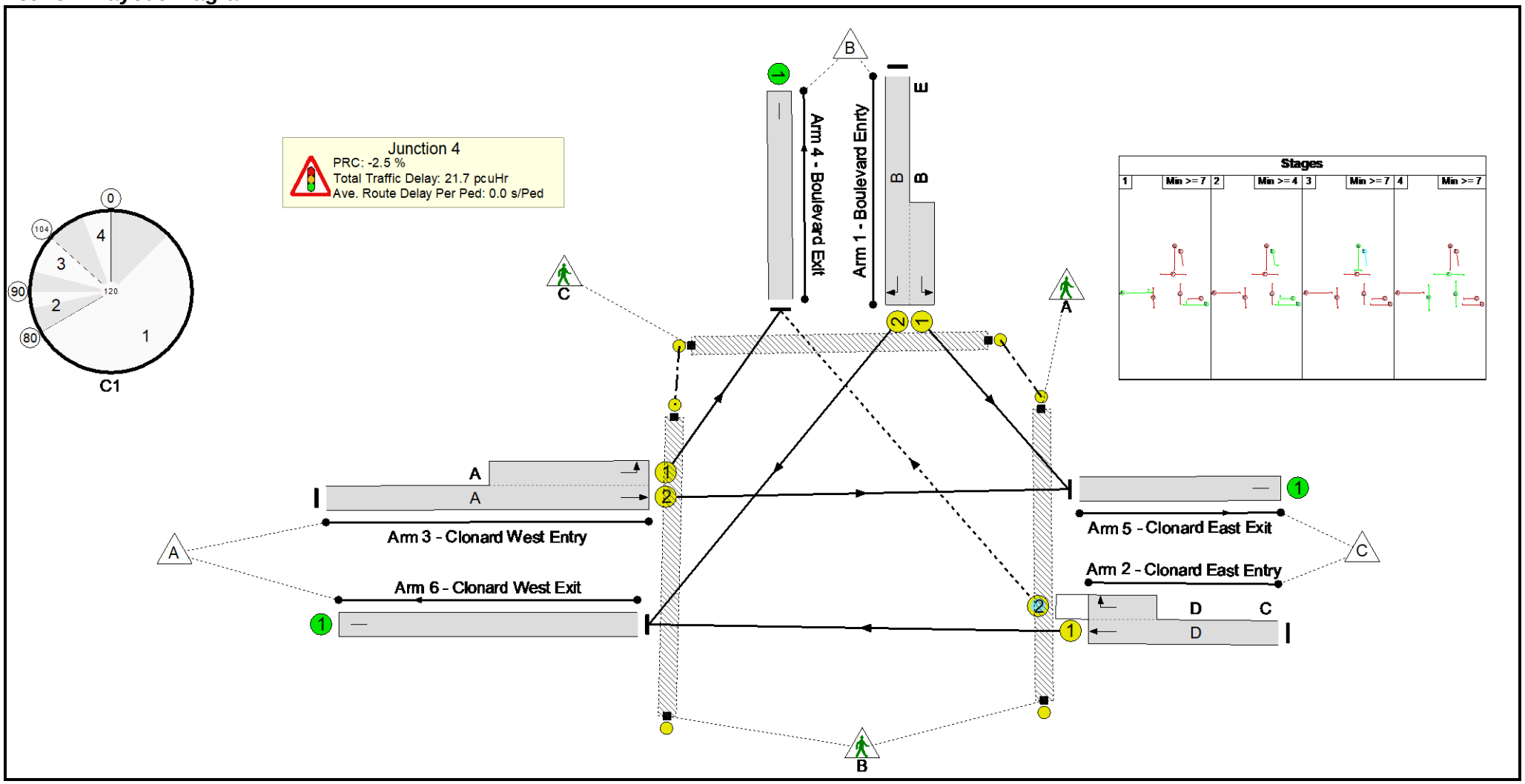
Stage Timings

Stage	1	2	3	4
Duration	65	4	9	7
Change Point	0	80	90	104

Signal Timings Diagram



Network Layout Diagram



Network Results

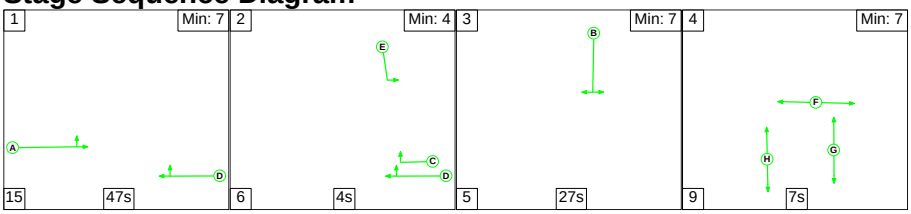
Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**92.2%**
Junction 4	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**92.2%**
1/2+1/1	Boulevard Enrty Left Right	U	N/A	N/A	B	E	1	9:18	9	202	1914:1747	160+71	87.8 : 87.8%
2/1+2/2	Clonard East Entry Right Ahead	U+O	N/A	N/A	D	C	1	75	4	686	1980:1891	1141+130	54.0 : 54.0%
3/2+3/1	Clonard West Entry Left Ahead	U	N/A	N/A	A		1	65	-	1114	2105:1747	994+214	92.2 : 92.2%
4/1	Boulevard Exit	U	N/A	N/A	-		-	-	-	267	Inf	Inf	0.0%
5/1	Clonard East Exit	U	N/A	N/A	-		-	-	-	979	Inf	Inf	0.0%
6/1	Clonard West Exit	U	N/A	N/A	-		-	-	-	756	Inf	Inf	0.0%
Ped Link: P1	Unnamed Ped Link	-	N/A	-	F		1	15	-	0	-	9000	0.0%
Ped Link: P2	Unnamed Ped Link	-	N/A	-	G		1	8	-	0	-	4800	0.0%
Ped Link: P3	Unnamed Ped Link	-	N/A	-	H		1	7	-	0	-	0	0.0%

Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network	**-**	**-**	**44**	**25**	**1**	**12.1**	**8.9**	**0.7**	**21.7**	**-**	**-**	**-**	**-**
Junction 4	**-**	**-**	**44**	**25**	**1**	**12.1**	**8.9**	**0.7**	**21.7**	**-**	**-**	**-**	**-**
1/2+1/1	202	202	-	-	-	2.9	3.0	-	5.8	104.1	4.6	3.0	7.6
2/1+2/2	686	686	44	25	1	2.2	0.6	0.7	3.5	18.5	11.9	0.6	12.5
3/2+3/1	1114	1114	-	-	-	7.0	5.3	-	12.3	39.9	31.0	5.3	36.3
4/1	267	267	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
5/1	979	979	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	756	756	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
Ped Link: P1	0	0	-	-	-	-	-	-	0.0	0.0	-	-	0.0
Ped Link: P2	0	0	-	-	-	-	-	-	0.0	0.0	-	-	0.0
Ped Link: P3	0	0	-	-	-	-	-	-	-	-	-	-	-

C1 PRC for Signalled Lanes (%): -2.5 Total Delay for Signalled Lanes (pcuHr): 21.71 Cycle Time (s): 120
PRC Over All Lanes (%): -2.5 Total Delay Over All Lanes(pcuHr): 21.71

Scenario 13: 'Scenario D 2025 AM ' (FG13: 'Scenario D 2025 - AM', Plan 1: 'Network Control Plan 1')

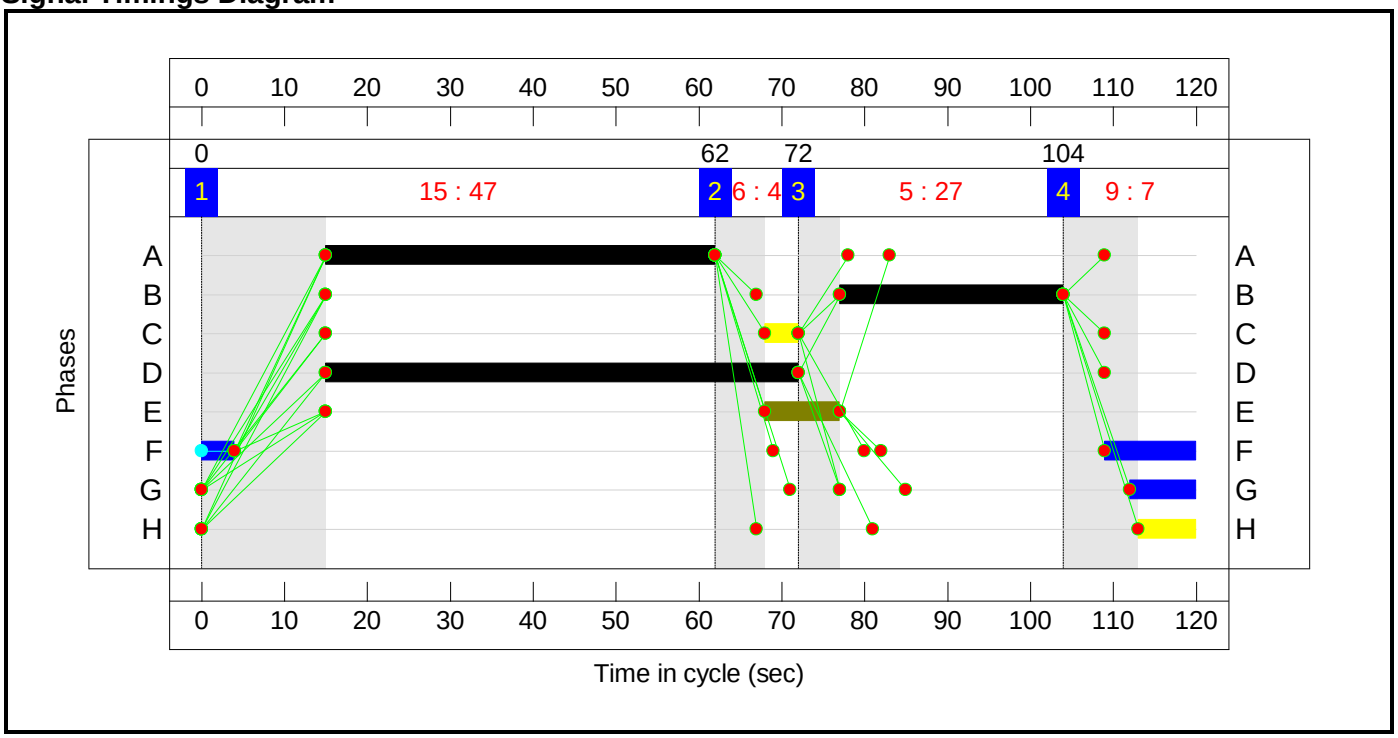
Stage Sequence Diagram



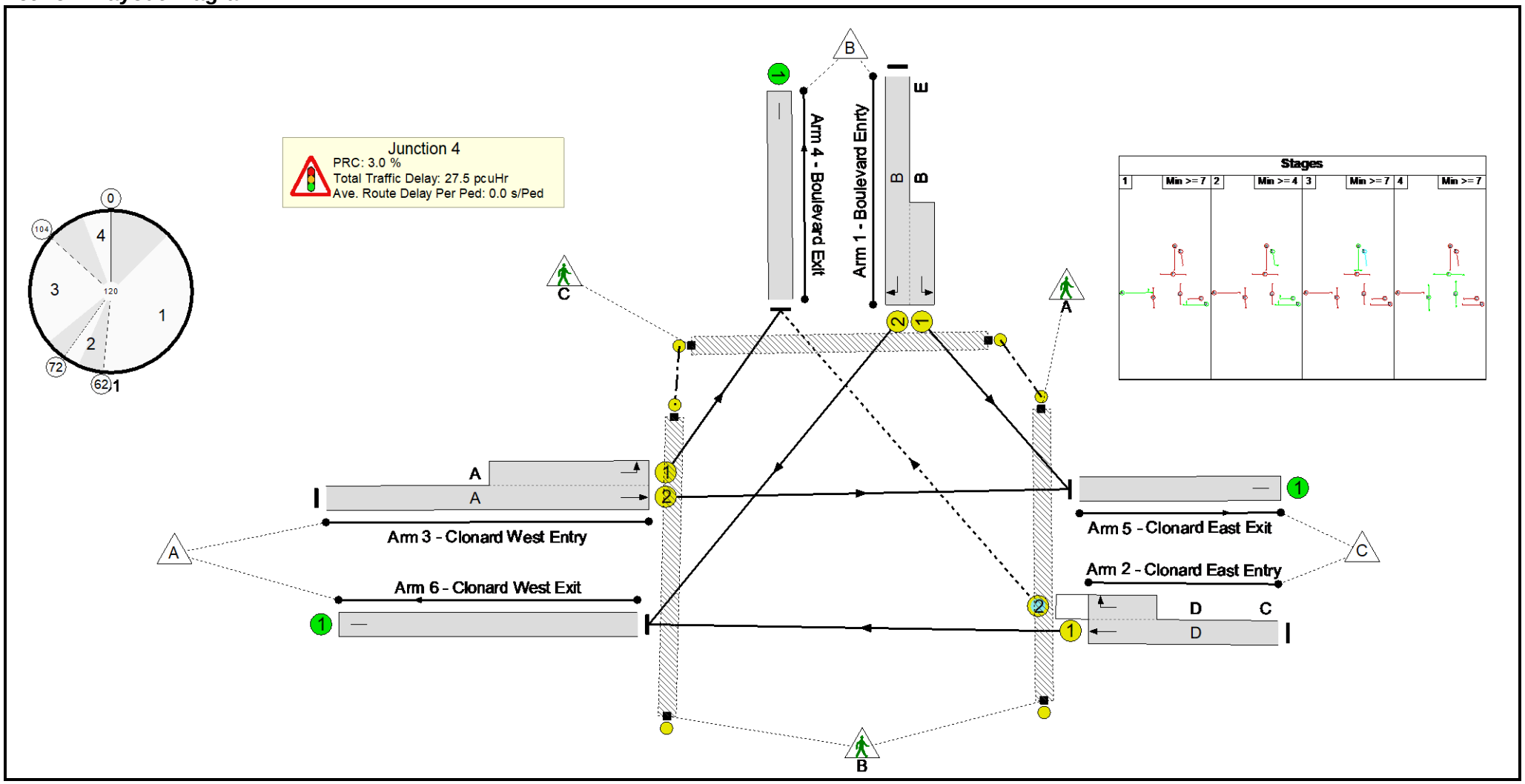
Stage Timings

Stage	1	2	3	4
Duration	47	4	27	7
Change Point	0	62	72	104

Signal Timings Diagram



Network Layout Diagram



Network Results

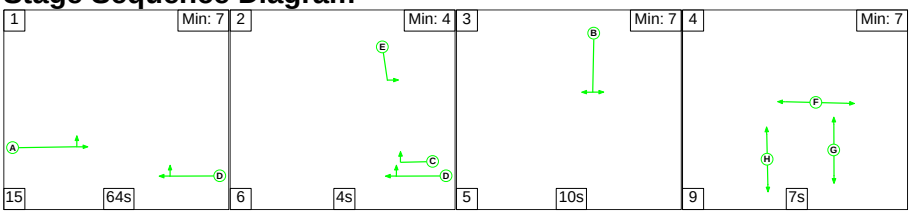
Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**87.4%**
Junction 4	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**87.4%**
1/2+1/1	Boulevard Enrty Left Right	U	N/A	N/A	B	E	1	27:36	9	455	1914:1747	368+165	85.2 : 85.2%
2/1+2/2	Clonard East Entry Right Ahead	U+O	N/A	N/A	D	C	1	57	4	852	1980:1891	871+104	87.4 : 87.4%
3/2+3/1	Clonard West Entry Left Ahead	U	N/A	N/A	A		1	47	-	787	2105:1747	716+202	85.7 : 85.7%
4/1	Boulevard Exit	U	N/A	N/A	-		-	-	-	264	Inf	Inf	0.0%
5/1	Clonard East Exit	U	N/A	N/A	-		-	-	-	755	Inf	Inf	0.0%
6/1	Clonard West Exit	U	N/A	N/A	-		-	-	-	1075	Inf	Inf	0.0%
Ped Link: P1	Unnamed Ped Link	-	N/A	-	F		1	15	-	0	-	9000	0.0%
Ped Link: P2	Unnamed Ped Link	-	N/A	-	G		1	8	-	0	-	4800	0.0%
Ped Link: P3	Unnamed Ped Link	-	N/A	-	H		1	7	-	0	-	0	0.0%

Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network	**-**	**-**	**82**	**8**	**2**	**18.2**	**8.9**	**0.4**	**27.5**	**-**	**-**	**-**	**-**
Junction 4	**-**	**-**	**82**	**8**	**2**	**18.2**	**8.9**	**0.4**	**27.5**	**-**	**-**	**-**	**-**
1/2+1/1	455	455	-	-	-	5.1	2.7	-	7.8	61.7	11.5	2.7	14.2
2/1+2/2	852	852	82	8	2	6.4	3.3	0.4	10.1	42.9	24.6	3.3	27.9
3/2+3/1	787	787	-	-	-	6.7	2.9	-	9.6	43.7	20.6	2.9	23.5
4/1	264	264	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
5/1	755	755	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	1075	1075	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
Ped Link: P1	0	0	-	-	-	-	-	-	0.0	0.0	-	-	0.0
Ped Link: P2	0	0	-	-	-	-	-	-	0.0	0.0	-	-	0.0
Ped Link: P3	0	0	-	-	-	-	-	-	-	-	-	-	-

C1 PRC for Signalled Lanes (%): 3.0 Total Delay for Signalled Lanes (pcuHr): 27.50 Cycle Time (s): 120
PRC Over All Lanes (%): 3.0 Total Delay Over All Lanes(pcuHr): 27.50

Scenario 14: 'Scenario D 2025 PM ' (FG14: 'Scenario D 2025 - PM', Plan 1: 'Network Control Plan 1')

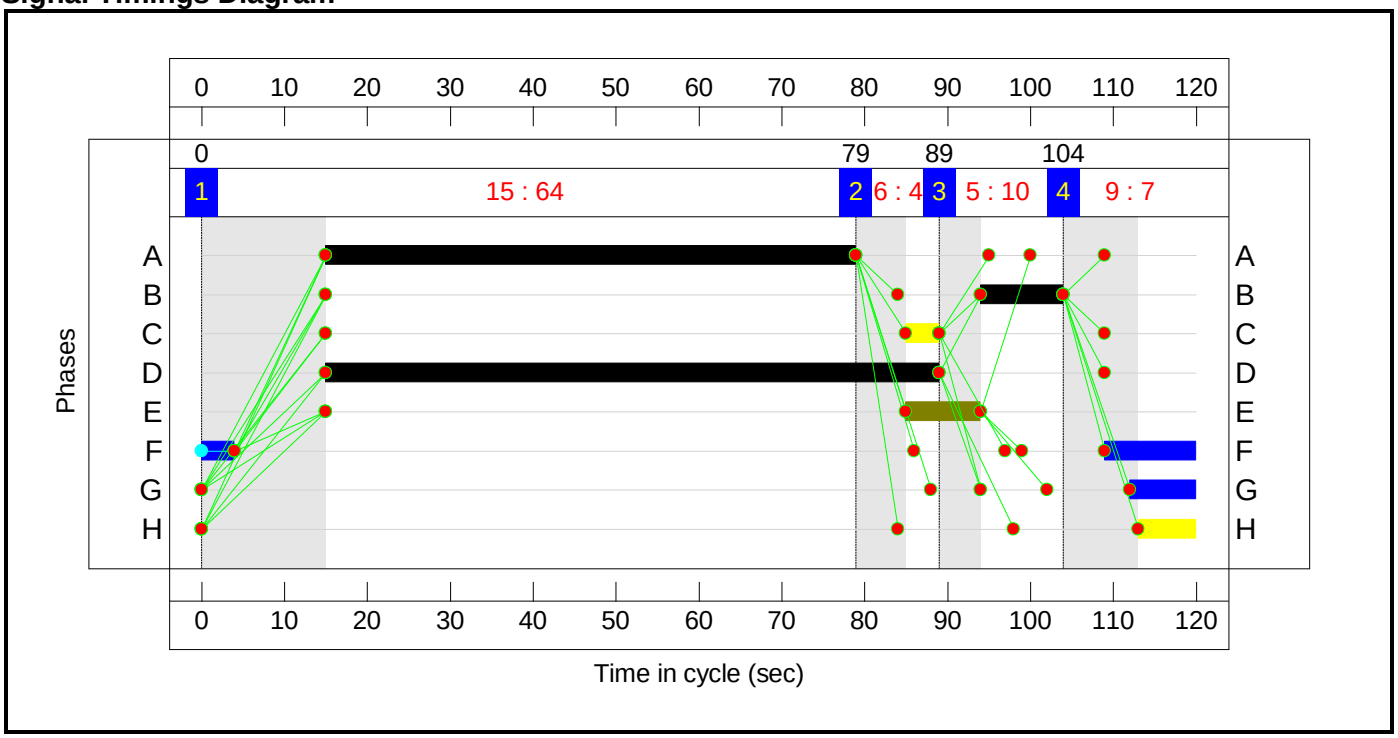
Stage Sequence Diagram



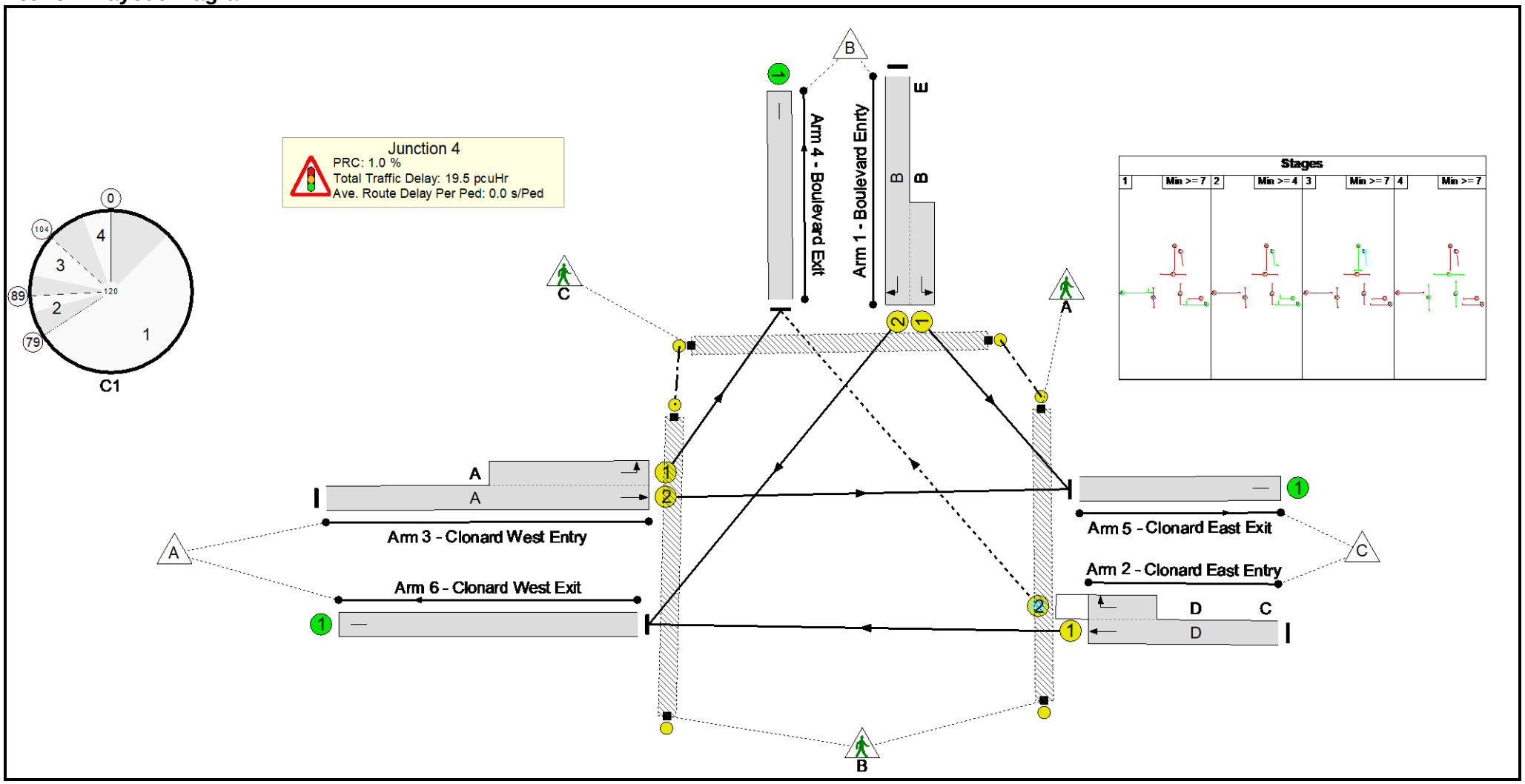
Stage Timings

Stage	1	2	3	4
Duration	64	4	10	7
Change Point	0	79	89	104

Signal Timings Diagram



Network Layout Diagram



Network Results

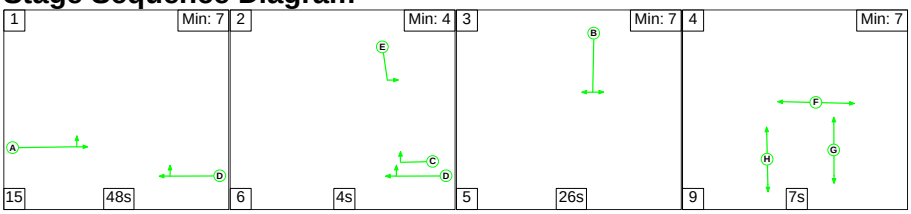
Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**89.2%**
Junction 4	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**89.2%**
1/2+1/1	Boulevard Enrty Left Right	U	N/A	N/A	B	E	1	10:19	9	221	1914:1747	175+81	86.1 : 86.1%
2/1+2/2	Clonard East Entry Right Ahead	U+O	N/A	N/A	D	C	1	74	4	644	1980:1891	1102+154	51.3 : 51.3%
3/2+3/1	Clonard West Entry Left Ahead	U	N/A	N/A	A		1	64	-	1070	2105:1747	949+251	89.2 : 89.2%
4/1	Boulevard Exit	U	N/A	N/A	-		-	-	-	303	Inf	Inf	0.0%
5/1	Clonard East Exit	U	N/A	N/A	-		-	-	-	916	Inf	Inf	0.0%
6/1	Clonard West Exit	U	N/A	N/A	-		-	-	-	716	Inf	Inf	0.0%
Ped Link: P1	Unnamed Ped Link	-	N/A	-	F		1	15	-	0	-	9000	0.0%
Ped Link: P2	Unnamed Ped Link	-	N/A	-	G		1	8	-	0	-	4800	0.0%
Ped Link: P3	Unnamed Ped Link	-	N/A	-	H		1	7	-	0	-	0	0.0%

Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network	**-**	**-**	**70**	**8**	**1**	**11.8**	**7.1**	**0.7**	**19.5**	**-**	**-**	**-**	**-**
Junction 4	**-**	**-**	**70**	**8**	**1**	**11.8**	**7.1**	**0.7**	**19.5**	**-**	**-**	**-**	**-**
1/2+1/1	221	221	-	-	-	3.1	2.7	-	5.8	94.2	4.9	2.7	7.6
2/1+2/2	644	644	70	8	1	2.1	0.5	0.7	3.3	18.7	10.9	0.5	11.4
3/2+3/1	1070	1070	-	-	-	6.5	3.9	-	10.4	35.0	28.0	3.9	31.9
4/1	303	303	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
5/1	916	916	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	716	716	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
Ped Link: P1	0	0	-	-	-	-	-	-	0.0	0.0	-	-	0.0
Ped Link: P2	0	0	-	-	-	-	-	-	0.0	0.0	-	-	0.0
Ped Link: P3	0	0	-	-	-	-	-	-	-	-	-	-	-

C1 PRC for Signalled Lanes (%): 1.0 Total Delay for Signalled Lanes (pcuHr): 19.55 Cycle Time (s): 120
PRC Over All Lanes (%): 1.0 Total Delay Over All Lanes(pcuHr): 19.55

Scenario 15: 'Scenario D 2030 AM ' (FG15: 'Scenario D 2030 - AM', Plan 1: 'Network Control Plan 1')

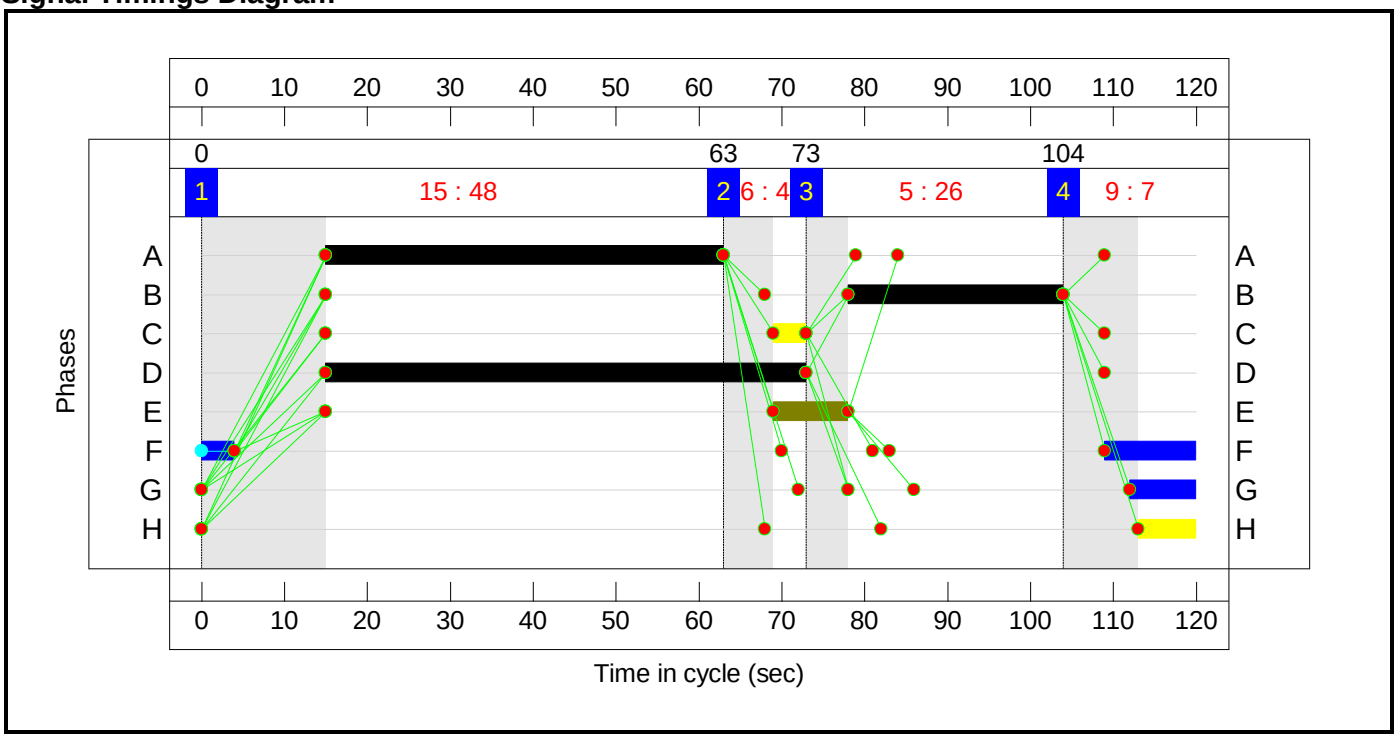
Stage Sequence Diagram



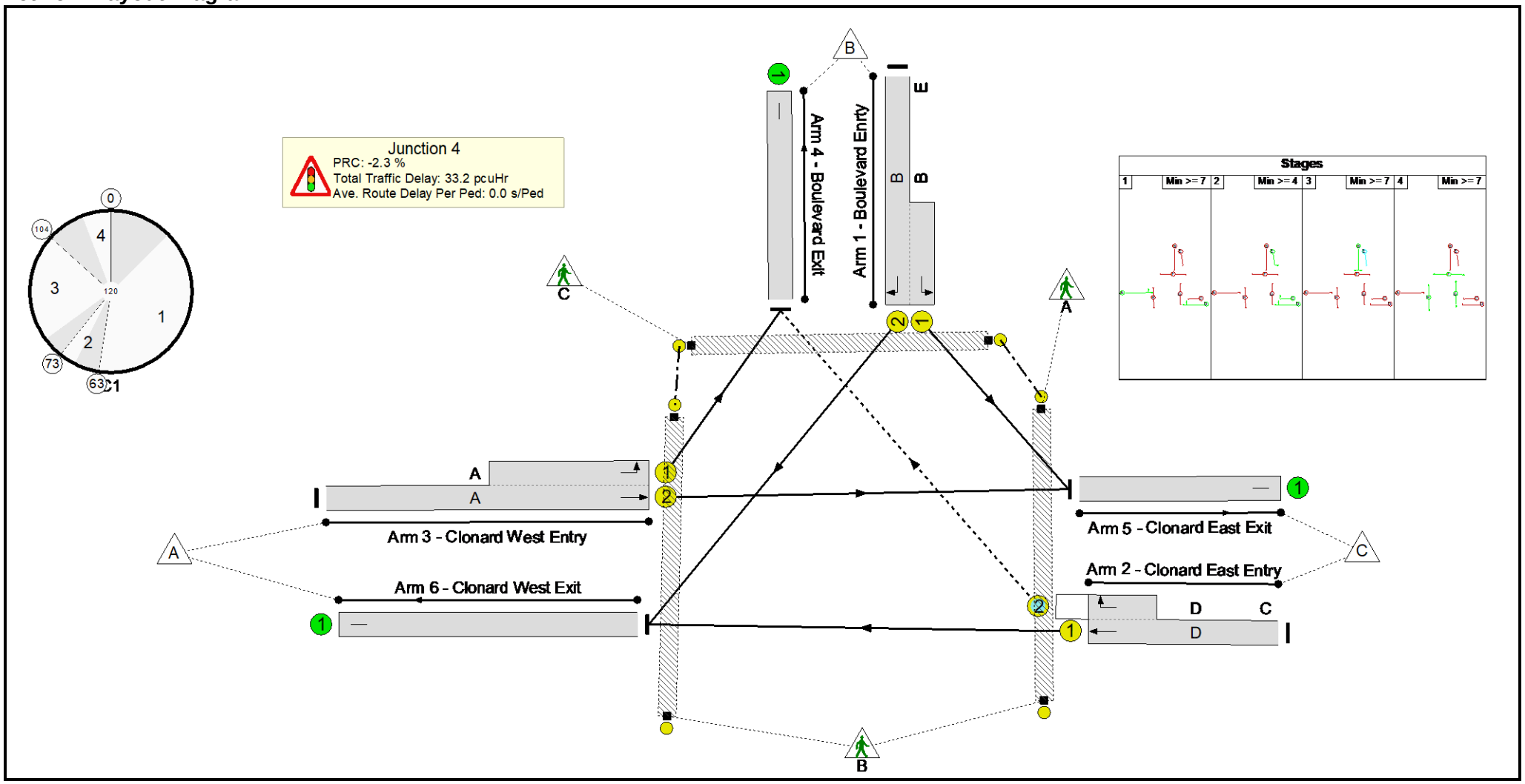
Stage Timings

Stage	1	2	3	4
Duration	48	4	26	7
Change Point	0	63	73	104

Signal Timings Diagram



Network Layout Diagram



Network Results

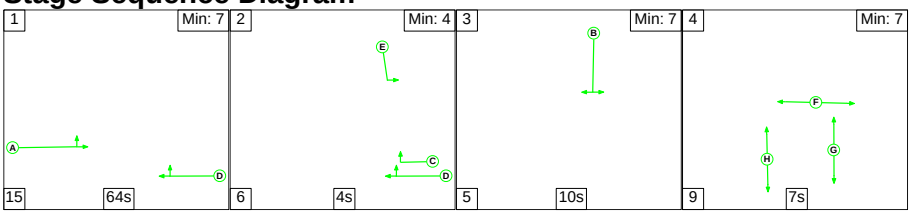
Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**92.1%**
Junction 4	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**92.1%**
1/2+1/1	Boulevard Enrty Left Right	U	N/A	N/A	B	E	1	26:35	9	464	1914:1747	357+162	89.4 : 89.4%
2/1+2/2	Clonard East Entry Right Ahead	U+O	N/A	N/A	D	C	1	58	4	913	1980:1891	888+103	92.1 : 92.1%
3/2+3/1	Clonard West Entry Left Ahead	U	N/A	N/A	A		1	48	-	841	2105:1747	733+200	90.2 : 90.2%
4/1	Boulevard Exit	U	N/A	N/A	-		-	-	-	275	Inf	Inf	0.0%
5/1	Clonard East Exit	U	N/A	N/A	-		-	-	-	806	Inf	Inf	0.0%
6/1	Clonard West Exit	U	N/A	N/A	-		-	-	-	1137	Inf	Inf	0.0%
Ped Link: P1	Unnamed Ped Link	-	N/A	-	F		1	15	-	0	-	9000	0.0%
Ped Link: P2	Unnamed Ped Link	-	N/A	-	G		1	8	-	0	-	4800	0.0%
Ped Link: P3	Unnamed Ped Link	-	N/A	-	H		1	7	-	0	-	0	0.0%

Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network	**-**	**-**	**55**	**39**	**2**	**19.7**	**13.0**	**0.5**	**33.2**	**-**	**-**	**-**	**-**
Junction 4	**-**	**-**	**55**	**39**	**2**	**19.7**	**13.0**	**0.5**	**33.2**	**-**	**-**	**-**	**-**
1/2+1/1	464	464	-	-	-	5.3	3.7	-	9.0	70.2	12.0	3.7	15.7
2/1+2/2	913	913	55	39	2	7.1	5.1	0.5	12.7	50.2	27.7	5.1	32.8
3/2+3/1	841	841	-	-	-	7.3	4.2	-	11.5	49.0	23.0	4.2	27.2
4/1	275	275	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
5/1	806	806	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	1137	1137	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
Ped Link: P1	0	0	-	-	-	-	-	-	0.0	0.0	-	-	0.0
Ped Link: P2	0	0	-	-	-	-	-	-	0.0	0.0	-	-	0.0
Ped Link: P3	0	0	-	-	-	-	-	-	-	-	-	-	-

C1 PRC for Signalled Lanes (%): -2.3 Total Delay for Signalled Lanes (pcuHr): 33.22 Cycle Time (s): 120
PRC Over All Lanes (%): -2.3 Total Delay Over All Lanes(pcuHr): 33.22

Scenario 16: 'Scenario D 2030 PM ' (FG16: 'Scenario D 2030 - PM', Plan 1: 'Network Control Plan 1')

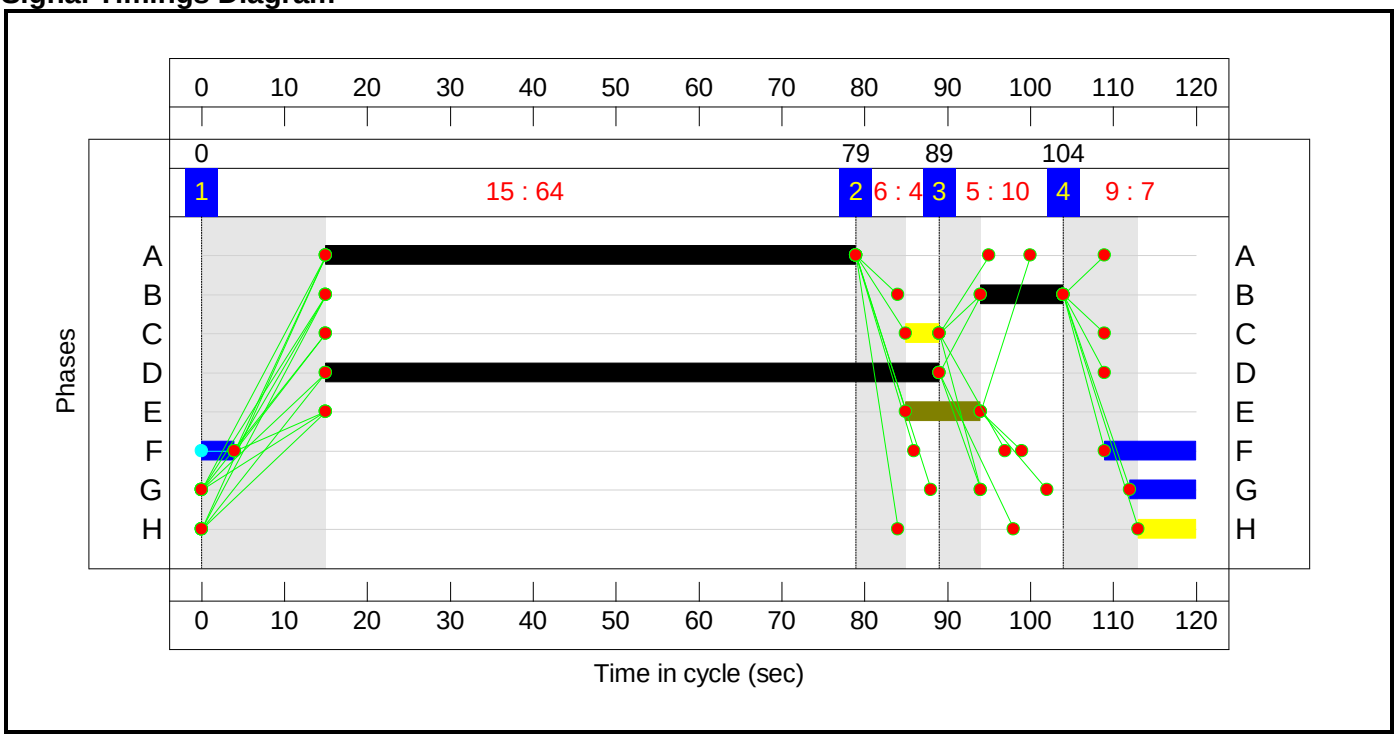
Stage Sequence Diagram



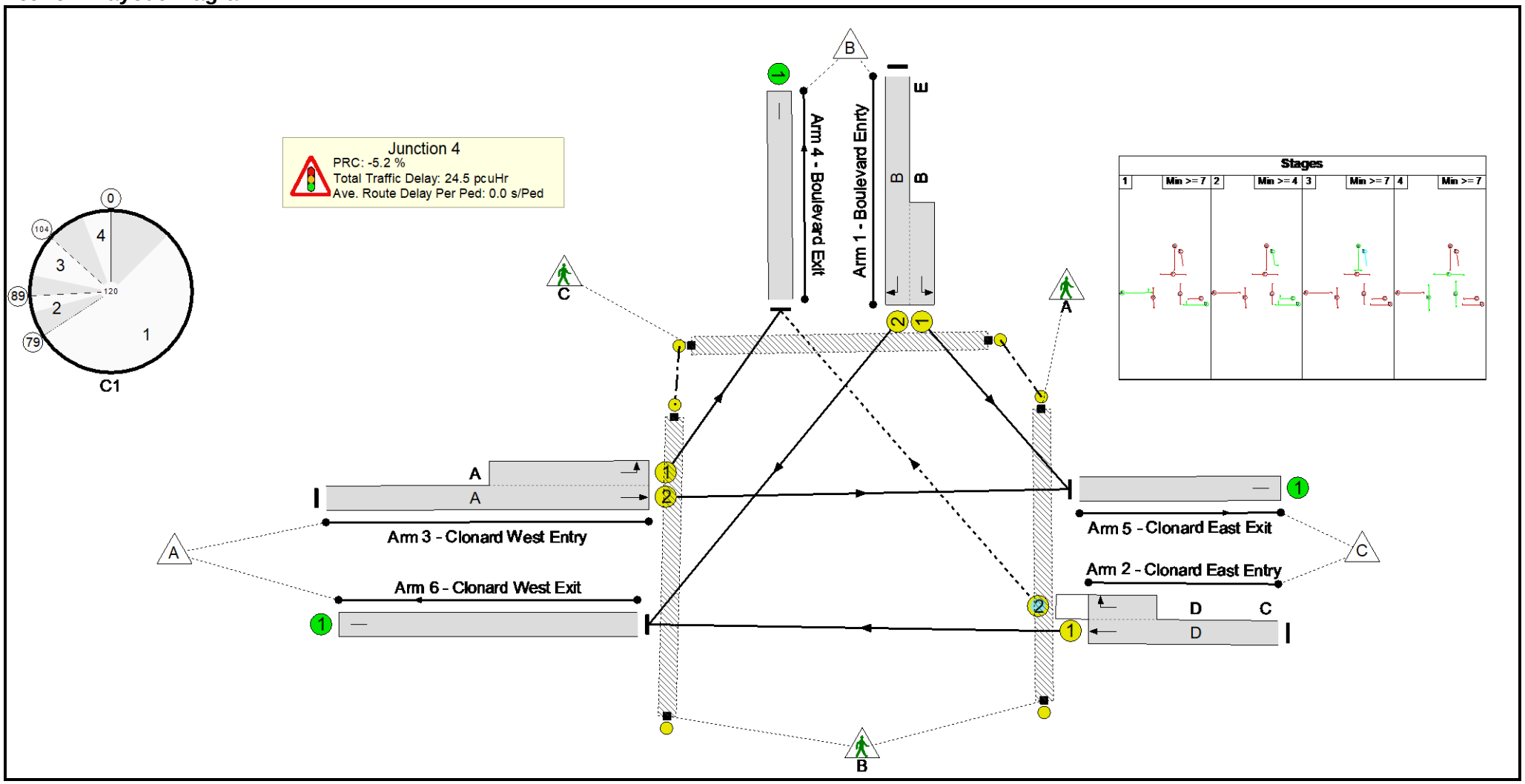
Stage Timings

Stage	1	2	3	4
Duration	64	4	10	7
Change Point	0	79	89	104

Signal Timings Diagram



Network Layout Diagram



Network Results

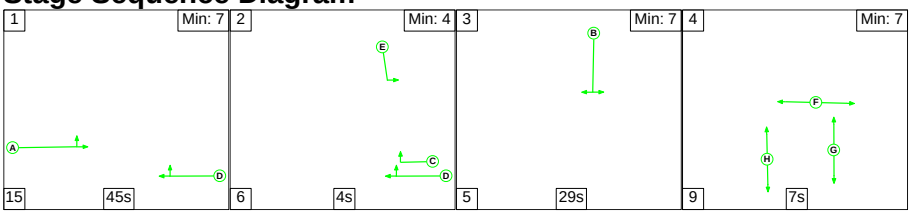
Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**94.7%**
Junction 4	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**94.7%**
1/2+1/1	Boulevard Enrty Left Right	U	N/A	N/A	B	E	1	10:19	9	223	1914:1747	175+80	87.2 : 87.2%
2/1+2/2	Clonard East Entry Right Ahead	U+O	N/A	N/A	D	C	1	74	4	686	1980:1891	1111+145	54.6 : 54.6%
3/2+3/1	Clonard West Entry Left Ahead	U	N/A	N/A	A		1	64	-	1133	2105:1747	960+237	94.7 : 94.7%
4/1	Boulevard Exit	U	N/A	N/A	-		-	-	-	303	Inf	Inf	0.0%
5/1	Clonard East Exit	U	N/A	N/A	-		-	-	-	979	Inf	Inf	0.0%
6/1	Clonard West Exit	U	N/A	N/A	-		-	-	-	760	Inf	Inf	0.0%
Ped Link: P1	Unnamed Ped Link	-	N/A	-	F		1	15	-	0	-	9000	0.0%
Ped Link: P2	Unnamed Ped Link	-	N/A	-	G		1	8	-	0	-	4800	0.0%
Ped Link: P3	Unnamed Ped Link	-	N/A	-	H		1	7	-	0	-	0	0.0%

Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network	**-**	**-**	**31**	**47**	**1**	**12.9**	**10.7**	**0.8**	**24.5**	**-**	**-**	**-**	**-**
Junction 4	**-**	**-**	**31**	**47**	**1**	**12.9**	**10.7**	**0.8**	**24.5**	**-**	**-**	**-**	**-**
1/2+1/1	223	223	-	-	-	3.1	2.9	-	6.0	97.3	5.0	2.9	7.9
2/1+2/2	686	686	31	47	1	2.4	0.6	0.8	3.8	19.8	12.0	0.6	12.6
3/2+3/1	1133	1133	-	-	-	7.4	7.2	-	14.7	46.7	32.5	7.2	39.8
4/1	303	303	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
5/1	979	979	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	760	760	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
Ped Link: P1	0	0	-	-	-	-	-	-	0.0	0.0	-	-	0.0
Ped Link: P2	0	0	-	-	-	-	-	-	0.0	0.0	-	-	0.0
Ped Link: P3	0	0	-	-	-	-	-	-	-	-	-	-	-

C1 PRC for Signalled Lanes (%): -5.2 Total Delay for Signalled Lanes (pcuHr): 24.49 Cycle Time (s): 120
PRC Over All Lanes (%): -5.2 Total Delay Over All Lanes(pcuHr): 24.49

Scenario 17: 'Scenario E 2025 AM ' (FG17: 'Scenario E 2025 - AM', Plan 1: 'Network Control Plan 1')

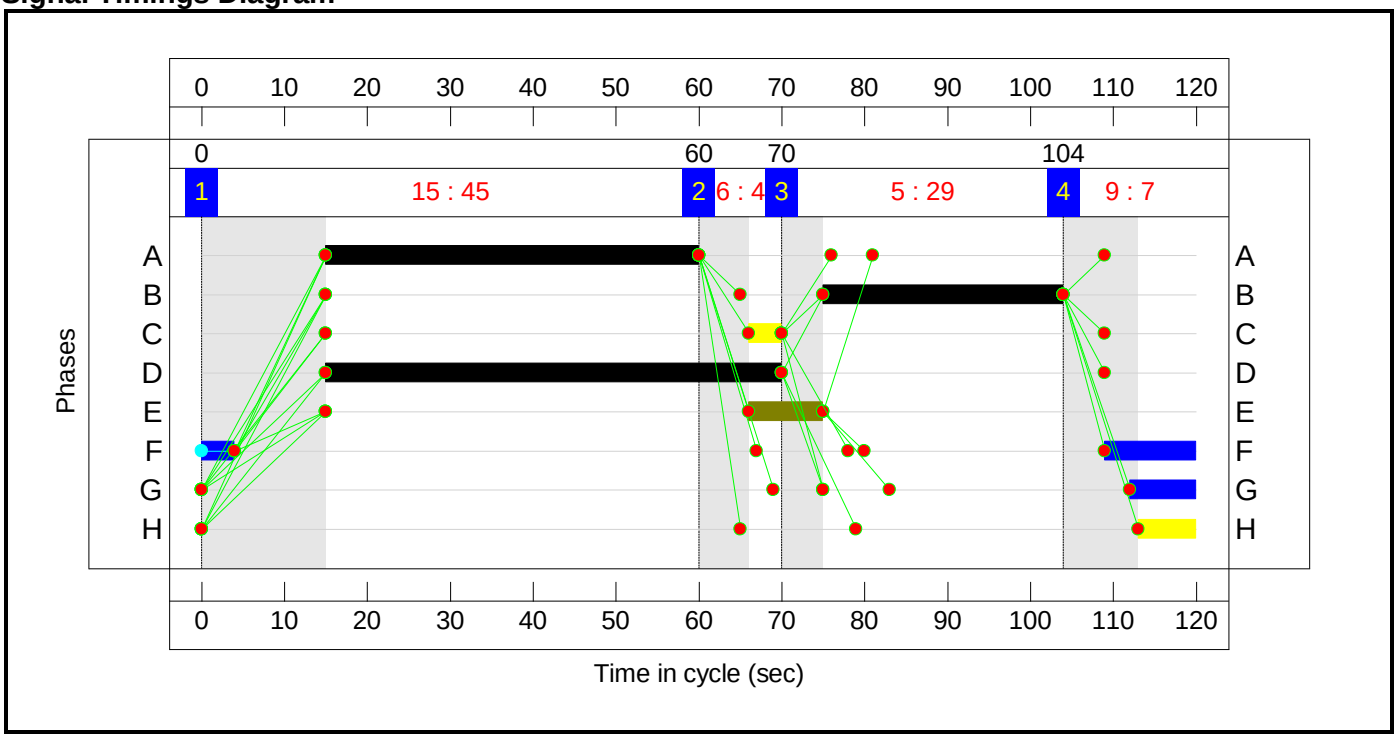
Stage Sequence Diagram



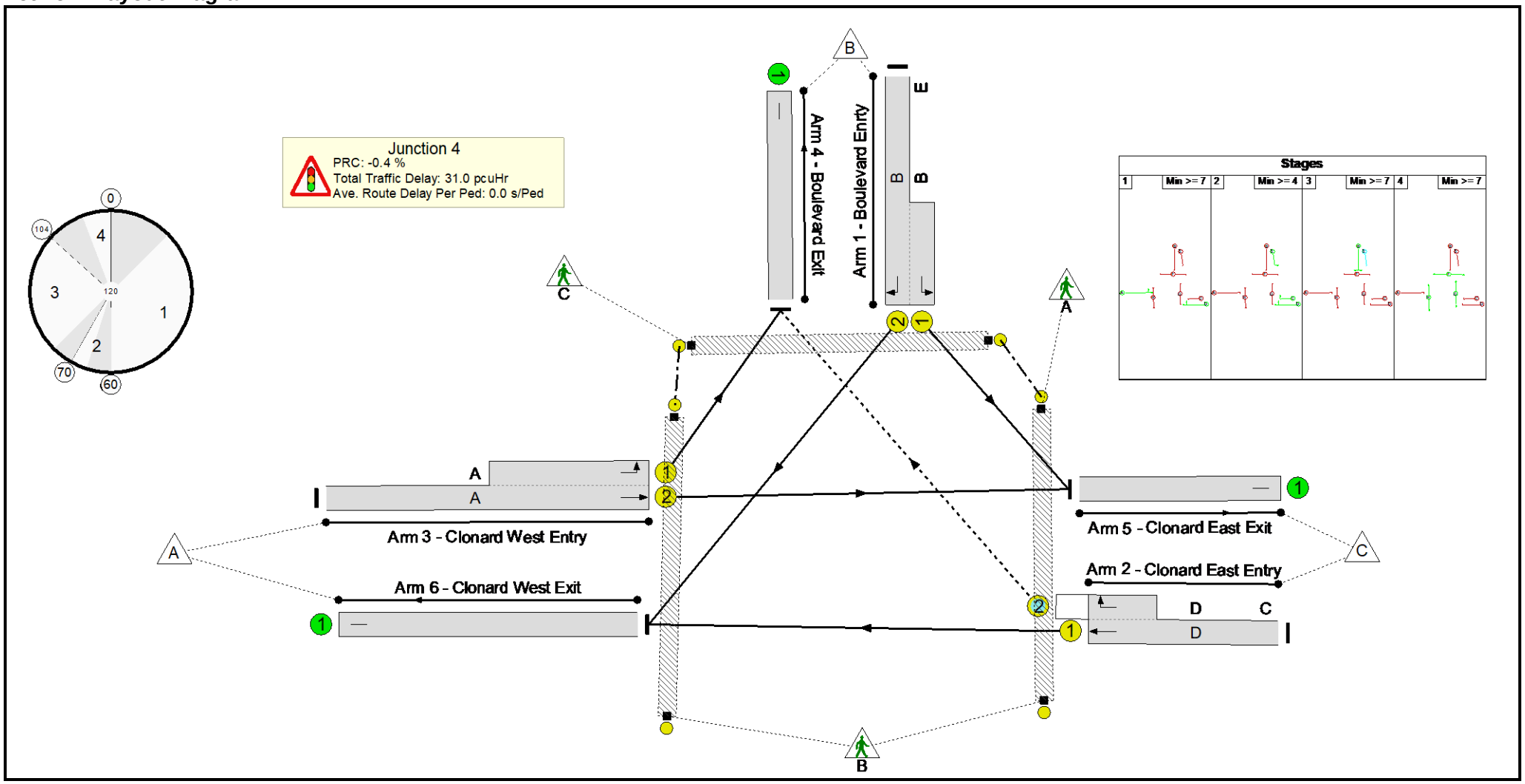
Stage Timings

Stage	1	2	3	4
Duration	45	4	29	7
Change Point	0	60	70	104

Signal Timings Diagram



Network Layout Diagram



Network Results

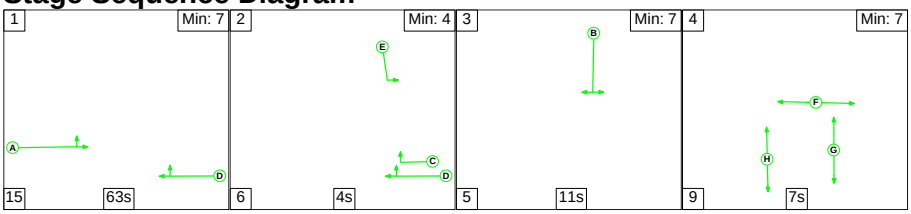
Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**90.3%**
Junction 4	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**90.3%**
1/2+1/1	Boulevard Enrty Left Right	U	N/A	N/A	B	E	1	29:38	9	497	1914:1747	390+174	88.1 : 88.1%
2/1+2/2	Clonard East Entry Right Ahead	U+O	N/A	N/A	D	C	1	55	4	852	1980:1891	838+105	90.3 : 90.3%
3/2+3/1	Clonard West Entry Left Ahead	U	N/A	N/A	A		1	45	-	785	2105:1747	683+206	88.3 : 88.3%
4/1	Boulevard Exit	U	N/A	N/A	-		-	-	-	277	Inf	Inf	0.0%
5/1	Clonard East Exit	U	N/A	N/A	-		-	-	-	756	Inf	Inf	0.0%
6/1	Clonard West Exit	U	N/A	N/A	-		-	-	-	1101	Inf	Inf	0.0%
Ped Link: P1	Unnamed Ped Link	-	N/A	-	F		1	15	-	0	-	9000	0.0%
Ped Link: P2	Unnamed Ped Link	-	N/A	-	G		1	8	-	0	-	4800	0.0%
Ped Link: P3	Unnamed Ped Link	-	N/A	-	H		1	7	-	0	-	0	0.0%

Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network	**-**	**-**	**65**	**28**	**2**	**19.3**	**11.2**	**0.5**	**31.0**	**-**	**-**	**-**	**-**
Junction 4	**-**	**-**	**65**	**28**	**2**	**19.3**	**11.2**	**0.5**	**31.0**	**-**	**-**	**-**	**-**
1/2+1/1	497	497	-	-	-	5.5	3.4	-	8.9	64.1	12.9	3.4	16.3
2/1+2/2	852	852	65	28	2	6.9	4.3	0.5	11.6	49.0	25.5	4.3	29.8
3/2+3/1	785	785	-	-	-	7.0	3.5	-	10.5	48.3	20.8	3.5	24.3
4/1	277	277	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
5/1	756	756	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	1101	1101	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
Ped Link: P1	0	0	-	-	-	-	-	-	0.0	0.0	-	-	0.0
Ped Link: P2	0	0	-	-	-	-	-	-	0.0	0.0	-	-	0.0
Ped Link: P3	0	0	-	-	-	-	-	-	-	-	-	-	-

C1 PRC for Signalled Lanes (%): -0.4 Total Delay for Signalled Lanes (pcuHr): 30.98 Cycle Time (s): 120
PRC Over All Lanes (%): -0.4 Total Delay Over All Lanes(pcuHr): 30.98

Scenario 18: 'Scenario E 2025 PM ' (FG18: 'Scenario E 2025 - PM', Plan 1: 'Network Control Plan 1')

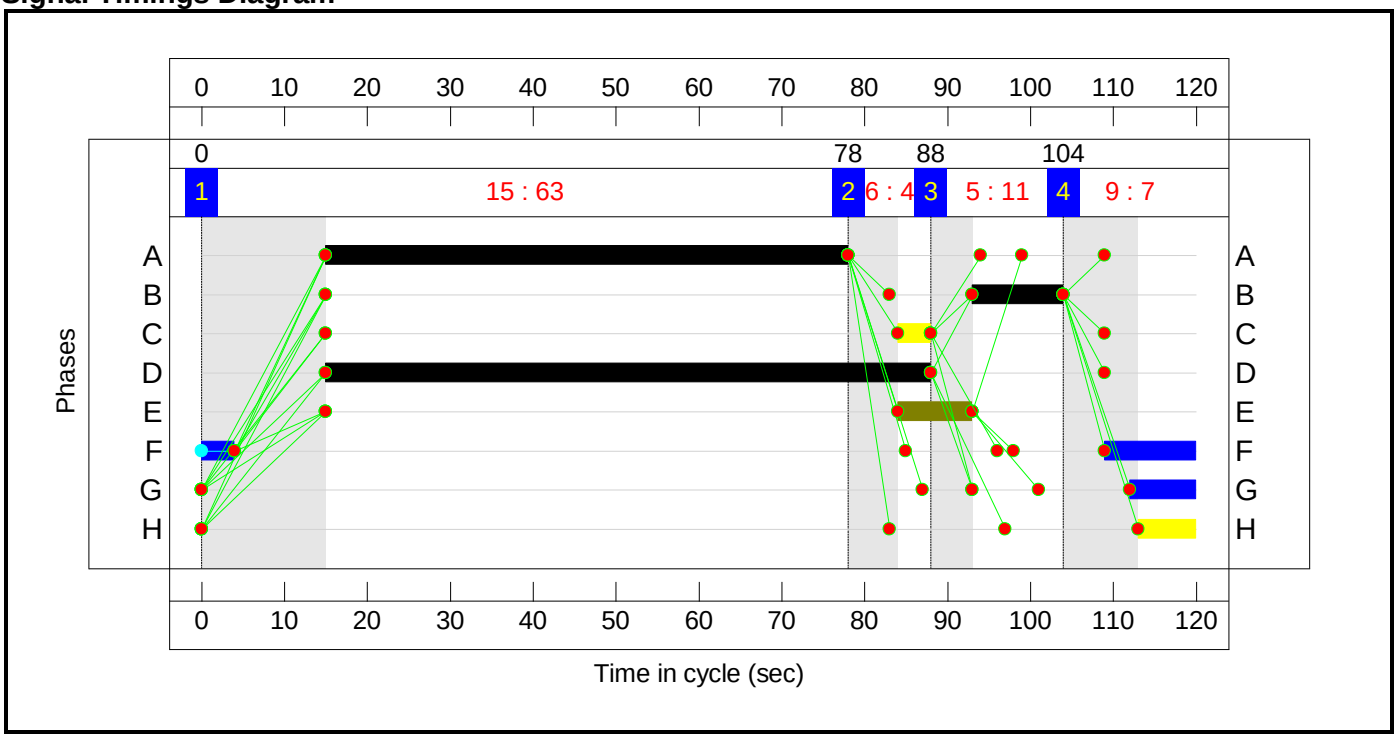
Stage Sequence Diagram



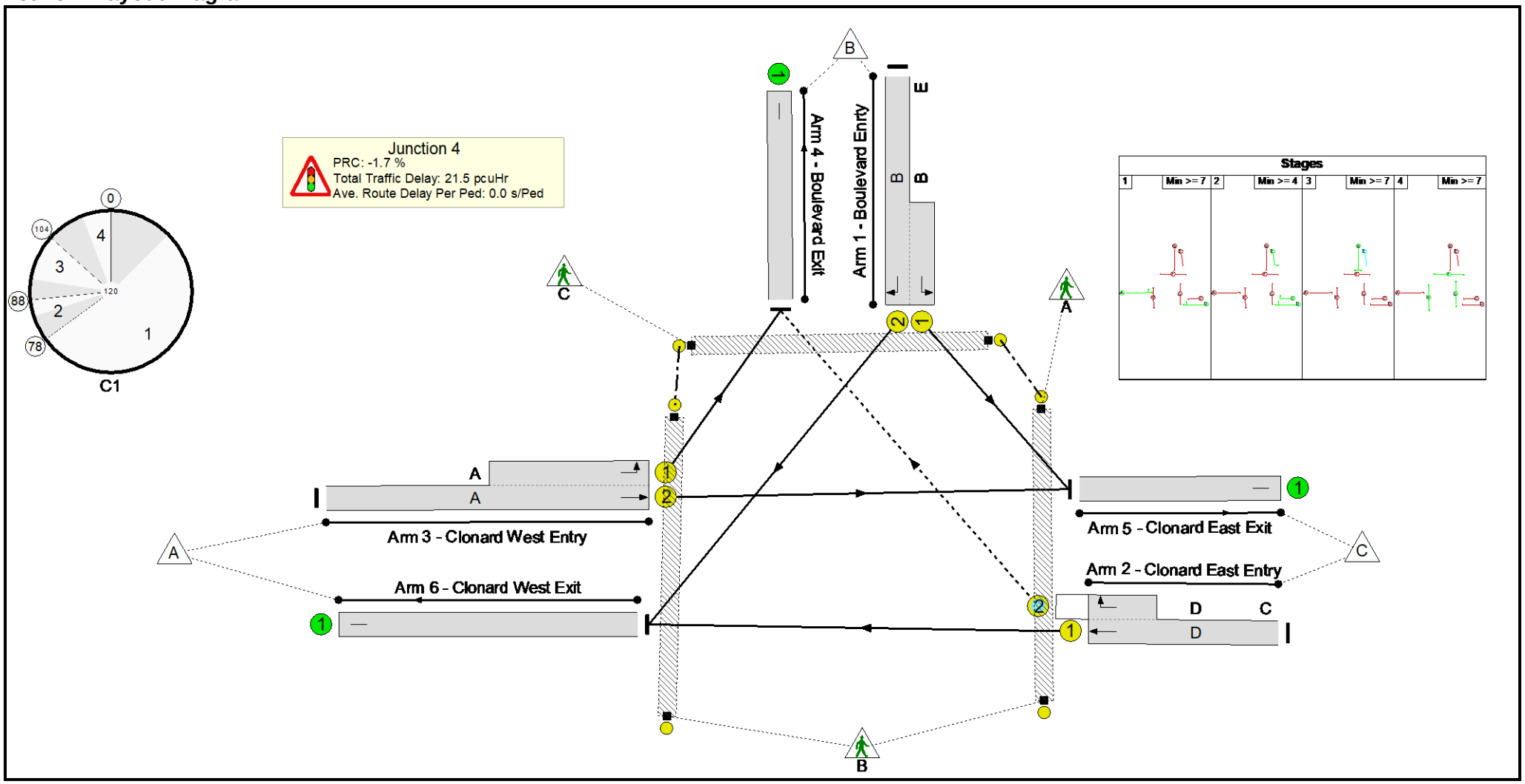
Stage Timings

Stage	1	2	3	4
Duration	63	4	11	7
Change Point	0	78	88	104

Signal Timings Diagram



Network Layout Diagram



Network Results

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**91.5%**
Junction 4	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**91.5%**
1/2+1/1	Boulevard Enrty Left Right	U	N/A	N/A	B	E	1	11:20	9	242	1914:1747	191+89	86.2 : 86.2%
2/1+2/2	Clonard East Entry Right Ahead	U+O	N/A	N/A	D	C	1	73	4	644	1980:1891	1074+168	51.9 : 51.9%
3/2+3/1	Clonard West Entry Left Ahead	U	N/A	N/A	A		1	63	-	1089	2105:1747	916+274	91.5 : 91.5%
4/1	Boulevard Exit	U	N/A	N/A	-		-	-	-	338	Inf	Inf	0.0%
5/1	Clonard East Exit	U	N/A	N/A	-		-	-	-	915	Inf	Inf	0.0%
6/1	Clonard West Exit	U	N/A	N/A	-		-	-	-	722	Inf	Inf	0.0%
Ped Link: P1	Unnamed Ped Link	-	N/A	-	F		1	15	-	0	-	9000	0.0%
Ped Link: P2	Unnamed Ped Link	-	N/A	-	G		1	8	-	0	-	4800	0.0%
Ped Link: P3	Unnamed Ped Link	-	N/A	-	H		1	7	-	0	-	0	0.0%

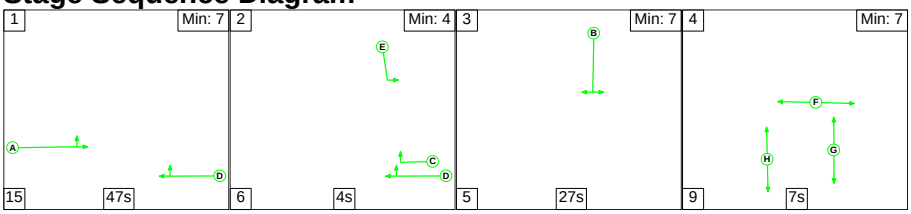
Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network	**-**	**-**	**57**	**29**	**1**	**12.5**	**8.2**	**0.8**	**21.5**	**-**	**-**	**-**	**-**
Junction 4	**-**	**-**	**57**	**29**	**1**	**12.5**	**8.2**	**0.8**	**21.5**	**-**	**-**	**-**	**-**
1/2+1/1	242	242	-	-	-	3.4	2.7	-	6.1	90.6	5.4	2.7	8.1
2/1+2/2	644	644	57	29	1	2.2	0.5	0.8	3.6	20.0	11.0	0.5	11.5
3/2+3/1	1089	1089	-	-	-	6.9	4.9	-	11.8	39.1	29.1	4.9	34.0
4/1	338	338	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
5/1	915	915	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	722	722	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
Ped Link: P1	0	0	-	-	-	-	-	-	0.0	0.0	-	-	0.0
Ped Link: P2	0	0	-	-	-	-	-	-	0.0	0.0	-	-	0.0
Ped Link: P3	0	0	-	-	-	-	-	-	-	-	-	-	-

C1 PRC for Signalled Lanes (%): -1.7 Total Delay for Signalled Lanes (pcuHr): 21.50 Cycle Time (s): 120

PRC Over All Lanes (%): -1.7 Total Delay Over All Lanes(pcuHr): 21.50

Scenario 19: 'Scenario E 2030 AM ' (FG19: 'Scenario E 2030 - AM', Plan 1: 'Network Control Plan 1')

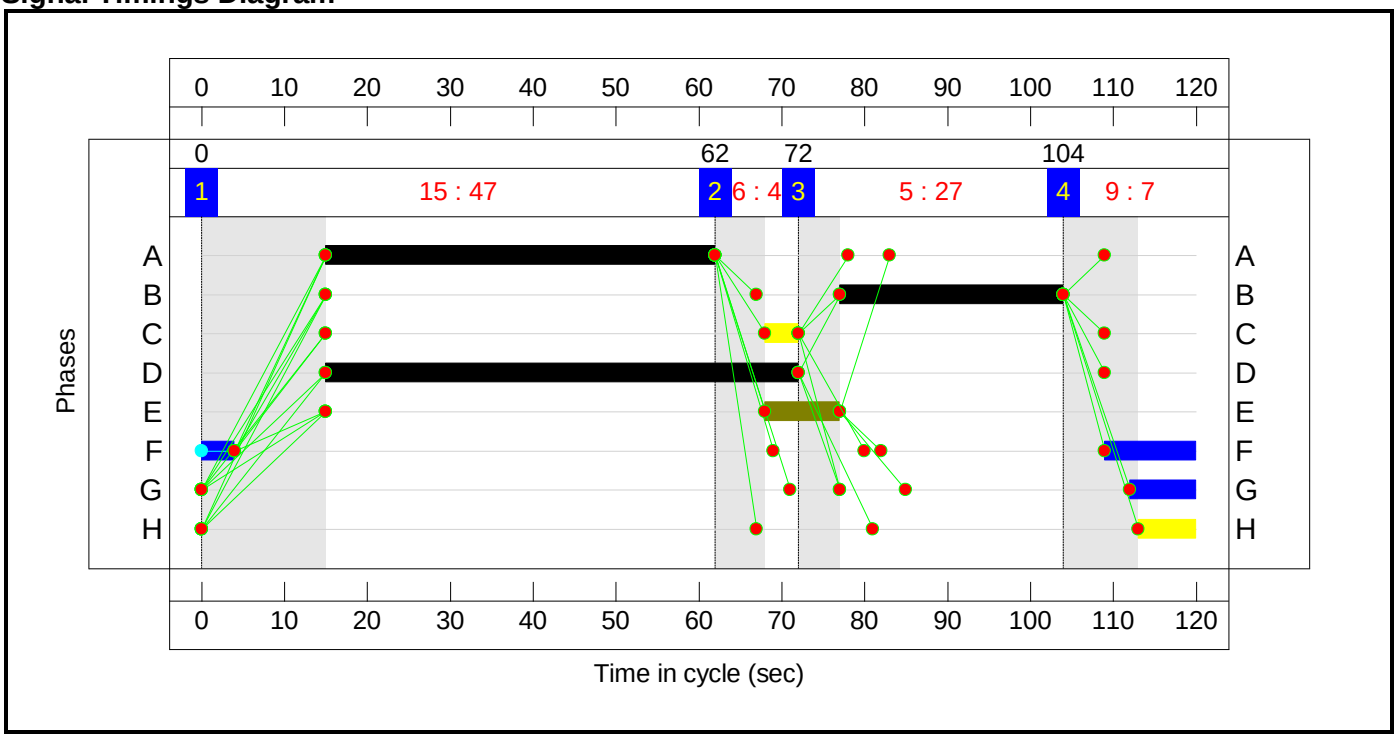
Stage Sequence Diagram



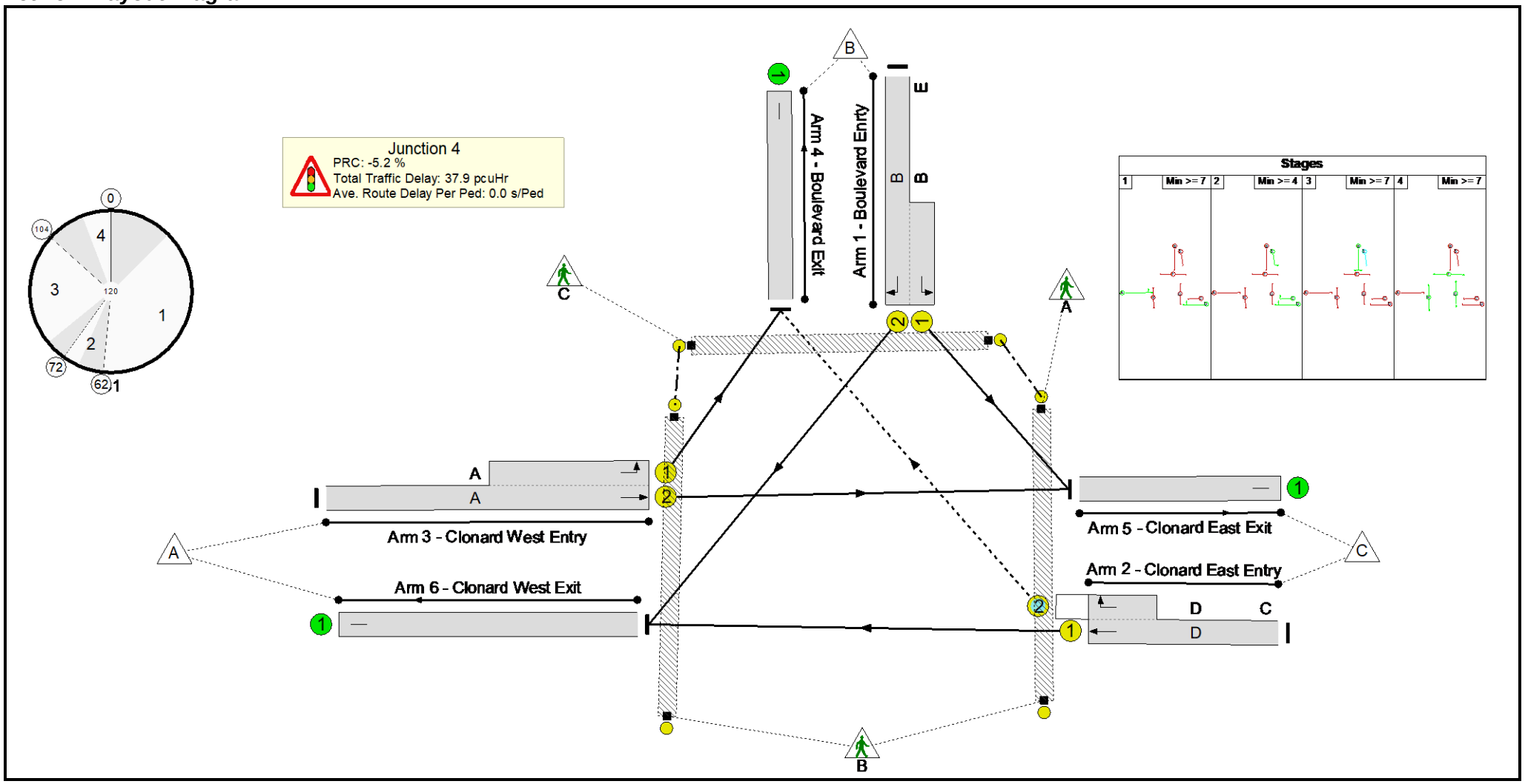
Stage Timings

Stage	1	2	3	4
Duration	47	4	27	7
Change Point	0	62	72	104

Signal Timings Diagram



Network Layout Diagram



Network Results

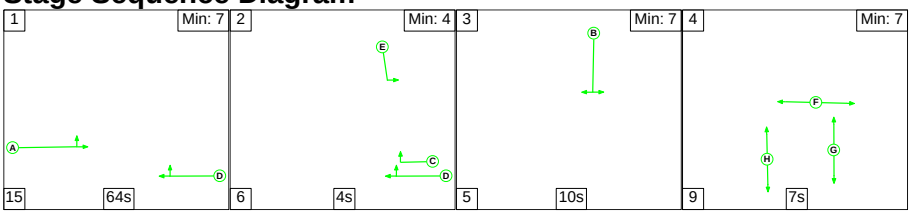
Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network	-	-	**N/A**	-	-		-	-	-	-	-	-	**94.7%**
Junction 4	-	-	**N/A**	-	-		-	-	-	-	-	-	**94.7%**
1/2+1/1	Boulevard Enrty Left Right	U	N/A	N/A	B	E	1	27:36	9	505	1914:1747	369+165	94.7 : 94.7%
2/1+2/2	Clonard East Entry Right Ahead	U+O	N/A	N/A	D	C	1	57	4	913	1980:1891	870+106	93.6 : 93.6%
3/2+3/1	Clonard West Entry Left Ahead	U	N/A	N/A	A		1	47	-	837	2105:1747	713+207	91.0 : 91.0%
4/1	Boulevard Exit	U	N/A	N/A	-		-	-	-	287	Inf	Inf	0.0%
5/1	Clonard East Exit	U	N/A	N/A	-		-	-	-	805	Inf	Inf	0.0%
6/1	Clonard West Exit	U	N/A	N/A	-		-	-	-	1163	Inf	Inf	0.0%
Ped Link: P1	Unnamed Ped Link	-	N/A	-	F		1	15	-	0	-	9000	0.0%
Ped Link: P2	Unnamed Ped Link	-	N/A	-	G		1	8	-	0	-	4800	0.0%
Ped Link: P3	Unnamed Ped Link	-	N/A	-	H		1	7	-	0	-	0	0.0%

Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network	**-**	**-**	**51**	**47**	**2**	**20.5**	**16.8**	**0.5**	**37.9**	**-**	**-**	**-**	**-**
Junction 4	**-**	**-**	**51**	**47**	**2**	**20.5**	**16.8**	**0.5**	**37.9**	**-**	**-**	**-**	**-**
1/2+1/1	505	505	-	-	-	5.9	6.2	-	12.1	86.0	13.6	6.2	19.8
2/1+2/2	913	913	51	47	2	7.3	6.1	0.5	13.9	54.9	27.9	6.1	34.0
3/2+3/1	837	837	-	-	-	7.4	4.5	-	11.9	51.2	23.0	4.5	27.5
4/1	287	287	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
5/1	805	805	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	1163	1163	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
Ped Link: P1	0	0	-	-	-	-	-	-	0.0	0.0	-	-	0.0
Ped Link: P2	0	0	-	-	-	-	-	-	0.0	0.0	-	-	0.0
Ped Link: P3	0	0	-	-	-	-	-	-	-	-	-	-	-

C1 PRC for Signalled Lanes (%): -5.2 Total Delay for Signalled Lanes (pcuHr): 37.90 Cycle Time (s): 120
PRC Over All Lanes (%): -5.2 Total Delay Over All Lanes(pcuHr): 37.90

Scenario 20: 'Scenario E 2030 PM ' (FG20: 'Scenario E 2030 - PM', Plan 1: 'Network Control Plan 1')

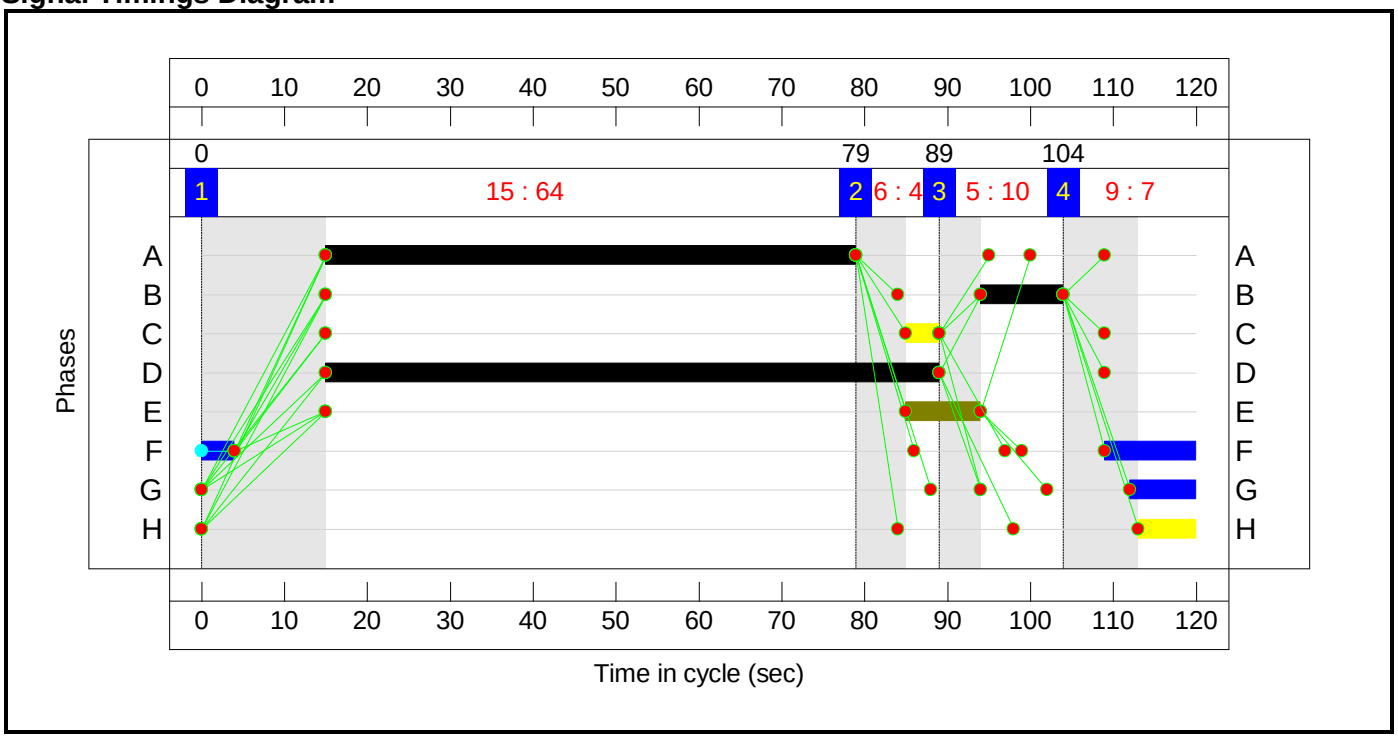
Stage Sequence Diagram



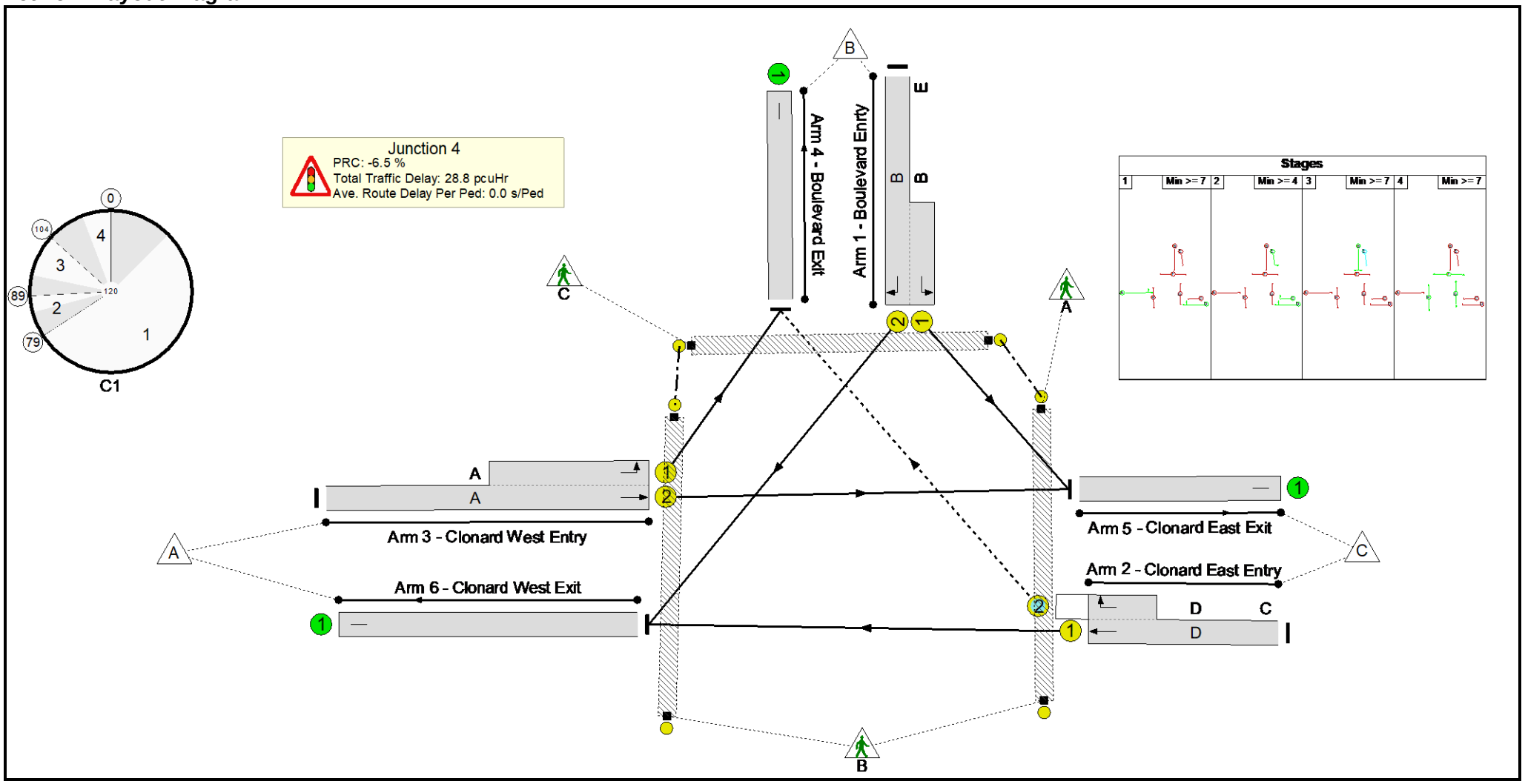
Stage Timings

Stage	1	2	3	4
Duration	64	4	10	7
Change Point	0	79	89	104

Signal Timings Diagram



Network Layout Diagram



Network Results

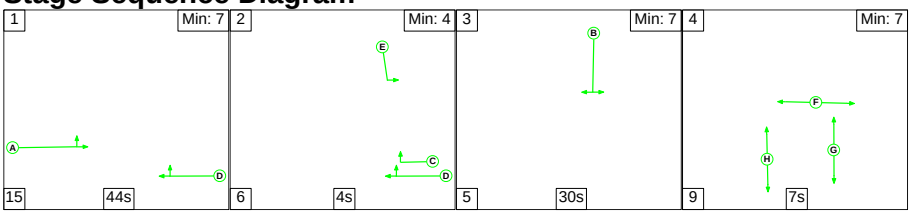
Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**95.8%**
Junction 4	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**95.8%**
1/2+1/1	Boulevard Enrty Left Right	U	N/A	N/A	B	E	1	10:19	9	245	1914:1747	175+82	95.2 : 95.2%
2/1+2/2	Clonard East Entry Right Ahead	U+O	N/A	N/A	D	C	1	74	4	685	1980:1891	1097+160	54.5 : 54.5%
3/2+3/1	Clonard West Entry Left Ahead	U	N/A	N/A	A		1	64	-	1153	2105:1747	940+263	95.8 : 95.8%
4/1	Boulevard Exit	U	N/A	N/A	-		-	-	-	339	Inf	Inf	0.0%
5/1	Clonard East Exit	U	N/A	N/A	-		-	-	-	979	Inf	Inf	0.0%
6/1	Clonard West Exit	U	N/A	N/A	-		-	-	-	765	Inf	Inf	0.0%
Ped Link: P1	Unnamed Ped Link	-	N/A	-	F		1	15	-	0	-	9000	0.0%
Ped Link: P2	Unnamed Ped Link	-	N/A	-	G		1	8	-	0	-	4800	0.0%
Ped Link: P3	Unnamed Ped Link	-	N/A	-	H		1	7	-	0	-	0	0.0%

Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network	**-**	**-**	**27**	**59**	**1**	**13.5**	**14.5**	**0.9**	**28.8**	**-**	**-**	**-**	**-**
Junction 4	**-**	**-**	**27**	**59**	**1**	**13.5**	**14.5**	**0.9**	**28.8**	**-**	**-**	**-**	**-**
1/2+1/1	245	245	-	-	-	3.5	5.3	-	8.8	129.0	5.5	5.3	10.8
2/1+2/2	685	685	27	59	1	2.4	0.6	0.9	3.9	20.3	11.9	0.6	12.5
3/2+3/1	1153	1153	-	-	-	7.6	8.6	-	16.2	50.5	33.5	8.6	42.0
4/1	339	339	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
5/1	979	979	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	765	765	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
Ped Link: P1	0	0	-	-	-	-	-	-	0.0	0.0	-	-	0.0
Ped Link: P2	0	0	-	-	-	-	-	-	0.0	0.0	-	-	0.0
Ped Link: P3	0	0	-	-	-	-	-	-	-	-	-	-	-

C1 PRC for Signalled Lanes (%): -6.5 Total Delay for Signalled Lanes (pcuHr): 28.82 Cycle Time (s): 120
PRC Over All Lanes (%): -6.5 Total Delay Over All Lanes(pcuHr): 28.82

Scenario 21: 'Scenario F 2025 AM ' (FG21: 'Scenario F 2025 - AM', Plan 1: 'Network Control Plan 1')

