

14 MATERIAL ASSETS (TRANSPORTATION)

14.1 Introduction

This section of the EIAR was prepared by Mark McKenna BEng (Hons) MSc MIEI and Mr Thomas Jennings BEng (Hons) MSc CMILT MIEI MIHT. Mark has over 7 years' experience in traffic and transportation projects whilst Thomas has over 20 years' experience in transportation industry.

This section of the EIAR covers transport and related sustainability issues including means of vehicular access, pedestrian, cyclist and local public transport connections. The principal objective of this chapter is to quantify any level of impact across the local road network and subsequently ascertain both the existing and future operational performance of the local road network. As outlined previously in this EIAR, the subject development includes the proposed construction of 1034no. residential units together with 6km of access road and associated infrastructure. This section should be read in conjunction with the preliminary design drawings and reports which accompany this planning application.

14.2 Assessment Methodology

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;
- 'Traffic Management Guidelines' Dublin Transportation Office & Department of the Environment and Local Government (May 2003); and
- 'Guidelines for Traffic Impact Assessments' The Institution of Highways and Transportation.

Our methodology for the Traffic & Transport Assessment incorporates a number of key inter-related stages, including; Site Audit, Traffic Counts, Planning Review, Trip Generation, Trip Distribution, Network Impact, and Network Assessment.

14.3 Receiving Environment

14.3.1 Proposed Development

14.3.1.1 Land Use

The subject development lands are zoned RES-N - *'To provide for new residential communities in accordance with approved area plans.'* (Figure 14.1).

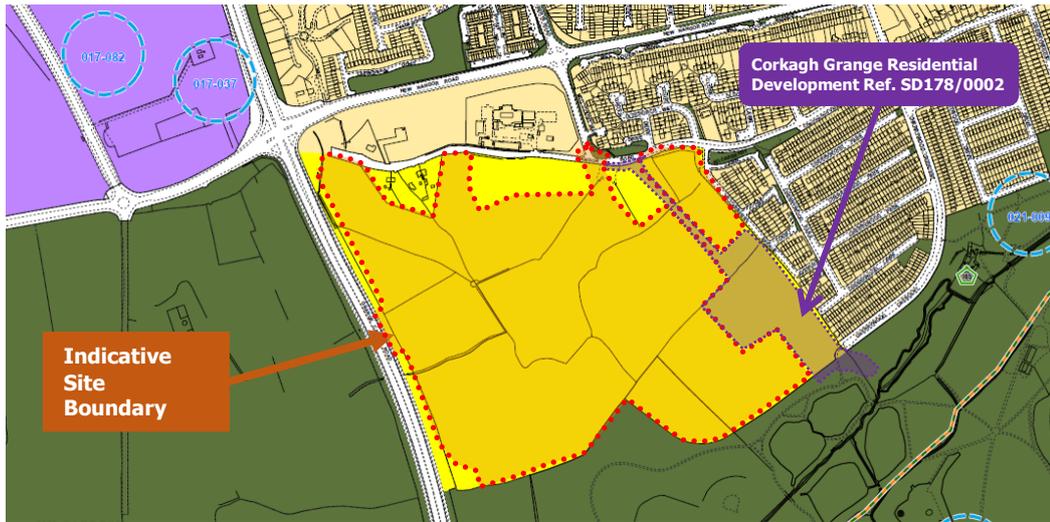


Figure 14.1: Land Use Zoning (Reference: SDCC Development Plan 2016-2022)

14.3.1.2 Location

The general location of the subject site in relation to the surrounding road network is illustrated in Figure 14.2 below whilst

Figure 14.3 indicatively shows the extent of the subject site boundary and neighbouring lands.

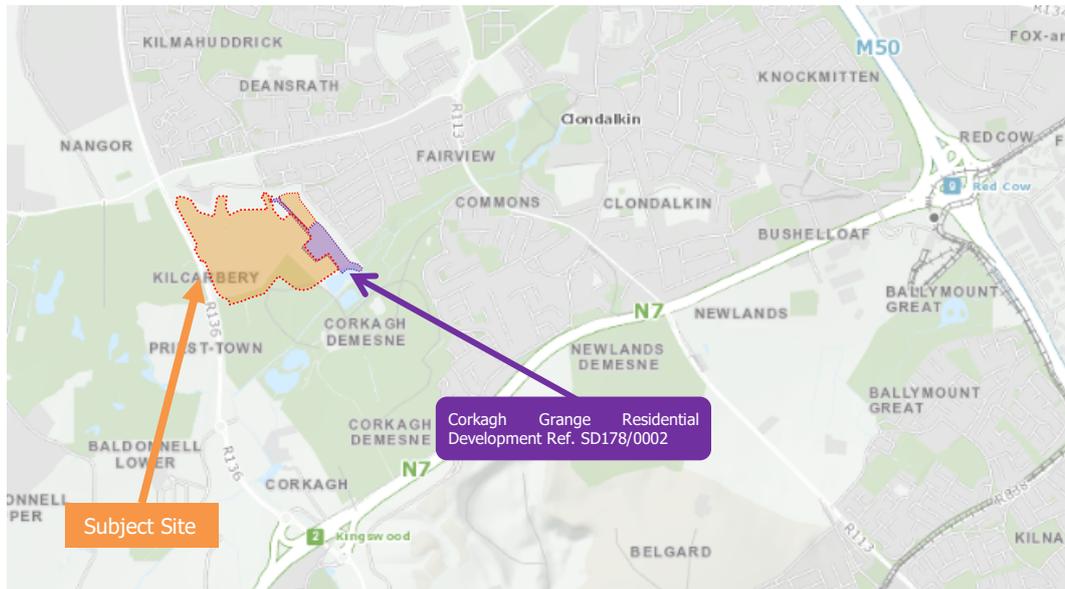


Figure 14.2: Site Location (Reference: OSI Maps)

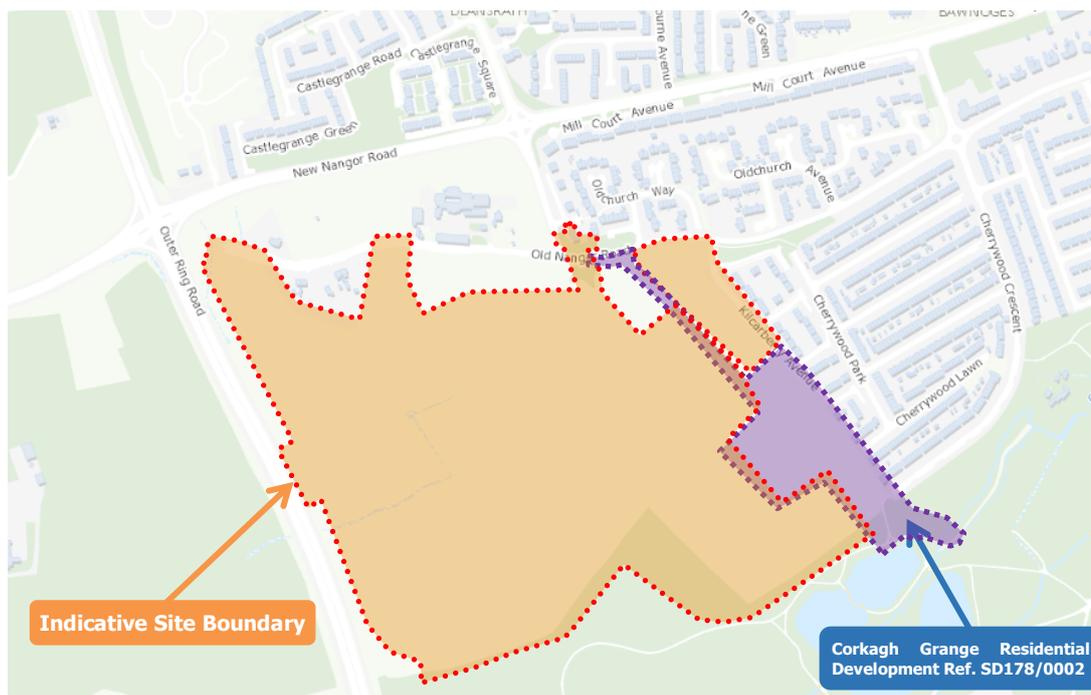


Figure 14.3: Site Location (Reference: OSI Maps)

The subject development site is located approximately 2.1km to the west of Clondalkin village centre. The subject lands are bounded to the west by R136 Outer Ring Road, and to the south by Corkagh Park. The northern boundary is formed by the Upper Nangor Road, residential dwellings fronting onto Upper Nangor Road and residential zoned land. Kilcarberry Avenue and lands with existing planning permission for 109no. residential units (Ref. SD178/0002) form the eastern boundary.

Grange Castle Golf course is located to the west, whilst Grange Castle Business Park is located to the north west, both on the western side of the R136 Outer Ring Road.

Travelling in a southerly direction along the R136 Outer Ring Road from the subject site, access can be gained to the strategic N7 via the Kingswood interchange (Junction 2). Travelling south-westbound from the Kingswood interchange, the N7 becomes the M7 motorway with subsequent access to the M8 and M9. The M7 provides links to Kildare, Portlaoise and Limerick, whilst the M8 provides a link to Cork. The M9 provides a road link to Carlow, Kilkenny and Waterford.

Travelling north-eastbound from the Kingswood interchange, the N7 merges with the M50 at the Red Cow interchange (junction 9). The M50 C-ring enables access to all areas of Dublin. Travelling in a northerly direction along the R136 Outer Ring Road from the subject site, access can be gained to the N4 via the Lucan interchange (Junction 3). The N4 connects with the M4 to the west, providing links to the destinations of Leixlip, Maynooth and Athlone and Galway (via the M6).

To the north of the subject site, the R134 New Nangor Road provides a direct route to Clondalkin village centre to the east.

14.3.1.3 Existing Transportation Infrastructure and Services

An audit of the local road network has therefore been undertaken to establish the existing transport conditions and vehicle movement patterns across the existing network.

Existing Cycling and Pedestrian Facilities

Along the western boundary of the subject site, the R136 Outer Ring Road is subject to a speed limit of 80kph, with street lighting available along both sides of the route. Pedestrians and cyclists can benefit from the provision of a shared pedestrian/cycle track along both sides of the route, segregated from the carriageway by safety barriers and landscaping. There are pedestrian crossing facilities available across each arm of the R136 Outer Ring Road / R134 New Nangor Road junction as located at the north-western boundary of the subject site. In addition, there are also pedestrian crossing facilities provided to the south west at the R136 Outer Ring Road/Baldonnell Business Park Link Road junction.

Along the northern boundary of the subject site, the Upper Nangor Road is subject to a speed limit of 50kph. To the west of the Saint Cuthbert's Road junction, there is no pedestrian footway provision, however to the east the footway provision alternates between the northern and southern sides of the route. Cyclists must share the road carriageway with general traffic along the Upper Nangor Road.

To the east of the subject site, there is a pedestrian footway provided along the eastern side of Kilcarberry Avenue with street lighting also present. Cyclists must share the road carriageway with general traffic along this route.

To the north, the New Nangor Road is subject to a speed limit of 60kph, with street lighting and good quality pedestrian footways along both sides of the route. Cyclists can make use of the bus lanes provided along both sides of the corridor.



