Comhairle Contae
Átha Cliath Theas
South Dublin County Council

Clonburris

A vibrant community offering a new way of living

Clonburris Strategic Development Zone (SDZ) Draft Planning Scheme

TRANSPORT ASSESSMENT & TRANSPORT STRATEGY

September 2017

Údarás Náisiúnta Iompair
National Transport Authority

TABLE OF CONTENTS

FIGURES

TABLES

APPEDICES

1 Introduction

This Transport Assessment report has been prepared on behalf of South Dublin County Council (SDCC) and the National Transport Authority (NTA).

As the specified Development Agency, SDCC have prepared a Draft Planning Scheme for the lands at Clonburris in accordance with its designation as a Strategic Development Zone. The SDZ lands which comprise approximately 280 hectares, are deemed to be of economic and social importance to the State.

To inform the transport requirements of the future development of the Clonburris SDZ, SDCC have requested support from the NTA to undertake a multi-modal transport assessments for the SDZ Area using the recently completed Regional Modelling System, specifically the Eastern Regional Model (ERM). This report sets out the Transport Assessment undertaken for the Clonburris SDZ.

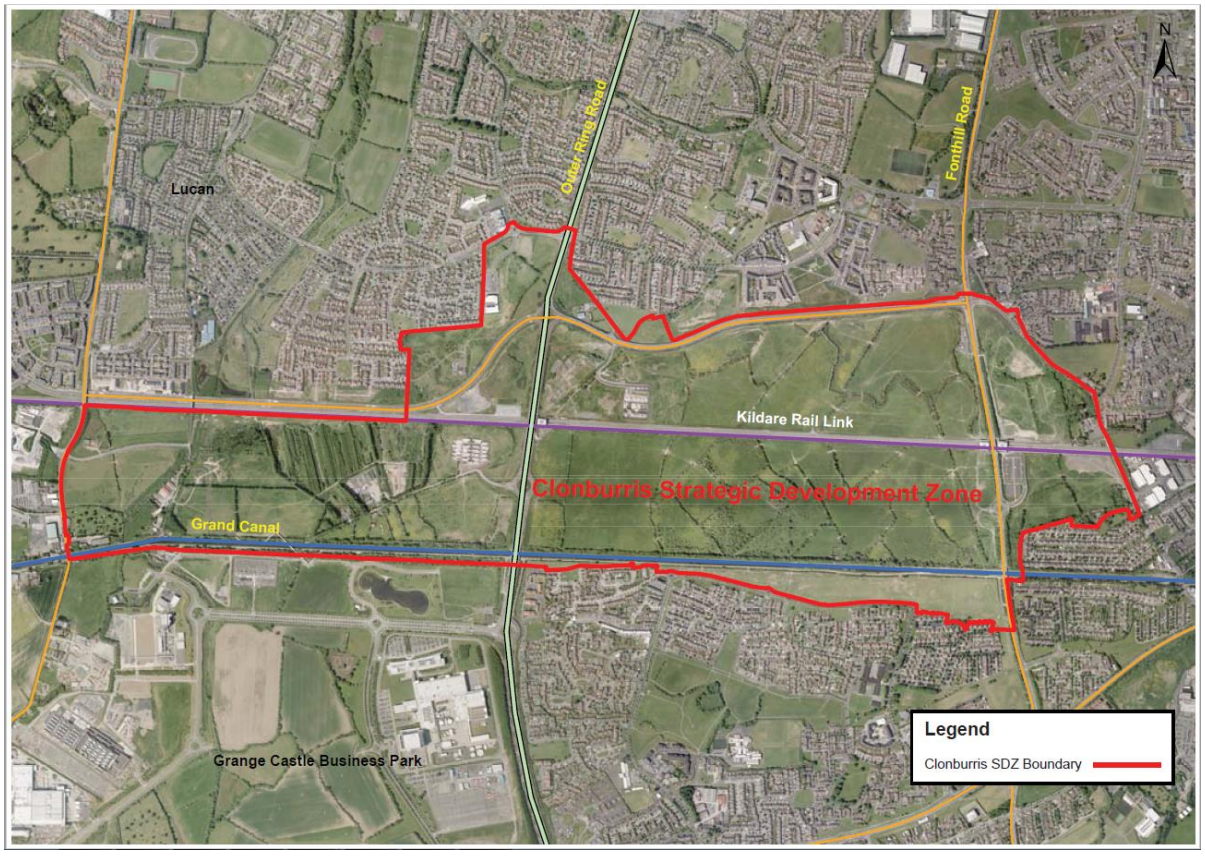


Figure 1.1 Aerial Image showing the extent of Clonburris SDZ lands

1.1 Background

This Transport Assessment has been prepared to support the development of the Clonburris SDZ Planning Scheme which will set out the future development requirements of the site. More specifically, the assessment has been undertaken to identify the appropriate transport infrastructure required to facilitate the future development of the site in its entirety. The assessment aims to identify the future transport needs of the site at both a strategic and local level for all modes and strives to prioritise measures which will encourage sustainable travel while protecting the efficiency of the future network.

1.2 Transport Objectives and Design Principles

The overarching transport objectives for the Clonburris area are contained in the SDZ Planning Scheme. These objectives are broken down into three main themes, namely:

- Movement and Transport;
- Land Use and Density; and
- Built Form and Design

For each of the above themes, a set of overarching and key principles have been defined which are outlined in further detail in the following sections.

1.2.1 Movement and Transport

Overarching Principle

To develop the SDZ lands in a manner that maximises existing and proposed public transport opportunities, including high quality rail and bus services, and support these opportunities with an integrated network of streets and routes with a clear hierarchy that promotes walking and cycling.

Key Principles

- To link the Development Areas of Clonburris with each other and with surrounding communities through a permeable and clear hierarchy of integrated streets and dedicated pedestrian and cycle routes;
- To integrate appropriate pieces of infrastructure that overcome challenges to movement across the SDZ lands;
- To develop a transport framework that maximises route choice and access to residential, education, retail, service, community and leisure uses by means of walking, cycling and public transport while balancing the needs of the car; and
- To upgrade existing sections of roads within the SDZ lands to integrated urban streets.

1.2.2 Land Use and Density

Overarching Principle

To direct land-uses and densities across the SDZ lands in a manner that creates a sustainable urban district that is based on the integration of land-use and transport planning.

Key Principles

- To co-ordinate residential, educational, employment and community uses and integrate such with transportation infrastructure in a manner that maximises and makes efficient use of existing and planned public transport services and local facilities;
- To promote increased residential densities within walking distance of public transport nodes and urban centres;
- To promote a mix of uses around the public transport nodes in a manner that creates viable and active urban centres;
- To establish two mixed use development areas/urban centres around both public transport nodes and distribute local community, retail and employment uses amongst surrounding residential Development Areas in the form of local nodes together with parklands; and
- To support the development of sustainable communities and to ensure that new residential development is carried out in accordance with Government policy in relation to the development of housing and residential communities, catering for a range of dwelling types and sizes.

1.2.3 Built Form and Design

Overarching Principle

To ensure that development across the SDZ lands is carried out in a design led manner that prioritises place making and accords with the core principles of urban design and the creation of integrated streets.

Key Principles

- To ensure that development is designed in accordance with best practice and promotes identity and diversity between Development Areas;
- To ensure that development is laid out in a series of blocks and plots that are legible, permeable and human in scale with appropriate topography responses, building heights, street widths, urban grain and street frontages;
- To design streets using a more integrated approach to pedestrian, cyclist and vehicular movement and ensure that the movement function of each street is reflected by an appropriate design response and design speed; and

1.2.4 Design Principles

Guided by the above principles from the Draft Planning Scheme a set of nine transport design principles were identified to guide this strategic transport assessment. Figure 1.2 states the overarching Clonburris Transport Assessment objectives and outlines the nine design principles that were formulated.

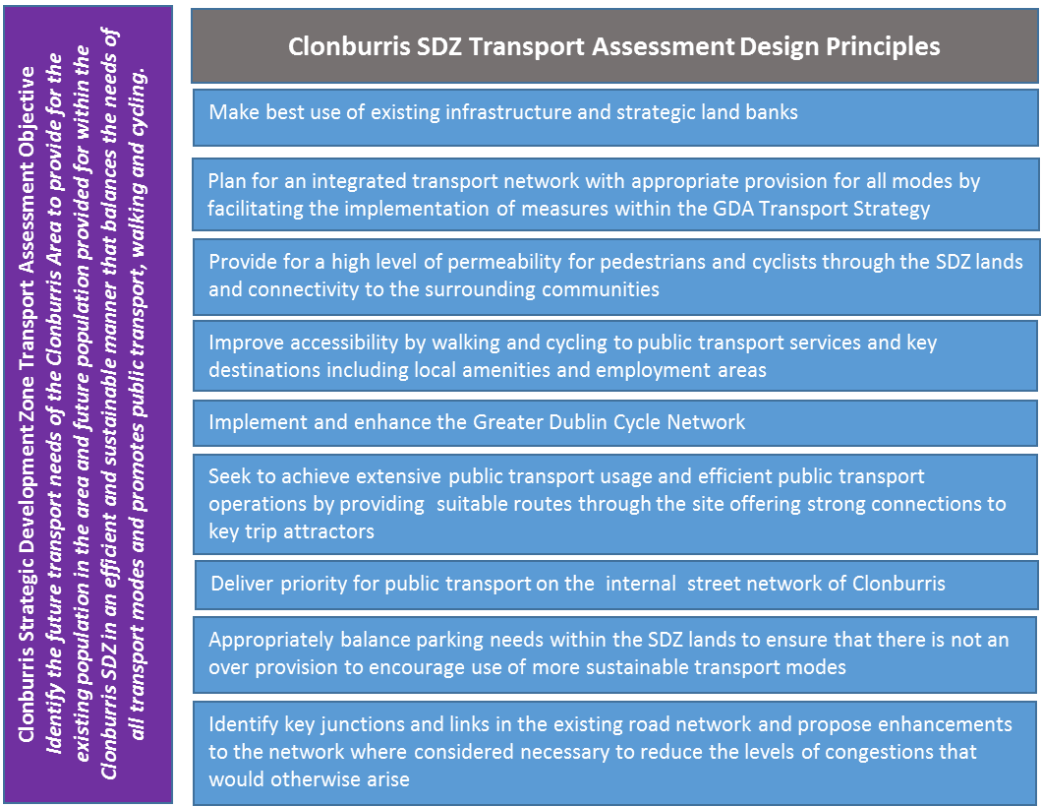


Figure 1.2 Transport Objective and Design Principles

1.3 Report Structure

The Transport Assessment has been structured as follows: -

- Chapter 2 – Provides a summary of the condition of the existing transport network; including a review of the existing public transport provision, highway conditions and walking cycling infrastructure.
- Chapter 3 – Contains a detailed review of planning policy and plans at a National, Regional and local policies level.
- Chapter 4 – Provides information on the proposed land use development of the Clonburris site and surrounding area
- Chapter 5 – Outlines the methodology employed in carrying out this Transport Assessment
- Chapter 6 - Provides a strategic transport assessment of the Clonburris development, examining trip length distribution and mode share (Private car, public transport and walking/cycling use) for its full build out.
- Chapter 7 – Outlines the various measures which form the overall Clonburris SDZ Transport Strategy, including:
  - Public Transport Strategy;
  - Walking and Cycling Strategy;
  - Street Network Strategy;
  - Parking Strategy; and
  - Mobility Management Plan Framework
- Chapter 8 - Provides a summary and conclusions of the transport assessment.

2 Baseline Transport Review

A review of the existing transport network was undertaken to inform the Transport Assessment. The review focused on all modes

- Active Modes e.g. cycling and walking;
- Existing Public Transport provision; including Bus, Rail and Light rail;
- Existing Road Network; and
- And an overview of existing transport demand in the surrounding area.

2.1 Existing Active Mode Provision

2.1.1 Existing Cycle Facilities

Clonburris is largely a greenfield site and as such there is limited cycle network within the site. However, the Grand Canal Greenway, which links Adamstown to the City Centre, passes through the site.

The site is dissected by the Fonthill and Grange Castle Roads on a north south axis both of which include segregated cycle facilities offering links to Lucan Village, Liffey Valley and the N4, which also features segregated cycle facilities and a cycle link to the City Centre. To the South, there are indirect cycle links to the Grange Castle Business Park and further south, Clondalkin Village and Tallaght.

The Thomas Omer Way is orientated along the northern boundary of the Clonburris site and has segregated cycle tracks on both sides of the road. The Lucan-Newlands Road runs along the eastern boundary of the site and does not currently have any cycle facilities.

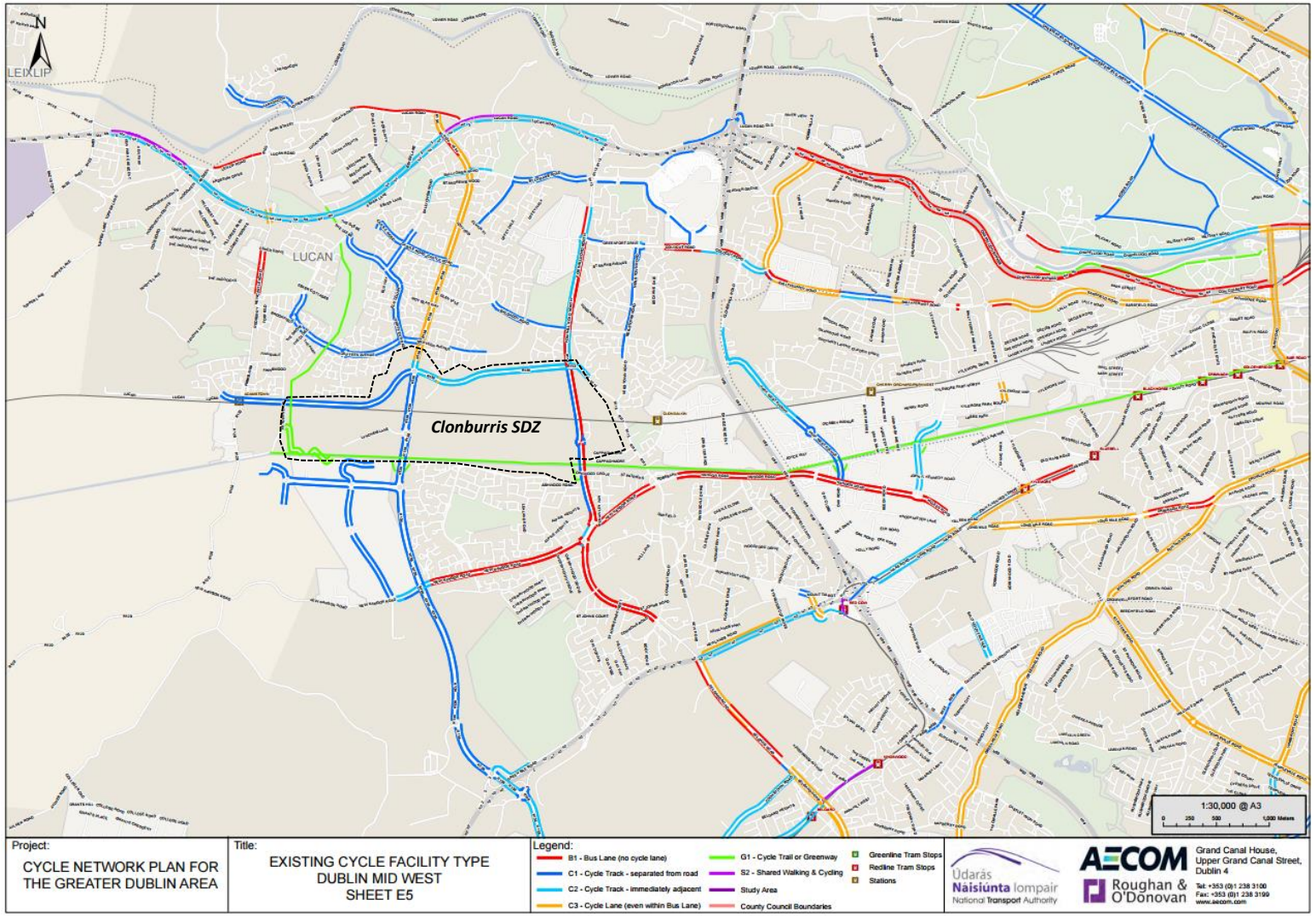


Figure 2.1 Extract from GDA Cycle Network Plan showing existing facilities

2.1.2 Existing Pedestrian Facilities

The Lucan-Newlands Road located along the eastern boundary of the site features footpaths either side along most of its length, however there is a northern section that has no footpath on the western side. The paths surfaces are generally of a high-quality, sections of the path are narrow in places and the path is immediately adjacent the carriageway.

The Fonthill Road features footpaths on either side, segregated from the carriageway by way of a grass margin. The paths are generally in good condition and are of a consistent width throughout. Fonthill Road offers walking connections to the Fonthill Retail Park and Liffey Valley Shopping Centre to the north, and Clondalkin village and the Nangor Road to the south.

The Grange Castle Road also features footpaths on either side segregated from the carriageway by way of a grass margin. The paths are generally in good condition and are of a consistent width throughout. The Grange Castle Road offers walking links to Lucan Village in the north, Adamstown to the west via its intersection with Adamstown Avenue, and to the south walking links to Grange Castle Business Park and Corkagh Park.

The Grand Canal Greenway bisects the south portion of Clonburris on an east west axis, offering a leisure walk link to Dublin City Centre and Adamstown to the west.

2.2 Existing Public Transport Provision

2.2.1 Existing Rail Network

Clonburris is situated on the Kildare railway line and has two railway stations within the SDZ lands. At its intersection with the Grange Castle Road lies the Kishoge Railway Station. Whilst the platform and station has been built, this station is not operational at present.

At its intersection with the Fonthill Road North lies the Clondalkin-Fonthill station. This station is served by commuter services to Heuston Station. Intercity trains do not serve this station. Following the recent upgrading of the Phoenix Park Tunnel, services calling at Clondalkin-Fonthill Station now offer connections to Drumcondra, Connolly, Tara Street, Pearse and Grand Canal Dock.

Eastbound services calling at Clondalkin-Fonthill offer good connections to Heuston station, which is the busiest station on the intercity train network offering strong connections to the regional cities and towns.

The table below outlines all the stations that are served by outbound trains calling at Clondalkin-Fonthill station and the number of times these stations are served by outbound trains daily:

Table 2.1 No of Daily Outbound Services calling at Clondalkin-Fonthill Station

Station	No. of services from Clondalkin-Fonthill
Adamstown	20
Hazelhatch & Celbridge	22
Sallins & Naas	22
Newbridge	22
Kildare	20

Athy	1
Carlow	1
Monasterevin	17
Portarlington	18
Portlaoise	18

The table below outlines all the stations that are served by inbound trains calling at Clondalkin-Fonthill station and the number of times these stations are served by inbound trains daily:

Table 2.2 No of Daily Inbound Services calling at Clondalkin-Fonthill Station

Station	No. of services from Clondalkin-Fonthill
Park West & Cherry Orchard	40
Heuston	40
Drumcondra	7
Connolly	7
Tara Street	7
Pearse	7
Grand Canal Dock	7

2.3 Existing Bus Network

A number of bus routes pass within close proximity of the site. These are a mix of radial, orbital and local services mainly operated by Dublin Bus. The services outlined in Table 2.3 show a mix of relatively high frequency cross city services and lower frequency local and orbital services.

Table 2.3 below outlines the current Dublin Bus routes that pass within close proximity of the Clonburris area: -

Table 2.3 Existing Dublin Bus Routes in the Clonburris Area

Route No.	Route	No of services in the Am Peak Period (0700-1000)
13	From Grange Castle To Harristown	14
25a	From Lucan (Esker Church) Towards Merrion Sq.	15
25b	From Adamstown Rail Station Towards Merrion Sq.	14
40	From Liffey Valley Shopping Centre Towards Finglas Village	17

Route No.	Route	No of services in the Am Peak Period (0700-1000)
51d	From Clondalkin Towards Aston Quay/Waterloo Rd	3
51X	From Dunawley Towards UCD Belfield	1
76	From Tallaght (The Square) Towards Chapelizod	8
76a	rom Blanchardstown Centre Towards Tallaght (The Square	1
151	From Foxborough (Balgaddy Rd.) Towards Docklands (East Rd.)	10
239	From Liffey Valley Shopping Centre Towards Blanchardstown Centre	3

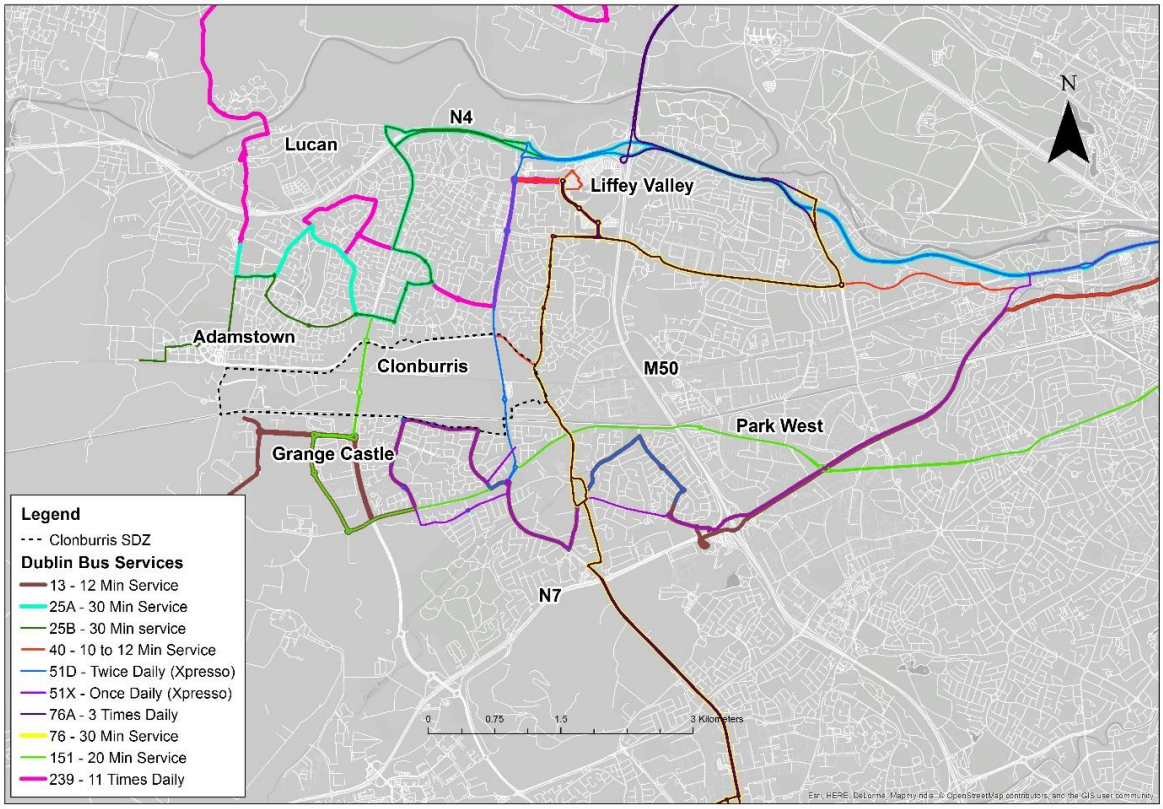


Figure 2.2 Map of existing Dublin Bus Network in the Clonburris Area

As can be seen from the table and the map the current Dublin Bus network in the area offers direct connections to key locations including the City Centre, Blanchardstown and Liffey Valley. Through transfer, the network offers connections to key destination including Park West, Clondalkin, Tallaght, Lucan and Grange Castle.

There is one privately operated bus service passing within close proximity to Clonburris, this is the Airport Hopper operating from Tallaght to Dublin Airport with 16 services a day via Fonthill Road North.

There are a number of roads in the immediate area that have bus priority in the form of Quality Bus Corridors (QBC's) these are: -

- To the south New Nangor Road features QBC's in both directions,
- Grange Castle Road Features QBC's in both directions,
- Thomas Omer Way also features QBC's in both directions, and
- Fonthill Road features a southbound QBC.

2.3.1 Existing Luas Network

Clonburris is located approximately 4km north of the Luas Red Line, which connects Tallaght and Citywest to the City Centre and Docklands. The closest red line Luas stops to the Clonburris are Belgard and Cheeverstown on the Citywest extension. These stations are located 4.4km and 6km respectively from Clonburris. Cheeverstown Luas station has a park and ride with 312 parking spaces.

The Luas operates from 05:30-0:30 midweek. At peak times, there is a Luas every 9-10 mins and at off peak times this drops to 10-15mins. The journey time from Belgard to the city centre is approx. 38 minutes.

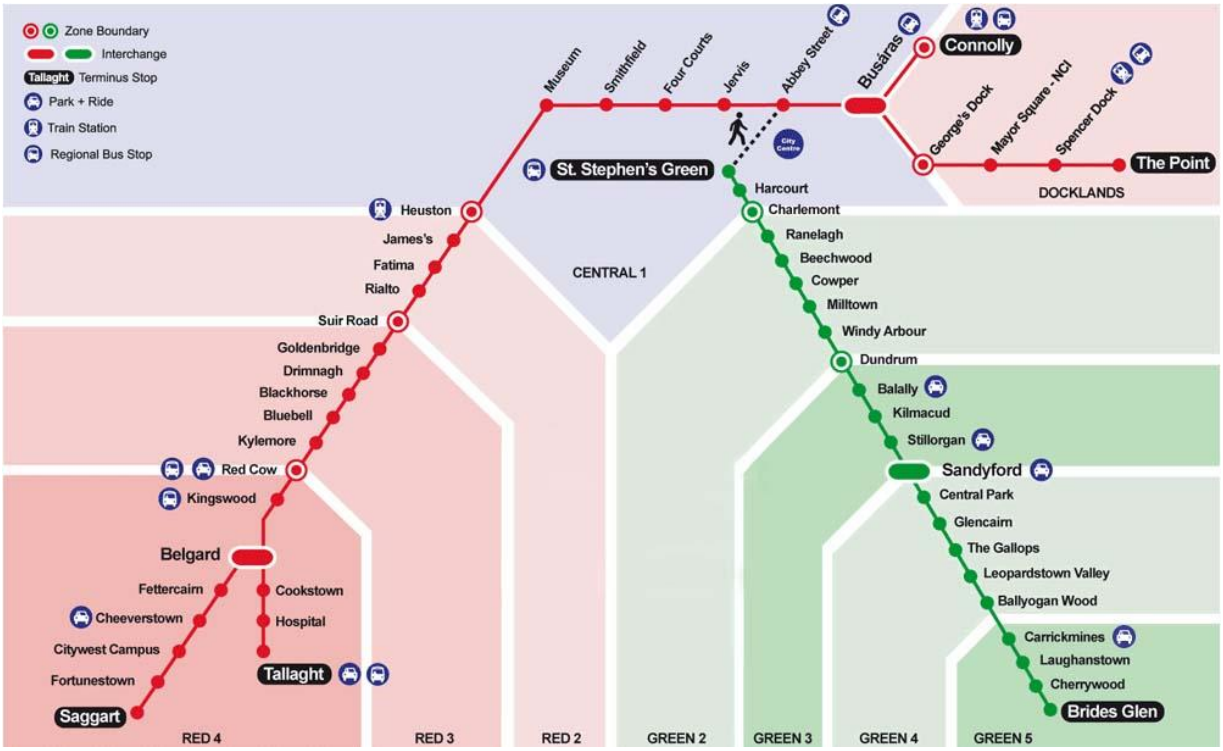


Figure 2.3 Map of existing Luas Network

2.4 Existing Road Network

Clonburris is located to the west of Dublin City Centre and is well connected to the National Road Network, served by several key strategic routes.

The study area is broadly bounded by Adamstown Avenue and Thomas Omer Way to the north, Lucan-Newlands Road to the east, the Lock Road to the west, Kilcronan Avenue and Kilcronan Crescent to the south.

The key north-south corridors through Clonburris include:

- the R113 Fonthill Road North which crosses through the eastern portion of Clonburris;
- the R136 Grange Castle Road which crosses through the western portion; and
- the R120 Lock Road which passes along the western boundary of the SDZ.

These roads link Clonburris to the N4 near Lucan in the north, and to the N7 in the south.

Key east-west corridors through the area include Adamstown Avenue and Thomas Omer Way to the immediate north, where these roads provide a connection between Fonthill Road North and Grange Castle Road. Coldcut Road, also to the north of the site provides an east-west connection from Fonthill Road North to Palmerston and Ballyfermot.

At the strategic level, Clonburris is connected to the M50 via the N4 and N7 interchanges which offer good links to Dublin Airport and the M1 to the north and the M/N11 to the south. The New Nangor Road and N7 Naas Road provide radial connections between the M50 and the Grange Castle Road.

A number of highway improvements are committed for key roads in the South Dublin area. These improvements are outlined in Chapter 4 of this assessment.

2.4.1 Accident Data

Accident data was obtained for the area surrounding the Clonburris site from the Road Safety Authorities Collision Statistics database. Figure 2.4 below shows the location and severity of all road traffic accidents recorded in the Clonburris area in the period 2005 – 2013. As can be seen from the map, there was one fatal accident near Clonburris, which occurred in the Grange Castle Business Park. A cluster of minor accidents was recorded to the south of the site on the New Nangor Road, Fonthill Road South and Lucan Newlands Road. Less dense clusters of minor accidents have also been recorded on the Balgaddy Road and Fonthill Road North.

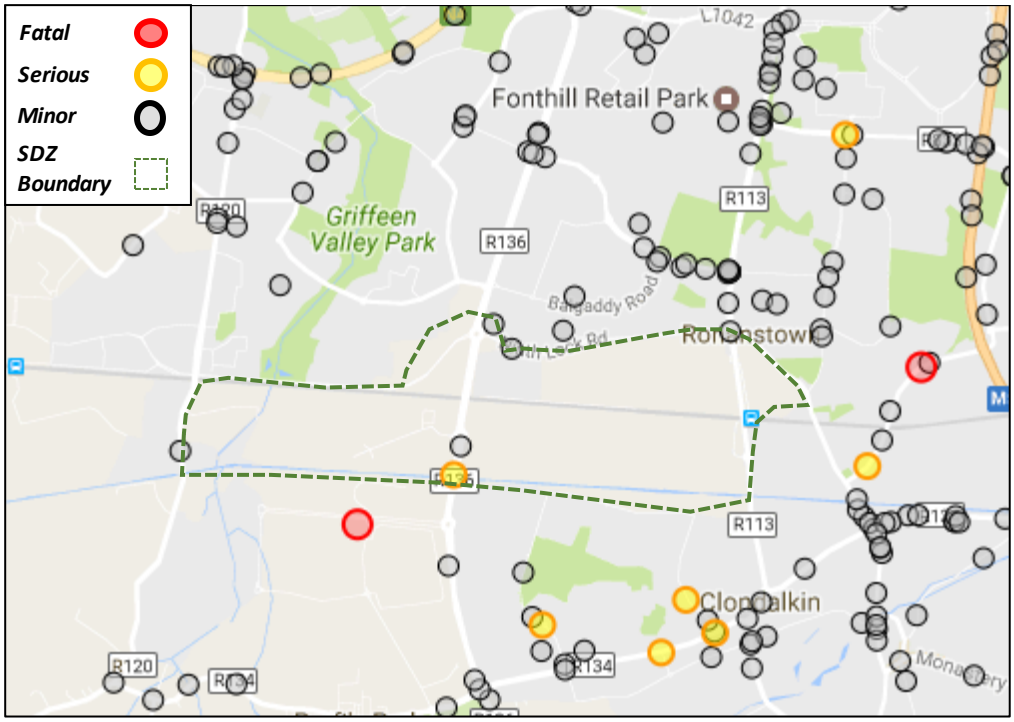


Figure 2.4 Map of Accident data for the period 2005 – 2013 (Source RSA Website)

2.5 Existing Transport Demand Overview

A review was carried out of existing transport behaviour in the established residential/employment areas surrounding Clonburris (i.e. Clondalkin, Adamstown, Grangecastle, Lucan), using 2012 travel data extracted from the ERM. This analysis gives an overview of the current trip distribution and mode share for the area.

Analysis of trip distribution shows that a high proportion (51%) of trips which originate in the South West City Sector remain within that sector (containing the Clonburris site) bounded by the N4, N7 and M50. Other areas attracting large numbers of trips include the West City sector (containing Park West) at 13% and the City Centre attracting 10% of trips. Tallaght and the North-West City (containing Blanchardstown and Ballycoolin Industrial Estate) sectors both attractor 7% of trips.

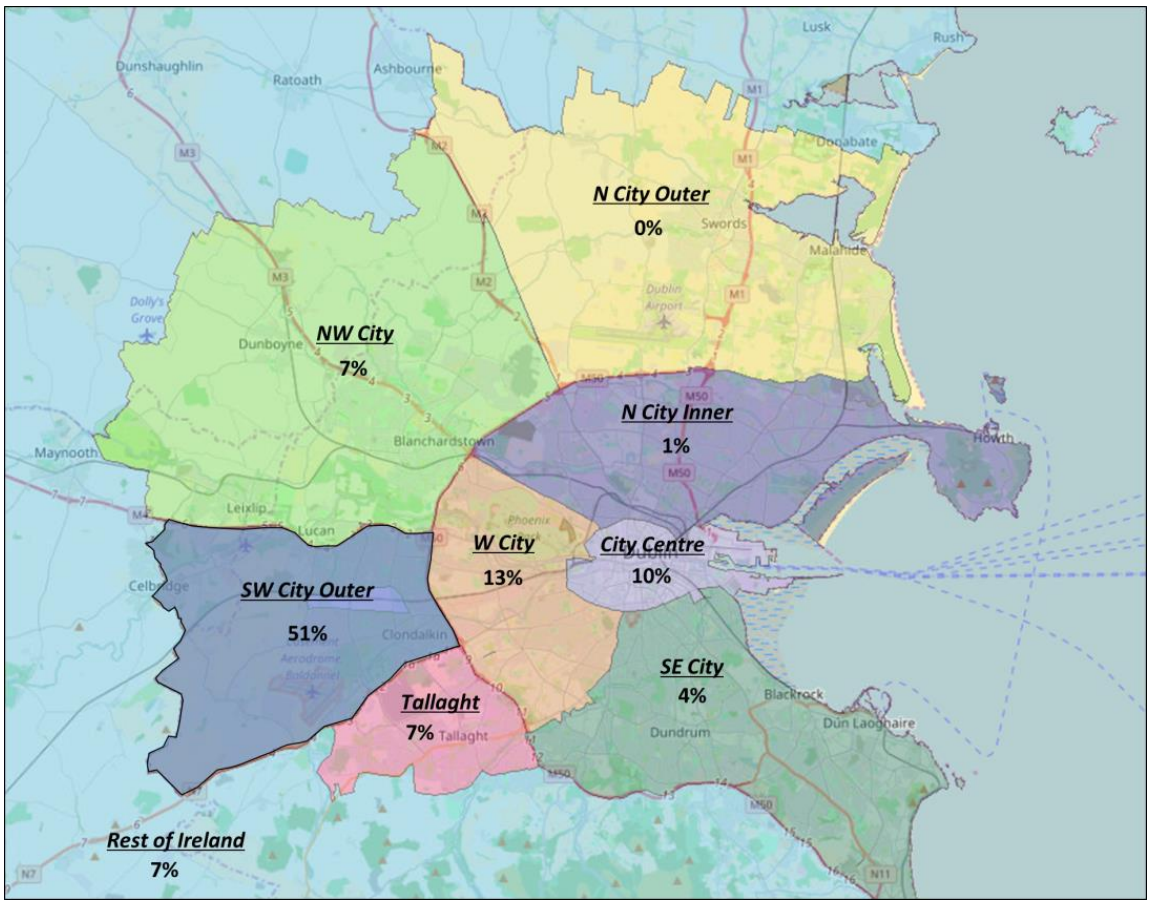


Figure 2.5 2012 Distribution of Trips from areas bordering Clonburris

Analysis of trip distribution shows a high level of local trips which could potentially be made by walking, cycling and public transport. It also shows that a high level of trips is made to the Park West area and the City Centre, which could be accommodated by Public transport, via the railway line or bus network. Trips to the North-West City, and Tallaght Sectors highlight the importance of the proposed orbital bus corridor that will link Tallaght to Blanchardstown via Clonburris.

Similar analysis using the ERM was undertaken on mode share, also using 2012 data extracted from the ERM for the existing Clonburris area. For the South West Sector (area containing Clonburris), the results show a high car and active mode share at 53% and 45% respectively and a relatively low public transport mode share at just 2%.

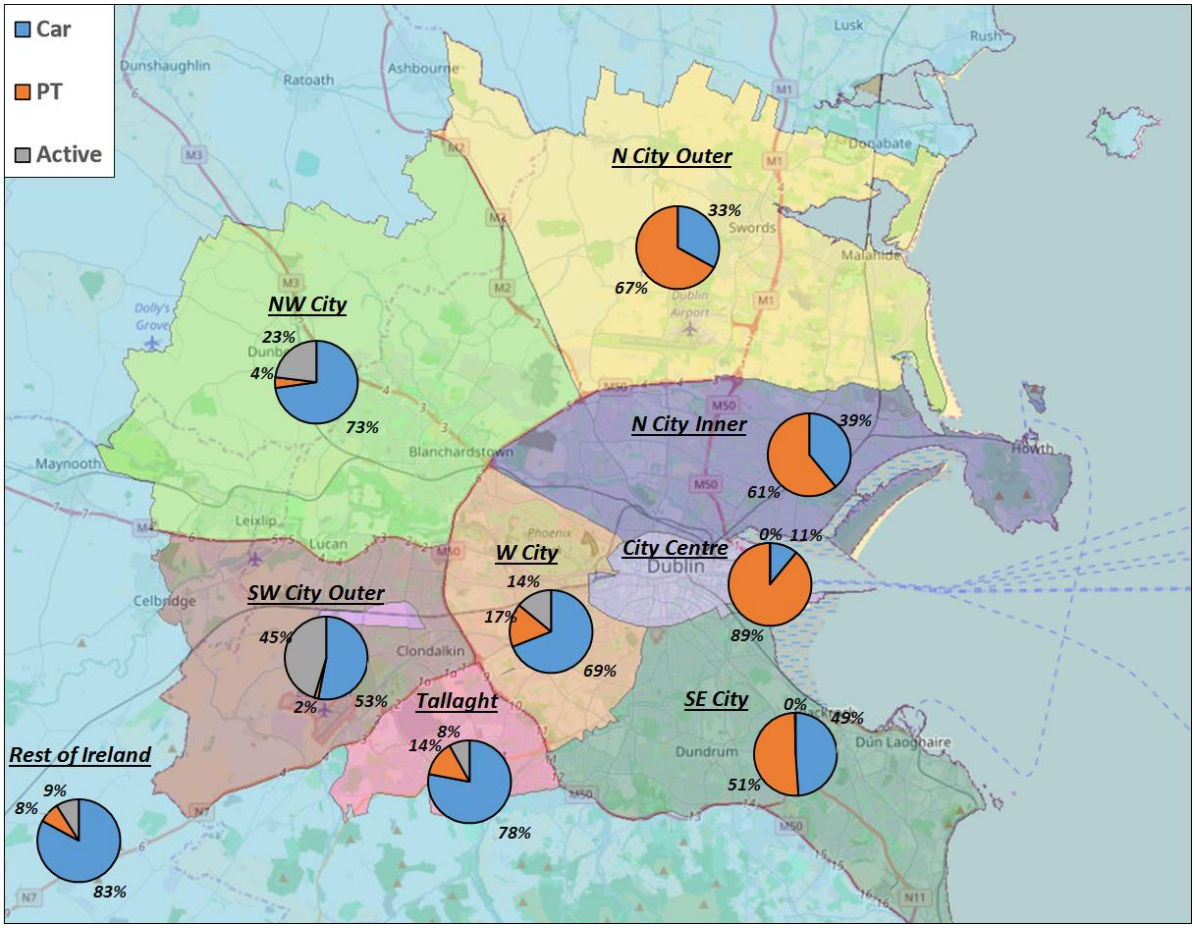


Figure 2.6 2012 Mode share of Trips from areas bordering Clonburris

Analysis of the other sectors of note, showed a high share of public transport use to the City Centre reflecting the number of cross city bus services and the rail line, but also the level of congestion and demand management measures (e.g. limited/paid parking) in the city centre. In the Tallaght and North West sectors (including Blanchardstown and Ballycoolin Industrial Estate) the analysis shows a high car mode share at 78% and 73% respectively. This is potentially due to a number of factors, including the short/medium distance of trips, availability of free (or low tariff) car parking and lower frequency/coverage public transport provision.

2.6 Summary

The previous sections provide an overview of the current transportation network serving the Clonburris development. In summary:

Cycle Facilities

- The Grand Canal Greenway, which links Adamstown to the City Centre, passes through the Clonburris SDZ Lands;
- The Fonthill Road North and Grange Castle Road, which bisect the Clonburris site, both include segregated cycle facilities offering links to Lucan Village, Liffey Valley and the N4.

Walk Facilities

- The Grand Canal Greenway bisects the south portion of Clonburris, offering a strategic cycle link and leisure walk link to Dublin City Centre and Adamstown;
- The Fonthill Road North, Grange Castle Road and R120 Lock Road have good quality segregated footpaths linking towards Adamstown, Lucan Village, Liffey Valley and Grange Castle.

PT Services

- The Clondalkin-Fonthill Train Station is served by Commuter services operating to Heuston Station;
- The opening of the Phoenix Park Tunnel offers connection to Drumcondra, Connolly, Tara Street, Pearse and Grand Canal Dock;
- A number of bus routes pass within close proximity of the Clonburris site, including a mix of radial, orbital and local services mainly operated by Dublin Bus;

Road Network

- The Clonburris site is bisected by the Grange Castle Rd (R136) and Fonthill Rd North, with the Lock Road (R120) running along its western boundary which provide connectivity to the N4, N7 and M50;

Base Transport Demand

- 51% of trips which originate within the area bounded by the N4, N7 and M50, remain within this sector in the AM Peak period;
- A large proportion of trips are travelling to sectors which are servable by sustainable modes i.e. walking, cycling and PT;
- High level of PT mode share for city centre trips in the AM Peak.

3 Current Transport Policy, Plans and Strategies

At the outset of the transport assessment, relevant national, regional and local policy, plans and guidelines were reviewed to identify policy objectives and aims relevant to Clonburris and to inform the development of the guiding design principles. This Chapter summarises the key findings of the review.

3.1 Chapter Structure

This chapter summarises the relevant national, regional and local policy and guidance overview and is structured as follow:

Section 3.2: National Policy and Strategies

- Building on Recovery: Infrastructure and Capital Investment 2016 – 2021(Department of Public Expenditure and Reform, 2015)
- Towards a National Planning Framework: A Roadmap for the Delivery of the National Planning Framework (DECLG, 2015)
- Investing in Our Transport Future: A Strategic Framework for Investment in Land Transport (Department of Transport, Tourism and Sport, 2015)
- Smarter Travel: A Sustainable Transport Future 2009 – 2020 (Department of Transport, 2009)
- National Cycle Policy Framework 2009 – 2020 (Department of Transport, 2009)
- National Cycle Manual (NTA, 2011)
- Healthy Ireland: A Framework for Improved Health and Wellbeing 2013 – 2025 (Department of Health, 2013)

Section 3.3: Regional and Local Policy

- Regional Planning Guidelines for the Greater Dublin Area 2010 - 2022 (Regional Planning Guidelines Office, 2010)
- Greater Dublin Area Transport Strategy 2016 - 2035 (NTA, 2016)
- Travel Smart Communities – Building a New Mobility Culture in South Dublin County (SDCC, 2013)
- Greater Dublin Area Cycle Network Plan (NTA, 2013)
- South Dublin County Council Development Plan 2016 - 2022 (South Dublin County Council, 2016)

Section 3.4: Guidance

- Sustainable Residential Development in Urban Areas (Department Environment, Heritage and Local Government, 2009)
- Urban Design Manual: A Best Practice Guide (Department of Environment, Heritage and Local Government, 2009)
- Permeability: A Best Practice Guide (NTA, 2015)
- Design Manual for Urban Roads and Streets (DTTAS & DECLG, 2013)
- Spatial Planning and National Roads: Guidelines for Planning Authorities (Department of Environment, Community and Local Government, 2012)
- Achieving Effective Workplace Travel Plans Guidance for Local Authorities (NTA, 2013)

Section 3.5: Current Committed Transport Schemes

3.2 National Policy and Strategies

This section outlines relevant national planning and transport policy including investment plans as well as strategic policies and plans.

3.2.1 Building on Recovery: Infrastructure and Capital Investment 2016 – 2021 (Department of Public Expenditure and Reform, 2015)

The *Infrastructure and Capital Investment 2016 – 2022 Plan* presents the Government's €42 billion framework for infrastructure investment in Ireland over the period 2016 to 2021. The transport investment is largely shaped by the recommendations set out in the *Strategic Framework for Investment in Land Transport* which aim to maintain and renew important strategic infrastructure, address urban congestion and improve the efficiency and safety of existing transport networks.

The plan identifies strategic infrastructure schemes to receive public funding including the following:

- The reopening of the Phoenix Park tunnel;
- Completion of the Dublin City Centre Re-signalling programme;
- The construction of a new Central Traffic Control centre for commuter and intercity rail;
- Further upgrading of Quality Bus Corridors;
- Metro North; and
- Completion of the Luas Cross City project.

In addition, the plan places a renewed focus on investing in key transport corridors including the upgrade of roads into Grange Castle Business Park (to the south of Clonburris SDZ) to provide access for industry.

3.2.2 Towards a National Planning Framework: A Roadmap for the Delivery of the National Planning Framework (DECLG, 2015)

This roadmap outlines a new National Planning Framework (NPF) which will supersede the National Spatial Strategy 2002 (NSS). Spanning 20 years, the NPF will provide a long-term central planning policy strategy which will guide future development and investment decisions and inform future regional strategies and county development plans. The NPF will adopt a strategic approach which will promote sustainable landuse and transport strategies in both urban and rural areas. The aim of this approach is to reduce emissions and address the necessity of adaptation to climate change protecting the environment and its amenities.

In February 2017 the government published 'Ireland 2040 Our Plan Issues and Choices', a paper setting out the key issues and challenges for the preparation of the NPF. As part of a comprehensive consultation process, the paper invited views on critical issues shaping the future of Ireland, such as spatial planning, infrastructure and global warming.

The feedback from the consultation will guide the development of the NPF, which is due for publication in late 2017.

3.2.3 Investing in Our Transport Future: A Strategic Framework for Investment in Land Transport (Department of Transport, Tourism and Sport, 2015)

This framework outlines high level priorities for future investment in land transport and key principles, reflective of those priorities, to which transport investment proposals will be required to adhere to. The framework also identifies funding consistent with maintaining, renewing and improving an appropriate transport network that can efficiently support the economic and social needs of the country as a key challenge. The alignment of land use and transport planning is highlighted to be a key priority to ensure effective integration between land use and transport planning.

3.2.4 Smarter Travel: A Sustainable Transport Future 2009 – 2020 (Department of Transport, 2009)

Smarter Travel is government policy which seeks to reduce the share of travel demand which is car dependant thus reducing reliance on fossils fuels and maximising the efficiency of the transport network. Its main objective is to promote a significant modal shift from private transport to public transport and sustainable transport modes over the period up to 2020. By 2020 the policy sets out a target of 55% mode share for walking, cycling and public transport which it aims to achieve through several actions themed around the following:

- Encouraging Smarter Travel;
- Delivering Alternative Ways of Travelling;
- Improving the Efficiency of Motorised Transport; and
- Ensuring Integrated Delivery of the Policy.

Aligning spatial planning and transport to address urban sprawl and urban-generated one-off housing in peri-urban areas is identified as a key area to encourage smarter travel. Specifically, the policy encourages good public transport connections with safe routes for walking and cycling to access and the use of local area plans and Strategic Development Zones (SDZs) within major urban areas as a way of improving the land use-transport integration.

3.2.5 National Cycle Policy Framework 2009 – 2020 (Department of Transport, 2009)

Underpinned by Smarter Travel, the National Cycle Policy Framework sets out to create a strong cycling culture in Ireland. The vision is that “all cities, towns, villages and rural areas will be bicycle friendly and cycling will be the preferred mode for shorter trips”. The framework aimed to develop cycling to the extent that 10% of all trips will be by bike by 2020. In terms of planning, the importance of permeable developments to allow shorter, more direct cycling and walking trips is highlighted.

3.2.6 National Cycle Manual (NTA, 2011)

The *National Cycle Manual* sets out current best practice and advice concerning cycling facilities, including provision at junctions, on routes as well as cycle parking facilities for different types of development. The guidance also highlights the requirement to maintain cycle facilities.

3.2.7 Healthy Ireland: A Framework for Improved Health and Wellbeing 2013 – 2025 (Department of Health, 2013)

Healthy Ireland sets out a Framework for action to improve the health and well-being of the population of Ireland. The framework recognizes the important role of transport and planning in terms of health and wellbeing with particular reference made to the Smarter Travel policy document.

3.3 Regional and Local Policy

This section outlines the regional and local planning and transport policies of relevance to the Clonburris SDZ.

3.3.1 Regional Planning Guidelines for the Greater Dublin Area 2010 - 2022 (Regional Planning Guidelines Office, 2010)

The Regional Planning Guidelines for the Greater Dublin Area (RPG) aim to direct the future growth of the Greater Dublin Area (GDA) over the medium to long term to achieve an economically vibrant, active and sustainable international Gateway Region with strong connectivity and communities living in accessible places well supported by local infrastructure.

The Physical infrastructure policy (Strategic Policy PIP1) of the RPG notes that future investment in transport in the GDA should:

- Provide efficient, effective and sustainable means of moving people and goods for all purposes which minimises the environmental impact and the social and economic cost to users;
- Allow for the development of a land use strategy that supports sustainable development; and
- Support growth and efficiencies in economic activity for both the GDA and the State.

It should be noted that the Greater Dublin Area is now part of the larger Eastern and Midlands Regional Assembly (EMRA). The EMRA includes the four counties of Dublin (Fingal, Dublin City, South Dublin, Dún Laoghaire-Rathdown), the 'Eastern' counties of Louth, Kildare, Meath, Wicklow and the Midlands counties of Longford, Laois, Offaly, and Westmeath. The current RPG's for the GDA will be replaced by the 'Regional Spatial & Economic Strategy' for the EMRA. The purpose of these strategies is described as follows: -

"*The objective of regional spatial and economic strategies shall be to support the implementation of the National Spatial Strategy and the economic policies and objectives of the Government by providing a long-term strategic planning and economic framework for the development of the region for which the strategies are prepared which shall be consistent with the National Spatial Strategy and the economic policies or objectives of the Government*." (S.23 Planning and Development Act 2000).

3.3.2 Greater Dublin Area Transport Strategy 2016 - 2035 (NTA, 2016)

The *Greater Dublin Area Transport Strategy* (The Strategy) establishes the framework for the transport provision necessary to achieve the land use vision set out in the RPGs. The purpose of the Strategy is to contribute to the objectives set out in the RPG by providing for the efficient, effective and sustainable movement of people and goods. The strategy outlines the transport infrastructure required across all modes by 2035 within the GDA to achieve this objective.

The strategy recognises the N4 corridor is a high capacity link which contains two of the region's most important future residential and commercial development areas at Clonburris and Adamstown. Clonburris is near two of the core orbital and radial city bus routes provided for in the Strategy as shown in Figure 3.1.

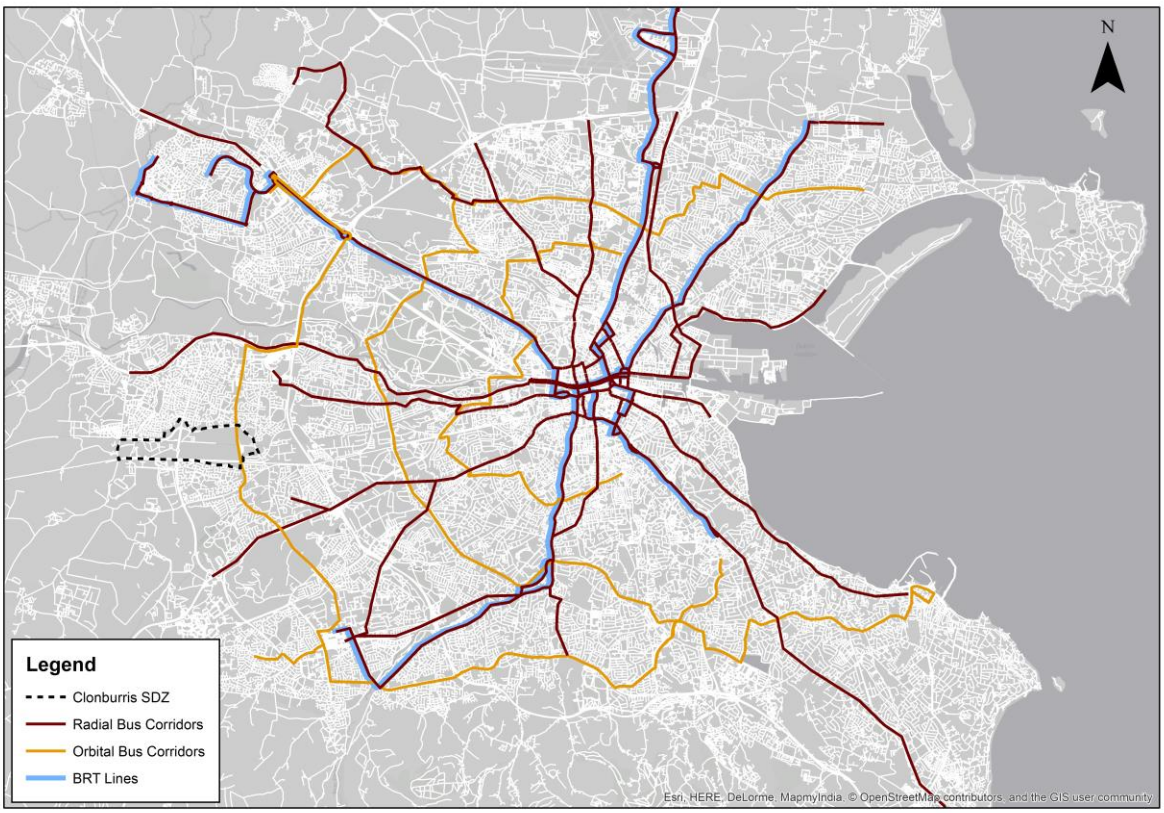


Figure 3.1 2035 Core Bus Network

In addition to the above core bus network the strategy outlines future improvements to the rail network including the opening of the Phoenix Park Tunnel, facilitating travel from the Kildare line through Connolly station, and the expansion of the Dart along the Kildare line as far as Hazelhatch. The future core rail network is shown in Figure 3.2 along with the strategic positioning of the Clonburris SDZ on the Kildare Line.

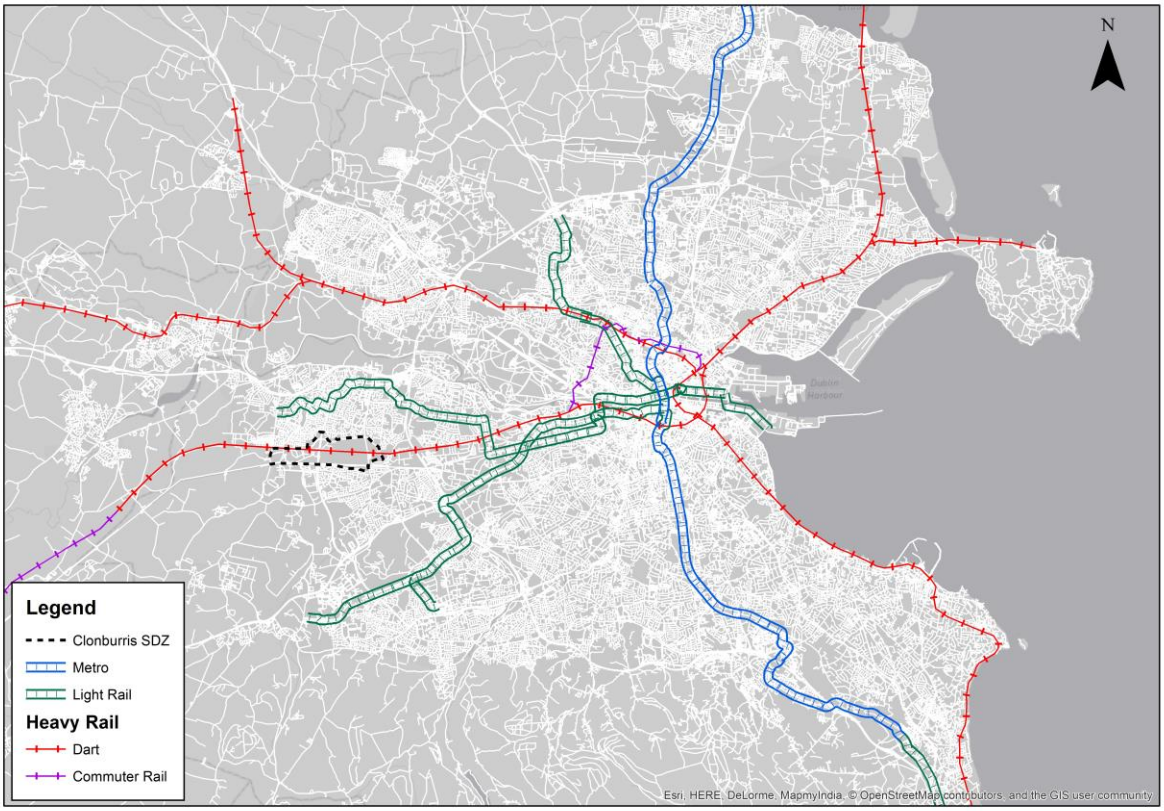


Figure 3.2 2035 Core Rail Network

The strategy recognises the importance of land use and transport planning in terms of influencing the how and why people travel and advocates the use of the following local land use planning principles:

- Planning at the local level should promote walking, cycling and public transport by maximising high density residential development near local amenities & schools and public transport services;
- New development areas should be fully permeable for walking and cycling and the retrospective implementation of walking and cycling facilities should be undertaken where practical; and
- Where possible, development should provide for filtered permeability to prioritise walking, cycling, public transport and discourage private car through trips; and
- Maximum parking standards should be set for all new developments, with the level of parking provision applied being based on the level of public transport accessibility.

The Strategy also supports the implementation of the cycle network proposed in the Greater Dublin Area Cycle Network Plan (GDACNP) in line with the principles set out in the National Cycle Manual. The GDACNP is discussed further in section 3.3.4.

3.3.3 Dublin Area Bus Network Redesign Choices Report (NTA, 2017)

In June 2017, the National Transport Authority published a Choices Report as part of the redesign of the Dublin Metropolitan Bus network. The Choices Report details the current patterns and trends across the network and presents an analysis of a number of issues affecting the current network. The

report coincided with a questionnaire and a period of public consultation seeking to gauge the public opinions on the current network and how they felt about potential strategies for improving the network going forward. Following the examination of the current issues, the Report presents strategies and options that could be implemented to alleviate some of these issues. The next step in the Bus Network Redesign project will be the publication of a detailed Network Review Report in late 2017.Greater Dublin Area Cycle Network Plan (NTA, 2013)

The *Greater Dublin Area Cycle Network Plan* sets out a 10-year strategy to expand the urban cycle network from 500km in length to 2,840km. The overarching ambition is for the cycle network in 2021 to carry as many commuters as currently take the bus representing a three-fold increase.

The network will consist of primary routes (serving the highest demand), secondary and feeder routes (forecast to have lower demand) as well as Greenway routes (through parks, along waterways etc.) as shown in Figure 3.3. The routes will comprise a mix of cycle tracks and lanes, cycleways and infrastructure-free cycle routes in low traffic environments. This includes secondary and Greenway routes within the Clonburris area as well as primary routes in the wider vicinity.

To complement the investment in the cycle network, the cycle network plan also provides for:

- Sufficient on-street and off street public cycle parking at key urban destinations such as bus and rail stations, schools and large workplaces;
- The expansion of the bike share scheme in Dublin City (Dublin Bikes) and the introduction of similar schemes across the GDA; and
- Implementation a comprehensive cycle route signage programme in conjunction with the development of the cycle network.

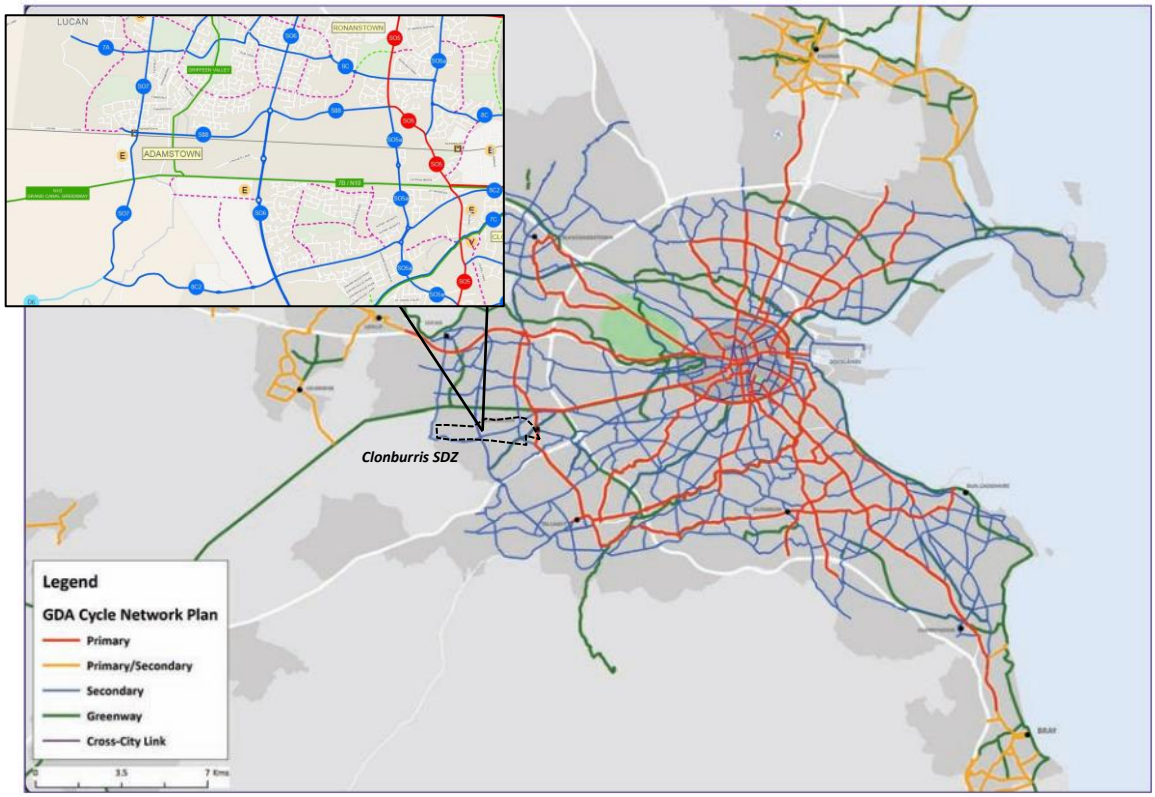


Figure 3.3 GDA Cycle Network Plan

3.3.4 Planning and Development of Large-Scale, Rail Focused Residential Areas in Dublin (NTA, 2013)

The purpose of this study was to assess the future delivery of rail-based large and medium scale residential development areas in Dublin. The study, which does not have a statutory basis, had the following key challenges: -

- To examine current issues arising in relation to large and medium scale residential development areas due to the noted pressure to deliver development at densities lower than those set out in the planning frameworks, largely driven by perceived market trends and funding issues; and
- To identify potential approaches that provide viable solutions to addressing these issues

The approach to conducting the study broadly comprised 4 stages which were: -

1. Assessment of the current situation and trends in Dublin in relation to largescale residential development delivery;
2. Key principles of high density schemes including case studies analysis;
3. Delivery & design considerations to achieving residential development in the current economic circumstances; and
4. Proof of Concept Analysis applied to one area.

The following are the key conclusions of the study: -

- Government policy in relation to sustainable residential density guidelines remains applicable;
- Government / public sector intervention is required to 'show confidence' in the delivery of strategic residential locations; and
- Flexibility in minimum densities should be considered subject to agreements being put in place to meet overall density targets.

3.3.5 South Dublin County Council Development Plan 2016 - 2022 (South Dublin County Council, 2016)

The South Dublin County Council Development Plan 2016 - 2022 covers the administrative area of South Dublin County. The policies and objectives of the Development Plan are underpinned by the following overarching considerations:

- Quality of Life, with an emphasis on key economic, environmental, social and cultural indicators;
- Prosperity, with an emphasis on contributing to a competitive business environment that supports economic development, job creation and prosperity for all;
- Sustainability, with an emphasis on making better use of key resources such as land, buildings, water, energy, waste and transport infrastructure;
- Health and Wellbeing, by facilitating active and healthy lifestyles with increased opportunities for walking, cycling and active sport and recreation;
- Social Inclusion, with an emphasis on creating socially and physically inclusive neighbourhoods, taking account of the recommendations of The National Disability Strategy Implementation Plan 2013-2015 and Inclusion Ireland's Changing Places campaign; and

- Climate Change Adaptation, with increased emphasis on reducing climate change at a local level through settlement and travel patterns, energy use and protection of green infrastructure.

Clonburris is identified as being within the 'Metropolitan Consolidation Town' of Clondalkin in the South Dublin Settlement Hierarchy which is described as an active urban area with strong transport links. The development plan states that the area should be developed at a relatively large scale to ensure that future development supports key public transport corridors which connect to the City and other large development areas. In accordance with the Guidance Note on Core Strategies (DECLG, 2009) the land capacity at Clonburris within the lifespan of the County Development Plan (2016 – 2022) was limited to 8,000 units as significant housing completions were considered to be unlikely to arise before 2017.

The Development Plan outlines a number of policies specific to Clonburris, including:

- Core Strategy (CS) Policy 2 Metropolitan Consolidation Towns – it is the policy of the Council to support the sustainable long term growth of Metropolitan Consolidation Towns through consolidation and urban expansion.
  - CS2 Objective 1: To promote and facilitate urban expansion on designated Strategic Development Zone sites at Adamstown and Clonburris, in tandem with the delivery of high capacity public transport services and subject to an approved Planning Scheme.

- Core Strategy (CS) Policy 7 Strategic Development Zones – it is the policy of the Council to continue to implement the approved Planning Schemes for Adamstown SDZ and to secure the implementation of an approved Planning Scheme for the Clonburris SDZ.

- Retail (R) Policy 6 District Centres – it is the policy of the Council to maintain and enhance the retailing function of District Centres (Level 3 & Level 4).
  - R6 Objective 3: To support and facilitate the development of new District Centres of an appropriate urban scale at Adamstown and Clonburris in accordance with approved Planning Schemes which should provide a sustainable retail mix including department stores and shopping centres that facilitates walking, cycling and use of public transport and reduces car journeys outside the SDZ for many retail needs.

The Development Plan notes the Council's support for strategic transport proposal in the area, including:

- Support for the delivery of the Luas to Lucan (linking Lucan, Liffey Valley and the City Centre);
- Support for the delivery of the Core Orbital Bus Network with a high frequency service linking Tallaght, Clondalkin, Liffey Valley and Blanchardstown; and
- Park and Ride expansion, including sites at Lucan and Clondalkin.

The Council will facilitate the above proposals through reservation of lands along the merging preferred routes and investigating availability of lands for proposed car parks.

3.3.6 Travel Smart Communities – Building a New Mobility Culture in South Dublin County (SDCC, 2013)

Travel Smart Communities Phase 1 focused on the communities in Lucan and Clondalkin with a community based travel behaviour programme in place during 2011/2012. This involved a range of

measures including Personalised Travel Planning, School Travel Planning, community events, engagement with Community Groups and Community Challenges to encourage more travel by sustainable modes for all types of trip. 14,000 households were targeted and there was direct engagement with 4,000 households and wider more general influence of 10,000 households. A review of the impact illustrated that that over a short time-frame a package of 'soft' measures can begin to achieve positive changes in travel behaviour.

3.4 Guidance

This section sets out key guidance documents of relevance to the development of Clonburris.

3.4.1 Traffic and Transport Assessment Guidelines (TII, 2014)

The *Traffic and Transport Assessment Guidelines* are aimed at promoting an integrated approach to transport provision and land use. The guidelines ensure development proposals must place an emphasis on the efficient use of investment in transport infrastructure, reduce travel demand and promote road safety.

The guidelines are intended to provide guidance for developers and their agents, planning authorities and Transport Infrastructure Ireland (TII, formally the National Roads Authority (NRA)) to assist in:

- Scoping and conducting studies for traffic and transport assessment in relation to future development and also development areas particularly areas in proximity to national roads;
- Defining thresholds at which studies are recommended as part of a planning proposal to minimise the impact of future proposals on the national roads network; and
- Contributing the provision of sustainable forms of development and better-informed planning decisions.

3.4.2 Sustainable Residential Development in Urban Areas (Department Environment, Heritage and Local Government, 2009)

The *Sustainable Residential Development in Urban Areas* guidelines set out the key planning principles which should be reflected in development plans and local area plans. It also guides the preparation and assessment of planning applications for residential development in urban areas. The guidelines promote mixed use developments that prioritise walking, cycling and public transport and minimise the need to use cars thus lessening the environmental impacts of travel.

The guidelines note that Strategic Development Zones (SDZ) provide an integrated planning framework and as such are highly suitable for creating sustainable neighbourhoods. As such, SDZ planning schemes are required to contain policies and objectives that underpin the creation of sustainable residential development.

3.4.3 Urban Design Manual: A Best Practice Guide (Department of Environment, Heritage and Local Government, 2009)

Urban Design Manual: A Best Practice Guide provides best practice advice on implementing the policies contained in guidelines for planning authorities on sustainable residential development in

urban areas. The Manual is intended to be read in conjunction with *Guidelines for Planning Authorities on Sustainable Residential Development in Urban Areas* (2009).

3.4.4 Permeability: A Best Practice Guide (NTA, 2015)

Permeability: A Best Practice Guide sets out guidance on how best to facilitate demand for walking and cycling in existing built-up areas. The scope extends to linkages for people to walk and cycle from their homes to shops, schools, local services, places of work and public transport stops and stations.

Permeability is defined as the extent to which an urban area permits the movement of people by walking or cycling. Characteristics of a permeable environment are highlighted as follows:

- Interconnected pedestrian and cycle street network;
- Absence of high walls and fences segregating housing areas and local/district centres;
- Absence of cul-de-sacs for pedestrians and cyclists; and
- Secure, well-lit, overlooked pedestrian and cycle links between housing areas and between housing and local/district centres.

3.4.5 Design Manual for Urban Roads and Streets (DTTAS & DECLG, 2013)

The *Design Manual for Urban Roads and Streets* (DMURS) promotes an integrated and collaborative street design approach within urban areas (i.e. cities, towns and villages) focusing on the receiving environment and balancing the needs of all users.

To achieve a more place-based/integrated approach to road and street design, the following four core principles are promoted within the manual:

- **Connected Networks** - To support the creation of integrated street networks which promote higher levels of permeability and legibility for all users, and more sustainable forms of transport;
- **Multi-Functional Streets** - The promotion of multi-functional, place-based streets that balance the needs of all users within a self-regulating environment;
- **Pedestrian Focus -** The quality of the street is measured by the quality of the pedestrian environment; and
- **Multi-disciplinary Approach** - Greater communication and co-operation between design professionals through the promotion of a plan-led, multidisciplinary approach to design.

The principles, approaches and standards set out in this Manual apply to the design of all urban roads and streets (with a speed limit of 60 km/h or less), except: (a) Motorways. (b) In exceptional circumstances, certain urban roads and streets with the written consent of Sanctioning Authorities.

3.4.6 Spatial Planning and National Roads: Guidelines for Planning Authorities (Department of Environment, Community and Local Government, 2012)

Spatial Planning and National Roads: Guidelines for Planning Authorities set out planning policy considerations relating to development affecting national primary and secondary roads, including motorways and associated junctions, outside the 50-60 kmph speed limit zones for cities, towns and villages.

The guidelines aim to facilitate a well-informed, integrated and consistent approach that affords maximum support for the goal of achieving and maintaining a safe and efficient network of national

roads in the broader context of sustainable development strategies, thereby facilitating continued economic growth and development throughout the country.

3.4.7 Achieving Effective Workplace Travel Plans Guidance for Local Authorities (NTA, 2013)

Achieving Effective Workplace Travel Plans Guidance for Local Authorities aims to assist local authorities in fully integrating the principles and practice of Workplace Travel Plans into both the development plan process and the development management process. The guidance advocates either a Workplace Travel Plan 'Statement' or a Standard Workplace Travel Plan be assessed on a case by case basis with consideration taken of the location, scale of development, nature of the uses proposed and anticipated impact on the surrounding area, in terms of trip volume and congestion.

The Guidelines offer threshold guidance for when a Work Place Travel Plan Statement or a Standard Work Place Travel Plan should be completed. Figure 3.4 below outlines the recommended thresholds for the production of a travel plan.

Land Use	Workplace Travel Plan Statement	Indicative no. of jobs	Standard Workplace Travel Plan	Indicative no. of jobs
Offices/Financial	> 500m2	25-100	> 2,000m2	>100
Retail/Shops	> 600m2	25-100	> 2,500m2	>100
Industrial	> 2,500m2	25-100	> 6,000m2	>100
Leisure		25-100		>100 or greater than >100,000 visitors annually
Hospitals/Medical Centres		25-100		>100 or greater than >100,000 visitors annually
Warehousing	> 2,500m2	25-100	>10,000m2	>100

Figure 3.4 Guidance for Workplace Travel Plan thresholds

3.5 Current Committed Transport Schemes

3.5.1 Strategic Transport Improvements

For detail on the committed strategic transport schemes please see section 3.3.2 above, and section 6.3 later in this report.

3.5.2 Committed Local Transport Schemes

Proposed of the proposed improvements to local networks internally within the SDCC administrative area that will be of benefit to the development of the Clonburris SDZ are as follows:

County Development Plan Road Programme

- Clonburris/Kishogue Street Network; Various streets within the Clonburris SDZ/LAP lands. This project will deliver a strategic street network providing access throughout the Clonburris LAP/SDZ lands
- Lock Road/R120 Upgrade of existing road from Adamstown to Ballybane. This project will provide improved access to the Grange Castle employment area.

Active Mode Improvement

- Grand Canal Greenway Green Route Extension. This project will extend the existing route to Hazelhatch.
- Griffeen Valley Greenway Green Route Extension. This project will extend the existing route from Griffeen Valley Park to Lucan.
- S05 Primary Route Tallaght to Liffey Valley via Belgard, Clondalkin and Clonburris.

3.6 Summary

The previous sections provide an overview of the relevant national, regional and local policy and guidance informing the development of the Clonburris SDZ Planning Scheme. In summary, the following documents were reviewed:

National Policy and Strategies

- Building on Recovery: Infrastructure and Capital Investment 2016 – 2021(Department of Public Expenditure and Reform, 2015);
- Towards a National Planning Framework: A Roadmap for the Delivery of the National Planning Framework (DECLG, 2015);
- Investing in Our Transport Future: A Strategic Framework for Investment in Land Transport (Department of Transport, Tourism and Sport, 2015);
- Smarter Travel: A Sustainable Transport Future 2009 – 2020 (Department of Transport, 2009);
- National Cycle Policy Framework 2009 – 2020 (Department of Transport, 2009);
- National Cycle Manual (NTA, 2011); and
- Healthy Ireland: A Framework for Improved Health and Wellbeing 2013 – 2025 (Department of Health, 2013).

Regional and Local Policy

- South Dublin County Council Development Plan 2016 - 2022 (South Dublin County Council, 2016);
- Regional Planning Guidelines for the Greater Dublin Area 2010 - 2022 (Regional Planning Guidelines Office, 2010);
- Greater Dublin Area Transport Strategy 2016 - 2035 (NTA, 2016);
- Travel Smart Communities – Building a New Mobility Culture in South Dublin County (SDCC, 2013); and
- Greater Dublin Area Cycle Network Plan (NTA, 2013).

Guidance

- Sustainable Residential Development in Urban Areas (Department Environment, Heritage and Local Government, 2009);
- Urban Design Manual: A Best Practice Guide (Department of Environment, Heritage and Local Government, 2009);
- Permeability: A Best Practice Guide (NTA, 2015);
- Design Manual for Urban Roads and Streets (DTTAS & DECLG, 2013);
- Spatial Planning and National Roads: Guidelines for Planning Authorities (Department of Environment, Community and Local Government, 2012); and
- Achieving Effective Workplace Travel Plans Guidance for Local Authorities (NTA, 2013)

4 Clonburris Development

4.1 Description of Development

The overall concept for the site is a predominantly new residential district with mixed use elements over the existing 280-hectare greenfield site, which incorporates two proposed new urban centres at Clondalkin-Fonthill and Kishoge railway stations together with community facilities (health centres, primary and secondary schools), retail and commercial premises, and leisure facilities.