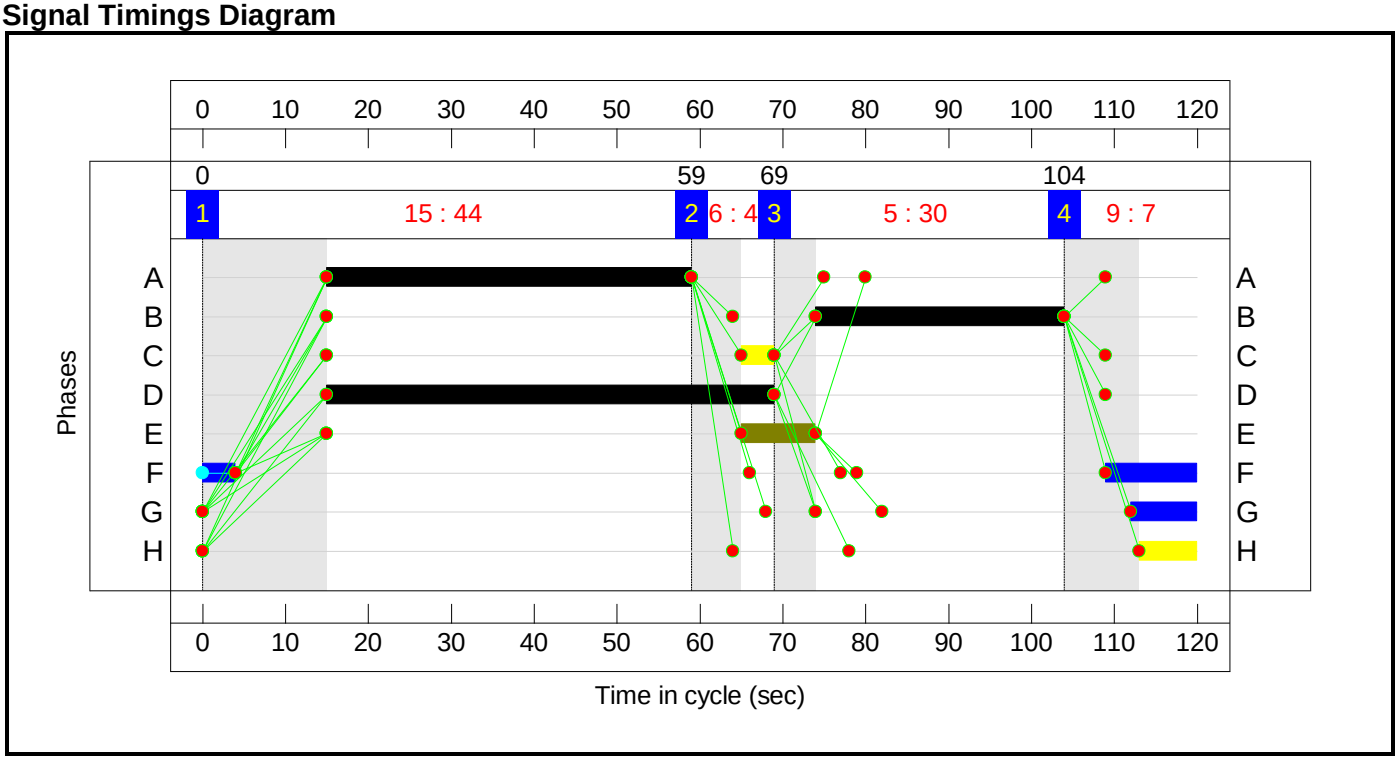
Stage Sequence Diagram



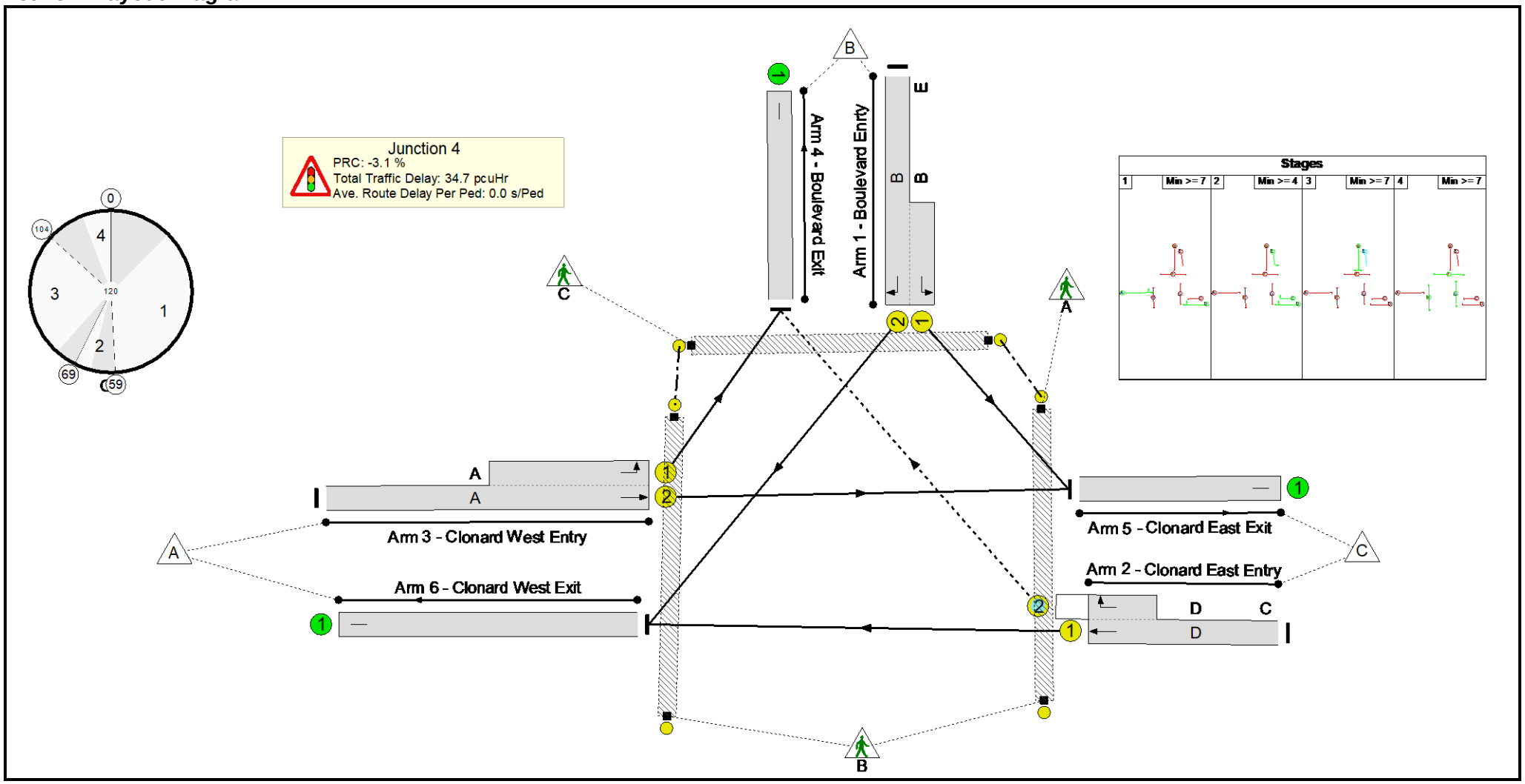
Stage Timings

Stage	1	2	3	4
Duration	44	4	30	7
Change Point	0	59	69	104

Signal Timings Diagram



Network Layout Diagram



Network Results

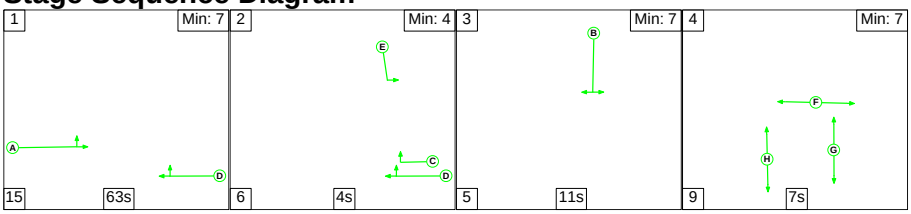
Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**92.8%**
Junction 4	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**92.8%**
1/2+1/1	Boulevard Enrty Left Right	U	N/A	N/A	B	E	1	30:39	9	537	1914:1747	402+177	92.8 : 92.8%
2/1+2/2	Clonard East Entry Right Ahead	U+O	N/A	N/A	D	C	1	54	4	853	1980:1891	820+108	92.0 : 92.0%
3/2+3/1	Clonard West Entry Left Ahead	U	N/A	N/A	A		1	44	-	782	2105:1747	663+214	89.1 : 89.1%
4/1	Boulevard Exit	U	N/A	N/A	-		-	-	-	290	Inf	Inf	0.0%
5/1	Clonard East Exit	U	N/A	N/A	-		-	-	-	755	Inf	Inf	0.0%
6/1	Clonard West Exit	U	N/A	N/A	-		-	-	-	1127	Inf	Inf	0.0%
Ped Link: P1	Unnamed Ped Link	-	N/A	-	F		1	15	-	0	-	9000	0.0%
Ped Link: P2	Unnamed Ped Link	-	N/A	-	G		1	8	-	0	-	4800	0.0%
Ped Link: P3	Unnamed Ped Link	-	N/A	-	H		1	7	-	0	-	0	0.0%

Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network	**-**	**-**	**61**	**36**	**2**	**20.2**	**14.0**	**0.5**	**34.7**	**-**	**-**	**-**	**-**
Junction 4	**-**	**-**	**61**	**36**	**2**	**20.2**	**14.0**	**0.5**	**34.7**	**-**	**-**	**-**	**-**
1/2+1/1	537	537	-	-	-	6.0	5.2	-	11.1	74.7	14.5	5.2	19.7
2/1+2/2	853	853	61	36	2	7.1	5.1	0.5	12.6	53.2	26.0	5.1	31.0
3/2+3/1	782	782	-	-	-	7.1	3.8	-	10.9	50.2	20.7	3.8	24.5
4/1	290	290	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
5/1	755	755	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	1127	1127	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
Ped Link: P1	0	0	-	-	-	-	-	-	0.0	0.0	-	-	0.0
Ped Link: P2	0	0	-	-	-	-	-	-	0.0	0.0	-	-	0.0
Ped Link: P3	0	0	-	-	-	-	-	-	-	-	-	-	-

C1 PRC for Signalled Lanes (%): -3.1 Total Delay for Signalled Lanes (pcuHr): 34.66 Cycle Time (s): 120
PRC Over All Lanes (%): -3.1 Total Delay Over All Lanes(pcuHr): 34.66

Scenario 22: 'Scenario F 2025 PM ' (FG22: 'Scenario F 2025 - PM', Plan 1: 'Network Control Plan 1')

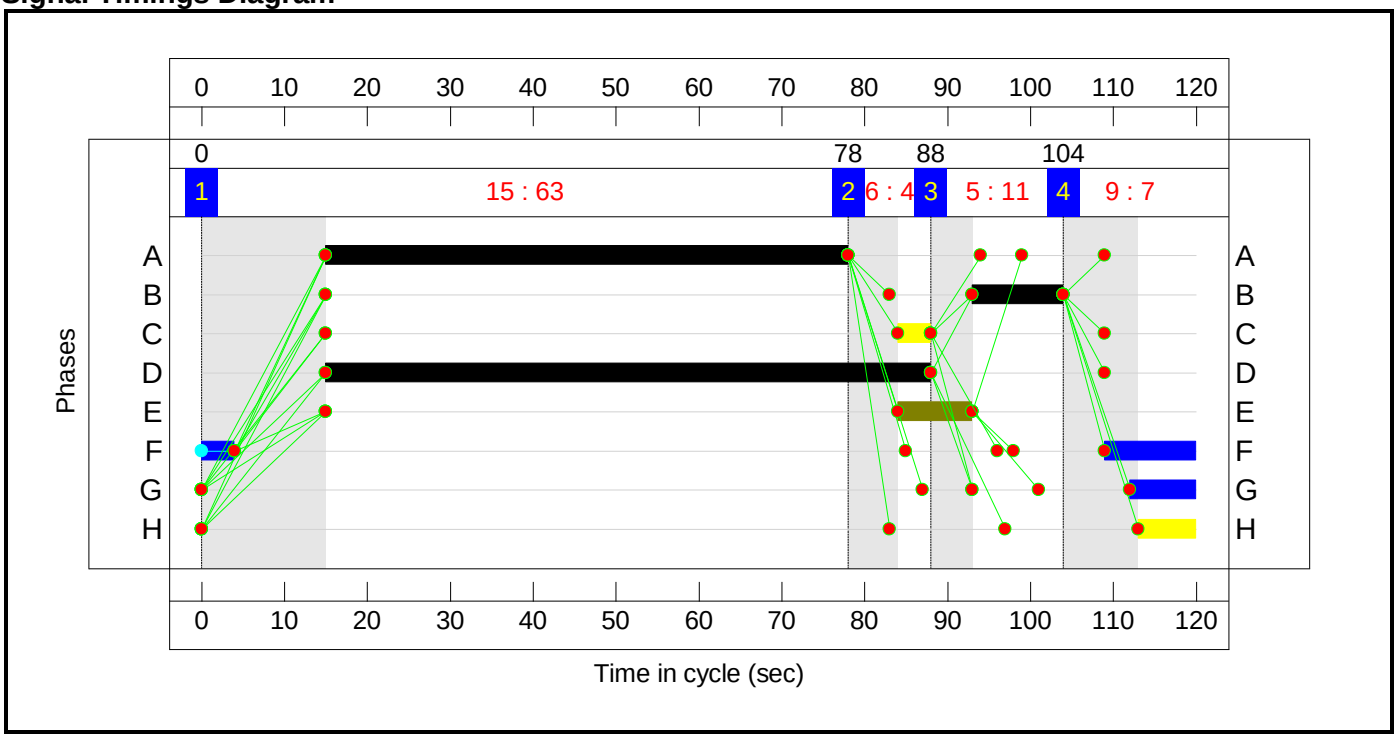
Stage Sequence Diagram



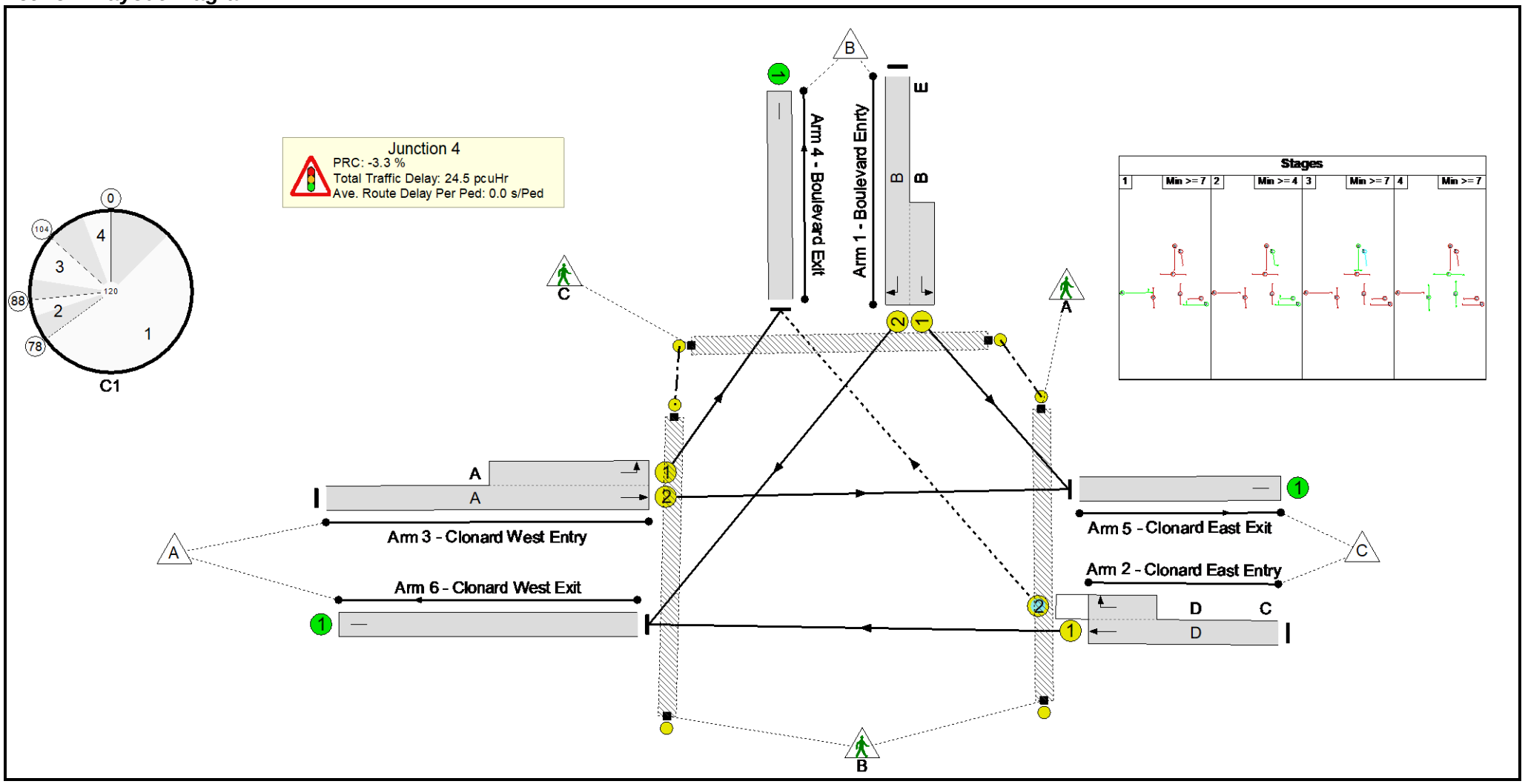
Stage Timings

Stage	1	2	3	4
Duration	63	4	11	7
Change Point	0	78	88	104

Signal Timings Diagram



Network Layout Diagram



Network Results

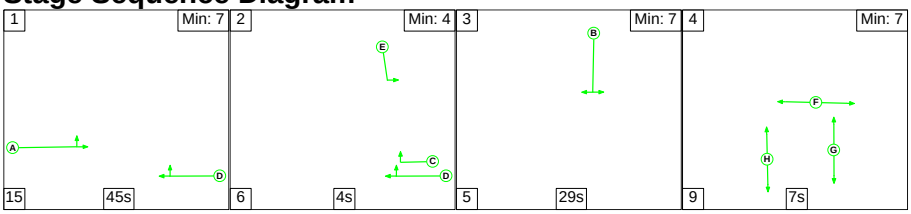
Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**93.0%**
Junction 4	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**93.0%**
1/2+1/1	Boulevard Enrty Left Right	U	N/A	N/A	B	E	1	11:20	9	263	1914:1747	191+91	93.0 : 93.0%
2/1+2/2	Clonard East Entry Right Ahead	U+O	N/A	N/A	D	C	1	73	4	644	1980:1891	1058+185	51.8 : 51.8%
3/2+3/1	Clonard West Entry Left Ahead	U	N/A	N/A	A		1	63	-	1109	2105:1747	897+301	92.6 : 92.6%
4/1	Boulevard Exit	U	N/A	N/A	-		-	-	-	375	Inf	Inf	0.0%
5/1	Clonard East Exit	U	N/A	N/A	-		-	-	-	915	Inf	Inf	0.0%
6/1	Clonard West Exit	U	N/A	N/A	-		-	-	-	726	Inf	Inf	0.0%
Ped Link: P1	Unnamed Ped Link	-	N/A	-	F		1	15	-	0	-	9000	0.0%
Ped Link: P2	Unnamed Ped Link	-	N/A	-	G		1	8	-	0	-	4800	0.0%
Ped Link: P3	Unnamed Ped Link	-	N/A	-	H		1	7	-	0	-	0	0.0%

Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network	**-**	**-**	**53**	**41**	**2**	**13.0**	**10.6**	**0.9**	**24.5**	**-**	**-**	**-**	**-**
Junction 4	**-**	**-**	**53**	**41**	**2**	**13.0**	**10.6**	**0.9**	**24.5**	**-**	**-**	**-**	**-**
1/2+1/1	263	263	-	-	-	3.7	4.6	-	8.2	112.4	5.9	4.6	10.4
2/1+2/2	644	644	53	41	2	2.3	0.5	0.9	3.7	20.6	10.9	0.5	11.4
3/2+3/1	1109	1109	-	-	-	7.1	5.5	-	12.6	41.0	30.0	5.5	35.5
4/1	375	375	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
5/1	915	915	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	726	726	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
Ped Link: P1	0	0	-	-	-	-	-	-	0.0	0.0	-	-	0.0
Ped Link: P2	0	0	-	-	-	-	-	-	0.0	0.0	-	-	0.0
Ped Link: P3	0	0	-	-	-	-	-	-	-	-	-	-	-

C1 PRC for Signalled Lanes (%): -3.3 Total Delay for Signalled Lanes (pcuHr): 24.53 Cycle Time (s): 120
PRC Over All Lanes (%): -3.3 Total Delay Over All Lanes(pcuHr): 24.53

Scenario 23: 'Scenario F 2030 AM ' (FG23: 'Scenario F 2030 - AM', Plan 1: 'Network Control Plan 1')

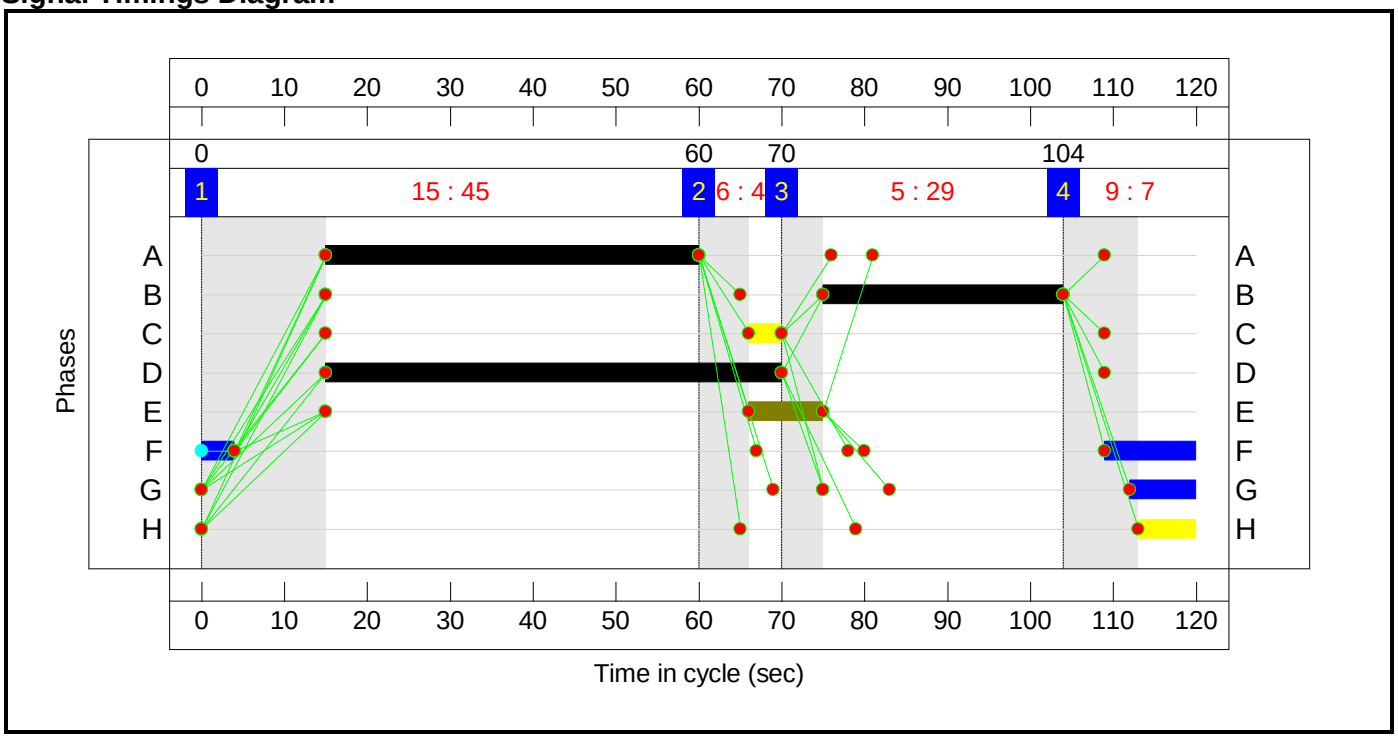
Stage Sequence Diagram



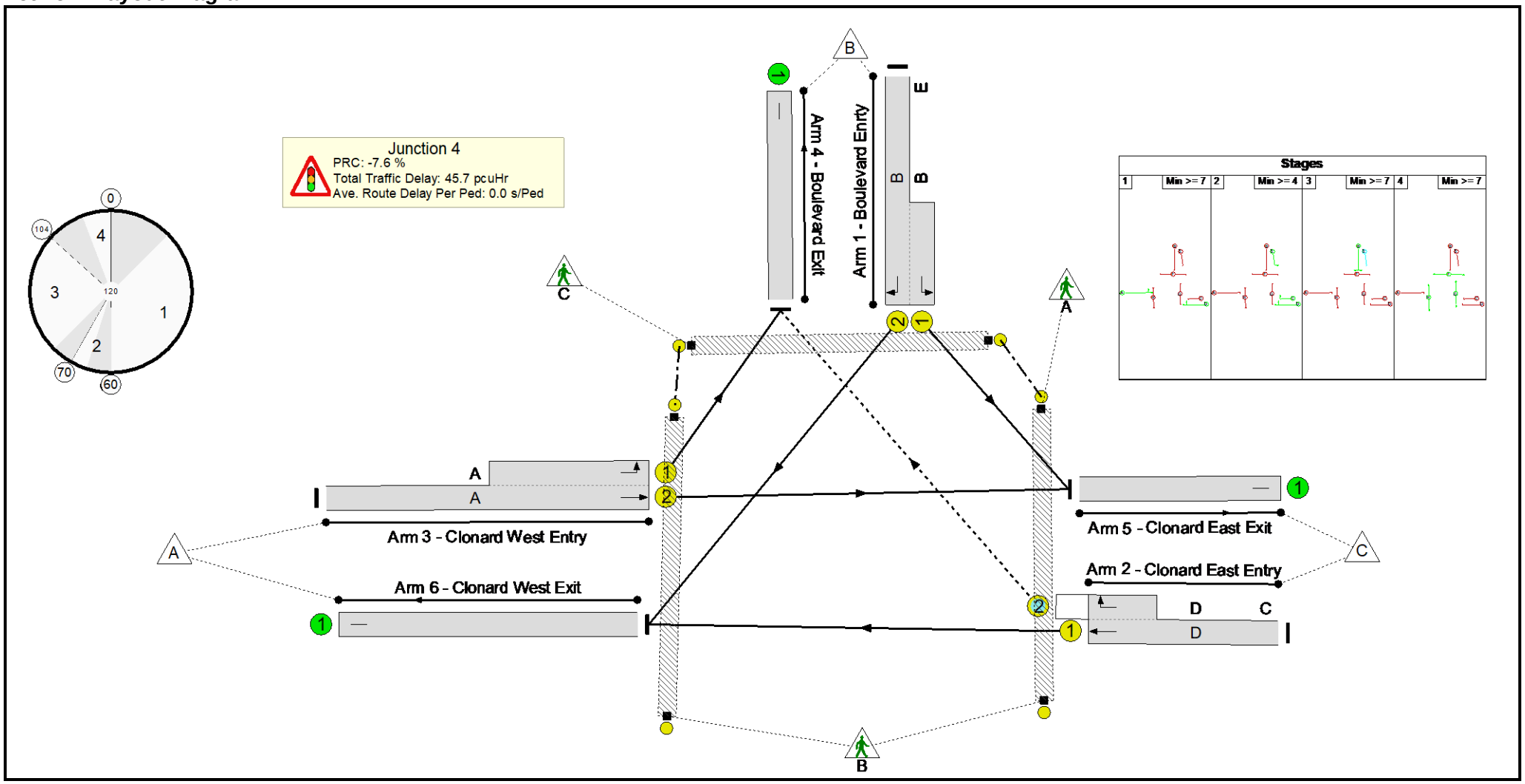
Stage Timings

Stage	1	2	3	4
Duration	45	4	29	7
Change Point	0	60	70	104

Signal Timings Diagram



Network Layout Diagram



Network Results

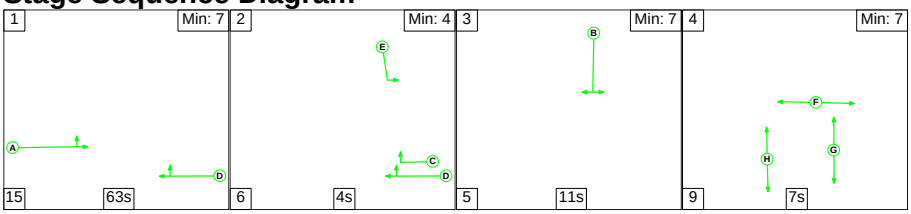
Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**96.8%**
Junction 4	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**96.8%**
1/2+1/1	Boulevard Enrty Left Right	U	N/A	N/A	B	E	1	29:38	9	545	1914:1747	391+173	96.7 : 96.7%
2/1+2/2	Clonard East Entry Right Ahead	U+O	N/A	N/A	D	C	1	55	4	913	1980:1891	838+105	96.8 : 96.8%
3/2+3/1	Clonard West Entry Left Ahead	U	N/A	N/A	A		1	45	-	835	2105:1747	681+210	93.7 : 93.7%
4/1	Boulevard Exit	U	N/A	N/A	-		-	-	-	299	Inf	Inf	0.0%
5/1	Clonard East Exit	U	N/A	N/A	-		-	-	-	805	Inf	Inf	0.0%
6/1	Clonard West Exit	U	N/A	N/A	-		-	-	-	1189	Inf	Inf	0.0%
Ped Link: P1	Unnamed Ped Link	-	N/A	-	F		1	15	-	0	-	9000	0.0%
Ped Link: P2	Unnamed Ped Link	-	N/A	-	G		1	8	-	0	-	4800	0.0%
Ped Link: P3	Unnamed Ped Link	-	N/A	-	H		1	7	-	0	-	0	0.0%

Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network	**-**	**-**	**35**	**65**	**2**	**21.8**	**23.4**	**0.5**	**45.7**	**-**	**-**	**-**	**-**
Junction 4	**-**	**-**	**35**	**65**	**2**	**21.8**	**23.4**	**0.5**	**45.7**	**-**	**-**	**-**	**-**
1/2+1/1	545	545	-	-	-	6.2	7.9	-	14.2	93.6	15.1	7.9	23.0
2/1+2/2	913	913	35	65	2	7.8	9.3	0.5	17.7	69.6	28.9	9.3	38.2
3/2+3/1	835	835	-	-	-	7.7	6.1	-	13.8	59.7	23.4	6.1	29.5
4/1	299	299	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
5/1	805	805	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	1189	1189	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
Ped Link: P1	0	0	-	-	-	-	-	-	0.0	0.0	-	-	0.0
Ped Link: P2	0	0	-	-	-	-	-	-	0.0	0.0	-	-	0.0
Ped Link: P3	0	0	-	-	-	-	-	-	-	-	-	-	-

C1 PRC for Signalled Lanes (%): -7.6 Total Delay for Signalled Lanes (pcuHr): 45.69 Cycle Time (s): 120
PRC Over All Lanes (%): -7.6 Total Delay Over All Lanes(pcuHr): 45.69

Scenario 24: 'Scenario F 2030 PM ' (FG24: 'Scenario F 2030 - PM', Plan 1: 'Network Control Plan 1')

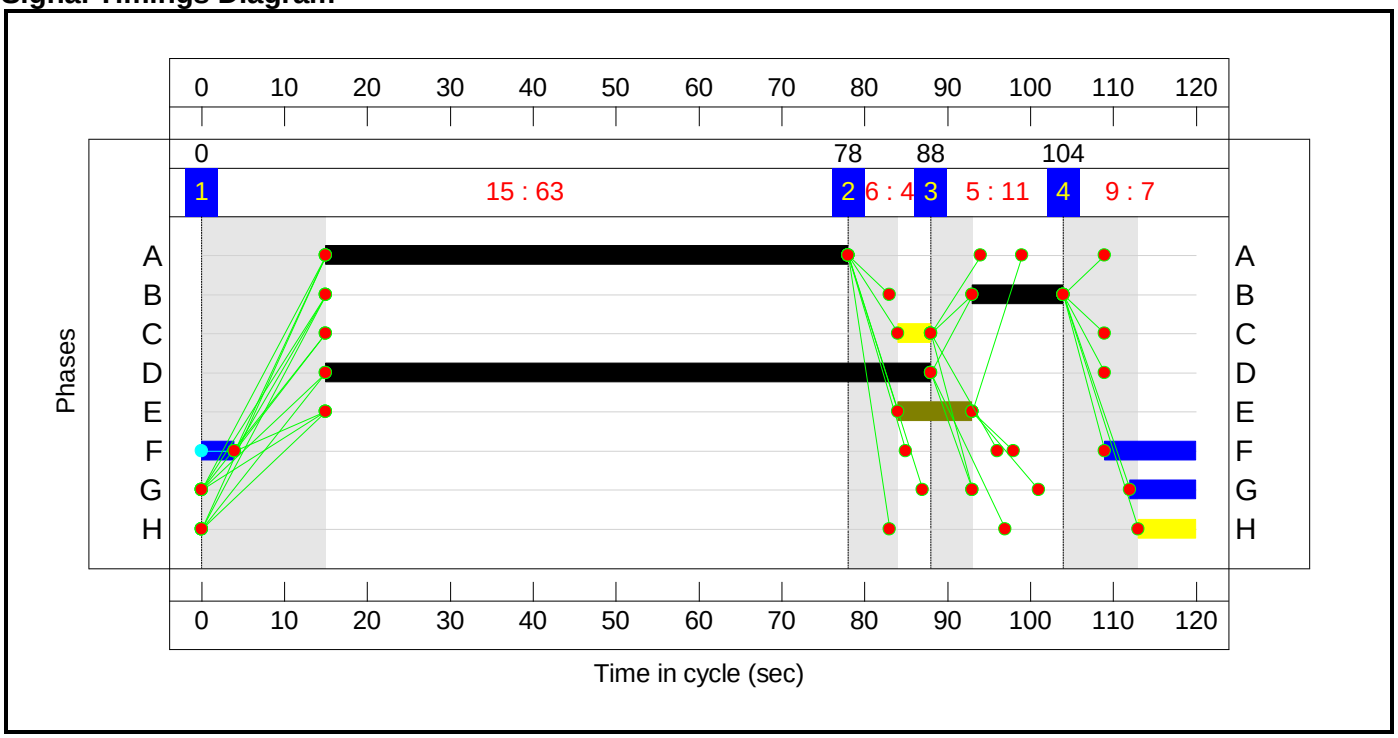
Stage Sequence Diagram



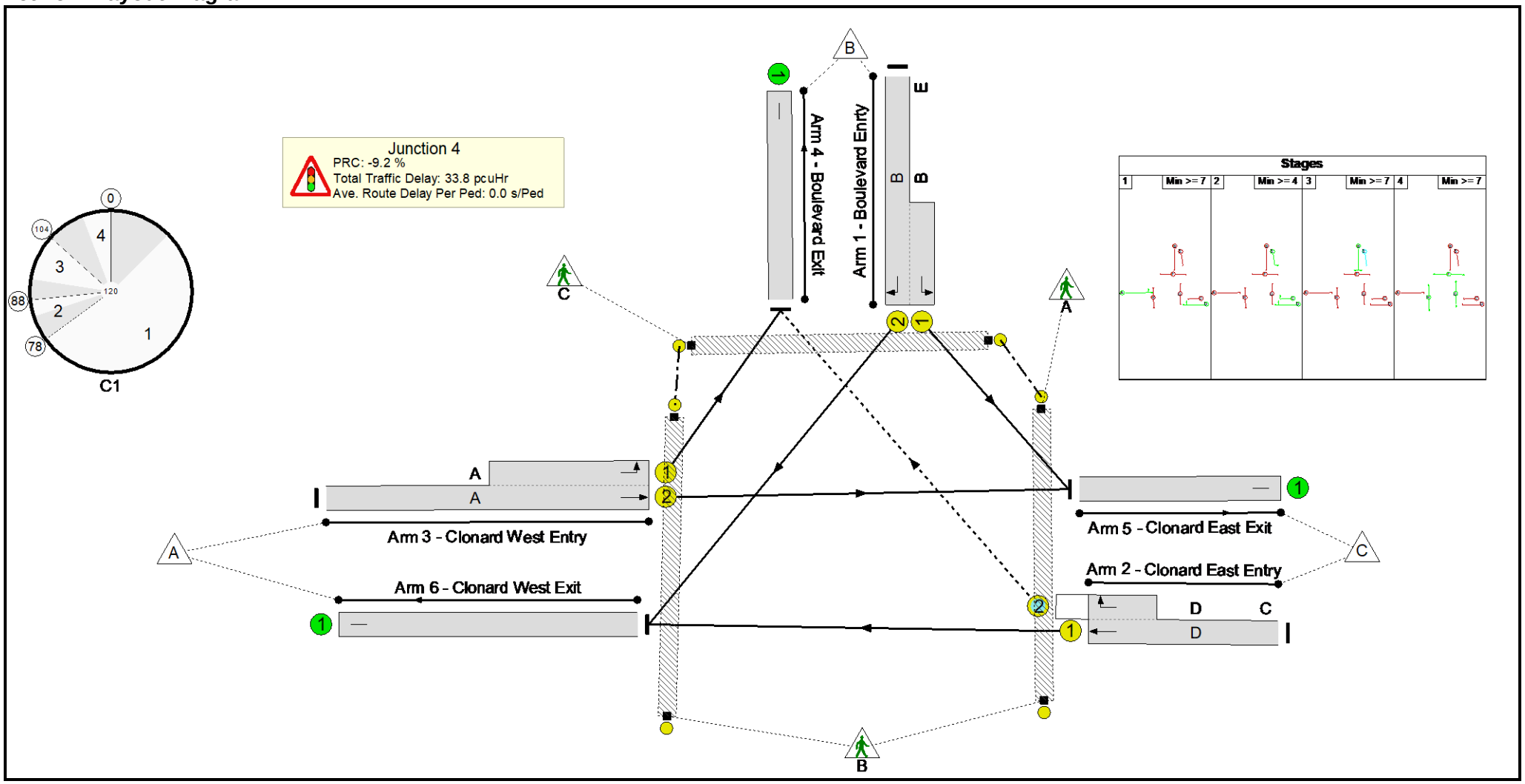
Stage Timings

Stage	1	2	3	4
Duration	63	4	11	7
Change Point	0	78	88	104

Signal Timings Diagram



Network Layout Diagram



Network Results

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**98.2%**
Junction 4	**-**	**-**	**N/A**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**98.2%**
1/2+1/1	Boulevard Enrty Left Right	U	N/A	N/A	B	E	1	11:20	9	267	1914:1747	191+91	94.6 : 94.6%
2/1+2/2	Clonard East Entry Right Ahead	U+O	N/A	N/A	D	C	1	73	4	686	1980:1891	1068+174	55.2 : 55.2%
3/2+3/1	Clonard West Entry Left Ahead	U	N/A	N/A	A		1	63	-	1172	2105:1747	909+284	98.2 : 98.2%
4/1	Boulevard Exit	U	N/A	N/A	-		-	-	-	375	Inf	Inf	0.0%
5/1	Clonard East Exit	U	N/A	N/A	-		-	-	-	979	Inf	Inf	0.0%
6/1	Clonard West Exit	U	N/A	N/A	-		-	-	-	771	Inf	Inf	0.0%
Ped Link: P1	Unnamed Ped Link	-	N/A	-	F		1	15	-	0	-	9000	0.0%
Ped Link: P2	Unnamed Ped Link	-	N/A	-	G		1	8	-	0	-	4800	0.0%
Ped Link: P3	Unnamed Ped Link	-	N/A	-	H		1	7	-	0	-	0	0.0%

Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network	**-**	**-**	**12**	**83**	**2**	**14.4**	**18.5**	**0.9**	**33.8**	**-**	**-**	**-**	**-**
Junction 4	**-**	**-**	**12**	**83**	**2**	**14.4**	**18.5**	**0.9**	**33.8**	**-**	**-**	**-**	**-**
1/2+1/1	267	267	-	-	-	3.7	5.2	-	8.9	120.2	6.0	5.2	11.2
2/1+2/2	686	686	12	83	2	2.6	0.6	0.9	4.1	21.5	12.1	0.6	12.7
3/2+3/1	1172	1172	-	-	-	8.1	12.7	-	20.8	63.9	34.7	12.7	47.4
4/1	375	375	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
5/1	979	979	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	771	771	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
Ped Link: P1	0	0	-	-	-	-	-	-	0.0	0.0	-	-	0.0
Ped Link: P2	0	0	-	-	-	-	-	-	0.0	0.0	-	-	0.0
Ped Link: P3	0	0	-	-	-	-	-	-	-	-	-	-	-

C1 PRC for Signalled Lanes (%): -9.2 Total Delay for Signalled Lanes (pcuHr): 33.81 Cycle Time (s): 120
PRC Over All Lanes (%): -9.2 Total Delay Over All Lanes(pcuHr): 33.81

APPENDIX B

TN07 – 2022 Traffic Survey Comparison

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TECHNICAL NOTE (TN07 – 2022 Traffic Survey Comparison)

Dean Swift Property Holdings

Proposed Residential Development

North West Balbriggan

Co. Dublin

Prepared By:

Brian Condon BSc, CMILT, MCIHT

Checked By:

Martin Peters MSc Eng, CEng MIEI, MIStructE MCIHT

File Ref.: 191004 Document No.: 191004/TN07 Date: 05th December 2022 Revision: Final 01

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Appendix A – TTAR 2022 Traffic Flow Diagram
Appendix B – March 2022 Junction Survey Data

1.0 INTRODUCTION

1.1 General

1.1.1 MPA Consulting Engineers have been commissioned by Dean Swift Property Holdings (DSPH) to provide traffic engineering and transport planning advice in relation to lands in Northwest Balbriggan, Co. Dublin. The broad location of the site is shown below in **Figure 1.1**



FIGURE 1.1: SITE AND JUNCTION LOCATIONS

1.1.2 This Technical Note (TN) has been prepared to compare traffic volumes through the local network based on traffic count data available from IDASO's database for 3 no. junctions along Clonard Road which are also shown in Figure 1.1.

1.1.3 The TN compares 2022 traffic volumes calculated within MPA Traffic and Transport Assessment Report (TTAR) dated September 2021 with junction survey counts undertaken in March 2022. In order to establish if the assessments and modelling in the TTAR, which are based on counts carried out over several years, are reflective of current traffic flows.

2.0 TRAFFIC VOLUMES

2.1 Methodology

2.1.1 The comparison is made of three junctions along Clonard Road. For consistency, this report uses the same naming and numbering convention as used in the TTAR. The junctions to be compared are:

- Junction 5: Clonard Road / Castlemill Link Road / Stephenstown Link Road;
- Junction 8: Clonard Road / Naul Road / L1390;
- Junction 13: Chapel Street / Harry Reynolds Road.

2.1.2 The comparison is made between 2022 base flows calculated within the TTAR and March 2022 traffic survey data.

2.2 TTAR September 2021

2.2.1 The TTAR used traffic survey data undertaken over several years as summarise below:

- Junction 5: Surveyed in 2018;
- Junction 8: Surveyed in 2016;
- Junction 13: Surveyed in 2019.

2.2.2 Traffic growth has been applied to the survey data to calculate 2022 base traffic flows. Traffic growth has been calculated using the growth factors contained in the TII 'Project Appraisal Guidelines for National Roads Unit 5.3 - Travel Demand Projections PE-PAG-02017' (May 2019).

2.2.3 The base traffic survey data and traffic growth calculations are included in Section 8.5 of the TTAR whist the traffic flow diagram is included in Appendix A.

2.2.4 The total 2022 traffic volumes through these junctions are shown in Table 2.1 below:

Time Period	2022 Base Malincross TTAR (PCUs)
Junction 5: Clonard Road / Castlemill Link Road / Stephenstown Link Road	
AM Peak	1,683
PM Peak	1,559
Junction 8: Clonard Road / Naul Road / L1390	
AM Peak	1,835
PM Peak	1,780
Junction 13: Chapel Street / Harry Reynolds Road	
AM Peak	1,270
PM Peak	1,113
All Junctions	
AM Peak	4,788
PM Peak	4,453

TABLE 2.1: MALINCROSS TTAR CALCULATED 2022 TRAFFIC VOLUMES

2.3 2022 Surveyed Flows

2.3.1 In March 2022, IDASO undertook traffic surveys of three junctions along Clonard Road. The full outputs are included in Appendix B and the traffic volumes through the junctions are summarised in Table 2.2 below:

Time Period	March 2022 Surveyed Flows (PCUs)
Junction 5: Clonard Road / Castlemill Link Road / Stephenstown Link Road	
AM Peak	1,704
PM Peak	1,558
Junction 8: Clonard Road / Naul Road / L1390	
AM Peak	1,863
PM Peak	1,712
Junction 13: Chapel Street / Harry Reynolds Road	
AM Peak	1,215
PM Peak	1,185
All Junctions	
AM Peak	4,782
PM Peak	4,454

TABLE 2.2: MARCH 2022 SURVEYED TRAFFIC VOLUMES

2.4 Comparison of Traffic Volumes

2.4.1 Table 2.3 below provides a comparison of the TTAR and Surveyed traffic volumes through the junctions:

	IDASO 2022 Surveyed Flows (PCUs)	2022 Base Malincross SHD (PCUs)	Difference (PCUs)
Junction 5: Clonard Road / Castlemill Link Road / Stephenstown Link Road			
AM Peak	1,704	1,683	-21
PM Peak	1,558	1,559	1
Junction 8: Clonard Road / Naul Road / L1390			
AM Peak	1,863	1,835	-28
PM Peak	1,712	1,780	68
Junction 13: Chapel Street / Harry Reynolds Road			
AM Peak	1,215	1,270	55
PM Peak	1,185	1,113	-71
ALL Junctions			
AM Peak	4,782	4788	6
PM Peak	4,454	4453	-2

TABLE 2.3: COMPARISON OF 2022 TRAFFIC VOLUMES

2.4.2 As shown in Table 2.3, there is some variation in the peak hour traffic volumes when considering each junction individually. But across the three junctions, the 2022 surveyed flows and TTAR calculated 2022 Base Flows, the difference negligible and the estimated 2022 base flows in the

TTAR can be considered to correlate well with the 2022 counted flows and are generally within +/- 5%.

3.0 REDUCED DEVELOPMENT MIXES

3.1 Proposed Malincross Development Mix

3.1.1 The TTAR prepared for Malincross is based on a development mix comprising 393 houses, 88 duplexes and 112 apartments providing a total of 593 dwellings. The trip generation is provided in Table 3.1 below (and Table 7.2 of the TTAR):

	Morning Peak Hour (08:00 – 09:00)		Evening Peak Hour (17:00 – 18:00)		Daily
	Arrivals	Deps	Arrivals	Deps	Two-Way
'Houses Privately Owned' 393 Dwellings	64	210	175	107	2,474
'Flats Privately Owned' 88 Dwellings	4	12	17	9	177
Duplex 112 Dwellings	13	41	39	23	507
TOTAL (593 Dwellings)	**81**	**263**	**231**	**139**	**3,158**

TABLE 3.1: ORIGINAL TTAR PROPOSED TRIP GENERATION

3.1.2 Since the writing the TTAR, the development mix has changed to 378 houses, 84 duplexes and 102 apartments for a total of 564 dwellings. The revised trip generation is shown in Table 3.2 below:

	Morning Peak Hour (08:00 – 09:00)		Evening Peak Hour (17:00 – 18:00)		Daily
	Arrivals	Deps	Arrivals	Deps	Two-Way
'Houses Privately Owned' 378 Dwellings	62	202	169	102	2,379
'Flats Privately Owned' 84 Dwellings	3	12	16	8	169
Duplex 102 Dwellings	11	34	33	19	424
TOTAL (564 Dwellings)	**76**	**248**	**218**	**129**	**2,972**

TABLE 3.2: CURRENT DEVELOPMENT MIX TRIP GENERATION

3.1.3 Tables 3.1 and 3.2 demonstrate that the revised development mix would generate fewer trips in the peak hours and across the day, almost 6% less, than what has been assessed within the September 2021 TTAR. Thus the September 2021 TTAR provides a "worst case" assessment of development vehicle trips.

3.2 Proposed Ladywell Development Mix

3.2.1 The committed residential development at Ladywell (Ref: F21A/0055) has been included within the TTAR based on a development of 328 dwellings as a mix of houses, duplexes and apartments.

3.2.2 Since writing the TTAR, the development mix for the Ladywell scheme has reduced to 306

dwellings, a reduction of almost 7%.

3.2.3 Similar to above, the revised Ladywell development mix provides fewer dwellings than assessed in the September 2021 TTAR. This means that the September 2021 TTAR is providing a robust assessment of the proposed development.

4.0 SUMMARY AND CONCLUSIONS

4.1 Summary

4.1.1 This Technical Note has been prepared to compare traffic volumes along the Clonard Road in Balbriggan. Co. Dublin, based on available 2022 traffic count data for three junctions along the road.

4.1.2 The MPA Transport and Traffic Assessment Report dated September 2021 used traffic survey data recorded over several years.

4.1.3 Traffic growth was applied to this survey data, based on TII growth factors, to calculate 2022 base traffic volumes.

4.1.4 Survey data for 3 no. junctions assessed within the TTAR is available from IDASO's database, surveys were undertaken in March 2022.

4.1.5 A comparison of the TTAR 2022 Base traffic volumes, and the 2022 Surveyed traffic volumes indicate a negligible difference in the total traffic volumes across the three junctions and individually the junctions are generally within +/- 5%.

4.1.6 It is also noted that the latest development proposals would provide fewer dwellings and fewer trips than assessed in the TTAR, 6% less.

4.1.7 What's more, the committed development at Ladywell is also providing fewer dwellings, 7% less, than allowed for within the TTAR.

4.1.8 As a result, the junction capacity assessment within TTAR provide a robust assessment of the background traffic and the development impact.

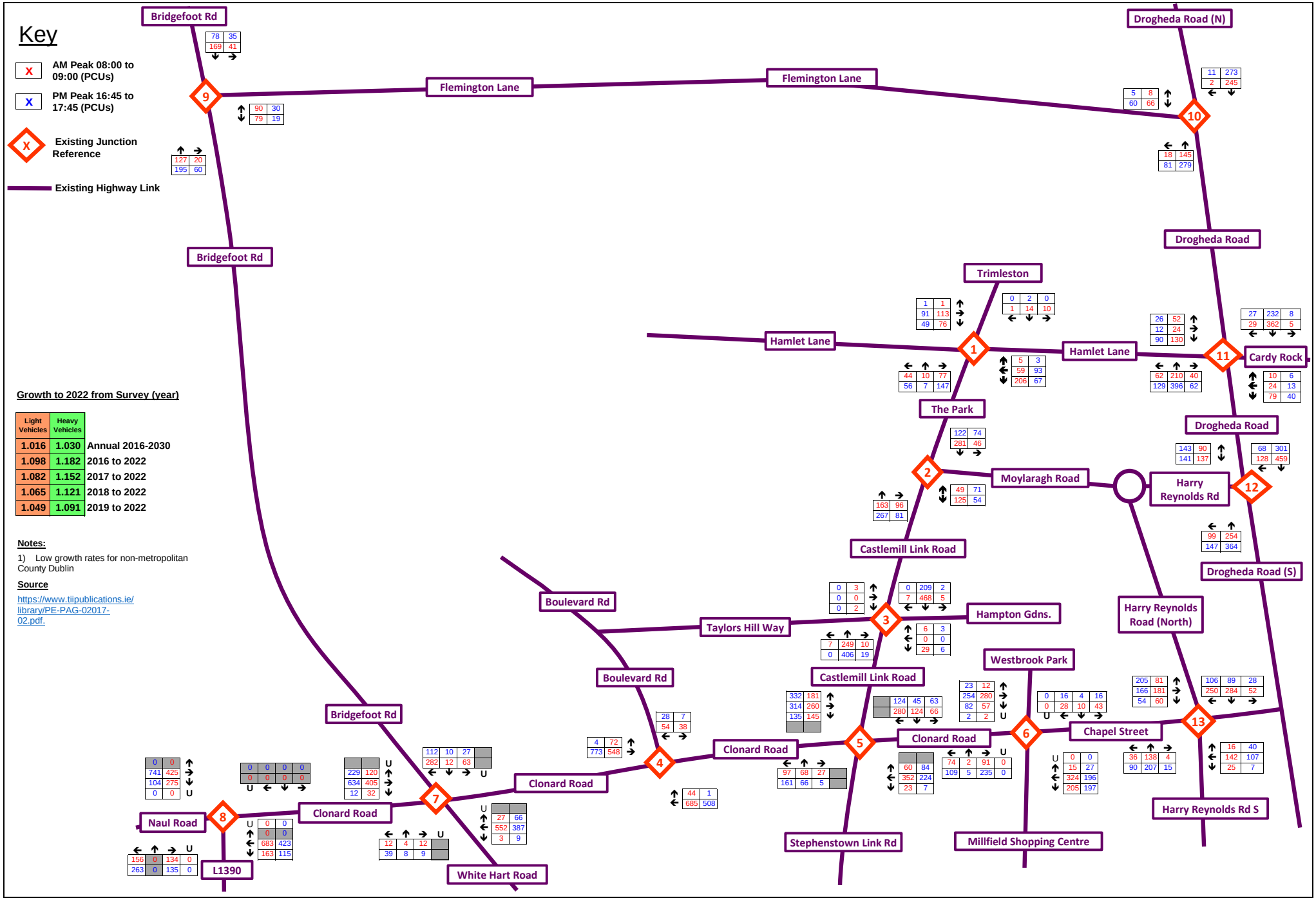
4.2 Conclusion

4.2.1 In conclusion, it is considered that this Technical Note demonstrates that the calculated 2022 Base traffic flows within the TTAR are in line with the up-to-date flows on the network.

4.2.2 The proposed junction capacity assessments are based on a greater development mix for both the Malincross and consented Ladywell developments. As such, the TTAR junction capacity assessments are appropriate whilst using robust calculations. Therefore, additional traffic surveys and further junction modelling is not required.

APPENDIX A

TTAR 2022 Traffic Flow Diagram



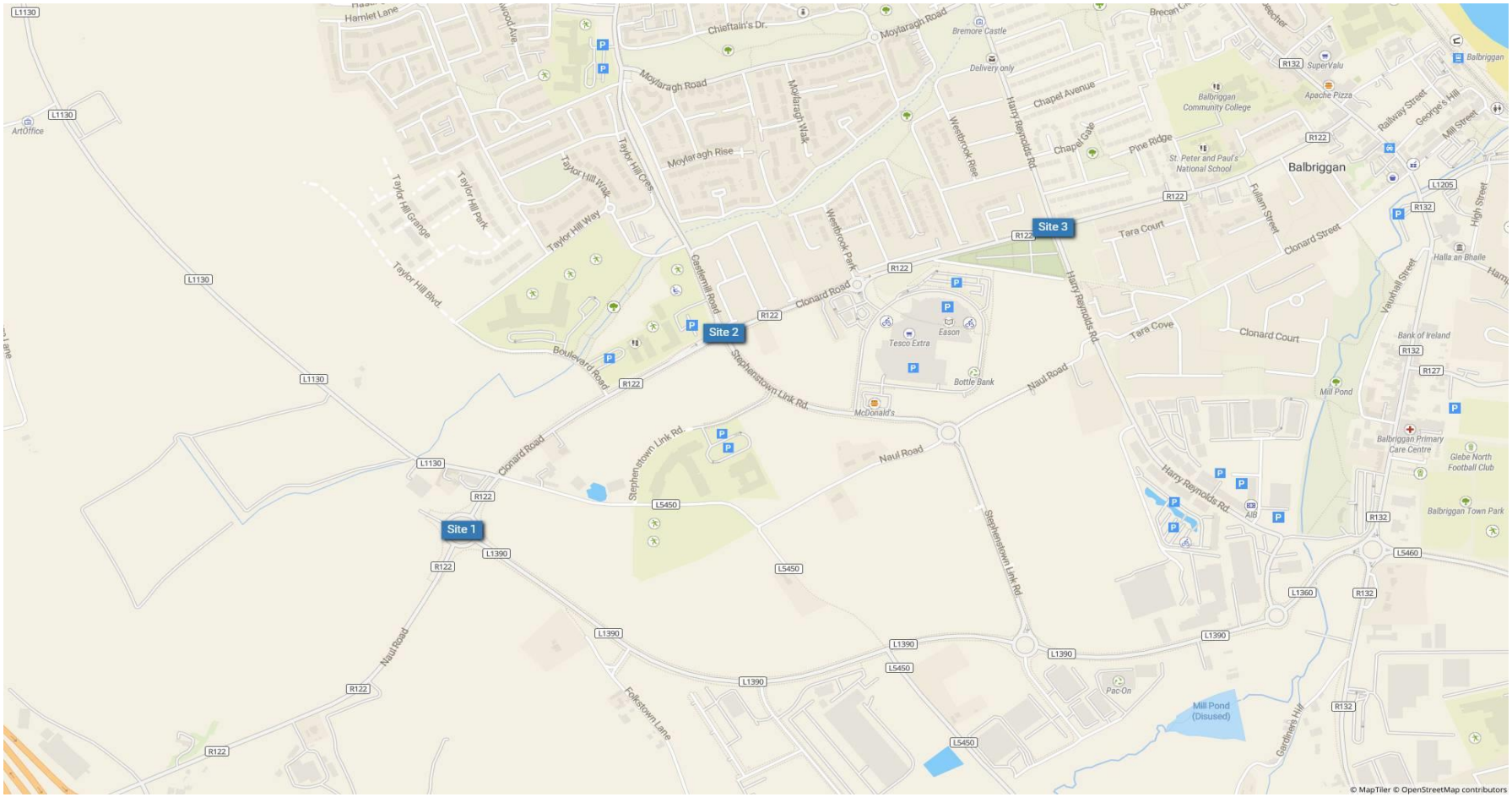
Martin Peters Associates Consulting Engineers 26 Upper Pembroke Street, Dublin 2 | T: +353 1 649 9001 | E: info@mpa.ie | W: www.mpa.ie	Drawing Title: 2022 Base Traffic Flows	**Drawn By:** AE	Project Title: Malincross SHD
		Checked By: RJW	Project Number: 191004
		Issue Date: Jan 2021	Drawing Number: 191004-TAR-002

APPENDIX B

March 2022 – Junction Survey Data

IDASO

Survey Name: HDR 22 080 Balbriggan
Date: Thu 31 Mar 2022





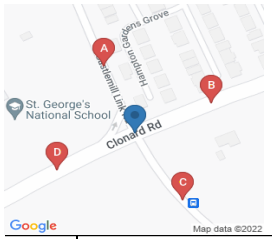
IDASO

Survey Name: HDR 22 080 Balbriggan
Site: Site 1
Location: R122/L1360
Date: Thu 31-Mar-2022

	A => A										A => B										A => C									
TIME	P/C	M/C	CAR	TAXI	LGV	OGV1	OGV2	PSV	TOT	PCU	P/C	M/C	CAR	TAXI	LGV	OGV1	OGV2	PSV	TOT	PCU	P/C	M/C	CAR	TAXI	LGV	OGV1	OGV2	PSV	TOT	PCU
06:00	0	0	1	0	0	0	0	0	1	1	0	0	1	0	0	0	0	0	1	1	0	0	82	0	17	3	0	0	102	103.5
06:15	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	3	3	0	1	116	0	19	1	0	0	137	136.9
06:30	0	0	1	0	0	0	0	0	1	1	0	0	6	0	0	0	1	0	7	8.3	0	2	105	2	16	0	0	0	125	123.8
06:45	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0	5	5	0	0	110	5	23	3	0	0	141	142.5
H/TOT	0	0	2	0	0	0	0	0	2	2	0	0	15	0	0	0	1	0	16	17.3	0	3	413	7	75	7	0	0	505	506.7
07:00	0	0	0	0	0	0	0	0	0	0	1	0	2	0	1	0	0	0	4	3.2	0	2	113	2	36	6	1	0	160	163.1
07:15	0	0	0	0	0	0	0	0	0	0	0	0	12	0	2	0	0	0	14	14	0	1	129	0	22	2	0	1	155	156.4
07:30	0	0	0	0	0	0	0	0	0	0	0	0	13	0	6	0	0	0	19	19	0	0	131	2	14	2	0	0	149	150
07:45	0	0	0	0	0	0	0	0	0	0	0	0	24	1	5	0	1	0	31	32.3	0	0	148	4	22	1	1	1	177	179.8
H/TOT	0	0	0	0	0	0	0	0	0	0	1	0	51	1	14	0	1	0	68	68.5	0	3	521	8	94	11	2	2	641	649.3
08:00	0	0	1	0	0	0	0	0	1	1	0	0	23	0	5	1	0	0	29	29.5	0	2	146	4	25	6	0	4	187	192.8
08:15	0	0	0	0	0	0	0	0	0	0	0	0	18	0	3	2	0	0	23	24	0	2	161	2	15	7	0	0	187	189.3
08:30	0	0	0	0	0	0	0	0	0	0	0	0	22	1	2	1	1	0	27	28.8	0	0	151	6	14	0	0	1	172	173
08:45	0	0	1	0	0	0	0	0	1	1	0	0	38	0	5	0	0	0	43	43	0	0	111	2	11	1	1	4	130	135.8
H/TOT	0	0	2	0	0	0	0	0	2	2	0	0	101	1	15	4	1	0	122	125.3	0	4	569	14	65	14	1	9	676	690.9
09:00	0	0	0	0	0	0	0	0	0	0	0	0	23	1	0	0	1	0	25	26.3	0	0	121	4	18	7	0	0	150	153.5
09:15	0	0	0	0	0	0	0	0	0	0	0	0	12	0	1	1	0	0	14	14.5	0	2	108	3	12	3	0	0	128	128.3
09:30	0	0	0	0	0	0	0	0	0	0	1	0	5	0	1	0	0	0	7	6.2	0	0	69	2	10	2	1	1	85	88.3
09:45	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	1	1	5	7.3	0	0	68	3	9	3	1	1	85	88.8
H/TOT	0	0	0	0	0	0	0	0	0	0	1	0	43	1	2	1	2	1	51	54.3	0	2	366	12	49	15	2	2	448	458.9
16:00	0	0	0	0	0	0	0	0	0	0	0	0	7	0	1	0	0	0	8	8	0	0	92	3	10	1	0	1	107	108.5
16:15	0	0	1	0	0	0	0	0	1	1	0	0	12	0	0	0	0	0	12	12	0	0	84	3	15	2	0	2	106	109
16:30	0	0	1	0	1	0	0	0	2	2	0	0	7	0	1	0	0	0	8	8	0	0	93	2	18	1	0	0	114	114.5
16:45	0	0	1	0	0	0	0	0	1	1	0	0	7	0	0	0	0	0	7	7	1	0	81	4	10	5	1	0	102	105
H/TOT	0	0	3	0	1	0	0	0	4	4	0	0	33	0	2	0	0	0	35	35	1	0	350	12	53	9	1	3	429	437
17:00	0	0	1	0	0	0	0	0	1	1	0	0	11	0	0	1	0	0	12	12.5	0	0	94	4	15	0	0	0	113	113
17:15	0	0	0	0	0	0	0	0	0	0	0	0	9	0	5	0	0	0	14	14	0	0	83	3	11	2	1	0	100	102.3
17:30	0	0	0	0	0	0	0	0	0	0	0	0	10	0	2	0	0	0	12	12	0	1	94	2	10	0	1	0	108	108.7
17:45	0	0	0	0	0	0	0	0	0	0	0	0	12	0	0	0	0	0	12	12	0	0	78	1	4	2	1	1	87	90.3
H/TOT	0	0	1	0	0	0	0	0	1	1	0	0	42	0	7	1	0	0	50	50.5	0	1	349	10	40	4	3	1	408	414.3
18:00	0	0	0	0	0	0	0	0	0	0	0	0	9	0	0	0	0	0	9	9	0	1	93	1	7	3	1	0	106	108.2
18:15	0	0	2	0	0	0	0	0	2	2	0	0	8	0	1	0	0	0	9	9	0	0	77	1	6	2	0	0	86	87
18:30	0	0	0	0	0	0	0	0	0	0	1	0	3	0	1	0	0	0	5	4.2	0	0	65	3	5	0	0	0	73	73
18:45	0	0	0	0	0	0	0	0	0	0	1	0	10	1	1	0	0	0	13	12.2	1	0	59	3	2	0	0	0	65	64.2
H/TOT	0	0	2	0	0	0	0	0	2	2	2	0	30	1	3	0	0	0	36	34.4	1	1	294	8	20	5	1	0	330	332.4
19:00	0	0	0	0	0	0	0	0	0	0	0	0	7	0	1	0	0	0	8	8	0	0	57	1	8	1	1	0	68	69.8
19:15	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0	5	5	0	0	73	1	3	0	0	0	77	77
19:30	0	0	1	0	0	0	0	0	1	1	0	0	6	0	0	0	0	0	6	6	0	0	54	3	5	1	1	0	64	65.8
19:45	0	0	0	0	0	0	0	0	0	0	0	0	10	1	0	0	0	0	11	11	0	1	41	0	5	0	0	0	47	46.4
H/TOT	0	0	1	0	0	0	0	0	1	1	0	0	28	1	1	0	0	0	30	30	0	1	225	5	21	2	2	0	256	259
14 TOT	0	0	18	0	2	0	0	0	20	20	6	0	615	12	63	13	9	3	721	737.4	3	20	4662	142	610	121	27	30	5615	5726.2

B => A										B => B										B => C									
P/C	M/C	CAR	TAXI	LGV	OGV1	OGV2	PSV	TOT	PCU	P/C	M/C	CAR	TAXI	LGV	OGV1	OGV2	PSV	TOT	PCU	P/C	M/C	CAR	TAXI	LGV	OGV1	OGV2	PSV	TOT	PCU
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	0	1	1	0	0	12	12.5
0	0	2	0	0	0	0	0	2	2	0	0	0	0	0	0	0	0	0	0	0	0	9	0	1	1	0	0	11	11.5
0	0	5	0	0	0	0	0	5	5	0	0	0	0	0	0	0	0	0	0	0	0	7	0	1	1	0	0	9	9.5
0	0	2	0	0	1	0	0	3	3.5	0	0	0	0	0	0	0	0	0	0	0	0	11	0	3	1	1	0	16	17.8
0	0	9	0	0	1	0	0	10	10.5	0	0	0	0	0	0	0	0	0	0	0	0	37	0	6	4	1	0	48	51.3
0	0	2	0	0	0	0	0	2	2	0	0	0	0	0	0	0	0	0	0	0	0	7	0	3	0	2	0	12	14.6
0	0	3	0	1	0	1	0	5	6.3	0	0	0	0	0	0	0	0	0	0	0	0	15	0	7	1	0	0	23	23.5
0	0	3	0	0	0	0	0	3	3	0	0	0	0	0	0	0	0	0	0	0	0	22	0	8	2	1	0	33	35.3
0	0	15	1	2	0	0	1	19	20	0	0	0	0	0	0	0	0	0	0	0	0	23	0	3	2	1	0	29	31.3
0	0	23	1	3	0	1	1	29	31.3	0	0	0	0	0	0	0	0	0	0	0	0	67	0	21	5	4	0	97	104.7
0	0	25	0	0	0	0	1	26	27	0	0	0	0	0	0	0	0	0	0	0	0	55	1	6	1	4	0	67	72.7
0	0	23	0	0	0	1	0	24	25.3	0	0	0	0	0	0	0	0	0	0	0	0	36	0	10	0	1	0	47	48.3
2	0	19	0	1	0	1	0	23	22.7	0	0	0	0	0	0	0	0	0	0	0	0	22	1	7	1	2	0	33	36.1
2	0	17	0	0	0	0	1	20	19.4	0	0	0	0	0	0	0	0	0	0	0	0	23	0	4	1	1	0	29	30.8
4	0	84	0	1	0	2	2	93	94.4	0	0	0	0	0	0	0	0	0	0	0	0	136	2	27	3	8	0	176	187.9
0	0	8	1	1	2	0	0	12	13	0	0	1	0	0	0	0	0	1	1	0	0	14	0	3	0	2	0	19	21.6
0	0	12	1	0	0	0	0	13	13	0	0	0	0	0	0	0	0	0	0	0	0	21	1	5	4	0	0	31	33
0	0	6	0	2	0	0	0	8	8	0	0	0	0	0	0	0	0	0	0	0	0	25	0	4	3	2	0	34	38.1
0	0	6	0	2	0	0	0	8	8	0	0	0	0	0	0	0	0	0	0	0	1	20	1	6	2	1	0	31	32.7
0	0	32	2	5	2	0	0	41	42	0	0	1	0	0	0	0	0	1	1	0	1	80	2	18	9	5	0	115	125.4
0	0	22	0	2	1	0	0	25	25.5	0	0	0	0	0	0	0	0	0	0	0	0	50	0	24	3	1	0	78	80.8
0	0	8	0	2	0	0	0	10	10	0	0	0	0	0	0	0	0	0	0	1	1	54	0	12	0	4	1	73	77.8
0	0	18	1	4	2	1	0	26	28.3	0	0	0	0	0	0	0	0	0	0	0	0	54	0	12	0	3	0	69	72.9
0	0	20	0	3	0	0	0	23	23	0	0	0	0	0	0	0	0	0	0	0	0	52	0	4	1	1	0	58	59.8
0	0	68	1	11	3	1	0	84	86.8	0	0	0	0	0	0	0	0	0	0	1	1	210	0	52	4	9	1	278	291.3
0	0	22	0	1	0	0	0	23	23	0	0	0	0	0	0	0	0	0	0	1	0	97	0	15	2	1	0	116	117.5
0	0	17	0	2	0	0	0	19	19	0	0	0	0	0	0	0	0	0	0	0	0	49	1	7	1	1	0	59	60.8
0	0	15	0	3	0	0	0	18	18	0	0	0	0	0	0	0	0	0	0	0	1	59	1	16	0	0	0	77	76.4
0	0	19	0	4	0	0	0	23	23	0	0	0	0	0	0	0	0	0	0	0	0	28	0	3	0	0	0	31	31
0	0	73	0	10	0	0	0	83	83	0	0	0	0	0	0	0	0	0	0	1	1	233	2	41	3	2	0	283	285.7
0	0	15	0	0	0	1	0	16	17.3	0	0	0	0	0	0	0	0	0	0	0	0	45	0	4	0	2	0	51	53.6
1	0	14	0	2	0	0	0	17	16.2	0	0	0	0	0	0	0	0	0	0	0	0	28	0	3	1	2	0	34	37.1
0	0	8	0	0	0	0	0	8	8	0	0	0	0	0	0	0	0	0	0	0	0	25	0	2	1	0	0	28	28.5
0	0	12	0	0	0	0	0	12	12	0	0	0	0	0	0	0	0	0	0	0	0	14	0	3	1	0	0	18	18.5
1	0	49	0	2	0	1	0	53	53.5	0	0	0	0	0	0	0	0	0	0	0	0	112	0	12	3	4	0	131	137.7
0	0	17	0	0	0	0	0	17	17	0	0	0	0	0	0	0	0	0	0	1	0	27	0	0	0	0	0	28	27.2
0	0	10	0	0	0	0	0	10	10	0	0	1	0	0	0	0	0	1	1	0	0	15	0	2	0	0	0	17	17
0	1	7	0	0	1	0	0	9	8.9	0	0	0	0	0	0	0	0	0	0	0	1	14	0	1	0	0	0	16	15.4
0	0	9	0	1	0	0	0	10	10	0	0	0	0	0	0	0	0	0	0	0	0	13	0	1	1	0	0	15	15.5
0	1	43	0	1	1	0	0	46	45.9	0	0	1	0	0	0	0	0	1	1	1	1	69	0	4	1	0	0	76	75.1
7	3	689	13	62	16	10	6	806	825.6	0	0	11	0	0	1	0	0	12	12.5	4	4	1537	18	309	87	79	4	2042	2186.6

C => A										C => B										C => C									
P/C	M/C	CAR	TAXI	LGV	OGV1	OGV2	PSV	TOT	PCU	P/C	M/C	CAR	TAXI	LGV	OGV1	OGV2	PSV	TOT	PCU	P/C	M/C	CAR	TAXI	LGV	OGV1	OGV2	PSV	TOT	PCU
0	0	7	0	3	0	0	0	10	10	0	0	4	0	3	0	0	0	7	7	0	0	0	0	0	0	0	0	0	0
0	0	13	0	2	0	0	0	15	15	0	0	8	0	2	0	0	0	10	10	0	0	0	0	0	0	0	0	0	0
0	0	13	0	2	1	0	0	16	16.5	0	0	12	0	6	0	2	0	20	22.6	0	0	0	0	0	0	0	0	0	0
0	0	22	1	2	2	0	0	27	28	0	1	33	0	3	0	0	0	37	36.4	0	0	0	0	0	0	0	0	0	0
0	0	55	1	9	3	0	0	68	69.5	0	1	57	0	14	0	2	0	74	76	0	0	0	0	0	0	0	0	0	0
0	0	28	0	5	0	1	0	34	35.3	0	0	24	0	9	1	1	0	35	36.8	0	0	0	0	0	0	0	0	0	0
0	0	22	1	8	4	0	0	35	37	0	0	31	0	10	0	1	0	42	43.3	0	0	1	0	0	0	0	0	1	1
0	0	54	3	12	3	0	1	73	75.5	0	0	36	1	9	3	4	2	55	63.7	0	0	0	0	0	0	0	0	0	0
0	0	61	3	16	2	0	1	83	85	1	0	67	0	10	2	2	0	82	84.8	0	0	0	0	0	0	0	0	0	0
0	0	165	7	41	9	1	2	225	232.8	1	0	158	1	38	6	8	2	214	228.6	0	0	1	0	0	0	0	0	1	1
0	0	87	3	12	0	0	1	103	104	0	0	74	0	12	1	2	0	89	92.1	0	0	1	0	0	0	0	0	1	1
0	0	120	3	8	3	1	3	138	143.8	0	0	45	0	4	1	0	0	50	50.5	0	0	0	0	0	0	0	0	0	0
0	0	121	2	10	1	1	0	135	136.8	0	0	49	0	8	1	0	1	59	60.5	0	0	0	0	0	0	0	0	0	0
0	0	86	1	12	3	0	0	102	103.5	0	0	59	0	6	2	1	0	68	70.3	0	0	0	0	0	0	0	0	0	0
0	0	414	9	42	7	2	4	478	488.1	0	0	227	0	30	5	3	1	266	273.4	0	0	1	0	0	0	0	0	1	1
1	1	55	0	11	8	0	0	76	78.6	0	0	43	2	5	4	2	0	56	60.6	0	0	0	0	0	0	0	0	0	0
0	0	55	2	11	3	0	2	73	76.5	0	0	25	1	3	3	1	0	33	35.8	0	0	0	0	1	0	0	0	1	1
0	0	44	1	13	4	0	0	62	64	0	0	21	2	4	2	0	0	29	30	0	0	1	0	0	0	0	0	1	1
0	0	51	1	10	2	0	0	64	65	0	0	16	0	1	2	1	0	20	22.3	0	0	0	0	0	0	0	0	0	0
1	1	205	4	45	17	0	2	275	284.1	0	0	105	5	13	11	4	0	138	148.7	0	0	1	0	1	0	0	0	2	2
0	1	100	4	22	2	1	0	130	131.7	0	0	16	1	7	0	6	0	30	37.8	0	0	0	0	0	0	0	0	0	0
0	0	142	2	23	2	0	1	170	172	0	0	18	0	10	1	4	0	33	38.7	0	0	0	0	0	0	0	0	0	0
0	0	137	4	21	4	1	0	167	170.3	0	0	19	0	2	1	3	0	25	29.4	0	0	1	0	0	0	0	0	1	1
0	3	135	2	19	4	1	0	164	165.5	0	0	12	0	9	0	0	0	21	21	0	0	0	0	0	0	0	0	0	0
0	4	514	12	85	12	3	1	631	639.5	0	0	65	1	28	2	13	0	109	126.9	0	0	1	0	0	0	0	0	1	1
0	1	155	2	22	3	1	0	184	186.2	0	0	17	1	4	1	1	0	24	25.8	0	0	0	0	0	0	0	0	0	0
0	0	142	0	26	6	0	1	175	179	0	0	18	0	8	0	0	0	26	26	0	0	0	0	0	0	0	0	0	0
0	4	170	4	23	2	1	1	205	205.9	0	0	17	0	5	2	1	0	25	27.3	0	0	0	0	1	0	0	0	1	1
0	1	133	1	20	3	1	0	159	161.2	0	0	15	0	5	0	2	0	22	24.6	0	0	0	0	0	0	0	0	0	0
0	6	600	7	91	14	3	2	723	732.3	0	0	67	1	22	3	4	0	97	103.7	0	0	0	0	1	0	0	0	1	1
0	2	129	4	19	0	1	0	155	155.1	0	0	20	0	3	1	0	0	24	24.5	0	0	0	0	0	0	0	0	0	0
0	2	162	0	29	1	0	0	194	193.3	0	0	19	0	4	1	0	0	24	24.5	0	0	0	0	0	0	0	0	0	0
0	0	126	5	10	0	0	0	141	141	0	0	15	0	1	0	0	0	16	16	0	0	0	0	0	0	0	0	0	0
0	0	119	3	14	1	0	0	137	137.5	0	0	17	0	0	0	0	0	17	17	0	0	0	0	0	0	0	0	0	0
0	4	536	12	72	2	1	0	627	626.9	0	0	71	0	8	2	0	0	81	82	0	0	0	0	0	0	0	0	0	0
0	0	104	1	16	0	1	0	122	123.3	0	0	10	0	1	0	2	0	13	15.6	0	0	0	0	0	0	0	0	0	0
0	0	117	4	10	0	1	0	132	133.3	0	0	12	0	1	1	0	0	14	14.5	0	0	0	0	0	0	0	0	0	0
0	0	100	2	9	1	0	0	112	112.5	0	0	17	0	1	0	0	0	18	18	0	0	0	0	0	0	0	0	0	0
0	3	79	5	10	0	0	0	97	95.2	0	0	14	0	0	1	0	0	15	15.5	0	0	0	0	0	0	0	0	0	0
0	3	400	12	45	1	2	0	463	464.3	0	0	53	0	3	2	2	0	60	63.6	0	0	0	0	0	0	0	0	0	0
2	20	4523	122	677	120	28	29	5521	5632.8	2	1	1234	14	263	78	80	6	1678	1824.8	0	0	7	0	3	0	1	0	11	12.3



IDASO

Survey Name: HDR 22 080 Balbriggan
Site: Site 2
Location: Castlemill Link Road/Clonard Road/Unnamed Road
Date: Thu 31-Mar-2022

	A => A										A => B										A => C										A => D									
TIME	P/C	M/C	CAR	TAXI	LGV	OGV1	OGV2	PSV	TOT	PCU	P/C	M/C	CAR	TAXI	LGV	OGV1	OGV2	PSV	TOT	PCU	P/C	M/C	CAR	TAXI	LGV	OGV1	OGV2	PSV	TOT	PCU	P/C	M/C	CAR	TAXI	LGV	OGV1	OGV2	PSV	TOT	PCU
06:00	0	0	0	0	0	0	0	0	0	0	1	0	3	0	0	0	0	0	4	3.2	0	0	5	0	1	0	0	0	6	6	0	0	50	0	11	0	0	0	61	61
06:15	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	1	0	0	3	0	1	0	0	0	4	4	0	0	60	1	8	0	0	0	69	69
06:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	11	0	0	0	0	0	11	11	0	1	44	1	10	1	0	0	57	56.9
06:45	0	0	0	0	0	0	0	0	0	0	0	0	9	0	0	0	0	0	9	9	0	0	8	0	1	0	0	0	9	9	0	0	41	2	12	1	0	0	56	56.5
H/TOT	0	0	0	0	0	0	0	0	0	0	1	0	13	0	0	0	0	0	14	13.2	0	0	27	0	3	0	0	0	30	30	0	1	195	4	41	2	0	0	243	243.4
07:00	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	4	4	0	0	5	1	2	0	0	0	8	8	0	0	49	0	19	2	0	0	70	71
07:15	0	0	0	0	0	0	0	0	0	0	0	0	4	0	1	0	0	0	5	5	0	0	15	0	1	0	0	0	16	16	0	0	62	0	12	2	0	0	76	77
07:30	0	0	0	0	0	0	0	0	0	0	0	0	8	0	0	0	0	0	8	8	1	0	18	0	1	0	0	0	20	19.2	0	0	61	0	11	0	0	0	72	72
07:45	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	4	4	2	0	26	1	1	2	0	0	32	31.4	0	0	69	2	13	0	0	0	84	84
H/TOT	0	0	0	0	0	0	0	0	0	0	0	0	20	0	1	0	0	0	21	21	3	0	64	2	5	2	0	0	76	74.6	0	0	241	2	55	4	0	0	302	304
08:00	0	0	0	0	0	0	0	0	0	0	2	0	6	0	0	1	0	0	9	7.9	8	0	49	4	1	1	0	0	63	57.1	0	1	55	2	12	0	0	0	70	69.4
08:15	0	0	0	0	0	0	0	0	0	0	1	0	5	0	0	1	0	0	7	6.7	5	0	59	0	4	0	0	0	68	64	0	1	67	1	8	1	0	0	78	77.9
08:30	0	0	0	0	0	0	0	0	0	0	0	0	11	1	0	0	0	0	12	12	4	0	36	2	0	0	0	0	42	38.8	0	0	43	1	6	0	0	0	50	50
08:45	0	0	0	0	0	0	0	0	0	0	0	0	13	0	0	0	0	0	13	13	6	0	51	0	0	1	0	0	58	53.7	0	0	30	3	6	0	0	0	39	39
H/TOT	0	0	0	0	0	0	0	0	0	0	3	0	35	1	0	2	0	0	41	39.6	23	0	195	6	5	2	0	0	231	213.6	0	2	195	7	32	1	0	0	237	236.3
09:00	0	0	0	0	0	0	0	0	0	0	0	0	18	0	0	0	0	1	19	20	0	0	53	0	5	0	0	0	58	58	0	0	46	0	5	1	0	0	52	52.5
09:15	0	0	0	0	0	0	0	0	0	0	0	0	7	0	1	0	0	0	8	8	0	0	21	1	3	0	0	0	25	25	0	1	31	2	5	2	0	0	41	41.4
09:30	0	0	0	0	0	0	0	0	0	0	0	0	5	1	0	1	0	0	7	7.5	0	0	22	0	5	1	0	0	28	28.5	0	0	21	1	1	1	0	1	25	26.5
09:45	0	0	0	0	0	0	0	0	0	0	0	0	10	0	0	0	0	0	10	10	0	0	21	1	1	0	0	0	23	23	0	0	18	1	2	1	0	0	22	22.5
H/TOT	0	0	0	0	0	0	0	0	0	0	0	0	40	1	1	1	0	1	44	45.5	0	0	117	2	14	1	0	0	134	134.5	0	1	116	4	13	5	0	1	140	142.9
16:00	0	0	0	0	0	0	0	0	0	0	0	0	9	0	0	0	0	0	9	9	0	0	27	1	0	0	0	0	28	28	1	0	31	1	3	0	0	0	36	35.2
16:15	0	0	0	0	0	0	0	0	0	0	0	0	12	0	2	0	0	0	14	14	0	0	30	1	1	0	0	0	32	32	0	0	23	2	4	1	0	0	30	30.5
16:30	0	0	0	0	0	0	0	0	0	0	0	0	6	0	0	0	0	0	6	6	0	0	24	0	2	0	0	0	26	26	0	0	24	1	8	1	0	0	34	34.5
16:45	0	0	0	0	0	0	0	0	0	0	0	0	10	0	1	0	0	0	11	11	0	1	30	1	1	0	0	0	33	32.4	0	0	27	2	4	1	0	0	34	34.5
H/TOT	0	0	0	0	0	0	0	0	0	0	0	0	37	0	3	0	0	0	40	40	0	1	111	3	4	0	0	0	119	118.4	1	0	105	6	19	3	0	0	134	134.7
17:00	0	0	0	0	0	0	0	0	0	0	0	0	8	0	0	0	0	0	8	8	0	0	33	0	1	0	0	0	34	34	0	0	41	2	2	0	0	0	45	45
17:15	0	0	0	0	0	0	0	0	0	0	0	0	13	0	2	0	0	0	15	15	0	0	36	1	2	1	0	0	40	40.5	0	0	28	2	5	0	0	0	35	35
17:30	0	0	0	0	0	0	0	0	0	0	2	0	12	0	2	0	0	0	16	14.4	0	0	36	2	2	0	0	0	40	40	0	1	21	0	2	0	0	0	24	23.4
17:45	0	0	0	0	0	0	0	0	0	0	0	0	12	0	1	0	0	0	13	13	0	0	34	0	1	0	0	0	35	35	0	0	28	1	2	1	0	0	32	32.5
H/TOT	0	0	0	0	0	0	0	0	0	0	2	0	45	0	5	0	0	0	52	50.4	0	0	139	3	6	1	0	0	149	149.5	0	1	118	5	11	1	0	0	136	135.9
18:00	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	4	4	0	0	34	0	1	0	0	0	35	35	0	0	29	0	2	0	0	0	31	31
18:15	0	0	0	0	0	0	0	0	0	0	0	0	10	0	1	0	0	0	11	11	0	1	36	0	3	0	0	0	40	39.4	0	0	22	0	2	0	0	0	24	24
18:30	0	0	0	0	0	0	0	0	0	0	0	0	11	0	0	0	0	0	11	11	0	0	39	0	1	0	0	0	40	40	0	0	19	1	3	0	0	0	23	23
18:45	0	0	0	0	0	0	0	0	0	0	0	0	14	0	0	1	0	0	15	15.5	0	0	36	0	1	0	0	0	37	37	0	0	23	0	2	0	0	0	25	25
H/TOT	0	0	0	0	0	0	0	0	0	0	0	0	39	0	1	1	0	0	41	41.5	0	1	145	0	6	0	0	0	152	151.4	0	0	93	1	9	0	0	0	103	103
19:00	0	0	0	0	0	0	0	0	0	0	0	0	15	1	0	0	0	0	16	16	0	0	26	0	1	0	0	0	27	27	0	0	21	0	3	0	1	0	25	26.3
19:15	0	0	0	0	0	0	0	0	0	0	0	0	7	0	0	0	0	0	7	7	0	0	21	0	0	0	0	0	21	21	0	0	20	1	1	0	0	0	22	22
19:30	0	0	0	0	0	0	0	0	0	0	0	0	10	1	0	0	0	0	11	11	0	0	31	0	2	0	0	0	33	33	0	0	18	4	2	0	0	0	24	24
19:45	0	0	0	0	0	0	0	0	0	0	0	0	12	0	1	0	0	0	13	13	0	0	31	1	0	0	0	0	32	32	0	0	18	1	4	0	0	0	23	23
H/TOT	0	0	0	0	0	0	0	0	0	0	0	0	44	2	1	0	0	0	47	47	0	0	109	1	3	0	0	0	113	113	0	0	77	6	10	0	1	0	94	95.3
14 TOT	0	0	0	0	0	0	0	0	0	0	7	0	464	13	23	4	0	2	513	511.4	28	2	1610	39	79	18	0	0	1776	1761.4	2	6	1645	54	255	29	2	3	1996	2010.9

B => A										B => B										B => C										B => D									
P/C	M/C	CAR	TAXI	LGV	OGV1	OGV2	PSV	TOT	PCU	P/C	M/C	CAR	TAXI	LGV	OGV1	OGV2	PSV	TOT	PCU	P/C	M/C	CAR	TAXI	LGV	OGV1	OGV2	PSV	TOT	PCU	P/C	M/C	CAR	TAXI	LGV	OGV1	OGV2	PSV	TOT	PCU
0	0	1	0	2	0	0	0	3	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	27	0	5	1	0	0	33	33.5
0	0	1	0	0	1	0	0	2	2.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	37	0	9	0	0	0	47	46.4
0	0	2	0	0	0	0	0	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	35	0	7	0	0	0	43	42.4
0	0	2	0	1	1	0	0	4	4.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	2	0	0	41	2	6	2	0	0	51	52
0	0	6	0	3	2	0	0	11	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	2	0	2	140	2	27	3	0	0	174	174.3
0	0	1	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	43	0	13	1	0	0	61	58.7
0	0	2	0	0	0	0	0	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	50	0	10	0	0	1	61	62
0	0	4	0	1	0	0	0	5	5	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	2	3	5	0	0	46	0	8	1	0	0	55	55.5
0	0	5	0	0	0	0	0	5	5	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	1	0	0	51	0	7	1	1	1	61	63.8
0	0	12	0	1	0	0	0	13	13	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	2	4	6	2	2	190	0	38	3	1	2	238	240
0	0	8	0	1	1	0	0	10	10.5	0	0	0	0	0	0	0	0	0	0	0	0	7	0	0	0	0	0	7	7	0	1	78	1	10	5	0	0	95	96.9
0	0	13	1	1	0	0	0	15	15	0	0	0	0	0	0	0	0	0	0	0	0	3	1	0	0	0	0	4	4	0	1	61	0	7	4	0	0	73	74.4
0	0	11	0	1	0	0	0	12	12	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	2	3	0	0	63	3	7	0	0	1	74	75
0	0	25	1	0	0	0	0	26	26	0	0	0	0	0	0	0	0	0	0	0	0	13	0	0	0	0	5	18	23	0	0	42	1	5	0	0	1	49	50
0	0	57	2	3	1	0	0	63	63.5	0	0	0	0	0	0	0	0	0	0	0	0	23	2	0	0	0	6	31	37	0	2	244	5	29	9	0	2	291	296.3
0	0	27	0	0	0	0	0	27	27	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	3	3	0	0	50	0	9	3	0	0	62	63.5
0	0	16	0	0	0	0	0	16	16	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	1	0	1	54	1	6	1	0	0	63	62.9
0	0	5	1	2	0	0	0	8	8	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	2	3	0	0	33	0	2	1	1	0	37	38.8
0	0	11	0	0	1	0	0	12	12.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1	0	0	31	3	5	1	0	0	40	40.5
0	0	59	1	2	1	0	0	63	63.5	0	0	0	0	0	0	0	0	0	0	0	0	5	0	1	0	0	1	7	8	0	1	168	4	22	6	1	0	202	205.7
0	0	17	2	1	0	0	0	20	20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	43	3	7	1	0	2	56	58.5
0	0	10	0	1	0	0	0	11	11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	39	0	6	1	0	1	47	48.5
0	0	15	0	2	0	0	0	17	17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	46	1	8	0	0	0	55	55
0	0	13	0	1	0	0	0	14	14	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	2	3	1	0	44	0	4	5	0	0	54	55.7
0	0	55	2	5	0	0	0	62	62	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	2	3	1	0	172	4	25	7	0	3	212	217.7
0	0	12	0	1	1	0	0	14	14.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	2	0	0	40	2	9	0	0	0	51	51
0	0	15	0	2	0	0	0	17	17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	47	2	7	3	0	0	59	60.5
0	0	14	0	0	0	0	0	14	14	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	1	0	0	54	1	4	0	0	0	59	59
0	0	21	0	1	0	0	0	22	22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	2	3	5	0	0	44	0	1	3	0	1	49	51.5
0	0	62	0	4	1	0	0	67	67.5	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	3	5	8	0	0	185	5	21	6	0	1	218	222
0	1	27	0	0	0	0	0	28	27.4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	2	0	0	50	0	4	2	0	0	56	57
0	0	15	1	0	0	0	0	16	16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	34	1	2	1	0	0	38	38.5
0	1	19	0	0	0	0	0	20	19.4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	4	0	0	28	3	2	0	0	0	33	33
0	0	19	1	3	0	0	0	23	23	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	2	2	0	0	27	2	1	0	0	0	30	30
0	2	80	2	3	0	0	0	87	85.8	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	3	5	8	0	0	139	6	9	3	0	0	157	158.5
0	0	17	2	0	0	0	0	19	19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	21	0	2	0	0	0	23	23
0	0	17	1	1	0	0	0	19	19	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	3	3	0	0	35	0	1	0	0	0	36	36
0	0	21	0	0	0	0	0	21	21	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	41	0	1	0	0	0	42	42
0	0	17	0	0	0	0	0	17	17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	18	1	1	0	0	0	21	20.4
0	0	72	3	1	0	0	0	76	76	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	3	3	0	1	115	1	5	0	0	0	122	121.4
2	2	678	23	32	9	0	1	747	749.7	0	0	0	0	0	0	0	0	0	0	0	0	76	3	4	0	0	25	108	133	9	11	2084	69	283	62	8	14	2540	2581.6

C => A										C => B										C => C										C => D									
P/C	M/C	CAR	TAXI	LGV	OGV1	OGV2	PSV	TOT	PCU	P/C	M/C	CAR	TAXI	LGV	OGV1	OGV2	PSV	TOT	PCU	P/C	M/C	CAR	TAXI	LGV	OGV1	OGV2	PSV	TOT	PCU	P/C	M/C	CAR	TAXI	LGV	OGV1	OGV2	PSV	TOT	PCU
0	0	3	0	0	0	0	0	3	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	1	0	0	3	3.5
0	0	1	0	1	0	0	0	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1
0	0	1	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	3	0	0	0	5	5
0	0	5	0	0	0	0	0	5	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	4	4
0	0	10	0	1	0	0	0	11	11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	0	4	1	0	0	13	13.5
0	0	3	0	0	0	0	0	3	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	2	0	0	0	5	5
0	0	5	0	0	0	0	0	5	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	3	3
0	0	3	1	0	0	0	0	4	4	0	0	1	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	3	1	0	0	0	0	4	4
0	0	9	1	0	0	0	0	10	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9	0	2	1	0	0	12	12.5
0	0	20	2	0	0	0	0	22	22	0	0	1	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	18	1	4	1	0	0	24	24.5
0	0	18	0	1	2	0	0	21	22	0	0	3	0	0	0	0	0	3	3	0	0	0	0	0	0	0	0	0	0	0	0	19	0	2	0	0	0	21	21
0	0	46	0	1	0	0	0	47	47	0	0	10	1	0	0	0	0	11	11	0	0	0	0	0	0	0	0	0	0	0	0	23	0	1	0	0	0	24	24
0	0	46	0	0	0	0	0	46	46	0	0	3	0	1	0	0	0	4	4	0	0	0	0	0	0	0	0	0	0	0	0	20	0	0	0	0	0	20	20
0	0	53	1	6	0	0	0	60	60	0	0	15	0	0	0	0	0	15	15	0	0	0	0	0	0	0	0	0	0	0	0	17	0	0	0	0	1	18	19
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0	0	43	4	2	0	0	1	50	51	0	0	5	1	0	0	0	0	6	6	0	0	0	0	0	0	0	0	0	0	0	0	23	0	3	2	0	0	28	29
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D => A										D => B										D => C										D => D									
P/C	M/C	CAR	TAXI	LGV	OGV1	OGV2	PSV	TOT	PCU	P/C	M/C	CAR	TAXI	LGV	OGV1	OGV2	PSV	TOT	PCU	P/C	M/C	CAR	TAXI	LGV	OGV1	OGV2	PSV	TOT	PCU	P/C	M/C	CAR	TAXI	LGV	OGV1	OGV2	PSV	TOT	PCU
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0	0	11	0	0	0	0	0	11	11	0	0	4	0	3	0	0	0	7	7	0	0	1	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0
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0	0	26	0	1	0	0	0	27	27	0	0	34	1	7	1	0	0	43	43.5	0	0	2	0	1	1	0	0	4	4.5	0	0	0	0	0	0	0	0	0	0
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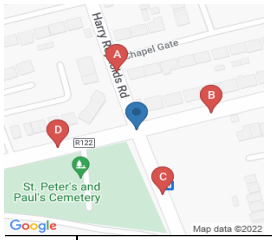
0	3	158	6	19	0	0	0	186	184.2	1	1	162	5	22	0	0	0	191	189.6	0	0	45	0	3	0	0	0	48	48	0	0	0	0	0	0	0	0	0	0
4	8	1606	57	240	35	2	6	1958	1976.1	11	8	2030	60	286	35	6	10	2446	2467.7	3	4	921	17	65	30	7	7	1054	1080.3	0	0	0	0	0	0	0	0	0	0



