consulting engineers

NRB

Transportation Assessment Report

including….

Mobility Management Plan

(Appendix F)

DMURS Statement of Consistency

(Appendix G)

Independent Stage 1 Road Safety/Quality Audit

(Appendix H)

Bus/LUAS Capacity Report

(Appendix I)

For

Proposed Residential Apartment Development

at

'Karuna' & 'Glenina' Sandyford Road, Dublin 18.

on behalf of

Midsal Homes Ltd.

FINAL ISSUE

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EXECUTIVE SUMMARY

NRB Consulting Engineers Ltd were appointed to address the Traffic & Transportation impact associated with the construction of a proposed residential apartment development on lands at 'Karuna' and 'Glenina' Sandyford Road, Dublin 18. The proposed development principally consists of the demolition of the existing dwelling and ancillary buildings known as 'Glenina', the existing dwelling known as 'Karuna' and the existing boundary wall fronting Sandyford Road, and the construction of a residential development principally comprising 137 No. apartments (32 No. 1-bed units, 78 No. 2-bed units and 27 No. 3-bed units) in 4 No. blocks ranging in height from part-1 No. storey to part-6 No. storeys with a part-basement/part-undercroft level (at Blocks B, C and D).

We have assessed the impact of the traffic associated with the proposed development, together with the established traffic on the adjacent affected road network for the AM Peak and PM Peak Hours.

The Transportation Assessment has been prepared in accordance with the TII's Traffic & Transportation Assessment Guidelines and addresses the traffic impact of the proposals. The assessment is based on comprehensive Weekday AM & Weekday PM Peak classified interval turning movement surveys of the local roads carried out in 2021, when schools were fully open and then applied a 'covid factor' utilising adjacent TII Traffic Counter Data to adjust the data to reflect non-pandemic times. This represents industry-standard procedure, being a pragmatic approach in the context of the statutory timeframes applied to planning applications during a pandemic. This traffic survey data formed the basis of the study, and this is included herein as ***Appendix B***.

The Report & analysis includes an assessment of impact of the proposed development traffic during the projected Opening Year 2024 together with an assessment of the Design Year 2039 (15 years following opening). Whilst we have selected an opening year of 2024, it should be noted that, if required, minor changes of 2-3 years in the choice of opening or design year would have no effect on the conclusions of this study.

The Transportation Assessment Report confirms that there is a negligible and unnoticeable traffic impact associated with the opening of the proposed subject development, and that it can be accommodated without any adverse traffic impact arising.

The proposed building line is sufficiently setback from the Sandyford Road to ensure it does not prejudice the future delivery of the proposed Blackglen Road / Harold's Grange Road Improvement Scheme which ties into the existing road, footpath and cycle lane alignments at the site frontage.

The scheme also delivers a new pedestrian connection to link to Coolkill / Cul Cuille directly to the north of the site, improving permeability for all pedestrians, including the proposed development.

The assessment includes a Preliminary Mobility Management Plan (MMP or Travel Plan) for the site which is included as ***Appendix F***. We have also prepared a Statement of Consistency with DMURS and confirm that the internal layout is compliant with the requirements, included as ***Appendix G***.

An independent Stage 1 Road Safety Audit including Quality Audit, together with the Designer Feedback form, has been undertaken and is included as ***Appendix H***. An assessment of impact/capacity on Bus/LUAS has also been undertaken and is included as ***Appendix I***. A 'Cycle Audit' is included at Section 2.0 below.

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

1.0 INTRODUCTION

1.1 This Transportation Assessment (TA) has been prepared by NRB Consulting Engineers Ltd and addresses the transportation capacity considerations relating to the proposal to construct a residential development on lands at 'Karuna' and 'Glenina' Sandyford Road, Dublin 18.

1.2 The proposed development principally consists of the demolition of the existing dwelling and ancillary buildings known as 'Glenina', the existing dwelling known as 'Karuna' and the existing boundary wall fronting Sandyford Road, and the construction of a residential development principally comprising 137 No. apartments (32 No. 1-bed units, 78 No. 2-bed units and 27 No. 3-bed units) in 4 No. blocks ranging in height from part-1 No. storey to part-6 No. storeys with a part-basement/part-undercroft level (at Blocks B, C and D).

1.3 A site location plan for the development is included below as ***Figure 1.1***.

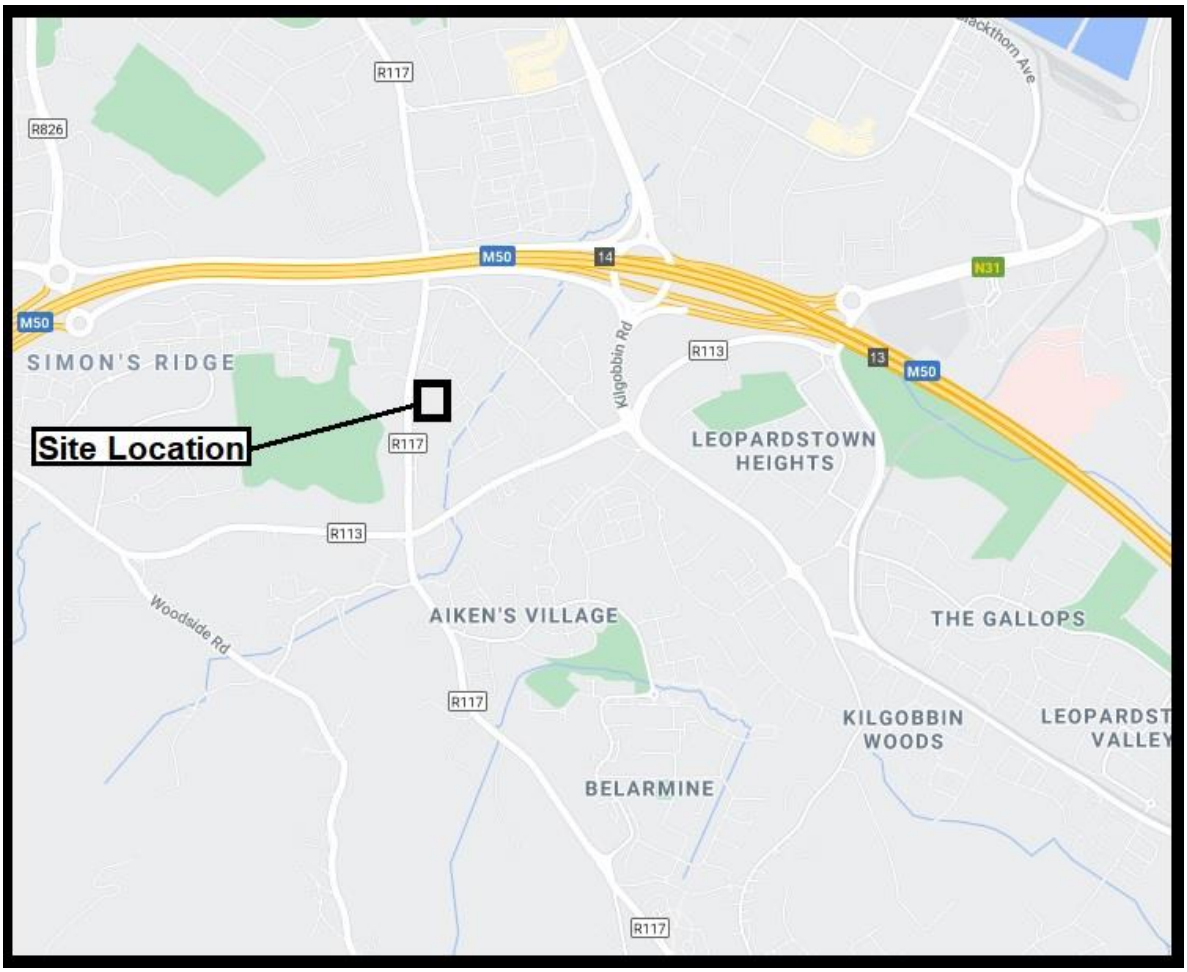


Figure 1.1: Site Location Plan in Context of Dublin

1.4 This Report addresses the impact of the proposed development and the implications for the adjacent road network for the weekday AM and PM Peak Hours, taking account of existing traffic conditions factored to projected opening and design year.

1.5 The site is considered to represent a sustainable location for primarily residential development of the nature proposed, in the context of both the short term and medium term Bus Services available and its location adjacent Sandyford Village and the Sandyford Business and Employment Zone. This is clearly supported by the Preliminary Mobility Management Plan included as ***Appendix F***.

1.6 It is proposed to provide vehicular access to the site by way of a simple priority controlled junction, replacing an existing access onto Sandyford Road. A second existing vehicular access is to be closed as part of the development. Drawings showing the access arrangement are included herein within **Appendix A**.

1.7 The proposed building line is sufficiently setback from the Sandyford Road to ensure it does not prejudice the future delivery of the proposed Blackglen Road / Harold's Grange Road Improvement Scheme which ties into the existing road, footpath and cycle lane alignments at the site frontage. Drawings showing the published Part 8 Compulsory Purchase Order acquisition line are included herein within **Appendix A**.

1.8 The layout and design of the scheme will meet the requirements of DMURS in terms of layout & geometric design (Refer to layout plan included herein as ***Appendix A***).

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

- Appropriate Scale of Development Proposals (conscious that the development constitutes primarily replacement residential development in a long-established area), with access via a simple priority junction onto Sandyford Road,
- Location of the development adjacent relatively frequent bus services and the services and facilities available serving Sandyford Village and the Sandyford Business and Employment Zone,
- The site location with Section 49 Luas contribution scheme area and its proximity to the Luas,

- Traffic & Transportation impact,
- Capacity of the access Junction to accommodate the worst-case development traffic flows,
- Pedestrian and cyclist permeability and promotion,
- Impact of the development on the free flow and capacity of the adjacent Sandyford Road and affected junctions, and
- The locational characteristics of the site being in a sustainable location in terms of travel characteristics (Refer Preliminary Mobility Management Plan included herein).

1.10 The Recommendations contained within this Transportation Assessment are based on the following sources of information and industry-standard practices:

- TII Traffic & Transport Assessment Guidelines,
- Design Manual for Urban Roads and Streets,
- Smarter Travel, A Sustainable Transport Future 2009-2020',
- the NTA's 'Greater Dublin Area Transport Strategy 2016-2035',
- the NTAs 'Integrated Implementation Plan 2019-2024',
- Traffic Survey Data collected,
- TII Traffic Counter Data,
- Relevant Design Guidance,
- Our experience in assessing the impact of Developments of this Nature, and
- Site Visits and Observations.

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

1.12 The assessment includes a Preliminary Mobility Management Plan (MMP or Travel Plan) for the site which is included as ***Appendix F***. We have also prepared a Statement of Consistency with DMURS and confirm that the internal layout is compliant with the requirements, included as ***Appendix G***.

1.13 An independent Stage 1 Road Safety Audit including Quality Audit, together with the Designer Feedback form, has been undertaken and is included as ***Appendix H***. All issues raised in the Audit are addressed in the feedback form, signed off by the Auditor Team and incorporated into the proposed scheme layout. An assessment of impact/capacity on Bus/LUAS has also been undertaken and is included as ***Appendix I***.

2.0 RECEIVING ENVIRONMENT/DEVELOPMENT PROPOSALS/PARKING

2.1 The proposed development is residential in nature, consisting of residential Apartments arranged in a series of 4 blocks, with the detailed description of the development and associated work included below.

2.2 The site is bound by a residential development known as 'Coolkill' to the east, a 2 storey residential dwelling known as 'The Pastures' to the south and the Sandyford Road (R117) immediately to the west. A residential development (which is under construction) known as 'Cul Cuille' bounds the site to the north.

2.3 Sandyford Road (R117) serving the site is classified as a Regional Road, is subject to an urban 50kph speed limits and is served with footpaths, signalised pedestrian crossing facilities & discontinuous off-road cycle lanes. It consists of a single carriageway road, with localised widening on the approach to terminal junctions and also includes dedicated off road cycle lanes along both sides at and to the north of the site. An image showing Sandyford Road to the north of the site is included below as ***Figure 2.1.***

Figure 2.1 – Sandyford Road North of the Site

2.4 Being an urban area, all of the roads are subject to a 50kph urban speed restriction. Sandyford Road at the site carries a weekday AM Peak Hour 2-way flow of approximately 805 PCUs and a weekday PM Peak Hour 2-Way flow of approximately 911 PCUs, measured at the location for the proposed site access. In these terms, it can be considered as moderately trafficked.

2.5 Whilst of course these flows are significant, it is a wide single carriageway with an associated large link capacity in this area, with a carrying capacity of 1,200 to 1,500 PCUs per-lane per-hour. In these terms it has a 2-way traffic carrying or 'link capacity' of approximately 2,400-3,000 PCUs. In this regard, Sandyford Road is considered moderately trafficked in terms of its Link Capacity.

2.6 A review of the Road Safety Authority (RSA) online collision database indicates that there is no record of any significant relevant collisions proximate to the site, between 2005-Date inclusive**.** As with all such urban roads of this nature, there have been several minor accidents further south and north remote from the site, however these are not considered to be significant in consideration of the subject development proposals.

2.7 The Accident History from the RSA online database is reproduced in ***Figure 2.2*** below.

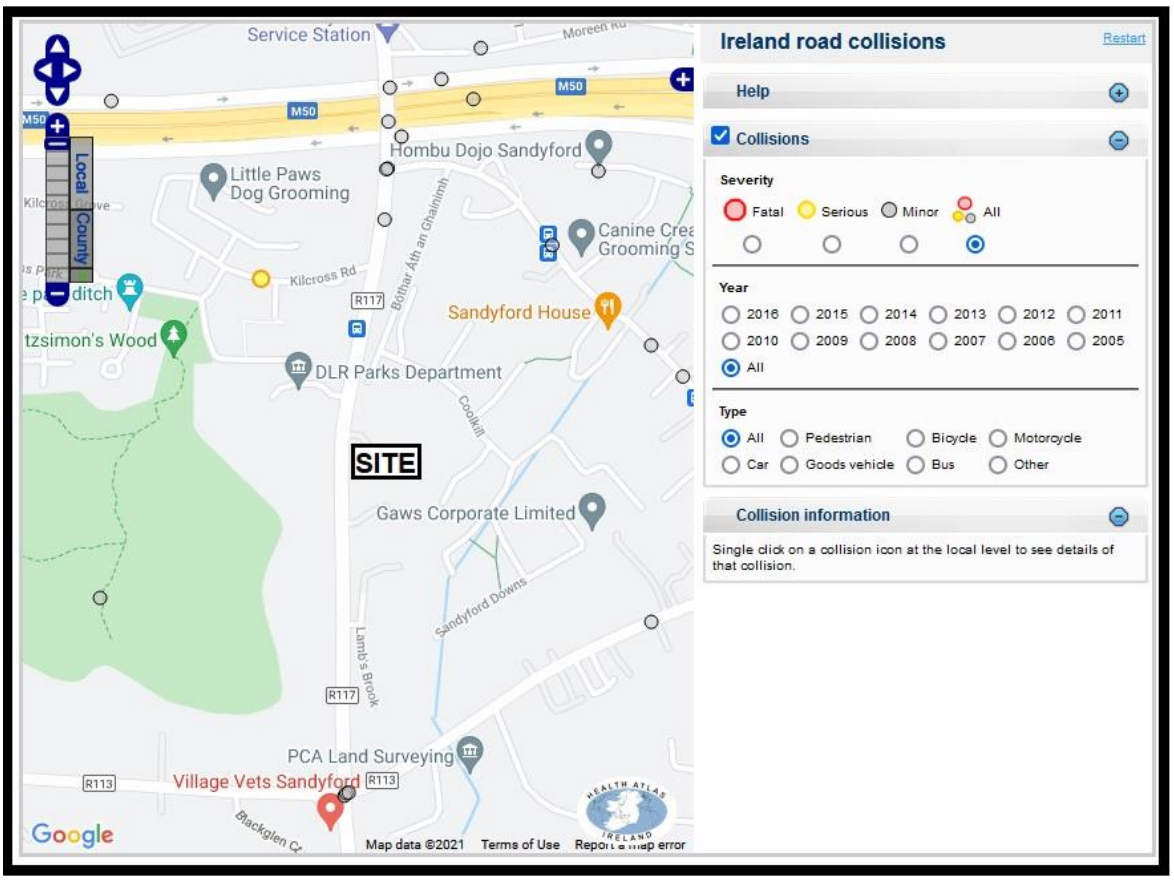


Figure 2.2 - Extract from RSA Online Database Accidents 2005-Date (All Types)

2.8 Observation indicated that, like the vast majority of roads in the Greater Dublin Area (GDA), whilst there are some peak commuter period traffic constraints at junctions remote from the site, notwithstanding the moderate volumes of traffic generated during these commuter peak periods, in general the network operates in an acceptable manner, without any major issues in terms of road safety. The safety of the local roads is evidenced by the absence of a significant adverse accident history.

2.9 We have nonetheless undertaken detailed modelling and analysis of the proposed site access junction and the effect of the development otherwise on Sandyford Road and adjacent junctions on the network surrounding the site. Assessment and resulting Capacity Modelling using Tii-approved software was undertaken for a selected year of opening 2024 and associated design year 2039 in accordance with industry Guidelines.

2.10 The standard methodology applied was to firstly ascertain the base background traffic conditions for both the weekday AM and weekday PM Commuter Peak periods. To this end we commissioned and undertook a 2021 Traffic Survey when schools were open on the existing affected roads and junctions in order to establish base background traffic conditions. We then applied a calculated **Covid Factor** based on accurate data extracted from the TII Permanent Traffic Counter data on the M50 nearest the site. This represents a pragmatic industry standard approach in these times when Planning Applications have statutory timeframes during a Pandemic.

Subject Development Proposals

2.11 Midsal Homes Limited intend to apply to An Bord Pleanála for permission for a strategic housing development at this site of 0.829 Ha approx. comprised of the properties known as ‘Karuna’ and ‘Glenina’ at Sandyford Road, Dublin 18, D18 C2H6 and D18 X5T7 respectively. The site is generally bound by a residential development known as ‘Coolkill’ to the east, a detached dwelling known as ‘The Pastures’ to the south, Sandyford Road (R117) to the west and a residential development (which is under construction) known as ‘Cul Cuille’ to the north. Works are also proposed at Sandyford Road, which include the removal of a wall and the creation of a new pedestrian connection to the existing cul-de-sac adjacent to ‘Cul Cuille’ to the north (0.016 Ha approx.) and at the footpath at Sandyford Road to provide a new multi-modal entrance, pedestrian/cycle entrances and landscaping (0.015 Ha approx.).

2.12 In addition, works are proposed for water services (0.05 Ha approx.): water supply to be sourced by way of a new connection to the existing 250 mm diameter water main across

from the proposed main entrance at Sandyford Road; surface water drainage network to discharge to the existing 525 mm diameter surface water sewer located to the north of the site at Sandyford Road via a new 150 mm surface water sewer; and foul water to discharge to the 225 mm diameter foul sewer under construction at Sandyford Road. An additional 0.01 ha has been assigned for Dún Laoghaire-Rathdown County Council to undertake road works to upgrade Sandyford Road. The residential development site, pedestrian connection, entrance works, water services and road works area will provide a total application site area of 0.92 Ha.

2.13 The proposed development principally consists of the demolition of the existing dwelling and ancillary buildings known as 'Glenina', the existing dwelling known as 'Karuna' and the existing boundary wall fronting Sandyford Road, and the construction of a residential development principally comprising 137 No. apartments (32 No. 1-bed units, 78 No. 2-bed units and 27 No. 3-bed units) in 4 No. blocks ranging in height from part-1 No. storey to part-6 No. storeys with a part-basement/part-undercroft level (at Blocks B, C and D).

2.14 The proposed development which has a gross floor space of 13,144 sq m (over a part-basement/part-undercroft level measuring 4,508 sq m, principally providing car and cycle parking and plant) also includes: internal communal amenities and support facilities (404 sq m); 137 No. car parking spaces, which include 127 No. spaces and 6 No. GoCar spaces located at basement level (accessed beneath Block B) and 4 No. set down spaces located at surface level adjacent to Block A; motorcycle parking spaces; cycle parking spaces; bin store; substation; switch room; meter rooms; plant rooms; new telecommunications infrastructure at rooftop level including microwave link dishes concealed in shrouds; hard and soft landscaping, including communal amenity space; private amenity space with balconies facing north, south, east and west; boundary treatments; and all associated works above and below ground.

2.15 A *Go-Car* Letter is included below to give assurance of the intent to operate these car club spaces.

GO CAR

Midsal Homes Ltd c/o
NRB Consulting Engineers Ltd
1st Floor
Apollo Building
Dundrum Road
Dundrum
Dublin 14

11/04/2022

To Whom It May Concern,

This is a letter to confirm that GoCar intends to provide a service of 6 (six) shared GoCar vehicles in the redevelopment of two houses at 'Karuna' & 'Glenina', Sandyford Road, Dublin 18. GoCar representatives have discussed the project with representatives of NRB Consulting Engineers Ltd, who are planning this development, and are excited to provide a car sharing service at this location to residents.

It is understood that the vehicles at this development will be positioned in the lower ground level car park for use by apartment residents. It is the intention for these vehicles to be used exclusively by the residents of the development.

GoCar is Ireland's leading car sharing service with over 60,000 members and over 860 cars and vans on fleet. Each GoCar which is placed in a community has the potential to replace the journeys of up to 15 private cars. The Department of Housing's Design Standards for New Apartments - Guidelines for Planning Authorities outline: "For all types of location, where it is sought to eliminate or reduce car parking provision, it is necessary to ensure... provision is also to be made for alternative mobility solutions including facilities for car sharing club vehicles."

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

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

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

Rob Montgomery
Revenue and Growth Manager
GoCar Carsharing Ltd
Mobile: 086 609 7096
Email: robert.montgomery@gocar

2.16 A total of 340 No. bicycle parking spaces including 2 designated cargo bike spaces are provided along with 6 motorcycle spaces. Many of the proposed Sheffield stands adjacent Block A are sufficiently spaced to allow larger sized bicycles including cargo bikes to be parked in this cycle parking zone. This flexibility provides for varying types of bike types and sizes at the development.

2.17 Similar to adjacent developments, it is anticipated that the development will be serviced using regular weekly refuse lorries within the site as required, with small transit vans or small-wheelbase trucks for day-to-day servicing of the apartments, which do not have onerous swept-paths and can easily be facilitated on the site.

2.18 The scheme includes a bin store at lower ground level adjacent the turning area. Bins will be collected directly from the bin store by the refuse collection company on collection day at the scheduled bin collection time, before being returned to the secure refuse store. The refuse collection company will have access to the bin store.

2.19 In traffic terms, for residential apartment schemes of this nature on the edge of the city centre with good transport links, they do not generate a significant volume of car movements. In this regard, the small scale of the entire facility is confirmed through the robust assessment of Car Traffic Generated, which is addressed further within Section 3 of this Report.

2.20 The site is also very well located to benefit both from existing Dublin bus services and from future service proposed as part of the Core Bus Network Plans. The site is also located within the Section 49 Luas contribution scheme area. All of the beneficial public and alternative Transportation Modes are defined in the Preliminary Mobility Management Plan included as ***Appendix F.***

Car Parking

2.21 The **Car Parking** standards to be applied in new residential developments in Dún Laoghaire-Rathdown are set out in Table 12.5 of the County Development Plan (2022-2028). These standards are defined as "Maximum" requirements, with the provision to be determined in accordance with the DLRCC Development Plan on a case-by-case basis, depending on the particular circumstances.

2.22 There are 137 quality residential apartments proposed with good accessibility to alternative and public transport. The site is located within the Section 49 Luas contribution scheme area. In addition there are high quality walking and cycling links on the network surrounding the site. In these terms, the development location is considered to be highly sustainable. The scheme also delivers a new pedestrian connection to link to Coolkill / Cul Cuille directly to the north of the site, improving permeability for all pedestrians, including the proposed development.

2.23 A total of 137 car parking spaces are being provided as part of the development (including 6 Go-Car car cllub spaces). With 137 apartments, this represents a car parking 'Ratio' of c 1 parking spaces per unit. The Go Cars company experience is that each Go Car offsets 15 Residents Cars, providing an effective car parking station ratio of ~1.6 at this site. This level of parking is considered appropriate given the highly sustainable location characteristics of the apartment scheme, and in consideration of National Guidance.

2.24 The 'Sustainable Urban Housing: Design Standards for New Apartments Guidelines for Planning Authorities' updates previous guidance in the context of greater evidence and knowledge of current and likely future housing demand in Ireland taking account of the Housing Agency National Statement on Housing Demand and Supply and projected need for additional housing supply out to 2020, the Government's action programme on housing and homelessness Rebuilding Ireland & National Planning Framework Ireland 2040, (subsequent to 2015 guidelines).

2.25 These new guidelines address car parking and include an objective to 'Remove requirements for car-parking in certain circumstances where there are better mobility solutions and to reduce costs.' Under Car Parking - Section 4.18 the guidelines acknowledge that 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. Under Section 4.19 the guidelines note that 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 wholly eliminated or substantially reduced. Specifically Paragraph 4.19 states;

Central and/or Accessible Urban Locations

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

2.26 This is to be applied in accessible areas such as in or adjoining city cores or at a confluence of public transport systems.

2.27 Section 4.20 describes these suitable locations. These locations are in or adjacent to (i.e. within 15 minutes walking distance of) city centres or centrally located employment locations. This includes 10 minutes walking distance of DART or Luas stops or within 5 minutes walking distance of high frequency (min 10 minute peak hour frequency) bus services.

2.28 Being ~20-minute walk (~6 minute cycle) from the centrally located employment of Sandyford Business and Employment Zone as shown on ***Fig 2.3*** below, this site falls just outside these walking times and is therefore borderline between the intermediate and central/accessible. It is recognised that for the subject site the current public transport accessibility does not support a significant reduction in the car parking provision (e.g. a ration of ~0.3 or lower as permitted on many Build-to-Rent schemes), and in this regard a parking ratio of ~1 is considered appropriate in this case. This is further bolstered by the GoCar provision.

Fig 2.3 – ~20-minute walk to Sandyford Business and Employment Zone

2.29 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.

2.30 So even in this Intermediate Urban Locations, 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.

2.31 A Travel Plan is enclosed with this application as ***Appendix F*** to demonstrate the applicant's commitment to encourage modal shift and the use of public transport, cycling and walking.

Car Park Management

2.32 Given the restricted number of car parking spaces provided, the scheme will also 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 dependency nature of the development is continually promoted and enhanced.

2.33 The development will be managed and operated by a Management Company. Car parking will not be an automatic entitlement with the apartments, but spaces will be available to rent and purchase. Renting/sales of parking will be allocated to residents mainly on a first come first served basis by the Management Company and will be continually managed by the Management.

2.34 Some parking spaces will be reserved for visitors with other car parking spaces allocated for rent/sale to larger units. The allocation of car parking spaces will be reviewed/renewed on an annual/ongoing basis to suit demand.

2.35 Dedicated Clauses can and will be contained within Letting / Sales Agreements for all Residential Apartments, which specifically address Car Parking. In the event where a parking space is an entitlement as part of a Letting / Sales Agreement, this will be clearly enunciated by way of a dedicated clause, with the specific space or spaces referenced in Agreements, with mapping provided & referenced therein to identify the relevant space.

2.36 Accordingly, unless they are dedicated to individual Residential Apartments, on-site parking will otherwise remain in the control of the Management Company. A car parking management regime will be implemented by the Management Company to control and manage access to the car parking bays, thereby actively managing the availability of on-site car parking for each of the following user profiles;

- Residents of the Apartments,
- Visitors/deliveries to the site,
- GoCars.

2.37 Though it is not expected to be necessary, in the longer term, access to the parking areas could be controlled by a combination of barriers and patrols to ensure that only permitted vehicles can gain access. If required, a barrier could be safely located set back sufficiently so as not to result in any hazard or obstruction with the prior agreement and approval of DLRCC. Access for approved users can be facilitated by coded keypad entry/fob control or Automated Number Plate Recognition (ANPR) technology, which only permits registered permitted vehicles to enter.

2.38 A clamping enforcement regime can also be in place within the entire site to ensure that parking restrictions are adhered to if required following occupation of the scheme.

2.39 This Scheme also includes 6 No Car Club Spaces ('Go Cars') to offset the need for residents and guests to have cars and car parking spaces. It is proposed that these prominently located parking spaces will be allocated to car club parking spaces (e.g. "Go Car" spaces).

2.40 In terms of EV, all car parking spaces can easily be upgraded to allow conversion for Electric Vehicles. In the case of a residential development of the nature proposed, with specific spaces likely dedicated to specific apartments, it is considered appropriate to facilitate the retrofitting of spaces, based on demand following occupation, rather than a percentage of spaces being defined as such and provided from the outset, however a minimum of 20% are proposed as EV charging initially in line with the development plan.

2.41 Car parking spaces can be upgraded to allow conversion for Electric Vehicles. Where residents request a charging point to be installed, the relevant charging point will be pre-wired back to their home electricity meter in the designated meter location. The socket point will have a lockable cover on it so that only that resident may use the power point.

2.42 Other suitable alternative supply arrangements will be considered as charging facilities change and technology improves.

2.43 The car park of the subject scheme will therefore be ducted to accept future cabling to serve a charging point for every car space as demanded. Within the lower ground level area, conduits will be run on the walls where charging points can also be mounted. This provision around the entire parking area will allow future charging points to be installed at any of the car parking spaces with minimum works as and when required.

Bicycle Parking

2.44 The DLR Cycle Policy sets out cycle parking standards and requirements within Dun Laoghaire-Rathdown. Table 4.1 'Cycle parking for residential development' sets out the requirements for apartments as 1 long stay parking space per unit plus 1 visitor space per 5 units. In this case 137 long stay and 28 visitor spaces i.e. 165 cycle parking spaces would be required for 137 apartments.

2.45 The 'Sustainable Urban Housing: Design Standards for New Apartments Guidelines for Planning Authorities' states that 1 bicycle parking space per bedroom plus 1 visitor space per 2 units is a requirement, which would indicate that significantly more cycle parking is required than is set out in the DLR Cycle Policy. In this case there are a total of 137 (32 No. one bed units, 78 No. two bed units and 27 No. three bed units – a total of 269 Bedrooms). This translates to a requirement for 269 residential bicycle parking spaces and 68 visitor bicycle parking spaces, strictly applying the Guidelines – being a requirement for a total of 337 spaces.

2.46 The New Apartments Guidelines also states that 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. The high quality of the cycle parking is reflected in the provision of a total of 340 new dedicated cycle parking spaces including 2 designated cargo bike spaces. Much of the cycle parking are Sheffield stands in line with DLR Cycle Policy preference for Sheffield Stands, with double stackers above the Sheffield Stands. This also supports the case for a slight reduction in car parking provision.

2.47 Many of the proposed Sheffield stands adjacent Block A are sufficiently spaced to allow larger sized bicycles including more cargo bikes to be parked in this cycle parking zone. This flexibility provides for varying types of bike types and sizes at the development.

2.48 302 bike spaces are provided to Lower Ground Floor Parking (152 of which are Sheffield stands with double stacker system cycle parking above) & 38 Spaces (Sheffield Stand) across the landscaping. The number of Sheffield Stands exceeds the minimum number of 165 spaces required by DLR Cycle Policy as noted above.

2.49 An example of the type of system proposed is shown at Fig 2.4 below. The cycle parking centres will be made to suit the DLR Cycle Policy. 2 cargo bike spaces are also proposed.

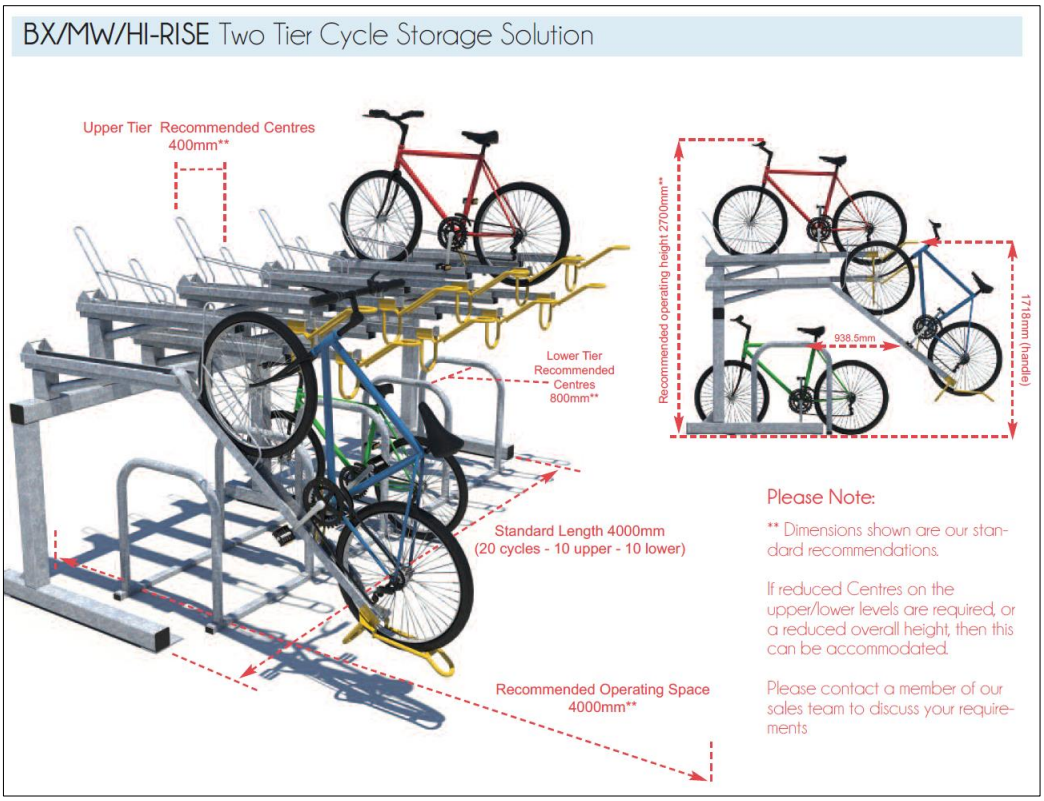


Fig 2.4 – Two Tier Cycle Storage Solution with Sheffield Stands at Lower Level

2.50 Motorcycle spaces are also accommodated in line with DLR County Development Plan 2022 - 2028 Section 12.4.7 Motorcycle Parking i.e. at a rate of 4% of the number of car parking spaces provided (space for 6 motorcycle spaces is provided which is in excess of 4% of the number of car parking spaces provided).

Cycle Audit

2.51 We have prepared Table 2.1 below which responds to Section 12.4.6.2 Cycle Parking Assessment Criteria included in the 2022-2028 Development Plan to show how the scheme meet these cycle requirements. The scheme drawing prepared by the Architects and those included at Appendix A demonstrate, in plan format, how the requirements of Council's Standards for Cycle Parking and Associated Cycling Facilities for New Developments, are met within the development.

Table 2.1 Response to DLR Cycle Parking Assessment Criteria

DLR Cycle Parking Assessment Criteria	Response
Is the number of cycle parking spaces and footprint adequate and is there suitable provision for parking of outsized formats (cargo bikes etc)?	Yes – cycle parking provided in excess of the DLR Cycle Policy numbers and spacing guidance along with 2 designated cargo bike spaces plus room for more outside format bikes adjacent Block A where Sheffield Stands are widely spaced.

