National Transport Authority

Clongriffin to City Centre CBC

Route Selection Report

CH2M Barry

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EXECUTIVE SUMMARY

General

CH2M Barry were appointed by the National Transport Authority to undertake the Feasibility and Options Report for the Clongriffin to City Centre CBC as identified in the Draft Transport Strategy for the Greater Dublin Area (2016-2035). This report details the route selection process for the Clongriffin to City Centre Core Bus Corridor Scheme, which is designed to full core bus corridor standards.

Scheme Objectives

The objective of the study is to identify a preferred route that, as far as reasonably practical, delivers the on-street infrastructure necessary to provide continuous priority for bus movements along the CBC. This will mean enhanced bus lane provision on the corridor, removing current delays in relevant locations and enabling the bus to provide a faster and more reliable alternative to car traffic along the route. This in turn will make bus transport a more attractive alternative for the travelling public. It will also make the bus system more efficient, as faster bus journeys means that more people can be moved with the same level of vehicle and driver resources.

In addition, it is a scheme objective to provide any cycle facilities along the route that are required under the Greater Dublin Area Cycle Network Plan (published by the NTA, 2013) to the target Quality of Service(s) specified therein and give further consideration to providing cycle facilities along sections of the route where they may not be expressly required under the Cycle Network Plan.

The Study Area

The Clongriffin to City Centre Bus Corridor Study Area runs from Clongriffin to the City Centre O'Connell Bridge - Eden Quay Junction. The study area was generally developed to include the main trip generators between the City Centre and Clongriffin either side of the central spine formed by the existing R105 & R107 route. The study area lies within the administrative area of Dublin City Council.

Route Options Assessment Process

A two-stage options assessment process was adopted.

At Stage 1 all feasible route options or links underwent a high-level assessment or 'sifting' process in order to assess its suitability and ability to provide for a CBC. This qualitative assessment evaluated each potentially viable route option in terms of ability to achieve the scheme objectives previously identified, and was based on professional judgement and a general appreciation of the existing physical conditions and constraints within the study area.

This assessment stage focused on high-level engineering and environmental constraints, comprising a desk study supplemented with site visits. The purpose of this assessment stage was to determine which route options were the most viable and should be considered for further detailed assessment. Following this any links which were disconnected or could not clearly form part of a CBC route were removed. The Preliminary

Route Assessment was then used to remove some route options that could be clearly demonstrated to be inferior to an adjacent viable route option.

Following the Stage 1 'sifting' assessment, shorter route options that passed the sifting process were assembled into coherent route options which connected the common nodes at extremities of each section of the study area. Initial indicative schemes for each route option were developed based on the specific constraints along a particular route, with a number of scheme options considered for particulalry constrained routes where required.

The indicative scheme for each route option was then progressed to 'Stage 2' of the assessment process Multi-Criteria Analysis (MCA) in accordance with the Department of Transport "Guidelines on a Common Appraisal Framework for Transport Projects published by the Department of Transport (DTTAS), March 2016.

The MCA considered Economy, Integration, Accessibility and Social Inclusion, Safety and Environment for each scheme indicative option. Each route option was comparatively assessed against sub-criteria under each of these main criteria and also in terms of performance against the study objectives. The scheme options were then ranked accordingly in order to identify the Emerging Preferred Route Option.

The Emerging Preferred Route

Based on the results of the analysis carried out as described in this report, an Emerging Preferred Route has been identified, as illustrated in Figure 0.1 and is described in the following paragraphs and in detail in Chapter 7.

Southbound: The emerging preferred route starts outside Clongriffin DART station, from here the bus travels along Clongriffin Main Street, including some parts that are not yet constructed to join the Malahide Road. The bus then continues south along the Malahide Road for 5.6 km until it reaches the junction with Marino Mart. Here the bus takes a right and continues straight along Marino Mart, Fairview, Annesley Bridge Road, North Strand Road and Amiens Street. The southbound bus circulates around the Custom House by travelling along Memorial Road and Custom House Quay

Northbound: The northbound route would follow the same route as the southbound routing except that it travels around the opposite side of the Custom House on Beresford Place.

Figure 0.1 Emerging Preferred Route

Concept Scheme Design

Bus lanes will be provided for the entire length of the scheme. Bus lanes will be constructed along Clongriffin Main Street in accordance with the LAP, these have already been constructed in some locations. A new junction will be constructed where Clongriffin Main Street meets Malahide Road and signals will provide priority for buses using the CBC route. Works on the junction with the R139 will allow for bus priority to be provided at the signals and increase provision for cyclists and pedestrians.

Further south along the Malahide Road existing bus lanes will be used and segregated cycle lanes will be provided by using existing verge space or by reducing the width of the median where appropriate. All signalised junctions along this route will be upgraded to provide enhanced bus priority and pedestrian/cycle facilities. The existing roundabouts at Artane and at Priorswood Road junctions will be upgraded to signalised junctions. Some commercial parking north of the junction with Kilmore Road will be affected, along with land take from gardens which would result in a reduction in parking capacity in approximately 10 gardens; parking for at least one car will still be possible in all of these gardens.

The Malahide Road will be widened to provide bus lanes on the sections where they do not currently exist, and new segregated cycle lanes will be provided for the whole length. Malahide Road is constrained for the section between Brian Road and Clontarf Road junctions, here cyclists in both directions will be diverted along Haverty Road and Brian Road. Southbound cyclists will be required to cross the road twice and two new toucan crossings will need to be introduced.

The section from Marino Mart along North Strand Road and Amiens Street as far as the Foley Street junction would generally follow the Clontarf to City Centre Cycle Scheme plans, which provides cycle and bus lanes in both directions. On-street parking/loading will be affected in places although it will be retained wherever feasible.

There is a pinch point on Amiens Street from the Foley Street to Sherriff Street junctions as the route passes under the DART bridge. The available cross section is limited in this section by the large piers supporting the bridge. Traffic signals will be used to hold northbound traffic in advance of the bridge and provide priority for northbound buses, dedicated bus lanes will be provided for southbound buses. Southbound cyclists will pass around the back of the piers with the construction of a new retaining wall and setting back of the existing railings. Northbound cyclists will have a dedicated cycle track on the inside of the existing piers, the existing parking/loading/taxi bay to the north of the bridge will be removed.

On Amiens Street, a southbound traffic lane will be removed for the section from Sheriff Street to the existing taxi rank outside Connolly Station and also from Store Street to Custom House Quay. A northbound traffic lane will be removed from Foley Street junction to the Beresford Place junction. The additional road space will be allocated to bus/cycle lanes and to increase the width of footpaths as this is a busy pedestrian area which currently has poor pedestrian facilities.

The existing taxi rank outside Connolly will be relocated to Harbourmaster Place. The existing time plated parking/loading in the northbound bus lane on Amiens Street will be removed.

Around the Custom House one lane of traffic will be removed from Memorial Place to allow for a southbound bus lane and one lane from the south-western side of Beresford Place which currently continues to Gardiner Street will be removed to allow for a continuous northbound bus lane. A two-way cycle route will be provided along the north quays in accordance with the Liffey Cycle Scheme.

Cost Estimate

A high-level cost estimate has been prepared based on the concept design for the scheme, which includes a number of assumptions regarding the scheme details. The estimated scheme infrastructure cost, which includes land acquisition and construction costs, is anticipated to be in the order of € 45-50 m.

Journey Time Benefits

Current journey times for the Dublin Bus 15 route, for the section which follows the emerging preferred route from Clongriffin to City Centre, can be seen to vary by as much as 60 % when comparing average peak and off-peak journey times. The variation in journey times is significantly more pronounced on the sections of the route which do not currently have dedicated bus lanes.

Similarly, comparing the average speed of buses during peak and off-peak times it can be seen that the average speed for buses along the route is considerably higher during off-peak times, in uncongested conditions compared to the lower speeds attained by the bus during peak times.

The journey times outside of peak hours, when traffic volumes are lower, are likely to be reflective of the journey times which could be achieved by a combination of improved bus priority, better enforcement of bus lanes and cashless fares. The current off-peak journey times average between 37 and 23 minutes.

Based on the above, a conclusion can be drawn that by improving the provision of bus lanes along the route (coupled with the introduction of cashless fares) the risk of turbulence to buses would be significantly reduced, allowing the buses to move along the route quicker and with more consistent journey times. The extent of these benefits will be confirmed and quantified at the next design stage.

Next Steps

This report has identified an emerging preferred route for the bus infrastructure along this Core Bus Corridor for which a concept design has been developed.

The next project stage (the development of a Preliminary Design) will further refine and update the initial concept design along the route. Further account will be taken of likely public transport service levels, particularly the bus service patterns and any changes to the overall bus network which may arise from the separate bus network review process. The proposals will be amended, if and as required, to integrate any resultant changes. The Preliminary Design will define the final practically achievable scheme for the CBC, considering more detailed studies of constraints, impacts and environmental assessment required at a local level.

Prior to finalisation of the CBC scheme design, a public consultation process will be undertaken, with inputs and feedback received incorporated where practical and appropriate to do so.

This Preliminary Design will form the basis of the planning consent process for the scheme, which will require a development consent application to be made directly to An Bord Pleanála, due to the nature and extent of the proposed works.

1 INTRODUCTION & BACKGROUND

1.1 Preamble

The purpose of this Route Selection Report is to identify an Emerging Preferred Route for the Clongriffin to City Centre CBC as identified in the Transport Strategy for the Greater Dublin Area 2016-2035 (NTA 2015). The CBC network represents the most important bus routes in the region, and are generally characterised by a high frequency of bus services, high passenger volumes and with significant trip attractors located along the route. The identified core network comprises sixteen radial bus corridors, three orbital bus corridors and six regional bus corridors. High quality bus corridors will reduce journey times and encourage modal shift away from private car including for work commuting trips and promote economic development.

An objective of the Transport Strategy for the Greater Dublin Area (GDA) is to develop the Core Bus network to achieve, as far as practicable, continuous priority for bus movement on the portions of the Core Bus Network within the Metropolitan Area. This will mean enhanced bus lane provision on these corridors, removing current delays on the bus network in the relevant locations and enabling the bus to provide a faster alternative to car traffic along these routes, making bus transport a more attractive alternative. It will also make the overall bus system more efficient, as faster bus journeys means that more people can be moved with the same level of vehicle and driver resources.

The Clongriffin to City Centre Corridor Study Area runs from Clongriffin DART station to the City Centre at the O'Connell Bridge - Eden Quay Junction. The corridor is within the administrative area of Dublin City Council. The Radial Core Bus Network as identified in the GDA Transport Strategy is illustrated in Figure 1.1, with the Clongriffin to City Centre CBC highlighted. This report presents the results of the various studies and surveys undertaken, details all feasible scheme options, reports on the option assessment process and proposes an Emerging Preferred Route.

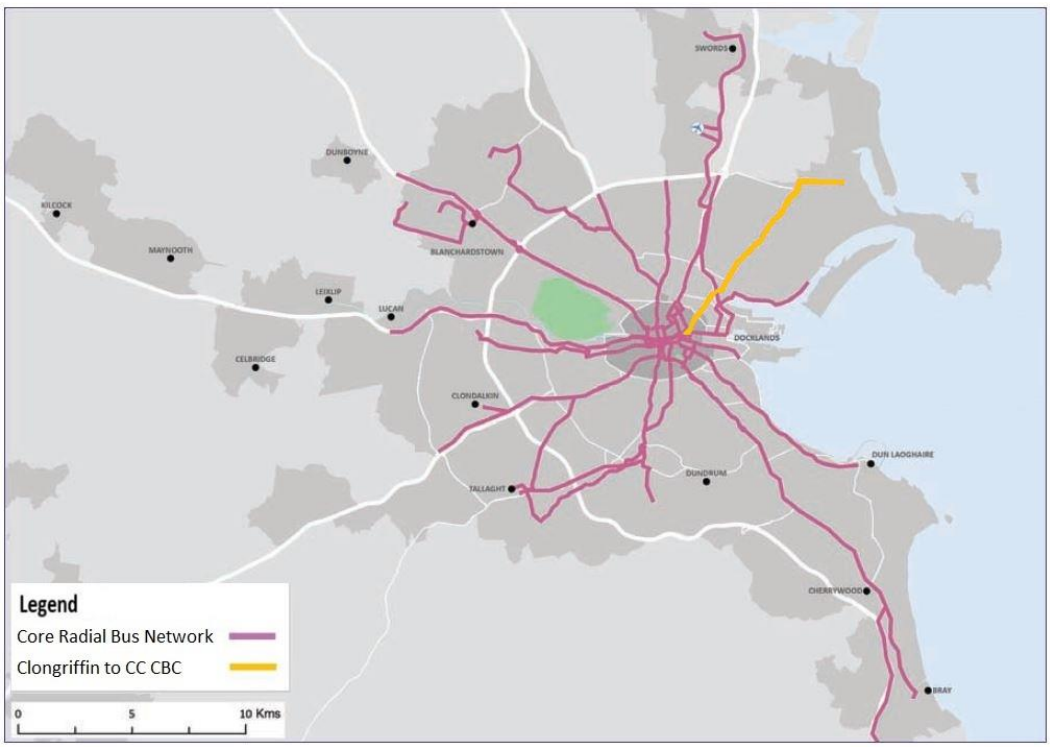


Figure 1.1 Radial Core Bus Networks

1.2 Report Structure

This report is structured as follows:

- **Chapter 2** – This chapter outlines the general background information to the project and the proposed CBC network. It also outlines the policy context in which the CBC was developed and presents the concept of the CBC network as outlined in the Transport Strategy for the Greater Dublin Area 2016-2035 (NTA 2015). The objectives for the CBC scheme are also set out. In addition, any other transport policies relevant to the CBC network are presented.

- **Chapter 3** – In this chapter, the study area for the Clongriffin to City Centre CBC is detailed and divided into two distinct sections. Scheme specific constraints and opportunities are discussed. The integration of the scheme with existing and planned transport networks is considered, along with considerations of the scheme for other road users.

- **Chapter 4** – The assessment methodology for identifying the Emerging Preferred Route is outlined in this chapter. This includes:

  - Stage 1 Options Assessment Sifting Stage: development of the "spider's web" for each of the two study area sections and the criteria for selecting or deselecting plausible link options, based on previously defined project objectives (Sifting Process)
  - Stage 2 Options Assessment Detailed Assessment: Development of schemes for each study area section (comprising of coherent links which passed through the Stage 1 analysis). Each of these schemes are then subjected to a Multi-Criteria Analysis (Detailed Assessment)

- **Chapters 5 & 6** – These chapters detail the Emerging Preferred Route selection process, for Sections 1 and 2 respectively, through Options Assessment Stage 1 and Stage 2 analysis.

- **Chapter 7** – This chapter gives the overall conclusions of the scheme options assessment process and identifies and describes the Emerging Preferred Route.

- **Chapter 8** – This chapter details the "next steps" in the delivery of the project.

2 TRANSPORT CONTEXT & SCHEME OBJECTIVES

2.1 Introduction

This chapter sets out the transport planning and policy framework within which the Clongriffin to City Centre CBC is being developed. It also details the relevant planned developments within the core study area which have been considered as part of the feasibility and options identification stage.

2.2 Transport Strategy for the Greater Dublin Area 2016-2035

Published by the NTA, the Transport Strategy for the Greater Dublin Area 2016 – 2035 report lays out a strategy for planning and delivery of transport infrastructure in the GDA over the next twenty years. The main relevant chapters of this report relate to the identification of the core bus network. This core bus network consists of sixteen radial bus corridors, three orbital bus corridors and six regional bus corridors.

Of these identified bus corridors, the ones relevant to this Clongriffin to City Centre CBC are:

- Clongriffin – Artane – Fairview;
- Ringsend – Pearse St
- Clongriffin to Tallaght BRT

2.3 Integrated Implementation Plan 2013-2018

The Integrated Implementation Plan 2013 – 2018 was published by the National Transport Authority in 2014. The plan sets out a transport infrastructure investment programme. It includes the main objectives and outputs of the NTA over the period of the plan. In addition, it describes the actions necessary to "ensure the effective integration of public transport infrastructure over the period of the Plan".

In relation to bus investment – the report outlines the key objective of improving "bus priority for bus transport to ensure that the bus has the journey time advantages that it needs to compete effectively with the private car".

This report identified the need to further develop the quality bus network in the Greater Dublin Area so as to achieve:

"….as far as practicable, continuous inbound priority and the maximum possible outbound priority on key bus routes into Dublin City Centre"

2.4 Greater Dublin Area Cycle Network Plan

The National Transport Authority adopted and published the Greater Dublin Area Cycle Network Plan (GDA CNP) in 2014. The purpose of the plan was to establish the extent of the existing cycle infrastructure and facilities in the Greater Dublin Area and to set out a strategy to develop an integrated cycle network for the future.

Within the GDA CNP, primary, secondary, feeder and greenway cycle routes were identified. A number of these routes lie within the core study area of the Clongriffin to City Centre CBC. In accordance with the GDA CNP, any upgrade to bus infrastructure which runs along any of the cycle routes must provide cycle infrastructure to the appropriate level (described in the NTA National Cycle Manual). If appropriate cycle infrastructure cannot be provided along the CBC route (which also runs along an identified cycle route), alternative routes for cyclists, to the appropriate standard provided on parallel / alternative streets should be identified.

2.5 Development Plan, Local Area Plans and Strategic Development Zones

The Development Plans state that the Emerging Preferred Option design for the scheme shall fully integrate with or have consideration for planned development in the environs of the core study area. These are identified as:

- General Plans
  - Transport Strategy for the Greater Dublin Area 2016-2035
  - The Dublin City Development Plan 2016-2022
  - The Clongriffin-Belmayne (North Fringe) Local Area Plan 2012-2018
  - Dublin City Centre Transport Study (2016)
  - Bus Rapid Transit Core Dublin Network (2012)
  - Fairview Marino Local Environment Improvement Plan 2014-2017
  - Georges Quay Local Area Plan 2012
- Transport Schemes
  - LUAS Cross City
  - Swords to City Centre BRT
  - Dublin Bus Network Redesign
  - DART Underground
  - Proposed Metro North
  - CBC Ringsend
- Cycling
  - GDA Cycle Network Plan
  - Liffey Cycle Scheme
  - Royal Canal Greenway
  - Clontarf to City Centre Cycle Route

2.6 CBC Concept

The Core Bus Network is identified in the Transport Strategy for the Greater Dublin Area 2016-2035 report by the National Transport Authority. This network represents the most critical bus routes in the Greater Dublin Area. Critical in this sense is defined as bus routes with high frequency of services, coupled with high passenger volumes and significant trip attractors along the route. The Core Bus Network comprises of sixteen radial bus corridors, three orbital corridors and six regional corridors, one of which is the Core Bus Corridor.

One of the main purposes of the Core Bus Network is to serve certain destinations and trip attractors/generators in the Greater Dublin Area, with a particular emphasis on locations which are not served by light rail or rail. Convenient interchange with other transport modes, such as rail, is also an objective of this Core Bus Network. The main focus of the Core Bus Network will be to "achieve, as far as practicable, continuous priority for bus movement on the portions of the Core Bus Network within the Metropolitan Area". This will be achieved by the removal of current delays on the bus network and the enabling of bus services to provide a more attractive service than car travel.

2.7 Objectives of CBCs

The National Transport Authority (NTA) have identified the following objectives for the Clongriffin to City Centre CBC:

- Deliver the on-street infrastructure necessary to provide continuous priority for bus movements along the Core Bus Corridor. This will mean enhanced bus lane provision on the corridor, removing current delays in relevant locations and enabling the bus to provide a faster alternative to car traffic along the route, making bus transport a more attractive alternative for road users. It will also make the bus system more efficient, as faster bus journeys means that more people can be moved with the same level of vehicle and driver resources; and

- Provide any cycle facilities along the route that are required under the Greater Dublin Area Cycle Network Plan (published by the NTA, 2013) to the target Quality of Service(s) specified therein and to give consideration to further providing cycle facilities along sections of the route where they may not be expressly required under the Cycle Network Plan.

2.8 Design Principles

2.8.1 Cross Sections

The following widths for the various components of the route cross section are assumed, dependent upon available width:

- 3.0m to 3.25m CBC lane
- 2.0m Footpath
- 1.75m to 2.5m Cycle Track
- 3.0m to 3.25m traffic lane
- 2.8m minimum for turning lanes

The cross-sections used for individual route options are detailed within the scheme descriptions discussed in Chapters 5 & 6.

2.8.2 Bus Stops

In general, the locations of existing Dublin Bus stops will be retained. However, each bus stop location has been reviewed and where appropriate bus stops will be relocated to reduce conflict between bus passengers and cyclists and/or to increase the population and employment catchments. In cases where two or more existing bus stops are provided in close proximity their locations will be rationalised to reduce delays to buses. The type of bus stop used is suited to the individual conditions at each bus stop location.

3 STUDY AREA

3.1 Introduction

In this chapter, the study area for the Clongriffin to City Centre CBC is detailed. Scheme specific constraints and opportunities within the Study Area are discussed, and the potential for integration of the scheme with existing and planned transport networks is considered, along with considerations of the scheme for other road users.

3.2 Study Area

The Clongriffin to City Centre Core Bus Corridor Study Area runs from Clongriffin to the City Centre at Custom House Quay. The study area was generally developed to include the main trip generators between the City Centre and Clongriffin either side of the central spine formed by the existing Malahide Road (R107) route as illustrated in Figure 3.1. The study area lies within the administrative area of Dublin City Council.

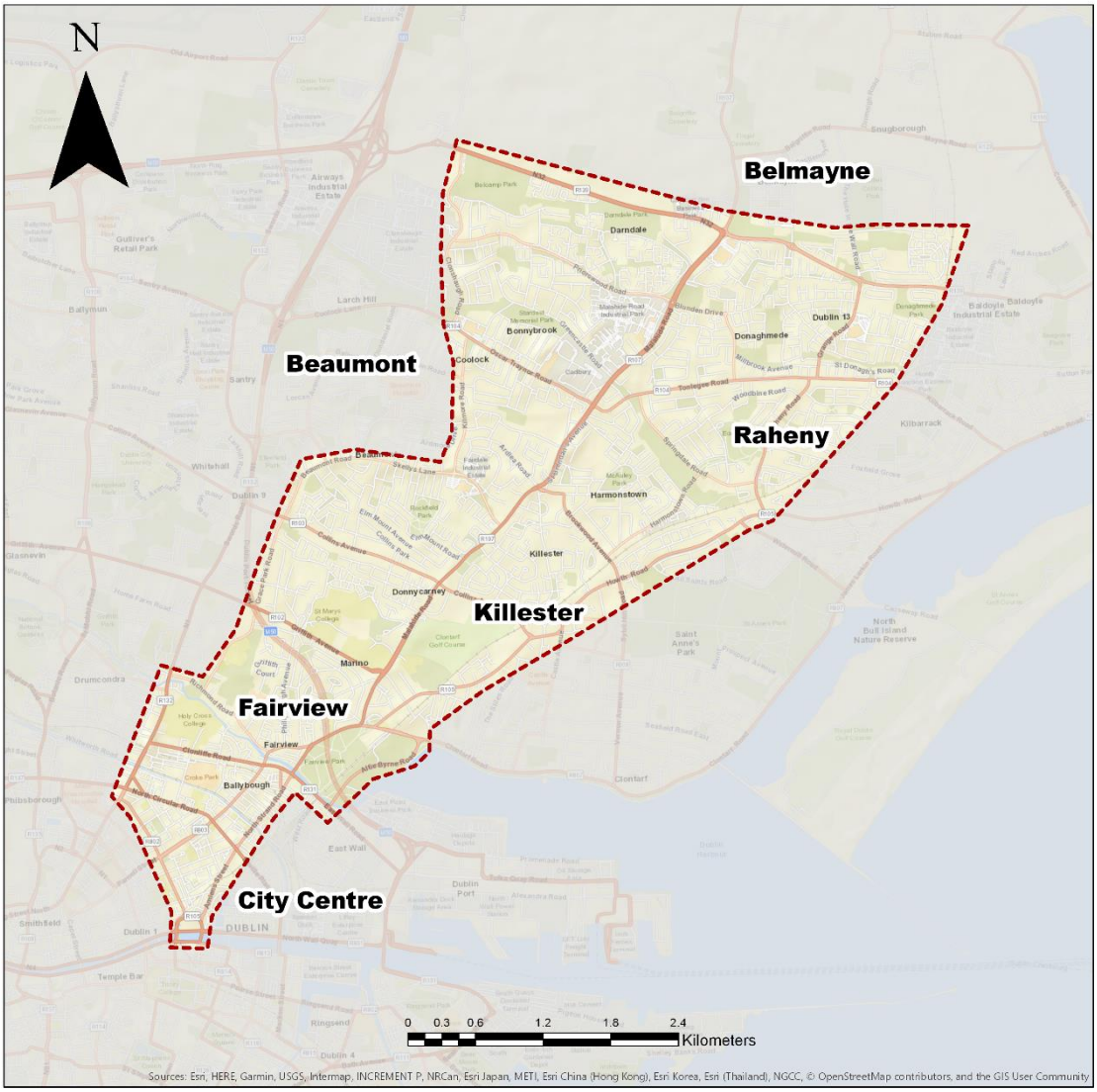


Figure 3.1 Study Area

The Study Area was split into two smaller sections, as shown by **Figure 3.2** below:

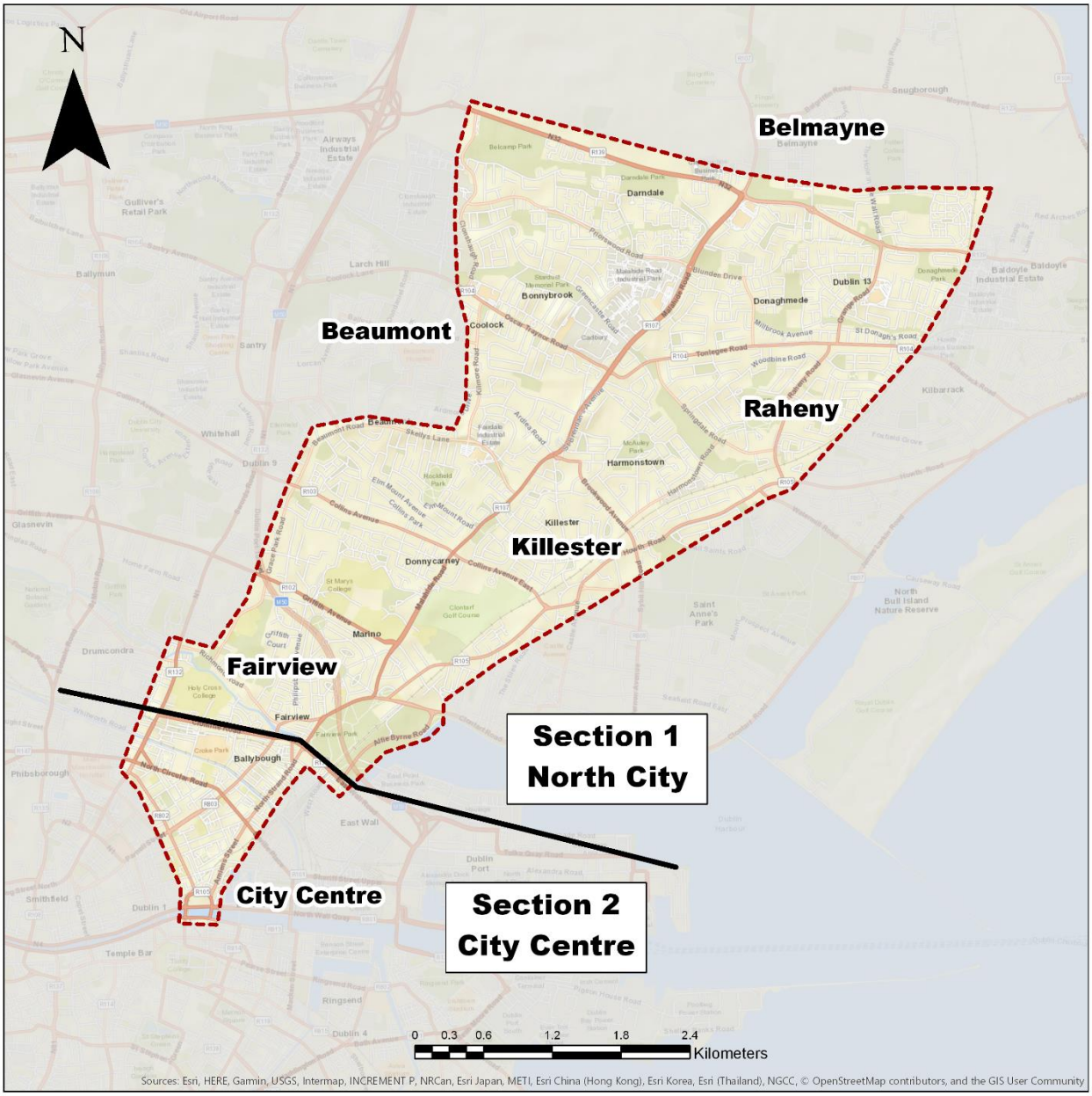


Figure 3.2 Study Area Sections

The southern terminus for the CBC is identified as O'Connell Bridge, as it can be reasonably assumed to represent Dublin City Centre, with a terminus at this location serving the main trip attracters associated with the city centre area. Any routes which terminate on here can travel along the Quays to connect to another outbound CBC.

The Northern Terminus location is discussed and assessed later in Chapter 5.1

3.3 Physical Constraints & Opportunities

There are a number of features in the natural and built environment within the study area which constrain scheme options or provide opportunities for enhanced integration. These are considered within the scheme assessment process and include the following:

- River Liffey, River Tolka and The Royal Canal (limited options for crossing restricts design options)
- Public transport infrastructure such as DART, LUAS, Dublin Bus and Irish Rail
- Planned and committed developments including Belmayne/Clongriffin LAP
- Trees and other natural and ecological features including rivers and streams
- Architectural, archaeological and heritage sites and features
- Protected structures adjacent to the route
- Existing urban and sub-urban roads and street networks
- Limited availability of land in urban and suburban areas.

3.4 Integration with Existing and Proposed Public Transport Network

An objective of the Clongriffin to City Centre CBC is to improve interchange between different modes of transport within the study area, including current transport infrastructure and future transport plans. Route options within the study area have been developed, in as far as is practical, to enhance interchange with these existing and future transport services which include:

- DART stations
- Existing Dublin Bus services at numerous locations along the route.
- LUAS
- Greater Dublin Area Cycle Network Plan (GDACNP)
- Future public transport proposals such as DART Interconnector and Metro North

3.5 Compatibility with Other Road Users

Consideration of other road users is a key component of the CBC scheme and the scheme objectives refer specifically to cyclists and pedestrians.

It is proposed to provide on-street cycle facilities as required under the Greater Dublin Area Cycle Network Plan (published by the NTA, 2013) to the target Quality of Service(s) specified therein.

In addition, pedestrian connectivity and permeability to high trip generating locations shall be considered in the assessment of route options.

Where practical, segregated facilities shall be provided for pedestrians and cyclists. In cases where it is deemed impractical to achieve this, these facilities will be provided along a suitable alternative route.

Traffic flow and access routes will be maintained along the route where practical. However, inevitably, there will be a negative impact on traffic capacity along the CBC route (this is as a result of reallocation of sections of road to bus and cycle lanes, enhanced priority for buses, improved pedestrian and cycle infrastructure at junctions and the implementation of turning restrictions). However, this reduction in the carrying capacity of the roads along the CBC route is offset by the positive impacts of the scheme such as increased quality of bus service and increased total trip capacity.

4 ASSESSMENT METHODOLOGY

4.1 Introduction

This chapter of the report details the methodology that was used as part of the Clongriffin to City Centre CBC Route Options Assessment. This methodology seeks to determine the optimum route and scheme design for this CBC. It assessed and compared alternative options under various criteria including a comparison of the environmental effects.

4.2 Assessment Process

The assessment methodology for identifying the Emerging Preferred Route is outlined in this chapter. A two-stage assessment process is utilised which comprised:

- Stage 1 Route Options Assessment ('sifting') which includes development of a "spider's web" for each of the two study area sections of potential route options and appraisal of these potential route options at a high level in terms of their ability to achieve the project objectives;
- Stage 2 Scheme Options Assessment: Comparison of each viable scheme option for each of the study area sections using a Multi-Criteria Analysis to determine the Emerging Preferred Route.

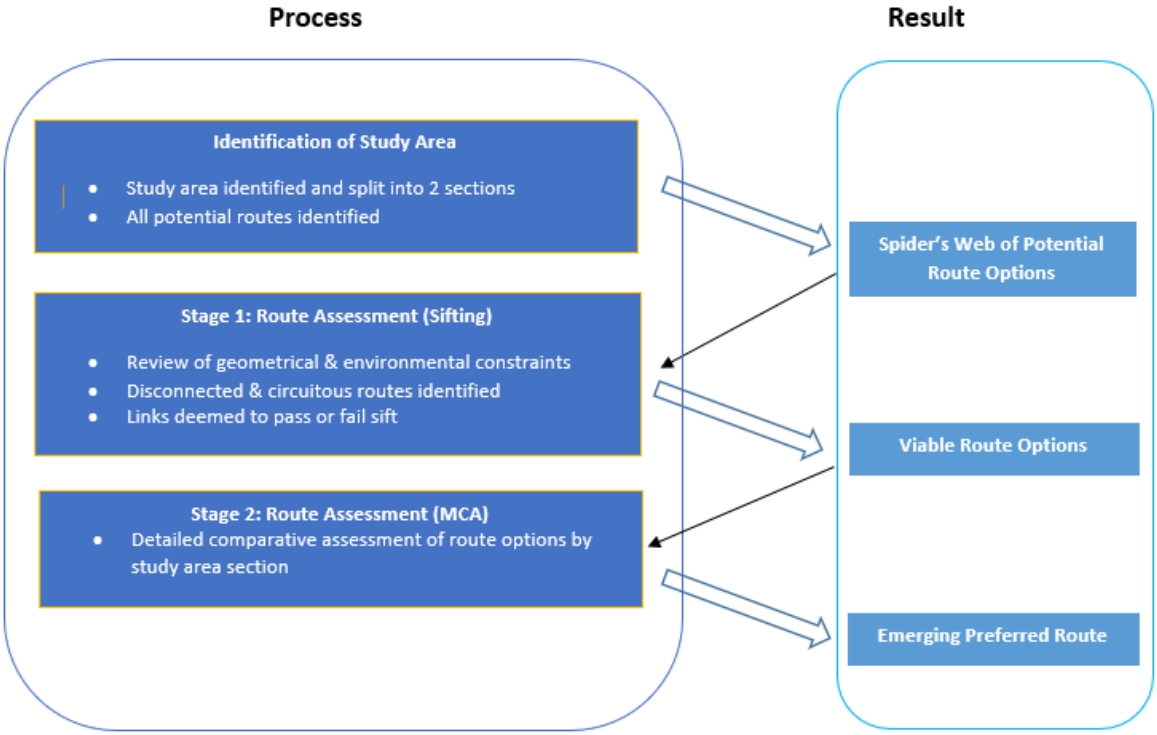


Figure 4.1 Assessment Process

4.3 Stage 1: Route Options Assessment

4.3.1 Spiders Web Development

An initial 'spiders-web' of potential route options that could possibly accommodate a CBC service was identified for each study area section. This 'spider's-web' of route options was chosen with reference to the CBC system characteristics and in order to meet the scheme objectives.

Initial route options identified also took cognisance of the physical constraints and opportunities present and the ability to integrate with other public transport modes. Of particular relevance in developing the spider's-web was the potential for the road or route sections to facilitate fast and reliable journey times and thereby be able to practically accommodate CBC lane priority.

Any road carrying an existing Dublin Bus service as well as any other plausible routes were included in the spider's web. Cul-de-sacs and narrow residential roads were discounted at this stage. This was an iterative process and after completing each stage it was often necessary to revisit the previous stages to ensure the logic and decision-making process remained consistent, and it was also necessary to occasionally look forward to ensure that no viable route options were discounted.

4.3.2 Sifting Process

All links identified as part of the spider's web underwent a high-level qualitative assessment based on professional judgement and general appreciation for existing physical conditions/ constraints within the study area. This was based on a desktop study, using data collected in the data collection process and site visits. This exercise identified links that would either not achieve the scheme objectives or would be subject to significant cost and/or impact to achieve these objectives (e.g. excessive land-take).

This assessment stage focused on engineering constraints together with a desktop study, identifying geometrical constraints, high level environmental constraints and population/employment densities. Assessment indicators used were as follows:

- land take assessment, in particular impacts on residential front gardens,
- pinch points along the link,
- presence of existing bus lanes and cycle facilities,
- junctions and their ability to accommodate measures to enhance bus priority,
- functionality of the street – impact on-street parking and loading, availability,
- high level environmental constraints,
- high level population and employment catchment analysis,
- high level integration with the land use and transport plans

Links that did not address the scheme objectives or were considered "un-deliverable" were deemed to fail the first sifting stage and were not progressed. Links that did meet the objectives and could be delivered were brought forward to the next stage.

Following is the list of data collected and considered for the Sift Assessment:

- Background Mapping OS Tiles
- Central Statistics Office (CSO) Data
- RAPID Areas & Deprived Geographic Index (Source: https://www.pobal.ie.)
- Environmental information (Source: http://map.geohive.ie)
- LUAS Cross City Drawings
- Swords to City Centre & Blanchardstown to UCD BRT General Arrangement drawings
- Land Use Zones & SDZs part of Development Plans & Local Area Plans
- AVL Data for relevant bus routes
- AVL Journey Time Variance Data
- General Arrangement drawings for Greenhills, Rathfarnham & Ringsend CBCs
- Dublin City Council City Centre Traffic Management Scheme Proposals
- Greater Dublin Area Cycle Network Plan

4.3.3 Removal of Disconnected Links

In this step, links that were disconnected or could clearly not form part of a Clongriffin to City Centre CBC route were discounted.

4.3.4 Preliminary Route Assessment

Following the Sift the remaining links were assembled into longer route options that span each study area section. Route options were assessed against the study objectives under the following criteria:

- Route length & directness
- Number of junctions
- Number of turning movements
- Level of bus priority practically achievable
- Potential negative impacts (requirement for land take, removal of on-street parking, etc)
- Requirement for split running (route options where inbound and outbound bus routes are separated by a large distance are not desirable)
- Walking distance to major trip attractors and areas of high residential/employment density

Based on these criteria, if a route option is shown to be considerably less favourable than an adjacent viable route option then it is discounted at this stage.

4.4 Stage 2: Multi Criteria Analysis

All route options that progressed to this stage were compared against one another using a detailed Multi-Criteria Analysis in accordance with the Department of Transport Document “Common Appraisal Framework for Transport Projects and Programmes”

Each scheme was comparatively assessed against the study objectives using the KPIs and method of measurements identified below. The scheme options were then ranked accordingly in order to identify the Emerging Preferred Route Option.

In accordance with the Department of Transport “Guidelines on a Common Appraisal Framework for Transport Projects”, the multi-criteria analysis considered Economy; Integration; Accessibility and Social Inclusion; Safety and Environment. The ‘Physical Activity’ criterion has not been assessed as it is considered that all route options will promote physical activity equally and as such this criterion is not considered to be a differentiator between route options.

The assessment criteria are detailed below in the table following:

Table 4.1 Assessment Criteria

Assessment Criteria		Sub-Criteria
1	**Economy**	1.a. Capital Cost
		1.b. Journey-time Reliability and Consistency
2	**Integration**	2.a. Land Use Integration
		2.b. Residential Population and Employment Catchments
		2.c. Public Transport Network Integration
		2.d. Traffic Network Integration
		2.e. Cyclists and Pedestrian Integration
3	**Accessibility and Social Inclusion**	3.a. High Volume Trip Attractors
		3.b. Deprived Geographic Areas
4	**Safety**	4. Road Safety
5	**Environment**	5.a. Archaeological, Architectural and Cultural Heritage
		5.b. Flora and Fauna
		5.c. Soils and Geology
		5.d. Hydrology
		5.e. Landscape and visual
		5.f. Noise, Vibration and Air
		5.g. Land Use and the Built Environment

4.4.1 Economy

4.4.1.1 Capital Cost (1.a.)

The capital cost of a scheme is comprised of the estimated infrastructure costs and the required land acquisition costs. These costs are normalised to per-kilometre rates for the purpose of comparison of one scheme with another.

1.a.i Indicative Infrastructure Cost Estimate

The infrastructure cost estimate determines the likely capital infrastructure cost of a particular scheme, taking into account the extent of works required in order to construct that scheme and achieve the route objectives. The infrastructure costs include the following:

- Road re-alignment / new road construction
- Junction upgrades
- Drainage
- Services and utilities protection and relocation work
- Lighting
- Modification to existing structures or any new structures required
- Bus priority infrastructure (upgrading of existing infrastructure or provision of new infrastructure)
- Construction traffic management
- Pedestrian and Cycle route infrastructure

Corridor sections (between junctions)

Construction cost estimates for corridor sections (between junctions) have been categorised as minor, or major. Minor works have been assumed where significant road widening is not anticipated, for example along sections of a route where bus and cycle infrastructure is already provided, or along sections where significant widening is geometrically constrained. For all other sections requiring significant road widening major works have been assumed.

A further detailed assessment has been carried out for all the roads falling under major works and specific units cost rates have been worked out for the majority of the roads, which is detailed in Table 4.3.

For each route option, the length of the route requiring either the minor or major works category has been calculated and multiplied by the relevant cost rate to derive the cost estimate for the route.

Table 4.2 Cost Per Km Assumptions

Construction Category	Construction Works Assumptions	Cost Rate (€/km)
Minor	Minor Works: • Local improvements to bus lanes; • New sections of paths where necessary; • New sections of cycle paths where necessary; • New or upgraded bus stops where necessary, including provision of Real Time Passenger Information (RTPI) and bus shelters;	€750,000

	• Kerb improvement locally (removal and replacement); • Footpath improvement locally (breaking out/additional concrete) including tactile paving and dished kerbs • Road resurfacing locally (milling/reinstatement or overlay) • Road markings (non-destructive removal of existing road markings): and • Signage (removal/relocation/replacement of existing and/or installation of new)	
Major	Roadway widening (including boundary works): • General site clearance (street furniture removal/relocation, etc); • Services protection /relocation/ diversion (power supply, communications, water, gas); • Drainage works (removal of and installation of new drainage systems); • New or upgraded bus stops where necessary, including provision of Real Time Passenger Information (RTPI) and bus shelters; • Earthworks (embankment treatments, retaining walls, slopes regrading, etc); • Pavement full depth reconstruction; • Kerbs footways and paved areas (removal and new); • Road markings (non-destructive removal of existing road markings, new road markings); • Signage (removal /relocation /replacement of existing and/or installation of new); • Road lighting (replacement, cabling, ducting); • Landscaping works (top soiling, fence, trees relocation, hedges, road margins Re-grading etc); • Property boundary reinstatement works (walls, gates, driveways landscaping etc).	€3,750,000
Major	New Construction in green field site (including boundary works): • General site clearance • Services protection /relocation/ diversion; • Drainage works (installation of new drainage systems); • New bus stops where necessary, including provision of Real Time Passenger Information (RTPI) and bus shelters; • Earthworks (embankment treatments, retaining walls, slopes regrading, etc); • Pavement full depth construction; • Kerbs footways and paved areas; • Road markings • Signage • Road lighting • Landscaping works (top soiling, fence, trees, hedges etc);	€4,200,000

	• Property boundary works (walls, gates, driveways landscaping etc).	
Major	Partially completed road works (Including boundary works): • Drainage works (any outstanding works); • New bus stops where necessary, including provision of Real Time Passenger Information (RTPI) and bus shelters; • Earthworks (embankment treatments, retaining walls, slopes regrading, etc); • Pavement full depth construction; • Kerbs footways and paved areas; • Road markings • Signage • Road lighting • Landscaping works (top soiling, fence, trees, hedges etc); • Property boundary works (walls, • gates, driveways landscaping etc). • Property boundary reinstatement works (walls, gates, driveways landscaping etc).	€2,000,000

Table 4.3 Cost Per Km Assumptions for Cycle route

Description	Cost per km
Offline Cycle route along Fairview (signing and lining)	€800,000

The likely scale of construction works required at junctions have been identified for each route and categorised as minor, moderate, major or extensively major as per **Table 4.4** below.

