consulting engineers

NRB

"Transportation Assessment Report"

including....

Stage 1 Road Safety Audit,
Preliminary Travel Plan, and
DMURS Statement of Consistency

For

Proposed Residential Development(s)

At

Lands West of Old Belgard Road and North, South & West of Cookstown Road, Cookstown Industrial Estate, Tallaght, Dublin 24.

SUBMISSION ISSUE

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Contents

Appendices.....

EXECUTIVE SUMMARY

NRB Consulting Engineers Ltd were appointed to address the Traffic/Transportation issues associated with a planning application for a mixed use residential apartment development on zoned development lands within Cookstown Industrial Estate.

The site was previously used for industrial and employment purposes. In this regard, the site has long established traffic and trip generation characteristics, which are most likely to have been significantly greater than the now proposed use.

Being located in the heart of Tallaght and within a 10-15 minute walk of The Square and other local large employment centres such as Tallaght Hospital and TU Dublin Campus, the site is ideally placed to take advantage of, and contribute to, non-car modes of travel.

This Transportation Assessment (TA) has been prepared to address any Traffic/Transportation issues associated with the proposal, and specifically the capacity of the existing road network. The report takes account of the Tallaght LAP transport policy & mobility policy context provisions which seek to change the nature of the networks in the area.

An independent Road Safety Audit of the Layout & Design has been undertaken and is included as ***Appendix G*** to this Report.

The Report has been prepared in accordance with the TII's Traffic & Transportation Assessment Guidelines, and addresses the worst case traffic impact of the proposal. This TA addresses the adequacy of the existing and improved local road network to safely and appropriately accommodate the worst case vehicular demands with the development fully occupied, taking account of the existing transportation demands locally. (The Report contains a dedicated ***Section 5.0*** that addresses the specific issues mentioned within Item 2 of the ABP Opinion of 29/April '20).

Comprehensive classified turning movement surveys of the existing affected roads and junctions were carried out during the weekday AM and PM Peak Hours prior to the Covid19 Pandemic. These formed the basis of the study. The analysis includes the effects of the existing traffic on the local roads and assesses the impact during the traditional peak commuter peaks periods.

The Transportation Assessment confirms that the improved road network and the access junctions are more than adequate to accommodate the worst case traffic associated with

the development. The assessment also confirms that the construction and full occupation of the scheme will have a negligible impact upon the operation of the adjacent road network.

The Report includes within its recommendations the upgrade/conversion of the existing Industrial Estate Roundabouts to Traffic Signal Control, a form of Road Junction Control which is considered more appropriate for a town centre environment, and the layout and design reflects this. All of the roads and junctions within the Red Line of the application are being upgraded to reflect the new residential status of the area, compliant with the requirements of DMURS are reflecting the planning policies of the Local Area Plan, in addition to other recommendations contained herein (including within the Appendices).

In terms of number of transport alternatives easily available to Residents, it is considered that the proposed development is very highly sustainable indeed, in terms of public and alternative transport accessibility. The proximity of the development to existing public transport services means that all residents will have viable alternatives to the private car for accessing the site and will not be reliant upon the car as a primary mode of travel.

Direct and high quality pedestrian linkages are provided between the sites and the existing pedestrian & cycling facilities on the surrounding road network. The lower provision of car parking will act as a demand management measure, ensuring that the development is accessed in the most sustainable manner, being almost predominantly reliant on non-car modes of travel.

The layout of the proposed development seeks to maximise permeability and enhances legibility, and the design of appropriately sized blocks actively contributes to a highly permeable and accessible community for both pedestrians and cyclists.

The Traffic/Transportation/Roads related issues raised in the ABP Opinion, Item #2, have been addressed herein, with the references summarised by way of a specific additional Chapter 5.

We also conclude that there are no adverse traffic/transportation capacity or operational safety issues associated with the construction and occupation of the proposed residential apartment developments (including the associated ancillary commercial uses).

1. INTRODUCTION

1.1 This Transportation Assessment (TA) has been prepared by NRB Consulting Engineers Ltd and addresses the Traffic / Transportation issues arising from the proposal to construct and occupy a total of 1,104 apartments/duplexes & the ancillary commercial elements, on the zoned sites at Cookstown, Tallaght.

1.2 The proposed development, a high density apartment/residential scheme with ancillary small commercial uses should be considered in the context of its location within the heart of Tallaght Town Centre. A site location plan is included below as ***Figure 1.1***;

Figure 1.1 - Site Location in Heart of Tallaght

1.3 In describing the Receiving Environment and the Proposed Future Environment, this report addresses the following aspects of the proposed development:

- Relative Small Scale of the development **in Traffic terms** (conscious of the long established use and nature of the established site),
- Location of the development within the heart of the Town Centre in close proximity to high quality Public Transport Links,

- Traffic & Transportation impact,
- Capacity of the proposed vehicular accesses to accommodate the worst-case development traffic flows,
- Capacity of the Existing Road Network,
- Adequacy and safety of the existing roads and junctions locally, within the area of influence (with the replacement of roundabouts with Traffic Signal Control).
- Strategic Road improvements that will significantly further reduce impact and increase local permeability (including the construction of the now proposed local roads infrastructure and the Part 8 N-S Link connecting Cookstown Industrial Estate Road through to Belgard Square North, and also the 3rd party Proposal to construct an E-W Link Road through to Belgard Road adjacent B&Q).
- The Upgrade of the existing Industrial Estate Roundabouts to Traffic Signal Control incorporating controlled dedicated pedestrian crossing facilitates - which is considered more appropriate in a Town Centre Environment.

1.4 Recommendations contained within this Transportation Assessment are based on the following sources of information and industry-standard practices; -

- The TII Traffic & Transport Assessment Guidelines,
- Design Manual for Urban Roads and Streets,
- Recent Weekday AM and PM Peak Classified Turning Movements Traffic Survey Data commissioned,
- TII Design Guidance,
- Transportation Planning Policy provisions of the SDCC Development Plan & the Tallaght Local Are Plan (LAP),
- Our experience in assessing the impact of Developments of this Nature, and
- Site Visits and Observations.

1.5 The Report has been prepared in accordance with the requirements of the TII's Traffic & Transport Assessment Guidelines. These are the professional Guidelines used to assess the impact of developments on public roads.

1.6 An independent Stage 1 Road Safety Audit of the Roads and Layout, together with the associated Designer Feedback form is included as ***Appendix G*** to this Report.

2. EXISTING CONDITIONS, DEVELOPMENT PROPOSALS & PARKING

2.1 The subject development sites are located on lands within Cookstown Industrial Estate, as illustrated above as ***Figure 1.1*** and an illustration of the elements of the development is extracted from the Architects Plans and is included below are ***Figure 2.1***

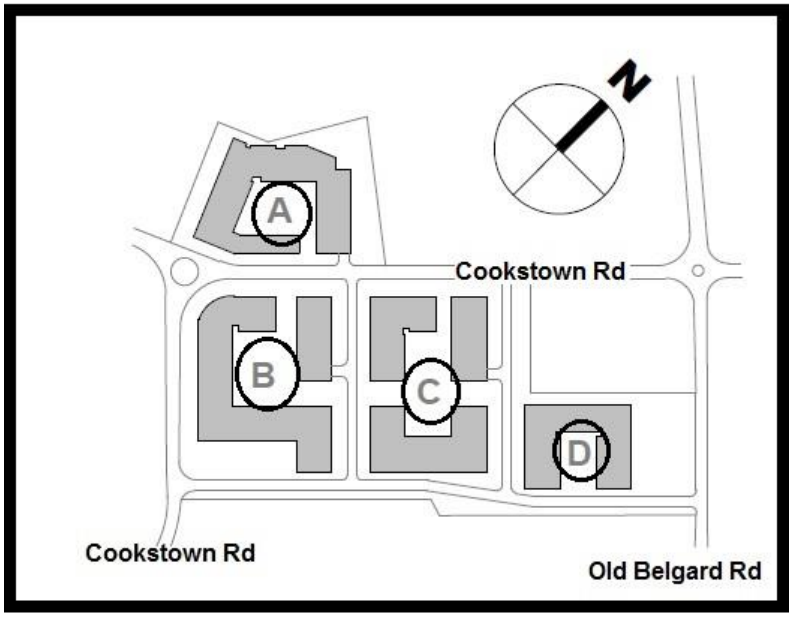


Figure 2.1 - Block Layout Plan

2.2 The content of the individual Blocks is as set out on the detailed Architectural Schedule of Accommodation, but in terms of Traffic/Transportation Assessment it is summarised below as ***Table 2.1*** for convenience.

Table 2.1; - Summary - Development Content by Block for Transportation Assessment Purposes

Block (Ref Fig 2.1)	*No.*
Block A	• 260 Apartments/Duplex Units, • Ancillary Residential Amenity Space, • Under-croft with 72 Car Parking Spaces & Cycle Parking
Block B	• 342 Apartments Units, • Ancillary Residential Amenity Space, • Ancillary Communal Space for Residents, • 285m^2 GFA Commercial Space, • Under-croft with 53 Car Parking Spaces & Cycle Parking
Block C	• 350 Apartments Units, • Ancillary Residential Amenity Space, • Ancillary Communal Crèche Space (272m^2 GFA), • Under-croft with 42 Car Parking Spaces & Cycle Parking
Block D	• 152 Apartments Units, • Ancillary Residential Amenity Space, • 1,500m2 GFA Local Office Space, • 477m^2 GFA Commercial Space • Under-croft with 51 Car Parking Spaces & Cycle Parking • Existing Garage & Forecourt

2.3 Based on the summary as set out above, the entire site has a total of 1,104 Apartments set out in individual blocks with streets and infrastructure arranged in traditional N-S and E-W blocks, consistent with the Local Area Plan, and as illustrated in the Layout drawings included as ***Appendix A.***

2.4 The development includes copious secure bicycle parking, limited car parking & refuse management/residential storage areas within the dedicated areas. Car Parking Quantum is addressed further within the Parking Section of the Report below. Importantly, it is proposed to remove and reconstruct the existing industrial estate roads consistent with the best practice design requirements of a residential urban area, removing and replacing the existing Industrial-type roads and road infrastructure.

2.5 The site is within the long-established Cookstown Industrial Estate, which clearly is Commercial/Industrial in nature, and this being addressed as part of the planning application. The sites are currently accessed by vehicular traffic by way of Belgard Road, Old Belgard Road, and Cookstown Estate Road.

2.6 Cookstown Road is a single carriageway 2-way road, currently subject to a 50kph speed restriction and is relatively lightly trafficked. It runs in a E-W orientation through the site (as an extension to First Avenue), and extends along the western boundary of the site where it is oriented in a N-S direction. The Traffic survey indicated that the road carries a weekday AM Peak Hour 2-Way traffic flow of approximately 600 Passenger Car Units (PCUs) and a 2-way flow of 590 PCUs in the PM Peak Hour. In these terms, the road is considered moderately trafficked in terms of its link carrying capacity.

2.7 First Ave consists of a single carriageway 2-way road, running generally in an E-W orientation, located west of the development sites. It too is subject to a 50kph speed limit, and has pedestrian footpaths along its length. The Traffic Survey indicated that the First Ave to the west carries a weekday AM Peak Hour traffic flow of approximately 190 PCUs, and a traffic flow of approximately 140 PCUs in the PM Peak Hour. In these terms, the road is considered very lightly trafficked in terms of its link carrying capacity

2.8 So, in general terms, the roads within Cookstown Industrial Estate are demonstrably lightly trafficked by vehicles currently. Out-with the Estate, Cookstown Road meets Old Belgard Road in the form of a medium ICD at-grade roundabout. Old Belgard Road is

also a single carriageway road with footpaths along both sides. It is however moderately trafficked in terms of hourly volume of flow, with a weekday AM Peak Hour traffic flow of approximately 880 PCUs, and a traffic flow of approximately 800 PCUs in the PM Peak Hour.

2.9 Belgard Rd runs parallel to Old Belgard Rd and is linked to Old Belgard Rd in several locations along its length, making the sites permeable for traffic from the east. Belgard Road is also a 2 lane dual-carriageway type road with footpaths along both sides, generally meeting all intersecting streets by way of at-grade traffic signal controlled junctions. Belgard Road is, by contrast, quite heavily trafficked in terms of hourly volume of flow, with a weekday AM Peak Hour traffic flow of approximately 1,830 PCUs, and a traffic flow of approximately 2,100 PCUs in the PM Peak Hour

2.10 A review of the Road Safety Authority (RSA) on-line database of reported road traffic accidents confirms that there have been no relevant accidents on the adjacent affected roads during the reported period 2005 to date, that are considered relevant or which will be affected by the proposed development. An extract from the RSA Database is included below as ***Figure 2.2***

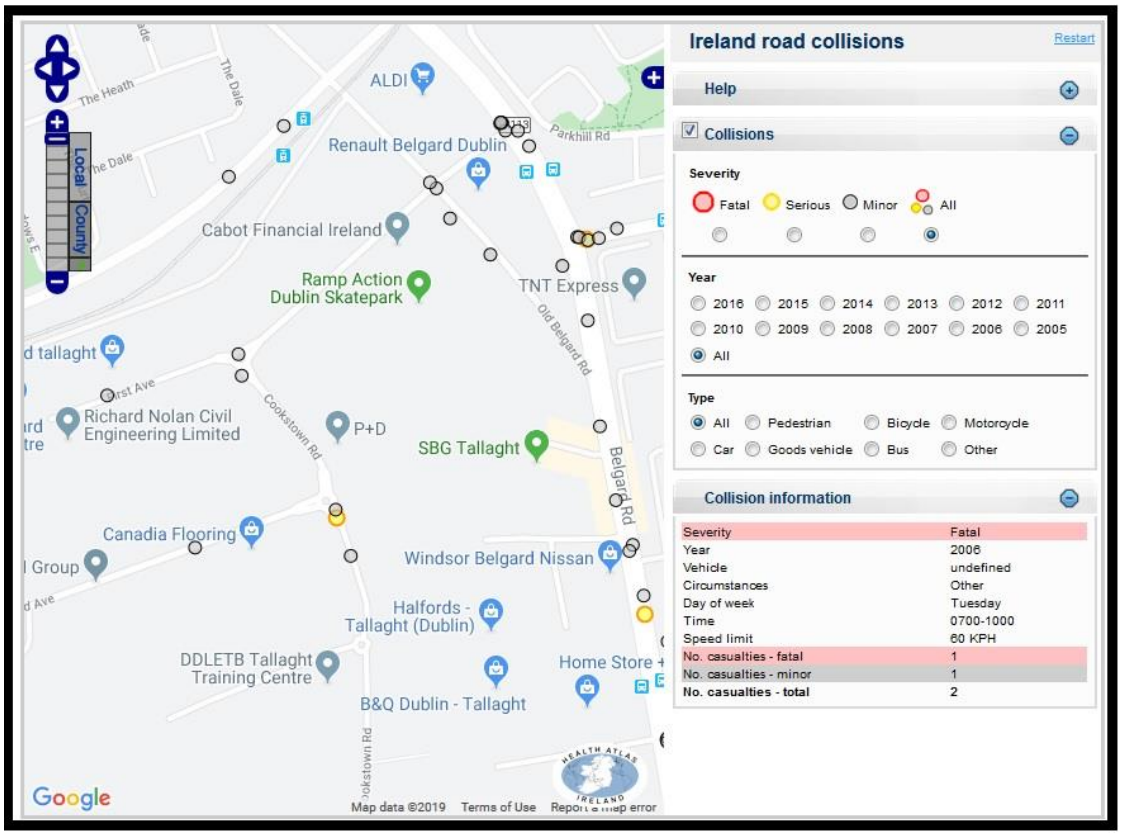


Figure 2.2 - RSA Accident Data Extract

Road Improvements and Plans

2.11 There are planned road improvements as part of this application, included as works within the red line, that will improve accessibility and increase local road permeability of the subject sites. The accessibility/permeability will be enhanced for all transport modes, with the removal of the inappropriate infrastructure and the replacement with modern residential-type infrastructure. The proposed altered internal roads will in particular increase accessibility to established public transport services and community facilities. The roadworks included in the application include; -

- The replacement & re-construction of Cookstown E-W road, along the northern extremity of the site,
- The replacement & re-construction of Cookstown N-S road, along the western boundary of the site,
- The replacement of 2 traditional Industrial Estate Roundabouts with at grade traffic signal controlled crossings (including pedestrian/cyclists priority within the sequence of the signals),
- The creation of a hight quality pedestrian route and link to the Belgard LUAS,
- New roads and links internally within the site, and
- All roads, footpaths, crossings, cyclists facilities and infrastructure constructed to standards that are consistent with a modern residential area.

2.12 The improved roads include the SDCC Part 8 construction of the N-S Link Road connecting Cookstown Industrial Estate Road through to Belgard Square North and also the 3rd party Proposal to construct an E-W Link Road through to Belgard Road, through lands known as the "Belgard Gardens Site" adjacent B&Q at Belgard Retail Park.

2.13 Given that the delivery of these two road projects are outside the control of the applicant, the beneficial effects of these links has not been included within this assessment. This is considered a robust approach, as it serves to concentrate traffic on and within the existing established road network. However, it is proposed to remove and reconstruct the existing industrial estate roads within the Red Line of the application as set out above, consistent with the best practice design requirements of a residential urban area providing safe and appropriate transportation linkages locally.

2.14 The 2 locally affected at Grade Roundabouts which are modelled as such herein are to be replaced by traffic signal controlled junctions, as this form of junction control is more appropriate for urban and residential environments.

Car Parking and Bicycle Parking Quantum & Justification

2.15 We have reviewed the **car parking** provision in terms of the maximum requirements of the SDCC Development Plan 2016-2022, for the entire development. The site is interpreted as being within SDCC Zone 2, with the resulting breakdowns provided herein for each individual Block below as ***Table 2.2, Table 2.3, Table 2.4*** and ***Table 2.5***; -

Table 2.2; - Car Parking Requirements as per SDCC Development Plan - BLOCK A

BLOCK	Element	No.	SDCC Max Rate	Requires Max No.
A	3 Bed+ Apartments	8	1.25/Unit	10
	2 Bed Apartments	137	1/unit	137
	1 Bed/Studio Apartments	115	0.75/unit	86
	Ancillary/Support Units	NA	NA	NA
	Block A Total Maximum Parking Required Under SDCC Plan			***233***

2.16 The under-croft for Site A has a provision of 72 spaces, including mobility-impaired parking spaces and this meets the MAXIMUM requirements of the SDCC Development Plan as set out above in ***Table 2.2*** above, being 30% of the maximum parking number allowed.

Table 2.3; - Car Parking Requirements as per SDCC Development Plan - BLOCK B

BLOCK	Element	No.	SDCC Max Rate	Requires Max No.
B	3 Bed+ Apartments	12	1.25/Unit	15
	2 Bed Apartments	150	1/unit	150
	1 Bed/Studio Apartments	180	0.75/unit	135
	Ancillary/Support Units	NA	NA	NA
	Block B Total Maximum Parking Required Under SDCC Plan			***300***

2.17 The under-croft for Site B has a provision of 57 spaces, including mobility-impaired parking spaces and this meets the MAXIMUM requirements of the SDCC Development Plan as set out above in ***Table 2.3*** above being 19% of the maximum parking number allowed.

Table 2.4; - Car Parking Requirements as per SDCC Development Plan - BLOCK C

BLOCK	Element	No.	SDCC Max Rate	Requires Max No.
C	3 Bed+ Apartments	25	1.25/Unit	31
	2 Bed Apartments	102	1/unit	102
	1 Bed/Studio Apartments	223	0.75/unit	167
	Ancillary/Support Units	NA	NA	NA
	Block C Total Maximum Parking Required Under SDCC Plan			***300***

2.18 The under-croft for Site C has a provision of 42 spaces, including mobility-impaired parking spaces and this meets the MAXIMUM requirements of the SDCC Development

Plan as set out above in ***Table 2.4*** above being 14% of the maximum parking number allowed.

Table 2.5; - Car Parking Requirements as per SDCC Development Plan - BLOCK D

BLOCK	Element	No.	SDCC Max Rate	Requires Max No.
D	3 Bed+ Apartments	0	1.25/Unit	0
	2 Bed Apartments	63	1/unit	63
	1 Bed/Studio Apartments	89	0.75/unit	67
	1,500m^2 Office	NA	1/75m^2	20
	477m^2 Commercial Unit	NA	1/25m^2	19
	Block D Total Maximum Parking Required Under SDCC Plan			***169***

2.19 The under-croft for Site D has a provision of 30 spaces (including those allocated to Offices), including mobility-impaired parking spaces and this meets the MAXIMUM requirements of the SDCC Development Plan as set out above in ***Table 2.5*** above being 18% of the maximum parking number allowed.

2.20 It is also noted that there are a significant number of on-street and surface parking spaces provided within the new street design along each of the new streets, adjacent Blocks A, B, C and D - these on street spaces are consistent with the recommendations of DMURS. **There are a total of 131 Spaces provided on-street, that are not reflected in the above calculations.** These spaces will facilitate short stay and visitor use, as well as facilitating set down and pick up, and taxi use, in addition to contributing to the streetscape wholly consistent with DMURS (which recommends street activity to promote lower ambient traffic speeds). The total car parking provision is 332 spaces, representing a parking ratio of 0.3 per unit.

2.21 The requirement for bicycle parking has also been assessed in accordance with the ***SDCC Development Plan*** and this is included below as ***Table 2.6*** to ***Table 2.9***

Table 2.6; - Block A - Min Bicycle Parking as per SDCC Development Plan -

Element	SDCC Max Parking Rate		Requires	
	Long Term	Short Stay	Long Stay	Short Stay
260 Apartments	1/5 units	1/10 units	52	26
Total Min Cycle Parking Required Under SDCC Plan			***78***	

Table 2.7; - Block B - Min Bicycle Parking as per SDCC Development Plan -

Element	SDCC Max Parking Rate		Requires	
	Long Term	Short Stay	Long Stay	Short Stay
342 Apartments	1/5 units	1/10 units	68	34
Total Min Cycle Parking Required Under SDCC Plan			***102***	

Table 2.8; - Block C - Min Bicycle Parking as per SDCC Development Plan -

Element	***SDCC Max Parking Rate***		***Requires***	
	Long Term	Short Stay	Long Stay	Short Stay
350 Apartments	1/5 units	1/10 units	70	35
Total Min Cycle Parking Required Under SDCC Plan			***105***	

Table 2.9; - Block D - Min Bicycle Parking for Apartments as per SDCC Development Plan -

Element	***SDCC Max Parking Rate***		***Requires***	
	Long Term	Short Stay	Long Stay	Short Stay
152 Apartments	1/5 units	1/10 units	30	15
Total Min Cycle Parking Required Under SDCC Plan			***45***	

2.22 Notwithstanding the Bicycle Parking & Storage requirements of the SDCC Development Plan, as illustrated above, cycle storage facilities are generally being provided to meet the more onerous requirements of The Department of Housing Planning & Local Government "***Sustainable Urban Housing Design Standards for New Apartments***" to meet the satisfaction of An Bord Pleanála.

2.23 In this regard, we set out below a schedule illustrating the current Bicycle Parking Provision at each of the Blocks, as ***Table 2.10.*** We believe that the bicycle parking provision is adequate to accommodate the worst case demands of the scheme.

Table 2.10; - Bicycle Parking Provided Per-Block & Total (With Bed Spaces illustrated)

Block Ref Fig 1.2	***At-Grade Visitor Cycle Parking Around Site***	***Bedrooms Per Block***	***Residential Cycle Spaces Required..***	***Total Residential Cycle Parking Provided***
Block A	***Refer Below***	**413**	**413**	**540**
Block B	***Refer Below***	**516**	**516**	**336**
Block C	***Refer Below***	**502**	**502**	**336**
Block D	***Refer Below***	**215**	**215**	**252**
Visitor Parking Assessment		**1 per 2 Units**		
Visitor Cycle Spaces		**552 Suggested**	**396 visitor spaces are provided at-Grade**	
Total Bicycle Parking Provided (for 1,104 Apartments with 1,646 Bedrooms Total)			**1,860**	

Discussion/Justification - Car Parking

2.24 Approximately c 30% of the maximum Development Plan Parking Maximum Standards are being provided within the parking areas associated with each block. In terms of the "***Sustainable Urban Housing Design Standards for New Apartments***" and the

requirement for private car parking spaces, we include below as ***Table 2.11*** an illustration of the Parking Ratio for each individual Block, for ease of reference by ABP.

Table 2.11; - Car Parking Provision & Ratio Provided Per-Block

Block (Ref Fig 1.2)	*No Apts*	*No. Parking Spaces*	*Parking Ratio*
Block A	**260**	**72**	**0.28**
Block B	**342**	**57**	**0.17**
Block C	**350**	**42**	**0.12**
Block D	**152**	**30***	**0.20**
Total	**1,104**	**201**	**-----**

* ***For Residential Elements***

2.25 If however the 131 No. on-street parking spaces are also included, there are 332 car parking spaces provided **representing a parking ratio overall of 0.3**. The Number of Parking Spaces provided for each block is considered to be appropriate for the development, consistent with other sustainable similarly ideally located developments of this nature. In this case the reduced parking provision is considered appropriate in light of the location of the proposed development immediately adjacent high quality public transport (and in consideration of the provisions of the SDCC Development Plan being "Maximum" standards).

2.26 There is also a commitment to provide a 'Hub' with a total of 16 Go-Car car share spaces within the scheme. The letter of intent with regard to this element is included herein within ***Appendix A***. The generous provision of Go-Car spaces provides ready-access to vehicles for residents in the event of requiring same.

2.27 The development is not a fully traditional residential apartment development. There are elements of 'Build-to-Rent' and, in this regard, the Car Parking requirements are fundamentally different, with anticipated lower car ownership and dependency for this nature of scheme. Given the low number of spaces provided (effectively visitor/mobility impaired parking, 16 No Go-Car Spaces & set down provision), the entire scheme will be actively marketed and promoted as a "***Reduced Car Dependency***" scheme and this will be communicated from the outset as part of sales and marketing. The development will also be managed on an on-going basis to ensure that the Reduced Car Dependency nature of the development is continually promoted and enhanced.

2.28 The National Standard, The Department of Housing Planning & Local Government "***Sustainable Urban Housing Design Standards for New Apartments***" sets out the parking requirements based on locational characteristics of any development and states (Paragraph 4.18); -

Car Parking

The Quantum of Car parking or the requirement for any such provision for apartment developments will vary having regard to the types of location in cities and towns that may be suitable for apartment development, broadly based on proximity and accessibility criteria.

2.29 It then goes on to identify the locational characteristics and features that warrant a reduction or elimination in provision of private car parking spaces (Paragraph 4.19) ;-

Central and/or Accessible Urban Locations

In larger scale and higher density developments, comprising wholly of apartments in more central locations that are well served by public transport, the default policy is for car parking provision to be minimised, substantially reduced or wholly eliminated in certain circumstances. The policies above would be particularly applicable in highly accessible areas such as in or adjoining city cores or at a confluence of public transport systems such as rail and bus stations located in close proximity.

2.30 In terms of the stated Policy, the subject site meets all the requirements for significantly reducing or eliminating the provision of Private Car Parking, under the headings; -

High Density Development	✓
Comprising Wholly of Apartments	✓
Central Location	✓
Well Served by Public Transport	✓
Rail/Bus in Close Proximity	✓

2.31 In these terms the proposed subject development meets all the necessary requirements for significantly reduced car parking provision, in this case c. 20% of the SDCC Max Car Parking requirement.

2.32 The National Apartment Guidance states (Paragraph 4.23); -

For all types of location, where it is sought to eliminate or reduce car parking provision, it is necessary to ensure, where possible, the provision of an appropriate number of drop off, service, visitor parking spaces and parking for the mobility impaired. Provision is also to be made for alternative mobility solutions including facilities for car sharing club

vehicles and cycle parking and secure storage. It is also a requirement to demonstrate specific measures that enable car parking provision to be reduced or avoided.

2.33 Conscious that the scheme is intended to be actively marketed as Reduced Car Dependency, the layout has been designed with the above issues in mind and the drawings clearly show the required features; -

Drop Off Spaces	✓
Apartment Servicing Areas/Spaces	✓
Dedicated Visitor Parking Spaces	✓
Mobility Impaired Spaces	✓
"Go-Car" Spaces	✓
Cycle Parking & Cycle Storage	✓

2.34 In terms of ***specific measures*** to enable car parking provision to be reduced to the level proposed, in this case the specific measures are; -

- The Active Management and Marketing of the Development from the outset as Reduced Car Dependency',
- Very Limited Dedicated Car Parking is intended to be provided to Residents or will any be attached to any rental properties (and same will be Specified in associated Rental Agreements),
- The Location within walking distance of all South Dublin amenities (eg The Square and SDCC HQ, Tallaght Hospital etc) and schools,
- Associated Employment Opportunities locally (*Based on the CSO Census Data, in 2016 there were 2,958 commuters who lived in the Electoral Division of Tallaght - Springfield but worked elsewhere. There were 8,874 commuters who travelled in to this electoral division to work. This resulted in a net in-flow of 5,916 commuters. This indicates that the locality has significant employment opportunities, and these are continually improving*),
- Proximity to the LUAS being served by the LUAS Red Line 'on the doorstep' of the sites,

- Very easy walk distance from the Dublin Bus Terminus at *The Square* (from where 7 high frequency services currently operate)

- 16 No. Dedicated "Go Car" spaces/cars provided within the development,

- Copious Cycle Parking and Cycle Storage (Refer Above),

- On site Security and Management by permanent staff and CCTV that will ensure the car parking areas are monitored and policed, with a clamping system in operation, so that the car parking restrictions are closely controlled and enforced.

3. TRIP GENERATION, ASSIGNMENT & DISTRIBUTION

3.1 The Trip Rate Information Computer System (TRICS) database is used to ascertain vehicular trip generation associated with the use of any particular site. This represents industry standard practice for Transportation Assessments in Ireland.

3.2 In this case the worst case assessment is based on TRICS, and a robust and onerous assessment has been undertaken in order to ensure that we thoroughly assess the impact, in terms of stress-testing the access junctions and the road capacity impact of the scheme. In this case the assessment has not considered the beneficial diluting effect of the proposed road improvements, apart from the recommended upgrade of the adjacent roundabouts to traffic signal control, and this therefore represents a robust assessment of impact as traffic generated is assumed to be concentrated within the existing network rather than within a more permeable network as planned by SDCC.

3.3 The Trip Rates applied in this case for each individual Block are as summarised below as ***Table 3.1, Table 3.2, Table 3.3 and Table 3.4*** and are as individually broken down and extracted from the relevant TRICS Database within Appendix B and Appendix C herewith

Table 3.1; - TRICS Data Summary, Worst Case Traffic Generation BLOCK A

Network Period	PCU Arrivals	PCU Departures	Total 2-Way Traffic
Weekday AM Peak Hr	15	51	66
Weekday PM Peak Hr	47	22	69

Table 3.2; - TRICS Data Summary, Worst Case Traffic Generation BLOCK B

Network Period	PCU Arrivals	PCU Departures	Total 2-Way Traffic
Weekday AM Peak Hr	38	84	122
Weekday PM Peak Hr	86	57	143

Table 3.3; - TRICS Data Summary, Worst Case Traffic Generation BLOCK C

Network Period	PCU Arrivals	PCU Departures	Total 2-Way Traffic
Weekday AM Peak Hr	29	77	106
Weekday PM Peak Hr	70	38	108

Table 3.4; - TRICS Data Summary, Worst Case Net Traffic Generation BLOCK D

Network Period	PCU Arrivals	PCU Departures	Total 2-Way Traffic
Weekday AM Peak Hr	39	40	79
Weekday PM Peak Hr	40	44	84

3.4 We have included herein as ***Appendix B*** the TRICS data output for the individual elements upon which the above are based, conscious of course that the majority if not all elements of the development will be for the use of local residents and do not therefore generate external traffic movements.

Assignment/Distribution - Future Year Traffic

3.5 We have used hand assignment techniques based on common-sense origin destination traffic patterns, with the worst case traffic assigned to the roads. We have assumed that 100% of the traffic will have the proposed individual under-croft development vehicular access as origin/destination during the peak hours, as it is considered that this methodology will result in the most onerous assessment of the impact on the adjacent roads.

3.6 The standard methodology applied was to firstly ascertain the base background traffic conditions for both the weekday AM and weekday PM Commuter Peak periods. We then used the TII Project Appraisal Guidelines (Unit 5.5 Link-Based Traffic Growth forecasting) to establish opening/occupation year 2025 and design year 2040 traffic conditions on the local road network.

3.7 The worst case traffic based on the content of the above tables was then applied in order to establish Opening Year and Design Year Traffic Conditions. This is all included in the calculations included herein as ***Appendix C***.

3.8 It should be noted that we have selected an opening year of 2025 as being reasonable and appropriate, in terms of full occupation - However, varying the opening year and design year by 1-3 years will have no significant impact upon the conclusions of the study.

4. TRAFFIC IMPACT - TRAFFIC CAPACITY RESULTS

4.1 The Institution of Highways and Transportation (IHT) Guidelines for Traffic Impact Assessment and the TII Traffic and Transport Assessment Guidelines sets out a mechanism for assessment of developments of this nature and determining whether further assessment is indeed required. This industry standard process requires a **Threshold Assessment** of the impact on the local roads to be provided in order to determine whether further more detailed modelling and assessment of particular critical junctions is necessary.

4.2 The professional guidance referenced above sets out specific increases in traffic volume associated with new development, which, if breeched, requires further detailed analysis to be undertaken. The recommendation is that, if the expected increase is 5% or greater, then further analysis is warranted in circumstances where junctions are within but are nearing capacity. It should be noted that the observed and surveyed traffic on the affected roads within the Industrial Estate are considered very low, and in this regard the addition of new traffic has a more onerous net effect (in simple terms, with low levels of existing traffic the net effect of increased traffic is greatly exacerbated).

4.3 In this regard, it is anticipated that the addition of the proposed development, to long established roads in the area will in reality not result in any significant level of increase in traffic capacity issues arising on the local roads, with all anticipated traffic increases being below the Industry-Standard levels above which further assessment is required. This is particularly the case in terms of impact upon for example Belgard Road Traffic conditions, as evidenced from the Threshold Assessment included below.

4.4 In the case of the subject site, in the context of its former industrial uses, given the previous established volume and nature of the traffic associated with these industrial uses it is expected that the conversion to local residential uses will see a significant improvement in traffic conditions for all transport modes.

4.5 It should also be noted that the proposed road improvements described above will in time further reduce traffic impact by dispersing and diluting the effect of any additional development related traffic volumes. In addition, under Assessment Guidance, any requirement to consider the effect of other committed or planned development would have the effect of further increasing base/background traffic conditions and would have the knock-on effect of reducing the net impact of the subject development traffic.

4.6 We have undertaken the detailed assessment of the impact of the proposed development (Reference ***Appendix C*** herewith), and this confirms the Threshold Impact of locally affected junctions as set out below as ***Table 4.1***.

Table 4.1; - Threshold Assessment of Junction Impact - TII Guidelines

Relevant Junction	AM Peak (%)	PM Peak (%)	Comment
Internal Estate Junctions	**N/A**	**N/A**	**ALL Key Junctions Assessed Below**
Cookstown Rd/Belgard Rd	**4.52%**	**4.07%**	**Sub 5% Threshold - No Assessment Reqd**
R838/Belgard Rd	**1.34%**	**1.18%**	**Sub 5% Threshold - No Assessment Reqd**
R383/Old Belgard Rd	**2.96%**	**4.77%**	**Sub 5% Threshold - No Assessment Reqd**
Cookstown Rd/Old Belgard Rd	**14.3%**	**16.8%**	**Exceeds 5% - Junction Assessed**

Internal Roundabout at First Ave/Cookstown Estate Rd

4.7 We have used the TII-approved computer simulation model ARCADY (Assessment of Roundabout Capacity and Delay) to assess the capacity queues and delay at the existing junction and in order to confirm that adequate reserve capacity exists in order to accommodate the proposed development traffic. The results of the modelling are summarised as ***Table 4.2***, with the entire models included herein as ***Appendix D***.

Table 4.2; - ARCADY Summary Results First Ave/Cookstown Estate Roundabout

Modelled Scenario	Period Mean Max Q (PCUs)	Period Max RFC
2025 Opening Year AM Peak	<1	0.43
2025 Opening Year PM Peak	<1	0.3
2040 Design Year AM Peak	<1	0.47
2040 Design Year PM Peak	<1	0.33

4.8 The results confirm that the existing junction, in its current form, is way more than adequate to accommodate the worst case traffic conditions associated with the entire of the proposed development, with all RFCs way below 100% (and indeed all are below the Industry Standard recommended Max RFC of 0.85).

4.9 However, it is accepted that a roundabout may not constitute the most appropriate form of junction within what is to become a residential estate, with the associated increased pedestrian and cyclist movements, and we believe that the existing roundabout may be best replaced with a simple Signal Controlled T-Junction (subject to agreement with SDCC). However, the modelling confirms existing adequacy.

Cookstown Estate Rd/New E-W Street - Worst Case T Junction

4.10 We have undertaken an assessment of the capacity queues and delays at the proposed priority controlled junction using the TII-approved simulation model PiCADY (Priority Intersection capacity and Delay). The output of the assessment is included herein as ***Appendix E***, and is summarised below as ***Table 4.3***.

Table 4.3; - PiCADY Summary Results New E-W Street/Cookstown Estate Rd Junction

Modelled Scenario	Period Mean Max Q (PCUs)	Period Max RFC
2025 Opening Year AM Peak	<1	0.24
2025 Opening Year PM Peak	<1	0.13
2040 Design Year AM Peak	<1	0.25
2040 Design Year PM Peak	<1	0.14

4.11 All Results Above are well below the theoretical maximum accepted RFC of 0.85 and therefore no capacity problems are anticipated at the Junction.

4.12 It should be noted that the **anticipated traffic flows at this junction are significantly greater than any of the other priority controlled T Junctions on the local network**, including all of the accesses to the proposed under-crofts and development accesses - in these terms the analysis provides evidence and assurance that there will be no capacity related issues whatsoever arising at other proposed network junctions.

Roundabout at Old Belgard Rd/Cookstown Estate Rd

4.13 We have also again used the TII-approved computer simulation model ARCADY (Assessment of Roundabout Capacity and Delay) to assess the capacity queues and delay at the existing junction and in order to confirm that adequate reserve capacity exists in order to accommodate the proposed development traffic. The results of the modelling are summarised as ***Table 4.4***, with the entire models included herein as ***Appendix F.***

Table 4.4; - ARCADY Summary Results Old Belgard Rd/Cookstown Estate Roundabout

Modelled Scenario	**Period Mean Max Q (PCUs)**	**Period Max RFC**
2025 Opening Year AM Peak	4	0.84
2025 Opening Year PM Peak	2	0.57
2040 Design Year AM Peak	8	0.91
2040 Design Year PM Peak	2	0.61

4.14 The assessment demonstrates that the roundabout has adequate capacity to accommodate the worst case development traffic right up to the Design Year 2040, with all RFCs being within 100% (and only marginally above the industry recommended level of 85% in 2040) . It should be noted that ARCADY is a macro-simulation modelling tool, which relies on free flow for exiting traffic on downstream links, and other variables which can affect junction operation. In this regard, whilst the junction model demonstrates adequate capacity it is understood that there are other external capacity constraints that can affect operation, and this is most likely the case here.

4.15 In this case therefore it is accepted that a roundabout may not constitute the most appropriate form of junction as one of the main points of vehicular access to what is to become a residential estate, given the associated increased pedestrian and cyclist movements. We therefore believe that the existing roundabout may well be best replaced with a simple 4-arm Signal Controlled 'Crossroads' Junction (subject to agreement with SDCC), consistent with other junctions on Belgard Rd. Alternatively, it could be combined with off-set dedicated controlled pedestrian crossings. Any redesign of the junction that may be deemed necessary will be agreed with officials in SDCC.

4.16 The analysis undertaken confirms that there is adequate capacity in the existing and proposed junctions to accommodate the worst case traffic projections without any concerns arising in terms of traffic congestion or indeed Traffic Safety.

5. RESPONSE TO ITEM #2 OF ABP OPINION OF 29 APRIL 2020

5.1 This Section of the Transportation Assessment Report addresses the specific issues raised within Section 2 of the ABP Opinion dated 29th April 2020, which is reproduced below as ***Figure 5.1.***

> **2.** Further consideration of the documentation as it relates to access to the proposed development and to the streets in and around the site. The documentation should demonstrate whether the street network would provide adequate access for pedestrians and other road uses from the proposed development to public transport facilities, places of employment and commercial and social services, having regard to the principles and detailed requirements for urban streets set out in DMURS. In particular the documentation should clarify whether and how any new pedestrian access would be provided to the Luas stop at Belgard and whether and how the existing roads in the industrial estate would be altered to make them suitable to serve urban residential development. If separate cycle facilities are proposed the documentation should demonstrate whether they would comply with the National Cycle Manual and provide proper priority for cyclists over vehicles exiting from minor roads at junctions. The documentation should also provide a rationale for the proposed provision of parking for cars and bicycles.

Figure 5.1 – Extract ABP Opinion, Item #2

In particular it is noted that possibly the most appropriate response to the Item 2 cn be found in Appendix H (beginning at page 132) and in Appendix I (beginning at page 154) of the Transport Assessment document which in turn is part of Appendix 10.1 of the EIAR.

5.2 In terms of ***'The documentation should demonstrate whether the street network would provide adequate access for pedestrians and other road users from the proposed development to public transport facilities, places of employment and commercial and social services, having regard to the principles and detailed requirements for urban streets set out in DMURS'***, the best reference to where this is addressed is within ***Appendix I*** of this Report, and we highlight the following;

- The design of the local replacement streets within the Red Line have been carefully undertaken, so as to be fully consistent with DMURS, and a DMURS Statement of Consistency is included herein as Appendix I,

- The DMURS Statement of Consistency states; - "*The proposed layout strategy seeks to maximise connectivity between key local destinations through the provision of a high level of permeability and legibility for all journeys, particularly for sustainable forms of travel (cycling and walking). The proposed residential scheme delivers greater mode and route choices along direct, attractive and safe linkages to local amenities and schools/service destinations through replacement of the existing industrial estate roads with modern streets"*
- The DMURS Statement of Consistency goes on to state; "*High Quality Connections between the proposed development and the employment areas and facilities within Tallaght, are provided"*
- The Independent Safety Audit included as ***Appendix G*** included a review of accessibility for cyclists, pedestrians and mobility impaired users and all of the issues raised by the Audit Team are incorporated.

5.3 In terms of ***'The documentation should clarify whether and how any new pedestrian access would be provided to the LUAS Stop at Belgard and whether and how the existing roads in the industrial estate would be altered to make them suitable to serve urban residential development'*** we highlight the following; -

- The planning application includes for the construction of a dedicated link to the Belgard LUAS Stop, and a letter of consent from the landowner (in this case Dublin City Council) has been received and is included as part of the planning application,

- All of the existing Industrial Estate roads & associated junctions within the red line of the planning application are being replaced with modern residential estate quality links and infrastructure, and **Section 2.11** of this Report states; -

  There are planned road improvements as part of this application, included as works within the red line, that will improve accessibility and increase local road permeability of the subject sites. The accessibility/permeability will be enhanced for all transport modes, with the removal of the inappropriate infrastructure and the replacement with modern residential-type infrastructure. The proposed altered internal roads will in particular increase accessibility to established public transport services and community facilities. The roadworks included in the application include; -

- *The replacement & re-construction of Cookstown E-W road, along the northern extremity of the site,*
- *The replacement & re-construction of Cookstown N-S road, along the western boundary of the site,*
- *The replacement of 2 traditional Industrial Estate Roundabouts with at grade traffic signal controlled crossings (including pedestrian/cyclists priority within the sequence of the signals),*
- *The creation of a hight quality pedestrian route and link to the Belgard LUAS,*
- *New roads and links internally within the site, and*

All roads, footpaths, crossings, cyclists facilities and infrastructure constructed to standards that are consistent with a modern residential area.