The indicative breakdown of development to be accommodated on the SDZ lands is outlined in the table below:

Table 4.1 Clonburris Development Quantum-

Breakdown of Development	
Net Development Area (ha.)	151
Target dwelling Nos.	8,437
Population range - Low	19,831
Population range - High	21,483
Target Commercial GFA (sqm) - Retail	21,520
Target Commercial GFA (sqm) – Non Retail	31,115
Community GFA (sqm)	7,300

Source: Clonburris Draft SDZ Planning Scheme (2017)

To promote travel by sustainable modes, one of the key design principles of the Clonburris SDZ Planning Scheme is to link development densities to the level of public transport provision.

The proposed breakdown of development in the Clonburris SDZ Planning Scheme, which have informed the assumptions that underpin this Transport Assessment, is shown in Figure 4.1.

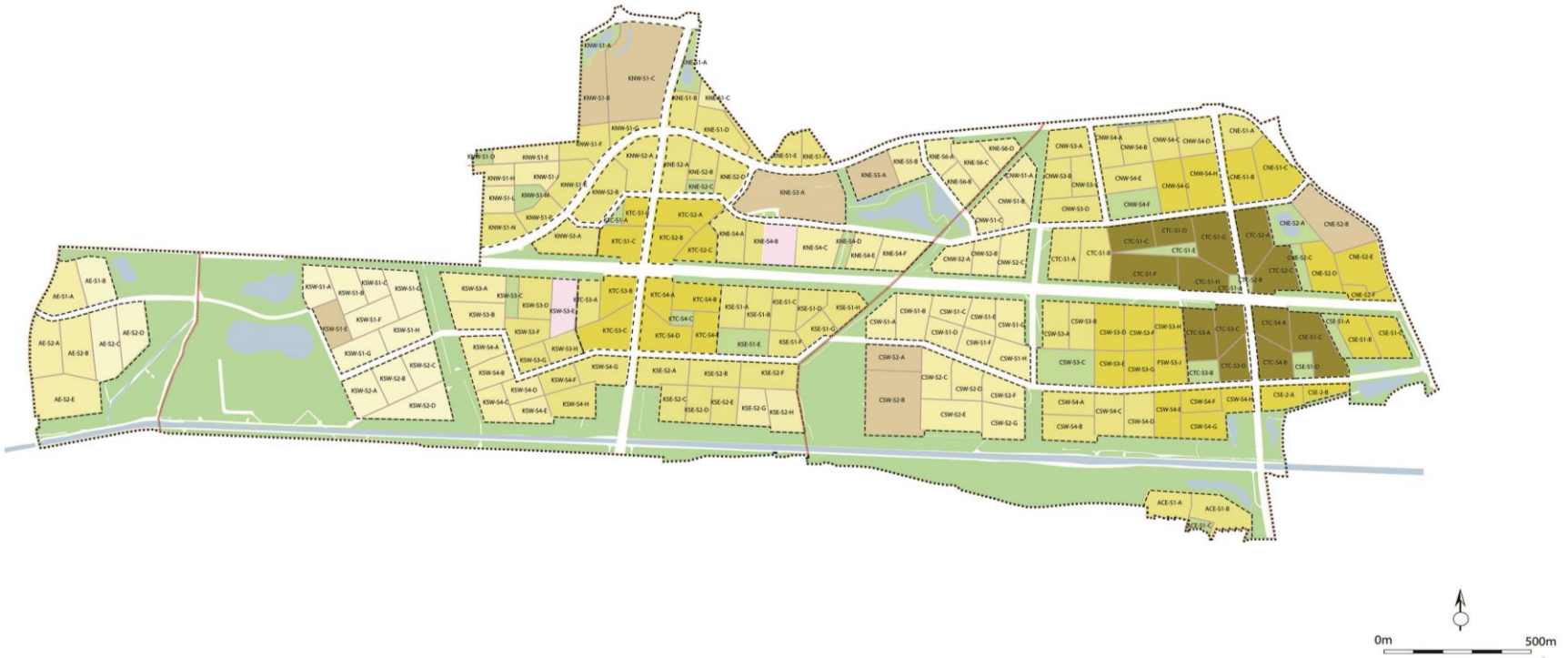


Figure 4.1 Block Layout and Densities

The block layout and target density map shows a concentration of higher density residential developments (70-80 units per hectare) around the Clondalkin-Fonthill and Kishoge railway stations, with relatively lower density levels in appropriate areas (45-50 units per hectare). The Fonthill urban centre will accommodate the highest densities and is centred on the existing Clondalkin-Fonthill train station and the proposed core orbital bus corridor.

The Kishoge urban centre will be centred on the Kishoge train station and on the proposed core orbital bus corridor, again affording the opportunity for higher densities. The two urban centres will be the primary focus of the planned retail and non-retail commercial floor space. However, it is also planned to have smaller community facilities that will contain small local based retail commercial spaces. The layout also accommodates a significant amount of open space, easily accessible to all residential areas (see Figure 4.1 above).

The planned retail component of the development will encompass approximately 21,520m² of retail gross floor area, most of which will be situated within the two-designated town centres near the Clondalkin-Fonthill train station and the Kishoge train station. This will ensure good accessibility to the retail centres by all transport modes.

The design of the blocks and the overall urban structure provides for a mix of residential and employment, retail, community, leisure and recreational sites. The block design will naturally allow people to link trip purposes and reduce the number of individual trips that would otherwise be required. The accommodation of employment, retail, community, leisure and recreational uses internally within Clonburris will also allow for the localisation of a lot of trip purposes. This will reduce the need for longer distance trips on the network, which may otherwise be undertaken by private car.

4.1.1 Education

Clonburris SDZ will accommodate four post-primary (secondary) schools one of which, Kishoge Community College, is already in place off Thomas Omer Way. The SDZ lands will also accommodate four primary schools one of which, Lucan East Educate Together School is already in place, off Griffeen Avenue (see Figure 4.1).

4.1.2 Movement

The proposed street hierarchy layout of Clonburris assumed for the Transport Assessment is shown in Figure 4.2. An internal network has been developed with the aim of maximising travel by walking, cycling and public transport. The approach to designing the internal road network has been designed as a permeable network, which can be safely and easily navigated by pedestrians. There has also been a focus on providing strong walking and cycling connections to adjoining areas. The internal street network is hierarchical in nature with arterial streets and link streets transitioning to local streets and home zones, which gives priority through design to active mode users. Further information on the walking and cycling network is provided in section 7.3 of this report.

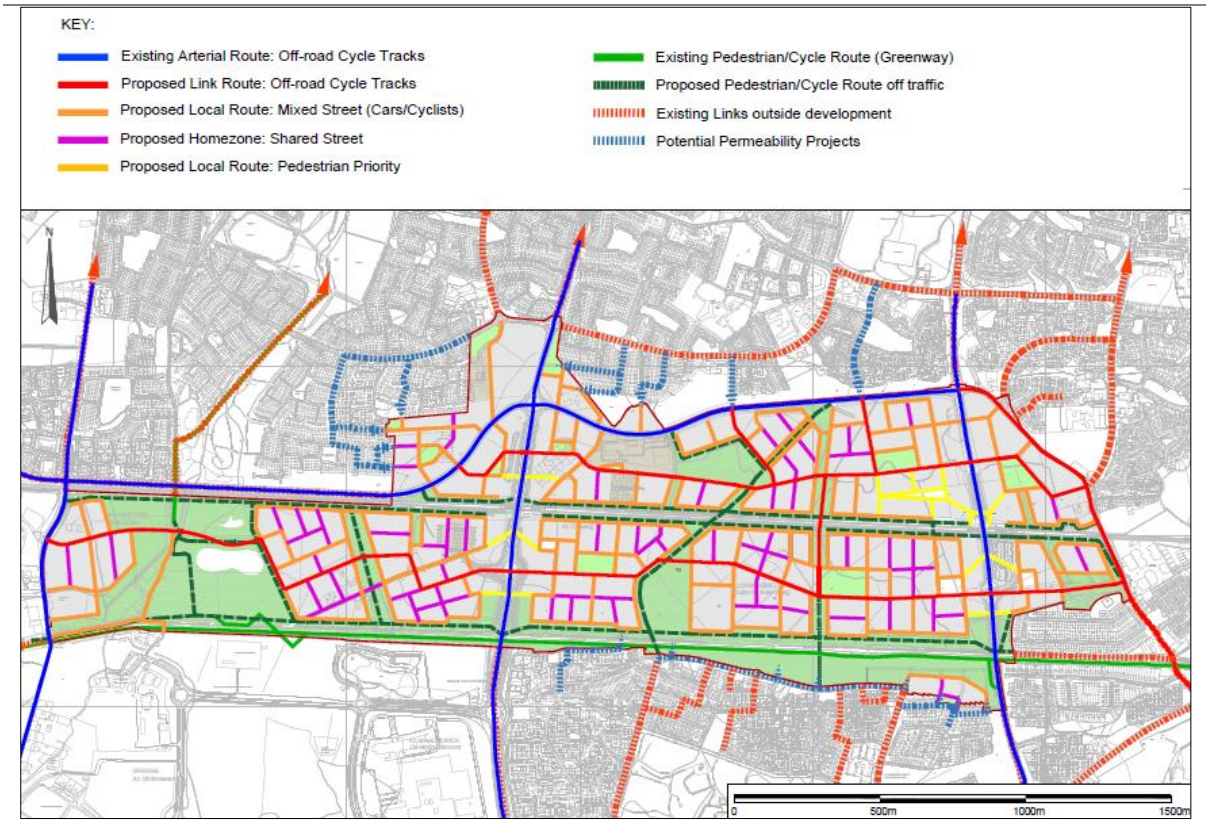


Figure 4.2 Internal Movement Strategy and Street Hierarchy

4.2 Consideration of Future Land Use within Surrounding Areas

An analysis of the NTA' s planning data sheets was undertaken to establish the estimated projected future growth in land uses within the SDCC area. The planning data sheets are formulated by the NTA using CSO population projections and in consultation with the relevant planning authorities to produce a robust set of growth projections for each county in the state. The data sheets outline growth in population, employment and pupils. Where appropriate, the forecast land use information within the NTA's planning data sheets was updated to reflect committed developments and SDCC growth forecasts.

This exercise was undertaken for the horizon year of 2035 as it coincides with the possible completion date for the full build out of Clonburris and with the planned delivery date for the transport infrastructure and policy measures contained in the NTA's Greater Dublin Area Transport Strategy: 2016-2035.

Analysis of the data sheets show static growth figures for the Lucan area from 2012 to 2035 as this is a mature area with limited sites for infill development or expansion. Adamstown shows a considerable increase in its population from 3,700 people in 2012 to 23,500 people in 2035. This is due to the build out of the lands included in the Adamstown SDZ. There are also notable increases in employment of 1,700 jobs and an increase of 2,000 school pupils.

Key employment areas in the surrounding area are also forecast to see significant growth in employment. Liffey Valley Shopping Centre is forecast to increase by 2,100 jobs. Grange Castle Business Park is also forecast for a significant increase in job numbers increasing by 3,200. To the South, Tallaght is also forecast to grow with increases of 5,000 jobs, 6,000 in population and 1,900 pupils.

These growth assumptions have been used to inform this Transport Assessment. For further detail please see figure 4.3 below.

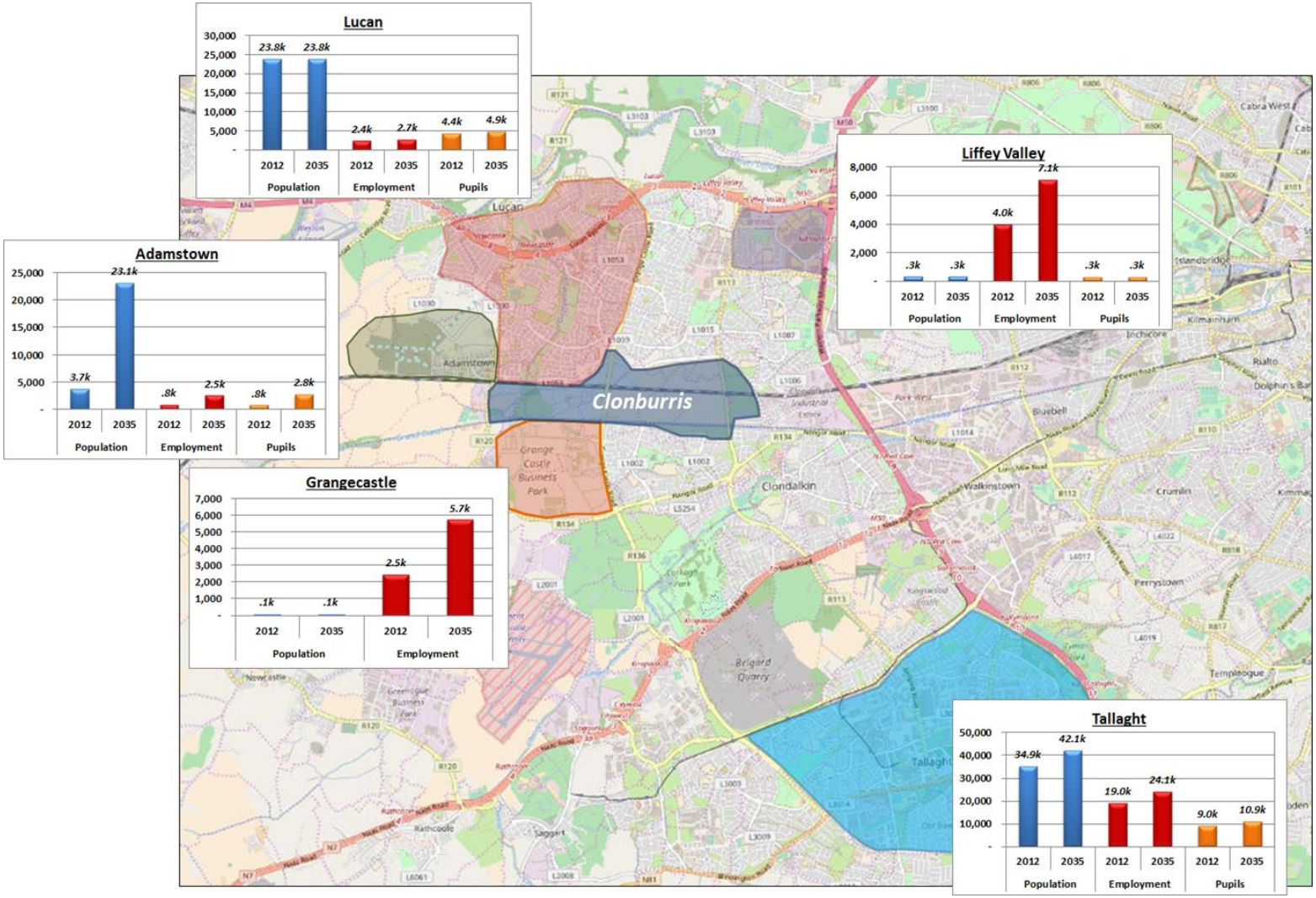


Figure 4.3 Clonburris SDZ Planning Data – Surrounding Area

4.3 Summary

The previous sections provide an overview of the planned development within the Clonburris SDZ. In summary:

Clonburris Development

- It is proposed that Clonburris will be a residential led, mixed use development, with approximately:
    - 8,400 dwellings supporting a population of 21,000 people;
    - Four primary and four post-primary schools;
    - 53,000 sqm of commercial floor space; and
    - 7,300 sqm of community space
- Urban centres are proposed at the train stations at Kishoge and Fonthill, which will support higher residential densities, and be the focal point for the majority of planned commercial floor space;
- The mixed land use design facilitates the localisation of a lot of trip purposes reducing the need for longer distance trips on the network and supporting the use of sustainable modes (walking and cycling);
- The internal Clonburris road network has been designed to be permeable, which can be safely and easily navigated by pedestrians and cyclists;
- Forecast 2035 planning data suggests significant levels of growth in areas adjacent to the proposed Clonburris SDZ, such as Adamstown, Grange Castle Business Park and Liffey Valley Shopping Centre.

5 Assessment Methodology

5.1 Overview

The following chapter provides an overview of the methodology utilised to assess the performance of the proposed development at Clonburris, and to develop the overarching transport strategy. The key transport objectives which form our design principles and proposed mitigations are described, along with the overall transport assessment framework.

5.2 Transport Objectives

The transport objectives for the Clonburris SDZ have been developed based on a review of national and local transport policy, and are outlined in further detail in Section 1.2 of this report. Some of the key objectives include:

- Plan for an integrated transport network with appropriate provision for all modes;
- Provide for a high level of permeability for pedestrians and cyclists;
- Improve accessibility by walking and cycling to public transport services and local amenities and employment areas;
- Seek to achieve extensive public transport usage; and
- Deliver Priority for public transport.

These objectives form the basis for the Clonburris Transport Strategy and its assessment methodology. They also inform the design principles used in the Clonburris internal network and junction design, including proposed walk, cycle and public transport infrastructure and service upgrades.

5.3 Assessment Methodology

Figure 5.1 illustrates the Assessment Methodology used to develop the Clonburris Transport Strategy, including the following key steps:

- Demand for Travel;
- Transport Measures;
- Measuring Effectiveness; and
- Mitigation.

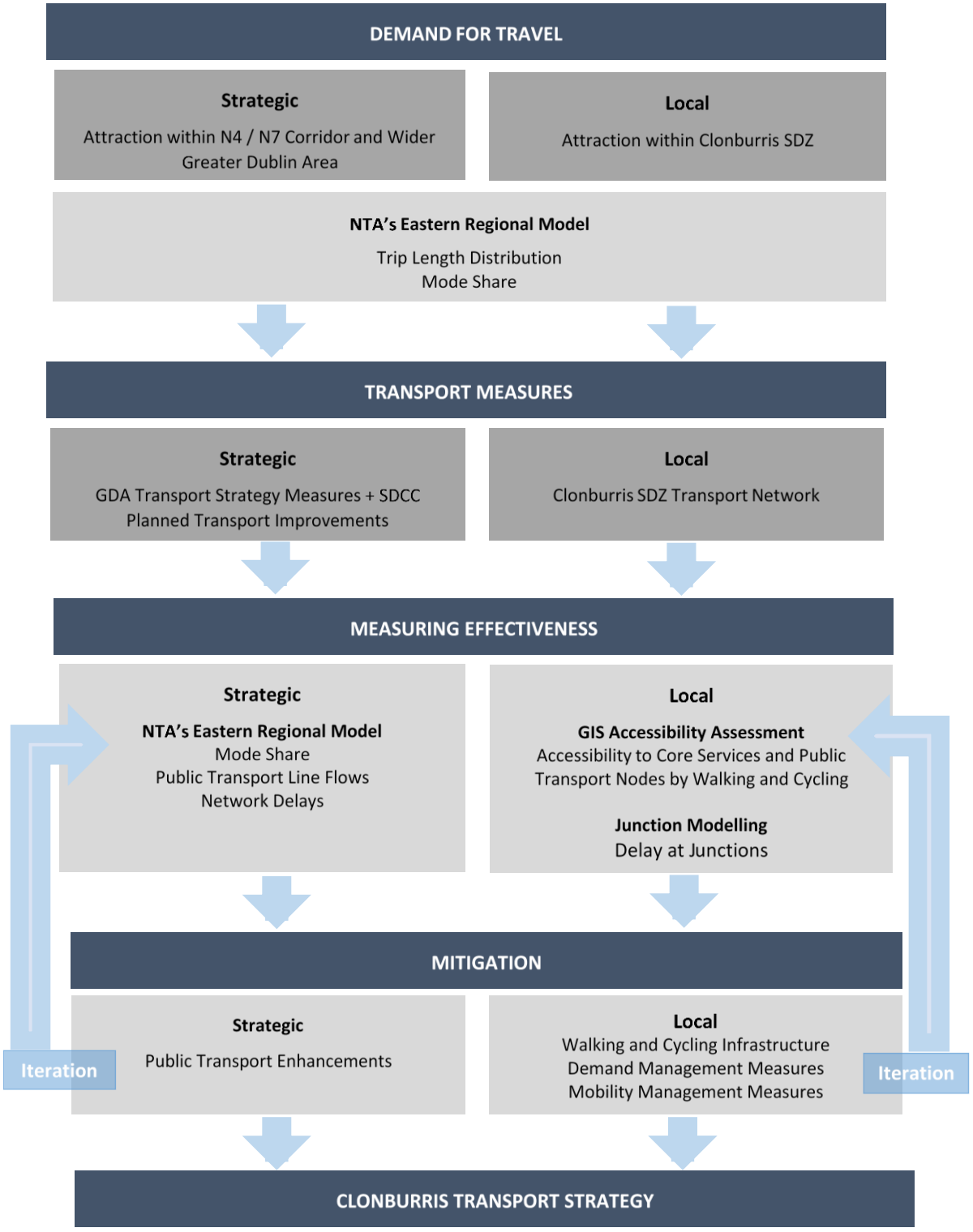


Figure 5.1 Clonburris SDZ Assessment Methodology

5.3.1 Step 1: Demand for Travel

The first step undertaken was to identify the quantum of transport demand generated by the proposed development at Clonburris. As noted previously in Chapter 4, it is envisaged that the Clonburris SDZ will support a population of approximately 21,000 people with approximately 2,400 jobs and 6,000 school places[1].

In order to generate transport demand, this demographic information was fed into the NTA's National Demand Forecasting Model (NDFM). The NDFM takes input land-use attributes such as population, number of employees etc., and estimates the total quantity of daily travel demand produced by and attracted to each of the 18,488 Census Small Areas.

The NTA's East Regional Model (ERM) was then utilised to process this daily travel demand, disaggregate it to specific time periods and undertake mode and destination choice (further information on the ERM is provided in Chapter 6 later in this report).

Strategic

At a wider strategic level, outputs from the ERM were analysed to evaluate the future travel behaviour of people living in Clonburris, including aspects such as:

- **Mode Share:** Identifying the proportion of people travelling to/from Clonburris using each of the available modes of transport (i.e. car, PT, Walking and Cycling);
- **Trip Distribution:** Identifying the key destinations of travel for people living in Clonburris and the forecast distribution of trips across the wider transport network; and
- **Trip Length Distribution:** Investigating the forecast distance of trips by mode for residents in Clonburris

The results of this analysis are outlined in Chapter 6 of this report and provide an overview of the forecast pattern of travel demand from Clonburris, which in turn, gives an insight into the potential impact on the wider transport network.

Local

The transport demand generated by the ERM is at a regional model zonal level. However, in the area surrounding the proposed Clonburris development, the ERM zones were too coarse in nature to provide an accurate representation of traffic entering the transport network.

Therefore, to provide a more accurate representation of localised demand, the ERM zones were disaggregated using proposed levels of residential, employment and education development from the Clonburris urban design. Figure 5.2, overleaf, illustrates the ERM Zones covering the Clonburris development along with the disaggregated zone system generated.

This disaggregated zone system facilitated improved representation of local demand on the transport network which was of vital importance when assessing the localised impact of the Clonburris development.

[1] Demographic figures based on the Clonburris SDZ Urban Design Framework

Figure 5.2 Local Clonburris Disaggregated Zone System

5.3.2 Step 2: Transport Measures

Once the forecast demand for travel had been ascertained, analysis was undertaken to identify proposed future year transport schemes which could support this demand at both a strategic and local level.

Strategic

At a strategic level, future transport schemes were identified from local and national policy documents, and studies carried out in the local area. The NTA's *'Greater Dublin Area Transport Strategy 2016 – 2035'* (described earlier in Chapter 4) outlines a framework for transport provision required to meet future travel demand and proposes several public transport, highway and walking and cycling measures for the GDA up to 2035.

In addition to the 2035 GDA Strategy, SDCC have identified a number of road infrastructure improvements for the N4/N7 corridor based on their 2016 - 2022 County Development Plan along with studies such as the *'N4/N7 Corridor Study' (TII, 2017)*, the *'Draft Lucan Access Study'* and the *'Adamstown SDZ Planning Scheme'*.

Local

The local Clonburris SDZ internal transport network was adopted from the Masterplan and Concept Drawings developed by Loci Urban Design Architecture & Planning. Figure 5.3 illustrates the proposed internal Clonburris road network including potential connections to the existing road infrastructure.

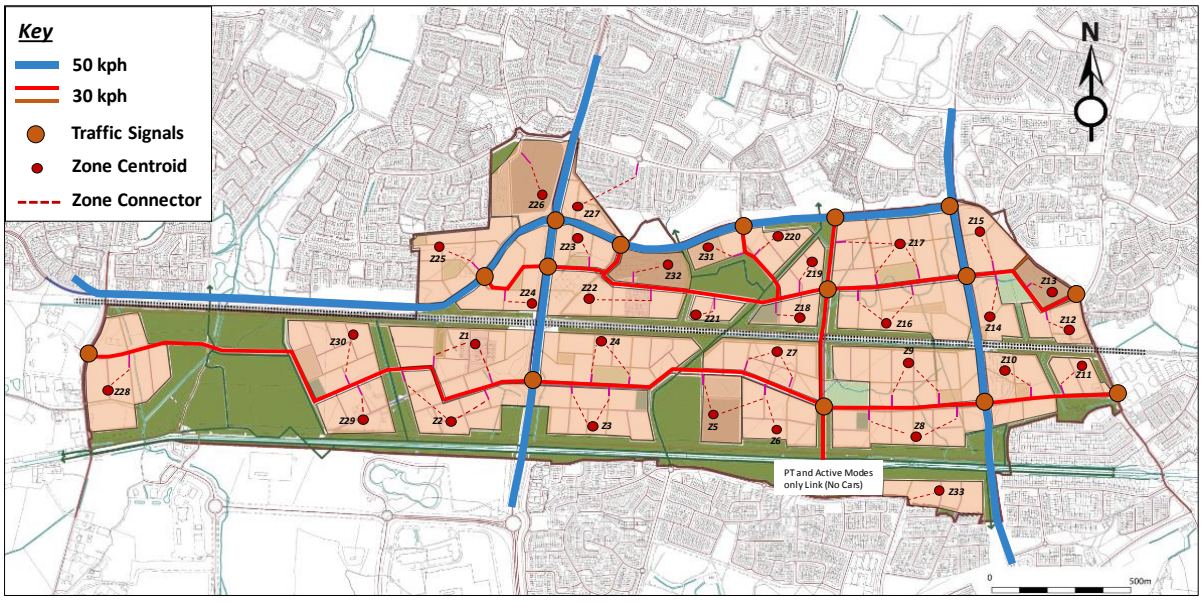


Figure 5.3 Clonburris Internal Road Network

Both the proposed strategic and local transport measures identified were included in forecast year test scenarios to identify their effectiveness in supporting the planned development at Clonburris. Further details of the specific measures tested are provided in Section 6.2 of this report.

5.3.3 Step 3: Measuring Effectiveness

In order to identify the effectiveness of the proposed transport measures in supporting the Clonburris development, analysis was carried out on the results of test scenarios at both a strategic and local level.

Strategic

The ERM was utilised to assess the wider strategic impact of the Clonburris development in the forecast years (2026 & 2035) focussing on the following key outputs:

- Mode Share;
- Public Transport Line Flows; and
- Junction performance and network delay in the wider N4/N7/M50 Corridor

Local

At a local level, analysis was carried out on the accessibility for residents living in Clonburris to nearby bus and rail services, along with schools and commercial centres. This was undertaken using Geographic Information Systems (GIS) to classify each of the Clonburris zones based on their level of accessibility, and therefore, their potential to use sustainable modes of travel rather than the private car.

Detailed junction modelling was undertaken for the new proposed junctions within the Clonburris SDZ, along with key identified junctions which are likely to be heavily impacted by the development. The disaggregated demand was used to feed traffic flows into specific junction modelling software (LINSIG and ARCADY) to identify junction performance and potential forecast delays.

5.3.4 Step 4: Mitigation

Based on the results from Step 3, a number of mitigation measures were identified to improve the performance of the Clonburris SDZ in terms of promoting the use of sustainable modes of travel and reducing the negative impacts on the wider traffic network. These mitigation measures included the following:

- Public transport enhancements;
- Walking and cycling infrastructure upgrades;
- Junction design improvements; and
- Mobility and demand management strategies.

The mitigation measures identified here were fed back into Step3 for assessment in an iterative process to develop the final Clonburris Transport Strategy.

The following chapters of this report detail the various elements which comprise the Clonburris Transport Strategy. For clarity and ease of reporting, results are only presented for the finalised strategy measures.

5.3.5 Summary

The previous sections have outlined the methodology used to assess the performance of the proposed development at Clonburris, and to generate the overarching transport strategy. In summary:

The Assessment Methodology includes four key steps;

Step 1: Demand for Travel

- The NTA's National Demand Forecasting Model (NDFM) was used to generate forecast demand based on future planning data;
- The NTA's East Regional Model (ERM) was then used to process this daily travel demand, disaggregate it to specific time periods and undertake mode and destination choice; and
- To provide a more accurate representation of localised demand, the ERM zones were disaggregated within the Clonburris SDZ using proposed levels of residential, employment and education development.

Step 2: Transport Measures

- At a strategic level, future transport schemes were identified from local and national policy documents, and studies carried out in the local area; and
- The local Clonburris SDZ internal transport network was adopted from the Masterplan and Concept Drawings.

Step 3: Measuring Effectiveness

- The ERM was used to assess the wider strategic impact of the Clonburris development in the forecast years; and
- An accessibility assessment and detailed junction modelling was carried out to identify the localised impact of the Clonburris SDZ.

Step 4: Mitigation

- Based on the results from Step 3, a number of mitigation measures were identified to improve the performance of the Clonburris SDZ in terms of promoting the use of sustainable modes of travel and reducing the negative impacts on the wider traffic network; and
- The mitigation measures identified were fed back into Step 3 for assessment in an iterative process to develop the final Clonburris Transport Strategy.

6 Strategic Assessment

6.1 Introduction

The following chapter presents the results of the wider strategic analysis carried out using the NTA's ERM to determine the future travel patterns and behaviour of residents within Clonburris. Firstly, a brief overview is provided of the ERM including its main functionality. The scenarios tested within the ERM are then described, before the final results are presented.

6.2 Overview of the ERM

6.2.1 Introduction

The ERM is a strategic multi-modal transport model representing travel by all the primary surface modes – including, walking and cycling (active modes), and travel by car, bus, rail, tram, light goods and heavy goods vehicles.

It covers the area to the east of Ireland including the counties of Dublin, Wicklow, Kildare, Meath, Louth, Wexford, Carlow, Laois, Offaly, Westmeath, Longford, Cavan and Monaghan as illustrated in Figure 6.1 below.

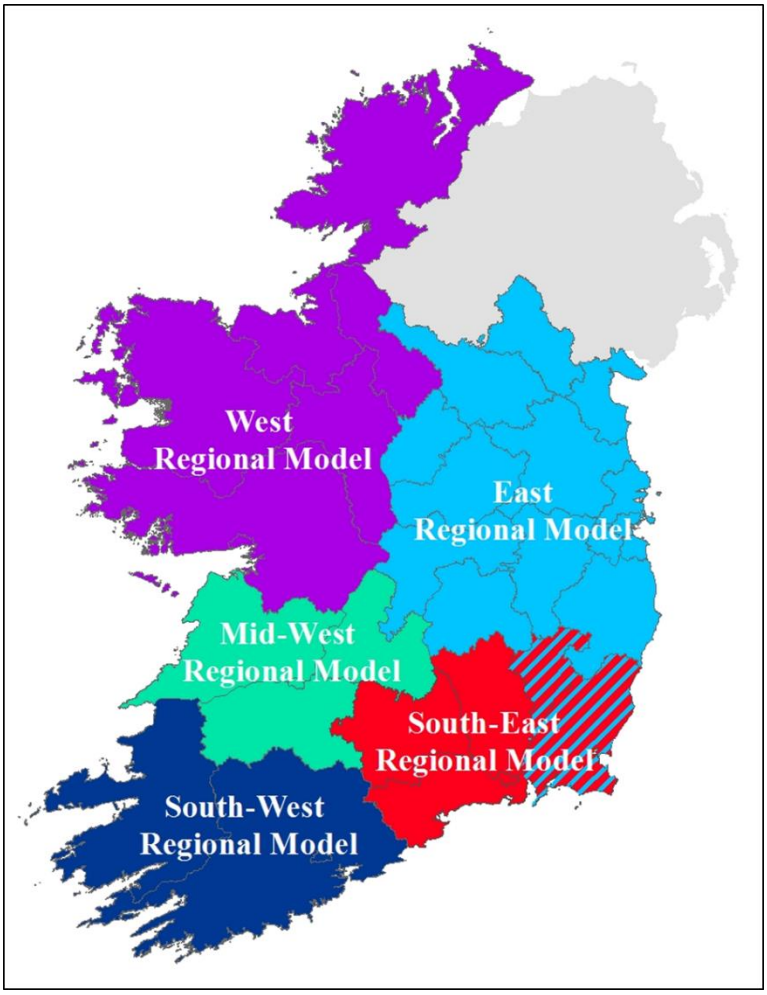


Figure 6.1 NTA Regional Model Areas

6.2.2 General Model Structure

The ERM sits within the overall NTA Regional Modelling System which comprises of the following three main components, namely:

- The National Demand Forecasting Model (NDFM);
- 5 Regional Models (including the ERM); and
- A suite of Appraisal Modules.

The NDFM takes input land-use attributes such as population, number of employees etc., and estimates the total quantity of daily travel demand produced by and attracted to each of the 18,488 Census Small Areas.

The ERM is then comprised of the following key elements:

- **Trip End Integration:** The Trip End Integration module converts the 24 hour trip ends output by the NDFM into the appropriate zone system and time period disaggregation for use in the Full Demand Model (FDM);

- **The Full Demand Model (FDM):** The FDM processes travel demand, carries out mode and destination choice, and outputs origin-destination travel matrices to the assignment models. The FDM and assignment models run iteratively until an equilibrium between travel demand and the cost of travel is achieved; and

- **Assignment Models:** The Road, Public Transport, and Active Modes assignment models receive the trip matrices produced by the FDM and assign them in their respective transport networks to determine route choice and the generalised cost for each origin and destination pair.

Destination and mode choice within the ERM have been calibrated using two main sources: Census 2011 Place of Work, School or College - Census of Anonymised Records (2011 POWSCAR), and the Irish National Household Travel Survey (2012 NHTS). Therefore, the ERM is an ideal tool to estimate the forecast travel behaviour for Clonburris.[2]

6.3 Scenarios tested

The ERM generally considers two main types of input for testing, namely:

- **Demand:** This represents changes to demographic information such as population, employment, education etc.; and
- **Supply:** This represents changes to the assignment networks e.g. new road infrastructure, new public transport services, new walk and cycle infrastructure etc.

6.3.1 Demand

Three proposed demand scenarios were identified for testing based on alternative forecast years, and differing views on the location of proposed development within South Dublin, namely:

- **2035 Clonburris:** Includes a high density mixed use development at Clonburris SDZ;

[2] At the time of writing, 2016 POWSCAR data is not yet available. As such, this transport assessment makes use of the best readily available data sources. The ERM model is based on the 2011 Census data. Whilst it is a planned task for the NTA to update its model in line with 2016 Census data, this is unlikely to be complete until sometime into 2018.

- **2035 Redistribution of Clonburris Growth:** Instead of using the SDZ approach, development planned for Clonburris is distributed to other zoned lands within South Dublin and North Kildare; and
- **2026 Clonburris**: Interim year demand scenario assuming straight line growth.

2035 Clonburris

As noted in Section 6.2 above, the NDFM takes demographic information and generates 24 hour travel demand for use in the ERM. 2035 Forecast population, employment and education data for the entire GDA was received from the NTA's planning department. This data was utilised to assess the 2035 GDA Strategy and incorporates planning information from various local authorities within the GDA area.

This 2035 demographic information was then altered to represent the full proposed build out of the Clonburris SDZ as detailed in Chapter 4 previously. Utilising this 2035 GDA planning data represented a prudent approach as it facilitated the analysis of the wider transport impacts of Clonburris while also taking cognisance of other planned development in the local area, such as:

- Adamstown;
- Liffey Valley Shopping Centre; and
- Grange Castle Business Park.

2035 Redistribution of Clonburris Growth

For this demand scenario, the planned development at Clonburris was re-distributed to other zoned lands within South Dublin and North Kildare. This represented a reasonable alternative scenario whereby the proposed SDZ at Clonburris is not developed. Figure 6.2 and 6.3 below illustrates the key Census Small Areas which experience an increase in population and employment due to the redistribution of Clonburris planning data.

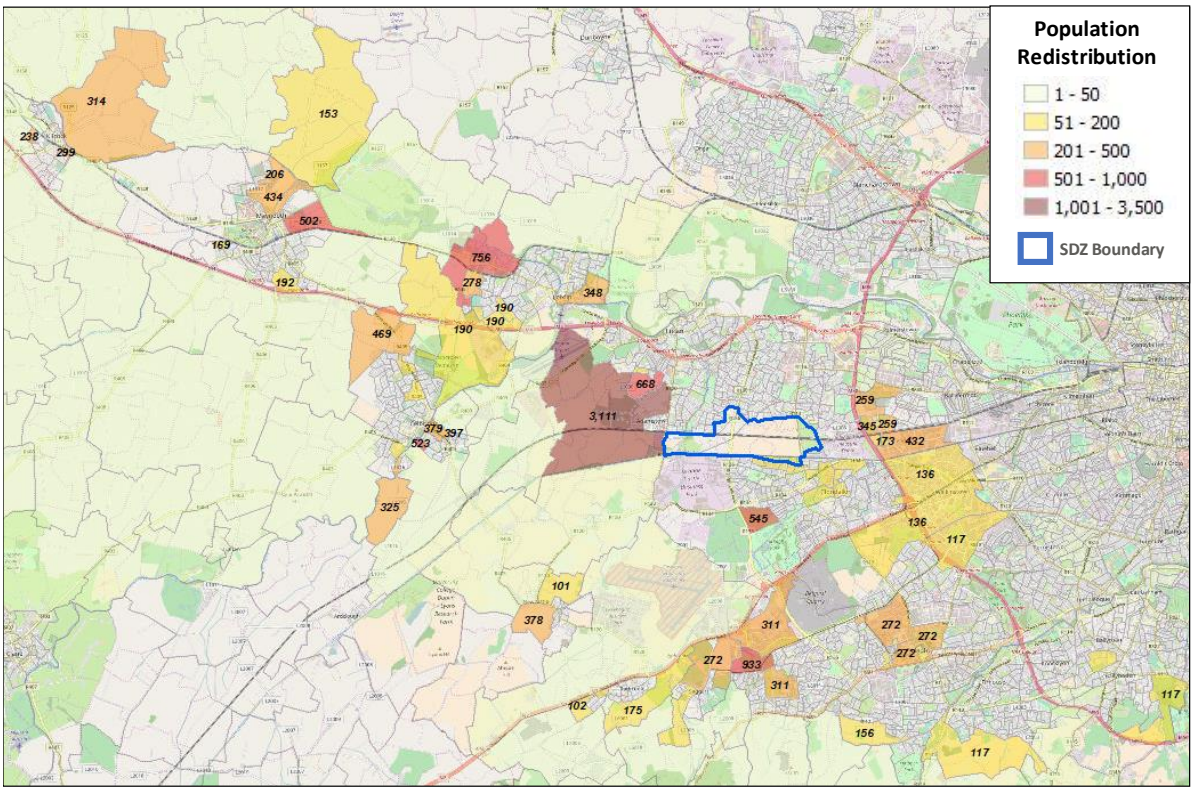


Figure 6.2 Clonburris Population Re-Distribution

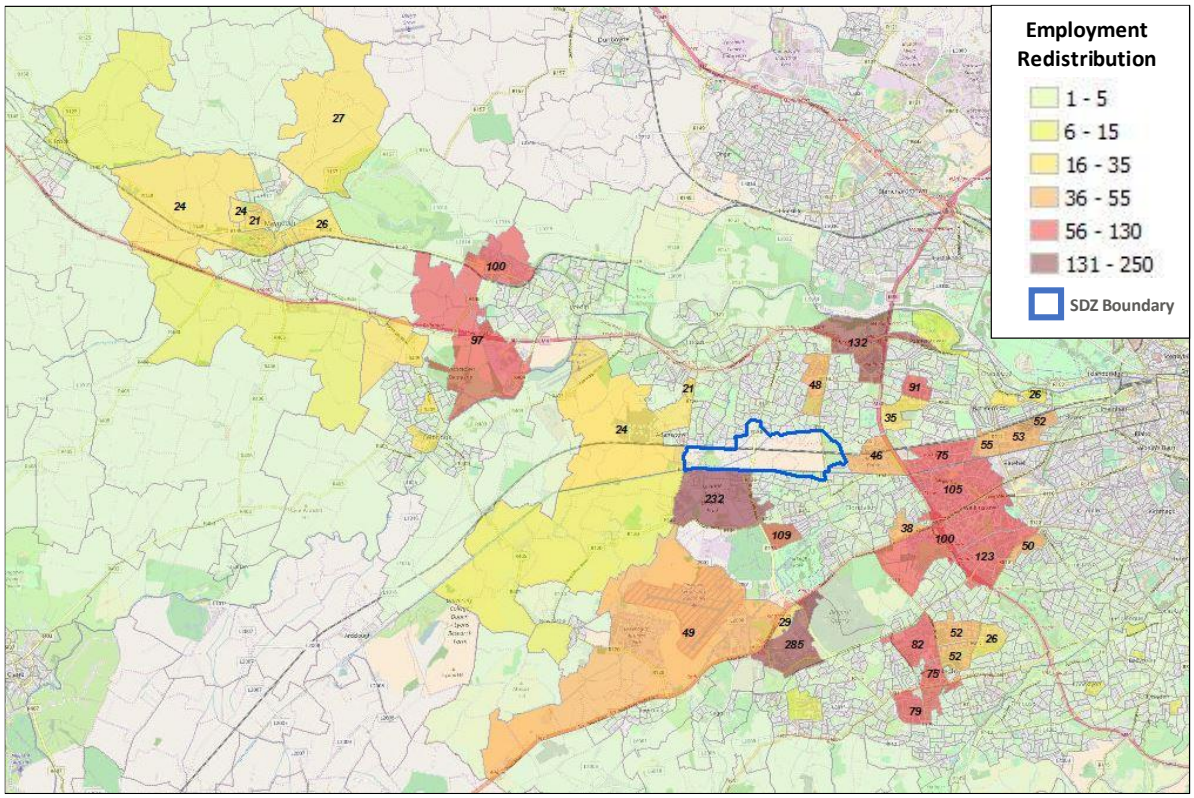


Figure 6.3 Clonburris Employment Re-Distribution

2026 Clonburris

2026 Forecast population, employment and education data for the entire GDA was generated through straight line interpolation between the base year, 2011, and the 2035 forecast year. In this scenario, it is assumed that development in the GDA, including the Clonburris SDZ, occurs in a uniform manner. This is deemed a prudent approach in the context that the Phasing Strategy contained in the Clonburris SDZ Planning Scheme is based on the delivery of housing as opposed to timelines. As noted previously, this planning data is fed into the NDFM to generate 2026 demand for use in the ERM.

6.3.2 Supply - 2035

The 2035 assignment network includes road, public transport, walking and cycling infrastructure proposals outlined in policy, along with studies carried out in the local area.

Road

Road infrastructure measures for testing were taken from two main sources, namely:

- The NTA's *'Greater Dublin Area Transport Strategy 2016 – 2035'*; and
- Planned SDCC Road schemes outlined in the County Development Plan 2016 - 2022

2035 GDA Strategy

A number of National, Regional and Local road network improvements are outlined in the 2035 GDA Strategy, all of which were included for testing. The following measures were of specific interest to the proposed Clonburris development:

- Development of an orbital link road connecting the N4 and N7; and
- Demand Management measures including multi-point tolling along the M50 and tolling on the N4.

SDCC Road Schemes

SDCC have outlined a number of proposed local road network enhancements within the 2016 - 2022 County Development Plan, and studies carried out in the area including the *'N4/N7 Corridor Study'* and the *'Lucan Access Study'*. Table 6.1 and Figure 6.4 below outline the key road network proposals which have been included for testing.

Table 6.1 SDCC Road Proposals

No.	Road	Description	Function
1	Celbridge Link Road	New Road between the Adamstown SDZ lands and Celbridge Road (R403)	To provide access to Adamstown SDZ Lands
2	Clonburris Street Network	Various streets within the Clonburris SDZ	Formation of a strategic network providing access through the Clonburris SDZ Lands
3	Newcastle Rd (R120)	Junction upgrades at the SuperValu roundabout, Hillcrest Rd & the N4 Overbridge	Enhance the efficiency and safety of these junctions for all users
4	Adamstown South Road	Link Road from Adamstown SDZ to the Grange Castle employment lands	To provide access between the Adamstown SDZ lands and Grange Castle Business Park
5	Lock Rd/R120 Upgrade	Upgrade of existing road from Adamstown to the New Nangor Rd (R134)	To provide improved access to the Grange Castle Business Park
6	Western Dublin Orbital Route	New road connecting the N4 and N7	Enhance orbital movement outside the M50 C-Ring. Included in the 2035 GDA Strategy

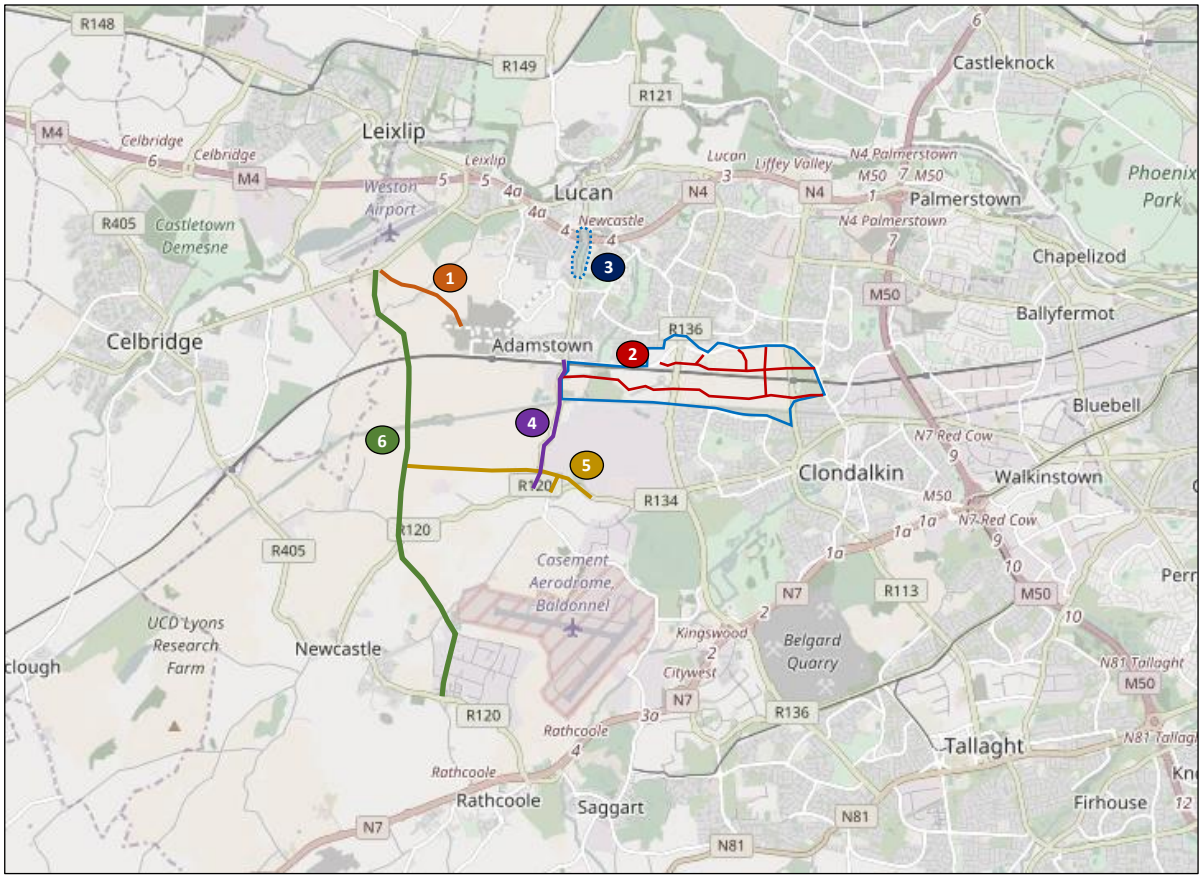


Figure 6.4 SDCC Road Proposals (indicative routes only)

Public Transport

The 2035 GDA Strategy outlines numerous proposed public transport upgrades which have been included for testing. These public transport measures are described in further detail in Chapter 7 of this Transport Strategy document, however, the key items which impact on the Clonburris development are as follows:

- DART Expansion to Hazelhatch;
- DART Underground;
- Orbital Bus from Tallaght to Blanchardstown;
- Upgrade of Radial Bus Services on the N4 and N7; and
- Luas Lucan

In addition to these strategy measures, analysis was undertaken to identify local bus improvements which could be introduced to support sustainable travel from Clonburris. Further information on these proposals are provided in Chapter 7.

Walking & Cycling

The walking and cycling network has been adopted from the 2035 GDA Strategy. The Strategy supports the Greater Dublin Area Cycle Network Plan which proposes to expand the cycle network to provide over 1,300 km of new connections between towns in the rural areas in the GDA. Figure 6.5, provides an overview of the Primary, Secondary and Greenway proposals planned in the area around Clonburris as part of the GDA Cycle Network Plan.

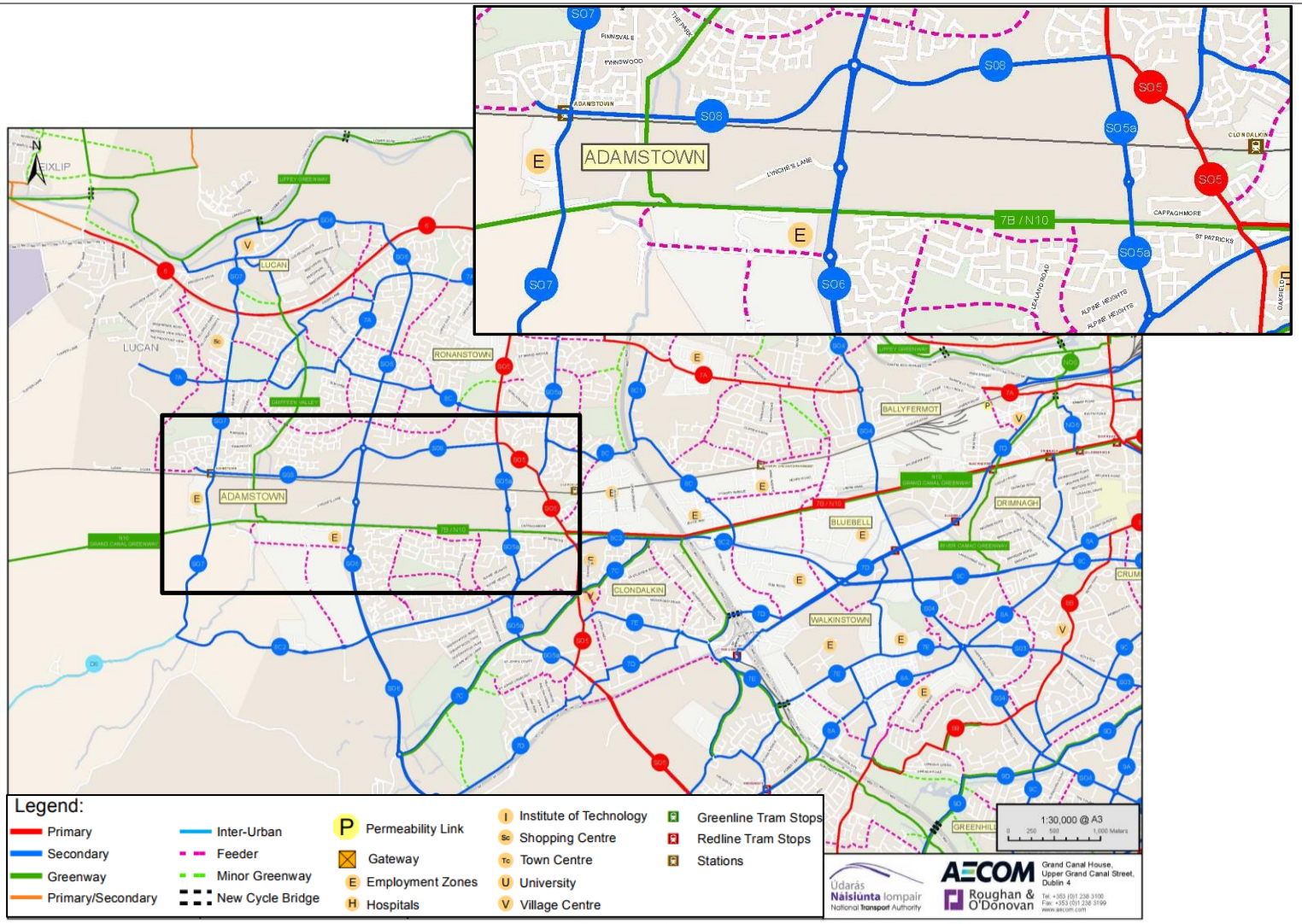


Figure 6.5 GDA Cycle Network Plan

Locally, walking and cycling infrastructure measures are proposed within the Clonburris development to:

- Ensure permeability for pedestrians and cyclists through the development;
- Promote the use of walking and cycling within the development;
- Provide accessibility to public transport, schools and commercial centres; and
- Provide walking and cycling connectivity to the external network etc.

Further information on the proposed walking and cycling measures are provided in Chapter 7 later in this report.

6.3.3 Supply – 2026

The NTA are currently undertaking a review of phasing of the GDA strategy measures up to 2035. Through consultation with the NTA, key elements of the GDA Strategy have been identified relevant to the SDZ Lands, which are envisaged to be implemented prior to 2026.

Road

In summary, the key measures which will impact on Clonburris (i.e. the N4/N7 link road and demand management on the N4/M50) are proposed to be implemented prior to 2026 and, as such, have been included for testing. In addition to this, the SDCC Road Proposals outlined in Table 6.1 previously have also been included in the 2026 road network scenario.

Public Transport

Table 6.2 below, outlines the key public transport proposals identified in the 2035 GDA strategy. All measures which are scheduled to be implemented prior to 2026 have been included in the modelling scenario. In summary, it is proposed that:

- The electrification and expansion of DART to Hazelhatch **will not** be implemented by 2026;
- DART Underground **will not** be constructed prior to 2026;
- Lucan Luas **will not** be constructed by 2026; and
- All bus strategy measures **will** be implemented by 2026, including the core orbital services running through the Clonburris SDZ.

Table 6.2 2035 GDA Strategy Public Transport Measures

Public Transport Strategy Measures	2026	2035
Heavy Rail		
Phoenix Park Tunnel	✓	✓
DART Expansion Programme	×	✓
Electrification to Drogheda-Balbriggan on the Northern line	✓	✓
Electrification to Balbriggan on the Northern line	×	✓
Electrification to Hazelhatch on the Kildare line	×	✓
Electrification to Maynooth on the Sligo line	×	✓
DART Underground	×	✓
Metro & Light Rail		
New Metro North	✓	✓
Luas Green Line Capacity Enhancement	✓	✓
Metro South - Luas Green Line Capacity Upgrade	×	✓
Luas Cross City	✓	✓

Finglas Luas	×	✓
Extension of Luas Green Line to Bray	×	✓
Lucan Luas	×	✓
Poolbeg Luas	×	✓
Bus		
Core (Radial) Bus Corridor / Network	✓	✓
Core Orbital Bus Network	✓	✓
Core Regional Bus Network	✓	✓
Bus Rapid Transit	✓	✓

Walking & Cycling

Through consultation with the NTA, it was noted that the walking and cycling infrastructure measures identified in the 2035 GDA Strategy are proposed to be implemented by 2026. Therefore, the full walking and cycling network, described previously and illustrated in Figure 6.5, was included for testing in the 2026 strategic modelling scenario.

6.4 Strategic Modelling Results

6.4.1 Introduction

The ERM was run using the test scenarios outlined above and detailed analysis was carried out on the forecast travel behaviour for Clonburris. Understanding the forecast travel pattern and behaviour, facilitated a greater appreciation of the potential impact of the Clonburris SDZ on the wider transport network. This strategic analysis focused on the following key aspects:

- Trip Distribution;
- Mode Share; and
- Trip Length Distribution.

6.4.2 Trip Distribution

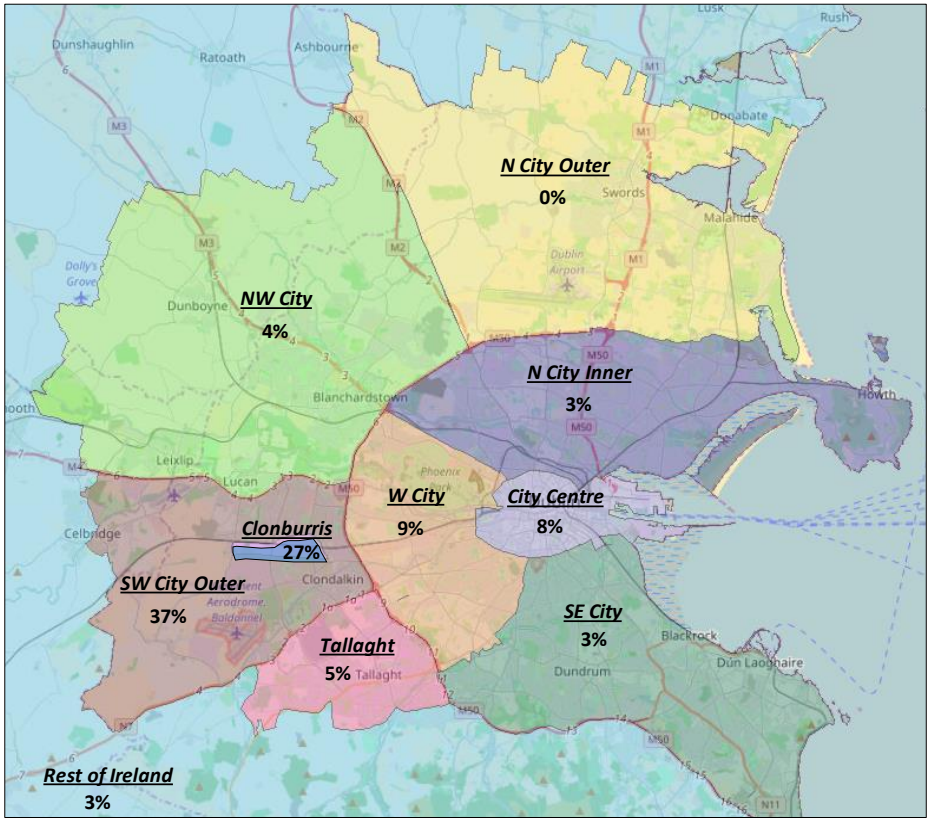
2035

Analysis was carried out on the key destination of travel for trips originating in Clonburris in the AM peak period. For ease of analysis, the 1,854 zones within the ERM have been aggregated to 10 distinct sectors. Figures 6.6 and 6.7 illustrate the percentage of trips, by mode, which originate in Clonburris and travel to each of the 10 defined sectors in the 2035 AM period.

The results indicate that approximately one third of all trips (27%) which originate in Clonburris stay within the development. This is reflective of the mixed-use nature of the SDZ with the availability of employment and retail opportunities, along with the provision of a number of primary and secondary schools. The high level of short distance internal Clonburris trips supports the use of sustainable modes of travel such as walking and cycling which reduces the impact of the development on the wider transport network.

Approximately three quarters (72%) of all car trips generated by Clonburris in the AM are forecast to stay within the area bounded by the N4, N7 and M50. There are a number of employment locations which are forecast for further growth in this area in 2035 including Grange Castle Business Park, Liffey Valley Shopping Centre, Fonthill Retail Park and Cherry Orchard Industrial Estate etc.

All Modes



Car

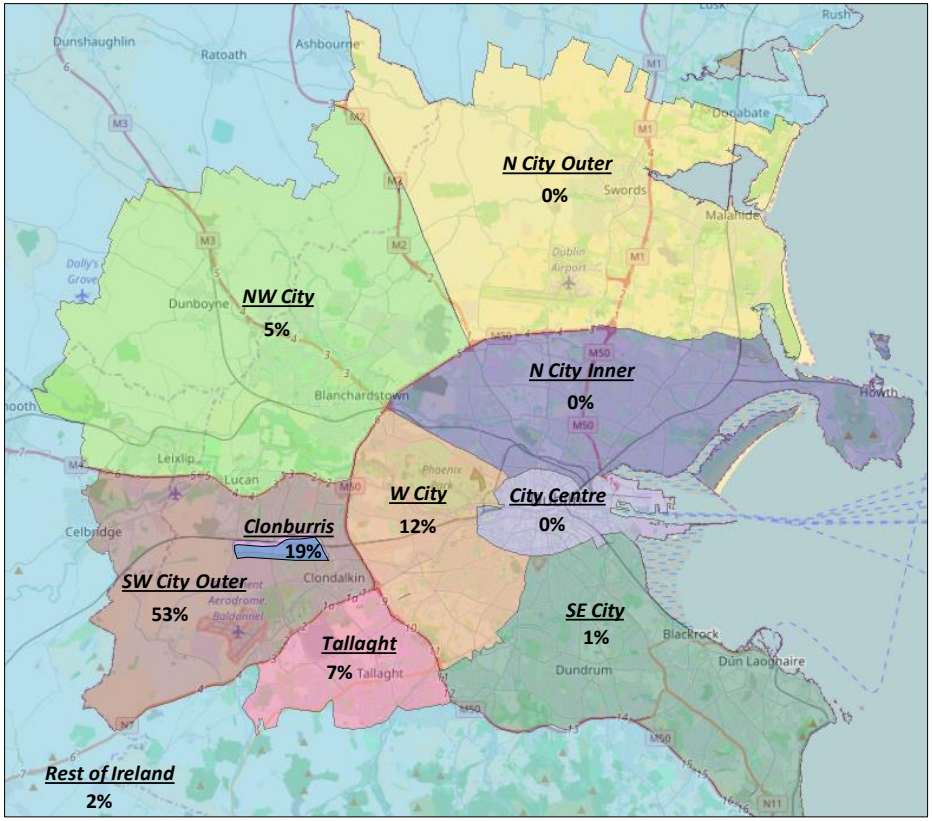
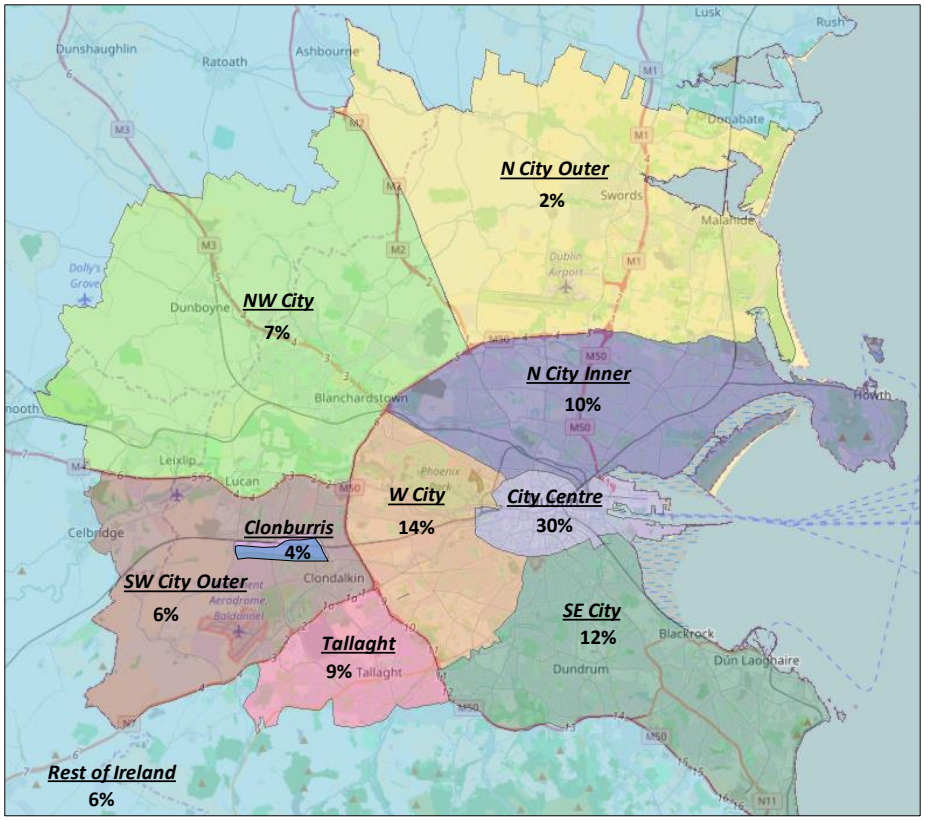


Figure 6.6 Clonburris Trip Distribution 2035 AM Peak Period – All Modes & Car

Public Transport



Walking & Cycling

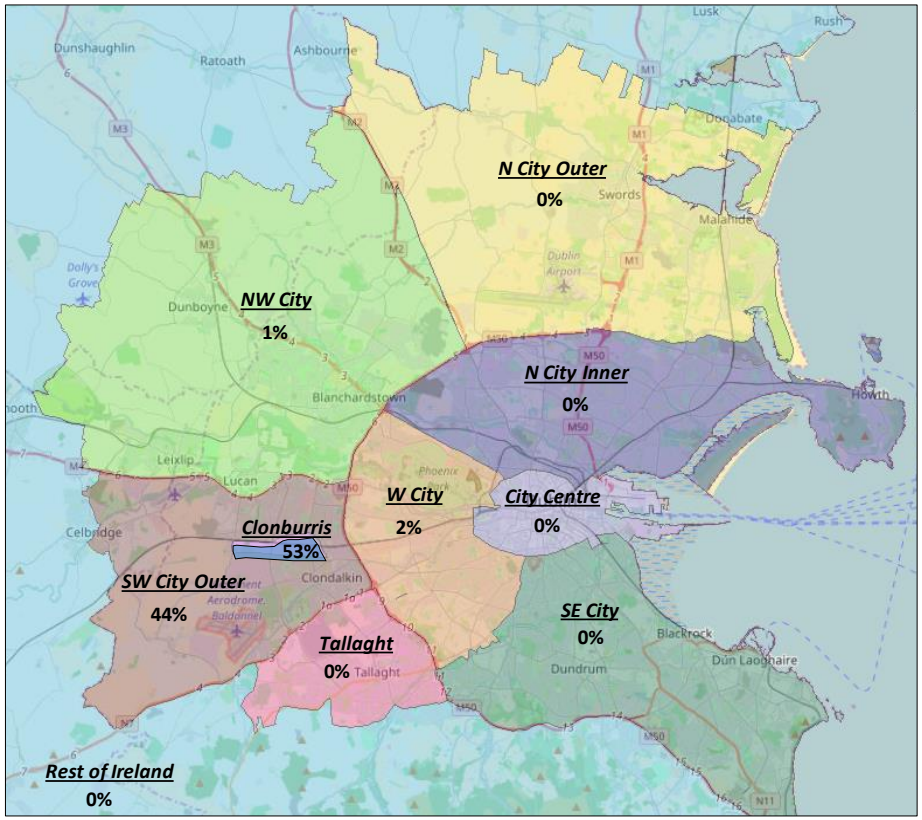


Figure 6.7 Clonburris Trip Distribution 2035 AM Peak Period – PT & Active

As the majority of car trips remain within the local area, this reduces the impact of Clonburris on the wider strategic road network, particularly the N4, N7 and M50.

The results in Figure 6.6 indicate that only a very small proportion of car trips (<1%) travel to the city centre in the 2035 AM peak. There are many factors which could influence this behaviour including:

- Longer journey times on the network due to general growth in car traffic in 2035;
- Demand Management on the national road network;
- Availability of public transport options; and
- Limited parking within Dublin City Centre.

The majority of Public Transport (PT) trips (30%) which originate in Clonburris are destined for Dublin city centre. PT improvements proposed as part of the GDA Strategy, including the DART expansion and DART Underground, will provide high frequency services to the city centre. The trip distribution analysis suggests that, at longer distance trips, PT becomes a more competitive alternative to the private car due to increased costs associated with demand management and congestion on the road network, and the availability of a high-quality PT network proposed as part of the GDA Strategy.

2026

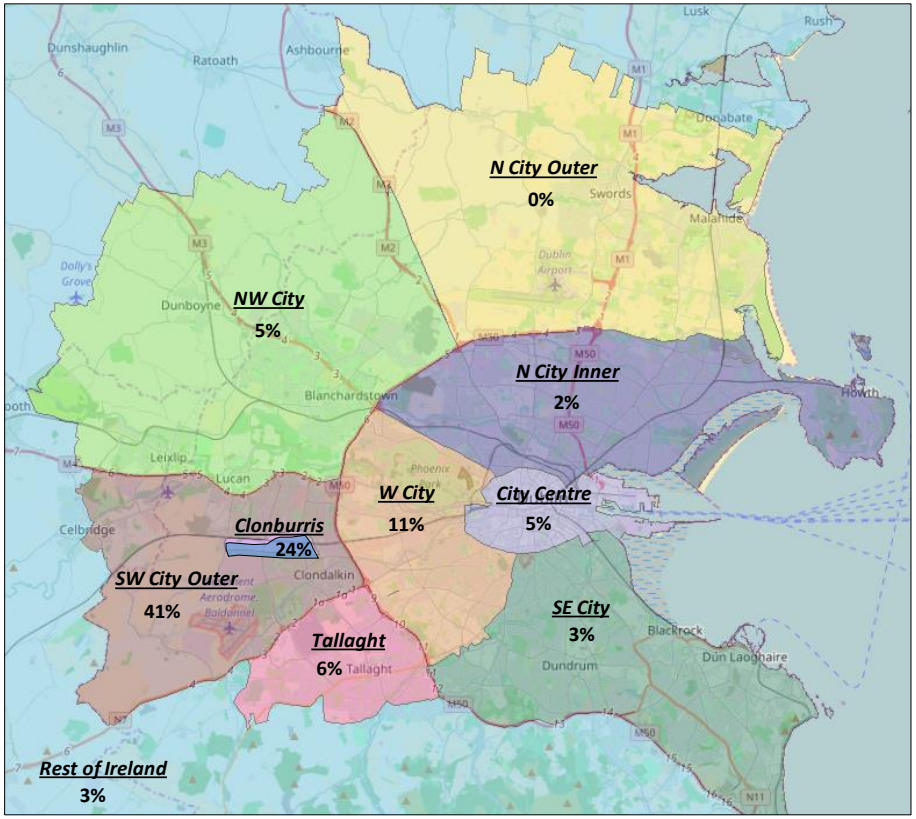
Distribution analysis was also carried out for trips originating in Clonburris in the 2026 AM Peak Period (07:00 – 10:00) and the results are illustrated in Figures 6.8 and 6.9, overleaf. As noted previously, for the strategic modelling assessment, it has been assumed that Clonburris will develop in a uniform manner with approximately 10,300 population, 1,200 jobs and 3,000 school pupils in 2026. This straight-line growth assumption is deemed prudent in the context that the Phasing Strategy contained in the Clonburris SDZ Planning Scheme is based on the delivery of housing as opposed to timelines.

The trip distribution results indicate that a quarter of trips (24%) originating within Clonburris stay within the SDZ. This is reflective of the mixed-use nature of the development with the provision of employment and schools serving the local population. The relatively high level of short distance internal trips supports walking and cycling, thus reducing the impact of Clonburris on the wider transport network.

Similar to the 2035 analysis, a large proportion of car trips originating within Clonburris (65%) remain within the M50, N7 and N4 boundary. As noted previously, there are a number of employment locations within this area such as Grange Castle Business Park and Liffey Valley Shopping centre which remain key attractors in 2026.

A lower proportion of PT trips are destined for the City Centre when compared to the 2035 analysis. This is primarily due to the unavailability of the DART expansion to Hazelhatch, and the DART Underground linking the Kildare line to the City Centre in 2026. The full GDA Strategy bus network proposals, including the orbital services, are planned for implementation prior to 2026, and this is reflected in the proportion of PT trips (13%) travelling from Clonburris to Tallaght.

All Modes



Car

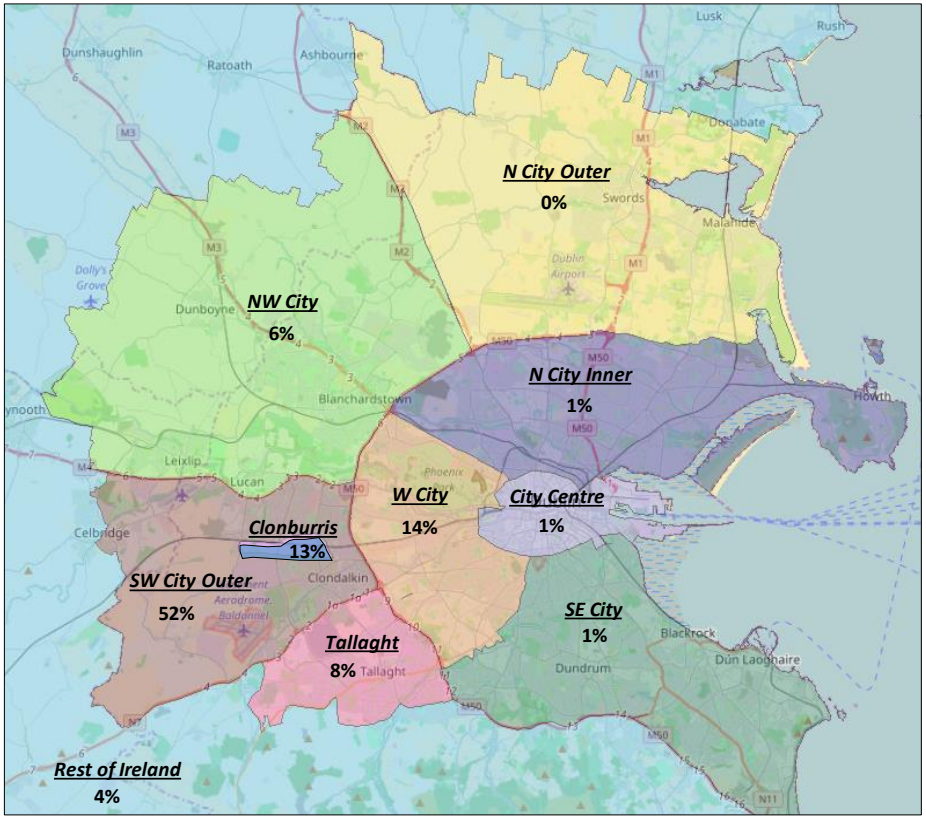
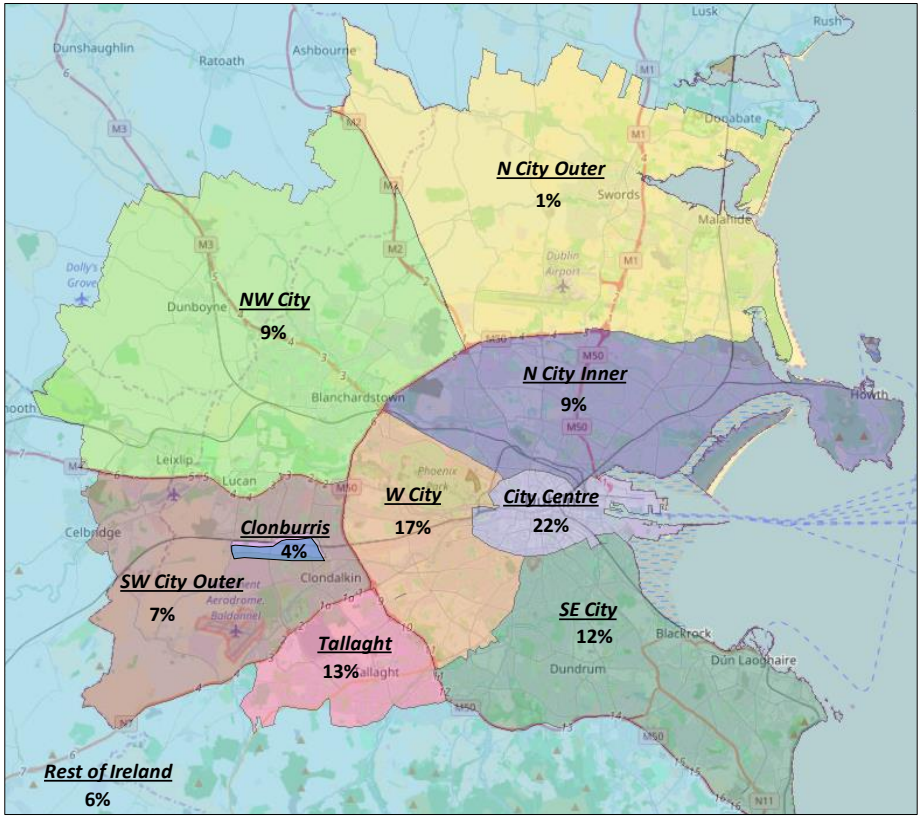


Figure 6.8 Clonburris Trip Distribution 2026 AM Peak Period – All Modes & Car

Public Transport



Walking & Cycling

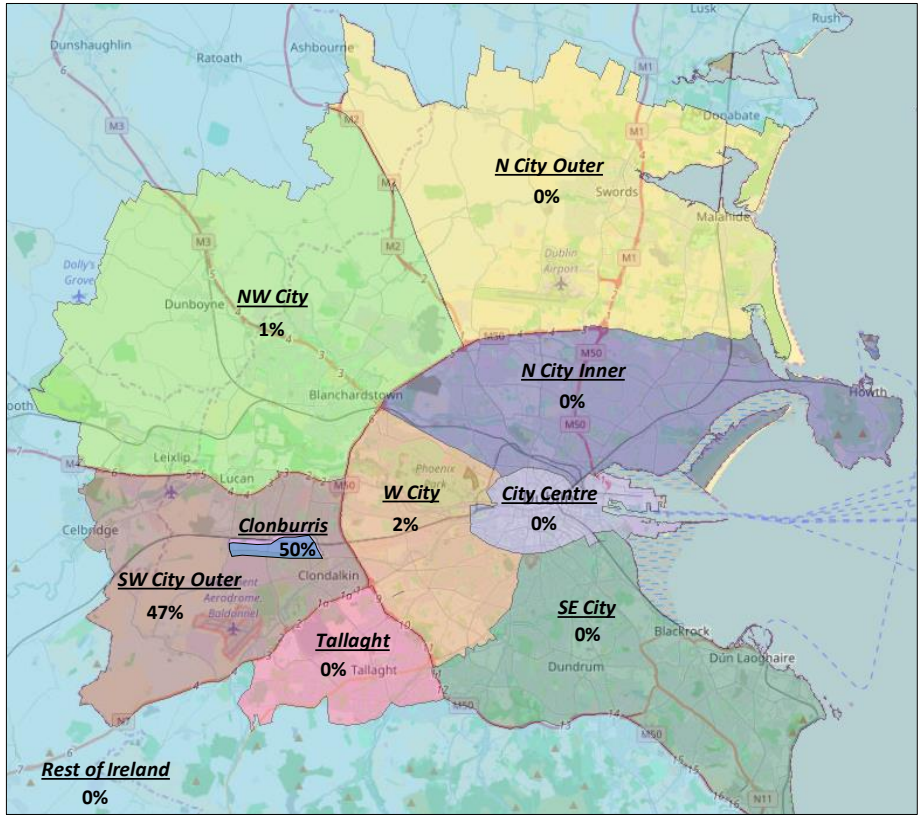


Figure 6.9 Clonburris Trip Distribution 2026 AM Peak Period – PT & Active

6.4.3 Mode Share

2035 Clonburris Demand

Analysis was undertaken on the total number of person trips generated by the Clonburris SDZ, identifying the proportion using each of the available modes of travel (i.e. car, PT, walking and cycling. Table 6.3 outlines the number of trips entering/leaving Clonburris for the AM (07:00 – 10:00), Lunch Time (LT 10:00 – 13:00), School Run (SR 13:00 – 16:00) and PM (16:00 – 19:00) periods in 2035, while Figure 6.10 illustrates the mode share for these trips.