Table 4.4 Junction Cost Assumptions

Construction Category	Construction Works Assumptions	Cost Rate (€/km)
Minor	Minor Works: Modifications to existing signal controlled junctions to: • introduce bus priority (i.e. changing method of control, etc), without significant alteration to their existing geometry and layout: • Road markings (non-destructive removal of existing road markings, new road markings); • Anti-skid surface; • Signage (removal/relocation/replacement of existing and/or installation of new); • Dished kerbs and tactile paving; • Additional signal poles/heads; • Modifications to the signal controller and associated traffic signal installation works (including electrical); and • Additional loop detectors.	€97,500
Moderate	Upgrading existing minor/major junctions to signal control junctions, without significant alteration to their existing geometry and layout (excluding boundary works): • Kerbs improvement locally (removal and new); • Footpaths improvement locally (breaking out and new); • Road markings (non-destructive removal of existing road markings, new road markings); • Signage (removal/relocation/replacement of existing and/or installation of new); • Anti-skid surface; • Dished kerbs and tactile paving; • New signal poles/heads; • New traffic signals ducting, cabling and chambers; • New signal controller and associated traffic signal installation works (including electrical); • New loop detectors; • Services protection/relocation/diversion (power supply, communications); • Limited earthworks; • Localised pavement reconstruction; and • Localised road lighting improvements (relocation, cabling, ducting).	€325,000

Major	Significant modifications to existing signal controlled junctions including upgrading of roundabouts to signal controlled junctions, including: • General site clearance (street furniture removal/relocation, etc); • Services protection/relocation/diversion (power supply, communications cables, water, gas); • Drainage works (removal of and installation of new drainage systems); • Earthworks (embankment treatments retaining walls, slopes re-grading, etc); • Pavement full depth reconstruction; • Kerbs footways and paved areas (removal and new); • Road markings (non-destructive removal of existing, new road markings); • Anti-skid surface; • Signage (removal/relocation/replacement of existing and/or installation of new); • Dished kerbs and tactile paving; • Signal poles/heads, traffic signals ducting, cabling and chambers; • Signal controller and installation works (incl. electrical); • Loop detectors; • Localised Road lighting (replacement, cabling, ducting); • Landscaping works (top soiling, fence, trees, hedges, margins re-grading, etc); and; • Property boundary reinstatement works (walls, gates, driveways landscaping etc).	€650,000
Extensively Major	Significant modifications to very large and/or typical complex existing signal controlled junctions including upgrading of roundabouts to signal controlled junctions, including: • General site clearance (street furniture removal/relocation, etc); • Services protection/relocation/diversion (power supply, communications cables, water, gas); • Drainage works (removal of and installation of new drainage systems); • Earthworks (embankment treatments retaining walls, slopes re-grading, etc); • Pavement full depth reconstruction; • Kerbs footways and paved areas (removal and new); • Road markings (non-destructive removal of existing, new road markings); • Anti-skid surface; • Signage (removal/relocation/replacement of existing and/or installation of new); • Dished kerbs and tactile paving;	€1,150,000

	• Signal poles/heads, traffic signals ducting, cabling and chambers; • Signal controller and installation works (incl. electrical); • Loop detectors; • Localised Road lighting (replacement, cabling, ducting); • Landscaping works (top soiling, fence, trees, hedges, margins re-grading, etc); and; • Property boundary reinstatement works (walls, gates, driveways landscaping etc).	

4.4.2 Land Acquisition Cost Estimate (1.a.ii)

The land acquisition costs consist of the cost of acquiring lands necessary for the scheme and also the costs of boundary / accommodation works associated with each scheme. It takes into account the likely number of properties required (commercial, public, residential and industrial) and also the extent of land required.

In this assessment, land is defined as either public or private. Public land is considered to be the space between road boundaries and any also any public open space. For this analysis, it is assumed that there is no cost associated with the acquisition of public land. The identification of land acquisition is based on available Ordnance Survey mapping only and as such is approximate.

For the purposes of this high-level cost assessment, private land is assumed to have a standardised cost of €1,500 per square metre, however for a more detailed analysis, a more site-specific approach would be required.

4.4.3 Journey-time reliability and consistency (1.b.)

This sub-criterion assesses route options in terms of the degree to which journey-time reliability and consistency are likely to be achieved. It consists of the following:

- **Journey time** savings for public transport services (including the CBC) on the scheme. These are achieved through the enhancement and implementation of dedicated bus lanes and priority along the route, upgrading of road sections, removal of pinch points and redesign of existing bus stops. Journey times for each route option have been compared by calculating the estimated journey time between common start and end points. The following assumptions have been made in the calculations of overall journey time:
  - Buses proceed at an assumed top speed (50kph) unless they are delayed
  - Buses are delayed when they stop at bus stops to pick up passengers, the length of delay is based on the available patronage data for each stop.
  - Buses are delayed at junctions, the length of delay is based on the type of junction
  - Buses are delayed when they are required to share congested lanes with general traffic. The length of delays is based on available queue length information and automatic vehicle location data from Dublin Bus.

- The **level of bus priority** provided in each route option determines the journey time reliability for this criterion. Bus priority is a combination of physical infrastructure such as dedicated bus lanes and traffic management measures which provide priority to buses. The level of priority reasonably achievable is compared for each scheme. It is dependent on the amount of road space which can be allocated to dedicated bus lanes, the amount of segregation possible and the provision of bus lanes on approaches to junctions.

4.4.4 Integration (2)

4.4.4.1 Land Use Integration (2.a.)

This criterion assesses how a scheme would integrate with any planned developments in the catchment area and also how it might enhance the economic opportunities of an area. This criterion includes how a scheme fits into local area plans or any other objectives in area / county policies.

4.4.4.2 Residential Population and Employment Catchments (2.b.)

The current residential and employment population within a particular walking route distance of each of the CBC stops is calculated in order to determine the number of potential users for each scheme option. To assess the potential population and employment catchments the walking distance from bus stop locations along each route was analysed using the network analyst module of ArcGIS to create walk time isochrones from each stop. The distances to the stops correlate to walk times of 5, 10 and 15min intervals and were estimated based on an average walking speed of 5kph. The population and employment within the isochrones was then calculated based on planning data received from the NTA at CSO small area level. Where just a portion of a small area fell within the walking catchments the portion of the population/employment within walking distance was estimated proportionally based on area. See sample catchment map **Figure 4.2** below.

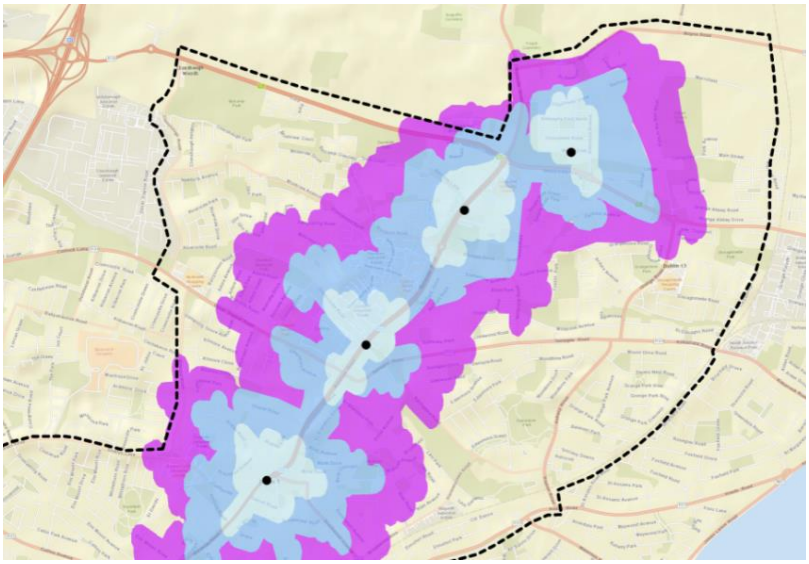


Figure 4.2 Sample bus stop catchment map with walking isochrones shown at 5/10/15 minute intervals

4.4.4.3 Transport Network Integration (2.c.)

Under this criterion, integration with wider public transport links are assessed and compared for each scheme. These include transport modes such as LUAS, DART, railway and public and private bus operators. The potential for interchange facilities such as safe walking areas, cycle parking areas, etc. are also assessed under this criterion. Where a potential CBC route shares a route with another public transport route over a significant distance this was seen as a negative under this criterion.

4.4.4.4 Traffic Network Integration (2.d.)

A comparative assessment of the expected traffic impact of each route option was undertaken based on professional judgement and understanding of traffic conditions in the Study Area. This represents a high-level assessment of the traffic impact of the route options considered in the Stage 2 MCA.

The anticipated traffic impact expected to be incurred by motorists using private vehicles as a result of the different route options will be assessed. The disadvantages experienced by motorists in respect of reduced junction capacity and restricted movements will be considered.

4.4.4.5 Cyclists and Pedestrian Integration (2.e.)

The compatibility of a scheme with the GDA Cycle Network Plan is assessed and the practicality of achieving cycle track segregation is explored. In some cases, it is necessary to provide an alternative cycle route on alternative streets to the CBC and this is considered under this criterion. The quality of infrastructure for cyclists practically achievable is also compared for each scheme option.

4.4.5 Accessibility & Social Inclusion (3)

4.4.5.1 High volume trip attractors (3.a.)

Trip attractors within a 15-minute walk from stops along a scheme are compared in order to determine schemes which would generate demand for buses along the CBC (in addition to residential and employment populations). Key trip attractors such as schools, universities, retail and commercial centres, hospitals and employment centres are considered in this analysis.

4.4.5.2 Deprived Geographic Areas (3.b.)

The potential of each scheme to impact on any deprived areas is assessed and compared under this criterion. RAPID (Revitalising Areas by Planning, Investment and Development) areas as well as the Geographic Deprivation Index of areas alongside a given route was used as a measure for this criterion.

4.4.6 Safety (4)

Under this criterion, the number of junctions along each scheme, as an approximate measure for the potential for collisions, are compared. In addition, the number of turn movements are compared, as these can also potentially lead to lower safety conditions along the scheme. Differentials in traffic speeds along a route are also assessed under this criterion as a high relative speed difference between transport modes may result in an increased road safety risk. This criterion also assesses the proximity of stops to pedestrian crossings and the width of footpaths along routes to the bus stops along a scheme as a means of assessing pedestrian safety.

4.4.7 Environment (5)

4.4.7.1 Archaeological, Architectural and Cultural Heritage (5.a)

Effects on cultural heritage can be considered in terms of impacts on below ground archaeological remains, historic buildings (individual and areas), and historic landscapes and parks. The construction, presence and operation of transport infrastructure can impact directly on such cultural heritage resources through physical impacts resulting from direct loss or damage, or indirectly through changes in setting, noise and vibration levels, air quality, and water levels.

Provision of a CBC has the potential for impacts on archaeological, architectural and cultural heritage. Potential impacts of each scheme on Recorded Monuments and Protected Structures (RMPs) within 50m of the corridor are assessed and compared. Potential impacts on Sites of Archaeological or Cultural Heritage and on buildings listed on the National Inventory of Architectural Heritage are also assessed and compared under this criterion.

4.4.7.2 Flora and Fauna (5.b.)

The provision of the CBC may have negative impacts on flora and fauna, for example, through construction of new infrastructure through green field sites. These impacts are compared for each scheme under this criterion.

4.4.7.3 Soils and Geology (5.c.)

Construction of infrastructure necessary for the provision of the CBC has the potential to negatively impact on soils and geology. For example, through land acquisition and ground excavation. There is also the potential to encounter ground contamination from historical industries. These considerations are compared for each scheme under this criterion.

4.4.7.4 Hydrology (5.d.)

The provision of CBC infrastructure may include aspects (for example structures) with the potential to impact on hydrology. Any such structures and impacts are considered for each scheme under this criterion.

4.4.7.5 Landscape and visual (5.e.)

Provision of CBC infrastructure has the potential to negatively impact on the landscape and visual aspects of the area, for example, by the removal of front gardens or green spaces or the altering of streetscapes, character and features. Different schemes are compared and any negative effects considered under this criterion.

The landscape (and visual) assessment of the route corridor options has had regard to:

- land use zonings (amenity, open space, recreation, sport)
- protected views and prospects
- Recreation Access Routes / Designated Walk Ways
- Tree Preservation Orders (TPO) and tree preservation/protection objectives
- the location of Protected Structures
- the location of sites on the Record of Monuments and Places (including Areas of Archaeological Potential)
- the designation of Architectural and candidate Architectural Conservation Areas (ACA)

4.4.7.6 Noise, Vibration and Air (5.f.)

Provision of CBC infrastructure has the potential to negatively impact on noise, vibration and air quality along a scheme. For example, through construction works. These effects are compared for each scheme option under this criterion. It is noted however that impact is quantified on whether the road is moving closer to a sensitive receptor, for example road widening or new realignment.

4.4.7.7 Land Use and the Built Environment (5.g.)

This criterion assesses the impact of each scheme option on land use character, and measures impacts which prevent land from achieving its intended use, for example through land acquisition, removal of parking spaces or severance of land.

4.4.8 Scheme Options Summary Table

Scheme options were assessed for each assessment criterion and compared relative to each other on a five-point scale, from having significant advantages, some advantages, some disadvantages to significant disadvantages over other route options. Schemes could also be considered neutral when no apparent advantages or disadvantages were identified across all scheme options.

Each route is given a comparative score (advantage/disadvantage) on a 5-point scale for each of the criteria listed in Table 4.1. below.

Table 4.5 MCA comparative advantage/disadvantage colour ranking table

Colour	Description
	Significant advantages over the other options
	Some advantages over the other options
	Neutral compared to other options
	Some disadvantages over other options
	Significant disadvantages compared to other options

NOTE: Where all options assessed are considered comparatively equal in terms of advantage/disadvantage they all ranked as neutral

In applying the assessment criteria to the Route Selection process, it is recognised that for different sections of the study area corridor, greater emphasis may need to be applied to some criterion over others in terms of their significance and influence on the route selection process. In drawing a conclusion as to which route represents the best option considering all of the criteria put together, judgement was applied to arrive at the preferred option.

The outcome and findings of the multi-criteria analysis are then finally considered in a holistic manner to derive a preferred end-to-end route for the proposed end-to-end CBC scheme.

4.5 Terminus Assessment

A multi-criteria analysis is also used to determine the optimum location for the northern terminus. Potential options for a terminus location were compared against one another using 3-point scale under a number of criteria. Each location was comparatively assessed against the study objectives using the KPIs and method of measurements identified below. The terminus options were then ranked accordingly in order to identify the preferred terminus location.

The assessment criteria are detailed in Table 4.6 below:

Table 4.6 - Terminus Assessment Criteria

Transport Integration	Public Transport Network Integration - Interchange with rail, DART, LUAS, other BRT and bus services
Surrounding Area	Integration with any planned developments in the surrounding area including local area plans or any other objectives in area / county policies
	High level comparison of population and employment calculation
Bus/Cycle Priority	Ability to achieve full bus and cycle priority on approach to the terminus
	Sufficient availability of space for layover of 2-3 buses along the road.
	Provide opportunity for park & ride for the bus users
Environmental	High level comparison of potential environmental impacts

The colour ranking scale used is shown below in Table 4.7

Table 4.7 - Ranking scale used for terminus assessment

Colour	Description
	Some Advantage over other options
	Neutral compared to other options
	Some Disadvantage over other options

5 STUDY AREA SECTION 1 – NORTH CITY

5.1 Northern Terminus Location

The two possible northern terminus locations considered are shown in **Figure 5.1** below.

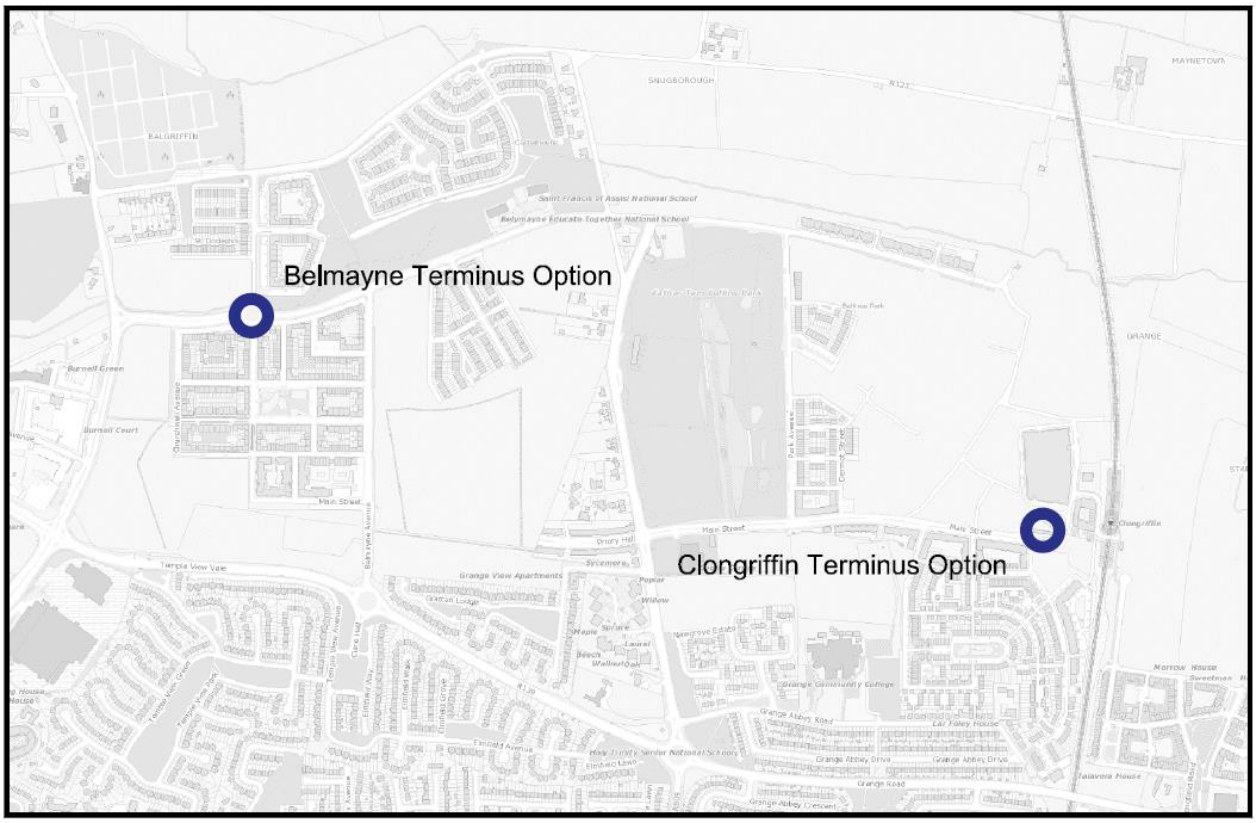


Figure 5.1 Northern Terminus Locations

5.1.1 Belmayne Terminus Option

This location was the preferred terminus of the indicative Swiftway study, located at the northern end of Belmayne. The proposed terminus stops would be along the Belmayne Road, with the roundabout being used to turn around. This option serves the Belmayne area to the south, along with new developments to the north, east and southwest. The downsides of this option are that it does not serve the DART, or most the Clongriffin area.

5.1.2 Clongriffin Terminus Option

This option uses the existing bus turnaround at Station Square in Clongriffin. Integration with other public transport modes was a key criterion in identifying a terminus location, this location best integrates with the DART service as passengers could easily interchange here. In addition to this there is a suitable turnaround facility, an existing park and ride facility and selection of this location would facilitate the completion of Clongriffin Main Street in accordance with the Clongriffin/Belmayne LAP. There is only one viable approach route to this terminus and all routes considered at a later stage will approach the terminus via Clongriffin Main Street, this approach road has existing bus lanes and segregated cycle lanes.

5.1.3 Option Assessment

Table 5.1 Northern Terminus Options Assessment Summary

Criteria	Belmayne	Clongriffin
Transport Integration	Only links with existing bus routes along Malahide Road.	Links with Clongriffin DART station and existing bus routes along Main Street.
Surrounding Area	Serves Belmayne and future planned development.	Serves Clongriffin and future planned development.
Bus/Cycle Priority	Could achieve full bus and cycle priority on approach.	Could achieve full bus and cycle priority on approach.
Space and Facilities	There is space for bus stops along Belmayne Road. Low amount of facilities nearby.	There is space for bus stops around Station Square. Park and Ride facilities, and commercial properties.
Environment	Options are considered equal under this criterion	Options are considered equal under this criterion

Based on the above MCA table, Station Square in Clongriffin is the preferred northern terminus location due to the link with the DART station, and better facilities nearby.

5.2 Stage 1: Route Options Assessment

This chapter outlines the options development process for Section 1 of the Study Area (North City).

All roads within Section 1 of the study area are assessed on a high level for their ability to form part of the CBC route. Route options are ruled out at this stage if they can clearly not form part of a CBC. The 'spider's web' of potential route options remaining after this initial phase was then progressed to Stage 1 Route Options Assessment ('sifting stage') for further analysis. The links which are subject to sifting are shown in **Figure 5.2**

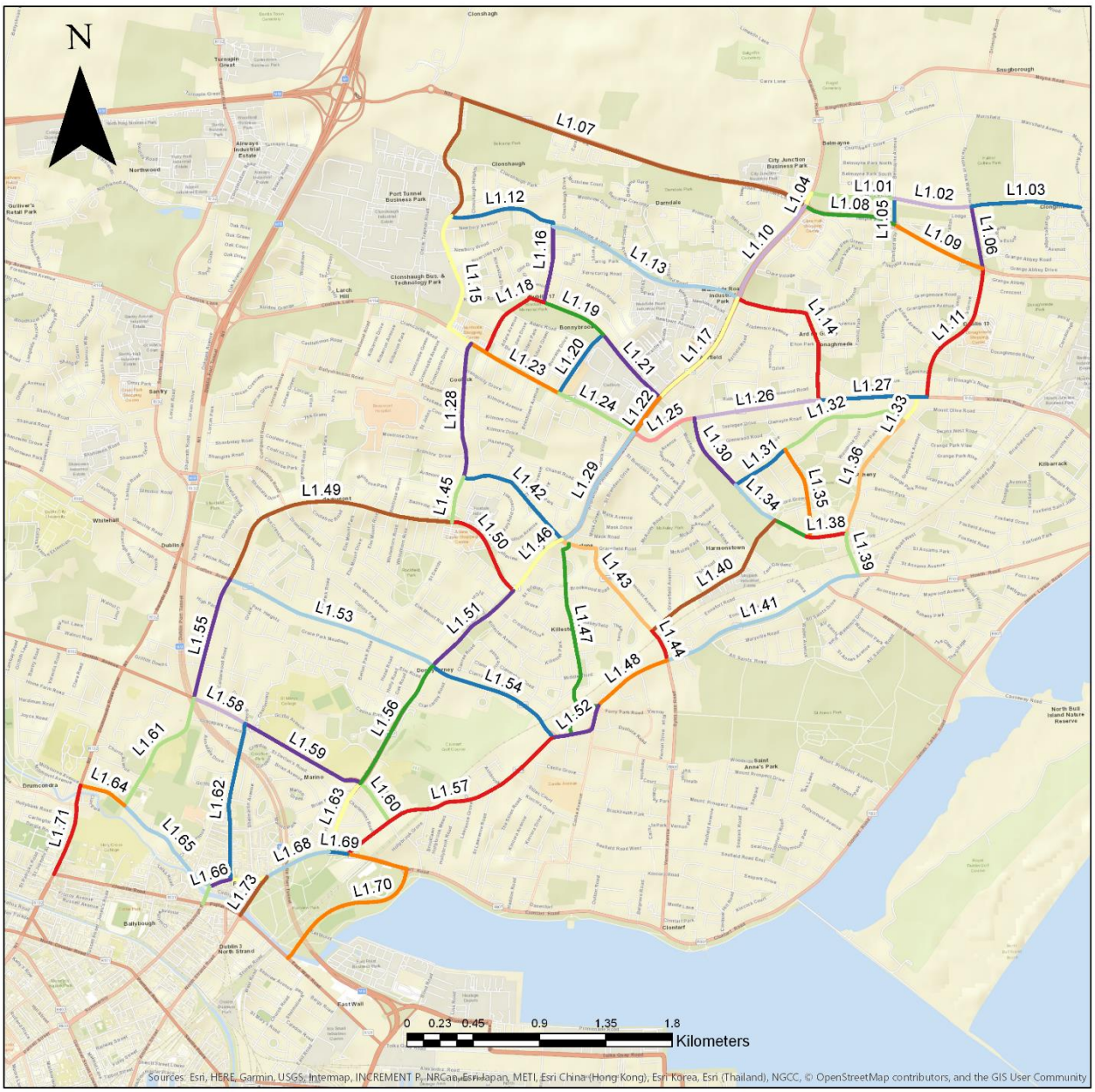


Figure 5.2 Section 1 Route Options

A summary of the Stage 1 route options assessment ('sifting') process is presented below,

Table 5.2 - Section 1 Route Option Assessment Stage 1

Link No.	Road Characteristics	Comments	Pass / Fail
L1.01	Urban	Clongriffin Main Street, as identified in the North Fringe LAP. This road has been partially completed and the remaining section requires construction through a green field site. This road is not part of the GDA CNP. This road is wide, and would not need any land take to provide dedicated bus lanes. This is considered a viable route option for this CBC.	Pass
L1.02	Urban / Residential	Clongriffin Main Street as identified in the North Fringe LAP. This road has been partially completed but is not currently open to traffic. This road is not part of the GDA CNP. This road is wide, and would not need any land take to provide dedicated bus lanes. This is considered a viable route option for this CBC.	Pass
L1.03	Urban	Clongriffin Main Street. One all vehicle lane in each direction and bus lanes in each direction. This road is not part of the GDA CNP, and has no cycle facilities. The eastern end of this link contains a looped section of road that links to the identified terminus at Clongriffin DART Station. Existing bus lanes could be used by a CBC and This is considered a viable route option for this CBC.	Pass
L1.04	Urban/ Regional	Malahide Road. Two all vehicle lanes in each direction, with a central tree lined verge & turning lane at junctions. This link is a primary route on the GDA CNP, and has off street cycle facilities along its length. It is a wide road, with no land take required to provide dedicated bus lanes. This is considered a viable route option for this CBC.	Pass
L1.05	Regional	Belmayne Avenue. One all vehicle lane in each direction. This link is not on the GDA CNP route and has no cycle facilities. There is roadside parking along one side. This is a wide road, and no land take would be required to provide dedicated bus lanes. This is considered a viable route option for this CBC.	Pass
L1.06	Regional	The Hole in The Wall Road. One all vehicle lane in each direction, and a bus lane in each direction. This road is not part of the GDA CNP, but has a southbound off-road cycle lane, northbound cyclists share the bus lane. This road is wide and already has bus lanes which could be used by a CBC. This is considered a viable route option for this CBC.	Pass
L1.07	Regional	R139 & Clonshaugh Road. The R139 portion of this link has one all vehicle lane in each direction, and a bus lane in each direction. The Clonshaugh road has one all vehicle lane in each direction. This link is not on the GDA CNP route and has no cycle facilities. The Clonshaugh Road would need to be widened to provide bus priority, and would require land take on the southern end. This is considered a viable route option for this CBC.	Pass
L1.08	Regional	R139. One all vehicle lane in each direction, and a bus lane in each direction with a central verge and turning lanes at junctions. This is a secondary route on the GDA CNP, but has no cycle facilities at present. Reallocating space from the hatched median or grass	Pass

		verges could allow for cycle facilities. This is considered a viable route option for this CBC.	
L1.09	Regional	R139. One all vehicle lane in each direction, and a bus lane in each direction with a central verge and turning lanes at junctions. This is a secondary route on the GDA CNP, but has no cycle facilities at present. Reallocating space from the hatched median or grass verges could allow for cycle facilities. This is considered a viable route option for this CBC.	Pass
L1.10	Regional / Urban	Malahide Road. Two all vehicle lanes in each direction and bus lanes in both directions, with a tree lined verge and turning lanes at the junctions. This link is a primary route on the GDA CNP, and has on-road cycle lanes in both directions. This is considered a viable route option for this CBC.	Pass
L1.11	Urban	Grange Road. One all vehicle lane in each direction, with a central verge and turning lanes along parts of the road. This link is a primary route on the GDA CNP, but has no cycle facilities other than at the northern roundabout. The road could be widened to provide dedicated bus lanes by using existing green space and some isolated land take from gardens at the southern end. This is considered a viable route option for this CBC.	Pass
L1.12	Residential	Clonshaugh Avenue. Small residential road with on street parking and residential access along both sides. This link forms part of a GDA CNP feeder route and there are currently no cycle facilities provided. This route has significant on-street parking, and direct driveway access along the entirety of the route. This is not considered a viable route option for this CBC.	Fail
L1.13	Regional / Residential	Priorswood Road. One all vehicle lane in both directions. This link forms part of a GDA CNP feeder route and there are currently no cycle facilities provided. This road is unrestricted, with open green space either side which could be used to widen the road to provide dedicated bus lanes. This is considered a viable route option for this CBC.	Pass
L1.14	Residential	Blunden Drive, Millbrook Road. Small residential road with on street parking and residential accesses along both sides. This link forms part of a GDA CNP feeder route and there are currently no cycle facilities provided. Land take from gardens and removal of on-street parking would be required to provide dedicated bus lanes. In addition, private accesses along the length of the road would lead to journey time delays for buses. For these reasons, this is not considered a viable route option for this CBC.	Fail
L1.15	Industrial / Residential	Clonshaugh Road & Oscar Traynor Road. One all vehicle lane in both directions. This is a small road, with residential access on the eastern side, and mostly green space & industrial areas on the western side which could be used for road widening. This is considered a viable route option for this CBC.	Pass

L1.16	Residential	Glin Road. Small residential road with on street parking and residential accesses along both sides. This link forms part of a GDA CNP feeder route and there are currently no cycle facilities provided. Road widening to provide dedicated bus lanes would require purchase of large areas of gardens along this route and this is not considered feasible. This is not considered a viable route option for this CBC.	Fail
L1.17	Regional / Urban	Malahide Road. One all vehicle lane in both directions and bus lanes in both directions, with a tree lined verge and turning lanes at the junctions. This link is a primary route on the GDA CNP, and has on-road cycle lanes in both directions. This is considered a viable route option for this CBC.	Pass
L1.18	Residential	Barryscourt Road. One all vehicle lane in each direction. This link forms part of a GDA CNP feeder route and there are currently no cycle facilities provided. The southern end has on street parking and residential accesses. Road widening to provide bus lanes could be achieved by mostly using adjacent green space. At the southern end of the link some land take from car parking spaces at the Northside Shopping Centre would be required. This is considered a viable route option for this CBC.	Pass
L1.19	Residential	Greencastle Road. Small residential road, with on street parking and residential accesses on the northern side, with parkland on the southern side. This link forms part of a GDA CNP feeder route and there are currently no cycle facilities provided. Road widening to provided dedicated bus lanes would require land take from Memorial Park or from gardens. Land take from the park may be feasible and This is considered a viable route option for this CBC.	Pass
L1.20	Residential / Urban	Coolock Drive. This is a residential and commercial street, with on street parking on both sides, and residential access along one side. Land take from gardens or from commercial parking would be needed in places to provide bus priority along this link. Construction of CBC infrastructure is feasible, and This is considered a viable route option for this CBC.	Pass
L1.21	Residential	Greencastle Road. Small residential road, with on street parking and residential access on the northern side, with parkland on the southern side. This link forms part of a GDA CNP feeder route and there are currently no cycle facilities provided. There is scope to widen the road to provide dedicated bus lanes using existing verge space and adjacent green space to the south.	Pass
L1.22	Regional / Urban	Malahide Road. One all vehicle lane in both directions and bus lanes in both directions, with a tree lined verge and turning lanes at the junctions. This link is a primary route on the GDA CNP, and has on-road cycle lanes in both directions. This is considered a viable route option for this CBC.	Pass
L1.23	Urban	Oscar Traynor Road. One way all vehicle lanes in both directions, with a central verge and turning lanes at the junctions. It is a secondary route on the GDA CNP, but has no cycle facilities at present. There are wide grass verges either side which could be used to provide dedicated bus lanes. This is considered a viable route option for this CBC.	Pass

L1.24	Urban	Oscar Traynor Road. One way all vehicle lanes in both directions, with a central verge and turning lanes at the junctions. It is a secondary route on the GDA CNP, but has no cycle facilities. There are wide grass verges either side which could be used to provide dedicated bus lanes. This is considered a viable route option for this CBC.	Pass
L1.25	Residential	Tonlegee Road. One way all vehicle lane in both directions. It is a secondary route on the GDA CNP, but has no cycle facilities. This route has wide tree lined verges and residential accesses on both sides. Some land take from gardens may be required to provide dedicated bus lanes. This route connects the viable routes L 1.39 & L 1.42. This is considered a viable route option for this CBC.	Pass
L1.26	Residential	Tonlegee Road. One way all vehicle lane in both directions. It is a secondary route on the GDA CNP, but has no cycle facilities. This route has wide tree lined verges and residential accesses on both sides. Dedicated bus lanes could be provided by widening into the verges. This is considered a viable route option for this CBC.	Pass
L1.27	Residential	Tonlegee Road. One way all vehicle lane in both directions. It is a secondary route on the GDA CNP, but has no cycle facilities. This route has wide tree lined verges and residential accesses on both sides. Dedicated bus lanes could be provided by widening into the verges. This is considered a viable route option for this CBC.	Pass
L1.28	Residential / Urban	Kilmore Road. One all vehicle lane in both directions. It is a secondary route on the GDA CNP, but has no cycle facilities. This is a current bus route with wide tree lined verges and residential accesses on both sides. Removing existing grass verges and land take from gardens would be required in places to widen the road to provide dedicated bus lanes. This link connects viable links at Oscar Traynor Road and Kilmore Road to create a route that serves Beaumount Hospital. This is considered a viable route option for this CBC.	Pass
L1.29	Regional / Urban	Malahide Road. One all vehicle lane in both directions and bus lanes in both directions, with a tree lined verge and turning lanes at the junctions. This link is a primary route on the GDA CNP, and has on-road cycle lanes in both directions. This is considered a viable route option for this CBC.	Pass
L1.30	Residential	Springdale Road. One all vehicle lane in both directions. On street parking and residential access on one side, parkland on the other. It is not on the GDA CNP, and has no cycle facilities. It is a wide road, with potential for further widening into the parkland to provide dedicated bus lanes. This is considered a viable route option for this CBC.	Pass
L1.31	Residential	Edenmore Park. Residential road with traffic calming ramps, on street parking and residential access on both sides. It is not on the GDA CNP, and has no cycle facilities. This link would require land take along the majority of its length from gardens and commercial parking spaces. This route option is not considered feasible owing to on-street parking, direct driveway access and restricted cross-section in places which would require significant property acquisition. Without land take, shared running would significantly	Fail

		impact the reliable operation of the CBC system. This is not considered a viable route option for this CBC.	
L1.32	Urban / Residential	Woodbine Road. Residential and commercial road with traffic calming ramps, on street parking and residential access on both sides. It is not on the GDA CNP, and has no cycle facilities. This link would require land take along the majority of its length from gardens. This route option is not considered feasible owing to restricted cross-section in places which would require significant property acquisition. Without land take, shared running would significantly impact the reliable operation of the CBC system. This is not considered a viable route option for this CBC.	Fail
L1.33	Residential	Raheny Road. One wide all traffic lane in both directions, opening into two lanes on the northern end. There is residential access on the western side of the road, and parkland / fire station grounds on the eastern side. The road would require some land take from gardens in order to provide bus priority. This route option is not considered feasible owing to on-street parking, direct driveway access and restricted cross-section in places which would require significant property acquisition. Without land take, shared running would significantly impact the reliable operation of the CBC system. This is not considered a viable route option for this CBC.	Fail
L1.34	Residential	Springdale Road. One all vehicle lane in both directions. On street parking and residential access on one side, parkland on the other. It is not on the GDA CNP, and has no cycle facilities. It is a wide road, with potential for further widening into the parkland. This is considered a viable route option for this CBC.	Pass
L1.35	Residential	Edenmore Crescent. Wide residential road with residential access on the western side, and parkland on the eastern side. It is not part of the GDA CNP, and has no cycle facilities. The road could be widened to provide dedicated bus lanes using existing verge space. This is considered a viable route option for this CBC.	Pass
L1.36	Residential	Raheny Road. Wide residential road with residential access on both sides. It is a primary route on the GDA CNP, but has no cycle facilities. Although the road is wide and has grass verges, it would likely require some garden land take at the northern end. This is considered a viable route option for this CBC.	Pass
L1.37	Residential	Springdale Road. Wide residential road with residential access on one side. This route is not on the GDA CNP. There is a wide verge on the southern end which would allow for some widening, but there may be land take required from gardens to provide dedicated bus lanes. This is considered a viable route option for this CBC.	Pass
L1.38	Residential	Springdale Road. Small road with on street parking and residential access on both sides. This link is not on the GDA CNP. This road would require land take from gardens along its whole length to provide dedicated bus lanes. This is not considered a viable route option for this CBC.	Fail

L1.39	Urban	Station Road. One all vehicle lane in both directions. This is a narrow road with properties on either side, widening of the road to provide bus priority would involve significant land take. There is an existing narrow bridge crossing over the DART line which would also require major construction works. It is a primary route on the GDA CNP, but has no cycle facilities. This is not considered a viable route option for this CBC.	Fail
L1.40	Residential / Urban	Brookwood Rise & Harmonstown Road. One all vehicle lane in both directions. Harmonstown Road is lined by residential access on the northern side, the southern side is industrial/ commercial land. Brookwood Rise has residential access on both sides. This route would require land take from gardens along the majority of the route. This is not considered a viable route option for this CBC.	Fail
L1.41	Residential / Urban	Howth Road. Wide road with one all vehicle lane in each direction, bus lanes in places, and a central verge with turning lanes at the junctions. This is a primary route on the GDA CNP. Road widening to provide bus and cycle lanes could be provided by using existing green space to the east, although many potentially significant trees would be affected. This is considered a viable route option for this CBC.	Pass
L1.42	Residential	Ardlea Road. Small road with residential access, and roadside parking on both sides. This is a secondary route on the GDA CNP, but has no cycle facilities. This road would require land take from gardens from the majority of its length as well as removal of on-street parking in order to provide dedicated bus lanes. This is not considered a viable route option for this CBC.	Fail
L1.43	Residential	Gracefield Road & Brookwood Avenue. This link is a wide residential road, with tree lined verges on both sides. It would require minimal land take to provide dedicated bus lanes. This is a secondary route on the GDA CNP, but has no cycle facilities at present. Providing bus lanes on this link is feasible and This is considered a viable route option for this CBC.	Pass
L1.44	Residential	Brookwood Avenue. This link is a residential road, with tree lined verges on both sides. This is a secondary route on the GDA CNP, but has no cycle facilities at present. Road widening to provide CBC infrastructure would require removal of a number of potentially significant trees and would require land take from gardens. There is a pinch point at the bridge over the railway tracks, which would require reconstruction of the bridge. The scale of the construction works to get bus priority over this DART crossing are considered excessive. This is not considered a viable route option for this CBC.	Fail
L1.45	Residential / Urban	Kilmore Road. One all vehicle lane in both directions. It is a secondary route on the GDA CNP, but has no cycle facilities. This is a current bus route with wide tree lined verges and residential accesses on both sides. Removing existing grass verges and some isolated land take from gardens would be required to widen the road to provide dedicated bus lanes. This link connects viable links at Oscar Traynor Road and Kilmore Road to create a route that serves Beaumount Hospital. This is considered a viable route option for this CBC.	Pass

L1.46	Residential / Urban	Malahide Road. One all vehicle lane in both directions and bus lanes in both directions. This link is a primary route on the GDA CNP, and has on-road cycle lanes in both directions. This is considered a viable route option for this CBC.	Pass
L1.47	Residential	St Brigid's Road & Abbeyfield. Small residential road with on street parking and residential accesses on both sides. This link forms part of a GDA CNP feeder route and there are currently no cycle facilities provided. Road widening to provide CBC infrastructure would require land take from gardens along the majority of its route, although some sections could be achieved using adjacent green space. This is not considered a viable route option for this CBC.	Fail
L1.48	Residential / Urban	Howth Road. One all vehicle lane in both directions, with a bus lane in the southbound direction, and an on-road cycle lane in the northbound direction. This link is a primary route on the GDA CNP. Land take would be required from gardens to provide dedicated bus lanes along the majority of this link. This route closely follows the DART line which is seen as a negative. This is not considered a viable route option for this CBC.	Fail
L1.49	Residential	Beaumont Road. One all vehicle lane in both directions. This is a secondary route on the GDA CNP and has cycle lanes in both directions. Land take from gardens would be required for road widening to provide dedicated bus lanes along a 1km section on the western part of this link. This is not considered a viable route option for this CBC.	Fail
L1.50	Residential / Urban	Kilmore Road. One all vehicle lane in both directions. This is a secondary route on the GDA CNP and has cycle lanes in both directions. This link is mostly lined by green space and so would require no land take to provide bus priority. This is considered a viable route option for this CBC.	Pass
L1.51	Residential / Urban	Malahide Road. One all vehicle lane in both directions and bus lanes in both directions. This link is a primary route on the GDA CNP, but has no cycle lanes. This is considered a viable route option for this CBC.	Pass
L1.52	Residential / Urban	Howth Road. One all vehicle lane in both directions, with a bus lane in the southbound direction, and a cycle lane in the northbound direction. There are residential accesses along both sides of the road. This link is a primary route on the GDA CNP. Land take would be required from gardens to provide dedicated bus lanes. This route closely matches the route of the DART line and would result in a doubling up of services. This route option is not considered feasible owing to similarity to the DART line and restricted cross-section in places which would require significant property acquisition. Without land take, shared running would significantly impact the reliable operation of the CBC system. This is not considered a viable route option for this CBC.	Fail
L1.53	Residential	Collins Avenue. Mostly residential road with on street parking and residential access on both sides. It is a primary route on the GDA CNP, but has no cycle facilities at present. Provision of CBC infrastructure would require land take from gardens along 1.5km of its length to provide dedicated bus and cycle lanes. This would	Fail

		affect over 100 properties and would also impact on residential parking. This is not considered a viable route option for this CBC.	
L1.54	Residential	Collins Avenue East. Residential road with on street parking and residential accesses on both sides. It is a primary route on the GDA CNP, but has no cycle facilities. Construction of CBC infrastructure would require significant land take from gardens to provide dedicated bus lanes, this would result in the complete removal of residential parking in several gardens along the route. This is not considered a viable route option for this CBC.	Fail
L1.55	Residential	Grace Park Road. One all vehicle lane in both directions. This road has residential accesses along the eastern side. A wall runs along the western side, beyond which is green space. Road widening to provide dedicated bus lanes could be done using this green space. It is a secondary route on the GDA CNP, but has no cycle facilities. This is considered a viable route option for this CBC.	Pass
L1.56	Residential / Urban	Malahide Road. One all vehicle lane in both directions and bus lanes in both directions, with a tree lined verge and turning lanes at the junctions. This link is a primary route on the GDA CNP, and has on-road cycle lanes in both directions. This is considered a viable route option for this CBC.	Pass
L1.57	Residential	Howth Road. One all vehicle lane in both directions, with a southbound bus lane for a small stretch. This link is a primary route on the GDA CNP and has on-road cycle lanes in both directions. Land take would be required from gardens along the whole length of the route to provide dedicated bus lanes. In addition, there is a pinch point under the DART line and 200m to the north where houses are close to the road on both sides, shared running would be required here and this would significantly delay buses. This is not considered a viable route option for this CBC.	Fail
L1.58	Residential	Griffith Avenue. One wide all vehicle lane in both directions. This link is a primary route on the GDA CNP, but has no cycle facilities. This link would require no land take to provide dedicated bus lanes but would require removal of a large number of potentially sensitive medium sized trees from either side of the road. This is considered a viable route option for this CBC.	Pass
L1.59	Residential	Griffith Avenue. One wide all vehicle lane in both directions. This link is a primary route on the GDA CNP, but has no cycle facilities. This link would require no land take to provide dedicated bus lanes but would require removal of a large number of potentially sensitive medium sized trees from either side of the road. This is considered a viable route option for this CBC.	Pass
L1.60	Residential	Copeland Avenue. One all vehicle lane in each direction with on-street parking on both sides. This is a quite residential street with a 3.5T weight restriction. Construction of CBC infrastructure would involve land take from gardens for the length of the road and would result in the removal of residential parking from many gardens. This is not considered a viable route option for this CBC.	Fail

L1.61	Residential / Urban	Grace Park Road. One wide all vehicle lane in both directions. This link is a secondary route on the GDA CNP, but has no cycle facilities. It would require significant land take from gardens along much of its length to provide dedicated bus lanes, and would require houses to be removed at certain pinch points. This is not considered a viable route option for this CBC.	Fail
L1.62	Residential	Philipsburg Avenue. Small residential road with on street parking and residential access on both sides. This link forms part of a GDA CNP feeder route and there are currently no cycle facilities provided. This link would require land take from gardens along the majority of its length to provide dedicated bus lanes. This is not considered a viable route option for this CBC.	Fail
L1.63	Residential / Urban	Malahide Road. One all vehicle lane in both directions and a bus lane in the southbound direction. This link is a primary route on the GDA CNP, and has a cycle lane in the northbound direction. This section is narrower than the rest of the Malahide Road and land take or traffic management changes would be required to get both cyclists and bus priority. This route connects the favourable route options of the Malahide Road to Marino Mart (L1.80) and onwards into the city centre. This is considered a viable route option for this CBC.	Pass
L1.64	Residential / Urban	Richmond Road. This is a small residential road, lined by terraced houses with on street parking on one side. The terraced houses have very small front gardens so there is no room for land take. It is a secondary route on the GDA CNP, but has no cycle facilities. This is not considered a viable route option for this CBC.	Fail
L1.65	Residential / Industrial	Richmond Road. The northern end of this link is lined by terraced houses with on street parking on one side. The terraced houses have very small front gardens so there is no room for land take. The rest of this link is lined by Tolka Park and industrial lands to the south, with residential and commercial land to the north. There is little room for land take along much of the link. This is not considered a viable route option for this CBC.	Fail
L1.66	Urban	Fairview Strand. One all vehicle lane in both directions, lined by terraced housing with small gardens. This is a secondary route on the GDA CNP but has no cycle facilities. There is very little room for land take as building lines are close to the street. This is not considered a viable route option for this CBC.	Fail
L1.67	Urban	Fairview Strand. One all vehicle lane in both directions with on street parking and lined by terraced housing with small gardens. This is a secondary route on the GDA CNP but has no cycle facilities. There is very little room for land take as building lines are close to the street. This is not considered a viable route option for this CBC.	Fail
L1.68	Urban	Fairview & Marino Mart. Two all vehicle lanes in both directions, with bus lanes in both directions. This is a primary route on the GDA CNP, and there is an on-road cycle lane northbound. This is considered a viable route option for this CBC.	Pass
L1.69	Urban	Clontarf Road. Two all vehicle lanes in both directions with a small central verge and an inbound bus lane. This is a primary route on	Pass

		the GDA CNP, and there is an on-road cycle lane in both directions. This is considered a viable route option for this CBC.	
L1.70	Urban	Clontarf Road & Alfie Bryne Road. The Clontarf Road has two all vehicle lanes in both directions with a central verge and a bus lane eastbound. The Alfie Byrne Road has one all vehicle lane in both directions. This link is a secondary route on the GDA CNP, with cycle facilities in both directions. There is potential to widen the road to provide dedicated bus lanes using adjacent green space. This is considered a viable route option for this CBC.	Pass
L1.71	Residential / urban	Drumcondra Road Lower. The northern end has one all vehicle lane in both directions with bus lanes in both directions. The southern end has two all vehicle lanes in each direction, with a bus lane in the southbound direction, and a cycle lane in the northbound direction This is a primary route of the GDS CNP and has cycle facilities. This road is on the route of the Swords to Dublin CBC and would result in bunching of services. This is not considered a viable route option for this CBC.	Fail
L1.72	Urban	Luke Kelly Bridge. Two all vehicle lanes in each direction with a central turning lane. This is a secondary route on the GDA CNP, but has no cycle facilities. It would be feasible to accommodate CBC and Cycle lanes along the bridge. This is considered a viable route option for this CBC.	Pass
L1.73	Urban	Annesley Bridge Road. Two all vehicle lanes northbound, one all vehicle lane southbound, with bus lanes in both directions. This is a primary route on the GDA CNP and has a cycle lane in the northbound direction. This is considered a viable route option for this CBC.	Pass

The outcome of the sift can be seen in the **Figure 5.3** Links shown in red failed the sift and those in blue passed.