IDASO

Survey Name: HDR 22 080 Balbriggan
Site: Site 3
Location: Harry Reynolds Road/Chapel St
Date: Thu 31-Mar-2022

	A => A										A => B										A => C										A => D									
TIME	P/C	M/C	CAR	TAXI	LGV	OGV1	OGV2	PSV	TOT	PCU	P/C	M/C	CAR	TAXI	LGV	OGV1	OGV2	PSV	TOT	PCU	P/C	M/C	CAR	TAXI	LGV	OGV1	OGV2	PSV	TOT	PCU	P/C	M/C	CAR	TAXI	LGV	OGV1	OGV2	PSV	TOT	PCU
06:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	1	0	0	0	6	6	0	1	15	0	2	0	0	0	18	17.4
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H/TOT	0	0	0	0	0	0	0	0	0	0	0	0	6	0	0	0	0	0	6	6	0	0	43	1	4	0	0	0	48	48	0	1	83	1	13	1	0	0	99	98.9
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07:15	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	2	2	0	0	19	0	0	0	0	0	19	19	0	0	34	1	5	0	0	1	41	42
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H/TOT	0	0	0	0	0	0	0	0	0	0	0	0	17	0	1	0	0	0	18	18	0	0	102	2	7	0	0	0	111	111	0	0	130	2	21	2	0	1	156	158
08:00	0	0	0	0	0	0	0	0	0	0	1	0	7	0	0	0	0	0	8	7.2	16	0	58	0	4	0	0	1	79	67.2	1	0	64	2	5	1	0	0	73	72.7
08:15	0	0	0	0	0	0	0	0	0	0	0	0	14	0	0	0	0	0	14	14	6	0	47	2	1	1	0	0	57	52.7	0	1	49	1	2	0	0	1	54	54.4
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H/TOT	0	0	0	0	0	0	0	0	0	0	1	0	65	1	1	0	0	0	68	67.2	30	0	211	5	12	2	0	4	264	245	1	1	212	6	14	1	0	2	237	238.1
09:00	0	0	0	0	0	0	0	0	0	0	0	0	48	3	7	0	0	0	58	58	0	0	42	2	2	1	0	0	47	47.5	0	0	34	0	3	1	0	0	38	38.5
09:15	0	0	0	0	0	0	0	0	0	0	0	0	22	1	0	0	0	0	23	23	1	0	27	0	4	1	0	0	33	32.7	0	1	35	0	1	0	0	0	37	36.4
09:30	0	0	0	0	0	0	0	0	0	0	0	0	6	2	1	0	0	0	9	9	0	0	18	1	4	0	0	0	23	23	0	0	25	2	1	0	0	0	28	28
09:45	0	0	0	0	0	0	0	0	0	0	0	0	7	0	0	0	0	0	7	7	0	0	17	0	3	4	0	0	24	26	0	0	18	2	0	0	0	0	20	20
H/TOT	0	0	0	0	0	0	0	0	0	0	0	0	83	6	8	0	0	0	97	97	1	0	104	3	13	6	0	0	127	129.2	0	1	112	4	5	1	0	0	123	122.9
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16:15	0	0	0	0	0	0	0	0	0	0	0	0	5	1	1	0	0	0	7	7	1	0	29	2	4	1	0	1	38	38.7	0	0	35	0	4	1	0	0	40	40.5
16:30	0	0	0	0	0	0	0	0	0	0	0	0	8	0	1	1	0	0	10	10.5	0	0	20	1	4	0	0	0	25	25	0	0	25	0	4	1	0	0	30	30.5
16:45	0	0	0	0	0	0	0	0	0	0	0	0	7	0	1	0	0	0	8	8	0	0	28	3	1	0	0	0	32	32	0	0	31	0	3	0	0	0	34	34
H/TOT	0	0	0	0	0	0	0	0	0	0	0	0	30	1	4	1	0	0	36	36.5	1	0	97	6	10	1	0	1	116	116.7	0	0	115	0	17	2	0	0	134	135
17:00	0	0	0	0	0	0	0	0	0	0	0	0	6	1	0	0	0	0	7	7	0	0	24	0	3	0	0	0	27	27	0	0	20	3	2	0	0	0	25	25
17:15	0	0	0	0	0	0	0	0	0	0	0	0	12	0	0	0	0	0	12	12	0	0	31	0	3	0	0	0	34	34	0	0	29	1	4	1	0	0	35	35.5
17:30	0	0	0	0	0	0	0	0	0	0	0	0	12	0	0	0	0	0	12	12	1	1	22	0	1	0	0	0	25	23.6	0	0	40	0	1	0	0	0	41	41
17:45	0	0	0	0	0	0	0	0	0	0	0	0	15	1	0	0	0	0	16	16	1	0	28	3	1	0	0	0	33	32.2	0	0	24	0	1	1	0	0	26	26.5
H/TOT	0	0	0	0	0	0	0	0	0	0	0	0	45	2	0	0	0	0	47	47	2	1	105	3	8	0	0	0	119	116.8	0	0	113	4	8	2	0	0	127	128
18:00	0	0	0	0	0	0	0	0	0	0	0	0	14	0	0	0	0	0	14	14	0	0	14	0	2	1	0	0	17	17.5	0	0	26	1	3	1	0	0	31	31.5
18:15	0	0	0	0	0	0	0	0	0	0	0	0	8	1	1	0	0	0	10	10	0	1	25	1	3	0	0	0	30	29.4	0	0	37	0	1	0	0	0	38	38
18:30	0	0	0	0	0	0	0	0	0	0	0	0	8	0	1	0	0	0	9	9	2	0	16	1	3	0	0	0	22	20.4	0	2	21	2	1	1	0	0	27	26.3
18:45	0	0	0	0	0	0	0	0	0	0	0	0	12	0	0	0	0	0	12	12	1	0	30	0	0	0	0	0	31	30.2	0	0	25	1	0	1	0	0	27	27.5
H/TOT	0	0	0	0	0	0	0	0	0	0	0	0	42	1	2	0	0	0	45	45	3	1	85	2	8	1	0	0	100	97.5	0	2	109	4	5	3	0	0	123	123.3
19:00	0	0	0	0	0	0	0	0	0	0	0	0	8	0	1	0	0	0	9	9	0	0	17	0	1	0	0	0	18	18	0	0	31	0	2	0	0	0	33	33
19:15	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0	5	5	2	0	17	1	2	0	0	0	22	20.4	0	0	28	0	0	0	0	0	28	28
19:30	0	0	0	0	0	0	0	0	0	0	0	0	6	0	1	0	0	0	7	7	0	0	18	0	0	0	0	0	18	18	0	0	25	0	2	0	0	0	27	27
19:45	0	0	0	0	0	0	0	0	0	0	0	0	7	0	0	0	0	0	7	7	0	0	24	0	1	0	0	0	25	25	1	1	15	0	0	0	0	0	17	15.6
H/TOT	0	0	0	0	0	0	0	0	0	0	0	0	26	0	2	0	0	0	28	28	2	0	76	1	4	0	0	0	83	81.4	1	1	99	0	4	0	0	0	105	103.6
14 TOT	0	0	0	0	0	0	0	0	0	0	1	0	511	19	33	2	0	1	567	568.2	44	4	1363	44	122	30	0	8	1615	1600.4	3	8	1515	45	149	26	1	7	1754	1768.1

B => A										B => B										B => C										B => D									
P/C	M/C	CAR	TAXI	LGV	OGV1	OGV2	PSV	TOT	PCU	P/C	M/C	CAR	TAXI	LGV	OGV1	OGV2	PSV	TOT	PCU	P/C	M/C	CAR	TAXI	LGV	OGV1	OGV2	PSV	TOT	PCU	P/C	M/C	CAR	TAXI	LGV	OGV1	OGV2	PSV	TOT	PCU
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12	1	3	1	0	0	17	17.5
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	11	0	4	0	0	0	16	15.2
0	0	1	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	1	0	0	12	1	4	0	0	0	17	17
0	0	0	0	1	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0.2	0	1	12	0	3	0	0	0	16	15.4
0	0	1	0	1	0	0	0	2	2	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	2	1.2	1	1	47	2	14	1	0	0	66	65.1
0	0	2	0	0	0	0	0	2	2	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	1	1	0	12	0	1	1	0	0	15	14.7
0	0	2	0	0	0	0	0	2	2	0	0	0	0	0	0	0	0	0	0	0	0	2	0	1	0	0	0	3	3	0	0	12	1	1	0	0	0	14	14
0	0	1	0	1	0	0	0	2	2	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	4	4	0	0	19	2	1	0	0	0	22	22
0	0	1	1	0	0	0	0	2	2	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	3	3	0	0	28	0	2	0	0	0	30	30
0	0	6	1	1	0	0	0	8	8	0	0	0	0	0	0	0	0	0	0	0	0	10	0	1	0	0	0	11	11	1	0	71	3	5	1	0	0	81	80.7
0	0	1	1	0	0	0	0	2	2	0	0	0	0	0	0	0	0	0	0	0	0	2	0	1	0	0	0	3	3	0	0	24	1	5	0	0	0	30	30
0	0	3	0	0	1	0	0	4	4.5	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	3	3	2	0	21	1	5	1	0	0	30	28.9
0	0	2	0	0	0	0	0	2	2	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	3	3	0	0	33	4	2	0	0	0	39	39
0	0	8	0	3	0	0	0	11	11	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	1	0	0	38	0	0	0	0	1	39	40
0	0	14	1	3	1	0	0	19	19.5	0	0	0	0	0	0	0	0	0	0	0	0	9	0	1	0	0	0	10	10	2	0	116	6	12	1	0	1	138	137.9
0	0	16	2	1	0	0	0	19	19	0	0	0	0	0	0	0	0	0	0	0	0	8	1	2	0	0	0	11	11	0	0	48	2	2	0	0	0	52	52
0	0	21	0	0	0	0	0	21	21	0	0	0	0	0	0	0	0	0	0	0	0	5	0	1	0	0	0	6	6	0	0	51	0	4	1	0	0	56	56.5
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0	0	41	3	2	0	0	0	46	46	0	0	0	0	0	0	0	0	0	0	0	0	25	2	3	0	0	0	30	30	0	0	136	3	12	1	0	0	152	152.5
0	0	8	2	1	0	0	0	11	11	0	0	0	0	0	0	0	0	0	0	0	0	7	0	0	0	0	0	7	7	0	0	26	3	4	0	0	2	35	37
0	0	6	0	0	1	0	0	7	7.5	0	0	0	0	0	0	0	0	0	0	0	0	3	0	4	0	0	0	7	7	1	0	29	0	2	0	0	0	32	31.2
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0	0	27	2	4	1	0	0	34	34.5	0	0	0	0	0	0	0	0	0	0	0	0	12	0	4	0	0	0	16	16	1	0	120	4	13	0	0	2	140	141.2
0	0	9	1	1	0	0	0	11	11	0	0	0	0	0	0	0	0	0	0	0	0	4	0	1	0	0	0	5	5	0	0	31	1	3	0	0	0	35	35
0	0	9	0	1	0	0	0	10	10	0	0	0	0	0	0	0	0	0	0	0	0	8	0	1	0	0	0	9	9	2	0	21	0	0	0	0	0	23	21.4
0	0	11	0	1	0	0	0	12	12	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	2	2	0	0	40	0	1	0	0	0	41	41
1	0	7	0	0	0	0	0	8	7.2	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	4	4	0	0	25	0	1	0	0	1	27	28
1	0	36	1	3	0	0	0	41	40.2	0	0	0	0	0	0	0	0	0	0	0	0	18	0	2	0	0	0	20	20	2	0	117	1	5	0	0	1	126	125.4
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0	0	8	0	0	0	0	0	8	8	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	4	4	0	0	24	0	1	0	0	0	25	25
0	0	5	0	0	0	0	0	5	5	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	2	2	0	0	16	0	0	0	0	0	16	16
0	0	8	0	0	0	0	0	8	8	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	2	2	2	0	21	2	4	0	0	0	29	27.4
0	0	36	0	0	0	0	0	36	36	0	0	0	0	0	0	0	0	0	0	0	0	10	0	1	0	0	0	11	11	2	0	93	3	6	0	0	0	104	102.4
0	0	4	0	1	0	0	0	5	5	0	0	0	0	0	0	0	0	0	0	1	0	6	0	0	0	0	0	7	6.2	1	0	21	0	0	0	0	0	22	21.2
0	0	12	1	1	0	0	0	14	14	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	2	2	1	0	23	0	1	0	0	0	25	24.2
0	0	5	0	1	0	0	0	6	6	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	2	2	0	0	24	0	0	0	0	0	24	24
0	0	2	0	0	0	0	0	2	2	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	3	3	0	0	15	1	0	0	0	0	16	16
0	0	23	1	3	0	0	0	27	27	0	0	0	0	0	0	0	0	0	0	1	0	11	0	2	0	0	0	14	13.2	2	0	83	1	1	0	0	0	87	85.4
2	0	334	13	28	2	0	0	379	378.4	0	0	0	0	0	0	0	0	0	0	3	0	191	4	22	3	0	0	223	222.1	14	1	1307	55	121	5	0	7	1510	1507.7

C => A										C => B										C => C										C => D									
P/C	M/C	CAR	TAXI	LGV	OGV1	OGV2	PSV	TOT	PCU	P/C	M/C	CAR	TAXI	LGV	OGV1	OGV2	PSV	TOT	PCU	P/C	M/C	CAR	TAXI	LGV	OGV1	OGV2	PSV	TOT	PCU	P/C	M/C	CAR	TAXI	LGV	OGV1	OGV2	PSV	TOT	PCU
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	2	2.5
0	0	1	0	1	0	0	0	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	2	2
0	0	2	0	0	0	0	0	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	1
0	0	3	0	2	0	0	0	5	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	1	3	4
0	0	6	0	3	0	0	0	9	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	1	1	0	1	8	9.5
0	0	1	0	2	1	0	0	4	4.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1
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0	0	26	1	3	0	0	0	30	30	0	0	2	0	0	0	0	0	2	2	0	0	0	0	0	0	0	0	0	0	0	0	5	0	2	0	0	0	7	7
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0	1	112	3	5	0	1	0	122	122.7	0	0	16	1	1	0	0	0	18	18	0	0	0	0	0	0	0	0	0	0	0	0	20	1	5	0	0	3	29	32
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1	1	33	0	4	0	0	0	39	37.6	0	0	2	0	0	0	0	0	2	2	0	0	0	0	0	0	0	0	0	0	1	0	12	0	1	0	0	1	15	15.2
2	1	143	0	15	1	0	1	163	162.3	0	0	14	0	3	0	0	0	17	17	0	0	0	0	0	0	0	0	0	0	1	0	33	0	1	1	0	1	37	37.7
1	0	55	1	4	0	0	0	61	60.2	0	0	3	0	2	0	0	0	5	5	0	0	0	0	0	0	0	0	0	0	0	0	15	0	3	0	0	1	19	20
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1	0	39	0	1	1	0	0	42	41.7	0	0	2	0	1	0	0	0	3	3	0	0	0	0	0	0	0	0	0	0	0	0	6	0	0	0	0	0	6	6
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2	0	189	3	10	1	0	0	205	203.9	0	0	14	2	5	0	0	0	21	21	0	0	0	0	0	0	0	0	0	0	0	0	49	2	5	0	0	2	58	60
0	1	29	0	3	1	0	0	34	33.9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	14	0	1	0	0	1	16	17
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APPENDIX 12.3

DMURS COMPLIANCE REPORT

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DMURS Compliance Statement

November 2023

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DOCUMENT CONTROL SHEET

	Client	Dean Swift Property Holdings							
	Project Title	Malincross Housing Development							
	Project Ref.	191004							
	Document Title	DMURS Compliance Statement							
	Document No.	191004-DMURS							
	This Document Comprises	DCS	TOC	LOT	LOG	LOF	LOD	Text	Appendices
		1	1	-	-	-	-	21	0
	Check								

Revision	Status	Author	Reviewed By	Approved By	Issue Dates
D01	Draft	BJC	MJP	MJP	07.12.2022
F01	Final	BJC	MJP	MJP	09.12.2022
F02	Final	BJC	MJP	MJP	30.06.2023
F03	**Final**	**BJC**	**MJP**	**MJP**	**20.11.2023**

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1.0 INTRODUCTION

1.1 Overview

1.1.1 MPA Consulting Engineers has been engaged by Dean Swift Property Holdings (DSPH), to prepare a DMURS Compliance Statement for a proposed Housing Development, at northwest Balbriggan, County Dublin.

1.1.2 This Statement verifies that the development and accompanying street network has been designed appropriately and in accordance with the recommendations set out in the Design Manual for Urban Roads and Streets (DMURS) 2019.

1.2 Proposed Development

1.2.1 The Masterplan is envisaged to deliver a total of 564 dwellings split between 378 houses, 84 duplex dwellings, 102 apartments and two five-classroom creches across four phases as set out in **Table 1.1** below.

1.2.2 There will be five Character Areas (CA) within the scheme as set out in the architect design statement.

Phase	Houses	Duplexes	Apartments	Total
1	124	30	42	196
2	71	18	14	103
3	84	24	20	128
4	99	12	26	137
Total	**378**	**84**	**102**	**564**

Table 1.1: Proposed Phasing of The Malincross Masterplan

1.2.3 The site is shown in **Figure 1.1** overleaf.

1.2.4 The proposed site layout is designed to accommodate the movement of people and provide a high priority on meeting the needs of pedestrians and cyclists so that growth in these modes of travel is encouraged.

1.2.5 The proposed scheme incorporates the specific design features with the objective of delivering a design that is in full compliance with DMURS.



FIGURE 1.1: MALINCROSS SITE LOCATION

1.3 Proposed Access

1.3.1 The access to the development will be from an extension of the under-construction Boulevard Road and existing Hamlet Lane as well as Flemington Lane and via Taylor Hill as per shown in **Figure 1.2**.

1.3.2 The development will also facilitate part of the Flemington Link Road by allowing for future road connections to R122 Naul Road to the south of the site. This future connection point is also shown in **Figure 1.2** and in accordance with the Fingal County Council Development Plan Objective.

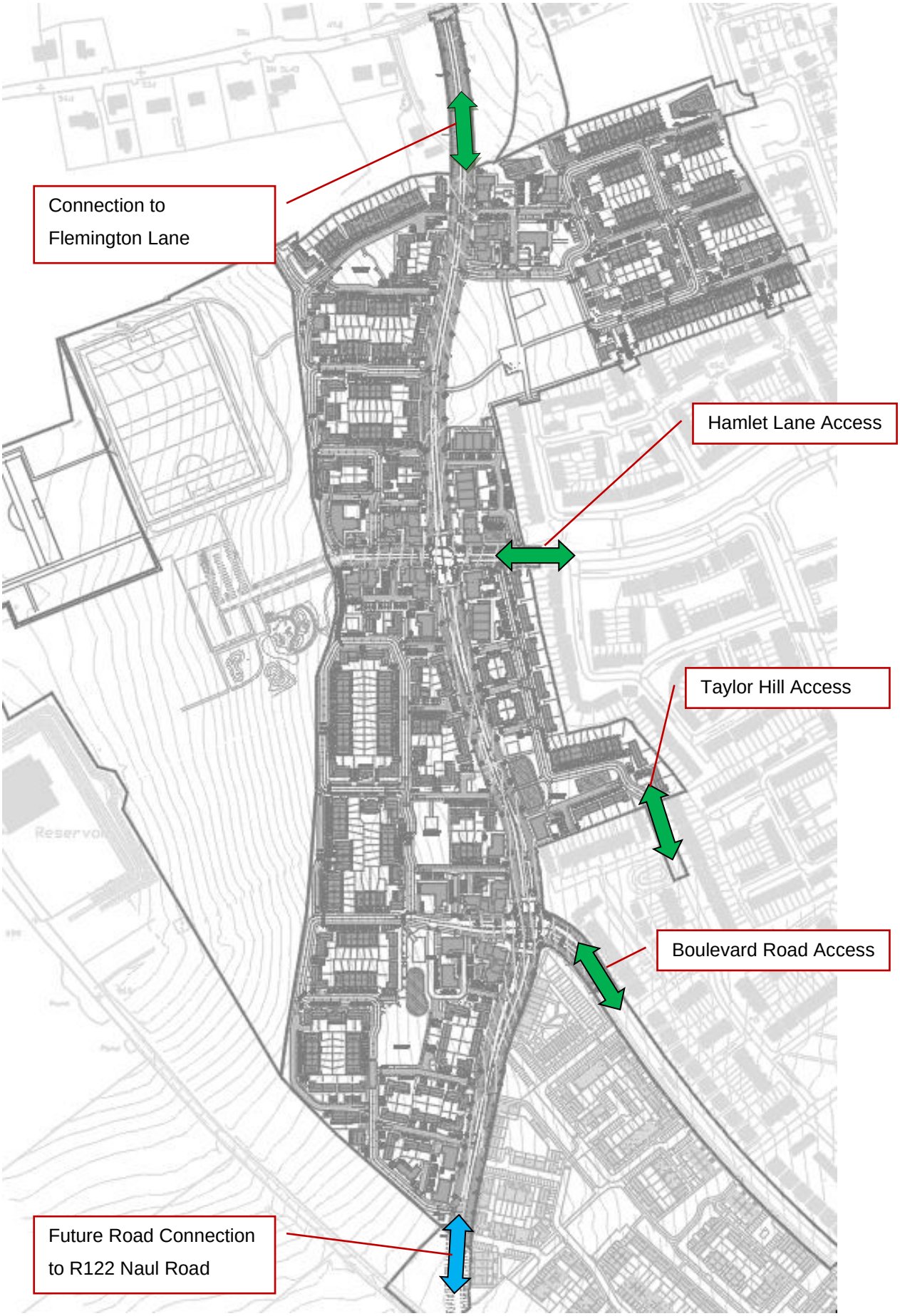


FIGURE 1.2 SITE LAYOUT AND ACCESS LOCATIONS

2.0 DESIGN PARAMETERS AND DEVELOPMENT COMPLIANCE

2.1 Overview

2.1.1 The proposed design is in accordance with the four core principles (DMURS 2019) outlined below:

Design Principle 1:

- To support the creation of integrated street networks which promote higher levels of permeability and legibility for all users, and in particular more sustainable forms of transport.

Design Principle 2:

- The promotion of multi-functional, place-based streets that balance the needs of all users within a self-regulating environment.

Design Principle 3:

- The quality of the street is measured by the quality of the pedestrian environment.

Design Principle 4:

- Greater communication and co-operation between design professionals through the promotion of a plan-led, multidisciplinary approach to design.

2.2 Strategy

2.2.1 The strategy for the proposed development maximizes connectivity between key local destinations through the provision of a high degree of permeability and legibility for all network users particularly for sustainable forms of travel.

2.2.2 The primary accesses for the subject site will be via extensions of the existing Boulevard Road and Hamlet Lane and the existing estate access in Taylor Hill Phase 2 which connect to adjacent residential areas as well as nearby local centres and schools. The proposed development allows the completion of the Flemington Link Road, otherwise known as the Balbriggan 'C' ring road.

2.2.3 The proposed design incorporates shared surfaces and homezones through the development.

2.2.4 The proposed links and connections in and around the site including links to the new Park to the west and the surrounding residential development to the east and south are shown below in **Figure 2.1** which indicates how they will be delivered with each phase of the development.

2.2.5 These links and connections include 7 no. links along the west boundary (3 no. to the existing park and 4 no. to the future park), and 12 no. links along the east boundary to various existing and proposed housing estates.

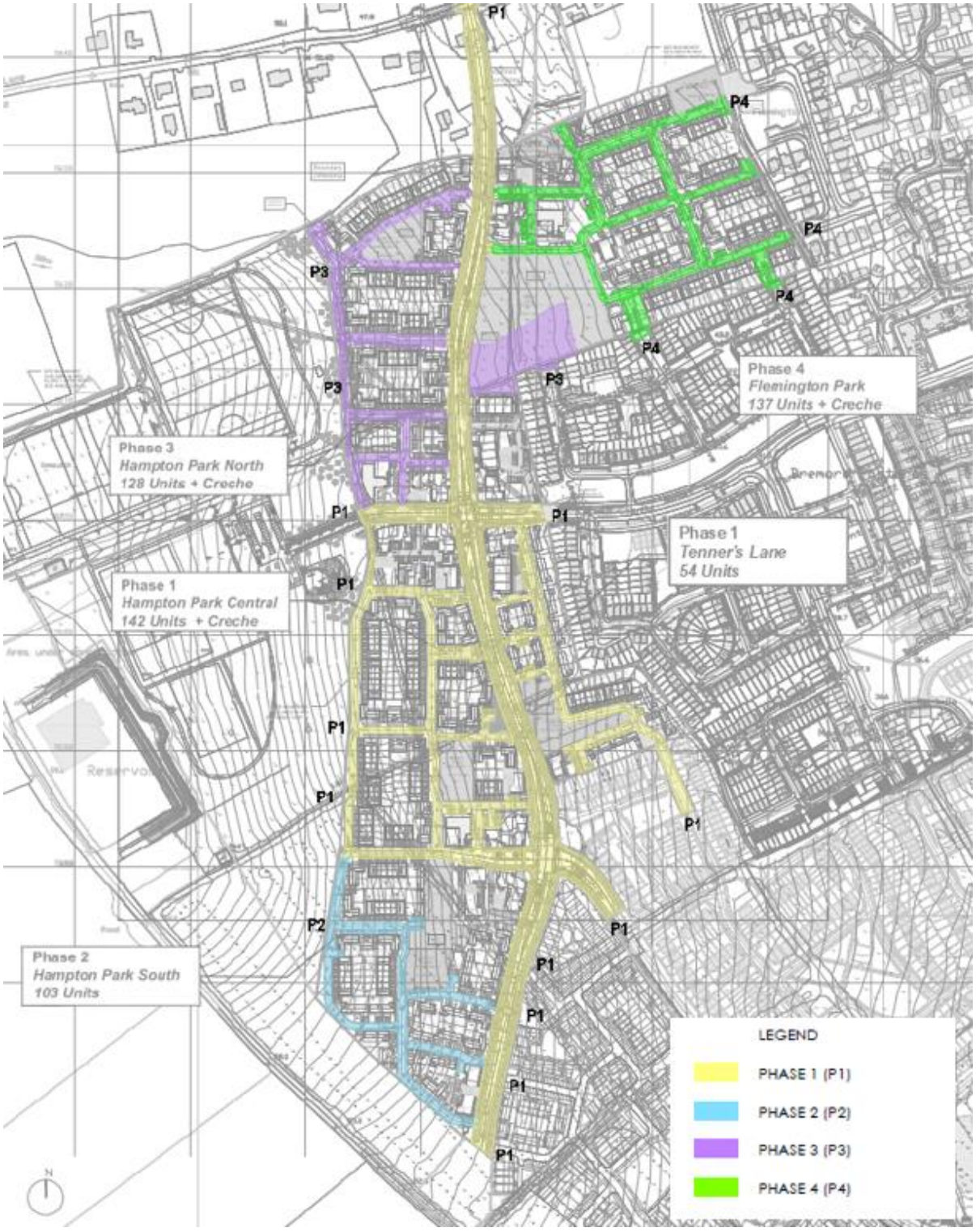


FIGURE 2.1 PROPOSED LINKS AND CONNECTIONS

3.0 DMURS DESIGN ELEMENTS

3.1 Movement Function

3.1.1 The internal road network has been designed to deliver security to future pedestrians and cyclists, offering local streets with footpaths, shared surfaces, ramps and homezones. The movement function of each of the internal local streets has sought to respect the different levels of motorised traffic whilst catering for a higher number of pedestrians and cyclists. Ramps and plazas have been provided on the site which enhances pedestrian safety by slowing traffic and making the car subservient to the pedestrian and cyclist. See **Figure 3.1** for details.

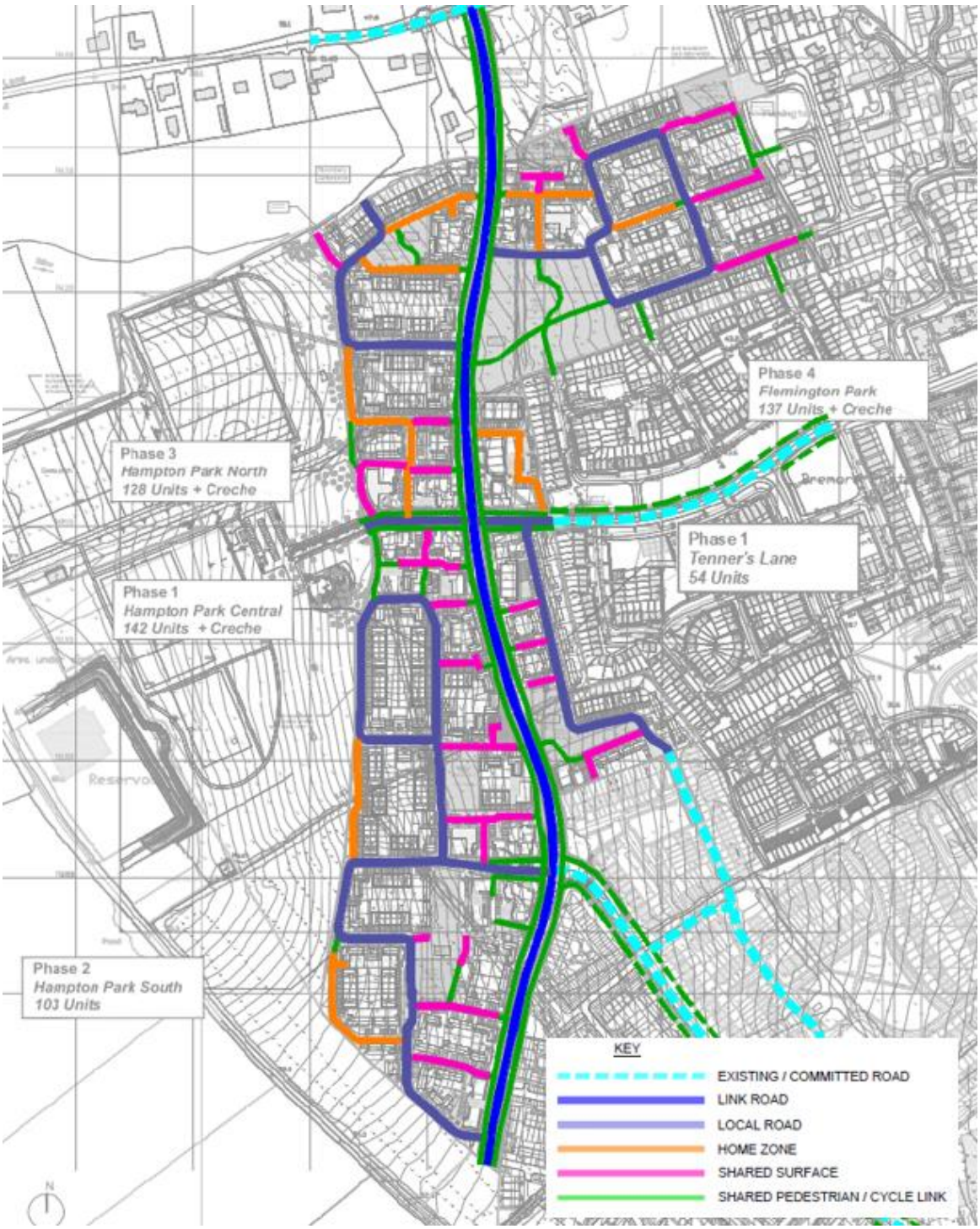


FIGURE 3.1: ROAD HIERARCHY

3.2 Block Sizes

3.2.1 DMURS states that “block dimension of 60-80m is optimal for pedestrian movement and will sustain a variety of building types”. This has primarily been achieved throughout the site.

3.2.2 In relation to the larger blocks DMURS states “A block dimension of up to 100m will enable a reasonable level of permeability for pedestrians and may also be used in Neighbourhoods and Suburbs”. This allows for an increase in the block dimensions.

3.2.3 The block sizes are shown in **Figure 3.3** below.

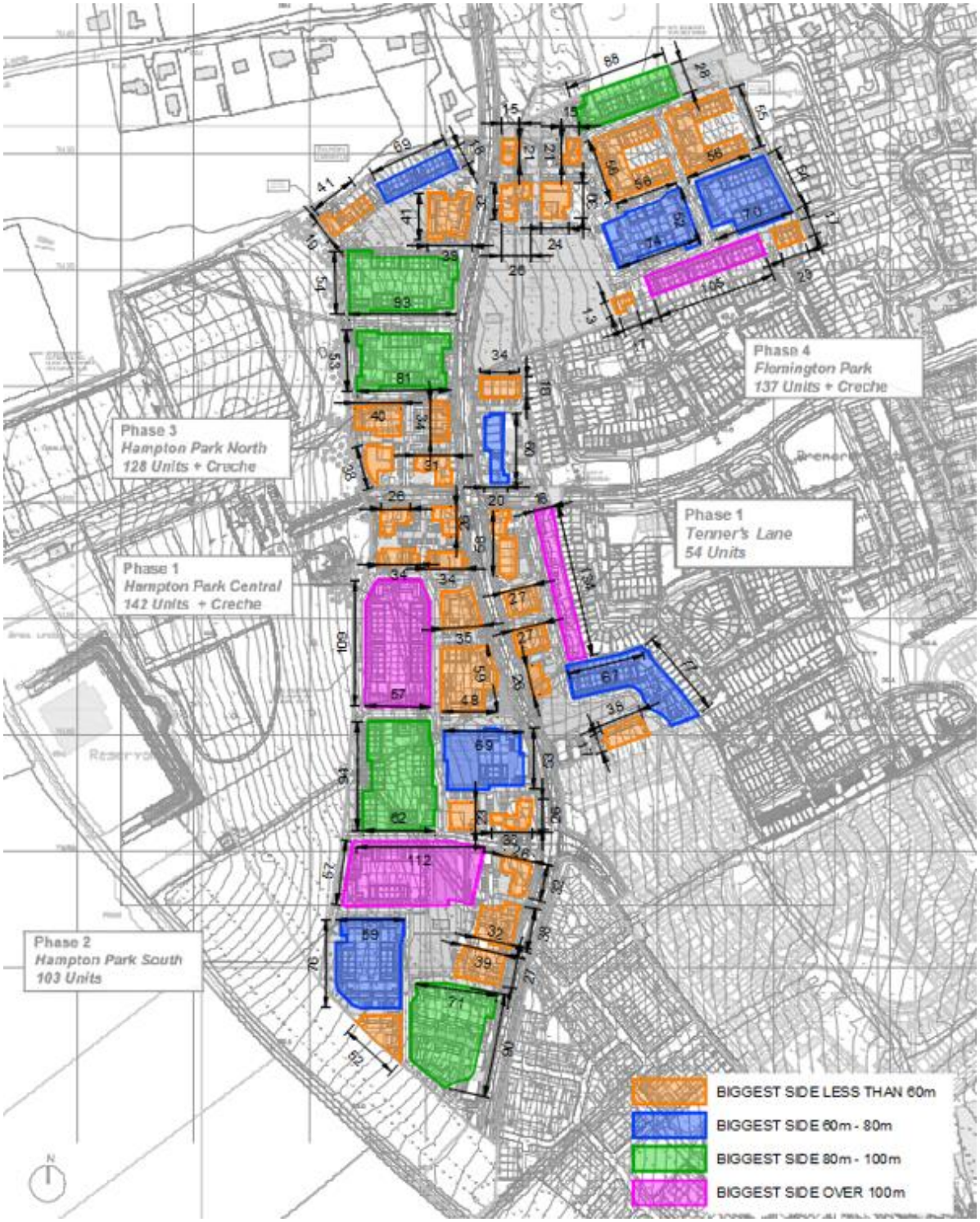


FIGURE 3.2: BLOCK SIZES

3.2.4 There are four instances where the proposed block size is greater than 100m. Two of these are located along the boundary of the development site and coincide with the existing built form adjoining the site.

3.2.5 For the other two instances of blocks have a frontage that is longer than 100m, to reduce the visual impact these blocks have been stepped.

3.3 Place Function

3.3.1 The proposed design approach successfully achieves the appropriate balance between the functional requirements of different network users whilst enhancing a sense of place for the development as a whole and maintaining diverse character areas. The proposed character areas are shown in **Figure 3.3** below

3.3.2 This character for each area has been achieved by the Design Team through:

- Local distinctiveness;
- Visual quality through different street types and house types; and
- Tendency to encourage social activity and informal play through green areas and public spaces.

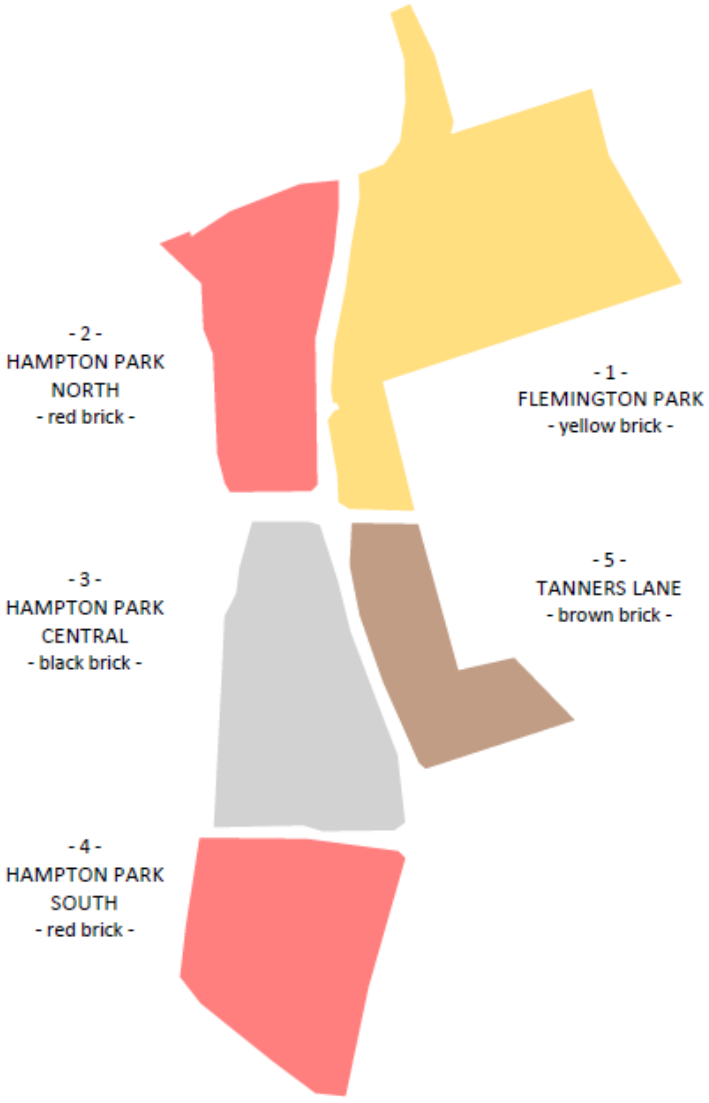


FIGURE 3.3: DEVELOPMENT CHARACTER AREAS

3.3.3 Further details regarding character areas are set out in the architectural design statement.

3.4 Street Layout

3.4.1 The main road through the site will eventually form part of the Flemington Link Road (FLR) and has been designed as such with signalised junctions with the main roads into the site, namely, Boulevard Road and Hamlet Lane. When the full FLR is completed in the future, this would be considered an Arterial Street based on through traffic movements.

3.4.2 The Link Road includes Bus Stop provision including laybys and shelters. This will facilitate the extension of existing bus services within Balbriggan to serve the development site (Refer to the Traffic and Transport Assessment Report for details).

3.4.3 Away from the Link Road, the roads have been designed as self-regulating streets, that is streets that do not require traffic lights and actively manages movement by offering nodal and route choices in a low-speed high-quality residential environment.

3.4.4 The proposed road layout is shown on drawings numbers 191004-C-002 and 191004-C-003 and its road sections on drawing number 191004-C-034.

3.4.5 Roads are to be constructed either as single or double camber of 1:40 falling to kerbs or proposed swales and tree-pits which will provide surface water treatment in addition to permeable paving and filter drain. Road gullies spaced to ensure that the max area drained is 180m², and double gullies with separate connections are provided at all low points.

3.4.6 All vertical gradients range from 1 in 200 to 1 in 13.25 slope (0.5% - 7.55%), refer to drawings numbers 191004-C-010 to 191004-C-013 for link road longitudinal sections, this is in line with DMURS standards for steep / hilly sites as we have here.

3.4.7 Pedestrian and Cycle Connections have been maximized throughout the site to promote a street network that is walkable, easily navigated and well connected. The use of vehicle cul-de-sacs has been implemented across the site and where possible pedestrian and cycle links have been provided at the end of the cul-de-sacs to provide permeability through the site.

3.5 Streetscape

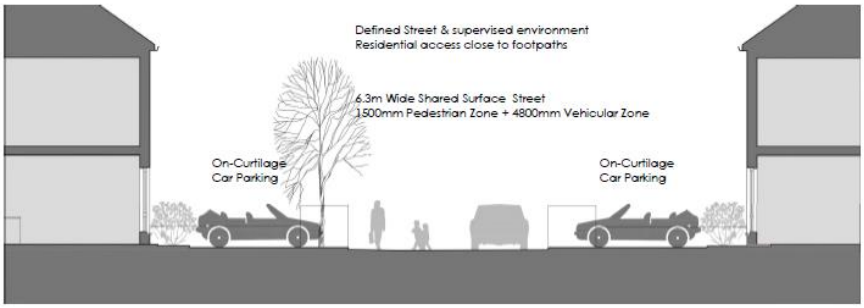
Building Height and Street Width

3.5.1 The new link road is designed as an arterial street which creates a sense of enclosure by working within the DMURS recommended ratios for building height to street width of 1:2 for strong and 1:3 for moderate enclosure supplemented by the use of street trees in the verges planted in continuous rows along the street edges.

3.5.2 Details of the street cross sections are shown below in **Figure 3.4** and detailed in the architectural design statement.

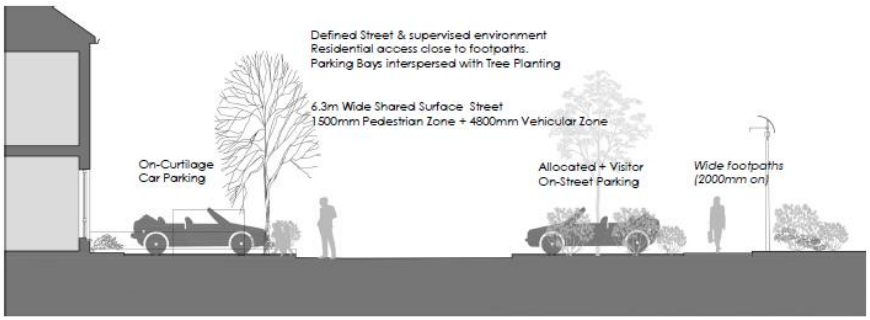
3.5.3 In areas of the site where there are archaeological constraints buildings on both sides of the street are not possible. In these areas the sense of urban street enclosure will be achieved by the use of tree planting as set out in the landscape architects designs.





Street Type 1
Shared Surface Street with On-Curtilage Car Parking





Street Type 2
Shared Surface Street with On-Curtilage Car Parking and On-Street Allocated / Visitor Parking.





Access Road Type 3
5.5m Access Road with 2.0m Wide Footpath on either Side .





Access Road Type 4
5.5m Access Road with 2.0m Wide Footpath on either Side .

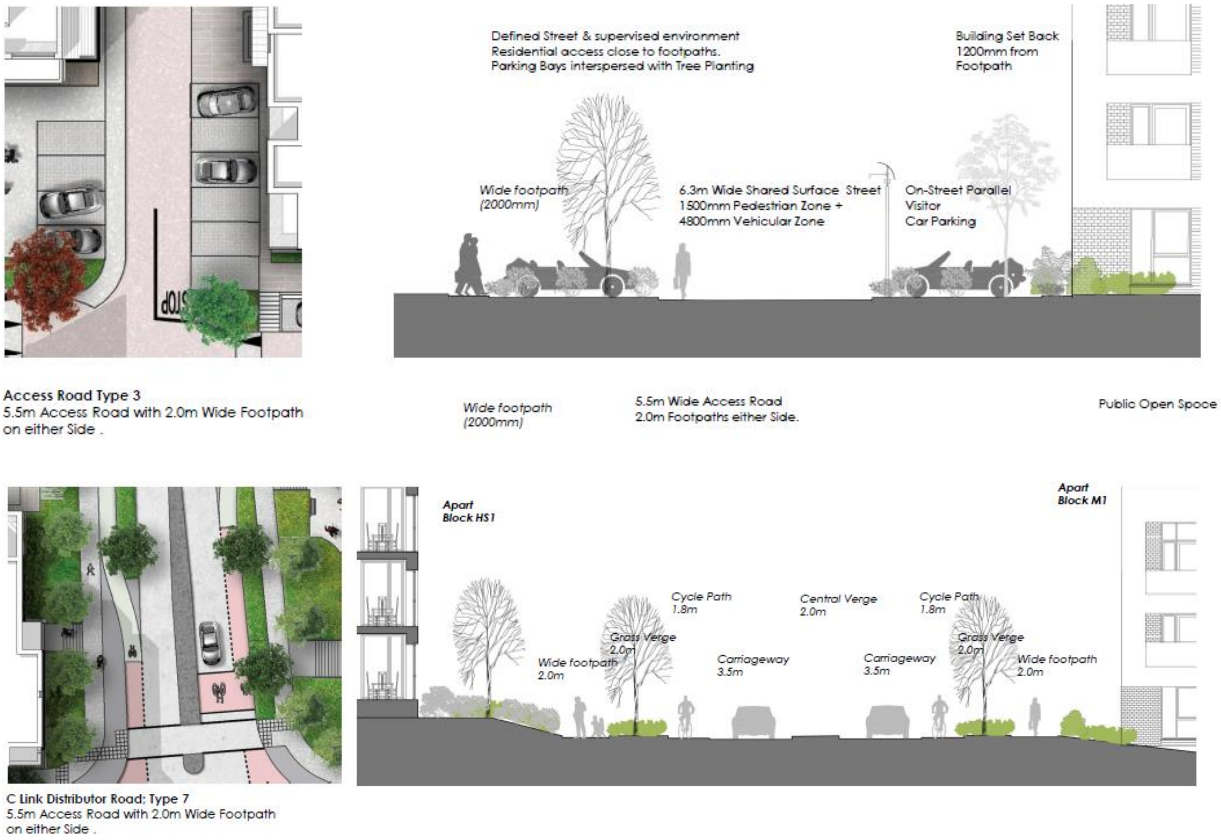


FIGURE 3.4 – STREET RATIOS

Enclosure

3.5.4 A sense of enclosure is provided along the new street with buildings fronting onto the street where feasible and well over 75% of the new street edge is enclosed by buildings which in conjunction with the height to width ratio and the use of street trees will provide a sense of a human scale urban environment where the car must respect the pedestrian and cycling priority.

Active Edge

3.5.5 As set out in DMURS an active frontage to the street edge enlivens the street creating a more interesting and engaging environment. In this scheme the design creates and active frontage through the positioning of entrances to dwellings, apartments and communal buildings along the street edge, see **Figure 3.5** below for details of how the design enhances the street edge by bringing the front door closer to the footpath and providing on-street car parking.

3.6 Street Trees

3.6.1 Street trees and planting are being used throughout the scheme to help define the street enclosure and also to break up parking areas with landscape features.

3.6.2 DMURS recommends that street trees be provided at max 14-20m to be effective, in this case street trees are being provided at approximately 12m centres along the street, details showing the use of street trees and planting can be seen in **Figure 3.5, Figure 3.6** and **Figure 3.7** below. Further details of the proposed trees are provided in the landscape architects pack.



FIGURE 3.5 – STREET ENCLOSURE & ACTIVE EDGE





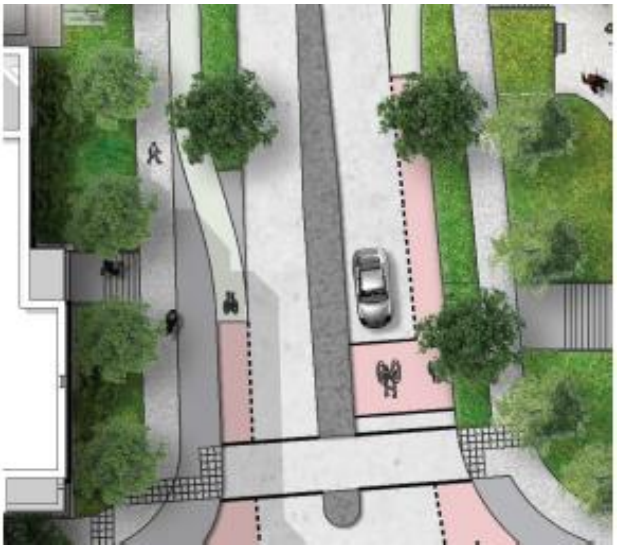


FIGURE 3.6 – STREET TREES AND PLANTING



FIGURE 3.7 – STREET TREES IN SHARED SURFACE STREETS

3.7 Wayfinding, Permeability and Legibility

3.7.1 Wayfinding, or legibility, relates to how people can find their way around an area. For pedestrians and cyclists this is of particular importance as they are more likely to move through an area if the route is clear.

3.7.2 The proposed design is based on filtered permeability network layout which allows pedestrian and cyclists through access on the cul-de-sacs, maximising the number of walkable and cyclable routes between destinations.

3.7.3 The Link Road provides the main north-south route through the development. The proposed orthogonal streets network adjacent to the Link Road provides legible and connected street design. Pedestrian and cycle access is provided between development blocks as shown in the Road Hierarchy plan in **Figure 3.1**.

3.7.4 Whilst future residents will become accustomed to the development layout, appropriate pedestrian and cycle signage will be provided at key intersections to improve wayfinding for visitors and through

traffic after the FLR has been completed.

3.8 Traffic Calming

3.8.1 The design concept for the traffic calming followed the recommendations in the "Design Manual for Urban Roads and Streets". The Link Road has been designed with a carriageway width of 6.5m.

3.8.2 The local roads within the development have been designed for a road width of 5.0m and 5.5m with separate footpath of 2m and cul-de-sacs / shared space of 6.3m (4.8m + 1.5m pedestrian buffer / services strip) are also included. Corner radii from 3.0m to 4.5m are used. The reduced corner radius ensures that crossing points are located closer to corners on pedestrian desire lines. This has been in accordance with section 4.3.3 of the DMURS manual.

3.8.3 Other traffic calming features include speed reducing bends, pinch-points along straight sections of road, chicanes, signal controlled crossings and raised table junctions. Along the Link Road, signal controlled junctions and signal controlled crossings are included.

3.8.4 The design speed in the proposed development is 30km/h with the homezones proposed at 15km/h. At the transition points to the homezones ramps and coloured macadam will be provided to differentiate from the local road to the homezone.

3.8.5 The locations of traffic calming features are shown in **Figure 3.7**.

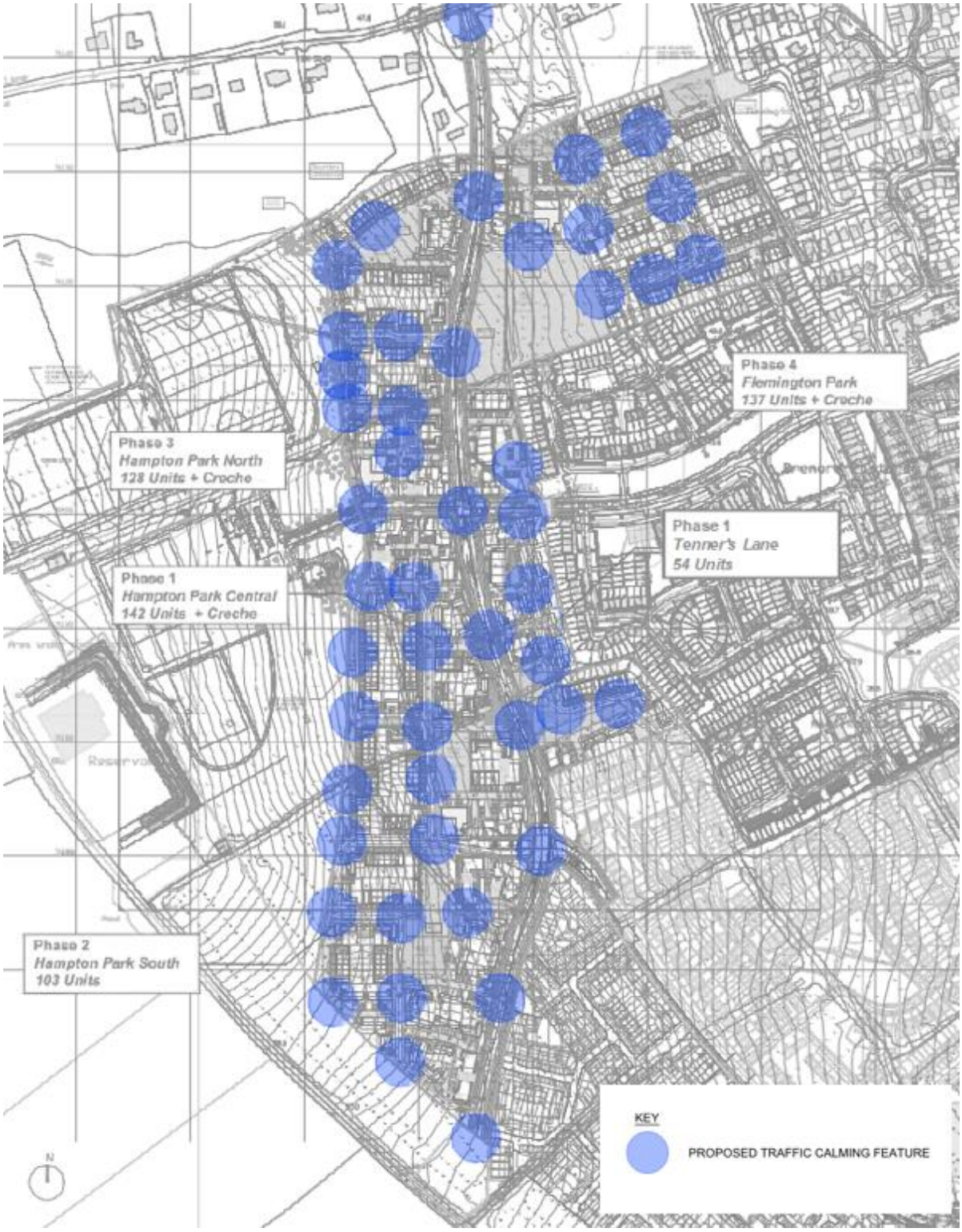


FIGURE 3.7: LOCATION OF TRAFFIC CALMING FEATURES

3.9 Signage and Line Marking

3.9.1 The proposed design has sought to specify minimal signage and line markings along the internal local streets with such treatments used sensitively throughout the development and only provided on the drawings where required.

3.10 Materials and Finish

3.10.1 Different materials have been used throughout the site for demarcation of different street layouts. The materials used will take the form of coloured macadam for the homezones, ramps and raised tables. Refer to the *Landscape proposals for Residential Development* report prepared by IS Design for details of the proposed materials.

3.11 Footways

3.11.1 Footpath construction in all housing estate developments will be of in-situ concrete construction or other approved surfaces in accordance with the requirements set out in Design Manual for Urban Roads and Streets (2019).

3.11.2 Footpaths widths through the development are minimum 2.0m which is above the 1.8m quoted in DMURS. Gradients on the internal footpaths do not exceed 1 in 13.25 (7.55%) which is in line with DMURS standards for steep sites as we have here.

3.12 Pedestrian Crossing

3.12.1 All informal pedestrian crossing facilities are at least 2.0m wide. Pedestrian connectivity and safety are paramount in the design. This has been addressed through the use of a number of pedestrian routes. Drop kerbs are provided to facilitate the migration of pedestrians across internal roadways. Tactile paving is also being provided.

3.13 Corner Radii

3.13.1 With the objective of encouraging low vehicle speeds and maximizing pedestrian safety and convenience, corner radii at local nodes have been generally specified as 3.0m and 4.5m as per DMURS guidance.

3.14 Cycle Facilities

3.14.1 Cycle facilities have been incorporated into the development in accordance with the National Cycle Manual including the provision of cycle protected junctions and cycle continuity along the link road in the form of footpath cross over junctions. Refer to **Figure 3.8 – 3.11** for details.

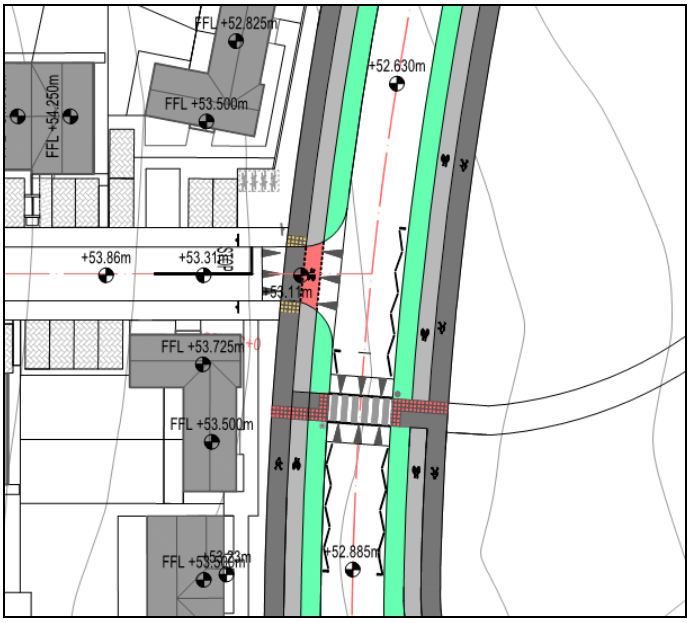


FIGURE 3.8: PROPOSED PRIORITY T-JUNCTION WITH FOOTWAY AND CYCLEWAY CROSSOVER

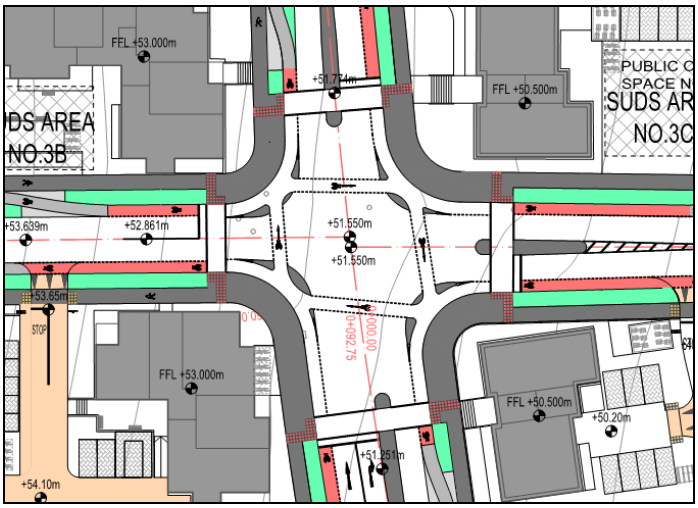


FIGURE 3.9: HAMLET LANE SIGNALS WITH CYCLE PROTECTED INFRASTRUCTURE

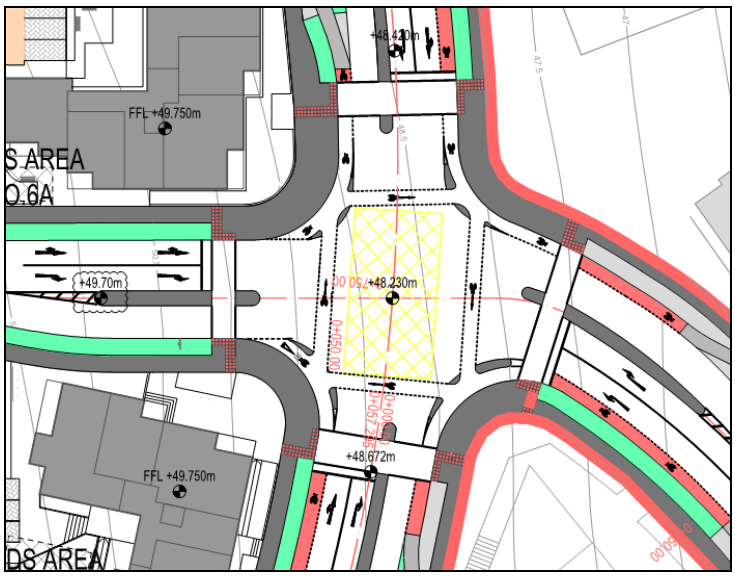


FIGURE 3.10: BOULEVARD RD SIGNALS WITH CYCLE PROTECTED INFRASTRUCTURE

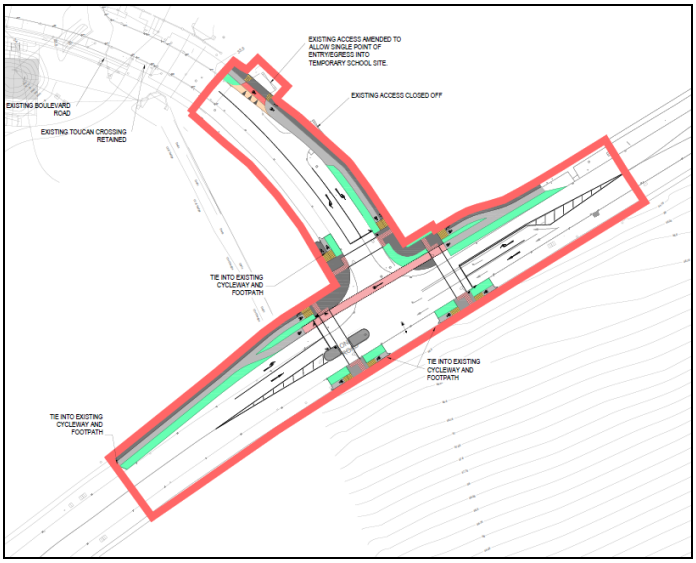


FIGURE 3.11: PROPOSED BOULEVARD ROAD AND CLONARD ROAD SIGNALS WITH CYCLE CONTINUITY INFRASTRUCTURE

3.15 Carriageway Width

3.15.1 All carriage widths are in accordance with DMURS and vary according to the street hierarchy. See **Figure 3.1** for details.

3.16 Forward Visibility and Visibility Splay

3.16.1 Visibility splays have been provided in accordance with Table 4.2 of DMURS. Refer to drawings number 191004-C-019 for details.

3.17 Parking & Set Down

3.17.1 The provision of on-street car parking includes perpendicular and parallel parking bays along with a limited number of bays. The spaces are provided along either one or both sides of the internal roads.

3.17.2 In accordance with 4.4.1 of DMURS the carriageway has been reduced from the traditional 6m to 5.5m for traffic calming. DMURS states that local roads should be between 5.0m-5.5m wide.

3.17.3 The perpendicular parking spaces are a minimum of 5m long, 2.5m wide and the parallel parking spaces are a minimum of 6m long 2.0m wide.

3.17.4 All set down areas at creches are parallel bays.

3.18 Planting

3.18.1 Urban tree planting will play an important part in providing a visual 'soft' relief from the urban grain of the proposed built development and in providing all the environmental benefits such as controlling CO^2, improving air quality and buffering storm water. Urban trees are proven to have a positive impact on health, reduce crime levels and roadside trees encourage careful driving and reduce speeding. The principal tree planting proposals are as follows:

- Trees in grass verges on the main spine road, where a root barrier will be provided on either side.

- Trees planted to the front of dwellings at the edge of public footpaths, to define residential streets.
- Trees in public footpaths with a 16m^3 root space below ground, equipped with tree grille and guard.
- Groupings of trees within public open spaces.
- Trees within the forecourt of private managed areas (i.e. Apartment blocks) installed with a root director will be provided to avoid breaking up paving in future years of growth.

3.18.2 All trees shall be clear stemmed which allow visibility and uniformity and are columnar in form, equipped with support systems / guying, irrigation pipes and tree grille in paved areas. All tree species shall be saline tolerant to ensure they will withstand possible sea salt spray. Refer to tree planting schedule for species list and drawings MAL-019-20-P10, P11, P12, P13 & P14 for details.

4.0 CONCLUSION

4.1 General

4.1.1 The outcome of this compliance statement is that the proposed development complies with the requirements for the Design of Urban Roads and Streets as set out in DMURS.

APPENDIX 12.4

Outline CTMP (Reference 191004-CTMP)

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DEAN SWIFT PROPERTY HOLDINGS
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Outline Construction Traffic Management Plan

November 2023

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For and on behalf of
MPA Consulting Engineers

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DOCUMENT CONTROL SHEET

	Client	Dean Swift Property Holdings Ltd						
	Project Title	Housing Development, Balbriggan, Co. Dublin						
	Project Ref.	191004						
	Document Title	Outline Construction Traffic Management Plan						
	Document No.	191004-CTMP-F01						
	This Document Comprises	DCS	TOC	Text	LOT	LOG	LOF	LOD	Appendices
		1	1	19	-	-	-	-	-
	Check								

Revision	Status	Author	Reviewed By	Approved By	Issue Dates
D01	Draft Issue	BJC	MJP	MJP	08.12.2022
F01	Final Issue	BJC	MJP	MJP	09.12.2022
F02	Final Issue	BJC	MJP	MJP	26.05.2023
F03	**Final Issue**	**BJC**	**MJP**	**MJP**	**20.11.2023**

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1.0 INTRODUCTION

1.1 General

1.1.1 This outline Construction Traffic Management Plan (CTMP) has been prepared by MPA Consulting Engineers at the request of our client, Dean Swift Property Holdings (DSPH), for the proposed Housing Development in Balbriggan, County Dublin.

1.1.2 This CTMP is submitted to allow a thorough assessment of potential construction traffic related issues, however it should be noted that full details of the construction programme, the source / routing of materials and the number of construction traffic movements is not yet known. This report therefore sets out the best available information at this time.

1.1.3 Consequently, this report is presented as an 'Outline' version to identify and establish certain key principles concerning construction traffic movements. It is expected that conditions will be included in the permission, requiring submission and approval of a more detailed version prior to the commencement of works on site.

1.2 Scope

1.2.1 This CTMP considers the movement of building material and construction personnel associated with the construction phase of the proposed housing development. The objective of this outline report is to manage and mitigate the impacts of construction traffic on the public road network.

1.2.2 Parts of the construction process will require the movement of earth works and construction material to and from the development site by Heavy Goods Vehicle (HGVs). This outline CTMP describes how these HGV movements will be managed during the various stages of construction as well as the interaction with the surrounding road network.

1.2.3 The Plan also considers the vehicle movements associated with the workforce involved in the construction as they travel to and from the site.

1.2.4 This Plan should serve as the basis for the final CTMP, with the Main Contractor required to prepare the final version once all programme, material quantity and material source information is known.

1.3 Structure of the Report

1.3.1 The remainder of this document is structured as follows:

- Section 2 provides an overview of the proposed development and the draft construction programme together with details of the site access arrangements for construction related traffic.
- Section 3 identifies the construction traffic generation and staff levels.
- Section 4 identifies the measures to be introduced to manage construction traffic.

- Section 5 identifies the communication, emergency procedures and enforcement of the plan.
- Section 6 outlines the conclusions of this report.

2.0 PROJECT DESCRIPTION

2.1 General

2.1.1 This section summarises the proposed development, access arrangements for construction traffic and the expected length of the construction programme.

2.1.2 The Housing Development is envisaged to deliver a total of 378 houses, 84 duplex dwellings, and 102 apartments across four phases. **TABLE 2.1** below details the proposed phased delivery of the Housing Development Masterplan.

Phase	Houses	Duplexes	Apartments	Total
1	124	30	42	196
2	71	18	14	103
3	84	24	20	128
4	99	12	26	137
Total	**378**	**84**	**102**	**564**

TABLE 2.1: PROPOSED PHASING OF THE DEVELOPMENT MASTERPLAN

2.1.3 The Housing Development Masterplan and development phases are shown overleaf in **FIGURE 2.1**. The development site is quite linear on a north to south orientation.

2.1.4 The access to the proposed site will be from an extension of the under-construction Boulevard Road and existing Hamlet Lane linked via a main Spine Road through the development which will link with Flemington Lane to the north.

2.1.5 Phase 1, located to the west and east of the Spine Road and comprising 124 houses, 30 duplex dwellings, 42 apartments and the link road to connect Boulevard Road and Flemington Lane as well as the upgrades to the Boulevard Road / Clonard Road Junction.

2.1.6 Subject to planning, Phase 1 is expected to commence in either Q2 or Q3 2024.

2.2 Location of Development

2.2.1 The site is approximately 2.0km northwest of the town centre and 1.0km northeast of Junction 6 of the M1 Motorway (Dublin to Belfast).

2.2.2 The site is located north of Clonard Road (the R122) and east of Bridgefoot Road (the L1130) and is bounded by Boulevard Road/the Taylor Hill residential development to the east and the Ladywell development (F21A/0055) to the South.

2.2.3 The location of the Housing Development site in the context of Balbriggan and the connecting road network is shown graphically in **FIGURE 2.2** and **FIGURE 2.3** overleaf.

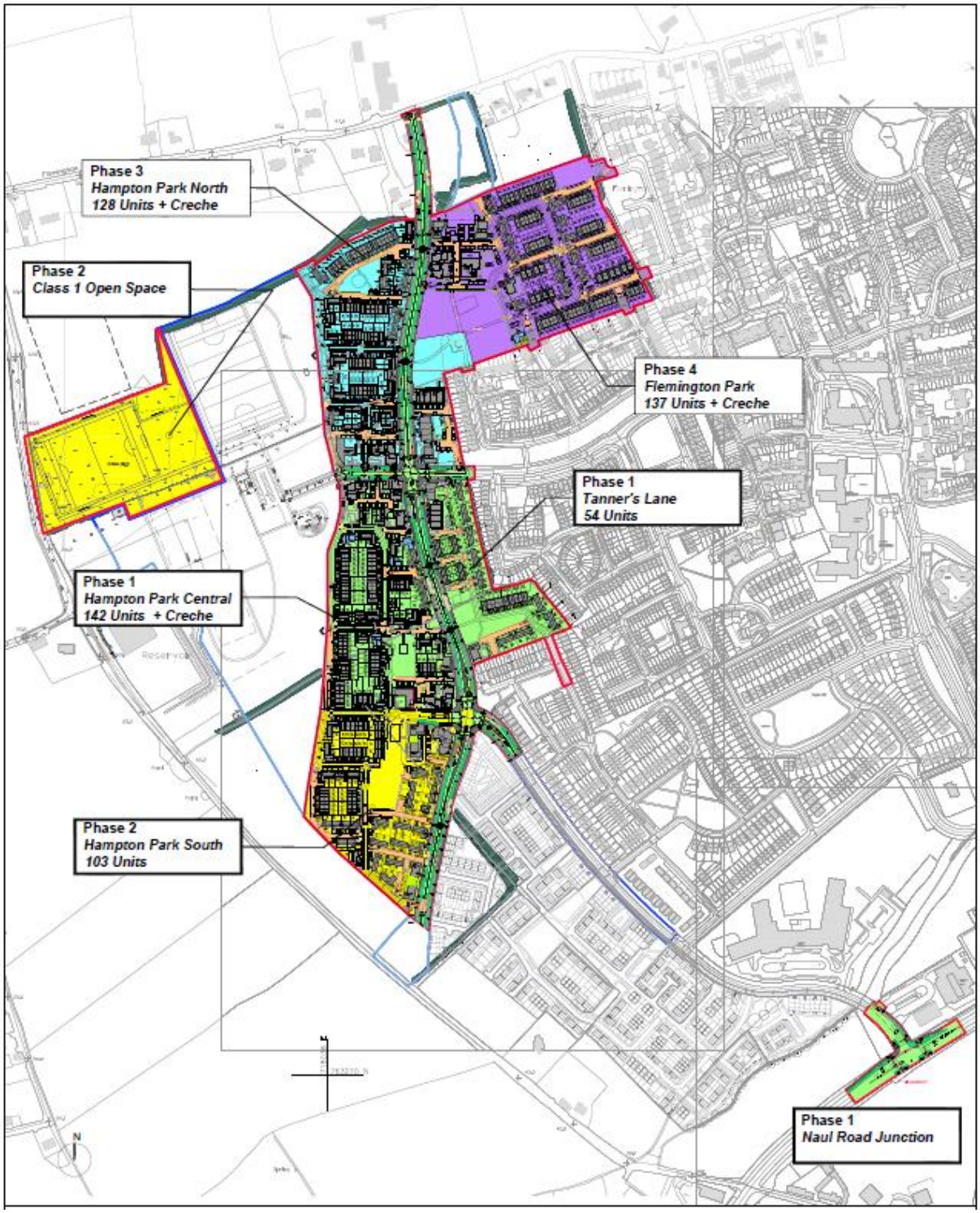

FIGURE 2.1: PROPOSED MASTERPLAN LAYOUT

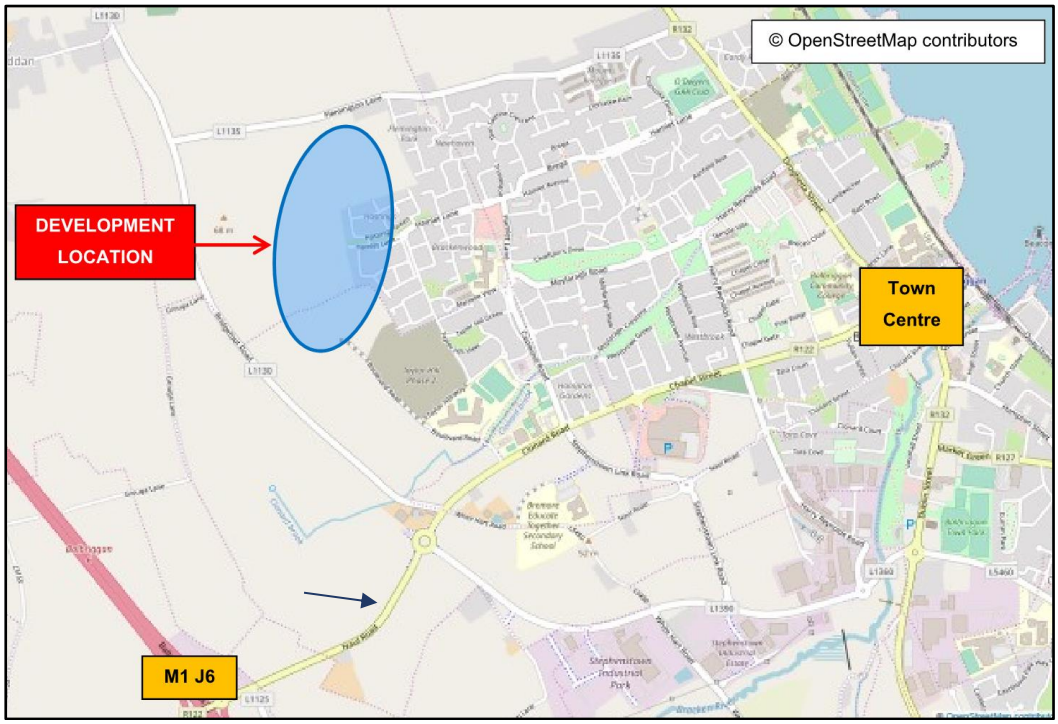

FIGURE 2.2: SITE LOCATION

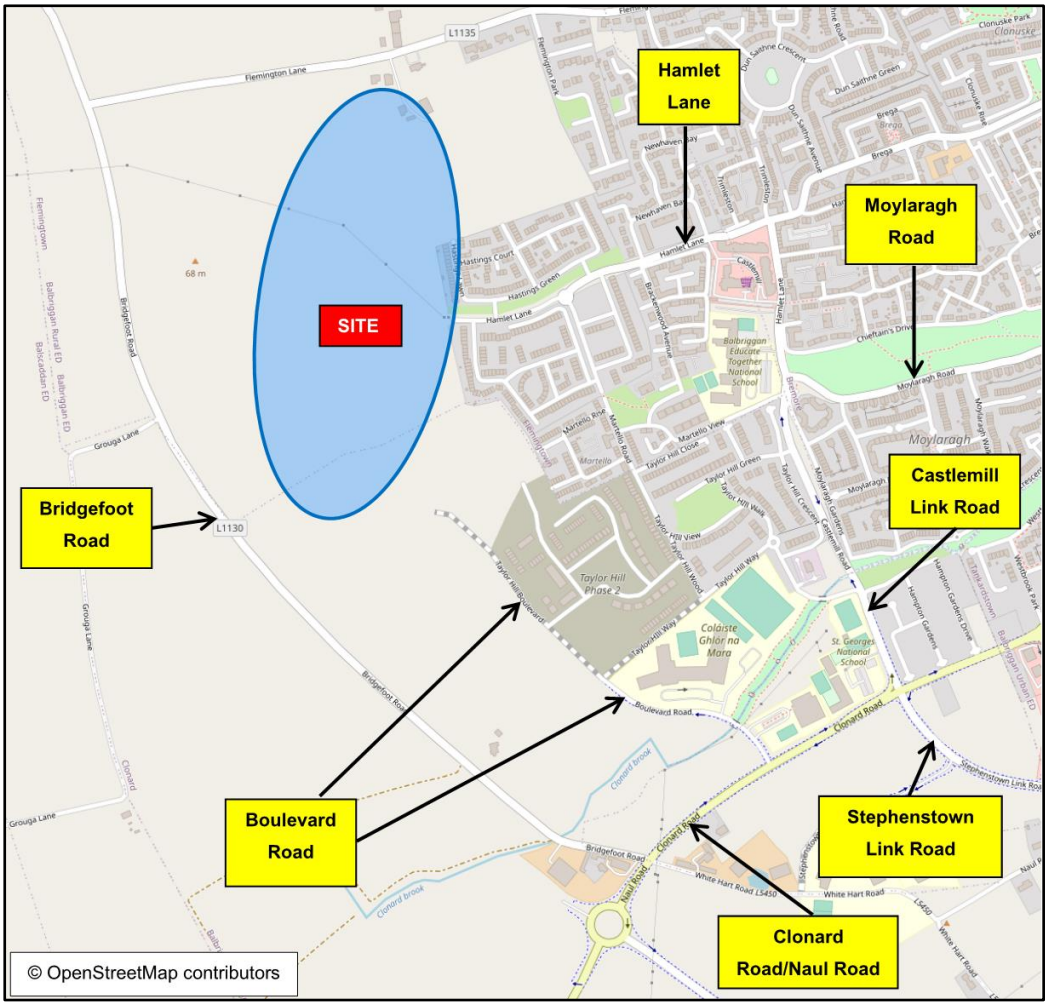

FIGURE 2.3: SITE LOCATION RELATIVE TO THE SURROUNDING ROAD NETWORK

2.3 Site Access for Construction Traffic

2.3.1 All construction traffic related to the development will access the site from Boulevard Road and through its junction with Clonard Road (R122).

2.3.2 It is envisaged that the majority of the construction traffic will approach and depart the site from / to the west via Naul Road and the M1.

2.3.3 Concrete based construction materials, namely building blocks and concrete, will likely be sourced from the village of Naul. The majority of the remaining building material (timber and hardware) will likely be sourced from Balbriggan and other areas of north Dublin.

2.4 Car / Pedestrian / Cycle Access for Construction Personnel

2.4.1 During the building works, construction personnel will access the site from Boulevard Road for the duration of the works.

2.4.2 Pedestrian and cyclists will also access the site from Boulevard Road.

2.4.3 The Main Contractor will provide a cycle parking / bicycle shelter within the contractor's compound.

2.5 Construction Personnel

2.5.1 It is envisaged that there will be approximately 30 construction personnel on site daily during the initial site establishment and ground works phase. This is expected to increase to approximately 100 construction personnel daily during peak construction activity.

2.5.2 On occasions, this may further increase, depending on the individual activities taking place on any particular day.

2.5.3 Full details will be provided in the final version of the CTMP, once known.

2.6 Construction Parking

2.6.1 Construction personnel parking will not be permitted on Boulevard Road, Clonard Road / Naul Road or any public or private road.

2.6.2 Construction car parking will be fully contained within the site, as shown overleaf in **FIGURE 2.4** (for Phase 1 and Phase 2). The car park will be constructed by laying a temporary surface.

2.6.3 As the works progress north the compound will be relocated as shown in **FIGURE 2.4**.

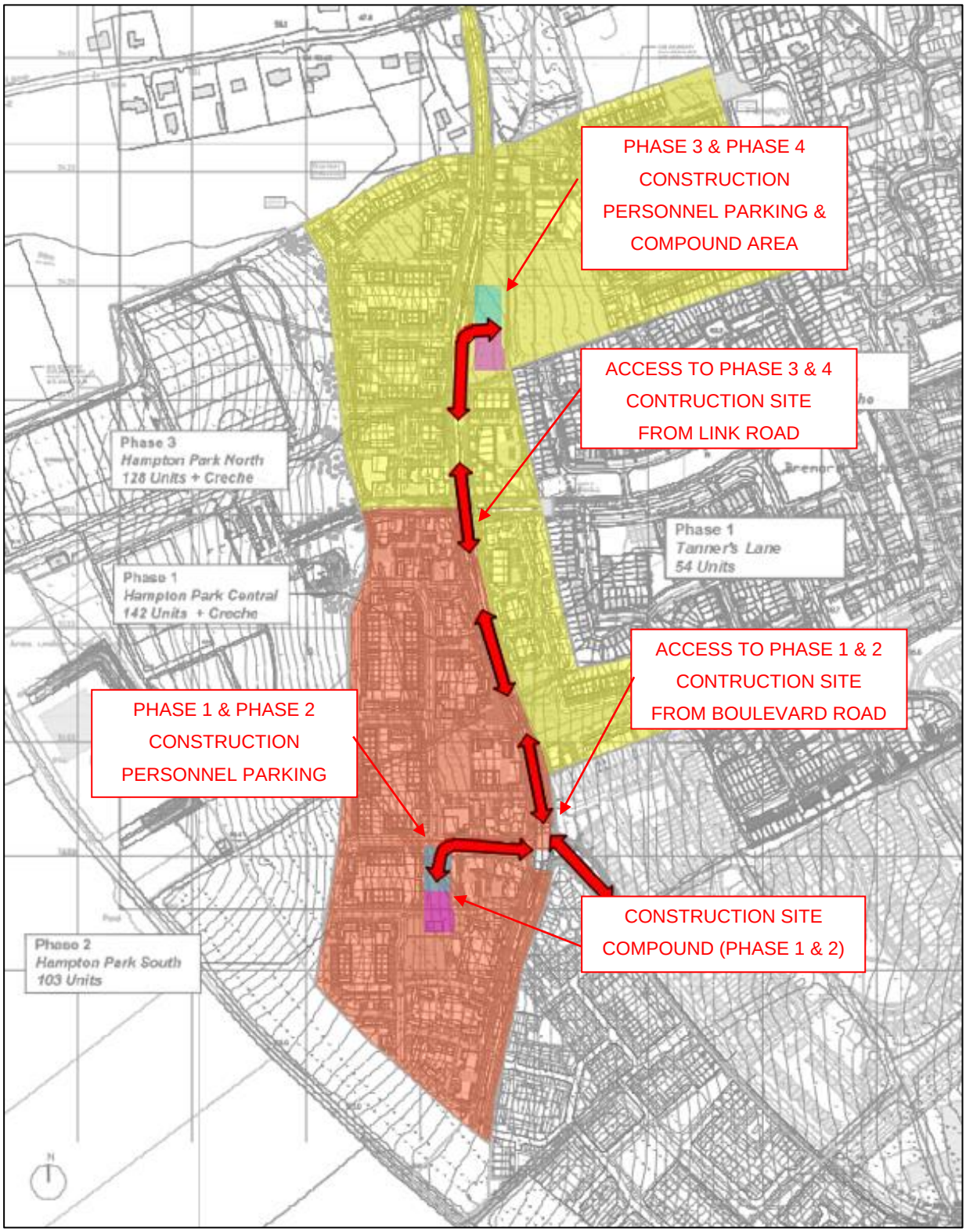

FIGURE 2.4: PHASE 1 – 4 CONSTRUCTION SITE COMPOUND AND PARKING

2.6.4 Parking for construction personnel and site visitors will be provided in line with expected personnel levels i.e. approximately 100 space to allow for COVID-19 social distancing (if required) and CIF recommendations on travel to and from sites.

2.6.5 The quantum of parking available will be kept under review by site management throughout the construction phases and adjusted as required. Further details will be provided in the final version of the CTMP.

2.7 Construction Site Layout

2.7.1 The contractors' compound will contain welfare facilities, sign in / sign out facilities, Construction Management Team (CMP) offices, kitchen facilities, toilets, storage / workshop areas for the contractors and sub-contractors, together with parking for the construction personnel as discussed above.

2.7.2 The Phase 1 site compound and parking will be located as shown in **FIGURE 2.4.** Security and sign in / sign out facilities will be located near the site entrance, thereby helping to control access to the construction site.

2.7.3 A wheel wash will be provided the entrance to the site and HGV traffic will be directed through as they depart the site. Refer to Section 4.7 for further details.

2.8 Construction Programme

2.8.1 It is not possible to provide a definitive construction programme at this application stage. The programme will be dependent on several factors such as market conditions, the detailed design, and development phasing which themselves could be influenced by any planning conditions imposed on the subsequent consent.

2.8.2 A detailed construction programme will form part of the final CTMP which will be issued prior to commencement of construction. DSPH or their main contractor will be required to prepare the final CTMP.

2.8.3 Notwithstanding this, the following outline construction programme has been assumed (although this is liable to change subject to planning, contractor appointment and market conditions):

- Subject to market conditions, the Masterplan will be delivered across four phases (1 – 4), as outlined in **TABLE 2.1** and **FIGURE 2.1**.
- Subject to planning, Phase 1 will commence in either Q2 or Q3 2024 and is scheduled to take 52 weeks to complete including the Link Road from Boulevard Road to Flemington Lane;
- The proposed Clonard Road / Boulevard Road junction improvements will be carried out as part of the Phase 1 works, although not required from a Traffic Engineering perspective until 60% of the houses are delivered and as per TN06 TTAR01.
- Subject to planning and market conditions, Phase 2 will commence after Phase 1 has been complete. Phase 2 is also expected to take 52 weeks to complete;
- Phase 3 will commence following the delivery of Phase 2 and is expected to take 52 weeks to complete;

- Similarly, Phase 4 will commence following the completion of Phase 3 and is also expected to take 52 weeks to complete.
- The entire Housing Development (Phase 1 – 4) is expected to take up to four (4) years to complete (subject to planning and market demand).

3.0 CONSTRUCTION TRAFFIC GENERATION

3.1 General

3.1.1 As with the construction programme, it is not possible to provide complete details of construction traffic volumes at this planning stage. Further detailed design work, programming and measurement of quantities will be required between the grant of planning permission and commencement of construction. These factors potentially have an influence on the number of deliveries to the site and the number of waste removals from the site.

3.1.2 A detailed assessment of construction traffic volumes will form part of the final CTMP which will be issued prior to the commencement of construction. The Main Contractor will be required to prepare the final CTMP.

3.1.3 All construction traffic will access the development site via Boulevard Road and through its junction with Clonard Road (R122).

3.1.4 Beyond this, it is envisaged that the bulk of construction traffic will approach / depart from the west via the M1 / Naul Road. Fewer vehicle movements are expected to arrive from and depart to the east (Clonard Road).

3.2 Scheduling of Deliveries

3.2.1 The Main Contractor will appoint a Construction Traffic Manager (CTM) who will schedule all deliveries to the site. This will be carried out to prevent clashes in delivery times and prevent congestion on the local road network.

3.2.2 Deliveries will be made during typical working hours which are 7:00AM to 7:00PM Monday to Friday and 7:00AM to 2:00PM on Saturday. However, as mentioned previously, deliveries will be scheduled to avoid the main traffic peak hours, to minimise any potential impacts.

3.2.3 Further details will be provided in the final version of the CTMP, once known.

3.3 Travel Options for Construction Personnel

3.3.1 It is envisaged that construction personnel will travel to and from the site by private car / van or by walking, cycling or public transport.

3.3.2 The practice of car / van sharing will be continually monitored by the Main Contractor's Health and Safety Officer during the COVID-19 National Health Emergency. The practice will be subject to the latest Government and Construction Industry Federation (CIF) guidelines.

3.3.3 Construction personnel, on foot or cycling, will access the site via the existing footway and cycling infrastructure on Boulevard and Clonard Road (R122). The development site is located on the fringe of Balbriggan and it is therefore expected that some construction personal, residing

in the town and in the neighbouring housing developments, will either walk or cycle to / from work.

3.3.4 Cycle parking / bicycle shelter will be provided within the contractor's compound.

3.3.5 Construction personnel will have good access to the public transport network, with bus and train services located nearby.

3.3.6 Balbriggan is serviced by two local bus services. One route serves the northern and western parts of the Balbriggan via Moylaragh Road and Hamlet Lane, whilst the second route serves the southern and western parts of the town via Drogheda Road, Harry Reynolds Road and Clonard Road.

3.3.7 The closest bus stop is located immediately south of the Clonard Road / Castlemill Link Road junction, which is five to 10 minutes' walk from the site. This route connects to Balbriggan Town Centre and to Balbriggan Railway Station.

3.3.8 The availability of non-car travel options will be highlighted to construction personnel at their initial site briefing / induction sessions.

3.4 Construction Traffic Generation

Heavy Good Vehicle (HGV) Movements

3.4.1 Whilst it is not possible at this stage to accurately identify the day to day HGV movements, based on experience with similar developments, it is predicted that the number of construction related HGV movements will be in the order of 40 arrivals and 40 departures each day for the first two to three months (initial site stripping and site establishment works for each phase).

3.4.2 Thereafter, HGV movements are predicted to decrease to approximately 10 – 15 arrivals and departures on a typical day. These movements will be distributed evenly throughout the day.

Cars and Vans

3.4.3 As discussed in Section 2.5, at the peak of construction, the average number of construction personnel is estimated to be approximately 100. Assuming a vehicle occupancy factor of 1.25, this would equate to approximately 80 vehicle arrivals and departures at start and at the end of the working day. Additional movements may also occur during lunch breaks or similar.

3.4.4 A Transport Assessment Report has been prepared by MPA Consulting Engineers and has been submitted with the planning application. The TAR has considered the operation of the local road network under future 'with development' traffic flow conditions and has concluded this to be acceptable.

3.4.5 Construction activities are extremely unlikely to generate more traffic than predicted for the completed development, therefore the impacts of construction traffic will themselves clearly be acceptable.

3.4.6 Further details will be provided within the final version of this CTMP, prior to commencement of construction.

4.0 CONSTRUCTION TRAFFIC MANAGEMENT PLAN

4.1 General

4.1.1 To construct the proposed development, it is important that construction traffic and traffic on the existing road network are managed to maximise construction efficiency and safety while minimising risk, inconvenience, and nuisance to the public. This will be achieved through careful management, programming and co-ordination of all works and traffic accessing the site.

4.1.2 The Main Contractor will be required to appoint a Construction Traffic Manager (CTM). The CTM will be required to coordinate and schedule all deliveries to the site, ensure that roadways are kept clear of mud and debris, advise haulage contractors on routes, and adhere to good traffic management principles.

4.2 Hours of Working

4.2.1 The site working hours are expected to be 7:00AM to 7:00PM on weekdays and 7:00PM to 2:00PM on Saturday. No works will be undertaken on Sundays or Bank Holidays, without the consent of Fingal County Council.

4.2.2 To maintain these working hours, the Main Contractor, and their sub-contractors may require a period of up to half an hour before and after normal working hours for preparation and close down activities. This period will not include the operation of plant or machinery nor will it include import or export of materials to or from the site.

4.2.3 In exceptional circumstances, for safety and operational reasons, it may be necessary to work outside of these hours. Should this be required, the hours and duration of work will be subject to consultation with Fingal County Council and kept to a minimum.

4.2.4 In certain circumstances, it may be necessary to arrange deliveries outside of the normal site working hours.

4.3 Access and Egress

4.3.1 Refer to Section 2.3 & 2.4 for details.

4.3.2 All construction traffic associated with the development will access the site via Boulevard Road and through its junction with Clonard Road (R122).