Table 6.3 Clonburris Person Trips by Time Period (2035)

Time Period	Car	PT	Walk	Cycle	Total
AM	9,292.74	5,230.32	5,780.50	790.35	21,093.90
LT	8,454.28	1,801.54	1,987.30	190.47	12,433.60
SR	10,763.96	3,300.20	3,941.11	441.55	18,446.82
PM	8,732.01	3,388.74	2,475.30	317.93	14,913.98

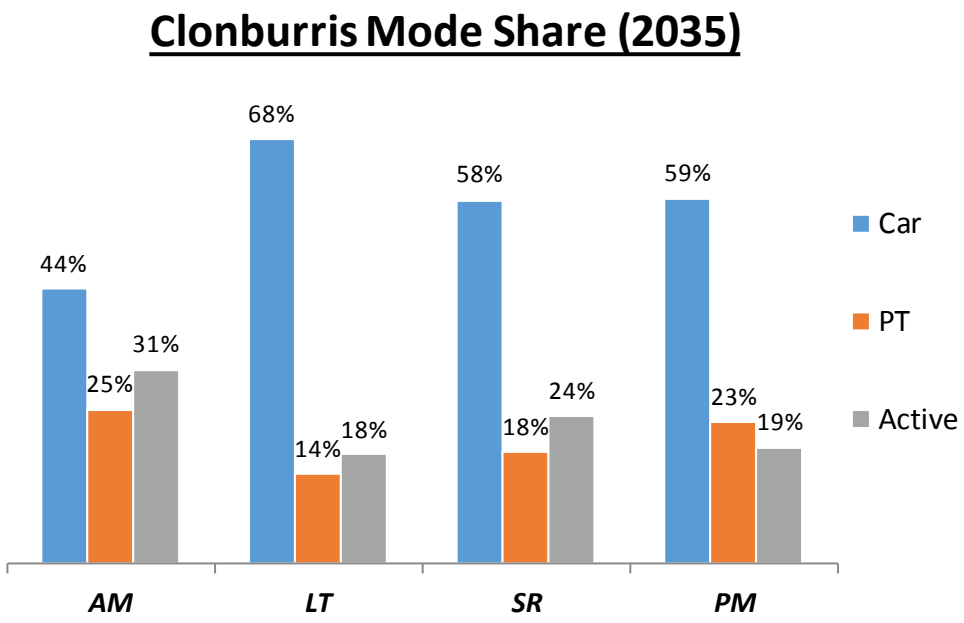


Figure 6.10 Clonburris Mode Share (2035)

The strategic modelling results indicate that over half (56%) of trips in the AM are by sustainable modes (i.e. walking, cycling and PT). The Department of Transport, Tourism and Sport (DTTAS) Smarter Travel Policy sets a target of 45% car mode share for commuting trips. The results in Figure 6.8 represent all travel purposes (i.e. not just commuting), however, the forecast car mode share is in-line with these targets (approx. 44%).

The AM period exhibits the lowest car mode share due to the predominance of work and education trips which tend to be concentrated and serviceable by sustainable modes. The AM and SR (School Run) time periods exhibit a relatively high proportion of active mode share (Walking and Cycling). This is reflective of short distance education trips available within Clonburris.

Figure 6.11 illustrates the mode share for trips originating in Clonburris in the AM period, travelling to each of the 10 sectors defined in Section 6.4.2 previously. As outlined in Figure 6.6 above, a significant proportion of Clonburris trips stay within the SDZ (approx. 27%). The results in Figure 6.9 indicate a strong active mode share within Clonburris (67%). This is reflective of the level of accessibility by walking and cycling within the development to public transport, schools, employment and commercial centres.

The results suggest that trips to the city centre are dominated by PT (97%). As noted previously, this is primarily due to the availability of a high-quality PT service, along with increased costs associated with car travel in 2035 including parking restrictions and tolling.

The mode share analysis indicates that, whilst Clonburris will generate approx. 21,000 person trips[3] (over the 3hr AM period), its location and type of development assist in reducing the level of impact on the wider transport network due to the following:

- Mixed use development encourages a number of internal trips which are servable by walking and cycling;
- Located beside a high frequency PT service providing access to the city centre and the wider region via high-quality interchange with other services; and
- Relatively high level of sustainable mode share in the AM period, thus reducing the impact of car traffic on the external road network.

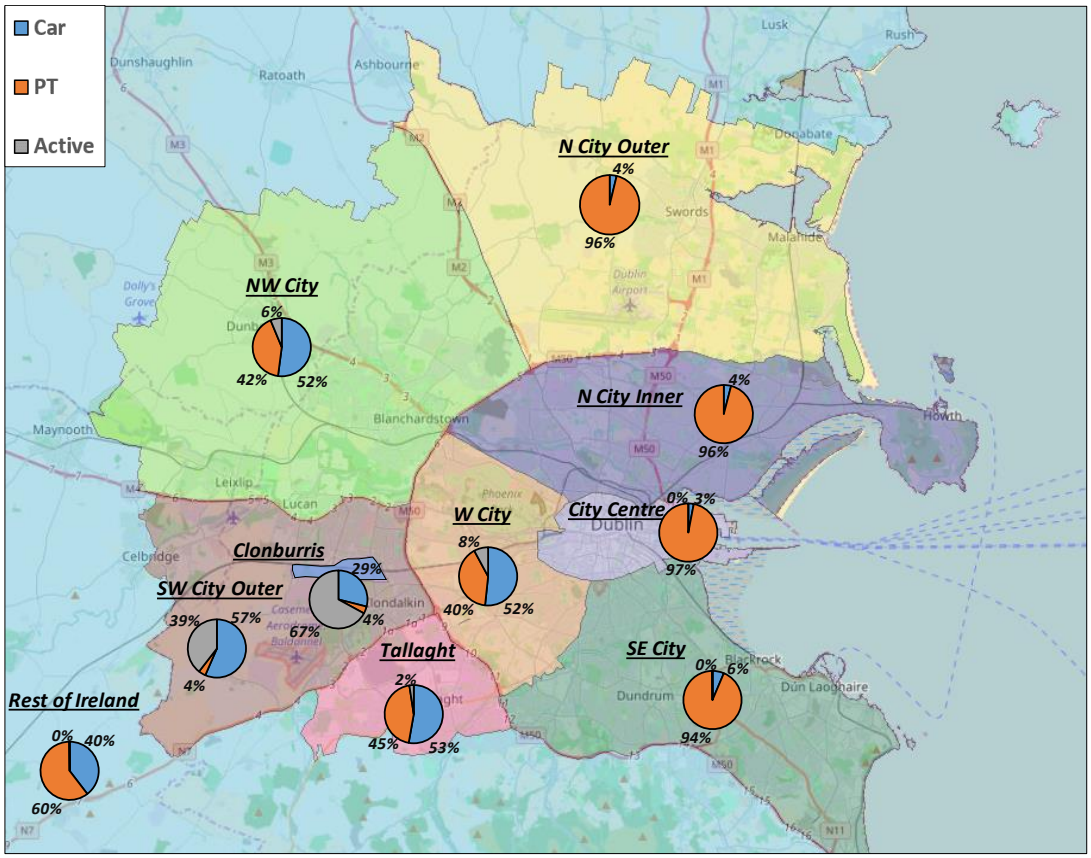


Figure 6.11 Origin Clonburris Trips Mode Share by Sector (2035)

[3] Trips generated are derived from the National Transport Authority's (NTA) National Trip End Model (NTEM). NTEM trip generation and attraction calculations have been calibrated through analysis of POWSCAR Census Data and the National Household Travel Survey. These calculations have been derived for a number of different trip purposes (or 'demand segments') such as commute, education, escort to education, shopping, visiting friends etc.

2035 Redistribution of Clonburris Growth Demand Comparison

As noted previously in Section 6.3, an alternative demand scenario was run for 2035 in the ERM, whereby the proposed development at Clonburris was redistributed to other zoned lands in South Dublin and North Kildare. As a comparative assessment, mode share analysis was carried out on three areas[4], i.e. North Leixlip, Kingswood and Citywest illustrated in Figure 6.12, which received the largest proportion of population that was planned for Clonburris.

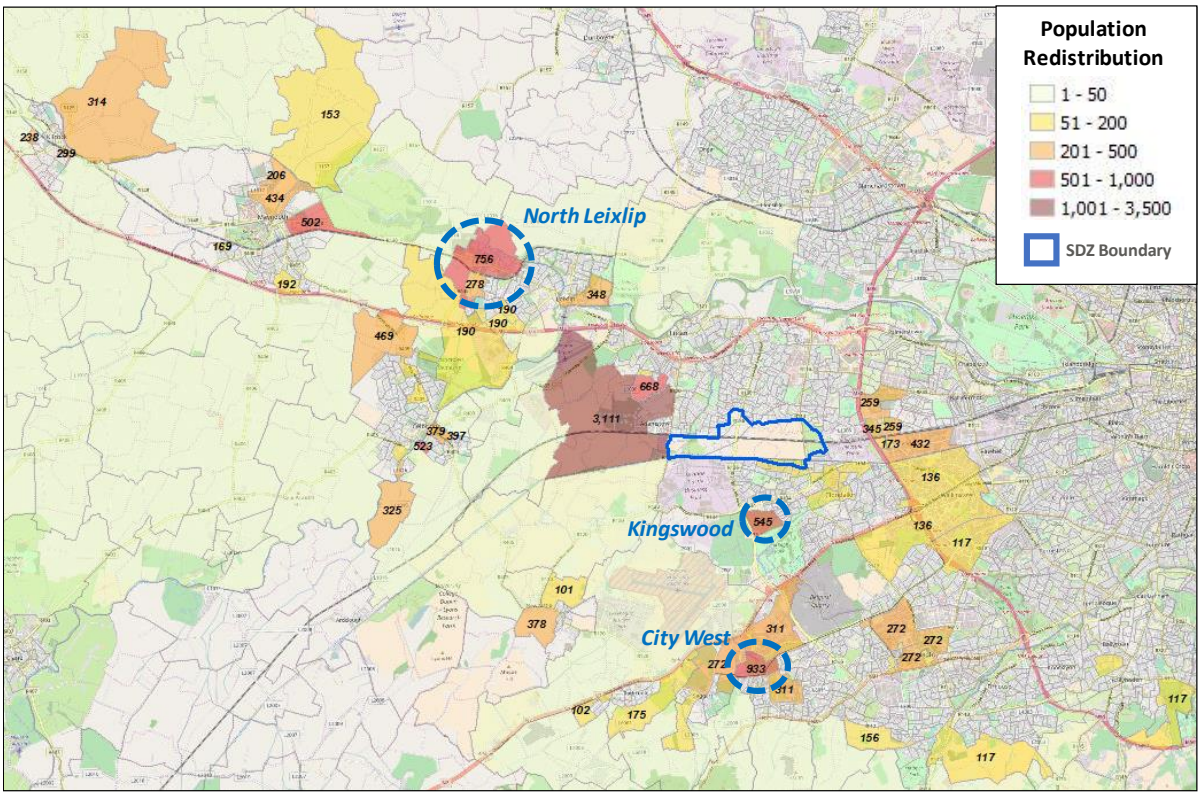


Figure 6.12 Mode Share Comparative Assessment Areas

Figure 6.13 illustrates the proportion of trips entering/leaving each area in the AM period by car and sustainable modes. These values are then compared to the mode share results achieved for Clonburris with a proposed full build out.

The results indicate that the alternative development areas experience a significantly higher car mode share than Clonburris in the forecast year of 2035. Therefore, if development was redistributed to these areas, there would be a higher proportion of traffic entering the road network leading to significantly higher levels of congestion and delay.

[4] Note: Adamstown was not selected for assessment due to its proximity to Clonburris and its comparable impact on the local road network

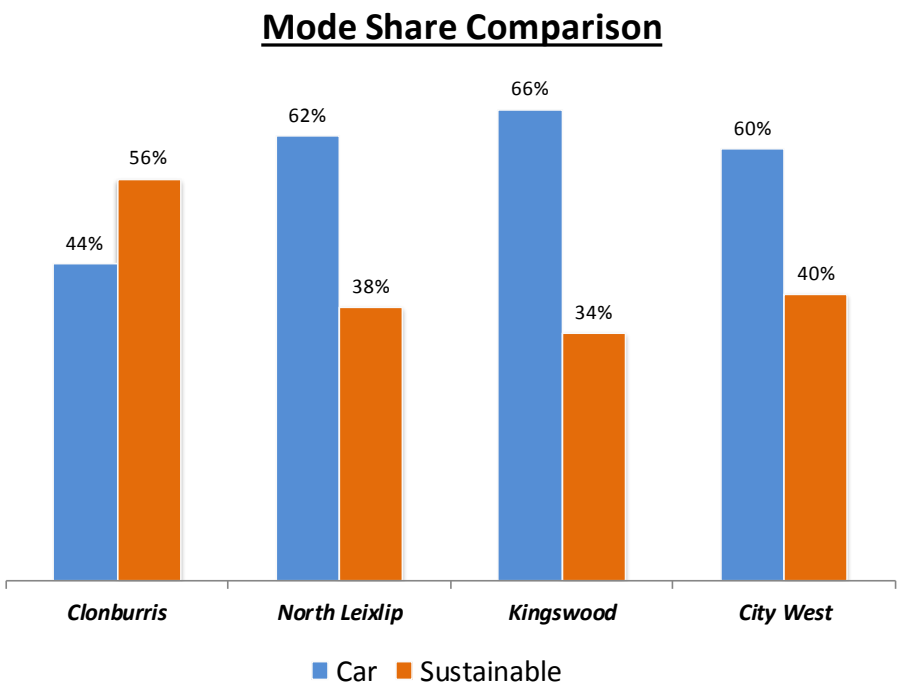


Figure 6.13 Mode Share Comparison

2026 Clonburris Demand

Table 6.4 outlines the number of trips entering/leaving the Clonburris development for the AM (07:00 – 10:00), Lunch Time (LT) (10:00 – 13:00), School Run (SR) (13:00 – 16:00) and PM (16:00 – 19:00) periods in 2026, and Figure 6.14, overleaf, illustrates the mode share for these trips.

Table 6.4 Clonburris Person Trips by Time Period (2026)

Time Period	Car	PT	Walk	Cycle	Total
AM	7,491.61	2,499.99	3,661.88	475.87	14,129.35
LT	6,604.29	1,148.16	1,582.03	179.32	9,513.79
SR	8,329.31	1,850.98	2,758.06	326.97	13,265.32
PM	7,003.82	1,622.31	1,722.69	225.35	10,574.17

The 2026 results indicate an increase in car mode share versus the 2035 full development scenario (Figure 6.10). This is reflective of the improved public transport offering in 2035 with:

- High frequency DART service operating every 7.5 mins in the peak periods; and
- DART Underground providing a direct link to Dublin City Centre.

In 2026, the Kildare Commuter Rail line serves Clondalkin-Fonthill Station in Clonburris, with a headway of approx. 12-15 mins in the AM Peak operating to Heuston Station, and limited services to Grand Canal Dock via the Phoenix Park Tunnel. This service is less attractive than that proposed in 2035, leading to a reduction in PT mode share of approximately 7-8% in the AM and PM Peak Periods.

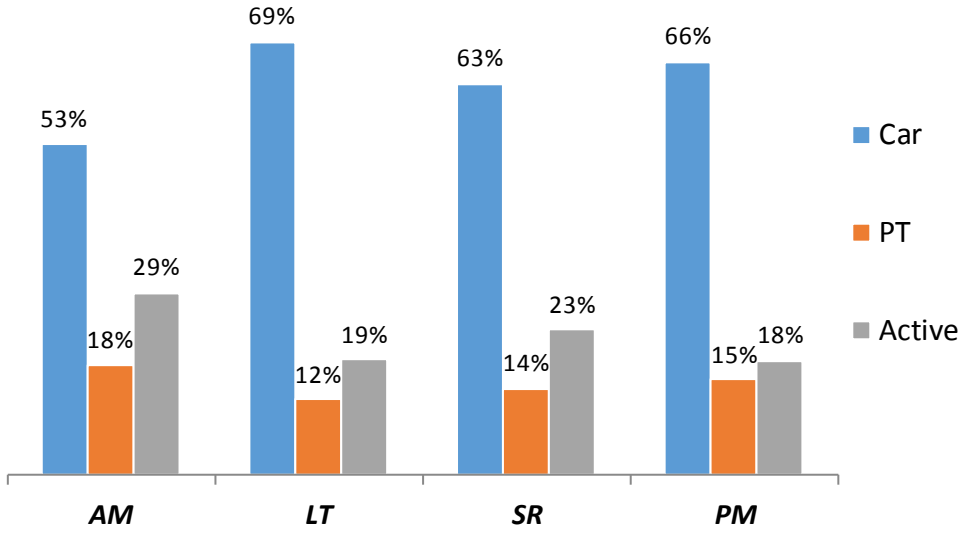


Figure 6.14 Clonburris Mode Share (2026)

Figure 6.15, below, illustrates the mode share for trips originating in Clonburris in the AM period, travelling to each of the 10 analysis sectors.

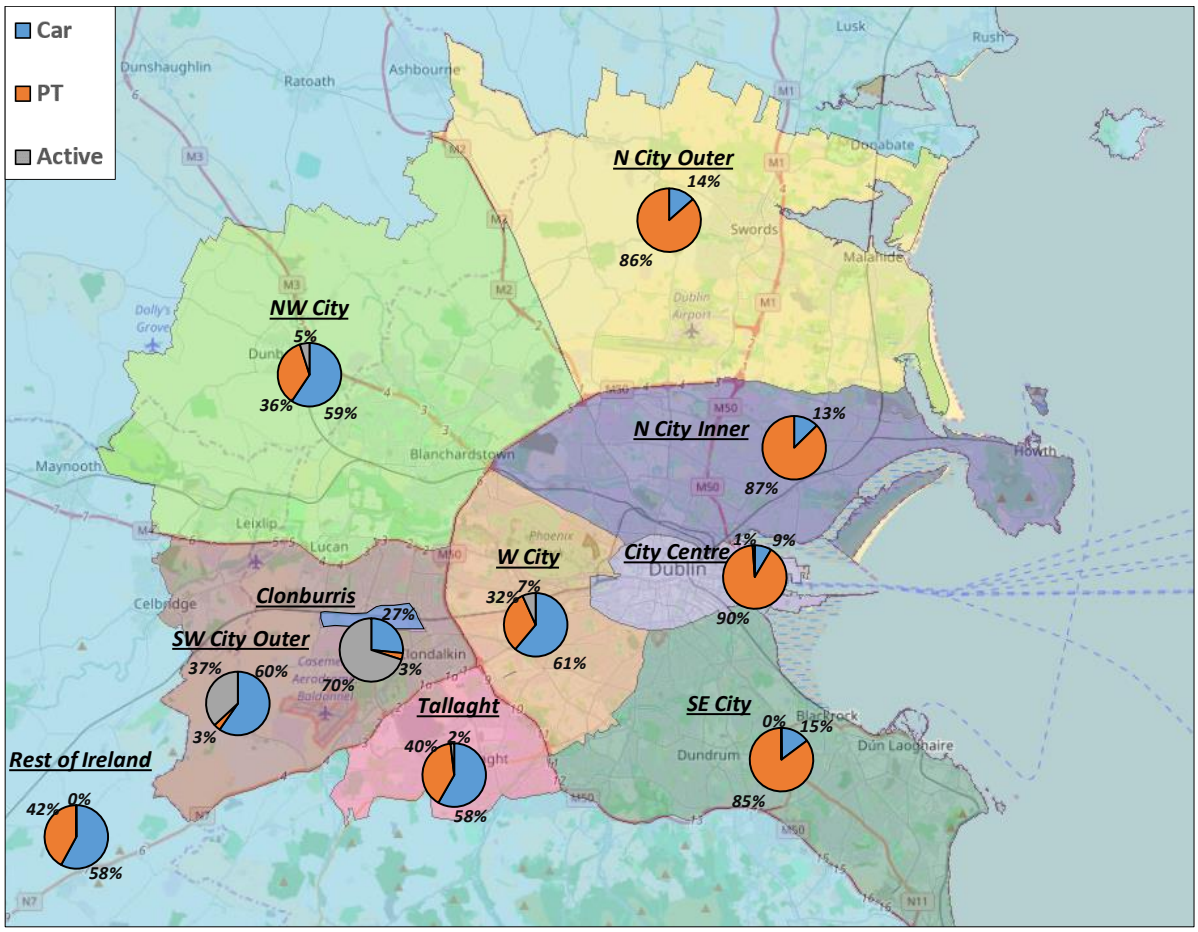


Figure 6.15 Origin Clonburris Trips Mode Share by Sector (2026)

As noted previously in the trip distribution analysis, 24% of trips generated by Clonburris in the 2026 AM peak stay within the development accessing local schools and employment. This short distance trip making supports the use of walking and cycling which is reflected in the relatively high proportion of active mode share, particularly in the AM and School Run time periods.

The results in figure 6.15 indicate that travel to most sectors are more car dependant in 2026 than 2035, particularly those along the rail corridor primarily due to the reduced service offering in 2026. Travel to Dublin City Centre is still dominated by PT due to increased costs associated with car travel in 2026 including congestion, demand management and parking constraints.

Whilst the mode share results in 2026 are not as notable as those for 2035, they still suggest that the type of development proposed at Clonburris will reduce the impact on the wider transport network, due to:

- Mixed use development encouraging a number of internal trips which are servable by walking and cycling;
- Relatively high level of sustainable mode share, particularly in the AM peak period (47%); and
- Lower car mode share than alternative areas proposed for development in the 2035 Clonburris Redistributed demand scenario.

6.4.4 Trip Length Distribution

2035

Figure 6.16 and 6.17, below, illustrate the forecast trip length distribution for all trips generated by the proposed Clonburris development in the AM peak period. The results indicate that the majority of trips (approx. 56%) originating in Clonburris are less than 4km in length.

As noted in the mode share analysis previously, the results in Figure 6.13 illustrate the relatively high levels of walking and cycling (active modes) used for shorter distance trips. Longer distance trips are generally undertaken by PT due to the availability of high quality PT services, in particular to the city centre, and an increase in costs of travel by car in 2035. The use of PT for these longer distance trips further reduces the impact of Clonburris on the wider strategic road network.

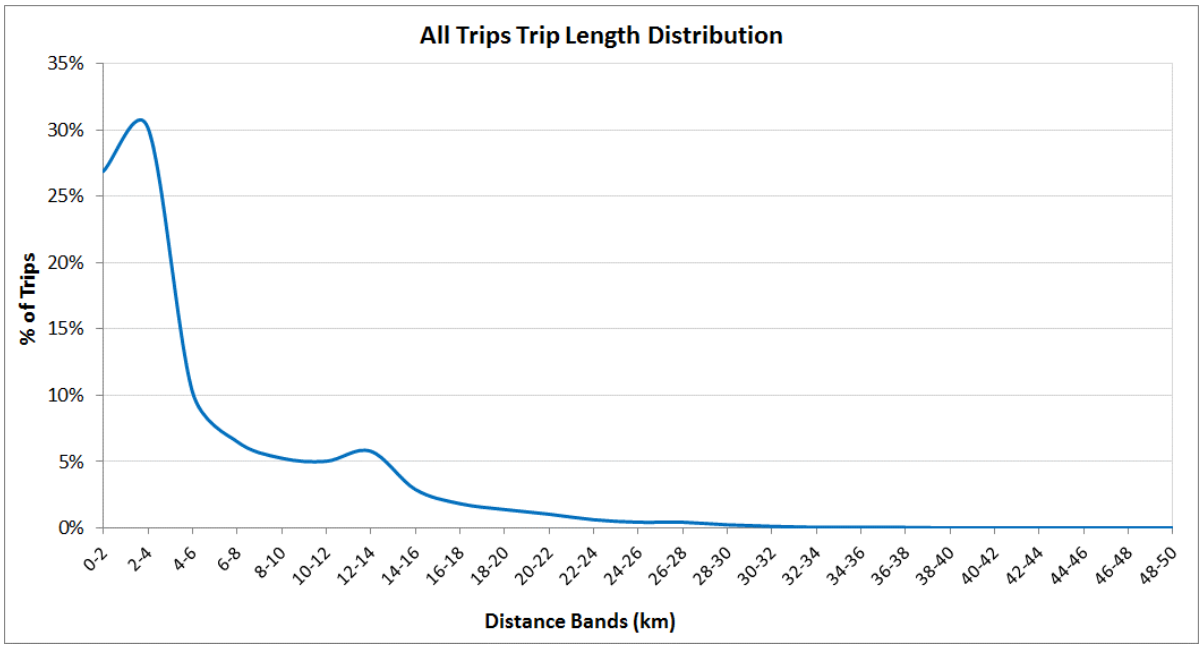


Figure 6.16 All Trips Trip Length Distribution – Clonburris 2035 AM

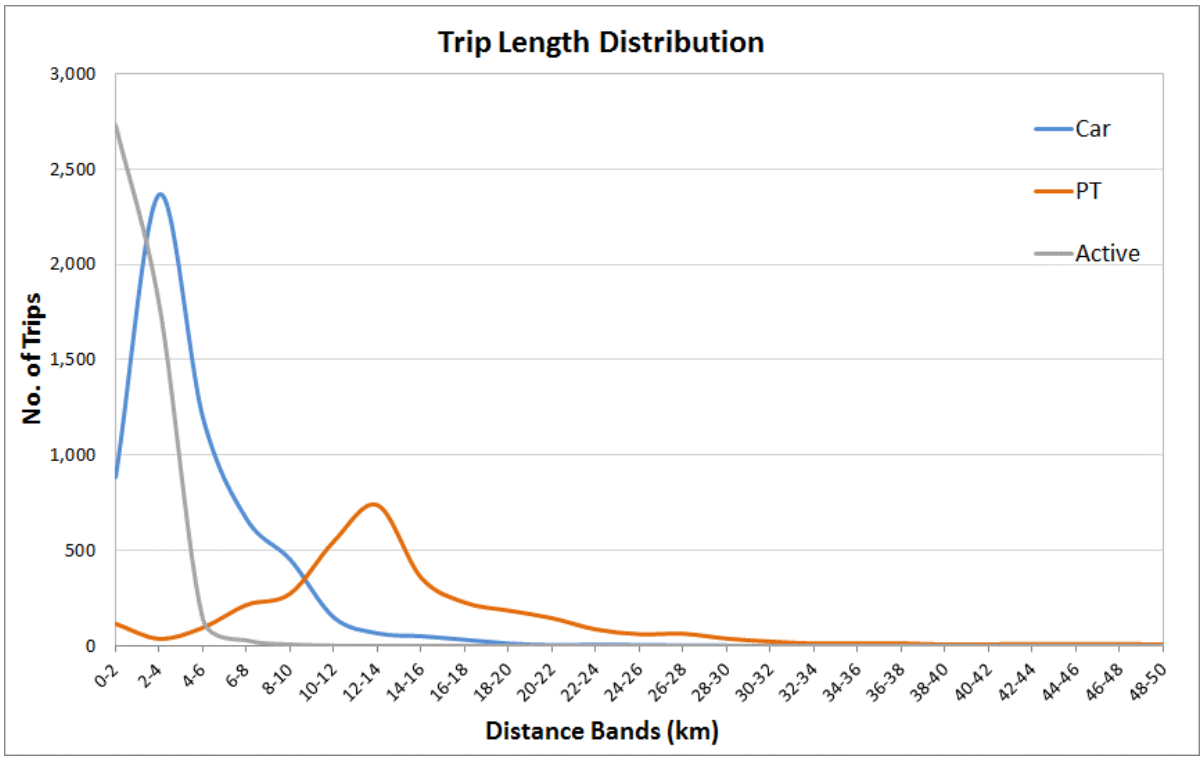


Figure 6.17 Trip Length Distribution by Mode – Clonburris 2035 AM

2026

Trip Length Distribution analysis was also carried out for forecast trips generated by Clonburris in the 2026 AM Peak, and the results are illustrated in Figure 6.18 and 6.19.

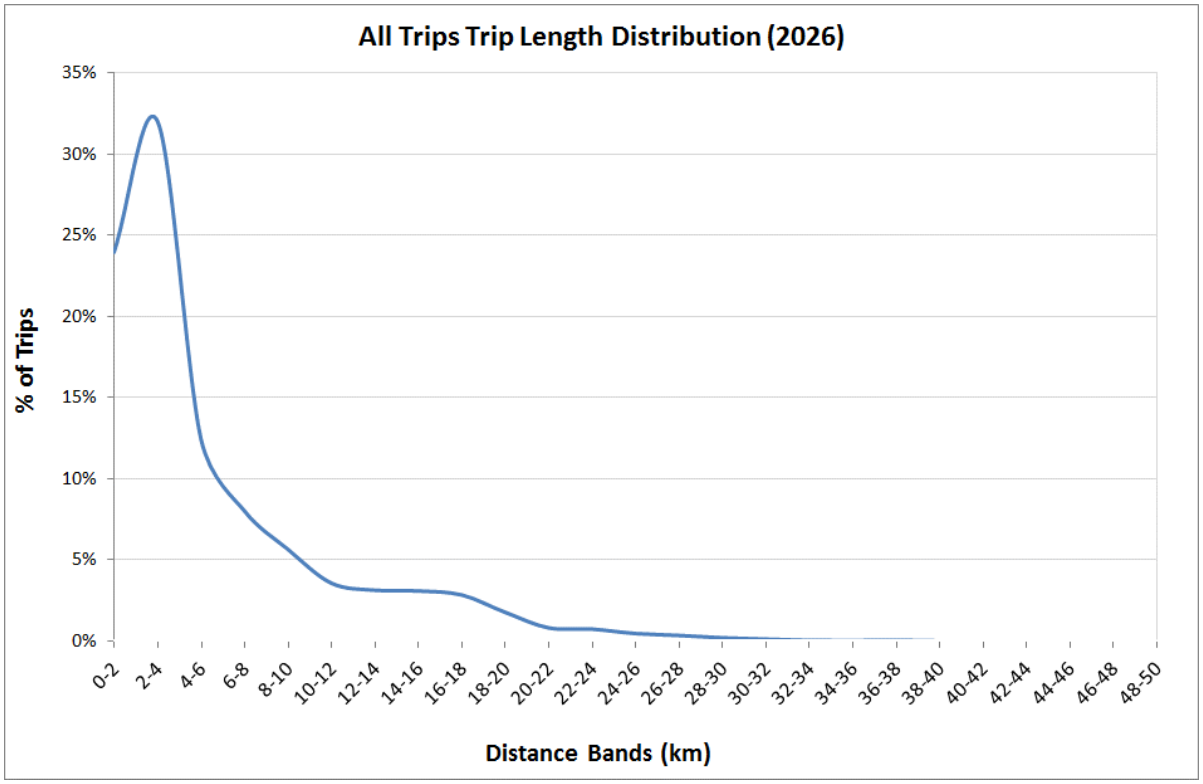


Figure 6.18 All Trips Trip Length Distribution – Clonburris 2026 AM

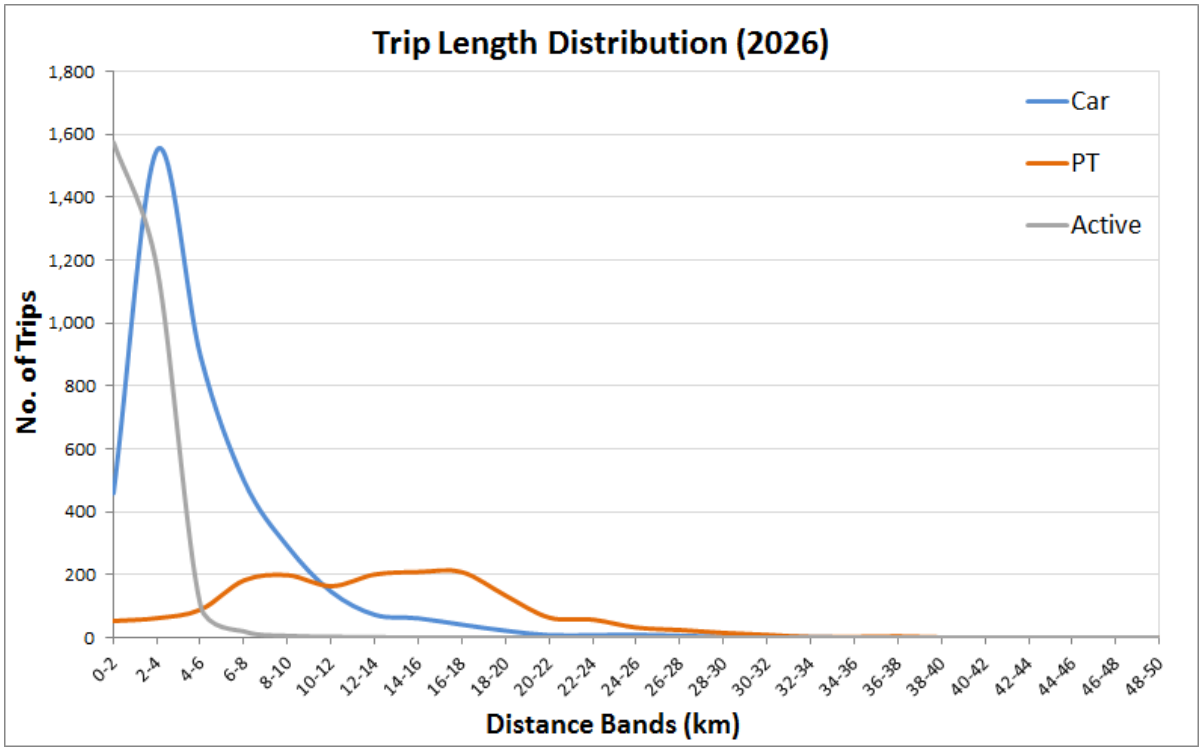


Figure 6.19 Trip Length Distribution by Mode – Clonburris 2026 AM

Similar to the 2035 analysis, the results in Figure 6.18 and 6.19 indicate that a high proportion of short distance trips are undertaken by walking and cycling. This is in-line with the mode share and trip distribution results outlined previously, and is reflective of the mixed-use nature of the Clonburris development with ease of accessibility to local employment locations and schools.

Longer distance trips are generally undertaken by PT which may be due to:

- Improved bus network and rail services in 2026;
- Demand management measures on strategic roads in 2026; and
- Increased congestion and parking restrictions in Dublin City in 2026.

The use of PT for these longer distance trips further reduces the impact of Clonburris on the wider strategic road network

6.4.5 Summary

The previous sections have outlined the results of the wider strategic analysis undertaken for Clonburris to determine forecast travel patterns and behaviour. In summary:

2035

Trip Distribution

- Approx. 27% of trips which originate in Clonburris in 2035 stay within the development, thus reducing the impact on the wider strategic road network;
- Approx. 72% of all car trips generated by Clonburris in the AM are forecast to stay within the area bounded by the N4, N7 and M50; and
- A large proportion of PT trips (30%) which originate in Clonburris are destined for Dublin city centre.

Mode Share

- Approx. 54% of trips in the AM period are undertaken by walking, cycling and PT;
- The AM and SR time periods exhibit a high proportion of walking and cycling. This is reflective of short distance education trips available within the Clonburris SDZ;
- The mode share analysis indicates that the location and type of development proposed at Clonburris will assist in reducing the level of impact on the wider transport network; and
- Redistribution of development from Clonburris would result in alternative development areas experiencing higher car mode share compared to Clonburris with higher demand placed on roads within the County

Trip Length Distribution

- Approx. 56% of trips originating in Clonburris are less than 4km in length;
- Results indicate high levels of walking and cycling use for shorter distance trips; and
- The use of PT for longer distance trips reduces the impact of Clonburris on the wider strategic road network.

2026

Trip Distribution

- Approx. 24% of trips which originate in Clonburris in 2026 stay within the development, thus reducing the impact on the wider strategic road network; and
- Approx. 65% of all car trips generated by Clonburris in the AM are forecast to stay within the area bounded by the N4, N7 and M50.

Mode Share

- Approx. 47% of trips in the AM period are undertaken by walking, cycling and PT;
- The AM and SR time periods exhibit a high proportion of walking and cycling. This is reflective of short distance education trips available within the Clonburris SDZ; and
- Clonburris has a higher car mode share in 2026 vs 2035, primarily due to the improved PT offering in the full 2035 GDA Strategy.

Trip Length Distribution

- Results are similar to those identified for 2035, i.e.:
    - Approx. 56% of trips originating in Clonburris are less than 4km in length;
    - Results indicate high levels of walking and cycling use for shorter distance trips; and
    - The use of PT for longer distance trips reduces the impact of Clonburris on the wider strategic road network.

7 Overall Clonburris SDZ Transport Strategy

7.1 Introduction

The following chapter outlines the various elements of the proposed Transport Strategy generated to support the sustainable development of the Clonburris SDZ. The strategy has been developed in-line with the methodology outlined in Chapter 5 previously, and comprises of a multi-faceted approach to existing and planned services and infrastructure in relation to:

- Public Transport Strategy;
- Walking and Cycling Strategy;
- Street Network Strategy;
- Parking Strategy; and
- Mobility Management Plan Framework

7.2 Public Transport Strategy

7.2.1 Overview

This section provides an overview of the proposed PT measures which have been identified to service the forecast demand generated by the Clonburris SDZ, and includes the following:

- **NTA Strategy Measures:** Provides details on the PT measures identified in the 2035 GDA Strategy which will impact on Clonburris;
- **Clonburris Measures:** Discusses measures which have been identified to capture local demand in the vicinity of Clonburris and support the GDA Strategy; and
- **Modelling Results:** Provides analysis of results from the ERM highlighting the performance of the proposed PT measures serving Clonburris.

It should be noted, that the alignment and details of all proposed PT measures set out in this section are indicative only, and subject to further development as the design and planning processes for individual projects progress. Accordingly, some of the details of the individual proposals will be subject to amendment as this design development work is undertaken.

7.2.2 NTA Strategy Measures

The 2035 GDA Strategy outlines numerous public transport proposals to serve predicted growth in travel demand to 2035 and promote the use of sustainable modes of travel. Table 6.2 above, outlined the proposed phasing of these key PT schemes, identifying measures which are likely to be implemented prior to 2026. Specific measures which are likely to impact on the Clonburris development include:

- **The DART Expansion Programme:** Extension of the DART system, providing fast, high-frequency electrified services to Hazelhatch on the Kildare Line, incorporating;
  - **DART Underground:** A proposed underground rail link connecting the Kildare Line to the city centre; and
  - **Opening of Kishoge Station:** Opening of the Kishoge Station within the proposed Clonburris SDZ which will provide improved rail access for residents;
- **Tallaght – Blanchardstown Orbital Route:** The provision of a high frequency orbital bus service which will link the Clonburris development with Tallaght and Blanchardstown, and also facilitate interchange with Luas and core radial bus services;
- **Upgrade of Radial Bus Services along the N4/N7:** The provision of improved bus priority to facilitate more efficient, high frequency radial bus services to the city centre; and

- **Luas Lucan:** The provision of a high capacity light rail network linking Lucan's large residential areas to the south of the N4 to the city centre.

It should also be noted that a key element of the strategy for Clonburris has been delivered in the period since its publication, namely the reintroduction of regular passenger services through the Phoenix Park Tunnel. Those travelling on Kildare route commuter services, which stop at Clondalkin-Fonthill, can now access Drumcondra, Connolly, Tara Street, Pearse and Grand Canal Dock Stations directly.

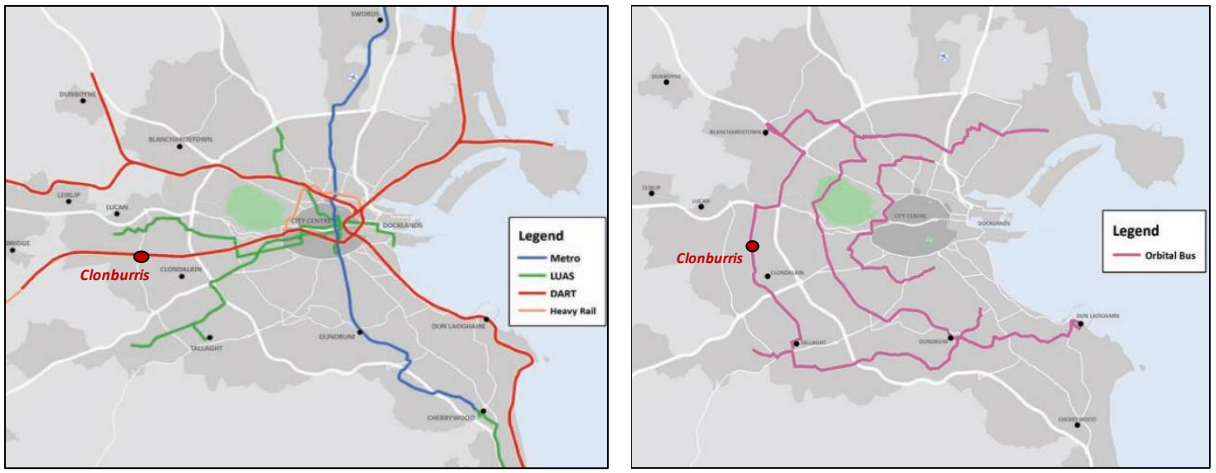


Figure 7.1 Proposed 2035 GDA Strategy PT Measures

7.2.3 Clonburris Measures

In order to identify specific PT measures for Clonburris, in addition to the GDA Strategy, analysis was carried out on the key car trip attractors in the vicinity of the development. Figure 7.2 below, illustrates the 24-hour car trips attracted to each of the ERM zones surrounding the Clonburris SDZ.

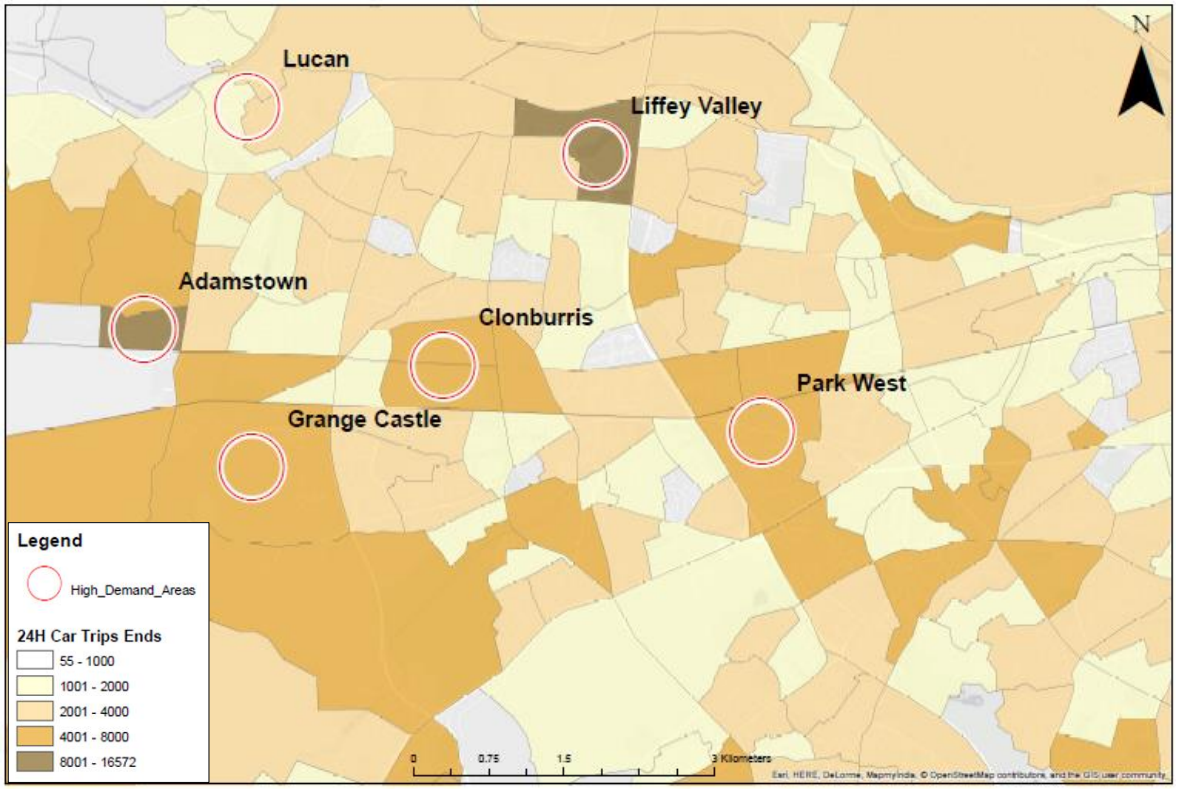


Figure 7.2 24 hr Car Trip Attractions

This analysis highlighted a number of areas which experienced high levels of car trip attractions that could potentially be captured by PT, namely:

- Adamstown;
- Grange Castle Business Park;
- Liffey Valley Shopping Centre; and
- Park West Industrial Estate.

The following bus measures were identified which could link Clonburris with these key car trip attractors and provide a sustainable alternative for trips originating within the SDZ:

- Additional Orbital Bus Services on the R136;
- Introduction of a new local service linking Lucan and Park West; and
- Provision of a new service from Grange Castle to Liffey Valley via Clonburris.

Tallaght – Blanchardstown Orbital

Within the 2035 GDA Strategy, the Tallaght – Blanchardstown Orbital route operates via the Fonthill Road (R113). It proposed that an additional orbital service will be provided which will link Liffey Valley to Tallaght via the Grange Castle Road (R136). It is envisaged that the provision of these high quality orbital bus services will:

- Capture a higher proportion of Clonburris demand;
- Provide interchange with the rail stations at both Kishoge and Clondalkin-Fonthill; and
- Provide a high frequency service linking Clonburris to Tallaght, Blanchardstown, Liffey Valley and Fonthill Retail Park.

Figure 7.3 illustrates the 2035 Strategy Orbital routing, including the proposed secondary orbital service operating via the R136.

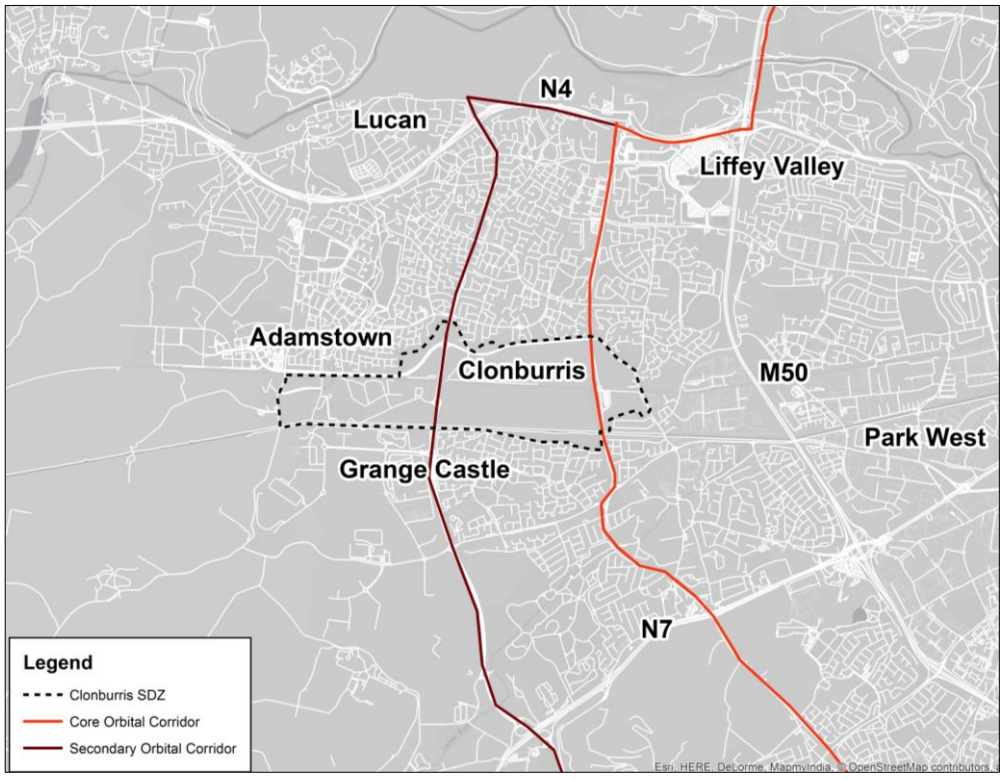


Figure 7.3 Proposed Orbital Services

Figure 7.4 provides an indicative alignment for the proposed orbital services through the Clonburris SDZ. Catchment analysis indicates that a significant proportion of the proposed development would be within 400m of a high quality Orbital Bus Service. Further catchment and accessibility analysis for proposed PT services within Clonburris is provided in Section 7.3.4 later in this report.

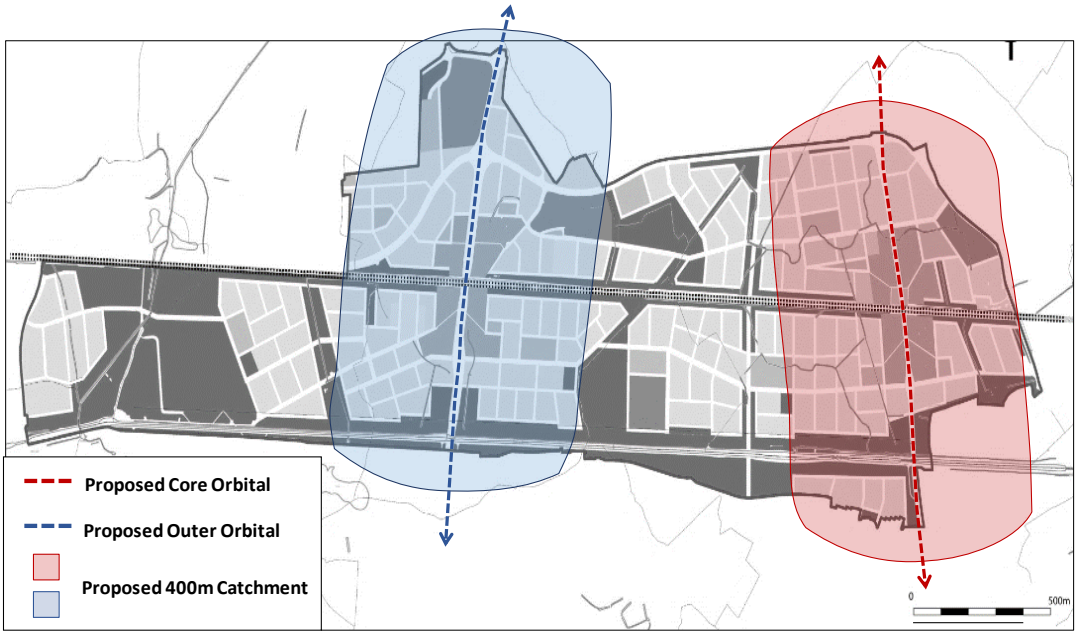


Figure 7.4 Propose Orbital Service Routing through the SDZ

Lucan – Park West Service

A new proposed local bus route was identified to service areas with high car trip attractors which are not directly linked by the 2035 GDA strategy measures. The proposed route is illustrated in Figure 7.5 and links Lucan, Adamstown, Clonburris and Park West Industrial Estate. This route complements the GDA Strategy as it provides interchange with Core and Orbital bus services along with Rail and Luas.

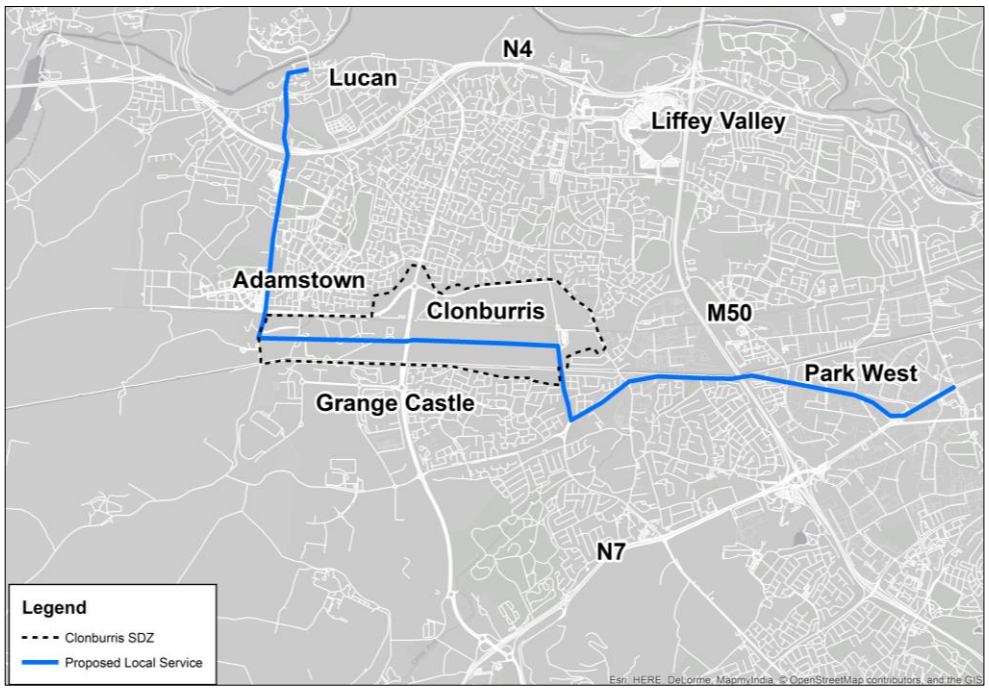


Figure 7.5 Proposed Lucan – Park West Bus Route

New Service from Grange Castle to Liffey Valley

It is proposed that a new service would run through Clonburris SDZ and between Grange Castle Business Park and Liffey Valley, as illustrated in Figure 7.6. This may achieved by the extension of an existing route, or by way of a new route interchanging with Luas and the Core Bus Network at Liffey Valley.

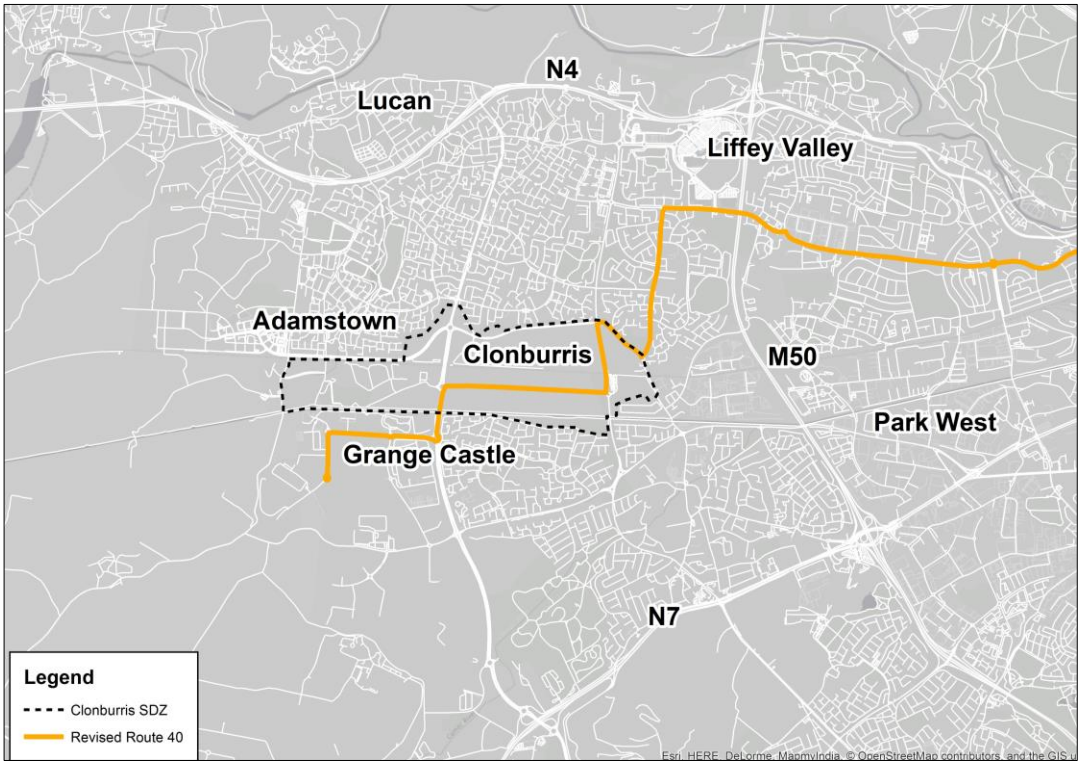


Figure 7.6 Proposed Grange Castle to Liffey Valley Service via Clonburris

7.2.4 Clonburris Public Transport Strategy

The Clonburris PT Strategy combines 2035 GDA Strategy measures with local Clonburris services and includes the following:

- High frequency, high capacity DART service linking Clonburris to the city centre with stations at Kishoge and Clondalkin-Fonthill;
- High Frequency Orbital Bus services linking Clonburris to Tallaght, Liffey Valley and Blanchardstown; and
- Local bus services linking Clonburris to areas of high demand

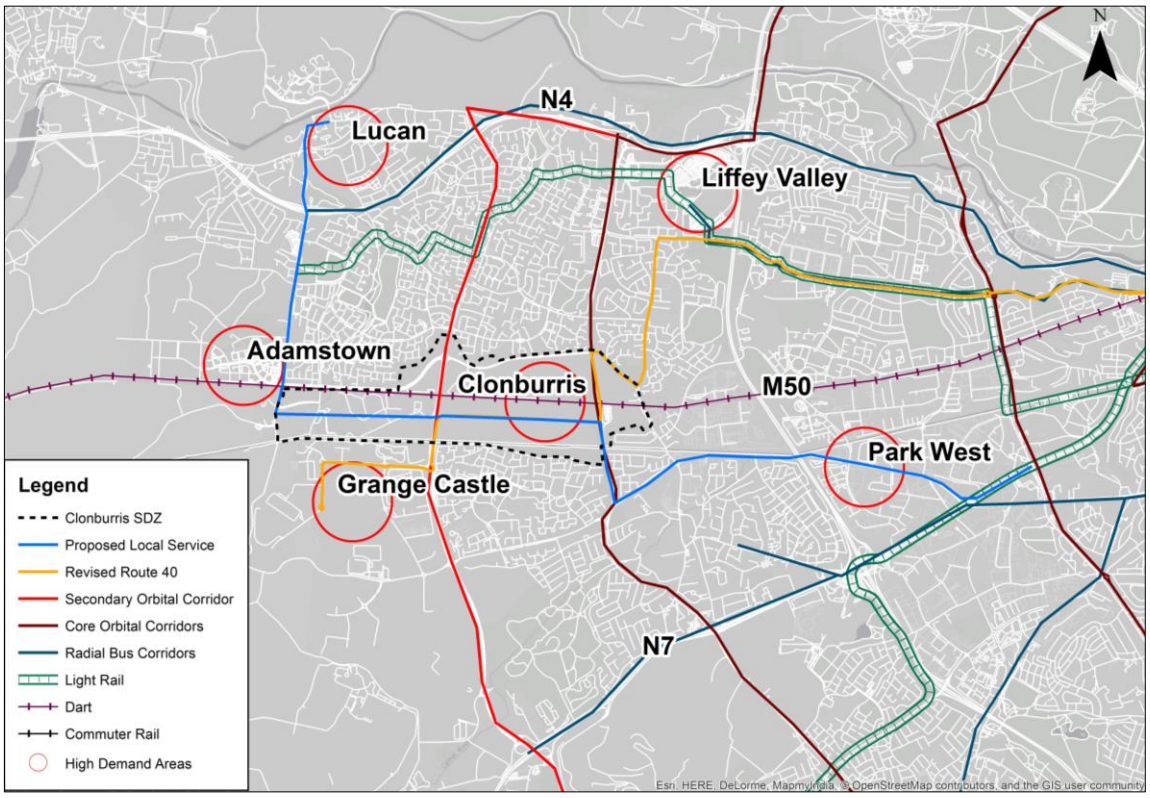


Figure 7.7 Clonburris PT Strategy Measures

7.2.5 Results

Introduction

The Clonburris PT Strategy was run in the ERM for the forecast year 2035 to identify its performance in terms of serving the proposed demand. The following sections provide an overview of the PT modelling results, broken down for the three key elements of the strategy, namely:

- High Frequency DART;
- High Frequency Orbital Bus; and
- Local Bus

It should be noted that bus routes shown above were derived for modelling purposes only and do not necessarily comprise proposals for the year 2035. Bus routes and levels of service will be reviewed regularly as Clonburris develops and will adapt to meet emerging travel demand patterns.

High Frequency DART

As noted earlier in this chapter, the Clonburris PT Strategy includes the extension of high frequency DART services to Hazelhatch along the Kildare Rail Line. The availability of DART Underground provides a direct high-frequency connection for services from Clonburris to the City Centre along with potential interchange with Metro, Luas and other DART services.

Within the strategic modelling, two DART services have been included which stop at stations in Clonburris, namely:

- Hazelhatch and Celbridge – Balbriggan; and
- Hazelhatch and Celbridge – Clongriffin.

These services combine to provide a DART frequency of 7.5 minutes from Clonburris to the city centre. Figure 7.8 and 7.9 illustrate the boarding and alighting profile for these DART services in the AM peak hour (08:00 – 09:00).

The results indicate that the DART is well utilised in the AM peak with approximately 2,000 passengers boarding at stations in Clonburris travelling towards the city centre. The service accommodates a maximum passenger volume of over 6,000 people in the AM peak hour, with the majority of passengers alighting at DART Underground stations in the City Centre at St. Stephen's Green and Pearse stations.

As expected, in the AM peak hour, the service travelling westbound away from the city centre, experiences lower passenger flows. However, this service facilitates approx. 700 passengers alighting at Clonburris stations.

The provision of this high frequency DART service influences the distribution pattern of PT trips from Clonburris as illustrated in Figure 6.7. This provides a competitive alternative for longer distance trips to the City Centre, thus reducing the car mode share and overall impact of Clonburris on the wider road network.

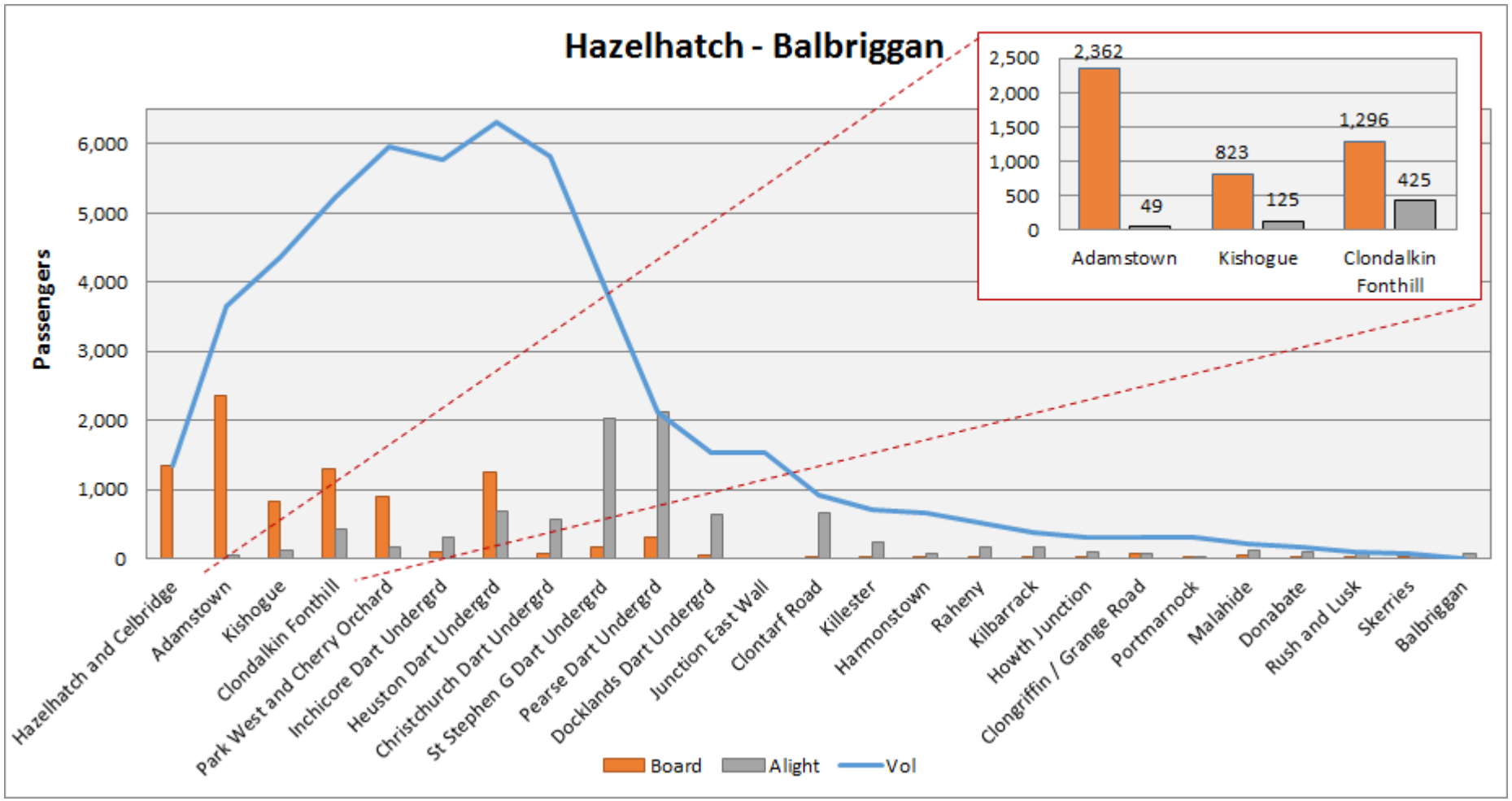


Figure 7.8 Hazelhatch DART Service Eastbound Boarding & Alighting Profile – 2035 AM Peak Hour

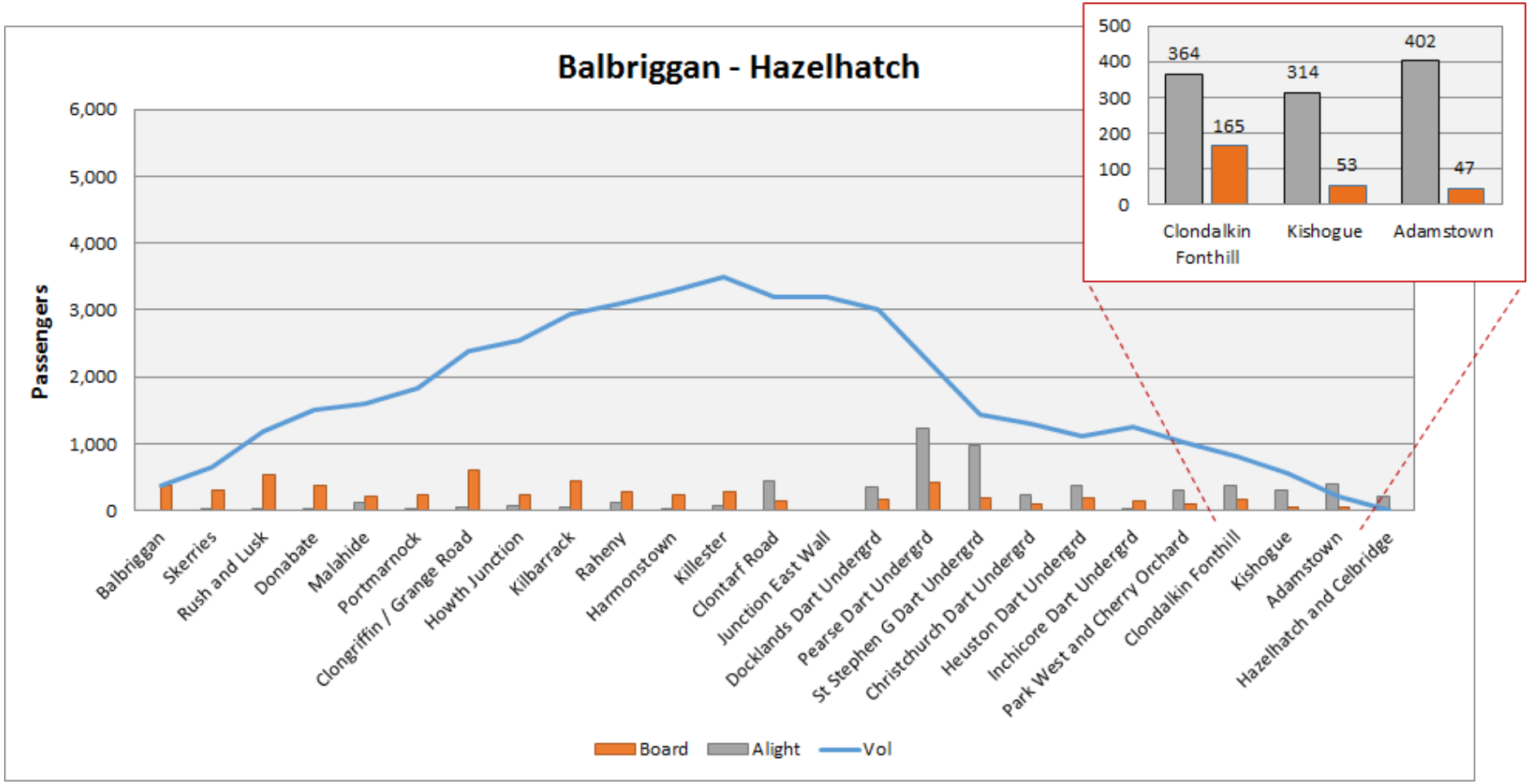


Figure 7.9 Hazelhatch DART Service Westbound Boarding & Alighting Profile – 2035 AM Peak Hour

High Frequency Orbital Bus

The Clonburris PT Strategy includes two orbital bus services running from Tallaght to Blanchardstown, serving the Clonburris SDZ. It should be noted that the routing for these services have not been finalised and may be subject to change based on further design and planning undertaken by the NTA.

For the purpose of this modelling exercise, the orbital services have been coded to match the routes in Figure 7.3 above, i.e.:

- Core Orbital Service operating North – South on the Fonthill Road North (R113) with an indicative headway of 5 minutes; and
- Secondary Orbital Service serving Liffey Valley to Tallaght via Lucan and Grange Castle Road (R136) with an indicative headway of 15 minutes.

Figure 7.10 illustrates this proposed orbital routing through the SDZ with indicative stopping and interchange locations highlighted. It should be noted that bus stop locations have been selected within the modelling analysis to ensure a high level of accessibility for Clonburris, and are based on:

- The location of ERM zone connectors; and
- The location of interchange points between bus and rail.

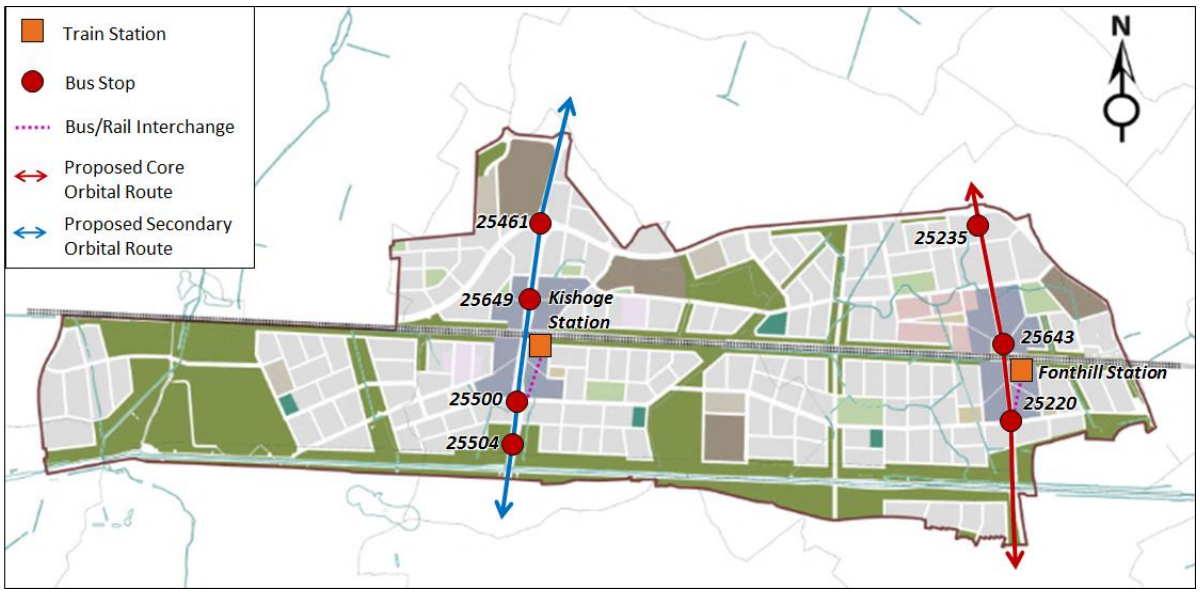
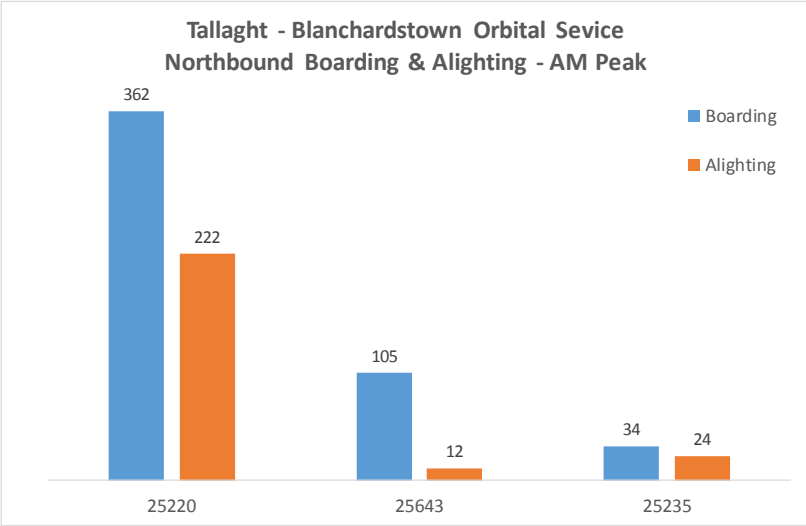


Figure 7.10 Orbital Bus Services within the Clonburris SDZ[5]

Figure 7.11 and 7.12 illustrate the boarding and alightings at stops within Clonburris for the Tallaght – Blanchardstown Core Orbital Service, and the Liffey Valley – Tallaght Secondary Orbital in both Northbound and Southbound directions. The results indicate that the orbital services are well utilised in the AM peak hour with approximately 549 and 629 passengers boarding in total in the Northbound and Southbound directions respectively. The high levels of boarding and alighting at stops 25500 and 25220 are reflective of potential interchange opportunities between complimentary high frequency bus and rail services.