5.4 In terms of ***'If separate cyclist facilities are proposed, the documentation should demonstrate whether they would comply with The National Cycle Manual and provide proper priority for cyclists over vehicles existing from minor roads at junctions'*** we highlight the following;

- Proposed Cycle facilities on the Larger Public Roads are compliant with the National Cycle Manual (NCM) (NCM pages 12 & 83), with advance cycle facilities and Toucan type crossings incorporated into all signal controlled junctions. Internally, for the minor streets, the cyclists infrastructure is also consistent with the NCM (Pages 54 & 55).

- Pedestrian and cyclist priority at minor roads, and associated traffic calming, is achieved through the use of raised platforms which afford priority to pedestrians and cyclists.

5.5 In terms of ***'The documentation should also provide a rationale for the proposed provision of parking for cars and bicycles'***, we highlight the following;

- A comprehensive rationale supporting the provision of Bicycle Parking & Car Parking numbers is set out in this Report (Paragraph 2.15 to 2.34 inclusive).

6. CONCLUSIONS

6.1 This Transportation Assessment Report assesses the traffic & transportation impact of the proposal to construct and occupy a large residential apartment development on lands west of Old Belgard Rd, North, South & West of Cookstown Rd within Cookstown Ind Est, Tallaght, D24. The proposed development comprises distinct blocks, with a greatly improved street network as illustrated on the enclosed plans.

6.2 The scheme design reflects the Transportation Planning Policy provisions of the SDCC Development Plan & the Tallaght Local Are Plan (LAP)

6.3 This Report has been prepared in accordance with the TIIs Traffic & Transport Assessment Guidelines, and is based on industry standard high Trip Generation Rates, in order to provide an onerous and robust assessment of the impact of the proposed development.

6.4 The analysis includes the effects of the existing traffic on the local roads and is based on a comprehensive classified vehicle turning movement survey undertaken for the purposes of this study, prior to the Covid 19 Pandemic Emergency. The assessment does not include the further beneficial effects associated with the proposals to improve accessibility and reduce impact through the provision of new road links to the subject lands. It is proposed to remove and reconstruct the existing industrial estate roads within the Red Line of the application, consistent with the best practice design requirements for a residential urban area providing safe and appropriate transportation linkages locally, changing the nature and form of the existing 'industrial streets'.

6.5 The proposed development site is ideally located within the heart of Tallaght Town Centre, and will therefore benefit from access to non-car modes of travel.

6.6 Car and Bicycle Parking is being provided generally in compliance with the requirements of the SDCC Development Plan and The Department of Housing Planning & Local Government "***Sustainable Urban Housing Design Standards for New Apartments***". Following our review of the provision we consider the number of car and bicycle parking spaces provided to be adequate and appropriate

6.7 An independent Stage 1 Road Safety Audit of the layout and the road network is included as ***Appendix G***. A preliminary Mobility Management Plan (aka Travel Plan) has been prepared to underscore the multi-modal accessibility of the site and is included as ***Appendix H***. A

review of the design in accordance with the requirements of DMURS is completed & the resulting *Statement of Consistency* is included as ***Appendix I***.

6.8 This report demonstrates that the proposed Development will have a negligible impact upon the established local traffic conditions and can easily be accommodated on the road network without any capacity or road safety concerns arising.

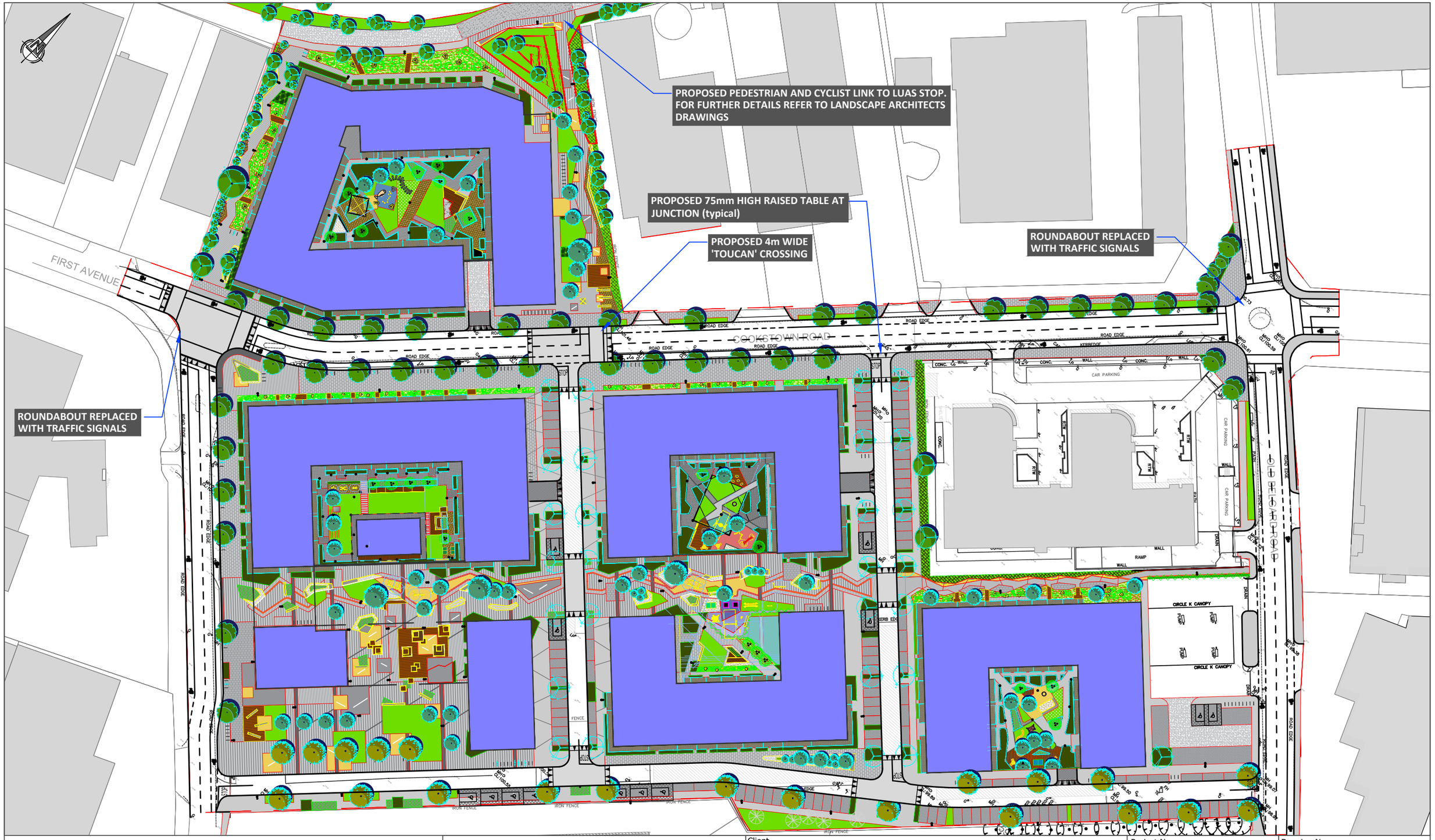
6.9 It is considered that there are no significant Operational Traffic Safety or Road Capacity issues that prevent a positive determination of the application by An Bord Pleanála.

APPENDICES - CONTENT

A	Proposed Development – Layout, Roads Arrangement & Access. Go-Car Letter of Intent/Commitment.
B	TRICS Trip Generation Output (Apartments, Shops, Offices, PFS)
C	Traffic Surveys, Trip Distribution & Network Traffic Flow Diagrams
D	ARCADY Junction Simulation Model Output - Cookstown Rd/1st Ave R'Abt
E	PiCADY Junction Model Output - Cookstown Rd/New E-W Street
F	ARCADY Junction Simulation Model Output - Old Belgard Rd/1st Ave R'Abt
G	Independent Stage 1 Road Safety Audit & Designer Feedback Form
H	Preliminary Mobility Management Plan (Travel Plan)
I	DMURS Statement of Consistency

APPENDIX A

Proposed Development -
Layout, Roads Arrangement & Access.
Go-Car Letter of Intent/Committment



NRB Consulting Engineers Ltd recommend that Road and land ownership boundaries are verified through Legal & Land searches by the Client.

This drawing is based upon CSR drawing 16408-2-100LMP, received 02/12/20. NRB Consulting Engineers Ltd shall not be liable for any inaccuracies or deficiencies.

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Client

Project No. 19-036

Drawing No. NRB-TA-001

Project: Lands west of Old Belgard Road and north, south and west of Cookstown Road, Cookstown Ind Est

Drawn	Checked	Approved
PB	ER 07/12/20	ER 07/12/20

Title: Proposed Development Layout

Date: 30-Nov-20

Scale @ A3: 1:1000

Rev

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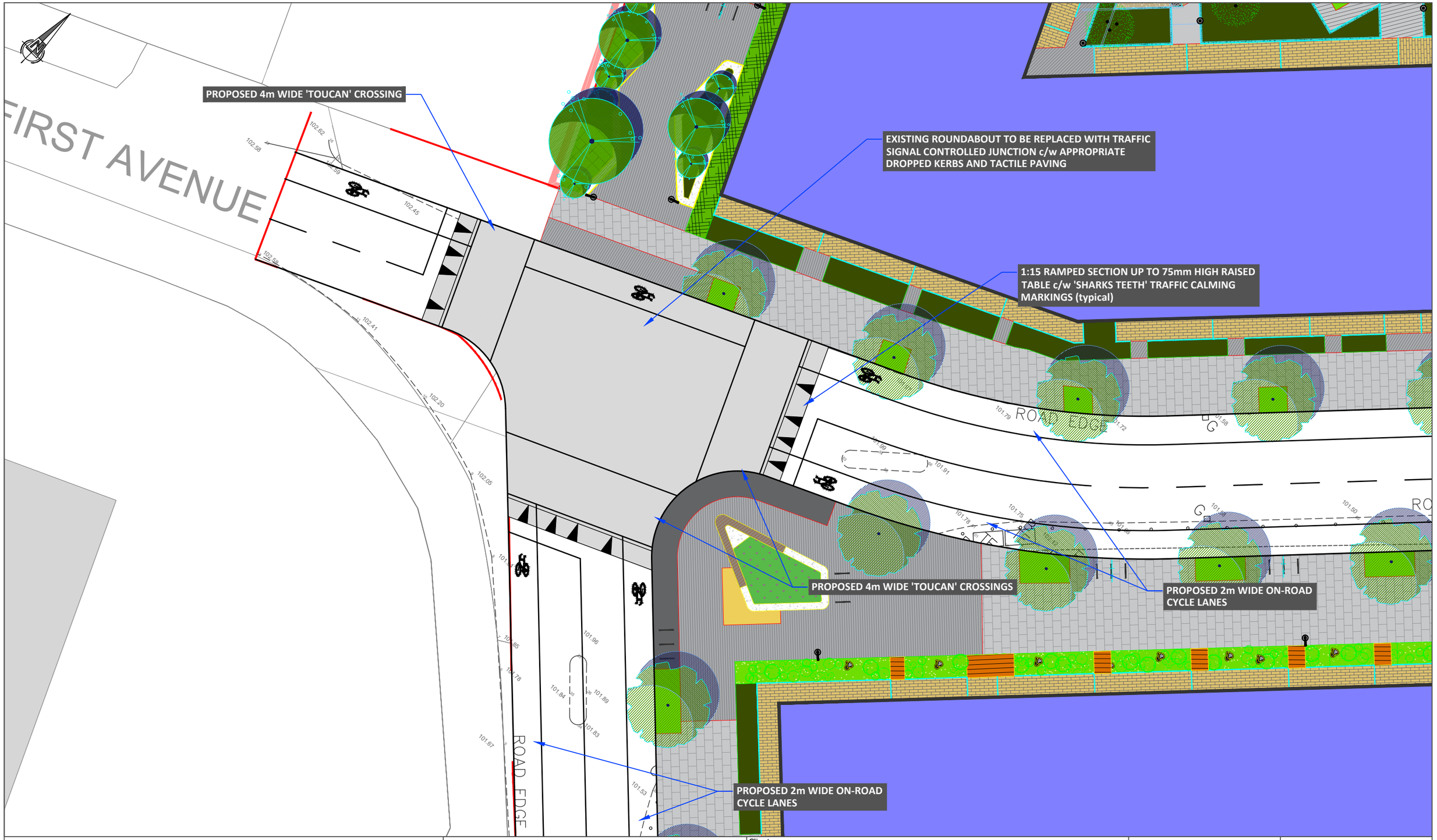
Purpose of Issue: ☐ Draft ☐ As Built ☐ Information ☐ Tender ☐ Approval ☐ Construction



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NRB consulting engineers

Client

Project: Lands west of Old Belgard Road and north, south and west of Cookstown Road, Cookstown Ind Est

Title: Proposed Traffic Sginals Layout at Junction of Cookstown Road and First Avenue

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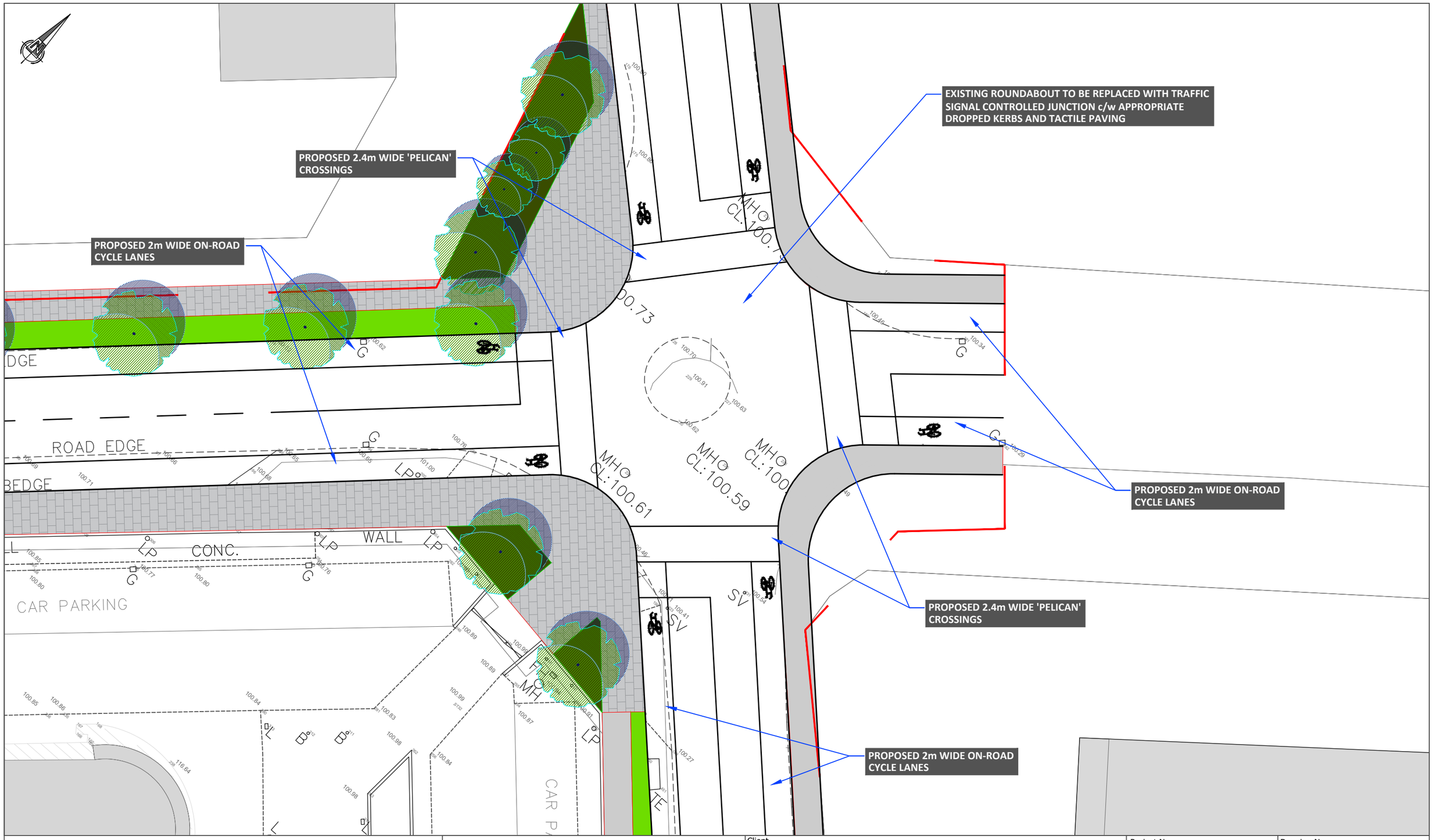
Project No.	Drawing No.
19-036	NRB-TA-002

Drawn	Checked	Approved
PB	ER 30/11/20	ER 30/11/20

Date	Scale @ A3	Rev
30-Nov-20	1:250	

Purpose of Issue: ☐ Draft ☐ Information ☐ Approval ☐ As Built ☐ Tender ☐ Construction



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NRB consulting engineers

Client

Project: Lands west of Old Belgard Road and north, south and west of Cookstown Road, Cookstown Ind Est

Title: Proposed Traffic Sginals Layout at Junction of Cookstown Road and Old Belgard Road

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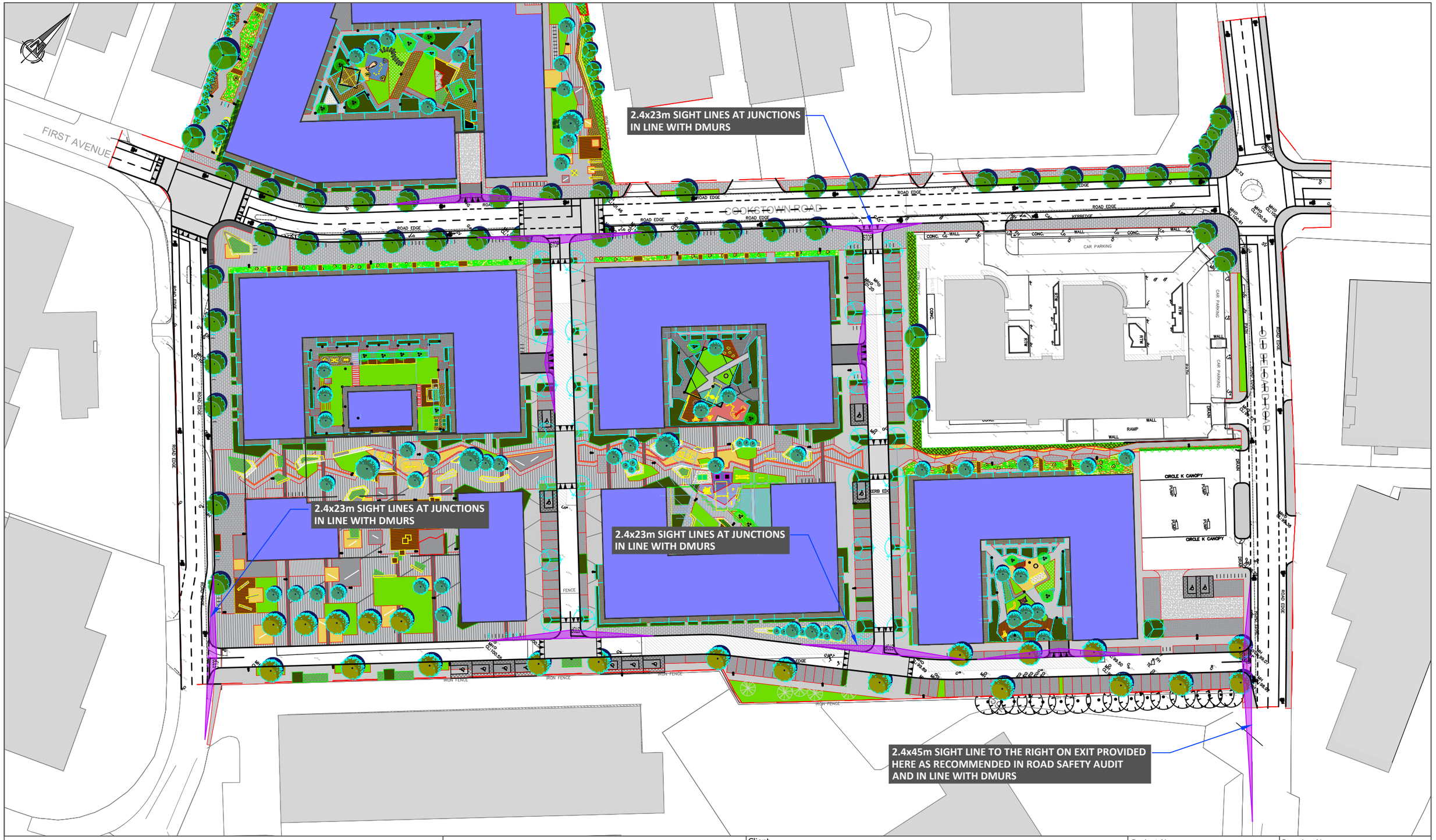
Project No.	Drawing No.
19-036	NRB-TA-003

Drawn	Checked	Approved
PB	ER 30/11/20	ER 30/11/20

Date	Scale @ A3	Rev
30-Nov-20	1:250	

Purpose of Issue: ☐ Draft ☐ As Built ☐ Information ☐ Tender ☐ Approval ☐ Construction



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NRB consulting engineers

Client

Project: Lands west of Old Belgard Road and north, south and west of Cookstown Road, Cookstown Ind Est

Title: Proposed Development Junction Sightlines

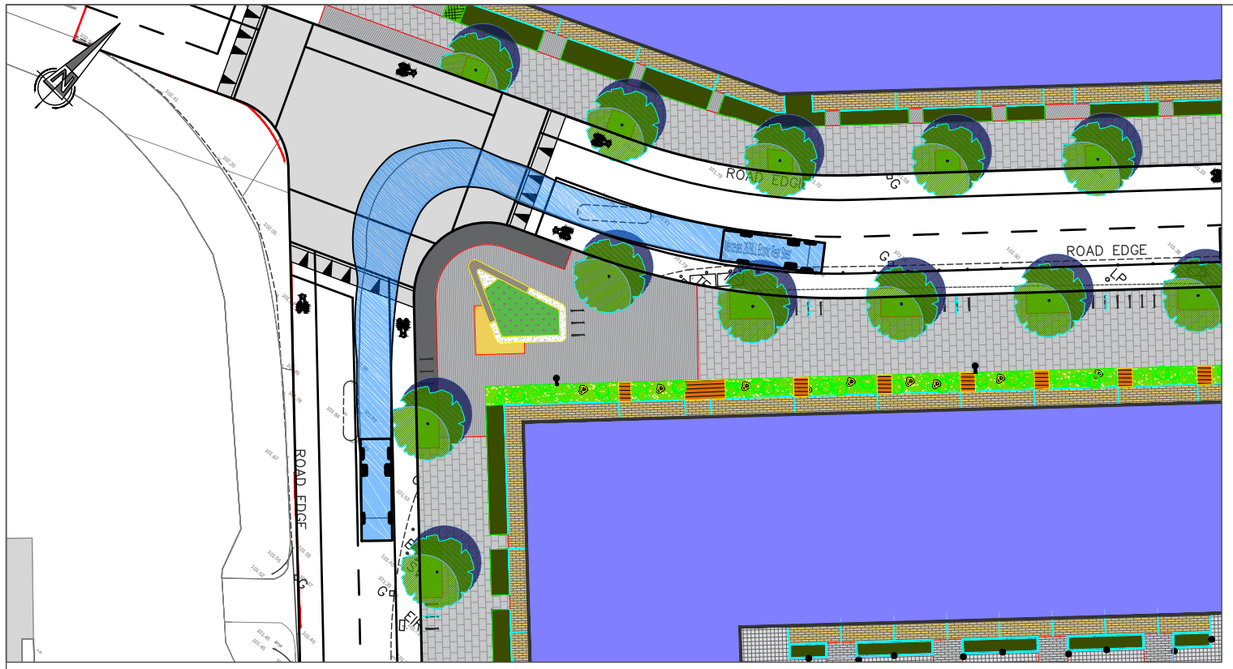
NRB Consulting Engineers Ltd accept no responsibility for any unauthorised amendments to this drawing. Only figured dimensions to be worked to.

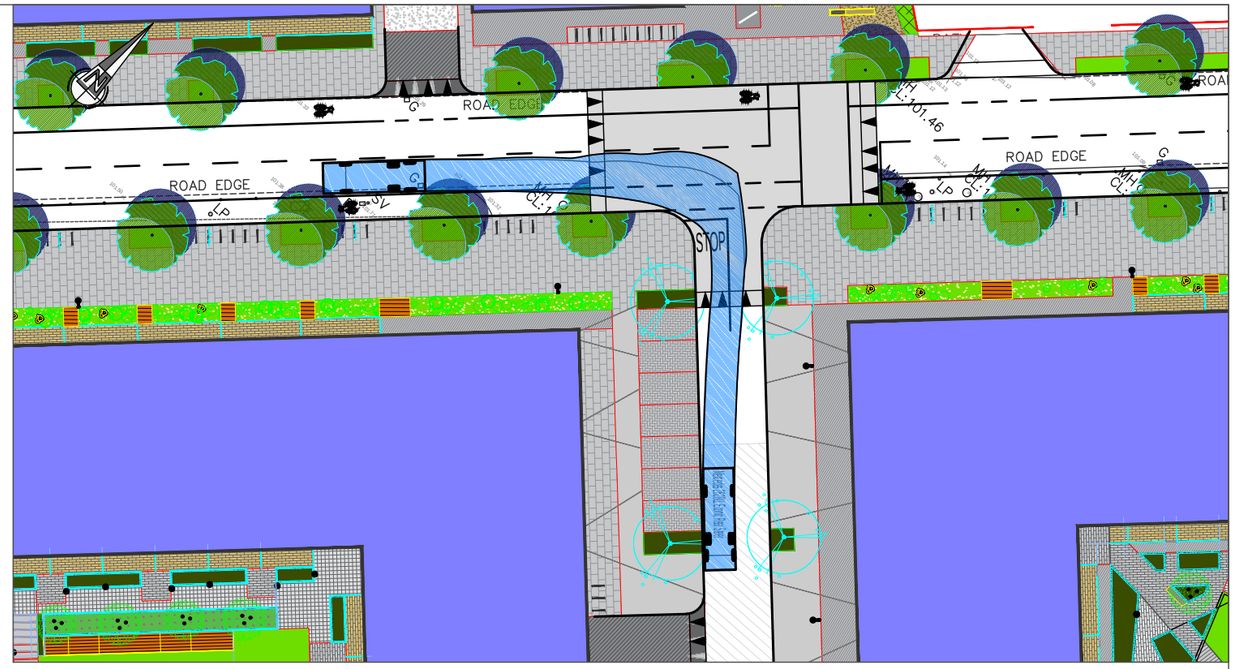
Project No.	Drawing No.
19-036	NRB-TA-004

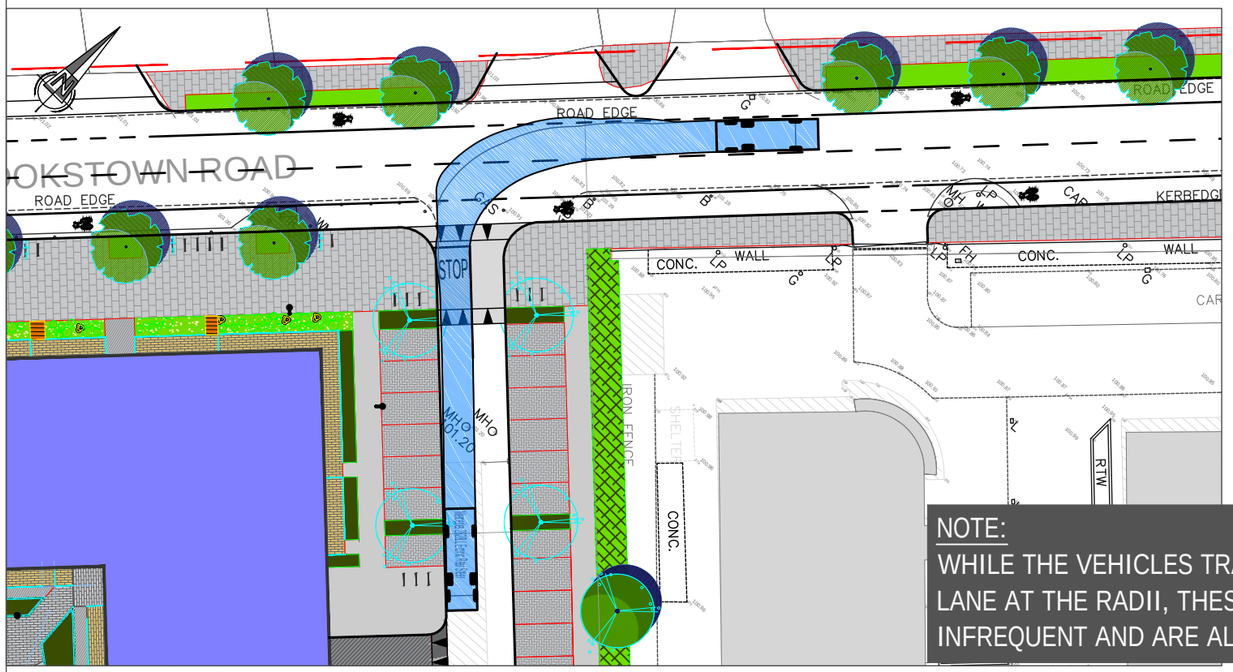
Drawn	Checked	Approved
PB	ER 07/12/20	ER 07/12/20

Date	Scale @ A3	Rev
7-Dec-20	1:1000	

Purpose of Issue: ☐ Draft ☐ Information ☐ Approval ☐ As Built ☐ Tender ☐ Construction







NOTE:
WHILE THE VEHICLES TRACK INTO THE OPPOSING LANE AT THE RADII, THESE MOVEMENTS WILL BE INFREQUENT AND ARE ALLOWABLE UNDER DMURS.

VARIOUS AUTOTRACKS OF A REFUSE VEHICLE AT THE PROPOSED DEVELOPMENT

VARIOUS AUTOTRACKS OF A REFUSE VEHICLE AT THE PROPOSED DEVELOPMENT

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Client

Project: Lands west of Old Belgard Road and north, south and west of Cookstown Road, Cookstown Ind Est

Title: Various AutoTRACKs of a Refuse Vehicle at the Proposed Development (1 of 2)

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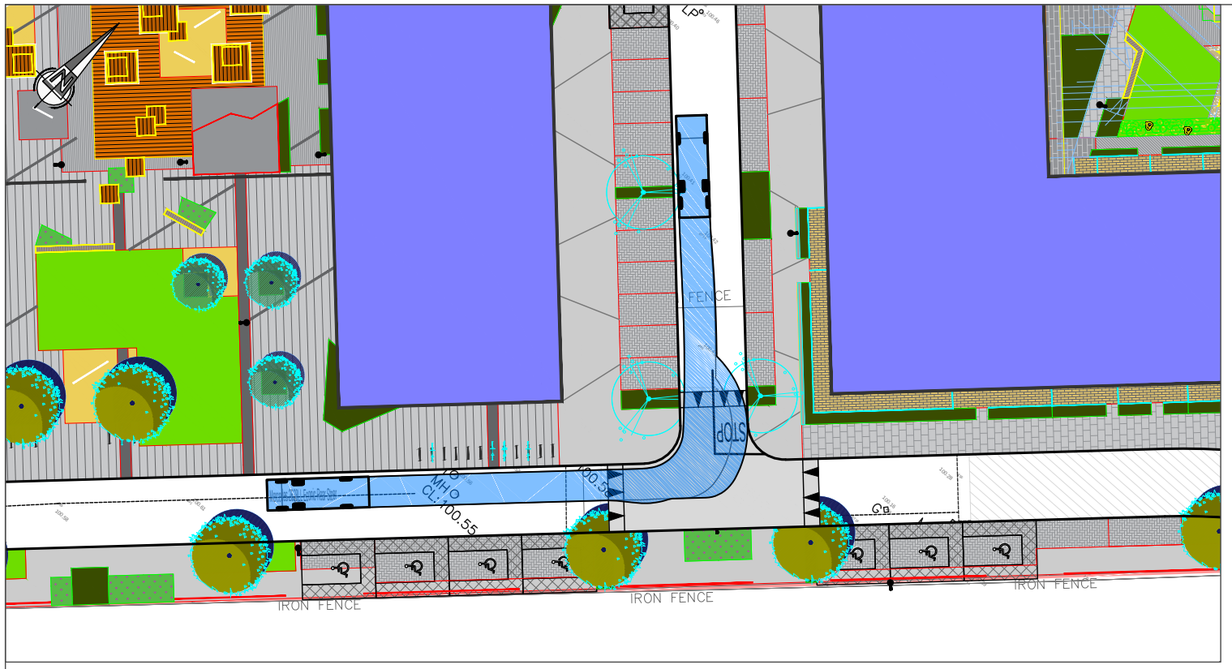
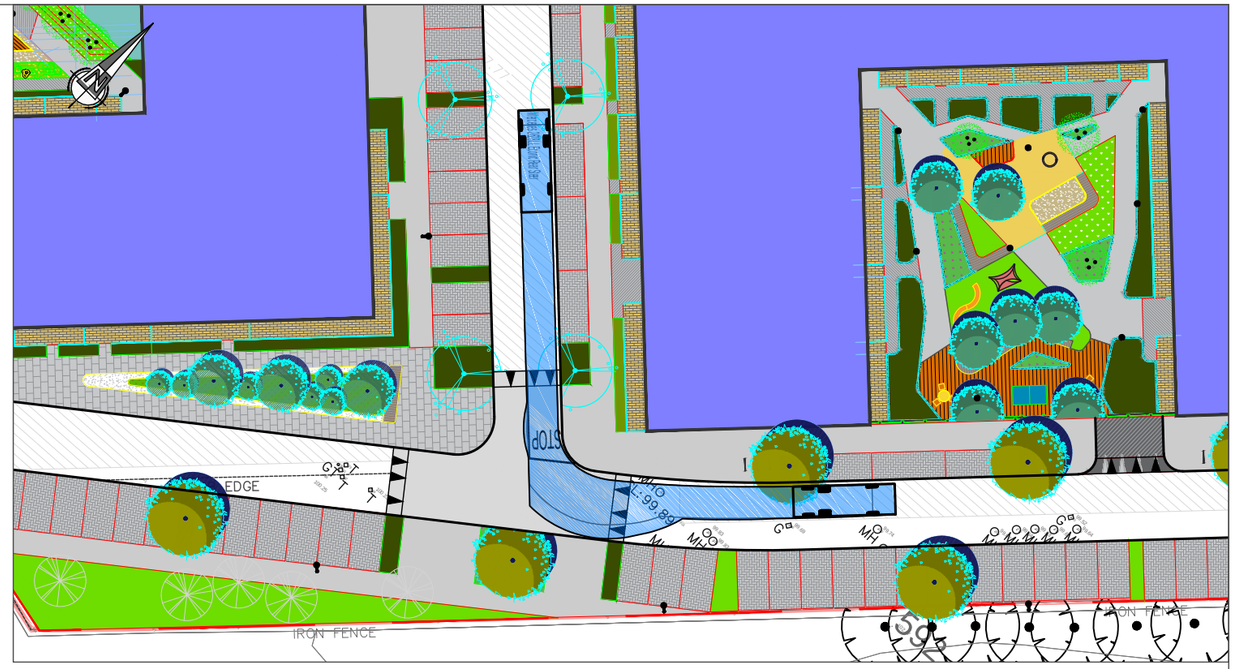
Project No.	Drawing No.
19-036	NRB-TA-005

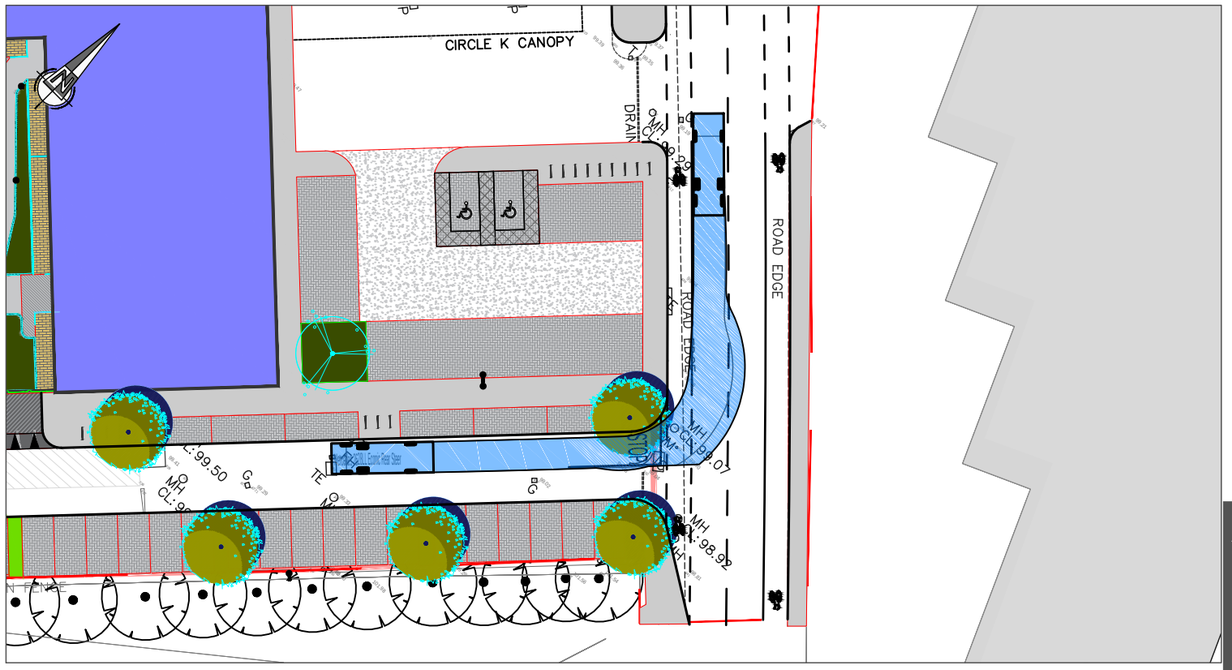
Drawn	Checked	Approved
PB	ER 07/12/20	ER 07/12/20

Date	Scale @ A3	Rev
7-Dec-20	1:500	

Purpose of Issue: ☐ Draft ☐ As Built ☐ Information ☐ Tender ☐ Approval ☐ Construction







NOTE:
WHILE THE VEHICLES TRACK INTO THE OPPOSING LANE AT THE RADII, THESE MOVEMENTS WILL BE INFREQUENT AND ARE ALLOWABLE UNDER DMURS.

VARIOUS AUTOTRACKS OF A REFUSE VEHICLE AT THE PROPOSED DEVELOPMENT

NRB Consulting Engineers Ltd recommend that Road and land ownership boundaries are verified through Legal & Land searches by the Client.

This drawing is based upon CSR drawing 16408-2-100LMP, received 02/12/20. NRB Consulting Engineers Ltd shall not be liable for any inaccuracies or deficiencies.

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Client

Project No. 19-036

Drawing No. NRB-TA-006

Project: Lands west of Old Belgard Road and north, south and west of Cookstown Road, Cookstown Ind Est

Drawn: PB

Checked: ER 07/12/20

Approved: ER 07/12/20

Title: Various AutoTRACKs of a Refuse Vehicle at the Proposed Development (2 of 2)

Date: 7-Dec-20

Scale @ A3: 1:500

Rev

Purpose of Issue: ☐ Draft ☐ Information ☐ Approval ☐ As Built ☐ Tender ☐ Construction

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Client

Project: Lands west of Old Belgard Road and north, south and west of Cookstown Road, Cookstown Ind Est

Title: Illustration of Parking Allocations

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Project No.	Drawing No.
19-036	NRB-TA-007

Drawn	Checked	Approved
PB	ER 07/12/20	ER 07/12/20

Date	Scale @ A3	Rev
7-Dec-20	1:1000	

Purpose of Issue: ☐ Draft ☐ As Built ☐ Information ☐ Tender ☐ Approval ☐ Construction

HWP,
Unit 1B Cookstown Industrial Estate,
Tallaght,
Dublin 24

Dublin, 21st October 2020

To Whom It May Concern,

This is a letter to confirm that GoCar intends to provide 16 shared car club vehicles in the proposed PRS Scheme at Cookstown Castle, Cookstown, Tallaght, Dublin 24. The scheme is set to comprise 1,104 apartments. GoCar representatives have discussed the project with representatives of NRB Consulting Engineers who are the Engineers for the Project and are excited to provide a car sharing service at this location.

It is understood that these vehicles will be exclusively used by residents of the development. GoCar will work with the eventual managers of the scheme to promote the service as an alternative to private cars.

GoCar is Ireland's leading car sharing service with over 60,000 members and over 800 cars and vans on fleet. Each GoCar which is placed in a community has the potential to replace the journeys of up to 15 private cars. The Department of Housing's Design Standards for New Apartments - Guidelines for Planning Authorities 2018 outline: "For all types of location, where it is sought to eliminate or reduce car parking provision, it is necessary to ensure... provision is also to be made for alternative mobility solutions including facilities for car sharing club vehicles."

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

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

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

Rob Kearns
Head of
Growth
GoCar Carsharing
Limited M: 083 822 3924
E: rob.kearns@gocar.ie

APPENDIX B

TRICS Trip Generation Output
(Apartments, Shops, Offices, PFS)

Calculation Reference: AUDIT-160301-200624-0613

TRIP RATE CALCULATION SELECTION PARAMETERS:

Land Use : 03 - RESIDENTIAL
Category : C - FLATS PRIVATELY OWNED
VEHICLES

Selected regions and areas:

02	SOUTH EAST		
	BD	BEDFORDSHIRE	3 days
	ES	EAST SUSSEX	1 days
	EX	ESSEX	2 days
	HC	HAMPSHIRE	1 days
03	SOUTH WEST		
	DC	DORSET	1 days
	DV	DEVON	1 days
04	EAST ANGLIA		
	CA	CAMBRIDGESHIRE	1 days
	NF	NORFOLK	1 days
	SF	SUFFOLK	2 days
05	EAST MIDLANDS		
	DS	DERBYSHIRE	1 days
	NT	NOTTINGHAMSHIRE	2 days
06	WEST MIDLANDS		
	WM	WEST MIDLANDS	1 days
07	YORKSHIRE & NORTH LINCOLNSHIRE		
	RI	EAST RIDING OF YORKSHIRE	1 days
08	NORTH WEST		
	MS	MERSEYSIDE	2 days
09	NORTH		
	CB	CUMBRIA	3 days
10	WALES		
	CO	CONWY	1 days
11	SCOTLAND		
	EB	CITY OF EDINBURGH	1 days
	SA	SOUTH AYRSHIRE	1 days
	SR	STIRLING	2 days
12	CONNAUGHT		
	GA	GALWAY	1 days
13	MUNSTER		
	WA	WATERFORD	1 days
14	LEINSTER		
	LU	LOUTH	3 days
15	GREATER DUBLIN		
	DL	DUBLIN	6 days
16	ULSTER (REPUBLIC OF IRELAND)		
	MG	MONAGHAN	1 days
17	ULSTER (NORTHERN IRELAND)		
	AN	ANTRIM	1 days

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

TRIP RATE for Land Use 03 - RESIDENTIAL/C - FLATS 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	41	59	0.048	41	59	0.165	41	59	0.213
08:00 - 09:00	41	59	0.057	41	59	0.198	41	59	0.255
09:00 - 10:00	41	59	0.071	41	59	0.098	41	59	0.169
10:00 - 11:00	41	59	0.061	41	59	0.082	41	59	0.143
11:00 - 12:00	41	59	0.067	41	59	0.082	41	59	0.149
12:00 - 13:00	41	59	0.093	41	59	0.089	41	59	0.182
13:00 - 14:00	41	59	0.076	41	59	0.087	41	59	0.163
14:00 - 15:00	41	59	0.081	41	59	0.078	41	59	0.159
15:00 - 16:00	41	59	0.099	41	59	0.066	41	59	0.165
16:00 - 17:00	41	59	0.121	41	59	0.080	41	59	0.201
17:00 - 18:00	41	59	0.179	41	59	0.086	41	59	0.265
18:00 - 19:00	41	59	0.178	41	59	0.098	41	59	0.276
19:00 - 20:00									
20:00 - 21:00									
21:00 - 22:00									
22:00 - 23:00									
23:00 - 24:00									
Total Rates:			1.131			1.209			2.340

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.*

Parameter summary

Trip rate parameter range selected:	6 - 184 (units:)
Survey date date range:	01/01/12 - 25/09/19
Number of weekdays (Monday-Friday):	41
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.

