Project

Proposed Residential Development
at Golf Lane, Glenamuck Road,
Carrickmines, Co. Dublin

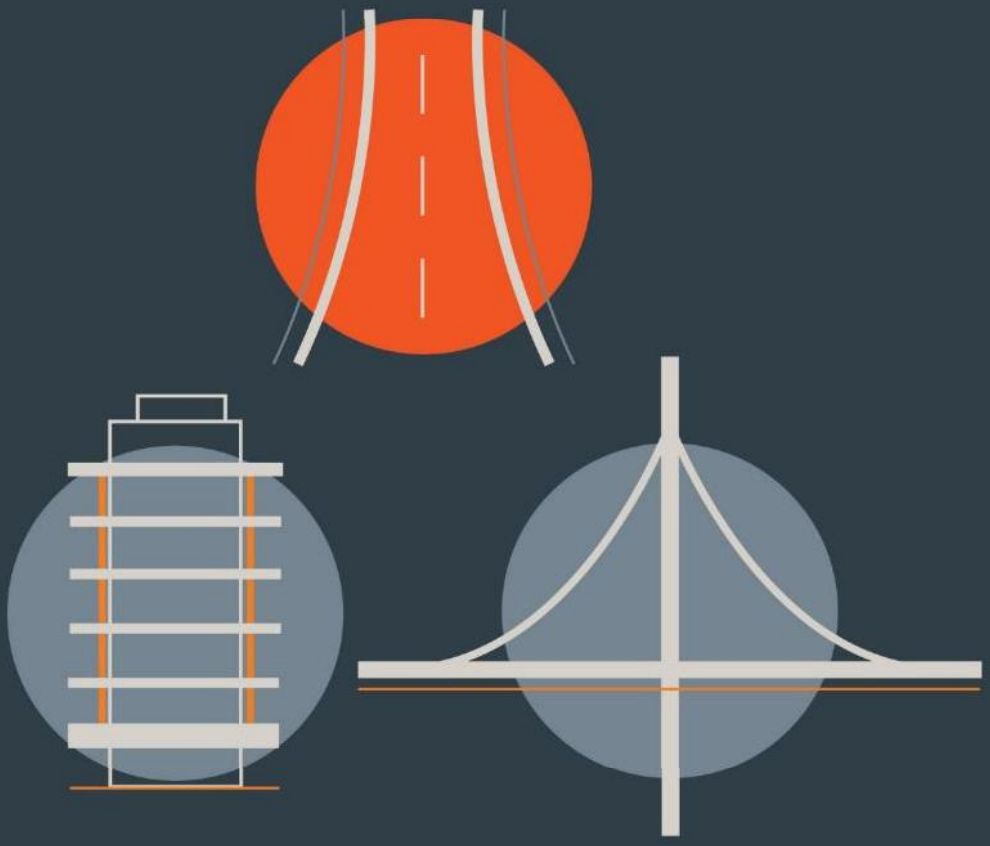
Report Title

TRAFFIC AND TRANSPORT ASSESSMENT REPORT

Client

Bowbeck DAC

TRANSPORTATION



DBFL CONSULTING ENGINEERS

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Author:	Helen Gendy
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DBFL Consulting Engineers

Dublin Office
Ormond House
Ormond Quay
Dublin 7

Tel 01 4004000
Fax 01 4004050
Email info@dbfl.ie
Web www.dbfl.ie

Waterford Office
The Atrium
Maritana Gate
Canada Street
Waterford

Tel 051 309500
Email info@dbfl.ie
Web www.dbfl.ie

Cork Office
Phoenix House
Monahan Road
Cork

Tel 021 2024538
Email info@dbfl.ie
Web www.dbfl.ie

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APPENDICES

1.0 INTRODUCTION

1.1 BACKGROUND

1.1.1 DBFL Consulting Engineers (DBFL) have been commissioned to prepare a Traffic and Transport Assessment (TTA) for a proposed residential development on a brownfield site located at Golf Lane, Glenamuck Road, Carrickmines, Co. Dublin.

1.1.2 The proposed development comprises 482 no. residential units (all apartments), along with ancillary residential amenities, and provision of a childcare facility, gym, and local shop. The proposed development is set out in 7 no. blocks with heights ranging from four to twenty-two storeys.

1.1.3 Two basement levels are proposed, providing car parking spaces (299 no.), bin stores, plant rooms, bicycle parking (1,000 no. spaces), and circulation areas. A further 240 no. bicycle parking spaces and 4 no. car parking spaces are provided at ground level. The proposed development includes landscaping, boundary treatments, public, private and communal open space (including roof terraces), two cycle / pedestrian crossings over the stream at the western side of the site, along with a new pedestrian and cycle crossing of Glenamuck Road South at the west of the site, cycle and pedestrian facilities, play facilities, and lighting. The proposed buildings include the provision of private open space in the form of balconies and winter gardens to all elevations of the proposed buildings. The development also includes vehicular, pedestrian, and cycle accesses, drop off areas, boundary treatments, services, and all associated ancillary and site development works.

1.1.4 The report has been produced to address any potential concerns that An Bord Pleanála may have pertaining to the level of influence of the proposed development upon the local transportation system.

1.2 OBJECTIVE

1.2.1 The purpose of this TTA is to quantify the existing transport environment and to detail the results of assessment work undertaken to identify the potential level of transport impact generated as a result of the proposed residential units on the subject site.

1.3 SCOPE

1.3.1 The scope of the assessment covers transport and sustainability issues including vehicle access and pedestrian, cyclist and public transport connections. Recommendations contained within this report are based on existing and proposed road layout plans, site visits, on site traffic observations and junction survey data.

1.4 METHODOLOGY

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

- '*Traffic and Transport Assessment Guidelines*' (May 2014) National Road Authority (now TII),
- *'Traffic Management Guidelines'* Dublin Transportation Office & Department of the Environment and Local Government (May 2003);
- *'Guidelines for Traffic Impact Assessments'* The Institution of Highways and Transportation;
- *Dún Laoghaire Rathdown Council Development Plan 2016-2022;*
- Ballyogan & Environs Local Area Plan 2019-2025;
- *Review of the Glenamuck Local Area Plan – Traffic Modelling Report* (June 2013) Dún Laoghaire Rathdown County Council and
- *Cherrywood SDZ*.

1.4.2 Our methodology incorporated a number of key inter-related stages, including;

- Background Review: This important exercise incorporated three parallel tasks which included (a) an examination of the local regulatory and development management documentation; (b) an analysis of previous 'transport' related, strategic and site specific studies of both development and transport infrastructure proposals across the Carrickmines area, and (c)

a review of recent planning applications to establish the legal status of various third party development schemes which have emerged and received full planning permission since.

- Site Audit: A site audit was undertaken to quantify existing road network issues and identify local infrastructure characteristics, in addition to establishing the level of accessibility to the site in terms of walking, cycling and public transport. An inventory of the local road network was also developed during this stage of the assessment.

- Traffic Counts: Junction traffic counts in addition to vehicle queue length surveys were undertaken and analysed with the objective of establishing local traffic characteristics in the immediate area of the proposed residential development.

- Trip Generation: A trip generation exercise has been carried out to establish the potential level of vehicle trips generated by the proposed residential development.

- Trip Distribution: Based upon both the existing traffic characteristics, a distribution exercise has been undertaken to assign site generated vehicle trips across the local road network.

- Network Analysis: Further to quantifying the predicted impact of vehicle movements across the local road network for the adopted optimum site access strategy more detailed computer simulations have been undertaken to assess the operational performance of key junctions in the post development 2023, 2028 and 2038 development scenarios.

1.5 REPORT STRUCTURE

1.5.1 As introduced above, this TTA seeks to clarify the potential level of influence generated by the proposed development upon the local road network and subsequently ascertain the existing and future operational performance of the local transport system. The structure of the report responds to the various stages of this exercise including the key tasks summarised below.

1.5.2 Section 2 of this report describes the existing conditions at the proposed development location and surrounding area, whilst Section 3 summarises of the relevant transport policies that influence the design and appraisal of the subject residential proposals proposed development itself.

1.5.3 A description of the subject development proposals is outlined in Section 4 whilst Section 5 provides a car parking analysis and justification for the proposed development with reference to CSO Census data and apartment developments with similar characteristics as the subject site.

1.5.1 In Section 6 a summary of the vehicle trip generation, vehicle distribution, and network assignment exercise is detailed, in addition to quantifying the potential level of impact, as generated by the subject proposals, upon key junctions across the local road network.

1.5.2 The operational performance of key local junctions for a range of different development / traffic scenarios both prior to and following the commissioning of the proposed residential development are investigated and reported within Section 7.

1.5.3 The potential traffic impact of the proposals assessed for the 2023 Opening Year and the 2028 (Opening Year +5 years) and 2038 (Opening Year +15 years) Horizon Years are summarised within Section 8.

1.5.4 The main conclusions and recommendations derived from the analysis are summarised in Section 9.

2.0 RECEIVING ENVIRONMENT

2.1 LAND USE

2.1.1 The subject development site is currently characterised as a brownfield site having previously accommodated a number of private dwelling houses. The subject lands are zoned *"Objective A – To protect and-or improve residential amenity"* within the Dún Laoghaire-Rathdown County Development Plan 2016-2022.

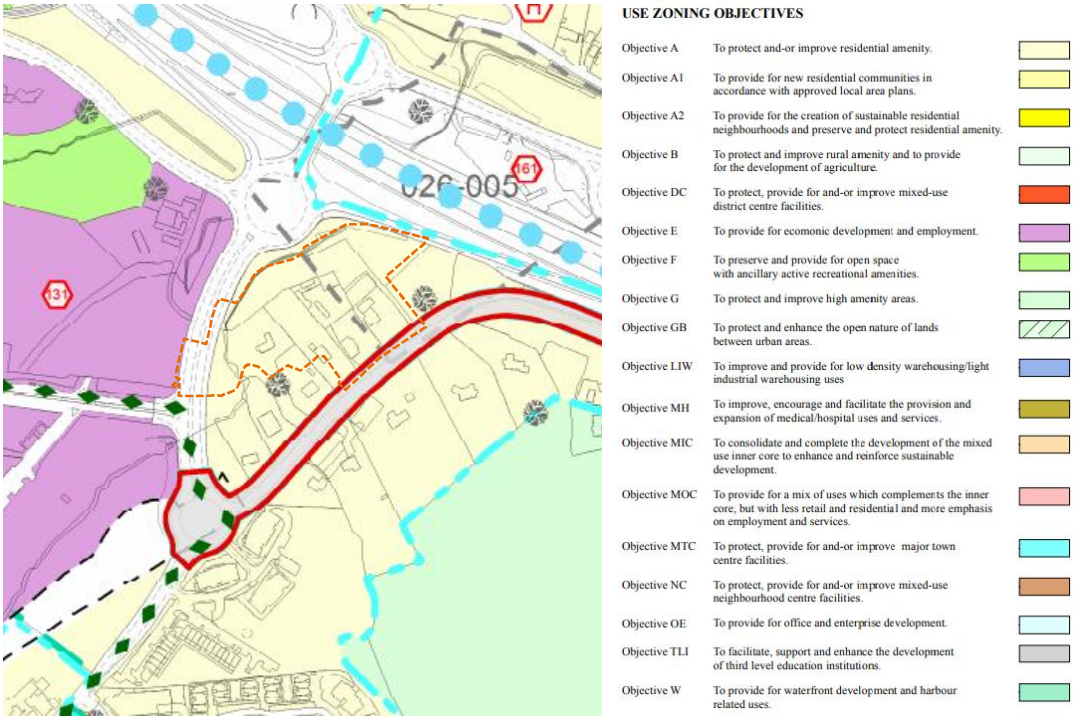


FIGURE 2.1: Site Location (Source: Google Maps)

2.1.2 Furthermore, two number planning applications have previously been sought on the subject lands (Planning Ref. D06A-1157 for 125 residential dwellings and Planning Ref. D08A-0590 for 90 residential dwellings). The previously permitted planning permission for these two applications have since lapsed.

2.2 LOCATION

2.2.1 The site has an area of c. 2.56 hectares and is bound to the north by the M50 motorway, to the east by Golf Lane, to the west by Glenamuck Road, and to the south by existing residential development.". The development fronts onto Golf Lane corridor which currently forms a cul de sac road used for access to existing local dwellings along Golf Lane and Carrickmines Golf Course.

2.2.2 The general location of the subject site in relation to the surrounding road network is illustrated in Figure 2.2 below whilst Figure 2.3 indicatively shows the extent of the subject site lands.

FIGURE 2.2: Site Location (Source: Google Maps)

FIGURE 2.3: Indicative Site Boundary (Source: Google Maps)

2.2.3 The subject development site is situated approximately 15km south of Dublin City Centre and 11km west of Dún Laoghaire. The high employment area of Sandyford

is located approximately 4.5km northwest of the subject site whilst Dundrum Shopping Centre is approximately 8km to the northwest.

2.2.4 Located on Golf Lane, the subject site is accessed via the existing Golf Lane Roundabout which is located to the south of the M50/ Glenamuck Road/ Ballyogan Road junction. The site is also located in lands allocated to form part of the Ballyogan Lands LAP on a parcel of lands positioned between the Cherrywood SDZ and Kiltiernan LAP as illustrated in Figure 2.4 below.

2.2.5 Golf Lane, which is located immediately to the south of the site is reserved within the Cherrywood SDZ, is to be upgraded in the future to become the link road connecting Glenamuck Road (and J15 M50) with the western portion of the SDZ lands via a new M50 overpass.

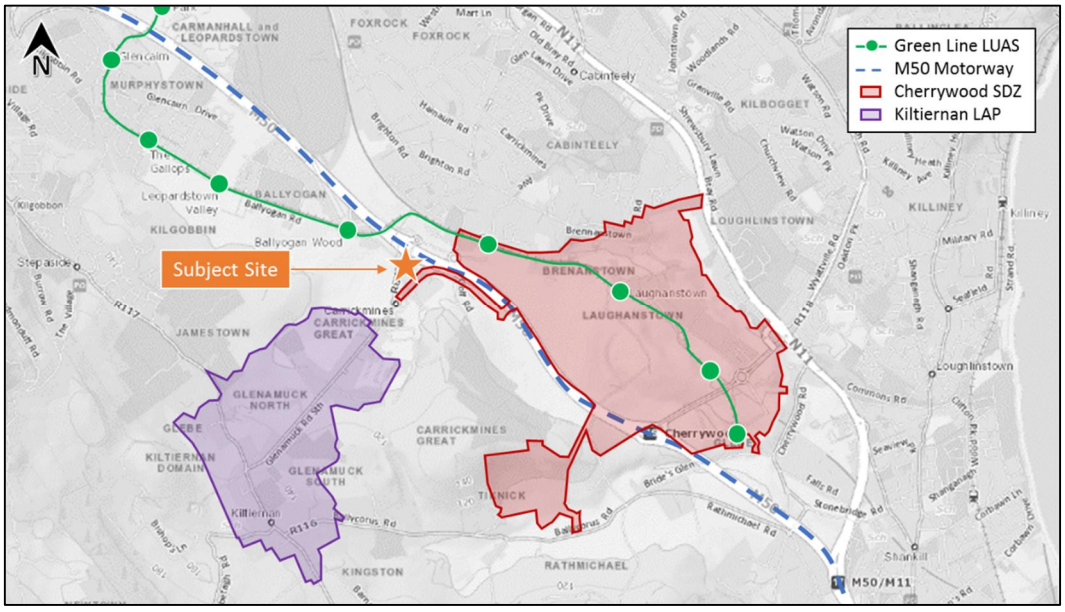


FIGURE 2.4: Location of Site within Greater Carrickmines Context (Source: GeoHive)

2.3 EXISTING TRANSPORTATION INFRASTRUCTURE

Road Network

2.3.1 The subject development site fronts onto the Golf Lane corridor. Travelling eastbound from the site provides access to Carrickmines Golf Club whilst travelling westbound from the site provides access to the Glenamuck Road corridor. Travelling northbound on Glenamuck Road provides access to Cornelscourt/ Cabinteely/ N11, Sandyford (4.5km) and Dundrum (8km) in addition to access to the strategic M50 Motorway (via Junction 15). Travelling in a southbound direction

along Glenamuck Road leads to Kilternan (approx. 2km) and Enniskerry Road. Glenamuck Road is subject to a speed limit of 50kph.

Existing Pedestrian and Cycling Facilities

2.3.2 Pedestrians benefit from existing footway and street lighting provision on both sides of the Glenamuck Road North corridor (as illustrated in Figure 2). The site of the proposed development benefits from relatively good quality cycle facilities across the general area which include the availability of cycle lanes along Glenamuck Road South corridor and on a number of links across the surrounding areas including Ballyogan Road. To the south of the Golf Lane roundabout junction, pedestrians benefit from the provision of a footway and street lighting on only one side (eastern side) of the Glenamuck Road South carriageway. There are currently no dedicated cycle facilities along this section of the corridor (Figure 2.5). Pedestrians also benefit from the provision of a footway and street lighting on the southern side of the Golf Lane corridor. Currently cyclists share the Golf Lane corridor with vehicular traffic.

FIGURE 2.5: Existing Pedestrian / Cycle Facilities on the Surrounding Road Network

Public Transport – Bus

2.3.3 Go-Ahead operates a bus service in the vicinity of the subject site. Go-Ahead Bus Route 63 operates services between Kilternan and Dún Laoghaire. As presented on Figure 2.6 below, the nearest Go Ahead Route 63 southbound bus stop (Bus Stop Number 7360) is located approximately 450m west of the subject site access whilst the nearest northbound bus stop for Go-Ahead Bus Route 63 (Bus Stop Number 7324) is located approximately 400m southwest of the subject site access.

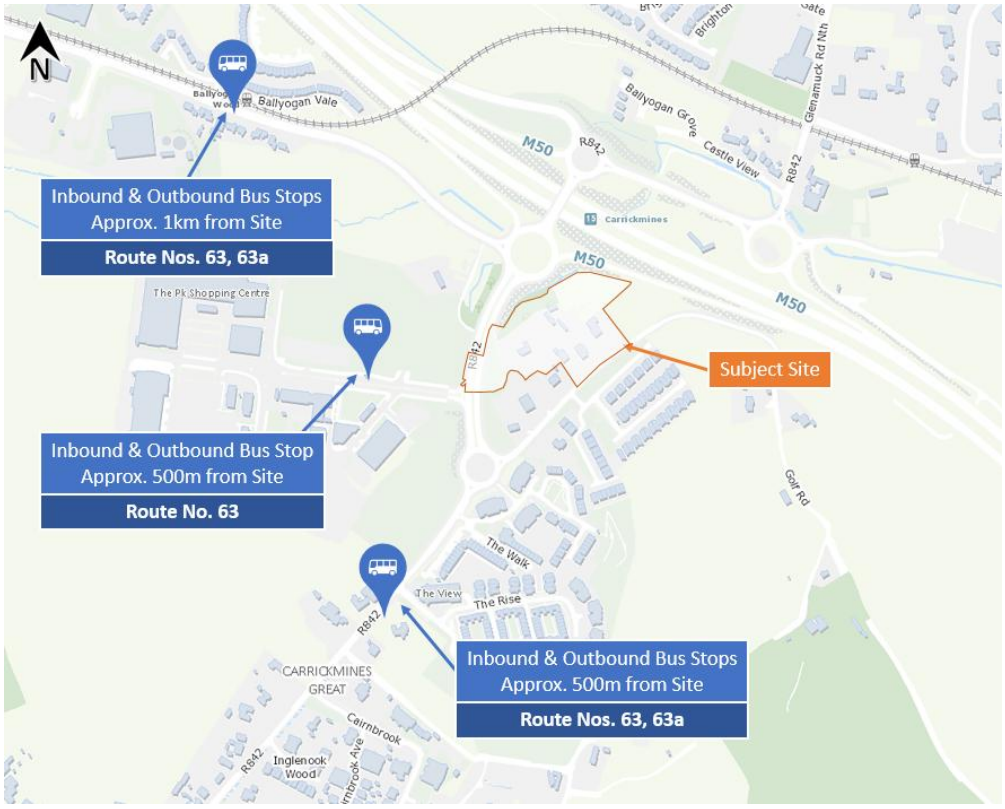


FIGURE 2.6: Existing Go-Ahead Bus Interchanges (Source: GeoHive)

2.3.4 The Go-Ahead operated bus service operates on a daily basis seven days a week and offers frequent schedules as summarised in Table 2.1 below.

Route No.	Route	Mon – Fri	Sat	Sun
63	Dún Laoghaire – Kilternan	34	34	30
	Kilternan - Dún Laoghaire	33	34	30

TABLE 2.1: Go-Ahead Bus Service Quantity (Source: TFI)

Public Transport – Heavy Rail

2.3.5 Killiney Train Station is located approximately 4.5km east of the subject site whilst Dún Laoghaire Station is 5.5km to the northeast. Both of these interchanges provide access to DART and regional Commuter rail services.

Public Transport – LUAS

2.3.6 The closest LUAS Green Line interchanges (Ballyogan Wood and Carrickmines) are both located approximately 850m (11-minute walk) walking distance to the northwest and northeast of the subject site respectively, via the Ballyogan Road and Glenamuck Road North. The LUAS Greenline currently provides access to Sandyford, Dundrum and the City Centre to the north in addition to intermediate destinations along its route (Figure 2.7). Table 2.2 below summarises the frequency with which the Luas Green Line service operates.

FIGURE 2.7: Luas Greenline Destinations (Source: LUAS)

Time	Monday – Friday	Saturday	Sunday
Peak	4-10	13-15	11-12
Off Peak	10-15	15	12-15

TABLE 2.2: LUAS Service Frequency (minutes)

FIGURE 2.8: Existing Public Transport Services

2.4 LOCAL AMENITIES

2.4.1 The proposed development site is very well placed in terms of the availability of local amenities. There are a number of schools within 5km of the subject site including Kilternan NS, Kilternan Church of Ireland NS, Stepaside Educate Together, Sandyford NS, Gaelscoil Slieve Rua, St. Brigid's Boys NS, Holy Trinity NS, Rosemount School and Gaelscoil Thaobh Na Coille. Furthermore, the subject site benefits from good access to leisure and shopping facilities. Figure 2.9 below shows indicatively the subject site's location in relation to the aforementioned local amenities.

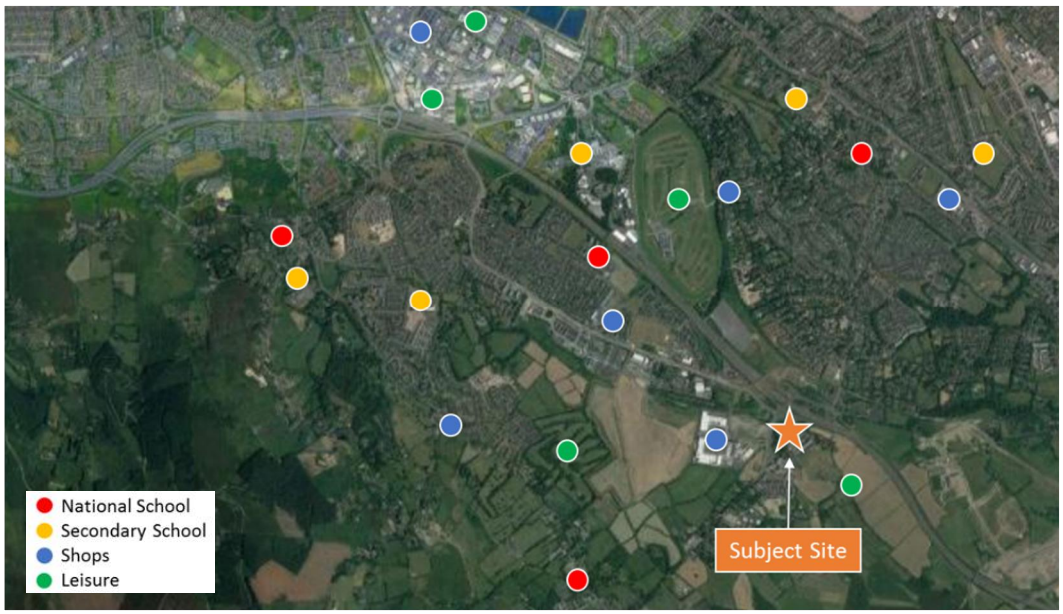


FIGURE 2.9: Subject Site Local Amenities

2.5 PROPOSED TRANSPORT INFRASTRUCTURE

Cycle Network Proposals

Greater Dublin Area Cycle Network Plan

2.5.1 In December 2013, the NTA published the report entitled *Greater Dublin Area Cycle Network* Plan. The report summarises the findings of a comprehensive body of work detailing a proposed Cycle Network incorporating Urban, Inter-urban and Greenroute networks covering the six county council areas that together form the defined Greater Dublin Area (GDA).

2.5.2 The subject site is located within the GDA Cycle Network sector designated as the "Dublin South East Sector". In the vicinity of the subject site the following route additions are proposed as indicated in Figure 2.10: -

- Route 11C: south from Goatstown Cross on Drummartin Link Road/ Kilgobbin Road/ Ballyogan Road to Carrickmines,
- A new feeder route linking the Inter-Urban cycle route (D1) with a proposed Secondary cycle route along Glenamuck Road (11C), and
- New and extended Greenway route from Shanganagh to Sandyford along the Carrickmines Stream and Ballyogan.

FIGURE 2.10: Proposed Cycle Network (Source: Sheet N8 GDA Cycle Network Plan)

Ballyogan & Environs Local Area Plan (BELAP) 2019-2025

2.5.3 Figure 4.11 and Table 4.6 of the BELAP outline the new linkages in the LAP area. The pedestrian / cycle links proposed in the immediate vicinity of the subject development site include;

- Link No. 1 Glenamuck Road to Kilgobbin Road Greenway

  "this dedicated Greenway Spine traversing the Plan area from east to west, would provide safe and dedicated cycling/walking linkages through the central landholdings connecting Glenamuck Road and Kilgobbin Road and

continuing on the existing Greenway in Stepaside North to Enniskerry Road".

- Link No. 27 – Golf Lane Link

  "Would link the Ballyogan Stream greenway spine (Link 1) through to the Kiltiernan Link Road".

- Link No. 20 – The Park Carrickmines to Glenamuck Road

  "This Link would connect the main 'crossroads' in The Park Carrickmines to the new Glenamuck District Distributor Road, and onward to Glenamuck Road, providing a route from Kiltiernan to The Park Carrickmines".

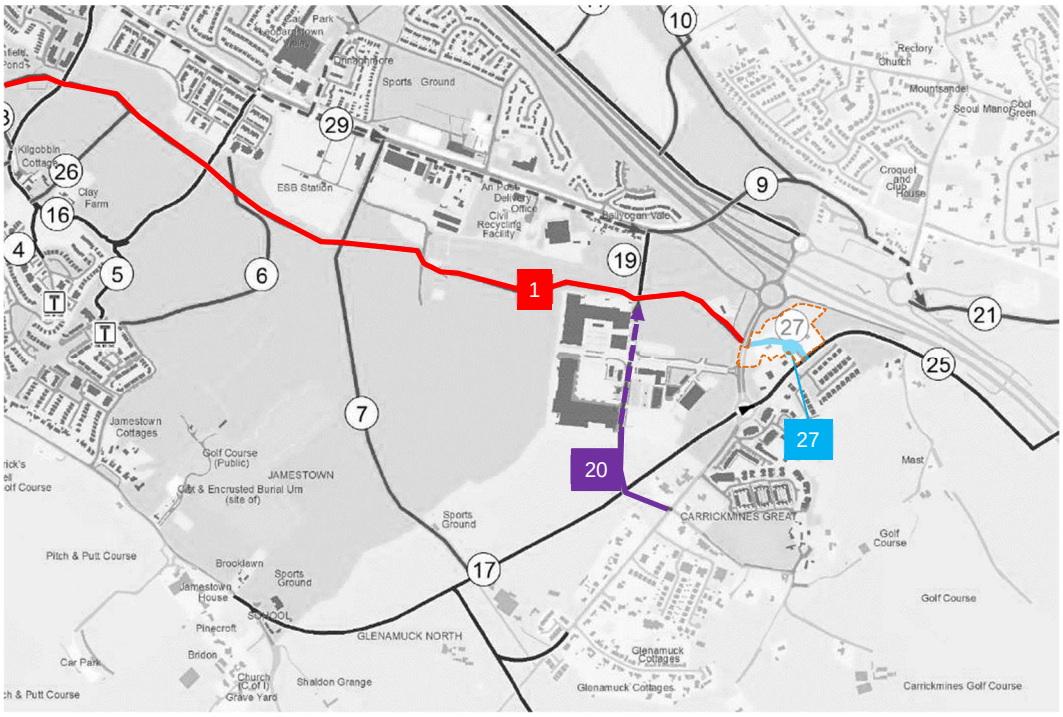


FIGURE 2.11: Future Cycle Infrastructure Proposals

2.5.4 Link No. 27 described above is indicatively shown to travel through the subject development site. Accordingly, a dedicated cycle / pedestrian link has been incorporated into the subject scheme proposals as will be discussed in greater detail later in this TTA report.

Public Transport Proposals – BusConnects

2.5.5 BusConnects is an initiative launched by the National Transport Authority with the aim of overhauling the bus system in the Dublin Region. This initiative includes review of bus services, the definition core bus network which comprises radial,

orbital and regional core bus corridors. It also includes enhancements to ticketing and fare systems as well as transition to a new low emission vehicle fleet.

2.5.6 This initiative proposes to implement a redesign of the existing bus network. The fundamental changes to the network expected would be as follows:

- Increasing the overall amount of bus services. Providing new and frequent orbital services connecting more outer parts of the city together;
- Simplifying the bus services on the key radial into “spines” where all buses will operate under a common letter system and buses will run very frequently and be more evenly spaced;
- Increasing the number of routes where buses will come every 15 minutes or less all day;
- The frequent network would become a web-shaped grid, with many interchange opportunities to reach more destinations. Everywhere that two frequent routes cross, a fast interchange is possible; and
- Additional service would be provided at peak hours to limit overcrowding.

2.5.7 In relation to the subject site, following this redesign of the bus network, the proposed development will be located in close proximity to the new BusConnects route L26 which will replace the existing Go-Ahead Bus route 63. This bus service will operate every 30 minutes on a daily basis

2.5.8 Figure 2.12 illustrates bus service proposals in the area and the frequency available for each route on a neutral weekday as detailed in the BusConnects redesign.

2.5.9 The Bus Network Redesign is the first step in a series of transformative changes to Dublin’s bus network over the coming years. However, the next steps in this initiative are the improvements to the infrastructure and operation of the proposed Bus network which include:

- building a network of “next generation” bus corridors on the busiest bus lines to make bus journeys faster, predictable and reliable;
- developing a state-of-the-art ticketing system using credit and debit cards or mobile phones to link with payment accounts and making payment much more convenient;

- implementing a cashless payment system to vastly speed up passenger boarding times;
- a simpler fare structure, allowing seamless movement between different bus services without financial penalty;
- new bus stops with better signage and information and increasing the provision of additional bus shelters; and
- transitioning to a new bus fleet using low-emission vehicle technologies.

FIGURE 2.12: Proposed Bus Network (Source: BusConnects)

Public Transport Proposals – Luas & Metro

2.5.10 According to current proposals by the NTA & TII, the proposed MetroLink will operate from Charlemont, immediately south of the Grand Canal, and will provide links to City Centre locations and Dublin Airport, terminating in Swords.

2.5.11 Residents of the proposed development will be able to avail of the proposed Metro Line through the Luas Green Line services accessible at the, Ballyogan Wood or Carrickmines Luas interchanges.

2.5.12 Other proposed extensions to the Luas network include a Lucan Line operating from the City Centre to Lucan and the extension of the Green Line south from

Brides Glen to Bray. Figure 2.13 below shows the existing Luas network with the proposed service extensions and Metro Line.

Figure 2.13: Proposed Light Rail Network (Source: NTA)

Public Transport Proposals

2.5.13 A Bus priority network is proposed within Map No. T2 of the DLRCC Development Plan 2016-2022 as presented in Figure 2.14 below. The proposals include for a bus priority scheme along Glenamuck Road and continuing through to the R117 Enniskerry Road South of the Enniskerry Road / Glenamuck Road junction.

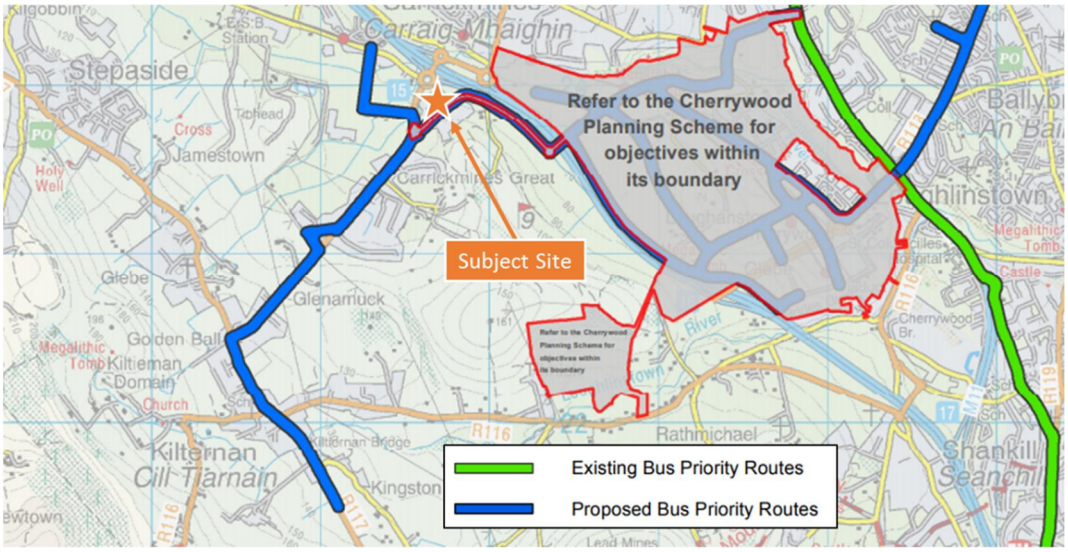


FIGURE 2.14: Proposed Bus Priority Network (Source: Extract from Map No. T2 DLRCC Development Plan 2016-2022)

Roads Proposals

2.5.14 Map No. T3 of the Dún Laoghaire Rathdown County Development Plan 2016-2022 presents the roads proposals within the plan area to be completed within the lifetime of the plan (Figure 2.15).

2.5.15 Key road objectives in the general area of the subject site include;

- Glenamuck District Distributor Road (GDDR)
- Glenamuck Local Distributor Road (GLDR)
- The Park to Ballyogan Link Road
- Golf Lane M50 Overpass to Cherrywood SDZ
- M50 3rd Lane (Sandyford to M11)

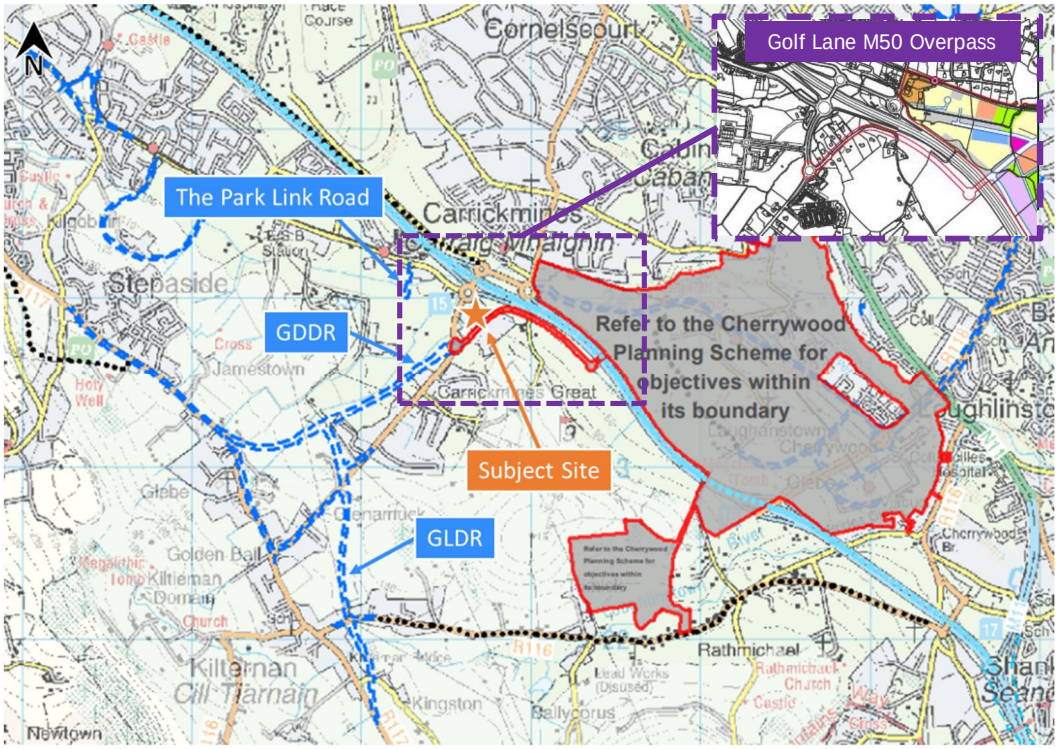


FIGURE 2.15: Road Proposals Map (Source: Map T3 - Dún Laoghaire Rathdown County Development Plan 2016-2022)

2.5.16 In reference to the County Development Plan, the following implementation timescales for these DLRCC roads have been adopted within the TTA.

- Glenamuck District Distributor Road (GDDR) – after 2023 but before 2028
- Glenamuck Local Distributor Road (GLDR) – after 2023 but before 2028
- The Park to Ballyogan Link Road – after 2023 but before 2028
- Golf Lane M50 Overpass to Cherrywood SDZ – after 2038
- M50 3rd Lane (Sandyford to M11) – after 2038

Glenamuck District Distributor Road and The Glenamuck Link Distributor Road

2.5.17 It is noted that as part of the GDDR scheme proposals, it is proposed that a new 'fourth' arm will be provided at the Golf Lane / Glenamuck Road Roundabout as located on Glenamuck Road South.

2.5.18 Within the Kiltiernan / Glenamuck LAP 2013, these road proposals are identified as the Glenamuck District Distributor Road (GDDR) and the Glenamuck Link Distributor Road (GLDR).

2.5.19 As part of the Kiltiernan / Glenamuck LAP 2013, a traffic modelling study was commissioned by DLRCC's transport planning section and carried out by RPS Consulting Engineers in order to ascertain as to whether the aforementioned road infrastructure proposals, which were originally proposed as part of the previous LAP, remain appropriate. The study consisted of an update of previous traffic modelling work carried out by the NTA which was used to demonstrate the level of transport infrastructure necessary if all lands within the LAP where developed.

2.5.20 The study assumed a 2022 design year and predicted that all LAP lands will be fully developed by that year. However, the study also acknowledges that this is highly unlikely and that it may be decades before the entire LAP is developed.

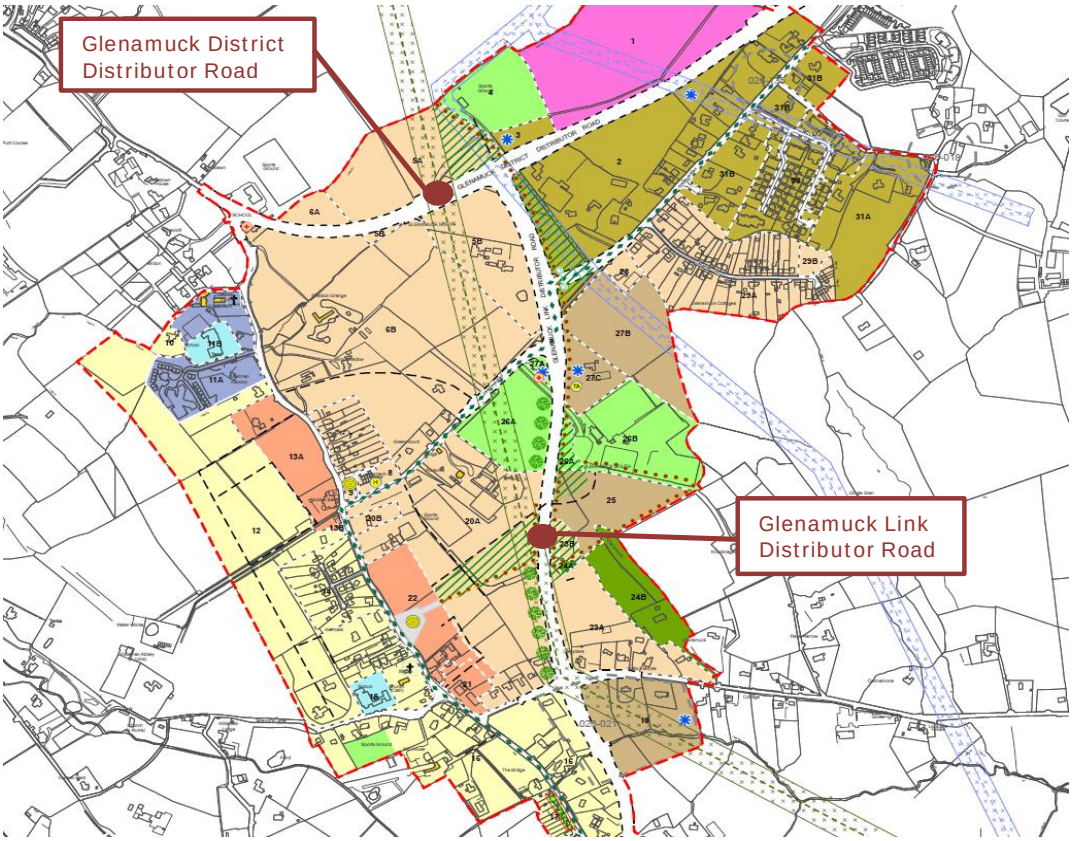


Figure 2.16: Kiltiernan / Glenamuck Local Area Plan 2013

2.5.21 The study recommends that a phased approach is taken with regard to the implementation of the road proposals and thereby proposes "Minimum Essential (Core) Roads Infrastructure" will *"need to be provided for lands to be developed in a sensible and sustainable manner"*. The proposed minimum essential (core) level of road infrastructure is proposed as follows;

a) *"GDDR (Glenamuck District Distributor Road - (primary link road)) - single carriageway from Enniskerry Road to Southern Roundabout at Carrickmines*
b) *GLDR (Glenamuck Link Distributor Road – (primary link road)) - single carriageway from Enniskerry Road to GDDR*
c) *Junction of GDDR and GLDR*
d) *Staggered junction between GLDR and the existing Glenamuck Road*
e) *Junction of GLDR and Ballycorus Road*
f) *Junction of Enniskerry Road and GDDR"*

2.5.22 Figure 2.17 below presents the proposed minimum essential (core) level of road infrastructure.

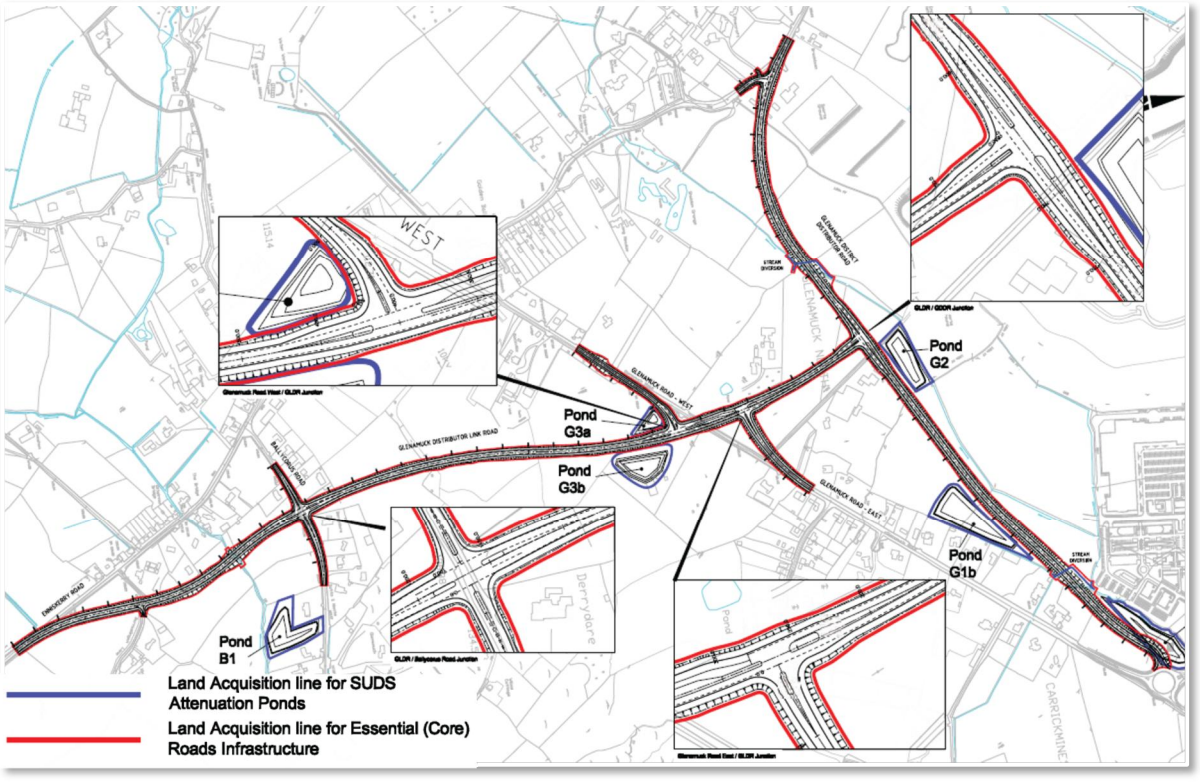


Figure 2.17: Minimum Essential (Core) Road Infrastructure (Source: Extract from RPS Dr. No. PA0003 Minimum (Core) Infrastructure Proposals at Glenamuck-Kilternan)

2.5.23 The study states that;

"As time passes and the development of the LAP lands and other areas in the wider environs takes place, it is likely that other road infrastructure improvements, both within and outside of the LAP area boundary may become necessary. Within the LAP area, the core infrastructure would require upgrading. These improvements would include junction upgrades to multi-lane facilities"

2.5.24 Therefore, whilst the aforementioned Minimum (Core) Infrastructure Proposals are implemented in the interim period, it is recommended that lands are protected from development in order to cater for the potential future traffic demand arising from the fully developed LAP. Figure 2.18 below illustrates the extent of the lands required for the implementation of the future road infrastructure upgrade identified by RPS.

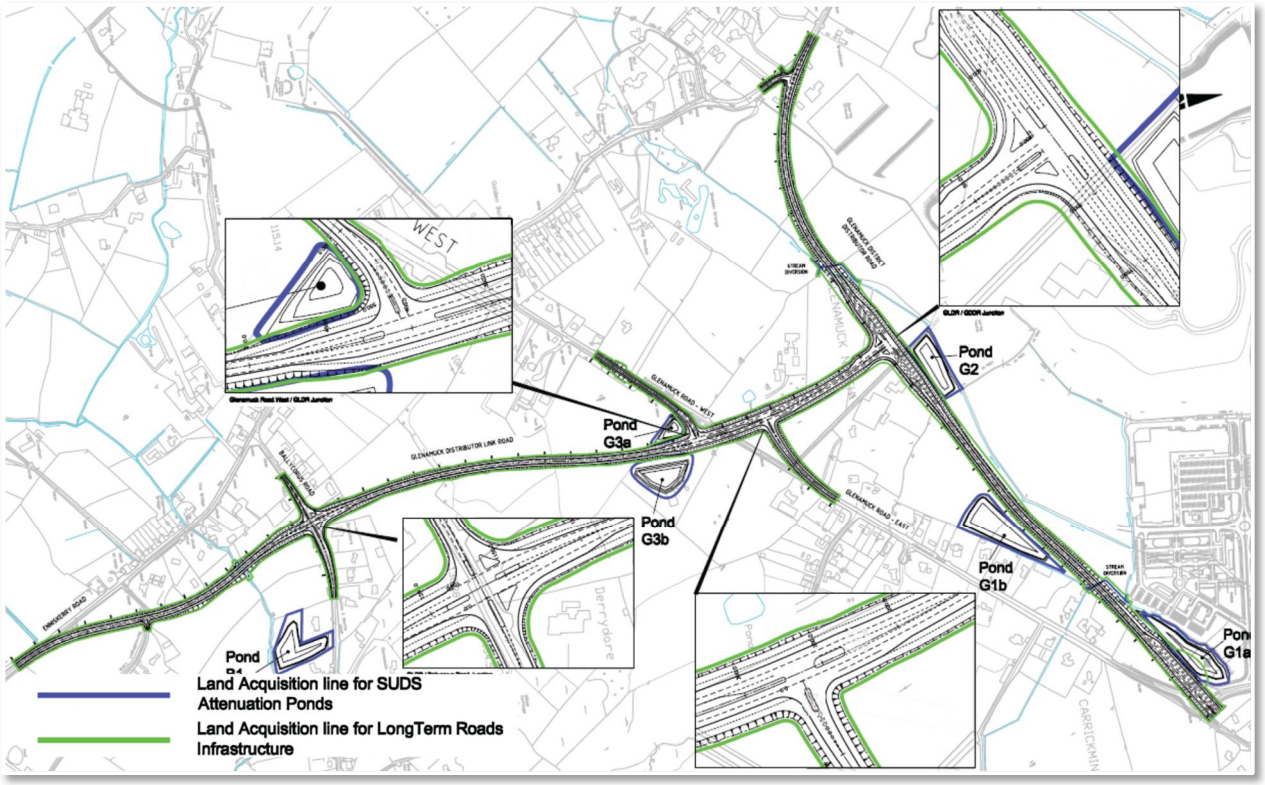


Figure 2.18: Long Term Road Infrastructure (Source: Extract from RPS Dr. No. PA0004 Long Term Infrastructure Proposals at Glenamuck-Kilternan)

2.5.25 In 2017 DLRCC appointed DBFL Consulting Engineers to update the earlier RPS traffic analysis and undertake the detailed design of the GDDR and GLDR schemes. The subsequent updated scheme has been submitted for planning (direct to ABP) and has recently gone through an oral hearing process (September 2019). The

scheme was approved on 19th December 2019 by ABP (PL. Ref. ABP-303945-19 / ABP-304174-19).

2.5.26 The updated traffic analysis by DBFL includes all zoned lands within the LAP at a density of 45 units per Ha. Accordingly, the strategic area wide appraisal of the local road network following the development on the subject site is specifically considered within the DLRCC commissioned analysis. This strategic appraisal is based upon the delivery of housing and implementation of GDDR and GLDR infrastructure by the end of 2020.