As noted previously in the mode share analysis (Figure 6.11), trips originating in Clonburris have a relatively high level of PT Mode Share to the Tallaght and NW City Sectors (45% and 42% respectively). This is predominantly due to the availability of a high frequency orbital bus service linking Clonburris to these areas.

[5] Note: Numbers in the diagram represent the modelling stop numbers and are used for reference in Graphs 7.11 and 7.12



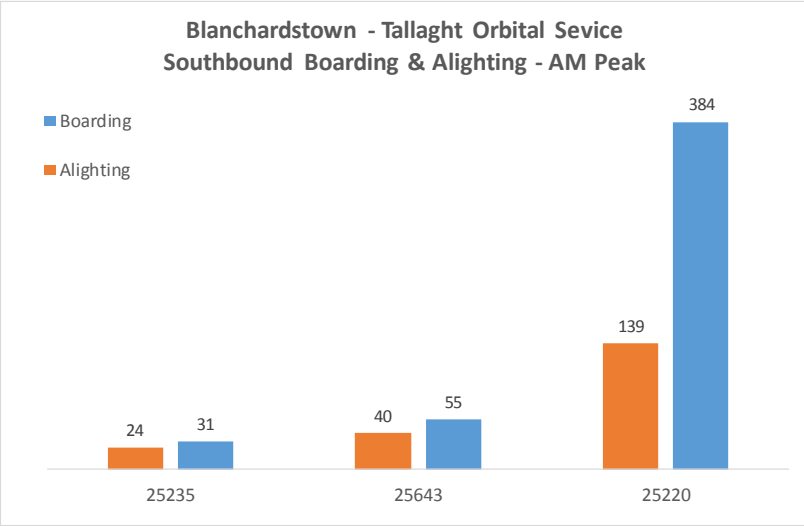
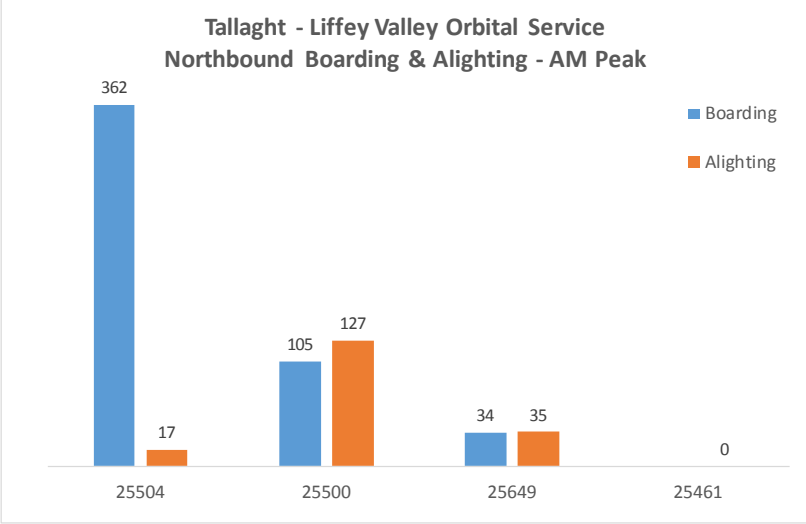


Figure 7.11 Tallaght - Blanchardstown Orbital Boarding and Alighting in Clonburris – 2035 AM Peak



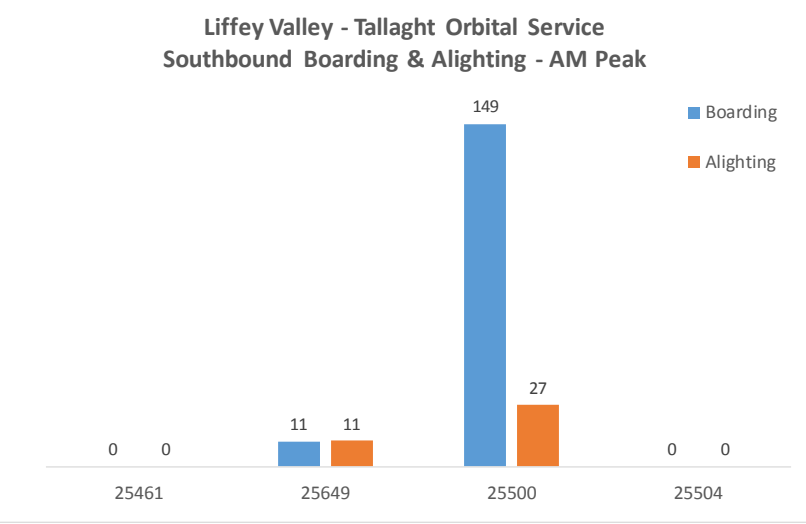


Figure 7.12 Tallaght – Liffey Valley Orbital Boarding and Alighting in Clonburris – 2035 AM Peak

Local Bus

The Clonburris PT Strategy outlines local bus proposals which can support sustainable travel from Clonburris to key trip attractors in the area.

Lucan – Park West Service

This proposed new bus service would link Lucan, Adamstown, Clonburris and Park West Business Park as described earlier in this chapter. Figure 7.13 and 7.14, overleaf, illustrate the forecast 2035 boarding and alighting profile for this service, highlighting stops located within the Clonburris development. For modelling purposes only, we have assumed an indicative headway of 10 minutes for this service.

The results indicate relatively low passenger boardings on the proposed new service in the AM peak hour i.e. approx. 90-120 passengers in each direction. Through analysis of the modelling results, car journey times from Clonburris to key destinations along the route (i.e. Adamstown and Park West) are less than 15 minutes. At these shorter distance trips, it is very difficult for bus to compete with the private car due to aspects such as:

- **Boarding Penalty**: penalty applied to represent the discomfort of queuing to get on a PT Service;
- **Walk Time**: time taken to walk to the PT service which is then factored to represent the perceived discomfort;
- **Wait time**: time spent waiting for a bus service at the stop etc.

These penalties increase the generalised cost of travel by bus and make it less competitive than the private car over shorter distances. This intuitively makes sense, given journey times of less than 15 minutes, car availability and the availability of parking at the destination, a person is more likely to use the car, rather than walk and wait for a bus service.

The Lucan – Park West route still delivers an important service as it provides a sustainable alternative for travel to car dominated attractors in the local area. It also provides interchange with core and orbital bus services and supports the PT measure detailed in the GDA Strategy. In order to further promote the use of this service, further demand management measures could be introduced to balance the relative costs of travel by bus and car, such as, the introduction of parking management at key destinations.

The Mobility Management Plan (MMP) for Clonburris outlines specific measures which can be implemented to support and promote the use of sustainable modes of travel. Further details on the Clonburris MMP are provided in Section 7.6 later in this report.

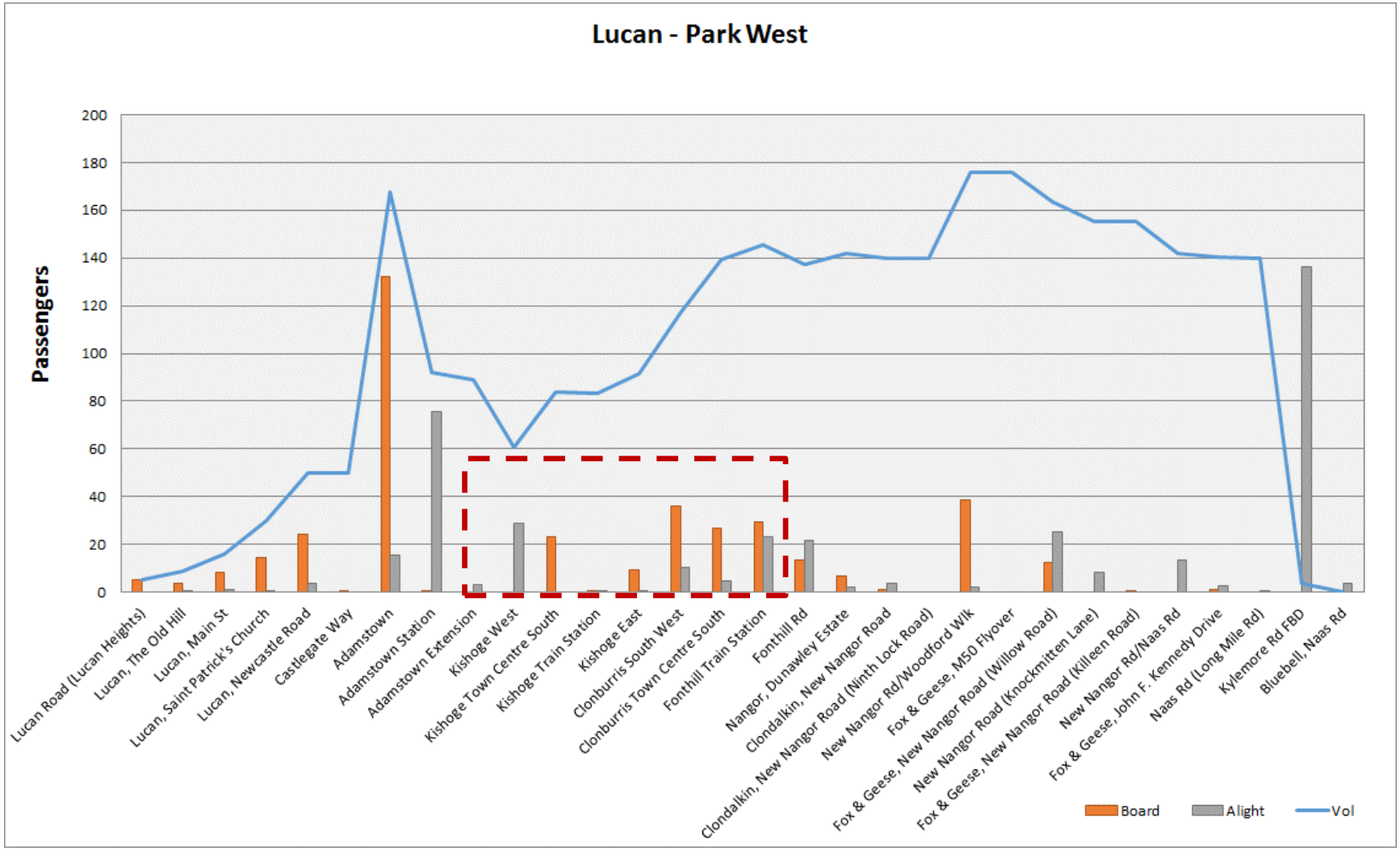


Figure 7.13 Lucan – Park West Boarding and Alighting Profile – 2035 AM Peak hour

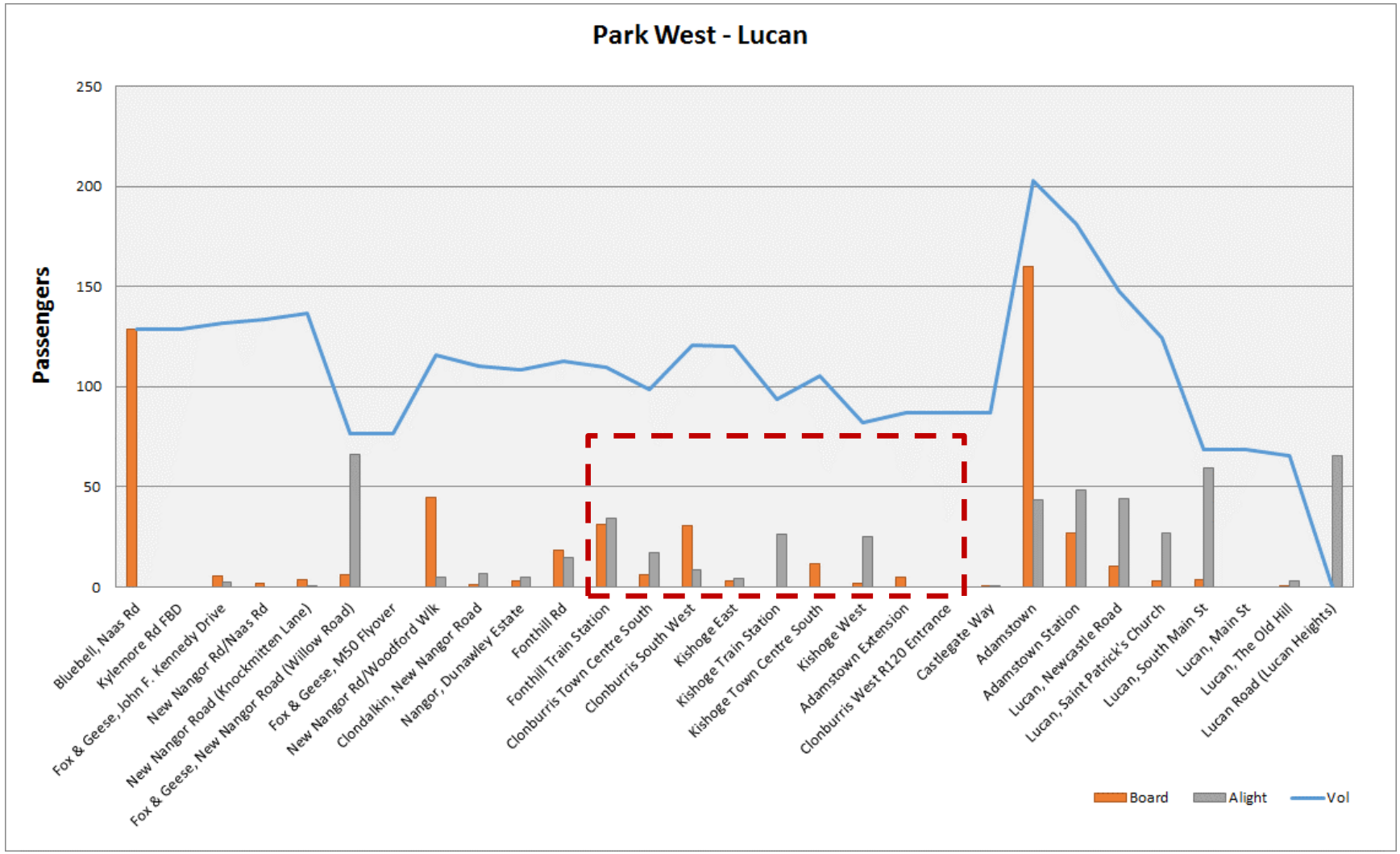
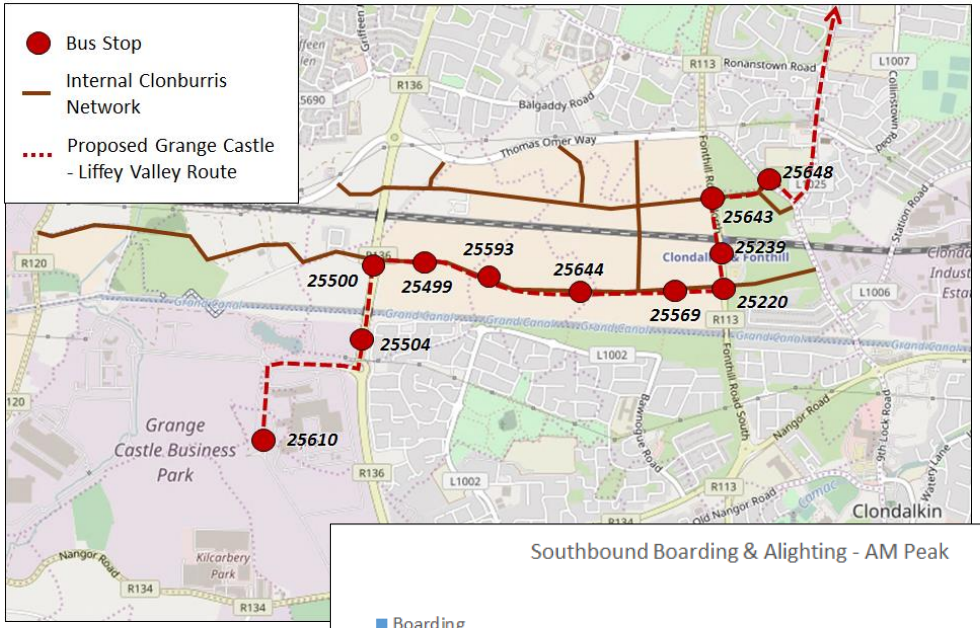


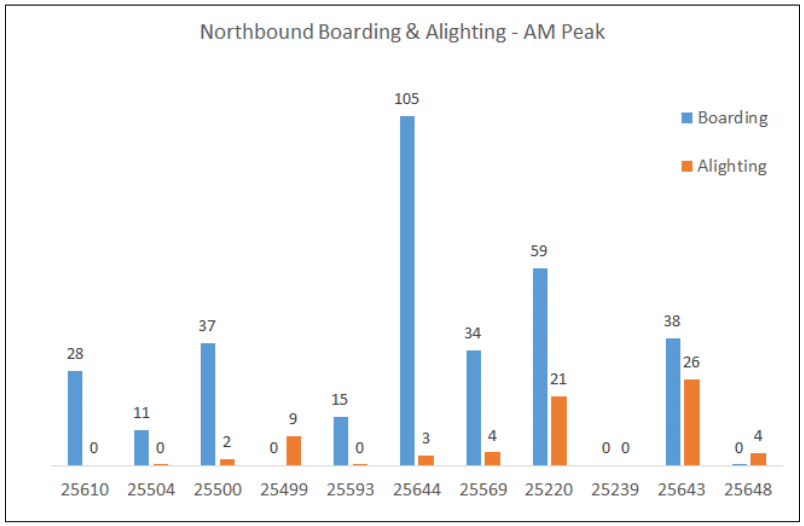
Figure 7.14 Park West – Lucan Boarding and Alighting Profile – 2035 AM Peak hour

Grange Castle to Liffey Valley Service via Clonburris

The proposed new service provides a connection between Clonburris and the employment area at Grange Castle Business Park. Figure 7.15 illustrates the proposed routing of the new service through the Southern East-West Link Road within the Clonburris development with an indicative headway of 11 minutes. Also shown, are the forecast boarding and alightings for stations within Clonburris in the AM peak hour in each direction of travel. Once again, it should be noted that all headways and stop locations are indicative in nature and have been identified for modelling purposes only.

Similar to the new proposed Lucan – Park West service, the results indicate low levels of boarding on the new Grange Castle – Liffey Valley route. As noted previously, at shorter distances, the bus has difficulties competing with the private car, particularly with the type of development at Grange Castle i.e. large industrial park with a high number of on-site free workplace parking spaces. Grange Castle is a large attractor of car trips in the area, and is forecast for future growth in 2035. Therefore, there is a requirement to provide additional bus services to this site. Further demand management measures, e.g. parking restraint/parking charges, would be required to further promote the use of this bus service.





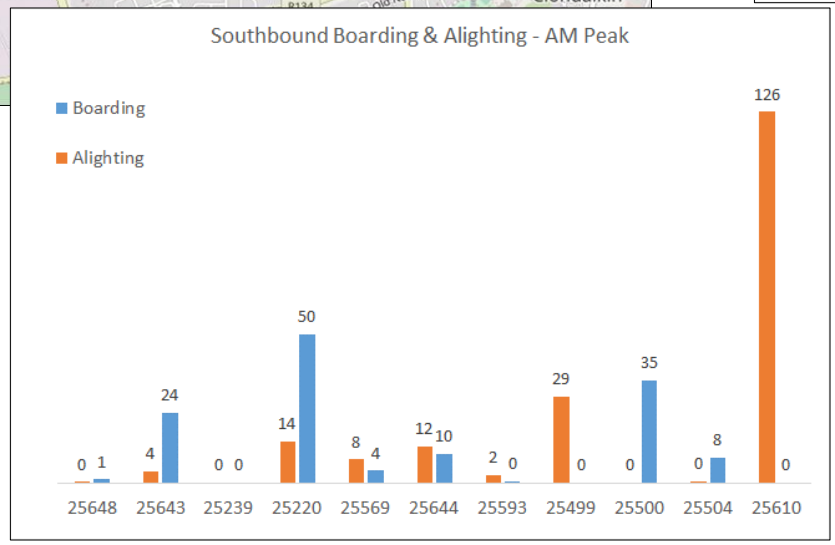


Figure 7.15 Grange Castle to Liffey Valley Service Boarding and Alighting 2035 AM Peak Hour

7.2.6 Summary

The previous sections of this report provide an overview of the proposed Clonburris Public Transport Strategy, and detail the results of analysis carried out in the ERM. In summary

Clonburris PT Strategy

- The Strategy includes the following key services:
    - High frequency, high capacity DART service linking Clonburris to the city centre with stations at Kishoge and Fonthill;
    - High Frequency Orbital Bus services linking Clonburris to Tallaght, Liffey Valley and Blanchardstown; and
    - Local bus services linking Clonburris to areas of high demand
- Results indicate that the DART is well utilised in the AM peak with approximately 2,000 passengers boarding at stations in Clonburris travelling towards the city centre;
- DART provides a competitive alternative for longer distance trips to the city centre, thus reducing the car mode share;
- The orbital bus services are well utilised in the AM peak hour impacting positively on the sustainable mode share to the Tallaght and NW City Sectors;
- The proposed local bus routes deliver important services in terms of providing sustainable transport alternatives to key car trip attractors in the area, however, they require further demand management measures to promote their use

7.3 Walking and Cycling Strategy

7.3.1 Overview

This section outlines the specific walking and cycling infrastructure recommendations for Clonburris and provides an assessment of the sites accessibility with respect to walking distances from residential areas to core services and public transport facilities.

Movement through the site, especially by sustainable modes, is a fundamental consideration for the Clonburris SDZ Masterplan. Walking and Cycling offer a sustainable alternative to the car and make a positive contribution to the overall character, public health and reduction in carbon emissions.

Two urban centres have been defined within Clonburris SDZ- Kishoge and Fonthill. The streets within these centres and the links between them prioritise pedestrian, cycle and public transport movement to ensure safe and attractive linkages are provided to and from major community resources such as schools, public transport nodes, retail, employment centres and recreational facilities.

The high quality public ream is especially designed to encourage cycling and walking, by maximising permeability and providing residents with access to major destinations within a 400 to 800 metre walk of their home.

7.3.2 Design Process

The development of the Walking and Cycling Network has followed a series of logical steps, which are outlined below:

Policy Review

Chapter 3 of this report outlines the current Transport Policy and Guidance shaping the design of Clonburris. To undertake the Walking and Cycling Network Assessment, we have consulted the following policies and guidance:

- National Cycle Policy Framework 2009 – 2020 (Department of Transport, 2009);
- National Cycle Manual (NTA, 2011);
- Greater Dublin Area Cycle Network Plan (NTA, 2013);
- Urban Design Manual: A Best Practice Guide (Department of Environment, Heritage and Local Government, 2009);

- Permeability: A Best Practice Guide (NTA, 2015); and
- Design Manual for Urban Roads and Streets (DTTAS & DECLG, 2013)

Data Collection: planned network information

GDA Cycle Network Plan

As detailed in Section 3, the GDA Cycle Network Plan categorise cycle routes as follows:

NETWORK	ROUTE CATEGORY	DESCRIPTION
Urban Cycle Network	Primary	Main cycle arteries that cross the urban area and carry most cycle traffic
	Secondary	Link between principal cycle routes and local zones
	Feeder	Cycle routes within local zones and/or connections from zones to the network levels above
Inter Urban Cycle Network	Links the towns and city across rural areas and includes elements of the National Cycle Network within the GDA.	
Green Route Network	Cycle routes developed predominately for tourist, recreational and leisure purposes but may also carry elements of the utility cycle route networks listed above. Many National Cycle routes will be of this type.	

The GDA Cycle Network Plan in Clonburris SDZ includes the following routes, which are illustrated in Figure 7.16:

- Primary level. Route: SO5.
- Secondary level. Routes: SO5a, SO6, SO7 and SO8.
- Green Route: Grand Canal Greenway and Griffeen Valley Greenway.

Draft Lucan Access Study

The Study contains a series of recommended measures to improve connectivity and permeability in the Lucan Area, enhancing the quality of the environment for pedestrians and cyclists and encouraging greater use of sustainable transport modes. Figure 7.17 shows the existing and proposed Network.

To the north of Clonburris, the plan includes cycle facilities along the full length of Balgaddy Road and the upgrade of several junctions.

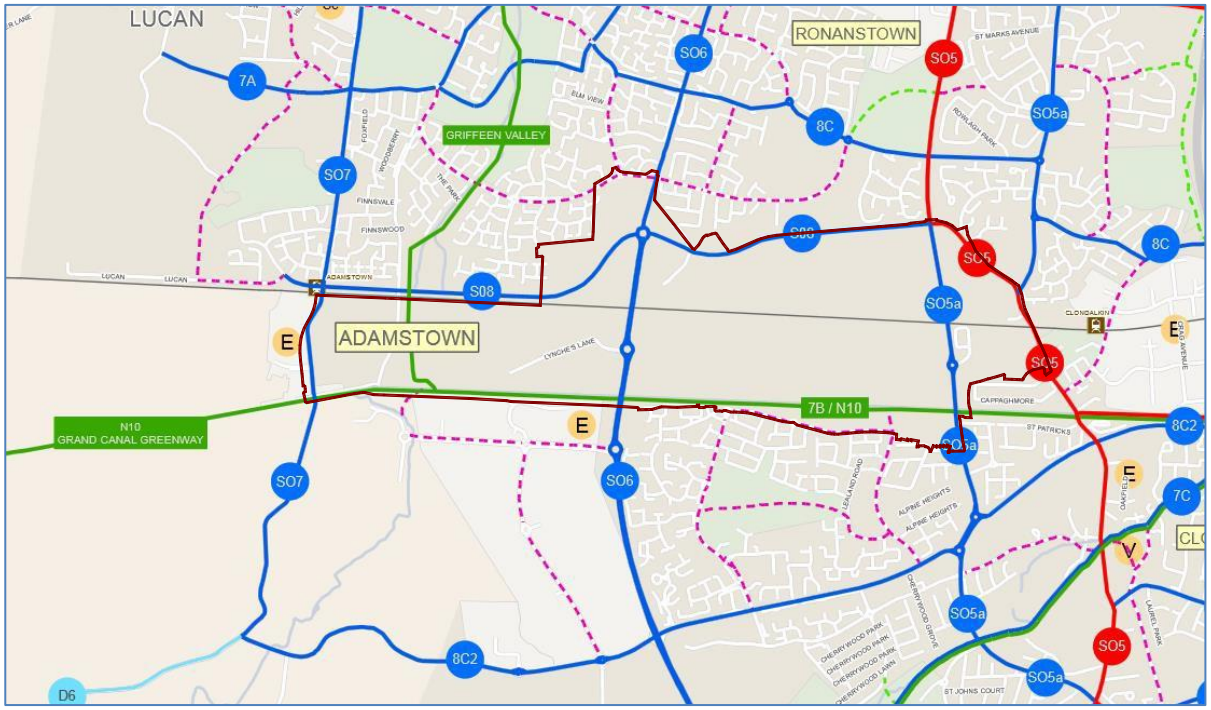


Figure 7.16 GDA Cycle Network Plan in Clonburris SDZ

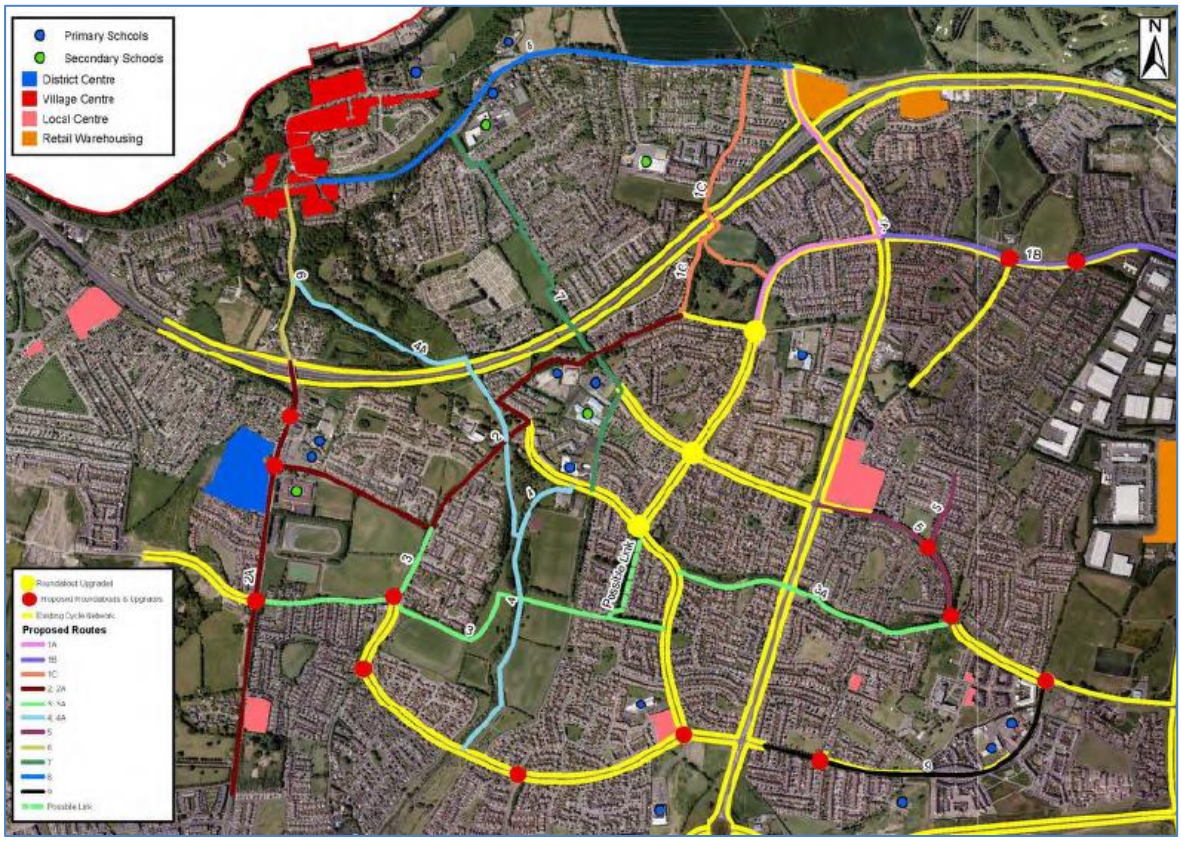


Figure 7.17 Draft Lucan Access Study

Existing Facilities Review

Existing Cycling Routes

The Grand Canal Greenway is a strategic cycling and walking facility on the southern side of the Grand Canal. Near Grange Castle Business Park there is a footbridge over the Canal for cyclist and pedestrians which connects the Grand Canal Greenway with the SDZ lands.

The Griffeen Valley Greenway runs along the Griffeen Valley Park, it is connected to the SDZ lands by a footbridge over the Railway line and the Adamstown Avenue.

The Arterial Streets of Adamstown Avenue (L1058) and Thomas Omer Way (L1059) provide off-road cycle tracks on both sides. Lucan-Newlands Road (L1015) provides off-road cycle tracks along a section of road between the junctions of Fonthill Road North and Wood Avens.

The R113 – Fonthill Road accommodates an off-road two way cycle track on the western side and the R136 – Grange Castle Road accommodates an off-road cycle track on both sides. Figure 7.18 illustrates the location and types of the existing cycle routes.

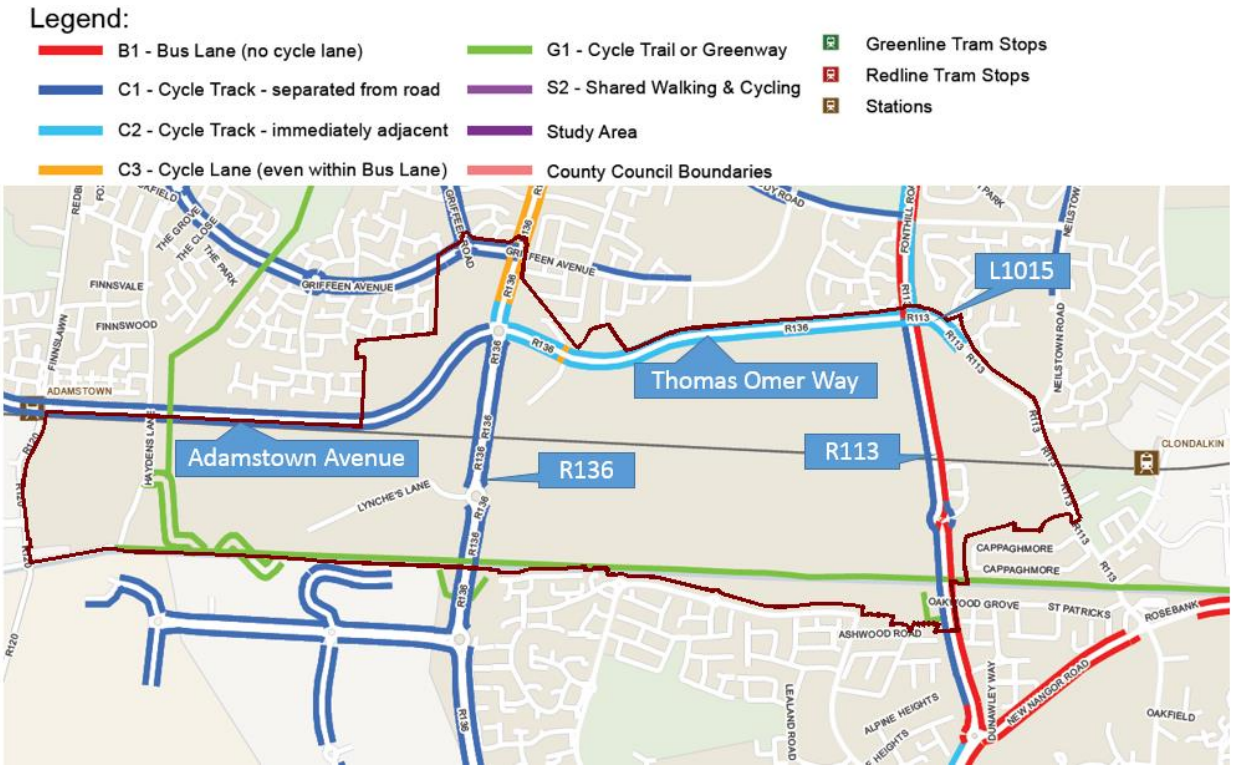


Figure 7.18 Existing Cycle Routes – Source: GDA Cycle Network Plan

Existing Pedestrian Routes

In addition to the Grand Canal Greenways, the Arterial Streets of Adamstown Avenue (L1058), Thomas Omer Way (L1059), the R113 – Fonthill Road and the R136 – Grange Castle Road provide footpaths on both sides.

Figure 7.19 indicates the location of the existing footpaths.

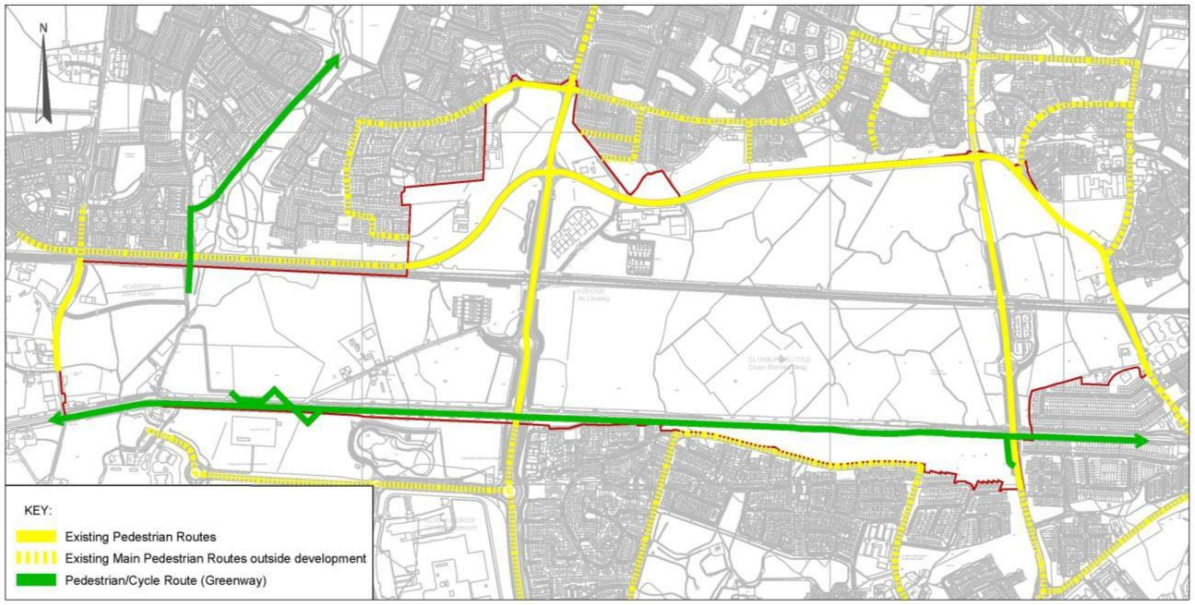


Figure 7.19 Existing Pedestrian Routes

Walking and Cycling travel demand assessment

The Accessibility Assessment in Section 7.3.4 maps the main trip attractions within the development; including schools, retail, community and public transport services, and identifies desirable/acceptable walking distances to those destinations from the residential areas.

This exercise has assisted in the identification of key desire lines within and external to Clonburris and has informed the design of walking and cycling measures to support the demand.

Street Hierarchy Description and Attributes

The street hierarchy adopted for the Clonburris SDZ Masterplan classifies its internal roads as Arterial Streets, Link Streets and Local Streets, illustrated in Figure 7.20 below.

Based on the network hierarchy descriptions provided in DMURS and the current masterplan layout for Clonburris SDZ, the following street attributes for speed limits, pedestrians and cyclist facilities are proposed:

Table 7.1 Street Hierarchy Attributes

Attribute	Street Hierarchy Description		
	Arterial	Link	Local
Speeds	■ 50kph with reduction to 30kph passing through centres.	■ Preferable 30kph in neighbourhoods and centres.	■ 30kph
Pedestrians	■ Footpaths provided with width corresponding to expected footfall and activity. Minimum 2metres. ■ Pedestrian crossings signal controlled at signalised junctions. ■ Additional signal controlled crossings provided mid-block along key desire lines. Minimum 4metres wide.	■ Footpaths provided with width corresponding to expected footfall and activity. Minimum 2metres. ■ Pedestrian crossings signal controlled at signalised junctions. Direct single movement crossings. ■ Additional signal controlled crossings provided mid-block along key desire lines. Minimum 4metres wide. Level grade pedestrian crossings at intersections with local Streets.	■ Footpaths provided with width corresponding to expected footfall and activity. Minimum 2metres. ■ Pedestrian crossings uncontrolled based on design of narrow carriageway and tight corner radius. ■ Shared surface permissible in appropriate locations – See DMURS and Home Zone Design Guidelines for further guidance
Cyclists	■ Off -street cycle track adjacent to carriageway, preferably raised and buffer incorporated. ■ Toucan crossings provided at intersections and along key desire lines- min	■ Off -road cycle track adjacent to carriageway, preferably raised and buffer incorporated. ■ Toucan crossings provided at intersections and along key desire lines- min	■ Shared street. Cyclist mixes with local traffic.

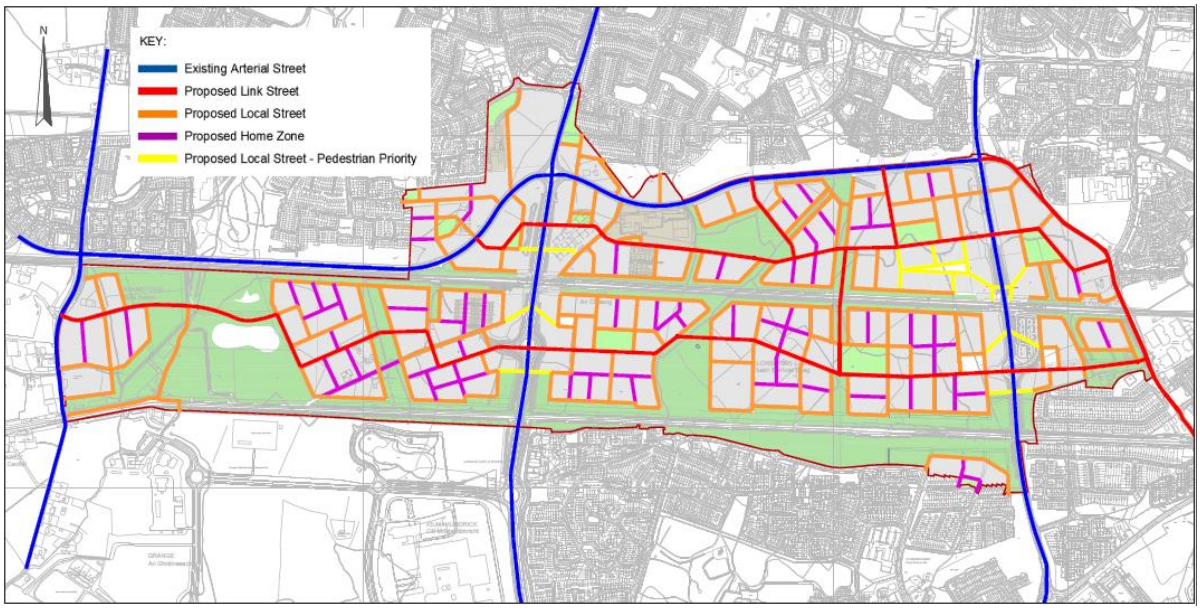


Figure 7.20 Street Hierarchy

Connection to external network

As well as designing a permeable pedestrian environment within Clonburris, it is also essential that the development is well integrated into the existing built environment with good connections to surrounding areas for pedestrians and cyclists. A map of the external routes (both existing and for potential permeability projects) linking into the masterplan SDZ is shown in Figure 7.21.

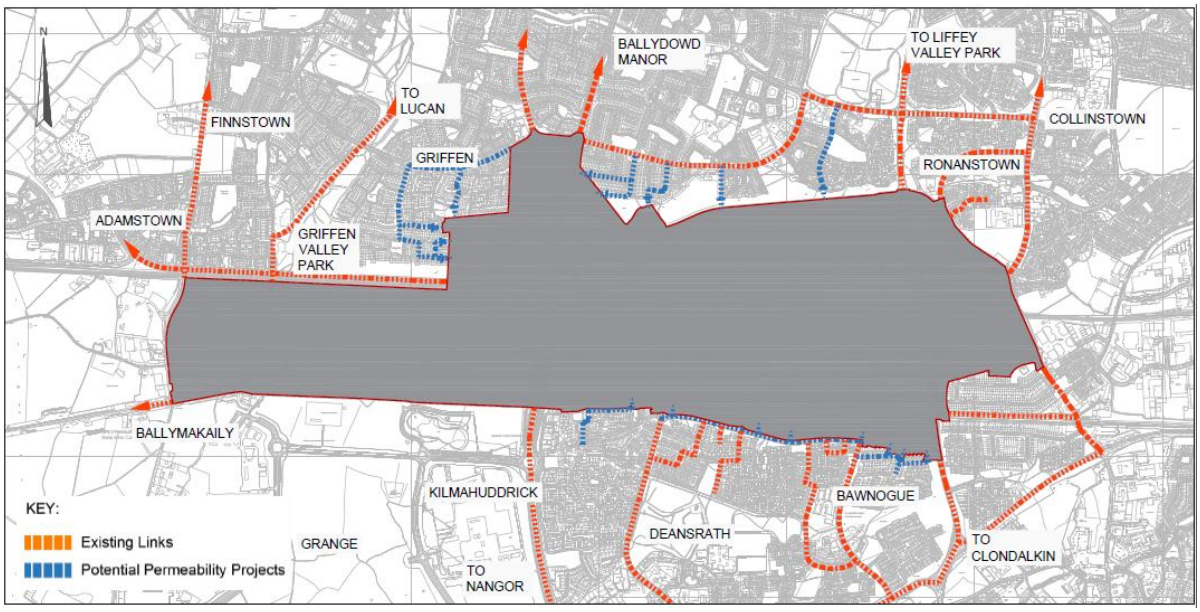


Figure 7.21 Connections to external network

7.3.3 Walking and Cycling Networks

Design Principles

The key design principles underpinning the design of the walking and cycling strategy are as follows:

- Attractive and safe pedestrian and cycle routes;
- Continuous links created to existing networks;
- Safe pedestrian crossings;
- Junctions designed for cyclists as per the standards on the National Cycle Manual;
- Clear signage for pedestrian and cycle routes; and
- High levels of permeability for walking and cycling.

Filtered Permeability Junctions

Filter permeability junctions are applied to prioritise the movement of more sustainable modes (i.e. pedestrians, cyclists and public transport) over private vehicles. For example, bus gates and vehicular cul-de-sacs.

It is proposed that filtered junctions will be provided on selected Local Street junctions with the Arterial Streets and Link Streets to allow full permeability to pedestrian and cyclists only. Figure 7.22 shows the typical arrangement for this type of junction.

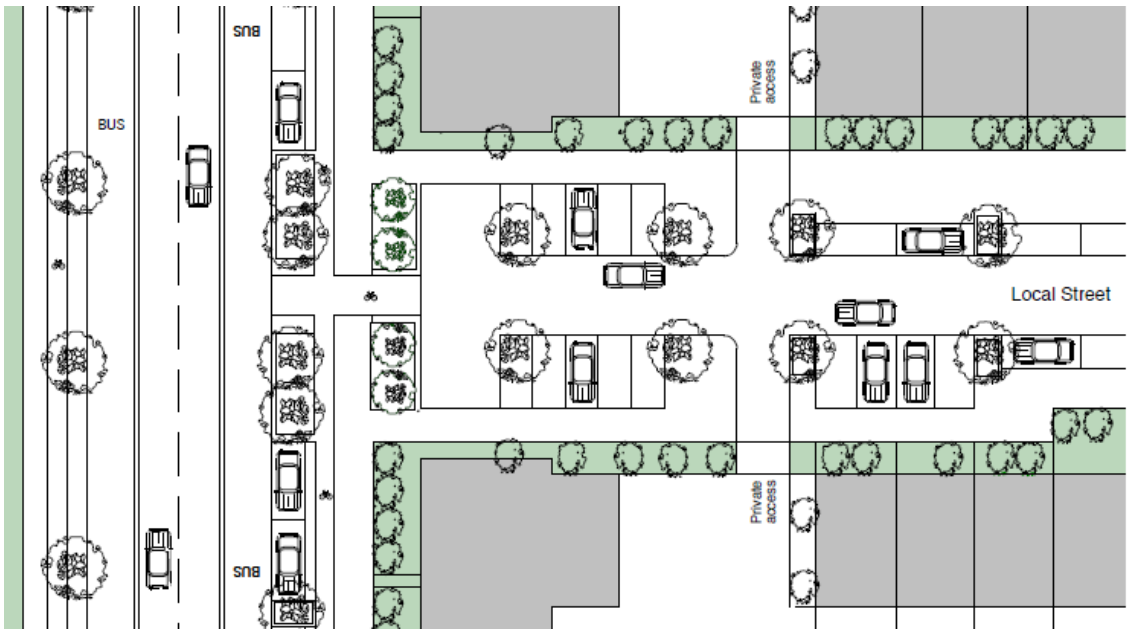


Figure 7.22 Filtered Junction

Proposed Walking and Cycling Networks

Following the methodology and design principles detailed above, a comprehensive walking and cycling network has been developed for Clonburris.

Figure 7.23 and MAP-01-WC in Appendix A illustrate the type of infrastructure provided for the proposed pedestrian and cycling routes through the site and how these routes link with the surrounding area.

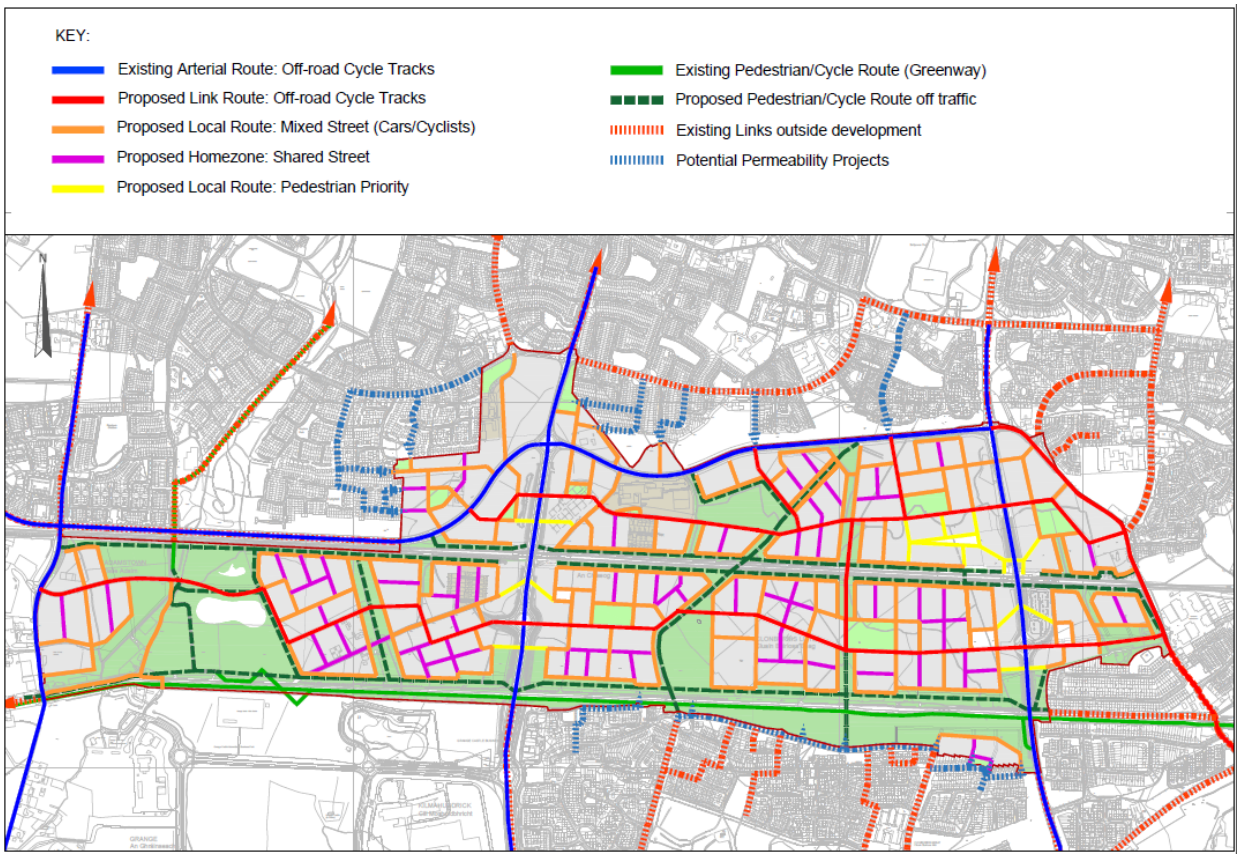


Figure 7.23 Proposed Walking and Cycling Network

The existing Grand Canal Greenway and Griffeen Valley Greenway will be complemented by a series of interconnecting and dedicated Cycle routes linking the residential areas to key attractions, both internal and external to Clonburris. The proposed dedicated Cycle Routes within the development are:

West-East Cycle Trails:

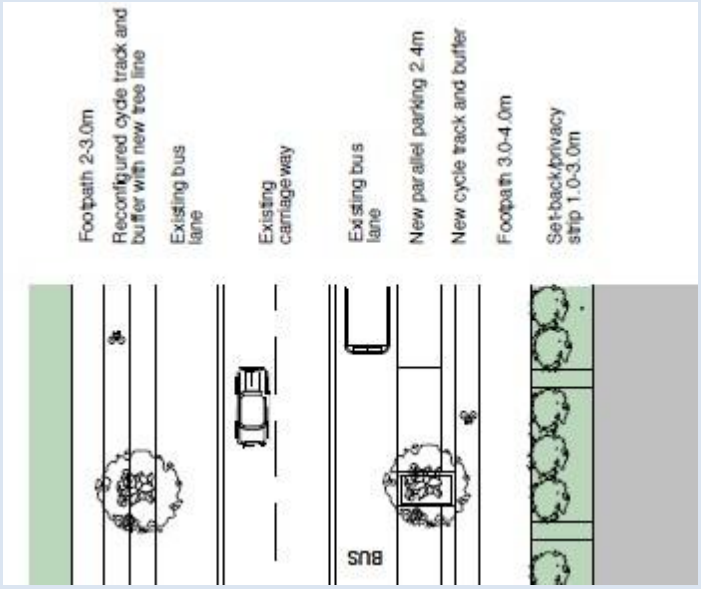
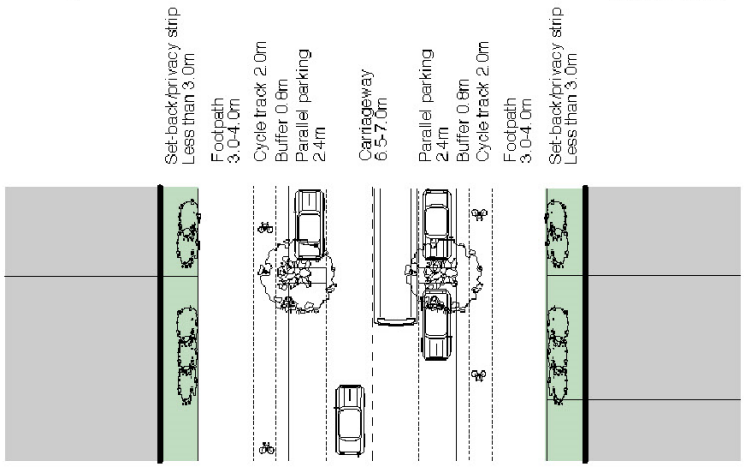
- Cycle Trail adjacent to the Railway Line on both sides of the railway line.
- Cycle Trail on the northern side Grand Canal setback along the street frontage

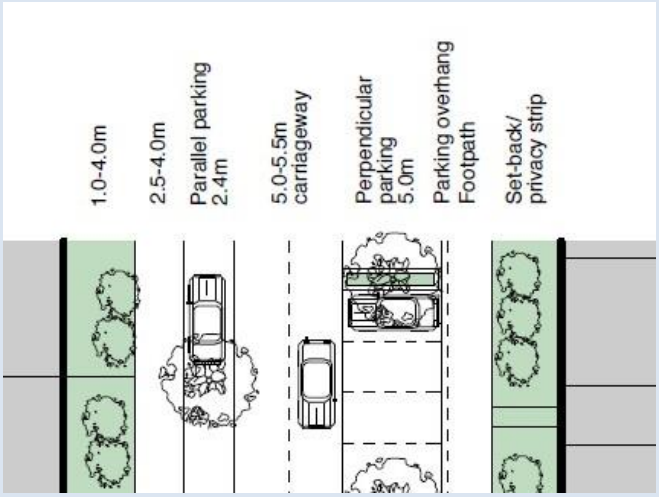
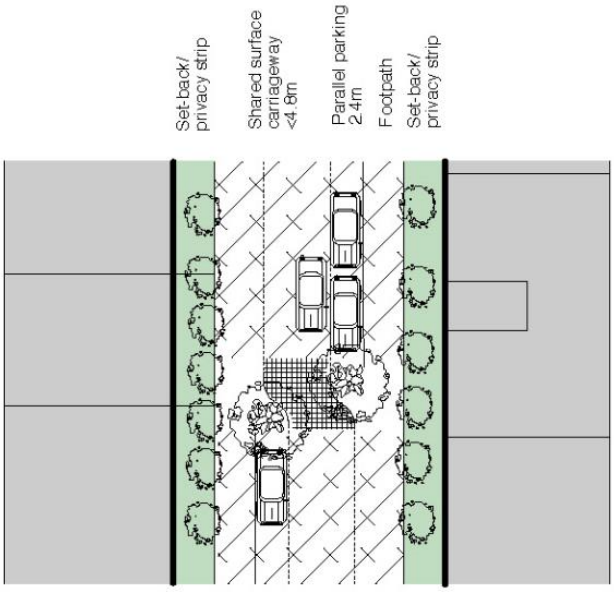
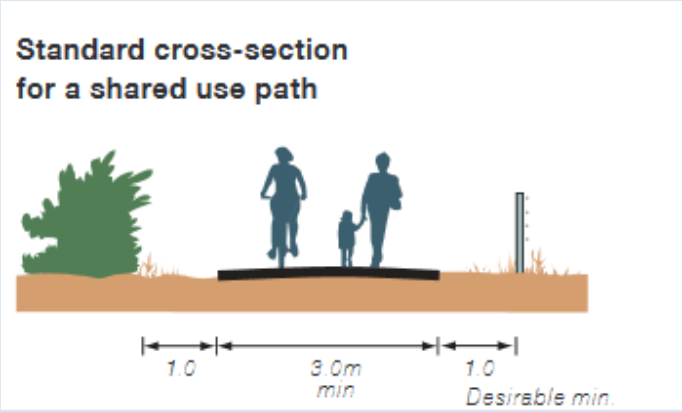
North-South Cycle Trails:

- On the Western side of the development, three Cycle Trails are proposed:
  - Following the existing path near Hayden's Lane (Kilmahuddrick Stream Open Space)
  - New trail along the eastern side of the Griffeen Park Extension.
  - New trail along the central green area between Kishoge South West.
- On the eastern side of the development, a Cycle Trail along the proposed 'Barony Park' linking the Grand Canal Greenway on Kilcronan Avenue with Thomas Omer Way.

The proposed Walking and Cycling infrastructure by link type is summarised in Table 7.2.

Table 7.2 Proposed Walking and Cycling Infrastructure by link type

Street Typology	Infrastructure Provision	Typical Cross Section
Arterial Roads	Raised off-road cycle track (recommended 2m wide), adjacent to carriageway and preferably separated by a buffer. Footpaths positioned on the inside of the cycle track (2-4m wide, depending on availability).	
Link Roads	Raised off-road cycle track (recommended 2m wide), adjacent to carriageway and preferably separated by a buffer. Footpaths positioned on the inside of the cycle track (4m wide min.).	

Street Typology	Infrastructure Provision	Typical Cross Section
Local Roads	Footpaths on both sides of the road and mixed traffic (cars and cyclists).	
Homezone	Shared surface. Pedestrians share street space with cars and cyclists.	
Cycle Trails or Greenway	Traffic free infrastructure for pedestrian and cyclists. Minimum preferred width 4 metres	

To implement the described Walking and Cycling Networks, the following infrastructure measures will need to be implemented within the development:

- 5 no. of Pedestrian/Cyclists bridges over the railway line and canal.
- 27 no. of Pedestrian/Cyclists signalised crossings (Toucan Crossings), minimum width 4m.
- 18 no. of Pedestrian/Cyclist crossings on Signalised Junctions.
- Approximate 65 no. of Filtered Junctions – for pedestrian and cyclist access only.
- Approximate 30 no. of Raised uncontrolled crossings along desire lines on local streets.

Figure 7.24 and MAP 02-WC in Appendix A illustrate the proposed location of the traffic signal junctions, toucan crossings, pedestrian/cycle bridges and proposed filtered junctions.

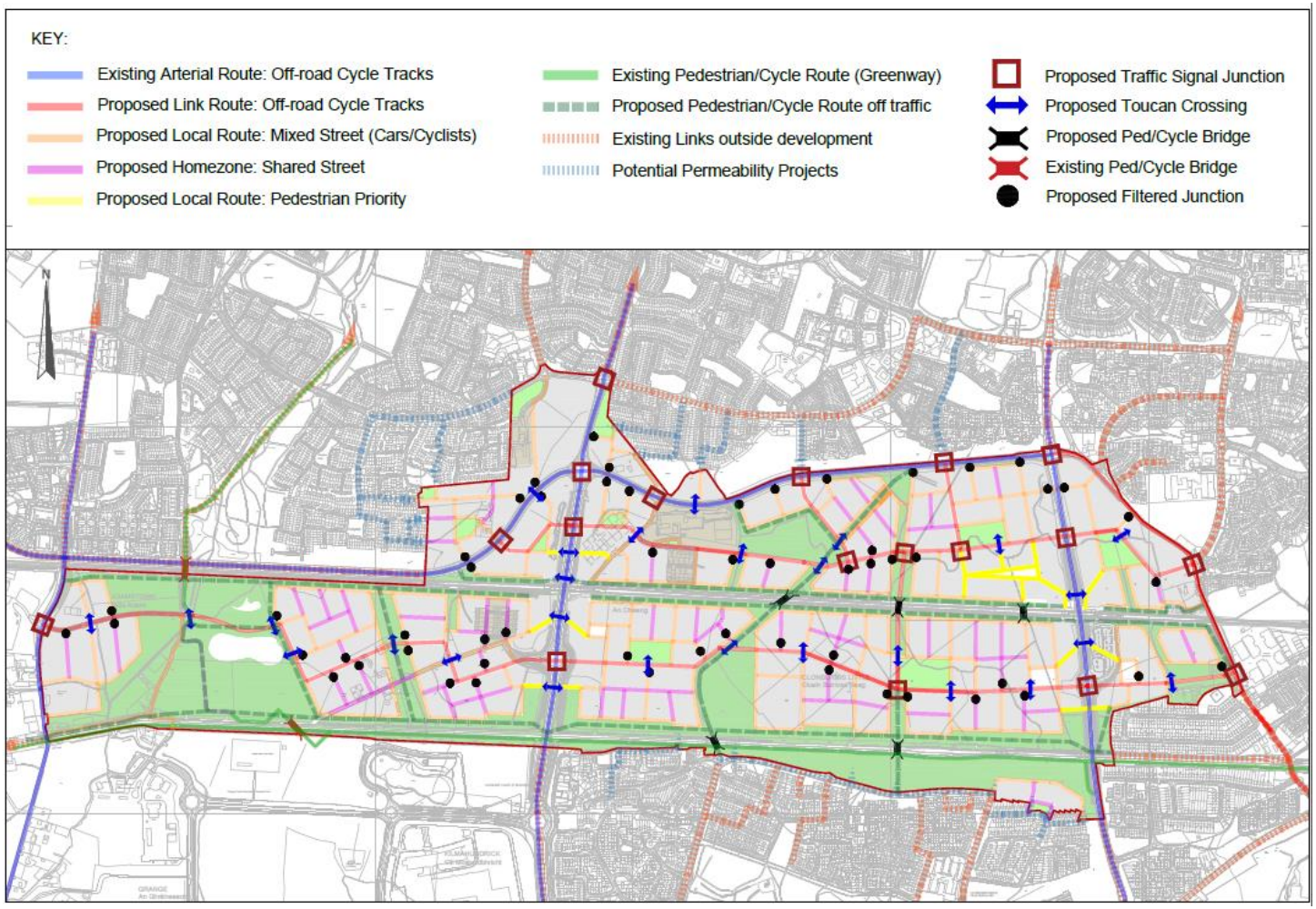


Figure 7.24 Proposed Infrastructure on the walking and cycling network

7.3.4 Accessibility Assessment

A detailed assessment was carried out for the SDZ to determine the level of accessibility to various areas and services within the site. Accessibility describes how well people, places and services are connected to each other using the transport system. Trains, buses and highways work more efficiently when the level of accessibility improves. This also applies to the provision of pedestrian and cycling facilities.

This accessibility assessment was developed for the following purposes:

- To help identify the optimum siting of residential areas within the SDZ that will support travel by public transport, walking and cycling;
- To understand the likely impacts of the proposed zoning within the SDZ on roads, stations and pedestrian and cycling facilities;
- To identify the most suitable locations for medical, education and other services, so that people can reach them effortlessly; and
- To recommend whether different locations within the SDZ need more or less car parking.

Figure 7.25 demonstrates the residential zones and their densities based on the number of dwellings.

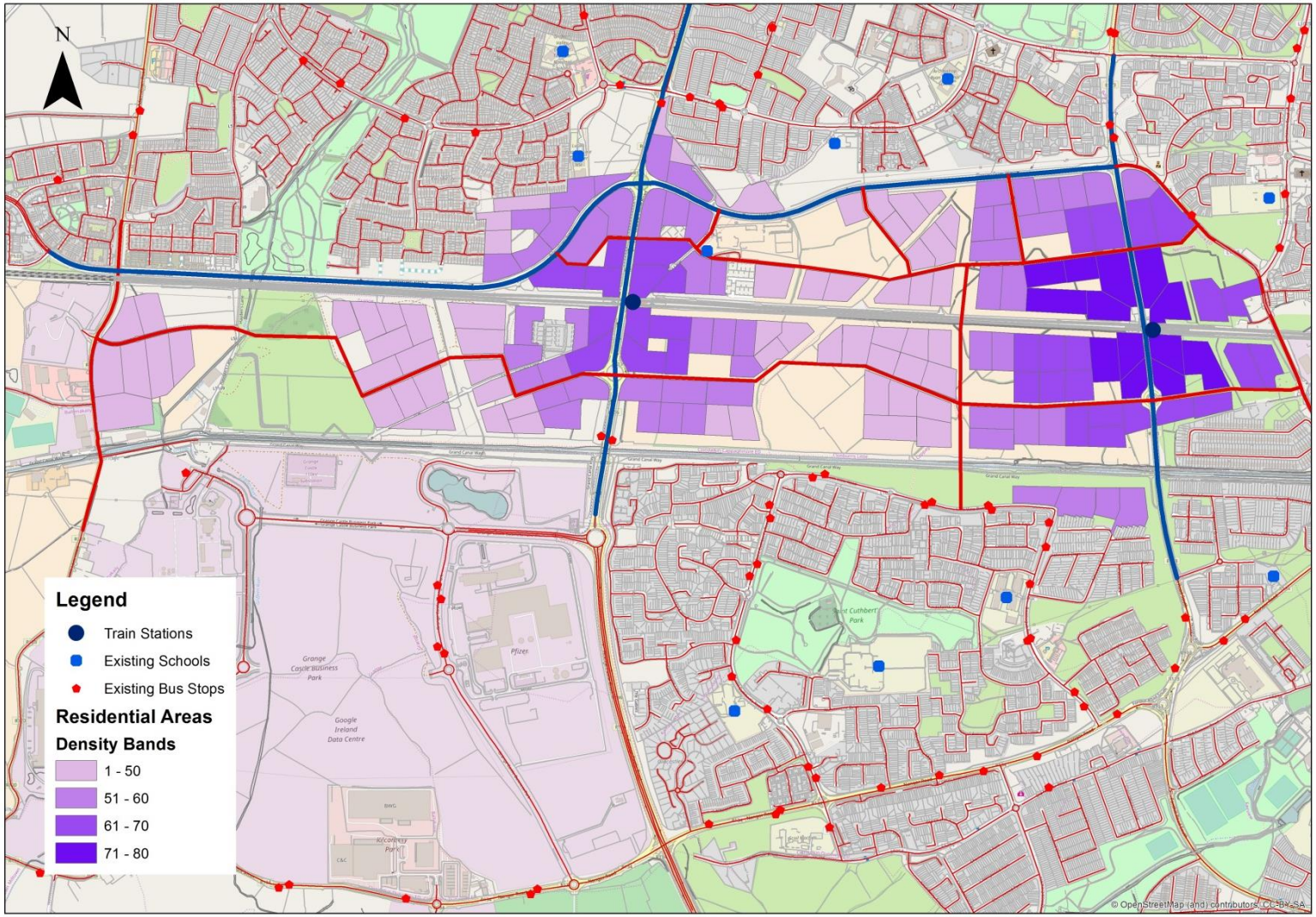


Figure 7.25 Residential Density

Accessibility Criteria

Guidelines for Providing for Journeys on Foot (Chartered Institute of Highways and Transportation (CIHT) 2000)' outlines desirable, acceptable and preferred maximum walk distances to key attractions and has been used a guide for developing accessibility level thresholds for Clonburris. These guidelines were reviewed in 2015 by CIHT, who found them still to be relevant for assessments. Table 7.3 sets out these distances.

Table 7.3 Suggested Acceptable Walking Distances to key attractions (CIHT)

	Town Centres (m)	Commuting/School (m)	Elsewhere (m)
Desirable	200	500	400
Acceptable	400	1000	800
Preferred Maximum	800	2000	1200

For the Clonburris SDZ accessibility assessment, the focus was primarily upon the desirable walk distances to core services and public transport provision. As the street network within Clonburris is compact and permeable, the assessment was completed using distance bands. The following measurements of accessibility from residential areas to key services included:

- sustainable transport;
- retail and community (including healthcare);
- education; and
- open space and leisure facilities.

Levels of accessibility were assessed by measuring walk distances from residential areas to:

- a bus stop within 400m, a rail station within 800m, cycle facilities within 250m;
- retail and community facilities: district centres within (a) 400m (b) 800m, local centres within (a) 400m (b) 800m;
- education within (a) 500m (b) 1000m; and
- community open space and community facilities within 400m

Figures 7.26 to 7.31 demonstrate the results for each of these criteria.