Figure 14.4: Existing Pedestrian Facilities on Upper Nangor Road



Figure 14.5: Existing Pedestrian Facilities on New Nangor Road

In addition to the cycle facilities referred to above, there are a variety of other bicycle infrastructure facilities available on the routes leading to/from the subject site (

Figure 14.6), the accumulative impact of which increasingly makes cycling more attractive and convenient in addition to enhancing safety for cycling to/from the proposed development site.

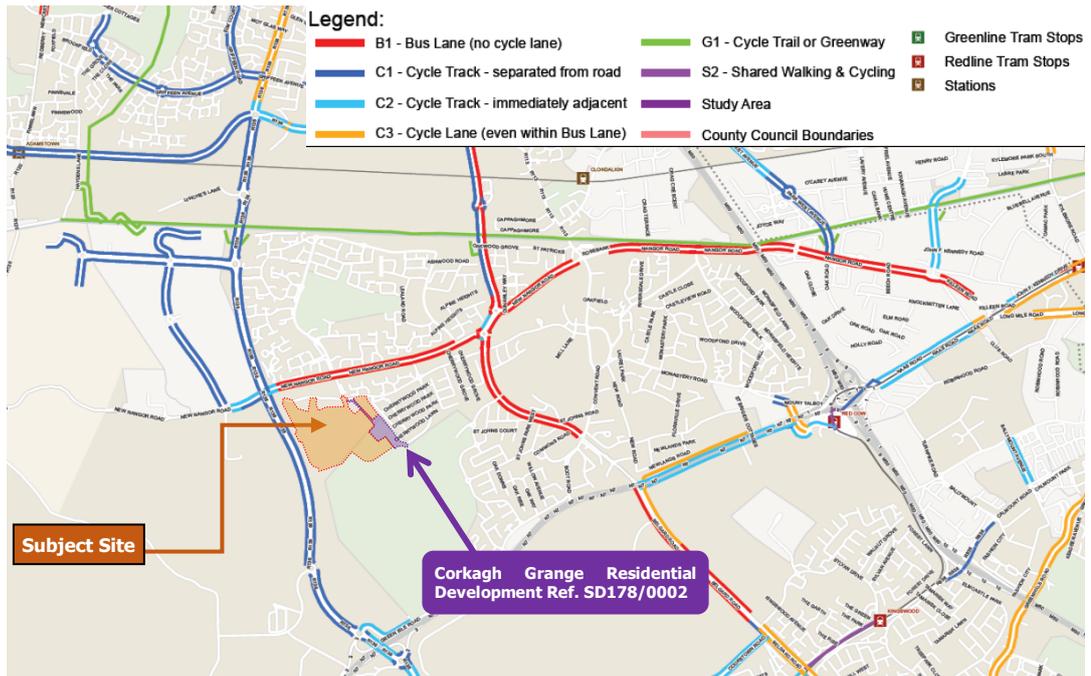


Figure 14.6: Existing Cycle Facilities on Local Road Network

Public Transport – Bus

The subject site benefits from good public transport accessibility levels. Dublin Bus operates four number services (13, 151, 68, 68x) along the New Nangor Road to the north of the site with interchanges available within 185m walking distance. Dublin Bus also operates three number services (51d, 51x, 68) along Saint Cuthbert’s Road to the northeast of the site with interchanges available within 110m walking distance. Furthermore, Dublin Bus operates service number 69 Saint John’s Lawn to the southeast of the subject site (via Corkagh Park), with an interchange accessible within approximately 600m walking distance. Details of these aforementioned services are indicated in Table 14.1 below.



Figure 14.7: Bus Interchanges Serving the Proposed Development.

Route Number	Destination	Monday – Friday	Saturday	Sunday
13	Harristown - Grange Castle	65	55	37
151	Docklands – Foxborough	48	36	33
68	Hawkins St – Newcastle	20	17	12
68x	UCD Belfield - Maynooth	9	-	-
51d	Aston Quay – Clondalkin	2	-	-
51x	Dunawley - UCD Belfield	1	-	-
69	Hawkins – Rathcoole	21	21	10

Table 14.1: No. of Bus Services per Day

Public Transport – Rail

The closest train station to the subject site is the Clondalkin Fonthill station which is located approximately 2.5km northeast of the subject site (Figure 14.8). This station operates southwestern commuter services. There are several high frequency peak period services operating daily to/from the Clondalkin Fonthill Station with services between Dublin/Grand Canal Dock – Kildare/Portlaoise. There are 150 vehicle parking spaces available at the station, in addition to the provision of sheltered cycle parking. The Kishogue train station, which is not yet operational, is located approximately 2.4 km north of the subject site access. Both of the aforementioned rail stations are located approximately a 30 minute walk from the subject site access. This 30 minute walking distance could act as a deterrent for some future residents of the proposed residential units to travel by rail.

Public Transport – LUAS

The subject site is located approximately 4km from the Cheeverstown LUAS Red Line interchange (Figure 14.8). The Red Line currently operates between Saggart/Tallaght and The Point. Figure 14.9 below illustrates the destinations that are accessible from the LUAS Red Line. There are 312 vehicle parking spaces available at the station, in addition to the provision of 10 sheffield cycle racks (20 cycle parking spaces). Table 14.2 below lists the frequency with which the Cheeverstown LUAS service operates.

Link	Weekdays		Saturdays		Sundays & Bank Holidays	
	Peak	Off-Peak	Peak	Off-Peak	Peak	Off-Peak
Cheeverstown – Belgard	6-16	3-11	7-20	12-14	9-12	6-20
Cheeverstown – The Point	3-10	4-10	11-20	12-13	10-20	10-11

Table 14.2: LUAS Service Frequency (minutes)

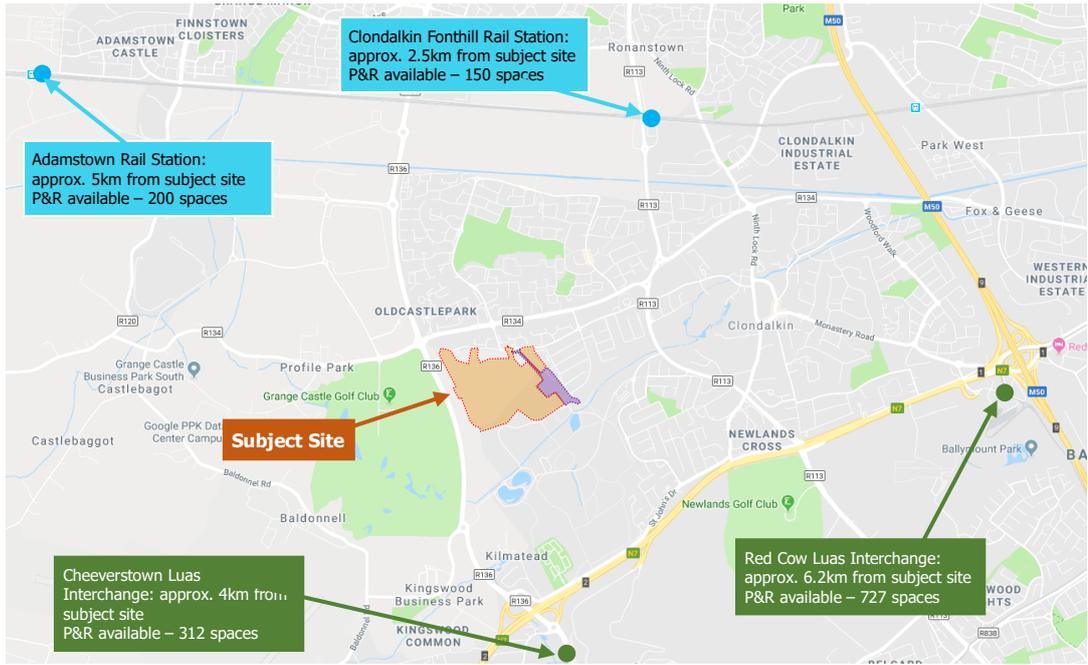


Figure 14.8: Rail Interchange Locations

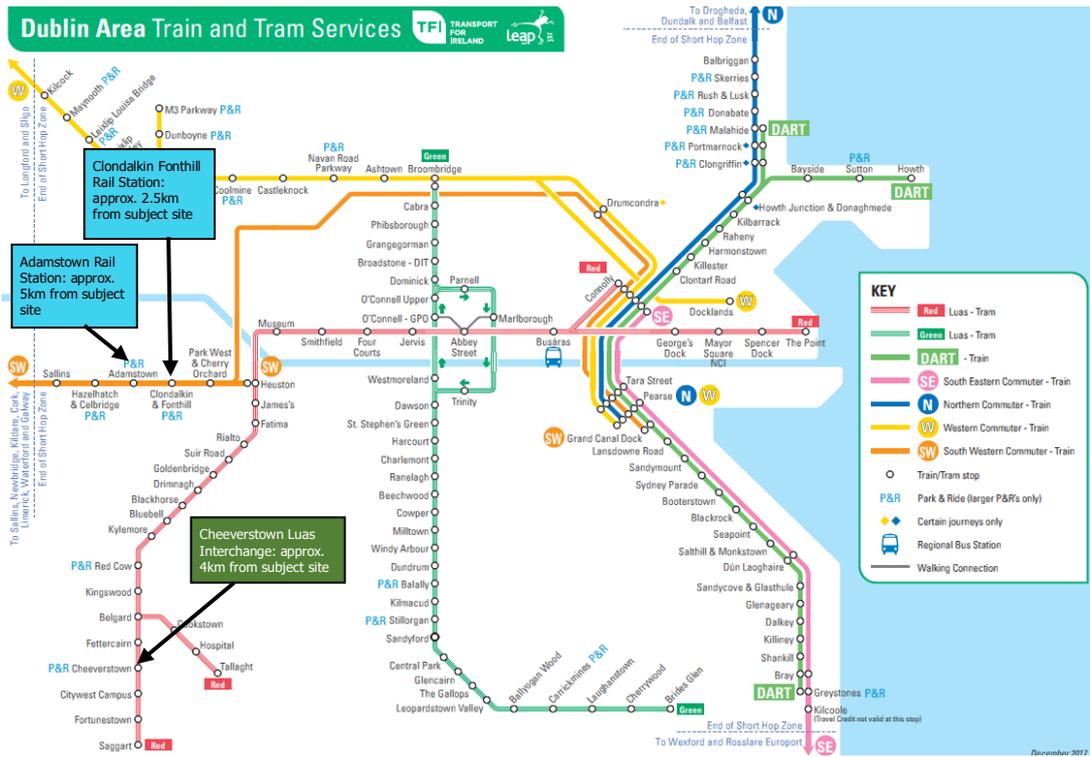


Figure 14.9: Rail/Luas Service Destinations (Source: <https://www.transportforireland.ie/journey-planner/maps/>)

Future Transportation Infrastructure and Services

Cycle Network Proposals

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 Green route networks covering the six county council areas that together form the defined Greater Dublin Area (GDA).

The subject site lies within the 'Dublin Mid West Sector' of the Greater Dublin Area Cycle Network Plan (2013). The Dublin West sector "extends southward from the N4 and River Liffey, to a line south of the N7 and the Ballymount and Walkinstown areas".

