



# **Appendix E**

## Route Selection Report

National Transport Authority

# City Centre to Kimmage CBC

## Route Selection Report

25/04/2018

**CH2M Barry**

# Document Control Sheet

<b>Client:</b>	National Transport Authority
<b>Project Title:</b>	City Centre to Kimmage CBC
<b>Document Title:</b>	Route Selection Report

Rev. No.	Effective Date	Revision Description	Checked	Approved
1	06/02/2018	DRAFT	RS	ND
2	10/04/2018	DRAFT	RS	ND
3	19/04/2018	DRAFT	RS	ND
4	25/04/2018	DRAFT	RS	ND

This report has been prepared in accordance with the instructions of the client, the National Transport Authority, for the client's sole and specific use. Any other persons who use any information contained herein do so at their own risk.

# Acknowledgements

This Feasibility and Options Report has been prepared by CH2M Barry Consulting Engineers and their Sub-Consultants, as follows:

Archaeological, Architectural & Cultural Heritage	Courtney Deery Ltd
Traffic Counts	IDASO
Environmental Assessments	RPS Ltd

# Table of Contents

## Volume 1: Feasibility & Options Report

<b>EXECUTIVE SUMMARY</b> .....	<b>1</b>
General.....	1
Scheme Objectives .....	1
The Study Area .....	1
Route Options Assessment Process.....	2
The Emerging Preferred Route .....	3
Concept Scheme Design.....	4
Cost Estimate .....	6
Journey Time Benefits.....	6
Next Steps.....	7
<b>1 INTRODUCTION &amp; BACKGROUND</b> .....	<b>8</b>
1.1 Preamble.....	8
1.2 Report Structure.....	9
<b>2 TRANSPORT CONTEXT &amp; SCHEME OBJECTIVES</b> .....	<b>10</b>
2.1 Introduction .....	10
2.2 Transport Strategy for the Greater Dublin Area 2016-2035.....	10
2.3 Integrated Implementation Plan 2013-2018.....	10
2.4 Greater Dublin Area Cycle Network Plan.....	10
2.5 Development Plan, Local Area Plans and Strategic Development Zones.....	11
2.6 CBC Concept .....	11
2.7 Objectives of CBCs .....	12
2.8 Design Principles .....	12
<b>3 STUDY AREA</b> .....	<b>13</b>
3.1 Introduction .....	13
3.2 Study Area .....	13
3.3 Physical Constraints & Opportunities.....	14
3.4 Integration with Existing and Proposed Public Transport Network.....	14
3.5 Compatibility with Other Road Users .....	14
<b>4 ASSESSMENT METHODOLOGY</b> .....	<b>15</b>
4.1 Introduction .....	15
4.2 Assessment Process.....	15
4.3 Stage 1: Spiders Web Development.....	16
4.4 Stage 1: Route Options Assessment – Sifting Stage .....	16
4.5 Stage 2: Route Options Assessment – Detailed Assessment.....	18
<b>5 STAGE 1: ROUTE OPTIONS ASSESSMENT</b> .....	<b>30</b>
5.1 Spider’s Web.....	30
5.2 Sifting Table .....	31
5.3 Removal of Disconnected Links.....	37
5.4 Sifting Conclusion .....	38
<b>6 STAGE 2: ROUTE OPTIONS ASSESSMENT</b> .....	<b>39</b>
6.1 Introduction .....	39
6.2 Route Option 1 – Clogher Road/Sundrive Road.....	41
6.3 Route Option 2 – Kimmage Road Lower .....	46
6.4 Options Assessment .....	58
<b>7 PROPOSED SCHEME</b> .....	<b>61</b>

---

7.1	Emerging Preferred Route .....	61
7.2	Concept Scheme Design .....	63
7.3	Summary .....	65
<b>8</b>	<b>NEXT STEPS .....</b>	<b>69</b>

## Volume 2: Appendices

Appendix A – Route Options Assessment Summary Tables

Appendix B – Road Safety Audit

Appendix C – Alternative Design for Kimmage Road Lower (Scheme 2B)

Appendix D – Junction Modelling Report

## Volume 3: Concept Scheme Design Drawings

# List of Figures

Figure 0.1 Emerging Preferred Route .....	3
Figure 1.1 Radial Core Bus Corridor Network .....	8
Figure 3.1 Study Area .....	13
Figure 4.1 Assessment Process .....	15
Figure 4.2 Sample bus stop catchment map .....	25
Figure 5.1 Spider's Web .....	30
Figure 5.2 Sifting Results .....	36
Figure 5.3 Removal of Disconnected Links .....	37
Figure 5.4 Route Options Remaining After Stage 1 Assessment .....	38
Figure 6.1 Route Options .....	39
Figure 6.2 Route Option 1 .....	41
Figure 6.3 Scheme Option 1 Indicative Scheme Design .....	42
Figure 6.4 Cross Section A-A .....	43
Figure 6.5 Cross Section B-B .....	43
Figure 6.6 Cross Section C-C .....	44
Figure 6.7 Cross Section D-D .....	44
Figure 6.8 Route Option 2 .....	46
Figure 6.9 Scheme Option 2A Indicative Scheme Design .....	47
Figure 6.10 Cross Section A-A .....	48
Figure 6.11 Cross Section B-B .....	49
Figure 6.12 Cross Section C-C .....	49
Figure 6.13 Cross Section D-D .....	49
Figure 6.14 Scheme Option 2B Indicative Scheme Design .....	51
Figure 6.15 Scheme Option 2C Indicative Scheme Design .....	53
Figure 6.16 - Section A-A .....	54
Figure 6.17 - Section B-B .....	54
Figure 6.18 - Section C-C .....	55
Figure 6.19 – D-D .....	55
Figure 6.20 Scheme Option 2D Indicative Scheme Design .....	56
Figure 7.1 Emerging Preferred Route .....	61
Figure 7.2 Existing Average Inbound Journey Times .....	66
Figure 7.3 Existing Average Outbound Journey Times .....	66
Figure 7.4 Existing Inbound Average Speed .....	67
Figure 7.5 Existing Outbound Average Speed .....	68

# List of Tables

Table 4.1 Details of Multi-Criteria Analysis for Stage 2 .....	19
Table 4.2 Route Sections Infrastructure Cost Estimate Assumptions.....	20
Table 4.3 Cost Per Km Assumptions for the alternate Cycle route .....	21
Table 4.4 Junctions Infrastructure Cost Estimate Assumptions .....	22
Table 4.5 Scheme Option Colour Coded Ranking Scale .....	28
Table 5.1 - Route Options Assessment Stage 1 "Sifting" .....	31
Table 6.1 Options Assessment Summary (Sub-Criteria) .....	58
Table 6.2 Route Options Assessment Summary (Main Criteria) .....	60



## EXECUTIVE SUMMARY

### General

CH2M Barry were appointed by the National Transport Authority to undertake the Feasibility and Options Report for the City Centre to Kimmage Core Bus Corridor. This report details out the City Centre to Kimmage CBC Scheme, which is designed to full core bus corridor standard.