Is the location of cycle parking convenient, appropriate and secure with adequate provision for covered parking?	Yes – conveniently located near the main development access, secure and mostly covered. Parking provided internally at undercroft/basement level, as well as in 2 No. locations externally, facilitating short-stay and long-stay parking, and ease of access.
Is the cycle parking area accessible in terms of dedicated access routes with ramps and/or kerb dishing where required?	Yes - cycle parking areas area are accessible, with direct access available to all cycle parking via the main development access.
Do the internal cycle access routes connect well with off-site cycle facilities – existing and proposed?	Yes – scheme connects to off-site cycle facilities –existing and proposed at Sandyford Road and linking with Cul Cuille to the north.
Is there adequate and appropriately designed and integrated provision for ancillary cycling and pedestrian facilities including showers, locker / changing rooms and drying areas?	Yes – contained within the apartments
Where cycle parking cannot be conveniently provided within the development, a financial contribution of €500 per cycle parking stand will be required to provide alternative on-street cycle parking provision in the vicinity of the development	N/A as cycle parking provided within the development
Consideration should be given to requiring the provision of cycle parking-related directional signage, in particular for storage and commercial parking facilities. Bike lockers, showers and changing rooms should be available at destination storage facilities (private).	Residential scheme so much of this is not applicable. Cycle parking is conveniently located near the main development access visitor parking is evident to arrivals.
For short-term cycle parking (e.g. for customers or visitors), cycle parking is required at ground level. This should be located within 25 metres of the destination in an area of good passive surveillance. Weather protected covered facilities should be considered where appropriate.	Yes – at ground and lower ground level near the main development access. Much of the cycle parking in within bike stores and covered. External and short-stay parking also provided in 2 No. other locations for ease of access and egress. Spaces benefit from passive surveillance.
For long-term cycle parking (e.g. for more than 3 hours for residents, staff, students), secure covered cycle parking is a requirement. This should be conveniently located within 50 metres of the destination and located near building access points where possible.	Yes – at ground and lower ground level near the main development access. Much of the cycle parking in within bike stores and covered.
In all cases it is a requirement to provide showers, changing facilities, lockers and clothes drying facilities, for use by staff that walk or cycle to work. CCTV cameras or passive surveillance of car parks and cycle parks may be required for personal safety and security considerations.	Yes – contained within the apartments. CCTV to be provided if required
All cycle facilities in multi-storey car parks shall be at ground floor level and completely segregated from vehicular traffic. Cyclists should also have designated entry and exit routes at the car park and with minimum headroom of 2.4 metres to facilitate access by cyclists.	Not a multi-storey car park.
Within larger new developments cycle routes shall link to the existing cycle network where possible and maintain a high degree of permeability through developments. Cycle Audits may be required in such developments.	Yes – scheme connects to off-site cycle facilities – existing and proposed. DMURS Quality Audit including Cycle Audit included with scheme

3.0 TRIP GENERATION, ASSIGNMENT AND DISTRIBUTION

3.1 In terms of assessing Car Traffic and the impact of same on the local road network, the Trip Rate Information Computer System 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. Indeed it is the recommended method of assessing traffic generation, specifically referenced in the TII Guidelines.

3.2 We have included as ***Appendix C*** the TRICS output for traditional Residential Apartments, and this provides a robust estimation of traffic as illustrated in ***Table 3.1*** below.

3.3 The following Table summarised the Output from the TRICS database which is included herein as ***Appendix C*** for comparison purposes.

Table 3.1: TRICS Data Summary, 137 Apartments - Proposed Scheme

137 No. Apartments	Arrivals (PCUs)		Departures (PCUs)		Total 2-Way Traffic Generated
Network Hour	Per Apt	Dev	Per Apt	Dev	
Weekday AM Peak Hr	0.062	8	0.203	28	36
Weekday PM Peak Hr	0.178	24	0.088	12	36

3.4 In the case of residential apartments, the application of TRICS in this case specifically excludes the effect of Shared Visits and quantifies the volumes of traffic on an individual basis with the traffic assigned as 100% primary trips - in these terms the assessment can be considered further robust.

3.5 Therefore, we consider that the use of TRICS in the methodology adopted is Robust and Onerous and the Trip Rates applied and used provide for a robust reflection of the expected worst case traffic generated by the proposed development. This is particularly the case for the subject site where there is restricted residential car parking provision, which further limits trip generation.

3.6 Notwithstanding, in light of observation of existing capacity conditions, the use of higher Trip Rates, if required, would have absolutely no impact upon the conclusions of the study. This is particularly the case given the low traffic impact associated with the development.

Assessment Methodology

3.7 We have used hand assignment techniques based on the observed movements, with the worst case traffic assigned to the roads based on the observed established traffic patterns, being the industry standard methodology. The standard methodology applied was to firstly ascertain the base background traffic conditions for both the weekday AM and weekday PM Commuter Peak periods. To this end we commissioned and undertook a 2021 Traffic Survey of the existing affected roads and junctions in order to establish base background traffic conditions.

3.8 We then applied a calculated **Covid Factor** based on accurate data extracted from the TII Permanent Traffic Counter data on the M50 nearest the site. This represents a pragmatic industry standard approach in these times when Planning Applications have statutory timeframes during a Pandemic. Details of the traffic surveys are included as ***Appendix B*** and are reproduced as commuter peak hour Stick Diagrams as ***Appendix D.***

3.9 We then used the TII PE-PAG-02017 Project Appraisal Guidelines for National Roads Unit 5.3 (Travel Demand Projections 2019, Table 6.1: Central Growth Rates: Annual Growth Factors, Metropolitan Dublin), to establish projected occupation/opening year 2024 and design year 2039 traffic conditions 15 years following opening on the local road network. The worst case traffic based on the content of ***Table 3.1*** above was then applied in order to establish Opening Year and Design Year Traffic Conditions with the proposed development in place and fully occupied. This is all included in the calculations included herein as ***Appendix D***.

3.10 It should be noted that we have selected an opening year of 2024 as being reasonable and appropriate. However, in our experience, varying the opening year and design year by 1-3 years, if required for whatever reason, 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. Traffic growth factors for future year assessments were calculated from data obtained in the TII PE-PAG-02017 Project Appraisal Guidelines for National Roads Unit 5.3 which provides the recommended method of predicting future year traffic growth on Roads.

3.11 Calculations of the relevant growth factors are included in ***Table 3.2*** below (based on tabulated 'Central Growth' for Metropolitan Dublin). It should be noted that any requirement to use different or higher growth factors will also have no implications whatsoever for the conclusions of the study.

Table 3.2 - Traffic Growth Rates, TII Travel Demand Projections Unit 5.3

Year	to Year	Table 6.1:
Surveyed	2024	1.049
2024	2039	1.153

4.0 TRAFFIC IMPACT - ROAD JUNCTION CAPACITY

4.1 The TII Traffic and Transport Assessment Guidelines sets out a strict mechanism for assessment of developments of this nature and determining whether further assessment is indeed required. This Guidelines 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 We have assessed the impact of the proposed development with a wide area of influence included. The professional guidance referenced above sets out specific increases in traffic volume associated with new development, which, when breached, requires further detailed analysis to be undertaken. The recommendation is that, if the expected increase is **5%** for networks that are considered heavily trafficked or congested, then further analysis is warranted. As noted above Sandyford Road is moderately trafficked here. However, a prudent/conservative approach was adopted. In this case, for robustness the 5% threshold has been applied.

4.3 In this regard, it is demonstrated herein that the proposed occupation of the Apartments, with relatively low volumes of vehicular traffic added to a busy network, will not result in any significant or noticeable level of new trips on the local roads, with all anticipated traffic increases beyond the Proposed Access junction are expected to be **well below** the Industry-Standard level of 5% above which further assessment is required.

4.4 Our assessment confirms that the absolute worst case traffic increases on the adjacent road network junctions, with the entire development open and occupied, undertaken in accordance with Guidelines, is as summarised below as ***Table 4.1***.

Table 4.1; - All of Proposed Development Open & Occupied - Threshold Assessment, Worst-Case Impact - AM & PM Peak Hours 2024

Assessed Road or Junction	Traffic Increase %		COMMENT
	AM Pk Hr	PM Pk Hr	
Bothar Atha an Ghainimh/Sandyford Rd	1.95%	1.85%	<<5% No Further Assessment Required
Kilcross Road/Sandyford Rd	1.91%	0.73%	<<5% No Further Assessment Required
Blackglen Rd/Hillcrest Rd/Sandyford Rd	0.68%	0.63%	<<5% No Further Assessment Required

4.5 These worst-case traffic increases beyond the access junction are below the Guideline and industry standard level above which further assessment is required, in accordance with the Guidelines.

4.6 To set these increased levels of traffic in context, the day-to-day variation in traffic volume (due to day-of-week or weather conditions for example) is accepted as 10%, so, in this context alone, increases of in all cases less than 5% in will go entirely unnoticed and this underscores the negligible impact of the proposed development traffic.

4.7 Adding additional background traffic volumes e.g. additional background traffic associated with recently permitted developments local to the site, will further reduce the percentage impact of the development as part of the above threshold assessments.

4.8 We have undertaken traffic modelling of the proposed access T-Junction for weekday AM and PM Periods (2024 Opening Year and 2039 Design Year +15) purely to confirm & demonstrate adequate capacity exists to accommodate the increased traffic associated with the development.

Access T-Junction Capacity Modelling

4.9 We have used the TII-approved software package 'Junctions 9' PiCADY' (**P**riority **I**ntersection **C**apacity **A**nd **D**ela**y**) software package (as part of the TRL Package 'Junction 9') to assess the capacity of the junction. PiCADY produces results based on a ratio of flow to capacity (RFC) and 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. We have appended the detailed computer simulation model results for the proposed site access in ***Appendix E***.

4.10 We have undertaken the detailed assessment of the capacity of the proposed access onto Sandyford Road, with the entire subject development in place and occupied. The detailed output of the models is summarised below as ***Table 4.2***

Table 4.2: Site Access PiCADY Results, Weekday AM & PM Commuter Pk Hours - 2024 & 2039

Modelled Scenario	*Period Mean Max Q (PCUs)*	*Period Max RFC*
Opening Year 2024 AM Peak Hr	<1	0.08
Opening Year 2024 PM Peak Hr	<1	0.04
Design Year 2039 AM Peak Hr	<1	0.08
Design Year 2039 PM Peak Hr	<1	0.04

4.11 The results of the modelling clearly show that the junction will have way more than adequate capacity to accommodate the worst case traffic associated with the fully complete and occupied scheme in opening and design years, conscious of the very small increases in traffic associated with the subject development.

4.12 The above analysis confirms that the construction of the proposed development will have a negligible impact upon the capacity and safety of the road network in the area and can easily be accommodated.

5.0 RESPONSE TO ABP OPINION & DLRCC TRAFFIC/ROADS

5.1 This section sets out the response to specific Traffic/Transportation & Roads matters raised in the ABP Opinion and by DLRCC Roads/Transportation Department dated 26th Oct 2021 (all as outlined within the ABP Opinion & attachments).

5.2 There are two 'Transportation' related items in the ABP Opinion. Item 2 requests *'A detailed statement, demonstrating how the proposed development will tie in safely with the wider road network, along Sandyford Road, in particular with respect to pedestrian and cycle routes.'*

5.3 Sandyford Road (R117) serving the site is classified as a Regional Road, is subject to an urban 50kph speed limits and is served with footpaths, signalised pedestrian crossing facilities & discontinuous off-road cycle lanes. It consists of a single carriageway road, with localised widening on the approach to terminal junctions and also includes dedicated off road cycle lanes along both sides at and to the north of the site. An image showing Sandyford Road to the north of the site is included below as ***Figure 5.1.***

5.4 Figure 5.1 – Sandyford Road North of the Site

5.5 It is proposed to provide vehicular access to the site by way of a simple priority controlled junction, replacing an existing access onto Sandyford Road. A second existing vehicular access is to be closed as part of the development. Drawings showing the access arrangement are included herein within **Appendix A**.

5.6 At the development access, the existing footpath and cycle track have priority over vehicular traffic. This will continue to be the case as part of the proposed scheme. The footpath and cycle track will continue through the vehicular access on a raised table, maintaining pedestrian and cyclist priority. The scheme connects to the existing footpaths and cycle tracks.

5.7 The scheme also delivers a new pedestrian connection to link to Coolkill / Cul Cuille directly to the north of the site, improving permeability for all pedestrians, including the proposed development.

5.8 The proposed building line is sufficiently setback from the Sandyford Road to ensure it does not prejudice the future delivery of the proposed Blackglen Road / Harold's Grange Road Improvement Scheme which ties into the existing road, footpath and cycle lane alignments at the site frontage. The scheme therefore provides for connections to the existing and proposed footpaths and cycle tracks.

5.9 An independent Stage 1 Road Safety Audit including Quality Audit, together with the Designer Feedback form, has been undertaken and is included as ***Appendix H***. The Quality Audit has been carried out in accordance with the guidance in the Design Manual for Urban Roads and Streets (DMURS), produced by Department of Transport Tourism and Sport in March 2013 and updated in June 2019. This portion of the Quality Audit includes an access audit, a walking audit and a cycling audit.

5.10 All issues raised in the Audit are addressed in the feedback form, signed off by the Auditor Team and incorporated into the proposed scheme layout. This provides further reassurance that proposed development will tie in safely with the wider road network, along Sandyford Road, including with respect to pedestrian and cycle routes.

5.11 Item 7 in the ABP Opinion requests '*A Traffic and Transportation Impact Assessment*.' This report is Traffic and Transportation Impact Assessment, addressing this item.

5.12 We have also included below the relevant extracts from the DLRCC Report, including these as individual numbered items as per the DLRCC Report, for ease of reference together with the Design Team Response following immediately thereafter in sequentially numbered paragraphs.

> 1. Pedestrian Access: The Applicant is requested to submit detailed drawings addressing issues with the pedestrian access points and pedestrian access to nearby estates at Coolkill for pedestrians and cyclists within areas in control of the applicant.

5.13 The layout plans at Appendix A, read in conjunction with the Landscape Architect drawings, illustrate the pedestrian and cyclist connectivity as requested. The scheme also delivers a new pedestrian connection to link to Coolkill / Cul Cuille directly to the north of the site, improving permeability for all pedestrians, including the proposed development.

5.14 The detail of the pedestrian access points to the proposed blocks from the public road were raised as a concern by DLRCC. These access points are now narrower, landscaped, with bollards provided and behind a fill height kerb along Sandyford so drivers will be clear that these are not vehicular access points. These measures will prevent access by vehicles.

> 2. The applicant shall show a minimum car parking provision of 1 space per apartment units, complying with DLR's acceptable reduced car parking standards.

5.15 The development provides for a car parking 'ratio' of 1.0 spaces per unit i.e. 137 space for 137 units. The rationale surrounding this provision is set out within Section 2.0 of this report. We believe that this provision is entirely appropriate for an Apartment scheme in this location.

> 3. Short-term Cycle Parking: The Applicant shall submit revised drawings and details which demonstrate 74 No. of short-term cycle parking spaces designed in accordance with Section 3 & Section 4 of DLRCC's *Standards for Cycle Parking and associated Cycling Facilities for New Developments (January 2018)*. The drawings should clear identify the location and also demonstrated that a minimum of 50% of short-term cycle parking should be covered with minimum spacing of 1m between cycle stands. Drawings should clearly identify the locations, type of cycle stands, dimensions and spacing in accordance with the DLR's Standards. An additional Sheffield stands parking bay shall be located at the southern section of the development.

5.16 The details of cycle parking are illustrated on the Architects layout plans. The justification for the cycle parking provision consistent with the National Apartment Guidelines is set out above in Section 2.0

5.17 The DLR Cycle Policy sets out cycle parking standards and requirements within Dun Laoghaire-Rathdown. Table 4.1 'Cycle parking for residential development' sets out the requirements for apartments as 1 long stay parking space per unit plus 1 visitor space per 5 units. In this case 137 long stay and 28 visitor spaces i.e. 165 cycle parking spaces would be required for 137 apartments. Well excess of this number is provided. Additional Sheffield stands are located at the southern section of the development.

> 4. Long-Term Cycle Parking: The Applicant shall submit revised drawings showing the provision of long-term cycle parking designed in accordance with Section 3 & Section 4 of DLRCC's *Standards for Cycle Parking and associated Cycling Facilities for New Developments (January 2018)*. Stacked cycling parking is not recommended and the preferred type of cycle parking stand is the Sheffield cycle stand. Accordingly, all proposed cycle parking at the development should be of the preferred 'Sheffield' unless an alternative to Stacked parking is agreed with transportation planning of the in accordance with DLRCC standards. The provision shall accommodate a variety of users and facilitate the move to sustainable modes of transportation, including the provision of up to 10% of bicycle storage should cater for larger footprint cargo bikes and further number for E-bikes for universal users. The drawings should clearly identify the location, quantum of cycle parking provision, type of stands, access routes to and from the public road, storage compounds and to core of apartment units / lifts.

5.18 The provision and design of cycle parking is in accordance with National Apartment Guideline requirements and is also fully consistent with recent Strategic Housing Applications to An Bord Pleanála. Sheffield stands are proposed in the development, with stacker system above.

5.19 We would note that there is no requirement in the Cycle Guidelines to provide for E-Bike or Cargo Bike storage however 2 cargo bike spaces are included. The justification for the cycle parking provision consistent with the National Apartment Guidelines is set out above in Section 2.0. Many of the proposed Sheffield stands adjacent Block A are sufficiently spaced to allow larger sized bicycles including more cargo bikes to be parked in this cycle parking zone. This flexibility provides for varying types of bike types and sizes at the development.

> 5. The applicant shall demonstrate that all proposed car parking spaces are constructed to be capable of accommodating future electric charging points for electrically operated vehicles. The following weblink is recommended http://www.esb.ie/electric-cars/index.jsp.

5.20 All car parking spaces are being designed so as to allow retro-fitting of EV Spaces as required. This is further addressed in Section 2.0 above.

> 6. The Applicant is requested to submit on detailed drawings the proposed internal access road designed to meet Dún Laoghaire-Rathdown County Council's 'Taking-in-Charge' requirements 'Taking In Charge Policy Document (September 2011 - Updated April 2013)': http://www.dlrcoco.ie/media/media,7464,en.doc and 'Taking in Charge Procedure Document': http://www.dlrcoco.ie/media/media,10719,en.pdf, and all to the satisfaction of the Planning Authority (Transportation & Water Services Department). For 'Taking-in-Charge' standards to meet a 40-year design life a minimum 200mm depth of flexible road surfacing is recommended for carriageway construction within all shared private and public space. The following minimum road construction surfacing depths are recommended:
>
> - 40mm Clause 942, surface course
> - 60mm Clause 906, binder course
> - 100mm, base course macadam
> - minimum 150mm Clause 804

5.21 The internal roadways are not intended to be offered for Taking-in-charge by DLRCC but will be privately operated, insured and maintained, with no liability vested in DLRCC.

7. The applicant should submit detailed drawings showing compliance with the recommendations (ramp gradients, widths, height clearance) stated in Section 8.2.4.10 - Design of Underground and Multi-storey car parks of the current County Development Plan (2016-2022). Relevant drawings showing vehicular movements shall be provided for constrained, proposed car parking spaces.

5.22 There is only one section of 'ramp' to the lower ground level area, consisting of a short section of ramped roadway at a gradient of 1:30. The details, together with Tracking of car parking spaces are included on drawings herein as ***Appendix A***. There are no constrained parking spaces but a sample of Autotracking of spaces are included at Appendix A. The minimum head room in the lower ground floor car park is 2.6m.

8. The applicant is requested to submit a 'Car Park Management Strategy' with proposed measures incorporating the following:
   - Provision of safe, clean and well-maintained car parking facilities for residents and visitors, incorporating safe access, security & signage
   - Efficient use of allocated spaces and availability all hours and days of the year.
   - Measures to avoid illegal parking within and development and enforcement
   - Measures to avoid illegal parking in the vicinity of the development
   - Monitoring and evaluation, including the need to expand provision of Electric Charging point

5.23 A Car Park Management strategy is included at section 2.0 above.

9. The Applicant is requested to submit a **detailed** Quality Audit (which shall include a Road Safety Audit, Access Audit, Cycle Audit and a Walking Audit) to demonstrate that appropriate consideration has been giving to all relevant aspects of the development in accordance with the Design Manual for Urban Roads & Streets (DMURS). The independent Audit Team shall be approved by the Planning Authority (Transportation Planning Section) and all measures recommended by the Auditor shall be undertaken unless the Planning Authority approves any departure in writing. A feedback report and a map showing the location of issues identified should also be submitted providing a response to each of the items. The Applicant and auditor shall have regard to access route to and from proposed residential units to proposed basement car parking spaces, including access for visitor car parking and requirements to be open to residents and visitors 24 hours of every day.

5.24 An independent Stage 1 Road Safety Audit including Quality Audit, together with the Designer Feedback form, has been undertaken and is included as ***Appendix H.***

> 10. The applicant is to get written agreement with the Capital projects lead for the Blackglen/Sandyford Road improvement scheme that this development will not in any way prejudice its delivery in terms of working space CPO plots required and constructability and will be in accordance with plans and particular submitted with this application.

5.25 We have engaged with DLRCC regarding the Blackglen Road / Harold's Grange Road Improvement Scheme. DLRCC have provided the Blackglen Road / Harold's Grange Road Improvement Scheme proposed permanent and temporary working space acquisition boundary lines in CAD format.

5.26 We have checked that the proposed building line is sufficiently setback from the Sandyford Road to ensure it does not prejudice the future delivery of the proposed Blackglen Road / Harold's Grange Road Improvement Scheme which ties into the existing road, footpath and cycle lane alignments along the site frontage and has no impact upon the scheme. The proposed building line is outside both the proposed permanent and the temporary working space acquisition boundary lines provided by DLRCC. This is illustrated on drawings at Appendix A.

6.0 CONCLUSIONS

6.1 This Traffic & Transport Assessment Report assesses the impact of the proposal to construct and occupy a proposed residential apartment development on lands at 'Karuna' and 'Glenina' Sandyford Road, Dublin 18.

6.2 This Report has been prepared in accordance with the TII Traffic & Transport Assessment Guidelines and is based on industry-standard Trip Generation Rates established using the most up to date version of the TRICS Database. The impact of the development traffic on the local roads has been modelled and assessed, based on a traffic survey/vehicle turning movement survey during normal school period, with industry standard covid factors applied based on TII Traffic Counter Data. Appropriate traffic growth factors have been applied to establish selected opening year and design year traffic conditions.

6.3 The proposed building line is sufficiently setback from the Sandyford Road to ensure it does not prejudice the future delivery of the proposed Blackglen Road / Harold's Grange Road Improvement Scheme which ties into the existing road, footpath and cycle lane alignments at the site frontage.

6.4 The assessment includes a Preliminary Mobility Management Plan (MMP or Travel Plan) for the site which is included as ***Appendix F***. We have also prepared a Statement of Consistency with DMURS and confirm that the internal layout is compliant with the requirements, included as ***Appendix G***.

6.5 An independent Stage 1 Road Safety Audit including Quality Audit, together with the Designer Feedback form, has been undertaken and is included as ***Appendix H***. An assessment of impact/capacity on Bus/LUAS has also been undertaken and is included as ***Appendix I***.

6.6 An assessment of Car Parking and Bicycle Parking quantum and design provided has been undertaken, and the provision is consistent with the requirements of the National Apartment Guidelines and best sustainability practices.

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

6.8 The assessment confirms that the proposed site access junction is of more than adequate capacity to accommodate the worst case traffic associated with the proposed development during the selected year of opening and the design year 15 years following opening.

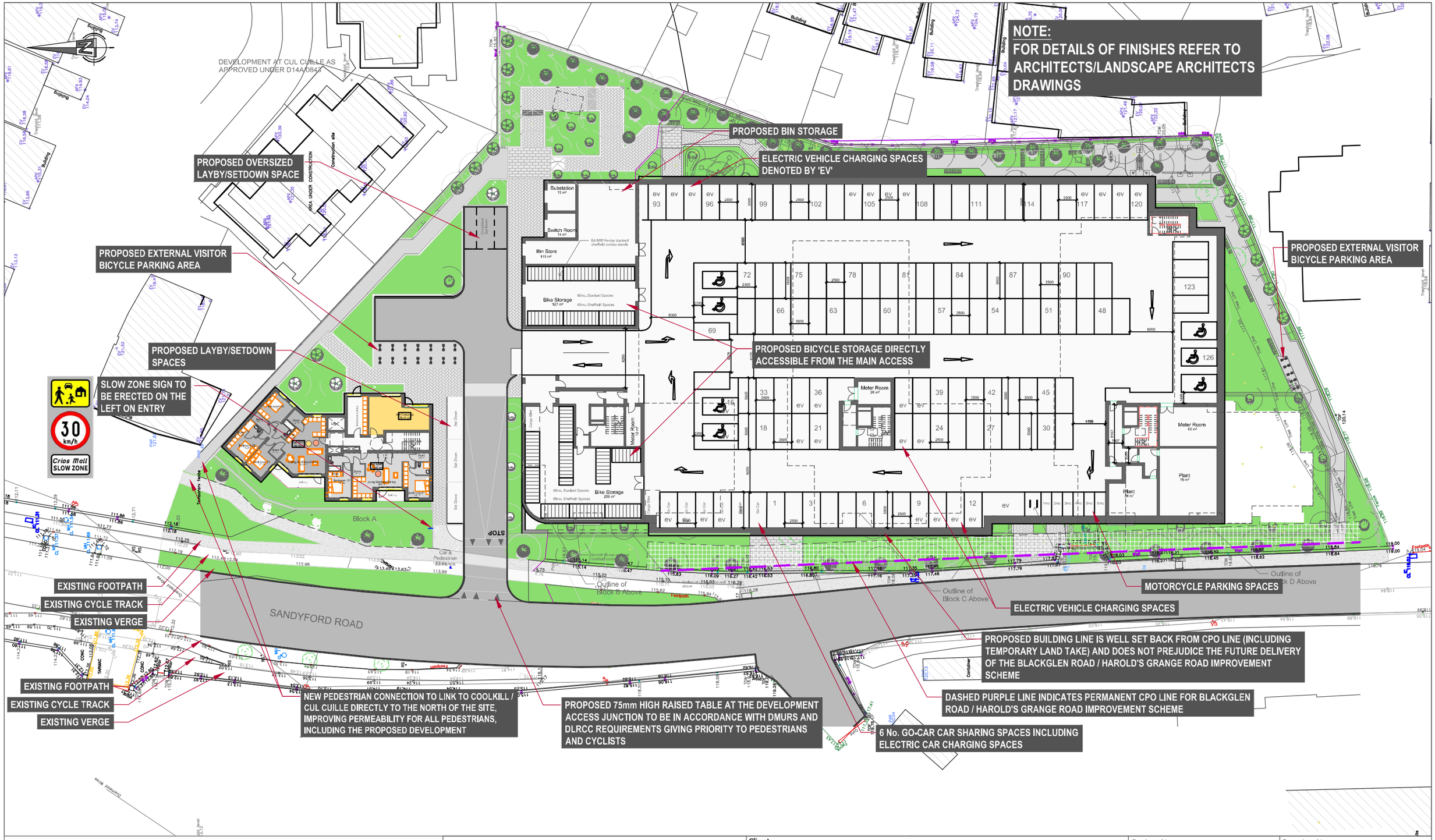
6.9 It is considered that there are no significant Operational Traffic Safety or Road Capacity issues, affecting the established road network, that prevent a positive determination of the application by An Bord Pleanála.

APPENDICES - CONTENT

A	Proposed Development – Site Layout Plans & Drawings
B	Weekday Classified Turning Movement Traffic Survey Output Data
C	TRICS Output Data – Residential Apartments
D	Traffic Calculations, Trip Distribution, Network Traffic Flow Diagrams & Projections Based on Traffic Surveys
E	Junction 9 PiCADY – Sandyford Road Site Access Junction
F	Preliminary Mobility Management Plan/Travel Plan
G	DMURS Statement of Consistency
H	Stage 1 Independent Road Safety Audit including Quality Audit
I	Bus/LUAS Capacity Assessment Report

APPENDIX A

Proposed Development
Site Layout/Plans & Drawings



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 architects drawing 533-HRA-00-LGF-DR-A-P-0200 received 12/04/22. 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: Sandyford SHD Dublin

Title: Proposed Site & Car Parking Layout

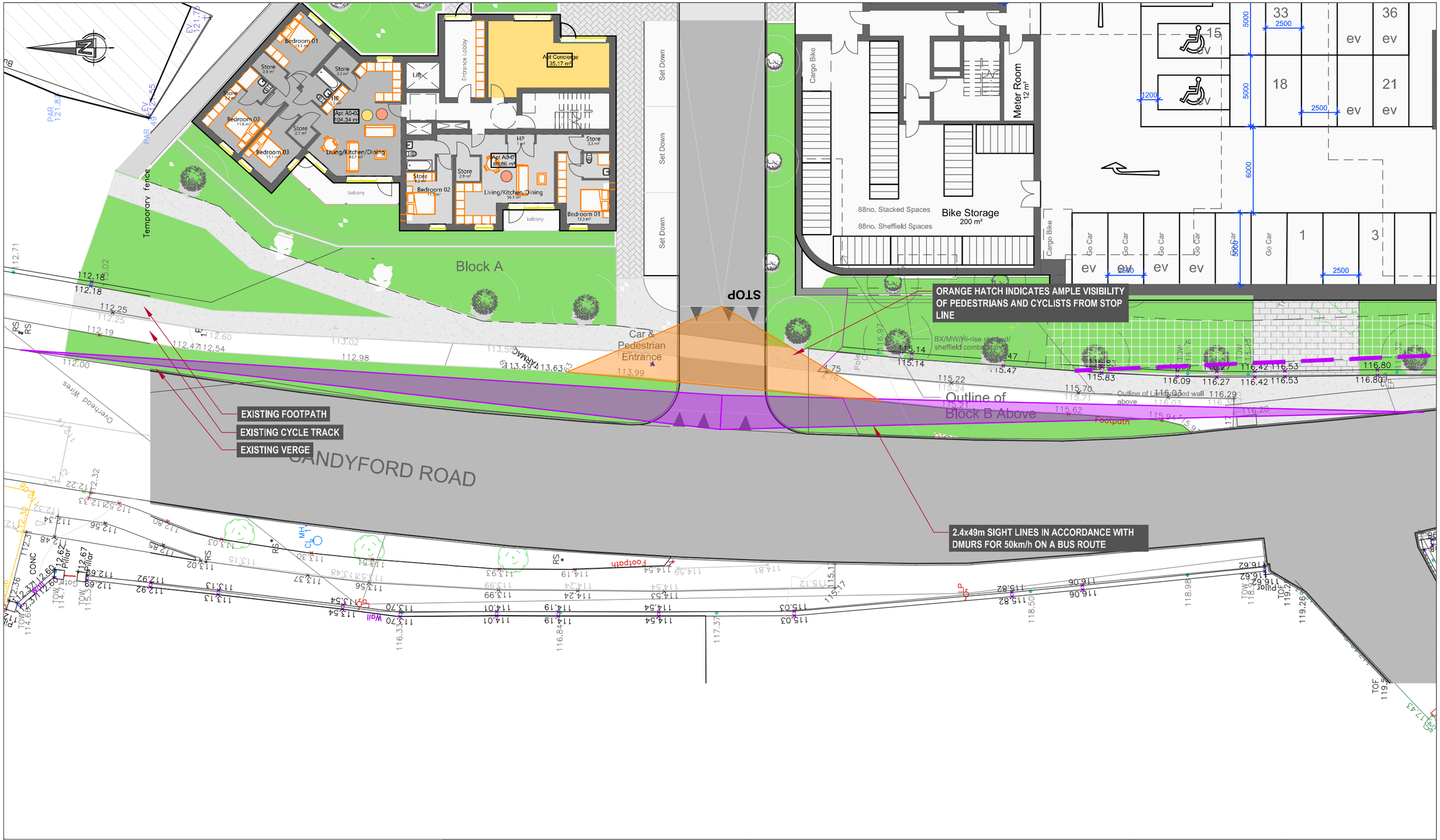
NRB Consulting Engineers Ltd accept no responsibility for any unauthorised amendments to this drawing. Only figured dimensions to be worked to.