In the vicinity of the subject site the following route additions are proposed (

Figure 14.10) which are all accessible to the subject site:-

- Route 7C: Camac River Greenway branch from the Grand Canal through Clondalkin Village to Corkagh Park and City West;
- Route SO6: Lucan (Esker) - Grange Castle - Kingswood - Jobstown along the R136;
- Route 8C: Cross-links to Ballymount and Crumlin in the South West sector via Nangor Road and Long Mile Road through Park West to Lucan South, with spur 8C1 to Route 7A at Palmerstown and Spur 8C2 to Grange Castle;
- Route SO5: from Liffey Valley Shopping Centre southward Fonthill Road and Ninth Lock Road to Clondalkin Village and Tallaght (with a parallel variant SO5a along Neilstown Road and Fonthill Road west of Clondalkin Village). A northward link will extend across the River Liffey to Blanchardstown;
- Route 7D: Inchicore - Naas Road- new bridge over M50 north of Red Cow - Clondalkin – Kingswood;
- Route 7B (& National Route 10 towards Cork): Pimlico to Rialto, Clondalkin, Adamstown via Grand Canal.



Figure 14.10: Proposed Cycle Routes (extract from Sheet N5 GDA CNP)

BusConnects-Dublin Area Bus Network Redesign

The National Transport Authority (NTA) has recently published a consultation report entitled ‘Dublin Area Bus Network Redesign Public Consultation Report’. The report introduces a number of significant changes to the bus services within Dublin including: -

- “Services to be arranged along seven cross-city super-frequent spines
- Dramatic increase in the numbers of orbital services
- Increase in the number of all-day high-frequency services
- Move to a simplified two-fare system
- A new route numbering system”.

Under the proposals, the level of bus service will increase by 27%. This includes services on 11 brand-new orbital routes that will operate on a 15-minute frequency or better, in the north, south and west of the network area.”

The public consultation for BusConnects ran from July to September 28th, 2018. Figure 14.11 & Figure 14.12 below indicate the existing and the proposed bus service midday frequencies in the vicinity of the subject site, prior to and after the BusConnects network redesign.

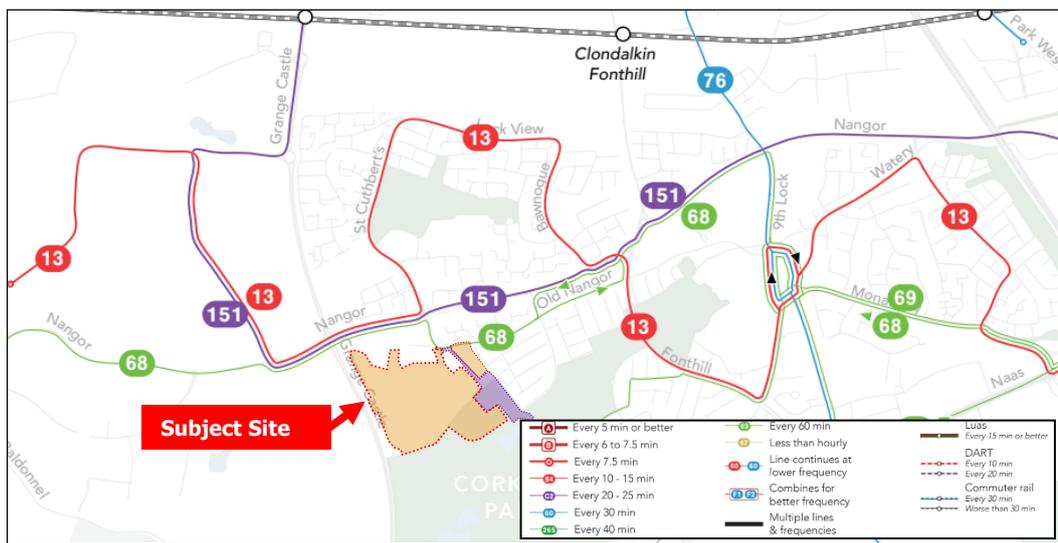


Figure 14.11: Existing Public Transport Services (weekday midday frequency)

(Extract of Map 1 - <https://busconnects.ie/initiatives/dublin-area-bus-network-redesign-maps/>)

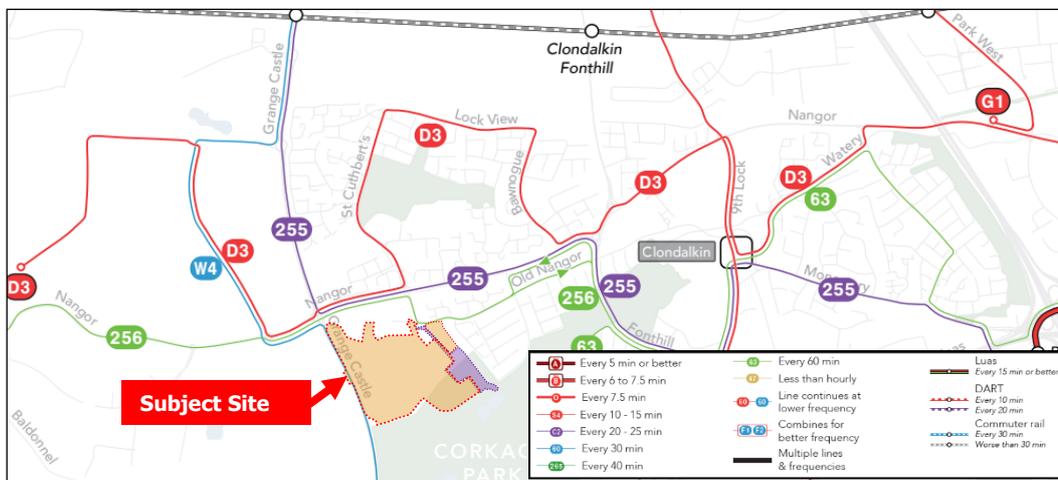


Figure 14.12: Proposed Public Transport Services (weekday midday frequency)

(Extract of Map 2 - <https://busconnects.ie/initiatives/dublin-area-bus-network-redesign-maps/>)

Under the BusConnects proposals, the following routes will be available within the immediate vicinity of the subject site:-

- **W4:** “is a new orbital generally following Grange Castle Road between Tallaght and Lucan, then following the N4 and M50 motorways to Blanchardstown. The W4 would serve Liffey Valley Shopping Centre via the freeway stop on the N4, where it would connect to the C spine and many other services. Service is initially proposed every 30 minutes all day. Reliability problems are inevitable due to traffic on the M50, but there is no other path available to make this crucial link.”
- **D3:** “(every 15 minutes) proceeds west to largely replace Route 13, serving Nangor Road, Clondalkin Village, Bawnogue, and the Grange Castle Business Park.”
- **Route 255:** “every 20 minutes, is the direct link from Redcow to Clondalkin Village but then continues west along Fonthill and Nangor Road and north on Grange Castle Road to connect with the Kildare Line, the W4 orbital and the C1+C2 branch of the C Spine, for ready access to Lucan and Liffey Valley.”
- **Route 63:** “is an hourly route from the city centre to Citywest. This hourly route is designed to serve very small low-demand areas not reachable by other more frequent routes, generally near the Luas Red Line but not close enough to a station”.

As part of the BusConnects public consultation, maps are available to show how the proposed changes will affect each area. Figure 14.13 below indicates the areas reachable within 30, 45- and 60-minute journey times. The travel times of 30, 45 and 60 minutes are based upon the following parameters:-

- The times/distances are based upon the public transport frequencies between 09:00-15:00 weekdays;
- There is the assumption that the waiting time for a particular service is half the time of the bus frequency (i.e. if the frequency of the bus is 20 minutes, there is an estimated 10-minute wait time); and
- There are higher frequencies available on some routes during the AM and PM peak hour periods, however this is not applicable to the routes which are within walking distance of the subject site.

The maps also provide information regarding how many more jobs that are accessible from a particular location within the 30, 45 and 60-minute travel time. It can be seen from Table 14.3 below, taken from the nearest reference point of Grange Castle Business Park, that residents of the subject site will have the benefit of being able to gain convenient access to an additional 25,400 jobs within a 30-minute travel when compared to the existing bus services.

The subject site is ideally located to benefit from the enhanced accessibility levels delivered by the BusConnects proposals.

How Many More Jobs Can I Reach?			
Travel Time	Jobs in Existing	Jobs in Proposed	% Change
30 mins	7,900	8,900	+13%
45 mins	35,300	50,800	+44%
60 mins	119,400	162,700	+36%

Table 14.3: Percentage Change in Number of Jobs Accessible before/after BusConnects Implementation



Figure 14.13: Areas Reachable Within 30, 45, and 60 minutes by Bus

BusConnects – Core Bus Corridor Project

The subject site is ideally located to benefit from the emerging core bus corridor project. The aim of the project is to provide dedicated bus lanes (and cycle facilities) along 16 of the busiest transport corridors in Dublin (

Figure 14.14).

Residents of the subject site will be able to access the ‘Clondalkin to Drumnigh’ corridor, along the New Nangor Road, approximately 1.3km to the north east of the subject site.

The NTA began the public consultation on the first four corridors (no’s 1,2,5,6) in November 2018 which will conclude on 15th February 2019. The public consultation for the phase 2 corridors (no’s 7,8, 9,10,11 & 12) which includes ‘Clondalkin to Drimnagh (no. 8) commenced in January 2019 and will continue until 28th March 2019. Details of the remainder of the corridors (phase 3) is scheduled to be published in February 2019.

Whilst these Bus Connects delivered benefits are very much welcomed, they do not represent a material transformation of public transport accessibility levels in the Kilcarbery area. Significant opportunities to provide much needed bus links to Clondalkin Fonthill Railway Station and other urban centres (other than the Clondalkin-City Centre corridor) have been missed by the NTA’s initiative.