### Scheme Objectives

The objective of the study is to identify an emerging preferred route that 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 City Centre to Kimmage Bus Corridor Study Area runs from the City Centre Patrick Street-Kevin Street Junction to Kimmage Cross Roads. The study area was generally developed to include the main trip generators between the City Centre and Kimmage either side of the central spine formed by the existing roads of Clanbrassil Street and Kimmage Road Lower. The entire 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 underwent a high-level assessment or 'sifting' process in order to assess their suitability and ability to form part of 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 the Stage 1 'sifting' assessment, shorter route options that passed the sifting process were assembled into coherent route options which connected the two termini. Initial indicative schemes for each route option were developed based on the specific constraints along a particular route, with several scheme options considered for particularly constrained sections.

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.

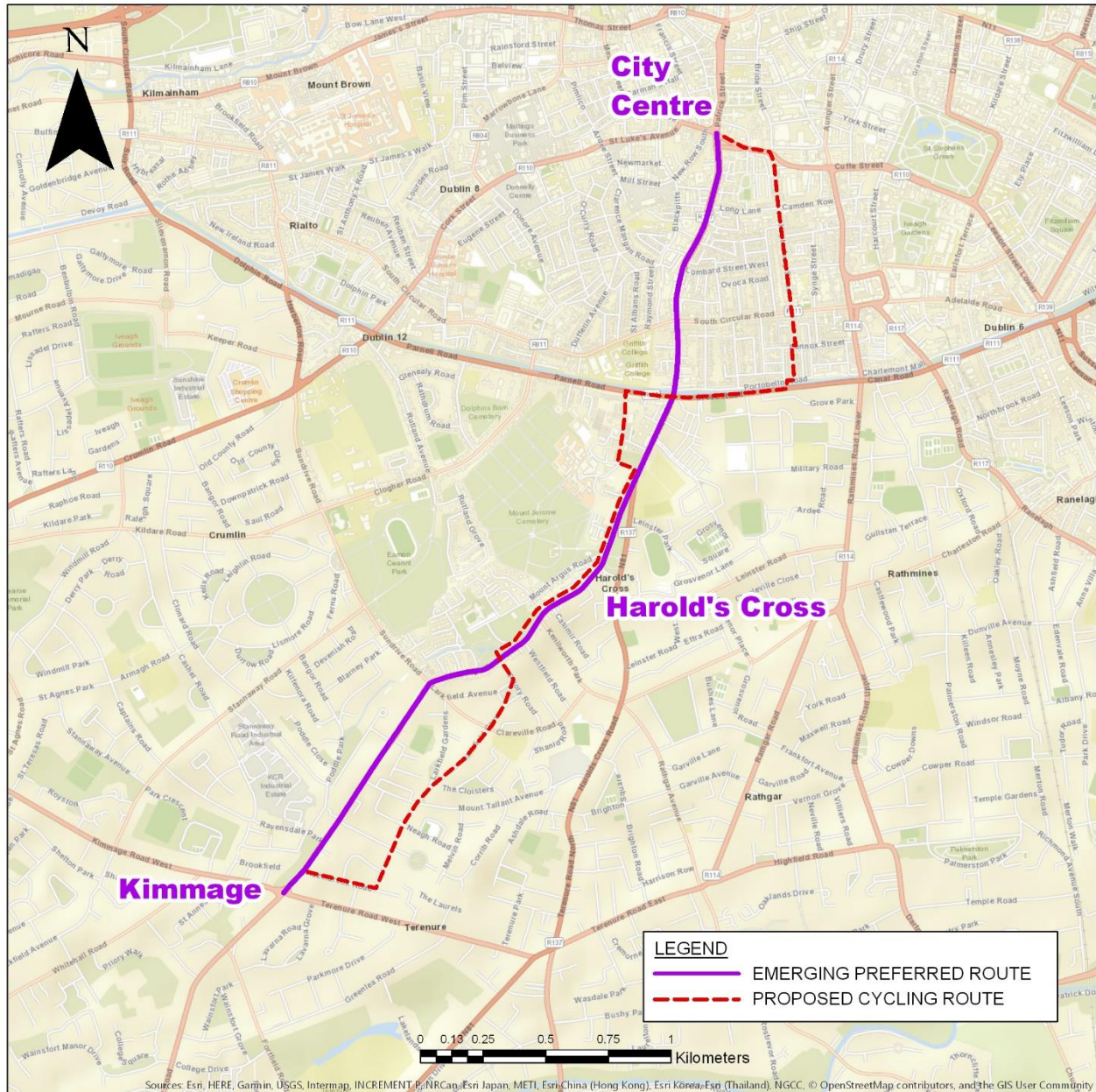


Figure 0.1 Emerging Preferred Route

**Outbound:** The route would commence at the junction of Patrick Street and Kevin Street, from here the bus would travel south along Clanbrassil Street and over Harold’s Cross Bridge. The bus would then continue on Harold’s Cross Road passing to the west of Harold’s Cross Park and on to Kimmage Road Lower to reach the terminus at Kimmage Cross Roads (KCR).

**Inbound:** The inbound route would follow the same route as the outbound routing.

## Concept Scheme Design

### **Bus Route:**

On Clanbrassil Street, the existing inbound bus lane would be maintained, and the second lane for outbound traffic would be converted to a bus lane. A new pedestrian bridge would be constructed to the west of Robert Emmet Bridge and some road widening would be required to provide bus lanes immediately to the north of the bridge. To the south of the bridge on Harold's Cross Road the existing bus lanes in both directions would be used.

The section of Kimmage Road Lower from the northern corner of Harold's Cross Park to Sundrive Road would be converted to local access only and only buses would be permitted to use it as a through route. To achieve this, "bus gates" would be provided in three locations, general traffic would not be permitted to pass these points. Both inbound and outbound traffic would be rerouted either via Sundrive Road/ Clogher Road or via Larkfield Park/ Clareville Road/ Harold's Cross Road. No land take would be required along this section.

On Kimmage Road Lower, south of the Sundrive Road junction, two-way traffic would be maintained and road widening would be required to provide dedicated bus lanes in both directions. This would require land take from portions of front gardens along the route. The forecourt of a petrol station and a portacabin being used as a commercial premises would also be affected here. On-street parking along this section would also need to be removed.

The scheme would require modification to the existing signalised junctions along the route to accommodate bus priority at traffic signals. The junctions at Clogher Road/Sundrive Road and the five-way cross roads in Harold's Cross would also be upgraded to facilitate the increase in traffic from the diversion routes. Provision would be made for right turning traffic from Harold's Cross Road onto Kenilworth Park for the outbound diversion.



