consulting engineers

NRB

Transportation Assessment Report

Including....

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

For

Proposed Residential Development

At

Mill Road, Saggart, Co. Dublin.

SUBMISSION ISSUE

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EXECUTIVE SUMMARY

NRB Consulting Engineers Ltd were appointed to address the Traffic/Transportation issues associated with a planning application for a residential housing/apartment development on zoned development lands at Mill Road, Saggart, Co. Dublin on a site on the western side of the Citywest Campus.

Being located on lands in the heart of Saggart, and with the new proposed link through Citywest Campus meaning it is within a 1km walk or cycle of Saggart Luas Stop, ~15 minute walk of Rathcoole Village centre and within ~20 minute walk or ~10 minute cycle of City West Shopping Centre, and the nearby large Employers within City West Business Campus, the site is ideally placed to take advantage of and contribute to sustainable 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 to accommodate the low levels of vehicular traffic associated with the proposed scheme.

The primary vehicular access is proposed by way of a priority junction onto Mill Road, with the capability to be upgraded to traffic signal control in future should the need arise.

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 road network to safely and appropriately accommodate the worst case vehicular demands with the development fully occupied, taking account of the existing traffic demands locally.

Comprehensive classified turning movement surveys of the existing affected roads and junctions were carried out during the weekday AM and PM Peak Hours in late 2019 during normal school term, prior to the Covid 19 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 periods.

The Transportation Assessment confirms that the proposed development has a negligible impact upon the operation of the adjacent road network and that the simple priority controlled vehicular access junction to Mill Road is more than adequate to accommodate the worst case traffic associated with the development. The assessment

confirms that the construction and full occupation of the residential scheme will have a negligible impact upon the operation of the adjacent road network.
An independent Road Safety Audit of the Access Design & internal layout has been undertaken together with the associated Designer Feedback Form, and is included as ***Appendix H*** to this Report.

The assessment includes a Preliminary Mobility Management Plan (MMP or Travel Plan) for the site which is included as a separate report as ***Appendix I***.

We have also prepared a Statement of Consistency with DMURS and confirm that the internal layout is compliant with the requirements of DMURS and this Report is included and appended as ***Appendix J***.

For the apartment elements we have undertaken a comprehensive review of car & cycle parking provision in terms of consistency with the National Apartment Guidelines. In terms of apartment car parking we confirm that the Car Parking ratio of 1.0 per Unit is consistent recent SHD planning permissions locally. A detailed review of car and bicycle parking provision is included within Section 2 of this Report.

Based on our studies, we conclude that there are no adverse traffic/transportation capacity or operational safety issues associated with the construction and occupation of the proposed residential development that would prevent a grant of planning permission by An Bord Pleanála.

1.0 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 185 apartments, 51 Residential Houses, 38 Duplex Units and an ancillary small Crèche on the suitably zoned site at Mill Road, Saggart, Co Dublin.

1.2 The proposed development, a high quality residential scheme with supporting facilities, should be considered in the context of its location within the heart of Saggart, with ever improving access to non-car modes of travel, and being in close proximity to services and employment destinations. The site's accessibility is being enhanced by way of a dedicated pedestrian and cyclist link through the Citywest Campus. A site location plan is included below as ***Figure 1.1***;

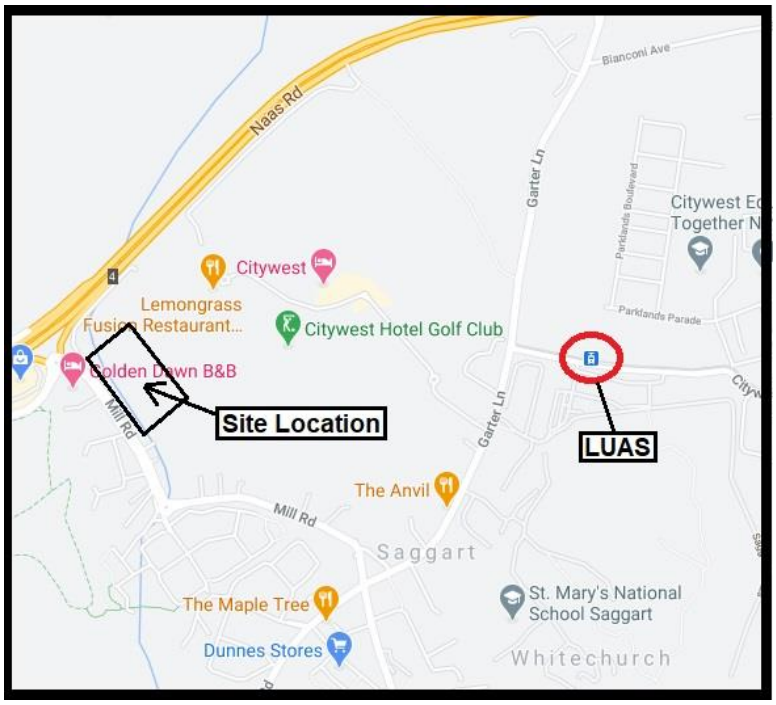

Figure 1.1 - Site Location in Saggart

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-generation terms,
- Location of the development in Saggart in close proximity to high quality services and employment opportunities,

- Traffic & Transportation impact,
- Capacity of the proposed vehicular accesses to accommodate the worst-case development traffic flows,
- Impact upon the adjacent road network,
- Capacity of the Existing Road Network,
- Adequacy and safety of the existing roads and junctions locally, within the area of influence

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 prior to the Covid 19 Pandemic,
- TII Design Guidance,
- 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 Road Safety Audit of the Access Design and internal layout has been undertaken and is included as ***Appendix H*** to this Report.

1.7 The assessment includes a Preliminary Mobility Management Plan (MMP or Travel Plan) for the site which is included as a separate report as ***Appendix I***.

1.8 We have also prepared a Statement of Consistency with DMURS and confirm that the internal layout is compliant with the requirements of DMURS and this is included and appended as ***Appendix J***.

2.0 EXISTING CONDITIONS, DEVELOPMENT PROPOSALS & PARKING

2.1 The subject development site is located immediately west of the overall Citywest Hotel Campus, and is bounded to the western perimeter by residences on Mill Road. The site is bound along its norther perimeter by the long established Service Road for the Citywest Campus. It is bound to the south and east by lands within the Citywest Campus.

2.2 Mill Road, generally oriented in a N-S direction, consists of a single carriageway road linking the N7 National Road with Saggart Village by way of Junction #4. It is a single carriageway 2-way road, currently subject to a 50kph speed restriction and is relatively lightly trafficked in the context of its Link Carrying Capacity. The Traffic survey confirms that Mill Road carries a weekday AM Peak Hour 2-Way traffic flow of approximately 805 Passenger Car Units (PCUs) and a 2-way flow of 822 PCUs in the PM Peak Hour. In these terms, the road is considered moderately trafficked in terms of its 'link-capacity' or traffic-carrying capacity

2.3 To set these flows in context, a road of this nature has a link or traffic capacity of between 1,200 & 1,500 PCUs per-direction per-hour (a capacity of between 2,400 & 3,000 2-way). So, considered in terms of its link capacity, Mill Road is actually moderately trafficked. However, it is generally accepted that the capacity of a road is determined by the throughput or capacity of its terminal junctions.

2.4 In the case of Mill Road, the traffic capacity of the road is affected by the operation of the Mill Road/Millrace Ave Roundabout to the south of the site, and the Mill Road/R120 Roundabout to the north. The capacity of these junctions is affected by the entry widths, which are required to maintain an acceptable and safe crossing width for pedestrians.

2.5 Both of these ‘terminal’ roundabout junctions, north and south, consist of medium sized inscribed circle diameter at grade roundabouts, and operate as traditional roundabout control. The subject development vehicular access layout has been arranged as a simple priority controlled junction, conscious that it can be upgraded to traffic signal control if required by the Local Authority in future.

2.6 The continuation of Mill Road itself to the south of the Mill Road/Millrace Ave roundabout, leads directly to Saggart Village Centre a short walk from the site. Mill Road at this point is also an urban single carriageway 2-way road, also subject to a 50kph speed restriction. It too is relatively lightly trafficked in the context of its Link Carrying Capacity.

2.7 The Traffic survey confirms that Mill Road through Saggart Village carries a weekday AM Peak Hour 2-Way traffic flow of approximately 794 Passenger Car Units (PCUs) and a 2-way flow of 836 PCUs in the PM Peak Hour. In these terms, the road is also considered moderately trafficked in terms of its 'link-capacity' or traffic-carrying capacity - conscious that it is also affected by the capacity of the local junctions.

2.8 The construction of the subject development will allow the future creation of network permeability, to and through the Citywest Campus, with the new access road creating an additional link to and through the site from Mill Road. It is important to note under ***Section 3.4.1 Vehicle Permeability***, the "***Design Manual for Urban Roads and Streets"*** (DMURS) states that 'Permeable layouts provide more frequent junctions which have a traffic-calming effect as drivers slow and show greater levels of caution'.

2.9 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.'

2.10 This supports the case for the addition of the direct access to Mill Road as proposed, with the access road to the site designed specifically for this purpose, as it greatly enhances the multi-modal transportation network in the area, and in particular provides for future improved pedestrian and cyclist connectivity to LUAS and Citywest Business Campus.

2.11 A review of the Road Safety Authority (RSA) on-line database of reported road traffic accidents confirms that there have been no significant accidents on the adjacent affected roads immediately at the site during the reported period 2005 to date (that are considered relevant or which will be affected by the proposed development).

2.12 An extract from the RSA Database is included below as ***Figure 2.1***

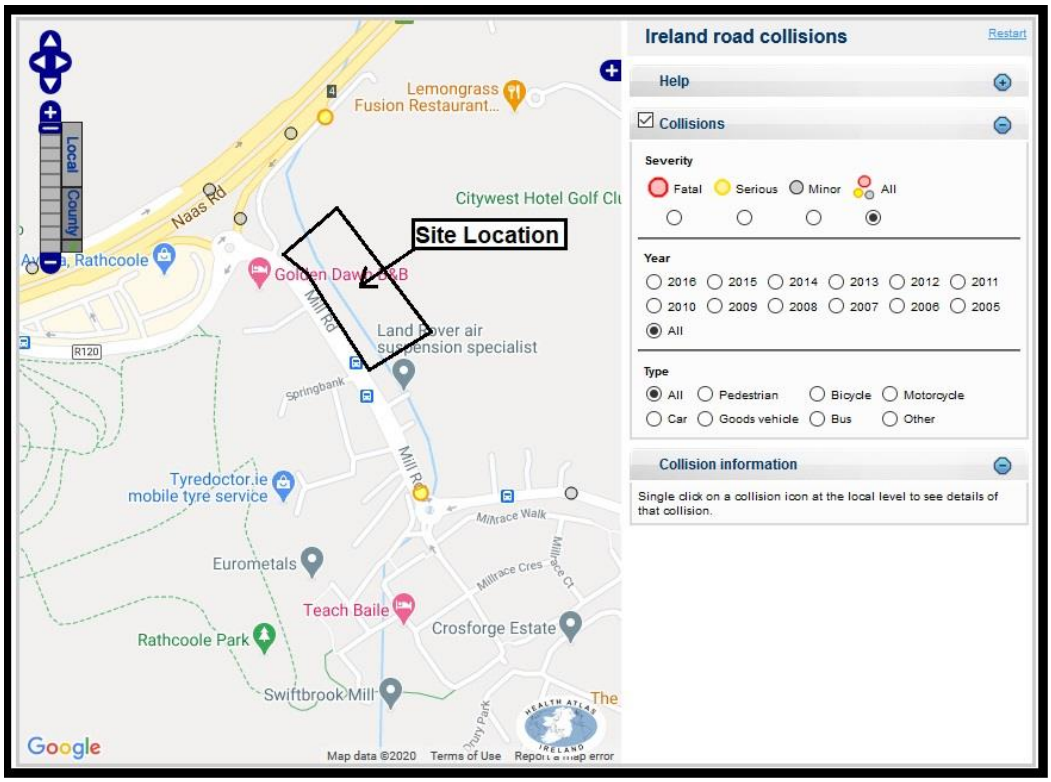

Figure 2.1 - RSA Accident Data – Extract

2.13 We include below as ***Figure 2.2*** an extract from the Architects Site Layout Plan showing the proposed development in the context of the local roads, for ease of reference.

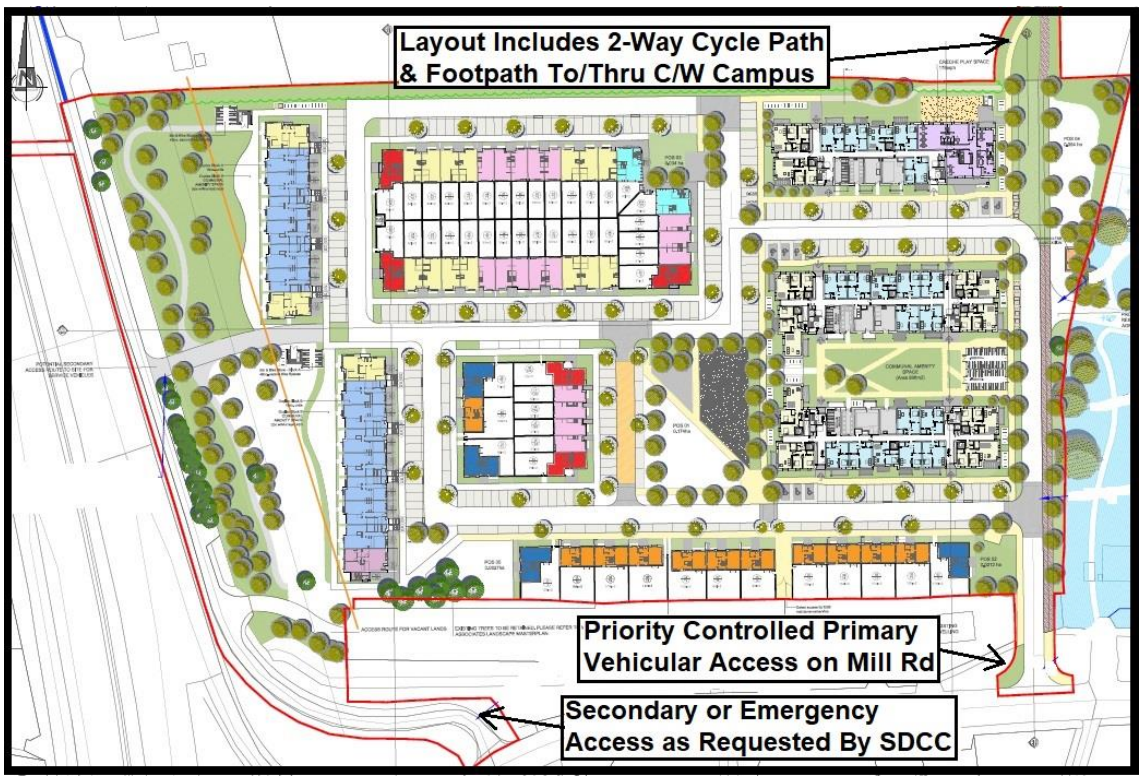

Figure 2.2 - Site Layout – Annotated with Access Features

2.14 The entire proposed development as illustrated above consists of a total of 185 Residential Apartments, 51 Residential Houses, 38 Duplex Units and an ancillary small Crèche. The development includes copious secure bicycle parking, restricted car parking, along with refuse management/residential storage areas located around on the site. The road layout has been carefully designed as a low speed permeable network, fully compliant with DMURS. Car and cycle parking quantum is addressed further within the Report below.

2.15 In terms of vehicular access, the primary access is by way of a simple priority junction on Mill Road in a slight stagger arrangement with the Springbank Housing access opposite. The access road itself serving the site has been carefully designed without direct housing frontage access so that it facilitates future access and connectivity to and through the Citywest Campus to the east in the event that it is required. The access road has been designed with high quality pedestrian and cyclist infrastructure included. A National Cycle Manual compliant 2-way cycle path and pedestrian footpath through Citywest Estate is also part of the plans.

2.16 At the specific request of SDCC, a secondary or emergency access has been incorporated to the north, by way of an upgraded service road which currently serves as an estate access during major events at Citywest. There are removable bollards at this point within the site to prevent vehicular access – however it does aid pedestrian & cyclist connectivity locally. This is as illustrated on ***Figure 2.2*** above.

Car Parking and Bicycle Parking Quantum & Justification

2.17 For the residential housing/duplex elements of the SHD, the residents and visitor car parking is provided within the street immediately fronting the houses. At the apartments, the car parking around the perimeter is intended for use of residents. Cycle storage & parking for the individual houses/duplexes can clearly be provided internally within the residents demise, in accordance with normal practice. Notwithstanding, there are dedicated enclosed cycle storage area provided for BOTH duplex and Apartment units.

2.18 There are a total of 276 Car Parking spaces provided on the entire site (including. mobility impaired spaces –which can easily be increased if necessary through amendments to 'regular' car parking spaces). It is intended that c.6 No. car parking spaces will be dedicated and allocated spaces for the 4 classroom Crèche, thereby leaving a total of 270 Parking Spaces for the residential elements. An extract from the Architects Schedule showing the Car Parking Quantum and Breakdown is included below as ***Figure 2.3***

Car Parking

		No. of units proposed	totals per type	*SDCC require per unit	* SDCC total required	Total SDCC requirement per type	Proposed Ratio per unit	**Total Proposed
Houses	2 Bed	17		1.5	25.5		1	17
	3+ Bed	34	51	2	68	93.5	2	68
Duplex	1 bed	2		1	2		0.825	1.65
	2 bed	17		1.25	21.25		0.825	14.025
	3 bed	19	38	1.5	28.5	51.75	0.825	15.675
Apts	1 bed	59		1	59		0.825	48.675
	2 bed	119		1.25	148.75		0.825	98.175
	3 bed	7	185	1.5	10.5	218.25	0.825	5.775
TOTAL RESIDENTIAL		274				363.5		268.975
Creche	4 classrooms			1 space per classroom		4	additional 2no. Spaces for set-down	6
Total required								274.975
Total No. car parking spaces proposed								276

Figure 2.3 – Extract Darmody Architects Car Parking Schedule

2.19 It is intended that the car parking will be numbered and allocated to specific units for residents, with an associated allocation of 10% of the total dedicated managed & controlled short stay visitor spaces dedicated around the site. There are 51 spaces allocated to the 51 residential houses, with 6 for the Creché, leaving the remaining 219 spaces to be dedicated to the apartments/duplexes combined. For the 223 residential apartment/duplex units (38 + 185 = 223) this represents a **Parking Ratio of 0.98**. This level of car parking provision is slightly in excess of the parking provision at permitted SHD Apartment Developments to the east of Citywest on Garters Lane, but we consider this to be an appropriate response in the context of the location.

2.20 In terms of Car Parking, given the lower number of spaces provided (effectively less than one per unit, combined with visitor parking), 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.

2.21 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

2.22 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);

<u>Central and/or Accessible Urban Locations</u>

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

2.23 Section 4.21 describes **Intermediate Urban Locations**. In suburban/urban locations served by public transport or close to town centres or employment areas and particularly for housing schemes with more than 45 dwellings per hectare net (18 per acre), planning authorities must consider a reduced overall car parking standard and apply an appropriate maximum car parking standard.

2.24 So even in this location, which we consider to be an Intermediate Urban Location, the guidelines promote a reduced overall car parking standard. These guidelines support the case for reduced car parking provision as part of this development supported by a strong central management regime intended to contribute to the capacity to establish and operate shared mobility measures.

2.25 In terms of the stated Policy, the subject site meets the requirements for significantly reducing the provision of Private Car Parking, under the headings;

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

2.26 In these terms the proposed subject development meets the majority of the necessary requirements for the reduced car parking provision.

2.27 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

2.28 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 following features can and will be incorporated; -

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

2.29 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',
- Limited Dedicated Car Parking is intended to be provided to Residents nor will any be attached to any rental properties (and same can be Specified in associated Rental Agreements),
- The Location within walking distance of local amenities, with the improved connectivity through Citywest Business Park (eg. Saggart Village, Citywest Business Campus, Greenogue & Baldonnell Business Parks, City West Shopping Centre and local schools),

- Associated Employment Opportunities locally within local Business Campuses within the catchment and also within the Greater Saggart and Tallaght Areas,
- Proximity to the LUAS being served by the LUAS Red Line within an easy walking and cycling distance of the site, with the direct connectivity through Citywest Campus,
- Very easy walk distance from the local Dublin Bus Stop on Mill Rd,
- Dedicated "Car Share" spaces/cars for car sharing can be allocated and provided within the development,
- Copious Cycle Parking and Cycle Storage (Refer Below),
- 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.

Bicycle Parking

2.30 Bicycle parking facilities are generally being provided in an attempt to meet and exceed the 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. An extract from the Guidance is included below as ***Figure 2.4***

> *Quantity* – a general minimum standard of 1 cycle storage space per bedroom shall be applied. For studio units, at least 1 cycle storage space shall be provided. Visitor cycle parking shall also be provided at a standard of 1 space per 2 residential units. Any deviation from these standards shall be at the discretion of the planning authority and shall be justified with respect to factors such as location, quality of facilities proposed, flexibility for future enhancement/enlargement, etc.

Figure 2.4 - Extract from Section 4.17 of Apartment Guidelines

2.31 Within the Apartments and Duplex Units, the subject Development has a total of 411 Bedrooms (contained within the 223 No. Apartments & Duplexes combined). In theory, these elements therefore require a total of 411 Residential Bike Parking Spaces PLUS 112 Visitor Bike Parking Spaces. This gives a total requirement of 523 Bike Parking Spaces. The Bicycle Parking Provision on the site is illustrated in the Architects Parking Schedule, which is reproduced below as ***Figure 2.5***

Bike Parking

		No. of units proposed	totals per type	*SDCC require per unit long term	* SDCC total required long term	*SDCC require per unit short term	* SDCC total required short term	2020 Apt guidelines requirement	2020 Apt guidelines require total	Proposed long term	Proposed short term	Total bike spaces Proposed
Duplex	1 bed	2	38	1 per 5 units	7.6	1 per 10 units	3.8	1 per bedroom + 1 per 2 apts	3	96	36	132
	2 bed	17							42.5			
	3 bed	19							66.5			
Apts	1 bed	59	185	1 per 5 units	37	1 per 10 units	18.5	1 per bedroom + 1 per 2 apts	88.5	320	128	448
	2 bed	119							297.5			
	3 bed	7							24.5			
Creche	5 staff, 50 children			1 per 5 staff	1	1 per 10 children	5			0	14	14
Public Open Space /Visitors	Case-by-case basis									0	40	40
TOTAL			223		46		28		523	416	218	634

Figure 2.5 – Extract Darmody Architects Bicycle Parking Schedule

2.32 The ***Sustainable Urban Housing Design Standards for New Apartments*** therefore requires the minimum provision of 523 Bicycle Parking Spaces, and 624 Spaces are provided on the site (416 Long Stay Residential Spaces and 218 Short Term Visitor Spaces). The development therefore exceeds the requirements of the ***Sustainable Urban Housing Design Standards for New Apartments*** in term of Bicycle Parking provision. Cycle parking for the 51 Residential Houses will be accommodated within the house curtilages, according with normal best practice.

3.0 TRIP GENERATION, ASSIGNMENT & DISTRIBUTION

3.1 The Trip Rate Information Computer System (TRICS) database is ordinarily used to ascertain vehicular trip generation associated with the use of any particular site. This represents industry standard practice for Transportation Assessments in Ireland. In this case the worst case assessment has been undertaken using the licensed version of TRICS.

3.2 A robust and onerous assessment has been undertaken of the impact along the adjacent Local Network, 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 on the important local links). The assessment is undertaken in accordance with the Guidelines in the context of the demonstrably low levels of traffic generated by the proposed development as confirmed herein.

3.3 We have included herein as ***Appendix C*** the TRICS data output for Residential Apartments, Residential Housing & Crèche facilities, upon which the assessment is based. The assessment of Traffic Generated by the site is as set out below as ***Table 3.1***, ***Table 3.2, Table 3.3*** with the total summarised as ***Table 3.4***

Table 3.1 – Traffic Generated by 185 Residential Apartments (PCUs)

185 No. Apartments	Car Arrivals		Car Departures		Total 2-Way Traffic
Network Period	per Apt	Total	per Apt	Total	
AM Peak Hr 8-9am	0.051	10	0.195	36	46
PM Peak Hr 5-6pm	0.177	33	0.086	16	49
24 Hour Day	1.111	206	1.187	220	426

Table 3.2 – Traffic Generated by 51 Houses & 38 Duplexes (PCUs)

51 Houses & 38 Duplexes	Car Arrivals		Car Departures		Total 2-Way Traffic
Network Period	per Unit	Total	per Unit	Total	
AM Peak Hr 8-9am	0.133	12	0.382	34	46
PM Peak Hr 5-6pm	0.352	31	0.180	16	47
24 Hour Day	2.249	200	2.388	207	407

Table 3.3 – Traffic Generated by Crèche Element (PCUs)

275m^2 GFA Crèche	Car Arrivals		Car Departures		Total 2-Way Traffic
Network Period	per 100m^2	Total	per 100m^2	Total	
AM Peak Hr 8-9am	3.396	9	2.806	8	17
PM Peak Hr 5-6pm	2.412	7	2.904	8	16
24 Hour Day	16.003	44	15.851	44	88

Table 3.4 – Total Worst Case Traffic Generated by Completed & Occupied Site (PCUs)

Network Period	PCU Arrivals	PCU Departures	2-Way Traffic
AM Peak Hr 8-9am	32	78	109
PM Peak Hr 5-6pm	71	40	111
24 Hour Day	450	470	920

3.4 We have used hand assignment techniques based on the observed patterns, with the worst case traffic as outlined in ***Table 3.4*** above assigned to the roads based on the observed established traffic patterns. The industry 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 5.3 (Travel Demand Projections Table 5.3.2) to establish Selected occupation/opening year 2023 and design year 2038 traffic conditions (15 years following opening) on the local road network.

3.5 The worst case traffic was then applied in order to establish Opening Year and Design Year Traffic Conditions with the entire proposed development in place and fully occupied. This is all included in the calculations included herein as ***Appendix D***.

3.6 It is noteworthy that the ENTIRE subject Development generates a Peak Hour Worst Case Flow of 111 no. 2-Way Car Movements during the Commuter Peak Hour. In simple terms, this equates to slightly more than one car each way every minute – a small volume of vehicular traffic in the context of any road network.

3.7 We have selected an opening year of 2023 as being reasonable and appropriate. However, in our experience, varying the opening year and design year by 1-3 years if required would have no significant impact upon the conclusions of the study. In addition, given the favourable results reported in this study, if required to apply higher background traffic conditions for any reason we would not anticipate any changes whatsoever to the conclusions.

3.8 Traffic growth factors for future year assessments were calculated from data obtained in the industry standard TII Travel Demand Projections Unit 5.3, which provides the recommended method of predicting future year traffic growth on Roads. Calculations of the relevant growth factors are included in ***Table 3.5*** below (based on tabulated 'medium growth' in the SDCC Area).

Table 3.5 - Traffic Growth Rates, TII Travel Demand Projections Unit 5.3

Year	to Year	Table 5.5.1:
2019	2023	1.044
2025	2038	1.078

3.9 It should be noted that any requirement to use different, or higher, growth factors will also have no real implications for the conclusions of the study.

4.0 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 at capacity, or are within but are nearing capacity.

4.3 It should be noted that in cases where the observed traffic flow on any road is low, the effect of the development can have a disproportionate impact (i.e. with low levels of existing traffic the net effect of increased traffic is exacerbated). With the current and predicted traffic characteristics in the area, it is anticipated that the addition of the proposed development traffic, to long established roads 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 the N7 Traffic Conditions, as evidenced from the Threshold Assessment included below.

4.4 We have undertaken the detailed assessment of the impact of the proposed development (Reference ***Appendix D*** Page 3 here-with), and this confirms the Threshold Impact of locally affected junctions as set out below as ***Table 4.1***

Table 4.1 - Threshold Assessment of Development Traffic Impact - TII Guidelines

Relevant Junction	AM Peak (%)	PM Peak (%)	Comment
Mill Rd/Millrace Ave R'Abt	3.6%	5.2%	Junction Assessed
Mill Rd/R120/N7 R'Abt	4.4%	3.4%	Sub 5% Threshold – BUT Junction Assessed for Completeness
N7 Junc #4 Southern R'Abt on R120	2.6%	2.5%	Sub 5% Threshold - No Assessment Reqd
N7 Junc #4 Northern R'Abt on R120	1.6%	1.7%	Sub 5% Threshold - No Assessment Reqd
Traffic Flow on N7 Carriageway	0.18%	0.08%	Sub Threshold (imperceptible) Impact

4.5 It is clear that the scale of the subject application is in all cases sub-threshold in Traffic Impact Terms, meaning that the increases in traffic are negligible and unnoticeable. The impact upon the Mill Road/Millrace Ave Roundabout to the south is slightly in excess of 5%, and so we have included this in further capacity assessment together with the Mill Road/R120 (Avoca) Roundabout for completeness and of course the site access. We have undertaken a detailed assessment of the capacity of all of these junctions using TII-approved software modelling techniques and this is included below.

4.6 We have used the TII-approved computer simulation model ARCADY (Assessment of Roundabout Capacity and Delay) and PiCADY (Priority Intersection Capacity & Delay) to assess the capacity queues and delay at the junctions and in order to confirm that adequate reserve capacity exists in order to accommodate the proposed development traffic in addition to existing flows. The software produces results based on a ratio of flow to capacity (RFC) and 'mean maximum' queue length. An RFC greater that 1.00 indicates that a junction is operating at or above capacity, with 0.85 considered to be the optimum RFC value. The results of the modelling for each junction are summarised and discussed below.

Proposed Site Access to Mill Road

4.7 We have included the effect of the existing Springbank Residential Housing Access opposite in the assessment of the site access capacity (Refer ***Appendix D***, page 4). The results of the PiCADY capacity modelling of the site access junction on Mill Road, with the effect of Springbank included, are summarised as ***Table 4.2***, with the entire models included herein as ***Appendix E***

Table 4.2 - PiCADY Summary Results Priority Controlled Site Access onto Mill Rd

Modelled Scenario	Period Mean Max Q (PCUs)	Period Max RFC
2023 Opening Year AM Peak	<1	0.22
2023 Opening Year PM Peak	<1	0.11
2038 Design Year AM Peak	<1	0.25
2038 Design Year PM Peak	<1	0.12

4.8 All of the Capacity Output Results Above are well below the recommended RFC of 0.85 (85% Capacity) and therefore no problems whatsoever are anticipated at the Proposed Junction in terms of Capacity or any significant vehicle Queue. This clearly confirms that a priority junction has more than adequate capacity to accommodate the proposed development traffic.

Existing Mill Road/Millrace Ave Roundabout

4.9 The results of the ARCADY capacity modelling of the established Roundabout junction on Mill Road at Millrace Ave, are summarised as ***Table 4.3***, with the entire models included herein as ***Appendix F***

Table 4.3; - ARCADY Summary Results - Mill Rd/Millrace Ave Roundabout

Modelled Scenario	Period Mean Max Q (PCUs)	Period Max RFC
2023 Opening Year AM Peak	<1	0.38
2023 Opening Year PM Peak	<1	0.44
2038 Design Year AM Peak	<1	0.44
2038 Design Year PM Peak	<1	0.52

4.10 All of the Capacity Output Results Above are well below the recommended RFC of 0.85 (85% Capacity) and therefore no problems whatsoever are anticipated at the established roundabout Junction in terms of Capacity or any significant vehicle Queuing.

Existing Mill Rd/R120 ('Avoca') Roundabout

4.11 The results of the ARCADY capacity modelling of the established Roundabout junction on Mill Road at the R120 (Avoca), are summarised as ***Table 4.4***, with the entire models included herein as ***Appendix G.***

Table 4.4; - ARCADY Summary Results - Mill Rd/R120 (Avoca) Roundabout

Modelled Scenario	Period Mean Max Q (PCUs)	Period Max RFC
2023 Opening Year AM Peak	2	0.66
2023 Opening Year PM Peak	2	0.71
2038 Design Year AM Peak	4	0.81
2038 Design Year PM Peak	3	0.76

4.12 All of the Capacity Output Results Above are below the recommended RFC of 0.85 (85% Capacity) and therefore no problems whatsoever are anticipated at the established roundabout Junction in terms of Capacity or any significant vehicle Queuing.

4.13 The analysis undertaken, with the subject development in place and fully occupied, confirms that there is more than 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.

5.0 RESPONSE TO MATTERS RAISED BY SDCC (REFER ABP OPINION)

5.1 This section sets out the response to matters raised by SDCC Roads/Transportation Department as outlined within the ABP Opinion and attachments. We have included below extracts from the SDCC Report, Summary Issues under the heading "Parking and Access". We include individual numbered items below for ease of reference together with the Design Team response.

> 1. That the existing Permission SD13A/0221EP for a housing development on lands located immediately to the south of the subject site be taken into consideration within the overall design of the proposed development. In particular it is proposed to provide a parallel vehicular access off the Mill Road ('Primary access road') very close to the permitted access street. This anomaly needs to be addressed by the applicant as SDCC are concerned about two access roads in such close proximity to each other. The provision of an integrated area plan for the entire RES-N lands will address this.

Figure 5.1 – SDCC Item #1

Item 1 – Response

5.2 This item was discussed and explained to SDCC during the pre-application discussion and meetings, in order to clear up the misunderstanding. In the preparation of the layout and design of the access, the adjacent permission was considered carefully, in order to ensure that there was no conflict between the permitted and the proposed. We include below an annotated extract from the Further Information Drawings **submitted with the application SD13A/0221**, again presented for ease of reference.

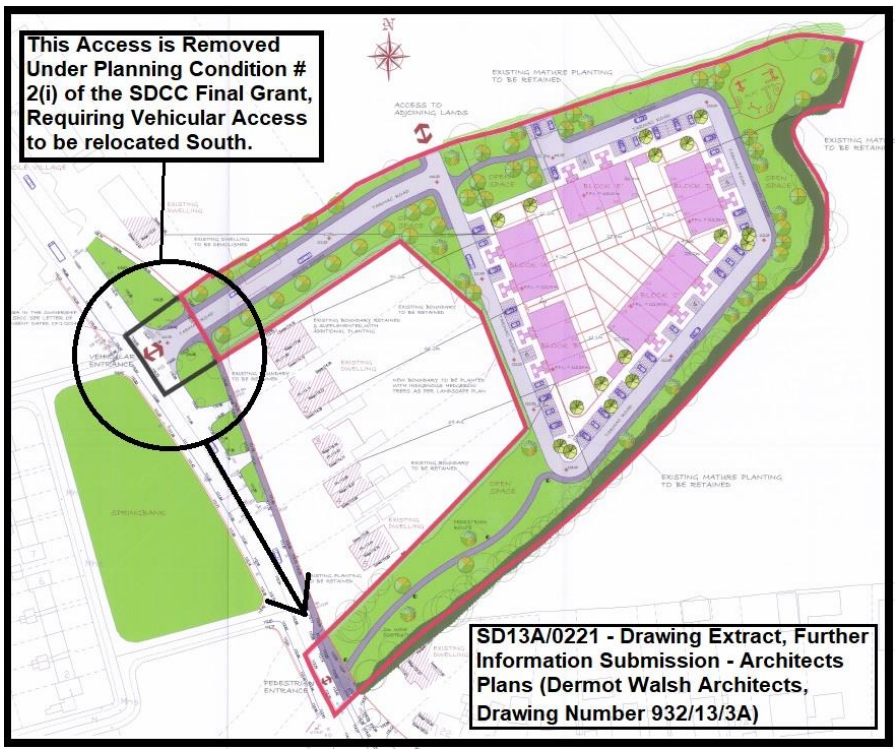

Figure 5.2 – Annotated Drawing Extract (SD13A/0221)

5.3 Within the SDCC Final Grant of planning permission, Condition #2(i) has been **overwritten on the Footer of the SDCC Headed Paper**, and it **makes it somewhat less legible**, which may in-part explain the confusion. Whilst it is less legible in printed form at A4, on 'zooming in' on a soft copy pdf, the condition clearly states:

> ***"Relocation of the northern most vehicular entrance and it's relocation to the south western strip and the incorporation of pedestrian facilities to this vehicular entrance"***

5.4 So, the access referred to under Item #1 of the SDCC Report has clearly been relocated by SDCC under the above quoted SDCC Planning Condition. Under these circumstances there is no conflict whatsoever between the applicant's proposed layout and the adjacent permission SD13A/0221.

2. All streets are 6.0m wide as detailed on the submitted drawings. This allows turning room in front of perpendicular parking bays. However, some of the links could be designed as shared surface Homezones to comply with DMURS recommendations. Generally, a clear hierarchy of streets is required showing the intended main link streets, back streets and Homezones for this phase and the adjoining RES-N lands. It is noted that the applicant has included a potential future access to the east (into Citywest Golf Club). The applicant is required to fully explain the rationale for this proposal, having regard to the current OS land use zoning and established golf course use. If it is intended to link through the existing City West campus, as notated on the site layout plan, street alignment, widths and connections to and through the campus should form part of the area plan/ masterplan. Cycling and pedestrian permeability should form part of the area plan clearly indicating key destinations. There are several raised Tables at key junctions to lower traffic speed. Autotrack analyses have been carried out for Fire tender/ Refuse Vehicles access.

Figure 5.3 – SDCC Item #2

Item 2 – Response

5.5 The internal layout of the development has been arranged to be consistent with both the principles & 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 by the entire Design Team, and moreover the scheme has been subject to a DMURS review, which is included as ***Appendix J***.

5.6 Following the Pre-App meeting and discussion a new amended link is provided through the Citywest Campus to link to the LUAS Station at Fortunestown Lane. This link consists of a National Cycle Manual compliant 2-way cycle lane together with an adjacent footpath. Whilst also providing connectivity to the LUAS, it also provided clear access to the facilities & services to the east of Citywest Campus.

3. Pedestrian and Cycling Access: Footpaths need to be a minimum width of 2.0m wide and the cycling routes need to be a minimum of 1.5m wide. Investigations should take place regarding the potential for two-way cycling through the Citywest Campus towards the Saggart Luas Stop.

Figure 5.4 – SDCC Item #3

Item 3 – Response

5.7 Footpaths and cycle lanes meet and exceed these requirements. Furthermore, a dedicated 2-way cycle lane and pedestrian link through the Citywest Campus is now provided.

4. The nearest Luas Stop is stated to be 1.5km from the site. However, measuring from Google Maps the distance is 1.6km from where the proposed access road joins Mill Road to the Luas stop, which would mean that the distance will be greater from the interior of the site. (Approximately 18 minutes-walk away).

Figure 5.5 – SDCC Item #4

Item 4 – Response

5.8 The subsequent provision of the dedicated safe direct route through the site results in the LUAS now being within approximately 1km walk or cycle distance of the development.

5. There is bus stop immediately adjacent to the proposed site with moderate services.

Figure 5.6 – SDCC Item #5

Item 5 – Response

5.9 The current bus services provide for additional alternative modes of travel, which supplement the LUAS accessibility. All of the alternative travel modes are outlined in the Preliminary MMP included as ***Appendix I***.

6. The location is a semi-peripheral urban location.

Figure 5.7 – SDCC Item #6

Item 6 – Response

5.10 We disagree – the development on appropriately zoned lands, is highly accessible and is within a developing growing residential area.