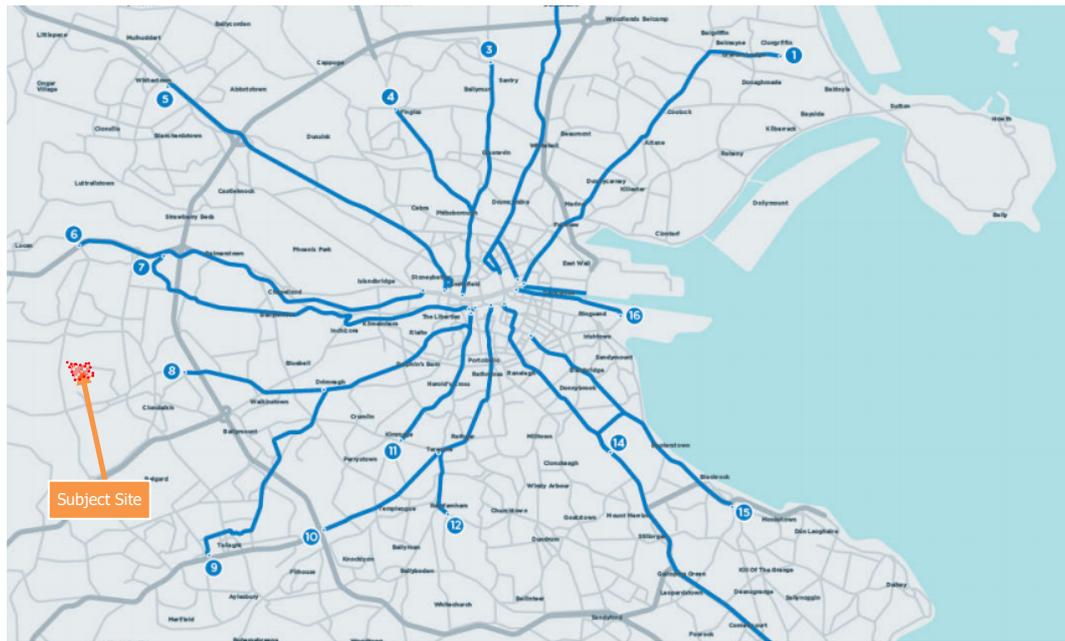


Figure 14.14: Core Bus Corridors (source:<https://busconnects.ie/initiatives/core-bus-corridor-project/>)

Although the proposed Metro West has been excluded from the most recent Transport Strategy for the Greater Dublin Area (2016-2035), the SDCC Development Plan states the following under its Transport and Mobility Actions:-

- *“To support the delivery of the Core Orbital Bus Network with a high frequency service linking Tallaght, Clonsilla, Liffey Valley and Blanchardstown. To facilitate this service the reservation along the Emerging Preferred Route alignment of the former Metro-West will be maintained subject to a future reassessment of all of the potential route options to ensure the most direct and efficient route is taken.”*
- *“Work with the NTA to secure the extension and expansion of the Core Bus Network and other bus services to serve new areas of employment, housing and tourism potential, whilst also improving the efficiency and frequency of services within more established areas.”*

Road Infrastructure Proposals

The South Dublin County Development Plan 2016-2022, has outlined a six-year programme for roads upgrades which includes the following in the general vicinity of the subject site: -

Adamstown Street Network -Various streets within the Adamstown SDZ lands

New Nangor Road/R134 Upgrade – upgrade/realignment of existing road between Nangor and Ballybane.

The Development Plan also outlines long-term road network proposals which will be phased ‘according to need’ and ‘may be brought forward for construction at an earlier date, subject to funding being available’:-

Adamstown South Road -new road link from Adamstown SDZ lands (via the existing railway bridge) to the Grange Castle employment lands

Citywest Junction Improvement- Realignment of eastbound slip lane

New Nangor Road Extension - new road between Nangor and Ballybane.

14.3.2 Cumulative – Kilcarbery

The eastern boundary of the subject site is formed by lands with existing planning permission for 109 residential units (Ref. SD178/0002). This development may generate an impact upon the local road networks existing traffic characteristics.

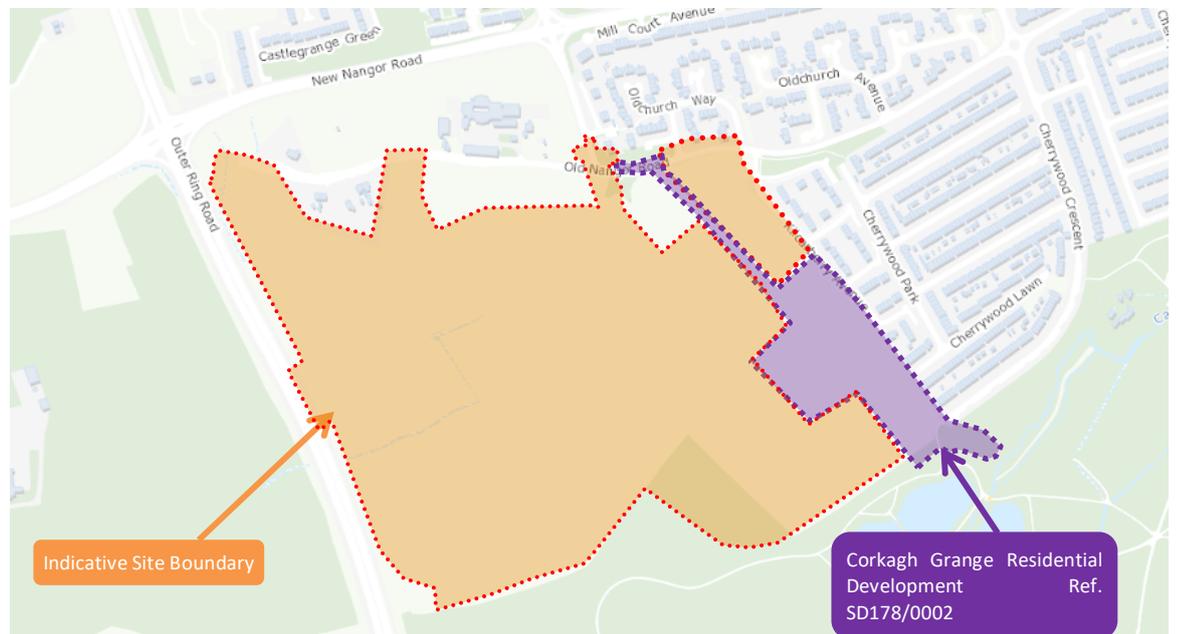


Figure 14.15: Committed Development Location

Beyond the above third-party residential development considered in this appraisal (Ref. SD178/0002), DBFL have determined there are no other significant local committed developments that would generate a notable impact upon the local road network serving the subject site within the adopted 2035 design year. Nevertheless, if all the zoned lands in the surrounding area were to be developed, this would have an effect on the local road network traffic levels.

14.4 Characteristics of the Proposed Development

14.4.1 Proposed Development

The proposals seek permission for the provision of 1034-unit residential development on residential zoned lands at Kilcarbery, Clondalkin. The development proposals include the provision of a 1034-unit residential development comprising: -

- 578 no. houses,
- 105 no. duplex units;
- 351 apartments within 9 no. apartment blocks;
- 1 no. 178sqm GFA retail unit within Apartment Block no. 2;
- 1 no. 909sqm GFA crèche building;
- 1 no 557sqm GFA within Apartment Block no. 7 (temporary);
- Community building 785sqm GFA;
- On site vehicle circulating roads and streets with associated car parking provision;
- A mix of independent pedestrian and cyclist infrastructure together with shared street spaces;

- Drainage and water supply infrastructure to accommodate the residential status of the site; and
- Lighting, power and communications infrastructure to accommodate the residential status of the site.

Site Access Arrangements

The north east parcel of the development site connects to an access road and junction on the Old Nangor Road (located east of the St Cuthbert's Rd junction) which have been granted planning permission as part of a third-party 109-unit residential development (Ref. SD178/0002). The aforementioned access road and junction are currently under construction.

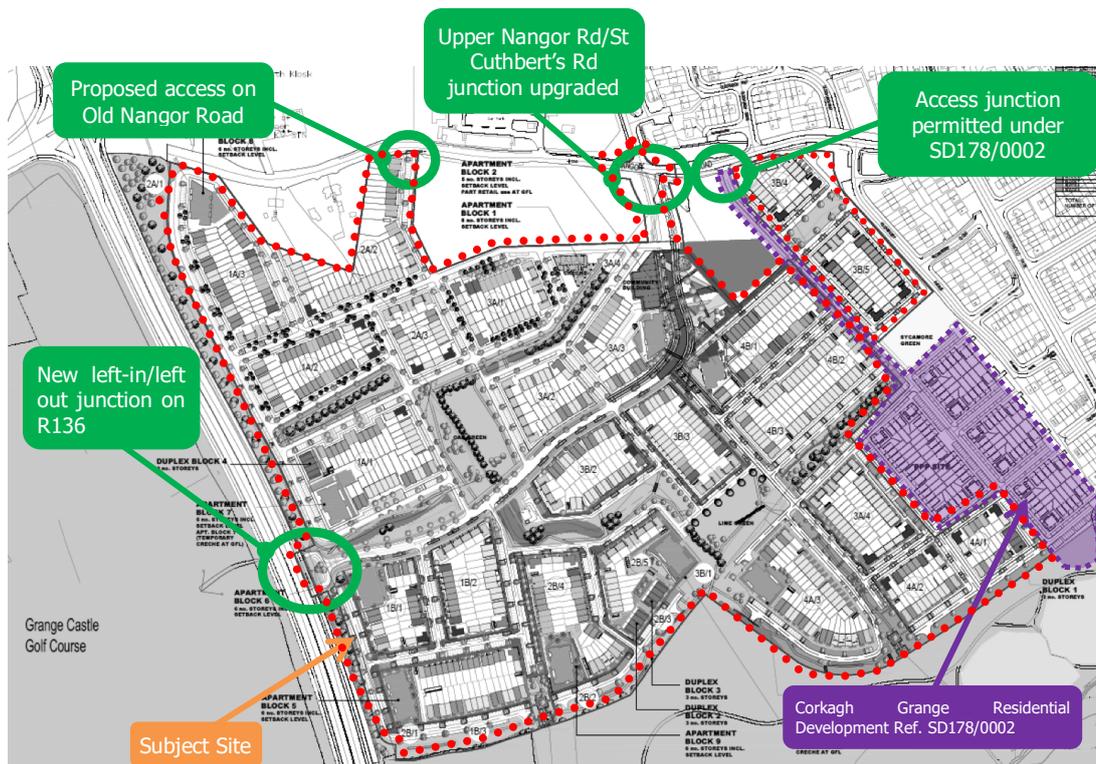


Figure 14.1: Site Access Locations (Extract from bkdarchitects Drawing No. 6168-002)

In addition to the permitted access junction referred to above, the subject site will benefit from the provision of a further three access junctions, one which will be incorporated into the Old Nangor Road/St Cuthbert's Road junction, one on the Old Nangor Road and one on the R136 Outer Ring Road (**Error! Reference source not found.**).

With respect to the proposed site access at the Upper Nangor Road/St Cuthbert's junction, as part of the development proposals, a fourth arm (subject site access) will be incorporated, and the junction will be upgraded from its existing 3-arm priority-controlled arrangement to a 4-arm priority-controlled junction. The site access and St Cuthbert's Road will be given priority at the junction, with the Upper Nangor Road and Old Nangor Road arms serving as the minor arms at the junction.

The proposed site access junction on the R136 Outer Ring Road will operate as a left in-left out priority-controlled junction. These access junctions will be utilised by all modes of transport travelling to/from the proposed development.

Pedestrian and Cyclists Improvements

The subject site will be highly accessible to pedestrians and cyclists from The R136 Outer Ring Road, Upper Nangor Road and Kilcarberry Avenue. Pedestrians will be given priority within the internal site layout to ensure desire lines within the site are accommodated providing a good level of service and ensures the risk of vehicle/pedestrian conflict with vehicles is minimised.

Parking Proposals

General Vehicle Parking

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

- 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; and
- Table 11.23 and 11.24 of the current South Dublin Council County Development Plan (2016-2022).

The subject site location on the Kilcarberry lands, can be classified within the DHPLG as 'Intermediate Urban Locations' as it is 'within easy walking distance (i.e up to 5 minutes or 400-500m) of reasonable frequent (minimum 15 minute peak hour frequency) urban bus services.

In relation to car parking, within 'Intermediate Urban Locations, the DHPLG document states: -

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

As outlined within the DHPLG design standards for new apartments (March 2018), the subject site can be classified as 'Intermediate Urban Locations' due to its location being within 500m walking distance of Dublin bus service 13 travelling along the New Nangor Road, operating with a 10-15 minute frequency.