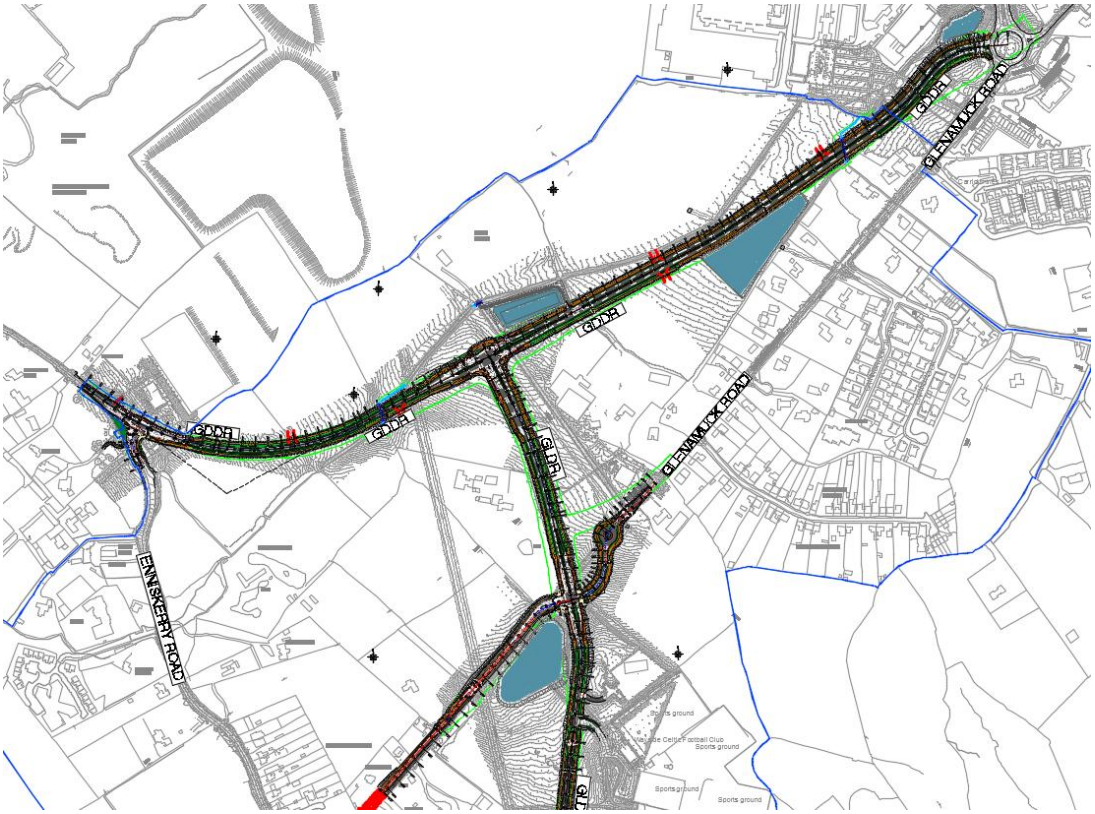


Figure 2.19: DBFL GDDR / GLDR Detailed Design (Extract from DBFL Dr. No. 170172-DBFL-01-XX-DR-C-2000)

Timescales

2.5.27 The ultimate implementation of the above infrastructure schemes by the local authority will be subject to further design, public consultation, approval, and importantly availability of funding and resources.

3.0 POLICY FRAMEWORK

3.1 DEVELOPMENT POLICY

Dún Laoghaire Rathdown County Development Plan 2016-2022

3.1.1 The Dún Laoghaire – Rathdown County Council (DLRCC) Development Plan 2016-2022 sets out the policies and objectives for sustainable development in the County up to 2022. It has been prepared in accordance with the requirements and various provisions of the Planning and Development Act 2000 as amended and the Planning and Development (Strategic Environmental Assessment Regulations 2004). In the context of the subject development site and the proposed residential development the most relevant policies are summarised as follows:

"Policy ST2: It is Council policy to actively support sustainable modes of transport and ensure that land use and zoning are fully integrated with the provision and development of high public quality transportation systems."

"Policy ST3: It is Council policy to promote, facilitate and cooperate with other transport agencies in securing the implementation of the transportation strategy for the County and the wider Dublin Region…."

"Policy ST5: It is Council policy to secure the development of a high-quality walking and cycling network across the County in accordance with relevant Council and National policy and guidelines."

"Policy ST6: The Council will continue to maintain and expand the footway and pedestrian route network to provide for accessible pedestrian routes within the County in accordance with best accessibility practice."

"Policy ST7: It is Council policy to secure improvements to the County Cycle Network in accordance with the Dún Laoghaire-Rathdown Cycle Network Review whilst supporting the NTA on the development and implementation of the Cycle Network Plan for the Greater Dublin Area.

"Policy ST11: It is Council policy to secure improvements to the public transport system as set out in 'Smarter Travel, A Sustainable Transport Future 2009-2020' and the NTA's 'Greater Dublin Area Draft Transport Strategy 2016-2035' by optimizing existing or proposed transport corridors and interchanges and by developing new Park and Ride and taxi rank facilities at appropriate locations."

"Policy ST14: It is Council policy to facilitate the provision of quality public transport interchanges at strategic Rail and Luas stations within the County……"

3.1.2 According to the Development Plan, the land use zoning objectives for the subject site is *"Objective A – To protect and / or improve residential amenity*."

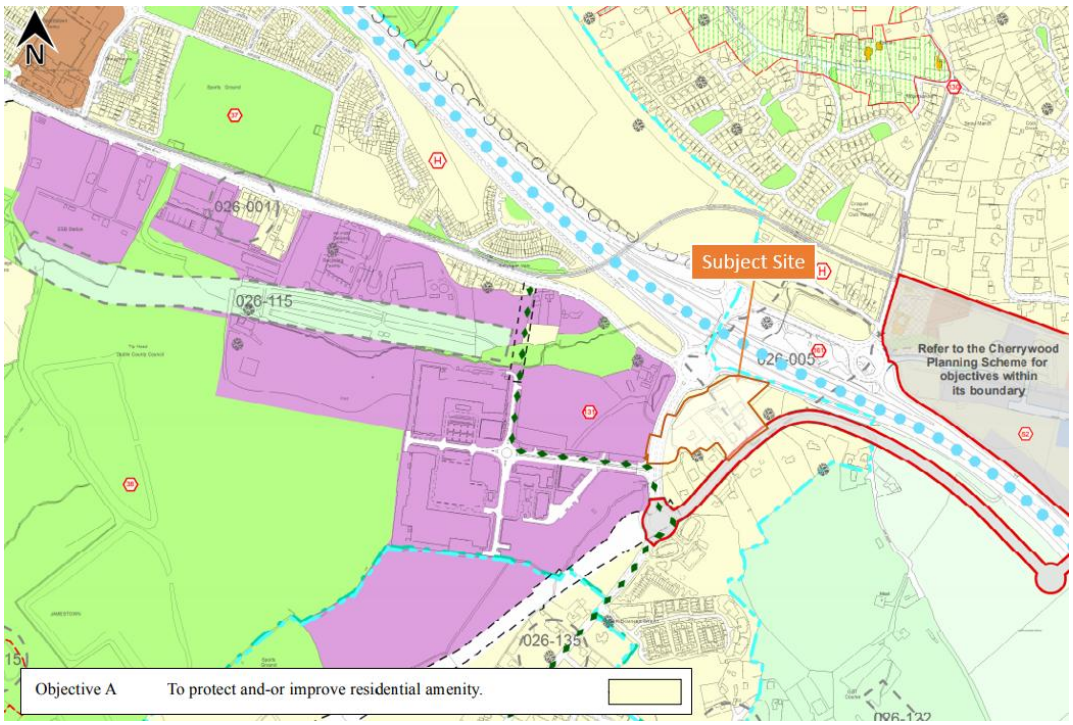


FIGURE 3.1: Dún Laoghaire Rathdown County Council County Development Plan – Land Use Zoning (Source: Extract from Map 9)

3.1.3 Table 2.2.5 in the Development Plan lists the six-year road objectives proposed by the Council. The following are relevant to the subject residential development site:

- Glenamuck Road South
- Glenamuck District Distributor Road

3.1.4 The Long-Term Road Objectives are listed in Table 2.2.6 of the Development Plan. In addition to the policy objectives and development management standards introduced of the County Development Plan, the future development potential (and associated phasing) of the Kiltiernan / Glenamuck Local Area Plan may also need to be considered due to (i) its proximity to the subject site, (ii) the additional demand placed upon the local transport system, and (iii) the infrastructure proposals identified within the LAP.

Transport Strategy for the Greater Dublin Area 2016-2035

3.1.5 The Transport Strategy for the Greater Dublin Area 2016-2035 is a document compiled by the National Transport Authority which sets out *"a framework for the planning and delivery of transport infrastructure and services in the Greater Dublin Area (GDA)" up to 2035.*

3.1.6 The purpose of the strategy is *"To contribute to the economic, social and cultural progress of the Greater Dublin Area by providing for the efficient, effective and sustainable movement of people and goods".*

3.1.7 The Strategy encompasses a study of travel patterns, trends and issues in order to set out transport proposals within designated corridors. The GDA has been segmented into 6 no. radial corridors (A to F). The subject site lies within Corridor F – Arklow – Wicklow – Greystones – Bray – Cherrywood – Dundrum – Dún Laoghaire – Dublin City Centre.

3.1.8 As part of the Strategy preparation, a report on this South East corridor has been carried out. In order to meet the future transport demand (up to 2035) in this region, a range of public transport and roads improvement options have been identified. The following list provides a summary of the public transport and road improvement options identified in the Strategy;

- Upgrading of the Green Line to Metro standard from the city centre all the way to a point in Bray,
- BRT and bus priority service growth including a BRT network linking the upgraded Metro at Bride's Glen or Sandyford,
- South East rail line will be increased,
- The N11 and M50 between Newmountkennedy and Sandyford will be upgraded,
- Improvements to Loughlinstown roundabout and
- A distributor road will be developed to service lands at Kiltiernan / Glenamuck.

Smarter Travel – A Sustainable Transport Future

3.1.9 *Smarter Travel* was published in 2009 by the Department of Transport which represents the national policy documentation outlining a broad vision for the future and establishes objectives and targets for transport. The document examines past trends in population and economic growth and transport concluding that these trends are unsustainable into the future.

3.1.10 In order to address the unsustainable nature of current travel behaviour, *Smarter Travel* sets down a number of key goals and targets for 2020 - including:

- Total vehicle km travelled by car will not significantly increase;
- Work-related commuting by car will be reduced from 65% to 45%;
- 10% of all trips will be by cycling;
- The efficiency of the transport system will be significantly improved.

3.1.11 The document recognises that these are ambitious targets, and outlines a suite of 49 actions required to achieve these targets – summarised under the following four main headings:

- Actions aimed at reducing distances travelled by car and the use of fiscal measures to discourage use of the car;
- Actions aimed at ensuring that alternatives to the car are more widely available;
- Actions aimed at improving fuel efficiency of motorised travel; and
- Actions aimed at strengthening institutional arrangements to deliver the targets.

Ballyogan & Environs Local Area Plan (BELAP) 2019-2025

3.1.12 The subject site is located within the boundary of BELAP boundary (Figure 3.2 below). The main principles guiding the future development in the BELAP area are summarised below.

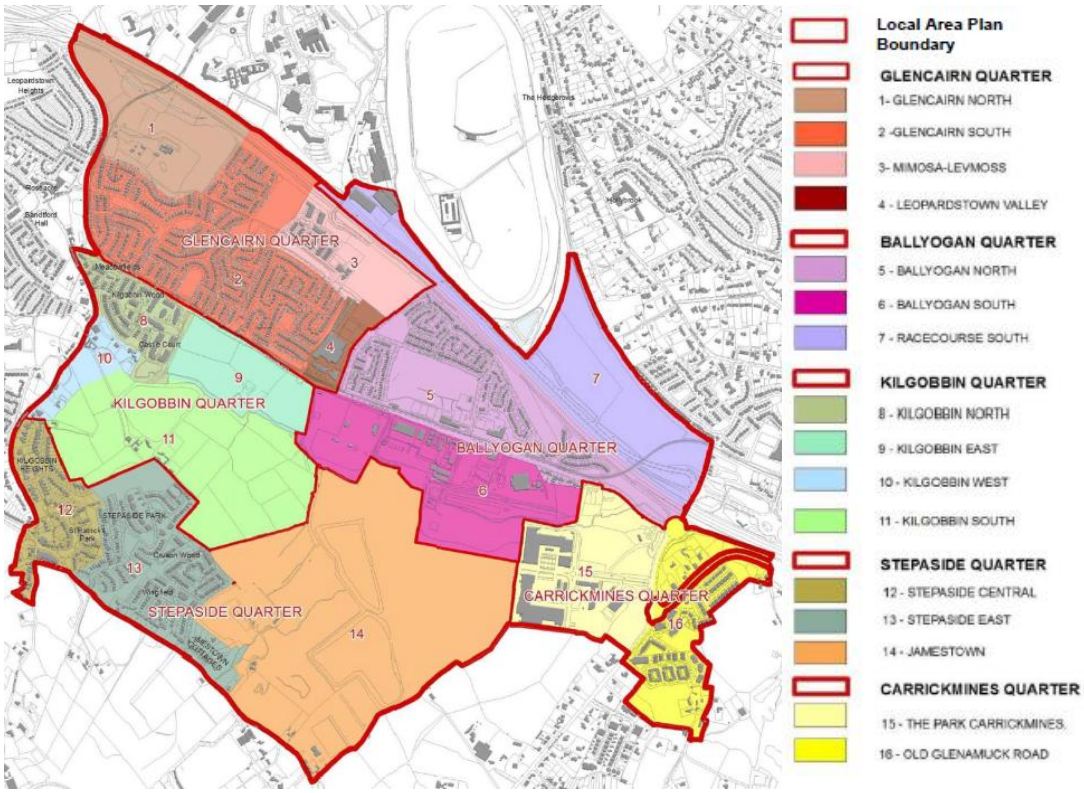


FIGURE 3.2: Ballyogan & Environs Local Area Plan – Neighbourhoods and Quarters (Source: Figure 5.1 of the BELAP)

Pedestrian and Cycle Policy

Policy BELAP MOV1 – Pedestrian and Cycle Network: "To provide for a new high quality pedestrian and cycle network within the LAP area which will connect existing and new communities and redefine the character of the LAP area; including (i) creation of new segregated green routes within the LAP area; (ii) improvement and upgrading of existing routes; (iii) improvement and increased number of pedestrian/cycle crossings on main roads; and (iv) connect into existing and planned networks surrounding the LAP area."

Policy BELAP MOV2 – M50 Crossings: "To facilitate the delivery of new and improved crossing opportunities of the M50 within and adjacent to the BELAP area, with particular emphasis on pedestrian and cycle routes."

Policy BELAP MOV3 – Onward Connections: "To ensure integration between the LAP lands with initiatives such as 'Smarter Travel' and strategic cycle routes connecting Dun Laoghaire-Rathdown and Dublin City and to develop improved connectivity to surrounding communities including Sandyford, Cherrywood and Kiltiernan/Glenamuck."

Public Transport Policy

Policy BELAP MOV5 – Routes to Public Transport: "To increase permeability to existing public transport routes by providing attractive, legible and direct walking and cycling links to bus and Luas stops."

Policy BELAP MOV7 –Public Transport Improvements: "To support and promote any and all improvements to capacity and service levels on the Luas Green Line corridor, including the delivery, in time, of the provision of a Metro grade service from Dublin Airport via the City Centre to Sandyford, and to support and promote any and all improvements to bus services and routings serving the area."

Roads Policy

Policy BELAP MOV8 – Balance between Movement and Place: "To protect the role of the key strategic roads within the LAP area so that they continue to serve their movement function, whilst also seeking visual and environmental improvements to these routes so that they contribute to a sense of place and create a pleasant environment to spend time. Schemes shall be designed in accordance with the Design Manual for Urban Roads and Streets, or its successor policy."

Policy BELAP MOV9 – Facilitating ALL Modes: "To ensure that all new routes, inclusive of those accommodating traffic, shall be designed and constructed in a manner that will facilitate the safe and easy movement of pedestrians and cyclists. Schemes shall be designed on the principle of 'filtered permeability."

Cherrywood SDZ

3.1.13 The subject site is located within the area of influence of the Cherrywood Strategic Development Zone (SDZ) area (Figure 3.3 below). The main principles guiding the future development (to which a number of successful planning applications have been made in 2015 / 2016) of Cherrywood include:

- To promote the growth of Cherrywood which enhances and supports balanced sustainable growth in the Greater Dublin Region and does not undermine the vitality and viability of other areas in the County and the Region.
- To create the framework for the development of a sustainable town and three villages with a supporting range of uses for the resident, working and visiting population.

- To link the area to its immediate hinterland and adjoining communities by restoring connectivity that has been severed by major roads.
- To balance the employment, commercial and retail base of Cherrywood with the future residential growth of the Plan Area.
- To create an environment that promotes / facilitates internal pedestrian and cycle movement meeting the requirements of Smarter Travel.

FIGURE 3.3: Cherrywood SDZ (Source: Cherrywood SDZ Planning Scheme)

3.1.14 It is a fundamental objective of the Cherrywood Planning Scheme to ensure that the future demands for travel are met in a sustainable way. The strategy of the plan is to limit car usage by making alternative modes of access more attractive. The first phase of development will be directed towards areas with convenient access to Luas stops in order to foster sustainable travel patterns from the outset.

3.1.15 The SDZ Planning Scheme Area suffers from high levels of severance due to the steep topography of the Carrickmines and Bride's Glen river valleys and the M50 motorway. The surrounding road network, particularly the N11, is not an attractive environment for cyclists and pedestrians, due to the type, speed and volume of the traffic.

3.1.16 Four detailed traffic studies have informed the SDZ's proposed road infrastructure, its deliverability and implementation, namely:

- The initial traffic management plan (Jan. 2007) was commissioned to optimise and manage the capacity of the existing road network, determine the need for new transport infrastructure to facilitate predicted development growth and define the maximum scale of development that is sustainable in transportation terms.
- The Cherrywood Town Centre Development – Tunnel Appraisal Report (April 2007) was a review of a developer proposal to bridge the Wyattville Link Road with streets and buildings linking both sides of the proposed Town Centre.
- The Cherrywood Common Infrastructure Implementation Plan (Feb. 2008) gave practical expression to the initial Traffic Management Plan and provided a clear and detailed strategy to coordinate residential, commercial, retail and other development with the essential economic, social and physical infrastructure required to serve the new community.
- Cherrywood Traffic Study – Update of Traffic Model (May 2010) was a review of the initial Traffic Management Plan of January 2007 in the context of changes to the infrastructure proposed in the Implementation Plan of March 2008. The study created an updated SATURN Model to demonstrate that the existing and proposed infrastructure would be adequate to cater for the phased Cherrywood Development.

3.1.17 The '*National Roads Traffic Management Study*' (NRA February 2011) proposes a range of measures, including traffic management and capacity enhancements, to preserve the strategic capacity of national roads for longer distance travel, particularly by goods and freight. This study has since been supplemented by the '*M50 Demand Management Study*' in 2014 the objectives of which at high level included;

- reduce demand on the M50, such that it operates without congestion for longer; and
- improve the safety and reliability of the M50 by reducing congestion.

3.1.18 An indicative package of measures are identified by the study which include;

- Fiscal Measures
- Intelligent Transport Systems/Traffic Control
- Travel Information
- Smarter Travel Measures

- Control

3.1.19 The phasing of development within the SDZ needs to respond to the additional impact generated and subsequent assessment of road networks performance at set intervals in conjunction with the TII / NTA. The NTA Transport Strategy proposes to evaluate the feasibility and potential benefits of measures to manage travel demand on roads in the Greater Dublin Area, including the implementation of ramp metering, variable speed limits or hard shoulder running on dual-carriageways or motorways, at times and places where congestion on these strategic roads is affecting journey time reliability and disrupting traffic flows. In the longer term, the NTA strategy suggest that it may be necessary to upgrade the M50 between Sandyford and Bray South, including an upgrade of Carrickmines interchange.

3.1.20 An integral component of the infrastructure strategy to support the SDZ includes proposals to upgrade Golf Lane to form a new link road which will cross the M50 and connect to Cherrywood SDZ. This road will comprise of one traffic lane, one bus lane as well as cycle lanes and footpaths in both directions. The existing Golf Lane roundabout will also be upgraded to a fully signalised junction as part of these works. The removal of the existing roundabout will also necessitate an upgrade to the existing 'left – in/left out' arrangement at the main entrance to the Park on Glenamuck Road as motorists arriving to the site from the M50 will no longer be able to perform a 'u – turn' at the upgraded junction.

3.1.21 The Greater Dublin Area Transport Strategy 2016-2035 proposes significant increases in the capacity and interconnectivity of the Luas Green Line including the following:

- Broombridge Luas from St. Stephens Green to Broombridge via Grangegorman providing a direct link from the Cherrywood Planning Scheme area through the City Centre to the north of the City;
- Increased passenger capacity on Green Line through extended trams;
- Extension of the Luas Green Line to North Bray;
- Extension of Metro North tunnel to the Luas Green Line, linking Cherrywood to the City Centre, Dublin Airport and Swords;
- Upgrade of Luas Green Line to Metro.

3.1.22 The NTA Transport Strategy states: *"A southbound extension of the Green Line from Brides Glen to the Bray area is proposed to improve public transport accessibility for this Designated Town. This will be subject to timing and scale of new development in this area, and appraisal, including economic assessment. A comparative analysis with a BRT alternative will be undertaken prior to final progression to Railway Order"*.

3.1.23 It was estimated that in 2030 only 14% of trips to employment in Cherrywood will come from centres to the north served by Luas. A further 13% will come from centres to the south assuming Luas / BRT is extended to Bray. This illustrates the need to extend the catchment served by Luas in order to achieve the target mode share of 25% Luas for work trips to Cherrywood. The phasing of development set out in Cherrywood Planning Scheme occurs in tandem with the improvement of public transport connections and services within the wider Metropolitan Area.

Kiltiernan Glenamuck Local Area Plan 2013

Overall Strategy

3.1.24 The Kiltiernan Glenamuck Local Area Plan 2013 sets out the policies and objectives for sustainable development within the LAP area. The LAP's key elements of the overall planning framework for the area include:

- The proposal to provide a bypass road of the Village core of Kiltiernan,
- The implementation of a Neighbourhood Framework Plan to consolidate the Village Core,
- The graduation of residential densities, from higher densities adjacent to the Luas line, to lower densities further from the main public transport artery,
- The implementation of a centrally-located major public open space/ school site.

Roads Proposals

3.1.25 The Kiltiernan / Glenamuck LAP 2013 (Figure 3.4) presents the road proposals within the plan area which are identified as the Glenamuck District Distributor Road (GDDR) and the Glenamuck Link Distributor Road (GLDR).

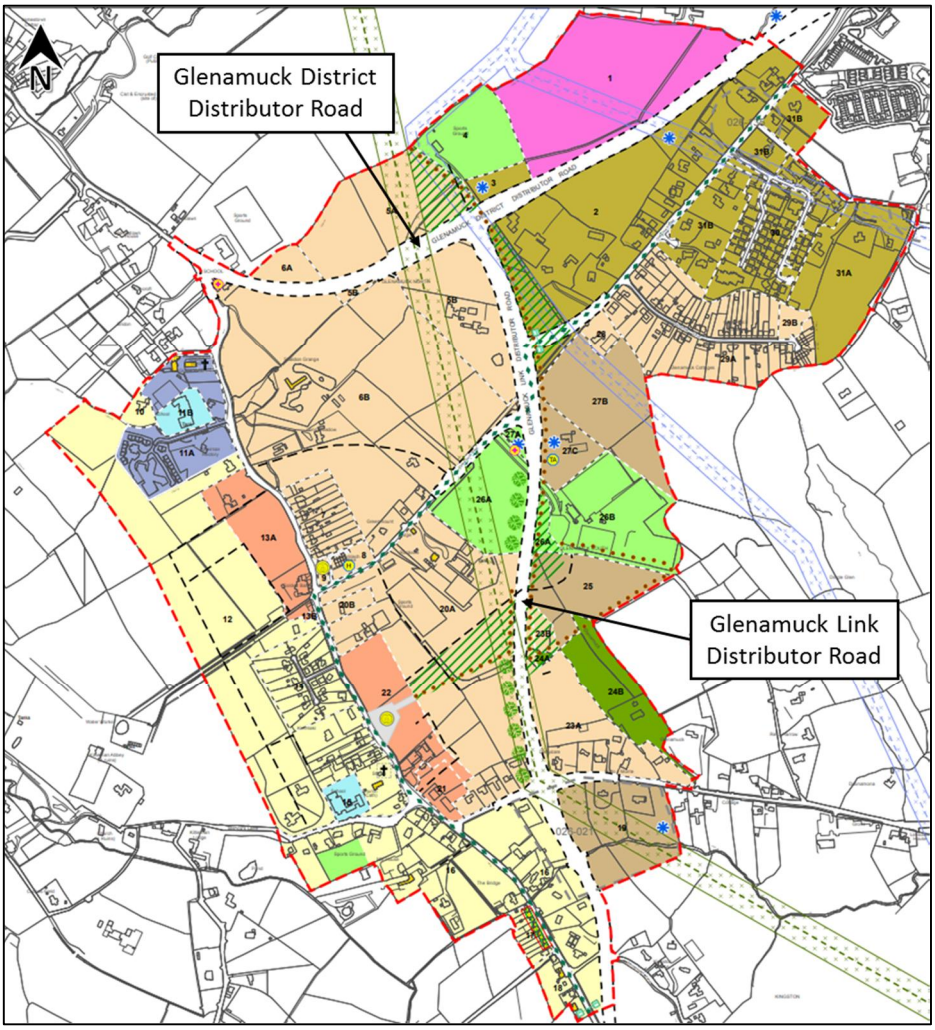


FIGURE 3.4: Kiltiernan Glenamuck Local Area Plan 2013

3.1.26 As part of the Kiltiernan / Glenamuck LAP 2013, a traffic modelling study was commissioned by DLRCC's transport planning section and carried out by RPS Consulting Engineers in order to ascertain as to whether the aforementioned road infrastructure proposals, which were originally proposed as part of the previous LAP, remain appropriate. The study consisted of an update of previous traffic modelling work carried out by the NTA which was used to demonstrate the level of transport infrastructure necessary if all lands within the LAP where developed.

3.1.27 The study assumed a 2022 design year and assumed that all LAP lands will be fully developed by that year. However, the study acknowledges that this is highly unlikely and that it may be decades before the entire LAP is developed.

3.1.28 The study recommends that a phased approach is taken with regard to the implementation of the road proposals and thereby proposes "Minimum Essential (Core) Roads Infrastructure" will *"need to be provided for lands to be developed*

in a sensible and sustainable manner". The proposed minimum essential (core) level of road infrastructure is proposed as follows;

a) *"GDDR (Glenamuck District Distributor Road - (primary link road)) - single carriageway from Enniskerry Road to Southern Roundabout at Carrickmines*
b) *GLDR (Glenamuck Link Distributor Road – (primary link road)) - single carriageway from Enniskerry Road to GDDR*
c) *Junction of GDDR and GLDR*
d) *Staggered junction between GLDR and the existing Glenamuck Road*
e) *Junction of GLDR and Ballycorus Road*
f) *Junction of Enniskerry Road and GDDR"*

Public Transport Proposals

3.1.29 A Bus priority network is proposed within Map No. T2 of the DLRCC Development Plan 2016-2022 as presented in Figure 3.5 below. The proposals include for a bus priority scheme along Glenamuck Road and continuing through to the R117 Enniskerry Road South of the Enniskerry Road / Glenamuck Road junction.

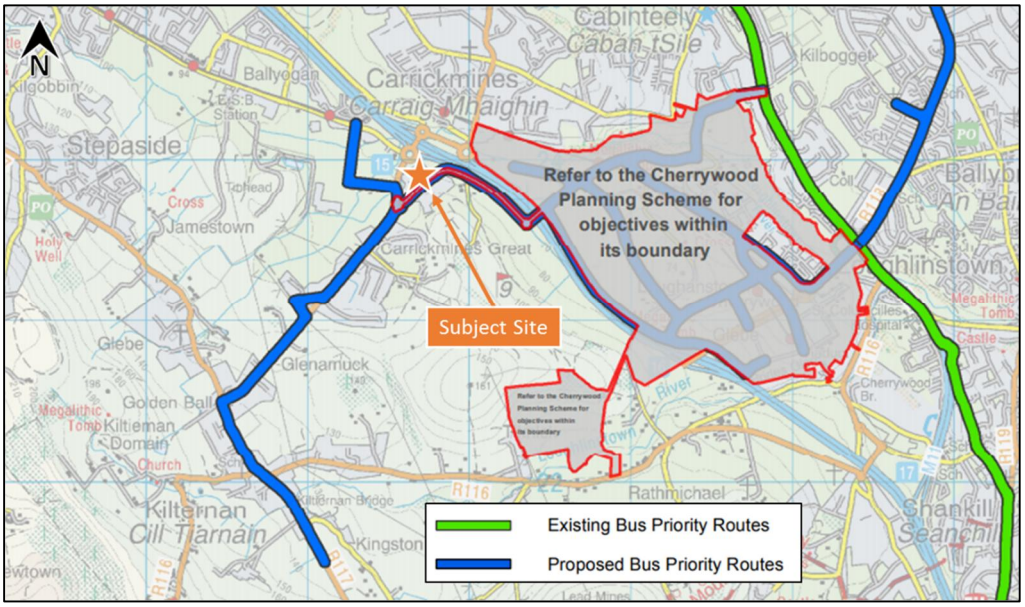


FIGURE 3.5: Proposed Bus Priority Network (Source: Extract from Map No. T2 DLRCC Development Plan 2016-2022)

3.2 INFRASTRUCTURE TIMELINE

3.2.1 The Kiltiernan/Glenamuck LAP 2013 presents the road proposals within the plan area which are identified as the Glenamuck District Distributor Road (GDDR) and

the Glenamuck Link Distributor (GLDR).

3.2.2 It is assumed that the Glenamuck District Distributor Road (GDDR) will not be complete by this appraisal's adopted 2023 Opening Year. However, it is assumed that the GDDR will be operational by the appraisal's Future Design years of 2028 and 2038. It is noted that consultants have recently been appointed by DLRCC to undertake the detailed design for the GDDR scheme.

3.2.3 Furthermore, it has been assumed that the planned upgrades to Golf Lane, including the new road bridge spanning the M50 corridor (as proposed as part of the Cherrywood SDZ) will not be constructed and open to traffic until 2038 or later.

FIGURE 3.6: Golf Lane Indicative Road Arrangement (Cherrywood SDZ)

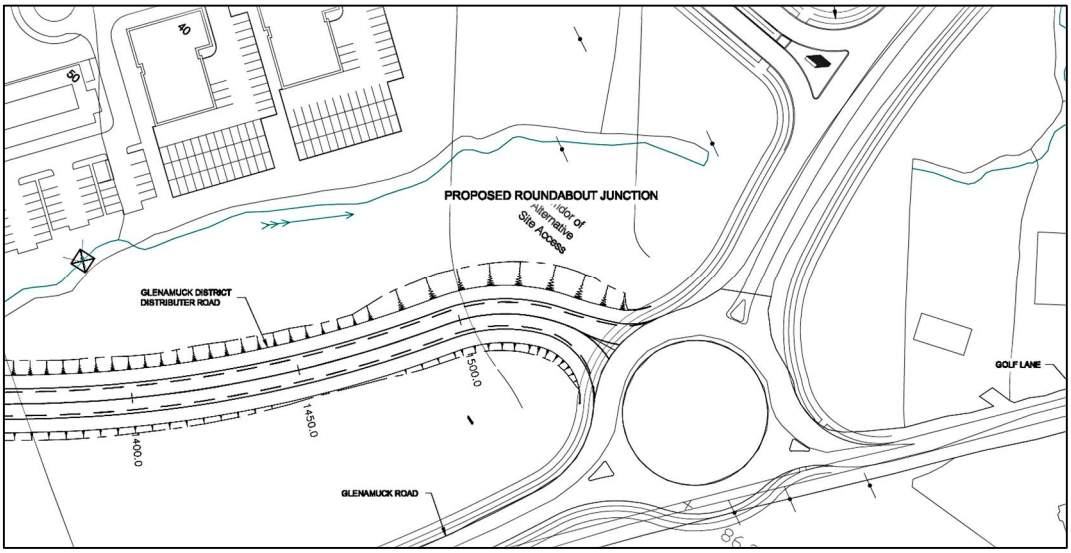


FIGURE 3.7: Kiltiernan/ Glenamuck Road Improvement Scheme – Golf Lane Roundabout Indicative Geometric Layout

3.3 DEVELOPMENT CONTROL

Car Parking Standards

3.3.1 In order to determine the appropriate quantum of vehicle parking for the proposed residential development, reference is made to the following:-

- Table 8.2.3 of the Dún Laoghaire Rathdown County Development Plan (2016-2022); and
- Chapter 4 of Sustainable Urban Housing: Design Standards for New Apartments Guidelines for Planning Authorities, as published by the Department of Housing, Planning and Local Government (DHPLG), March 2018. The site's location on the Golf Lane lands, can be classified as a 'Central and / or Accessible Urban Locations'. In relation to car parking, within 'Central and / or Accessible Urban Locations, the DHPLG document states:

  '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.'

3.3.2 With regard to the proposed development schedule, the associated car parking requirements are outlined in Table 3.1 below.

	Unit No.	Description	Standard		Requirement	
			DLRCC	DHPLG	DLRCC	DHPLG
Residential	214	1-bed	1 / unit	Minimise car parking	211	-
	229	2-bed	1.5 / unit		344	
	37	3-bed	2 / unit		74	
	2	Duplex	2 / unit		4	
Creche	15 staff		1 / staff	-	15	-
Gym	340		1 / 20m^2	-	17	-
Retail	154		1 / 50m^2	-	3	-
Total					668	-

Note: Residential Parking are generally regarded as 'standard' parking provision.

TABLE 3.1: Car Parking Standards

3.3.3 In response to the above local development management requirements the scheme is required to provide 668 car parking spaces within the proposed development.

Disabled Car Parking

3.3.4 The development management standards state that *"For both residential and non-residential car parking, 4% of car parking spaces provided shall be suitable for use by disabled persons".*

Motorcycle Parking

3.3.5 Motorcycle parking spaces are to be provided at a minimum rate of 4 spaces per 100 car parking spaces.

Electric Vehicle Parking

3.3.6 Residential developments are required to provide a minimum of 1 no. electric vehicle parking space per 10 residential units. Accordingly, electric vehicle car parking spaces will be provided at a rate of 1 per 10 apartments which equates to 48 no. electric vehicle parking spaces.

Cycle Parking Standards

3.3.7 Reference has been made to the DLRCC cycle parking publication "Standards for Cycle Parking and associated Cycle Facilities for New Developments (January 2018)" and Section 4.17 of the Department of Housing, planning and Local Government (DHPLG) "Sustainable Urban Housing: Design Standards for New Apartments".

Land Use	DLRCC Standards		DHPLG Standards		No. of Units / Size	DLRCC Requirement		DHPLG Requirements	
	Long Stay	Short Stay	Long Stay	Short Stay		Long Stay	Short Stay	Long Stay	Short Stay
Residential	1 / unit	1 / 5 units	1 / bed	1/2 apts	1 bed - 214	214	43	214	107
					2 bed - 229	229	46	458	115
					3 bed - 37	37	7	111	19
					Duplex - 2	2	1	6	1
Crèche	1 / 5 staff	1 / 10 children	-	-	15 staff / 100 children	3	10	As DLRCC	
Gym / Café	1 / 5 staff	1 / 100m²	-	-	340 / 5 staff	1	6	As DLRCC	
Retail	1 / 5 staff	1 / 100m²	-	-	154 / 3 staff	1	2	As DLRCC	
Total						487	115	794	260
						602		1054	

Table 3.2: Cycle Parking Standards

3.3.8 In response to the local Development Plan requirements the scheme is required to provide at least 602 on-site cycle parking spaces comprising at minimum 487 long

stay and 115 short stay bicycle parking spaces as part of the proposed residential development. With reference to the DHPLG requirements, the subject scheme is required to provide 1054 residential cycle parking spaces comprising 794 long stay spaces and 260 short stay spaces.

4.0 CHARACTERISTICS OF PROPOSALS

4.1 PREVIOUS PLANNING APPLICATION

Planning Ref: D08A-0590

4.1.1 Planning permission was previously granted for a residential development on the subject lands in December 2008 by Dún Laoghaire Rathdown County Council. The proposals comprised of the following:

- 90 no. dwellings,
- A two-storey crèche,
- A basement level health spa; and
- Basement accommodating 132 car parking spaces, 90 bicycle parking spaces.

4.1.2 The application is Phase 2 of previously approved planning ref. D06A-1157.

4.1.3 In June 2009, An Bord Pleanala subsequently refused permission following a third-party appeal for this Phase 2 scheme on the grounds of noise.

Planning Ref: D06A-1157

4.1.4 Permission was granted by Dún Laoghaire Rathdown County Council in December 2008 for the construction of 4 no. houses, 121 no. apartments (three blocks over basement) and 190 car parking spaces (31 no. at surface level and 159 no. at basement level).

Planning Ref: ABP-30233618

4.1.5 The recent SHD application on the subject site for 250 no. apartments was refused planning permission in November 2018.

4.2 CURRENT APPLICATION PROPOSALS

4.2.1 The proposed development comprises a residential development of 482 no. residential units (all apartments), along with ancillary residential amenities, and provision of a childcare facility, gym, and local shop set out over 7 no. blocks.

4.2.2 The proposed residential units comprise;

- 31 no. studio apartments,
- 183 no. 1-bed apartments,

- 229 no. 2-bed apartments,
- 39 no. 3-bed apartments (including 2 no. duplex units).

4.2.3 Two basement levels are proposed, providing car parking spaces (299 no.), bin stores, plant rooms, bicycle parking (1000 no. spaces), and circulation areas. A further 240 no. bicycle parking spaces are provided at ground level.

4.2.4 The proposed development includes landscaping, boundary treatments, public, private and communal open space, two cycle / pedestrian crossings over the stream at the western side of the site, along with a new pedestrian and cycle crossing of Glenamuck Road South at the west of the site, cycle and pedestrian facilities, play facilities, and lighting. The proposed buildings include the provision of private open space in the form of balconies and winter gardens to all elevations of the proposed buildings.

4.2.5 The development also includes vehicular, pedestrian, and cycle accesses, drop off areas, boundary treatments, services, and all associated ancillary and site development works.

FIGURE 4.1: Proposed Site Layout

4.2.6 Further details of the above proposals in regard to the proposed residential development are illustrated in Henry J Lyons Architects scheme drawings as submitted with this planning application.

4.3 SITE ACCESS ARRANGEMENTS

Vehicular Access

4.3.1 The subject site will benefit from a single vehicle access which will be provided on Golf Lane as shown in Figure 4.2 below. It will be located approximately 255m northwest of the Glenamuck Road Roundabout.

4.3.1 The majority of vehicles entering the site (i.e. residents) will be directed down a short ramp and into the basement car park. Other vehicles (such as deliveries, set down, visitors) will be accommodated at 'podium'/ ground level near Blocks B and D pedestrian access points. A turning facility is proposed at podium level allowing for drop off / collection purposes.

4.3.2 The overall development site has been set back to accommodate the future implementation of the DLRCC proposed Golf Lane M50 Overpass to Cherrywood SDZ. The proposed set back and Golf Lane upgrade corridor is presented in Figure 4.2 below.

Pedestrian & Cyclist Accessibility

4.3.3 In addition to the subject site's main access (as located on Golf Lane) which accommodates access to the subject development site by all modes as indicated in Figure 4.2 below, pedestrians/cyclists will be provided with additional convenient dedicated access/egress locations along Glenamuck Road South and Golf Lane.

4.3.4 Dedicated cycle access ramps are proposed between surface level and upper basement level located adjacent to the vehicular access and another located south of the tower accessed off the proposed cycle / ped facility operating along the northern and north eastern site boundary. In addition, pedestrians may also access podium level via an adjacent parallel dedicated pedestrian link from as presented in Figure 4.2 below.

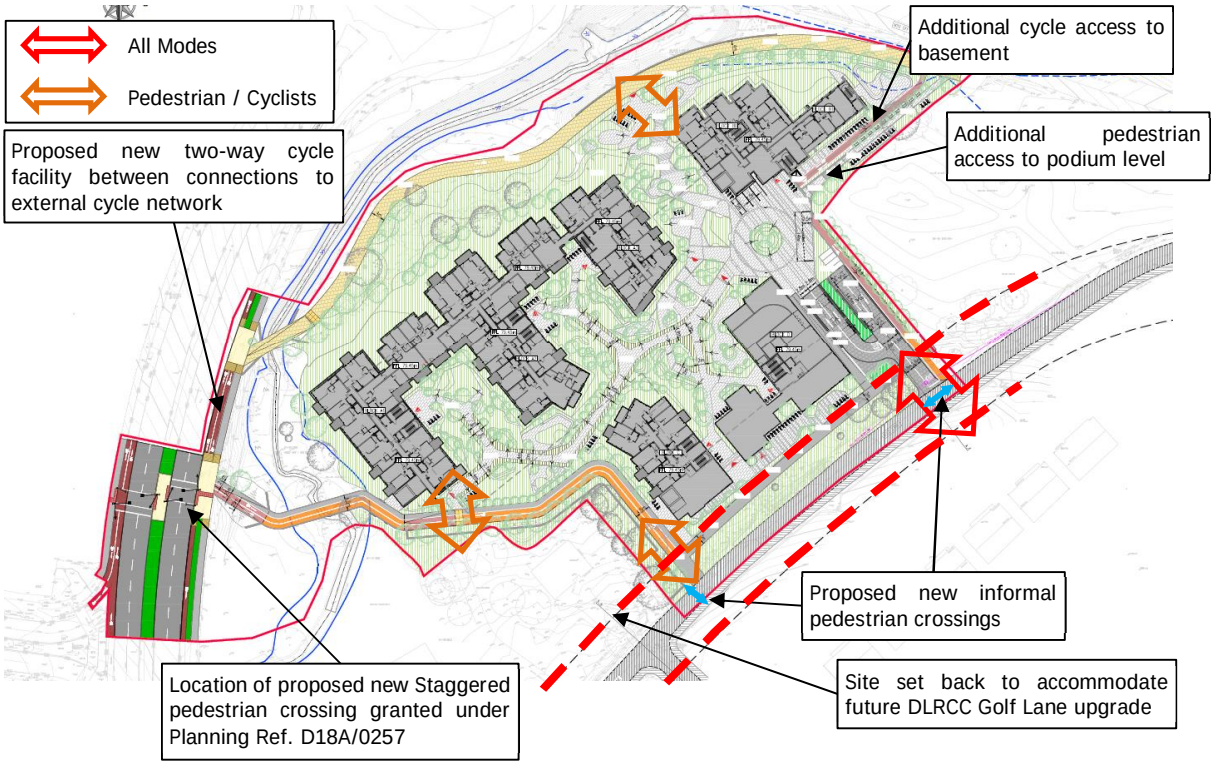


FIGURE 4.2: Proposed Site Accessibility

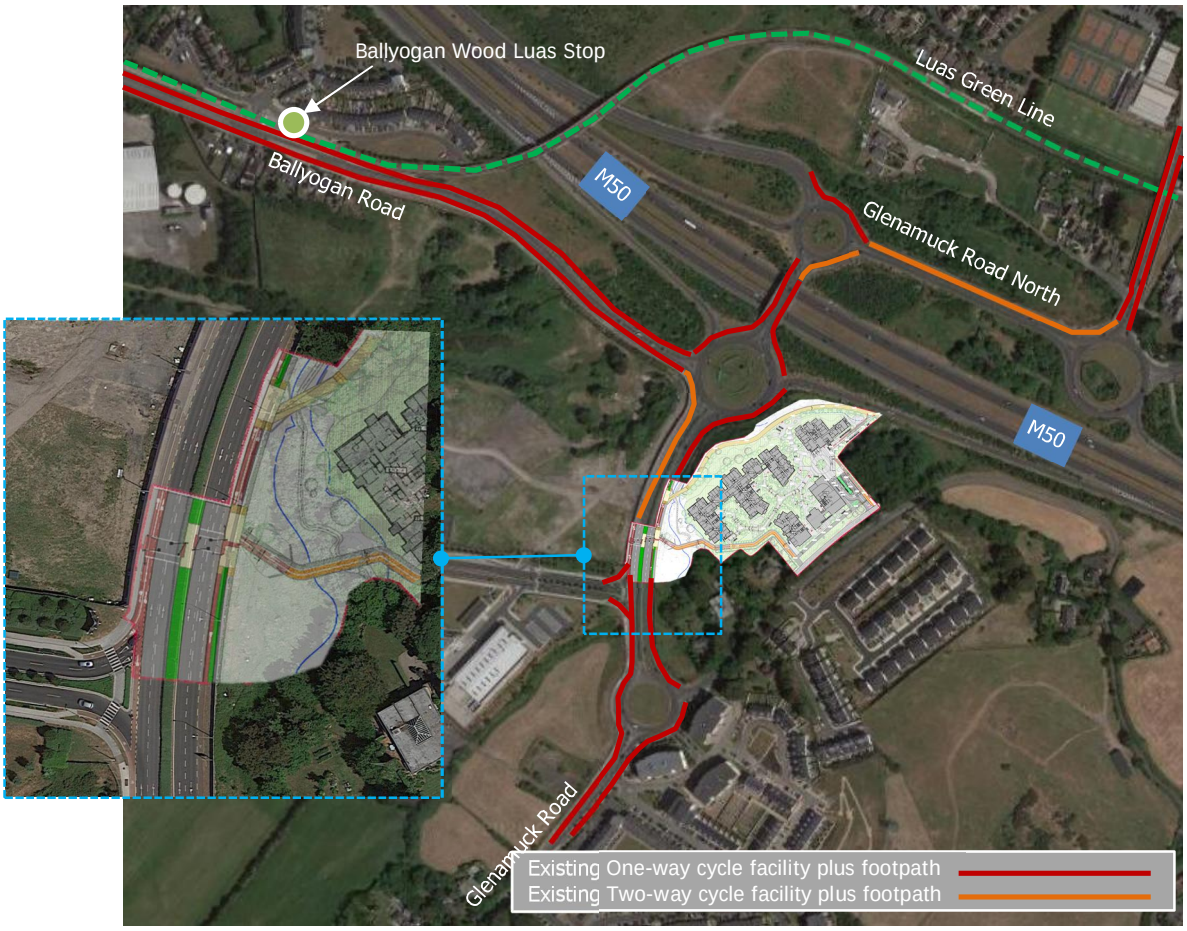


FIGURE 4.3: Pedestrian / Cycle Connectivity

4.3.5 As introduced in Section 2.5.3 of this TTA, the BELAP proposes a new pedestrian link between Glenamuck Road South and Golf Lane. Accordingly, the subject scheme proposals incorporate a new dedicated cycle / pedestrian link between Glenamuck Road South and Golf Lane via the southwestern boundary of the subject site. This new non-vehicular link connects with Golf Lane in the vicinity of the proposed new pedestrian crossing on Glenamuck Road South granted as part of Planning Ref. D18A/0257. The proposed new footpath within the subject site boundary has been set back from the existing Golf Lane corridor so that it can be retained as the footpath along the future Golf Lane upgraded layout.

4.3.6 This new cycle / pedestrian facility will enhance accessibility to The Park retail development as well as the neighbouring LUAS interchange on Ballyogan Road and bus stops on Glenamuck Road and at The Park.

On Site Car Parking

4.3.7 The subject scheme proposals include for a total of 303 no. car parking spaces comprising 202 at upper basement level, 97 at lower basement level and 4 no. at surface level (inclusive of set down / loading bay). Of the 303 on-site car parking spaces, 10 no. have been assigned to the Creche / amenity / café / retail land uses. The surface level car parking spaces comprise 3 no. visitor car parking spaces an 1 no. set down / loading bay. Of the 299 basement car parking spaces, a total of 289 no. spaces are dedicated to the residential units whilst the remaining 10 no. basement car parking spaces are for the non-residential uses.

4.3.8 This residential car parking provision is lower than the development plan requirement (633 spaces) and equates to a ratio of 0.6 spaces per apartment unit. Nevertheless, due to i) the site's close proximity to the frequent Luas services and bus stops, ii) the high level of cycle parking provision proposed and iii) the policy of the DHPLG for new developments at such locations is for car parking provision to be *'minimised, substantially reduced or wholly eliminated in certain circumstances'*, it is concluded that the opportunity exists for a reduced quantum of dedicated residential car parking spaces to be provided for a development on the subject site.

4.3.9 The non-residential on-site land uses (creche, gym / café, residential amenity) will predominantly cater for the subject residential development and therefore are not expected to generate a significant number of vehicular trips. Accordingly, as

introduced previously, a total of 10 no. car parking spaces have been allocated to non-residential land uses to facilitate staff associated with these land uses travelling to the site by car. For childcare services, Table 8.2.4 of the development plan requires the provision of a maximum of 1 car parking space per staff member (includes set down spaces). Accordingly, assuming a total of 15 no. crèche staff, a maximum of 15 no. crèche car parking spaces are required as part of the subject scheme proposals. It is noted that the crèche car parking requirement is inclusive of set down spaces.

4.3.10 Accordingly, the opportunity exists for a reduced provision of crèche dedicated car parking spaces as the subject facility is expected to predominantly serve the subject residential apartments. Therefore, the vast majority of trips to the proposed crèche facility are expected to comprise walking trips to / from the proposed residential apartments. The subject scheme proposes 6 no. dedicated crèche car parking spaces. The remaining 4 no. non-residential car parking spaces have been assigned for staff at the retail, gym / café, and amenity units. A summary of the car parking allocation is summarised in Table 4.1 below.

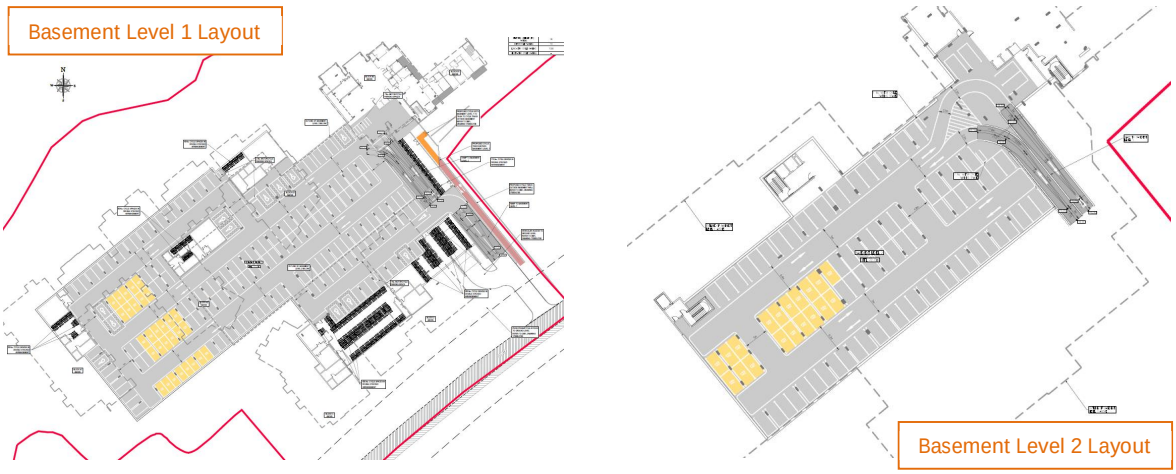


FIGURE 4.4: Basement Level Car Parking

Car Share

4.3.11 The subject scheme proposes the provision of 7 no. car share spaces located at basement level (included within the 289 no. residential car parking spaces introduced above). Research has shown that 1 car share vehicle can replace up to 15 private cars (Source: *Transit Co-operative Research Programme – Report 108 'Car Sharing: Where and How it Succeeds'*).