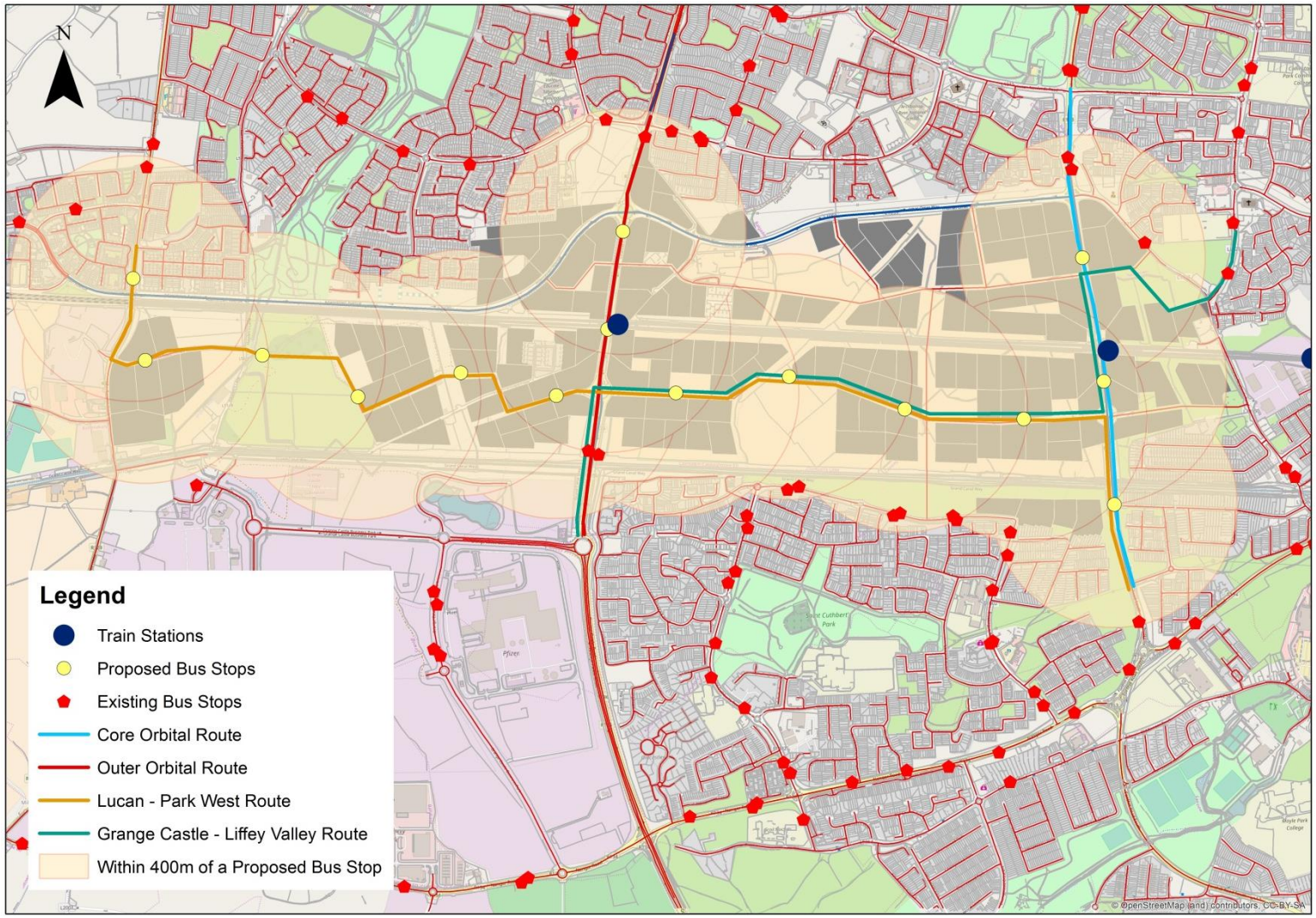


Figure 7.26 Areas within 400m of Proposed Bus Stops

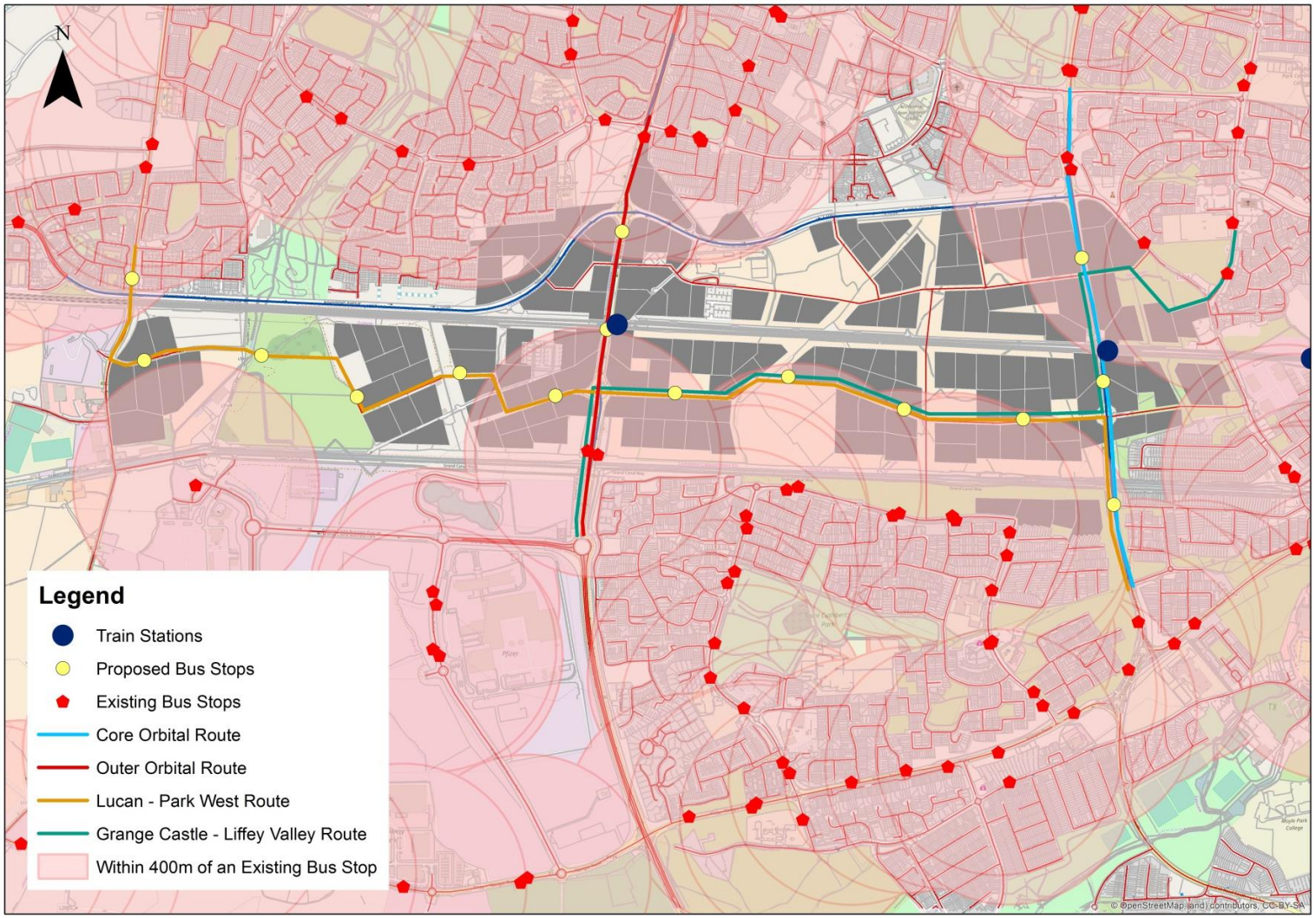


Figure 7.27 Areas within 400m of Existing Bus Stops

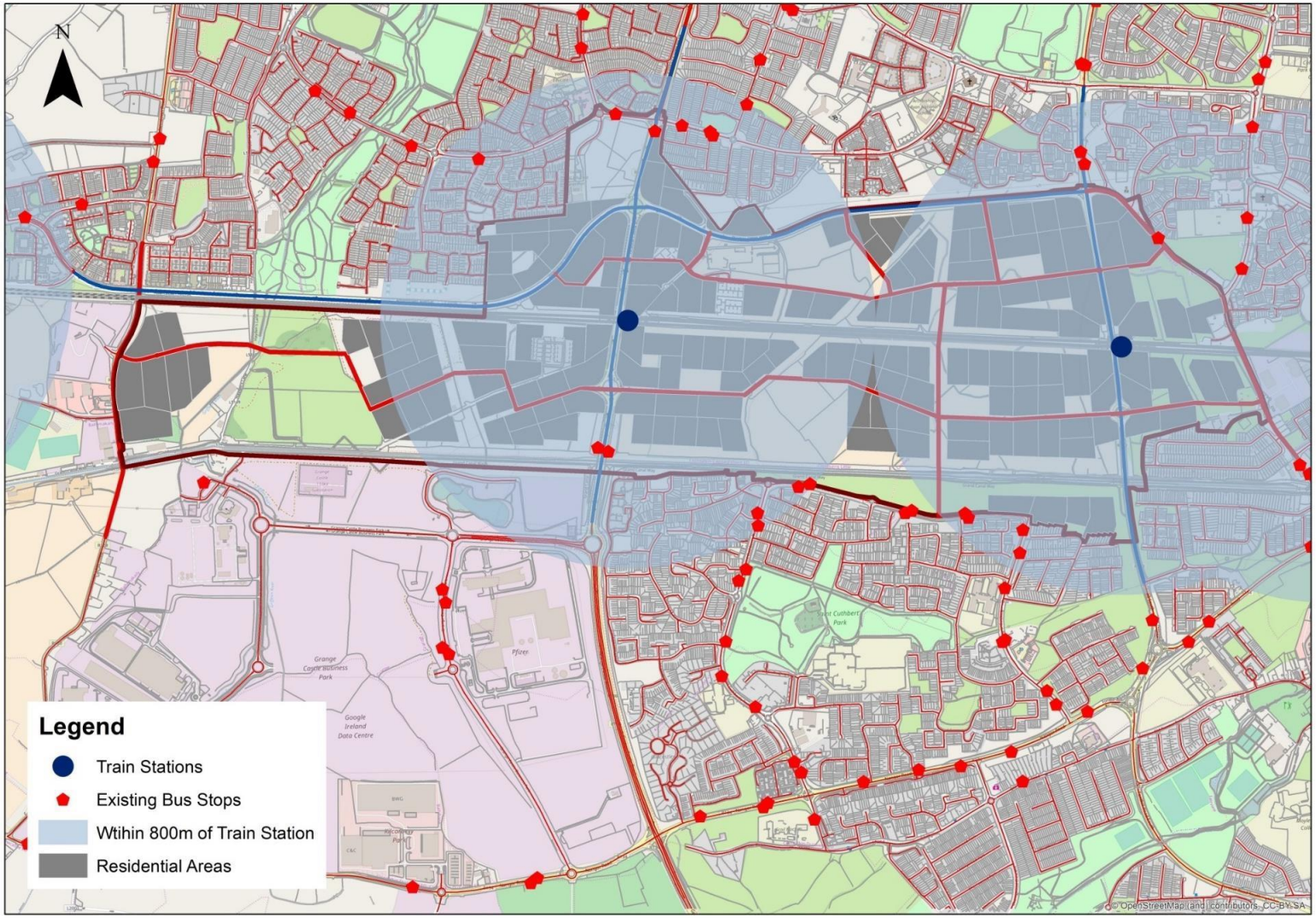


Figure 7.28 Areas within 800m of a Train Station

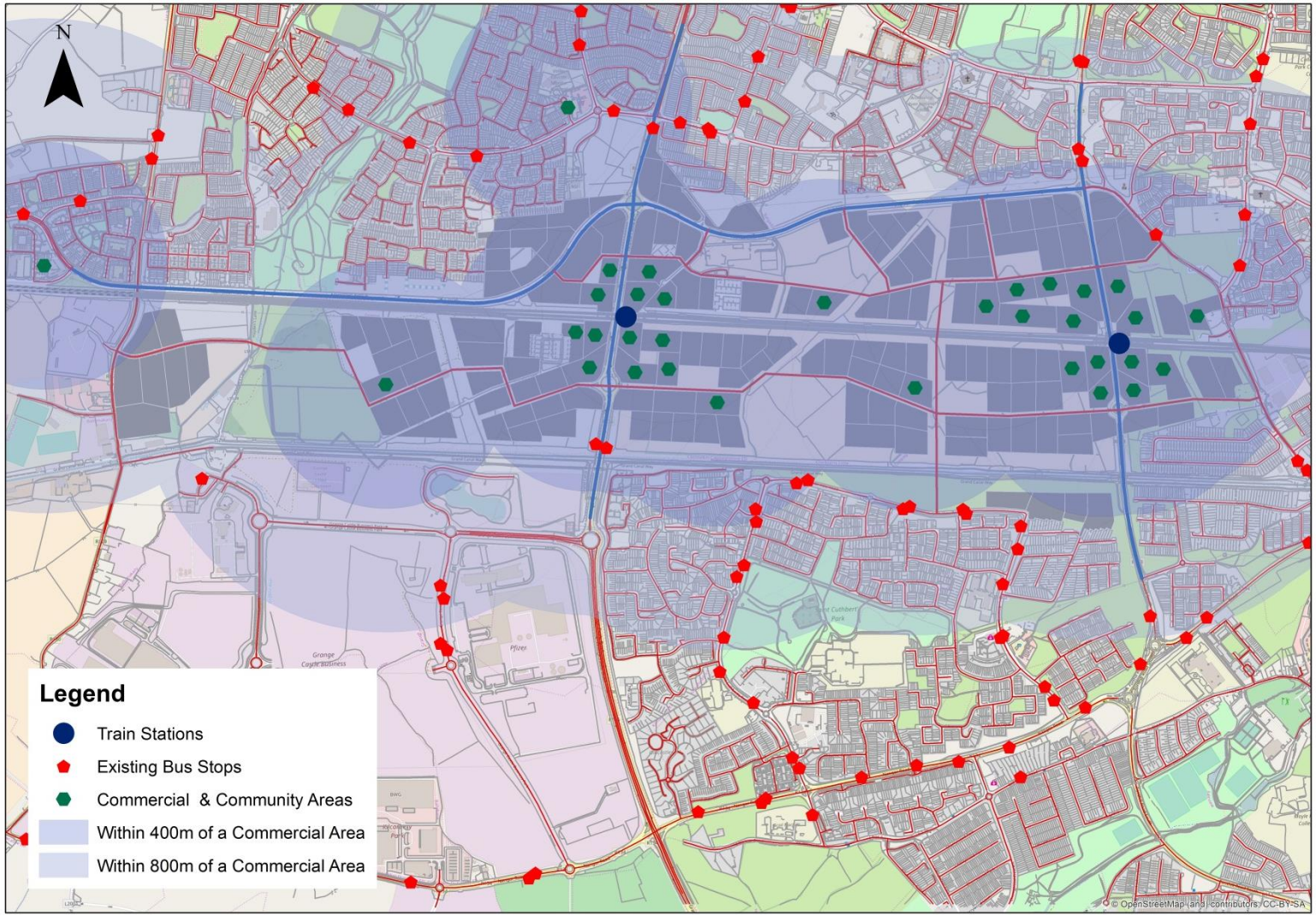


Figure 7.29 Areas within 400m and 800m of Retail and Community Facilities

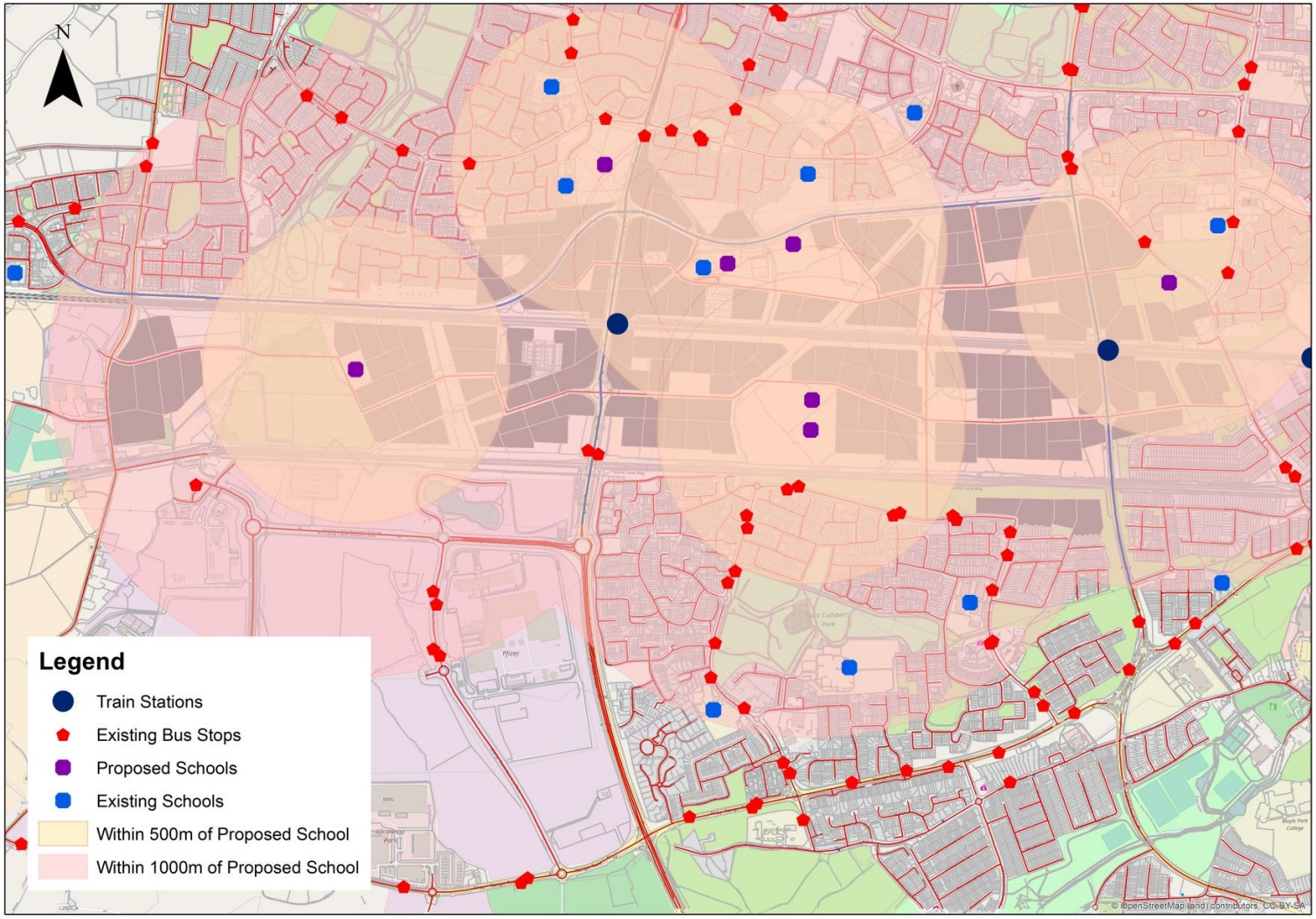


Figure 7.30: Areas within 500m and 1,000m of Proposed Schools

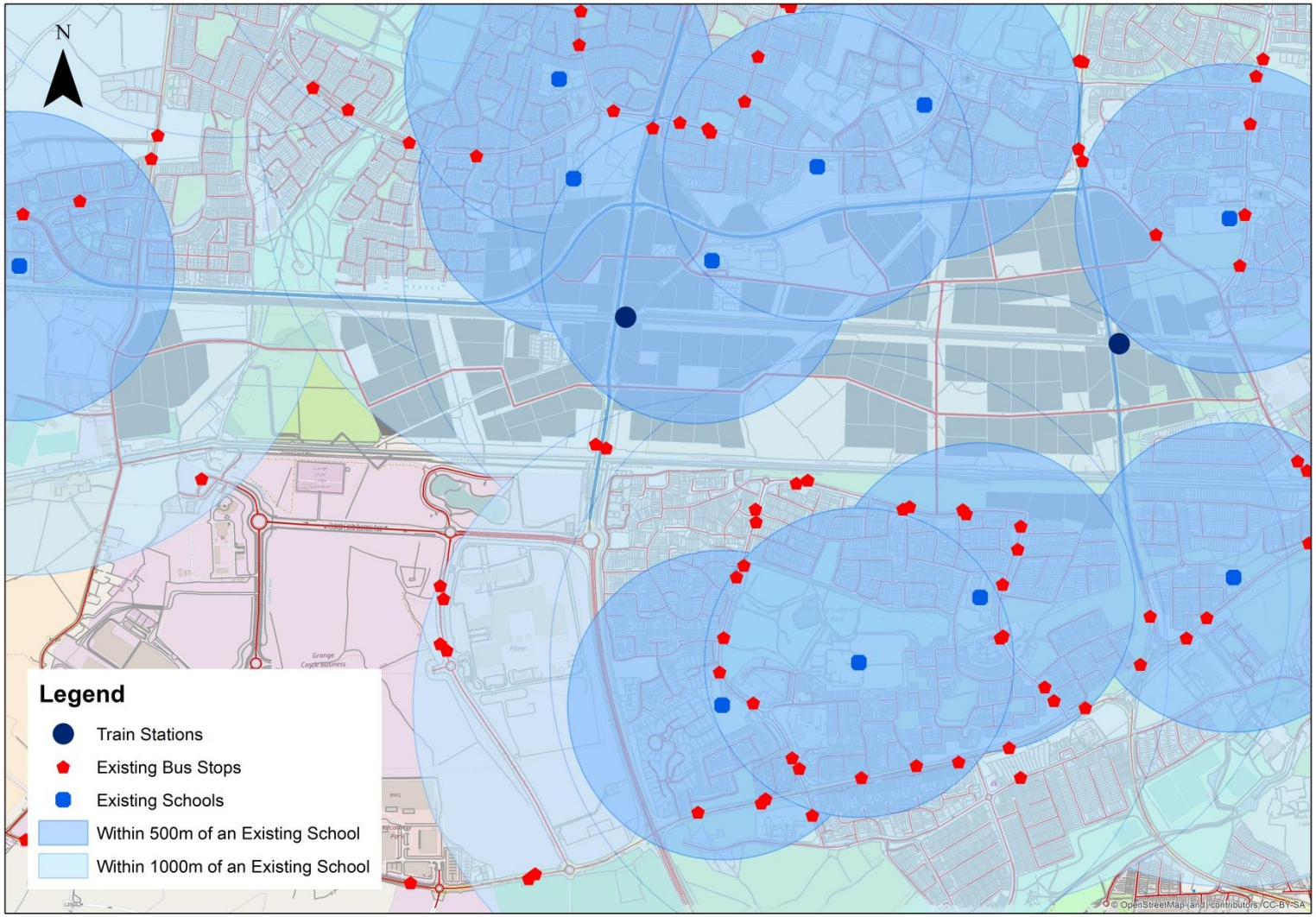


Figure 7.31 Areas within 500m and 1,000m of Existing Schools

Four levels of accessibility were considered and measured as follows:

Service Area	Criteria	Level 1	Level 2	Level 3	Level 4
Sustainable Transport	Bus stop with 400m	✓	✓	✓	✓
	Rail station within 800m	✓	✓	✓	
	Cycling facilities within 250m	✓	✓	✓	✓
Retail & Community	District Centre within 400metre	✓			
	District Centre within 800metre		✓		
	Local Centre within 400metre			✓	
	Local Centre within 800metre				✓
Education	School within 500 metres	✓	✓		
	School within 1000 metres			✓	✓
Open Space and Leisure	Open Space/ Leisure within 400metre	✓	✓	✓	✓

Figure 7.32 Accessibility Criteria

Given the sustainable objectives of the Clonburris SDZ, challenging criteria for access to sustainable transport facilities have been set for all service levels.

With regards to assessing healthcare, it is an assumption that healthcare provision will be provided in the retail centres and community facilities. Therefore, no separate assessment of access to healthcare has been undertaken.

The appraisal of the levels of accessibility is illustrated by coloured isochrones in Figures 7.33 and 7.34 below.

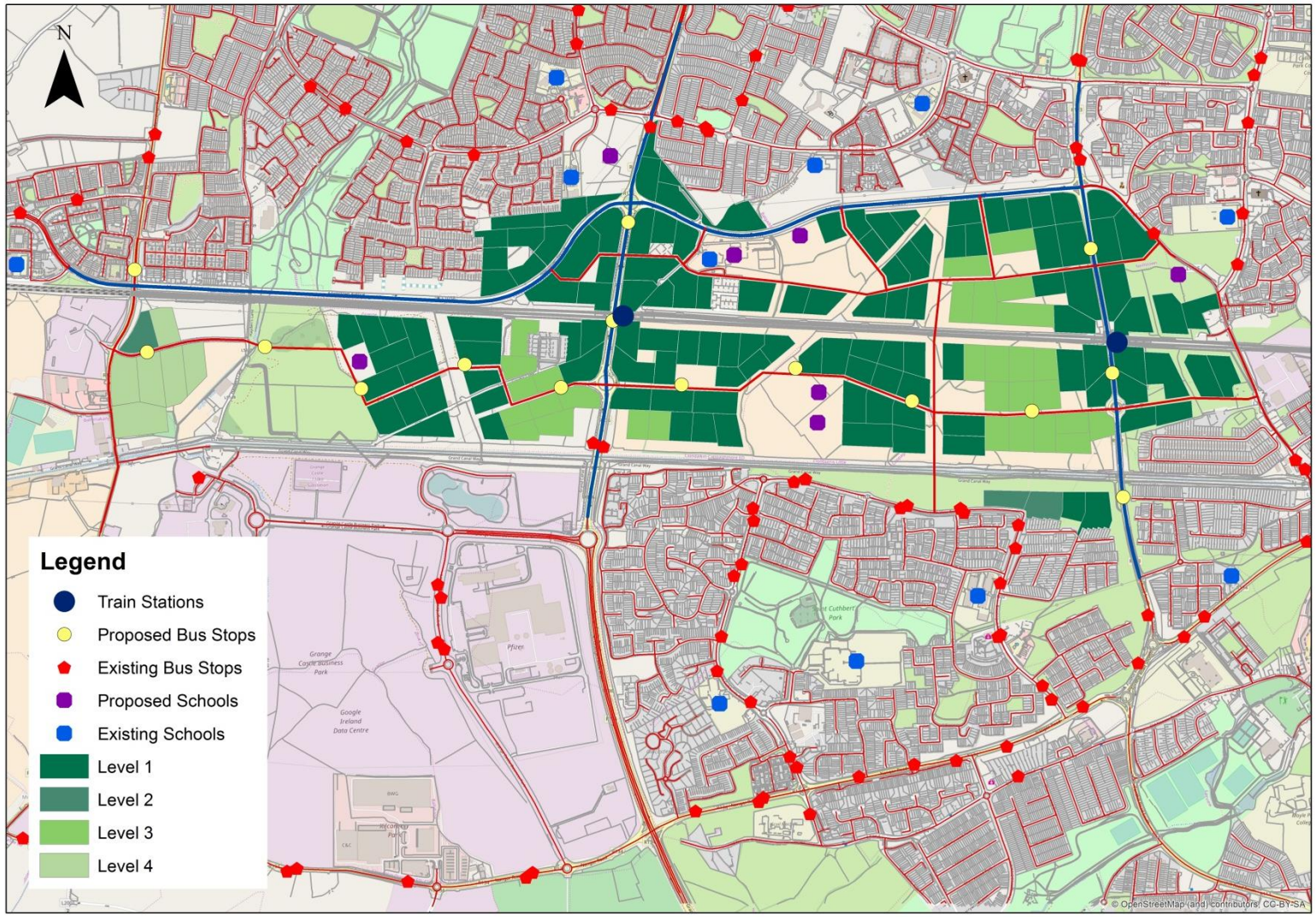


Figure 7.33 Accessibility Levels

Figure 7.34: Accessibility Levels

The areas achieving the highest levels of accessibility (Level 1) are mainly concentrated around Fonthill and Kishoge urban centres. The area directly west of Fonthill urban centre is identified as Level 3 as it is not within 500m of a proposed school, but is within 1000m. The area to the far west of the site is considered a Level 4 as it is not within 400m of the retail and community facilities, despite being within 400m of a bus stop and 1000m of a proposed school.

Table 7.4 Accessibility Bands

Accessibility Bands	Number of Dwellings	% Dwellings	Commercial Services (GFA sqm)	% Commercial Services	Community Services (GFA sqm)	% Community Services
1	6,350	75%	45,670	87%	4,800	66%
2	110	1%	0	0%	0	0%
3	1,600	19%	6,970	13%	2,500	34%
4	380	5%	0	0%	0	0%

Approximately 75% of residences will meet the criteria for Level 1, and are therefore able to access a bus stop within 400m and a train station within an 800m walking distance, access a retail or community facility within a 400m walking distance and access a proposed school within a 500m walking distance. Approximately 98% of all residences within the development will be able to access a bus stop within 400m or a train station within 800m.

This demonstrates the high levels of accessibility achieved within the Clonburris site, thereby supporting the SDZ overarching objective of developing a sustainable mixed use development with a compact and permeable network.

7.3.5 Summary

The previous sections provide an overview of the proposed walking and cycling network for the Clonburris SDZ, including an assessment of accessibility to key services such as schools, PT, commercial centres etc. In summary:

Walk and Cycle Network

- Filter permeability junctions are applied at various locations to prioritise the movement of more sustainable modes (i.e. pedestrians, cyclists and public transport) over private vehicles;
- Cycle trails are proposed running both East-West and North-South through the development facilitating internal cycle traffic, along with providing linkages to existing external cycle lanes and Greenways;
- Footpaths will be provided, along with controlled and uncontrolled pedestrian crossings, throughout the proposed development to facilitate, and promote, pedestrian movements;
- A linked network of street integrated and dedicated pedestrian routes will permeate the SDZ lands.
- Cycle tracks will be provided on all Arterial and Link Roads to provide enhanced safety for cyclists as well as strategic cycle routes through and along open spaces.

Accessibility

- The areas achieving the high levels of accessibility (Level 1) are mainly concentrated around Fonthill and Kishoge Train Stations;
- Approx. 75% of residents will be within 400m of a core bus service and 800m of a rail station;
- Approx. 72% of residents will be within 500m of a school;
- Areas to the far west of the proposed site experience reduced levels of accessibility.

7.4 Street Network Strategy

7.4.1 Overview

This section outlines the potential impact of the development at Clonburris on the local and strategic road network. The analysis and results have been separated into two distinct sections, as follows:

- **Wider Network Performance:** Investigates results of the ERM and focuses on the impact on the wider strategic road network; and
- **Local Junction Assessment:** Details the results of localised modelling undertaken for key junctions in the immediate vicinity of Clonburris. Proposed mitigation measures are outlined for junctions operating close to capacity and preliminary junction diagrams are presented.

7.4.2 Wider Network Performance

Introduction

Section 6.2 details the various road network proposals which have been tested in the ERM for the forecast year 2026 and 2035. Analysis was carried out on the outputs from the ERM to determine the performance of the road network, with particular focus on the following:

- The **contribution** of Clonburris demand to traffic on the local and strategic road network; and
- The **performance of junctions** in the wider strategic network including analysis of forecast delay and volume over capacity (V/C)

Contribution Flows

2035

The volume of traffic originating in Clonburris has been calculated as a proportion of overall demand on the links, and is presented in Figure 7.35 below[6]. Through a review of the assigned traffic demand, Clonburris generates approximately 1,700 passenger car units (pcus) onto the wider road network in the 2035 AM peak hour (08:00 – 09:00). The results indicate that Clonburris contributes highest to local links in the vicinity of the SDZ, namely:

- The Fonthill Road (R113);
- Grange Castle Road (R136);
- Thomas Omer Way;
- Adamstown Avenue; and
- Cloverhill Road

The results in Figure 7.35, illustrate that the contribution of traffic generated by Clonburris diminishes at further distances from the development, with very little impact on the wider strategic road network of the N4, N7 and M50.

[6] It should be noted that only links with a contribution of greater than 5% are illustrated

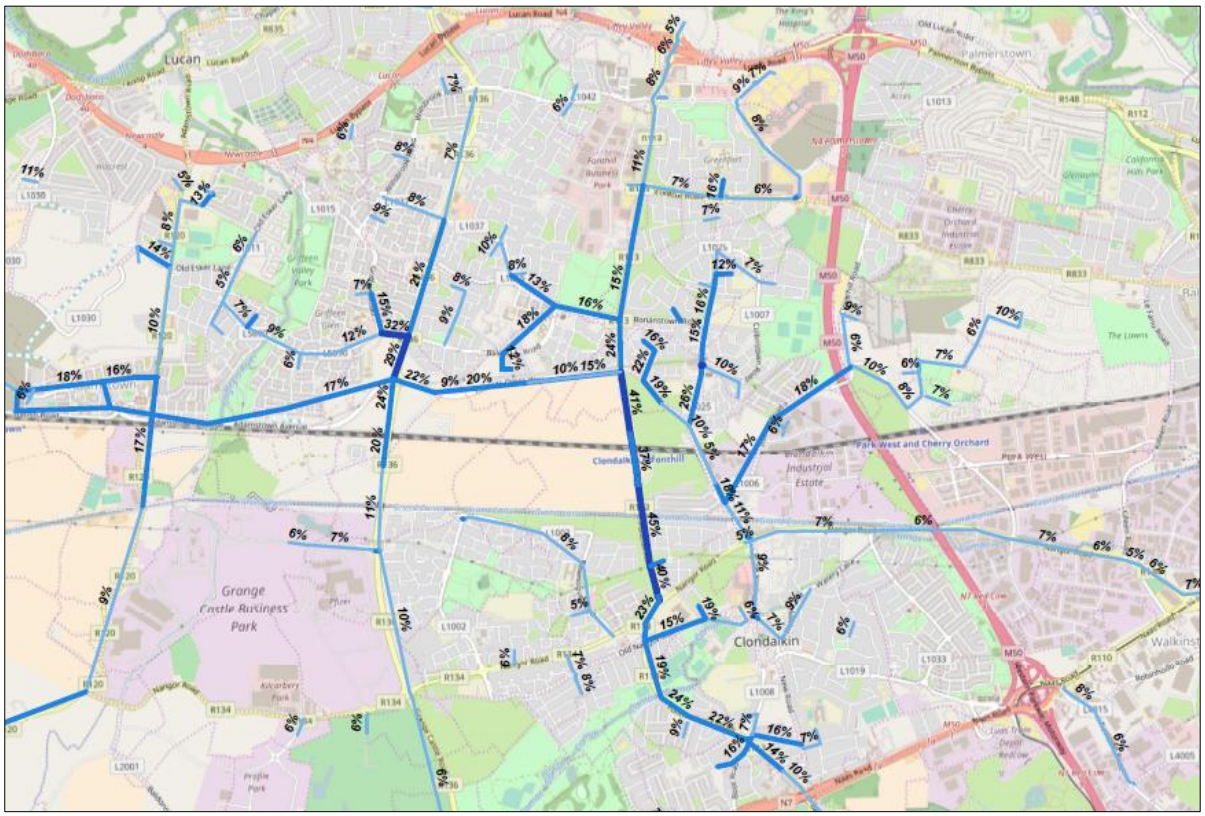


Figure 7.35 2035 Clonburris Flow Contribution – AM Peak

Figure 7.36 and 7.37 provide a more detailed analysis of the contribution of Clonburris traffic to the N4, N7 and M50. Particular focus is given to the N4/Fonthill Road North intersection, as this area currently experiences congestion in the peak hours, and it is proposed that this junction will have a contribution from Clonburris traffic of greater than 5%. It should be noted that the contribution to the N4/Grange Castle Road (Outer Ring Road) intersection will be less than 5% and therefore detailed illustration of contribution flows around said intersection are not necessary.

Location	Total Flow	Clonburris Contribution	%
A	964.12	70.40	7%
B	775.97	59.66	8%
C	1,123.78	125.21	11%
D	1,595.31	40.29	3%
E	588.69	23.00	4%
F	729.74	46.99	6%
G	478.56	20.97	4%
H	4,746.32	28.21	1%
I	6,228.75	18.62	0.3%
J	5,861.32	0.21	0%

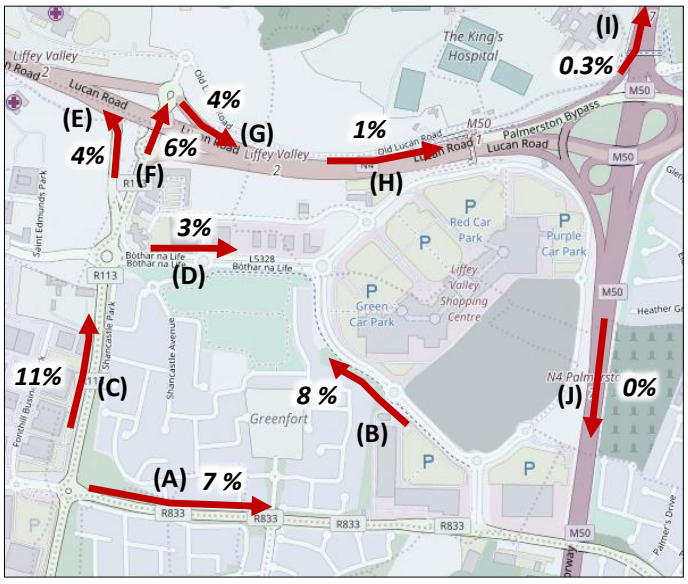


Figure 7.36 Clonburris Contribution N4/Fonthill Road North Intersection 2035 AM Peak

Location	Total Flow	Clonburris Contribution	%
K	2,864.57	23.00	0.80%
L	4,746.32	28.21	0.59%
M	6,228.75	18.62	0.30%
N	5,861.32	0.21	0.00%
O	5,634.47	5.88	0.10%
P	6,010.08	4.86	0.08%

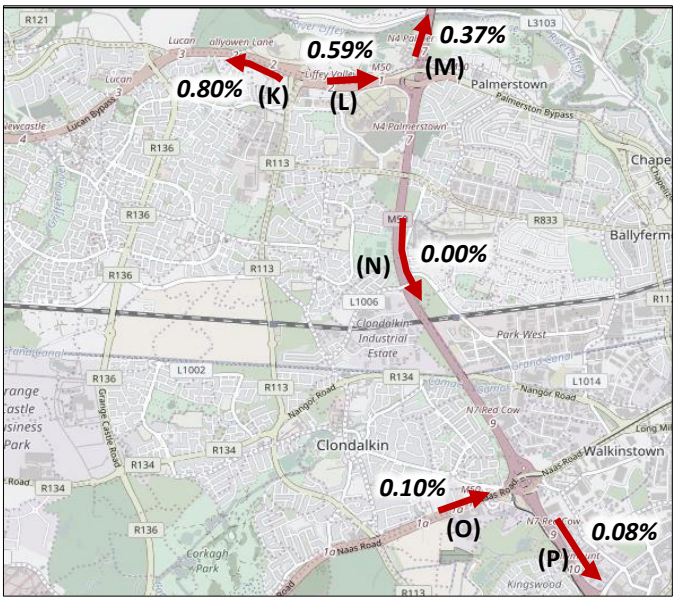


Figure 7.37 Clonburris Contribution N4, N7 and M50 2035 AM Peak

The results indicate that traffic generated by Clonburris contributes less than one percent to the overall traffic on the strategic road network in the AM peak hour. As noted previously in the trip distribution analysis (Section 6.4), approximately 72% of car traffic generated by the Clonburris development stay within the N4, N7 and M50 boundary area, and hence, do not negatively impact on the wider road network.

2026

Contribution analysis was also undertaken for the 2026 forecast year, and the proportion of overall traffic demand on the road network associated with the Clonburris development is illustrated in Figure 7.38, overleaf. Through a review of the assigned traffic demand, Clonburris generates approximately 1,250 passenger car units (pcus) onto the wider road network in the 2026 AM peak hour (08:00 – 09:00). Similar to 2035, the results indicate that Clonburris contributes highest to local links in the vicinity of the SDZ, namely:

- The Fonthill Road (R113);
- Grange Castle Road (R136);
- Thomas Omer Way;
- Adamstown Avenue; and
- Cloverhill Road

The analysis suggests that the contribution of traffic generated by Clonburris diminishes at further distances from the development, with less than one percent contribution on the wider strategic road network of the N4, N7 and M50. As noted previously in the trip distribution analysis (Section 6.4), approximately 65% of car traffic generated by the Clonburris development stay within the N4, N7 and M50 boundary area, and hence, do not negatively impact on the wider road network.

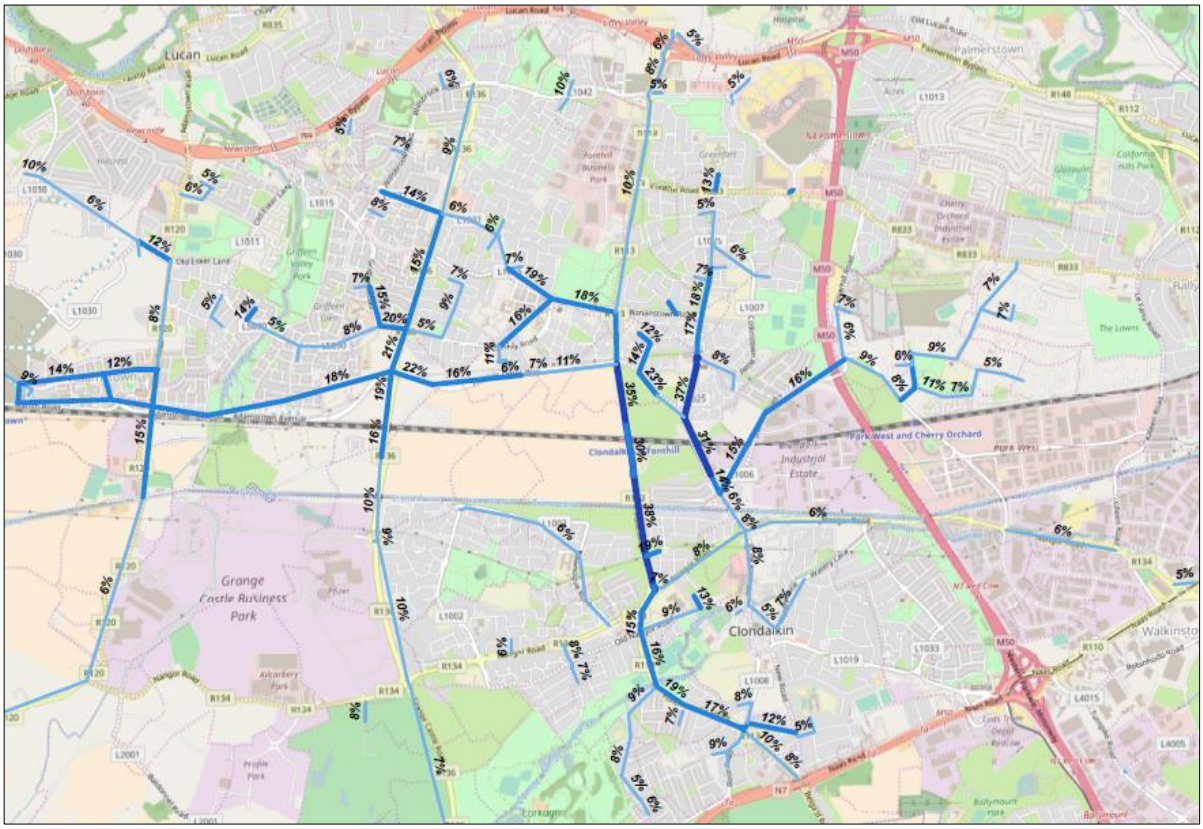


Figure 7.38 2026 Clonburris Flow Contribution – AM Peak

Location	Total Flow	Clonburris Contribution	%
A	847.00	20.93	2%
B	525.19	18.96	4%
C	1,105.97	110.55	10%
D	1,760.29	42.23	2%
E	517.87	14.94	3%
F	702.39	43.73	6%
G	468.70	23.96	5%
H	4,873.97	31.01	1%
I	6,762.24	23.33	0.3%
J	6,301.88	0.00	0%

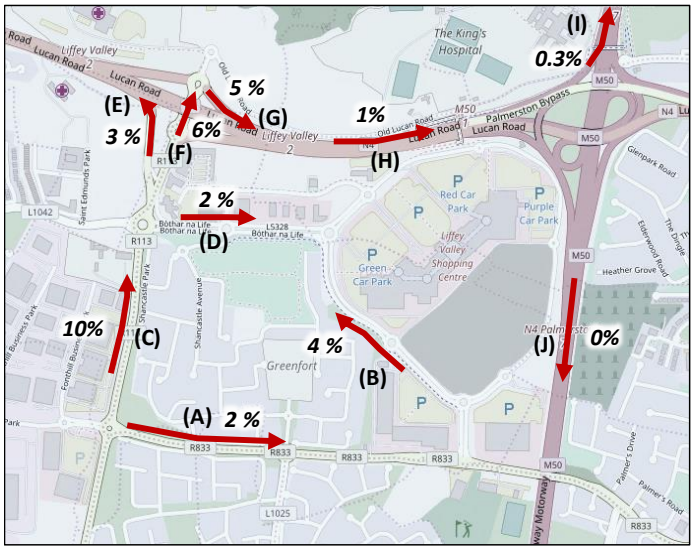


Figure 7.39 Clonburris Contribution N4/Fonthill Road North Intersection 2026 AM Peak

Location	Total Flow	Clonburris Contribution	%
K	2,737.49	14.94	0.55%
L	4,873.97	31.01	0.64%
M	6,762.24	23.33	0.35%
N	6,301.88	0.00	0.00%
O	5,642.67	6.02	0.11%
P	6,149.65	4.55	0.07%

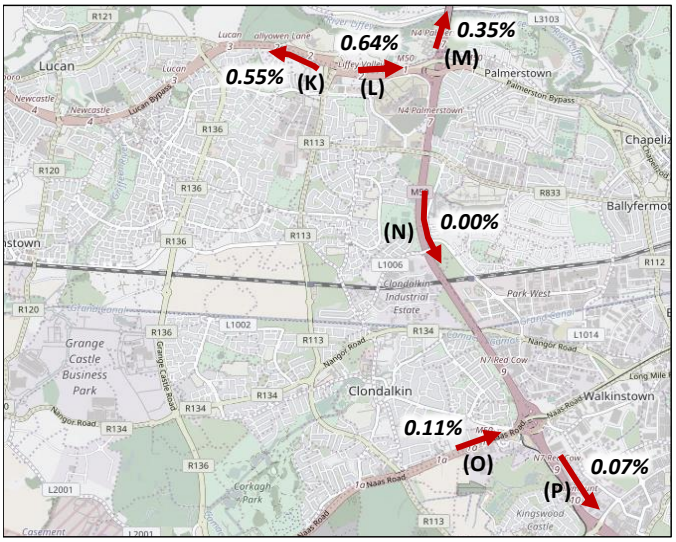


Figure 7.40 Clonburris Contribution N4, N7 and M50 2026 AM Peak

Strategic Junction Performance - 2035

Introduction

Based on a review of the proposed Clonburris internal road network, and the contribution analysis outlined above, key junctions within the N4/N7/M50 boundary area were identified for assessment (illustrated in Figure 7.41, overleaf).

These junctions were then separated into two main types of assessment as follows:

- **Detailed Junction Modelling:** The performance of new junctions proposed as part of the Clonburris SDZ, along with key existing junctions which are likely to be heavily impacted by the development, were analysed using detailed junction modelling software. The results of this junction analysis, including preliminary design drawings, is provided later in this chapter; and
- **Strategic ERM Assessment:** The performance of existing junctions which are of importance to the wider strategic network were analysed using outputs from the ERM, in particular volume over capacity (V/C) and junction delay.

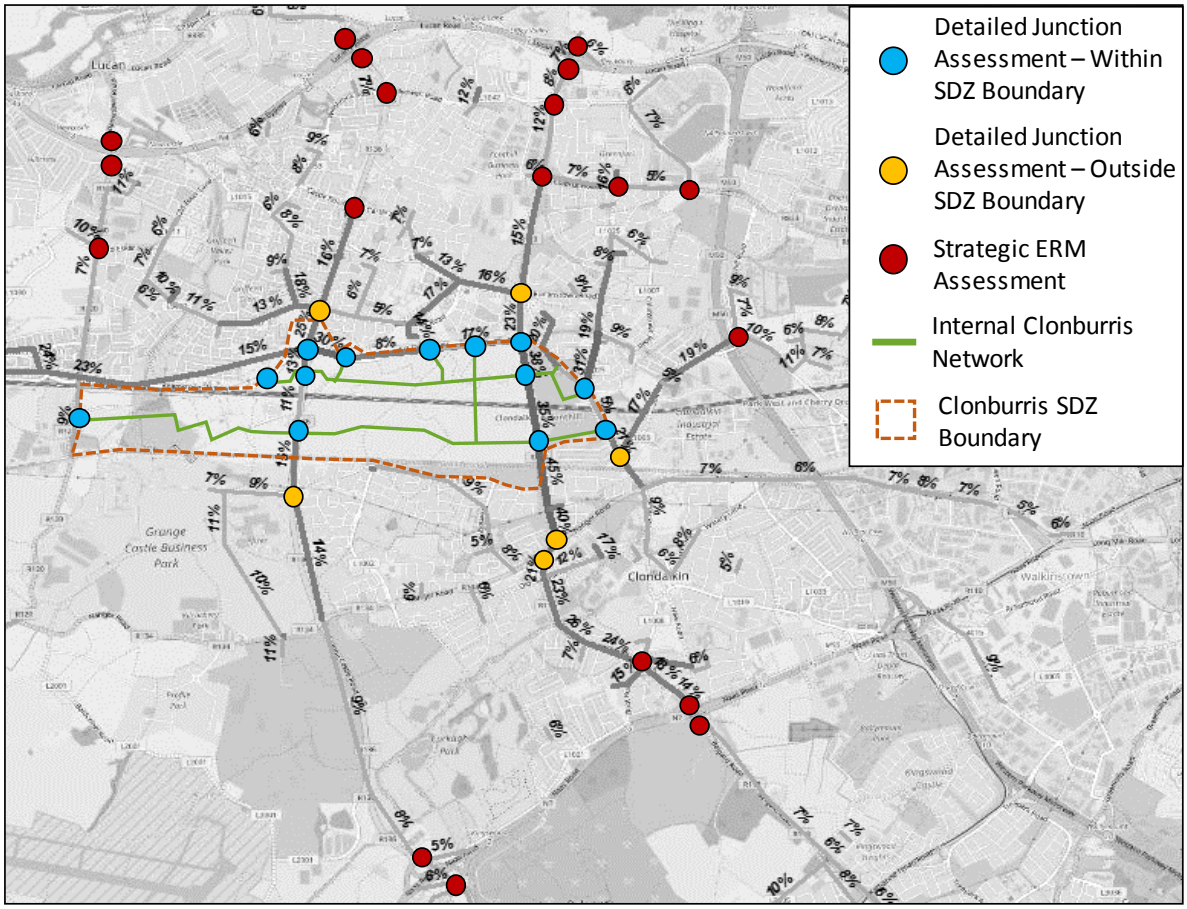


Figure 7.41 Clonburris Junctions for Assessment

There are a number of factors which impact on the performance of junctions identified for strategic assessment in the forecast year of 2035, including:

- Demand management on the national road network;
- Parking management within Dublin city centre;
- Proposed development at Liffey Valley, Adamstown and Grange Castle etc.

Therefore, the performance assessment had to be carried out taking cognisance of the above factors. To do this, two distinct demand scenarios were run for 2035 as detailed previously in Section 6.3, namely:

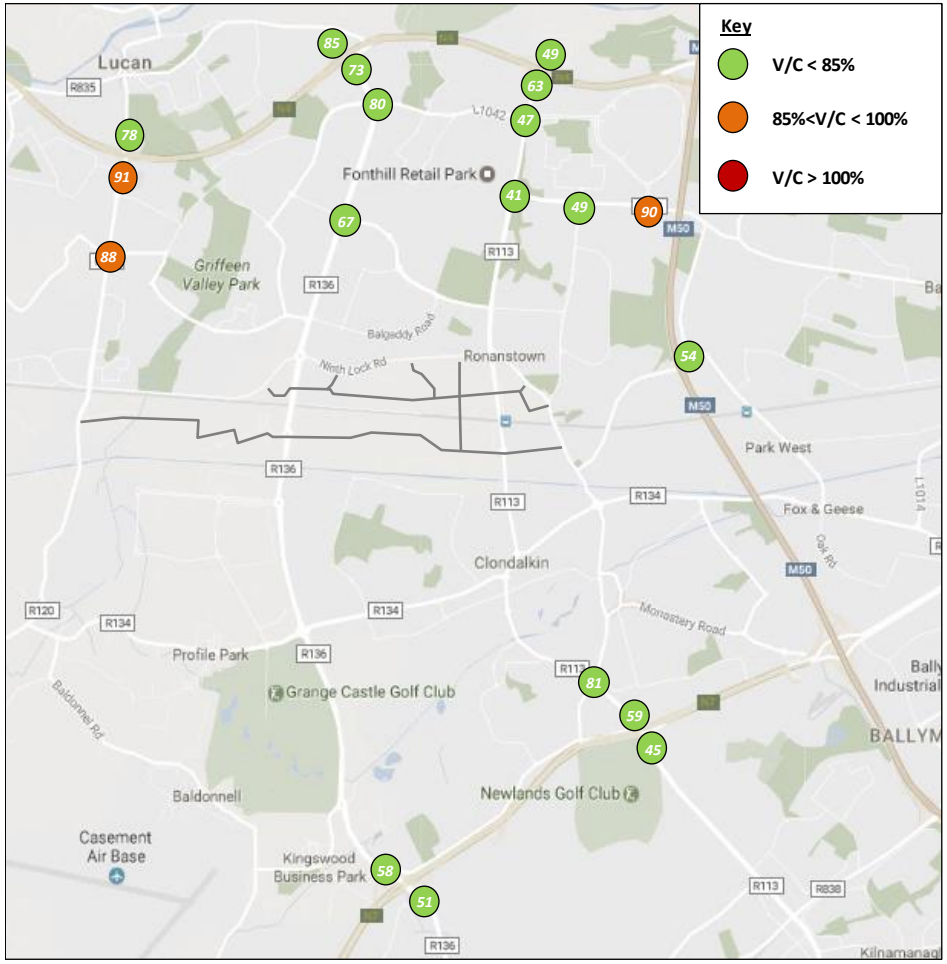
- **2035 Clonburris:** full development of the Clonburris SDZ; and
- **2035 Redistribution of Clonburris Growth:** alternative demand scenario with proposed Clonburris development redistributed to other zoned lands in South Dublin and North Kildare

A comparative analysis was undertaken for the above scenarios in an attempt to identify the change in performance if the Clonburris SDZ was not developed, focusing on V/C and overall junction delay.

Volume over Capacity

Volume over capacity (V/C) is a commonly used index to assess the performance of junctions. For each of the junctions highlighted in red in Figure 7.41, the demand weighted average, and maximum turning V/C, have been calculated. Figure 7.42 and 7.43 illustrate the results of this V/C analysis for both the '2035 Clonburris' and '2035 Redistribution of Clonburris Growth' demand scenarios.

2035 Clonburris



2035 Redistribution of Clonburris Growth

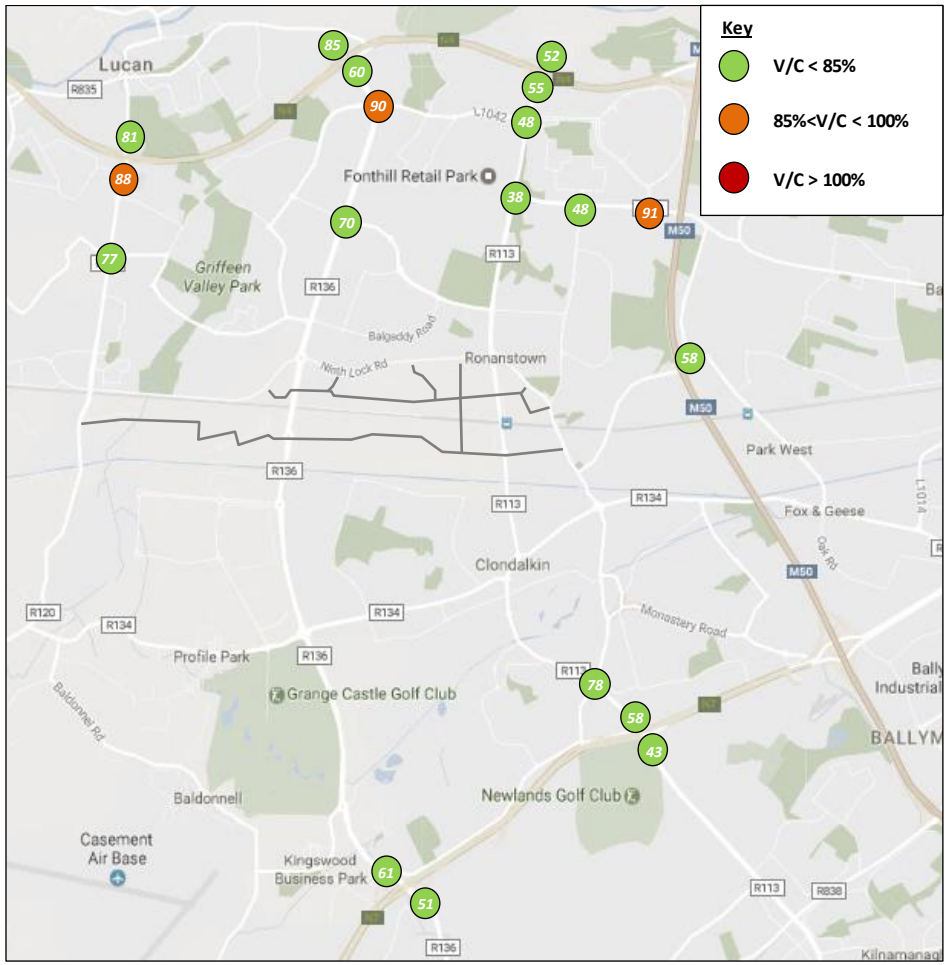
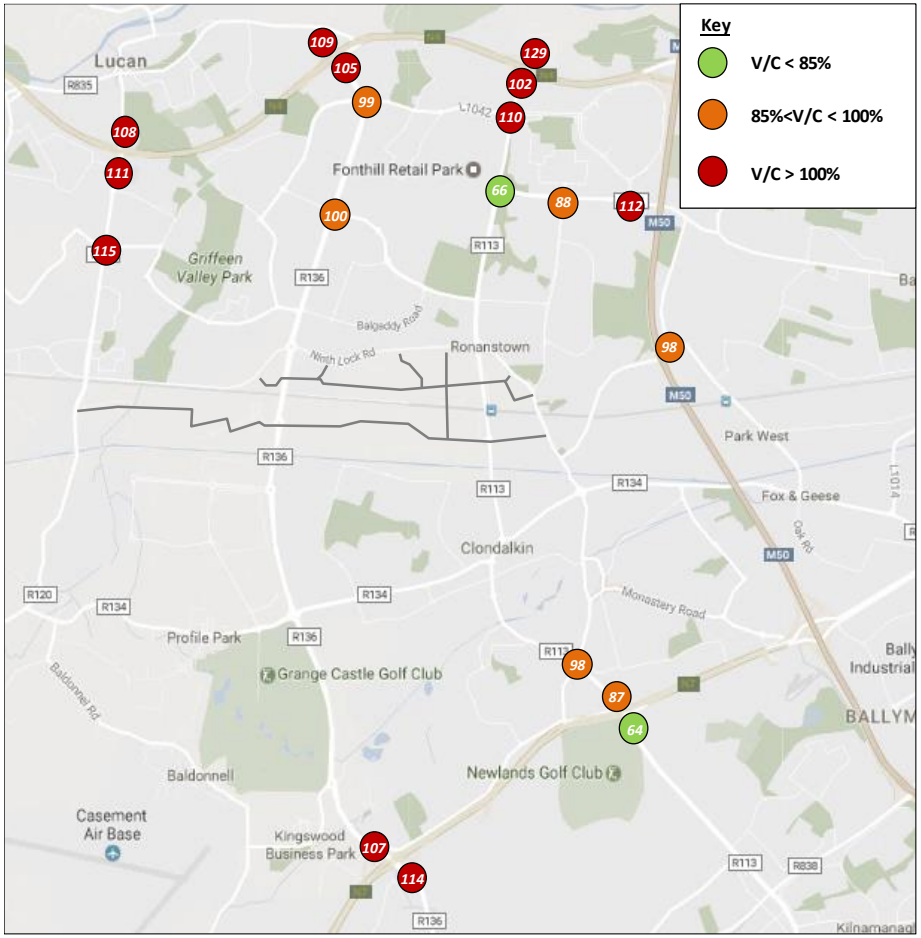


Figure 7.42 Strategic Junction Performance – Average V/C 2035 AM Peak

2035 Clonburris



2035 Redistribution of Clonburris Growth

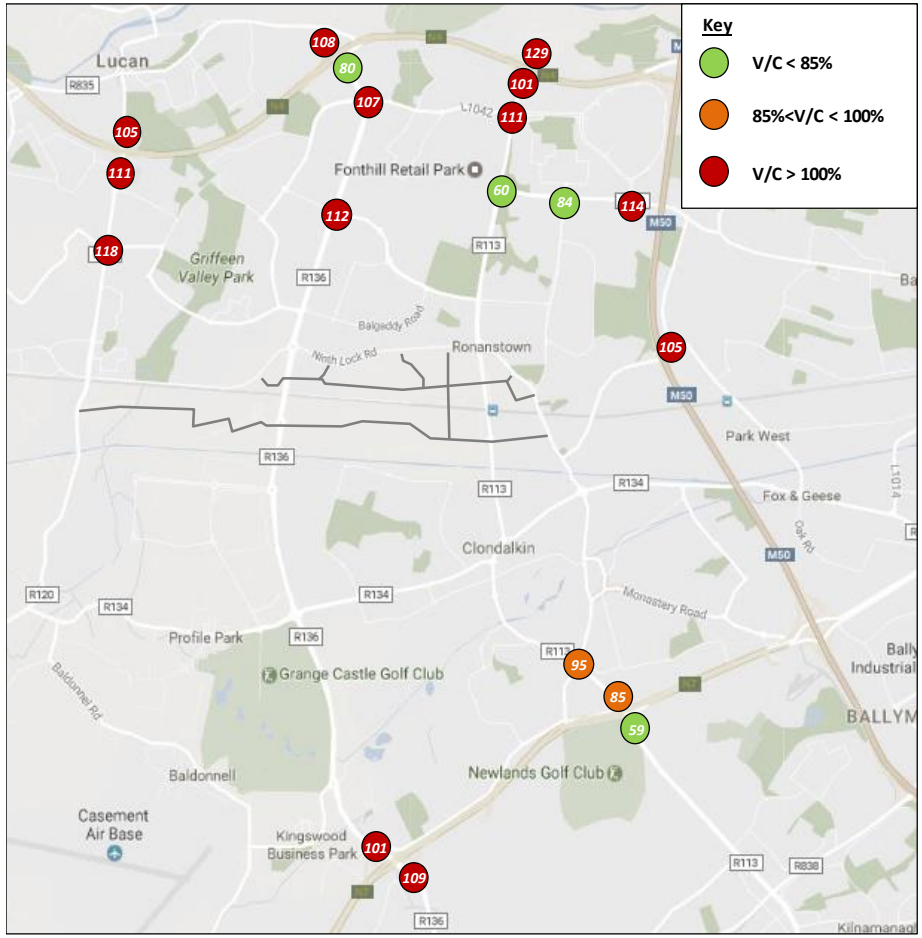


Figure 7.43 Strategic Junction Performance – Max V/C 2035 AM Peak

In general, a V/C of greater than 100% means that demand through the junction exceeds capacity leading to significant congestion and delay. Typically, junctions with V/C in excess of 85% are regarded as suffering from traffic congestion.

The results in Figure 7.42 and 7.43 above, indicate that both demand scenarios experience similar results, with a number of junctions having turning movements which are operating over capacity in the AM peak in 2035. Table 7.5 below, outlines the number of turning movements in each scenario which have V/C values within identified ranges.

Table 7.5 Summary V/C Analysis – AM Peak

V/C (%)	2035 Clonburris	%	2035 Redistributed	%
<50	113	55%	116	56%
>50 & <85	46	22%	45	22%
>85 & <100	25	12%	15	7%
>100	22	11%	30	15%

The results suggest that the '2035 Clonburris' scenario performs better than its alternative, with fewer turning movements with a V/C of greater than 100%. The V/C analysis indicates that the wider N4/N7/M50 boundary area experiences high levels of demand and congestion in 2035, irrespective of the development at Clonburris.

In the scenario where Clonburris is not developed, road traffic re-distributes to fill spare capacity, particularly on high quality links such as the Fonthill Road (R113) and Grange Castle Road (R136). As such, these links experience similar levels of traffic demand in both the with, and without, Clonburris scenario. This is illustrated in Figure 7.44, overleaf, which displays the car trips on key strategic links extracted from the '2035 Clonburris' and '2035 Redistribution of Clonburris Growth' model runs.

At a wider strategic level (i.e. interchanges with the N4/N7), Clonburris contributes very little demand to these junctions, and therefore, the results are similar in both the 'with' and 'without' Clonburris scenario. Some of these junctions are already operating over capacity at present, and the growth in traffic demand to 2035 further exacerbates this issue, regardless of whether the Clonburris SDZ gets developed or not.

Junction Delay

In addition to V/C analysis, average junction delay was also calculated for each of the strategic assessment junctions. This average vehicle turn delay was then linked to Level of Service (LOS) based on criteria set out in the Transportation Research Board's (TRB)[7] Highway Capacity Manual (HCM 2010). LOS is a qualitative measure used to assess the performance levels of traffic through a junction based on aspects such as speed, turn delay per vehicle etc.

[7] The Transportation Research Board is a non-profit organisation that provides independent, objective, and interdisciplinary solutions to problems and issues facing transportation professionals

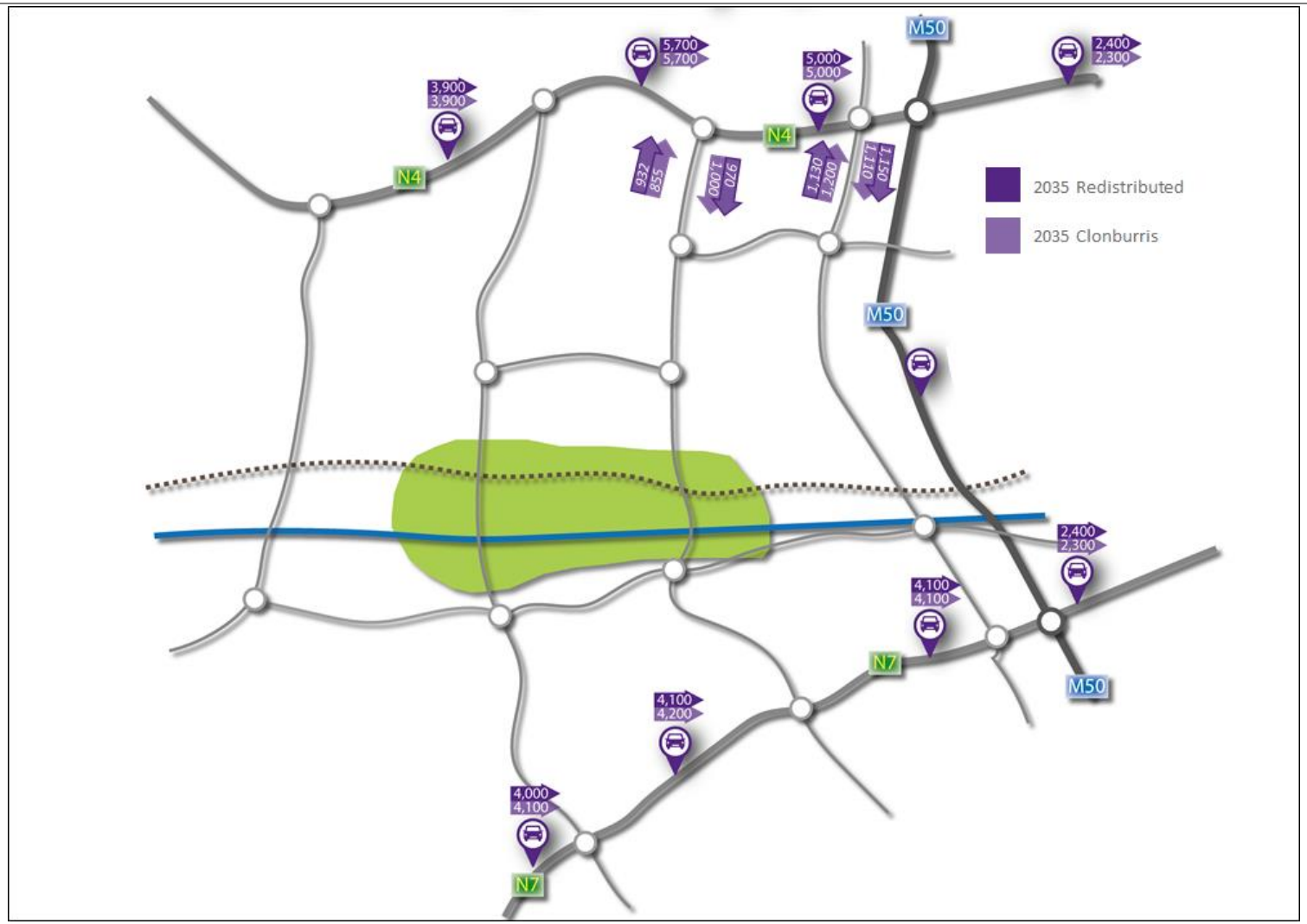


Figure 7.44 Car Trips on the Strategic Road Network Clonburris vs Redistributed (2035)

Table 7.6 Highway Capacity Manual Level of Service Definition

LOS	Average Delay (seconds)		Description
	Signalised	Un-signalised	
A	0-10	0-10	Excellent
B	>10 & <20	>10 & <15	Very Good
C	>20 & <35	>15 & <25	Good
D	>35 & <55	>25 & <35	Fair
E	>55 & <80	>35 & <50	Poor
F	>80	>50	Failure

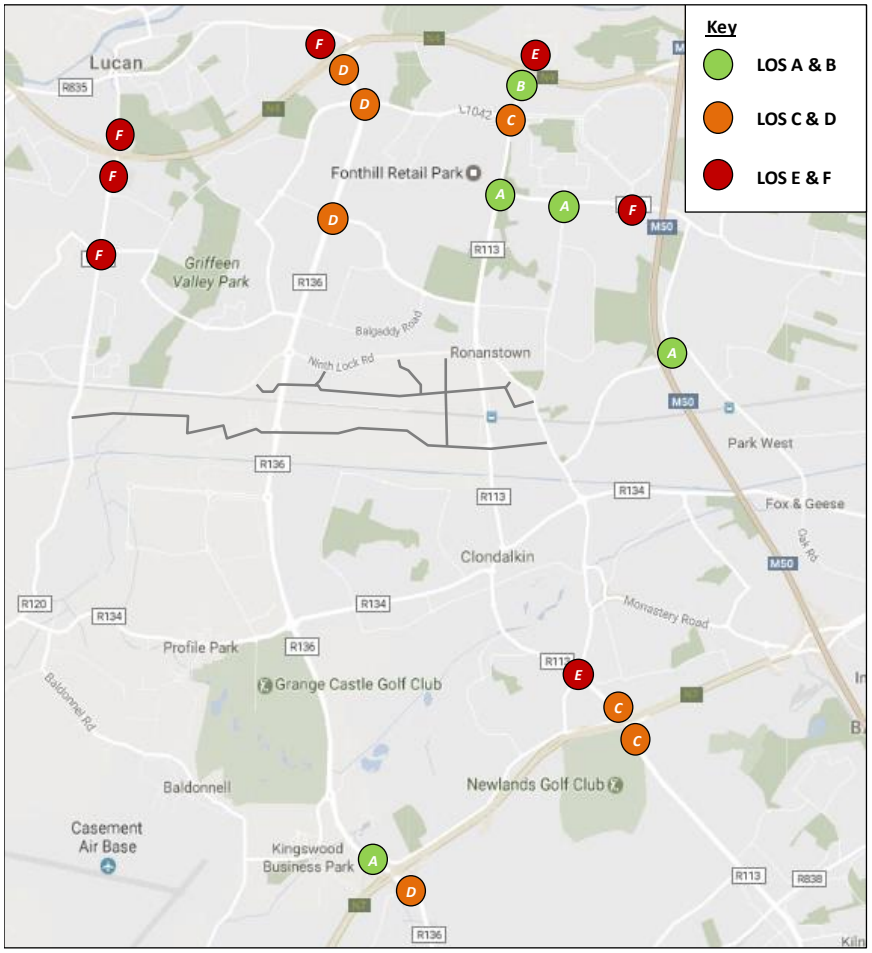
Figure 7.45, overleaf, illustrates the calculated LOS for both the '2035 Clonburris' and '2035 Redistribution of Clonburris Growth' demand scenarios. As noted in the V/C analysis above, the results indicate that both demand scenarios provide similar LOS for the junctions assessed.

In the '2035 Redistribution of Clonburris Growth' scenario, a large proportion of the proposed Clonburris population and employment are redistributed to other areas in the N4/N7/M50 boundary such as Adamstown, Grange Castle and Liffey Valley (see Figure 6.2 and 6.3 above). Also, as noted previously, any spare capacity on high quality links such as the Fonthill Road and Grange Castle Road, created by not developing Clonburris, becomes quickly used by other road users re-routing to find a path which minimises their journey time. As a result, these links experience similar levels of travel demand in the with, and without, Clonburris demand scenarios leading to the comparable results in the LOS and V/C analysis.

The LOS and V/C analysis indicate that the '2035 Clonburris' scenario performs better than its alternative, with fewer turning movements with a V/C of greater than 100%, and fewer junctions operating with a LOS of 'E' or 'F'. It also suggests that areas within the N4/N7/M50 boundary will experience congestion and delay in 2035, irrespective of whether Clonburris gets developed, particularly at the interchanges with the N4 and N7. However, focusing development at Clonburris provides a number of sustainable planning and transportation benefits, such as:

- Mixed use development supporting walking and cycling;
- Adjacent to a high quality rail service which supports PT mode share;
- Opening of the Kishoge train station which can serve residents currently living in the local area;
- The development of walking and cycling infrastructure providing improved connectivity within the area etc.; and
- The availability of new schools and commercial centres for residents in housing estates in close proximity to the development etc.

2035 Clonburris



2035 Redistribution of Clonburris Growth

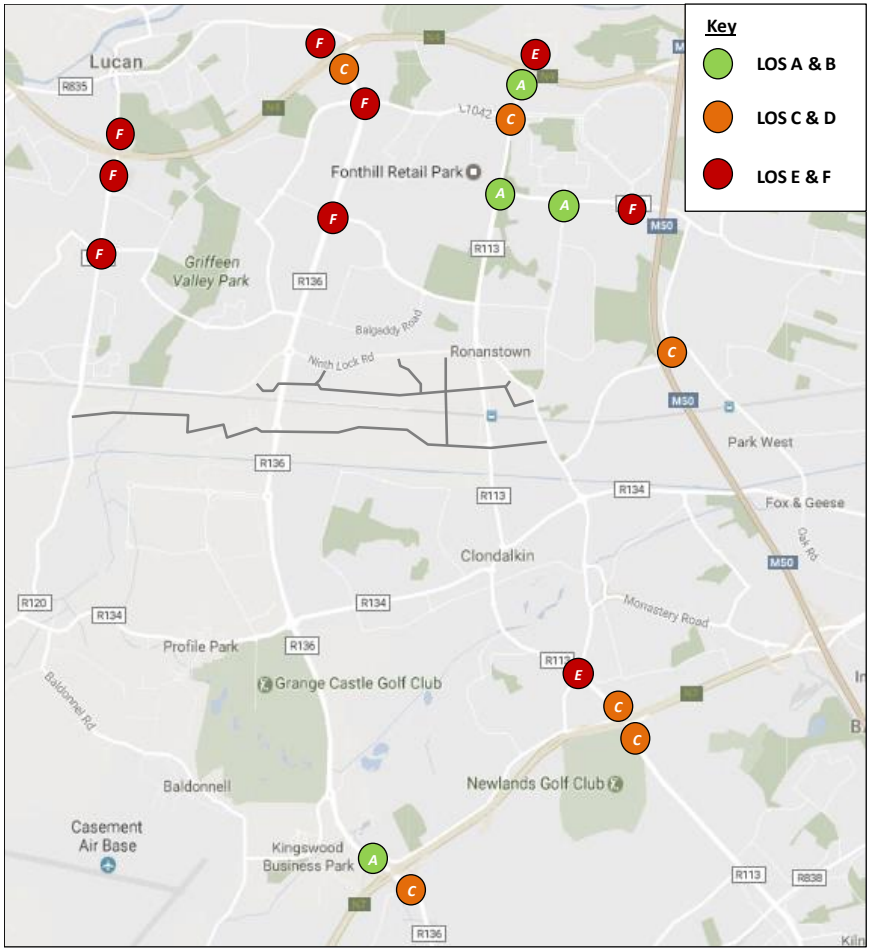


Figure 7.45 Junction Level of Service 2035 AM Peak Hour

Strategic Junction Performance - 2026

Similar to the 2035 assessment, V/C and junction delay analysis was undertaken for key junctions, outlined in Figure 7.41 previously, for the forecast year 2026. This was used to identify the strategic performance of these junctions with reduced development at Clonburris and lower general background traffic growth.

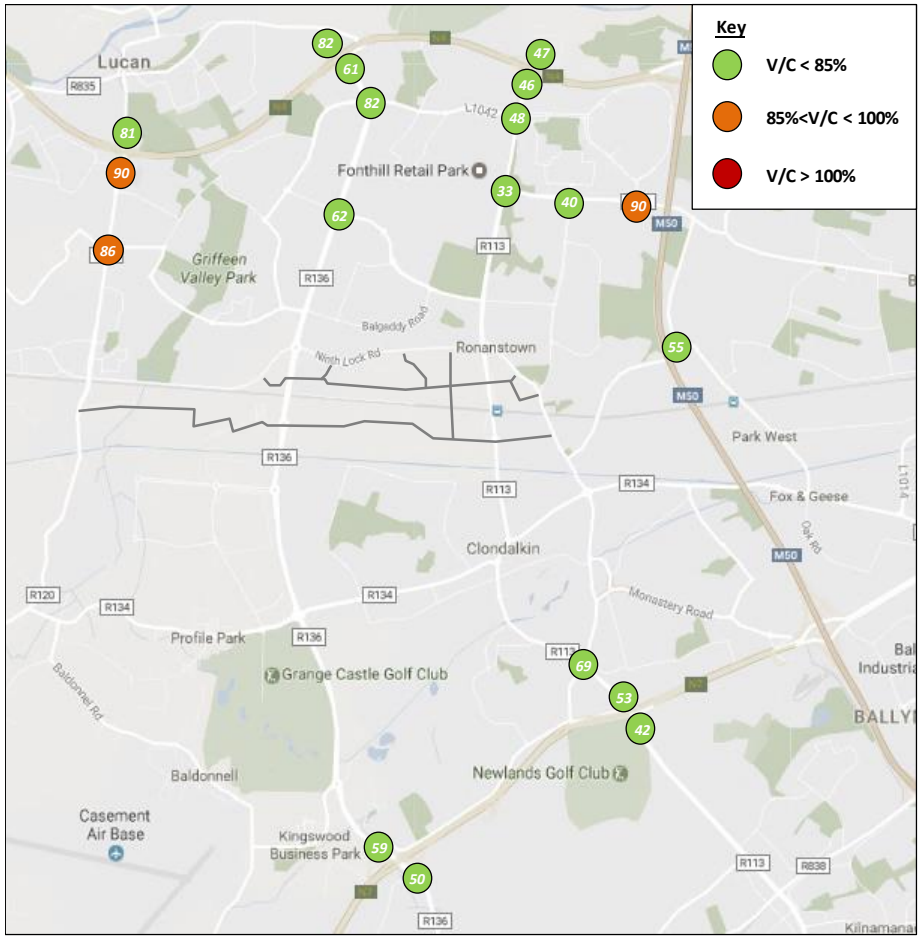
Figure 7.46 and 7.47, overleaf, illustrate the maximum, and demand weighted, V/C for both the '2026 Clonburris' and the ERM base year 2012 demand scenarios. As noted previously, a V/C of greater than 100% means that demand through the junction exceeds capacity leading to significant congestion and delay. The results suggest that, even in the base scenario, some junctions have turning movements which are operating over capacity, particularly at the interchanges with the N4 and N7. As expected, the general growth in traffic to 2026 further exacerbates this issue with a general increase in maximum and average V/C.

As described in the previous section and Table 7.6, the average vehicle turning delay at junctions can be linked to a prescribed Level of Service (LOS). Figure 7.48 illustrates the calculated LOS for both the '2026 Clonburris' and ERM 2012 base demand scenarios. As noted in the V/C analysis, the results in Figure 7.48 indicate that junctions connecting to the N4 and N7 experience significant levels of delay in the 2012 base AM Peak Period.

The V/C and LOS results in 2026 are similar to those outlined previously for 2035 in Figure 7.42, 7.43 and 7.45. There are a number of reasons why a significant deterioration in junction performance is not experienced, including:

- The road network is already operating close/over capacity at a number of locations in 2026, and therefore, cannot sustain more demand in 2035. Additional 2035 traffic will disperse to find alternative route options which can minimise their journey time;
- Further 2035 GDA Strategy public transport measures are due to be implemented by 2035, including the DART Expansion and Lucan Luas, which will support the use of sustainable modes and reduce the level of car traffic on the network; and
- Demand management measures on the national road network, including the N4 and M50, will be implemented to control the level of growth in traffic on these roads in order to support their strategic function.