7. A fully developed Mobility Management Plan needs to be agreed with SDCC which encourages the use of Public Transport and Active Travel at the development.

Figure 5.8 – SDCC Item #7

Item 7 – Response

5.11 A preliminary MMP has been prepared and is included as Appendix I. It should be recognised that a Travel Plan/Mobility Management Plan prepared at planning

application stage, when the development is un-built and unoccupied, can only highlight the current and proposed Alternative Transport initiatives in place at the site, and set out the applicant's commitment to the promotion of sustainable transport measures. It is intended that a working MMP will be prepared following completion and occupation in the event of a grant of planning permission.

8. The ***Traffic and Transport Assessment*** submitted has demonstrated that the proposed development will not have a significant impact on the surrounding Road Network. The RFC values at the Mill road/R120 and Mill road/Millrace Avenue roundabouts do not exceed 0.85 and therefore there is sufficient capacity and there will be **minimal** queuing at peak times. TII should be consulted regarding the capacity of Junction 4 off the N7 and traffic tailing back onto the N7 currently.

Figure 5.9 – SDCC Item #8

Item 8 – Response

5.12 The comprehensive TA undertaken demonstrates the very low impact upon the N7 Junction #4 and associated intersections. All impacts (refer Appendix D) are well below the TII Guideline-recommended threshold level of 5% which require further interrogation. As we understand it, TII are a statutory consultee on applications of this nature, and of course as a policy TII do not entertain discussion or consultation with commercial parties preparing planning applications.

9. ***Car Parking:*** The car parking provision is as follows: Residential Element = 287no. spaces. This is split into 259 no. for the residents and 28no. for visitor spaces. This equates to a residential Parking ratio of 0.94. This parking allocation is considered a little high and 20no. to 30no. spaces could be removed from the Duplex and Apartment allocations. The Housing parking should remain unchanged. The total Creche set Down Spaces = 6 spaces.

Figure 5.10 – SDCC Item #9

Item 9 – Response

5.13 We believe the level of car parking provided is appropriate, and an assessment of provision is included within the main body of this TA Report within Section 2.0.

10. ***Bicycle Parking:*** Using the Apartment guidance there are 393no. bedrooms in the Duplex and Apartment blocks. In theory, the minimum bicycle provision is: 393no. resident spaces and 223/2 = 111no. visitor spaces. This makes a total of 504no. spaces. It is intended to provide 518no. bicycle parking spaces at the development. These will be located in bicycle stores and Sheffield Stands for the visitor spaces. Roads recommend all the visitor spaces to be covered to protect bikes form inclement weather.

Figure 5.11 – SDCC Item #10

Item 10 – Response

5.14 We believe the level of bicycle parking provided is appropriate, and an assessment of bicycle provision is included within the main body of this TA Report. We would highlight that the provision of visitor bicycle parking by way of traditional Sheffield Stands represents normal and best practice.

6.0 CONCLUSIONS

6.1 This Transportation Assessment Report assesses the traffic & transportation impact of the proposal to construct and occupy a residential development on the subject site at Mill Road, Saggart, Co Dublin.

6.2 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.

6.3 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 in late 2019. The proposed road serving the site from Mill Road has been designed to accommodate and facilitate future access to the overall Citywest Campus, with the site layout designed to ensure strict adherence to DMURS. The analysis clearly demonstrates that the proposed priority controlled access will have more than adequate capacity to accommodate the traffic generated by the development.

6.4 The proposed development site is ideally located within the heart of Saggart, close to a wide range of amenities, and will therefore benefit from access to non-car modes of travel.

6.5 Car and Bicycle Parking is being provided in compliance with the requirements of 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. In terms of car parking provision, the per-unit Ratio of 0.98 is consistent with recent ABP permissions on sites in close proximity to the subject lands.

6.6 An independent Road Safety Audit of the Access Design and internal layout is included as ***Appendix H*** to this Report. The assessment includes a Preliminary Mobility Management Plan (MMP or Travel Plan) for the site which is included as a separate report as ***Appendix I***. We have also prepared a Statement of Consistency with DMURS and confirm that the internal layout is compliant with the requirements of DMURS and this is included and appended as ***Appendix J***

6.7 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.

6.8 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 & Access Arrangement
B	Recent Traffic Survey Data Output
C	TRICS Trip Generation Output (Residential Housing & Apartments)
D	Traffic Surveys, Trip Distribution & Network Traffic Flow Diagrams
E	PiCADY Junction Simulation Model Output – Mill Rd Site Access
F	ARCADY Junction Model Output – Established Mill Rd/Millrace Roundabout
G	ARCADY Junction Model Output – Established Mill Rd/R120 Roundabout
H	Independent Stage 1 Road Safety Audit & Designer Feedback Form
I	Preliminary Mobility Management Plan (Travel Plan)
J	DMURS Statement of Consistency

APPENDIX A

Proposed Development
Layout & Access Arrangement

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 Darmody Architects drawing 00-00-00 Proposed Site Plan received 06/12/21. NRB Consulting Engineers Ltd shall not be liable for any inaccuracies or deficiencies.

REV	DATE	AMENDMENTS	DRAWN	CHK	APP

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Client

Project: Mill Road SHD, Rathcoole

Title: Proposed Development General Arrangement

Project No.: 20-053

Drawing No.: NRB-TA-001

Drawn: PB

Checked: ER 06/12/21

Approved: ER 06/12/21

Date: 6-Dec-21

Scale @ A3: 1:1000

Rev: C

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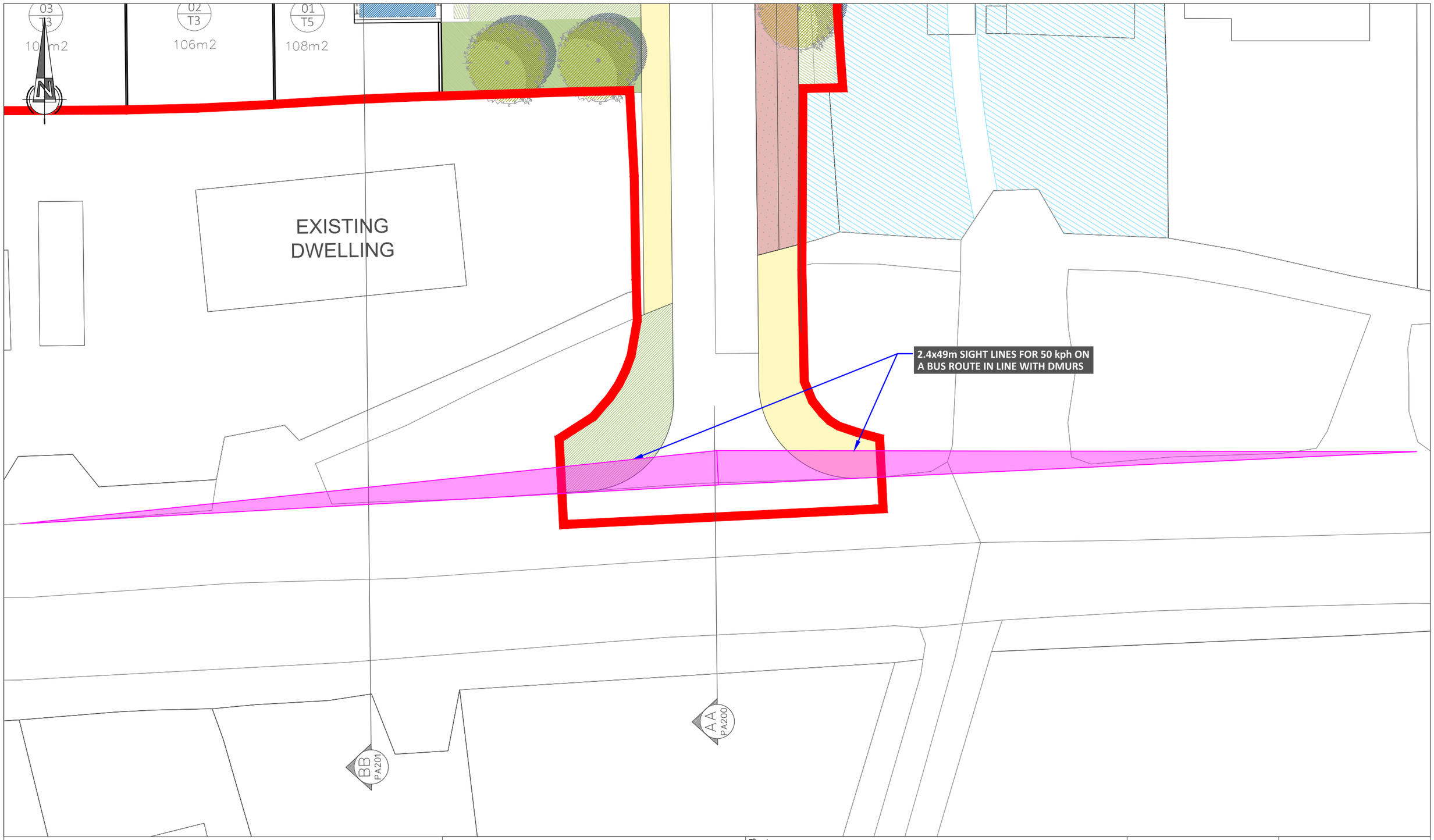
Purpose of Issue: ☐ Draft ☐ Information ☐ Approval ☐ As Built ☐ Tender ☐ Construction



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Client

Project: Mill Road SHD
Rathcoole

Title: Proposed Development
Access Sight Lines

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Project No.	Drawing No.
20-053	NRB-TA-002

Drawn	Checked	Approved
PB	ER 06/12/21	ER 06/12/21

Date	Scale @ A3	Rev
6-Dec-21	1:250	C

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

MURRAY & ASSOCIATES LANDSCAPE MASTERPLAN

COMMUNAL AMI
SPACE 210sqm

Block A
no. units

Block A
MUNAL
SPACE
ays) sqm

POS 03
0.034 ha

POS 01
0.174ha

E-CAR

E-CAR

Bin & Bike Store - Block A
48no. secure Bike Spaces

Duplex Block B

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

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

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Client

Project: Mill Road SHD
Rathcoole

Title: AutoTRACKs of a Refuse Vehicle within the Development 1 of 2

Project No.: 20-053

Drawing No.: NRB-TA-003

Drawn: PB

Checked: ER 06/12/21

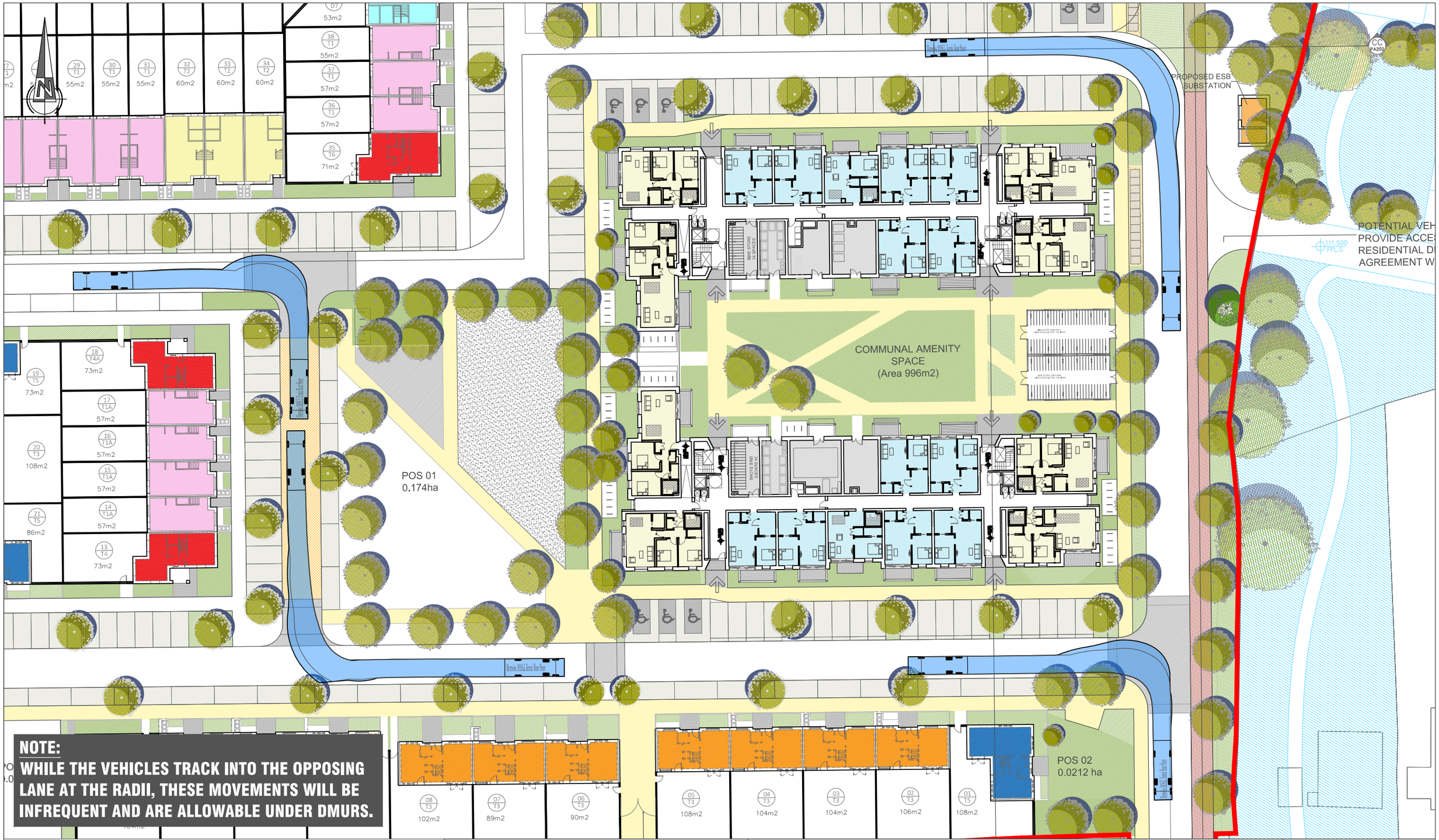
Approved: ER 06/12/21

Date: 6-Dec-21

Scale @ A3: 1:500

Rev: C

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.

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Client

Project: Mill Road SHD
Rathcoole

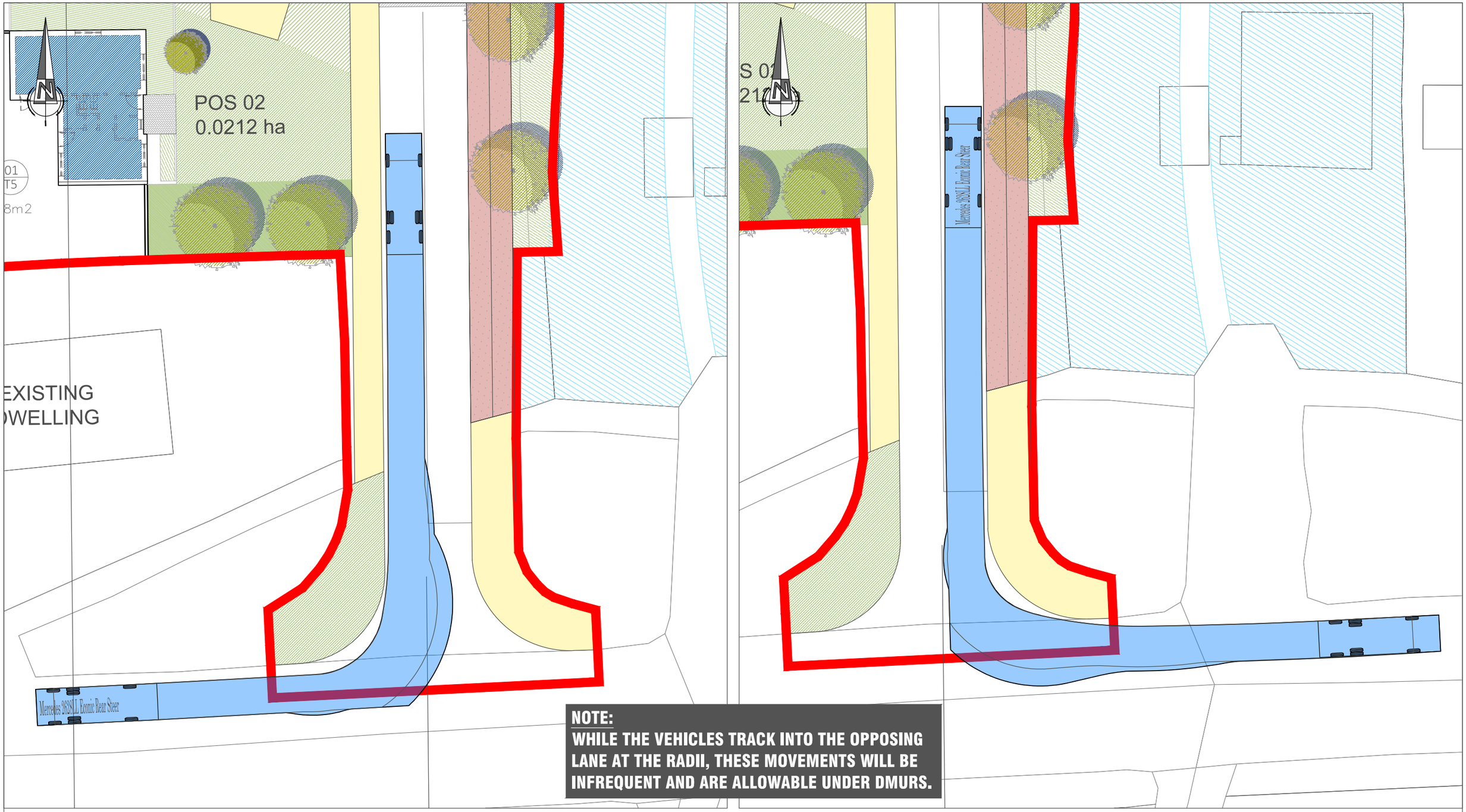
Title: AutoTRACKs of a Refuse Vehicle within the Development 2 of 2

Project No.	Drawing No.
20-053	NRB-TA-004

Drawn	Checked	Approved
PB	ER 06/12/21	ER 06/12/21

Date	Scale @ A3	Rev
6-Dec-21	1:500	C

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.

AUTOTRACK OF A REFUSE VEHICLE ENTERING AT THE PROPOSED ACCESS

AUTOTRACK OF A REFUSE VEHICLE EXITING AT THE PROPOSED ACCESS

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 Darmody Architects drawing 00-00-00 Proposed Site Plan received 06/12/21. NRB Consulting Engineers Ltd shall not be liable for any inaccuracies or deficiencies.

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Client		Project No. 20-053	Drawing No. NRB-TA-005
Project	Mill Road SHD Rathcoole	Drawn PB / Checked ER 06/12/21	Approved ER 06/12/21
Title	AutoTRACKs of a Refuse Vehicle at the Development Access	Date 6-Dec-21	Scale @ A3 1:250 / Rev C

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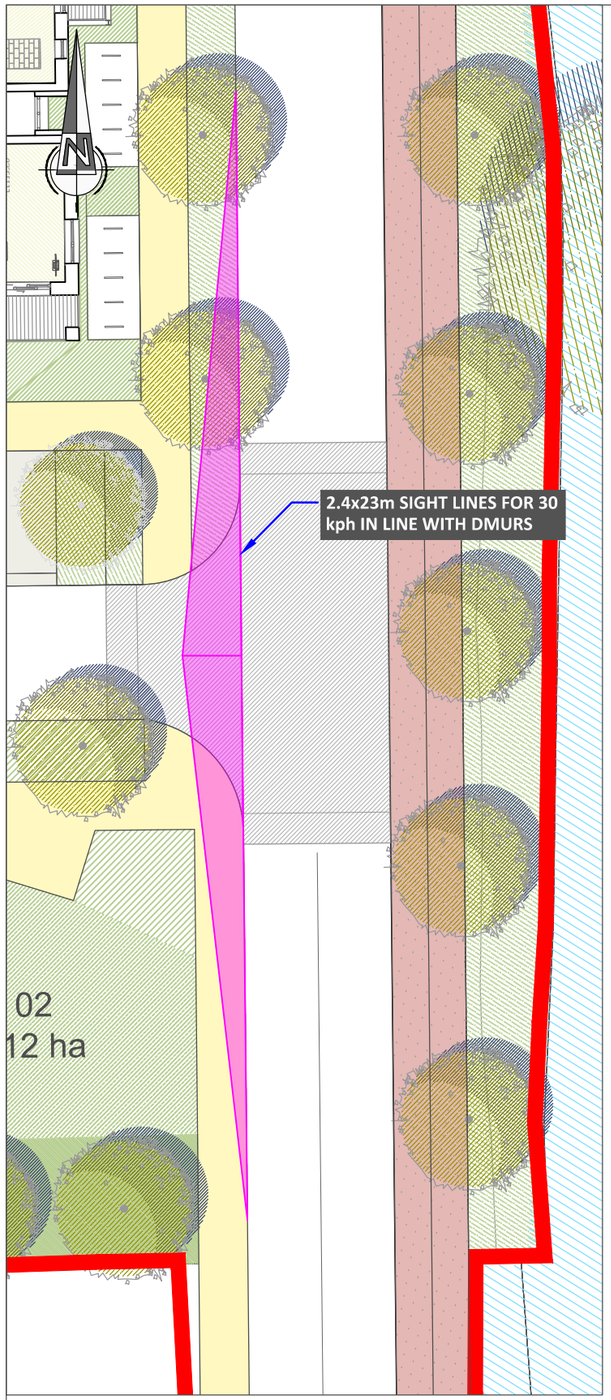
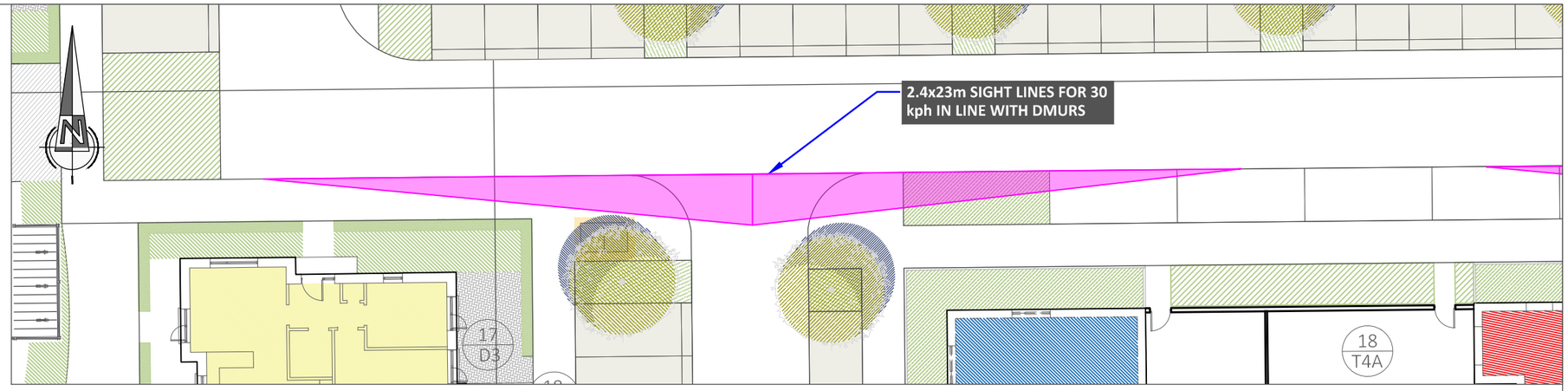
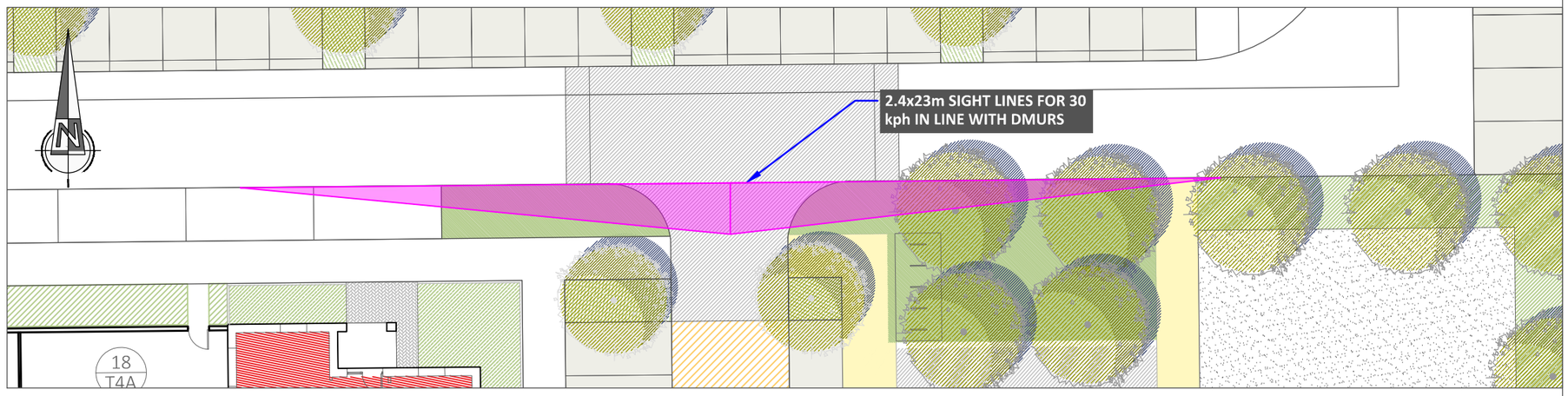
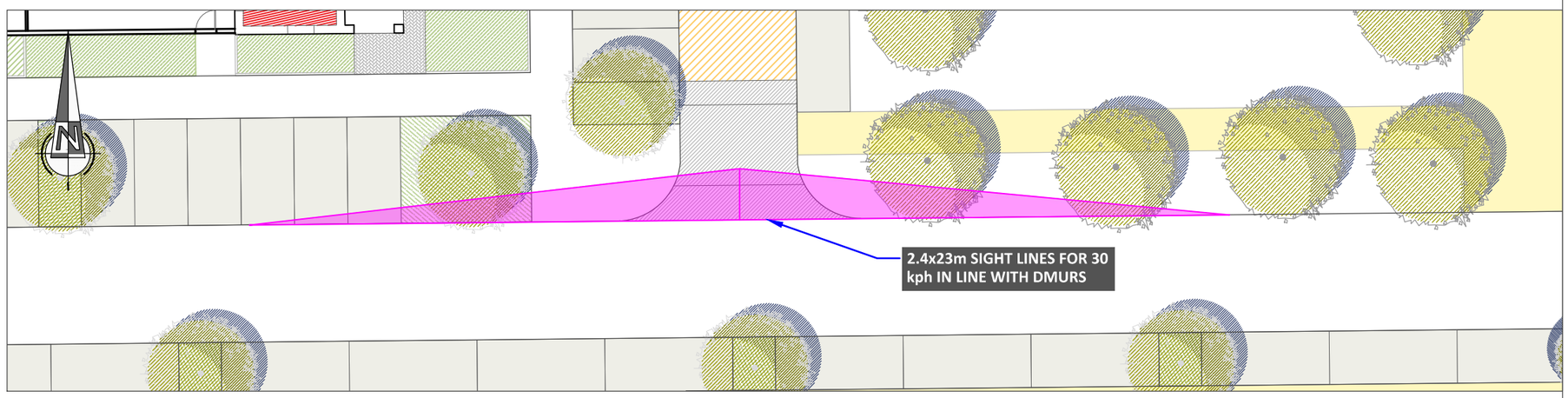
Purpose of Issue: ☐ Draft ☐ Information ☐ Approval ☐ As Built ☐ Tender ☐ Construction









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Client

Project: Mill Road SHD
Rathcoole

Title: Sight Lines at Internal Junctions

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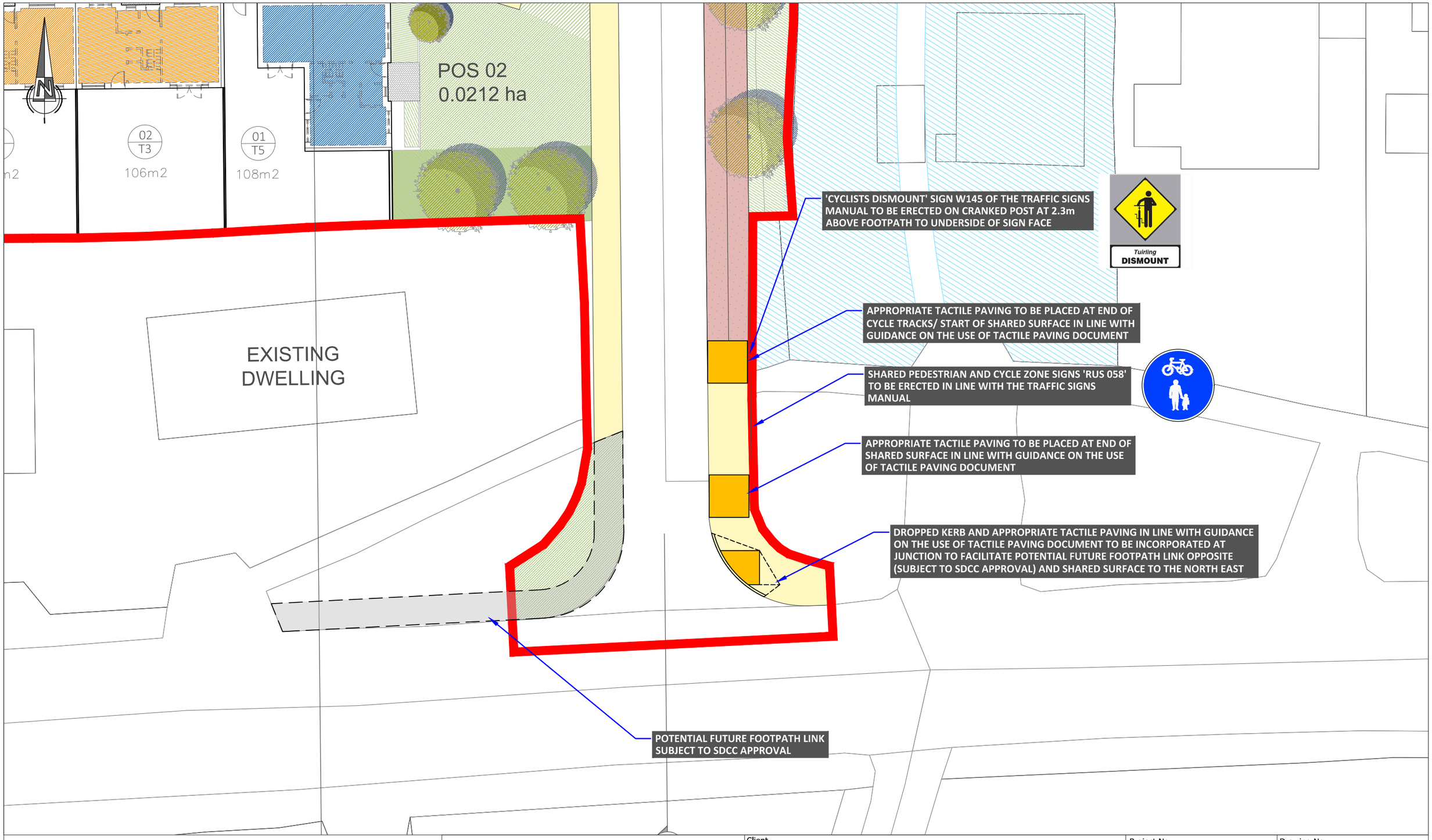
Project No.	Drawing No.
20-053	NRB-TA-006

Drawn	Checked	Approved
PB	ER 06/12/21	ER 06/12/21

Date	Scale @ A3	Rev
7-Dec-21	1:250	C

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



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Client

Project: Mill Road SHD
Rathcoole

Title: RSA Response
Item 3.4

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Project No.	Drawing No.
20-053	NRB-RSA-001

Drawn	Checked	Approved
PB	ER 06/12/21	ER 06/12/21

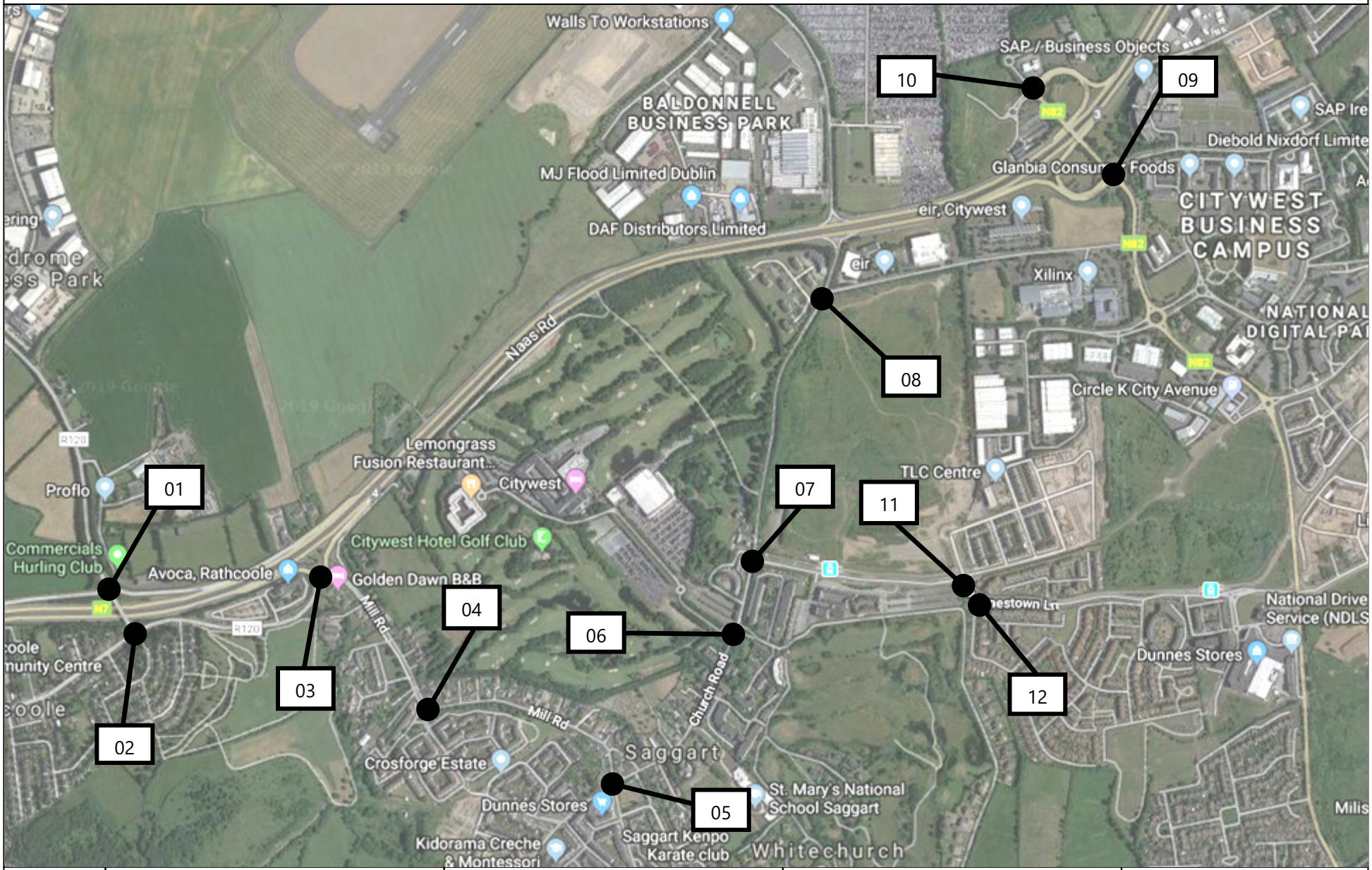
Date	Scale @ A3	Rev
6-Dec-21	1:250	-

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

APPENDIX B

Recent Traffic Survey Data Output

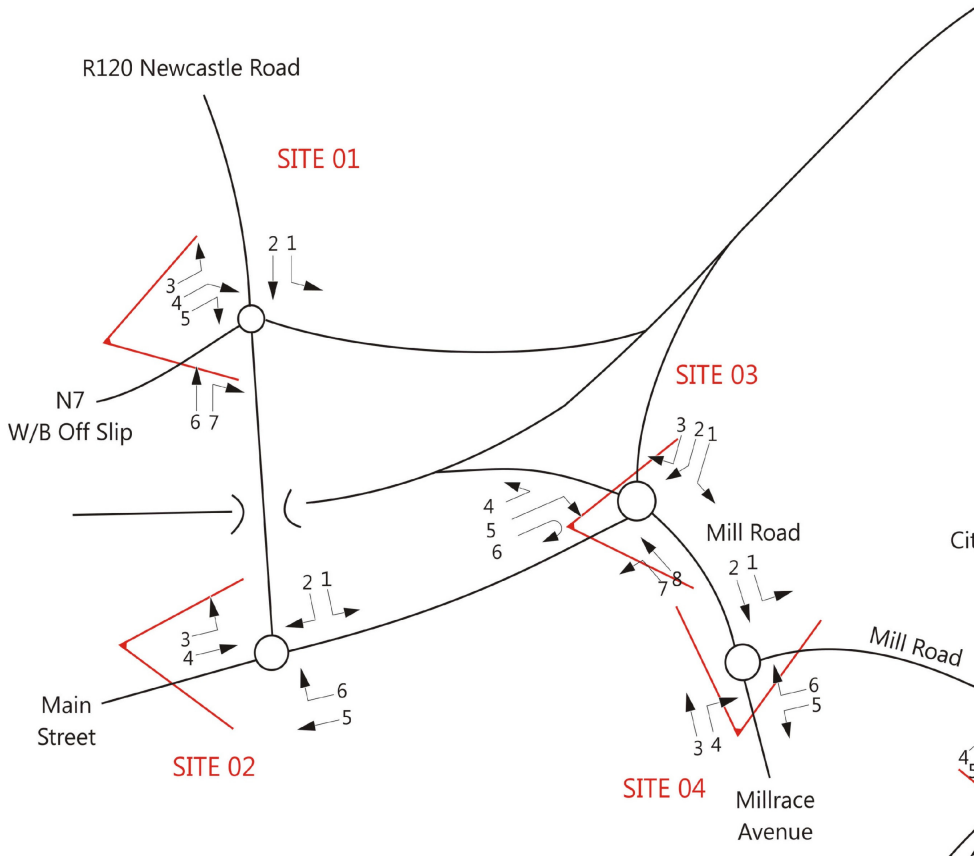
Citywest/Rathcoole Traffic Survey Site Locations