Disabled Car Parking Provision

4.3.12 The development plan requires the provision of disabled car parking spaces at a rate of 4% of car parking provision. Accordingly, a total of 12 no. disabled car parking spaces are required as part of the subject proposals. The subject scheme proposes 12 no. disabled car parking spaces located within the upper basement level and is therefore compliant with the development plan requirement.

Electric Vehicle Parking Provision

4.3.13 The development plan requires the provision of parking spaces capable of accommodating electric vehicles at a rate of 1 car parking space per 10 residential units. Accordingly, a total of 49 no. electric vehicle compatible parking spaces are proposed as part of the subject scheme (i.e. 10% of apartments). Additionally, the remaining apartment car parking spaces can, in the future, incorporate electric charging points should the demand arise.

Motorcycle Parking Provision

4.3.14 The subject scheme proposals accommodate 12 no. motorcycle spaces which is compliant with the development plan standard which requires 4 no. motorcycle spaces per 100 car parking spaces.

Land Use	Standard	Disabled	Car Share	Electric	Setdown/Visitor at Surface	Motorcycle
Residential	222	11	7	49	4	12
Crèche	5	1	-	-		
Non-residential	4	-	-	-		
Sub-Total	231	12	7	49	4	12
Total	**299**					

Table 4.1: Car / Motorcycle Parking Provision

Bicycle Parking

4.3.15 The subject development proposals include for a total of 1240 bicycle parking spaces comprising 240 short term bicycle spaces located at podium level and 1000 long term bicycle spaces within the upper basement level. Figure 4.5 and Figure 4.6 below presents the proposed bicycle parking provision located and podium and basement levels respectively.

4.3.16 This level of overall cycle parking provision (1240) is more than double the DLRCC requirements (602) and exceeds the DHPLG requirement (1054).

Land Use	DLRCC		DHPLG		Proposed	
	Long Stay	Short Stay	Long Stay	Short Stay	Long Stay	Short Stay
Residential	482	97	787	242	970	222
Crèche	3	10	As DLRCC		10	10
Gym / Café	1	6	As DLRCC		10	6
Retail	1	2	As DLRCC		10	2
Subtotal	487	115	794	260	1000	240
Total	602		1054		1240	

Table 4.2: Bicycle Parking Provision

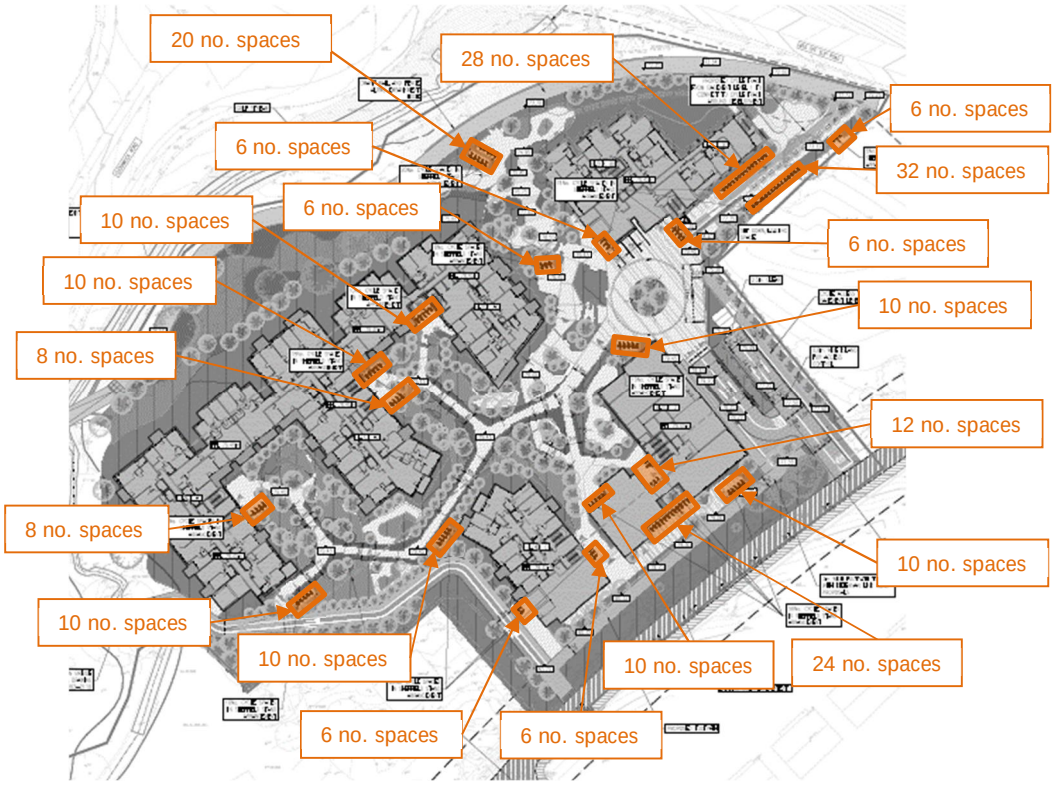


FIGURE 4.5: Bicycle Parking Spaces at Podium Level

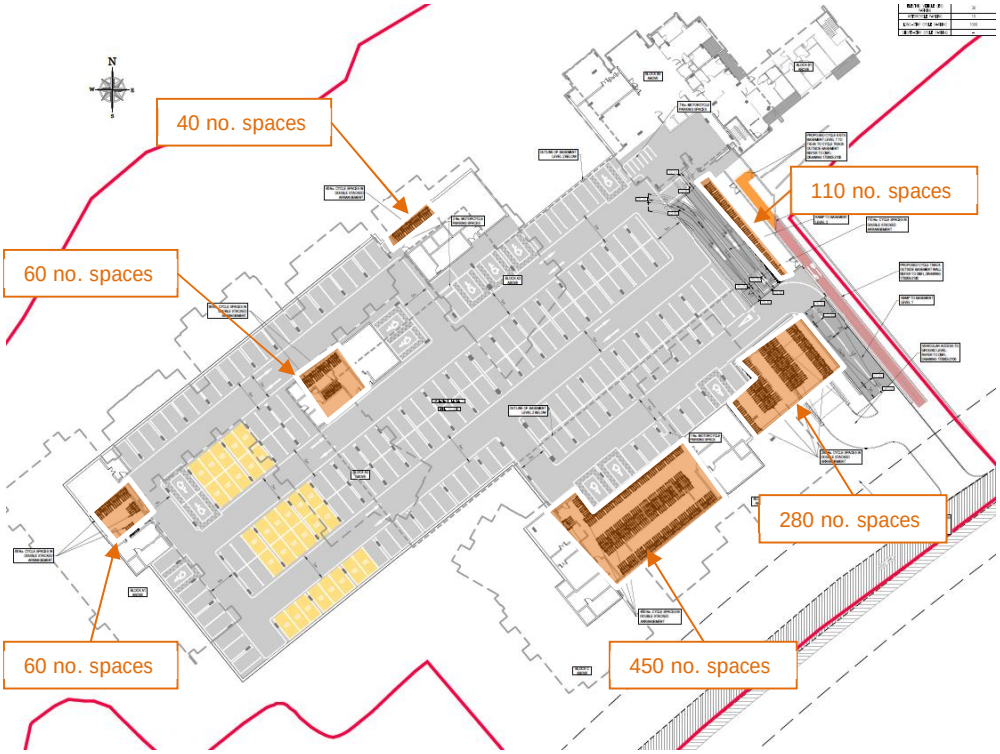


FIGURE 4.6: Bicycle Parking Spaces at Upper Basement Level

5.0 CAR PARKING ANALYSIS

5.1 OVERVIEW

5.1.1 In order to estimate the potential car parking demand at the subject development, 3 no. car parking assessments have been undertaken, including;

a) DBFL car parking demand surveys at apartment developments within Dún Laoghaire - Rathdown County Council and other local areas with similar public transport accessibility levels;
b) Assessment of the DLRCC Development Plan Standards and the DHPLG Guidelines; and
c) Review of the 'Car Availability' and 'Car Use' within the 2016 Census results for apartment developments with similar characteristics to the subject development.

5.1.2 A review of recently approved residential apartment developments located in key transport corridors has also been detailed to highlight the reduced car parking ratios proposed within those developments.

5.2 INITIATIVES FOR SUSTAINABLE TRAVEL

5.2.1 The following sustainable initiatives set out below provide excellent alternative travel opportunities and management within residential developments that propose reduced car parking:

- Parking Management Strategy
- Mobility Management Plan
- Car Share Facility
- Cycling Parking

Parking Management Strategy

5.2.2 A Parking Management Strategy will be incorporated into the development in order to manage the daily operations within the car park. The Parking Management Strategy will be founded on the principle that no residential unit will be allocated a parking space as part of the purchasing agreement for the property. Aside from the 10 no. non-residential car spaces, the remaining 282 no. spaces (excluding the 7 no. car share spaces) will be available for tenants to rent on a need's basis.

5.2.3 The rental cost associated with the parking spaces should be set at such a rate so as to discourage the use of the private vehicle unless necessary and to encourage the uptake of more sustainable modes such as walking, cycling and public transport for which there are good opportunities surrounding the development site, including the LUAS green line. The parking spaces should be allocated on a 'first come, first served' basis in terms of paying the prescribed fee. Access to the car park should be strictly controlled by a combination of barriers and shutters, with entry being facilitated by a code.

Mobility Management Plan

5.2.4 An outline Mobility Management Plan has been prepared for the proposed Golf Lane residential development to inform residents of the sustainable transport modes available at the subject site as well as the introduction of incentives to promote and facilitate the use of these alternative modes.

Car Share Facility

5.2.5 In addition to the car parking provision for the proposed development, 7 no. spaces will be allocated for car sharing clubs. These clubs offer members access to a vehicle without ownership.

5.2.6 GoCar is Ireland's leading car sharing service with 40,000 members and over 600 cars and vans across 18 counties in Ireland. As introduced previously, each GoCar or car share vehicle which is placed in a community has the potential to replace the journeys of up to 15 private cars. Accordingly, it could be argued that the provision of 7 dedicated on-site car share vehicles within the scheme's car park facility for the use of residents has the potential to negate the need for 105 private car parking spaces.

5.2.7 The building management company will engage a car share operator, such as GoCar, to manage the spaces. All residents will have the option to become members of the car share service. On becoming members, residents can then book cars online or via the app for as little as an hour, then unlock the car with their phone. The keys are in the car, with fuel, insurance and city parking all included. The benefits of such car sharing services include;

- The reduction of the number of cars on the road and therefore traffic congestion, noise and air pollution;
- Minimising the demand for car parking and freeing up land traditionally used

for private parking spaces;

- Increasing use of public transport, walking and cycling as the need for car ownership is reduced;
- Car sharing allows those who cannot afford a car the opportunity to drive, encouraging social inclusivity.

Cycle Parking

5.2.8 Provision of adequate, high quality cycle parking facilities will be provided within the development. A total of 1240 bicycle parking spaces have been proposed, these provide for both long term and short term parking. Provision of good cycle parking will be a key component for travel within the development considering the reduction of car parking facilities.

5.3 DBFL CAR PARKING DEMAND SURVEYS

5.3.1 DBFL have undertaken a number of parking surveys at existing apartment developments located in close proximity to high quality public transport services in order to determine the appropriate requirement for car parking at residential developments such as the subject scheme.

5.3.2 Table 5.1 below provides a summary of these car parking surveys and the corresponding equivalent rate of parking recorded at each development. The surveys were undertaken at night time (between 2300 and 2400) on a weeknight to ensure that the recorded car parking demand was near or at its potential maximum demand i.e. all residents present.

Apartment Scheme Name and Location	No. of Units (Apartments)	Car Parking Available (Spaces)	Recorded Demand (DBFL Surveys)	Ratio (Space/Unit)
The Grange (Emerald Block) (Brewery Road, Galloping Green)	54	67	35	0.65
Hazel Brook Apartments (Kilmacud Road Upper, Dublin 14)	54	66	46	0.85
Shanagarry Apartments (Milltown Road, Dublin 14)	111	118	93	0.83
New Bancroft Apartments (Greenhills Road, Dublin 24)	153	160	70	0.46
			Average Ratio	0.698

Table 5.1: Residential Apartments Car Parking Demand (Occupied) Surveys

5.3.3 In the survey results shown in Table 5.1 above, the Grange in Galloping Green shows a car parking demand to apartment unit ratio of 0.65. It is also noted that New Bancroft Apartments shows a relatively low car parking demand to residential unit ratio of 0.46.

5.3.4 The analysis above reveals that at similar apartment development locations throughout Dublin, car parking demand is proven to be below, and in some cases significantly lower, than development plan car parking requirements.

5.3.5 It is noted that the DBFL surveyed sites represent examples of underutilized car parking provision even where additional car parking capacity exists, which can in some instances encourage dependence on and ownership of private vehicles. However, the proposed development's reduced car parking provision will not only limit the quantum of potential vehicular trips that the proposals could generate but also encourage increased uptake of sustainable modes of travel by future occupants of the development.

5.4 CAR PARKING PRECEDENT

5.4.1 Recently, a number of developments located in key transport corridors have been successfully granted planning permission with substantially reduced car parking ratios being proposed, these include the following developments:

- *Belgard Gardens, Tallaght* (ABP-303306-19) – 438 no. apartment units proposed with 0.24 car parking spaces per unit.
- *Davitt Road, Inchicore* (ABP-303435-19) – 265 no. units proposed with 0.44 car parking spaces per unit.
- *Swiss Cottage, Santry* (ABP-302605-18) – 112 no. units proposed with 0.30 car parking spaces per unit.

5.4.2 The high quality public transport offerings and ample provision of cycle parking spaces at the above sites resulted in a feasible, appropriate and sustainable quantum of car parking being offered to future occupants.

5.4.3 It is an objective for this development to reduce the need for commuters to travel by car and instead to avail of more sustainable modes of travel in line with current and future travel requirements as set out in recent national and local policy documents within Ireland.

6.0 NETWORK CONDITIONS & TRIP GENERATION

6.1 TRAFFIC SURVEYS

6.1.1 In order to establish up to date local road networks traffic characteristics and subsequently enable the identification of the potential impact of the proposed residential development upon the local road network, traffic surveys were undertaken by an independent specialist firm IDASO (Innovative Data Solutions).

6.1.2 With the objective of quantifying the existing traffic movements across the local road network, vehicle turning counts were undertaken at five local junctions. Weekday traffic counts (classified) were conducted by IDASO over a 12-hour survey period from 07:00 to 19:00 at the following junctions:

- Junction 1: Golf Lane / Blackberry Hill residential development junction;
- Junction 2: Glenamuck Road South / Golf Lane junction;
- Junction 3: Glenamuck Road South / Ballyogan Road / Glenamuck Road North junction;
- Junction 4: Glenamuck Road North / Ballyogan Grove / M50 slip road junction; and
- Junction 5: Glenamuck Road North / Carrickmines P&R junction.

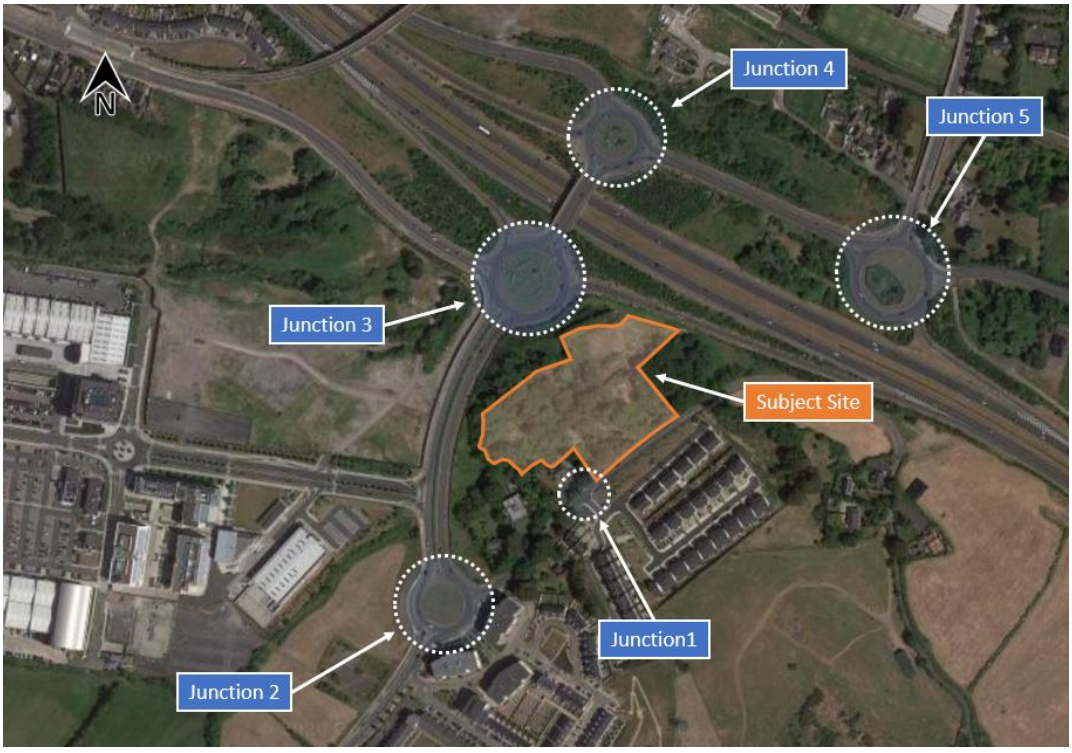


FIGURE 6.1: Junctions Included Within the Traffic Model

6.1.3 The analysis of the survey results established that the local weekday AM and PM peak hours occur between 08:15 - 09:15 and 17:15 - 18:15 respectively.

6.1.4 In order to analyse and assess the impact of the potential future development on the subject site lands upon the local road network, a traffic model incorporating these five local junctions has been created by DBFL.

6.1.5 The recorded peak hour traffic flows at the above junctions is presented in Figure 1 as included within Appendix A.

6.2 TRIP GENERATION

Proposed Development

6.2.1 With the objective of investigating the actual demand that could potentially be generated at the proposed residential development, the following Donor site exercise has been undertaken to identify, survey and analysis existing developments, which exhibit similar land use (residential apartments) and operational characteristics to that being proposed as part of the subject proposals;

Proposed Development Residential Trip Rates

6.2.2 Following an analysis of existing residential developments which are located in close proximity to both the Luas Green Line and a range of retail / leisure facilities; the following three sites have been adopted by DBFL as representing appropriate 'donor' sites in terms of trip generation and public transport accessibility (e.g. LUAS) characteristics. As such the three selected sites are as follows (Figure 6.2):

a) Shanagarry Residential Development, Milltown Road, Dublin 6;
b) Elmfield Residential Development, Ballyogan Road, Leopardstown, Dublin 18; and
c) Tully Vale Residential Development, Cherrywood, Dublin 18

6.2.3 The trip rates presented in Table 6.1 below represents the corresponding 'average' trip rates calculated from the three adopted donor sites during the local road networks AM and PM peak hour periods.

FIGURE 6.2: Donor Sites Locations

AM Peak Hour			PM Peak Hour		
Arr	Dep	2-way	Arr	Dep	2-way
0.051	0.223	0.275	0.159	0.060	0.220

TABLE 6.1: Peak Hour Average Apartments Unit Vehicle Trip Rate

6.2.4 Based on the above trip rates, the potential peak hour traffic generation is calculated based on 482 apartments. Table 6.2 summarises the predicted peak hour AM and PM traffic generated by the proposed development.

Units	AM Peak Hour			PM Peak Hour		
	Arr	Dep	2-way	Arr	Dep	2-way
482	25	107	132	77	29	106

TABLE 6.2: Proposed Residential Development - Vehicle Generation

6.2.5 The proposed community focused childcare facility will predominantly generate residents 'walk in' trips (and a small number of staff trips) and therefore has not been included as part of the trip generation assessment. Similarly, the gym / retail element of the development has not been included in the trip generation exercise as this facility will cater for residents use only.

6.3 COMMITTED DEVELOPMENT

6.3.1 The following third party committed developments (granted planning permission but not yet constructed or partially constructed) are located within the area of influence of the subject site and will have to be considered as part of the assessment of the development proposals.

- Site 1 (Carrickmines Green Site D16A/0483): Planning permission granted for modifications to the residential development under Planning Ref. D11A/0312, D12A/0262 and D14A/0338 in October 2016 by Dún Laoghaire Rathdown County Council. The development will consist of the construction of a block of 3 no. 3-storey terraced houses in lieu of 5 units which were omitted under condition 5 of Planning Ref. D11A/0312. The parent planning permission reference is D04A/0327 which was for 227 residential units.
- Site 2 (The Park, Carrickmines Site): The Park, Carrickmines has been subject to 3 significant planning applications. Phase 1 comprised mainly of retail warehousing and office accommodation (Planning Ref. D02A/0558) and related to the southwest and southeast quadrants. Phase 2 comprised of retail warehousing, comparison retailing office and hotel accommodation (Planning Ref. D03A/1239) and related to the northwest and northeast quadrants. Permission was granted in April 2008 (Planning Ref. D07A/0936) for amendments to previously permitted development Reg. Ref. D03A/1239). A planning application on the site (Planning Ref. D12A/0163) was refused planning permission in June 2012 by the Planning Authority for a mixed-use District Centre development with a GFA of 58,863m^2.
- Site 3A (Clay Farm Phase 1 - D15A/0247): Phase 1 of the Clay Farm masterplan lands (a two-phase development) was granted a seven-year planning permission (Planning Ref: D15A/0247) for 425 residential units by Dún Laoghaire Rathdown County Council on 19th April 2016.
- Site 3B (Clay Farm Phase 1C - ABP30428819): The application site relates to the westernmost part of Phase 1C of the permitted Phase 1 Clay Farm development (ABP Ref: PL06D.246601 / DLRCC Reg. Ref.: D15A/0247). The proposed development relates to the provision of 192 no. apartments in two no. blocks and was granted planning permission by ABP in July 2019.

- Site 3C (Clay Farm Phase 2 - ABP30152218): Application to An Bord Pleanála for a ten year permission for a strategic housing development consisting of 927 no. residential units, a neighbourhood centre containing a childcare facility with a GFA of c. 604 sqm and 2 no. retail units each and was granted planning permission by ABP in August 2018.
- Site 4 (Aged Care Facility D16A/0452): Permission was granted in August 2016 by Dún Laoghaire Rathdown County Council for the construction of a part four storey, part five storey Aged Care Facility to accommodate 224 no. bedrooms and ancillary resident and staff facilities, with a GFA of 12,580m^2 over a single level basement with a GFA of 2,020 m^2.

6.3.2 The locations of the committed developments that are of relevance to the subject site are illustrated in Figure 6.3 below.

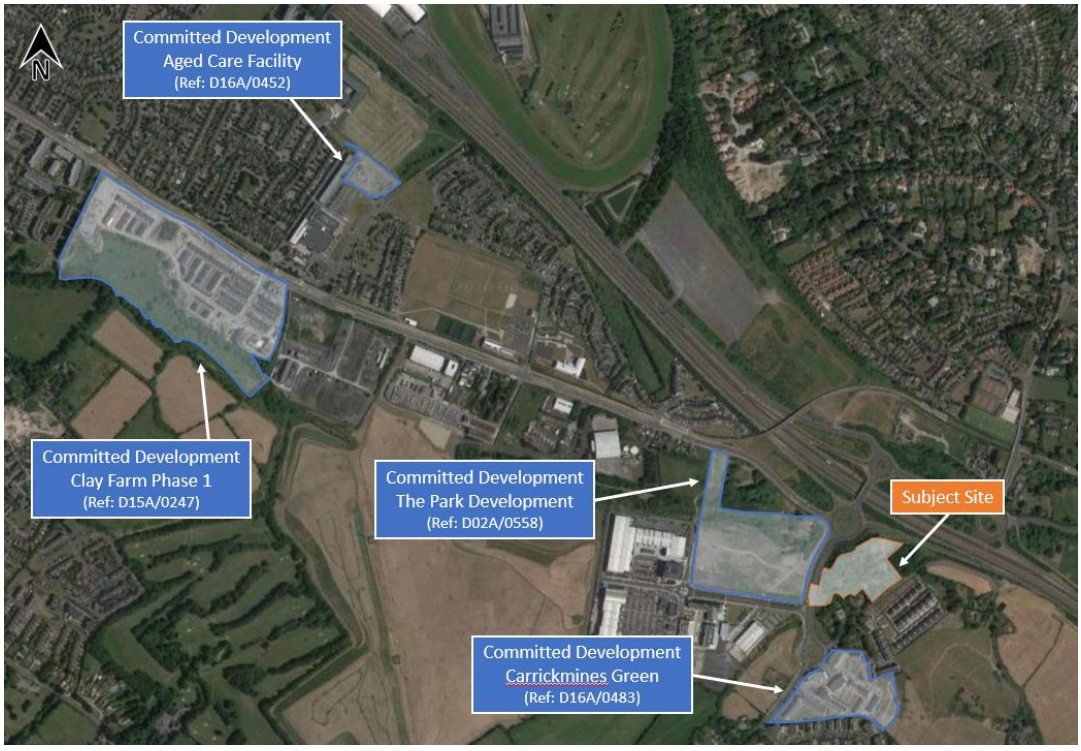


FIGURE 6.3: Location of Committed Developments

Committed Development Trip Generation

6.3.3 In order to establish the potential quantum of traffic generated by the four no. third party developments trip, the Dún Laoghaire Rathdown County Council's online planning system has been referenced and each third-party scheme's corresponding Traffic & Transport Assessment report was obtained and reviewed.

The vehicle trips derived from this exercise have been incorporated as committed developments within the Excel based network traffic assignment model developed by DBFL for the subject development proposals.

Committed Development Trip Distribution

6.3.4 The potential of committed development traffic generated has been distributed as per that approved under each individual development planning application. It has been assumed that the Glenamuck District Distributor Road will not be in place before the adopted 2023 Opening Year 2023 but will be in the subsequent adopted 2028 & 2038 Future Design Years. Accordingly, the committed development trips have been redistributed in the 2028 and 2038 Future Design Year scenarios to reflect the new routing options that are made available following the implementation of this proposed infrastructure proposal.

6.4 FUTURE TRAFFIC GROWTH

6.4.1 The TTA adopts an Opening Design Year of 2023. In accordance with TII Guidance, Future Design years (+5 and +15 years) of 2028 and 2038 have therefore been adopted.

6.4.2 Although traffic growth may not increase at the rates once predicted, to ensure a robust analysis of the impact of traffic upon the local road network we have adopted growth rates using the Transport Infrastructure Ireland (TII) traffic projections. Table 6.1 (Unit 5.3 – Travel Demand Projections) within the TII Project Appraisal Guidelines provides Annual Growth Factors for the different regions within Ireland. The subject site lies within the 'Dublin' metropolitan area with the growth factors as outlined within Table 6.3 below.

Low Sensitivity Growth				Central Growth				High Sensitivity Growth			
2016-2030		2030-2040		2016-2030		2030-2040		2016-2030		2030-2040	
LV	HV	LV	HV	LV	HV	LV	HV	LV	HV	LV	HV
1.0146	1.0280	1.0034	1.0116	1.0162	1.0295	1.0051	1.0136	1.0191	1.0328	1.0087	1.0172

TABLE 6.3: National Traffic Growth Forecasts: Annual Growth Factors (Source: Extract from Table 6.1 PAG)

6.4.3 Applying the annual factors as outlined in Table 6.3 above for the adopted Opening Year of 2023 and Future Horizon Years of 2028 (Opening Year +5 years)

and 2038 (Opening Year +15 years), the following growth rates have been adopted to establish corresponding 2023, 2028 and 2038 baseline network flows.

- 2017 to 2023 – 1.1012 (or 10.12%);
- 2017 to 2028 – 1.1933 (or 19.34%); and
- 2017 to 2038 – 1.2695 (or 26.95%).

6.4.4 The TII Project Appraisal Guidelines states that *"the central growth rates are intended for use in project appraisal with the low and high growth rates to be used as sensitivity tests for economic and environmental impacts."*

6.5 TRIP DISTRIBUTION & ASSIGNMENT

6.5.1 The distribution of the proposed residential development traffic as proposed by DBFL, through the Golf Lane roundabout, is presented in Figure 3a and 3b as included in Appendix A of this report. The associated residential vehicle trips have been assigned to the network via the Golf Lane roundabout, as presented in the following two Tables 6.4 (2023 scenario) and 6.5 (2028 & 2038 scenarios).

Direction	AM Peak		PM Peak	
	Inbound	Outbound	Inbound	Outbound
Glenamuck Road (northbound)	91%	80%	76%	80%
Glenamuck Road (southbound)	9%	20%	24%	20%

TABLE 6.4: Proposed Development Trip Distribution (2023)

Direction	AM Peak		PM Peak	
	Inbound	Outbound	Inbound	Outbound
Glenamuck Road (northbound)	75%	75%	70%	70%
Glenamuck Road (southbound)	2%	2%	2%	2%
Glenamuck District Distributor Road (GDDR)	23%	23%	28%	28%

TABLE 6.5: Proposed Development Trip Distribution (2028 & 2038)

6.6 CONSTRUCTION STAGE TRAFFIC GENERATION

6.6.1 Construction stage traffic will comprise the following categories:-

- HGV trips - Excavation plant, dumper trucks and materials delivery vehicles involved in site development works;

- Private vehicles owned and driven by site construction and supervisory staff.

6.6.2 Based on a preliminary review of the existing survey data and proposed site levels it is estimated that approximately 30,500m^3 of material will require excavation. It is anticipated that the generation of HGV movements during the build period would be evenly spread throughout the day. HGV movements are not expected to exceed 4 two-way vehicle trips per hour (i.e. 2 truckloads) during the busiest period of the construction 'build' works equating to a total of 48 no. HGV trips per day (assuming a 12 hour working day).

6.6.3 On-site employees will generally arrive before 08:00, thus avoiding the morning peak hour traffic and generally depart after 16:00. Based upon the experience of similar developments, a development of this type and scale would, at a maximum, necessitate approximately 40 staff on site at any one time, subsequently generating no more than 30 two-way vehicle trips during the peak AM and PM periods over the period of the phased construction works. However, for the purposes of providing a robust assessment it has been assumed that a small number of employees would arrive/depart during the peak hours.

6.6.4 The predicted daily two-way construction stage vehicle trip generation (during peak construction period) is presented in Table 6.6 below.

Period	HGV	Cars / LGV	Total (Veh's)	Total (PCU's)
Daily	48	60	108	170
AM Peak	4	3	7	12
Afternoon Peak	4	0	4	9
PM Peak	4	3	7	12

TABLE 6.6: Predicted Peak Construction Stage Traffic Generation

7.0 NETWORK IMPACT

7.1 ASSESSMENT SCOPE

Assessment Scenarios

7.1.1 Two different traffic scenarios have been assessed, namely (a) the 'Base' (Do-Nothing) traffic characteristics and (b) the 'Post Development' (Do-Something) traffic characteristics.

7.1.2 The 'Base' traffic scenario takes into account the potential level of traffic that could be generated by the 'committed development' (Section 6.3), in addition to the existing flows travelling across the network.

7.1.3 The proposed development traffic flows are then added to the network's 'Base' (Base + Committed Developments) traffic flows to establish the new 'Post Development' traffic flows.

7.1.4 In summary, the following scenarios are considered: -

Do Nothing:

- A1 – 2023 Base Flows + Committed Developments;
- A2 – 2028 Base Flows + Committed Developments; and
- A3 – 2038 Base Flows + Committed Developments.

Do Something:

- B1 – 2023 Do Nothing (A1) + Proposed Development Flows;
- B2 – 2028 Do Nothing (A2) + Proposed Development Flows; and
- B3 – 2038 Do Nothing (A3) + Proposed Development Flows.

Assessment Periods

7.1.5 The AM and PM peak hour flows have been identified as occurring between 08:15 - 09:15 and 17:15 – 18:15 respectively.

Network Vehicle Flows

7.1.6 The following Figures as included in Appendix A present the vehicle flows across the local road network for each of the adopted development scenarios: -

- Figure 9 – 2023 Do Nothing
- Figure 10 – 2023 Do Something
- Figure 11 – 2028 Do Nothing

- Figure 12 – 2028 Do Something
- Figure 13 – 2038 Do Nothing
- Figure 14 – 2038 Do Something

Infrastructure Scenarios

7.1.7 Table 7.1 below details the assumed timescales in regard to the implementation of off-site infrastructure by others.

Design Year	3rd Party Committed Development	GDDR Implemented	Golf Lane M50 Overpass
2023	Yes	No	No
2028	Yes	Yes	No
2038	Yes	Yes	No

TABLE 7.1: Infrastructure Scenarios

7.2 NETWORK IMPACT

7.2.1 The Institution of Highways and Transportation document 'Guidelines for Traffic Impact Assessments' states that the impact of a proposed development upon the local road network is considered material when the level of traffic it generates surpasses 10% and 5% on normal and congested networks respectively. When such levels of impact are generated a more detailed assessment should be undertaken to ascertain the specific impact upon the networks operational performance. These same thresholds are reproduced in the NRA document entitled *'Traffic and Transport Assessment Guidelines (2014)'*.

7.2.2 In accordance with the IHT and NRA (TII) guidelines we have undertaken an assessment to establish the potential level of impact upon the key junctions of the local road network. To enable this calculation to be undertaken we have based the analysis upon the 2038 Future Design Year.

Ref	Junction Location	AM Peak	PM Peak
1	Site Access/ Golf Lane 3-arm priority	-	-
2	Glenamuck Road South/ Golf Lane roundabout	6.26%	4.60%
3	Glenamuck Road/ Ballyogan Road/ M50 slip road	2.46%	1.89%
4	Glenamuck Road North/ Ballyogan Grove/ M50 slip road	1.46%	1.54%
5	Glenamuck Road North/ Carrickmines P&R/ M50 slip road	1.35%	1.21%

TABLE 7.2: Proposed Development's Network Impact

7.2.3 The analysis demonstrates that the proposals will generate a subthreshold impact upon Junctions 2, 3, 4 and 5 as detailed in Table 7.2 above. Nevertheless, the impact at Junction 2 is recorded as being slightly over the 5% threshold (for congested networks) in the AM peak hour assessment. Accordingly, the operational performance of Junctions 1 (site access junction) and key off-site Junction 2 (Glenamuck Road South /Golf Lane Roundabout), will be investigated in greater detail in Chapter 8.

7.2.4 Figure 7.1 below details the amount of two-way vehicle trips to/from the proposed development site that will travel through the Glenamuck Road / Golf Lane Roundabout Junction in the 2038 design year as result of the proposed 482-unit residential development. The resulting percentage increase in traffic flows as a result of the traffic generated by the proposed development is established as being below the 10% threshold at all key off-site junctions however is predicted to be over the 5% threshold at Junction 2 in the AM peak hour.

7.2.5 For the key off-site junctions, it can be seen that the proposed development (482 units) would result in the following increases in the 2038 Future Design Year:

- Junction 2 (Glenamuck Road/ Golf Lane roundabout): an increase of 6.26% (132 New Vehicle Trips) in the AM peak period and 4.60% (106 New Vehicle Trips) in the PM peak period;
- Junction 3 (Glenamuck Road/ Ballyogan Road/ M50 slip road roundabout): an increase of 2.46% (99 New Vehicle Trips) in the AM peak period and 1.89% (74 New Vehicle Trips) in the PM peak period;
- Junction 4 (Glenamuck Road North/ Ballyogan Grove/ M50 slip road roundabout): an increase of 1.46% (51 New Vehicle Trips) in the AM peak period and 1.54% (46 New Vehicle Trips) in the PM peak period;
- Junction 5 (Glenamuck Road North/ Carrickmine R&R/ M50 slip road roundabout): an increase of 1.35% (30 New Vehicle Trips) in the AM peak period and 1.21% (28 New Vehicle Trips) in the PM peak period.

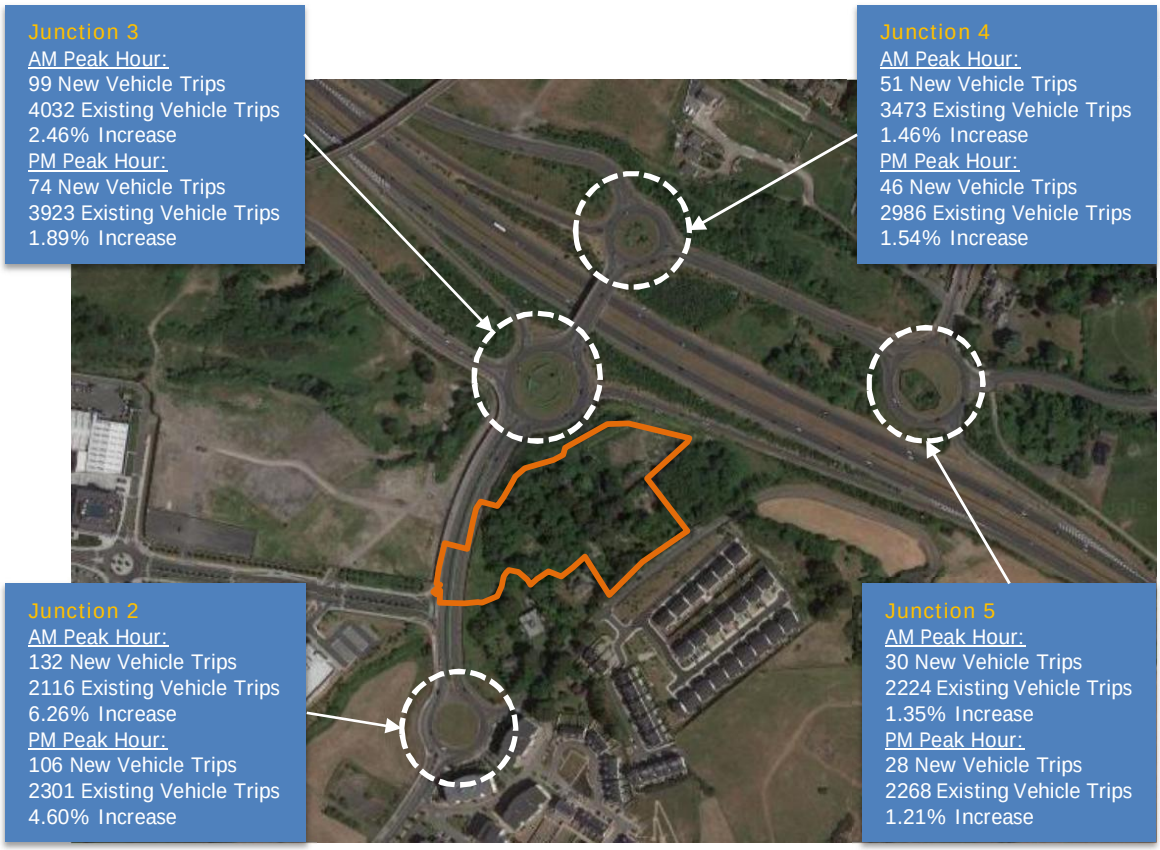


FIGURE 7.1: Increase in Vehicle Trips Generated Through Key Of-Site Junction in 2038 – 482 Units

7.3 MITIGATION STRATEGY

Construction Phase

7.3.1 A Construction Traffic Management Plan will be prepared prior to the commencement of construction work on site. This plan will be prepared in consultation with Dún Laoghaire Rathdown County Council in order to agree on traffic management and monitoring measures as outlined below:

- During the pre-construction phase, the site will be securely fenced off from adjacent properties, public footpaths and roads.
- A dedicated 'construction' site access/ egress junction will be provided during the works.
- Provision of sufficient on-site parking and compounding to ensure no potential overflow of construction generated traffic onto the local road network.

- The traffic generated by the construction phase of the development will be strictly controlled in order to minimise the impact of this traffic on the surrounding road network.
- All road works will be adequately signposted and enclosed to ensure the safety of all road users and construction personnel.

Operational Phase

7.3.2 A package of integrated measures has been identified to both manage and off-set the additional local demand that the proposed residential development on the subject zoned lands could potentially generate as a result of the forecast increase in vehicle movements by residents of the scheme. The identified measures are summarised below.

- Management – A Mobility Management Plan (MMP) has been compiled with the aim of guiding the delivery and management of coordinated initiatives by the scheme promotor. The MMP ultimately seeks to encourage sustainable travel practises for all journeys to and from the proposed development.
- Infrastructure – The provision of an appropriate number of cycle parking facilities to encourage the uptake of cycling by residents
- Infrastructure – New formal road crossing facilities on Glenamuck Road South as part of approved Planning Ref. D18A/0257 which will encourage walking, cycling and public transport use by residents.

8.0 NETWORK ANALYSIS

8.1 INTRODUCTION

8.1.1 The operational assessment of the local road network has been undertaken using the Transport Research Laboratory (TRL) computer packages ARCADY for roundabout junctions and PICADY for priority controlled junctions.

8.1.2 When considering roundabout and priority controlled junctions, a Ratio of Flow to Capacity (RFC) greater than 85% (0.85) would indicate a junction to be approaching capacity, as operation above this RFC value is poor and deteriorates quickly.

8.1.3 A 90-minute AM and PM period has been simulated, from 08:00 to 09:30 and 17:00 to 18:30. Traffic flows were entered using an Origin-Destination table for the peak hours.

8.1.4 In order to determine if the proposed site access junction will cater for the predicted level of traffic generation, a traffic model of the site access junction was analysed for the scheme's 2023 Opening Year and subsequent 2028 and 2038 Future Design Years.

8.2 JUNCTION 1: SITE ACCESS/ GOLF LANE

8.2.1 The results of the operational assessment of this three-arm priority controlled junction during the weekday morning and evening peaks are summarised in Tables 8.1 below. The site access has been assessed in the worst case 2038 Future Design Year only. The arms were labelled as follows within the PICADY model:

Arm A: Golf Lane (West)

Arm B: Site Access

Arm C: Golf Lane (East)

2038 Do Something Scenario

8.2.2 The 2038 "Do Something" scenario assumes that the 482 residential dwellings are built and occupied. The 2038 AM peak hour PICADY results (Table 8.1) indicate that the Site Access / Golf Lane three arm priority junction will operate well within

capacity with a maximum RFC value of only 0.23 with a corresponding queue of 0.3 pcus being recorded.

Scenario	Arm	RFC	Queue (pcu)	Delay (s)
AM Peak	B-AC	0.23	0.3	8.88
	C-AB	0.00	0.0	0.00
PM Peak	B-AC	0.06	0.1	7.41
	C-AB	0.00	0.0	0.00

TABLE 8.1: 2038 PICADY Do-Something Analysis

8.2.3 The 2038 "Do Something" PM peak hour PICADY results also indicates that the junction will operate with a significant amount of reserve capacity with a maximum RFC of 0.06 and a corresponding queue of 0.1 pcus being recorded. A copy of the PICADY output file can be found in Appendix B.

8.3 JUNCTION 2: GLENAMUCK ROAD SOUTH/ GOLF LANE

8.3.1 The results of the operational assessment of this three-arm roundabout junction during the weekday morning and evening peaks are summarised in Tables 8.2 to 8.7 below. The arms were labelled as follows within the ARCADY model:

Arm A: Glenamuck Road

Arm B: Golf Lane

Arm C: Glenamuck Road South

2023 AM Peak

8.3.2 The ARCADY results (Table 8.2) indicate that the junction will operate within capacity for the 2023 "Do Nothing" AM peak hour with a maximum RFC value of only 0.69 and a corresponding queue of 2.2 pcu's being recorded.

Scenario	Arm	RFC	Queue (pcu)	Delay (s)
Do Nothing	1	0.34	0.5	2.05
	2	0.04	0.0	5.24
	3	0.69	2.2	8.41
Do Something	1	0.35	0.5	2.07
	2	0.20	0.2	6.21
	3	0.72	2.5	9.44

Table 8.2: 2023 AM Peak ARCADY Analysis

8.3.3 With the inclusion of the proposed development, the ARCADY results reveal that during the 2023 "Do Something" AM period the junction will continue to operate within capacity with a maximum RFC value of 0.72 and a corresponding queue of 2.5 pcus recorded. A copy of the ARCADY output file can be found in Appendix C.

2023 PM Peak

8.3.4 The results of the ARCADY based assessment (Table 8.3) demonstrate that the junction will operate within capacity for the 2023 "Do Nothing" PM peak hour with a maximum RFC value of only 0.52 and a corresponding queue of 1.1 pcus being recorded.

Scenario	Arm	RFC	Queue (pcu)	Delay (s)
Do Nothing	1	0.52	1.1	2.79
	2	0.04	0.0	7.39
	3	0.43	0.7	4.40
Do Something	1	0.55	1.2	2.95
	2	0.10	0.1	7.85
	3	0.44	0.8	4.56

Table 8.3: 2023 PM Peak ARCADY Analysis

8.3.5 With the inclusion of the proposed development, the junction simulation results suggest that during the 2023 "Do Something" PM period the junction will continue to operate within capacity with a maximum RFC value of 0.55 and a corresponding queue of 1.2 pcus recorded.

2028 AM Peak

8.3.6 It is assumed that the Glenamuck District Distributor Road will be in place during the 2028 Future Design Year. This will result in the existing three arm roundabout upgraded to a four-arm roundabout. The arms were labelled as follows within the ARCADY model for the enhanced four-arm roundabout:

Arm A: Glenamuck Road

Arm B: Golf Lane

Arm C: Glenamuck Road South

Arm D: Glenamuck District Distributor Road

8.3.7 The ARCADY results (Table 8.4) indicate that the junction will operate within capacity for the 2028 "Do Nothing" AM peak hour with a maximum RFC value of 0.71 and a corresponding queue of 2.4 pcus being recorded.

Scenario	Arm	RFC	Queue (pcu)	Delay (s)
Do Nothing	1	0.32	0.5	1.96
	2	0.04	0.0	4.92
	3	0.10	0.1	3.37
	4	0.71	2.4	8.46
Do Something	1	0.33	0.5	1.99
	2	0.18	0.2	5.76
	3	0.10	0.1	3.55
	4	0.74	2.7	9.49

Table 8.4: 2028 AM Peak ARCADY Analysis

8.3.8 With the inclusion of the proposed development, the ARCADY results reveal that during the 2028 "Do Something" AM period the junction will continue to operate within capacity with a maximum RFC value of 0.74 and a corresponding queue of 2.7 pcus recorded.

2028 PM Peak

8.3.9 The results of the ARCADY based assessment (Table 8.5) demonstrate that the junction will operate within capacity for the 2028 "Do Nothing" PM peak hour with a maximum RFC value of only 0.53 and a corresponding queue of 1.1 pcus being recorded.

Scenario	Arm	RFC	Queue (pcu)	Delay (s)
Do Nothing	1	0.53	1.1	2.80
	2	0.05	0.0	7.46
	3	0.08	0.1	3.94
	4	0.45	0.8	4.39
Do Something	1	0.55	1.2	2.96
	2	0.10	0.1	7.92
	3	0.08	0.1	4.01
	4	0.47	0.9	4.57

Table 8.5: 2028 PM Peak ARCADY Analysis

8.3.10 With the inclusion of the proposed development, the junction simulation results suggest that during the 2028 "Do Something" PM period the junction will continue

to operate within capacity with a maximum RFC value of 0.55 and a corresponding queue of 1.2 pcus recorded.

2038 AM Peak

8.3.11 The ARCADY results (Table 8.6) indicate that the junction will be operating within capacity for the 2038 "Do Nothing" AM peak hour with a maximum RFC value of 0.76 and a corresponding queue of 3.0 pcus being recorded.

Scenario	Arm	RFC	Queue (pcu)	Delay (s)
Do Nothing	1	0.34	0.5	2.02
	2	0.04	0.0	5.08
	3	0.10	0.1	3.45
	4	0.76	3.0	10.14
Do Something	1	0.35	0.5	2.04
	2	0.19	0.2	5.98
	3	0.11	0.1	3.65
	4	0.79	3.5	11.60

Table 8.6: 2038 AM Peak ARCADY Analysis

8.3.12 With the inclusion of the proposed development, the ARCADY results reveal that during the 2038 "Do Something" AM period the junction will continue to operate within capacity with a maximum RFC value of 0.79 and a corresponding queue of 3.5 pcus recorded.

2038 PM Peak

8.3.13 The results of the ARCADY based assessment (Table 8.7) demonstrate that the junction will operate within capacity for the 2038 "Do Nothing" PM peak hour with a maximum RFC value of 0.56 and a corresponding queue of 1.2 pcus being recorded.

Scenario	Arm	RFC	Queue (pcu)	Delay (s)
Do Nothing	1	0.56	1.2	2.98
	2	0.05	0.1	8.05
	3	0.08	0.1	4.11
	4	0.48	0.9	4.64
Do Something	1	0.58	1.4	3.16
	2	0.11	0.1	8.60
	3	0.09	0.1	4.19
	4	0.50	1.0	4.85

Table 8.7: 2038 PM Peak ARCADY Analysis

8.3.14 With the inclusion of the proposed development, the junction simulation results suggest that during the 2038 “Do Something” PM period the junction will continue to operate within capacity with a maximum RFC value of 0.58 and a corresponding queue of 1.4 pcus recorded.

9.0 SUMMARY AND CONCLUSION

9.1 SUMMARY

9.1.1 DBFL Consulting Engineers (DBFL) have been commissioned to prepare a Traffic and Transport Assessment (TTA) for a proposed residential development on a brownfield site located at Golf Lane, Glenamuck Road, Carrickmines, Co. Dublin.

9.1.2 The proposed development comprises 482 no. residential units (all apartments), along with ancillary residential amenities, and provision of a childcare facility, gym, and local shop. The proposed development is set out in 7 no. blocks with heights ranging from four to twenty-two storeys.

9.1.3 Two basement levels are proposed, providing car parking spaces (299 no.), bin stores, plant rooms, bicycle parking (1,000 no. spaces), and circulation areas. A further 240 no. bicycle parking spaces and 4 no. car parking spaces are provided at ground level.

9.1.4 The proposed development includes landscaping, boundary treatments, public, private and communal open space (including roof terraces), two cycle / pedestrian crossings over the stream at the western side of the site, along with a new pedestrian and cycle crossing of Glenamuck Road South at the west of the site, cycle and pedestrian facilities, play facilities, and lighting. The proposed buildings include the provision of private open space in the form of balconies and winter gardens to all elevations of the proposed buildings. The development also includes vehicular, pedestrian, and cycle accesses, drop off areas, boundary treatments, services, and all associated ancillary and site development works.

9.1.5 The report has been produced to address any potential concerns that An Bord Pleanála may have pertaining to the level of influence of the proposed development upon the local transportation system.

9.1.6 This TTA has carried out a range of assessments for an Opening Year of 2023, and Future Design Year assessments of 2028 and 2038.