2026 Clonburris



2012 Base

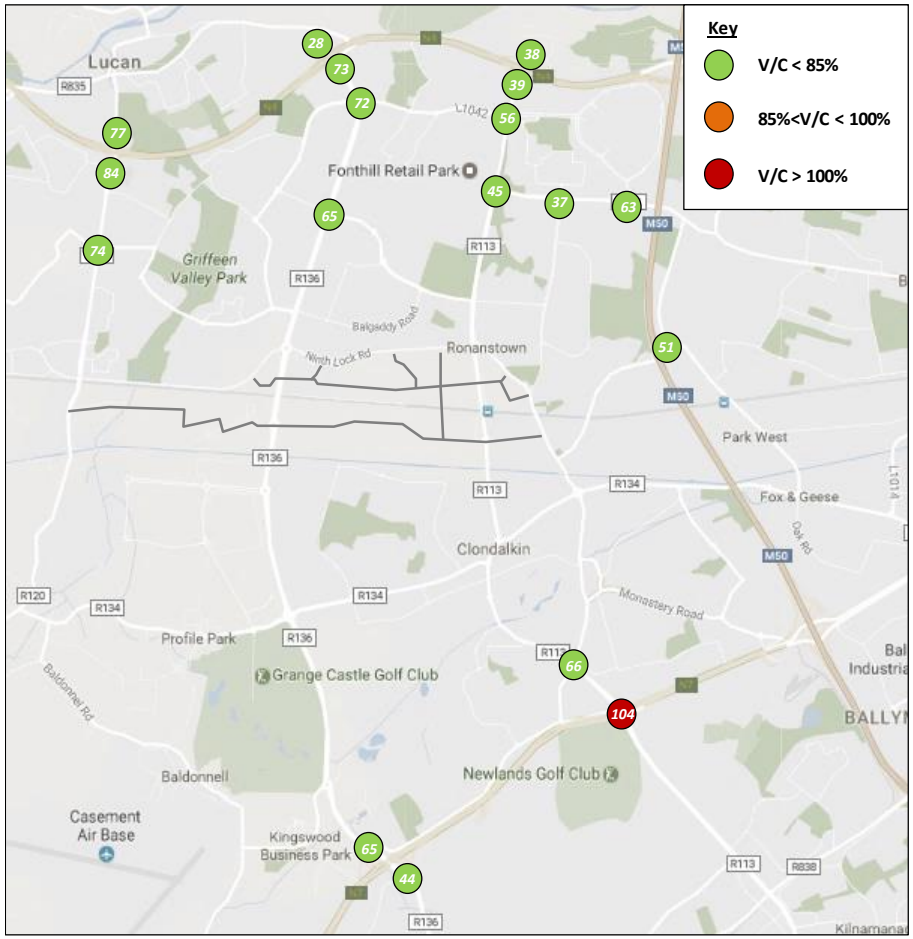
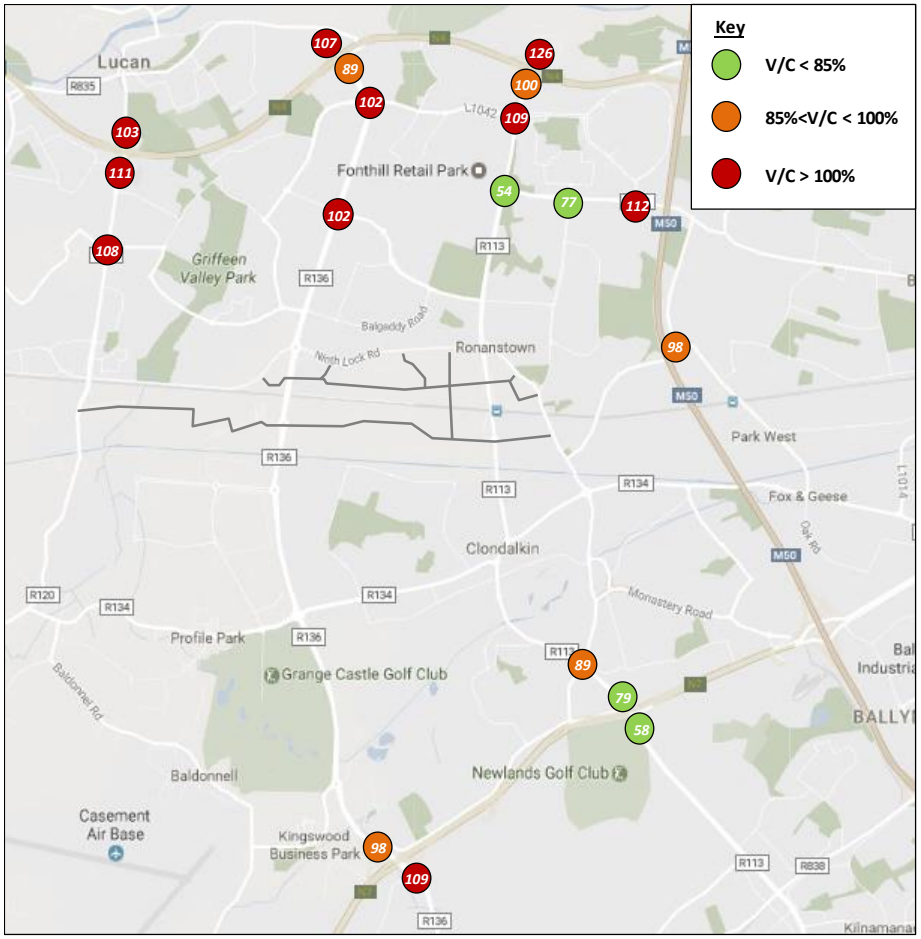


Figure 7.46 Strategic Junction Performance – Average V/C 2026 AM Peak

2026 Clonburris



2012 Base

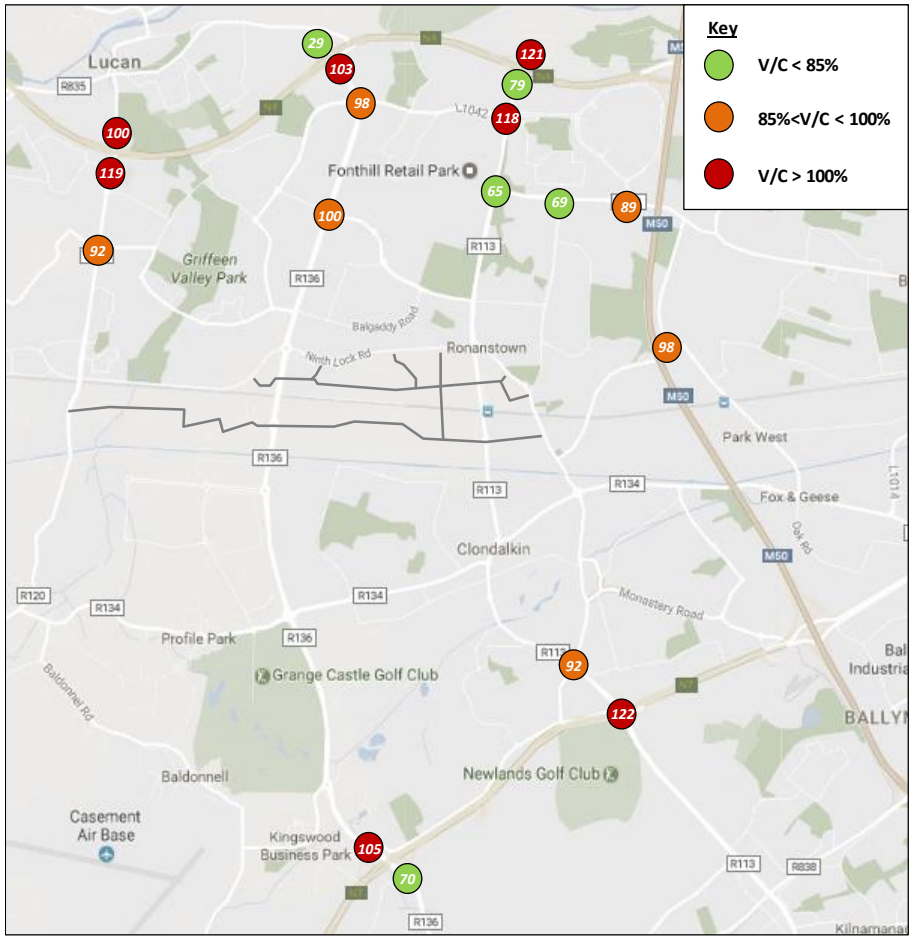
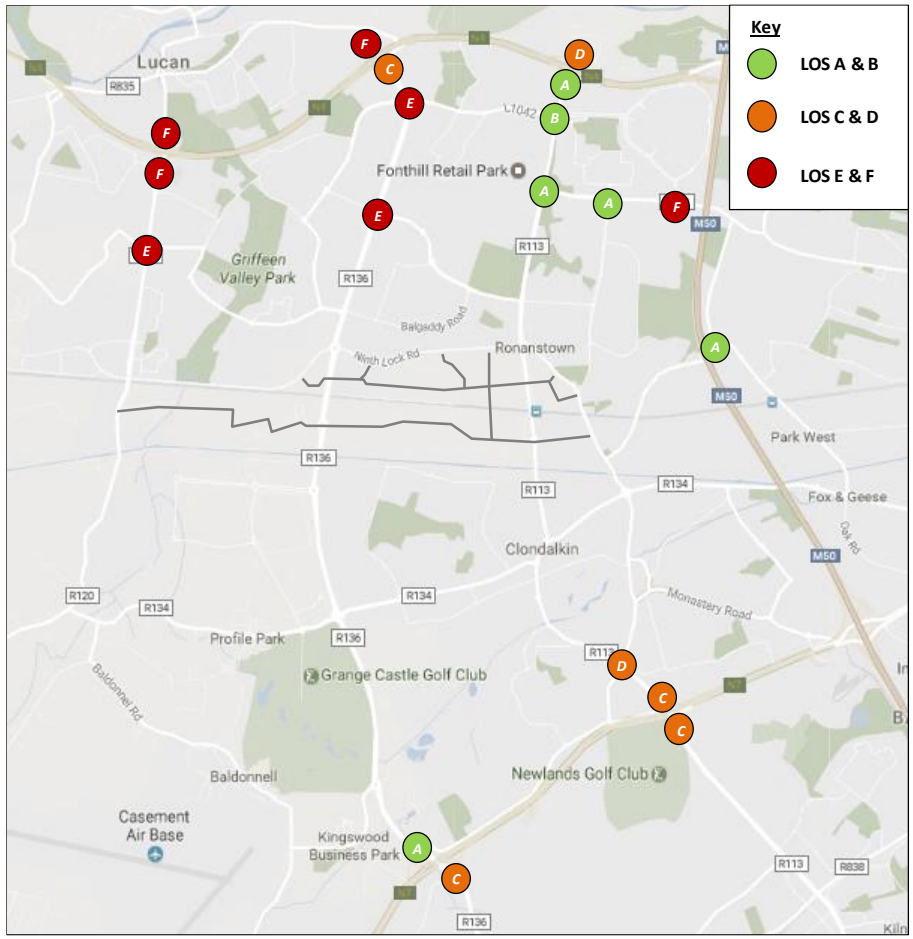


Figure 7.47 Strategic Junction Performance – Max V/C 2026 AM Peak

2026 Clonburris



2012 Base

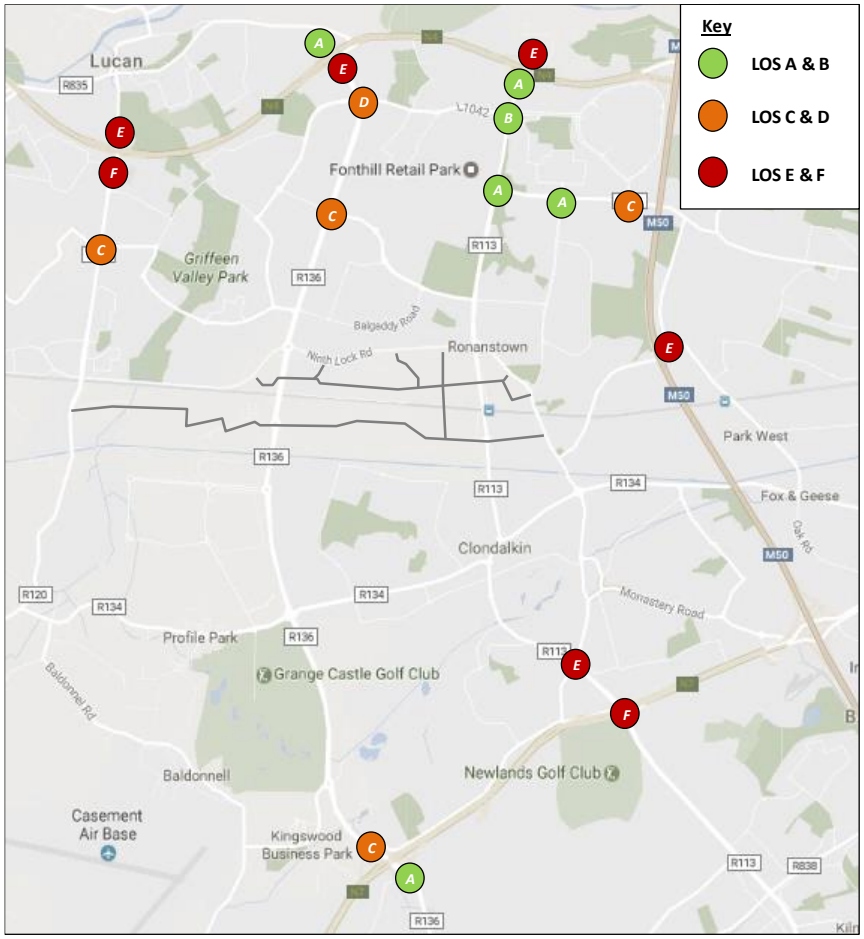


Figure 7.48 Junction Level of Service 2026 AM Peak Hour

7.4.3 Local Junction Assessment

Introduction

As noted earlier in this chapter, 19 junctions, illustrated in Figure 7.41, were shortlisted for detailed assessment, including five existing signalised junctions and three existing roundabouts. The detailed junction modelling and design was undertaken using an iterative process including the following key steps:

- **Step1 Strategic Model:** The ERM was utilised to extract forecast year demand for the Clonburris development;
- **Step2 Localised Modelling:** The strategic ERM was disaggregated to a local zone level (see Figure 5.2 previously). This provided a more accurate representation of traffic demand generated from the proposed Clonburris development which was then assigned to a detailed local road network;
- **Step3 Junction Modelling:** Flows from the localised modelling were fed into LINSIG and ARCADY to assess junction performance and inform design; and
- **Step4 Iteration:** Step 2 and 3 above were run in an iterative process until an optimum design was achieved

Preliminary designs have been created for each of these junctions based on the overarching design principles and modelling results, with the exception of existing junctions S1, S7, R1, R2 and R3. For these existing junctions, modelling was undertaken to ascertain forecast junction performance, and recommendations are provided to mitigate identified issues.

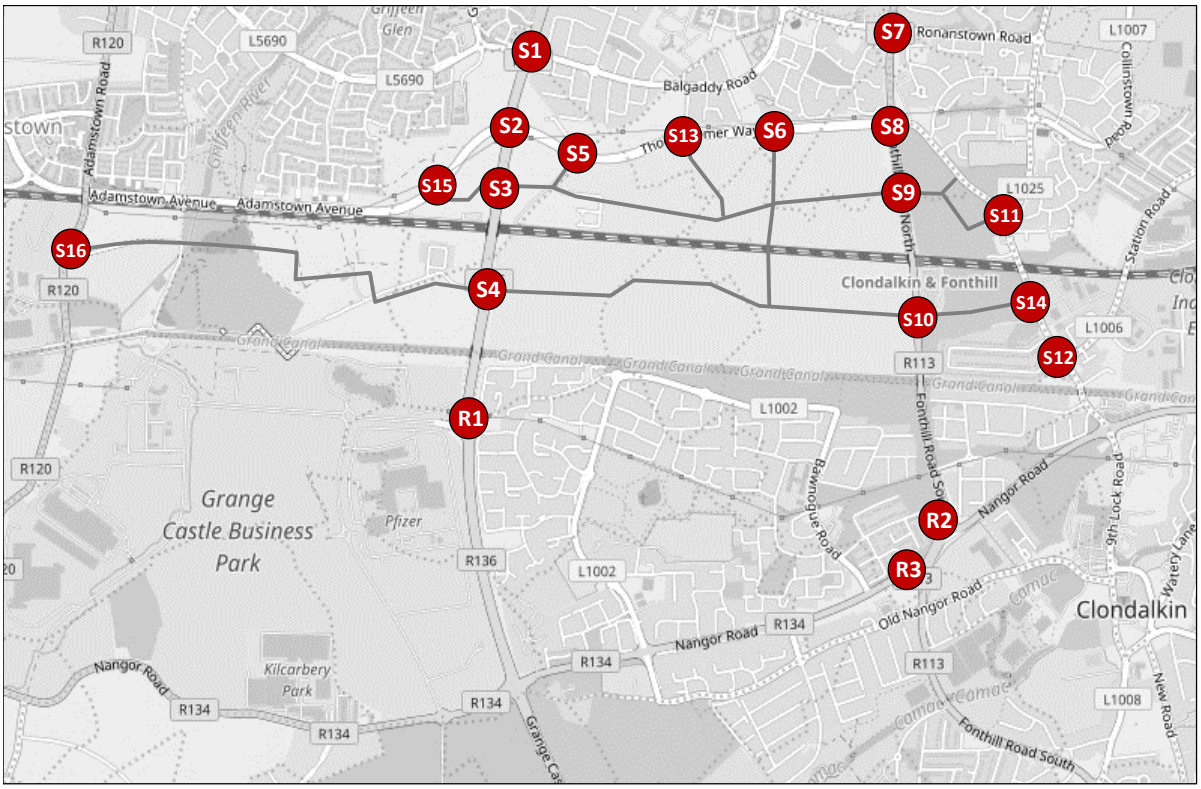


Figure 7.49 Junctions Selected for Detailed Assessment

Modelling Results and Design

The following section outlines the proposed preliminary designs for each of the junctions illustrated in Figure 7.49. For each junction, the design rationale is documented along with results from the detailed modelling assessment. When presenting modelling results, two main operational performance measures were utilised, namely:

- **Practical Reserve Capacity (PRC):** PRC is used to assess signalised junction performance and is a measure of how much additional traffic can pass through a junction controlled by the stage stream whilst maintaining a maximum degree of saturation of 90% on all lanes. A positive PRC indicates that a junction has spare capacity and may be able to accept more traffic. A negative PRC indicates that the junction is over capacity and is suffering from traffic congestion; and
- **Level of Service (LOS):** LOS has been used in assessing roundabouts, and classifies junction performance based on average vehicle delay as noted in Table 7.6 above.

The design of the junctions presented in the following section have been prepared in accordance with the overriding objectives of the Clonburris SDZ. The following table presents some of the key development objectives and how they have informed the design of the junctions:

Table 7.7 Development Objectives and Design Response

Objectives	Design Response
Public Transport: maximise and makes efficient use of existing and planned public transport services	Along designated high frequency (service every 15minutes or less) public transport corridors, dedicated bus lanes are proposed with priority given at traffic signals.
Active modes: Provide integrated streets with dedicated pedestrian and cycle facilities	Segregated cycle tracks provided on all arterial and link streets with appropriate levels of priority and safety provided at junctions. Signalised toucan crossings provided at signalised junctions with direct single movement crossings provided where feasible. All designs to be prepared in accordance with the National Cycle Manual.
Balancing needs: Maximises accessibility for walking, cycling and public transport while balancing the needs of the car	Integrated approach adopted to junction design which recognises the demand for travel on the network for each transport mode; providing an appropriate level of priority for walking, cycling and public transport; whilst managing the efficiency of the road network for vehicular traffic.
Place making: Upgrade existing sections of strategic roads within the SDZ lands to integrated urban streets	Where feasible, reducing the visual impact of the junctions (e.g. reducing number of trafficked lanes) and providing appropriate design speeds, which respond to the place making objectives of the SDZ, whilst managing the movement requirements of the corridor.

Illustrations of proposed junction designs are presented in the following sections and more detailed drawings are provided at a larger size in Appendix B of this report. The junction designs are at a preliminary level indicating the scale and intent of the design. The designs will be refined at subsequent stages of the implementation of the Planning Scheme.

Junction S1: Grange Castle Rd (R136)/Griffeen Avenue/Balgaddy Road

Design Rationale

- Existing layout on the Grangecastle Road to be retained.
- Consideration to be given to inclusion of short left turn flare lanes (40-50metres in length) on the Balgaddy Road and Griffeen Avenue to reduce congestion on these roads.

Junction Performance

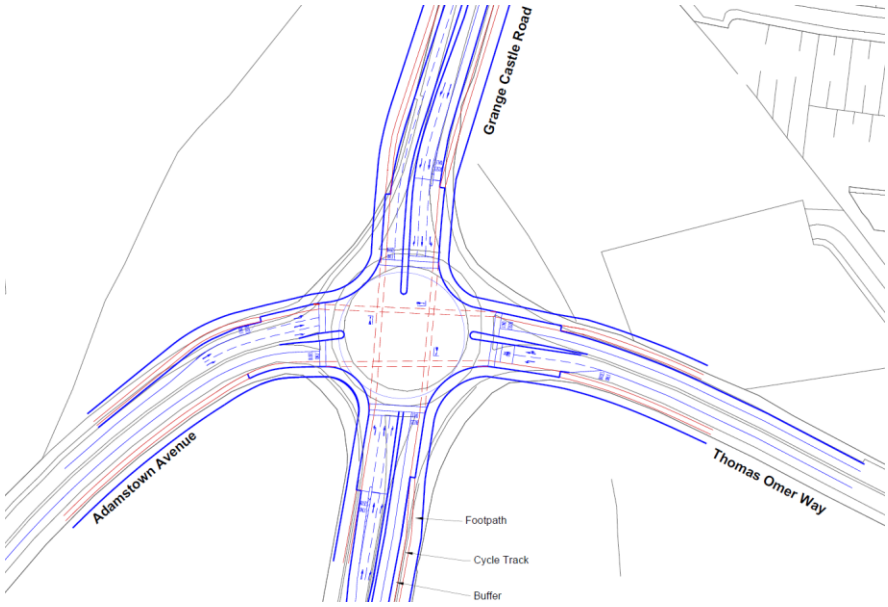
- Modelling analysis carried out in LINSIG indicates that the junction operates satisfactorily during the 2035 AM and PM peak hour with:
  - PRC of 1.9% in the AM peak and 4.0% in the PM; and
  - Maximum average turn delay per vehicle of 62.20 seconds in the AM peak and 64.20 seconds in the PM peak

	PRC (%)	Junction average Delay /PCU (sec)
AM	1.9	15.95
PM	4.0	18.78

Conclusion

- Junction performs satisfactorily in both AM and PM peak hours in 2035 based on the inclusion of short turn flare lanes (40-50metres) on the Balgaddy Road and Griffeen Avenue.

Junction S2: Adamstown Avenue / Thomas Omer Way / Grange Castle Rd (R136)



Design Rationale

- Bus queue jump (or queue relocation) facility introduced on Grange Castle Road to enable buses to enter the junction in a priority position;
- General traffic held at a set of pre-signals, and released following passage of the bus;
- Segregated cycle track to provide enhanced safety for cyclists;
- Proposed upgrade to signalised junction to:
  - Improve safety for pedestrians to cater for increased movements to adjacent residential areas and schools; and
  - Cater for increased traffic flows based on general growth in demand along with additional traffic generated by the Clonburris SDZ
- North and South Arms are designed with pre-signal stop line approximately 30m from stop line and one straight ahead lane with left and right flares provided to cater for large traffic demand along the R136;
- East and West arms have a bus lane with single traffic lane for straight ahead movements and left and right flares of varying length to cater for forecast turning movements.

Junction Performance

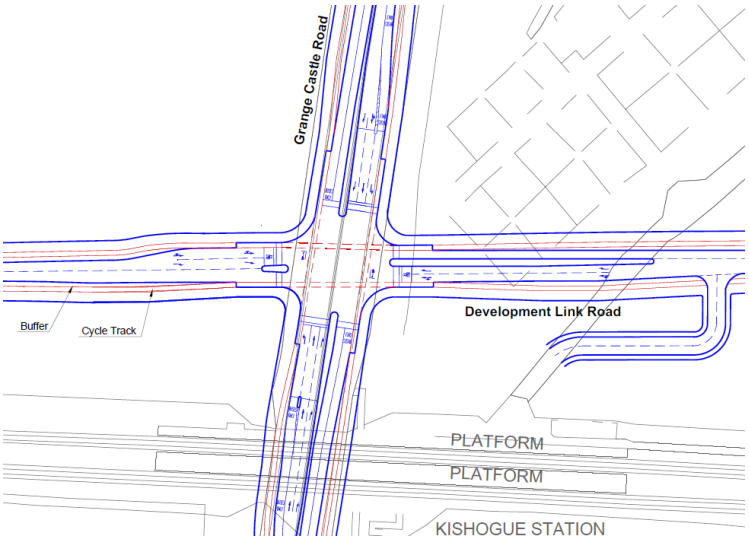
- Modelling analysis carried out in LINSIG indicates that the junction operates satisfactorily during the AM and PM peak hour with a cycle time of 120 seconds:
  - PRC of 0.3% in the AM peak and 6.4% in the PM; and
  - Maximum average turn delay per vehicle of 205.80 seconds in the AM peak and 147.8 seconds in the PM peak

	PRC (%)	Junction average Delay /PCU (sec)
AM	0.3	24.43
PM	6.4	21.00

Conclusion

- Relatively compact junction proposed which maximises accessibility for walking, cycling and public transport while balancing the needs of the car
- Junction approaches capacity but performs satisfactorily in both peak hours in 2035.

Junction S3: Grange Castle Rd (R136) / New Development Road



Design Rationale

- Bus queue jump (or queue relocation) facility introduced on Grange Castle Road to enable buses to enter the junction in a priority position;
- General traffic held at a set of pre-signals, and released following passage of the bus;
- Segregated cycle track to provide enhanced safety for cyclists;
- Proposed signalised junction to:
  - Provide improved safety and accessibility for pedestrians; and
  - Cater for increased traffic flows based on general growth in demand along with additional traffic generated by the Clonburris SDZ
- North and South arms are designed with pre-signal stop line approximately 30m from advance stop line and one straight ahead lane with left and right flares. South arm is designed with right flare extending 46m beyond pre-signal stop line;
- East and West arms have a single traffic lane for straight ahead movements with left and right to flares of varying length to cater for forecast turning movements.
- Bus lanes are not proposed on the eastern and western arms.

Junction Performance

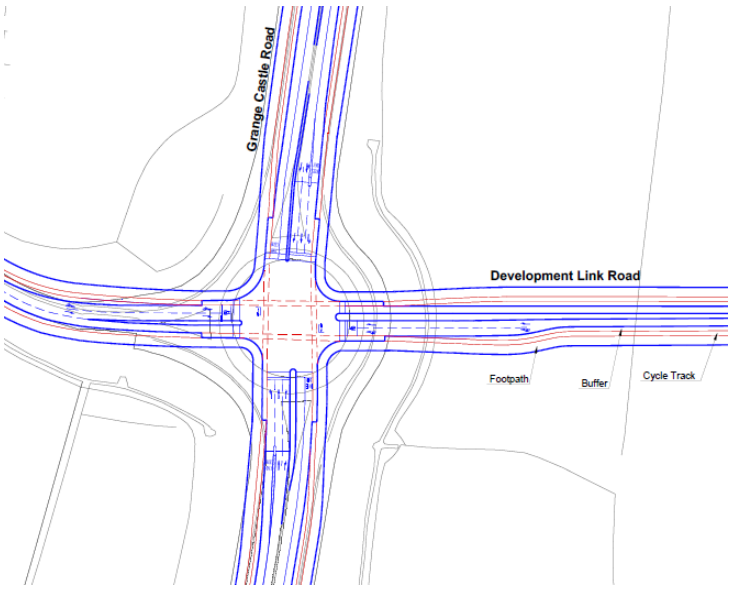
- Modelling analysis carried out in LINSIG indicates that the junction operates satisfactorily during the AM and PM peak hour with a cycle time of 120 seconds:
  - PRC of 0.6% in the AM peak and 0.1% in the PM; and
  - Maximum average turn delay per vehicle of 115.9 seconds in the AM peak and 78 seconds in the PM peak

	PRC (%)	Junction average Delay /PCU (sec)
AM	0.6	25.77
PM	0.1	19.00

Conclusion

- Relatively compact junction proposed which maximises accessibility for walking, cycling and public transport while balancing the needs of the car
- Junction approaches capacity but performs satisfactorily in both peak hours in 2035.

Junction S4: Grange Castle Rd (R136) / Southern E-W Clonburris Link Road



Design Rationale

- Bus queue jump (or queue relocation) facility introduced on Grange Castle Road to enable buses to enter the junction in a priority position;
- General traffic held at a set of pre-signals, and released following passage of the bus;
- Segregated cycle track to provide enhanced safety for cyclists;
- Proposed signalised junction to:
  - Provide improved safety and accessibility for pedestrians; and
  - Cater for increased traffic flows based on general growth in demand along with additional traffic generated by the Clonburris SDZ
- North and South arms are designed with pre-signal stop line approximately 30m from advance stop line and one straight ahead lane with left and right flares;
- East and West arms have a single traffic lane for straight ahead movements with left and right to flares of varying length to cater for forecast turning movements.
- Bus lanes are not proposed on the western arm.

Junction Performance

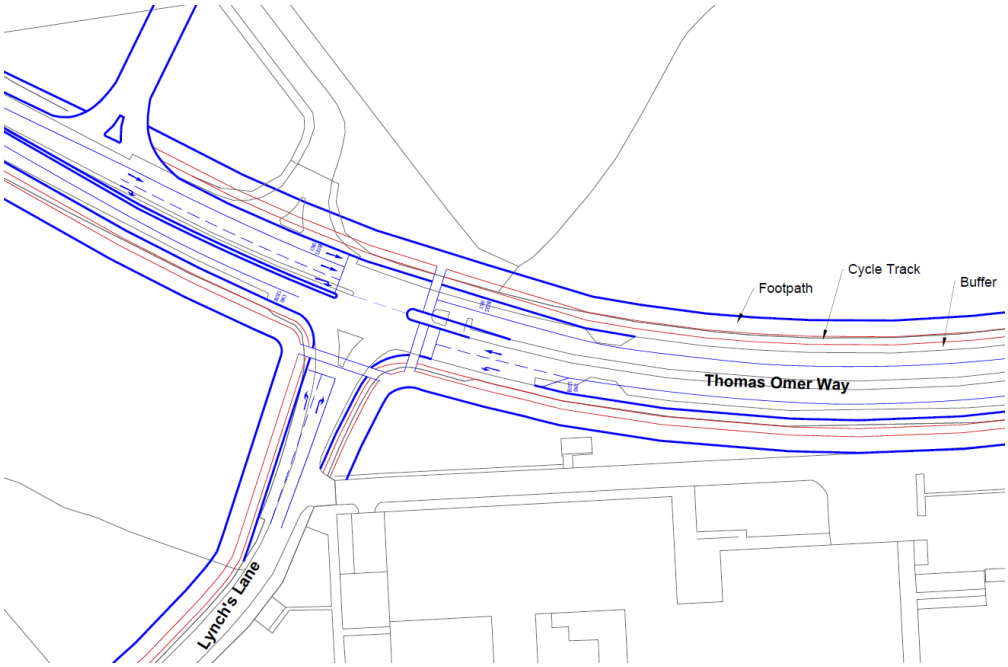
- Modelling analysis carried out in LINSIG indicates that the junction operates satisfactorily during the AM and PM peak hour with:
  - PRC of 0.9% in the AM peak and 6.1% in the PM; and
  - Maximum average turn delay per vehicle of 87.5 in the AM peak and 76.1 seconds in the PM peak

	PRC (%)	Junction average Delay /PCU (sec)
AM	0.9	26.11
PM	6.1	24.3

Conclusion

- Relatively compact junction proposed which maximises accessibility for walking, cycling and public transport while balancing the needs of the car
- Junction approaches capacity but performs satisfactorily in both peak hours in 2035.

Junction S5: Thomas Omer Way/Lynch's Lane



Design Rationale

- Bus lanes advanced to the stop line to provide priority along bus corridors;
- Segregated cycle track to provide enhanced safety for cyclists;
- Proposed signalised junction to:
  - Provide improved safety and accessibility for pedestrians; and
  - Cater for increased traffic flows based on general growth in demand along with additional traffic generated by the Clonburris SDZ
- West and East arms are designed with a bus lane and one straight ahead lane along with right and left flares respectively provided to cater for turning traffic demand;
- South arm has a single traffic lane for right turning movement with left flare to cater for forecast turning movements.

Junction Performance

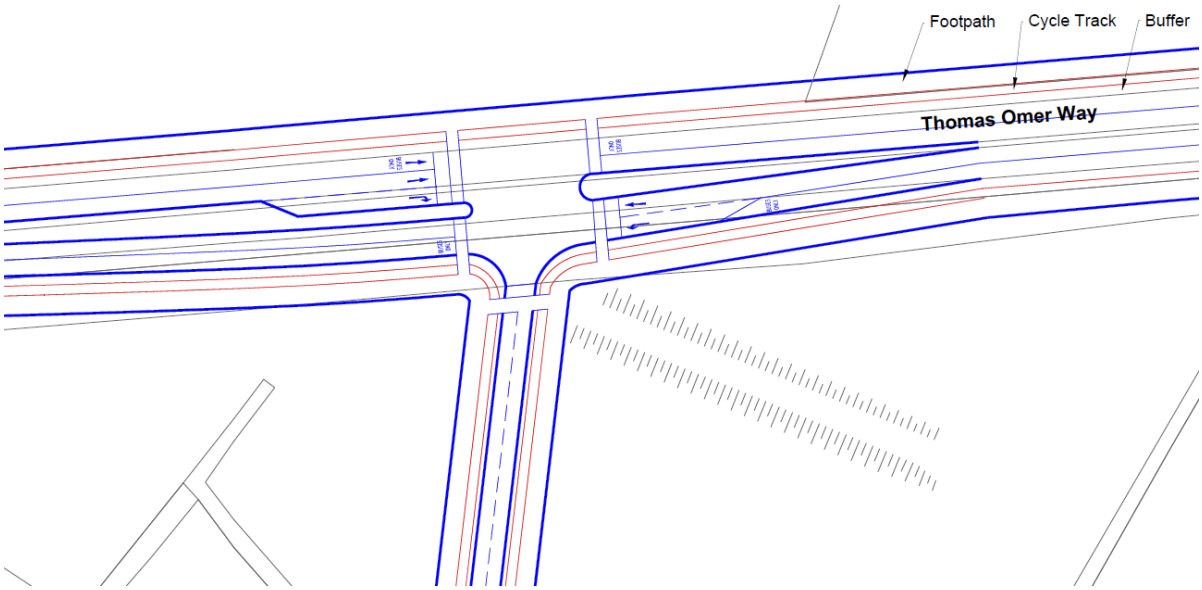
- Modelling analysis carried out in LINSIG indicates that the junction operates satisfactorily during the AM and PM peak hour with:
  - PRC of 3.3% in the AM peak and 2.9% in the PM; and
  - Maximum average delay per vehicle of 61.40 seconds in the AM peak and 53.30 seconds in the PM peak

	PRC (%)	Junction average Delay /PCU (sec)
AM	3.3	19.39
PM	2.9	21.06

Conclusion

- Compact junction proposed which maximises accessibility for walking, cycling and public transport while balancing the needs of the car
- Junction approaches capacity but performs satisfactorily in both peak hours in 2035.

Junction S6: Thomas Omer Way/New Development Road



Design Rationale

- Bus lanes advanced to the stop line to provide priority along bus corridors;
- Segregated cycle track to provide enhanced safety for cyclists;
- Proposed signalised junction to:
  - Provide improved safety and accessibility for pedestrians; and
  - Cater for increased traffic flows based on general growth in demand along with additional traffic generated by the Clonburris SDZ
- West and East arms are designed with a bus lane and one straight ahead lane along with right and left flares respectively provided to cater for turning traffic demand;
- South arm has a single traffic lane for left and right turning movements due to low forecasted flows.

Junction Performance

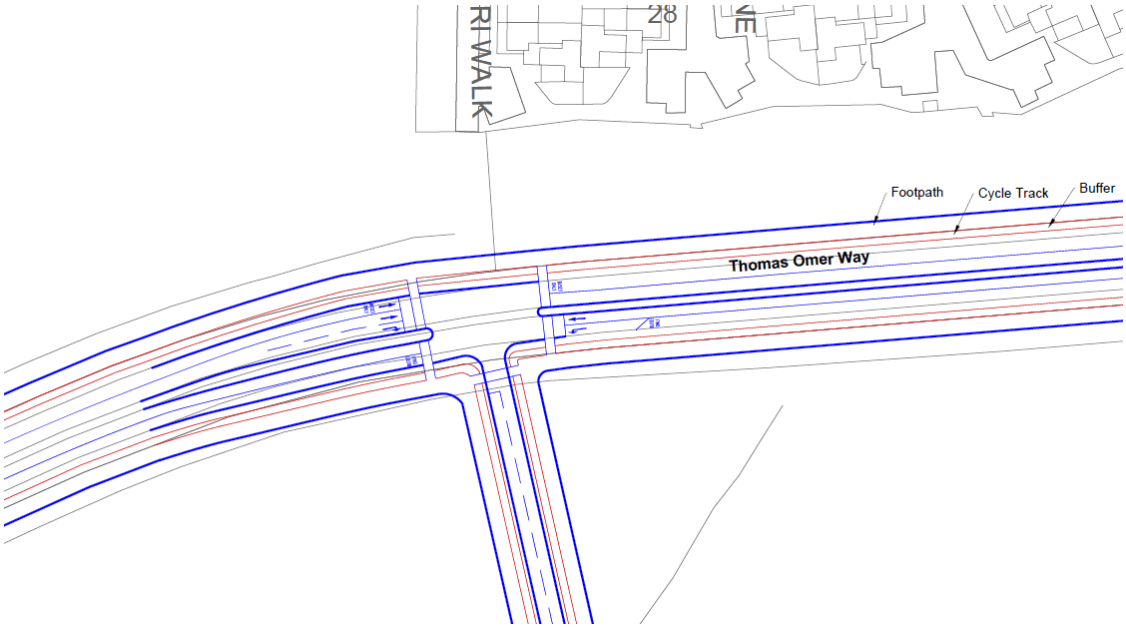
- Modelling analysis carried out in LINSIG indicates that the junction operates satisfactorily during the AM and PM peak hour with:
  - PRC of 1.3% in the AM peak and 31.2% in the PM; and
  - Maximum average turn delay per vehicle of 75.70 seconds in AM peak and 73.50 seconds in PM peak

	PRC (%)	Junction average Delay /PCU (sec)
AM	1.3	13.69
PM	31.2	11.63

Conclusion

- Compact junction proposed which maximises accessibility for walking, cycling and public transport while balancing the needs of the car
- Junction performs satisfactorily in both peak hours in the 2035 scenario.

Junction S13: Thomas Omer Way/New Development Road



Design Rationale

- Bus lanes advanced to the stop line to provide priority along core bus corridors;
- Segregated cycle track to provide enhanced safety for cyclists;
- Proposed signalised junction to:
  - Provide improved safety and accessibility for pedestrians; and
  - Cater for increased traffic flows based on general growth in demand along with additional traffic generated by the Clonburris SDZ
- West and East arms are designed with a bus lane and one straight ahead lane along with right and left flares respectively provided to cater for turning traffic demand;
- South arm has a single traffic lane for left and right turning movements due to low forecasted flows.

Junction Performance

- Modelling analysis carried out in LINSIG indicates that the junction operates satisfactorily during the AM and PM peak hour with:
  - PRC of 5.6% in the AM peak and 37.6% in the PM; and
  - Maximum average turn delay per vehicle of 75.5 seconds in the AM peak and 71.60 seconds in the PM peak

	PRC (%)	Junction average Delay /PCU (sec)
AM	5.6	15.20
PM	37.6	12.0

Conclusion

- Compact junction proposed which maximises accessibility for walking, cycling and public transport while balancing the needs of the car
- Junction performs satisfactorily in both peak hours in the 2035 scenario.

Junction S7: Fonthill Rd North (R113) / Castle Road

Design Rationale

- General layout at the Fonthill Road North / Castle Road signalised junction to be retained.
- Cycle track to be continued through the junction

Junction Performance

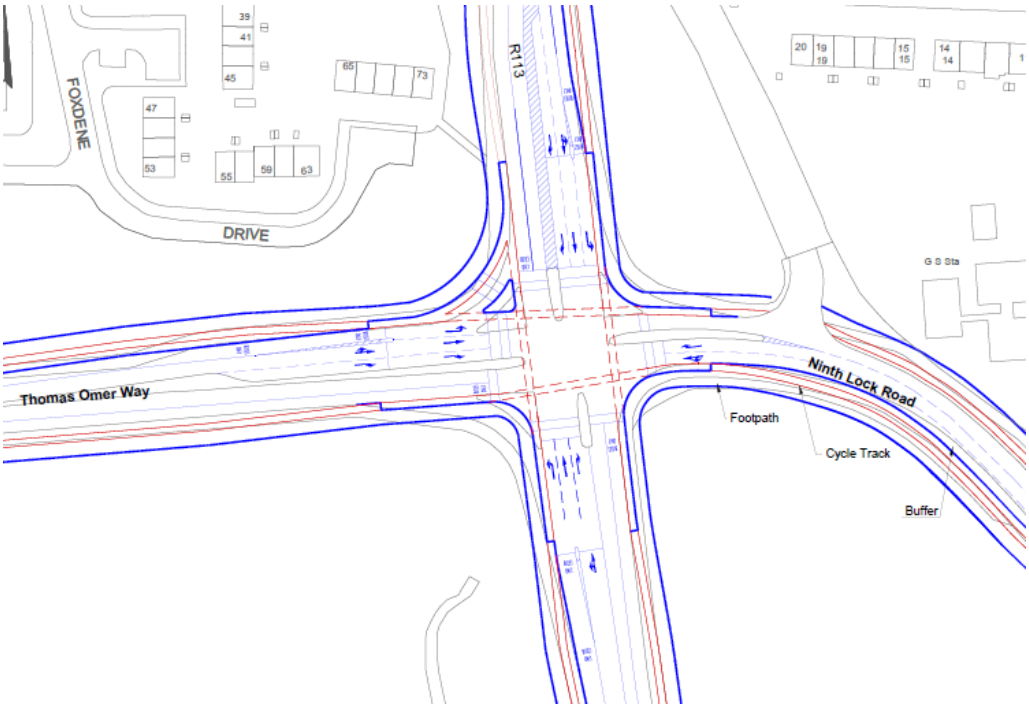
- Modelling analysis carried out in LINSIG indicates that the junction operates satisfactorily during the AM and PM peak hour with a cycle time of 120 seconds:
  - PRC of 4.5% in the AM peak and 46.1% in the PM; and
  - Maximum average turn delay per vehicle of 70.8 seconds in the AM peak and 59.4 seconds in the PM peak

	PRC (%)	Junction average Delay /PCU (sec)
AM	4.5	18.0
PM	46.1	14.75

Conclusion

- General layout at the Fonthill Road North / Castle Road signalised junction to be retained, but with inclusion of cycle facilities.
- Junction approaches capacity in the AM peak hour, but performs satisfactorily in 2035

Junction S8: Fonthill Rd North (R113) / Thomas Omer Way



Design Rationale

- Bus queue jump (or queue relocation) facility introduced on Fonthill Road North to enable buses to enter the junction in a priority position;
- General traffic held at a set of pre-signals, and released following passage of the bus;
- Segregated cycle track to provide enhanced safety for cyclists;
- Proposed signalised junction to:
  - Provide improved safety and accessibility for pedestrians; and
  - Cater for increased traffic flows based on general growth in demand along with additional traffic generated by the Clonburris SDZ
- North and South arms are designed with pre-signal stop line approximately 30m from the advance stop line and one straight ahead lane with left and right flares. North arm has extended right turn flare for 35m;
- Bus lanes are not proposed on the eastern or western arm

Junction Performance

- Modelling analysis carried out in LINSIG indicates that the junction exceeds the PRC capacity threshold during the AM and PM peak hour with:
  - PRC of -5.8% in the AM peak and -15.5% in the PM; and
  - Maximum average turn delay per vehicle of 137.5 seconds in the AM peak and 231.2 seconds in the PM peak

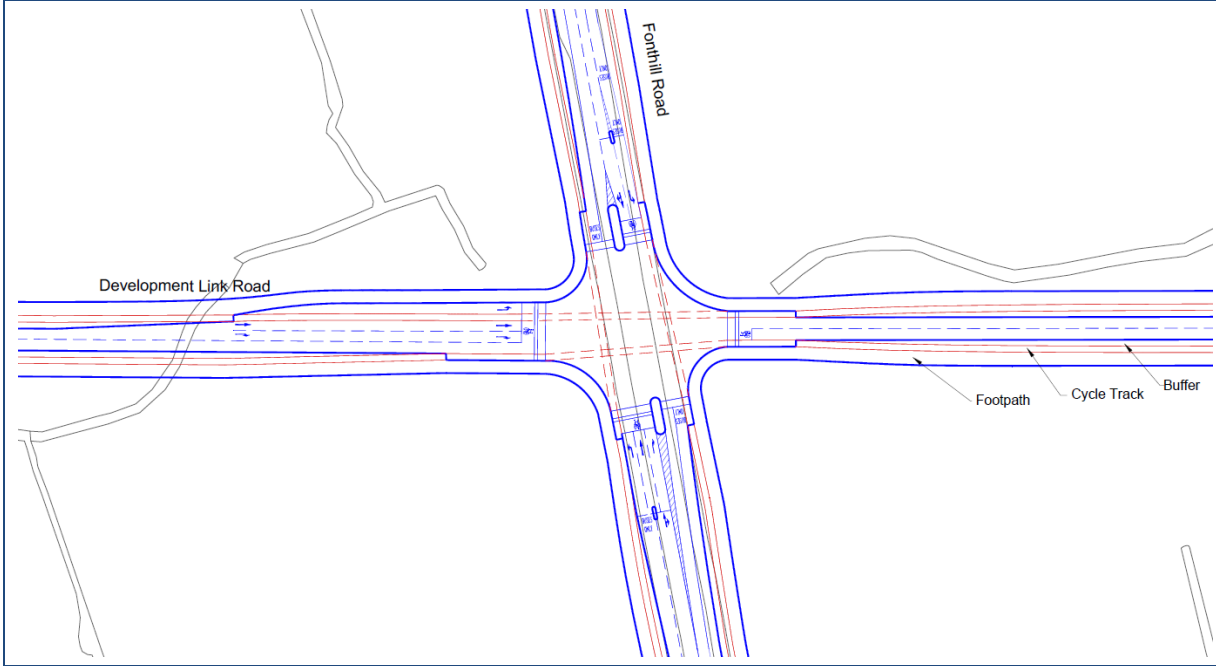
	PRC (%)	Junction average Delay /PCU (sec)
AM	-5.8	29.92
PM	-15.5	41.5

- In the AM Peak, the modelling forecasts a maximum queue length of 12 vehicles (70 metres) on the Fonthill Road North (North Arm) which is well within the available queuing capacity with Junction 7 located 300 metres north. The modelling results forecast a maximum queue length of 44 vehicles (253 metres) on the Fonthill Road North (South Arm) which would slightly encroach on Junction 9 to the south, with 240 metres of available queuing capacity;
- In the PM peak, the modelling forecasts a maximum queue length of 24 vehicles (138 metres) on the Fonthill Road North (north arm) which is well within the available queuing capacity with Junction 7 located 300 metres north. The modelling results forecast a maximum queue length of 56 vehicles (322 metres) on the Fonthill Road North (south arm) which would encroach on the junction located further south, being Junction 9, with 240 metres of available queuing capacity;
- Unless managed, the peak hour queue lengths noted above will impact on the operation of the downstream junction for both public transport and general traffic;
- Linked signal timings and the potential use of MOVA or similar signal infrastructure, will be used to enhance the capacity of this corridor and mitigate the impact of queuing on the upstream junctions on the Fonthill Road North.

Conclusion

- Relatively compact junction proposed which maximises accessibility for walking, cycling and public transport while seeking to balance the needs of the car;
- During the 2035 forecast year scenarios AM and PM peak hour scenarios, the junction exceeds the PRC capacity threshold with queuing in the southbound direction extending back to the upstream junction;
- This will be mitigated through the implementation of linked signal timings and the potential use of MOVA or similar signal infrastructure, which optimise the performance of traffic signals in order to reduce queuing and delays.

Junction S9: Fonthill Rd North (R113) / New Development Road



Design Rationale

- Bus queue jump (or queue relocation) facility introduced on Fonthill Road North to enable buses to enter the junction in a priority position;
- General traffic held at a set of pre-signals, and released following passage of the bus;
- Segregated cycle track to provide enhanced safety for cyclists;
- Proposed signalised junction to:
  - Provide improved safety and accessibility for pedestrians; and
  - Cater for increased traffic flows based on general growth in demand along with additional traffic generated by the Clonburris SDZ
- North and South arms are designed with pre-signal stop line approximately 30m from advance stop line and one straight ahead lane with left and right flares;
- West arm has one single lane for straight movement and left and right flares whereas East arm has one lane for all movements.
- Bus lanes are not proposed on the eastern and western arms.

Junction Performance

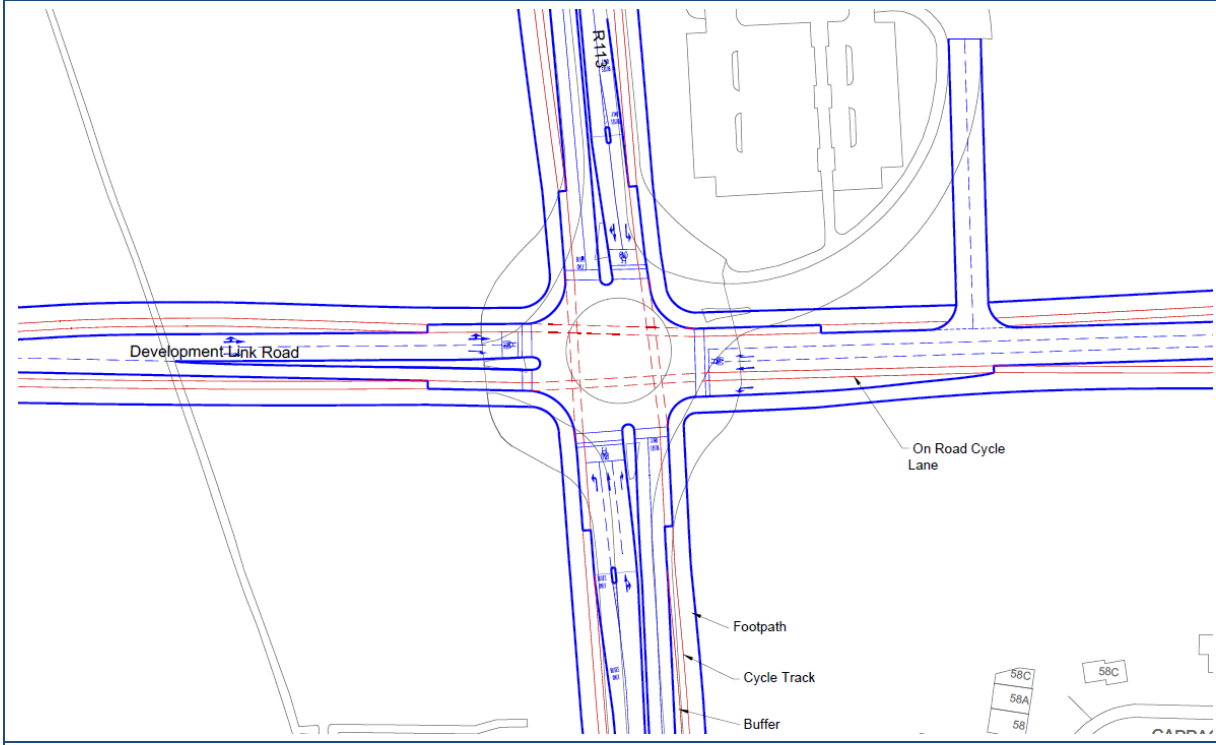
- Modelling analysis carried out in LINSIG indicates that the junction marginally exceeds the PRC capacity threshold during the AM Peak and operates near capacity in the PM:
  - PRC of -3.3% in the AM peak and 4.5% in the PM; and
  - Maximum average turn delay per vehicle of 127.10 seconds in the AM peak and 110.90 seconds in the PM peak

	PRC (%)	Junction average Delay /PCU (sec)
AM	-3.3	24.8
PM	4.5	21.6

Conclusion

- Relatively compact junction proposed which maximises accessibility for walking, cycling and public transport while seeking to balancing the needs of the car;
- The junction operates slightly over capacity in the AM Peak but overall performs without any significant delay. The Fonthill Road North (South Arm) is predicted to operate with a Degree of Saturation of 92.9% and maximum queue length of 40 PCU forecasted, which can be accommodated without blocking back to the upstream junction.

Junction S10: Fonthill Rd North (R113) / New Development Road



Design Rationale

- Bus lanes advanced to the stop line to provide priority along core bus corridors;
- Segregated cycle track to provide enhanced safety for cyclists;
- Proposed signalised junction to:
  - Provide improved safety and accessibility for pedestrians; and
  - Cater for increased traffic flows based on general growth in demand along with additional traffic generated by the Clonburris SDZ
- North and South arms are designed with pre-signal stop line approximately 30m from advance stop line and one straight ahead lane with left and right flares. North arm does not have right turning flare;
- East and West arms have been designed with one lane for straight ahead movement and left and right flares of varying length to cater for forecast turning movements.
- Bus lanes are not proposed on the west and east arms

Junction Performance

- Modelling analysis carried out in LINSIG indicates that the junction exceeds the PRC capacity threshold during the AM and PM peak hour with:
  - PRC of -11.3% in the AM peak and -23.7% in the PM; and
  - Maximum average turn delay per vehicle of 190.80 seconds in the AM peak and 323.60 seconds in the PM peak

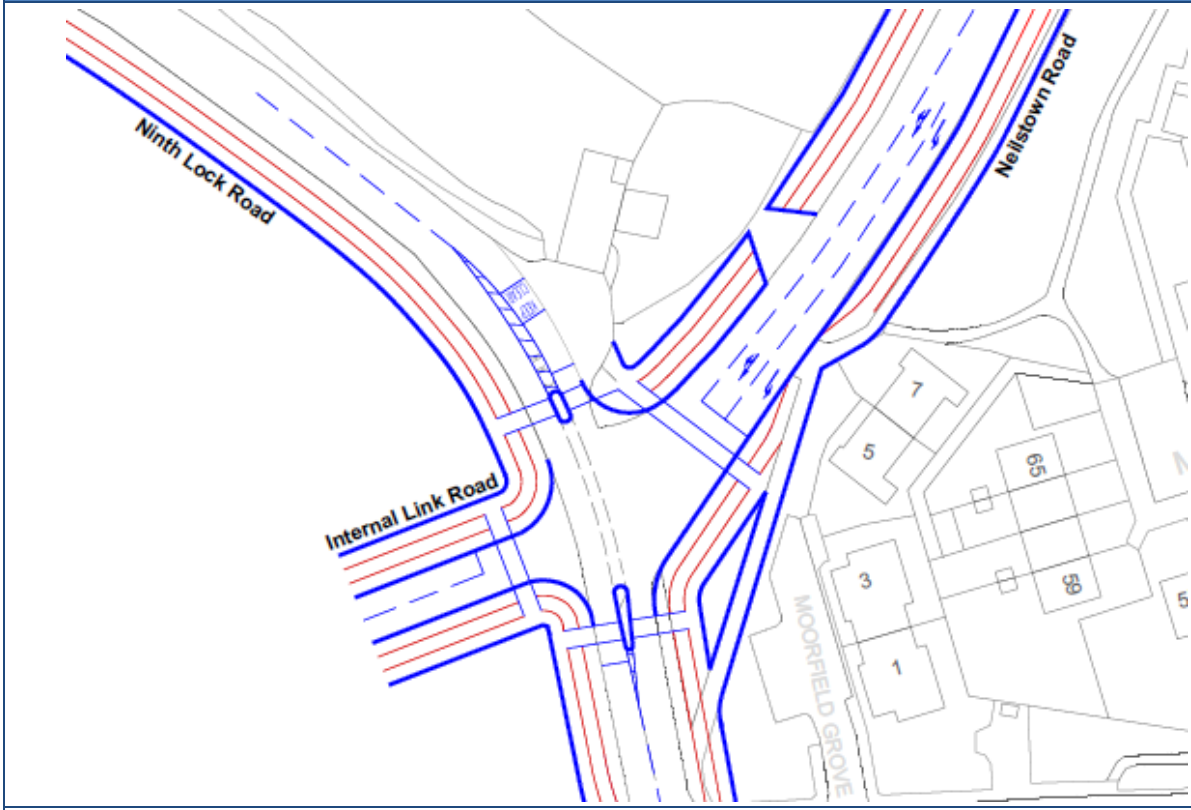
	PRC (%)	Junction average Delay /PCU (sec)
AM	-11.3	44.5
PM	-23.7	70.7

- In the AM peak period, the modelling forecasts a maximum queue length of 35 vehicles (201 metres) on the Fonthill Road North (North Arm) which is within the available queuing capacity with Junction 9 located 400 metres north. A predicted maximum queue length of 54 vehicles (311 metres) on the Fonthill Road North (South Arm) can be accommodated with Dunawley Avenue located 520 metres south.
- In the PM peak, queuing is forecast on the Fonthill Road North (North Arm), Fonthill Road North (South Arm) and New Development Road (East Arm). The maximum queuing is within the available capacity on the junction approaches with the exception of the Fonthill Road North (South Arm). The queuing from this approach is predicted to be 99 PCU (569m) which, unless managed, will extend back to the Dunawley Avenue junction.
- Unless managed, the peak hour queue lengths noted above will impact on the operation of the upstream junction for both public transport and general traffic;
- Linked signal timings and the potential use of MOVA or similar signal infrastructure, will be used to enhance the capacity of this corridor and mitigate the impact of queuing on the upstream junctions.

Conclusion

- Relatively compact junction proposed which maximises accessibility for walking, cycling and public transport while seeking to balancing the needs of the car;
- During the 2035 forecast year scenarios AM and PM peak hour scenarios, the junction exceeds the PRC capacity threshold with queuing in the southbound direction extending back to the upstream junction in the PM peak;
- This will be mitigated through the implementation of linked signal timings and the potential use of MOVA or similar signal infrastructure, which optimise the performance of traffic signals in order to reduce queuing and delays.

Junction S11: Thomas Omer Way/Neilstown Road



Design Rationale

- Proposed signalised junction to:
  - Provide improved safety and accessibility for pedestrians; and
  - Cater for increased traffic flows based on general growth in demand along with additional traffic generated by the Clonburris SDZ
- North, South and West arms are designed with a single lane for all movements;
- Eastern arm is designed with a single traffic lane for right turning movements with a left flare.

Junction Performance

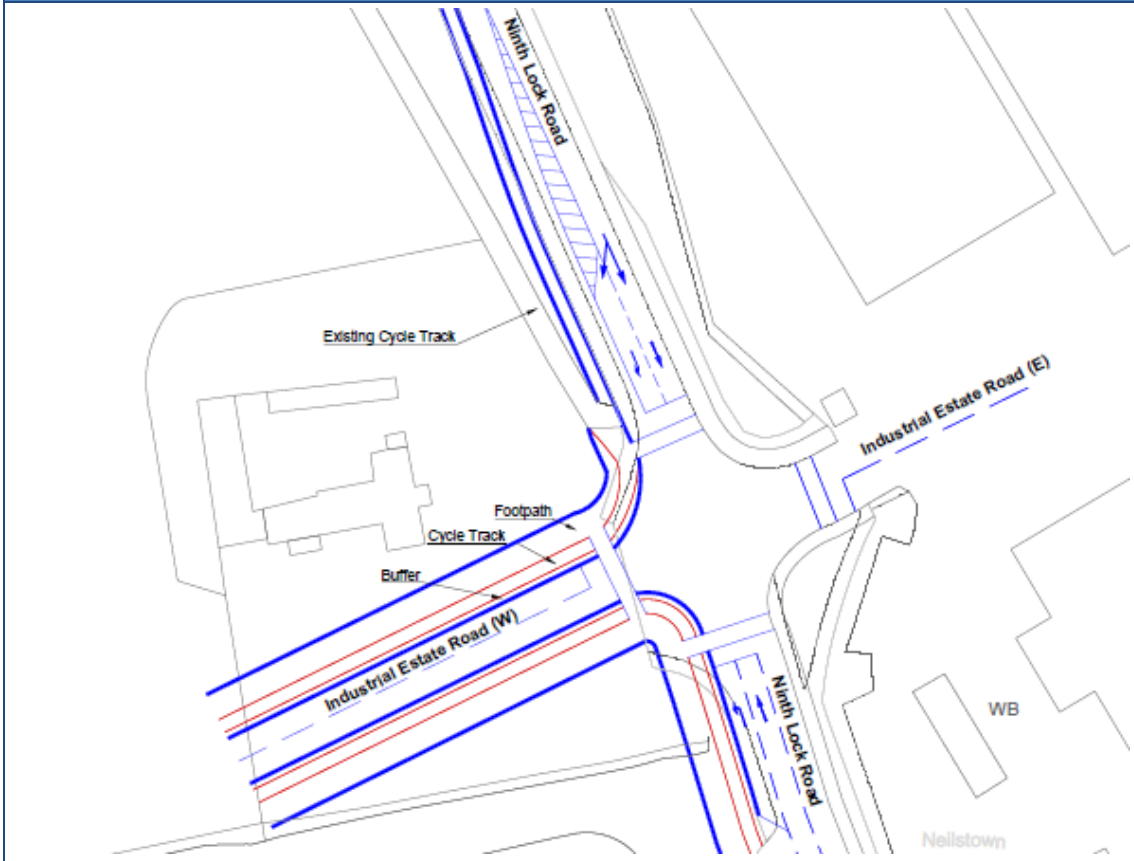
- Modelling analysis carried out in LINSIG indicates that the junction operates satisfactorily during the AM and PM peak hour with:
  - PRC of 12.7% in the AM peak and 7.4% in the PM; and
  - Maximum average turn delay per vehicle of 49.70 seconds in the AM peak and 54.80 seconds in the PM peak

	PRC (%)	Junction average Delay /PCU (sec)
AM	12.7	18.76
PM	7.4	20.73

Conclusion

- Compact junction proposed accommodating enhanced pedestrian and cycle facilities.
- Junction performs satisfactorily in both peak hours in the 2035 scenario.

Junction S14: Lucan Newlands Road/New development Road



Design Rationale

- Proposed signalised junction to:
  - Provide improved safety and accessibility for pedestrians; and
  - Cater for increased traffic flows based on general growth in demand along with additional traffic generated by the Clonburris SDZ
- North and South arms are designed with a single lane for straight ahead movements with a right and left flare respectively;
- Western arm is designed with a single traffic lane for all turning movements.

Junction Performance

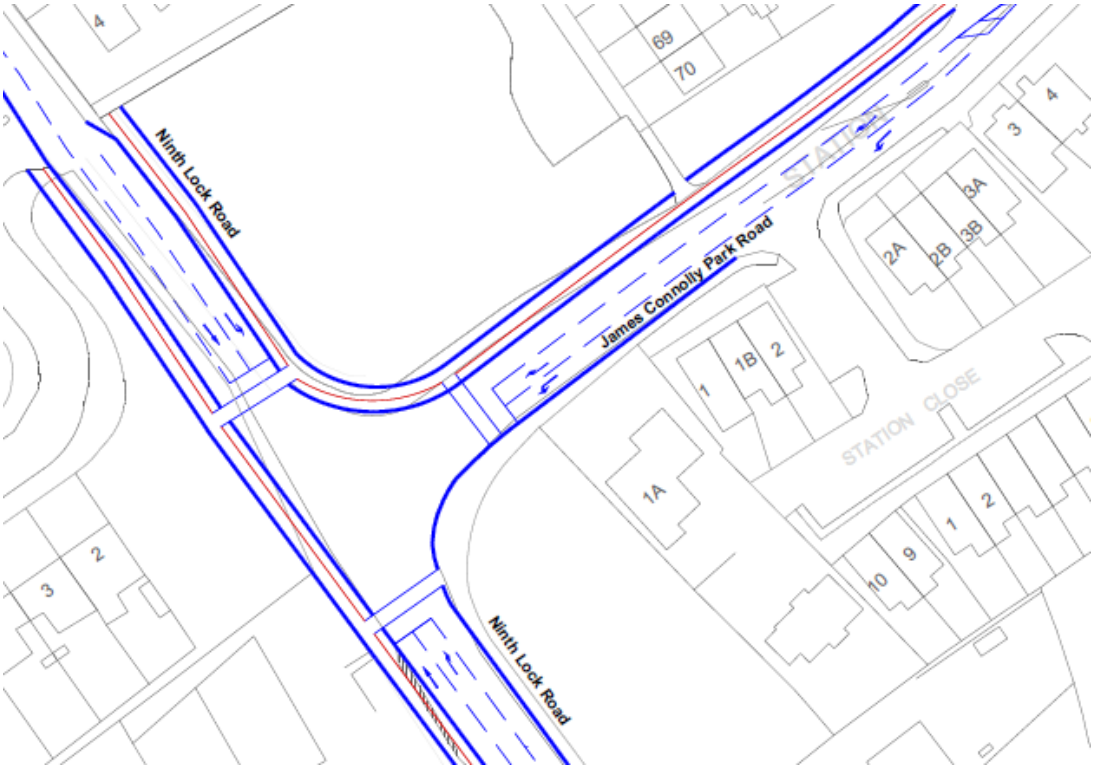
- Modelling analysis carried out in LINSIG indicates that the junction operates satisfactorily during the AM and PM peak hour with:
  - PRC of 70.8% in the AM peak and 16.3% in the PM; and
  - Maximum average turn delay per vehicle of 70.40 seconds in the AM peak and 70.20 seconds in the PM peak

	PRC (%)	Junction average Delay /PCU (sec)
AM	70.8	15.30
PM	16.3	18.33

Conclusion

- Compact junction proposed accommodating enhanced pedestrian and cycle facilities
- Junction performs satisfactorily in both peak hours in the 2035 scenario.

Junction S12: Lucan Newlands Road/Station Road



Design Rationale

- Proposed improvements to the current signalised junction to:
  - Provide improved safety and accessibility for pedestrians; and
  - Cater for increased traffic flows based on general growth in demand along with additional traffic generated by the Clonburris SDZ
- South arm is designed with two approach lanes with nearside lane for straight ahead movement and offside lane for straight and right turning traffic;
- North and Eastern arms are designed with a single traffic lane with left and right flares respectively.

Junction Performance

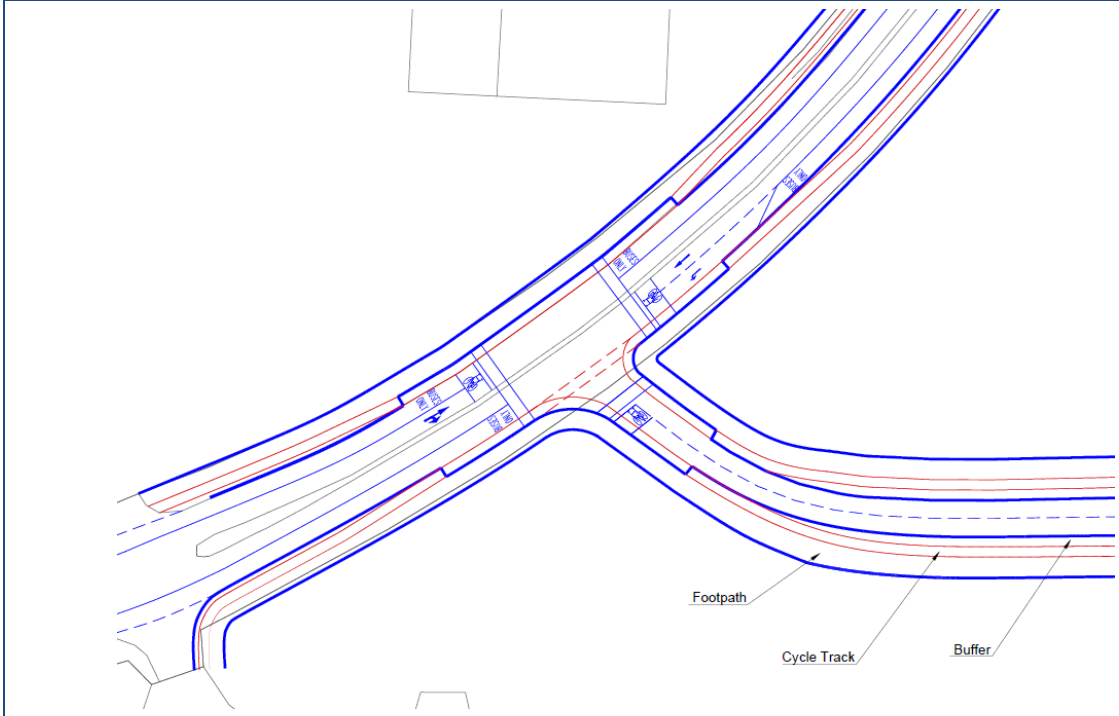
- Modelling analysis carried out in LINSIG indicates that the junction operates satisfactorily during the AM and PM peak hour with:
  - PRC of 2.9% in the AM peak and 7.4% in the PM; and
  - Maximum average turn delay per vehicle of 53.60 seconds in the AM peak and 63.30 seconds in the PM peak

	PRC (%)	Junction average Delay /PCU (sec)
AM	2.9	19.94
PM	7.4	16.27

Conclusion

- Compact junction proposed accommodating enhanced pedestrian and cycle facilities
- Junction performs satisfactorily in both peak hours in the 2035 scenario.

Junction S15: Adamstown Avenue/New Development Road



Design Rationale

- Bus lanes advanced to the stop line to provide priority along core bus corridors;
- Segregated cycle track to provide enhanced safety for cyclists;
- Proposed signalised junction to:
  - Provide improved safety and accessibility for pedestrians; and
  - Cater for increased traffic flows based on general growth in demand along with additional traffic generated by the Clonburris SDZ
- West and East arms are designed with a bus lane and one straight ahead lane along with right and left flares respectively provided to cater for turning traffic demand;
- South arm has a single traffic lane for left and right turning movements due to low forecasted flows.

Junction Performance

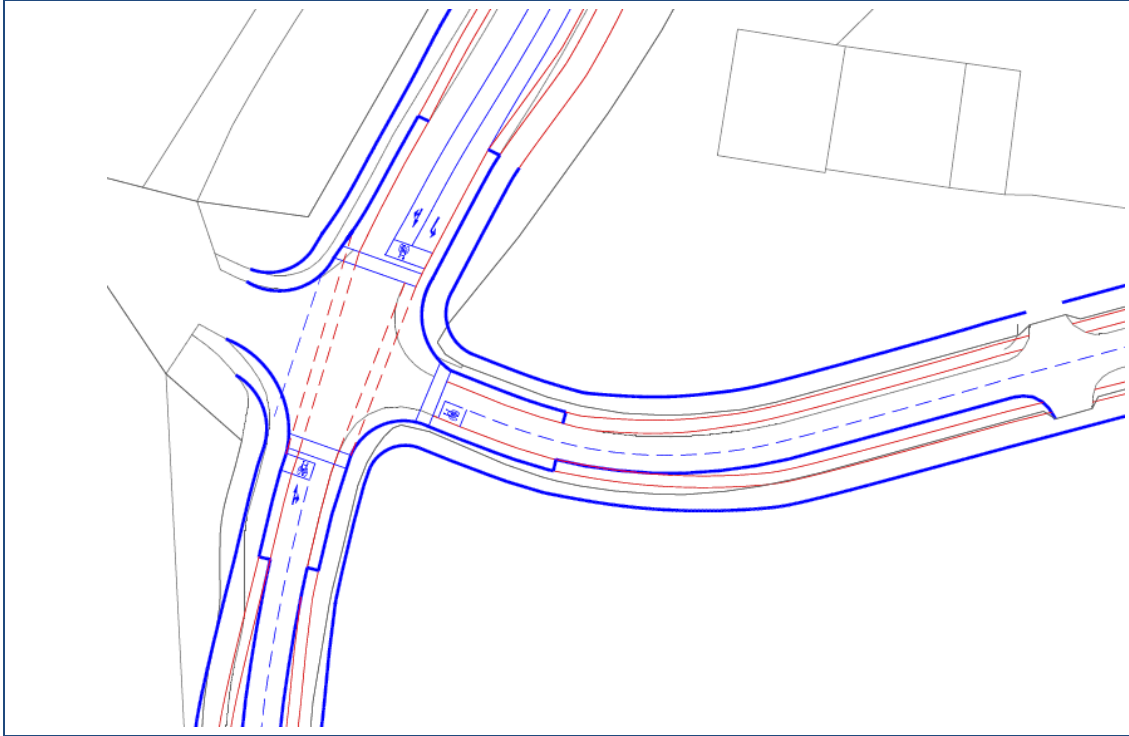
- Modelling analysis carried out in LINSIG indicates that the junction operates satisfactorily during the AM and PM peak hour with:
  - PRC of 1.3% in the AM peak and 0.6% in the PM; and
  - Maximum average turn delay per vehicle of 87.3 seconds in the AM peak and 86.5 seconds in the PM peak

	PRC (%)	Junction average Delay /PCU (sec)
AM	1.3	26.1
PM	0.6	28.4

Conclusion

- Compact junction proposed which enhances accessibility for walking and cycling.
- Junction performs satisfactorily in both peak hours in the 2035 scenario.

Junction S16: R120 Newcastle Road/New Development Road



Design Rationale

- Segregated cycle track to provide enhanced safety for cyclists;
- Proposed signalised junction to:
  - Provide improved safety and accessibility for pedestrians; and
  - Cater for increased traffic flows based on general growth in demand along with additional traffic generated by the Clonburris SDZ
- North arm designed with dedicated left turn lane to cater for turning traffic demand;
- All other arms single lane entry due to low forecasted flows.

Junction Performance

- Modelling analysis carried out in LINSIG indicates that the junction operates satisfactorily during the AM and PM peak hour with:
  - PRC of 1.8% in the AM peak and 8.9% in the PM; and
  - Maximum average turn delay per vehicle of 116.9 seconds in the AM peak and 57.6 seconds in the PM peak

	PRC (%)	Junction average Delay /PCU (sec)
AM	1.8	28.5
PM	8.9	21.1

Conclusion

- Compact junction proposed which enhances accessibility for walking and cycling.
- Junction performs satisfactorily in both peak hours in the 2035 scenario.

Junction R1: Grange Castle Road / Grange Castle Business Park

Design Rationale

- General layout at the Grange Castle Road/ Grange Castle Business park to be retained in short term, but with option to convert to signalised junction in the longer term.

Junction Performance

- Modelling analysis carried out in ARCADY indicates that the junction operates satisfactorily during the AM and PM peak hour:
  - Maximum RFC of 0.45 in the AM peak and 0.38 in the PM; Overall junction delay of 2.7 seconds in AM peak and 2.22 seconds in PM peak.

Conclusion

- General layout at the Grange Castle Road/ Grange Castle Business park to be retained in short term, but with option to convert to signalised junction in the longer term.
- Junction performs satisfactorily in the AM and PM Peak hour in 2035

Junction R2 and R3: New Nangor Road / Fonthill Road South

Design Rationale

- General layout at the New Nangor Road / Fonthill Road South to be retained.

Junction Performance

- Modelling analysis carried out in ARCADY indicates that the junction operates satisfactorily during the AM and PM peak hour:
  - Maximum RFC of 0.79 in the AM peak and 0.59 in the PM; Overall junction delay of 6.75 seconds in AM peak and 4.26 seconds in PM peak

Conclusion

- General layout at the New Nangor Road / Fonthill Road South to be retained.
- Junction performs satisfactorily in the AM and PM Peak hour in 2035

7.4.4 Summary

The previous sections provide an overview of the impact of Clonburris on the road network at both a strategic and local level. At the local level, detailed junction modelling has been undertaken which informed preliminary designs. In summary:

Road Network Performance

- Clonburris will generate approximately 1,700 passenger car units onto the wider road network in the 2035 AM peak hour, and approx. 1,250 pcus in the 2026 AM Peak Hour;
- Traffic generated by Clonburris will contribute to less than one percent to the overall traffic on the strategic road network in the 2026 and 2035 AM peak i.e. N4, N7 & M50;
- V/C and LOS analysis indicates that a number of junctions in the 2012 ERM base year experience congestion and delay, particularly at the intersections with the N4 and N7;
- The Strategic LOS and V/C analysis indicate that the '2035 Clonburris' scenario performs better than its alternative and areas within the N4/N7/M50 boundary will experience congestion and delay in 2035, irrespective of whether Clonburris gets developed, particularly at the interchanges with the N4 and N7;
- Focusing development at the Clonburris SDZ provides a number of sustainable planning and transportation benefits, such as:
    - Mixed use development supporting walking and cycling;
    - Proximity to a high quality Rail service which supports PT mode share;
    - Opening of the Kishoge train station which can serve residents currently living in the local area;
    - The development of walking and cycling infrastructure providing improved connectivity within the area etc.; and
    - The availability of new schools and commercial centres for residents in housing estates in close proximity to the development etc.
- A number of network enhancements are proposed in the vicinity of Clonburris which aim to maximises accessibility for walking, cycling and public transport while balancing the needs of the car;
- Detailed modelling indicates that the majority of identified junctions in the vicinity of Clonburris will operate satisfactorily in the peak periods;
- During the 2035 forecast year scenarios, the PRC capacity threshold will be exceeded for two junctions on the Fonthill Road resulting in queuing extending back to upstream junctions; and
- This will be mitigated through the implementation of linked signal timings and the potential use of MOVA or similar signal infrastructure, which optimise the performance of traffic signals in order to reduce queuing and delays.

7.5 Parking Strategy

7.5.1 Parking Plans and Policies

South Dublin County Council Development Plan 2016

The provision of parking has a major influence on travel choices and on trip generation within and to a site. This in turn impacts on the traffic levels in an area. The 2016-2022 County Development Plan (CDP) recognised this issue and developed a comprehensive set of parking standards considering the accessibility of a development area. In this way, travel demand can be managed positively.

The non-residential and residential parking standards taken from the CDP are set out in Figure 7.50 below. The standards are extensive and have been set out to be considered as a maximum provision. The maximum provision should not be considered as a target and where high levels of accessibility are experienced, then the parking provision should be set lower than the standards. In this way, the sustainability of the SDZ Lands will be supported and the ability to influence travel behaviour changes maximised. Within the CDP, 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 (includes a train station, Luas station or bus stop with a high quality service).

This zoning can be applied to the Clonburris SDZ whereby the accessibility appraisal shows that the majority of the proposed development site falls within 'Zone 2 residential and Non-residential'.

The CDP also requires that minimum bicycle parking standards are applied for both long stay and visitor (short stay). The provision of bicycle parking is also important to support sustainable active travel. These standards are set out below for completeness.

Other parking policies included in the CDP support the provision of electric vehicles. All developments should 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.

Parking layout and design matters are set in paragraph 11.4.4 of the CDP. These are also important considerations in the development of the parking strategy for the SDZ and are taken into account in the drafting of the Clonburris parking strategy.

Greater Dublin Area Transport Strategy Integrated Implementation Plan 2013 -2018

At a national level the Greater Dublin Area Transport Strategy Integrated Implementation Plan 2013 -2018 states that:

"*All non-residential development proposals in the GDA should be subject to maximum parking standards. These should be set by the local authorities in the GDA in consultation with the Authority and should vary spatially on the basis of centrality and the level of public transport provision*;"

In locations where the highest intensity of development occurs, an approach that caps car parking on an area-wide basis should be applied. The car parking strategy for this SDZ will take on board these national requirements.