Figure 5.3 Section 1 Sifting Process Step 1

5.2.1 Removal of Disconnected Links

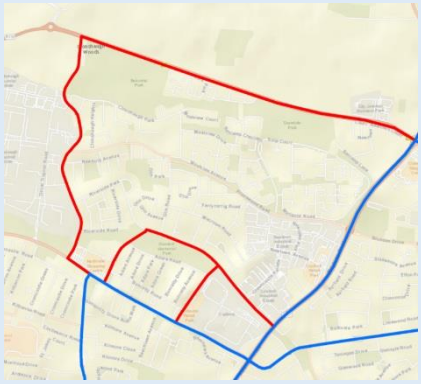
The links shown in red are disconnected and could not clearly form part of a Clongriffin to City Centre CBC route and have not been considered further.

Figure 5.4 Section 1 Sifting Process Step 2

5.2.2 Preliminary Route Assessment

A summary of the Preliminary Route Assessment process is presented in Table 5.3 below

Table 5.3 - Section 1 Preliminary Route Assessment

Road Names	Comments	Map
R139, Clonshaugh Road, Greencastle Road, Barryscourt Road, Coolock Drive	All route options using these roads have routes which are circuitous in nature and would lead to longer journey times when compared to the adjacent route options with two-way bus movements on Oscar Traynor Road and Kilmore Road, or on Malahide Road. These routes would also require buses to pass through a higher number of junctions and make more turning movements. For these reasons, these route options are not considered further	

The outcome of the Preliminary Route Assessment can be seen below in **Figure 5.5**. The links shown in red have failed those shown in blue have passed.

Figure 5.5 Section 1 Sifting Process Step 3

5.2.3 Section 1 – Sifting Conclusion

Following the Stage 1 sift, 35 of the 88 links assessed passed the initial sifting stage and were progressed to the next assessment stage. These links are presented in Figure 5.6.

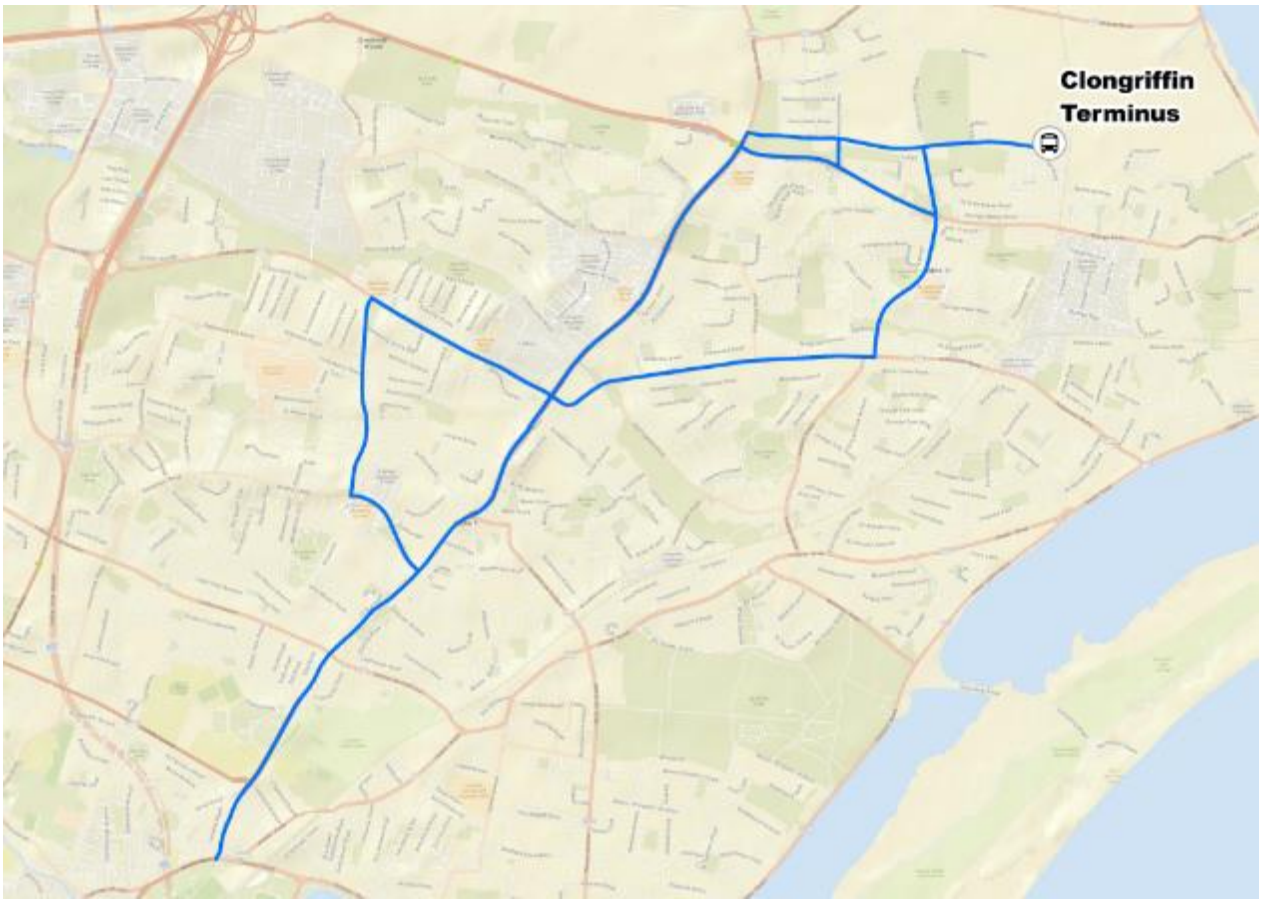


Figure 5.6 Section 1 Route Options Remaining After Stage 1 Assessment

5.3 Stage 2: Route Options Assessment - Belmayne/Clongriffin

5.3.1 Introduction

Following the Stage 1 sifting process the nine remaining links in this section are assembled together to form three viable route options for Section 1, as follows:

- Route Option 1: Using the Clongriffin Main Street
- Route Option 2: Using new Clongriffin Main Street, Belmayne Ave and the R139
- Route Option 3: Using the Hole in the Wall Road, and the R139

The terminus for both these routes for consideration in the Stage 2 Assessment is the Clongriffin DART Station.

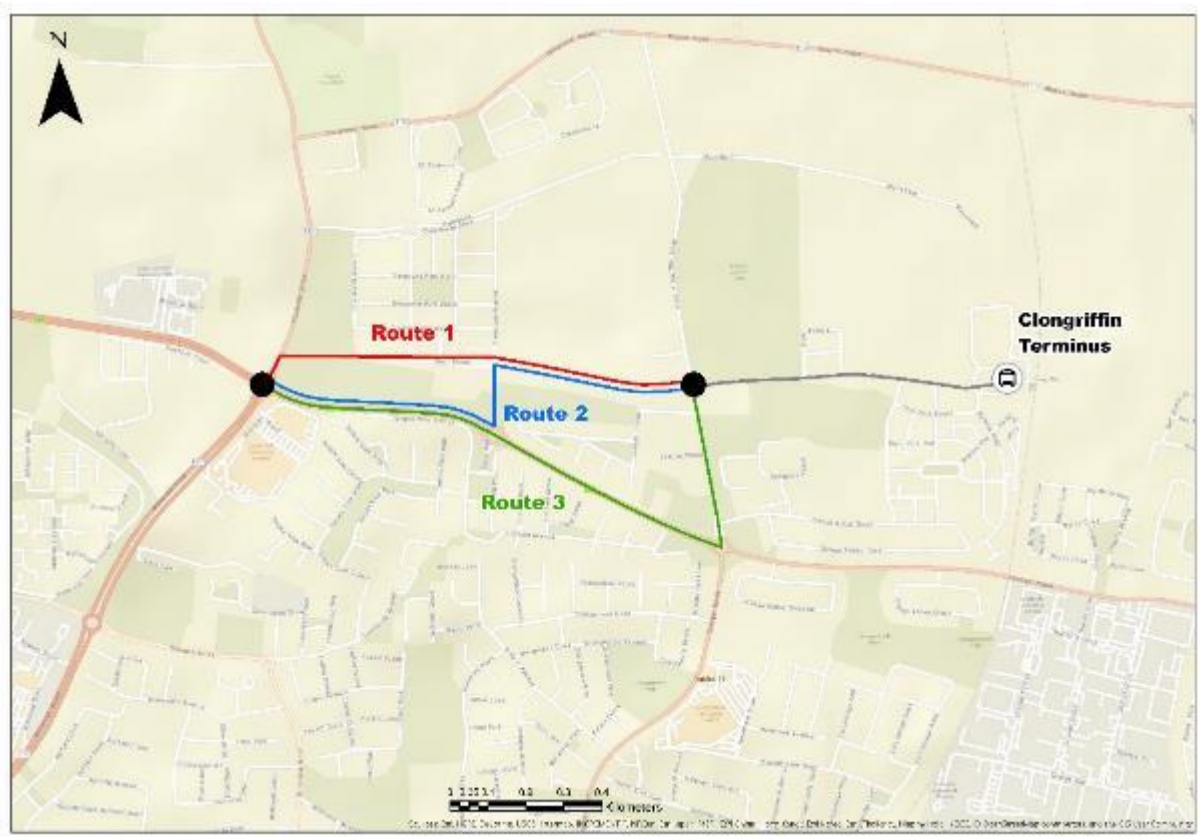


Figure 5.7 Section 1 (Belmayne/Clongriffin) Route Options

5.3.2 Route Option 1

Route Description

Route Option 1 is presented in Figure 5.8 and described as follows.

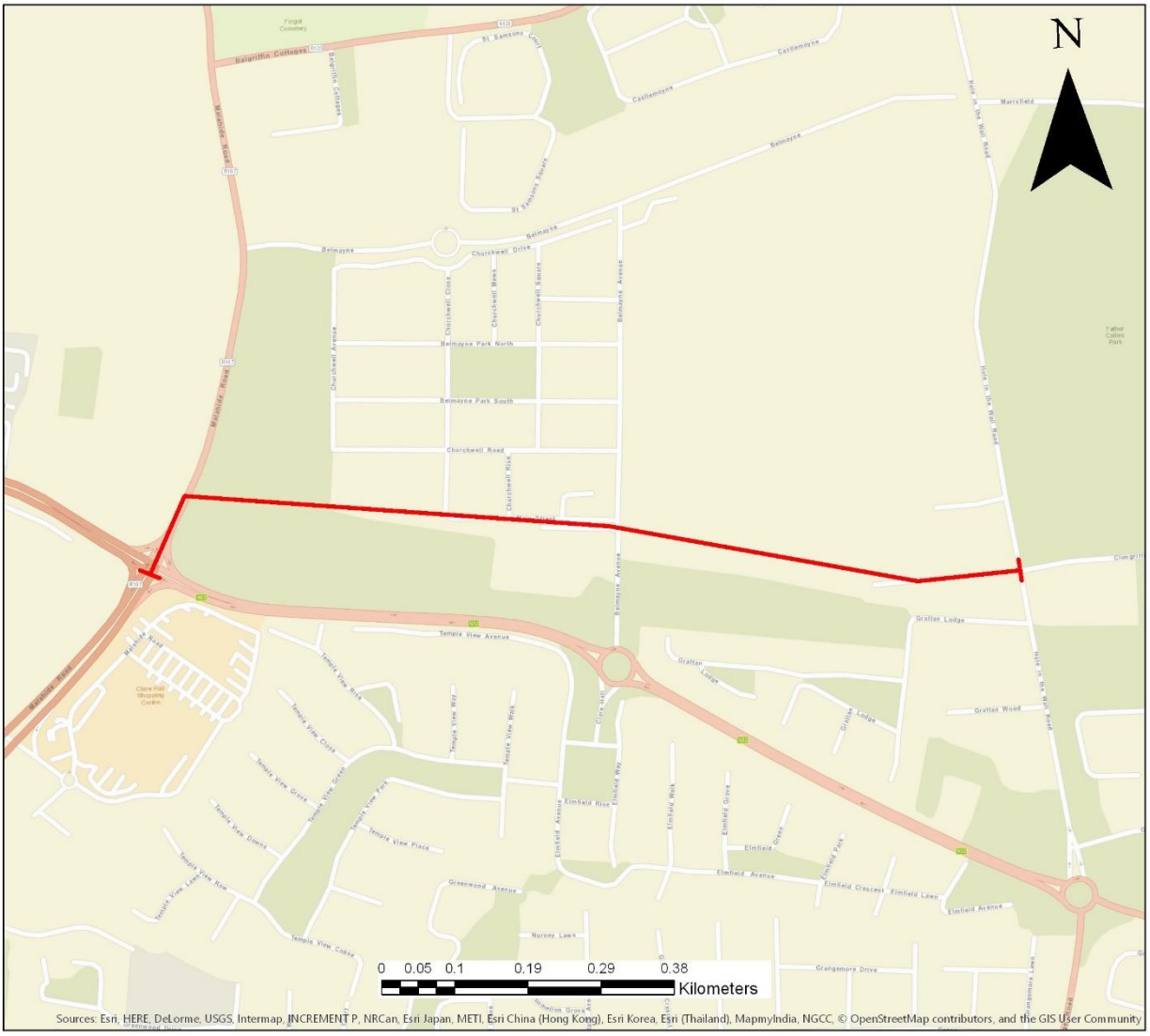


Figure 5.8 Route Option 1

Southbound: Route Option 1 would commence at the junction of Hole in the Wall Road and Clongriffin Main Street, from here the bus travels along Clongriffin Main Street, including some parts that are not yet constructed to join the Malahide Road and continue south to the junction of R139/R107 by Clarehall Shopping Centre

Northbound: The northbound route would follow the same route as the southbound routing.

Route Option 1 Indicative Scheme Design

Figure 5.9 illustrates the indicative scheme design for Route Option 1 as well as the location of an indicative cross-section.

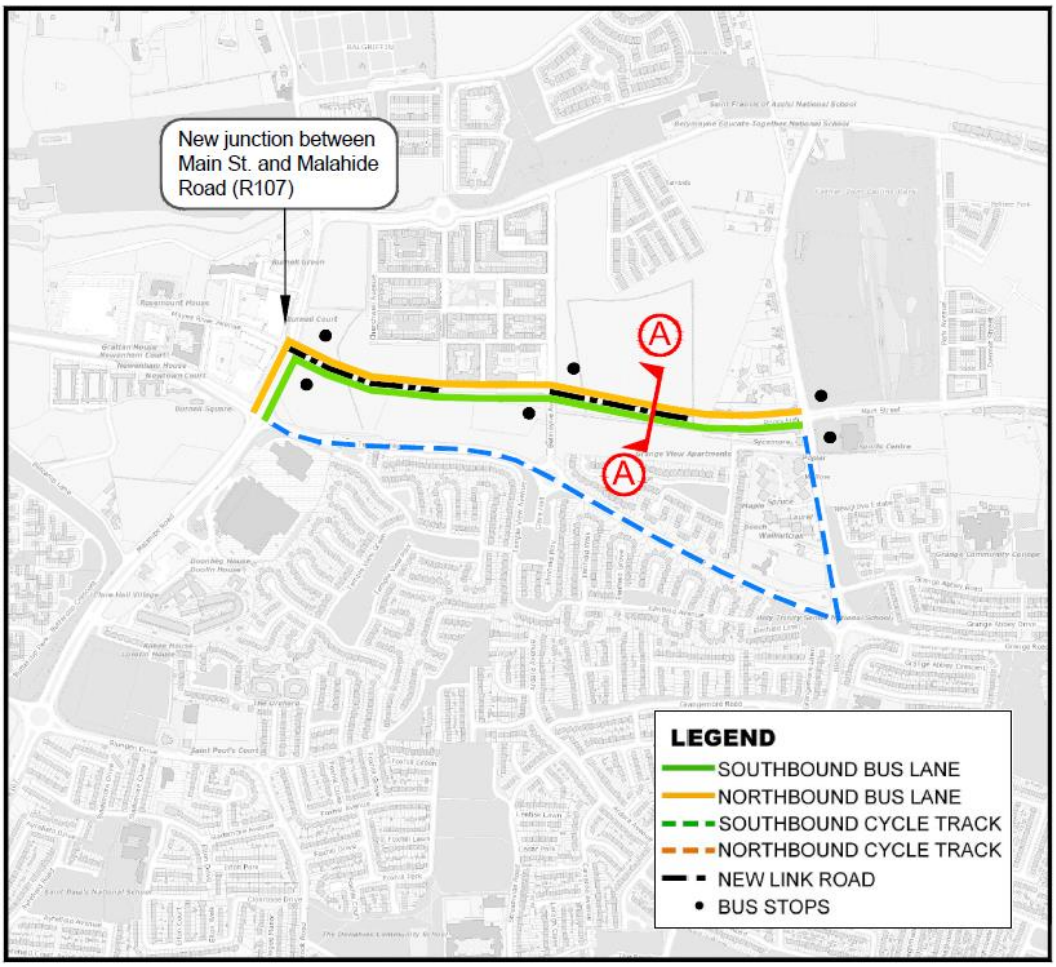


Figure 5.9 Route Option 1 Indicative Scheme Design

Bus Stops: A total of three bus stops would be provided in each direction along this route option.

Bus lanes will be provided for the entire length of the scheme. Clongriffin Main Street is not on the GDA cycle network plan and so it is suggested that cyclists use the secondary cycle route along the R139 and Hole in the Wall Road. Existing bus lanes will be used Clongriffin Main Street and the two sections yet to be completed will be built in accordance with the LAP. A new bus only junction will be constructed where Main Street meets Malahide Road and signals will provide priority for buses using the CBC route. Road widening and realignment will be required to provide bus lanes on the Malahide Road section.

Northbound buses on Malahide Road will move to the right-hand lane in advance of the junction with the R139 as this will allow them to pass through the junction and more easily make the right turn onto Clongriffin Main Street. Both of these junctions will be upgraded to provide enhanced pedestrian and cyclist facilities.

A cross-section on Clongriffin Main Street is presented in Figure 5.10.

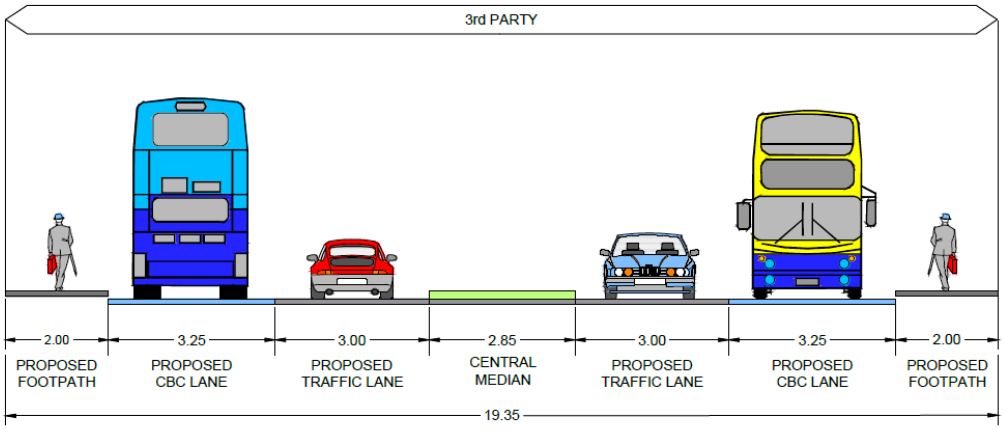


Figure 5.10 Cross Section A-A

5.3.3 Route Option 2

Route Description

Route Option 2 is presented in Figure 5.11 and described as follows.

Figure 5.11 Route Option 2

Southbound: Option 2 would commence at the junction of Hole in the Wall Road and Clongriffin Main Street, from here the bus travels along Clongriffin Main Street, including some parts that are not yet completed to turn onto Belmayne Avenue and then R139 to reach the junction of R139/R107 by Clarehall Shopping Centre.

Northbound: The northbound route would follow the same route as the southbound routing.

Route Option 2 Indicative Scheme Design

Figure 5.12 illustrates the indicative scheme design for Route Option 2 as well as the location of indicative cross-sections.

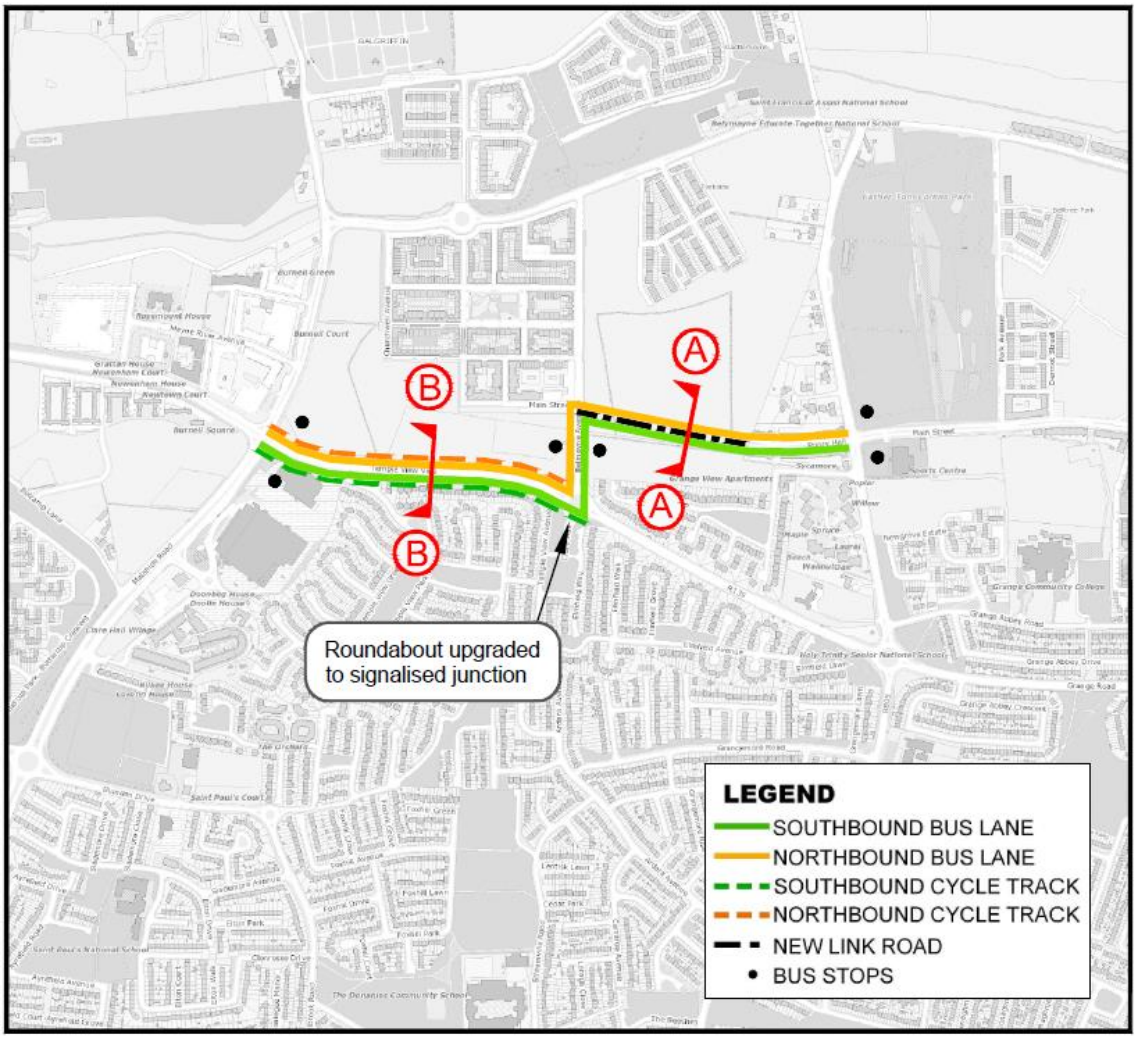


Figure 5.12 Route Option 2 Indicative Scheme Design

Bus Stops: A total of three bus stops would be provided in each direction along this route option.

Bus and cycle lanes will be provided along the R139. Bus lanes will be constructed along Clongriffin Main Street in accordance with the LAP, these have already been constructed in some locations. The signals at the junction of Belmayne Avenue/Clongriffin Main Street will be adjusted to provide priority to the CBC. Belmayne Avenue will be widened locally to provide bus lanes. The existing roundabout at the junction with the R139 will be converted to a signalised junction in order to provide bus priority and pedestrian/cyclist facilities. There are existing bus lanes along the R139 although construction works will be required to provide cycle lanes here.

Northbound buses on Malahide Road will move to the right-hand lane in advance of the junction with the R139 as this will allow them to easily make the right turn onto the R139. This junction will also be upgraded to provide enhanced pedestrian and cyclist facilities.

A cross-section on Clongriffin Main Street is presented in Figure 5.13.

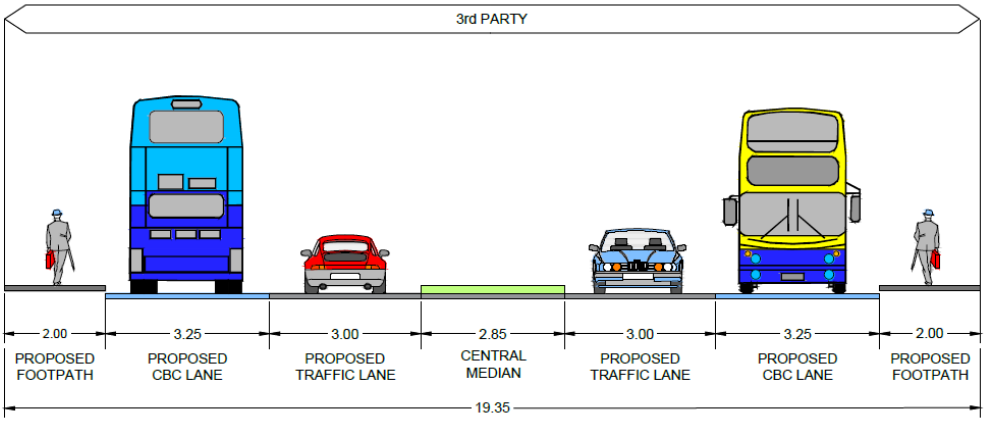


Figure 5.13 Cross Section A-A

A cross-section on the R139 is presented in Figure 5.14.

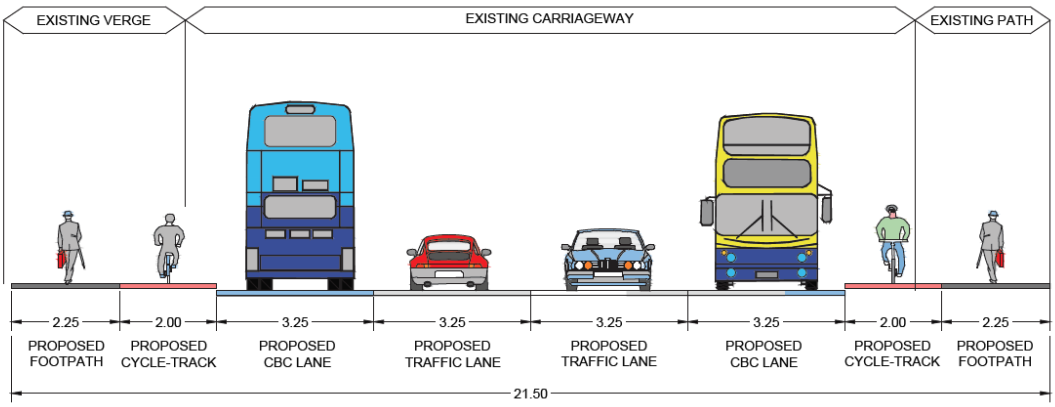


Figure 5.14 Cross Section B-B

5.3.4 Route Option 3

Route Description

Route Option 3 is presented in Figure 5.15 and described as follows.

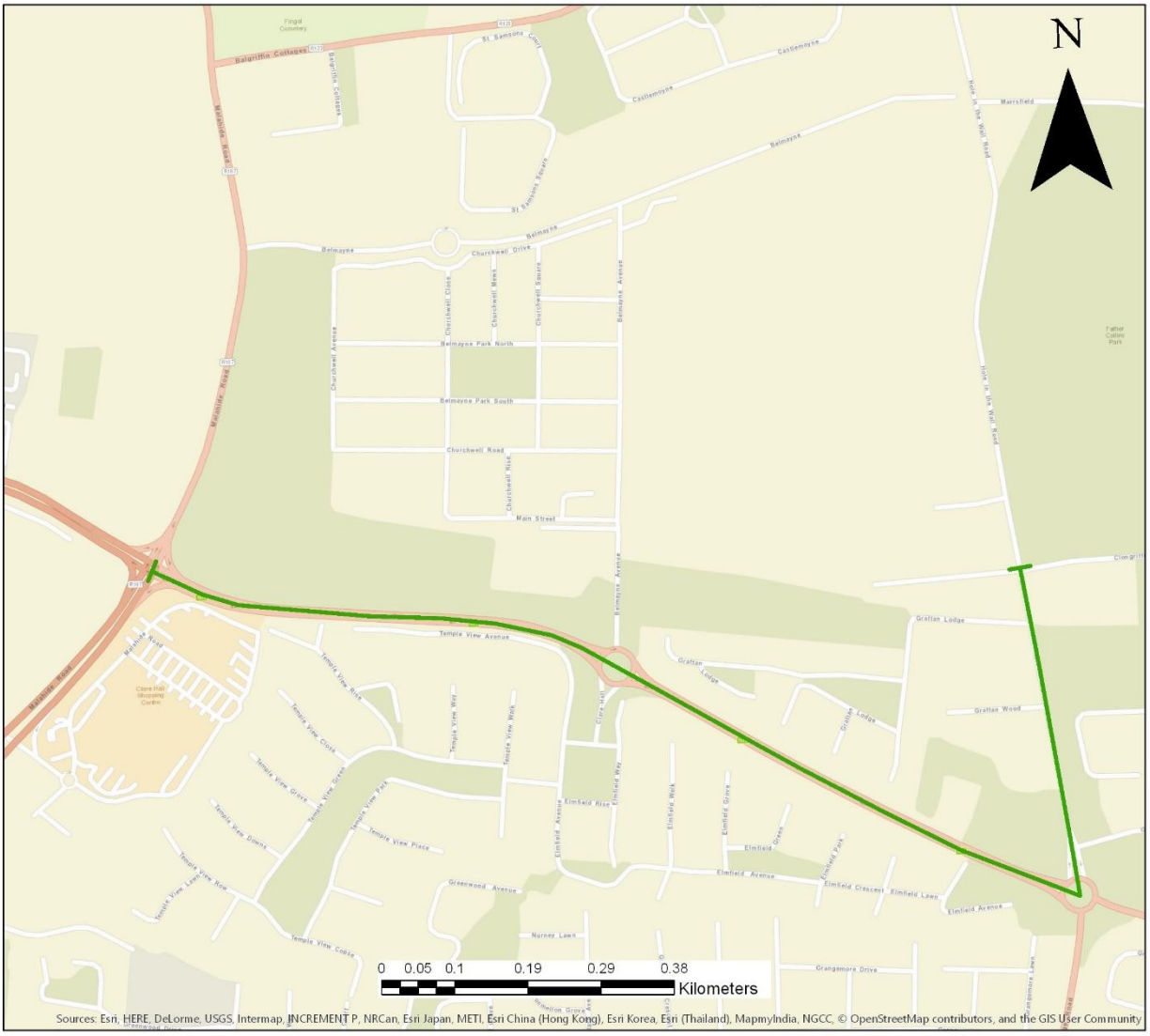


Figure 5.15 Route Option 3

Southbound: Option 3 would commence at the junction of Hole in the Wall Road and Clongriffin Main Street, from here the bus travels along the Hole in The Wall Road and then R139 to reach the junction of R139/R107 by Clarehall Shopping Centre.

Northbound: The northbound route would follow the same route as the southbound routing.

Indicative Scheme Design

Figure 5.16 illustrates the indicative scheme design for Route Option 3 as well as the location of an indicative cross-section.

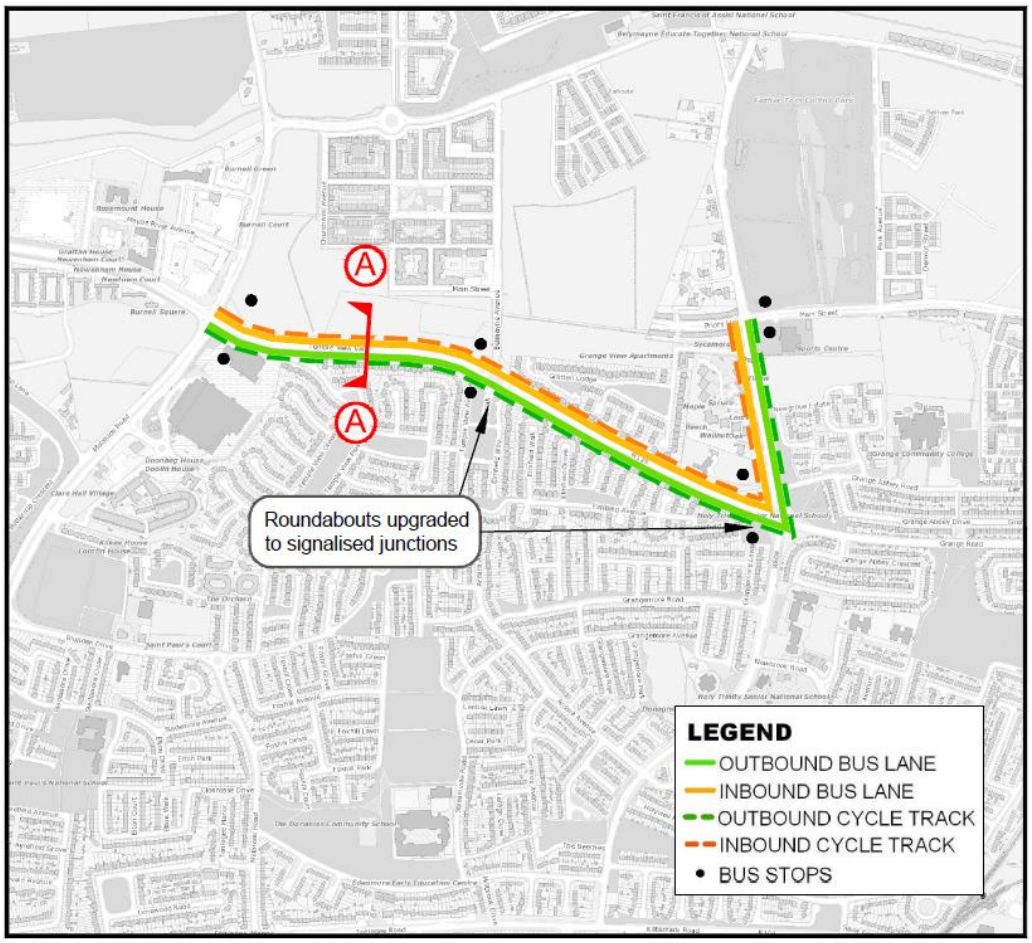


Figure 5.16 Route Option 3 Indicative Scheme Design

Bus Stops: A total of four bus stops would be provided in each direction along this route option.

The Hole in the Wall Road will be widened locally to provide bus and cycle lanes where they do not already exist. The two existing roundabouts on the R139 will be converted to signalised junctions in order to provide bus priority and pedestrian/cyclist facilities. There are existing bus lanes along the R139 although construction works will be required to provide cycle lanes here and some land take from portions of back gardens would be required on the eastern end of this road.

Northbound buses on Malahide Road will move to the right-hand lane in advance of the junction with the R139 as this will allow them to easily make the right turn onto the R139. This junction will also be upgraded to provide enhanced pedestrian and cyclist facilities.

A cross-section on the R139 is presented in Figure 5.17

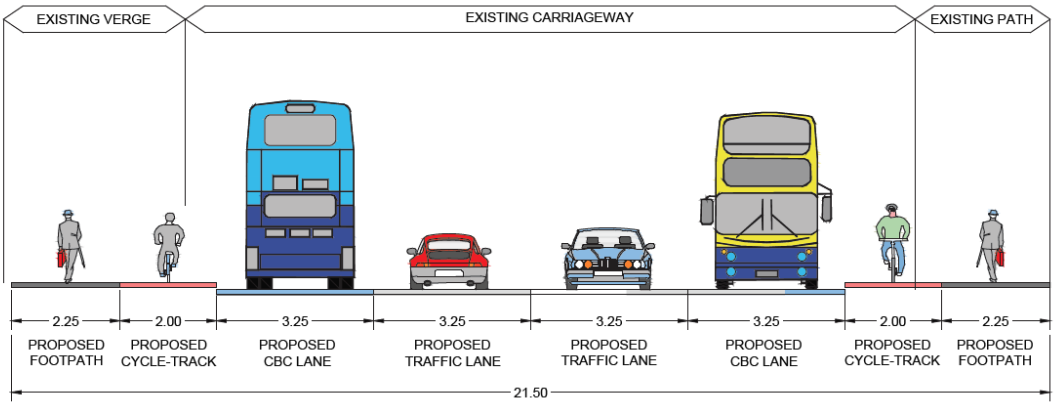


Figure 5.17 Cross Section A-A

5.3.5 Route Options Assessment

Details of the 'Stage 2' route options assessment undertaken for the Clongriffin to City Centre CBC are presented in Appendix A.