4.4 Proposed HGV Routes

4.4.1 Refer to Section 2.3 and to **FIGURE 4.1** overleaf.

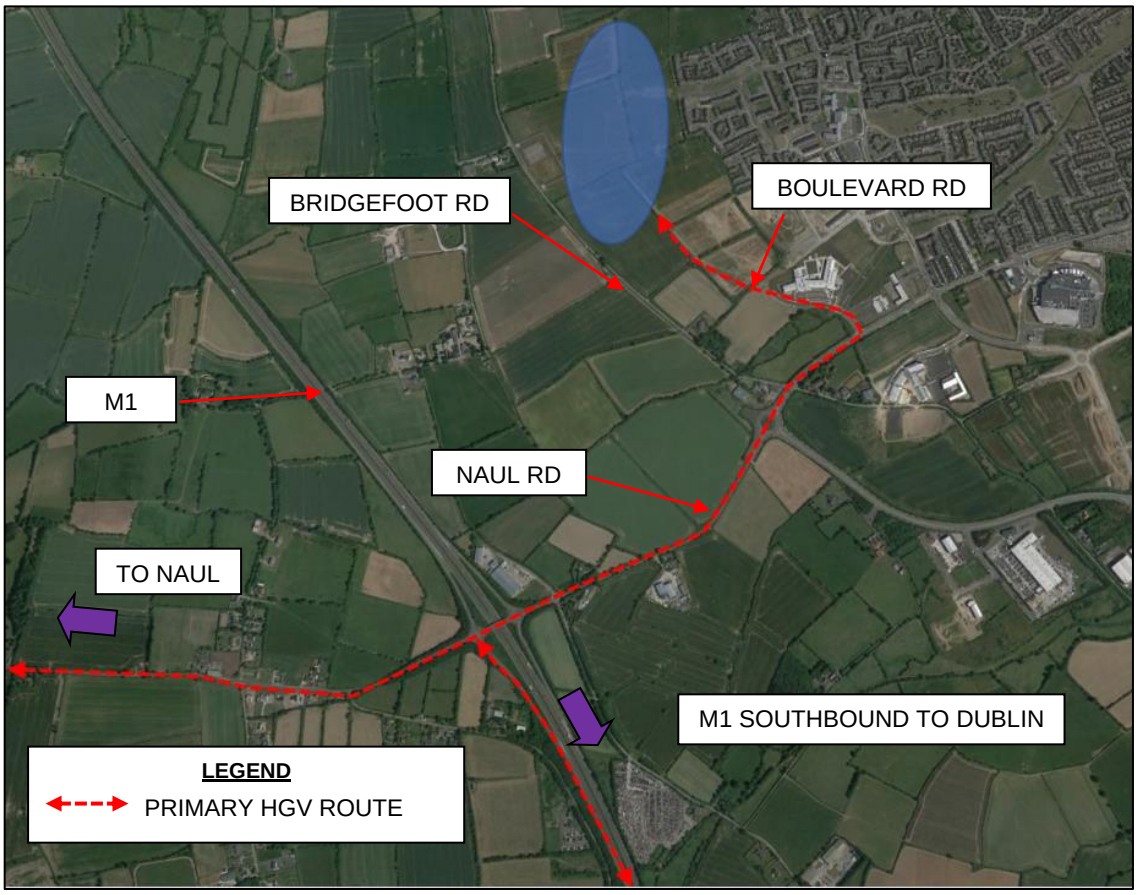

FIGURE 4.1: PRIMARY HGV ROUTES TO THE SITE

4.5 Traffic Management Principles

4.5.1 To minimise the impact of HGV movements on the existing road network the following construction traffic management principles will be observed:

- To minimise the impact that the construction works will have on local residents and surrounding environment, the Main Contractor will be required to appoint a Construction Traffic Manager (CTM);
- The CTM will be responsible for ensuring all delivery vehicles to and from the site are managed efficiently and reduce nuisance or unnecessary disruption to the operation of the existing road network;
- The CTM role will also include advising haulage contractors and their drivers of the most appropriate route to follow when approaching the site, in particular providing advice on local width and weight restrictions;
- The CTM will ensure traffic management principles and the mitigation measures are implemented and that the public road is kept clear of mud and debris through ensuring that loads are suitably sheeted and secured and undertaking regular street cleaning as necessary; and
- To assist the CTM, a Banksperson will be stationed at the main site access gates to directly control HGV movements as they arrive and depart the site. The role will include ensuring loads are appropriately sheeted, ensuring vehicles have passed through the wheel wash

and mud is not deposited on the public road, ensuring drivers follow any informal vehicle routings within the site, addressing any immediate issues raised by the public and supervising turning movements in and out of the site.

4.5.2 The final Construction Traffic Management Plan will be incorporated as part of the overall Health and Safety policy for the site.

4.6 Signage

4.6.1 Traffic management signage will be erected by the Main Contractor in accordance with the final CTMP, and as agreed with Fingal County Council.

4.6.2 Signage will include construction site entrance warning signs and HGV routing signage. All signage shall be provided in accordance with the Department of Transport's Traffic Signs Manual, Chapter 8 – Temporary Traffic Measures and Signs for Roadworks.

4.7 Site Fencing and Access

4.7.1 Heras fencing, secured to a minimum height of two (2) metres, will be provided along the construction site boundary to prohibit unauthorised access. The fencing will be checked daily and maintained as necessary. It will be the responsibility of the Site Manager to open and lock the construction site access gates each day and to ensure the site is not left open and unattended at any time.

4.7.2 Access to the construction site will only be to authorised persons.

4.8 Construction Traffic Speed Limits

4.8.1 Adherence to posted speed limits will be emphasised to all staff / suppliers and contractors during induction training.

4.8.2 Construction vehicle and HGV drivers will be advised to adhere to a 30km/h speed limit on Boulevard Road and on Naul / Clonard Road between Bridgefoot Road and Castlemill Road. This requirement will only apply to construction and delivery vehicles and will not apply to general traffic. It is not proposed to sign post such speed limits in the interest for local road users.

4.9 Wheel Wash

4.9.1 Use of a formal wheel wash will be a requirement for all HGV vehicles leaving the site. The wheel wash will assist in reducing the displacement of materials onto the local road network. The wheel wash facility will be located adjacent to the site entrance and will be manned full time to register all vehicles entering and departing the site and to monitor use of the wheel wash. This will ensure that vehicle wheels are as clean as possible before returning to the public roads.

4.10 Road Cleaning

4.10.1 The CTM will ensure traffic management principles and the mitigation measures are implemented and that the public road is kept clear of mud and debris through ensuring that loads are suitably sheeted and secured and undertaking regular street cleaning as necessary.

4.11 Road Condition

4.11.1 The CTM will ensure that:

- The transportation contractor shall take all reasonable measures while transporting any material likely to cause fugitive loses from the vehicle during transportation to / from the site.

4.11.2 The Main Contractor will carry out a pavement condition survey of the local roads one month prior to the start of works.

4.11.3 Throughout the course of the project delivery, on-going visual inspections and monitoring of the primary haulage routes will be carried out to ensure damage caused by construction traffic is recorded and Fingal County Council is notified. Arrangements will be made to repair any such damage to an appropriate standard and in a timely manner.

4.11.4 Upon completion of the Housing Development, the pavement condition survey, carried out at the preconstruction phase, will be repeated and a comparison of the pre and post construction surveys carried out. Where such comparative assessments identify a section of road as having been damaged or as having deteriorated as a clear result of construction traffic, the road will be repaired to the satisfaction of Fingal County Council.

4.12 Road Closure / Abnormal Loads

4.12.1 At this time, it is not envisaged that abnormally large or heavy loads will be required during the construction process. Temporary or partial road closures may be required to facilitate utility connections such as watermain, foul, surface water etc.

4.12.2 If temporary road closures are subsequently required, they will be coordinated with Fingal County Council and the relevant authorities.

4.13 Additional Mitigation Measures

4.13.1 To reduce the impact of construction works on the surrounding area, the following measures will be introduced and retained through the course of the construction works:

- Watering of on-site access roads – During dry weather, all on-site access roads will be watered at suitable intervals to reduce the likelihood of dust clouds forming and escaping from the site. This will reduce the overall impact of the works on any neighbouring uses; and

- No vehicles idling – Where possible, on-site vehicles will be encouraged to turn off their engines when parked, waiting to unload or when not in use. This will reduce the noise impact on the surrounding area and will result in lower vehicle emissions.

5.0 IMPLEMENTATION

5.1 Communication

5.1.1 The Main Contractor shall communicate with Fingal County Council and emergency services throughout the construction phase.

5.1.2 The Main Contractor shall ensure that all submissions required under the Planning Permission are provided to Fingal County Council and any other body required under the Planning Permission.

5.1.3 The Main Contractor shall liaise with the other construction projects in the area to avoid conflicts with deliveries, road closures or similar.

5.1.4 The Main Contractor will also liaise with Fingal County Council and community representatives about community events that may be impacted by the proposed traffic management measures.

5.1.5 The CTM's contact details will be provided to Fingal County Council and be available at the site entrance.

5.2 Emergency Procedures

5.2.1 The Main Contractor shall be required to appoint a safety officer for the site and comply with all relevant Safety and Health Legislation, including the provision of first-aiders.

5.2.2 The Main Contractor shall provide necessary contact information for responsible personnel to the local authority and emergency services.

5.3 Enforcement

5.3.1 All personnel working on site shall be required to adhere to the Final CTMP. An information session on the responsibilities of contractors, as set out in the Final CTMP, shall be included in the site induction programme.

6.0 CONCLUSION

6.1 General

6.1.1 This outline Construction Traffic Management Plan (CTMP) sets out the basis for mitigating the impacts of the construction related traffic from the Housing Development in Balbriggan, County Dublin. There are sufficient vehicle routing and delivery scheduling options available to mitigate the traffic impacts of the construction phase.

6.1.2 The Main Contractor will be required to prepare the final CTMP, at which point greater detail will be available on methods of construction, volumes of construction materials and likely traffic movements associated with the construction. The final CTMP will also demonstrate compliance with any conditions set out in the Planning Permission.

6.1.3 The Main Contractor will be required to appoint a Construction Traffic Manager who will be required to coordinate and schedule all deliveries to the site, ensure that roadways are kept clear of mud and debris, advise haulage contractors of appropriate routes and ensure adherence to good traffic management principles.

APPENDIX 12.5

Future AADT at the critical junctions along the Clonard Road corridor

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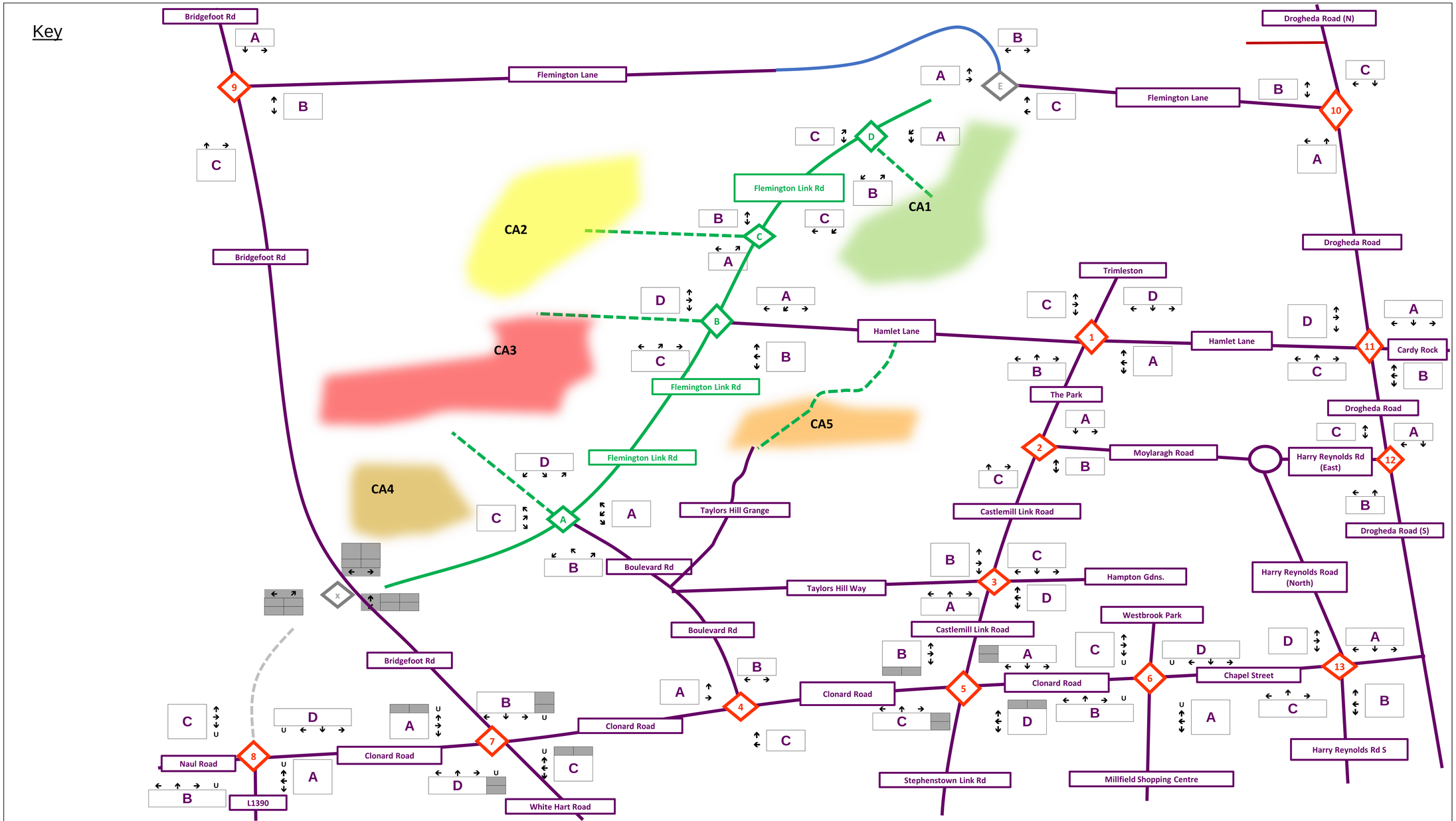
HUGHES PLANNING
& DEVELOPMENT CONSULTANTS

Key



Martin Peters Associates Consulting Engineers 26 Upper Pembroke Street, Dublin 2 | T: +353 1 649 9001 | E: info@mpa.ie | W: www.mpa.ie	Drawing Title: Arm Labels for Modelling	**Drawn By:** AE	Project Title: Malincross SHD
		Checked By: RJW	Project Number: 191004
		Issue Date: Jan 2021	Drawing Number: 191004-TAR-001

BASELINE TRAFFIC FLOWS: NO DEVELOPMENT AND NO COMMITTED DEVELOPMENT

			2022 Base				2025 Base				2030 Base				2040 Base			
Junction No.	Arm Ref	Arm	24-hour AADT Two-Way Total Vehicle Movements	24-hour AADT Two-Way Light Vehicle Movements	24-hour AADT Two-Way No. of HGVs	24-hour AADT Two-Way % HGVs	24-hour AADT Two-Way Total Vehicle Movements	24-hour AADT Two-Way Light Vehicle Movements	24-hour AADT Two-Way No. of HGVs	24-hour AADT Two-Way % HGVs	24-hour AADT Two-Way Total Vehicle Movements	24-hour AADT Two-Way Light Vehicle Movements	24-hour AADT Two-Way No. of HGVs	24-hour AADT Two-Way % HGVs	24-hour AADT Two-Way Total Vehicle Movements	24-hour AADT Two-Way Light Vehicle Movements	24-hour AADT Two-Way No. of HGVs	24-hour AADT Two-Way % HGVs
1	A	Hamlet Lane (E)	4599	4469	130	2.84%	4829	4687	142	2.95%	5213	5051	162	3.11%	5435	5257	178	3.28%
1	B	The Park (S)	3904	3776	128	3.27%	4100	3961	139	3.40%	4428	4269	159	3.59%	4617	4443	174	3.78%
1	C	Hamlet Lane (W)	3295	3139	155	4.72%	3462	3293	170	4.90%	3742	3549	193	5.16%	3905	3693	212	5.44%
1	D	Trimleston (N)	354	349	5	1.49%	372	366	6	1.55%	401	395	7	1.63%	418	411	7	1.72%
2	A	The Park (N)	6058	5886	173	2.85%	6362	6173	188	2.96%	6867	6653	214	3.12%	7159	6924	236	3.29%
2	B	Morlaragh Rd	3223	3118	105	3.27%	3385	3270	115	3.40%	3656	3525	131	3.58%	3812	3668	144	3.78%
2	C	Castlemill Link Rd (S)	6375	6245	130	2.05%	6692	6550	142	2.13%	7221	7059	162	2.24%	7524	7346	178	2.37%
3	A	Castlemill Link Rd (S)	7885	7751	134	1.70%	8276	8130	147	1.77%	8928	8761	167	1.87%	9301	9118	183	1.97%
3	B	Taylors Hill Way (W)	84	84	0	0.00%	88	88	0	0.00%	95	95	0	0.00%	99	99	0	0.00%
3	C	Castlemill Link Rd (N)	7596	7463	133	1.75%	7973	7828	145	1.82%	8601	8436	165	1.92%	8961	8779	182	2.03%
3	D	Hampton Gardens (E)	561	549	12	2.11%	589	576	13	2.20%	636	621	15	2.32%	663	646	16	2.44%
4	A	Clonard Road West	14213	13731	482	3.39%	14929	14403	526	3.52%	16121	15522	599	3.72%	16812	16153	658	3.92%
4	B	Boulevard Road	896	806	90	10.00%	943	846	98	10.36%	1023	911	111	10.89%	1071	948	122	11.43%
4	C	Clonard Road East	14092	13691	401	2.84%	14798	14361	437	2.95%	15974	15476	498	3.12%	16653	16106	547	3.28%
5	A	Castlemill Link Rd	8067	7922	145	1.80%	8468	8309	158	1.87%	9135	8955	180	1.97%	9517	9319	198	2.08%
5	B	Clonard Road West	14092	13691	401	2.84%	14798	14361	437	2.95%	15974	15476	498	3.12%	16653	16106	547	3.28%
5	C	Stephenstown Link Rd	4826	4685	141	2.92%	5068	4914	154	3.03%	5471	5296	175	3.20%	5704	5512	192	3.37%
5	D	Clonard Road East	8188	7916	273	3.33%	8600	8303	298	3.46%	9287	8948	339	3.65%	9684	9312	372	3.85%
6	A	Chapel St (E)	11055	10725	331	2.99%	11610	11249	361	3.11%	12534	12123	411	3.28%	13068	12616	452	3.46%
6	B	Millfield Shopping (S)	7468	7295	173	2.31%	7840	7652	188	2.40%	8461	8246	214	2.53%	8817	8582	236	2.67%
6	C	Clonard Rd (W)	8172	7874	298	3.64%	8584	8260	325	3.78%	9271	8901	370	3.99%	9670	9264	407	4.20%
6	D	Westbrook Pk (N)	1107	1075	32	2.86%	1162	1128	34	2.97%	1255	1215	39	3.13%	1308	1265	43	3.30%
7	A	Naul Rd (W)	7360	6760	600	8.15%	7745	7090	654	8.45%	8386	7641	745	8.89%	8771	7952	819	9.34%
7	B	Bridgefoot Rd (N)	2423	2214	210	8.65%	2551	2322	229	8.97%	2763	2502	261	9.43%	2890	2604	286	9.91%
7	C	Clonard Rd (E)	5913	5524	389	6.58%	6218	5794	424	6.82%	6727	6244	483	7.18%	7029	6498	531	7.55%
7	D	White Hart Rd (S)	335	303	32	9.53%	353	318	35	9.88%	382	343	40	10.38%	400	357	44	10.90%
8	A	Naul Rd (E)	14215	13615	600	4.22%	14935	14281	654	4.38%	16136	15390	745	4.62%	16836	16016	819	4.87%
8	B	L1390 (S)	4961	4516	444	8.96%	5222	4737	485	9.28%	5657	5105	552	9.76%	5920	5313	607	10.25%
8	C	Naul Rd (W)	14518	13701	817	5.62%	15262	14371	891	5.84%	16502	15488	1015	6.15%	17233	16118	1115	6.47%
9	A	Bridgefoot Rd (N)	3500	3374	126	3.60%	3676	3539	137	3.73%	3970	3814	156	3.94%	4141	3969	172	4.15%
9	B	Flemington Lane (E)	1642	1596	46	2.80%	1724	1674	50	2.91%	1861	1804	57	3.07%	1941	1878	63	3.24%
9	C	Bridgefoot Rd (S)	3468	3328	139	4.02%	3643	3491	152	4.17%	3936	3762	173	4.40%	4106	3916	190	4.63%
10	A	Drogheda St (S)	7073	6729	344	4.86%	7433	7058	375	5.04%	8034	7607	427	5.32%	8385	7916	469	5.60%
10	B	Fleminton Lane (W)	1699	1662	37	2.15%	1783	1744	40	2.23%	1924	1879	45	2.36%	2005	1956	50	2.49%
10	C	Drogheda St (N)	5761	5441	321	5.57%	6056	5707	350	5.78%	6548	6150	398	6.08%	6838	6400	438	6.40%
11	A	Drogheda St (N)	7269	7102	167	2.29%	7631	7449	182	2.38%	8235	8028	207	2.51%	8582	8355	228	2.65%
11	B	Cardy Rock (E)	1728	1722	6	0.37%	1813	1806	7	0.39%	1954	1946	8	0.41%	2034	2026	9	0.43%
11	C	Drogheda St (S)	9729	9455	274	2.82%	10216	9917	299	2.93%	11029	10688	341	3.09%	11497	11123	375	3.26%
11	D	Hamlet Lane (W)	3275	3205	71	2.15%	3438	3361	77	2.24%	3710	3623	88	2.36%	3866	3770	96	2.49%
12	A	Drogheda St (N)	9935	9635	300	3.02%	10433	10106	327	3.14%	11264	10891	373	3.31%	11744	11334	410	3.49%
12	B	Drogheda St (S)	11013	10684	329	2.99%	11566	11206	359	3.11%	12486	12077	409	3.28%	13018	12568	450	3.46%
12	C	Harry Reynolds (W)	5605	5481	124	2.22%	5885	5749	136	2.31%	6350	6196	154	2.43%	6618	6448	170	2.57%
13	A	Harry Reynolds (N)	7644	7519	126	1.64%	8023	7886	137	1.71%	8655	8499	156	1.80%	9016	8845	172	1.90%
13	B	Chapel St (E)	4571	4528	42	0.93%	4796	4750	46	0.96%	5171	5119	53	1.02%	5385	5327	58	1.07%
13	C	Harry Reynolds (S)	4898	4786	112	2.28%	5142	5020	122	2.37%	5549	5410	139	2.50%	5783	5630	152	2.63%
13	D	Chapel St (W)	8451	8267	185	2.18%	8872	8671	201	2.27%	9574	9345	229	2.40%	9977	9725	252	2.53%

BASE PLUS COMMITTED DEVELOPMENT TRAFFIC ONLY

			2022 Base + Com				2025 Base + Com				2030 Base + Com				2040 Base + Com			
Junction No.	**Arm Ref**	**Arm**	24-hour AADT Two-Way Total Vehicle Movements	24-hour AADT Two-Way Light Vehicle Movements	24-hour AADT Two-Way No. of HGVs	24-hour AADT Two-Way % HGVs	24-hour AADT Two-Way Total Vehicle Movements	24-hour AADT Two-Way Light Vehicle Movements	24-hour AADT Two-Way No. of HGVs	24-hour AADT Two-Way % HGVs	24-hour AADT Two-Way Total Vehicle Movements	24-hour AADT Two-Way Light Vehicle Movements	24-hour AADT Two-Way No. of HGVs	24-hour AADT Two-Way % HGVs	24-hour AADT Two-Way Total Vehicle Movements	24-hour AADT Two-Way Light Vehicle Movements	24-hour AADT Two-Way No. of HGVs	24-hour AADT Two-Way % HGVs
1	A	Hamlet Lane (E)	4599	4469	130	2.84%	4829	4687	142	2.95%	5213	5051	162	3.11%	5435	5257	178	3.28%
1	B	The Park (S)	3904	3776	128	3.27%	4100	3961	139	3.40%	4428	4269	159	3.59%	4617	4443	174	3.78%
1	C	Hamlet Lane (W)	3295	3139	155	4.72%	3462	3293	170	4.90%	3742	3549	193	5.16%	3905	3693	212	5.44%
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2	A	The Park (N)	6058	5886	173	2.85%	6362	6173	188	2.96%	6867	6653	214	3.12%	7159	6924	236	3.29%
2	B	Morlaragh Rd	3223	3118	105	3.27%	3385	3270	115	3.40%	3656	3525	131	3.58%	3812	3668	144	3.78%
2	C	Castlemill Link Rd (S)	6375	6245	130	2.05%	6692	6550	142	2.13%	7221	7059	162	2.24%	7524	7346	178	2.37%
3	A	Castlemill Link Rd (S)	8821	8687	134	1.52%	9212	9066	147	1.59%	9864	9697	167	1.69%	10237	10054	183	1.79%
3	B	Taylors Hill Way (W)	1020	1020	0	0.00%	1024	1024	0	0.00%	1031	1031	0	0.00%	1035	1035	0	0.00%
3	C	Castlemill Link Rd (N)	7596	7463	133	1.75%	7973	7828	145	1.82%	8601	8436	165	1.92%	8961	8779	182	2.03%
3	D	Hampton Gardens (E)	561	549	12	2.11%	589	576	13	2.20%	636	621	15	2.32%	663	646	16	2.44%
4	A	Clonard Road West	17108	16626	482	2.82%	17824	17298	526	2.95%	19016	18417	599	3.15%	19707	19048	658	3.34%
4	B	Boulevard Road	4112	4022	90	2.18%	4159	4062	98	2.35%	4239	4127	111	2.63%	4287	4164	122	2.85%
4	C	Clonard Road East	15655	15254	401	2.56%	16361	15924	437	2.67%	17537	17039	498	2.84%	18216	17669	547	3.00%
5	A	Castlemill Link Rd	9003	8858	145	1.61%	9404	9245	158	1.68%	10071	9891	180	1.79%	10453	10255	198	1.89%
5	B	Clonard Road West	15655	15254	401	2.56%	16361	15924	437	2.67%	17537	17039	498	2.84%	18216	17669	547	3.00%
5	C	Stephenstown Link Rd	5077	4936	141	2.78%	5319	5165	154	2.89%	5722	5547	175	3.06%	5955	5763	192	3.23%
5	D	Clonard Road East	9330	9058	273	2.92%	9742	9445	298	3.05%	10429	10090	339	3.25%	10826	10454	372	3.44%
6	A	Chapel St (E)	11870	11540	331	2.79%	12425	12064	361	2.90%	13349	12938	411	3.08%	13883	13432	452	3.25%
6	B	Millfield Shopping (S)	7731	7559	173	2.23%	8104	7916	188	2.32%	8724	8510	214	2.46%	9081	8846	236	2.60%
6	C	Clonard Rd (W)	9314	9016	298	3.20%	9726	9402	325	3.34%	10413	10043	370	3.55%	10812	10406	407	3.76%
6	D	Westbrook Pk (N)	1170	1138	32	2.70%	1225	1191	34	2.82%	1318	1278	39	2.98%	1371	1328	43	3.15%
7	A	Naul Rd (W)	10255	9655	600	5.85%	10640	9985	654	6.15%	11281	10536	745	6.61%	11666	10847	819	7.02%
7	B	Bridgefoot Rd (N)	2423	2214	210	8.65%	2551	2322	229	8.97%	2763	2502	261	9.43%	2890	2604	286	9.91%
7	C	Clonard Rd (E)	8808	8419	389	4.41%	9113	8689	424	4.65%	9622	9139	483	5.02%	9924	9393	531	5.35%
7	D	White Hart Rd (S)	335	303	32	9.53%	353	318	35	9.88%	382	343	40	10.38%	400	357	44	10.90%
8	A	Naul Rd (E)	17110	16510	600	3.51%	17830	17176	654	3.67%	19031	18285	745	3.92%	19731	18911	819	4.15%
8	B	L1390 (S)	5540	5095	444	8.02%	5801	5316	485	8.36%	6236	5684	552	8.85%	6499	5892	607	9.34%
8	C	Naul Rd (W)	16834	16017	817	4.85%	17578	16687	891	5.07%	18818	17804	1015	5.39%	19549	18434	1115	5.70%
9	A	Bridgefoot Rd (N)	3500	3374	126	3.60%	3676	3539	137	3.73%	3970	3814	156	3.94%	4141	3969	172	4.15%
9	B	Flemington Lane (E)	1642	1596	46	2.80%	1724	1674	50	2.91%	1861	1804	57	3.07%	1941	1878	63	3.24%
9	C	Bridgefoot Rd (S)	3468	3328	139	4.02%	3643	3491	152	4.17%	3936	3762	173	4.40%	4106	3916	190	4.63%
10	A	Drogheda St (S)	7073	6729	344	4.86%	7433	7058	375	5.04%	8034	7607	427	5.32%	8385	7916	469	5.60%
10	B	Fleminton Lane (W)	1699	1662	37	2.15%	1783	1744	40	2.23%	1924	1879	45	2.36%	2005	1956	50	2.49%
10	C	Drogheda St (N)	5761	5441	321	5.57%	6056	5707	350	5.78%	6548	6150	398	6.08%	6838	6400	438	6.40%
11	A	Drogheda St (N)	7269	7102	167	2.29%	7631	7449	182	2.38%	8235	8028	207	2.51%	8582	8355	228	2.65%
11	B	Cardy Rock (E)	1728	1722	6	0.37%	1813	1806	7	0.39%	1954	1946	8	0.41%	2034	2026	9	0.43%
11	C	Drogheda St (S)	9729	9455	274	2.82%	10216	9917	299	2.93%	11029	10688	341	3.09%	11497	11123	375	3.26%
11	D	Hamlet Lane (W)	3275	3205	71	2.15%	3438	3361	77	2.24%	3710	3623	88	2.36%	3866	3770	96	2.49%
12	A	Drogheda St (N)	9935	9635	300	3.02%	10433	10106	327	3.14%	11264	10891	373	3.31%	11744	11334	410	3.49%
12	B	Drogheda St (S)	11013	10684	329	2.99%	11566	11206	359	3.11%	12486	12077	409	3.28%	13018	12568	450	3.46%
12	C	Harry Reynolds (W)	5605	5481	124	2.22%	5885	5749	136	2.31%	6350	6196	154	2.43%	6618	6448	170	2.57%
13	A	Harry Reynolds (N)	8036	7911	126	1.56%	8415	8278	137	1.63%	9047	8891	156	1.73%	9408	9237	172	1.82%
13	B	Chapel St (E)	4888	4845	42	0.87%	5113	5067	46	0.90%	5488	5436	53	0.96%	5702	5644	58	1.01%
13	C	Harry Reynolds (S)	5004	4892	112	2.23%	5248	5126	122	2.32%	5655	5516	139	2.45%	5889	5737	152	2.59%
13	D	Chapel St (W)	9266	9082	185	1.99%	9687	9486	201	2.08%	10389	10160	229	2.21%	10792	10540	252	2.34%

BASE PLUS COMMITTED DEVELOPMENT AND MALINCROSS DEVELOPME + 593 Dwellings

			2022 Base + All				2025 Base + All				2030 Base + All				2040 Base + All			
Junction No.	Arm Ref	Arm	24-hour AADT Two-Way Total Vehicle Movements	24-hour AADT Two-Way Light Vehicle Movements	24-hour AADT Two-Way No. of HGVs	24-hour AADT Two-Way % HGVs	24-hour AADT Two-Way Total Vehicle Movements	24-hour AADT Two-Way Light Vehicle Movements	24-hour AADT Two-Way No. of HGVs	24-hour AADT Two-Way % HGVs	24-hour AADT Two-Way Total Vehicle Movements	24-hour AADT Two-Way Light Vehicle Movements	24-hour AADT Two-Way No. of HGVs	24-hour AADT Two-Way % HGVs	24-hour AADT Two-Way Total Vehicle Movements	24-hour AADT Two-Way Light Vehicle Movements	24-hour AADT Two-Way No. of HGVs	24-hour AADT Two-Way % HGVs
1	A	Hamlet Lane (E)					4983	4840	142	2.86%	5367	5204	162	3.02%	5588	5410	178	3.19%
1	B	The Park (S)					4560	4421	139	3.06%	4887	4728	159	3.25%	5077	4902	174	3.44%
1	C	Hamlet Lane (W)					4075	3906	170	4.16%	4355	4161	193	4.44%	4518	4306	212	4.70%
1	D	Trimleston (N)					372	366	6	1.55%	401	395	7	1.63%	418	411	7	1.72%
2	A	The Park (N)					6821	6633	188	2.76%	7327	7113	214	2.93%	7619	7383	236	3.09%
2	B	Morlaragh Rd					3845	3730	115	2.99%	4115	3984	131	3.18%	4272	4128	144	3.37%
2	C	Castlemill Link Rd (S)					6692	6550	142	2.13%	7221	7059	162	2.24%	7524	7346	178	2.37%
3	A	Castlemill Link Rd (S)					9212	9066	147	1.59%	9864	9697	167	1.69%	10237	10054	183	1.79%
3	B	Taylors Hill Way (W)					1024	1024	0	0.00%	1031	1031	0	0.00%	1035	1035	0	0.00%
3	C	Castlemill Link Rd (N)					7973	7828	145	1.82%	8601	8436	165	1.92%	8961	8779	182	2.03%
3	D	Hampton Gardens (E)					589	576	13	2.20%	636	621	15	2.32%	663	646	16	2.44%
4	A	Clonard Road West					19577	19051	526	2.69%	20769	20170	599	2.88%	21460	20802	658	3.07%
4	B	Boulevard Road					6610	6513	98	1.48%	6690	6578	111	1.66%	6738	6615	122	1.82%
4	C	Clonard Road East					17058	16621	437	2.56%	18235	17737	498	2.73%	18914	18367	547	2.89%
5	A	Castlemill Link Rd					9404	9245	158	1.68%	10071	9891	180	1.79%	10453	10255	198	1.89%
5	B	Clonard Road West					17058	16621	437	2.56%	18235	17737	498	2.73%	18914	18367	547	2.89%
5	C	Stephenstown Link Rd					5319	5165	154	2.89%	5722	5547	175	3.06%	5955	5763	192	3.23%
5	D	Clonard Road East					10440	10143	298	2.85%	11127	10788	339	3.05%	11524	11152	372	3.23%
6	A	Chapel St (E)					12967	12607	361	2.78%	13891	13481	411	2.96%	14425	13974	452	3.13%
6	B	Millfield Shopping (S)					8221	8032	188	2.29%	8841	8627	214	2.43%	9198	8962	236	2.56%
6	C	Clonard Rd (W)					10424	10099	325	3.12%	11111	10741	370	3.33%	11510	11103	407	3.53%
6	D	Westbrook Pk (N)					1262	1228	34	2.73%	1355	1315	39	2.90%	1408	1365	43	3.07%
7	A	Naul Rd (W)					12393	11739	654	5.28%	13035	12290	745	5.72%	13420	12600	819	6.10%
7	B	Bridgefoot Rd (N)					2551	2322	229	8.97%	2763	2502	261	9.43%	2890	2604	286	9.91%
7	C	Clonard Rd (E)					10867	10442	424	3.90%	11376	10893	483	4.25%	11678	11147	531	4.55%
7	D	White Hart Rd (S)					353	318	35	9.88%	382	343	40	10.38%	400	357	44	10.90%
8	A	Naul Rd (E)					19583	18929	654	3.34%	20784	20039	745	3.59%	21484	20665	819	3.81%
8	B	L1390 (S)					6178	5693	485	7.85%	6613	6061	552	8.35%	6876	6269	607	8.82%
8	C	Naul Rd (W)					18955	18064	891	4.70%	20195	19180	1015	5.02%	20926	19811	1115	5.33%
9	A	Bridgefoot Rd (N)					3676	3539	137	3.73%	3970	3814	156	3.94%	4141	3969	172	4.15%
9	B	Flemington Lane (E)					1724	1674	50	2.91%	1861	1804	57	3.07%	1941	1878	63	3.24%
9	C	Bridgefoot Rd (S)					3643	3491	152	4.17%	3936	3762	173	4.40%	4106	3916	190	4.63%
10	A	Drogheda St (S)					7586	7211	375	4.94%	8187	7760	427	5.22%	8539	8069	469	5.50%
10	B	Fleminton Lane (W)					1783	1744	40	2.23%	1924	1879	45	2.36%	2005	1956	50	2.49%
10	C	Drogheda St (N)					6210	5860	350	5.63%	6702	6303	398	5.95%	6991	6553	438	6.26%
11	A	Drogheda St (N)					7784	7602	182	2.34%	8388	8181	207	2.47%	8735	8508	228	2.60%
11	B	Cardy Rock (E)					1813	1806	7	0.39%	1954	1946	8	0.41%	2034	2026	9	0.43%
11	C	Drogheda St (S)					10216	9917	299	2.93%	11029	10688	341	3.09%	11497	11123	375	3.26%
11	D	Hamlet Lane (W)					3591	3515	77	2.14%	3863	3776	88	2.27%	4019	3923	96	2.40%
12	A	Drogheda St (N)					10433	10106	327	3.14%	11264	10891	373	3.31%	11744	11334	410	3.49%
12	B	Drogheda St (S)					11811	11451	359	3.04%	12731	12322	409	3.21%	13263	12813	450	3.39%
12	C	Harry Reynolds (W)					6130	5994	136	2.21%	6595	6441	154	2.34%	6863	6693	170	2.47%
13	A	Harry Reynolds (N)					8630	8493	137	1.59%	9261	9105	156	1.69%	9623	9451	172	1.78%
13	B	Chapel St (E)					5384	5338	46	0.86%	5759	5707	53	0.91%	5973	5915	58	0.97%
13	C	Harry Reynolds (S)					5734	5612	122	2.12%	6141	6002	139	2.26%	6374	6222	152	2.39%
13	D	Chapel St (W)					10230	10028	201	1.97%	10932	10702	229	2.10%	11335	11082	252	2.22%
A	A	FLR North					1444	1444	0	0.00%	1444	1444	0	0.00%	1444	1444	0	0.00%
A	B	Boulevard Rd					2229	2229	0	0.00%	2229	2229	0	0.00%	2229	2229	0	0.00%
A	C	FLR South					303	303	0	0.00%	303	303	0	0.00%	303	303	0	0.00%
A	D	Western Access					1005	1005	0	0.00%	1005	1005	0	0.00%	1005	1005	0	0.00%
B	A	FLR North					1066	1066	0	0.00%	1066	1066	0	0.00%	1066	1066	0	0.00%
B	B	Hamlet Lane (E)					557	557	0	0.00%	557	557	0	0.00%	557	557	0	0.00%
B	C	FLR South					1444	1444	0	0.00%	1444	1444	0	0.00%	1444	1444	0	0.00%
B	D	Western Access					412	412	0	0.00%	412	412	0	0.00%	412	412	0	0.00%
C	A	FLR South					1066	1066	0	0.00%	1066	1066	0	0.00%	1066	1066	0	0.00%
C	B	Western Access					334	334	0	0.00%	334	334	0	0.00%	334	334	0	0.00%
C	C	FLR North					731	731	0	0.00%	731	731	0	0.00%	731	731	0	0.00%
D	A	FLR North					0	0	0	#DIV/0!	0	0	0	#DIV/0!	0	0	0	#DIV/0!
D	B	Eastern Access					731	731	0	0.00%	731	731	0	0.00%	731	731	0	0.00%
D	C	FLR South					731	731	0	0.00%	731	731	0	0.00%	731	731	0	0.00%

APPENDIX 12.6

Mobility Management Plan (Reference 191004-MMP)

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Mobility Management Plan Framework

November 2023

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DOCUMENT CONTROL SHEET

	Client	Dean Swift Property Holdings							
	Project Title	Malincross Housing Development							
	Project Ref.	191004							
	Document Title	Mobility Management Plan Framework							
	Document No.	191004-MMP01							
	This Document Comprises	DCS	TOC	LOT	LOG	LOF	LOD	Text	Appendices
		1	2	-	-	-	-	38	2
	Check								

Revision	Status	Author	Reviewed By	Approved By	Issue Dates
D01	Draft	BJC	MJP	MJP	08.12.2022
F01	Final	BJC	MJP	MJP	09.12.2022
F02	Final	BJC	MJP	MJP	26.05.2023
F03	Final	BJC	MJP	MJP	30.06.2023
F04	**Final**	**BJC**	**MJP**	**MJP**	**20.11.2023**

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1.0 INTRODUCTION

1.1 Overview

1.1.1 This Mobility Management Plan Framework has been prepared by MPA Consulting Engineers in support of the planning application to Fingal County Council for the Large Scale Residential Development (LRD) in Balbriggan, County Dublin.

1.1.2 The Masterplan is envisaged to deliver a total of 564 dwellings split between 378 houses, 84 duplex dwellings, 102 apartments and two five-classroom creches across five Character Areas (CA).

1.1.3 Phase	Houses	Duplexes	Apartments	Total
1	124	30	42	196
2	71	18	14	103
3	84	24	20	128
4	99	12	26	137
Total	**378**	**84**	**102**	**564**

1.1.4 Table 1.1 provides a summary of the phases of the development.

Phase	Houses	Duplexes	Apartments	Total
1	124	30	42	196
2	71	18	14	103
3	84	24	20	128
4	99	12	26	137
Total	**378**	**84**	**102**	**564**

TABLE 1.1: PROPOSED PHASES OF THE MALINCROSS MASTERPLAN

1.1.5 The site is shown in **Figure 1.1** below.



FIGURE 1.1: MALINCROSS SITE AREA

1.2 What is a Mobility Management Plan?

1.2.1 A Mobility Management Plan (MMP) is a package of measures aimed at promoting and encouraging sustainable travel and reducing reliance on single occupancy private vehicle use.

1.2.2 The purpose of a Mobility Management Plan is not to be 'anti-car', but to make apparent, encourage and support broader community expectations for carrying out their daily business in a more sustainable way.

1.2.3 A Mobility Management Plan has a clear set of objectives which underpins the purpose for having a Mobility Management Plan. Appropriate measures are identified to help achieve the stated objectives, as well as appropriate monitoring and marketing techniques.

1.2.4 A robust Mobility Management Plan can play a significant role in reducing the transport impacts of a development, though critical to its success is the commitment of the developer, local authority and other interested parties to ensuring its implementation and progress.

1.3 Objectives of Mobility Management Plan Framework

1.3.1 The objectives of the Framework document should benefit both future residents of the development and the wider community. The overarching, site specific objective has therefore been identified as:

- *Seek to minimise the number of single occupancy private vehicle journeys made to and from the housing development, to promote travel by more sustainable modes of transport, and to manage the overall transport impacts of the development.*

1.3.2 Wider environmental, economic and health objectives also apply, such as:

- *Reducing carbon emissions;*
- *Reducing dependency on the car;*
- *Reducing living costs; and*
- *Improving individual health and fitness.*

1.3.3 These objectives should guide the setting of targets and the types of actions that are implemented.

1.3.4 This Framework document addresses the future residents need for access to a full range of facilities for education, leisure and shopping. By successfully promoting access to these facilities via sustainable modes of transport, the above objectives can be achieved.

1.4 Target Audience

1.4.1 The Mobility Management Plan Framework has the following target audience:

- **Future Residents** - Future residents, reading Chapter 4, will be informed of the sustainable modes of transport in the locale and will be encouraged to consider walking, cycling and public transport as an alternative mode of travel.
- **Appointed Mobility Manager and Working Group** - The appointed Mobility Manager and working group members will be responsible for the implementation of the Framework document. The Working Group will find the Mobility Plan's stated 'Objectives' in Chapter 1 and a list of suggested 'Targets' and 'Actions' in Chapter 6 and Chapter 7 respectively. The Actions and Targets will be updated regularly and actioned by the appointed Mobility Manager and Working Group.
- **Fingal County Council** – Council will be keen review the Framework's Targets and Actions and confirm that they are realistic, achievable and implementable.

1.5 Motivation to Encourage a Shift Towards Sustainable Modes of Travel

Sustainability

1.5.1 Studies indicate that carbon dioxide (CO_2) is one of the important greenhouse gases and that its emission from the combustion of fossil fuels is one of the major causes of global warming. It is also argued that transport is one of the fastest growing sources of climate change gases in Ireland.

1.5.2 Overall, 19.5 percent of Ireland's greenhouse gas (GHG) emissions are from the transport sector, and this proportion is expected to increase substantially by 2020 (Source: Environmental Protection Agency – Ireland's Environment Assessment – Chapter 10: Environment and Transport).

1.5.3 Everybody can play a part in reducing these greenhouse gas emissions, especially when choosing a sustainable mode of travel in lieu of a single occupancy vehicle (SOV) use.

1.5.4 For instance:

- Walking and Cycling – Is by far the greenest modes of travel;
- Bus or Train – Mass transit systems offer a greener mode of travel per passenger than SOVs; and
- Car Sharing – two or more people sharing a car generates half or less the emissions from a SOV.

1.5.5 The Institution of Highways and Transportation states that three quarters of journeys by all modes are less than five miles (8km) and half are less than two miles (3.2km). These are distances that can be cycled comfortably by a reasonably fit person. Based on an average cycling speed of 4.0m/s (14.4km/k) 8 kilometres can be cycled in just over half an hour and 3.2 kilometres can be cycled in less than 15 minutes. Given the location of the site and its proximity to Balbriggan Town Centre, it is clear that all necessary services and facilities are available within an appropriate walking and cycling distance. In addition to Balbriggan Town Centre, other retail options are available at Millfield Shopping Centre, located approximately 850 metres to the south east of the site.

1.5.6 Furthermore, the adjacent Glenveagh Homes Ladywell Development will include some commercial floorspace (540sqm), which will cater for the Malincross LRD and wider community.

Personal Health and Fitness

1.5.7 Choosing to cycle or walk will have positive benefits to an individual's health, fitness and wellbeing. The Government, through the Health Service Executive (HSE), recommends 30 minutes of exercise every day to:

- Reduce the risk of developing chronic diseases including heart disease, strokes and cancer;
- Increase life expectancy and improve quality of life in later years;
- Keep your weight at a healthy level;
- Protect both your physical and mental health; and
- Reduce stress and boost your energy levels.

Financial

1.5.8 There are also significant financial benefits associated with non-car travel modes. Over recent years fuel prices have been steadily increasing. This coupled with increased parking charges, increased car tax, insurance costs, vehicle maintenance, and vehicle depreciation, means that the cost of using the private car as the travel mode of choice is spiraling.

1.5.9 In comparison, the day-to-day costs associated with walking are negligible. Apart from potentially purchasing a bicycle, the day-to-day costs of cycling are also negligible.

1.6 Structure of Mobility Management Plan Framework

1.6.1 The remainder of this report is divided into the following chapters:

- **Chapter 2** provides a review of the relevant guidance and policy documents that have helped to establish the principles of this Mobility Management Plan Framework;
- **Chapter 3** outlines the environment within which the housing development is located;
- **Chapter 4** summarises the sustainable modes of travel that are available to residents;
- **Chapter 5** establishes the existing travel trends in the locale;
- **Chapter 6** proposes a series of Mobility Management Targets;
- **Chapter 7** outlines a series of suggested Actions that can be implemented and considered as part of the Mobility Management Plan Framework. This chapter also discusses the monitoring and review process for the Framework document.

2.0 POLICY CONTEXT

2.1 Overview

2.1.1 MPA Consulting Engineers has made reference to the following documents:

- Fingal Development Plan 2023 - 2029
- Fingal Development Plan 2017 – 2023
- Transport Strategy for the Greater Dublin Area 2016 – 2035 (National Transport Authority);
- Project Ireland 2040;
- Smarter Travel: A Sustainable Transport Future: A New Transport Policy for Ireland, 2009-2020, (Department of Transport Tourism and Sport (DTTAS), 2008);
- Greater Dublin Area Cycle Network Plan (National Transport Authority);
- The National Cycling Policy Framework 2010; and
- Transport for Ireland Dublin Area Train and Tram Services (Transport for Ireland).

2.1.2 These planning policies will aid in preparing a strategy that, upon implementation, will reduce the overall single occupancy vehicle (SOV) dependency and increase more sustainable forms of transport through incentives and create a positive sustainable transport environment for future resident while adhering to local and national policies.

2.2 Fingal Development Plan 2023 – 2029

2.2.1 The Fingal Development Plan 2023 – 2029 provides the current framework for planning and sustainable development within the municipality of Fingal. The most relevant policies and objectives include:



Movement and Infrastructure – Statement of Policy

- *This Plan recognises and supports a collaborative approach that needs to be taken by all stakeholders to ensure the delivery of a sustainable transport network including key transport projects, new walking and cycling infrastructure, behavioural change initiatives and improved roads access.*

Objectives

- **Objective CMO1** – *Work with the NTA, TII and other transport agencies in facilitating the integrated set of transport objectives for the County as set out in this Plan, in line with National and Regional policy including the NTA's GDA Transport Strategy and any subsequent plan to encourage modal shift towards more sustainable modes of transport and patterns of commuting to reduce reliance on the private car;*
- **Objective CMO4** – *Prepare a Local Transport Plan for Balbriggan, in consultation with the NTA and other relevant stakeholders;*
- **Objective CMO6** – *Maintain and improve the pedestrian and cyclist environment and promote the development of a network of pedestrian/cycle routes which link residential areas with schools, employment, recreational destinations and public transport stops to create a*

pedestrian/cyclist environment that is safe, accessible to all in accordance with best accessibility standards;

- **Objective CMO7** – *Work with the relevant transport providers, agencies, and stakeholders to facilitate the integration of active travel (walking/cycling etc.) with public transport, ensuring ease of access for all;.*
- **Objective CMO23** - *Support the delivery of key sustainable transport projects including MetroLink, BusConnects, DART+ and LUAS expansion programme so as to provide an integrated public transport network with efficient interchange between transport modes to serve needs of the County and the mid-east region in collaboration with the NTA, TII, Irish Rail and other relevant stakeholders;*
- **Objective CMP2** – *Concentrate compact growth around existing and planned transport services ensuring that transport and land-use are integrated to the greatest extent possible so that the demand for travel in general and for car-based travel is reduced;*
- **Objective CMP4** – *Prepare Local Transport Plans based on the ABTA methodology in conjunction with the preparation of Local Area Masterplans, Framework Plans, and other large-scale studies and plans as appropriate, in consultation with the NTA and TII and other relevant stakeholders;*
- **Objective CMP5** – *Promote best practice mobility management and travel planning through the requirement for proactive mobility strategies for development focussed on prioritising sustainable modes of travel including walking, cycling and public transport;*
- **Objective CMP7** – *Secure the development of a high-quality and inclusive pedestrian and cycling network and provision of supporting facilities / infrastructure across the County, including the upgrade of the existing network and support the integration of walking, cycling and physical activity with placemaking, including public realm improvements, in collaboration with the NTA and other relevant stakeholders, local communities and adjoining Local Authorities in the context of the impact of development schemes with cross boundary impacts and opportunities where appropriate. Routes within the network shall have regard to NTA and TII national standards and policies.*

2.3 Fingal Development Plan 2017 – 2023



2.3.1 The Fingal Development Plan 2017 – 2023 set out the vision, policies and objectives for planning and sustainable development within the municipality of Fingal at the commencement of the design of this project. The most relevant policies and objectives referenced:

Movement and Infrastructure – Statement of Policy

- *Promote and facilitate movement to, from and within the County of Fingal, by integrating land use with a high quality, sustainable transport system that priorities walking, cycling and public transport.*

Objectives

- **Objective MT01** - *Support National and Regional transport policies as they apply to Fingal. In particular, the Council supports the Government's commitment to the proposed new Metro*

North and DART expansion included in Building on Recovery: Infrastructure and Capital Investment 2016-2021. The Council also supports the implementation of sustainable transport solutions;

- **Objective MT02** - *Support the recommendations of the National Transport Authority's Transport Strategy for the Greater Dublin Area 2016-2035 to facilitate the future sustainable growth of Fingal;*
- **Objective MT03** - *Implement Smarter Travel – A Sustainable Travel Future policy and work to achieve the Key Goals set out in this policy;*
- **Objective MT13** - *Promote walking and cycling as efficient, healthy, and environmentally friendly modes of transport by securing the development of a network of direct, comfortable, convenient and safe cycle routes and footpaths, particularly in urban areas;*
- **Objective MT14** - *The Council will work in cooperation with the National Transport Authority (NTA) and adjoining Local Authorities to implement the Greater Dublin Area Cycle Network Plan subject to detailed engineering design and the mitigation measures presented in the SEA and Nature Impact Statement accompanying the NTA Plan;*
- **Objective MT17** - *Improve pedestrian and cycle connectivity to schools and third level colleges and identify and minimise barriers to children walking and cycling to primary and secondary schools.*
- **Objective MT20** - *Investigate the use of demand management measures to improve the attractiveness of urban centres for cyclists (and public transport users).*
- **Objective MT22** - *Improve pedestrian and cycle connectivity to stations and other public transport interchanges.*

2.4 Transport Strategy for the Greater Dublin Area 2016 – 2035

2.4.1 The Transport Strategy for the Greater Dublin Area (2016 – 2035), prepared by the NTA, outlines the following strategy:



- *To contribute to the economic, social and cultural progress of the Greater Dublin area by providing for the efficient, effective and sustainable movement of people and goods.*

2.4.2 Chapter five of the aforementioned report sets out the *"strategic infrastructure that is proposed to be delivered within the lifetime of the strategy".* The strategy proposals are presented by the various modes of transport as follows:

- *Heavy Rail Infrastructure;*
- *Light Rail Infrastructure;*
- *Bus Infrastructure;*
- *Cycling Infrastructure;*
- *Walking; and*
- *Road Network*

2.4.3 Within each section of the modes of transport, the NTA outline the proposed measures to be adopted

when providing a development and the considerations that have to be given.

2.5 Project Ireland 2040

2.5.1 The National Planning Framework (NPF) is a national document intended to guide, at a high level, strategic planning and development for Ireland over the next 20+ years, so that as the population grows, that growth is sustainable in economic, social and environmental terms.



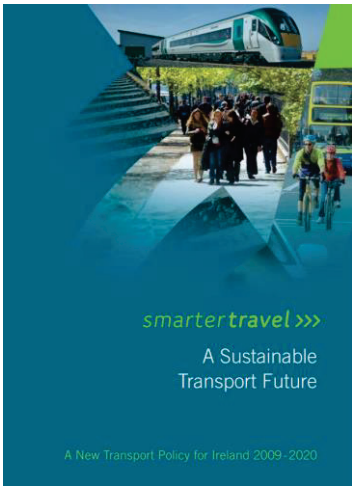
2.5.2 The NPF details 10 National Strategic Outcomes and the National Development Plan 2018–2027 outlines how public capital investment over the next 10 years aims to secure the realisation of each of these under corresponding 'Strategic Investment Priorities'.

2.5.3 National Strategic Outcome No. 4 states:

- *An environmentally sustainable public transport system will enable growth and change; meet the significant increase in travel demand and urban congestion while also contributing to our national policy vision of a low-carbon economy. A step change is required under the NPF in putting in place environmentally sustainable public transport systems in order to secure Ireland's climate action goals. These must represent a decisive shift away from polluting and carbon-intensive propulsion system to new technologies such as electric vehicles and introduction of electric and other alternatively fuelled systems for public transport fleets. The expansion of attractive and sustainable public transport alternatives to private based car transport will reduce congestion and emissions and enable the transport sector to cater in an environmentally sustainable way for the demands associated with longer term population and employment growth envisaged under the NPF. Furthermore, the provision of safe alternative active travel options such as segregated cycling and walking facilities can also help alleviate congestion and meet climate action objectives by providing viable alternatives and connectivity.*

2.6 Smarter Travel – A Sustainable Transport Future

2.6.1 The Smarter Travel Policy, published in 2009, sets out a goal to reduce work-related commuting by car nationally in Ireland from 65 percent to 45 percent by 2020. The policy sets out 49 different actions to achieve a more sustainable transport system grouped into four (4) overarching actions, outlined on page 29 of the policy, as follows:



- Actions to reduce distance travelled by private car and encourage smarter travel, include focusing population and employment growth predominately in larger urban areas and the use of pricing mechanisms or fiscal measures to encourage behavioural change;
- Actions aimed at ensuring that alternatives to the car are more widely available, mainly through a radically improved public transport service and through investment in cycling and walking;

- Actions aimed at improving the fuel efficiency of motorised transport through improved fleet structure, energy efficient driving and alternative technologies; and
- Actions aimed at strengthening institutional arrangements to deliver the targets.

2.6.2 The Smarter Travel Policy emphasises the potential of mobility management to encourage people to change their travel behaviour and commitment to ensuring better integration of land use planning (Action 2) as well as to requiring and encouraging large workplaces to develop and implement workplace travel plans (Action 8) and that personalised travel plans should be prepared to encourage people to use public forms of transport (Action 9).

Action 2

2.6.3 We will ensure better integration of land use planning and transport policies in the relevant planning guidelines as part of their ongoing review, and we will avail of policy directives to give effect to specific measures needed to meet the vision for sustainable travel.

2.6.4 The following will also be included in future planning guidelines:

- *A general requirement that significant housing development in all cities and towns must have good public transport connections and safe routes for walking and cycling to access such connections and local amenities;*
- *Integration of cycling and public transport;*
- *Promotion of targets requiring a minimum percentage of new residential and mixed-use development to take place on brownfield/existing sites to consolidate urban growth and enable organic development of urban areas from the centre out;*
- *Ensuring a general minimum housing density of between 35 and 50 dwellings per hectare in urban areas of suitable size and population and requiring substantially higher densities where local circumstances warrant, particularly in high capacity public transport corridors;*
- *Specification of a maximum permitted level of car parking for commercial sites, which have suitable public transport facilities and are within walking/ cycling distance to amenities;*
- *A requirement that developments above a certain scale have viable travel plans in place;*
- *A requirement that development in urban rail corridors be high density and appropriate for public transport use (e.g. not warehousing or other activities with low employment intensity);*
- *Guidance on the incorporation of cycling and walking policies in development plans;*
- *A general restriction of the future development of out-of-town retail centres except in exceptional circumstances and consideration of a similar requirement that parking charges be introduced for most existing centres; and*
- *Encouragement of the use of local area plans and strategic development zones (SDZs) within major urban areas as a way of improving the land use-transport interface, particularly to ensure that employment and residential centres are co-located.*

Action 8

2.6.5 Workplace Travel Plans encourage employers and employees to take steps to reduce dependency on the car and to take alternative transport options. The Minister for Transport has already provided initial funding for a pilot scheme managed by the Dublin Transportation Office (DTO) and the

Department of Transport was the first Department to introduce such a Plan. The Government has also introduced a parking levy on employee car parking in key urban areas in the region of €200 per annum to dissuade use of the private car for commuting purposes. We will now focus on encouraging alternative ways of travelling to work. We will, therefore:

- *Work towards a requirement on organisations with over 100 staff to develop and implement workplace travel plans;*
- *Provide support and guidelines for the development and implementation of workplace travel plans; and*
- *Seek a plan from the Office of Public Works to reduce car-parking spaces at Government offices where alternative travel options are possible and require other public sector organisations to do likewise as part of their workplace travel plans*.

Action 9

2.6.6 Personalised Travel Plans aim to encourage individuals to take alternatives to car travel where these are available. International experience shows that such Plans must be accompanied by good, targeted marketing and involve incentives to encourage people to use alternatives to the private car. We will implement a programme to promote Personalised Travel Plans aimed at citizens in areas served by public transport.

3.0 SITE DESCRIPTION

3.1 Overview

3.1.1 Chapter 3 describes setting and location of the Malincross LRD relative to key destinations.

3.2 Development Location

3.2.1 The Malincross LRD site is a green field site located approximately 2km northwest of Balbriggan town centre, Co. Dublin.

3.2.2 The Masterplan site is 22.62ha (55.9 acres); (including Residential Site Area: 19.28ha (47.6 acres) & Class 1 Open Space - 2.8667ha (7.1 acres)). The site is located north of Clonard Road (the R122) and east of Bridgefoot Road (the L1130) and is bounded by Boulevard Road/the Taylor Hill Residential Development to the east and the Ladywell Residential Development (F21A/0055) to the south.

3.2.3 Balbriggan itself is located approximately 30km north of Dublin City in the northern part of the traditional County Dublin (now Fingal). It is home to a population of nearly 22,000 (2016 census).

3.2.4 Balbriggan is well connected due to the proximity of the M1 motorway that links south to the M50 / Dublin (and beyond to the rest of the country) and north to Belfast. The main Belfast-Dublin railway line passes through Balbriggan Railway Station and local bus routes provide regular links around Balbriggan town and to key local destinations.

3.2.5 Further, plans for the extension of DART services from Dublin to Drogheda have recently been published by the National Transport Authority. The expansion program, rebranded DART+, aims to double peak hour capacity with more trains and new stations, to create a full metropolitan area DART network for Dublin. A delivery date and funding for the DART+ Coastal North line has yet to be announced, however the DART+ program is seen as key future project and is included in the *National Development Plan 2018-2027*, *Transport Strategy for the Greater Dublin Area 2016 – 2035* and *The Climate Action Plan 2019*.

3.2.6 When delivered, the DART+ Coastal North project will provide a modern and frequent rail service that will connect Balbriggan to Dublin City and Drogheda.

3.2.7 The location of the housing development relative to the surrounding road network and to key destinations is shown overleaf in **Figure 3.1** and **Figure 3.2** overleaf:



FIGURE 3.1: DEVELOPMENT ACCESSIBILITY



FIGURE 3.2: KEY DESTINATIONS IN THE LOCALE

3.2.8 Some key destinations in the locale are detailed in **Table 3.1** below. The walking and cycling times are based on a walking speed of 1.4m/s (5kph) and cycling speeds of 4.0m/s (14kph) respectively.

Ref	Destination	Distance from Site	Walking Time to Destination	Cycling Time to Destination
1	Castle Mill Shopping Centre	900m	~11 min	~4 min
2	Millfield Shopping Centre	1.8km	~21.5 min	~7.5 min
3	Balbriggan Town Centre	3.0km	~36 min	~12.5 min
4	Coláiste Ghlór na Mara	900m	~5 min	~4 min
5	St Georges National School	1.2km	~14 min	~5 min
6	Bremore Educate Together Secondary School	1.8kmm	~21.5 min	~7.5 min
7	Scoil Chormaic CNS (Primary School)	1.7km	~20 min	~7 min
8	Balbriggan Educate Together National School	1.0km	~12 min	~4 min
9	Balbriggan Railway Station	2.8km	~33 min	~12 min
10	Loreto Secondary School Balbriggan	2.5km	~30 min	~10.5 min
11	Access to M1 Motorway	2.5km	-	-
12	GoCar Hire Station at Millfield S.C	900m	~11 min	~4 min
13	GoCar Hire Station at Balbriggan Railway Station	2.8km	~21.5 min	~12 min

TABLE 3.1: KEY DESTINATIONS IN THE LOCALE

4.0 SUSTAINABLE TRANSPORT OPTIONS FOR RESIDENTS

4.1 Overview

4.1.1 Chapter 4 informs of the sustainable modes of travel that are available to future residents.

4.1.2 This chapter of the Framework will be reviewed annually, and the public transport services and timetables will be continually reviewed and updated by the nominated Mobility Manager.

4.1.3 Furthermore, this chapter will be continually updated by the Mobility Manager as new sustainable transport modes become available i.e. future bicycle / scooter or car share schemes in Balbriggan or future extension of DART service to Balbriggan.

4.2 Public Transport

4.2.1 The development has access to a wide variety of public transport services with bus and train services to Dublin City services operating within convenient walking distance of the development.

Bus Routes

4.2.2 Balbriggan is served by the Balbriggan Town Service (B1), which operates two routes around the town, as shown in **Figure 4.1** below.



FIGURE 4.1: BALBRIGGAN BUS ROUTES

4.2.3 One route, shown in green, serves the northern and western parts of Balbriggan via Moylaragh Road and Hamlet Lane, whilst the second route, shown in purple, serves the southern and western parts of the town via the R132, Harry Reynolds Road and Clonard Road.

4.2.4 The closest existing bus stop is located is located Hamlet Lane, which is a five-minute walk from the housing development.

4.2.5 As part of the proposed Malincross and adjacent Ladywell residential developments, Boulevard Road will extend north and connect with Hamlet Lane. At this point in time, local bus services are expected to start operating on Boulevard Road as shown by the blue dashed line in **Figure 4.1**. Residents will be able to access the local bus network via a short walk to a bus stop on Boulevard Road.

4.2.6 The latest bus timetable is attached as **Appendix A** to this report.

Rail Access

4.2.7 Balbriggan Railway Station is located just north of Balbriggan Town Centre and is accessed by the B1 bus service (nine-minute journey). Balbriggan Railway Station is on the Dublin – Newry commuter line as well as the Dublin – Dundalk DART line.

4.2.8 Intercity / commuter train services operate typically at 15 - 60-minute intervals from 07:49AM to 00:28AM, Monday to Friday.

4.2.9 DART train services to Dublin Connolly are regular with a 15 to 35-minute frequency during the week between 6:19AM and 10:21PM.

4.2.10 The frequency reduces to 30 – 60 minutes on Saturdays and hourly on Sundays. The northbound route to Drogheda runs to a similar frequency.

4.2.11 The latest intercity train timetable is attached as **Appendix B** to this report. Full details of the DART timetable can be found at https://www.irishrail.ie/IrishRail/media/Timetable-PDF-s/Connolly-DART-timetables/4-_18-_dart_commuter.pdf.

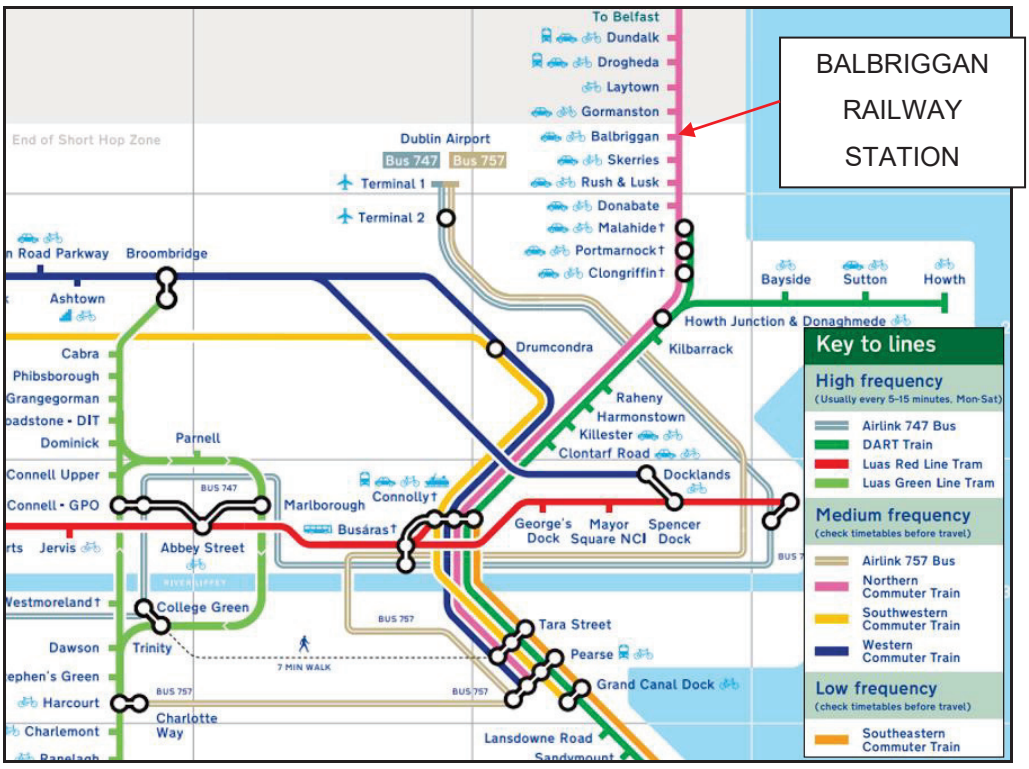


FIGURE 4.2: IRISH RAIL MAP

Future DART+ Rail Services

4.2.12 Plans for the extension of DART services from Dublin to Drogheda have recently been published by the National Transport Authority. The expansion program, rebranded DART+, aims to double peak hour capacity with more trains and new stations, to create a full metropolitan area DART network for Dublin. A delivery date and funding for the DART+ Coastal North line has yet to be announced, however the DART+ program is seen as key future project and is included in the *National Development Plan 2018-2027*, *Transport Strategy for the Greater Dublin Area 2016 – 2035* and *The Climate Action Plan 2019.*

4.2.13 When delivered, the project (DART+ Coastal North) will provide a modern and frequent rail service that will connect Balbriggan to Dublin City and Drogheda.

4.2.14 The latest information on the DART+ Coastal North project can be found online at www.irishrail.ie. A succinct description of the project is presented overleaf in **Figure 4.3**.

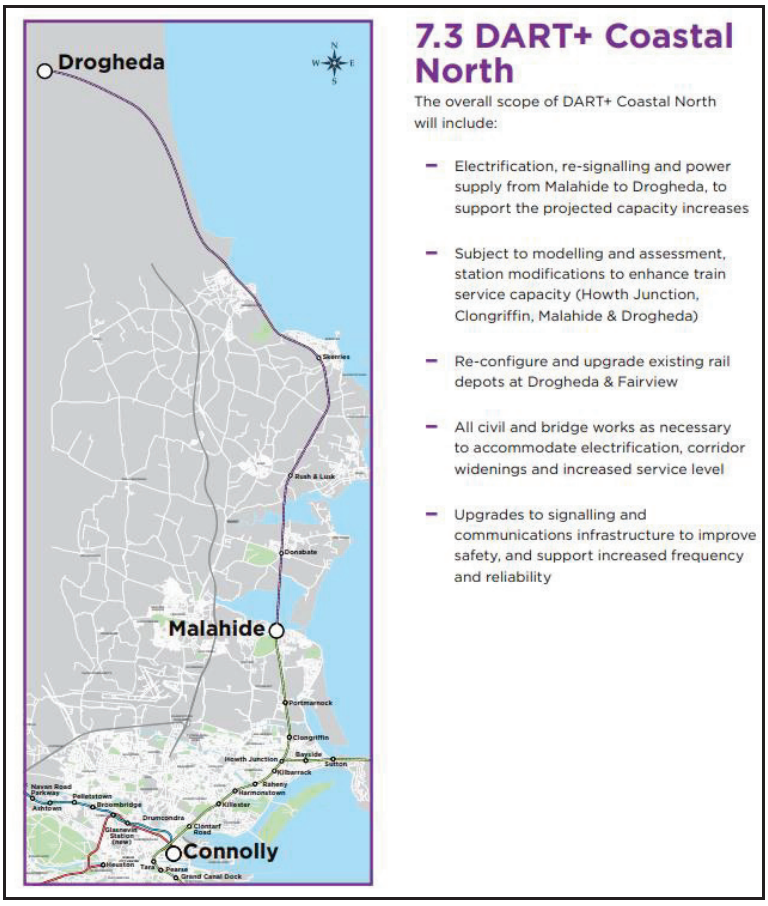


FIGURE 4.3: DART+ COASTAL NORTH PROJECT

Plan Your Journey

4.2.15 Residents can plan their public transport journey at www.transportforireland.ie/plan-a-journey/.

4.2.16 Additionally, residents can download the *Transport for Ireland Journey Planner App* for free from Apple Store or Google Play. Some of the App features include:

- Real time train, DART, LUAS and bus information, including cancellations;
- Search train, DART, LUAS and bus timetables;

- Ability to search for the closest train, DART, LUAS and bus stop;
- Plan a whole journey;
- Save favourite locations and recent journeys; and
- Email and in-calendar functions.

4.2.17 Alternatively, residents can visit www.Balbriggan.info and can find real time bus and train information.

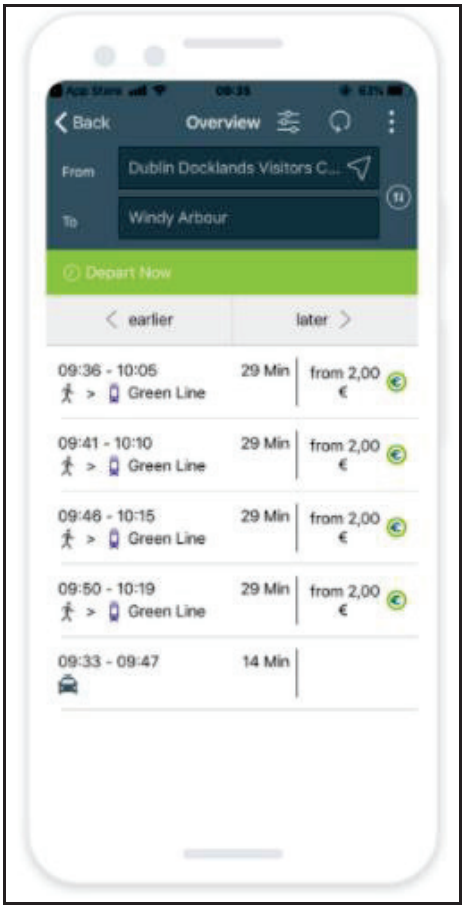
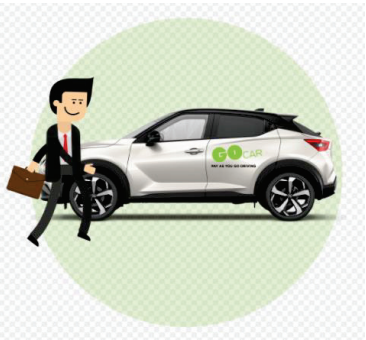


FIGURE 4.4: TFI JOURNEY PLANNER APP INTERFACE

4.2.18 Residents can also download the *Transport for Ireland Leap Card Top-Up App* for free from Apple Store or Google Play. The App allows instant fare top-up, balance checking and ticket collection.

4.3 Car Club Services



4.3.1 Car clubs provide socially inclusive, low emission mobility which helps to break dependency on private car ownership. Pay as you go cars offer affordable, occasional access to cars to benefit individuals.

4.3.2 Two (2) GoCar hire stations are located within a 1.8km walking distance of the development. GoCar members can book online or via the App, for durations as little as an hour. The benefits of car sharing includes:

- The reduction of cars on the road, thus reducing traffic congestion, noise and air pollution;

- Increases public transport use, walking and cycling due to the reduced need for car ownership;
- Car sharing allows those who cannot afford a motor vehicle the opportunity to drive and therefore encouraging social inclusivity.

4.3.3 The location of the GoCar hire stations is detailed below in **Table 4.1** and **Figure 4.5**.

Car Share Hire Station Location	Distance to Hire Station	Walking Time to Hire Station
Castle Mill Shopping Centre	900m	~ 11 min
Balbriggan Railway Station	2.8km	~ 21.5 min

TABLE 4.1: CAR CLUB HIRE STATIONS IN THE LOCALE

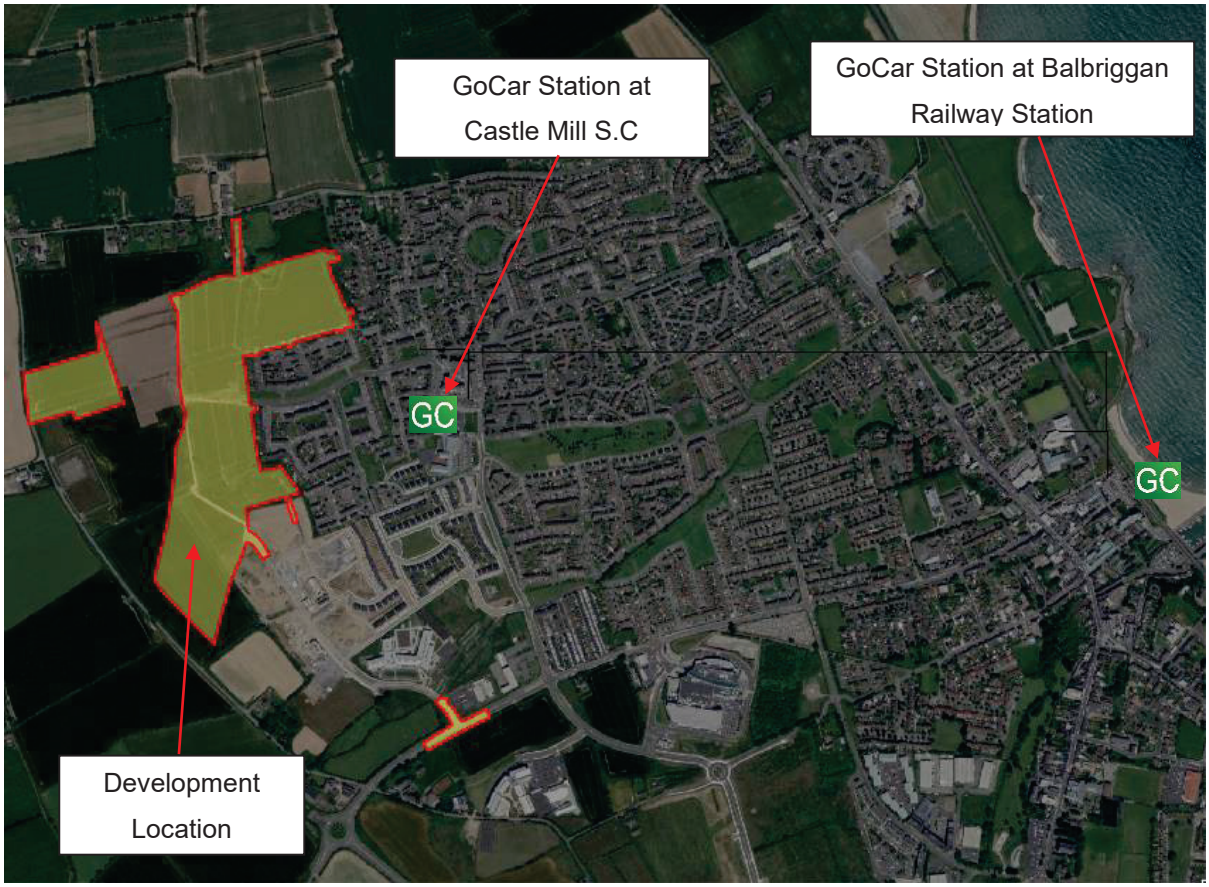


FIGURE 4.5: CAR SHARE HIRE STATIONS IN THE LOCALE

4.3.4 Residents can download the GoCar App for free from Apple Store or Google Play.

4.3.5 Alternatively, online bookings can make at www.gocar.ie.

4.4 Taxi Services

4.4.1 The following local taxi services operate in Balbriggan:

- **Bracken Cabs, 6A Drogheda Street Balbriggan.**
  Tel: (01) 841 3111;
- **G Cabs**, 7 Railway Street, Balbriggan
  Tel (01) 841 7777; and
- **Anthony's Taxi and Airport Transfers**, Cardy Rock Cres., Balbriggan
  Tel (087) 943 1513



4.4.2 Alternatively, residents can download the Lynk or Free-Now App for free from Apple Store or Google Play or book a taxi on-line.

4.5 Cycling as an Alternative Mode of Transport



4.5.1 The Chartered Institute of Highways and Transportation (CIHT) states that three quarters of journeys by all modes are less than five miles (8km) and half are less than two miles (3.2km). These are distances that can therefore be cycled comfortably by a reasonably fit person.

4.5.2 The whole of Balbriggan is within 3.2km of the development site, as shown in **Figure 4.6** and therefore cycling to and from the housing development is a viable option as residents and visitors alike can make use of the extensive network of cycle infrastructure already in place in the locale. This includes dedicated off-road cycleways and those provided as a segregated facility along, Boulevard Road, Clonard Road and Castlemill Link Road.



FIGURE 4.6: 3.2KM CYCLING CATCHMENT AROUND HOUSING DEVELOPMENT

4.5.3 In addition, the National Transport authority (NTA) has surveyed cycling infrastructure in the Greater Dublin Area (GDA) (Greater Dublin area Cycle Network Plan). An extract from this plan, detailing the surveyed cycling infrastructure in Balbriggan is presented overleaf in **Figure 4.7**.

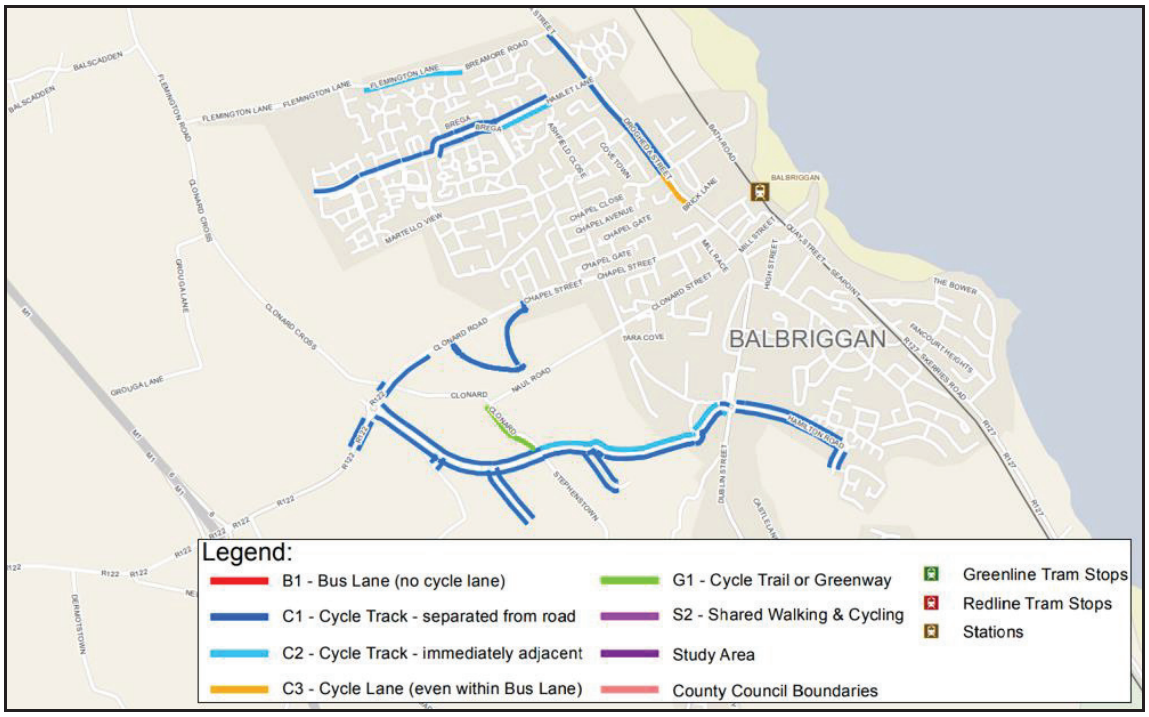
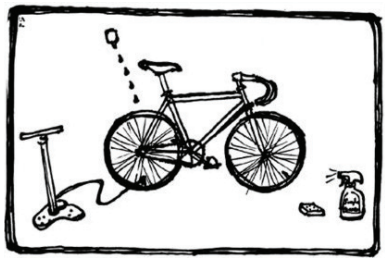


FIGURE 4.7: SURVEYED LOCAL CYCLING INFRASTRUCTURE[1]

Service Your Bicycle

4.5.4 If residents need to service or repair their bicycle, there are a number of shops nearby that offer this service, including:

- **Cycle and Angling Store**, High Street Balbriggan. Tel: (01) 841 3597; and
- **Richies Bike Store**, Town Centre Mall, Swords. Tel (01) 890 0631



4.6 Walking as an Alternative Mode of Transport

4.6.1 Good quality footways are provided on both sides of all roads and footways are typically 2.0 metres wide and formed with concrete. Drop kerbs are provided where these footways cross side road junctions.

4.6.2 Walking journeys to and from the various local facilities is likely to be a genuine travel choice for many residents of the development.

4.6.3 Acceptable walking distances will vary considerably depending on various factors such as fitness and land topography; however, the 'Providing for Journeys on Foot' guidelines produced by the Chartered Institution of Highways and Transportation (CIHT) identifies suggested acceptable walking

[1] Source: Greater Dublin area Cycle Network Plan

distances for different types of journey, as shown overleaf in **Figure 4.8**.

Table 3.2: Suggested Acceptable Walking Distance.

	Town centres (m)	Commuting/School Sight-seeing (m)	Elsewhere (m)
Desirable	200	500	400
Acceptable	400	1000	800
Preferred maximum	800	2000	1200

FIGURE 4.8: SUGGESTED ACCEPTABLE WALKING DISTANCES (CIHT)

4.6.4 These distances can be applied to the development, as shown in **Table 4.2**.

4.6.5 **Table 4.2** demonstrates, that based on a walking speed of 1.4 m/sec, all schools are within a 12-minute walk of the site and that there is a range of shops and community facilities within a 13-minute walk.

4.6.6 The nearest bus stops are with the target 400m distance. What is more, it should be noted that existing bus routes can be extended through the proposed development as Boulevard Road is extended and linked to Hamlet Lane.

Destination	Distance from Site	Walking Time to Destination	CIHT Maximum Guidance
Bus Stop (Hamlet Lane)	400m	~5 mins	400m
Castle Mill Shopping Centre	900m	~11 min	1,200m
Millfield Shopping Centre	1.8km	~21.5 min	1,200m
Balbriggan Town Centre	3.0km	~36 min	2,000m
Coláiste Ghlór na Mara	900m	~5 min	2,000m
St Georges National School	1.2km	~14 min	2,000m
Bremore Educate Together Secondary School	1.8kmm	~21.5 min	2,000m
Scoil Chormaic CNS (Primary School)	1.7km	~20 min	2,000m
Balbriggan Educate Together	1.0km	~12 min	2,000m

National School			
Balbriggan Railway Station	2.8km	~33 min	2,000m
Loreto Secondary School Balbriggan	2.5km	~30 min	2,000m

TABLE 4.2: WALKING DISTANCES VERSUS CIHT GUIDANCE

4.6.7 In light of the above, it is evident that the housing scheme is ideally located, and an extensive range of local facilities can easily be accessed on foot.

4.6.8 The housing development itself has been designed to include high quality pedestrian routes throughout that link through to the existing off-site routes.

4.6.9 A summary of the existing and planned pedestrian and cycling links to / from the Malincross is presented below in **Figure 4.9**.

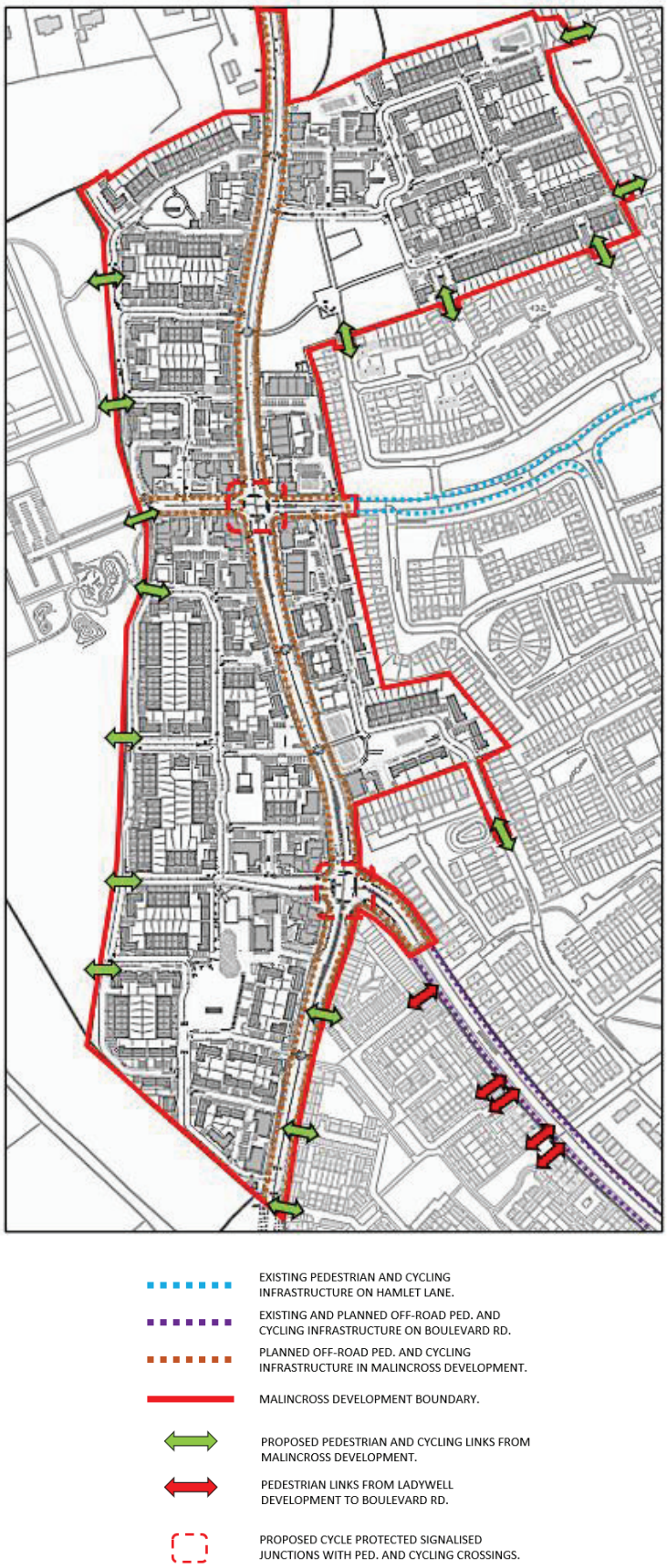


FIGURE 4.9: PLANNED AND EXISTING PEDESTRIAN AND CYCLING LINKS TO AND FROM THE MALINCROSS SITE

5.0 EXISTING TRAVEL PATTERNS

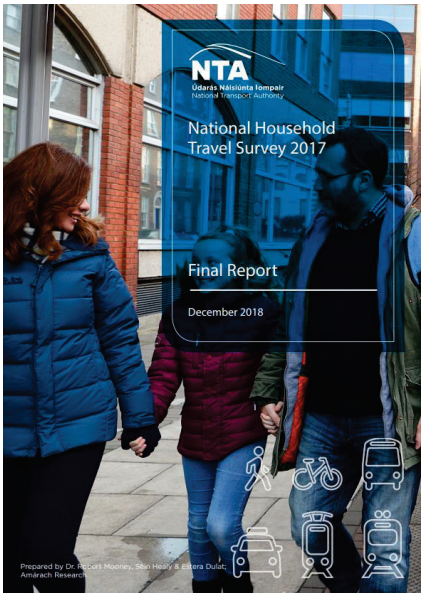
5.1 Overview

5.1.1 To determine existing travel patterns, reference has been made to the National Transport Authority's National Household Travel Survey 2017 and 2016 census data.

5.1.2 The data will help to inform both the existing travel patterns of Balbriggan residents and the likely travel patterns of future residents of the scheme.

5.2 National Household Travel Survey

5.2.1 The National Household Travel Survey is a nationally representative study of Ireland's travel habits. Data has been gathered through two sources - a CAPI administered survey of each household and a three-day travel diary of each person over four years old in that household.



5.2.2 Through these two methods, a comprehensive sample of national travel habits has been achieved. In total, 5,906 households have been surveyed. From these households, 10,289 diaries have been complete. At a national level, these diaries have captured 62,307 trips and have detailed distance travelled, duration of journey, mode of transport, reason for the journey, the day of travel, time of outward journey, in addition to the number of people taking the trip and their demographic profile.

5.2.3 The purpose of the study is 'to gather travel information for the Authority's on-going transportation planning role and to provide travel data for the update of their regional transport models and for the development of additional transport modelling tools'.

5.3 Greater Dublin Area

5.3.1 To determine the existing travel patterns of the Greater Dublin Area, reference has been made to Chapter 7 of the National Household Travel Survey, which details the travel behaviors of those surveyed within the Greater Dublin Area.

5.3.2 The Greater Dublin Area, as defined by in the National Household Travel Survey, is shown in **Figure 5.1**. A summary of the mode and reasons for travel for persons in the Greater Dublin Area is presented in **Figure 5.2** and **Figure 5.3** respectively.