Project No.	Drawing No.
21-043	NRB-TA-001

Drawn	Checked	Approved
PB	SN 14/04/22	SN 14/04/22

Date	Scale @ A3	Rev
7-Apr-22	1:500	A

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



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Client

Project: Sandyford SHD Dublin

Title: Proposed Site Access Sight Lines

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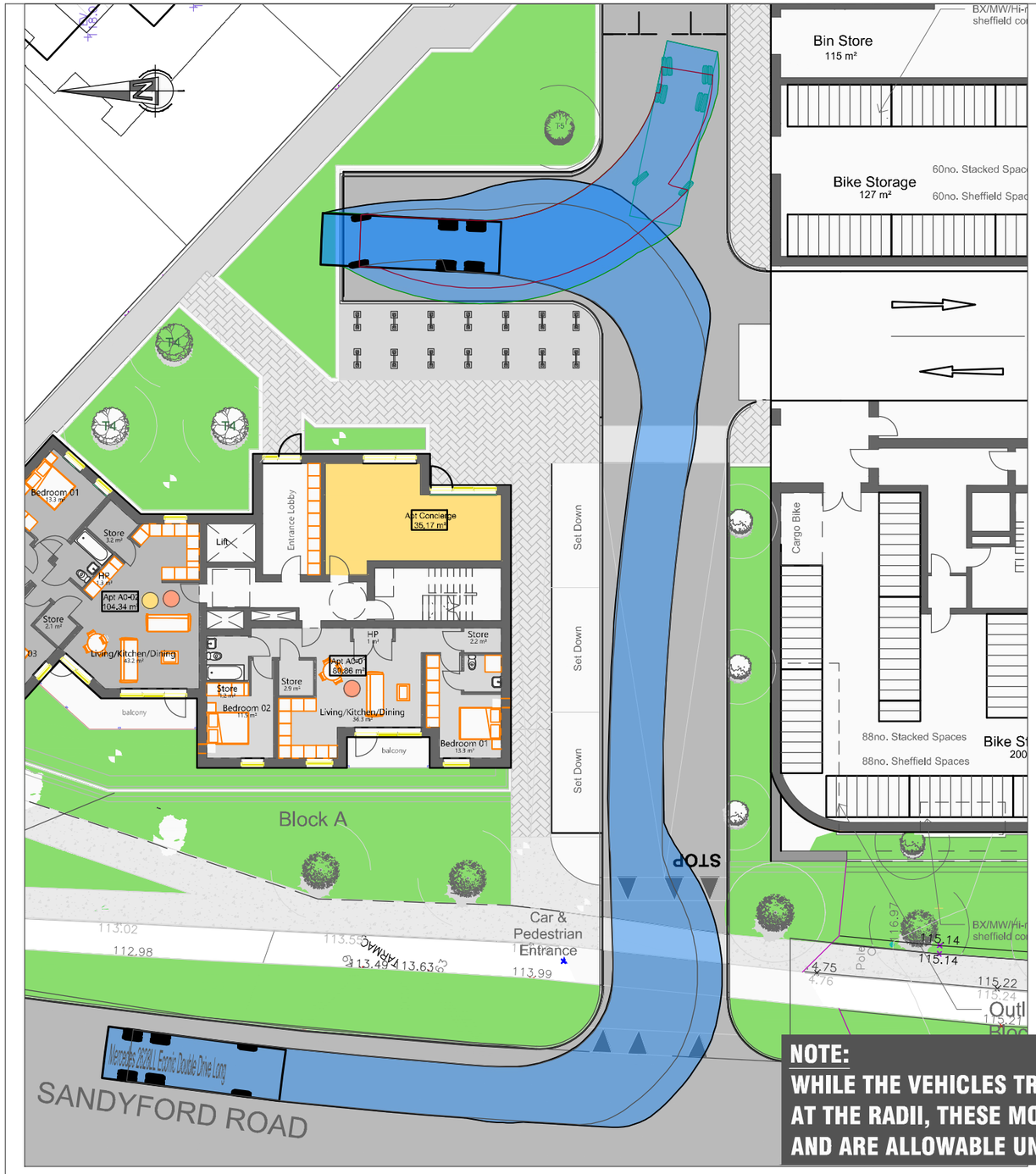
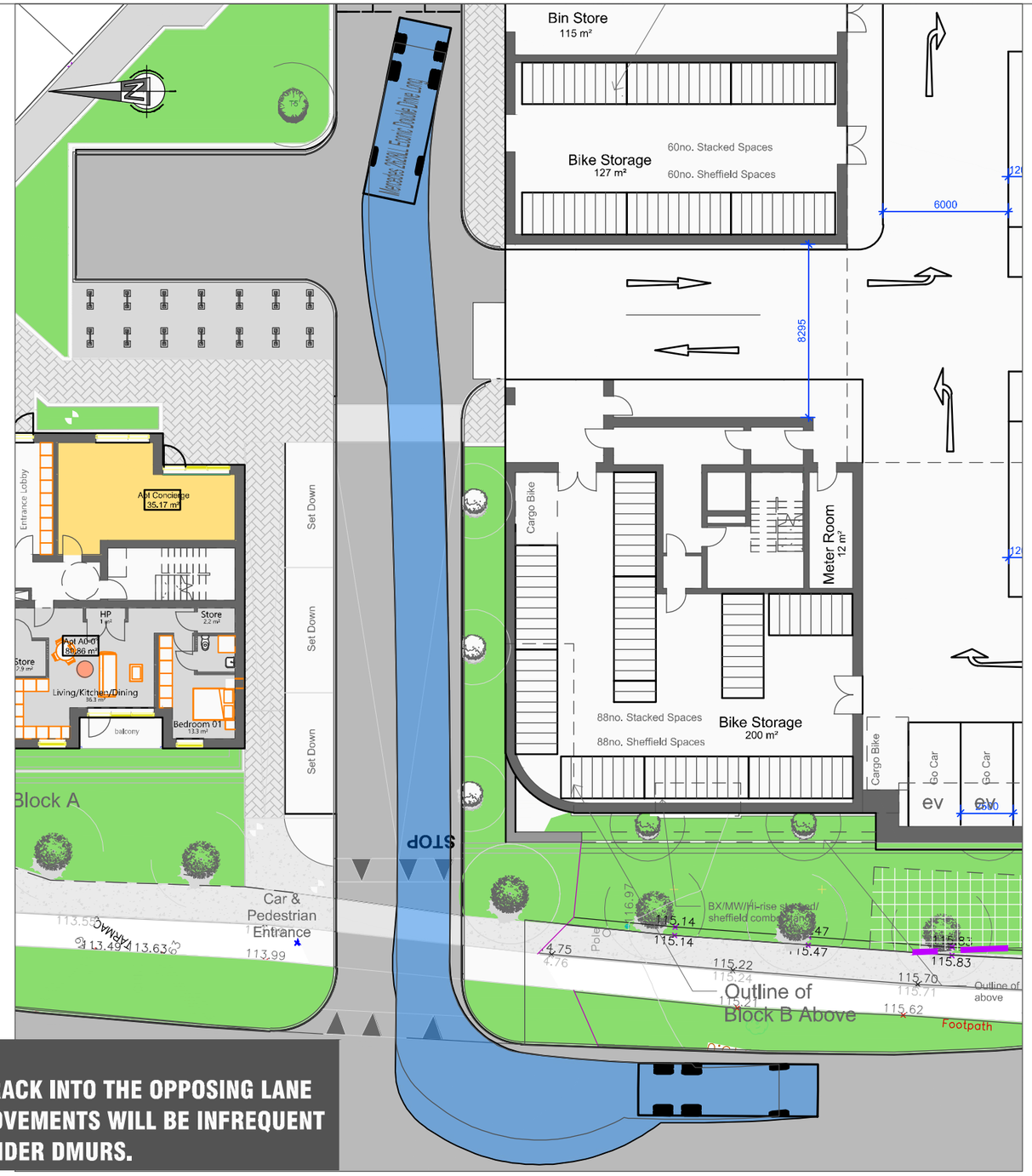
Project No.	Drawing No.
21-043	NRB-TA-002

Drawn	Checked	Approved
PB	SN 14/04/22	SN 14/04/22

Date	Scale @ A3	Rev
7-Apr-22	1:250	A

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.

AUTOTRACK OF A REFUSE VEHICLE ENTERING THE PROPOSED DEVELOPMENT

AUTOTRACK OF A REFUSE VEHICLE EXITING THE PROPOSED DEVELOPMENT

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

This drawing is based upon architects drawing 533-HRA-00-LGF-DR-A-P-0200 received 12/04/22. NRB Consulting Engineers Ltd shall not be liable for any inaccuracies or deficiencies.

REV	DATE	AMENDMENTS	DRAWN	CHK	APP

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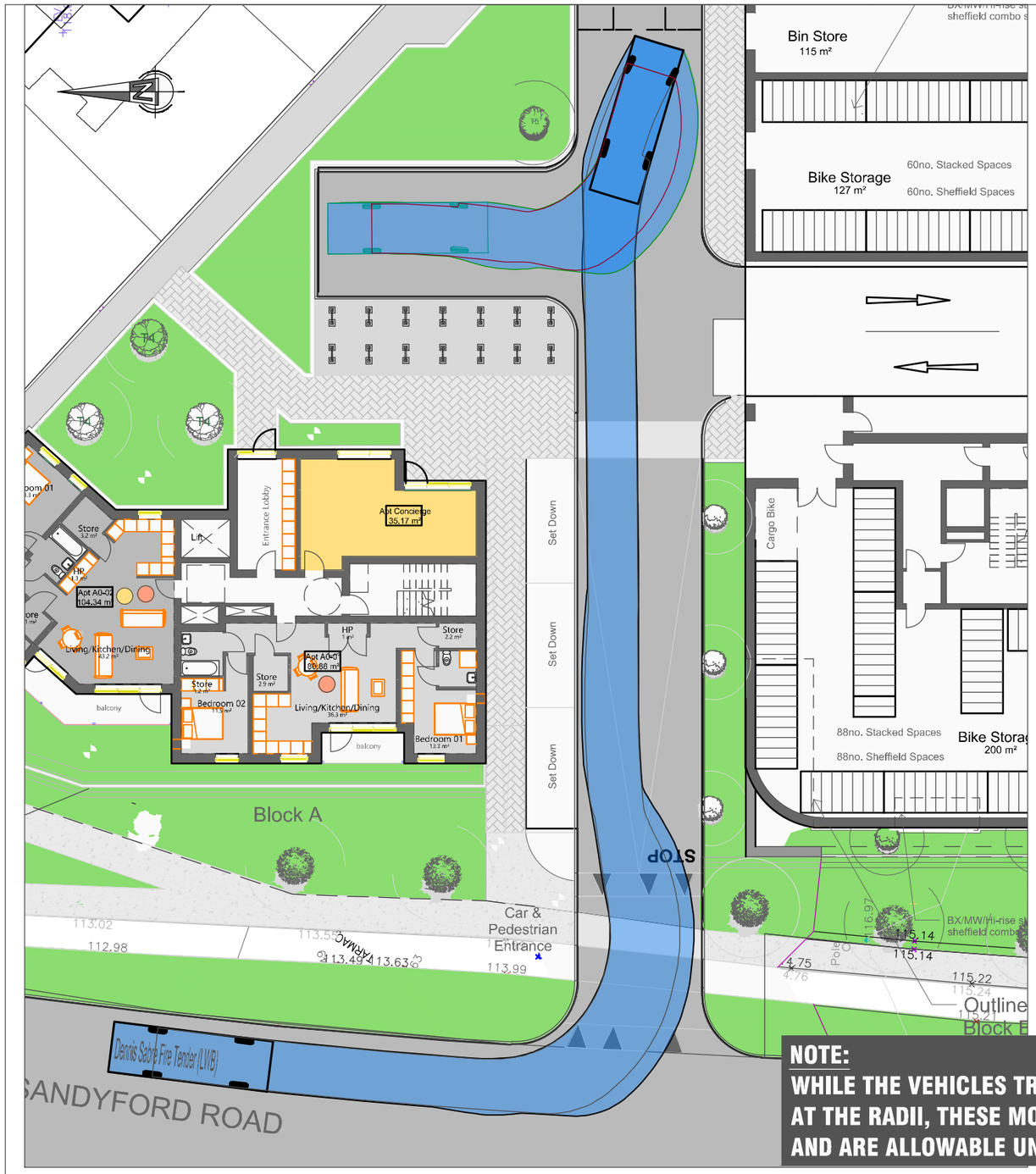
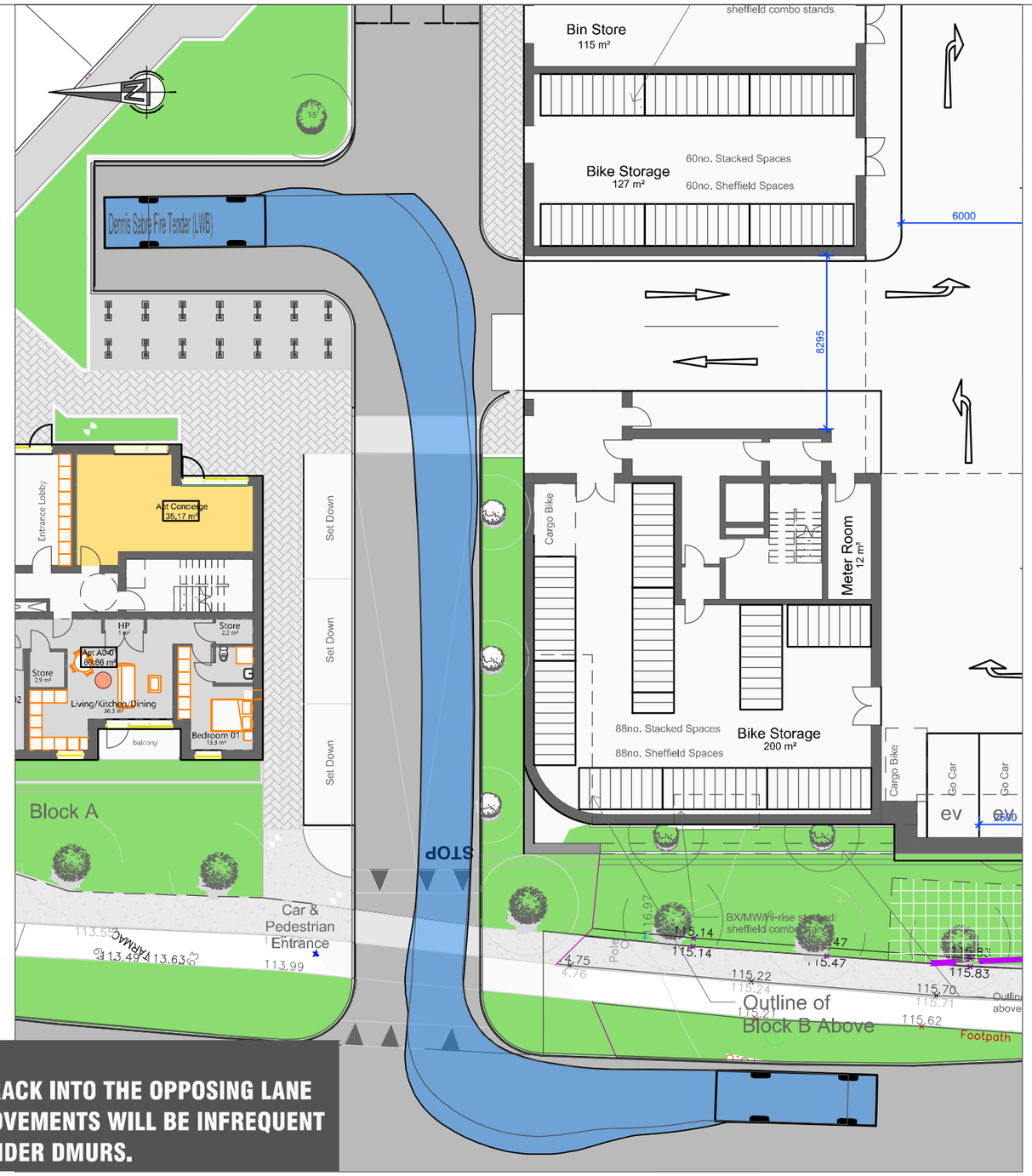
Client		Project No. 21-043	Drawing No. NRB-TA-003
Project	Sandyford SHD Dublin	Drawn PB / Checked SN 14/04/22	Approved SN 14/04/22
Title	Autotracks of a Refuse Vehicle Entering and Exiting the Development	Date 7-Apr-22	Scale @ A3 1:250 / Rev A
	NRB Consulting Engineers Ltd accept no responsibility for any unauthorised amendments to this drawing. Only figured dimensions to be worked to.	Purpose of Issue	☐ Draft ☐ Information ☐ Approval ☐ As Built ☐ Tender ☐ Construction



AUTOTRACK OF A FIRE TENDER ENTERING THE PROPOSED DEVELOPMENT



AUTOTRACK OF A FIRE TENDER EXITING THE PROPOSED DEVELOPMENT

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.

This drawing is based upon architects drawing 533-HRA-00-LGF-DR-A-P-0200 received 12/04/22. NRB Consulting Engineers Ltd shall not be liable for any inaccuracies or deficiencies.

REV	DATE	AMENDMENTS	DRAWN	CHK	APP

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Registered in Ireland No. 491679

NRB consulting engineers

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Client		Project No. 21-043	Drawing No. NRB-TA-004
Project	Sandyford SHD Dublin	Drawn PB / Checked SN 14/04/22	Approved SN 14/04/22
Title	Autotracks of a Fire Tender Entering and Exiting the Development	Date 7-Apr-22	Scale @ A3 1:250 / Rev A
	NRB Consulting Engineers Ltd accept no responsibility for any unauthorised amendments to this drawing. Only figured dimensions to be worked to.	Purpose of Issue	☐ Draft ☐ Information ☐ Approval ☐ As Built ☐ Tender ☐ Construction

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 architects drawing 533-HRA-00-LGF-DR-A-P-0200 received 12/04/22. NRB Consulting Engineers Ltd shall not be liable for any inaccuracies or deficiencies.

REV	DATE	AMENDMENTS	DRAWN	CHK	APP

NRB Consulting Engineers Ltd
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Client

Project: Sandyford SHD Dublin

Title: Autotracks of a Large Car Entering and Exiting Various Parking Spaces

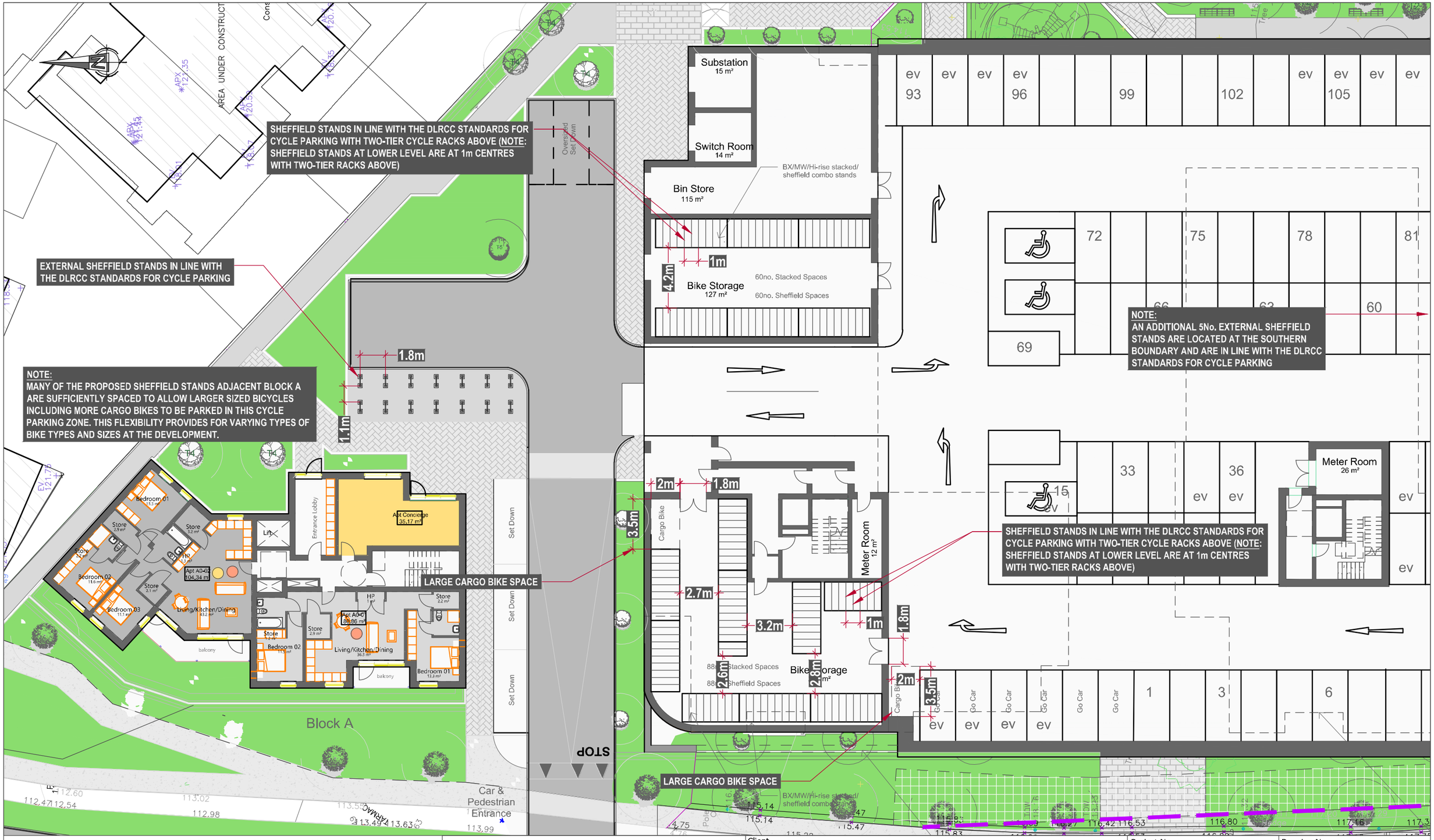
NRB Consulting Engineers Ltd accept no responsibility for any unauthorised amendments to this drawing. Only figured dimensions to be worked to.

Project No.	Drawing No.
21-043	NRB-TA-005

Drawn	Checked	Approved
PB	SN 14/04/22	SN 14/04/22

Date	Scale @ A3	Rev
14-Apr-22	1:250	A

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



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 architects drawing 533-HRA-00-LGF-DR-A-P-0200 received 12/04/22. NRB Consulting Engineers Ltd shall not be liable for any inaccuracies or deficiencies.

REV	DATE	AMENDMENTS	DRAWN	CHK	APP

NRB Consulting Engineers Ltd
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NRB consulting engineers

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Client		Project No. 21-043	Drawing No. NRB-TA-006
Project: Sandyford SHD Dublin	Drawn: PB	Checked: SN 14/04/22	Approved: SN 14/04/22
Title: Cycle Audit Plan	Date: 14-Apr-22	Scale @ A3: 1:250	Rev: A

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

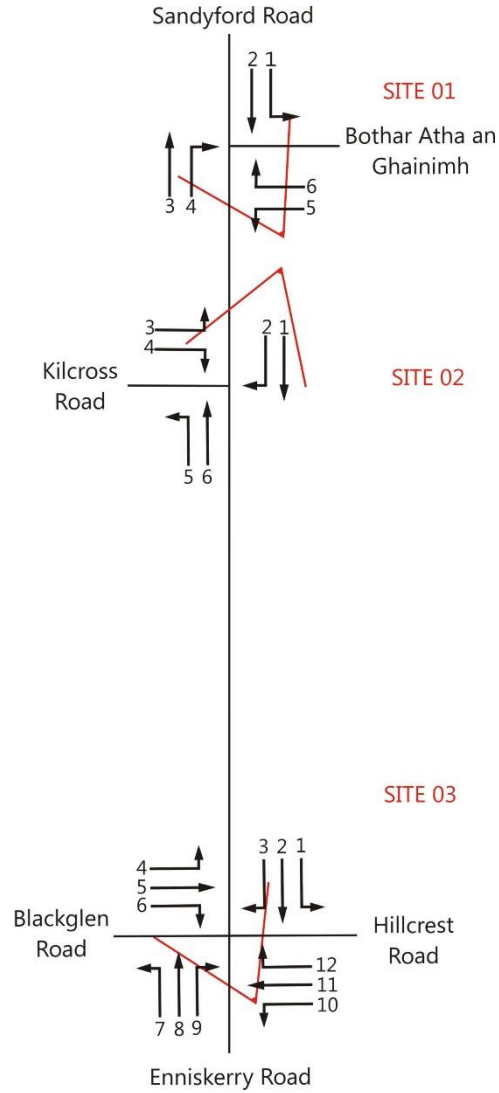
Purpose of Issue: ☐ Draft ☐ Information ☐ Approval ☐ As Built ☐ Tender ☐ Construction

APPENDIX B

Weekday - Classified
Turning Movement Traffic Survey Output Data

Site Locations

Movement Numbers



Job number: TRA/21/055	Job date: May 2021	Drawing No: TRA/21/055-01	traffinomics.ie
Client: NRB Consulting Engineers	Job day Thursday	SURVEY DETAILS	

TRAFFINOMICS LIMITED

SANDYFORD ROAD TRAFFIC COUNTS **MAY 2021**

MANUAL CLASSIFIED JUNCTION TURNING COUNTS **TRA/21/055**

SITE: 01 DATE: 6th May 2021

LOCATION: Sandyford Road/Bothar Ath an Ghainimh DAY: Thursday

	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	7	2	1	0	10	11	3	0	19	6	1	1	30	30	2	0	46	1	0	1	50	49
07:15	0	0	10	3	0	1	14	15	2	0	20	7	1	0	30	29	9	0	40	7	2	0	58	53
07:30	2	0	8	5	2	0	17	17	6	1	25	3	0	1	36	32	6	0	105	6	0	1	118	114
07:45	0	0	16	3	0	0	19	19	4	0	30	6	1	2	43	43	6	0	139	5	1	3	154	153
H/TOT	2	0	41	13	3	1	60	62	15	1	94	22	3	4	139	133	23	0	330	19	3	5	380	370
08:00	2	0	18	0	0	0	20	18	3	0	51	1	0	1	56	55	12	0	90	5	6	0	113	109
08:15	0	1	23	3	3	0	30	32	3	0	78	4	3	2	90	93	12	0	82	6	0	1	101	92
08:30	1	0	34	2	0	2	39	40	3	0	73	7	1	0	84	83	10	0	92	5	1	4	112	109
08:45	0	0	38	5	2	2	47	51	7	0	90	6	4	1	108	107	6	0	76	3	4	0	89	88
H/TOT	3	1	113	10	5	4	136	142	16	0	292	18	8	4	338	337	40	0	340	19	11	5	415	399
09:00	1	0	24	2	1	0	28	28	2	0	63	4	1	0	70	69	6	0	82	7	0	0	95	90
09:15	1	0	26	3	0	0	30	29	6	0	55	6	3	1	71	70	3	0	66	4	5	0	78	81
09:30	0	0	33	0	2	0	35	37	1	0	39	1	3	0	44	46	3	1	53	7	4	1	69	71
09:45	0	0	16	3	0	1	20	21	4	1	72	9	2	0	88	86	4	1	63	11	5	2	86	89
H/TOT	2	0	99	8	3	1	113	115	13	1	229	20	9	1	273	272	16	2	264	29	14	3	328	331
P/TOT	7	1	253	31	11	6	309	320	44	2	615	60	20	9	750	743	79	2	934	67	28	13	1123	1100

	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
16:00	2	1	39	3	1	0	46	45	13	2	88	4	2	0	109	99	3	1	72	6	3	0	85	85
16:15	2	0	25	1	1	1	30	30	5	0	109	6	0	0	120	116	1	2	82	4	2	0	91	91
16:30	3	0	29	4	0	0	36	34	9	2	124	9	2	3	149	146	2	2	83	7	2	1	97	97
16:45	0	2	34	4	0	1	41	41	5	1	101	7	0	0	114	109	7	3	80	8	1	1	100	95
H/TOT	7	3	127	12	2	2	153	150	32	5	422	26	4	3	492	470	13	8	317	25	8	2	373	368
17:00	2	0	36	2	1	0	41	40	3	0	103	14	3	1	124	126	11	0	85	3	0	1	100	92
17:15	1	1	39	1	0	0	42	41	11	1	120	10	1	0	143	135	1	0	59	4	0	0	64	63
17:30	0	0	26	2	0	0	28	28	3	0	83	5	0	1	92	91	5	1	89	6	0	1	102	98
17:45	0	0	45	1	0	1	47	48	16	0	130	8	2	0	156	145	4	0	59	5	0	1	69	67
H/TOT	3	1	146	6	1	1	158	157	33	1	436	37	6	2	515	496	21	1	292	18	0	3	335	321
18:00	2	0	27	3	0	0	32	30	10	1	118	6	1	0	136	128	7	1	66	6	0	1	81	76
18:15	1	0	33	2	0	0	36	35	12	2	85	4	1	2	106	98	9	2	74	2	0	0	87	79
18:30	2	1	27	1	0	1	32	31	5	2	98	12	1	0	118	114	6	1	73	5	0	3	88	86
18:45	0	1	29	0	0	0	30	29	9	0	93	11	0	0	113	106	10	0	64	9	1	0	84	77
H/TOT	5	2	116	6	0	1	130	126	36	5	394	33	3	2	473	446	32	4	277	22	1	4	340	317
P/TOT	15	6	389	24	3	4	441	432	101	11	1252	96	13	7	1480	1413	66	13	886	65	9	9	1048	1005

TRAFFINOMICS LIMITED

SANDYFORD ROAD TRAFFIC COUNTS **MAY 2021**

MANUAL CLASSIFIED JUNCTION TURNING COUNTS **TRA/21/055**

SITE: 01 DATE: 6th May 2021

LOCATION: Sandyford Road/Bothar Ath an Ghainimh DAY: Thursday

	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	4	0	0	0	4	4	0	0	3	1	0	0	4	4	0	0	13	0	0	0	13	13
07:15	1	0	6	2	2	0	11	12	0	0	1	0	0	0	1	1	0	0	9	3	0	0	12	12
07:30	0	1	9	1	0	0	11	10	0	0	3	0	0	0	3	3	2	0	26	3	2	1	34	35
07:45	0	0	5	1	0	0	6	6	0	0	4	0	0	1	5	6	0	0	31	3	1	0	35	36
H/TOT	1	1	24	4	2	0	32	33	0	0	11	1	0	1	13	14	2	0	79	9	3	1	94	96
08:00	0	0	5	0	1	0	6	7	0	0	4	0	0	0	4	4	4	0	34	1	2	0	41	40
08:15	0	0	5	0	2	0	7	9	2	0	9	1	0	0	12	10	2	0	44	1	0	0	47	45
08:30	0	0	8	0	0	0	8	8	0	0	11	1	1	0	13	14	3	0	45	0	0	1	49	48
08:45	0	0	6	2	1	0	9	10	0	0	3	1	0	0	4	4	1	0	46	3	2	0	52	53
H/TOT	0	0	24	2	4	0	30	34	2	0	27	3	1	0	33	32	10	0	169	5	4	1	189	186
09:00	0	0	8	1	0	0	9	9	0	0	5	1	0	0	6	6	1	0	25	5	2	1	34	36
09:15	0	0	8	1	1	0	10	11	0	0	4	1	1	0	6	7	0	0	39	2	0	0	41	41
09:30	0	0	9	1	0	0	10	10	0	0	0	0	1	0	1	2	1	1	27	5	0	0	34	33
09:45	0	0	7	1	0	0	8	8	0	0	8	0	1	0	9	10	1	0	20	3	1	1	26	27
H/TOT	0	0	32	4	1	0	37	38	0	0	17	2	3	0	22	25	3	1	111	15	3	2	135	137
P/TOT	1	1	80	10	7	0	99	105	2	0	55	6	4	1	68	71	15	1	359	29	10	4	418	419

	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
16:00	0	0	8	0	0	0	8	8	0	0	8	2	0	0	10	10	0	0	36	4	0	1	41	42
16:15	1	0	10	1	0	0	12	11	2	0	3	2	0	0	7	5	2	0	34	4	1	0	41	40
16:30	0	0	7	0	0	0	7	7	0	0	10	1	2	0	13	15	0	0	36	2	0	0	38	38
16:45	0	0	7	1	1	0	9	10	0	0	14	1	0	0	15	15	2	0	34	1	0	1	38	37
H/TOT	1	0	32	2	1	0	36	36	2	0	35	6	2	0	45	45	4	0	140	11	1	2	158	158
17:00	2	0	5	1	0	0	8	6	2	1	10	2	0	0	15	13	0	1	34	3	0	0	38	37
17:15	0	0	6	0	0	0	6	6	0	0	12	2	0	0	14	14	1	0	33	2	0	0	36	35
17:30	0	1	7	2	0	0	10	9	2	0	11	0	1	0	14	13	1	1	28	1	0	0	31	30
17:45	0	0	8	1	0	0	9	9	1	0	10	3	1	0	15	15	0	0	28	3	0	0	31	31
H/TOT	2	1	26	4	0	0	33	31	5	1	43	7	2	0	58	55	2	2	123	9	0	0	136	133
18:00	0	0	14	1	0	0	15	15	0	1	11	1	0	0	13	12	2	2	35	0	0	1	40	38
18:15	1	0	5	0	0	0	6	5	4	0	14	1	0	0	19	16	0	0	24	0	0	0	24	24
18:30	0	0	7	1	0	0	8	8	0	0	4	2	0	0	6	6	3	0	30	4	0	0	37	35
18:45	0	0	12	2	0	0	14	14	2	0	10	0	0	0	12	10	0	1	26	1	0	0	28	27
H/TOT	1	0	38	4	0	0	43	42	6	1	39	4	0	0	50	45	5	3	115	5	0	1	129	124
P/TOT	4	1	96	10	1	0	112	109	13	2	117	17	4	0	153	145	11	5	378	25	1	3	423	415

TRAFFINOMICS LIMITED

SANDYFORD ROAD TRAFFIC COUNTS **MAY 2021**

MANUAL CLASSIFIED JUNCTION TURNING COUNTS **TRA/21/055**

SITE: 02 DATE: 6th May 2021

LOCATION: Sandyford Road/Kilcross Road DAY: Thursday

	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	3	0	17	7	1	1	29	29	0	0	5	0	0	0	5	5	1	0	6	0	0	0	7	6
07:15	2	0	19	5	1	0	27	26	0	0	2	2	0	0	4	4	1	0	11	3	1	0	16	16
07:30	5	1	23	2	0	1	32	28	1	0	5	1	0	0	7	6	1	1	16	2	0	0	20	19
07:45	4	0	28	3	1	3	39	40	0	0	6	3	0	0	9	9	0	0	16	1	0	1	18	19
H/TOT	14	1	87	17	3	5	127	123	1	0	18	6	0	0	25	24	3	1	49	6	1	1	61	60
08:00	3	0	53	0	0	1	57	56	0	0	2	1	0	0	3	3	0	0	11	1	1	0	13	14
08:15	5	0	80	4	3	2	94	95	0	0	7	1	0	0	8	8	1	0	12	0	0	1	14	14
08:30	3	0	78	6	2	0	89	89	0	0	6	2	0	0	8	8	1	0	16	0	0	0	17	16
08:45	6	0	79	5	4	1	95	95	1	0	14	2	0	0	17	16	0	0	7	2	1	0	10	11
H/TOT	17	0	290	15	9	4	335	334	1	0	29	6	0	0	36	35	2	0	46	3	2	1	54	55
09:00	2	0	60	5	1	0	68	67	0	0	8	0	0	0	8	8	0	0	8	5	0	0	13	13
09:15	6	0	53	5	3	1	68	67	0	0	6	2	1	0	9	10	0	0	9	2	1	0	12	13
09:30	1	0	36	0	4	0	41	44	0	0	3	1	0	0	4	4	0	0	13	1	1	0	15	16
09:45	4	0	70	9	3	0	86	86	0	1	10	0	0	0	11	10	0	1	18	2	0	0	21	20
H/TOT	13	0	219	19	11	1	263	265	0	1	27	3	1	0	32	32	0	1	48	10	2	0	61	62
P/TOT	44	1	596	51	23	10	725	722	2	1	74	15	1	0	93	92	5	2	143	19	5	2	176	178

	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
16:00	11	1	85	6	2	0	105	98	2	1	11	0	0	0	14	12	0	0	6	1	0	0	7	7
16:15	6	0	95	6	0	0	107	102	1	0	17	2	0	0	20	19	0	0	12	0	0	0	12	12
16:30	7	2	113	9	4	3	138	138	2	0	21	1	0	0	24	22	0	0	12	2	1	0	15	16
16:45	5	0	104	7	0	0	116	112	0	1	11	1	0	0	13	12	0	0	5	2	0	0	7	7
H/TOT	29	3	397	28	6	3	466	450	5	2	60	4	0	0	71	66	0	0	35	5	1	0	41	42
17:00	4	0	101	15	3	1	124	125	1	1	12	1	0	0	15	14	1	0	8	1	0	0	10	9
17:15	8	0	125	7	1	0	141	136	3	1	7	5	0	0	16	13	0	0	6	2	0	0	8	8
17:30	1	0	78	4	0	1	84	84	4	0	16	1	1	0	22	20	0	0	5	1	0	0	6	6
17:45	12	0	122	8	2	0	144	136	5	0	18	3	1	0	27	24	1	0	13	2	0	0	16	15
H/TOT	25	0	426	34	6	2	493	481	13	2	53	10	2	0	80	70	2	0	32	6	0	0	40	38
18:00	9	1	106	5	1	0	122	115	1	1	23	2	0	0	27	26	0	1	11	3	0	1	16	16
18:15	13	2	82	4	1	0	102	91	3	0	17	1	0	2	23	23	3	2	8	2	0	0	15	11
18:30	4	0	86	8	1	0	99	97	1	2	16	6	0	0	25	23	0	1	11	2	0	1	15	15
18:45	9	0	91	10	0	0	110	103	2	0	12	1	0	0	15	13	0	0	14	3	0	0	17	17
H/TOT	35	3	365	27	3	0	433	406	7	3	68	10	0	2	90	85	3	4	44	10	0	2	63	60
P/TOT	89	6	1188	89	15	5	1392	1337	25	7	181	24	2	2	241	221	5	4	111	21	1	2	144	141