A summary of the ranking of route options against the scheme sub-criteria is presented in Table 5.4 below.

Table 5.4 Route Options Assessment Summary (Sub-Criteria)

Assessment Criteria	Sub-Criteria	Route 1	Route 2	Route 3
Economy	Capital Cost			
	Journey-time reliability and consistency			
Integration	Land Use Integration			
	Population and Employment Catchments			
	Public Transport Integration			
	Traffic Network Integration			
	Cyclists and pedestrian Integration			
Accessibility and Social Inclusion	High Volume Trip Attractors			
	Deprived Geographic Areas & Areas Underserved by Public Transport			
Safety	Road Safety			
Environment	Archaeological, Architectural and Cultural Heritage			
	Flora and Fauna			
	Soils and Geology			
	Hydrology			
	Landscape and visual			
	Noise and Vibration			
	Air Quality			
	Land Use and the Built Environment			

In terms of "Capital Cost" Route 1 and 2 have lower capital cost as they involve less construction work and only minor modifications would be required for the already completed parts of Clongriffin Main Street. Route 3 is the most expensive as it the longest route and involves road widening and land take from gardens on the eastern section of the R139.

All routes provide full bus priority however the longer length of Route 3 would result in slightly longer journey times and so it scores worse on this criterion.

Route 1 would facilitate the full completion of Clongriffin Main St as per the Belmayne/Clongriffin LAP and so scores best on the "Land Use Integration Criteria".

Route 3 scores best on the “Residential & Employment Catchment” criterion as it better serves the existing housing estates to the south. It should be noted however that these figures do not include the residents who will be housed in the planned Clongriffin/Belmayne LAP which will be better served by Routes 1 and 2

Route 3 scores best under “Pedestrian & Cycle Integration” as it is fully on a GDA CNP secondary route and cycle lanes would be provided.

Route 3 involves some land take from portions of back gardens along the R139 and so scores worst on the “Landscape & Visual” criterion

5.3.6 Conclusion

A summary of the assessment and a relative ranking for each of the five assessment criteria is shown below in **Table 5.5**

Table 5.5 Route Options Assessment Summary (Main Criteria)

Assessment Criteria	Route 1	Route 2	Route 3
Economy			
Integration			
Accessibility and Social Inclusion			
Safety			
Environment			

Based on the assessments above it has been determined that Route 1 offers the preferred route option for the following reasons:

- It has a lower capital cost than other schemes
- It has a faster and more reliable journey time than Route 3
- It facilitates the full completion of Clongriffin Main Street in accordance with the LAP
- It is more favourable under the Environmental criterion than Route 3

Route 1 is identified as the preferred option for this section and is brought forward into the Emerging Preferred Route as described in Chapter 8.

5.4 Stage 2: Route Options Assessment - Clongriffin to Artane

5.4.1 Introduction

Following the Stage 1 sifting process the 18 remaining links in this section are assembled together to form four viable route options for Section 1, as follows:

- Route Option 1: Using Kilmore Road
- Route Option 2: Using Malahide Road
- Route Option 3: Using Tonlegee Road and Howth Road.
- Route Option 4: Using Kilmore Road, Tonlegee Road and Howth Road

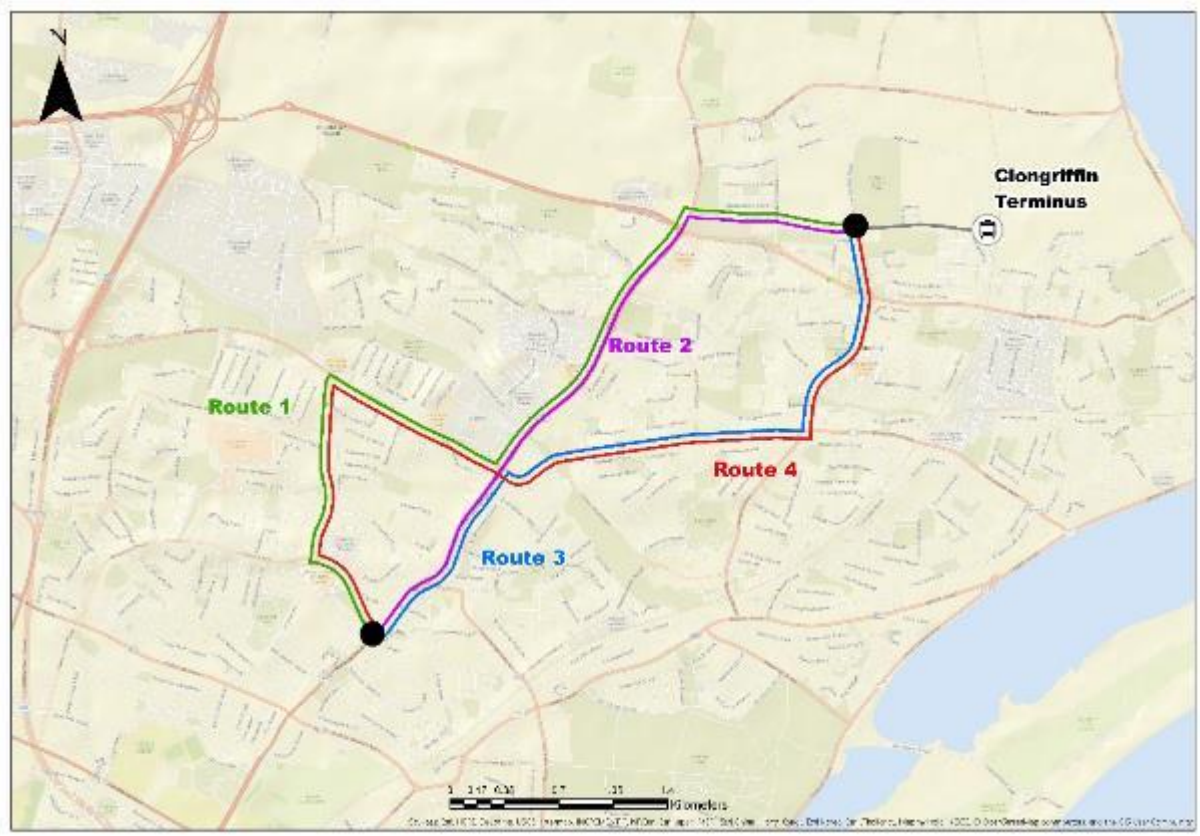


Figure 5.18 Section 1 (Clongriffin to Artane) Route Options

5.4.2 Route Option 1

Route Description

Route 1 is presented in Figure 5.19 and described as follows.

Figure 5.19 Route Option 1

Southbound: Route 1 would commence at the junction of Hole in the Wall Road and Clongriffin Main Street, from here the bus travels along Clongriffin Main Street, including some parts that are not yet constructed to join the Malahide Road. The bus continues south and turns right onto Oscar Traynor Road and travels via Kilmore Road to return to the Malahide Road.

Northbound: The northbound route would follow the same route as the southbound routing.

Route Option 1 Indicative Scheme Design

Figure 5.20 illustrates the indicative scheme design for route Option 1 as well as location of indicative cross-sections.

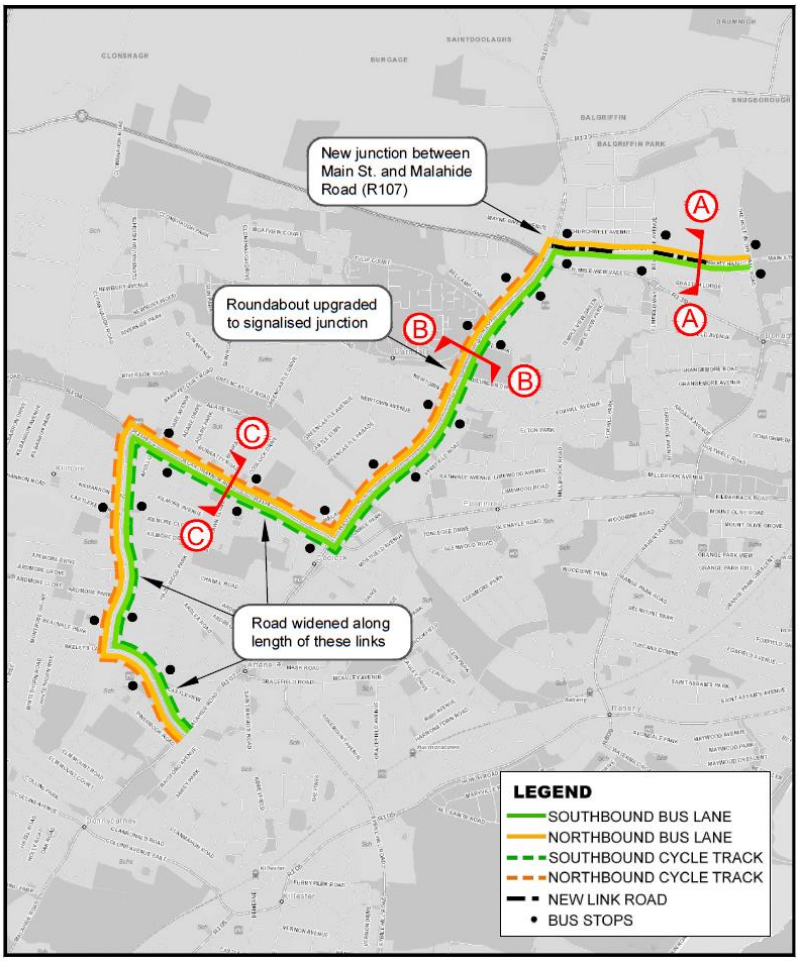


Figure 5.20 Route Option 1 Indicative Scheme Design

Bus Stops: A total of 13 bus stops would be provided in each direction along this route option.

Bus lanes will be provided for the length of the scheme. Segregated cycle lanes will be provided for the entire route south of the Northern Cross junction. Bus lanes will be constructed along Clongriffin Main Street in accordance with the LAP, these have already been constructed in some locations. A new bus only junction will be constructed where Clongriffin Main Street meets Malahide Road and signals will provide priority for buses using the CBC route. Road widening and realignment will be required to provide bus lanes on the Malahide Road section where they do not currently exist.

Further south along the Malahide Road existing bus lanes will be used by the CBC and segregated cycle lanes will be provided by using existing verge space or by reducing the width of the median where appropriate. All signalised junctions along this route will be upgraded to provide enhanced bus priority and pedestrian/cycle facilities. The existing roundabout at Priorswood Road junction will be upgraded to a signalised junction.

Oscar Traynor Road and Kilmore Road will be widened using verge/green space on either side of the road to provide bus and cycle lanes. Land take from gardens will be required in places along Kilmore Road and the cross section has been reduced in these areas, to minimise the extent of the land take.

A cross-section on Clongriffin Main Street is presented in Figure 5.21.

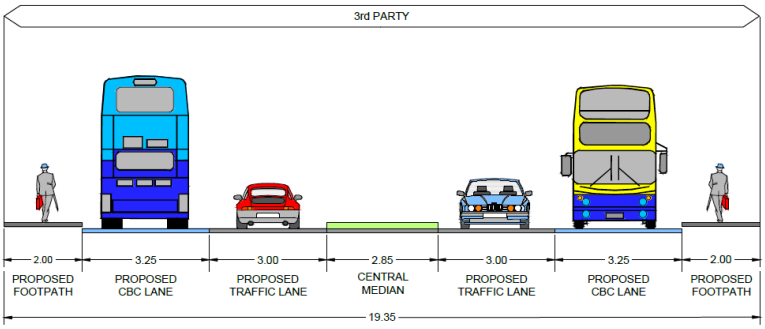


Figure 5.21 Cross Section A-A

A cross-section on Malahide Road is presented in Figure 5.22.

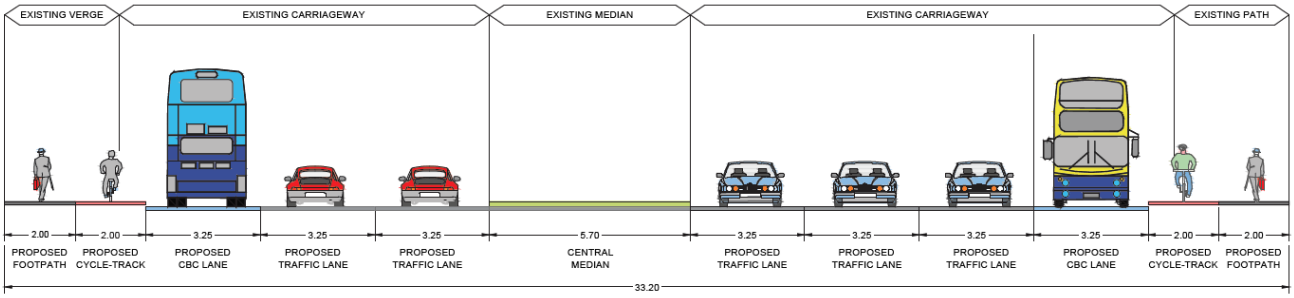


Figure 5.22 Cross Section B-B

A cross-section on Oscar Traynor Road is presented in Figure 5.23

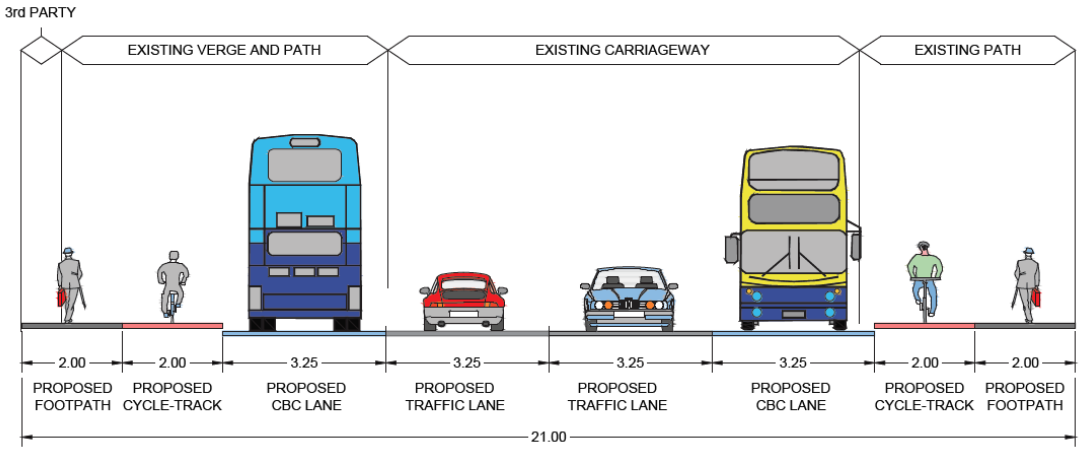


Figure 5.23 - Cross Section C-C

5.4.3 Route Option 2

Route Description

Route Option 2 is presented in Figure 5.24 and described as follows.

Figure 5.24 Route Option 2

Southbound: Route 2 would at the junction of Hole in the Wall Road and Clongriffin Main Street, from here the bus travels along Clongriffin Main Street, including some parts that are not yet constructed to join the Malahide Road. From here the bus continues south along the Malahide Road until it reaches the junction with Kilmore Road.

Northbound: The northbound route would follow the same route as the southbound routing.

Indicative Scheme Design

Figure 5.25 illustrates the indicative scheme design for Route Option 2 as well as the location of indicative cross-sections.

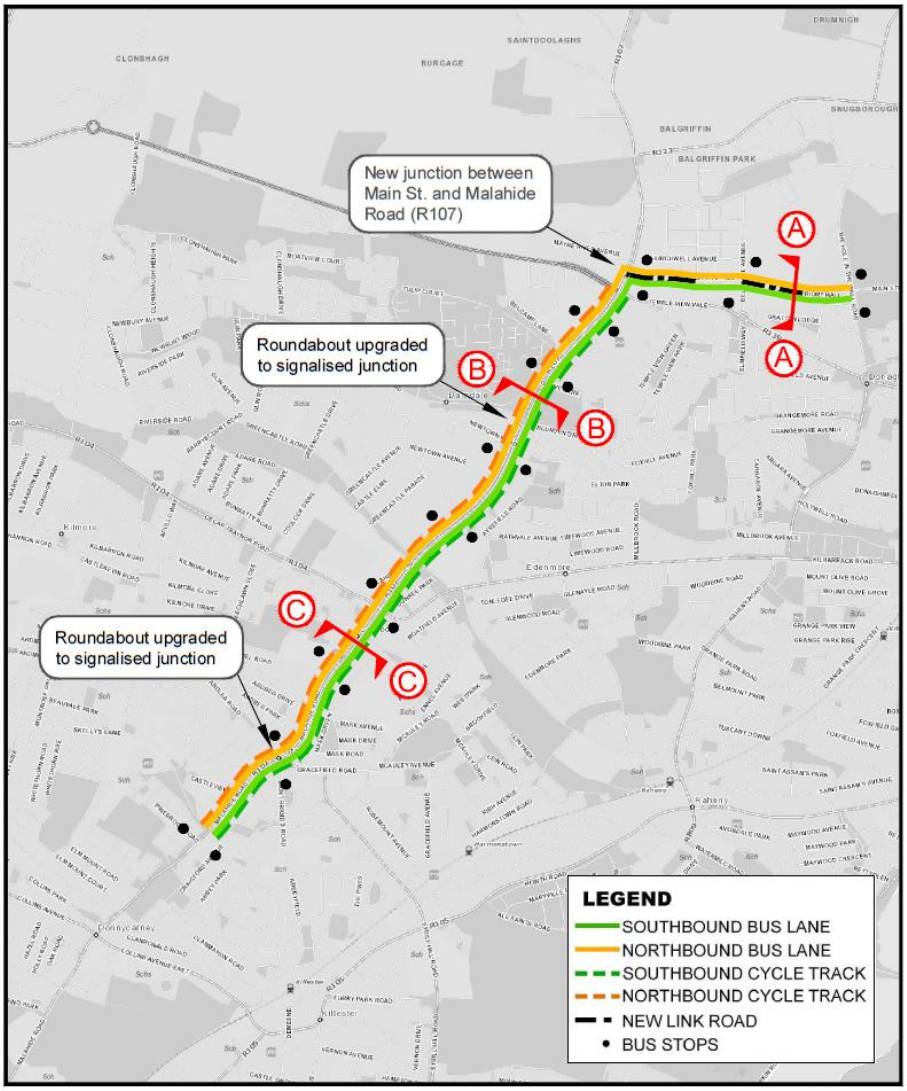


Figure 5.25 Route Option 2 Indicative Scheme Design

Bus Stops: A total of 11 bus stops would be provided in each direction along this route option.

Bus lanes will be provided for the entire length of the scheme. Segregated cycle lanes will be provided for the entire route south of the Northern Cross junction. Bus lanes will be constructed along Clongriffin Main Street in accordance with the LAP, these have already been constructed in some locations. A new bus only junction will be constructed where Clongriffin Main Street meets Malahide Road and signals will provide priority for buses using the CBC route. Road widening and realignment will be required to provide bus lanes on the Malahide Road section where they do not currently exist.

Further south along the Malahide Road existing bus lanes will be used by the CBC and segregated cycle lanes will be provided by using existing verge space or by reducing the width of the median where appropriate. All signalised junctions along this route will be upgraded to provide enhanced bus priority and pedestrian/cycle facilities. The existing roundabouts at Artane and at Priorswood Road junction will be upgraded to signalised junctions. Some commercial parking north of the junction with Kilmore Road will be

affected. Some land take from portions of 10 gardens north of Kilmore Road would also be required, residential parking in these gardens will still be possible.

A cross-section on Clongriffin Main Street is presented in Figure 5.26

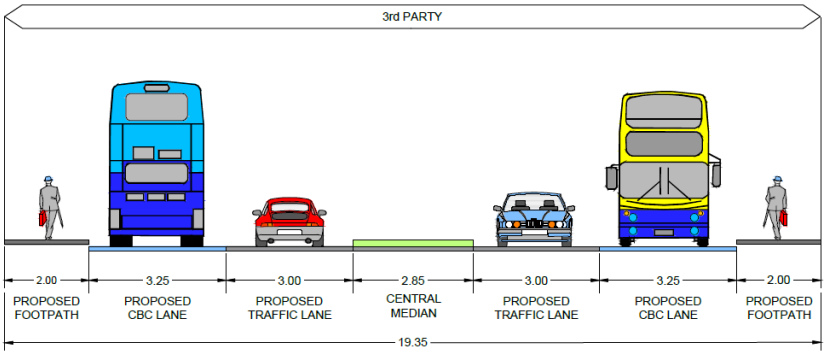


Figure 5.26 Cross Section A-A

A cross-section on Malahide Road is presented in Figure 5.27

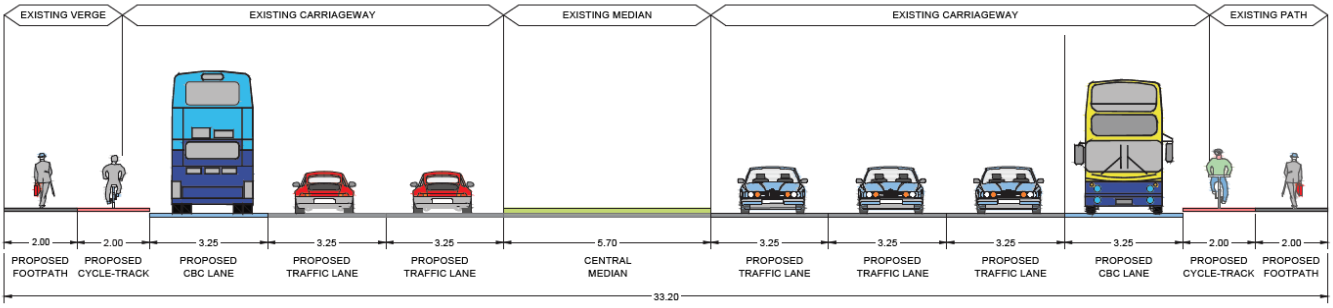


Figure 5.27 Cross Section B-B

A second cross-section further along Malahide Road is presented in Figure 5.28

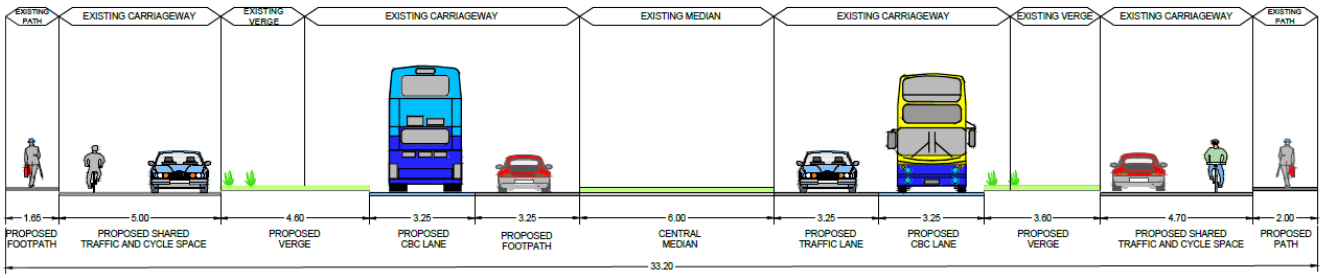


Figure 5.28 - Cross Section C-C

5.4.4 Route Option 3

Route Description

Route Option 3 is presented in Figure 5.29 and described as follows.

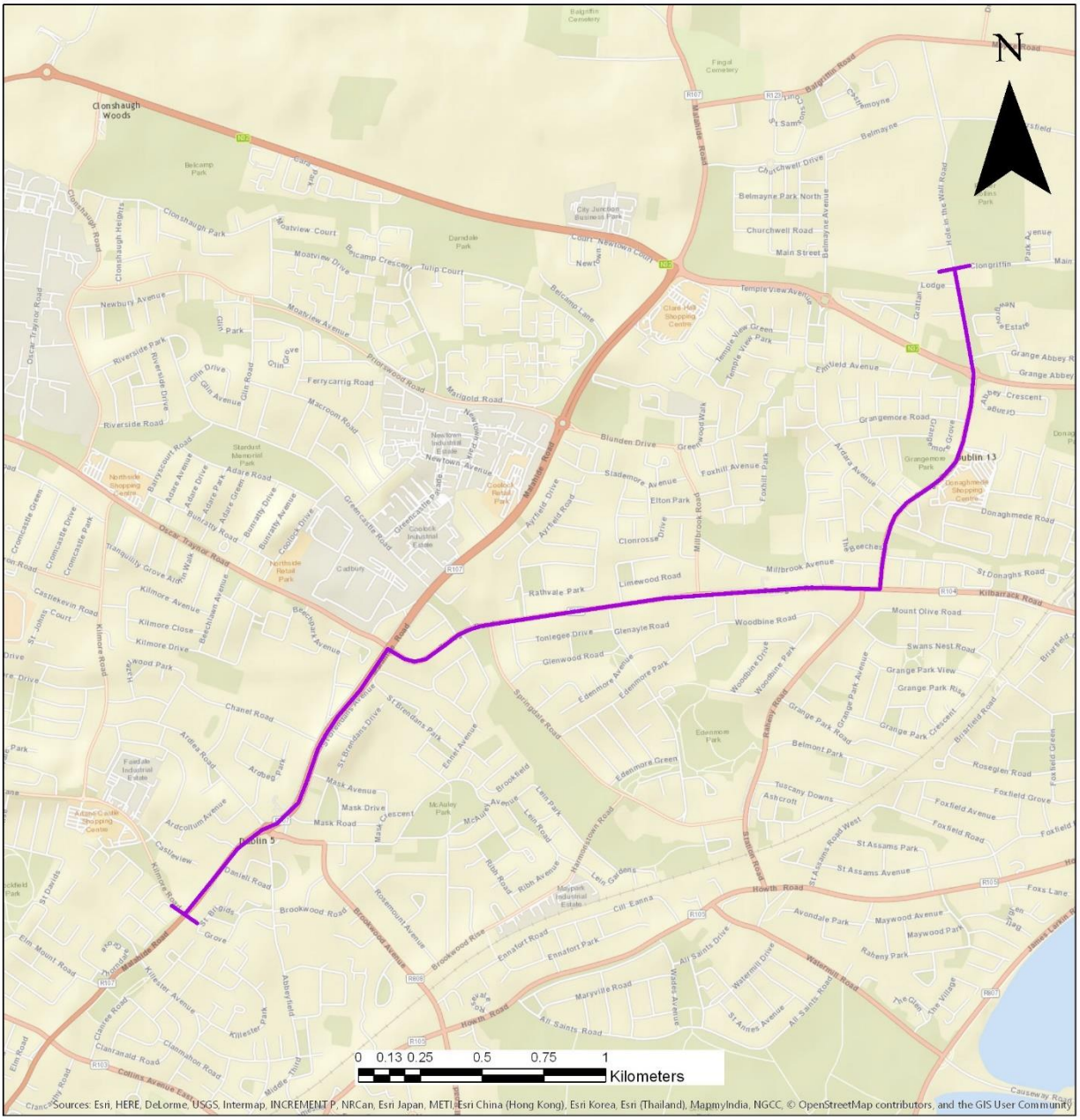


Figure 5.29 Route Option 3

Southbound: Route 3 would commence at the junction of Hole in the Wall Road and Clongriffin Main Street, from here the bus travels along Hole in the Wall Road, Grange Road and Tonlegee Road to reach the Malahide Road, form here the bus continues south along the Malahide Road until it reaches the junction with Kilmore Road.

Northbound: The northbound route would follow the same route as the southbound routing.

Indicative Scheme Design

Figure 5.30 illustrates the indicative scheme design for Route Option 3 as well as the location of indicative cross-sections.

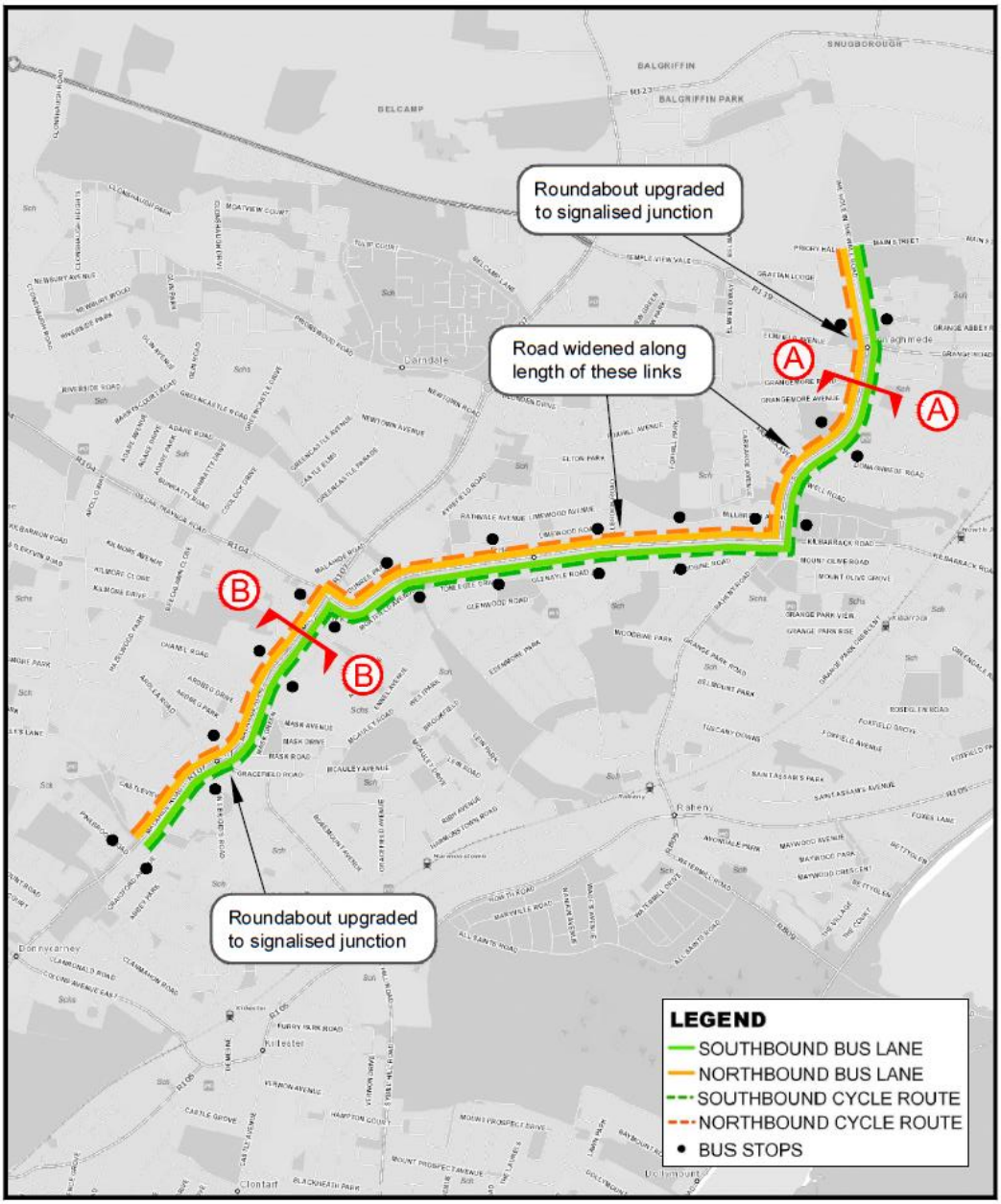


Figure 5.30 Route Option 3 Indicative Scheme Design

Bus Stops: A total of 11 bus stops would be provided in each direction along this route option.

Bus and segregated cycle lanes will be provided for the entire length of the scheme. The Hole in the Wall Road will be widened locally to provide bus and cycle lanes where they do not already exist. The existing roundabout at the R139 junction will be converted to a signalised crossroads. Significant road widening would be required on Grange Road and Tonlegee Road, this can mostly be achieved by using green space either side of the road however land take would be required from portions of front gardens along the western half of Tonlegee Road, the cross section would be reduced here to minimise land-take from gardens.

Along the Malahide Road existing bus lanes will be used by the CBC and segregated cycle lanes will be provided by using existing verge space or by reducing the width of the median where appropriate. All

signalised junctions along this route will be upgraded to provide enhanced bus priority and pedestrian/cycle facilities. The existing roundabout at Artane will be upgraded to a signalised junction. Some parking north of the junction with Kilmore Road will be affected. Some commercial parking north of the junction with Kilmore Road will be affected. Some land take from portions of 10 gardens north of Kilmore Road would also be required, residential parking in these gardens will still be possible.

A cross-section on Grange Road is presented in Figure 5.31

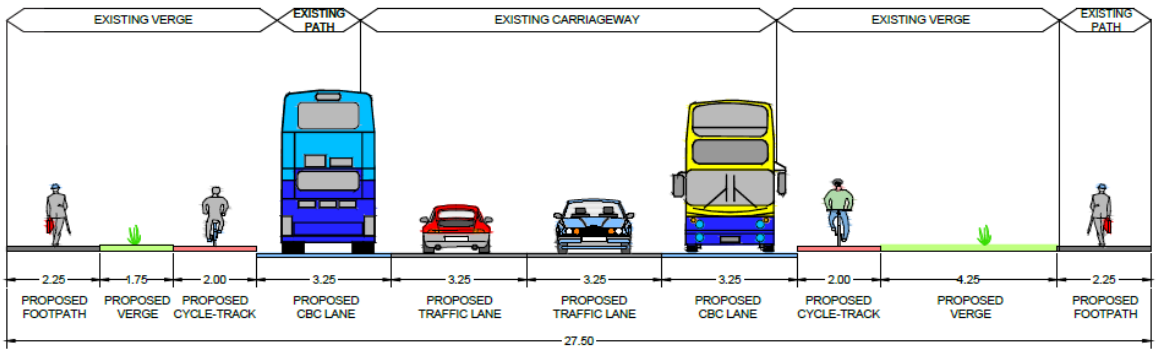


Figure 5.31 Cross Section A-A

A cross-section on Malahide Road is presented in Figure 5.32

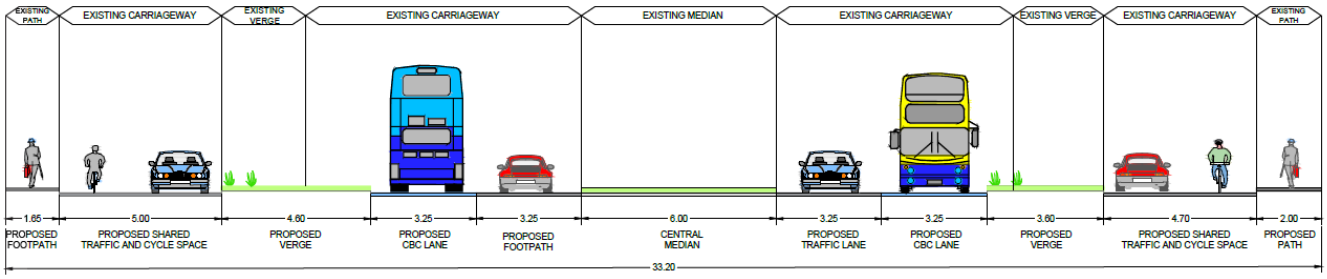


Figure 5.32 Cross Section B-B

5.4.5 Route Option 4

Route Description

Route Option 4 is presented in Figure 5.33 and described as follows.

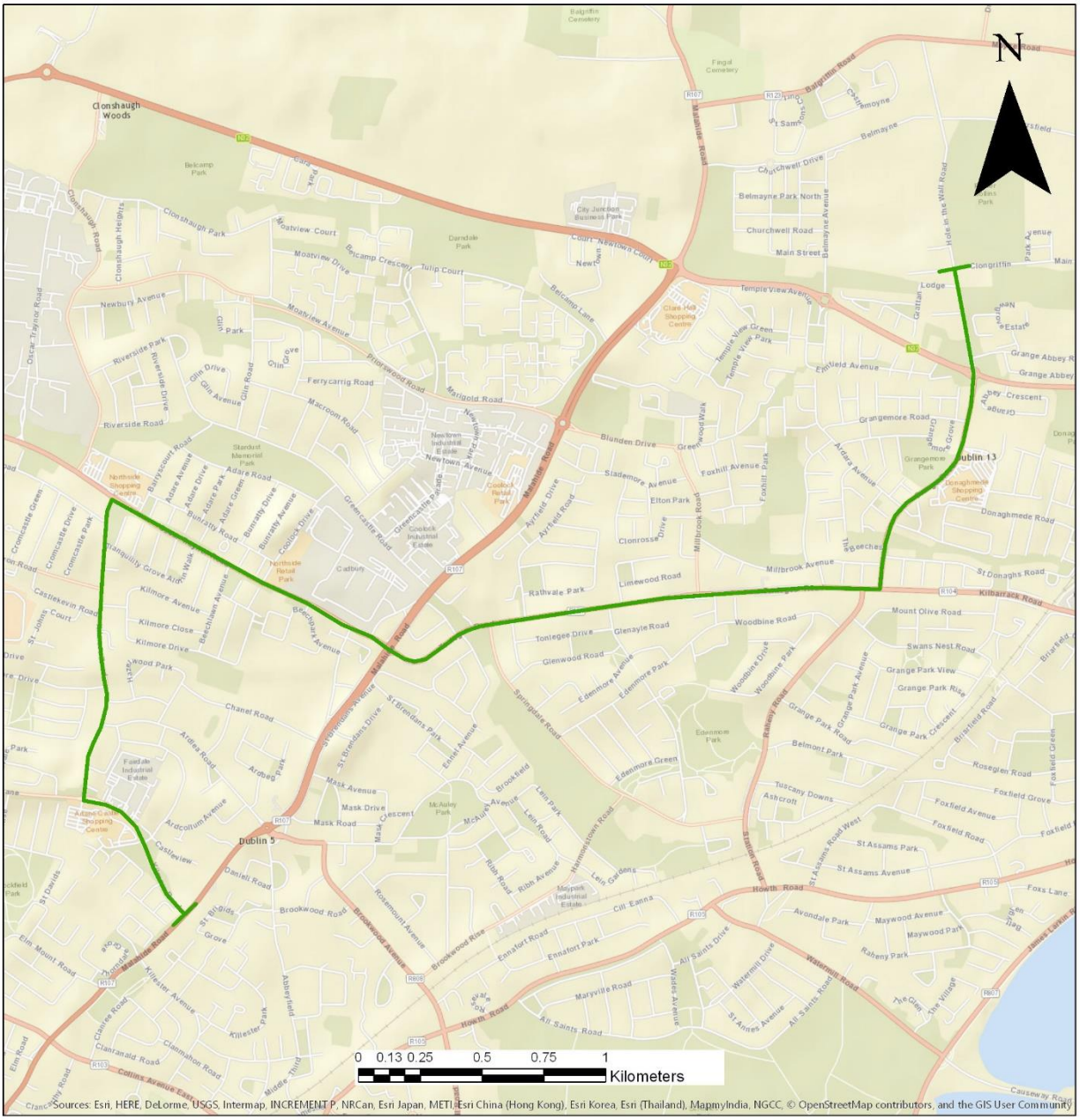


Figure 5.33 Route Option 4

Southbound: Route 4 would commence at the junction of Hole in the Wall Road and Clongriffin Main Street, from here the bus travels along Hole in the Wall Road, Grange Road, Tonlegee Road, Oscar Traynor Road and Kilmore Road to reach the junction with the Malahide Road.

Northbound: The northbound route would follow the same route as the southbound routing.

Indicative Scheme Design

Figure 5.34 illustrates the indicative scheme design for Route Option 4 as well as the location of indicative cross-sections.

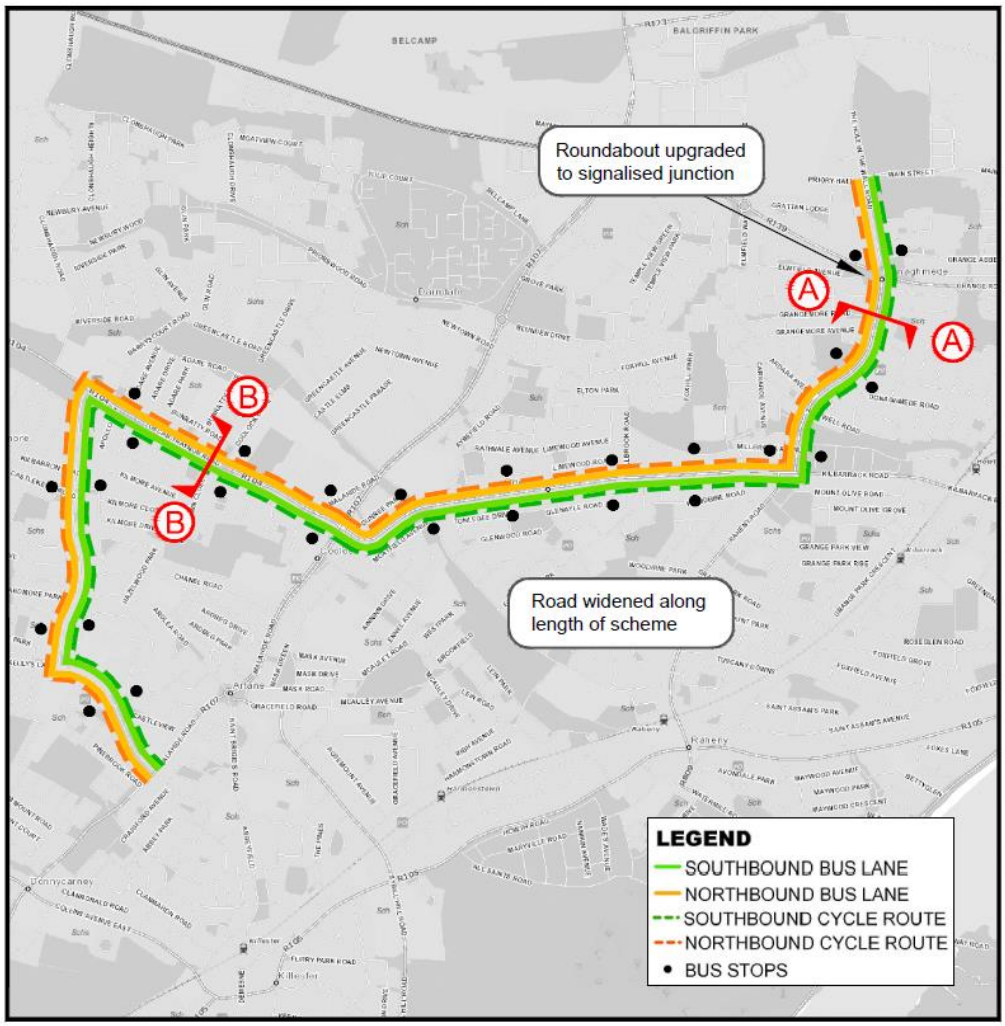


Figure 5.34 Route Option 4 Indicative Scheme Design

Bus Stops: A total of 13 bus stops would be provided in each direction along this route option.