	Job number: TRA/19/259	Job Date: Friday 22nd November 2019	Drawing No: TRA/19/259-01
	Client: NRB Consulting Engineers		Traffic Survey Locations

traffinomics.ie

Site & Turning Count Movement Numbering



TRAFFINOMICS LIMITED

CITYWEST/RATHCOOLE TRAFFIC COUNTS **NOVEMBER 2019**

MANUAL CLASSIFIED JUNCTION TURNING COUNTS **TRA/19/259**

SITE: 01 DATE: 22nd November 2019

LOCATION: R120 Newcastle Road/N7 E/B Slips DAY: Friday

	MOVEMENT 1								MOVEMENT 2							
TIME	**PCL**	**MCL**	**CAR**	**LGV**	**HGV**	**BUS**	**TOT**	**PCU**	**PCL**	**MCL**	**CAR**	**LGV**	**HGV**	**BUS**	**TOT**	**PCU**
07:00	0	0	34	7	14	0	55	69	0	0	37	10	10	2	59	71
07:15	0	0	41	10	18	0	69	87	0	0	31	9	6	1	47	54
07:30	0	0	47	22	26	1	96	123	0	0	35	11	12	2	60	74
07:45	0	0	68	9	8	0	85	93	0	0	41	17	13	1	72	86
H/TOT	0	0	190	48	66	1	305	372	0	0	144	47	41	6	238	285
08:00	0	0	76	19	18	0	113	131	0	0	50	11	6	1	68	75
08:15	0	0	66	12	17	0	95	112	0	0	42	10	6	1	59	66
08:30	0	0	47	22	15	0	84	99	0	0	43	17	5	0	65	70
08:45	1	0	77	24	22	0	124	145	0	0	50	20	7	1	78	86
H/TOT	1	0	266	77	72	0	416	487	0	0	185	58	24	3	270	297
09:00	0	0	49	31	21	1	102	124	0	0	51	13	7	0	71	78
09:15	0	0	61	24	20	1	106	127	0	0	53	12	8	2	75	85
09:30	1	0	50	33	29	1	114	143	0	0	49	16	12	2	79	93
09:45	0	0	45	32	24	0	101	125	0	0	51	15	9	0	75	84
H/TOT	1	0	205	120	94	3	423	519	0	0	204	56	36	4	300	340
10:00	0	1	49	41	20	0	111	130	0	0	48	16	9	0	73	82
10:15	0	0	47	39	28	0	114	142	0	0	37	14	14	1	66	81
10:30	0	0	52	31	21	0	104	125	0	0	53	16	9	0	78	87
10:45	0	0	49	25	25	0	99	124	1	0	47	11	10	0	69	78
H/TOT	0	1	197	136	94	0	428	521	1	0	185	57	42	1	286	328
11:00	0	0	39	28	24	0	91	115	0	0	32	19	12	0	63	75
11:15	0	0	51	30	32	1	114	147	0	0	42	5	9	0	56	65
11:30	0	0	41	37	29	1	108	138	0	0	49	19	8	2	78	88
11:45	0	0	51	34	28	0	113	141	0	0	48	12	8	0	68	76
H/TOT	0	0	182	129	113	2	426	541	0	0	171	55	37	2	265	304
12:00	0	0	55	25	28	0	108	136	0	0	55	9	11	0	75	86
12:15	0	0	74	27	27	0	128	155	0	0	56	7	5	0	68	73
12:30	0	0	54	35	20	0	109	129	0	0	53	13	3	0	69	72
12:45	0	1	49	16	17	0	83	99	1	0	66	21	9	1	98	107
H/TOT	0	1	232	103	92	0	428	519	1	0	230	50	28	1	310	338

TRAFFINOMICS LIMITED

CITYWEST/RATHCOOLE TRAFFIC COUNTS **NOVEMBER 2019**

MANUAL CLASSIFIED JUNCTION TURNING COUNTS **TRA/19/259**

SITE: 01 DATE: 22nd November 2019

LOCATION: R120 Newcastle Road/N7 E/B Slips DAY: Friday

	MOVEMENT 1								MOVEMENT 2							
TIME	PCL	MCL	CAR	LGV	HGV	BUS	TOT	PCU	PCL	MCL	CAR	LGV	HGV	BUS	TOT	PCU
13:00	0	0	52	21	12	0	85	97	0	0	96	16	8	0	120	128
13:15	0	0	47	38	22	0	107	129	0	0	52	19	7	0	78	85
13:30	0	0	55	21	19	0	95	114	0	1	76	14	5	0	96	100
13:45	0	0	75	29	23	0	127	150	1	0	57	7	8	0	73	80
H/TOT	0	0	229	109	76	0	414	490	1	1	281	56	28	0	367	394
14:00	0	1	72	27	19	0	119	137	0	1	63	15	5	0	84	88
14:15	0	0	67	23	18	0	108	126	0	0	59	17	8	0	84	92
14:30	0	0	50	33	20	0	103	123	0	0	67	8	9	0	84	93
14:45	0	0	55	31	23	0	109	132	1	0	59	19	16	1	96	112
H/TOT	0	1	244	114	80	0	439	518	1	1	248	59	38	1	348	386
15:00	0	1	79	23	13	1	117	130	2	1	71	9	8	0	91	97
15:15	0	2	79	28	15	0	124	138	0	0	64	13	6	0	83	89
15:30	0	0	70	14	11	0	95	106	0	1	84	11	12	2	110	123
15:45	0	1	72	14	17	0	104	120	1	0	74	21	8	1	105	113
H/TOT	0	4	300	79	56	1	440	495	3	2	293	54	34	3	389	422
16:00	0	1	69	20	12	0	102	113	1	0	95	12	5	2	115	121
16:15	0	0	61	20	4	0	85	89	2	0	63	26	4	0	95	97
16:30	0	1	70	10	7	0	88	94	0	0	85	14	3	0	102	105
16:45	0	0	71	14	4	0	89	93	1	0	58	18	4	0	81	84
H/TOT	0	2	271	64	27	0	364	390	4	0	301	70	16	2	393	408
17:00	0	2	78	12	3	0	95	97	0	1	89	15	4	0	109	112
17:15	0	0	74	4	10	0	88	98	0	0	81	12	5	0	98	103
17:30	0	0	79	8	5	0	92	97	0	0	90	12	4	1	107	112
17:45	0	0	55	5	3	0	63	66	0	0	74	7	6	0	87	93
H/TOT	0	2	286	29	21	0	338	358	0	1	334	46	19	1	401	420
18:00	0	0	54	7	5	0	66	71	0	0	68	9	2	0	79	81
18:15	0	1	44	6	2	0	53	54	0	0	57	2	6	0	65	71
18:30	0	0	44	6	2	0	52	54	0	0	58	7	3	0	68	71
18:45	0	2	52	5	5	0	64	68	0	0	44	9	2	0	55	57
H/TOT	0	3	194	24	14	0	235	247	0	0	227	27	13	0	267	280
P/TOT	2	14	2796	1032	805	7	4656	5458	11	5	2803	635	356	24	3834	4202.2

TRAFFINOMICS LIMITED

CITYWEST/RATHCOOLE TRAFFIC COUNTS **NOVEMBER 2019**

MANUAL CLASSIFIED JUNCTION TURNING COUNTS **TRA/19/259**

SITE: 01 DATE: 22nd November 2019

LOCATION: R120 Newcastle Road/N7 E/B Slips DAY: Friday

	MOVEMENT 3								MOVEMENT 4								MOVEMENT 5							
TIME	PCL	MCL	CAR	LGV	HGV	BUS	TOT	PCU	PCL	MCL	CAR	LGV	HGV	BUS	TOT	PCU	PCL	MCL	CAR	LGV	HGV	BUS	TOT	PCU
07:00	0	0	38	7	15	0	60	75	0	0	25	3	4	0	32	36	0	0	42	12	7	0	61	68
07:15	0	0	22	10	9	0	41	50	0	0	33	10	1	2	46	49	2	0	30	10	2	0	44	44
07:30	0	0	20	10	10	0	40	50	0	0	24	1	0	0	25	25	0	0	25	10	2	1	38	41
07:45	0	0	36	10	3	0	49	52	0	0	25	4	3	1	33	37	0	0	30	8	0	0	38	38
H/TOT	0	0	116	37	37	0	190	227	0	0	107	18	8	3	136	147	2	0	127	40	11	1	181	191
08:00	0	0	22	4	7	0	33	40	0	1	16	2	4	1	24	28	0	0	27	4	4	1	36	41
08:15	0	0	20	10	11	0	41	52	0	0	7	0	1	0	8	9	0	0	29	9	3	1	42	46
08:30	0	0	35	8	11	0	54	65	0	0	15	4	1	2	22	25	0	0	25	3	8	0	36	44
08:45	0	1	51	9	9	0	70	78	0	0	9	1	2	0	12	14	0	0	37	6	4	0	47	51
H/TOT	0	1	128	31	38	0	198	235	0	1	47	7	8	3	66	76	0	0	118	22	19	2	161	182
09:00	0	0	42	15	9	1	67	77	0	0	8	1	0	0	9	9	0	0	38	8	2	0	48	50
09:15	0	0	39	11	6	0	56	62	0	0	8	2	1	0	11	12	0	0	45	9	3	1	58	62
09:30	0	0	17	6	7	1	31	39	0	0	6	4	0	0	10	10	0	0	29	6	2	0	37	39
09:45	0	0	19	7	11	0	37	48	0	0	5	3	0	0	8	8	1	0	33	5	0	0	39	38
H/TOT	0	0	117	39	33	2	191	226	0	0	27	10	1	0	38	39	1	0	145	28	7	1	182	189
10:00	0	0	14	7	9	0	30	39	0	0	6	2	1	0	9	10	0	0	31	1	3	2	37	42
10:15	0	0	13	7	6	0	26	32	0	0	10	2	1	0	13	14	0	0	29	8	4	0	41	45
10:30	0	0	10	4	5	0	19	24	0	1	2	4	1	0	8	8	0	0	31	4	7	0	42	49
10:45	0	0	4	5	4	0	13	17	0	0	6	3	0	0	9	9	0	0	27	3	0	1	31	32
H/TOT	0	0	41	23	24	0	88	112	0	1	24	11	3	0	39	41	0	0	118	16	14	3	151	168
11:00	0	0	10	6	4	0	20	24	0	0	4	2	0	0	6	6	1	0	34	4	1	0	40	40
11:15	0	0	18	3	5	0	26	31	0	0	4	3	3	1	11	15	1	0	29	3	2	0	35	36
11:30	0	0	5	5	9	0	19	28	0	0	6	2	1	0	9	10	0	0	33	4	1	1	39	41
11:45	0	0	12	5	9	0	26	35	0	0	8	4	1	0	13	14	0	0	23	3	3	0	29	32
H/TOT	0	0	45	19	27	0	91	118	0	0	22	11	5	1	39	45	2	0	119	14	7	1	143	149
12:00	0	0	15	6	6	0	27	33	0	0	9	1	2	0	12	14	0	0	42	3	1	0	46	47
12:15	0	0	11	5	7	0	23	30	0	0	3	4	2	0	9	11	0	0	40	7	2	0	49	51
12:30	0	0	15	2	4	0	21	25	0	0	5	0	0	0	5	5	0	0	50	3	1	0	54	55
12:45	0	0	14	6	8	0	28	36	0	0	6	4	0	0	10	10	0	0	35	3	0	0	38	38
H/TOT	0	0	55	19	25	0	99	124	0	0	23	9	4	0	36	40	0	0	167	16	4	0	187	191

TRAFFINOMICS LIMITED

CITYWEST/RATHCOOLE TRAFFIC COUNTS **NOVEMBER 2019**

MANUAL CLASSIFIED JUNCTION TURNING COUNTS **TRA/19/259**

SITE: 01 DATE: 22nd November 2019

LOCATION: R120 Newcastle Road/N7 E/B Slips DAY: Friday

	MOVEMENT 3								MOVEMENT 4								MOVEMENT 5							
TIME	PCL	MCL	CAR	LGV	HGV	BUS	TOT	PCU	PCL	MCL	CAR	LGV	HGV	BUS	TOT	PCU	PCL	MCL	CAR	LGV	HGV	BUS	TOT	PCU
13:00	0	0	16	4	10	0	30	40	0	0	13	2	1	0	16	17	0	0	43	8	4	0	55	59
13:15	0	0	14	6	10	0	30	40	0	0	3	1	0	0	4	4	0	0	36	5	1	0	42	43
13:30	0	0	23	11	12	0	46	58	0	0	4	5	1	0	10	11	0	0	31	10	5	1	47	53
13:45	0	0	21	10	7	0	38	45	0	0	7	2	0	0	9	9	0	0	35	2	1	0	38	39
H/TOT	0	0	74	31	39	0	144	183	0	0	27	10	2	0	39	41	0	0	145	25	11	1	182	194
14:00	0	0	13	11	5	3	32	40	0	0	11	0	1	0	12	13	3	0	43	4	2	1	53	54
14:15	0	0	18	6	14	0	38	52	0	0	5	4	1	0	10	11	1	0	42	8	2	0	53	54
14:30	0	0	18	3	5	0	26	31	0	0	8	2	1	0	11	12	1	0	50	6	7	1	65	72
14:45	0	0	22	5	6	0	33	39	0	0	8	1	1	1	11	13	0	0	29	6	0	0	35	35
H/TOT	0	0	71	25	30	3	129	162	0	0	32	7	4	1	44	49	5	0	164	24	11	2	206	215
15:00	0	0	17	4	5	0	26	31	0	0	6	3	0	0	9	9	0	1	41	3	4	1	50	54
15:15	0	0	19	5	7	0	31	38	0	0	5	3	0	0	8	8	0	0	56	1	1	1	59	61
15:30	0	0	13	6	6	1	26	33	0	0	9	3	0	1	13	14	1	0	47	2	1	2	53	55
15:45	0	0	16	8	11	2	37	50	0	0	4	4	2	0	10	12	1	0	48	13	3	1	66	69
H/TOT	0	0	65	23	29	3	120	152	0	0	24	13	2	1	40	43	2	1	192	19	9	5	228	240
16:00	0	0	19	8	2	0	29	31	0	0	15	0	2	0	17	19	1	0	56	6	3	0	66	68
16:15	0	0	10	6	5	0	21	26	0	0	17	0	0	0	17	17	0	0	50	9	1	0	60	61
16:30	0	0	13	4	14	0	31	45	0	0	15	4	0	0	19	19	0	0	49	6	2	0	57	59
16:45	0	0	9	4	9	0	22	31	0	0	10	2	0	0	12	12	0	1	38	7	0	0	46	45
H/TOT	0	0	51	22	30	0	103	133	0	0	57	6	2	0	65	67	1	1	193	28	6	0	229	234
17:00	0	0	11	3	3	0	17	20	0	0	22	2	0	0	24	24	0	0	65	12	1	0	78	79
17:15	0	0	17	2	5	0	24	29	0	0	9	4	0	0	13	13	1	0	53	5	4	0	63	66
17:30	0	0	13	3	2	0	18	20	0	0	10	1	0	0	11	11	1	1	14	13	0	0	29	28
17:45	0	0	21	4	4	0	29	33	0	0	3	0	0	0	3	3	0	0	39	3	3	0	45	48
H/TOT	0	0	62	12	14	0	88	102	0	0	44	7	0	0	51	51	2	1	171	33	8	0	215	221
18:00	0	0	10	3	7	0	20	27	0	0	3	0	0	0	3	3	2	0	32	5	4	0	43	45
18:15	0	0	7	2	4	0	13	17	0	0	5	0	0	0	5	5	0	0	32	0	0	0	32	32
18:30	0	0	12	1	2	0	15	17	0	0	1	1	0	0	2	2	1	1	30	4	3	1	40	43
18:45	0	0	6	1	3	0	10	13	0	0	4	1	0	0	5	5	0	0	24	1	0	0	25	25
H/TOT	0	0	35	7	16	0	58	74	0	0	13	2	0	0	15	15	3	1	118	10	7	1	140	145
P/TOT	0	1	860	288	342	8	1499	1848.4	0	2	447	111	39	9	608	654.8	18	4	1777	275	114	17	2205	2319.2

TRAFFINOMICS LIMITED

CITYWEST/RATHCOOLE TRAFFIC COUNTS
MANUAL CLASSIFIED JUNCTION TURNING COUNTS

SITE: 01 DATE: 22r

LOCATION: R120 Newcastle Road/N7 E/B Slips DAY:

	MOVEMENT 6								MOVEMENT 7							
TIME	PCL	MCL	CAR	LGV	HGV	BUS	TOT	PCU	PCL	MCL	CAR	LGV	HGV	BUS	TOT	PCU
07:00	0	0	103	29	18	0	150	168	0	0	89	15	0	0	104	104
07:15	0	0	96	30	10	2	138	150	4	0	138	10	2	1	155	155
07:30	1	4	99	34	13	2	153	165	0	2	132	15	2	1	152	154
07:45	0	0	123	48	9	1	181	191	0	0	132	6	1	0	139	140
H/TOT	1	4	421	141	50	5	622	674	4	2	491	46	5	2	550	553
08:00	0	2	118	34	17	1	172	189	2	1	127	17	1	1	149	149
08:15	1	1	130	39	13	1	185	198	0	1	110	25	3	1	140	143
08:30	1	0	125	28	14	2	170	185	0	2	120	12	0	0	134	133
08:45	1	0	133	27	13	0	174	186	0	3	105	2	3	1	114	116
H/TOT	3	3	506	128	57	4	701	758	2	7	462	56	7	3	537	541
09:00	0	1	129	35	23	1	189	212	0	0	96	11	5	0	112	117
09:15	0	0	112	41	21	1	175	197	0	0	87	6	4	0	97	101
09:30	0	1	98	32	38	1	170	208	1	0	70	18	4	2	95	100
09:45	0	2	102	33	20	0	157	176	2	0	94	4	5	0	105	108
H/TOT	0	4	441	141	102	3	691	794	3	0	347	39	18	2	409	427
10:00	0	0	89	33	20	0	142	162	0	0	81	16	2	0	99	101
10:15	0	0	88	40	34	0	162	196	0	0	55	12	3	0	70	73
10:30	0	0	81	26	23	1	131	155	0	1	62	2	4	1	70	74
10:45	0	0	73	38	27	1	139	167	0	0	75	5	6	0	86	92
H/TOT	0	0	331	137	104	2	574	680	0	1	273	35	15	1	325	340
11:00	0	0	68	36	27	1	132	160	0	1	68	16	4	0	89	92
11:15	0	0	88	35	30	1	154	185	0	0	71	9	2	2	84	88
11:30	0	0	67	26	24	0	117	141	0	2	60	5	8	0	75	82
11:45	0	0	68	37	34	0	139	173	0	1	72	7	1	1	82	83
H/TOT	0	0	291	134	115	2	542	659	0	4	271	37	15	3	330	346
12:00	0	0	75	30	30	0	135	165	0	0	65	16	4	0	85	89
12:15	0	0	84	46	25	0	155	180	0	1	61	12	1	0	75	75
12:30	0	0	77	29	27	0	133	160	0	0	65	5	9	0	79	88
12:45	0	0	94	35	25	0	154	179	0	0	63	17	0	0	80	80
H/TOT	0	0	330	140	107	0	577	684	0	1	254	50	14	0	319	332

TRAFFINOMICS LIMITED

CITYWEST/RATHCOOLE TRAFFIC COUNTS
MANUAL CLASSIFIED JUNCTION TURNING COUNTS

SITE: 01 DATE: 22r

LOCATION: R120 Newcastle Road/N7 E/B Slips DAY:

	MOVEMENT 6								MOVEMENT 7							
TIME	PCL	MCL	CAR	LGV	HGV	BUS	TOT	PCU	PCL	MCL	CAR	LGV	HGV	BUS	TOT	PCU
13:00	0	0	96	32	19	0	147	166	0	0	75	13	3	1	92	96
13:15	0	0	111	38	31	0	180	211	0	0	90	11	2	1	104	107
13:30	0	1	101	36	30	1	169	199	0	0	85	11	-9	0	87	78
13:45	0	1	116	35	26	0	178	203	0	0	75	17	4	1	97	102
H/TOT	0	2	424	141	106	1	674	780	0	0	325	52	0	3	380	383
14:00	0	0	94	37	29	1	161	191	0	0	74	8	1	0	83	84
14:15	0	0	86	33	29	3	151	183	0	0	79	4	2	0	85	87
14:30	0	2	105	22	24	0	153	176	0	0	62	16	3	0	81	84
14:45	0	0	107	39	25	1	172	198	0	0	73	2	4	0	79	83
H/TOT	0	2	392	131	107	5	637	748	0	0	288	30	10	0	328	338
15:00	0	1	94	23	25	0	143	167	2	1	87	17	3	1	111	113
15:15	1	0	71	23	24	0	119	142	0	0	81	12	2	1	96	99
15:30	0	0	81	23	15	0	119	134	0	0	61	11	1	1	74	76
15:45	0	3	76	27	15	1	122	136	0	0	84	3	2	1	90	93
H/TOT	1	4	322	96	79	1	503	580	2	1	313	43	8	4	371	381
16:00	0	0	96	28	17	1	142	160	0	0	78	11	1	0	90	91
16:15	0	0	92	24	18	1	135	154	0	0	66	10	0	0	76	76
16:30	0	0	82	25	16	0	123	139	0	0	64	3	2	0	69	71
16:45	1	0	60	16	7	1	85	92	0	0	51	10	1	1	63	65
H/TOT	1	0	330	93	58	3	485	545	0	0	259	34	4	1	298	303
17:00	0	0	94	17	4	1	116	121	0	1	64	8	1	0	74	74
17:15	0	0	97	17	9	1	124	134	0	1	49	7	1	0	58	58
17:30	0	0	83	13	12	0	108	120	0	0	80	0	0	0	80	80
17:45	0	0	106	14	11	0	131	142	0	1	55	3	1	0	60	60
H/TOT	0	0	380	61	36	2	479	517	0	3	248	18	3	0	272	273
18:00	0	0	63	5	6	0	74	80	0	0	60	9	1	0	70	71
18:15	1	0	76	5	13	0	95	107	0	0	75	7	2	0	84	86
18:30	1	0	72	9	7	0	89	95	0	0	63	6	1	1	71	73
18:45	0	0	79	11	10	0	100	110	0	0	55	3	1	1	60	62
H/TOT	2	0	290	30	36	0	358	392	0	0	253	25	5	2	285	292
P/TOT	8	19	4458	1373	957	28	6843	7810.2	11	19	3784	465	104	21	4404	4508.8

TRAFFINOMICS LIMITED

CITYWEST/RATHCOOLE TRAFFIC COUNTS **NOVEMBER 2019**

MANUAL CLASSIFIED JUNCTION TURNING COUNTS **TRA/19/259**

SITE: 02 DATE: 22nd November 2019

LOCATION: R120 Newcastle Road/Rathcoole Main Street DAY: Friday

	MOVEMENT 1								MOVEMENT 2								MOVEMENT 3							
TIME	PCL	MCL	CAR	LGV	HGV	BUS	TOT	PCU	PCL	MCL	CAR	LGV	HGV	BUS	TOT	PCU	PCL	MCL	CAR	LGV	HGV	BUS	TOT	PCU
07:00	0	0	70	21	17	1	109	127	0	0	9	1	0	1	11	12	0	0	95	14	2	0	111	113
07:15	2	0	52	16	8	1	79	86	0	0	9	3	0	0	12	12	2	0	131	9	2	1	145	146
07:30	0	0	50	19	14	3	86	103	0	0	10	2	0	0	12	12	0	3	125	14	3	1	146	148
07:45	0	0	53	17	12	0	82	94	0	0	18	8	1	1	28	30	0	0	124	11	2	0	137	139
H/TOT	2	0	225	73	51	5	356	410	0	0	46	14	1	2	63	66	2	3	475	48	9	2	539	547
08:00	0	0	57	12	10	1	80	91	0	0	20	3	0	1	24	25	2	1	116	13	3	2	137	140
08:15	0	0	45	17	9	1	72	82	0	0	26	2	0	1	29	30	0	0	106	22	1	1	130	132
08:30	0	0	31	14	11	0	56	67	0	0	37	6	2	0	45	47	1	1	106	12	0	2	122	123
08:45	0	0	36	21	8	0	65	73	0	0	51	5	3	1	60	64	0	3	103	5	1	1	113	113
H/TOT	0	0	169	64	38	2	273	313	0	0	134	16	5	3	158	166	3	5	431	52	5	6	502	508
09:00	0	0	51	17	9	0	77	86	0	0	38	4	0	0	42	42	0	0	97	9	1	0	107	108
09:15	0	0	54	12	8	1	75	84	0	0	44	9	3	2	58	63	0	0	82	9	4	0	95	99
09:30	0	0	55	11	13	2	81	96	0	0	23	11	1	0	35	36	0	0	66	10	6	1	83	90
09:45	0	0	48	12	8	0	68	76	1	0	36	8	1	0	46	46	1	0	84	10	3	0	98	100
H/TOT	0	0	208	52	38	3	301	342	1	0	141	32	5	2	181	187	1	0	329	38	14	1	383	397
10:00	0	0	50	8	9	2	69	80	0	0	29	9	3	0	41	44	0	0	93	16	3	0	112	115
10:15	0	0	44	13	16	0	73	89	0	0	22	9	2	1	34	37	0	0	63	23	3	0	89	92
10:30	0	0	46	15	13	0	74	87	0	0	38	5	3	0	46	49	0	0	62	5	1	0	68	69
10:45	1	0	46	7	9	0	63	71	0	0	28	7	1	1	37	39	0	0	74	8	2	0	84	86
H/TOT	1	0	186	43	47	2	279	327	0	0	117	30	9	2	158	169	0	0	292	52	9	0	353	362
11:00	1	0	42	14	11	0	68	78	0	0	24	9	2	0	35	37	0	1	48	14	2	0	65	66
11:15	1	0	49	1	10	0	61	70	0	0	22	7	1	0	30	31	0	0	58	9	3	2	72	77
11:30	0	0	54	17	7	2	80	89	0	0	28	6	2	1	37	40	0	1	39	7	5	0	52	56
11:45	0	0	44	9	8	0	61	69	0	0	27	6	3	0	36	39	0	1	68	9	1	1	80	81
H/TOT	2	0	189	41	36	2	270	306	0	0	101	28	8	1	138	147	0	3	213	39	11	3	269	281
12:00	0	0	58	8	12	0	78	90	0	0	39	4	0	0	43	43	0	0	59	13	2	0	74	76
12:15	0	0	65	7	7	0	79	86	0	0	31	7	0	0	38	38	0	0	58	9	0	0	67	67
12:30	0	0	71	10	4	0	85	89	0	0	32	6	0	0	38	38	0	0	63	7	5	0	75	80
12:45	1	0	69	17	8	1	96	104	0	0	32	7	1	0	40	41	0	0	67	21	1	0	89	90
H/TOT	1	0	263	42	31	1	338	369	0	0	134	24	1	0	159	160	0	0	247	50	8	0	305	313

TRAFFINOMICS LIMITED

CITYWEST/RATHCOOLE TRAFFIC COUNTS **NOVEMBER 2019**

MANUAL CLASSIFIED JUNCTION TURNING COUNTS **TRA/19/259**

SITE: 02 DATE: 22nd November 2019

LOCATION: R120 Newcastle Road/Rathcoole Main Street DAY: Friday

	MOVEMENT 1								MOVEMENT 2								MOVEMENT 3							
TIME	**PCL**	**MCL**	**CAR**	**LGV**	**HGV**	**BUS**	**TOT**	**PCU**	**PCL**	**MCL**	**CAR**	**LGV**	**HGV**	**BUS**	**TOT**	**PCU**	**PCL**	**MCL**	**CAR**	**LGV**	**HGV**	**BUS**	**TOT**	**PCU**
13:00	0	0	82	12	12	0	106	118	0	0	57	12	0	0	69	69	0	0	70	12	1	1	84	86
13:15	0	0	47	13	7	0	67	74	0	0	41	11	1	0	53	54	0	0	90	16	1	0	107	108
13:30	0	0	62	13	9	1	85	95	0	1	45	11	1	0	58	58	0	0	60	20	1	0	81	82
13:45	0	0	63	8	9	0	80	89	1	0	29	1	0	0	31	30	0	0	75	18	1	1	95	97
H/TOT	0	0	254	46	37	1	338	376	1	1	172	35	2	0	211	212	0	0	295	66	4	2	367	373
14:00	3	1	70	12	7	1	94	99	0	0	36	7	0	0	43	43	0	0	66	20	2	0	88	90
14:15	1	0	58	19	9	0	87	95	0	0	43	6	1	0	50	51	0	0	78	9	2	0	89	91
14:30	1	0	64	7	15	1	88	103	0	0	53	7	1	0	61	62	0	0	69	13	3	0	85	88
14:45	0	0	42	20	14	1	77	92	1	0	46	5	2	0	54	55	0	0	83	7	2	1	93	96
H/TOT	5	1	234	58	45	3	346	389	1	0	178	25	4	0	208	211	0	0	296	49	9	1	355	365
15:00	1	1	76	6	10	0	94	103	1	1	36	6	2	1	47	49	1	1	85	14	5	1	107	112
15:15	0	0	69	9	5	0	83	88	0	0	51	5	2	1	59	62	1	0	79	6	1	1	88	89
15:30	1	1	72	10	12	2	98	111	0	0	59	3	1	2	65	68	0	0	56	11	3	1	71	75
15:45	2	0	74	21	10	1	108	117	0	0	48	13	1	1	63	65	0	0	82	2	1	1	86	88
H/TOT	4	2	291	46	37	3	383	419	1	1	194	27	6	5	234	244	2	1	302	33	10	4	352	364
16:00	2	0	96	13	6	2	119	125	0	0	55	5	2	0	62	64	0	0	80	15	4	1	100	105
16:15	2	0	70	24	5	0	101	104	0	0	43	11	0	0	54	54	0	0	77	7	0	0	84	84
16:30	0	0	86	17	4	0	107	111	0	0	48	3	1	0	52	53	0	0	64	4	4	0	72	76
16:45	1	1	60	20	4	0	86	89	0	0	36	5	0	0	41	41	0	0	41	7	0	1	49	50
H/TOT	5	1	312	74	19	2	413	429	0	0	182	24	3	0	209	212	0	0	262	33	8	2	305	315
17:00	0	1	97	23	4	0	125	128	0	0	57	4	1	0	62	63	0	1	62	9	0	0	72	71
17:15	1	0	76	11	9	0	97	105	0	0	58	6	0	0	64	64	0	0	69	8	3	0	80	83
17:30	1	1	59	15	3	0	79	81	0	0	45	10	1	1	57	59	0	0	75	2	0	0	77	77
17:45	0	0	70	6	8	0	84	92	0	0	43	4	1	0	48	49	0	1	56	6	0	0	63	62
H/TOT	2	2	302	55	24	0	385	406	0	0	203	24	3	1	231	235	0	2	262	25	3	0	292	294
18:00	2	0	60	8	5	0	75	78	0	0	40	6	1	0	47	48	0	0	65	7	1	0	73	74
18:15	0	0	54	2	5	0	61	66	0	0	35	0	1	0	36	37	0	0	77	4	1	0	82	83
18:30	1	0	51	7	5	1	65	70	0	1	37	4	1	0	43	43	0	0	65	6	0	0	71	71
18:45	0	0	40	5	2	0	47	49	0	0	28	5	0	0	33	33	0	0	49	5	0	1	55	56
H/TOT	3	0	205	22	17	1	248	264	0	1	140	15	3	0	159	161	0	0	256	22	2	1	281	284
P/TOT	25	6	2838	616	420	25	3930	4351.4	4	3	1742	294	50	16	2109	2170	8	14	3660	507	92	22	4303	4402.2

TRAFFINOMICS LIMITED

CITYWEST/RATHCOOLE TRAFFIC COUNTS **NOVEMBER 2019**

MANUAL CLASSIFIED JUNCTION TURNING COUNTS **TRA/19/259**

SITE: 02 DATE: 22nd November 2019

LOCATION: R120 Newcastle Road/Rathcoole Main Street DAY: Friday

	MOVEMENT 4								MOVEMENT 5								MOVEMENT 6							
TIME	PCL	MCL	CAR	LGV	HGV	BUS	TOT	PCU	PCL	MCL	CAR	LGV	HGV	BUS	TOT	PCU	PCL	MCL	CAR	LGV	HGV	BUS	TOT	PCU
07:00	0	0	54	12	1	2	69	72	0	0	16	5	1	1	23	25	0	0	97	30	16	0	143	159
07:15	2	0	47	4	1	1	55	55	0	1	10	2	1	1	15	16	2	0	103	31	10	2	148	158
07:30	0	0	42	3	0	1	46	47	0	0	24	1	1	0	26	27	1	3	106	35	12	2	159	170
07:45	0	0	30	6	0	1	37	38	0	0	22	5	4	0	31	35	0	0	131	43	8	1	183	192
H/TOT	2	0	173	25	2	5	207	212	0	1	72	13	7	2	95	103	3	3	437	139	46	5	633	680
08:00	2	0	33	1	1	0	37	36	0	0	18	5	2	1	26	29	0	2	129	38	15	0	184	198
08:15	0	0	23	2	1	1	27	29	0	0	35	6	0	2	43	45	1	2	134	42	15	1	195	209
08:30	0	0	44	4	1	0	49	50	0	1	46	2	3	0	52	54	0	1	139	28	14	0	182	195
08:45	0	0	47	1	0	0	48	48	0	0	54	4	3	1	62	66	1	0	135	24	15	0	175	189
H/TOT	2	0	147	8	3	1	161	163	0	1	153	17	8	4	183	194	2	5	537	132	59	1	736	791
09:00	0	0	39	3	0	1	43	44	0	0	42	7	2	1	52	55	0	1	128	37	27	1	194	221
09:15	1	0	38	3	0	0	42	41	0	0	42	6	0	0	48	48	0	0	117	38	21	1	177	199
09:30	0	0	45	5	1	0	51	52	0	0	31	7	0	1	39	40	1	1	102	40	36	2	182	219
09:45	0	0	37	1	2	0	40	42	0	0	52	11	1	0	64	65	1	2	112	27	22	0	164	184
H/TOT	1	0	159	12	3	1	176	179	0	0	167	31	3	2	203	208	2	4	459	142	106	4	717	823
10:00	0	0	28	5	2	0	35	37	0	0	36	6	1	1	44	46	0	0	77	33	19	0	129	148
10:15	0	0	35	3	2	0	40	42	0	0	39	4	1	0	44	45	0	0	80	29	34	0	143	177
10:30	0	0	30	4	0	1	35	36	0	0	48	4	0	0	52	52	0	1	81	23	26	2	133	160
10:45	0	0	17	1	0	0	18	18	0	0	35	6	3	0	44	47	0	0	74	35	31	1	141	173
H/TOT	0	0	110	13	4	1	128	133	0	0	158	20	5	1	184	190	0	1	312	120	110	3	546	658
11:00	0	0	28	4	1	0	33	34	0	0	47	6	1	1	55	57	0	0	88	38	29	1	156	186
11:15	0	0	33	9	0	0	42	42	0	0	42	3	2	0	47	49	0	0	101	35	29	1	166	196
11:30	0	0	27	4	2	1	34	37	0	0	36	6	1	0	43	44	0	1	88	24	27	0	140	166
11:45	0	0	25	1	2	0	28	30	1	0	63	2	1	1	68	69	0	0	72	35	34	0	141	175
H/TOT	0	0	113	18	5	1	137	143	1	0	188	17	5	2	213	219	0	1	349	132	119	2	603	723
12:00	0	0	39	4	1	0	44	45	0	0	48	4	1	0	53	54	0	0	81	33	32	0	146	178
12:15	0	0	37	3	1	0	41	42	0	0	48	7	1	0	56	57	0	1	87	49	26	0	163	188
12:30	0	0	24	0	0	1	25	26	0	0	54	10	2	0	66	68	0	0	79	27	31	0	137	168
12:45	0	0	34	3	0	0	37	37	0	0	49	6	1	0	56	57	0	0	90	31	24	0	145	169
H/TOT	0	0	134	10	2	1	147	150	0	0	199	27	5	0	231	236	0	1	337	140	113	0	591	703

TRAFFINOMICS LIMITED

CITYWEST/RATHCOOLE TRAFFIC COUNTS **NOVEMBER 2019**

MANUAL CLASSIFIED JUNCTION TURNING COUNTS **TRA/19/259**

SITE: 02 DATE: 22nd November 2019

LOCATION: R120 Newcastle Road/Rathcoole Main Street DAY: Friday

	MOVEMENT 4								MOVEMENT 5								MOVEMENT 6							
TIME	PCL	MCL	CAR	LGV	HGV	BUS	TOT	PCU	PCL	MCL	CAR	LGV	HGV	BUS	TOT	PCU	PCL	MCL	CAR	LGV	HGV	BUS	TOT	PCU
13:00	0	0	39	2	1	0	42	43	0	0	59	5	0	1	65	66	0	0	101	33	21	0	155	176
13:15	0	0	32	6	0	1	39	40	0	0	56	2	1	0	59	60	0	0	111	33	32	1	177	210
13:30	0	0	27	1	1	1	30	32	0	0	58	12	1	0	71	72	0	1	126	27	20	1	175	195
13:45	0	0	43	4	2	1	50	53	0	0	63	8	1	0	72	73	0	1	116	34	29	0	180	208
H/TOT	0	0	141	13	4	3	161	168	0	0	236	27	3	1	267	271	0	2	454	127	102	2	687	790
14:00	0	0	34	1	0	0	35	35	0	0	53	12	1	0	66	67	0	0	102	25	28	1	156	185
14:15	0	0	27	3	0	1	31	32	0	0	65	6	1	3	75	79	0	0	87	28	29	3	147	179
14:30	0	0	28	2	0	1	31	32	0	0	61	6	2	0	69	71	0	2	98	25	24	0	149	172
14:45	0	0	61	0	0	0	61	61	0	0	68	4	1	0	73	74	0	0	97	34	27	0	158	185
H/TOT	0	0	150	6	0	2	158	160	0	0	247	28	5	3	283	291	0	2	384	112	108	4	610	721
15:00	0	0	56	4	0	0	60	60	0	1	67	8	0	1	77	77	1	1	96	26	23	0	147	169
15:15	0	0	36	1	0	0	37	37	0	0	81	11	2	1	95	98	0	0	73	29	25	0	127	152
15:30	0	0	33	0	0	2	35	37	1	0	85	4	3	0	93	95	0	0	86	23	13	0	122	135
15:45	0	0	73	5	0	2	80	82	1	0	69	6	1	1	78	79	0	3	78	28	16	1	126	141
H/TOT	0	0	198	10	0	4	212	216	2	1	302	29	6	3	343	350	1	4	333	106	77	1	522	597
16:00	0	0	53	0	0	0	53	53	0	0	58	8	1	1	68	70	0	0	94	24	14	0	132	146
16:15	0	0	27	1	0	0	28	28	0	1	80	7	0	0	88	87	0	0	81	27	18	1	127	146
16:30	0	0	33	3	0	0	36	36	0	0	86	5	0	0	91	91	0	0	82	24	14	0	120	134
16:45	0	1	27	3	0	0	31	30	0	2	78	13	1	1	95	96	1	0	70	19	8	1	99	107
H/TOT	0	1	140	7	0	0	148	147	0	3	302	33	2	2	342	344	1	0	327	94	54	2	478	533
17:00	0	0	45	4	0	0	49	49	0	0	101	6	1	0	108	109	0	0	96	16	5	1	118	124
17:15	0	0	50	2	0	0	52	52	0	0	82	6	1	0	89	90	0	1	77	16	7	1	102	109
17:30	0	0	35	3	0	0	38	38	0	0	80	10	1	3	94	98	0	0	88	11	12	0	111	123
17:45	0	0	34	2	0	1	37	38	0	0	89	10	2	0	101	103	0	0	105	11	12	0	128	140
H/TOT	0	0	164	11	0	1	176	177	0	0	352	32	5	3	392	400	0	1	366	54	36	2	459	496
18:00	0	0	36	1	0	0	37	37	0	0	89	7	0	0	96	96	0	0	58	7	6	0	71	77
18:15	0	0	45	0	0	0	45	45	0	1	63	10	1	1	76	77	1	0	74	8	14	0	97	110
18:30	0	0	32	1	2	1	36	39	0	1	69	5	0	1	76	76	1	0	70	9	8	1	89	97
18:45	0	0	29	1	0	0	30	30	0	0	92	6	1	0	99	100	0	0	85	9	11	0	105	116
H/TOT	0	0	142	3	2	1	148	151	0	2	313	28	2	2	347	350	2	0	287	33	39	1	362	400
P/TOT	5	1	1771	136	25	21	1959	2000.4	3	8	2689	302	56	25	3083	3156.8	11	24	4582	1331	969	27	6944	7916.8