9.2 CONCLUSIONS

9.2.1 Based upon the information and analysis detailed within this Traffic and Transport Assessment it has been demonstrated that: -

- The site benefits from the appropriate land use zoning.
- DLRCC have previously granted permission for a similar (approx. 200 units) residential development on the subject site.
- The site is easily accessible to pedestrians and cyclists and they can benefit from existing pedestrian/cyclist infrastructure on Glenamuck Road. Furthermore, the subject development proposals include the provision of pedestrian and cycle routes through the site and thereby delivering the DLRCC proposed Link No. 27 – Golf Lane Link identified within the BELAP 2019-2025 which *"would link the Ballyogan Stream greenway spine (Link 1) through to the Kiltiernan Link Road".*
- The subject site is highly accessible by public transport with two LUAS stops located within walking distance. Furthermore, Dublin Bus route number 63 is accessible with a bus interchange being within 450m of the subject site on Ballyogan Road.
- The subject scheme proposals include for a total of 303 no. car parking spaces comprising 202 at upper basement level, 97 at lower basement level and 4 no. at surface level (inclusive of set down / loading bay). Of the 303 on-site car parking spaces, 10 no. have been assigned to the Creche / amenity / café / retail land uses. The surface level car parking spaces comprise 3 no. visitor car parking spaces an 1 no. set down / loading bay. Of the 299 basement car parking spaces, a total of 289 no. spaces are dedicated to the residential units whilst the remaining 10 no. basement car parking spaces are for the non-residential uses.
- This residential car parking provision is lower than the development plan requirement (633 spaces for the residential units) and equates to a ratio of 0.6 spaces per apartment unit. Nevertheless, due to i) the site's close proximity to the frequent Luas services and bus stops, ii) the high level of cycle parking provision proposed and iii) the policy of the DHPLG for new developments at such locations is for car parking provision to be 'minimised, substantially reduced or wholly eliminated in certain circumstances', it is concluded that the opportunity exists for a reduced quantum of dedicated residential car parking spaces to be provided for a development on the subject site.
- The subject development proposals include for a total of 1240 bicycle parking spaces comprising 240 short term bicycle spaces located at podium level and 1000 long term bicycle spaces within the upper basement level. This level of

overall cycle parking provision (1240) is more than double the DLRCC requirements (602) and exceeds the DHPLG requirement (1054) thereby maximising the potential for future residents to choose cycling as a preferred mode of travel to / from the subject site.

- The Trip Generation and network assignment exercise demonstrates that the subject development (482 units) will result in a modest increase of vehicle flows across the local road network during both the morning pm and evening peaks. As illustrated in Figure 9.1 below the development would result in the following increases in the 2038 Future Design Year:
    - Junction 2 (Glenamuck Road/ Golf Lane roundabout): an increase of 6.26% (132 New Vehicle Trips) in the AM peak period and 4.60% (106 New Vehicle Trips) in the PM peak period;
    - Junction 3 (Glenamuck Road/ Ballyogan Road/ M50 slip road roundabout): an increase of 2.46% (99 New Vehicle Trips) in the AM peak period and 1.89% (74 New Vehicle Trips) in the PM peak period;
    - Junction 4 (Glenamuck Road North/ Ballyogan Grove/ M50 slip road roundabout): an increase of 1.46% (51 New Vehicle Trips) in the AM peak period and 1.54% (46 New Vehicle Trips) in the PM peak period;
    - Junction 5 (Glenamuck Road North/ Carrickmine R&R/ M50 slip road roundabout): an increase of 1.35% (30 New Vehicle Trips) in the AM peak period and 1.21% (28 New Vehicle Trips) in the PM peak period.
- The network impact assessment demonstrates that the proposals will generate a subthreshold (<10%) impact upon Junctions 2, 3, 4 and 5. Nevertheless, the impact at Junction 2 is recorded as being slightly over the 5% threshold (for congested networks) in the AM peak hour assessment. Accordingly, the operational performance of Junctions 1 (site access junction) and key off-site Junction 2 (Glenamuck Road South / Golf Lane Roundabout), has been subject to more detailed analysis.

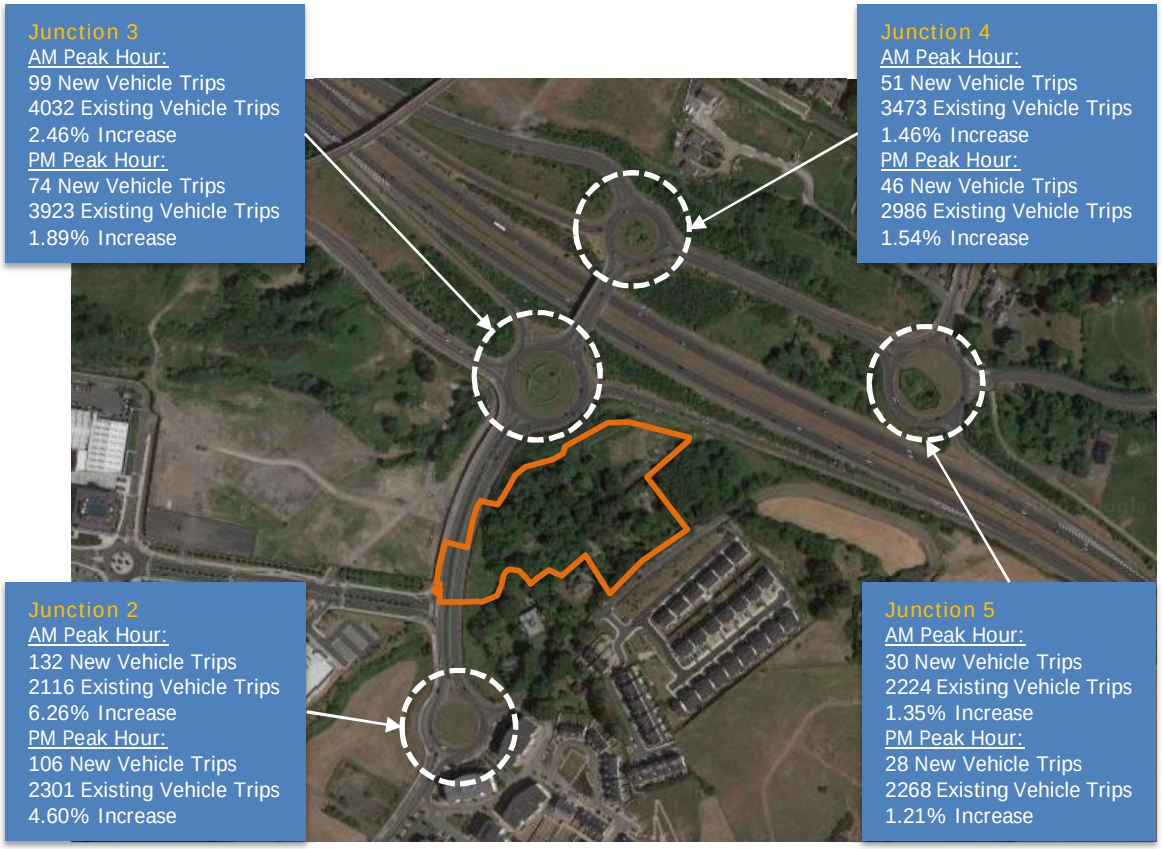


FIGURE 9.1: Increase in Vehicle Trips Generated Through Key Of-Site Junction in 2038 – 482 Units

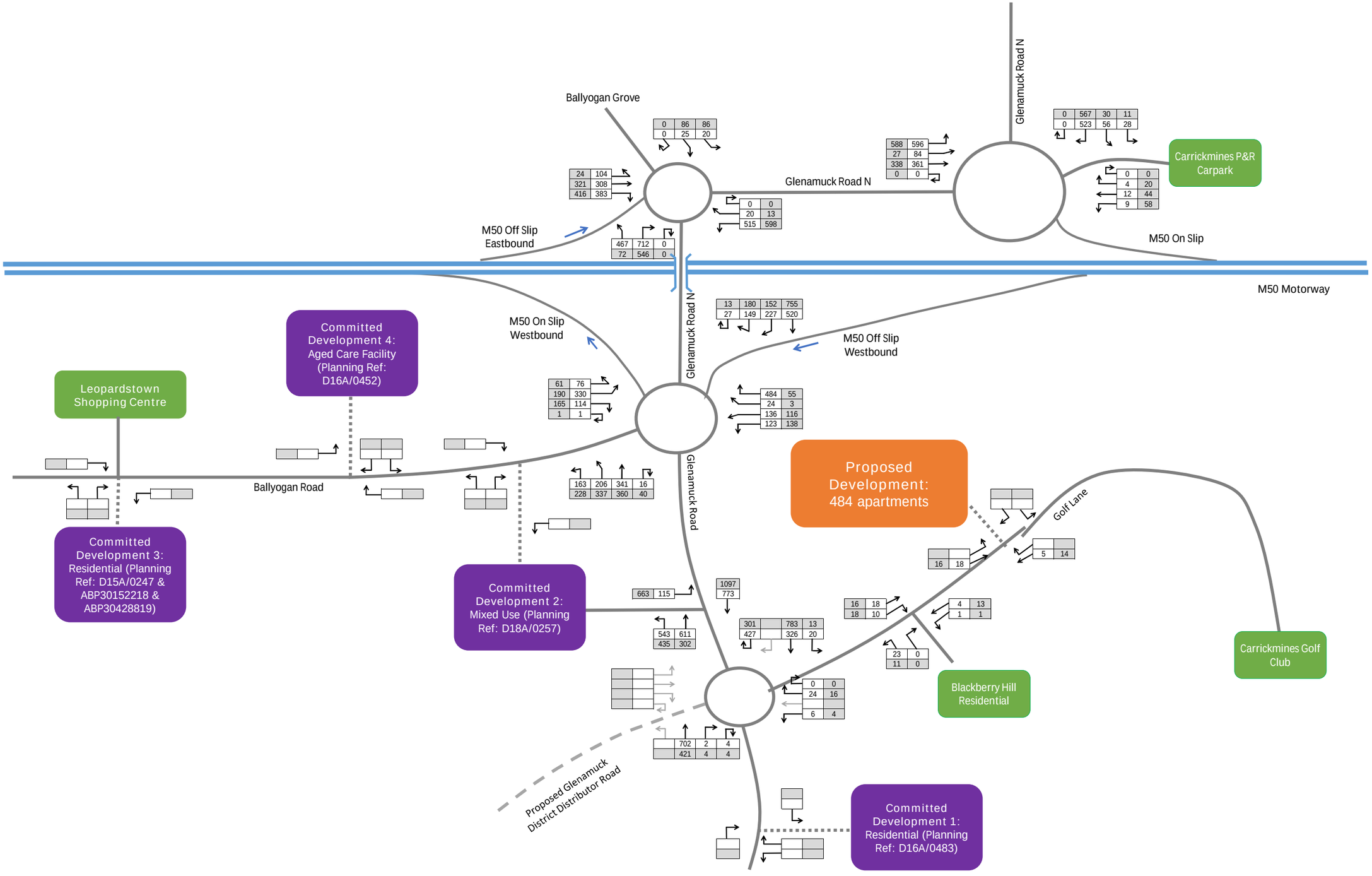
- The evaluation of the operational performance of the subject site Access junction on Golf Lane following the implementation of the proposed 482-unit residential scheme has demonstrated that the proposed site access junction will operate well within capacity in the worst case 2038 Future Design Year.
- Similarly, the evaluation of the operational performance of the Glenamuck Road South / Golf Lane roundabout junction will operate within acceptable operational parameters in all Do-Nothing and Do-Something scenarios. The junction analysis reveals that the introduction of the subject development traffic results in a negligible impact on the operational performance of this key off-site junction compared to the Do-Nothing scenario.

9.2.2 It is concluded that the proposals will not result in a material deterioration of existing road conditions and as a result there are no significant traffic or transportation related reasons that should prevent the granting of planning permission for the proposed development.

APPENDICES

APPENDIX A

Traffic Flow Diagrams



DBFL Consulting Engineers

Dublin Office: Dublin Office: Ormond House, Upper Ormond Quay, Dublin 7 ph:+353 1 400 4000

Cork Office: Phoenix House, Monahan Road, Cork ph:+353 21 2024538 email: info@dbfl.ie website: www.dbfl.ie

Waterford Office: Suite 8b The Atrium, Maritana Gate, Canada Street, Waterford ph:+353 51 309 500

Project : Proposed Residential Development
Golf Lane, Glenamuck Road, Carrickmines, Co. Dublin

DRG. Title : Network Traffic Flows
2017 Base Flows

Key:
AM Peak Hour (0815-0915)
PM Peak Hour (1715-1815)

Flows measured in PCU's

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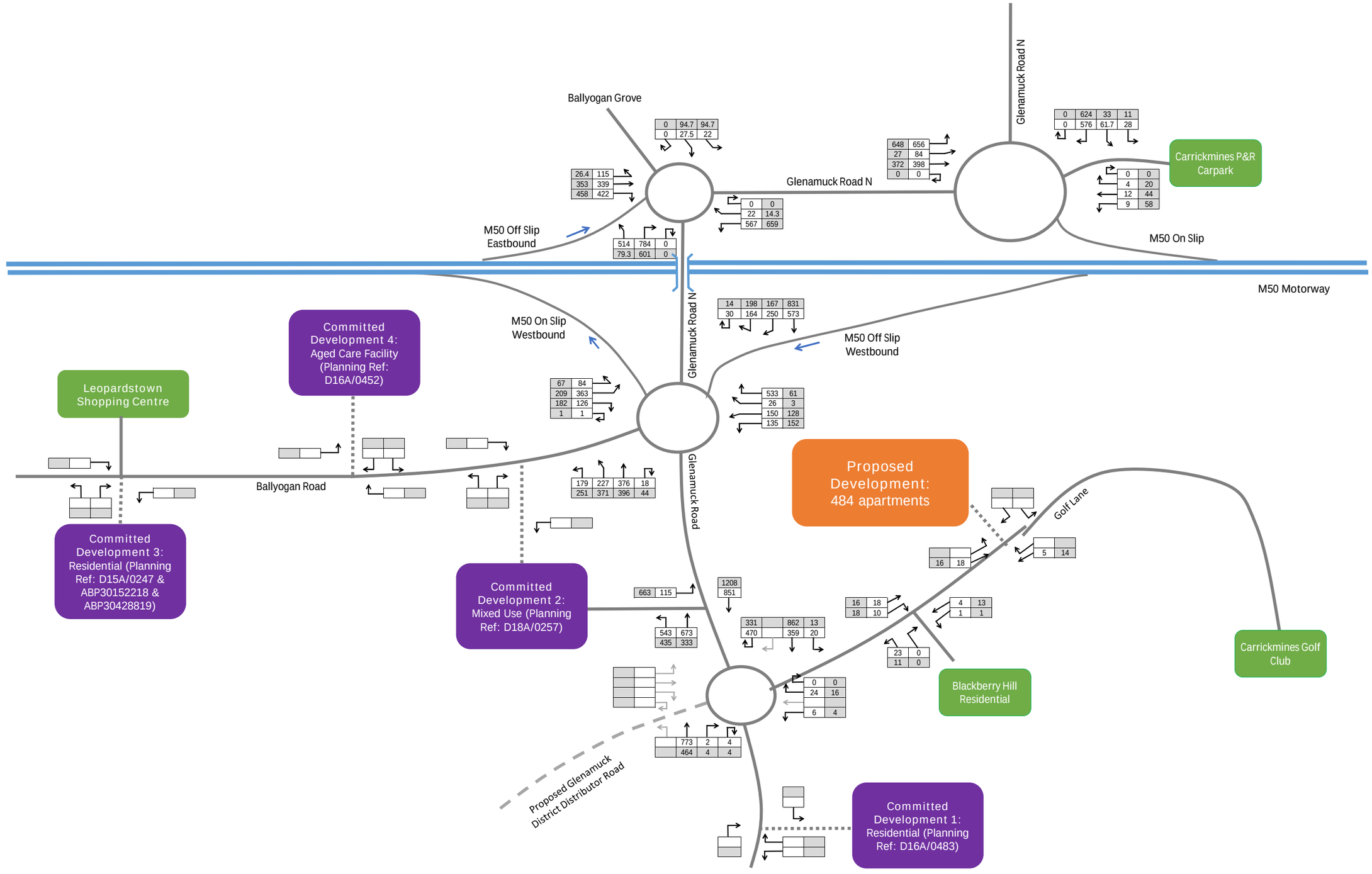

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DRG. Title : Network Traffic Flows
2023 Base Flows

Key:
AM Peak Hour (0815-0915)
PM Peak Hour (1715-1815)

Flows measured in PCU's

2016-2030 Medium Growth
2023 1.0162 1.1012

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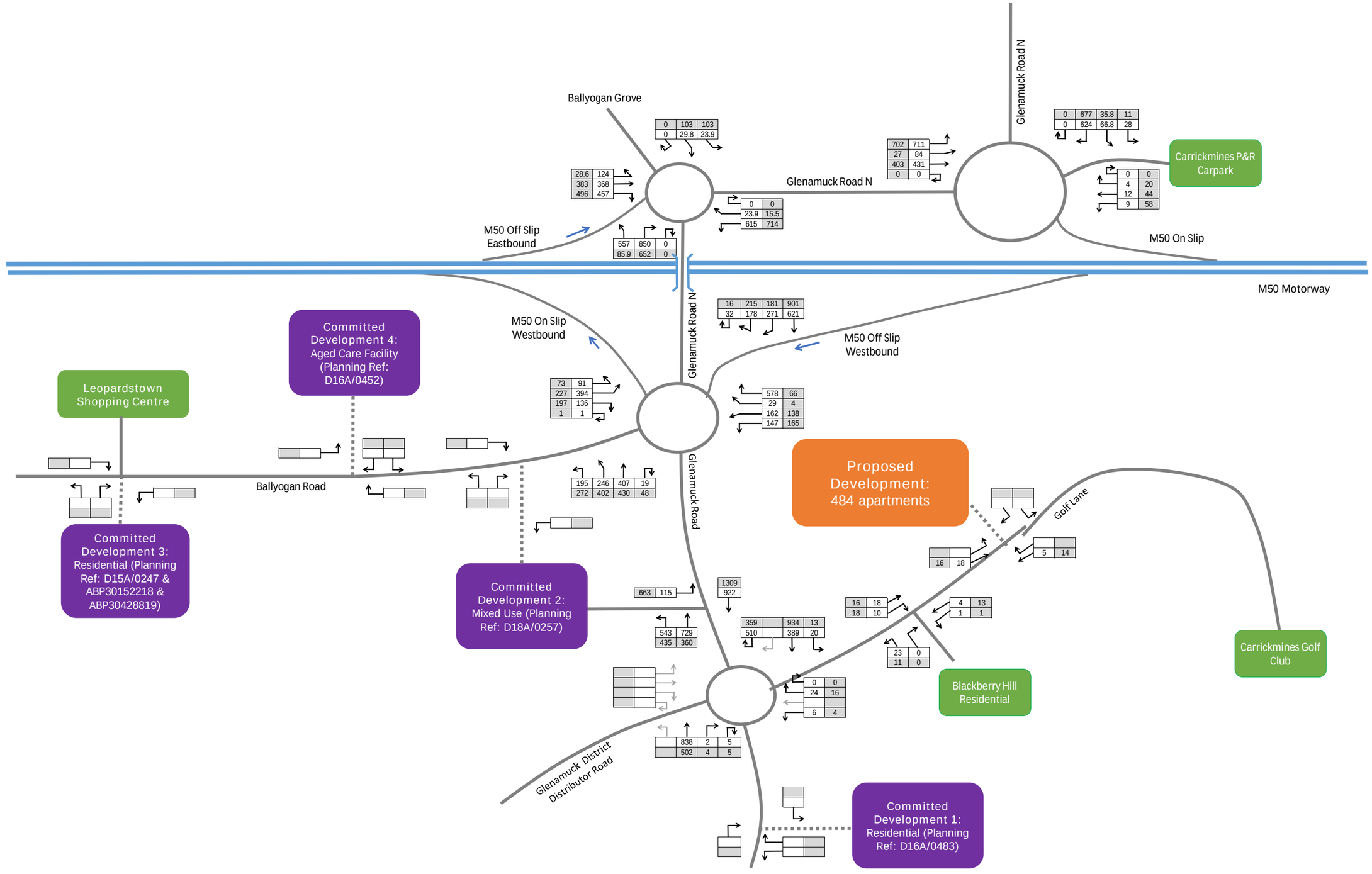

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Cork Office: Phoenix House, Monahan Road, Cork ph:+353 21 2024538 email: info@dbfl.ie website: www.dbfl.ie

Waterford Office: Suite 8b The Atrium, Maritana Gate, Canada Street, Waterford ph:+353 51 309 500

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DRG. Title : Network Traffic Flows
2028 Base Flows

Key:
AM Peak Hour (0815-0915)
PM Peak Hour (1715-1815)

Flows measured in PCU's

2016-2030 Medium Growth
2028 1.0162 1.1934

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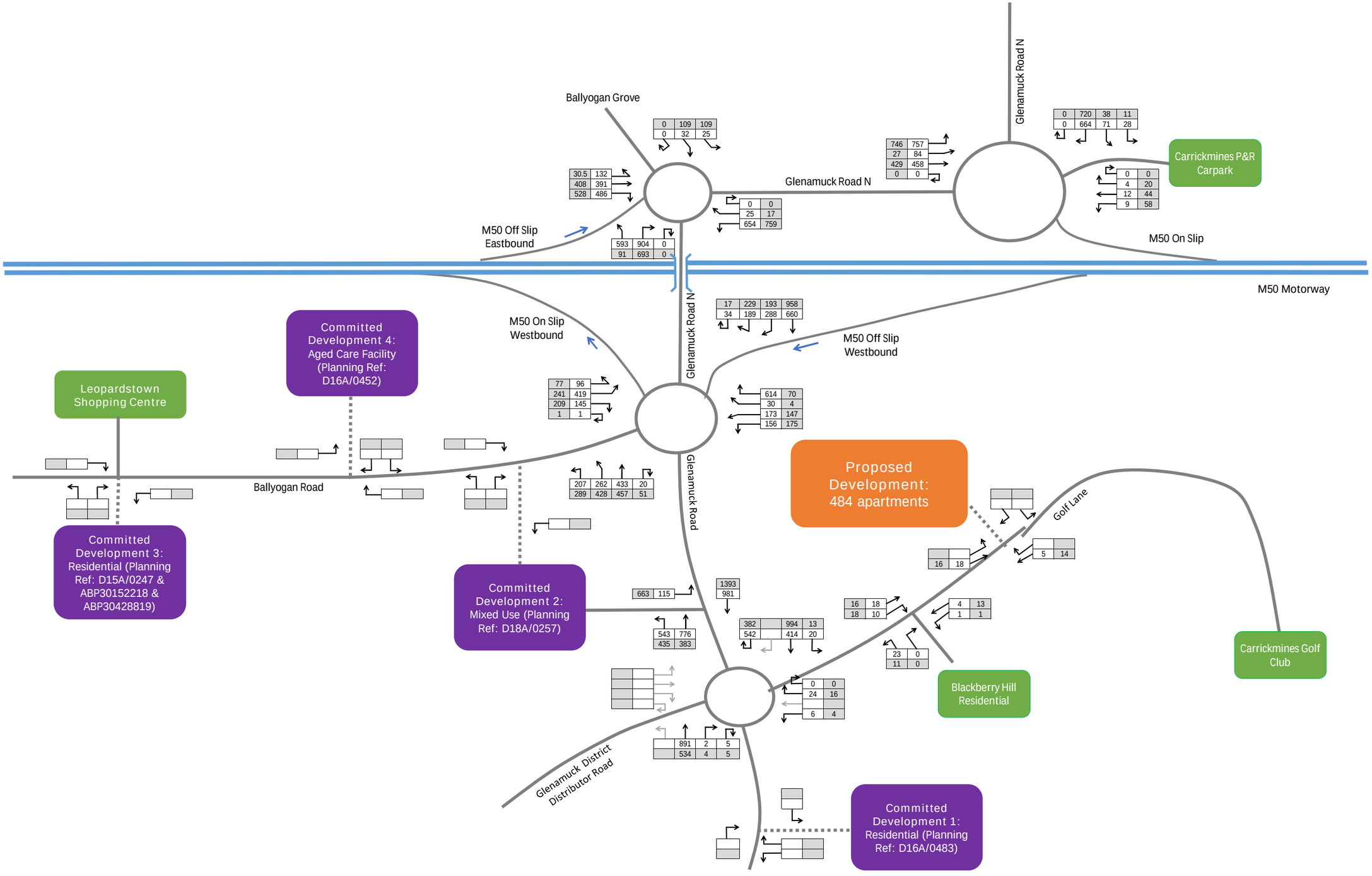

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DRG. Title : Network Traffic Flows
2038 Base Flows

Key:
AM Peak Hour (0815-0915)
PM Peak Hour (1715-1815)

Flows measured in PCU's

2030-2040 Medium Growth
2038 1.0051 1.2695

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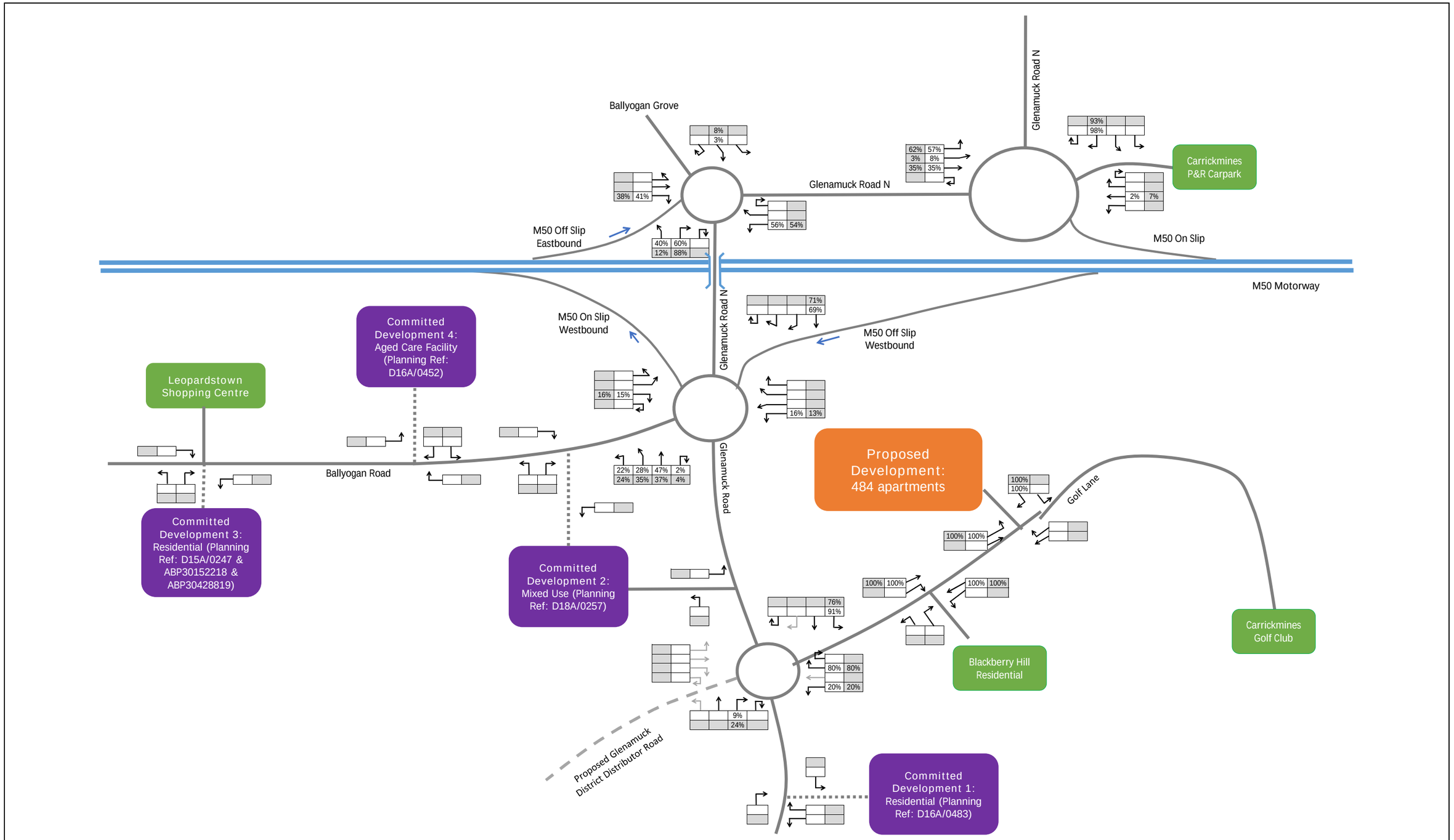

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DRG. Title : Network Traffic Flows
Proposed Development Traffic Distribution 2023

Key:
AM Peak Hour (0815-0915)
PM Peak Hour (1715-1815)

Flows measured in PCU's

Dwn:	Ckd:	Date:
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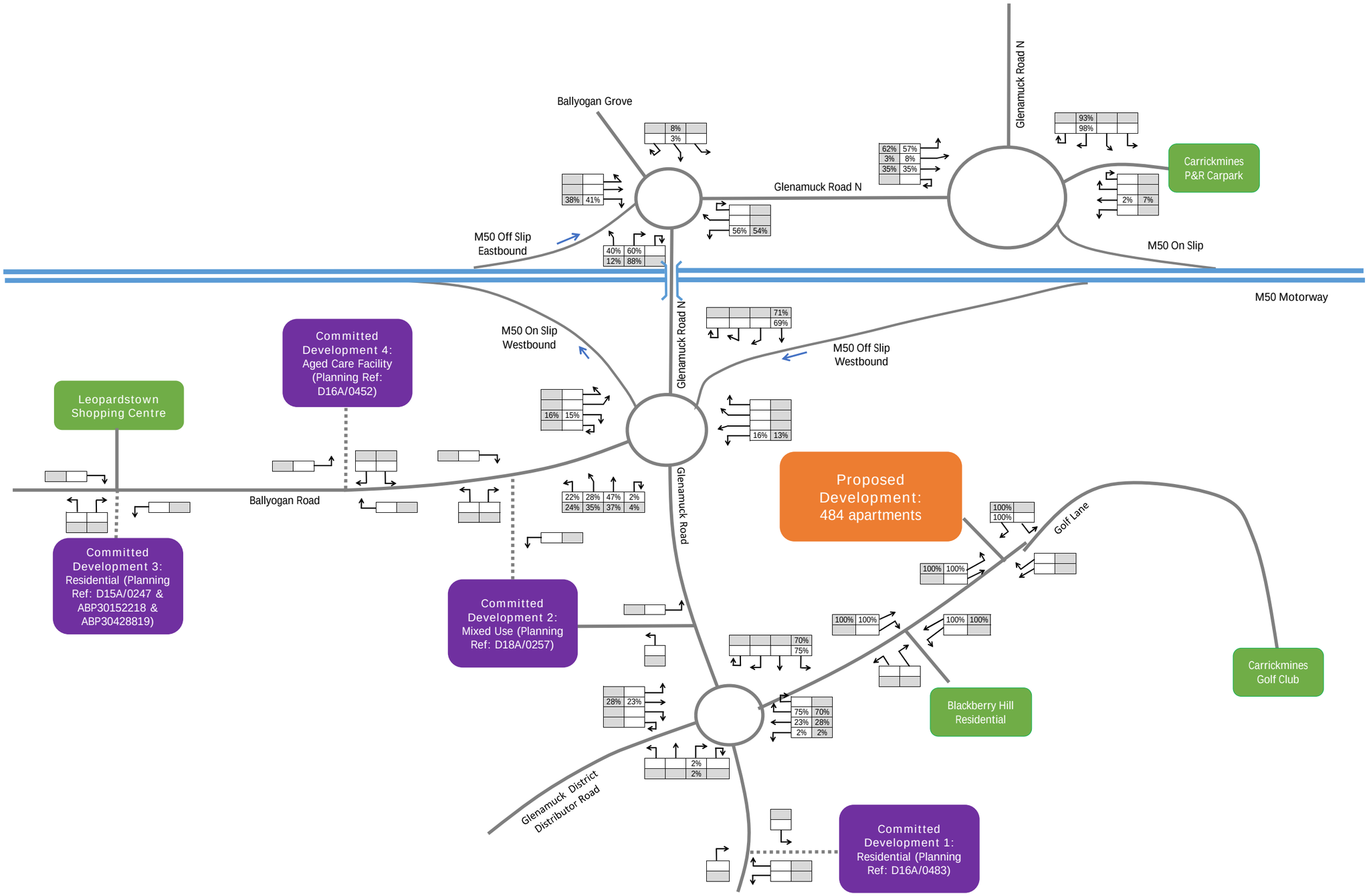

DBFL Consulting Engineers

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Cork Office: Phoenix House, Monahan Road, Cork ph:+353 21 2024538 email: info@dbfl.ie website: www.dbfl.ie

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DRG. Title :
Network Traffic Flows
Proposed Development Traffic Distribution 2028 & 2038

Key:
AM Peak Hour (0815-0915)
PM Peak Hour (1715-1815)

Flows measured in PCU's

Dwn:	Ckd:	Date:

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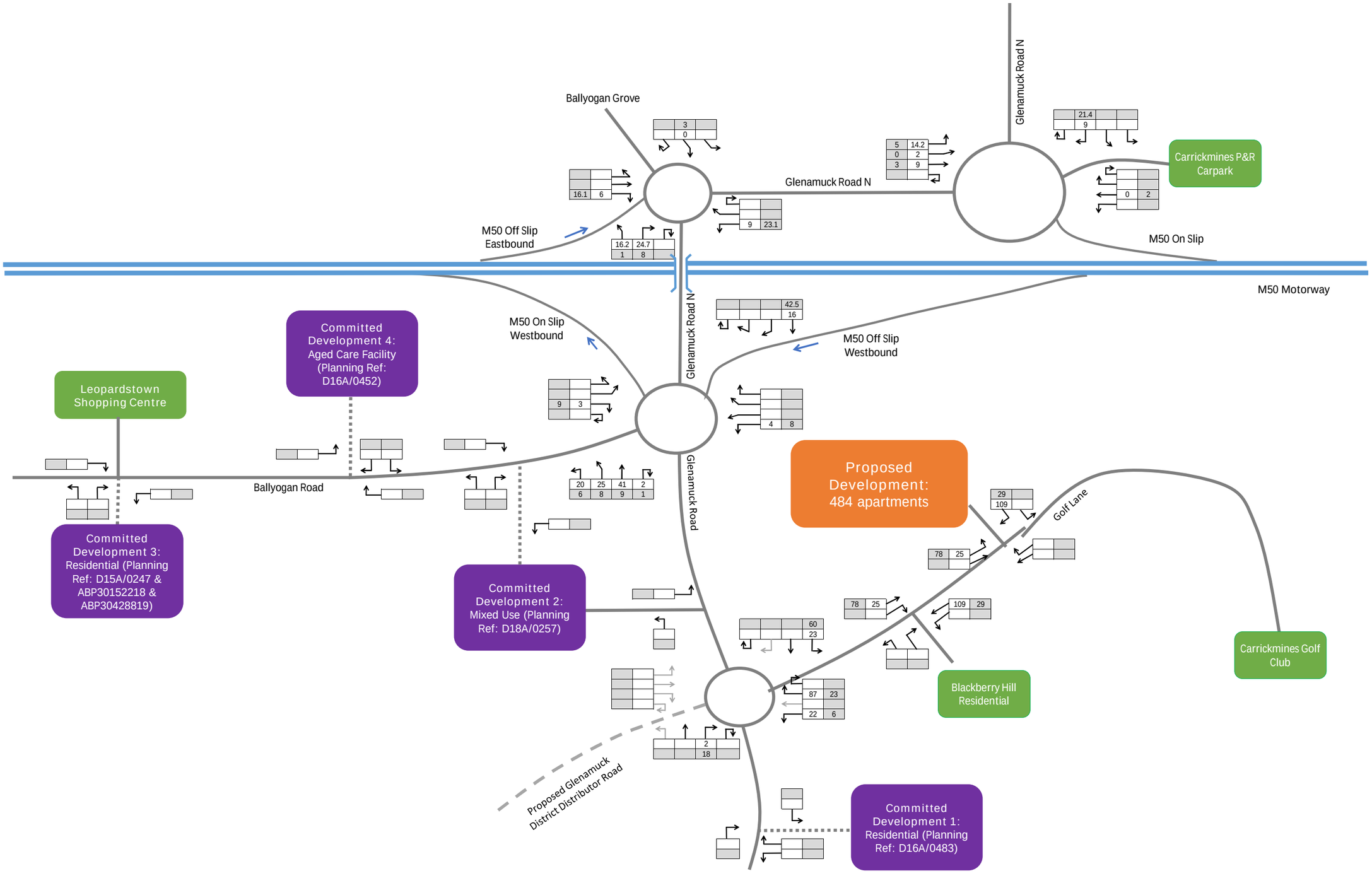

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ph:+353 1 400 4000

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DRG. Title :
Proposed Residential Development
Traffic Flows 2023

Key:
AM Peak Hour (0815-0915)
PM Peak Hour (1715-1815)

Flows measured in PCU's

AM Peak		PM Peak	
Arr	Dep	Arr	Dep
25	109	78	29

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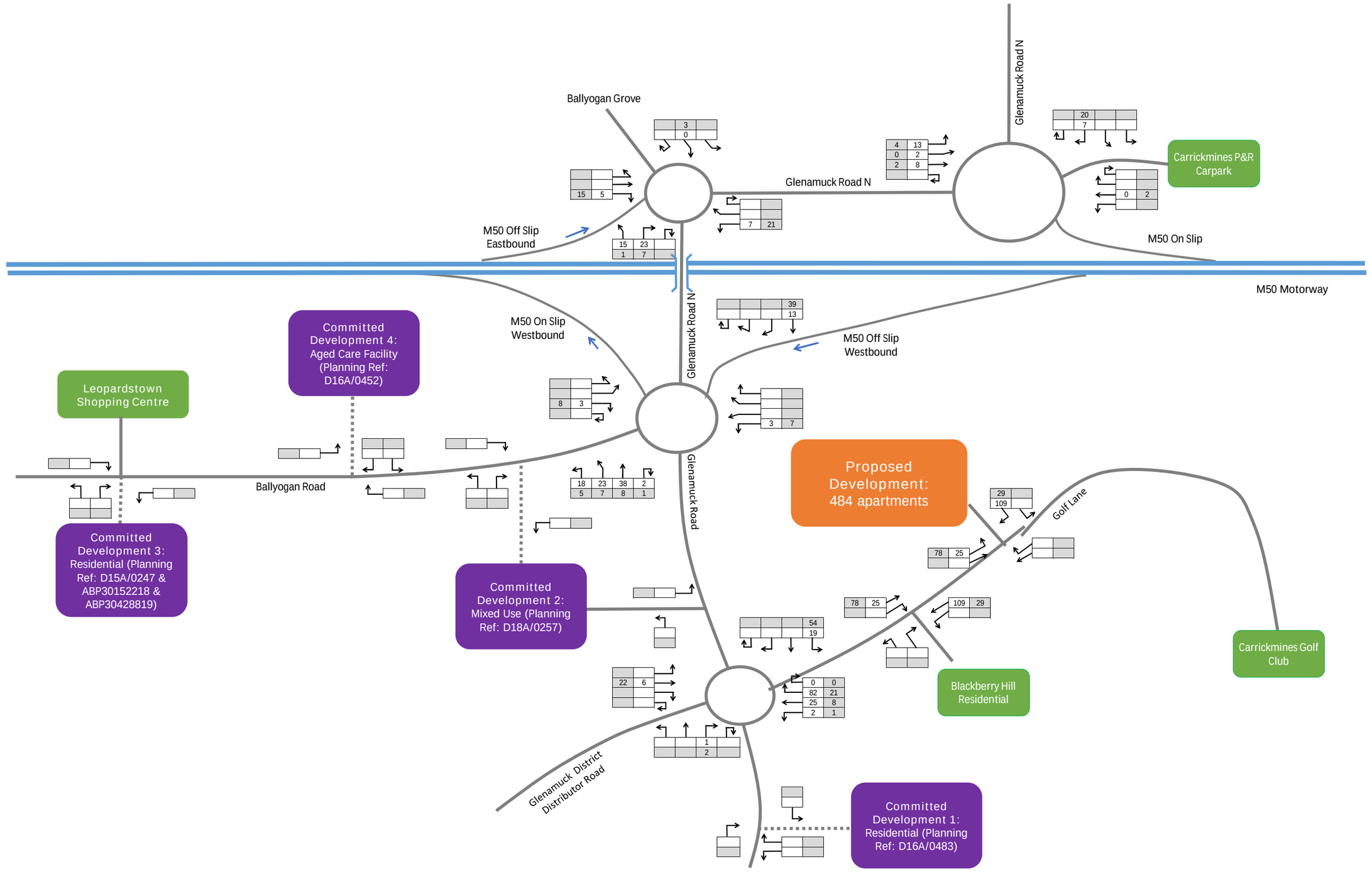

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DRG. Title :
Proposed Residential Development
Traffic Flows 2028 & 2038

Key:
AM Peak Hour (0815-0915)
PM Peak Hour (1715-1815)

Flows measured in PCU's

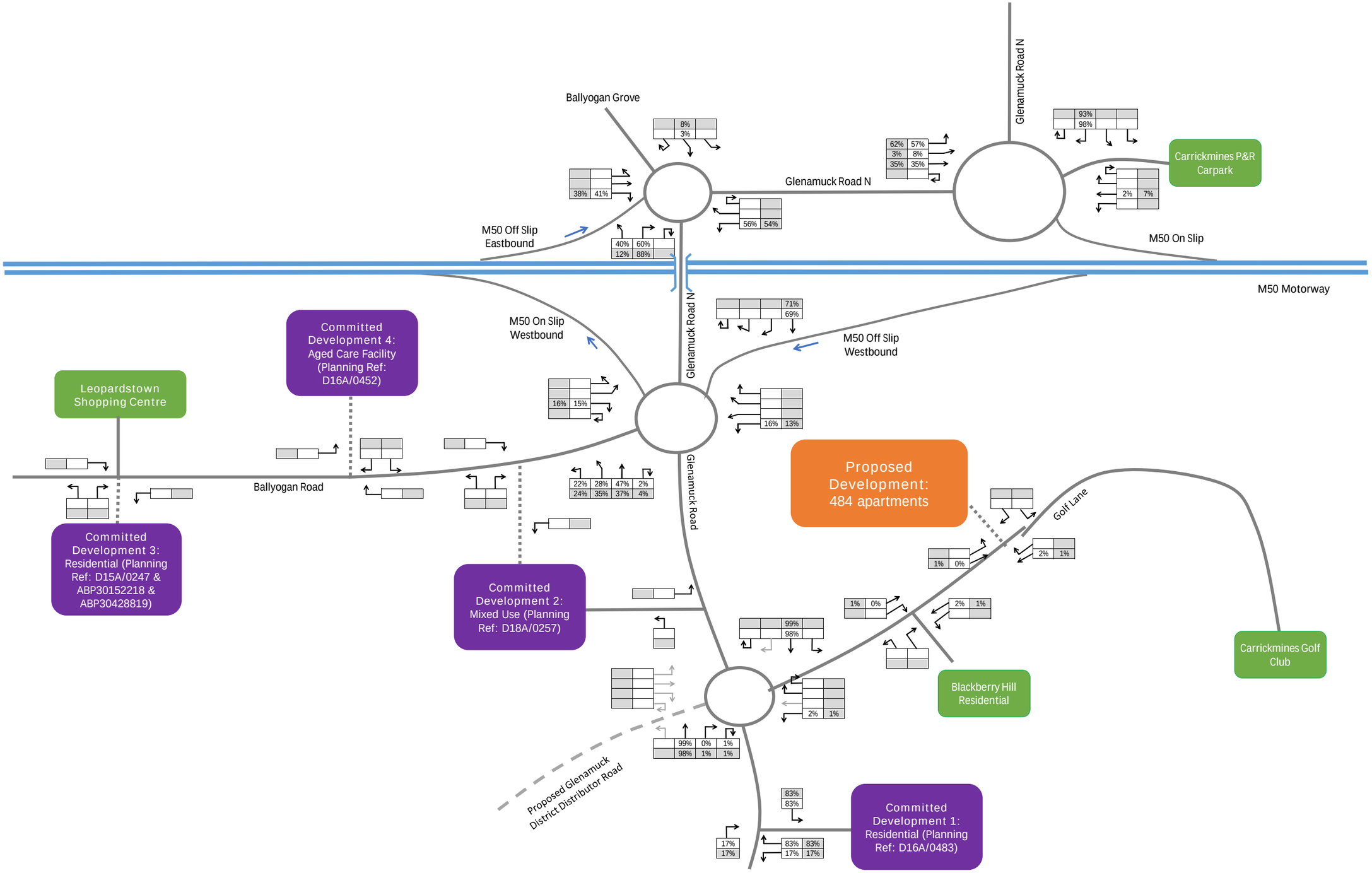
AM Peak		PM Peak	
Arr	Dep	Arr	Dep
25	109	78	29

Dwn: | Ckd: | Date:

Ref: p170063\calcs\excel\TRAFFIC\170063 Traffic Model 001

Figure: 4b

Rev: -



DBFL Consulting Engineers

Dublin Office: Ormond House, Upper Ormond Quay, Dublin 7
ph:+353 1 400 4000

Cork Office: Phoenix House, Monahan Road, Cork
ph:+353 21 2024538
email: info@dbfl.ie
website: www.dbfl.ie

Waterford Office: Suite 8b The Atrium, Maritana Gate, Canada Street, Waterford
ph:+353 51 309 500

Project :
Proposed Residential Development
Golf Lane, Glenamuck Road, Carrickmines, Co. Dublin

DRG. Title :
Committed Development 1
Trip Distribution

Key:
AM Peak Hour (0815-0915)
PM Peak Hour (1715-1815)

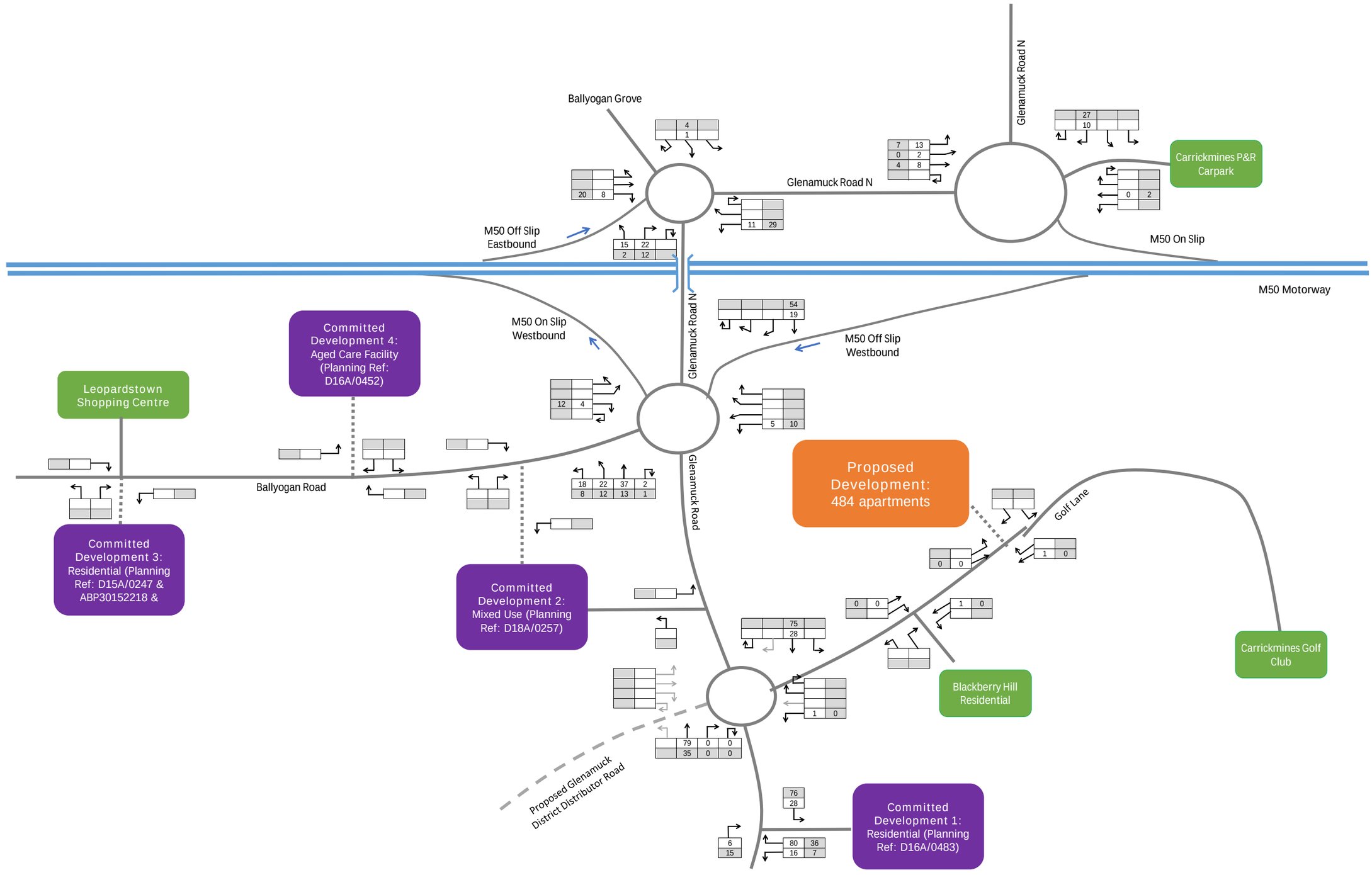
Flows measured in PCU's

Dwn: | Ckd: | Date:

Ref: p170063\calcs\excel\TRAFFIC\170063 Traffic Model 001

Figure: 5.1a

Rev: -



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Waterford Office: Suite 8b The Atrium, Maritana Gate, Canada Street, Waterford ph:+353 51 309 500

Project : Proposed Residential Development
Golf Lane, Glenamuck Road, Carrickmines, Co. Dublin

DRG. Title : Committed Development 1
Trip Generation

Key:
AM Peak Hour (0815-0915)
PM Peak Hour (1715-1815)