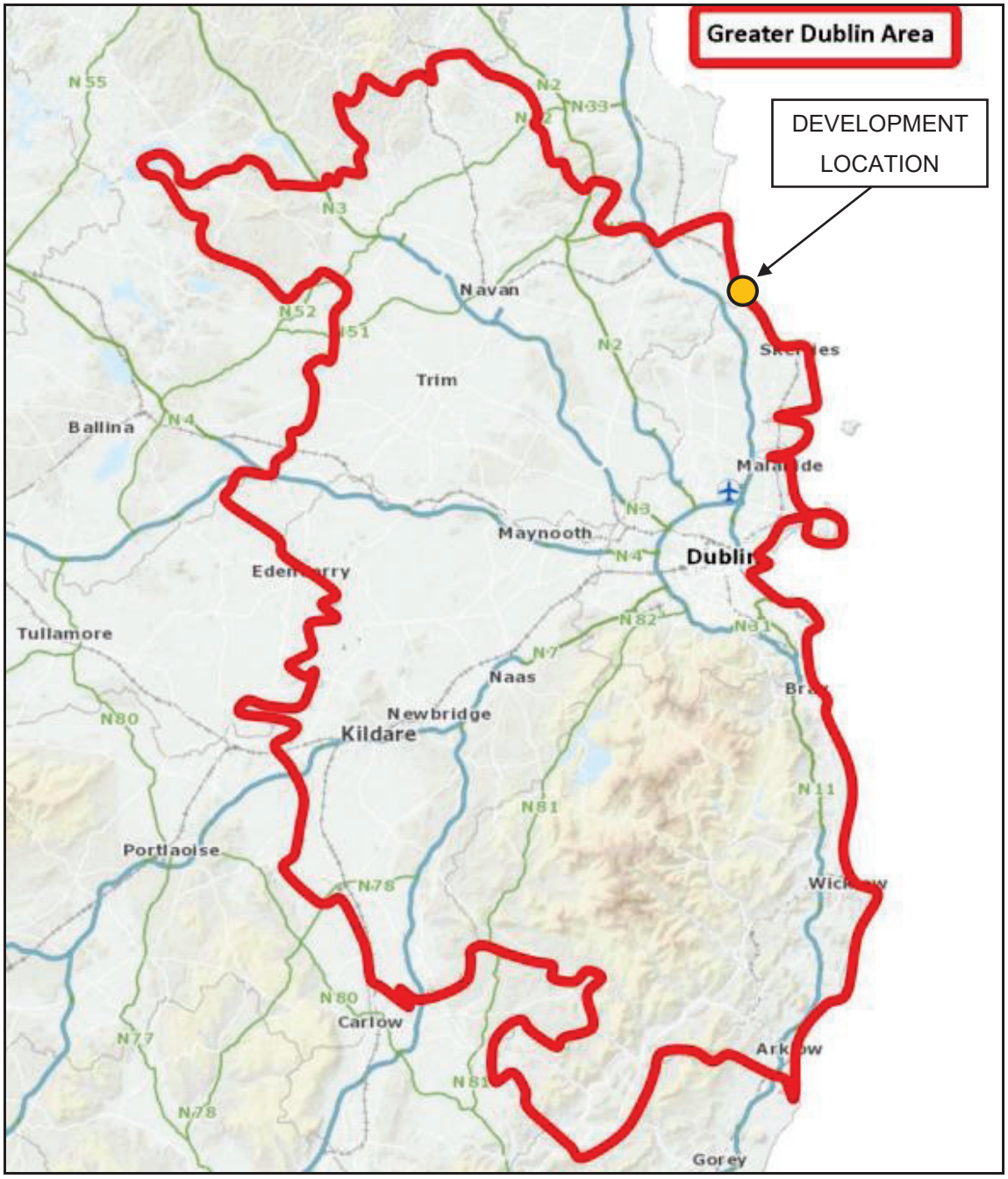


FIGURE 5.1: LOCATION OF DEVELOPMENT IN THE CONTEXT OF THE GDA

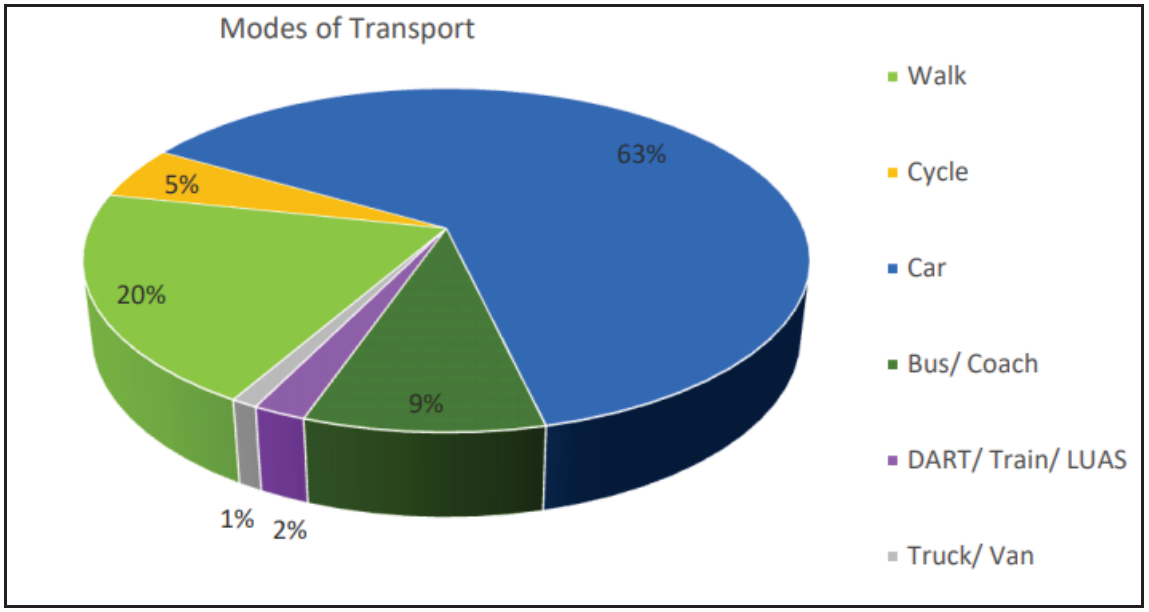
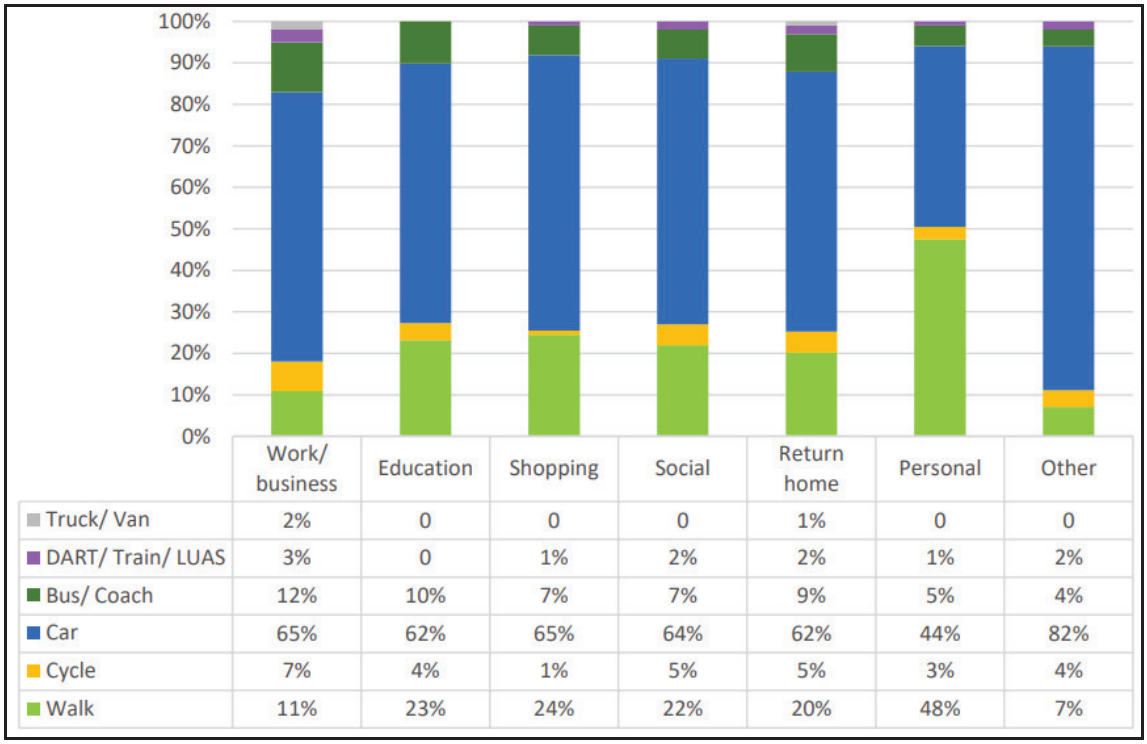


FIGURE 5.2: MODES OF TRANSPORT: GREATER DUBLIN AREA (NATIONAL HOUSING TRAVEL SURVEY 2017)

5.3.3 In summary, the National Housing Travel Survey has identified the following travel mode share in the Greater Dublin Area:

- Car – 63 percent;
- Walking – 20 percent;
- Bus / Coach – 9 percent;
- Cycling – 5 percent;
- DART / Train / LIAS – 2 percent; and
- Truck / Van – 1 percent.

5.3.4 The National Housing Travel Survey further breaks down the mode share split based on the type / reason of trip undertaken, as presented in **Figure 5.3**.



	Work/ business	Education	Shopping	Social	Return home	Personal	Other
Truck/ Van	2%	0	0	0	1%	0	0
DART/ Train/ LUAS	3%	0	1%	2%	2%	1%	2%
Bus/ Coach	12%	10%	7%	7%	9%	5%	4%
Car	65%	62%	65%	64%	62%	44%	82%
Cycle	7%	4%	1%	5%	5%	3%	4%
Walk	11%	23%	24%	22%	20%	48%	7%

FIGURE 5.3: MODES OF TRANSPORT FOR REASON OF TRAVEL: GREATER DUBLIN AREA (NATIONAL HOUSING TRAVEL SURVEY 2017)

5.3.5 In summary, the car is the most widely used mode of transport within the Greater Dublin Area, accounting for 63 percent of all trips. Public transport (bus, DART, Train and LUAS) contributes only 11 percent of the total trips taken.

5.3.6 The car is the mode of transport for two thirds of all work / business trips and the same proportion for all shopping trips in the Greater Dublin Area. It is also widely used for education (62 percent) and social trips (64 percent). The only instance where the car is not the most widely used mode of transport is for personal trips, where walking accounts for 48 percent of trips taken compared to 44 percent for the car.

5.4 2016 Census Data

5.4.1 The Central Statistics Office's SAPMAP (Small Areas Population Map) data has been analysed to determine existing travel mode trends in the locale. The analysis has then been used to identify an initial baseline travel characteristic for the proposed Malincross LRD.

5.4.2 **Figure 5.4** overleaf details the residential areas that have been analysed.

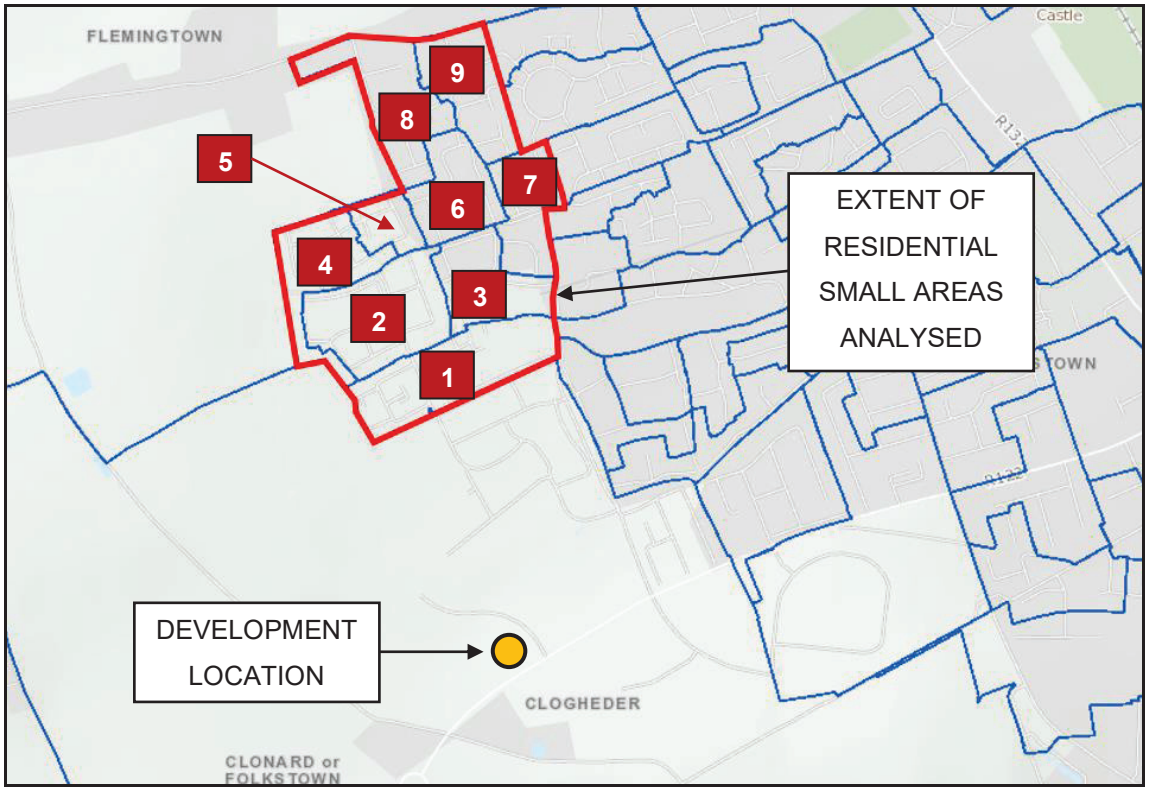


FIGURE 5.4: EXTENT OF RESIDENTIAL SMALL AREA BOUNDARIES (CENSUS.CSO.IE)

- 1 – Small Area 267002020;
- 2 – Small Area 267002027;
- 3 – Small Area 267002019;
- 4 – Small Area 267002028;
- 5 – Small Area 267002026;
- 6 – Small Area 267002024;
- 7 – Small Area 267002023;
- 8 – Small Area 267002033; and
- 9 – Small Area 267002018;

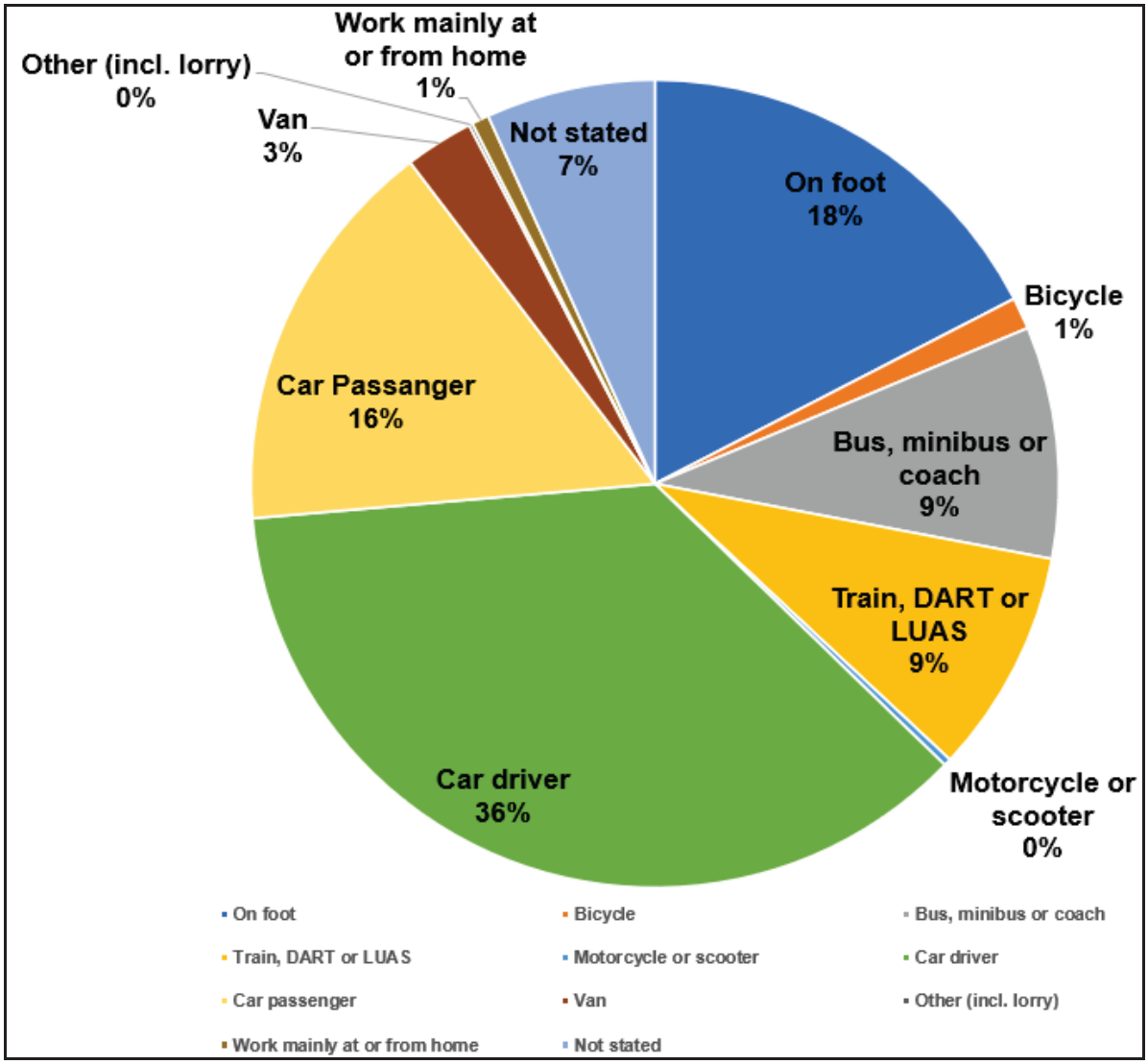


FIGURE 5.5: MODES OF TRANSPORT IN THE LOCALE (CSO SAP MAPS ANALYSIS)

5.4.3 From the Central Statistics Office SAP Maps, it has been found that the predominant mode of travel in the locale is car (36 percent), followed by walking (18 percent), car passenger (16 percent), train (nine percent) and bus (nine percent).

5.4.4 Only one percent (1%) of residents in the study area cycle.

5.4.5 The foregoing analysis indicates that sustainable modes of travel accounts for 37% percent of local travel behaviour.

5.5 Comparison of National Housing Travel Survey and 2016 Census Data

5.5.1 A comparison of local travel behaviour is detailed overleaf in **Table 5.1** overleaf:

Mode of Transport	National Housing Travel Survey (Percent)	2016 Census SAP Maps (Percent)
Walking	20%	18%
Bus	9%	9%
DART / Train / LUAS	2%	9%
Cycling	5%	1%
Car Driver	63%	36%
Car Passenger	-	16%
Van / Lorry	1%	3%
Motorcycle / Scooter	-	0%
Work from Home	-	1%
Not Stated	-	7%

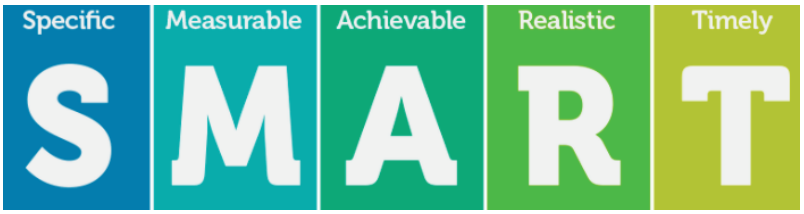
TABLE 5.1: TRAVEL MODE COMPARISON

6.0 MOBILITY MANAGEMENT TARGETS

6.1 Targets

6.1.1 In order to establish whether a Mobility Management Plan Framework is working successfully, it is necessary to identify a set of targets that are **SMART.**

- **S**pecific
- **M**easurable
- **A**chievable
- **R**ealistic; and
- **T**ime-bound.



6.1.2 A number of 'Action-Type' Targets have been identified as being suitable for the Malincross LRD. These are non-quantifiable Targets and take the form of Actions which need to be achieved.

6.1.3 These Actions and Targets are summarised below in **Table 6.2**.

Action	Target Date	Responsibility
Appoint a Mobility Manager.	Three (3) months after the first dwelling is occupied	Developer
Develop a Mobility Management marketing website for the site which will contain electronic walking, cycling and public transport information, including links to real time information and bus / train ticket purchase websites. The website will underscore DSPH's commitment to sustainability and promote sustainable travel options to potential purchasers.	Marketing of Development	
Produce a Welcome Pack. The Welcome Pack will include detailed and specific travel information such as: • A site-specific multi-model walking, cycling and public transport map showing local walking, cycling and public transport routes. These will be supplemented by approximate walking times to these areas /	Completion of each residential unit and subsequent sale of each residential unit	Mobility Manager / Developer

destinations; • Site specific public transport information identifying the location of nearby public transport terminals / stops and the services available. This information will be further supplemented with details on service frequency and hours of operation; • Appropriate contact details for the Mobility Manager, public transport enquiries and car share schemes / websites; • Details of appropriate websites that explain the health and financial benefits associated with reduced car usage; and • A summary of the Objectives, Targets and suggested Actions associated with the subject Mobility Management Plan Framework.		
Undertake Baseline Travel Survey.	Six (6) months after first dwelling is occupied	Mobility Manager / Working Group
Identify modal split targets which can be reviewed once the baseline travel characteristics have been established.	Nine (9) months after first dwelling is occupied	

TABLE 6.1:SUMMARY OF 'ACTION-TYPE' TARGETS

6.1.4 In order to establish whether a Mobility Management Plan Framework is working successfully, it is necessary to identify a set of 'Aim-Type' targets. To establish the baseline model splits, it will be necessary to undertake a baseline travel habits survey. It is recommended that this survey is circulated to residents, by the Mobility Manager, six (6) months after the first dwelling has been occupied.

6.1.5 The travel habits survey will identify how and the reason for resident travel choice.

6.2 Future Targets

6.2.1 Due to the nature of the site being a new development, baseline travel survey information is not available (the first survey will be carried out six (6) months after the first dwelling has been occupied). In order to determine interim Mode Split targets, reference has been made to 2016 Census data (refer to **Table 5.1**).

6.2.2 A baseline travel survey will then be carried out (six months after the first dwelling has been occupied) to determine if the initial targets are representative. This baseline travel survey data will provide a better understanding of what can be achieved and accordingly, form the basis for setting targets for future revisions of the Mobility Management Plan Framework.

Mode	2016 Census	1 Year after first Baseline Travel Survey	5 Years after first Baseline Travel Survey	Target Rational
Walking	18	19	20	Target to be in line with the National Housing Travel Survey for GDA (20 percent)
Bus	9	10	12	A marginal increase is anticipated by promoting sustainable travel options and highlighting the housing scheme's proximity to good public transport infrastructure.
Train	9	10	12	A marginal increase is anticipated by promoting sustainable travel options and highlighting the housing scheme's proximity to good public transport and cycling / pedestrian infrastructure.
Cycling	1	2	5	Target to be in line with the National Housing Travel Survey for GDA (five (5) percent)
Car (Driver)	36	32	23	A reduction in Single Occupancy Vehicle (SOV) is anticipated by both promoting and informing resident of sustainable travel

				modes in the locale.
Car (Passenger)	16	16	17	A marginal increase is expected due to car sharing.
Other	11	11	11	It is anticipated that these modes of travel will remain the same albeit the percentage of those working from home is likely to increase post CO-VID.

TABLE 6.2:MOBILITY MANAGEMENT PLAN TARGETS

6.2.3 The targets, outlined in **Table 6.2** are considered to be both realistic and achievable.

7.0 MOBILITY MANAGEMENT PLAN MEASURES AND MONITORING

7.1 Overview

7.1.1 The list of actions presented in this section, form the basis for implementation of the Mobility Management Plan Framework.

7.1.2 Each action is accompanied by a timeframe as to when it could be implemented. Collectively, these actions aim at achieving the mode split targets set out in Chapter 6 of this report.

7.1.3 It should be noted, however, that not all actions should be viewed as being compulsory but rather as potential options that should be investigated and could be implemented.

7.1.4 Notwithstanding the above, each dwelling owner will be provided with a 'Welcome Pack' which provides, at a minimum:

- A copy of bus and train services and timetables;
- Details of local taxi services;
- Details of bicycle facilities including local cycle routes, bicycle parking facilities at Balbriggan Railway Station and contact details of nearby bicycle repair shops;
- Details of key pedestrian routes and destinations proximate to the housing development; and
- Location and approximate walking time to Car Share hire stations.

7.2 Mobility Management Plan Framework Actions

Cycling Actions

7.2.1 The actions, outlined below, will encourage residents to consider cycling as an alternative mode of transport.

Action	Responsibility	Implementation
Establish an internal Bicycle Users Group (BUG). BUG's are formed by people who want to work together to improve facilities for cyclists and encourage cycling.	Mobility Manager / Working Group	Within first year of occupancy
Identify employees living near work that may be interested in cycling to work.		On-going
Produce maps that informs on cycling distances, journey times and optimal routes to local facilities i.e. shops and schools.		Within first year of occupancy
Promote and participate in sustainable events such as: • Bike to School Week; • National Cycling Week; and		On-going

• Work Environment Day.		
Promote the health benefits of cycling		
Have good, secure apartment bicycle parking in an easily accessible location.	Developer	Provided as part of the Development
Provide bicycle parking for apartment visitors		

TABLE 7.1:MOBILITY MANAGEMENT PLAN ACTIONS (CYCLING)

Walking Actions

7.2.2 The actions, outlined below will encourage residents to consider walking as an alternative mode of transport:

Action	Responsibility	Implementation
Identify employees living near work that may be interested in walking to work.	Mobility Manager / Working Group	On-going
Produce maps that informs on walking distances, journey times and optimal routes to local facilities i.e. shops, schools and public transport stops.		Within first year of occupancy
Promote and participate in sustainable events such as: • Walk to School Week; • National Walking Day; and • Work Environment Day.		On-going
Promote walking though organised walking events and groups		
Have some Travel Smart Get to Work Days, encouraging residents to walk to their place oof work.		
Promote the health benefits of walking		
Liaise with Fingal County Council and negotiate for improvements to footpaths used by residents		

TABLE 7.2:MOBILITY MANAGEMENT PLAN ACTIONS (WALKING)

Public Transport Actions

7.2.3 The following measures are expected to encourage further public transport use:

Action	Responsibility	Implementation
Develop maps showing public transport terminals and routes within the vicinity of the site.	Mobility Manager / Working Group	Within first year of occupancy
Provide household 'Welcome Packs' with relevant bus and train timetables to purchasers upon occupation of a dwelling		Before occupying a dwelling
Encourage public transport use for both personal and business travel.		On-going
Promote smartphone Apps that provide real time train, DART, LUAS and bus information.		
Promote car share schemes in the locale and provide information pertaining to joining costs, car locations and details on how the scheme works.		
Apply for a car share station in the Malincross Masterplan area.		
Set up a car-pooling database for residents.		Within first year of occupancy
Install a notice board in the lobby area of the apartments and populate the notice board with maps showing the main public transport routes and terminals / stops in the area and public transport timetables.		

TABLE 7.3:MOBILITY MANAGEMENT PLAN ACTIONS (PUBLIC TRANSPORT)

7.3 Monitoring

7.3.1 In order for the Mobility Management Plan Framework to be effective, it must be reviewed on a regular basis. It is important to ensure that the Framework Plan is meetings its objectives and targets and having the intended impact, particularly on single occupancy vehicle (SOV) use and sustainable transport choices.

7.3.2 The Framework document should be reviewed annually, for at least the first five (5) years and travel surveys should be carried out annually during this period.

7.3.3 The Mobility Management Plan Framework should be updated and changed based on the results of the travel surveys and to reflect changing circumstances.

7.4 Responsibility for Monitoring

7.4.1 The future residents and the nominated Mobility Manager will be responsible for the monitoring and management of the Mobility Management Plan Framework.

7.4.2 It is recommended that a Working Group is convened to manage the implementation of preferred actions. The Working Group would comprise residents and would be led by the appointed Mobility Manager. The primary aim of the Working Group is to:

- Review the Mobility Management Plan Framework initiatives and determine a program for implementation;
- Oversee travel surveys;
- Provide feedback on activities and initiatives;
- Update mode split targets in line with the travel surveys;
- Assist and promote activities and disseminate information; and
- Advocate sustainable transport modes among residents.

7.4.3 The Working Group would be responsible for the Framework document remaining a ‘live’, with it being amended as necessary to meet mode split targets.

APPENDIX A

Bus Timetable

Table No.

BALBRIGGAN TOWN SERVICE B1

MONDAY TO FRIDAY

ROUTE	B1	B1	B1	B1	B1	B1	B1	B1	B1	B1	B1	B1	B1	B1	B1	B1	B1	B1	B1	B1	B1	B1	B1	B1	B1	B1	B1	B1	B1	B1	B1	B1	B1	B1	B1	B1	B1	B1	B1
Balbriggan (Rail Station)		06:50	07:05	07:30	07:50	08:15	08:30	08:50	09:15	09:30	09:50	10:15	10:30	10:50	11:15	11:30	11:50	12:15	12:30	12:50	13:15	13:30	13:50	14:15	14:30	14:50	15:15	15:30	15:50	16:15	16:30	16:50	17:15	17:30	18:00	18:15	18:30	18:50	19:15
Balbriggan (Bank of Ireland)		-	-	07:32	-	-	08:33	-	-	09:32	-	-	10:32	-	-	11:32	-	-	12:33	-	-	13:33	-	-	14:33	-	-	15:33	-	-	16:33	-	-	17:32	-	-	18:32	-	-
Balbriggan (St Peter and Paul Church)		-	-	07:33	-	-	08:35	-	-	09:33	-	-	10:34	-	-	11:34	-	-	12:35	-	-	13:35	-	-	14:35	-	-	15:35	-	-	16:35	-	-	17:34	-	-	18:33	-	-
Balbriggan (Community College)		06:51	07:06	-	07:51	08:16	-	08:51	09:16	-	09:51	10:16	-	10:51	11:16	-	11:51	12:16	-	12:51	13:16	-	13:51	14:16	-	14:51	15:16	-	15:51	16:16	-	16:51	17:16	-	18:01	18:16	-	18:51	19:16
Balbriggan (Bath Rd Service Station)		06:51	07:07	-	07:52	08:17	-	08:53	09:17	-	09:52	10:17	-	10:52	11:17	-	11:52	12:17	-	12:52	13:17	-	13:52	14:17	-	14:52	15:17	-	15:52	16:17	-	16:53	17:17	-	18:02	18:17	-	18:53	19:17
Castleland Roundabout		-	-	07:34	-	-	08:36	-	-	09:34	-	-	10:35	-	-	11:35	-	-	12:36	-	-	13:36	-	-	14:36	-	-	15:36	-	-	16:36	-	-	17:36	-	-	18:35	-	-
Harry Reynolds Rd (Opp Jaffa's)		-	-	07:36	-	-	08:39	-	-	09:36	-	-	10:37	-	-	11:37	-	-	12:39	-	-	13:39	-	-	14:39	-	-	15:39	-	-	16:39	-	-	17:38	-	-	18:38	-	-
Harry Reynolds Rd (Graveyard)		-	-	07:37	-	-	08:40	-	-	09:37	-	-	10:38	-	-	11:38	-	-	12:40	-	-	13:40	-	-	14:40	-	-	15:40	-	-	16:40	-	-	17:39	-	-	18:39	-	-
Clonard Rd (Opp St George's N.S)		-	-	07:39	-	-	08:42	-	-	09:39	-	-	10:40	-	-	11:40	-	-	12:42	-	-	13:42	-	-	14:42	-	-	15:42	-	-	16:42	-	-	17:41	-	-	18:41	-	-
Millfield Shopping Centre		-	-	07:40	-	-	08:43	-	-	09:40	-	-	10:41	-	-	11:41	-	-	12:43	-	-	13:43	-	-	14:43	-	-	15:43	-	-	16:43	-	-	17:42	-	-	18:42	-	-
Moylaragh Park	06:40	06:52	07:08		07:53	08:18		08:55	09:18		09:53	10:18		10:53	11:18		11:53	12:18		12:53	13:18		13:54	14:18		14:54	15:18		15:54	16:18		16:55	17:19		18:04	18:19		18:55	19:19
Barons Hill Rise	06:42	06:54	07:11		07:56	08:21		08:58	09:21		09:56	10:21		10:56	11:21		11:56	12:21		12:56	13:21		13:57	14:21		14:57	15:21		15:57	16:21		16:58	17:22		18:07	18:22		18:58	19:22
Hastings Green Roundabout	06:43	06:55	07:13		07:58	08:23		09:00	09:22		09:57	10:22		10:58	11:22		11:57	12:22		12:58	13:22		13:59	14:22		14:59	15:22		15:59	16:22		17:00	17:24		18:09	18:24		19:00	19:24

MONDAY TO FRIDAY

ROUTE	B1	B1	B1	B1	B1	B1	B1	B1	B1	B1	B1	B1	B1	B1	B1	B1	B1	B1	B1	B1	B1	B1	B1	B1	B1	B1	B1	B1	B1	B1	B1	B1	B1	B1	B1	B1	B1	B1	B1
Millfield Shopping Centre				07:40			08:43			09:40			10:41			11:41			12:43			13:43			14:43			15:43			16:43			17:42			18:42			
Harry Reynolds Rd (Westbrook Drive)				07:42			08:45			09:42			10:43			11:43			12:45			13:45			14:45			15:45			16:45			17:44			18:44			
Harry Reynolds Rd (Ashfield Green)				07:43			08:46			09:43			10:44			11:44			12:46			13:46			14:46			15:46			16:46			17:45			18:45			
Hastings Green Roundabout	06:43	06:55	07:13	-	07:58	08:23	-	09:00	09:22	-	09:57	10:22	-	10:58	11:22	-	11:57	12:22	-	12:58	13:22	-	13:59	14:22	-	14:59	15:22	-	15:59	16:22	-	17:00	17:24	-	18:09	18:24	-	19:00	19:24
Brega	06:44	06:56	07:14	-	07:59	08:24	-	09:01	09:23	-	09:58	10:23	-	10:59	11:23	-	11:58	12:23	-	12:59	13:23	-	14:00	14:23	-	15:00	15:23	-	16:00	16:23	-	17:01	17:25	-	18:10	18:25	-	19:01	19:25
Hamlet Lane	06:45	06:57	07:15	-	08:00	08:25	-	09:02	09:24	-	09:59	10:24	-	11:00	11:24	-	11:59	12:24	-	13:00	13:24	-	14:01	14:24	-	15:01	15:24	-	16:01	16:24	-	17:02	17:26	-	18:11	18:26	-	19:02	19:26
Balbriggan (Opposite Garda Station)	06:46	06:59	07:16	-	08:02	08:27	-	09:03	09:26	-	10:01	10:26	-	11:02	11:26	-	12:01	12:26	-	13:02	13:26	-	14:03	14:26	-	15:03	15:26	-	16:03	16:26	-	17:04	17:27	-	18:12	18:27	-	19:03	19:27
Balbriggan (Bath Road)	06:47	07:00	07:17	07:44	08:03	08:28	08:47	09:04	09:27	09:44	10:02	10:27	10:45	11:03	11:27	11:45	12:02	12:27	12:47	13:03	13:27	13:47	14:04	14:27	14:47	15:04	15:27	15:47	16:04	16:27	16:47	17:05	17:28	17:46	18:13	18:28	18:46	19:04	19:28
Balbriggan (Apache Pizza)	06:48	07:00	07:18	07:45	08:04	08:29	08:48	09:05	09:28	09:45	10:03	10:28	10:46	11:04	11:28	11:46	12:03	12:28	12:48	13:04	13:28	13:48	14:05	14:28	14:48	15:05	15:28	15:48	16:05	16:28	16:48	17:06	17:29	17:47	18:14	18:29	18:47	19:04	19:28
Balbriggan (Rail Station)	06:49	07:01	07:19	07:47	08:06	08:30	08:50	09:07	09:30	09:47	10:05	10:30	10:48	11:06	11:30	11:48	12:05	12:30	12:50	13:06	13:30	13:50	14:07	14:30	14:50	15:07	15:29	15:50	16:07	16:29	16:50	17:08	17:30	17:49	18:15	18:30	18:49	19:05	19:29

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Table No.

BALBRIGGAN TOWN SERVICE B1

SATURDAY

ROUTE	B1	B1	B1	B1	B1	B1	B1	B1	B1	B1	B1	B1	B1	B1	B1	B1	B1	B1	B1	B1	B1	B1	B1	B1
Balbriggan (Rail Station)	09:15	09:30	09:50	10:15	10:30	10:50	11:15	12:30	12:50	13:15	13:30	13:50	14:15	14:30	14:50	15:15	16:30	16:50	17:15	17:30	17:50	18:15	18:30	18:50
Balbriggan (Bank of Ireland)	-	09:32	-	-	10:32	-	-	12:33	-	-	13:33	-	-	14:33	-	-	16:32	-	-	17:32	-	-	18:32	-
Balbriggan (St Peter and Paul Church)	-	09:33	-	-	10:34	-	-	12:35	-	-	13:35	-	-	14:35	-	-	16:33	-	-	17:33	-	-	18:33	-
Balbriggan (Community College)	09:16	-	09:51	10:16	-	10:51	11:16	-	12:51	13:16	-	13:51	14:16	-	14:51	15:16	-	16:51	17:16	-	17:51	18:16	-	18:51
Balbriggan (Bath Rd Service Station)	09:17	-	09:52	10:17	-	10:52	11:17	-	12:52	13:17	-	13:52	14:17	-	14:52	15:17	-	16:52	17:17	-	17:52	18:17	-	18:52
Castleland Roundabout	-	09:34	-	-	10:35	-	-	12:36	-	-	13:36	-	-	14:36	-	-	16:34	-	-	17:34	-	-	18:34	-
Harry Reynolds Rd (Opp Jaffa's)	-	09:36	-	-	10:37	-	-	12:38	-	-	13:38	-	-	14:38	-	-	16:36	-	-	17:36	-	-	18:36	-
Harry Reynolds Rd (Graveyard)	-	09:37	-	-	10:38	-	-	12:38	-	-	13:38	-	-	14:38	-	-	16:37	-	-	17:37	-	-	18:37	-
Clonard Rd (Opp St George's N.S)	-	09:39	-	-	10:40	-	-	12:40	-	-	13:40	-	-	14:40	-	-	16:39	-	-	17:39	-	-	18:39	-
Millfield Shopping Centre	-	09:40	-	-	10:41	-	-	12:41	-	-	13:41	-	-	14:41	-	-	16:40	-	-	17:40	-	-	18:40	-
Moylaragh Park	09:18		09:53	10:18		10:53	11:18		12:53	13:18		13:53	14:18		14:53	15:18		16:53	17:18		17:53	18:18		18:53
Barons Hill Rise	09:21		09:56	10:21		10:56	11:20		12:55	13:21		13:56	14:21		14:56	15:20		16:55	17:21		17:56	18:21		18:56
Hastings Green Roundabout	09:23		09:58	10:23		10:58	11:22		12:57	13:22		13:57	14:22		14:58	15:22		16:57	17:23		17:58	18:23		18:58

SATURDAY

ROUTE	B1	B1	B1	B1	B1	B1	B1	B1	B1	B1	B1	B1	B1	B1	B1	B1	B1	B1	B1	B1	B1	B1	B1	B1
Millfield Shopping Centre		09:40			10:41			12:41			13:41			14:41			16:40			17:40			18:40	
Harry Reynolds Rd (Westbrook Drive)		09:42			10:43			12:43			13:43			14:43			16:42			17:42			18:42	
Harry Reynolds Rd (Ashfield Green)		09:42			10:44			12:44			13:44			14:44			16:43			17:43			18:43	
Hastings Green Roundabout	09:23	-	09:58	10:23	-	10:58	11:22	-	12:57	13:22	-	13:57	14:22	-	14:58	15:22	-	16:57	17:23	-	17:58	18:23	-	18:58
Brega	09:24	-	09:59	10:24	-	10:59	11:23	-	12:58	13:23	-	13:58	14:23	-	14:59	15:23	-	16:58	17:24	-	17:59	18:24	-	18:59
Hamlet Lane	09:25	-	10:00	10:25	-	11:00	11:24	-	12:59	13:24	-	13:59	14:24	-	15:00	15:24	-	16:59	17:25	-	18:00	18:25	-	19:00
Balbriggan (Opposite Garda Station)	09:26	-	10:01	10:27	-	11:02	11:26	-	13:00	13:26	-	14:01	14:26	-	15:02	15:26	-	17:01	17:27	-	18:02	18:27	-	19:01
Balbriggan (Bath Road)	09:27	09:44	10:02	10:28	10:45	11:03	11:27	12:45	13:01	13:27	13:46	14:02	14:27	14:46	15:03	15:27	16:45	17:02	17:28	17:45	18:03	18:28	18:44	19:02
Balbriggan (Apache Pizza)	09:28	09:44	10:03	10:29	10:46	11:04	11:28	12:46	13:02	13:28	13:47	14:03	14:28	14:47	15:04	15:28	16:46	17:03	17:29	17:46	18:04	18:29	18:44	19:02

	SATURDAY																							
ROUTE	***B1***	***B1***	***B1***	***B1***	***B1***	***B1***	***B1***	***B1***	***B1***	***B1***	***B1***	***B1***	***B1***	***B1***	***B1***	***B1***	***B1***	***B1***	***B1***	***B1***	***B1***	***B1***	***B1***	***B1***
Balbriggan (Rail Station)	09:29	09:46	10:05	10:30	10:48	11:06	11:30	12:48	13:04	13:30	13:49	14:05	14:30	14:49	15:06	15:30	16:48	17:05	17:30	17:48	18:05	18:30	18:46	19:03

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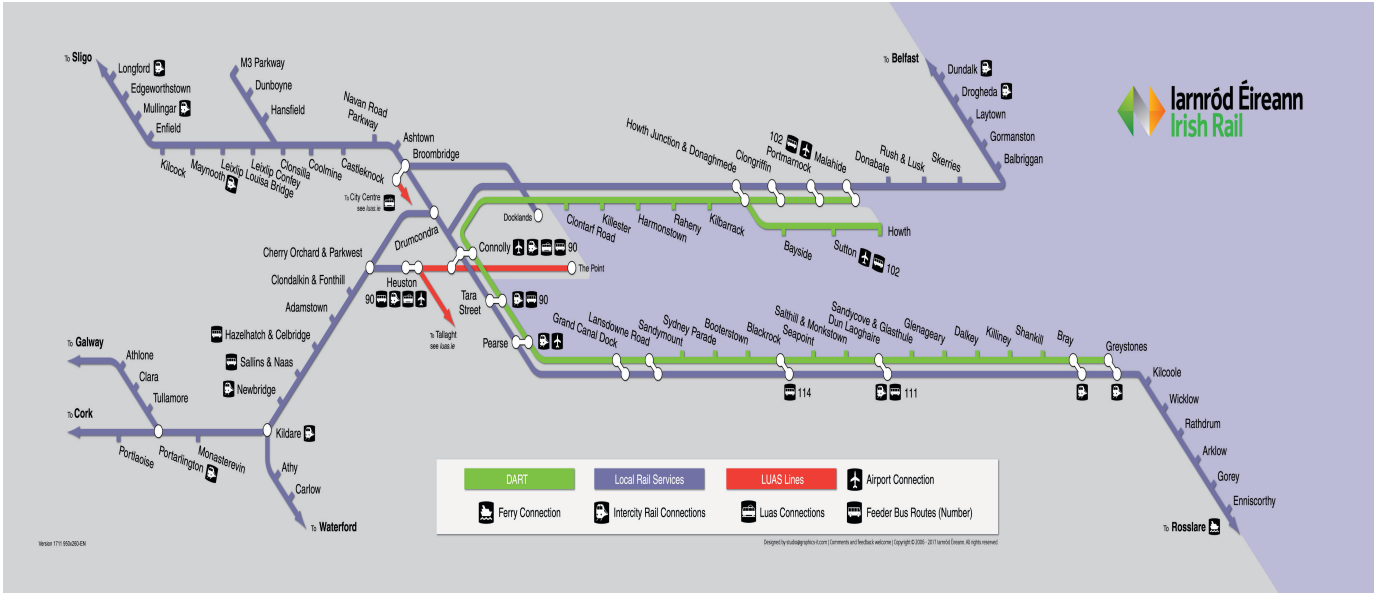
APPENDIX B

Train Timetable

Baile Átha Cliath - Dún Dealgan/An tlúr
Luan go Domhnaigh (gan saoire phoiblí san áireamh)
Bailí ó 26.09.2021 go bhfógrófar a mhalairt

Dublin - Dundalk/Newry
Monday to Sunday (excluding public holidays)
Valid from 26.09.2021 until further notice

Iarnród Éireann
Irish Rail


Iarnród Éireann
Irish Rail
To Sligo
Longford
Edgeworthstown
Mullingar
Enfield
M3 Parkway
Dunboyne
Hansfield
Navan Road Parkway
Ashtown
Broombridge
Kilcock
Maynooth
Leixlip Confey
Leixlip Louisa Bridge
Clonsilla
Coolmine
Castleknock
To City Centre
see buss.ie
To Belfast
Dundalk
Drogheda
Laytown
Gormanston
Balbriggan
Howth Junction & Donaghmede
Clongriffin
Portmarnock
102
Malahide
Donabate
Rush & Lusk
Skerries
Howth
Sutton
102
Bayside
Kilbarrack
Raheny
Harmonstown
Killester
Clontarf Road
Docklands
Connolly
90
The Point
Drumcondra
Cherry Orchard & Parkwest
Clondalkin & Fonthill
Adamstown
Heuston
90
To Tallaght
see buss.ie
Tara Street
90
Pearse
Grand Canal Dock
Lansdowne Road
Sandymount
Sydney Parade
Booterstown
Blackrock
Seapoint
Salthill & Monkstown
Dun Laoghaire
Sandycove & Glasthule
Glenageary
Dalkey
Killiney
Shankill
Bray
Greystones
114
111
Kilcoole
Wicklow
Rathdrum
Arklow
Gorey
Enniscorthy
To Rosslare
Hazelhatch & Celbridge
Sallins & Naas
Newbridge
To Galway
Athlone
Clara
Tullamore
To Cork
Kildare
Portlaoise
Portarlington
Monasterevin
Athy
Carlow
To Waterford
DART
Local Rail Services
LUAS Lines
Airport Connection
Ferry Connection
Intercity Rail Connections
Luas Connections
Feeder Bus Routes (Number)

Baile Átha Cliath - Dún Dealgan - Luan go hAoine (gan saoire phoiblí san áireamh) - Bailí ó 26.09.2021 go bhfógrófar a mhalairt
Dublin - Dundalk - Monday - Friday (excluding public holidays) - Valid from 26.09.2021 until further notice

		Monday to Friday																				
		..	..	..	..	From R'lare	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
BRAY (DALY)	**Dep**	..	..	..	..	07:59	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
DUN LAOGHAIRE (Mallin)	**Dep**	..	..	..	..	08:20	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Blackrock	**Dep**	..	..	..	..	08:27	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Sydney Parade	**Dep**	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Lansdowne Road	**Dep**	..	..	..	..	08:35	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
GRAND CANAL DOCK	**Dep**	*06:55*	..	*07:35*	*07:48*	08:38	*08:54*	..	*09:48*	*10:16*	*10:55*	..	*11:35*	*12:35*	..	*13:35*	*14:35*	..	*15:05*	*15:35*	*16:15*	..
DUBLIN Pearse	**Dep**	07:09	..	*07:37*	07:54	08:41	*08:57*	..	09:54	*10:19*	*10:57*	..	*11:37*	*12:37*	..	*13:37*	*14:37*	..	*15:12*	15:43	16:21	..
Tara Street Ⓐ	**Dep**	07:11	..	*07:39*	07:57	08:44	*08:59*	..	09:56	*10:22*	*10:59*	..	*11:39*	*12:39*	..	*13:39*	*14:39*	..	*15:14*	15:46	16:24	..
DUBLIN Connolly Ⓐ Ⓛ	**Arr**	07.14	..	*07:41*	08.00	08.47	*09:01*	..	09.59	*10:25*	*11:01*	..	*11:41*	*12:41*	..	*13:41*	*14:41*	..	*15:17*	15:49	16:27	..
DUBLIN Connolly	**Dep**	07:15	07:35	07:50	08:00	08:50	09:10	09:30	10:00	10:30	11:07	11:20	11:50	12:50	13:20	13:50	14:50	15:20	15:23	15:50	16:28	16:50
Howth Junction & Donaghmede	**Dep**	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Clongriffin	**Dep**	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Portmarnock	**Dep**	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Malahide	**Dep**	07:29	..	08:15	08:26	09:14	09:27	..	10:25	10:54	11:24	..	12:07	13:07	..	14:07	15:07	..	15:44	16:09	16:46	..
Donabate	**Dep**	07:34	..		08:31	09:19	..	..	10:29	10:58	11:28	..	12:11	13:11	..	14:11	15:11	..	15:49	16:13	16:51	..
Rush And Lusk	**Dep**	07:38	..		08:35	09:23	..	..	10:33	11:03	11:33	..	12:16	13:16	..	14:16	15:16	..	15:53	16:18	16:55	..
Skerries	**Dep**	07:44	..	08:25	08:41	09:29	09:37	..	10:39	11:08	11:40	..	12:21	13:21	..	14:21	15:21	..	16:00	16:23	17:01	..
BALBRIGGAN	**Arr**	07:49	..	08:30	08:46	09:34	09:43	..	10:44	11:13	11:48	..	12:26	13:26	..	14:26	15:26	..	16:05	16:28	17:06	..
BALBRIGGAN	**Dep**	07:49	..	08:30	08:46	09:34	09:43	..	10:44	11:14	11:49	..	12:27	13:27	..	14:27	15:27	..	16:05	16:29	17:06	..
Gormanston	**Dep**	..	..	08:35	08:51	09:39	..	..	10:48	11:18	11:53	..	12:31	13:31	..	14:31	15:31	..	16:10	16:34	17:11	..
Laytown	**Dep**	07:57	..	08:39	08:56	09:44	09:51	..	10:53	11:23	11:58	..	12:36	13:36	..	14:36	15:36	..	16:15	16:39	17:16	..
DROGHEDA (MACBRIDE)	**Arr**	08:05	08:10	08:49	09:04	09:52	09:59	10:04	11:01	11:32	12:07	11:54	12:45	13:45	13:54	14:45	15:45	15:54	16:24	16:48	17:24	..
Drogheda (MacBride)	**Dep**	..	08:11	..	09:05	09:54	..	10:06	..	..	12:10	11:55	..	..	13:56	..	..	15:55	..	..	..	..
DUNDALK (CLARKE)	**Arr**	..	08:32	..	09:30	10:18	..	10:25	..	..	12:35	12:16	..	..	14:16	..	..	16:15	..	..	..	17:48
Dundalk (Clarke)	**Dep**	..	08:32	..	..		..	10:27	..	..	..	12:17	..	..	14:18	..	..	16:16	..	..	..	17:50
NEWRY	**Arr**	..	08:48	..	..		..	10:46	..	..	..	12:33	..	..	14:36	..	..	16:33	..	..	..	18:06
		..	To	..	..		..	To	..	..	..	To	..	..	To	..	..	To	..	..	..	To
		..	Belfast	..	..	..	..	Belfast	..	..	..	Belfast	..	..	Belfast	..	..	Belfast	..	..	..	Belfast

Times in *italics* indicate a connecting train.

Ⓛ LUAS Tram Link to/from Dublin City Centre and Heuston Station Ⓐ Bus connection to/from Dublin Airport available nearby
Timetable subject to alteration at Public Holiday periods. Please see irishrail.ie for further information. Passengers must purchase tickets before joining the train.
Department of Social Protection Free Travel Pass holders must be in possession of their free travel ticket when travelling on the train. Penalty fines will apply to passengers travelling without the correct ticket. Passengers are reminded that station platform gates will close 2 minutes prior to departure.

Baile Átha Cliath - Dún Dealgan - Luan go hAoine (gan saoire phoiblí san áireamh) - Bailí ó 26.09.2021 go bhfógrófar a mhalairt
Dublin - Dundalk - Monday - Friday (excluding public holidays) - Valid from 26.09.2021 until further notice

		Monday to Friday												Mon to Thurs	Fri Only	Monday to Friday	
		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
BRAY (DALY)	**Dep**	..	..	..	16:50	..	..	..	..	..	..	..	..	..	..	..	..
DUN LAOGHAIRE (Mallin)	**Dep**	..	..	..	17:11	..	..	..	..	..	..	..	..	..	..	..	..
Blackrock	**Dep**	..	..	..	17:16	..	..	..	..	..	..	..	..	..	..	..	..
Sydney Parade	**Dep**	..	..	..	17:21	..	..	..	..	..	..	..	..	..	..	..	..
Lansdowne Road	**Dep**	..	..	..	17:25	..	..	..	..	..	..	..	..	..	..	..	..
GRAND CANAL DOCK	**Dep**	*16:45*	*16:59*	*17:05*	17:28	*17:55*	*18:17*	..	*18:36*	*19:16*	*20:05*	..	*20:37*	*21:30*	*21:30*	*22:30*	*23:25*
DUBLIN Pearse	**Dep**	16:53	*17:02*	17:13	17:31	18:00	18:24	..	*18:38*	19:23	20:15	..	20:50	21:40	21:40	22:40	23:40
Tara Street Ⓐ	**Dep**	16:55	*17:04*	17:16	17:34	18:03	18:26	..	*18:40*	19:26	20:17	..	20:53	21:42	21:42	22:42	23:43
DUBLIN Connolly Ⓐ Ⓛ	**Arr**	16:58	*17:07*	17:19	17:37	18:06	18:29	..	*18:42*	19:29	20:20	..	20:56	21:45	21:45	22:45	23:46
DUBLIN Connolly	**Dep**	17:00	17:12	17:21	17:39	18:07	18:30	18:50	19:00	19:30	20:21	20:50	20:57	21:46	21:46	22:46	23:47
Howth Junction & Donaghmede	**Dep**	..	..	..	..	..	..	..	..	..	20:32	..	..	..	..	..	23:57
Clongriffin	**Dep**	..	..	..	..	18:22	..	..	..	..	20:35	..	..	..	..	..	23:59
Portmarnock	**Dep**	..	..	..	..	18:25	..	..	..	..	20:38	..	..	..	..	..	00:02
Malahide	**Dep**	17:19	17:29	..	17:58	18:30	18:46	..	..	19:47	20:43	..	21:12	22:09	22:09	23:04	00:08
Donabate	**Dep**	17:23	17:33	17:47	18:03	18:34	18:50	19:08	..	19:52	20:47	..	21:17	22:13	22:13	23:09	00:12
Rush And Lusk	**Dep**	17:28	17:38	17:52	18:07	18:39	18:55	19:13	..	19:56	20:52	..	21:21	22:18	22:18	23:13	00:17
Skerries	**Dep**	17:34	17:43	17:58	18:13	18:44	19:00	19:20	..	20:02	20:57	..	21:27	22:23	22:23	23:19	00:22
BALBRIGGAN	**Arr**	17:39	17:50	18:03	18:18	18:49	19:05	19:29	..	20:07	21:02	..	21:32	22:28	22:28	23:24	00:27
BALBRIGGAN	**Dep**	17:39	..	18:04	18:19	18:50	19:05	19:29	..	20:07	21:03	..	21:32	22:29	22:29	23:24	00:28
Gormanston	**Dep**	17:43	..	18:08	18:24	18:54	19:10	..	..	20:12	21:07	..	21:37	22:33	22:33	23:29	00:32
Laytown	**Dep**	17:48	..	18:13	18:29	18:59	19:15	19:36	..	20:17	21:12	..	21:42	22:38	22:38	23:34	00:37
DROGHEDA (MACBRIDE)	**Arr**	17:57	..	18:21	18:38	19:07	19:24	19:44	19:33	20:25	21:21	21:28	21:50	22:48	22:48	23:43	00:47
Drogheda (MacBride)	**Dep**	..	..	18:22	..	19:09	..	..	19:35	..	..	21:29	..	..	22:49	23:44	00:50
DUNDALK (CLARKE)	**Arr**	..	..	18:46	..	19:33	..	..	19:54	..	..	21:49	..	..	23:12	00:08	01:14
Dundalk (Clarke)	**Dep**	..	..	18:47	..	..	..	..	19:56	..	..	21:50	..	..	..	..	..
NEWRY	**Arr**	..	..	19:12	..	..	..	..	20:12	..	..	22:08	..	..	..	..	..
		..	..		..	..	..	..	To Belfast	..	..	To Belfast	..	..	..	..	..

Times in *italics* indicate a connecting train.

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Department of Social Protection Free Travel Pass holders must be in possession of their free travel ticket when travelling on the train. Penalty fines will apply to passengers travelling without the correct ticket. Passengers are reminded that station platform gates will close 2 minutes prior to departure.

Baile Átha Cliath - Dún Dealgan - Sathairn (gan saoire phoiblí san áireamh) - Bailí ó 26.09.2021 go bhfógrófar a mhalairt
Dublin - Dundalk - Saturday (excluding public holidays) - Valid from 26.09.2021 until further notice

		Saturday Only																							
		..	..	From	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
		..	..	Gorey	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
BRAY (Daly)	**Dep**	..	..	08:05	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
DUN LAOGHAIRE (Mallin)	**Dep**	..	..	08:25	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Blackrock	**Dep**	..	..	08:30	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Sydney Parade	**Dep**	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Lansdowne Road	**Dep**	..	..	08:36	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
GRAND CANAL DOCK	**Dep**	..	*07:46*	08:38	..	*09:46*	*10:21*	*10:41*	..	*11:31*	*12:33*	..	*13:30*	*14:31*	..	*15:21*	*15:40*	*16:16*	..	*17:00*	*17:31*	*17:59*	*18:16*	..
DUBLIN Pearse	**Dep**	..	*07:49*	08:40	..	*09:49*	*10:24*	*10:44*	..	*11:34*	*12:37*	..	*13:33*	*14:34*	..	*15:24*	*15:48*	*16:19*	..	*17:03*	*17:34*	*18:02*	*18:19*	..
Tara Street Ⓐ	**Dep**	..	*07:51*	08:44	..	*09:51*	*10:26*	*10:46*	..	*11:36*	*12:39*	..	*13:35*	*14:36*	..	*15:26*	*15:50*	*16:21*	..	*17:05*	*17:36*	*18:04*	*18:21*	..
DUBLIN Connolly	**Arr**	..	*07:53*	08:47	..	*09:53*	*10:28*	*10:48*	..	*11:38*	*12:41*	..	*13:37*	*14:38*	..	*15:28*	*15:55*	*16:23*	..	*17:07*	*17:38*	*18:06*	*18:25*	..
DUBLIN Connolly Ⓐ Ⓛ	**Dep**	07:35	08:05	08:50	09:30	10:00	10:40	11:05	11:20	11:50	12:50	13:20	13:50	14:45	15:20	15:44	16:05	16:35	16:50	17:15	17:50	18:22	18:40	..
Howth Junction & Donaghmede	**Dep**	..	08:14	09:00	..	..	10:50	11:15	..	12:00	13:00	..	14:00	14:57	..	15:54	16:16	..	..	17:27	18:02	18:32	..	..
Clongriffin	**Dep**	..	08:16	09:02	..	..	10:52	11:17	..	12:02	13:02	..	..	..	..	15:56	16:18	..	..	17:30	..	18:34	..	..
Portmarnock	**Dep**	..	08:19	09:05	..	..	10:55	11:19	..	12:05	13:05	..	..	..	..	15:59	16:21	..	..	17:33	..	18:37	..	..
Malahide	**Dep**	..	08:24	09:10	..	10:24	11:00	11:24	..	12:10	13:10	..	14:07	15:04	..	16:04	16:25	16:55	..	17:38	18:11	18:41	18:55	..
Donabate	**Dep**	..	08:28	09:14	..	10:28	11:04	11:29	..	12:14	13:14	..	14:11	15:08	..	16:08	16:30	17:00	..	17:43	18:16	18:46	18:59	..
Rush And Lusk	**Dep**	..	08:33	09:19	..	10:33	11:09	11:33	..	12:19	13:19	..	14:16	15:13	..	16:13	16:34	17:04	..	17:48	18:20	18:50	19:04	..
Skerries	**Dep**	..	08:38	09:24	..	10:38	11:14	11:40	..	12:24	13:24	..	14:21	15:18	..	16:18	16:40	17:11	..	17:54	18:26	18:56	19:10	..
Balbriggan	**Arr**	..	08:43	09:29	..	10:43	11:19	11:49	..	12:29	13:29	..	14:26	15:23	..	16:23	16:45	17:21	..	17:59	18:31	19:01	19:15	..
Balbriggan	**Dep**	..	08:44	09:30	..	10:44	11:20	11:49	..	12:30	13:30	..	14:27	15:24	..	16:24	16:45	17:21	..	18:00	18:31	19:01	19:15	..
Gormanston	**Dep**	..	08:48	09:34	..	10:48	11:24	11:53	..	12:35	13:34	..	14:31	15:28	..	16:28	16:50	17:26	..	18:04	18:36	19:06	..	..
Laytown	**Dep**	..	08:53	09:39	..	10:53	11:29	11:59	..	12:39	13:39	..	14:36	15:33	..	16:33	16:55	17:31	..	18:09	18:41	19:11	19:22	..
DROGHEDA (MacBride)	**Arr**	08:10	09:02	09:47	10:04	11:01	11:38	12:07	11:54	12:48	13:48	13:54	14:45	15:42	15:54	16:42	17:03	17:39	..	18:16	18:49	19:19	19:30	..
DROGHEDA (MacBride)	**Dep**	08:12	..	09:48	10:06	..	..	12:10	11:45	..	..	13:56	..	..	15:55	..	..	..	..	18:17	..	..	..	..
DUNDALK (Clarke)	**Arr**	08:31	..	10:12	10:25	..	..	12:35	12:16	..	..	14:16	..	..	16:15	..	..	..	17:44	18:41	..	..	..	..
DUNDALK (Clarke)	**Dep**	08:32	..	..	10:27	..	..	..	12:17	..	..	14:18	..	..	16:16	..	..	..	17:44	..	..	..	..	..
NEWRY	**Arr**	08:48	..	..	10:46	..	..	..	12:36	..	..	14:37	..	..	16:35	..	..	..	18:06	..	..	..	..	..
		To	..	..	To	..	..	..	To	..	..	To	..	..	To	..	..	..	To	..	..	..	..	..
		Belfast	..	..	Belfast	..	..	..	Belfast	..	..	Belfast	..	..	Belfast	..	..	..	Belfast	..	..	..	..	..

Times in *italics* indicate a connecting train.

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Baile Átha Cliath - Dún Dealgan - Sathairn (gan saoire phoiblí san áireamh) - Bailí ó 26.09.2021 go bhfógrófar a mhalairt
Dublin - Dundalk - Saturday (excluding public holidays) - Valid from 26.09.2021 until further notice

		Saturday Only						
		..	..	..	..	..	..	..
		..	..	..	..	..	..	..
BRAY (Daly)	Dep	..	..	..	..	..	..	..
DUN LAOGHAIRE (Mallin)	Dep	..	..	..	..	..	..	..
Blackrock	Dep	..	..	..	..	..	..	..
Sydney Parade	Dep	..	..	..	..	..	..	..
Lansdowne Road	Dep	..	..	..	..	..	..	..
GRAND CANAL DOCK	Dep	..	*18:59*	*19:59*	..	*21:31*	*22:31*	*23:16*
DUBLIN Pearse	Dep	..	*19:03*	*20:02*	..	*21:34*	*22:34*	23:40
Tara Street Ⓐ	Dep	..	*19:05*	*20:04*	..	*21:36*	*22:36*	23:43
DUBLIN Connolly	Arr	..	*19:07*	*20:07*	..	*21:38*	*22:38*	23:46
DUBLIN Connolly Ⓐ Ⓛ	Dep	19:00	19:20	20:20	20:50	21:45	22:45	23:47
Howth Junction & Donaghmede	Dep	..	..	20:30	..	21:58	22:58	23:57
Clongriffin	Dep	..	..	20:32	..	22:00	23:00	23:59
Portmarnock	Dep	..	..	20:35	..	22:03	23:03	00:02
Malahide	Dep	..	19:40	20:40	..	22:09	23:09	00:08
Donabate	Dep	..	19:44	20:44	..	22:13	23:13	00:12
Rush And Lusk	Dep	..	19:49	20:49	..	22:18	23:18	00:17
Skerries	Dep	..	19:54	20:54	..	22:23	23:23	00:22
Balbriggan	Arr	..	19:59	20:59	..	22:28	23:28	00:28
Balbriggan	Dep	..	20:00	21:00	..	22:29	23:29	00:28
Gormanston	Dep	..	20:04	21:04	..	22:33	23:33	00:32
Laytown	Dep	..	20:09	21:09	..	22:38	23:38	00:37
DROGHEDA (MacBride)	Arr	19:34	20:18	21:18	21:28	22:47	23:47	00:47
DROGHEDA (MacBride)	Dep	19:35	..	..	21:29	..	23:48	00:50
DUNDALK (Clarke)	Arr	19:55	..	..	21:49	..	00:12	01:14
DUNDALK (Clarke)	Dep	19:56	..	..	20:50	..	..	..
NEWRY	Arr	20:14	..	..	22:08	..	..	..
		To Belfast	..	..	To Belfast	..	..	..

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Baile Átha Cliath - Dún Dealgan - Dé Domhnaigh (gan saoire phoiblí san áireamh) - Bailí ó 26.09.2021 go bhfógrófar a mhalairt
Dublin - Dundalk - Sunday (excluding public holidays) - Valid from 26.09.2021 until further notice

		Sunday Only																		
GRAND CANAL DOCK	**DEP**	..	..	*10:05*	*11:05*	..	*12:00*	*12:55*	..	*13:55*	*14:55*	..	*15:55*	*16:55*	*17:55*	..	*18:55*	*20:20*	*21:05*	*22:05*	*23:00*
DUBLIN Pearse	**Dep**	..	..	*10:08*	*11:08*	..	*12:03*	*12:58*	..	*13:58*	*14:58*	..	*15:58*	*16:58*	*17:58*	..	*18:58*	*20:24*	*21:08*	*22:08*	23:40
Tara Street Ⓐ	**Dep**	..	..	*10:10*	*11:10*	..	*12:05*	*13:00*	..	*14:00*	*15:00*	..	*16:00*	*17:00*	*18:00*	..	*19:00*	*20:27*	*21:10*	*22:10*	23:43
DUBLIN Connolly	**Arr**	..	..	*10:12*	*11:12*	..	*12:07*	*13:02*	..	*14:02*	*15:02*	..	*16:02*	*17:02*	*18:02*	..	*19:02*	*20:30*	*21:12*	*22:12*	23:46
DUBLIN Connolly Ⓐ Ⓛ	**Dep**	09:20	10:00	10:17	11:22	12:00	12:15	13:15	14:00	14:15	15:15	16:00	16:15	17:15	18:20	19:00	19:20	20:35	21:35	22:35	23:47
Howth Junction & Donaghmede	**Dep**	09:30	..	..	11:32	..	..	13:25	..	..	15:25	..	16:25	17:25	18:29	..	19:31	20:49	21:47	22:47	23:57
Clongriffin	**Dep**	09:32	..	10:33	11:34	..	12:28	13:28	..	..	15:27	..	16:27	17:27	18:32	..	19:33	20:51	21:49	22:49	23:59
Portmarnock	**Dep**	09:35	..	10:36	11:37	..	12:31	13:30	..	..	15:30	..	16:30	17:30	18:35	..	19:36	20:54	21:52	22:52	00.02
Malahide	**Dep**	09:40	..	10:42	11:42	..	12:36	13:35	..	14:33	15:35	..	16:35	17:35	18:39	..	19:42	20:59	21:57	22:57	00:08
Donabate	**Dep**	09:44	..	10:46	11:46	..	12:40	13:39	..	14:37	15:39	..	16:39	17:39	18:44	..	19:46	21:03	22:01	23:01	00:12
Rush And Lusk	**Dep**	09:49	..	10:51	11:51	..	12:45	13:44	..	14:42	15:44	..	16:44	17:44	18:48	..	19:51	21:08	22:06	23:06	00:17
Skerries	**Dep**	09:54	..	10:56	11:56	..	12:50	13:49	..	14:47	15:49	..	16:49	17:49	18:54	..	19:56	21:13	22:11	23:11	00:22
Balbriggan	**Dep**	10:00	..	11:02	12:02	..	12:56	13:55	..	14:53	15:55	..	16:55	17:55	18:59	..	20:02	21:19	22:17	23:17	00:28
Gormanston	**Dep**	10:04	..	11:06	12:06	..	13:00	13:59	..	14:57	15:59	..	16:59	17:59	19:04	..	20:06	21:23	22:21	23:21	00:32
Laytown	**Dep**	10:09	..	11:11	12:11	..	13:05	14:04	..	15:02	16:04	..	17:04	18:04	19:09	..	20:11	21:28	22:26	23:26	00:37
DROGHEDA (MacBride)	**Arr**	10:18	10:32	11:20	12:21	12:32	13:14	14:13	14:32	15:11	16:13	16:32	17:14	18:13	19:16	19:33	20:20	21:37	22:35	23:35	00:47
DROGHEDA (MacBride)	**Dep**	..	10:32	..	..	12:32	..	..	14:32	..	..	16:32	..	..	..	19:33	..	..	22:37	..	00:50
DUNDALK (Clarke)	**Arr**	..	10:54	..	..	12:54	..	..	14:54	..	..	16:54	..	..	..	19:55	..	..	23:01	..	01:14
DUNDALK (Clarke)	**Dep**	..	10:54	..	..	12:54	..	..	14:54	..	..	16:54	..	..	..	19:55	..	..	..	..	..
NEWRY	**Arr**	..	11:12	..	..	13:12	..	..	15:12	..	..	17:12	..	..	..	20:12	..	..	..	..	..
		..	To	..	..	To	..	..	To	..	..	To	..	..	..	To	..	..	..	..	..
		..	Belfast	..	..	Belfast	..	..	Belfast	..	..	Belfast	..	..	..	Belfast	..	..	..	..	..

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BÁC - Dún Dealgan - Dé Domhnaigh (gan saoire phoiblí san áireamh)
Dublin - Dundalk - Sunday (excluding public holidays)

Dún Dealgan - Baile Átha Cliath - Luan go hAoine (gan saoire phoiblí san áireamh) - Bailí ó 26.09.2021 go bhfógrófar a mhalairt
Dundalk - Dublin - Monday - Friday (excluding public holidays) - Valid from 26.09.2021 until further notice

		Monday to Friday																					
		..	..	..	..	..	..	..	..	From	..	..	From	..	..	..	..	From	..	..	..	From	
		..	..	..	..	..	..	..	..	Belfast	..	..	Belfast	..	..	..	..	Belfast	..	..	..	Belfast	
NEWRY	**Dep**	..	..	..	..	..	06:30	..	..	07:42	..	..	08:56	..	..	..	..	11:28	..	..	..	13:28	..
DUNDALK (Clarke)	**Dep**	05:40	..	..	06:30	..	07:00	07:10	..	08:00	..	..	09:15	..	..	10:15	10:50	11:47	..	12:45	..	13:47	..
DROGHEDA (MacBride)	**Dep**	06:04	06:28	06:45	06:55	07:05	07:21	07:36	07:58	08:22	08:30	09:00	..	09:40	10:10	10:40	11:14	12:08	12:20	13:10	13:40	14:08	14:20
Laytown	**Dep**	06:10	06:34	06:51	07:02	07:11	07:29	07:43	08:05	..	08:36	09:06	..	09:46	10:16	10:46	11:20	..	12:26	13:16	13:46	..	14:26
Gormanston	**Dep**	..	06:40	..	07:08	07:17	..	07:49	08:10	..	08:42	09:12	..	09:52	10:22	10:52	..	..	12:32	13:22	13:52	..	14:32
Balbriggan	**Dep**	06:19	06:44	06:59	07:12	07:21	07:37	07:54	08:15	..	08:46	09:16	..	09:56	10:26	10:55	11:28	..	12:36	13:26	13:56	..	14:36
Skerries	**Dep**	06:25	06:51	07:05	07:18	07:28	07:44	08:01	08:21	..	08:52	09:22	..	10:02	10:32	11:01	11:34	..	12:42	13:32	14:02	..	14:42
Rush And Lusk	**Dep**	06:32	06:58	07:12	07:25	07:35	07:51	08:09	08:28	..	08:58	09:28	..	10:08	10:38	11:08	11:40	..	12:48	13:38	14:08	..	14:48
Donabate	**Dep**	06:36	07:02	07:17	07:30	07:39	07:56	08:14	08:33	..	09:02	09:32	..	10:12	10:42	11:12	11:44	..	12:52	13:42	14:12	..	14:52
Malahide	**Dep**	06:41	07:07	07:23	07:36	07:45	08:03	08:19	08:38	..	09:08	09:38	..	10:17	10:47	11:16	11:49	..	12:57	13:47	14:17	..	14:57
Portmarnock	**Dep**	..	07:11	07:29	07:42	07:52	..	..	08:43	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Clongriffin	**Dep**	..	..	..	07:45	07:55	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Howth Junction & Donaghmede	**Dep**	06:48	07:15	..	07:47	..	..	..	08:47	..	..	..	..	..	..	..	..	..	..	..	..	..	..
DUBLIN Connolly Ⓐ Ⓛ	**Arr**	06:57	07:28	07:48	07:59	08:08	08:19	08:39	08:57	09:00	09:29	10:01	10:05	10:39	11:09	11:39	12:09	12:40	13:18	14:11	14:38	14:40	15:18
DUBLIN Connolly	**Dep**	06:59	07:30	07:50	08:01	08:10	*08:26*	08:41	08:59	..	09:31	*10:07*	..	10:41	*11:16*	*11:46*	*12:18*	..	*13:26*	*14:16*	*14:50*	..	*15:26*
Tara Street Ⓐ	**Dep**	07:03	07:33	07:53	08:05	08:13	*08:30*	08:45	09:04	..	09:34	*10:10*	..	10:44	*11:19*	*11:49*	*12:21*	..	*13:29*	*14:19*	*14:53*	..	*15:30*
DUBLIN Pearse	**Arr**	07:04	07:35	07:54	08:06	08:15	*08:31*	08:46	09:05	..	09:35	*10:11*	..	10:46	*11:20*	*11:50*	*12:22*	..	*13:31*	*14:20*	*14:54*	..	*15:31*
GRAND CANAL DOCK	**Dep**	*07:13*	*07:43*	*08:02*	08:10	08:20	*08:34*	*08:54*	09:10	..	*09:43*	*10:14*	..	*10:53*	*11:23*	*11:53*	*12:24*	..	*13:33*	*14:23*	*14:57*	..	*15:33*
Lansdowne Road	**Dep**	..	..	..	08:13	08:23	..	..	09:13	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Sydney Parade	**Dep**	..	..	..	08:17	08:27	..	..	09:17	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Blackrock	**Dep**	..	..	..	08:22	08:32	..	..	09:21	..	..	..	..	..	..	..	..	..	..	..	..	..	..
DUN LAOGHAIRE (Mallin)	**Dep**	..	..	..	08:28	08:38	..	..	09:27	..	..	..	..	..	..	..	..	..	..	..	..	..	..
BRAY (Daly)	**Arr**	..	..	..	08:49	09:00	..	..	09:50	..	..	..	..	..	..	..	..	..	..	..	..	..	..

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Dún Dealgan - Baile Átha Cliath - Luan go hAoine (gan saoire phoiblí san áireamh) - Bailí ó 26.09.2021 go bhfógrófar a mhalairt
Dundalk - Dublin - Monday - Friday (excluding public holidays) - Valid from 26.09.2021 until further notice

		Monday to Friday																	
		..	..	From	..	..	..	..	..	From				From			From		
		..	..	Belfast	..	..	..	..	..	Belfast				Belfast			Belfast		
NEWRY	**Dep**	..	..	14:59	..	..	..	..	..	17:02	..	..	..	19:03	..	..	21:03	..
DUNDALK (Clarke)	**Dep**	..	..	15:19	..	..	..	..	..	17:20	..	..	..	19:20	..	20:40	21:20	..
DROGHEDA (MacBride)	**Dep**	14:50	15:10	15:41	15:50	16:02	16:28	17:00	17:30	17:41	..	18:02	18:50	19:41	20:00	21:05	21:41	22:05
Laytown	**Dep**	14:56	15:16	..	15:56	16:08	16:34	17:06	..	..	..	18:08	18:56	..	20:06	21:11	..	22:11
Gormanston	**Dep**	15:02	15:22	..	..	16:14	..	17:12	..	..	..	18:14	19:02	..	20:12	21:17	..	22:17
Balbriggan	**Dep**	15:06	15:25	..	16:05	16:17	16:42	17:16	17:43	..	17:58	18:18	19:06	..	20:16	21:21	..	22:21
Skerries	**Dep**	15:12	15:31	..	16:11	16:23	16:48	17:22	17:49	..	18:05	18:24	19:12	..	20:22	21:27	..	22:27
Rush And Lusk	**Dep**	15:18	15:38	..	16:18	16:30	..	17:28	..	..	18:11	18:30	19:18	..	20:28	21:33	..	22:33
Donabate	**Dep**	15:22	15:41	..	16:22	16:34	..	17:32	..	..	18:15	18:34	19:22	..	20:32	21:37	..	22:37
Malahide	**Dep**	15:27	15:48	..	16:27	16:38	16:59	17:37	..	..	18:21	18:39	19:27	..	20:37	21:42	..	22:42
Portmarnock	**Dep**	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Clongriffin	**Dep**	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Howth Junction & Donaghmede	**Dep**	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
DUBLIN Connolly Ⓐ Ⓛ	**Arr**	15:48	16:11	16:20	16:48	17:00	17:19	18:03	18:13	18:17	18:42	19:01	19:48	20:15	20:59	22:01	22:15	23:01
DUBLIN Connolly	**Dep**	15:50	16:12	..	*16:55*	17:02	*17:26*	18:04	18:17	..	18:44	19:02	19:50	..	21:01	22:03	..	*23:09*
Tara Street Ⓐ	**Dep**	15:53	16:15	..	*16:59*	17:05	*17:29*	18:07	18:20	..	18:47	19:06	19:53	..	21:04	22:06	..	*23:13*
DUBLIN Pearse	**Arr**	15:55	16:17	..	*17:01*	17:08	*17:30*	18:09	18:22	..	18:48	19:07	19:55	..	21:06	22:08	..	*23:14*
GRAND CANAL DOCK	**Dep**	..	*16:23*	..	*17:06*	*17:17*	*17:33*	*18:15*	*18:33*	..	*18:53*	*19:17*	*20:03*	..	*21:18*	*22:19*	..	*23:18*
Lansdowne Road	**Dep**	16:01	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Sydney Parade	**Dep**	16:06	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Blackrock	**Dep**	16:12	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
DUN LAOGHAIRE (Mallin)	**Dep**	16:18	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
BRAY (Daly)	**Arr**	16:39	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..

Times in *italics* indicate a connecting train.

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Timetable subject to alteration at Public Holiday periods. Please see irishrail.ie for further information. Passengers must purchase tickets before joining the train.
Department of Social Protection Free Travel Pass holders must be in possession of their free travel ticket when travelling on the train. Penalty fines will apply to passengers travelling without the correct ticket. Passengers are reminded that station platform gates will close 2 minutes prior to departure.

Dún Dealgan - BÁC - Luan go hAoine (gan saoire phoiblí san áireamh)
Dundalk - Dublin - Monday - Friday (excluding public holidays)

Dún Dealgan - Baile Átha Cliath - Sathairn (gan saoire phoiblí san áireamh) - Bailí ó 26.09.2021 go bhfógrófar a mhalairt
Dundalk - Dublin - Saturday (excluding public holidays) - Valid from 26.09.2021 until further notice

		Saturday Only																			
					From		From				From	..	..	..	From	..	..	..	From	..	..
					Belfast		Belfast				Belfast	..	..	..	Belfast	..	..	..	Belfast	..	..
NEWRY	**Dep**	..	..	..	07:42	..	08:54	..	..	..	11:28	..	..	..	13:31	..	..	..	15.04	..	..
DUNDALK (Clarke)	**Dep**	..	07:05	..	08:00	08:10	09:13	..	10:15	11:05	11:47	..	12:45	..	13:47	..	..	..	15:22	..	..
DROGHEDA (MacBride)	**Arr**	..	07:29	..	08:22	08:33	..	..	10:38	11:29	12:07	..	13:08	..	14:07	..	..	..	15:42	..	..
DROGHEDA (MacBride)	**Dep**	06:28	07:30	07:58	08:22	08:35	..	09:40	10:40	11:30	12:08	12:20	13:10	13:38	14:08	14:20	14:40	15:15	15:43	16:10	17:10
Laytown	**Dep**	06:34	07:36	08:04	..	08:41	..	09:46	10:46	11:37	..	12:26	13:16	13:44	..	14:26	14:46	15:21	..	16:16	17:16
Gormanston	**Dep**	06:40	07:42	08:10	..	08:47	..	09:52	10:52	11:45	..	12:32	13:22	13:50	..	14:32	14:52	15:27	..	16:22	17:22
Balbriggan	**Dep**	06:44	07:46	08:14	..	08:51	..	09:56	10:56	11:51	..	12:36	13:26	13:54	..	14:36	14:56	15:31	..	16:26	17:26
Skerries	**Dep**	06:51	07:52	08:20	..	08:57	..	10:02	11:02	11:57	..	12:42	13:32	14:00	..	14:42	15:02	15:37	..	16:32	17:32
Rush And Lusk	**Dep**	06:58	07:58	08:26	..	09:03	..	10:08	11:08	12:04	..	12:48	13:38	14:06	..	14:48	15:08	15:43	..	16:38	17:38
Donabate	**Dep**	07:02	08:02	08:30	..	09:07	..	10:12	11:12	12:08	..	12:52	13:42	14:10	..	14:52	15:12	15:47	..	16:42	17:42
Malahide	**Dep**	07:07	08:07	08:35	..	09:13	..	10:17	11:17	12:13	..	12:58	13:47	14:15	..	14:57	15:17	15:52	..	16:47	17:47
Portmarnock	**Dep**	07:12	08:12	08:40	..	09:17	..	..	11:22	12:17	..	..	..	..	..	..	..	15:57	..	..	17:51
Clongriffin	**Dep**	07:14	08:14	08:42	..	09:20	..	..	11:24	12:20	..	..	..	..	..	..	..	15:59	..	..	17:54
Howth Junction & Donaghmede	**Dep**	07:17	08:17	08:45	..	09:22	..	10:23	11:27	12:22	..	..	13:54	14:22	..	..	..	16:02	..	16:56	17:56
DUBLIN Connolly Ⓐ Ⓛ	**Arr**	07:30	08:30	08:57	09:00	09:34	10:05	10:35	11:39	12:33	12:40	13:18	14:05	14:34	14:40	15:15	15:34	16:15	16:20	17:07	18:08
DUBLIN Connolly	**Dep**	*07:42*	08:32	*09:10*	..	*09:44*	..	*10:43*	*11:51*	*12:40*	..	*13:27*	*14:14*	*14:41*	..	*15:25*	*15:40*	*16:30*	..	*17:13*	*18:13*
Tara Street Ⓐ	**Dep**	*07:45*	08:35	*09:13*	..	*09:48*	..	*10:46*	*11:54*	*12:43*	..	*13:30*	*14:17*	*14:45*	..	*15:28*	*15:43*	*16:33*	..	*17:16*	*18:16*
DUBLIN Pearse	**Arr**	*07:46*	08:38	*09:14*	..	*09:49*	..	*10:47*	*11:55*	*12:44*	..	*13:31*	*14:18*	*14:46*	..	*15:29*	*15:44*	*16:34*	..	*17:17*	*18:17*
GRAND CANAL DOCK	**Arr**	*07:48*	*08:51*	*09:16*		*09:51*		*10:49*	*11:57*	*12:46*		*13:33*	*14:20*	*14:48*		*15:31*	*15:46*	*16:36*		*17:19*	*18:20*

Times in *italics* indicate a connecting train.

Ⓛ LUAS Tram Link to/from Dublin City Centre and Heuston Station Ⓐ Bus connection to/from Dublin Airport available nearby
Timetable subject to alteration at Public Holiday periods. Please see irishrail.ie for further information. Passengers must purchase tickets before joining the train.
Department of Social Protection Free Travel Pass holders must be in possession of their free travel ticket when travelling on the train. Penalty fines will apply to passengers travelling without the correct ticket. Passengers are reminded that station platform gates will close 2 minutes prior to departure.

		Saturday Only							
		..	From	..	..	From	..	From	..
		..	Belfast	..	..	Belfast	..	Belfast	..
NEWRY	**Dep**	..	17:02	..	..	19:02	..	21:02	..
DUNDALK (Clarke)	**Dep**	..	17:20	..	..	19:20	..	21:20	..
DROGHEDA (MacBride)	**Arr**	..	17:41	..	..	19:41	..	21:41	..
DROGHEDA (MacBride)	**Dep**	17:30	17:41	18:02	18:50	19:41	20:10	21:41	22:10
Laytown	**Dep**	..	..	18:08	18:56	..	20:16	..	22:16
Gormanston	**Dep**	..	..	18:14	19:02	..	20:22	..	22:22
Balbriggan	**Dep**	17:43	..	18:18	19:06	..	20:26	..	22:26
Skerries	**Dep**	17:49	..	18:24	19:12	..	20:32	..	22:32
Rush And Lusk	**Dep**	..	..	18:30	19:18	..	20:38	..	22:38
Donabate	**Dep**	..	..	18:34	19:22	..	20:42	..	22:42
Malahide	**Dep**	..	..	18:40	19:28	..	20:47	..	22:47
Portmarnock	**Dep**	..	..	18:45	19:33	..	..	..	22:51
Clongriffin	**Dep**	..	..	18:47	19:35	..	..	..	22:54
Howth Junction & Donaghmede	**Dep**	..	..	18:50	19:38	..	20:54	..	22:56
DUBLIN Connolly Ⓐ Ⓛ	**Arr**	18:16	18:18	19:05	19:49	20:15	21:05	22:15	23:07
DUBLIN Connolly	**Dep**	..	*18:26*	*19:10*	*19:55*	..	*21:12*	..	23:08
Tara Street Ⓐ	**Dep**	..	*18:29*	*19:13*	*19:58*	..	*21:15*	..	23:12
DUBLIN Pearse	**Arr**	..	*18:30*	*19:14*	*19:59*	..	*21:16*	..	23:13
GRAND CANAL DOCK	**Arr**		*18:32*	*19:16*	*20:01*		*21:18*		*23:26*

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Timetable subject to alteration at Public Holiday periods. Please see irishrail.ie for further information. Passengers must purchase tickets before joining the train.
Department of Social Protection Free Travel Pass holders must be in possession of their free travel ticket when travelling on the train. Penalty fines will apply to passengers travelling without the correct ticket. Passengers are reminded that station platform gates will close 2 minutes prior to departure.

Dún Dealgan - Baile Átha Cliath - Dé Domhnaigh (gan saoire phoiblí san áireamh) - Bailí ó 26.09.2021 go bhfógrófar a mhalairt
Dundalk - Dublin - Sunday (excluding public holidays) - Valid from 26.09.2021 until further notice

		Sunday Only																			
					From			From			From	..	..	..	From	..	..	..	From	..	..
					Belfast			Belfast			Belfast	..	..	..	Belfast	..	..	..	Belfast	..	..
NEWRY	**Dep**	..	..	..	10:01	..	..	11:58	..	..	13:58	..	..	..	16:58	..	..	..	19:58	..	..
DUNDALK (Clarke)	**Dep**	..	..	09:30	10:19	..	..	12:17	..	..	14:17	..	..	..	17:17	..	..	..	20:17	..	..
DROGHEDA (MacBride)	**Arr**	..	..	09:53	10:40	..	..	12:39	..	..	14:39	..	..	..	17:40	..	..	..	20:40	..	..
DROGHEDA (MacBride)	**Dep**	07:55	08:55	09:55	10:40	10:55	12:05	12:39	13:05	14:05	14:40	15:05	16:05	17:05	17:40	18:05	18:55	19:55	20:40	20:55	21:55
Laytown	**Dep**	08:01	09:01	10:01	..	11:01	12:11	..	13:11	14:11	..	15:11	16:11	17:11	..	18:11	19:01	20:01	..	21:01	22:01
Gormanston	**Dep**	08:07	09:07	10:07	..	11:07	12:17	..	13:17	14:17	..	15:17	16:17	17:17	..	18:17	19:07	20:07	..	21:06	22:07
Balbriggan	**Dep**	08:10	09:10	10:10	..	11:10	12:20	..	13:20	14:20	..	15:20	16:20	17:20	..	18:20	19:10	20:10	..	21:10	22:10
Skerries	**Dep**	08:16	09:16	10:16	..	11:16	12:26	..	13:26	14:26	..	15:26	16:26	17:26	..	18:26	19:16	20:16	..	21:16	22:16
Rush And Lusk	**Dep**	08:23	09:23	10:23	..	11:23	12:33	..	13:33	14:33	..	15:33	16:33	17:33	..	18:33	19:23	20:23	..	21:23	22:23
Donabate	**Dep**	08:27	09:27	10:27	..	11:27	12:37	..	13:37	14:37	..	15:37	16:37	17:37	..	18:37	19:27	20:27	..	21:27	22:27
Malahide	**Dep**	08:31	09:31	10:31	..	11:31	12:42	..	13:41	14:43	..	15:41	16:41	17:41	..	18:43	19:32	20:31	..	21:31	22:31
Portmarnock	**Dep**	08:36	09:36	10:36	..	11:36	..	..	13:46	..	..	15:46	16:46	17:46	..	..	19:37	20:36	..	..	..
Clongriffin	**Dep**	08:38	09:38	10:38	..	11:38	..	..	13:48	..	..	15:48	16:48	17:48	..	..	19:39	20:38	..	..	..
Howth Junction & Donaghmede	**Dep**	08:41	09:41	10:41	..	11:40	..	..	13:50	..	..	15:51	16:51	17:51	..	..	19:43	20:41	..	..	..
DUBLIN Connolly Ⓐ Ⓛ	**Arr**	08:52	09:53	10:53	11:20	11:52	13:03	13:15	14:03	15:03	15:15	16:03	17:03	18:03	18:15	19:03	19:55	20:54	21:15	21:53	22:48
DUBLIN Connolly	**Dep**	*08:56*	*09:59*	*10:59*	..	*11:59*	*13:11*	..	*14:09*	*15:13*	..	*16:09*	*17:12*	*18:09*	..	*19:13*	*20:00*	*21:00*	..	*22:01*	22:50
Tara Street Ⓐ	**Dep**	*08:59*	*10:02*	*11:02*	..	*12:02*	*13:14*	..	*14:12*	*15:16*	..	*16:12*	*17:15*	*18:12*	..	*19:16*	*20:03*	*21:03*	..	*22:04*	22:53
DUBLIN Pearse	**Arr**	*09:00*	*10:03*	*11:03*	..	*12:03*	*13:15*	..	*14:13*	*15:17*	..	*16:13*	*17:16*	*18:13*	..	*19:17*	*20:04*	*21:04*	..	*22:05*	22:55
GRAND CANAL DOCK	**Arr**	*09:02*	*10:06*	*11:06*		*12:06*	*13:17*		*14:16*	*15:19*		*16:16*	*17:18*	*18:16*		*19:19*	*20:07*	*21:07*		*22:07*	*23:07*

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Department of Social Protection Free Travel Pass holders must be in possession of their free travel ticket when travelling on the train. Penalty fines will apply to passengers travelling without the correct ticket. Passengers are reminded that station platform gates will close 2 minutes prior to departure.

APPENDIX 13.1A

Confirmation of Feasibility From Irish Water Ref. CDS22007645

85 Merrion Square, Dublin 2, D02 FX60
+353 (0)1 539 0710 info@hpdc.ie www.hpdc.ie

HUGHES PLANNING
& DEVELOPMENT CONSULTANTS

CONFIRMATION OF FEASIBILITY

Uisce Éireann
Bosca OP448
Oifig Sheachadta na
Cathrach Theas
Cathair Chorcaí

Irish Water
PO Box 448,
South City
Delivery Office
Cork City.

www.water.ie

Martin Peters

MPA Consulting
Ormonde Road
Kilkenny
R95AHX8

24 November 2022

Our Ref: CDS22007645 Pre-Connection Enquiry
Naul Road, Balbriggan, Co. Dublin

Dear Applicant/Agent,

We have completed the review of the Pre-Connection Enquiry.

Irish Water has reviewed the pre-connection enquiry in relation to a Water & Wastewater connection for a Multi/Mixed Use Development of 565 unit(s) at Naul Road, Balbriggan, Co. Dublin, (the **Development)**.

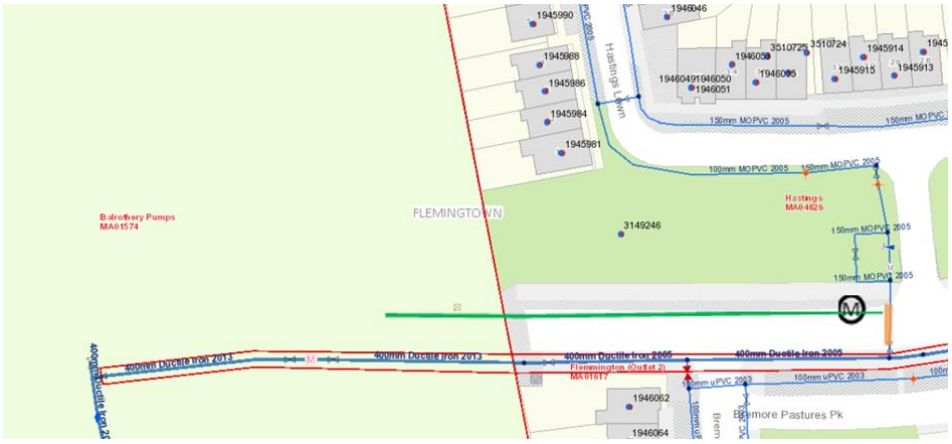
Based upon the details provided we can advise the following regarding connecting to the networks;

- **Water Connection** - Feasible Subject to upgrades

  - In order to accommodate the proposed connection following are required:
    - Approximately 10m of the existing 150mm MoPVC main (amber line below) in Hamlet Lane to be upgraded to 225mm ID pipe
    - The spine main of the new DMA shall be of 200mm ID pipe minimum (green line below) to provide capacity for fire and daily peak. A DMA meter with associated telemetry to be installed at the line.
    - The branch mains shall be 150mm ID to accommodate daily peak demand and fire capacity. Connection mains shall be 100mm ID.
    - An onsite booster pump to provide pressure to the Development is required
    - Bulk meter to be installed on the site development side of each connection main and linked up with telemetry online

Stiúrthóirí / Directors: Cathal Marley (Chairman), Niall Gleeson, Eamon Gallen, Yvonne Harris, Brendan Murphy, Dawn O'Driscoll, Maria O'Dwyer
Oifig Chláraithe / Registered Office: Teach Colvill, 24-26 Sráid Thalbóid, Baile Átha Cliath 1, D01 NP86 / Colvill House, 24-26 Talbot Street, Dublin 1 D01 NP86
Is cuideachta ghníomhaíochta ainmnithe atá faoi theorainn scaireanna é Uisce Éireann / Irish Water is a designated activity company, limited by shares.
Uimhir Chláraithe in Éirinn / Registered in Ireland No.: 530363

- These upgrade works are not currently on Irish Water investment plan therefore, the applicant will be required to fund these local network upgrades. The fee will be calculated at a connection application stage.