TRAFFINOMICS LIMITED

CITYWEST/RATHCOOLE TRAFFIC COUNTS **NOVEMBER 2019**

MANUAL CLASSIFIED JUNCTION TURNING COUNTS **TRA/19/259**

SITE: 03 DATE: 22nd November 2019

LOCATION: R120 Newcastle Road/N7 W/B Slips/Mill Road DAY: Friday

	MOVEMENT 1								MOVEMENT 2								MOVEMENT 3							
TIME	PCL	MCL	CAR	LGV	HGV	BUS	TOT	PCU	PCL	MCL	CAR	LGV	HGV	BUS	TOT	PCU	PCL	MCL	CAR	LGV	HGV	BUS	TOT	PCU
07:00	0	0	1	0	0	0	1	1	0	0	64	21	13	1	99	113	0	0	0	0	0	0	0	0
07:15	0	0	1	0	0	0	1	1	0	0	65	29	10	2	106	118	0	0	0	0	0	0	0	0
07:30	0	0	2	1	0	0	3	3	0	3	85	27	10	1	126	135	0	0	0	0	0	0	0	0
07:45	0	0	3	1	0	0	4	4	0	0	107	38	9	0	154	163	0	0	0	0	0	0	0	0
H/TOT	0	0	7	2	0	0	9	9	0	3	321	115	42	4	485	529	0	0	0	0	0	0	0	0
08:00	0	0	5	2	0	0	7	7	0	2	108	33	15	0	158	172	0	0	1	0	0	0	1	1
08:15	0	0	6	1	1	0	8	9	0	1	120	34	15	0	170	184	0	0	0	0	0	0	0	0
08:30	0	0	0	1	0	0	1	1	0	1	101	22	18	0	142	159	0	0	2	0	1	0	3	4
08:45	0	0	2	0	1	0	3	4	0	0	131	21	14	0	166	180	0	0	0	0	0	0	0	0
H/TOT	0	0	13	4	2	0	19	21	0	4	460	110	62	0	636	696	0	0	3	0	1	0	4	5
09:00	0	0	5	1	0	0	6	6	0	0	102	31	28	1	162	191	0	0	0	0	2	0	2	4
09:15	0	0	5	1	0	0	6	6	0	0	100	34	18	2	154	174	0	0	0	0	0	0	0	0
09:30	0	0	5	1	0	0	6	6	0	0	92	29	33	0	154	187	0	0	0	0	0	0	0	0
09:45	0	0	2	3	1	1	7	9	0	2	114	33	19	0	168	186	0	0	0	0	0	0	0	0
H/TOT	0	0	17	6	1	1	25	27	0	2	408	127	98	3	638	738	0	0	0	0	2	0	2	4
10:00	0	0	3	0	1	0	4	5	0	0	93	32	22	0	147	169	0	0	0	0	0	0	0	0
10:15	0	0	4	1	0	0	5	5	0	0	84	29	31	0	144	175	0	0	0	0	0	0	0	0
10:30	0	0	9	2	0	0	11	11	0	1	101	20	27	1	150	177	0	0	0	0	0	0	0	0
10:45	0	0	2	3	0	0	5	5	0	0	95	30	24	1	150	175	0	0	0	0	0	0	0	0
H/TOT	0	0	18	6	1	0	25	26	0	1	373	111	104	2	591	696	0	0	0	0	0	0	0	0
11:00	0	0	4	0	0	0	4	4	0	0	91	35	25	1	152	178	0	0	0	0	0	0	0	0
11:15	0	0	2	2	0	0	4	4	0	0	101	28	30	1	160	191	0	0	0	0	0	0	0	0
11:30	0	0	8	0	0	0	8	8	0	0	94	23	24	0	141	165	0	0	0	0	0	0	0	0
11:45	0	0	6	0	3	0	9	12	0	0	105	29	33	0	167	200	0	0	1	0	0	0	1	1
H/TOT	0	0	20	2	3	0	25	28	0	0	391	115	112	2	620	734	0	0	1	0	0	0	1	1
12:00	0	0	9	2	0	0	11	11	0	0	100	30	30	0	160	190	0	0	1	0	0	0	1	1
12:15	0	0	4	1	0	0	5	5	0	0	117	51	30	0	198	228	0	0	0	0	0	0	0	0
12:30	0	0	2	0	2	0	4	6	1	0	114	32	29	0	176	204	0	0	0	0	0	0	0	0
12:45	0	0	6	2	2	0	10	12	0	0	121	36	21	0	178	199	0	0	0	0	0	0	0	0
H/TOT	0	0	21	5	4	0	30	34	1	0	452	149	110	0	712	821	0	0	1	0	0	0	1	1

TRAFFINOMICS LIMITED

CITYWEST/RATHCOOLE TRAFFIC COUNTS **NOVEMBER 2019**

MANUAL CLASSIFIED JUNCTION TURNING COUNTS **TRA/19/259**

SITE: 03 DATE: 22nd November 2019

LOCATION: R120 Newcastle Road/N7 W/B Slips/Mill Road DAY: Friday

	MOVEMENT 1								MOVEMENT 2								MOVEMENT 3							
TIME	PCL	MCL	CAR	LGV	HGV	BUS	TOT	PCU	PCL	MCL	CAR	LGV	HGV	BUS	TOT	PCU	PCL	MCL	CAR	LGV	HGV	BUS	TOT	PCU
13:00	0	0	10	1	0	0	11	11	0	0	125	32	25	0	182	207	0	0	0	0	0	0	0	0
13:15	0	0	5	0	0	0	5	5	0	0	123	31	27	0	181	208	0	0	0	0	0	0	0	0
13:30	0	0	8	1	0	0	9	9	0	0	125	33	22	0	180	202	0	0	0	0	0	0	0	0
13:45	0	0	9	1	0	0	10	10	0	1	130	28	27	0	186	212	0	0	1	0	0	0	1	1
H/TOT	0	0	32	3	0	0	35	35	0	1	503	124	101	0	729	829	0	0	1	0	0	0	1	1
14:00	0	0	10	1	0	0	11	11	0	0	109	37	27	1	174	202	0	0	0	0	0	0	0	0
14:15	0	1	5	2	0	0	8	7	0	0	119	27	30	4	180	214	0	0	1	1	0	0	2	2
14:30	0	0	5	0	1	0	6	7	0	1	98	24	22	0	145	166	0	0	0	0	0	0	0	0
14:45	0	0	5	1	0	0	6	6	0	0	112	27	27	0	166	193	0	0	1	0	0	0	1	1
H/TOT	0	1	25	4	1	0	31	31	0	1	438	115	106	5	665	775	0	0	2	1	0	0	3	3
15:00	0	0	9	1	0	0	10	10	0	1	104	16	16	1	138	154	0	0	0	0	0	0	0	0
15:15	0	0	3	1	0	0	4	4	0	0	88	27	23	0	138	161	0	0	1	0	0	0	1	1
15:30	0	0	4	0	0	0	4	4	0	0	95	22	17	0	134	151	0	0	1	0	0	0	1	1
15:45	0	0	5	1	1	0	7	8	1	4	83	20	17	1	126	141	0	0	0	0	0	0	0	0
H/TOT	0	0	21	3	1	0	25	26	1	5	370	85	73	2	536	607	0	0	2	0	0	0	2	2
16:00	0	0	3	0	0	0	3	3	0	0	97	24	12	2	135	149	0	0	0	0	0	0	0	0
16:15	0	0	7	3	0	1	11	12	0	1	105	23	19	0	148	166	0	0	0	0	0	0	0	0
16:30	0	0	9	0	1	0	10	11	0	0	105	15	11	0	131	142	0	0	0	0	0	0	0	0
16:45	0	0	11	0	0	0	11	11	0	2	107	18	7	1	135	142	0	0	1	0	0	0	1	1
H/TOT	0	0	30	3	1	1	35	37	0	3	414	80	49	3	549	599	0	0	1	0	0	0	1	1
17:00	0	0	12	1	0	0	13	13	0	1	113	19	3	1	137	140	0	0	0	0	0	0	0	0
17:15	0	0	9	0	0	0	9	9	1	1	104	8	7	1	122	129	0	0	0	0	0	0	0	0
17:30	0	0	9	2	0	0	11	11	0	1	109	16	11	2	139	151	0	0	0	0	0	0	0	0
17:45	0	0	12	1	0	0	13	13	1	0	127	10	14	0	152	165	0	0	0	0	0	0	0	0
H/TOT	0	0	42	4	0	0	46	46	2	3	453	53	35	4	550	586	0	0	0	0	0	0	0	0
18:00	0	0	8	1	0	0	9	9	0	0	95	10	5	0	110	115	0	0	0	0	0	0	0	0
18:15	0	0	13	2	0	0	15	15	0	1	90	7	14	0	112	125	0	0	1	0	0	0	1	1
18:30	0	0	8	5	1	0	14	15	0	0	96	7	9	0	112	121	0	0	0	0	0	0	0	0
18:45	0	0	12	0	0	0	12	12	0	0	109	9	11	0	129	140	0	0	0	0	0	0	0	0
H/TOT	0	0	41	8	1	0	50	51	0	1	390	33	39	0	463	501	0	0	1	0	0	0	1	1
P/TOT	0	1	287	50	15	2	355	371.4	4	24	4973	1217	931	25	7174	8112.4	0	0	12	1	3	0	16	19

TRAFFINOMICS LIMITED

CITYWEST/RATHCOOLE TRAFFIC COUNTS **NOVEMBER 2019**

MANUAL CLASSIFIED JUNCTION TURNING COUNTS **TRA/19/259**

SITE: 03 DATE: 22nd November 2019

LOCATION: R120 Newcastle Road/N7 W/B Slips/Mill Road DAY: Friday

	MOVEMENT 4								MOVEMENT 5								MOVEMENT 6							
TIME	PCL	MCL	CAR	LGV	HGV	BUS	TOT	PCU	PCL	MCL	CAR	LGV	HGV	BUS	TOT	PCU	PCL	MCL	CAR	LGV	HGV	BUS	TOT	PCU
07:00	0	0	9	4	12	1	26	39	0	0	122	34	9	1	166	176	0	0	3	2	0	1	6	7
07:15	0	0	6	3	5	1	15	21	3	0	95	16	6	1	121	126	0	0	0	1	0	0	1	1
07:30	0	0	8	5	12	2	27	41	0	0	81	11	2	3	97	102	0	0	0	0	0	0	0	0
07:45	0	0	7	4	10	0	21	31	0	0	81	19	2	0	102	104	0	0	0	1	0	0	1	1
H/TOT	0	0	30	16	39	4	89	132	3	0	379	80	19	5	486	508	0	0	3	4	0	1	8	9
08:00	0	0	8	5	8	0	21	29	2	0	86	10	4	2	104	108	0	0	0	1	0	0	1	1
08:15	0	0	7	4	9	0	20	29	0	0	72	13	0	3	88	91	0	0	0	1	0	0	1	1
08:30	0	0	7	8	12	0	27	39	0	0	72	12	1	0	85	86	0	0	0	0	0	0	0	0
08:45	0	0	6	10	7	0	23	30	0	0	70	11	0	0	81	81	0	0	0	0	0	0	0	0
H/TOT	0	0	28	27	36	0	91	127	2	0	300	46	5	5	358	366	0	0	0	2	0	0	2	2
09:00	0	0	8	10	9	0	27	36	0	0	78	11	1	1	91	93	0	0	6	0	1	0	7	8
09:15	0	0	18	3	7	1	29	37	2	0	69	12	0	0	83	81	0	0	8	1	0	0	9	9
09:30	0	0	16	5	12	0	33	45	0	0	70	11	1	2	84	87	0	0	6	3	1	0	10	11
09:45	0	0	20	8	8	0	36	44	0	0	66	4	4	0	74	78	0	0	13	0	0	0	13	13
H/TOT	0	0	62	26	36	1	125	162	2	0	283	38	6	3	332	339	0	0	33	4	2	0	39	41
10:00	0	0	22	8	8	2	40	50	0	0	49	3	3	0	55	58	0	0	10	1	0	0	11	11
10:15	0	0	16	6	16	0	38	54	0	0	53	9	2	0	64	66	0	0	19	2	0	0	21	21
10:30	0	0	21	10	11	0	42	53	0	0	56	10	0	1	67	68	0	0	18	0	0	0	18	18
10:45	0	0	34	5	8	0	47	55	0	0	40	5	1	0	46	47	0	0	12	0	2	0	14	16
H/TOT	0	0	93	29	43	2	167	212	0	0	198	27	6	1	232	239	0	0	59	3	2	0	64	66
11:00	0	0	21	9	10	0	40	50	0	0	44	9	1	0	54	55	0	0	18	3	2	0	23	25
11:15	0	0	19	3	8	0	30	38	0	0	50	8	2	0	60	62	0	0	26	2	2	0	30	32
11:30	0	0	29	7	3	2	41	46	0	0	62	9	7	1	79	87	0	0	14	1	0	0	15	15
11:45	0	0	28	2	6	0	36	42	0	0	42	6	3	0	51	54	0	0	21	1	0	0	22	22
H/TOT	0	0	97	21	27	2	147	176	0	0	198	32	13	1	244	258	0	0	79	7	4	0	90	94
12:00	0	0	34	2	13	0	49	62	0	0	62	12	2	0	76	78	0	0	20	0	0	0	20	20
12:15	0	0	44	3	5	0	52	57	0	0	75	6	2	0	83	85	0	0	21	2	0	0	23	23
12:30	0	0	33	3	2	0	38	40	0	0	65	6	3	1	75	79	0	0	22	0	0	0	22	22
12:45	0	0	48	11	9	0	68	77	1	0	69	9	0	0	79	78	0	0	16	3	0	0	19	19
H/TOT	0	0	159	19	29	0	207	236	1	0	271	33	7	1	313	320	0	0	79	5	0	0	84	84

TRAFFINOMICS LIMITED

CITYWEST/RATHCOOLE TRAFFIC COUNTS **NOVEMBER 2019**

MANUAL CLASSIFIED JUNCTION TURNING COUNTS **TRA/19/259**

SITE: 03 DATE: 22nd November 2019

LOCATION: R120 Newcastle Road/N7 W/B Slips/Mill Road DAY: Friday

	MOVEMENT 4								MOVEMENT 5								MOVEMENT 6							
TIME	PCL	MCL	CAR	LGV	HGV	BUS	TOT	PCU	PCL	MCL	CAR	LGV	HGV	BUS	TOT	PCU	PCL	MCL	CAR	LGV	HGV	BUS	TOT	PCU
13:00	0	0	48	6	10	0	64	74	0	0	96	6	2	0	104	106	0	0	29	0	0	0	29	29
13:15	0	0	40	7	6	0	53	59	0	0	66	11	1	1	79	81	0	0	27	0	0	0	27	27
13:30	0	0	53	8	7	1	69	77	0	0	61	7	1	1	70	72	0	0	35	0	0	0	35	35
13:45	0	0	60	7	7	0	74	81	1	0	80	7	4	1	93	97	0	0	17	5	1	0	23	24
H/TOT	0	0	201	28	30	1	260	291	1	0	303	31	8	3	346	356	0	0	108	5	1	0	114	115
14:00	0	0	45	6	6	1	58	65	1	1	87	7	1	0	97	97	0	0	23	0	0	0	23	23
14:15	0	0	36	9	9	0	54	63	0	1	69	14	1	1	86	87	0	0	13	1	0	0	14	14
14:30	0	0	37	3	8	1	49	58	0	0	62	9	2	1	74	77	0	0	32	1	0	0	33	33
14:45	0	0	32	11	19	0	62	81	0	0	82	9	1	1	93	95	0	0	16	1	0	0	17	17
H/TOT	0	0	150	29	42	2	223	267	1	2	300	39	5	3	350	356	0	0	84	3	0	0	87	87
15:00	0	0	47	4	8	0	59	67	1	0	94	10	1	0	106	106	0	0	14	2	1	0	17	18
15:15	0	0	45	3	4	0	52	56	0	0	64	7	2	0	73	75	0	0	16	0	0	0	16	16
15:30	0	0	48	10	11	1	70	82	0	1	68	5	1	3	78	81	0	0	20	0	0	0	20	20
15:45	0	1	27	14	7	1	50	57	1	0	110	12	3	2	128	132	0	0	20	1	0	0	21	21
H/TOT	0	1	167	31	30	2	231	262	2	1	336	34	7	5	385	395	0	0	70	3	1	0	74	75
16:00	0	0	55	4	4	0	63	67	1	0	112	8	2	2	125	128	0	0	16	1	0	0	17	17
16:15	0	0	41	12	6	0	59	65	1	0	57	15	1	0	74	74	0	0	16	1	0	0	17	17
16:30	0	0	52	8	3	0	63	66	1	0	79	11	0	0	91	90	0	0	13	0	0	0	13	13
16:45	0	0	26	16	4	0	46	50	1	1	75	7	1	0	85	85	0	0	15	3	0	0	18	18
H/TOT	0	0	174	40	17	0	231	248	4	1	323	41	4	2	375	377	0	0	60	5	0	0	65	65
17:00	0	1	52	13	1	0	67	67	0	0	92	12	1	0	105	106	0	0	18	0	0	0	18	18
17:15	0	0	49	6	8	0	63	71	0	0	104	7	3	0	114	117	0	0	13	0	0	0	13	13
17:30	0	1	40	9	3	0	53	55	0	1	76	5	0	0	82	81	0	0	8	1	0	0	9	9
17:45	0	0	32	5	7	0	44	51	0	0	70	3	2	1	76	79	0	0	17	0	0	0	17	17
H/TOT	0	2	173	33	19	0	227	245	0	1	342	27	6	1	377	383	0	0	56	1	0	0	57	57
18:00	0	0	34	4	3	0	41	44	1	0	78	7	1	0	87	87	0	0	6	1	0	0	7	7
18:15	0	0	29	1	4	0	34	38	0	0	86	1	2	0	89	91	0	0	16	0	0	0	16	16
18:30	0	0	25	2	4	0	31	35	1	0	62	2	2	2	69	72	0	0	10	1	0	0	11	11
18:45	0	0	20	3	3	0	26	29	0	0	55	7	0	0	62	62	1	0	5	0	0	0	6	5
H/TOT	0	0	108	10	14	0	132	146	2	0	281	17	5	2	307	312	1	0	37	2	0	0	40	39
P/TOT	0	3	1442	309	362	14	2130	2504.2	18	5	3514	445	91	32	4105	4210.6	1	0	668	44	10	1	724	734.2

TRAFFINOMICS LIMITED

CITYWEST/RATHCOOLE TRAFFIC COUNTS
MANUAL CLASSIFIED JUNCTION TURNING COUNTS

SITE: 03 DATE: 22r

LOCATION: R120 Newcastle Road/N7 W/B Slips/Mill Road DAY:

	MOVEMENT 7								MOVEMENT 8							
TIME	PCL	MCL	CAR	LGV	HGV	BUS	TOT	PCU	PCL	MCL	CAR	LGV	HGV	BUS	TOT	PCU
07:00	0	0	38	8	1	0	47	48	0	0	6	1	1	0	8	9
07:15	0	0	53	4	1	0	58	59	0	0	9	1	1	0	11	12
07:30	0	0	56	7	6	0	69	75	0	0	12	1	1	0	14	15
07:45	0	0	47	10	1	1	59	61	0	0	8	1	1	0	10	11
H/TOT	0	0	194	29	9	1	233	243	0	0	35	4	4	0	43	47
08:00	0	0	30	12	0	2	44	46	0	0	11	4	0	0	15	15
08:15	1	0	54	12	1	2	70	72	0	0	23	0	1	1	25	27
08:30	0	1	82	14	2	0	99	100	0	0	54	4	0	0	58	58
08:45	0	0	70	12	1	0	83	84	0	0	30	3	0	1	34	35
H/TOT	1	1	236	50	4	4	296	303	0	0	118	11	1	2	132	135
09:00	0	1	66	9	2	0	78	79	0	0	24	1	0	0	25	25
09:15	1	0	64	10	0	0	75	74	0	0	15	3	1	0	19	20
09:30	0	1	54	10	2	3	70	74	0	0	17	2	2	0	21	23
09:45	0	0	48	8	1	0	57	58	0	0	8	0	0	0	8	8
H/TOT	1	2	232	37	5	3	280	286	0	0	64	6	3	0	73	76
10:00	0	0	47	4	1	1	53	55	0	0	6	0	1	0	7	8
10:15	0	0	38	8	2	0	48	50	0	0	4	1	2	0	7	9
10:30	0	0	39	11	1	0	51	52	0	0	13	1	2	0	16	18
10:45	0	0	33	10	8	0	51	59	0	0	8	0	0	0	8	8
H/TOT	0	0	157	33	12	1	203	216	0	0	31	2	5	0	38	43
11:00	0	0	49	11	6	1	67	74	0	0	9	4	1	0	14	15
11:15	0	0	42	6	2	0	50	52	0	0	9	2	1	0	12	13
11:30	0	1	40	6	1	0	48	48	0	0	8	0	0	0	8	8
11:45	0	0	31	7	3	1	42	46	0	0	10	5	0	0	15	15
H/TOT	0	1	162	30	12	2	207	220	0	0	36	11	2	0	49	51
12:00	0	0	48	7	2	0	57	59	0	0	10	4	1	0	15	16
12:15	0	1	44	8	1	0	54	54	0	0	18	0	0	0	18	18
12:30	0	0	49	5	2	0	56	58	0	0	15	1	0	0	16	16
12:45	0	0	47	4	2	0	53	55	0	0	14	2	1	0	17	18
H/TOT	0	1	188	24	7	0	220	226	0	0	57	7	2	0	66	68

TRAFFINOMICS LIMITED

CITYWEST/RATHCOOLE TRAFFIC COUNTS
MANUAL CLASSIFIED JUNCTION TURNING COUNTS

SITE: 03 DATE: 22r

LOCATION: R120 Newcastle Road/N7 W/B Slips/Mill Road DAY:

	MOVEMENT 7								MOVEMENT 8							
TIME	PCL	MCL	CAR	LGV	HGV	BUS	TOT	PCU	PCL	MCL	CAR	LGV	HGV	BUS	TOT	PCU
13:00	0	0	49	5	2	1	57	60	0	0	25	7	1	0	33	34
13:15	0	0	50	6	2	1	59	62	0	0	15	6	0	0	21	21
13:30	0	1	60	9	1	0	71	71	0	0	21	4	1	0	26	27
13:45	0	0	45	6	1	0	52	53	0	0	12	5	1	0	18	19
H/TOT	0	1	204	26	6	2	239	246	0	0	73	22	3	0	98	101
14:00	0	0	62	8	3	0	73	76	0	0	22	4	1	0	27	28
14:15	0	0	51	5	2	1	59	62	0	0	15	4	0	0	19	19
14:30	0	1	56	7	1	0	65	65	0	0	32	4	1	0	37	38
14:45	0	0	50	10	2	0	62	64	0	0	36	8	4	1	49	54
H/TOT	0	1	219	30	8	1	259	267	0	0	105	20	6	1	132	139
15:00	0	0	61	9	4	0	74	78	0	0	33	6	0	0	39	39
15:15	1	0	67	9	2	1	80	82	0	0	25	9	0	1	35	36
15:30	0	0	58	10	1	0	69	70	0	0	50	9	0	0	59	59
15:45	0	0	66	9	1	1	77	79	0	0	22	5	0	0	27	27
H/TOT	1	0	252	37	8	2	300	309	0	0	130	29	0	1	160	161
16:00	0	1	63	9	1	0	74	74	0	0	39	7	2	0	48	50
16:15	0	0	67	16	1	1	85	87	0	0	43	9	1	0	53	54
16:30	1	0	55	8	1	1	66	67	0	0	41	8	0	0	49	49
16:45	0	0	48	9	3	0	60	63	0	0	25	3	1	0	29	30
H/TOT	1	1	233	42	6	2	285	292	0	0	148	27	4	0	179	183
17:00	0	0	75	7	1	0	83	84	0	0	30	4	0	0	34	34
17:15	0	0	51	5	1	1	58	60	0	0	32	5	1	0	38	39
17:30	0	0	57	4	2	0	63	65	0	0	24	6	0	0	30	30
17:45	0	0	68	4	0	0	72	72	0	0	27	4	0	0	31	31
H/TOT	0	0	251	20	4	1	276	281	0	0	113	19	1	0	133	134
18:00	0	0	53	3	1	0	57	58	0	0	23	1	1	0	25	26
18:15	1	0	37	7	1	1	47	48	0	0	21	1	0	0	22	22
18:30	0	0	50	1	0	1	52	53	0	0	20	1	1	0	22	23
18:45	0	0	69	3	0	0	72	72	0	0	17	2	0	0	19	19
H/TOT	1	0	209	14	2	2	228	231	0	0	81	5	2	0	88	90
P/TOT	5	8	2537	372	83	21	3026	3121.2	0	0	991	163	33	4	1191	1228

TRAFFINOMICS LIMITED

CITYWEST/RATHCOOLE TRAFFIC COUNTS **NOVEMBER 2019**

MANUAL CLASSIFIED JUNCTION TURNING COUNTS **TRA/19/259**

SITE: 04 DATE: 22nd November 2019

LOCATION: Mill Road/Millrace Avenue DAY: Friday

	MOVEMENT 1								MOVEMENT 2								MOVEMENT 3							
TIME	PCL	MCL	CAR	LGV	HGV	BUS	TOT	PCU	PCL	MCL	CAR	LGV	HGV	BUS	TOT	PCU	PCL	MCL	CAR	LGV	HGV	BUS	TOT	PCU
07:00	1	0	94	25	8	1	129	137	0	0	2	1	0	0	3	3	0	0	5	0	0	0	5	5
07:15	0	0	87	24	7	1	119	127	0	0	1	1	0	0	2	2	0	0	17	0	0	0	17	17
07:30	0	0	87	13	2	2	104	108	0	0	2	0	0	0	2	2	0	0	15	0	0	0	15	15
07:45	0	0	81	21	2	0	104	106	0	0	0	0	0	0	0	0	0	0	17	0	0	0	17	17
H/TOT	1	0	349	83	19	4	456	478	0	0	5	2	0	0	7	7	0	0	54	0	0	0	54	54
08:00	0	0	78	10	4	2	94	100	0	0	4	1	0	1	6	7	0	0	7	5	0	0	12	12
08:15	3	0	71	11	2	3	90	93	0	0	7	0	0	0	7	7	0	0	24	1	0	0	25	25
08:30	0	0	62	13	2	1	78	81	0	0	7	0	0	0	7	7	0	0	19	2	0	0	21	21
08:45	0	0	61	12	0	0	73	73	0	0	11	0	0	0	11	11	0	0	16	2	0	0	18	18
H/TOT	3	0	272	46	8	6	335	347	0	0	29	1	0	1	31	32	0	0	66	10	0	0	76	76
09:00	0	0	66	10	0	1	77	78	0	0	5	1	0	0	6	6	0	0	10	0	0	0	10	10
09:15	3	0	70	10	1	0	84	83	0	0	6	1	0	0	7	7	0	0	9	1	0	0	10	10
09:30	1	0	63	11	0	1	76	76	0	0	6	1	0	0	7	7	0	0	8	1	0	0	9	9
09:45	0	0	65	8	3	0	76	79	0	0	4	0	1	0	5	6	0	0	5	1	0	0	6	6
H/TOT	4	0	264	39	4	2	313	316	0	0	21	3	1	0	25	26	0	0	32	3	0	0	35	35
10:00	0	0	49	3	4	0	56	60	0	0	3	0	0	0	3	3	0	0	6	1	0	0	7	7
10:15	0	0	52	9	2	0	63	65	0	0	4	2	0	0	6	6	0	0	4	0	0	0	4	4
10:30	0	0	59	11	2	1	73	76	0	0	0	1	0	0	1	1	0	0	3	0	0	0	3	3
10:45	1	0	44	9	0	0	54	53	0	0	2	0	0	0	2	2	0	0	2	1	0	0	3	3
H/TOT	1	0	204	32	8	1	246	254	0	0	9	3	0	0	12	12	0	0	15	2	0	0	17	17
11:00	1	0	44	6	3	0	54	56	0	0	3	1	0	0	4	4	0	0	2	1	0	0	3	3
11:15	1	0	54	10	1	0	66	66	0	0	0	1	0	0	1	1	0	0	2	1	0	0	3	3
11:30	0	0	57	8	5	1	71	77	0	0	3	0	0	0	3	3	0	1	6	0	0	0	7	6
11:45	0	0	44	7	5	0	56	61	0	0	3	0	2	0	5	7	1	0	2	0	0	0	3	2
H/TOT	2	0	199	31	14	1	247	260	0	0	9	2	2	0	13	15	1	1	12	2	0	0	16	15
12:00	0	0	67	11	1	0	79	80	0	0	6	0	0	0	6	6	0	0	4	0	0	0	4	4
12:15	1	0	69	9	3	0	82	84	0	0	5	0	0	0	5	5	1	0	6	1	0	0	8	7
12:30	0	0	70	5	3	0	78	81	0	0	5	0	0	0	5	5	0	0	4	2	0	0	6	6
12:45	1	0	72	7	1	0	81	81	0	0	3	2	0	0	5	5	0	0	3	0	0	0	3	3
H/TOT	2	0	278	32	8	0	320	326	0	0	19	2	0	0	21	21	1	0	17	3	0	0	21	20

TRAFFINOMICS LIMITED

CITYWEST/RATHCOOLE TRAFFIC COUNTS **NOVEMBER 2019**

MANUAL CLASSIFIED JUNCTION TURNING COUNTS **TRA/19/259**

SITE: 04 DATE: 22nd November 2019

LOCATION: Mill Road/Millrace Avenue DAY: Friday

	MOVEMENT 1								MOVEMENT 2								MOVEMENT 3							
TIME	PCL	MCL	CAR	LGV	HGV	BUS	TOT	PCU	PCL	MCL	CAR	LGV	HGV	BUS	TOT	PCU	PCL	MCL	CAR	LGV	HGV	BUS	TOT	PCU
13:00	0	0	95	5	1	1	102	104	0	0	10	0	1	0	11	12	0	0	5	0	0	0	5	5
13:15	2	0	59	12	2	0	75	75	0	0	8	1	0	0	9	9	0	0	8	1	0	0	9	9
13:30	0	0	66	7	1	2	76	79	0	0	5	0	0	0	5	5	0	0	9	1	0	0	10	10
13:45	1	0	82	10	3	0	96	98	0	0	7	1	0	0	8	8	0	0	4	0	1	0	5	6
H/TOT	3	0	302	34	7	3	349	357	0	0	30	2	1	0	33	34	0	0	26	2	1	0	29	30
14:00	2	0	78	7	2	0	89	89	0	0	12	1	0	0	13	13	0	0	3	0	0	0	3	3
14:15	1	1	73	14	1	1	91	92	0	1	3	1	0	0	5	4	0	0	11	1	0	0	12	12
14:30	0	0	69	12	3	1	85	89	0	0	3	0	0	0	3	3	0	0	7	1	0	0	8	8
14:45	0	0	78	9	1	1	89	91	0	0	7	0	0	0	7	7	0	0	6	0	0	0	6	6
H/TOT	3	1	298	42	7	3	354	361	0	1	25	2	0	0	28	27	0	0	27	2	0	0	29	29
15:00	3	0	86	8	1	0	98	97	0	0	13	0	0	0	13	13	2	0	8	2	0	0	12	10
15:15	0	0	63	7	2	0	72	74	0	0	2	0	0	0	2	2	0	0	10	1	0	0	11	11
15:30	1	0	65	5	1	3	75	78	0	0	4	0	0	0	4	4	0	0	16	1	0	0	17	17
15:45	0	0	96	12	4	0	112	116	0	0	16	2	0	0	18	18	0	0	7	1	0	0	8	8
H/TOT	4	0	310	32	8	3	357	365	0	0	35	2	0	0	37	37	2	0	41	5	0	0	48	46
16:00	1	0	80	8	2	2	93	96	0	0	12	0	0	0	12	12	0	0	4	0	0	0	4	4
16:15	1	1	52	15	1	3	73	76	0	0	9	0	0	0	9	9	0	0	3	0	0	0	3	3
16:30	0	0	73	11	1	0	85	86	0	0	12	1	1	0	14	15	0	0	8	1	0	0	9	9
16:45	0	0	71	5	0	0	76	76	0	0	13	1	1	0	15	16	0	0	2	0	1	0	3	4
H/TOT	2	1	276	39	4	5	327	334	0	0	46	2	2	0	50	52	0	0	17	1	1	0	19	20
17:00	1	0	90	11	1	0	103	103	0	0	10	1	0	0	11	11	0	0	3	0	0	0	3	3
17:15	2	0	91	5	2	0	100	100	0	0	9	0	0	0	9	9	0	0	5	0	0	0	5	5
17:30	0	1	71	3	0	0	75	74	0	0	7	1	0	0	8	8	0	0	6	1	0	0	7	7
17:45	0	0	68	5	3	0	76	79	0	0	16	0	0	0	16	16	0	0	11	0	0	0	11	11
H/TOT	3	1	320	24	6	0	354	357	0	0	42	2	0	0	44	44	0	0	25	1	0	0	26	26
18:00	1	0	64	6	1	0	72	72	0	0	17	1	0	0	18	18	0	0	6	1	0	0	7	7
18:15	0	0	82	0	2	0	84	86	0	0	11	1	0	0	12	12	0	0	3	0	0	0	3	3
18:30	1	0	60	5	0	2	68	69	0	0	9	2	1	0	12	13	0	0	8	0	0	0	8	8
18:45	0	0	60	6	0	0	66	66	0	0	9	1	0	0	10	10	0	0	13	0	0	0	13	13
H/TOT	2	0	266	17	3	2	290	293	0	0	46	5	1	0	52	53	0	0	30	1	0	0	31	31
P/TOT	30	3	3338	451	96	30	3948	4048.2	0	1	316	28	7	1	353	360.4	4	1	362	32	2	0	401	399.2

TRAFFINOMICS LIMITED

CITYWEST/RATHCOOLE TRAFFIC COUNTS **NOVEMBER 2019**

MANUAL CLASSIFIED JUNCTION TURNING COUNTS **TRA/19/259**

SITE: 04 DATE: 22nd November 2019

LOCATION: Mill Road/Millrace Avenue DAY: Friday

	MOVEMENT 4								MOVEMENT 5								MOVEMENT 6							
TIME	PCL	MCL	CAR	LGV	HGV	BUS	TOT	PCU	PCL	MCL	CAR	LGV	HGV	BUS	TOT	PCU	PCL	MCL	CAR	LGV	HGV	BUS	TOT	PCU
07:00	0	0	10	2	0	0	12	12	0	0	1	0	0	0	1	1	0	0	33	5	3	1	42	46
07:15	0	0	15	1	0	0	16	16	0	0	2	0	0	0	2	2	2	0	28	3	1	0	34	33
07:30	0	0	8	0	0	0	8	8	0	0	2	0	0	0	2	2	2	0	54	9	6	0	71	75
07:45	0	1	14	0	0	1	16	16	0	0	1	1	0	1	3	4	0	0	36	9	1	3	49	53
H/TOT	0	1	47	3	0	1	52	52	0	0	6	1	0	1	8	9	4	0	151	26	11	4	196	208
08:00	1	0	10	0	0	0	11	10	0	0	0	0	0	0	0	0	0	0	38	7	0	0	45	45
08:15	0	0	20	2	0	1	23	24	0	0	7	1	0	1	9	10	2	0	71	10	2	2	87	89
08:30	0	0	27	1	0	0	28	28	0	0	4	0	0	0	4	4	2	1	118	11	1	0	133	132
08:45	0	0	13	1	0	0	14	14	0	0	7	0	0	0	7	7	1	0	73	7	1	1	83	84
H/TOT	1	0	70	4	0	1	76	76	0	0	18	1	0	1	20	21	5	1	300	35	4	3	348	350
09:00	0	0	5	0	0	0	5	5	0	0	11	0	0	0	11	11	1	1	78	9	2	0	91	92
09:15	0	0	5	1	0	0	6	6	0	0	13	0	0	0	13	13	1	0	65	10	2	1	79	81
09:30	0	0	4	0	0	0	4	4	0	0	8	1	1	0	10	11	1	1	56	11	5	1	75	80
09:45	0	0	6	0	2	0	8	10	0	0	4	1	0	0	5	5	0	0	53	9	2	0	64	66
H/TOT	0	0	20	1	2	0	23	25	0	0	36	2	1	0	39	40	3	2	252	39	11	2	309	318
10:00	0	0	3	0	0	0	3	3	0	0	3	0	0	0	3	3	0	0	41	3	1	1	46	48
10:15	0	0	4	0	0	0	4	4	0	0	2	0	0	0	2	2	0	0	40	8	4	0	52	56
10:30	0	0	4	1	0	0	5	5	0	0	3	0	0	0	3	3	0	0	51	11	3	0	65	68
10:45	0	0	4	0	0	0	4	4	0	0	4	0	0	0	4	4	0	0	40	8	7	0	55	62
H/TOT	0	0	15	1	0	0	16	16	0	0	12	0	0	0	12	12	0	0	172	30	15	1	218	234
11:00	0	0	5	0	0	0	5	5	0	0	3	1	0	0	4	4	1	0	54	13	7	1	76	83
11:15	0	0	2	0	0	0	2	2	0	0	1	0	0	0	1	1	0	0	51	7	3	0	61	64
11:30	0	0	5	0	0	0	5	5	0	0	2	0	0	0	2	2	0	0	38	5	1	0	44	45
11:45	0	0	9	1	1	0	11	12	0	0	4	0	0	0	4	4	0	0	37	11	4	1	53	58
H/TOT	0	0	21	1	1	0	23	24	0	0	10	1	0	0	11	11	1	0	180	36	15	2	234	250
12:00	0	0	5	0	1	0	6	7	0	0	9	0	0	0	9	9	0	0	55	12	0	0	67	67
12:15	0	0	3	0	0	0	3	3	0	0	7	1	0	0	8	8	0	0	56	3	1	0	60	61
12:30	0	0	3	1	0	0	4	4	0	0	7	1	0	0	8	8	0	0	53	6	3	0	62	65
12:45	0	0	2	1	0	0	3	3	0	0	7	1	0	0	8	8	0	0	56	4	2	0	62	64
H/TOT	0	0	13	2	1	0	16	17	0	0	30	3	0	0	33	33	0	0	220	25	6	0	251	257