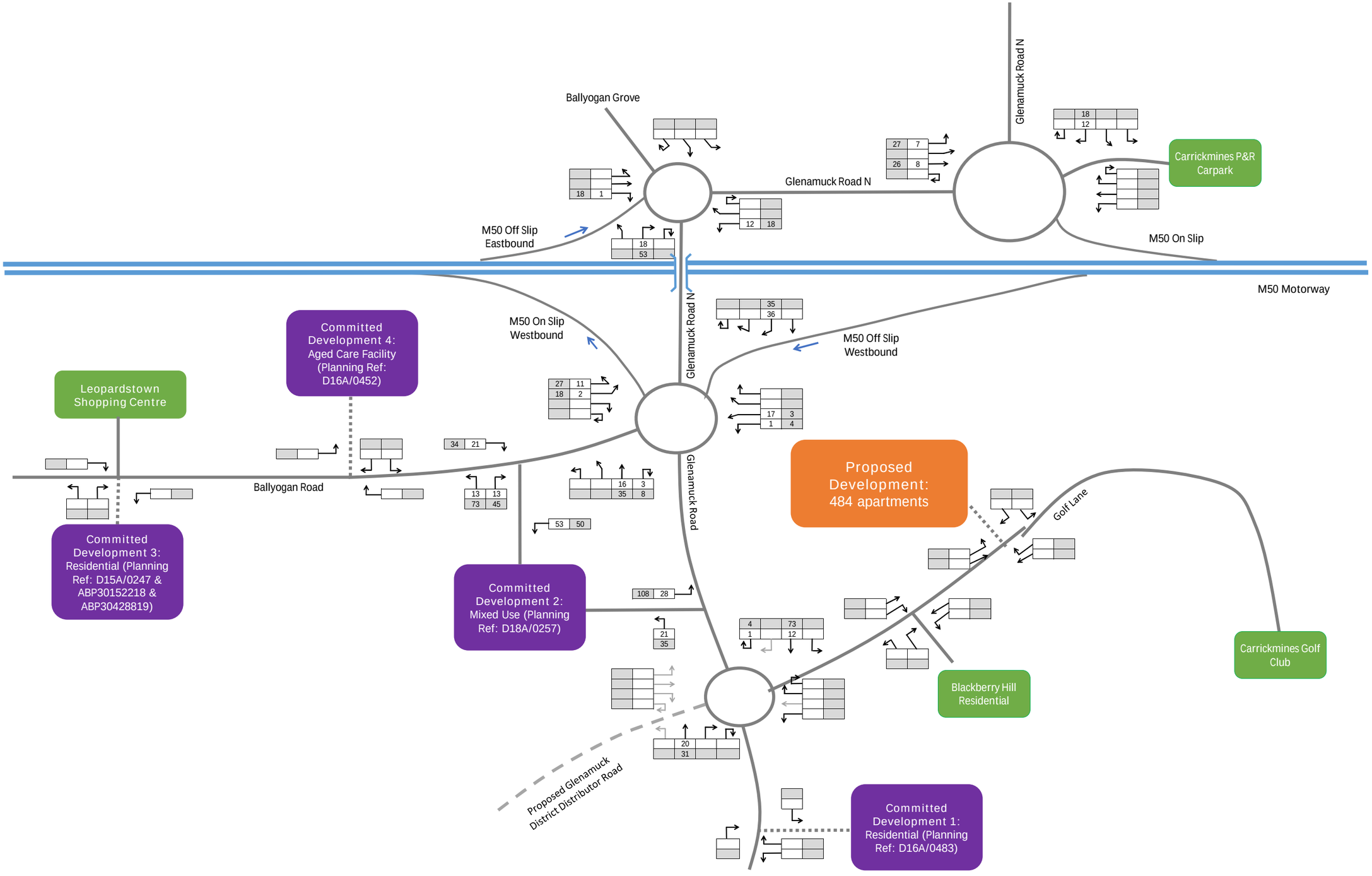
Flows measured in PCU's

AM Peak		PM Peak	
Arr	Dep	Arr	Dep
34	96	91	43

Dwn: | Ckd: | Date:

Ref: p170063\calcs\excel\TRAFFIC\170063 Traffic Model 001

Figure: 5.1b | Rev: -



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Dublin Office: Dublin Office: Ormond House, Upper Ormond Quay, Dublin 7 ph:+353 1 400 4000

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Project : Proposed Residential Development
Golf Lane, Glenamuck Road, Carrickmines, Co. Dublin

DRG. Title : Committed Development 2
Trip Generation - 2023

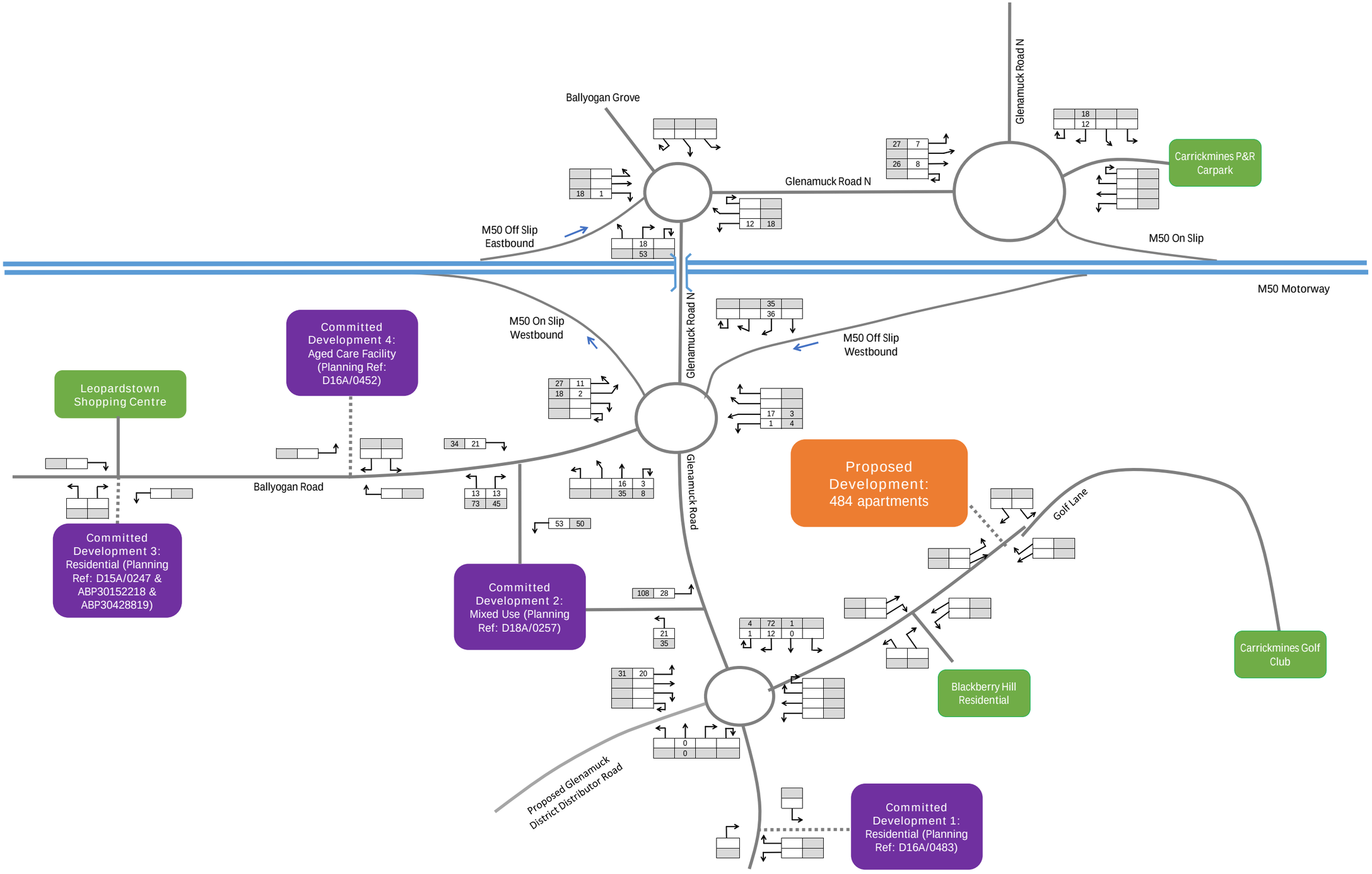
Key:
AM Peak Hour (0815-0915)
PM Peak Hour (1715-1815)

Flows measured in PCU's

Dwn:	Ckd:	Date:

Ref: p170063\calcs\excel\TRAFFIC\170063 Traffic Model 001

Figure:	Rev:
5.2a	-



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Dublin Office: Dublin Office: Ormond House, Upper Ormond Quay, Dublin 7 ph:+353 1 400 4000

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Waterford Office: Suite 8b The Atrium, Maritana Gate, Canada Street, Waterford ph:+353 51 309 500

Project : Proposed Residential Development
Golf Lane, Glenamuck Road, Carrickmines, Co. Dublin

DRG. Title : Committed Development 2
Trip Generation - 2028 & 2038

Key:
AM Peak Hour (0815-0915)
PM Peak Hour (1715-1815)

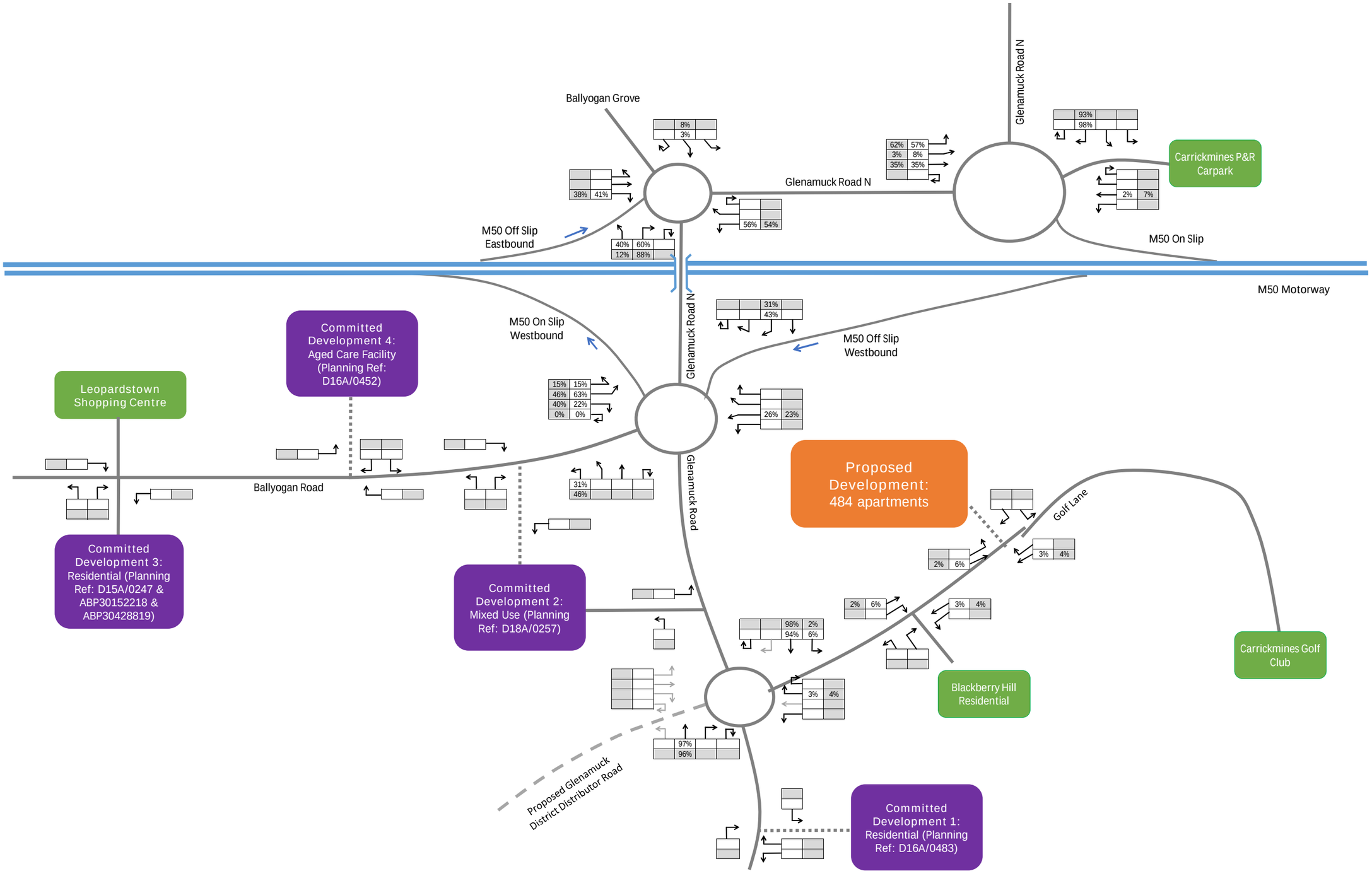
Flows measured in PCU's

Dwn:	Ckd:	Date:

Ref: p170063\calcs\excel\TRAFFIC\170063 Traffic Model 001

Figure: 5.2a

Rev: -



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Dublin Office: Ormond House, Upper Ormond Quay, Dublin 7
ph:+353 1 400 4000

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email: info@dbfl.ie
website: www.dbfl.ie

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ph:+353 51 309 500

Project :
Proposed Residential Development
Golf Lane, Glenamuck Road, Carrickmines, Co. Dublin

DRG. Title :
Committed Development 3
Trip Distribution

Key:
AM Peak Hour (0815-0915)
PM Peak Hour (1715-1815)

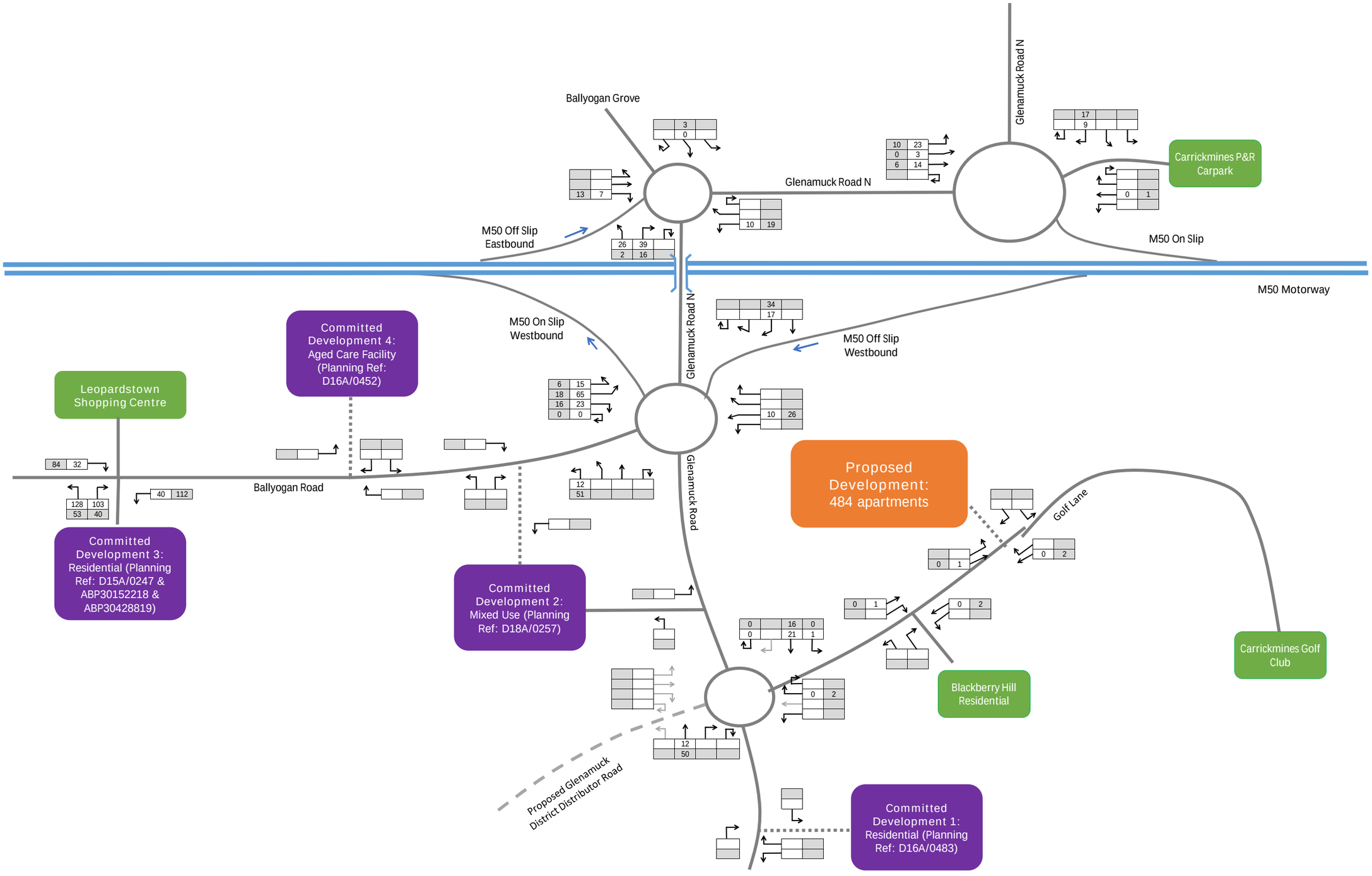
Flows measured in PCU's

Dwn:	Ckd:	Date:

Ref: p170063\calcs\excel\TRAFFIC\170063 Traffic Model 001

Figure: 5.3a

Rev: -



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Dublin Office: Dublin Office: Ormond House, Upper Ormond Quay, Dublin 7 ph:+353 1 400 4000

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Waterford Office: Suite 8b The Atrium, Maritana Gate, Canada Street, Waterford ph:+353 51 309 500

Project : Proposed Residential Development
Golf Lane, Glenamuck Road, Carrickmines, Co. Dublin

DRG. Title : Committed Development 3
2023 Trip Generation

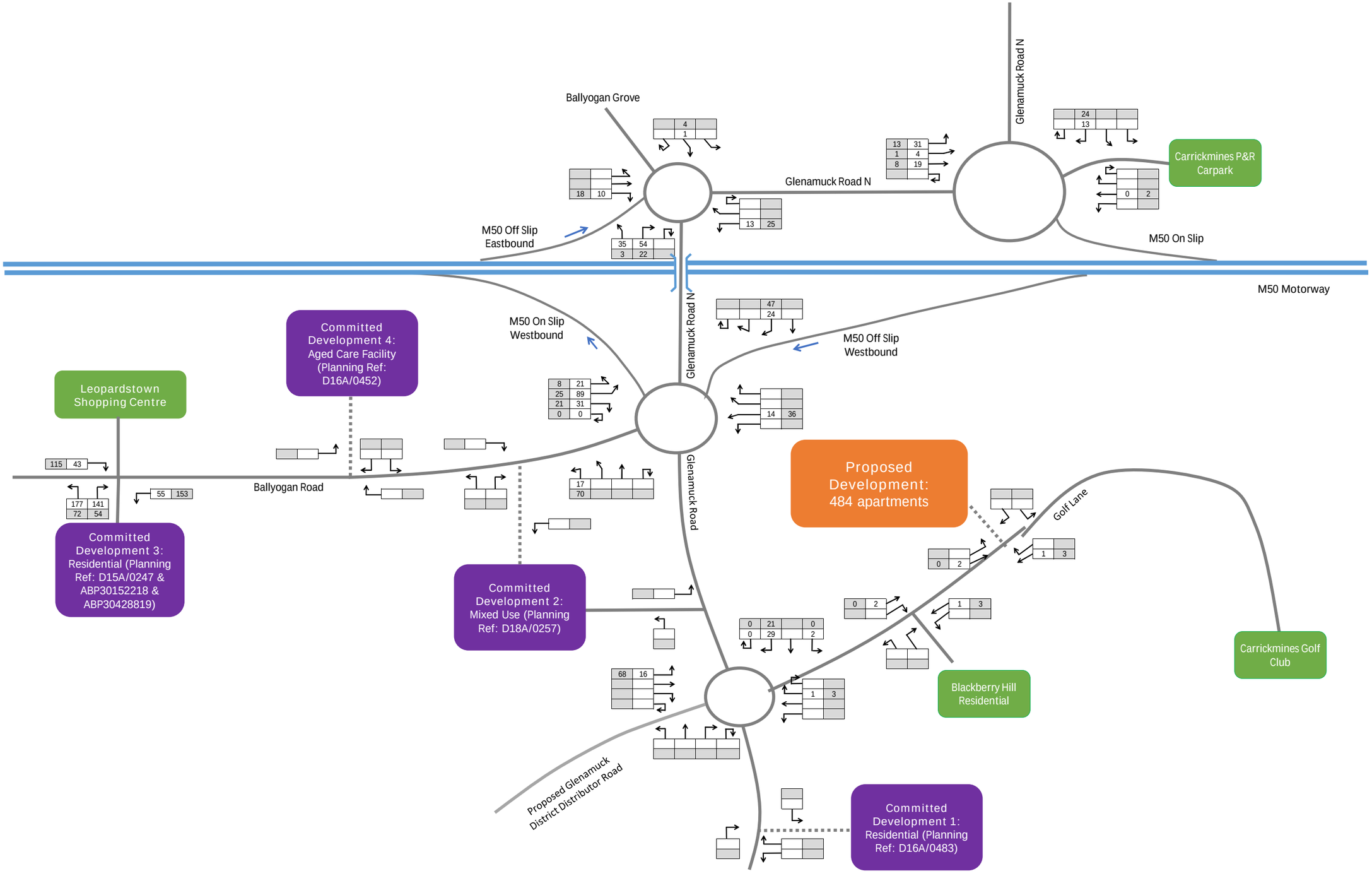
Key: AM Peak Hour (0815-0915) / PM Peak Hour (1715-1815)

Flows measured in PCU's

Dwn: | Ckd: | Date:

Ref: p170063\calcs\excel\TRAFFIC\170063 Traffic Model 001

Figure: 5.3b | Rev: -



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Dublin Office: Dublin Office: Ormond House, Upper Ormond Quay, Dublin 7 ph:+353 1 400 4000

Cork Office: Phoenix House, Monahan Road, Cork ph:+353 21 2024538 email: info@dbfl.ie website: www.dbfl.ie

Waterford Office: Suite 8b The Atrium, Maritana Gate, Canada Street, Waterford ph:+353 51 309 500

Project : Proposed Residential Development
Golf Lane, Glenamuck Road, Carrickmines, Co. Dublin

DRG. Title : Committed Development 3
2028 & 2038 Trip Generation

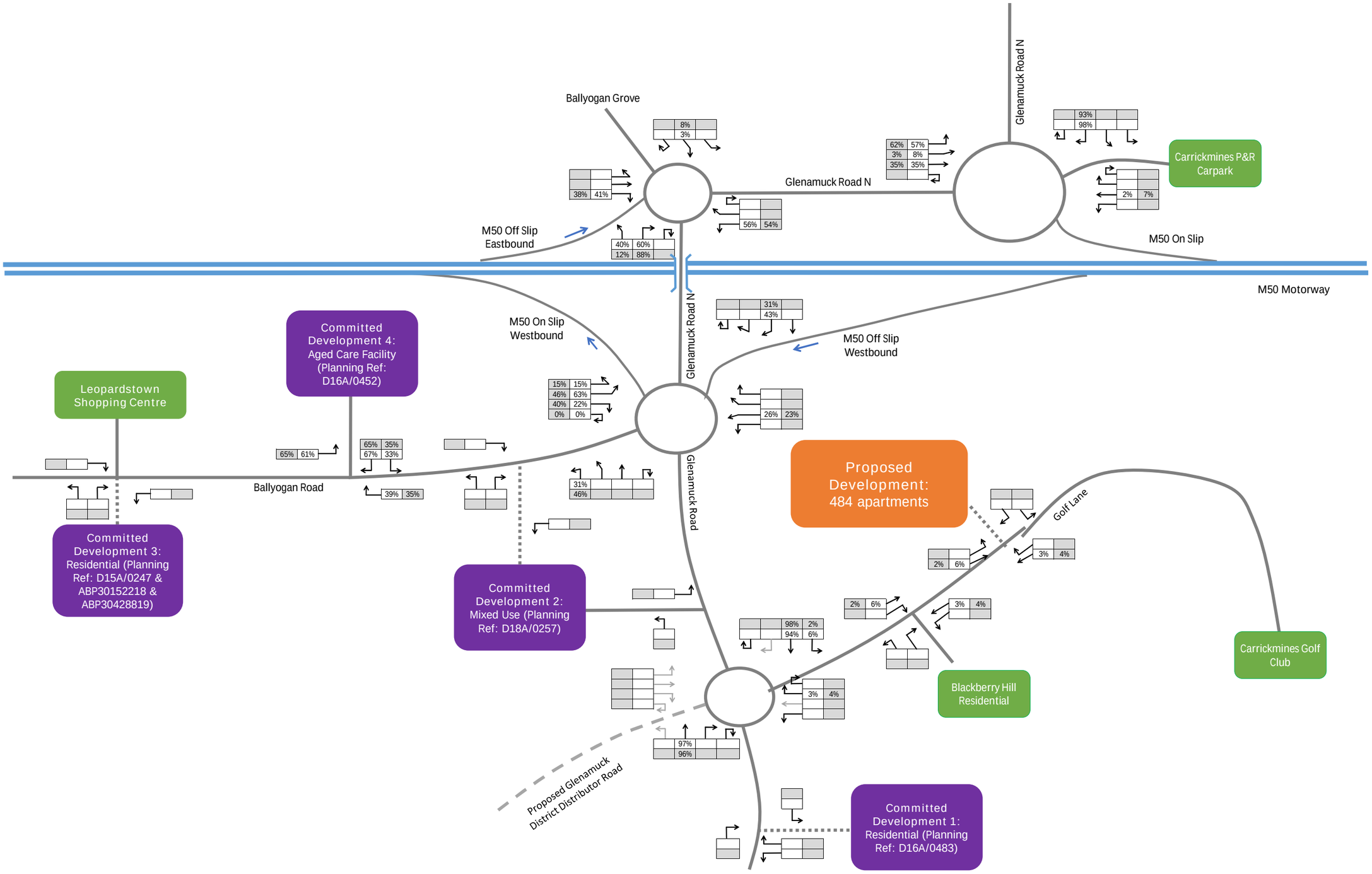
Key:
AM Peak Hour (0815-0915)
PM Peak Hour (1715-1815)

Flows measured in PCU's

Dwn: | Ckd: | Date:

Ref: p170063\calcs\excel\TRAFFIC\170063 Traffic Model 001

Figure: 5.3c | Rev: -



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Dublin Office: Ormond House, Upper Ormond Quay, Dublin 7
ph:+353 1 400 4000

Cork Office: Phoenix House, Monahan Road, Cork
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email: info@dbfl.ie
website: www.dbfl.ie

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ph:+353 51 309 500

Project :
Proposed Residential Development
Golf Lane, Glenamuck Road, Carrickmines, Co. Dublin

DRG. Title :
Committed Development 4
Trip Distribution

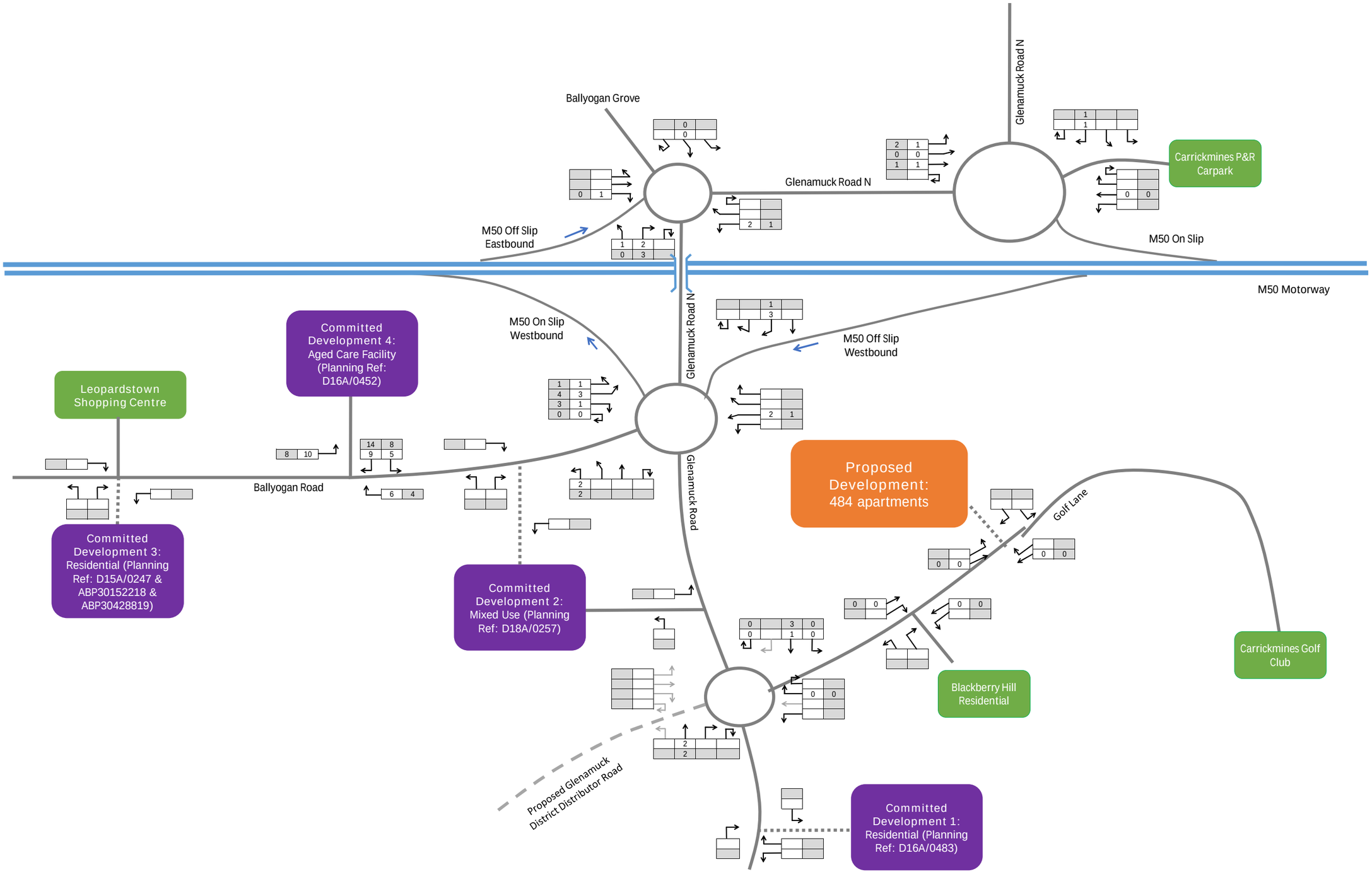
Key:
AM Peak Hour (0815-0915)
PM Peak Hour (1715-1815)

Flows measured in PCU's

Dwn:	Ckd:	Date:

Ref: p170063\calcs\excel\TRAFFIC\170063 Traffic Model 001

Figure:	Rev:
5.4a	-



DBFL Consulting Engineers

Dublin Office: Ormond House, Upper Ormond Quay, Dublin 7
ph:+353 1 400 4000

Cork Office: Phoenix House, Monahan Road, Cork
ph:+353 21 2024538
email: info@dbfl.ie
website: www.dbfl.ie

Waterford Office: Suite 8b The Atrium, Maritana Gate, Canada Street, Waterford
ph:+353 51 309 500

Project :
Proposed Residential Development
Golf Lane, Glenamuck Road, Carrickmines, Co. Dublin

DRG. Title :
Committed Development 4
Trip Generation

Key:
AM Peak Hour (0815-0915)
PM Peak Hour (1715-1815)

Flows measured in PCU's

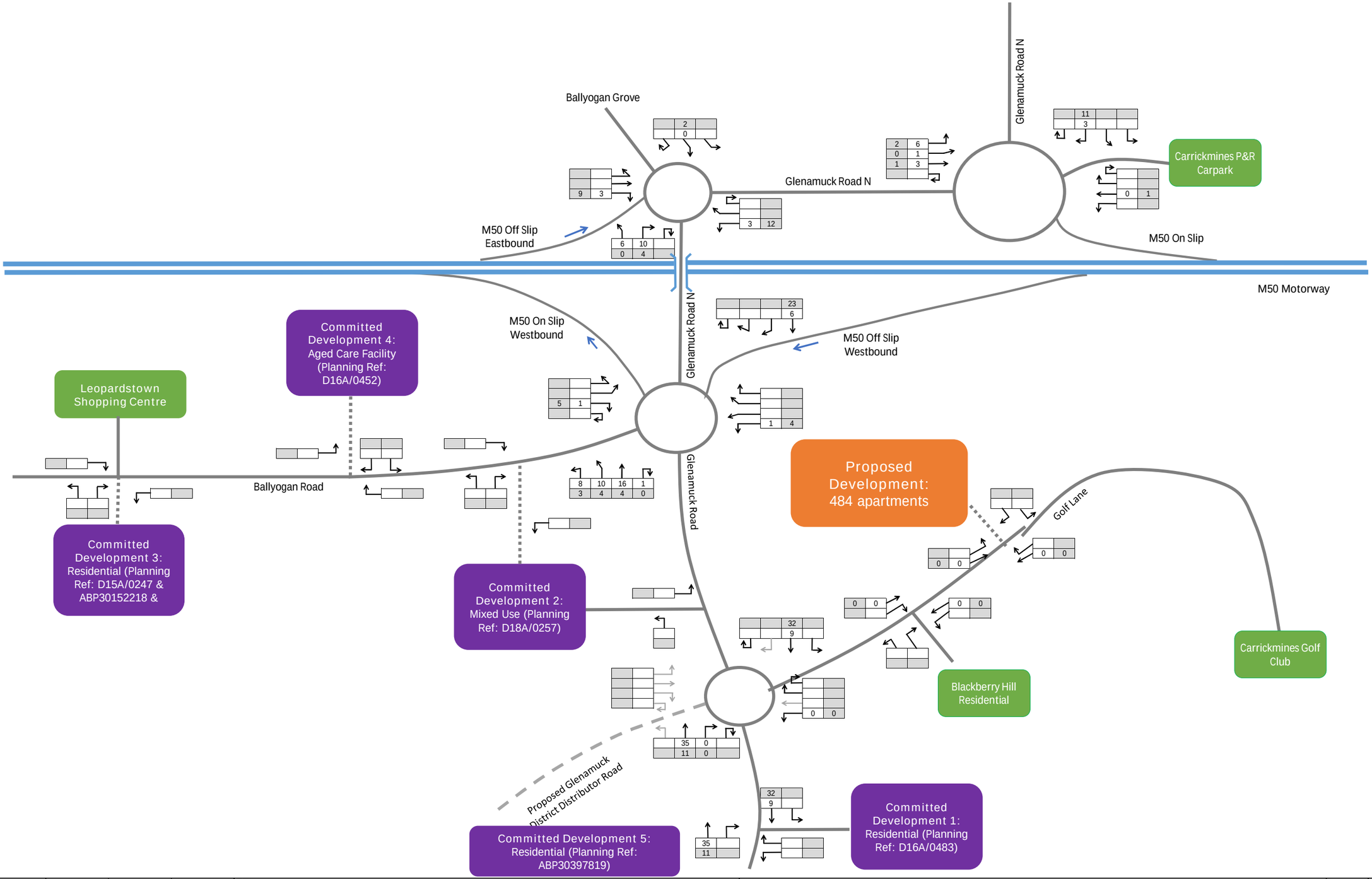
AM Peak		PM Peak	
Arr	Dep	Arr	Dep
16	14	12	22

Dwn: | Ckd: | Date:

Ref: p170063\calcs\excel\TRAFFIC\170063 Traffic Model 001

Figure: 5.4b

Rev: -



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Cork Office: Phoenix House, Monahan Road, Cork ph:+353 21 2024538 email: info@dbfl.ie website: www.dbfl.ie

Waterford Office: Suite 8b The Atrium, Maritana Gate, Canada Street, Waterford ph:+353 51 309 500

Project : Proposed Residential Development
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DRG. Title : Committed Development 5
Trip Generation

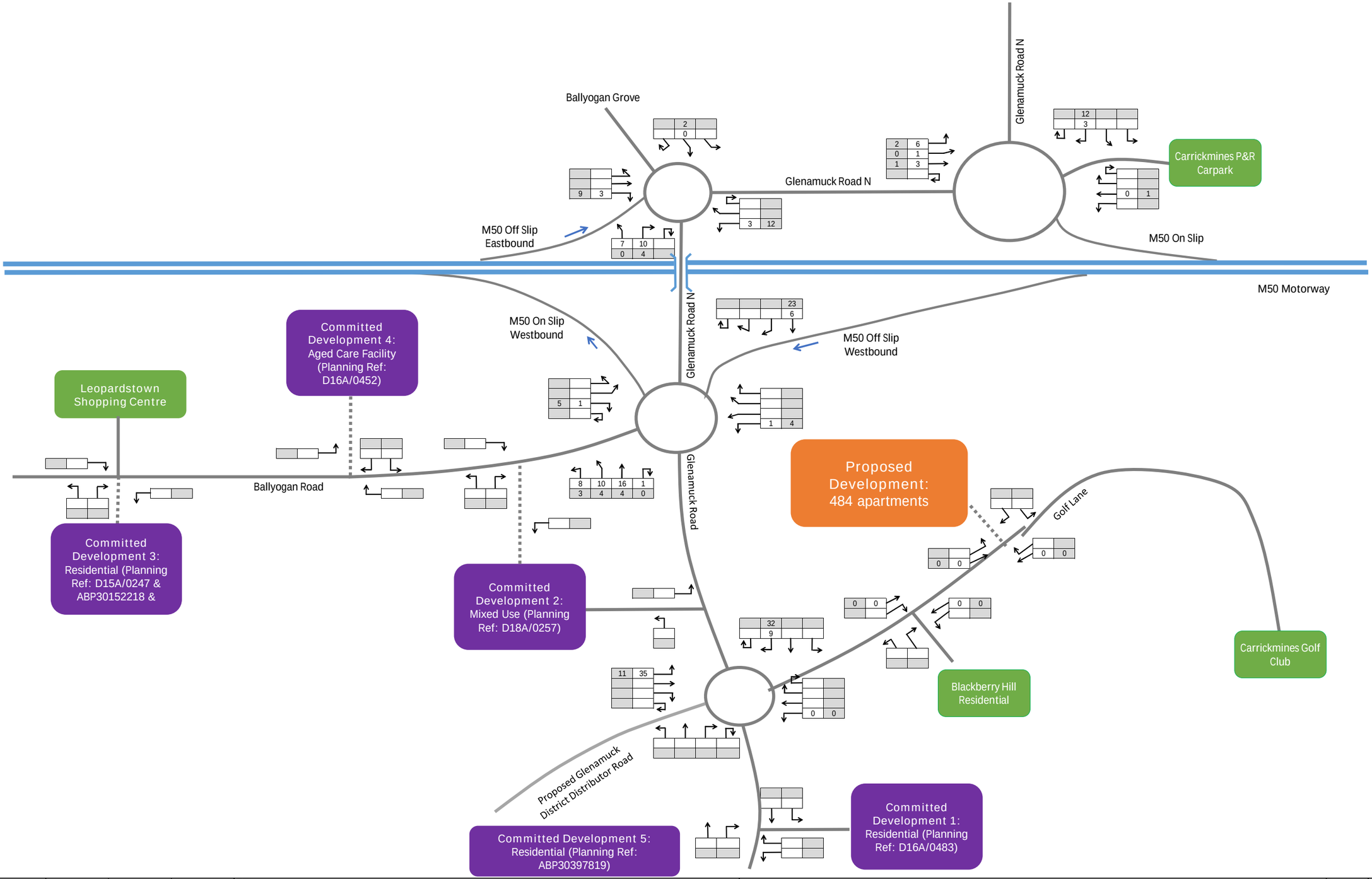
Key: AM Peak Hour (0815-0915) PM Peak Hour (1715-1815)

Flows measured in PCU's

Dwn:	Ckd:	Date:

Ref: p170063\calcs\excel\TRAFFIC\170063 Traffic Model 001

Figure:	Rev:
5.5a	-



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Dublin Office: Dublin Office: Ormond House, Upper Ormond Quay, Dublin 7 ph:+353 1 400 4000

Cork Office: Phoenix House, Monahan Road, Cork ph:+353 21 2024538 email: info@dbfl.ie website: www.dbfl.ie

Waterford Office: Suite 8b The Atrium, Maritana Gate, Canada Street, Waterford ph:+353 51 309 500

Project : Proposed Residential Development
Golf Lane, Glenamuck Road, Carrickmines, Co. Dublin

DRG. Title : Committed Development 5
2028 & 2038Trip Generation

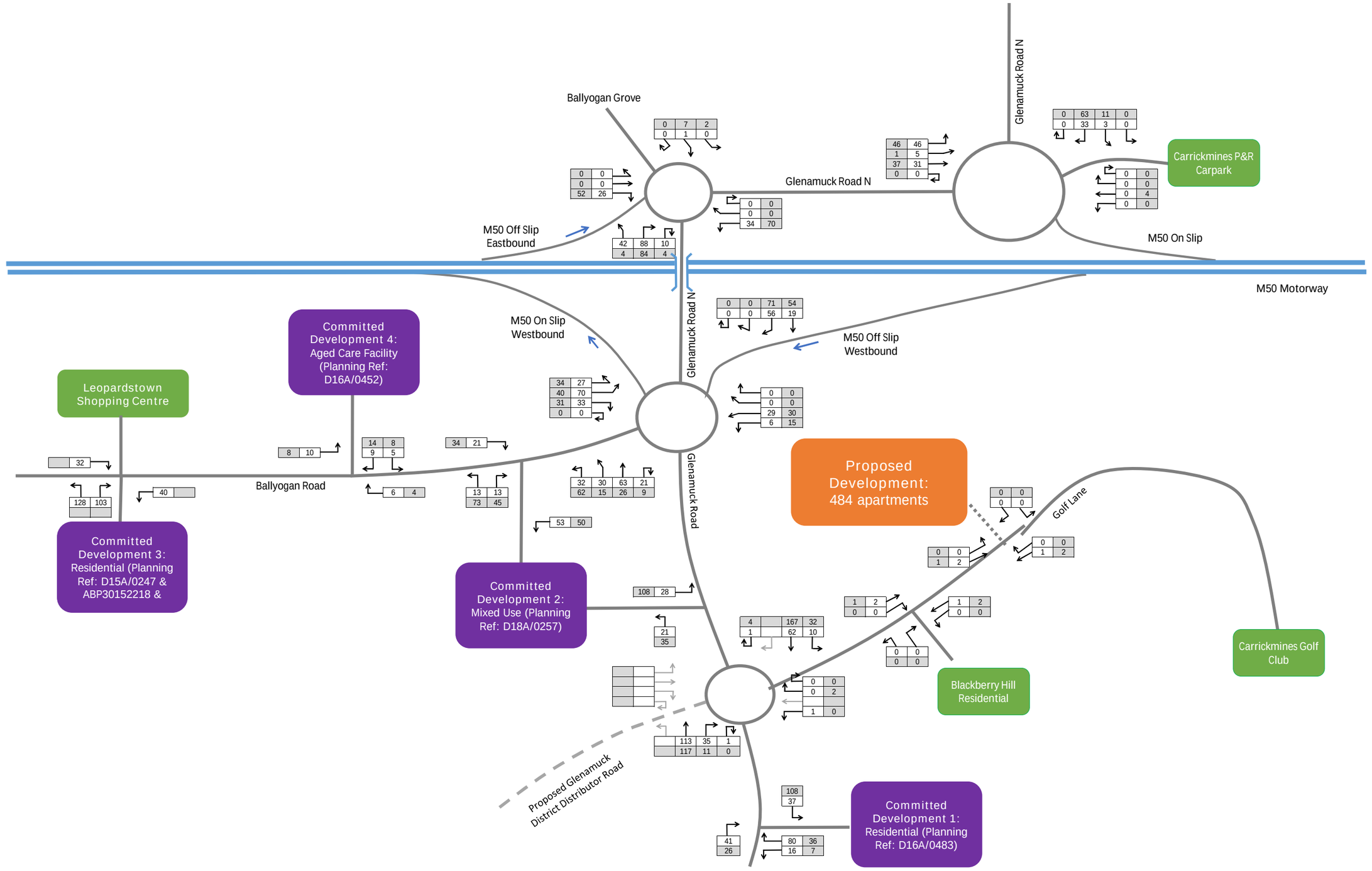
Key: AM Peak Hour (0815-0915) PM Peak Hour (1715-1815)

Flows measured in PCU's

Dwn: | Ckd: | Date:

Ref: p170063\calcs\excel\TRAFFIC\170063 Traffic Model 001

Figure: 5.5b | Rev: -



DBFL Consulting Engineers

Dublin Office: Ormond House, Upper Ormond Quay, Dublin 7
ph:+353 1 400 4000

Cork Office: Phoenix House, Monahan Road, Cork
ph:+353 21 2024538
email: info@dbfl.ie
website: www.dbfl.ie

Waterford Office: Suite 8b The Atrium, Maritana Gate, Canada Street, Waterford
ph:+353 51 309 500

Project : Proposed Residential Development
Golf Lane, Glenamuck Road, Carrickmines, Co. Dublin

DRG. Title : Committed Development (Sites 1 - 4)
Trip Generation 2023

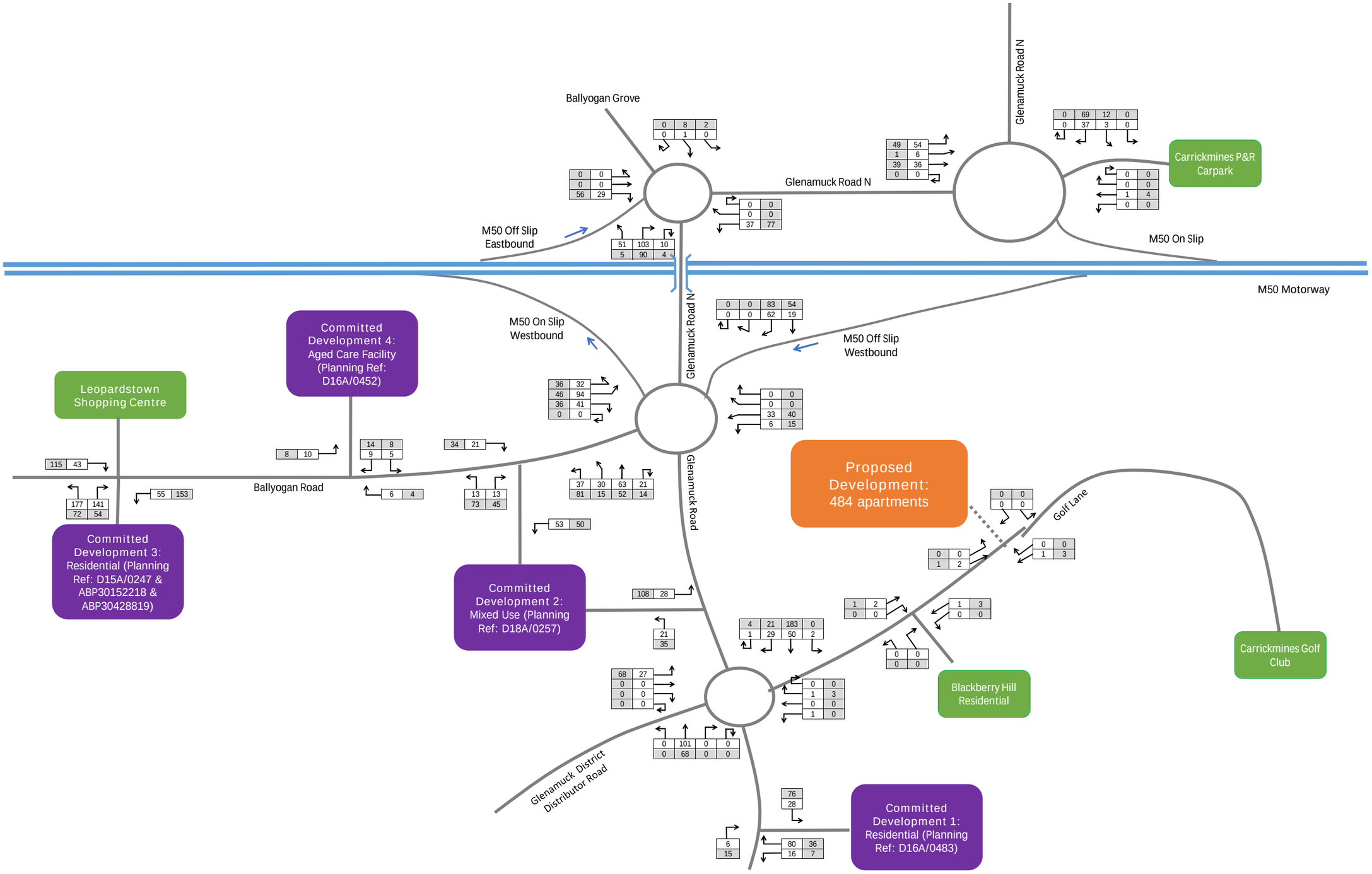
Key:
AM Peak Hour (0815-0915)
PM Peak Hour (1715-1815)

Flows measured in PCU's

Dwn: | Ckd: | Date:

Ref: p170063\calcs\excel\TRAFFIC\170063 Traffic Model 001

Figure: 6a | Rev: -



DBFL Consulting Engineers

Dublin Office: Dublin Office: Ormond House, Upper Ormond Quay, Dublin 7 ph:+353 1 400 4000

Cork Office: Phoenix House, Monahan Road, Cork ph:+353 21 2024538 email: info@dbfl.ie website: www.dbfl.ie

Waterford Office: Suite 8b The Atrium, Maritana Gate, Canada Street, Waterford ph:+353 51 309 500

Project : Proposed Residential Development
Golf Lane, Glenamuck Road, Carrickmines, Co. Dublin

DRG. Title : Committed Development (Sites 1 - 4)
Trip Generation 2028 & 2038

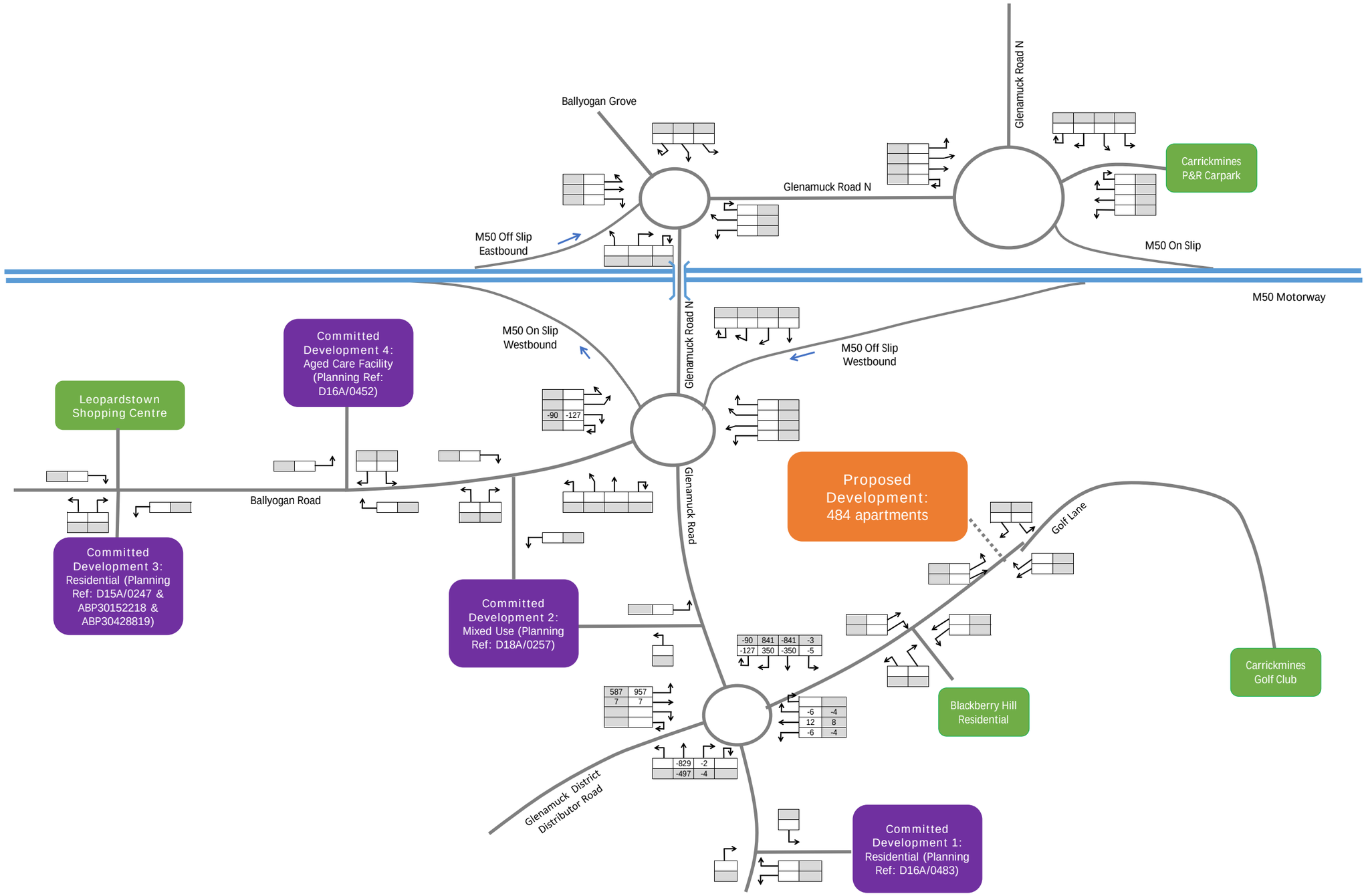
Key:
AM Peak Hour (0815-0915)
PM Peak Hour (1715-1815)