- The proposed Development indicates that Irish Water assets are present on the site. The Developer has to demonstrate that proposed structures and works will not inhibit access for maintenance or endanger structural or functional integrity of the assets during and after the works. Drawings (showing clearance distances, changing to ground levels) and Method Statements should be included in the Detailed Design of the Development. A wayleave in favour of Irish Water will be required over the assets that are not located within the Public Space. For design submissions and queries related to diversion/build near or over, please contact IW Diversion Team via email address diversions@water.ie

- **Wastewater Connection** - Feasible Subject to upgrades

- In order to accommodate the proposed connection, upgrade works are required to increase the capacity of Quay Street Pumping Station. Irish Water currently has a project underway which will provide the necessary upgrade and capacity. This upgrade project is scheduled to be completed by Q2/2024 (this may be subject to change) and the proposed connection could be completed as soon as possibly practicable after this date.

This letter does not constitute an offer, in whole or in part, to provide a connection to any Irish Water infrastructure. Before the Development can be connected to our network(s) you must submit a connection application and be granted and sign a connection agreement with Irish Water.

As the network capacity changes constantly, this review is only valid at the time of its completion. As soon as planning permission has been granted for the Development, a completed connection application should be submitted. The connection application is available at www.water.ie/connections/get-connected/

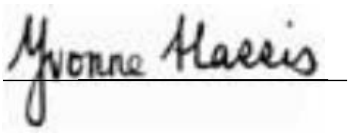
Where can you find more information?

- **Section A -** What is important to know?
- **Section B -** Details of Irish Water's Network(s)

This letter is issued to provide information about the current feasibility of the proposed connection(s) to Irish Water's network(s). This is not a connection offer and capacity in Irish Water's network(s) may only be secured by entering into a connection agreement with Irish Water.

For any further information, visit **www.water.ie/connections, email newconnections@water.ie** or contact 1800 278 278**.**

Yours sincerely,



Yvonne Harris
Head of Customer Operations

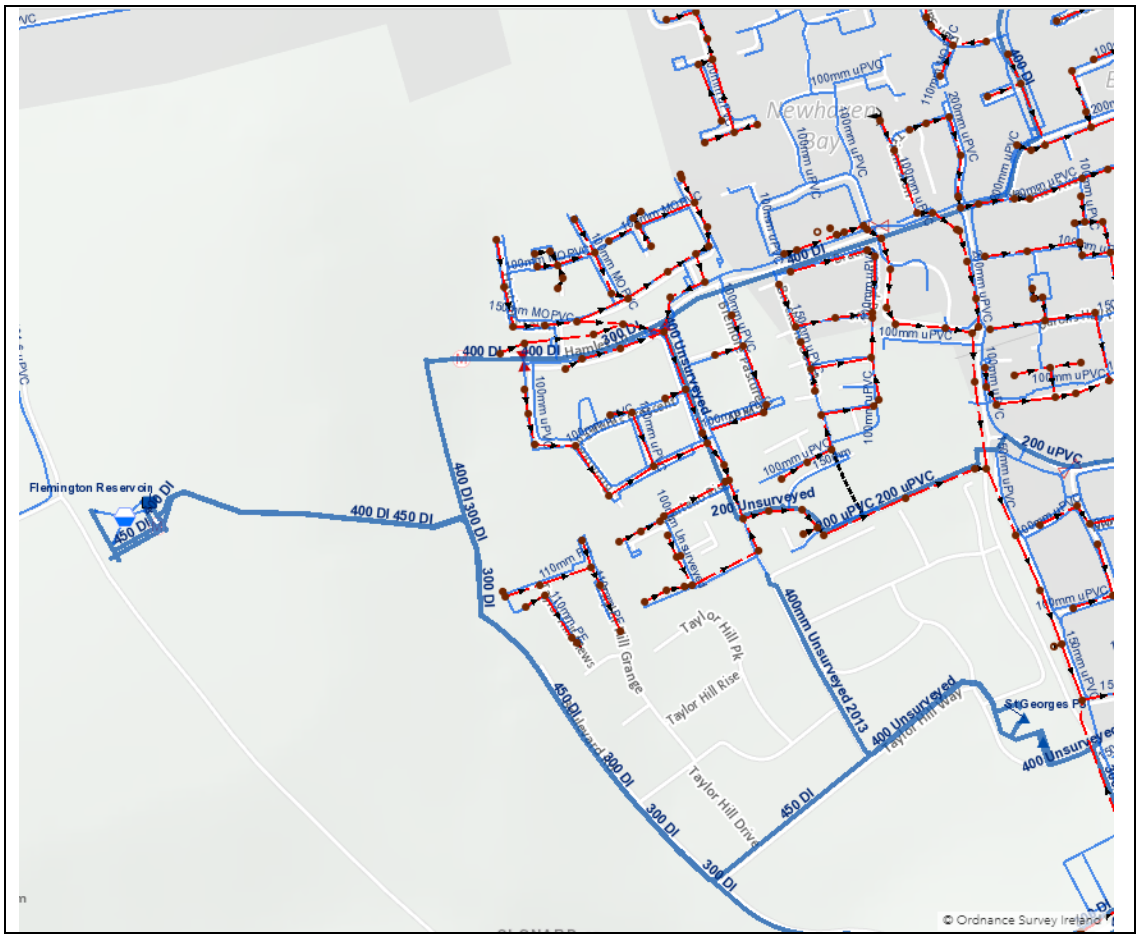
Section A - What is important to know?

What is important to know?	Why is this important?
Do you need a contract to connect?	• Yes, a contract is required to connect. This letter does not constitute a contract or an offer in whole or in part to provide a connection to Irish Water's network(s). • Before the Development can connect to Irish Water's network(s), you must submit a connection application and be granted and sign a connection agreement with Irish Water.
When should I submit a Connection Application?	• A connection application should only be submitted after planning permission has been granted.
Where can I find information on connection charges?	• Irish Water connection charges can be found at: https://www.water.ie/connections/information/charges/
Who will carry out the connection work?	• All works to Irish Water's network(s), including works in the public space, must be carried out by Irish Water*. *Where a Developer has been granted specific permission and has been issued a connection offer for Self-Lay in the Public Road/Area, they may complete the relevant connection works
Fire flow Requirements	• The Confirmation of Feasibility does not extend to fire flow requirements for the Development. Fire flow requirements are a matter for the Developer to determine. • **What to do?** - Contact the relevant Local Fire Authority
Plan for disposal of storm water	• The Confirmation of Feasibility does not extend to the management or disposal of storm water or ground waters. • **What to do?** - Contact the relevant Local Authority to discuss the management or disposal of proposed storm water or ground water discharges.
Where do I find details of Irish Water's network(s)?	• Requests for maps showing Irish Water's network(s) can be submitted to: datarequests@water.ie

What are the design requirements for the connection(s)?	• The design and construction of the Water & Wastewater pipes and related infrastructure to be installed in this Development shall comply with ***the Irish Water Connections and Developer Services Standard Details and Codes of Practice,*** available at www.water.ie/connections
Trade Effluent Licensing	• Any person discharging trade effluent** to a sewer, must have a Trade Effluent Licence issued pursuant to section 16 of the Local Government (Water Pollution) Act, 1977 (as amended). • More information and an application form for a Trade Effluent License can be found at the following link: https://www.water.ie/business/trade-effluent/about/ **trade effluent is defined in the Local Government (Water Pollution) Act, 1977 (as amended)

Section B – Details of Irish Water's Network(s)

The map included below outlines the current Irish Water infrastructure adjacent the Development: To access Irish Water Maps email datarequests@water.ie



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Note: The information provided on the included maps as to the position of Irish Water's underground network(s) is provided as a general guide only. The information is based on the best available information provided by each Local Authority in Ireland to Irish Water.

Whilst every care has been taken in respect of the information on Irish Water's network(s), Irish Water assumes no responsibility for and gives no guarantees, undertakings or warranties concerning the accuracy, completeness or up to date nature of the information provided, nor does it accept any liability whatsoever arising from or out of any errors or omissions. This information should not be solely relied upon in the event of excavations or any other works being carried out in the vicinity of Irish Water's underground network(s). The onus is on the parties carrying out excavations or any other works to ensure the exact location of Irish Water's underground network(s) is identified prior to excavations or any other works being carried out. Service connection pipes are not generally shown but their presence should be anticipated.

APPENDIX 13.1B

Statement of Design Acceptance from Irish Water Ref. CDS22007645

85 Merrion Square, Dublin 2, D02 FX60
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HUGHES PLANNING
& DEVELOPMENT CONSULTANTS

Martin Peters
MPA Consulting Engineers
Ormonde Road
Kilkenny
R95AHX8

Uisce Éireann
Bosca OP 448
Oifig Sheachadta na
Cathrach Theas
Cathair Chorcaí

Irish Water
PO Box 448,
South City
Delivery Office,
Cork City.

www.water.ie

29 May 2023

Re: Design Submission for Naul Road, Balbriggan, Co. Dublin (the "Development") (the "Design Submission") / Connection Reference No: CDS22007645

Dear Martin Peters,

Many thanks for your recent Design Submission.

We have reviewed your proposal for the connection(s) at the Development. Based on the information provided, which included the documents outlined in Appendix A to this letter, Irish Water has no objection to your proposals.

This letter does not constitute an offer, in whole or in part, to provide a connection to any Irish Water infrastructure. Before you can connect to our network you must sign a connection agreement with Irish Water. This can be applied for by completing the connection application form at www.water.ie/connections. Irish Water's current charges for water and wastewater connections are set out in the Water Charges Plan as approved by the Commission for Regulation of Utilities (CRU)(https://www.cru.ie/document_group/irish-waters-water-charges-plan-2018/).

You the Customer (including any designers/contractors or other related parties appointed by you) is entirely responsible for the design and construction of all water and/or wastewater infrastructure within the Development which is necessary to facilitate connection(s) from the boundary of the Development to Irish Water's network(s) (the "**Self-Lay Works**"), as reflected in your Design Submission. Acceptance of the Design Submission by Irish Water does not, in any way, render Irish Water liable for any elements of the design and/or construction of the Self-Lay Works.

If you have any further questions, please contact your Irish Water representative:
Name: Antonio Garzón
Phone: 087 475 0587
Email: Antonio.garzonmielgo@water.ie

Yours sincerely,

Yvonne Harris

Yvonne Harris
Head of Customer Operations

Stiúrthóirí / Directors: Tony Keohane (Chairman), Niall Gleeson (CEO), Christopher Banks, Fred Barry, Gerard Britchfield, Liz Joyce, Patricia King, Eileen Maher, Cathy Mannion, Michael Walsh
Oifig Chláraithe / Registered Office: Teach Colvill, 24–26 Sráid Thalbóid, Baile Átha Cliath 1, D01 NP86 / Colvill House, 24–26 Talbot Street, Dublin 1 D01 NP86
Is cuideachta ghníomhaíochta ainmnithe atá faoi theorainn scaireanna é Uisce Éireann / Irish Water is a designated activity company, limited by shares.
Uimhir Chláraithe in Éirinn / Registered in Ireland No.: 530363
IW-HP-MD
REV013

Appendix A

Document Title & Revision

- 191004-C-007.0-Proposed Foul Drainage Layout-Overall Rev PL5
- 191004-C-007.1-Proposed Foul Drainage Layout-Sheet 1 of 5- Rev PL5
- 191004-C-007.2-Proposed Foul Drainage Layout-Sheet 2 of 5- Rev PL5
- 191004-C-007.3-Proposed Foul Drainage Layout-Sheet 3 of 5- Rev PL5
- 191004-C-007.4-Proposed Foul Drainage Layout-Sheet 4 of 5- Rev PL5
- 191004-C-007.5-Proposed Foul Drainage Layout-Sheet 5 of 5- Rev PL5
- 191004-C-009.0-Proposed Watermain Layout-Overall-Rev PL5
- 191004-C-009.1-Proposed Watermain Layout-Sheet 1 of 5-Rev PL5
- 191004-C-009.2-Proposed Watermain Layout-Sheet 2 of 5-Rev PL5
- 191004-C-009.3-Proposed Watermain Layout-Sheet 3 of 5-Rev PL5
- 191004-C-009.4-Proposed Watermain Layout-Sheet 4 of 5-Rev PL5
- 191004-C-009.5-Proposed Watermain Layout-Sheet 5 of 5-Rev PL5
- 191004-C-020-Proposed Foul Long Sections-Sheet 1 of 5-Rev PL5
- 191004-C-021-Proposed Foul Long Sections-Sheet 2 of 5-Rev PL5
- 191004-C-022-Proposed Foul Long Sections-Sheet 3 of 5-Rev PL5
- 191004-C-023-Proposed Foul Long Sections-Sheet 4 of 5-Rev PL5
- 191004-C-024-Proposed Foul Long Sections-Sheet 5 of 5-Rev PL5
- 191004-C-033-Proposed Watermain Details Sheet 2-Rev PL3
- 191004-C-035-Proposed External Works Details-Rev PL4

Standard Details/Code of Practice Exemption:

1. Note IW prefers watermain to be laid under the footpath, due to restrictions on this site with footpath being reserved for comms, power and lighting ducts, services will be laid out to IW standards as per detail on drawing 191004/C/035

Additional Comments

The design submission will be subject to further technical review at connection application stage.

Irish Water cannot guarantee that its Network in any location will have the capacity to deliver a particular flow rate and associated residual pressure to meet the requirements of the relevant Fire Authority, see Section 1.17 of Water Code of Practice.

For further information, visit ***www.water.ie/connections***

Notwithstanding any matters listed above, the Customer (including any appointed designers/contractors, etc.) is entirely responsible for the design and construction of the Self-Lay Works. Acceptance of the Design Submission by Irish Water will not, in any way, render Irish Water liable for any elements of the design and/or construction of the Self-Lay Works.

APPENDIX 13.2A

Demolition Drawings

85 Merrion Square, Dublin 2, D02 FX60
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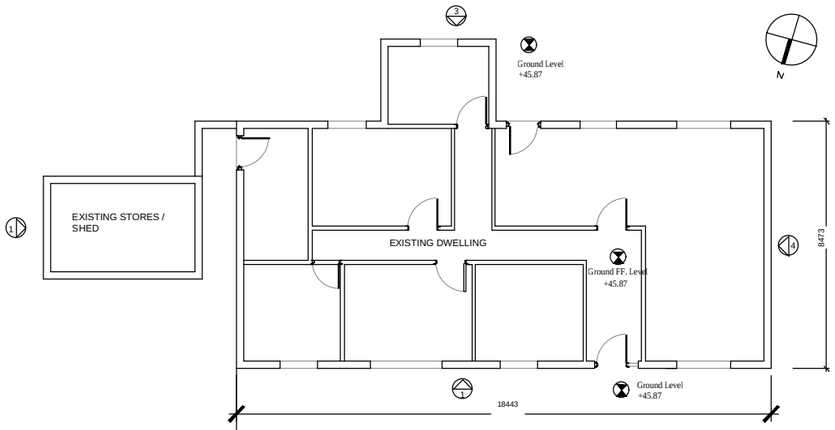

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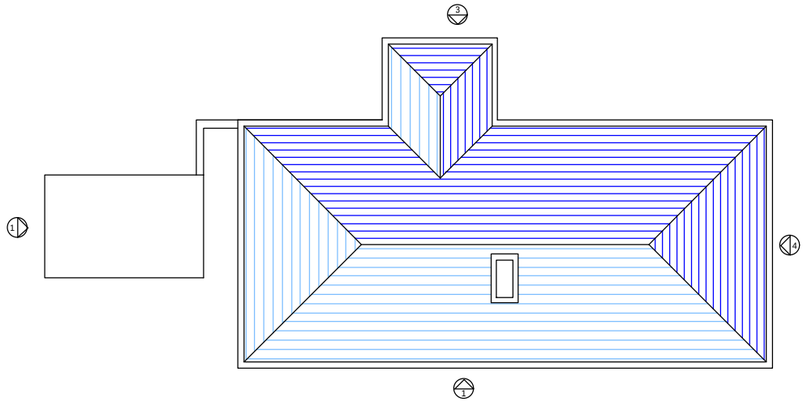
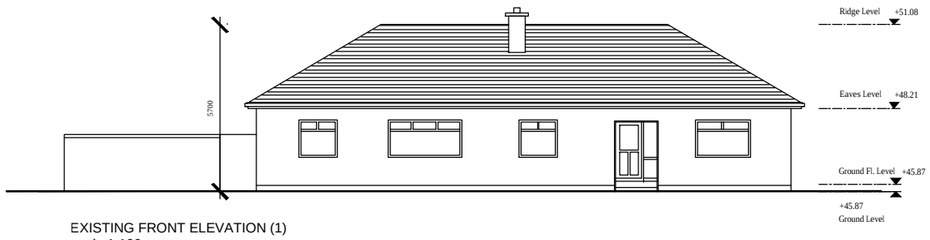
scale 1:100



EXISTING ROOF FLOOR PLAN
scale 1:100

EXISTING BUILDING A; DERELICT DWELLING
scale 1:100



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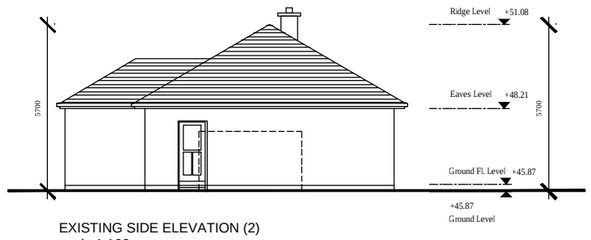
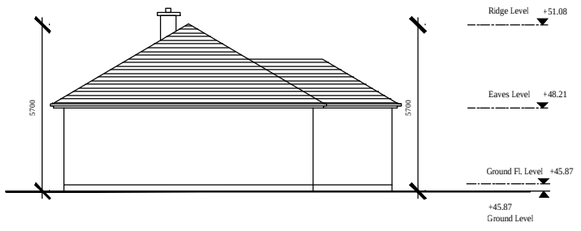
scale 1:100



EXISTING SIDE ELEVATION (2)
scale 1:100



EXISTING REAR ELEVATION (3)
scale 1:100



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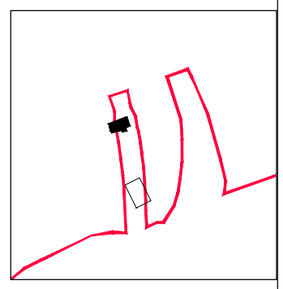

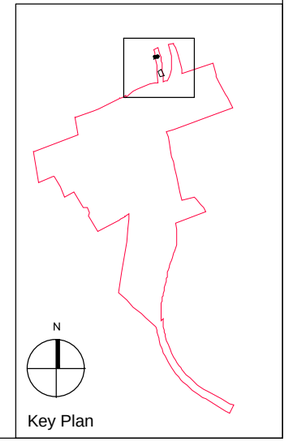

Key Plan

GENERAL NOTES:

ALL DIMENSIONS ARE TO BE CONFIRMED ON SITE

DIMENSIONS ARE NOT TO BE SCALED FROM THIS DRAWING

THIS DRAWING IS TO BE READ IN CONJUNCTION WITH CONSULTANTS DRAWINGS

ALL WORK TO BE CARRIED OUT IN ACCORDANCE WITH CURRENT BUILDING REGULATIONS

REV:	DATE:	DRWN:	DESCRIPTION:
A	A	FC	FGHFGHFGH

PLANNING		PROJECT NO:	1902	DATE:	01-11-2019
		SCALE:	1:2500@ A1	DRAWN BY:	RC
PROJECT TITLE:	Proposed Residential Development at Balbriggan, Co. Dublin. Building A; Dwelling	FILE NAME:	1902_Demolition	CHECKED BY:	RC
		DRAWING NO:	1902_SITE_0512	REVISION:	-
DRAWING TITLE:	Demolition Drawings Plans & Elevations of Existing Buildings	FERREIRA ARCHITECTS		ROSEMOUNT HALL, ROSEMOUNT ESTATE DUNDRUM ROAD, DUNDRUM, D14 FP59 tel: ++ 353-1-2063523 web: www.ferreira.ie email : admin@ferreira.ie	

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APPENDIX 13.2B

Demolition Drawings

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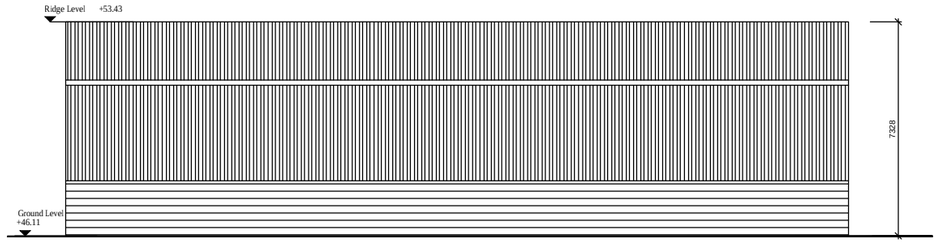

EXISTING FRONT ELEVATION (1)
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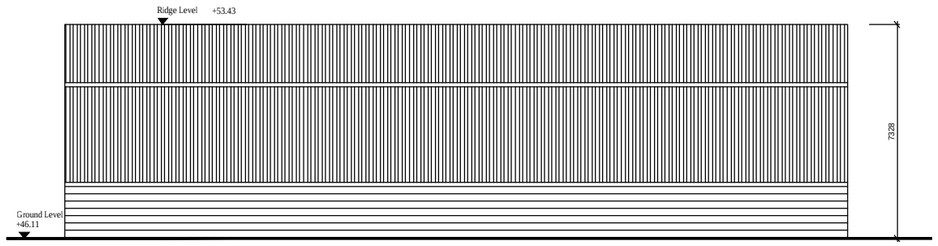

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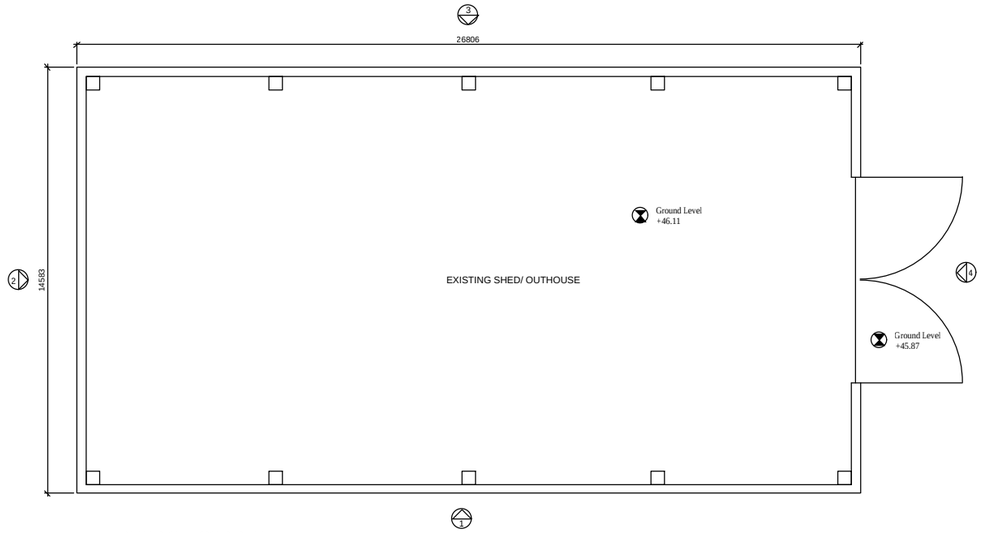
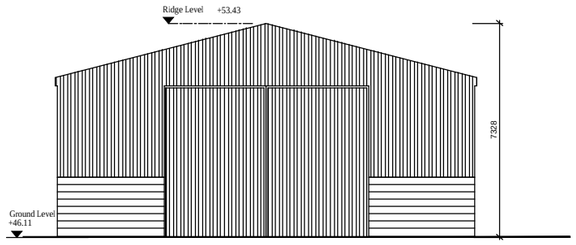


EXISTING FLOOR PLAN
scale 1:100

EXISTING BUILDING B; SHED / OUTHOUSE
scale 1:100



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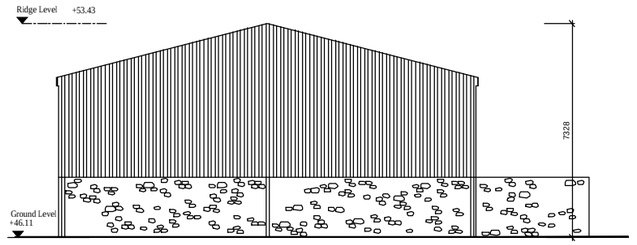

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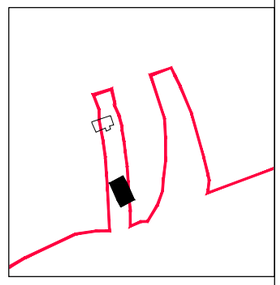

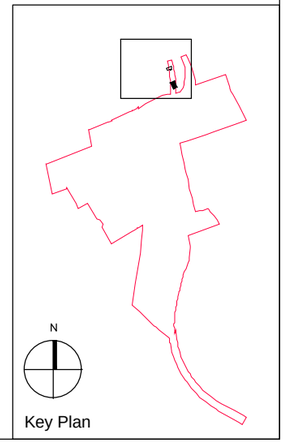

Key Plan

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REV.:	DATE:	DRWN.:	DESCRIPTION:
A	A	FC	FGHFGHFGH

PLANNING

PROJECT TITLE:	Proposed Residential Development at Balbriggan, Co. Dublin. Building B; Shed / Outhouse	PROJECT NO:	1902	DATE:	01-11-2019
		SCALE:	1:200@ A3	DRAWN BY:	RC
		FILE NAME:	1902_Demolition	CHECKED BY:	RC
		DRAWING NO:	1902_SITE_0513	REVISION:	-
DRAWING TITLE:	Demolition Drawings Plans & Elevations of Existing Buildings				

FERREIRA ARCHITECTS
ROSEMOUNT HALL, ROSEMOUNT ESTATE
DUNDRUM ROAD, DUNDRUM, D14 FP59
tel: ++ 353-1-2063523
web: www.ferreira.ie
email : admin@ferreira.ie

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APPENDIX 14.1

National Monuments Legislation 1930-2004

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Appendix 14.1 National Monuments Legislation 1930-2004

All archaeological sites have the full protection of the national monuments legislation (Principal Act 1930; Amendments 1954, 1987, 1994 and 2004).

In the 1987 Amendment of Section 2 of the Principal Act (1930), the definition of a national monument is specified as:

any artificial or partly artificial building, structure or erection or group of such buildings, structures or erections,

any artificial cave, stone or natural product, whether forming part of the ground, that has been artificially carved, sculptured or worked upon or which (where it does not form part of the place where it is) appears to have been purposely put or arranged in position,

any, or any part of any, prehistoric or ancient

(i) tomb, grave or burial deposit, or
(ii) ritual, industrial or habitation site,

And

any place comprising the remains or traces of any such building, structure or erection, any cave, stone or natural product or any such tomb, grave, burial deposit or ritual, industrial or habitation site...

Under Section 14 of the Principal Act (1930):

It shall be unlawful...

to demolish or remove wholly or in part or to disfigure, deface, alter, or in any manner injure or interfere with any such national monument without or otherwise than in accordance with the consent hereinafter mentioned (a licence issued by the Office of Public Works National Monuments Branch),

or

to excavate, dig, plough or otherwise disturb the ground within, around, or in the proximity to any such national monument without or otherwise than in accordance...

Under Amendment to Section 23 of the Principal Act (1930),

A person who finds an archaeological object shall, within four days after the finding, make a report of it to a member of the Garda Síochána...or the Director of the National Museum...

The latter is of relevance to any finds made during a watching brief.

In the 1994 Amendment of Section 12 of the Principal Act (1930), all of the sites and 'places' recorded by the Sites and Monuments Record of the Office of Public Works are provided with a new status in law. This new status provides a level of protection to the listed sites that is equivalent to that accorded to 'registered' sites [Section 8(1), National Monuments Amendment Act 1954] as follows:

The Commissioners shall establish and maintain a record of monuments and places where they believe there are monuments and the record shall be comprised of a list of monuments and such places and a map or maps showing each monument and such place in respect of each county in the State.

The Commissioners shall cause to be exhibited in a prescribed manner in each county the list and map or maps of the county drawn up and publish in a prescribed manner information about when and where the lists and maps may be consulted.

In addition, when the owner or occupier (not being the Commissioners) of a monument or place which

has been recorded, or any person proposes to carry out, or to cause or permit the carrying out of, any work at or in relation to such monument or place, he shall give notice in writing of his proposal to carry out the work to the Commissioners and shall not, except in the case of urgent necessity and with the consent of the Commissioners, commence the work for a period of two months after having given the notice.

The National Monuments Amendment Act 2004

The National Monuments Amendment Act enacted in 2004 provides clarification in relation to the division of responsibilities between the Minister of Environment, Heritage and Local Government, Finance and Arts, Sports and Tourism together with the Commissioners of Public Works. The Minister of Environment, Heritage and Local Government will issue directions relating to archaeological works and will be advised by the National Monuments Section and the National Museum of Ireland. The Act gives discretion to the Minister of Environment, Heritage and Local Government to grant consent or issue directions in relation to road developments (Section 49 and 51) approved by An Bord Pleanála and/or in relation to the discovery of National Monuments

14A. (1) The consent of the Minister under section 14 of this Act and any further consent or licence under any other provision of the National Monuments Acts 1930 to 2004 shall not be required where the works involved are connected with an approved road development.

(2) Any works of an archaeological nature that are carried out in respect of an approved road development shall be carried out in accordance with the directions of the Minister, which directions shall be issued following consultation by the minister with the Director of the National Museum of Ireland.

Subsection 14A (4) Where a national monument has been discovered to which subsection (3) of this section relates, then

(a) the road authority carrying out the road development shall report the discovery to the Minister
(b) subject to subsection (7) of this section, and pending any directions by the minister under paragraph (d) of this subsection, no works which would interfere with the monument shall be carried out, except works urgently required to secure its preservation carried out in accordance with such measures as may be specified by the Minister

The Minister will consult with the Director of the National Museum of Ireland for a period not longer than 14 days before issuing further directions in relation to the national monument.

The Minister will not be restricted to archaeological considerations alone, but will also consider the wider public interest.

APPENDIX 14.2

Assessment Methodology

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Appendix 14.2 Assessment Methodology

Glossary of Impacts

Types of Impacts

Potential impacts on the receiving cultural heritage[1] environment can be described as direct physical impacts, indirect physical impacts, and impacts on setting (i.e. the surroundings in which a cultural heritage asset can be experienced; Historic England 2017).

Direct physical impacts are those development activities that directly cause damage to the fabric of a cultural heritage asset. Typically, these activities are related to construction works (e.g. they could include excavation of foundations, earthmoving / site preparation creation of access roads, cycle paths, and the excavation of service trenches).

Indirect physical impacts are those processes, triggered by development activity, that lead to the degradation of cultural heritage assets.

Impacts on the setting of cultural heritage assets describe how the presence of a development changes the surroundings of an asset in such a way that it affects (positively or negatively) the heritage significance of that asset. Visual impacts are most commonly encountered. Such impacts may be encountered at all stages in the life cycle of a development, but they are only likely to be considered significant during the prolonged operational life of the development.

Types of impact (now referred to as effects), as defined by the EPA Guidelines on Information to be Contained in Environmental Impact Assessment Reports (hereafter referred to as the EPA Guidelines) (EPA 2022):

Cumulative Impact – The addition of many minor or insignificant effects, including effects of other projects, to create larger, more significant, effects.

Do Nothing Impact – The environment as it would be in the future should the subject project not be carried out.

Indeterminable Impact – When the full consequences of a change in the environment cannot be described.

Irreversible Impact – When the character, distinctiveness, diversity or reproductive capacity of an environment is permanently lost.

Residual Impact – The degree of environmental change that will occur after the proposed mitigation measures have taken effect.

'*Worst case' Impact* – The effects arising from a project in the case where mitigation measures substantially fail; and

Indirect or Secondary Impacts – Effects on the environment, which are not a direct result of the project, often produced away from the project site or because of a complex pathway.

Quality of Impacts

Impacts on the cultural heritage environment are assessed in terms of their quality, i.e. positive, negative, neutral:

[1] Cultural Heritage includes archaeology, architectural heritage, and folklore and history

Negative Impact: A change that will detract from or permanently remove an cultural heritage asset from the landscape;

Neutral Impact: A change that does not affect cultural heritage; and

Positive Impact: A change that improves or enhances the setting of a cultural heritage asset.

Duration of Impacts

The duration of an impact can be as follows:

Temporary Impact: Impact lasting for one year or less;

Short-term Impact: Impact lasting one to seven years;

Medium-term Impact: Impact lasting seven to fifteen years;

Long-term Impact: Impact lasting fifteen to sixty years; and

Permanent Impact: Impact lasting over sixty years.

Assessment Methodology

This assessment methodology has regard to the EPA assessment criteria (EPA 2022) and to the National Roads Authority (NRA) Guidelines for the Assessment of Archaeological Heritage Impact of National Road Schemes (hereafter referred to as the NRA Guidelines) (NRA 2005).

Cultural heritage sites are a non-renewable resource and such assets are generally considered to be location sensitive. In this context, any change to their environment, such as construction activity and ground disturbance works, could adversely affect these sites.

Significance / Sensitivity Criteria

In accordance with EPA Guidelines (EPA 2022), the context, character, significance and sensitivity of each cultural heritage asset requires evaluation and the significance of the impact is then determined by considering the significance / sensitivity of the asset and the predicted magnitude of the impact.

The significance / sensitivity can be ascertained by looking at the following criteria: the existing status (level of protection), condition or preservation, documentation or historical significance, group value, rarity, visibility in the landscape, fragility or vulnerability, and amenity value (Table 1). While these criteria contribute to the significance of a feature they should not be treated as definitive. These criteria are indicators which contribute to a wider judgement based on the individual circumstances of these cultural heritage assets.

Table 1 Explanation of Cultural Heritage Asset Assessment Criteria

Criteria	Explanation
Existing Status	The level of protection associated with a cultural heritage asset is an important consideration.
Condition / Preservation / Integrity	The survival of a cultural heritage asset's archaeological potential both above and below ground is an important consideration and should be assessed in relation to its present condition and surviving features. Well-preserved sites should be highlighted, this assessment can only be based on a field inspection.
Documentation / Data	The significance of a a cultural heritage asset may be enhanced by the existence of records of previous investigations or contemporary documentation supported by written evidence or historic maps. Sites with a definite historical association or an example of a notable event or person should be highlighted.
Group Value / Character	The value of a single a cultural heritage asset may be greatly enhanced by its association with related contemporary monuments or with monuments from different periods indicating an extended time presence in any specific area. In some cases it may be preferable to protect the complete group, including associated and adjacent land, rather than to protect

	isolated monuments within that group.
Rarity / Character	The rarity of some a cultural heritage asset types can be a central factor affecting response strategies for development, whatever the condition of the individual feature. It is important to recognise sites that have a limited distribution.
Visibility in the landscape/ Character / Integrity	Cultural heritage assets that are highly visible in the landscape have a heightened physical presence. The inter-visibility between monuments may also be explored in this category.
Fragility / Vulnerability / Integrity	It is important to assess the level of threat to a cultural heritage asset from erosion, natural degradation, agricultural activity, land clearance, neglect, careless treatment or development.
Amenity Value / Character	Regard should be taken of the existing and potential amenity value of a cultural heritage asset.

An evaluation of the significance / sensitivity of cultural heritage assets is based on their designation and on the extent to which these assets contribute to the cultural heritage environment, though their individual or group qualities, either directly or potentially. Table 2 presents the scale of significance / sensitivity together with criteria. It has been compiled by Courtney Deery Heritage Consultancy Ltd, based on standard authorities and guidelines as listed at the end of this appendix. Undesignated cultural heritage sites can be assigned a low, medium or high sensitivity value, taking into consideration the criteria cited in Table 1 (e.g. condition, character, integrity or preservation, data, group value, rarity, visibility in the landscape, fragility or vulnerability, and amenity value).

Table 2 Significance / Sensitivity Criteria

Sensitivity / Significance	Criteria
Very high	World Heritage Properties and properties on the Tentative List. Built heritage assets, historic gardens and designed landscapes rated as being of international importance by the National Inventory of Architectural Heritage (NIAH).
High	National Monuments. Protected Structures, built heritage assets, historic gardens and designed landscapes, rated as being of national importance by the NIAH, and structures within an Architectural Conservation Area (ACA). Undesignated cultural heritage sites considered to be of national importance.
Medium	Recorded Monuments (RMP sites, and SMR sites scheduled for inclusion in the next revision of the RMP). Protected Structures / NIAH sites and ACAs. Newly identified archaeological sites, confirmed through archaeological investigation, to be added to the SMR. Undesignated cultural heritage sites considered to be of regional importance.
Low	Assets compromised by poor preservation and/or poor survival of contextual associations. Sites listed in the County or City Industrial Heritage Records, Record of Protected Structures (RPS) and NIAH Building for which there are no upstanding remains. Upstanding sites listed in the County or City Industrial Heritage Records considered to be of local importance. Undisturbed greenfield areas and riverine environs, which have an inherent archaeological potential. Undesignated cultural heritage sites considered to be of local importance.
Negligible	Assets with very little or no surviving cultural heritage interest.
Unknown	The importance of the asset has not yet been ascertained (e.g. a LiDAR feature that may or may not be archaeological). In such cases, the significance of effect will be 'Indeterminable'.

Table 3 Description of Criteria

Criteria	Description
World Heritage	World Heritage Properties as designated by the United Nations

Criteria	Description
Properties	Educational, Scientific and Cultural Organization (UNESCO) and properties on the Tentative List.
National Monuments	The National Monuments Act (1930, Section 2) defines a 'National Monument' as 'a monument or the remains of a monument the preservation of which is a matter of national importance by reason of the historical, architectural, traditional, artistic or archaeological interest attaching thereto'. The National Monuments legislation legally protects access to and the visual amenity associated with National Monuments and requires consent from the Minister for invasive works in their vicinity.
Recorded Monuments	The primary source of information for archaeology is the Record of Monuments and Places (RMP) maintained by the Department of Housing, Local Government and Heritage (DHLGH). The RMP documents known upstanding archaeological monuments, their original location (in cases of destroyed monuments) and the position of possible sites in rural areas identified as cropmarks on vertical aerial photographs dating to before 1700 AD (with some later ones also being included). It is based on a comprehensive range of published and publicly available documentary and cartographic sources. For the purpose of the assessment, the Sites and Monument Record (SMR) data and mapping as updated by the Archaeological Survey of Ireland (www.archaeology.ie) was also examined.
Protected Structures	A 'Protected Structure' is a structure that a planning authority considers to be of special interest from an architectural, historical, archaeological, artistic, cultural, scientific, social, or technical point of view and is included in its Record of Protected Structures (RPS). It may be a building or part of a building which is of significance because of its architectural or artistic quality, or its setting, or because of its association with commercial, cultural, economic, industrial, military, political, social, or religious history.
Architectural Conservation Areas	An Architectural Conservation Area (ACA) is a place, area, group of structures or townscapes that is of special interest and that has been afforded statutory protection by the planning authority in accordance with Section 81 of the Planning & Development Act.
NIAH	The National Inventory of Architectural Heritage (NIAH) is a state initiative established on a statutory basis, to identify, record, and evaluate the post-1700 architectural heritage of Ireland, uniformly and consistently as an aid in the protection and conservation of the built heritage. NIAH surveys provide the basis for the recommendations of the Minister for Housing, Local Government and Heritage to the planning authorities for the inclusion of particular structures in their Record of Protected Structures (RPS).
Undesignated Sites	Newly identified archaeological sites that have been confirmed through archaeological investigation (monitoring, testing, excavation, geophysical survey) are considered to be of medium importance. Such sites are undesignated as they have yet to be added to the SMR.
	Potential or undesignated cultural heritage sites identified through aerial photography, historic mapping, stray finds are considered to be of low sensitivity, as they have yet to be ground-truthed through archaeological investigation. Similarly, undisturbed greenfield areas and riverine environs, which have an inherent but as yet unproven archaeological potential are considered to be of low sensitivity.
	Zones of archaeological potential (ZAP) can be defined as areas within the urban and rural landscape that possess the potential to contain archaeological remains due to the settlement history of a place and or to the presence of topographical features such as rivers, lakes and high, defendable ground
	Sites / features recorded in county / city industrial heritage surveys, where these are not designated assets.

Magnitude of Impact

When assessing the impact magnitude, the following criteria need to be considered:

Extent – size, scale and spatial distributions of the impact;

Duration – period of time over which the impact will occur;

Frequency – how often the impact will occur; and

Context – how will the extent, duration and frequency contrast with the accepted baseline conditions (see Table 1).

Table 4 Magnitude of Impact Criteria

Impact Magnitude	Criteria
High	These impacts arise where a cultural heritage asset is completely and irreversibly destroyed by a proposed development. A change such that the value of the asset is totally altered or destroyed, leading to a complete loss of character, integrity and data about the site.
Medium	An impact which, by its magnitude, duration or intensity alters an important / significant aspect of the environment. An impact like this would be where a cultural heritage asset would be impacted upon leading to a significant loss of character, integrity and data about the site. Or an impact which by its magnitude results in the partial loss of a historic structure (including fabric loss or alteration) or grounds including the part removal of buildings or features or part removal of demesne land (e.g. severance, visual intrusion or degradation of setting and amenity). A permanent positive impact that enhances or restores the character and / or setting of an upstanding cultural heritage site in a clearly noticeable manner.
Low	A low impact arises where a change to the site is proposed which though noticeable is not such that the cultural heritage character / integrity of the site is significantly compromised, and where there is no significant loss of data about the site. A positive impact that results in partial enhancement of the character and / or setting of an upstanding cultural heritage site in the medium to long-term.
Negligible	An impact which causes very minor changes in the character of the environment and does not directly impact a cultural heritage asset, or affect the appreciation or significance of the asset. There would be very minor changes to the character and integrity of the asset and no loss of data about the site.

Significance of Effect

The EPA Revised Guidelines on the Information to be Contained in Environmental Impact Statements (EIS) (EPA 2017) contained two additional levels of significance of effect: Very Significant and Not Significant (Table 5 and Image 1). These levels have been retained in the current EPA Guidelines (2022).

Table 5 Significance of Effects (EPA 2022)

Significance of Impact	Description
Very Significant	An impact which by its character, magnitude, duration or intensity significantly alters the majority of a sensitive aspect of the environment, for example in this case a monument
Not Significant	An impact which causes noticeable changes in the character of the environment but without noticeable consequences.

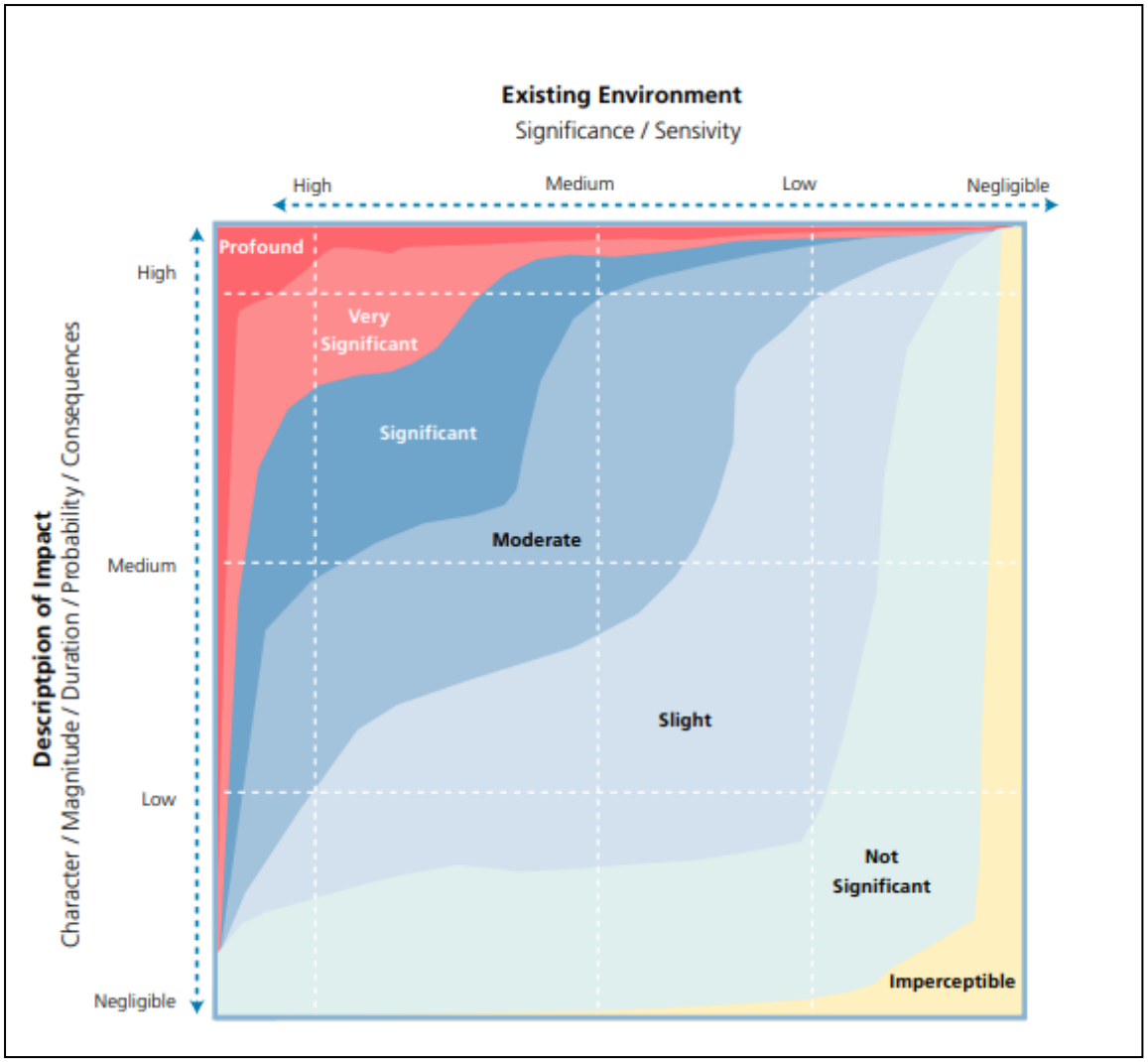

Image 1 Figure 3.4 Chart Showing Typical Classifications of the Significance of Effects, from the EPA Guidelines on Information to be Contained in EIAR (EPA 2022).

The likely significance of impacts is determined by considering the baseline rating or sensitivity value of the asset upon which the impact has an impact and the magnitude of the impact (Image 1). The impact significance is defined as Imperceptible, Not Significant, Slight, Moderate, Significant, Very Significant, or Profound (Table 5).

Table 5 Defining Significance of Effects

Impact	Definition
Imperceptible	An impact capable of measurement but without noticeable consequences.
Not Significant	An impact which causes noticeable changes in the character of the environment but without significant consequences.
Slight	An impact which causes minor changes in the character of the environment and does not affect a cultural heritage asset in a moderate or significant manner.
Moderate	A moderate impact arises where a change to the site is proposed which though noticeable, does not lead to a significant loss of character, integrity and data about the cultural heritage asset.
Significant	An impact which, by its magnitude, duration or intensity, alters an important aspect of the environment. An impact like this would be where part or all of a site would be permanently impacted upon, leading to a significant loss of character, integrity and data about the cultural heritage asset.
Very Significant	An impact which, by its character, magnitude, duration or intensity significantly alters most of a sensitive aspect of the environment.

Profound	Applies where mitigation would be unlikely to remove adverse impacts. Reserved for adverse, negative impacts only. These impacts arise where a cultural heritage asset is completely and irreversibly destroyed by a proposed development.

Relevant Guidelines and Standards

- EPA (2015). Revised Guidelines on the information to be contained in Environmental Impact Statements, Draft September 2015.
- EPA (2022). Guidelines on the information to be contained in Environmental Impact Assessment Reports.
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- EirGrid (2015). Cultural Heritage Guidelines for Electricity Transmission Projects: A Standard Approach to Archaeological, Architectural and Cultural Heritage Impact Assessment of High Voltage Transmission Projects. EirGrid.
- Department of Arts, Heritage, Gaeltacht and the Islands (1999). Framework and Principles for the Protection of the Archaeological Heritage.
- DAHG (2015). National Landscape Strategy for Ireland 2015-2025.
- Department of Arts, Heritage and the Gaeltacht (2011). Architectural Heritage Protection Guidelines for Planning Authorities.

APPENDIX 14.3

Archaeological Investigations in the Vicinity of the Proposed Development Site

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Appendix 14.3 Archaeological Investigations in the Vicinity of the Proposed Development Site

A series of archaeological investigations have been undertaken in lands adjacent to the application site and across north-west Balbriggan. The results of these investigations demonstrate the rich archaeological landscape of this area and provide a context for the archaeological sites within the site boundaries. The investigations in which archaeological material was revealed are summarised below.

Gas Pipeline to the West (Tobin 2003; Licence no. 02E0112; and Byrnes 2002a; 2002b; 2002c; Licence no. 02E0296, 02E0297, 02E0298)

The Gas Pipeline to the West project was routed west of the application site. Archaeological monitoring (Tobin 2003; Licence no.: 02E0112) revealed kiln / bowl furnace 545m north of the proposed development (Site 6.3.2), an enclosure 520m to the north (Site 6.3.3; SMR DU001-031), a pit 480m to the northwest (Site 6.4.1), a possible *fulacht fiadh* 120m to the west (Site 6.4.2) and a structure 550m to the southwest (Site 6.5.4). The kiln was excavated by Byrnes (2002a; Licence no.: 02E0296). The enclosure was excavated by Byrnes (2002b; Licence no.: 02E0297) and was found to have a curvilinear ditch containing sherds of Bronze Age coarse pottery and burnt and unburnt bone, suggesting a ring ditch. Radiocarbon dating returned dates of 986-817 cal. BC and 217-344 cal. BC, suggesting Late Bronze Age construction date and activity which continued into the Late Iron Age. The pit was found to be a non-archaeological tree bole. The *fulacht fiadh* was not excavated. The structure was excavated by Byrnes (2002c; Licence no.: 02E0298) and was found to comprise a Bronze Age structure with stake-/post-holes, slot trenches and charcoal-rich pits. It was subsequently added to the SMR (SMR DU004-046).

Flemingtown (Bolger 2006a, 2006b; 2009; Licence no. 05E0663)

This assessment was undertaken over a c. 9.43ha area immediately east of the application site in an area which now accommodates housing. Test excavations and geophysical survey (Leigh 2005; Licence no. 05E0114) identified archaeological areas A-E which appeared to extend over c. 1ha on a ridge of high ground which ran parallel with the boundary of the application site. Two further areas (F and G) were later identified in the lower lying area to the east. Archaeological excavations were undertaken in the eastern parts of Areas A-C and across the whole of Areas D, E, F and G. The investigations resulted in four sites being added to the SMR (DU001-014, DU001-015, DU001-016, DU001-017), with the most significant in terms of this application being the early medieval enclosure site DU001-015, which extends into the application area to join the field system DU001-023.

Areas A-C formed the main archaeological complex of an organised early medieval landscape and included artefacts such as ring-headed brooches and possible sherds of E-ware. The complex was similar in size and scale to other early medieval enclosure complexes, but as no evidence for habitation or house structures were found the enclosure cannot be classified as a habitation site. The early medieval activity was characterised by a sequence of ditches which delimited the area or carried water to the eastern perimeter of the site. An industrial area was apparent within the site, comprising bowl furnaces and associated pits (SMR DU001-016). A cluster of kilns was also found, including a keyhole-shaped example with a circular chamber and a flue (SMR DU001-017). The upper stone of a rotary quern was also recovered. Radiocarbon dating indicates the site was occupied from at least the late 6th century to the early 11th century.

Prehistoric activity was noted on the site, including Bronze Age activity in the form of two truncated burnt mounds on the eastern extent of the site. The earliest phase of activity was a Neolithic house at Area E (SMR DU001-014), adjacent to the boundary with the application site. It measured 10m north-south by 6m east-west and appeared to have been a plank-built structure utilising slot trenches, with evidence for a doorway on the west. It was radiocarbon dated to 3394-3387 cal BC (UBA-8523), with over 250 sherds of Early Neolithic pottery retrieved from the slot trenches.

Balbriggan North West – Flemingtown excavation (Elliott 2007b; Licence no. 07E0361)

The western parts of Areas A-C which were investigated by Bolger (2006a; 2006b; 2009; Licence no.: 05E0663) were excavated under this separate licence. A brief summary in the form of an 'Excavations' bulletin describes an excavation of a hilltop enclosure in Flemington. A large curving ditch which may have enclosed the hilltop appeared to be of Middle Bronze Age date. Apparently

contemporary features included large areas of metalling were located within and outside of the enclosure, and several linear features. Artefacts from this phase included four barbed and tanged chert arrowheads which would date the site to c. 1500BC; and large quantities of struck and worked flint may similarly date to this phase.

Two rectangular domestic structures were recorded, which the excavator believed to be stratigraphically later than the enclosure, on the northerly high ground of the site. They were truncated by medieval features, but no artefacts were retrieved to date them. They comprised of substantial post holes with packing stones in-situ, shallow possible plank slots and internal stake hole divisions. They both measured 10m by 4.5m and were orientated northwest to southeast. One had a hearth at the northern end and a number of internal pits. It is possible that two curvilinear ditches of 20m diameter may have functioned as foundation slots for a wattle and daub fence which may have enclosed the area. Rectangular houses are unusual in the archaeological record in that they date to only a few particular periods, but the excavator believed them to post-date the earliest Bronze Age phase and they were truncated by medieval features.

Industrial activity on the site included metal working pits to the south where small-scale iron working appears to have taken place. Two kilns were also excavated.

A souterrain was revealed on the northern extent of the site which featured a large circular chamber with a passageway which continued north beyond the limit of the excavation (towards the proposed development site), and a smaller circular chamber to the south which may have functioned as an entranceway. A second chamber was uncovered to the west but extended beyond the limit of the excavation. A bone needle and fragments of fired clay were retrieved from the large circular chamber. Two fragments of a lignite bracelet were retrieved from a ditch to the south of the souterrain. Souterrains date to the Early Medieval period, and lignite bracelets are also typically of this period.

The majority of the ditches and curvilinear ditches within the site appear to respect a massive ditch which measures 3m wide and 2m deep. It defined the western border of activity and would have enclosed an area of over 35m by 96m. Some of the ditches are suggested to be associated with water management, similar to Bolger's interpretation (2006a, 2006b; Licence no. 05E0663). Some smaller curvilinear features may have functioned as internal divisions.

Flemington Lane (Linnane 2007; Licence no. 07E0933)

A programme of test excavations was undertaken in the lands adjacent to the northern boundaries of the application site in advance of a discontinued plan for housing. A geophysical survey (Licence no. 07R0188) had not identified any significant archaeological patterns in advance of the testing. Test excavations noted three ditches, two of which were curvilinear. The nature and significance of these features was not determined as further investigations did not take place.

Parkway Water Main (Connell 2008; Licence no. 07E1155)

Although the Parkway Water Main excavations did not reveal any archaeological sites within the application area, four archaeological sites were excavated elsewhere on that scheme. One site, a burnt mound or *fulacht fiadh*, had been identified previously by Elliott in Field 17 (2007a; Licence no. 07E0057; Site 17/1) and is recorded as an SMR site (DU002-021). The ground was particularly wet and the full extent of the mound was not established. A second burnt mound was discovered in Field 12 (following O'Carroll's 2006 field numbers) and two pits were revealed in Field 11, corresponding with Sites 11/2 and 11/3 from Elliott's (2007a) investigation.

Parkway Link Road (Linnane 2008; Licence no. 08E0106)

Test-trenching along the route of the Parkway Link Road revealed one archaeological site, approximately 875m southeast of the application site (SMR DU005-117; Excavation - miscellaneous). It comprised a 32m long northeast by southwest oriented ditch with an associated pit. Both contained charcoal-rich fills with heat-cracked stone and traces of cremated bone and were thought to be of Bronze Age date.

Stephenstown LAP assessment (Frazer 2009; Licence no. 09E0303)

A programme of geophysical survey and test excavation was undertaken within the Balbriggan Stephenstown LAP lands in 2009. One archaeological site was identified, a prehistoric pit with pottery / possible cremation pit, approximately 1.4km southwest of the application lands.

Clonard / Folkstown Great (McGlade 2019; Licence no.:15E0507, 15E0586)

Excavations were undertaken at the site of a proposed school in Clogheder and Clonard / Folkstown Great across Fields 12, 13, 16, 17, 21 and 22. Testing (Licence no. 15E0507) revealed 26 archaeological features, including prehistoric areas and medieval activity. The site was at the edge of a wetland environment with marshy ground to the north and southeast, and a stream to the south.

The earliest feature comprised two near-parallel gullies which appeared to define a 4-4.5m wide routeway in Field 17 approaching the watercourse. Two separate samples returned Mesolithic dates of 5622-5492 BC and 5667-5537 BC. A Mesolithic pit (4767-4252 BC) was also identified in the area, truncated by a penannular enclosure.

Other prehistoric features included a Neolithic cremation pit, Middle Bronze Age penannular enclosure, ring ditch and two *fulachta fiadh* cooking sites. McGlade suggests that this later prehistoric landscape was influenced by this longstanding routeway, with Bronze Age monuments marking key points along the trackway.

The cremation pit (3781-3652 BC) was identified southeast of the entrance and contained cremated bone, sherds of Neolithic pottery, fragments of baked clay and burnt flint. The ring ditch was located southwest of the enclosure, and the southern half was excavated under a separate project (cf. Section 0; McLoughlin 2018; Licence no. 15E0558). This portion showed the earliest fill to date to 2155-1941 BC and went through several phases of use with up to two re-cuts of the ditch and the erection of posts before the site went out of use in the Early Iron Age.

The enclosure, measuring approximately 23m by 18.5m internally with a potentially palisaded ditch, contained Middle Bronze Age pottery, sherds of a crucible, a clay mound for a pin shank or awl and a grinding stone.

The medieval phase of the site comprised of a ditch to the northeast which contained evidence for metalworking using coal, with a series of other ditches and a metalled surface extending perpendicular to it.

250m Boulevard Road (McLoughlin 2018; Licence no. 15E0558)

Archaeological monitoring was undertaken on a 250m section of the Boulevard Road as part of the larger future development of North West Balbriggan. Three archaeological sites were identified, including a burnt mound (Site 1; ITM 718595E, 763354N, 34.933m OD), a spread of burnt mound material (Site 2; ITM 718649E, 763334N) and a ring ditch (Site 3; ITM 718596E 763383N). Sites 1 and 2 were preserved in situ by reducing the size of the compound area and moving the stream diversion.

The ring ditch lay partially within the adjacent site excavated by McGlade (2016; Licence no. 15E0586). A third part had been removed previously in the installation of a pipeline. It measured 6.4m internally and 9.88m externally. Small quantities of burnt human bone and unburnt animal bone and charcoal were recovered, with the burnt bone representing the partial remains of an adult human. The bone was radiocarbon dated to 969-807 cal. BC (2725 ± 37 BP; UBA 31819), dating the site to the Late Bronze Age. Six water-rolled flint pebbles had been placed with the cremation deposit, and the animal bone assemblage included a portion of unburnt horse femur, which if of a similar date to the human bone may represent some of the oldest horse remains in Ireland, but insufficient collagen in the sample made dating impossible.

Clonard / Folkstown Great (McLoughlin 2019; Licence no. 17E0247)

Archaeological testing and monitoring were undertaken in Fields 12 and 13 in the vicinity of the enclosure (SMR DU002-020) which had been detected by geophysical survey (Nicholls 2005: Licence

no. 05R0137). The enclosure itself was retained as part of a Class 2 Open Space. Ditches were identified which corresponded to the results of the geophysical survey and a further linear ditch extended into the area north of the enclosure. Late Bronze Age pottery was recovered from the inner enclosure ditch, and animal bone was retrieved from the outer ditch. A charred cereal grain from one of the fills returned a Late Bronze Age date of 895-802 cal. BC.

An area north of the enclosure comprised of linear ditches which were probably associated with the enclosure and contained animal bone and a hammer stone. A small area of metalling is likely to be associated with these features. Peripheral features included a rectangular trough and six pits, representing further Bronze Age activity.

Taylors Hill (Purcell 2019; Licence no. 18E0238)

An archaeological excavation was undertaken in Fields 10, 11 and 15 in advance of a separate housing development (Taylors Hill) in Clonard / Folkstown Great.

Area A was located in F10, and comprised of a palaeochannel, linear enclosing ditches and some evidence of Neolithic activity in the form of a curvilinear channel, possible hearth and a Neolithic flint assemblage. Two sub-rectangular pits of possible modern date were also identified.

Area B was located in F11 and revealed a small circular pit and a small deposit of burnt soil of unknown date and two agricultural ditches. Area E, comprising of linear drainage channels, was also uncovered in F11.

Areas C and D were located in F15, and included a single post hole and a linear deposit in a plough furrow in Area C and two narrow linear features in Area D which probably represented relatively recent field drains.

APPENDIX 14.4

Archaeological Testing Report, Licence No.: 21E0298

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Archaeological Testing Report

Flemingtown, Balbriggan,

Co. Dublin

Pre-Planning SHD

Excavation Licence No.: 21E0298

Site Director: Gill McLoughlin

ITM: 718050 / 764000

On behalf of

Dean Swift Property Holdings

21st July 2021







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Plate 45 T20 Trench overview, looking E 71

EXECUTIVE SUMMARY

This report describes the results of a programme of archaeological testing carried out by Gill McLoughlin of Courtney Deery Heritage Consultancy Ltd. (Licence No. 21E0298). The work has been carried out pre-planning in relation to a proposed SDH planning application, on behalf of Dean Swift Property Holdings. The testing follows on from a pre-planning Archaeological Impact Assessment Report carried out by Courtney Deery Heritage Consultancy in 2019.

The site is bounded by the Clonard Road to the west and southwest and Flemingtown Lane to the north. Existing housing lies to the east and to the southeast are the lands of a separate ongoing housing development.

The lands were formerly intended for development under the discontinued Balbriggan North West Local Area Plan and a series of investigations were undertaken between 2006 and 2008 as part of that project, revealing 18 archaeological areas within the application lands, six of which were added to the Sites and Monuments Record (RMP no.: DU001-022001; DU001-022002, DU001-015, DU001-023, DU001-024, DU001-025, DU001-026, DU001-027). It should be noted that two of these SMR sites (RMP no.: DU001-024, DU001-0025) appear on www.archaeology.ie with an error in the co-ordinates, resulting in the depiction of DU001-024 in the webGIS outside of the application area to the east and DU001-025 approximately 80m east of it's true location.

The main aim of the testing was to assess the extent of the features around the fringes of the concentration of features designated as field system DU001-023. The testing also aimed to confirm the location of a possible enclosure indicated in geophysical survey (possibly the mis-located DU001-024) and to test the location of a possible sub-surface enclosure visible on google maps (June 2018) which has recently been added to the record (DU001-033).

Archaeological testing took place over nine days from the 31st May 2021 and confirmed the presence of substantial archaeological features in trenches T14 - T20 inclusive, which corresponded with the concentration of anomalies representing field system DU001-023 as indicated in the geophysical survey. The geophysical survey interpretation was found to have a high degree of accuracy where anomalies were interpreted as definite archaeology (purple on the interpretation drawing). Associated with, but outside of the main concentration, there were less substantial archaeological features present in trenches T10 and T11 and possible archaeology in the form of linear ditch/gully type features present in trenches T4, T5 and T8.

There were no features of archaeological interest identified in trenches T2 and T3 in the location of the possible enclosure indicated in the geophysical survey. The presence of a possible ditched enclosure indicated in aerial photography (DU001-033) was confirmed in trench T1 as a double ditched enclosure.

No dateable finds were recovered from any of the investigated features, but the field system most likely dates to the early medieval period (based on a lack of dateable finds and dating of the previously excavated, associated site to the south). Based on form, the double ditched enclosure could date to the Bronze Age or the early medieval period.

Recommendations are detailed in section 5 of the report and involve preservation in situ, archaeological excavation and archaeological monitoring.

Preservation in situ is recommended for the main concentration of features that make up the field system DU001-023 and for the newly discovered double ditched enclosure (DU001-033).

Full archaeological excavation (preservation by record) is recommended for less substantial archaeological features to the north of the field system, identified in trenches T10 and T11 and for more substantial archaeological features in the southwest of the field system, identified in trenches T18 – T20, where they cannot be avoided by a planned roadway. Excavation is also recommended for Sites 4/1 and 4/2 which were identified during a previous testing exercise (Elliott, 2007).

Archaeological monitoring is recommended in the area around trenches T4, T5 and T8 to further assess the potential of the gully/ditch-type features identified in that area and archaeological monitoring of topsoil removal is also recommended throughout the development area, with provision made to deal with any further archaeological remains that may be encountered. This could involve preservation in situ or full archaeological excavation as appropriate.

1. INTRODUCTION

1.1. General

This report describes the results of archaeological testing carried out by Gill McLoughlin of Courtney Deery Heritage Consultancy Ltd. (Licence No. 21E0298). The work has been carried out pre-planning in relation to a proposed SDH planning application, on behalf of Dean Swift Property Holdings. The testing took place over nine days from the 31st May 2021.

The site is bounded by the Clonard Road to the west and southwest and Flemingtown Lane to the north. Existing housing lies to the east and to the southeast are the lands of a separate ongoing housing development (ITM 718050E / 764000N) (Figure 1).

The purpose of the programme of archaeological testing was to establish the extent of archaeological remains associated with field system DU001-023 and possible enclosure DU001-024. The current plans involve the preservation in situ of the main concentration of features making up field system DU001-023, but some features around the edges may be impacted by the development and the testing layout was designed to assess this impact. Dispersed features to the north of the main concentration in an area planned for development were also assessed, as was a possible enclosure (DU001-024) indicated on geophysical survey to the northwest of the main concentration of activity. (*note – DU001-024 has been mis-located and is shown on archaeology.ie as being approximately 250m to the SE).

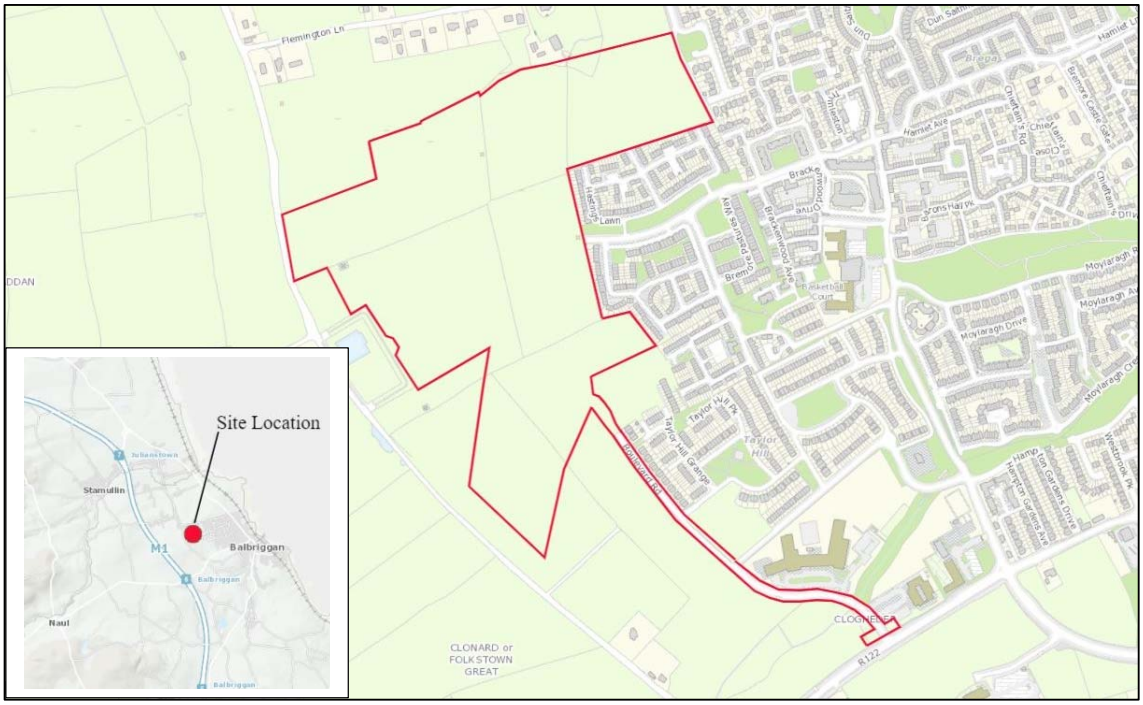

Figure 1 Site Location



Figure 2 Aerial image, digital globe

1.2. Description of Proposed Development

The proposed development is the subject of a SHD planning application and comprises a residential development including a north-south running road which joins with the existing Boulevard Road which exits onto the R122 to the south (Figure 3). The section of the Boulevard Road to the southeast has already been constructed associated with separate developments. The development layout has been amended where possible to avoid the majority of the concentration of archaeological features associated with field system DU001-023.

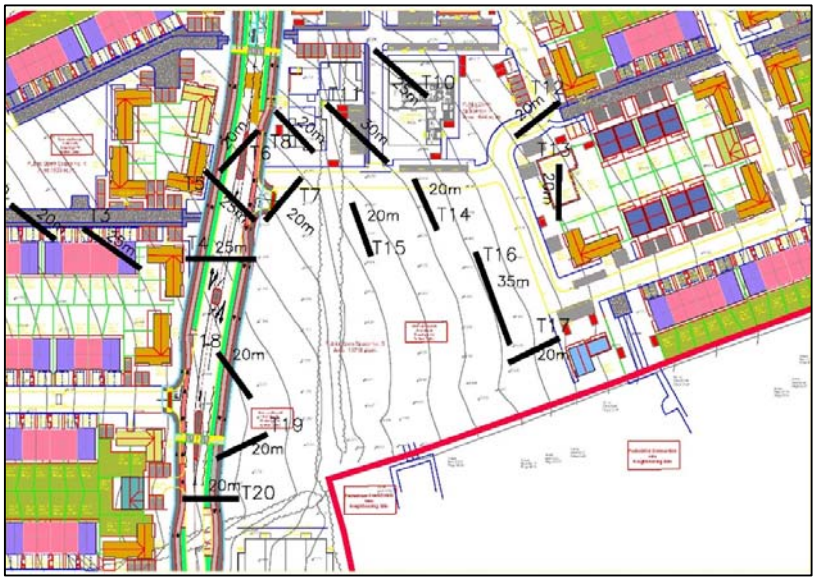

Figure 3 Proposed development layout around DU001-023 and trench layout T2 – T20

2. ARCHAEOLOGICAL AND HISTORICAL BACKGROUND

2.1. Prehistory

Recent excavations have shown that the wetlands in Clonard / Folkstown Great, immediately south of the proposed development were being exploited as early as the Mesolithic period (McGlade 2019; Licence no.: 15E0586). A pathway defined by two parallel gullies, were interpreted as possibly representing access to the wetlands and a nearby watercourse.

The Neolithic period is well represented in this part of North Dublin, located only 1.8km from the coast. The hilltop location of the application site would have provided extensive views and the light soils which were desirable for prehistoric farming practices, while proximity to the sea would have facilitated communication.

An Early Neolithic house was excavated approximately 36m east of the application site (RMP no.: DU001-014; Licence no.: 05E0663) on a north-south oriented ridge, which most likely accommodated further settlement and agricultural features. Test excavations throughout the application lands have revealed numerous pits and linear features which have the potential to date from this period. This is supported by the discovery of a flint blade within a linear feature in Field 9 (RMP no.: DU001-028; Site 9/1 in Elliott 2007a) south of the house, just outside of the application site boundary. Excavations carried out in relation to a housing development in adjacent lands in 2018 comprising a curvilinear channel and a possible hearth were also suggested on the basis of lithic finds to date to the Neolithic period (Purcell, 18E0238). There are also extensive views within the application area towards the Neolithic passage tomb cemetery at Fourknocks, Co. Meath.

There is significant evidence in the area for Bronze Age settlement and funerary activity in the Middle and Late Bronze Ages. A Middle Bronze Age house was discovered 495m southwest of the site in Clonard / Folkstown Great, and excavations within the application area suggest the existence of further Bronze Age settlement within the lands. A curving ditch of Middle Bronze Age date may have formed a hilltop enclosure which accommodated settlement activity including areas of metalling, several linear features, large quantities of struck and worked flint and four barbed and tanged arrowheads (Elliott 2007b; Licence no.: 07E0361). Two truncated burnt mounds were identified downslope of this area in a separate excavation (Bolger 2006b; Licence no.: 05E0663) and they most likely represent the use of wetter marginal lands by the occupants of the hilltop site.

The Late Bronze Age is represented in the area by an enclosure 525m north of the application site in Flemingtown (RMP no.: DU001-031; Byrnes 2002; Licence no.: 02E0297). Excavations revealed Bronze Age coarse pottery and burnt and unburnt bone, suggesting the feature was a ring ditch burial site. Radiocarbon

dating suggested a construction date in the Late Bronze Age with activity which continued into the Late Iron Age (986-817 cal. BC and 217-344 cal. BC).

Another area of Bronze Age activity was identified approximately 400m southeast of the application area in Clonard / Folkstown Great and excavated under two licences (McGlade 2016; Licence no.: 15E0586; and McLoughlin 2018; Licence no. 15E0558). It included a penannular enclosure, cremation pit, ringditch, four burnt mound / spread sites and a possible routeway. The enclosure may have had a palisade in the ditch, and finds included probable Late Bronze Age pottery, a possible clay mould and a grinding stone. The cremation pit was southeast of the entrance and contained cremated bone, possible prehistoric pottery and tubular copper alloy beads.

The ring ditch burial included burnt human bone dating to the Late Bronze Age (969-807 cal. BC; 2725 ± 37 BP; UBA 31819) and a deposition of six water-rolled flint pebbles. Animal bone included a horse femur which could not be dated, but if of similar date to the human bone may represent some of the earliest horse bone in Ireland.

The area was on the edge of a wetland environment, sloping towards a stream to the south, and the Bronze Age inhabitants made use of this environment for four outdoor cooking sites in the form of burnt mound / burnt spread / fulacht fiadh sites.

Beyond the stream, another site excavated in advance of the Parkway Link Road was thought to be Bronze Age (Linnane 2008, Licence no.: 08E0106). It comprised of a 32m ditch and associated pit which contained heat-cracked stones and traces of cremated bone thought to be of Bronze Age date.

Approximately 250m east of the application area in Clonard/Folkstown Great test trenching carried out in 2017 to define a zone of preservation around enclosure DU001-020 and to retrieve dating material revealed Late Bronze Age pottery and a sample of charred cereal from the enclosure ditch was radiocarbon dated to 895-802 BC. Peripheral features identified during monitoring of the remainder of the site comprised a rectangular trough consistent with burnt mound activity which also dated to the late Bronze Age (831-552 BC) and two pits containing flint scrapers, flakes and cores, along with a single sherd of Beaker pottery and a single sherd of later middle Bronze Age pottery, representing further Bronze Age activity (McLoughlin, 2019).

Test trenching along the route of the Parkway Link Road revealed one archaeological site, approximately 915m southeast of the application site (RMP no. DU005-117; Excavation - miscellaneous). It comprised of a 32m long northeast by southwest oriented ditch with an associated pit. Both contained charcoal-rich fills with heat-cracked stone and traces of cremated bone and were thought to be of Bronze Age date.

These sites demonstrate that there was probable continuity of activity on the hilltop in Flemingtown from the Neolithic to the Middle Bronze Age period. The burial sites date to the Late Bronze Age and appear to be located downslope of the main occupation area both on the north and south, with a significant cluster of associated features found in Clonard / Folkstown Great adjacent to the stream.

Evidence of Iron Age occupation is increasingly being found on multi-period sites such as the lands of Northwest Balbriggan. Indeed, an Iron Age phase was noted at a ring-ditch burial site in Flemingtown (RMP no.: DU001-031; Byrnes 2002; Licence no.: 02E0297). Given the existence of both Bronze Age and Early Medieval sites in this area, it is likely that Iron Age continuity exists within these lands and that some of the features identified within previous assessments of these lands date to this period.

2.2. Early Medieval

Prior to the excavations of the 2000s in this area, the only known site which was likely to be of this period was the holy well adjacent to the northern edge of the application site, known as Lady Well (RMP no.: DU001-004). Since then, a series of excavations in Flemingtown and Clonard / Folkstown Great have revealed an extensive and organised Early Medieval landscape.

An extensive Early Medieval site is located within the site and immediately to the east in Flemingtown which has been investigated through geophysical survey and extensive archaeological investigations (Bolger 2006a; Bolger 2006b; Elliott 2007b; Leigh 2005; Nichols 2005). It includes a large enclosure site on a north-south ridge (RMP no.: DU001-015), and an associated field system (RMP no.: DU001-023), both of which extend into the proposed development area. The southern extent (outside of the site boundaries) included an industrial site (RMP no.: DU001-016) and corn drying kiln (RMP no.: DU001-017) and no evidence of habitation was found in that part of the site. Extensive ditches appeared to organise the site and created a complex water management system. A sample from one of the ditches radiocarbon dated it to AD 1002-1013.

The northern half of the site extended into the study area and included a substantial ditch which appeared to delimit the site and other ditches and linear features associated with water management and agriculture (Elliot 2007b; Licence no.: 07E0361). Further areas of industrial activity were evident in the form of ironworking pits and two kilns. A souterrain was also discovered on the north of the enclosure, comprising of two chambers and a passageway and including a bone needle among the finds.

While the site seems quite similar to other Early Medieval enclosure complexes, there was little evidence for habitation or structures in the southern portion excavated by Bolger (Bolger 2006a; Bolger 2006b; Licence no.: 05E0663), and while structures were noted in the northern portion excavated by Elliot (2007b; Licence no.: 07E0361), they are of unknown date.

2.3. RMP / SMR sites

There are six RMP / SMR sites located within the application site (RMP no.: DU001-022002, DU001-023, DU001-024, DU001-025, DU001-026, DU001-033, Figure 4), with the caveat that site RMP no: DU001-024 is currently being projected with the wrong co-ordinates on the webGIS service on www.archaeology.ie in adjacent lands. In addition to this, a large enclosure site was partially excavated in adjacent lands and is being projected at the site of the previous excavation (RMP no.: DU001-015). The majority of this site extends into the application site (DU001-023). There also appears to be an error in the projected location of DU001-025.

The zones of archaeological potential for a further three sites fall within the site boundaries (RMP no.: DU001-004, DU001-022001, DU001-027). One of these sites (RMP no.: DU001-004; holy well) is a designated RMP site on the published 1998 Record of Monuments and Places and is the only visible site above the surface. All other sites are subsurface archaeological sites that have been added to the Sites and Monuments Record, having been discovered in recent years, and are scheduled for inclusion in the next revision of the RMP. They include pits, a field system, six enclosures, a ring-ditch, an industrial site, a corn-drying kiln, a Neolithic house and three excavation sites comprising of two pit clusters and a linear feature. The sites are discussed in Section 6, Previous Investigations. There also appears to be an error in the projected location of DU001-027.

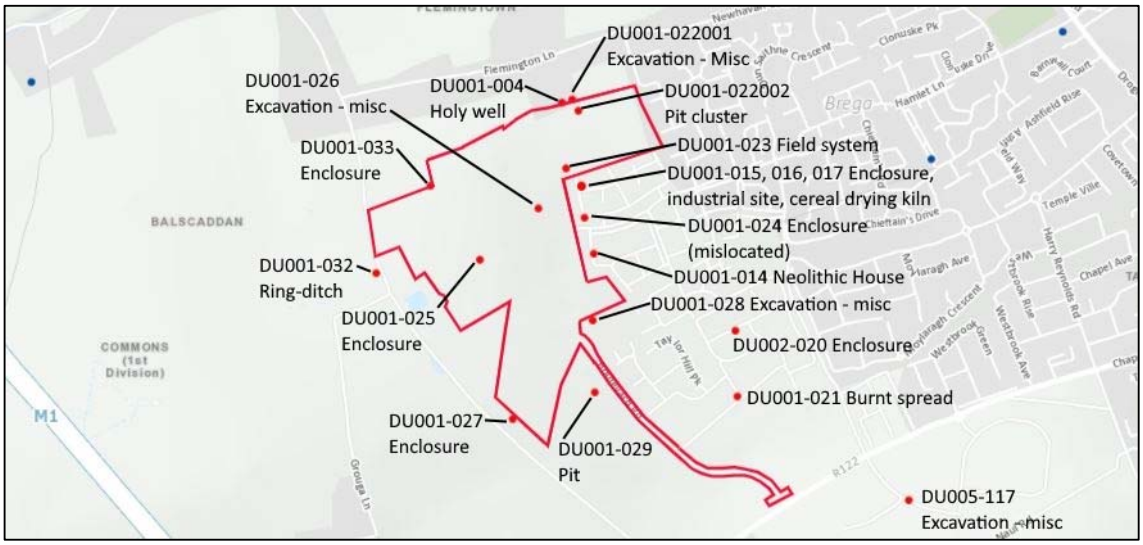

Figure 4 Site boundary and recorded sites (as shown on www.archaeology.ie)

Table 1 RMP / SMR sites in & adjacent to application lands (descriptions from www.archaeology.ie)

RMP / SMR no.	Description
DU001-004	*Ritual site – holy well:* Natural spring well situated in an area of rock outcrop adjacent to farm buildings. Enclosed by a recently constructed ditch and bank which was built to keep farm animals out. Known as Lady well (Ó Danachair 1958, 72). Comprises a roughly circular, water filled depression into which modern field drains empty. It was once a large structure and water was channelled through the rock into a small stream (Skyvova, 2005, 51). The site has been used as a dumping ground of recent years. Geophysical prospecting within the field immediately to the east of the holy well picked up natural and ferrous anomalies but no definite archaeological sites (Nicholls & Shiel, 2005).
DU001-014	*House – Neolithic:* Pre-development investigations in 2005 identified evidence dating from the Neolithic through to the early medieval period. The earliest activity at the site dates from the Neolithic. It comprises a Neolithic house, oriented roughly N-S (L 10m, Wth 6m). The footprint of the building was wholly defined by a slot trench, suggesting that the structure was plank built with evidence for a doorway on the W side. A substantial assemblage of early Neolithic pottery and struck flint were retrieved from the slot trench. This produced a radiocarbon date of 3394-3387 cal. BC (Bolger, T.2009, 25-26).
DU001-015	*Enclosure:* Pre-development investigations in 2005 revealed a multiple-ditched enclosure. There was no indication of a habitation area within the excavated portion of the site and only very limited evidence for structures. One of the ditches produced a calibrated radiocarbon date of AD 1002-1013 (Bolger, T 2009, 27-29). *** Note that the majority of this site is within the application lands.*
DU001-016	*Industrial site:* Pre-development investigations in 2005 revealed evidence for metalworking in the form of bowl furnaces with associated pits. A large quantity of ferric slag was retrieved from the site (Bolger 2009, 32, Fig.10).
DU001-017	*Kiln – corn-drying:* Pre-development investigations in 2005 revealed a cluster of kilns including one keyhole-shaped feature with a perfectly circular chamber (Diam.2.60m, D 0.05m-0.24m) and a flue or passage which exited the chamber on the W. The upper stone of a rotary quern was also uncovered (Bolger 2009, 32-33).
DU001-022001	*Excavation – miscellaneous:* Geophysical survey (licence no. 05R0137) identified a series of anomalies (Nicholls and Shiel 2005) that suggested the presence of potential archaeological features. Test excavation (Licence no. 07E0057) confirmed the presence of a dense pit cluster interspersed with a series of linear features and curving ditches within an area measuring 45m by 50. A piece of struck flint was recovered from a linear feature suggesting a prehistoric date (Elliott 2007, 285).
DU001-022002	*Pit:* Geophysical survey (licence no. 05R0137) identified a series of anomalies that suggested the presence of potential archaeological features. Test excavation confirmed the presence of a pit cluster that consisted of at least six pits, circular in plan (average 0.30m diam.) with similar charcoal rich fills with burnt bone inclusions (Elliott 2007, 286).
DU001-023	*Field system:* Geophysical survey (licence no. 050137; Nicholls and Shiel, 2005) identified strong linear and rectilinear responses that suggest a large complex at the interior of which are numerous internal divisions, pit-type responses and possible industrial activity. Possibly a continuation of early medieval activity excavated immediately to the south (DU001-015----).
DU001-024	*Enclosure:* Geophysical survey (licence no. 050R137) identified a series of anomalies (Nicholls and Shiel 2005). Test excavation (licence no. 07E0057) confirmed the presence of a series of ditches (average 0.30m deep) that form a sub-square enclosure (Elliot 2007, 288). *** Note that this site is being projected to the wrong co-ordinates & is located within the application area in Field 4*
DU001-025	*Enclosure:* Geophysical survey (licence no. 050R137) identified a series of anomalies thought to represent a series of conjoined enclosures with several large pit-type anomalies (Nicholls and Shiel 2005). Test excavation (licence no. 07E0057) confirmed the presence of a cluster of pits and related linear and curvilinear features. Fill of features consisted of charcoal rich soil, some with burnt bone inclusions (Elliot 2007, 291). *** Note that this site is being projected to the wrong co-*ordinates*. It is located within the application area in Field 6.*
DU001-026	*Excavation – miscellaneous:* Geophysical survey (licence no. 05R0137) identified a series of anomalies thought to represent a series of conjoined enclosures with several large pit-type anomalies (Nicholls and Shiel 2005). Test excavation (licence no. 07E0057) confirmed the presence of a cluster of pits and possible structural features within an area 30m x60m under redeposited natural. Burnt and charcoal fills were predominant (Elliot 2007, 292).

RMP / SMR no.	Description
DU001-027	*Enclosure:* Geophysical survey (licence no. 05R0137) identified the remains of a circular enclosure, of probable stone origin, measuring approximately 30m in diameter (Nicholls and Shiel 2005, 9). *** Note that this site is being projected to the wrong co-ordinates and is located approximately 100m to the south, in Field 8.*
DU001-028	*Excavation – miscellaneous:* Test excavation (licence no. 07E0057) identified a V-shaped linear feature orientated north-west/south-east (Elliot 2007, 295). A flint blade was recovered from the fill suggesting a prehistoric date. In the field to the north east is a Neolithic house (DU001-014----).
DU001-029	*Pit:* Test excavation (licence no. 07E0057) identified a large circular pit with charcoal rich fill. A flint blade was recovered from the fill suggesting prehistoric date for the feature (Elliot 2007, 297).
DU001-032	*Ring-ditch:* Located at the SE corner of a large arable field. The ring-ditch, one of a number of cropmark sites W of Balbriggan, is clearly visible on Apple Maps (June 2018). Site comprises a circular ring-ditch (Ext. diam c. 13m) defined by a ditch (Wth. c. 2m), where visible.
DU001-033	*Enclosure:* Located at the SE corner of a large arable field the southern half of a circular enclosure, one of a number of cropmark enclosures W of Balbriggan, is clearly visible on Google Earth imagery (24 June 2018). Site bisected by later field boundary with enclosure most clearly visible in arable field to S. It comprises a circular enclosure (Ext. diam. c. 35.4m) defined to the S by a ditch (Wth. c. 1.3m). Other linear and curvilinear cropmarks to the E and W may be associated with the enclosure.

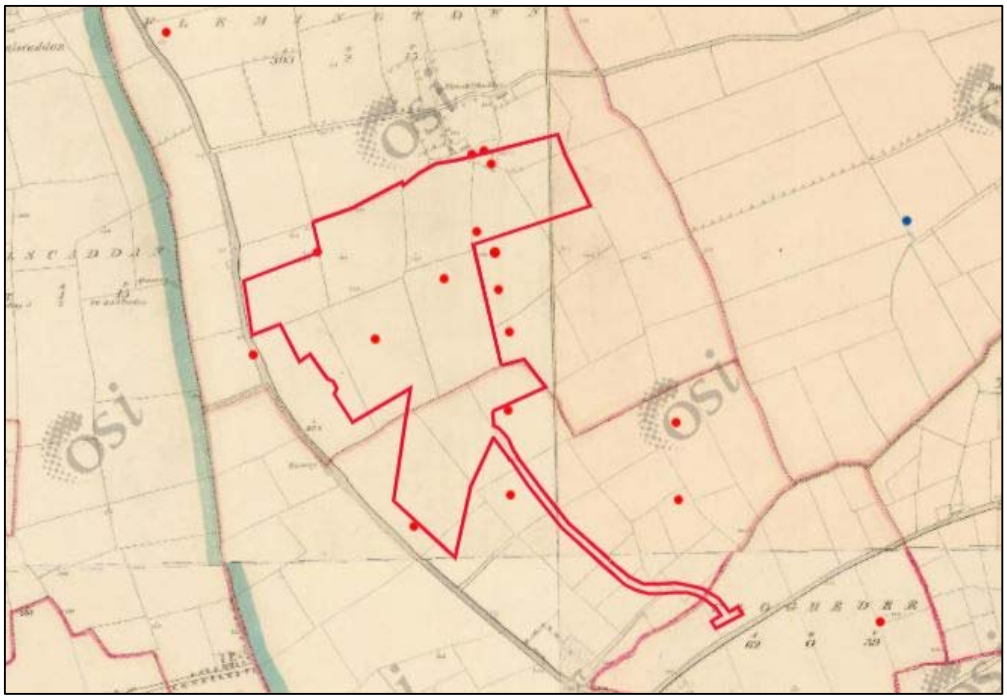

Figure 5 First edition OS 6-inch map showing site location & recorded sites (as shown on www.archaeology.ie)

3. SUMMARY OF PREVIOUS INVESTIGATIONS

Archaeological Assessment, O'Carroll, 2006

An archaeological assessment of the lands of the discontinued North West Balbriggan Area Action Plan was carried out by Ellen O'Carroll of The Archaeology Company in 2006. The assessment included a geophysical survey (Nichols 2005), site walkover, documentary and cartographic research and the production of a report.

Geophysical Survey, Nichols, 2005, 05R0137

A gradiometer scan was undertaken across the lands, with detailed survey undertaken in areas where anomalies were detected (Figures 6-7). Several anomalies were identified within the lands, six of which were later added to the SMR. A large settlement complex was identified measuring approximately 200m north-south by 120m east-west and extending further southeast beyond the survey area and the site boundaries. It was later added to the SMR as a field system (RMP no.: DU001-023) conjoined with the enclosure (RMP no.: DU001-015) which extends into the adjacent lands.

Several pit-type features were detected in the north of the area and were later included in the SMR (RMP no.: DU001-022001/2). A series of conjoined enclosures identified over a 60m by 60m area were suggestive of a prehistoric settlement and were later recorded in the SMR as an enclosure (RMP no.: DU001-025). A small truncated enclosure or possible barrow was identified in the southwest of the area and this was later added to the SMR as an enclosure site (RMP no.: DU001-027). The field numbers used in the geophysical is survey were also used in the testing report and followed through in site numbers ie. sites 2/1 and 2/2 are located in field 2 or F2.

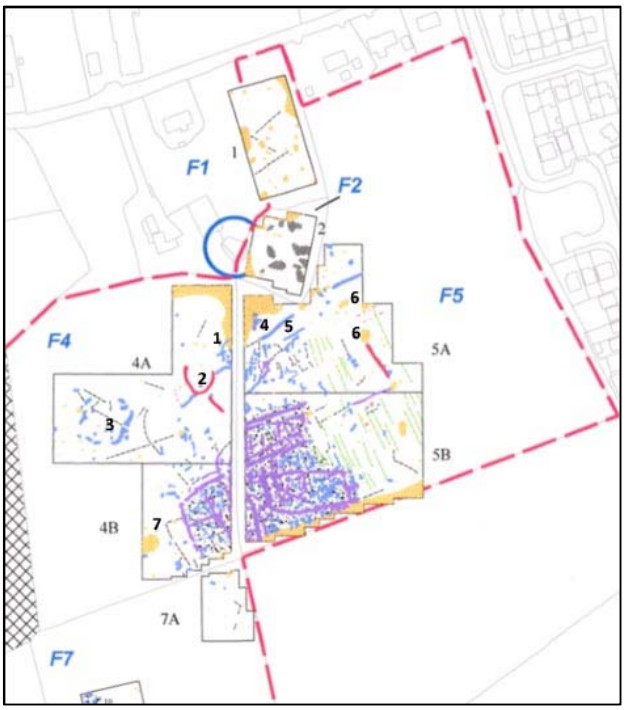

Figure 6 Geophysical survey interpretation, Nichols 2005 (RMP DU001-023)

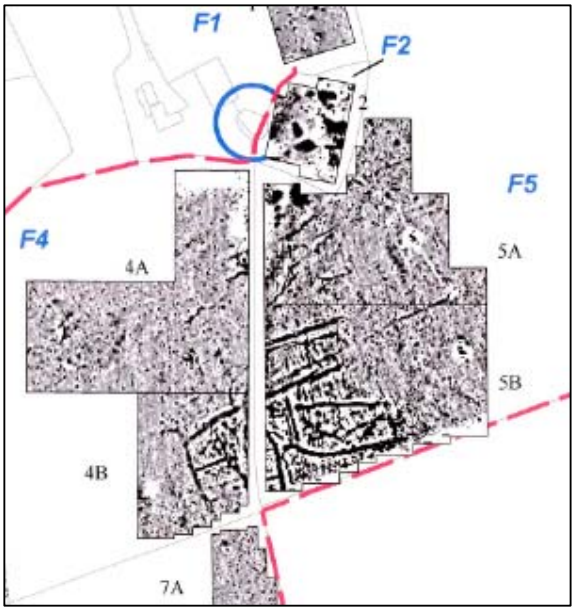

Figure 7 Geophysical survey, greyscale, Nicholls 2005 (RMP DU001-023)

Geophysical Survey, Leigh, 2007, 07R0009

A second geophysical survey was undertaken in 2007 which targeted areas which were inaccessible due to crops etc. in the original survey. One of these areas (field 3) was located in the area of the current application (Figure 8). Many of the anomalies detected in this area were consistent with natural geological features.