Bus and segregated cycle lanes will be provided for the entire length of the scheme. The Hole in the Wall Road will be widened locally to provide bus and cycle lanes where they do not already exist. The existing roundabout at the R139 junction will be converted to a signalised crossroads. Significant road widening would be required on Grange Road and Tonlegee Road, this can mostly be achieved by using green space either side of the road however land take would be required from front gardens along the western half of Tonlegee Road. Cross section is minimised here to reduce land-take from gardens.

Oscar Traynor Road and Kilmore Road will be widened using verge/green space on either side of the road to provide bus and cycle lanes. Land take from gardens will be required in places along Kilmore Road and the cross section has been reduced in these areas to avoid properties, with narrower cycle lanes and no grass verge proposed. All signalised junctions along this route will be upgraded to provide enhanced bus priority and pedestrian/cycle facilities.

A cross-section on Grange Road is presented in Figure 5.35.

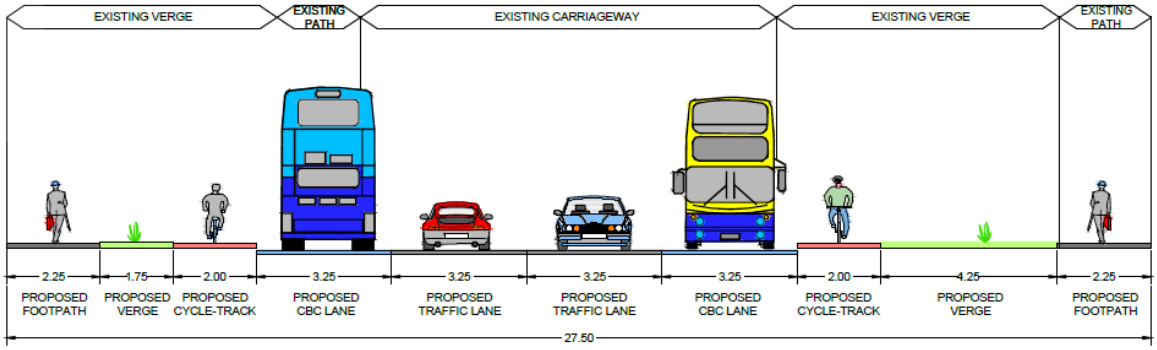


Figure 5.35 Cross Section A-A

A cross-section on Oscar Traynor Road is presented in Figure 5.36

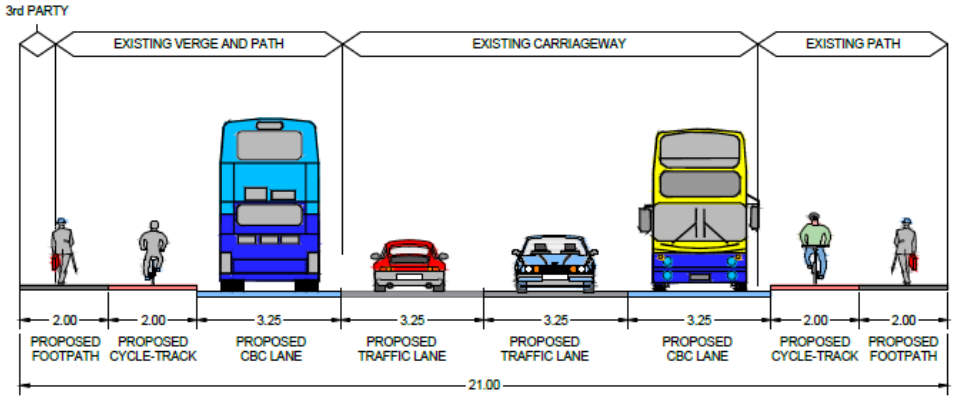


Figure 5.36 Cross Section B-B

5.4.6 Route Options Assessment

Details of the 'Stage 2' route options assessment undertaken for the Clongriffin to City Centre CBC are presented in **Appendix A**.

A summary of the ranking of route options against the scheme sub-criteria is presented in Table 5.6 below.

Table 5.6 Route Options Assessment Summary (Sub-Criteria)

Assessment Criteria	Sub-Criteria	Route 1	Route 2	Route 3	Route 4
Economy	Capital Cost				
	Journey-time reliability and consistency				
Integration	Land Use Integration				
	Population and Employment Catchments				
	Public Transport Integration				
	Traffic Network Integration				
	Cyclists and pedestrian Integration				
Accessibility and Social Inclusion	High Volume Trip Attractors				
	Deprived Geographic Areas & Areas Underserved by Public Transport				
Safety	Road Safety				
Environment	Archaeological, Architectural and Cultural Heritage				
	Flora and Fauna				
	Soils and Geology				
	Hydrology				
	Landscape and visual				
	Noise and Vibration				
	Air Quality				
	Land Use and the Built Environment				

In terms of "Economy" route options which travel along the Malahide Road are determined to be comparatively more favourable than alternatives, with Route 2 scoring higher in comparison to other options. This is mainly due to the wide road reservation, existing bus lanes and the shorter route length. It also provides the most direct route and hence is move favourable in terms of "Journey Time Reliability and Consistency".

In terms of Integration, Routes 1 and 2 would facilitate the completion of Clongriffin Main Street and so score higher in the "Land Use Integration" criterion. Routes 1 and 4 are longer and pass through areas of slightly higher population density and so score higher on the "Population and Employment Catchment" criterion. As comparatively fewer new bus lanes and interventions at junctions would be required for Route 2 it scores better on the "Traffic Network Integration" criterion. Route 2 would provide cycle lanes for a longer length of a GDA CNP primary route and so scores higher in terms of "Cycle and Pedestrian Integration"

In terms of “Accessibility and Social Inclusion” Route 4 serves a slightly higher number of key trip attractors by passing closer to more schools and shopping centres, Routes 1 and 2 better serve the deprived areas around Darndale and so score higher on the “Deprived Geographic Areas” criterion.

Route 2 would involve fewer turning movements for the buses and so is considered more favourable than the alternatives in terms of “Safety”.

In terms of Environment routes along the Malahide Road are considered favourable over alternatives, this is due to the significantly lower land take and construction works that would be required due to the existing bus lanes and wide road reservation.

5.4.7 Conclusion

A summary of the assessment and a relative ranking for each of the five assessment criteria is shown below in **Table 5.7**

Table 5.7 Route Options Assessment Summary (Main Criteria)

Assessment Criteria	Route 1	Route 2	Route 3	Route 4
Economy				
Integration				
Accessibility and Social inclusion				
Safety				
Environment				

Based on the assessments above it has been determined that Route 2 offers the preferred route option for the following reasons:

- It has a significantly lower capital cost than other routes
- It has a faster and more reliable journey time than other routes
- It scores better on Safety than other routes
- It is significantly more favourable under the Environmental criterion than other routes

Route 2 is identified as the preferred option for this section and is brought forward into the Emerging Preferred Route as described in Chapter 8.

5.5 Common Section – Malahide Road (Kilmore Road to Griffith Ave)

5.5.1 Introduction

Following the Stage 1 sifting process the three remaining links are assembled together to form only one viable route option for this section.

Route Description

The preferred route option is presented in **Figure 5.37** and described as follows.

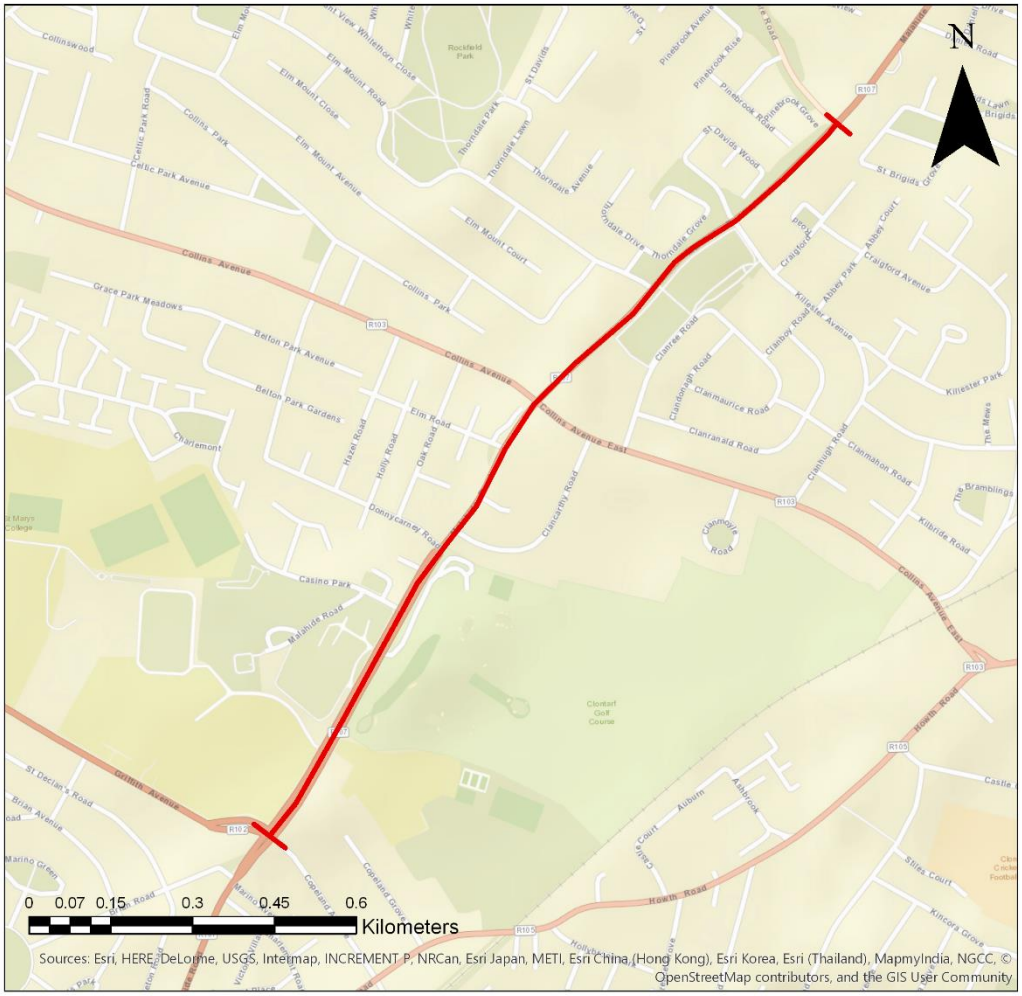


Figure 5.37 Section 1 (Kimore Rd to Griffith Ave) Route Option

Southbound: All routes would commence at the junction of Malahide Road and Kilmore Road, from here the bus travels along the Malahide Road until it reaches the junction with Griffith Avenue.

Northbound: The northbound route would follow the same route as the southbound routing.

Indicative Scheme Design

Figure 5.38 illustrates the indicative scheme design as well as the location of indicative cross-sections.

Figure 5.38 Indicative Scheme Design

Bus Stops: A total of five bus stops would be provided in each direction along this route option.

Bus lanes and segregated cycle lanes will be provided for the entire length of the scheme. The Malahide Road will be widened to provide bus lanes on the sections where they do not currently exist, and new segregated cycle lanes will be provided for the whole length. Road widening can mostly be facilitated with land take from public green areas, parks, playing fields of Ardscoil Ris and land from Clontarf Golf Club. However, land take from portions of front gardens would be required either side of the junction with Collins Avenue. In these sections, the cross section will be reduced to minimise land take as no suitable alternate

cycle routes were found. The section between Elm Road and Donnycarney Road is particularly constrained and over this section the widths of the cycle tracks have been reduced to 1.5m each in order to balance the need for residential parking and cycle safety.

Approximately 15 gardens south of Collins Avenue junction will be affected. Parking capacity in these gardens will be reduced, but parking will still be available in the gardens. All junctions will be upgraded to provide bus priority and enhanced pedestrian/cyclist facilities.

A cross-section on Malahide Road in the most constrained section is presented in Figure 5.39

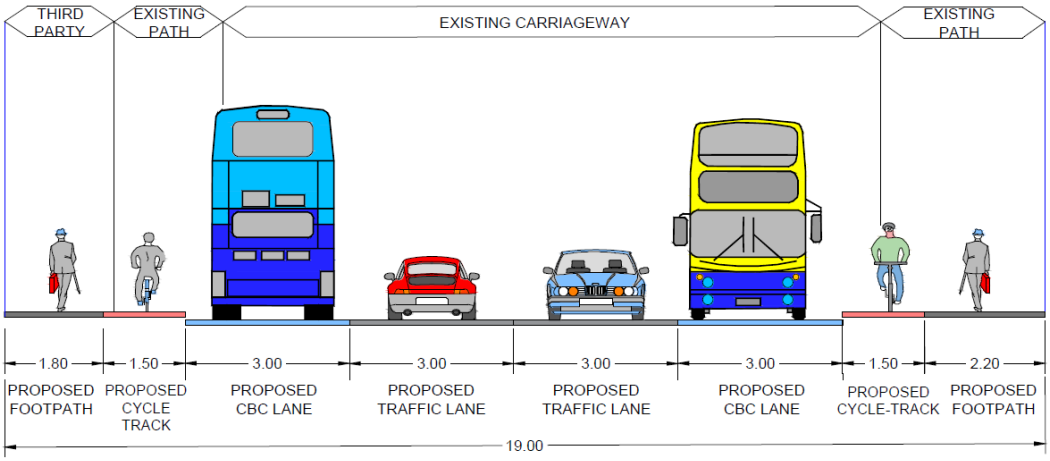


Figure 5.39 Cross Section A-A

A second cross-section further along Malahide Road is presented in Figure 5.40

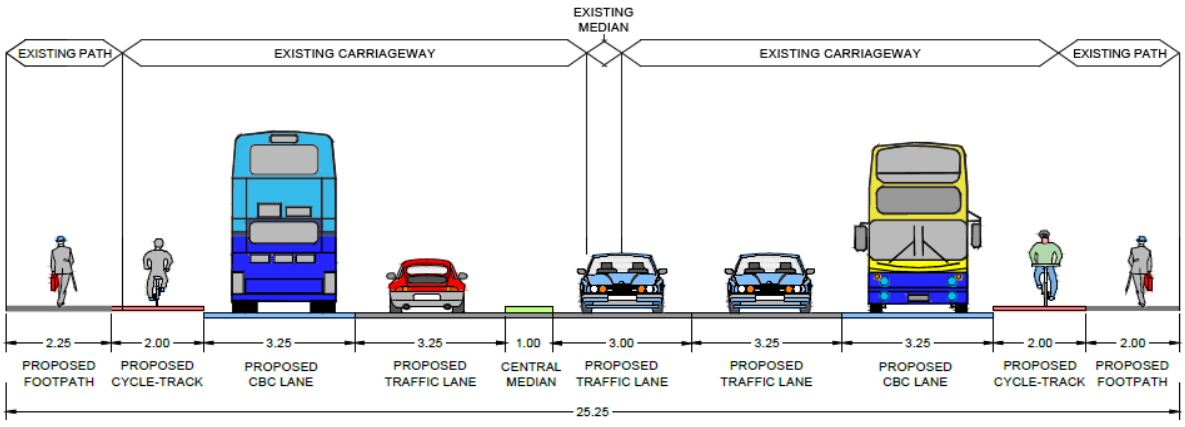


Figure 5.40 Cross Section B-B

5.6 Stage 2: Route Options Assessment - Malahide Road (Griffith Avenue to Clontarf Road)

5.6.1 Introduction

Following the Stage 1 sifting process the three remaining links are assembled together to form only one viable route option for this section. However, as this section is particularly constrained, four Scheme Options have been developed to mitigate the impacts on residents along the most constrained section, which is the southern end of Malahide Road as it approaches Marino Mart. It was not considered feasible to provide dedicated bus, cycle and traffic lanes in both directions through this section, as this would mean all parking in a number of residents' gardens would be removed and no suitable alternative could be found.

Route Description

All Schemes follow the same route as presented in **Figure 5.41** and described as follows.

Figure 5.41 Section 1 (Griffith Ave to Clontarf Rd) Route Option

Southbound: All routes would commence at the junction of Malahide Road and Griffith Avenue, from here the bus travels along the Malahide Road until it reaches the junction with Clontarf Road. The bus then turns right onto Marino Mart and continues along Annesley Bridge Road to reach Annesley Bridge

Northbound: The northbound route would follow the same route as the southbound routing.

5.6.2 Scheme Option 1 - Indicative Scheme Design

Figure 5.42 illustrates the indicative scheme design for Route Option 4 as well as the location of indicative cross-sections.

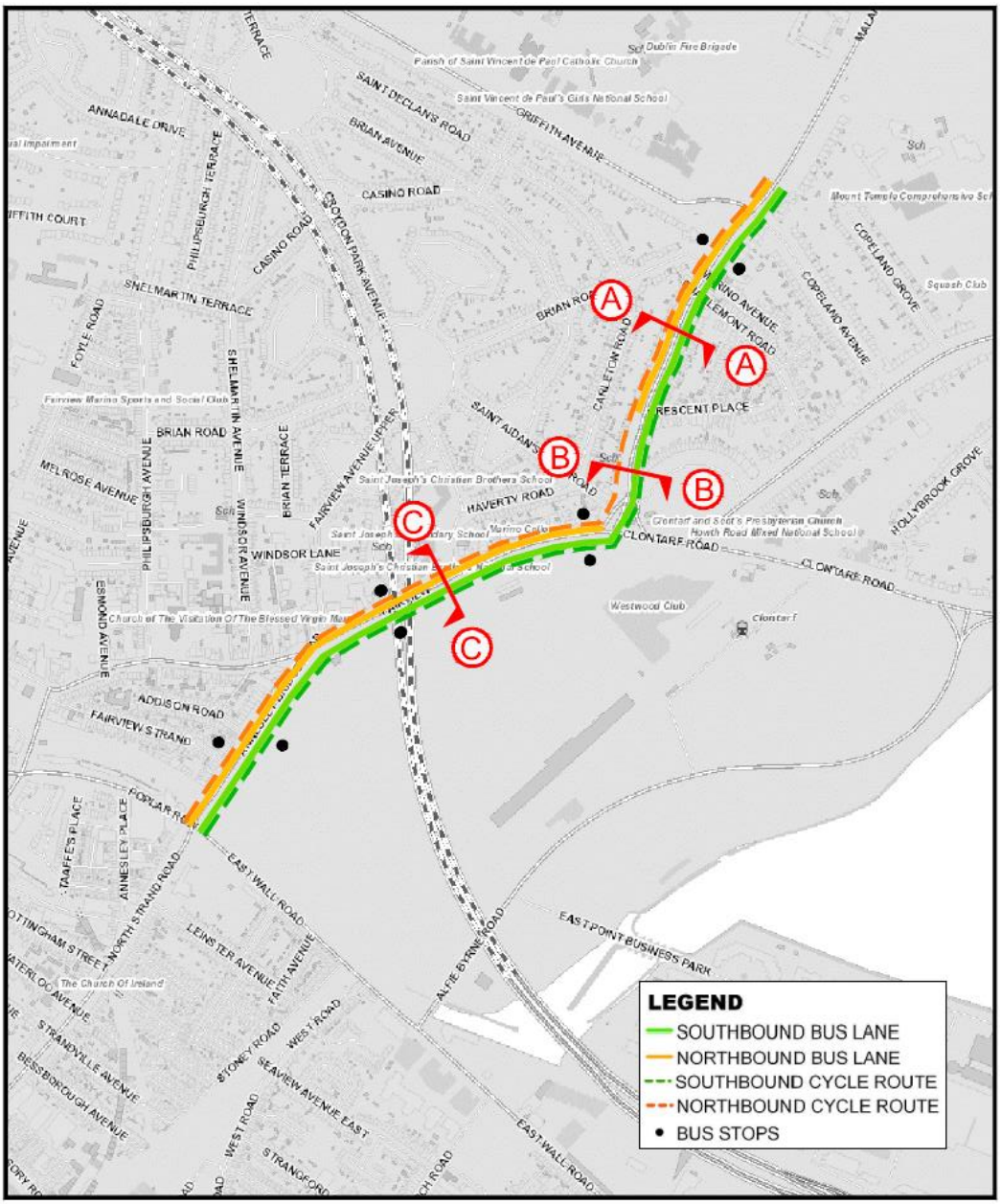


Figure 5.42 Route Option 2 Indicative Scheme Design

Bus Stops: A total of four bus stops would be provided in each direction along this route option.

Scheme 1 provides bus and cycle lanes in both directions through with the exception that northbound buses would be required to share a lane with traffic for a 200m length at the southern end of Malahide Road. Land take would be required from portions of front gardens of residential properties to achieve this and the cross section and lane widths have been reduced in order to keep land take to a minimum.

No northbound bus lane is provided until after the most constrained section at the southern end of Malahide Road has been passed. A dedicated bus signal would be provided for left turning buses on Marino Mart. The queue length data from the junction at Collins Avenue indicates that the maximum queue length stretched back 130 metres in the PM peak, and so delays for buses on this shared section should not be

too significant. The required land take would reduce the parking capacity in 12 gardens although at least one parking space would remain in each garden. There is currently 75 metres of off-peak commercial parking in the southbound bus lane, this will be removed as part of all schemes.

The section along Marino Mart and Annesley Bridge Road will be the same for all four schemes and will be in accordance with the Clontarf to City Centre Cycle Scheme, which provides bus priority and segregated cycle facilities in both directions. This scheme favours removing a lane of inbound traffic on Marino Mart over the removal of some trees in the footpath alongside Fairview Park. This lane removal also facilitates the provision of cycle lanes through the pinch point where the road passes under the existing pedestrian footbridge. On-street parking and loading will be affected but will be maintained wherever practical.

The junction at Malahide Road/Clontarf Road will be upgraded and a lane of southbound traffic will be removed, this will affect the capacity of the junction. The junction with Fairview Strand will also be upgraded to provide enhanced pedestrian and cyclist facilities.

A cross-section on Malahide Road is presented in Figure 5.43.

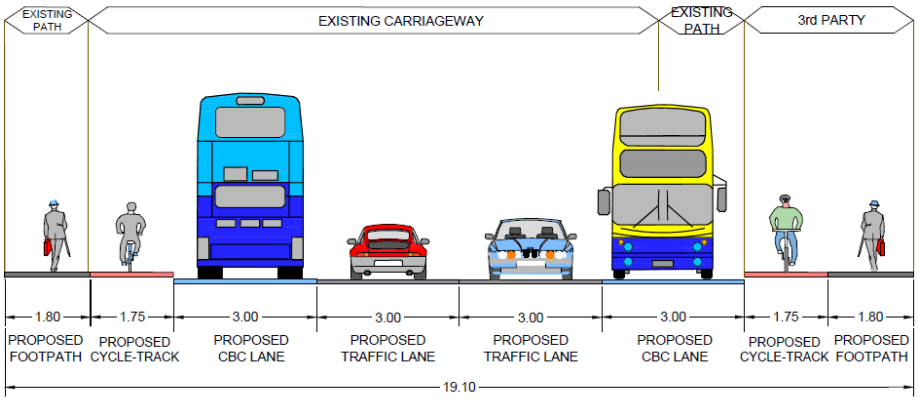


Figure 5.43 Cross Section A-A

A cross-section on Malahide Road at the section without a northbound bus lane is presented in Figure 5.44

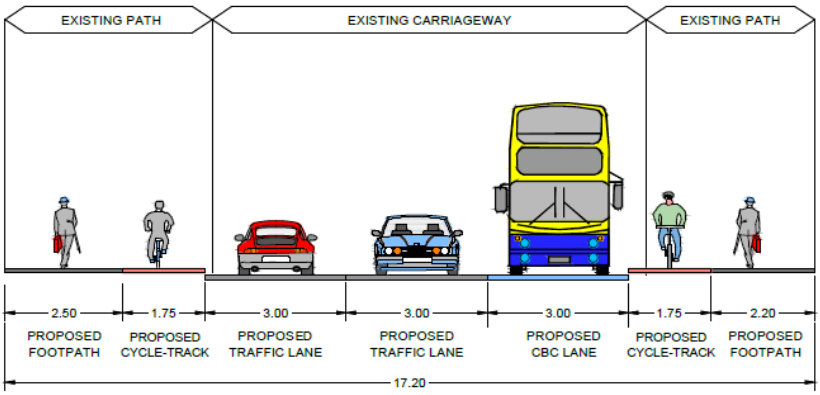


Figure 5.44 Cross Section B-B

A cross-section on Marino Mart is presented in **Figure 5.45**

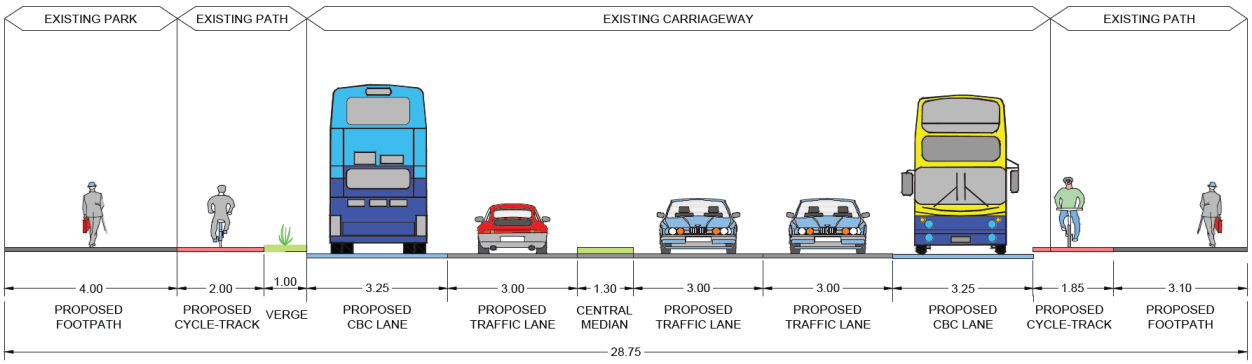


Figure 5.45 Cross Section C-C

5.6.3 Scheme Option 2 - Indicative Scheme Design

Figure 5.46 illustrates the indicative scheme design for Route Option 2 as well as the location of indicative cross-sections.

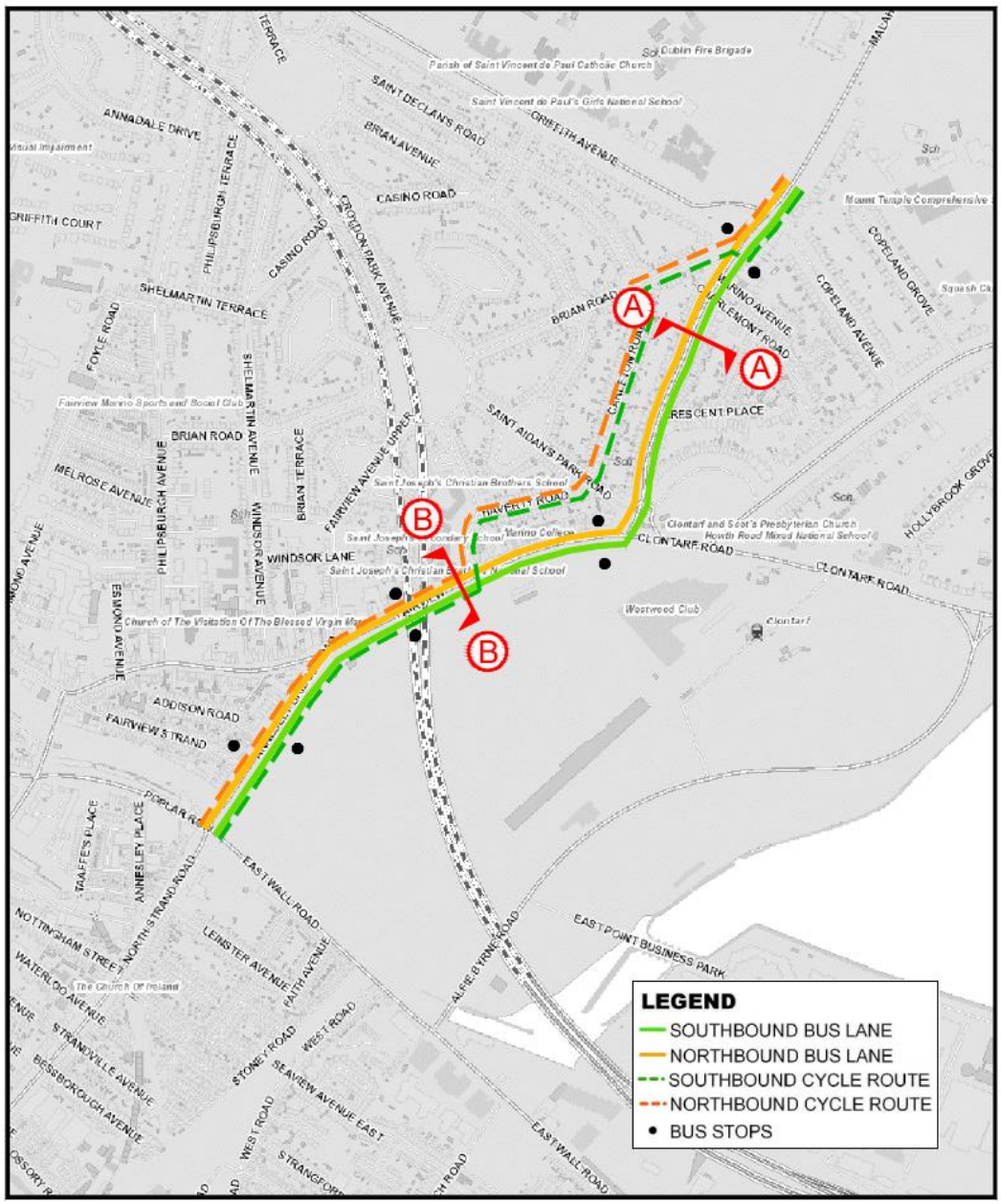


Figure 5.46 Route Option 4 Indicative Scheme Design

Bus Stops: A total of four bus stops would be provided in each direction along this route option.

This scheme is similar to Scheme 1 except that cyclists in both directions would be diverted along Haverty Road and Brian Road and this would allow continuous bus lanes to be provided in both directions. Southbound cyclists would be required to cross the road twice and two new toucan crossings would need to be introduced. It is likely many southbound cyclists would continue to use Malahide Road, and this may delay buses, although cyclists will be travelling downhill for this section.

This scheme has a cross section of 15.6m and as a result only 3 gardens would have their parking capacity reduced and parking would remain possible in all gardens where residents currently park.

A cross-section on Malahide Road is presented in Figure 5.47

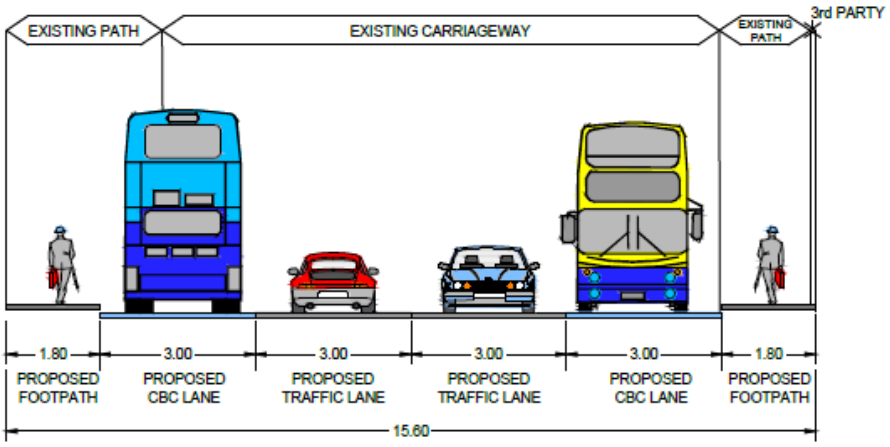


Figure 5.47 Cross Section A-A

A cross-section on Marino Mart is presented in Figure 5.48

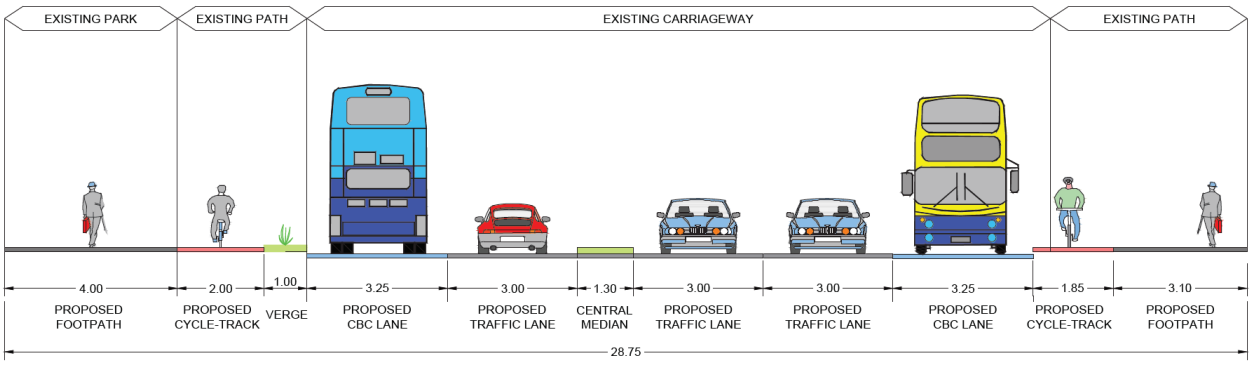


Figure 5.48 Cross Section B-B

5.6.4 Scheme Option 3 - Indicative Scheme Design

Figure 5.59 illustrates the indicative scheme design for Option 3 as well as the location of indicative cross-sections.

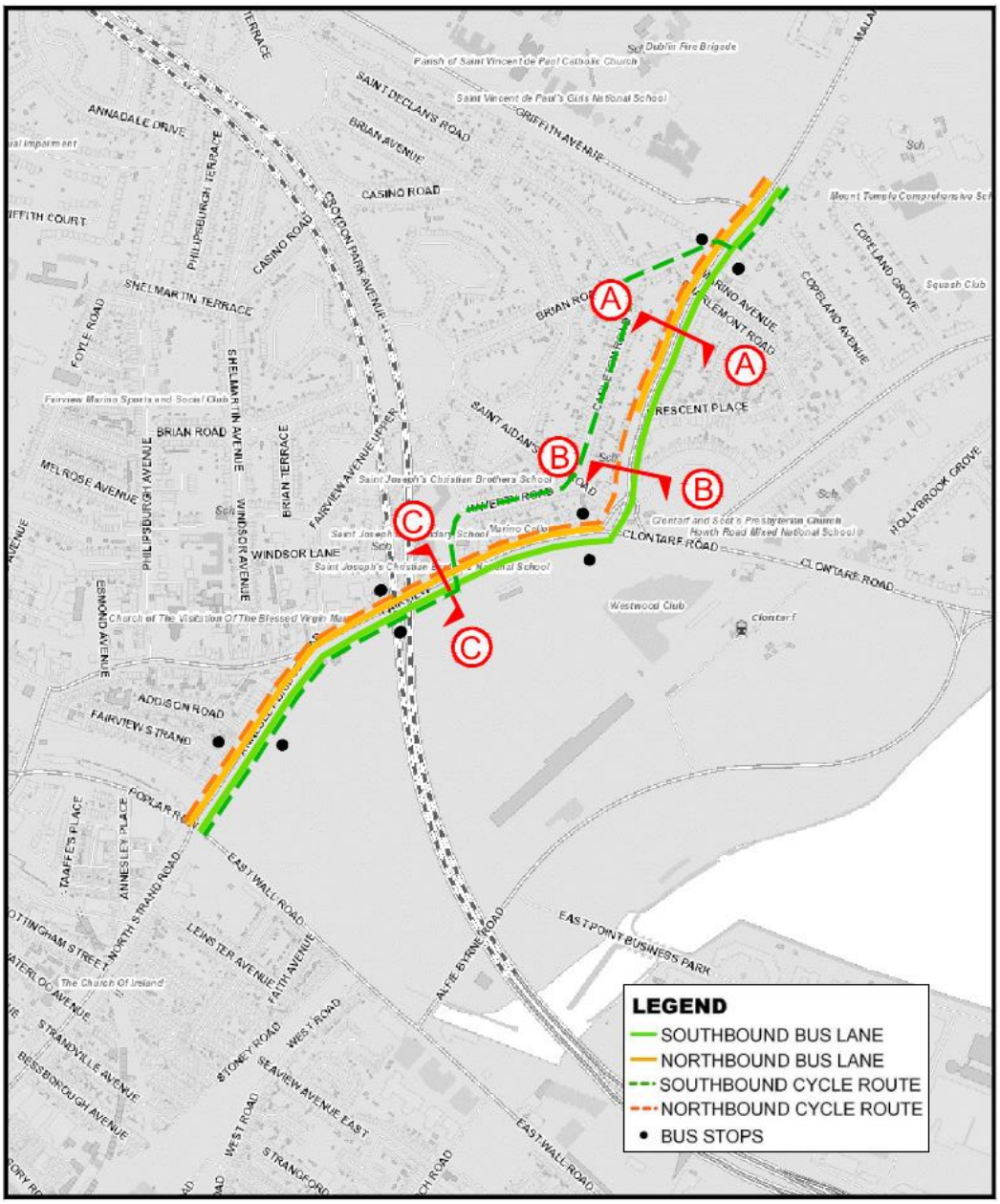


Figure 5.49 Route Option 3 Indicative Scheme Design

This scheme is similar to Scheme 1 except that southbound cyclists would be diverted along Haverty Road and Brian Road. Southbound cyclists would be required to cross the road twice and two new toucan crossings would need to be introduced. It is likely many southbound cyclists would continue to use Malahide Road, and this may delay buses although cyclists will be travelling downhill for this section. Again, no northbound bus lane is provided until after the most constrained section at the southern end of Malahide Road has been passed.

This scheme has cross sections of 14.35m and 17.35m, land take would be required from the eastern side of the road only. Parking capacity would be reduced but would remain possible in these gardens.

A cross-section on Malahide Road is presented in Figure 5.50

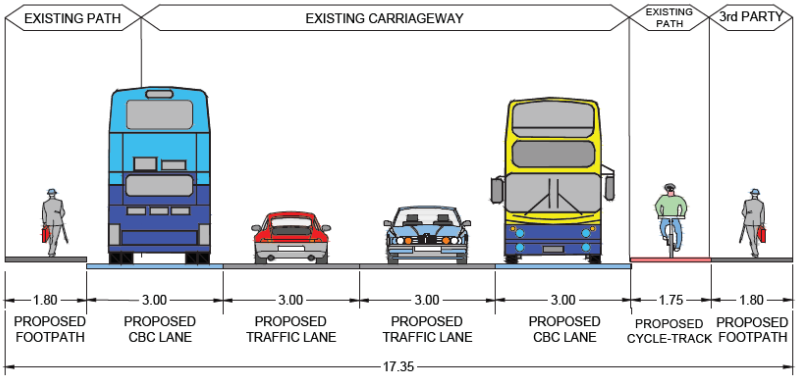


Figure 5.50 Cross Section A-A

A cross-section on Malahide Road is presented in Figure 5.51

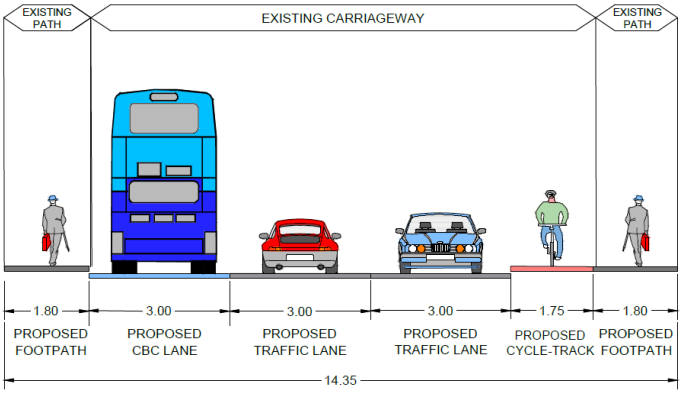


Figure 5.51 Cross Section B-B

A cross-section on Marino Mart is presented in Figure 5.52

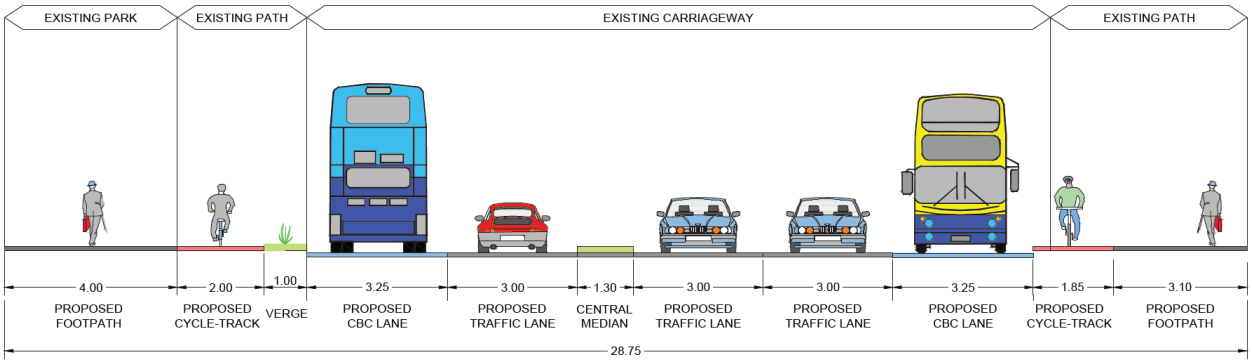


Figure 5.52 Cross Section C-C

5.6.5 Scheme Option 4 - Indicative Scheme Design

Figure 5.53 illustrates the indicative scheme design for Option 4 as well as the location of indicative cross-sections.