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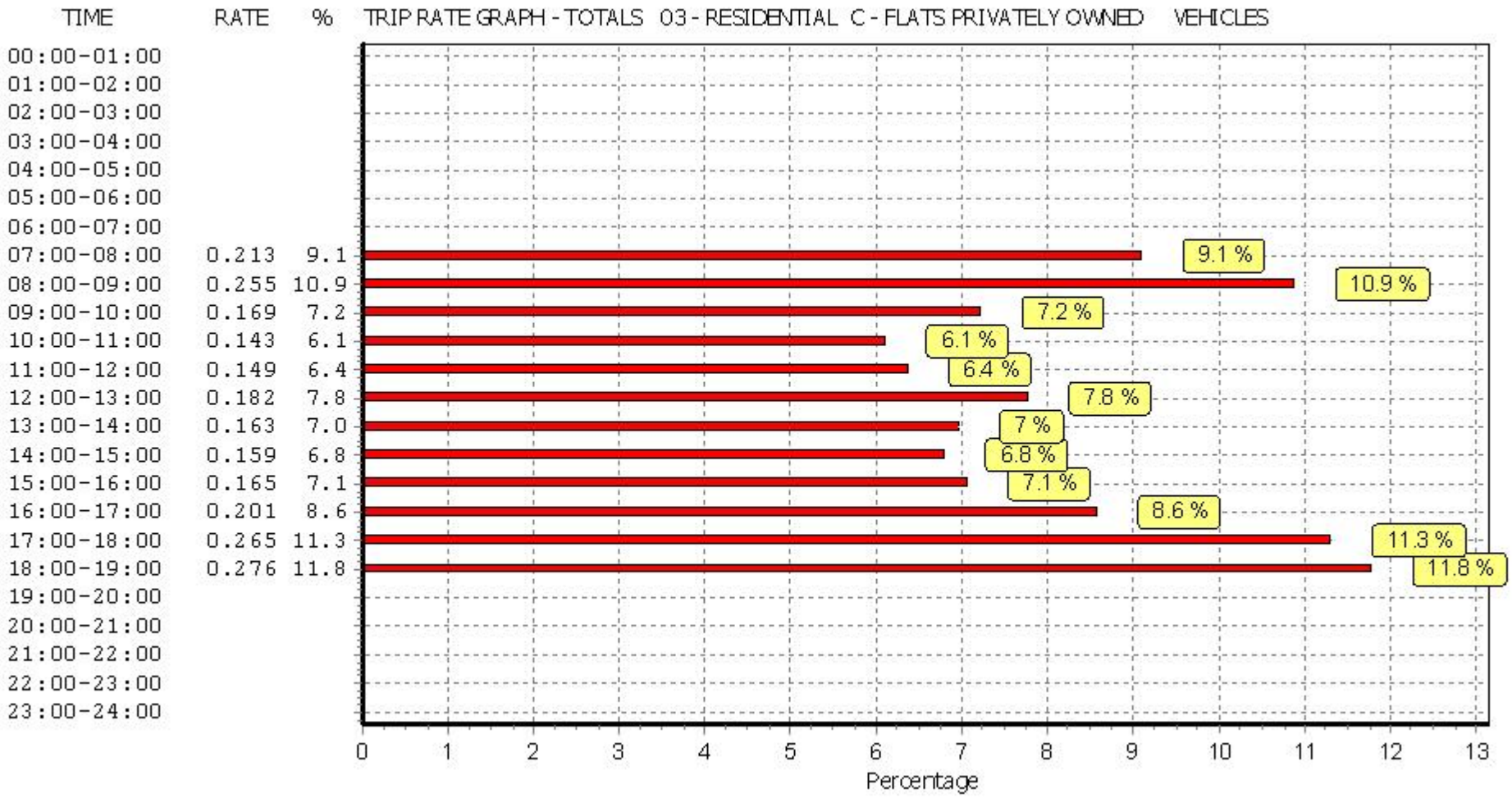


This graph is a visual representation of the trip rate calculation results screen. The same time periods and trip rates are displayed, but in addition there is an additional column showing the percentage of the total trip rate by individual time period, allowing peak periods to be easily identified through observation. Note that the type of count and the selected direction is shown at the top of the graph.

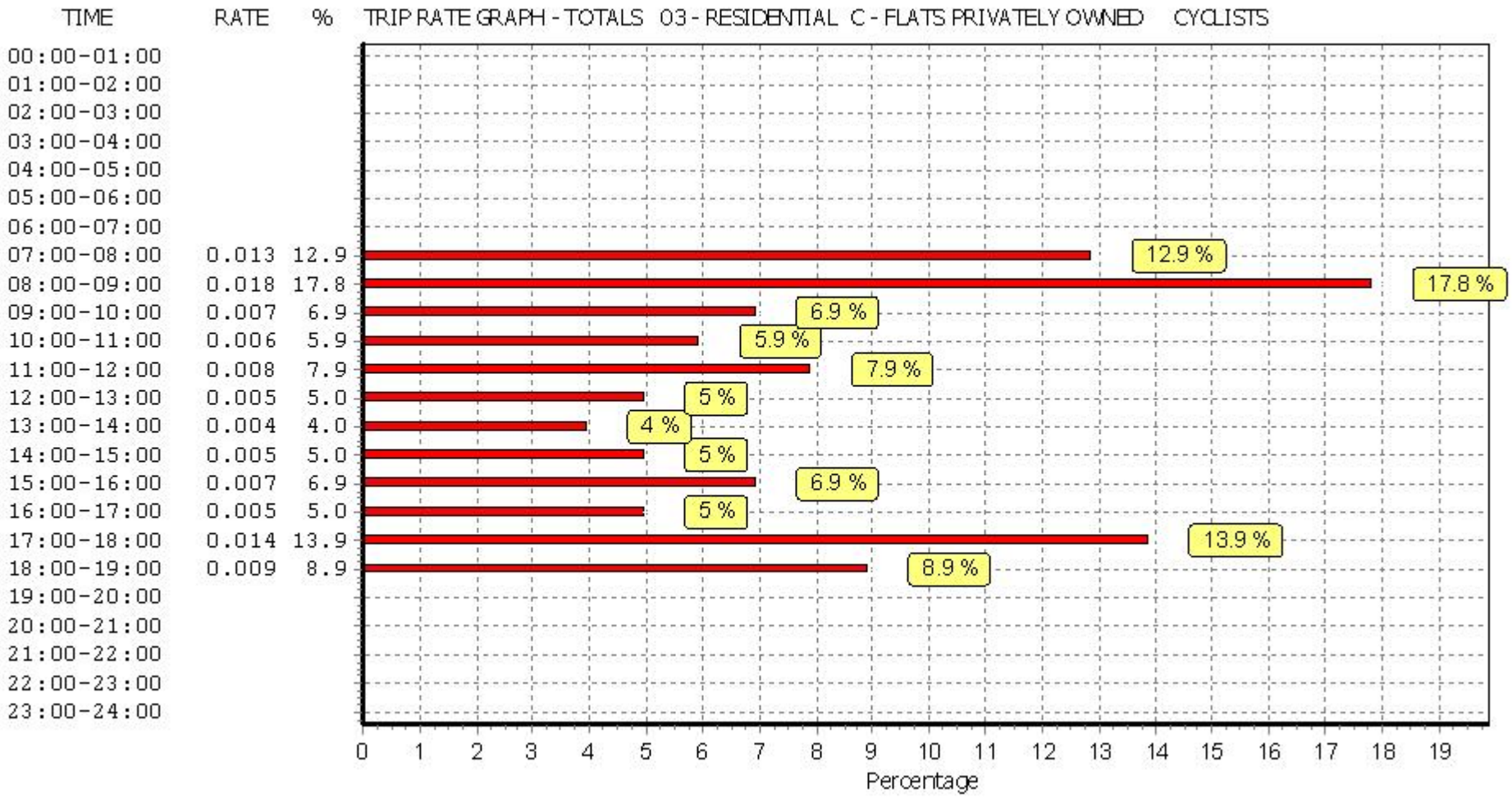
TRIP RATE for Land Use 03 - RESIDENTIAL/C - FLATS PRIVATELY OWNED
CYCLISTS
Calculation factor: 1 DWELLS
BOLD print indicates peak (busiest) period

	ARRIVALS			DEPARTURES			TOTALS		
Time Range	No. Days	Ave. DWELLS	Trip Rate	No. Days	Ave. DWELLS	Trip Rate	No. Days	Ave. DWELLS	Trip Rate
00:00 - 01:00									
01:00 - 02:00									
02:00 - 03:00									
03:00 - 04:00									
04:00 - 05:00									
05:00 - 06:00									
06:00 - 07:00									
07:00 - 08:00	41	59	0.003	41	59	0.010	41	59	0.013
08:00 - 09:00	41	59	0.003	41	59	0.015	41	59	0.018
09:00 - 10:00	41	59	0.003	41	59	0.004	41	59	0.007
10:00 - 11:00	41	59	0.002	41	59	0.004	41	59	0.006
11:00 - 12:00	41	59	0.005	41	59	0.003	41	59	0.008
12:00 - 13:00	41	59	0.003	41	59	0.002	41	59	0.005
13:00 - 14:00	41	59	0.002	41	59	0.002	41	59	0.004
14:00 - 15:00	41	59	0.003	41	59	0.002	41	59	0.005
15:00 - 16:00	41	59	0.004	41	59	0.003	41	59	0.007
16:00 - 17:00	41	59	0.003	41	59	0.002	41	59	0.005
17:00 - 18:00	41	59	0.009	41	59	0.005	41	59	0.014
18:00 - 19:00	41	59	0.007	41	59	0.002	41	59	0.009
19:00 - 20:00									
20:00 - 21:00									
21:00 - 22:00									
22:00 - 23:00									
23:00 - 24:00									
Total Rates:			0.047			0.054			0.101

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.*

NRB Consulting Engineers Ltd 8 Leopardstown Business Centre, Ballyogan Avenue Dublin 18 Licence No: 160301



This graph is a visual representation of the trip rate calculation results screen. The same time periods and trip rates are displayed, but in addition there is an additional column showing the percentage of the total trip rate by individual time period, allowing peak periods to be easily identified through observation. Note that the type of count and the selected direction is shown at the top of the graph.

Calculation Reference: AUDIT-160301-191211-1248

TRIP RATE CALCULATION SELECTION PARAMETERS:

Land Use : 02 - EMPLOYMENT
Category : A - OFFICE
VEHICLES

Selected regions and areas:

03	SOUTH WEST		
	BR	BRISTOL CITY	1 days
	DC	DORSET	1 days
	WL	WILTSHIRE	1 days
04	EAST ANGLIA		
	CA	CAMBRIDGESHIRE	3 days
	NF	NORFOLK	2 days
	SF	SUFFOLK	1 days
05	EAST MIDLANDS		
	LE	LEICESTERSHIRE	1 days
06	WEST MIDLANDS		
	WK	WARWICKSHIRE	1 days
	WM	WEST MIDLANDS	1 days
	WO	WORCESTERSHIRE	2 days
07	YORKSHIRE & NORTH LINCOLNSHIRE		
	NY	NORTH YORKSHIRE	2 days
	WY	WEST YORKSHIRE	2 days
08	NORTH WEST		
	GM	GREATER MANCHESTER	3 days
	LC	LANCASHIRE	1 days
	MS	MERSEYSIDE	1 days
09	NORTH		
	CB	CUMBRIA	1 days
	DH	DURHAM	2 days
	TV	TEES VALLEY	1 days
	TW	TYNE & WEAR	2 days
10	WALES		
	CO	CONWY	1 days
	MT	MERTHYR TYDFIL	1 days
	PS	POWYS	1 days
	SW	SWANSEA	2 days
11	SCOTLAND		
	DU	DUNDEE CITY	1 days
	EB	CITY OF EDINBURGH	1 days
12	CONNAUGHT		
	CS	SLIGO	1 days
	RO	ROSCOMMON	1 days
13	MUNSTER		
	CR	CORK	1 days
15	GREATER DUBLIN		
	DL	DUBLIN	3 days
16	ULSTER (REPUBLIC OF IRELAND)		
	MG	MONAGHAN	2 days
17	ULSTER (NORTHERN IRELAND)		
	AN	ANTRIM	2 days

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

TRIP RATE for Land Use 02 - EMPLOYMENT/A - OFFICE
VEHICLES
Calculation factor: 100 sqm
BOLD print indicates peak (busiest) period

	ARRIVALS			DEPARTURES			TOTALS		
Time Range	No. Days	Ave. GFA	Trip Rate	No. Days	Ave. GFA	Trip Rate	No. Days	Ave. GFA	Trip Rate
00:00 - 00:30									
00:30 - 01:00									
01:00 - 01:30									
01:30 - 02:00									
02:00 - 02:30									
02:30 - 03:00									
03:00 - 03:30									
03:30 - 04:00									
04:00 - 04:30									
04:30 - 05:00									
05:00 - 05:30									
05:30 - 06:00									
06:00 - 06:30									
06:30 - 07:00									
07:00 - 07:30	44	4575	0.108	44	4575	0.012	44	4575	0.120
07:30 - 08:00	44	4575	0.376	44	4575	0.061	44	4575	0.437
08:00 - 08:30	46	4389	0.561	46	4389	0.067	46	4389	0.628
08:30 - 09:00	46	4389	0.650	46	4389	0.106	46	4389	0.756
09:00 - 09:30	46	4389	0.499	46	4389	0.100	46	4389	0.599
09:30 - 10:00	46	4389	0.298	46	4389	0.135	46	4389	0.433
10:00 - 10:30	46	4389	0.189	46	4389	0.125	46	4389	0.314
10:30 - 11:00	46	4389	0.163	46	4389	0.105	46	4389	0.268
11:00 - 11:30	46	4389	0.138	46	4389	0.127	46	4389	0.265
11:30 - 12:00	46	4389	0.128	46	4389	0.118	46	4389	0.246
12:00 - 12:30	46	4389	0.132	46	4389	0.159	46	4389	0.291
12:30 - 13:00	46	4389	0.169	46	4389	0.208	46	4389	0.377
13:00 - 13:30	46	4389	0.183	46	4389	0.191	46	4389	0.374
13:30 - 14:00	46	4389	0.195	46	4389	0.153	46	4389	0.348
14:00 - 14:30	46	4389	0.167	46	4389	0.119	46	4389	0.286
14:30 - 15:00	46	4389	0.125	46	4389	0.155	46	4389	0.280
15:00 - 15:30	46	4389	0.095	46	4389	0.149	46	4389	0.244
15:30 - 16:00	46	4389	0.077	46	4389	0.170	46	4389	0.247
16:00 - 16:30	46	4389	0.087	46	4389	0.351	46	4389	0.438
16:30 - 17:00	46	4389	0.091	46	4389	0.387	46	4389	0.478
17:00 - 17:30	46	4389	0.073	46	4389	0.632	46	4389	0.705
17:30 - 18:00	46	4389	0.052	46	4389	0.386	46	4389	0.438
18:00 - 18:30	43	4653	0.028	43	4653	0.304	43	4653	0.332
18:30 - 19:00	42	4754	0.014	42	4754	0.123	42	4754	0.137
19:00 - 19:30									
19:30 - 20:00									
20:00 - 20:30									
20:30 - 21:00									
21:00 - 21:30									
21:30 - 22:00									
22:00 - 22:30									
22:30 - 23:00									
23:00 - 23:30									
23:30 - 24:00									
Total Rates:			4.598			4.443			9.041

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.

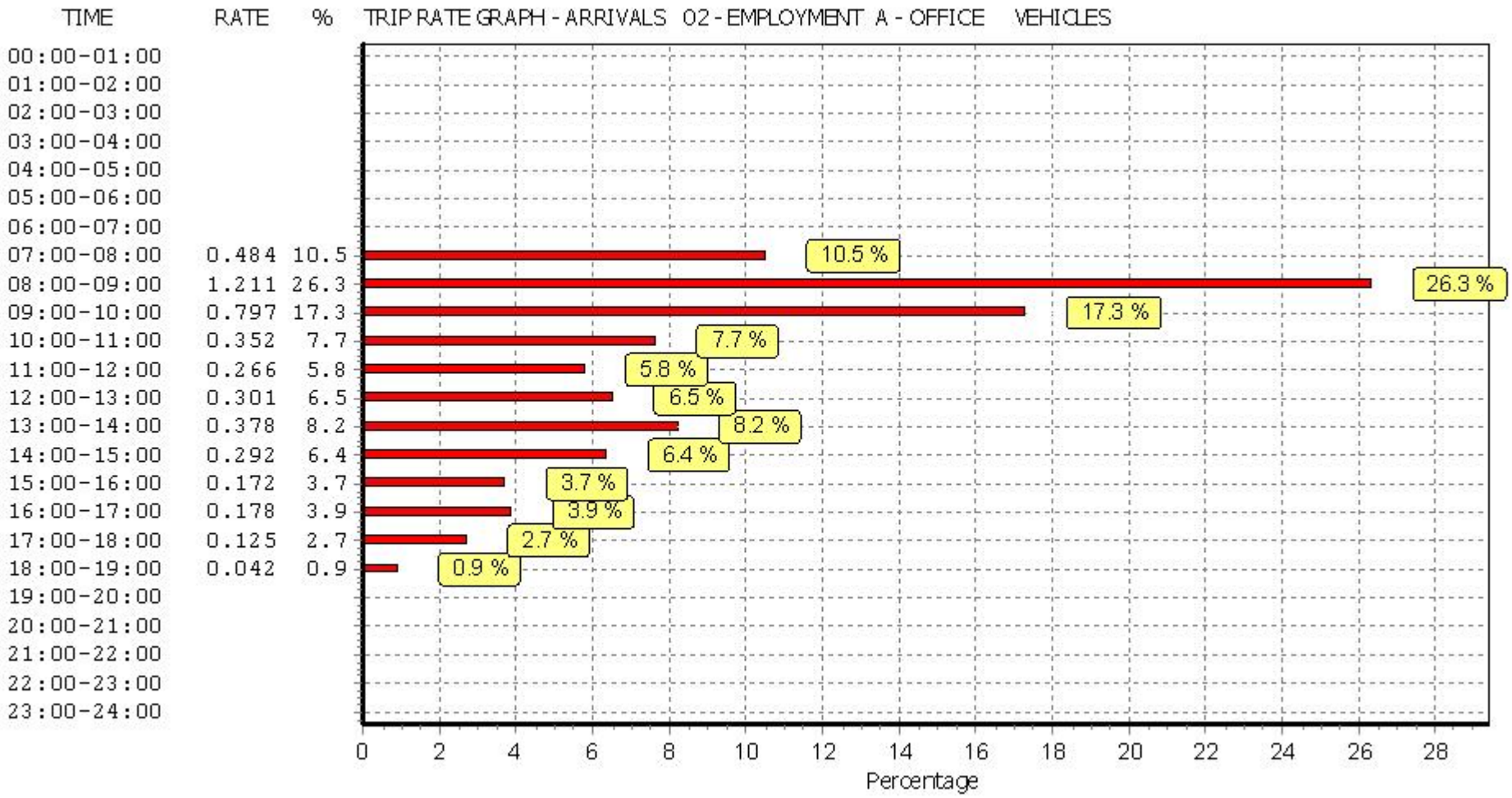
*To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected 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.*

Parameter summary

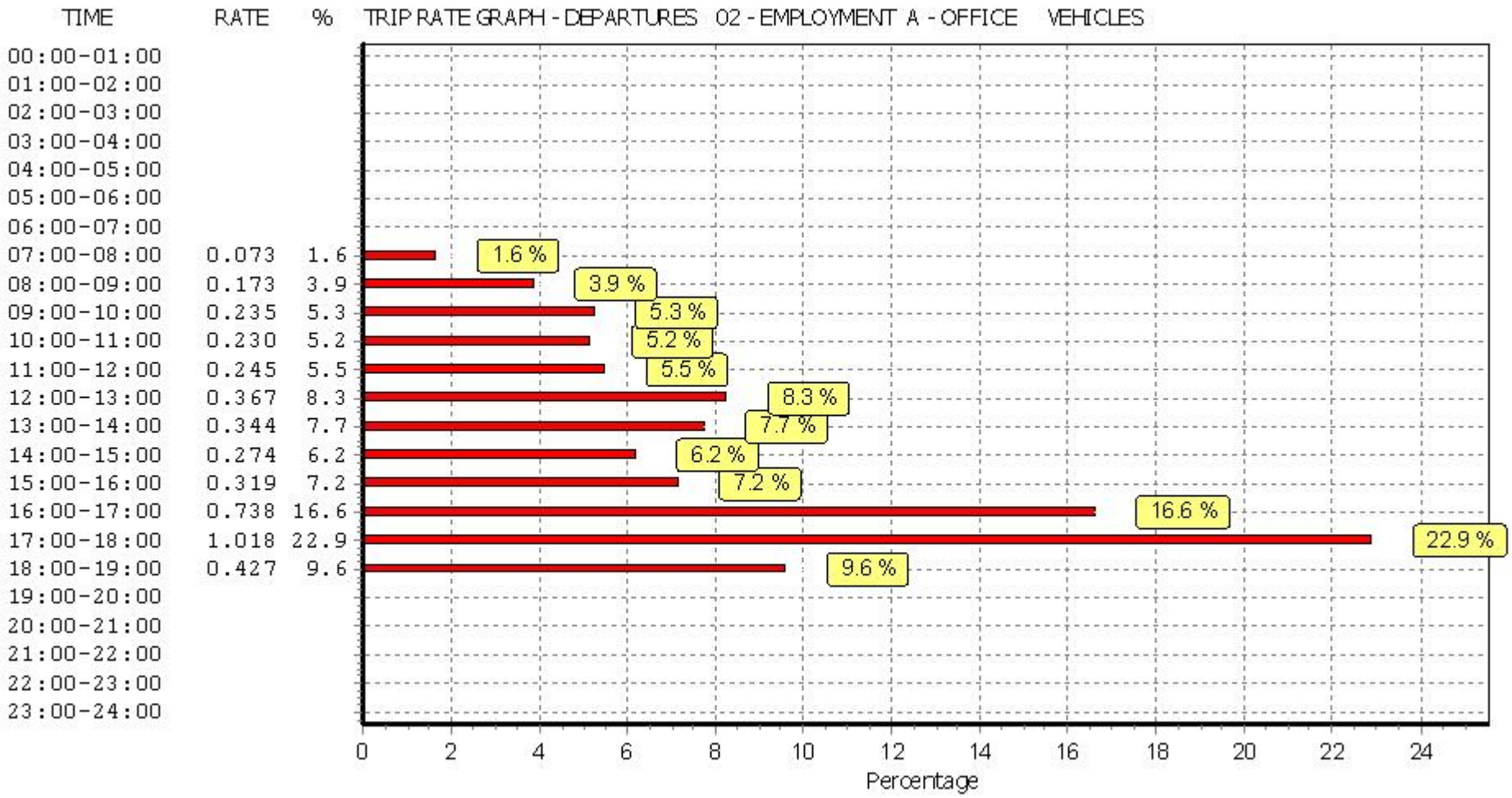
Trip rate parameter range selected:	178 - 22657 (units: sqm)
Survey date date range:	01/01/11 - 14/03/19
Number of weekdays (Monday-Friday):	46
Number of Saturdays:	0
Number of Sundays:	0
Surveys automatically removed from selection:	1
Surveys manually removed from selection:	0

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.

NRB Consulting Engineers Ltd 8 Leopardstown Business Centre, Ballyogan Avenue Dublin 18 Licence No: 160301



This graph is a visual representation of the trip rate calculation results screen. The same time periods and trip rates are displayed, but in addition there is an additional column showing the percentage of the total trip rate by individual time period, allowing peak periods to be easily identified through observation. Note that the type of count and the selected direction is shown at the top of the graph.



This graph is a visual representation of the trip rate calculation results screen. The same time periods and trip rates are displayed, but in addition there is an additional column showing the percentage of the total trip rate by individual time period, allowing peak periods to be easily identified through observation. Note that the type of count and the selected direction is shown at the top of the graph.

Calculation Reference: AUDIT-160301-191211-1221

TRIP RATE CALCULATION SELECTION PARAMETERS:

Land Use : 13 - PETROL FILLING STATIONS
Category : A - PETROL FILLING STATIONS
VEHICLES

Selected regions and areas:

03	SOUTH WEST		
	DV	DEVON	1 days
04	EAST ANGLIA		
	CA	CAMBRIDGESHIRE	1 days
05	EAST MIDLANDS		
	LE	LEICESTERSHIRE	1 days
06	WEST MIDLANDS		
	SH	SHROPSHIRE	1 days
	WM	WEST MIDLANDS	2 days
08	NORTH WEST		
	LC	LANCASHIRE	1 days
09	NORTH		
	NB	NORTHUMBERLAND	1 days
10	WALES		
	CP	CAERPHILLY	1 days
11	SCOTLAND		
	EB	CITY OF EDINBURGH	1 days
	FA	FALKIRK	1 days
13	MUNSTER		
	CR	CORK	2 days
14	LEINSTER		
	LU	LOUTH	1 days
15	GREATER DUBLIN		
	DL	DUBLIN	1 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

LIST OF SITES relevant to selection parameters

1 CA-13-A-04 BP CAMBRIDGESHIRE
CHERRY HINTON ROAD
CAMBRIDGE
CAMBRIDGE
Suburban Area (PPS6 Out of Centre)
Residential Zone
Total Filling bays: 8
Survey date: WEDNESDAY *19/10/11* *Survey Type: MANUAL*

2 CP-13-A-01 TEXACO CAERPHILLY
NANTGARW ROAD
CAERPHILLY

Suburban Area (PPS6 Out of Centre)
Industrial Zone
Total Filling bays: 8
Survey date: TUESDAY *17/07/12* *Survey Type: MANUAL*

3 CR-13-A-01 TOPAZ CORK
VICARS ROAD
CORK

Suburban Area (PPS6 Out of Centre)
Industrial Zone
Total Filling bays: 10
Survey date: THURSDAY *13/12/12* *Survey Type: MANUAL*

4 CR-13-A-02 APPLEGREEN CORK
NORTH RING ROAD
CORK

Edge of Town
Residential Zone
Total Filling bays: 8
Survey date: FRIDAY *23/03/18* *Survey Type: MANUAL*

5 DL-13-A-03 APPLEGREEN DUBLIN
CLONSKEAGH ROAD
DUBLIN
CLONSKEAGH
Neighbourhood Centre (PPS6 Local Centre)
No Sub Category
Total Filling bays: 8
Survey date: THURSDAY *12/09/13* *Survey Type: MANUAL*

6 DV-13-A-03 GULF DEVON
MAIN ROAD
EXETER
PINHOE
Edge of Town
Residential Zone
Total Filling bays: 4
Survey date: THURSDAY *28/11/13* *Survey Type: MANUAL*

7 EB-13-A-02 SHELL CITY OF EDINBURGH
1 STENHOUSE ROAD
EDINBURGH

Suburban Area (PPS6 Out of Centre)
Residential Zone
Total Filling bays: 8
Survey date: FRIDAY *06/05/11* *Survey Type: MANUAL*

8 FA-13-A-02 MURCO FALKIRK
A801
FALKIRK
MADDISTON
Free Standing (PPS6 Out of Town)
Out of Town
Total Filling bays: 12
Survey date: MONDAY *03/06/13* *Survey Type: MANUAL*

9 LC-13-A-01 MURCO LANCASHIRE
VICTORIA ROAD
PRESTON
WALTON LE DALE
Edge of Town Centre
Built-Up Zone
Total Filling bays: 8
Survey date: MONDAY *14/05/12* *Survey Type: MANUAL*

LIST OF SITES relevant to selection parameters (Cont.)

10 LE-13-A-03 TOTAL LEICESTERSHIRE
GLENFIELD ROAD
LEICESTER

Suburban Area (PPS6 Out of Centre)
Residential Zone
Total Filling bays: 8
Survey date: THURSDAY *27/09/12* *Survey Type: MANUAL*

11 LU-13-A-01 BURMAH LOUTH
DUBLIN ROAD
DUNDALK

Suburban Area (PPS6 Out of Centre)
Residential Zone
Total Filling bays: 6
Survey date: THURSDAY *29/11/12* *Survey Type: MANUAL*

12 MG-13-A-01 G&G EMYVALE MONAGHAN
MAIN STREET
EMYVALE

Neighbourhood Centre (PPS6 Local Centre)
Village
Total Filling bays: 4
Survey date: WEDNESDAY *25/09/13* *Survey Type: MANUAL*

13 NB-13-A-03 BP NORTHUMBERLAND
BURRADON ROAD
NEAR CRAMLINGTON
ANNITSFORD
Edge of Town
Residential Zone
Total Filling bays: 11
Survey date: THURSDAY *22/11/12* *Survey Type: MANUAL*

14 SH-13-A-01 LOCAL SHROPSHIRE
THE MOUNT
SHREWSBURY
FRANKWELL
Edge of Town
Residential Zone
Total Filling bays: 4
Survey date: FRIDAY *30/05/14* *Survey Type: MANUAL*

15 WM-13-A-03 TOTAL WEST MIDLANDS
CHESTER ROAD
BIRMINGHAM
CASTLE BROMWICH
Edge of Town
Residential Zone
Total Filling bays: 8
Survey date: TUESDAY *18/10/11* *Survey Type: MANUAL*

16 WM-13-A-04 SHELL WEST MIDLANDS
STATION ROAD
BIRMINGHAM
STECHFORD
Suburban Area (PPS6 Out of Centre)
No Sub Category
Total Filling bays: 8
Survey date: TUESDAY *23/10/12* *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 13 - PETROL FILLING STATIONS/A - PETROL FILLING STATIONS
VEHICLES
Calculation factor: 1 BAYS
BOLD print indicates peak (busiest) period

	ARRIVALS			DEPARTURES			TOTALS		
Time Range	No. Days	Ave. BAYS	Trip Rate	No. Days	Ave. BAYS	Trip Rate	No. Days	Ave. BAYS	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	10	8	3.551	10	8	3.244	10	8	6.795
07:00 - 08:00	16	8	5.390	16	8	5.130	16	8	10.520
08:00 - 09:00	16	8	5.764	16	8	5.878	16	8	11.642
09:00 - 10:00	16	8	5.911	16	8	5.854	16	8	11.765
10:00 - 11:00	16	8	5.659	16	8	5.504	16	8	11.163
11:00 - 12:00	16	8	5.366	16	8	5.285	16	8	10.651
12:00 - 13:00	16	8	5.780	16	8	5.797	16	8	11.577
13:00 - 14:00	16	8	5.390	16	8	5.415	16	8	10.805
14:00 - 15:00	16	8	5.756	16	8	5.894	16	8	11.650
15:00 - 16:00	16	8	6.065	16	8	5.789	16	8	11.854
16:00 - 17:00	16	8	6.049	16	8	6.293	16	8	12.342
17:00 - 18:00	16	8	5.829	16	8	5.894	16	8	11.723
18:00 - 19:00	16	8	5.585	16	8	5.634	16	8	11.219
19:00 - 20:00	13	8	5.098	13	8	5.402	13	8	10.500
20:00 - 21:00	13	8	4.069	13	8	4.147	13	8	8.216
21:00 - 22:00	13	8	3.314	13	8	3.373	13	8	6.687
22:00 - 23:00									
23:00 - 24:00									
Total Rates:			84.576			84.533			169.109

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.*

Parameter summary

Trip rate parameter range selected:	4 - 12 (units:)
Survey date date range:	01/01/11 - 14/07/18
Number of weekdays (Monday-Friday):	16
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.

Calculation Reference: AUDIT-160301-191211-1204

TRIP RATE CALCULATION SELECTION PARAMETERS:

Land Use : 01 - RETAIL
Category : I - SHOPPING CENTRE - LOCAL SHOPS
VEHICLES

Selected regions and areas:

03	SOUTH WEST		
	BR	BRISTOL CITY	1 days
	DV	DEVON	1 days
04	EAST ANGLIA		
	CA	CAMBRIDGESHIRE	1 days
05	EAST MIDLANDS		
	LE	LEICESTERSHIRE	1 days
06	WEST MIDLANDS		
	SH	SHROPSHIRE	1 days
	WM	WEST MIDLANDS	1 days
	WO	WORCESTERSHIRE	1 days
08	NORTH WEST		
	CH	CHESHIRE	2 days
	LC	LANCASHIRE	1 days
09	NORTH		
	TV	TEES VALLEY	2 days
	TW	TYNE & WEAR	2 days
11	SCOTLAND		
	SR	STIRLING	1 days
13	MUNSTER		
	CR	CORK	1 days
15	GREATER DUBLIN		
	DL	DUBLIN	2 days
16	ULSTER (REPUBLIC OF IRELAND)		
	DN	DONEGAL	1 days
17	ULSTER (NORTHERN IRELAND)		
	DE	DERRY	2 days
	DO	DOWN	1 days

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

TRIP RATE for Land Use 01 - RETAIL/I - SHOPPING CENTRE - LOCAL SHOPS
VEHICLES
Calculation factor: 100 sqm
BOLD print indicates peak (busiest) period

	ARRIVALS			DEPARTURES			TOTALS		
Time Range	No. Days	Ave. GFA	Trip Rate	No. Days	Ave. GFA	Trip Rate	No. Days	Ave. GFA	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	1	540	1.296	1	540	1.296	1	540	2.592
07:00 - 08:00	22	1238	2.417	22	1238	2.156	22	1238	4.573
08:00 - 09:00	22	1238	2.949	22	1238	2.619	22	1238	5.568
09:00 - 10:00	22	1238	3.732	22	1238	3.203	22	1238	6.935
10:00 - 11:00	22	1238	3.684	22	1238	3.412	22	1238	7.096
11:00 - 12:00	22	1238	3.857	22	1238	4.007	22	1238	7.864
12:00 - 13:00	22	1238	4.742	22	1238	4.577	22	1238	9.319
13:00 - 14:00	22	1238	4.202	22	1238	4.239	22	1238	8.441
14:00 - 15:00	22	1238	3.864	22	1238	3.919	22	1238	7.783
15:00 - 16:00	22	1238	3.769	22	1238	3.893	22	1238	7.662
16:00 - 17:00	22	1238	4.125	22	1238	3.971	22	1238	8.096
17:00 - 18:00	22	1238	4.007	22	1238	4.345	22	1238	8.352
18:00 - 19:00	22	1238	3.893	22	1238	4.125	22	1238	8.018
19:00 - 20:00	19	1221	4.025	19	1221	4.059	19	1221	8.084
20:00 - 21:00	19	1221	3.197	19	1221	3.370	19	1221	6.567
21:00 - 22:00	15	1034	3.313	15	1034	3.732	15	1034	7.045
22:00 - 23:00									
23:00 - 24:00									
Total Rates:			57.072			56.923			113.995

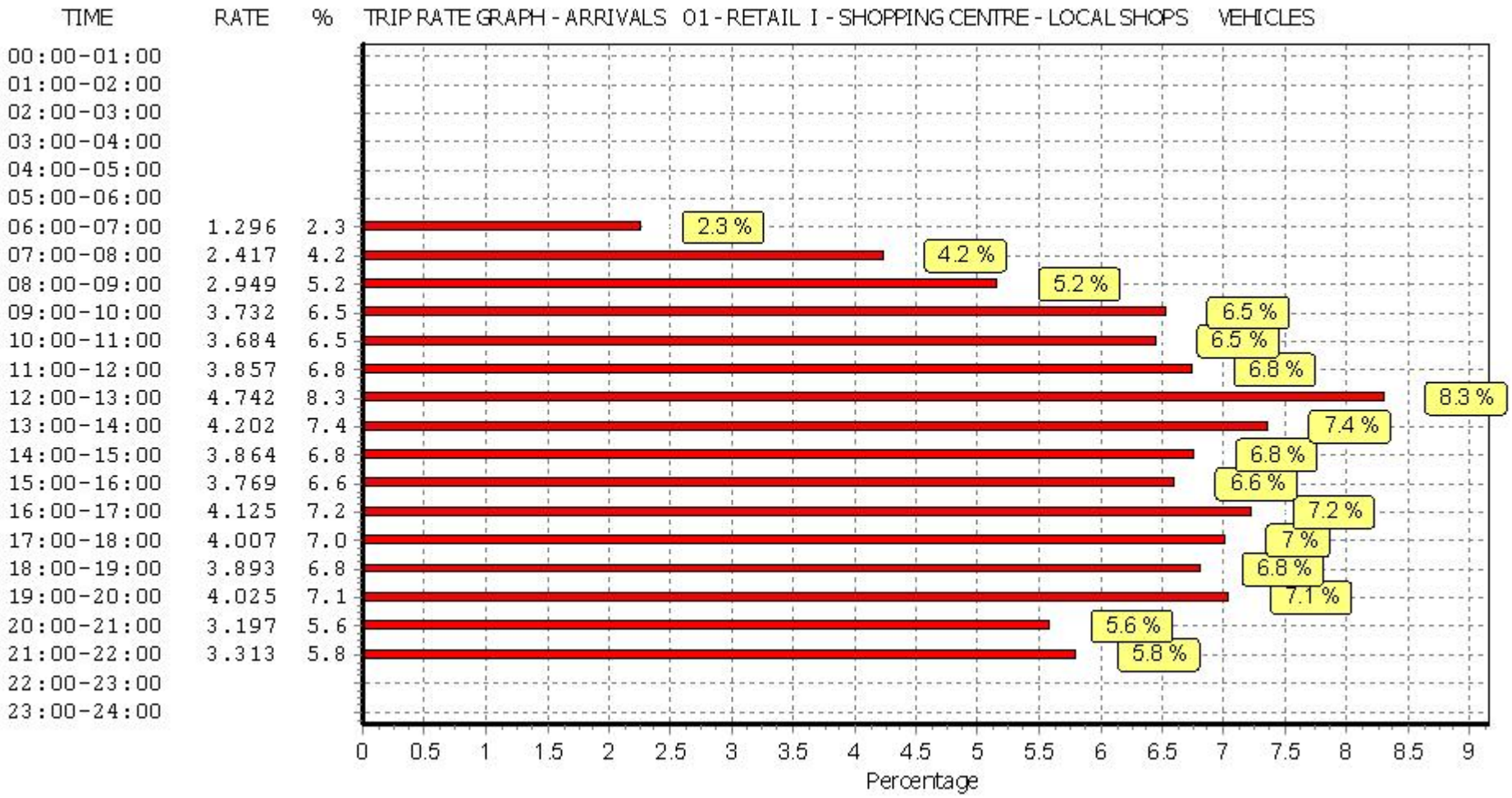
This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are 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.*

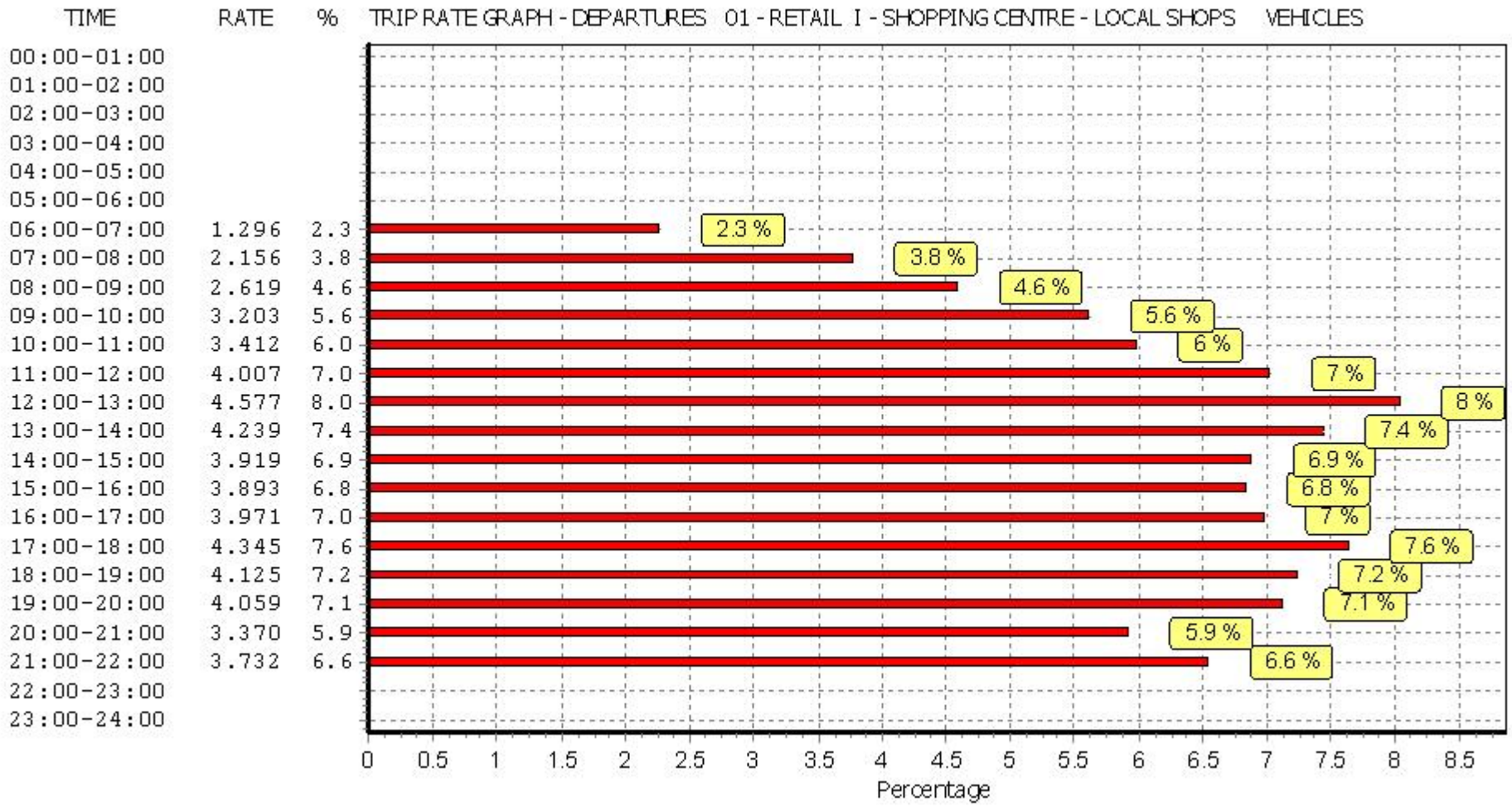
Parameter summary

Trip rate parameter range selected:	260 - 4052 (units: sqm)
Survey date date range:	01/01/11 - 24/05/19
Number of weekdays (Monday-Friday):	22
Number of Saturdays:	0
Number of Sundays:	0
Surveys automatically removed from selection:	1
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.