Figure 8 Geophysical survey, Leigh, 2007 (field 3)

Archaeological testing, Elliott 07E0057

A programme of test excavations was undertaken over the lands of northwest Balbriggan following the results of the geophysical survey (Figures 9-10). This testing was undertaken in advance of a previous phase of development which was never implemented within the old Balbriggan North West Local Area Plan.

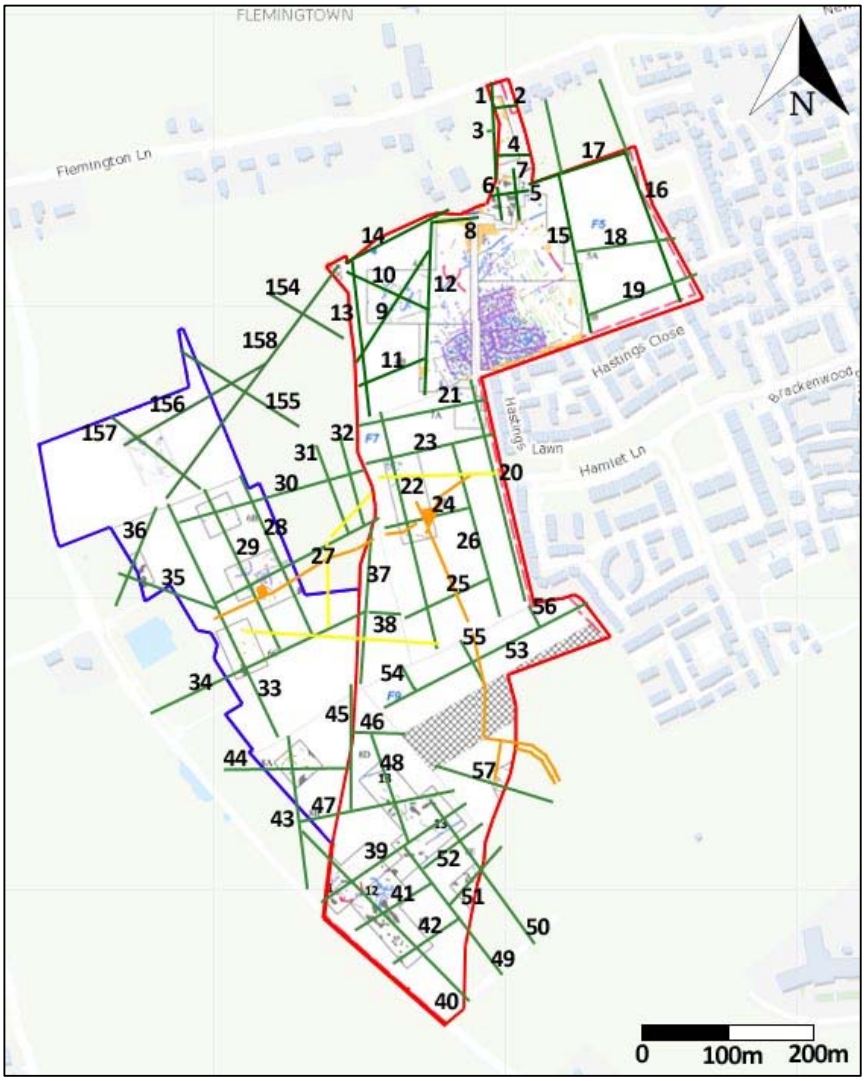

Figure 9 Test trenches excavated under licence 07E0057 & geophysical survey results

This programme of archaeological testing had taken place over a larger area comprising 22 fields, revealing a total of 38 archaeological sites. Elliot notes that some of the smaller, isolated sites may form the outer edges of larger archaeological complexes. The pit clusters in Field 2 with possible curvilinear ditches (Sites 2/1, 2/2; RMP no.: DU001-022001, DU001-022002) may be quite a significant site, as would the pit clusters in Field 6 (Sites 6/1, 6/2; RMP no. DU001-025; Enclosure). In the case of both fields, burnt bone may suggest cremation activity.

At the time of these investigations, it was agreed with the National Monuments Service that preservation in-situ would be the approach for the large enclosure and field system (RMP no. DU001-015, DU001-023) in Fields 4 and 5 in the form of an Archaeology Park, which is the reason this area was not tested.

All other sites identified in these investigations were designated 'Low Significance' and a strategy of excavation or 'Preservation by Record' was scheduled but never realised.

14 of the 38 sites identified as a result of the testing exercise were located within the current application area, excluding the field system and enclosure (RMP no.: DU001-023, DU001-015) which were not tested. The sites identified during testing within the application area are as follows.

Field 2

Three test trenches (5-7) were excavated revealing post-medieval stone drains, ditches and modern service lines. Two areas of archaeological significance were identified.

Site 2/1 comprised of a dense pit cluster interspersed with a series of linear features and curving ditches across an area measuring 45m by 50m in the centre-west of the field. A piece of struck flint suggests a possible prehistoric date. The site was later added to the SMR as 'Excavation – miscellaneous' (RMP no.: DU001-022001).

Site 2/2 comprised of a pit cluster over a 15m area with charcoal-rich fills and occasional burnt bone inclusions. This site was later added to the SMR as 'Pit' (RMP no.: DU001-022002).

Field 3

Five test trenches were excavated in Field 3 (154-158). Post medieval drains and modern services were found throughout the field. Some ditches were identified which may be of archaeological potential, but most likely represent field boundaries and medieval drainage features. Two areas of archaeological significance were revealed.

Site 3/1 comprised of a series of linear and curvilinear features in the northwest area of the field, one of which formed a broad arc which may continue to form a circle of c. 10m.

Site 3/2 comprised of a large pit with charcoal fills.

Field 4

No test trenches were placed within the enclosure / field system (RMP no.: DU001-015, DU001-023) and seven trenches (8-14) were proposed in the remainder of the field. Overhead power lines prevented the excavation of Trench 11 and the southern portions of Trenches 12 and 13. Testing revealed post-medieval drainage features and modern services. Two areas of archaeological significance were discovered.

Site 4/1 comprised of a series of ditches which may be related to the eastern side of the sub square anomaly (3) which was identified in the geophysical survey, while **Site 4/2** comprised of two ditches and a pit which

may be related to the western side of the same sub square anomaly. The description of these sites, comprising of a series of ditches with an average of 0.30m depth, corresponds with the description of the sub-square enclosure (RMP no.: DU001-024) which has been wrongly located on the webGIS service at www.archaeology.ie.

Field 5

No test trenches were placed within the settlement / field system (RMP no.: DU001-015, DU001-023) and five test trenches were excavated in the remainder of the field, revealing post-medieval stone drains and drainage / agricultural features. Ditches forming former field boundaries depicted in historical mapping crossed Trenches 15 and 16. One area of archaeological potential was identified.

Site 5/1 was a potential enclosure and linear feature, possibly related to the settlement / field system to the west.

Field 6

The southern boundary of Field 6 acts as townland boundary between Flemington and Clonard / Folkstown Great. Twelve test trenches (Trenches 25-38) were excavated within this field, although a 60m exclusion zone on the western extent of the field could not be trenched. Post-medieval stone drains, ditches and modern services were revealed and two archaeological areas were identified.

Site 6/1 comprised of a complex of archaeological features in an area of approximately 10 by 45m, including a pit cluster with charcoal rich fill and burnt bone inclusions. The pit cluster is surrounded by a series of linear and curvilinear features which appear to be related. This corresponds with Anomaly 8 from the geophysical survey and was later added to the SMR as an enclosure site (RMP no.: DU001-025). This indicates that the site is currently being projected to the wrong co-ordinates on the webGIS at www.archaeology.ie.

Site 6/2 was a cluster of three pits located in the centre north of the field in a trench span of 15m long. They featured evidence of burning and contained charcoal inclusions. It may be associated with Site 6/1 40m to the south.

Field 7

The southern extent of Field 7 acts as the townland boundary between Flemington and Clonard / Folkstown Great. Seven test trenches (Trenches 20-26) were excavated revealing post-medieval stone drains and modern linear features. Four ditches may be of archaeological significance, but are most likely related to post-medieval drainage, and a continuation of existing field boundaries. One site of archaeological potential was revealed in the middle of the field in Trenches 24 and 26.

Site 7/1 was a cluster of archaeological features in an area measuring approximately 30m by 60m, comprising of pits and possible structural features. There were burnt and charcoal fills, but no finds were retrieved to suggest date or function. It was noted that redeposited natural overlying one of the features may conceal further features. This site was later added to the SMR (RMP no.: DU001-026; Excavation – miscellaneous), but is currently being projected with the wrong co-ordinates.

Field 8

Thirteen test trenches were proposed for Field 8, but a 60m exclusion zone in place along the western extent of the field meant that the geophysical features identified centre west in the field including a circular enclosure were not tested. Post-medieval drains and modern linear features were discovered in the eastern side of the field, and a number of ditches may be archaeological, but are most likely related to post-medieval drainage. Three areas of archaeological potential were identified.

Site 8/1 comprised of a series of features over a 65m band between Trenches 39 and 49. They may be related and contain predominantly charcoal rich fills.

Site 8/2 comprises of two possible pits, 45m apart, in Trenches 51 and 52 in the eastern part of the field.

Site 8/3 is an isolated pit approximately 100m south of Site 8/1 near the southern boundary of the field.

Field 9

Flint debitage and local red pottery were noted in the ploughed topsoil in the assessment (O'Carroll 2006). Thirteen test trenches were excavated, of which five (Trenches 53-57, 150-153) were within the site boundaries. Numerous stone drains and modern service trenches were identified, as well as several ditches which were thought not to be of archaeological significance. Two archaeological areas were identified.

Site 9/1 comprised of linear features and a pit, with one of the linears containing a flint blade. A ditch and metalled surface were also identified. This archaeological site was added to the SMR (RMP DU001-028; Excavation - miscellaneous), and while the identified portions fall outside of the application boundaries, it may extend beyond the limits of the test trench to impact the application site. The site suggests the possibility that activity related to the Neolithic house (RMP no.: DU001-014) may extend towards the application site.

Site 9/2 was located in the centre west of the field, comprising of a large irregular pit containing charcoal-rich soil and burnt stone inclusions, approximately 75m northwest of site 9/1 and may be related. The burnt stone inclusions may suggest a *fulacht fiadh* nearby.

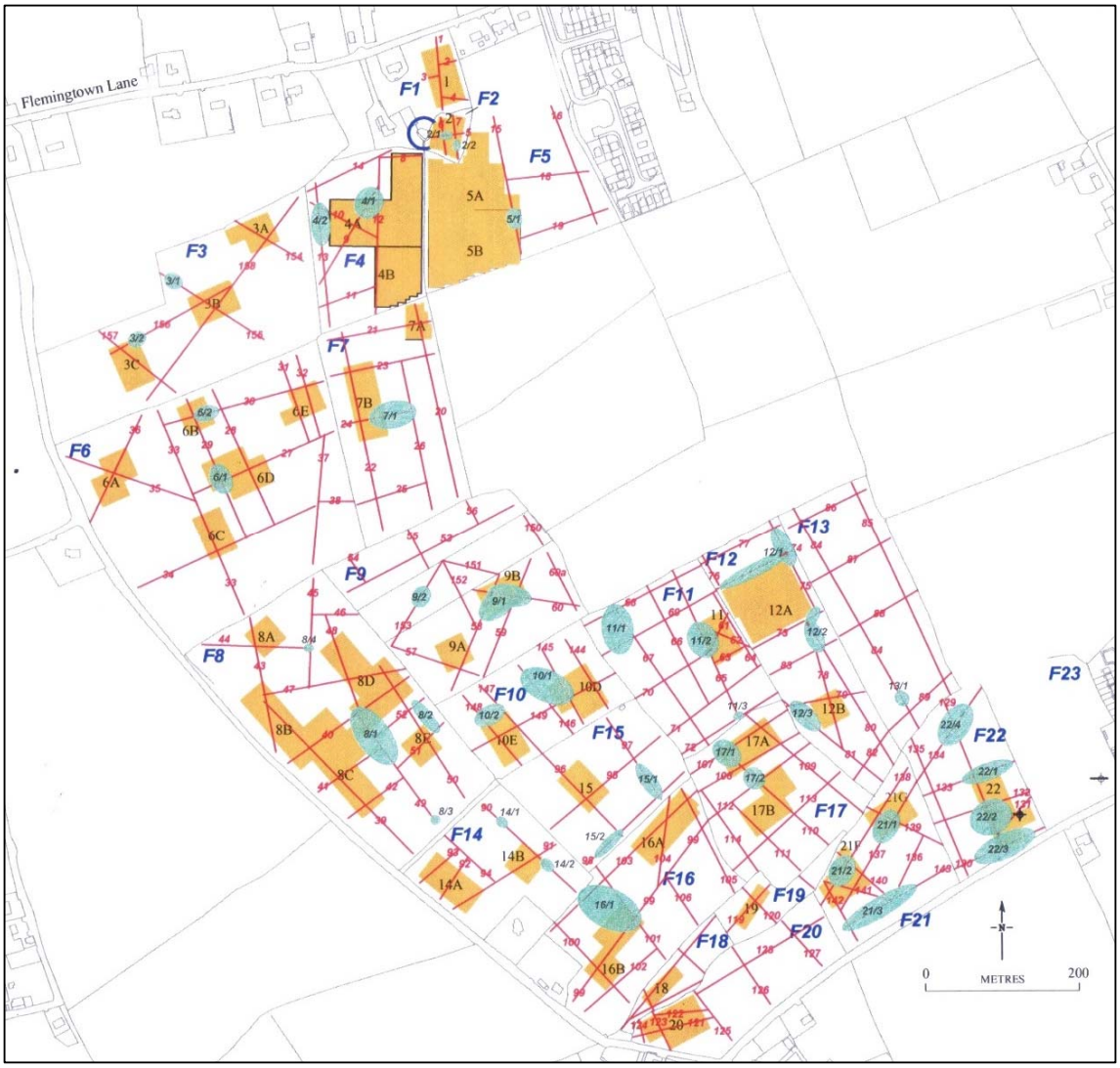

Figure 10 Test trench layout, Elliott 2007, showing geophysical survey areas (yellow), identified sites (green) & field numbers (F). F2-F10 are relevant to this application.

Balbriggan North West – Flemingtown excavation (Elliott 2007b; Licence no.: 07E0361)

An excavation was carried out at a hilltop site in Flemingtown approximately 200m south of the holy well (RMP no.: DU001-004). The brief summary provided in the form of an 'Excavations' bulletin describes a substantial multi-period site. A large curving ditch which may have enclosed the hilltop appeared to be of Middle Bronze Age date. Apparently contemporary features included large areas of metalling were located within and outside of the enclosure, and several linear features. Artefacts from this phase included four barbed and tanged chert arrowheads which would date the site to c. 1500BC; and large quantities of struck and worked flint may similarly date to this phase.

Two rectangular domestic structures were recorded, which the excavator believed to be stratigraphically later than the enclosure, on the northerly high ground of the site. They were truncated by medieval features, but no artefacts were retrieved to date them. They comprised of substantial post holes with packing stones in-situ, shallow possible plank slots and internal stake hole divisions. They both measured 10m by 4.5m and were orientated northwest to southeast. One had a hearth at the northern end and a number of internal pits. It is possible that two curvilinear ditches of 20m diameter may have functioned as foundation slots for a wattle and daub fence which may have enclosed the area. Rectangular houses are unusual in the archaeological record in that they date to only a few particular periods, but the excavator believed them to post date the earliest Bronze Age phase and they were truncated by medieval features.

Industrial activity on the site included metal working pits to the south where small-scale iron working appears to have taken place. Two kilns were also excavated.

A souterrain was revealed on the northern extent of the site which featured a large circular chamber with a passageway which continued north beyond the limit of the excavation, and a smaller circular chamber to the south which may have functioned as an entranceway. A second chamber was uncovered to the west but extended beyond the limit of the excavation. A bone needle and fragments of fired clay were retrieved from the large circular chamber. Two fragments of a lignite bracelet were retrieved from a ditch to the south of the souterrain. Souterrains date to the Early Medieval period, and lignite bracelets are also typically of this period.

The majority of the ditches and curvilinear ditches within the site appear to respect a massive ditch which measures 3m wide and 2m deep. It defined the western border of activity would have enclosed an area of over 35m by 96m. Some of the ditches are suggested to be associated with water management, similar to the site excavated by Bolger (2006a, 2006b; Licence no.: 05E0663). Some smaller curvilinear features may have functioned as internal divisions.

Parkway Water Main (Connell 2008; Licence no.: 07E1155)

The route of a proposed water main at Parkway, Balbriggan, which traversed the application site was tested in January 2008 with the aim of assessing the archaeological nature of a number of archaeological features that had been identified in the previous assessment. Twenty test trenches were excavated, of which five (Trenches 1-5) are within the applications lands in Fields 6, 7 and 9, with Trench 6 immediately outside of the site boundary.

In addition to the linear test trenches, three areas were stripped adjoining Trenches 1, 2/3 and 4 to further investigate features suggested in Elliot's (2007; Licence no.: 07E0057) phase of testing but failed to reveal features of archaeological nature. Patches of decomposing stone were noted along a stone-filled French

land drain in a herring bone pattern in Trench 2, but no archaeological features were revealed in this phase of testing.

An additional five trenches were excavated as part of the water scheme in 2012 (O'Hara & O'Connell 2012; Licence no. 07E1155ext) revealing nothing of archaeological significance.

Adjacent investigations

A series of archaeological investigations have also been undertaken in lands adjacent to the application site and across Northwest Balbriggan. The results of these investigations indicate the rich archaeological landscape of this area and provide a context for the archaeological sites within the site boundaries. The investigations in which archaeological material was revealed are summarised below.

Gas Pipeline to the West (Tobin 2003; Licence no.: 02E0112; and Byrnes 2002; Licence no.: 02E0297)

The Gas Pipeline to the West project was routed west of the application site. Investigations 470m northwest revealed a burnt mound 120m west of the application site. An enclosure with curvilinear ditch was identified 525m north of the application site (RMP no.: DU001-031; enclosure), containing sherds of Bronze Age coarse pottery and burnt and unburnt bone, suggesting a ring ditch. Radiocarbon dating returned dates of 986-817 cal. BC and 217-344 cal. BC, suggesting Late Bronze Age construction date and activity which continued into the Late Iron Age.

Flemingtown (Bolger 2006a, 2006b; Licence no.: 05E0663)

This assessment was undertaken over a c. 9.43ha area immediately east of the application site in an area which now accommodates housing. Test excavations and geophysical survey (Leigh 2005; Licence no. 05E0114) identified archaeological areas A-E which appeared to extend over c. 1ha on a ridge of high ground which ran parallel with the boundary of the application site. Two further areas (F and G) were later identified in the lower lying area to the east. The investigations resulted in four sites being added to the SMR (RMP no.: DU001-014, DU001-015, DU001-016, DU001-017), with the most significant for this application being the early medieval enclosure site (RMP no.: DU001-015) which extends into the application area to join the field system (RMP no. DU001-023).

Areas A-C formed the main archaeological complex of an organised Early Medieval landscape and included artefacts such as ring-headed brooches and possible sherds of e-ware. The complex was similar in size and scale to other Early Medieval enclosure complexes, but no evidence for habitation or house structures were found which by which to class the enclosure as a habitation site. The early medieval activity was characterised by a sequence of ditches which delimited area or carried water to the eastern perimeter of the site. An industrial area was apparent within the site, comprising of bowl furnaces and associated pits (RMP no.: DU001-016). In addition, a cluster of kilns was found including a keyhole-shaped example with a

circular chamber and a flue (RMP no.: DU001-017). The upper stone of rotary quern was also recovered. Radiocarbon dating indicates the site was occupied from at least the late 6th century to the early 11th century.

Prehistoric activity was noted on the site, including Bronze Age activity in the form of two truncated burnt mounds on the eastern extent of the site. The earliest phase of activity was a Neolithic house at Area E (RMP no.: DU001-014), adjacent to the boundary with the application site. It measured 10m north-south by 6m east-west and appeared to have been a plank-built structure utilising slot trenches with evidence for a doorway on the west. It was radiocarbon dated to 4778+/-31BP (UBA-8523, 3642-3387 cal BC), with over 250 sherds of Early Neolithic pottery retrieved from the slot trenches.

Flemington Lane (Linnane 2007; Licence no.: 07E0933)

A programme of test excavations was undertaken in the lands adjacent to the northern boundaries of the application area in advance of a discontinued plan for housing. A geophysical survey (Licence no.: 07R0188) had not identified any significant archaeological patterns in advance of the testing. Test excavations noted three ditches, two of which were curvilinear. The nature and significance of these features was not determined as further investigations did not take place.

Parkway Water Main (Connell 2008; Licence no.: 07E1155)

Although the Parkway Water Main excavations did not reveal any archaeological sites within the application area, four archaeological sites were excavated elsewhere on the scheme. One site, a burnt mound or *fulacht fiadh*, had been identified previously by Elliot in Field 17 (2007; Licence no.: 07E0057; Site 17/1) and is recorded as an SMR site (RMP no.: DU002-021). The ground was particularly wet and the full extent of the mound was not established.

A second burnt mound was discovered in Field 12 (following O'Carroll's 2006 field numbers) and two pits were revealed in Field 11, corresponding with Sites 11/2 and 11/3 from Elliot's (2007) investigation.

Parkway Link Road (Linnane 2008; Licence no.: 08E0106)

Test trenching along the route of the Parkway Link Road revealed one archaeological site, approximately 915m southeast of the application site (RMP no. DU005-117; Excavation - miscellaneous). It comprised of a 32m long northeast by southwest oriented ditch with an associated pit. Both contained charcoal-rich fills with heat-cracked stone and traces of cremated bone and were thought to be of Bronze Age date.

Flemingtown Lane Link Road (Lyttleton 2008a, 2008b; Licence no.: 08E0528)

A programme of testing was undertaken in Field 1 on the northern end of a proposed ring road where it merged with Flemington Lane, north of the holy well (RMP no.: DU001-004). Medieval features associated with the enclosure to the south were identified including seven linear features and a curvilinear feature which measured approximately 4m in diameter. Several fragments of medieval pottery were recovered. A number of post-medieval stone drains were also identified in this area.

Stephenstown LAP assessment (Frazer 2009; Licence no.: 09E0303)

A programme of geophysical survey and test excavation was undertaken within the Balbriggan Stephenstown LAP lands in 2009. One archaeological site was identified, a prehistoric pit with pottery / possible cremation pit, approximately 1.4km southwest of the application lands.

Clonard / Folkstown Great (McGlade 2019; Licence no.:15E0507, 15E0586)

Excavations were undertaken at the site of a proposed school in Clogheder and Clonard / Folkstown Great across Fields 12, 13, 16, 17, 21 and 22. Testing (Licence no.: 15E0507) revealed 26 archaeological features, including prehistoric areas and medieval activity. The site was at the edge of a wetland environment with marshy ground to the north and southeast, and a stream to the south.

The earliest feature comprised of two near-parallel gullies which appeared to define a 4-4.5m wide routeway in Field 17 approaching the watercourse. Two separate samples returned Mesolithic dates of 5622-5492 BC and 5667-5537 BC. A Mesolithic pit (4767-4252 BC) was also identified in the area, truncated by a penannular enclosure.

Other prehistoric features included a Neolithic cremation pit, Middle Bronze Age penannular enclosure, ring ditch and two *fulachta fiadh* cooking sites. McGlade suggests that this later prehistoric landscape was influenced by this longstanding routeway, with Bronze Age monuments marking key points along the trackway.

The cremation pit (3781-3652 BC) was identified southeast of the entrance and contained cremated bone, sherds of Neolithic pottery, fragments of baked clay and burnt flint. The ring ditch was located southwest of the enclosure, and the southern half was excavated under a separate project (cf. Section 6.4.9; McLoughlin 2018; Licence no.: 15E0558). This portion showed the earliest fill to date to 2155-1941 BC and went through several phases of use with up to two re-cuts of the ditch and the erection of posts before the site went out of use in the Early Iron Age.

The enclosure, measuring approximately 23m by 18.5m internally with a potentially palisaded ditch, contained Middle Bronze Age pottery, sherds of a crucible, a clay mound for a pin shank or awl and a grinding stone.

The medieval phase of the site comprised of a ditch to the northeast which contained evidence for metalworking using coal, with a series of other ditches and a metalled surface extending perpendicular to it.

250m Boulevard Road (McLoughlin 2018; Licence no.:15E0558)

Archaeological monitoring was undertaken on a 250m section of the Boulevard Road as part of the larger future development of North West Balbriggan. Three archaeological sites were identified, including a burnt mound (Site 1; ITM 718595E, 763354N, 34.933m OD), a spread of burnt mound material (Site 2; ITM 718649E, 763334N, 33.850m OD) and a Ring-ditch (Site 3; ITM 718596E 763383N, 34.898 OD). Sites 1 and 2 were preserved in situ by reducing the size of the compound area and moving the stream diversion.

The ring ditch lay partially within the adjacent site excavated by McGlade (2016; Licence no.: 15E0586). A third part had been removed previously in the installation of a pipeline. It measured 6.4m internally and 9.88m externally. Small quantities of burnt human bone and unburnt animal bone and charcoal were recovered, with the burnt bone representing the partial remains of an adult human. The bone was radiocarbon dated to 969-807 cal. BC (2725 ± 37 BP; UBA 31819), dating the site to the Late Bronze Age. Six water-rolled flint pebbles had been placed with the cremation deposit, and the animal bone assemblage included a portion of unburnt horse femur, which if of a similar date to the human bone may represent some of the oldest horse remains in Ireland, but insufficient collagen in the sample made dating impossible.

Clonard / Folkstown Great (McLoughlin 2019; Licence no.:17E0247)

Archaeological testing and monitoring were undertaken in Fields 12 and 13 in the vicinity of the enclosure (RMP no. DU002-020) which had been detected by geophysical survey (Nichols 2005: Licence no.: 05R0137). The enclosure itself was retained as part of a Class 2 Open Space. Ditches were identified which corresponded to the results of the geophysical survey and a further linear ditch extended into the area north of the enclosure. Late Bronze Age pottery was recovered from the inner enclosure ditch, and animal bone was retrieved from the outer ditch. A charred cereal grain from one of the fills returned a Late Bronze Age date of 895-802 cal. BC.

An area north of the enclosure comprised of linear ditches which were probably associated with the enclosure and contained animal bone and a hammer stone. A small area of metalling is likely to be associated with these features. Peripheral features included a rectangular trough and six pits, representing further Bronze Age activity.

Taylors Hill (Purcell 2019; Licence no.:18E0238)

An archaeological excavation was undertaken in Fields 10, 11 and 15 in advance of a separate housing development (Taylors Hill) in Clonard / Folkstown Great.

Area A was located in Field 10, and comprised of a palaeochannel, linear enclosing ditches and some evidence of Neolithic activity in the form of a curvilinear channel, possible hearth and a Neolithic flint assemblage. Two sub-rectangular pits of possible modern date were also identified.

Area B was located in Field 11 and revealed a small circular pit and a small deposit of burnt soil of unknown date and two agricultural ditches. Area E, comprising of linear drainage channels, was also uncovered in Field 11.

Areas C and D were located in Field 15 and included a single post hole and a linear deposit in a plough furrow in Area C and two narrow linear features in Area D which probably represented relatively recent field drains.

4. ARCHAEOLOGICAL TESTING RESULTS

4.1. General

Archaeological testing was carried out over nine days from 31st May 2021 by the author assisted by two archaeologists. This was carried out using a 13-tonne tracked excavator fitted with toothless grading bucket under strict archaeological direction.

In total 20 trenches were excavated (Figure 11), including one test trench to target the newly discovered sub-surface enclosure designated DU011-033 visible on Google maps (June 2018)(Figure 12).

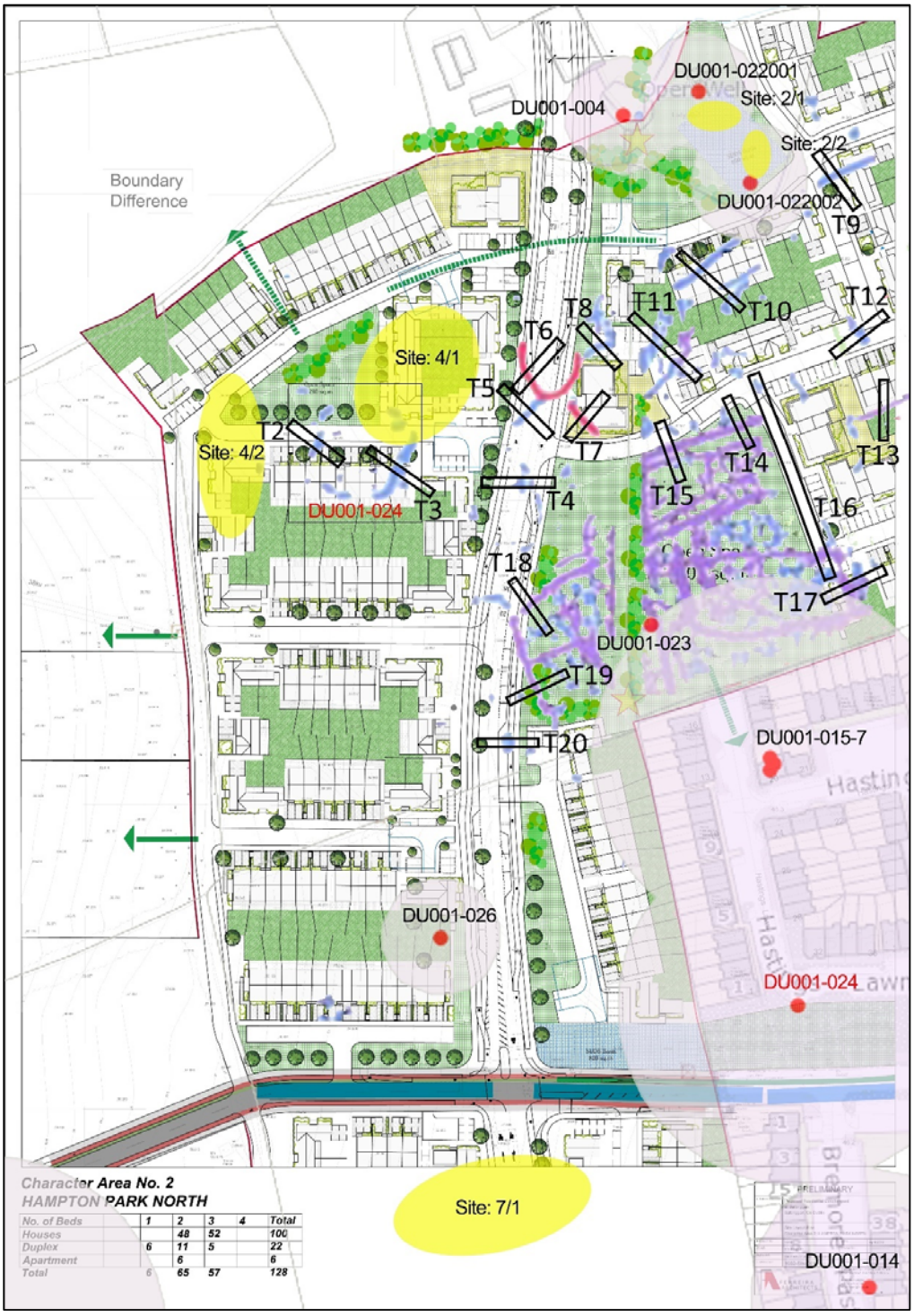

Figure 11 Test trench layout in the area of field system DU001-023 (trenches T2-T20)



Figure 12 Google maps (June 2018) with location of proposed test trench T1 at site DU001-033

4.2. Methodology

All trenches were excavated to the surface of archaeological or potential archaeological deposits or to the underlying natural subsoil, whichever was encountered first. Any potential archaeological features were cleaned and sectioned where necessary, to establish their nature, extent and character. Photographs, plans and context recording sheets were used to record any features of potential archaeological interest. A register with full details of all contexts is included as Appendix 1 to the rear of the report.

4.3. Trench T1

Trench T1 was placed to target a possible double ditched enclosure visible on aerial photography which had recently been added to the record as DU001-033 (Figures 3 & 12).

Table 2 Summary of Trench 1

GENERAL DESCRIPTION			
Dimensions. 32m long x 1.9m wide x 0.3m deep Orientation. WSW-ENE ITM co-ords: 717808 E / 764092 N, 717836 E / 764102 N Plate Refs: Plates 1-3			
CONTEXT NO.	**DEPTH**	**DESCRIPTION**	**INTERPRETATION**
C1	0.00 – 0.3m	Plough soil.	Plough soil
C2	0.3	Loose, yellow orange, sandy gravel.	Natural subsoil

GENERAL DESCRIPTION			
Dimensions. 32m long x 1.9m wide x 0.3m deep Orientation. WSW-ENE ITM co-ords: 717808 E / 764092 N, 717836 E / 764102 N Plate Refs: Plates 1-3			
CONTEXT NO.	**DEPTH**	**DESCRIPTION**	**INTERPRETATION**
C81	Base of trench – 0.95m	Loose, grey with slight orange mottling (redeposited natural), clayey sand, with frequent stones up to 0.1m in diameter, no other inclusions. 1.95m wide x 0.95m depth. Sharp break of slope at top with steep sides, almost V shaped. Siltier grey upper fill 0.15m depth with patch of redeposited natural on top.	Inner enclosure ditch
C82	Base of trench – 0.6m	Loose, silty sand, grey-brown, quite gravelly with lots of stones up to 0.1m diameter, no other inclusions. 1.3m wide x 0.6m deep. Steep sides with a flat base.	Internal ditch related to enclosure
C83	Base of trench – 0.24m	Loose, light grey, silty sand with gravely inclusions, no other inclusions of note. 1m wide at north side of trench, only 0.5m wide at south side. East sides are steep, west more gradual.	Outer enclosure ditch

Three ditches were uncovered within Trench T1, two of which correspond to enclosure ditches identified on Google maps (June 2018)(C81 & C83). C81 appears to correspond with the inner enclosure ditch and measures 1.95m wide x 0.95m deep, while C83 appears to correspond with the outer enclosure ditch. It measures 1m wide with a much shallower depth of 0.24m and had the same orientation as C81. The two ditches are approximately 10m apart which also corresponds with the aerial photography. A third linear feature (C82) was identified at the eastern end of the trench and represents and internal ditch. It measures 1.3m wide x 0.6m deep and was oriented WNW-ESE. No datable finds were recovered from any of the features within the trench.

4.4. Trench T2

Trench T2 was placed to target a series of pit type responses and trends indicated on the geophysical survey which appeared to form a circular enclosure. Interpretation was uncertain as the pattern was not clear and modern ferrous responses were also present (Figure 11).

Table 3 Summary of Trench 2

GENERAL DESCRIPTION			
Dimensions. 20m long x 1.9m wide x 0.45m deep Orientation. NW-SE ITM co-ords: 718066 E / 764224 N, 718082 E / 764212 N Plate Refs: Plate 4			
CONTEXT NO.	**DEPTH**	**DESCRIPTION**	**INTERPRETATION**
C1	0.00 – 0.45m	Plough soil.	Plough soil

GENERAL DESCRIPTION			
Dimensions. 20m long x 1.9m wide x 0.45m deep Orientation. NW-SE ITM co-ords: 718066 E / 764224 N, 718082 E / 764212 N Plate Refs: Plate 4			
CONTEXT NO.	**DEPTH**	**DESCRIPTION**	**INTERPRETATION**
C2	0.45m – base of trench	Compact yellow, silty sand, mottled with decayed stones in places.	Natural subsoil

An old test trench with hazard tape at the base was identified at the NW end of the trench, oriented WNW-ESE, while further to the southeast an irregular anomaly was investigated and found to be a natural variation in the subsoil which appeared to correspond with the anomaly indicated in the geophysical survey. The old test trench corresponds with Elliott's 2007 Trench 10. No features, finds or deposits of archaeological interest were identified within the trench.

4.5. Trench T3

Trench T3 was placed to target the same possible enclosure as that in trench T2 which was indicated on the geophysical survey (Figure 11).

Table 4 Summary of Trench 3

GENERAL DESCRIPTION			
Dimensions. 25m long x 1.9m wide x 0.4 – 0.6m deep Orientation. NW-SE ITM co-ords: 718092 E / 764216 N, 718112 E / 764202 N Plate Refs: Plate 5			
CONTEXT NO.	**DEPTH**	**DESCRIPTION**	**INTERPRETATION**
C1	0.00 – 0.6m	Plough soil.	Plough soil
C2	0.6 – base of trench	Firm, yellow grey, mottled, silty sand.	Natural subsoil

The continuation of an old test trench also identified in T2 (Elliott, 2007, Trench 10) was identified oriented WNW-ESE. No features, finds or deposits of archaeological interest were identified within the trench.

4.6. Trench T4

Trench T4 was placed to target an isolated irregular shaped geophysical anomaly (Figure 11).

Table 5 Summary of Trench 4

GENERAL DESCRIPTION			
Dimensions. 25m long x 1.9m wide x 0.5m deep Orientation. E-W ITM co-ords: 718128 E / 764205 N, 718153 E / 764205 N Plate Refs: Plates 6-7			
CONTEXT NO.	**DEPTH**	**DESCRIPTION**	**INTERPRETATION**
C1	0.00 – 0.5m	Plough soil.	Plough soil

GENERAL DESCRIPTION			
Dimensions. 25m long x 1.9m wide x 0.5m deep Orientation. E-W ITM co-ords: 718128 E / 764205 N, 718153 E / 764205 N Plate Refs: Plates 6-7			
CONTEXT NO.	**DEPTH**	**DESCRIPTION**	**INTERPRETATION**
C2	0.5 – base of trench	Compact, yellow and mottled grey (mostly yellow), silty sand.	Natural subsoil
C46	Base of trench – 0.23m	Loose, mid-brown, silty clay with no inclusions, cut has one steep side and one gradual with a concave base. Width 0.5m x depth 0.23m.	Fill and linear (Possibly archaeological)
C47	Base of trench – 0.4m	Moderately compact, grey/brown with mottled orange-brown, clayey silt with some occasional charcoal inclusions and stones max 0.1m. Cut has a sharp BOS at top, very steep sides, and a flat base with a gradual slope at top on the east side. 1.1m wide x 0.4m deep.	Ditch / gully-type feature (Possibly archaeological)
C48	Base of trench – 0.1m	Loose, mid-brown, silty sand with no inclusions. Cut – gradual sides with a concave base, probably a furrow. Width 0.3m x depth 0.1m.	Probable agricultural furrow (not archaeological)

Trench 4 revealed three ditch / gully-type features. At the eastern end, two of these features (C46 & C47) were parallel to each other and oriented NNW-SSE. C47 was the most substantial of the features in the trench measuring 1.1m wide x 0.4m deep and C46 measured 0.5m wide x 0.23m deep. Towards the western end of the trench C48 measured 0.3m wide x 0.1m deep and is likely to represent an agricultural furrow. A modern stone drain was also identified oriented N-S. No dateable finds were recovered from any of the features but there remains a possibility that C46 and C47 could be of archaeological interest.

4.7. Trench T5

Trench T5 was placed to target a linear-type geophysical anomaly (Figure 11).

Table 6 Summary of Trench 5

GENERAL DESCRIPTION			
Dimensions. 25m long x 1.9m wide x 0.6m deep Orientation. NW-SE ITM co-ords: 718135 E / 764236 N, 718153 E / 764219 N Plate Refs: Plates 8-9			
CONTEXT NO.	**DEPTH**	**DESCRIPTION**	**INTERPRETATION**
C1	0.00 – 0.6m	Plough soil.	Plough soil
C2	0.6 – base of trench	Compact, orange-grey mottled, silty sand.	Natural subsoil
C43	Base of trench – 0.13m	Moderately compact, mid-brown/grey, silty sand with no inclusions. Gradual sides with a sharp upper break of slope and a concave base. Width 0.65m x 0.13m depth.	Linear gully-type feature (Possibly archaeological)
C44	Base of trench -0.3m	Moderately compact, mid-dark brown, sandy silt with medium sized stones. Cut has	Linear gully-type feature

GENERAL DESCRIPTION			
Dimensions. 25m long x 1.9m wide x 0.6m deep Orientation. NW-SE ITM co-ords: 718135 E / 764236 N, 718153 E / 764219 N Plate Refs: Plates 8-9			
CONTEXT NO.	**DEPTH**	**DESCRIPTION**	**INTERPRETATION**
		gradual sides, a gradual break of slope at top and bottom and a flat base. Width 0.45m approx. x 0.3m depth.	(possibly archaeological)
C45	Base of trench – 0.43m	Moderately compact dark brown, sandy clay with medium sized stones and rare charcoal inclusions. Cut has steep sides and a flat base. Width 1m approx. x 0.43m deep.	Linear gully-type feature (possibly archaeological)

Trench 5 revealed three linear features, two of which were oriented roughly SW-NE and converge in the centre of the trench (C44 & C45) giving them a combined width of 1.45m and depth of 0.43m. These combined features appear to correspond with the geophysical anomaly targeted. Another smaller and shallower linear feature at the NW end of the trench was oriented N-S (C43). No dateable finds were recovered from any of the features but there remains a possibility that these features could be of archaeological interest.

4.8. Trench T6

Trench T6 was placed to target a 'C' shaped geophysical anomaly thought to represent a possible stone enclosure or associated structures. Interpretation was cautious as these features could also relate to frost cracking in the underlying glacial till (Figure 11).

Table 7 Summary of Trench 6

GENERAL DESCRIPTION			
Dimensions. 20m long x 1.9m wide x 0.4 – 0.5m deep Orientation. NE – SW ITM co-ords: 718140 E / 764236 N, 718154 E / 764251 N Plate Refs: Plate 10			
CONTEXT NO.	**DEPTH**	**DESCRIPTION**	**INTERPRETATION**
C1	0.00 – 0.5m	Plough soil	Plough soil
C2	0.5 – base of trench	Compact grey yellow mottled silty sand	Natural subsoil
C42	Base of trench – 0.15m	Loose yellow brown silty sand with no inclusions. Cut has very gradual sides with a flat base. Width 1.15m x 0.15m depth	Linear gully-type feature (not-archaeological)

One shallow gully-type feature was identified in trench T6, oriented NNW-SSE across the centre of the trench. There were no dateable inclusions, and it did not appear to be of archaeological interest. A modern stone drain was also uncovered oriented ENE-WSW, which was also identified in trench T8. No features corresponding with the geophysical anomaly indicated were identified in this trench and no features, finds or deposits of archaeological interest were identified.

4.9. Trench T7

Trench T7 was placed to target a short linear geophysical anomaly with the same signature as that in trench T6 (Figure 11).

Table 8 Summary of Trench 7

GENERAL DESCRIPTION			
Dimensions. 20m long x 1.9m wide x 0.4 - 0.6m deep Orientation. NE – SW ITM co-ords: 718156 E / 764219 N, 718169 E / 764234 N Plate Refs: Plate 11			
CONTEXT NO.	**DEPTH**	**DESCRIPTION**	**INTERPRETATION**
C1	0.00 – 0.6m	Plough soil.	Plough soil
C2	0.5 – base of trench	Compact grey yellow silty sand with frequent small stones.	Natural subsoil

A single stone drain measuring 0.22m wide filled with small stones approx. 0.05m diameter and a ridged terracotta pipe in the base was revealed in trench T8 oriented N-S. No features, finds or deposits of archaeological interest were identified within the trench.

4.10. Trench T8

Trench T8 was placed to target a linear-type geophysical anomaly in the vicinity of a possible circular enclosure obscured by the existing field boundary (Figure 11).

Table 9 Summary of Trench 8

GENERAL DESCRIPTION			
Dimensions. 20m long x 1.9m wide x 0.5 - 0.6m deep Orientation. NW-SE ITM co-ords: 718160 E / 764258 N, 718174 E / 764243 N Plate Refs: Plates 12-13			
CONTEXT NO.	**DEPTH**	**DESCRIPTION**	**INTERPRETATION**
C1	0.00 – 0.6m	Plough soil.	Plough soil
C2	0.6m – base of trench	Compact, grey/yellow with frequent stones, silty sand.	Natural subsoil
C41	Base of trench – 0.58m	Moderately compact, dark brown/grey brown, sandy silt with occasional small stones and charcoal inclusions. Cut has very steep sides and a flat base. 1.3m wide x 0.58m deep.	Linear ditch-type feature (possibly archaeological)

Trench T8 revealed a single ditch-type feature, oriented ENE-WSW across the trench which appeared to correspond with the geophysical anomaly targeted. There were no dateable finds recovered from the excavated section. Two modern stone drains were also identified, one of which was a continuation of a drain also identified in trench T6.

4.11. Trench T9

Trench T9 was placed to target a linear-type geophysical anomaly (Figure 11).

Table 10 Summary of Trench 9

GENERAL DESCRIPTION			
Dimensions. 20m long x 1.9m wide x 0.35m deep Orientation. NW-SE ITM co-ords: 718238 E / 764314 N, 718250 E / 764297 N Plate Refs: n/a			
CONTEXT NO.	**DEPTH**	**DESCRIPTION**	**INTERPRETATION**
C1	0.00 – 0.35m	Plough soil.	Plough soil
C2	0.35m – base of trench	Compact, yellow brown soil mottled with grey, frequent small stones.	Natural subsoil

A potential feature was investigated roughly in the centre of the trench which appeared to correspond with the geophysical anomaly indicated and was found to be a variation in the natural subsoil. No features, finds or deposits of archaeological interest were identified within the trench.

4.12. Trench T10

Trench T10 was placed to target a series of linear-type geophysical anomalies and a cluster of four pit-type anomalies (Figure 11).

Table 11 Summary of Trench 10

GENERAL DESCRIPTION			
Dimensions. 25m long x 1.9m wide x 0.3m deep Orientation. NW-SE ITM co-ords: 718195 E / 764280 N, 718214 E / 764263 N Plate Refs: Plates 14-15			
CONTEXT NO.	**DEPTH**	**DESCRIPTION**	**INTERPRETATION**
C1	0.00 – 0.3m	Plough soil.	Plough soil
C2	0.3m – base of trench	Compact, yellow sandy silt with frequent small stones.	Natural subsoil
C39	Base of trench – 0.12m	Firm, dark grey-brown silty sand with occasional charcoal and small stones. Width 0.4m x 0.12m deep.	Small gully-type feature (Archaeological)
C40	Base of trench – 0.37m min, 0.6m max	Compact, dark grey mottled with yellow, silty clay with occasional charcoal and frequent small stones (20%) up to 0.1m in diameter.	Natural accumulation of clay (not archaeological)

Trench T10 revealed a large spread of grey clay (C40) in the NW end of the trench where two sondages determined the depth to be between 0.37m and 0.6m. This deposit had the appearance of a natural accumulation of clay due to standing water and did not appear to be of archaeological interest. Two modern stone drains were also identified crossing this area in a NE-SW and NNE-SSW direction. In the SE of the

trench a shallow gully–type feature (C39) measured 0.4m wide x 0.12m deep and is of archaeological interest. No dateable finds were recovered.

4.13. Trench T11

Trench T11 was placed to target two irregular linear-type geophysical anomalies (Figure 11).

Table 12 Summary of Trench 11

GENERAL DESCRIPTION			
Dimensions. 28.5m long x 1.9m wide x 0.4m deep (trench was extended to the NW) Orientation. NW-SE ITM co-ords: 718178 E / 764260 N, 718200 E / 764239 N Plate Refs: Plates 16-19			
CONTEXT NO.	**DEPTH**	**DESCRIPTION**	**INTERPRETATION**
C1	0.00 – 0.4m	Plough soil.	Plough soil
C2	0.4m – base of trench	Compact, yellow mottled with grey, and frequent small stones.	Natural subsoil
C32	Base of trench – 0.22m	Loose, brown/grey, sandy silt with no inclusions, steep sides and a U-shaped base. 2.2m x 0.46m x 0.22m deep.	Linear gully
C33	Base of trench – 0.2m	Moderately compact, light grey clayey silt with no inclusions. Width 0.3m x 0.2m depth.	Linear gully
C34	Base of trench – 0.26m	Moderately compact, dark black, grey clayey silt with occasional charcoal and small stone inclusions (0.02m diam). Sides vary from steep to gradual, with a concave base deeper on the NW side. Width 0.8m x 0.26m deep.	Linear ditch
C35	Base of trench – 0.2m	Moderately compact, grey, brown clayey silt with occasional charcoal. Width 0.6m x 0.2m depth.	Linear ditch/gully
C36	Base of trench – 0.2m	Moderately compact, mid brown clayey silt with occasional charcoal and small stones (0.02m diam). Width 0.55m x depth 0.2m.	Linear ditch/gully
C37	N/A	Band of natural.	Natural
C38	Base of trench – 0.25m	Compact, mid-grey, silty clay with no inclusions. One side steep, the other more gradual, concave base. Width 1m x 0.25m deep.	Probable modern gully associated with existing field boundary

Trench 11 revealed five shallow linear gully / ditch-type features, most of which correspond with the pattern of geophysical anomalies which are oriented SW-NE. At the SE end of the trench one of the gullies (C32) is oriented E-W. All five features contained dark fills and are of archaeological interest, although no datable finds were recovered. The most substantial of these features measured 0.8m wide x 0.26m deep (C34). At the NW end of the trench an additional gully/ditch (C38) is aligned with the upstanding field boundary and appears to be related to it.

4.14. Trench T12

Trench T12 was placed to target a relatively isolated geophysical anomaly (Figure 11).

Table 13 Summary of Trench 12

GENERAL DESCRIPTION			
Dimensions. 20m long x 1.9m wide x 0.4m deep Orientation. NE – SW ITM co-ords: 718245 E / 764248 N, 718261 E / 764261 N Plate Refs: n/a			
CONTEXT NO.	**DEPTH**	**DESCRIPTION**	**INTERPRETATION**
C1	0.00 – 0.4m	Plough soil.	Plough soil
C2	0.4m – base of trench	Compact, brown, yellow, silty sand.	Natural subsoil

A single stone drain oriented NE-SW was identified in the central area of trench T12. No features, finds or deposits of archaeological interest and no features corresponding with the geophysical anomaly were identified within the trench.

4.15. Trench T13

Trench T13 was placed to target a linear-type geophysical anomaly (Figure 11).

Table 14 Summary of Trench 13

GENERAL DESCRIPTION			
Dimensions. 20m long x 1.9m wide x 0.4m deep Orientation. N – S ITM co-ords: 718260 E / 764239 N, 718260 E / 764219 N Plate Refs: n/a			
CONTEXT NO.	**DEPTH**	**DESCRIPTION**	**INTERPRETATION**
C1	0.00 – 0.4m	Plough soil.	Plough soil
C2	0.4m – base of trench	Compact yellow silty sand, mottled in grey places, with some small stones.	Natural subsoil

Trench T13 revealed a band of black gritty natural at the N end of the trench as well as a modern stone drain running NE-SW through the centre. Neither of these corresponded with the geophysical anomaly but a deposit of grey silty clay located centrally within the trench, may correspond although it was deemed to be not of archaeological interest. No features, finds or deposits of archaeological interest were identified in Trench T13.

4.16. Trench T14

Trench T14 was placed to target linear ditch-type geophysical anomalies associated with a former field system (Figure 11).

Table 15 Summary of Trench 14

GENERAL DESCRIPTION			
Dimensions. 20m long x 1.9m wide x 0.35m deep Orientation. NNW – SSE ITM co-ords: 718209 E / 764234 N, 718217 E / 764215 N Plate Refs: Plates 20-24			
CONTEXT NO.	**DEPTH**	**DESCRIPTION**	**INTERPRETATION**
C1	0.00 – 0.35m	Plough soil.	Plough soil
C2	0.35m – base of trench	Compact yellow silty sand with mineral staining and some small stones.	Natural subsoil
C22	Base of trench – 0.5m min	Moderately compact, mid grey-brown silty sand that becomes looser towards base due to water, with occasional charcoal and saturated bone inclusions. Very steep sides and does not line up with any features in Trench 15. Width 1.35m x a minimum depth of 0.5m, digging abandoned due to water ingress from below.	Linear ditch
C23	Base of trench – 0.2m	Mid grey, moderately loose, silty sand with occasional small stone (0.02-0.03m) inclusions. Gradual sides with a concave base. Width 1m x 0.2m depth. Same feature as C28 in T15.	Linear ditch/ gully
C24	Base of trench – 0.2m	Loose, brown-grey, stony, wet, silty sand with saturated bone inclusions. 3.6m diameter.	Large spread / shallow pit
C25	Base of trench – 0.23m	Loose, brown dark grey, silty clay with no inclusions of note. Shallow with gradual sides and a dip in middle of base. Width 1.25m x 0.23m depth.	Linear ditch/ gully
C26	Base of trench – 0.06m	Dark brown, black silty sand of moderate compaction with occasional charcoal. Width 0.27m x 0.2m x 0.06m depth.	Small pit

Trench 14 contained three linear ditches / gullies (C22, C23, C25) all oriented in a SW-NE direction and corresponding with the anomalies indicated in the geophysical survey. At the very centre of the trench was a large shallow pit or spread (C24), with a smaller oblong shaped pit (C26) being located further NW. A modern stone drain was also identified oriented WSW-ENE. C22 and C24 contain animal bone in very poor condition (waterlogged).

4.17. Trench T15

Trench T15 was placed to target linear ditch-type geophysical anomalies associated with a former field system (Figure 11).

Table 16 Summary of Trench 15

GENERAL DESCRIPTION			
Dimensions. 24m long x 1.9m wide x 0.4m deep (trench extended to the NW) Orientation. NNW – SSE ITM co-ords: 718187 E / 764225 N, 718194 E / 764206 N Plate Refs: Plates 25-29			
CONTEXT NO.	**DEPTH**	**DESCRIPTION**	**INTERPRETATION**
C1	0.00 – 0.4m	Plough soil.	Plough soil
C2	0.4m – base of trench	Compact yellow silty sand with frequent small stones 0.05-0.1m diameter.	Natural subsoil
C27	Base of trench – 1.2m	Upper fill is loose brown silty sand, 0.48m deep with a lens of charcoal within. Lower fill is very loose, mid grey silty clay with occasional waterlogged animal bone and charcoal. Very steep sides with a flat base. Width 3.2m wide (1m wide at base) x 1.2m deep.	Substantial linear ditch
C28	Base of trench – not sectioned	Same as C23 in Trench T14, width 0.95m.	Linear ditch / gully
C29	Base of trench-0.45m	Black loose silty sand with rare charcoal inclusions and redeposited natural on top. Sharp break of slope at top and steep sides, narrow 'U' shaped cut. Width 1m x 0.45m depth.	Linear ditch
C30	Base of trench – 0.35m	Moderately compact, dark grey black, clayey sand with occasional small stones (0.05m) and rare charcoal inclusions. Charcoal rich layer at base and redeposited natural at north side of feature. Steep sides and flat base.	Fill of large pit
C31	Base of trench – 0.1m	Small shallow linear gully-type feature, 0.4m wide x 0.1m deep.	Linear gully

Trench T15 revealed four linear ditches/ gullies and one large pit. The largest of the ditches is 3.2m wide x 1.2m deep (C27) and the pit is 1.55m diameter x 0.35m deep. C28 was the same features that was identified in Trench T14 (C23). Several of the features contain charcoal and the largest ditch also contains animal bone in poor condition.

4.18. Trench T16

Trench T16 was placed to target a linear-type and other irregular shaped geophysical anomalies associated with a concentration of features representing a former field system (Figure 11).

Table 17 Summary of Trench 16

GENERAL DESCRIPTION			
Dimensions. 67m long x 1.9m wide x 0.45m deep (extended to the NNW) Orientation. NNW – SSE ITM co-ords: 718243 E / 764175 N, 718219 E / 764237 N Plate Refs: Plates 30-33			
CONTEXT NO.	**DEPTH**	**DESCRIPTION**	**INTERPRETATION**
C1	0.00 – 0.45m	Plough soil.	Plough soil
C2	0.45m – base of trench	Compact yellow grey silty sand with some small pebbles.	Natural subsoil
C16	Base of trench – 0.18m	Loose, dark brown sandy silt, no inclusions of note. 2.3m diameter, 0.18m deep.	Shallow pit / spread
C17	Not sectioned	Moderately compact, mid-dark brown with bone visible of surface. Same as ditch C10 in Trench 17 which was 2.35m wide x 0.9m deep.	Linear ditch
C18	Base of trench – 0.09m	Compact, mid-dark brown, silty sand with occasional charcoal. Width 0.9m x 0.35m x 0.09m deep.	Small pit
C19	Base of trench – 0.09m	Compact, mid-dark brown, silty sand with occasional charcoal. Width 0.4m x 0.25m x 0.09m deep.	Small pit
C20	Base of trench – 0.09m	Compact, mid-dark brown, silty sand with occasional charcoal. Width 0.45m x 0.3m x 0.09m deep.	Small pit
C21	Base of trench - 0.4m	Mid grey, silty clay. Gradual sides with a flat base, width 4.5m x 0.4m deep.	Ditch / hollow filled with clay. Natural accumulation of clay / related to drainage - not archaeological.
C61	Base of trench – 0.06m	Dark brown/grey with occasional charcoal. 0.5m diameter x 0.06m deep.	Pit/spread
C62	not sectioned	Dark brown/grey/black with frequent charcoal. 0.85m x 1.1m.	Pit/spread
C63	Not sectioned	Dark brown/grey with occasional charcoal. 0.4m diameter.	Pit/spread
C64	Not sectioned	Dark brown/grey with occasional charcoal. 0.3m diameter.	Pit/spread
C65	Base of trench – 0.05m	Dark brown/grey/black with frequent charcoal. 1m x 0.5m x 0.05m depth.	Pit/spread
C66	Not sectioned	Dark brown/grey with occasional charcoal. 0.2m diameter.	Possible posthole
C67	Not sectioned	Dark brown/grey with occasional charcoal.0.15m diameter.	Possible posthole
C68	Base of trench – 0.15m	Dark brown/grey with occasional charcoal. 0.6m x 0.85m x 0.15m depth.	Pit

GENERAL DESCRIPTION			
Dimensions. 67m long x 1.9m wide x 0.45m deep (extended to the NNW) Orientation. NNW – SSE ITM co-ords: 718243 E / 764175 N, 718219 E / 764237 N Plate Refs: Plates 30-33			
CONTEXT NO.	**DEPTH**	**DESCRIPTION**	**INTERPRETATION**
C69	Base of trench – 0.05m	Dark brown/grey with occasional charcoal. 0.6m x 0.3m x 0.05m depth.	Pit/spread
C70	not sectioned	Dark brown/grey with occasional charcoal. 0.3m x 0.5m.	Pit/spread
C71	Not sectioned	Dark brown/grey with occasional charcoal. Irregular shaped spread 1m x 0.9m.	Pit/spread
C72	Not sectioned	Dark brown/grey with occasional charcoal. 0.4m x 0.2m.	Pit/spread
C73	Base of trench – 0.07m	Dark brown/grey with occasional charcoal. 1m x 0.9m x 0.07m deep.	Pit/spread
C74	Base of trench -	Possible metaling approaching southern edge of large pit C75 with stones measuring from 0.02-0.03m to 0.1m in diameter. Up to 1.05m wide, depth not established due to water ingress from below.	Metalling
C75	Base of trench – 1.14m	Large pit feature containing sticky clay organic fill with animal bone and snail shell inclusions, coming down onto very stony natural. 6.25m wide x 1.14m deep.	Large pit
C76	0.2m	Upper fill of pit C75. Loose/ moderately compact mid brown clayey silt with occasional small stones. Over C77.	Fill of large pit C75
C77	0.2m	Fill of pit C75. Moderately compact grey-brown clayey silt with some small stones, over C78.	Fill of large pit C75
C78	0.12m	Fill of pit C75. Moderately compact brown-grey clayey silt , spare inclusions of pebbles. Over C79.	Fill of large pit C75
C79	0.3m	Fill of pit C75. Moderately compact sticky clay with occasional snail shell and animal bone inclusions. Over C80.	Fill of large pit C75
C80	0.3m	Basal fill of pit C75. Moderately compact dark grey-black silty clay with frequent snail shell and occasional wood fragments.	Fill of large pit C75

In the SSE end of trench T16 a shallow pit/spread (C16), a ditch (C17) oriented roughly E-W, and a cluster of pits (C18, C19, & C20) were identified, all of which are of archaeological interest. Pit / spread C16 and ditch C17 correspond with the geophysical results and are part of a concentration of features related to a former field system. A large shallow ditch or hollow filled with grey clay was also identified but was deemed not to be of archaeological interest (C21). The trench was extended by approx. 30m to the NNW to further assess the limit of the concentration of features to the east, and a large number of features were exposed including a further hollow filled with grey clay, a very large pit (C75), an area of metalling (C74) and a collection of

spreads / pits and possible postholes at the NNW end of the trench (C61-C73). None of the features in the extension to the trench were indicated on the geophysical survey but they are all of archaeological interest.

Six modern stone drains were also identified within the trench and attest to the waterlogged nature of this area of the field which also accounts for the clay filled hollows present in this trench which were identified in T13 and T10 also. The large pit may represent a waterhole and measured 6.25m wide x 1.14m deep and contained contained organic material at the base (animal bone, wood fragments and charcoal).

4.19. Trench T17

Trench T17 was placed to target geophysical anomalies which appeared to form the SE extent of a former field system (Figure 11).

Table 18 Summary of Trench 17

GENERAL DESCRIPTION			
Dimensions. 24m long x 1.9m wide x 0.4 - 0.5m deep Orientation. WSW – ENE ITM co-ords: 718242 E / 764168 N, 718260 E / 764177 N Plate Refs: Plates 34-36			
CONTEXT NO.	**DEPTH**	**DESCRIPTION**	**INTERPRETATION**
C1	0.00 – 0.5m	Plough soil.	Plough soil
C2	0.5m – base of trench	Compact yellow grey silty sand with some small pebbles.	Natural subsoil
C9	Base of trench – 0.3m	Moderately compact, mid brown-grey, silty sand with occasional charcoal flecks, depth up to 0.3m. 7.4m in length and extended beyond the test trench on both sides.	Spread
C10	Base of trench – 0.9m	Moderately compact, mid brown sandy silt with occasional charcoal inclusions. Gradual break of slope at top, very steep sides with a concave base. 2.35m wide x 0.9m depth.	Ditch, upper fill
C11	Base of trench – 0.09m	Firm, sandy silt with occasional charcoal. Concave profile. Width 0.35m x 0.09m depth.	Small linear gully
C12	Base of trench – 0.1m	Very loose, soft grey-brown, silty sand with occasional bone and charcoal inclusions. Depth 0.1m.	Irregular shaped shallow spread
C13	Base of trench – 0.32m	Firm, dark brown silty sand with occasional charcoal, burnt bone and burnt flint inclusions. Cut has one very steep side (other side beyond baulk). Probable width 0.7m x 0.32m depth.	Linear gully
C14	Base of trench – 0.1m	Loose, soft dark brown sandy silt with frequent bone and occasional charcoal inclusions. Width 0.6m x depth 0.1m.	Linear gully /spread
C15	Base of trench – 0.9m	Moderately compact, grey-yellow, sandy clay with occasional bone and charcoal inclusions, bottom fill of cut.	Ditch C10, lower fill

Trench T17 exposed a total of six features including two spreads (C9 & C12), a large linear ditch (C10) oriented NNW-SSE across the centre of the trench, and three small linear gully-type features (C11, C13 & C14). Ditch C10 and spread C9 correspond with anomalies indicated in the geophysical survey and are substantial features. Ditch C10 measured 2.35m wide x 0.9m deep and spread C9 measured 7.4m long x 0.3m deep. No dateable finds were recovered from any of the features but all are of archaeological interest.

4.20. Trench T18

Trench T18 was placed to target a linear-type geophysical anomaly in the NW extent of a concentration of features representing a former field system (Figure 11).

Table 19 Summary of Trench 18

GENERAL DESCRIPTION			
Dimensions. 22m long x 1.9m wide x 0.6m deep Orientation. NW – SE ITM co-ords: 718140 E / 764172 N, 718151 E / 764156 N Plate Refs: Plates 37-40			
CONTEXT NO.	**DEPTH**	**DESCRIPTION**	**INTERPRETATION**
C1	0.00 – 0.6m	Plough soil.	Plough soil
C2	0.6m – base of trench	Moderately compact, yellow silty sand, gravelly in places.	Natural subsoil
C49	Base of trench – 0.45m	Moderately compact, mid brown-grey sandy clay with occasional stones. Cut has steep sides and a flat base. Width 1.4m x 0.45m depth.	Linear ditch
C50	Base of trench – 0.75m	Loose/moderate compaction, grey-brown sandy clay with occasional charcoal inclusions, stonier towards the base. Cut has gradual sides, break of slope at top is gradual and sharp at bottom, and base itself flat. Width 2.75m x 0.75m depth.	Linear ditch
C51	Base of trench – 0.08m deep	Moderately compact, mid grey silty sand with occasional charcoal. 2.6m long & extends beyond the edge of the trench on both sides, 0.08m deep.	Shallow spread
C52	Base of trench – 0.18m	Moderately compact, mid grey/brown, silty sand with occasional charcoal. Cut has one steep side and one more gradual and a concave base. Width 0.55m x 0.18m deep.	Linear gully-type feature
C53	Base of trench – 0.07m	Loose, mid grey, brown sandy silt with occasional charcoal inclusions. Cut is concave in shape. 0.26m wide x 0.07m deep.	Probable furrow
C54	Base of trench – 0.08m	Loose, mid grey/dark brown sandy silt with occasional charcoal inclusions. Concave cut, 0.6m wide x 0.08m deep.	Probable furrow

Trench T18 contained two ditches (C49, C50), a shallow spread (C51), three smaller linear gully-type features (C52, C53 & C54) and a modern stone drain. The largest ditch is 2.75m wide x 0.75m deep and corresponds with the linear ditch-type anomaly indicated in the geophysical survey. The spread measures 0.08m deep x

2.6m in length and extends beyond the edges of the trench in both directions. Most features identified in the trench contain charcoal. A modern stone drain was also found in the SE end of the trench, oriented N-S. No dateable finds were recovered from any of the features but all are of archaeological interest.

4.21. Trench T19

Trench T19 was placed to target a to target a linear-type geophysical anomaly in the SW extent of a concentration of features representing a former field system (Figure 11).

Table 20 Summary of Trench 19

GENERAL DESCRIPTION			
Dimensions. 20m long x 1.9m wide x 0.3m deep Orientation. WSW – ENE ITM co-ords: 718139 E / 764134 N, 718157 E / 764143 N Plate Refs: Plates 41-44			
CONTEXT NO.	**DEPTH**	**DESCRIPTION**	**INTERPRETATION**
C1	0.00 – 0.3m	Plough soil.	Plough soil
C2	0.3m – base of trench	Compact, yellow grey mottled silty sand.	Natural subsoil
C55	Base of trench – 1m	Moderately compact, mid brown/grey, silty sand with occasional charcoal and three chunks of unworked flint, also some mid angular stones approx. 0.08m in diameter. Break of slope on the west side is gradual and steeper on the east side, the west side is gradual at first on the west side but becomes steeper, while the east side is steep with a ledge towards the base. Base is concave. Width 3.8m x 1m depth.	Linear ditch
C56	Base of trench – 1m	Loose, dark brown grey, gravelly silty clay.	Bottom fill in ditch C55
C57	Not sectioned	Possible kiln or elongated pit with three possible postholes (0.2m, 0.2m and 0.14m in diameter, dark grey fill with charcoal inclusions) and frequent stones up to 0.4m x 0.25m, burnt clay evident around some edges with frequent charcoal. Light grey sandy silt towards centre and darker grey towards the edges.	Possible kiln or elongated pit
C58	Base of trench – 0.33m minimum	Loose-moderate compaction, black/orange/light brown clayey silt with abundant charcoal and burnt clay inclusions. Circular pit with charcoal all around the edges and burnt in situ soil, sharp sides with a sharp break of slope at top with steep sides, base not reached. 1.2m x 1m x 0.33m min depth. Truncated by modern drain.	Circular pit
C59	Base of trench - 0.55m	Moderately compact, dark grey-brown silty sand with frequent charcoal and rare burnt bone, also some burnt angular stones approx. 0.05m in diameter. Break of slope on	Ditch / large pit

GENERAL DESCRIPTION			
Dimensions. 20m long x 1.9m wide x 0.3m deep Orientation. WSW – ENE ITM co-ords: 718139 E / 764134 N, 718157 E / 764143 N Plate Refs: Plates 41-44			
CONTEXT NO.	**DEPTH**	**DESCRIPTION**	**INTERPRETATION**
		N side is gradual and steep on the S side. North sides are gradual with south sides being sharper, base is flat and even. 2.45m x estimated 2.7m x 0.55m deep.	
C60	Base of trench – 0.05m	Compact, mid-brown sandy clay, no inclusions of note. Gradual break of slope and sides with a concave base. Width 0.3m x length 1.2m x 0.05m depth. Appears to be truncated by possible kiln C57.	Shallow linear / gully

Trench T19 contained a large pit / possible ditch (C59), a linear ditch corresponding with the geophysical survey (C55) which measures 3.8m wide x 1m deep and an elongated pit/ possible kiln at the E end of trench measuring 5.1m x 1.2m (C57) and associated possible postholes and circular charcoal filled pit (C58). A modern stone drain oriented N-S also truncates the area. All features contain charcoal and pit/ditch C55 also contains burnt bone. No dateable finds were recovered from any of the features but all are of archaeological interest.

4.22. Trench T20

Trench T20 was placed to target an irregular shaped and relatively isolated geophysical anomaly located outside of the main concentration of features making up a former field system (Figure 11).

Table 21 Summary of Trench 20

GENERAL DESCRIPTION			
Dimensions. 20m long x 1.9m wide x 0.35 - 0.6m deep Orientation. E – W ITM co-ords: 718127 E / 764120 N, 718147 E / 764120 N Plate Refs: Plate 45			
CONTEXT NO.	**DEPTH**	**DESCRIPTION**	**INTERPRETATION**
C1	0.00 – 0.6m	Plough soil.	Plough soil
C2	0.6m – base of trench	Compact, bright yellow-brown silty sand.	Natural subsoil
C3	Base of trench – 0.08m	Loose, black silty sand with some burnt bone inclusions. Possible slot 0.9m x 0.25m x 0.08m deep, stakeholes 0.1m diameter.	Possible slot trench & stakeholes
C4	Base of trench – 0.05m	Black, charcoal rich silty sand. 0.5m x 0.3m x 0.05m.	Shallow pit
C5	Base of trench – 0.25m	Compact, black / dark grey, with some charcoal flecks and a small amount of burnt stone inclusions. 0.7m wide, extends west beyond baulk, depth 0.25m.	Pit

GENERAL DESCRIPTION			
Dimensions. 20m long x 1.9m wide x 0.35 - 0.6m deep Orientation. E – W ITM co-ords: 718127 E / 764120 N, 718147 E / 764120 N Plate Refs: Plate 45			
CONTEXT NO.	**DEPTH**	**DESCRIPTION**	**INTERPRETATION**
C6	Base of trench – 0.15m	Compact, grey-brown silty sand. One piece of struck flint within. 4m diameter.	Spread/pit
C7	Base of trench - 0.35m	Loose, grey silty sand, no inclusions of note. Width 2.5m x 0.35m depth.	Ditch-type feature
C8	Base of trench – 0.6m	Compact, grey with mottled brown, silty sand, 0.6m deep. Same as C5. C5 & C8 may together be a spread.	Possible linear / spread

In trench T20 two ditch/gully-type features were identified, the largest measuring 2.5m wide x 0.35m deep (C7). A slot/gully-type feature measuring 0.9m x 0.25m x 0.08m deep, associated with three possible stakeholes was identified in the west end of the trench and could be indicative of a structure (C3). Burnt bone and a burnt flint chip were noted in the fill. The spread (C6) measured 4m in diameter x 0.15m deep and contained a single piece of struck flint. A stone drain oriented roughly N-S was also identified in the centre of the trench. No dateable finds were recovered from any of the features, but all are of archaeological interest.

5. CONCLUSIONS AND FURTHER RECOMMENDATIONS

5.1. Conclusions

The main aim of the testing was to assess the extent of the features around the fringes of the concentration of activity designated as field system DU001-023. The testing also aimed to confirm the location of a possible enclosure indicated in geophysical survey (possibly the mis-located DU001-024) and to test the location of a possible sub-surface enclosure visible on google maps (June 2018) which has recently been added to the record (DU001-033).

The testing confirmed the presence of substantial archaeological features in trenches T14 - T20 inclusive, which corresponded with the concentration of anomalies representing field system DU001-023 as indicated in the geophysical survey. The geophysical survey interpretation was found to have a high degree of accuracy where anomalies were interpreted as definite archaeology (purple on the interpretation drawing). Associated with, but outside of the main concentration, there were less substantial archaeological features present in trenches T10 and T11 and possible archaeology in the form of linear ditch / gully type features present in trenches T4, T5 and T8.

There were no features of archaeological interest identified in trenches T2 and T3 in the location of the possible enclosure indicated in the geophysical survey. The presence of a possible ditched enclosure indicated in aerial photography (DU001-033) was confirmed in trench T1 as a double ditched enclosure.

No dateable finds were recovered from any of the investigated features, but the field system most likely dates to the early medieval period (based on a lack of dateable finds and dating of the previously excavated, associated site to the south). Based on form, the double ditched enclosure could date to the Bronze Age or the early medieval period.

Table 22 Summary table of testing results

TRENCH #	DEPTH	FEATURES IDENTIFIED	INTERPRETATION
T1	0.3m	Three ditches identified, corresponding with cropmark on aerial photograph (DU001-033). 1.95m wide x 0.95m deep, 1.3m wide x 0.6m deep and 1m wide x 0.24m deep.	Double ditched enclosure - archaeology
T2	0.45m	Edge of old test trench visible (Elliott 2007, Trench 10) & a variation in the natural subsoil which may account for the geophysical anomaly.	No archaeology identified
T3	0.4 - 0.6m	Old test trench visible (Elliott 2007, Trench 10)	No archaeology identified
T4	0.5m	Three ditch / gully type features and a modern stone drain. The most substantial linear is 1.1m wide x 0.4m deep.	Possible archaeology - ditch / gully type features
T5	0.6m	Three ditch / gully type features. Two of the features converge and have a width of 1.45m and depth of 0.43m, occasional charcoal.	Possible archaeology - ditch / gully type features
T6	0.4 – 0.5m	Shallow gully type feature and a modern stone drain. Gully is 1.15m wide x 0.15m deep and may correspond with geophysical anomaly but does not appear to be archaeological.	No archaeology identified
T7	0.4 - 0.6m	One modern stone drain	No archaeology identified
T8	0.5 - 0.6m	One ditch and two modern stone drains. Ditch is 1.3m wide x 0.58m deep, occasional charcoal.	Possible archaeology – ditch
T9	0.35m	No features identified. A localised variation in the natural subsoil may account for the geophysical anomaly	No archaeology identified
T10	0.3 – 0.4m	Shallow gully–type feature at SE end of trench, 0.4m wide x 0.12m deep & contains charcoal. Also a spread of clay at the NW end, up to 0.6m deep – appears to be a natural accumulation (ie not archaeological)	Gully type feature - archaeology
T11	0.4m	Six linear features, mostly small, most substantial is 0.8m wide x 0.26m deep. All but one at the NW end appear to be archaeological and most contain charcoal.	Ditch / gully type features - archaeology
T12	0.4m	One modern stone drain	No archaeology identified
T13	0.4m	Linear variation in the natural subsoil towards the N end of the trench which may relate to the geophysical anomaly and an area of grey clay in the centre of the trench which appears to be a natural accumulation. Also a modern stone drain.	No archaeology identified
T14	0.35m	Three ditch-type features, two pits and a modern stone drain. The largest ditch-type feature was 1.35m wide x more than 0.5m deep (excavation was halted due to water ingress from below). Largest pit / spread is 3.6m diameter and 0.2m deep (possibly deeper). Several of the features contain animal bone (waterlogged, very poor condition).	Ditches and pits / spreads - archaeology

TRENCH #	DEPTH	FEATURES IDENTIFIED	INTERPRETATION
T15	0.4m	Four linear ditches/ gullies and one large pit. Largest of the ditches is 3.2m wide x 1.2m deep and the pit is 1.55m diameter x 0.35m deep. Several of the features contain charcoal and the largest ditch also contains animal bone in poor condition.	Ditches, gullies and pit - archaeology
T16	0.45m	Large pits, ditch, small pits / spreads, wide shallow hollows or ditches filled with grey clay, area of metaling and a series of small pits and spreads. Many of the features contain charcoal. Also a series of modern stone drains running roughly E-W through the area. Largest pit – type feature measured 6.25m wide x 1.14m deep and contained organic material at the base (animal bone, wood fragments, charcoal). A ditch at the S end of the trench corresponds with one indicated on geophysical survey and with one in T17 which measured 2.35m wide x 0.9m deep (animal bone visible on the surface).	Pits, spreads, ditches and hollows, metalling - archaeology
T17	0.4 – 0.5m	Two spreads, three gully-type features and a ditch. Ditch corresponds with geophysical survey and measures 2.35m x 0.9m deep and the largest spread measures 7.4m in length and 0.3m in depth. Most features contain charcoal and animal bone.	Spreads, gully-type features and ditch - archaeology
T18	0.6m	Two ditches, shallow spread, three smaller linear gully-type features and a modern stone drain. Largest ditch is 2.75m wide x 0.75m deep. Spread measures 0.08m deep x 2.5m in length. Most features contain charcoal.	Ditches, spread & gully-type features - archaeology
T19	0.3m	Large pit / possible ditch, 0.55m deep x 2.45m wide. Linear ditch corresponding with geophysical survey measures 3.8m wide x 1m deep. Elongated pit at E end of trench measures 5.1m x 1.2m and is associated with stones, burnt clay and lots of charcoal – possible kiln, also associated with several possible postholes and a pit measuring 1.2m x 1m. Modern stone drain also truncates the area. All features contain charcoal & pit at SW end also contains burnt bone.	Pit / ditch, ditch, possible kiln, pit and postholes - archaeology
T20	0.35 – 0.6m	Two ditches / gullies, largest is 2.5m wide x 0.35m deep. Slot / gully-type feature measuring 0.9m x 0.25m x 0.08m deep, associated with possible stakeholes. Burnt bone and burnt flint chip noted in the fill. Pit 0.5m diameter x 0.2m deep. Spread 4m in diameter x 0.15m deep, contained flint.	Ditches / gullies, possible slot trench, pit and spread - archaeology

5.2. Recommendations

Preservation in situ

- It is recommended that double ditched enclosure DU001-033 be preserved in situ within a green space within any future development. A buffer zone of at least 10m should be included from the outer edge of the enclosure.

- It is recommended that the main concentration of features comprising field system DU001-023 be preserved in situ, with a buffer zone of 10-20m from the outer edge of the known archaeology. This area should be fenced off in advance of construction and should not be used for compounds, storage of materials or spoil, or any other construction related activity which could impact on the

below ground remains. It is noted that a north-south roadway planned to the west of the field system is integrated with other developments in the wider area and it is not feasible to change its layout at this stage. As such the impacted portion of the field system to the southwest will require full archaeological excavation (see below).

Excavation (preservation by record)

- It is recommended that the southwestern extent of the field system, where the impact from a proposed north-south roadway cannot be avoided (vicinity of trenches T18 – T20 inclusive), be fully excavated and preserved by record in advance of development. This should be carried out under licence to the DHLGH.

- It is recommended that the archaeological remains identified to the north of the main concentration, identified in trenches T10 and T11 be fully excavated and preserved by record in advance of development. This should be carried out under licence to the DHLGH.

- It is recommended that the archaeological remains previously identified by Elliott (2007) named Site 4/1 and 4/2 be fully excavated and preserved by record in advance of development. This should be carried out under licence to the DHLGH.

Archaeological Monitoring

- It is recommended that the vicinity of trenches T4, T5 and T8 be stripped of topsoil under archaeological supervision in advance of development to further assess whether the gully/ditch type features identified in this area are archaeological in nature and if so, they should be appropriately excavated and preserved by record under licence to the DHLGH.

- It is further recommended that all topsoil stripping in the proposed development area be archaeologically monitored under licence to the DHLGH with provision made to deal with any further archaeological remains that may be discovered. This could be in the form of preservation in situ or full archaeological excavation (preservation by record)

Please note that all recommendations are subject to approval by the National Monuments Section of the Department of Housing, Local Government & Heritage (DHLGH).