The South Dublin County Development Plan 2016-2022 states the following in relation to car parking:-

- It is the policy of Council to take a balanced approach to the provision of car parking with the aim of meeting the needs of businesses and communities whilst promoting a transition towards more sustainable forms of transportation.
- Tables 11.23 and 11.24 set out the Maximum Parking rates for non-residential and residential development. Parking rates are divided into two main categories:
 - Zone 1: General rate applicable throughout the County.
 - Zone 2 (Non Residential): More restrictive rates for application within town and village centres, within 800 metres of a Train or Luas station and within 400 metres of a high quality bus service (including proposed services that have proceeded to construction).
 - Zone 2 (Residential): More restrictive rates for application within town and village centres, within 400 metres of a high quality public transport service 5 (includes a train station, Luas station or bus stop with a high quality service)'. (5A high frequency route is where buses operate with a minimum 10 minute frequency at peak times and a 20 minute off-peak frequency.)

With regard to the proposed development schedule the associated SDCC Maximum car parking requirements are outlined in Table 14.1 below.

As summarised in Table 14.1 it can be established that the subject development proposals comply fully with the SDCC car parking standards in regard to the childcare facilities, retail unit and community centre. In regard to the development proposals for the 1034 residential units, it is noted that the car parking proposals for these units are below (approximately 14% below) the maximum and subsequently comply with the maximum standard recommended by SDCC. The provision of 1478no. car parking spaces equates to 1.4 no. spaces per residential unit on average.

Description		Quantity of Units/GFA/classrooms	Parking Required Per Unit (Zone 1)	MAXIMUM Parking Permitted	Parking Provided
3+ bed House		578	2 space per unit	1156	1478
1 bed duplex		41	1 space per unit	41	
2 bed duplex		49	1.25 space per unit	61	
3 bed duplex		64	1.5 space per unit	96	
1 bed apartment		101	1 space per unit	101	
2 bed apartment		175	1.25 space per unit	219	
3 + bed apartment		26	1.5 spaces per unit	39	
Residential Sub-total				1713	
Retail		178m ²	1 per 25sqm GFA	7	7
Childcare facilities	Crèche building	909m ²	1 per classroom	11	11
	Crèche in Block 7	557m ²	1 per classroom	5	5
Childcare Facility Sub-total				16	16
Community Centre		785m ²	1 per 25sqm GFA	31	9
Total				1783	1510

Table 14.1: Development Vehicle Parking Maximum Requirements & Development Provision

A review of the 2019 Census car ownership statistics has been undertaken at existing local residential areas that comprise a mix of apartment and housing residential units. A total of 3 no. Census designated 'small areas' have been deemed representative of the subject development characteristics including: -

1. Small Area 2017_267049022 : Castlegrange
2. Small Area 2017_267049006 : Grange View Rd
3. Small Area 2017_267049032 : Kilcronan

Table 14.2 summarises the ratio of car ownership per residential unit in each of the small areas introduced above. It has been established that, at these comparable local residential areas, there is an existing ratio of approximately 1 car per residential unit.

Accordingly, the proposed car parking ratio of 1.4 parking spaces per residential unit is predicted to be more than sufficient car parking provision to cater for proposed developments car parking demand at the subject Kilcarbery site.

Considering the DHPLG guidelines' opportunity of reducing the quantum of on-site car parking for apartment developments similar as the subject proposals, DBFL believe that the proposed reduction of only 14% below the SDCC Development Plan maximum standards complies fully with the principles and recommendations of the DHPLG guidelines.

Small Area	Units	Car Ownership	Ratio
1	117	125	1.07
2	108	119	1.10
3	102	81	0.79
Total	327	325	0.99

Table 14.2: Car Ownership Ratio at similar Residential Areas

Mobility Impaired Parking

The appropriate level of mobility impaired parking provision for the proposed development will also be provided in accordance with South Dublin County Council Development Plan requirements. The Development Plan States:- *'Disabled car parking spaces shall generally be provided at a rate of 5% of the total number of spaces.'* This equates to a total of 75 no. disabled spaces.

Car Parking for Electric Vehicles

The appropriate level of electric vehicle parking provision for the proposed development will be provided in accordance with South Dublin County Council Development Plan requirements. The Development Plan States:- *'all developments shall provide facilities for the charging of battery operated cars at a rate of up to 10% of the total car parking spaces. The remainder of the parking spaces should be constructed to be capable of accommodating future charging points, as required.'* The 10% requirement equates to 150 dedicated electric vehicle parking bays.

Cycle Parking

The appropriate level of cycle parking provision for the proposed development will also be provided in reference to both (i) the South Dublin County Council requirements; and (ii) the DHPLG guidelines. The South Dublin County Council cycle parking standards are detailed in **Table 14.3** below: -

Land Use Description	SDCC Cycle Parking Requirement		DHPLG Requirements	
	Short Stay	Long Stay	Short Stay	Long Stay
Houses	N/A	N/A	N/A	N/A
Apartments/duplex	1 / 10 apartments	1 / 5 apartments	1 / 2 units	1 / bedroom
Retail	1 / 50sqm	1 / 5 staff	N/A	N/A
Crèche/Childcare	1 / 10 children-	1 / 5 staff	N/A	N/A
Community Centre	1 / 100sqm	1 / 5 staff	N/A	N/A

Table 14.3: Cycle Parking Requirements.

In reference to Table 14.4 below, the proposals include the provision of a total of 251 short stay and 854 long stay bicycle parking stands/opportunities (1105 in total) on-site within the subject development site. The SDCC bicycle parking standards are considered to be 'minimum' standards, whereas the DHPLG requirements are considered to be the preferred level of provision in situations where on-site car parking has been substantially or completely removed as permitted in certain situations by the corresponding DHPLG car parking guidance. The high provision of bicycle parking proposed on-site for the apartment units has been provided even though the residential development car parking proposals are only 14% below the SDCC development plan standards (i.e. 1478 spaces opposed to 1713).

Block / Land Use	No. of Units/ GFA/staff/ children	SDCC Parking Requirement			DHPLG Requirements			Development Provision		
		Short Stay	Long Stay	Total	Short Stay	Long Stay	Total	Short Stay	Long Stay	Total
1	6x1-bed,18x2-bed,5x3-bed	3	6	9	15	57	72	15	57	72
2	4x1-bed,15x2-bed,5x3-bed	3	5	8	12	49	61	12	49	61
3	13x1-bed,17x2-bed	3	6	9	15	47	62	15	47	62
4	13x1-bed,17x2-bed	3	6	9	15	47	62	15	47	62
5	12x1-bed,22x2-bed,11x3-bed	5	9	14	22	89	111	22	89	111
6	16x1-bed,21x2-bed	4	8	12	18	58	77	18	58	76
7	16x1-bed,21x2-bed	4	8	12	18	58	77	18	58	76
8	5x1-bed,23x2-bed,5x3-bed	4	7	11	17	66	83	17	66	83
9	16x1-bed,21x2-bed	4	8	12	19	58	77	19	58	77
Duplex	41x1-bed,49x2-bed,16x3-bed	15	31	46	77	331	408	74	314	388
Creche	Block 7: 98 children/19 staff	10	4	14	N/A	N/A	N/A	7	4	11
	Building: 122 children/19 staff	12	4	16	N/A	N/A	N/A	7	4	11
Retail	178m ²	4	1	5	N/A	N/A	N/A	4	1	5
Centre	785m ²	8	2	10	N/A	N/A	N/A	8	2	10
Total		82	105	187	262	871	1136	251	854	1105

Table 14.4: Cycle Parking Requirements and Development Provision

DBFL consider this to be a modest scale of reduction and not the 'substantial' reduction that the guidelines could consider and at which the high DHPLG bicycle parking requirements would be of greater relevance. Nevertheless, the design approach in regard to the specification of bicycle parking on-site, in the context of the sites' accessibility characteristics (including the proposed car parking provision), is deemed to be a more than adequate as it is significantly higher than the SDCC cycle parking standards and comparable to the 'maximum' DHPLG requirements.

In reference to Table 14.4 above it can be established that the proposed on-site bicycle parking provision of 1105 spaces (including Short and Long-term parking spaces) is approximately 591% more than the 187 cycle parking opportunities required by the SDCC development management standards.

14.4.1.1 Construction Stage

The subject development is proposed to be rolled out over a number of years with the initial 178 no. residential units and within Block 7 will be complete by the end of the adopted 2020 Opening Year. The remaining residential and non-residential units are predicted to be complete and occupied sometime before the adopted 2025 Future Design Year.

During the general excavation of the foundations there will be additional HGV movements from the site. All suitable material will be used for construction and fill activities where possible and appropriate. All spoil material will be removed to a registered landfill site which will be agreed in full with the Local Authority.

In addition to the traffic generated by the disposal of surplus subsoil from the site, there will be traffic generated from deliveries of construction materials and equipment. It should be pointed out that construction traffic generated during the development works tends to be outside of peak hours. Such trips would generally be spread out over the full working day and will not be higher than the peak hour predicted volumes for the operational stage.

Construction traffic will consist of the following categories: -

- Private vehicles owned and driven by site construction staff and by full time supervisory staff. On-site employees will generally arrive before 08:00, thus avoiding the morning peak hour traffic. These employees will generally depart after 18:00. It should be noted that a large proportion of construction workers would arrive in shared transport.
- Excavation plant and dumper trucks involved in site development works and material delivery vehicles for the following: granular fill materials, concrete pipes, manholes, reinforcement steel, ready-mix concrete and mortar, concrete blocks, miscellaneous building materials, etc.

On-site employees will generally arrive before 08:00, thus avoiding the morning peak hour traffic. These employees will generally depart after 18:00. It should be noted that a large proportion of construction workers would arrive in shared transport. Deliveries would arrive at a dispersed rate during the course of the day. It is estimated that peak delivery rates would be in the region of 1 - 2 deliveries per hour throughout the day.

14.4.1.2 Operational Stage

In order to assess the operation of the proposed road network and its future capacity, a traffic model of the existing local road network and proposed links was created. Existing traffic levels were obtained from counts carried out in the vicinity of the subject site access in November 2018 therefore peak hour flows were established. The aforementioned traffic surveys (weekday classified junction turning counts) were conducted by Nationwide Data Collection over two number three-hour survey periods from 07:00 to 10:00 in the AM and again from 16:00 to 19:00 in the PM period at the following seven junctions (Figure 14.2): -

- A. R136 Outer Ring Rd/New Nangor Rd junction;
- B. St Cuthbert's Rd/New Nangor Rd junction;
- C. Old Nangor Rd/ St Cuthbert's Rd/Upper Nangor Rd junction;
- D. New Nangor Rd/Fonthill Rd junction;
- E. Old Nangor Rd/Fonthill Rd junction;
- F. R136 Outer Ring Rd/N7 Slip lane/Green Isle Rd/New Nangor Rd junction; and
- G. R136 Outer Ring Rd/N7 Slip lane/Old Naas Rd junction.

In order to analyse and assess the predicted traffic generation from the proposed residential development upon the local road network, an area wide traffic model incorporating these local junctions was created by DBFL.

The traffic survey established that the local AM and PM peak hours occur between 07:30-08:30 – 09:00 and 16:45-17:45.