**Cycle Route:**

Describing the route in an outbound direction the proposed cycle scheme would travel down Kevin Street, New Bride Street, Heytesbury Street, Stamer Street and Martin Street. From here it would cross a new bridge over the Grand Canal to join Grove Road and continue to Greenmount Lane. Cyclists would then cycle out the entrance of Our Lady's Hospice and along Harold's Cross Road. Cyclists would then follow the existing roads of Lower Kimmage Road, Priory Road, Larkfield Grove, Derravaragh Road and Hazel Brook Road to reach Kimmage Cross Roads

Cycle tracks would be provided in both directions on Kevin Street, this can be achieved by reallocating road space from traffic lanes. A two-way cycle track would be provided on New Bride Street, to provide the space for this the street would be restricted to one-way only in a southbound direction for motorists. This two-way cycle lane would extend just past the junction with Long Lane and Heytesbury Street would be made into a cul-de-sac at this location, with only cyclists allowed to pass through. Inbound motorists would be diverted onto Arnott Street to avoid the need for a U-Turn and similarly outbound motorists would be diverted onto Camden Row or Long Lane. This traffic restriction would reduce traffic volumes and speeds on Heytesbury Street like in the "environmental area" which currently exists to the South of South Circular Road, it is proposed that cyclists and motorists would share road space on Heytesbury Street.

Stamer Street and Martin Street are within this existing "environmental area" and are currently low volume low speed roads and again cyclists would share road space with motorists. Construction works on these roads would be limited to signage, road marking, alterations to speed humps and road resurfacing if required. A new pedestrian/cyclist bridge and length of boardwalk would also be constructed over the Grand Canal to link to the cycle lanes on Grove Road.

The junctions on Kevin Street, with Clanbrassil Street and New Bride Street, would be upgraded to enhance pedestrian and cyclist facilities, some traffic lanes would be removed to provide additional road space for cyclists and to reduce the overall footprint of the junctions. The junction at New Bride Street/Long Lane would also be upgraded to cater for the new traffic and cyclist layouts.

The existing cycle lanes along Grove Road and the carriageway on Greenmount Lane would be resurfaced, a new cycle track through the Grounds of Our Lady's Hospice would be constructed to join to the existing roads within the Hospice. On the 100m section of Harold's Cross Road closest to the entrance to Our Lady's Hospice a two-way cycle track on the western side of the road would be constructed. This would involve removing the on-street parking from the front of 12 houses along the road, alternative parking could be provided for these residents with land take from green areas of Our Lady's Hospice. On Lower Kimmage Road and the section of Harold's Cross Road to the west of Harold's Cross Park cyclists would share road space with local traffic and buses.

Mount Argus Road, Priory Road, Larkfield Grove, Derravaragh Road and Hazelbrook Road are low speed/low volume roads and cyclists will share road space with general traffic. Construction works would be limited to road marking, alterations to speed humps and resurfacing if required.

## 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 **€ 19-22 m.**

## Journey Time Benefits

Current journey times for the Dublin Bus route 54a, which follows the emerging preferred route from Patrick Street to KCR, can be seen to vary by as much as 70% when comparing average peak and off-peak journey times. The variation in journey times is more pronounced on the sections of the route which do not currently have dedicated bus lanes. It is also notable that the delays experienced by inbound traffic in the AM peak are more significant than for buses travelling in the opposite direction in the PM peak.

Similarly, by 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.

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 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 City Centre to Kimmage CBC. 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 Radial Core Bus Network as identified in the GDA Transport Strategy (2016 - 2035) is illustrated in Figure 1.1, with the City Centre to Kimmage CBC also highlighted for information. The Strategy also provided for Bus Rapid Transit on a number of these core bus routes, including a route from Clongriffin to Tallaght with Harold's Cross Road shown forming a section of the indicative alignment. As part of the ongoing Dublin Area Bus Network Redesign (also provided for in the GDA Transport Strategy), the need for additional bus provision serving a wider South Western quadrant of the City than that which would have been served by the Strategy proposals was identified. As such, a Core Bus Corridor serving demand from Kimmage Templeogue, Perrystown, Walkinstown and parts of Tallaght has been developed. The City Centre to Kimmage Corridor Study Area runs from the junction at Kevin Street/Patrick Street to Kimmage Cross Roads. The corridor is within the administrative area of Dublin City Council and links the South West quadrant of the City with the City Centre.

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 Corridor Network



## 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 City Centre to Kimmage CBC is detailed and the 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, through Options Assessment Stage 1 and Stage 2 analysis respectively.
- **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 City Centre to Kimmage 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 City Centre to Kimmage CBC are:

- Greenhills CBC
- Rathfarnham CBC
- 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 City Centre to Kimmage 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
  - Dublin City Centre Transport Study (2016)
  - Bus Rapid Transit Core Dublin Network (2012)
- Transport Schemes
  - Dublin Bus Network Redesign
  - CBC Greenhills & Rathfarnham
- Cycling
  - Greater Dublin Area Cycle Network Plan
  - Grand Canal Greenway

## 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 City Centre to Kimmage CBC. To as far as is practicable:

- 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:

- 3.0 m CBC lane
- 2.0 m Footpath
- 1.75 m Cycle Track
- 3.0m Traffic Lane

Individual cross-sections at specific locations are detailed within the scheme descriptions discussed in Chapter 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 City Centre to Kimmage 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 City Centre to Kimmage Bus Corridor Study Area runs from the Patrick Street-Kevin Street Junction in the City Centre to Kimmage Cross Roads (KCR). The study area was generally developed to include the main roads and trip generators between the City Centre and Kimmage either side of the central spine formed by the existing roads of Clanbrassil Street and Kimmage Road Lower. Roads immediately to the east of the study area boundary were not included as they form part of the adjacent Rathfarnham CBC. The study area lies within the administrative area of Dublin City Council.