TRAFFINOMICS LIMITED

SANDYFORD ROAD TRAFFIC COUNTS **MAY 2021**

MANUAL CLASSIFIED JUNCTION TURNING COUNTS **TRA/21/055**

SITE: 02 DATE: 6th May 2021

LOCATION: Sandyford Road/Kilcross Road DAY: Thursday

	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	1	0	0	0	1	1	0	0	0	0	0	0	0	0	1	0	44	1	0	1	47	47
07:15	0	0	3	1	0	0	4	4	0	0	1	0	1	0	2	3	9	0	35	6	3	0	53	49
07:30	0	0	2	0	1	0	3	4	0	0	2	0	2	0	4	6	5	0	98	5	0	1	109	106
07:45	0	0	4	0	0	0	4	4	0	0	1	0	0	0	1	1	6	0	128	5	1	2	142	140
H/TOT	0	0	10	1	1	0	12	13	0	0	4	0	3	0	7	10	21	0	305	17	4	4	351	342
08:00	0	0	2	0	0	0	2	2	0	0	1	0	0	0	1	1	12	0	84	4	6	0	106	102
08:15	0	0	9	0	0	0	9	9	0	0	1	0	0	0	1	1	11	0	75	6	2	0	94	87
08:30	0	0	6	1	0	0	7	7	0	0	3	0	0	0	3	3	9	0	84	5	1	4	103	101
08:45	0	0	10	1	0	0	11	11	0	0	2	0	0	0	2	2	6	0	75	3	4	0	88	87
H/TOT	0	0	27	2	0	0	29	29	0	0	7	0	0	0	7	7	38	0	318	18	13	4	391	378
09:00	0	0	1	0	1	0	2	3	0	0	11	0	1	0	12	13	6	0	82	3	0	0	91	86
09:15	0	0	1	0	0	0	1	1	0	0	3	1	2	0	6	8	3	0	65	3	5	0	76	79
09:30	0	0	1	1	1	0	3	4	0	0	1	0	0	0	1	1	3	1	49	7	3	1	64	65
09:45	0	0	5	0	0	0	5	5	0	0	3	0	0	0	3	3	4	0	52	10	5	2	73	77
H/TOT	0	0	8	1	2	0	11	13	0	0	18	1	3	0	22	25	16	1	248	23	13	3	304	307
P/TOT	0	0	45	4	3	0	52	55	0	0	29	1	6	0	36	42	75	1	871	58	30	11	1046	1026

	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
16:00	0	0	2	0	0	0	2	2	0	0	3	1	0	0	4	4	3	1	74	5	3	0	86	86
16:15	0	0	2	0	0	0	2	2	0	0	6	0	1	0	7	8	2	2	80	5	2	0	91	90
16:30	0	0	4	0	1	0	5	6	0	0	2	2	0	0	4	4	2	2	78	5	1	1	89	88
16:45	0	0	6	0	0	0	6	6	0	0	2	0	1	0	3	4	7	3	82	7	2	1	102	98
H/TOT	0	0	14	0	1	0	15	16	0	0	13	3	2	0	18	20	14	8	314	22	8	2	368	362
17:00	0	0	6	0	0	0	6	6	0	0	4	1	0	0	5	5	12	0	82	3	0	1	98	89
17:15	0	0	6	0	1	0	7	8	0	0	7	1	0	0	8	8	1	0	59	2	0	0	62	61
17:30	1	0	0	0	2	0	3	4	1	0	6	0	2	0	9	10	5	2	91	7	0	1	106	102
17:45	0	0	5	0	0	0	5	5	0	0	4	0	1	0	5	6	3	0	54	4	0	1	62	61
H/TOT	1	0	17	0	3	0	21	23	1	0	21	2	3	0	27	29	21	2	286	16	0	3	328	313
18:00	0	0	7	0	0	0	7	7	0	0	1	0	0	1	2	3	7	0	69	4	0	0	80	74
18:15	0	0	6	0	0	0	6	6	0	0	3	1	0	0	4	4	7	0	71	0	0	0	78	72
18:30	0	0	3	0	0	0	3	3	0	0	2	0	0	0	2	2	6	0	69	4	0	2	81	78
18:45	0	0	6	1	2	0	9	11	0	0	4	0	1	0	5	6	10	0	62	8	1	0	81	74
H/TOT	0	0	22	1	2	0	25	27	0	0	10	1	1	1	13	15	30	0	271	16	1	2	320	299
P/TOT	1	0	53	1	6	0	61	66	1	0	44	6	6	1	58	64	65	10	871	54	9	7	1016	974

TRAFFINOMICS LIMITED

SANDYFORD ROAD TRAFFIC COUNTS **MAY 2021**

MANUAL CLASSIFIED JUNCTION TURNING COUNTS **TRA/21/055**

SITE: 03 DATE: 6th May 2021

LOCATION: Sandyford Road/Blackglen Road/Enniskerry Road/Hillcrest Road DAY: Thursday

	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	2	0	0	0	2	2	0	0	8	2	1	0	11	12	0	0	4	2	0	1	7	8
07:15	0	0	2	0	0	0	2	2	1	0	11	2	0	0	14	13	0	0	7	4	1	0	12	13
07:30	0	0	0	0	1	0	1	2	3	1	11	2	0	1	18	16	0	0	12	1	0	0	13	13
07:45	0	0	2	1	0	0	3	3	3	0	26	0	1	2	32	33	0	0	7	2	0	1	10	11
H/TOT	0	0	6	1	1	0	8	9	7	1	56	6	2	3	75	74	0	0	30	9	1	2	42	45
08:00	0	0	3	0	0	0	3	3	3	0	36	1	0	0	40	38	0	0	16	0	0	1	17	18
08:15	0	0	1	0	0	0	1	1	2	0	50	2	4	2	60	64	0	0	29	1	0	0	30	30
08:30	0	0	0	0	0	0	0	0	2	0	64	3	1	0	70	69	0	0	21	1	0	0	22	22
08:45	0	0	2	0	0	0	2	2	8	0	51	6	2	1	68	65	0	0	26	1	0	1	28	29
H/TOT	0	0	6	0	0	0	6	6	15	0	201	12	7	3	238	236	0	0	92	3	0	2	97	99
09:00	0	0	0	0	0	0	0	0	1	0	55	2	2	0	60	61	0	0	19	2	0	1	22	23
09:15	0	0	2	0	0	0	2	2	1	1	35	3	4	0	44	47	3	0	19	1	0	0	23	21
09:30	0	0	1	0	0	0	1	1	0	0	27	0	3	0	30	33	1	0	9	1	1	0	12	12
09:45	0	0	5	0	0	0	5	5	4	0	25	5	0	0	34	31	0	0	16	6	2	0	24	26
H/TOT	0	0	8	0	0	0	8	8	6	1	142	10	9	0	168	172	4	0	63	10	3	1	81	82
P/TOT	0	0	20	1	1	0	22	23	28	2	399	28	18	6	481	481	4	0	185	22	4	5	220	226

	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
16:00	1	0	1	2	0	0	4	3	3	1	71	5	0	0	80	77	0	0	18	1	0	0	19	19
16:15	0	0	4	2	0	0	6	6	7	0	84	6	0	0	97	91	0	0	26	0	1	0	27	28
16:30	0	0	3	1	0	0	4	4	2	2	74	9	2	2	91	92	1	0	22	0	1	1	25	26
16:45	0	0	6	3	0	0	9	9	3	1	91	8	0	0	103	100	0	0	24	3	0	0	27	27
H/TOT	1	0	14	8	0	0	23	22	15	4	320	28	2	2	371	361	1	0	90	4	2	1	98	100
17:00	0	0	3	1	0	0	4	4	2	1	82	8	3	0	96	97	1	0	24	5	0	1	31	31
17:15	1	0	0	0	0	0	1	0	7	0	97	6	0	0	110	104	4	0	14	2	0	0	20	17
17:30	0	0	1	0	0	0	1	1	4	0	67	4	1	0	76	74	0	0	20	1	0	1	22	23
17:45	0	0	1	0	0	0	1	1	13	0	92	4	2	0	111	103	1	0	30	3	0	0	34	33
H/TOT	1	0	5	1	0	0	7	6	26	1	338	22	6	0	393	378	6	0	88	11	0	2	107	104
18:00	0	0	2	0	0	0	2	2	4	0	81	3	1	0	89	87	2	0	30	3	0	0	35	33
18:15	0	0	0	0	0	0	0	0	11	1	74	3	2	0	91	84	0	0	19	1	0	1	21	22
18:30	0	0	2	0	0	0	2	2	2	2	67	5	0	0	76	73	0	0	19	2	0	0	21	21
18:45	0	0	2	0	0	0	2	2	4	0	59	5	0	0	68	65	4	0	35	4	0	0	43	40
H/TOT	0	0	6	0	0	0	6	6	21	3	281	16	3	0	324	308	6	0	103	10	0	1	120	116
P/TOT	2	0	25	9	0	0	36	34	62	8	939	66	11	2	1088	1047	13	0	281	25	2	4	325	321

TRAFFINOMICS LIMITED

SANDYFORD ROAD TRAFFIC COUNTS **MAY 2021**

MANUAL CLASSIFIED JUNCTION TURNING COUNTS **TRA/21/055**

SITE: 03 DATE: 6th May 2021

LOCATION: Sandyford Road/Blackglen Road/Enniskerry Road/Hillcrest Road DAY: Thursday

	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	6	0	1	1	8	10	0	0	22	3	0	0	25	25	0	0	4	1	0	0	5	5
07:15	0	0	9	3	1	0	13	14	0	0	22	4	0	0	26	26	1	0	6	1	1	0	9	9
07:30	2	0	19	3	0	1	25	24	0	0	38	4	0	0	42	42	0	0	9	0	0	0	9	9
07:45	1	0	33	1	0	1	36	36	2	0	44	5	0	0	51	49	0	1	21	1	2	0	25	26
H/TOT	3	0	67	7	2	3	82	85	2	0	126	16	0	0	144	142	1	1	40	3	3	0	48	50
08:00	1	0	19	3	1	0	24	24	2	0	34	4	0	0	40	38	1	0	21	1	0	0	23	22
08:15	2	0	28	2	0	0	32	30	0	0	50	4	1	0	55	56	0	0	25	0	0	0	25	25
08:30	0	0	33	2	1	2	38	41	0	0	37	1	0	1	39	40	0	0	33	0	1	0	34	35
08:45	0	0	33	1	0	0	34	34	0	0	24	1	0	0	25	25	0	0	24	0	1	0	25	26
H/TOT	3	0	113	8	2	2	128	130	2	0	145	10	1	1	159	159	1	0	103	1	2	0	107	108
09:00	1	0	28	1	0	0	30	29	0	0	20	1	0	0	21	21	0	1	23	3	0	0	27	26
09:15	2	0	20	3	0	0	25	23	1	0	24	3	0	0	28	27	0	0	21	2	0	0	23	23
09:30	0	1	14	3	0	2	20	21	0	0	21	4	0	0	25	25	0	0	14	2	0	0	16	16
09:45	0	0	11	2	2	0	15	17	0	0	16	3	0	0	19	19	1	0	24	1	1	0	27	27
H/TOT	3	1	73	9	2	2	90	91	1	0	81	11	0	0	93	92	1	1	82	8	1	0	93	93
P/TOT	9	1	253	24	6	7	300	305	5	0	352	37	1	1	396	394	3	2	225	12	6	0	248	250

	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
16:00	1	0	13	3	1	0	18	18	0	0	20	0	0	0	20	20	1	0	32	5	2	0	40	41
16:15	0	2	27	2	0	0	31	30	1	0	30	3	0	0	34	33	0	0	26	2	0	0	28	28
16:30	1	0	14	3	0	0	18	17	0	0	29	2	0	0	31	31	0	0	24	4	0	0	28	28
16:45	0	0	25	2	0	2	29	31	0	0	26	1	1	0	28	29	2	0	37	5	0	0	44	42
H/TOT	2	2	79	10	1	2	96	96	1	0	105	6	1	0	113	113	3	0	119	16	2	0	140	140
17:00	0	0	24	0	0	0	24	24	1	0	28	2	0	0	31	30	0	0	36	0	0	0	36	36
17:15	0	0	18	1	0	0	19	19	0	0	30	4	0	0	34	34	1	0	35	3	0	0	39	38
17:30	2	0	23	2	0	0	27	25	3	1	26	2	0	0	32	29	6	0	25	1	0	0	32	27
17:45	0	0	15	2	0	0	17	17	0	0	25	0	0	0	25	25	3	0	20	2	0	0	25	23
H/TOT	2	0	80	5	0	0	87	85	4	1	109	8	0	0	122	118	10	0	116	6	0	0	132	124
18:00	3	0	25	1	0	1	30	29	0	0	25	2	1	0	28	29	3	0	24	0	0	0	27	25
18:15	5	0	17	1	0	1	24	21	1	1	21	1	0	0	24	23	3	0	35	3	0	0	41	39
18:30	1	0	18	1	0	1	21	21	0	0	26	2	0	0	28	28	3	0	30	1	0	0	34	32
18:45	1	0	16	2	0	0	19	18	2	0	22	1	0	0	25	23	2	0	16	1	0	0	19	17
H/TOT	10	0	76	5	0	3	94	89	3	1	94	6	1	0	105	103	11	0	105	5	0	0	121	112
P/TOT	14	2	235	20	1	5	277	271	8	2	308	20	2	0	340	334	24	0	340	27	2	0	393	376

TRAFFINOMICS LIMITED

SANDYFORD ROAD TRAFFIC COUNTS **MAY 2021**

MANUAL CLASSIFIED JUNCTION TURNING COUNTS **TRA/21/055**

SITE: 03 DATE: 6th May 2021

LOCATION: Sandyford Road/Blackglen Road/Enniskerry Road/Hillcrest Road DAY: Thursday

	MOVEMENT 7								MOVEMENT 8								MOVEMENT 9							
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	5	2	0	0	7	7	3	0	24	0	0	0	27	25	0	0	15	3	0	0	18	18
07:15	0	1	7	0	2	0	10	11	5	0	38	4	0	0	47	43	0	0	28	3	0	0	31	31
07:30	2	0	11	2	0	0	15	13	3	0	79	0	0	1	83	82	0	0	35	3	0	0	38	38
07:45	1	0	20	1	0	0	22	21	7	0	93	3	1	0	104	99	1	0	51	6	0	0	58	57
H/TOT	3	1	43	5	2	0	54	53	18	0	234	7	1	1	261	249	1	0	129	15	0	0	145	144
08:00	0	0	26	0	0	1	27	28	8	0	61	3	5	0	77	76	0	0	37	4	1	0	42	43
08:15	0	0	20	0	0	0	20	20	6	0	48	2	0	1	57	53	0	0	36	2	0	0	38	38
08:30	1	0	12	0	0	1	14	14	9	0	60	1	0	1	71	65	0	0	27	4	0	0	31	31
08:45	0	0	18	1	0	0	19	19	5	1	39	2	3	0	50	48	0	0	29	2	0	0	31	31
H/TOT	1	0	76	1	0	2	80	81	28	1	208	8	8	2	255	242	0	0	129	12	1	0	142	143
09:00	0	0	38	3	2	0	43	45	4	0	81	2	1	0	88	86	0	0	35	1	0	0	36	36
09:15	1	0	14	2	0	0	17	16	1	0	28	1	6	0	36	41	0	0	15	4	0	0	19	19
09:30	0	0	17	1	1	0	19	20	2	0	35	4	3	0	44	45	0	0	16	2	1	0	19	20
09:45	1	0	16	1	0	1	19	19	3	0	36	4	3	1	47	49	0	0	19	4	0	0	23	23
H/TOT	2	0	85	7	3	1	98	100	10	0	180	11	13	1	215	221	0	0	85	11	1	0	97	98
P/TOT	6	1	204	13	5	3	232	235	56	1	622	26	22	4	731	712	1	0	343	38	2	0	384	385

	MOVEMENT 7								MOVEMENT 8								MOVEMENT 9							
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
16:00	0	0	28	0	1	0	29	30	2	1	68	3	2	0	76	76	0	0	29	5	0	0	34	34
16:15	1	0	32	2	1	0	36	36	1	1	55	3	1	0	61	61	0	0	20	5	0	0	25	25
16:30	1	0	31	3	0	0	35	34	3	2	55	4	0	1	65	62	0	0	20	6	1	0	27	28
16:45	0	0	29	0	0	0	29	29	8	4	59	3	2	0	76	69	2	0	7	5	0	0	14	12
H/TOT	2	0	120	5	2	0	129	129	14	8	237	13	5	1	278	268	2	0	76	21	1	0	100	99
17:00	2	0	24	2	0	0	28	26	2	0	56	5	0	0	63	61	0	1	40	2	0	0	43	42
17:15	1	0	26	2	1	0	30	30	1	1	50	1	0	0	53	52	0	0	28	3	0	0	31	31
17:30	0	0	22	1	0	0	23	23	3	0	71	3	0	0	77	75	0	0	27	3	0	0	30	30
17:45	1	0	38	2	1	0	42	42	3	0	46	2	0	1	52	51	1	0	15	4	0	0	20	19
H/TOT	4	0	110	7	2	0	123	122	9	1	223	11	0	1	245	238	1	1	110	12	0	0	124	123
18:00	1	0	16	0	0	0	17	16	1	0	45	3	1	0	50	50	2	0	20	4	0	0	26	24
18:15	3	0	19	1	0	0	23	21	2	0	56	2	0	0	60	58	0	0	21	1	0	0	22	22
18:30	2	0	26	1	0	0	29	27	4	0	39	2	0	1	46	44	0	0	31	3	0	0	34	34
18:45	5	0	28	1	0	0	34	30	12	0	51	6	1	0	70	61	2	0	17	1	0	0	20	18
H/TOT	11	0	89	3	0	0	103	94	19	0	191	13	2	1	226	214	4	0	89	9	0	0	102	99
P/TOT	17	0	319	15	4	0	355	345	42	9	651	37	7	3	749	720	7	1	275	42	1	0	326	321

TRAFFINOMICS LIMITED

SANDYFORD ROAD TRAFFIC COUNTS **MAY 2021**

MANUAL CLASSIFIED JUNCTION TURNING COUNTS **TRA/21/055**

SITE: 03 DATE: 6th May 2021

LOCATION: Sandyford Road/Blackglen Road/Enniskerry Road/Hillcrest Road DAY: Thursday

	MOVEMENT 10								MOVEMENT 11								MOVEMENT 12							
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	13	4	0	0	17	17	2	0	4	3	0	0	9	7	0	0	5	5	0	0	10	10
07:15	0	0	20	8	0	0	28	28	0	0	9	2	0	0	11	11	0	0	0	3	0	0	3	3
07:30	1	0	14	3	1	0	19	19	0	0	14	2	0	0	16	16	0	0	4	2	0	0	6	6
07:45	0	0	11	3	0	0	14	14	0	0	20	5	1	0	26	27	0	0	0	1	0	0	1	1
H/TOT	1	0	58	18	1	0	78	78	2	0	47	12	1	0	62	61	0	0	9	11	0	0	20	20
08:00	3	0	17	5	1	0	26	25	0	0	21	2	0	0	23	23	0	0	3	2	0	0	5	5
08:15	0	0	29	2	0	0	31	31	0	0	27	2	0	0	29	29	0	0	1	0	0	0	1	1
08:30	0	0	45	6	1	0	52	53	1	0	19	3	0	0	23	22	0	0	1	0	0	0	1	1
08:45	1	0	44	3	0	0	48	47	1	0	34	1	1	0	37	37	0	0	0	0	1	0	1	2
H/TOT	4	0	135	16	2	0	157	156	2	0	101	8	1	0	112	111	0	0	5	2	1	0	8	9
09:00	1	0	19	1	0	0	21	20	3	0	29	4	0	0	36	34	0	0	0	0	0	0	0	0
09:15	2	0	20	8	1	0	31	30	2	0	25	6	1	0	34	33	0	0	1	0	0	0	1	1
09:30	0	0	16	2	0	0	18	18	2	0	14	3	0	1	20	19	0	0	3	0	0	0	3	3
09:45	0	0	10	4	1	0	15	16	1	0	13	0	0	0	14	13	0	0	4	0	0	0	4	4
H/TOT	3	0	65	15	2	0	85	85	8	0	81	13	1	1	104	100	0	0	8	0	0	0	8	8
P/TOT	8	0	258	49	5	0	320	319	12	0	229	33	3	1	278	272	0	0	22	13	1	0	36	37

	MOVEMENT 10								MOVEMENT 11								MOVEMENT 12							
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
16:00	0	0	19	3	1	0	23	24	0	0	18	1	0	0	19	19	0	0	4	0	0	0	4	4
16:15	0	0	38	4	0	0	42	42	0	0	29	4	0	0	33	33	0	0	2	0	0	0	2	2
16:30	0	0	29	1	1	0	31	32	0	0	32	3	0	0	35	35	0	0	0	1	0	0	1	1
16:45	0	0	41	4	0	0	45	45	1	1	47	3	0	0	52	51	0	0	1	0	0	0	1	1
H/TOT	0	0	127	12	2	0	141	143	1	1	126	11	0	0	139	138	0	0	7	1	0	0	8	8
17:00	1	0	33	6	1	0	41	41	1	0	19	2	0	0	22	21	1	0	1	0	0	0	2	1
17:15	0	0	35	6	0	0	41	41	0	0	32	3	0	0	35	35	0	0	4	1	0	0	5	5
17:30	0	0	48	6	0	0	54	54	0	0	37	5	0	0	42	42	0	0	1	0	0	0	1	1
17:45	1	0	41	5	0	0	47	46	1	0	39	4	0	0	44	43	0	0	0	0	0	0	0	0
H/TOT	2	0	157	23	1	0	183	182	2	0	127	14	0	0	143	141	1	0	6	1	0	0	8	7
18:00	0	0	44	1	0	0	45	45	1	0	45	1	0	0	47	46	0	0	4	1	0	0	5	5
18:15	2	1	38	3	1	0	45	44	1	0	40	1	0	0	42	41	0	0	8	0	0	0	8	8
18:30	1	0	40	5	1	0	47	47	1	0	40	2	0	0	43	42	0	0	4	0	0	0	4	4
18:45	1	0	33	2	0	0	36	35	1	0	28	4	0	0	33	32	0	0	2	1	0	0	3	3
H/TOT	4	1	155	11	2	0	173	171	4	0	153	8	0	0	165	162	0	0	18	2	0	0	20	20
P/TOT	6	1	439	46	5	0	497	497	7	1	406	33	0	0	447	441	1	0	31	4	0	0	36	35

APPENDIX C

TRICS Output Data
Residential Apartments

Calculation Reference: AUDIT-160301-210416-0430

TRIP RATE CALCULATION SELECTION PARAMETERS:

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

Selected regions and areas:

03	SOUTH WEST		
	DC	DORSET	1 days
	DV	DEVON	1 days
04	EAST ANGLIA		
	CA	CAMBRIDGESHIRE	1 days
	NF	NORFOLK	2 days
	SF	SUFFOLK	3 days
05	EAST MIDLANDS		
	DS	DERBYSHIRE	1 days
	LE	LEICESTERSHIRE	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
	SY	SOUTH 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	3 days
12	CONNAUGHT		
	GA	GALWAY	1 days
13	MUNSTER		
	WA	WATERFORD	1 days
14	LEINSTER		
	LU	LOUTH	3 days
15	GREATER DUBLIN		
	DL	DUBLIN	7 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	40	61	0.045	40	61	0.155	40	61	0.200
08:00 - 09:00	40	61	0.062	40	61	0.203	40	61	0.265
09:00 - 10:00	40	61	0.076	40	61	0.088	40	61	0.164
10:00 - 11:00	40	61	0.054	40	61	0.073	40	61	0.127
11:00 - 12:00	40	61	0.064	40	61	0.077	40	61	0.141
12:00 - 13:00	40	61	0.083	40	61	0.079	40	61	0.162
13:00 - 14:00	40	61	0.075	40	61	0.088	40	61	0.163
14:00 - 15:00	40	61	0.092	40	61	0.087	40	61	0.179
15:00 - 16:00	40	61	0.105	40	61	0.069	40	61	0.174
16:00 - 17:00	40	61	0.120	40	61	0.080	40	61	0.200
17:00 - 18:00	40	61	0.178	40	61	0.088	40	61	0.266
18:00 - 19:00	40	61	0.155	40	61	0.100	40	61	0.255
19:00 - 20:00									
20:00 - 21:00									
21:00 - 22:00									
22:00 - 23:00									
23:00 - 24:00									
Total Rates:			1.109			1.187			2.296

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

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

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Parameter summary

Trip rate parameter range selected:	9 - 332 (units:)
Survey date date range:	01/01/13 - 23/10/20
Number of weekdays (Monday-Friday):	40
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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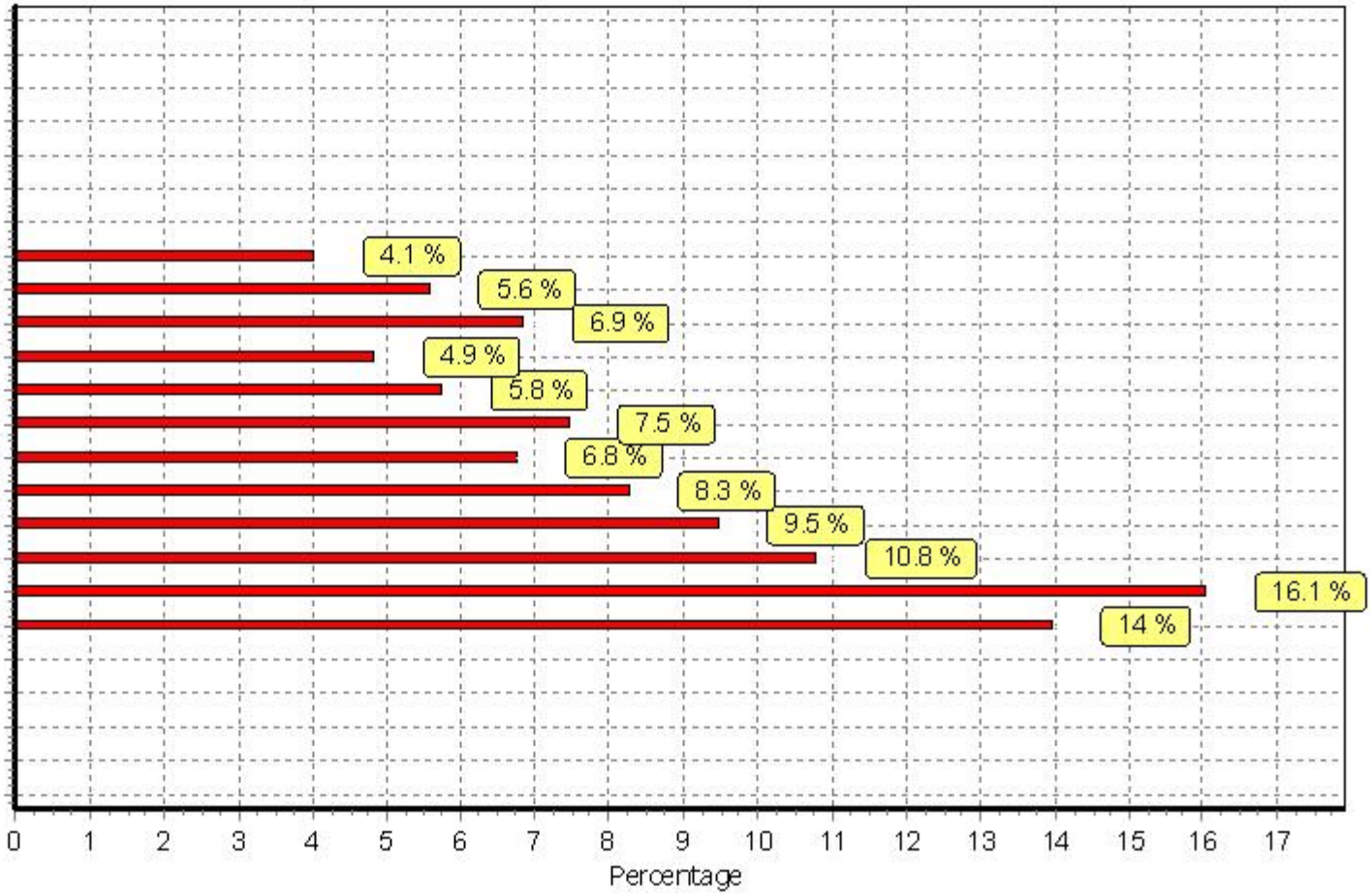
TRIP RATE GRAPH - ARRIVALS 03 - RESIDENTIAL C - FLATS PRIVATELY OWNED TOTAL VEHICLES

TIME	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	0.045	4.1
08:00-09:00	0.062	5.6
09:00-10:00	0.076	6.9
10:00-11:00	0.054	4.9
11:00-12:00	0.064	5.8
12:00-13:00	0.083	7.5
13:00-14:00	0.075	6.8
14:00-15:00	0.092	8.3
15:00-16:00	0.105	9.5
16:00-17:00	0.120	10.8
17:00-18:00	0.178	16.1
18:00-19:00	0.155	14.0
19:00-20:00		
20:00-21:00		
21:00-22:00		
22:00-23:00		
23:00-24:00		



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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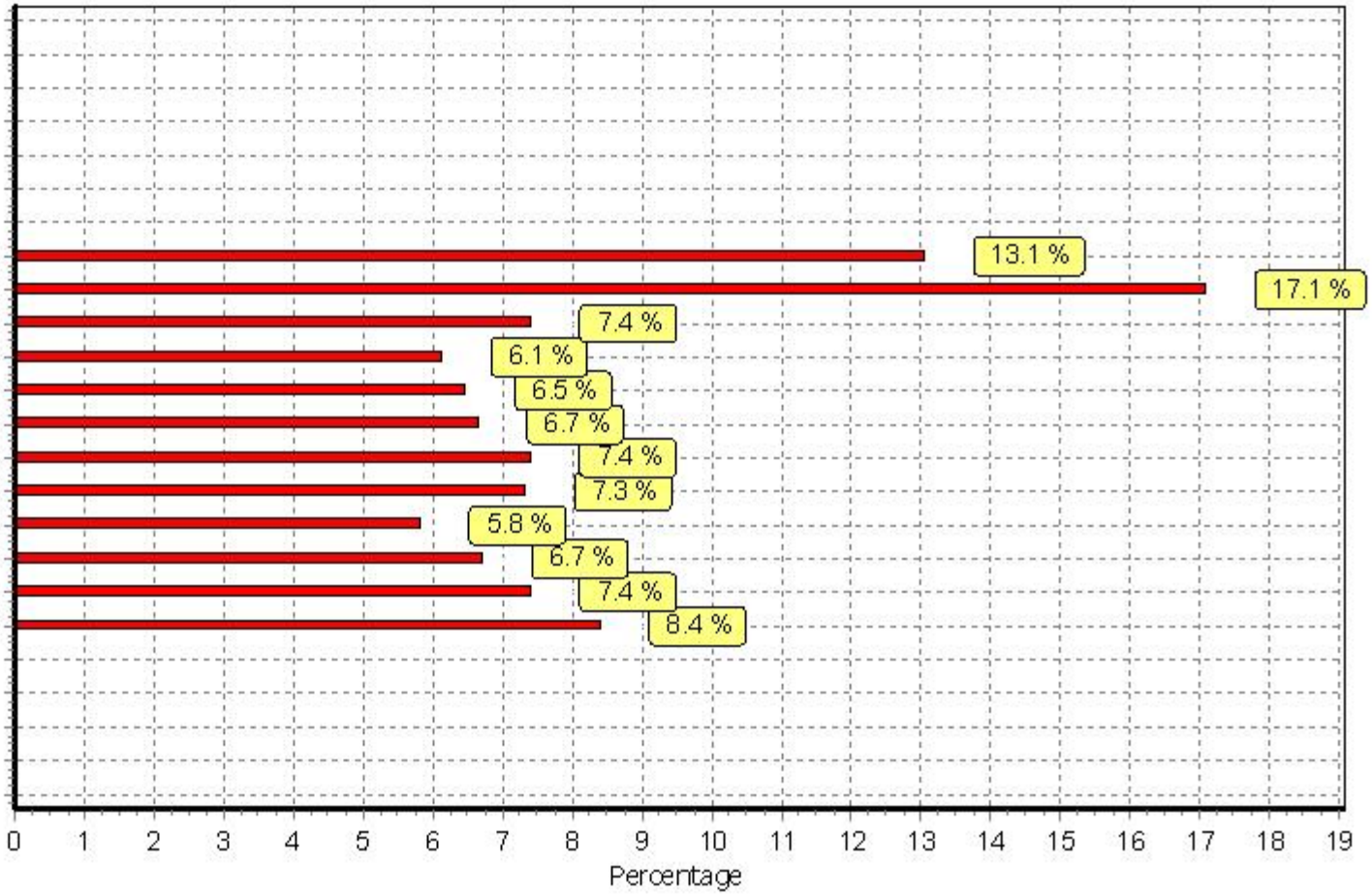
TRIP RATE GRAPH - DEPARTURES 03 - RESIDENTIAL C - FLATS PRIVATELY OWNED TOTAL VEHICLES

TIME	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	0.155	13.1
08:00-09:00	0.203	17.1
09:00-10:00	0.088	7.4
10:00-11:00	0.073	6.1
11:00-12:00	0.077	6.5
12:00-13:00	0.079	6.7
13:00-14:00	0.088	7.4
14:00-15:00	0.087	7.3
15:00-16:00	0.069	5.8
16:00-17:00	0.080	6.7
17:00-18:00	0.088	7.4
18:00-19:00	0.100	8.4
19:00-20:00		
20:00-21:00		
21:00-22:00		
22:00-23:00		
23:00-24:00		