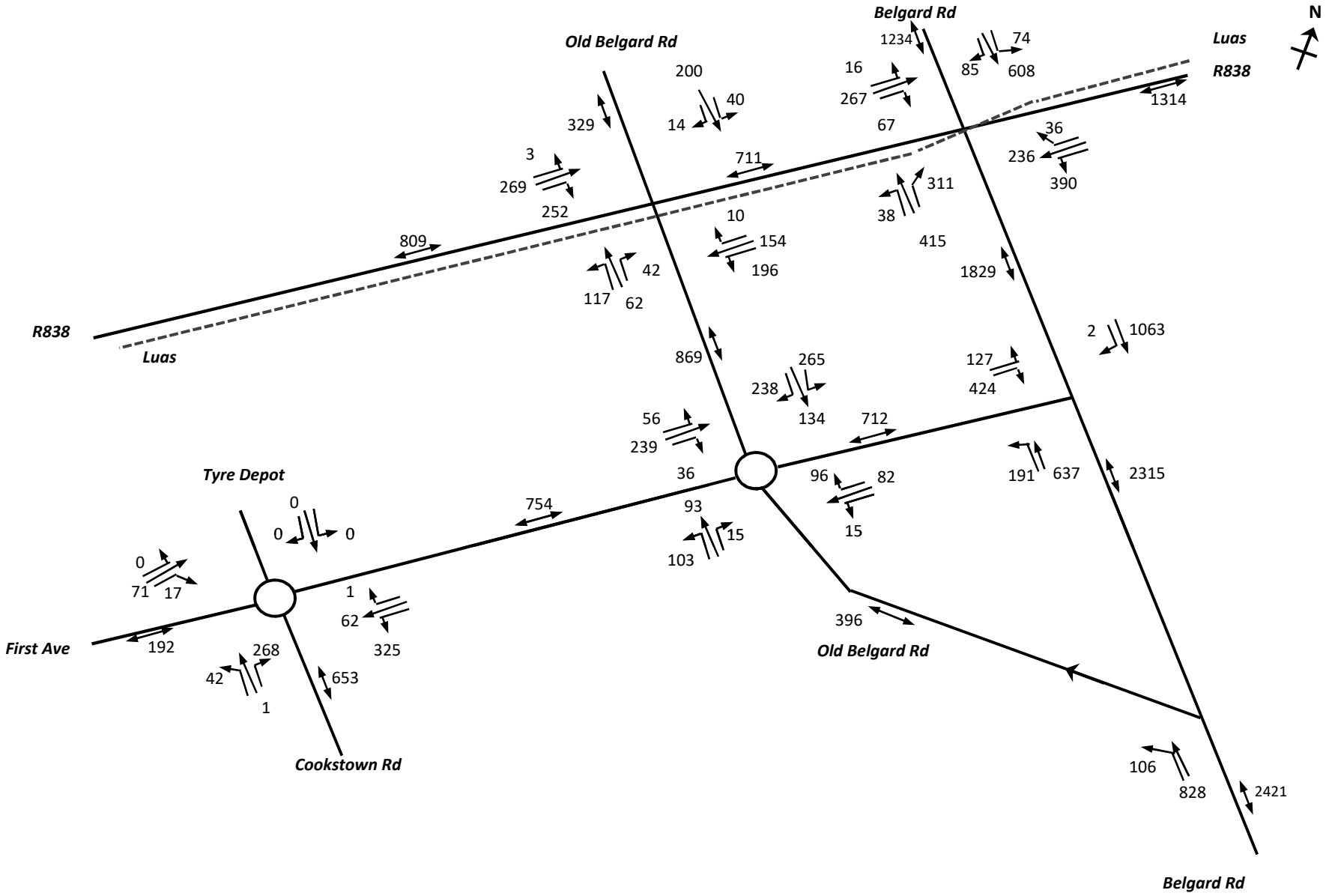
This graph is a visual representation of the trip rate calculation results screen. The same time periods and trip rates are displayed, but in addition there is an additional column showing the percentage of the total trip rate by individual time period, allowing peak periods to be easily identified through observation. Note that the type of count and the selected direction is shown at the top of the graph.



This graph is a visual representation of the trip rate calculation results screen. The same time periods and trip rates are displayed, but in addition there is an additional column showing the percentage of the total trip rate by individual time period, allowing peak periods to be easily identified through observation. Note that the type of count and the selected direction is shown at the top of the graph.

APPENDIX C

Traffic Surveys, Trip Distribution & Network Traffic Flow Projections & Diagrams

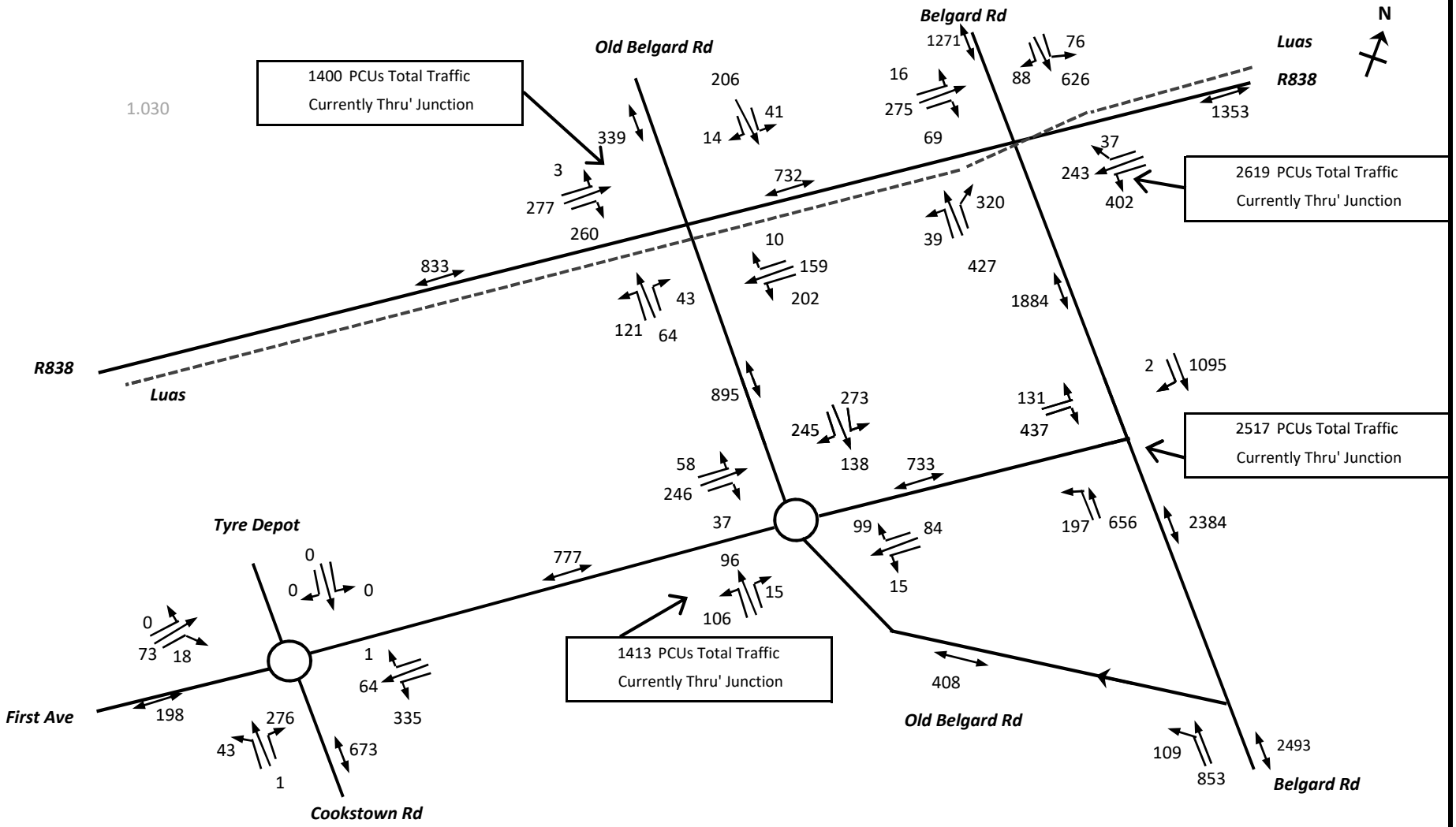


AS SURVEYED TRAFFIC FLOWS 2019 - WEEKDAY AM PEAK 8-9AM (PCUs)

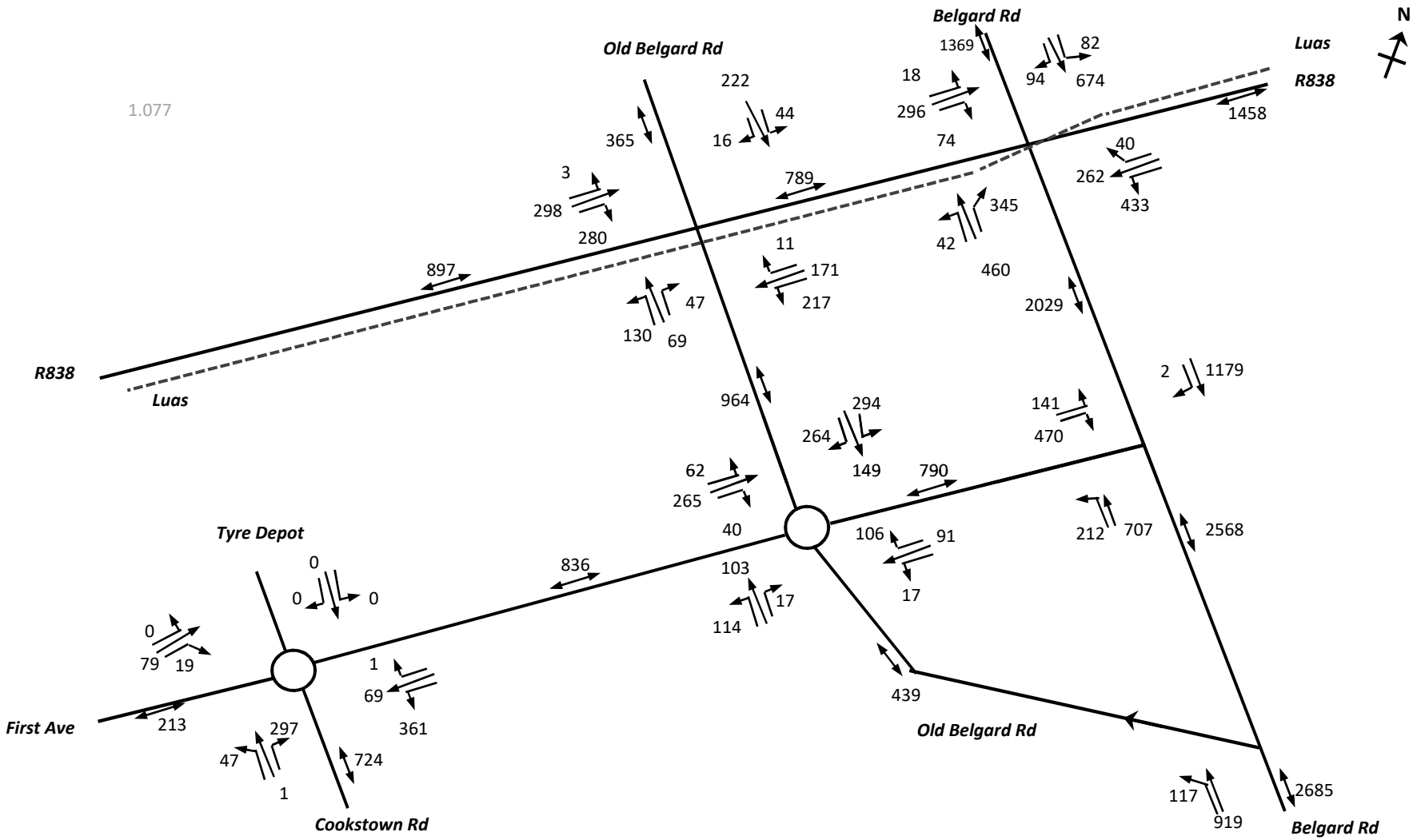
TII PE-PAG-02017 Project Appraisal Guidelines for National Roads Unit 5.3 (Travel Demand Projections, Table 5.3.2: Link-Based Growth Rates: Annual Growth Factors) SDCC

2019 to 2025 = 1.030

2025 to 2040 = 1.077



Projected Weekday AM Peak Hour Traffic Volumes (8-9am)
SELECTED OPENING YEAR 2025 - WITHOUT NEW DEVELOPMENT (PCUs).



Projected Weekday AM Peak Hour Traffic Volumes (8-9am)
SELECTED DESIGN YEAR 2040 (OPENING YEAR +15) - WITHOUT NEW DEVELOPMENT (PCUs).

TRICS Traffic Generation Assessment - BLOCK A

260 APARTMENTS/DUPLEX					
260 No Apts	Car Arrivals		Car Departures		Total 2-Way Traffic
Network Period	Per Unit	Total	Per Unit	Total	
AM Peak Hr 8-9am	0.057	15	0.198	51	66
PM Peak Hr 5-6pm	0.179	47	0.086	22	69

BLOCK A TOTAL

TRICS Traffic Generation Assessment - BLOCK B

342 APARTMENTS					
342 No Apts	Car Arrivals		Car Departures		Total 2-Way Traffic
Network Period	Per Unit	Total	Per Unit	Total	
AM Peak Hr 8-9am	0.057	19	0.198	68	87
PM Peak Hr 5-6pm	0.179	61	0.086	29	91

285m2 Commercial/Retail					
285 m2 Retail	Car Arrivals		Car Departures		Total 2-Way Traffic
Network Period	Per 100m2	Total	Per 100m2	Total	
AM Peak Hr 8-9am	2.949	8	2.619	7	16
PM Peak Hr 5-6pm	4.007	11	4.345	12	24

Total Traffic Generated - BLOCK B			
Network Period	Car Arrivals	Car Departures	2-Way Traffic Tot
AM Peak Hr 8-9am	27	75	102
PM Peak Hr 5-6pm	72	41	113

BLOCK B TOTAL

TRICS Traffic Generation Assessment - BLOCK C

350 APARTMENTS					
350 No Apts	Car Arrivals		Car Departures		Total 2-Way Traffic
Network Period	Per Unit	Total	Per Unit	Total	
AM Peak Hr 8-9am	0.057	20	0.198	69	89
PM Peak Hr 5-6pm	0.179	63	0.086	30	93

272m2 CRECHE					
272 m2 Creche	Car Arrivals		Car Departures		Total 2-Way Traffic
Network Period	Per 100m2	Total	Per 100m2	Total	
AM Peak Hr 8-9am	3.270	9	2.513	7	16
PM Peak Hr 5-6pm	2.326	6	2.842	8	14

Total Traffic Generated - BLOCK C			
Network Period	Car Arrivals	Car Departures	2-Way Traffic Tot
AM Peak Hr 8-9am	29	76	105
PM Peak Hr 5-6pm	69	38	107

BLOCK C TOTAL

TRICS Traffic Generation Assessment - BLOCK D - NET ADDITIONAL TRAFFIC

152 APARTMENTS					
152 No Apts	Car Arrivals		Car Departures		Total 2-Way Traffic
Network Period	Per Unit	Total	Per Unit	Total	
AM Peak Hr 8-9am	0.057	9	0.198	30	39
PM Peak Hr 5-6pm	0.179	27	0.086	13	41

1,500m2 OFFICES					
1500 m2 Office	Car Arrivals		Car Departures		Total 2-Way Traffic
Network Period	Per 100m2	Total	Per 100m2	Total	
AM Peak Hr 8-9am	1.211	18	0.173	3	20
PM Peak Hr 5-6pm	0.125	2	1.018	15	17

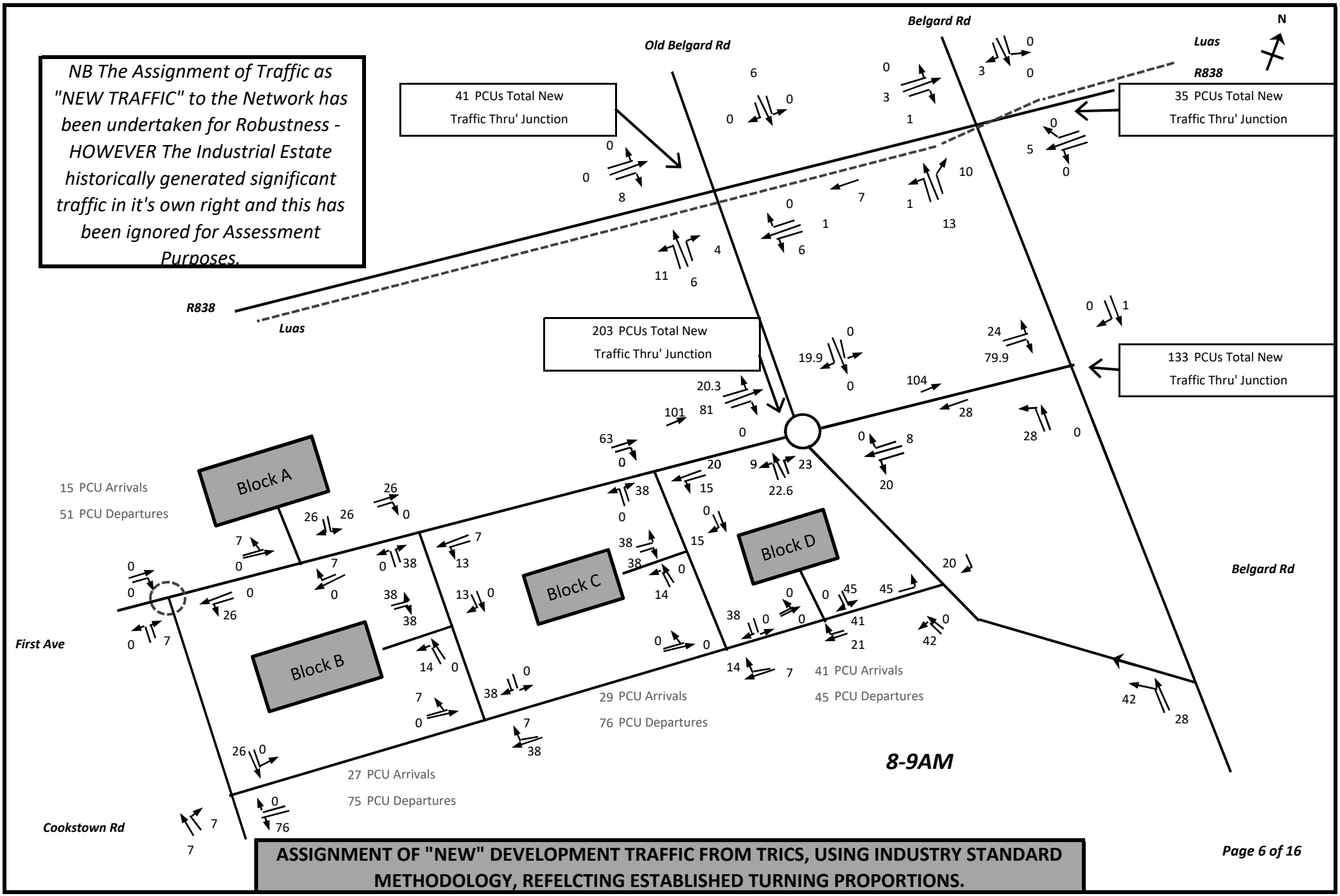
477m2 Commercial/Retail					
477 m2 Retail	Car Arrivals		Car Departures		Total 2-Way Traffic
Network Period	Per 100m2	Total	Per 100m2	Total	
AM Peak Hr 8-9am	2.949	14	2.619	12	27
PM Peak Hr 5-6pm	4.007	19	4.345	21	40

Total NET ADDITIONAL Traffic Generated - BLOCK D			
Network Period	Car Arrivals	Car Departures	2-Way Traffic Tot
AM Peak Hr 8-9am	41	45	86
PM Peak Hr 5-6pm	48	49	97

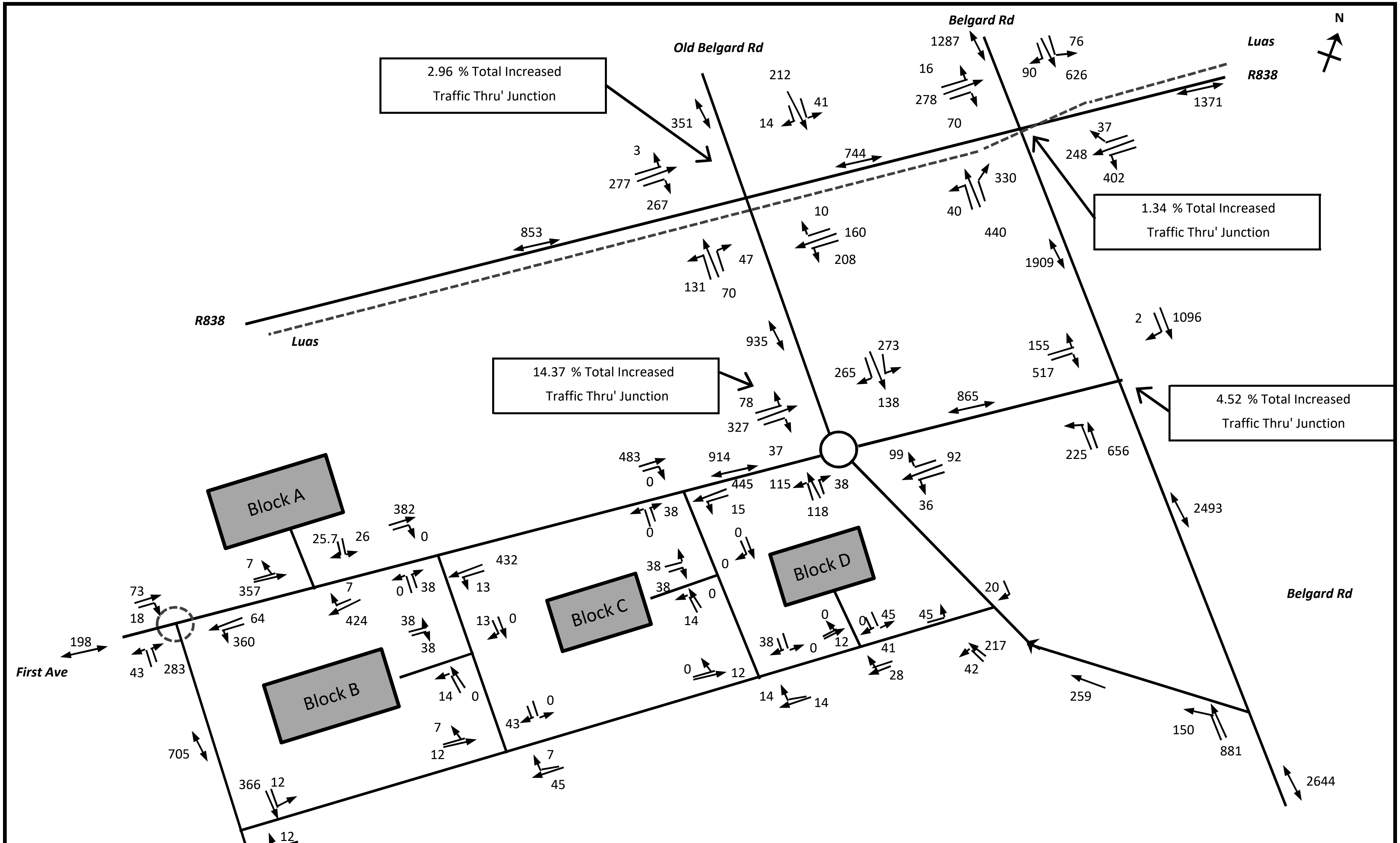
For Info - Traffic Already Being Generated by an 8-Stand PFS

Petrol Filling Station & Ancillary Shop/Kiosk Unit					
8 Stand PFS	Car Arrivals		Car Departures		Total 2-Way Traffic
Network Period	per Stand	Total	per Stand	Total	
AM Peak Hr 8-9am	5.764	46	5.874	47	93
PM Peak Hr 5-6pm	5.829	47	5.894	47	94

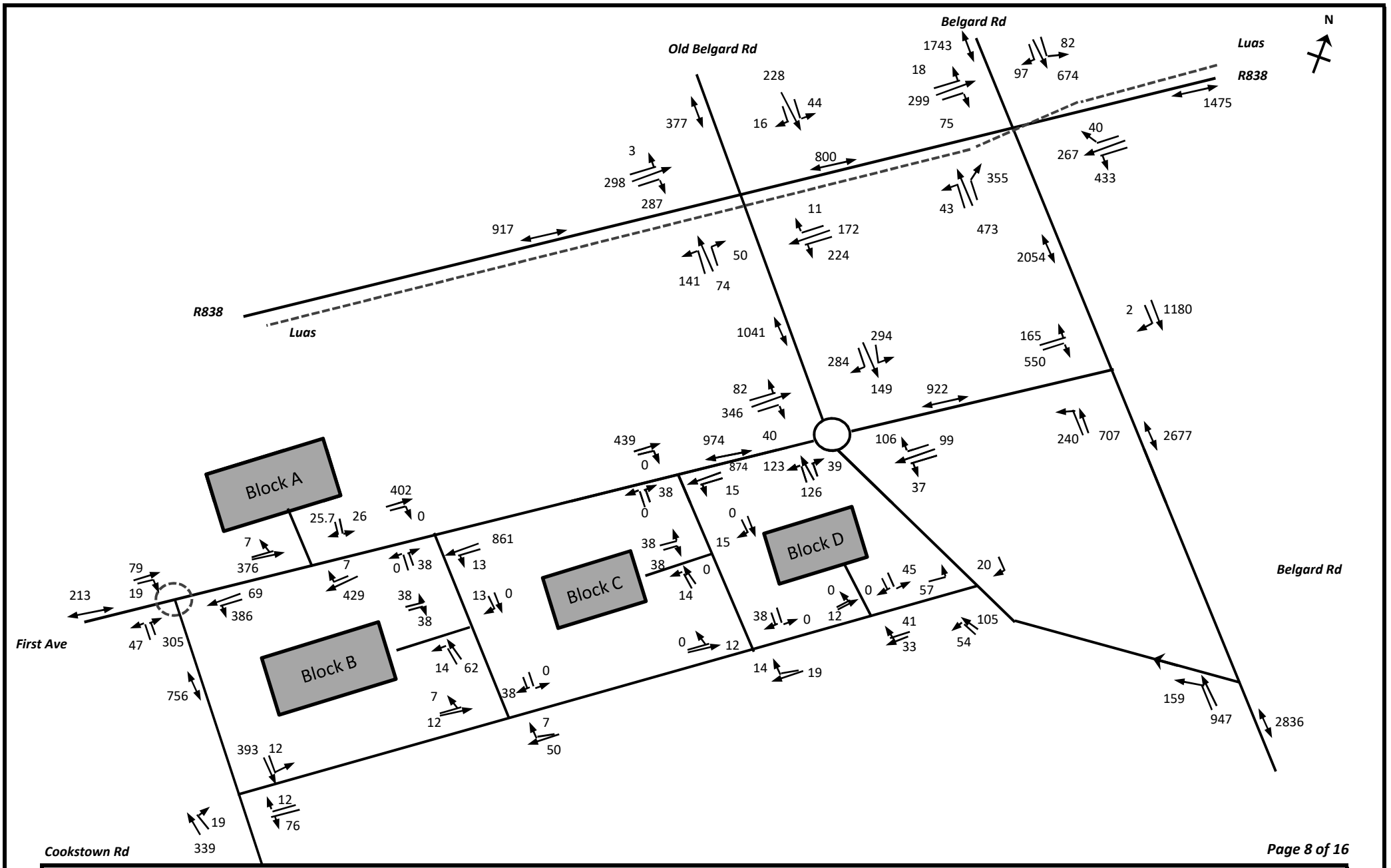
Note - The Filling Station is Being Replaced and it's Traffic is alredy established and included in the Traffic Surveys of the Existing Network that have been completed, so adding in Traffic associated with a Replacement PFS and Kiosk in not appropriate.



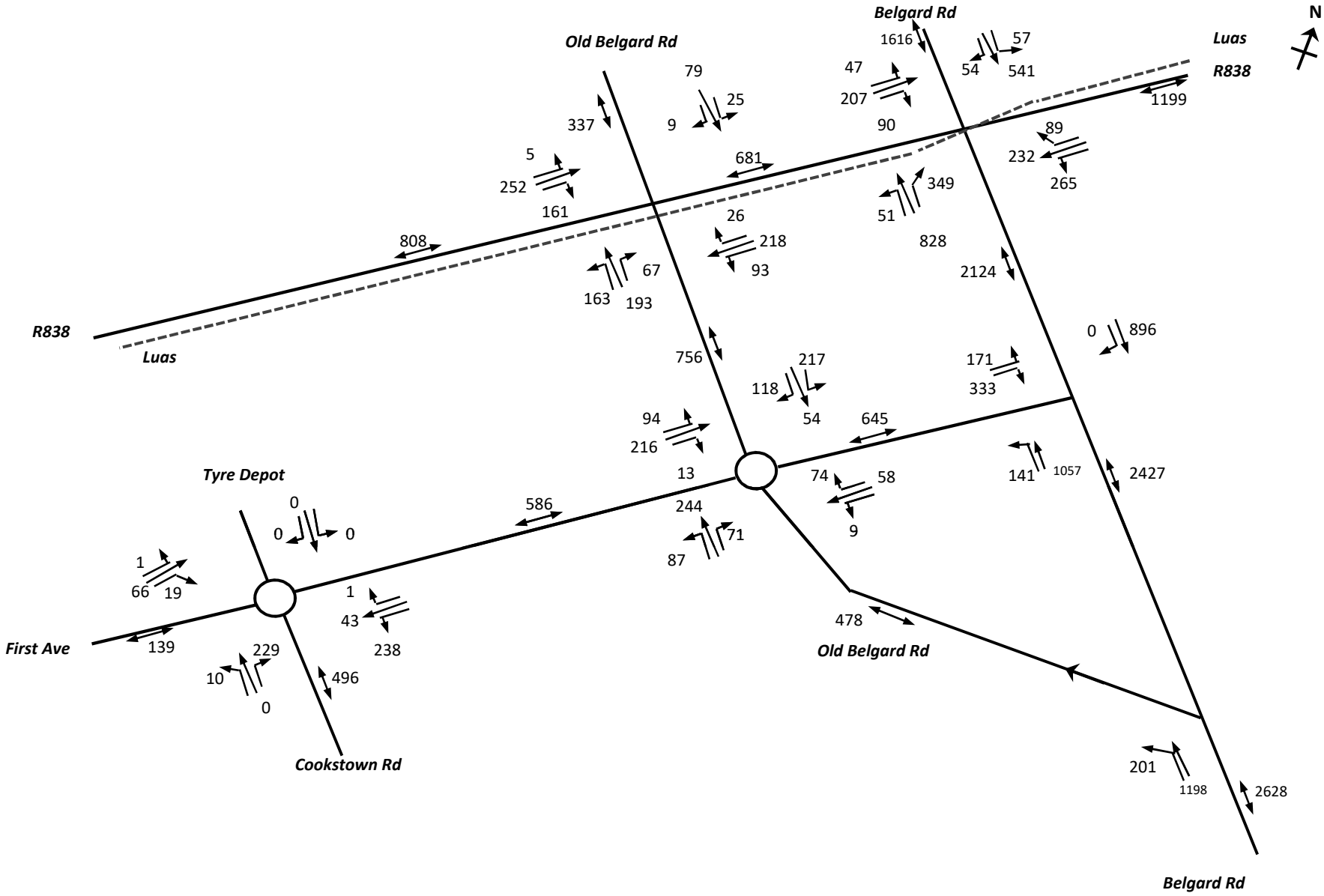
ASSIGNMENT OF "NEW" DEVELOPMENT TRAFFIC FROM TRICS, USING INDUSTRY STANDARD METHODOLOGY, REFELCTING ESTABLISHED TURNING PROPORTIONS.



Projected Weekday AM Peak Hour Traffic Volumes (8-9am)
SELECTED OPENING YEAR 2025 - WITH DEVELOPMENT OPEN & OCCUPIED (PCUs).



Projected Weekday AM Peak Hour Traffic Volumes (8-9am) DESIGN YEAR 2040 (OPENING YEAR+15) - WITH DEVELOPMENT OPEN & OCCUPIED (PCUs).

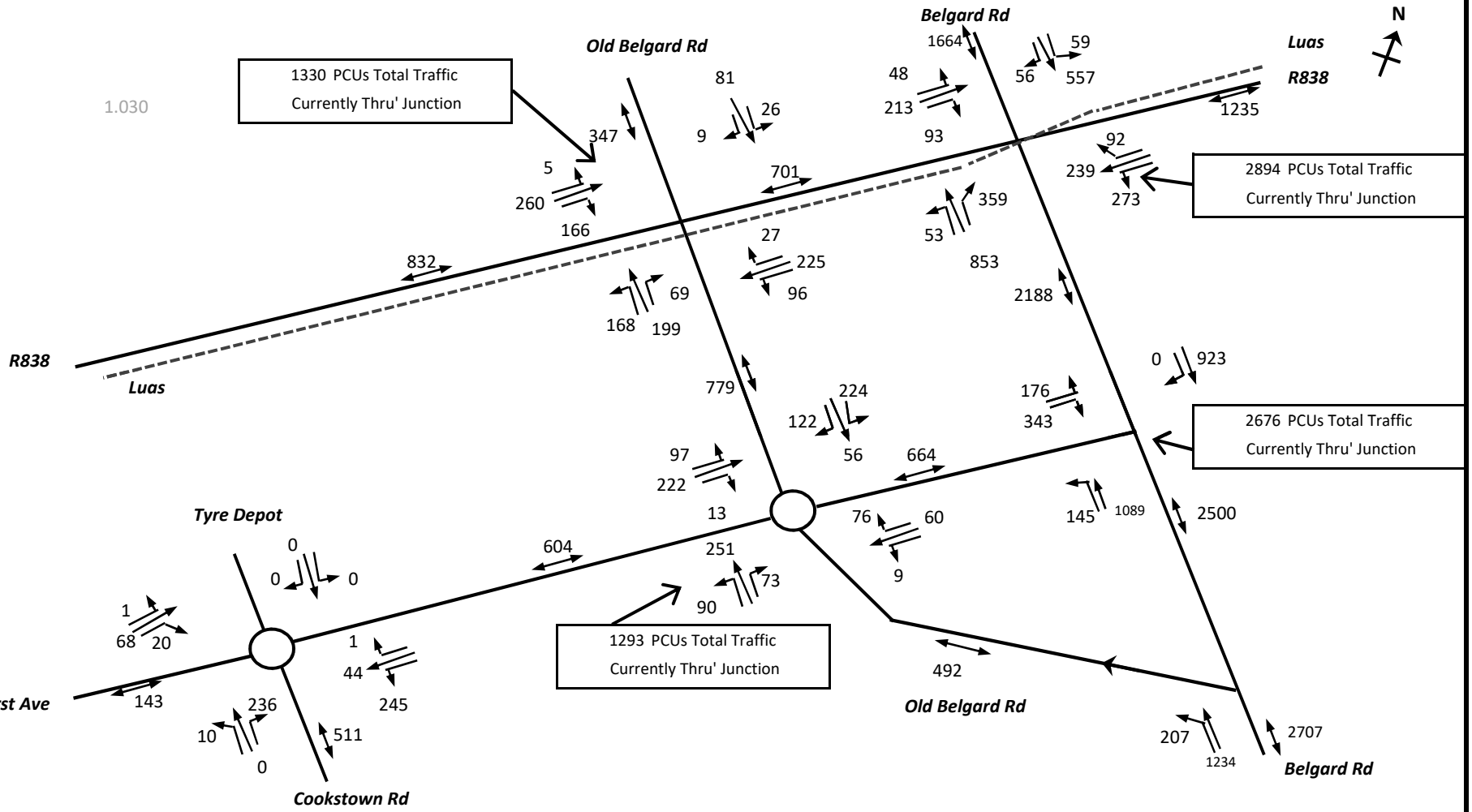


AS SURVEYED TRAFFIC FLOWS 2019 - WEEKDAY PM PEAK 5-6PM (PCUs)

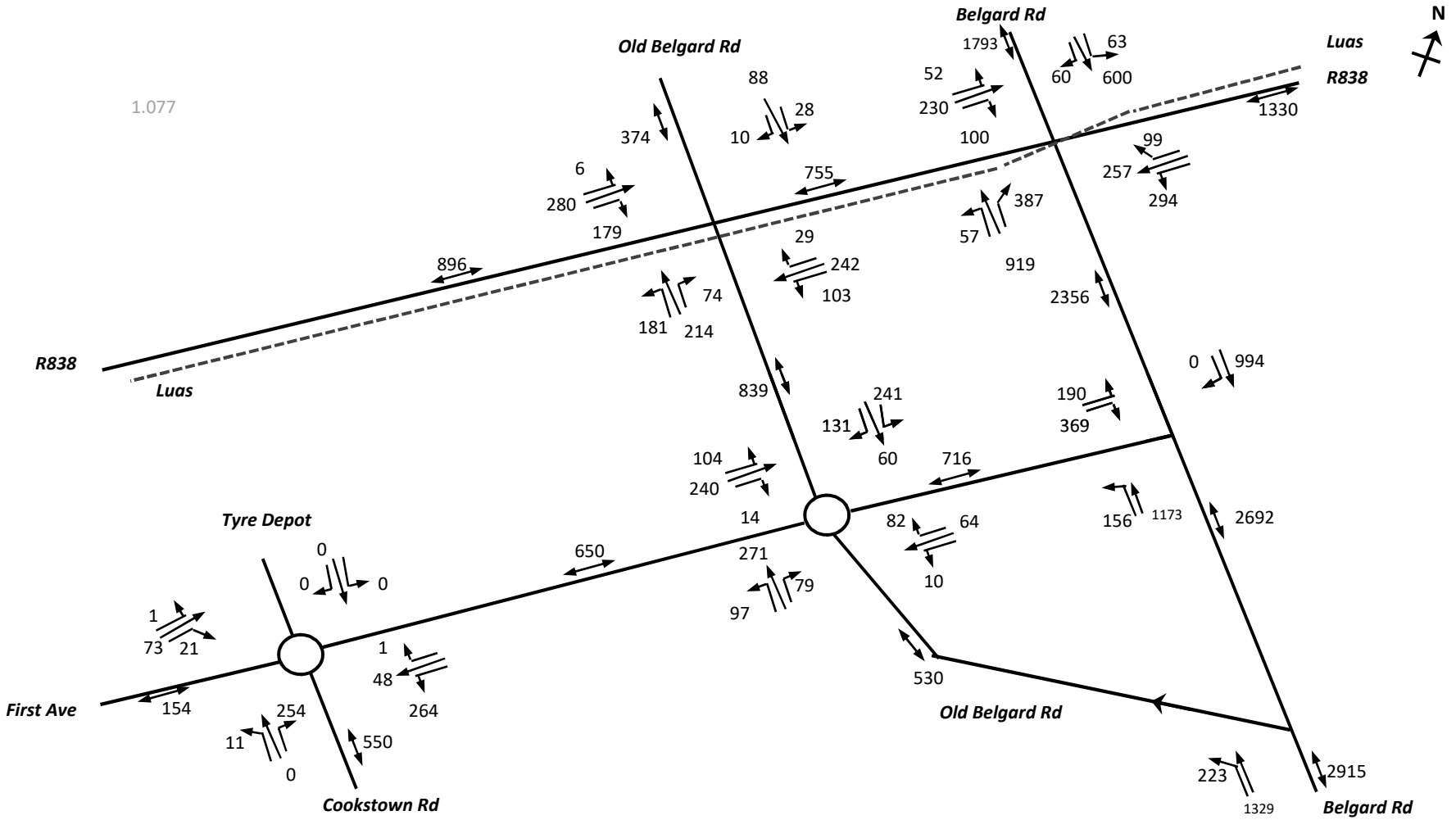
TII PE-PAG-02017 Project Appraisal Guidelines for National Roads Unit 5.3 (Travel Demand Projections, Table 5.3.2: Link-Based Growth Rates: Annual Growth Factors) SDCC

2019 to 2025 = 1.030

2025 to 2040 = 1.077



Projected Weekday PM Peak Hour Traffic Volumes (5-6pm)
SELECTED OPENING YEAR 2025 - WITHOUT NEW DEVELOPMENT (PCUs).



Projected Weekday PM Peak Hour Traffic Volumes (5-6pm)
SELECTED DESIGN YEAR 2040 (OPENING YEAR +15) - WITHOUT NEW DEVELOPMENT (PCUs).