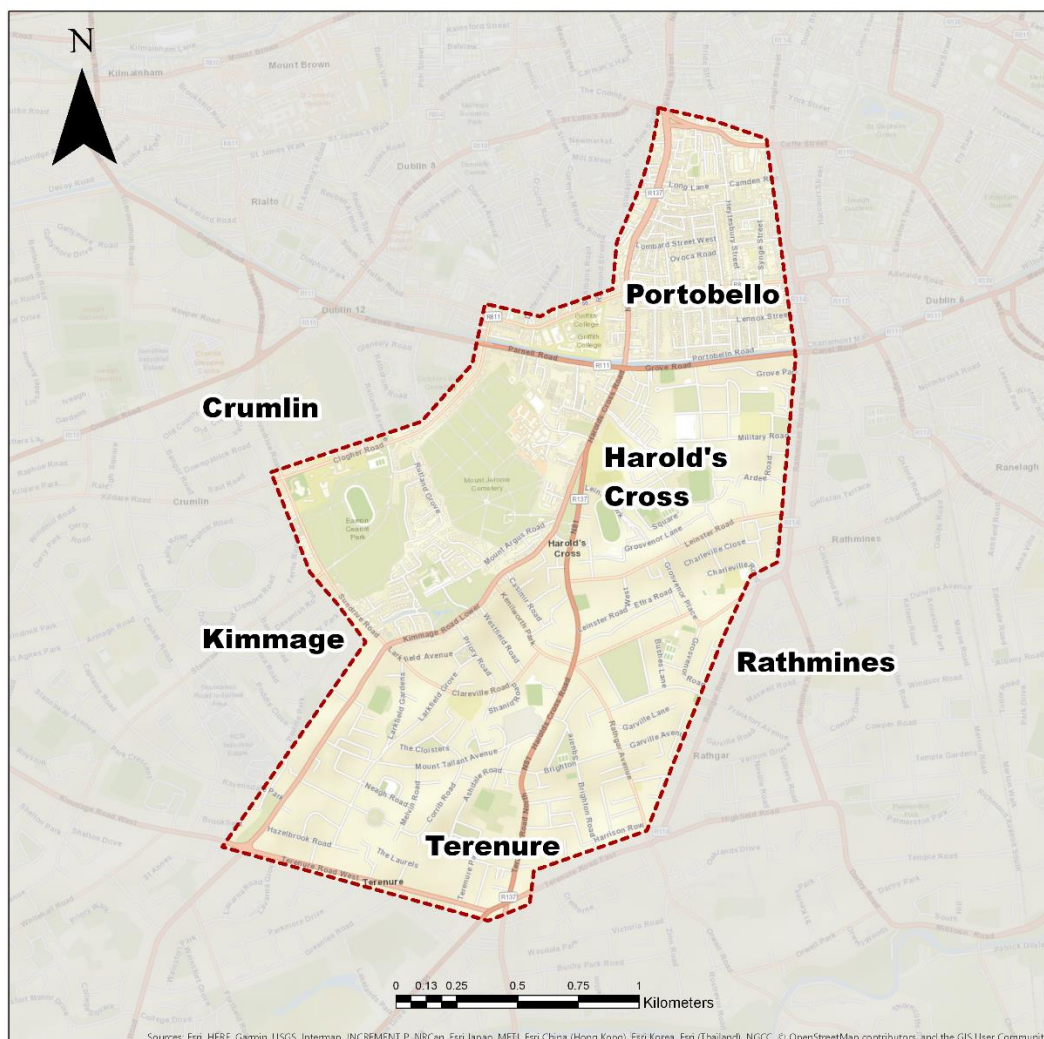


Figure 3.1 Study Area

### 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:

- Public transport infrastructure such as Dublin Bus
- 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.
- The Grand Canal (limited options for crossing the river restricts design options)

### 3.4 Integration with Existing and Proposed Public Transport Network

An objective of the City Centre to Kimmage 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:

- Existing Dublin Bus services at numerous locations along the route.
- Greater Dublin Area Cycle Network Plan (GDACNP)

### 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 where it is practicable to do so. In cases where it is deemed impractical to achieve this, these facilities will be provided along a suitable alternative route.

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

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 would be 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 City Centre to Kimmage 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.

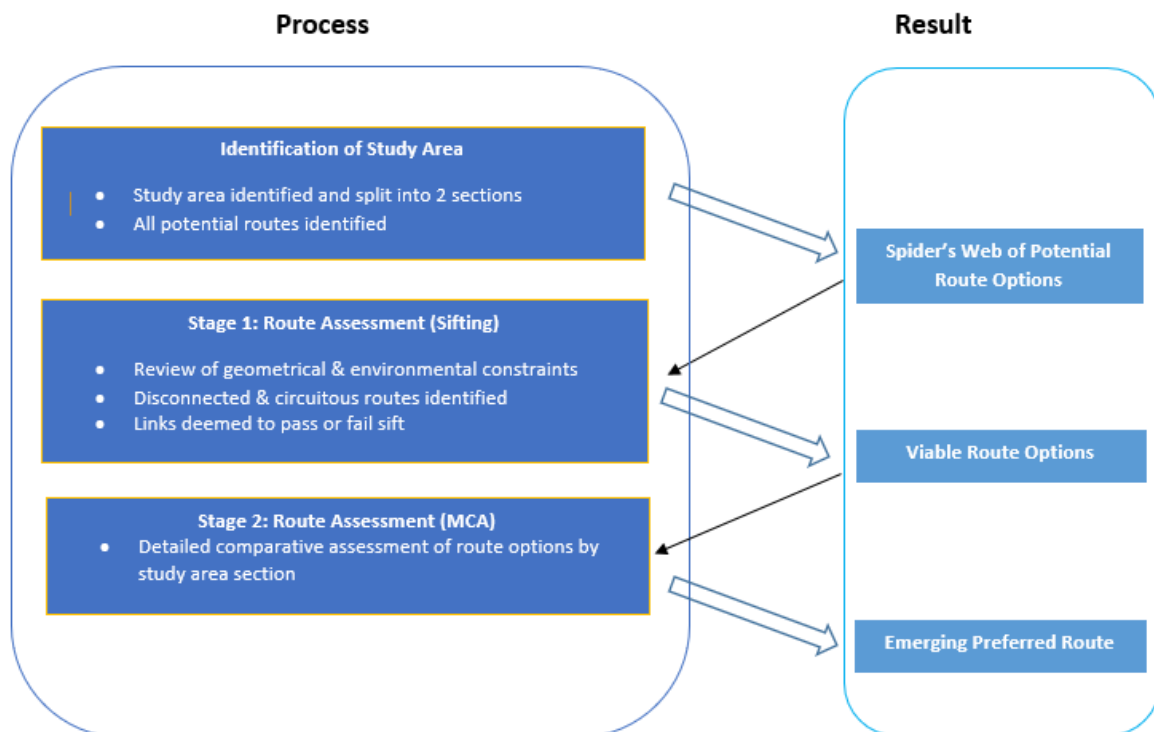


Figure 4.1 Assessment Process



### 4.3 Stage 1: Spiders Web Development

At this stage an initial 'spiders-web' of potential route options that could possibly accommodate a CBC service was identified. 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. The route selection process 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 remained consistent and it was also necessary to occasionally look forward ensuring that no viable route options were discounted.

### 4.4 Stage 1: Route Options Assessment – Sifting Stage

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 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 First 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 Journey Time Variance Data for relevant bus routes
- General Arrangement drawings for Greenhills, Rathfarnham & Ringsend CBCs
- Dublin City Council City Centre Traffic Management Scheme Proposals
- Greater Dublin Area Cycle Network Plan

Following the sift, links that were disconnected or could clearly not form part of a City Centre to Kimmage CBC route were discounted.