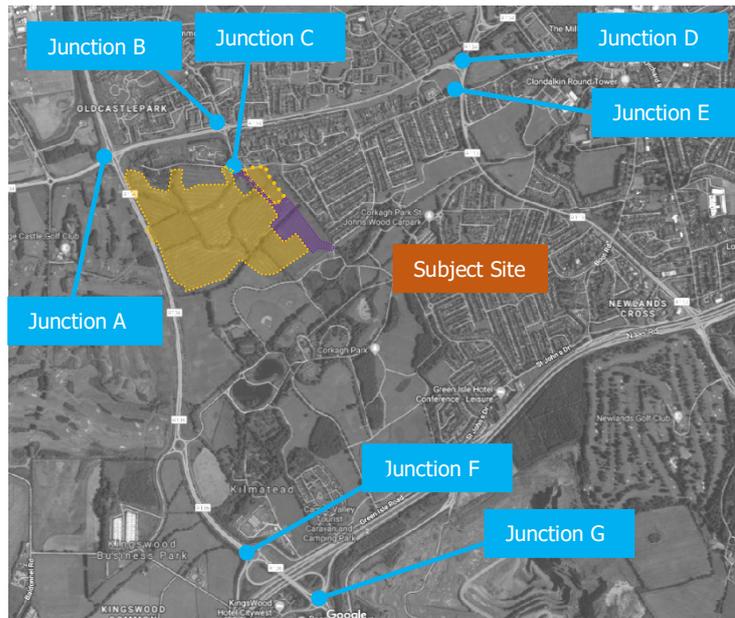


Figure 14.2: Traffic Survey Locations

Residential Trip Generation

With the objective of establishing the vehicle trip rates and associate traffic generation figures for the subject site, the following data sources will be reviewed, as detailed in the following paragraphs:-

- Review of 2016 Census Data – Existing Modal Split trends; and
- TRICS Database

The initial analysis considered the mode of travel used by residents living in each of the above 2 catchment areas when traveling to school, college and work. The principal mode of travel used by residents in each catchment area is summarised in Figure 14.3 below.

In summary it can be seen that 17% walk, 3% cycle, a total of 16% use public transport, 41% are car drivers, whilst 16% are car passengers. A total of 7% did not respond or work from home.

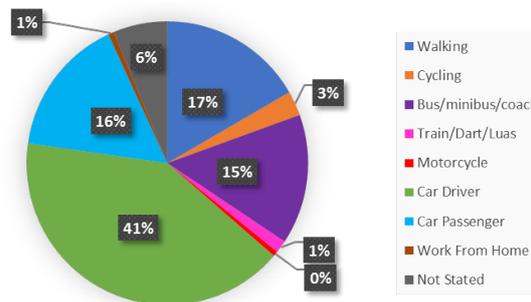


Figure 14.3: Mode of Travel – Commuting to Work/School/College

To estimate the potential level of vehicle trips that could be generated by the proposed subject residential development reference was also be made to the TRICS database. TRICS provides trip rate information for a variety of different land uses and development types, which can be applied to the subject development.

Based on TRICS generated Total Person trip rates (**Table 14.5**), potential peak hour person trips have been calculated based on the proposed development schedule of 1034no. residential units comprising: -

- 578no. houses (365 privately owned and 213 social housing units);
- 105no. duplex units (52 privately owned and 53 social housing units); and
- 351no. apartment units (306 privately owned and 45 social housing units).

The analysis of the 2016 census data for the local catchment areas within the vicinity of the site revealed car drivers represent a 41% mode share for means of travel to/from work/school/college. Accordingly, the 41% mode share has been applied to the Total Person trip generation (Table 14.5) to quantify the potential traffic generation for the residential elements of the subject site (Table 14.6).

It is estimated that 178 no. of the proposed 578no. house units will be constructed by the 2020 Opening year, with the remaining 400no. houses, 105no. duplex units and 351no. apartments constructed by the year 2025.

Land Use (Trics)	Period	Total People Trip Rates (per unit)		Total People	
		Arr	Dep	Arr	Dep
Mixed Private Houses & Flats	AM	0.123	0.491	89	355
	PM	0.464	0.281	336	203
Mixed Affordable Houses & Flats	AM	0.132	0.369	41	114
	PM	0.553	0.434	171	135
Total	AM		130	469	
	PM		507	338	

Table 14.5: Proposed Development Total People Trip Rates & Total People Generation

Subject Development	Period	Vehicle Traffic Generation (41% Mode Share)	
		Arr	Dep
2020 Opening Year	AM	9	32
	PM	37	25
2025 & 2035 Future Year	AM	53	192
	PM	208	139

Table 14.6: Proposed Development Vehicle Traffic Generation – Residential

Childcare Facilities Trip Generation

To estimate the potential level of vehicle trips that could be generated by the proposed crèche elements of the subject development, reference has again been made to the TRICS database. A summary of the adopted trip rates is provided in Table 14.7 below.

Land Use (Trics)	Period	Vehicle Trip Rates (per 100sqm)	
		Arr	Dep
Crèche Trip Rates	AM	2.993	2.108
	PM	2.752	3.182

Table 14.7: Proposed Development Trip Rates – Crèche

Land Use (Trics)	Period	Traffic Generation	
		Arr	Dep
Apartment Block 7 Crèche (557m ²)	AM	17	12
	PM	15	18
Crèche Building (909m ²)	AM	27	19
	PM	25	29

Table 14.8: Proposed Development Vehicle Traffic Generation – Crèches

It is estimated that by the 2020 Opening Year the crèche will be constructed/operational within Block 7, with the standalone crèche building constructed/operational by the 2025 future year.

Whilst the planning regulations envision that the crèches will solely serve the residents of the subject development, in reality this may not always be the case. As such, in order to provide a robust assessment, it has been assumed that 25% of the traffic generation to/from the crèche elements of the subject development will originate from the local road network external to the subject site. The traffic generation in Table 14.8 above have been discounted to reflect this, with the resulting traffic generation for each of the assessment years (2020, 2025 & 2035) shown in Table 14.9 below.

Subject Development	Period	Vehicle Traffic Generation	
		Arr	Dep
2020 Opening Year	AM	4	3
	PM	4	4
2025 & 2035 Future Year	AM	11	8
	PM	10	12

Table 14.9: Proposed Development Vehicle Traffic Generation – Crèches

Retail & Community Centre Trip Generation

It is anticipated that the proposed retail unit and community centre will solely serve residents of the subject development and as such these elements will not generate any additional vehicle trips on the adjacent local road network.

Total Vehicle Trip Generation

Table 14.10 below summarises the total predicted peak hour AM and PM traffic generated by the proposed development for each of the assessment years.

Subject Development	Period	Vehicle Traffic Generation	
		Arr	Dep
2020 Opening Year	AM	13	35
	PM	40	30
2025 Future Year	AM	64	200
	PM	218	150
2035 Future Year	AM	64	200
	PM	218	150

Table 14.10: Proposed Development Vehicle Traffic Generation – Total

Trip Distribution & Assignment

The distribution of subject development traffic as proposed by DBFL is based upon the surveyed traffic movements at the nearby key local junctions.

14.4.2 Cumulative – Kilcarbery

14.4.2.1 Construction Stage

It is expected that both the aforementioned committed development (Ref. SD178/0002) and any future 3rd party developments will have similar construction stage activities to the subject development's construction stage.

14.4.2.2 Operational Stage

The subject assessment has assumed that the committed development (Ref. SD178/0002) will be in place and operational by the adopted 2020 Opening Year and therefore, all design year assessment scenarios incorporate these predicted 3rd Party vehicle trips.

Accordingly, in addition to the potential subject development vehicle trip generation detailed above, the aforementioned committed development, located adjacent to the subject development site, reference has been made to the corresponding Malone O'Regan TTA report (May 2017) that was submitted with the application to establish the potential quantum of traffic generated by this 3rd party development (Table 14.11).

	Peak	Arr	Dep	Arr	Dep
03 Residential / L: Mixed Affordable Housing (Flats & Houses)	AM	0.120	0.272	13	30
	PM	0.285	0.204	31	22

Table 14.11: Corkagh Grange Residential Development Trip Rates & Traffic Generation (Ref. SD178/0002)

Furthermore, if all the zoned lands in the surrounding area were to be developed, this would have an effect on the local road network traffic levels. However, the scale of potential impact would be fully assessed during the planning procedures for any of these individual third-party developments (which currently do not benefit from planning permission). Nevertheless, the utilisation of TII's growth rates does take some account of the potential additional traffic that such third party site could generate (Table 14.12).

Region	Name	Low Growth				Medium Growth				High Growth			
		2013-2030		2030-2050		2013-2030		2030-2050		2013-2030		2030-2050	
		LV	HV	LV	HV	LV	HV	LV	HV	LV	HV	LV	HV
1	Dublin	1.0089	1.0221	1.0004	1.0135	1.0134	1.0237	1.0038	1.0176	1.0149	1.0242	1.0054	1.0195

Table 14.12: National Traffic Growth Forecasts: Annual Growth Factors (Extract from Table 5.3.2 PAG)

14.5 Potential Impact of the Proposed Development

14.5.1 Proposed Development

14.5.1.1 Construction Stage

In the absence of a final construction programme it is difficult to assess the exact impact during the construction period at this preliminary stage. Nevertheless, the potential impact will be generated by traffic arising from the disposal of surplus subsoil from the site and from deliveries of construction materials and equipment. It should be pointed out that construction traffic generated during the development works tends to be outside of peak hours. Such trips would generally be spread out over the full working day and will not be higher than the peak hour predicted volumes for the operational stage.

A significant benefit of the subject development site's characteristics is that all construction traffic vehicle parking demands can be accommodated on-site thereby minimising the impact upon the operational performance and safety levels of the adjacent public road network.

14.5.1.2 Operational Stage

Network Impact

The amount of two-way vehicle trips that are predicted to be generated to/from the proposed development site and will travel through the key offsite junctions in the 2035 design year as a result of the proposed 1034-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 (5% for congested networks) at the following junctions (Figure 14.1): -

- Junction A: R136 Outer Ring Rd/New Nangor Rd junction;
- Junction D: New Nangor Rd/Fonthill Rd junction;
- Junction E: Old Nangor Rd/Fonthill Rd junction;
- Junction F: R136 Outer Ring Rd/N7 Slip lane/Green Isle Rd/New Nangor Rd junction; and
- Junction G: R136 Outer Ring Rd/N7 Slip lane/Old Naas Rd junction. It is therefore considered that any direct effect on soils and geology in the operational phase of the development is unlikely.