TRAFFINOMICS LIMITED

CITYWEST/RATHCOOLE TRAFFIC COUNTS **NOVEMBER 2019**

MANUAL CLASSIFIED JUNCTION TURNING COUNTS **TRA/19/259**

SITE: 04 DATE: 22nd November 2019

LOCATION: Mill Road/Millrace Avenue DAY: Friday

	MOVEMENT 4								MOVEMENT 5								MOVEMENT 6							
TIME	PCL	MCL	CAR	LGV	HGV	BUS	TOT	PCU	PCL	MCL	CAR	LGV	HGV	BUS	TOT	PCU	PCL	MCL	CAR	LGV	HGV	BUS	TOT	PCU
13:00	0	0	4	1	0	0	5	5	0	0	4	0	0	0	4	4	0	0	68	8	2	1	79	82
13:15	0	0	9	0	0	0	9	9	0	0	1	0	0	0	1	1	1	0	53	9	2	0	65	66
13:30	0	0	7	1	0	0	8	8	0	0	5	0	0	0	5	5	0	1	75	14	2	0	92	93
13:45	0	0	10	0	0	0	10	10	0	0	10	0	0	0	10	10	0	0	51	8	1	0	60	61
H/TOT	0	0	30	2	0	0	32	32	0	0	20	0	0	0	20	20	1	1	247	39	7	1	296	303
14:00	0	0	8	0	0	0	8	8	0	0	8	0	0	0	8	8	0	0	75	12	5	1	93	99
14:15	0	0	16	0	0	0	16	16	0	0	7	1	0	0	8	8	0	0	67	7	2	1	77	80
14:30	0	0	6	1	0	0	7	7	0	0	8	0	0	0	8	8	0	1	78	12	5	0	96	100
14:45	0	0	6	0	0	0	6	6	0	0	23	0	0	0	23	23	0	0	84	15	4	1	104	109
H/TOT	0	0	36	1	0	0	37	37	0	0	46	1	0	0	47	47	0	1	304	46	16	3	370	388
15:00	0	0	6	0	0	2	8	10	0	0	13	2	0	2	17	19	0	1	76	18	3	0	98	100
15:15	0	0	8	0	0	0	8	8	0	0	15	0	0	0	15	15	1	0	78	15	2	2	98	101
15:30	0	0	6	1	0	0	7	7	0	0	13	1	0	0	14	14	0	0	89	19	1	0	109	110
15:45	0	0	4	0	0	0	4	4	0	0	6	1	0	1	8	9	0	0	92	18	1	0	111	112
H/TOT	0	0	24	1	0	2	27	29	0	0	47	4	0	3	54	57	1	1	335	70	7	2	416	424
16:00	0	0	8	0	0	0	8	8	0	1	11	0	0	0	12	11	0	0	93	17	3	0	113	116
16:15	0	0	9	0	0	0	9	9	0	0	3	1	0	0	4	4	0	0	99	17	2	0	118	120
16:30	0	0	5	0	0	0	5	5	0	0	12	0	0	0	12	12	2	0	85	17	1	1	106	106
16:45	0	0	5	1	1	0	7	8	0	0	11	1	0	0	12	12	0	0	82	14	6	0	102	108
H/TOT	0	0	27	1	1	0	29	30	0	1	37	2	0	0	40	39	2	0	359	65	12	1	439	450
17:00	0	0	6	0	0	0	6	6	0	0	11	0	0	0	11	11	0	0	99	12	1	0	112	113
17:15	0	0	9	0	0	0	9	9	1	0	21	1	0	0	23	22	0	0	76	13	2	1	92	95
17:30	0	0	4	0	0	0	4	4	0	0	5	0	0	0	5	5	0	0	77	10	2	0	89	91
17:45	0	0	8	0	0	0	8	8	0	0	18	1	0	0	19	19	0	0	85	9	1	0	95	96
H/TOT	0	0	27	0	0	0	27	27	1	0	55	2	0	0	58	57	0	0	337	44	6	1	388	395
18:00	0	0	14	0	0	0	14	14	0	0	18	1	0	0	19	19	0	0	65	3	1	0	69	70
18:15	0	0	7	0	0	0	7	7	0	0	13	1	1	0	15	16	2	0	56	9	1	1	69	69
18:30	0	0	7	0	0	0	7	7	0	0	13	0	0	0	13	13	1	0	64	7	0	1	73	73
18:45	0	0	9	1	0	0	10	10	0	0	12	0	0	0	12	12	0	0	70	8	1	0	79	80
H/TOT	0	0	37	1	0	0	38	38	0	0	56	2	1	0	59	60	3	0	255	27	3	2	290	293
P/TOT	1	1	367	18	5	4	396	403.6	1	1	373	19	2	5	401	406.6	20	6	3112	482	113	22	3755	3870.4

APPENDIX C

TRICS Traffic Generation Output
Residential Housing & Apartments

Calculation Reference: AUDIT-160301-201103-1103

TRIP RATE CALCULATION SELECTION PARAMETERS:

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

Selected regions and areas:

03	**SOUTH WEST**		
	DC	DORSET	1 days
	DV	DEVON	3 days
	SM	SOMERSET	3 days
	WL	WILTSHIRE	1 days
04	**EAST ANGLIA**		
	CA	CAMBRIDGESHIRE	2 days
	NF	NORFOLK	11 days
	SF	SUFFOLK	4 days
05	**EAST MIDLANDS**		
	DS	DERBYSHIRE	1 days
	LE	LEICESTERSHIRE	1 days
	LN	LINCOLNSHIRE	2 days
06	**WEST MIDLANDS**		
	SH	SHROPSHIRE	2 days
	ST	STAFFORDSHIRE	3 days
	WK	WARWICKSHIRE	3 days
	WM	WEST MIDLANDS	2 days
07	**YORKSHIRE & NORTH LINCOLNSHIRE**		
	NE	NORTH EAST LINCOLNSHIRE	2 days
	NY	NORTH YORKSHIRE	6 days
	SY	SOUTH YORKSHIRE	1 days
	WY	WEST YORKSHIRE	1 days
08	**NORTH WEST**		
	CH	CHESHIRE	4 days
	GM	GREATER MANCHESTER	1 days
	LC	LANCASHIRE	2 days
	MS	MERSEYSIDE	1 days
09	**NORTH**		
	CB	CUMBRIA	1 days
	DH	DURHAM	3 days
	TW	TYNE & WEAR	2 days
10	**WALES**		
	PS	POWYS	2 days
	VG	VALE OF GLAMORGAN	1 days
11	**SCOTLAND**		
	AG	ANGUS	1 days
	FA	FALKIRK	2 days
	HI	HIGHLAND	1 days
12	**CONNAUGHT**		
	CS	SLIGO	2 days
	GA	GALWAY	1 days
	LT	LEITRIM	2 days
	RO	ROSCOMMON	2 days
13	**MUNSTER**		
	WA	WATERFORD	1 days
14	**LEINSTER**		
	CC	CARLOW	1 days
	WC	WICKLOW	2 days
	WX	WEXFORD	1 days
15	**GREATER DUBLIN**		
	DL	DUBLIN	2 days
16	**ULSTER (REPUBLIC OF IRELAND)**		
	CV	CAVAN	2 days
	DN	DONEGAL	5 days
17	**ULSTER (NORTHERN IRELAND)**		
	AN	ANTRIM	2 days
	DO	DOWN	1 days
	TY	TYRONE	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/A - HOUSES PRIVATELY OWNED
TOTAL VEHICLES
Calculation factor: 1 DWELLS
BOLD print indicates peak (busiest) period

	ARRIVALS			DEPARTURES			TOTALS		
Time Range	No. Days	Ave. DWELLS	Trip Rate	No. Days	Ave. DWELLS	Trip Rate	No. Days	Ave. DWELLS	Trip Rate
00:00 - 01:00									
01:00 - 02:00									
02:00 - 03:00									
03:00 - 04:00									
04:00 - 05:00									
05:00 - 06:00									
06:00 - 07:00									
07:00 - 08:00	95	96	0.067	95	96	0.285	95	96	0.352
08:00 - 09:00	95	96	0.133	**95**	**96**	**0.382**	95	96	0.515
09:00 - 10:00	95	96	0.151	95	96	0.186	95	96	0.337
10:00 - 11:00	95	96	0.123	95	96	0.141	95	96	0.264
11:00 - 12:00	95	96	0.128	95	96	0.136	95	96	0.264
12:00 - 13:00	95	96	0.160	95	96	0.159	95	96	0.319
13:00 - 14:00	95	96	0.158	95	96	0.156	95	96	0.314
14:00 - 15:00	95	96	0.174	95	96	0.181	95	96	0.355
15:00 - 16:00	95	96	0.242	95	96	0.178	95	96	0.420
16:00 - 17:00	95	96	0.273	95	96	0.167	95	96	0.440
17:00 - 18:00	**95**	**96**	**0.352**	95	96	0.180	**95**	**96**	**0.532**
18:00 - 19:00	95	96	0.288	95	96	0.177	95	96	0.465
19:00 - 20:00									
20:00 - 21:00									
21:00 - 22:00									
22:00 - 23:00									
23:00 - 24:00									
Total Rates:			2.249			2.328			4.577

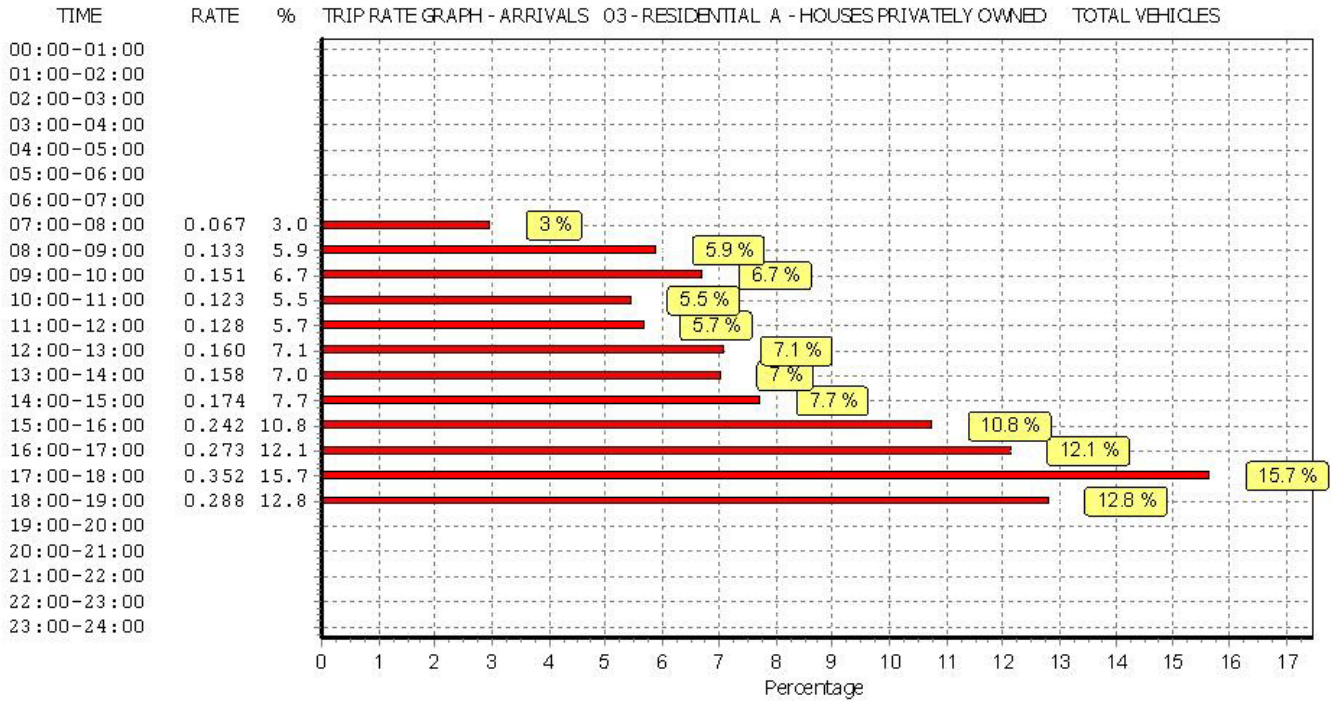
This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are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

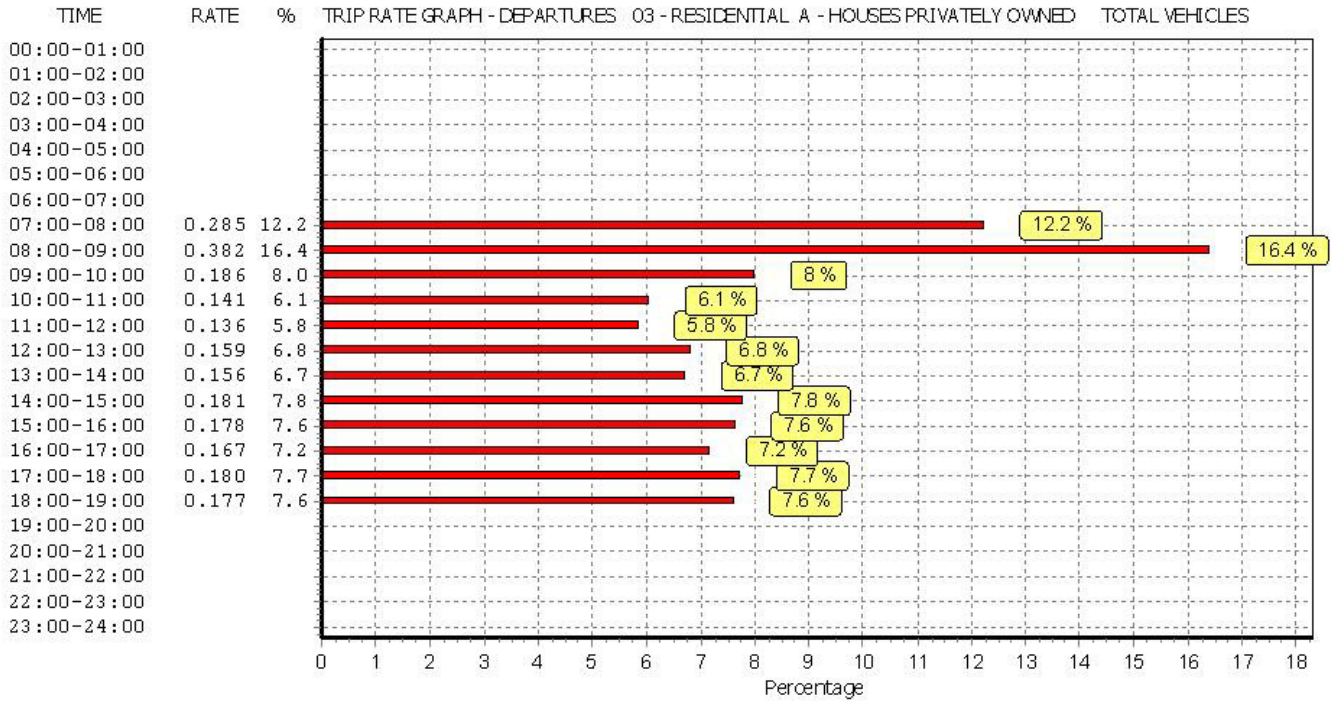
Parameter summary

Trip rate parameter range selected:	6 - 1817 (units:)
Survey date date range:	01/01/12 - 27/09/19
Number of weekdays (Monday-Friday):	99
Number of Saturdays:	0
Number of Sundays:	0
Surveys automatically removed from selection:	7
Surveys manually removed from selection:	0

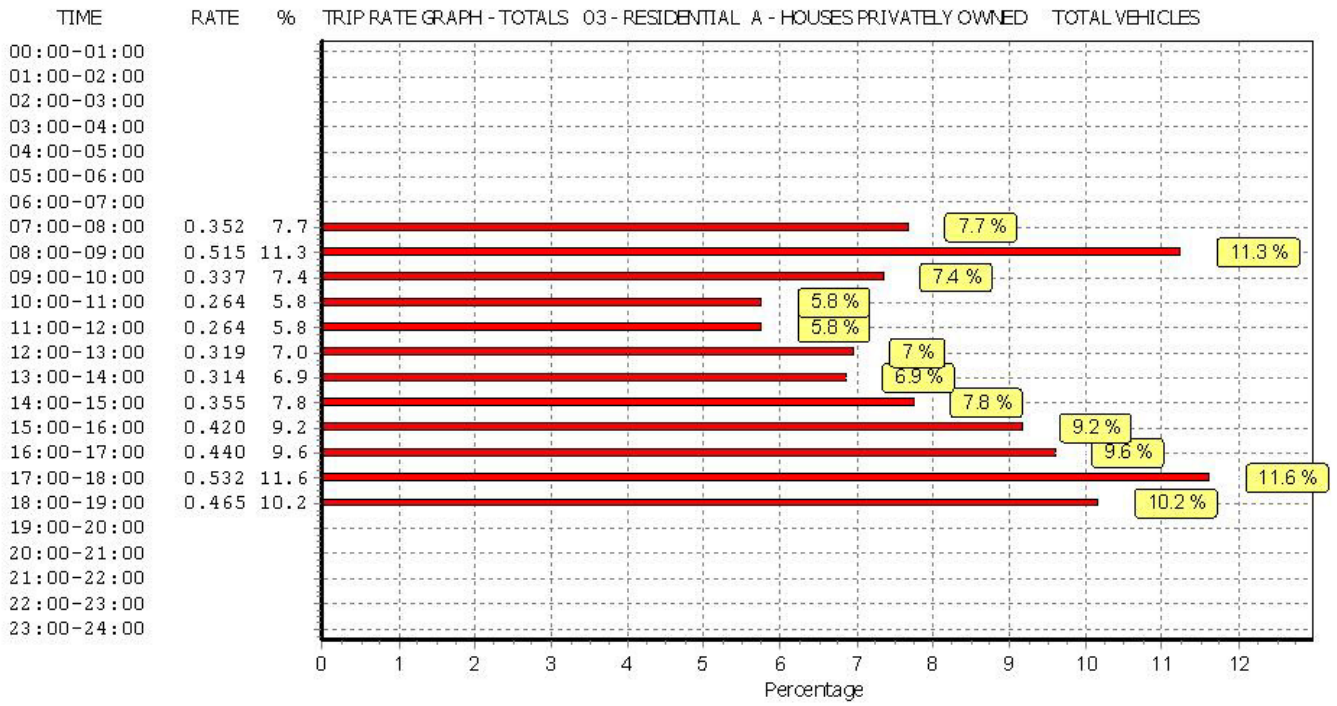
This section displays a quick summary of some of the data filtering selections made by the TRICS® user. The trip rate calculation parameter range of all selected surveys is displayed first, followed by the range of minimum and maximum survey dates selected by the user. Then, the total number of selected 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.



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-160301-201009-1036

TRIP RATE CALCULATION SELECTION PARAMETERS:

Land Use : 03 - RESIDENTIAL
Category : C - FLATS PRIVATELY OWNED
TOTAL 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
	HF	HERTFORDSHIRE	1 days
03	SOUTH WEST		
	DC	DORSET	1 days
	DV	DEVON	1 days
04	EAST ANGLIA		
	CA	CAMBRIDGESHIRE	1 days
	NF	NORFOLK	2 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
TOTAL VEHICLES
Calculation factor: 1 DWELLS
BOLD print indicates peak (busiest) period

	ARRIVALS			DEPARTURES			TOTALS		
Time Range	No. Days	Ave. DWELLS	Trip Rate	No. Days	Ave. DWELLS	Trip Rate	No. Days	Ave. DWELLS	Trip Rate
00:00 - 01:00									
01:00 - 02:00									
02:00 - 03:00									
03:00 - 04:00									
04:00 - 05:00									
05:00 - 06:00									
06:00 - 07:00									
07:00 - 08:00	43	60	0.046	43	60	0.162	43	60	0.208
08:00 - 09:00	43	60	0.056	43	60	0.195	43	60	0.251
09:00 - 10:00	43	60	0.069	43	60	0.097	43	60	0.166
10:00 - 11:00	43	60	0.059	43	60	0.080	43	60	0.139
11:00 - 12:00	43	60	0.066	43	60	0.080	43	60	0.146
12:00 - 13:00	43	60	0.091	43	60	0.088	43	60	0.179
13:00 - 14:00	43	60	0.074	43	60	0.084	43	60	0.158
14:00 - 15:00	43	60	0.079	43	60	0.077	43	60	0.156
15:00 - 16:00	43	60	0.098	43	60	0.064	43	60	0.162
16:00 - 17:00	43	60	0.119	43	60	0.078	43	60	0.197
17:00 - 18:00	43	60	0.177	43	60	0.086	43	60	0.263
18:00 - 19:00	43	60	0.177	43	60	0.096	43	60	0.273
19:00 - 20:00									
20:00 - 21:00									
21:00 - 22:00									
22:00 - 23:00									
23:00 - 24:00									
Total Rates:			1.111			1.187			2.298

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 - 18/11/19
Number of weekdays (Monday-Friday):	43
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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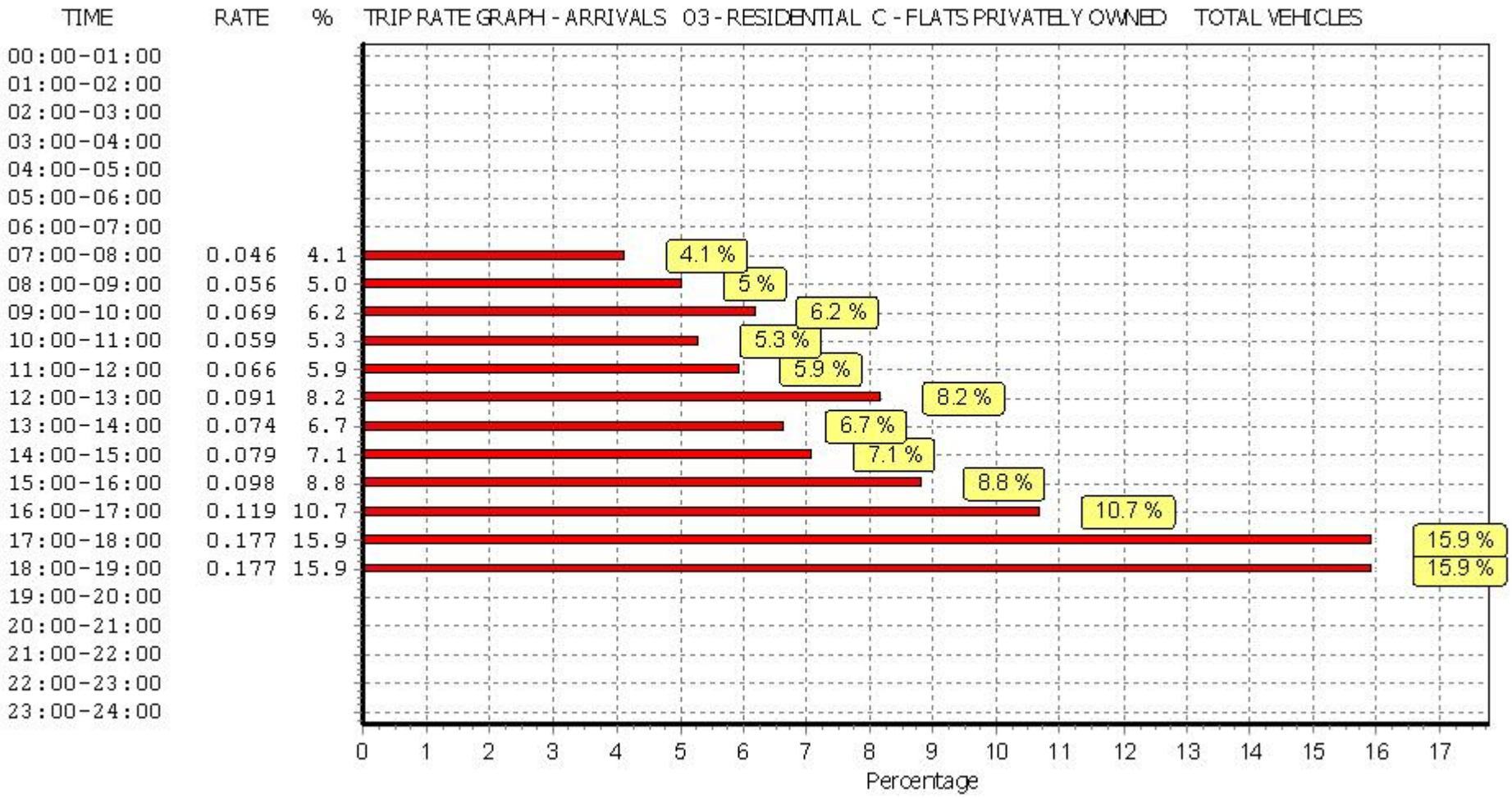

This graph is a visual representation of the trip rate calculation results screen. The same time periods and trip rates are displayed, but in addition there is an additional column showing the percentage of the total trip rate by individual time period, allowing peak periods to be easily identified through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

Calculation Reference: AUDIT-160301-201106-1101

TRIP RATE CALCULATION SELECTION PARAMETERS:

Land Use : 04 - EDUCATION
Category : D - NURSERY
TOTAL VEHICLES

Selected regions and areas:

02	SOUTH EAST		
	ES	EAST SUSSEX	1 days
03	SOUTH WEST		
	WL	WILTSHIRE	1 days
04	EAST ANGLIA		
	CA	CAMBRIDGESHIRE	1 days
	SF	SUFFOLK	1 days
05	EAST MIDLANDS		
	DS	DERBYSHIRE	1 days
	LE	LEICESTERSHIRE	1 days
	LN	LINCOLNSHIRE	1 days
	NR	NORTHAMPTONSHIRE	1 days
06	WEST MIDLANDS		
	SH	SHROPSHIRE	1 days
	WK	WARWICKSHIRE	1 days
08	NORTH WEST		
	CH	CHESHIRE	1 days
09	NORTH		
	TV	TEES VALLEY	1 days
	TW	TYNE & WEAR	2 days
10	WALES		
	BG	BRIDGEND	1 days
	MM	MONMOUTHSHIRE	1 days
11	SCOTLAND		
	DU	DUNDEE CITY	1 days
	SR	STIRLING	1 days
12	CONNAUGHT		
	RO	ROSCOMMON	2 days
15	GREATER DUBLIN		
	DL	DUBLIN	1 days
17	ULSTER (NORTHERN IRELAND)		
	DE	DERRY	1 days

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

TRIP RATE for Land Use 04 - EDUCATION/D - NURSERY
TOTAL 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	2	328	0.152	2	328	0.000	2	328	0.152
07:00 - 08:00	22	462	1.742	22	462	0.788	22	462	2.530
08:00 - 09:00	22	462	3.396	22	462	2.806	22	462	6.202
09:00 - 10:00	22	462	1.782	22	462	1.644	22	462	3.426
10:00 - 11:00	22	462	0.502	22	462	0.374	22	462	0.876
11:00 - 12:00	22	462	0.689	22	462	0.522	22	462	1.211
12:00 - 13:00	22	462	1.299	22	462	1.427	22	462	2.726
13:00 - 14:00	22	462	0.876	22	462	1.309	22	462	2.185
14:00 - 15:00	22	462	0.650	22	462	0.640	22	462	1.290
15:00 - 16:00	22	462	0.847	22	462	1.034	22	462	1.881
16:00 - 17:00	22	462	1.496	22	462	1.644	22	462	3.140
17:00 - 18:00	22	462	2.412	22	462	2.904	22	462	5.316
18:00 - 19:00	21	477	0.160	21	477	0.759	21	477	0.919
19:00 - 20:00	1	400	0.000	1	400	0.000	1	400	0.000
20:00 - 21:00									
21:00 - 22:00									
22:00 - 23:00									
23:00 - 24:00									
Total Rates:			16.003			15.851			31.854

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:	150 - 1300 (units: sqm)
Survey date date range:	01/01/12 - 27/09/19
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.

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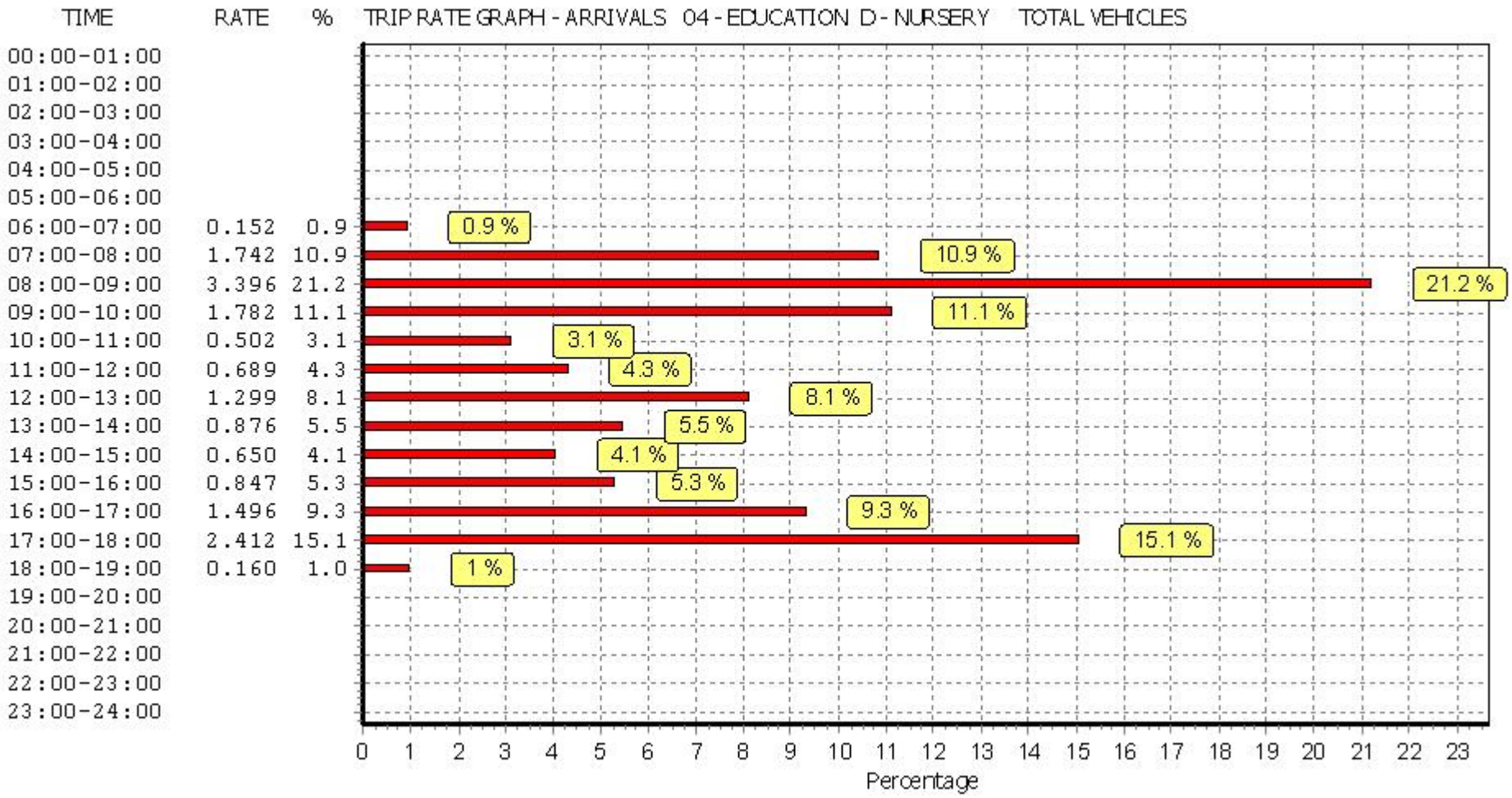

This graph is a visual representation of the trip rate calculation results screen. The same time periods and trip rates are displayed, but in addition there is an additional column showing the percentage of the total trip rate by individual time period, allowing peak periods to be easily identified through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

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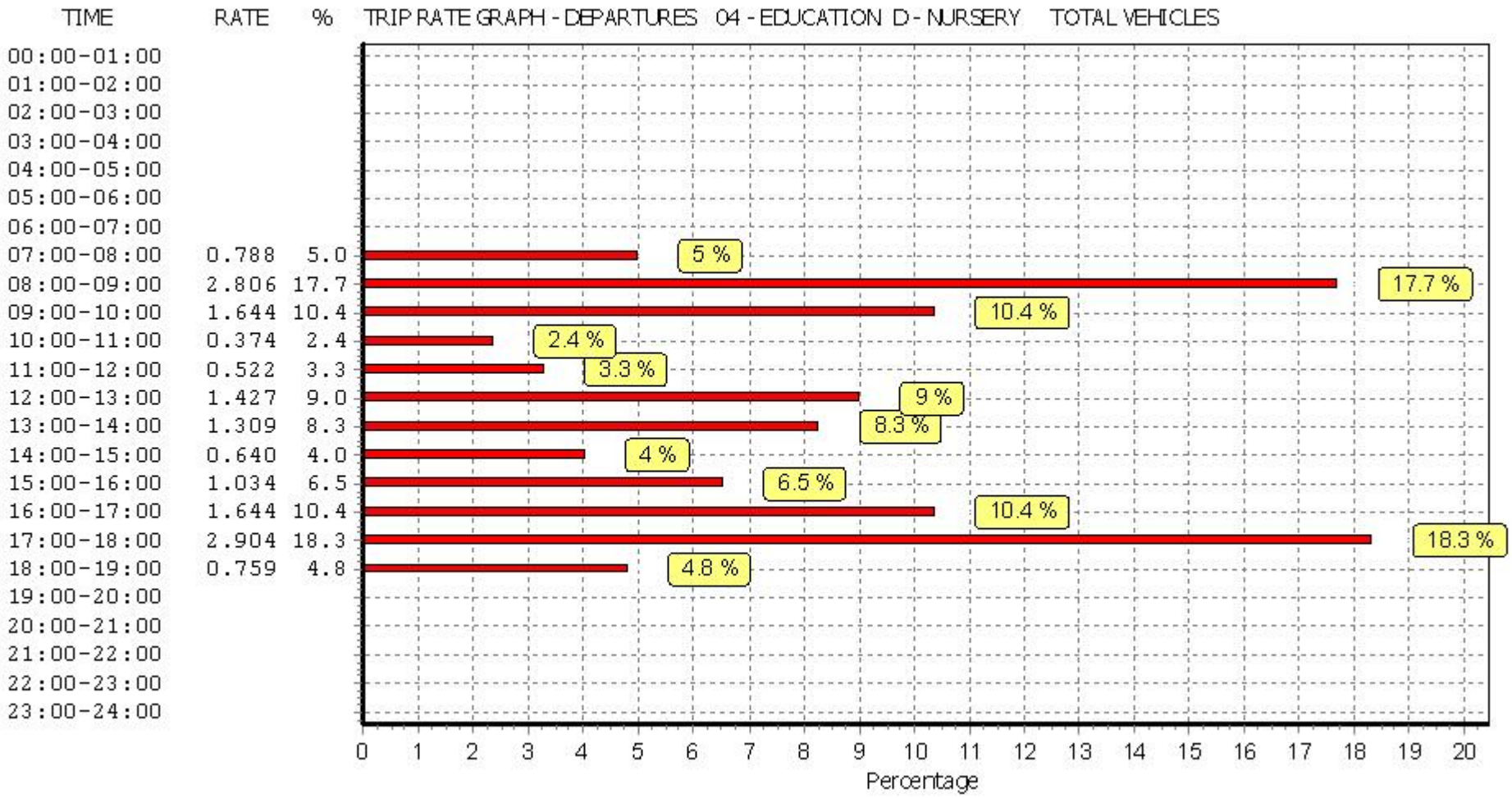
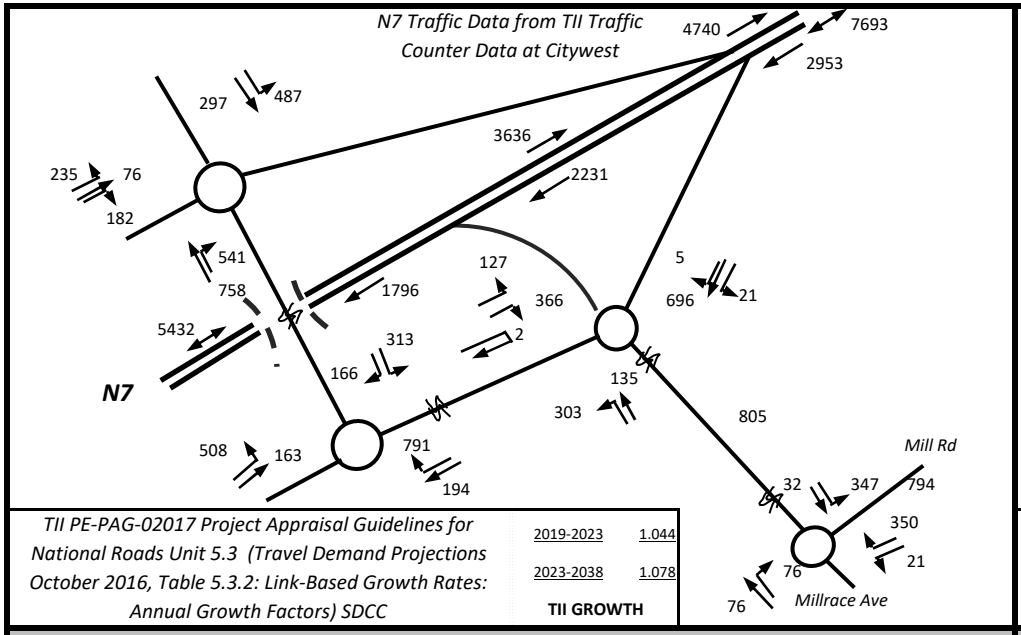


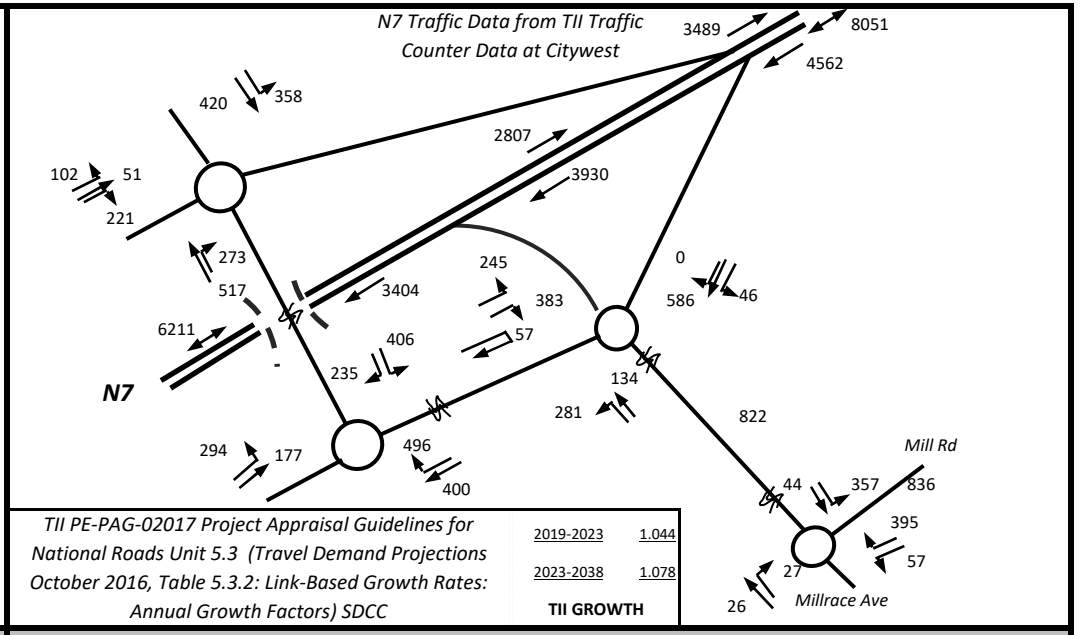
This graph is a visual representation of the trip rate calculation results screen. The same time periods and trip rates are displayed, but in addition there is an additional column showing the percentage of the total trip rate by individual time period, allowing peak periods to be easily identified through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