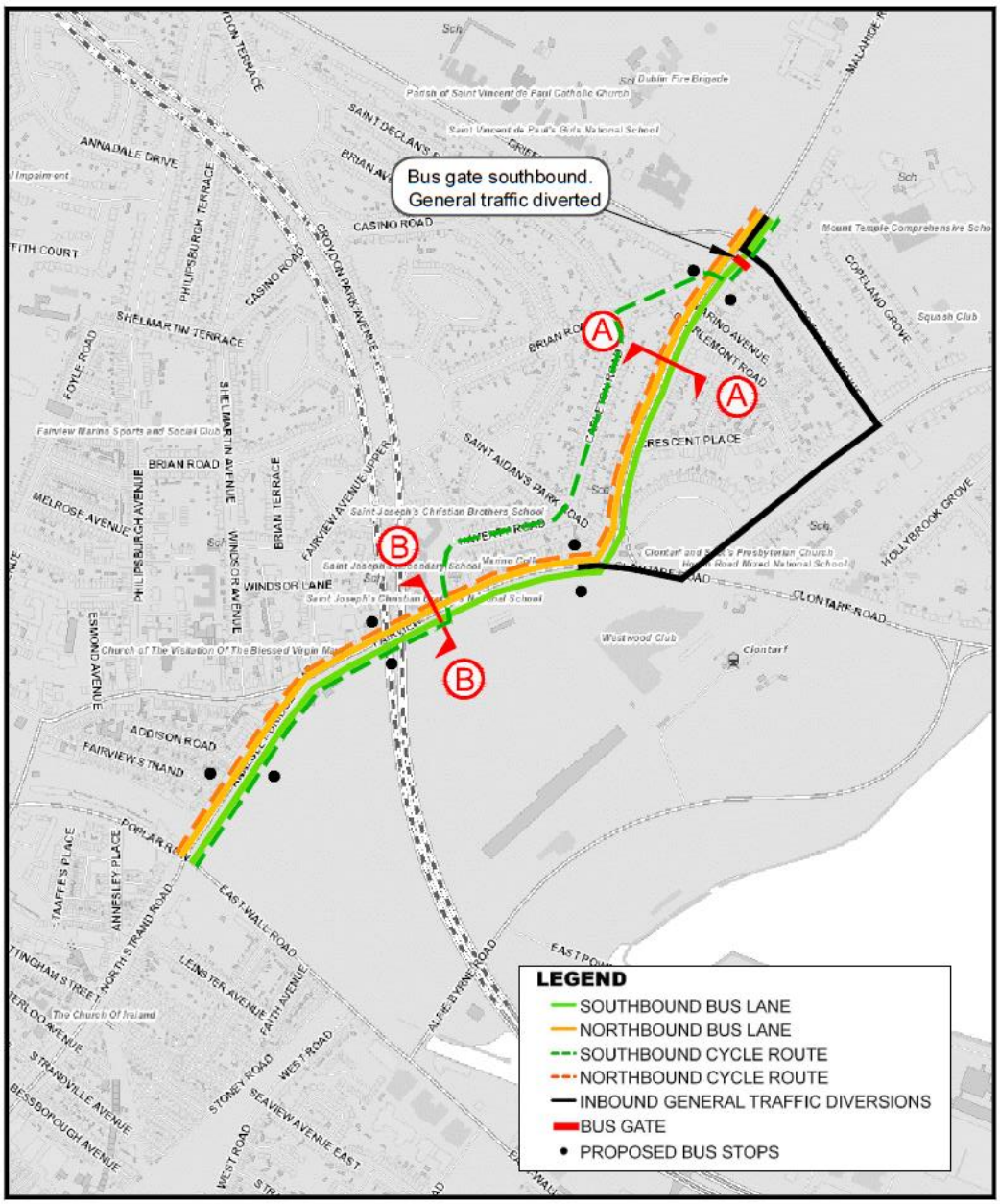


Figure 5.53 Route Option 4 Indicative Scheme Design

For scheme 4 southbound motorists would be diverted via Copeland Avenue and Howth Road as shown in Figure 5.46. Again, southbound cyclists would be diverted and would be required to cross the road twice at two new toucan crossing. It is likely many southbound cyclists would continue to use Malahide Road, and this may delay buses although cyclists will be travelling downhill for this section. The cross section chosen for this scheme would fit within the existing road reserve and no land take would be required.

On-street parking would be removed from one side of Copeland Avenue to provide wider traffic lanes as the volume of traffic using this road would increase greatly. The junctions at both ends of Copeland Avenue as well as the junction at the southern end of Howth Road would be upgraded to suit the new traffic flows.

A cross-section on Malahide Road is presented in Figure 5.54

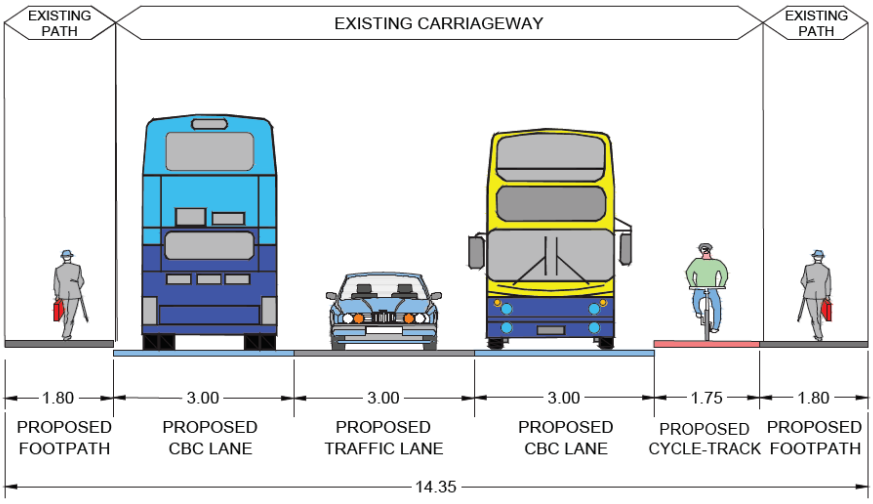


Figure 5.54 Cross Section A-A

A cross-section on Marino Mart is presented in Figure 5.55

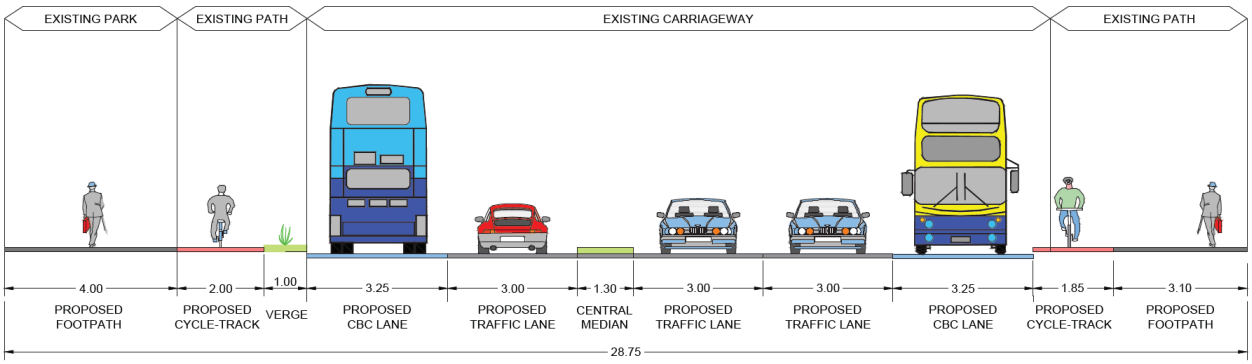


Figure 5.55 Cross Section B-B

5.6.6 Route Options Assessment

Details of the 'Stage 2' route options assessment undertaken for the Clongriffin to City Centre CBC are presented in **Appendix A**.

A summary of the ranking of route options against the scheme sub-criteria is presented in Table 5.8 below.

Table 5.8 Route Options Assessment Summary (Sub-Criteria)

Assessment Criteria	Sub-Criteria	Scheme 1	Scheme 2	Scheme 3	Scheme 4
Economy	Capital Cost				
	Journey-time reliability and consistency				
Integration	Land Use Integration				
	Population and Employment Catchments				
	Public Transport Integration				
	Traffic Network Integration				
	Cyclists and pedestrian Integration				
Accessibility and Social Inclusion	High Volume Trip Attractors				
	Deprived Geographic Areas & Areas Underserved by Public Transport				
Safety	Road Safety				
Environment	Archaeological, Architectural and Cultural Heritage				
	Flora and Fauna				
	Soils and Geology				
	Hydrology				
	Landscape and visual				
	Noise and Vibration				
	Air Quality				
	Land Use and the Built Environment				

In terms of "Capital Cost" Scheme 1 has the widest cross section to construct and the highest amount of land take from gardens and so scores worst. Scheme 3 has a narrower cross section, Scheme 4 requires no land take but has extra lengths of road and junction works associated with the diversion route and Scheme 2 has a narrow cross section with limited land take, and so all three of these schemes rank higher on this criterion.

In terms of "Journey Time Reliability and Consistency", all schemes would provide a good level of bus priority. On some schemes buses could be delayed as they would be required to share lanes with cyclists while on other schemes northbound buses are required to share a lane with general traffic over a 200m section where queueing is not expected. On balance all schemes are considered equal under this criterion

Scheme 1 would provide dedicated cycle tracks on Malahide Road in both directions and so ranks highest on "Cyclist and Pedestrian Integration". Schemes 3 and 4 would provide cycle facilities in one direction while Scheme 2 would have none.

In terms of “Environment”, the main determining factor between Schemes 1, 2 and 3 is the amount of private land take required on Malahide Road. Scheme 1 requires the most, followed by Scheme 3 and then Scheme 2 and they are ranked accordingly. The exception being under the “Flora & Fauna” criterion where land take on the western side of the road is the deciding factor and so Scheme 2 scores worse than Scheme 3.

Scheme 4 does not require any land take from gardens or protected structures along Malahide Road and so scores well under the “Landscape & Visual”, “Flora & Fauna”, “Soils & Geology” and “Archaeological, Architectural & Cultural Heritage” criteria. However, the increase in traffic using Copeland Avenue and removal of on-street parking means it scores poorly under the “Land Use & the Built Environment”, “Air Quality” and “Noise and Vibration” criteria.

5.6.7 Conclusion

A summary of the assessment and a relative ranking for each of the four assessment criteria is shown below in **Table 5.9**

Table 5.9 Route Options Assessment Summary (Main Criteria)

Assessment Criteria	Scheme 1	Scheme 2	Scheme 3	Scheme 4
Economy				
Integration				
Accessibility and Social Inclusion				
Safety				
Environment				

Based on the assessments above it has been determined that Scheme 2 offers the preferred route option for the following reasons:

- It has a lower capital cost than other options
- It provides dedicated bus lanes in both directions and so the journey time reliability will be good
- It is more favourable under the Environmental criterion than other options

Scheme 2 is identified as the preferred option for this section and is brought forward into the Emerging Preferred Route as described in Chapter 8, Scheme 3 is the next preferred.

6 STUDY AREA SECTION 2 – CITY CENTRE

6.1 Stage 1: Route Options Assessment

This chapter outlines the options development process for Section 2 of the Study Area (City Centre). All roads within Section 2 of the study area are assessed on a high level for their ability to form part of the CBC route. Route options are ruled out at this stage if they can clearly not form part of a CBC.

The 'spider's web' of potential route options remaining after this initial phase was then progressed to Stage 1 Route Options Assessment ('sifting stage') for further analysis. The links which are subject to sifting are shown in **Figure 6.1**.

The southern terminus for the CBC is identified as O'Connell Bridge, as it can be reasonably assumed to represent Dublin City Centre, with a terminus at this location serving the main trip attracters associated with the city centre area. Any routes which terminate here can also travel along the Quays to connect to another radial CBC.

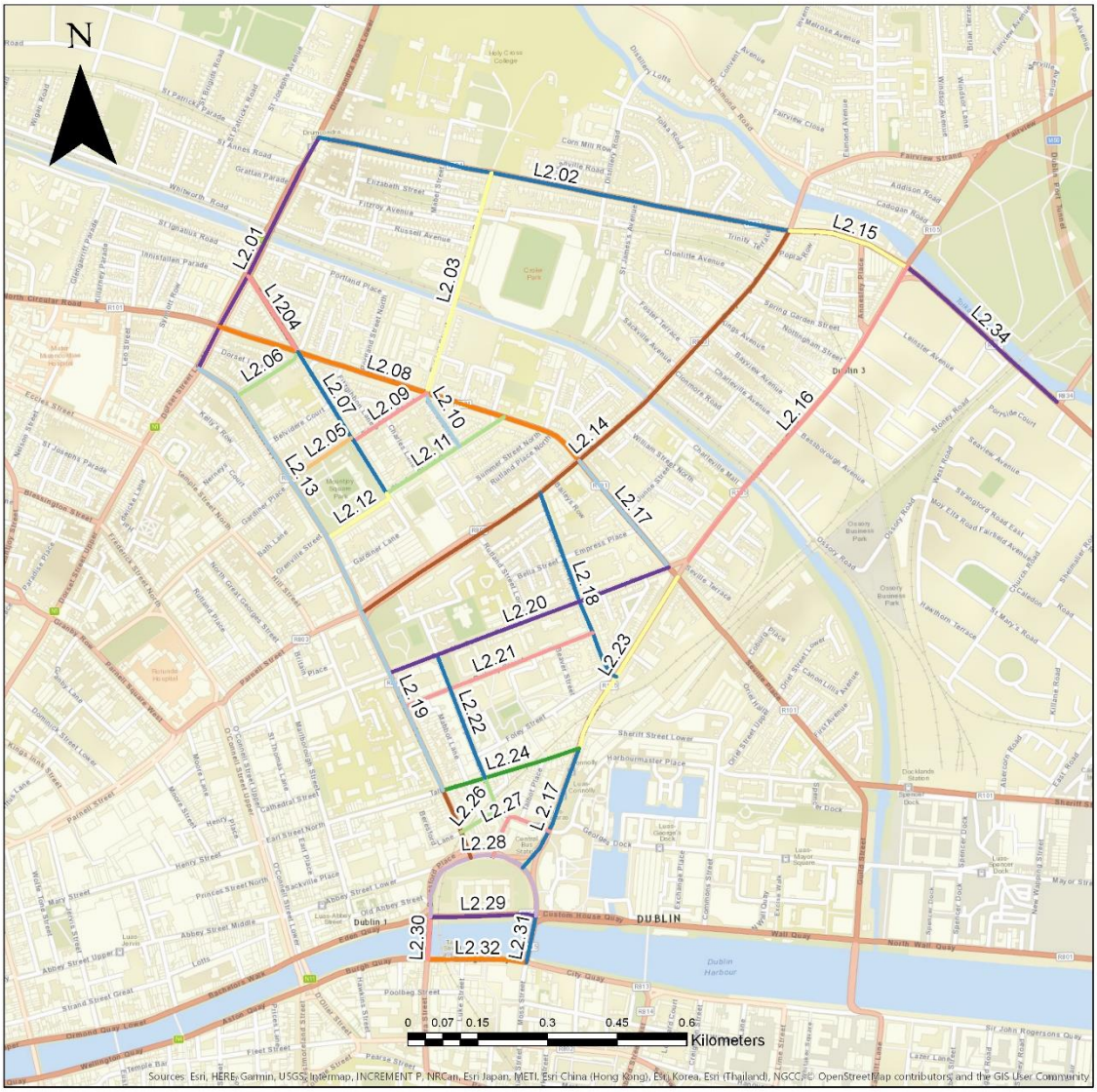


Figure 6.1 Section 1 Route Options City Centre

A summary of the Stage 1 route options assessment ('sifting') process is presented in Table 6.1

Table 6.1 – Section 2 Route Options Assessment Stage 1

Link No.	Road Characteristics	Comments	Pass / Fail
L 2.01	Regional	Dorset Street Upper/ Bolton Street. Two all vehicle lane in each direction from Capel Street to Dominic Street., one all vehicle lane in each direction for the remainder. There is a bus lane northbound from Granby Row to Frederick Street. This route is part of a GDA CNP primary route, cyclists are required to share the bus lanes at present. There will be a crossing of the Luas Cross City line at the junction with Dominic Street. There is potential to provide bus lanes in the locations they don't already exist by the removal of a lane of general traffic. This is considered a viable route option for this CBC.	Pass
L 2.02	Urban, on-street parking	Clonliffe Road. 1 all vehicle lane in each direction with residential on-street parking. This link forms part of a GDA CNP primary and secondary routes, there are no cycle facilities provided at present. There is potential to widen the road but this would require removing on-street residential parking and purchase of front gardens. This is not considered a viable route option for this CBC.	Fail
L 2.03	Urban, on-street parking	Jones Road, Russel Street. One all vehicle lane in each direction with on-street residential parking. This route forms part of a GDA CNP primary route, there are no cycle facilities provided at present. There is limited potential to widen the road as building lines are close to the street. Provision of CBC infrastructure is not feasible. This is not considered a viable route option for this CBC.	Fail
L 2.04	Residential, on-street parking	Belvedere Road. One all vehicle lane in each direction with on-street residential parking. This route forms part of a GDA CNP secondary route, there are on-road advisory cycle lanes provided at present. There is potential to widen the road with the removal of parking but terraced houses with basement entrances mean that no land take from front gardens is feasible. Dedicated bus lanes cannot be provided through this link and so This is not considered a viable route option for this CBC.	Fail
L 2.05	Urban, on-street parking	Mountjoy Square North. Two all vehicle lanes in each direction with on-street parking on one side. This link forms part of a GDA CNP primary route and there are no cycle facilities at present. There is potential to provide dedicated CBC lanes with removal of on-street parking and reallocation of road space. This is considered a viable route option for this CBC.	Pass
L 2.06	Residential, on-street parking	Sherrard Street. One all vehicle lane in each direction with residential on-street parking. This link is not part of the GDA CNP network and no cycle facilities are provided. This is a narrow residential street and is not suitable for CBC lanes. This is not considered a viable route option for this CBC.	Fail
L 2.07	Residential, on-street parking	Belvedere Road, Mountjoy Square East. There is one all vehicle lane in each direction with residential on-street parking. This link is not part of the GDA CNP network and no cycling facilities are provided. CBC lanes could be provided with the removal of on-street parking. This is considered a viable route option for this CBC.	Pass

L 2.08	Urban, on-street parking	North Circular Road, Portland Row. North Circular Road. One all vehicle lane in each direction with on-street residential parking. This link is part of a GDA CNP secondary route and there on-road cycle lanes provided at present. Widening of the road to provide bus lanes would require the removal of a large amount of on-street parking and the removal of trees lining the street. While constructing CBC infrastructure is feasible, the impact on residential parking is considered too severe. This is not considered a viable route option for this CBC.	Fail
L 2.09	Residential, on-street parking	Fitzgibbon Street. One all vehicle lane in each direction with on-street parking reserved for Garda vehicles from Fitzgibbon Street Station. This link forms part of a GDA CNP primary route, there are no cycling facilities provided at present. There is potential to accommodate CBC with the removal of Garda parking spaces. This is considered a viable route option for this CBC.	Pass
L 2.10	Residential, on-street parking	Emmet Street. One all vehicle lane northbound only with on-street parking. This link does not form part of the GDA CNP network and there are no cycling facilities provided at present. This is a narrow one-way residential road and is unsuitable for a CBC. This is not considered a viable route option for this CBC.	Fail
L 2.11	Residential, on-street parking	Charles Street Great. One all vehicle lane in each direction with on-street residential parking. This link does not form part of the GDA CNP network and there are no cycling facilities provided. There is potential to provide CBC lanes with the removal of on-street parking. This is considered a viable route option for this CBC.	Pass
L 2.12	Urban, on-street parking	Mountjoy Square South. One all vehicle lane in each direction with on-street parking on both sides. This link does not form part of the GDA CNP network and there are no cycling facilities provided. Dedicated bus lanes could be provided in both directions with removal of on-street parking and reallocation of road space. This is considered a viable route option for this CBC.	Pass
L 2.13	Urban, on-street parking	Gardiner Street Middle & Upper, Mountjoy Square West. Two all vehicle lanes in each direction with partial northbound bus lane. This link does not form part of the GDA CNP and there are no cycling facilities provided. There is potential to provide CBC lanes in both directions with removal of on street parking, reallocation of road space and some land take from front gardens. This is considered a viable route option for this CBC.	Pass
L 2.14	Urban, on-street parking	Summerhill, Ballybough Road. Two all vehicle lanes in each direction with some on-street parking. This link forms part of a GDA CNP primary route and there are no cycling facilities provided at present. There is limited potential to widen the roadway, but a CBC could be accommodated by removing on-street parking and one general traffic lane in each direction. This is considered a viable route option for this CBC.	Pass
L 2.15	Urban, on-street parking	Poplar Row. One all vehicle lane in each direction on the eastern side of the link and two all vehicle lanes in each direction on the western side. This link forms part of a GDA CNP secondary route, there are no cycle facilities provided at present. The eastern portion is too narrow to fir general traffic and CBC lanes. This is not considered a viable route option for this CBC.	Fail
L 2.16	Urban	North Strand Road. One all vehicle lane and one bus lane in each direction. This link forms part of a GDA CNP secondary route and there are no cycling facilities provided at present. Existing bus lanes can cater for a CBC. This is considered a viable route option for this CBC.	Pass

L 2.17	Urban, on-street parking	North Circular Road, Portland Row. North Circular Road. One all vehicle lane in each direction with on-street residential parking. This link is part of a GDA CNP secondary route and there on-road cycle lanes provided at present. Widening of the road to provide bus lanes would require the removal of a large amount of on-street parking and the removal of trees lining the street. While constructing CBC infrastructure is feasible, the impact on residential parking is considered too severe. This is not considered a viable route option for this CBC.	Fail
L 2.18	Urban, on-street parking	Buckingham Street. Two all vehicle lanes in northbound only, on-street residential parking on both sides. This link does not form part of the GDA CNP network and there are no cycle facilities provided. Dedicated BRT lanes could be provided in both directions by removing on-street parking and reallocation of road space. This is considered a viable route option for this CBC.	Pass
L 2.19	Urban, on-street parking	Gardiner Street Lower. Two all vehicle lanes in each direction with on-street parking on one side off peak. This link does not form part the GDA CNP network and there are on-road advisory cycle lanes provided. Dedicated CBC lanes could be provided by reallocating road space and removing of on-street parking. This is considered a viable route option for this CBC.	Pass
L 2.20	Urban, on-street parking	Sean McDermott Street Lower. One all-vehicle lane in each direction with some on-street parking. This route forms part of a GDA CNP secondary route and there are no cycling facilities provided at present. Dedicated CBC lanes could be provided with the removal of on-street parking and reallocation of road space. This is considered a viable route option for this CBC.	Pass
L 2.21	Urban, on-street parking	Railway Street. One all vehicle lane in each direction. This link does not form part of the GDA CNP network and there are no cycle facilities provided. The road becomes very narrow on the eastern end and as a result this road is unsuitable for a CBC. This is not considered a viable route option for this CBC.	Fail
L 2.22	Urban. On-street parking	Gloucester Place Lower, James Joyce Street. One all vehicle lane in each direction, the section south of Foley Street junction is one-way only northbound. This link forms part of a GDA CNP secondary route and there are no cycle facilities at present. This link is too narrow for the provision of dedicated CBC lanes. This is not considered a viable route option for this CBC.	Fail
L 2.23	Urban, on-street parking	Amien Street. Two all vehicle lanes in each direction for the southern section, one all vehicle lane and one bus lane in each direction for the northern section. This link forms part of a GDA CNP primary route and there are no cycling facilities provided at present. Dedicated bus lanes could be provided where they do not exist by removing a general traffic lane in each direction. This is considered a viable route option for this CBC.	Pass
L 2.24	Urban	Talbot Street. One all vehicle lane westbound only. This link does not form part of the GDA CNP network and there are no cycle facilities provided. Street is traffic calmed with parking, loading, bike parking and a Dublin Bikes stand on the street. This is also a busy pedestrian and shopping street. Dedicated CBC lanes cannot be provided on this link. This is not considered a viable route option for this CBC.	Fail
L 2.25	Urban	Gardiner Street Lower. Two all vehicle lanes in each direction with on-street parking on one side off peak. This link does not form part the GDA CNP network and there are on-road advisory cycle lanes provided. Dedicated CBC lanes could be provided by reallocating road space and removing of on-street parking. This is considered a viable route option for this CBC.	Pass

L 2.26	Urban	Frenchman's Lane. One all vehicle lane northbound only. This link does not form part of the GDA CNP network and there are no cycle facilities provided. This is a narrow lane with no potential for widening and is unsuitable for a CBC. This is not considered a viable route option for this CBC.	Fail
L 2.27	Urban	Store Street. One Luas line in each direction and one all vehicle lane in a westbound only direction. This links forms part of a GDA CNP secondary route and there are no cycle facilities provided at present. This link is busy with Luas, bus, taxi movements and there is insufficient space to provide dedicated CBC lanes without negatively affecting the level of service of the Luas. This is not considered a viable route option for this CBC.	Fail
L 2.28	Urban	Amien St. two all vehicle lanes and one bus lane in each direction north of Store St junction, two all vehicle lanes northbound and three southbound south of Store St junction. This link forms part of a GDA CNP primary route and there are no cycling facilities provided at present. The Amien St area between Connolly station and Busarus is under review as part of the Dublin City Transport Study. Existing bus lanes can cater for a BRT, shared running may be required on approach to Beresford Place. This is a viable route option.	Pass
L 2.29	Urban	Beresford Place. Three to four all vehicle lanes in a clockwise gyratory system. One Luas line in each direction passes to the north and the road passes under a DART bridge. This link does not form part of the GDA CNP network and no cycle facilities are provided. The traffic using this link is expected to drop significantly if the DCC transport study proposals are put in place at Eden Quay, this will allow for a full redesign of the traffic layout of this junction to make it more suitable for pedestrians, cyclists and public transport. This is considered a viable route option for this CBC.	Pass
L 2.30	Urban	Custom House Quay. Two all vehicle lanes eastbound only and one contra flow bus lane. This route forms part of a GDA CNP primary route and there are on road cycle lanes. Dedicated bus lanes could be provided eastbound by removing a lane of general traffic. This is considered a viable route option for this CBC.	Pass
L 2.31	Bridge	Butt Bridge. Four all vehicle lanes northbound only. This link does not form part of the GDA CNP network and no cycle facilities are provided. Dedicated bus lanes could be provided by removing one of the general traffic lanes. This is considered a viable route option for this CBC.	Pass
L 2.32	Bridge	Memorial Bridge. Four all vehicle lanes southbound only. This link forms part of a GDA CNP primary route, there are on road cycle lanes southbound and off road northbound. A dedicated bus lane could be provided by removing one of the general traffic lanes. This is considered a viable route option for this CBC.	Pass
L 2.33	Urban, on-street parking	R105, George's Quay, from junction with Moss Street to Junction with Tara Street. This section has a bridge at either end, with Butt bridge off the junction with Tara Street. There are two lanes of one-way traffic (running east) and a bus lane along this section of road. There is on-street parking and a taxi rank on the River Liffey side. There are also several bus stops inset off the bus lane on the south side of the road. There is a cycle lane along all of this section of road. Road widening could be achieved by using the on-street parking, taxi-ranks and in-set bus stops, although this potential is reduced near the junction with Tara Street where the taxi rank ends. This section comes under the Dublin City Centre Transport Study, Pedestrian Network / Public Realm proposal number 9 "South Quays (George's Quay to Essex Quay) – Additional bus lane and bus stops". There are no GDA CNP routes along this section.	Pass, one-way only

		This is a viable route option as bus priority could be provided by using the existing bus lane and enhanced further by removing a lane of general traffic in accordance with DCC plans.	
L 2.34	Urban, on-street parking	East Wall Road. 1 all vehicle lane in each direction with residential on-street parking. This link forms part of a GDA CNP secondary route, there are no cycle facilities provided at present. There is minimal potential to widen the road by removing on-street parking or purchase of front gardens. There is an existing narrow crossing under the DART line. There is insufficient width to provide dedicated BRT lanes and so this is not considered a viable route option	Fail

The outcome of the sift can be seen in the **Figure 6.2**. Links shown in red failed the sift and those in blue passed.

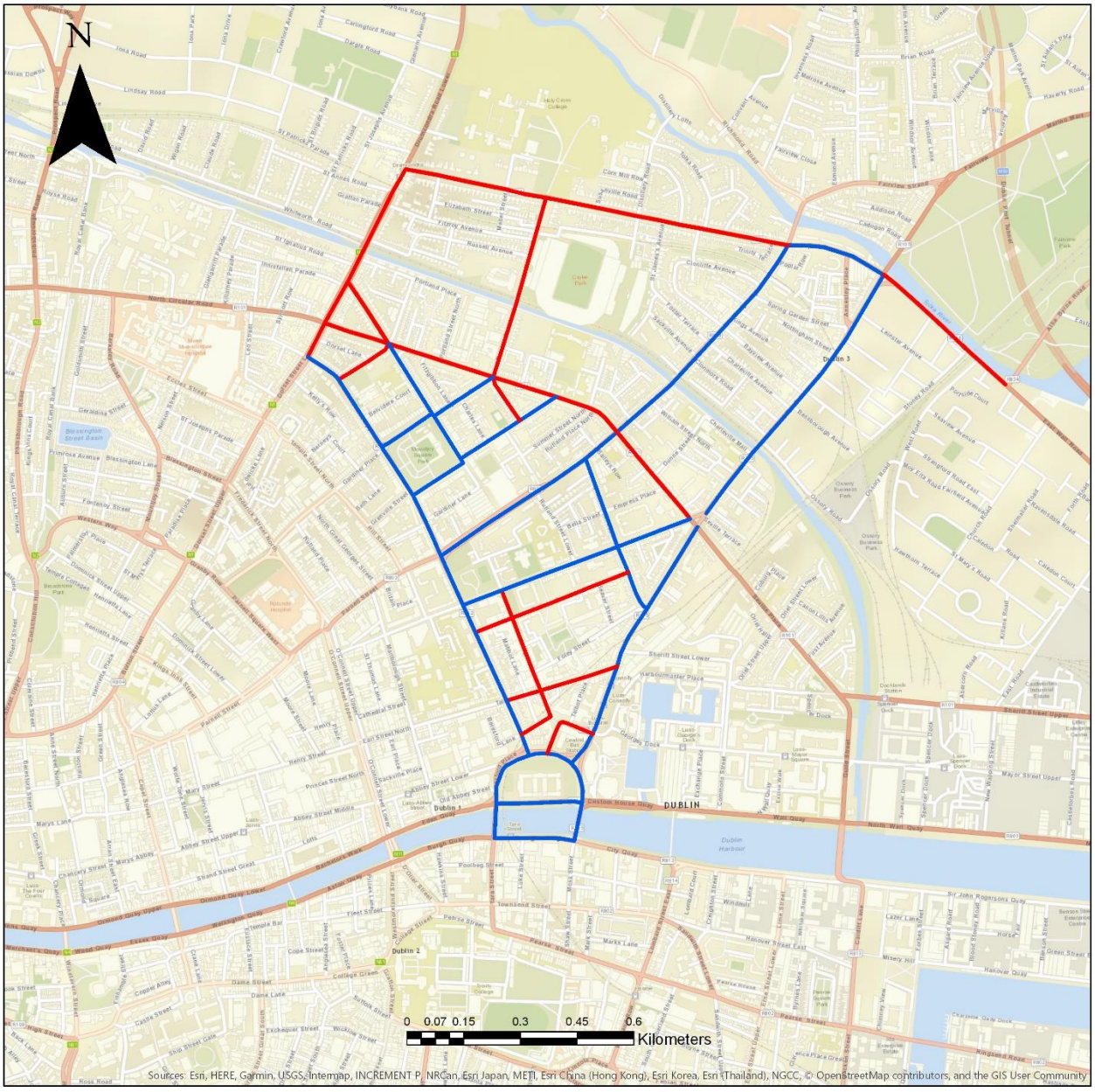


Figure 6.2 Section 2 Sifting Process Step 1

6.1.1 Removal of Disconnected Links

The links shown in red are disconnected and could not clearly form part of a Clongriffin to City Centre CBC route and have been removed at this stage.

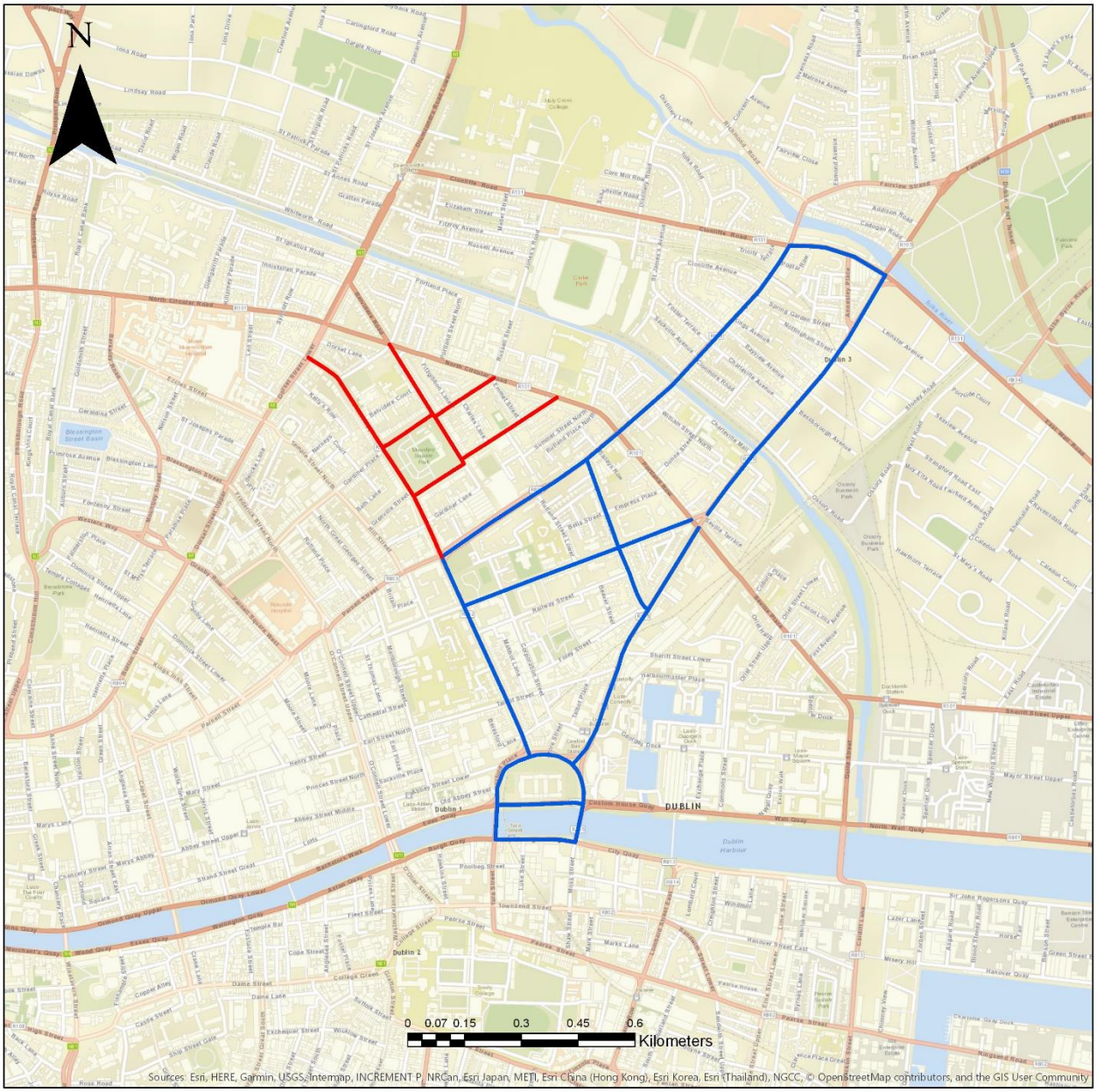
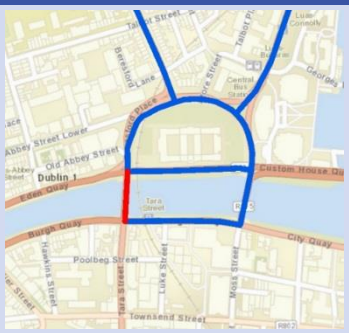


Figure 6.3 Section 2 Sifting Process Step 2

6.1.2 Preliminary Route Assessment

A summary of the Preliminary Route Assessment process is presented below in Table 6.2,

Table 6.2 - Section 2 Preliminary Route Assessment

Road Names	Comments	Map
Butt Bridge	While providing bus lanes on this bridge is feasible by reallocating road space it would require the introduction of a contra-flow bus lane on either Butt Bridge or the South Quays. Other similar routes using O'Connell, Rosie Hackett or Talbot Bridge would not require the introduction of a new contra-flow lane and would be less disruptive to general traffic. For this reason, this route option is not considered further	
Buckingham Street	The route option using Buckingham Street is circuitous in nature and would lead to longer journey times when compared to the adjacent route option with two-way bus movements on North Strand Road. This route would also require buses to pass through a higher number of junctions and make more turning movements. For these reasons, this route option is not considered further	

The outcome of the Preliminary Route Assessment can be seen below. The links shown in red have failed those in blue have passed.

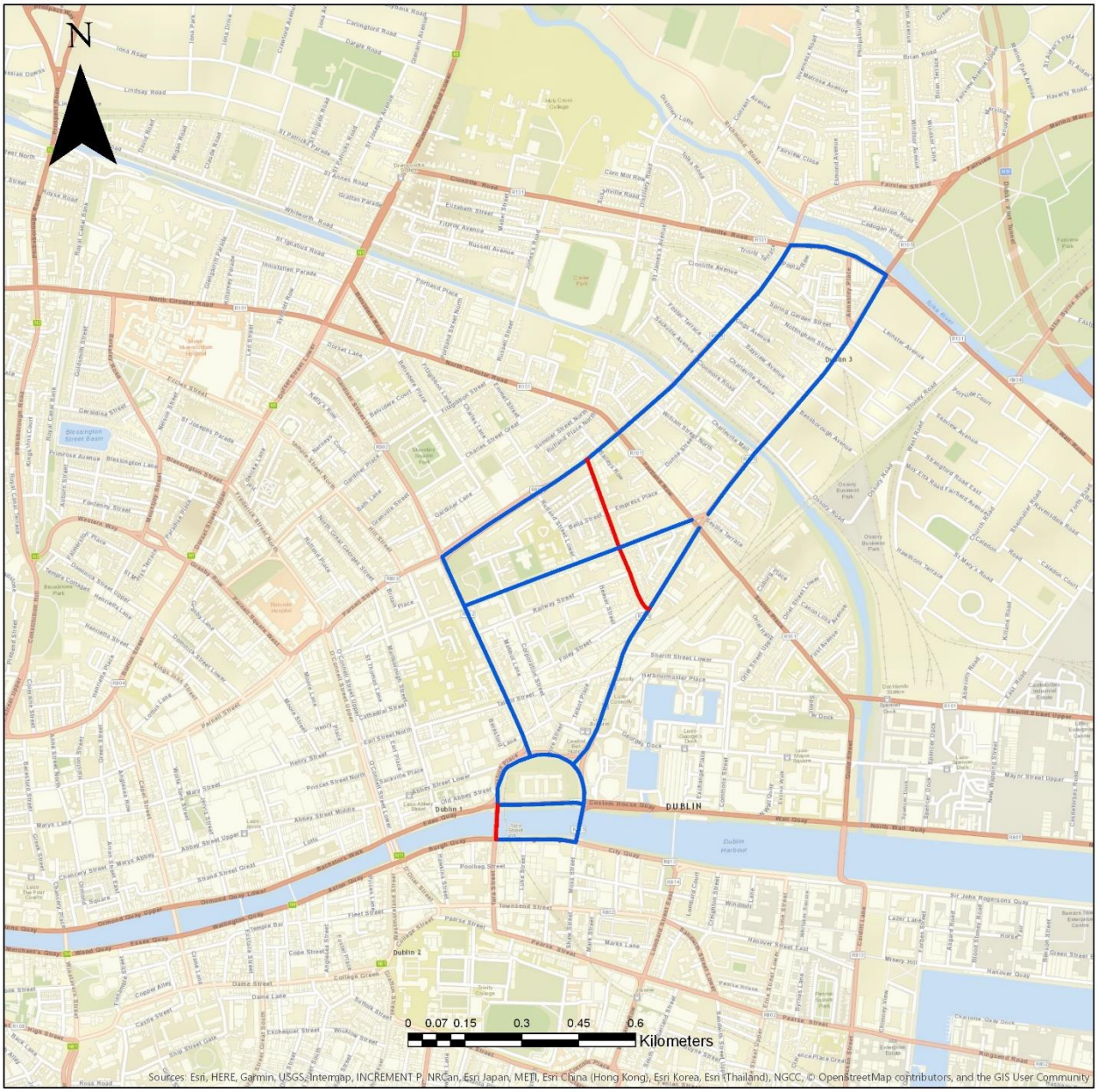


Figure 6.4 Section 2 Sifting Process Step 3

6.1.3 Sifting Conclusion

Following the Stage 1 sift, 16 of the 68 links assessed passed the initial sifting stage and were progressed to the next assessment stage. These links are presented in **Figure 6.5**.