It can be seen that the proposed development would result in the following predicted impacts during the 2035 Future Year (Opening Year +15): -

- Junction A: At the R136 Outer Ring Rd/New Nangor Rd junction: an increase of 1.8% (80 New Vehicle Trips) in the AM peak period, and 2.7% (114 New Vehicle Trips) in the PM peak period;
- Junction B: At the St Cuthbert's Rd/New Nangor Rd junction: an increase of 6.0% (129 New Vehicle Trips) in the AM peak period, and 8.4% (175 New Vehicle Trips) in the PM peak period;
- Junction C: At the Old Nangor Rd/ St Cuthbert's Rd/Upper Nangor Rd junction: an increase of 69.3% (192 New Vehicle Trips) in the AM peak period, and 131.3% (268 New Vehicle Trips) in the PM peak period;
- Junction D: At the New Nangor Rd/Fonthill Rd junction: an increase of 3.1% (120 New Vehicle Trips) in the AM peak period, and 4.2% (151 New Vehicle Trips) in the PM peak period;
- Junction E: At the Old Nangor Rd/Fonthill Rd junction: an increase of 2.0% (70 New Vehicle Trips) in the AM peak period, and 3.6% (103 New Vehicle Trips) in the PM peak period;
- Junction F: At the R136 Outer Ring Rd/N7 Slip lane/Green Isle Rd/New Nangor Rd junction: an increase of 1.2% (64 New Vehicle Trips) in the AM peak period, and 1.6% (81 New Vehicle Trips) in the PM peak period; and
- Junction G: At the R136 Outer Ring Rd/N7 Slip lane/Old Naas Rd junction: an increase of 1.2% (54 New Vehicle Trips) in the AM peak period, and 1.3% (62 New Vehicle Trips) in the PM peak period.

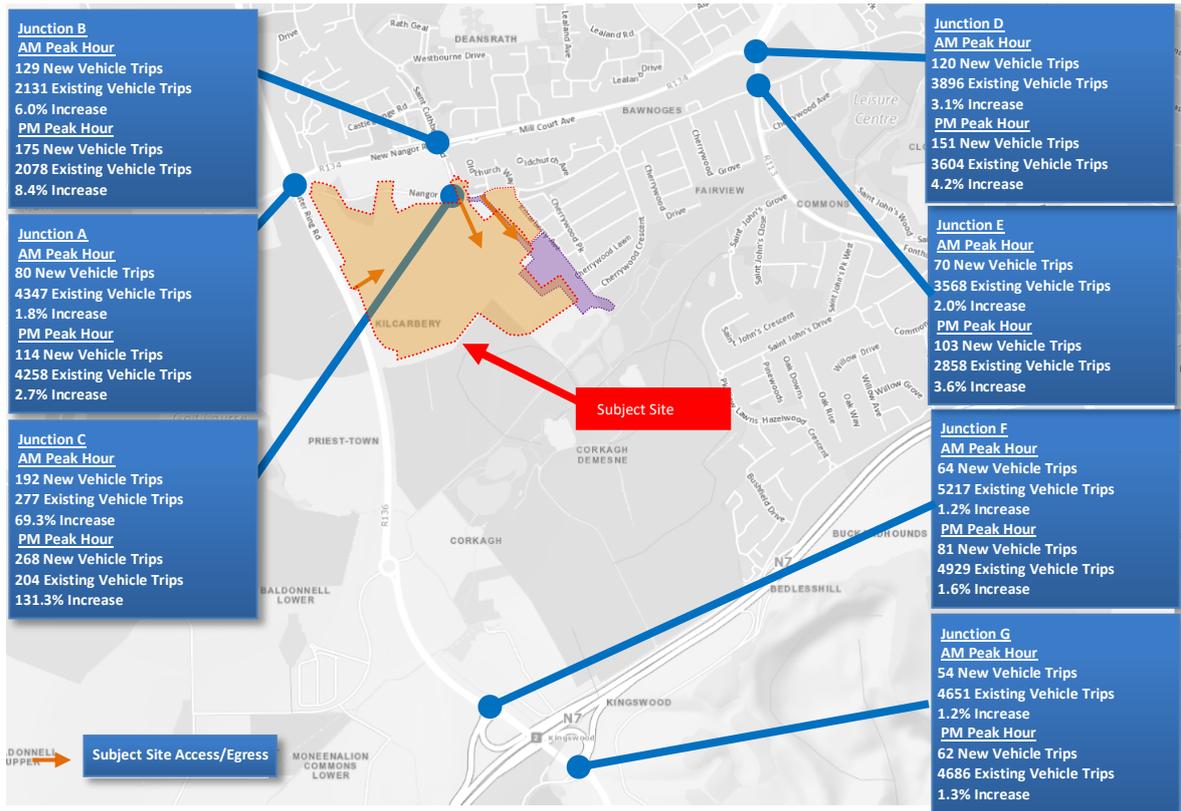


Figure 14.1: Increase in Vehicle Trips Generated at local junctions – 2035

Network Assessment

The resulting percentage increase in traffic flows as a result of the traffic generated by the proposed development is established as being above the 10% threshold (5% for congested networks) at Junction C: Nangor Rd/ St Cuthbert’s Rd/Upper Nangor Rd junction (Figure 14.1).

As part of the development proposals, a fourth arm (subject site access) will be incorporated into the aforementioned junction thereby upgrading it from its existing 3-arm priority-controlled arrangement to a 4-arm priority-controlled junction. The site access and St Cuthbert’s Road will be given priority at the junction, with the Upper Nangor Road and Old Nangor Road arms serving as the minor arms at the junction.

Accordingly, in order to determine if this aforementioned junction (with its proposed upgraded layout), in addition to the proposed access junction on the R136 Outer Ring Road will cater for the predicted level of traffic generation, a traffic model of these junctions has been analysed for the schemes 2020 Opening Year and subsequent 2025 and 2035 Future Design Years.

The operational assessment of these junctions has been undertaken using the Transport Research Laboratory (TRL) computer packages PICADY (JUNCTIONS 9) for priority-controlled junctions.

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

A 90-minute AM and PM period has been simulated, from 07:15 to 08:45 and 16:30 to 18:00. Traffic flows were entered using an Origin-Destination table for the peak hours.

Nangor Rd/St Cuthbert's Rd/Upper Nangor Rd Junction

The results of the operational assessment of the Nangor Rd/St Cuthbert's Rd/Upper Nangor Rd Junction proposed four-arm priority-controlled junction during the weekday morning and evening peaks are summarised in Table 14.1 to Table 14.3 below. The arms were labelled as follows within the PICADY model: -

- Arm A: St Cuthbert's Road
- Arm B: Nangor Road
- Arm C: Site Access
- Arm D: Upper Nangor Road

During the 2020 "Do Something" AM peak hour, with the inclusion of the subject development traffic, the junction simulation model (Table 14.1) results indicate the maximum ratio of demand to capacity (RFC) of 0.22 and a corresponding queue of 0.3 passenger car units (pcus) will occur on the Nangor Road arm of the junction.

For the 2020 "Do Something" PM peak hour, with the inclusion of the subject development traffic, the junction simulation model (Table 14.1) results indicate the maximum RFC of 0.20 and a corresponding queue of 0.2 pcus will again occur on the Nangor Road arm of the junction.

Periods	AM		PM	
Traffic Stream	Do Something		Do Something	
	RFC	Queue	RFC	Queue
B-CD	0.02	0.0	0.02	0.0
B-AD	0.22	0.3	0.20	0.2
A-BCD	0.10	0.1	0.00	0.0
D-AB	0.01	0.0	0.01	0.0
D-BC	0.00	0.0	0.00	0.0
C-ABD	0.01	0.0	0.01	0.0

Table 14.1: PICADY Results: 2020 Opening Year – Do Something

During the 2025 "Do Something" AM peak hour, with the inclusion of the subject development traffic, the junction simulation model (Table 14.2) results indicate the maximum RFC of 0.27 and a corresponding queue of 0.4 pcus will occur on the Nangor Road arm of the junction.

For the 2025 "Do Something" PM peak hour, with the inclusion of the subject development traffic, the junction simulation model (Table 14.2) results indicate the maximum RFC of 0.24 and a corresponding queue of 0.3 pcus will occur on the Nangor Road arm of the junction.

Periods	AM		PM	
Traffic Stream	Do Something		Do Something	
	RFC	Queue	RFC	Queue
B-CD	0.05	0.1	0.10	0.1
B-AD	0.27	0.4	0.24	0.3
A-BCD	0.12	0.2	0.00	0.0
D-AB	0.01	0.0	0.02	0.0
D-BC	0.00	0.0	0.01	0.0
C-ABD	0.08	0.1	0.06	0.1

Table 14.2: PICADY Results: 2025 Future Year – Do Something

During the 2035 “Do Something” AM peak hour, with the inclusion of the subject development traffic, the junction simulation model (Table 14.3) results indicate the maximum RFC of 0.28 and a corresponding queue of 0.4pcus will occur on the Nangor Road arm of the junction.

For the 2035 “Do Something” PM peak hour, with the inclusion of the subject development traffic, the junction simulation model (Table 14.3) results indicate the maximum RFC of 0.26 and a corresponding queue of 0.3 pcus will occur on the Nangor Road arm of the junction.

Periods	AM		PM	
Traffic Stream	Do Something		Do Something	
	RFC	Queue	RFC	Queue
B-CD	0.05	0.1	0.10	0.1
B-AD	0.28	0.4	0.26	0.3
A-BCD	0.13	0.2	0.00	0.0
D-AB	0.01	0.0	0.02	0.0
D-BC	0.00	0.0	0.01	0.0
C-ABD	0.08	0.1	0.06	0.1

Table 14.3: PICADY Results: 2035 Future Year – Do Something

R136 Outer Ring Road/Site Access Junction

The results of the operational assessment of the R136 Outer Ring Road / Site Access three priority-controlled junction during the weekday morning and evening peaks are summarised in Table 14.4 to Table 14.6 below. The arms were labelled as follows within the PICADY model: -

- Arm A: R136 North
- Arm B: Site Access
- Arm A: R136 South

During the 2020 “Do Something” AM peak hour, with the inclusion of the subject development traffic, the junction simulation model (Table 14.4) results indicate the maximum RFC of 0.02 with no corresponding queue will occur on the Site Access arm of the junction.

For the 2020 “Do Something” PM peak hour, with the inclusion of the subject development traffic, the junction simulation model (Table 14.4) results indicate the maximum RFC of 0.02 with no corresponding queue will occur on the Site Access arm of the junction.

Periods	AM		PM	
Traffic Stream	Do Something		Do Something	
	RFC	Queue	RFC	Queue
B-AC	0.02	0.0	0.02	0.0
C-AB	0.00	0.0	0.00	0.0

Table 14.4: PICADY Results: 2020 Opening Year – Do Something

During the 2025 “Do Something” AM peak hour, with the inclusion of the subject development traffic, the junction simulation model (Table 14.5) results indicate the maximum ratio of demand to capacity (RFC) of 0.13 and a corresponding queue of 0.2 pcus will occur on the Site Access arm of the junction.

For the 2025 “Do Something” PM peak hour, with the inclusion of the subject development traffic, the junction simulation model (Table 14.5) results indicate the maximum RFC of 0.12 and a corresponding queue of 0.1pcus will occur on the Nangor Road arm of the junction.

Periods	AM		PM	
Traffic Stream	Do Something		Do Something	
	RFC	Queue	RFC	Queue
B-AC	0.13	0.2	0.12	0.1
C-AB	0.00	0.0	0.00	0.0

Table 14.5: PICADY Results: 2025 Future Year – Do Something

During the 2035 “Do Something” AM peak hour, with the inclusion of the subject development traffic, the junction simulation model (Table 14.6) results indicate the maximum RFC of 0.14 and a corresponding queue of 0.2 pcus will occur on the Nangor Road arm of the junction.