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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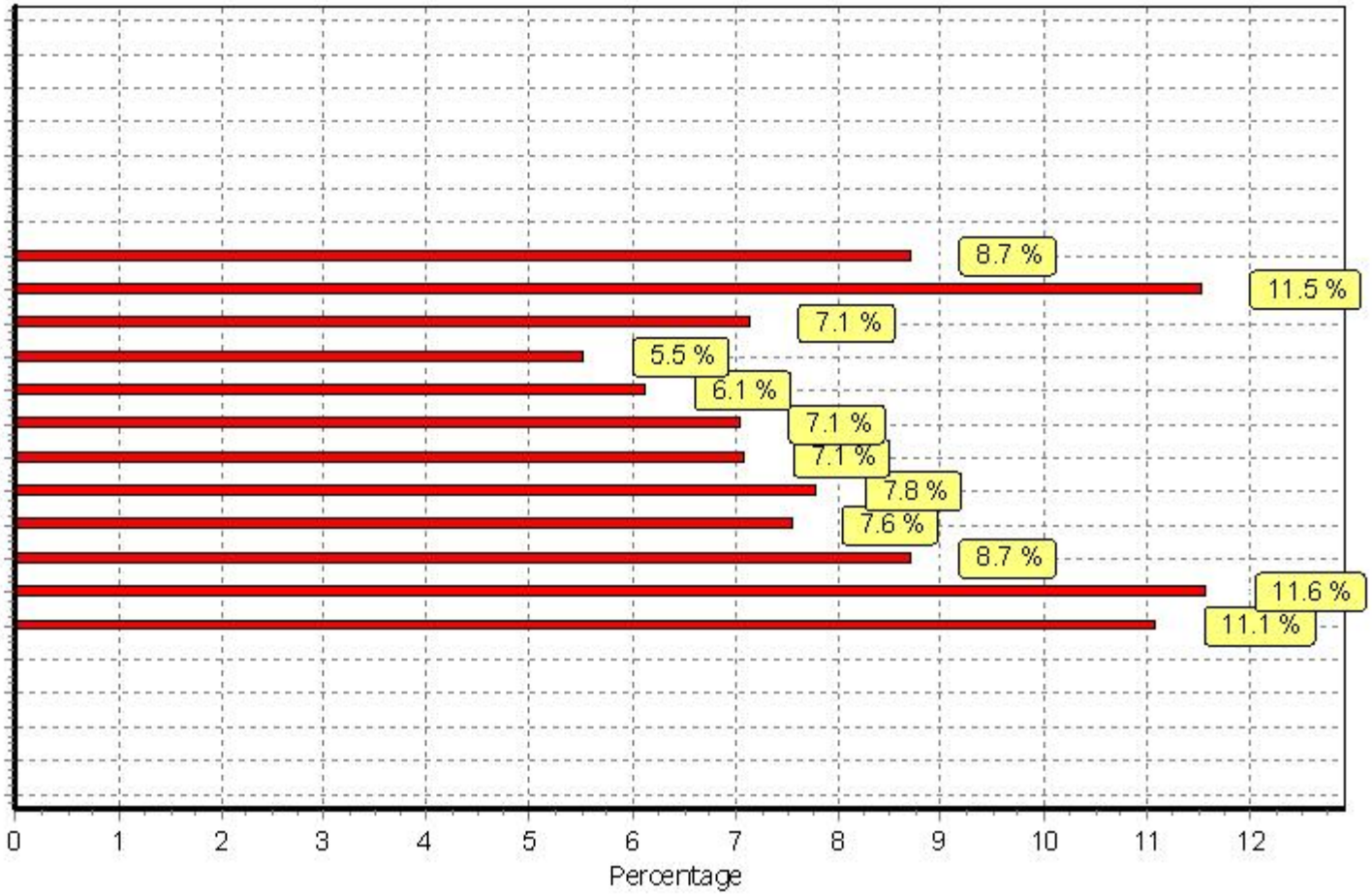
TRIP RATE GRAPH - TOTALS 03 - RESIDENTIAL C - FLATS PRIVATELY OWNED TOTAL VEHICLES

TIME	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	0.200	8.7
08:00-09:00	0.265	11.5
09:00-10:00	0.164	7.1
10:00-11:00	0.127	5.5
11:00-12:00	0.141	6.1
12:00-13:00	0.162	7.1
13:00-14:00	0.163	7.1
14:00-15:00	0.179	7.8
15:00-16:00	0.174	7.6
16:00-17:00	0.200	8.7
17:00-18:00	0.266	11.6
18:00-19:00	0.255	11.1
19:00-20:00		
20:00-21:00		
21:00-22:00		
22:00-23:00		
23:00-24:00		

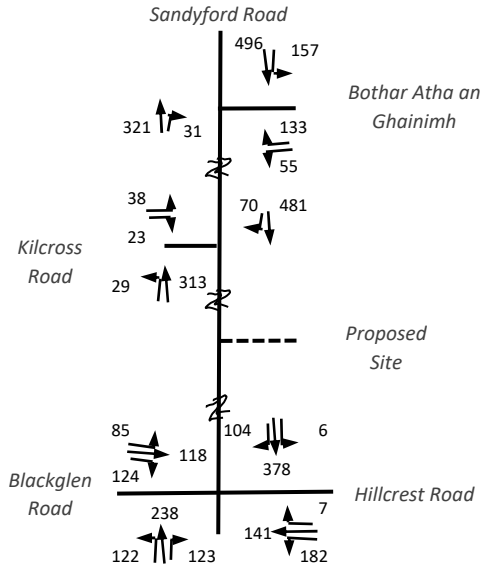


This graph is a visual representation of the trip rate calculation results screen. The same time periods and trip rates are displayed, but in addition there is an additional column showing the percentage of the total trip rate by individual time period, allowing peak periods to be easily identified through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

APPENDIX D

Traffic Calculations, Trip Distribution, Network Traffic Flow Diagrams & Projections Based on Traffic Surveys/TRICS

AM PEAK HR 8-9am



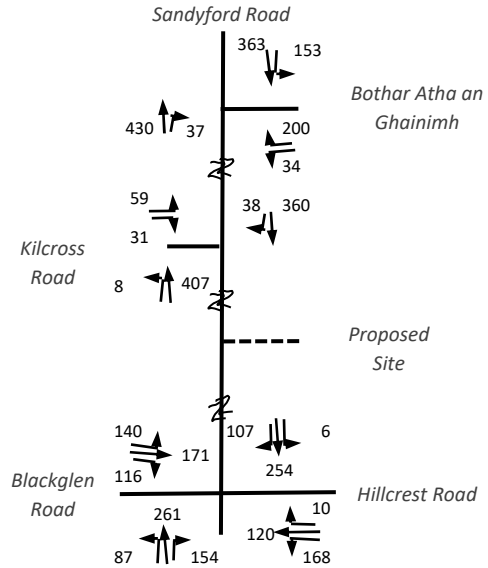
PM PEAK HR 5-6pm

Existing As Surveyed 2021 Traffic (PCUs) - WITHOUT NEW DEVELOPMENT (Refer Appendix B).

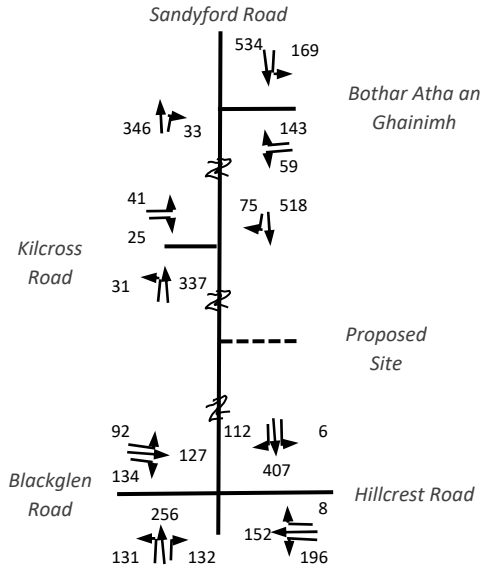
M50 TII Counter Jn13-Jn14 - 06/5/2021, AM 6473, PM 6183, gives equiv AADT = 63280

M50 TII Counter Jn13-Jn14 - 09/5/2019, AM 7538, PM 609, gives equiv AADT = 68140

Resulting Covid Factor to Apply to Surveyed Flows = 1.077



AM PEAK HR 8-9am

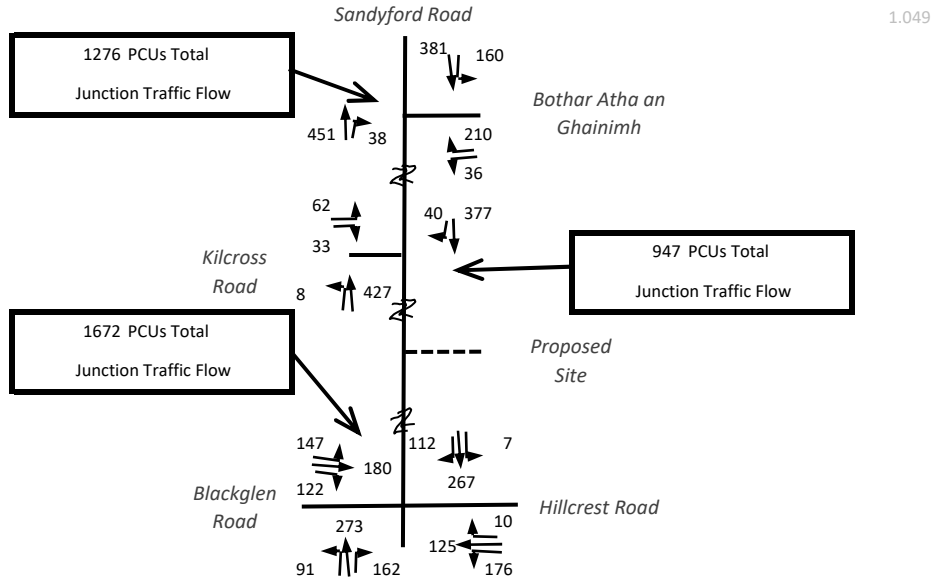


PM PEAK HR 5-6pm

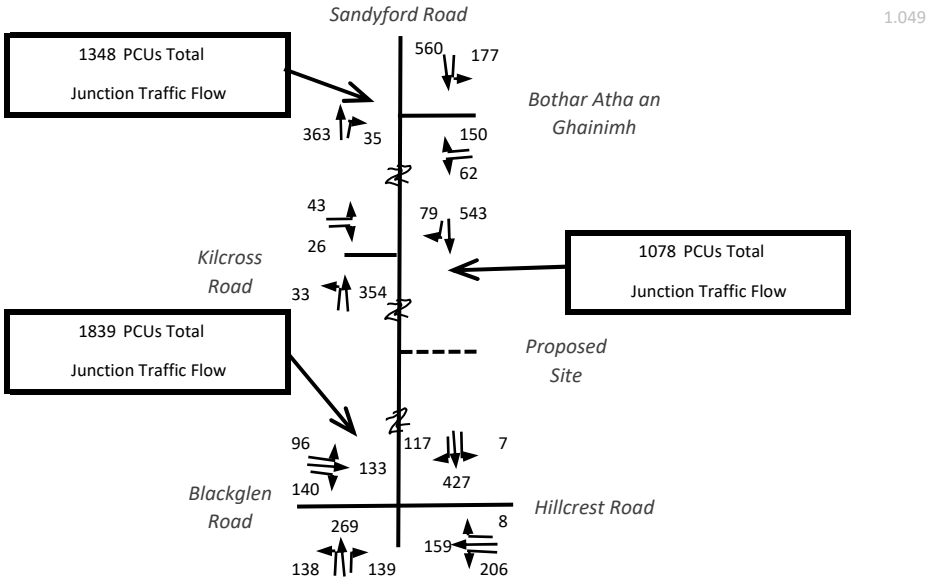
Corrected 2021 Weekday Peak Hour Traffic Volumes - Industry Standard Covid Factors Applied (PCUs) - WITHOUT NEW DEVELOPMENT

TII PE-PAG-02017 Project Appraisal Guidelines for National Roads Unit 5.3
(Travel Demand Projections 2019, Table 6.1: Central Growth Rates: Annual Growth Factors Metropolitan Dublin)

2021 to 2024 = 1.049
2024 to 2039 = 1.153

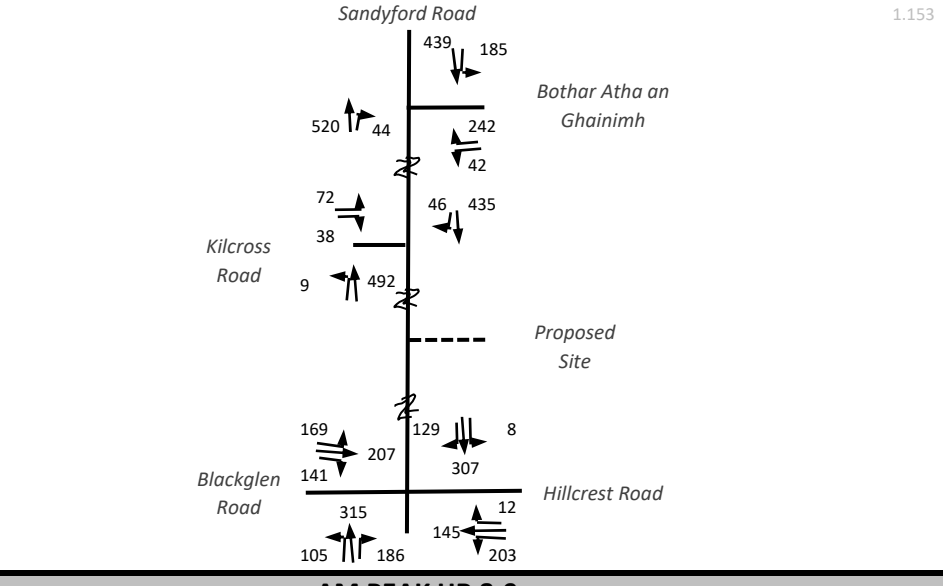


AM PEAK HR 8-9am

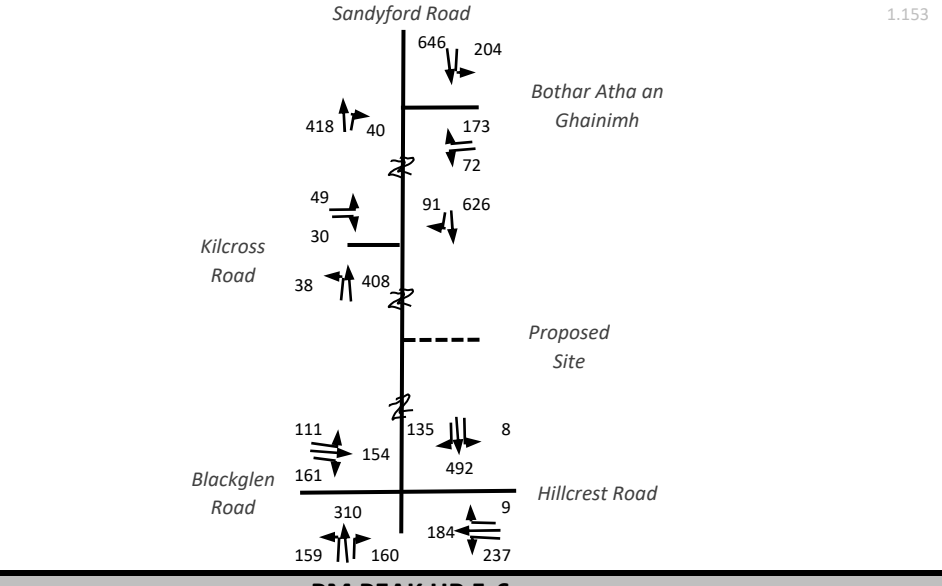


PM PEAK HR 5-6pm

Projected Selected Opening Year 2024 Weekday Peak Hour Traffic Volumes - TII Annual Growth Factors Applied (PCUs) - WITHOUT NEW DEVELOPMENT



AM PEAK HR 8-9am



PM PEAK HR 5-6pm

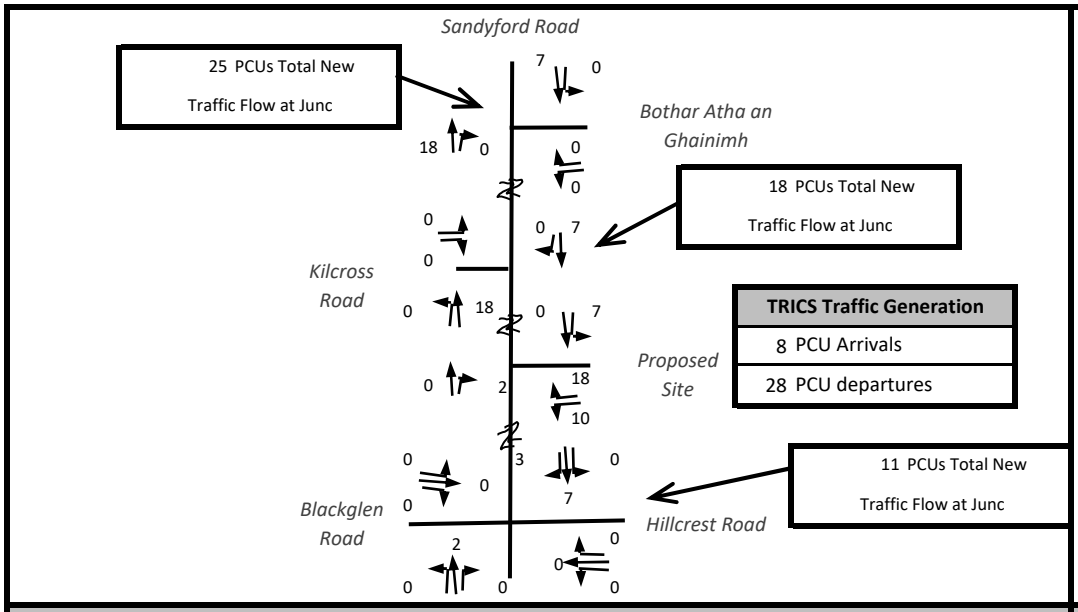
Associated Design Year 2039 Weekday Peak Hour Traffic Volumes - TII Annual Growth Factors Applied (PCUs) - WITHOUT NEW DEVELOPMENT

TRICS ASSESSMENT OF WORST-CASE TRAFFIC GENERATED BY PROPOSED DEVELOPMENT (Subject Site Only)

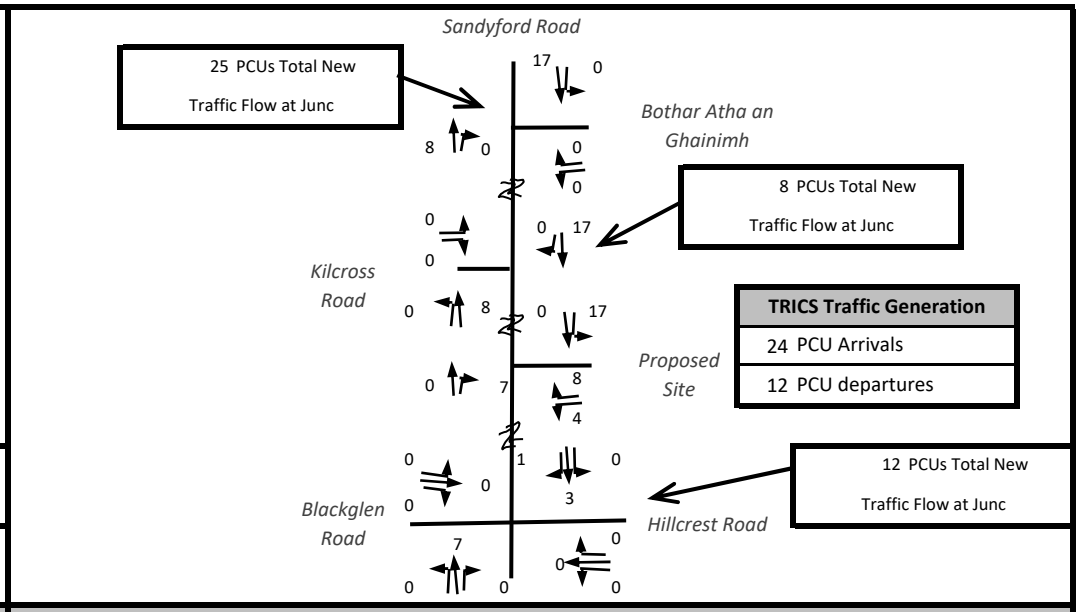
REFER TO TRICS V7.8.2 OUTPUT WITHIN APPENDIX C

137 No Apartments	Arrivals (PCUs)		Departures (PCUs)		Total 2-Way Traffic Generated
Network Hour	Per Unit	137 No	Per Unit	137 No	
Weekday AM Peak Hr	0.062	8	0.203	28	36
Weekday PM Peak Hr	0.178	24	0.088	12	36

137 Apartments

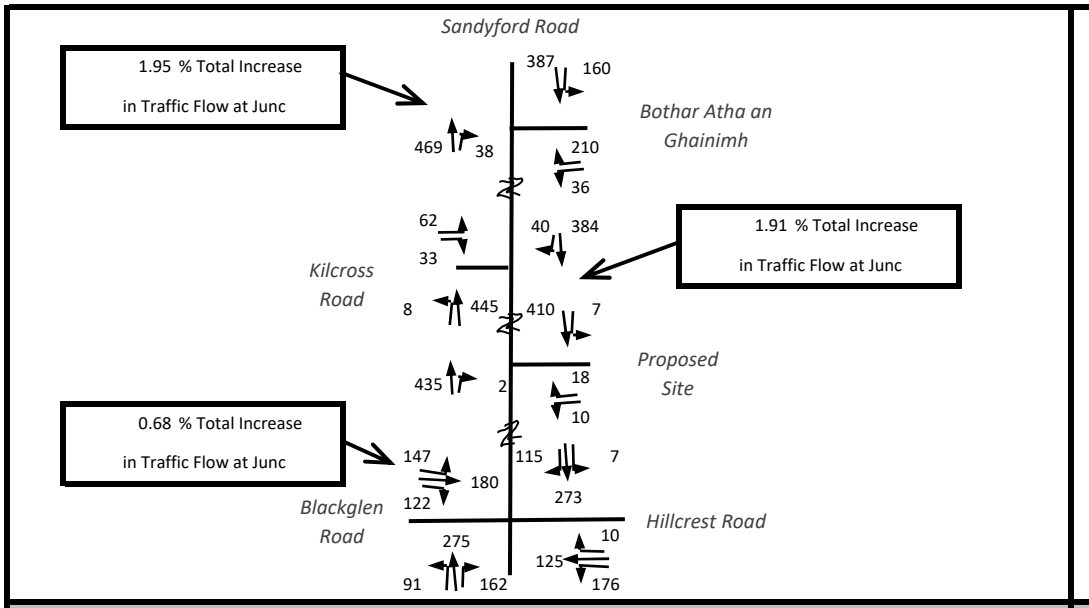


AM PEAK HR 8-9am

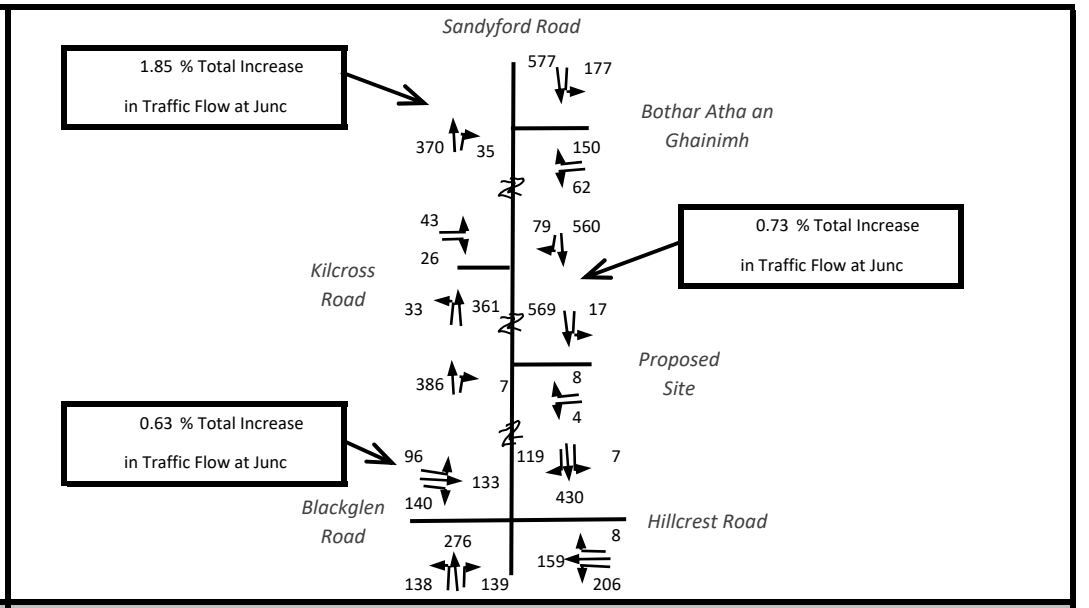


PM PEAK HR 5-6pm

ASSIGNMENT OF SUBJECT DEVELOPMENT TRAFFIC ONLY TO NETWORK ***(BASED ON ESTABLISHED OBSERVED PROPORTIONS, BEING INDUSTRY STANDARD PRACTICE)***

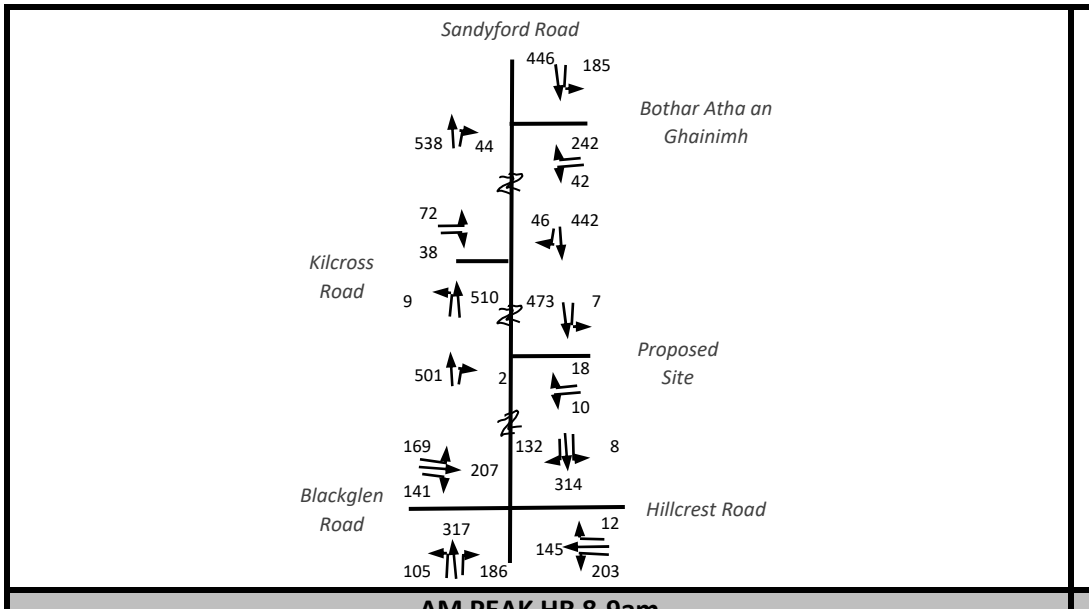


AM PEAK HR 8-9am

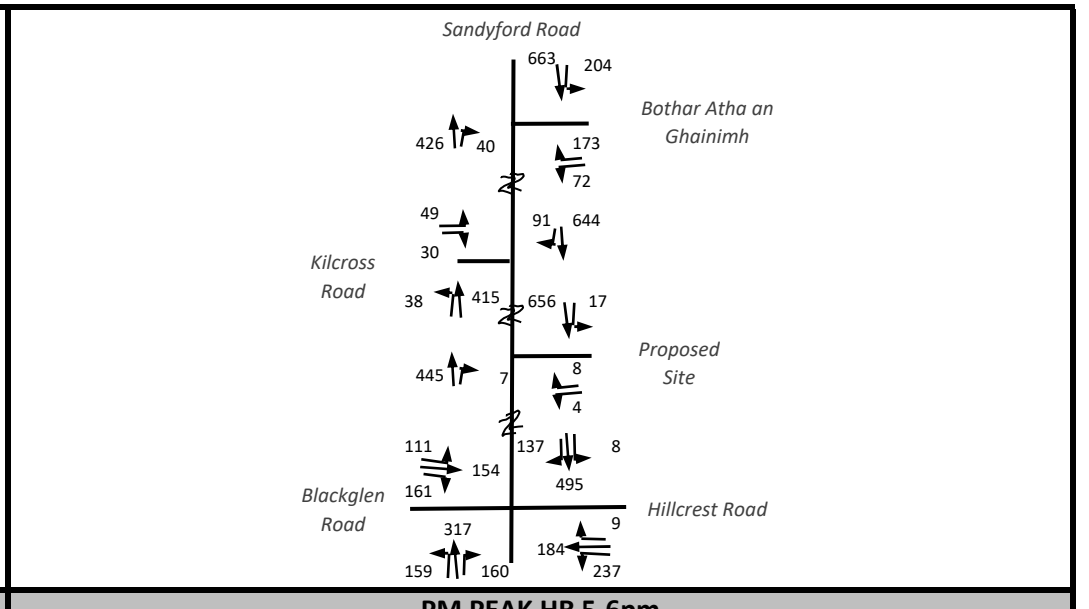


PM PEAK HR 5-6pm

Projected Selected Opening Year 2024 Weekday Peak Hour Traffic Volumes - WITH SUBJECT DEVELOPMENT OPEN & OCCUPIED



AM PEAK HR 8-9am



PM PEAK HR 5-6pm

Associated Design Year 2039 (Ope +15) Weekday Peak Hour Traffic Volumes - WITH SUBJECT DEVELOPMENT OPEN & OCCUPIED

APPENDIX E

Junction9 PiCADY Output
(Site Access/Sandyford Rd Junction)

Capacity Assessment With Subject Development Open and Occupied
Priority Controlled Sandyford Rd Site Access Junction

Modelled Scenario	Period Mean Max Q (PCUs)	Period Max RFC
2024 Opening Year AM Peak Hr	<1	0.08
2024 Opening Year PM Peak Hr	<1	0.04
2039 Design Year AM Peak Hr	<1	0.08
2039 Design Year PM Peak Hr	<1	0.04

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

NB - Any Small Changes to Selected Opening Year 2024 or Design Year 2039, or indeed significantly higher traffic volumes experienced, as clearly deductable from the positive results presented, will clearly have no significant implications in terms of the conclusions of the Study. The Excess Capacity in the Junction is such that the modelled RFCs are practically immeasurable.

Junctions 9

PICADY 9 - Priority Intersection Module

Version: 9.0.1.4646 []
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Filename: 2024AMPM.j9
Path: C:\Users\Eoin\NRB Consulting Engineers Ltd\NRB Server - Documents\2021\21-043 Sandyford Rd SHD\Calculations\PiCADYs
Report generation date: 22/03/2022 10:59:43

»2024, AM
»2024, PM

Summary of junction performance

	AM				PM			
	Q (PCU)	Delay (s)	RFC	LOS	Q (PCU)	Delay (s)	RFC	LOS
	2024							
Stream B-AC	0.1	9.51	0.08	A	0.0	10.12	0.04	B
Stream C-AB	0.0	7.07	0.00	A	0.0	7.71	0.02	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	23/08/2021
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	2024	AM	ONE HOUR	07:45	09:15	15
D2	2024	PM	ONE HOUR	16:45	18:15	15

Analysis Set Details

ID	Network flow scaling factor (%)
A1	100.000

2024, 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 T Junction	T-Junction	Two-way	0.33	A

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Arms

Arms

Arm	Name	Description	Arm type
A	Sandyford Rd N		Major
B	Site Access		Minor
C	Sandyford Rd S		Major

Major Arm Geometry

Arm	Width of carriageway (m)	Has kerbed central reserve	Has right turn bay	Visibility for right turn (m)	Blocks?	Blocking queue (PCU)
C	7.00			90.0	✓	1.00

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

Minor Arm Geometry

Arm	Minor arm type	Lane width (m)	Visibility to left (m)	Visibility to right (m)
B	One lane	3.00	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 C-A	Slope for C-B
1	B-A	552	0.096	0.243	0.153	0.347
1	B-C	681	0.100	0.252	-	-
1	C-B	626	0.232	0.232	-	-

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	2024	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		✓	417	100.000
B		✓	29	100.000
C		✓	437	100.000

Origin-Destination Data

Demand (PCU/hr)

		To		
		A	B	C
From	A	0	7	410
	B	19	0	10
	C	435	2	0

Vehicle Mix

HV %s

		To		
		A	B	C
From	A	0	2	2
	B	2	0	2
	C	2	2	0

Results

Results Summary for whole modelled period

Stream	Max RFC	Max delay (s)	Max Q (PCU)	Max LOS
B-AC	0.08	9.51	0.1	A
C-AB	0.00	7.07	0.0	A
C-A				
A-B				
A-C				

Main Results for each time segment

07:45 - 08:00

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-AC	22	474	0.046	22	0.0	8.117	A
C-AB	2	554	0.003	1	0.0	6.642	A
C-A	327			327			
A-B	5			5			
A-C	309			309			

08:00 - 08:15

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-AC	26	451	0.058	26	0.1	8.647	A
C-AB	2	541	0.003	2	0.0	6.814	A
C-A	391			391			
A-B	6			6			
A-C	369			369			

08:15 - 08:30

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-AC	32	418	0.076	32	0.1	9.502	A
C-AB	2	522	0.004	2	0.0	7.066	A
C-A	479			479			
A-B	8			8			
A-C	451			451			

08:30 - 08:45

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-AC	32	418	0.076	32	0.1	9.506	A
C-AB	2	522	0.004	2	0.0	7.066	A
C-A	479			479			
A-B	8			8			
A-C	451			451			

08:45 - 09:00

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-AC	26	451	0.058	26	0.1	8.652	A
C-AB	2	541	0.003	2	0.0	6.817	A
C-A	391			391			
A-B	6			6			
A-C	369			369			

09:00 - 09:15

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-AC	22	474	0.046	22	0.0	8.127	A
C-AB	2	554	0.003	2	0.0	6.642	A
C-A	327			327			
A-B	5			5			
A-C	309			309			

2024, 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 T Junction	T-Junction	Two-way	0.18	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	2024	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		✓	586	100.000
B		✓	12	100.000
C		✓	393	100.000

Origin-Destination Data

Demand (PCU/hr)

		To		
		A	B	C
From	A	0	17	569
	B	8	0	4
	C	386	7	0

Vehicle Mix

HV %s

		To		
		A	B	C
From	A	0	2	2
	B	2	0	2
	C	2	2	0

Results

Results Summary for whole modelled period

Stream	Max RFC	Max delay (s)	Max Q (PCU)	Max LOS
B-AC	0.04	10.12	0.0	B
C-AB	0.02	7.71	0.0	A
C-A				
A-B				
A-C				

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-AC	9	445	0.020	9	0.0	8.424	A
C-AB	5	527	0.010	5	0.0	7.038	A
C-A	291			291			
A-B	13			13			
A-C	428			428			

17:00 - 17:15

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-AC	11	416	0.026	11	0.0	9.057	A
C-AB	6	509	0.012	6	0.0	7.310	A
C-A	347			347			
A-B	15			15			
A-C	512			512			

17:15 - 17:30

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-AC	13	376	0.035	13	0.0	10.113	B
C-AB	8	484	0.016	8	0.0	7.713	A
C-A	425			425			
A-B	19			19			
A-C	626			626			

17:30 - 17:45

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-AC	13	376	0.035	13	0.0	10.116	B
C-AB	8	484	0.016	8	0.0	7.713	A
C-A	425			425			
A-B	19			19			
A-C	626			626			

17:45 - 18:00

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-AC	11	416	0.026	11	0.0	9.060	A
C-AB	6	509	0.012	6	0.0	7.313	A
C-A	347			347			
A-B	15			15			
A-C	512			512			

18:00 - 18:15

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-AC	9	445	0.020	9	0.0	8.428	A
C-AB	5	527	0.010	5	0.0	7.041	A
C-A	291			291			
A-B	13			13			
A-C	428			428			