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PLATES



Plate 1 T1, section of C83



Plate 2 T1 section of C82



Plate 3 T1, section of C81



Plate 4 T2, looking SE showing old test trench (Elliott, 2007, Trench 10)



Plate 5 T3, looking SE showing old test trench (Elliott, 2007, Trench 10)



Plate 6 T4, looking west



Plate 7 T4, section of C47



Plate 8 T5, looking NW



Plate 9 T5, section of C45, C44



Plate 10 T6, looking SW



Plate 11 T7, looking SW



Plate 12 T8, looking NW



Plate 13 T8, section of C41



Plate 14 T10, section of C39



Plate 15 T10, sondage in clay layer at NW end of trench C40



Plate 16 T11, looking NW



Plate 17 T11, section of C34



Plate 18 T11 sections of C32 & C33



Plate 19 T11, sections of C36 & C35



Plate 20 T14 looking SSE



Plate 21 T14 section of C22



Plate 22 T14, section of C23



Plate 23 T14, section of C25



Plate 24 T14, Pit/spread C24, looking S



Plate 25 T15 looking NW



Plate 26 T15, section of C27



Plate 27 T15 section of pit C30



Plate 28 T15, section of linear ditch C29



Plate 29 T15, section of ditch C27



Plate 30 T16 section of pit/spread C16 at S end of trench



Plate 31 T16 (ext), pit features at NNW end of trench



Plate 32 T16 (ext), section of large pit C60



Plate 33 T16 (ext), area of metalling C74



Plate 34 T17 sections of linear gullies C13 & C14



Plate 35 T17, sondage through spread C9



Plate 36 T17, section of ditch C10



Plate 37 T18, looking NW



Plate 38 T18, section of ditch C49



Plate 39 T18, section of ditch C50



Plate 40 T18 overview, C51, C52, C53, C54, looking NW



Plate 41 T19, pit C57, looking NW



Plate 42 T19, section of ditch C55



Plate 43 T19, pit C58, with pit C57 in background



Plate 44 T19, section of pit C59 with ditch C55 in background, looking ENE



Plate 45 T20 Trench overview, looking E

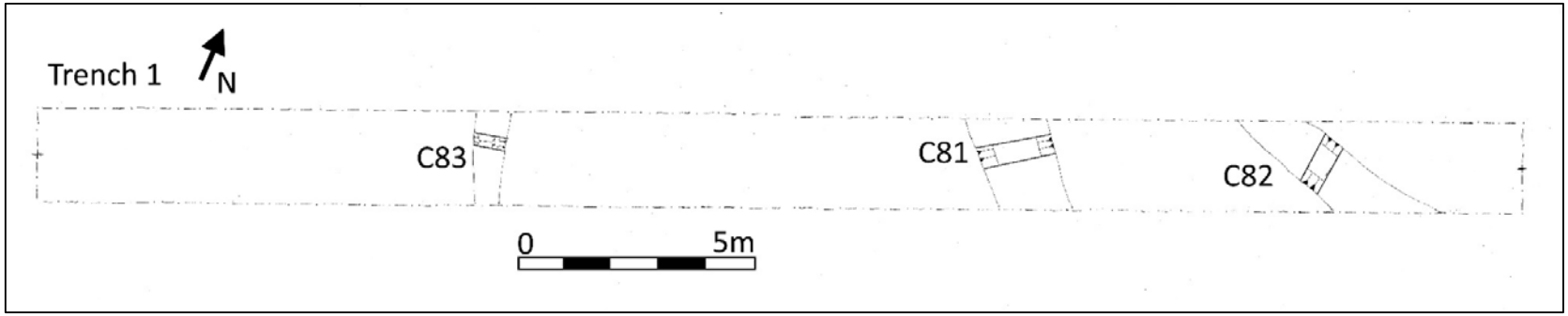

Figure 13 Plan of trench T1

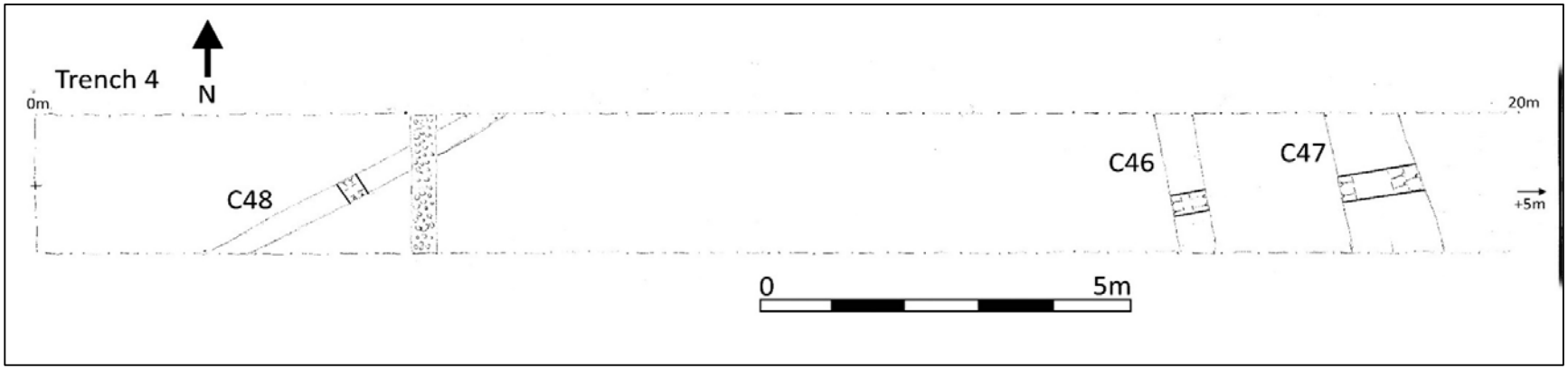

Figure 14 Plan of trench T4

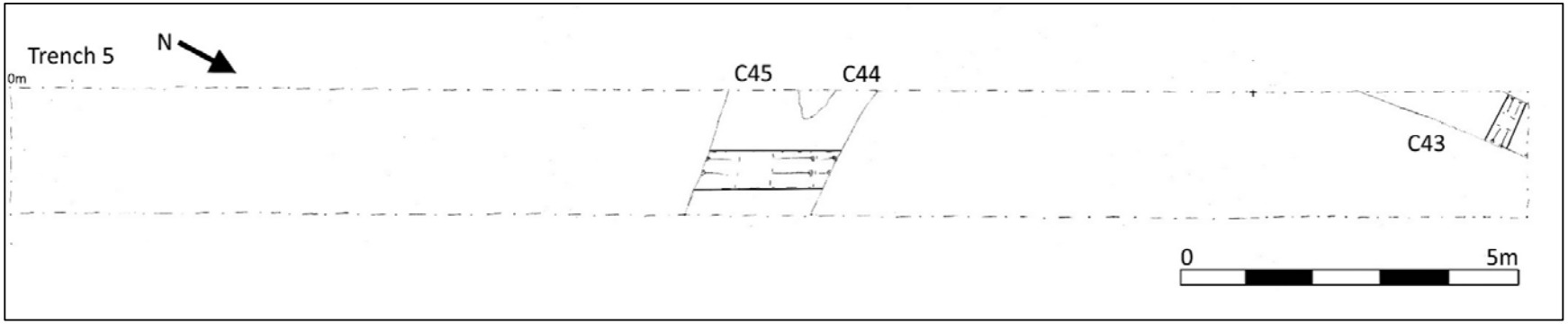

Figure 15 Plan of trench T5

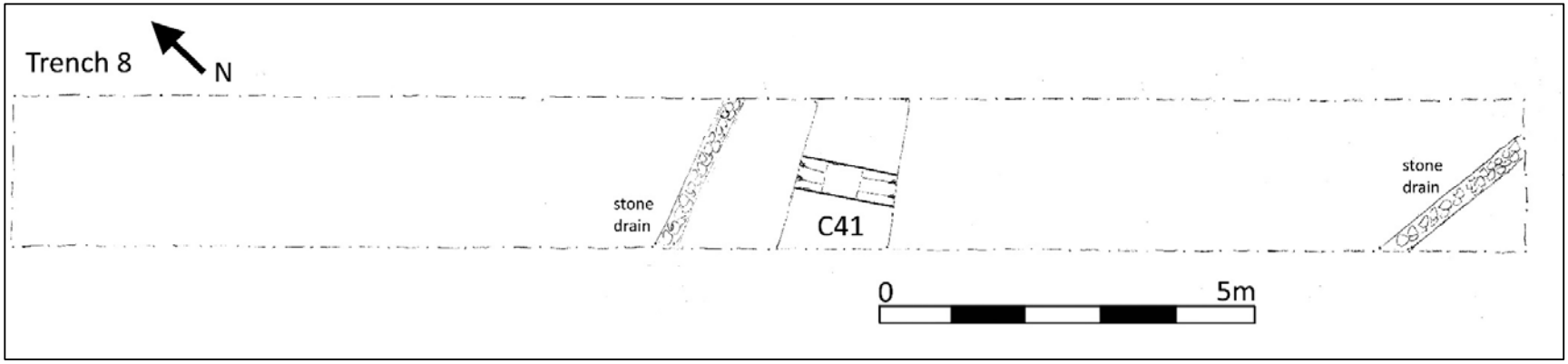

Figure 16 Plan of trench T8

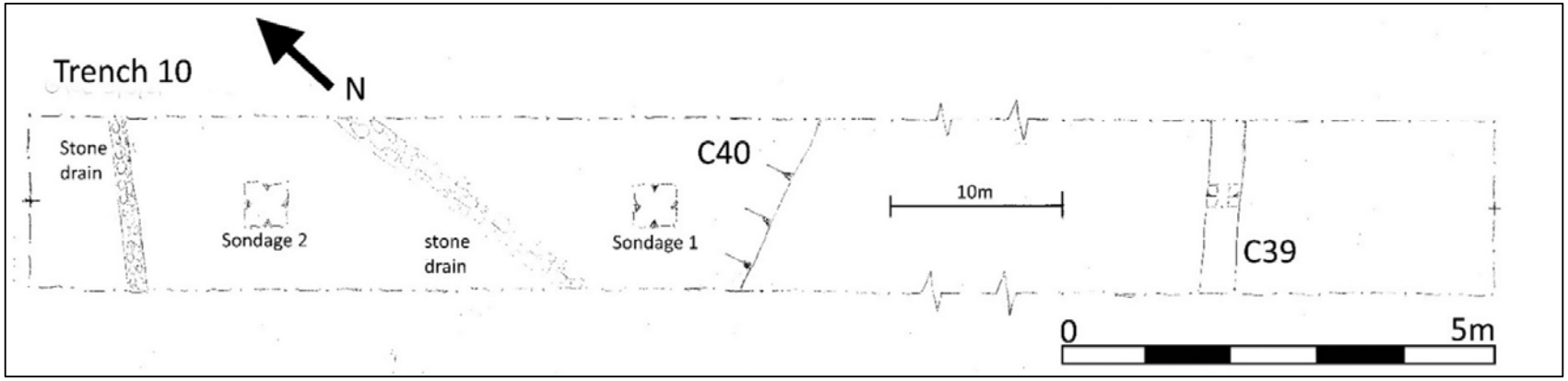

Figure 17 Plan of trench T10

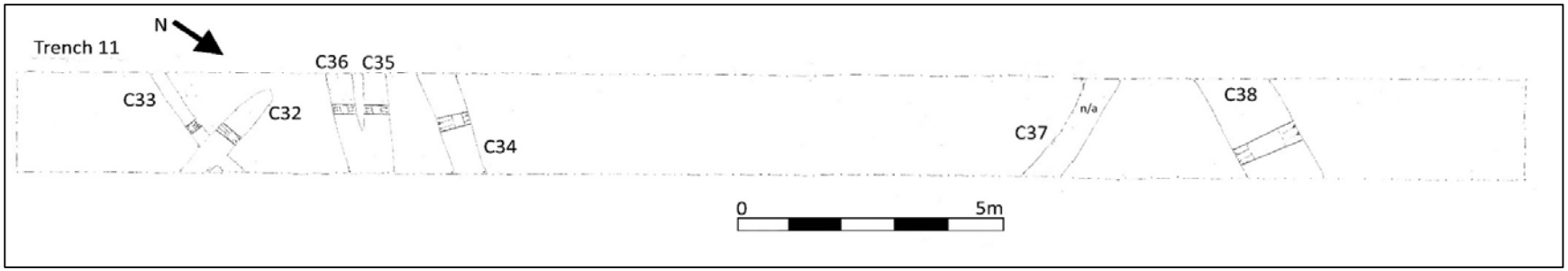

Figure 18 Plan of trench T11

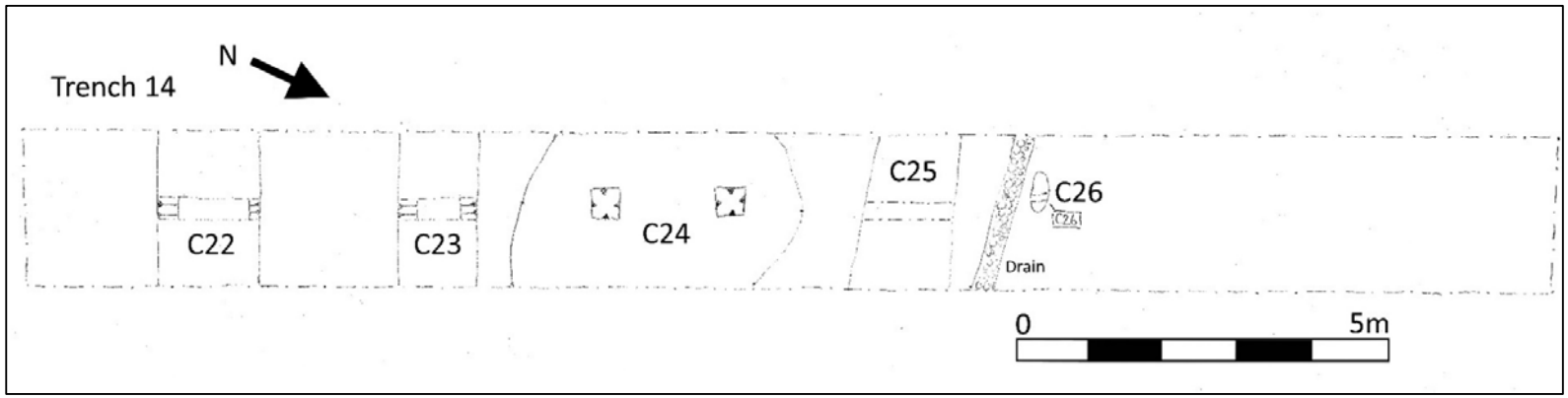

Figure 19 Plan of trench 14

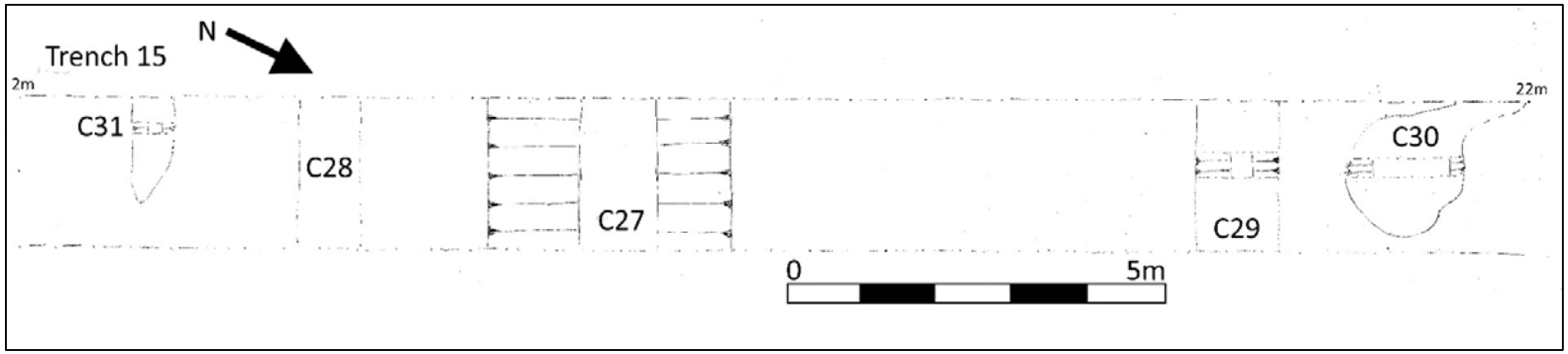

Figure 20 Plan of trench T15

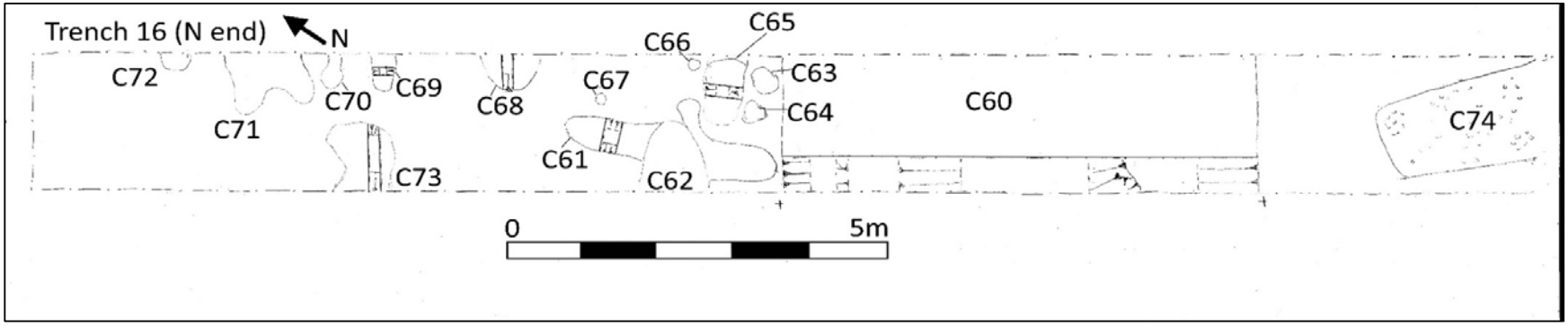

Figure 21 Plan of trench T16 (N end)

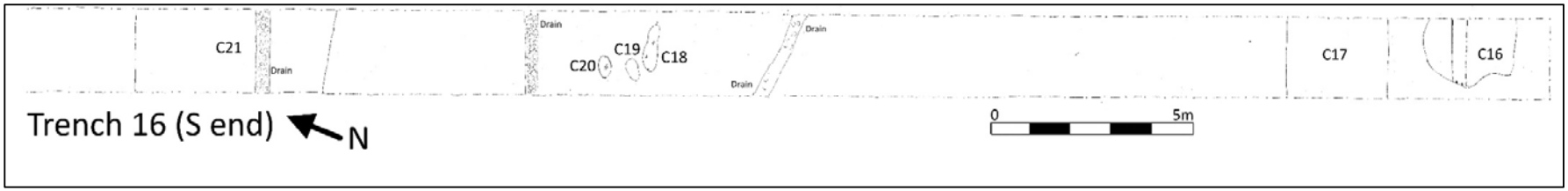

Figure 22 Plan of trench T16 (S end)

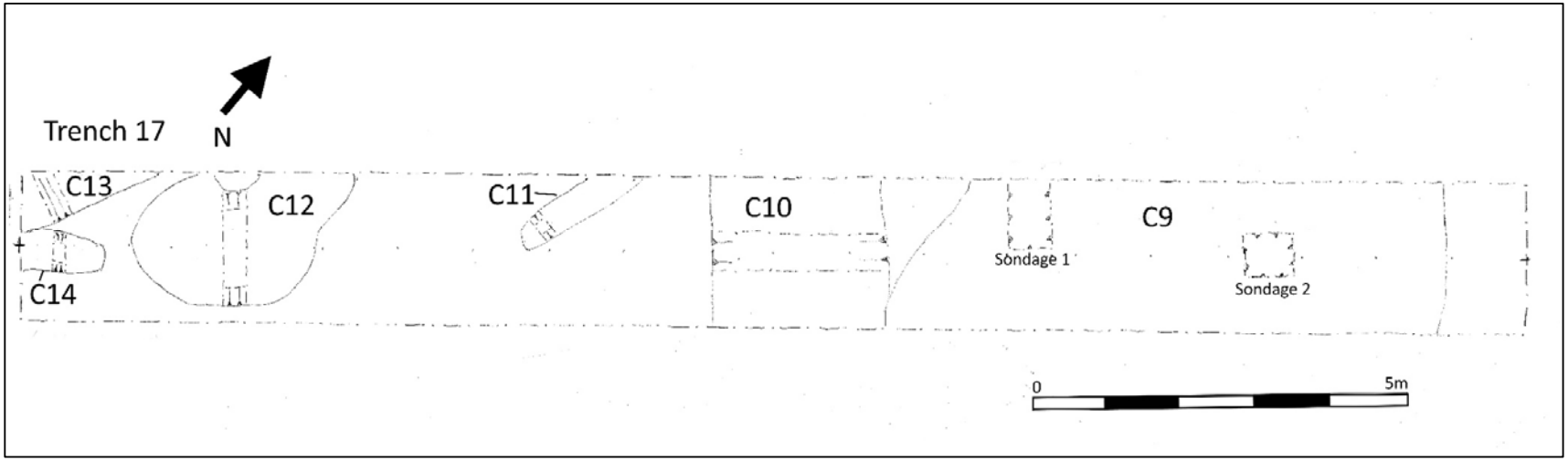

Figure 23 Plan of trench T17

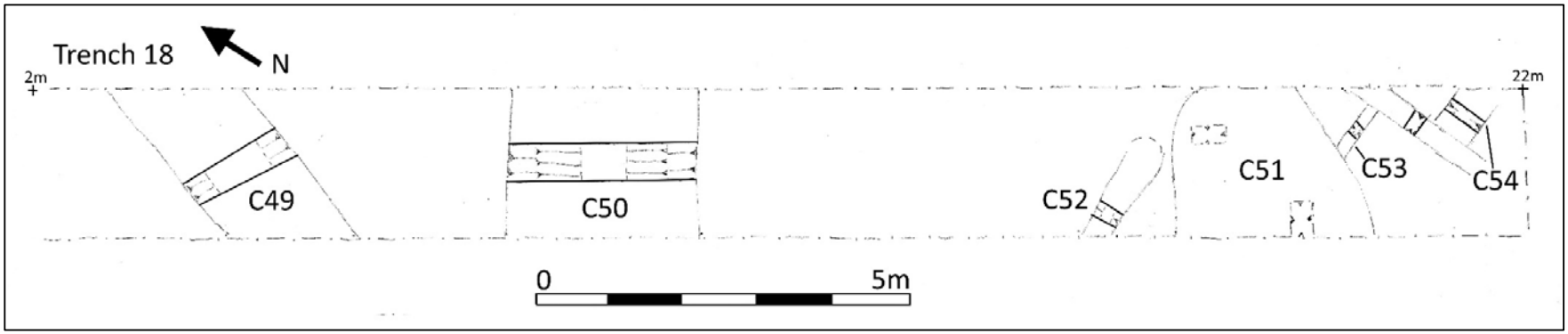

Figure 24 Plan of trench T18

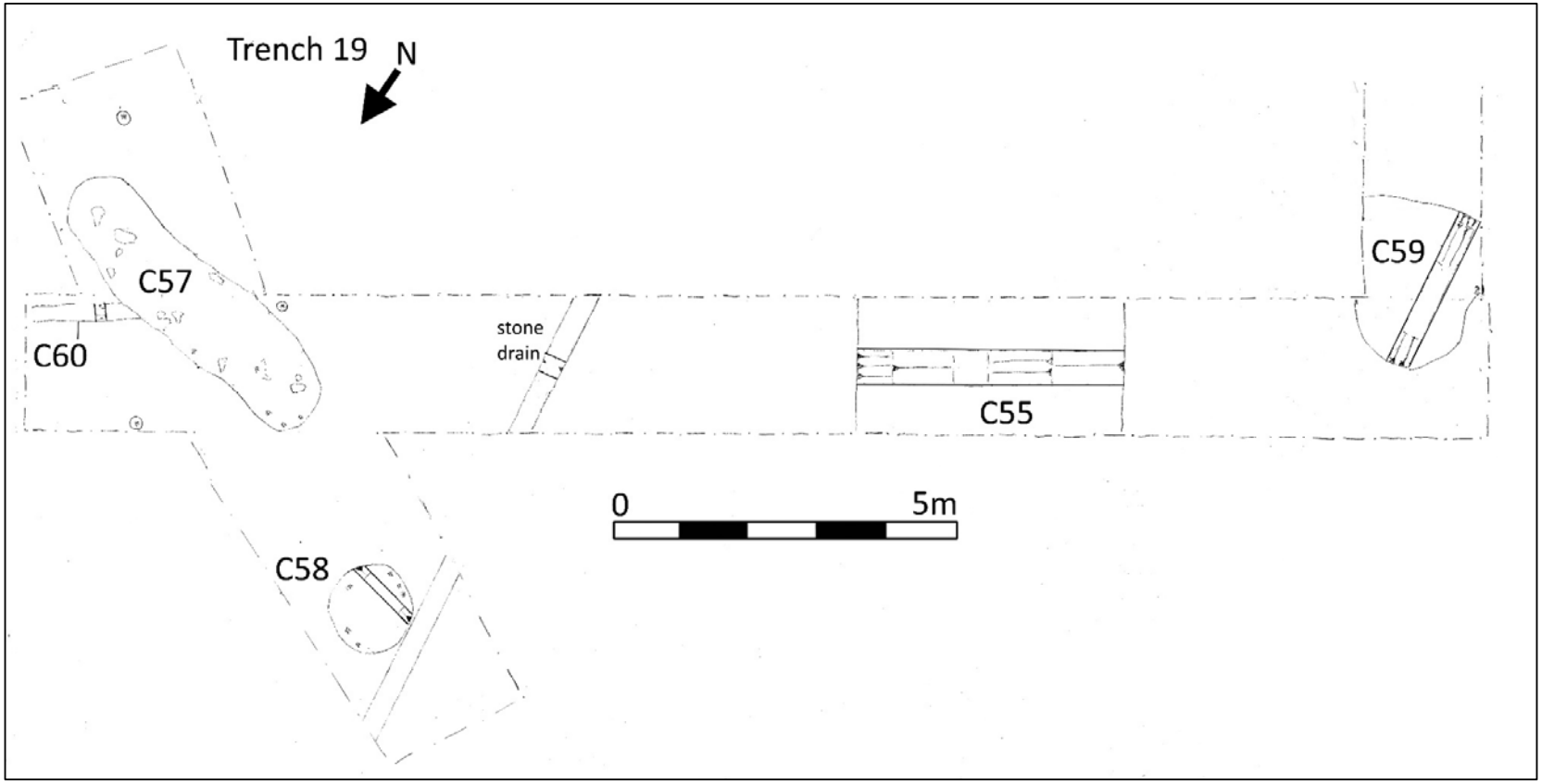

Figure 25 Plan of trench T19

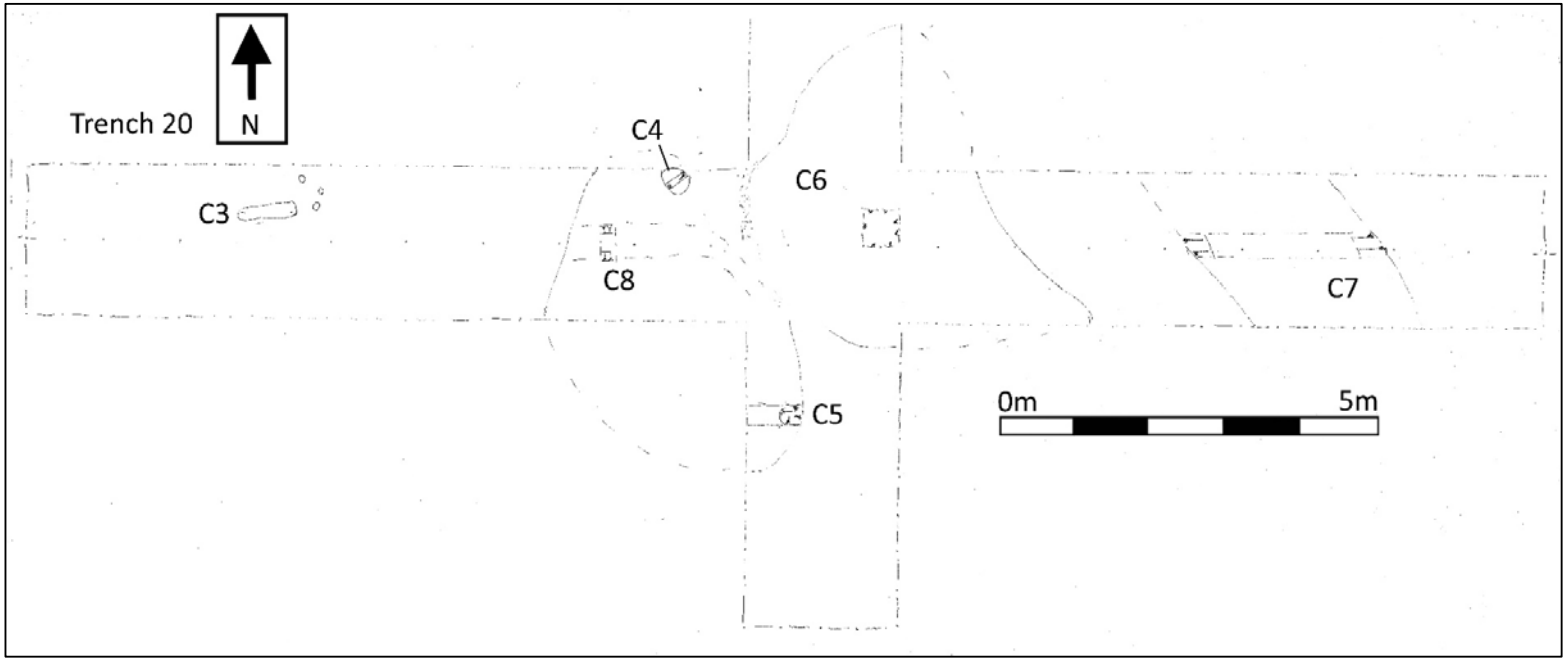

Figure 26 Plan of trench T20

APPENDIX 1 CONTEXT RECORD

CONTEXT NO.	CUT / FILL / OTHER	DESCRIPTION	Trench #
C1	Topsoil	Topsoil, sod, or plough soil, typically loose, dark and silty	All
C2	Natural subsoil	Varies, usually yellow/grey to mottled brown, stony and silty sand	Al
C3	Base of trench – 0.08m	Loose, black silty sand with some burnt bone inclusions. Possible slot 0.9m x 0.25m x 0.08m deep, stakeholes 0.1m diameter.	Trench 20
C4	Base of trench – 0.05m	Black, charcoal rich silty sand. 0.5m x 0.3m x 0.05m.	Trench 20
C5	Base of trench – 0.25m	Compact, black / dark grey, with some charcoal flecks and a small amount of burnt stone inclusions. 0.7m wide, extends west beyond baulk, depth 0.25m.	Trench 20
C6	Base of trench – 0.15m	Compact, grey-brown silty sand. One piece of struck flint within. 4m diameter.	Trench 20
C7	Base of trench - 0.35m	Loose, grey silty sand, no inclusions of note. Width 2.5m x 0.35m depth.	Trench 20
C8	Base of trench – 0.6m	Compact, grey with mottled brown, silty sand, 0.6m deep. Same as C5. C5 & C8 may together be a spread.	Trench 20
C9	Base of trench – 0.3m	Moderately compact, mid brown-grey, silty sand with occasional charcoal flecks, depth up to 0.3m. 7.4m in length and extended beyond the test trench on both sides.	Trench 17
C10	Base of trench – 0.9m	Moderately compact, mid brown sandy silt with occasional charcoal inclusions. Gradual break of slope at top, very steep sides with a concave base. 2.35m wide x 0.9m depth.	Trench 17
C11	Base of trench – 0.09m	Firm, sandy silt with occasional charcoal. Concave profile. Width 0.35m x 0.09m depth.	Trench 17
C12	Base of trench – 0.1m	Very loose, soft grey-brown, silty sand with occasional bone and charcoal inclusions. Depth 0.1m.	Trench 17
C13	Base of trench – 0.32m	Firm, dark brown silty sand with occasional charcoal, burnt bone and burnt flint inclusions. Cut has one very steep side (other side beyond baulk). Probable width 0.7m x 0.32m depth.	Trench 17
C14	Base of trench – 0.1m	Loose, soft dark brown sandy silt with frequent bone and occasional charcoal inclusions. Width 0.6m x depth 0.1m.	Trench 17
C15	Base of trench – 0.9m	Moderately compact, grey-yellow, sandy clay with occasional bone and charcoal inclusions, bottom fill of cut.	Trench 17
C16	Base of trench – 0.18m	Loose, dark brown sandy silt, no inclusions of note. 2.3m diameter, 0.18m deep.	Trench 16

CONTEXT NO.	CUT / FILL / OTHER	DESCRIPTION	Trench #
C17	Not sectioned	Moderately compact, mid-dark brown with bone visible of surface. Same as ditch C10 in Trench 17 which was 2.35m wide x 0.9m deep.	Trench 16
C18	Base of trench – 0.09m	Compact, mid-dark brown, silty sand with occasional charcoal. Width 0.9m x 0.35m x 0.09m deep.	Trench 16
C19	Base of trench – 0.09m	Compact, mid-dark brown, silty sand with occasional charcoal. Width 0.4m x 0.25m x 0.09m deep.	Trench 16
C20	Base of trench – 0.09m	Compact, mid-dark brown, silty sand with occasional charcoal. Width 0.45m x 0.3m x 0.09m deep.	Trench 16
C21	Base of trench - 0.4m	Mid grey, silty clay. Gradual sides with a flat base, width 4.5m x 0.4m deep.	Trench 16
C22	Base of trench – 0.5m min	Moderately compact, mid grey-brown silty sand that becomes looser towards base due to water, with occasional charcoal and saturated bone inclusions. Very steep sides and does not line up with any features in Trench 15. Width 1.35m x a minimum depth of 0.5m, digging abandoned due to water ingress from below.	Trench 14
C23	Base of trench – 0.2m	Mid grey, moderately loose, silty sand with occasional small stone (0.02-0.03m) inclusions. Gradual sides with a concave base. Width 1m x 0.2m depth. Same feature as C28 in T15.	Trench 14
C24	Base of trench – 0.2m	Loose, brown-grey, stony, wet, silty sand with saturated bone inclusions. 3.6m diameter.	Trench 14
C25	Base of trench – 0.23m	Loose, brown dark grey, silty clay with no inclusions of note. Shallow with gradual sides and a dip in middle of base. Width 1.25m x 0.23m depth.	Trench 14
C26	Base of trench – 0.06m	Dark brown, black silty sand of moderate compaction with occasional charcoal. Width 0.27m x 0.2m x 0.06m depth.	Trench 14
C27	Base of trench – 1.2m	Upper fill is loose brown silty sand, 0.48m deep with a lens of charcoal within. Lower fill is very loose, mid grey silty clay with occasional waterlogged animal bone and charcoal. Very steep sides with a flat base. Width 3.2m wide (1m wide at base) x 1.2m deep.	Trench 15
C28	Not sectioned	Same as C23 in Trench T14, width 0.95m.	Trench 15
C29	Base of trench- 0.45m	Black loose silty sand with rare charcoal inclusions and redeposited natural on top. Sharp break of slope at top and steep sides, narrow 'U' shaped cut. Width 1m x 0.45m depth.	Trench 15
C30	Base of trench – 0.35m	Moderately compact, dark grey black, clayey sand with occasional small stones (0.05m) and rare charcoal inclusions. Charcoal rich layer at base and redeposited natural at north side of feature. Steep sides and flat base.	Trench 15

CONTEXT NO.	CUT / FILL / OTHER	DESCRIPTION	Trench #
C31	Base of trench – 0.1m	Small shallow linear gully-type feature, 0.4m wide x 0.1m deep.	Trench 15
C32	Base of trench – 0.22m	Loose, brown/grey, sandy silt with no inclusions, steep sides and a U-shaped base. 2.2m x 0.46m x 0.22m deep.	Trench 11
C33	Base of trench – 0.2m	Moderately compact, light grey clayey silt with no inclusions. Width 0.3m x 0.2m depth.	Trench 11
C34	Base of trench – 0.26m	Moderately compact, dark black, grey clayey silt with occasional charcoal and small stone inclusions (0.02m diam). Sides vary from steep to gradual, with a concave base deeper on the NW side. Width 0.8m x 0.26m deep.	Trench 11
C35	Base of trench – 0.2m	Moderately compact, grey, brown clayey silt with occasional charcoal. Width 0.6m x 0.2m depth.	Trench 11
C36	Base of trench – 0.2m	Moderately compact, mid brown clayey silt with occasional charcoal and small stones (0.02m diam). Width 0.55m x depth 0.2m.	Trench 11
C37	N/A	Band of natural.	Trench 11
C38	Base of trench – 0.25m	Compact, mid-grey, silty clay with no inclusions. One side steep, the other more gradual, concave base. Width 1m x 0.25m deep.	Trench 11
C39	Base of trench – 0.12m	Firm, dark grey-brown silty sand with occasional charcoal and small stones. Width 0.4m x 0.12m deep.	Trench 10
C40	Base of trench – 0.6m max	Compact, dark grey mottled with yellow, silty clay with occasional charcoal and frequent small stones (20%) up to 0.1m in diameter.	Trench 10
C41	Base of trench – 0.58m	Moderately compact, dark brown/grey-brown, sandy silt with occasional small stones and charcoal inclusions. Cut has very steep sides and a flat base. 1.3m wide x 0.58m deep.	Trench 8
C42	Base of trench – 0.15m	Loose yellow brown silty sand with no inclusions. Cut has very gradual sides with a flat base. Width 1.15m x 0.15m depth	Trench 6
C43	Base of trench – 0.13m	Moderately compact, mid-brown/grey, silty sand with no inclusions. Gradual sides with a sharp upper break of slope and a concave base. Width 0.65m x 0.13m depth.	Trench 5
C44	Base of trench - 0.3m	Moderately compact, mid-dark brown, sandy silt with medium sized stones. Cut has gradual sides, a gradual break of slope at top and bottom and a flat base. Width 0.45m approx. x 0.3m depth.	Trench 5
C45	Base of trench – 0.43m	Moderately compact dark brown, sandy clay with medium sized stones and rare charcoal inclusions. Cut has steep sides and a flat base. Width 1m approx. x 0.43m deep.	Trench 5
C46	Base of trench – 0.23m	Loose, mid-brown, silty clay with no inclusions, cut has one steep side and one gradual with a concave base. Width 0.5m x depth 0.23m.	Trench 4

CONTEXT NO.	CUT / FILL / OTHER	DESCRIPTION	Trench #
C47	Base of trench – 0.4m	Moderately compact, grey/brown with mottled orange-brown, clayey silt with some occasional charcoal inclusions and stones max 0.1m. Cut has a sharp BOS at top, very steep sides, and a flat base with a gradual slope at top on the east side. 1.1m wide x 0.4m deep.	Trench 4
C48	Base of trench – 0.1m	Loose, mid-brown, silty sand with no inclusions. Cut – gradual sides with a concave base, probably a furrow. Width 0.3m x depth 0.1m.	Trench 4
C49	Base of trench – 0.45m	Moderately compact, mid brown-grey sandy clay with occasional stones. Cut has steep sides and a flat base. Width 1.4m x 0.45m depth.	Trench 18
C50	Base of trench – 0.75m	Loose/moderate compaction, grey-brown sandy clay with occasional charcoal inclusions, stonier towards the base. Cut has gradual sides, break of slope at top is gradual and sharp at bottom, and base itself flat. Width 2.75m x 0.75m depth.	Trench 18
C51	Base of trench – 0.08m	Moderately compact, mid grey silty sand with occasional charcoal. 2.6m long & extends beyond the edge of the trench on both sides, 0.08m deep.	Trench 18
C52	Base of trench – 0.18m	Moderately compact, mid grey/brown, silty sand with occasional charcoal. Cut has one steep side and one more gradual and a concave base. Width 0.55m x 0.18m deep.	Trench 18
C53	Base of trench – 0.07m	Loose, mid grey, brown sandy silt with occasional charcoal inclusions. Cut is concave in shape. 0.26m wide x 0.07m deep.	Trench 18
C54	Base of trench – 0.08m	Loose, mid grey/dark brown sandy silt with occasional charcoal inclusions. Concave cut, 0.6m wide x 0.08m deep.	Trench 18
C55	Base of trench – 1m	Moderately compact, mid brown/grey, silty sand with occasional charcoal and three chunks of unworked flint, also some mid angular stones approx. 0.08m in diameter. Break of slope on the west side is gradual and steeper on the east side, the west side is gradual at first on the west side but becomes steeper, while the east side is steep with a ledge towards the base. Base is concave. Width 3.8m x 1m depth.	Trench 19
C56	Base of trench – 1m	Loose, dark brown grey, gravelly silty clay.	Trench 19
C57	Not sectioned	Possible kiln or elongated pit with three possible postholes (0.2m, 0.2m and 0.14m in diameter, dark grey fill with charcoal inclusions) and frequent stones up to 0.4m x 0.25m, burnt clay evident around some edges with frequent charcoal. Light grey sandy silt towards centre and darker grey towards the edges.	Trench 19
C58	Base of trench – 0.33m minimum	Loose-moderate compaction, black/orange/light brown clayey silt with abundant charcoal and burnt clay inclusions. Circular pit with charcoal all around the edges and burnt in situ soil, sharp sides with a sharp break of slope at top with steep sides, base not	Trench 19

CONTEXT NO.	CUT / FILL / OTHER	DESCRIPTION	Trench #
		reached. 1.2m x 1m x 0.33m min depth. Truncated by modern drain.	
C59	Base of trench - 0.55m	Moderately compact, dark grey-brown silty sand with frequent charcoal and rare burnt bone, also some burnt angular stones approx. 0.05m in diameter. Break of slope on N side is gradual and steep on the S side. North sides are gradual with south sides being sharper, base is flat and even. 2.45m x estimated 2.7m x 0.55m deep.	Trench 19
C60	Base of trench – 0.05m	Compact, mid-brown sandy clay, no inclusions of note. Gradual break of slope and sides with a concave base. Width 0.3m x length 1.2m x 0.05m depth. Appears to be truncated by possible kiln C57.	Trench 19
C61	Base of trench – 0.06m	Dark brown/grey with occasional charcoal. 0.5m diameter x 0.06m deep.	Trench 16
C62	Not sectioned	Dark brown/grey/black with frequent charcoal. 0.85m x 1.1m.	Trench 16
C63	Not sectioned	Dark brown/grey with occasional charcoal. 0.4m diameter.	Trench 16
C64	Not sectioned	Dark brown/grey with occasional charcoal. 0.3m diameter.	Trench 16
C65	Base of trench – 0.05m	Dark brown/grey/black with frequent charcoal. 1m x 0.5m x 0.05m depth.	Trench 16
C66	Not sectioned	Dark brown/grey with occasional charcoal. 0.2m diameter.	Trench 16
C67	Not sectioned	Dark brown/grey with occasional charcoal.0.15m diameter.	Trench 16
C68	Base of trench – 0.15m	Dark brown/grey with occasional charcoal. 0.6m x 0.85m x 0.15m depth.	Trench 16
C69	Base of trench – 0.05m	Dark brown/grey with occasional charcoal. 0.6m x 0.3m x 0.05m depth.	Trench 16
C70	Not sectioned	Dark brown/grey with occasional charcoal. 0.3m x 0.5m.	Trench 16
C71	Not sectioned	Dark brown/grey with occasional charcoal. Irregular shaped spread 1m x 0.9m.	Trench 16
C72	Not sectioned	Dark brown/grey with occasional charcoal. 0.4m x 0.2m.	Trench 16
C73	Base of trench – 0.07m	Dark brown/grey with occasional charcoal. 1m x 0.9m x 0.07m deep.	Trench 16
C74	Not sectioned	Possible metaling approaching southern edge of large pit C75 with stones measuring from 0.02-0.03m to 0.1m in diameter. Up to 1.05m wide, depth not established due to water ingress from below.	Trench 16
C75	Base of trench – 1.14m	Large pit feature containing sticky clay organic fill with animal bone and snail shell inclusions, coming down onto very stony natural. 6.25m wide x 1.14m deep.	Trench 16

CONTEXT NO.	CUT / FILL / OTHER	DESCRIPTION	Trench #
C76	0.2m	Upper fill of pit C75. Loose/ moderately compact mid brown clayey silt with occasional small stones. Over C77.	Trench 16
C77	0.2m	Fill of pit C75. Moderately compact grey-brown clayey silt with some small stones, over C78.	Trench 16
C78	0.12m	Fill of pit C75. Moderately compact brown-grey clayey silt , spare inclusions of pebbles. Over C79.	Trench 16
C79	0.3m	Fill of pit C75. Moderately compact sticky clay with occasional snail shell and animal bone inclusions. Over C80.	Trench 16
C80	0.3m	Basal fill of pit C75. Moderately compact dark grey-black silty clay with frequent snail shell and occasional wood fragments.	Trench 16
C81	Base of trench – 0.95m	Loose, grey with slight orange mottling (redeposited natural), clayey sand, with frequent stones up to 0.1m in diameter, no other inclusions. 1.95m wide x 0.95m depth. Sharp break of slope at top with steep sides, almost V shaped. Siltier grey upper fill 0.15m depth with patch of redeposited natural on top.	Trench 1
C82	Base of trench – 0.6m	Loose, silty sand, grey-brown, quite gravelly with lots of stones up to 0.1m diameter, no other inclusions. 1.3m wide x 0.6m deep. Steep sides with a flat base.	Trench 1
C83	Base of trench – 0.24m	Loose, light grey, silty sand with gravely inclusions, no other inclusions of note. 1m wide at north side of trench, only 0.5m wide at south side. East sides are steep, west more gradual.	Trench 1

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ARCHAEOLOGY & CULTURAL HERITAGE

APPENDIX 14.5

Cultural Heritage Mitigation Maps

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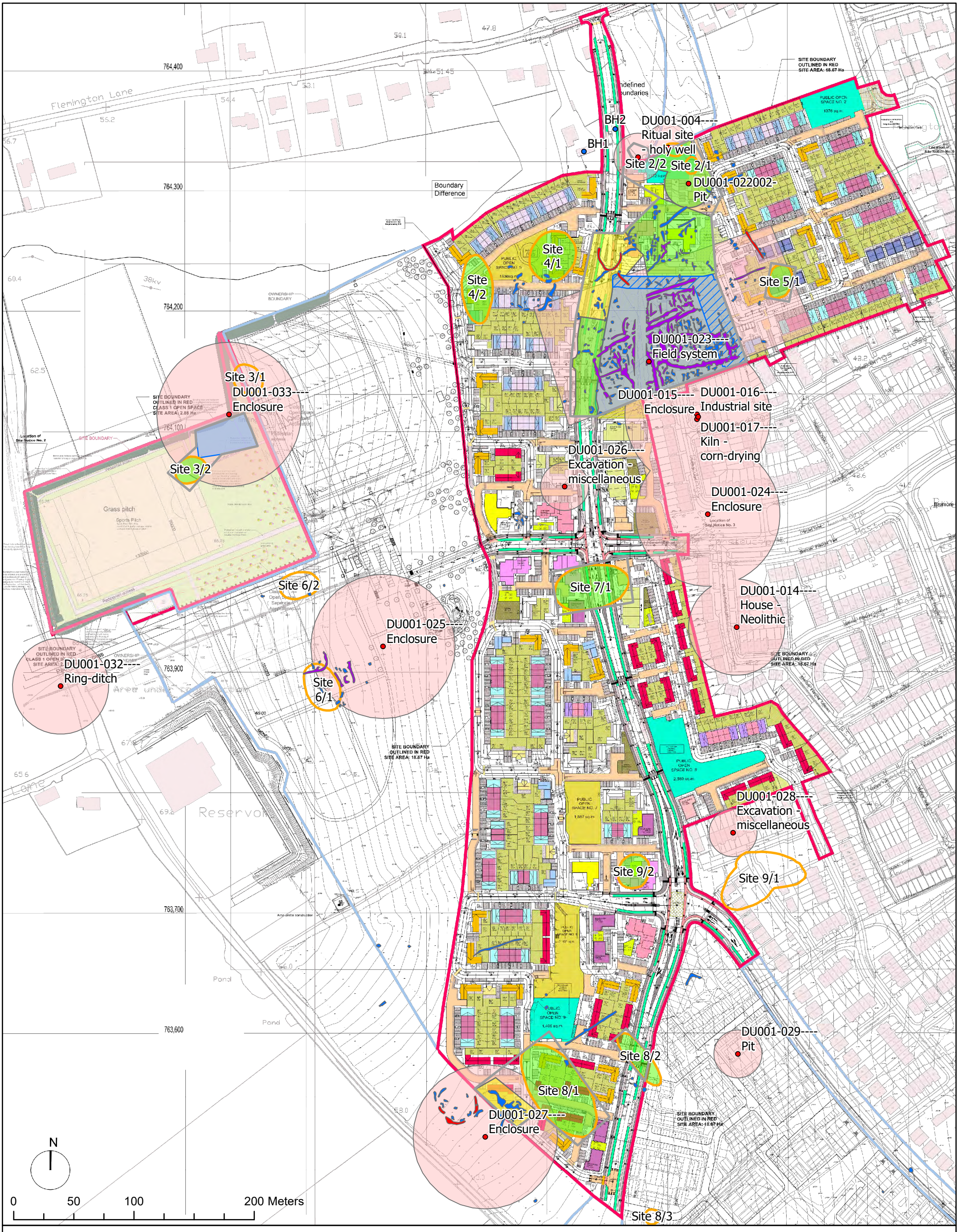


Legend

- RMP / SMR site
- Built Heritage site
- Fencing to protect cultural heritage
- Preservation in-situ
- Preservation by record
- Further investigations recommended
- Archaeological buffer
- Site identified by Elliott (07E0057)
- Zone of Notification

Geophysics

- ?Archaeology
- Archaeology
- Negative anomaly

Project: Large Scale Residential Development at Lands of Flemington Lane, Balbriggan (FCC Ref. LRD0006/S2)

Map 1: Archaeological Mitigation Map

For: Glenveigh Homes

Prepared by: Dr. Yolande O' Brien

Date: 25/05/23

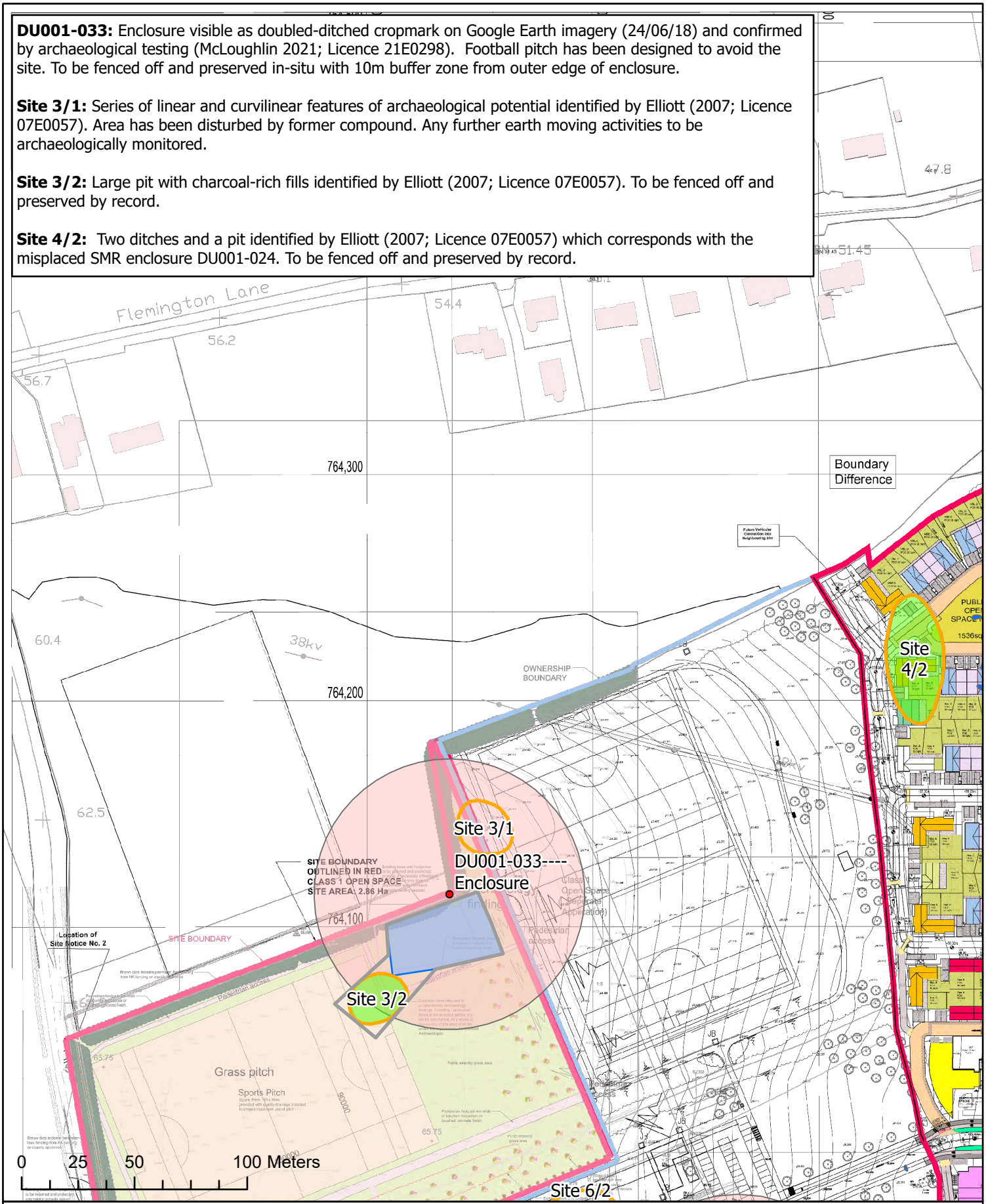
CourtneyDeery
ARCHAEOLOGY & CULTURAL HERITAGE

DU001-033: Enclosure visible as doubled-ditched cropmark on Google Earth imagery (24/06/18) and confirmed by archaeological testing (McLoughlin 2021; Licence 21E0298). Football pitch has been designed to avoid the site. To be fenced off and preserved in-situ with 10m buffer zone from outer edge of enclosure.

Site 3/1: Series of linear and curvilinear features of archaeological potential identified by Elliott (2007; Licence 07E0057). Area has been disturbed by former compound. Any further earth moving activities to be archaeologically monitored.

Site 3/2: Large pit with charcoal-rich fills identified by Elliott (2007; Licence 07E0057). To be fenced off and preserved by record.

Site 4/2: Two ditches and a pit identified by Elliott (2007; Licence 07E0057) which corresponds with the misplaced SMR enclosure DU001-024. To be fenced off and preserved by record.



Legend

- RMP / SMR site
- Fencing to protect cultural heritage
- Preservation in-situ
- Preservation by record
- Site identified by Elliott (07E0057)
- Zone of Notification

Geophysics

- ?Archaeology

Project: Large Scale Residential Development at Lands of Flemington Lane, Balbriggan (FCC Ref. LRD0006/S2)

Map 2: Archaeological Mitigation, northwest quadrant

For: Glenveigh Homes

Prepared by: Dr. Yolande O' Brien

Date: 25/05/23

CourtneyDeery
ARCHAEOLOGY & CULTURAL HERITAGE

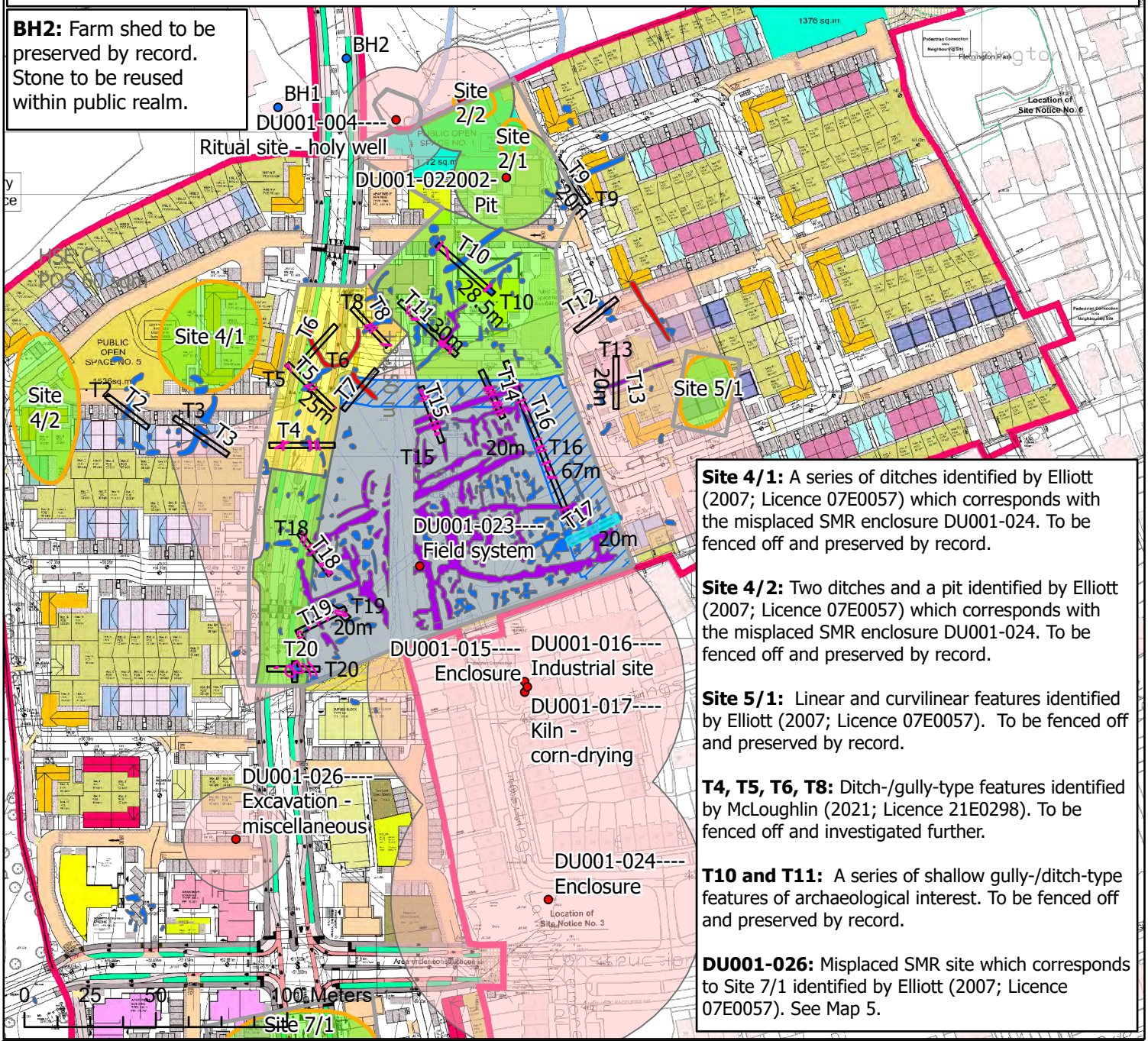
DU001-004: Holy well immediately outside proposed development site known as Lady Well. To be fenced off and preserved in-situ with hydrology protected. Landscaping will include a reflective area. All works in the vicinity are to be under the supervision of an archaeologist.

DU001-022001: Dense pit cluster and series of possibly curving ditches identified by Elliott (2007; Licence 07E0057; Site 2/1). To be fenced off and preserved by record.

DU001-022002: Cluster of pits with charcoal-rich fills and burnt bone inclusions identified by Elliott (2007; Licence 07E0057; Site 2/2). To be fenced off and preserved by record.

DU001-023: Field system identified by geophysical survey (Nicholls 2005; Licence 05R0137) and confirmed with archaeological testing (McLoughlin 2021; Licence 21E0298) . The enclosure in adjacent lands extends into this area (DU001-015). To be fenced off and preserved in-situ with a buffer zone extending 10-20m from the edge of the archaeology. Landscaping will not impact the subsurface features and all works in the vicinity are to be under the supervision of an archaeologist. Impact to the southwest corner cannot be avoided due to the Distributor Road and peripheral features to the north of the main concentration will also be impacted. These areas will

BH2: Farm shed to be preserved by record. Stone to be reused within public realm.



Site 4/1: A series of ditches identified by Elliott (2007; Licence 07E0057) which corresponds with the misplaced SMR enclosure DU001-024. To be fenced off and preserved by record.

Site 4/2: Two ditches and a pit identified by Elliott (2007; Licence 07E0057) which corresponds with the misplaced SMR enclosure DU001-024. To be fenced off and preserved by record.

Site 5/1: Linear and curvilinear features identified by Elliott (2007; Licence 07E0057). To be fenced off and preserved by record.

T4, T5, T6, T8: Ditch-/gully-type features identified by McLoughlin (2021; Licence 21E0298). To be fenced off and investigated further.

T10 and T11: A series of shallow gully-/ditch-type features of archaeological interest. To be fenced off and preserved by record.

DU001-026: Misplaced SMR site which corresponds to Site 7/1 identified by Elliott (2007; Licence 07E0057). See Map 5.

Legend

- RMP / SMR site
- Built Heritage site
- Fencing to protect cultural heritage
- Preservation in-situ
- Preservation by record
- Further investigations recommended
- Archaeological buffer
- Site identified by Elliott (07E0057)
- Zone of Notification

Geophysics

- ?Archaeology
- Archaeology
- Negative anomaly

Project: Large Scale Residential Development at Lands of Flemington Lane, Balbriggan (FCC Ref. LRD0006/S2)

Map 3: Archaeological Mitigation, northeast quadrant

For: Glenveigh Homes

Prepared by: Dr. Yolande O' Brien

Date: 25/05/23

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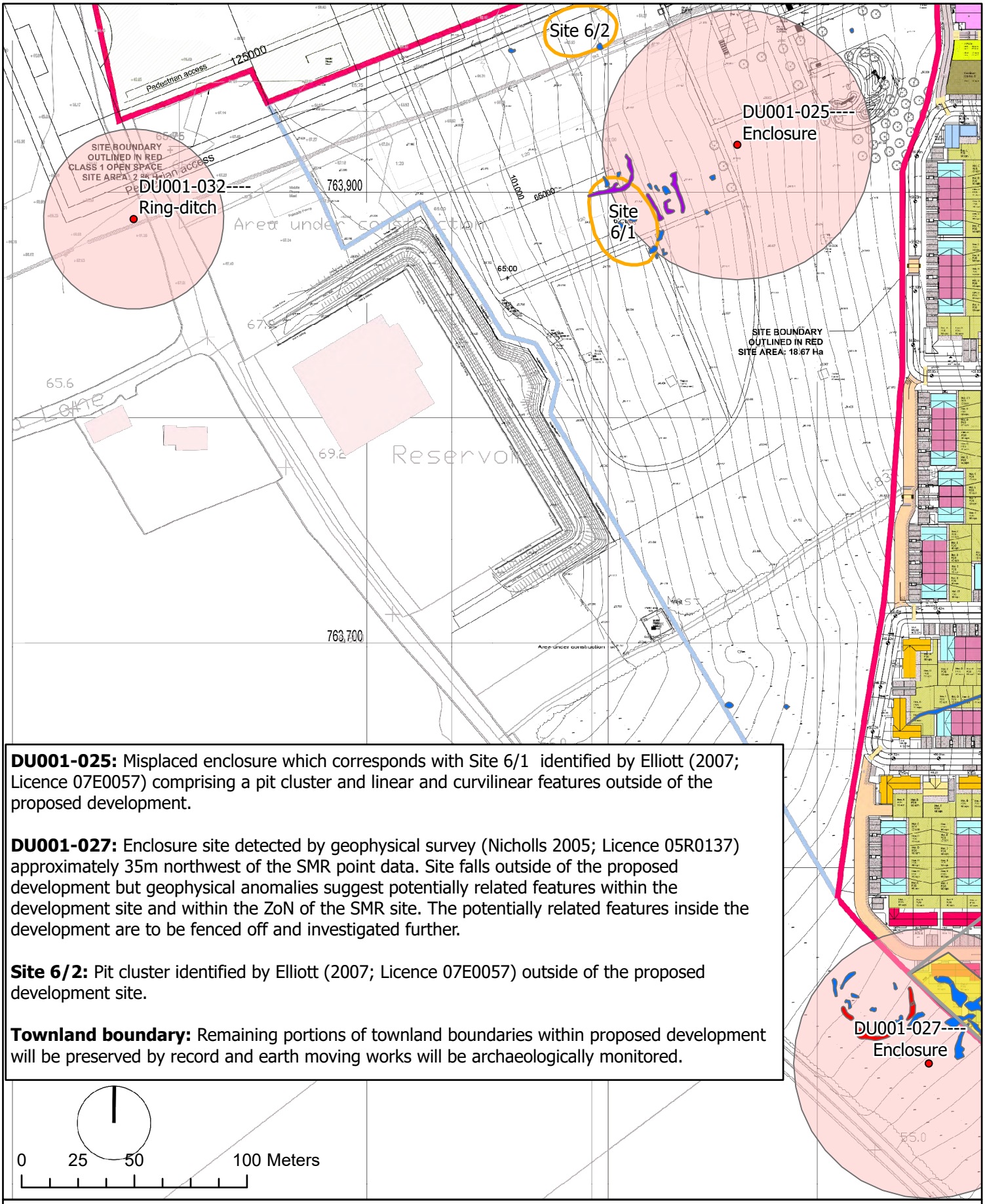

DU001-025: Misplaced enclosure which corresponds with Site 6/1 identified by Elliott (2007; Licence 07E0057) comprising a pit cluster and linear and curvilinear features outside of the proposed development.

DU001-027: Enclosure site detected by geophysical survey (Nicholls 2005; Licence 05R0137) approximately 35m northwest of the SMR point data. Site falls outside of the proposed development but geophysical anomalies suggest potentially related features within the development site and within the ZoN of the SMR site. The potentially related features inside the development are to be fenced off and investigated further.

Site 6/2: Pit cluster identified by Elliott (2007; Licence 07E0057) outside of the proposed development site.

Townland boundary: Remaining portions of townland boundaries within proposed development will be preserved by record and earth moving works will be archaeologically monitored.

Legend

- RMP / SMR site
- Fencing to protect cultural heritage
- Further investigations recommended
- Site identified by Elliott (07E0057)
- Zone of Notification

Geophysics

- ?Archaeology
- Archaeology
- Negative anomaly

Project: Large Scale Residential Development at Lands of Flemington Lane, Balbriggan (FCC Ref. LRD0006/S2)

Prepared by: Dr. Yolande O' Brien

Date: 25/05/23

Map 4: Archaeological Mitigation, southwest quadrant

For: Glenveigh Homes

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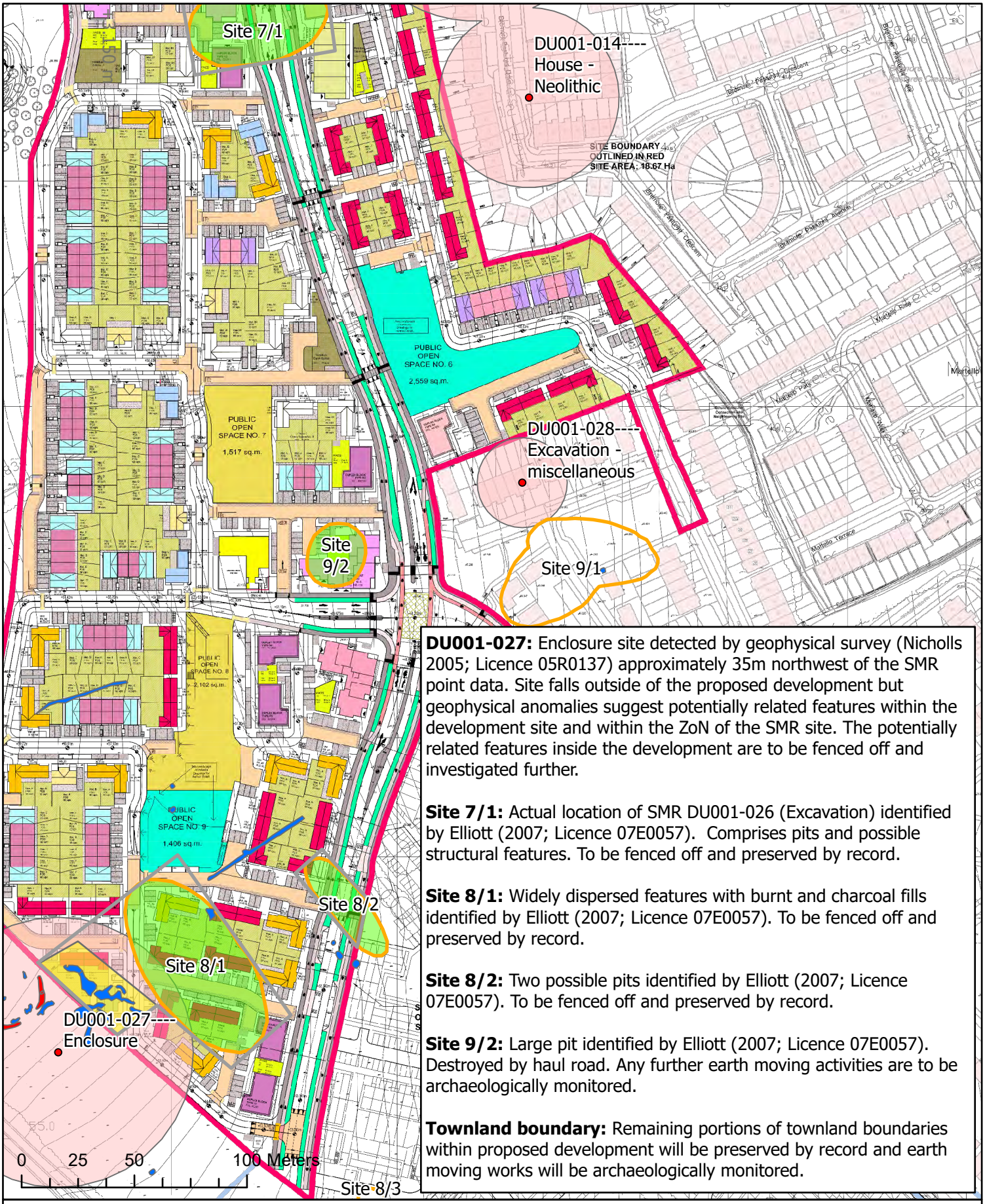

DU001-027: Enclosure site detected by geophysical survey (Nicholls 2005; Licence 05R0137) approximately 35m northwest of the SMR point data. Site falls outside of the proposed development but geophysical anomalies suggest potentially related features within the development site and within the ZoN of the SMR site. The potentially related features inside the development are to be fenced off and investigated further.

Site 7/1: Actual location of SMR DU001-026 (Excavation) identified by Elliott (2007; Licence 07E0057). Comprises pits and possible structural features. To be fenced off and preserved by record.

Site 8/1: Widely dispersed features with burnt and charcoal fills identified by Elliott (2007; Licence 07E0057). To be fenced off and preserved by record.

Site 8/2: Two possible pits identified by Elliott (2007; Licence 07E0057). To be fenced off and preserved by record.

Site 9/2: Large pit identified by Elliott (2007; Licence 07E0057). Destroyed by haul road. Any further earth moving activities are to be archaeologically monitored.

Townland boundary: Remaining portions of townland boundaries within proposed development will be preserved by record and earth moving works will be archaeologically monitored.

Legend

- RMP / SMR site
- Fencing to protect cultural heritage
- Preservation by record
- Further investigations recommended
- Site identified by Elliott (07E0057)
- Zone of Notification

Geophysics

- ?Archaeology
- Negative anomaly

Project: Large Scale Residential Development at Lands of Flemington Lane, Balbriggan (FCC Ref. LRD0006/S2)

Map 5: Archaeological Mitigation, southeast quadrant

For: Glenveigh Homes

Prepared by: Dr. Yolande O' Brien

Date: 25/05/23

CourtneyDeery
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APPENDIX 15A

Tree Survey (Charles McCorkell Arboricultural Consultancy 2022)

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This drawing is to be read in conjunction with the respective arboricultural schedules and reports relevant to this project.

Where contradictions between this drawing and any other design information becomes apparent, the respective authors should be contacted immediately.

It is the responsibility of the main site contractor to check and verify all information and measurements onsite and confirm prior to the commencement of works, and to ensure that all site operatives work in accordance with respective arboricultural reports and BS5837:2012, Trees in relation to design, demolition and construction.

BS5837:2012 Tree Categorisation

Category A
Trees of high quality with an estimated remaining life expectancy of at least 40 years

Category B
Trees of moderate quality with an estimated life expectancy of at least 20 years

Category C
Trees of low quality with an estimated life expectancy of at least 10 years, or young trees with a stem diameter below 150mm

Category U
Those in such a condition that they cannot realistically be retained as living trees in the context of the current land use for longer than 10 years

Key

Root Protection Areas
The minimum area around a tree deemed to contain sufficient roots and rooting volume to maintain the trees viability.

H3 — Reference Number for Tree, Group or Hedgerow.

Tree, Shrub or Hedgerow Group.

Site boundary.

N

Revision	Date	Description
C	17/05/23	Updated boundary

Title:
Tree Survey Plan

Project:
Balbriggan, Co. Dublin

Client:
Dean Swift Property Holdings Unlimited

Date: Dec 2022	Scale: 1:1000 @ A0	Status: Planning	
Drawn by: CMcC	Dwg ref: 181122-P-10		Rev: C
Checked by: CMcC			

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APPENDIX 15B

LVIA Visualisations and Photomontages (3D Design Bureau)

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3D DESIGN BUREAU

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Design | Planning | Marketing

Lands off Flemington Lane
Balbriggan, Co. Dublin

Verified Views and CGI

Applicant: Dean Swift Property Holdings Unlimited Company

November 2023

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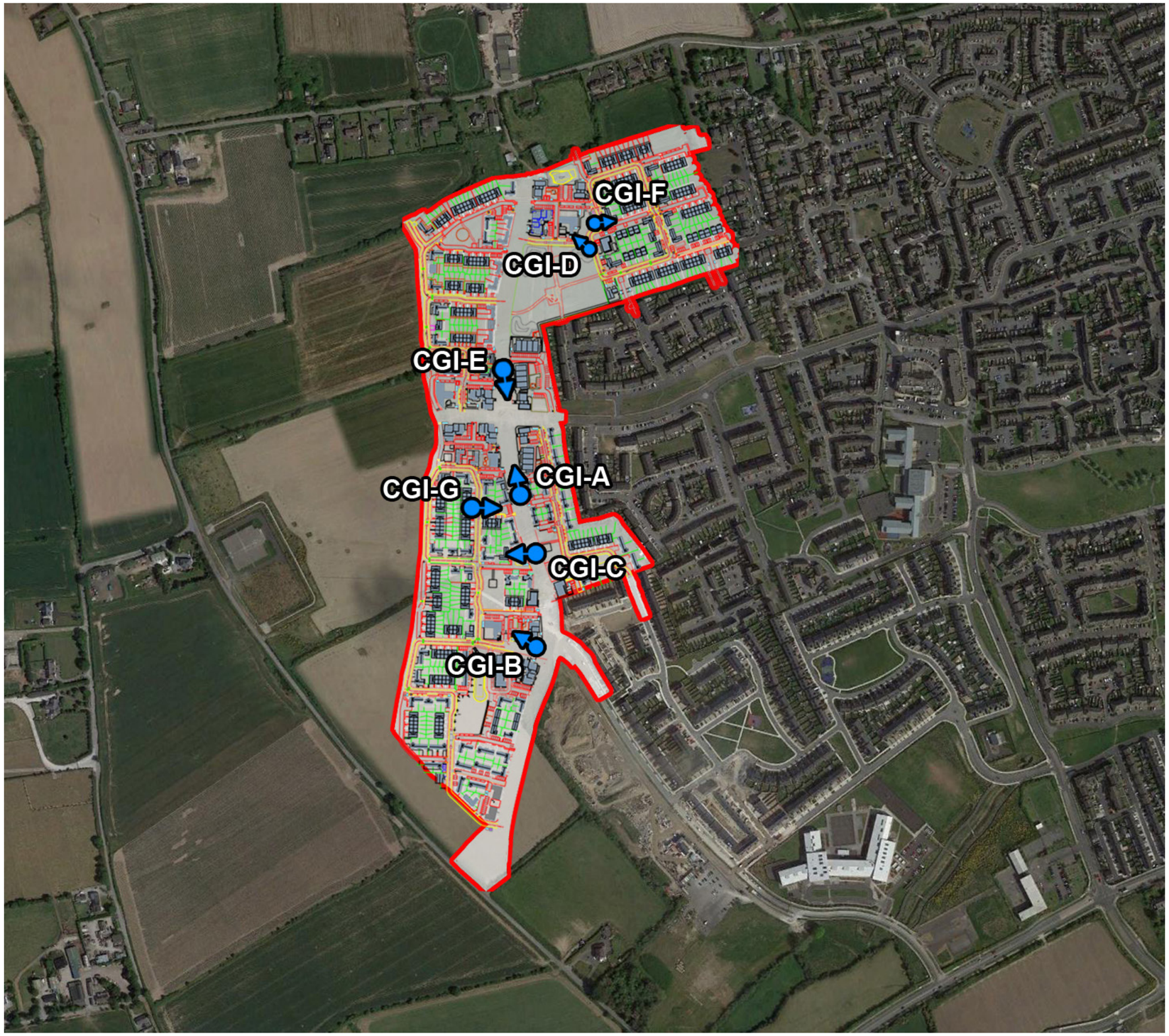
www.3ddesignbureau.com



Project Title: Lands off Flemington Lane Balbriggan, Co. Dublin	Applicant Name: Dean Swift Property Holdings Unlimited Company	Image Title: CGI Location Map
	CGI & VVMs by 3D DESIGN BUREAU	Tel: 01 288 0186 www.3ddesignbureau.com info@3ddesignbureau.com



Project Title: Lands off Flemington Lane Balbriggan, Co. Dublin	**Applicant Name: Dean Swift Property Holdings Unlimited Company**	**Image Title: CGI A**
	CGI & VVMs by 3D DESIGN BUREAU	Tel: 01 288 0186 www.3ddesignbureau.com info@3ddesignbureau.com



Project Title: Lands off Flemington Lane Balbriggan, Co. Dublin	**Applicant Name: Dean Swift Property Holdings Unlimited Company**	**Image Title: CGI B**
	CGI & VVMs by 3D DESIGN BUREAU	Tel: 01 288 0186 www.3ddesignbureau.com info@3ddesignbureau.com



Project Title: Lands off Flemington Lane Balbriggan, Co. Dublin	Applicant Name: Dean Swift Property Holdings Unlimited Company	Image Title: CGI C
	CGI & VVMs by 3D DESIGN BUREAU	Tel: 01 288 0186 www.3ddesignbureau.com info@3ddesignbureau.com



Project Title: Lands off Flemington Lane Balbriggan, Co. Dublin	**Applicant Name: Dean Swift Property Holdings Unlimited Company**	**Image Title: CGI D**
	CGI & VVMs by 3D DESIGN BUREAU	Tel: 01 288 0186 www.3ddesignbureau.com info@3ddesignbureau.com



Project Title: Lands off Flemington Lane Balbriggan, Co. Dublin	**Applicant Name: Dean Swift Property Holdings Unlimited Company**	**Image Title: CGI E**
	CGI & VVMs by 3D DESIGN BUREAU	Tel: 01 288 0186 www.3ddesignbureau.com info@3ddesignbureau.com



Project Title: Lands off Flemington Lane Balbriggan, Co. Dublin	**Applicant Name: Dean Swift Property Holdings Unlimited Company**	**Image Title: CGI F**
	CGI & VVMs by 3D DESIGN BUREAU	Tel: 01 288 0186 www.3ddesignbureau.com info@3ddesignbureau.com



Project Title: Lands off Flemington Lane Balbriggan, Co. Dublin	**Applicant Name: Dean Swift Property Holdings Unlimited Company**	**Image Title: CGI G**
	CGI & VVMs by 3D DESIGN BUREAU	Tel: 01 288 0186 www.3ddesignbureau.com info@3ddesignbureau.com



Project Title: Lands off Flemington Lane Balbriggan, Co. Dublin	**Applicant Name: Dean Swift Property Holdings Unlimited Company**	**Image Title: Viewpoint Location Map**
	CGI & VVMs by 3D DESIGN BUREAU	Tel: 01 288 0186 www.3ddesignbureau.com info@3ddesignbureau.com

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Project Title: Lands off Flemington Lane Balbriggan, Co. Dublin	Applicant Name: Dean Swift Property Holdings Unlimited Company	Image Title: Baseline VVM 1
	CGI & VVMs by 3D DESIGN BUREAU	Tel: 01 288 0186 www.3ddesignbureau.com info@3ddesignbureau.com

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Project Title: Lands off Flemington Lane Balbriggan, Co. Dublin	Applicant Name: Dean Swift Property Holdings Unlimited Company	Image Title: Proposed VVM 1
	CGI & VVMs by 3D DESIGN BUREAU	Tel: 01 288 0186 www.3ddesignbureau.com info@3ddesignbureau.com

Camera Type: Canon EOS 5D Mark IV	Lens Type: EF24-70mmf/4LISUSM	Focal Length: 35mm	Approx Dist: 966m	Date & Time: 05/05/2023,11:06:59



Project Title: Lands off Flemington Lane Balbriggan, Co. Dublin	Applicant Name: Dean Swift Property Holdings Unlimited Company	Image Title: Baseline VVM 2
	CGI & VVMs by 3D DESIGN BUREAU	Tel: 01 288 0186 www.3ddesignbureau.com info@3ddesignbureau.com

Camera Type: Canon EOS 5D Mark IV	Lens Type: EF24-70mmf/4LISUSM	Focal Length: 35mm	Approx Dist: 966m	Date & Time: 05/05/2023,11:06:59



Project Title: Lands off Flemington Lane Balbriggan, Co. Dublin	Applicant Name: Dean Swift Property Holdings Unlimited Company	Image Title: Proposed VVM 2
	CGI & VVMs by 3D DESIGN BUREAU	Tel: 01 288 0186 www.3ddesignbureau.com info@3ddesignbureau.com

Camera Type: Canon EOS 5D Mark IV	Lens Type: EF16-35mmf/4LISUSM	Focal Length: 35mm	Approx Dist: 2078m	Date & Time: 02/05/2023,13:31:15



Project Title: Lands off Flemington Lane Balbriggan, Co. Dublin	Applicant Name: Dean Swift Property Holdings Unlimited Company	Image Title: Baseline VVM 3
	CGI & VVMs by 3D DESIGN BUREAU	Tel: 01 288 0186 www.3ddesignbureau.com info@3ddesignbureau.com

Camera Type: Canon EOS 5D Mark IV	Lens Type: EF16-35mmf/4LISUSM	Focal Length: 35mm	Approx Dist: 2078m	Date & Time: 02/05/2023,13:31:15



Project Title: Lands off Flemington Lane Balbriggan, Co. Dublin	Applicant Name: Dean Swift Property Holdings Unlimited Company	Image Title: Proposed VVM 3
	CGI & VVMs by 3D DESIGN BUREAU	Tel: 01 288 0186 www.3ddesignbureau.com info@3ddesignbureau.com

Camera Type: Canon EOS 5D Mark IV	Lens Type: EF16-35mmf/4LISUSM	Focal Length: 16mm	Approx Dist: 52m	Date & Time: 02/05/2023,13:00:34



Project Title: Lands off Flemington Lane Balbriggan, Co. Dublin	Applicant Name: Dean Swift Property Holdings Unlimited Company	Image Title: Baseline VVM 4
	CGI & VVMs by 3D DESIGN BUREAU	Tel: 01 288 0186 www.3ddesignbureau.com info@3ddesignbureau.com

Camera Type: Canon EOS 5D Mark IV	Lens Type: EF16-35mmf/4LISUSM	Focal Length: 16mm	Approx Dist: 52m	Date & Time: 02/05/2023,13:00:34



Project Title: Lands off Flemington Lane Balbriggan, Co. Dublin	Applicant Name: Dean Swift Property Holdings Unlimited Company	Image Title: Proposed VVM 4
	CGI & VVMs by 3D DESIGN BUREAU	Tel: 01 288 0186 www.3ddesignbureau.com info@3ddesignbureau.com

Camera Type: Canon EOS 5D Mark IV	Lens Type: EF16-35mmf/4LISUSM	Focal Length: 16mm	Approx Dist: 86m	Date & Time: 02/05/2023,13:10:52



Project Title: Lands off Flemington Lane Balbriggan, Co. Dublin	Applicant Name: Dean Swift Property Holdings Unlimited Company	Image Title: Baseline VVM 5
	CGI & VVMs by 3D DESIGN BUREAU	Tel: 01 288 0186 www.3ddesignbureau.com info@3ddesignbureau.com

Camera Type: Canon EOS 5D Mark IV	Lens Type: EF16-35mmf/4LISUSM	Focal Length: 16mm	Approx Dist: 86m	Date & Time: 02/05/2023,13:10:52



Project Title: Lands off Flemington Lane Balbriggan, Co. Dublin	Applicant Name: Dean Swift Property Holdings Unlimited Company	Image Title: Proposed VVM 5
	CGI & VVMs by 3D DESIGN BUREAU	Tel: 01 288 0186 www.3ddesignbureau.com info@3ddesignbureau.com

Camera Type: Canon EOS 5D Mark IV	Lens Type: EF16-35mmf/4LISUSM	Focal Length: 16mm	Approx Dist: 107m	Date & Time: 02/05/2023,13:17:30



Project Title: Lands off Flemington Lane Balbriggan, Co. Dublin	Applicant Name: Dean Swift Property Holdings Unlimited Company	Image Title: Baseline VVM 6
	CGI & VVMs by 3D DESIGN BUREAU	Tel: 01 288 0186 www.3ddesignbureau.com info@3ddesignbureau.com

Camera Type: Canon EOS 5D Mark IV	Lens Type: EF16-35mmf/4LISUSM	Focal Length: 16mm	Approx Dist: 107m	Date & Time: 02/05/2023,13:17:30



Project Title: Lands off Flemington Lane Balbriggan, Co. Dublin	Applicant Name: Dean Swift Property Holdings Unlimited Company	Image Title: Proposed VVM 6
	CGI & VVMs by 3D DESIGN BUREAU	Tel: 01 288 0186 www.3ddesignbureau.com info@3ddesignbureau.com

Camera Type: Canon EOS 5D Mark IV	Lens Type: EF16-35mmf/4LISUSM	Focal Length: 24mm	Approx Dist: 773m	Date & Time: 02/05/2023,13:46:06



Project Title: Lands off Flemington Lane Balbriggan, Co. Dublin	Applicant Name: Dean Swift Property Holdings Unlimited Company	Image Title: Baseline VVM 7
	CGI & VVMs by 3D DESIGN BUREAU	Tel: 01 288 0186 www.3ddesignbureau.com info@3ddesignbureau.com

Camera Type: Canon EOS 5D Mark IV	Lens Type: EF16-35mmf/4LISUSM	Focal Length: 24mm	Approx Dist: 773m	Date & Time: 02/05/2023,13:46:06



Project Title: Lands off Flemington Lane Balbriggan, Co. Dublin	Applicant Name: Dean Swift Property Holdings Unlimited Company	Image Title: Proposed VVM 7
	CGI & VVMs by 3D DESIGN BUREAU	Tel: 01 288 0186 www.3ddesignbureau.com info@3ddesignbureau.com

Camera Type: Canon EOS 5D Mark IV	Lens Type: EF16-35mmf/4LISUSM	Focal Length: 24mm	Approx Dist: 930m	Date & Time: 02/05/2023,13:53:51



Project Title: Lands off Flemington Lane Balbriggan, Co. Dublin	Applicant Name: Dean Swift Property Holdings Unlimited Company	Image Title: Baseline VVM 8
	CGI & VVMs by 3D DESIGN BUREAU	Tel: 01 288 0186 www.3ddesignbureau.com info@3ddesignbureau.com

Camera Type: Canon EOS 5D Mark IV	Lens Type: EF16-35mmf/4LISUSM	Focal Length: 24mm	Approx Dist: 930m	Date & Time: 02/05/2023,13:53:51



Project Title: Lands off Flemington Lane Balbriggan, Co. Dublin	Applicant Name: Dean Swift Property Holdings Unlimited Company	Image Title: Proposed VVM 8
	CGI & VVMs by 3D DESIGN BUREAU	Tel: 01 288 0186 www.3ddesignbureau.com info@3ddesignbureau.com

Camera Type: Canon EOS 5D Mark IV	Lens Type: EF16-35mmf/4LISUSM	Focal Length: 16mm	Approx Dist: 72m	Date & Time: 17/08/21, 14:04:24



Project Title: Lands off Flemington Lane Balbriggan, Co. Dublin	Applicant Name: Dean Swift Property Holdings Unlimited Company	Image Title: Baseline VVM 9
	CGI & VVMs by 3D DESIGN BUREAU	Tel: 01 288 0186 www.3ddesignbureau.com info@3ddesignbureau.com

Camera Type: Canon EOS 5D Mark IV	Lens Type: EF16-35mmf/4LISUSM	Focal Length: 16mm	Approx Dist: 72m	Date & Time: 17/08/21, 14:04:24



Project Title: Lands off Flemington Lane Balbriggan, Co. Dublin	Applicant Name: Dean Swift Property Holdings Unlimited Company	Image Title: Proposed VVM 9
	CGI & VVMs by 3D DESIGN BUREAU	Tel: 01 288 0186 www.3ddesignbureau.com info@3ddesignbureau.com

Camera Type: Canon EOS 5D Mark IV	Lens Type: EF16-35mmf/4LISUSM	Focal Length: 16mm	Approx Dist: 163m	Date & Time: 02/05/2023,14:13:49



Project Title: Lands off Flemington Lane Balbriggan, Co. Dublin	Applicant Name: Dean Swift Property Holdings Unlimited Company	Image Title: Baseline VVM 10
	CGI & VVMs by 3D DESIGN BUREAU	Tel: 01 288 0186 www.3ddesignbureau.com info@3ddesignbureau.com

Camera Type: Canon EOS 5D Mark IV	Lens Type: EF16-35mmf/4LISUSM	Focal Length: 16mm	Approx Dist: 163m	Date & Time: 02/05/2023,14:13:49



Project Title: Lands off Flemington Lane Balbriggan, Co. Dublin	Applicant Name: Dean Swift Property Holdings Unlimited Company	Image Title: Proposed VVM 10
	CGI & VVMs by 3D DESIGN BUREAU	Tel: 01 288 0186 www.3ddesignbureau.com info@3ddesignbureau.com

3D DESIGN BUREAU

APPENDIX

Methodology

Verified Views Montages (VVM)

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1.Overview

This methodology has been prepared by 3D Design Bureau to explain the production of Verified View Montages (VVM). The preparation and presentation of reliable verifiable visual information is a key component to the writing of Landscape Visual Impact Assessment reports. It should be noted that VVMs are technical images and should be produced and used in a technically appropriate manner.

This booklet maybe accompanied by the inclusion of a number of CGIs from various viewpoint locations within the proposed site. These have been produced to give a better understanding of the design intent from a close range perspective. Whilst we have included soft landscaping that reflects the proposed design as close as possible, artistic license may have been used for certain planting and trees with regard to species, size and exact locations.

2.What Is A Verified View Montage

A Verified View Montage (VVM) is an accurate visual representation of the potential impact (or lack there of) that a proposed development may have on its surrounding environment when constructed. VVMs are produced using technical scientific verification methods, through the use of photography, surveying, 3D modelling, rendering and post-production.
Verified View Montages work by using the correct geospatial insertion of accurate and detailed digital 3D models in the existing landscape allowing for a photorealistic view of the planned development in its intended location.
The correct combination of all these fields of expertise will deliver a result in which we believe and trust to be accurate for official usage by the client for their intended purposes (ex. Planning applications, impact studies,...).

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3.Methodology

3.1 Project Planning

Following appointment to the project, a desktop study is carried out with a full list of suggested views being drawn up for review prior to visiting the site. This is carried
out between 3D Design Bureau, the client, and the planning consultant.

Note: If a LVIA report is being written by a third party (landscape architect or planning consultant), the medium to long range views will be guided by them. After obtaining a full list of viewpoint locations, it is reviewed, checked and a plan for the taking of baseline photographs is put in place.
Note: 3D modelling of the proposed scheme can, and usually is, commenced prior to the photographic site visit.

3.2 Data Capture: High Resolution Baseline Photography

Every baseline photograph is captured in raw settings using a high-resolution digital SLR camera. This allows for the maximum possible information to be retained in the digital file. It also avoids the file being altered by any internal camera processing definitions, which retains the maximum control and fidelity on the end results.

The focal lengths used depend on the surrounding context and proximity to the subject site. 3D Design Bureau use high quality lenses with focal lengths that allow for capturing enough surrounding context without compromising quality and fidelity, by avoiding excessive barrelling, distortion, or aberrations. All shots are taken horizontally with the use of a 50mm lens (where possible) and wider angle also.

Note: Although the 50mm focal length represents the perceived scale of the human eye, it does not represent the human field of view and therefore should not necessarily be used to show the proposed development in its context. Peripheral vision needs to be accounted for and whilst the 50mm lens option is recommended in the *British Landscape Institute Technical Guidance Note*, this does not take into account the dynamic movement of the human eye.

Furthermore, panoramic VVMs are described in the *British Landscape Institute Technical Guidance Note*. 3DDB do not produce these type of VVMs as they are made up of a series of individual VVMs stitched together. The stitching process is a non repeatable action which can result in different outputs of the same image each time. Therefore accuracy and verifiability can be called into question.

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3.Methodology

3.2 Data Capture: High Resolution Baseline Photography (cont`d)

Each photo location is correctly recorded and marked as follows

On-Site:

The tripod location on site is paint marked and photographed in relation to existing elements. (Fig 1 below)
The location of each photo is manually marked on a printed map while on site.
The camera height is recorded.

In-Studio:

All photographs go through post processing back in the studio. The full set of photos along with a viewpoint location map (Fig 2 below) are issued to the client for review and to choose the best shots that will demonstrate the visual impact that the proposed scheme may/may not have. For each photo at each location, two focal lengths will be issued – the 50mm option and a wider field of view option. The most appropriate shot will be chosen depending on the surrounding context and location of the shot. See earlier section 3.2 for further explanation.



Fig.1: Camera Location marked and photographed.

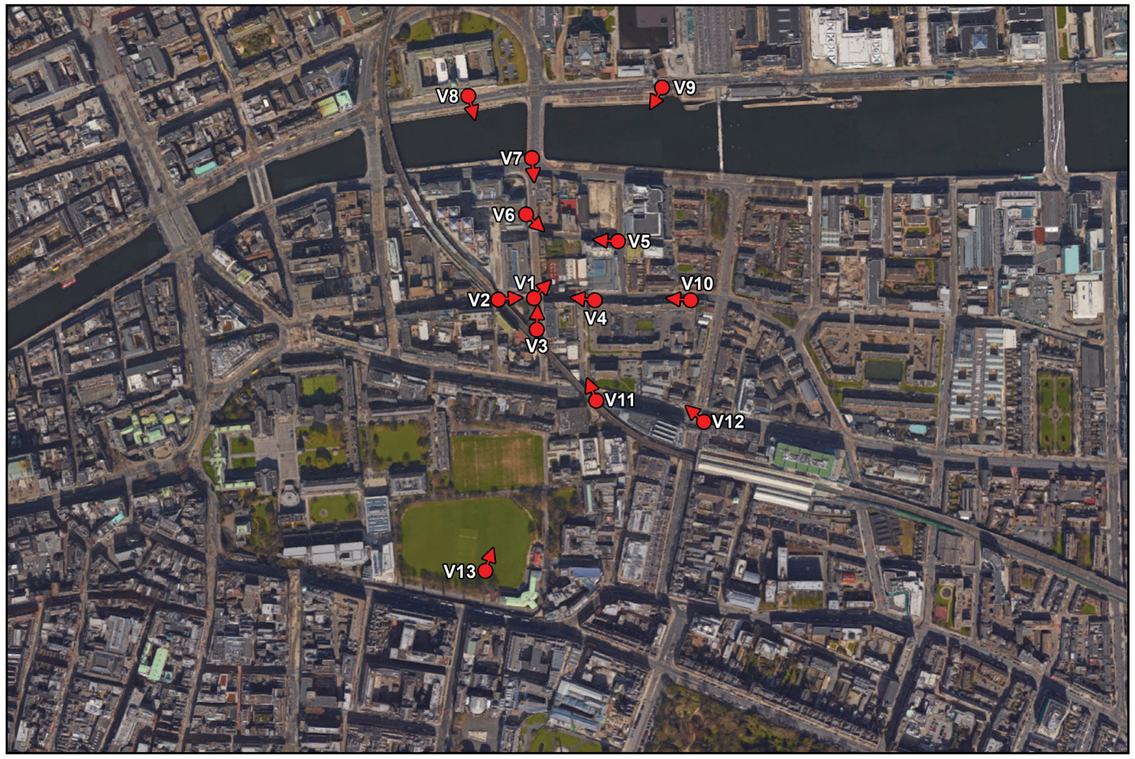

Fig.2: Viewpoint location map post site visit.

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3.Methodology

3.2 Data Capture: High Resolution Baseline Photography (cont`d)

Sample baseline photographs prior to selection and prior to marking up for surveying.



Fig.3: Baseline photo for view 5



Fig.4: Baseline photo for view 3



Fig.5: Baseline photo for view 4



Fig.6: Baseline photo for view 9

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3.Methodology

3.3 Baseline Photo Surveying

When all baseline photos are chosen for the VVMs, each one is marked up in studio as per Fig 7 below. Fixed reference points within each photo, such as parapet heights, kerbing, lamp posts etc are coloured coded on the baseline photos. All ‘marked up’ baseline photos are then issued to our qualified topographical surveyor for surveying purposes.
The survey team records the camera/tripod position using GPS and Total Station to an accuracy of +/-1cm Northing and Easting and to an accuracy of +/- 2cm Elevation. The ‘marked up’ fixed reference points identified in each photo are then surveyed to establish exact orientation of the view and to verify the photomontage process. (Fig 8 below). This survey data is later modelled and included in the digital 3D model of the proposed development. (See section 3.4)



Fig.7: Fixed reference points marked for surveyour.



Fig.8: Fixed reference points surveyed and numbered by surveyor.

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3.Methodology

3.4 3D Modelling & Visualisation

3D Modelling

An accurate digital 3D model of the ‘proposed’ development is produced using 3D software of choice. All of 3D Design Bureau’s 3D modelling is carried out within AutoDesk’s Revit. The digital 3D model is created from a combination of the third party architectural, engineering and landscape drawings. All proposed model information is contained in the one file and it is always positioned relative to the existing topographical site survey information supplied.
The ‘marked up’ fixed reference points (see section 3.3) which have been surveyed, are also modelled along with any other relevant survey information from the supplied topographical survey drawings. As stated above, the proposed 3D model and survey 3D model information are geospatially positioned relative to one another. This is imperative to ensure the accurate positioning and camera matching of the proposed digital 3D model within each chosen photo.

Visualisation

Once the digital 3D Revit model is complete, it is handed over to the 3D visualisation team for production. This stage of production involves matching of textures & finishes, lighting conditions and asset population for the proposed scheme. This ensures the accurate visual representation of the digital 3D model is as close as possible to the intended future ‘As Built’ development. Note: For accurate camera matching of the digital model to the baseline photography (which can take place prior to the visualisation process) please see Section 3.5.
There are various 3D visualisation software’s that are widely used for this stage of production. 3D Design Bureau use Autodesk 3D Studio Max as its main software for the visualisation process. This is accepted as the leading industry standard for architectural visualisation work and production of VVMs.

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3.Methodology

3.4 3D Modelling & Visualisation

Fig.8: Digital 3D model including the fixed reference points

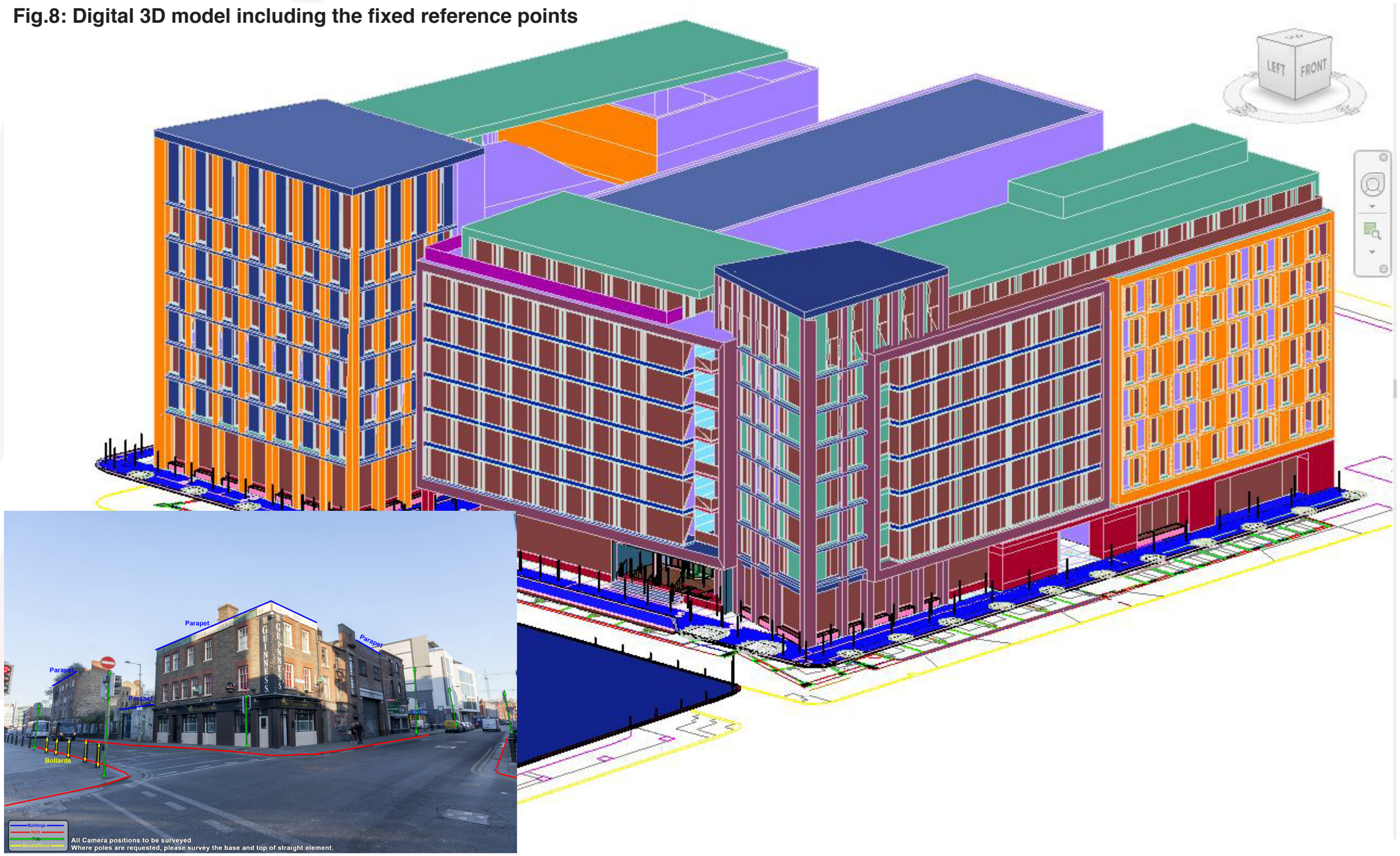

Fig.9: Fixed reference points surveyed and numbered by surveyor.

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3.Methodology

3.5 Camera Matching / Rendering / Post Production

Following the completion of the 3D visualisation process, Section 3.4, (but in some instances prior to this) the following methodology is applied to ensure views are verifiable.

Camera Matching

All of the information recorded at the time of the baseline photographic site visit, that is, camera co-ordinates, angle of view, and direction of view, is programmed into the virtual camera within the 3D software package of choice - 3D Studio Max. Insertion of digital cameras within the software, with the matching attributes of the physical camera, is carried out. All elements of the photo survey, that have been surveyed and included in the digital model and geolocated relative to the proposed development are a key component to the camera matching process. This careful methodology ensures that the size, position, and height, of the proposed development in each VVM is correct to an accuracy of 0.33% i.e. +/- 1mm on an A3 print.

Rendering

Following the camera matching and 3D visualisation process the views are ‘rendered’ at high resolution and placed onto its matching baseline photograph using Adobe Photoshop software. The mathematical accuracy is then double checked and verified by ensuring that existing ‘marked up’ fixed reference p point features, which were also rendered, line up exactly in the baseline photo.

Post Production

Post production for all views is the last stage in the VVM process. The VVM specialist establishes which existing features such as buildings, landscape and trees, are in the foreground of the proposed development and those that are in the background, i.e. which features will mask the development and which ones will appear behind the development. When it is found that the development is not visible due to foreground features, its extremities will be indicated with a red outline. Furthermore on wide angle chosen views, the extent of 50mm lens is identified on the shot.

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3.Methodology

3.5 Camera Matching / Rendering / Post Production



Fig.10: Fixed reference points for surveyor on Baseline untreated photo.

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3.Methodology

3.5 Camera Matching / Rendering / Post Production



Fig.11: Fixed reference points modelled, rendered and overlaid on baseline photo confirming accuracy

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4. Results

The resulting VVM, having gone through this extensive procedure, is classed as an accurate and verifiable representation of the proposed development as viewed from the selected photo locations. This shows, as closely as possible, any future impact a proposed development may have on the surrounding environment and existing buildings. It should be noted that the foundation of any Landscape/Townscape Visual Impact Assessment (LVIA / TVIA) report are accurate verified view montages.





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