Flows measured in PCU's

Dwn:	Ckd:	Date:

Ref: p170063\calcs\excel\TRAFFIC\170063 Traffic Model 001

Figure:	Rev:
6b	-



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Dublin Office: Ormond House, Upper Ormond Quay, Dublin 7
ph:+353 1 400 4000

Cork Office: Phoenix House, Monahan Road, Cork
ph:+353 21 2024538

Waterford Office: Suite 8b The Atrium, Maritana Gate, Canada Street, Waterford
ph:+353 51 309 500

email: info@dbfl.ie
website: www.dbfl.ie

Project :
Proposed Residential Development
Golf Lane, Glenamuck Road, Carrickmines, Co. Dublin

DRG. Title :
2028 Redistribution of Traffic Flows

Key:
AM Peak Hour (0815-0915)
PM Peak Hour (1715-1815)

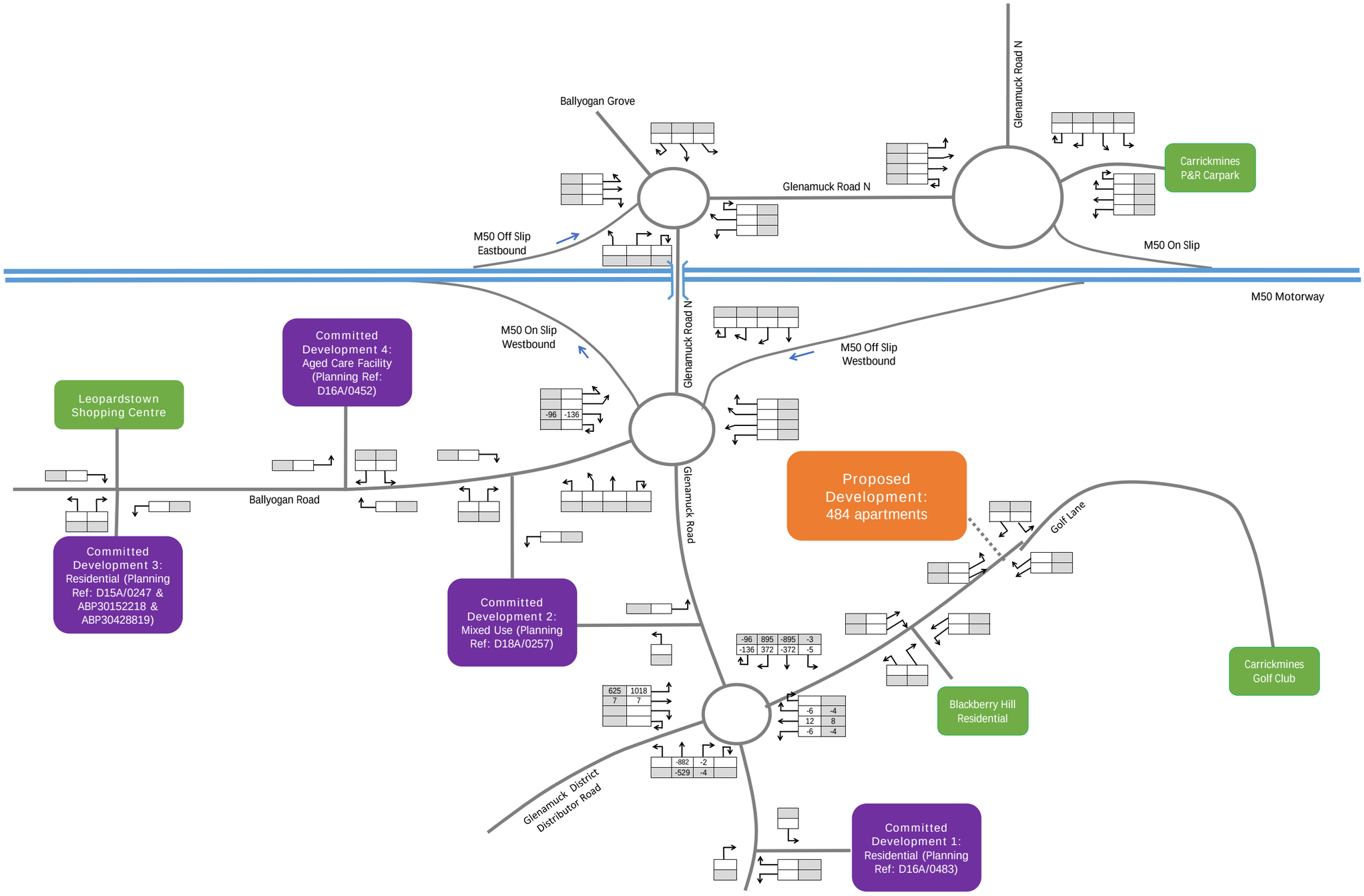
Flows measured in PCU's

Dwn:	Ckd:	Date:

Ref: p170063\calcs\excel\TRAFFIC\170063 Traffic Model 001

Figure: 7a

Rev: -



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Dublin Office: Ormond House, Upper Ormond Quay, Dublin 7
ph:+353 1 400 4000

Cork Office: Phoenix House, Monahan Road, Cork
ph:+353 21 2024538
email: info@dbfl.ie
website: www.dbfl.ie

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ph:+353 51 309 500

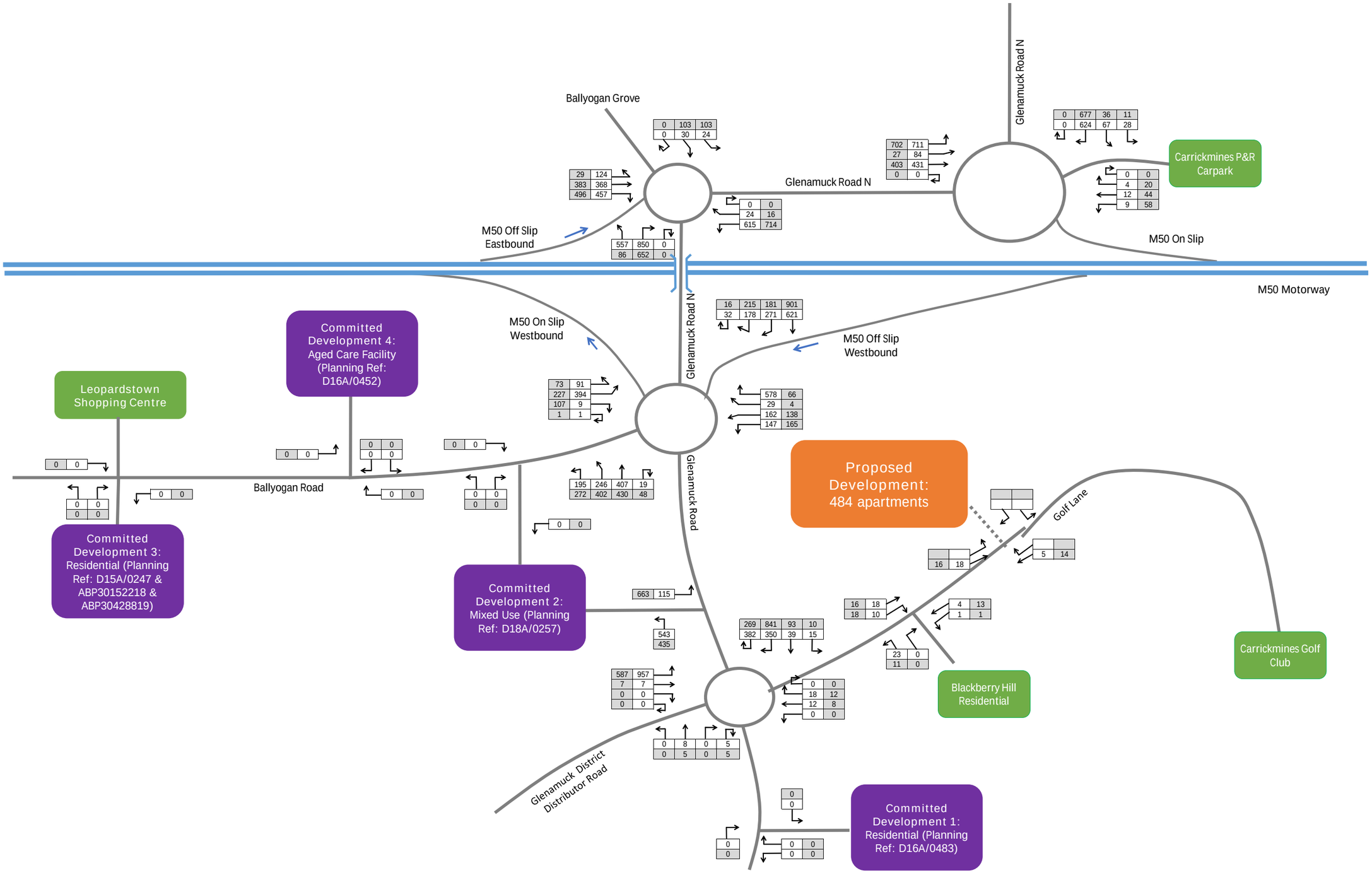
Project :
Proposed Residential Development
Golf Lane, Glenamuck Road, Carrickmines, Co. Dublin

DRG. Title :
2038 Redistribution of Traffic Flows

Key:
AM Peak Hour (0815-0915)
PM Peak Hour (1715-1815)

Flows measured in PCU's

Dwn:	Ckd:	Date:
Ref: p170063\calcs\excel\TRAFFIC\170063 Traffic Model 001		
Figure: 7b		Rev: -



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Project : Proposed Residential Development
Golf Lane, Glenamuck Road, Carrickmines, Co. Dublin

DRG. Title : Network Traffic Flows
2028 Adjusted Base Flows

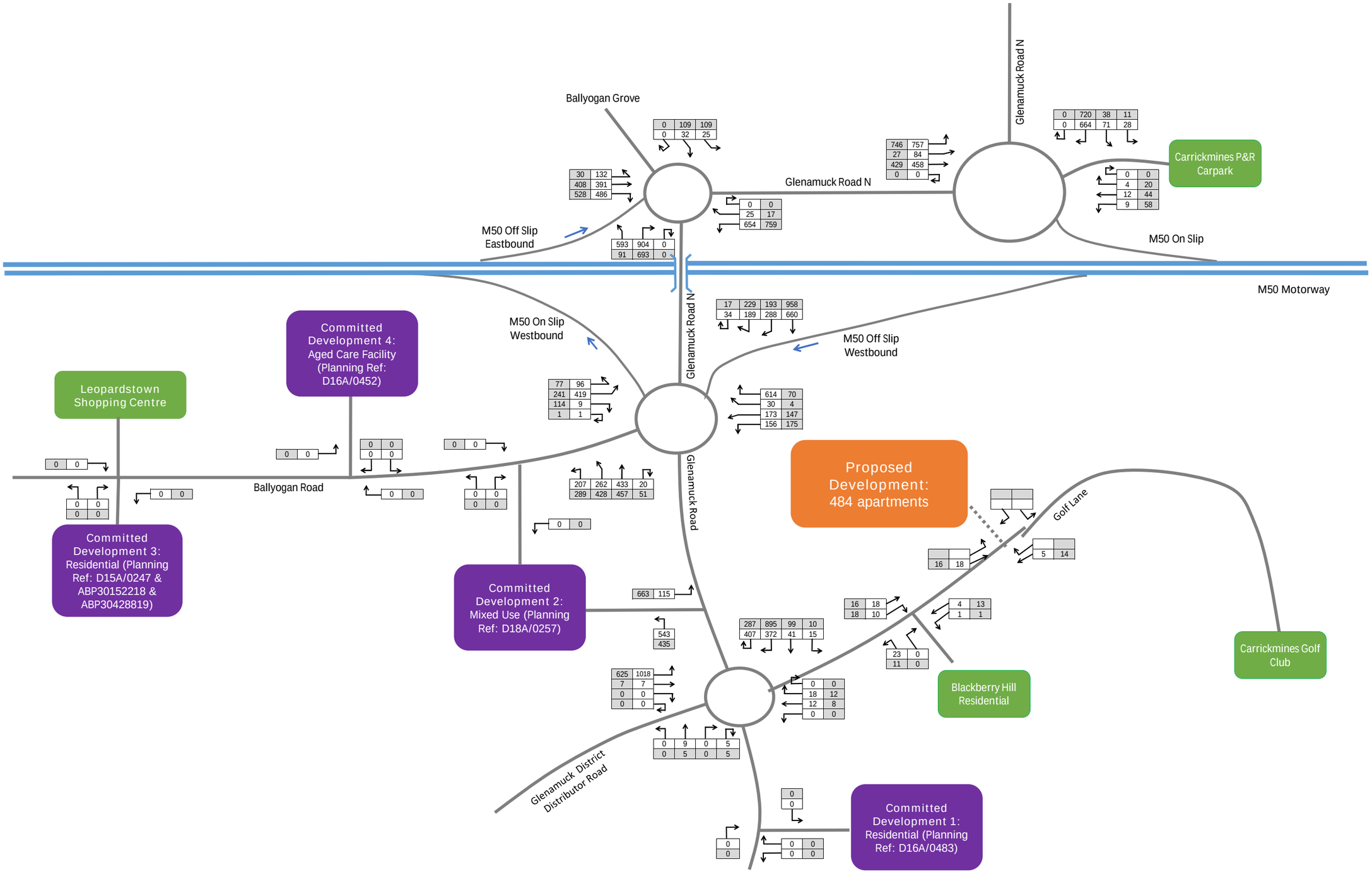
Key:
AM Peak Hour (0815-0915)
PM Peak Hour (1715-1815)

Flows measured in PCU's

Dwn: | Ckd: | Date:

Ref: p170063\calcs\excel\TRAFFIC\170063 Traffic Model 001

Figure: 8a | Rev: -



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Project : Proposed Residential Development
Golf Lane, Glenamuck Road, Carrickmines, Co. Dublin

DRG. Title : Network Traffic Flows
2038 Adjusted Base Flows

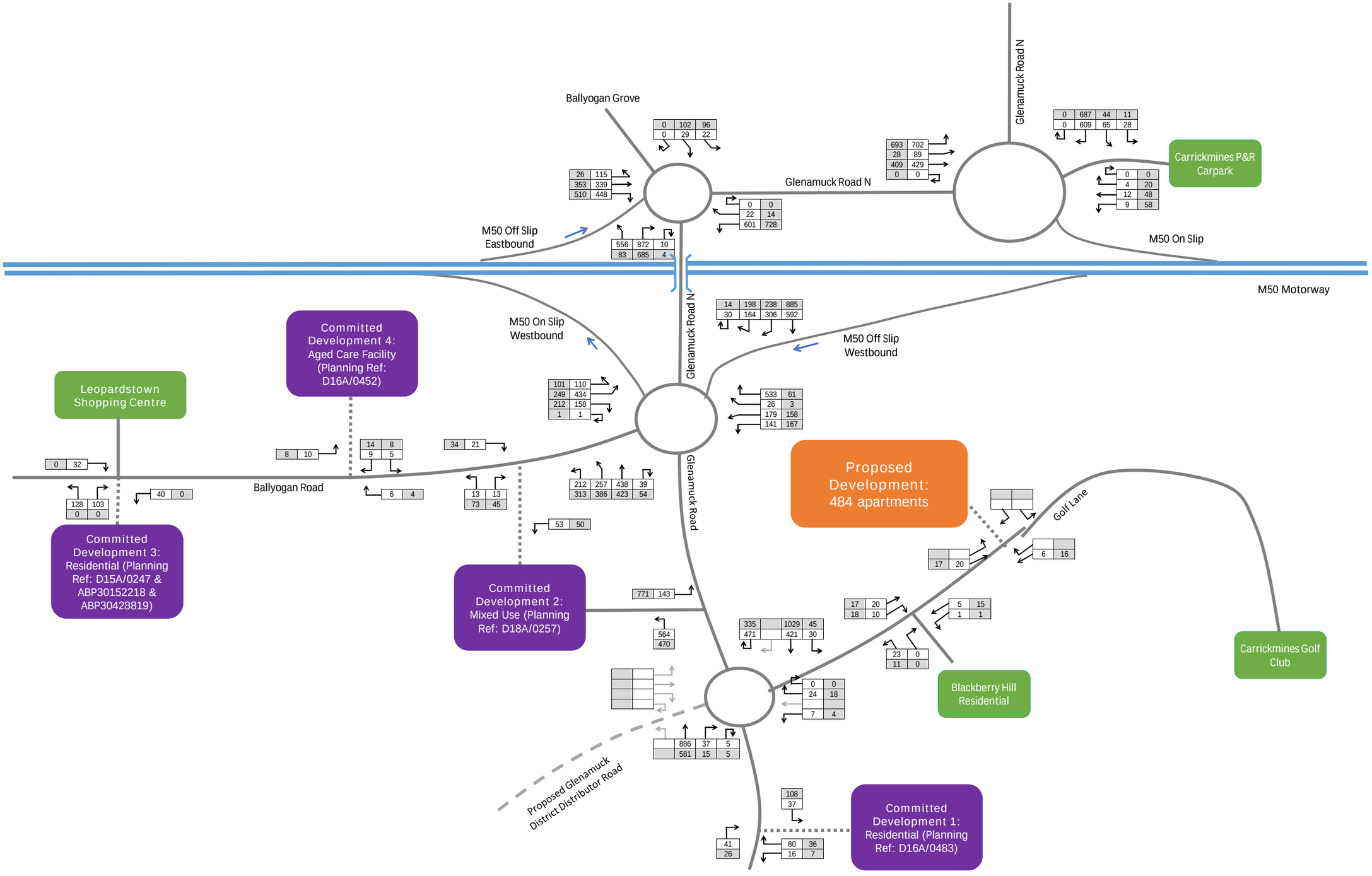
Key:
AM Peak Hour (0815-0915)
PM Peak Hour (1715-1815)

Flows measured in PCU's

Dwn: | Ckd: | Date:

Ref: p170063\calcs\excel\TRAFFIC\170063 Traffic Model 001

Figure: 8b | Rev: -



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Project : Proposed Residential Development
Golf Lane, Glenamuck Road, Carrickmines, Co. Dublin

DRG. Title : Network Traffic Flows
2023 Do Nothing Scenario

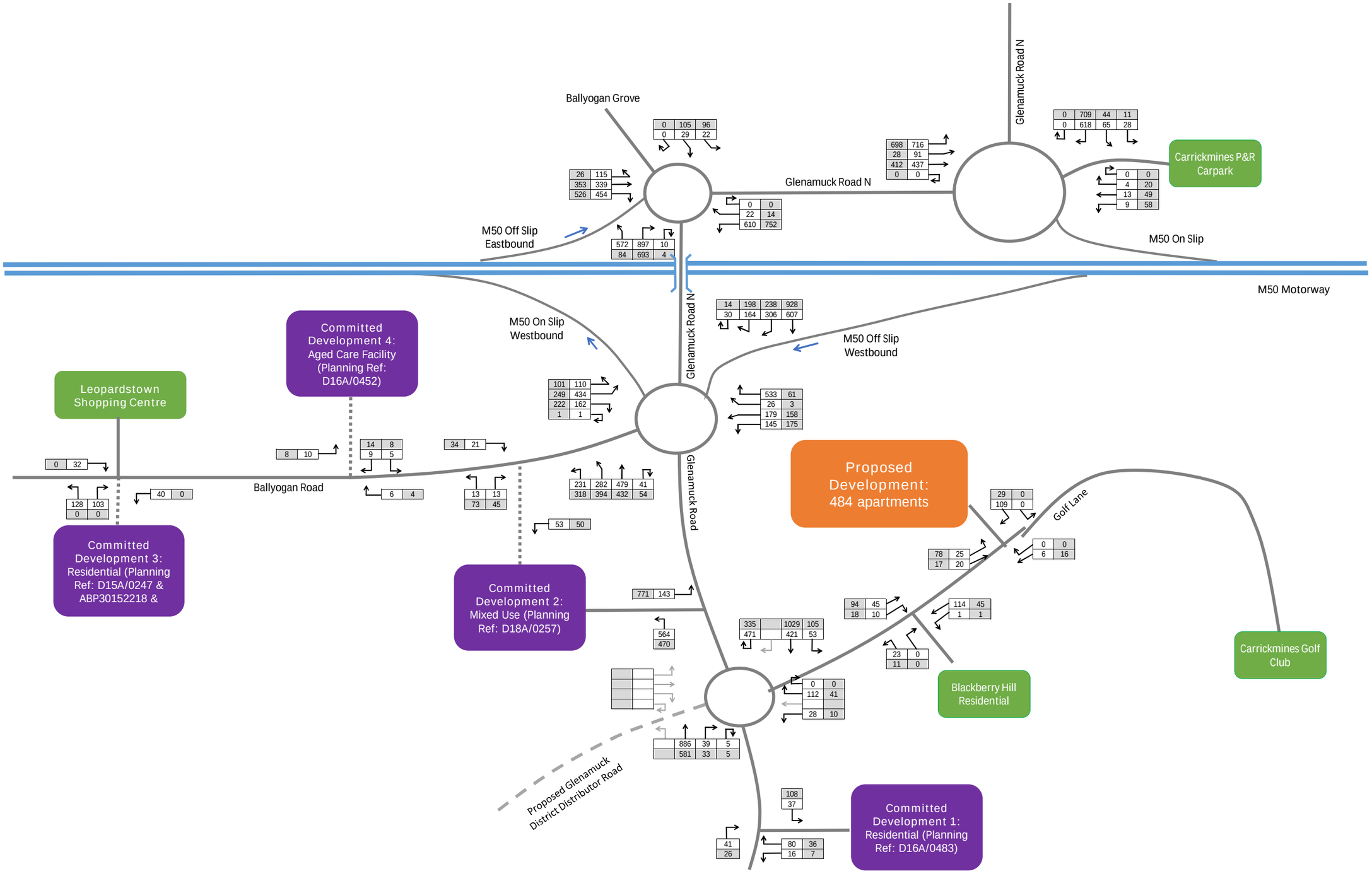
Key:
AM Peak Hour (0815-0915)
PM Peak Hour (1715-1815)

Flows measured in PCU's

Dwn: | Ckd: | Date:

Ref: p170063\calcs\excel\TRAFFIC\170063 Traffic Model 001

Figure: 9 | Rev: -



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Project :
Proposed Residential Development
Golf Lane, Glenamuck Road, Carrickmines, Co. Dublin

DRG. Title :
Network Traffic Flows
2023 Do Something Scenario

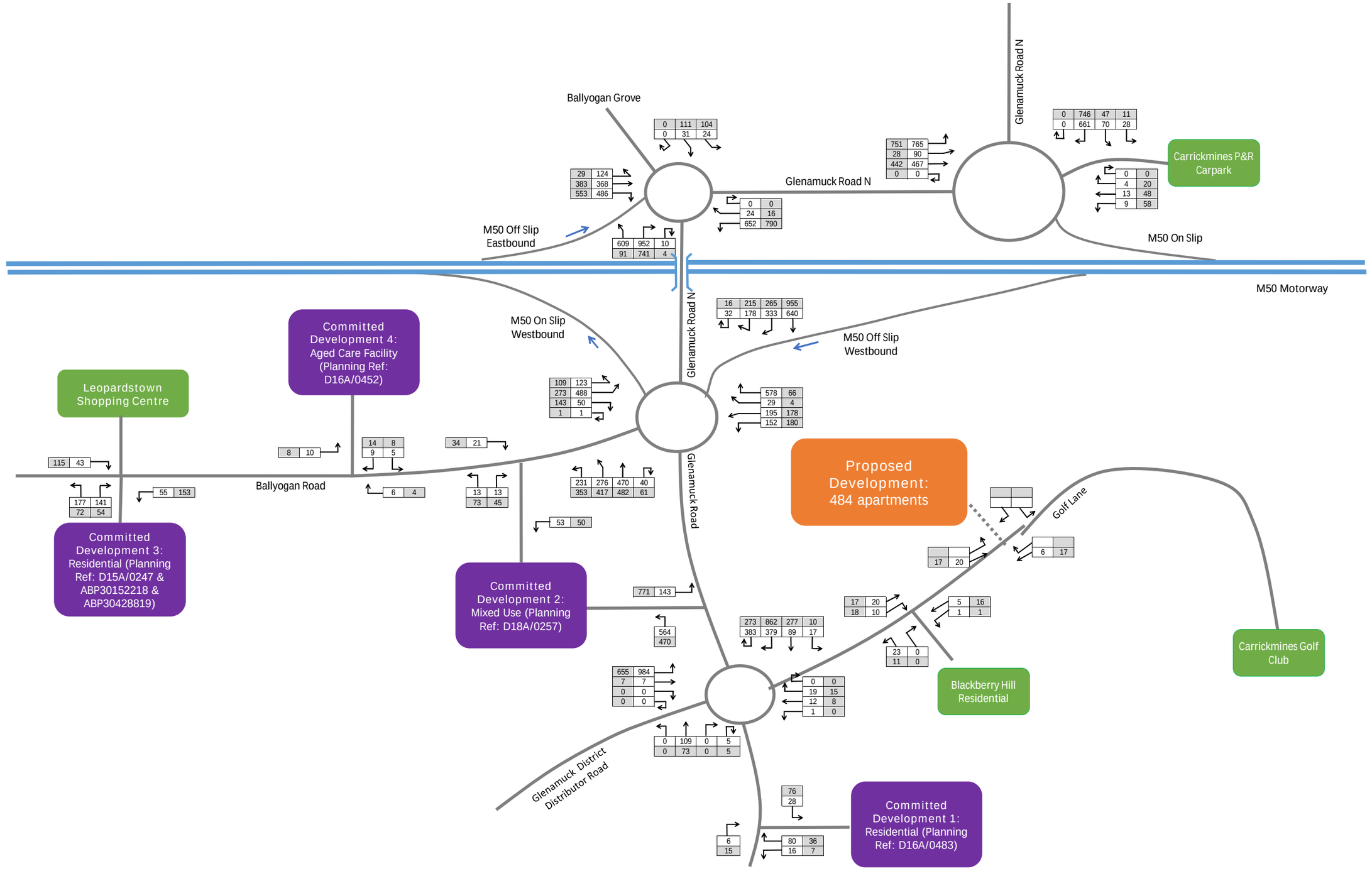
Key:
AM Peak Hour (0815-0915)
PM Peak Hour (1715-1815)

Flows measured in PCU's

Dwn: | Ckd: | Date:

Ref: p170063\calcs\excel\TRAFFIC\170063 Traffic Model 001

Figure: 10 | Rev: -



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Project : Proposed Residential Development
Golf Lane, Glenamuck Road, Carrickmines, Co. Dublin

DRG. Title : Network Traffic Flows
2028 Do Nothing Scenario

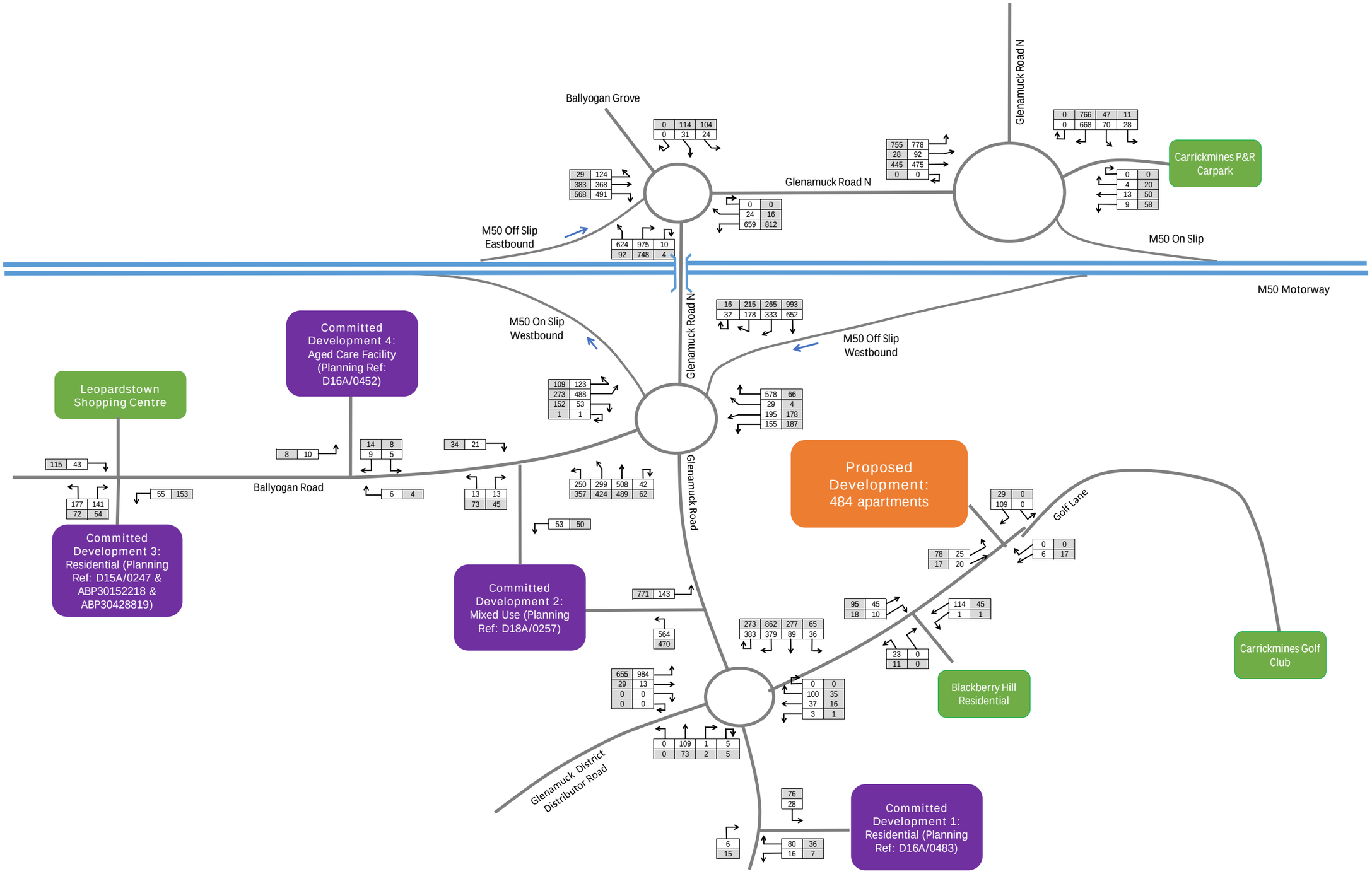
Key:
AM Peak Hour (0815-0915)
PM Peak Hour (1715-1815)

Flows measured in PCU's

Dwn: | Ckd: | Date:

Ref: p170063\calcs\excel\TRAFFIC\170063 Traffic Model 001

Figure: 11 | Rev: -



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Project : Proposed Residential Development
Golf Lane, Glenamuck Road, Carrickmines, Co. Dublin

DRG. Title : Network Traffic Flows
2028 Do Something Scenario

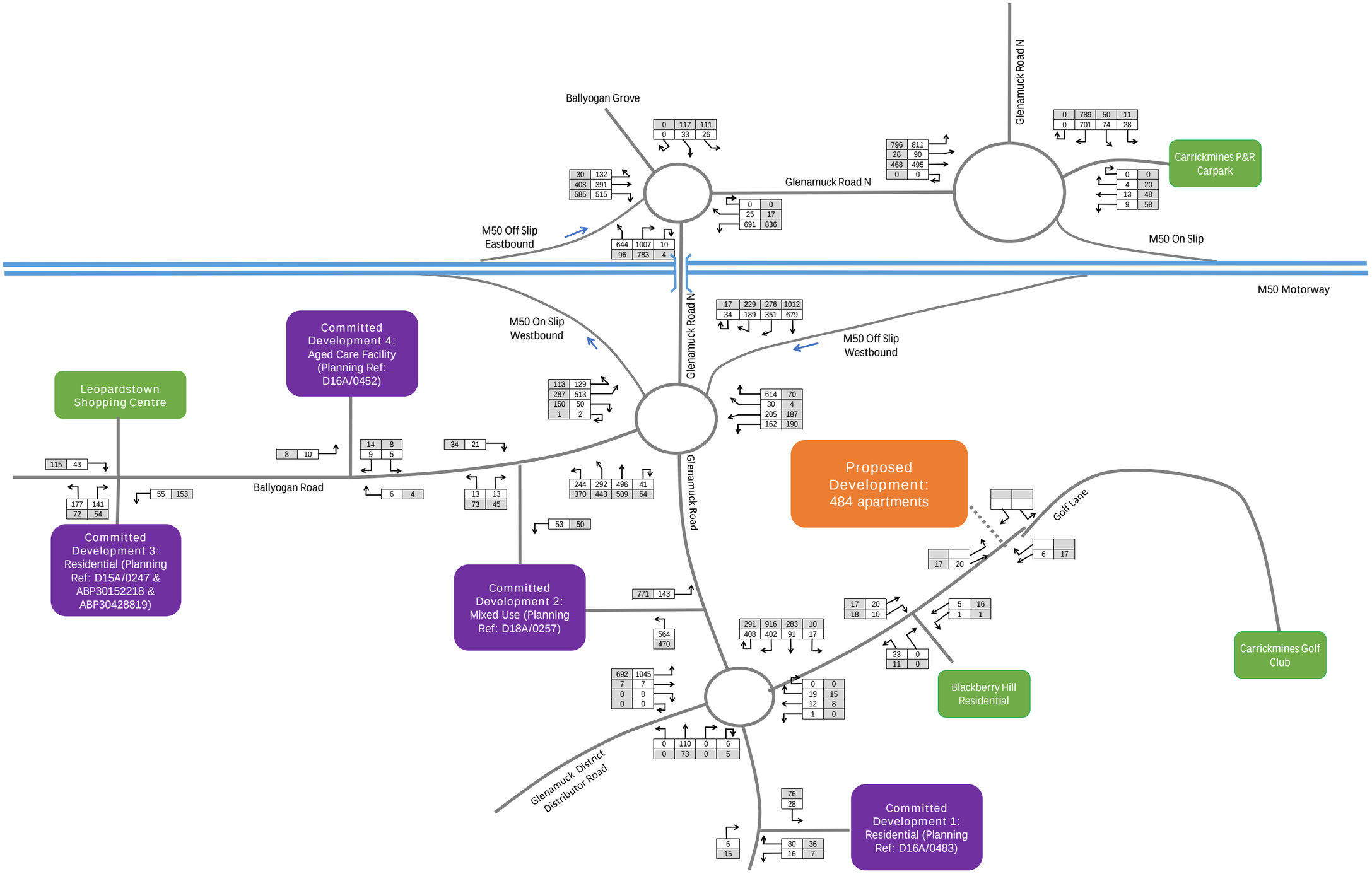
Key:
AM Peak Hour (0815-0915)
PM Peak Hour (1715-1815)

Flows measured in PCU's

Dwn: | Ckd: | Date:

Ref: p170063\calcs\excel\TRAFFIC\170063 Traffic Model 001

Figure: 12 | Rev: -



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Dublin Office: Dublin Office: Ormond House, Upper Ormond Quay, Dublin 7 ph:+353 1 400 4000

Cork Office: Phoenix House, Monahan Road, Cork ph:+353 21 2024538 email: info@dbfl.ie website: www.dbfl.ie

Waterford Office: Suite 8b The Atrium, Maritana Gate, Canada Street, Waterford ph:+353 51 309 500

Project : Proposed Residential Development
Golf Lane, Glenamuck Road, Carrickmines, Co. Dublin

DRG. Title : Network Traffic Flows
2038 Do Nothing Scenario

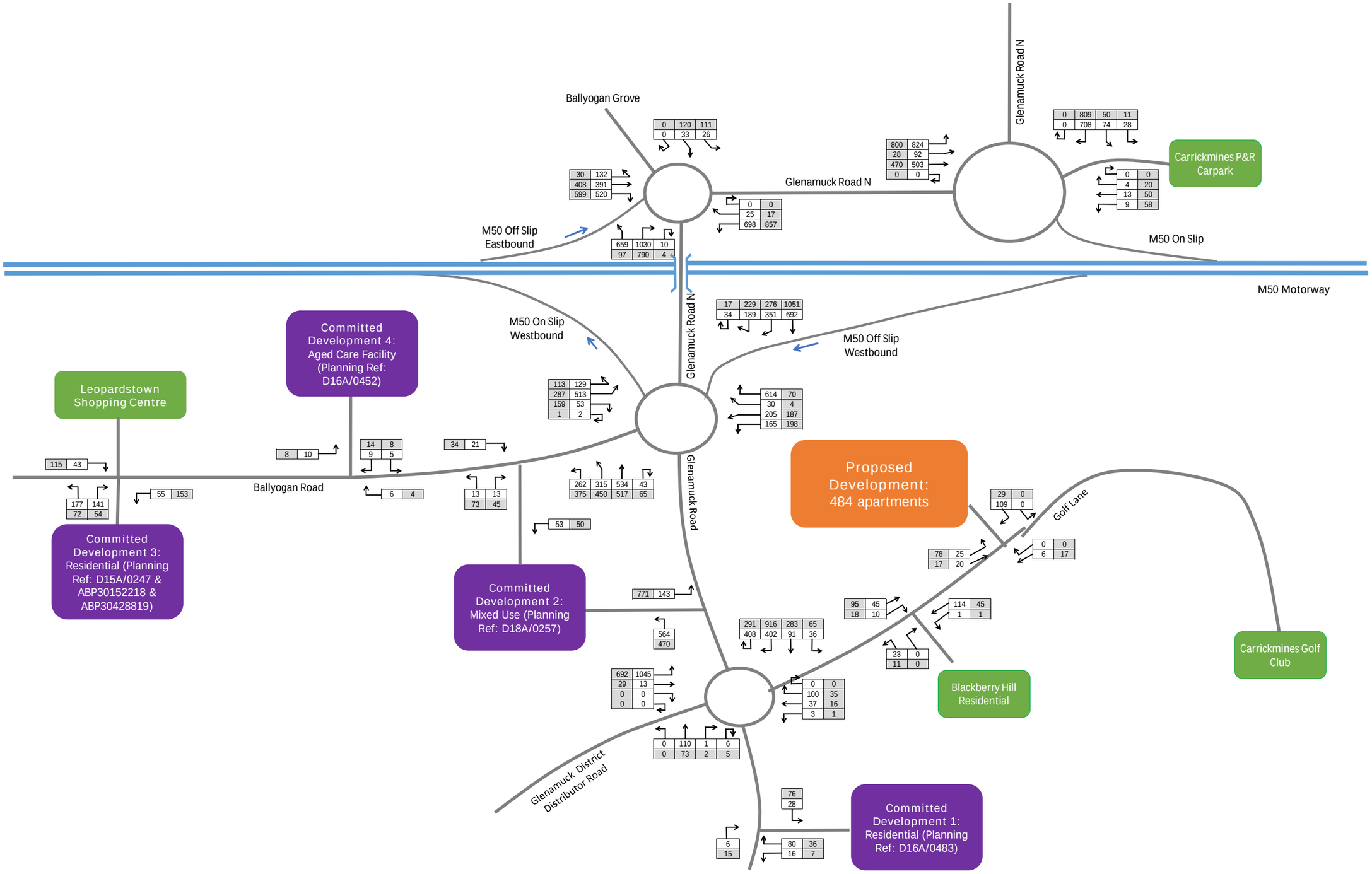
Key: AM Peak Hour (0815-0915) PM Peak Hour (1715-1815)

Flows measured in PCU's

Dwn: | Ckd: | Date:

Ref: p170063\calcs\excel\TRAFFIC\170063 Traffic Model 001

Figure: 13 | Rev: -



DBFL Consulting Engineers

Dublin Office: Dublin Office: Ormond House, Upper Ormond Quay, Dublin 7 ph:+353 1 400 4000

Cork Office: Phoenix House, Monahan Road, Cork ph:+353 21 2024538 email: info@dbfl.ie website: www.dbfl.ie

Waterford Office: Suite 8b The Atrium, Maritana Gate, Canada Street, Waterford ph:+353 51 309 500

Project : Proposed Residential Development
Golf Lane, Glenamuck Road, Carrickmines, Co. Dublin

DRG. Title : Network Traffic Flows
2038 Do Something Scenario

Key:
AM Peak Hour (0815-0915)
PM Peak Hour (1715-1815)

Flows measured in PCU's

Dwn:	Ckd:	Date:

Ref: p170063\calcs\excel\TRAFFIC\170063 Traffic Model 001

Figure: 14

Rev: -

APPENDIX B

PICADY Output Files

Junctions 9

PICADY 9 - Priority Intersection Module

Filename: Site Access.j9
Path: G:\2017\p170063\calcs\arcady\2020 Application
Report generation date: 18/03/2020 12:47:56

»Do-Something - 2038, AM
»Do-Something - 2038, PM

Summary of junction performance

	AM					PM				
	Queue (PCU)	Delay (s)	RFC	LOS	Network Residual Capacity	Queue (PCU)	Delay (s)	RFC	LOS	Network Residual Capacity
	Do-Something - 2038									
Stream B-AC	0.3	8.91	0.23	A	238 % [Stream B-AC]	0.1	7.41	0.06	A	815 % [Stream B-AC]
Stream C-AB	0.0	0.00	0.00	A		0.0	0.00	0.00	A	

Values shown are the highest values encountered over all time segments. Delay is the maximum value of average delay per arriving vehicle. Network Residual Capacity indicates the amount by which network flow could be increased before a user-definable threshold (see Analysis Options) is met.

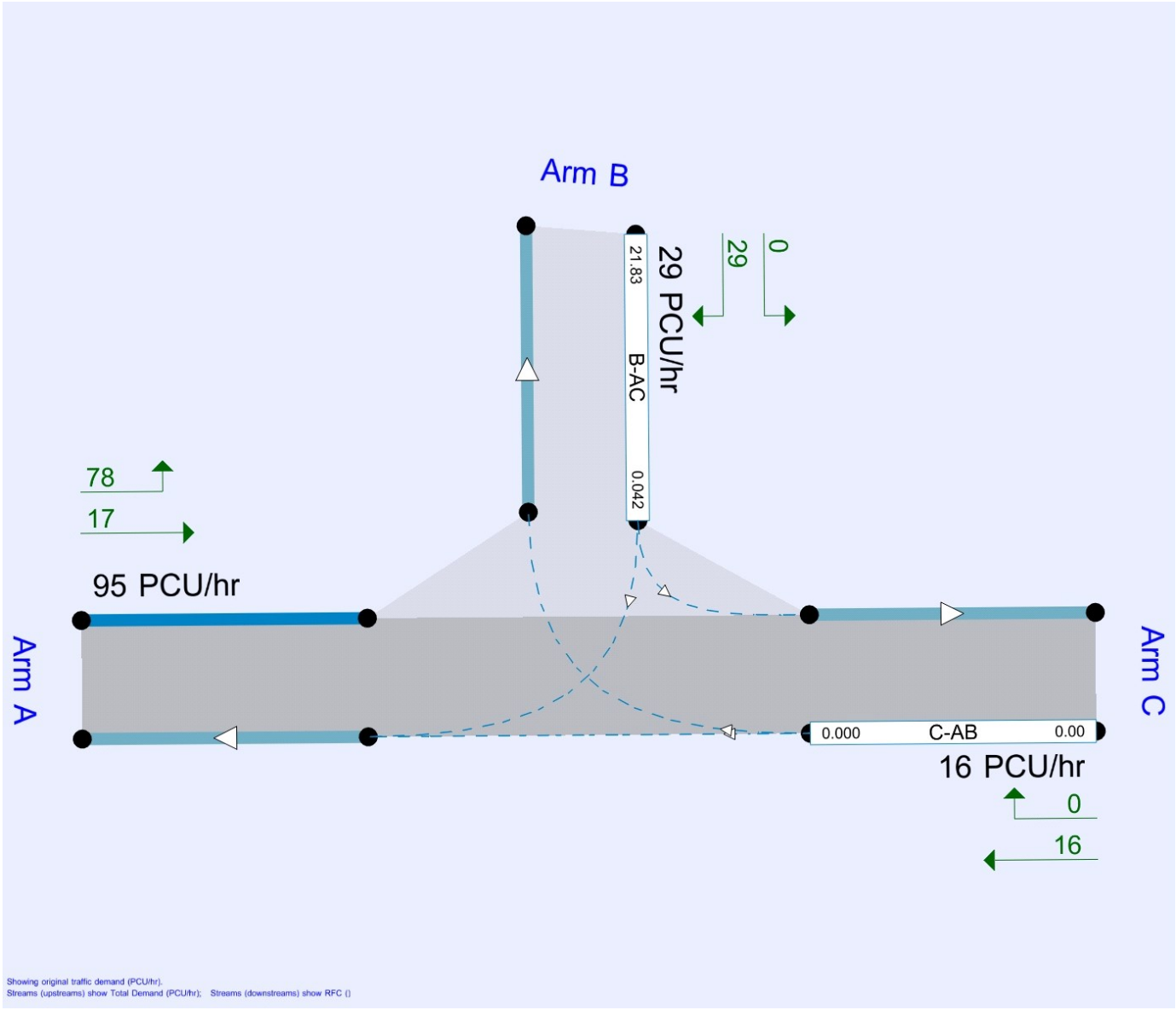
File summary

File Description

Title	Residential Development at Golf Lane
Location	Site Access Junction
Site number	
Date	18/03/2020
Version	
Status	Pre-Planning
Identifier	
Client	
Jobnumber	170063
Enumerator	HEADOFFICE"mckennam
Description	

Units

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



The junction diagram reflects the last run of Junctions.