## 4.5 Stage 2: Route Options Assessment – Detailed Assessment

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 Table 4.1 in following:

Table 4.1 Details of Multi-Criteria Analysis for Stage 2

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
		5.g. Air Quality
		5.h. Land Use and the Built Environment

## 4.5.1 Economy (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 Route Sections Infrastructure Cost Estimate Assumptions**

Construction Category	Construction Works Assumptions	Cost Rate (€/km)
Minor	Minor Works: <ul style="list-style-type: none"> <li>• Local improvements to bus lanes;</li> <li>• New sections of footpaths where necessary;</li> <li>• New sections of cycle paths where necessary;</li> <li>• New or upgraded bus stops where necessary, including provision of Real Time Passenger Information (RTPI) and bus shelters;</li> <li>• Kerb improvement locally (removal and replacement);</li> </ul>	€750,000

	<ul style="list-style-type: none"> <li>• Footpath improvement locally (breaking out/additional concrete) including tactile paving and dished kerbs</li> <li>• Road resurfacing locally (milling/reinstatement or overlay)</li> <li>• Road markings (non-destructive removal of existing road markings): and</li> <li>• Signage (removal/relocation/replacement of existing and/or installation of new)</li> </ul>	
Major	<p>Roadway widening (including boundary works):</p> <ul style="list-style-type: none"> <li>• General site clearance (street furniture removal/relocation, etc);</li> <li>• Services protection /relocation/ diversion (power supply, communications, water, gas);</li> <li>• Drainage works (removal of and installation of new drainage systems);</li> <li>• New or upgraded bus stops where necessary, including provision of Real Time Passenger Information (RTPI) and bus shelters;</li> <li>• Earthworks (embankment treatments, retaining walls, slopes regrading, etc);</li> <li>• Pavement (full depth reconstruction);</li> <li>• Kerbs, footways and paved areas (removal and new);</li> <li>• Road markings (non-destructive removal of existing road markings, new road markings);</li> <li>• Signage (removal /relocation /replacement of existing and/or installation of new);</li> <li>• Road lighting (replacement, cabling, ducting);</li> <li>• Landscaping works (top soiling, fence, trees relocation, hedges, road margins, re-grading, etc);</li> <li>• Property boundary reinstatement works (walls, gates, driveways, landscaping, etc).</li> </ul>	€2,800,000

**Table 4.3 Cost Per Km Assumptions for the alternate Cycle route**

Description	Cost per km
Cycle route through local road/ streets (signing and lining)	€800,000
Cycle lane through major road (provision of cycle lane)	€1,500,000
New Cycle route (full construction with land take over the River Poddle)	€5,000,000

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

## Junctions

The likely scale of construction works required at junctions is identified for each route and categorised as Minor, Moderate, Major or Extensively Major as per Table 4.4 following.

**Table 4.4 Junctions Infrastructure Cost Estimate Assumptions**

Construction Category	Construction Works Assumptions	Cost Rate (€/km)
Minor	<p>Minor Works: Modifications to existing signal controlled junctions to:</p> <ul style="list-style-type: none"> <li>• Introduce bus priority (i.e. changing method of control, etc), without significant alteration to their existing geometry and layout:</li> <li>• Road markings (non-destructive removal of existing road markings, new road markings);</li> <li>• Anti-skid surface;</li> <li>• Signage (removal/relocation/replacement of existing and/or installation of new);</li> <li>• Dished kerbs and tactile paving;</li> <li>• Additional signal poles/heads;</li> <li>• Modifications to the signal controller and associated traffic signal installation works (including electrical); and</li> <li>• Additional loop detectors.</li> </ul>	€97,500
Moderate	<p>Upgrading existing minor/major junctions to signal control junctions, without significant alteration to their existing geometry and layout (excluding boundary works):</p> <ul style="list-style-type: none"> <li>• Kerbs improvement locally (removal and new);</li> <li>• Footpaths improvement locally (breaking out and new);</li> <li>• Road markings (non-destructive removal of existing road markings, new road markings);</li> <li>• Signage (removal/relocation/replacement of existing and/or installation of new);</li> <li>• Anti-skid surface;</li> <li>• Dished kerbs and tactile paving;</li> <li>• New signal poles/heads;</li> <li>• New traffic signals ducting, cabling and chambers;</li> <li>• New signal controller and associated traffic signal installation works (including electrical);</li> <li>• New loop detectors;</li> <li>• Services protection/relocation/diversion (power supply, communications);</li> <li>• Limited earthworks;</li> <li>• Localised pavement reconstruction; and</li> </ul>	€325,000

	<ul style="list-style-type: none"> <li>Localised road lighting improvements (relocation, cabling, ducting).</li> </ul>	
Major	<p>Significant modifications to existing signal controlled junctions including upgrading of roundabouts to signal controlled junctions, including:</p> <ul style="list-style-type: none"> <li>General site clearance (street furniture removal/relocation, etc);</li> <li>Services protection/relocation/diversion (power supply, communications cables, water, gas);</li> <li>Drainage works (removal of and installation of new drainage systems);</li> <li>Earthworks (embankment treatments retaining walls, slopes re-grading, etc);</li> <li>Pavement full depth reconstruction;</li> <li>Kerbs footways and paved areas (removal and new);</li> <li>Road markings (non-destructive removal of existing, new road markings);</li> <li>Anti-skid surface;</li> <li>Signage (removal/relocation/replacement of existing and/or installation of new);</li> <li>Dished kerbs and tactile paving;</li> <li>Signal poles/heads, traffic signals ducting, cabling and chambers;</li> <li>Signal controller and installation works (incl. electrical);</li> <li>Loop detectors;</li> <li>Localised Road lighting (replacement, cabling, ducting);</li> <li>Landscaping works (top soiling, fence, trees, hedges, margins re-grading, etc); and;</li> <li>Property boundary reinstatement works (walls, gates, driveways landscaping etc).</li> </ul>	€650,000
Extensively Major	<p>Significant modifications to very large and/or typical complex existing signal controlled junctions including upgrading of roundabouts to signal controlled junctions, including:</p> <ul style="list-style-type: none"> <li>General site clearance (street furniture removal/relocation, etc);</li> <li>Services protection/relocation/diversion (power supply, communications cables, water, gas);</li> <li>Drainage works (removal of and installation of new drainage systems);</li> <li>Earthworks (embankment treatments retaining walls, slopes re-grading, etc);</li> <li>Pavement full depth reconstruction;</li> <li>Kerbs footways and paved areas (removal and new);</li> <li>Road markings (non-destructive removal of existing, new road markings);</li> <li>Anti-skid surface;</li> </ul>	€1,150,000

	<ul style="list-style-type: none"> <li>• Signage (removal/relocation/replacement of existing and/or installation of new);</li> <li>• Dished kerbs and tactile paving;</li> <li>• Signal poles/heads, traffic signals ducting, cabling and chambers;</li> <li>• Signal controller and installation works (incl. electrical);</li> <li>• Loop detectors;</li> <li>• Localised Road lighting (replacement, cabling, ducting);</li> <li>• Landscaping works (top soiling, fence, trees, hedges, margins re-grading, etc); and;</li> <li>• Property boundary reinstatement works (walls, gates, driveways landscaping etc).</li> </ul>	
--	---	--