Transport Strategy for the Greater Dublin Area 2016-2035

The NTA's Transport Strategy for the Greater Dublin Area sets out the principles for managing parking supply and supporting sustainable development. These principles are set out below and have been considered in the development of the parking strategy for Clonburris:

- Implement common maximum standards for a range of consistently-defined land use types within the GDA regional land use hierarchy;
- Limit the availability of workplace parking in urban centres to discourage car commuting, where alternative transport options are available;
- Implement area-based parking cap in locations where the highest intensity of development occurs and is promoted, such as Dublin City Centre, town / district centres and higher-order public transport nodes;
- Promote the provision and management of destination parking in areas of high trip demand, subject to appropriate pricing and locational criteria; and
- Provide appropriate parking arrangements for specific user requirements including disabled drivers, motorcycles and scooters in Dublin City Centre and other centres of activity, as well as at public transport nodes, in line with demand, and having regard to the needs of other modes.

Parking Layout Design Guidance

The *Guidelines for Planning Authorities on Sustainable Residential Development in Urban Areas (Cities, Towns & Villages) 2009* states that "Minimum densities should be specified in local area plans, and maximum (rather than minimum) parking standards should reflect proximity to public transport facilities." Section 7.6 of this report advocates the principles for the sensitive design of parking layouts which will not dominate the public realm.

This guidance, along with 'Design Manual for Urban Roads and Streets', advises on parking layout arrangements (Section 4.4.9) and the CDP guidelines have been considered in the accommodation of parking provision as set out in this parking strategy.

CATEGORY	LAND USE	ZONE 1	ZONE 2
Accommodation	Hotel	1 per bedroom	0.5 per bedroom
	Mobile Home Park	1 per unit	1 per unit
	Nursing Home, Retirement Home	1 per 4 residents	1 per 8 residents
	Student Accommodation	1 per 10 bed spaces	1 per 20 bed spaces
Civic, Community and Religious	Bank Community Centre Library Public Institution	1 per 25 sqm GFA	1 per 50 sqm GFA
	Place of worship	1 per 6 seats	1 per 12 seats
	Funeral Home	1 per 20 sqm GFA	1 per 20 sqm GFA
Education	College of Higher Education	1 per staff + 1 per 15 students	1 per 2 staff + 1 per 30 students
	Crèche School	1 per classroom	0.5 per classroom
Medical	Clinics and Group Practices	2 per consulting room	1.5 per consulting room
	Hospital	1 per 100 sqm GFA	1 per 150 sqm GFA
Retail and retail Service	Café Restaurant	1 per 15 sqm GFA	1 per 20 sqm GFA
	Bar Club	1 per 30 sqm	1 per 40 sqm
	Retail Convenience	1 per 15 sqm	1 per 25 sqm
	Retail Comparison	1 per 25 sqm	1 per 35 sqm
	Retail Warehousing	1 per 50 sqm	1 per 50 sqm
	Vehicle Service Station	1 per 250 GFA	1 per 250 GFA
Enterprise and Employment	Offices Manufacturing	1 per 50 sqm GFA	1 per 75 sqm GFA
	Warehousing	1 per 100 sqm GFA	1 per 200 sqm GFA
Sports and Recreation	Bowling Alley	3 per lane	1 per lane
	Archery Ranges Driving Ranges	1 per 3m of base line	1 per 3m of base line
	Clubhouse Gymnasium	1 per 20 sqm GFA	1 per 40 sqm GFA
	Courts Pitches	15 per pitch	7.5 per pitch
	Golf or Pitch and Putt Courses	2 spaces per hole	2 spaces per hole
Venue	Auditoriums Cinema Conference Centre Theatre	1 per 5 seats	1 per 10 seats
	Stadium	1 per 15 seats + 1 coach space per 500 spectators	1 per 15 seats
Other	Marina (Canal)	1 space per berth (excluding visitor berths)	1 space per berth (excluding visitor berths)

Figure 7.50 SDCC County Development Plan 2016 – 2022 Maximum Parking Rates (Non Residential)

DWELLING TYPE	NO. OF BEDROOMS	ZONE 1	ZONE 2
Apartment	1 Bed	1 space	0.75 space
Duplex	2 bed	1.25 space	1 space
	3 bed+	1.5 spaces	1.25 space
House	1 Bed	1 space	1 space
	2 Bed	1.5 space	1.25
	3+ bed	2 space	1.5

Figure 7.51 SDCC County Development Plan 2016 – 2022 Maximum Parking Rates (Residential)

CATEGORY	LAND USE	ZONE 1	ZONE 2
Accommodation[6]	Hotel	1 per 5 staff	1 per 10 bedrooms
	Nursing Home	1 per 5 staff	1 per 10 residents
	Residential Apartment	1 per 5 apartments	1 per 10 apartments
	Student Accommodation	1 per bedroom	1 per 5 bedrooms
Civic, Community and Religious	Bank Community Centre Library Public Institution	1 per 5 staff	1 per 100 sqm GFA
	Place of Worship		1 per 10 seats
Education	College of Higher Education	1 per 5 staff 1 per 2 students	
	Crèche	1 per 5 staff	1 per 10 children
	Primary Schools	1 per 5 staff 1 per 5 students	
	Post Primary Schools	1 per 5 staff 1 per 2 students	
Medical	Clinics and Group Practices	1 per 5 staff	0.5 per consulting room
	Hospital	1 per 5 staff	1 per 10 beds
Retail and retail Service	Café Restaurant	1 per 5 staff	1 per 10 seats
	Bar Club	1 per 5 staff	1 per 150 sqm GFA
	Retail Convenience	1 per 5 staff	1 per 50 sqm GFA
	Retail Comparison	1 per 5 staff	1 per 50 sqm GFA
	Retail Warehousing	1 per 5 staff	1 per 100 sqm GFA
	Vehicle Service Station	1 per 5 staff	
Enterprise and Employment	Offices Manufacturing	1 per 200 sqm GFA	1 per 200 sqm GFA
	Warehousing	1 per 200 sqm	
	Clubhouse Gymnasium	1 per 5 staff	1 per 50 sqm GFA
	Courts Pitches	1 per 5 staff	4 per pitch
	Golf or Pitch and Putt Courses	1 per 5 staff	
Venue	Auditoriums	1 per 5 staff	1 per 10 seats
	Cinema	1 per 5 staff	1 per 10 seats

	Conference Centre	1 per 5 staff	1 per 10 seats
	Stadium	1 per 5 staff	1 per 10 seats
	Theatre	1 per 5 staff	1 per 10 seats

Figure 7.52 SDCC County Development Plan 2016 – 2022 Minimum Bicycle Parking Standards

7.5.2 Parking Strategy for the Clonburris Site

The overall transport objective for the site is to create a sustainable and integrated transport system.

Accessibility levels have been specifically developed for the SDZ and these are set out in Section 7.3.4 of the transport assessment. These levels relate to the accessibility to public transport provision and access to services/land uses proposed within the SDZ.

These accessibility levels have been drafted to be in line with the CDP parking standards and complement Zone 2 parking standards. These are illustrated in Figure 7.53 below.

Service Area	Criteria	Level 1	Level 2	Level 3	Level 4
Sustainable Transport	Bus stop with 400m	✓	✓	✓	✓
	Rail station within 800m	✓	✓	✓	
	Cycling facilities within 250m	✓	✓	✓	✓
Retail & Community	District Centre within 400metre	✓			
	District Centre within 800metre		✓		
	Local Centre within 400metre			✓	
	Local Centre within 800metre				✓
Education	School within 500 metres	✓	✓		
	School within 1000 metres			✓	✓
Open Space and Leisure	Open Space/ Leisure within 400metre	✓	✓	✓	✓

SDCC Zone 2 Parking: Development within 400 metres of a high quality public transport service

SDCC Zone 1 Parking: SDCC General Rate

Figure 7.53 Accessibility Levels Linked to SDCC Parking Zones

It is proposed that the highest levels of accessibility (Levels 1 and 2) will support a further reduction of parking rates from those set out in Zone 2 of the CDP. The Level 3 accessibility level will be in accordance with Zone 2 standards set out in the CDP. With reference to the CDP parking standards, Lower parking provision for individual developments would also be acceptable subject to compliance with the following:

- The proximity of the site to the Kishogue and Clondalkin-Fonthill Railway Stations,

- The proximity of the development to services that fulfil occasional and day to day needs,
- Demonstration that car parking can be shared between complementary land uses including Park and Ride Facilities,
- The existence of a robust and achievable Workforce Management or Mobility Management Plan for the development,
- The ability of people to fulfil multiple needs in a single journey,
- The levels of car dependency generated by particular uses within the development,
- The ability of residents to live in close proximity to the workplace,
- Peak hours of demand and the ability to share spaces between different uses,
- Uses for which parking rates can be accumulated. Parking demand surveys would be required to be carried out on a case by case basis for any application of shared spaces between different uses. The potential of shared car parking to minimise traffic impact, especially with regards to the public realm is significant. This is illustrated in the Figure 7.54 below:

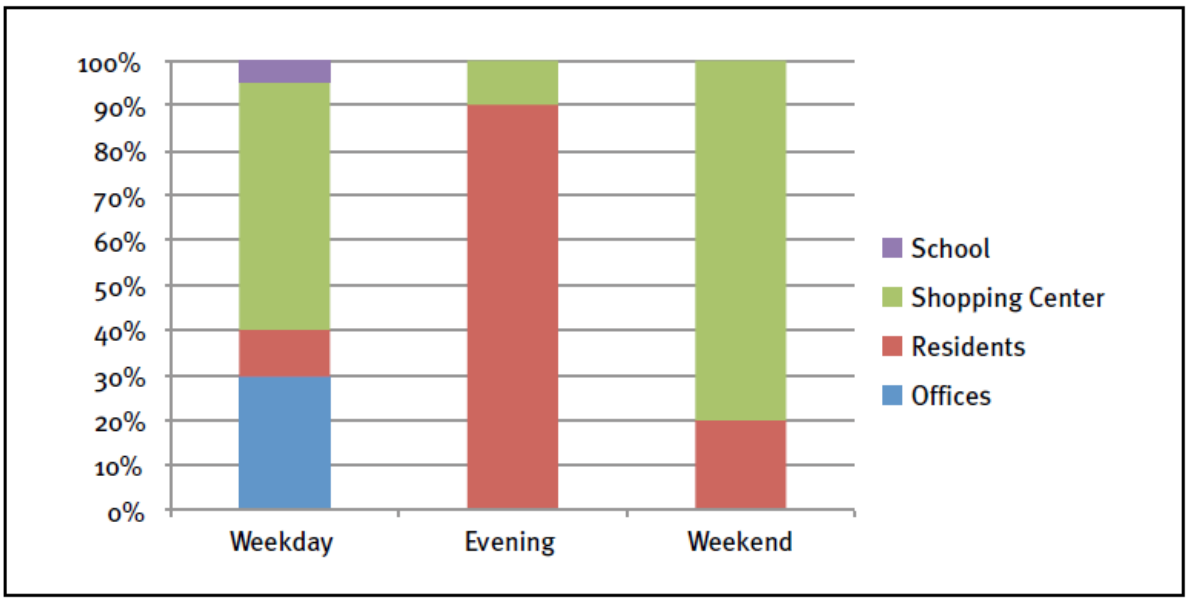


Figure 7.54 Parking Application Proportions – Source: Institute for Transportation & Development Policy (International)

Proposed Reduced Parking Standards for the SDZ

The following reductions in the CDP Zone 2 parking standards are put forward to support the principles of sustainability of the site and the implementation of the mobility management plans for the SDZ:

Accessibility Level 1: (Density 80dph)	1 Bedroom Apartments – 0 spaces (car free) 2 Bedroom Apartments – 0.75 space 3 Bedroom Apartments – 1 space
Accessibility Level 2: (Density 70dph)	1 Bedroom Apartments – 0.50 space 2 Bedroom Apartment – 0.75 space 3 Bedroom Apartment – 1 space
Accessibility Level 3:	I Bedroom Apartments – 0.75 space

(Density 60dph) 2 Bedroom Apartments – 1 space
3 Bedroom Apartments – 1.25 spaces
1 Bedroom House – 1 space
2 Bedroom House – 1.25 space
3 Bedroom House – 1.5 space

For all residential and commercial land uses that are situated in Accessibility level 4 (with a proposed 45dph and 50dph) the CDP Zone 1 car parking standards will apply as a maximum.

Bicycle parking standards will not be reduced from those set out in the CDP and will be considered as a minimum. In addition to the parking standards, the following design matters should be accommodated:

- On-street bicycle parking will be located throughout the site to serve the comprehensive and well-connected network of cycle paths with a special emphasis on providing maximum convenience to destinations such as shopping or public transport locations.
- The design of cycle parking facilities should ensure that cyclists can securely lock the frame and both wheels. Common designs such as Butterfly and Sheffield stands are possible examples of designs that could be introduced.
- Other measures that should be considered for on-street bicycle parking include:
  - **Security** – parking should be located where possible in areas of high natural surveillance. CCTV surveillance of bicycle parking areas with a large number of spaces such as train stations or shopping centres should be considered.
  - **Lighting** – Well-lit areas enhance the perception of security and personal safety and therefore people are more likely to use a cycle park that is well lit.
  - **Visibility** – locating bicycle parking in an area of high public visibility not only means that people will be aware that it has been provided, but also create the perception that the bike will be under natural surveillance by people passing by.
  - **Grouping** – Frequent small clusters of bicycle parking are preferable to large dispersed parks, not only in terms of perceived safety and usability, but will also increase accessibility levels to a range of services.
  - **Positioning** – Spaces should be located an adequate distance from the kerbline of the road to ensure that bikes do not overhang into the street.
  - **Obstruction** – the park and bikes should not obstruct pedestrian movement, obstruct car views at crossings or junctions, stop car doors from opening, hinder shop deliveries or obscure signage or information boards.
  - **Appearance** – Larger parking facilities must be maintained so that they appear tidy, free from litter and keep in character with the area.
  - **Surface texture** – Must be considered for the visually impaired. Bright high visibility materials or high visibility tape should be used where appropriate.
  - **Covering/shelter** – Longer stay parking is more attractive to cyclists if covered.

Calculating Base Parking Demand within the SDZ

An estimation of the base parking demand has been undertaken for the full build out of the Clonburris SDZ, using the following steps:

- **Step 1:** Identify the overall quantum of planned development;
- **Step 2:** Develop land use breakdown assumptions (e.g. Dwelling sizes per area);
- **Step 3:** Identify accessibility levels of the site in accordance with CDP parking zone criteria; and
- **Step 4**: Apply CDP maximum parking standards to the land use breakdown with respect to accessibility criteria

Step 1: Identify the overall quantum of planned development

The planned total quantum of development for Clonburris is indicated in table 7.8 below. This is broken down into residential population (low and high growth), Commercial Retail, Commercial non-retail (E.g. employment) and Community uses.

Table 7.8 Quantum of Development

	Net Development Area (ha.)	Target dwellings	Population range	Population range	Commercial GFA (sqm)	Commercial GFA (sqm)	Community GFA (sqm)
Sector	Exc. Strategic Infrastructure		low	high	Retail	Employment	
Kishoge Urban Centre	10.94	734	1762	1909	3500	11800	1500
Kishoge South West	21.55	1059	2542	2754	300	200	600
Kishoge South East	12.50	678	1627	1762	400	200	1500
Kishoge North West	11.16	565	1357	1470	0	0	0
Kishoge North East	14.36	737	1770	1918	0	0	0
Clonburris Urban Centre	17.90	1265	3037	3290	16520	18515	2500
Clonburris South West	25.98	1441	3458	3746	400	200	600
Clonburris North West	14.37	783	1878	2035	400	200	600
Clonburris South East	3.30	201	482	522	0	0	0
Clonburris North East	7.50	410	565	612	0	0	0
Adamstown Ext	9.19	442	1061	1150	0	0	0
Canal Ext	2.27	121	291	315	0	0	0
Sub-totals	151.02	8437	19830	21483	21520	31115	7300

Step 2: Develop land use breakdown assumptions (e.g. Dwelling sizes per area)

Based on the defined density levels, a suggested housing typology has been developed to guide the level of housing provision (see Table 7.9 below). Knowledge of the housing typology guides the calculation of the base parking demand.

Table 7.9 Density and housing typology

Density	Category				
	Semi-D	Terrace	Townhouse	Duplex/ maisonette	Apartment
45 DPH	Minor	Main	Minor	Minor	N/A
50 DPH	N/A	Main	Minor	Minor	Minor
60 DPH			Mix	Mix	Mix
70 DPH			Minor	Minor	Main
80 DPH					Sole

Notes:

Minor: Limited numbers can be accommodated at this density on short frontages or the corners of blocks;

Main: Principal typology in block. May be combined with a minor typology;

Sole: Sole typology in block. Typically, in higher density and mixed use blocks

To examine the base parking demand for the SDZ area using the CDP standards, the following repartition of dwellings type has been assumed (Table 7.10). These assumptions act as a guide to determine the level of parking spaces that may be required within the SDZ and the consequential impact on the urban form that is being proposed.

Table 7.10 Assumed repartition of dwellings type

	Apartment / Duplex			House			
Density	**1**	**2**	**3+**	**1**	**2**	**3**	**Total**
80	50%	30%	20%	-	-	-	100%
70	30%	25%	20%	-	15%	10%	100%
60	15%	15%	20%	-	30%	20%	100%
50	-	5%	20%	-	30%	45%	100%
45	-	-	15%	-	35%	50%	100%

Step 3: Identify accessibility levels of the site in accordance with CDP parking zone criteria

Section 7.3.4 of this report details the accessibility levels achieved for the Clonburris site with respect to walking distances to core services and public transport provision. As noted in Figure 7.53, Accessibility levels 1-3 of the Clonburris accessibility assessment corresponds to 'Zone 2' of the CDP parking standards i.e. Developments within 400metres of a high quality public transport service.

With the routing of bus services along the east-west aligned link street to the south of the railway line, this results in over 99% of the future population within Clonburris live within a 'Zone 2' classified parking area.

Step 4: Apply CDP maximum parking standards to the land use breakdown with respect to accessibility criteria

Based on the total quantum of development, assumed land use breakdowns and calculation of the accessibility levels, the breakdown of parking demand for each area in the SDZ can be calculated. These results are presented by area in Tables 7.11 and by density level in Table 7.12. The results indicate that a base parking demand of 11,489 parking spaces could be required if the maximum parking standards are applied.

Table 7.11 Calculated Parking Demand by Development Sector

Sector	Parking Demand
Kishoge TC	1,302
Kishoge South West	1,406
Kishoge South East	837
Kishoge North West	694
Kishoge North East	930
Clonburris TC	2,065
Clonburris South West	1,751
Clonburris North West	964
Clonburris South East	213
Clonburris North East	441
Adamstown Ext	742
Canal Ext	144

Table 7.12 Calculated Parking Demand by Area Type

Area Type	Parking Demand
Residential (Density 45)	903
Residential (Density 50)	2,669
Residential (Density 60)	3,317
Residential (Density 70)	2,325
Residential (Density 80)	1,046
Commercial (Retail)	814
Commercial (Non-Retail)	415

7.5.3 Parking Layout

This parking strategy examines what impact this level of provision may have on the urban form for the SDZ, considering the design requirements for parking as set out in the County Development Plan and the *Design Manual for Urban Roads and Streets* (DMURS). These design considerations are:

- **For Parallel/Perpendicular Parking:** Combination permissible, but perpendicular parking should not be deployed on both sides of the street
- **Parallel Parking**: 6 metres length requirement with break every three spaces
- **Perpendicular Parking:** 2.5 metres width requirement with break every five spaces
- **Crossings and junctions**: Kerb build-outs provided on the approach to junctions to facilitate visibility splays, ensure a clear line of sight etc.

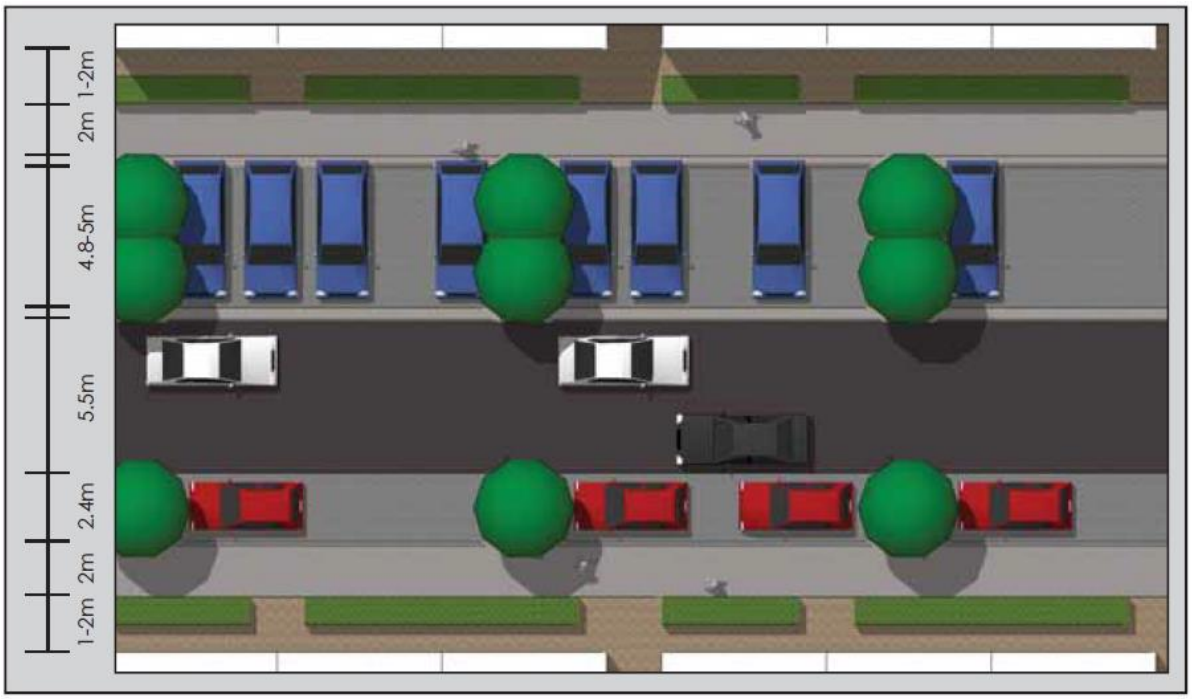


Figure 4.76: Extract from the Newcastle LAP (South Dublin County Council) illustrating the layout of a Local street with a uniform mix of parallel and perpendicular parking.

Figure 7.55 Layout of a Local Street with a uniform mix of parallel and perpendicular parking

Studied Streets: Illustrative Case Study – Parking Provision

To assess the feasibility and impact of the application of CDP standards in the SDZ, a series of zones were selected for examination which ranged across all levels of densities and accessibility levels. Figure 7.56 depicts the areas studied in the SDZ.

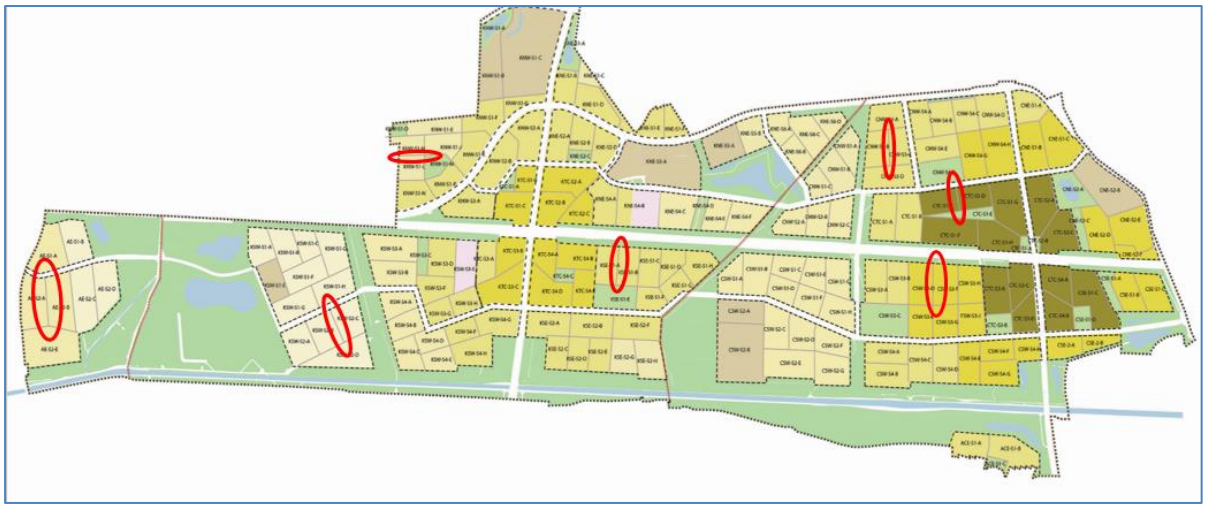


Figure 7.56 Studied Street Locations

Each location was examined considering the spatial availability of on street parking and meeting the parking design requirements as set out in the CDP.

In conclusion, the analysis displayed in Table 7.13 shows that the maximum parking standard provision can be met on street in most areas within the SDZ lands. This provision meets the design considerations established in DMURS allowing for crossings and junctions, along with break points in the parking to minimise the impact on the urban realm.

Three of the seven assessed areas revealed that supplementary parking to the on-street parking may be needed to meet the maximum parking standards. These areas are in the Clonburris Town Centre and on the western side of the SDZ Lands towards the edge of Adamstown. As suggested by DMURS, the additional parking could take the form of underground parking. However, until the individual development proposals come forward for these areas, which will include detailed traffic impact assessments alongside car parking demand studies, such provision is highlighted but not stated as a requirement.

Table 7.13 Analysis of Potential Parking Provision vs Proposed Capacity

Street	SDCC Parking Zone Number	Street Length	Dwellings Density	Potential Parking Demand	Capacity with Parallel Parking (both sides)	Capacity with Parallel and Perpendicular Parking	Potential Need for Supplementary Parking
KSWS2B-KSWS2C	2	88	45	33	22	37	
KNWS1H-KNWS1L	2	72	50	20	18	31	
AES2A-AES2B	1	124	50	83	31	53	✓
CNWS3B-CNWS3C	2	83	60	26	21	35	
KSES1A-KSES1B	2	86	60	28	21	37	
CSWS3D-CSWS3F	2	96	70	46	24	41	✓
CTCS1C-CTCS1D	2	60	80 (Commercial Area)	63	15	26	✓

7.5.4 Managing Parking Demand

The SDZ will need to accommodate parking for the following:

Car Clubs

It is recommended that a car club network be established on the Clonburris site, with all residents and businesses encouraged to become members of the club upon moving to the development. Members of the club can hire vehicles at short notice for as little as half an hour. The vehicles themselves would be sited at various convenient locations around the site, near public transport networks. Designated on street parking spaces for car clubs will be provided in accessibility level 1 zones.

This would help reduce the number of car borne trips and demand for parking in Clonburris by providing the option of hiring a vehicle when needed without needing to purchase one or pay the necessary costs of tax, insurance etc. By encouraging people not to purchase a private vehicle, but providing access to one when necessary, people would be less likely to use a vehicle as frequently as if they owned one.

Car Share Parking Spaces

Car sharing programs will be implemented by employers in conjunction with the overall travel plan framework proposed for the site. By installing a database listing those with access to a vehicle, the location that they live and possibly even locations that they drive through, people would be encouraged to car share with others that travel in the same direction employing similar routes.

Electric Cars

In line with the CDP policy TM7 Objective 4, the design of the SDZ will incorporate the provision of electric charging points.

Park and Ride at Rail Stations

The Kildare Route Railway Order made provision for Park and Ride facilities at Clondalkin-Fonthill and Kishoge Railway Stations. These facilities may be incorporated into mixed use buildings.

Parking Tariffs

It is recommended that parking tariffs are applied to any off-street retail parking areas to manage the demand for travel by car to the Clonburris town centre. These parking charges could in turn be used to financially support travel by other modes of transport.

Parking rates should be designed to be in line with other retail centres in the area to reduce the likelihood of motorists travelling longer distances to cheaper or free parking areas. Parking tariffs in other centres in the Greater Dublin Area would provide a useful reference point for determining tariffs in the Clonburris retail district. The exact scale of tariffs will be determined prior to the year of opening to reflect conditions nearer the time.

Loading Facilities

Loading facilities for retail centres will generally be provided off-street for developments, however limited parking bays may be provided on-street to facilitate servicing of retail developments.

On-street loading facilities would be limited to smaller service vehicles, such as courier parking. Large rigid and articulated vehicles would not be permitted to use these spaces and adequate off-street facilities must be provided where necessary for these vehicles.

7.5.5 Summary

This section provided an overview of the parking strategy proposed for the Clonburris SDZ taking guidance from available policies and development plans. In summary:

South Dublin County Development Plan (June 2016)

- The CDP recognises the important relationship between parking availability and travel choice.
- The CDP includes a comprehensive set of parking standards considering the accessibility of a development area to public transport provision.
- The CDP parking standards are a maximum provision and lower parking provisions for developments are acceptable based on accessibility to public transport, sharing of spaces between complimentary land uses and existence of robust travel plans.
- The CDP also includes a comprehensive set of minimum parking standards for bicycles for a range of land uses.

Clonburris Car Parking Provision

- Based on the total quantum of development, assumed land use breakdown and level of accessibility, the base parking demand for Clonburris is 11,489 parking spaces. This is based on the CDP maximum parking standards.
- The parking strategy for Clonburris identifies potential further reductions to the parking standards to encourage sustainable travel based on the density and mix of land uses, high level of accessibility, public transport provision and supporting Mobility Management Plan.
- The parking strategy examined the spatial requirement for residential on-street parking, concluding that maximum parking standard provision could be met on-street with only a few areas requiring supplementary parking. The final demand for parking and its most appropriate form will be addressed at the Planning application stage for each individual development.
- The parking strategy provides further recommendation on managing parking demand through the implementation of car clubs, sharing of parking spaces and implementation of paid parking at the retail centres.

7.6 Mobility Management Plan Framework

This Transport Assessment and Strategy incorporates a Mobility Management Plan Framework (MMPF), which provides the implementation mechanism for supporting the sustainable development principles for Clonburris. MMPs should form an intrinsic part of planning for the SDZ lands. Each individual development should demonstrate how its MMP contributes to and supports the overall MMPF. This includes the setting and meeting of mode share targets for the individual development which will be demonstrated in the Traffic and Transport Assessment[8] for the development. Where the development is for mixed use, a residential MMP alongside a school travel or a work place travel plan should be produced to demonstrate how the trip generation and travel demand for the development will be managed. Each individual development should produce an implementation plan for the associated land use MMP. The MMPF for the SDZ lands supports the overall travel demand and includes measures to support sustainable travel.

7.6.1 Policy, Strategy and Guidance Overview

Mobility management planning is now embedded in the transport assessment process. The following policy overview sets out the key policy directives at a national and local level which support mobility management and in turn deliver sustainable transport planning.

Smarter Travel: A Sustainable Transport Future 2009 – 2020 (Department of Transport, 2009)

Smarter Travel sets out how the Government's vision and targets for sustainable travel in Ireland by the year 2020. The plan is underpinned by five key goals to:

- Reduce overall travel demand;
- Maximise the efficiency of the transport network;
- Reduce reliance on fossil fuels;
- Reduce transport emissions; and
- Improve accessibility to transport.

To achieve these goals and ensure sustainable travel by 2020, the Government sets the following key targets:

- Work-related commuting by car will be reduced from a current modal share of 65% to 45%. This will result in between 500,000 and 600,000 commuters taking means of transport other than the private car. Change in personal behaviour will also be necessary for other travel purposes as the majority of travel relates to non-commuting.
- Car drivers will be accommodated on other modes such as walking, cycling, public transport and car sharing (to the extent that commuting by these modes will rise to 55% by 2020) or through other measures such as e-working.
- The total kilometres travelled by the car fleet in 2020 will not increase significantly from current total car kilometres.

A number of actions are set out in this policy document to achieve the goals and targets, themed around:

[8] Individual development within the SDZ lands will be required to undertake a Traffic and Transport Assessment (TTA) in accordance with TII's *Traffic and Transport Assessment Guidelines* (May 2014), the NTA's *Traffic Management Guidelines* (2003) and the requirements of SDCC's Land Use Planning and Transportation Department.

- Encouraging Smarter Travel;
- Delivering Alternative Ways of Travelling;
- Improving the Efficiency of Motorised Transport;
- Ensuring Integrated Delivery of Policy; and
- Aligning spatial planning and transport to address urban sprawl

A general requirement of *Smarter Travel* is that significant housing development in all cities and towns must have good public transport connections and safe routes for walking and cycling to access such connections and local amenities.

Smarter Travel also encourages the implementation of Local Area Plans and Strategic Development Zones (SDZs) within major urban areas as a way of improving the land use-transport interface, particularly to ensure that employment and residential centres are co-located. This guidance is key in terms of directing the MMPF for Clonburris SDZ.

Other Guidance

Guidance for implementing work place travel plans, school travel plans and advice on the delivery and effectiveness of community travel plans has been produced by the National Transport Authority (*Workplace Travel Plans - A Guide for Implementers 2012*) has been considered in the development of the MMPF for Clonburris. Interventions set out in these guidance notes have been included in the proceeding MMPF.

The County Development Plan also reiterates thresholds for the production of mobility management plans for work places on the basis of the NTA Guidelines. MMPs are required for all new schools or for existing schools where 25% or greater expansion in classrooms is proposed.

7.6.2 Mobility Management Plan Framework - Development

This MMPF for the SDZ lands comprises of an overall strategic framework which includes targets for each mode across the site. The MMPF delivery will be supported by a public transport strategy for Clonburris, the pedestrian and cycling networks and the parking strategy for the site, included in this Transport Assessment and Transport Strategy. The overall form and design of the SDZ will support the MMPF as key services within the site – schools, retail and commercial and public transport will be located within short walking distances and an extensive cycle route network. All of which will support sustainable travel choices.

Mode share targets for the MMPF have been derived using the strategic transport model projections for 2035 for the AM peak period of travel.

Table 7.14 below outlines the mode share for trips originating within Clonburris in 2035 for all journey purposes i.e. commute, education, business trips etc.

Table 7.14 2035 Forecast Mode Share for trips Originating in Clonburris

Time Period	Car	PT	Active
AM	43%	24%	34%

The overall mode share for sustainable transport in the site is high due to the accessibility of local services, including schools within 500m or 1000 m of residential areas, public transport (rail and bus services) within 400m or 800m of residential areas and retail and community services also within walking distances. These targets are achievable given the level of public transport, walking and cycling provision within and traversing the site.

Individual MMP's for residential areas, work places and schools will be developed as the Planning Scheme is implemented. The measures for inclusion in these plans are set out below. Targets for mode share for each land use will be developed taking into account the accessibility levels of the site.

Mobility Management Plan Framework - Measures

The MMPF for the site will comprise physical infrastructure measures and behaviour change measures / "soft" measures that include travel campaigns, travel challenges and support in making travel choices through travel planning for residents, commuters and schools.

The key aims and objectives for the MMPF are:

- To support the sustainable movement within the site through the provision of public transport provision and walkable/ cyclable neighbourhoods;
- To ensure access to services by alternative means to single car occupancy;
- To support a basic level of access to public transport through the provision of a bus stop within 400 metres of residential dwellings throughout the site and rail services within 800m;
- To support the mode share targets established for the land use types within the masterplan; and
- To ensure the effectiveness of the mobility management plan through monitoring and reinforcement of measures.

The infrastructure measures that will support sustainable travel are set out below. The Implementation of these measures is essential to meeting the sustainable mode split targets set for the site as a whole.

Walking

Typical infrastructure measures which encourage increased levels of walking include:

- Logical, high quality walking network that encourages residents to minimize unnecessary car trips to local facilities such as education facilities and health service providers (doctors, dentists, pharmacy);
- The Planning Scheme for the SDZ Lands includes pedestrian routes permeating through the residential neighbourhoods as well as maximising exposure to attractive features of the site such as the canal frontage;
- As well as designing a permeable pedestrian environment within Clonburris it is also planned to provide good connections to surrounding areas;
- Level changes and increases in distance are inconvenient and can be difficult for people to use, therefore at-grade crossings are proposed wherever practicable. Footbridges and subways have been avoided where possible, except where local topography has made this necessary;
- Good quality walking facilities are proposed to public transport stations and where practicable direct pedestrian desire lines are followed;
- Appropriate levels of lighting should be provided along pedestrian paths to encourage pedestrian activity; and
- Pedestrian routes should be well signposted with key destinations such as public transport nodes, educational facilities, recreational facilities, town centre locations as well as links to surrounding areas.

Cycling

The Clonburris cycle network has been designed to connect directly with a number of cycle routes in surrounding areas to encourage travel to other areas by bicycle. Typical infrastructure measures which encourage increased levels of cycling include:

- Secure, well-lit, convenient and covered cycle storage at rail stations to encourage commuters to travel to the stations by bicycle rather than car;
- Cycle parking will be provided at key locations throughout the site and in areas that have good natural surveillance;
- Parking provided on the street should allow the bicycle frame and wheels to be easily locked to the stand;
- Integration of cycle routes with major public transport provision;
- Cycling routes should be signposted with key destinations such as public transport nodes, educational facilities, recreational facilities, town centre locations as well as links to surrounding areas; and
- A bicycle users group could be formed to promote cycling.

Public Transport – Bus and Rail

Typical measures which encourage increased levels of travel by public transport include:

- Frequent bus services that permeate into the residential areas so that the shortest walk trips to public transport can be provided;
- Enhancement of the integrated transport network by providing high quality facilities that provide easy and efficient interchange between different public transport modes. This will be especially important for the Clondalkin-Fonthill station area which will allow interchange between rail and bus services;
- Easy to understand and up-to-date, high quality information should be provided at stations, on services, fares and local amenities. This should include information on other travel modes such as walking and cycling as well as location of other nearby public transport nodes;
- A new bus network will be created through the site which would comprise of diverting and increasing headway on existing bus routes as well as development of potential new routes;
- Parking restrictions should ensure bus stops are kept free of car parking;
- Pedestrian access paths to bus stops should be in good condition and of a suitable quality for disabled people to access the stop;
- Security should also be considered at stops and appropriate lighting should be provided for the real and perceived safety of commuters; and
- Priority measures to ensure bus journey reliability.

Parking Management – supply and demand

Typical measures which can be employed to manage the demand for parking include:

- Introduction of a car sharing scheme with access to the national car share database for all residents and employees in the SDZ;
- Development and implementation of a residential car club scheme in the higher accessible parts of the site to provide a vehicle accessible to all for a small hourly fee, as well as reducing the demand for parking and discourage people from using cars for non-essential trips. A range of vehicles could be provided to support different activities;
- Development of car free areas within areas of high accessibility; and

- Implementation of the car parking strategy proposed for the Clonburris area in this Transport Assessment.

Travel Behaviour Support "soft" measures

The development of the MMPF for Clonburris will also be supported through the provision of the following:

- The provision of a Steering Group supporting the delivery of the travel management measures e.g. car clubs;
- Provision of individual travel planning advice and travel information to residents prior to occupation to assist in influencing their travel behaviour and supporting the travel demand management measures;
- Initiatives such as providing free public transport travel for the first month of occupancy for residents should be considered – research indicates that travel behaviour is most heavily influenced when people first live in an area;
- Development of a comprehensive travel plan web site for the new Clonburris site which provides clear and concise links to transport information internet sites as well as local travel information such as the Clonburris cycle network, updates on local travel information, etc.; and
- On-going review and update of MMPF by the Development Agency.

7.6.3 MMPF Accessibility Targets

As detailed in Section 7.6.2, an overall mode share target has been established for the SDZ lands. - These have been derived using the strategic transport model projections for 2035, which includes for the full build out of Clonburris and delivery of the GDA Transport Strategy measures, and with a view to national sustainable travel targets as set out in the Government's 'Smarter Travel: A Sustainable Transport Future 2009 – 2020'.

Mode share targets have also been established for specific journey purposes (e.g. journey to work, school etc.) with further consideration given to the accessibility zones levels which reflect the level of sustainable transport infrastructure that is to be provided. The following section details these journey specific mode share targets.

Work Place Travel Plans and Business Travel

The Work Place Travel Plan focuses upon the journey to work. Business travel plans will focus upon managing travel demand for journeys made during the course of work.

Table 7.15 outlines the forecast mode share for commuter trips with a destination in Clonburris from the 2035 strategic modelling AM peak period.

Table 7.15 2035 Forecast Mode Share for commuter trips with a destination in Clonburris

Time Period	Car	PT	Active
AM	68%	16%	16%

The AM modes share for car is seen to be 68%. This is an average across the entire SDZ Lands. For work places located in accessibility level 1, a target of 45% of commuter trips by car is set for 2035. This is proposed as a minimum target given the high level of public transport that is provided in accessibility level 1 and the reduced parking provision that will be in this accessibility level.

In accessibility level 2 a proposed target for commuter mode share of 45% is also prescribed given the high level of public transport and active travel infrastructure that is to be provided. The 45% target is considered to be a maximum level target within this accessibility level.

In accessibility level 3 a proposed target for commuter mode share is proposed to be set at 55% car by 2035 and opportunities for further enhancing this target to meet the national target of 45% reviewed from 2026 onwards.

In accessibility level 4, which is the lowest level of accessibility within the site will have a target of 68% commuter mode share. This is considered an optimistic target given the level of public transport that is provided in this area and the level of parking provision that could be provided for the residential dwellings. However, this is an enhancement in terms of current travel behaviour patterns which is experienced in the surrounding areas of this section of the SDZ.

Measures to be included in the work place travel plans are:

- Car Share scheme and dedicated car share parking facilities;
- Interest free loans for Clonburris employees to purchase public transport season tickets;
- Provision of interest-free loans for the purchase of bicycles as part of staff benefit packages;
- Showers, changing facilities and lockers to be provided at employment locations for people that cycle to work;
- A bicycle users group to promote cycling, including cycle training;
- Information to staff about local cycling routes and connections with other cycle routes in surrounding areas;
- Fleet bikes to be provided at office developments;
- Cycle Challenge initiatives; and
- Monitoring plan for all modes of travel to work.

Mode share targets for business trips originating in Clonburris have been derived from the strategic model for the AM peak period, and are outlined in Table 7.16.

Table 7.16 Business Trips Mode Share Targets

Time Period	Car	PT	Active
AM	57%	27%	15%

It is proposed that the Work Place Travel Plans incorporate measures to support business travel by modes other than the car to reduce the car mode share target as shown above. Reducing the need to travel through alternative ways of working should also be promoted. Such measures include home working, flexible working, teleconferencing and reducing the pecuniary benefits of business travel, for example car allowances.

School Travel Plans

Considerable work has been carried out by South Dublin County Council in implementing school travel plans. Policy C9 Objective 6 of the CDP states that: "*schools should be located so as to promote walking and cycling, including the provision of adequate secure bicycle storage in all schools*." The development of the masterplan for Clonburris supports this policy.

The following mode share targets for travel to school in the morning peak is projected for 2035 based on the results of the ERM and Accessibility Assessment:

Table 7.17 School Travel Mode Share Targets

Time Period	Car	PT	Active
AM	17%	27%	56%

The school travel plans that will be developed throughout the implementation of the SDZ will support these targets.

Residential (Community) Travel Plans

Community travel plans play a significant role in influencing travel behaviour. The pilot community travel plan for Adamstown SDZ (September 2009) demonstrated that residents travel behaviour can be changed through the provision of high quality information, residents travel planning packs, the provision of public transport tickets, cycle support groups and cycle challenges.

Community Travel Plans will be implemented for residential zones within the Clonburris SDZ and will support the following targets for trips classed as shopping, visiting friends and one way trips:

Table 7.18 Other Travel Mode Share Targets (i.e. shopping, visiting friends etc.)

Car	PT	Active
57%	21%	22%

In levels of high accessibility (zones 1 and 2) the mode share target of trips originating in the site by car of 57% will be considered a maximum target given the high level of provision of sustainable transport modes. Overall monitoring of the MMP throughout the site will be carried out and opportunities to improve this car based mode share will be sought.

The following MMP measures will be applied in the Community Travel Plans:

- Community Car clubs;
- Community Car Share initiatives;
- Provision of residential travel packs supported by personalised travel planning, including the provision of public transport trial tickets;
- Community Bike Fleets and parking provision;
- Neighbourhood Cycle Challenge initiatives; and
- Access to the Clonburris Travel Website which will advise on travel opportunities, opportunities to become involved in cycle challenge initiatives, guidance on access to cycle training.

The preparation of individual Community Travel Plans will be the responsibility of the developer submitting the planning application. The delivery of the individual Community Travel Plans will remain the responsibility of the developer, who in turn may set up a management company or community group to maintain and monitor its performance. The management company or community group will then be responsible for reporting the performance of the Community Travel Plan to the MMPF Steering Group.

Influencing travel behaviour of older travellers

The strategic model has projected the mode share of retired travellers up to 2035 for trips originating from the site. These targets are set positive in terms of travel by sustainable modes, especially walking and cycling. These targets should be maintained as a benchmark for this group of travellers and supported through targeted marketing which should take the form of a “Life Style” challenge on/before retirement.

Table 7.19 Retired Travel Mode Share Targets

Time Period	Car	PT	Active
AM	55%	9%	35%

7.6.4 Monitoring the MMPF

Monitoring should be carried out at a strategic level for the SDZ lands as a whole and at a local level/user level to determine the effectiveness of the measures that are implemented as part of work place travel plans, residential travel plans (community travel plans) and school travel plans.

Following the implementation of a MMPF, it is recommended that an interim assessment which involves the collection of key data sets is carried out one year post occupation and a full monitoring assessment is carried out in year 2 of the site occupation.

The interim assessment will present the progress that the travel plans are making towards reaching the targets and highlight any issues which may have arisen.

It is important that this data is analysed against accurate background data. This means that any traffic growth experienced due to land use development is captured to ensure that the transport efficiency of a site is established.

The data collected should mirror the baseline data sets to ensure that no seasonal variations impact on the data and the subsequent evaluation.

It is recommended that a steering group be set up to continuously monitor the effectiveness of the MMPF.

7.6.5 Summary

This section outlines a set of proposals which form the Mobility Management Plan Framework for the Clonburris SDZ. In summary:

Mobility Management Plan Framework

- The MMPF provides the implementation mechanism for supporting the sustainable development principles for Clonburris.
- The MMPF for Clonburris comprises of an overall strategic framework which includes targets for each mode across the site. Individual MMP's for residential areas, work places and schools will be developed as the site is implemented.
- Mode share targets for the MMPF have been derived using the strategic transport model projections for 2035, which includes for the full build out of Clonburris and delivery of the GDA Transport Strategy measures, and with a view to national sustainable travel targets as set out in the Government's 'Smarter Travel: A Sustainable Transport Future 2009 – 2020'.
- The overall mode share targets for 2035 for Clonburris for the AM peak travel is 43% car and 57% sustainable travel (e.g. walking, cycling or public transport).
- The MMPF for the site identifies a comprehensive list of physical infrastructure measures and behaviour change measures aimed at encouraging walking, cycling, and public transport use, as well as managing parking demand.
- As well as the overall MMPF mode share target, the MMPF outlines mode share targets and supporting MMPF measures for different journey purposes, including travel to school, commuting and business travel, residential, leisure and travel for older citizens.
- The MMPF concludes by recommending a monitoring strategy for individual travel plans, with periodic assessments undertaken to monitor the effectiveness of the overall MMPF.

8 Summary and Conclusions

8.1 Summary

As the specified Development Agency, SDCC have prepared a Draft Planning Scheme for the lands at Clonburris in accordance with its designation as a Strategic Development Zone.

This Transport Assessment has been prepared to support the development of the Clonburris SDZ Planning Scheme.

8.1.1 Baseline Review

Cycle Facilities

- The Grand Canal Greenway, which links Lock Road to the City Centre, passes through the proposed Clonburris site;
- The Fonthill and Grange Castle Roads, which bisect the Clonburris site, both include segregated cycle facilities offering links to Lucan Village, Liffey Valley and the N4.

Walk Facilities

- The Grand Canal Greenway bisects the south portion of Clonburris, offering a leisure walk link to Dublin City Centre from Lock Road;
- The Fonthill and Grange Castle Roads both have good quality segregated footpaths linking to Adamstown, Lucan Village, Liffey Valley, Clondalkin and Grange Castle.

Public Transport Services

- The Clondalkin-Fonthill Train Station is served by Commuter services operating to Heuston Station;
- The Phoenix Park Tunnel offers connection to Drumcondra, Connolly, Tara Street, Pearse and Grand Canal Dock;
- A number of bus routes pass within close proximity of the Clonburris site, including a mix of radial, orbital and local services mainly operated by Dublin Bus;

Road Network

- The Clonburris site is bisected by the Grange Castle Rd (R136) and Fonthill Rd (R113) which provide connectivity to the N4, N7 and M50;

Base Transport Demand

- 51% of trips which originate within the area bounded by the N4, N7 and M50, remain within this sector in the AM Peak period;
- A large proportion of trips are travelling to sectors which are servable by sustainable modes i.e. walking, cycling and PT;
- High level of PT mode share for city centre trips in the AM Peak.

8.1.2 Current Transport Policy, Plans and Strategies

National Policy and Strategies

- Building on Recovery: Infrastructure and Capital Investment 2016 – 2021(Department of Public Expenditure and Reform, 2015)

- Towards a National Planning Framework: A Roadmap for the Delivery of the National Planning Framework (DECLG, 2015)
- Investing in Our Transport Future: A Strategic Framework for Investment in Land Transport (Department of Transport, Tourism and Sport, 2015)
- Smarter Travel: A Sustainable Transport Future 2009 – 2020 (Department of Transport, 2009)
- National Cycle Policy Framework 2009 – 2020 (Department of Transport, 2009)
- National Cycle Manual (NTA, 2011)
- Healthy Ireland: A Framework for Improved Health and Wellbeing 2013 – 2025 (Department of Health, 2013)

Regional and Local Policy

- South Dublin County Council Development Plan 2016 - 2022 (South Dublin County Council, 2016)
- Regional Planning Guidelines for the Greater Dublin Area 2010 - 2022 (Regional Planning Guidelines Office, 2010)
- Greater Dublin Area Transport Strategy 2016 - 2035 (NTA, 2016)
- Travel Smart Communities – Building a New Mobility Culture in South Dublin County (SDCC, 2013)
- Greater Dublin Area Cycle Network Plan (NTA, 2013)

Guidance

- Sustainable Residential Development in Urban Areas (Department Environment, Heritage and Local Government, 2009)
- Urban Design Manual: A Best Practice Guide (Department of Environment, Heritage and Local Government, 2009)
- Permeability: A Best Practice Guide (NTA, 2015)
- Design Manual for Urban Roads and Streets (DTTAS & DECLG, 2013)
- Spatial Planning and National Roads: Guidelines for Planning Authorities (Department of Environment, Community and Local Government, 2012)
- Achieving Effective Workplace Travel Plans Guidance for Local Authorities (NTA, 2013)

8.1.3 Clonburris Development

- It is proposed that Clonburris will be a residential led, mixed use development, with approximately:
  - 8,437 dwellings supporting a population of 21,483 people;
  - Four primary and four post-primary schools;
  - 52,635 sqm of commercial floor space; and
  - 7,300 sqm of community space
- Town centres are proposed at the train stations at Kishoge and Clondalkin-Fonthill, which will support higher residential densities, and will be the focal point for the majority of planned commercial floor space;
- The mixed land use design facilitates the localisation of a large number of trip purposes reducing the need for longer distance trips on the network and supporting the use of sustainable modes (walking and cycling);

- The internal Clonburris road network has been designed to be permeable, which can be safely and easily navigated by pedestrians and cyclists;
- Forecast 2035 planning data suggests significant levels of growth in areas adjacent to the proposed Clonburris SDZ, such as Adamstown, Grange Castle Business Park and Liffey Valley Shopping Centre.

8.1.4 Assessment Methodology

The following methodology used to assess the performance of the proposed development at Clonburris, and to generate the overarching transport strategy

Step 1: Demand for Travel

- The NTA's National Demand Forecasting Model (NDFM) was used to generate forecast demand based on future planning data;
- The NTA's East Regional Model (ERM) was then used to process this daily travel demand, disaggregate it to specific time periods and undertake mode and destination choice;
- To provide a more accurate representation of localised demand, the ERM zones were disaggregated within the Clonburris SDZ using proposed levels of residential, employment and education development.

Step 2: Transport Measures

- At a strategic level, future transport schemes were identified from local and national policy documents, and studies carried out in the local area;
- The local Clonburris SDZ internal transport network was adopted from the Masterplan and Concept Drawings developed by Loci Urban Design Architecture & Planning.

Step 3: Measuring Effectiveness

- The ERM was used to assess the wider strategic impact of the Clonburris development in the forecast years;
- An accessibility assessment and detailed junction modelling was carried out to identify the localised impact of the Clonburris SDZ.

Step 4: Mitigation

- Based on the results from Step3, a number of mitigation measures were identified to improve the performance of the Clonburris SDZ in terms of promoting the use of sustainable modes of travel and reducing the negative impacts on the wider traffic network;
- The mitigation measures identified were fed back into Step3 for assessment in an iterative process to develop the final Clonburris Transport Strategy.

8.1.5 Strategic Assessment of Clonburris

A Strategic Assessment of the Clonburris development was undertaken using the NTA's Eastern Regional multi-modal model. Key outcomes were as follows:

2035

Trip Distribution

- Approx. 27% of trips which originate in Clonburris in 2035 stay within the development, thus reducing the impact on the wider strategic road network;

- Approx. 72% of all car trips generated by Clonburris in the AM are forecast to stay within the area bounded by the N4, N7 and M50;
- A large proportion of PT trips (30%) which originate in Clonburris are destined for Dublin city centre.

Mode Share

- Approx. 54% of trips in the AM period are undertaken by walking, cycling and PT;
- The AM and SR time periods exhibit a high proportion of walking and cycling. This is reflective of short distance education trips available within the Clonburris SDZ;
- The mode share analysis indicates that the location and type of development proposed at Clonburris will assist in reducing the level of impact on the wider transport network;
- Redistribution of development from Clonburris would result in alternative development areas experiencing higher car mode share compared to Clonburris with higher demand placed on roads within the County

Trip Length Distribution

- Approx. 56% of trips originating in Clonburris are less than 4km in length;
- Results indicate high levels of walking and cycling use for shorter distance trips;
- The use of PT for longer distance trips reduces the impact of Clonburris on the wider strategic road network.

2026

Trip Distribution

- Approx. 24% of trips which originate in Clonburris in 2026 stay within the development, thus reducing the impact on the wider strategic road network;
- Approx. 65% of all car trips generated by Clonburris in the AM are forecast to stay within the area bounded by the N4, N7 and M50.

Mode Share

- Approx. 47% of trips in the AM period are undertaken by walking, cycling and PT;
- The AM and SR time periods exhibit a high proportion of walking and cycling. This is reflective of short distance education trips available within the Clonburris SDZ;
- Clonburris has a higher car mode share in 2026 vs 2035, primarily due to the improved PT offering in the full 2035 GDA Strategy.

Trip Length Distribution

- Results are similar to those identified for 2035, i.e.:
  - Approx. 56% of trips originating in Clonburris are less than 4km in length;
  - Results indicate high levels of walking and cycling use for shorter distance trips; and
  - The use of PT for longer distance trips reduces the impact of Clonburris on the wider strategic road network.

8.1.6 Clonburris Public Transport Strategy

- The Strategy includes the following key services:
  - High frequency, high capacity DART service linking Clonburris to the city centre with stations at Kishoge and Clondalkin-Fonthill;

- High Frequency Orbital Bus services linking Clonburris to Tallaght, Liffey Valley and Blanchardstown; and
- Local bus services linking Clonburris to areas of high demand

- The modelling indicates that the DART will be utilised in the AM peak with approximately 2,000 passengers boarding at stations in Clonburris travelling towards the city centre;
- DART provides a competitive alternative for longer distance trips to the city centre, thus reducing the car mode share;
- The orbital bus service is well utilised in the AM peak hour impacting positively on the sustainable mode share to the Tallaght and NW City Sectors;
- The proposed local bus routes deliver important services in terms of providing sustainable transport alternatives to key car trip attractors in the area, however, they require further demand management measures to promote their use.

8.1.7 Walking and Cycling

Walk and Cycle Network

- Filter permeability junctions are applied at various locations to prioritise the movement of more sustainable modes (i.e. pedestrians, cyclists and public transport) over private vehicles;
- Cycle trails are proposed running both East-West and North-South through the development facilitating internal cycle traffic, along with providing linkages to existing external cycle lanes and Greenways;
- Adequate footpaths will be provided, along with controlled and uncontrolled pedestrian crossings, throughout the proposed development to facilitate, and promote, pedestrian movements;
- Off-road cycle tracks will be provided on all Arterial and Link Roads to provide enhanced safety for cyclists.

Accessibility

- The areas achieving the high levels of accessibility (Level 1) are mainly concentrated around Clondalkin-Fonthill and Kishoge Train Stations;
- Approximately 75% of residences will meet the criteria for Level 1, and are therefore able to access a bus stop within 400m and a train station within an 800m walking distance, access a retail or community facility within a 400m walking distance and access a proposed school within a 500m walking distance;
- Approximately 98% of all residences within the development will be able to access a bus stop within 400m or a train station within 800m.

8.1.8 Street Network Performance

- Clonburris will generate approximately 1,700 passenger car units (pcus) onto the wider road network in the 2035 AM peak hour, and approx. 1,250 pcus in the 2026 AM Peak Hour;
- Traffic generated by Clonburris will contribute to less than one percent to the overall traffic on the strategic road network in the 2026 and 2035 AM peak i.e. N4, N7 & M50;
- V/C and LOS analysis indicates that a number of junctions in the 2012 ERM base year experience congestion and delay, particularly at the intersections with the N4 and N7;

- The LOS and V/C analysis indicate that the '2035 Clonburris' scenario performs better than its alternative, with fewer turning movements with a V/C of greater than 100%, and fewer junctions operating with a LOS of 'E' or 'F';
- The Strategic LOS and V/C analysis also indicate that areas within the N4/N7/M50 boundary will experience congestion and delay in 2035, irrespective of whether Clonburris gets developed, particularly at the interchanges with the N4 and N7;
- Focusing development at the Clonburris SDZ provides a number of sustainable planning and transportation benefits, such as:
  - Mixed use development supporting walking and cycling;
  - Adjacent to a high quality Rail service which supports PT mode share;
  - Opening of the Kishoge train station which can serve residents currently living in the local area;
  - The development of walking and cycling infrastructure providing improved connectivity within the area etc.; and
  - The availability of new schools and commercial centres for residents in housing estates in close proximity to the development etc.
- A number of network enhancements are proposed in the vicinity of Clonburris which aim to maximises accessibility for walking, cycling and public transport while balancing the needs of the car;
- Detailed modelling indicates that the majority of identified junctions in the vicinity of Clonburris will operate satisfactorily in the peak periods;
- During the 2035 forecast year scenarios AM and PM peak hour scenarios, the PRC capacity threshold will be exceeded for two junctions on Fonthill Road North, resulting in queuing extending back to downstream junctions; and
- This will be mitigated through the implementation of linked signal timings and the potential use of MOVA or similar signal infrastructure, which optimise the performance of traffic signals in order to reduce queuing and delay

8.1.9 Parking Strategy

South Dublin County Council Development Plan 2016-2022

The CDP recognises the important relationship between parking availability and travel choice.

- The CDP includes a comprehensive set of parking standards considering the accessibility of a development area to public transport provision.
- The CDP parking standards are a maximum provision and lower parking provisions for developments are acceptable based on accessibility to public transport, sharing of spaces between complimentary land uses and existence of robust travel plans.
- The CDP also includes a comprehensive set of minimum parking standards for bicycles for a range of land uses.

Clonburris Car Parking Provision

- Based on the total quantum of development, assumed land use breakdown and level of accessibility, the base parking demand for Clonburris is 11,489 parking spaces. This is based on the CDP maximum parking standards.

- The parking strategy for Clonburris identifies potential further reductions to the parking standards to encourage sustainable travel based on the density and mix of land uses, high level of accessibility, public transport provision and supporting Mobility Management Plan Framework.
- The parking strategy examined the spatial requirement for residential on-street parking, concluding that maximum parking standard provision could be met on-street with only a few areas requiring supplementary parking.
- The parking strategy provides further recommendation on managing parking demand through the implementation of car clubs, sharing of parking spaces and implementation of paid parking at the retail centres.

8.1.10 Mobility Management Plan Framework

- The MMPF provides the implementation mechanism for supporting the sustainable development principles for Clonburris.
- The MMPF for Clonburris comprises of an overall strategic MMP framework which includes targets for each mode across the site. Individual MMP's for residential areas, work places and schools will be developed as the site is implemented.
- Mode share targets for the MMPF have been derived using the strategic transport model projections for 2035, which includes for the full build out of Clonburris and delivery of the GDA Transport Strategy measures, and with a view to national sustainable travel targets as set out in the Government's 'Smarter Travel: A Sustainable Transport Future 2009 – 2020'.
- The overall mode share targets for 2035 for Clonburris for the AM peak travel is 43% car and 57% sustainable travel (e.g. walking, cycling or public transport).
- The MMPF for the SDZ Lands identifies a comprehensive list of physical infrastructure measures and behaviour change measures aimed at encouraging walking, cycling, and public transport use, as well as managing parking demand.
- As well as the overall MMPF mode share target, the MMPF outlines mode share targets and supporting MMPF measures for different journey purposes, including travel to school, commuting and business travel, residential, leisure and travel for older citizens.
- The MMPF concludes by recommending a monitoring strategy for individual travel plans, with periodic assessments undertaken to monitor the effectiveness of the overall MMPF

8.2 Conclusion

The Clonburris SDZ lands provide a unique opportunity for truly sustainable development. The strategic transport assessment has been undertaken using nine transport design principles which support the overarching sustainable development objectives for the Planning Scheme.

These nine transport design principles are:

- *To make best use of existing infrastructure and strategic land banks.*
- *Plan for an integrated transport network with appropriate provision for all modes by facilitating the implementation of measures within the GDA Transport Strategy.*
- *Provide for a high level of permeability for pedestrians and cyclists throughout the SDZ and provide connectivity to the surrounding communities.*
- *Improve accessibility by walking and cycling to public transport services and key destinations including local amenities and employment areas.*

- *Improve and enhance the Dublin Cycle Network.*
- *Support extensive public transport usage and energy efficient public transport operations through network design.*
- *Deliver priority for public transport on the internal streets of Clonburris.*
- *Appropriately balance parking needs within the SDZ lands with sustainable transport provision, and,*
- *Identify key junctions and links to the existing road network and propose enhancement where necessary to reduce the levels of congestion.*

Through the application of these nine design principles, the transport assessment has identified the future transport needs of the site at a strategic and local level for all modes. The assessment provides guidance on the prioritisation of measures which will encourage sustainable travel, while protecting the efficiency of the existing and future network.

A proposed street hierarchy layout for Clonburris has been established that maximises route choice and access to key services by means of walking, cycling and public transport while balancing the needs of the car. The internal network has been developed as a permeable network which can be safely and easily navigated by pedestrians and supports active travel. Sustainable transport connections are also provided to surrounding areas.

A comprehensive public transport plan has been developed for Clonburris which integrates the committed infrastructure measures contained in the NTA's Greater Dublin Area Transport strategy 2016-2035 (e.g. DART expansion programme, Core Orbital and Radial bus services etc.) with a series of planned local bus services linking Clonburris to the wider South Dublin community.

The integration of the transportation and land use within the SDZ lands has resulted in a highly accessible development, with over 75% of all dwellings situated within 250metres of a cycle route, 400m of a bus stop, 800m of a rail station, 400metres of a retail or community facility and 500metres of a school.

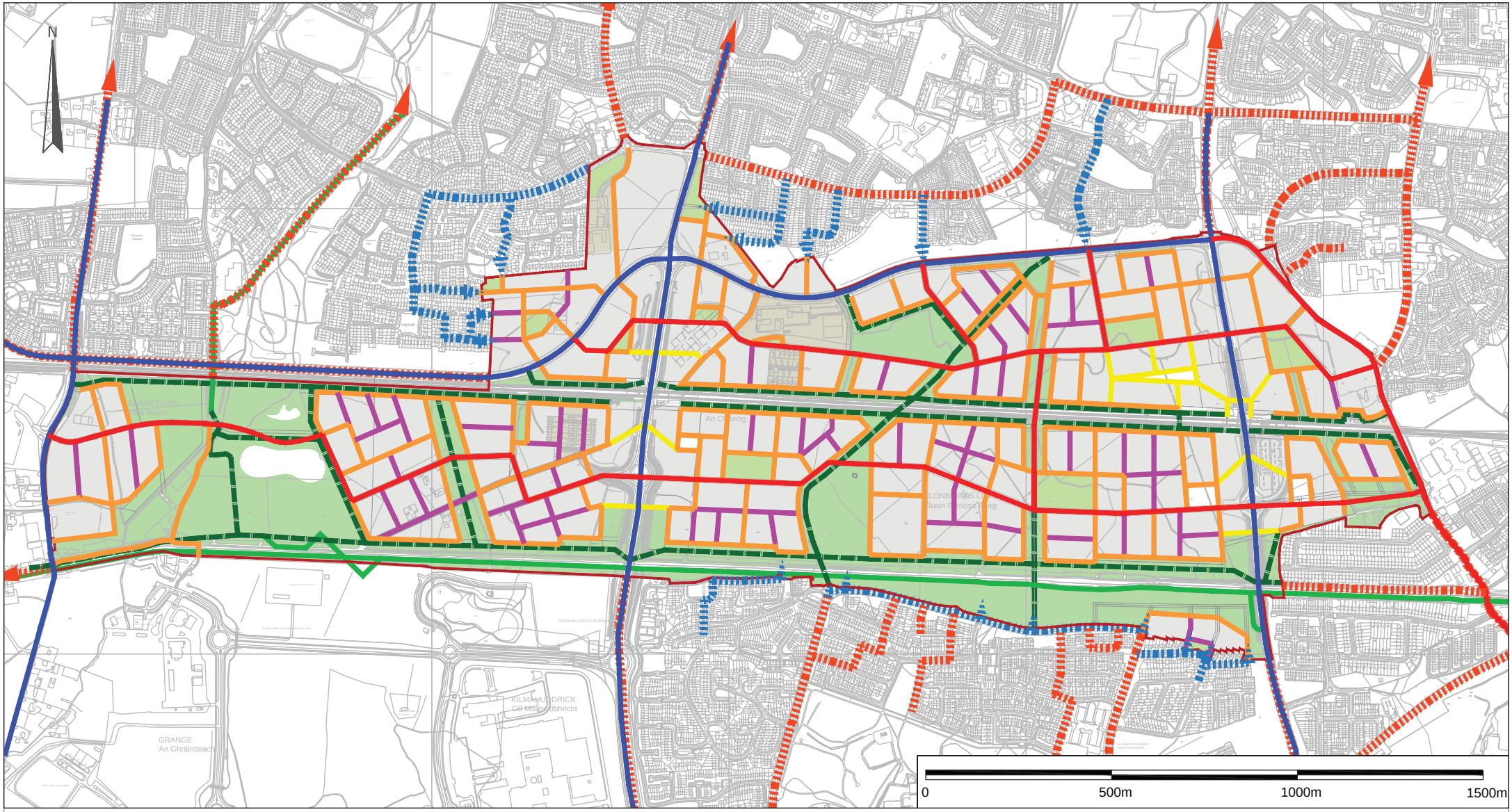
A Parking strategy has been developed which provides an appropriate level of parking to serve the needs of the community while promoting the use of sustainable transport with maximum parking standards to be applied in line with the County Development Plan.

A MMPF has been developed for the SDZ Lands along with mode share targets for work place travel plans and school travel plans. These plans are supported by the sustainable transport measures for the SDZ Lands and will assist in providing a healthy environment which supports active travel and energy efficiency development.

All of the above measures contribute to the development of a sustainable community with the majority of trips from Clonburris within the critical morning peak period being accommodated by sustainable modes.

To conclude, Clonburris is one of the optimal locations for large-scale development in the State due to the availability of high-frequency and high capacity rail and bus infrastructure and services, as well as walking and cycling, as modes of travel for all trip purposes for the future population and workforce. Its development, in the manner foreseen, will comprise a prime example of integrated transport and land-use planning catering for the housing needs of South Dublin.