Analysis Options

Calculate Queue Percentiles	Calculate residual capacity	Residual capacity criteria type	RFC Threshold	Average Delay threshold (s)	Queue threshold (PCU)
	✓	Delay	0.85	36.00	20.00

Demand Set Summary

Scenario name	Time Period name	Traffic profile type	Model start time (HH:mm)	Model finish time (HH:mm)	Time segment length (min)
2038	AM	ONE HOUR	08:00	09:30	15
2038	PM	ONE HOUR	17:00	18:30	15

Do-Something - 2038, AM

Data Errors and Warnings

No errors or warnings

Analysis Set Details

ID	Name	Network flow scaling factor (%)
A1	Do-Something	100.000

Junction Network

Junctions

Junction	Name	Junction Type	Major road direction	Junction Delay (s)	Junction LOS
1	untitled	T-Junction	Two-way	6.07	A

Junction Network Options

Driving side	Lighting	Network residual capacity (%)	First arm reaching threshold
Left	Normal/unknown	238	Stream B-AC

Arms

Arms

Arm	Name	Description	Arm type
A	Golf Lane (West)		Major
B	Site Access		Minor
C	Golf Lane (East)		Major

Major Arm Geometry

Arm	Width of carriageway (m)	Has kerbed central reserve	Has right turn bay	Visibility for right turn (m)	Blocks?	Blocking queue (PCU)
C	6.00			155.0	✓	0.00

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

Minor Arm Geometry

Arm	Minor arm type	Lane width (m)	Visibility to left (m)	Visibility to right (m)
B	One lane	2.80	31	115

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	533.301	0.097	0.246	0.154	0.351
1	B-C	682.390	0.105	0.264	-	-
1	C-B	663.725	0.257	0.257	-	-

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	Model start time (HH:mm)	Model finish time (HH:mm)	Time segment length (min)
D1	2038	AM	ONE HOUR	08:00	09:30	15

Vehicle mix varies over turn	Vehicle mix varies over entry	Vehicle mix source	PCU Factor for a HV (PCU)
✓	✓	HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
A		✓	45.00	100.000
B		✓	109.00	100.000
C		✓	6.00	100.000

Origin-Destination Data

Demand (PCU/hr)

		To		
		A	B	C
From	A	0.000	25.000	20.000
	B	109.000	0.000	0.000
	C	6.000	0.000	0.000

Vehicle Mix

Heavy Vehicle proportion

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

Results

Results Summary for whole modelled period

Stream	Max RFC	Max delay (s)	Max Queue (PCU)	Max LOS
B-AC	0.23	8.91	0.3	A
C-AB	0.00	0.00	0.0	A

Main Results for each time segment

Main results: (08:00-08:15)

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-AC	82.06	527.08	0.156	81.33	0.2	8.064	A
C-AB	0.00	655.01	0.000	0.00	0.0	0.000	A
C-A	4.52			4.52			
A-B	18.82			18.82			
A-C	15.06			15.06			

Main results: (08:15-08:30)

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-AC	97.99	525.87	0.186	97.81	0.2	8.406	A
C-AB	0.00	653.32	0.000	0.00	0.0	0.000	A
C-A	5.39			5.39			
A-B	22.47			22.47			
A-C	17.98			17.98			

Main results: (08:30-08:45)

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-AC	120.01	524.20	0.229	119.74	0.3	8.895	A
C-AB	0.00	650.98	0.000	0.00	0.0	0.000	A
C-A	6.61			6.61			
A-B	27.53			27.53			
A-C	22.02			22.02			

Main results: (08:45-09:00)

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-AC	120.01	524.20	0.229	120.00	0.3	8.906	A
C-AB	0.00	650.98	0.000	0.00	0.0	0.000	A
C-A	6.61			6.61			
A-B	27.53			27.53			
A-C	22.02			22.02			

Main results: (09:00-09:15)

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-AC	97.99	525.87	0.186	98.24	0.2	8.423	A
C-AB	0.00	653.32	0.000	0.00	0.0	0.000	A
C-A	5.39			5.39			
A-B	22.47			22.47			
A-C	17.98			17.98			

Main results: (09:15-09:30)

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-AC	82.06	527.08	0.156	82.24	0.2	8.095	A
C-AB	0.00	655.01	0.000	0.00	0.0	0.000	A
C-A	4.52			4.52			
A-B	18.82			18.82			
A-C	15.06			15.06			

Do-Something - 2038, PM

Data Errors and Warnings

No errors or warnings

Analysis Set Details

ID	Name	Network flow scaling factor (%)
A1	Do-Something	100.000

Junction Network

Junctions

Junction	Name	Junction Type	Major road direction	Junction Delay (s)	Junction LOS
1	untitled	T-Junction	Two-way	1.54	A

Junction Network Options

[same as above]

Arms

Arms

[same as above]

Major Arm Geometry

[same as above]

Minor Arm Geometry

[same as above]

Slope / Intercept / Capacity

[same as above]

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Model start time (HH:mm)	Model finish time (HH:mm)	Time segment length (min)
D2	2038	PM	ONE HOUR	17:00	18:30	15

Vehicle mix varies over turn	Vehicle mix varies over entry	Vehicle mix source	PCU Factor for a HV (PCU)
✓	✓	HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
A		✓	95.00	100.000
B		✓	29.00	100.000
C		✓	16.00	100.000

Origin-Destination Data

Demand (PCU/hr)

		To		
		A	B	C
From	A	0.000	78.000	17.000
	B	29.000	0.000	0.000
	C	16.000	0.000	0.000

Vehicle Mix

Heavy Vehicle proportion

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

Results

Results Summary for whole modelled period

Stream	Max RFC	Max delay (s)	Max Queue (PCU)	Max LOS
B-AC	0.06	7.41	0.1	A
C-AB	0.00	0.00	0.0	A

Main Results for each time segment

Main results: (17:00-17:15)

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-AC	21.83	522.59	0.042	21.66	0.0	7.185	A
C-AB	0.00	645.33	0.000	0.00	0.0	0.000	A
C-A	12.05			12.05			
A-B	58.72			58.72			
A-C	12.80			12.80			

Main results: (17:15-17:30)

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-AC	26.07	520.52	0.050	26.03	0.1	7.279	A
C-AB	0.00	641.76	0.000	0.00	0.0	0.000	A
C-A	14.38			14.38			
A-B	70.12			70.12			
A-C	15.28			15.28			

Main results: (17:30-17:45)

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-AC	31.93	517.64	0.062	31.88	0.1	7.410	A
C-AB	0.00	636.83	0.000	0.00	0.0	0.000	A
C-A	17.62			17.62			
A-B	85.88			85.88			
A-C	18.72			18.72			

Main results: (17:45-18:00)

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-AC	31.93	517.64	0.062	31.93	0.1	7.410	A
C-AB	0.00	636.83	0.000	0.00	0.0	0.000	A
C-A	17.62			17.62			
A-B	85.88			85.88			
A-C	18.72			18.72			

Main results: (18:00-18:15)

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-AC	26.07	520.52	0.050	26.12	0.1	7.281	A
C-AB	0.00	641.76	0.000	0.00	0.0	0.000	A
C-A	14.38			14.38			
A-B	70.12			70.12			
A-C	15.28			15.28			

Main results: (18:15-18:30)

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-AC	21.83	522.59	0.042	21.87	0.0	7.192	A
C-AB	0.00	645.33	0.000	0.00	0.0	0.000	A
C-A	12.05			12.05			
A-B	58.72			58.72			
A-C	12.80			12.80			

APPENDIX C

ARCADY Output Files

Junctions 9

ARCADY 9 - Roundabout Module

Filename: Glenamuck Rd_Golf Ln 3-arm.j9
Path: G:\2017\p170063\calcs\arcady\2020 Application
Report generation date: 18/03/2020 12:09:14

Summary of junction performance

	AM				PM			
	Queue (PCU)	Delay (s)	RFC	LOS	Queue (PCU)	Delay (s)	RFC	LOS
	DN 2023							
1 - Glenamuck Rd	0.5	2.05	0.34	A	1.1	2.79	0.52	A
2 - Golf Lane	0.0	5.24	0.04	A	0.0	7.39	0.04	A
3 - Glenamuck Rd S	2.2	8.41	0.69	A	0.7	4.40	0.43	A
	DS 2023							
1 - Glenamuck Rd	0.5	2.07	0.35	A	1.2	2.95	0.55	A
2 - Golf Lane	0.2	6.21	0.20	A	0.1	7.85	0.10	A
3 - Glenamuck Rd S	2.5	9.44	0.72	A	0.8	4.56	0.44	A

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

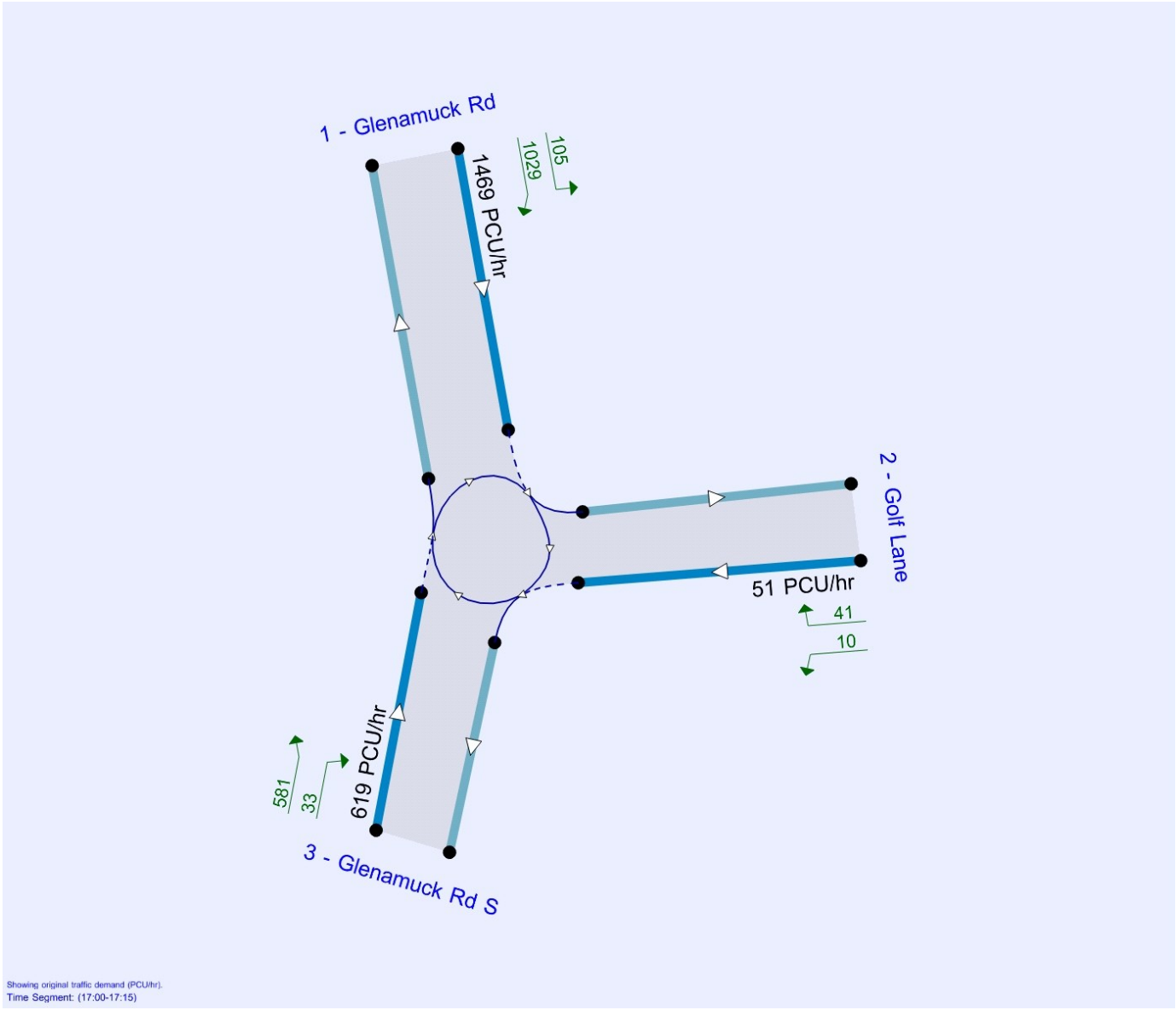
File summary

File Description

Title	Residential Development at Golf Lane
Location	Glenamuck Rd / Golf Lane
Site number	
Date	18/03/2020
Version	
Status	Pre-Planning
Identifier	
Client	
Jobnumber	170063
Enumerator	HEADOFFICE"mckennam
Description	Opening Year

Units

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



The junction diagram reflects the last run of Junctions.

Analysis Options

Calculate Queue Percentiles	Calculate residual capacity	RFC Threshold	Average Delay threshold (s)	Queue threshold (PCU)
		0.85	36.00	20.00

Demand Set Summary

Scenario name	Time Period name	Traffic profile type	Model start time (HH:mm)	Model finish time (HH:mm)	Model time period length (min)	Time segment length (min)
DN 2023	AM	DIRECT	08:00	09:30	90	15
DN 2023	PM	DIRECT	17:00	18:30	90	15
DS 2023	AM	DIRECT	08:00	09:30	90	15
DS 2023	PM	DIRECT	17:00	18:30	90	15

DN 2023, AM

Data Errors and Warnings

No errors or warnings

Analysis Set Details

ID	Network flow scaling factor (%)
A1	100.000

Junction Network

Junctions

Junction	Name	Junction Type	Junction Delay (s)	Junction LOS
1 - Glenamuck Roundabout	Glenamuck Roundabout	Standard Roundabout	5.24	A

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Arms

Arms

Arm	Name	Description
1	Glenamuck Rd	
2	Golf Lane	
3	Glenamuck Rd S	

Capacity Options

Arm	Minimum capacity (PCU/hr)	Maximum capacity (PCU/hr)
1 - Glenamuck Rd	0.00	99999.00
2 - Golf Lane	0.00	99999.00
3 - Glenamuck Rd S	0.00	99999.00

Roundabout Geometry

Arm	V - Approach road half-width (m)	E - Entry width (m)	l' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit only
1 - Glenamuck Rd	7.70	11.00	7.6	64.0	60.0	44.3	
2 - Golf Lane	3.00	5.10	4.5	28.0	60.0	46.0	
3 - Glenamuck Rd S	4.10	7.20	8.3	28.0	60.0	46.0	

Slope / Intercept / Capacity

Roundabout Slope and Intercept used in model

Arm	Final slope	Final intercept (PCU/hr)
1 - Glenamuck Rd	0.727	2707.529
2 - Golf Lane	0.445	1115.830
3 - Glenamuck Rd S	0.529	1599.719

The slope and intercept shown above include any corrections and adjustments.

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Model start time (HH:mm)	Model finish time (HH:mm)	Model time period length (min)	Time segment length (min)
D1	DN 2023	AM	DIRECT	08:00	09:30	90	15

Vehicle mix varies over turn	Vehicle mix varies over entry	Vehicle mix source	PCU Factor for a HV (PCU)	O-D data varies over time
✓	✓	HV Percentages	2.00	✓

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Scaling Factor (%)
1 - Glenamuck Rd		✓	100.000
2 - Golf Lane		✓	100.000
3 - Glenamuck Rd S		✓	100.000

Origin-Destination Data

Demand (PCU/hr)

(08:00-08:15)

		To		
		1 - Glenamuck Rd	2 - Golf Lane	3 - Glenamuck Rd S
From	1 - Glenamuck Rd	471.000	30.000	421.000
	2 - Golf Lane	24.000	0.000	7.000
	3 - Glenamuck Rd S	886.000	37.000	5.000

Demand (PCU/hr)

(08:15-08:30)

		To		
		1 - Glenamuck Rd	2 - Golf Lane	3 - Glenamuck Rd S
From	1 - Glenamuck Rd	0.000	0.000	0.000
	2 - Golf Lane	0.000	0.000	0.000
	3 - Glenamuck Rd S	0.000	0.000	0.000

Demand (PCU/hr)

(08:30-08:45)

		To		
		1 - Glenamuck Rd	2 - Golf Lane	3 - Glenamuck Rd S
From	1 - Glenamuck Rd	0.000	0.000	0.000
	2 - Golf Lane	0.000	0.000	0.000
	3 - Glenamuck Rd S	0.000	0.000	0.000

Demand (PCU/hr)

(08:45-09:00)

		To		
		1 - Glenamuck Rd	2 - Golf Lane	3 - Glenamuck Rd S
From	1 - Glenamuck Rd	0.000	0.000	0.000
	2 - Golf Lane	0.000	0.000	0.000
	3 - Glenamuck Rd S	0.000	0.000	0.000

Demand (PCU/hr)

(09:00-09:15)

		To		
		1 - Glenamuck Rd	2 - Golf Lane	3 - Glenamuck Rd S
From	1 - Glenamuck Rd	0.000	0.000	0.000
	2 - Golf Lane	0.000	0.000	0.000
	3 - Glenamuck Rd S	0.000	0.000	0.000

Demand (PCU/hr)

(09:15-09:30)

		To		
		1 - Glenamuck Rd	2 - Golf Lane	3 - Glenamuck Rd S
From	1 - Glenamuck Rd	0.000	0.000	0.000
	2 - Golf Lane	0.000	0.000	0.000
	3 - Glenamuck Rd S	0.000	0.000	0.000

Vehicle Mix

Heavy Vehicle proportion

		To		
		1 - Glenamuck Rd	2 - Golf Lane	3 - Glenamuck Rd S
From	1 - Glenamuck Rd	0	0	0
	2 - Golf Lane	0	0	0
	3 - Glenamuck Rd S	0	0	0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max delay (s)	Max Queue (PCU)	Max LOS
1 - Glenamuck Rd	0.34	2.05	0.5	A
2 - Golf Lane	0.04	5.24	0.0	A
3 - Glenamuck Rd S	0.69	8.41	2.2	A

Main Results for each time segment

Main results: (08:00-08:15)

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
1 - Glenamuck Rd	922.00	41.60	2677.27	0.344	919.91	0.5	2.045	A
2 - Golf Lane	31.00	894.93	717.65	0.043	30.82	0.0	5.240	A
3 - Glenamuck Rd S	928.00	493.79	1338.62	0.693	919.23	2.2	8.415	A

Main results: (08:15-08:30)

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
1 - Glenamuck Rd	0.00	0.40	2707.24	0.000	2.09	0.0	0.000	A
2 - Golf Lane	0.00	2.07	1114.91	0.000	0.18	0.0	0.000	A
3 - Glenamuck Rd S	0.00	1.21	1599.08	0.000	8.77	0.0	0.000	A

Main results: (08:30-08:45)

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
1 - Glenamuck Rd	0.00	0.00	2707.53	0.000	0.00	0.0	0.000	A
2 - Golf Lane	0.00	0.00	1115.83	0.000	0.00	0.0	0.000	A
3 - Glenamuck Rd S	0.00	0.00	1599.72	0.000	0.00	0.0	0.000	A

Main results: (08:45-09:00)

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
1 - Glenamuck Rd	0.00	0.00	2707.53	0.000	0.00	0.0	0.000	A
2 - Golf Lane	0.00	0.00	1115.83	0.000	0.00	0.0	0.000	A
3 - Glenamuck Rd S	0.00	0.00	1599.72	0.000	0.00	0.0	0.000	A

Main results: (09:00-09:15)

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
1 - Glenamuck Rd	0.00	0.00	2707.53	0.000	0.00	0.0	0.000	A
2 - Golf Lane	0.00	0.00	1115.83	0.000	0.00	0.0	0.000	A
3 - Glenamuck Rd S	0.00	0.00	1599.72	0.000	0.00	0.0	0.000	A

Main results: (09:15-09:30)

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
1 - Glenamuck Rd	0.00	0.00	2707.53	0.000	0.00	0.0	0.000	A
2 - Golf Lane	0.00	0.00	1115.83	0.000	0.00	0.0	0.000	A
3 - Glenamuck Rd S	0.00	0.00	1599.72	0.000	0.00	0.0	0.000	A

DN 2023, PM

Data Errors and Warnings
No errors or warnings

Analysis Set Details

ID	Network flow scaling factor (%)
A1	100.000

Junction Network

Junctions

Junction	Name	Junction Type	Junction Delay (s)	Junction LOS
1 - Glenamuck Roundabout	Glenamuck Roundabout	Standard Roundabout	3.31	A

Junction Network Options
[same as above]

Arms

Arms
[same as above]

Capacity Options
[same as above]

Roundabout Geometry
[same as above]

Slope / Intercept / Capacity
[same as above]

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Model start time (HH:mm)	Model finish time (HH:mm)	Model time period length (min)	Time segment length (min)
D2	DN 2023	PM	DIRECT	17:00	18:30	90	15

Vehicle mix varies over turn	Vehicle mix varies over entry	Vehicle mix source	PCU Factor for a HV (PCU)	O-D data varies over time
✓	✓	HV Percentages	2.00	✓

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Scaling Factor (%)
1 - Glenamuck Rd		✓	100.000
2 - Golf Lane		✓	100.000
3 - Glenamuck Rd S		✓	100.000

Origin-Destination Data

Demand (PCU/hr)

(17:00-17:15)

		To		
		1 - Glenamuck Rd	2 - Golf Lane	3 - Glenamuck Rd S
From	1 - Glenamuck Rd	335.000	45.000	1029.000
	2 - Golf Lane	18.000	0.000	4.000
	3 - Glenamuck Rd S	581.000	15.000	5.000

Demand (PCU/hr)

(17:15-17:30)

		To		
		1 - Glenamuck Rd	2 - Golf Lane	3 - Glenamuck Rd S
From	1 - Glenamuck Rd	0.000	0.000	0.000
	2 - Golf Lane	0.000	0.000	0.000
	3 - Glenamuck Rd S	0.000	0.000	0.000

Demand (PCU/hr)

(17:30-17:45)

		To		
		1 - Glenamuck Rd	2 - Golf Lane	3 - Glenamuck Rd S
From	1 - Glenamuck Rd	0.000	0.000	0.000
	2 - Golf Lane	0.000	0.000	0.000
	3 - Glenamuck Rd S	0.000	0.000	0.000

Demand (PCU/hr)

(17:45-18:00)

		To		
		1 - Glenamuck Rd	2 - Golf Lane	3 - Glenamuck Rd S
From	1 - Glenamuck Rd	0.000	0.000	0.000
	2 - Golf Lane	0.000	0.000	0.000
	3 - Glenamuck Rd S	0.000	0.000	0.000

Demand (PCU/hr)

(18:00-18:15)

		To		
		1 - Glenamuck Rd	2 - Golf Lane	3 - Glenamuck Rd S
From	1 - Glenamuck Rd	0.000	0.000	0.000
	2 - Golf Lane	0.000	0.000	0.000
	3 - Glenamuck Rd S	0.000	0.000	0.000

Demand (PCU/hr)

(18:15-18:30)

		To		
		1 - Glenamuck Rd	2 - Golf Lane	3 - Glenamuck Rd S
From	1 - Glenamuck Rd	0.000	0.000	0.000
	2 - Golf Lane	0.000	0.000	0.000
	3 - Glenamuck Rd S	0.000	0.000	0.000

Vehicle Mix

Heavy Vehicle proportion

		To		
		1 - Glenamuck Rd	2 - Golf Lane	3 - Glenamuck Rd S
From	1 - Glenamuck Rd	0	0	0
	2 - Golf Lane	0	0	0
	3 - Glenamuck Rd S	0	0	0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max delay (s)	Max Queue (PCU)	Max LOS
1 - Glenamuck Rd	0.52	2.79	1.1	A
2 - Golf Lane	0.04	7.39	0.0	A
3 - Glenamuck Rd S	0.43	4.40	0.7	A

Main Results for each time segment

Main results: (17:00-17:15)

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
1 - Glenamuck Rd	1409.00	19.90	2693.05	0.523	1404.64	1.1	2.785	A
2 - Golf Lane	22.00	1364.75	508.61	0.043	21.82	0.0	7.394	A
3 - Glenamuck Rd S	601.00	351.82	1413.69	0.425	598.07	0.7	4.398	A

Main results: (17:15-17:30)

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
1 - Glenamuck Rd	0.00	0.10	2707.46	0.000	4.36	0.0	0.000	A
2 - Golf Lane	0.00	4.25	1113.94	0.000	0.18	0.0	0.000	A
3 - Glenamuck Rd S	0.00	1.18	1599.09	0.000	2.93	0.0	0.000	A

Main results: (17:30-17:45)

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
1 - Glenamuck Rd	0.00	0.00	2707.53	0.000	0.00	0.0	0.000	A
2 - Golf Lane	0.00	0.00	1115.83	0.000	0.00	0.0	0.000	A
3 - Glenamuck Rd S	0.00	0.00	1599.72	0.000	0.00	0.0	0.000	A

Main results: (17:45-18:00)

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
1 - Glenamuck Rd	0.00	0.00	2707.53	0.000	0.00	0.0	0.000	A
2 - Golf Lane	0.00	0.00	1115.83	0.000	0.00	0.0	0.000	A
3 - Glenamuck Rd S	0.00	0.00	1599.72	0.000	0.00	0.0	0.000	A

Main results: (18:00-18:15)

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
1 - Glenamuck Rd	0.00	0.00	2707.53	0.000	0.00	0.0	0.000	A
2 - Golf Lane	0.00	0.00	1115.83	0.000	0.00	0.0	0.000	A
3 - Glenamuck Rd S	0.00	0.00	1599.72	0.000	0.00	0.0	0.000	A

Main results: (18:15-18:30)

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
1 - Glenamuck Rd	0.00	0.00	2707.53	0.000	0.00	0.0	0.000	A
2 - Golf Lane	0.00	0.00	1115.83	0.000	0.00	0.0	0.000	A
3 - Glenamuck Rd S	0.00	0.00	1599.72	0.000	0.00	0.0	0.000	A

DS 2023, AM

Data Errors and Warnings

No errors or warnings

Analysis Set Details

ID	Network flow scaling factor (%)
A1	100.000

Junction Network

Junctions

Junction	Name	Junction Type	Junction Delay (s)	Junction LOS
1 - Glenamuck Roundabout	Glenamuck Roundabout	Standard Roundabout	5.76	A

Junction Network Options

[same as above]

Arms

Arms

[same as above]

Capacity Options

[same as above]

Roundabout Geometry

[same as above]

Slope / Intercept / Capacity

[same as above]

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Model start time (HH:mm)	Model finish time (HH:mm)	Model time period length (min)	Time segment length (min)
D3	DS 2023	AM	DIRECT	08:00	09:30	90	15

Vehicle mix varies over turn	Vehicle mix varies over entry	Vehicle mix source	PCU Factor for a HV (PCU)	O-D data varies over time
✓	✓	HV Percentages	2.00	✓

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Scaling Factor (%)
1 - Glenamuck Rd		✓	100.000
2 - Golf Lane		✓	100.000
3 - Glenamuck Rd S		✓	100.000

Origin-Destination Data

(08:00-08:15)

Demand (PCU/hr)

		To		
		1 - Glenamuck Rd	2 - Golf Lane	3 - Glenamuck Rd S
From	1 - Glenamuck Rd	471.000	53.000	421.000
	2 - Golf Lane	112.000	0.000	28.000
	3 - Glenamuck Rd S	886.000	39.000	5.000

(08:15-08:30)

Demand (PCU/hr)

		To		
		1 - Glenamuck Rd	2 - Golf Lane	3 - Glenamuck Rd S
From	1 - Glenamuck Rd	0.000	0.000	0.000
	2 - Golf Lane	0.000	0.000	0.000
	3 - Glenamuck Rd S	0.000	0.000	0.000

(08:30-08:45)

Demand (PCU/hr)

		To		
		1 - Glenamuck Rd	2 - Golf Lane	3 - Glenamuck Rd S
From	1 - Glenamuck Rd	0.000	0.000	0.000
	2 - Golf Lane	0.000	0.000	0.000
	3 - Glenamuck Rd S	0.000	0.000	0.000

(08:45-09:00)

Demand (PCU/hr)

		To		
		1 - Glenamuck Rd	2 - Golf Lane	3 - Glenamuck Rd S
From	1 - Glenamuck Rd	0.000	0.000	0.000
	2 - Golf Lane	0.000	0.000	0.000
	3 - Glenamuck Rd S	0.000	0.000	0.000

(09:00-09:15)

Demand (PCU/hr)

		To		
		1 - Glenamuck Rd	2 - Golf Lane	3 - Glenamuck Rd S
From	1 - Glenamuck Rd	0.000	0.000	0.000
	2 - Golf Lane	0.000	0.000	0.000
	3 - Glenamuck Rd S	0.000	0.000	0.000

Demand (PCU/hr)

(09:15-09:30)

		To		
		1 - Glenamuck Rd	2 - Golf Lane	3 - Glenamuck Rd S
From	1 - Glenamuck Rd	0.000	0.000	0.000
	2 - Golf Lane	0.000	0.000	0.000
	3 - Glenamuck Rd S	0.000	0.000	0.000

Vehicle Mix

Heavy Vehicle proportion

		To		
		1 - Glenamuck Rd	2 - Golf Lane	3 - Glenamuck Rd S
From	1 - Glenamuck Rd	0	0	0
	2 - Golf Lane	0	0	0
	3 - Glenamuck Rd S	0	0	0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max delay (s)	Max Queue (PCU)	Max LOS
1 - Glenamuck Rd	0.35	2.07	0.5	A
2 - Golf Lane	0.20	6.21	0.2	A
3 - Glenamuck Rd S	0.72	9.44	2.5	A

Main Results for each time segment

Main results: (08:00-08:15)

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
1 - Glenamuck Rd	945.00	43.53	2675.86	0.353	942.82	0.5	2.074	A
2 - Golf Lane	140.00	894.89	717.67	0.195	139.04	0.2	6.211	A
3 - Glenamuck Rd S	930.00	581.15	1292.43	0.720	920.11	2.5	9.435	A

Main results: (08:15-08:30)

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
1 - Glenamuck Rd	0.00	0.47	2707.19	0.000	2.18	0.0	0.000	A
2 - Golf Lane	0.00	2.11	1114.89	0.000	0.96	0.0	0.000	A
3 - Glenamuck Rd S	0.00	1.85	1598.74	0.000	9.89	0.0	0.000	A

Main results: (08:30-08:45)

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
1 - Glenamuck Rd	0.00	0.00	2707.53	0.000	0.00	0.0	0.000	A
2 - Golf Lane	0.00	0.00	1115.83	0.000	0.00	0.0	0.000	A
3 - Glenamuck Rd S	0.00	0.00	1599.72	0.000	0.00	0.0	0.000	A

Main results: (08:45-09:00)

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
1 - Glenamuck Rd	0.00	0.00	2707.53	0.000	0.00	0.0	0.000	A
2 - Golf Lane	0.00	0.00	1115.83	0.000	0.00	0.0	0.000	A
3 - Glenamuck Rd S	0.00	0.00	1599.72	0.000	0.00	0.0	0.000	A

Main results: (09:00-09:15)

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
1 - Glenamuck Rd	0.00	0.00	2707.53	0.000	0.00	0.0	0.000	A
2 - Golf Lane	0.00	0.00	1115.83	0.000	0.00	0.0	0.000	A
3 - Glenamuck Rd S	0.00	0.00	1599.72	0.000	0.00	0.0	0.000	A

Main results: (09:15-09:30)

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
1 - Glenamuck Rd	0.00	0.00	2707.53	0.000	0.00	0.0	0.000	A
2 - Golf Lane	0.00	0.00	1115.83	0.000	0.00	0.0	0.000	A
3 - Glenamuck Rd S	0.00	0.00	1599.72	0.000	0.00	0.0	0.000	A

DS 2023, PM

Data Errors and Warnings

No errors or warnings

Analysis Set Details

ID	Network flow scaling factor (%)
A1	100.000

Junction Network

Junctions

Junction	Name	Junction Type	Junction Delay (s)	Junction LOS
1 - Glenamuck Roundabout	Glenamuck Roundabout	Standard Roundabout	3.53	A

Junction Network Options

[same as above]

Arms

Arms

[same as above]

Capacity Options

[same as above]

Roundabout Geometry

[same as above]

Slope / Intercept / Capacity

[same as above]

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Model start time (HH:mm)	Model finish time (HH:mm)	Model time period length (min)	Time segment length (min)
D4	DS 2023	PM	DIRECT	17:00	18:30	90	15

Vehicle mix varies over turn	Vehicle mix varies over entry	Vehicle mix source	PCU Factor for a HV (PCU)	O-D data varies over time
✓	✓	HV Percentages	2.00	✓

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Scaling Factor (%)
1 - Glenamuck Rd		✓	100.000
2 - Golf Lane		✓	100.000
3 - Glenamuck Rd S		✓	100.000

Origin-Destination Data

(17:00-17:15)

Demand (PCU/hr)

		To		
		1 - Glenamuck Rd	2 - Golf Lane	3 - Glenamuck Rd S
From	1 - Glenamuck Rd	335.000	105.000	1029.000
	2 - Golf Lane	41.000	0.000	10.000
	3 - Glenamuck Rd S	581.000	33.000	5.000

(17:15-17:30)

Demand (PCU/hr)

		To		
		1 - Glenamuck Rd	2 - Golf Lane	3 - Glenamuck Rd S
From	1 - Glenamuck Rd	0.000	0.000	0.000
	2 - Golf Lane	0.000	0.000	0.000
	3 - Glenamuck Rd S	0.000	0.000	0.000

(17:30-17:45)

Demand (PCU/hr)

		To		
		1 - Glenamuck Rd	2 - Golf Lane	3 - Glenamuck Rd S
From	1 - Glenamuck Rd	0.000	0.000	0.000
	2 - Golf Lane	0.000	0.000	0.000
	3 - Glenamuck Rd S	0.000	0.000	0.000

(17:45-18:00)

Demand (PCU/hr)

		To		
		1 - Glenamuck Rd	2 - Golf Lane	3 - Glenamuck Rd S
From	1 - Glenamuck Rd	0.000	0.000	0.000
	2 - Golf Lane	0.000	0.000	0.000
	3 - Glenamuck Rd S	0.000	0.000	0.000

(18:00-18:15)

Demand (PCU/hr)

		To		
		1 - Glenamuck Rd	2 - Golf Lane	3 - Glenamuck Rd S
From	1 - Glenamuck Rd	0.000	0.000	0.000
	2 - Golf Lane	0.000	0.000	0.000
	3 - Glenamuck Rd S	0.000	0.000	0.000

Demand (PCU/hr)

(18:15-18:30)

		To		
		1 - Glenamuck Rd	2 - Golf Lane	3 - Glenamuck Rd S
From	1 - Glenamuck Rd	0.000	0.000	0.000
	2 - Golf Lane	0.000	0.000	0.000
	3 - Glenamuck Rd S	0.000	0.000	0.000

Vehicle Mix

Heavy Vehicle proportion

		To		
		1 - Glenamuck Rd	2 - Golf Lane	3 - Glenamuck Rd S
From	1 - Glenamuck Rd	0	0	0
	2 - Golf Lane	0	0	0
	3 - Glenamuck Rd S	0	0	0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max delay (s)	Max Queue (PCU)	Max LOS
1 - Glenamuck Rd	0.55	2.95	1.2	A
2 - Golf Lane	0.10	7.85	0.1	A
3 - Glenamuck Rd S	0.44	4.56	0.8	A

Main Results for each time segment

Main results: (17:00-17:15)

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
1 - Glenamuck Rd	1469.00	37.81	2680.03	0.548	1464.18	1.2	2.948	A
2 - Golf Lane	51.00	1364.50	508.72	0.100	50.56	0.1	7.850	A
3 - Glenamuck Rd S	619.00	374.55	1401.67	0.442	615.87	0.8	4.563	A

Main results: (17:15-17:30)

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
1 - Glenamuck Rd	0.00	0.19	2707.39	0.000	4.82	0.0	0.000	A
2 - Golf Lane	0.00	4.50	1113.83	0.000	0.44	0.0	0.000	A
3 - Glenamuck Rd S	0.00	1.45	1598.95	0.000	3.13	0.0	0.000	A

Main results: (17:30-17:45)

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
1 - Glenamuck Rd	0.00	0.00	2707.53	0.000	0.00	0.0	0.000	A
2 - Golf Lane	0.00	0.00	1115.83	0.000	0.00	0.0	0.000	A
3 - Glenamuck Rd S	0.00	0.00	1599.72	0.000	0.00	0.0	0.000	A

Main results: (17:45-18:00)

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
1 - Glenamuck Rd	0.00	0.00	2707.53	0.000	0.00	0.0	0.000	A
2 - Golf Lane	0.00	0.00	1115.83	0.000	0.00	0.0	0.000	A
3 - Glenamuck Rd S	0.00	0.00	1599.72	0.000	0.00	0.0	0.000	A

Main results: (18:00-18:15)

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
1 - Glenamuck Rd	0.00	0.00	2707.53	0.000	0.00	0.0	0.000	A
2 - Golf Lane	0.00	0.00	1115.83	0.000	0.00	0.0	0.000	A
3 - Glenamuck Rd S	0.00	0.00	1599.72	0.000	0.00	0.0	0.000	A

Main results: (18:15-18:30)

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
1 - Glenamuck Rd	0.00	0.00	2707.53	0.000	0.00	0.0	0.000	A
2 - Golf Lane	0.00	0.00	1115.83	0.000	0.00	0.0	0.000	A
3 - Glenamuck Rd S	0.00	0.00	1599.72	0.000	0.00	0.0	0.000	A

Junctions 9

ARCADY 9 - Roundabout Module

Filename: Glenamuck Rd_Golf Ln 4-arm.j9
Path: G:\2017\p170063\calcs\arcady\2020 Application
Report generation date: 18/03/2020 12:32:19

Summary of junction performance

	AM				PM			
	Queue (PCU)	Delay (s)	RFC	LOS	Queue (PCU)	Delay (s)	RFC	LOS
DN 2028								
1 - Glenamuck Rd	0.5	1.96	0.32	A	1.1	2.80	0.53	A
2 - Golf Lane	0.0	4.92	0.04	A	0.0	7.46	0.05	A
3 - Glenamuck Rd S	0.1	3.37	0.10	A	0.1	3.94	0.08	A
4 - Glenamuck District Distributor Rd	2.4	8.46	0.71	A	0.8	4.39	0.45	A
DS 2028								
1 - Glenamuck Rd	0.5	1.99	0.33	A	1.2	2.96	0.55	A
2 - Golf Lane	0.2	5.76	0.18	A	0.1	7.92	0.10	A
3 - Glenamuck Rd S	0.1	3.55	0.10	A	0.1	4.01	0.08	A
4 - Glenamuck District Distributor Rd	2.7	9.49	0.74	A	0.9	4.57	0.47	A
DN 2038								
1 - Glenamuck Rd	0.5	2.02	0.34	A	1.2	2.98	0.56	A
2 - Golf Lane	0.0	5.08	0.04	A	0.1	8.05	0.05	A
3 - Glenamuck Rd S	0.1	3.45	0.10	A	0.1	4.11	0.08	A
4 - Glenamuck District Distributor Rd	3.0	10.14	0.76	B	0.9	4.64	0.48	A
DS 2038								
1 - Glenamuck Rd	0.5	2.04	0.35	A	1.4	3.16	0.58	A
2 - Golf Lane	0.2	5.98	0.19	A	0.1	8.60	0.11	A
3 - Glenamuck Rd S	0.1	3.65	0.11	A	0.1	4.19	0.09	A
4 - Glenamuck District Distributor Rd	3.5	11.60	0.79	B	1.0	4.85	0.50	A

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

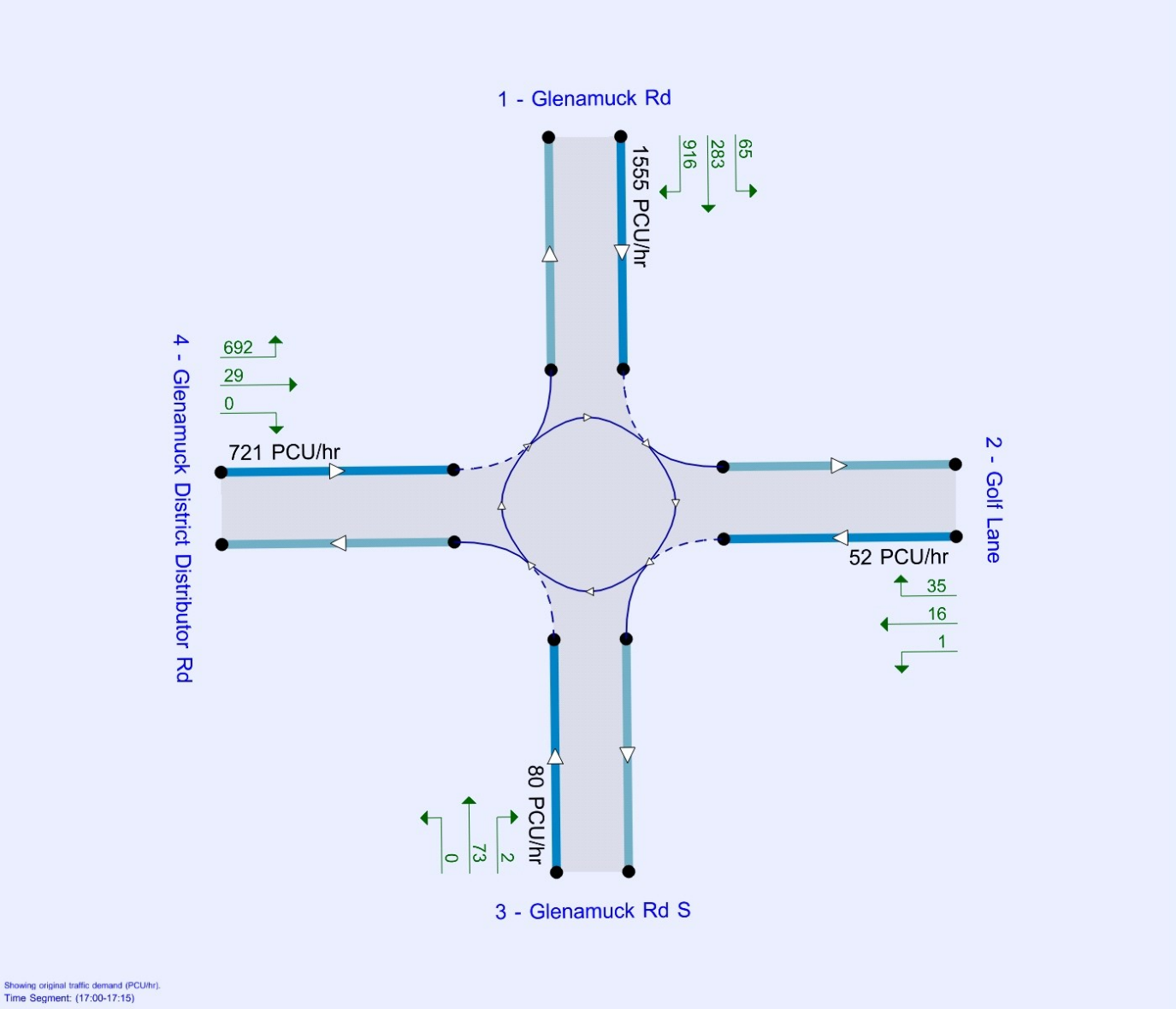
File summary

File Description

Title	Residential Development at Golf Lane
Location	Glenamuck Rd / Golf Lane
Site number	
Date	18/03/2020
Version	
Status	Pre-Planning
Identifier	
Client	
Jobnumber	170063
Enumerator	HEADOFFICE"heungs
Description	Future Design Years

Units

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



The junction diagram reflects the last run of Junctions.

Analysis Options

Calculate Queue Percentiles	Calculate residual capacity	RFC Threshold	Average Delay threshold (s)	Queue threshold (PCU)
		0.85	36.00	20.00

Demand Set Summary

Scenario name	Time Period name	Traffic profile type	Model start time (HH:mm)	Model finish time (HH:mm)	Model time period length (min)	Time segment length (min)
DN 2028	AM	DIRECT	08:00	09:30	90	15
DN 2028	PM	DIRECT	17:00	18:30	90	15
DS 2028	AM	DIRECT	08:00	09:30	90	15
DS 2028	PM	DIRECT	17:00	18:30	90	15
DN 2038	AM	DIRECT	08:00	09:30	90	15
DN 2038	PM	DIRECT	17:00	18:30	90	15
DS 2038	AM	DIRECT	08:00	09:30	90	15
DS 2038	PM	DIRECT	17:00	18:30	90	15

DN 2028, AM

Data Errors and Warnings

No errors or warnings

Analysis Set Details

ID	Network flow scaling factor (%)
A1	100.000

Junction Network

Junctions

Junction	Name	Junction Type	Junction Delay (s)	Junction LOS
1 - Glenamuck Roundabout	Glenamuck Roundabout	Standard Roundabout	5.30	A

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Arms

Arms

Arm	Name	Description
1	Glenamuck Rd	
2	Golf Lane	
3	Glenamuck Rd S	
4	Glenamuck District Distributor Rd	

Capacity Options

Arm	Minimum capacity (PCU/hr)	Maximum capacity (PCU/hr)
1 - Glenamuck Rd	0.00	99999.00
2 - Golf Lane	0.00	99999.00
3 - Glenamuck Rd S	0.00	99999.00
4 - Glenamuck District Distributor Rd	0.00	99999.00

Roundabout Geometry

Arm	V - Approach road half-width (m)	E - Entry width (m)	l' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit only
1 - Glenamuck Rd	7.70	11.00	7.6	64.0	60.0	44.3	
2 - Golf Lane	3.00	5.10	4.5	27.0	60.0	35.3	
3 - Glenamuck Rd S	4.10	7.20	8.3	28.0	60.0	46.0	
4 - Glenamuck District Distributor Rd	6.00	6.50	1.1	15.0	60.0	58.0	

Slope / Intercept / Capacity

Roundabout Slope and Intercept used in model

Arm	Final slope	Final intercept (PCU/hr)
1 - Glenamuck Rd	0.727	2707.529
2 - Golf Lane	0.462	1157.549
3 - Glenamuck Rd S	0.529	1600.798
4 - Glenamuck District Distributor Rd	0.521	1666.449

The slope and intercept shown above include any corrections and adjustments.

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Model start time (HH:mm)	Model finish time (HH:mm)	Model time period length (min)	Time segment length (min)
D1	DN 2028	AM	DIRECT	08:00	09:30	90	15

Vehicle mix varies over turn	Vehicle mix varies over entry	Vehicle mix source	PCU Factor for a HV (PCU)	O-D data varies over time
✓	✓	HV Percentages	2.00	✓

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Scaling Factor (%)
1 - Glenamuck Rd		✓	100.000
2 - Golf Lane		✓	100.000
3 - Glenamuck Rd S		✓	100.000
4 - Glenamuck District Distributor Rd		✓	100.000

Origin-Destination Data

Demand (PCU/hr)

(08:00-08:15)

		To			
		1 - Glenamuck Rd	2 - Golf Lane	3 - Glenamuck Rd S	4 - Glenamuck District Distributor Rd
From	1 - Glenamuck Rd	383.000	17.000	89.000	379.000
	2 - Golf Lane	19.000	0.000	1.000	12.000
	3 - Glenamuck Rd S	109.000	0.000	5.000	0.000
	4 - Glenamuck District Distributor Rd	984.000	7.000	0.000	0.000

Demand (PCU/hr)

(08:15-08:30)

		To			
		1 - Glenamuck Rd	2 - Golf Lane	3 - Glenamuck Rd S	4 - Glenamuck District Distributor Rd
From	1 - Glenamuck Rd	0.000	0.000	0.000	0.000
	2 - Golf Lane	0.000	0.000	0.000	0.000
	3 - Glenamuck Rd S	0.000	0.000	0.000	0.000
	4 - Glenamuck District Distributor Rd	0.000	0.000	0.000	0.000

Demand (PCU/hr)

(08:30-08:45)

		To			
		1 - Glenamuck Rd	2 - Golf Lane	3 - Glenamuck Rd S	4 - Glenamuck District Distributor Rd
From	1 - Glenamuck Rd	0.000	0.000	0.000	0.000
	2 - Golf Lane	0.000	0.000	0.000	0.000
	3 - Glenamuck Rd S	0.000	0.000	0.000	0.000
	4 - Glenamuck District Distributor Rd	0.000	0.000	0.000	0.000

Demand (PCU/hr)

(08:45-09:00)

		To			
		1 - Glenamuck Rd	2 - Golf Lane	3 - Glenamuck Rd S	4 - Glenamuck District Distributor Rd
From	1 - Glenamuck Rd	0.000	0.000	0.000	0.000
	2 - Golf Lane	0.000	0.000	0.000	0.000
	3 - Glenamuck Rd S	0.000	0.000	0.000	0.000
	4 - Glenamuck District Distributor Rd	0.000	0.000	0.000	0.000

Demand (PCU/hr)

(09:00-09:15)

		To			
		1 - Glenamuck Rd	2 - Golf Lane	3 - Glenamuck Rd S	4 - Glenamuck District Distributor Rd
From	1 - Glenamuck Rd	0.000	0.000	0.000	0.000
	2 - Golf Lane	0.000	0.000	0.000	0.000
	3 - Glenamuck Rd S	0.000	0.000	0.000	0.000
	4 - Glenamuck District Distributor Rd	0.000	0.000	0.000	0.000

Demand (PCU/hr)

(09:15-09:30)

		To			
		1 - Glenamuck Rd	2 - Golf Lane	3 - Glenamuck Rd S	4 - Glenamuck District Distributor Rd
From	1 - Glenamuck Rd	0.000	0.000	0.000	0.000
	2 - Golf Lane	0.000	0.000	0.000	0.000
	3 - Glenamuck Rd S	0.000	0.000	0.000	0.000
	4 - Glenamuck District Distributor Rd	0.000	0.000	0.000	0.000

Vehicle Mix

Heavy Vehicle proportion

		To			
		1 - Glenamuck Rd	2 - Golf Lane	3 - Glenamuck Rd S	4 - Glenamuck District Distributor Rd
From	1 - Glenamuck Rd	0	0	0	0
	2 - Golf Lane	0	0	0	0
	3 - Glenamuck Rd S	0	0	0	0
	4 - Glenamuck District Distributor Rd	0	0	0	0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max delay (s)	Max Queue (PCU)	Max LOS
1 - Glenamuck Rd	0.32	1.96	0.5	A
2 - Golf Lane	0.04	4.92	0.0	A
3 - Glenamuck Rd S	0.10	3.37	0.1	A
4 - Glenamuck District Distributor Rd	0.71	8.46	2.4	A

Main Results for each time segment

Main results: (08:00-08:15)

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
1 - Glenamuck Rd	868.00	11.91	2698.86	0.322	866.11	0.5	1.962	A
2 - Golf Lane	32.00	854.13	763.31	0.042	31.83	0.0	4.920	A
3 - Glenamuck Rd S	114.00	791.17	1182.30	0.096	113.57	0.1	3.366	A
4 - Glenamuck District Distributor Rd	991.00	514.64	1398.09	0.709	981.57	2.4	8.462	A

Main results: (08:15-08:30)

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
1 - Glenamuck Rd	0.00	0.09	2707.47	0.000	1.89	0.0	0.000	A
2 - Golf Lane	0.00	1.87	1156.69	0.000	0.17	0.0	0.000	A
3 - Glenamuck Rd S	0.00	1.83	1599.83	0.000	0.43	0.0	0.000	A
4 - Glenamuck District Distributor Rd	0.00	1.36	1665.74	0.000	9.43	0.0	0.000	A

Main results: (08:30-08:45)

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
1 - Glenamuck Rd	0.00	0.00	2707.53	0.000	0.00	0.0	0.000	A
2 - Golf Lane	0.00	0.00	1157.55	0.000	0.00	0.0	0.000	A
3 - Glenamuck Rd S	0.00	0.00	1600.80	0.000	0.00	0.0	0.000	A
4 - Glenamuck District Distributor Rd	0.00	0.00	1666.45	0.000	0.00	0.0	0.000	A

Main results: (08:45-09:00)

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
1 - Glenamuck Rd	0.00	0.00	2707.53	0.000	0.00	0.0	0.000	A
2 - Golf Lane	0.00	0.00	1157.55	0.000	0.00	0.0	0.000	A
3 - Glenamuck Rd S	0.00	0.00	1600.80	0.000	0.00	0.0	0.000	A
4 - Glenamuck District Distributor Rd	0.00	0.00	1666.45	0.000	0.00	0.0	0.000	A

Main results: (09:00-09:15)

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
1 - Glenamuck Rd	0.00	0.00	2707.53	0.000	0.00	0.0	0.000	A
2 - Golf Lane	0.00	0.00	1157.55	0.000	0.00	0.0	0.000	A
3 - Glenamuck Rd S	0.00	0.00	1600.80	0.000	0.00	0.0	0.000	A
4 - Glenamuck District Distributor Rd	0.00	0.00	1666.45	0.000	0.00	0.0	0.000	A

Main results: (09:15-09:30)

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
1 - Glenamuck Rd	0.00	0.00	2707.53	0.000	0.00	0.0	0.000	A
2 - Golf Lane	0.00	0.00	1157.55	0.000	0.00	0.0	0.000	A
3 - Glenamuck Rd S	0.00	0.00	1600.80	0.000	0.00	0.0	0.000	A
4 - Glenamuck District Distributor Rd	0.00	0.00	1666.45	0.000	0.00	0.0	0.000	A

DN 2028, PM

Data Errors and Warnings

No errors or warnings

Analysis Set Details

ID	Network flow scaling factor (%)
A1	100.000

Junction Network

Junctions

Junction	Name	Junction Type	Junction Delay (s)	Junction LOS
1 - Glenamuck Roundabout	Glenamuck Roundabout	Standard Roundabout	3.37	A

Junction Network Options

[same as above]

Arms

Arms

[same as above]

Capacity Options

[same as above]

Roundabout Geometry

[same as above]

Slope / Intercept / Capacity

[same as above]

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Model start time (HH:mm)	Model finish time (HH:mm)	Model time period length (min)	Time segment length (min)
D2	DN 2028	PM	DIRECT	17:00	18:30	90	15

Vehicle mix varies over turn	Vehicle mix varies over entry	Vehicle mix source	PCU Factor for a HV (PCU)	O-D data varies over time
✓	✓	HV Percentages	2.00	✓

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Scaling Factor (%)
1 - Glenamuck Rd		✓	100.000
2 - Golf Lane		✓	100.000
3 - Glenamuck Rd S		✓	100.000
4 - Glenamuck District Distributor Rd		✓	100.000

Origin-Destination Data

(17:00-17:15)

Demand (PCU/hr)

		To			
		1 - Glenamuck Rd	2 - Golf Lane	3 - Glenamuck Rd S	4 - Glenamuck District Distributor Rd
From	1 - Glenamuck Rd	273.000	10.000	277.000	862.000
	2 - Golf Lane	15.000	0.000	0.000	8.000
	3 - Glenamuck Rd S	73.000	0.000	5.000	0.000
	4 - Glenamuck District Distributor Rd	655.000	7.000	0.000	0.000

(17:15-17:30)

Demand (PCU/hr)

		To			
		1 - Glenamuck Rd	2 - Golf Lane	3 - Glenamuck Rd S	4 - Glenamuck District Distributor Rd
From	1 - Glenamuck Rd	0.000	0.000	0.000	0.000
	2 - Golf Lane	0.000	0.000	0.000	0.000
	3 - Glenamuck Rd S	0.000	0.000	0.000	0.000
	4 - Glenamuck District Distributor Rd	0.000	0.000	0.000	0.000

(17:30-17:45)

Demand (PCU/hr)

		To			
		1 - Glenamuck Rd	2 - Golf Lane	3 - Glenamuck Rd S	4 - Glenamuck District Distributor Rd
From	1 - Glenamuck Rd	0.000	0.000	0.000	0.000
	2 - Golf Lane	0.000	0.000	0.000	0.000
	3 - Glenamuck Rd S	0.000	0.000	0.000	0.000
	4 - Glenamuck District Distributor Rd	0.000	0.000	0.000	0.000

(17:45-18:00)

Demand (PCU/hr)