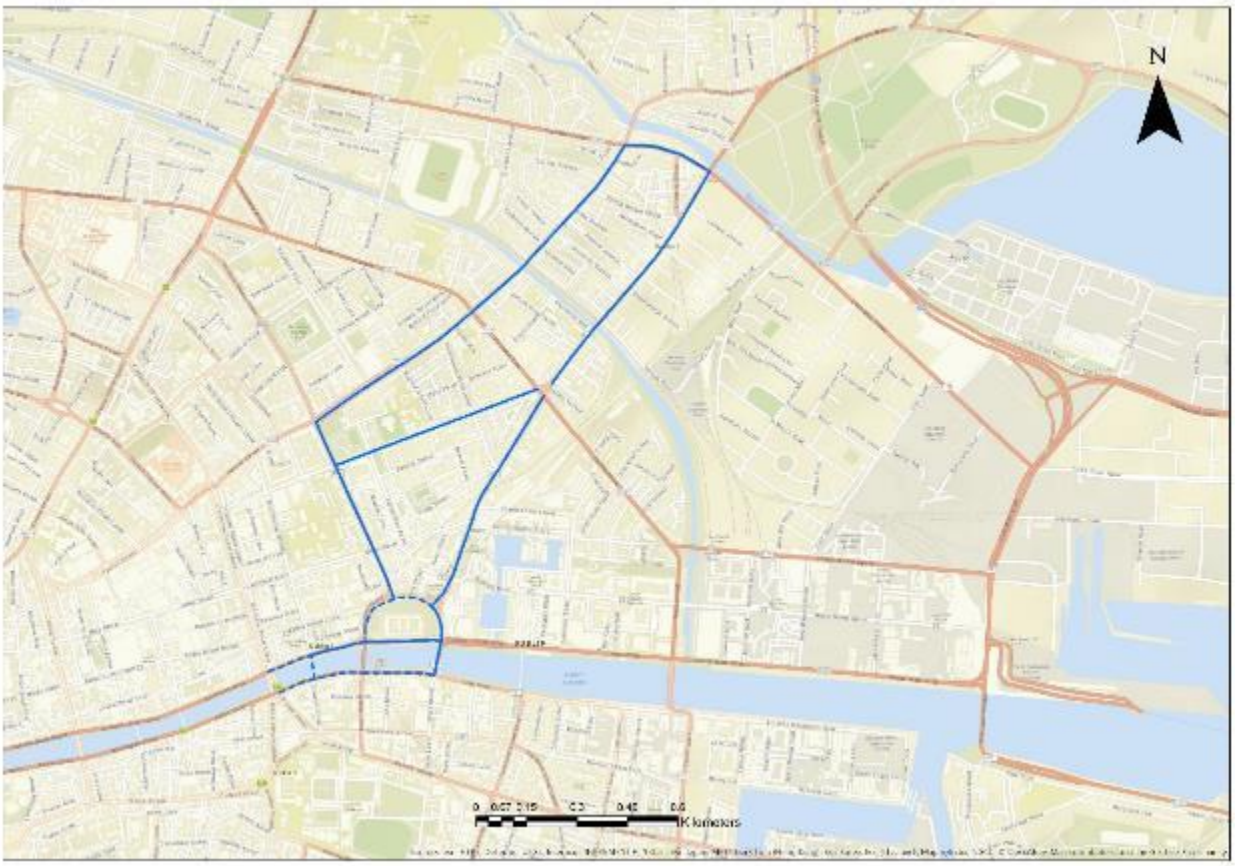


Figure 6.5 Section 1 Route Options Remaining After Stage 1 Assessment

6.2 Stage 2: Route Options Assessment - Annesley Bridge to Custom House

6.2.1 Introduction

Following the Stage 1 sifting process the nine remaining links in this section are assembled together to form three viable route options for Section 1, as follows:

- Route Option 1: Using Ballybough Road, Summerhill & Gardiner Street
- Route Option 2: Using North Strand Road, Sean McDermott Street and Gardiner Street
- Route Option 3: Using North Strand Road & Amiens Street

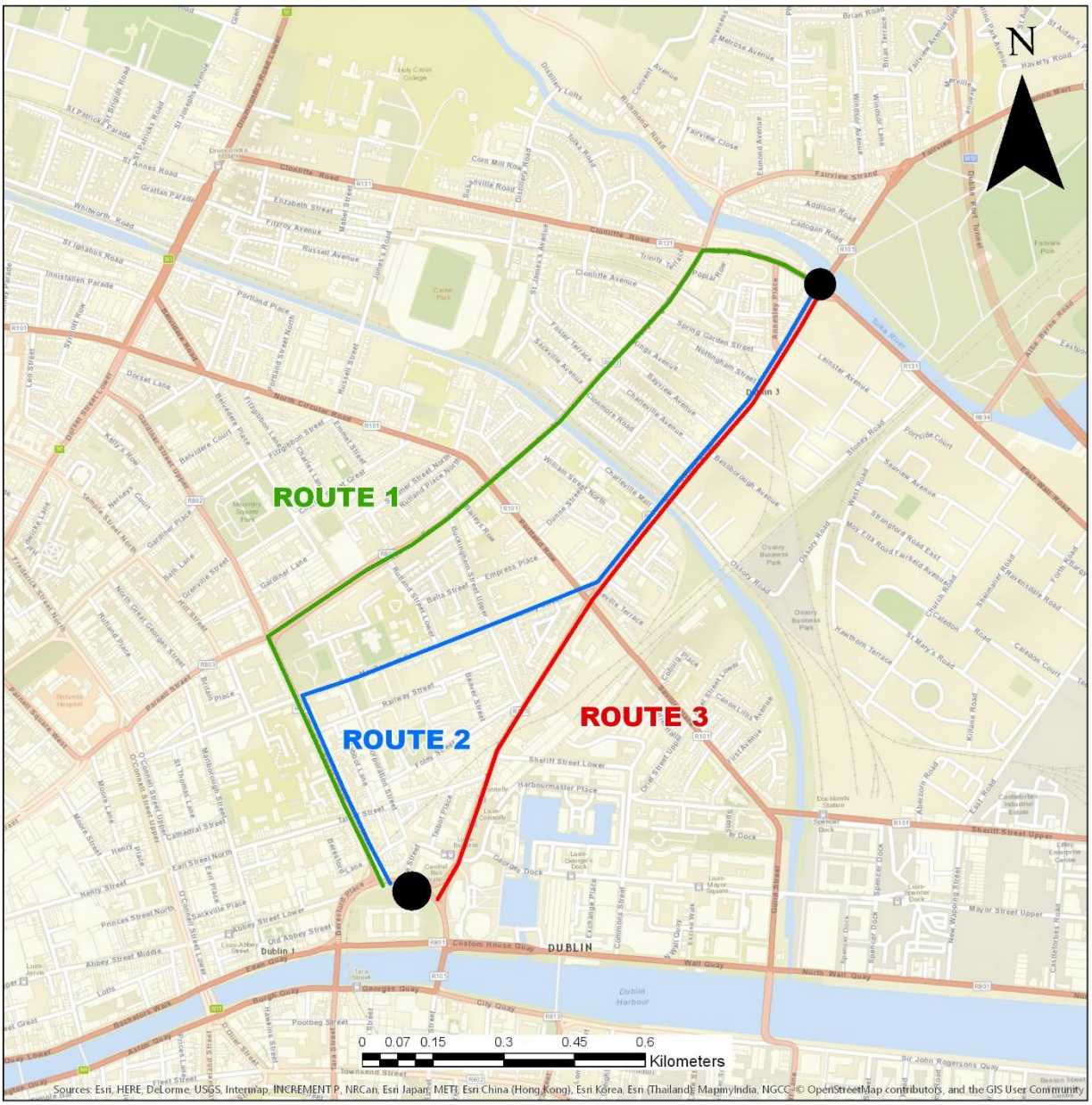


Figure 6.6 Section 2 Route Options

6.2.2 Route Option 1

Route Description

Route Option 1 is presented in Figure 6.7 and described as follows.

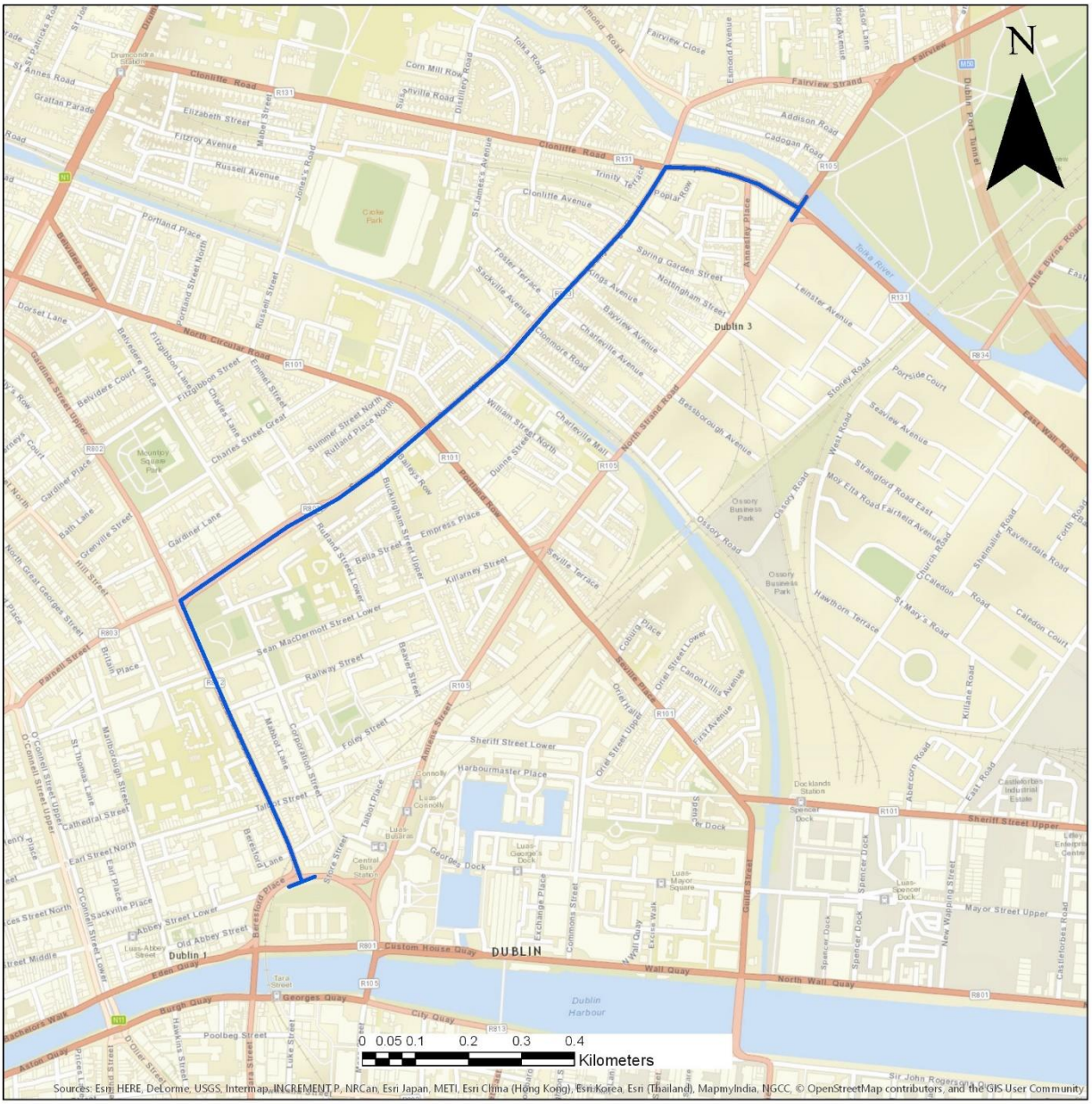


Figure 6.7 Route Option 1

Southbound: Route 1 commences at the junction of Annesley Bridge Road and Poplar Row, from here the bus travels west along Poplar Row The bus then turns left onto Ballybough Road/Summerhill Parade and then turns left onto Gardiner Street.

Northbound: The northbound route follows the same route as the southbound routing.

Indicative Scheme Design

Figure 6.8 illustrates the indicative scheme design for route Option 1 as well as location of indicative cross-sections.

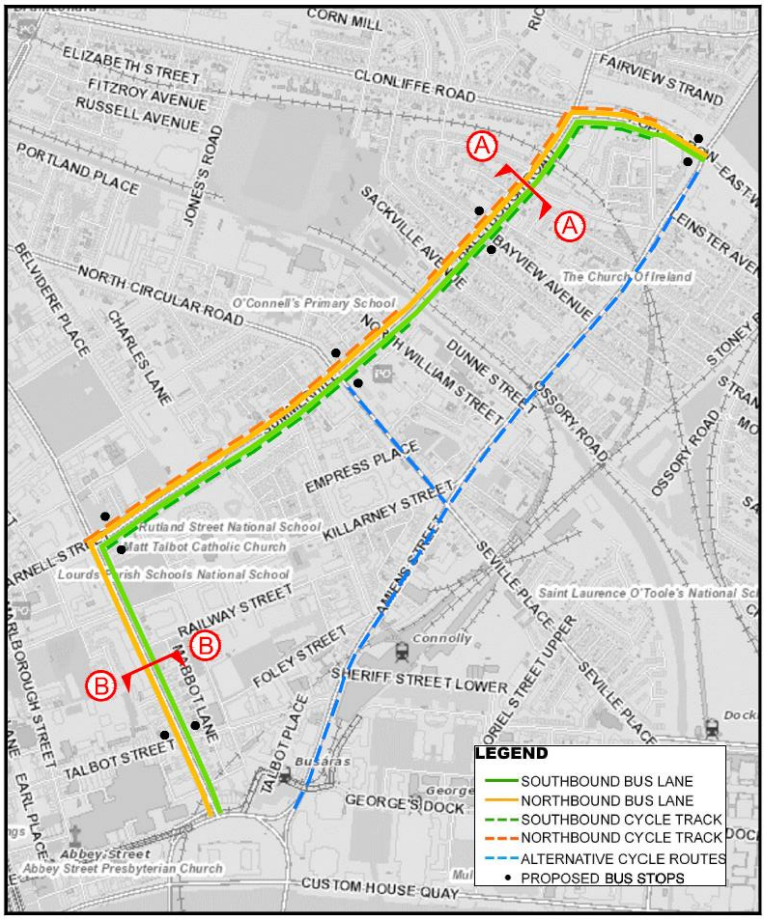


Figure 6.8 Route Option 1 Indicative Scheme Design

Stops: A total of five bus stops would be provided in each direction along this route option.

The narrow section of Poplar Row between Annesley Bridge Road and Annesley Place would be converted to bus only, with general traffic being diverted along Annesley Place. The remaining section of Poplar Row, Ballybough Road and Summerhill Parade would have bus and traffic lanes in both directions. The restricted space available means that cycle lanes would not be provided through two pinch points and cyclists would be required to share the bus lane. On-street parallel parking, both formal and informal, along the majority of Summerhill Parade would be affected, although there are sections along the road where parking can be retained. Gardiner Street is not wide enough to accommodate cycle lanes, so alternate routes along Amiens Street are proposed, although Gardiner Street does not form part of the GDA CNP network.

All junctions along this route would be upgraded to provide bus priority and enhanced pedestrian/cyclist facilities.

A cross-section on Ballybough Road is presented in Figure 6.9

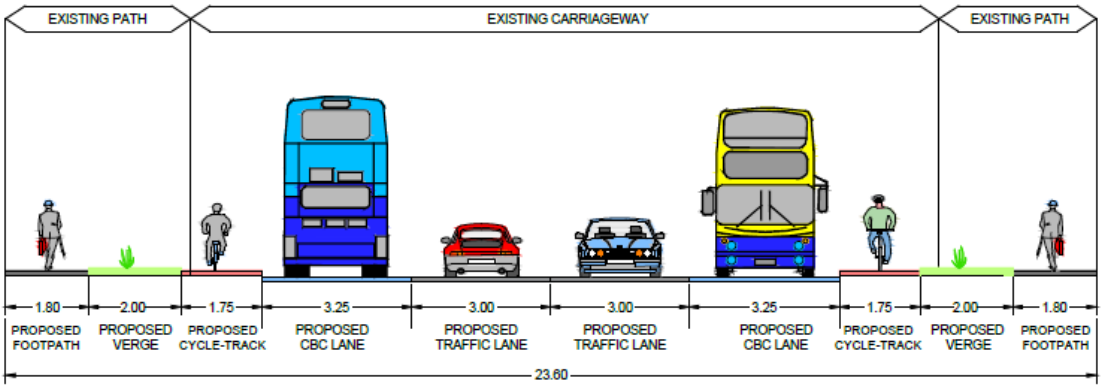


Figure 6.9 Cross Section A-A

A cross-section on Gardiner Street is presented in Figure 6.10

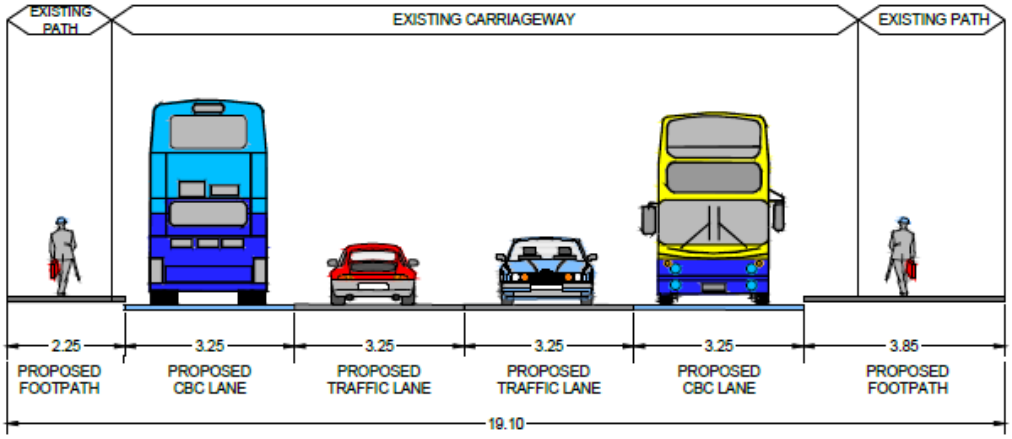


Figure 6.10 Cross Section B-B

6.2.3 Route Option 2

Route Description

Route Option 2 is presented in Figure 6.11 and described as follows.

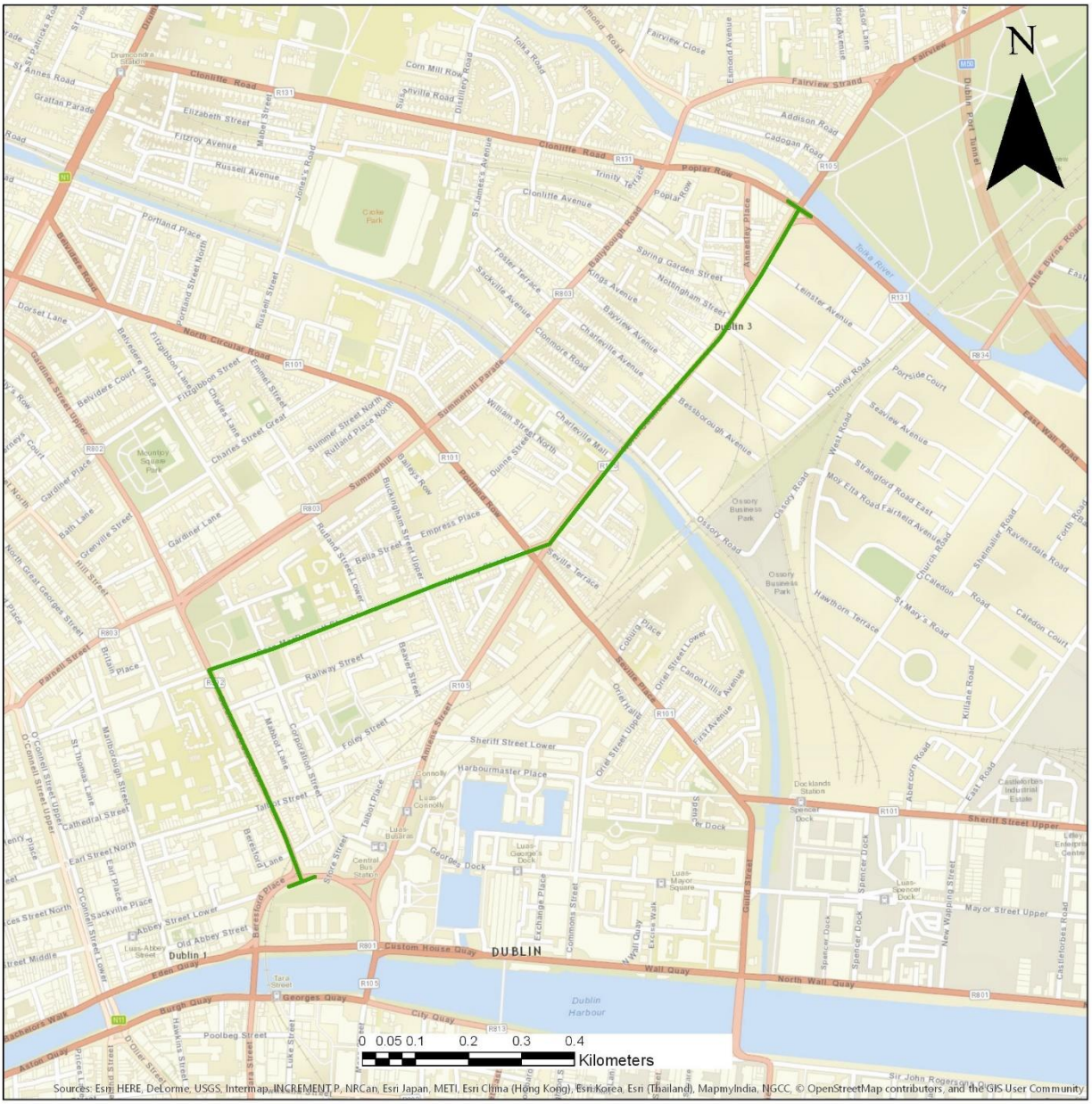


Figure 6.11 Route Option 2

Southbound: Route Option 2 would commence at the junction of Annesley Bridge Road and Poplar Row, from here the bus travels south along North Strand Road, turning onto Killarney Street/Sean MacDermott Street and then onto Gardiner Street.

Northbound: The northbound route follows the same route as the southbound routing.

Indicative Scheme Design

Figure 6.12 illustrates the indicative scheme design for Route Option 2 as well as the location of indicative cross-sections.

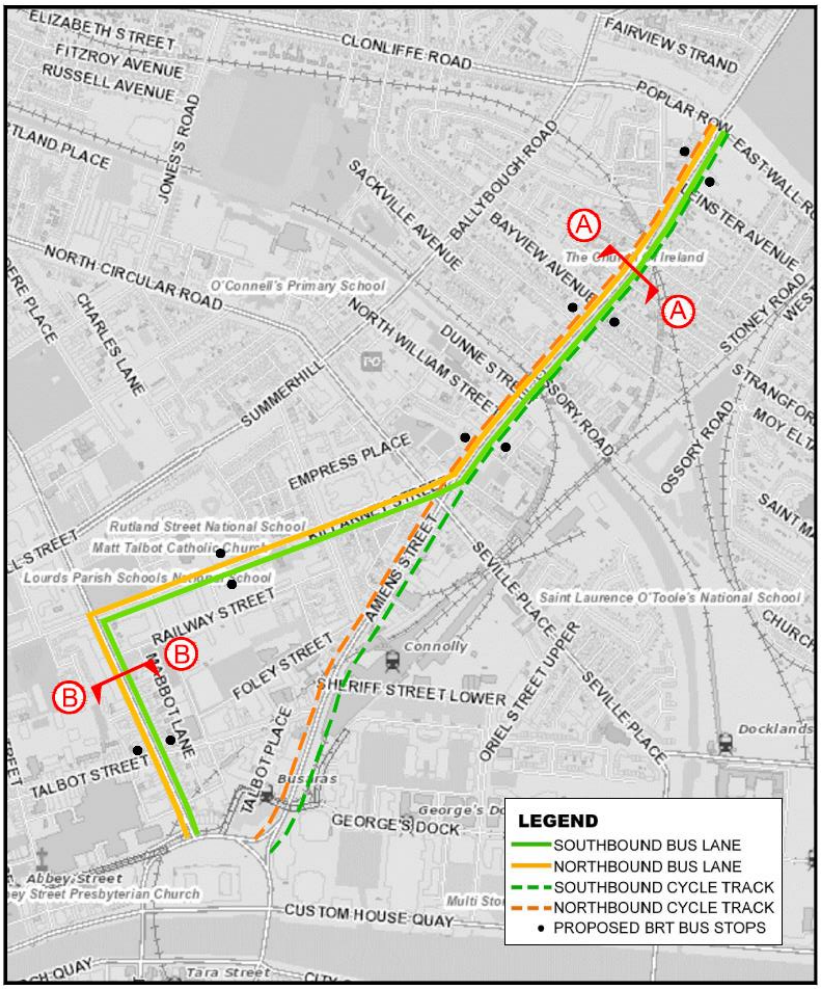


Figure 6.12 Route Option 2 Indicative Scheme Design

Stops: A total of five bus stops would be provided in each direction along this route option.

The portion of North Strand Road would generally follow the Clontarf to City Centre Cycle Scheme plans, which provides cycle and bus lanes in both directions. The section on Killarney Street/ Sean MacDermott Street would require the removal of parking spaces either side of the 600 metre length of road.

It is not feasible to provide cycles lanes along Killarney Street/Sean MacDermott Street and Gardiner Street as building lines are too close to the street on either side. The suggested diversion is along Amiens Street, which is a primary route on the Cycle Network Plan.

All junctions along this route would be upgraded to provide bus priority and enhanced pedestrian/cyclist facilities.

A cross-section on North Strand Road is presented in Figure 6.13

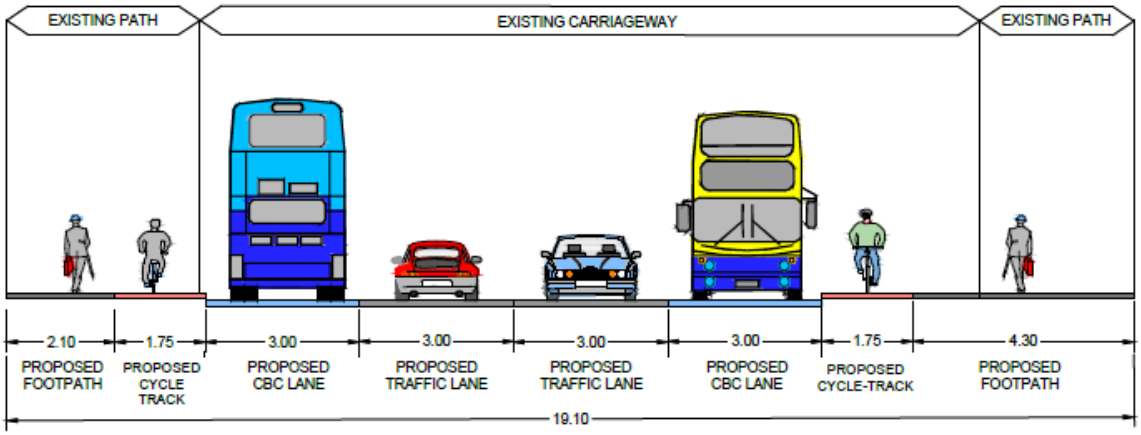


Figure 6.13 Cross Section A-A

A cross-section on Gardiner Street is presented in Figure 6.14

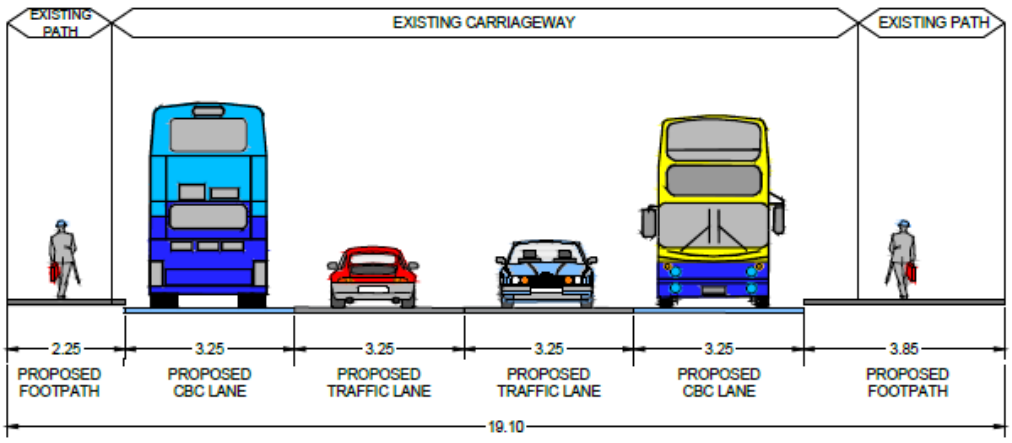


Figure 6.14 Cross Section B-B

6.2.4 Route Option 3

Route Description

Route Option 3 is presented in Figure 6.15 and described as follows.

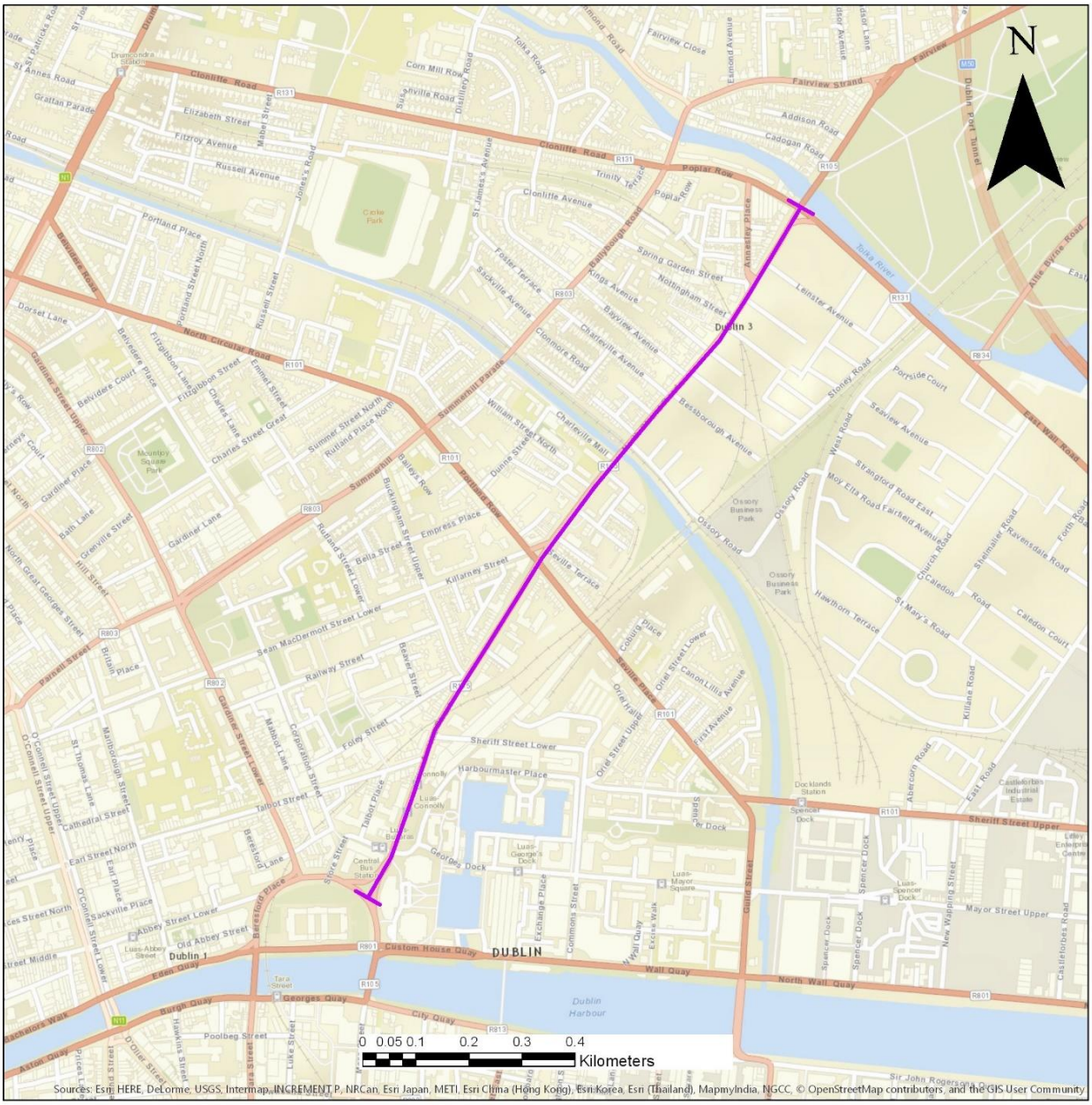


Figure 6.15 Route Option 3

Southbound: Route Option 3 would commence at the junction of Annesley Bridge Road and Poplar Row, from here the bus travels south along North Strand Road/Amiens Street.

Northbound: The northbound route follows the same route as the southbound routing.

Indicative Scheme Design

Figure 6.16 illustrates the indicative scheme design for Route Option 3 as well as the location of indicative cross-sections.

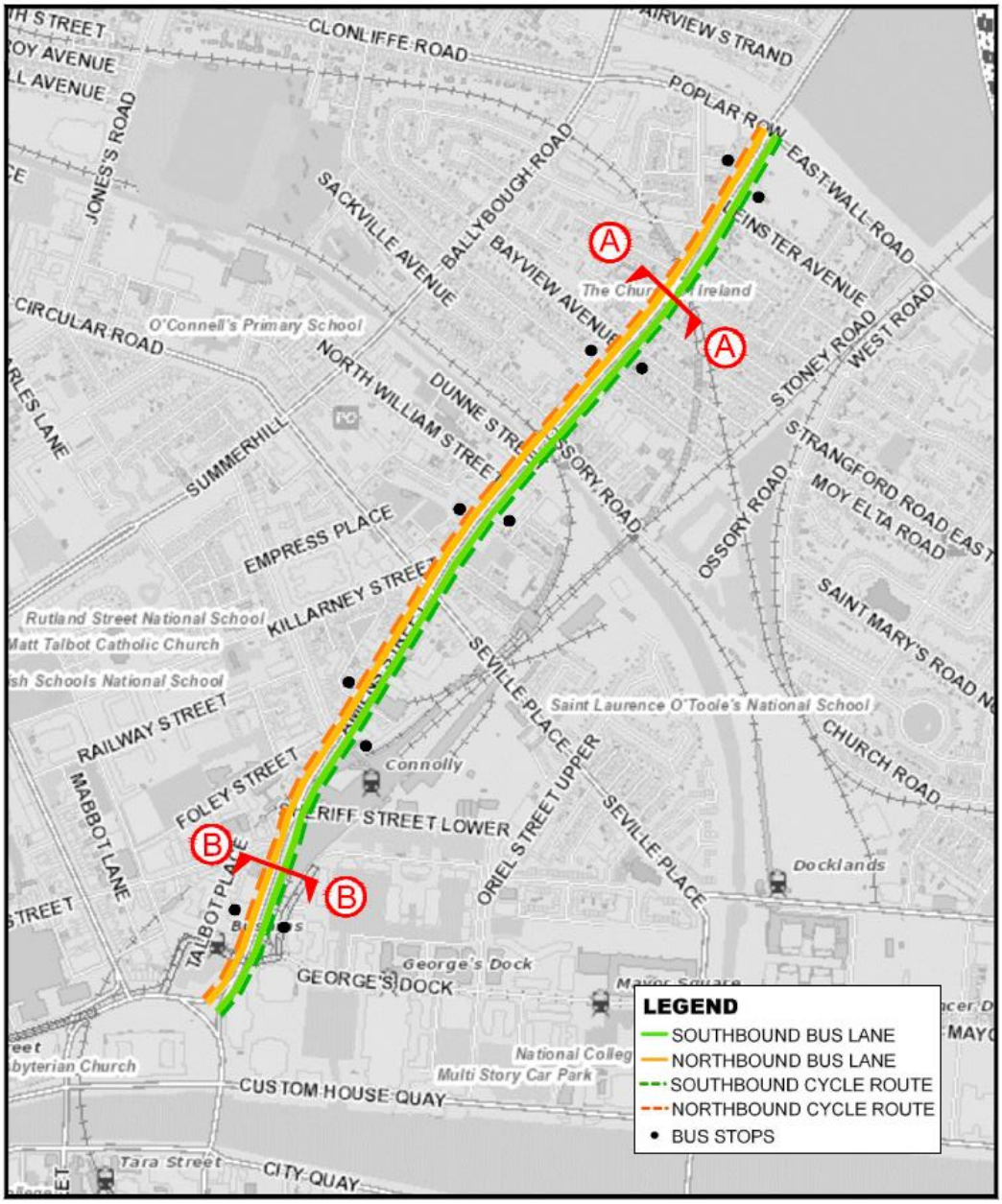


Figure 6.16 Route Option 3 Indicative Scheme Design

Stops: A total of five bus stops would be provided in each direction along this route option.

The portion of North Strand Road/Amiens Street as far as the Foley Street junction would generally follow the Clontarf to City Centre Cycle Scheme plans, which provides for cycle and bus lanes in both directions. On-street parking/loading will be affected in places although will be retained wherever feasible, footpath widths would be reduced in a number of places.

There is a pinch point from Foley Street to Sherriff Street as the route passes under the existing DART bridge. Dedicated bus lanes would be provided for inbound buses and a traffic signal would be used to provide priority for outbound buses along this short section.

An inbound traffic lane would be removed for the section from Sheriff Street to the existing taxi rank outside Connolly Station and also from Store Street to Custom House Quay. An outbound traffic lane would be removed from Foley Street junction to the Beresford Place junction. The additional road space will be allocated to bus/cycle lanes and to increase the width of footpaths as this is a busy pedestrian area which currently has poor pedestrian facilities.

The existing taxi rank outside Connolly Station would be relocated to Harbourmaster Place. The existing time plated parking/loading in the northbound bus lane on Amiens Street would be removed.

A cross-section on North Strand Road is presented in Figure 6.17

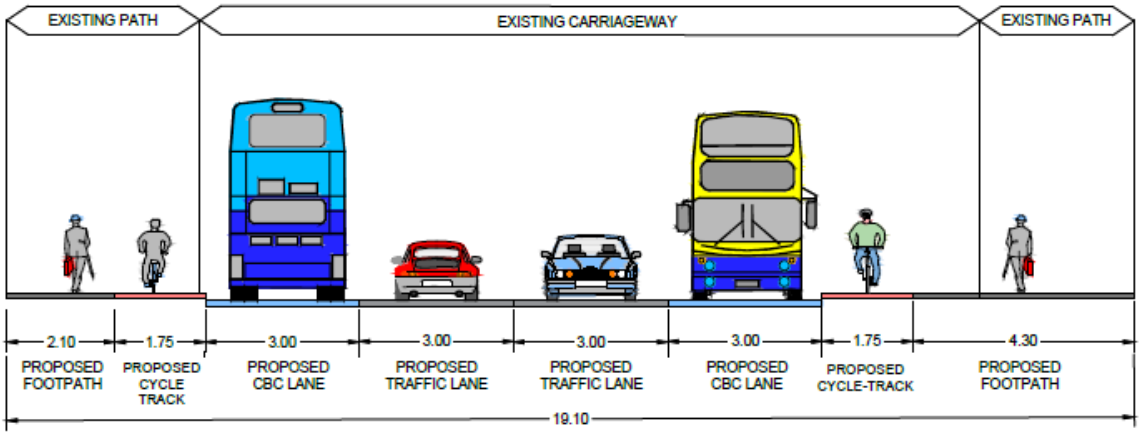


Figure 6.17 Cross Section A-A

A cross-section on Amiens Street is presented in Figure 6.18.

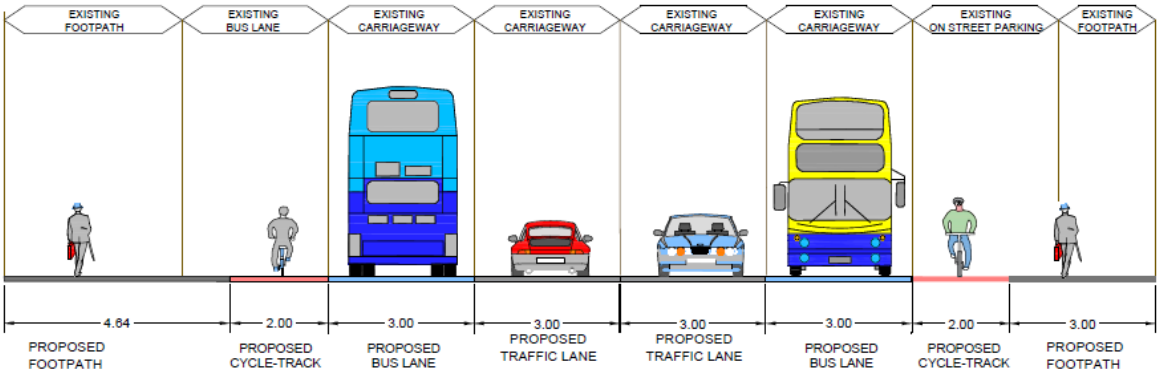


Figure 6.18 Cross Section B-B

6.2.5 Route Options Assessment

Details of the 'Stage 2' route options assessment undertaken for the Annesley Bridge to Custom House CBC are presented in Appendix A.

A summary of the ranking of route options against the scheme sub-criteria is presented in Table 6.3 below.

Table 6.3 Route Options Assessment Summary (Sub-Criteria)

Assessment Criteria	Sub-Criteria	Route 1	Route 2	Route 3
Economy	Capital Cost			
	Journey-time reliability and consistency			
Integration	Land Use Integration			
	Population and Employment Catchments			
	Public Transport Integration			
	Transport Network Integration			
	Cyclists and pedestrian Integration			
Accessibility and Social Inclusion	High Volume Trip Attractors			
	Deprived Geographic Areas & Areas Underserved by Public Transport			
Safety	Road Safety			
Environment	Archaeological, Architectural and Cultural Heritage			
	Flora and Fauna			
	Soils and Geology			
	Hydrology			
	Landscape and visual			
	Noise and Vibration			
	Air Quality			
	Land Use and the Built Environment			

In terms of "Economy" route options which travel along Amiens Street are determined to be comparatively more favourable than alternatives, with Route 3 scoring highly in comparison to other options. This is mainly due to the wide road reservation, existing bus lanes and the shorter route length. It also provides the most direct route and hence is more favourable in terms of journey time reliability and consistency.

In terms of "Integration", Route 1 is longer and passes through areas of slightly higher population density and so scores higher on the "Population and Employment Catchment" criterion. Route 3 would provide new cycle lanes for a GDA CNP primary route along with wider footpaths on Amiens St and so scores significantly higher in terms of "Cycle and Pedestrian Integration". Route 3 directly serves Connolly Station and the IFSC and scores higher on "Public Transport Integration" and "High Volume Trip Attractors". Route 1 better serves

the more deprived areas along Summerhill / Ballybough Road and so scores higher on the "Deprived Geographic Areas" criterion.

All options are considered equal in terms of "Safety".

In terms of "Environment" all routes are equal under most sub-criteria. Route 3 is considered favourable as it would have less of an impact on parking and has the potential to improve the public realm on Amiens Street.

6.2.6 Conclusion

A summary of the assessment and a relative ranking for each of the five assessment criteria is shown below in **Table 6.4**

Table 6.4 Route Options Assessment Summary (Main Criteria)

Assessment Criteria	Route 1	Route 2	Route 3
Economy			
Integration			
Accessibility and Social Inclusion			
Safety			
Environment			

Based on the assessments above it has been determined that Route 3 offers the preferred route option for the following reasons:

- It has a lower capital cost than other routes
- It has a faster and more reliable journey time than other routes
- It integrates with Connolly Station, serves the IFSC and completes a primary route in the GDA CNP
- It is more favourable under the Environmental criterion than other routes

Route 3 is identified as the preferred option for this section and is brought forward into the Emerging Preferred Route as described in Chapter 8.

6.3 Stage 2: Route Options Assessment – Custom House to Liffey

6.3.1 Introduction

Following the Stage 2 sifting process, the five remaining links in this section are assembled together to form two viable route options in each direction. The locations of these route options are shown in **Figure 6.19** below. The terminus for these routes for consideration in the Stage 2 Assessment is Talbot Bridge, two separate termini are possible for the southbound option, on either side of the bridge, due to the current traffic arrangement on the city quays.

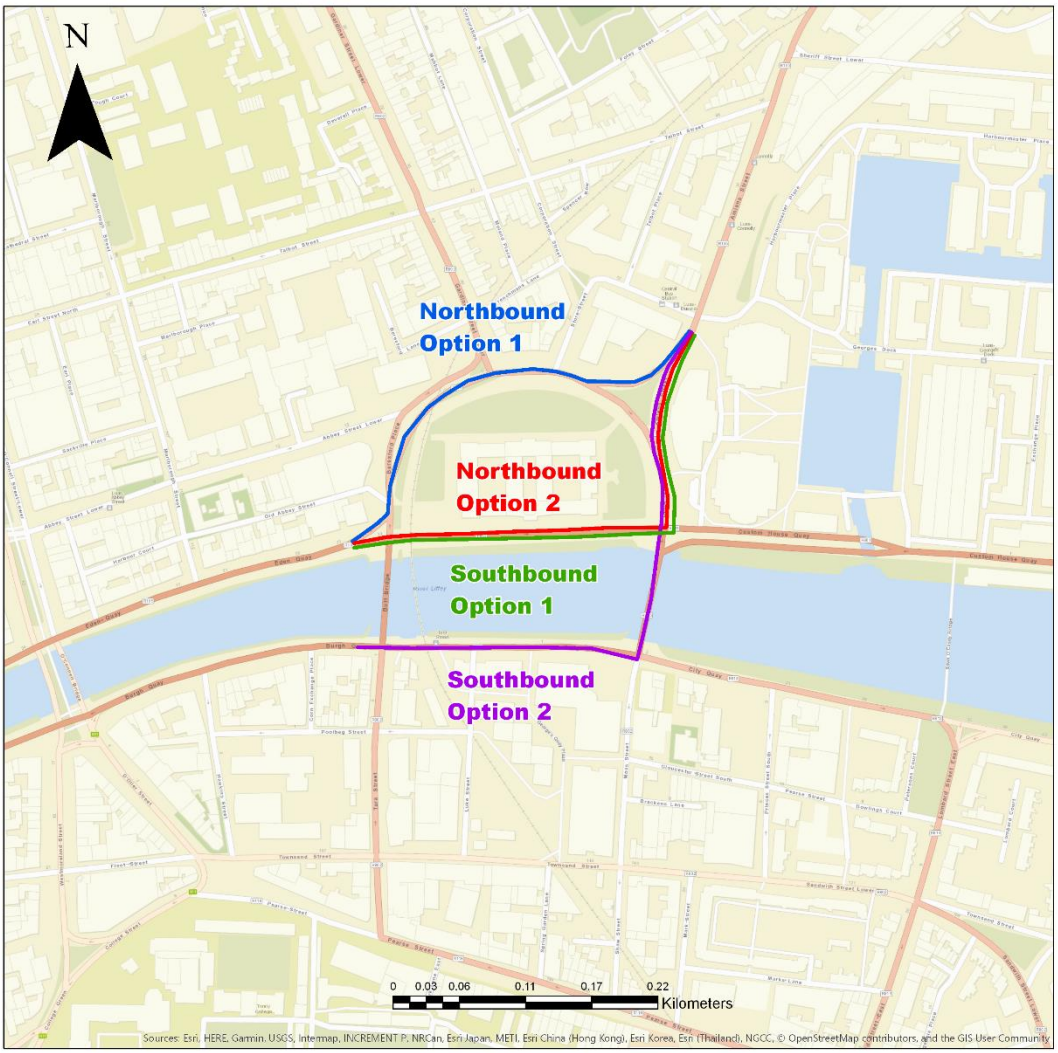


Figure 6.19 Section 1 (Clongriffin to Artane) Route Options

These northbound and southbound route options combine to form 4 potential CBC routes:

- Route Option 1 – Southbound Option 1 and Northbound Option 2
- Route Option 2 – Southbound Option 1 and Northbound Option 1
- Route Option 3 – Southbound Option 2 and Northbound Option 2
- Route Option 4 – Southbound Option 2 and Northbound Option 1

6.3.2 Route Option 1

Route Description

Southbound: Starting on Amiens Street, this route travels south onto Memorial Road before turning right onto the contraflow bus lane along Custom House Quay.