Junctions 9

PICADY 9 - Priority Intersection Module

Version: 9.0.1.4646 []
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Filename: 2039AMPM.j9
Path: C:\Users\Eoin\NRB Consulting Engineers Ltd\NRB Server - Documents\2021\21-043 Sandyford Rd SHD\Calculations\PiCADYs
Report generation date: 22/03/2022 11:02:11

»2039, AM
»2039, PM

Summary of junction performance

	AM				PM			
	Q (PCU)	Delay (s)	RFC	LOS	Q (PCU)	Delay (s)	RFC	LOS
	2039							
Stream B-AC	0.1	10.13	0.08	B	0.0	11.13	0.04	B
Stream C-AB	0.0	7.29	0.00	A	0.0	8.06	0.02	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	23/08/2021
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	2039	AM	ONE HOUR	07:45	09:15	15
D2	2039	PM	ONE HOUR	16:45	18:15	15

Analysis Set Details

ID	Network flow scaling factor (%)
A1	100.000

2039, 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 T Junction	T-Junction	Two-way	0.30	A

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Arms

Arms

Arm	Name	Description	Arm type
A	Sandyford Rd N		Major
B	Site Access		Minor
C	Sandyford Rd S		Major

Major Arm Geometry

Arm	Width of carriageway (m)	Has kerbed central reserve	Has right turn bay	Visibility for right turn (m)	Blocks?	Blocking queue (PCU)
C	7.00			90.0	✓	1.00

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

Minor Arm Geometry

Arm	Minor arm type	Lane width (m)	Visibility to left (m)	Visibility to right (m)
B	One lane	3.00	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 C-A	Slope for C-B
1	B-A	552	0.096	0.243	0.153	0.347
1	B-C	681	0.100	0.252	-	-
1	C-B	626	0.232	0.232	-	-

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	2039	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		✓	480	100.000
B		✓	28	100.000
C		✓	503	100.000

Origin-Destination Data

Demand (PCU/hr)

		To		
		A	B	C
From	A	0	7	473
	B	18	0	10
	C	501	2	0

Vehicle Mix

HV %s

		To		
		A	B	C
From	A	0	2	2
	B	2	0	2
	C	2	2	0

Results

Results Summary for whole modelled period

Stream	Max RFC	Max delay (s)	Max Q (PCU)	Max LOS
B-AC	0.08	10.13	0.1	B
C-AB	0.00	7.29	0.0	A
C-A				
A-B				
A-C				

Main Results for each time segment

07:45 - 08:00

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-AC	21	458	0.046	21	0.0	8.404	A
C-AB	2	543	0.003	1	0.0	6.775	A
C-A	377			377			
A-B	5			5			
A-C	356			356			

08:00 - 08:15

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-AC	25	431	0.058	25	0.1	9.050	A
C-AB	2	528	0.003	2	0.0	6.981	A
C-A	450			450			
A-B	6			6			
A-C	425			425			

08:15 - 08:30

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-AC	31	393	0.078	31	0.1	10.131	B
C-AB	2	506	0.004	2	0.0	7.285	A
C-A	552			552			
A-B	8			8			
A-C	521			521			

08:30 - 08:45

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-AC	31	393	0.078	31	0.1	10.135	B
C-AB	2	506	0.004	2	0.0	7.285	A
C-A	552			552			
A-B	8			8			
A-C	521			521			

08:45 - 09:00

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-AC	25	431	0.058	25	0.1	9.058	A
C-AB	2	528	0.003	2	0.0	6.984	A
C-A	450			450			
A-B	6			6			
A-C	425			425			

09:00 - 09:15

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-AC	21	458	0.046	21	0.0	8.414	A
C-AB	2	543	0.003	2	0.0	6.778	A
C-A	377			377			
A-B	5			5			
A-C	356			356			

2039, 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 T Junction	T-Junction	Two-way	0.17	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	2039	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		✓	673	100.000
B		✓	12	100.000
C		✓	452	100.000

Origin-Destination Data

Demand (PCU/hr)

		To		
		A	B	C
From	A	0	17	656
	B	8	0	4
	C	445	7	0

Vehicle Mix

HV %s

		To		
		A	B	C
From	A	0	2	2
	B	2	0	2
	C	2	2	0

Results

Results Summary for whole modelled period

Stream	Max RFC	Max delay (s)	Max Q (PCU)	Max LOS
B-AC	0.04	11.13	0.0	B
C-AB	0.02	8.06	0.0	A
C-A				
A-B				
A-C				

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-AC	9	423	0.021	9	0.0	8.872	A
C-AB	5	512	0.010	5	0.0	7.241	A
C-A	335			335			
A-B	13			13			
A-C	494			494			

17:00 - 17:15

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-AC	11	390	0.028	11	0.0	9.693	A
C-AB	6	491	0.013	6	0.0	7.570	A
C-A	400			400			
A-B	15			15			
A-C	590			590			

17:15 - 17:30

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-AC	13	343	0.039	13	0.0	11.130	B
C-AB	8	463	0.017	8	0.0	8.064	A
C-A	490			490			
A-B	19			19			
A-C	722			722			

17:30 - 17:45

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-AC	13	343	0.039	13	0.0	11.132	B
C-AB	8	463	0.017	8	0.0	8.064	A
C-A	490			490			
A-B	19			19			
A-C	722			722			

17:45 - 18:00

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-AC	11	390	0.028	11	0.0	9.698	A
C-AB	6	491	0.013	6	0.0	7.573	A
C-A	400			400			
A-B	15			15			
A-C	590			590			

18:00 - 18:15

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-AC	9	423	0.021	9	0.0	8.878	A
C-AB	5	512	0.010	5	0.0	7.241	A
C-A	335			335			
A-B	13			13			
A-C	494			494			

APPENDIX F

Preliminary Planning Stage
Mobility Management Plan/Travel Plan

consulting engineers

NRB

Residential Travel Plan
(Mobility Management Plan)

Appendix F

For

Proposed Residential Apartment Development

at

'Karuna' & 'Glenina'
Sandyford Road,
Dublin 18.

on behalf of

Midsal Homes Ltd.

FINAL ISSUE

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

Registered in Ireland No. 491679

Contents

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4	2.0	Access to the Site - By Mode
13	3.0	Collection of Baseline Information
14	4.0	The Travel Plan
20	5.0	Implementing the Plan
22	6.0	Monitoring and Review

1.0 INTRODUCTION

1.1 NRB Consulting Engineers have been commissioned to prepare a Residential Travel Plan in support of a proposed 137 unit residential apartment development on a site at Sandyford Road, Dublin 18. This report explains the applicant's commitment to the promotion of more sustainable and cost effective travel habits among the end occupiers/residents of the scheme. In this case, sustainable travel is supported by the reduced provision of car parking for the development, the proximity to public transport (bus and Luas), the provision of Go Car car club spaces and generous cycle parking provision.

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 staff and other visitors. Such a plan usually concentrates on staff commuting patterns. In essence, a TP is useful not only to reduce the attractiveness of private car use, but also for the ability to promote and support the use of more sustainable transport modes such as walking, cycling, shared transport and mass transit such as buses and trains.

Aims and Objectives of this Travel Plan

1.4 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.

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 Development:

- Reduced residential car parking demand and reduced congestion on the local road network due to lower demand for private transport and/or more efficient use of private motor vehicles,

- Improved safety for cyclists and pedestrians,
- Direct financial savings for those taking part in the developed initiatives, through higher than average vehicle occupancy rates,
- A reduction in car parking and car set-down demand, resulting in improved operational efficiency and safety for all,
- Improved social networking between all those participating in the shared initiatives,
- Improved environmental consideration and performance,
- Improved public image for the development, which sets an example to the broader community and may lead to residents making better travel decisions in the future,
- Improved health and well-being for those using active non-car transport modes,
- Regular 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, staff & 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);
- Greater Dublin Area Transport Strategy 2016-2035 (NTA);
- Integrated Implementation Plan 2019-2024 (NTA).

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 within the Management Company responsible for the development. 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 has been used herein as the basis for the assessment, conclusions and recommendations.

2.0 ACCESS TO THE SITE - BY MODE

2.1 The development consists of a total of 137 unit residential apartment units, arranged in 4 blocks together with ancillary/supporting facilities, with secure off street parking areas for bicycles and a reduced number of private cars proposed along with bins storage, electrical room, plant enclosures and all associated site works.

2.2 For a Residential Development, it is essential for the successful Travel Planning to concentrate on journeys associated with work and school commuting patterns. These are the groups which can most practically be encouraged to use modes of transport other than the car.

2.3 It should be noted that, being located in a long established residential area of an urban village and ~20-minute walk (~6 minute cycle) from the centrally located employment of Sandyford Business and Employment Zone, this contributes to sustainable living, with employment opportunities, retail and leisure all located within reasonable proximity. The measures and initiatives below are relevant and assist in addressing the transportation demands of the proposed scheme.

Cycling and Walking Facilities

2.4 At present, pedestrian/cycle traffic at/to the existing site is served by an extensive City Wide network of footpaths, signalised pedestrian crossings and cycle lanes/facilities. On Sandyford Road at and north of the site, there are off road cycle paths provided in both directions providing the highest quality linkage to/from the City Centre and areas such as the Sandyford Business and Employment Zone. This is as illustrated in ***Figure 2.1*** below. The scheme also delivers a new pedestrian connection to link to Coolkill / Cul Cuille directly to the north of the site, improving permeability for all pedestrians, including the proposed development.

Figure 2.1 – Sandyford Road North of the Site

2.5 The National Transport Authority (NTA) have published a GDA Cycle Network Plan, and this is included below as ***Figure 2.2*** showing the site in context and demonstrating the cyclist permeability of the location.

Figure 2.2 – GDA Cycle Network Plan, Showing Site Location

2.6 The key to cycle accessibility is convenient safe links, with secure and carefully sited cycle parking. Cycling is ideal for shorter journeys. The generous provision of cycle parking for the site is addressed in more detail within ***Section 2.0*** of the ***TA Report***.

2.7 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.

2.8 To illustrate the extent of the GDA accessible by both Bicycle (8km – out and back) and on foot (2km) we have included below approximate 'Iso-Distance Mapping' for a 2km and 4km Radius from the site. These illustrate the extent of the employment, retail and schools within sustainable travel distance of the site, as ***Figure 2.3*** and ***Figure 2.4***.

Figure 2.3 – 4Km Radius Iso-Distance of the Subject Site (Cycle)

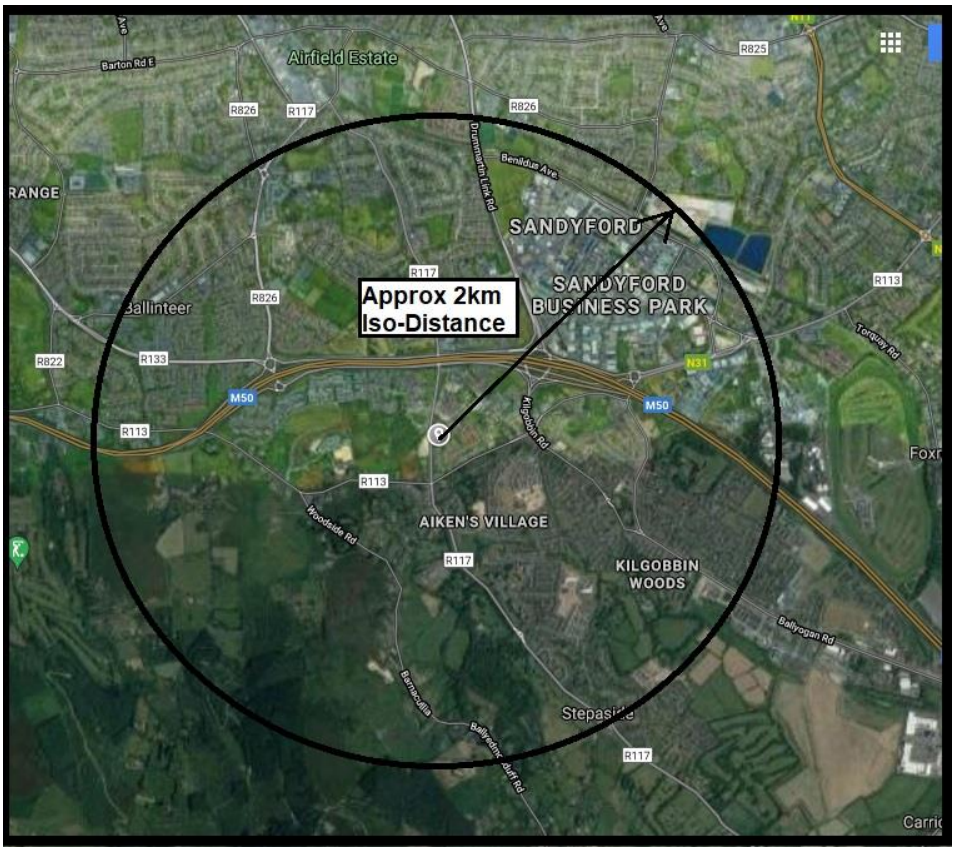

Figure 2.4 – 2Km Radius Iso-Distance of the Subject Site (Walk)

2.9 Bicycle sharing facilities are becoming ever more popular with the Dublin Bikes and Bleeperbike initiatives spreading ever further throughout the City and into Suburbs. These facilities offer a bicycle sharing alternative mode of transport, and are easily accessible from the site.

2.10 Of course, being within close proximity to the major employment district of Sandyford Business Park, this means that a very significant number of Employment Destinations and Offices are within an easy and acceptable walk-commute of the site.

2.11 The site is also within the heart of Sandyford & Stepaside Communities and is within the catchment for local Primary and Secondary Schools.

2.12 In these terms we believe that walking will represent the most popular mode of home-work-home and home-school-home travel for residents of the Apartments.

Cycle Parking

2.13 Given the clear accessibility of the location as demonstrated above, it is anticipated that a significant number of residents can be encouraged to cycle to work and school etc. with the safe links and secure parking which are in place and that is reflected in the provision of a total of 340 dedicated cycle parking spaces including 2 designated cargo bike spaces. This number is considered appropriate in terms of published policy documents.

2.14 Cycle parking provision is over and above the DLR Cycle Policy requirements (1 long stay cycle space per apartment plus 1 short stay visitor cycle space per 5 apartments) 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 the DLR Unit, as the ongoing provision of cycle facilities is fully implemented.

2.15 It is acknowledged that cyclists need to be confident that their cycles will not be tampered with while they are in storage. Cycle parking are located in secure, active, well lit & security monitored places where they can be passively surveyed, or by closed circuit television.

2.16 The DLRCC Development Plan and Policy Documents vision is to cultivate a cycling culture, through the implementation of appropriate infrastructure and promotional measures, which positively encourages all members of the community to cycle at all life stages and abilities as a mode of sustainable transport that delivers environmental, health and economic benefits to both the individual and the community.

BUS ACCESSIBILITY

2.17 The development is well placed to take advantage of the existing and future Dublin Bus and services, with existing stops in close proximity to the site. The location and proximity to the established bus stops and services (NB accurate at the time of writing) are illustrated on ***Figure 2.5*** below.

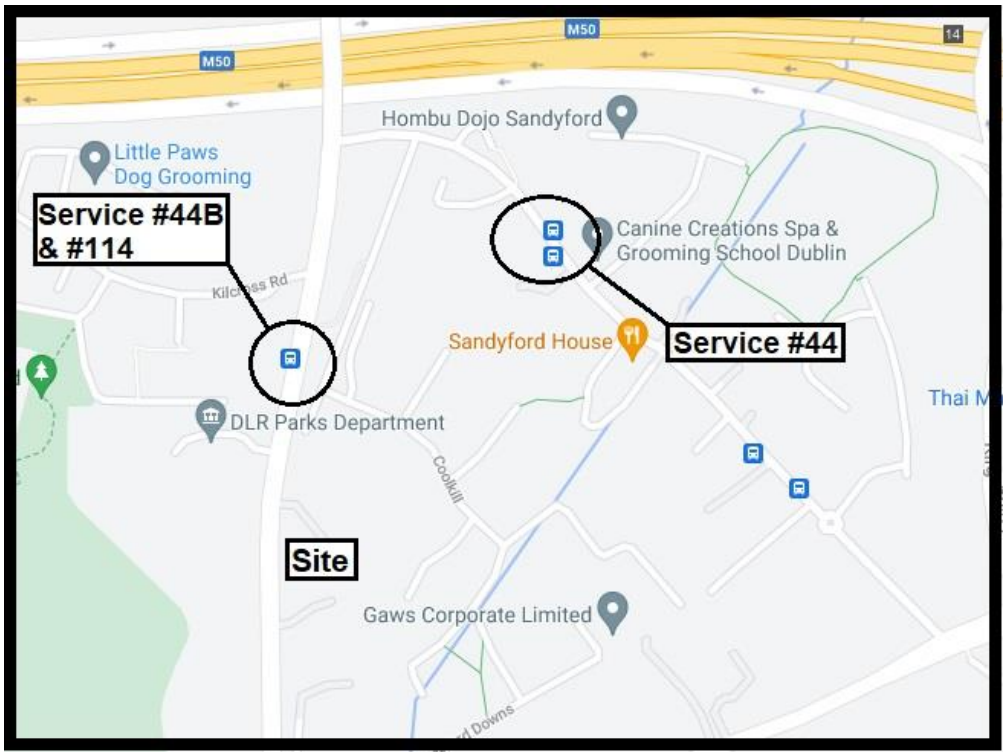

Figure 2.5 – Existing Dublin Bus Services

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

2.19 The site is clearly very accessible to the existing Bus Stops on Sandyford Road which are served by frequent Bus Services, which provide a beneficial link to Balally LUAS. The combination of these services provide a maximum frequency of 20-30 minutes to and from the city during peak commuter periods, with easy bus accessibility to/from the City Centre.

2.20 In terms of Future Planned Services, the NTA have recently published details of Bus Connects and the overall bus network for the GDA, the 'New Dublin Area Network' - showing Spine Routes, Feeder and Orbital Routes. An extract from the NTA Plans showing the site location is included below as ***Figure 2.6.***

2.21 This future network shows that the site's accessibility to bus services will be further enhanced.

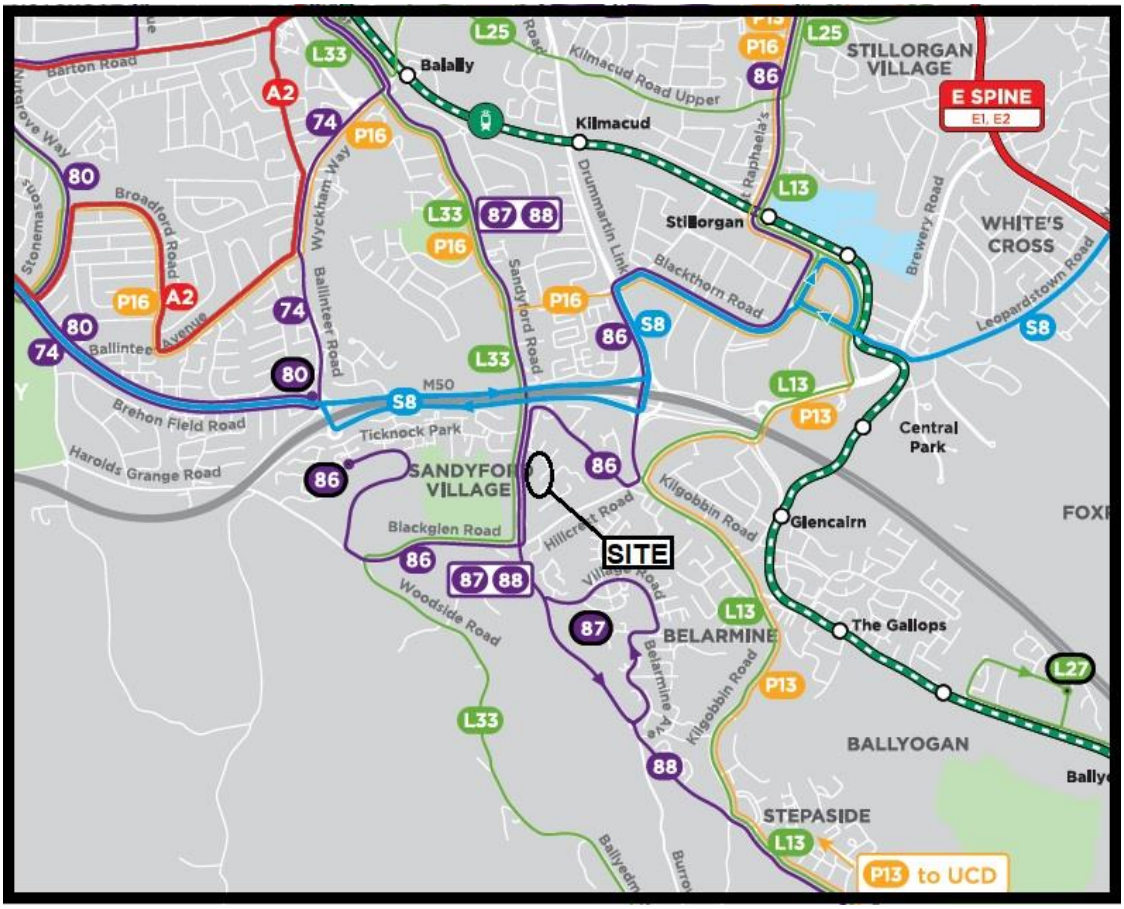

Figure 2.6 – NTA GDA New Dublin Area Network - Bus Services Plan

LUAS

2.22 The site is located close to LUAS Services at Glencairn, which provides an alternative commuting mode for residents. Glencairn Stop is within an 8-9 minute cycle time of the site as illustrated in ***Figure 2.7*** below. The site is also located with Section 49 Luas contribution scheme area.

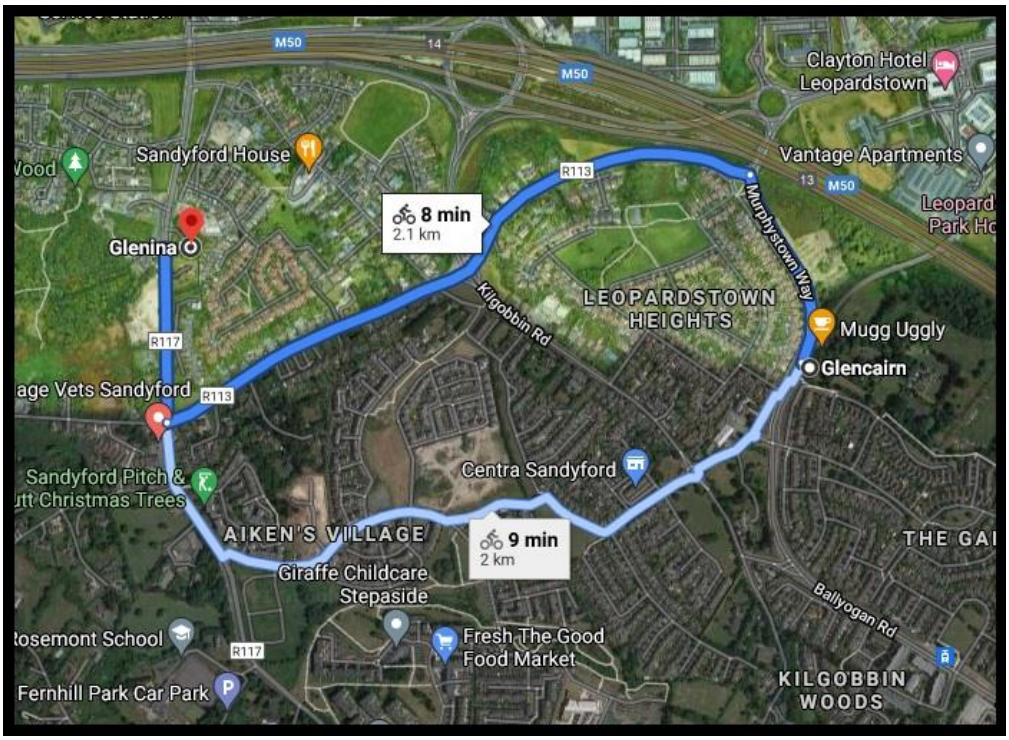

Figure 2.7 – Cycle Distance/Proximity to LUAS Services at Glencairn

2.23 Working Residents will likely be offered the opportunity to purchase public transport commuter tickets under the current 'Employer Pass' and 'TaxSaver' programmes. 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

MAINLINE BUS AND RAIL

2.24 With the existing and proposed bus & LUAS services to/from the city, the site is therefore also within easy reach of the mainline Nationwide Bus & Train Services - trains via Connolly & Heuston Stations and Buses via Busarus Terminus.

2.25 With ease of accessibility by Bus and Rail, and with the existing services, it is therefore considered that the proposed development is sustainable in terms of public transport accessibility. The proximity of the development to existing public transport services means that end occupiers/residents will have viable alternatives to the private car for accessing the site and will not be reliant whatsoever upon the car as a primary mode of travel.

GO CAR

2.26 Go Car is a pay-as-you-go car rental scheme which is easy to join with multiple locations around the city including in the vicinity of the subject development, with free parking at Dublin on-street pay and display spaces. This is another option available to residents and visitors. 6 Car Club e.g. Go Car spaces are proposed on this site to support this development.

TAXI ACCESSIBILITY

2.27 In terms of taxis, modern communication devices (e.g. 'Freenow' and 'Lynk') now allow taxis to be ordered on a demand-basis, without any requirement for formal taxi ranks or dedicated taxi holding areas. Setdown spaces are included near the entry to the scheme to accommodate taxis / drop off / set down etc when needed.

CAR PARKING

2.28 137 car parking spaces are to be provided with this development This is an effective travel demand management measure in itself. Details of the justification of the parking provision are set out in the main body of the TA Report. However, it is clear that the lower provision of car parking will act as a travel demand management measure, ensuring that the development is occupied in the most sustainable manner being reliant on non-car modes of travel.

2.29 It is proposed that 6 parking spaces will be allocated to car club parking spaces (e.g. Go Car spaces). These will be located near the access for ease for use for end occupiers/residents.

Residents Communication

2.30 Prior to moving in, the Management Company will issue welcome packs to all residents. These packs include details of the development and how it is run, advice on moving in, public transport information, useful local information, the restricted availability of on-site parking and can require confirmation of a time-slot to move in. The preparation of this information ensures residents are familiar with the operation of the development before moving in.

2.31 In terms of number of transport alternatives easily available to Residents, it is considered that the proposed development is very 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.

2.32 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 and can also be monitored by CCTV.

2.33 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.

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

3.0 COLLECTION OF BASELINE INFORMATION

Possible Travel Pattern Questionnaires

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

3.2 Shortly after occupation of the new development, a detailed travel-questionnaire will be compiled and distributed to residents for completion. The aim of the travel questionnaire will be to establish travel patterns between work and home and school among other travel demands. The information gathered from this survey will be used to inform the further development of the Travel Plan.

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

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

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 travelling 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

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

- **W** - Wake Up! - Studies have shown that people who walk 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 can be a great way to meet other walkers, share the experience, and develop personal skills.
- **N** - New adventures - Walking 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 helps people incorporate physical activity into their daily routines. Research shows that regular physical activity can benefit your body and mind.

4.4 Most adults will consider walking a maximum of 3.5 km (Approx 30/40 minutes). Residents working within a 3.5 km radius of the site will be encouraged to walk as often as their schedule permits.

4.5 The following initiatives and incentives can be used to encourage walking:

- 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 travelling in 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

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

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

4.8 Some positive aspects of cycling 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 reduces the need to travel by car thus reducing fuel costs and freeing up road space for more cyclists;
- **C** - Confidence building - travelling 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 there are fewer cars on the road which makes it safer for those who cycle and walk;
- **I** - Interpersonal skills - Cycling can be a great way to meet other cyclists and share the experience;
- **N** - New adventures - Cycling 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 helps people incorporate physical activity into their daily routines. Research shows that regular physical activity can benefit your body and mind.

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

4.10 The following initiatives and incentives can be used to encourage cycling:

- New cycle parking installed within the development, secure and well lit;
- Publicise cycle parking availability by way of signage and on notice boards;
- 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 travelling in area of influence	100%
Percentage of Residents using Public Transport	TBC in each survey when occupied

Table 4.3: Key Information: Public Transport

4.11 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 on public transport, especially during peak periods, the less people travelling by private car;
- Saving money – Taking public transport 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 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.

4.12 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 and the length of time it takes to walk to them;

Go-Car/Car Sharing

Car Sharing – Key Information	
Approx. zone of influence	All Residents
Percentage of Residents travelling 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

4.13 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.

4.14 Although use of the car to get to work or to school is essential for some people, car sharing schemes such as GoCar (which are active in Dublin) have the potential to deliver a significant reduction in private vehicle trips by promoting higher than average occupancy rates for each vehicle.

4.15 Car sharing often happens informally, however some participants often prefer a formal scheme such as a GoCar facility which will normally generate a higher take-up for car sharing, and more efficiency in terms of increased occupancy rates.

4.16 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.

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

- Provide Go Cars at the Development,
- Draw up a car-sharing policy for how the scheme will operate,
- 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.

4.18 Other travel planning measures such as the use of technology, flexible working arrangements and video conferencing facilities will and are used as part of this development to minimise travel requirements and allow people to use alternative means of transport.

Action Plan Summary Table

4.19 The Summary Action Plan is described in the Table below. Modal Split Targets will be determined following on from the first 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

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

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

5.5 The nominated person and their contact details will be provided to the Planning Authority upon occupation of the development.

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 Operator 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

5.8 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.

5.9 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.

5.10 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.

5.11 The Coordinator can identify communication tools and networks used by the different audiences in the development, 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 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.

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

6.0 CONCLUSIONS

6.1 The development forming the subject of this application accords with the principles of sustainable development, being located within an established serviced residential neighbourhood within clear and easy access to alternative modes of travel. With reduced car parking provided this also acts as a travel demand management measure. The Operator, 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 report assists these efforts by forming an outline framework and providing guidance for its success. Monitoring and reviewing the initiatives set out within the plan will form a far greater part of the working 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 Operator 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 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 working Travel Plan be set in motion full residential 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.

APPENDIX G

DMURS Statement of Consistency

consulting engineers

NRB

DMURS Design Statement
Technical Note
(Appendix G)

For

Proposed Residential Apartment Development

at

'Karuna' & 'Glenina'
Sandyford Road,
Dublin 18.

on behalf of

Midsal Homes Ltd.

FINAL ISSUE

1st Floor, Apollo Buildings, Dundrum Road, Dundrum, Dublin 14.
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Registered in Ireland No. 491679

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). The scheme proposals are the outcome of an integrated design approach. This approach seeks 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 use 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 access points 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. In addition to the main development access, there are also alternative direct pedestrian linkages from Sandyford Road into the site. The scheme also delivers a new pedestrian connection to link to Coolkill / Cul Cuille directly to the north of the site, improving permeability for all pedestrians, including the proposed development.

2.3 Dedicated routes are provided for pedestrians and for cyclists to access Sandyford Road. 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 replaces an existing access. It is clearly defined and shared with the cyclist accesses to the development. It is distinct from the pedestrian accesses to the development and out-with the open space.

b) The proposed scheme includes the replacement of 1 existing established access onto Sandyford Road and the closure of a second established accesses onto Sandyford Road, which in itself has beneficial effects. The plan then offers a well-connected, sustainable and improved but permeable network through connectivity to and through the Development.

c) The scheme also delivers a new pedestrian connection to link to Coolkill / Cul Cuille directly to the north of the site, improving permeability for all pedestrians, including the proposed development.

d) 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.

e) 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.

f) Appropriate clear unobstructed visibility splays, as per DMURS requirements, will at the site access junctions to the external road network.

g) 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. Similar to the exiting site access treatment, at Sandyford Road, the existing footpath and cycle lanes will be continued across the proposed main site access on a raised travel, thereby allowing pedestrians to informally assert a degree of priority. The separation of vehicular access to the development from other the pedestrian accesses to the development and the open space aid in this aspect of the layout.

h) At the Sandyford Road serving the site, a simple priority controlled access junction is to be provided – and by nature this clearly provides priority to Main Road Traffic. This connects with the Pedestrian, Cyclists and Bus Stop facilities running along the boundary of the Sandyford Road.

i) All informal pedestrian uncontrolled crossing facilities will be at least 2.0m wide.

j) 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.

k) Internally within the development, where carriageway kerb are required, heights will be typically ~60mm in accordance with the objectives of DMURS.

l) Much of the Sandyford Road includes cycle lanes which will provide access to the development. Within the development, as required cyclists will share the carriageway with other street users as per the NCM guidance for such situations and best practice.

m) The proposed building line is sufficiently setback from the Sandyford Road to ensure it does not prejudice the future delivery of the proposed Blackglen Road / Harold's Grange Road Improvement Scheme which ties into the existing road, footpath and cycle lane alignments at the site frontage.

n) Any required street signage and road markings will be in accordance with the Department of Transport Traffic Signs Manual, and the location and form will be agreed in advance with DLRCC.

APPENDIX H

Stage 1 Independent Road Safety Audit including Quality Audit

Title: **STAGE 1 ROAD SAFETY AUDIT INCLUDING QUALITY AUDIT**

For;

Proposed Apartment Development at 'Karuna' & 'Glenina', Sandyford Road, Dublin 18.

Client: **NRB Consulting Engineers Ltd.**

Date: **April 2022**

Report reference: **1444R01**

VERSION: **FINAL**

Prepared By:

Bruton Consulting Engineers Ltd

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1.0 Introduction

This report was prepared in response to a request from Mr. Seamus Nolan of NRB Consulting Engineers Ltd for a Stage 1 Road Safety Audit including Quality Audit of the proposed Strategic Housing Development (SHD) at 'Karuna' & 'Glenina', Sandyford Road, Dublin 18.

The 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 Quality Audit has been carried out in accordance with the guidance in the Design Manual for Urban Roads and Streets (DMURS), produced by Department of Transport Tourism and Sport in March 2013 and updated in June 2019.

This portion of the Quality Audit includes an access audit, a walking audit and a cycling audit, i.e. those elements carried out by persons independent of the Design Team.

The Road Safety and Quality Audit Team comprised of;

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

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

The Road Safety Audit and Quality Audit involved the examination of drawings and other material provided by NRB and a site visit by both team members on the 29th of March 2022.

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

The problems raised in this Quality Audit may belong to more than one of the categories of Audit named above. A table has been provided at the start of Section 3 of this report detailing which category of audit each problem is associated with.

Recommendations have been provided to help improve the quality of the design with regard to the areas described above. A feedback form has also been provided for the designer to complete indicating whether or not he/she will accept those recommendations or provide alternative recommendations for implementation.

The information supplied to the Audit Team is listed in **Appendix A.**

A feedback form for the Designer to complete is contained in **Appendix B.**

A plan drawing showing the problem locations is contained in **Appendix C**.

2.0 Background

It is proposed to construct a residential apartment development in 4no. blocks of varying height at the existing residential sites known as 'Karuna' & 'Glenina' at Sandyford Road, Dublin 18.