APPENDIX D

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

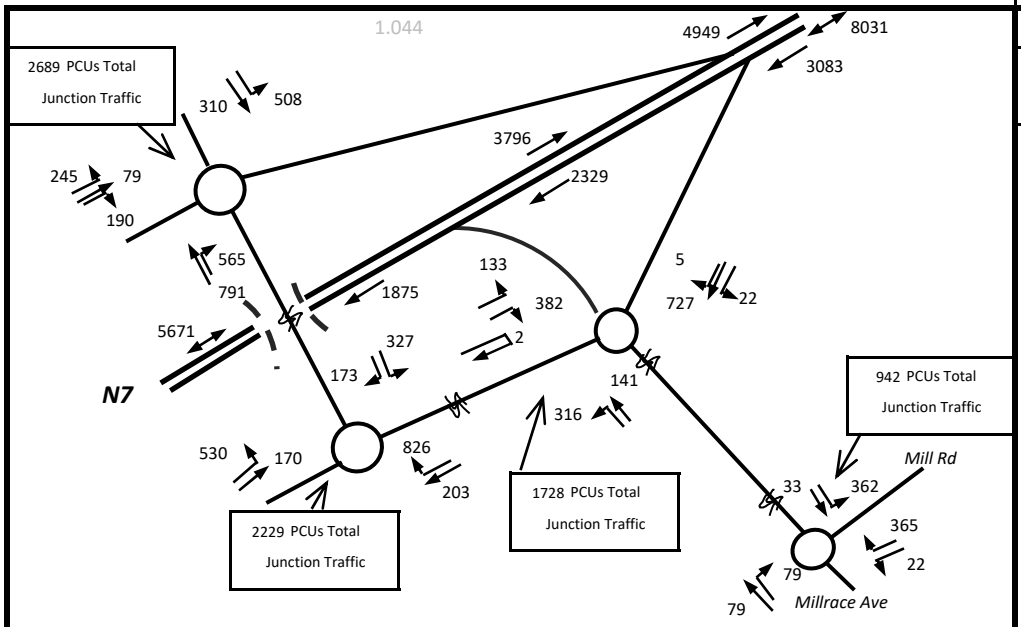


WEEKDAY AM PEAK HOUR 8-9AM

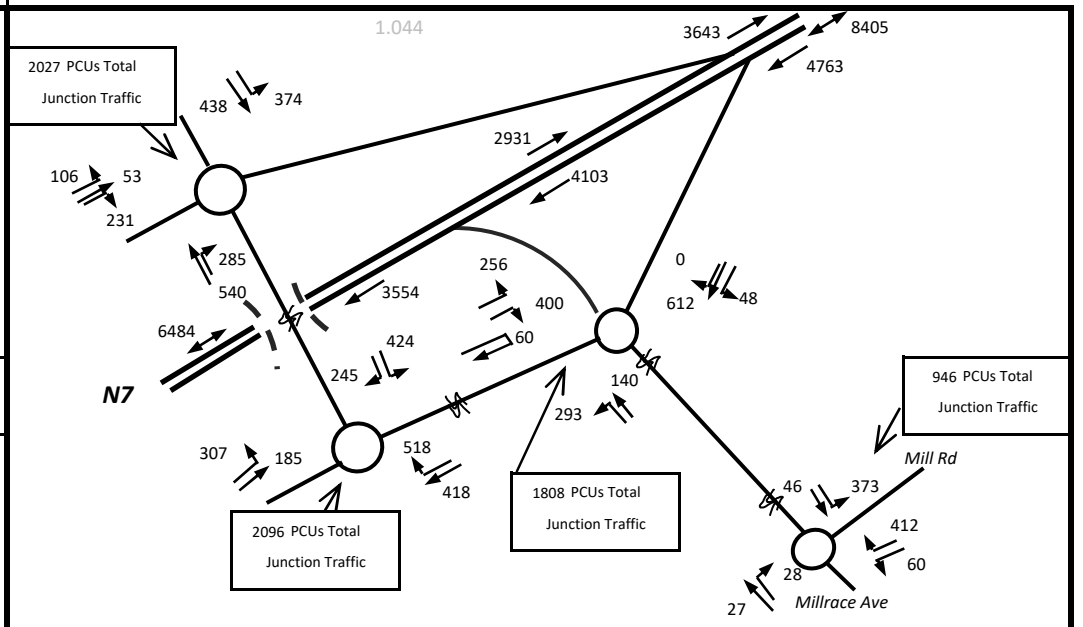


WEEKDAY PM PEAK HOUR 5-6PM

EXISTING AS-SURVEYED TRAFFIC CONDITIONS 2019 (PCUs) NOVEMBER

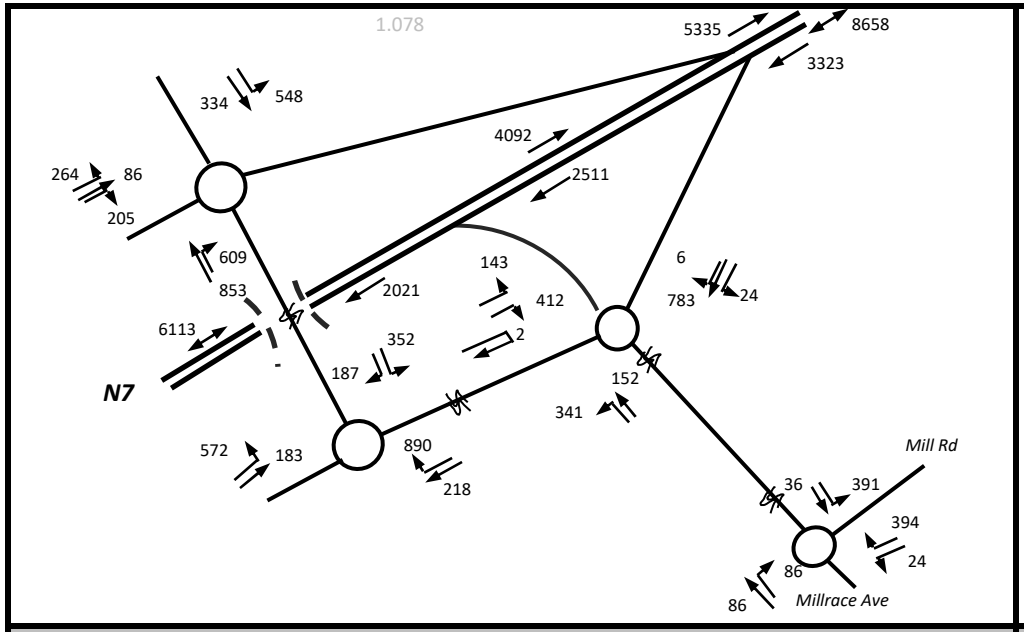


WEEKDAY AM PEAK HOUR 8-9AM

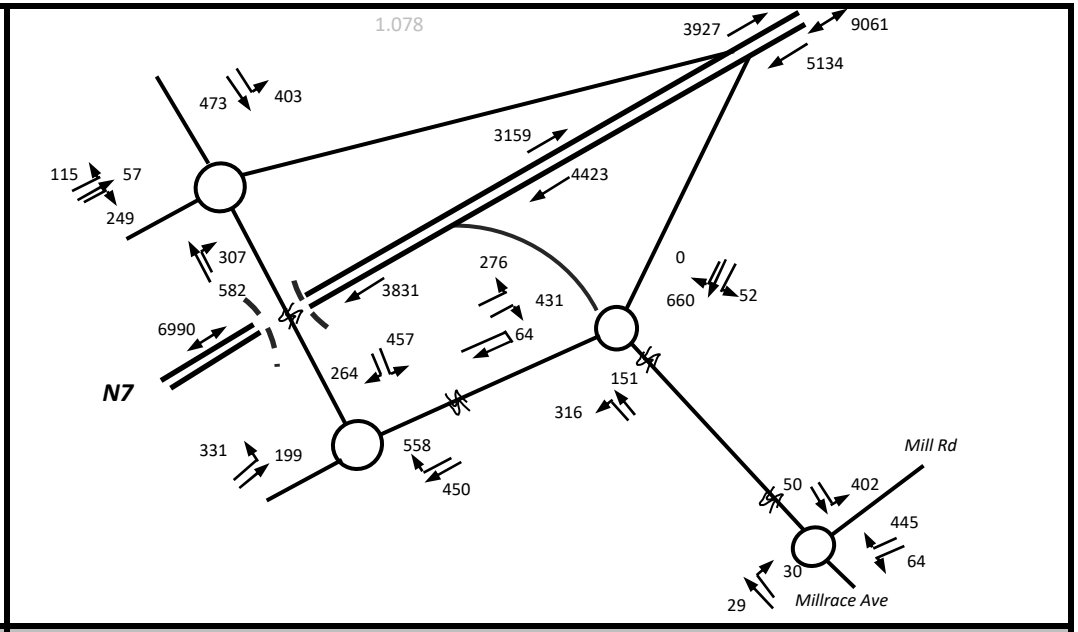


WEEKDAY PM PEAK HOUR 5-6PM

PROJECTED OPENING YEAR TRAFFIC CONDITIONS 2023 (PCUs) - WITHOUT PROPOSED DEVELOPMENT



WEEKDAY AM PEAK HOUR 8-9AM



WEEKDAY PM PEAK HOUR 5-6PM

PROJECTED DESIGN YEAR TRAFFIC CONDITIONS 2038 (PCUs) - WITHOUT PROPOSED DEVELOPMENT

TRICS (Assessment of Worst Case Traffic Generated - Refer Appendix C)

A - Residential Apartments - 185 No. Units

185 No. Apts	Car Arrivals		Car Departures		Total 2-Way Traffic
Network Period	per Apt	Total	per Apt	Total	
AM Peak Hr 8-9am	0.056	10	0.195	36	46
PM Peak Hr 5-6pm	0.177	33	0.086	16	49
24 Hour Day	1.111	206	1.187	220	426

B - Residential Housing/Duplex - 89 No. Units

89 Houses	Car Arrivals		Car Departures		Total 2-Way Traffic
Network Period	per Hse	Total	per Hse	Total	
AM Peak Hr 8-9am	0.133	12	0.382	34	46
PM Peak Hr 5-6pm	0.352	31	0.180	16	47
24 Hour Day	2.249	200	2.328	207	407

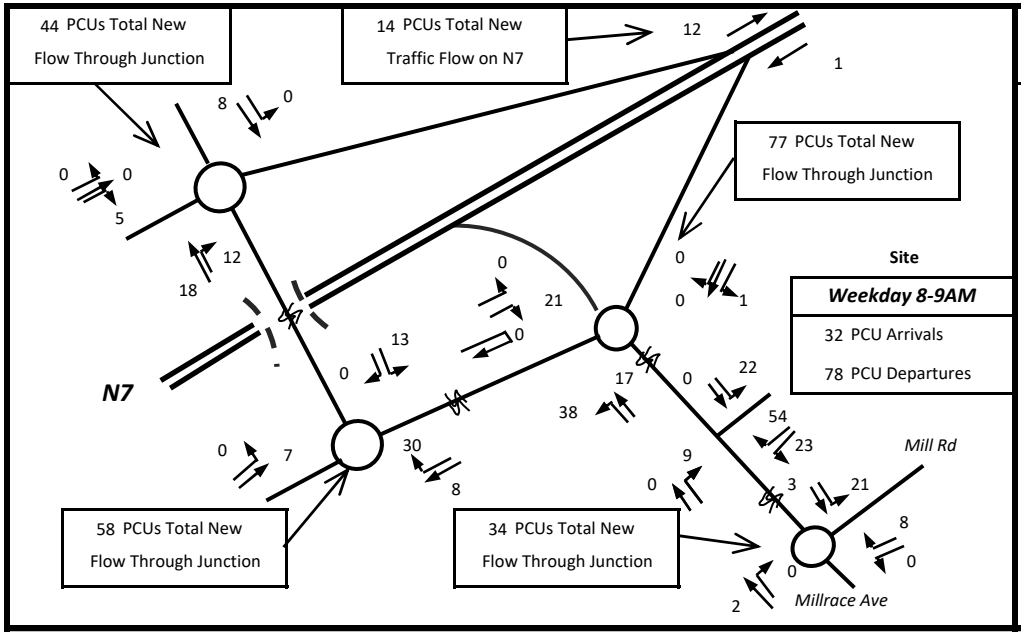
C - Creche - 275m2 GFA

275 m2 GFA	Car Arrivals		Car Departures		Total 2-Way Traffic
Network Period	per 100m2	Total	per 100m2	Total	
AM Peak Hr 8-9am	3.396	9	2.806	8	17
PM Peak Hr 5-6pm	2.412	7	2.904	8	15
24 Hour Day	16.003	44	15.851	44	88

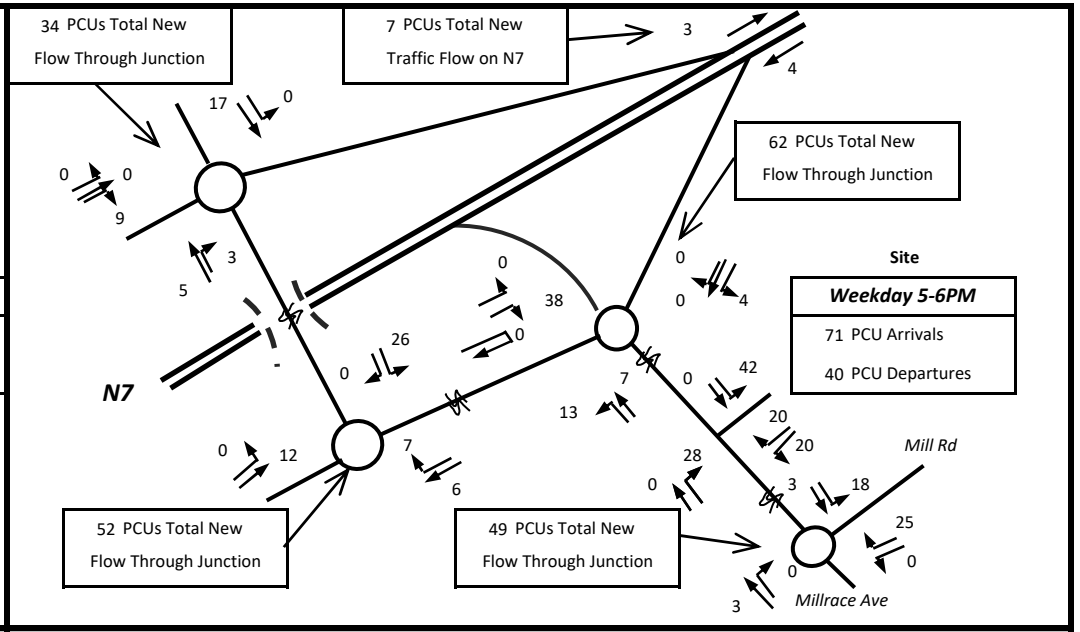
TOTAL TRAFFIC - HOUSING AND APARTMENTS

Network Period	PCU Arrivals	PCU Departures	2-Way Traffic
AM Peak Hr 8-9am	32	78	109
PM Peak Hr 5-6pm	71	40	111
24 Hour Day	450	470	920

A + B + C

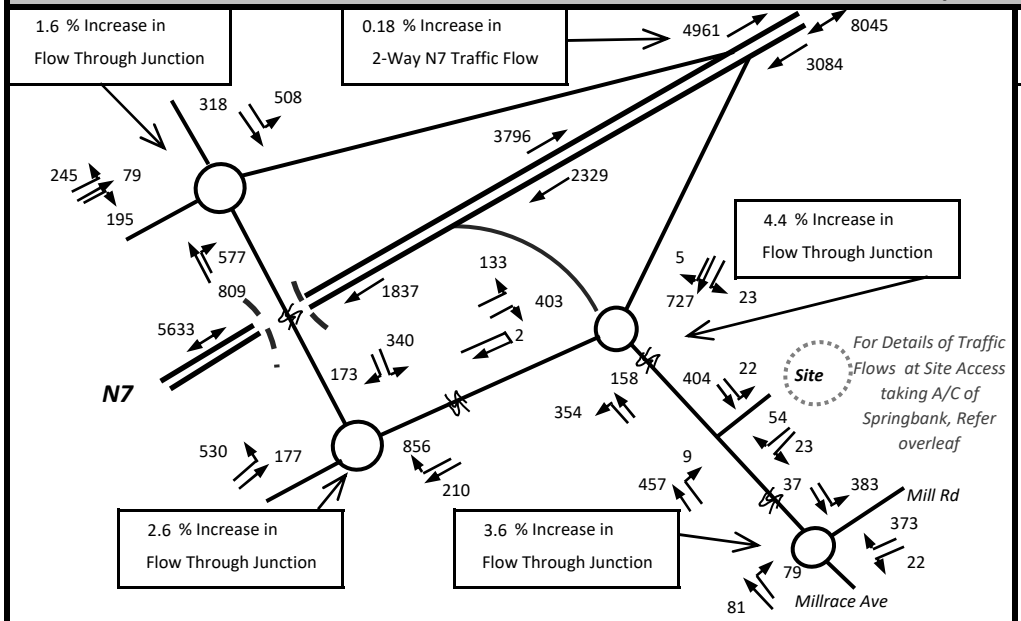


WEEKDAY AM PEAK HOUR 8-9AM

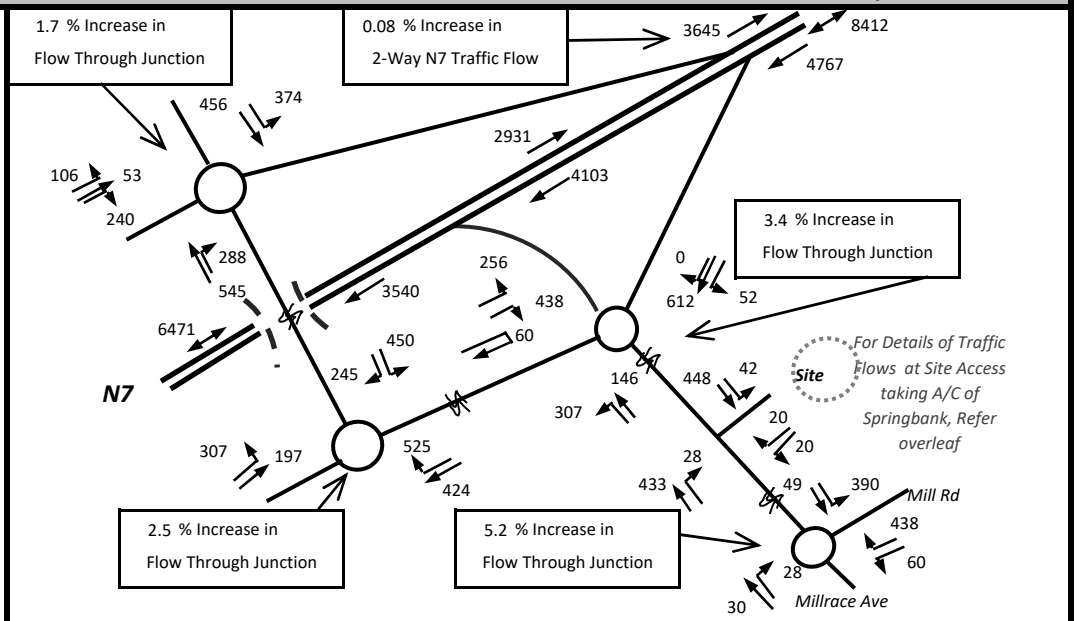


WEEKDAY PM PEAK HOUR 5-6PM

ASSIGNMENT OF DEVELOPMENT TRAFFIC TO NETWORK (IN ACCORDANCE WITH OBSERVED JUNCTION TURNING PROPORTIONS)

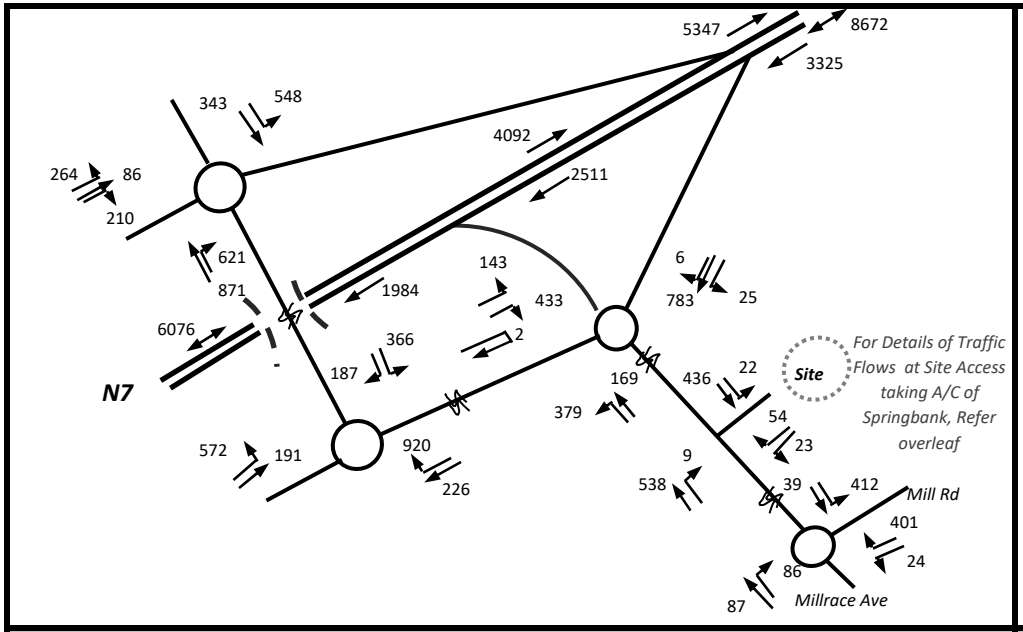


WEEKDAY AM PEAK HOUR 8-9AM

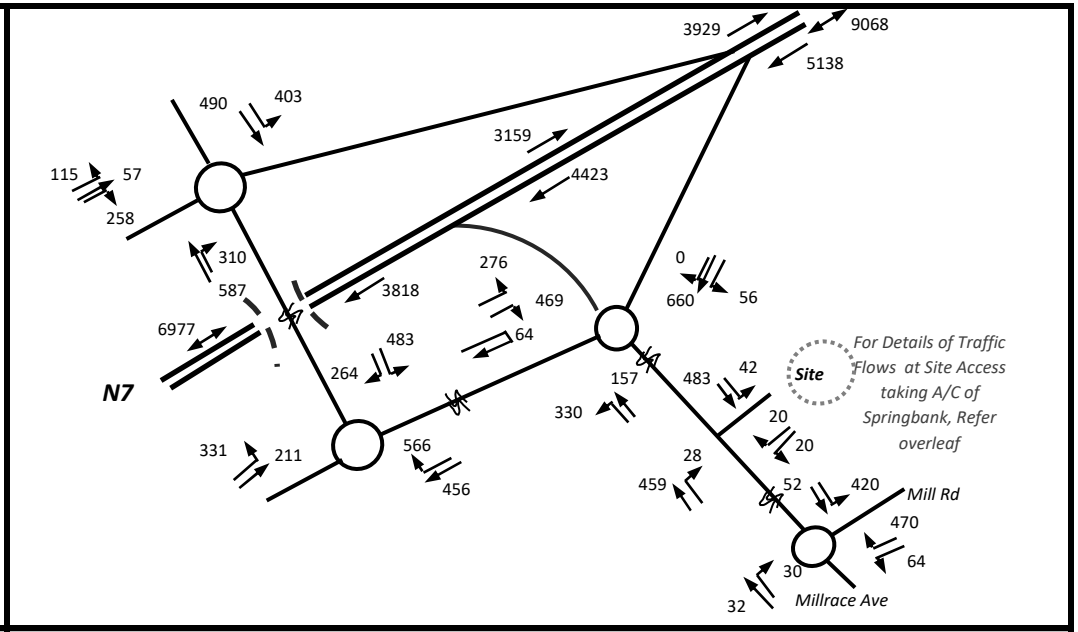


WEEKDAY PM PEAK HOUR 5-6PM

PROJECTED OPENING YEAR TRAFFIC CONDITIONS 2023 (PCUs) - WITH ENTIRE PROPOSED DEVELOPMENT



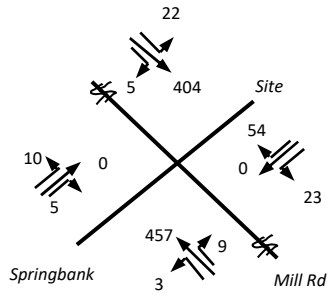
WEEKDAY AM PEAK HOUR 8-9AM



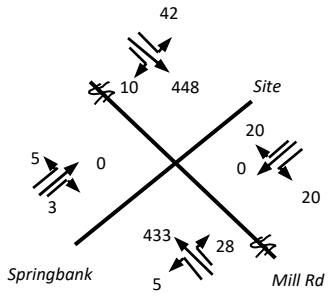
WEEKDAY PM PEAK HOUR 5-6PM

PROJECTED DESIGN YEAR TRAFFIC CONDITIONS 2038 (PCUs) - <u>WITH ENTIRE</u> PROPOSED DEVELOPMENT

ASSESSMENT OF SITE ACCESS JUNCTION TAKING ACCOUNT OF SPRINGBANK RESIDENTIAL HOUSING OPPOSITE

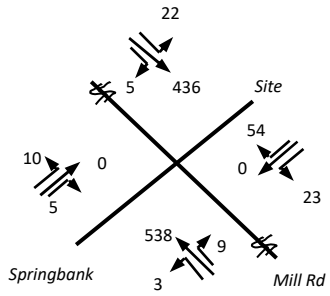


Weekday AM Peak 8-9AM

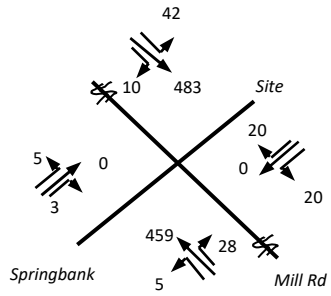


Weekday PM Peak 5-6PM

OPENING YEAR 2023 WITH PROPOSED DEVELOPMENT



Weekday AM Peak 8-9AM



Weekday PM Peak 5-6PM

DESIGN YEAR 2038 WITH PROPOSED DEVELOPMENT

APPENDIX E

PiCADY Junction Simulation Model Output - NEW Vehicular Access on Mill Rd

Proposed New Vehicular Access to Mill Rd.,
Summary PICADY Results in Order as included herein
(Robust & Worst Case)

Modelled Scenario	Period Mean Max Q (PCUs)	Period Max RFC
2023 Opening Year AM Peak	<1	0.22
2023 Opening Year PM Peak	<1	0.11
2038 Design Year AM Peak	<1	0.25
2038 Design Year PM Peak	<1	0.12

All Results Above are well below the recommended RFC of 0.85 (85% Capacity) and therefore no problems whatsoever are anticipated at the Proposed Junction in terms of Capacity or excessive vehicle Queues - AND This Clearly and Unequivically Demonstrates that Traffic Signal Control is Unnecessary

NB *Any Small Changes to Selected Opening Year 2023 or Design Year 2038 will have no significant implications in terms of the conclusions of the Study.*

Junctions 9

PICADY 9 - Priority Intersection Module

Filename: 2023 AM PM.j9
Path: C:\Users\Eoin\NRB Consulting Engineers Ltd\NRB Server - Documents\2020\20-053 Mill Rd SHD Tetrarch\Calculations\Site Access Picadys
Report generation date: 06/11/2020 14:48:04

Summary of junction performance

	AM				PM			
	Q (PCU)	Delay (s)	RFC	LOS	Q (PCU)	Delay (s)	RFC	LOS
	2023							
Stream B-ACD	0.3	11.78	0.22	B	0.1	9.81	0.11	A
Stream A-D	0.0	6.69	0.01	A	0.0	6.78	0.02	A
Stream D-ABC	0.0	8.28	0.04	A	0.0	8.30	0.02	A
Stream C-B	0.0	6.61	0.02	A	0.1	7.16	0.06	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	06/11/2020
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	2023	AM	ONE HOUR	07:45	09:15	15
D2	2023	PM	ONE HOUR	16:45	18:15	15

Analysis Set Details

ID	Network flow scaling factor (%)
A1	100.000

2023, 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	Site Access/Mill Rd/Springbank	Crossroads	Two-way	1.14	A

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Arms

Arms

Arm	Name	Description	Arm type
A	Mill Rd North		Major
B	Subject Site Access		Minor
C	Mill Rd South		Major
D	Springbank Estate		Minor

Major Arm Geometry

Arm	Width of carriageway (m)	Has kerbed central reserve	Has right turn bay	Width for right turn (m)	Visibility for right turn (m)	Blocks?	Blocking queue (PCU)
A	6.00		✓	3.00	90.0		-
C	6.00		✓	3.00	90.0		-

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

Minor Arm Geometry

Arm	Minor arm type	Lane width (m)	Visibility to left (m)	Visibility to right (m)
B	One lane	3.00	90	90
D	One lane	3.00	90	90

Slope / Intercept / Capacity

Priority Intersection Slopes and Intercepts

Junction	Stream	Intercept (PCU/hr)	Slope for A-B	Slope for A-C	Slope for A-D	Slope for B-A	Slope for B-C	Slope for B-D	Slope for C-A	Slope for C-B	Slope for C-D	Slope for D-A	Slope for D-B	Slope for D-C
1	A-D	681	-	-	-	-	-	-	0.264	0.377	0.264	-	-	-
1	B-A	552	0.101	0.254	0.254	-	-	-	0.160	0.363	-	0.254	0.254	0.127
1	B-C	681	0.104	0.264	-	-	-	-	-	-	-	-	-	-
1	B-D, nearside lane	552	0.101	0.254	0.254	-	-	-	0.160	0.363	0.160	-	-	-
1	B-D, offside lane	552	0.101	0.254	0.254	-	-	-	0.160	0.363	0.160	-	-	-
1	C-B	681	0.264	0.264	0.377	-	-	-	-	-	-	-	-	-
1	D-A	681	-	-	-	-	-	-	0.264	-	0.104	-	-	-
1	D-B, nearside lane	552	0.160	0.160	0.363	-	-	-	0.254	0.254	0.101	-	-	-
1	D-B, offside lane	552	0.160	0.160	0.363	-	-	-	0.254	0.254	0.101	-	-	-
1	D-C	552	-	0.160	0.363	0.127	0.254	0.254	0.254	0.254	0.101	-	-	-

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	2023	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		✓	431	100.000
B		✓	78	100.000
C		✓	469	100.000
D		✓	15	100.000

Origin-Destination Data

Demand (PCU/hr)

		To			
		A	B	C	D
From	A	0	22	404	5
	B	55	0	23	0
	C	457	9	0	3
	D	10	0	5	0

Vehicle Mix

HV %s

		To			
		A	B	C	D
From	A	0	0	1	0
	B	0	0	0	0
	C	1	0	0	0
	D	0	0	0	0

Results

Results Summary for whole modelled period

Stream	Max RFC	Max delay (s)	Max Q (PCU)	Max LOS
B-ACD	0.22	11.78	0.3	B
A-B				
A-C				
A-D	0.01	6.69	0.0	A
D-ABC	0.04	8.28	0.0	A
C-D				
C-A				
C-B	0.02	6.61	0.0	A

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-ACD	59	454	0.129	58	0.1	9.081	A
A-B	17			17			
A-C	304			304			
A-D	4	587	0.006	4	0.0	6.174	A
D-ABC	11	511	0.022	11	0.0	7.205	A
C-D	2			2			
C-A	344			344			
C-B	7	595	0.011	7	0.0	6.123	A

08:00 - 08:15

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-ACD	70	428	0.164	70	0.2	10.049	B
A-B	20			20			
A-C	363			363			
A-D	4	568	0.008	4	0.0	6.382	A
D-ABC	13	486	0.028	13	0.0	7.614	A
C-D	3			3			
C-A	411			411			
C-B	8	578	0.014	8	0.0	6.317	A

08:15 - 08:30

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-ACD	86	392	0.219	86	0.3	11.752	B
A-B	24			24			
A-C	445			445			
A-D	6	543	0.010	5	0.0	6.693	A
D-ABC	17	451	0.037	16	0.0	8.278	A
C-D	3			3			
C-A	503			503			
C-B	10	555	0.018	10	0.0	6.605	A

08:30 - 08:45

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-ACD	86	392	0.219	86	0.3	11.778	B
A-B	24			24			
A-C	445			445			
A-D	6	543	0.010	6	0.0	6.693	A
D-ABC	17	451	0.037	17	0.0	8.279	A
C-D	3			3			
C-A	503			503			
C-B	10	555	0.018	10	0.0	6.605	A

08:45 - 09:00

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-ACD	70	428	0.164	70	0.2	10.080	B
A-B	20			20			
A-C	363			363			
A-D	4	568	0.008	5	0.0	6.382	A
D-ABC	13	486	0.028	14	0.0	7.619	A
C-D	3			3			
C-A	411			411			
C-B	8	578	0.014	8	0.0	6.317	A

09:00 - 09:15

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-ACD	59	454	0.129	59	0.2	9.116	A
A-B	17			17			
A-C	304			304			
A-D	4	587	0.006	4	0.0	6.175	A
D-ABC	11	511	0.022	11	0.0	7.207	A
C-D	2			2			
C-A	344			344			
C-B	7	595	0.011	7	0.0	6.123	A

2023, 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	Site Access/Mill Rd/Springbank	Crossroads	Two-way	0.72	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	2023	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 (%)
A		✓	501	100.000
B		✓	40	100.000
C		✓	466	100.000
D		✓	8	100.000

Origin-Destination Data

Demand (PCU/hr)

		To			
		A	B	C	D
From	A	0	43	448	10
	B	20	0	20	0
	C	433	28	0	5
	D	5	0	3	0

Vehicle Mix

HV %s

		To			
		A	B	C	D
From	A	0	0	1	0
	B	0	0	0	0
	C	1	0	0	0
	D	0	0	0	0

Results

Results Summary for whole modelled period

Stream	Max RFC	Max delay (s)	Max Q (PCU)	Max LOS
B-ACD	0.11	9.81	0.1	A
A-B				
A-C				
A-D	0.02	6.78	0.0	A
D-ABC	0.02	8.30	0.0	A
C-D				
C-A				
C-B	0.06	7.16	0.1	A

Main Results for each time segment

16:45 - 17:00

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-ACD	30	476	0.063	30	0.1	8.056	A
A-B	32			32			
A-C	337			337			
A-D	8	586	0.013	7	0.0	6.225	A
D-ABC	6	503	0.012	6	0.0	7.237	A
C-D	4			4			
C-A	326			326			
C-B	21	580	0.036	21	0.0	6.434	A

17:00 - 17:15

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-ACD	36	449	0.080	36	0.1	8.707	A
A-B	39			39			
A-C	403			403			
A-D	9	567	0.016	9	0.0	6.448	A
D-ABC	7	478	0.015	7	0.0	7.641	A
C-D	4			4			
C-A	389			389			
C-B	25	561	0.045	25	0.0	6.720	A

17:15 - 17:30

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-ACD	44	411	0.107	44	0.1	9.800	A
A-B	47			47			
A-C	493			493			
A-D	11	542	0.020	11	0.0	6.782	A
D-ABC	9	443	0.020	9	0.0	8.300	A
C-D	6			6			
C-A	477			477			
C-B	31	534	0.058	31	0.1	7.155	A

17:30 - 17:45

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-ACD	44	411	0.107	44	0.1	9.806	A
A-B	47			47			
A-C	493			493			
A-D	11	542	0.020	11	0.0	6.782	A
D-ABC	9	442	0.020	9	0.0	8.300	A
C-D	6			6			
C-A	477			477			
C-B	31	534	0.058	31	0.1	7.155	A

17:45 - 18:00

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-ACD	36	449	0.080	36	0.1	8.714	A
A-B	39			39			
A-C	403			403			
A-D	9	567	0.016	9	0.0	6.448	A
D-ABC	7	478	0.015	7	0.0	7.643	A
C-D	4			4			
C-A	389			389			
C-B	25	561	0.045	25	0.0	6.724	A

18:00 - 18:15

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-ACD	30	476	0.063	30	0.1	8.072	A
A-B	32			32			
A-C	337			337			
A-D	8	586	0.013	8	0.0	6.226	A
D-ABC	6	503	0.012	6	0.0	7.241	A
C-D	4			4			
C-A	326			326			
C-B	21	580	0.036	21	0.0	6.438	A

Junctions 9

PICADY 9 - Priority Intersection Module

Filename: 2038 AM PM.j9
Path: C:\Users\Eoin\NRB Consulting Engineers Ltd\NRB Server - Documents\2020\20-053 Mill Rd SHD Tetrarch\Calculations\Site Access Picadys
Report generation date: 06/11/2020 14:50:24

Summary of junction performance

	AM				PM			
	Q (PCU)	Delay (s)	RFC	LOS	Q (PCU)	Delay (s)	RFC	LOS
	2038							
Stream B-ACD	0.3	13.63	0.25	B	0.1	10.80	0.12	B
Stream A-D	0.0	7.19	0.01	A	0.0	7.05	0.02	A
Stream D-ABC	0.0	9.28	0.04	A	0.0	8.94	0.02	A
Stream C-B	0.0	6.87	0.02	A	0.1	7.50	0.06	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	06/11/2020
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	2038	AM	ONE HOUR	07:45	09:15	15
D2	2038	PM	ONE HOUR	16:45	18:15	15

Analysis Set Details

ID	Network flow scaling factor (%)
A1	100.000

2038, 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	Site Access/Mill Rd/Springbank	Crossroads	Two-way	1.09	A

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Arms

Arms

Arm	Name	Description	Arm type
A	Mill Rd North		Major
B	Subject Site Access		Minor
C	Mill Rd South		Major
D	Springbank Estate		Minor

Major Arm Geometry

Arm	Width of carriageway (m)	Has kerbed central reserve	Has right turn bay	Width for right turn (m)	Visibility for right turn (m)	Blocks?	Blocking queue (PCU)
A	6.00		✓	3.00	90.0		-
C	6.00		✓	3.00	90.0		-

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

Minor Arm Geometry

Arm	Minor arm type	Lane width (m)	Visibility to left (m)	Visibility to right (m)
B	One lane	3.00	90	90
D	One lane	3.00	90	90