### 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.

### 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.

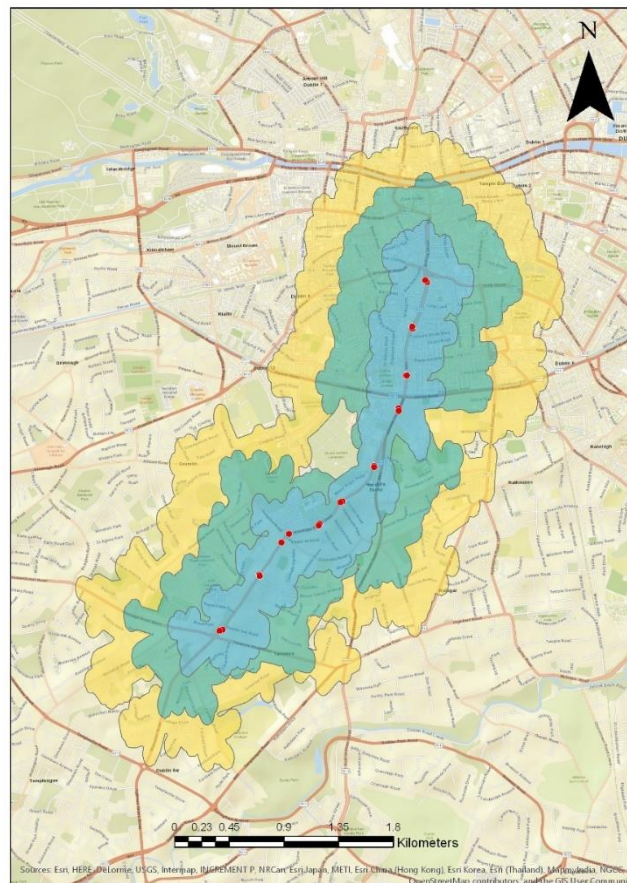
## 4.5.2 Integration (2)

### 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.

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

The current residential and employment population within a particular walking distance of each of the CBC stops is calculated in order to determine the number of potential users for each route 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. A sample catchment map, **Figure 4.2** below, shows walking isochrones at 5/10/15 minute intervals.



**Figure 4.2** Sample bus stop catchment map

### **Public 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.

### **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.

### **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.

## **4.5.3 Accessibility & Social Inclusion (3)**

### **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.

### **Deprived Geographic Areas (3.b.)**

The potential of each scheme to impact on any deprived area is assessed and compared under this criterion. The location of 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.

## **4.5.4 Safety (4)**

### **Road Safety (4.a.)**

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.

## 4.5.5 Environment (5)

### 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.

### 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.

### 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.

### 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.

### 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)

### Noise and Vibration and Air (5.f.)

Provision of CBC infrastructure has the potential to negatively impact on noise and vibration levels 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.

### Air Quality (5.g.)

Provision of CBC infrastructure has the potential to negatively impact on 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.

### Land Use and the Built Environment (5.h.)

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.

## 4.5.6 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 five-point scale for each of the criteria listed in Table 4.4. below.

**Table 4.5 Scheme Option Colour Coded Ranking Scale**

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*

### 4.5.7 Conclusion

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.



## 5 STAGE 1: ROUTE OPTIONS ASSESSMENT

### 5.1 Spider's Web

All roads within 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 the 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 making up the Spider's Web are shown in Figure 5.1

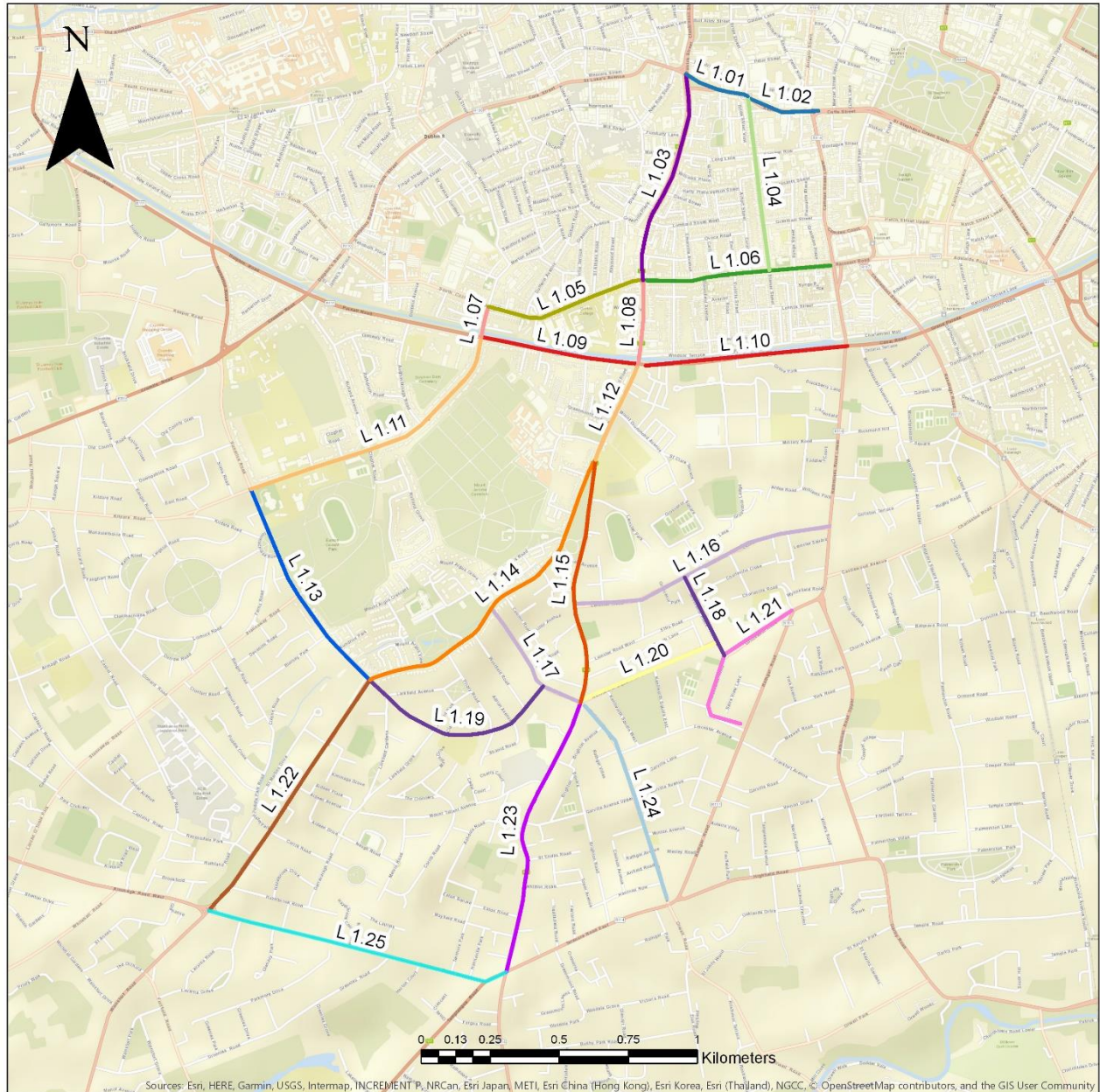


Figure 5.1 Spider's Web

## 5.2 Sifting Table

A summary of the Stage 1 route options assessment ('sifting') process is presented in Table 5.1 below