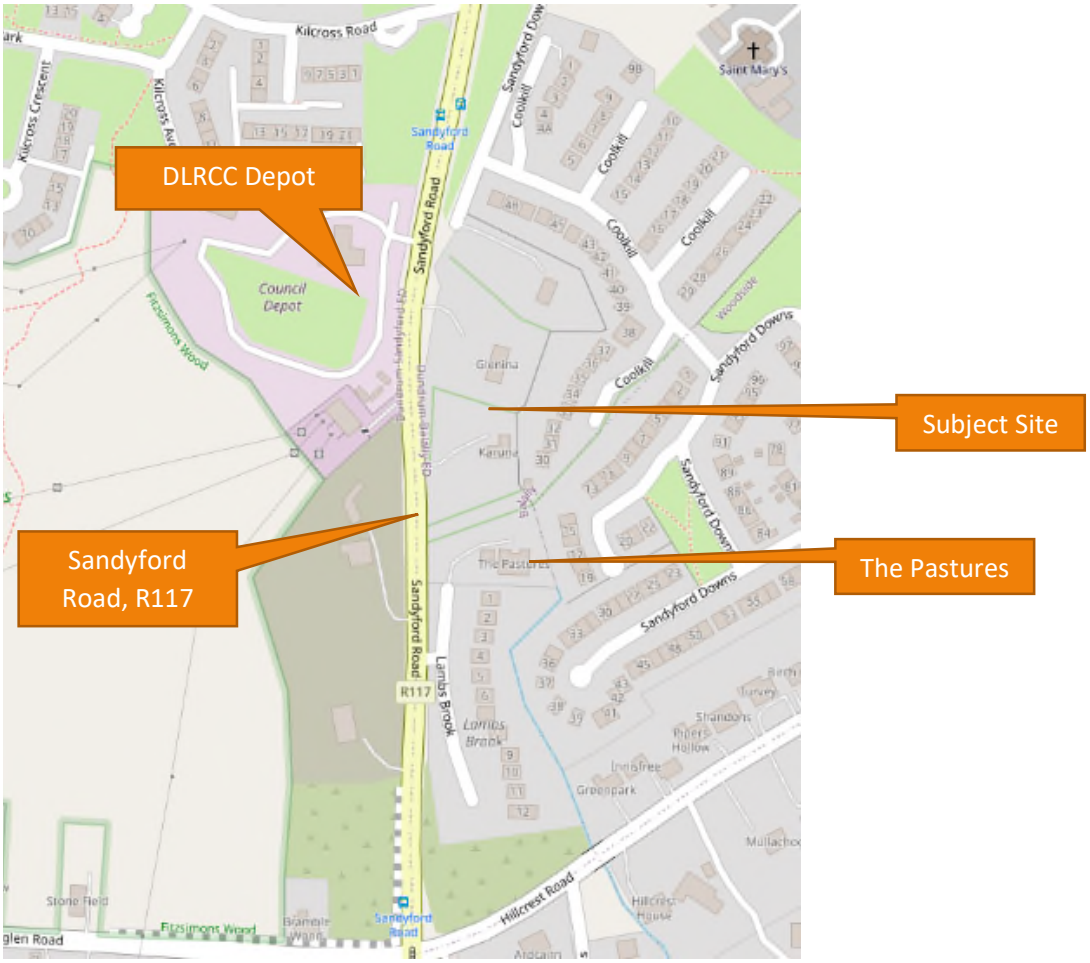
It is proposed to provide vehicular access to the site by means of a simple priority junction which would replace an existing access onto Sandyford Road.

The scheme design has taken account of plan (land take and working space) for the Blackglen Road/Harold's Grange Road Improvement Scheme which has planning approval via the Part 8 process.

The site is located north of The Pastures (provisional site) site and south of the Cul Cuille site.

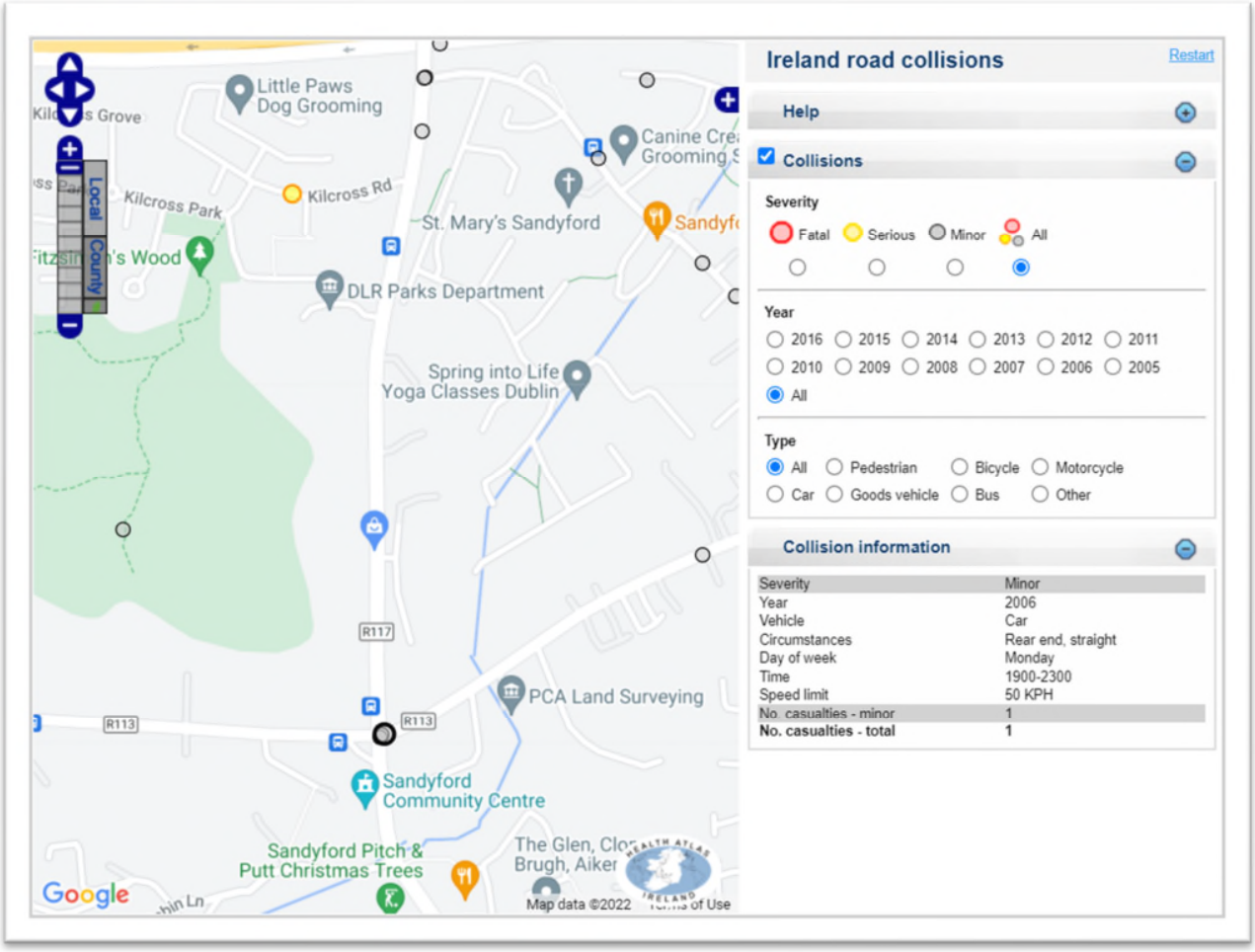
Sandyford Road is a bus route and has a footpath and cycle track on both sides from the site access northwards.

The location of the site is shown below.



Click for Google Maps Link

A review of the Road Safety Authority's website shows that between the years 2005 and 2016 there were no collisions at the proposed junction location. There were some minor injury collisions recorded at the R117/R113 junction. This junction was being improved at the time of the site visit.



3.0 Issues Identified in This RSA Stage 1 incl. Quality Audit.

Summary Table of Problem Categories

Problem Reference	Access Audit	Walking Audit	Cycling Audit	Road Safety Audit	Quality Audit
3.1		✓	✓	✓	✓
3.2			✓	✓	✓
3.3	✓	✓	✓	✓	✓
3.4	✓				✓
3.5	✓				✓

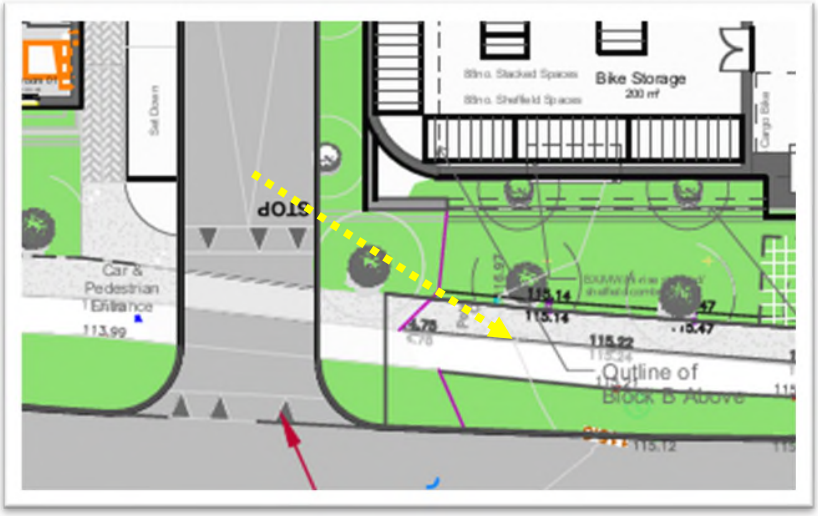
3.1 Problem

LOCATION

Drawing NRB-TA-001 & Landscape Plan, Murphy & Sheanon.

PROBLEM

The drawing (NRB-TA-002) shows the required sightlines to vehicular traffic on Sandyford Road for those exiting the proposed development. It is unclear however if the proposed landscaping will obscure a driver's visibility to approaching pedestrians and possible contraflow cyclists on the cycle track. Without adequate visibility this could lead to collisions with those vulnerable road users.



RECOMMENDATION

It is recommended that adequate visibility be provided.

3.2 Problem

LOCATION

Drawing 533-HRA-00-ZZ-DR-A-S-00 – Proposed Site layout, Sandyford Road.

PROBLEM

It is unclear where cyclists exiting the development and wishing to travel northbound on Sandyford Road will gain access to that cycle track. Without a dedicated access point for cyclists they may opt to stay on-carriageway which would increase the likelihood of a collision with passing vehicles.

RECOMMENDATION

It is recommended that a route for cyclists across Sandyford Road and to the existing northbound cycle track be provided.

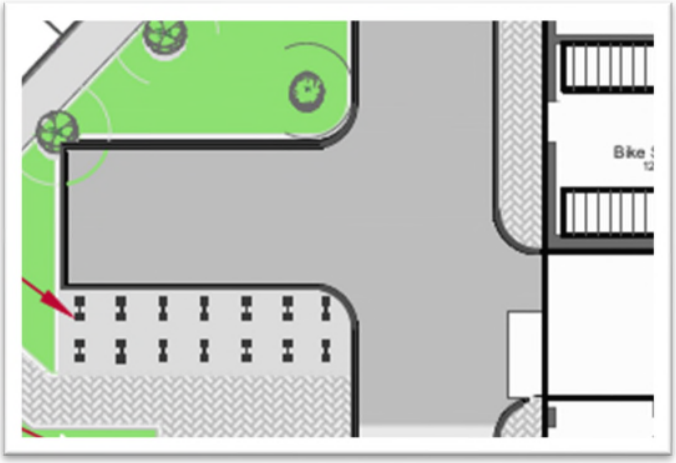
3.3 Problem

LOCATION

Drawing NRB-TA -003

PROBLEM

The swept path of a refuse vehicle has been shown and adequate space is available. It is unclear however where the refuse bins will be stored on collection day and if they will cause obstruction to pedestrians or cyclists or if they will obscure visibility for drivers.



RECOMMENDATION

It is recommended that the refuse bins be stored in a suitable location on collection day.

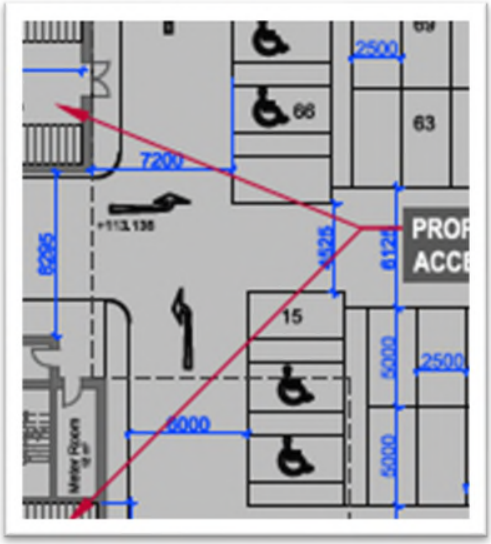
3.4 Problem

LOCATION

Drawing NRB-TA -001

PROBLEM

All the disabled parking spaces are provided in the basement car park. It is unclear if the clear height within the car park is sufficient to cater for high top conversion vehicles. Inadequate clearance could lead to a lack of accessibility for those vehicle users.



RECOMMENDATION

It is recommended that sufficient height be provided or that an external disabled parking space be provided.

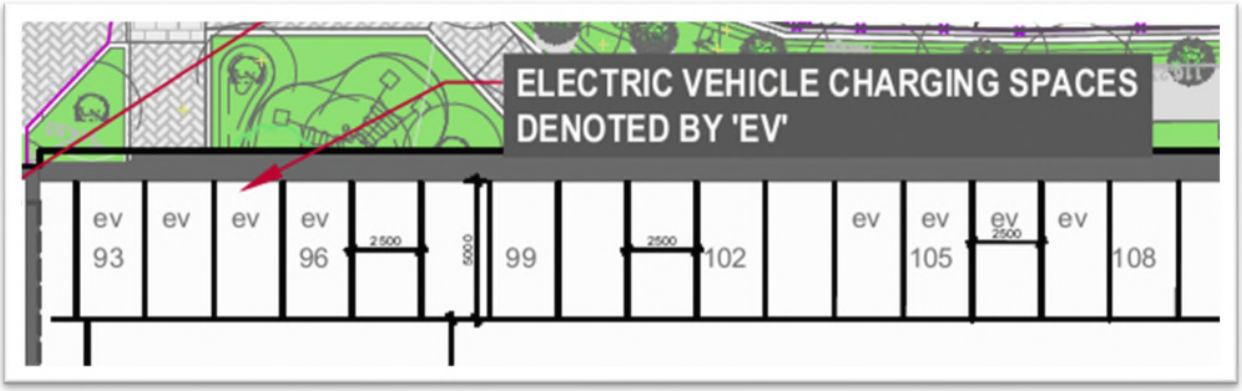
3.5 Problem

LOCATION

Drawing NRB-TA -001

PROBLEM

There are many EV charging spaces within the basement. It is unclear if the parking bays are of sufficient size to accommodate the charging infrastructure including the sockets and cables. A lack of space could lead to inaccessibility for some users and trips over the cables if they are too close to vehicle entry points.



RECOMMENDATION

It is recommended that adequate space be provided at EV charging spaces.

4.0 Road Safety Audit Stage 1 and Quality Audit Statement

This Road Safety Audit and Quality Audit has been carried out in accordance with the guidance given in DMURS and TII Publication GE-STY-01024.

It 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:** Norman Bruton

(Road Safety & Audit Quality Audit Team Leader) **Dated: 14/4/2022**

Owen O'Reilly **Signed:** Owen O'Reilly

(Road Safety & Quality Audit Team Member) **Dated: 14/4/2022**

Appendix A

List of Material Supplied for this RSA1 & Quality Audit;

- Drawing NRB-TA-001
- Drawing NRB-TA-002
- Drawing NRB-TA-003
- Drawing NRB-TA-004
- Drawing 533-HRA-00-ZZ-DR-A-S-00
- Drawing 533-HRA-00-ZZ-DR-A-S-0200
- Drawing 533-HRA-00-ZZ-DR-A-S-0201
- Draft Transport Assessment, NRB
- Draft Landscape Plan.

Appendix B

Feedback Form

SAFETY AUDIT & QUALITY AUDIT FORM – FEEDBACK ON AUDIT REPORT

Scheme: Sandyford Road, Residential Development
Stage: 1 Road Safety Audit incl QA
Date Audit (Site Visit) Completed: 29th March 2022

Paragraph No. in Audit Report	Problem accepted (yes/no)	Recommended measure accepted (yes/no)	Alternative measures (describe)	Alternative measures accepted by Auditors (Yes/No)
3.1	Y	Y – Adequate Visibility Splay will be provided, with low level planting and clear stem trees where applicable in this zone.		
3.2	Y	Y – Northbound cyclists can cross Sandyford Road at the site access and join the existing cycle tracks at the existing dropped kerb at the DLRCC Parks Dept entrance ~30m to the north of the development access.		
3.3	Y	Y – Bin store is adjacent the turning area. Refuse bins will be collected directly from the bin store and then return directly to the store. Refuse collection company will have access to the store.		
3.4	Y	Y – 2.6m minimum as per Part M i.e., sufficient height, is provided in the basement for high top conversion vehicles.		
3.5	Y	Y – spaces are 2.5m wide x 5.0m deep. These are privately managed car parking spaces and not public EV Charging Points. Spaces are sufficiently sized to accommodate sockets & cables and users will be advised to ensure cables are tidily arranged when parked for charging.	Note – minimum car parking space in DMURS is 2.4m x 4.8m - these spaces are larger	Yes

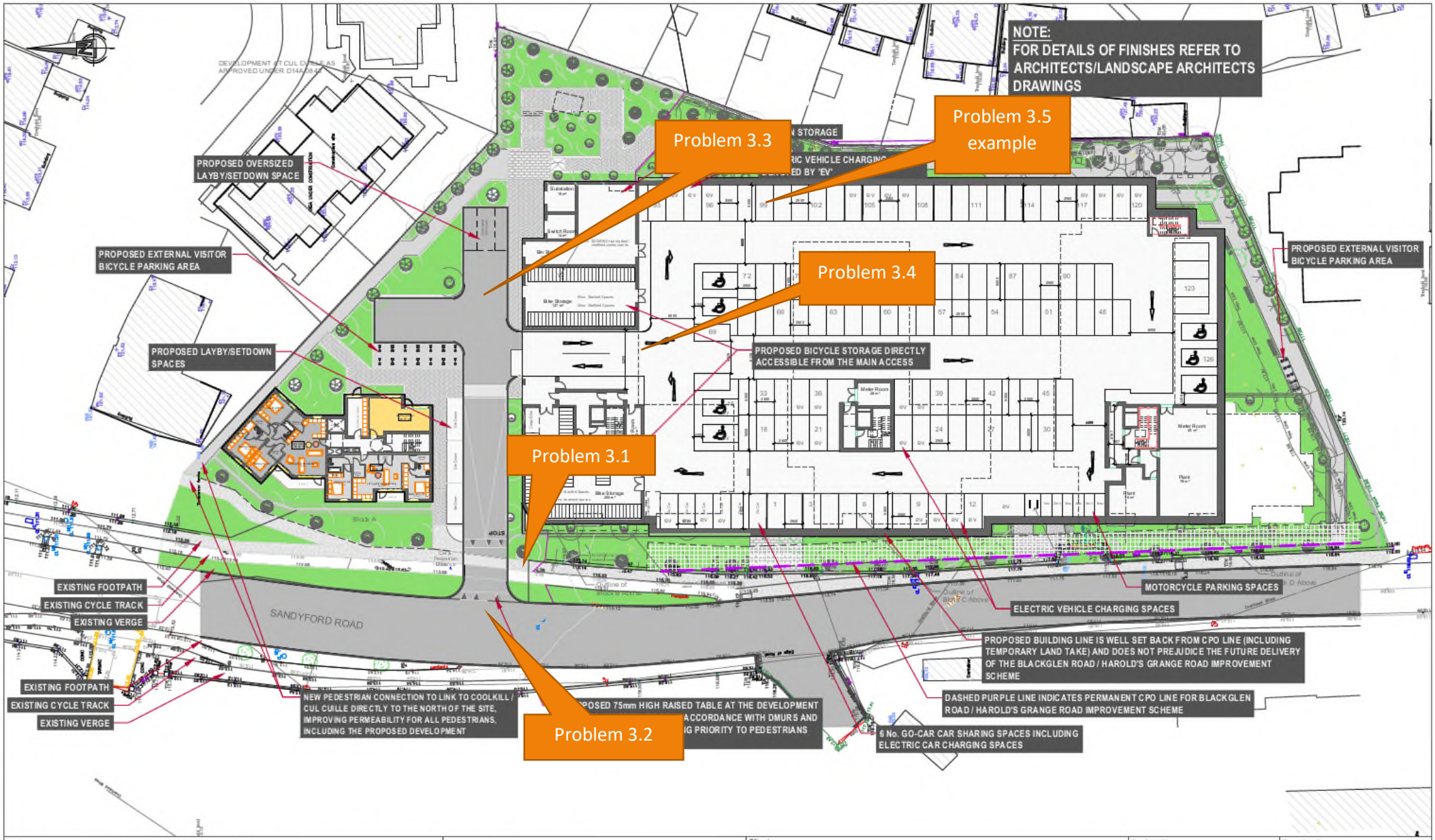
Signed..... **Date**.....07.04.22.....
Design Team Leader

Signed..... **Date**.....12/4/2022.....
Audit Team Leader

Signed..... **Date**.....12/04/2022
Developer/ Employer

Appendix C

Problem Location Plan.



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 architects drawing 533-HRA-00-LGF-DR-A-P-0200 received 12/04/22. NRB Consulting Engineers Ltd shall not be liable for any inaccuracies or deficiencies.

REV	DATE	AMENDMENTS	DRAWN	CHK	APP

NRB Consulting Engineers Ltd
1st Floor, Apollo Building
Dundrum Road
Dundrum
Dublin 14

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Email: info@nrb.ie
Web: www.nrb.ie
Registered in Ireland No. 491679

NRB consulting engineers

Client		Project No. 21-043	Drawing No. NRB-TA-001
Project	Sandyford SHD Dublin	Drawn PB / Checked SN 14/04/22	Approved SN 14/04/22
Title	Proposed Site & Car Parking Layout	Date 8-Apr-22	Scale @ A3 1:500 / Rev A

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

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

APPENDIX I

Bus/LUAS Capacity Assessment Report

consulting engineers

NRB

Bus/LUAS Capacity Assessment Report

(Appendix I)

For

Proposed Residential Apartment Development

at

'Karuna' & 'Glenina'
Sandyford Road,
Dublin 18.

FINAL ISSUE

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

Registered in Ireland No. 491679

Contents

Page	Section	Description
2	1.0	Introduction
4	2.0	Bus/LUAS Locations & Services (Current/Proposed)
12	3.0	Bus/LUAS Use Predictions, Capacity & Demand
16	4.0	Conclusions

Appendices.....

A	Bus Timetable Information *(Correct at Time of Collating Data & Writing Report)*

1.0 INTRODUCTION

1.1 NRB Consulting Engineers Ltd were appointed to address the Bus & LUAS Demand and capacity associated with a planning application for a proposed residential apartment development on lands at 'Karuna' and 'Glenina' Sandyford Road, Dublin 18.

1.2 The proposed development principally consists of the demolition of the existing dwelling and ancillary buildings known as 'Glenina', the existing dwelling known as 'Karuna' and the existing boundary wall fronting Sandyford Road, and the construction of a residential development principally comprising 137 No. apartments (32 No. 1-bed units, 78 No. 2-bed units and 27 No. 3-bed units) in 4 No. blocks ranging in height from part-1 No. storey to part-6 No. storeys with a part-basement/part-undercroft level (at Blocks B, C and D).

1.3 Clearly, as established residential sites, they had established transportation demands associated with their use, however, this report has been prepared as if the Bus & LUAS Demand created is additional new demand for these services. This is expected based on 2 number existing dwellings increasing to 137 number proposed dwellings.

1.4 The NRB commission on the project consists of this assessment of current & future Bus & LUAS capacity, a 'Bus & LUAS Capacity Assessment Report'.

1.5 Whilst this Report contains an assessment of Bus & LUAS Capacity and demand, it should be remembered that Service Providers are commercial in nature, running their businesses based on current demand rather than medium to longer term future demand. In simple terms, commercial services are provided based on actual existing footfall rather than potential future demand. If there is an increased demand for services with full or over-capacity services, Operators then generally react to improve facilities if it makes commercial sense to do so. More customers means more revenue generated by the services.

1.6 Notwithstanding the above, the purpose of this Study is to review the potential impact of the development upon the existing and future bus & LUAS services in the vicinity of the site.

1.7 The analysis of the existing and future services is based on an assessment methodology which includes trip generation assessment, modal split assumptions, and assignment/distribution. These assumptions have been based on real data extracted from the Central Statistics Office (CSO) 2016 Small Area Map Data, available through the SAP online mapping tool. This data was used to quantify the anticipated demand for services as a result of the proposed development locally, based fully on adjacent CSO Statistical Small Areas.

1.8 The first step was to review the current and future planned services. The bus stops within an easy walking distance of the subject site were identified, with the current bus services, bus service frequency and capacity studied and assessed. Similarly, the demand for LUAS services at the nearest stop (Glencairn) was assessed based on current provision.

1.9 *BusConnects* is expected to be implemented within a relatively short timeframe. This initiative will reconfigure the bus services for the Greater Dublin Area completely. This Study therefore considers both the existing bus network and the planned *BusConnects* Network.

1.10 The Luas Green Line Capacity Enhancement Project commenced in 2019 and has provided significant extra capacity on the Luas Green Line serving Glencairn. It included lengthening the existing green line trams to 55m in length, plus the purchase of 8 additional 55m long trams. A major expansion of Sandyford Depot was also undertaken to facilitate the growth in the green line fleet. Power system upgrades also facilitated the additional and longer trams. The €11.1m extension of the service increased the length of the existing trams from 44m to 55m and increased passenger capacity by 30%. Each of the 26 extended trams (with the addition of 2 new modules per tram measuring 11.1m long in total) increased passenger capacity from 319 to 408, with 89 more passengers per-tram accommodated than had previously been the case.

1.11 The Study focuses on the peak commuter periods for the development, and in particular the busiest weekday AM commuter peak demand for services – this represents the period of highest demand on the network consistent with the TII Traffic & Transport Assessment Guidelines (May 2014). The methodology assumes that the trips will be assigned to the nearest available bus stops and of course to Glencairn LUAS, which is closest LUAS Station.

2.0 BUS/LUAS LOCATIONS & SERVICES (CURRENT & FUTURE)

CURRENT SERVICES

2.1 For commuting, a walk distance to/ from Bus Stops of up to 1km is generally considered to be acceptable. For the purposes of this assessment, we have assumed a 7-10min walk time as being appropriate, reflecting a distance of circa 700-1,000m depending on speed of walking.

2.2 The site is reasonably well served by Bus Services, and this is illustrated below within ***Figure 2.1*** below illustrating the existing bus services & stops within acceptable walking distance of the site.

Figure 2.1 – Existing Bus Stops Serving the Site

2.3 Clearly, the Number 44B and 114 services pass the site directly on Sandyford Road, with the Number 44 service a short walk distance away. The walk time to the existing Bus Stops and Services to the north of the site are illustrated below as ***Figure 2.2*** and ***Figure 2.3*** (correct at time of writing).

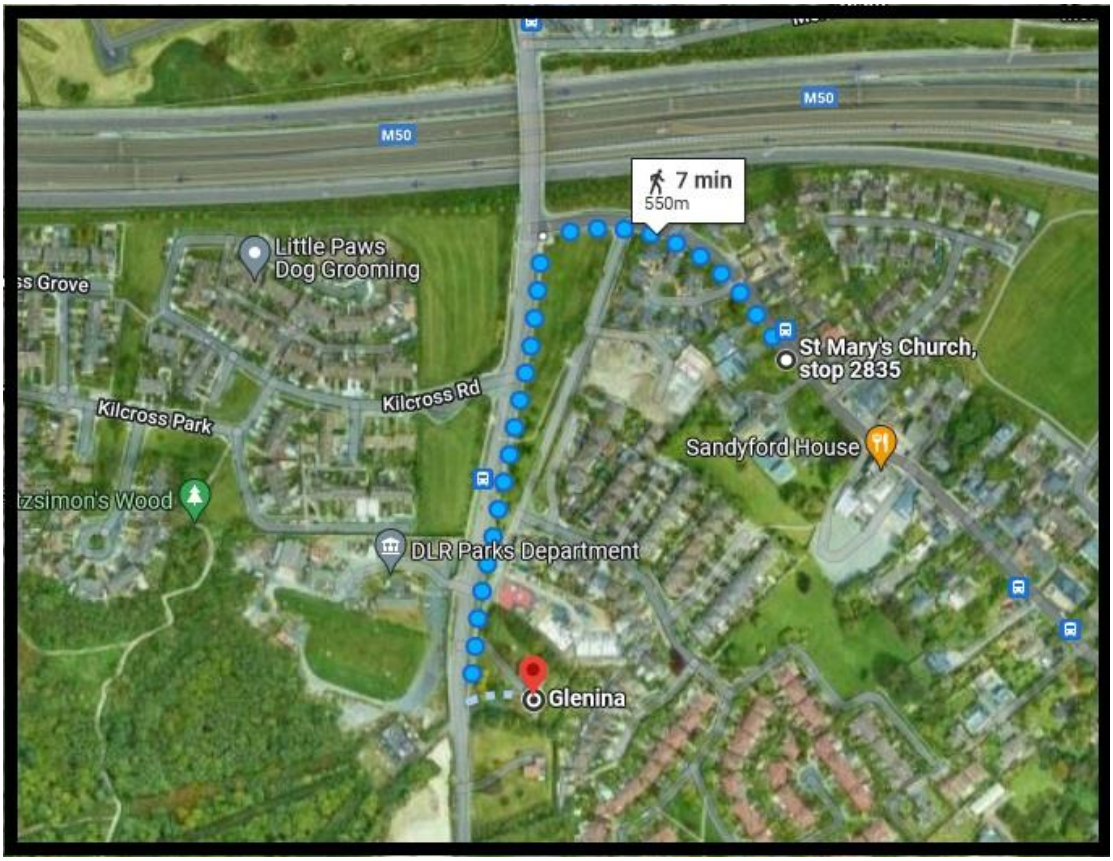

Figure 2.2 – Walk Time to Bus Stops North of the Site

Figure 2.3 – Walk Time to Bus Stops North of the Site

2.4 The scheme also delivers a new pedestrian connection to link to Coolkill / Cul Cille directly to the north of the site, improving permeability for all pedestrians, including the proposed development. This creates pedestrian linkage through the existing Coolkill residential estate to Sandyford village and the bus stops therein.

2.5 It should be noted that the 44B and 44 both provide access to LUAS Stops and the 114 service provides for access to the DART Services at Blackrock. The 44 service links with DCU Campus by way of a frequent cross-city service. These services supplement and enhance the multi modal accessibility of the site to DART/LUAS and onwards to City Centre Transport Hubs and inter-city services.

2.6 As an illustration of walk time to LUAS, we include below the *Google* walk time to the Green Line LUAS Services at Glencairn as ***Figure 2.4***, and the *Google* Cycle time to the Green Line LUAS Services at Glencairn as ***Figure 2.5***. In our experience, a significant proportion of Apartment residents are cyclists, and the cycling/walking distance to/from LUAS will ensure it is a viable alternative for use by residents.

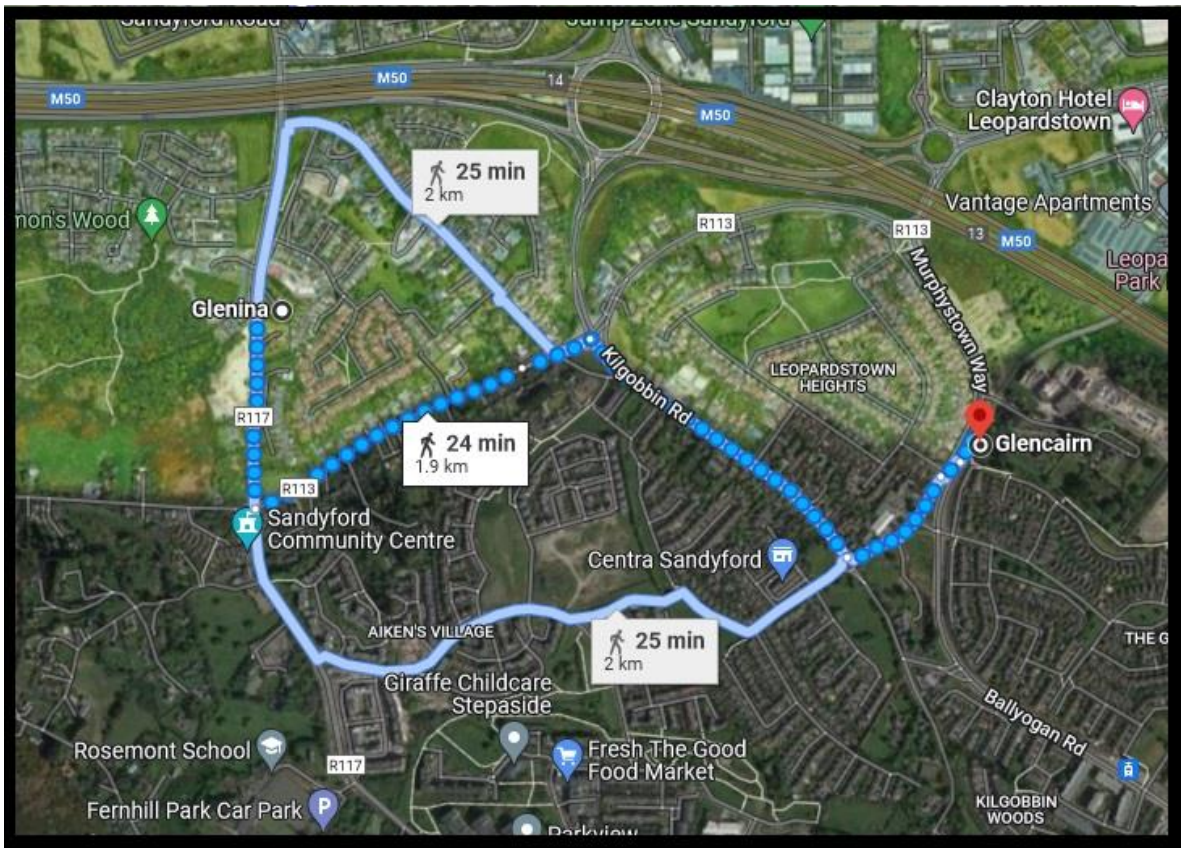

Figure 2.4 – Walk Time of 24 Mins to Glencairn LUAS

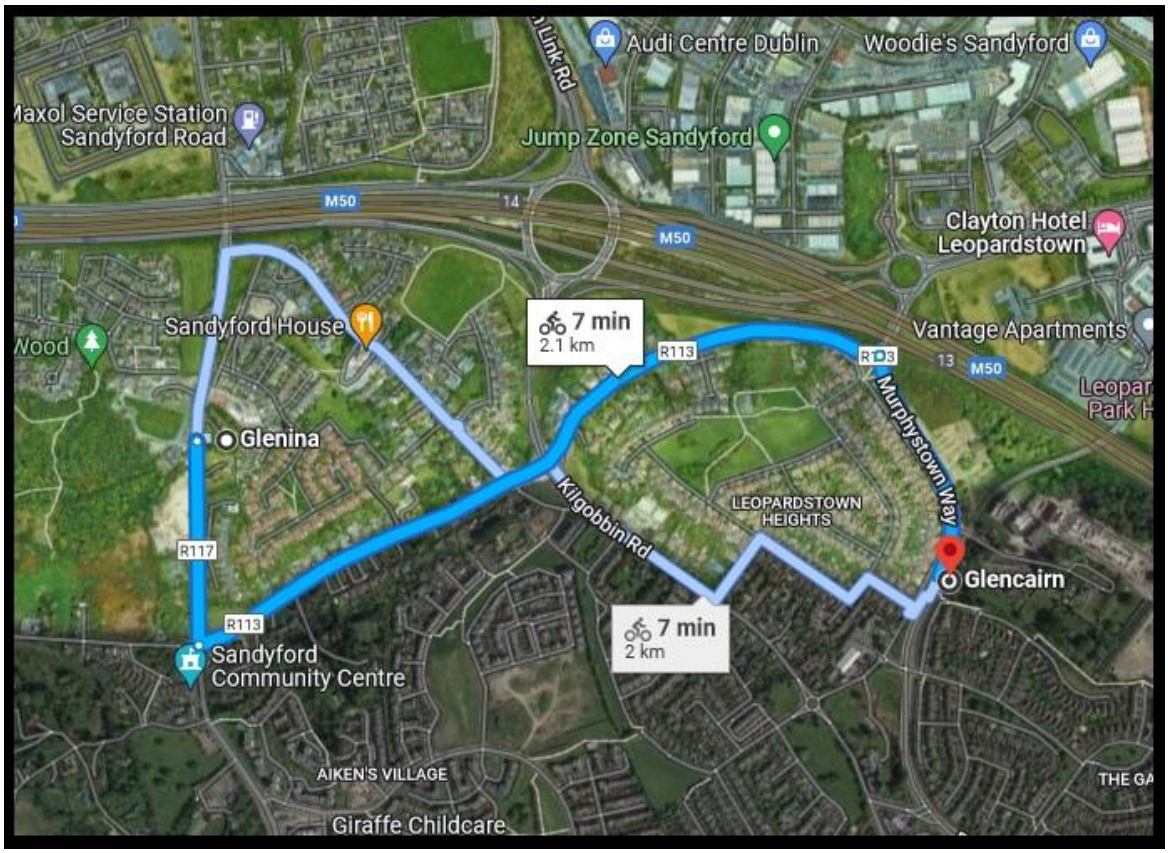

Figure 2.5 – Cycle Time of 7 Mins to Glencairn LUAS

2.7 In terms of the Existing Bus Service Provision and Service Frequency, the Timetables for each existing Services within a generally-acceptable walking distance are included herein as ***Appendix A***. These details have been collated and are summarised below as ***Table 2.1,*** extracting information relating to the busy 7-9am weekday AM Commuter Period.