TRICS Traffic Generation Assessment - BLOCK A

260 APARTMENTS/DUPLEX					
260 No Apts	Car Arrivals		Car Departures		Total 2-Way Traffic
Network Period	Per Unit	Total	Per Unit	Total	
AM Peak Hr 8-9am	0.057	15	0.198	51	66
PM Peak Hr 5-6pm	0.179	47	0.086	22	69

BLOCK A TOTAL

TRICS Traffic Generation Assessment - BLOCK B

342 APARTMENTS					
342 No Apts	Car Arrivals		Car Departures		Total 2-Way Traffic
Network Period	Per Unit	Total	Per Unit	Total	
AM Peak Hr 8-9am	0.057	19	0.198	68	87
PM Peak Hr 5-6pm	0.179	61	0.086	29	91

285m2 Commercial/Retail					
285 m2 Retail	Car Arrivals		Car Departures		Total 2-Way Traffic
Network Period	Per 100m2	Total	Per 100m2	Total	
AM Peak Hr 8-9am	2.949	8	2.619	7	16
PM Peak Hr 5-6pm	4.007	11	4.345	12	24

Total Traffic Generated - BLOCK B			
Network Period	Car Arrivals	Car Departures	2-Way Traffic Tot
AM Peak Hr 8-9am	27	75	102
PM Peak Hr 5-6pm	72	41	113

BLOCK B TOTAL

TRICS Traffic Generation Assessment - BLOCK C

350 APARTMENTS					
350 No Apts	Car Arrivals		Car Departures		Total 2-Way Traffic
Network Period	Per Unit	Total	Per Unit	Total	
AM Peak Hr 8-9am	0.057	20	0.198	69	89
PM Peak Hr 5-6pm	0.179	63	0.086	30	93

272 m2 CRECHE					
272 m2 Creche	Car Arrivals		Car Departures		Total 2-Way Traffic
Network Period	Per 100m2	Total	Per 100m2	Total	
AM Peak Hr 8-9am	3.270	9	2.513	7	16
PM Peak Hr 5-6pm	2.326	6	2.842	8	14

Total Traffic Generated - BLOCK C			
Network Period	Car Arrivals	Car Departures	2-Way Traffic Tot
AM Peak Hr 8-9am	29	76	105
PM Peak Hr 5-6pm	69	38	107

BLOCK C TOTAL

TRICS Traffic Generation Assessment - BLOCK D - NET ADDITIONAL TRAFFIC

152 APARTMENTS					
152 No Apts	Car Arrivals		Car Departures		Total 2-Way Traffic
Network Period	Per Unit	Total	Per Unit	Total	
AM Peak Hr 8-9am	0.057	9	0.198	30	39
PM Peak Hr 5-6pm	0.179	27	0.086	13	41

1,500m2 OFFICES					
1500 m2 Office	Car Arrivals		Car Departures		Total 2-Way Traffic
Network Period	Per 100m2	Total	Per 100m2	Total	
AM Peak Hr 8-9am	1.211	18	0.173	3	20
PM Peak Hr 5-6pm	0.125	2	1.018	15	17

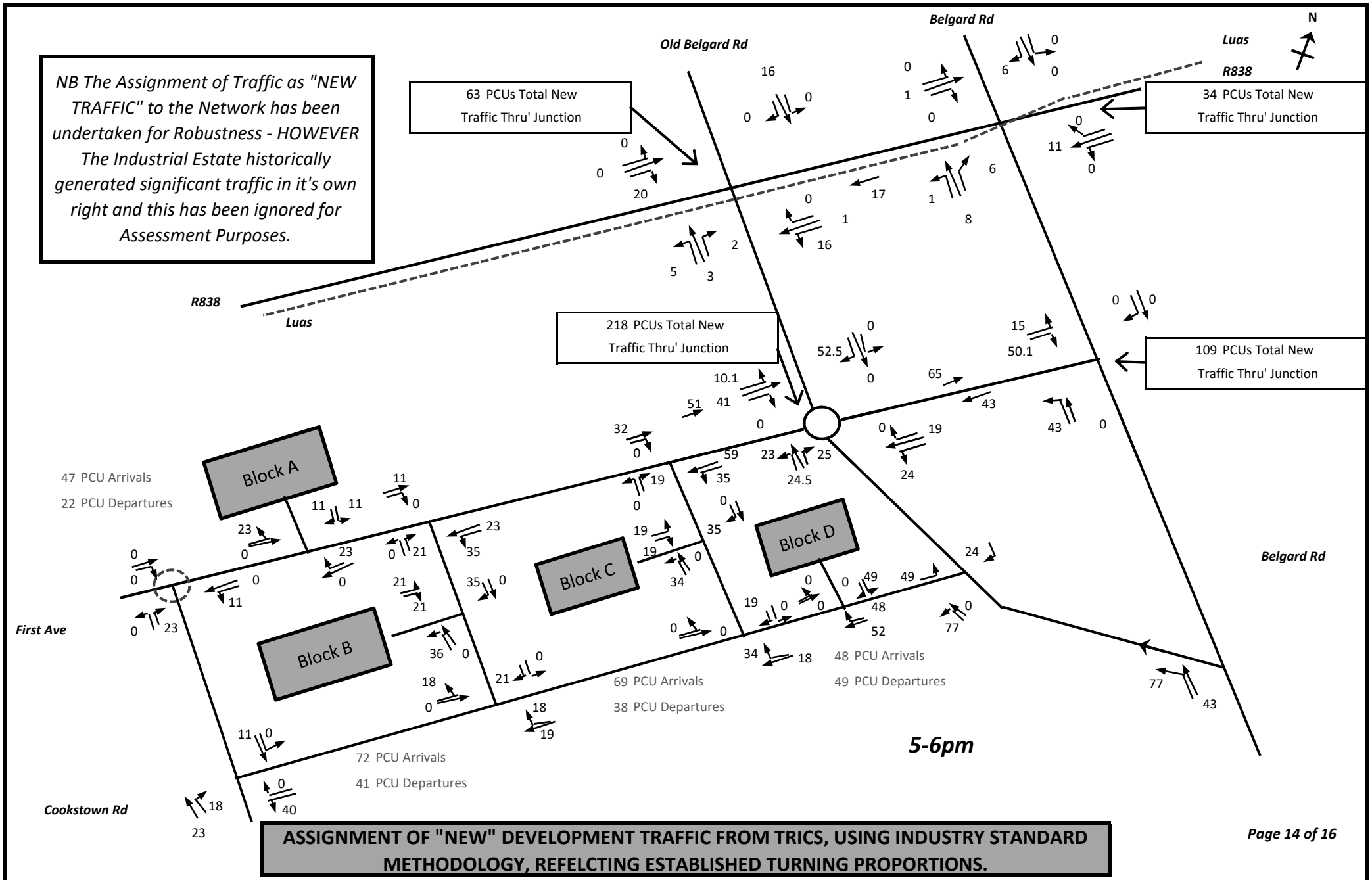
477m2 Commercial/Retail					
477 m2 Retail	Car Arrivals		Car Departures		Total 2-Way Traffic
Network Period	Per 100m2	Total	Per 100m2	Total	
AM Peak Hr 8-9am	2.949	14	2.619	12	27
PM Peak Hr 5-6pm	4.007	19	4.345	21	40

Total NET ADDITIONAL Traffic Generated - BLOCK D			
Network Period	Car Arrivals	Car Departures	2-Way Traffic Tot
AM Peak Hr 8-9am	41	45	86
PM Peak Hr 5-6pm	48	49	97

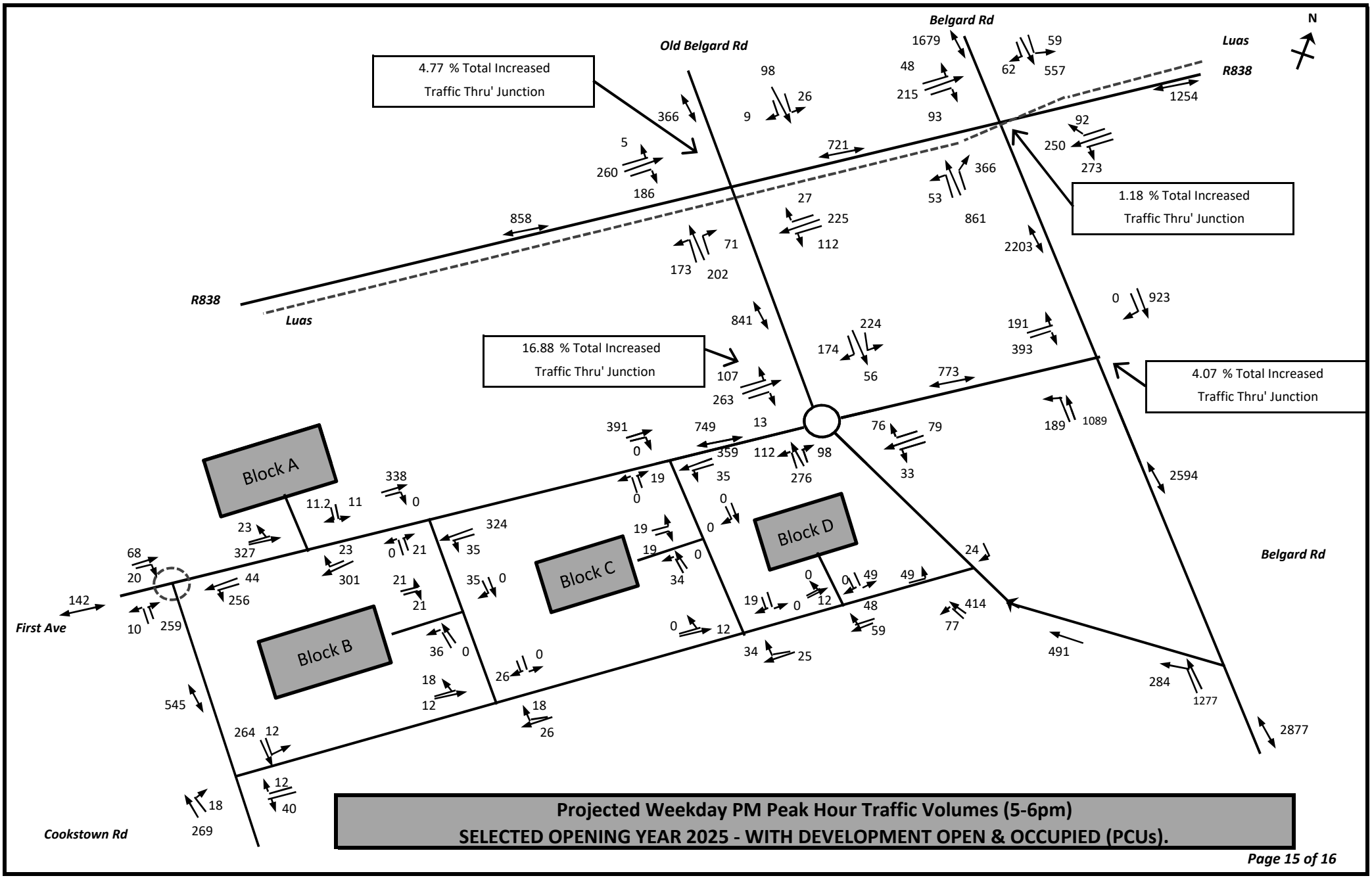
For Info - Traffic Already Being Generated by an 8-Stand PFS

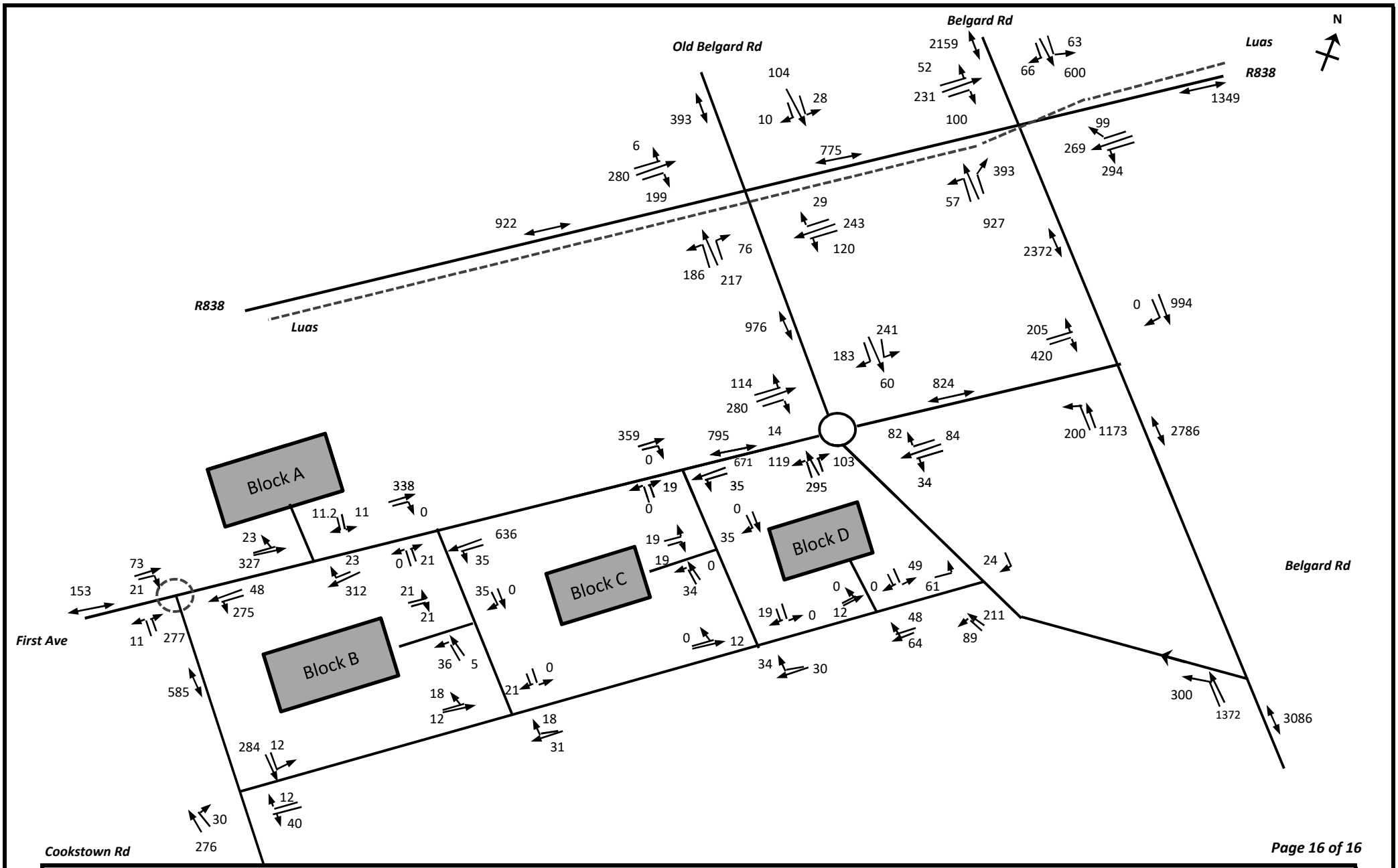
Petrol Filling Station & Ancillary Shop/Kiosk Unit					
8 Stand PFS	Car Arrivals		Car Departures		Total 2-Way Traffic
Network Period	per Stand	Total	per Stand	Total	
AM Peak Hr 8-9am	5.764	46	5.874	47	93
PM Peak Hr 5-6pm	5.829	47	5.894	47	94

Note - The Filling Station is Being Replaced and it's Traffic is alredy established and included in the Traffic Surveys of the Existing Network that have been completed, so adding in Traffic associated with a Replacement PFS and Kiosk in not appropriate.



ASSIGNMENT OF "NEW" DEVELOPMENT TRAFFIC FROM TRICS, USING INDUSTRY STANDARD METHODOLOGY, REFELCTING ESTABLISHED TURNING PROPORTIONS.


Belgard Rd
Old Belgard Rd
Luas
R838
N
4.77 % Total Increased
Traffic Thru' Junction
1.18 % Total Increased
Traffic Thru' Junction
16.88 % Total Increased
Traffic Thru' Junction
4.07 % Total Increased
Traffic Thru' Junction
Block A
Block B
Block C
Block D
First Ave
Cookstown Rd
Belgard Rd
Projected Weekday PM Peak Hour Traffic Volumes (5-6pm)
SELECTED OPENING YEAR 2025 - WITH DEVELOPMENT OPEN & OCCUPIED (PCUs).



Projected Weekday PM Peak Hour Traffic Volumes (5-6pm) DESIGN YEAR 2040 (OPENING YEAR+15) - WITH DEVELOPMENT OPEN & OCCUPIED (PCUs).

APPENDIX D

ARCADY Junction Simulation Model Output
Cookstown Rd/1st Ave Roundabout

Existing Roundabout at Cookstown Estate Rd/1st Avenue
Summary ARCADY Results in Order as included herein
(Robust & Worst Case)

Modelled Scenario	Period Mean Max Q (PCUs)	Period Max RFC
2025 Opening Year AM Peak	<1	0.43
2025 Opening Year PM Peak	<1	0.3
2040 Design Year AM Peak	<1	0.47
2040 Design Year PM Peak	<1	0.33

All Results Above are well below the recommended RFC of 0.85 (85% Capacity) and therefore no problems whatsoever are anticipated at the Existing Roundabout in terms of Capacity or excessive vehicle Queues

ACCEPTING that it is possible that SDCC may want to see this Roundabout altered to Traffic Signal Control, which is considered a more appropriate junction form in an Urban Residential Environment. Traffic Signals are easily Accommodated.

NB *Any Small Changes to Selected Opening Year 2025 or Design Year 2040 will have no significant implications in terms of the conclusions of the Study.*

Junctions 9

ARCADY 9 - Roundabout Module

Filename: 2025 AM PM.j9
Path: N:\01 Projects\2019\19-036 Cookstown Phase 3\Calculations\Ctwn Rd 1st Ave ARCADYS
Report generation date: 12/12/2019 17:41:00

Summary of junction performance

	AM				PM			
	Q (PCU)	Delay (s)	RFC	LOS	Q (PCU)	Delay (s)	RFC	LOS
	2025							
Arm 1	0.8	5.93	0.43	A	0.4	4.83	0.30	A
Arm 2	0.5	5.21	0.34	A	0.4	4.73	0.28	A
Arm 3	0.1	4.41	0.11	A	0.1	4.33	0.10	A

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

File summary

File Description

Title	(untitled)
Location	
Site number	
Date	12/12/2019
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Enumerator	NRB-004\Eoin
Description	

Units

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

Analysis Options

Calculate Q Percentiles	Calculate residual capacity	RFC Threshold	Av. Delay threshold (s)	Q 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	AM	ONE HOUR	07:45	09:15	15
D2	2025	PM	ONE HOUR	16:45	18:15	15

Analysis Set Details

ID	Network flow scaling factor (%)
A1	100.000

2025, AM

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction Type	Junction Delay (s)	Junction LOS
1	1st Avs Ctwn Roundabout	Standard Roundabout	5.49	A

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Arms

Arms

Arm	Name	Description
1	1st Ave East	
2	Cookstown Rd S	
3	1st Ave West	

Roundabout Geometry

Arm	V (m)	E (m)	l' (m)	R (m)	D (m)	PHI (deg)	Exit only
1	3.00	3.60	10.0	12.0	30.0	12.0	
2	3.00	3.60	10.0	12.0	30.0	12.0	
3	3.00	3.60	10.0	12.0	30.0	12.0	

Slope / Intercept / Capacity

Roundabout Slope and Intercept used in model

Arm	Final slope	Final intercept (PCU/hr)
1	0.543	1093
2	0.543	1093
3	0.543	1093

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	AM	ONE HOUR	07:45	09:15	15

Vehicle mix source	PCU Factor for a HV (PCU)
HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Av. Demand (PCU/hr)	Scaling Factor (%)
1		✓	426	100.000
2		✓	325	100.000
3		✓	91	100.000

Origin-Destination Data

Demand (PCU/hr)

		To		
		1	2	3
From	1	0	362	64
	2	282	0	43
	3	73	18	0

Vehicle Mix

HV %s

		To		
		1	2	3
From	1	0	1	1
	2	1	0	1
	3	1	1	0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max delay (s)	Max Q (PCU)	Max LOS
1	0.43	5.93	0.8	A
2	0.34	5.21	0.5	A
3	0.11	4.41	0.1	A

Main Results for each time segment

07:45 - 08:00

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
1	321	13	1086	0.295	319	0.4	4.731	A
2	245	48	1067	0.229	243	0.3	4.408	A
3	69	211	978	0.070	68	0.1	3.993	A

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
1	383	16	1084	0.353	382	0.5	5.176	A
2	292	57	1062	0.275	292	0.4	4.718	A
3	82	253	956	0.086	82	0.1	4.160	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
1	469	20	1082	0.433	468	0.8	5.910	A
2	358	70	1055	0.339	357	0.5	5.211	A
3	100	310	925	0.108	100	0.1	4.408	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
1	469	20	1082	0.433	469	0.8	5.926	A
2	358	70	1055	0.339	358	0.5	5.215	A
3	100	310	925	0.108	100	0.1	4.409	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
1	383	16	1084	0.353	384	0.6	5.197	A
2	292	58	1062	0.275	293	0.4	4.731	A
3	82	254	955	0.086	82	0.1	4.164	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
1	321	14	1086	0.295	321	0.4	4.760	A
2	245	48	1067	0.229	245	0.3	4.424	A
3	69	213	978	0.070	69	0.1	3.999	A

2025, PM

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction Type	Junction Delay (s)	Junction LOS
1	1st Avs Ctwn Roundabout	Standard Roundabout	4.72	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	PM	ONE HOUR	16:45	18:15	15

Vehicle mix source	PCU Factor for a HV (PCU)
HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Av. Demand (PCU/hr)	Scaling Factor (%)
1		✓	299	100.000
2		✓	271	100.000
3		✓	88	100.000

Origin-Destination Data

Demand (PCU/hr)

		To		
		1	2	3
From	1	0	255	44
	2	261	0	10
	3	68	20	0

Vehicle Mix

HV %s

		To		
		1	2	3
From	1	0	1	1
	2	1	0	1
	3	1	1	0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max delay (s)	Max Q (PCU)	Max LOS
1	0.30	4.83	0.4	A
2	0.28	4.73	0.4	A
3	0.10	4.33	0.1	A

Main Results for each time segment

16:45 - 17:00

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
1	225	15	1085	0.207	224	0.3	4.217	A
2	204	33	1075	0.190	203	0.2	4.164	A
3	66	196	987	0.067	66	0.1	3.947	A

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
1	269	18	1083	0.248	269	0.3	4.461	A
2	244	40	1072	0.227	243	0.3	4.388	A
3	79	234	966	0.082	79	0.1	4.099	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
1	329	22	1081	0.304	329	0.4	4.830	A
2	298	48	1067	0.280	298	0.4	4.726	A
3	97	287	937	0.103	97	0.1	4.325	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
1	329	22	1081	0.304	329	0.4	4.834	A
2	298	48	1067	0.280	298	0.4	4.730	A
3	97	287	937	0.103	97	0.1	4.326	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
1	269	18	1083	0.248	269	0.3	4.469	A
2	244	40	1072	0.227	244	0.3	4.396	A
3	79	235	966	0.082	79	0.1	4.103	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
1	225	15	1085	0.207	225	0.3	4.232	A
2	204	33	1075	0.190	204	0.2	4.177	A
3	66	197	986	0.067	66	0.1	3.953	A

Junctions 9

ARCADY 9 - Roundabout Module

Filename: 2040 AM PM.j9
Path: N:\01 Projects\2019\19-036 Cookstown Phase 3\Calculations\Ctwn Rd 1st Ave ARCADYS
Report generation date: 12/12/2019 17:44:22

Summary of junction performance

	AM				PM			
	Q (PCU)	Delay (s)	RFC	LOS	Q (PCU)	Delay (s)	RFC	LOS
	2040							
Arm 1	0.9	6.28	0.47	A	0.5	5.01	0.33	A
Arm 2	0.6	5.46	0.37	A	0.4	4.89	0.30	A
Arm 3	0.1	4.52	0.12	A	0.1	4.42	0.11	A

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

File summary

File Description

Title	(untitled)
Location	
Site number	
Date	12/12/2019
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Enumerator	NRB-004\Eoin
Description	

Units

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

Analysis Options

Calculate Q Percentiles	Calculate residual capacity	RFC Threshold	Av. Delay threshold (s)	Q 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	2040	AM	ONE HOUR	07:45	09:15	15
D2	2040	PM	ONE HOUR	16:45	18:15	15

Analysis Set Details

ID	Network flow scaling factor (%)
A1	100.000

2040, AM

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction Type	Junction Delay (s)	Junction LOS
1	1st Avs Ctwn Roundabout	Standard Roundabout	5.77	A

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Arms

Arms

Arm	Name	Description
1	1st Ave East	
2	Cookstown Rd S	
3	1st Ave West	

Roundabout Geometry

Arm	V (m)	E (m)	l' (m)	R (m)	D (m)	PHI (deg)	Exit only
1	3.00	3.60	10.0	12.0	30.0	12.0	
2	3.00	3.60	10.0	12.0	30.0	12.0	
3	3.00	3.60	10.0	12.0	30.0	12.0	

Slope / Intercept / Capacity

Roundabout Slope and Intercept used in model

Arm	Final slope	Final intercept (PCU/hr)
1	0.543	1093
2	0.543	1093
3	0.543	1093

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	2040	AM	ONE HOUR	07:45	09:15	15

Vehicle mix source	PCU Factor for a HV (PCU)
HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Av. Demand (PCU/hr)	Scaling Factor (%)
1		✓	457	100.000
2		✓	351	100.000
3		✓	98	100.000

Origin-Destination Data

Demand (PCU/hr)

		To		
		1	2	3
From	1	0	388	69
	2	304	0	47
	3	79	19	0

Vehicle Mix

HV %s

		To		
		1	2	3
From	1	0	1	1
	2	1	0	1
	3	1	1	0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max delay (s)	Max Q (PCU)	Max LOS
1	0.47	6.28	0.9	A
2	0.37	5.46	0.6	A
3	0.12	4.52	0.1	A

Main Results for each time segment

07:45 - 08:00

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
1	344	14	1085	0.317	342	0.5	4.880	A
2	264	52	1065	0.248	263	0.3	4.525	A
3	74	228	970	0.076	73	0.1	4.057	A

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
1	411	17	1084	0.379	410	0.6	5.392	A
2	316	62	1060	0.298	315	0.4	4.882	A
3	88	273	945	0.093	88	0.1	4.242	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
1	503	21	1082	0.465	502	0.9	6.260	A
2	386	76	1052	0.367	386	0.6	5.453	A
3	108	334	912	0.118	108	0.1	4.522	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
1	503	21	1082	0.465	503	0.9	6.282	A
2	386	76	1052	0.367	386	0.6	5.462	A
3	108	335	911	0.118	108	0.1	4.524	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
1	411	17	1084	0.379	412	0.6	5.419	A
2	316	62	1059	0.298	316	0.4	4.897	A
3	88	274	945	0.093	88	0.1	4.246	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
1	344	14	1085	0.317	345	0.5	4.911	A
2	264	52	1065	0.248	265	0.3	4.546	A
3	74	229	969	0.076	74	0.1	4.063	A

2040, PM

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction Type	Junction Delay (s)	Junction LOS
1	1st Avs Ctwn Roundabout	Standard Roundabout	4.88	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)
D2	2040	PM	ONE HOUR	16:45	18:15	15

Vehicle mix source	PCU Factor for a HV (PCU)
HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Av. Demand (PCU/hr)	Scaling Factor (%)
1		✓	322	100.000
2		✓	291	100.000
3		✓	94	100.000

Origin-Destination Data

Demand (PCU/hr)

		To		
		1	2	3
From	1	0	274	48
	2	280	0	11
	3	73	21	0

Vehicle Mix

HV %s

		To		
		1	2	3
From	1	0	1	1
	2	1	0	1
	3	1	1	0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max delay (s)	Max Q (PCU)	Max LOS
1	0.33	5.01	0.5	A
2	0.30	4.89	0.4	A
3	0.11	4.42	0.1	A

Main Results for each time segment

16:45 - 17:00

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
1	242	16	1085	0.224	241	0.3	4.306	A
2	219	36	1074	0.204	218	0.3	4.244	A
3	71	210	979	0.072	70	0.1	4.000	A

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
1	289	19	1083	0.267	289	0.4	4.577	A
2	262	43	1070	0.245	261	0.3	4.496	A
3	85	251	957	0.088	84	0.1	4.168	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
1	355	23	1081	0.328	354	0.5	5.000	A
2	320	53	1065	0.301	320	0.4	4.881	A
3	103	308	926	0.112	103	0.1	4.420	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
1	355	23	1081	0.328	355	0.5	5.006	A
2	320	53	1065	0.301	320	0.4	4.885	A
3	103	308	926	0.112	103	0.1	4.421	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
1	289	19	1083	0.267	290	0.4	4.589	A
2	262	43	1070	0.245	262	0.3	4.503	A
3	85	252	956	0.088	85	0.1	4.171	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
1	242	16	1085	0.224	243	0.3	4.320	A
2	219	36	1074	0.204	219	0.3	4.257	A
3	71	211	979	0.072	71	0.1	4.007	A

APPENDIX E

PiCADY Junction Model Output
Cookstown Rd/New E-W Street

Proposed Priority Controlled Junction at E-W Street
Summary PiCADY Results in Order as included herein
(Robust & Worst Case)

Modelled Scenario	Period Mean Max Q (PCUs)	Period Max RFC
2025 Opening Year AM Peak	<1	0.24
2025 Opening Year PM Peak	<1	0.13
2040 Design Year AM Peak	<1	0.25
2040 Design Year PM Peak	<1	0.14

All Results Above are well below the Recommended RFC of 0.85 (85% Capacity), and therefore no problems whatsoever are anticipated at the Proposed Site Access in terms of Capacity or excessive vehicle Queues - This is unsurprising in light of the very low volumes of anticipated traffic.

NB *Any Small Changes to Selected Opening Year 2025 or Design Year 2040 will have no significant implications in terms of the conclusions of the Study.*

Junctions 9

PICADY 9 - Priority Intersection Module

Version: 9.0.1.4646 []

For sales and distribution information, program advice and maintenance, contact TRL:
Tel: +44 (0)1344 770758 email: software@trl.co.uk Web: http://www.trlsoftware.co.uk

Filename: 2025 AM PM.j9
Path: N:\01 Projects\2019\19-036 Cookstown Phase 3\Calculations\Ctwn Rd New EW Street PICADYS
Report generation date: 12/12/2019 17:10:10

Summary of junction performance

	AM				PM			
	Q (PCU)	Delay (s)	RFC	LOS	Q (PCU)	Delay (s)	RFC	LOS
	2025							
Stream B-AC	0.3	10.53	0.24	B	0.1	9.03	0.13	A
Stream C-AB	0.0	5.36	0.03	A	0.0	5.46	0.03	A

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

File summary

File Description

Title	(untitled)
Location	
Site number	
Date	12/12/2019
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Enumerator	NRB-004\Eoin
Description	

Units

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

Analysis Options

Calculate Q Percentiles	Calculate residual capacity	RFC Threshold	Av. Delay threshold (s)	Q 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	AM	ONE HOUR	07:45	09:15	15
D2	2025	PM	ONE HOUR	15:45	17:15	15

Analysis Set Details

ID	Network flow scaling factor (%)
A1	100.000

2025, 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	C'twn Rd/EW Street Junc (Worst Case)	T-Junction	Two-way	1.41	A

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Arms

Arms

Arm	Name	Description	Arm type
A	Cookstown Rd N		Major
B	New EW Street		Minor
C	Cookstown Rd S		Major

Major Arm Geometry

Arm	Width of carriageway (m)	Has kerbed central reserve	Has right turn bay	Visibility for right turn (m)	Blocks?	Blocking queue (PCU)
C	6.00			0.0	✓	0.00

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

Minor Arm Geometry

Arm	Minor arm type	Lane width (m)	Visibility to left (m)	Visibility to right (m)
B	One lane	2.20	0	0

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	440	0.080	0.202	0.127	0.289
1	B-C	574	0.088	0.222	-	-
1	C-B	574	0.222	0.222	-	-

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	AM	ONE HOUR	07:45	09:15	15

Vehicle mix source	PCU Factor for a HV (PCU)
HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Av. Demand (PCU/hr)	Scaling Factor (%)
A		✓	379	100.000
B		✓	100	100.000
C		✓	336	100.000

Origin-Destination Data

Demand (PCU/hr)

		To		
		A	B	C
From	A	0	12	367
	B	12	0	88
	C	326	10	0

Vehicle Mix

HV %s

		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 Q (PCU)	Max LOS
B-AC	0.24	10.53	0.3	B
C-AB	0.03	5.36	0.0	A
C-A				
A-B				
A-C				

Main Results for each time segment

07:45 - 08:00

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-AC	75	485	0.155	75	0.2	8.763	A
C-AB	12	686	0.017	12	0.0	5.354	A
C-A	241			241			
A-B	9			9			
A-C	276			276			

08:00 - 08:15

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-AC	90	471	0.191	90	0.2	9.434	A
C-AB	15	710	0.022	15	0.0	5.200	A
C-A	287			287			
A-B	11			11			
A-C	330			330			

08:15 - 08:30

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-AC	110	452	0.244	110	0.3	10.505	B
C-AB	21	744	0.029	21	0.0	5.002	A
C-A	349			349			
A-B	13			13			
A-C	404			404			

08:30 - 08:45

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-AC	110	452	0.244	110	0.3	10.526	B
C-AB	21	744	0.029	21	0.0	5.006	A
C-A	349			349			
A-B	13			13			
A-C	404			404			

08:45 - 09:00

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-AC	90	471	0.191	90	0.2	9.461	A
C-AB	15	710	0.022	15	0.0	5.206	A
C-A	287			287			
A-B	11			11			
A-C	330			330			

09:00 - 09:15

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-AC	75	485	0.155	75	0.2	8.803	A
C-AB	12	686	0.017	12	0.0	5.359	A
C-A	241			241			
A-B	9			9			
A-C	276			276			

2025, 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	C'twn Rd/EW Street Junc (Worst Case)	T-Junction	Two-way	0.91	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)
D2	2025	PM	ONE HOUR	15:45	17:15	15

Vehicle mix source	PCU Factor for a HV (PCU)
HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Av. Demand (PCU/hr)	Scaling Factor (%)
A		✓	274	100.000
B		✓	52	100.000
C		✓	282	100.000

Origin-Destination Data

Demand (PCU/hr)

		To		
		A	B	C
From	A	0	12	262
	B	12	0	40
	C	272	10	0

Vehicle Mix

HV %s

		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 Q (PCU)	Max LOS
B-AC	0.13	9.03	0.1	A
C-AB	0.03	5.46	0.0	A
C-A				
A-B				
A-C				

Main Results for each time segment

15:45 - 16:00

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-AC	39	482	0.081	39	0.1	8.115	A
C-AB	11	673	0.016	11	0.0	5.454	A
C-A	201			201			
A-B	9			9			
A-C	197			197			

16:00 - 16:15

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-AC	47	471	0.099	47	0.1	8.482	A
C-AB	14	693	0.020	14	0.0	5.316	A
C-A	240			240			
A-B	11			11			
A-C	236			236			

16:15 - 16:30

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-AC	57	456	0.126	57	0.1	9.024	A
C-AB	19	722	0.026	19	0.0	5.138	A
C-A	292			292			
A-B	13			13			
A-C	288			288			

16:30 - 16:45

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-AC	57	456	0.126	57	0.1	9.029	A
C-AB	19	722	0.026	19	0.0	5.140	A
C-A	292			292			
A-B	13			13			
A-C	288			288			

16:45 - 17:00

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-AC	47	471	0.099	47	0.1	8.492	A
C-AB	14	693	0.020	14	0.0	5.322	A
C-A	240			240			
A-B	11			11			
A-C	236			236			

17:00 - 17:15

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-AC	39	482	0.081	39	0.1	8.138	A
C-AB	11	673	0.016	11	0.0	5.458	A
C-A	201			201			
A-B	9			9			
A-C	197			197			

Junctions 9

PICADY 9 - Priority Intersection Module

Filename: 2040 AM PM.j9
Path: N:\01 Projects\2019\19-036 Cookstown Phase 3\Calculations\Ctwn Rd New EW Street PICADYS
Report generation date: 12/12/2019 17:28:10

Summary of junction performance

	AM				PM			
	Q (PCU)	Delay (s)	RFC	LOS	Q (PCU)	Delay (s)	RFC	LOS
	2040							
Stream B-AC	0.3	10.78	0.25	B	0.1	9.30	0.13	A
Stream C-AB	0.1	5.44	0.06	A	0.3	5.89	0.14	A

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

File summary

File Description

Title	(untitled)
Location	
Site number	
Date	12/12/2019
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Enumerator	NRB-004\Eoin
Description	

Units

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

Analysis Options

Calculate Q Percentiles	Calculate residual capacity	RFC Threshold	Av. Delay threshold (s)	Q 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	2040	AM	ONE HOUR	07:45	09:15	15
D2	2040	PM	ONE HOUR	15:45	17:15	15

Analysis Set Details

ID	Network flow scaling factor (%)
A1	100.000

2040, 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	C'twn Rd/EW Street Junc (Worst Case)	T-Junction	Two-way	1.47	A

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Arms

Arms

Arm	Name	Description	Arm type
A	Cookstown Rd N		Major
B	New EW Street		Minor
C	Cookstown Rd S		Major

Major Arm Geometry

Arm	Width of carriageway (m)	Has kerbed central reserve	Has right turn bay	Visibility for right turn (m)	Blocks?	Blocking queue (PCU)
C	6.00			0.0	✓	0.00

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

Minor Arm Geometry

Arm	Minor arm type	Lane width (m)	Visibility to left (m)	Visibility to right (m)
B	One lane	2.20	0	0

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	440	0.080	0.202	0.127	0.289
1	B-C	574	0.088	0.222	-	-
1	C-B	574	0.222	0.222	-	-

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	2040	AM	ONE HOUR	07:45	09:15	15

Vehicle mix source	PCU Factor for a HV (PCU)
HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Av. Demand (PCU/hr)	Scaling Factor (%)
A		✓	407	100.000
B		✓	100	100.000
C		✓	358	100.000

Origin-Destination Data

Demand (PCU/hr)

		To		
		A	B	C
From	A	0	12	395
	B	12	0	88
	C	338	20	0

Vehicle Mix

HV %s

		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 Q (PCU)	Max LOS
B-AC	0.25	10.78	0.3	B
C-AB	0.06	5.44	0.1	A
C-A				
A-B				
A-C				

Main Results for each time segment

07:45 - 08:00

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-AC	75	479	0.157	75	0.2	8.879	A
C-AB	24	689	0.035	24	0.0	5.431	A
C-A	246			246			
A-B	9			9			
A-C	297			297			

08:00 - 08:15

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-AC	90	465	0.194	90	0.2	9.601	A
C-AB	31	713	0.044	31	0.1	5.299	A
C-A	290			290			
A-B	11			11			
A-C	355			355			

08:15 - 08:30

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-AC	110	444	0.248	110	0.3	10.761	B
C-AB	44	748	0.059	44	0.1	5.135	A
C-A	350			350			
A-B	13			13			
A-C	435			435			

08:30 - 08:45

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-AC	110	444	0.248	110	0.3	10.785	B
C-AB	44	749	0.059	44	0.1	5.138	A
C-A	350			350			
A-B	13			13			
A-C	435			435			

08:45 - 09:00

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-AC	90	465	0.194	90	0.2	9.627	A
C-AB	31	713	0.044	32	0.1	5.308	A
C-A	290			290			
A-B	11			11			
A-C	355			355			

09:00 - 09:15

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-AC	75	479	0.157	76	0.2	8.921	A
C-AB	24	689	0.035	24	0.0	5.439	A
C-A	246			246			
A-B	9			9			
A-C	297			297			

2040, 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	C'twn Rd/EW Street Junc (Worst Case)	T-Junction	Two-way	1.46	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)
D2	2040	PM	ONE HOUR	15:45	17:15	15

Vehicle mix source	PCU Factor for a HV (PCU)
HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Av. Demand (PCU/hr)	Scaling Factor (%)
A		✓	295	100.000
B		✓	52	100.000
C		✓	333	100.000

Origin-Destination Data

Demand (PCU/hr)

		To		
		A	B	C
From	A	0	12	283
	B	12	0	40
	C	279	54	0

Vehicle Mix

HV %s

		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 Q (PCU)	Max LOS
B-AC	0.13	9.30	0.1	A
C-AB	0.14	5.89	0.3	A
C-A				
A-B				
A-C				

Main Results for each time segment

15:45 - 16:00

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-AC	39	474	0.083	39	0.1	8.262	A
C-AB	59	673	0.088	58	0.1	5.870	A
C-A	192			192			
A-B	9			9			
A-C	213			213			

16:00 - 16:15

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-AC	47	462	0.101	47	0.1	8.672	A
C-AB	76	694	0.110	76	0.2	5.848	A
C-A	223			223			
A-B	11			11			
A-C	254			254			

16:15 - 16:30

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-AC	57	444	0.129	57	0.1	9.297	A
C-AB	104	723	0.143	103	0.3	5.835	A
C-A	263			263			
A-B	13			13			
A-C	312			312			

16:30 - 16:45

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-AC	57	444	0.129	57	0.1	9.303	A
C-AB	104	724	0.143	104	0.3	5.840	A
C-A	263			263			
A-B	13			13			
A-C	312			312			

16:45 - 17:00

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-AC	47	462	0.101	47	0.1	8.682	A
C-AB	76	694	0.110	77	0.2	5.862	A
C-A	223			223			
A-B	11			11			
A-C	254			254			

17:00 - 17:15

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-AC	39	474	0.083	39	0.1	8.281	A
C-AB	59	674	0.088	60	0.2	5.887	A
C-A	191			191			
A-B	9			9			
A-C	213			213			

APPENDIX F

ARCADY Junction Simulation Model Output
Old Belgard Rd/1st Ave R'Abt

Existing Roundabout at 1st Avenue/Old Belgard Rd
Summary ARCADY Results in Order as included herein
(Robust & Worst Case)

Modelled Scenario	Period Mean Max Q (PCUs)	Period Max RFC
2025 Opening Year AM Peak	4	0.84
2025 Opening Year PM Peak	2	0.57
2040 Design Year AM Peak	8	0.91
2040 Design Year PM Peak	2	0.61

All Results Above are within the recommended RFC of 0.85 (85% Capacity) during Opening Year 2025 and below 100% (Capacity) in the Design Year 2040 - therefore The Junction is approaching Capacity in 2040, considered as a stand-alone junction.

ACCEPTING that it is possible that SDCC may also want to see this Roundabout altered to Traffic Signal Control, which is considered a more appropriate junction form in an Urban Residential Environment. Traffic Signals are easily Accommodated.