APPENDIX A WALK AND CYCLE NETWORK



KEY:

- Existing Arterial Route: Off-road Cycle Tracks
- Proposed Link Route: Off-road Cycle Tracks
- Proposed Local Route: Mixed Street (Cars/Cyclists)
- Proposed Homezone: Shared Street
- Proposed Local Route: Pedestrian Priority
- Existing Pedestrian/Cycle Route (Greenway)
- Proposed Pedestrian/Cycle Route off traffic
- Existing Links outside development
- Potential Permeability Projects

REVISION	DATE	DESCRIPTION	DRAWN	CHECKED	APPROVED
B	01/06/17	SECOND ISSUE FOLLOWING SDCC COMMENTS	AMP	AA	AA
A	12/04/17	ISSUED TO SDCC	AMP	AA	AA
A	23/01/17	FOR INTERNAL WORKSHOP	AMP	AA	AA

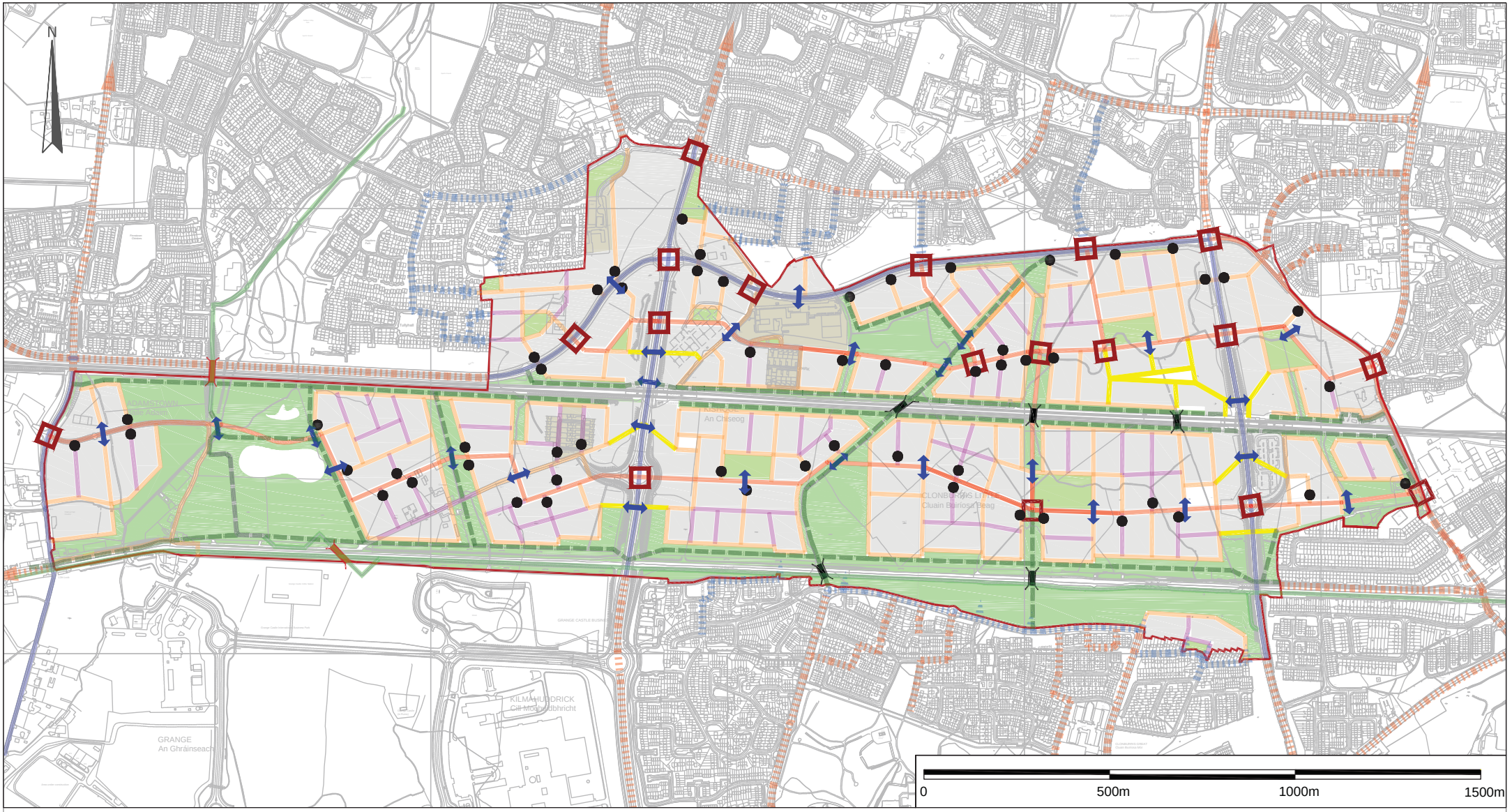
SYSTRA

JACOBS

Comhairle Contae Átha Cliath Theas
South Dublin County Council

Údarás Náisiúnta Iompair
National Transport Authority

DRAWN : AMP	STATUS: Draft		PROJECT: Clonburris SDZ
CHECKED : AA	SCALE: 1:10,000@A3	DATE: June 2017	TITLE: Proposed Walking and Cycling Network
APPROVED :	FORMAT: AutoCAD	CLIENT : South Dublin Co. Co.	
PROJECT MANAGER :			DRAWING NO. MAP 01 - WC / REV. B



KEY:

- Existing Arterial Route: Off-road Cycle Tracks
- Proposed Link Route: Off-road Cycle Tracks
- Proposed Local Route: Mixed Street (Cars/Cyclists)
- Proposed Homezone: Shared Street
- Proposed Local Route: Pedestrian Priority
- Existing Pedestrian/Cycle Route (Greenway)
- Proposed Pedestrian/Cycle Route off traffic
- Existing Links outside development
- Potential Permeability Projects
- Proposed Traffic Signal Junction
- Proposed Toucan Crossing
- Proposed Ped/Cycle Bridge
- Existing Ped/Cycle Bridge
- Proposed Filtered Junction

REVISION	DATE	DESCRIPTION	DRAWN	CHECKED	APPROVED
B	01/06/17	SECOND ISSUE FOLLOWING SDCC COMMENTS	AMP	AA	AA
A	12/04/17	ISSUED TO SDCC	AMP	AA	AA
A	23/01/17	FOR INTERNAL WORKSHOP	AMP	AA	AA

SYSTRA

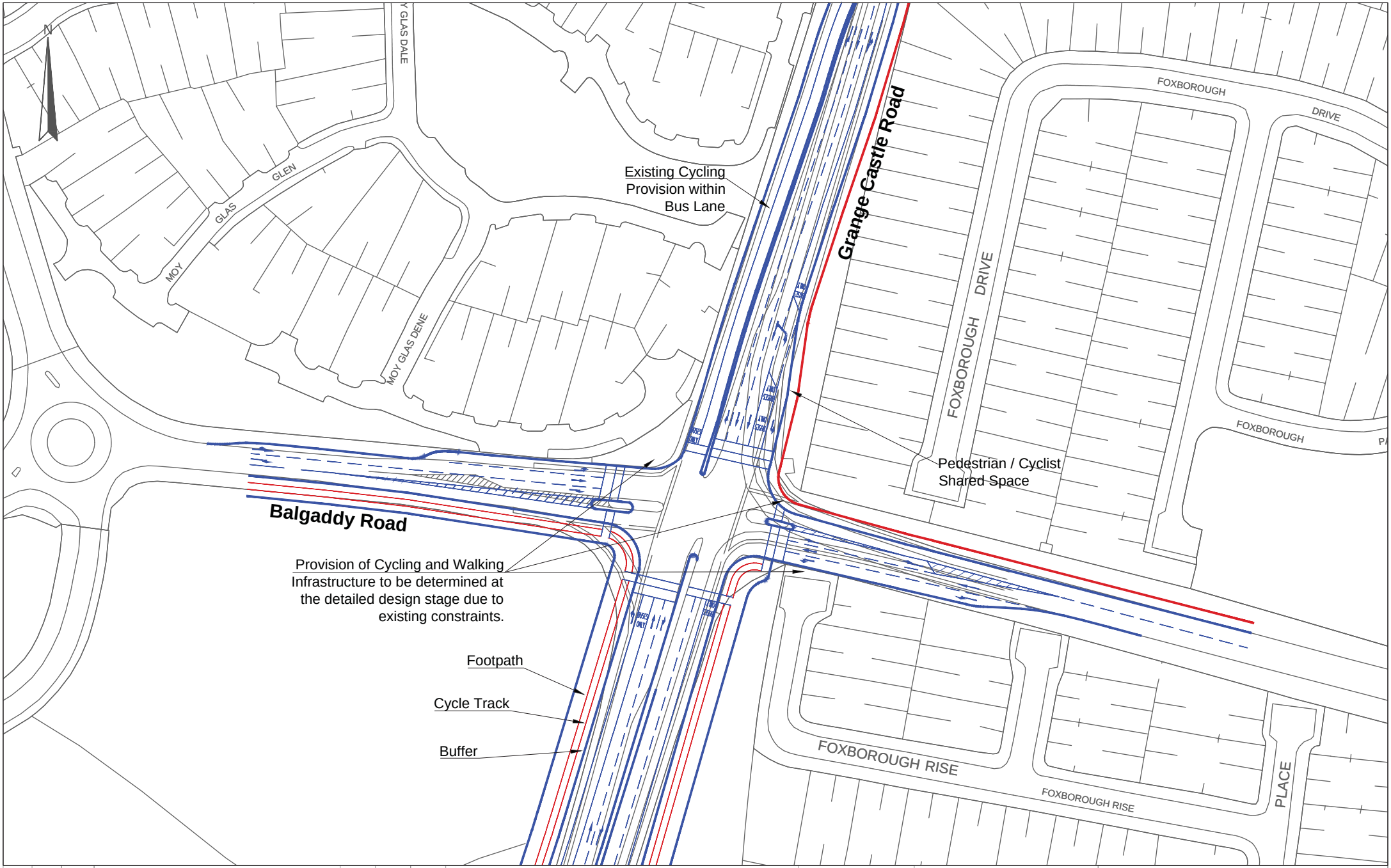
JACOBS

Comhairle Contae Átha Cliath Theas
South Dublin County Council

Údarás Náisiúnta Iompair
National Transport Authority

DRAWN : AMP	STATUS: Draft		PROJECT: Clonburris SDZ
CHECKED : AA	SCALE: 1:10,000@A3	DATE: June 2017	TITLE: Proposed Walking and Cycling Network Provision of Infrastructure
APPROVED :	FORMAT: AutoCAD	CLIENT : South Dublin Co. Co.	
PROJECT MANAGER :			DRAWING NO. MAP 02 - WC / REV. B

APPENDIX B JUNCTION DESIGN DRAWINGS



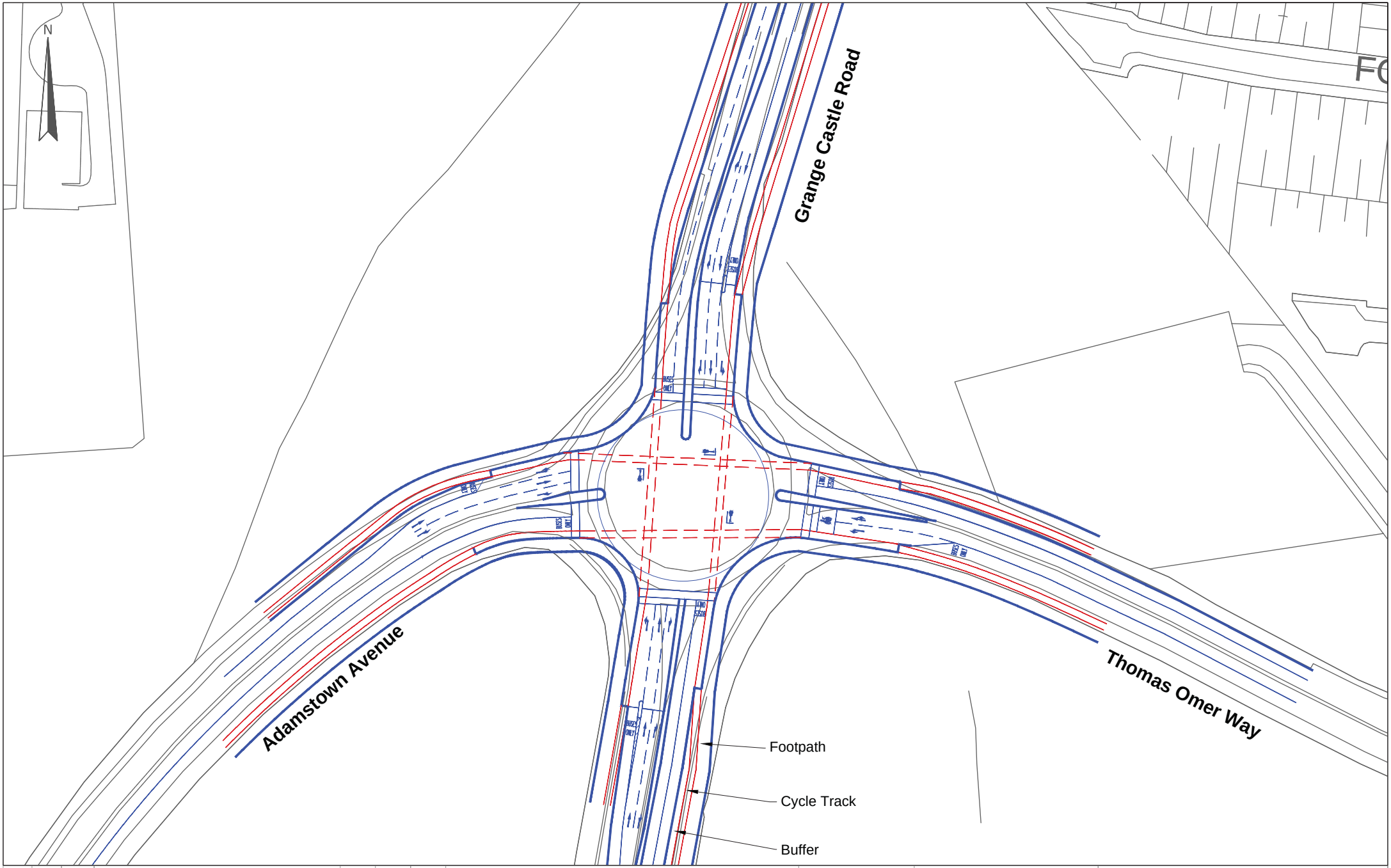
REVISION	DATE	DESCRIPTION	DRAWN	CHECKED	APPROVED
A	13/04/17	Design of newly proposed junction layout.	DM	CW	

SYSTRA JACOBS

Comhairle Contae Átha Cliath Theas South Dublin County Council

Údarás Náisiúnta Iompair National Transport Authority

DRAWN : DM	STATUS: Draft		PROJECT: Clonburris SDZ
CHECKED : CW	SCALE: 1:1000@A3	DATE: April 2017	TITLE: Junction 1 Design - Signalised Junction
APPROVED : --	FORMAT: AutoCAD	CLIENT : South Dublin Co. Co.	
PROJECT MANAGER : --			DRAWING NO. 32106211\J1\A REV. A



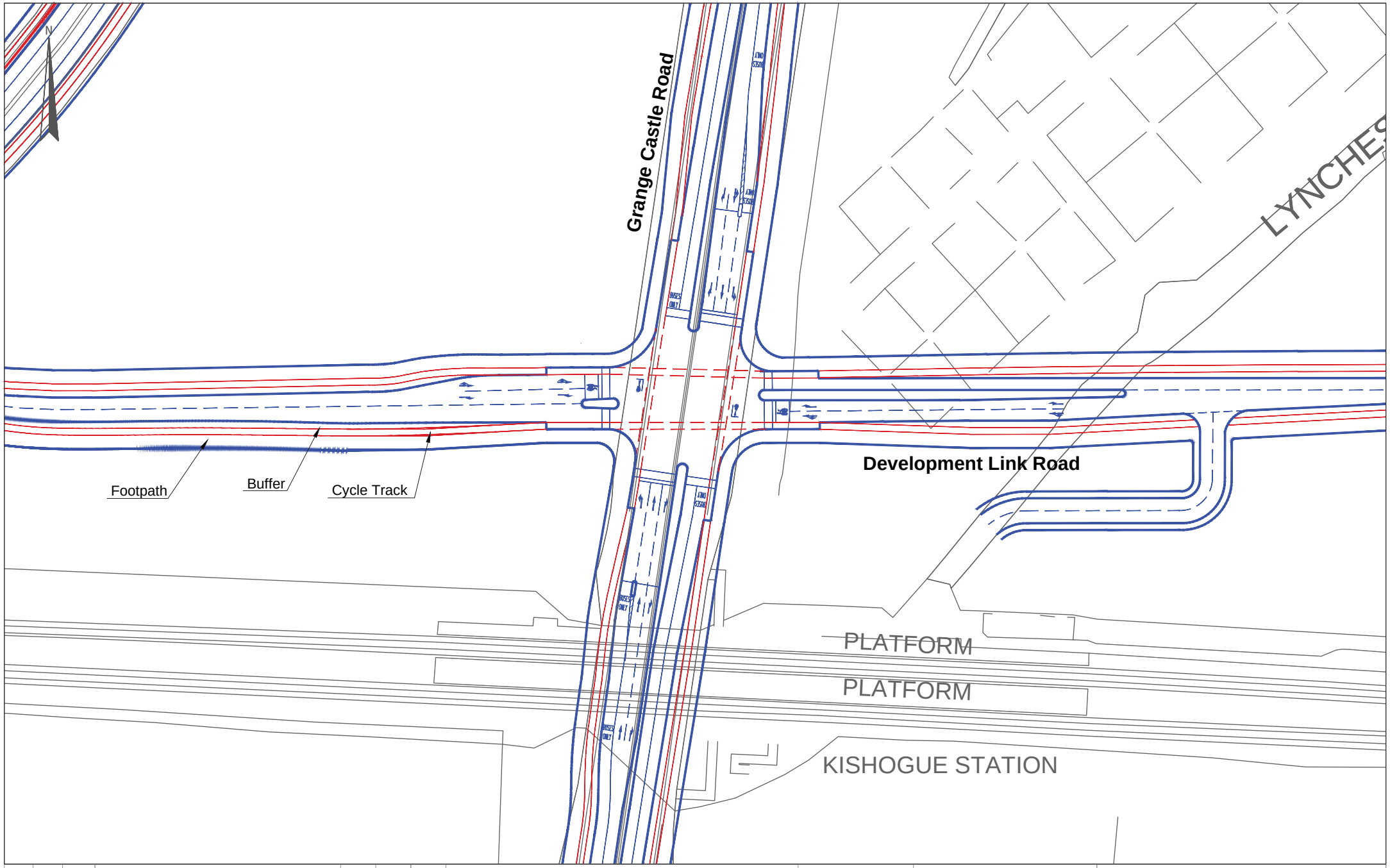
REVISION	DATE	DESCRIPTION	DRAWN	CHECKED	APPROVED
B	31/05/17	Ammendment to newly proposed junction layout.	DM	CW	
A	12/04/17	Design of newly proposed junction layout.	DM	CW	

SYSTRA JACOBS

Comhairle Contae Átha Cliath Theas South Dublin County Council

Údarás Náisiúnta Iompair National Transport Authority

DRAWN : DM	STATUS: Draft		PROJECT: Clonburris SDZ
CHECKED : CW	SCALE: 1:1000@A3	DATE: May 2017	TITLE: Junction 2 Design - Signalised Junction
APPROVED : --	FORMAT: AutoCAD	CLIENT : South Dublin Co. Co.	
PROJECT MANAGER : --		DRAWING NO. 32106211\J2\B	REV. B



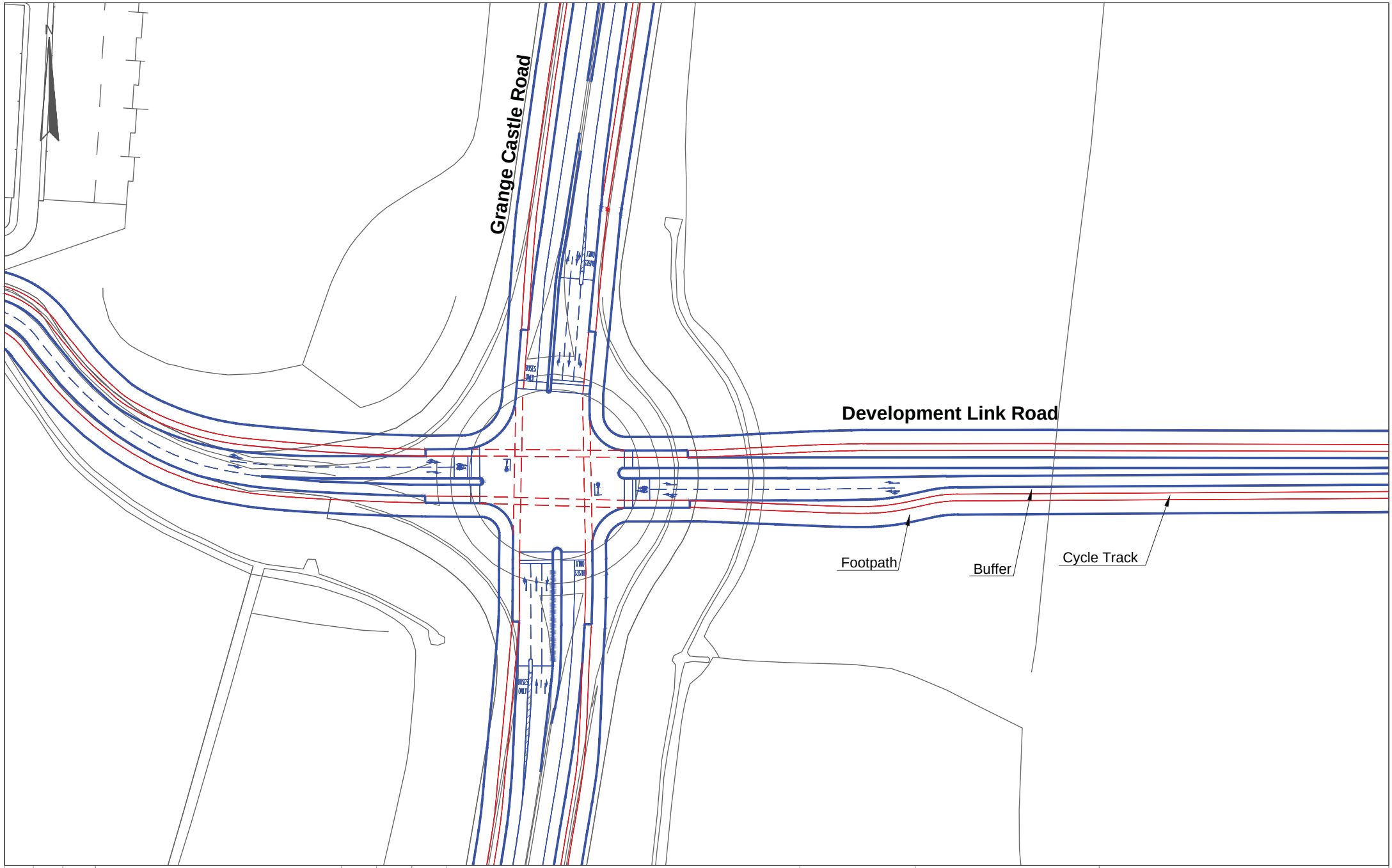
REVISION	DATE	DESCRIPTION	DRAWN	CHECKED	APPROVED
B	01/06/17	Ammendment to newly proposed junction layout.	DM	CW	
A	13/04/17	Design of newly proposed junction layout.	DM	CW	

SYSTRA JACOBS

Comhairle Contae Átha Cliath Theas South Dublin County Council

Údarás Náisiúnta Iompair National Transport Authority

DRAWN : CL	STATUS: Draft		PROJECT: Clonburris SDZ
CHECKED : CW	SCALE: 1:1000@A3	DATE: June 2017	TITLE: Junction 3 Design - Signalised Junction
APPROVED : --	FORMAT: AutoCAD	CLIENT : South Dublin Co. Co.	
PROJECT MANAGER : --		DRAWING NO. 32106211\J3\B	REV. B



REVISION	DATE	DESCRIPTION	DRAWN	CHECKED	APPROVED
C	16/08/17	Bus lane removed from east arm.	DM	CW	
B	01/06/17	Ammendment to newly proposed junction layout.	DM	CW	
A	13/04/17	Design of newly proposed junction layout.	DM	CW	

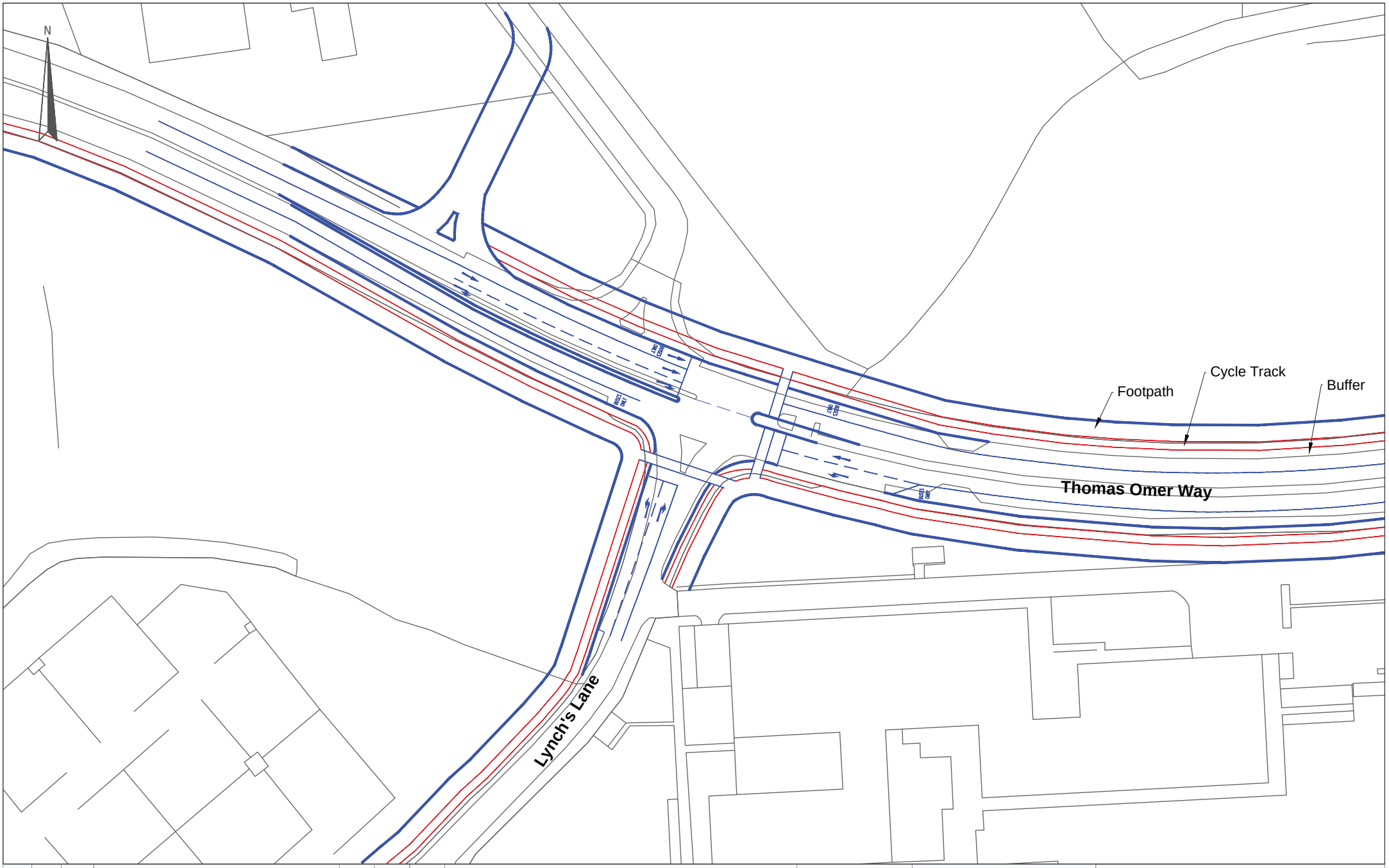
SYSTRA

JACOBS

Comhairle Contae Átha Cliath Theas South Dublin County Council

Údarás Náisiúnta Iompair National Transport Authority

DRAWN : DM	STATUS: Draft		PROJECT: Clonburris SDZ
CHECKED : CW	SCALE: 1:1000@A3	DATE: June 2017	TITLE: Junction 4 Design - Signalised Junction
APPROVED : --	FORMAT: AutoCAD	CLIENT : South Dublin Co. Co.	
PROJECT MANAGER : --			DRAWING NO. 32106211\J4\C REV. C



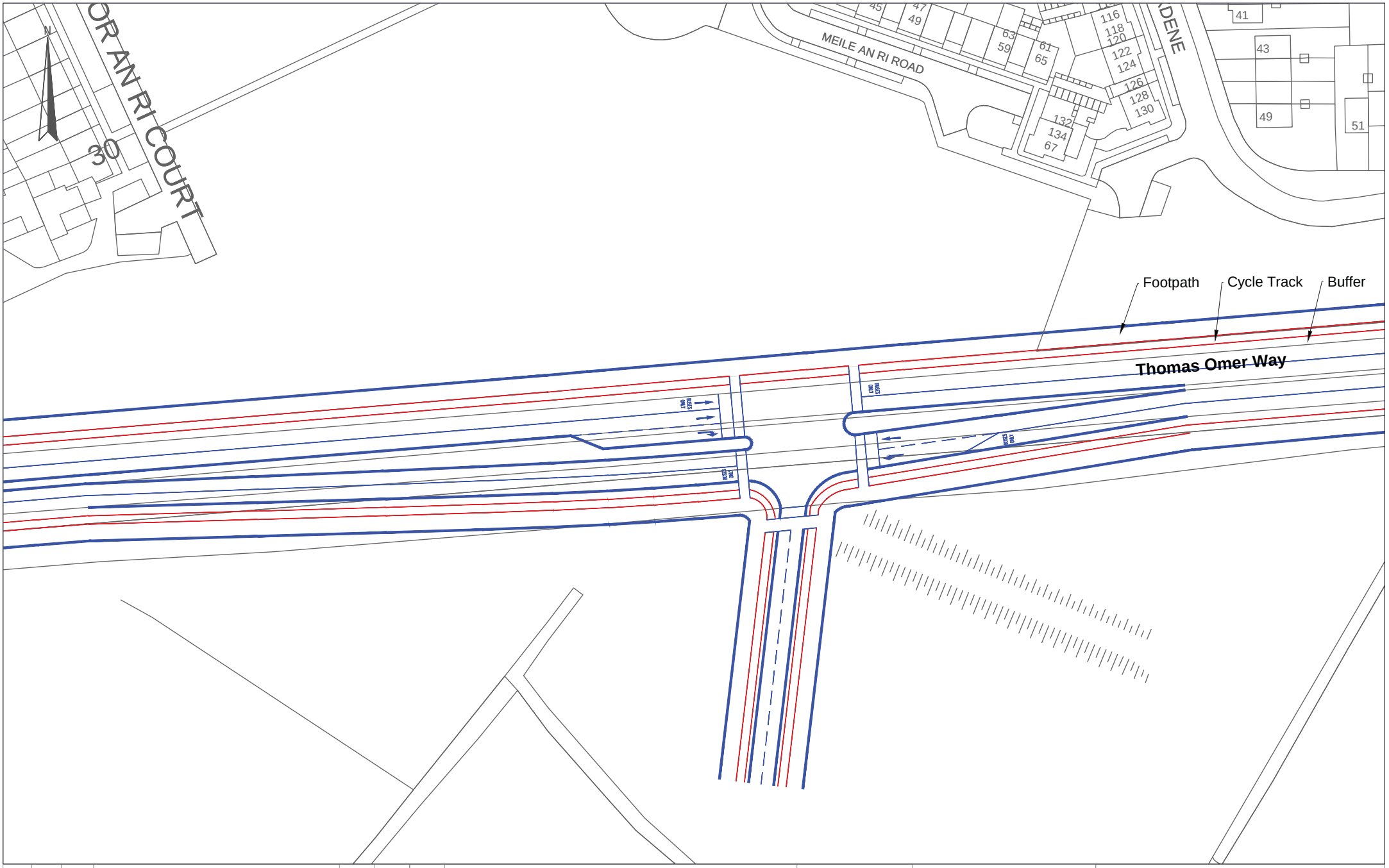
REVISION	DATE	DESCRIPTION	DRAWN	CHECKED	APPROVED
A	06/04/17	Design of newly proposed junction layout.	CL	CW	

SYSTRA JACOBS

Comhairle Contae Átha Cliath Theas South Dublin County Council

Údarás Náisiúnta Iompair National Transport Authority

DRAWN : CL	STATUS: Draft		PROJECT: Clonburris SDZ
CHECKED : CW	SCALE: 1:1000@A3	DATE: April 2017	TITLE: Junction 5 Design - Signalised Junction
APPROVED : --	FORMAT: AutoCAD	CLIENT : South Dublin Co. Co.	
PROJECT MANAGER : --			DRAWING NO. 32106211\J5\A / REV. A



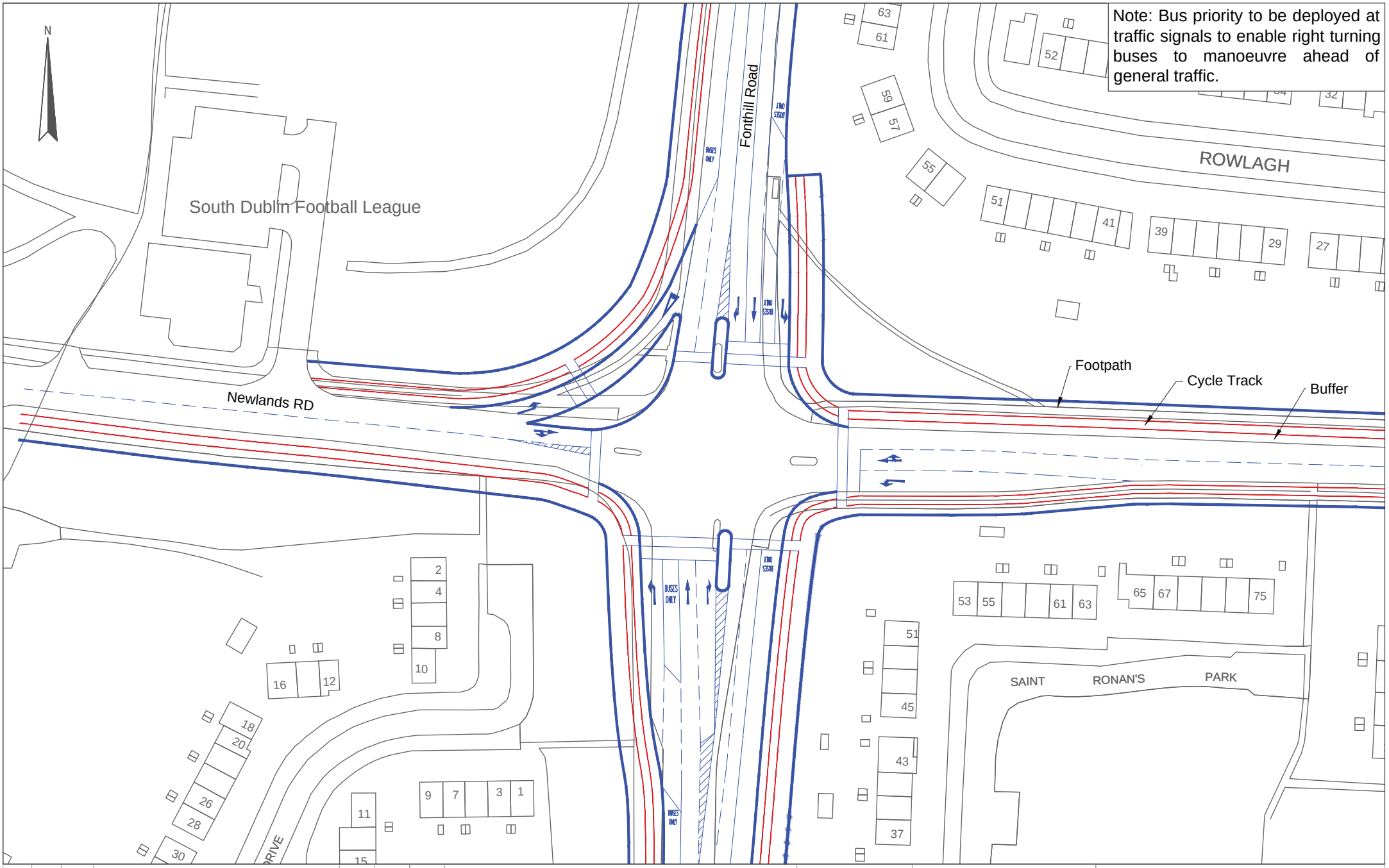
REVISION	DATE	DESCRIPTION	DRAWN	CHECKED	APPROVED
A	06/04/17	Design of newly proposed junction layout.	CL	CW	

SYSTRA JACOBS

Comhairle Contae Átha Cliath Theas South Dublin County Council

Údarás Náisiúnta Iompair National Transport Authority

DRAWN : CL	STATUS: Draft		PROJECT: Clonburris SDZ
CHECKED : CW	SCALE: 1:1000@A3	DATE: April 2017	TITLE: Junction 6 Design - Signalised Junction
APPROVED : --	FORMAT: AutoCAD	CLIENT : South Dublin Co. Co.	
PROJECT MANAGER : --			DRAWING NO. 32106211\J6\A / REV. A



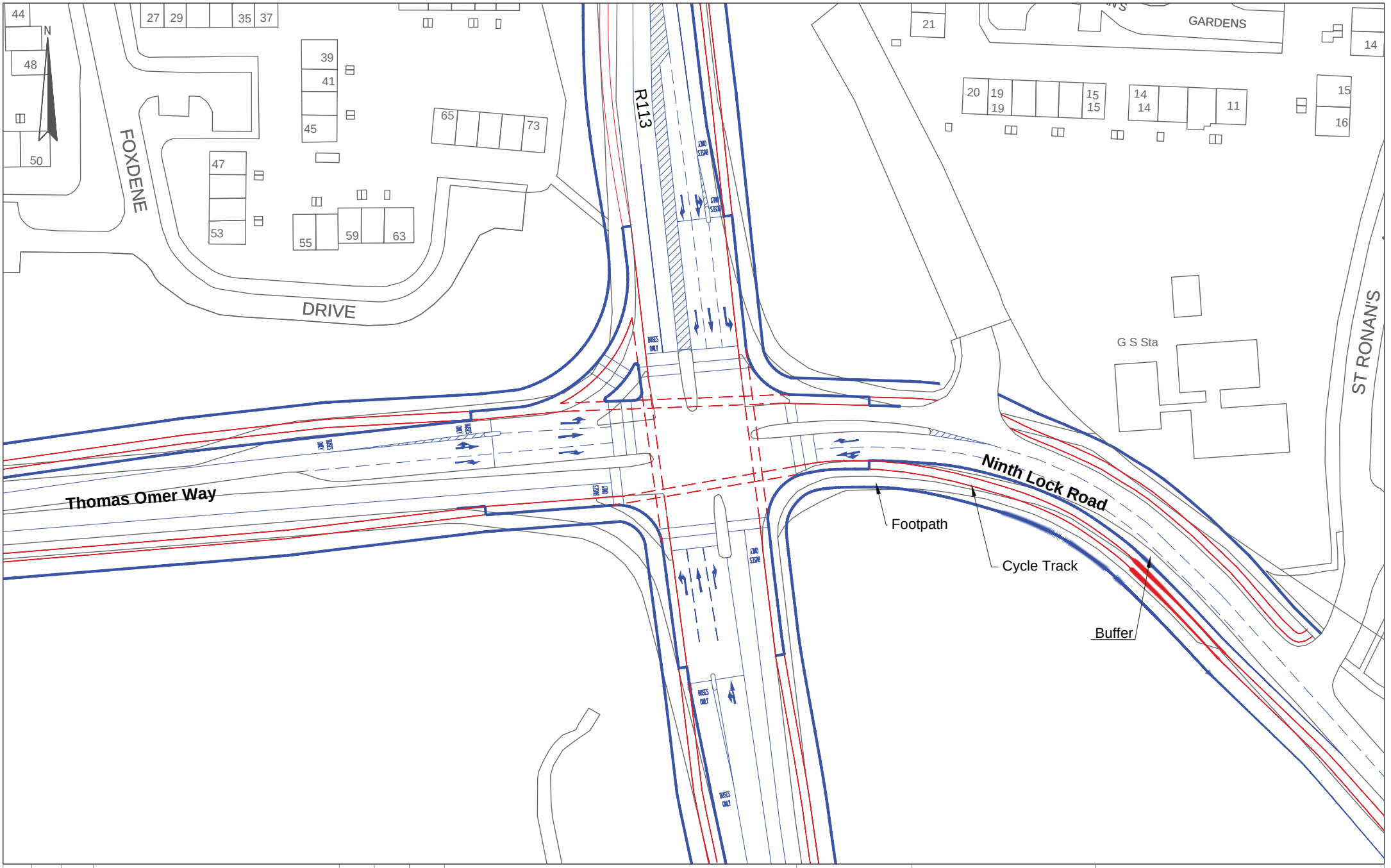
REVISION	DATE	DESCRIPTION	DRAWN	CHECKED	APPROVED
A	06/04/17	??	CL	CW	

SYSTRA JACOBS

Comhairle Contae Átha Cliath Theas South Dublin County Council

Údarás Náisiúnta Iompair National Transport Authority

DRAWN : CL	STATUS: Draft		PROJECT: Clonburris SDZ
CHECKED : CW	SCALE: 1:1000@A3	DATE: April 2017	TITLE: Junction 7 Design - Signalised Junction
APPROVED : --	FORMAT: AutoCAD	CLIENT : South Dublin Co. Co.	
PROJECT MANAGER : --			DRAWING NO. 32106211\J7\A / REV. A



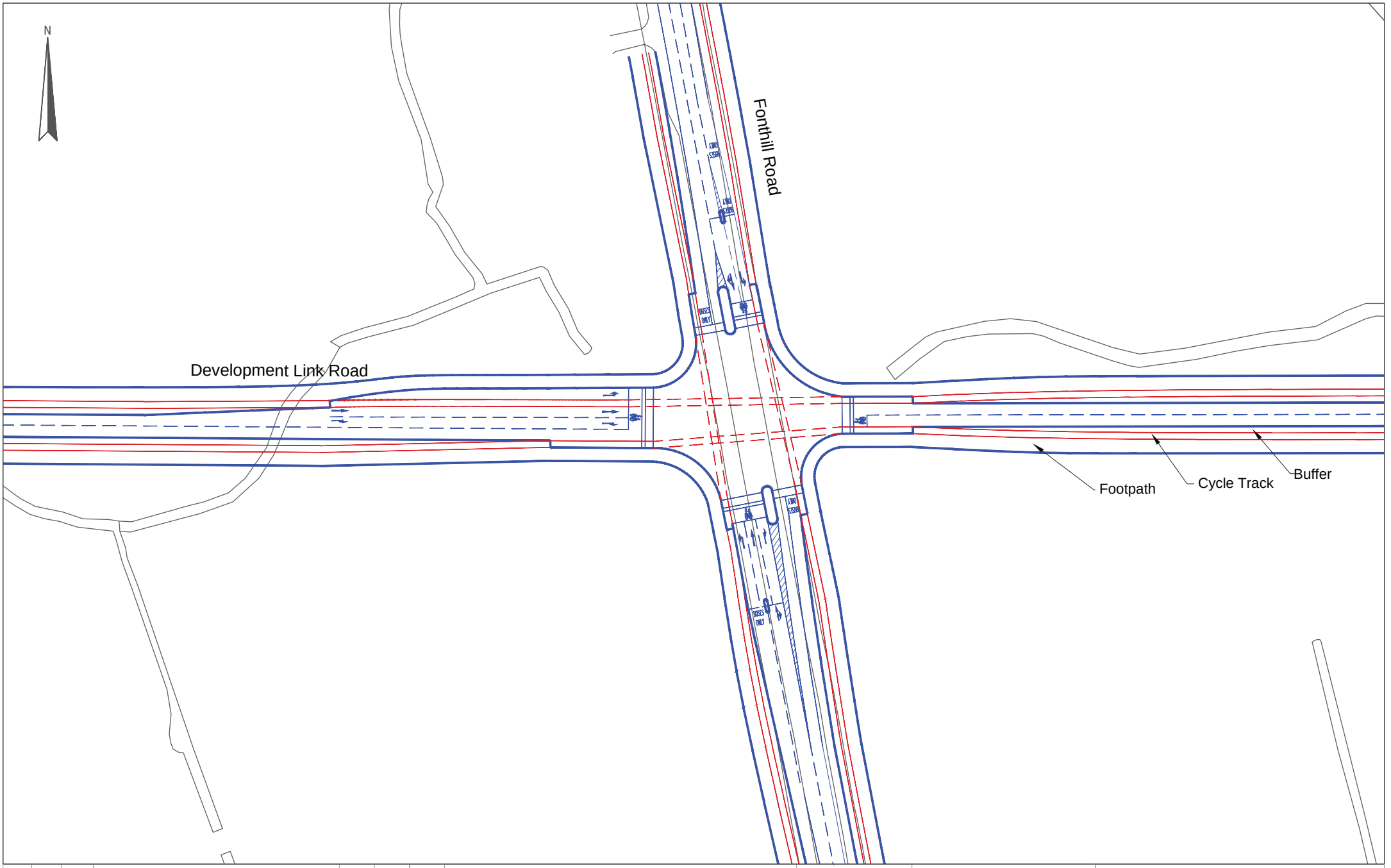
REVISION	DATE	DESCRIPTION	DRAWN	CHECKED	APPROVED
A	06/04/17	??	CL	CW	

SYSTRA JACOBS

Comhairle Contae Átha Cliath Theas South Dublin County Council

Údarás Náisiúnta Iompair National Transport Authority

DRAWN : CL	STATUS: Draft		PROJECT: Clonburris SDZ
CHECKED : CW	SCALE: 1:1000@A3	DATE: April 2017	TITLE: Junction 8 Design - Signalised Junction
APPROVED : --	FORMAT: AutoCAD	CLIENT : South Dublin Co. Co.	
PROJECT MANAGER : --			DRAWING NO. 32106211\J8\A / REV. A



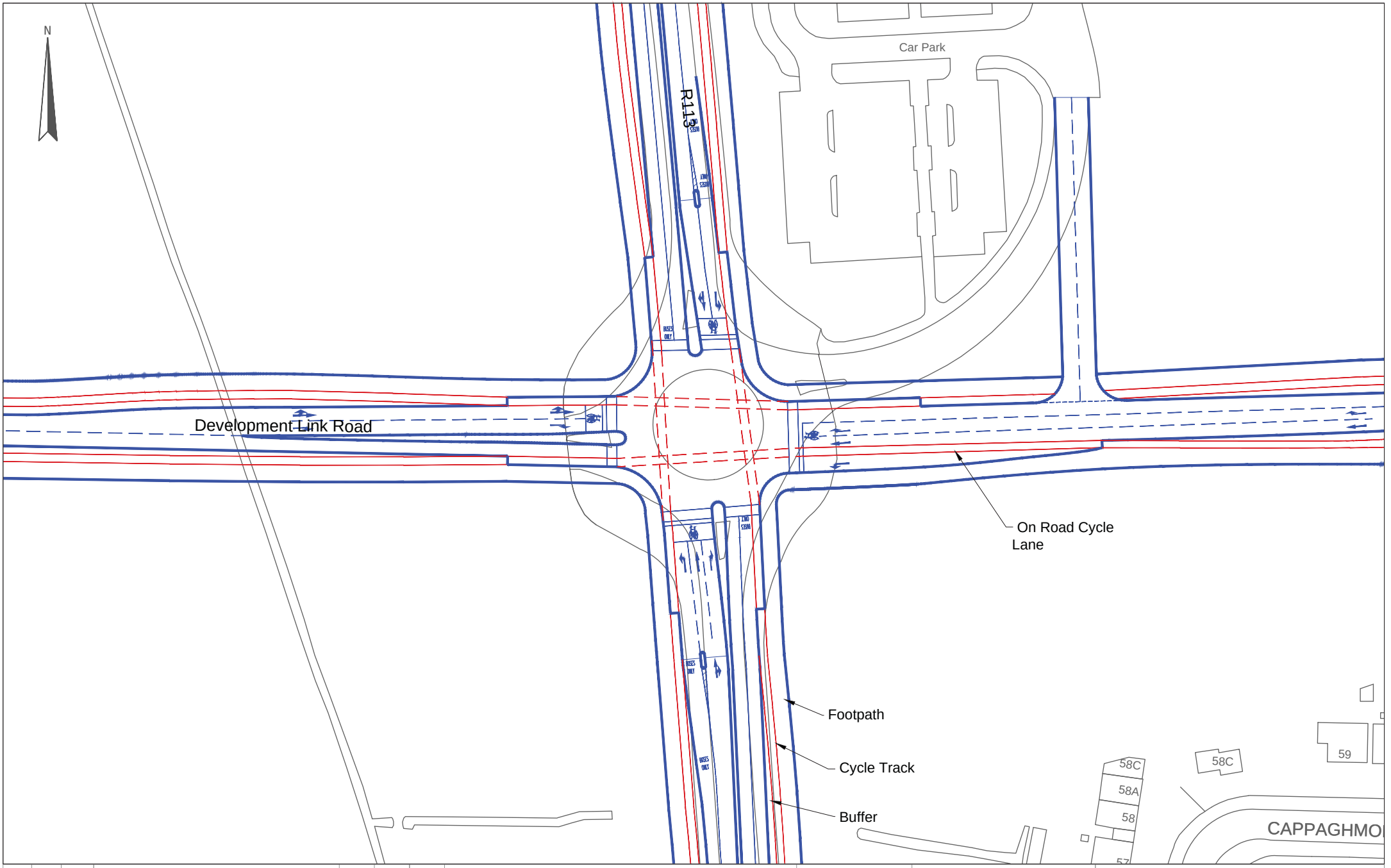
REVISION	DATE	DESCRIPTION	DRAWN	CHECKED	APPROVED
A	06/04/17	??	CL	CW	

SYSTRA JACOBS

Comhairle Contae Átha Cliath Theas South Dublin County Council

Údarás Náisiúnta Iompair National Transport Authority

DRAWN : CL	STATUS: Draft		PROJECT: Clonburris SDZ
CHECKED : CW	SCALE: 1:1000@A3	DATE: April 2017	TITLE: Junction 9 Design - Signalised Junction
APPROVED : --	FORMAT: AutoCAD	CLIENT : South Dublin Co. Co.	
PROJECT MANAGER : --			DRAWING NO. 32106211\J9\A / REV. A



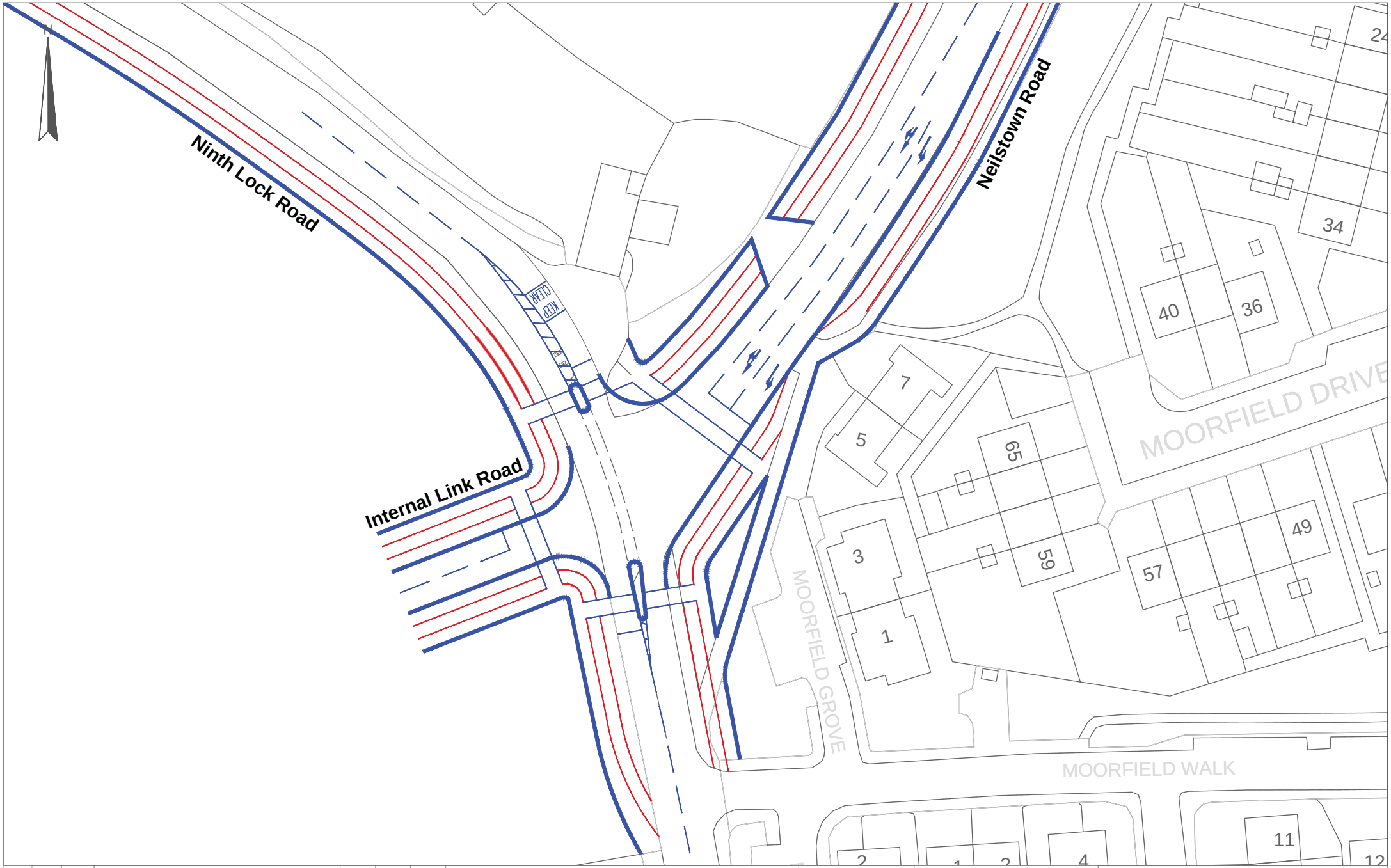
REVISION	DATE	DESCRIPTION	DRAWN	CHECKED	APPROVED
A	06/04/17	??	CL	CW	

SYSTRA JACOBS

Comhairle Contae Átha Cliath Theas South Dublin County Council

Údarás Náisiúnta Iompair National Transport Authority

DRAWN : CL	STATUS: Draft		PROJECT: Clonburris SDZ
CHECKED : CW	SCALE: 1:1000@A3	DATE: April 2017	TITLE: Junction 10 Design - Signalised Junction
APPROVED : --	FORMAT: AutoCAD	CLIENT : South Dublin Co. Co.	
PROJECT MANAGER : --		DRAWING NO. 32106211\J10\A	REV. A



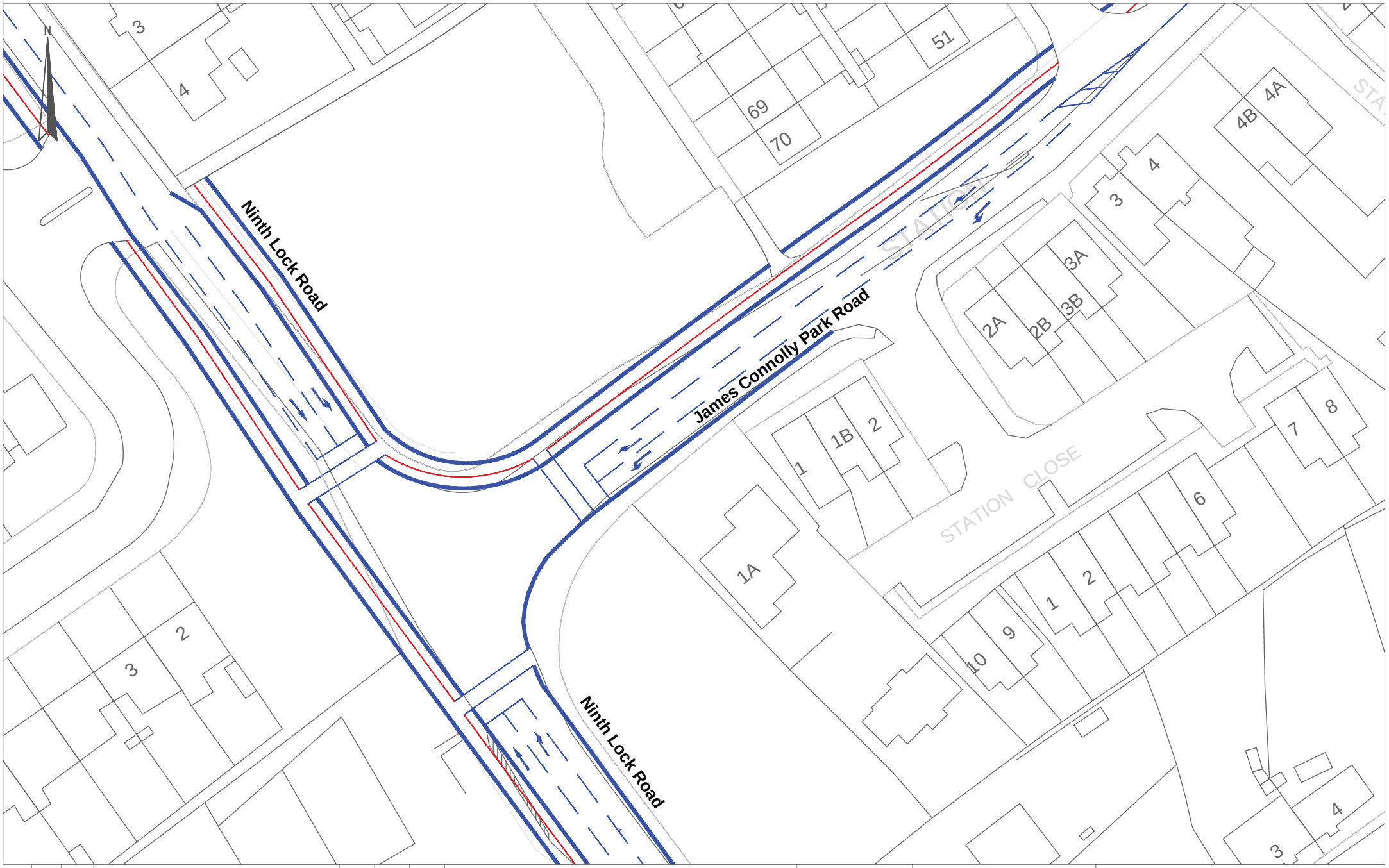
REVISION	DATE	DESCRIPTION	DRAWN	CHECKED	APPROVED
A	13/04/17	Design of newly proposed junction layout.	DM	CW	

SYSTRA JACOBS

Comhairle Contae Átha Cliath Theas South Dublin County Council

Údarás Náisiúnta Iompair National Transport Authority

DRAWN : DM	STATUS: Draft		PROJECT: Clonburris SDZ
CHECKED : CW	SCALE: 1:500@A3	DATE: April 2017	TITLE: Junction 11 Design - Signalised Junction
APPROVED : --	FORMAT: AutoCAD	CLIENT : South Dublin Co. Co.	
PROJECT MANAGER : --		DRAWING NO. 32106211\J11\A	REV. A



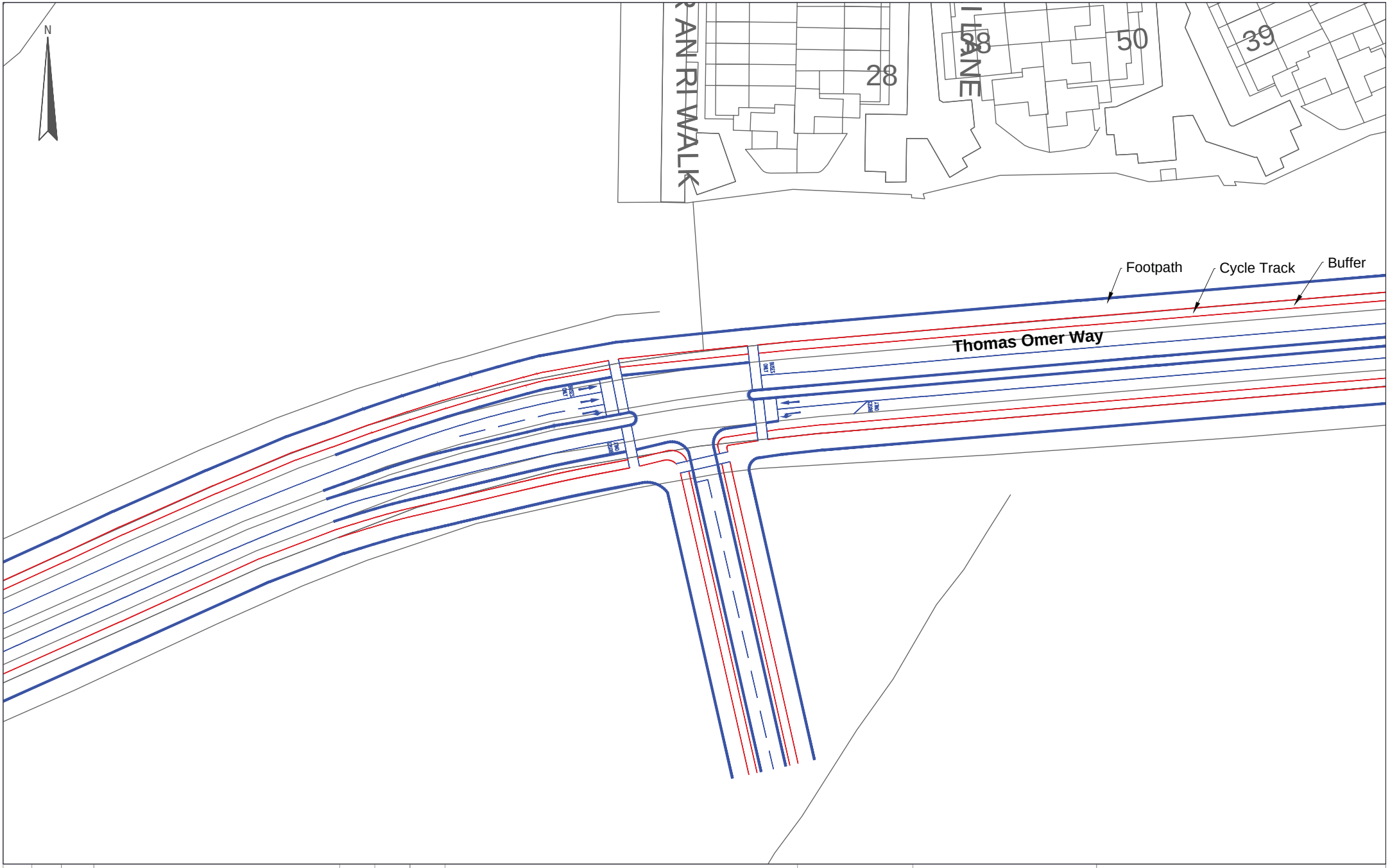
REVISION	DATE	DESCRIPTION	DRAWN	CHECKED	APPROVED
A	11/04/17	Design of newly proposed junction layout.	DM	CW	

SYSTRA JACOBS

Comhairle Contae Átha Cliath Theas South Dublin County Council

Údarás Náisiúnta Iompair National Transport Authority

DRAWN : CL	STATUS: Draft		PROJECT: Clonburris SDZ
CHECKED : CW	SCALE: 1:500@A3	DATE: April 2017	TITLE: Junction 12 Design - Signalised Junction
APPROVED : --	FORMAT: AutoCAD	CLIENT : South Dublin Co. Co.	
PROJECT MANAGER : --	This drawing must not be either loaned, copied or otherwise reproduced in whole or in part or used for any purpose without the prior written permission of SYSTRA Ltd.		DRAWING NO. 32106211\J12\A / REV. A



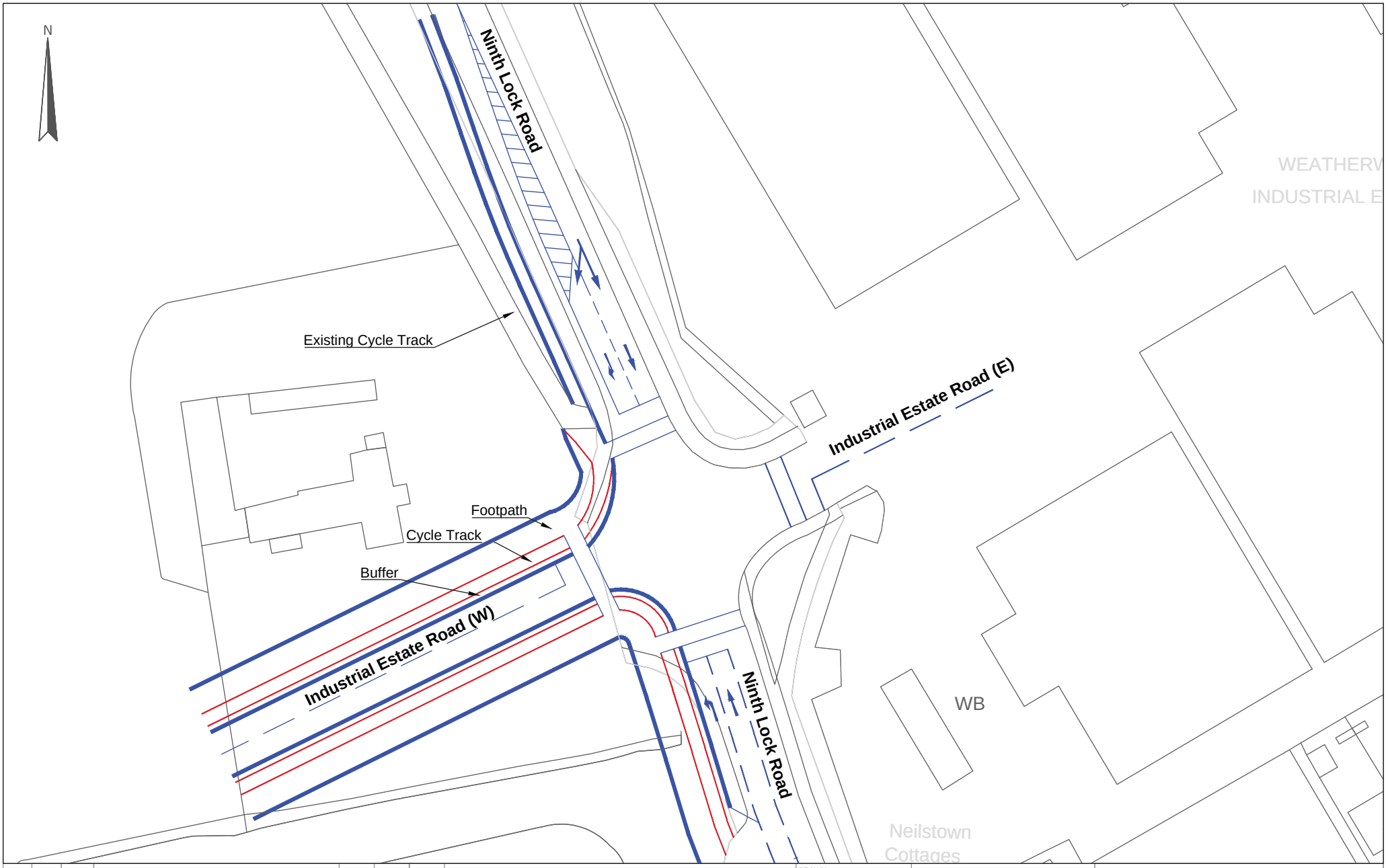
REVISION	DATE	DESCRIPTION	DRAWN	CHECKED	APPROVED
A	06/04/17	Design of newly proposed junction layout.	CL	CW	

SYSTRA JACOBS

Comhairle Contae Átha Cliath Theas South Dublin County Council

Údarás Náisiúnta Iompair National Transport Authority

DRAWN : CL	STATUS: Draft		PROJECT: Clonburris SDZ
CHECKED : CW	SCALE: 1:1000@A3	DATE: April 2017	TITLE: Junction 13 Design - Signalised Junction
APPROVED : --	FORMAT: AutoCAD	CLIENT : South Dublin Co. Co.	
PROJECT MANAGER : --		DRAWING NO. 32106211\J13\A	REV. A



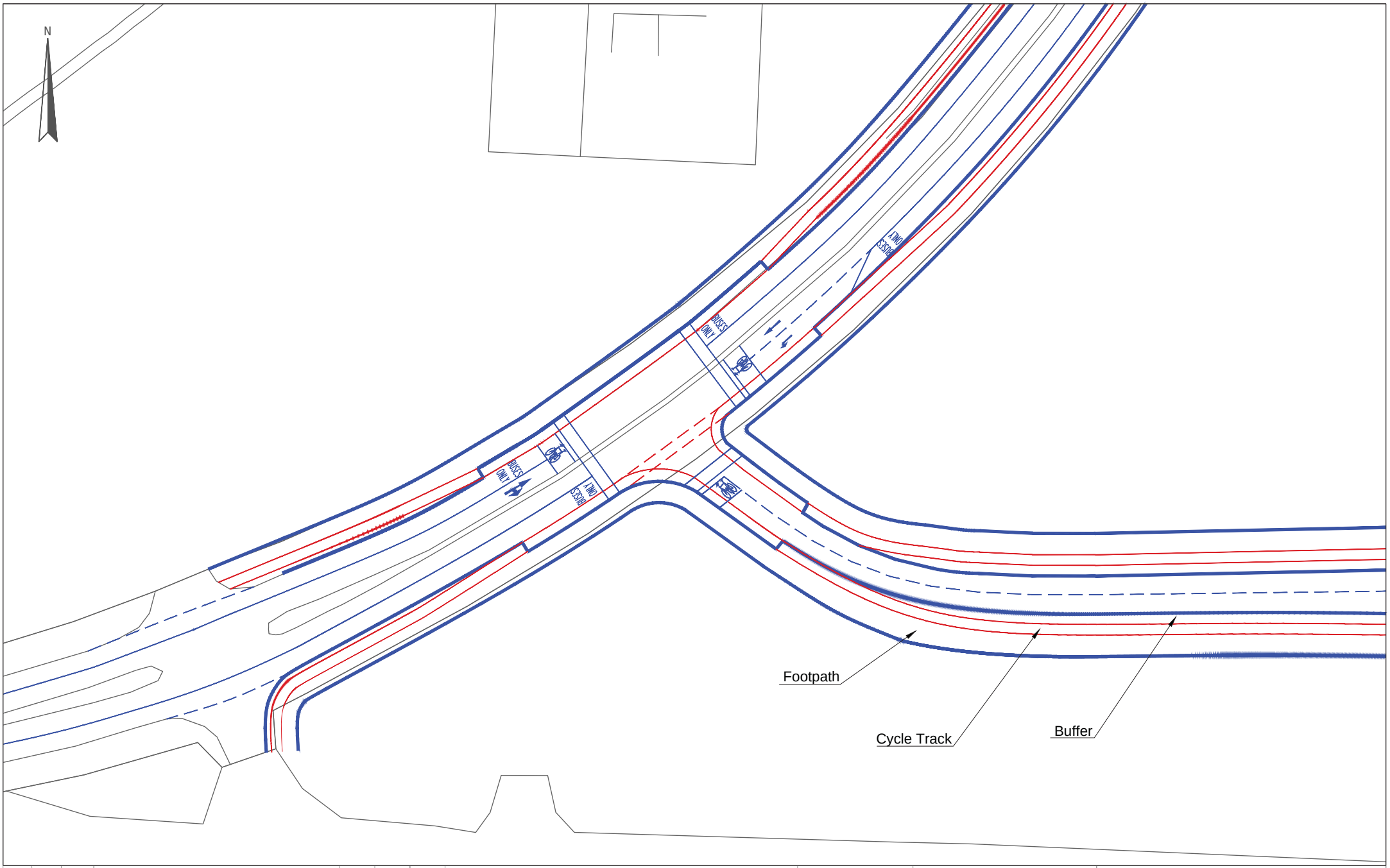
REVISION	DATE	DESCRIPTION	DRAWN	CHECKED	APPROVED
A	11/04/17	Design of newly proposed junction layout.	DM	CW	

SYSTRA JACOBS

Comhairle Contae Átha Cliath Theas South Dublin County Council

Údarás Náisiúnta Iompair National Transport Authority

DRAWN : DM	STATUS: Draft		PROJECT: Clonburris SDZ
CHECKED : CW	SCALE: 1:500@A3	DATE: April 2017	TITLE: Junction 14 Design - Signalised Junction
APPROVED : --	FORMAT: AutoCAD	CLIENT : South Dublin Co. Co.	
PROJECT MANAGER : --		DRAWING NO. 32106211\J14\A	REV. A



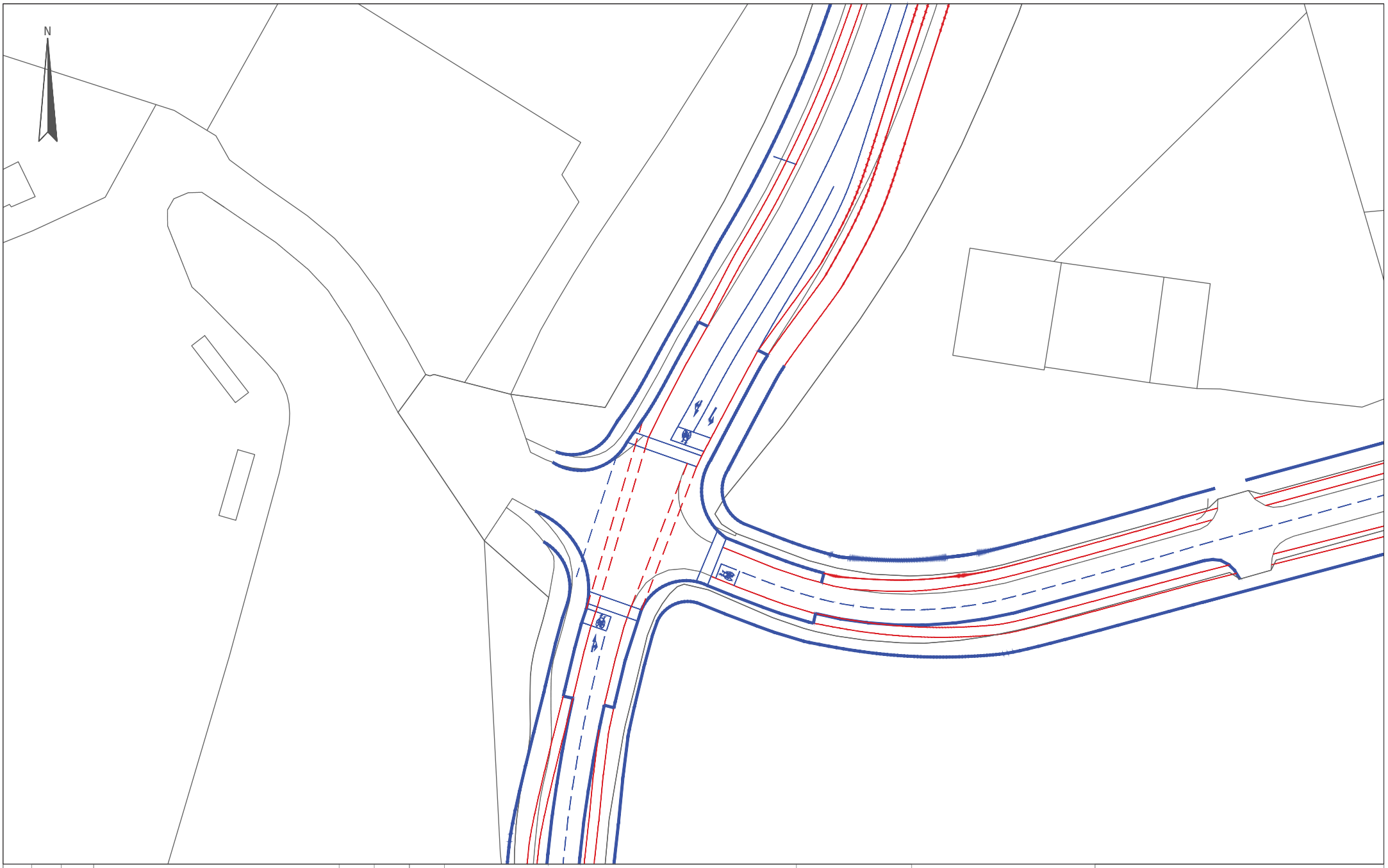
REVISION	DATE	DESCRIPTION	DRAWN	CHECKED	APPROVED
		Design of newly proposed junction layout.			

SYSTRA JACOBS

Comhairle Contae Átha Cliath Theas South Dublin County Council

Údarás Náisiúnta Iompair National Transport Authority

DRAWN : CL	STATUS: Draft		PROJECT: Clonburris SDZ
CHECKED : CW	SCALE: 1:1000@A3	DATE: May 2017	TITLE: Junction 15 Design - Signalised Junction
APPROVED : --	FORMAT: AutoCAD	CLIENT : South Dublin Co. Co.	
PROJECT MANAGER : --		DRAWING NO. 32106211\J15\A	REV. A



REVISION	DATE	DESCRIPTION	DRAWN	CHECKED	APPROVED

SYSTRA JACOBS

Comhairle Contae Átha Cliath Theas South Dublin County Council

Údarás Náisiúnta Iompair National Transport Authority

DRAWN : CL	STATUS: Draft		PROJECT: Clonburris SDZ
CHECKED : CW	SCALE: 1:1000@A3	DATE: May 2017	TITLE: Junction 16 Design - Signalised Junction
APPROVED : --	FORMAT: AutoCAD	CLIENT : South Dublin Co. Co.	
PROJECT MANAGER : --			DRAWING NO. 32106211\J16\A / REV. A

APPENDIX C GLOSSARY OF TERMS

Clonburris SDZ Transport Assessment Report Glossary of Terms

The following table provides a glossary of the main terminology utilised within the Clonburris SDZ TA Report.

Term	Description
Active Modes	Term used to describe walking and cycling modes of transport.
AM	Morning peak period covering the hours of 07:00 – 10:00
ARCADY	ARCADY is a software that models traffic capacity, queues and delays at roundabouts.
Assignment Models	The Road, Public Transport, and Active Modes assignment models receive the trip matrices produced by the FDM and assign them in their respective transport networks to determine route choice and the generalised cost for each origin and destination pair.
Boarding Penalty	Penalty applied to represent the discomfort of queuing to get on a PT Service
Bus queue jump	A queue jump is a type of roadway geometry used to provide preference to buses at intersections. It consists of an additional travel lane on the approach to a signalised intersection which is often restricted to buses only. A queue jump lane is usually accompanied by a signal which provides a phase specifically for buses within the queue jump. Buses in the queue jump lane get a "head-start" over other queued vehicles and can therefore merge into the regular travel lanes immediately beyond the signal. The intent of the lane is to allow the buses to cut to the front of the queue, reducing the delay caused by the signal and improving the operational efficiency.
Catchment	A catchment area for public transport can be defined as the vicinity of a stop or station of a public transport line. Moreover, this area is where most of the non- transferring passengers at the particular stop or station come from.
CDP	County Development Plan
Census Small Areas (CSA)	Small Areas are areas of population generally comprising between 80 and 120 dwellings created by The National Institute of Regional and Spatial Analysis (NIRSA) on behalf of the Ordnance Survey Ireland (OSi) in consultation with CSO. Small Areas were designed as the lowest level of geography for the compilation of statistics in line with data protection and generally comprise either complete or part of townlands or neighbourhoods. There is a constraint on Small Areas that they must nest within Electoral Division boundaries.

Term	Description
Commuting Trips	Travel to/from work
Congestion	Traffic congestion is a condition on transport networks that occurs as use increases, and is characterised by slower speeds, longer trip times, and increased vehicular queueing.
Demand Forecasting Model (NDFM)	The NDFM includes a set of models and tools that are used to derive levels of trip making (nationally) from planning data for input to each of the regional models.
Demand Management	Transportation demand management is the application of strategies and policies to reduce travel demand, or to redistribute this demand in space or in time. Example demand management measures can include parking restrictions, parking charges and road tolls.
DMURS	Design Manual for Urban Roads and Streets
DTTAS	The Department of Transport, Tourism and Sport
East Regional Model (ERM)	The ERM is a strategic multi-modal transport model representing travel by all the primary surface modes – including, walking and cycling (active modes), and travel by car, bus, rail, tram, light goods and heavy goods vehicles. It covers the area to the east of Ireland including the counties of Dublin, Wicklow, Kildare, Meath, Louth, Wexford, Carlow, Laois, Offaly, Westmeath, Longford, Cavan and Monaghan.
ERM zone connectors	Link connecting the centre of an ERM zone to the modelled transport network
Flare Lane	Where a carriageway widens on approach to a junction stop line to provide additional capacity e.g. where a 1 lane approach extends to 2 lanes for a short distance prior to the stop line.
GDA	Greater Dublin Area
Generalised Cost of Travel	The generalised cost is the sum of the monetary and non-monetary costs of a journey. Monetary costs might include a fare on a public transport journey, or the costs of fuel, wear and tear and any parking charge, toll or congestion charge on a car journey. Non-monetary costs refer to the time spent undertaking the journey. Monetary values are converted to time using a value of time figure, which usually varies according to the traveller's income and the purpose of the trip. Within the FDM all generalised costs are represented in generalised minutes.

Term	Description
Geographic Information Systems (GIS)	GIS is a computer software designed to capture, store, manipulate, analyse, manage, and present spatial or geographic data.
GFA	Gross Floor Area is the total floor area inside the building envelope, including the external walls, and excluding the roof.
Headway	Headway is the time interval between two public transport services.
Home Zones	A home zone is a living street (or group of streets) which are designed primarily to meet the needs of pedestrians, cyclists, children and residents and where the speeds and dominance of the cars is reduced.
Level of Service (LOS)	Level of Service is a qualitive measure used to assess the performance levels of traffic through a junction based on aspects such as speed, turn delay per vehicle etc.
LINSIG	LINSIG is a software tool which allows traffic engineers to model traffic signals and their effect on traffic capacities and queuing.
LT	Lunch time peak period covering the hours of 10:00 – 13:00
MMP	A Mobility Management Plan (MMP) is a package of measures implemented to manage travel demand from a development and support sustainable travel.
Mode and Destination Choice	An essential function of the ERM is to replicate the choice of mode and destination that a traveller will make when undertaking a journey for a particular purpose given that they will be travelling at a particular time of day (considering both outbound and inbound time periods).
Mode Share	Represents the proportion of people using the various available modes of travel i.e. car, public transport, walking and cycling.
MOVA	MOVA (Microprocessor Optimised Vehicle Actuation) is a traffic signalling system which optimises the performance of traffic signals in order to reduce queuing and delays.
National Trip End Model (NTEM)	NTEM derives trips by purpose associated with each Census Small Area based on various zonal attributes such as levels of employment, population etc.

Term	Description
NTA	National Transport Authority
Passenger Car Unit (PCU)	A Passenger Car Unit (PCU) is a method used in Transport Modelling to allow for the different vehicle types within a traffic flow group to be assessed in a consistent manner. Typically, a car would be equal to 1 PCU while a Heavy Goods Vehicle could have a PCU value of 2.5 - 3.
PM	Evening peak period covering the hours of 16:00 – 19:00
Practical Reserve Capacity (PRC)	PRC is used to assess signalised junction performance and is a measure of how much additional traffic can pass through a junction controlled by the stage stream whilst maintaining a maximum degree of saturation of 90% on all lanes. A positive PRC indicates that a junction has spare capacity and may be able to accept more traffic. A negative PRC indicates that the junction is over capacity and is suffering from traffic congestion.
PT	Public Transport
Quality Bus Corridor (QBC)	Quality Bus Corridors (QBC) are an initiative to give dedicated road space and traffic signal priority to buses in order to reduce journey times and improve service consistency.
Regional Modelling System (RMS)	The NTA has developed a Regional Modelling System for Ireland that allows for the appraisal of a wide range of potential future transport and land use options. The RMS includes 5 Regional Models which are focussed on the travel-to-work areas of major population centres (e.g. Dublin, Cork, Galway, Limerick, and Waterford). Also included is a National Demand Forecasting Model (NDFM) which generates future year demand and a suite of appraisal tools used to assess model results.
SDCC	South Dublin County Council
SR	School run peak period covering the hours of 13:00 – 16:00
Straight Line Interpolation	Straight Line interpolation involves estimating a new value by connecting two adjacent known values with a straight line
Strategic Development Zone (SDZ)	Strategic Development Zones are lands which have been designated by the Government for a fast track planning process, where the development of those lands is considered to be of strategic national importance.
The Full Demand Model	The FDM processes travel demand, carries out mode and destination choice, and outputs origin-destination travel matrices to the

Term	Description
(FDM)	assignment models. The FDM and assignment models run iteratively until an equilibrium between travel demand and the cost of travel is achieved.
TII	Transport infrastructure Ireland
Trip Distribution	Identifies where people are travelling to and from.
Trip End Integration	The Trip End Integration module converts the 24 hour trip ends output by the NDFM into the appropriate zone system and time period disaggregation for use in the Full Demand Model (FDM).
Trip Length Distribution	Analysis of the distance of trips made on the transport network by the available modes of travel.
Volume over Capacity (V/C)	The V/C of a highway link or junction is one of the principal factors influencing queues and delays. Strictly speaking, when the V/C is 100% it means that the traffic flow in vehicles has reached 100% of the design capacity of the link or junction. The latter is then considered to be 'saturated' and delays are then likely to occur.
Wait Time	Time spent waiting for a PT service at the stop etc.
Walk Time	Time taken to walk to the PT service which is then factored to represent the perceived discomfort
Zones	The area covered by each of the Regional Models is divided into model zones. The zone system for each regional model has been developed using strict criteria based on aspects such as the level of activity (travel demand), where future transport infrastructure is being considered, land-use types and allowing for separation along natural or divisional boundaries and DEDs