Table 2.1; - Buses within 10min Walk Distance, 7-9am Approx Capacity.

Service #	Route	Operator	No. Buses 7-9am (Mon - Fri)	Total Person Capacity (7-9am)	Thru City Core (Y/N)
44	DCU to Enniskerry	Dublin Bus Double Decker	3	273	Y
44B	Dundrum LUAS to Glencillen	Dublin Bus Single Decker	2	90	N
114	Blackrock DART to Rockview, via LUAS	Go Ahead Ireland Double Decker	3	273	N
		Total (7-9am) All Routes	**8**	**636**	
		Total (7-9am) Routes to LUAS & DART	**5**	**363**	
		Total (7-9am) Routes Via City Centre	**3**	**273**	

2.8 The above demonstrates that the site is clearly accessible to a significant existing bus provision, with a capacity of c636 bus seats during the 7-9am commuter peak period citybound, all within an 7-10 minute walk-distance of the site***.***

2.9 And of course, the majority of these bus services provide for connectivity to Public Transports Hubs and Interchanges (Rail, Intercity Bus Services, LUAS etc) located within the City Core.

2.10 The **LUAS Green Line** Service runs via Glencairn. Luas Green Line is c24.5km in length and has 35 Stops along the route. It runs from Brides Glen to Broombridge via the City centre and provides connectivity to public transport hubs and interchanges. The Green Line has *Park & Ride* and *Cycle & Ride* facilities incorporated into the design. The service operates on a continual basis throughout the day, with Trams running on an approximate average 4-5 minute interval basis during the morning and evening peaks (in both directions). The approximate citybound LUAS capacity 7-9am is then illustrated below as ***Table 2.2***

Table 2.2; - LUAS Approximate Existing Capacity Each Way (7-9am)

Details	No. 7-9am	People Capacity
LUAS Trams via Dundrum (Green Line)*	24	408
Total LUAS People Capacity 7-9am (each direction)	9792	

*****Based on LUAS Frequency of 1 Tram Every 5 minutes*

2.11 The Transport for Ireland, LUAS & Dublin Bus websites (and Mobile Phone Apps) now provide a service that allows customers access up to date real information for Arrivals and departures on a stop-by-stop basis. This information on Arrivals and Departures allows customers to plan their arrivals and departures & associated walk/cycle times accurately, facilitating efficient journey planning (and minimising congestion on platforms or stops).

2.12 The LUAS Trams are of course modern and of high quality. Almost all of Dublin Bus & Go-Ahead Bus Services consist of fleets of high quality comfortable ‘Double Decker’ Buses, being accessible buses with ‘low-floor’ technology incorporated into their design.

2.13 Transport for Ireland also provides an interactive online tool that enables the user to plan journeys, with real time information on Bus & Rail services on a nationwide basis.

2.14 The LUAS Green Line Services have been recently upgraded as set out above. We have also set out below details of the proposed bus service improvements locally as part of BusConnects.

FUTURE BUS SERVICES

2.15 In terms of **Future Planned Services**, the NTA have recently published details of the overall bus network for the GDA, the 'New Dublin Area Network' - showing Spine Routes, Feeder and Orbital Routes. An extract from the NTA Plans showing the site location is included below as ***Figure 2.6***.

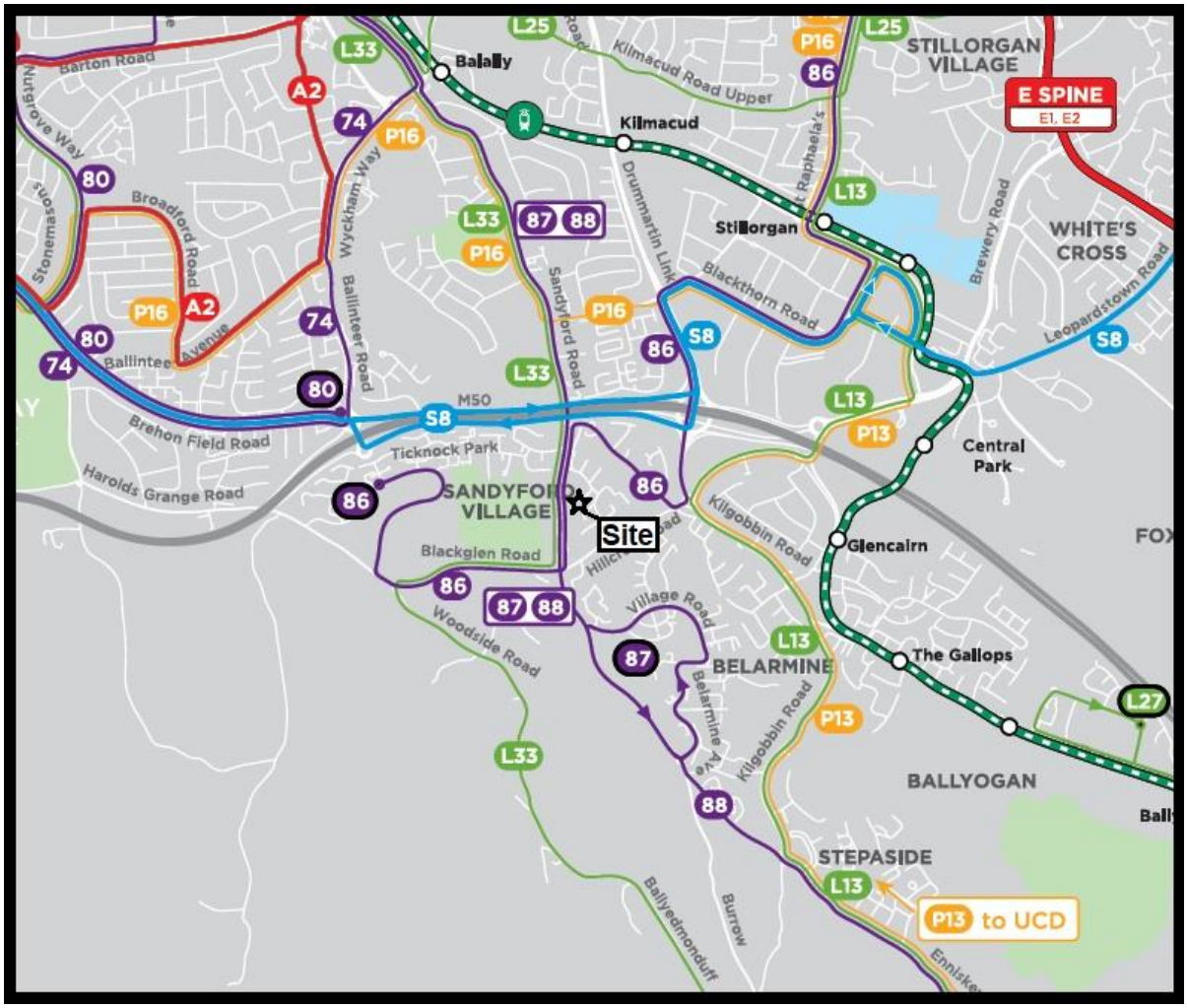

Figure 2.6 – Extract Current NTA Network Plans & Site

2.16 This future network shows that the site's accessibility to bus services will be further enhanced, with a high frequency and permeable service to be provided.

2.17 The site is located served by **Radial Route 86, 87** and **88** (Purple), and Local **Route 33** (Green) with the expected frequency of these services as illustrated in extracts included ***Figure 2.7*** and ***Figure 2.8*** below.

Radial frequency tables

The number in each box is the expected time in minutes between buses. It is subject to adjustment in line with future passenger numbers.

Radial Routes		Weekday																		
Route no.	To and From	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11
58	Rathcoole - City Centre - Dublin Port		60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60
60	Red Cow - Cherry Orchard - Doclos Rd. - Spencer Dock		60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60
71	Tallaght - Ballymount - Warrenmount - East Wall		30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	60
72	Drimnagh - Warrenmount - East Wall		30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	60
73	Marino - City Centre - Walkinstown	30	15	10	15	15	15	15	15	15	15	15	10	15	15	15	15	15	15	30
74	Dundrum - Whitechurch - Crumlin - City Centre		30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	60
80	Liffey Valley - City Centre - Ballinteer	30	15	10	10	15	15	15	15	15	15	10	10	10	15	15	15	15	15	30
81	Greenhills - City Centre - Ringsend		20	15	15	20	20	20	20	20	20	15	15	15	20	20	20	20	20	30
82	Killinarden - Crumlin - Ringsend		20	20	20	20	20	20	20	20	20	20	20	20	20	30	30	30	30	30
85	Tallaght - Ballyboden - Harold's Cross - Parnell Square	30	15	10	10	15	15	15	15	15	15	10	10	10	15	15	15	15	15	30
86	Ticknock - Goatstown - Mountjoy Square	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	60
87	Belarmine - Dundrum - Mountjoy Square		60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	
88	Enniskerry - Belarmine - Dundrum - Mountjoy Square		60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60
98	Loughinstown Drive - Dún Laoghaire - Mountjoy Sq.		60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60

***Figure 2.7 – Extract** NTA Core Bus Network GDA, Radial Route Frequencies*

Local frequency tables

The number in each box is the expected time in minutes between buses. It is subject to adjustment in line with future passenger numbers.

Local Routes		Weekday																		
Route no.	To and From	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11
L1	Greystones - Newcastle Loop Clockwise - Bray		40	40	40	40	40	40	40	40	40	40	40	40	40	60	60	60	60	60
L2	Greystones - Newcastle Loop Anticlockwise - Bray		40	40	40	40	40	40	40	40	40	40	40	40	40	60	60	60	60	60
L3	Greystones Circulator (1-way loop)		30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	60
L11	Kilmacanogue - Bray - Dún Laoghaire		20	20	20	20	20	20	20	20	20	20	20	20	20	30	30	30	30	30
L12	Ballywaltrim - Bray Station		20	20	20	20	20	20	20	20	20	20	20	20	20	30	30	30	30	30
L13	Kilternan - Stillorgan Village - UCD - Ringsend		60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60
L14	Southern Cross Rd - Bray Station - Palermo		30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	60
L15	Shop River - Enniskerry - Bray		60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60
L21	Dalkey - Dún Laoghaire		60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60
L22	Brides Glen - Sally Glen Road - Dún Laoghaire	30	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	30
L25	Dundrum - Dún Laoghaire	30	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	30
L26	Kilternan - Cabinteely - Deansgrange - Blackrock		30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	60
L27	Ballyogan - Cabinteely - NRH - Dún Laoghaire		30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	60
L33	Glencullen - Dundrum			60	60	60		60		60		60		60	60		60			
L35	Rockbrook - Dundrum				60		60		60		60		60							
L44	Ballymore Eustace - Blessington - Tallaght		60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60
L51	Adamstown - Lucan Village - Esker - Liffey Valley		60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60

***Figure 2.8 – Extract** NTA Core Bus Network GDA, Local Route Frequencies*

2.18 The site is therefore ideally placed in terms of future frequent bus availability, based on the NTAs published Plans.

2.19 In terms of **Bus Passenger Capacity**, the Go-Ahead Ireland services and a typical old-type Dublin Bus double decker bus have a capacity to accommodate ~91 passengers. However, it should be noted Dublin Bus are introducing new hybrid buses, some of which have extra capacity e.g. the new Wrightbus StreetDeck HEV 96 double-decker buses. The 44B is a single decker bus with a capacity for ~45 passengers.

3.0 BUS USE PREDICTIONS, CAPACITY & DEMAND

3.1 We have used the CSO Local Small Area Mapping to establish the proportion of Bus & LUAS Users within the local area surrounding the site in order to estimate the additional demand for services, utilising real data rather than estimations of modal split. An annotated extract from the CSO Database Small Area Mapping used for this purpose is included below as ***Figure 3.1.***

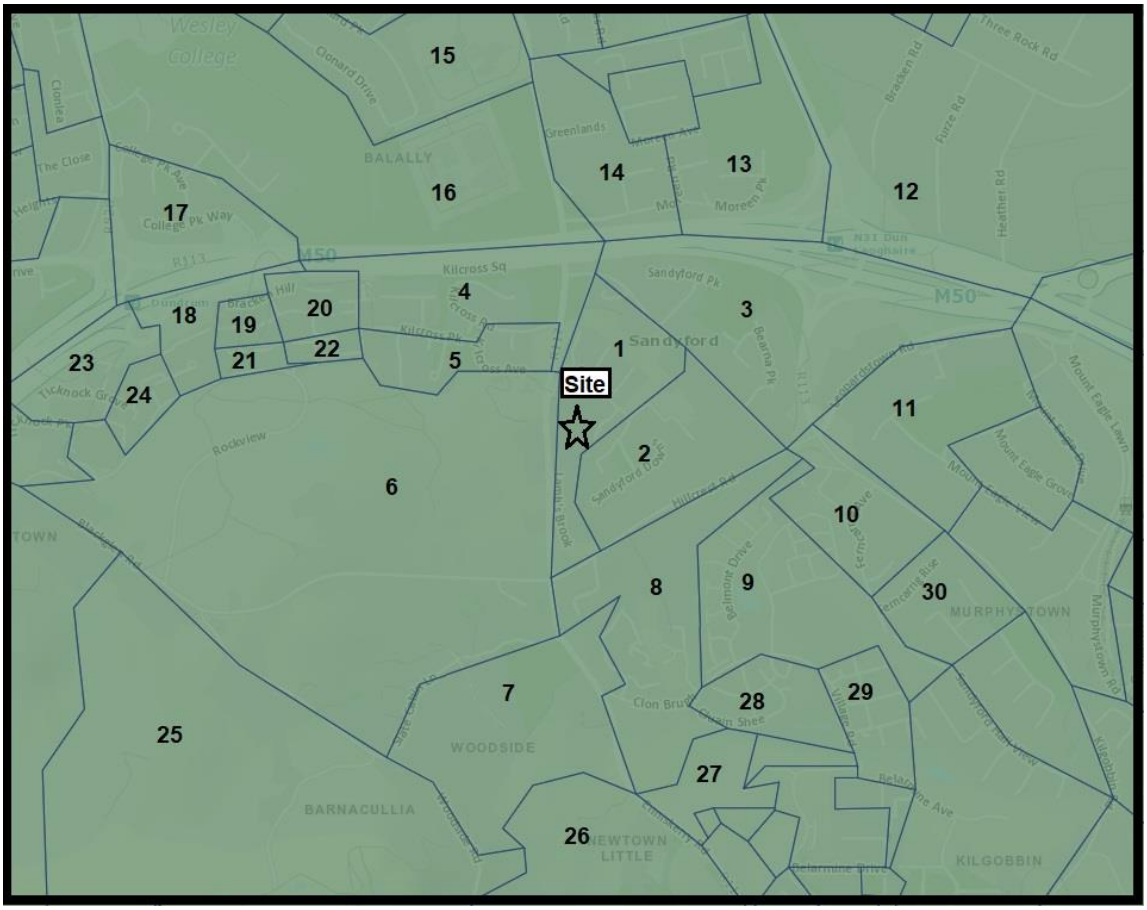

Figure 3.1 – Collated CSO Local Area Data

3.2 We have extracted information from the Census Data for these local small statistical areas to calculate the demand for Bus & LUAS during the busy weekday AM Commuter period, and this is illustrated below as ***Table 3.1***.

Table 3.1 – Bus & LUAS Demand Based on CSO Data & Expected Residential Population

CSO Small Area Ref. Above	Total Population	Total Commuters Age 5+ to Work, School or College	No. of Bus Users	No. of LUAS Users	No. of Commuters Leaving Home 7-9am to Work/Schl or College
1	236	165	7	22	130
2	396	279	15	39	214
3	342	198	8	14	128
4	385	231	17	14	151
5	231	138	7	10	79
6	374	283	19	19	201
7	181	129	8	11	86
8	272	188	12	40	132
9	347	258	6	61	197
10	236	188	14	38	142
11	300	232	22	44	176
12	467	289	18	78	180
13	224	127	7	13	84
14	286	176	13	21	115
15	404	224	5	24	173
16	481	334	16	37	262
17	381	293	17	36	229
18	202	156	17	11	114
19	297	230	21	25	151
20	277	222	16	15	144
21	158	127	11	10	86
22	155	119	14	9	77
23	271	208	11	13	157
24	221	169	21	12	113
25	202	126	6	12	89
26	323	204	4	12	136
27	298	226	24	22	153
28	264	205	8	44	152
29	381	287	7	63	215
30	440	356	28	55	275
Totals	9032	6367	399	824	4541
CALCULATION OF BUS & LUAS DEMAND DUE TO DEVELOPMENT BASED ON LOCAL CSO DATA					
Percentage of Total Population in Area Commuting =					70.5%
Percentage of Total Population in Area Commuting By Bus =					4.4%
Percentage of Total Population in Area Commuting By LUAs =					9.1%
Percentage of Commuters Leaving Home 7-9am =					71.3%
505	Residents within Occupied Proposed Development, based on Bed Spaces Full Occupancy				
22	Bus Commuters (Consistent with the Local Area Census Data)				
16	**Total Additional Bus Commuters Between 7am and 9am**				
46	LUAS Commuters (Consistent with the Local Area Census Data)				
33	**Total Additional LUAS Commuters Between 7am and 9am**				

BUS/LUAS CAPACITY & DEMAND

3.3 Based on existing travel patterns in the locality, the above confirms that the Development will create an additional worst case demand for approximately 16 seats on bus services between 7am and 9am. There will be an additional worst case demand for 33 LUAS seats on Green Line Services between 7am and 9am. Of course, it is not possible to predict the commuting destination of future residents.

3.4 Exact details of bus passenger numbers are not available as this information is commercially sensitive, and due to cash fares taken on board it is not possible to determine seat availability on a service-by-service basis, even by operators themselves. Therefore, on site visual surveys to review existing demand and to confirm seat availability on Bus Services on Sandyford Road were undertaken on a weekday in April 2022 during normal school term. From these on-site visual surveys of routes 44, 44B and 114, bus services in the AM and PM peak periods had in excess of 50% spare capacity available with many buses closer to 80% or more spare capacity.

3.5 The predicted increased service demand should be considered in terms of the capacity locally, for both Buses and LUAS.

3.6 In terms of **Buses**, the demand is illustrated in ***Table 3.2*** below - with c636 bus seats available during the weekday AM commuter peak period, all within a 7-10 minute walk of the subject site. There are a similar number of services and seats during the weekday PM Peak period 4pm-6pm, however demand is greater during the weekday AM Peak (due to 'peak spreading' that occurs in the evenings, with much more significant staggered departure times from Work or College locations).

Table 3.2; Total Peak Demand for Bus Seats Due to Development

Details	Buses	Seats
Total Number of Buses (7-9am) All Routes	8	636
Total Number of Buses (7-9am) Routes Via City Centre	3	273
Total Demand for Seats Created by Proposed Development (7-9am)		16
Percentage Impact Upon Existing Services within 10min Walk (All Routes)		2.5
Percentage Impact Upon Existing Services within 10min Walk (Routes Via City)		5.8

3.7 The resulting increased demand for bus seats is approximately 2.5% of the total available seat capacity locally. This is considered negligible, and we believe it can easily be accommodated within the current service provision.

3.8 Based on current frequencies, the calculated additional demand for seats would result in ~16 additional passenger per bus during the AM Peak period. Based on the on-site surveys of services it is clear that there is adequate spare capacity on these bus services to cater for the increase in demand.

3.9 In terms of **LUAS** services at Glencairn, the demand associated with the development is illustrated in ***Table 3.3*** below, and this has then been used to calculate the demand and impact upon services.

Table 3.3; Total Peak Demand for LUAS Seats Due to Development

Details	No. 7-9am	People Capacity
LUAS Trams via Glencairn (Green Line)*	20	408
Total LUAS People Capacity 7-9am	8160	
Total Demand Created by Proposed Development	33	
% Additional Demand Created	0.40%	

**Based on LUAS Frequency of 1 Tram Every 5 minutes*

3.10 The proposed development will therefore also create an additional demand for LUAS seats, equating to 0.4% of the current carrying capacity. At way less than 1%, this is also considered negligible and we believe it can easily be accommodated within the current service provision.

3.11 We conclude that this very small additional demand for LUAS and Bus services can easily be accommodated within the existing services. In future, there are additional services to be created as part of BusConnects as set out within Section 2.0 above. There will also be more than adequate capacity on the further improved services locally.

3.12 The analysis is based on 2016 CSO travel patterns, and whilst the development seeks to encourage modal shift, given the small increase in predicted Bus and LUAS demand, any possible future changes in demand due to improve modal shift (walking, cycling, increased working from home and public transport etc) will still have negligible impact on bus capacity here.

4.0 CONCLUSIONS

4.1 NRB Consulting Engineers Ltd were appointed to address the Bus & LUAS Demand and capacity associated with a planning application for a proposed residential apartment development on lands at 'Karuna' and 'Glenina', Sandyford Road, Dublin 18.

4.2 The NRB commission on the project consists of this assessment of current & future Bus & LUAS capacity, a 'Bus & LUAS Capacity Assessment Report. The analysis of the existing and future Bus/LUAS services has been undertaken based on an assessment methodology which includes trip generation assessment, modal split assumptions, and assignment/distribution. These assumptions have been based on real data extracted from the Central Statistics Office (CSO) 2016 Small Area Map Data, available through the CSO online mapping tool. This data was used to quantify the anticipated demand for Bus/LUAS as a result of the proposed development in this particular location, utilising current local modal shift patterns & statistics.

4.3 The assessment confirms that the completion and full occupation of the development will result in an increased demand for Bus/LUAS seats, with an additional 16 Bus customers and 33 LUAS customers during the weekday AM Commuter Peak 7-9am (and less during the PM Commuter peak period). This represents a total of less than 2.5% of the Bus and 0.40% of LUAS seating capacity available locally during this AM Period.

4.4 A recent survey of bus seat availability was undertaken to aid this study. We conclude that the additional demand for Bus/LUAS trips as a result of the proposed development can be accommodated on the existing & improved services without any noticeable effect.

4.5 Whilst this Report contains an assessment of current capacity, it should be remembered that service providers are commercial in nature, running their businesses based on existing demand, rather than medium to longer term future demand. Services are provided based on real demand rather than potential demand. If there is an increased demand for services, or indeed if there is a deficit in a service provision, Operators generally react to improve facilities if it makes commercial sense to do so. More customers means more revenue generated.

APPENDIX A

A	Bus Timetable Information *(Correct at Time of Collating Data & Writing Report)*

A A A

44

Buses from/to
From DCU To Enniskerry
Operative Date: 26/01/2020
Version: TT 20.1

From DCU Towards Enniskerry

DCU , Cnoc na Fuiseoige , Sráid Uí Chonaill , Dún Droma , An Chéim , Áth na Sceire

Buses leave terminus at:

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

Route Variations
k Operates from Larkhill to O'Connell Street
p Operates from Parnell Sq. East to Enniskerry
c From DCU, departs O'Connell Street at 23:30

DCU >> 5mins >> Larkhill >> 25mins >> O'Connell St. >> 30mins >> Dundrum >> 15mins >> Stepaside >> 15mins >> Enniskerry

All times are off peak estimates

From Enniskerry Towards DCU

Áth na Sceire , An Chéim , Dún Droma , Sráid Uí Chonaill , Cnoc na Fuiseoige , DCU

Buses leave terminus at:

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

Route Variations
d To Dundrum only

c From Enniskerry, departs O'Connell Street at 23:30

Enniskerry >> 15mins >> Stepaside >> 15mins >> Dundrum >> 30mins >> O'Connell St. >> 25mins >> Larkhill >> 5mins >> DCU

All times are off peak estimates

Fare Stages

83 17 DCU
82 18 Larkhill
81 19 Collins Ave. (Larkhill Rd.)
80 20 Drumcondra Rd. Upr. (Griffith Ave.)
79 21 Drumcondra Rd. Upr. (Clonturk Park)
78 22 Drumcondra Rail Station
77 23 Dorset St. (North Circular Rd.)
76 24 Dorset St. (North Frederick St.)
75 25 O'Connell St.
74 26 Merrion Sq. / Clare St.
73 27 Earlsfort Terrace
72 28 Charlemont St.
71 29 Ranelagh Rd. (Dartmouth Rd.)
70 30 Ranelagh (Chelmsford Rd.)
69 31 Sandford Rd. (Marlboro Rd.)
68 32 Milltown (Ramleh Park)
67 33 Milltown (Church)
66 34 Dundrum Rd. (Bird Ave.)
65 35 Dundrum Rd. (Columbanus Rd.)
64 36 Dundrum Rd. (Frankfort Park)
63 37 Dundrum Rd. (Ballinteer Rd.)
62 38 Sandyford Rd. (Dundrum Town Centre)
61 39 Sandyford Rd. (Balally Cottages)
60 40 Sandyford Corner (Kilcross)
59 41 Sandyford Village
58 42 Murphystown Cross (Hillcrest)
57 43 Murphystown Rd.
56 44 Kilgobbin Lane
55 45 Stepaside Village
54 46 Jamestown (St. Norbert's)
53 47 Jamestown House
52 48 Goldenball (Glenamuck Rd.)
51 49 Ballycorus Rd.
50 50 Kilternan (Willis)
49 51 Kilternan Hotel
48 52 The Scalp (Butlers)
47 53 Killegar House
46 54 Monastery Corner
45 55 Enniskerry (National School)

Customer Comment Desk: (01) 8734222
Phone lines open: Monday to Saturday 08:30hrs – 18:00hrs (except public holidays)

A A A

44b

Buses from/to
Dundrum Luas Station To Glencullen
Operative Date: 07/01/2018
Version: TT 8.1

From Dundrum Luas Station Towards Glencullen

Stáisiún Luas Dhún Droma , Dún Droma , Áth an Ghainimh , Gleann Cuilinn

	Monday - Friday				Saturday	Sunday
Buses leave terminus at:	06:50	07:45	08:50	15:45	NO SERVICE	NO SERVICE
	17:30					

Dundrum Luas Station >> 5mins >> Dundrum >> 10mins >> Sandyford >> 15mins >> Glencullen

All times are off peak estimates

From Glencullen Towards Dundrum Luas Station

Gleann Cuilinn , Áth an Ghainimh , Dún Droma , Stáisiún Luas Dhún Droma

	Monday - Friday				Saturday	Sunday
Buses leave terminus at:	07:15	08:15	09:20	16:35	NO SERVICE	NO SERVICE
	18:10					

Glencullen >> 15mins >> Sandyford >> 10mins >> Dundrum >> 5mins >> Dundrum Luas Station

All times are off peak estimates

Fare Stages

36	64	Dundrum Luas Station	44	56	Barnacullia
37	63	Dundrum Rd. (Ballinteer Rd.)	45	55	Stone Bungalow
38	62	Sandyford Rd. (Dundrum Town Centre)	46	54	Cannons Corner
39	61	Sandyford Rd. (Balally Cottages)	47	53	Ballyedmonduff Cottages
40	60	Sandyford Corner (Kilcross)	48	52	Ballyedmonduff House
41	59	Lamb's Cross	49	51	Johnny Foxes Pub
42	58	Lamb Doyles	50	50	Furry Lane
43	57	Woodside Cottages	51	49	Glencullen

Customer Comment Desk: (01) 8734222
Phone lines open: Monday to Saturday 08:30hrs – 18:00hrs (except public holidays)

Ticknock - Blackrock
via Sandyford Luas

114 **Monday to Friday** **Valid from 13th of Marc 2022**

Service Number	114	114	114	114	114	114	114	114	114	114	114	114	114	114	114	114	114
Rockview (6200)	06:10	06:40	07:05	07:40	08:30	09:40	10:35	11:35	12:35	13:35	14:35	15:35	16:50	17:35	18:35	19:30	20:30
Sandyford Luas (5142)	06:20	06:51	07:18	07:56	08:46	09:53	10:48	11:48	12:48	13:48	14:45	15:45	17:03	17:48	18:48	19:40	20:40
Newtownpark Avenue (3193)	06:25	06:58	07:26	08:06	08:56	10:02	10:55	11:55	12:55	13:55	14:56	15:56	17:13	17:58	18:58	19:47	20:46
Blackrock Station (3085)	06:35	07:06	07:38	08:21	09:11	10:13	11:06	12:06	13:06	14:06	15:07	16:07	17:24	18:09	19:09	19:55	20:54

Blackrock - Ticknock
via Sandyford Luas

114 **Monday to Friday** **Valid from 13th of Marc 2022**

Service Number	114	114	114	114	114	114	114	114	114	114	114	114	114	114	114	114	114
Blackrock Station (3085)	07:40	08:45	09:50	10:50	11:50	12:50	13:50	14:50	16:00	16:45	17:45	18:50	19:50	20:45	21:45	22:45	23:45
Stillorgan Road (3175)	07:53	08:58	09:59	10:59	11:59	13:00	14:00	15:00	16:12	16:57	17:57	19:01	19:57	20:52	21:52	22:52	23:52
Dale Drive (4475)	08:07	09:12	10:07	11:07	12:07	13:09	14:09	15:09	16:23	17:08	18:08	19:08	20:03	20:58	21:58	22:58	23:58
Rockview (6199)	08:21	09:26	10:20	11:18	12:18	13:24	14:24	15:24	16:40	17:25	18:25	19:22	20:13	21:08	22:08	23:06	24:06

Ticknock - Blackrock
via Sandyford Luas

114 **Saturday** **Valid from 13th of Marc 2022**

Service Number	114	114	114	114	114	114	114	114	114	114	114	114	114	114	114
Rockview (6200)	06:30	07:30	08:30	09:30	10:30	11:30	12:30	13:30	14:30	15:30	16:30	17:30	18:25	19:25	20:25
Sandyford Luas (5142)	06:41	07:41	08:41	09:41	10:41	11:42	12:43	13:43	14:42	15:41	16:41	17:41	18:35	19:35	20:35
Newtownpark Avenue (3193)	06:46	07:47	08:47	09:48	10:48	11:49	12:50	13:50	14:49	15:48	16:48	17:47	18:41	19:41	20:41
Blackrock Station (3085)	06:53	07:55	08:55	09:56	10:58	12:00	13:01	14:01	15:00	15:59	16:59	17:57	18:51	19:49	20:49

Blackrock - Ticknock
via Sandyford Luas

114 **Saturday** **Valid from 13th of Marc 2022**

Service Number	114	114	114	114	114	114	114	114	114	114	114	114	114	114	114
Blackrock Station (3085)	09:50	10:50	11:50	12:50	13:50	14:50	15:50	16:50	17:50	18:50	19:50	20:45	21:45	22:45	23:45
Stillorgan Road (3175)	09:59	11:00	12:00	13:01	14:01	14:59	15:59	16:59	17:59	18:58	19:57	20:52	21:52	22:52	23:52
Dale Drive (4475)	10:06	11:07	12:07	13:08	14:08	15:06	16:06	17:06	18:06	19:04	20:03	20:58	21:58	22:58	23:58
Rockview (6199)	10:16	11:17	12:20	13:22	14:22	15:18	16:18	17:18	18:18	19:13	20:12	21:07	22:07	23:07	24:06

Ticknock - Blackrock via Sandyford Luas | **114** | **Sunday** | **Valid from 13th of Marc 2022**

Service Number	114	114	114	114	114	114	114	114	114	114
Rockview (6200)	10:30	11:30	12:30	13:30	14:30	15:30	16:30	17:30	18:25	19:25
Sandyford Luas (5142)	10:41	11:42	12:42	13:42	14:42	15:41	16:41	17:41	18:35	19:35
Newtownpark Avenue (3193)	10:47	11:48	12:49	13:49	14:49	15:48	16:48	17:48	18:41	19:41
Blackrock Station (3085)	10:57	11:59	13:00	14:00	15:00	15:57	16:57	17:57	18:49	19:49

Blackrock - Ticknock via Sandyford Luas | **114** | **Sunday** | **Valid from 13th of Marc 2022**

Service Number	114	114	114	114	114	114	114	114	114	114
Blackrock Station (3085)	12:50	13:50	14:55	15:50	16:50	17:50	18:50	19:55	20:50	21:50
Stillorgan Road (3175)	12:59	13:59	15:04	15:59	16:59	17:59	18:58	20:03	20:57	21:57
Dale Drive (4475)	13:06	14:06	15:11	16:06	17:06	18:06	19:04	20:09	21:03	22:03
Rockview (6199)	13:18	14:18	15:23	16:18	17:18	18:16	19:14	20:19	21:13	22:11