***NB** Any Small Changes to Selected Opening Year 2025 or Design Year 2040 will have no significant implications in terms of the conclusions of the Study.*

Junctions 9

ARCADY 9 - Roundabout Module

Filename: 2025 AM PM.j9
Path: G:\Shared drives\Server\01 Projects\2019\19-036 Cookstown Phase 3\Calculations\1st Ave Old Belgadr ARCADYS
Report generation date: 07/09/2020 16:53:21

Summary of junction performance

	AM				PM			
	Q (PCU)	Delay (s)	RFC	LOS	Q (PCU)	Delay (s)	RFC	LOS
	2025							
Arm 1	0.4	5.90	0.29	A	0.3	4.68	0.21	A
Arm 2	0.5	6.52	0.35	A	1.3	9.15	0.57	A
Arm 3	1.0	7.42	0.50	A	1.0	8.31	0.49	A
Arm 4	4.8	24.56	0.84	C	1.2	8.97	0.55	A

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

File summary

File Description

Title	(untitled)
Location	
Site number	
Date	12/12/2019
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Enumerator	NRB-004\Eoin
Description	

Units

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

Analysis Options

Calculate Q Percentiles	Calculate residual capacity	RFC Threshold	Av. Delay threshold (s)	Q 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	AM	ONE HOUR	07:45	09:15	15
D2	2025	PM	ONE HOUR	16:45	18:15	15

Analysis Set Details

ID	Network flow scaling factor (%)
A1	100.000

2025, AM

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction Type	Junction Delay (s)	Junction LOS
1	1st Ave Old Belgard Rndab	Standard Roundabout	14.23	B

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Arms

Arms

Arm	Name	Description
1	Link to Belgard Rd	
2	Old Belgard Rd S	
3	1st Ave Arm	
4	Old Belgard Rd N	

Roundabout Geometry

Arm	V (m)	E (m)	l' (m)	R (m)	D (m)	PHI (deg)	Exit only
1	3.00	3.70	15.0	12.0	35.0	11.0	
2	3.00	3.70	15.0	12.0	35.0	11.0	
3	3.00	3.70	15.0	12.0	35.0	11.0	
4	3.00	3.70	15.0	12.0	35.0	11.0	

Slope / Intercept / Capacity

Roundabout Slope and Intercept used in model

Arm	Final slope	Final intercept (PCU/hr)
1	0.546	1130
2	0.546	1130
3	0.546	1130
4	0.546	1130

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	AM	ONE HOUR	07:45	09:15	15

Vehicle mix source	PCU Factor for a HV (PCU)
HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Av. Demand (PCU/hr)	Scaling Factor (%)
1		✓	227	100.000
2		✓	271	100.000
3		✓	442	100.000
4		✓	676	100.000

Origin-Destination Data

Demand (PCU/hr)

		To			
		1	2	3	4
From	1	0	36	92	99
	2	38	0	115	118
	3	327	37	0	78
	4	273	138	265	0

Vehicle Mix

HV %s

		To			
		1	2	3	4
From	1	0	1	1	1
	2	1	0	1	1
	3	1	1	0	1
	4	1	1	1	0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max delay (s)	Max Q (PCU)	Max LOS
1	0.29	5.90	0.4	A
2	0.35	6.52	0.5	A
3	0.50	7.42	1.0	A
4	0.84	24.56	4.8	C

Main Results for each time segment

07:45 - 08:00

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
1	171	328	951	0.180	170	0.2	4.654	A
2	204	341	944	0.216	203	0.3	4.901	A
3	333	191	1026	0.324	331	0.5	5.217	A
4	509	301	966	0.527	505	1.1	7.813	A

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
1	204	394	915	0.223	204	0.3	5.113	A
2	244	409	907	0.269	243	0.4	5.477	A
3	397	229	1005	0.395	397	0.7	5.971	A
4	608	361	933	0.651	605	1.8	10.983	B

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
1	250	478	869	0.288	249	0.4	5.866	A
2	298	497	858	0.348	298	0.5	6.478	A
3	487	280	977	0.498	485	1.0	7.374	A
4	744	441	889	0.837	733	4.5	21.995	C

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
1	250	484	866	0.289	250	0.4	5.903	A
2	298	502	856	0.349	298	0.5	6.519	A
3	487	281	977	0.498	487	1.0	7.419	A
4	744	443	888	0.838	743	4.8	24.559	C

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
1	204	403	910	0.224	205	0.3	5.158	A
2	244	415	903	0.270	244	0.4	5.523	A
3	397	230	1004	0.396	399	0.7	6.014	A
4	608	363	932	0.652	619	2.0	12.026	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
1	171	333	948	0.180	171	0.2	4.682	A
2	204	345	942	0.217	204	0.3	4.936	A
3	333	192	1025	0.325	333	0.5	5.263	A
4	509	303	964	0.528	512	1.1	8.097	A

2025, PM

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction Type	Junction Delay (s)	Junction LOS
1	1st Ave Old Belgard Rndab	Standard Roundabout	8.33	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	PM	ONE HOUR	16:45	18:15	15

Vehicle mix source	PCU Factor for a HV (PCU)
HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Av. Demand (PCU/hr)	Scaling Factor (%)
1		✓	188	100.000
2		✓	486	100.000
3		✓	383	100.000
4		✓	454	100.000

Origin-Destination Data

Demand (PCU/hr)

		To			
		1	2	3	4
From	1	0	33	79	76
	2	98	0	112	276
	3	263	13	0	107
	4	224	56	174	0

Vehicle Mix

HV %s

		To			
		1	2	3	4
From	1	0	1	1	1
	2	1	0	1	1
	3	1	1	0	1
	4	1	1	1	0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max delay (s)	Max Q (PCU)	Max LOS
1	0.21	4.68	0.3	A
2	0.57	9.15	1.3	A
3	0.49	8.31	1.0	A
4	0.55	8.97	1.2	A

Main Results for each time segment

16:45 - 17:00

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
1	142	182	1031	0.137	141	0.2	4.084	A
2	366	246	995	0.368	364	0.6	5.734	A
3	288	337	946	0.305	287	0.4	5.499	A
4	342	280	977	0.350	340	0.5	5.684	A

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
1	169	218	1011	0.167	169	0.2	4.316	A
2	437	295	969	0.451	436	0.8	6.812	A
3	344	404	909	0.379	344	0.6	6.418	A
4	408	336	947	0.431	407	0.8	6.729	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
1	207	267	984	0.210	207	0.3	4.675	A
2	535	361	933	0.574	533	1.3	9.053	A
3	422	494	860	0.490	420	1.0	8.238	A
4	500	410	906	0.552	498	1.2	8.875	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
1	207	268	984	0.210	207	0.3	4.679	A
2	535	362	932	0.574	535	1.3	9.152	A
3	422	495	859	0.491	422	1.0	8.305	A
4	500	412	905	0.552	500	1.2	8.969	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
1	169	219	1010	0.167	169	0.2	4.325	A
2	437	297	968	0.451	439	0.8	6.898	A
3	344	406	908	0.379	346	0.6	6.482	A
4	408	338	946	0.432	410	0.8	6.810	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
1	142	183	1030	0.137	142	0.2	4.094	A
2	366	248	994	0.368	367	0.6	5.804	A
3	288	340	944	0.305	289	0.4	5.553	A
4	342	282	976	0.350	343	0.5	5.750	A

Junctions 9

ARCADY 9 - Roundabout Module

Filename: 2040 AM PM.j9
Path: G:\Shared drives\Server\01 Projects\2019\19-036 Cookstown Phase 3\Calculations\1st Ave Old Belgadr ARCADYS
Report generation date: 07/09/2020 16:55:55

Summary of junction performance

	AM				PM			
	Q (PCU)	Delay (s)	RFC	LOS	Q (PCU)	Delay (s)	RFC	LOS
	2040							
Arm 1	0.5	6.26	0.31	A	0.3	4.79	0.21	A
Arm 2	0.6	6.99	0.38	A	1.5	9.95	0.60	A
Arm 3	1.1	8.05	0.53	A	1.1	8.92	0.52	A
Arm 4	8.7	41.85	0.92	E	1.6	10.33	0.61	B

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

File summary

File Description

Title	(untitled)
Location	
Site number	
Date	12/12/2019
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Enumerator	NRB-004\Eoin
Description	

Units

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

Analysis Options

Calculate Q Percentiles	Calculate residual capacity	RFC Threshold	Av. Delay threshold (s)	Q 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	2040	AM	ONE HOUR	07:45	09:15	15
D2	2040	PM	ONE HOUR	16:45	18:15	15

Analysis Set Details

ID	Network flow scaling factor (%)
A1	100.000

2040, AM

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction Type	Junction Delay (s)	Junction LOS
1	1st Ave Old Belgard Rndab	Standard Roundabout	21.87	C

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Arms

Arms

Arm	Name	Description
1	Link to Belgard Rd	
2	Old Belgard Rd S	
3	1st Ave Arm	
4	Old Belgard Rd N	

Roundabout Geometry

Arm	V (m)	E (m)	l' (m)	R (m)	D (m)	PHI (deg)	Exit only
1	3.00	3.70	15.0	12.0	35.0	11.0	
2	3.00	3.70	15.0	12.0	35.0	11.0	
3	3.00	3.70	15.0	12.0	35.0	11.0	
4	3.00	3.70	15.0	12.0	35.0	11.0	

Slope / Intercept / Capacity

Roundabout Slope and Intercept used in model

Arm	Final slope	Final intercept (PCU/hr)
1	0.546	1130
2	0.546	1130
3	0.546	1130
4	0.546	1130

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	2040	AM	ONE HOUR	07:45	09:15	15

Vehicle mix source	PCU Factor for a HV (PCU)
HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Av. Demand (PCU/hr)	Scaling Factor (%)
1		✓	242	100.000
2		✓	288	100.000
3		✓	468	100.000
4		✓	727	100.000

Origin-Destination Data

Demand (PCU/hr)

		To			
		1	2	3	4
From	1	0	37	99	106
	2	39	0	123	126
	3	346	40	0	82
	4	294	149	284	0

Vehicle Mix

HV %s

		To			
		1	2	3	4
From	1	0	1	1	1
	2	1	0	1	1
	3	1	1	0	1
	4	1	1	1	0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max delay (s)	Max Q (PCU)	Max LOS
1	0.31	6.26	0.5	A
2	0.38	6.99	0.6	A
3	0.53	8.05	1.1	A
4	0.92	41.85	8.7	E

Main Results for each time segment

07:45 - 08:00

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
1	182	353	937	0.194	181	0.2	4.803	A
2	217	365	930	0.233	216	0.3	5.078	A
3	352	203	1019	0.346	350	0.5	5.436	A
4	547	318	956	0.572	542	1.3	8.672	A

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
1	218	423	899	0.242	217	0.3	5.330	A
2	259	438	891	0.291	258	0.4	5.746	A
3	421	243	997	0.422	420	0.7	6.290	A
4	654	381	922	0.709	649	2.3	13.155	B

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
1	266	508	852	0.313	266	0.5	6.195	A
2	317	530	841	0.377	316	0.6	6.926	A
3	515	298	967	0.533	514	1.1	7.985	A
4	800	467	875	0.915	780	7.5	32.657	D

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
1	266	518	847	0.315	266	0.5	6.262	A
2	317	537	837	0.379	317	0.6	6.994	A
3	515	298	967	0.533	515	1.1	8.047	A
4	800	468	874	0.915	796	8.7	41.847	E

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
1	218	440	890	0.245	218	0.3	5.417	A
2	259	450	884	0.293	260	0.4	5.826	A
3	421	244	997	0.422	422	0.7	6.350	A
4	654	383	921	0.710	678	2.6	16.322	C

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
1	182	359	934	0.195	183	0.2	4.841	A
2	217	370	928	0.234	217	0.3	5.122	A
3	352	204	1018	0.346	353	0.5	5.472	A
4	547	321	955	0.573	552	1.4	9.136	A

2040, PM

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction Type	Junction Delay (s)	Junction LOS
1	1st Ave Old Belgard Rndab	Standard Roundabout	9.20	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	2040	PM	ONE HOUR	16:45	18:15	15

Vehicle mix source	PCU Factor for a HV (PCU)
HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Av. Demand (PCU/hr)	Scaling Factor (%)
1		✓	187	100.000
2		✓	497	100.000
3		✓	407	100.000
4		✓	502	100.000

Origin-Destination Data

Demand (PCU/hr)

		To			
		1	2	3	4
From	1	0	18	87	82
	2	82	0	123	292
	3	279	14	0	114
	4	241	68	193	0

Vehicle Mix

HV %s

		To			
		1	2	3	4
From	1	0	1	1	1
	2	1	0	1	1
	3	1	1	0	1
	4	1	1	1	0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max delay (s)	Max Q (PCU)	Max LOS
1	0.21	4.79	0.3	A
2	0.60	9.95	1.5	A
3	0.52	8.92	1.1	A
4	0.61	10.33	1.6	B

Main Results for each time segment

16:45 - 17:00

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
1	141	206	1018	0.138	140	0.2	4.141	A
2	374	271	982	0.381	372	0.6	5.934	A
3	306	341	944	0.325	304	0.5	5.672	A
4	378	281	977	0.387	375	0.6	6.021	A

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
1	168	247	995	0.169	168	0.2	4.393	A
2	447	325	953	0.469	446	0.9	7.160	A
3	366	409	907	0.404	365	0.7	6.706	A
4	451	336	946	0.477	450	0.9	7.313	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
1	206	301	965	0.213	206	0.3	4.785	A
2	547	397	913	0.599	545	1.5	9.813	A
3	448	500	857	0.523	446	1.1	8.826	A
4	553	411	905	0.611	550	1.5	10.164	B

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
1	206	303	965	0.213	206	0.3	4.791	A
2	547	399	912	0.600	547	1.5	9.951	A
3	448	502	856	0.524	448	1.1	8.915	A
4	553	413	904	0.611	553	1.6	10.326	B

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
1	168	249	994	0.169	168	0.2	4.405	A
2	447	327	952	0.470	449	0.9	7.272	A
3	366	412	905	0.404	368	0.7	6.783	A
4	451	339	945	0.478	454	0.9	7.441	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
1	141	208	1017	0.138	141	0.2	4.154	A
2	374	273	981	0.382	375	0.6	6.017	A
3	306	344	942	0.325	307	0.5	5.737	A
4	378	283	975	0.387	379	0.6	6.111	A

APPENDIX G

Independent Stage 1 Road Safety Audit & Designer Feedback Form

Title: **STAGE 1 ROAD SAFETY AUDIT**

For;

Proposed Residential Development at Lands West of Old Belgard road and North, South & West of Cookstown Road, Cookstown Industrial Estate, Tallaght, Dublin 24.

Client: **NRB Consulting Engineers**

Date: **September 2020**

Report reference: **0857R01**

VERSION: **FINAL**

Prepared By:

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BRUTON CONSULTING ENGINEERS

CONTENTS SHEET

Contents

1.0 Introduction

This report was prepared in response to a request from Mr. Paul Burke, NRB Consulting Engineers, for a Stage 1 Road Safety Audit of the proposed residential development at West of Old Belgard Road and North, South & West of Cookstown Road, Cookstown Industrial Estate, Tallaght, Dublin 24.

The Road Safety Audit Team comprised of;

Team Leader: **Norman Bruton**, BE CEng FIEI, Cert Comp RSA.

TII Auditor Approval no. NB 168446

Team Member: **Owen O'Reilly**, B.SC. Eng Dip Struct. Eng NCEA Civil Dip Civil. Eng CEng MIEI

TII Auditor Approval no. OO1291756

The Road Safety Audit comprised an examination of the drawings and a site visit, together on the 4th September 2020.

The weather at the time of the site visit was dry and the road surface was dry.

This Stage 1 Road Safety Audit has been carried out in accordance with the requirements of TII Publication Number GE-STY-01024, dated December 2017.

The scheme has been examined and this report compiled in respect of the consideration of those matters that have an adverse effect on road safety. It has not been examined or verified for compliance with any other standards or criteria.

The problems identified in this report are considered to require action in order to improve the safety of the scheme for road users.

If any of the recommendations within this safety audit report are not accepted, a written response is required, stating reasons for non-acceptance. Comments made within the report under the heading of Observation are intended to be for information only. Written responses to Observations are not required.

A location map showing where each problem occurs is provided in **Appendix A.**

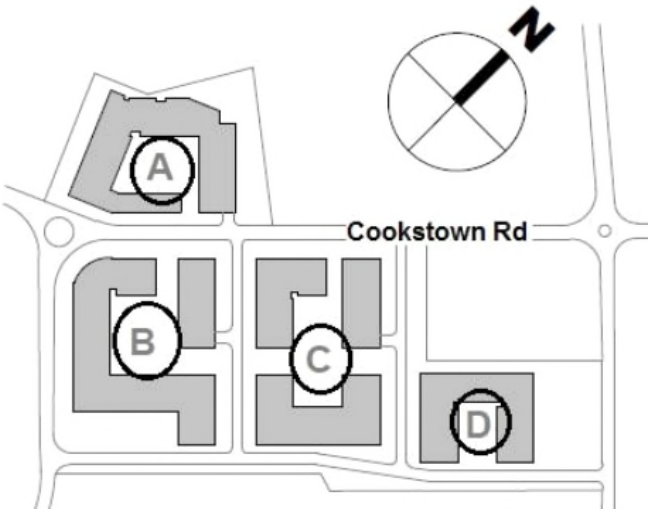
A list of the documents provided to the Audit Team is provided in **Appendix B.**

The feedback form for the Design Team Leader to complete is provided in **Appendix C.**

2.0 Background

It is proposed to construct a high density mixed use residential apartment development with some ancillary commercial uses on the existing commercial/industrial lands between Old Belgard Road and Cookstown Road.

The development will consist of four blocks. The development content for each block is outlined in the table below which has been extracted from the Draft Traffic and Transport Assessment report prepared by NRB Consulting Engineers.



Block A	• 260 Apartments/Duplex Units, • Ancillary Residential Amenity Space, • Under-croft with 72 Car Parking Spaces & Cycle Parking
Block B	• 339 Apartments Units, • Ancillary Residential Amenity Space, • Ancillary Communal Gym Space for Residents, • 641m^2 GFA Retail/Shop at GF Level, • Under-croft with 58 Car Parking Spaces & Cycle Parking
Block C	• 353 Apartments Units, • Ancillary Residential Amenity Space, • Ancillary Communal Crèche Space (272m^2 GFA), • Under-croft with 39 Car Parking Spaces & Cycle Parking
Block D	• 153 Apartments Units, • Ancillary Residential Amenity Space, • 1,922m2 GFA Local Office Space, • 249m^2 GFA Commercial Space • Possible Replacement Garage & Forecourt

A pedestrian link will be provided to Belgard Luas Station.

The Cookstown Industrial Estate is becoming a residential area on a phased basis based on a number of planning applications and based on promotion in the South Dublin Development Plan for the regeneration of older industrial estates along the Luas Corridor.

At the time of the site visit the Belgard Square North – Cookstown Industrial Estate Link Road was under construction. (The same Audit Team, carried out the Stage 1 and Stage 2 RSAs for that scheme.)

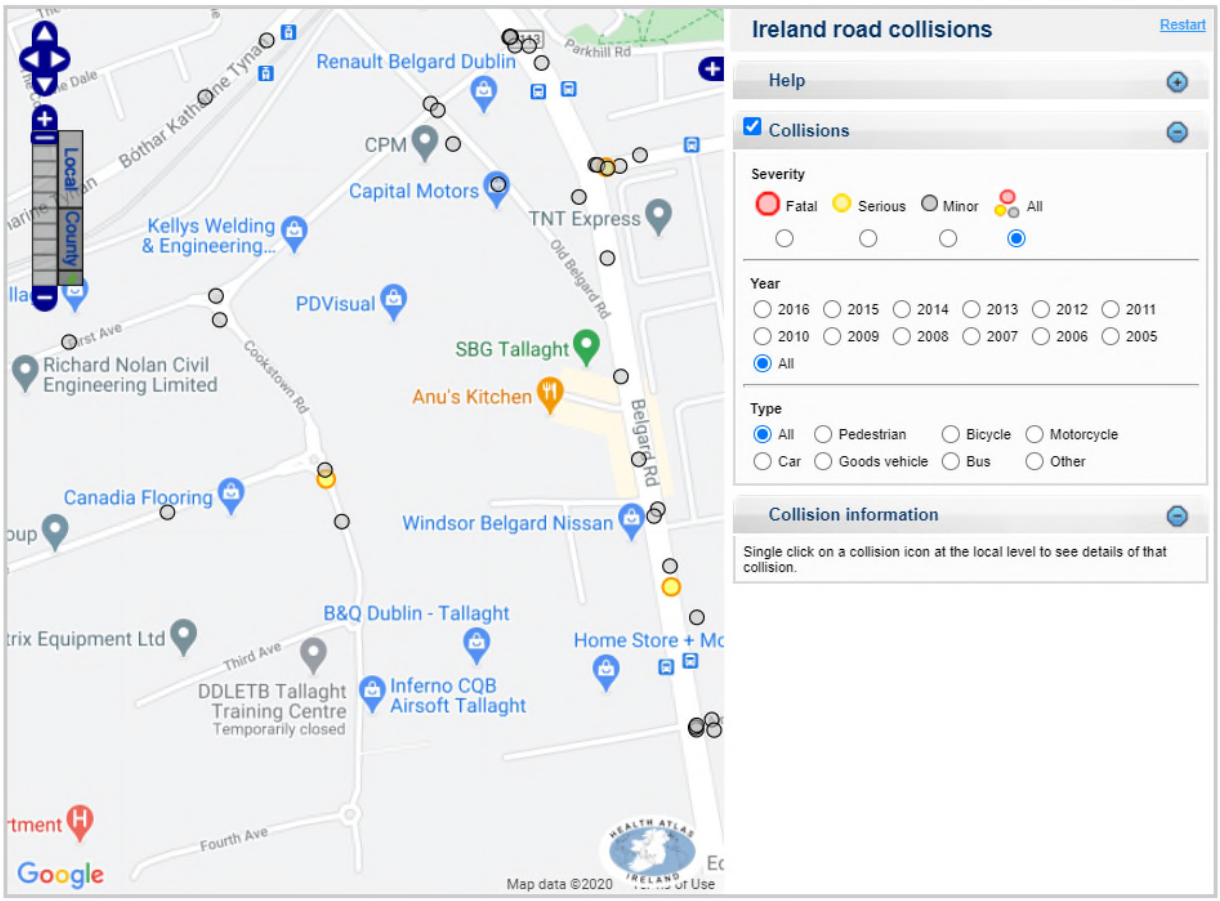
There are high containment kerbs throughout the existing Cookstown Industrial Estate roads which have a dual role of protecting vulnerable road users on the footpaths from errant vehicles and to prevent parking at inappropriate locations. There kerbs will be removed and replaced with standard height (125mm high kerbs)

The speed limit is 50km/hr.

The site location map is shown below.

Image Courtesy of openstreetmap.org

The Road Safety Authority's website www.rsa.ie shows that there have been six minor injury collisions recorded along the roads surrounding the site within the 12 year period 2005 to 2016. One collision on Old Belgard Road involved a pedestrian, another on the same road involved a cyclist. The other 4 collisions involved cars.



3.0 Main Report

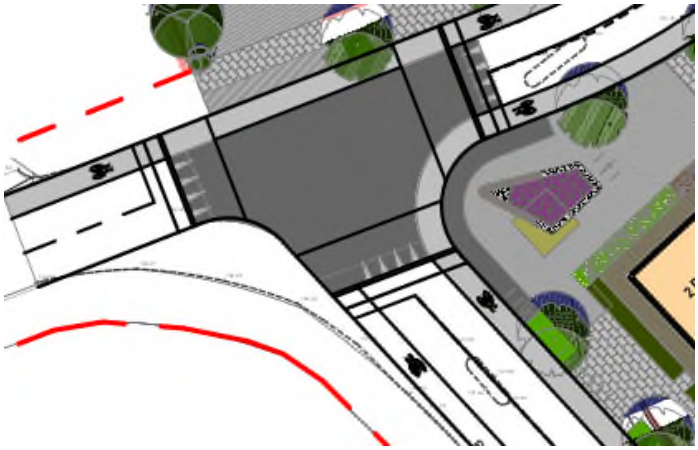
3.1 Problem

Location

Drawing Xref roads 06-08-20

Problem

The regeneration of Cookstown Industrial Estate as a whole may take several years and involve many phases. During this period there will be a shift from industrial traffic to residential traffic including pedestrians and cyclists. The percentage of heavy goods vehicles will be high at first and will decrease as time goes on, subject to the regeneration taking place. There is a risk that during the early stages that the roads network will be redeveloped in line with DMURS but will not be able to cater for heavy goods vehicles turning movements, interaction with cyclists etc. which can result in high severity collisions if they occur.



Recommendation

It is recommended that a routing plan for heavy goods vehicles be developed and signed to remove those vehicles that do not need local access from using the portion of Cookstown Road and Old Belgard Road associated with this development. Temporary layouts at the signalised junctions may be required to facilitate the swept path of heavy goods vehicles. Cyclists in particular should not have to share a space with left turning heavy goods vehicles.

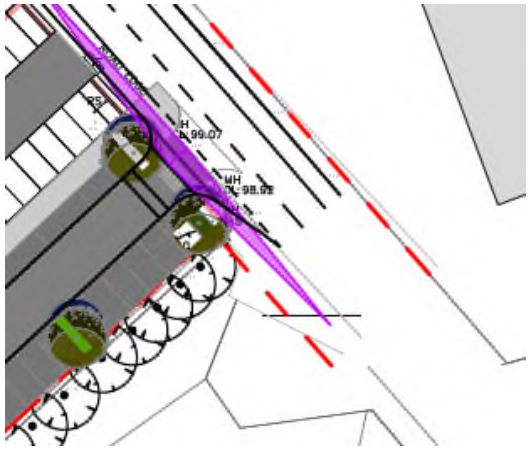
3.2 Problem

Location

Drawing Xref roads 06-08-20

Problem

The speed of vehicles observed travelling northbound on the Old Belgard road appeared to be generally in excess of 50km/hr. This may be due to the slip road type junction off the R113. If the visibility provided to the right for drivers exiting the new road to the south of the site is not sufficient then collisions could occur between exiting vehicles and through traffic.



Recommendation

It is recommended that traffic calming measures are provided to slow northbound traffic on approach to the new junction.

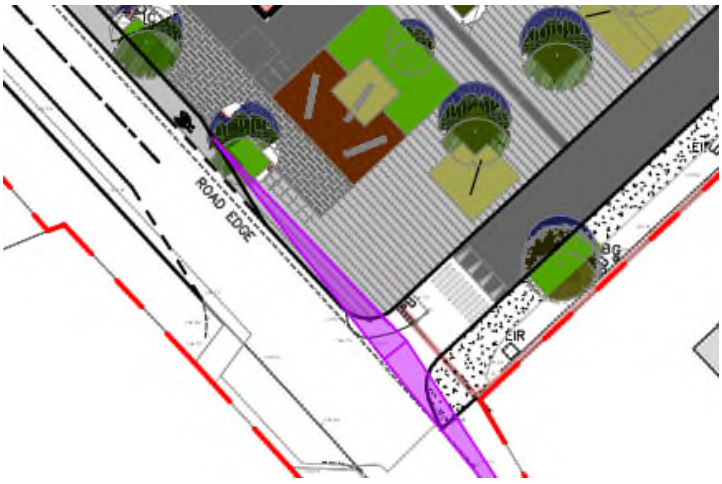
3.3 Problem

Location

Drawing Xref roads 06-08-20

Problem

The proposed cycle track on Cookstown Road terminates before the new southern junction of the site. Cyclists have to merge with general traffic possibly for a short distance before entering the new junction or continuing their journey southbound towards Belgard Square. The lack of cycle facilities at the new junction could lead to collisions between cyclists and turning traffic.



Recommendation

It is recommended that the cycle lane is extended beyond the junction and terminated at a suitable location south of the junction where it can be continued by a subsequent phase of construction without leaving a pinch-point in the future.

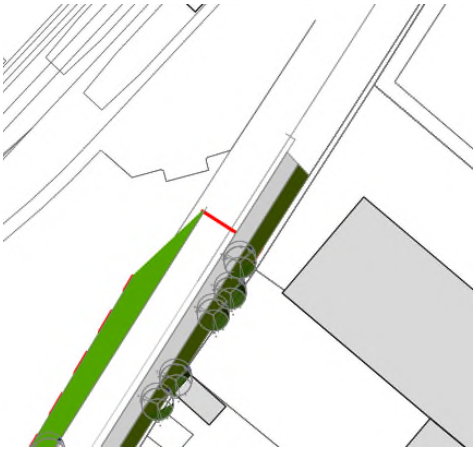
3.4 Problem

Location

Drawing Xref roads 06-08-20

Problem

There is a proposed pedestrian link from Block A to Belgard Luas Station. It was observed during the site visit that there is no access to the station from that end. There is a risk that pedestrians will climb over the railings and fall as they attempt to get to the platforms via the shortest route.



Recommendation

It is recommended that a new access to the station be provided through consultation with TII.

3.5 Problem

Location

Drawing Xref roads 06-08-20

Problem

It is anticipated that there will be a high pedestrian demand across Cookstown Road at the northern side of the site to access the pedestrian link to Belgard Luas station. This may include the mobility impaired such as blind or partially sighted individuals and may also include school children. Without a dedicated crossing point there is a risk of collisions between pedestrians and general traffic.

Recommendation

It is recommended that a controlled pedestrian/toucan crossing be provided at the desire line across Cookstown Road.

4.0 Observations

4.1 Observation

Vertical alignment, drainage, or cross sectional details were not provided to the Audit Team. The drawing was also not scaled and carriageway. Footpath and cycle track/lane dimensions were not provided.

4.2 Observation

Swept paths for HGV, refuse trucks and fire tenders were not provided.

4.3 Observation

Adequate lighting will be needed for the Luas pedestrian link to provide security and safety for users.

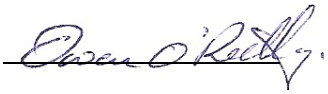
5.0 Audit Statement

We certify that we have examined the site and the information provided. The examination has been carried out with the sole purpose of identifying any aspects of the design which could be added, removed or modified in order to improve the safety of the scheme.

The problems identified have been noted in this report together with associated safety improvement suggestions which we would recommend should be studied for implementation. The audit has been carried out by the persons named below who have not been involved in any design work on this scheme as a member of the Design Team.

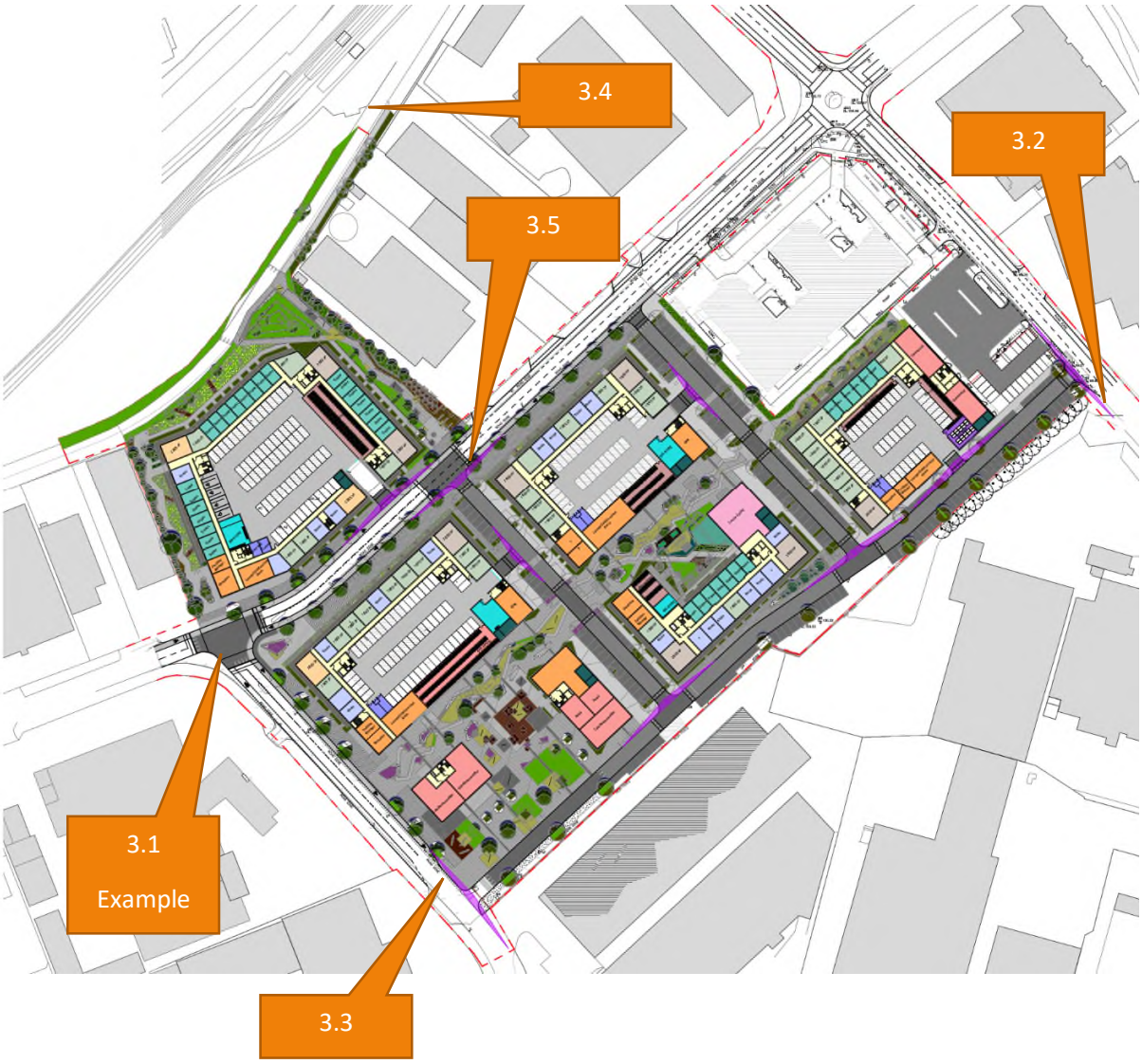
Norman Bruton **Signed:** 

(Audit Team Leader) **Dated: 24/9/2020**

Owen O'Reilly **Signed:** 

(Audit Team Member) **Dated: 24/9/2020**

Appendix A – Problem Location Map



Appendix B

Information Supplied to the Audit Team

- Drawing Xref roads 06-08-20

Background Information Supplied to the Audit Team

- Draft TTA, NRB August 2020

Appendix C

Feedback Form

SAFETY AUDIT FORM – FEEDBACK ON AUDIT REPORT

Scheme: Cookstown Ind Estate
Stage: 1 Road Safety Audit
Date Audit (Site Visit) Completed: 4th September 2020

Paragraph No. in Safety Audit Report	Problem accepted (yes/no)	Recommended measure accepted (yes/no)	Alternative measures (describe)	Alternative measures accepted by Auditors (Yes/No)
3.1	Y	Y – The progress of Cookstown regeneration and associated reduction in HGVs to be reviewed at detailed design and construction stage in consultation with SDCC. Road works are designed in accordance with DMURS for this application. A routing plan can be developed through consultation with SDCC as there are other accesses to the estate. Temporary layouts to give more room for HGVs at signals can be developed at detailed design stage in consultation with SDCC if required.		
3.2	Y	Y – sightline is adequate and in accordance DMURS. Traffic calming speed reduction ramp added.		
3.3	Y	Y – Advisory cycle lane extended past the development where it can be continued by a subsequent development of adjacent 3rd party lands.		
3.4	Y	Y – Exact form of pedestrian access to LUAS platform through the railing to be agreed through consultation with relevant parties		
3.5	Y	Y – Controlled Toucan Crossing added as recommended.		

Observations:

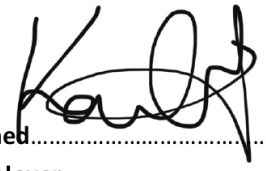
4.1 Cycle tracks and footpaths are 2m each in width. All other relevant details (drainage, public lighting etc.) will be provided a detailed design stage.

4.2 Tracks for refuse vehicles and HGV's now attached.

4.3 Noted, and will be provided at detailed design stage.

Signed  ..... **Date** 24/09/20
Design Team Leader

Signed  ..... **Date**24/9/2020.....
Audit Team Leader

Signed  ..... **Date**24/9/2020.....
Employer

APPENDIX H

Preliminary Planning Stage Mobility Management Plan (Travel Plan)

consulting engineers

NRB

Preliminary

Travel Plan

(Mobility Management Plan)

Appendix H

For

Multiple Block
Residential Apartment
Development

on

Lands West of Old Belgard Road and North, South & West of Cookstown Road, Cookstown Industrial Estate, Tallaght, Dublin 24.

SUBMISSION ISSUE

Apollo Buildings, Dundrum Road, Dundrum, Dublin 14.
Tel/fax: +353 1 292 1941, E-mail: info@nrb.ie, Web: www.nrb.ie

Registered in Ireland No. 491679

Contents

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Tel/fax: +353 1 292 1941, E-mail: info@nrb.ie, Web: www.nrb.ie

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1.0 INTRODUCTION

Preamble….

1.1 NRB Consulting Engineers have been commissioned to prepare a Preliminary Travel Plan in support of an application for the redevelopment of the subject lands within Cookstown Industrial Estate, Tallaght, in order to explain the applicants commitment to the promotion of more sustainable and cost effective travel habits among the end occupiers/residents of the scheme. This report has been prepared conscious of Transportation Planning Policy provisions of the SDCC Development Plan & the Tallaght Local Are Plan (LAP). Pre-Planning discussion and consultation with SDCC Officials in terms of the Local Area Plan requirements have informed the content of this preliminary Mobility Management Plan.

1.2 This document has been subsequently reviewed conscious of the content of the ABP Opinion (Item #2) with Mobility Management Features that support high density residential development added following input from ABP and SDCC Officials (such as the commitment to 16 Go Car Spaces, and the link to Belgard LUAS added, for example).

What is a Travel Plan?

1.3 Originally and elsewhere called Mobility Management Plans (MMPs), they originated in the United States and the Netherlands in the late 1980s. In the US, employers over a certain size (generally over 100 employees) were required to implement 'Trip Reduction Plans' in order to reduce single-occupancy car commuting trips, and to increase car occupancy.

1.4 A MMP or Travel Plan (TP) consists of a package of measures put in place by an organisation to encourage and support more sustainable travel patterns among staff and other visitors. Such a plan usually concentrates on staff commuting patterns. In essence, a TP is useful not only to reduce the attractiveness of private car use, but also for the ability to promote and support the use of more sustainable transport modes such as walking, cycling, shared transport and mass transit such as buses and trains.

Aims and Objectives of this Travel Plan

1.5 The package generally includes measures to promote and improve the attractiveness of using public transport, cycling, walking, car sharing, flexible working or a combination of these as alternatives to single-occupancy car journeys to work. A TP can consider all travel associated with the residential or work site, including business travel, fleet management, customer access and deliveries. It should be considered as a dynamic process where a package of measures and campaigns are identified, piloted and monitored on an on-going basis. This MMP recognises the fact that, for some people, car use is often essential as part of the home to work commute, as the work commute is often combined with other important trips, for example having to drop children to school or crèche on the way.

1.6 The changes which are being sought as part of any plan may be as simple as car sharing one-day per week, or walking on Wednesdays, or taking the bus on days which do not conflict with other commitments, leisure or work activities.

1.7 It is envisaged that once in place, the Travel Plan will enable the following benefits to be realised for the Development:

- Reduced residential car parking demand and reduced congestion on the local road network due to lower demand for private transport and/or more efficient use of private motor vehicles,
- Improved safety for cyclists and pedestrians,
- Direct financial savings for those taking part in the developed initiatives, through higher than average vehicle occupancy rates,
- A reduction in car parking and car set-down demand, resulting in improved operational efficiency and safety for all,
- Improved social networking between all those participating in the shared initiatives,
- Improved environmental consideration and performance,
- Improved public image for the development, which sets an example to the broader community and may lead to residents making better travel decisions in the future,
- Improved health and well-being for those using active non-car transport modes,
- On-going liaison with the Local Authority and public transport providers to maintain, improve, and support transportation services to and from the site,
- Improved attractiveness of the development to prospective residents,
- Optimal levels of safety for all staff and visitors.

Methodology

1.8 As part of this Travel Plan, reference has been made to the following documents:

- Your Step By Step Guide To Travel Plans (NTA 2012);
- Achieving Effective Workplace Travel Plans (NTA 2011);
- Traffic and Transport Assessment Guidelines (TII);
- Traffic Management Guidelines (DoELG, 2003);
- Mobility Management Plans – DTO Advice Note (DTO, 2002);
- The Route to Sustainable Commuting (DTO 2001);
- Smarter Travel: A Sustainable Transport Future (DOT)

1.9 Consultation with key stakeholders is an essential part of any Travel plan. As discussed below, as part of the operational phase of this development, a Travel Plan Coordinator Role will be appointed from with the Management Company. Following on, once occupied, Residents will be asked to complete detailed questionnaires on essential data in relation to their existing travel

patterns. This information will be used to inform the ongoing implementation, monitoring and review of the plan for this development.

1.10 This information has been used herein as the basis for the assessment, conclusions and recommendations.

2.0 ACCESS TO THE SITE - BY MODE

2.1 The development consists of the construction of 1,104 apartments, in a series of traditional blocks, on appropriately zoned sites at Cookstown Industrial Estate, Dublin 24. A location plan is shown below as ***Figure 2.1***.

Figure 2.1 – Site(s) Location Map

2.2 The entire of the proposed Residential Development is of the highest quality with attractive living and leisure spaces incorporated into the Masterplan.

2.3 It is essential for the successful Travel Planning to concentrate on journeys associated with work and school commuting patterns. These are the groups which can most practically be encouraged to use modes of transport other than the car. The Tallaght LAP seeks to create a vibrant living residential area and the content and provisions of the MMP support this.

2.4 Notwithstanding this, the development is located in the heart of Tallaght and is in very close proximity to the range of public and alternative transport services in Tallaght, and in particular is immediately adjacent the LUAS, with a new pedestrian link provided.

Pedestrian and Cycling Facilities

2.5 The National Transport Authority (NTA) has surveyed the cycle facilities for the Greater Dublin Area (GDA) as part of the GDA Cycle Network Plan. An extract from this plan showing the facilities is included herein as ***Appendix A***.

2.6 The use and viability of the local services will be enhanced through the encouragement of the use of bicycles and through the demand measurement control of car parking provision.

2.7 Dockless Bicycles, known locally as 'Bleeper Bikes' have been operating in South Dublin County Council since 2017. Similar to the popular Dublin Bikes scheme, the Dockless Bikes initiative provides an accessible, short term bike rental scheme across the area which will help to encourage and facilitate a positive shift to cycling as an alternative to the private car.

2.8 The basis for these schemes is that they have access to rental bikes stored on public cycle parking stands and can return them to other approved public locations for a small fee. This has an advantage over the Dublin bike scheme as it does not require dedicated docking stations to be constructed. It also avoids the frustration and queues which can occur when waiting for a bike to become available and being returned to an empty docking station.

2.9 There are a number of locations permitted to drop off and collect dockless bikes in Tallaght, including many within a short walking distance of the subject sites.

2.10 The key to cycle accessibility is convenient safe links, with secure and carefully sited cycle parking. Cycling is ideal for shorter journeys. A significant amount of work has been carried out in the provision of facilities for Cyclists in SDCC (more that 200km of cycle facilities have been provided to date, and work is ongoing on the N81 and along the Dodder Riverbank to provide improved cycling access to Tallaght generally). The SDCC Development Plan & Tallaght LAP Strategies are to promote cycling and walking in the area and the development complies with these objectives.

2.11 The existing Cycle Infrastructure, which is being continually improved is identified in ***Figure 2.2*** below:

Figure 2.2 Existing Cycle Infrastructure

2.12 The enclosed GDA Cycle Network Plan sets out the proposals for improvements to the existing Cycle Network Plan locally. These are highlighted in ***Figure 2.3*** below

Figure 2.3 - Future Cycle Network

2.13 It is clear that it is proposed that the sites will be bounded by primary, secondary and feeder routes, bordering the development sites directly, thereby creating a high quality network of cycle routes throughout the local area - which will in turn connect to a comprehensive plan for the GDA outside of Tallaght.

2.14 The introduction of Toucan crossing facilities for cyclists at all Traffic Signal Controlled junctions within Tallaght, a scheme which is being rolled out, will further enhance cyclist accessibility and permeability. This will be further enhanced by the planned modernisation of the roads serving the sites within the red line of the application.

2.15 At present, pedestrian/cycle traffic at/to the existing sites are served by an extensive network of high quality footpaths and cycle lanes, outside of Cookstown Estate. The development includes sensible and simple at grade links to these facilities which are immediately adjacent the development.

2.16 The location of the proposed development is ideal in terms of encouraging walking. The proximity to Tallaght IT and Tallaght University Hospital means that walking will be an attractive alternative option for the vast majority of residents. In addition, being located in the heart of Tallaght a short distance from every day services such as Tallaght Town Centre ("The Square") reduces the need to travel and will assist in encouraging walking.

2.17 The SDCC, and National Objective, is to cultivate a walking and cycling culture, through the implementation of appropriate infrastructure and promotional measures, which positively encourages all members of the community to walk or cycle at all life stages and abilities, using modes of sustainable transport that delivers environmental, health and economic benefits to both the individual and the community. This is compliant with the objectives of both the SDCC Development Plan and the Tallaght LAP.

2.18 To help meet the target set in Ireland's first National Cycle Policy Framework launched in April 2009 (that 10% of all journeys will be by bike by 2020), the following will assist:

- Improve cycling conditions on primary cycle routes in the area as per the enclosed details,
- Develop new cycle route/ greenways through parks and open spaces,
- Improve connectivity/permeability from cycle routes to key destinations,
- Provide 30kph zones within residential areas and other suitable locations,
- Provide new secure cycle parking,
- Continue cycle training in schools,
- Ensure that cycling is a key element of all development (which has clearly been incorporated in this case) and
- Monitor trends in cycle numbers using cycle counter data.