Slope / Intercept / Capacity

Priority Intersection Slopes and Intercepts

Junction	Stream	Intercept (PCU/hr)	Slope for A-B	Slope for A-C	Slope for A-D	Slope for B-A	Slope for B-C	Slope for B-D	Slope for C-A	Slope for C-B	Slope for C-D	Slope for D-A	Slope for D-B	Slope for D-C
1	A-D	681	-	-	-	-	-	-	0.264	0.377	0.264	-	-	-
1	B-A	552	0.101	0.254	0.254	-	-	-	0.160	0.363	-	0.254	0.254	0.127
1	B-C	681	0.104	0.264	-	-	-	-	-	-	-	-	-	-
1	B-D, nearside lane	552	0.101	0.254	0.254	-	-	-	0.160	0.363	0.160	-	-	-
1	B-D, offside lane	552	0.101	0.254	0.254	-	-	-	0.160	0.363	0.160	-	-	-
1	C-B	681	0.264	0.264	0.377	-	-	-	-	-	-	-	-	-
1	D-A	681	-	-	-	-	-	-	0.264	-	0.104	-	-	-
1	D-B, nearside lane	552	0.160	0.160	0.363	-	-	-	0.254	0.254	0.101	-	-	-
1	D-B, offside lane	552	0.160	0.160	0.363	-	-	-	0.254	0.254	0.101	-	-	-
1	D-C	552	-	0.160	0.363	0.127	0.254	0.254	0.254	0.254	0.101	-	-	-

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	2038	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		✓	503	100.000
B		✓	78	100.000
C		✓	596	100.000
D		✓	15	100.000

Origin-Destination Data

Demand (PCU/hr)

		To			
		A	B	C	D
From	A	0	22	476	5
	B	55	0	23	0
	C	584	9	0	3
	D	10	0	5	0

Vehicle Mix

HV %s

		To			
		A	B	C	D
From	A	0	0	1	0
	B	0	0	0	0
	C	1	0	0	0
	D	0	0	0	0

Results

Results Summary for whole modelled period

Stream	Max RFC	Max delay (s)	Max Q (PCU)	Max LOS
B-ACD	0.25	13.63	0.3	B
A-B				
A-C				
A-D	0.01	7.19	0.0	A
D-ABC	0.04	9.28	0.0	A
C-D				
C-A				
C-B	0.02	6.87	0.0	A

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-ACD	59	427	0.138	58	0.2	9.753	A
A-B	17			17			
A-C	358			358			
A-D	4	562	0.007	4	0.0	6.453	A
D-ABC	11	480	0.024	11	0.0	7.670	A
C-D	2			2			
C-A	440			440			
C-B	7	580	0.012	7	0.0	6.276	A

08:00 - 08:15

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-ACD	70	395	0.178	70	0.2	11.073	B
A-B	20			20			
A-C	428			428			
A-D	4	538	0.008	4	0.0	6.742	A
D-ABC	13	449	0.030	13	0.0	8.262	A
C-D	3			3			
C-A	525			525			
C-B	8	561	0.014	8	0.0	6.512	A

08:15 - 08:30

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-ACD	86	350	0.245	85	0.3	13.586	B
A-B	24			24			
A-C	524			524			
A-D	6	506	0.011	5	0.0	7.186	A
D-ABC	17	405	0.041	16	0.0	9.275	A
C-D	3			3			
C-A	643			643			
C-B	10	534	0.019	10	0.0	6.869	A

08:30 - 08:45

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-ACD	86	350	0.245	86	0.3	13.629	B
A-B	24			24			
A-C	524			524			
A-D	6	506	0.011	6	0.0	7.186	A
D-ABC	17	404	0.041	17	0.0	9.278	A
C-D	3			3			
C-A	643			643			
C-B	10	534	0.019	10	0.0	6.869	A

08:45 - 09:00

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-ACD	70	395	0.178	71	0.2	11.118	B
A-B	20			20			
A-C	428			428			
A-D	4	538	0.008	5	0.0	6.742	A
D-ABC	13	449	0.030	14	0.0	8.267	A
C-D	3			3			
C-A	525			525			
C-B	8	561	0.014	8	0.0	6.515	A

09:00 - 09:15

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-ACD	59	427	0.138	59	0.2	9.799	A
A-B	17			17			
A-C	358			358			
A-D	4	561	0.007	4	0.0	6.454	A
D-ABC	11	480	0.024	11	0.0	7.676	A
C-D	2			2			
C-A	440			440			
C-B	7	580	0.012	7	0.0	6.278	A

2038, 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	Site Access/Mill Rd/Springbank	Crossroads	Two-way	0.67	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	2038	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 (%)
A		✓	581	100.000
B		✓	40	100.000
C		✓	535	100.000
D		✓	8	100.000

Origin-Destination Data

Demand (PCU/hr)

		To			
		A	B	C	D
From	A	0	43	528	10
	B	20	0	20	0
	C	502	28	0	5
	D	5	0	3	0

Vehicle Mix

HV %s

		To			
		A	B	C	D
From	A	0	0	1	0
	B	0	0	0	0
	C	1	0	0	0
	D	0	0	0	0

Results

Results Summary for whole modelled period

Stream	Max RFC	Max delay (s)	Max Q (PCU)	Max LOS
B-ACD	0.12	10.80	0.1	B
A-B				
A-C				
A-D	0.02	7.05	0.0	A
D-ABC	0.02	8.94	0.0	A
C-D				
C-A				
C-B	0.06	7.50	0.1	A

Main Results for each time segment

16:45 - 17:00

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-ACD	30	454	0.066	30	0.1	8.476	A
A-B	32			32			
A-C	398			398			
A-D	8	572	0.013	7	0.0	6.376	A
D-ABC	6	484	0.012	6	0.0	7.537	A
C-D	4			4			
C-A	378			378			
C-B	21	564	0.037	21	0.0	6.622	A

17:00 - 17:15

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-ACD	36	423	0.085	36	0.1	9.309	A
A-B	39			39			
A-C	475			475			
A-D	9	551	0.016	9	0.0	6.642	A
D-ABC	7	454	0.016	7	0.0	8.056	A
C-D	4			4			
C-A	451			451			
C-B	25	542	0.046	25	0.0	6.967	A

17:15 - 17:30

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-ACD	44	377	0.117	44	0.1	10.792	B
A-B	47			47			
A-C	581			581			
A-D	11	522	0.021	11	0.0	7.048	A
D-ABC	9	412	0.021	9	0.0	8.935	A
C-D	6			6			
C-A	553			553			
C-B	31	511	0.060	31	0.1	7.501	A

17:30 - 17:45

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-ACD	44	377	0.117	44	0.1	10.801	B
A-B	47			47			
A-C	581			581			
A-D	11	522	0.021	11	0.0	7.048	A
D-ABC	9	412	0.021	9	0.0	8.936	A
C-D	6			6			
C-A	553			553			
C-B	31	511	0.060	31	0.1	7.502	A

17:45 - 18:00

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-ACD	36	422	0.085	36	0.1	9.322	A
A-B	39			39			
A-C	475			475			
A-D	9	551	0.016	9	0.0	6.646	A
D-ABC	7	454	0.016	7	0.0	8.059	A
C-D	4			4			
C-A	451			451			
C-B	25	542	0.046	25	0.0	6.968	A

18:00 - 18:15

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-ACD	30	454	0.066	30	0.1	8.491	A
A-B	32			32			
A-C	398			398			
A-D	8	572	0.013	8	0.0	6.378	A
D-ABC	6	484	0.012	6	0.0	7.541	A
C-D	4			4			
C-A	378			378			
C-B	21	564	0.037	21	0.0	6.626	A

APPENDIX F

ARCADY Junction Model Output
Established Mill Rd/Millrace Ave Roundabout

Established Mill Rd/Millrace Ave Roundabout
Summary ARCADY Results in Order as included herein
(Robust & Worst Case)

Modelled Scenario	Period Mean Max Q (PCUs)	Period Max RFC
2023 Opening Year AM Peak	<1	0.38
2023 Opening Year PM Peak	<1	0.44
2038 Design Year AM Peak	<1	0.44
2038 Design Year PM Peak	<1	0.52

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

NB *Any Small Changes to Selected Opening Year 2023 or Design Year 2038 will have no significant implications in terms of the conclusions of the Study.*

Junctions 9

ARCADY 9 - Roundabout Module

Filename: 2023 AM PM.j9
Path: C:\Users\Eoin\NRB Consulting Engineers Ltd\NRB Server - Documents\2020\20-053 Mill Rd SHD Tetrarch\Calculations\Mill Rd Millrace Rd Arcadys
Report generation date: 06/11/2020 16:49:33

Summary of junction performance

	AM				PM			
	Q (PCU)	Delay (s)	RFC	LOS	Q (PCU)	Delay (s)	RFC	LOS
	2023							
Arm 1	0.5	4.44	0.35	A	0.8	5.21	0.44	A
Arm 2	0.2	4.22	0.17	A	0.1	3.90	0.06	A
Arm 3	0.6	4.75	0.38	A	0.6	4.68	0.38	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	06/11/2020
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	2023	AM	ONE HOUR	07:45	09:15	15
D2	2023	PM	ONE HOUR	16:45	18:15	15

Analysis Set Details

ID	Network flow scaling factor (%)
A1	100.000

2023, AM

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction Type	Junction Delay (s)	Junction LOS
1	Mill Rd - Millrace Rd Roundabout	Standard Roundabout	4.54	A

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Arms

Arms

Arm	Name	Description
1	Mill Rd South	
2	Millrace Ave	
3	Mill Rd N	

Roundabout Geometry

Arm	V (m)	E (m)	l' (m)	R (m)	D (m)	PHI (deg)	Exit only
1	3.00	4.50	12.0	15.0	30.0	15.0	
2	3.00	4.50	12.0	15.0	30.0	15.0	
3	3.00	4.50	12.0	15.0	30.0	15.0	

Slope / Intercept / Capacity

Roundabout Slope and Intercept used in model

Arm	Final slope	Final intercept (PCU/hr)
1	0.583	1278
2	0.583	1278
3	0.583	1278

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	2023	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		✓	395	100.000
2		✓	160	100.000
3		✓	420	100.000

Origin-Destination Data

Demand (PCU/hr)

		To		
		1	2	3
From	1	0	22	373
	2	79	0	81
	3	383	37	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	0.35	4.44	0.5	A
2	0.17	4.22	0.2	A
3	0.38	4.75	0.6	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	297	28	1262	0.236	296	0.3	3.761	A
2	120	280	1115	0.108	120	0.1	3.652	A
3	316	59	1243	0.254	315	0.3	3.911	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	355	33	1258	0.282	355	0.4	4.023	A
2	144	335	1083	0.133	144	0.2	3.872	A
3	378	71	1236	0.305	377	0.4	4.230	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	435	41	1254	0.347	434	0.5	4.433	A
2	176	410	1039	0.170	176	0.2	4.213	A
3	462	87	1227	0.377	462	0.6	4.746	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	435	41	1254	0.347	435	0.5	4.438	A
2	176	411	1038	0.170	176	0.2	4.216	A
3	462	87	1227	0.377	462	0.6	4.754	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	355	33	1258	0.282	356	0.4	4.031	A
2	144	336	1082	0.133	144	0.2	3.876	A
3	378	71	1236	0.305	378	0.4	4.241	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	297	28	1261	0.236	298	0.3	3.776	A
2	120	281	1114	0.108	121	0.1	3.662	A
3	316	60	1243	0.254	317	0.3	3.927	A

2023, PM

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction Type	Junction Delay (s)	Junction LOS
1	Mill Rd - Millrace Rd Roundabout	Standard Roundabout	4.90	A

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D2	2023	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		✓	498	100.000
2		✓	58	100.000
3		✓	439	100.000

Origin-Destination Data

Demand (PCU/hr)

		To		
		1	2	3
From	1	0	60	438
	2	28	0	30
	3	390	49	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	0.44	5.21	0.8	A
2	0.06	3.90	0.1	A
3	0.38	4.68	0.6	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	375	37	1256	0.298	373	0.4	4.110	A
2	44	328	1087	0.040	43	0.0	3.485	A
3	331	21	1266	0.261	329	0.4	3.877	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	448	44	1252	0.358	447	0.6	4.514	A
2	52	393	1049	0.050	52	0.1	3.647	A
3	395	25	1263	0.312	394	0.5	4.183	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	548	54	1246	0.440	547	0.8	5.196	A
2	64	481	997	0.064	64	0.1	3.895	A
3	483	31	1260	0.384	483	0.6	4.675	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	548	54	1246	0.440	548	0.8	5.208	A
2	64	482	997	0.064	64	0.1	3.897	A
3	483	31	1260	0.384	483	0.6	4.682	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	448	44	1252	0.358	449	0.6	4.531	A
2	52	395	1048	0.050	52	0.1	3.653	A
3	395	25	1263	0.312	395	0.5	4.193	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	375	37	1256	0.298	375	0.4	4.132	A
2	44	330	1085	0.040	44	0.0	3.492	A
3	331	21	1265	0.261	331	0.4	3.893	A

Junctions 9

ARCADY 9 - Roundabout Module

Filename: 2038 AM PM.j9
Path: C:\Users\Eoin\NRB Consulting Engineers Ltd\NRB Server - Documents\2020\20-053 Mill Rd SHD Tetrarch\Calculations\Mill Rd Millrace Rd Arcadys
Report generation date: 06/11/2020 17:01:02

Summary of junction performance

	AM				PM			
	Q (PCU)	Delay (s)	RFC	LOS	Q (PCU)	Delay (s)	RFC	LOS
	2038							
Arm 1	0.7	4.92	0.41	A	1.1	6.04	0.52	A
Arm 2	0.3	4.60	0.21	A	0.1	4.15	0.08	A
Arm 3	0.8	5.37	0.44	A	0.8	5.26	0.45	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	06/11/2020
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	2038	AM	ONE HOUR	07:45	09:15	15
D2	2038	PM	ONE HOUR	16:45	18:15	15

Analysis Set Details

ID	Network flow scaling factor (%)
A1	100.000

2038, AM

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction Type	Junction Delay (s)	Junction LOS
1	Mill Rd - Millrace Rd Roundabout	Standard Roundabout	5.06	A

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Arms

Arms

Arm	Name	Description
1	Mill Rd South	
2	Millrace Ave	
3	Mill Rd N	

Roundabout Geometry

Arm	V (m)	E (m)	l' (m)	R (m)	D (m)	PHI (deg)	Exit only
1	3.00	4.50	12.0	15.0	30.0	15.0	
2	3.00	4.50	12.0	15.0	30.0	15.0	
3	3.00	4.50	12.0	15.0	30.0	15.0	

Slope / Intercept / Capacity

Roundabout Slope and Intercept used in model

Arm	Final slope	Final intercept (PCU/hr)
1	0.583	1278
2	0.583	1278
3	0.583	1278

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	2038	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		✓	464	100.000
2		✓	188	100.000
3		✓	491	100.000

Origin-Destination Data

Demand (PCU/hr)

		To		
		1	2	3
From	1	0	26	438
	2	93	0	95
	3	448	43	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	0.41	4.92	0.7	A
2	0.21	4.60	0.3	A
3	0.44	5.37	0.8	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	349	32	1259	0.277	348	0.4	3.984	A
2	142	328	1086	0.130	141	0.2	3.843	A
3	370	70	1237	0.299	368	0.4	4.177	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	417	39	1255	0.332	417	0.5	4.334	A
2	169	393	1049	0.161	169	0.2	4.131	A
3	441	84	1229	0.359	441	0.6	4.610	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	511	47	1250	0.409	510	0.7	4.907	A
2	207	482	997	0.208	207	0.3	4.598	A
3	541	102	1218	0.444	540	0.8	5.350	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	511	47	1250	0.409	511	0.7	4.917	A
2	207	482	997	0.208	207	0.3	4.603	A
3	541	102	1218	0.444	541	0.8	5.366	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	417	39	1255	0.332	418	0.5	4.347	A
2	169	394	1048	0.161	169	0.2	4.140	A
3	441	84	1229	0.359	442	0.6	4.627	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	349	32	1259	0.277	350	0.4	4.003	A
2	142	330	1085	0.130	142	0.2	3.854	A
3	370	70	1237	0.299	370	0.4	4.199	A

2038, PM

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction Type	Junction Delay (s)	Junction LOS
1	Mill Rd - Millrace Rd Roundabout	Standard Roundabout	5.59	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	2038	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		✓	581	100.000
2		✓	68	100.000
3		✓	514	100.000

Origin-Destination Data

Demand (PCU/hr)

		To		
		1	2	3
From	1	0	70	511
	2	33	0	35
	3	457	57	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	0.52	6.04	1.1	A
2	0.08	4.15	0.1	A
3	0.45	5.26	0.8	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	437	43	1253	0.349	435	0.5	4.435	A
2	51	383	1055	0.049	51	0.1	3.622	A
3	387	25	1263	0.306	385	0.4	4.132	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	522	51	1248	0.419	522	0.7	5.000	A
2	61	459	1010	0.061	61	0.1	3.828	A
3	462	30	1260	0.367	462	0.6	4.548	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	640	63	1241	0.515	638	1.1	6.017	A
2	75	561	951	0.079	75	0.1	4.151	A
3	566	36	1257	0.450	565	0.8	5.249	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	640	63	1241	0.515	640	1.1	6.044	A
2	75	563	950	0.079	75	0.1	4.154	A
3	566	36	1257	0.450	566	0.8	5.264	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	522	51	1248	0.419	524	0.7	5.029	A
2	61	461	1009	0.061	61	0.1	3.836	A
3	462	30	1260	0.367	463	0.6	4.566	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	437	43	1253	0.349	438	0.5	4.469	A
2	51	385	1053	0.049	51	0.1	3.630	A
3	387	25	1263	0.306	388	0.4	4.155	A

APPENDIX G

ARCADY Junction Model Output
Established Mill Rd/R120 Roundabout

Established Mill Rd/R120 Roundabout
Summary ARCADY Results in Order as included herein
(Robust & Worst Case)

Modelled Scenario	Period Mean Max Q (PCUs)	Period Max RFC
2023 Opening Year AM Peak	2	0.66
2023 Opening Year PM Peak	2	0.61
2038 Design Year AM Peak	4	0.81
2038 Design Year PM Peak	3	0.76

All Results Above are below the recommended RFC of 0.85 (85% Capacity) and therefore no problems are anticipated at the Established Junction in terms of Capacity or excessive vehicle Queues.

NB *Any Small Changes to Selected Opening Year 2023 or Design Year 2038 will have no significant implications in terms of the conclusions of the Study*

Junctions 9

ARCADY 9 - Roundabout Module

Filename: 2023 AM PM.j9
Path: C:\Users\Eoin\NRB Consulting Engineers Ltd\NRB Server - Documents\2020\20-053 Mill Rd SHD Tetrarch\Calculations\Mill Rd R120 Roundabout
Report generation date: 06/11/2020 17:37:36

Summary of junction performance

	AM				PM			
	Q (PCU)	Delay (s)	RFC	LOS	Q (PCU)	Delay (s)	RFC	LOS
	2023							
Arm 1	1.2	7.78	0.55	A	0.9	6.32	0.46	A
Arm 2	0.7	4.36	0.42	A	1.4	5.98	0.58	A
Arm 3	2.0	8.58	0.66	A	1.6	7.92	0.61	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	06/11/2020
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	2023	AM	ONE HOUR	07:45	09:15	15
D2	2023	PM	ONE HOUR	16:45	18:15	15

Analysis Set Details

ID	Network flow scaling factor (%)
A1	100.000

2023, AM

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction Type	Junction Delay (s)	Junction LOS
1	Mill Rd - R120 - N7 Roundabout	Standard Roundabout	7.10	A

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Arms

Arms

Arm	Name	Description
1	Mill Rd South	
2	R120 to Avoca etc	
3	N7 Off Slip Entry and Exit	

Roundabout Geometry

Arm	V (m)	E (m)	l' (m)	R (m)	D (m)	PHI (deg)	Exit only
1	3.50	5.50	15.0	15.0	36.0	15.0	
2	3.50	5.50	15.0	15.0	36.0	15.0	
3	3.50	5.50	15.0	15.0	30.0	15.0	

Slope / Intercept / Capacity

Roundabout Slope and Intercept used in model

Arm	Final slope	Final intercept (PCU/hr)
1	0.628	1538
2	0.628	1538
3	0.636	1538

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	2023	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		✓	512	100.000
2		✓	538	100.000
3		✓	755	100.000

Origin-Destination Data

Demand (PCU/hr)

		To		
		1	2	3
From	1	0	354	158
	2	403	2	133
	3	23	727	5

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	0.55	7.78	1.2	A
2	0.42	4.36	0.7	A
3	0.66	8.58	2.0	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	385	550	1193	0.323	384	0.5	4.485	A
2	405	122	1462	0.277	403	0.4	3.432	A
3	568	304	1345	0.423	565	0.7	4.647	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	460	659	1125	0.409	459	0.7	5.459	A
2	484	146	1446	0.334	483	0.5	3.772	A
3	679	364	1307	0.519	677	1.1	5.760	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	564	805	1033	0.546	562	1.2	7.686	A
2	592	179	1426	0.415	592	0.7	4.352	A
3	831	445	1255	0.662	828	1.9	8.440	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	564	808	1031	0.547	564	1.2	7.782	A
2	592	179	1426	0.416	592	0.7	4.362	A
3	831	446	1255	0.662	831	2.0	8.577	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	460	663	1122	0.410	462	0.7	5.531	A
2	484	147	1446	0.335	484	0.5	3.783	A
3	679	365	1306	0.520	682	1.1	5.856	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	385	554	1190	0.324	386	0.5	4.528	A
2	405	123	1461	0.277	406	0.4	3.447	A
3	568	305	1344	0.423	570	0.7	4.703	A

2023, PM

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction Type	Junction Delay (s)	Junction LOS
1	Mill Rd - R120 - N7 Roundabout	Standard Roundabout	6.75	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	2023	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		✓	453	100.000
2		✓	754	100.000
3		✓	664	100.000

Origin-Destination Data

Demand (PCU/hr)

		To		
		1	2	3
From	1	0	307	146
	2	438	60	256
	3	52	612	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	0.46	6.32	0.9	A
2	0.58	5.98	1.4	A
3	0.61	7.92	1.6	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	341	503	1222	0.279	339	0.4	4.113	A
2	568	109	1470	0.386	565	0.6	4.005	A
3	500	373	1301	0.384	497	0.6	4.511	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	407	603	1160	0.351	407	0.5	4.825	A
2	678	131	1456	0.466	677	0.9	4.657	A
3	597	447	1254	0.476	596	0.9	5.515	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	499	737	1075	0.464	497	0.9	6.279	A
2	830	160	1438	0.577	828	1.4	5.942	A
3	731	547	1191	0.614	728	1.6	7.822	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	499	740	1074	0.465	499	0.9	6.324	A
2	830	161	1437	0.578	830	1.4	5.982	A
3	731	548	1190	0.615	731	1.6	7.922	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	407	607	1157	0.352	409	0.6	4.865	A
2	678	132	1456	0.466	680	0.9	4.693	A
3	597	449	1253	0.476	600	0.9	5.589	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	341	507	1220	0.280	342	0.4	4.143	A
2	568	110	1469	0.386	569	0.6	4.038	A
3	500	376	1300	0.385	501	0.6	4.561	A

Junctions 9

ARCADY 9 - Roundabout Module

Filename: 2038 AM PM.j9
Path: C:\Users\Eoin\NRB Consulting Engineers Ltd\NRB Server - Documents\2020\20-053 Mill Rd SHD Tetrarch\Calculations\Mill Rd R120 Roundabout
Report generation date: 06/11/2020 17:42:48

Summary of junction performance

	AM				PM			
	Q (PCU)	Delay (s)	RFC	LOS	Q (PCU)	Delay (s)	RFC	LOS
	2038							
Arm 1	2.2	12.57	0.69	B	1.4	8.91	0.59	A
Arm 2	1.0	5.08	0.49	A	2.1	8.04	0.68	A
Arm 3	4.1	15.76	0.81	C	3.1	13.30	0.76	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	06/11/2020
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	2038	AM	ONE HOUR	07:45	09:15	15
D2	2038	PM	ONE HOUR	16:45	18:15	15

Analysis Set Details

ID	Network flow scaling factor (%)
A1	100.000

2038, AM

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction Type	Junction Delay (s)	Junction LOS
1	Mill Rd - R120 - N7 Roundabout	Standard Roundabout	11.68	B

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Arms

Arms

Arm	Name	Description
1	Mill Rd South	
2	R120 to Avoca etc	
3	N7 Off Slip Entry and Exit	

Roundabout Geometry

Arm	V (m)	E (m)	l' (m)	R (m)	D (m)	PHI (deg)	Exit only
1	3.50	5.50	15.0	15.0	36.0	15.0	
2	3.50	5.50	15.0	15.0	36.0	15.0	
3	3.50	5.50	15.0	15.0	30.0	15.0	

Slope / Intercept / Capacity

Roundabout Slope and Intercept used in model

Arm	Final slope	Final intercept (PCU/hr)
1	0.628	1538
2	0.628	1538
3	0.636	1538

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	2038	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		✓	593	100.000
2		✓	629	100.000
3		✓	889	100.000

Origin-Destination Data

Demand (PCU/hr)

		To		
		1	2	3
From	1	0	410	183
	2	471	2	156
	3	27	856	6

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	0.69	12.57	2.2	B
2	0.49	5.08	1.0	A
3	0.81	15.76	4.1	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	446	646	1132	0.394	444	0.7	5.261	A
2	474	141	1449	0.327	472	0.5	3.709	A
3	669	355	1313	0.510	665	1.0	5.578	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	533	774	1052	0.507	532	1.0	6.967	A
2	565	169	1432	0.395	565	0.7	4.193	A
3	799	425	1268	0.630	797	1.7	7.665	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	653	942	946	0.690	648	2.2	12.021	B
2	693	207	1409	0.492	691	1.0	5.061	A
3	979	520	1208	0.810	970	4.0	14.722	B

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	653	951	941	0.694	653	2.2	12.571	B
2	693	208	1408	0.492	693	1.0	5.083	A
3	979	521	1207	0.811	978	4.1	15.756	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	533	786	1045	0.510	538	1.1	7.236	A
2	565	171	1431	0.395	567	0.7	4.215	A
3	799	426	1267	0.631	809	1.8	8.085	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	446	653	1128	0.396	448	0.7	5.361	A
2	474	143	1449	0.327	474	0.5	3.733	A
3	669	357	1312	0.510	672	1.1	5.709	A

2038, PM

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction Type	Junction Delay (s)	Junction LOS
1	Mill Rd - R120 - N7 Roundabout	Standard Roundabout	10.13	B

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D2	2038	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		✓	530	100.000
2		✓	880	100.000
3		✓	782	100.000

Origin-Destination Data

Demand (PCU/hr)

		To		
		1	2	3
From	1	0	359	171
	2	509	70	301
	3	61	721	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	0.59	8.91	1.4	A
2	0.68	8.04	2.1	A
3	0.76	13.30	3.1	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	399	592	1166	0.342	397	0.5	4.713	A
2	663	128	1458	0.454	659	0.8	4.529	A
3	589	434	1263	0.466	585	0.9	5.342	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	476	709	1093	0.436	475	0.8	5.879	A
2	791	153	1442	0.549	790	1.2	5.551	A
3	703	520	1208	0.582	701	1.4	7.142	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	584	865	995	0.586	581	1.4	8.726	A
2	969	187	1421	0.682	965	2.1	7.917	A
3	861	635	1134	0.759	854	3.0	12.696	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	584	871	991	0.589	583	1.4	8.905	A
2	969	188	1420	0.682	969	2.1	8.043	A
3	861	637	1133	0.760	861	3.1	13.299	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	476	718	1088	0.438	479	0.8	5.999	A
2	791	155	1441	0.549	795	1.2	5.650	A
3	703	523	1206	0.583	710	1.4	7.424	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	399	598	1163	0.343	400	0.5	4.772	A
2	663	129	1457	0.455	664	0.8	4.589	A
3	589	437	1261	0.467	591	0.9	5.447	A

APPENDIX H

Independent Stage 1 Road Safety Audit & Designer Feedback Form

Title: **STAGE 1 ROAD SAFETY AUDIT**

For;

Proposed Residential Development at Mill Road, Saggart, Co. Dublin.

Client: **NRB Consulting Engineers.**

Date: **October 2021**

Report reference: **1195R01**

VERSION: **FINAL (09-12-2021)**

Prepared By:

Bruton Consulting Engineers Ltd

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CONTENTS SHEET

Contents

1.0 Introduction

This report was prepared in response to a request from Mr. Seamus Nolan, NRB Consulting Engineers, for a Stage 1 Road Safety Audit of the proposed residential development at Mill Road, Saggart Co. Dublin.

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 provided and a site visit by the Audit Team, on the 22nd of October 2021.

The weather at the time of the daytime site visit was dry and the road surface was also 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 to be completed by the Design Team Leader is provided in **Appendix C.**

2.0 Background

It is proposed to construct a residential development (185 apartments, 51 residential houses, 38 Duplex units and an ancillary creche) at Mill Road, Saggart, Co. Dublin on the western side of the Citywest Campus.

Given the location of the proposed scheme with links to the Luas, buses and Saggart itself it is intended that this development will be suitable for non-car owning occupiers.

The scheme is located close to junction 4 on the N7 dual carriageway. This junction does have existing peak hour capacity issues whereby queues from the roundabout extend back to the deceleration lane. For the purposes of this audit this issue, which Transport Infrastructure Ireland and the Design Team are aware of, is deemed outside the scope of the Audit Brief, The collision records discussed below show that there is no trend or cluster of collisions at this location to suggest that the capacity issue has a related safety record.

This audit is focused on the vehicular accesses to the development, the internal road network, footway and cycle network within the development and link to areas external to the development.

It is proposed to provide a pedestrian/cycle link to the Citywest campus.

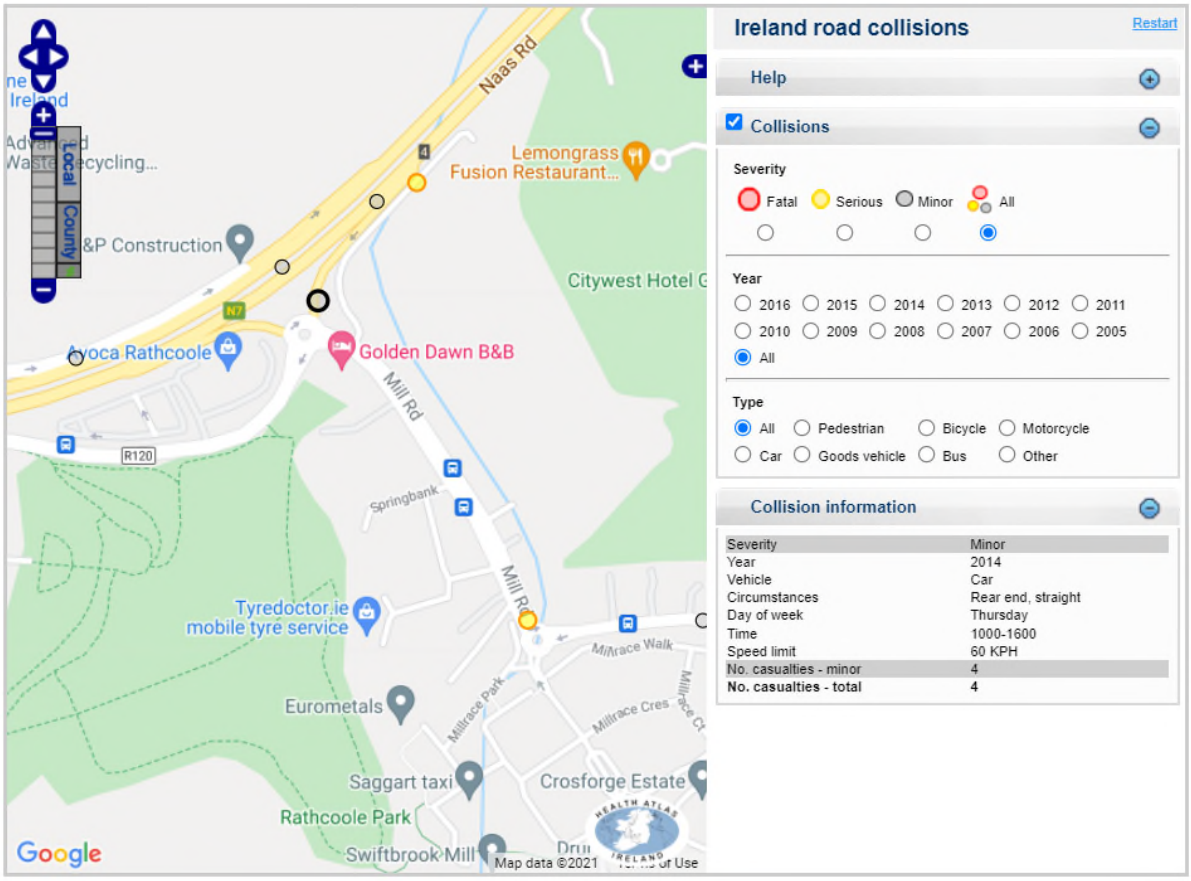
The main internal access road will be 6.0m wide and the others will generally be 5.5m wide. Parking will be a combination of parallel parking and perpendicular parking.

The speed limit on Mill Road is 50km/hr.
It is assumed that the speed limit within the development will be 30km/hr.

The site location is shown below.

Image courtesy of openstreetmap.org

The Road Safety Authority's website www.rsa.ie shows that there was one serious injury collision in 2008 on the parallel road to the N7 which may act as a secondary access, which involved a pedestrian and a car.



3.0 Issues Raised in This Road Safety Audit.

3.1 Problem

LOCATION

Drawing NRB-TA-001 Rev A

PROBLEM

The potential secondary access route to site for service vehicles along the parallel road to the N7 could lead to glare onto mainline N7 drivers from the headlights of vehicles using the parallel road. This could result in loss of control collisions.

RECOMMENDATION

It is recommended that if the potential access is to be used then suitable screening be provided along the N7 boundary and a suitable distance behind the vehicle restraint system.

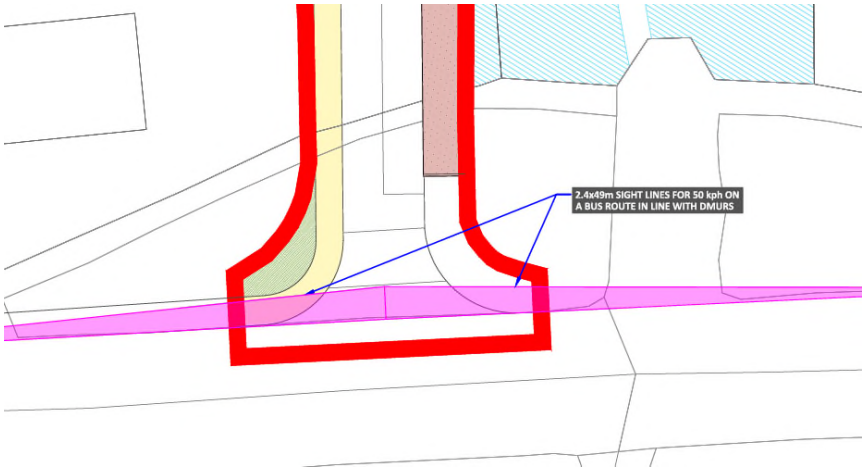
3.2 Problem

LOCATION

Drawing NRB-TA-002 Rev -

PROBLEM

There is an existing bus stop (Stop 3636, route 69) at the location of the proposed access off Mill Road. Drivers exiting the estate may attempt to exit when the bus is stopped leading to collisions with other vehicles that pass out the bus given the wide carriageway at this location due to the presence of the right turning lane for Springbank.



RECOMMENDATION

It is recommended that the bus stop be relocated .

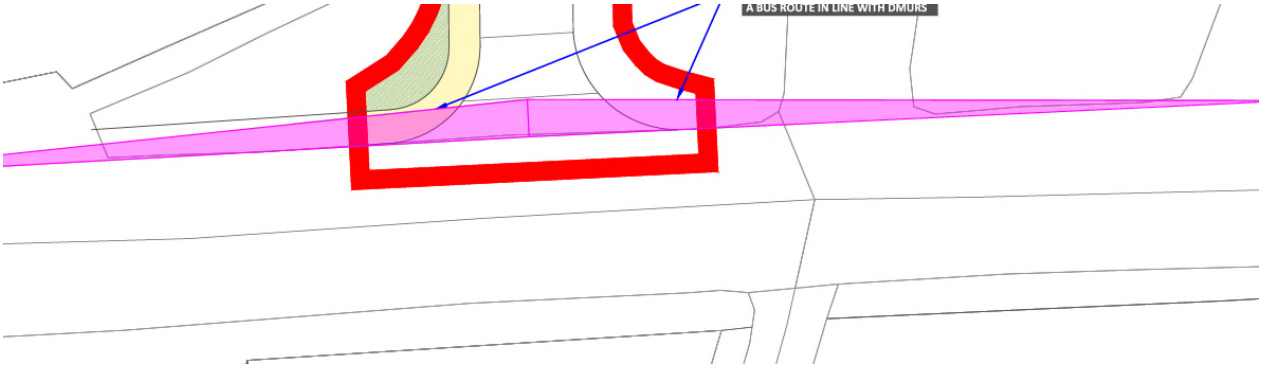
3.3 Problem

LOCATION

Drawing NRB-TA-002 Rev -

PROBLEM

It is proposed to provide a footpath to the corner radius of the proposed access of Mill Road. There is no existing footpath at this location to join to. The existing footpath to the rear of the green area is relatively narrow. The lack of a footpath could lead to pedestrian walking on the grassed area which could lead to slips and falls or on the carriageway which would lead to a greater risk of being struck by a passing vehicle.



RECOMMENDATION

It is recommended that a footpath be provided at the edge of the carriageway along the entire green area with suitable areas of uncontrolled pedestrian crossings to access the footpath on the opposite side of Mill Road for bus users etc.

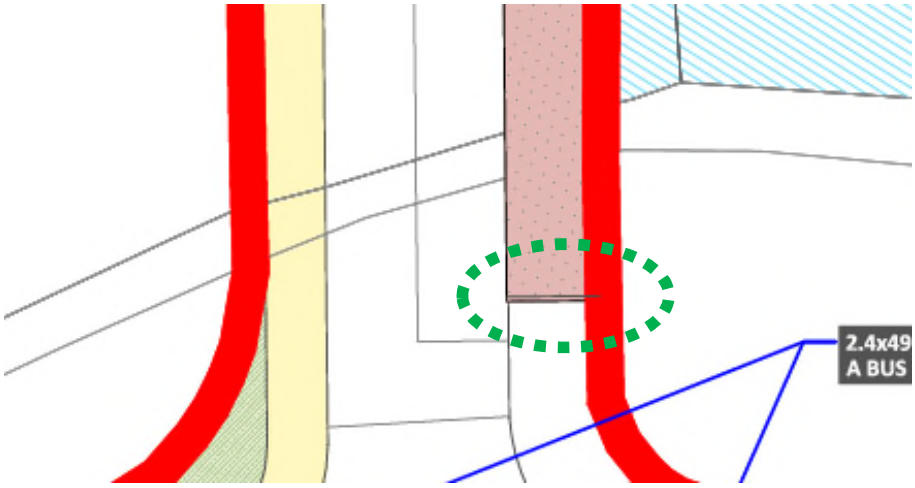
3.4 Problem

LOCATION

Drawing NRB-TA-002 Rev -

PROBLEM

The internal two-way cycle track that is to link with the City West Campus terminates on approach to the Mill Road junction. There are no details provided of how cyclists will access this facility if travelling from Mill Road. This could lead to collisions with cars as cyclists cross the access road or as they merge onto the carriageway after using the facility.



RECOMMENDATION

It is recommended that crossing and transition details be provided for cyclists to use the facility. In addition, interaction with pedestrians on the footpath at the rear of the green area should be taken into account at the detailed design stage.