For the 2035 “Do Something” PM peak hour, with the inclusion of the subject development traffic, the junction simulation model (Table 14.6) results indicate the maximum ratio of demand to capacity (RFC) of 0.13 and a corresponding queue of 0.1 pcus will occur on the Nangor Road arm of the junction.

Periods	AM		PM	
Traffic Stream	Do Something		Do Something	
	RFC	Queue	RFC	Queue
B-AC	0.14	0.2	0.13	0.1
C-AB	0.00	0.0	0.00	0.0

Table 14.6: PICADY Results: 2035 Future Year – Do Something

14.5.1.3 Do-Nothing Impact

In the absence of the proposed development, the overall operational performance of the existing junctions on the surrounding road network will be affected by the impact caused by committed development and forecast background network traffic growth (should that growth arise).

14.5.2 Cumulative – Kilcarbery

14.5.2.1 Construction Stage

It is predicted that the committed development (Ref. SD178/0002) will be complete by the subject development’s adopted 2020 Opening Year. Accordingly, the peak construction stage traffic associated with both the subject development and committed development traffic is not expected to coincide. Similarly, potential future development on zoned 3rd Party lands that have yet to be subject to planning applications will likely be developed in phases thereby reducing the potential cumulative construction impact on the local road network at any one time.

14.5.2.2 Operational Stage

The analysis detailed above represents an appraisal in terms of potential cumulative impacts for a typical weekday as it is focused upon the key two busiest periods of the day (i.e. AM and PM peak hours). During the other 22 hours of the day, traffic flows are predicted to be significantly lower resulting in the network operating with additional reserve capacity to that forecast for the peak hour periods.

The adjacent committed development (Ref. SD178/0002) has been incorporated into the analysis detailed above and therefore the cumulative impact of both the subject proposals and this committed development have been assessed.

Furthermore, as introduced previously, if all the zoned lands in the surrounding area were to be developed, this would have an effect on the local road network traffic levels. However, the scale of potential impact would be fully assessed during the planning procedures for any of these individual third-party developments (which currently do not benefit from planning permission). Nevertheless, the utilisation of TII's growth rates does take some account of the potential additional traffic that such third party site could generate.

14.5.2.3 Do-Nothing Impact

The 'Do-Nothing' traffic scenario takes into account the potential level of traffic that could be generated by the 'committed development' (Ref. SD178/0002), in addition to the existing (growthed) traffic flows travelling across the network.

Existing Traffic Flows

Applying the annual factors (medium growth) as outlined in Table 2.4 above for the adopted Opening Year of 2020 and Future Horizon Years of 2025 (+5 years) and 2035 (+15 years), the following growth rates have been adopted to establish corresponding 2020, 2025 and 2035 baseline network flows: -

- 2018 to 2020 – 1.027 (or 2.7%);
- 2018 to 2025 – 1.098 (or 9.8%); and
- 2018 to 2035 – 1.190 (or 19.0%).

Committed Development

The eastern boundary of the subject site is formed by lands with existing planning permission for 109 residential units (Ref. SD178/0002). This development may generate an impact upon the local road network's existing traffic characteristics.

In order to establish the potential quantum of traffic generated by the Corkagh Grange committed development, reference has been made to the corresponding Malone O'Regan TTA report (May 2017) that was submitted with the application. Table 14.7 below indicates the TRICS derived trip rates and associate vehicle traffic generation for the Corkagh Grange residential development.

	Peak	Arr	Dep	Arr	Dep
03 Residential / L: Mixed Affordable Housing (Flats & Houses)	AM	0.120	0.272	13	30
	PM	0.285	0.204	31	22

Table 14.7: Corkagh Grange Residential Development Trip Rates & Traffic Generation (Ref. SD178/0002)

Beyond the above third-party residential development considered in this appraisal (Ref. SD178/0002), DBFL have determined there are no other significant local committed developments that would generate a notable impact upon the local road network serving the subject site within the adopted 2035 design year.

14.6 Ameliorative, Remedial or Reductive Measures

14.6.1 Proposed Development

14.6.1.1 Construction Stage

A Construction Management Plan and the associated Construction Traffic Management Plan (CTMP) in addition to the application accompanying Construction and Waste Management Plan will be developed by the appointed contractor and submitted to South Dublin County Council for approval prior to commencement of works.

The Construction Management Plan will incorporate a range of integrated control measures and associated management initiatives with the objective of mitigating the impact of the proposed development's on-site construction activities.

In order to ensure satisfactory operation of the construction stage the following is proposed:

- Provision of sufficient on-site parking and compounding to ensure no potential overflow onto the local network.
- It is likely that some numbers of the construction team will be brought to/from the site in vans/minibuses, which will serve to reduce the trip generation potential.
- Site offices and compound will be located within the site boundary. The site will be able to accommodate employee and visitor parking throughout the construction period through the construction of temporary hardstanding areas.
- Finally, truck wheel washes will be installed at construction entrances and any specific recommendations with regard to construction traffic management made by the Local Authority will be adhered to.

14.6.1.2 Operational Stage

With the objective of mitigating the potential impact of the proposed development during its operational stage, the following initiatives and associated timescale for their implementation have been identified and subsequently form an integral part of the subject development proposals.

- Management - A Mobility Management (MMP) is to be rolled out with the aim of guiding the delivery and management of coordinated initiatives by the scheme promotor. The MMP ultimately seeks to encourage sustainable travel practices for all journeys to and from the proposed development site. This MMP will be developed in partnership with SDCC to specifically consider the opportunities of shaping all journeys and promoting sustainable transport habits at both the proposed development.
- Services – The high provision of a total of 251 short term and 854 long term bicycle parking stands/opportunities (1105no. in total).

14.6.2 Cumulative – Kilcarbery

14.6.2.1 Construction Stage

No cumulative ameliorative, remedial or reductive measures have been identified as part of the proposed developments construction phase.

14.6.2.2 Operational Stage

The subject development's internal road network incorporates a through route between the adjoining committed development site and the R136. Once complete, this internal link will accommodate committed development traffic wishing to travel to the R136 (southbound towards the strategic N7 road network) and from the R136 (southbound) via the subject development's proposed left in / left out site access junction thereby providing the opportunity to reducing the volume of potential future committed development traffic travelling along the New Nangor Road corridor.

14.7 Residual Impact of the Proposed Development

14.7.1 Proposed Development

14.7.1.1 Construction Stage

Provided the above mitigation measures and management procedures are incorporated during the construction phase, the residual impact on the local receiving environment will be temporary in nature and neutral in terms of quality and effect.

14.7.1.2 Operational Stage

The implementation of the mitigation measures outlined above, including the MMP, will ensure that the residual effect on the local receiving environment is both managed and minimised. The analysis predicts the scale of residual impact, during the 2020, 2025 and 2035 design years, as largely being well below 5% on the surrounding links with the exception of following links as shown in Table 14.1.

The significance of each of the projected impacts at each of the key links is detailed within the following tables for the worst case (i.e. peak hours) 2035 Future Year scenarios.

Junction	AM	PM
B-St Cuthbert's Rd/New Nangor Rd junction	5.9%	8.2%
C-Nangor Rd/St Cuthbert's Rd/Upper Nangor Rd Junction	68.2%	128.7%

Table 14.1: Junctions with Impacts >5%

The significance of each of the projected impacts at each of the key junctions is detailed within the following tables for the worst case (i.e. peak hours) 2035 Future Year scenarios.

Ref	Environmental Character	Quality / Scale of Impact	Impact Significance	Duration
B	Low Sensitivity	Negative - Low	Slight	Long Term
C	Low Sensitivity	Negative - High	Moderate	Long Term

Table 14.2: Impact Significance – 2035 Design Year (AM Peak Hour)

Ref	Environmental Character	Quality / Scale of Impact	Impact Significance	Duration
B	Low Sensitivity	Negative - Low	Slight	Long Term
C	Low Sensitivity	Negative - High	Moderate	Long Term

Table 14.3: Impact Significance – 2035 Design Year (PM Peak Hour)

14.7.1.3 Worst Case Impact

The analysis undertaken above represents a worst-case appraisal of a typical weekday as it is focused upon the two busiest periods of the day (i.e. AM and PM peak hours). During the remaining 22 hours of the day, traffic flows are predicted to be significantly lower resulting in the network operating with additional reserve capacity to that forecast for the peak hour periods. Similarly, over the weekend periods both the site generated traffic and the external road network traffic flows are generally lower compared to the weekday peak hour periods that have been assessed.

14.7.2 Cumulative – Kilcarbery

14.7.2.1 Construction Stage

It is expected that the committed development and future 3rd party developments will incorporate mitigation measures during the construction stage similar to those proposed as part of the subject scheme. Accordingly, the residual impact on the local receiving environment will be temporary in nature and neutral in terms of quality and effect. Furthermore, the timescale for the development of both the subject development and 3rd party developments will differ and are not likely to be constructed simultaneously.

14.7.2.2 Operational Stage

No cumulative residual impacts have been identified in relation to the operational phase of the proposed development.

14.7.2.3 Worst Case Impact

The analysis undertaken above incorporates the committed development traffic and growth base network traffic (approximately accounting for future potential development upon 3rd Party lands in the surrounding area in the absence of planning applications) thereby representing a worst-case appraisal.

14.8 Monitoring

14.8.1 Proposed Development

14.8.1.1 Construction Stage

During the construction stage, the following monitoring exercises are proposed: -

- Compliance with construction vehicle routing practices,
- Compliance with construction vehicle parking practices,
- Internal and External road conditions,
- Timings of construction activities.

14.8.1.2 Operational Stage

As part of the MMP process, bi-annual post occupancy surveys are to be carried out in order to determine the success of the measures and initiatives as set out in the proposed MMP document. The information obtained from the monitoring surveys will be used to identify ways in which the MMP measures and initiatives should be taken forward in order to maintain and further encourage sustainable travel characteristics.

14.8.2 Cumulative – Kilcarbery

14.8.2.1 Construction Stage

Whilst it is predicted that the peak construction stage of the committed development (Ref. SD178/0002) will be complete by the time construction commences on the subject development site, the external road conditions is proposed to be closely monitored.

14.8.2.2 Operational Stage

No cumulative monitoring activities have been identified in relation to the operational phase of the proposed development.

14.9 Reinstatement

14.9.1 Proposed Development

14.9.1.1 Construction Stage

Normal post construction reinstatement will take place on completion of the works. The construction works area will be reinstated following completion of development with landscaped areas provided where proposed. The works will be restricted to the footprint of the site for the proposed development. Excavated topsoil and subsoil will be reused in reinstatement and landscaping where appropriate or dealt with in the appropriate manner i.e. sent for soil recovery as appropriate.

14.9.1.2 Operational Stage

No reinstatement requirements have been identified in relation to the operational phase of the proposed development.

14.9.2 Cumulative – Kilcarbery

14.9.2.1 Construction Stage

No cumulative reinstatement requirements have been identified in relation to the construction phase of the proposed development.

14.9.2.2 Operational Stage

No cumulative reinstatement requirements have been identified in relation to the operational phase of the proposed development.

14.10 Difficulties Encountered

There were no material difficulties encountered in compiling and assessing the data for this EIAR sufficient to prevent modelling of the likely transportation effects of the proposed development. The analysis reported within this chapter is based upon traffic survey data specifically commissioned for this appraisal and undertaken in 2018.