2.19 The local infrastructure plans support the 19 specific objectives in the National Cycle Policy Framework. The proposed residential development on the subject sites, through good design, will assist in the promotion of cycling as a primary mode of travel.

2.20 For journeys greater than 8km, it is recognised that a modal shift to cycling could be achievable for some, but not all, and options such as public transport and car sharing should be considered. Journeys up to 8km could be undertaken by bicycle and journeys up to 3-4km could be undertaken by walking or cycling.

Cycle Parking

2.21 The Residential Apartment Guidelines recommends a significantly higher cycle parking requirement that that contained in the SDCC Development Plan. The Guidelines recommend 1 cycle parking stand per Bed-Space, plus 1 spaces per 2 units for visitors – the provision here is consistent with the Apartment Guidelines and is discussed in greater detail in the main body of the TA Report (Paragraphs 2.23 & 2.24).

2.22 It is expected that a very significant number of residents will be willing to cycle to work or to school, if safe links and secure parking are in place, and that is reflected in the provision of large

number of dedicated cycle parking spaces over and above the SDCC Cycle Policy requirements and in line with new national Design Standards for Apartments. Once occupied, advice can be provided on routes by the appointed Travel Plan Coordinator, possibly with the help of a bicycle user group. This can be further facilitated in consultation with SDCC, as the ongoing provision of cycle facilities as set out above is fully implemented.

2.23 It is acknowledged that cyclists need to be confident that their cycles will not be tampered with while they are in storage. With this in mind, it is proposed to install the cycle parking with racks which allow both frame and wheels to be secured, and this has been included. These cycle racks are located in an active, well lit & security monitored place or where they can be seen by a security guard, either directly, or by closed circuit television.

Bus Provision

2.24 There are a number of Dublin Bus Stops operating locally, with the closest main stops (or Terminus Points) being located on Belgard square North and Belgard Road. There are several main routes within a 10 minute walk distance of the site and these are detailed in ***Figure 2.4*** below.

Route	***Description***
27	Clare Hall – Jobstown
49	Pearse Street – Tallaght (The Square)
54a	Pearse St. – Ellensborough / Kiltipper Way
56a	Ringsend Rd. – Tallaght (The Square)
65	Poolbeg St. – Blessington / Ballymore
75	The Square Tallaght – Dun Laoghaire
76	Chapelizod – Tallaght (The Square)
76a	Blanchardstown Centre – Tallaght (The Square)
77a	Ringsend Rd. – Citywest

Figure 2.4 - Bus Services within a 10 Minute Walk

2.25 All of the Dublin Bus routes currently passing the development are operated using new low-floor wheelchair accessible city buses. Detail of routes, timetables and fares are provided on www.dublinbus.ie, on the Dublin Bus App, and on the Transport for Ireland National Journey Planner App.

2.26 An additional Map showing the core Dublin Bus routes is included herein as an Appendix.

2.27 The proposed improved CORE Radial Routes which affect the subject development site are as follows:

- Tallaght-Walkinstown-Crumlin (Radial),

- Tallaght-Rathfarnham-Terenure (Radial),
- Dundrum/UCD - Tallaght (Orbital)

Mainline Bus Services Linking Tallaght

2.28 Bus Éireann also has a stop on Belgard Square which is served by Route No 132, linking Dublin Connolly with Bunclody in Co Wexford. Busarus is also accessible via the LUAS Red Line which is on the doorstep. The site is therefore highly accessible to a wide range of national mainline rail services serving all destinations around Ireland, and of course linking to Dublin Airport.

2.29 The ***Airport Hopper*** Tallaght Mini Bus Service operates between The Square Tallaght Town Centre and Dublin Airport, on an approximate hourly basis over the course of the working day.

2.30 Maps and Tables showing Bus Services are included herein and all are easily accessible via Service Provider Apps.

LUAS

2.31 The LUAS Red Line stops (Cookstown & Belgard) are immediately beside the site and high quality improved pedestrian links are provided. LUAS has become a highly successful travel mode linking Tallaght with local areas and onwards to the city centre. It is a semi-segregated light rail tram service operating at street level but generally gets priority over motorised vehicles at junctions. A map extract from the LUAS website, showing the complete network, is included below as ***Figure 2.5***

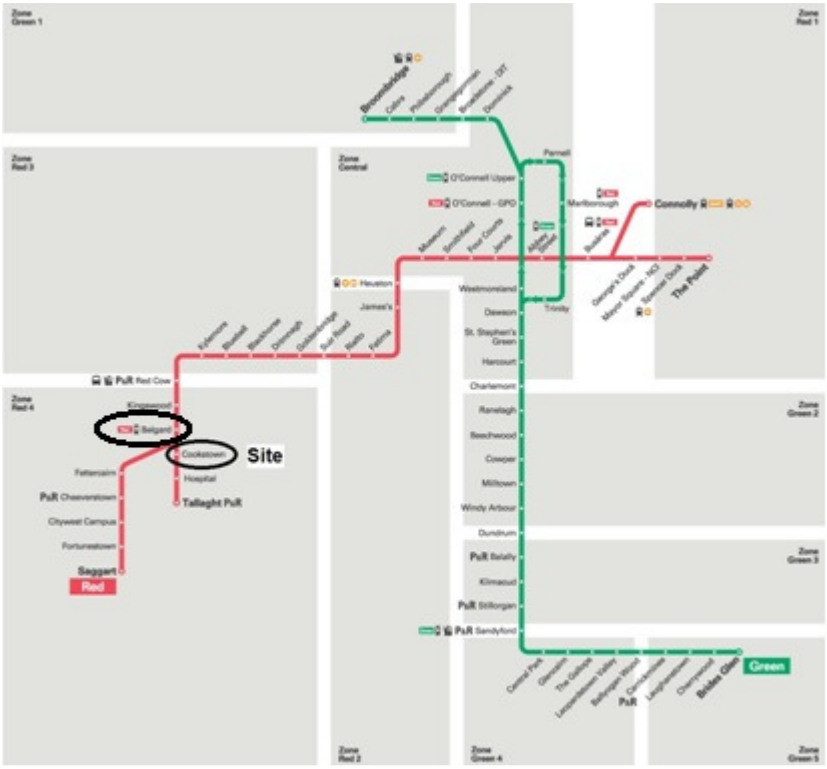

Figure 2.5 - LUAS Services

2.32 The LUAS Red Line serving the site provides a regular service between the 3 Arena/Connolly Station and Tallaght/Saggart with intermediate stops at key locations including Busarus, Heuston Station, Red Cow and City West. The normal day to day operating times are 05:30-24:00

2.33 The recently extended Green Line now provides a good degree of connectivity with the Red Line and their respective stops intersecting at O'Connell Street and Abbey Street. The Green Line provides a service between Sandyford and Broombridge with intermediate stops at St Stephens Green, Westmoreland, Cabra, Phibsborough and Broadstone DIT.

2.34 LUAS runs on a frequency of service which changes depending upon the time of day to adequately cater for demand. The service frequencies for the Local Services are detailed below as ***Figure 2.6***:

Tallaght - Eastbound Towards Connolly or The Point

Monday - Friday			
	Min	Avg	Max
05:30-07:00	10	14	20
07:00-10:00	3	8	10
10:00-16:00	9	9	10
16:00-19:00	9	9	10
19:00-00:00	6	10	15

Saturday			
	Min	Avg	Max
06:30-10:00	12	15	20
10:00-16:00	12	12	13
16:00-19:00	10	11	13
19:00-00:00	3	11	15

Sunday & Bank Holidays			
	Min	Avg	Max
07:00-12:00	10	13	20
12:00-19:00	10	10	11
19:00-23:00	10	11	12

Figure 2.6 - LUAS Service Frequencies

2.35 The LUAS provides excellent connectivity with other rail and DART services including both intercity, commuter and DART services operating out of Heuston Station and Connolly Station - both of which are served by the Red Line LUAS.

2.36 LUAS has the ability to deliver significant increased capacity through a combination of longer carriages/trains and increased frequency of service.

2.37 In terms of number of transport alternatives easily available to Residents, it is considered that the proposed development is very highly sustainable indeed, in terms of public and alternative transport accessibility. The proximity of the development to existing public transport services means that all residents will have viable alternatives to the private car for accessing the site and will not be reliant upon the car as a primary mode of travel.

2.38 Direct and high quality pedestrian linkages are provided between the sites and the existing pedestrian facilities on the surrounding road network. The entrances to the sites will be well lit, so that people can feel secure in using the facilities.

2.39 Public transport maps and timetables can be provided in prominent locations on the sites and the

information will be kept up to date by the appointed Travel Plan Coordinator, a role for the Management Company.

2.40 Working Residents are generally now offered the opportunity to purchase public transport commuter tickets under the current 'Employer Pass' and 'TaxSaver' programmes, by individual Employers. Under these schemes the employer applies to Iarnród Éireann / Bus Éireann for tax free public transport tickets for their employees as an incentive for them to use public transport to travel to work.

2.41 With this in mind, the main focus of this Travel Plan will be to promote and support the use of alternative modes to the private car.

Car Parking

2.42 There are a reduced number of under-croft private car parking spaces provided for, including Go Car, Residential Spaces, mobility impaired and visitor parking. The limited car parking is considered appropriate in light of the location of the proposed development immediately adjacent high quality public transport, the inclusion of on-site services, and in consideration of the provisions of the SDCC Development Plan being "Maximum" standards. The development is also not a traditional residential apartment development, and in this regard the Car Parking requirements are fundamentally different, with anticipated lower car ownership and dependency for this nature of scheme. Given the low number of spaces provided (effectively managed residential spaces, visitor/mobility impaired parking, Go-Car and set down), the entire scheme will be actively marketed and promoted as a "Reduced Car Dependency" scheme and this will be communicated from the outset as part of sales and marketing. The development will also be managed on an on-going basis by the appointed Development Management Company to ensure that the reduced car dependency nature of the development is continually promoted and enhanced.

2.43 Details of the justification of the parking provision are set out in the main body of the Transportation Assessment Report. However, it is clear that the lower provision of car parking will act as a demand management measure, ensuring that the development is accessed in the most sustainable manner, being almost predominantly reliant on non-car modes of travel.

2.44 If considered appropriate, as part of a working MMP, additional priority spaces will in future be allocated to car-sharing workers when they travel together, with 10 'Go-Car' currently planned. These are some of the most accessible spaces and are clearly visible to other car park users. It is acknowledged that this may require some level of 'policing'.

Electric Vehicle Charging

2.45 The car parking spaces will be designed so that they can easily be upgraded to allow conversion for Electric Vehicles. The entire car park of the subject scheme can be ducted to accept cabling

to serve a charging point for every car space. Conduits can be run on the walls or underground, and charging points can also be retro-mounted. Where residents request a charging point to be installed, the relevant charging point can be pre-wired back to their home electricity meter in the designated meter location. The socket point will have a lockable cover on it so that only that resident may use the power point. This provision around the parking area allows future charging points to be installed at any of the car parking spaces with minimum works as and when required.

3.0 COLLECTION OF BASELINE INFORMATION

Possible Travel Pattern Questionnaires

3.1 The Redevelopment is a proposed high quality residential development in the centre of Tallaght. The development has capacity for in excess of 2,000 people when fully occupied (1,641 bedrooms in the 1,104 apartments).

3.2 Once occupied, and when the Travel Plan Coordinator is appointed, the occupiers of the proposed development will be encouraged to continually monitor the Travel Plan initiatives in order to maximise on their success.

3.3 Shortly after occupation of the new development, a detailed travel-questionnaire will likely be complied and distributed to Residents for completion. The aim of the travel questionnaire will be to establish travel patterns between work and home and school travel demand. The information gathered from this survey will be used to inform the further development of the Travel Plan.

3.4 The Baseline Survey information will also allow the Travel Plan Coordinator for the development to set realistic modal-split targets for the development.

3.5 It is anticipated that, given the very-much town centre location and good transport links at this development, combined with the reduced and managed levels of car parking on site, there will be a high percentage of use via public and alternative transport. The Travel Plan will need to maintain this positive modal split and improve it, where possible. It is informative to note that the "Smarter Travel: A Sustainable Transport Future" (DOT) Objective for 2020 is to achieve a reduced work related commuting by car modal share of 65% to 45%.

3.6 The Travel Plan is not seeking a radical change in terms of a modal shift; it is recognised that the use of the car is often essential for many users. Instead, the Plan seeks small but consistent increments of change in our approach to, and the use of, alternatives to the car.

4.0 THE TRAVEL PLAN

4.1 The successful implementation of a Travel Plan will ensure that, in-so-far-as-possible, the impacts of this traffic are reduced and minimised where practical, while providing a number of environmental and economic advantages detailed below.

4.2 The following sub-sections detail the available initiatives which will serve to better manage travel demand, and therefore the traffic impact of work-related journeys, focused on the movement of residents during peak times.

Walking

Walking - Key Information	
Approx Zone of Influence	3.5km
Percentage of Residents working in area of influence	TBC in each survey when occupied
Percentage of Residents interested in Walking	TBC in each survey when occupied

Table 4.1 – Key Information: Walking

4.4 There are many local, global, and personal benefits to walking to work, a few of which are listed following:

- **W** - Wake Up! - Studies have shown that people who walk to work are more awake and find it easier to concentrate.
- **A** - Always one step ahead - Walking makes people more aware of road safety issues and helps them develop stronger personal safety skills.
- **L** - Less congestion - If you leave the car at home and walk, there are fewer cars on the road which makes it safer for those who walk and cycle.
- **K** - Kinder to the environment - By leaving the car at home you are reducing the amount of CO 2 produced and helping to reduce the effects of climate change and air pollution.
- **I** - Interpersonal skills - Walking to work or school can be a great way to meet other walkers, share the experience, and develop personal skills.
- **N** - New adventures - Walking to work or school is a great way to learn about your local environment and community. It's also a fun way to learn about the weather, landscape, and local ecosystems.
- **G** - Get fit and stay active - Walking to and from work or school helps people incorporate physical activity into their daily routines. Research shows that regular physical activity can benefit your body and mind.

4.5 Most adults will consider walking a maximum of 3.5 km (Approx 30/40 minutes) to work. Residents working within a 3.5 km radius of the site will be encouraged to walk to work as often as their schedule permits. Similarly school trips can be encouraged on foot.

4.6 The following initiatives and incentives can be used to encourage walking to work or school:

- Take part in a 'Pedometer Challenge' which is organised through the Irish Heart Foundation or Smarter Travel Workplaces;
- Organise special events such as a 'Walk to work/school on Wednesdays' where participants are rewarded for their participation;;
- Keep umbrellas in public areas on a deposit system for use when raining;
- Display Smarter Travel Workplaces Accessibility Walking maps on notice boards areas so Residents can plan journeys;
- Organise lunch time or afternoon walks as part of a health and well-being programme;
- Highlight the direct savings gained due to reduced use of private vehicles.

Cycling

Cycling – Key Information	
Approx. zone of influence	10km
Percentage of Residents Surveyed known to Work within the area of influence	TBC in each survey when occupied
Percentage of Residents interested in cycling	TBC in each survey when occupied

Table 4.2 : Key Information - Cycling

4.7 Research suggests that cycling is a viable mode of transport for people who live up to 10 km from work or school.

4.8 Cycling is a great way to travel. It helps foster independence, raises awareness of road safety, and helps the environment.

4.9 Some positive aspects of cycling to work or school are listed following:

- **C** - Cycling is fun! - Cycling is a great form of transport but it's also a great recreational activity. Cycling is a skill that stays with you for life and it's a fantastic way to explore your local community.
- **Y** - You save time & money - cycling to work reduces the need to travel by car thus reducing fuel costs and freeing up road space for more cyclists;
- **C** - Confidence building - travelling to work as an independent cyclist can give

people increased confidence proving beneficial in all aspects of life;

- **L** - Less congestion - If you leave the car at home and cycle to work there are fewer cars on the road which makes it safer for those who cycle and walk to work or school;
- **I** - Interpersonal skills - Cycling to work or to school can be a great way to meet other cyclists and share the experience;
- **N** - New adventures - Cycling to work or school is a great way to learn about your local environment and community. It helps people to understand where they live and how their actions affect their local environment;
- **G** - Get fit and stay active - cycling to and from work or school helps people incorporate physical activity into their daily routines. Research shows that regular physical activity can benefit your body and mind.

4.10 The provision of enhanced and attractive cycle parking facilities at the site will clearly play a critical role in promoting journeys by bicycle.

4.11 The following initiatives and incentives can be used to encourage cycling to work and school:

- New cycle parking installed within the development, secure and well lit;
- It will publicise cycle parking availability by way of signage and on notice boards;
- It will display maps on notice boards areas so people can plan journeys;
- The development can provide free cycle accessories (panniers, lights, visi-vests, helmets) in periodic draws for cyclists,
- The Travel Plan Coordinator can organise cycle training sessions on site on the rules of the road and the specific risks associated with the locality;
- The Travel Plan Coordinator can invite bike suppliers on site for a 'Green Day' or 'Green Week' so that people can try bikes before buying;
- The Travel Plan Coordinator can set up a Bicycle User Group (BUG) to promote cycling;
- The Travel Plan Coordinator can highlight the direct savings gained due to reduced use of private vehicles;
- The Travel Plan Coordinator can encourage residents to take part in National Bike Week, see www.bikeweek.ie.

Public Transport

Public Transport – Key Information	
Approx. zone of influence	All Residents
Percentage of Residents in area of influence	100%
Percentage of Residents using Public Transport	TBC in each survey when occupied

Table 4.3: Key Information: Public Transport

4.12 There are many benefits to taking public transport, some of which include:

- Personal Opportunities – Public transportation provides personal mobility and freedom;
- Saving fuel – Every full standard bus can take more than 50 cars off the road, resulting in fuel savings from reduced congestion;
- Reducing congestion – The more people who travel to work or to school on public transport, especially during peak periods, the less people travelling by private car;
- Saving money – Taking public transport to and from work or school is a lot cheaper than travelling by car and saves the cost of buying, maintaining and running a vehicle;
- Reducing fuel consumption – A full standard bus uses significantly less fuel per passenger than the average car;
- Reducing carbon footprint – Public transport is at least twice as energy efficient as private cars. Buses produce less than half the CO2 emissions per passenger kilometre compared to cars and a full bus produces 377 times less carbon monoxide than a full car;
- Get fit and stay active - Walking to and from work or school to public transport helps people incorporate physical activity into their daily routines. Research shows that regular physical activity can benefit your body and mind.
- Less stress – Using public transport can be less stressful than driving yourself, allowing you to relax, read, or listen to music.

4.13 The following initiatives and incentives can be used by the Development Management Company at Occupation Stage to encourage people to take public transport:

- Publicise Employee Tax Saver Commuter tickets, which offer savings to employers in PSRI per ticket sold and significant savings to employees in marginal tax rate and levies on the price of their ticket;
- Encourage public transport use for travel by promoting smart cards, advertising the availability of these tickets to Residents;
- Publicise the availability of Real Time Information. Real Time Information shows when your bus is due to arrive at your bus stop so you can plan your journey more accurately;
- Provide maps of local bus routes and the nearest bus stops, LUAS Timetables and Frequencies, and the length of time it takes to walk to them;
- Contact local providers about issues such as location of existing and new bus stops, timing of routes, or where you have market information about a potential new route.

Go-Car/Car Sharing

Car Sharing – Key Information	
Approx. zone of influence	All Residents
Percentage of Residents in area of influence	100%
Percentage of Residents Car Sharing	TBC in each survey when occupied

Table 4.4: Key Information - Go-Car/Car Sharing

4.14 Every day thousands of commuters drive to work or to school on the same routes to the same destinations, at the same time as their colleagues. By car sharing just once a week, a commuter's fuel costs can be reduced by 20%, and in a similar fashion, the demand for work place parking can be reduced by 20%. If every single-occupancy driver carried another driver, there would be 50% less cars on the road at peak times.

4.15 Although use of the car to get to work or to school is essential for a large proportion of people, car sharing schemes have the potential to deliver a significant reduction in private vehicle trips by promoting higher than average occupancy rates for each vehicle.

4.16 A locally run car sharing scheme relies on a database containing workplace information, working hours, and peoples preferences such as gender/driver/passenger and their preferred route to and from work. This will be incorporated into the role for the Development Management Co.

4.17 The car-sharing database can be a map showing where Residents work, a database of car-sharers' details hosted on an organisations intranet site, or an on map-based matching website.

4.18 Car sharing often happens informally, however some participants often prefer a formal scheme such as a go Car facility which will normally generate a higher take-up for car sharing, and more efficiency in terms of increased occupancy rates. Car sharing is much easier promoted within a community such as is proposed here, and will be done by the Development Management Co.

4.19 Encouraging more Residents to share car journeys to work rather than driving alone as well as encouraging more to set up and take part in car sharing/pooling would prove a very effective means of reducing daily car trips to and from the site.

4.20 The following initiatives and incentives can be used to encourage car sharing:

- Provide incentives to sign up to a car sharing scheme with preferential parking spaces in the most convenient location;
- Draw up a car-sharing policy for how the scheme will operate, and issue car-

sharing permits to those qualifying to use the car-sharing spaces;

- Highlight to drivers that they do not have to share with a person that doesn't suit them – allow choice based on gender, route, smoking or non-smoking;
- Clarify the financial implications of the scheme – those accepting a lift could contribute towards fuel costs.
- Use existing online databases for car sharing. For example, the development could set up its own private car sharing site using www.carsharing.ie.
- Allocate parking spaces for use solely by car sharers, for example near to building entrances.

Action Plan Summary Table

4.25 The Summary Action Plan is described in the Table below. Modal Split Targets will be determined following on from the first Residential survey shortly after full occupation, typically within the first six months. This will be part of the role of the Travel Plan Coordinator, within the remit of the Development Management Company. This will show existing travel patterns with realistic targets set to improve the modal split of Residents.

	Initiative	Impact on Delivery	Difficulty Delivering	Current Modal Split	Target MS
Residents Initiatives	Walking	Medium	Low	TBC	TBC
	Cycling	Medium	Medium	TBC	TBC
	Public Transport	High	Low	TBC	TBC
	Other	Medium	Medium	TBC	TBC
	Car - Sharing	Medium	Medium	TBC	TBC
	Cars - 1 Passenger Only	High - Negative	High	TBC	TBC
Promoting the TP	Marketing the Plan	High	Low	Driven By TP Coordinator	
	Measuring Success	High	Medium	Annual Surveys	

Action Plan Summary Table

5.0 IMPLEMENTING THE PLAN

Background

5.1 Setting realistic targets and a sustained approach to the promotion of the Travel Plan is important if the measures are to be successful. The objectives and benefits of the Plan will be made clear and broadcast during the full lifecycle of the Plan.

5.2 The implementation of a successful Travel plan will require the upfront investment of resources. As well as reviewing objectives and initiatives regularly, it is equally important to measure results. This provides an indication of any Plan's success, and ensures that the targets remain realistic.

The Travel Plan Coordinator

5.4 The key objective of this Travel Plan is to ensure that the traffic impacts and car usage associated with the operation of Redevelopment are minimised. Achieving this objective will result in a wide array of benefits for the development and its stakeholders.

5.5 To ensure the plan is effective it is essential for a Travel Plan Coordinator to be appointed for the Development upon 100% occupation.

5.6 It is envisaged that the Coordinator will work closely with residents to enthusiastically promote and market the Travel Plan. As Residents will be the focus of the plan; their involvement must be sought from the outset.

5.7 To support the Travel Plan Coordinator's efforts, the Management Company must ensure that they have sufficient time to carry out their duties. In addition, it is essential that the powers of decision making are bestowed upon him/her, along with a suitable budget and programme for implementation.

Promoting the Travel Plan

5.9 Active promotion and marketing is needed if the Travel Plan is to have a positive impact on stakeholder travel patterns to and from the site.

5.10 All marketing initiatives should be focused on areas where there is willingness to change. Such information has been extracted from the questionnaires and has been described in Section 3 of this Plan.

- **Identify the Aim** – e.g. to reduce low occupancy car commuting, school, and business travel & to promote active travel, public transport & alternatives to travelling by car.
- **Brand the Plan** – as part of communicating the Travel Plan, visually brand all work relating to it with a consistent look, slogan, identity or logo.

- **Identify the Target Audience** – 'segment the audience' (e.g. shift workers, school travel, sedentary workers, people travelling long/ short distances, mode used, members of a walking club or green team) so you can target the message and events towards these different groups.

5.11 As part of the marketing process, the Travel Plan coordinator can personalise a plan for the Development, drawing attention to the benefits of participation and support for its implementation.

5.12 The Coordinator can identify communication tools and networks used by the different audiences in the Residences, and use these to communicate about travel.

5.13 Promotional material regardless of its quality is only as good as its distribution network; material incentives assist greatly in introducing people to alternative modes of commuting.

5.14 The plan should not be anti-car - it should be about promoting equity among modes and offering choice and accessibility.

5.15 The Coordinator can promote positive messages associated with a plan, for example, reduced tax/PRSI payments, getting fit and active, reducing congestion, reducing CO2 emissions and so on, and encourage people to start small – changing one day per week for example, to explore their options.

5.16 Marketing drives which feature individual Residents who have reduced their car use can carry a strong message. This will serve to raise not only the profile of the Plan, but also send a clear message in relation to the Residents commitment to the Plan.

6.0 CONCLUSIONS

6.1 The development forming the subject of this application accords with the principles of sustainable development, being located within an established town centre within clear and easy access to alternative modes of travel, and with very little car parking provided acting as a further demand management measure . The Management Company, once the development is occupied, will utilise pragmatic measures that encourage safe and viable alternatives to the private car for accessing the development.

6.2 Good Travel Planning is not a one-off event, it is instead an on-going iterative process requiring continued effort. This Preliminary report assists these efforts by forming an outline framework and providing guidance for its success. Monitoring and reviewing the initiatives set out within the plan will form a far greater part of the Final Travel Plan itself.

6.3 The key to the Plans success will be the appointment of a ***Travel Plan Coordinator*** for the development, once occupied, a role which will be part of the Development Management Company responsibilities. They will be vested with total responsibility for implementing the plan. They should be granted the authority and time to execute the Plan, and be provided with sufficient resources to realise the Plans success.

6.4 As Residents are the focus of the plan; their involvement should be sought from the outset following occupation. To this end, the Plan Coordinator should be assisted and supported by the Management Company and Residents. This will serve to spread the work load, and also give the Residents a valuable input into the operation of the Plan.

6.5 Successful Travel Plans require extensive marketing **and** regular review. The measures set out in the Action Plan Summary Table (Chapter 4) should form the basis of a sound, realistic Plan and should be clearly set out and be fully transparent to all users.

6.6 Residents also have an essential responsibility in terms of co-operating with, and taking an active part in the plan. They are, after all, the plan's primary focus.

6.7 It is recommended that the Final Travel Plan be set in motion at full occupation. The plan should evolve and develop with the development, taking into account changing Residents and their travel preferences and needs.

6.8 Annual reviews of the Plan should include a full stakeholder survey, providing valuable information for target setting and marketing target groups. It is emphasised that failing to meet initial targets should not be seen as failure, as the preliminary 12 to 18 months of the plan should be viewed as a calibration exercise for target setting.

consulting engineers

NRB

Preliminary

Travel Plan

(Mobility Management Plan)

Appendix H

For

Multiple Block
Residential Apartment
Development

on

Lands West of Old Belgard Road and North, South & West of Cookstown Road, Cookstown Industrial Estate, Tallaght, Dublin 24.

SUBMISSION ISSUE

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Registered in Ireland No. 491679

Contents

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1.0 INTRODUCTION

Preamble….

1.1 NRB Consulting Engineers have been commissioned to prepare a Preliminary Travel Plan in support of an application for the redevelopment of the subject lands within Cookstown Industrial Estate, Tallaght, in order to explain the applicants commitment to the promotion of more sustainable and cost effective travel habits among the end occupiers/residents of the scheme. This report has been prepared conscious of Transportation Planning Policy provisions of the SDCC Development Plan & the Tallaght Local Are Plan (LAP). Pre-Planning discussion and consultation with SDCC Officials in terms of the Local Area Plan requirements have informed the content of this preliminary Mobility Management Plan.

1.2 This document has been subsequently reviewed conscious of the content of the ABP Opinion (Item #2) with Mobility Management Features that support high density residential development added following input from ABP and SDCC Officials (such as the commitment to 16 Go Car Spaces, and the link to Belgard LUAS added, for example).

What is a Travel Plan?

1.3 Originally and elsewhere called Mobility Management Plans (MMPs), they originated in the United States and the Netherlands in the late 1980s. In the US, employers over a certain size (generally over 100 employees) were required to implement 'Trip Reduction Plans' in order to reduce single-occupancy car commuting trips, and to increase car occupancy.

1.4 A MMP or Travel Plan (TP) consists of a package of measures put in place by an organisation to encourage and support more sustainable travel patterns among staff and other visitors. Such a plan usually concentrates on staff commuting patterns. In essence, a TP is useful not only to reduce the attractiveness of private car use, but also for the ability to promote and support the use of more sustainable transport modes such as walking, cycling, shared transport and mass transit such as buses and trains.

Aims and Objectives of this Travel Plan

1.5 The package generally includes measures to promote and improve the attractiveness of using public transport, cycling, walking, car sharing, flexible working or a combination of these as alternatives to single-occupancy car journeys to work. A TP can consider all travel associated with the residential or work site, including business travel, fleet management, customer access and deliveries. It should be considered as a dynamic process where a package of measures and campaigns are identified, piloted and monitored on an on-going basis. This MMP recognises the fact that, for some people, car use is often essential as part of the home to work commute, as the work commute is often combined with other important trips, for example having to drop children to school or crèche on the way.

1.6 The changes which are being sought as part of any plan may be as simple as car sharing one-day per week, or walking on Wednesdays, or taking the bus on days which do not conflict with other commitments, leisure or work activities.

1.7 It is envisaged that once in place, the Travel Plan will enable the following benefits to be realised for the Development:

- Reduced residential car parking demand and reduced congestion on the local road network due to lower demand for private transport and/or more efficient use of private motor vehicles,
- Improved safety for cyclists and pedestrians,
- Direct financial savings for those taking part in the developed initiatives, through higher than average vehicle occupancy rates,
- A reduction in car parking and car set-down demand, resulting in improved operational efficiency and safety for all,
- Improved social networking between all those participating in the shared initiatives,
- Improved environmental consideration and performance,
- Improved public image for the development, which sets an example to the broader community and may lead to residents making better travel decisions in the future,
- Improved health and well-being for those using active non-car transport modes,
- On-going liaison with the Local Authority and public transport providers to maintain, improve, and support transportation services to and from the site,
- Improved attractiveness of the development to prospective residents,
- Optimal levels of safety for all staff and visitors.

Methodology

1.8 As part of this Travel Plan, reference has been made to the following documents:

- Your Step By Step Guide To Travel Plans (NTA 2012);
- Achieving Effective Workplace Travel Plans (NTA 2011);
- Traffic and Transport Assessment Guidelines (TII);
- Traffic Management Guidelines (DoELG, 2003);
- Mobility Management Plans – DTO Advice Note (DTO, 2002);
- The Route to Sustainable Commuting (DTO 2001);
- Smarter Travel: A Sustainable Transport Future (DOT)

1.9 Consultation with key stakeholders is an essential part of any Travel plan. As discussed below, as part of the operational phase of this development, a Travel Plan Coordinator Role will be appointed from with the Management Company. Following on, once occupied, Residents will be asked to complete detailed questionnaires on essential data in relation to their existing travel

patterns. This information will be used to inform the ongoing implementation, monitoring and review of the plan for this development.

1.10 This information has been used herein as the basis for the assessment, conclusions and recommendations.

2.0 ACCESS TO THE SITE - BY MODE

2.1 The development consists of the construction of 1,104 apartments, in a series of traditional blocks, on appropriately zoned sites at Cookstown Industrial Estate, Dublin 24. A location plan is shown below as ***Figure 2.1***.

Figure 2.1 – Site(s) Location Map

2.2 The entire of the proposed Residential Development is of the highest quality with attractive living and leisure spaces incorporated into the Masterplan.

2.3 It is essential for the successful Travel Planning to concentrate on journeys associated with work and school commuting patterns. These are the groups which can most practically be encouraged to use modes of transport other than the car. The Tallaght LAP seeks to create a vibrant living residential area and the content and provisions of the MMP support this.

2.4 Notwithstanding this, the development is located in the heart of Tallaght and is in very close proximity to the range of public and alternative transport services in Tallaght, and in particular is immediately adjacent the LUAS, with a new pedestrian link provided.

Pedestrian and Cycling Facilities

2.5 The National Transport Authority (NTA) has surveyed the cycle facilities for the Greater Dublin Area (GDA) as part of the GDA Cycle Network Plan. An extract from this plan showing the facilities is included herein as ***Appendix A***.

2.6 The use and viability of the local services will be enhanced through the encouragement of the use of bicycles and through the demand measurement control of car parking provision.

2.7 Dockless Bicycles, known locally as 'Bleeper Bikes' have been operating in South Dublin County Council since 2017. Similar to the popular Dublin Bikes scheme, the Dockless Bikes initiative provides an accessible, short term bike rental scheme across the area which will help to encourage and facilitate a positive shift to cycling as an alternative to the private car.

2.8 The basis for these schemes is that they have access to rental bikes stored on public cycle parking stands and can return them to other approved public locations for a small fee. This has an advantage over the Dublin bike scheme as it does not require dedicated docking stations to be constructed. It also avoids the frustration and queues which can occur when waiting for a bike to become available and being returned to an empty docking station.

2.9 There are a number of locations permitted to drop off and collect dockless bikes in Tallaght, including many within a short walking distance of the subject sites.

2.10 The key to cycle accessibility is convenient safe links, with secure and carefully sited cycle parking. Cycling is ideal for shorter journeys. A significant amount of work has been carried out in the provision of facilities for Cyclists in SDCC (more that 200km of cycle facilities have been provided to date, and work is ongoing on the N81 and along the Dodder Riverbank to provide improved cycling access to Tallaght generally). The SDCC Development Plan & Tallaght LAP Strategies are to promote cycling and walking in the area and the development complies with these objectives.

2.11 The existing Cycle Infrastructure, which is being continually improved is identified in ***Figure 2.2*** below:

Figure 2.2 Existing Cycle Infrastructure

2.12 The enclosed GDA Cycle Network Plan sets out the proposals for improvements to the existing Cycle Network Plan locally. These are highlighted in ***Figure 2.3*** below

Figure 2.3 - Future Cycle Network

2.13 It is clear that it is proposed that the sites will be bounded by primary, secondary and feeder routes, bordering the development sites directly, thereby creating a high quality network of cycle routes throughout the local area - which will in turn connect to a comprehensive plan for the GDA outside of Tallaght.

2.14 The introduction of Toucan crossing facilities for cyclists at all Traffic Signal Controlled junctions within Tallaght, a scheme which is being rolled out, will further enhance cyclist accessibility and permeability. This will be further enhanced by the planned modernisation of the roads serving the sites within the red line of the application.

2.15 At present, pedestrian/cycle traffic at/to the existing sites are served by an extensive network of high quality footpaths and cycle lanes, outside of Cookstown Estate. The development includes sensible and simple at grade links to these facilities which are immediately adjacent the development.

2.16 The location of the proposed development is ideal in terms of encouraging walking. The proximity to Tallaght IT and Tallaght University Hospital means that walking will be an attractive alternative option for the vast majority of residents. In addition, being located in the heart of Tallaght a short distance from every day services such as Tallaght Town Centre ("The Square") reduces the need to travel and will assist in encouraging walking.

2.17 The SDCC, and National Objective, is to cultivate a walking and cycling culture, through the implementation of appropriate infrastructure and promotional measures, which positively encourages all members of the community to walk or cycle at all life stages and abilities, using modes of sustainable transport that delivers environmental, health and economic benefits to both the individual and the community. This is compliant with the objectives of both the SDCC Development Plan and the Tallaght LAP.

2.18 To help meet the target set in Ireland's first National Cycle Policy Framework launched in April 2009 (that 10% of all journeys will be by bike by 2020), the following will assist:

- Improve cycling conditions on primary cycle routes in the area as per the enclosed details,
- Develop new cycle route/ greenways through parks and open spaces,
- Improve connectivity/permeability from cycle routes to key destinations,
- Provide 30kph zones within residential areas and other suitable locations,
- Provide new secure cycle parking,
- Continue cycle training in schools,
- Ensure that cycling is a key element of all development (which has clearly been incorporated in this case) and
- Monitor trends in cycle numbers using cycle counter data.

2.19 The local infrastructure plans support the 19 specific objectives in the National Cycle Policy Framework. The proposed residential development on the subject sites, through good design, will assist in the promotion of cycling as a primary mode of travel.

2.20 For journeys greater than 8km, it is recognised that a modal shift to cycling could be achievable for some, but not all, and options such as public transport and car sharing should be considered. Journeys up to 8km could be undertaken by bicycle and journeys up to 3-4km could be undertaken by walking or cycling.

Cycle Parking

2.21 The Residential Apartment Guidelines recommends a significantly higher cycle parking requirement that that contained in the SDCC Development Plan. The Guidelines recommend 1 cycle parking stand per Bed-Space, plus 1 spaces per 2 units for visitors – the provision here is consistent with the Apartment Guidelines and is discussed in greater detail in the main body of the TA Report (Paragraphs 2.23 & 2.24).

2.22 It is expected that a very significant number of residents will be willing to cycle to work or to school, if safe links and secure parking are in place, and that is reflected in the provision of large

number of dedicated cycle parking spaces over and above the SDCC Cycle Policy requirements and in line with new national Design Standards for Apartments. Once occupied, advice can be provided on routes by the appointed Travel Plan Coordinator, possibly with the help of a bicycle user group. This can be further facilitated in consultation with SDCC, as the ongoing provision of cycle facilities as set out above is fully implemented.

2.23 It is acknowledged that cyclists need to be confident that their cycles will not be tampered with while they are in storage. With this in mind, it is proposed to install the cycle parking with racks which allow both frame and wheels to be secured, and this has been included. These cycle racks are located in an active, well lit & security monitored place or where they can be seen by a security guard, either directly, or by closed circuit television.

Bus Provision

2.24 There are a number of Dublin Bus Stops operating locally, with the closest main stops (or Terminus Points) being located on Belgard square North and Belgard Road. There are several main routes within a 10 minute walk distance of the site and these are detailed in ***Figure 2.4*** below.

Route	***Description***
27	Clare Hall – Jobstown
49	Pearse Street – Tallaght (The Square)
54a	Pearse St. – Ellensborough / Kiltipper Way
56a	Ringsend Rd. – Tallaght (The Square)
65	Poolbeg St. – Blessington / Ballymore
75	The Square Tallaght – Dun Laoghaire
76	Chapelizod – Tallaght (The Square)
76a	Blanchardstown Centre – Tallaght (The Square)
77a	Ringsend Rd. – Citywest

Figure 2.4 - Bus Services within a 10 Minute Walk

2.25 All of the Dublin Bus routes currently passing the development are operated using new low-floor wheelchair accessible city buses. Detail of routes, timetables and fares are provided on www.dublinbus.ie, on the Dublin Bus App, and on the Transport for Ireland National Journey Planner App.

2.26 An additional Map showing the core Dublin Bus routes is included herein as an Appendix.

2.27 The proposed improved CORE Radial Routes which affect the subject development site are as follows:

- Tallaght-Walkinstown-Crumlin (Radial),

- Tallaght-Rathfarnham-Terenure (Radial),
- Dundrum/UCD - Tallaght (Orbital)

Mainline Bus Services Linking Tallaght

2.28 Bus Éireann also has a stop on Belgard Square which is served by Route No 132, linking Dublin Connolly with Bunclody in Co Wexford. Busarus is also accessible via the LUAS Red Line which is on the doorstep. The site is therefore highly accessible to a wide range of national mainline rail services serving all destinations around Ireland, and of course linking to Dublin Airport.

2.29 The ***Airport Hopper*** Tallaght Mini Bus Service operates between The Square Tallaght Town Centre and Dublin Airport, on an approximate hourly basis over the course of the working day.

2.30 Maps and Tables showing Bus Services are included herein and all are easily accessible via Service Provider Apps.

LUAS

2.31 The LUAS Red Line stops (Cookstown & Belgard) are immediately beside the site and high quality improved pedestrian links are provided. LUAS has become a highly successful travel mode linking Tallaght with local areas and onwards to the city centre. It is a semi-segregated light rail tram service operating at street level but generally gets priority over motorised vehicles at junctions. A map extract from the LUAS website, showing the complete network, is included below as ***Figure 2.5***

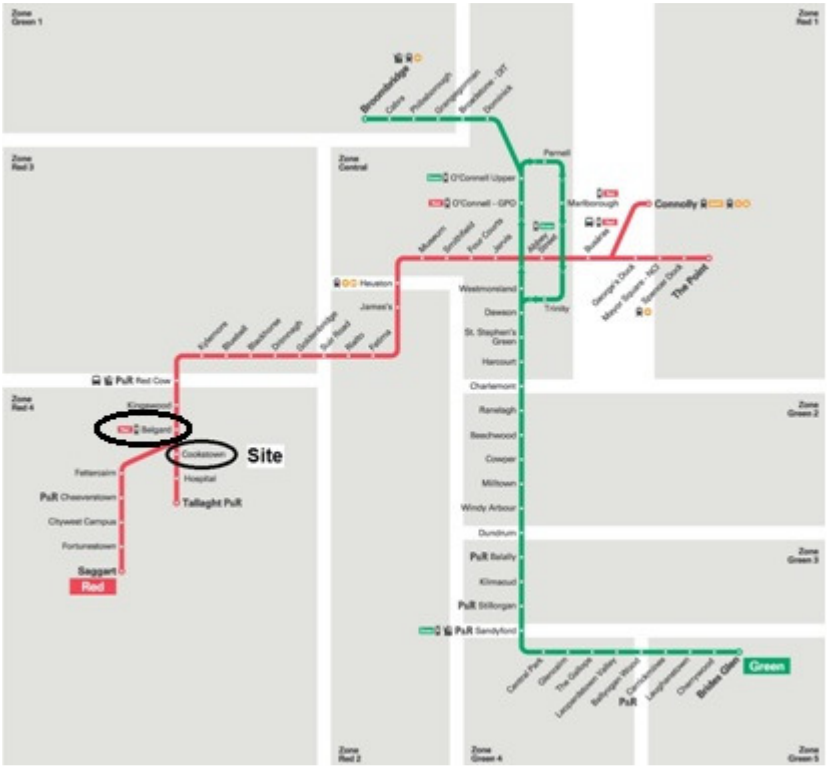


Figure 2.5 - LUAS Services

2.32 The LUAS Red Line serving the site provides a regular service between the 3 Arena/Connolly Station and Tallaght/Saggart with intermediate stops at key locations including Busarus, Heuston Station, Red Cow and City West. The normal day to day operating times are 05:30-24:00

2.33 The recently extended Green Line now provides a good degree of connectivity with the Red Line and their respective stops intersecting at O'Connell Street and Abbey Street. The Green Line provides a service between Sandyford and Broombridge with intermediate stops at St Stephens Green, Westmoreland, Cabra, Phibsborough and Broadstone DIT.