**Table 5.1 - Route Options Assessment Stage 1 "Sifting"**

Link No.	Road Characteristics	Comments	Pass / Fail
L1.01	Urban, on-street parking	Kevin Street Upper. This section consists of two-way traffic with two lanes of traffic in each direction. This forms part of a GDA CNP primary route and there are advisory cycle lanes along most of this section at present. There are currently no bus lanes along this route. Potential to widen the road is limited due to the built-up nature of the area and limited on-street parking spaces. Bus lanes could be provided by removing a lane of general traffic in each direction and this is considered a viable route option for this CBC.	Pass
L1.02	Urban, on-street parking	Kevin Street Upper. This section consists of two-way traffic with one lane of traffic in each direction. This forms part of a GDA CNP primary route and there are advisory cycle lanes along most of this section at present. There are currently no bus lanes along this route. Potential to widen the road is limited due to the built-up nature of the area and limited on-street parking spaces. While provision of dedicated bus lanes in both directions on the eastern end of this link is not considered feasible it may be possible to provide some level of bus priority using traffic management or traffic signals and this is considered a viable route option for this CBC.	Pass
L1.03	Urban & Residential, on-street parking and loading	R137, New Street South, Clanbrassil Street Lower and Clanbrassil Street Upper, from junction with Patrick Street to the junction with South Circular Road. This section consists of two-way traffic, with varying numbers of lanes in each direction. There are cycle lanes along most of this route. There is also partial bus lane provision. There is some on-street parking and loading spaces. This link is wide enough to accommodate CBC lanes with outbound general traffic lanes removed in places. The GDA CNP secondary route 9B runs along this section. This is considered a viable route option for this CBC.	Pass
L1.04	Urban & Residential, on-street parking	New Bride Street and Heytesbury Street from junction with Bride Street and junction with Stamer Street. This section consists of two lanes of traffic, one in each direction with sections of on-street parking. There are no cycle lanes or bus lanes along this section. The road widens to accommodate more lanes on approach to the junction with Bride Street. The GDA CNP primary route 9 runs along this section. Potential to widen this road is limited due to the close proximity of the buildings to the road edge, and removal of on street parking would have considerable impact to the residential properties along this link. This is not considered a viable route option for this CBC.	Fail

<b>L1.05</b>	Urban & Residential, on-street parking / loading	South Circular Road, from junction with Donore Avenue to junction with Clanbrassil Street. This section consists of one to two lanes of traffic in each direction. There are partial bus lanes but no cycle lanes. The GDA CNP secondary route C7 runs along this section. There are sections of on-street parking and a loading bay. The road is already wide, and could accommodate a CBC with the removal of some on-street parking and trees along one side of the road. This is considered a viable route option for this CBC.	Pass
<b>L1.06</b>	Urban & Residential, on-street parking / loading	South Circular Road, from junction with Clanbrassil Street to junction with Richmond Street South. This section consists of one to two lanes of traffic in each direction. There are partial bus lanes but no cycle lanes. The GDA CNP secondary route C7 runs along this section. There are sections of on-street parking and a loading bay. The road is already wide, and could accommodate bus lanes with the removal of some on-street parking and trees along one side of the road. This is considered a viable route option for this CBC.	Pass
<b>L1.07</b>	Urban & Residential	Donore Avenue, from junction with South Circular Road to Parnell Road. This link consists of one general traffic lane in each direction with the inbound lane flaring into two lanes at the junction with South Circular Road. There are no bus lanes or cycle lanes along this street. There is little room for widening, with houses either side of the road however the existing wide footpaths could be narrowed to provide dedicated bus lanes. An additional pedestrian bridge or bridges would be needed over the Grand Canal to allow bus priority over the existing bridge. This is a viable route option for this CBC.	Pass
<b>L1.08</b>	Urban & Residential	Clanbrassil Street Upper, from junction with Harold's Cross Road to junction with South Circular Road. This section consists of one to two lanes of traffic in either direction, with a partial bus lane in one direction. There is a small section of on-street parking. There are cycle lanes either side of this street. The northern end is sufficiently wide to accommodate CBC with the removal of some on-street parking. The southern end of the link would require some road widening and reconfiguration of the pedestrian layout. Bridge widening, or an additional pedestrian/cyclist bridge would be required at Harold's Cross Bridge. This is considered a viable route option for this CBC.	Pass
<b>L1.09</b>	Regional/ Urban	Parnell Road (R111). One all vehicle lane in each direction. It forms part of the grand canal route which is currently heavily trafficked and has high volumes of cyclists. It is on a GDA CNP secondary route and there are on road cycle lanes provided at present. Widening of the road to provide bus lanes is not feasible as the building line is close to the road on the south and the Grand Canal to the north is a protected conservation area. Provision of CBC infrastructure is not feasible. This is not considered a viable route option for this CBC.	Fail
<b>L 1.10</b>	Regional/ Urban	Grove Road (R111). One all vehicle lane in each direction. It forms part of the grand canal route which is currently heavily trafficked and has high volumes of cyclists. It is on a GDA CNP secondary route and there are on road cycle lanes provided at present. Widening of the road to provide bus lanes is not feasible as the building line is close to the road on the south and the grand canal to the north is a	Fail