Northbound: This route starts on Eden Quay travelling east before turning left onto a contraflow lane on Memorial Road, then travelling north up Amiens Street.

Route Option 1 Indicative Scheme Design

Figure 6.20 illustrates the indicative scheme design for Route Option 1 as well as location of an indicative cross-section.

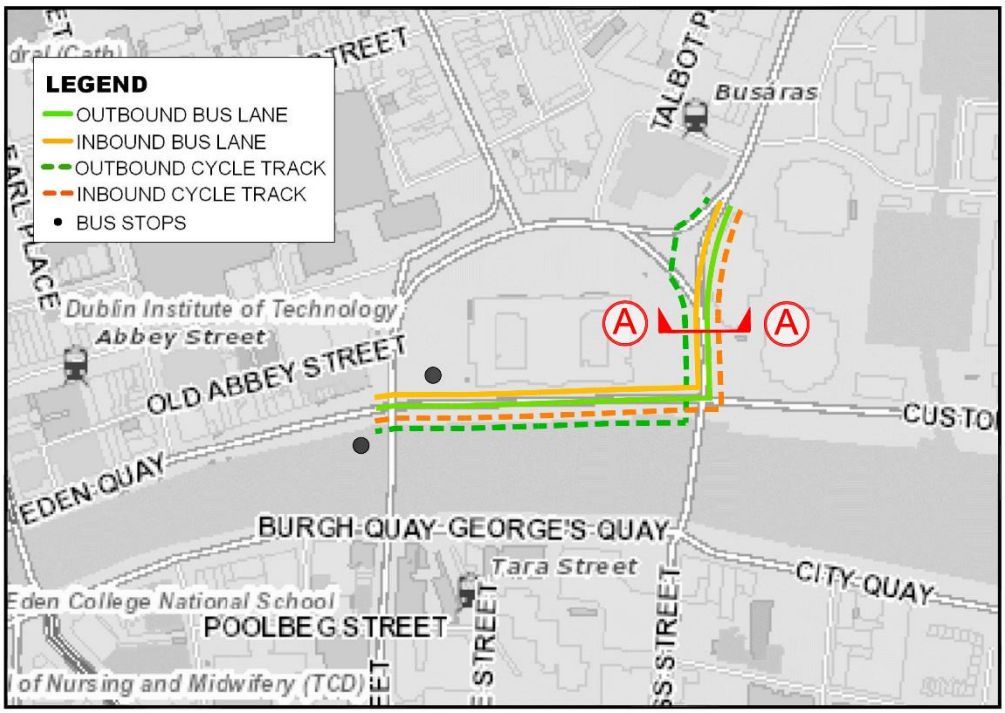


Figure 6.20 Route Option 1 Indicative Scheme Design

Stops: A total of two bus stops would be provided in each direction along this route option.

This scheme proposes the introduction of a northbound contraflow lane using the westernmost lane of Memorial Road, with the southbound bus lane immediately east of it. The remaining two lanes would be used for general traffic heading straight onto Talbot Bridge and turning left onto Custom House Quay. A bus only pre-signal would be provided at the traffic lights at the end of Amiens Street to allow southbound buses to move over to the right-hand land lane on Memorial Road

Cyclists would use a two-way segregated cycle path along the north side of the river in accordance with the Liffey Cycle Scheme.

A cross-section on Memorial Road is presented in Figure 6.21

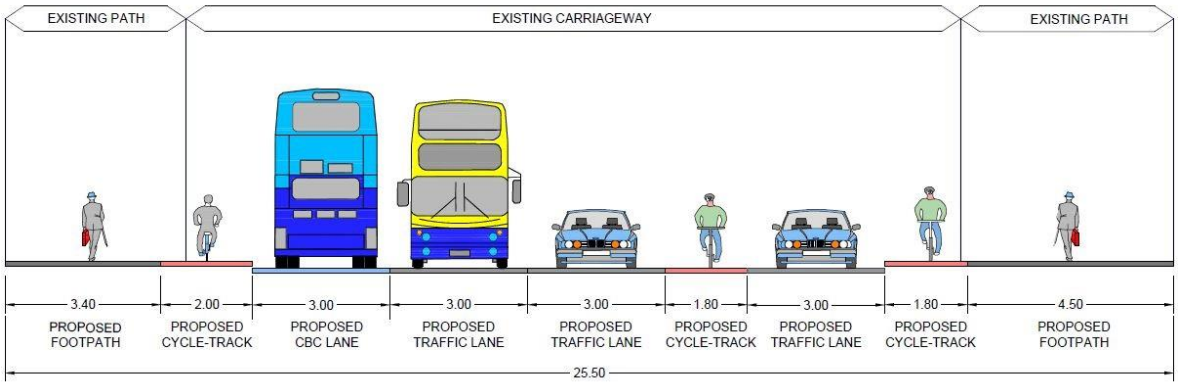


Figure 6.21 Cross Section A-A

6.3.3 Route Option 2

Route Description

Southbound: Starting on Amiens Street, this route travels south onto Memorial Road before turning right onto the contraflow bus lane along Custom House Quay.

Northbound: This route starts on Eden Quay travelling east before turning left onto Beresford Place then travelling north up Amiens Street.

Indicative Scheme Design

Figure 6.22 illustrates the indicative scheme design for Route Option 2 as well as the location of an indicative cross-section.

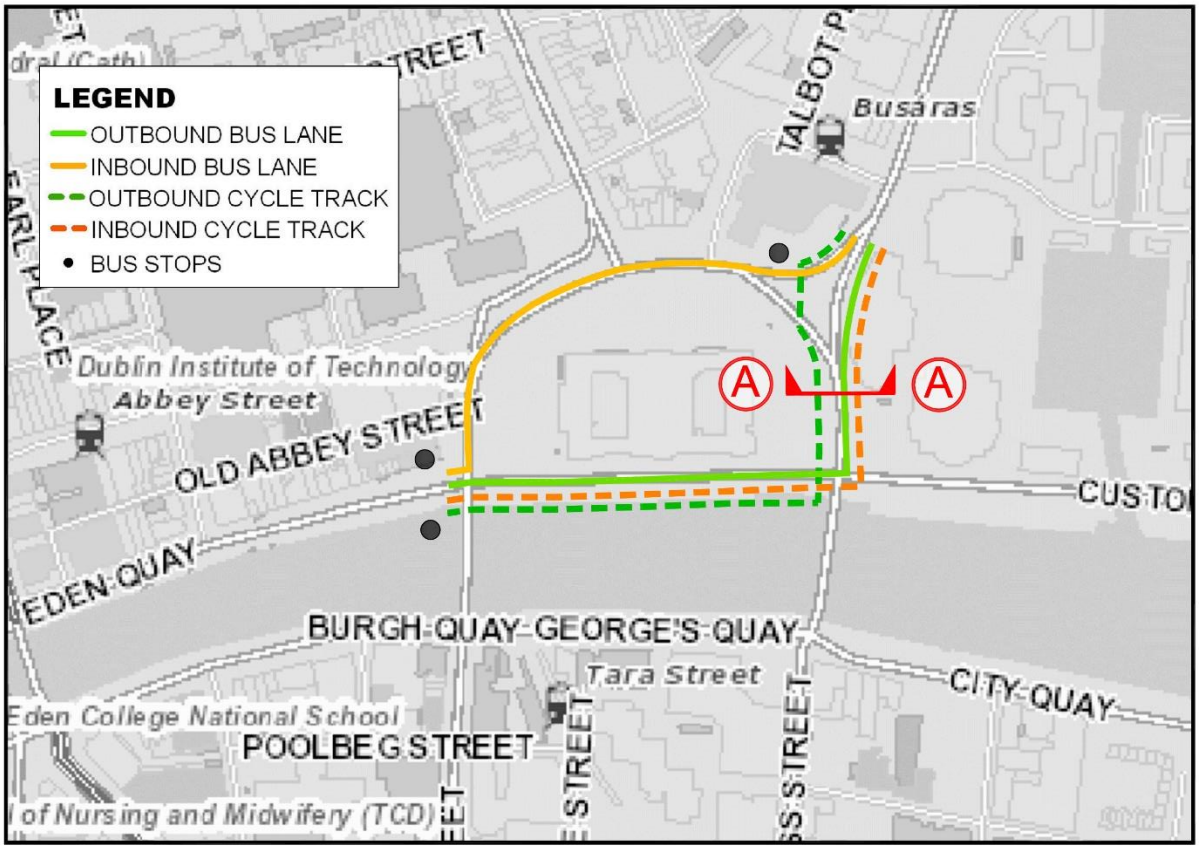


Figure 6.22 Route Option 2 Indicative Scheme Design

Stops: A total of two bus stops would be provided in each direction along this route option.

In this scheme, the southbound bus lane would occupy the westernmost lane on Memorial Road, leaving three lanes for southbound general traffic. Around Beresford Place, the second lane from the left would be converted to a bus lane. In order to avoid weaving conflicts, the bus would be given a green light to turn left from Eden Quay before general traffic. The bus lane would follow the southern side of the LUAS tracks around the north of Beresford Place. This would require reconfiguration of traffic islands and Gardiner Street Lower would be reduced to one lane for northbound general traffic.

Cyclists would use a two-way segregated cycle path along the north side of the river in accordance with the Liffey Cycle Scheme.

A cross-section on Memorial Road. is presented in Figure 6.23

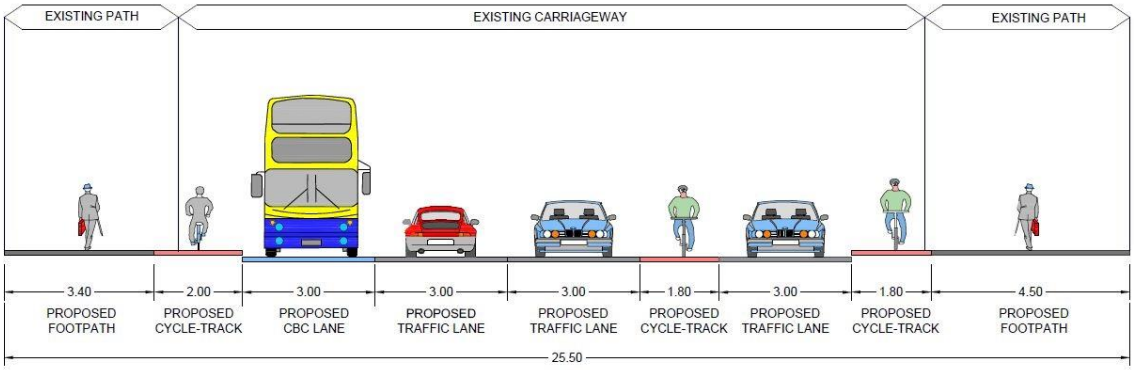


Figure 6.23 Cross Section A-A

6.3.4 Route Option 3

Route Description

Southbound: Starting on Amiens Street, this route travels south onto Memorial Road and crosses Talbot Bridge before turning right onto Georges Quay, and continuing west.

Northbound: This route starts on Eden Quay travelling east before turning left onto a contraflow lane on Memorial Road, then travelling north up Amiens Street.

Indicative Scheme Design

Figure 5.22 illustrates the indicative scheme design for Route Option 3 as well as the location of an indicative cross-section.

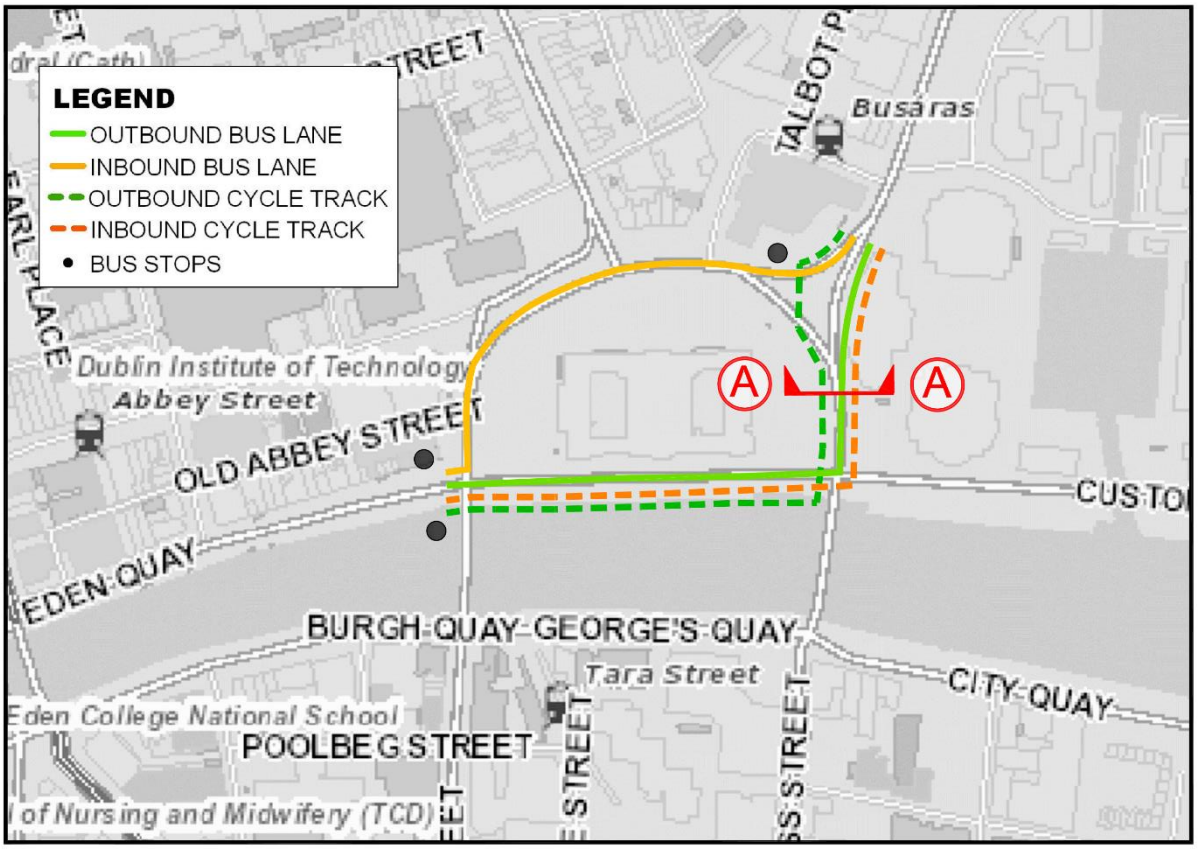


Figure 6.24 Route Option 3 Indicative Scheme Design

Stops: A total of two bus stops would likely be provided in each direction along this route option.

This is largely similar to Route Option 1, however the southbound route crosses Talbot Bridge, with the bus lane occupying the second lane from the west. This route then uses one of the two existing bus lanes along the South Quays.

A cross-section on Memorial Road is presented in Figure 6.25:

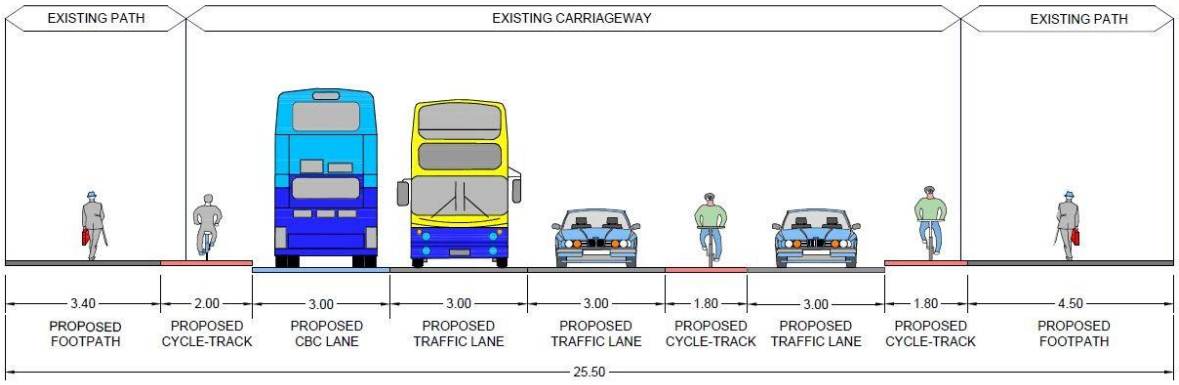


Figure 6.25 Cross Section A-A

Route Option 4

Route Description

Southbound: Starting on Amiens Street, this route travels south onto Memorial Road and crosses Talbot Bridge before turning right onto Georges Quay, and continues west.

Northbound: This route starts on Eden Quay travelling east before turning left onto Beresford Place then travelling north up Amiens Street.

Indicative Scheme Design

Figure 6.26 illustrates the indicative scheme design for Route Option 4 as well as the location of an indicative cross-section.

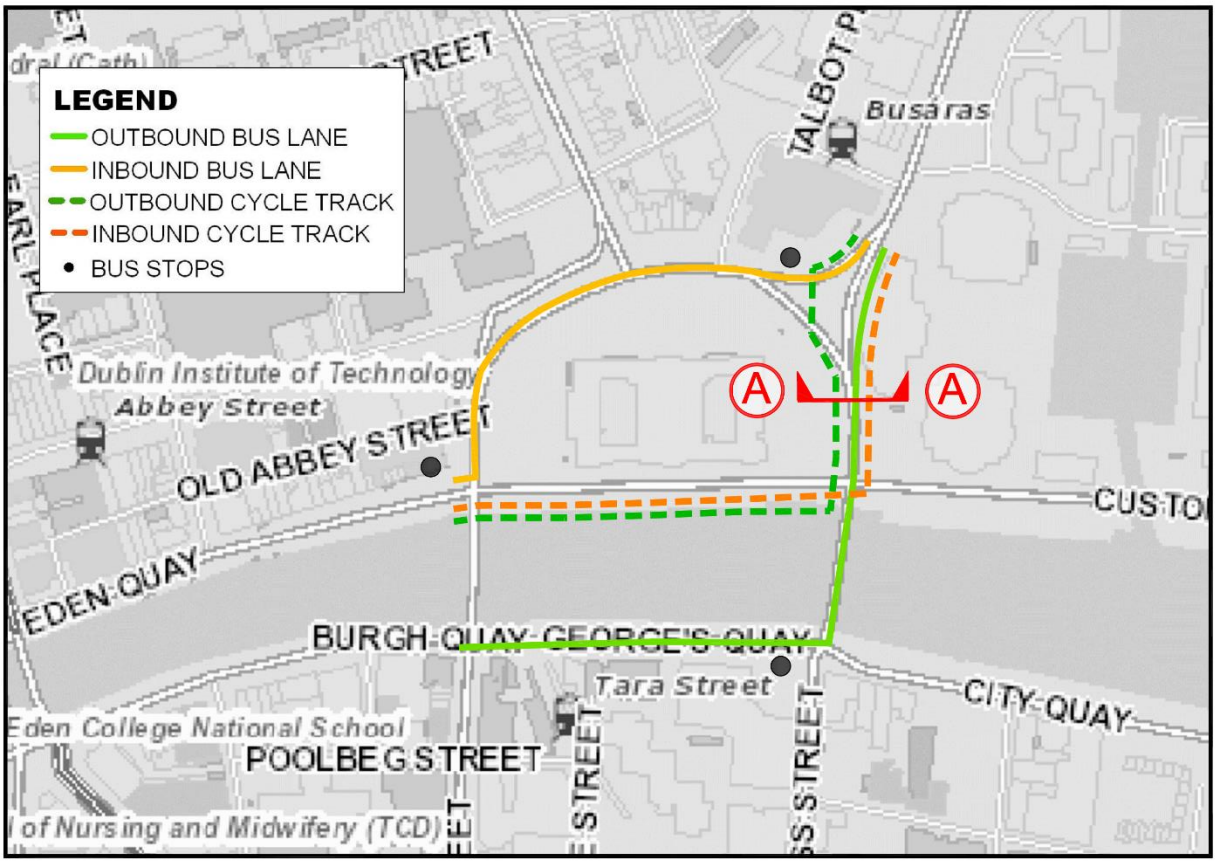


Figure 6.26 Route Option 4 Indicative Scheme Design

Stops: A total of two bus stops would likely be provided in each direction along this route option.

This is largely similar to Route Option 2, however the southbound route crosses Talbot Bridge, with the bus lane occupying the second lane from the west. This route then uses one of the two existing bus lanes along the South Quays.

A cross-section on Memorial Road is presented in Figure 6.27

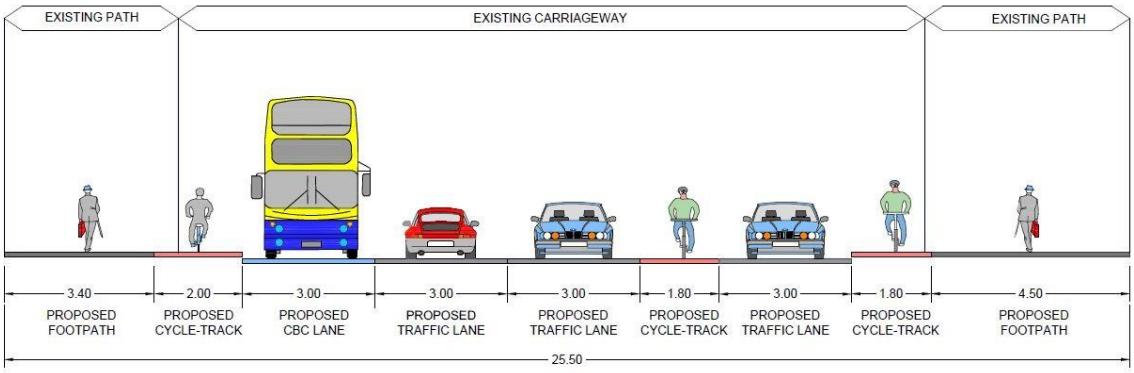


Figure 6.27 Cross Section A-A

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6.3.5 Route Options Assessment

Details of the 'Stage 2' route options assessment undertaken for the Custom House to Liffey section are presented in **Appendix A**.

A summary of the ranking of route options against the scheme sub-criteria is presented in Table 6.5 below.

Table 6.5 Route Options Assessment Summary (Sub-Criteria)

Assessment Criteria	Sub-Criteria	Route 1	Route 2	Route 3	Route 4
Economy	Capital Cost				
	Journey-time reliability and consistency				
Integration	Land Use Integration				
	Population and Employment Catchments				
	Public Transport Integration				
	Traffic Network Integration				
	Cyclists and pedestrian Integration				
Accessibility and Social Inclusion	High Volume Trip Attractors				
	Deprived Geographic Areas & Areas Underserved by Public Transport				
Safety	Road Safety				
Environment	Archaeological, Architectural and Cultural Heritage				
	Flora and Fauna				
	Soils and Geology				
	Hydrology				
	Landscape and visual				
	Noise and Vibration				
	Air Quality				
	Land Use and the Built Environment				

In terms of "Journey Time Reliability and Consistency" southbound routes which use Talbot Memorial Bridge are considered less favourable. This is because right turning traffic on the bridge would be required to weave across a bus lane and this turbulence may cause journey time delays. Buses using Custom House Quay would not experience these delays.

In terms of "Traffic Network Integration" northbound routes which use the contra-flow lane on Memorial Road are considered less favourable. This contra flow lane would reduce Memorial Road to two lanes southbound and reduce the capacity of the junction. The alternative of northbound buses using Beresford Place is considered to have a lesser impact on general traffic.

6.3.6 Conclusion

A summary of the assessment and a relative ranking for each of the five assessment criteria is shown below in **Table 6.6**

Assessment Criteria	Route 1	Route 2	Route 3	Route 4
Economy				
Integration				
Accessibility and Social inclusion				
Safety				
Environment				

Table 6.6 Route Options Assessment Summary (Main Criteria)

Based on the assessments above it has been determined that Route 2 offers the preferred route option for the following reasons:

- It would disrupt general traffic less than Options 1 and 4
- The bus would experience less turbulence and therefore have better journey time reliability than Options 3 and 4

Route 2 is identified as the preferred option for this section and is brought forward into the Emerging Preferred Route as described in Chapter 8.

It is noted however, that there is little to differentiate between options in this section and that depending on the outcomes of other city centre studies it may be more appropriate to select a different route option. The next preferred is Route Option 4. While this option would have slightly less bus priority it would avoid the potential conflict between inbound buses and the two-way cycle track along the North Quays at the proposed bus stops.

7 PROPOSED SCHEME

7.1 Introduction

Chapters 5 and 6 of this report presented an appraisal of all route options considered for study area Sections 1 and 2 respectively. Following this appraisal, preferred route sections are combined to form an end-to-end Emerging Preferred Route. This chapter of the report presents and describes the emerging preferred route identified and the concept scheme design. Concept scheme design drawings are included in Volume 3 of this report.

7.2 Emerging Preferred Route

The Emerging Preferred Route is presented in Figure 7.1 below:

Figure 7.1 Emerging Preferred Route

Southbound: The emerging preferred route starts outside Clongriffin DART station, from here the bus travels along Clongriffin Main Street, including some parts that are not yet constructed to join the Malahide Road. The bus then continues south along the Malahide Road for 5.6 km until it reaches the junction with Marino Mart. Here the bus takes a right and continues straight along Marino Mart, Fairview, Annesley Bridge Road, North Strand Road and Amiens Street. The southbound bus circulates around the Custom House by travelling along Memorial Road and Custom House Quay

Northbound: The northbound route would follow the same route as the southbound routing except that it travels around the opposite side of the Custom House on Beresford Place.

7.3 Concept Scheme Design

Bus lanes will be constructed along Clongriffin Main Street in accordance with the LAP, these have already been constructed in some locations. A new bus only junction will be constructed where Clongriffin Main Street meets Malahide Road and signals will provide priority for buses using the CBC route. Works on the junction with the R139 will allow for bus priority to be provided at the signals and enhance facilities for cyclists and pedestrians.

Further south along the Malahide Road existing bus lanes will be used and segregated cycle lanes will be provided by using existing verge space or by reducing the width of the median where appropriate. All signalised junctions along this route will be upgraded to provide enhanced bus priority and pedestrian/cycle facilities. The existing roundabouts at Artane and at Priorswood Road junctions will be upgraded to signalised junctions. Some commercial parking north of the junction with Kilmore Road will be affected, along with land take from gardens which would result in a reduction in parking capacity in approximately 10 gardens. Although parking for at least one car will still be possible in all of these gardens.

The Malahide Road will be widened to provide bus lanes on the sections where they do not currently exist, and new segregated cycle lanes will be provided for the whole length. Road widening can mostly be facilitated with land take from public green areas, parks, playing fields of Ardscoil Ris and land from Clontarf Golf Club. However, some land take from portions of front gardens would be required either side of the junction with Collins Avenue. In these sections, the cross section will be reduced to minimise land take. Approximately 15 gardens south of Collins Avenue junction will be affected. Parking capacity in these gardens will be reduced, but parking will still be available.

Malahide Road is constrained for the section between Brian Road and Clontarf Road junctions, here cyclists in both directions will be diverted along Haverty Road and Brian Road. Southbound cyclists will be required to cross the road twice and two new toucan crossings will need to be introduced.

The portion of North Strand Road/Amiens Street as far as the Foley Street junction would generally follow the Clontarf to City Centre Cycle Scheme plans, which provides cycle and bus lanes in both directions. On-street parking/loading will be affected in places although will be retained wherever feasible. Footpath widths will be reduced in a number of places

There is a pinch point on Amiens Street from Foley Street to Sherriff Street junctions as the route passes under the existing DART bridge. The available cross section is limited in this section by the large piers supporting the existing DART bridge. Traffic signals will be used to hold northbound traffic in advance of the bridge and provide priority for northbound buses, dedicated bus lanes will be provided for southbound buses. Southbound cyclists will pass around the back of the piers with the construction of a new retaining wall and setting back of the existing railings. Northbound cyclists will have a dedicated cycle track on the inside of the existing piers, the existing parking/loading/taxi bay to the north of the bridge will be removed.

On Amiens Street a southbound traffic lane will be removed for the section from Sheriff Street to the existing taxi rank outside Connolly Station and also from Store Street to Custom House Quay. A northbound traffic lane will be removed from Foley Street junction to the Beresford Place junction. The additional road space will be allocated to bus/cycle lanes and to increase the width of footpaths as this is a busy pedestrian area which currently has poor pedestrian facilities.

The existing taxi rank outside Connolly will be relocated to Harbourmaster Place. The existing time plated parking/loading in the northbound bus lane on Amiens Street will be removed.

Around the Custom House one lane of traffic will be removed from Memorial Road to allow for a southbound bus lane and one lane from the south-western side of Beresford Place which currently continues to Gardiner Street will be removed to allow for a continuous northbound bus lane. A two-way cycle route will be provided along the north quays in accordance with the Liffey Cycle Scheme.

7.4 Cost Estimate

A high-level cost estimate for has been prepared based on the concept design drawings. According to this estimate the proposed CBC infrastructure cost is anticipated to be in the region of **€45m-€50m**.

A further breakdown of the costs is shown below:

7.4.1 Section 1 – North City

Length of Scheme Section: 8 km

Indicative Infrastructure Cost: € 35.5 million

Indicative Land Acquisition Cost: €2.5 million

Total Indicative Cost of Scheme Section: €38 million

7.4.2 Section 2 – City Centre

Length of Scheme Section: 2.4 km

Indicative Infrastructure Cost: € 10 million

Indicative Land Acquisition Cost: € 0 million

Total Indicative Cost of Scheme Section: €10 million

7.4.3 Total

Length of Scheme Section: 10.4 km

Indicative Infrastructure Cost: € 45.5 million

Indicative Land Acquisition Cost: € 2.5 million

Total Indicative Cost of Scheme Section: € 48 million

7.5 Summary

7.5.1 Infrastructure Provision

The emerging preferred route measures approximately 10.4 km in total. Along the emerging preferred route currently bus infrastructure is provided for 9.1 km in the inbound and 8.8 km in the outbound direction.

The emerging preferred scheme would improve this provision to the entire length (10.4 km) for the inbound and outbound directions, with the exception of a 60m section where outbound buses get priority by means of a “virtual bus lane” which would be kept clear by traffic signals.

In addition, improvements to cycle infrastructure along the emerging preferred route would increase the overall provision to 9.9 km (95 %) in each direction, with an off-route cycle track provided for the section without cycle facilities.

7.5.2 Journey Time Benefits

Through the provision of increased bus priority infrastructure, the proposed scheme would improve the overall journey time for buses as well as the journey time reliability. A review of the existing journey time data for buses illustrates the issues that will be addressed by the proposed scheme.

The following graphs show the existing journey time and bus speed data for the section of the Dublin Bus 15 bus route which overlaps with the emerging preferred route (between Clongriffin DART station and Eden Quay). The information presented in these graphs has been taken from the automatic vehicle location system on the Dublin Bus fleet and the journey times are inclusive of dwell times at stops. Figure 7.2 & 7.3 present the average journey time variation during a normal weekday for the inbound and outbound directions.

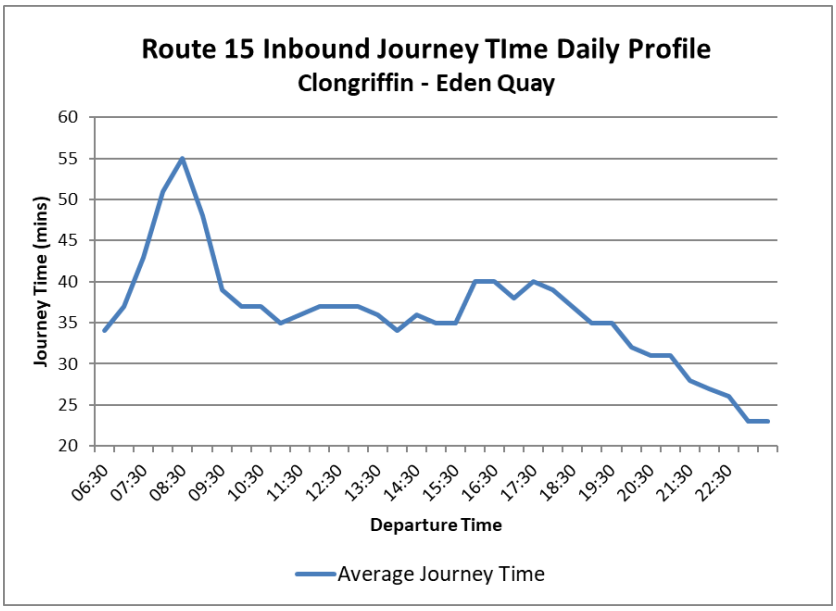

Figure 7.1 Existing Inbound Average Journey Times

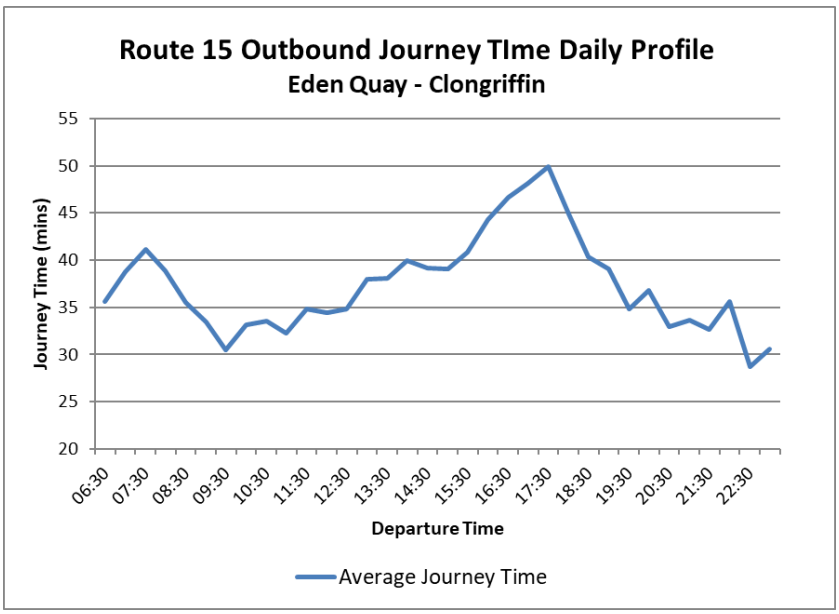

Figure 7.2 Existing Outbound Average Journey Times

The graphs presented in Figure 7.1 and Figure 7.2 show the current issues with journey time reliability along the route. Journey times during the core hours of bus operation (07:00 – 19:00) are observed to vary between 55 and 35 minutes inbound and between 50 and 31 minutes outbound. The variation in journey times is most likely due to the lack of bus priority on sections of the route as well as boarding times at stops which are high due to the requirement for each passenger to interact with the driver.

As such, the journey times outside of these hours, when traffic volumes are lower, are more reflective of the journey times which could be achieved by a combination of improved bus priority, better enforcement of bus lanes and cashless fares. Outside of the core hours of operation the average journey time is observed to reduce to between 37 and 23 minutes inbound and between 37 and 29 minutes outbound. For inbound and outbound journeys both the average journey time as well as the variance between the upper and lower limits are seen to reduce

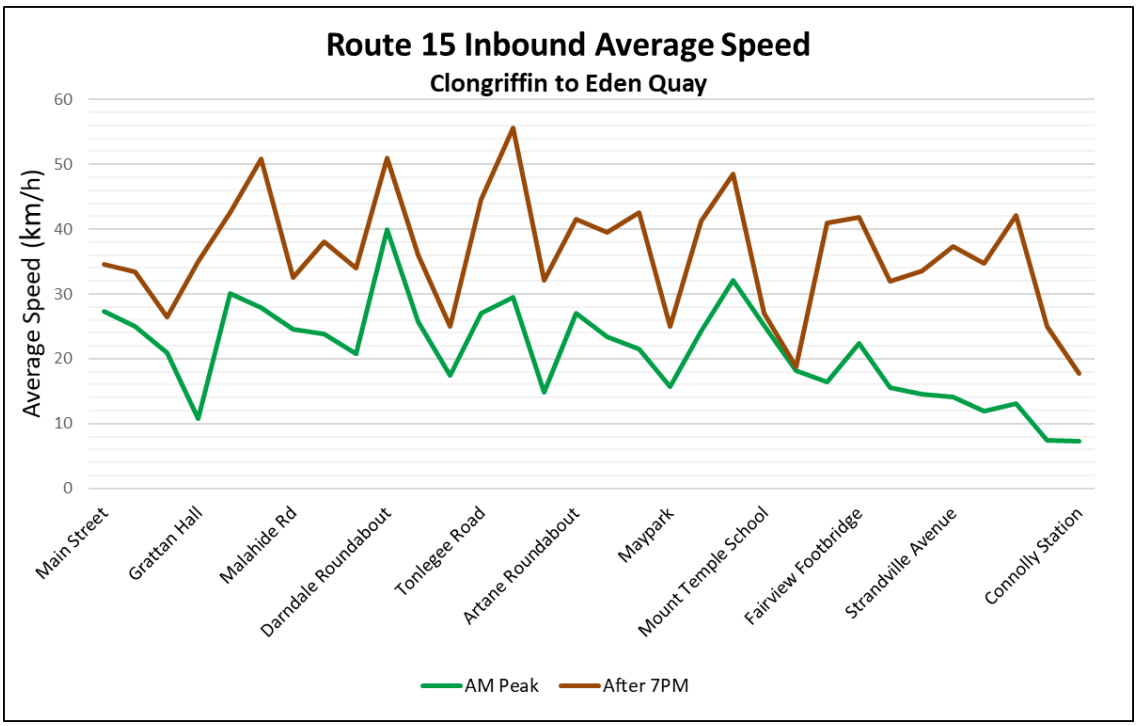

Figure 7.3 Existing Inbound Average Speed

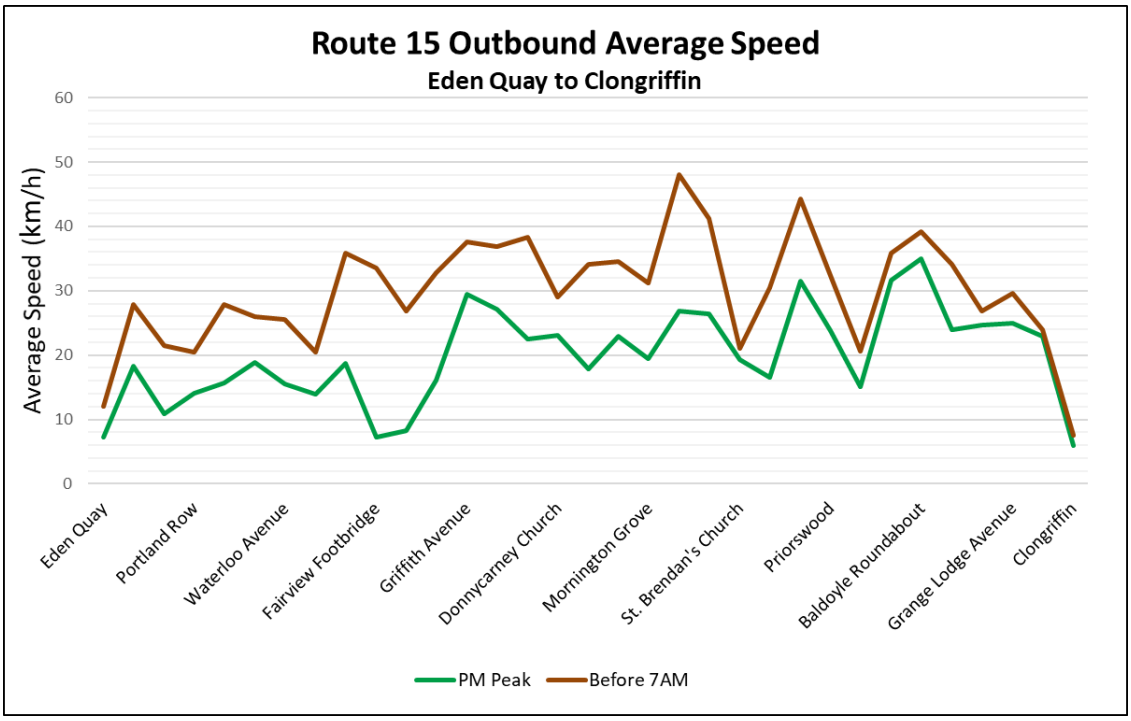

Figure 7.4 Existing Outbound Average Speed

The benefits can also be seen by comparing the existing average link speeds along the route during peak and off-peak periods as shown in Figure 7.3 and Figure 7.4 (these exclude dwell times at bus stops). Looking at both the inbound and outbound data, it can be seen that the average speed for buses along the route is higher during off-peak times, in uncongested conditions compared to the lower speeds attained by the bus during the peak times. This further illustrates the benefits improved bus priority will bring to buses operating along the proposed route.

Based on the above, a conclusion can be drawn that by improving the provision of bus lanes and bus priority at junctions along the route (coupled with the introduction of cashless fares) the risk of journey time turbulence to buses would be reduced, allowing the buses to move along the route quicker and with more consistent journey times. The extent of these benefits will be confirmed and quantified at the next design stage.

8 NEXT STEPS

This report has identified an emerging preferred route for the bus infrastructure along this Core Bus Corridor for which a concept design has been developed.

The next project stage (The development of a Preliminary Design) will further refine and update the initial concept design along the route. Further account will be taken of likely public transport service levels, particularly the bus service patterns and any changes to the overall bus network which may arise from the separate bus network review process. The proposals will be amended, if and as required, to integrate any resultant changes. The Preliminary Design will define the final practically achievable scheme for the CBC, considering more detailed studies of constraints, impacts and environmental assessment required at a local level.

Prior to finalisation of the CBC scheme design, a public consultation process will be undertaken, with inputs and feedback received incorporated where practical and appropriate to do so.

This Preliminary Design will form the basis of the planning consent process for the scheme, which will require a development consent application to be made directly to An Bord Pleanála, due to the nature and extent of the proposed works.