		To			
		1 - Glenamuck Rd	2 - Golf Lane	3 - Glenamuck Rd S	4 - Glenamuck District Distributor Rd
From	1 - Glenamuck Rd	0.000	0.000	0.000	0.000
	2 - Golf Lane	0.000	0.000	0.000	0.000
	3 - Glenamuck Rd S	0.000	0.000	0.000	0.000
	4 - Glenamuck District Distributor Rd	0.000	0.000	0.000	0.000

Demand (PCU/hr)

(18:00-18:15)

		To			
		1 - Glenamuck Rd	2 - Golf Lane	3 - Glenamuck Rd S	4 - Glenamuck District Distributor Rd
From	1 - Glenamuck Rd	0.000	0.000	0.000	0.000
	2 - Golf Lane	0.000	0.000	0.000	0.000
	3 - Glenamuck Rd S	0.000	0.000	0.000	0.000
	4 - Glenamuck District Distributor Rd	0.000	0.000	0.000	0.000

Demand (PCU/hr)

(18:15-18:30)

		To			
		1 - Glenamuck Rd	2 - Golf Lane	3 - Glenamuck Rd S	4 - Glenamuck District Distributor Rd
From	1 - Glenamuck Rd	0.000	0.000	0.000	0.000
	2 - Golf Lane	0.000	0.000	0.000	0.000
	3 - Glenamuck Rd S	0.000	0.000	0.000	0.000
	4 - Glenamuck District Distributor Rd	0.000	0.000	0.000	0.000

Vehicle Mix

Heavy Vehicle proportion

		To			
		1 - Glenamuck Rd	2 - Golf Lane	3 - Glenamuck Rd S	4 - Glenamuck District Distributor Rd
From	1 - Glenamuck Rd	0	0	0	0
	2 - Golf Lane	0	0	0	0
	3 - Glenamuck Rd S	0	0	0	0
	4 - Glenamuck District Distributor Rd	0	0	0	0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max delay (s)	Max Queue (PCU)	Max LOS
1 - Glenamuck Rd	0.53	2.80	1.1	A
2 - Golf Lane	0.05	7.46	0.0	A
3 - Glenamuck Rd S	0.08	3.94	0.1	A
4 - Glenamuck District Distributor Rd	0.45	4.39	0.8	A

Main Results for each time segment

Main results: (17:00-17:15)

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
1 - Glenamuck Rd	1422.00	11.94	2698.84	0.527	1417.57	1.1	2.801	A
2 - Golf Lane	23.00	1412.58	505.54	0.046	22.81	0.0	7.458	A
3 - Glenamuck Rd S	78.00	1154.28	990.23	0.079	77.66	0.1	3.944	A
4 - Glenamuck District Distributor Rd	662.00	364.69	1476.28	0.448	658.78	0.8	4.387	A

Main results: (17:15-17:30)

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
1 - Glenamuck Rd	0.00	0.06	2707.49	0.000	4.43	0.0	0.000	A
2 - Golf Lane	0.00	4.42	1155.51	0.000	0.19	0.0	0.000	A
3 - Glenamuck Rd S	0.00	3.72	1598.83	0.000	0.34	0.0	0.000	A
4 - Glenamuck District Distributor Rd	0.00	1.31	1665.76	0.000	3.22	0.0	0.000	A

Main results: (17:30-17:45)

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
1 - Glenamuck Rd	0.00	0.00	2707.53	0.000	0.00	0.0	0.000	A
2 - Golf Lane	0.00	0.00	1157.55	0.000	0.00	0.0	0.000	A
3 - Glenamuck Rd S	0.00	0.00	1600.80	0.000	0.00	0.0	0.000	A
4 - Glenamuck District Distributor Rd	0.00	0.00	1666.45	0.000	0.00	0.0	0.000	A

Main results: (17:45-18:00)

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
1 - Glenamuck Rd	0.00	0.00	2707.53	0.000	0.00	0.0	0.000	A
2 - Golf Lane	0.00	0.00	1157.55	0.000	0.00	0.0	0.000	A
3 - Glenamuck Rd S	0.00	0.00	1600.80	0.000	0.00	0.0	0.000	A
4 - Glenamuck District Distributor Rd	0.00	0.00	1666.45	0.000	0.00	0.0	0.000	A

Main results: (18:00-18:15)

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
1 - Glenamuck Rd	0.00	0.00	2707.53	0.000	0.00	0.0	0.000	A
2 - Golf Lane	0.00	0.00	1157.55	0.000	0.00	0.0	0.000	A
3 - Glenamuck Rd S	0.00	0.00	1600.80	0.000	0.00	0.0	0.000	A
4 - Glenamuck District Distributor Rd	0.00	0.00	1666.45	0.000	0.00	0.0	0.000	A

Main results: (18:15-18:30)

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
1 - Glenamuck Rd	0.00	0.00	2707.53	0.000	0.00	0.0	0.000	A
2 - Golf Lane	0.00	0.00	1157.55	0.000	0.00	0.0	0.000	A
3 - Glenamuck Rd S	0.00	0.00	1600.80	0.000	0.00	0.0	0.000	A
4 - Glenamuck District Distributor Rd	0.00	0.00	1666.45	0.000	0.00	0.0	0.000	A

DS 2028, AM

Data Errors and Warnings

No errors or warnings

Analysis Set Details

ID	Network flow scaling factor (%)
A1	100.000

Junction Network

Junctions

Junction	Name	Junction Type	Junction Delay (s)	Junction LOS
1 - Glenamuck Roundabout	Glenamuck Roundabout	Standard Roundabout	5.82	A

Junction Network Options

[same as above]

Arms

Arms

[same as above]

Capacity Options

[same as above]

Roundabout Geometry

[same as above]

Slope / Intercept / Capacity

[same as above]

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Model start time (HH:mm)	Model finish time (HH:mm)	Model time period length (min)	Time segment length (min)
D3	DS 2028	AM	DIRECT	08:00	09:30	90	15

Vehicle mix varies over turn	Vehicle mix varies over entry	Vehicle mix source	PCU Factor for a HV (PCU)	O-D data varies over time
✓	✓	HV Percentages	2.00	✓

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Scaling Factor (%)
1 - Glenamuck Rd		✓	100.000
2 - Golf Lane		✓	100.000
3 - Glenamuck Rd S		✓	100.000
4 - Glenamuck District Distributor Rd		✓	100.000

Origin-Destination Data

(08:00-08:15)

Demand (PCU/hr)

		To			
		1 - Glenamuck Rd	2 - Golf Lane	3 - Glenamuck Rd S	4 - Glenamuck District Distributor Rd
From	1 - Glenamuck Rd	383.000	36.000	89.000	379.000
	2 - Golf Lane	100.000	0.000	3.000	37.000
	3 - Glenamuck Rd S	109.000	1.000	5.000	0.000
	4 - Glenamuck District Distributor Rd	984.000	13.000	0.000	0.000

(08:15-08:30)

Demand (PCU/hr)

		To			
		1 - Glenamuck Rd	2 - Golf Lane	3 - Glenamuck Rd S	4 - Glenamuck District Distributor Rd
From	1 - Glenamuck Rd	0.000	0.000	0.000	0.000
	2 - Golf Lane	0.000	0.000	0.000	0.000
	3 - Glenamuck Rd S	0.000	0.000	0.000	0.000
	4 - Glenamuck District Distributor Rd	0.000	0.000	0.000	0.000

(08:30-08:45)

Demand (PCU/hr)

		To			
		1 - Glenamuck Rd	2 - Golf Lane	3 - Glenamuck Rd S	4 - Glenamuck District Distributor Rd
From	1 - Glenamuck Rd	0.000	0.000	0.000	0.000
	2 - Golf Lane	0.000	0.000	0.000	0.000
	3 - Glenamuck Rd S	0.000	0.000	0.000	0.000
	4 - Glenamuck District Distributor Rd	0.000	0.000	0.000	0.000

(08:45-09:00)

Demand (PCU/hr)

		To			
		1 - Glenamuck Rd	2 - Golf Lane	3 - Glenamuck Rd S	4 - Glenamuck District Distributor Rd
From	1 - Glenamuck Rd	0.000	0.000	0.000	0.000
	2 - Golf Lane	0.000	0.000	0.000	0.000
	3 - Glenamuck Rd S	0.000	0.000	0.000	0.000
	4 - Glenamuck District Distributor Rd	0.000	0.000	0.000	0.000

Demand (PCU/hr)

(09:00-09:15)

		To			
		1 - Glenamuck Rd	2 - Golf Lane	3 - Glenamuck Rd S	4 - Glenamuck District Distributor Rd
From	1 - Glenamuck Rd	0.000	0.000	0.000	0.000
	2 - Golf Lane	0.000	0.000	0.000	0.000
	3 - Glenamuck Rd S	0.000	0.000	0.000	0.000
	4 - Glenamuck District Distributor Rd	0.000	0.000	0.000	0.000

Demand (PCU/hr)

(09:15-09:30)

		To			
		1 - Glenamuck Rd	2 - Golf Lane	3 - Glenamuck Rd S	4 - Glenamuck District Distributor Rd
From	1 - Glenamuck Rd	0.000	0.000	0.000	0.000
	2 - Golf Lane	0.000	0.000	0.000	0.000
	3 - Glenamuck Rd S	0.000	0.000	0.000	0.000
	4 - Glenamuck District Distributor Rd	0.000	0.000	0.000	0.000

Vehicle Mix

Heavy Vehicle proportion

		To			
		1 - Glenamuck Rd	2 - Golf Lane	3 - Glenamuck Rd S	4 - Glenamuck District Distributor Rd
From	1 - Glenamuck Rd	0	0	0	0
	2 - Golf Lane	0	0	0	0
	3 - Glenamuck Rd S	0	0	0	0
	4 - Glenamuck District Distributor Rd	0	0	0	0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max delay (s)	Max Queue (PCU)	Max LOS
1 - Glenamuck Rd	0.33	1.99	0.5	A
2 - Golf Lane	0.18	5.76	0.2	A
3 - Glenamuck Rd S	0.10	3.55	0.1	A
4 - Glenamuck District Distributor Rd	0.74	9.49	2.7	A

Main Results for each time segment

Main results: (08:00-08:15)

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
1 - Glenamuck Rd	887.00	18.84	2693.83	0.329	885.04	0.5	1.989	A
2 - Golf Lane	140.00	854.10	763.32	0.183	139.11	0.2	5.759	A
3 - Glenamuck Rd S	115.00	896.45	1126.61	0.102	114.55	0.1	3.555	A
4 - Glenamuck District Distributor Rd	997.00	596.07	1355.62	0.735	986.32	2.7	9.492	A

Main results: (08:15-08:30)

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
1 - Glenamuck Rd	0.00	0.16	2707.41	0.000	1.96	0.0	0.000	A
2 - Golf Lane	0.00	1.90	1156.67	0.000	0.89	0.0	0.000	A
3 - Glenamuck Rd S	0.00	2.55	1599.45	0.000	0.45	0.0	0.000	A
4 - Glenamuck District Distributor Rd	0.00	1.93	1665.44	0.000	10.68	0.0	0.000	A

Main results: (08:30-08:45)

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
1 - Glenamuck Rd	0.00	0.00	2707.53	0.000	0.00	0.0	0.000	A
2 - Golf Lane	0.00	0.00	1157.55	0.000	0.00	0.0	0.000	A
3 - Glenamuck Rd S	0.00	0.00	1600.80	0.000	0.00	0.0	0.000	A
4 - Glenamuck District Distributor Rd	0.00	0.00	1666.45	0.000	0.00	0.0	0.000	A

Main results: (08:45-09:00)

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
1 - Glenamuck Rd	0.00	0.00	2707.53	0.000	0.00	0.0	0.000	A
2 - Golf Lane	0.00	0.00	1157.55	0.000	0.00	0.0	0.000	A
3 - Glenamuck Rd S	0.00	0.00	1600.80	0.000	0.00	0.0	0.000	A
4 - Glenamuck District Distributor Rd	0.00	0.00	1666.45	0.000	0.00	0.0	0.000	A

Main results: (09:00-09:15)

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
1 - Glenamuck Rd	0.00	0.00	2707.53	0.000	0.00	0.0	0.000	A
2 - Golf Lane	0.00	0.00	1157.55	0.000	0.00	0.0	0.000	A
3 - Glenamuck Rd S	0.00	0.00	1600.80	0.000	0.00	0.0	0.000	A
4 - Glenamuck District Distributor Rd	0.00	0.00	1666.45	0.000	0.00	0.0	0.000	A

Main results: (09:15-09:30)

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
1 - Glenamuck Rd	0.00	0.00	2707.53	0.000	0.00	0.0	0.000	A
2 - Golf Lane	0.00	0.00	1157.55	0.000	0.00	0.0	0.000	A
3 - Glenamuck Rd S	0.00	0.00	1600.80	0.000	0.00	0.0	0.000	A
4 - Glenamuck District Distributor Rd	0.00	0.00	1666.45	0.000	0.00	0.0	0.000	A

DS 2028, PM

Data Errors and Warnings

No errors or warnings

Analysis Set Details

ID	Network flow scaling factor (%)
A1	100.000

Junction Network

Junctions

Junction	Name	Junction Type	Junction Delay (s)	Junction LOS
1 - Glenamuck Roundabout	Glenamuck Roundabout	Standard Roundabout	3.59	A

Junction Network Options

[same as above]

Arms

Arms

[same as above]

Capacity Options

[same as above]

Roundabout Geometry

[same as above]

Slope / Intercept / Capacity

[same as above]

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Model start time (HH:mm)	Model finish time (HH:mm)	Model time period length (min)	Time segment length (min)
D4	DS 2028	PM	DIRECT	17:00	18:30	90	15

Vehicle mix varies over turn	Vehicle mix varies over entry	Vehicle mix source	PCU Factor for a HV (PCU)	O-D data varies over time
✓	✓	HV Percentages	2.00	✓

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Scaling Factor (%)
1 - Glenamuck Rd		✓	100.000
2 - Golf Lane		✓	100.000
3 - Glenamuck Rd S		✓	100.000
4 - Glenamuck District Distributor Rd		✓	100.000

Origin-Destination Data

(17:00-17:15)

Demand (PCU/hr)

		To			
		1 - Glenamuck Rd	2 - Golf Lane	3 - Glenamuck Rd S	4 - Glenamuck District Distributor Rd
From	1 - Glenamuck Rd	273.000	65.000	277.000	862.000
	2 - Golf Lane	35.000	0.000	1.000	16.000
	3 - Glenamuck Rd S	73.000	2.000	5.000	0.000
	4 - Glenamuck District Distributor Rd	655.000	29.000	0.000	0.000

(17:15-17:30)

Demand (PCU/hr)

		To			
		1 - Glenamuck Rd	2 - Golf Lane	3 - Glenamuck Rd S	4 - Glenamuck District Distributor Rd
From	1 - Glenamuck Rd	0.000	0.000	0.000	0.000
	2 - Golf Lane	0.000	0.000	0.000	0.000
	3 - Glenamuck Rd S	0.000	0.000	0.000	0.000
	4 - Glenamuck District Distributor Rd	0.000	0.000	0.000	0.000

(17:30-17:45)

Demand (PCU/hr)

		To			
		1 - Glenamuck Rd	2 - Golf Lane	3 - Glenamuck Rd S	4 - Glenamuck District Distributor Rd
From	1 - Glenamuck Rd	0.000	0.000	0.000	0.000
	2 - Golf Lane	0.000	0.000	0.000	0.000
	3 - Glenamuck Rd S	0.000	0.000	0.000	0.000
	4 - Glenamuck District Distributor Rd	0.000	0.000	0.000	0.000

(17:45-18:00)

Demand (PCU/hr)

		To			
		1 - Glenamuck Rd	2 - Golf Lane	3 - Glenamuck Rd S	4 - Glenamuck District Distributor Rd
From	1 - Glenamuck Rd	0.000	0.000	0.000	0.000
	2 - Golf Lane	0.000	0.000	0.000	0.000
	3 - Glenamuck Rd S	0.000	0.000	0.000	0.000
	4 - Glenamuck District Distributor Rd	0.000	0.000	0.000	0.000

Demand (PCU/hr)

(18:00-18:15)

		To			
		1 - Glenamuck Rd	2 - Golf Lane	3 - Glenamuck Rd S	4 - Glenamuck District Distributor Rd
From	1 - Glenamuck Rd	0.000	0.000	0.000	0.000
	2 - Golf Lane	0.000	0.000	0.000	0.000
	3 - Glenamuck Rd S	0.000	0.000	0.000	0.000
	4 - Glenamuck District Distributor Rd	0.000	0.000	0.000	0.000

Demand (PCU/hr)

(18:15-18:30)

		To			
		1 - Glenamuck Rd	2 - Golf Lane	3 - Glenamuck Rd S	4 - Glenamuck District Distributor Rd
From	1 - Glenamuck Rd	0.000	0.000	0.000	0.000
	2 - Golf Lane	0.000	0.000	0.000	0.000
	3 - Glenamuck Rd S	0.000	0.000	0.000	0.000
	4 - Glenamuck District Distributor Rd	0.000	0.000	0.000	0.000

Vehicle Mix

Heavy Vehicle proportion

		To			
		1 - Glenamuck Rd	2 - Golf Lane	3 - Glenamuck Rd S	4 - Glenamuck District Distributor Rd
From	1 - Glenamuck Rd	0	0	0	0
	2 - Golf Lane	0	0	0	0
	3 - Glenamuck Rd S	0	0	0	0
	4 - Glenamuck District Distributor Rd	0	0	0	0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max delay (s)	Max Queue (PCU)	Max LOS
1 - Glenamuck Rd	0.55	2.96	1.2	A
2 - Golf Lane	0.10	7.92	0.1	A
3 - Glenamuck Rd S	0.08	4.01	0.1	A
4 - Glenamuck District Distributor Rd	0.47	4.57	0.9	A

Main Results for each time segment

Main results: (17:00-17:15)

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
1 - Glenamuck Rd	1477.00	35.82	2681.47	0.551	1472.13	1.2	2.964	A
2 - Golf Lane	52.00	1412.32	505.66	0.103	51.55	0.1	7.919	A
3 - Glenamuck Rd S	80.00	1181.81	975.67	0.082	79.64	0.1	4.015	A
4 - Glenamuck District Distributor Rd	684.00	386.44	1464.94	0.467	680.53	0.9	4.569	A

Main results: (17:15-17:30)

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
1 - Glenamuck Rd	0.00	0.18	2707.40	0.000	4.87	0.0	0.000	A
2 - Golf Lane	0.00	4.68	1155.39	0.000	0.45	0.0	0.000	A
3 - Glenamuck Rd S	0.00	4.19	1598.58	0.000	0.36	0.0	0.000	A
4 - Glenamuck District Distributor Rd	0.00	1.56	1665.63	0.000	3.47	0.0	0.000	A

Main results: (17:30-17:45)

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
1 - Glenamuck Rd	0.00	0.00	2707.53	0.000	0.00	0.0	0.000	A
2 - Golf Lane	0.00	0.00	1157.55	0.000	0.00	0.0	0.000	A
3 - Glenamuck Rd S	0.00	0.00	1600.80	0.000	0.00	0.0	0.000	A
4 - Glenamuck District Distributor Rd	0.00	0.00	1666.45	0.000	0.00	0.0	0.000	A

Main results: (17:45-18:00)

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
1 - Glenamuck Rd	0.00	0.00	2707.53	0.000	0.00	0.0	0.000	A
2 - Golf Lane	0.00	0.00	1157.55	0.000	0.00	0.0	0.000	A
3 - Glenamuck Rd S	0.00	0.00	1600.80	0.000	0.00	0.0	0.000	A
4 - Glenamuck District Distributor Rd	0.00	0.00	1666.45	0.000	0.00	0.0	0.000	A

Main results: (18:00-18:15)

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
1 - Glenamuck Rd	0.00	0.00	2707.53	0.000	0.00	0.0	0.000	A
2 - Golf Lane	0.00	0.00	1157.55	0.000	0.00	0.0	0.000	A
3 - Glenamuck Rd S	0.00	0.00	1600.80	0.000	0.00	0.0	0.000	A
4 - Glenamuck District Distributor Rd	0.00	0.00	1666.45	0.000	0.00	0.0	0.000	A

Main results: (18:15-18:30)

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
1 - Glenamuck Rd	0.00	0.00	2707.53	0.000	0.00	0.0	0.000	A
2 - Golf Lane	0.00	0.00	1157.55	0.000	0.00	0.0	0.000	A
3 - Glenamuck Rd S	0.00	0.00	1600.80	0.000	0.00	0.0	0.000	A
4 - Glenamuck District Distributor Rd	0.00	0.00	1666.45	0.000	0.00	0.0	0.000	A

DN 2038, AM

Data Errors and Warnings

No errors or warnings

Analysis Set Details

ID	Network flow scaling factor (%)
A1	100.000

Junction Network

Junctions

Junction	Name	Junction Type	Junction Delay (s)	Junction LOS
1 - Glenamuck Roundabout	Glenamuck Roundabout	Standard Roundabout	6.17	A

Junction Network Options

[same as above]

Arms

Arms

[same as above]

Capacity Options

[same as above]

Roundabout Geometry

[same as above]

Slope / Intercept / Capacity

[same as above]

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Model start time (HH:mm)	Model finish time (HH:mm)	Model time period length (min)	Time segment length (min)
D5	DN 2038	AM	DIRECT	08:00	09:30	90	15

Vehicle mix varies over turn	Vehicle mix varies over entry	Vehicle mix source	PCU Factor for a HV (PCU)	O-D data varies over time
✓	✓	HV Percentages	2.00	✓

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Scaling Factor (%)
1 - Glenamuck Rd		✓	100.000
2 - Golf Lane		✓	100.000
3 - Glenamuck Rd S		✓	100.000
4 - Glenamuck District Distributor Rd		✓	100.000

Origin-Destination Data

(08:00-08:15)

Demand (PCU/hr)

		To			
		1 - Glenamuck Rd	2 - Golf Lane	3 - Glenamuck Rd S	4 - Glenamuck District Distributor Rd
From	1 - Glenamuck Rd	408.000	17.000	91.000	402.000
	2 - Golf Lane	19.000	0.000	1.000	12.000
	3 - Glenamuck Rd S	110.000	0.000	6.000	0.000
	4 - Glenamuck District Distributor Rd	1045.000	7.000	0.000	0.000

(08:15-08:30)

Demand (PCU/hr)

		To			
		1 - Glenamuck Rd	2 - Golf Lane	3 - Glenamuck Rd S	4 - Glenamuck District Distributor Rd
From	1 - Glenamuck Rd	0.000	0.000	0.000	0.000
	2 - Golf Lane	0.000	0.000	0.000	0.000
	3 - Glenamuck Rd S	0.000	0.000	0.000	0.000
	4 - Glenamuck District Distributor Rd	0.000	0.000	0.000	0.000

(08:30-08:45)

Demand (PCU/hr)

		To			
		1 - Glenamuck Rd	2 - Golf Lane	3 - Glenamuck Rd S	4 - Glenamuck District Distributor Rd
From	1 - Glenamuck Rd	0.000	0.000	0.000	0.000
	2 - Golf Lane	0.000	0.000	0.000	0.000
	3 - Glenamuck Rd S	0.000	0.000	0.000	0.000
	4 - Glenamuck District Distributor Rd	0.000	0.000	0.000	0.000

(08:45-09:00)

Demand (PCU/hr)

		To			
		1 - Glenamuck Rd	2 - Golf Lane	3 - Glenamuck Rd S	4 - Glenamuck District Distributor Rd
From	1 - Glenamuck Rd	0.000	0.000	0.000	0.000
	2 - Golf Lane	0.000	0.000	0.000	0.000
	3 - Glenamuck Rd S	0.000	0.000	0.000	0.000
	4 - Glenamuck District Distributor Rd	0.000	0.000	0.000	0.000

Demand (PCU/hr)

(09:00-09:15)

		To			
		1 - Glenamuck Rd	2 - Golf Lane	3 - Glenamuck Rd S	4 - Glenamuck District Distributor Rd
From	1 - Glenamuck Rd	0.000	0.000	0.000	0.000
	2 - Golf Lane	0.000	0.000	0.000	0.000
	3 - Glenamuck Rd S	0.000	0.000	0.000	0.000
	4 - Glenamuck District Distributor Rd	0.000	0.000	0.000	0.000

Demand (PCU/hr)

(09:15-09:30)

		To			
		1 - Glenamuck Rd	2 - Golf Lane	3 - Glenamuck Rd S	4 - Glenamuck District Distributor Rd
From	1 - Glenamuck Rd	0.000	0.000	0.000	0.000
	2 - Golf Lane	0.000	0.000	0.000	0.000
	3 - Glenamuck Rd S	0.000	0.000	0.000	0.000
	4 - Glenamuck District Distributor Rd	0.000	0.000	0.000	0.000

Vehicle Mix

Heavy Vehicle proportion

		To			
		1 - Glenamuck Rd	2 - Golf Lane	3 - Glenamuck Rd S	4 - Glenamuck District Distributor Rd
From	1 - Glenamuck Rd	0	0	0	0
	2 - Golf Lane	0	0	0	0
	3 - Glenamuck Rd S	0	0	0	0
	4 - Glenamuck District Distributor Rd	0	0	0	0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max delay (s)	Max Queue (PCU)	Max LOS
1 - Glenamuck Rd	0.34	2.02	0.5	A
2 - Golf Lane	0.04	5.08	0.0	A
3 - Glenamuck Rd S	0.10	3.45	0.1	A
4 - Glenamuck District Distributor Rd	0.76	10.14	3.0	B

Main Results for each time segment

Main results: (08:00-08:15)

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
1 - Glenamuck Rd	918.00	12.90	2698.15	0.340	915.94	0.5	2.018	A
2 - Golf Lane	32.00	904.96	739.85	0.043	31.82	0.0	5.083	A
3 - Glenamuck Rd S	116.00	839.01	1156.99	0.100	115.56	0.1	3.454	A
4 - Glenamuck District Distributor Rd	1052.00	541.54	1384.06	0.760	1039.91	3.0	10.135	B

Main results: (08:15-08:30)

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
1 - Glenamuck Rd	0.00	0.10	2707.45	0.000	2.06	0.0	0.000	A
2 - Golf Lane	0.00	2.04	1156.61	0.000	0.18	0.0	0.000	A
3 - Glenamuck Rd S	0.00	1.99	1599.75	0.000	0.44	0.0	0.000	A
4 - Glenamuck District Distributor Rd	0.00	1.46	1665.69	0.000	12.09	0.0	0.000	A

Main results: (08:30-08:45)

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
1 - Glenamuck Rd	0.00	0.00	2707.53	0.000	0.00	0.0	0.000	A
2 - Golf Lane	0.00	0.00	1157.55	0.000	0.00	0.0	0.000	A
3 - Glenamuck Rd S	0.00	0.00	1600.80	0.000	0.00	0.0	0.000	A
4 - Glenamuck District Distributor Rd	0.00	0.00	1666.45	0.000	0.00	0.0	0.000	A

Main results: (08:45-09:00)

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
1 - Glenamuck Rd	0.00	0.00	2707.53	0.000	0.00	0.0	0.000	A
2 - Golf Lane	0.00	0.00	1157.55	0.000	0.00	0.0	0.000	A
3 - Glenamuck Rd S	0.00	0.00	1600.80	0.000	0.00	0.0	0.000	A
4 - Glenamuck District Distributor Rd	0.00	0.00	1666.45	0.000	0.00	0.0	0.000	A

Main results: (09:00-09:15)

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
1 - Glenamuck Rd	0.00	0.00	2707.53	0.000	0.00	0.0	0.000	A
2 - Golf Lane	0.00	0.00	1157.55	0.000	0.00	0.0	0.000	A
3 - Glenamuck Rd S	0.00	0.00	1600.80	0.000	0.00	0.0	0.000	A
4 - Glenamuck District Distributor Rd	0.00	0.00	1666.45	0.000	0.00	0.0	0.000	A

Main results: (09:15-09:30)

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
1 - Glenamuck Rd	0.00	0.00	2707.53	0.000	0.00	0.0	0.000	A
2 - Golf Lane	0.00	0.00	1157.55	0.000	0.00	0.0	0.000	A
3 - Glenamuck Rd S	0.00	0.00	1600.80	0.000	0.00	0.0	0.000	A
4 - Glenamuck District Distributor Rd	0.00	0.00	1666.45	0.000	0.00	0.0	0.000	A

DN 2038, PM

Data Errors and Warnings

No errors or warnings

Analysis Set Details

ID	Network flow scaling factor (%)
A1	100.000

Junction Network

Junctions

Junction	Name	Junction Type	Junction Delay (s)	Junction LOS
1 - Glenamuck Roundabout	Glenamuck Roundabout	Standard Roundabout	3.57	A

Junction Network Options

[same as above]

Arms

Arms

[same as above]

Capacity Options

[same as above]

Roundabout Geometry

[same as above]

Slope / Intercept / Capacity

[same as above]

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Model start time (HH:mm)	Model finish time (HH:mm)	Model time period length (min)	Time segment length (min)
D6	DN 2038	PM	DIRECT	17:00	18:30	90	15

Vehicle mix varies over turn	Vehicle mix varies over entry	Vehicle mix source	PCU Factor for a HV (PCU)	O-D data varies over time
✓	✓	HV Percentages	2.00	✓

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Scaling Factor (%)
1 - Glenamuck Rd		✓	100.000
2 - Golf Lane		✓	100.000
3 - Glenamuck Rd S		✓	100.000
4 - Glenamuck District Distributor Rd		✓	100.000

Origin-Destination Data

(17:00-17:15)

Demand (PCU/hr)

		To			
		1 - Glenamuck Rd	2 - Golf Lane	3 - Glenamuck Rd S	4 - Glenamuck District Distributor Rd
From	1 - Glenamuck Rd	291.000	10.000	283.000	916.000
	2 - Golf Lane	15.000	0.000	0.000	8.000
	3 - Glenamuck Rd S	73.000	0.000	5.000	0.000
	4 - Glenamuck District Distributor Rd	692.000	7.000	0.000	0.000

(17:15-17:30)

Demand (PCU/hr)

		To			
		1 - Glenamuck Rd	2 - Golf Lane	3 - Glenamuck Rd S	4 - Glenamuck District Distributor Rd
From	1 - Glenamuck Rd	0.000	0.000	0.000	0.000
	2 - Golf Lane	0.000	0.000	0.000	0.000
	3 - Glenamuck Rd S	0.000	0.000	0.000	0.000
	4 - Glenamuck District Distributor Rd	0.000	0.000	0.000	0.000

(17:30-17:45)

Demand (PCU/hr)

		To			
		1 - Glenamuck Rd	2 - Golf Lane	3 - Glenamuck Rd S	4 - Glenamuck District Distributor Rd
From	1 - Glenamuck Rd	0.000	0.000	0.000	0.000
	2 - Golf Lane	0.000	0.000	0.000	0.000
	3 - Glenamuck Rd S	0.000	0.000	0.000	0.000
	4 - Glenamuck District Distributor Rd	0.000	0.000	0.000	0.000

(17:45-18:00)

Demand (PCU/hr)

		To			
		1 - Glenamuck Rd	2 - Golf Lane	3 - Glenamuck Rd S	4 - Glenamuck District Distributor Rd
From	1 - Glenamuck Rd	0.000	0.000	0.000	0.000
	2 - Golf Lane	0.000	0.000	0.000	0.000
	3 - Glenamuck Rd S	0.000	0.000	0.000	0.000
	4 - Glenamuck District Distributor Rd	0.000	0.000	0.000	0.000

Demand (PCU/hr)

(18:00-18:15)

		To			
		1 - Glenamuck Rd	2 - Golf Lane	3 - Glenamuck Rd S	4 - Glenamuck District Distributor Rd
From	1 - Glenamuck Rd	0.000	0.000	0.000	0.000
	2 - Golf Lane	0.000	0.000	0.000	0.000
	3 - Glenamuck Rd S	0.000	0.000	0.000	0.000
	4 - Glenamuck District Distributor Rd	0.000	0.000	0.000	0.000

Demand (PCU/hr)

(18:15-18:30)

		To			
		1 - Glenamuck Rd	2 - Golf Lane	3 - Glenamuck Rd S	4 - Glenamuck District Distributor Rd
From	1 - Glenamuck Rd	0.000	0.000	0.000	0.000
	2 - Golf Lane	0.000	0.000	0.000	0.000
	3 - Glenamuck Rd S	0.000	0.000	0.000	0.000
	4 - Glenamuck District Distributor Rd	0.000	0.000	0.000	0.000

Vehicle Mix

Heavy Vehicle proportion

		To			
		1 - Glenamuck Rd	2 - Golf Lane	3 - Glenamuck Rd S	4 - Glenamuck District Distributor Rd
From	1 - Glenamuck Rd	0	0	0	0
	2 - Golf Lane	0	0	0	0
	3 - Glenamuck Rd S	0	0	0	0
	4 - Glenamuck District Distributor Rd	0	0	0	0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max delay (s)	Max Queue (PCU)	Max LOS
1 - Glenamuck Rd	0.56	2.98	1.2	A
2 - Golf Lane	0.05	8.05	0.1	A
3 - Glenamuck Rd S	0.08	4.11	0.1	A
4 - Glenamuck District Distributor Rd	0.48	4.64	0.9	A

Main Results for each time segment

Main results: (17:00-17:15)

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
1 - Glenamuck Rd	1500.00	11.94	2698.84	0.556	1495.03	1.2	2.978	A
2 - Golf Lane	23.00	1490.04	469.79	0.049	22.80	0.1	8.050	A
3 - Glenamuck Rd S	78.00	1225.80	952.40	0.082	77.64	0.1	4.113	A
4 - Glenamuck District Distributor Rd	699.00	382.55	1466.97	0.476	695.39	0.9	4.645	A

Main results: (17:15-17:30)

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
1 - Glenamuck Rd	0.00	0.06	2707.49	0.000	4.97	0.0	0.000	A
2 - Golf Lane	0.00	4.96	1155.26	0.000	0.20	0.0	0.000	A
3 - Glenamuck Rd S	0.00	4.20	1598.58	0.000	0.36	0.0	0.000	A
4 - Glenamuck District Distributor Rd	0.00	1.45	1665.69	0.000	3.61	0.0	0.000	A

Main results: (17:30-17:45)

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
1 - Glenamuck Rd	0.00	0.00	2707.53	0.000	0.00	0.0	0.000	A
2 - Golf Lane	0.00	0.00	1157.55	0.000	0.00	0.0	0.000	A
3 - Glenamuck Rd S	0.00	0.00	1600.80	0.000	0.00	0.0	0.000	A
4 - Glenamuck District Distributor Rd	0.00	0.00	1666.45	0.000	0.00	0.0	0.000	A

Main results: (17:45-18:00)

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
1 - Glenamuck Rd	0.00	0.00	2707.53	0.000	0.00	0.0	0.000	A
2 - Golf Lane	0.00	0.00	1157.55	0.000	0.00	0.0	0.000	A
3 - Glenamuck Rd S	0.00	0.00	1600.80	0.000	0.00	0.0	0.000	A
4 - Glenamuck District Distributor Rd	0.00	0.00	1666.45	0.000	0.00	0.0	0.000	A

Main results: (18:00-18:15)

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
1 - Glenamuck Rd	0.00	0.00	2707.53	0.000	0.00	0.0	0.000	A
2 - Golf Lane	0.00	0.00	1157.55	0.000	0.00	0.0	0.000	A
3 - Glenamuck Rd S	0.00	0.00	1600.80	0.000	0.00	0.0	0.000	A
4 - Glenamuck District Distributor Rd	0.00	0.00	1666.45	0.000	0.00	0.0	0.000	A

Main results: (18:15-18:30)

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
1 - Glenamuck Rd	0.00	0.00	2707.53	0.000	0.00	0.0	0.000	A
2 - Golf Lane	0.00	0.00	1157.55	0.000	0.00	0.0	0.000	A
3 - Glenamuck Rd S	0.00	0.00	1600.80	0.000	0.00	0.0	0.000	A
4 - Glenamuck District Distributor Rd	0.00	0.00	1666.45	0.000	0.00	0.0	0.000	A

DS 2038, AM

Data Errors and Warnings

No errors or warnings

Analysis Set Details

ID	Network flow scaling factor (%)
A1	100.000

Junction Network

Junctions

Junction	Name	Junction Type	Junction Delay (s)	Junction LOS
1 - Glenamuck Roundabout	Glenamuck Roundabout	Standard Roundabout	6.86	A

Junction Network Options

[same as above]

Arms

Arms

[same as above]

Capacity Options

[same as above]

Roundabout Geometry

[same as above]

Slope / Intercept / Capacity

[same as above]

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Model start time (HH:mm)	Model finish time (HH:mm)	Model time period length (min)	Time segment length (min)
D7	DS 2038	AM	DIRECT	08:00	09:30	90	15

Vehicle mix varies over turn	Vehicle mix varies over entry	Vehicle mix source	PCU Factor for a HV (PCU)	O-D data varies over time
✓	✓	HV Percentages	2.00	✓

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Scaling Factor (%)
1 - Glenamuck Rd		✓	100.000
2 - Golf Lane		✓	100.000
3 - Glenamuck Rd S		✓	100.000
4 - Glenamuck District Distributor Rd		✓	100.000

Origin-Destination Data

(08:00-08:15)

Demand (PCU/hr)

		To			
		1 - Glenamuck Rd	2 - Golf Lane	3 - Glenamuck Rd S	4 - Glenamuck District Distributor Rd
From	1 - Glenamuck Rd	408.000	36.000	91.000	402.000
	2 - Golf Lane	100.000	0.000	3.000	37.000
	3 - Glenamuck Rd S	110.000	1.000	6.000	0.000
	4 - Glenamuck District Distributor Rd	1045.000	13.000	0.000	0.000

(08:15-08:30)

Demand (PCU/hr)

		To			
		1 - Glenamuck Rd	2 - Golf Lane	3 - Glenamuck Rd S	4 - Glenamuck District Distributor Rd
From	1 - Glenamuck Rd	0.000	0.000	0.000	0.000
	2 - Golf Lane	0.000	0.000	0.000	0.000
	3 - Glenamuck Rd S	0.000	0.000	0.000	0.000
	4 - Glenamuck District Distributor Rd	0.000	0.000	0.000	0.000

(08:30-08:45)

Demand (PCU/hr)

		To			
		1 - Glenamuck Rd	2 - Golf Lane	3 - Glenamuck Rd S	4 - Glenamuck District Distributor Rd
From	1 - Glenamuck Rd	0.000	0.000	0.000	0.000
	2 - Golf Lane	0.000	0.000	0.000	0.000
	3 - Glenamuck Rd S	0.000	0.000	0.000	0.000
	4 - Glenamuck District Distributor Rd	0.000	0.000	0.000	0.000

(08:45-09:00)

Demand (PCU/hr)

		To			
		1 - Glenamuck Rd	2 - Golf Lane	3 - Glenamuck Rd S	4 - Glenamuck District Distributor Rd
From	1 - Glenamuck Rd	0.000	0.000	0.000	0.000
	2 - Golf Lane	0.000	0.000	0.000	0.000
	3 - Glenamuck Rd S	0.000	0.000	0.000	0.000
	4 - Glenamuck District Distributor Rd	0.000	0.000	0.000	0.000

Demand (PCU/hr)

(09:00-09:15)

		To			
		1 - Glenamuck Rd	2 - Golf Lane	3 - Glenamuck Rd S	4 - Glenamuck District Distributor Rd
From	1 - Glenamuck Rd	0.000	0.000	0.000	0.000
	2 - Golf Lane	0.000	0.000	0.000	0.000
	3 - Glenamuck Rd S	0.000	0.000	0.000	0.000
	4 - Glenamuck District Distributor Rd	0.000	0.000	0.000	0.000

Demand (PCU/hr)

(09:15-09:30)

		To			
		1 - Glenamuck Rd	2 - Golf Lane	3 - Glenamuck Rd S	4 - Glenamuck District Distributor Rd
From	1 - Glenamuck Rd	0.000	0.000	0.000	0.000
	2 - Golf Lane	0.000	0.000	0.000	0.000
	3 - Glenamuck Rd S	0.000	0.000	0.000	0.000
	4 - Glenamuck District Distributor Rd	0.000	0.000	0.000	0.000

Vehicle Mix

Heavy Vehicle proportion

		To			
		1 - Glenamuck Rd	2 - Golf Lane	3 - Glenamuck Rd S	4 - Glenamuck District Distributor Rd
From	1 - Glenamuck Rd	0	0	0	0
	2 - Golf Lane	0	0	0	0
	3 - Glenamuck Rd S	0	0	0	0
	4 - Glenamuck District Distributor Rd	0	0	0	0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max delay (s)	Max Queue (PCU)	Max LOS
1 - Glenamuck Rd	0.35	2.04	0.5	A
2 - Golf Lane	0.19	5.98	0.2	A
3 - Glenamuck Rd S	0.11	3.65	0.1	A
4 - Glenamuck District Distributor Rd	0.79	11.60	3.5	B

Main Results for each time segment

Main results: (08:00-08:15)

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
1 - Glenamuck Rd	937.00	19.80	2693.13	0.348	934.87	0.5	2.044	A
2 - Golf Lane	140.00	904.93	739.86	0.189	139.07	0.2	5.984	A
3 - Glenamuck Rd S	117.00	944.26	1101.32	0.106	116.53	0.1	3.653	A
4 - Glenamuck District Distributor Rd	1058.00	622.94	1341.61	0.789	1043.97	3.5	11.604	B

Main results: (08:15-08:30)

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
1 - Glenamuck Rd	0.00	0.20	2707.38	0.000	2.13	0.0	0.000	A
2 - Golf Lane	0.00	2.07	1156.59	0.000	0.93	0.0	0.000	A
3 - Glenamuck Rd S	0.00	2.74	1599.35	0.000	0.47	0.0	0.000	A
4 - Glenamuck District Distributor Rd	0.00	2.06	1665.37	0.000	14.03	0.0	0.000	A

Main results: (08:30-08:45)

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
1 - Glenamuck Rd	0.00	0.00	2707.53	0.000	0.00	0.0	0.000	A
2 - Golf Lane	0.00	0.00	1157.55	0.000	0.00	0.0	0.000	A
3 - Glenamuck Rd S	0.00	0.00	1600.80	0.000	0.00	0.0	0.000	A
4 - Glenamuck District Distributor Rd	0.00	0.00	1666.45	0.000	0.00	0.0	0.000	A

Main results: (08:45-09:00)

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
1 - Glenamuck Rd	0.00	0.00	2707.53	0.000	0.00	0.0	0.000	A
2 - Golf Lane	0.00	0.00	1157.55	0.000	0.00	0.0	0.000	A
3 - Glenamuck Rd S	0.00	0.00	1600.80	0.000	0.00	0.0	0.000	A
4 - Glenamuck District Distributor Rd	0.00	0.00	1666.45	0.000	0.00	0.0	0.000	A

Main results: (09:00-09:15)

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
1 - Glenamuck Rd	0.00	0.00	2707.53	0.000	0.00	0.0	0.000	A
2 - Golf Lane	0.00	0.00	1157.55	0.000	0.00	0.0	0.000	A
3 - Glenamuck Rd S	0.00	0.00	1600.80	0.000	0.00	0.0	0.000	A
4 - Glenamuck District Distributor Rd	0.00	0.00	1666.45	0.000	0.00	0.0	0.000	A

Main results: (09:15-09:30)

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
1 - Glenamuck Rd	0.00	0.00	2707.53	0.000	0.00	0.0	0.000	A
2 - Golf Lane	0.00	0.00	1157.55	0.000	0.00	0.0	0.000	A
3 - Glenamuck Rd S	0.00	0.00	1600.80	0.000	0.00	0.0	0.000	A
4 - Glenamuck District Distributor Rd	0.00	0.00	1666.45	0.000	0.00	0.0	0.000	A

DS 2038, PM

Data Errors and Warnings

No errors or warnings

Analysis Set Details

ID	Network flow scaling factor (%)
A1	100.000

Junction Network

Junctions

Junction	Name	Junction Type	Junction Delay (s)	Junction LOS
1 - Glenamuck Roundabout	Glenamuck Roundabout	Standard Roundabout	3.82	A

Junction Network Options

[same as above]

Arms

Arms

[same as above]

Capacity Options

[same as above]

Roundabout Geometry

[same as above]

Slope / Intercept / Capacity

[same as above]

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Model start time (HH:mm)	Model finish time (HH:mm)	Model time period length (min)	Time segment length (min)
D8	DS 2038	PM	DIRECT	17:00	18:30	90	15

Vehicle mix varies over turn	Vehicle mix varies over entry	Vehicle mix source	PCU Factor for a HV (PCU)	O-D data varies over time
✓	✓	HV Percentages	2.00	✓

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Scaling Factor (%)
1 - Glenamuck Rd		✓	100.000
2 - Golf Lane		✓	100.000
3 - Glenamuck Rd S		✓	100.000
4 - Glenamuck District Distributor Rd		✓	100.000

Origin-Destination Data

Demand (PCU/hr)

(17:00-17:15)

		To			
		1 - Glenamuck Rd	2 - Golf Lane	3 - Glenamuck Rd S	4 - Glenamuck District Distributor Rd
From	1 - Glenamuck Rd	291.000	65.000	283.000	916.000
	2 - Golf Lane	35.000	0.000	1.000	16.000
	3 - Glenamuck Rd S	73.000	2.000	5.000	0.000
	4 - Glenamuck District Distributor Rd	692.000	29.000	0.000	0.000

Demand (PCU/hr)

(17:15-17:30)

		To			
		1 - Glenamuck Rd	2 - Golf Lane	3 - Glenamuck Rd S	4 - Glenamuck District Distributor Rd
From	1 - Glenamuck Rd	0.000	0.000	0.000	0.000
	2 - Golf Lane	0.000	0.000	0.000	0.000
	3 - Glenamuck Rd S	0.000	0.000	0.000	0.000
	4 - Glenamuck District Distributor Rd	0.000	0.000	0.000	0.000

Demand (PCU/hr)

(17:30-17:45)

		To			
		1 - Glenamuck Rd	2 - Golf Lane	3 - Glenamuck Rd S	4 - Glenamuck District Distributor Rd
From	1 - Glenamuck Rd	0.000	0.000	0.000	0.000
	2 - Golf Lane	0.000	0.000	0.000	0.000
	3 - Glenamuck Rd S	0.000	0.000	0.000	0.000
	4 - Glenamuck District Distributor Rd	0.000	0.000	0.000	0.000

Demand (PCU/hr)

(17:45-18:00)

		To			
		1 - Glenamuck Rd	2 - Golf Lane	3 - Glenamuck Rd S	4 - Glenamuck District Distributor Rd
From	1 - Glenamuck Rd	0.000	0.000	0.000	0.000
	2 - Golf Lane	0.000	0.000	0.000	0.000
	3 - Glenamuck Rd S	0.000	0.000	0.000	0.000
	4 - Glenamuck District Distributor Rd	0.000	0.000	0.000	0.000

(18:00-18:15)

Demand (PCU/hr)

		To			
		1 - Glenamuck Rd	2 - Golf Lane	3 - Glenamuck Rd S	4 - Glenamuck District Distributor Rd
From	1 - Glenamuck Rd	0.000	0.000	0.000	0.000
	2 - Golf Lane	0.000	0.000	0.000	0.000
	3 - Glenamuck Rd S	0.000	0.000	0.000	0.000
	4 - Glenamuck District Distributor Rd	0.000	0.000	0.000	0.000

(18:15-18:30)

Demand (PCU/hr)

		To			
		1 - Glenamuck Rd	2 - Golf Lane	3 - Glenamuck Rd S	4 - Glenamuck District Distributor Rd
From	1 - Glenamuck Rd	0.000	0.000	0.000	0.000
	2 - Golf Lane	0.000	0.000	0.000	0.000
	3 - Glenamuck Rd S	0.000	0.000	0.000	0.000
	4 - Glenamuck District Distributor Rd	0.000	0.000	0.000	0.000

Vehicle Mix

Heavy Vehicle proportion

		To			
		1 - Glenamuck Rd	2 - Golf Lane	3 - Glenamuck Rd S	4 - Glenamuck District Distributor Rd
From	1 - Glenamuck Rd	0	0	0	0
	2 - Golf Lane	0	0	0	0
	3 - Glenamuck Rd S	0	0	0	0
	4 - Glenamuck District Distributor Rd	0	0	0	0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max delay (s)	Max Queue (PCU)	Max LOS
1 - Glenamuck Rd	0.58	3.16	1.4	A
2 - Golf Lane	0.11	8.60	0.1	A
3 - Glenamuck Rd S	0.09	4.19	0.1	A
4 - Glenamuck District Distributor Rd	0.50	4.85	1.0	A

Main Results for each time segment

Main results: (17:00-17:15)

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
1 - Glenamuck Rd	1555.00	35.81	2681.48	0.580	1549.52	1.4	3.165	A
2 - Golf Lane	52.00	1489.73	469.93	0.111	51.51	0.1	8.597	A
3 - Glenamuck Rd S	80.00	1253.27	937.87	0.085	79.63	0.1	4.192	A
4 - Glenamuck District Distributor Rd	721.00	404.27	1455.64	0.495	717.12	1.0	4.850	A

Main results: (17:15-17:30)

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
1 - Glenamuck Rd	0.00	0.19	2707.39	0.000	5.48	0.0	0.000	A
2 - Golf Lane	0.00	5.27	1155.12	0.000	0.49	0.0	0.000	A
3 - Glenamuck Rd S	0.00	4.73	1598.29	0.000	0.37	0.0	0.000	A
4 - Glenamuck District Distributor Rd	0.00	1.73	1665.55	0.000	3.88	0.0	0.000	A

Main results: (17:30-17:45)

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
1 - Glenamuck Rd	0.00	0.00	2707.53	0.000	0.00	0.0	0.000	A
2 - Golf Lane	0.00	0.00	1157.55	0.000	0.00	0.0	0.000	A
3 - Glenamuck Rd S	0.00	0.00	1600.80	0.000	0.00	0.0	0.000	A
4 - Glenamuck District Distributor Rd	0.00	0.00	1666.45	0.000	0.00	0.0	0.000	A

Main results: (17:45-18:00)

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
1 - Glenamuck Rd	0.00	0.00	2707.53	0.000	0.00	0.0	0.000	A
2 - Golf Lane	0.00	0.00	1157.55	0.000	0.00	0.0	0.000	A
3 - Glenamuck Rd S	0.00	0.00	1600.80	0.000	0.00	0.0	0.000	A
4 - Glenamuck District Distributor Rd	0.00	0.00	1666.45	0.000	0.00	0.0	0.000	A

Main results: (18:00-18:15)

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
1 - Glenamuck Rd	0.00	0.00	2707.53	0.000	0.00	0.0	0.000	A
2 - Golf Lane	0.00	0.00	1157.55	0.000	0.00	0.0	0.000	A
3 - Glenamuck Rd S	0.00	0.00	1600.80	0.000	0.00	0.0	0.000	A
4 - Glenamuck District Distributor Rd	0.00	0.00	1666.45	0.000	0.00	0.0	0.000	A

Main results: (18:15-18:30)

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
1 - Glenamuck Rd	0.00	0.00	2707.53	0.000	0.00	0.0	0.000	A
2 - Golf Lane	0.00	0.00	1157.55	0.000	0.00	0.0	0.000	A
3 - Glenamuck Rd S	0.00	0.00	1600.80	0.000	0.00	0.0	0.000	A
4 - Glenamuck District Distributor Rd	0.00	0.00	1666.45	0.000	0.00	0.0	0.000	A