2.34 LUAS runs on a frequency of service which changes depending upon the time of day to adequately cater for demand. The service frequencies for the Local Services are detailed below as ***Figure 2.6***:

Tallaght - Eastbound Towards Connolly or The Point

Monday - Friday			
	Min	Avg	Max
05:30-07:00	10	14	20
07:00-10:00	3	8	10
10:00-16:00	9	9	10
16:00-19:00	9	9	10
19:00-00:00	6	10	15

Saturday			
	Min	Avg	Max
06:30-10:00	12	15	20
10:00-16:00	12	12	13
16:00-19:00	10	11	13
19:00-00:00	3	11	15

Sunday & Bank Holidays			
	Min	Avg	Max
07:00-12:00	10	13	20
12:00-19:00	10	10	11
19:00-23:00	10	11	12

Figure 2.6 - LUAS Service Frequencies

2.35 The LUAS provides excellent connectivity with other rail and DART services including both intercity, commuter and DART services operating out of Heuston Station and Connolly Station - both of which are served by the Red Line LUAS.

2.36 LUAS has the ability to deliver significant increased capacity through a combination of longer carriages/trains and increased frequency of service.

2.37 In terms of number of transport alternatives easily available to Residents, it is considered that the proposed development is very highly sustainable indeed, in terms of public and alternative transport accessibility. The proximity of the development to existing public transport services means that all residents will have viable alternatives to the private car for accessing the site and will not be reliant upon the car as a primary mode of travel.

2.38 Direct and high quality pedestrian linkages are provided between the sites and the existing pedestrian facilities on the surrounding road network. The entrances to the sites will be well lit, so that people can feel secure in using the facilities.

2.39 Public transport maps and timetables can be provided in prominent locations on the sites and the

information will be kept up to date by the appointed Travel Plan Coordinator, a role for the Management Company.

2.40 Working Residents are generally now offered the opportunity to purchase public transport commuter tickets under the current 'Employer Pass' and 'TaxSaver' programmes, by individual Employers. Under these schemes the employer applies to Iarnród Éireann / Bus Éireann for tax free public transport tickets for their employees as an incentive for them to use public transport to travel to work.

2.41 With this in mind, the main focus of this Travel Plan will be to promote and support the use of alternative modes to the private car.

Car Parking

2.42 There are a reduced number of under-croft private car parking spaces provided for, including Go Car, Residential Spaces, mobility impaired and visitor parking. The limited car parking is considered appropriate in light of the location of the proposed development immediately adjacent high quality public transport, the inclusion of on-site services, and in consideration of the provisions of the SDCC Development Plan being "Maximum" standards. The development is also not a traditional residential apartment development, and in this regard the Car Parking requirements are fundamentally different, with anticipated lower car ownership and dependency for this nature of scheme. Given the low number of spaces provided (effectively managed residential spaces, visitor/mobility impaired parking, Go-Car and set down), the entire scheme will be actively marketed and promoted as a "Reduced Car Dependency" scheme and this will be communicated from the outset as part of sales and marketing. The development will also be managed on an on-going basis by the appointed Development Management Company to ensure that the reduced car dependency nature of the development is continually promoted and enhanced.

2.43 Details of the justification of the parking provision are set out in the main body of the Transportation Assessment Report. However, it is clear that the lower provision of car parking will act as a demand management measure, ensuring that the development is accessed in the most sustainable manner, being almost predominantly reliant on non-car modes of travel.

2.44 If considered appropriate, as part of a working MMP, additional priority spaces will in future be allocated to car-sharing workers when they travel together, with 10 'Go-Car' currently planned. These are some of the most accessible spaces and are clearly visible to other car park users. It is acknowledged that this may require some level of 'policing'.

Electric Vehicle Charging

2.45 The car parking spaces will be designed so that they can easily be upgraded to allow conversion for Electric Vehicles. The entire car park of the subject scheme can be ducted to accept cabling

to serve a charging point for every car space. Conduits can be run on the walls or underground, and charging points can also be retro-mounted. Where residents request a charging point to be installed, the relevant charging point can be pre-wired back to their home electricity meter in the designated meter location. The socket point will have a lockable cover on it so that only that resident may use the power point. This provision around the parking area allows future charging points to be installed at any of the car parking spaces with minimum works as and when required.

3.0 COLLECTION OF BASELINE INFORMATION

Possible Travel Pattern Questionnaires

3.1 The Redevelopment is a proposed high quality residential development in the centre of Tallaght. The development has capacity for in excess of 2,000 people when fully occupied (1,641 bedrooms in the 1,104 apartments).

3.2 Once occupied, and when the Travel Plan Coordinator is appointed, the occupiers of the proposed development will be encouraged to continually monitor the Travel Plan initiatives in order to maximise on their success.

3.3 Shortly after occupation of the new development, a detailed travel-questionnaire will likely be complied and distributed to Residents for completion. The aim of the travel questionnaire will be to establish travel patterns between work and home and school travel demand. The information gathered from this survey will be used to inform the further development of the Travel Plan.

3.4 The Baseline Survey information will also allow the Travel Plan Coordinator for the development to set realistic modal-split targets for the development.

3.5 It is anticipated that, given the very-much town centre location and good transport links at this development, combined with the reduced and managed levels of car parking on site, there will be a high percentage of use via public and alternative transport. The Travel Plan will need to maintain this positive modal split and improve it, where possible. It is informative to note that the "Smarter Travel: A Sustainable Transport Future" (DOT) Objective for 2020 is to achieve a reduced work related commuting by car modal share of 65% to 45%.

3.6 The Travel Plan is not seeking a radical change in terms of a modal shift; it is recognised that the use of the car is often essential for many users. Instead, the Plan seeks small but consistent increments of change in our approach to, and the use of, alternatives to the car.

4.0 THE TRAVEL PLAN

4.1 The successful implementation of a Travel Plan will ensure that, in-so-far-as-possible, the impacts of this traffic are reduced and minimised where practical, while providing a number of environmental and economic advantages detailed below.

4.2 The following sub-sections detail the available initiatives which will serve to better manage travel demand, and therefore the traffic impact of work-related journeys, focused on the movement of residents during peak times.

Walking

Walking - Key Information	
Approx Zone of Influence	3.5km
Percentage of Residents working in area of influence	TBC in each survey when occupied
Percentage of Residents interested in Walking	TBC in each survey when occupied

Table 4.1 – Key Information: Walking

4.4 There are many local, global, and personal benefits to walking to work, a few of which are listed following:

- **W** - Wake Up! - Studies have shown that people who walk to work are more awake and find it easier to concentrate.
- **A** - Always one step ahead - Walking makes people more aware of road safety issues and helps them develop stronger personal safety skills.
- **L** - Less congestion - If you leave the car at home and walk, there are fewer cars on the road which makes it safer for those who walk and cycle.
- **K** - Kinder to the environment - By leaving the car at home you are reducing the amount of CO 2 produced and helping to reduce the effects of climate change and air pollution.
- **I** - Interpersonal skills - Walking to work or school can be a great way to meet other walkers, share the experience, and develop personal skills.
- **N** - New adventures - Walking to work or school is a great way to learn about your local environment and community. It's also a fun way to learn about the weather, landscape, and local ecosystems.
- **G** - Get fit and stay active - Walking to and from work or school helps people incorporate physical activity into their daily routines. Research shows that regular physical activity can benefit your body and mind.

4.5 Most adults will consider walking a maximum of 3.5 km (Approx 30/40 minutes) to work. Residents working within a 3.5 km radius of the site will be encouraged to walk to work as often as their schedule permits. Similarly school trips can be encouraged on foot.

4.6 The following initiatives and incentives can be used to encourage walking to work or school:

- Take part in a 'Pedometer Challenge' which is organised through the Irish Heart Foundation or Smarter Travel Workplaces;
- Organise special events such as a 'Walk to work/school on Wednesdays' where participants are rewarded for their participation;;
- Keep umbrellas in public areas on a deposit system for use when raining;
- Display Smarter Travel Workplaces Accessibility Walking maps on notice boards areas so Residents can plan journeys;
- Organise lunch time or afternoon walks as part of a health and well-being programme;
- Highlight the direct savings gained due to reduced use of private vehicles.

Cycling

Cycling – Key Information	
Approx. zone of influence	10km
Percentage of Residents Surveyed known to Work within the area of influence	TBC in each survey when occupied
Percentage of Residents interested in cycling	TBC in each survey when occupied

Table 4.2 : Key Information - Cycling

4.7 Research suggests that cycling is a viable mode of transport for people who live up to 10 km from work or school.

4.8 Cycling is a great way to travel. It helps foster independence, raises awareness of road safety, and helps the environment.

4.9 Some positive aspects of cycling to work or school are listed following:

- **C** - Cycling is fun! - Cycling is a great form of transport but it's also a great recreational activity. Cycling is a skill that stays with you for life and it's a fantastic way to explore your local community.
- **Y** - You save time & money - cycling to work reduces the need to travel by car thus reducing fuel costs and freeing up road space for more cyclists;
- **C** - Confidence building - travelling to work as an independent cyclist can give

people increased confidence proving beneficial in all aspects of life;

- **L** - Less congestion - If you leave the car at home and cycle to work there are fewer cars on the road which makes it safer for those who cycle and walk to work or school;
- **I** - Interpersonal skills - Cycling to work or to school can be a great way to meet other cyclists and share the experience;
- **N** - New adventures - Cycling to work or school is a great way to learn about your local environment and community. It helps people to understand where they live and how their actions affect their local environment;
- **G** - Get fit and stay active - cycling to and from work or school helps people incorporate physical activity into their daily routines. Research shows that regular physical activity can benefit your body and mind.

4.10 The provision of enhanced and attractive cycle parking facilities at the site will clearly play a critical role in promoting journeys by bicycle.

4.11 The following initiatives and incentives can be used to encourage cycling to work and school:

- New cycle parking installed within the development, secure and well lit;
- It will publicise cycle parking availability by way of signage and on notice boards;
- It will display maps on notice boards areas so people can plan journeys;
- The development can provide free cycle accessories (panniers, lights, visi-vests, helmets) in periodic draws for cyclists,
- The Travel Plan Coordinator can organise cycle training sessions on site on the rules of the road and the specific risks associated with the locality;
- The Travel Plan Coordinator can invite bike suppliers on site for a 'Green Day' or 'Green Week' so that people can try bikes before buying;
- The Travel Plan Coordinator can set up a Bicycle User Group (BUG) to promote cycling;
- The Travel Plan Coordinator can highlight the direct savings gained due to reduced use of private vehicles;
- The Travel Plan Coordinator can encourage residents to take part in National Bike Week, see www.bikeweek.ie.

Public Transport

Public Transport – Key Information	
Approx. zone of influence	All Residents
Percentage of Residents in area of influence	100%
Percentage of Residents using Public Transport	TBC in each survey when occupied

Table 4.3: Key Information: Public Transport

4.12 There are many benefits to taking public transport, some of which include:

- Personal Opportunities – Public transportation provides personal mobility and freedom;
- Saving fuel – Every full standard bus can take more than 50 cars off the road, resulting in fuel savings from reduced congestion;
- Reducing congestion – The more people who travel to work or to school on public transport, especially during peak periods, the less people travelling by private car;
- Saving money – Taking public transport to and from work or school is a lot cheaper than travelling by car and saves the cost of buying, maintaining and running a vehicle;
- Reducing fuel consumption – A full standard bus uses significantly less fuel per passenger than the average car;
- Reducing carbon footprint – Public transport is at least twice as energy efficient as private cars. Buses produce less than half the CO2 emissions per passenger kilometre compared to cars and a full bus produces 377 times less carbon monoxide than a full car;
- Get fit and stay active - Walking to and from work or school to public transport helps people incorporate physical activity into their daily routines. Research shows that regular physical activity can benefit your body and mind.
- Less stress – Using public transport can be less stressful than driving yourself, allowing you to relax, read, or listen to music.

4.13 The following initiatives and incentives can be used by the Development Management Company at Occupation Stage to encourage people to take public transport:

- Publicise Employee Tax Saver Commuter tickets, which offer savings to employers in PSRI per ticket sold and significant savings to employees in marginal tax rate and levies on the price of their ticket;
- Encourage public transport use for travel by promoting smart cards, advertising the availability of these tickets to Residents;
- Publicise the availability of Real Time Information. Real Time Information shows when your bus is due to arrive at your bus stop so you can plan your journey more accurately;
- Provide maps of local bus routes and the nearest bus stops, LUAS Timetables and Frequencies, and the length of time it takes to walk to them;
- Contact local providers about issues such as location of existing and new bus stops, timing of routes, or where you have market information about a potential new route.

Go-Car/Car Sharing

Car Sharing – Key Information	
Approx. zone of influence	All Residents
Percentage of Residents in area of influence	100%
Percentage of Residents Car Sharing	TBC in each survey when occupied

Table 4.4: Key Information - Go-Car/Car Sharing

4.14 Every day thousands of commuters drive to work or to school on the same routes to the same destinations, at the same time as their colleagues. By car sharing just once a week, a commuter's fuel costs can be reduced by 20%, and in a similar fashion, the demand for work place parking can be reduced by 20%. If every single-occupancy driver carried another driver, there would be 50% less cars on the road at peak times.

4.15 Although use of the car to get to work or to school is essential for a large proportion of people, car sharing schemes have the potential to deliver a significant reduction in private vehicle trips by promoting higher than average occupancy rates for each vehicle.

4.16 A locally run car sharing scheme relies on a database containing workplace information, working hours, and peoples preferences such as gender/driver/passenger and their preferred route to and from work. This will be incorporated into the role for the Development Management Co.

4.17 The car-sharing database can be a map showing where Residents work, a database of car-sharers' details hosted on an organisations intranet site, or an on map-based matching website.

4.18 Car sharing often happens informally, however some participants often prefer a formal scheme such as a go Car facility which will normally generate a higher take-up for car sharing, and more efficiency in terms of increased occupancy rates. Car sharing is much easier promoted within a community such as is proposed here, and will be done by the Development Management Co.

4.19 Encouraging more Residents to share car journeys to work rather than driving alone as well as encouraging more to set up and take part in car sharing/pooling would prove a very effective means of reducing daily car trips to and from the site.

4.20 The following initiatives and incentives can be used to encourage car sharing:

- Provide incentives to sign up to a car sharing scheme with preferential parking spaces in the most convenient location;
- Draw up a car-sharing policy for how the scheme will operate, and issue car-

sharing permits to those qualifying to use the car-sharing spaces;

- Highlight to drivers that they do not have to share with a person that doesn't suit them – allow choice based on gender, route, smoking or non-smoking;
- Clarify the financial implications of the scheme – those accepting a lift could contribute towards fuel costs.
- Use existing online databases for car sharing. For example, the development could set up its own private car sharing site using www.carsharing.ie.
- Allocate parking spaces for use solely by car sharers, for example near to building entrances.

Action Plan Summary Table

4.25 The Summary Action Plan is described in the Table below. Modal Split Targets will be determined following on from the first Residential survey shortly after full occupation, typically within the first six months. This will be part of the role of the Travel Plan Coordinator, within the remit of the Development Management Company. This will show existing travel patterns with realistic targets set to improve the modal split of Residents.

	Initiative	Impact on Delivery	Difficulty Delivering	Current Modal Split	Target MS
Residents Initiatives	Walking	Medium	Low	TBC	TBC
	Cycling	Medium	Medium	TBC	TBC
	Public Transport	High	Low	TBC	TBC
	Other	Medium	Medium	TBC	TBC
	Car - Sharing	Medium	Medium	TBC	TBC
	Cars - 1 Passenger Only	High - Negative	High	TBC	TBC
Promoting the TP	Marketing the Plan	High	Low	Driven By TP Coordinator	
	Measuring Success	High	Medium	Annual Surveys	

Action Plan Summary Table

5.0 IMPLEMENTING THE PLAN

Background

5.1 Setting realistic targets and a sustained approach to the promotion of the Travel Plan is important if the measures are to be successful. The objectives and benefits of the Plan will be made clear and broadcast during the full lifecycle of the Plan.

5.2 The implementation of a successful Travel plan will require the upfront investment of resources. As well as reviewing objectives and initiatives regularly, it is equally important to measure results. This provides an indication of any Plan's success, and ensures that the targets remain realistic.

The Travel Plan Coordinator

5.4 The key objective of this Travel Plan is to ensure that the traffic impacts and car usage associated with the operation of Redevelopment are minimised. Achieving this objective will result in a wide array of benefits for the development and its stakeholders.

5.5 To ensure the plan is effective it is essential for a Travel Plan Coordinator to be appointed for the Development upon 100% occupation.

5.6 It is envisaged that the Coordinator will work closely with residents to enthusiastically promote and market the Travel Plan. As Residents will be the focus of the plan; their involvement must be sought from the outset.

5.7 To support the Travel Plan Coordinator's efforts, the Management Company must ensure that they have sufficient time to carry out their duties. In addition, it is essential that the powers of decision making are bestowed upon him/her, along with a suitable budget and programme for implementation.

Promoting the Travel Plan

5.9 Active promotion and marketing is needed if the Travel Plan is to have a positive impact on stakeholder travel patterns to and from the site.

5.10 All marketing initiatives should be focused on areas where there is willingness to change. Such information has been extracted from the questionnaires and has been described in Section 3 of this Plan.

- **Identify the Aim** – e.g. to reduce low occupancy car commuting, school, and business travel & to promote active travel, public transport & alternatives to travelling by car.
- **Brand the Plan** – as part of communicating the Travel Plan, visually brand all work relating to it with a consistent look, slogan, identity or logo.

- **Identify the Target Audience** – 'segment the audience' (e.g. shift workers, school travel, sedentary workers, people travelling long/ short distances, mode used, members of a walking club or green team) so you can target the message and events towards these different groups.

5.11 As part of the marketing process, the Travel Plan coordinator can personalise a plan for the Development, drawing attention to the benefits of participation and support for its implementation.

5.12 The Coordinator can identify communication tools and networks used by the different audiences in the Residences, and use these to communicate about travel.

5.13 Promotional material regardless of its quality is only as good as its distribution network; material incentives assist greatly in introducing people to alternative modes of commuting.

5.14 The plan should not be anti-car - it should be about promoting equity among modes and offering choice and accessibility.

5.15 The Coordinator can promote positive messages associated with a plan, for example, reduced tax/PRSI payments, getting fit and active, reducing congestion, reducing CO2 emissions and so on, and encourage people to start small – changing one day per week for example, to explore their options.

5.16 Marketing drives which feature individual Residents who have reduced their car use can carry a strong message. This will serve to raise not only the profile of the Plan, but also send a clear message in relation to the Residents commitment to the Plan.

6.0 CONCLUSIONS

6.1 The development forming the subject of this application accords with the principles of sustainable development, being located within an established town centre within clear and easy access to alternative modes of travel, and with very little car parking provided acting as a further demand management measure . The Management Company, once the development is occupied, will utilise pragmatic measures that encourage safe and viable alternatives to the private car for accessing the development.

6.2 Good Travel Planning is not a one-off event, it is instead an on-going iterative process requiring continued effort. This Preliminary report assists these efforts by forming an outline framework and providing guidance for its success. Monitoring and reviewing the initiatives set out within the plan will form a far greater part of the Final Travel Plan itself.

6.3 The key to the Plans success will be the appointment of a ***Travel Plan Coordinator*** for the development, once occupied, a role which will be part of the Development Management Company responsibilities. They will be vested with total responsibility for implementing the plan. They should be granted the authority and time to execute the Plan, and be provided with sufficient resources to realise the Plans success.

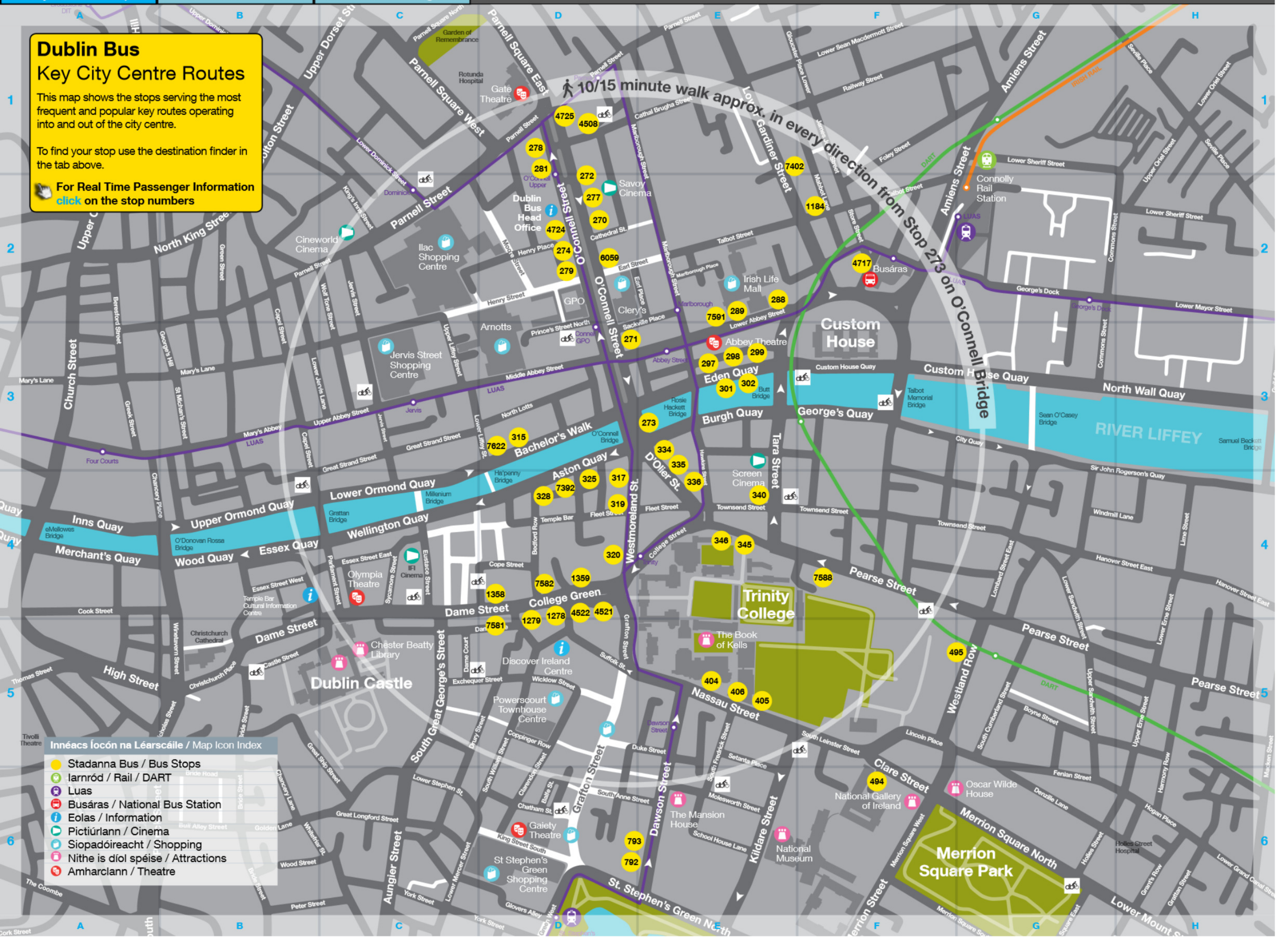
6.4 As Residents are the focus of the plan; their involvement should be sought from the outset following occupation. To this end, the Plan Coordinator should be assisted and supported by the Management Company and Residents. This will serve to spread the work load, and also give the Residents a valuable input into the operation of the Plan.

6.5 Successful Travel Plans require extensive marketing **and** regular review. The measures set out in the Action Plan Summary Table (Chapter 4) should form the basis of a sound, realistic Plan and should be clearly set out and be fully transparent to all users.

6.6 Residents also have an essential responsibility in terms of co-operating with, and taking an active part in the plan. They are, after all, the plan's primary focus.

6.7 It is recommended that the Final Travel Plan be set in motion at full occupation. The plan should evolve and develop with the development, taking into account changing Residents and their travel preferences and needs.

6.8 Annual reviews of the Plan should include a full stakeholder survey, providing valuable information for target setting and marketing target groups. It is emphasised that failing to meet initial targets should not be seen as failure, as the preliminary 12 to 18 months of the plan should be viewed as a calibration exercise for target setting.



Dublin Bus
Key City Centre Routes
This map shows the stops serving the most frequent and popular key routes operating into and out of the city centre.
To find your stop use the destination finder in the tab above.
For Real Time Passenger Information click on the stop numbers
10/15 minute walk approx. in every direction from Stop 273 on O'Connell Bridge
Innéacs Íocón na Léarscáile / Map Icon Index
Stadanna Bus / Bus Stops
Iarnród / Rail / DART
Luas
Busáras / National Bus Station
Eolas / Information
Pictiúrlann / Cinema
Siopadóireacht / Shopping
Nithe is díol spéise / Attractions
Amharclann / Theatre
Custom House
Trinity College
Dublin Castle
Merrion Square Park
RIVER LIFFEY
O'Connell Street
O'Connell Bridge
Westmoreland St.
Grafton Street
Dawson Street
Nassau Street
College Green
Dame Street
Pearse Street
Clare Street
Merrion Square North
St. Stephen's Green North
Parnell Square East
Parnell Square West
Parnell Street
North King Street
Church Street
Upper Dorset St
Gardiner Street
Amiens Street
Eden Quay
Burgh Quay
George's Quay
Custom House Quay
North Wall Quay
Bachelor's Walk
Aston Quay
Lower Ormond Quay
Upper Ormond Quay
Wellington Quay
Essex Quay
Wood Quay
Inns Quay
Merchant's Quay
High Street
D'Olier St.
Tara Street
Westland Row
South Great George's Street
Aungier Street
Kildare Street
Busáras
Connolly Rail Station
Dublin Bus Head Office
GPO
Arnotts
Clery's
Ilac Shopping Centre
Jervis Street Shopping Centre
Irish Life Mall
Abbey Theatre
Savoy Cinema
Cineworld Cinema
Screen Cinema
Gate Theatre
Olympia Theatre
Gaiety Theatre
Chester Beatty Library
The Book of Kells
Discover Ireland Centre
Powerscourt Townhouse Centre
St Stephen's Green Shopping Centre
The Mansion House
National Museum
National Gallery of Ireland
Oscar Wilde House
4725
4508
278
281
272
277
270
4724
274
279
6059
271
7402
1184
4717
288
289
7591
299
298
297
302
301
273
334
335
336
340
315
7622
325
317
7392
328
319
320
346
345
7588
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1278
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Dublin Bus
Key City Centre Routes

Use the index and grid reference to find the right stop on the city centre map.

The stop number shown on the map also appears on the top of the bus stop to help you find your stop more easily.

For Real Time Passenger Information click on the stop numbers

For Timetable Information click the Bus Route numbers

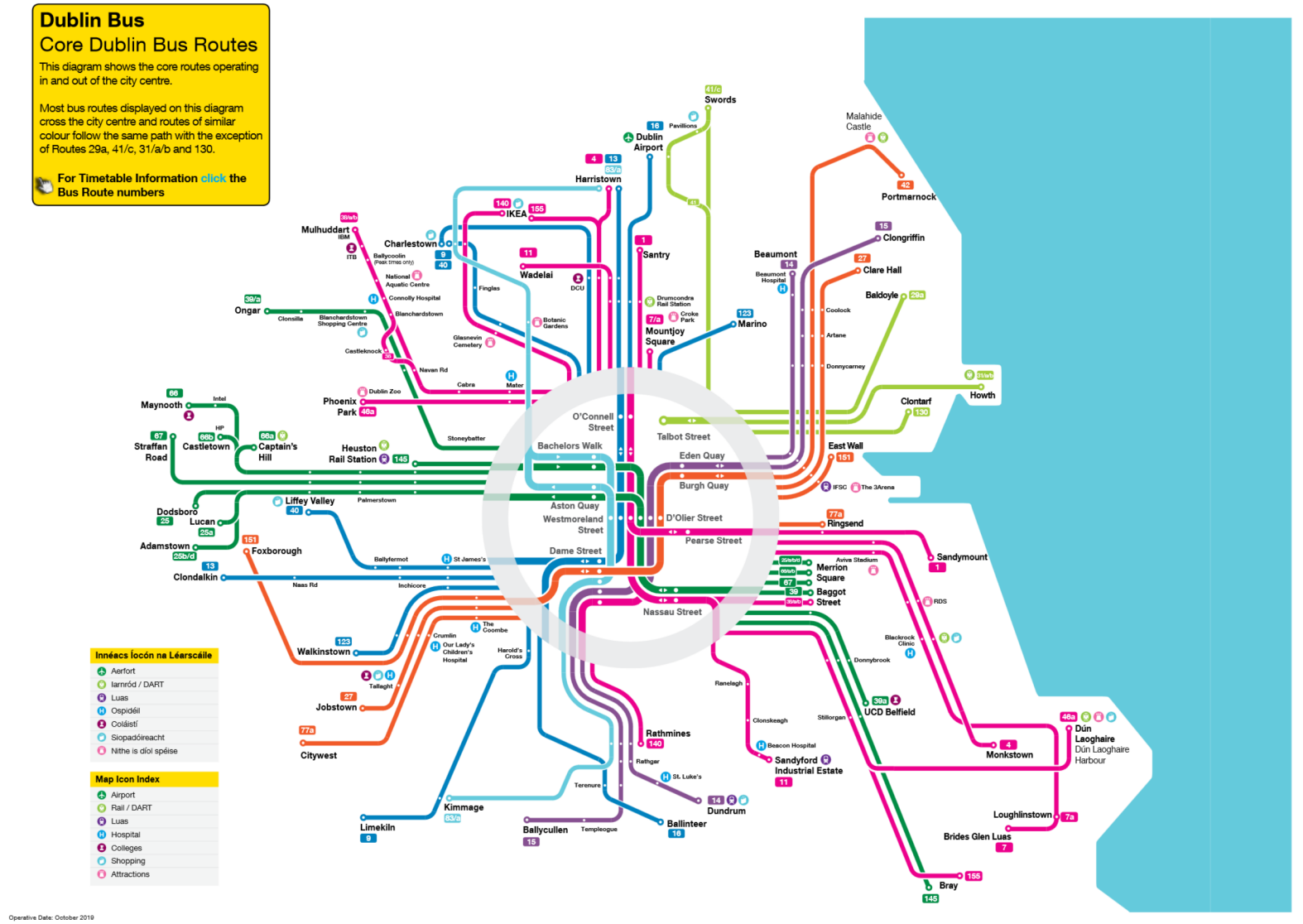
Route Destination	Bus Route	Stop Number	Grid Ref
Ballsbridge/RDS	4, 7, 7a	4725	D1
	4, 7, 7a	273	E3
	4, 7, 7a	405	E5
Ballyfermot	40	270	D2
	40	335	E3
	40	4521	D4
Blackrock	4, 7, 7a	4725	D1
	4, 7, 7a	273	E3
	4, 7, 7a	405	E5
Blanchardstown -	39/a	793	D6
Shopping Centre	39/a	7588	F4
	39/a	328	D4
Blanchardstown -	38/a, 39	793	D6
Village	39	7588	F4
	38/a	274	D2
	39	328	D4
Botanic Gardens	83	1359	D4
	83, 155	319	D4
Bray Main Street	145	7622	D3
	145, 155	334	E3
	145, 155	406	E5
Celbridge	67	346	E4
	67	317	D4
Charlestown S.C.	9	1359	D4
	9, 40	319	D4
	9	281	D1
	40	1358	D4
	40	279	D2
Citywest Business Pk.	77a	4522	D4
Clondalkin Village	13	270	D2
	13	335	E3
	13	4521	D4
Clonskeagh	11	271	D3
	11	404	E5
Clontarf	130	7591	E2
Coolock	15	7582	D4
	15	299	E3
	27	1358	D4
	27	298	E3
Coombe Hospital	27, 151	302	E3
	27, 77a, 151	4522	D4
Croke Park & Museum	11	793	D6
	13, 16	1359	D4
	11, 16	320	D4
	1, 13	319	D4
	1, 11, 16	278	D1
DCU	9, 13	1359	D4
	9, 13, 155	319	D4
	4, 9, 13 , 155	281	D1
	11	793	D6
	11	278	D1
Donnybrook	39a	315	D3
	46a, 145, 155	334	E3
	39a	335	E3
	39a	404	E5
	39a, 155	6059	D3
	46a, 145, 155	406	E5
Dublin Airport	16, 747	1359	D4
	16	320	D4
	16	278	D1
	41	288	E2
	747, 757	4717	G3
	747	4724	D2
	747	4508	D1
	747	7402	E1
	757	494	F6
	757	495	F5
	757	7588	G7
Dublin Zoo	46a	792	D6
	46a	320	D4
	46a	274	D2
Dún Laoghaire	7, 7a	4725	D1
	7, 7a	273	E3
	7, 7a	405	E5
	46a	6059	D2
	46a	334	E3
	46a	406	E5
Dundrum	14	301	E3
	14	336	E4
	14	7581	D5
Fairview	14, 15	7582	D4
	15	299	E3
	27	1358	D4
	27	298	E3
	130	7591	E2
Finglas Village	40	1358	D4
	40	319	D4
	40	279	D2
Glasnevin Cemetery	40	1358	D4
	40	319	D4
	40	279	D2
	140	7582	D4
	140	274	D2
Guinness Storehouse	13, 40	270	D2
	13, 123, 40	335	E3
	13, 40	4521	D4
	123	272	D2
	123	1278	D4
Harold's Cross	9	277	D2
	9	336	E4
	9	1278	D4
	16	270	D2
	16	336	E4
	16	1279	D5
Heuston Rail Station	25/a/b/d, 66/a/b, 67	346	E4
	66/a/b, 67	317	D4
	25/a/b/d	7392	D4
	145	792	D6
	145	7588	F4
	145	325	D4
Howth Summit	31/a	289	E2
Howth Village	31/a	289	E2
IKEA	140	7582	D4
	140	319	D4
	140	274	D2
	155	792	D6
	155	319	D4
	155	281	D2
Kimmage	83	315	D3
	9, 83	336	E4
	83	1279	D5
Leeson Street	11	271	D3
	11	404	E5
	46a, 155	6059	D2
	46a, 145, 155	334	E3
	46a, 145, 155	406	E5
Liffey Valley S.C.	40	270	D2
	40	335	E3
	40	4521	D5
Lucan (Esker Church)	25a	346	E4
	25a	7392	D4
Lucan Village	25, 66/a/b, 67	346	E4
	66/a/b, 67	317	D4
	25	7392	D4
Malahide Road	42	1184	F2
Malahide Village	42	1184	F2
Marino	123	1359	D4
	123	274	D2
	123	4508	D1
Mater Hospital	38/a/b	793	D6
	38/a/b	274	D2
	46a	792	D6
	46a	320	D4
	46a	274	D2
Mater Hospital (Private)	11	793	D6
	11, 16	320	D4
	1, 13, 40	319	D4
	1, 11, 16	278	D1
	13, 16	1359	D4
	13	281	D2
	40	1358	D4
	40	279	D2
Maynooth Village	66	346	E4
	66	317	D4
Merrion Square	4, 7, 7a	4725	D1
	4, 7, 7a	273	E3
	4, 7, 7a	405	E5
	25/a/b/d, 66/a/b, 67	315	D3
	25/a/b/d, 66/a/b, 67	406	E5
Naas Road	13	270	D2
	13	335	E3
	13	4521	D4
Navan Road	38/a/b, 39/a	793	D6
	39/a	7588	F4
	38/a/b	274	D2
	39/a	328	D4
North Circular Road	46a	792	D6
	46a	320	D4
	46a	274	D2
Ongar	39/a	793	D6
	39/a	7588	F4
	39/a	328	D4
Our Lady's Children's	27, 151	302	E3
Hospital, Crumlin	27, 77a, 151	4522	D4
	123	272	D2
	123	335	E3
	123	1278	D4
Phibsboro	9	1359	D4
	9, 83, 140, 155	319	D4
	4, 9, 155	281	D1
	140	7582	D4
	140	274	D2
Ranelagh	11	271	D3
	11	404	E5
Rathfarnham	16	270	D2
	16	336	E4
	16	1279	D5
Rathgar	14, 15	301	E3
	14	336	E4
	14, 15	7581	D5
Rathmines	14, 15	301	E3
	83/a	315	D3
	14, 83	336	E4
	14, 15, 140	7581	D5
	140	6059	D2
	140	334	E3
Ringsend	1	271	D3
	1, 77a	340	E4
Santry	16	1359	D7
	16	320	D4
	1	319	D4
	1, 16	278	D1
	41/c	288	E2
South Circular Road	9	277	D2
	9	336	E4
Stillorgan Village	46a, 155	6059	D2
	46a, 145, 155	334	E3
	46a, 145, 155	406	E5
	145	7622	D3
Swords Village	41/c	288	E2
Tallaght Village	27	302	E3
	27	4522	D4
Templeogue	15	301	E3
	15	7581	D5
Terenure Village	15	301	E3
	15	7581	D5
	16	270	D2
	16	336	E4
The 3Arena	151	7622	D3
	151	297	E3
The Square Tallaght	27	302	E3
	27	4522	D4
UCD Belfield	39a	315	D3
	39a	335	E3
	39a	404	E5
Walkinstown Cross	27	302	E3
	27, 77a	4522	D4

Dublin Bus
Core Dublin Bus Routes

This diagram shows the core routes operating in and out of the city centre.

Most bus routes displayed on this diagram cross the city centre and routes of similar colour follow the same path with the exception of Routes 29a, 41/c, 31/a/b and 130.

For Timetable Information click the Bus Route numbers



Innéacs Íocón na Léarscáile

- Aerfort
- Iarnród / DART
- Luas
- Ospidéil
- Coláistí
- Siopadóireacht
- Nithe is díol spéise

Map Icon Index

- Airport
- Rail / DART
- Luas
- Hospital
- Colleges
- Shopping
- Attractions

Operative Date: October 2019

APPENDIX I

DMURS
Statement of Consistency

consulting engineers

NRB

DMURS Design Statement
Technical Note
(Appendix I)

for

Proposed Residential Development(s)

on

Lands West of Old Belgard Road and North, South & West of Cookstown Road, Cookstown Industrial Estate, Tallaght, Dublin 24

SUBMISSION ISSUE

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1.0 INTRODUCTION

1.1 It is NRB's opinion that the proposed Residential Development Layout and associated roads are consistent with both the principles and guidance outlined within the *Design Manual for Urban Roads and Streets* (DMURS) 2013, as amended in 2019. The scheme proposals are the outcome of an integrated design approach, in which the evolution of the development design incorporated various mitigation measures and development proposals in response to a series of consultations with SDCC and ABP. This approach seeks to implement a sustainable community connected by well-designed links, layout and accesses - which combined to deliver attractive, convenient and safe slow mode access to this residential development, in addition to promoting modal shift and viable alternatives to car based journeys. The resultant proposed Cookstown Castle Development provides for an enhanced high quality and easily accessible sustainable community based neighbourhood.

1.2 The following section discusses design features which are incorporated within the proposed residential scheme with the objective of delivering a design that is consistent with the principles of DMURS.

2.0 DESIGN ATTRIBUTES

2.1 The proposed layout strategy seeks to maximise connectivity between key local destinations through the provision of a high level of permeability and legibility for all journeys, particularly for sustainable forms of travel (cycling and walking). The proposed residential scheme delivers greater mode and route choices along direct, attractive and safe linkages to local amenities and schools/service destinations through replacement of the existing industrial estate roads with modern streets.

2.2 High Quality Connections between the proposed development and the employment areas and facilities within Tallaght, are provided. The layout itself has been designed to deliver a hierarchy which provide safe access within / across the proposed new residential community, linking the site and community with the established network. Vehicular access to the car parking is separate from the pedestrian accesses to the development and has been designed with safety in mind, conscious that an independent Road Safety Audit was also undertaken, reinforcing safety features.

2.3 As part of the development, the access facilities are to address the different levels of motorised traffic whilst optimising access to/from the proposed development via

alternative transport for higher number of pedestrians and cyclists. The design philosophy has sought to emphasise the context / place status of the scheme in terms of level of connectivity provided, quality of the proposed design, provision of enhanced accommodation for pedestrian / cyclists activity and vulnerable users requirements whilst ensuring appropriate 'transition' solutions for conflicting mobility movements as recommended in DMURS and the Tallaght LAP, particularly at street junctions.

2.4 The layout of the proposed development seeks to maximise permeability and enhances legibility, and the design of appropriately sized blocks actively contributes to a highly permeable and accessible community for both pedestrians and cyclists.

2.5 The proposed layout seeks to successfully create an appropriate balance between the functional requirements of different network users whilst enhancing the 'sense of place'. Design attributes of the proposed layout which contribute to achieving this ***DMURS objective*** include:

a) Vehicular access to the development car parks is separate from the pedestrian accesses to the development and the open space.

b) Through the provision of separate vehicle accesses onto the local streets, the plan offers a well-connected but permeable network,

c) Under ***Section 3.4.1 Vehicle Permeability***, DMURS states that 'Permeable layouts provide more frequent junctions which have a traffic-calming effect as drivers slow and show greater levels of caution' - in this regard the form of streets and road layout in the proposed Cookstown Castle Development conform with DMURS and the Tallaght LAP.

d) DMURS also goes on to state that 'Designers may be concerned that more permeable street layouts will result in a higher rate of collisions. However, research has shown that there is no significant difference in the collision risk attributable to more permeable street layouts in urban areas and that more frequent and less busy junctions need not lead to higher numbers of accidents.'

e) The proposed design deliberately seeks to specify minimal signage and line markings along the internal layout, with such treatments used sensitively throughout and predominately at key nodes and 'transition' areas.

f) Footpaths not less than 1.8m (2.0m or wider) will be provided throughout the scheme with connections and tie-ins to existing external pedestrian networks.

g) Appropriate clear unobstructed visibility splays, as per DMURS requirements, will be maintained at the site access junctions to the external road network and at all public road junctions.

h) Well designed and frequent pedestrian crossing facilities will be provided along key travel desire lines throughout the emerging Area in addition to those located at street nodes. All courtesy crossings will be provided with either dropped kerbs thereby allowing pedestrians to informally assert a degree of priority. The separation of vehicular access to the development from the pedestrian accesses to the development aid in this aspect of the layout.

i) Along the more heavily trafficked routes, formal signalised controlled crossings can be provided at junctions for the benefit of both pedestrians and cyclists. These will connect with the Pedestrian, Cyclists and Bus Stop facilities adjacent the subject site. Raised platforms are proposed at all intersections, which serve to reduce traffic speed and aid the safe prioritised passage of pedestrians and vulnerable road users. In addition, it may be considered appropriate to replace existing roundabout controlled junctions with signal controlled junctions, and this strategy would be consistent with DMURS.

j) All informal pedestrian crossing facilities will be at least 2.0m wide, whilst all controlled pedestrian crossings will be a minimum of 2.4m wide.

k) With the objective of encouraging low vehicle speeds and maximising pedestrian safety and convenience, corner radii will be 6m where swept path analysis permits and will incorporate further reduced radii where feasible in line with DMURS guidance.

l) Internally within the development, where carriageway kerb are required, heights will be typically 75-80mm in accordance with the objectives of DMURS.

m) Within the development, as required, cyclists will share the space with other street users as per the NCM guidance for such situations and best practice. The proposed Cycle facilities on the Larger Public Roads are compliant with the National Cycle Manual (NCM) (NCM pages 12 & 83), with advance cycle facilities and Toucan type crossings incorporated into all signal controlled junctions. Internally, for the minor streets, the cyclists infrastructure is also consistent with the NCM (Pages 54 & 55)

n) Any required street signage and road markings will be in accordance with the Department of Transport Traffic Signs Manual, and the location and form will be agreed in advance with South Dublin County Council (conscious of DMURS recommendations on the minimisation of signage / reduction of street clutter).