4.0 Observations

4.1 Observation

Road drainage details have not been provided to the Audit Team. The proposed spot levels suggest relatively flat alignments. It is assumed that suitable road drainage will be provided to prevent surface water ponding.

4.2 Observation

It is assumed that tree of suitable girth, clear stem and canopy height will be chosen so that they do not become obstacles to visibility or hazards for drivers or vulnerable road users.

5.0 Audit Statement

We certify that we have examined the site on the 22nd October 2021. 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: 09/12/2021**

Owen O'Reilly **Signed:** 

(Audit Team Member) **Dated: _09/12/2021**

Appendix A – Problem Location Map

Appendix B

Information Supplied to the Audit Team

- Drawing NRB-TA-001
- Drawing NRB-TA-002
- Drawing NRB-TA-003
- Drawing NRB-TA-004
- Drawing NRB-TA-005
- Drawing NRB-TA-006
- Drawing 19037 PA-001 Proposed Site Plan (Darmody Architecture)

Information Supplied for Background Information

- Transport Assessment Report, NRB, ABP PRE-APP issue

Appendix C

Feedback Form

SAFETY AUDIT FORM – FEEDBACK ON AUDIT REPORT

Scheme: Mill Road, Saggart
Stage: 1 Road Safety Audit
Date Audit (Site Visit) Completed: 22nd October 2021

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 Service Road	Yes	Yes – Appropriate screening will be provided as recommended – will be done at detailed design stage. Note: the service road is likely to rarely if ever be used.		Yes
3.2 Bus Stop	Yes	Yes - Bus Stop will be relocated with the agreement of the NTA/Dublin Bus.		Yes
3.3 Footpath	Yes	Yes - Footpath will be extended as suggested at detailed design stage with the agreement of SDCC.		Yes
3.4 Cycle Facility	Yes	Yes - Transition details, tactile paving and signage will be agreed at detailed design stage. See drawing NRB-RSA-001 for details.		Yes

Observation 4.1 – Drainage Details will form part of Detailed Design Stage.
Observation 4.2 – Tree stems and landscaping will be detailed so as not to impede visibilities.

Signed **Date:** 26th Oct 2021
Design Team Leader

Signed..... **Date**...16/11/2021.....
Audit Team Leader

Signed..... **Date**...16/11/2021.....
Employer

APPENDIX I

Preliminary Planning Stage Mobility Management Plan (Travel Plan)

consulting engineers

NRB

Preliminary
Travel Plan

(Mobility Management Plan)

Appendix I

For

Residential Development

at

Mill Road, Saggart,
Co. Dublin.

SUBMISSION ISSUE

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

Registered in Ireland No. 491679

Contents

Appendices

1.0 INTRODUCTION

1.1 NRB Consulting Engineers have been commissioned to prepare a Preliminary Travel Plan (or Mobility Management Plan) for an application for a Residential Development at Mill Road, Saggart, Co Dublin 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. It should be recognised that a Travel Plan/Mobility Management Plan prepared at planning application stage, when the development is un-built and unoccupied, can only highlight the current and proposed Alternative Transport initiatives in place at the site, and set out the applicant's commitment to the promotion of sustainable transport measures. It is intended that a working MMP will be prepared following completion and occupation, in the event of a grant of planning permission

What is a Travel Plan?

1.2 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.

1.3 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 residents, staff and other visitors. Such a plan usually concentrates on 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

1.4 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-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.

1.5 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.

1.6 It is envisaged that once in place, the Travel Plan will enable the following benefits to be realised for the Residential 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 & 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 residents and visitors.

Methodology

1.7 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)

1.8 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 Development 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.

1.9 This information will then be used as the basis for an assessment, drawing conclusions and recommendations.

2.0 ACCESS TO THE SITE - BY MODE

2.1 The development consists of the construction of a total of 185 apartments, 32 Duplexes and 58 Houses, with an ancillary Crèche, arranged in a modern streetscape setting, on appropriately zoned lands at Mill Road, Saggart, Co Dublin. A location plan is shown below as ***Figure 2.1***.

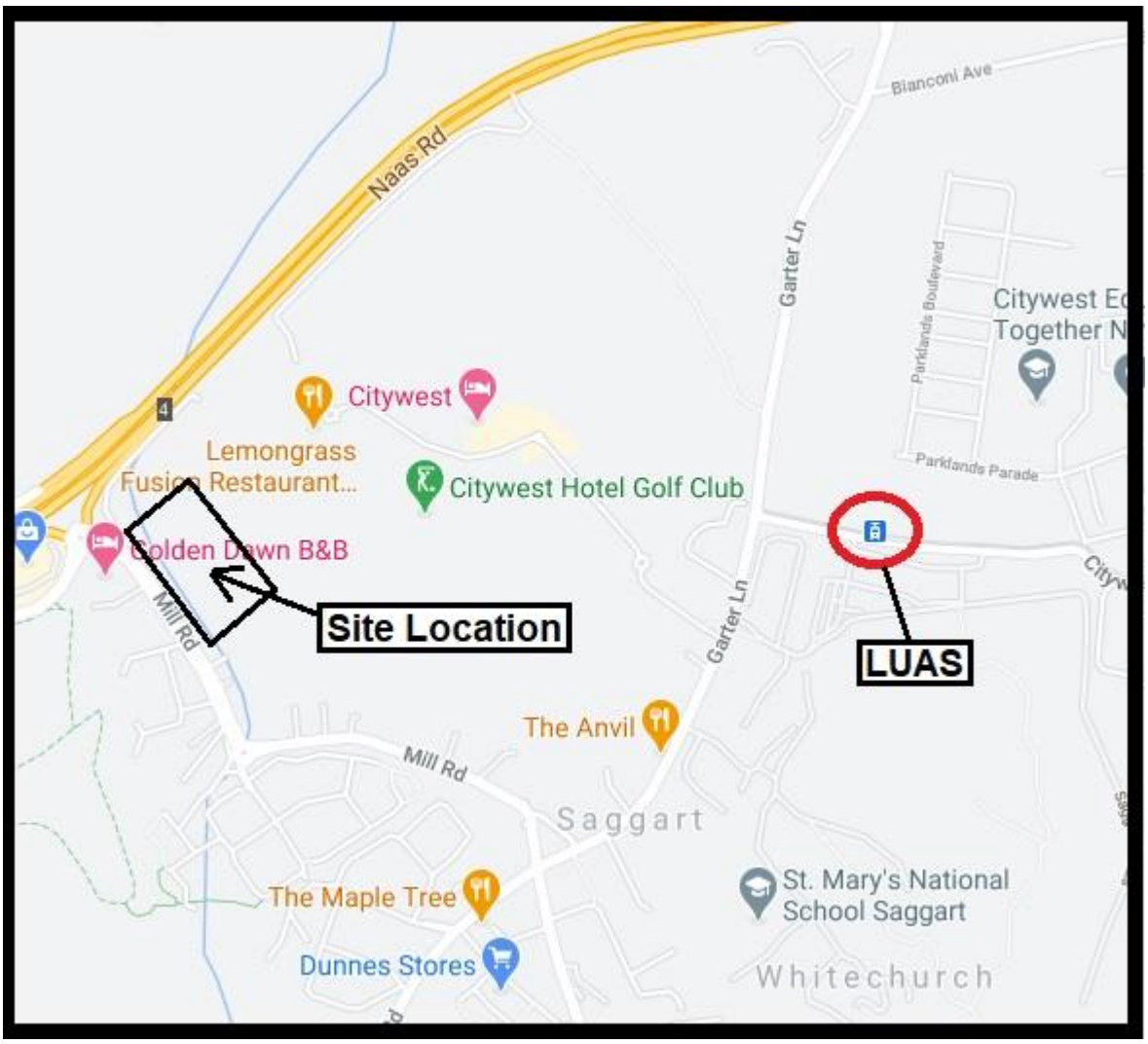


Figure 2.1 – Site Location Map

2.2 It is essential for the successful Travel Planning to concentrate on journeys associated with work & school commuting patterns. These are the groups which can most practically be encouraged to use modes of transport other than the car.

2.3 Notwithstanding this, the development is located in the heart of Saggart and is in very close proximity to the range of public & alternative transport services in Saggart, including Dublin Bus, and in particular is accessible on foot/bicycle to LUAS (and is very close by way of access through the Citywest Hotel Campus).

Pedestrian and Cycling Facilities

2.4 The National Transport Authority (NTA) has surveyed the cycle facilities for the Greater Dublin Area (GDA) as part of the GDA Cycle Network Plan. This plan showing the facilities linking the site with the GDA is included herein as ***Appendix A***. An extract is provided below as ***Figure 2.2*** showing the good network of cycle links connecting the site with the GDA Network.

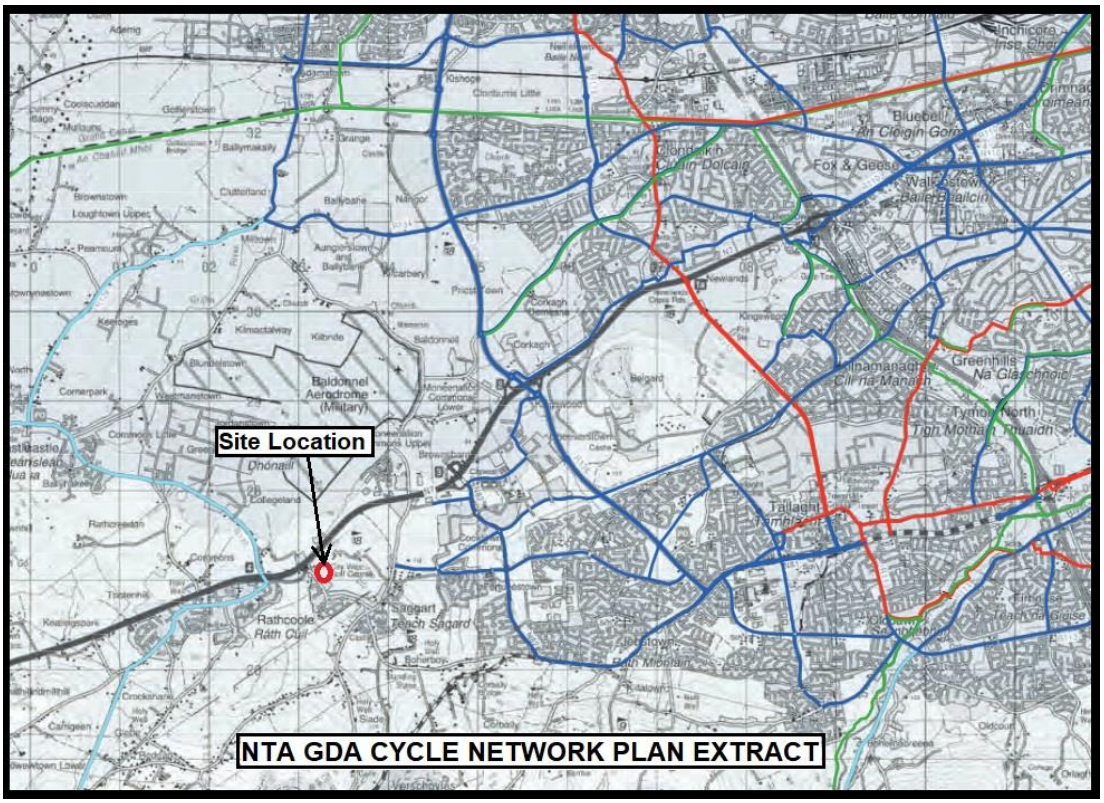


Figure 2.2 – Site and GDA Cycle Network

2.5 The links to the GDA Network will clearly be further enhanced as the overall Citywest Hotel Campus is further opened up and developed, and to this end a dedicated cycle/pedestrian facility is being provided through the Campus as part of this application.

2.6 The use and viability of the local services will therefore be enhanced through the encouragement of the use of bicycles and through the demand management control of limited 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 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).

2.10 It is clear from ***Figure 2.2*** above that it is proposed that the site will be bounded by primary, secondary and Greenway routes linked to the development site by way of the proposed new dedicated cycle & pedestrian facility. This will further creatine a higher quality network of cycle routes linking the site locally, with Tallaght, and onwards to the City Centre.

2.11 The introduction of Toucan crossing facilities for cyclists at all Traffic Signal Controlled junctions within SDCC, a scheme which is being rolled out, will further enhance cyclist accessibility and permeability.

2.12 The location of the proposed development is ideal in terms of encouraging walking. The proximity to City West Business Campus, Baldonnell & Greenogue Business Parks (as high Employment Locations), to Tallaght IT and Tallaght University Hospital and other local employment hubs means that walking combined with LUAS will be an attractive alternative option for the vast majority of residents. In addition, being located in the heart of Saggart and a short distance from every day services such as City West Shopping Centre and Rathcoole Village, reduces the need to travel by car and will assist in encouraging walking and cycling.

2.13 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, as modes of sustainable transport that delivers environmental, health and economic benefits to both the individual and the community.

2.14 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 locally 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 and
- Monitor trends in cycle numbers using cycle counter data.

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

2.16 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.

2.17 In terms of walking, the site is immediately adjacent Bus Stops on Mill Road which are served by frequent Dublin Bus Services (see below). In addition, the site is within a currently acceptable walking distance of the LUAS **by road** through Saggart, as per ***Figure 2.3*** below;

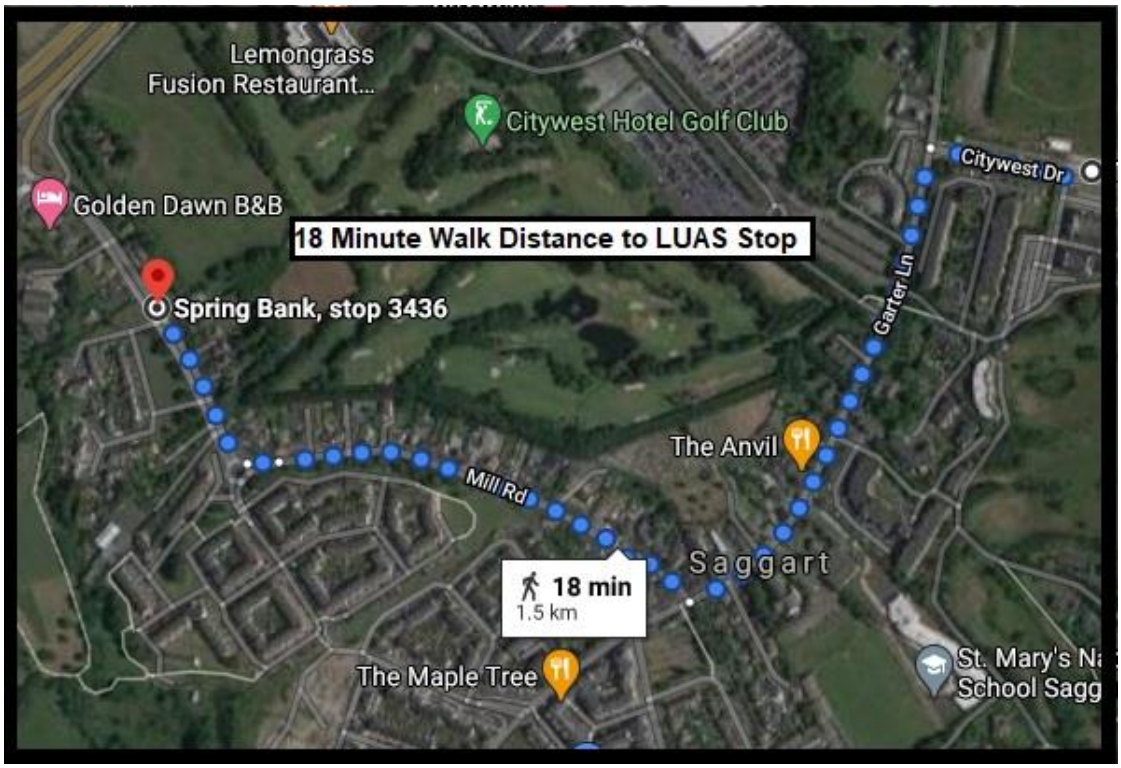


Figure 2.3 – 18min Walk Time to LUAS by Road

2.18 In addition, it is of course proposed to create a new dedicated NCM Compliant Cycle & Pedestrian link through Citywest Campus. This will provide a much closer accessible link to both LUAS and the facilities within the greater Citywest. The new resulting site proximity to LUAS is as illustrated on ***Figure 2.4*** below;

Figure 2.4 – 1km Walk/Cycle to LUAS via Citywest Campus

Cycle Parking

2.19 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 space per bedroom plus 1 visitor space per 2 residential units, and therefore it is proposed to provide secure cycle parking spaces along with secure surface level cycle parking within the development consistent with the Guidelines. This is addressed in Section 2 of the TA Report.

2.20 It is expected that a very significant number of residents will be willing to cycle to work or 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's own 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.

2.21 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. 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.

2.22 Within the secured enclosed cycle storage areas, the arriving and departing cyclists will be required to dismount and walk to the cycle racks with their cycles in a safe manner (something

which occurs without any difficulty at similar facilities in cities throughout the world).

Bus Provision

2.23 Currently #69 Dublin Bus Service serves Mill Road in Saggart, with the route linking Saggart and Rathcoole with the City Centre at Hawkins Street. Bus stops are currently in close proximity to the subject site, as illustrated below as ***Figure 2.5***

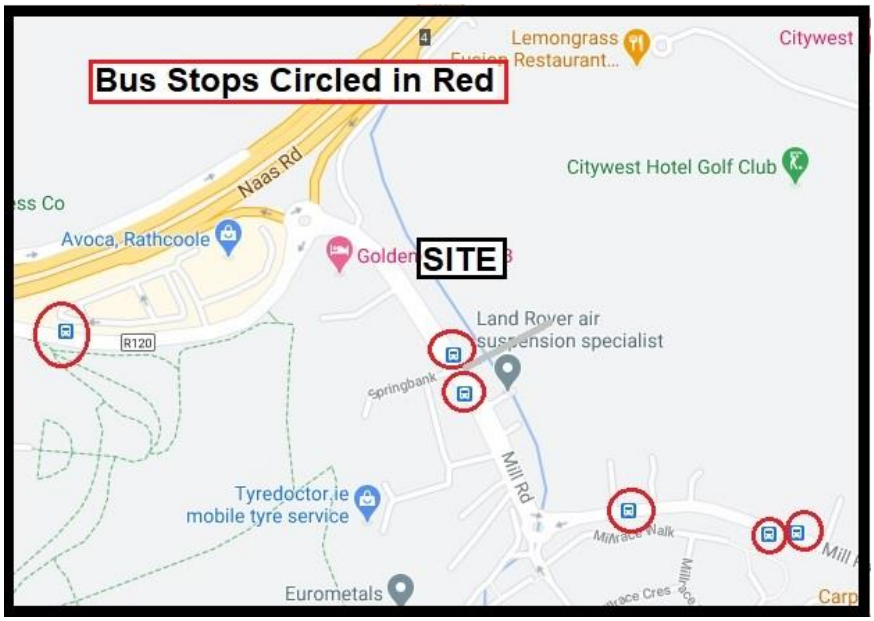
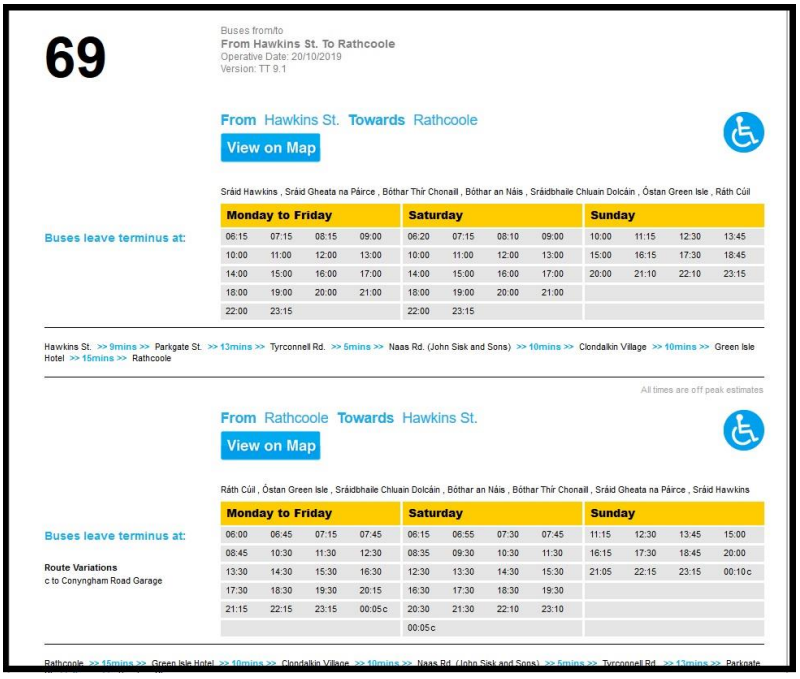


Figure 2.5 – Site Location and Bus Stops

2.24 The service #69 operates a commuter service between the site and the City Centre, with the current Mon-Fri Timetable reproduced below as ***Figure 2.6***



69

Buses from/to
From Hawkins St. To Rathcoole
Operative Date: 20/10/2019
Version: TT 9.1

From Hawkins St. **Towards** Rathcoole
View on Map

Sráid Hawkins , Sráid Gheata na Páirce , Bóthar Thír Chonaill , Bóthar an Náis , Sráidbhaile Chluain Dolcáin , Óstan Green Isle , Ráth Cúil

Buses leave terminus at:

Monday to Friday				Saturday				Sunday			
06:15	07:15	08:15	09:00	06:20	07:15	08:10	09:00	10:00	11:15	12:30	13:45
10:00	11:00	12:00	13:00	10:00	11:00	12:00	13:00	15:00	16:15	17:30	18:45
14:00	15:00	16:00	17:00	14:00	15:00	16:00	17:00	20:00	21:10	22:10	23:15
18:00	19:00	20:00	21:00	18:00	19:00	20:00	21:00				
22:00	23:15			22:00	23:15						

Hawkins St. >> 9mins >> Parkgate St. >> 13mins >> Tyrconnell Rd. >> 5mins >> Naas Rd. (John Sisk and Sons) >> 10mins >> Clondalkin Village >> 10mins >> Green Isle Hotel >> 15mins >> Rathcoole

All times are off peak estimates

From Rathcoole **Towards** Hawkins St.
View on Map

Ráth Cúil , Óstan Green Isle , Sráidbhaile Chluain Dolcáin , Bóthar an Náis , Bóthar Thír Chonaill , Sráid Gheata na Páirce , Sráid Hawkins

Buses leave terminus at:

Monday to Friday				Saturday				Sunday			
06:00	06:45	07:15	07:45	06:15	06:55	07:30	07:45	11:15	12:30	13:45	15:00
08:45	10:30	11:30	12:30	08:35	09:30	10:30	11:30	16:15	17:30	18:45	20:00
13:30	14:30	15:30	16:30	12:30	13:30	14:30	15:30	21:05	22:15	23:15	00:10c
17:30	18:30	19:30	20:15	16:30	17:30	18:30	19:30				
21:15	22:15	23:15	00:05c	20:30	21:30	22:10	23:10				
				00:05c							

Route Variations
c to Conyngham Road Garage

Rathcoole >> 15mins >> Green Isle Hotel >> 10mins >> Clondalkin Village >> 10mins >> Naas Rd. (John Sisk and Sons) >> 5mins >> Tyrconnell Rd. >> 13mins >> Parkgate

Figure 2.6 – Timetable #69 Service (Extract Shows Mon-Fir Frequency)

2.25 All of the Dublin Bus routes currently in use 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 and plans is included herein as an Appendix.

LUAS

2.27 The LUAS Red Line stop of Saggart is in proximity to the site, as demonstrated above. LUAS has become a highly successful travel mode linking City West and Saggart 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 2.7***.

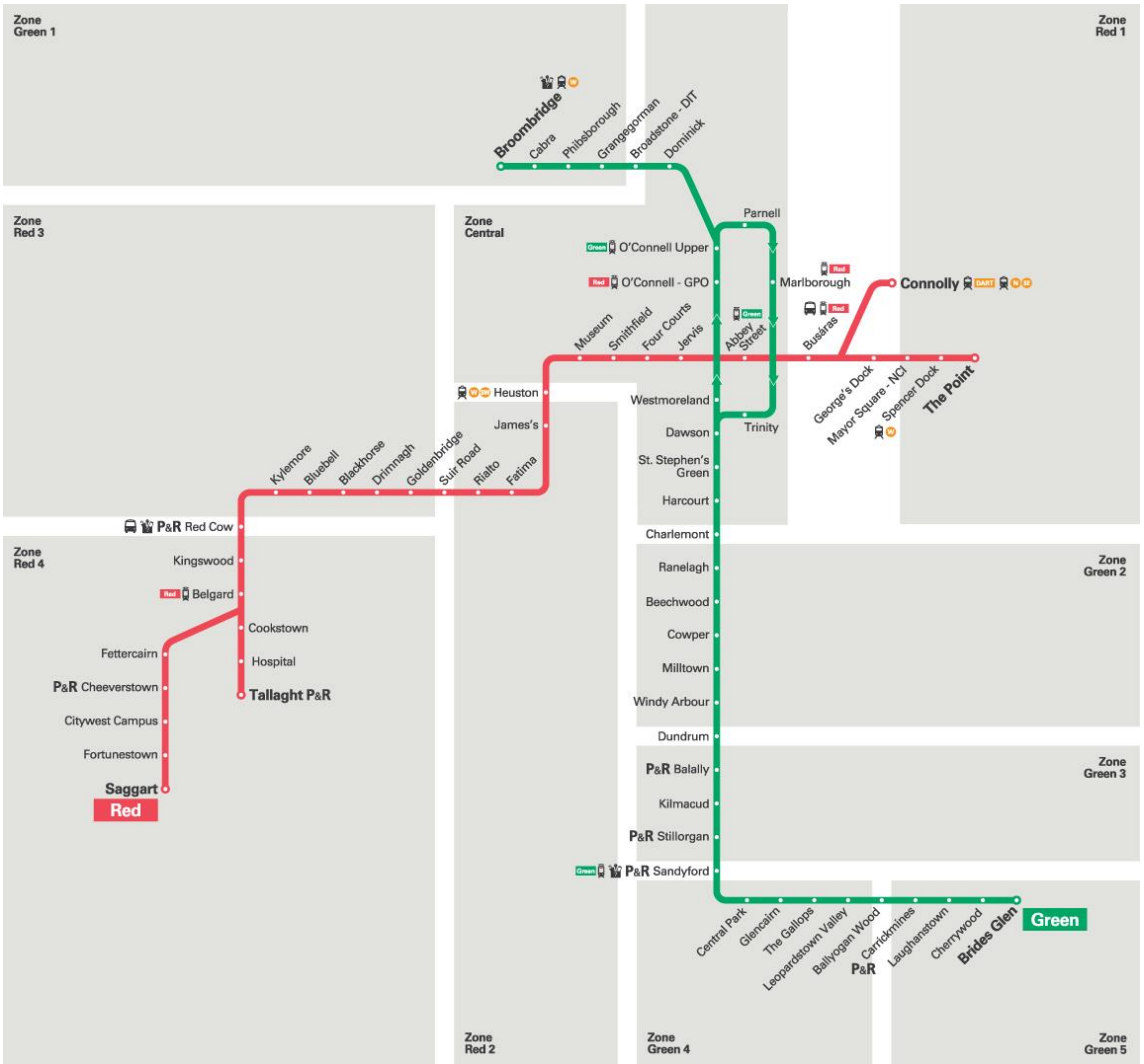


Figure 2.7 - LUAS Services

2.28 The Red Line serving the Saggart Area 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

2.29 The 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 Brides Glen and Broombridge with intermediate stops at St Stephens Green, Westmoreland, Cabra, Phibsborough and Broadstone DIT.

2.30 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***:

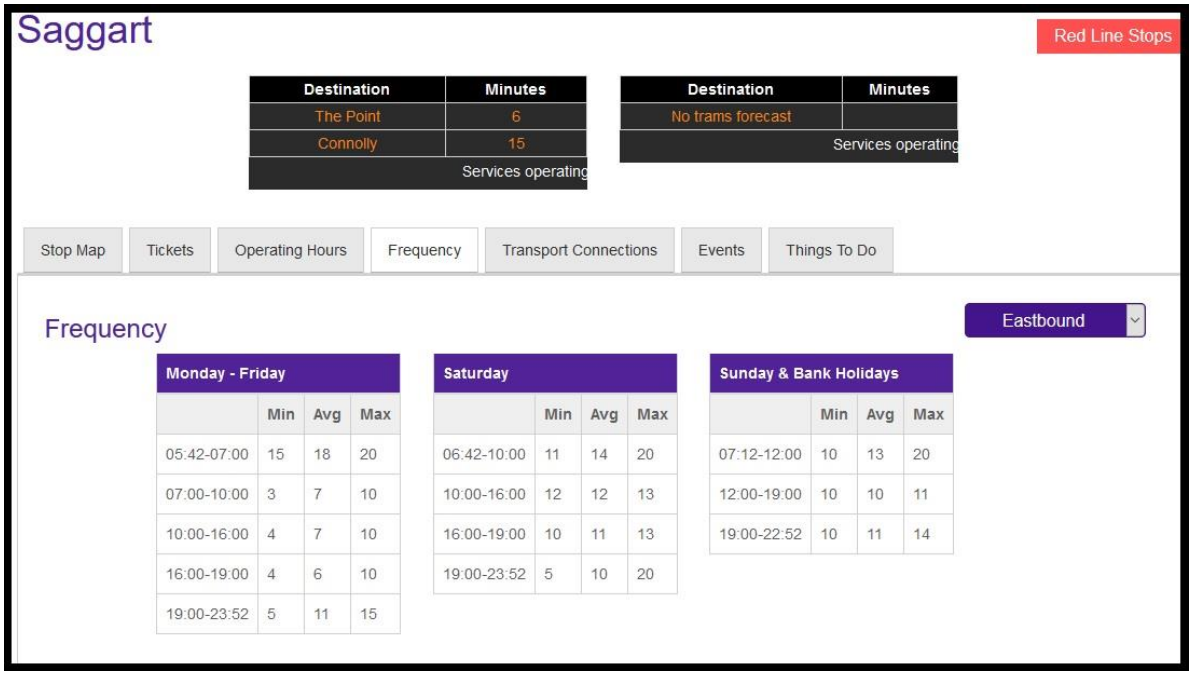


Figure 2.6 - LUAS Service Frequencies (From LUAS Website)

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

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

2.33 In terms of number of transport alternatives easily available to Residents, it is considered that the proposed development is therefore **highly sustainable** 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.

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

2.35 Public transport maps and timetables can be provided in prominent locations on site and the information will be kept up to date by the appointed Travel Plan Coordinator, a role for the Management Company.

2.36 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.

2.37 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

2.38 There are a significantly reduced number of private car parking spaces provided within the site, all at surface level (which can include *Go-Car*, Residential Spaces, mobility impaired and visitor parking). This 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. Given the low number of spaces provided, with effectively less than one parking space per residential unit, 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.

2.39 Details of the justification of the parking provision are set out in Section 2 of the Transportation Assessment Report. However, it is clear that the slightly lower provision of car parking will in itself act as a demand-management measure, ensuring that the development is occupied in the most sustainable manner, being almost predominantly reliant on non-car modes of travel.

2.40 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. These can be dedicated as some of the most accessible spaces and will be clearly visible as-such to other car park users. It is acknowledged that this may require some level of 'policing' by the Management Company.

Electric Vehicle Charging

2.41 The car parking spaces within the site can all easily be designed so that they can be upgraded to allow conversion for Electric Vehicle Charging. The entire car park areas of the subject scheme can and will be 'ducted' to accept cabling to serve a charging point for every car space. Conduits can be run on the walls, or buried within landscaped areas, where charging points can also be 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 can have a lockable cover on it so that only that resident may use the power point. This provision around the parking area would allow 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 Saggart within an acceptable distance of the LUAS.

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 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 sustainable location and good transport links at this development, combined with the limited car parking on site, there will be a high percentage of use accessing 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 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. 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.

4.17 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.

4.18 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.

4.19 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. 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 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 near 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 clear and easy access to alternative non-car modes of travel. With reduced car parking provided, this also acts as a significant demand-management measure in the promotion of alternatives to the car as a first choice mode of travel. 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 through identifying the current & future connections that are available . 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. 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.

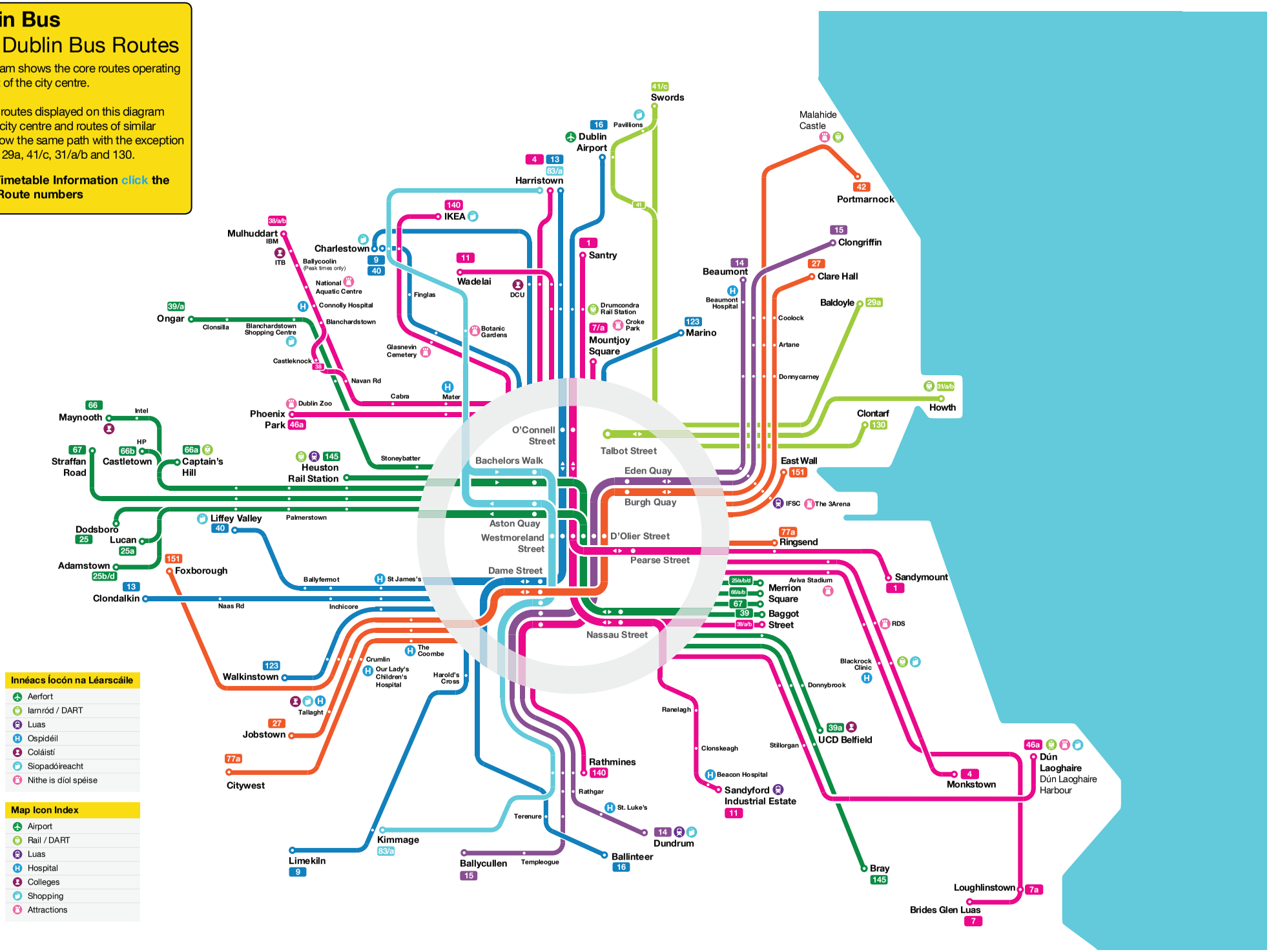
6.8 Annual reviews of the Plan should include a full stakeholder survey, providing valuable information for target setting and marketing target groups. It is emphasised that failing to meet initial targets should not be seen as failure, as the preliminary 12 to 18 months of the plan should be viewed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

Dublin Bus
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
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Operative Date: March 2018

Project:	Title:	Legend:
CYCLE NETWORK PLAN FOR THE GREATER DUBLIN AREA	PROPOSED CYCLE NETWORK DUBLIN METROPOLITAN AREA SHEET CN2	Primary, Secondary, Greenway, Inter-Urban

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APPENDIX J

DMURS
Statement of Consistency

consulting engineers

NRB

DMURS Design Compliance Statement Technical Note

Appendix J

For

Residential Development

At

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SUBMISSION ISSUE

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1.0 INTRODUCTION

1.1 It is NRB's opinion that the proposed residential development is 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 by the entire Design Team. This approach sought to implement a sustainable community connected by well-designed links, layout and accesses - which combined deliver attractive, convenient and safe access in addition to promoting modal shift and viable alternatives to car based journeys.

1.2 The following section discusses design features which are incorporated within the proposed mixed 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 & route choices along direct, attractive and safe linkages to local amenities and schools/service destinations.

2.2 High Quality Connections between the proposed development and the local roads and public transport services are provided. The internal road layout itself 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 and proposed local network whilst avoiding cul-de-sacs. Dedicated routes are provided for pedestrians and for cyclists from Mill Road.

2.3 As part of the development the movement function is designed to respect the different levels of motorised traffic whilst optimising access to/from alternative transport and catering for higher number of pedestrians & cyclists. In parallel the adopted design philosophy has sought to consider the context / place status of the scheme in terms of level of connectivity provided, quality of the proposed design, level of pedestrian / cyclists activity and vulnerable users requirements whilst identifying appropriate 'transition' solutions 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) The main vehicular access to the development is by way of a simple priority controlled junction from Mill Road, with separate dedicated provision for pedestrians and cyclises,

b) The proposed scheme includes provision of linkages with already-permitted local developments & future connectivity to & through Citywest Hotel Campus, thereby enhancing the street network and permeability. The combined plans offer a well-connected and improved 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'. This is clearly provided for within the layout design.

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

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 no less than 1.8m (generally 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, are provided at the site access junctions to the external road network, and internally within the site, with Forward Stopping Distance maintained around bends.

h) Well designed and frequent pedestrian crossing facilities will be provided along key travel desire lines throughout the scheme in addition to those located at street nodes where raised platforms are provided.

i) All courtesy crossings will be provided with either dropped kerbs and/or raised tables, thereby allowing pedestrians to informally assert a degree of priority. The street activity and landscaping design within the open space aid in this aspect of the layout.

j) At the Mill Road Access Junction, a formal signalised controlled 'Toucan' crossing for pedestrians/cyclists can be provided on Mill Road in the event that SDCC consider this necessary.

k) Internally, 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.

l) 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 be of further reduced radii where feasible in line with DMURS guidance.

m) Internally within the development, where carriageway kerb are required, heights will be typically 75-80mm in accordance with the objectives of DMURS.

n) Within the development, as required, cyclists will share the carriageway with other street users as per the National Cycle Manual guidance for such situations and best practice for residential streets of this nature.

o) 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.