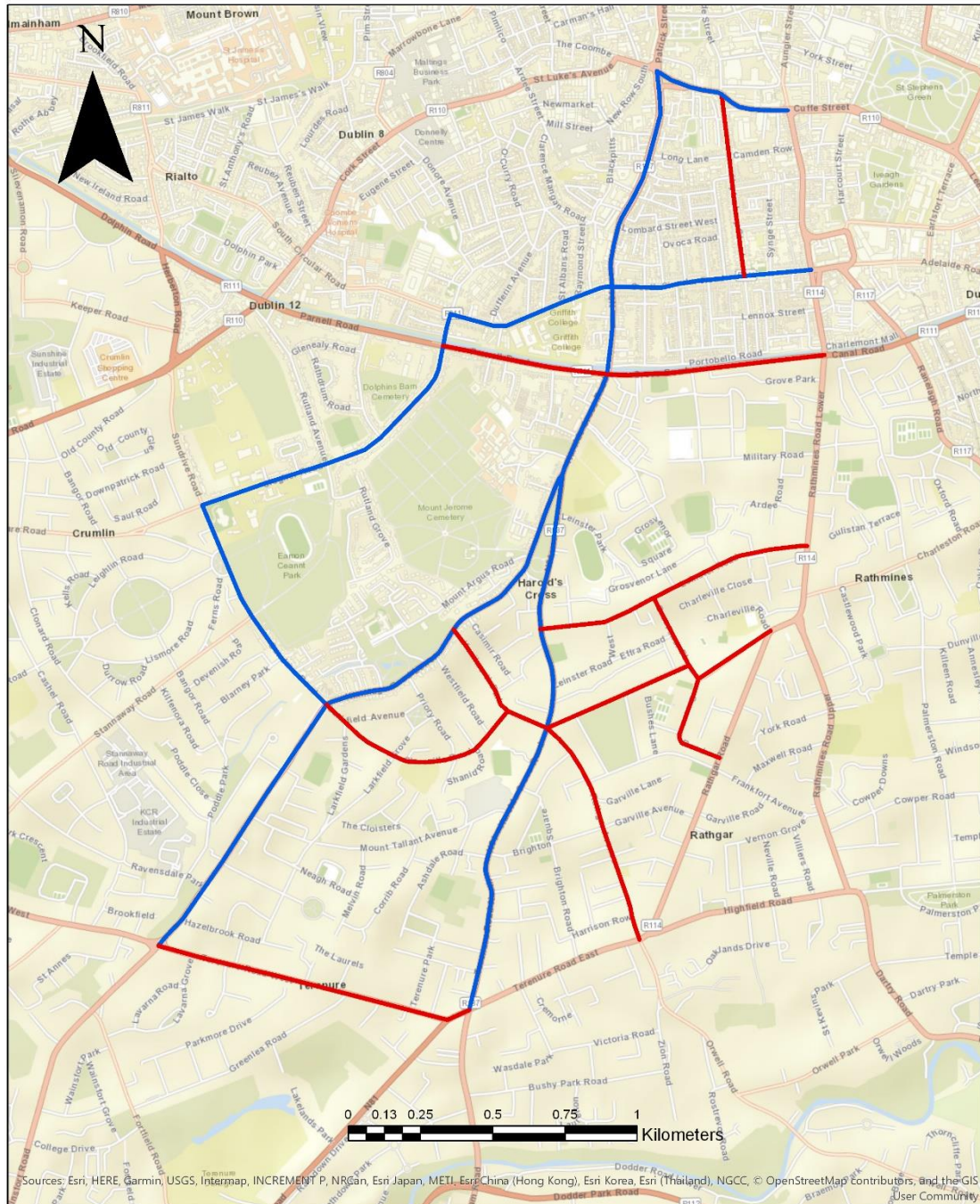


		protected conservation area. Provision of CBC infrastructure is not feasible. This is not considered a viable route option for this CBC.	
<b>L1.12</b>	Regional/ Urban	Clogher Road. One all vehicle lane in each direction. This is a secondary route on the GDA NCP. There are no bus lanes or cycle lanes along this road. The road is lined by residential entrances, bus lanes could be provided by narrowing the existing wide footpaths. Removal of some street trees and on-street parking would also be required. This is considered a viable route option for this CBC.	Pass
<b>L 1.12</b>	Regional/ Urban	Harold's Cross Road (R137). One all vehicle lane in each direction as well as existing bus lanes in both directions. This link is part of a GDA CNP secondary route and cyclists are currently required to cycle in the bus lanes. This is considered a viable route option for this CBC as there are existing bus lanes in both directions.	Pass
<b>L1.13</b>	Regional/ Urban	Sundrive Road. One all vehicle lane in each direction. This link is a secondary route on the GDA CNP. There are no cycle lanes or bus lanes along this link. Road widening to provide bus lanes could be provided by reallocating road space and narrowing the existing footpaths. Removal of street trees and on-street parking would also be required. This is considered a viable route option for this CBC.	Pass
<b>L 1.14</b>	Regional/ Urban	Kimmage Road Lower (R817). One all vehicle lane in each direction. This link forms part of a GDA NCP primary route and there are on-road advisory cycle lanes provided at present. On street parking is in operation on one side of the road at a time, this side changes to suit morning and evening peak traffic. Widening of the road would require land take along the whole link from front gardens and public parks. There are significant pinch points at McGowan's Pub and on the approach to Sundrive Road junction and purchase of buildings may be required. This link is considered a viable route option despite the significant constraints as there are limited other route options for providing CBC priority through this section. This link connects with L3.02 & L3.11 & L3.15 to form a direct route. This is considered a viable route option for this CBC.	Pass
<b>L 1.15</b>	Regional/ Urban	Harolds Cross Road (R137). One all vehicle lane in each direction and partial bus lanes in both directions. This link forms part of a GDA CNP secondary route, cyclists share the bus lanes where they exist and have on-road advisory cycle tracks where they do not. There is some potential to widen the road by removing on-street parking and/or front gardens. There is a pinch point near the junction with Leinster Road where the purchase of buildings or traffic management measures would be required to provide bus priority. This is considered a viable route option for this CBC.	Pass
<b>L 1.16</b>	Residential, on-street parking	Leinster Road. One all vehicle lane in each direction with residential on-street parking on both sides and traffic calming speed humps. This link is a GDA CNP feeder route and there are currently no cycle facilities. Provision of dedicated bus would require widening of the road with removal of on-street residential parking and/or land take from front gardens along the whole link. There is a pinch point at Rathmines Library where road widening is not feasible and shared	Fail

		running would be required, this would result in significant journey time delays. This is not considered a viable route option for this CBC.	
<b>L 1.17</b>	Residential, on-street parking	Kenilworth Park. Narrow single carriageway with residential on-street parking on both sides. Widening of the road would require removal of parking and front gardens along the whole length of the link. This link is on a GDA CNP secondary route, but no cycle facilities are provided at present. This is not considered a viable route option for this CBC.	Fail
<b>L1.18</b>	Residential	Grosvenor Place. Narrow residential road with one all vehicle lane in each direction and on-street parking on both sides. This is not part of the GDA CNP. Provision of dedicated bus lanes would require removal of on-street residential parking along the length of the street and no suitable alternative is available, extensive land take from front gardens would be also be required. This is not considered a viable route option for this CBC.	Fail
<b>L 1.19</b>	Residential	Clareville Road, Larkfield Park. One all vehicle lane in each direction with residential on-street parking on both sides and traffic calming speed humps. Widening of the road to provide CBC and cycling infrastructure would require removal of residential on-street parking and land take from gardens along the whole link. There are pinch points at either end of the link where buildings would any road widening, shared running here would result in journey time delays for buses. This link forms part of a GDA CNP secondary route but there are no cycle facilities at present. This is not considered a viable route option for this CBC.	Fail
<b>L 1.20</b>	Residential	Kenilworth Square North, Kenilworth Road. Single carriageway in each direction with residential on-street parking on both sides. Widening of the road to provide dedicated CBC lanes would require removal of residential parking and/or front gardens along the whole length of the link, land take may also be required from the playing fields of St Marys College. A large number of street trees would also have to be removed. This link is on a GDA CNP secondary route but no cycle facilities are provided at present. This is not considered a viable route option for this CBC.	Fail
<b>L 1.21</b>	Residential	Grosvenor Road, from Frankfurt Avenue to the junction with Rathgar Road. One all-vehicle lane in each direction with on street parking on both sides. This link is not on the GDA CNP network and no cycle facilities are provided. Provision of dedicated bus lanes would require removal of on-street residential parking along the length of the street and no suitable alternative is available, extensive land take from front gardens would be also be required. This is not considered a viable route option for this CBC.	Fail
<b>L 1.22</b>	Regional/ Urban	Kimmage Road Lower (R817). One all vehicle lane in each direction. This link forms part of a GDA CNP primary route and there are currently on-road advisory cycle tracks provided. There is potential to widen the road to provide dedicated bus lanes although this would require land take from a number of gardens along the route and may directly impact the canopy of the petrol station at KCR and	Pass

		the portacabin used by Battery World. There is a pinch point by KCR House Pub and cycle facilities could be provided on this link. This is considered a viable route option despite the constraints as there are limited options for providing CBC priority through this section and this link connects with L3.02 & L3.04 & L3.15 to form a direct route. This is considered a viable route option for this CBC.	
<b>L 1.23</b>	Regional/ Urban	Harold's Cross Road (R137), from Kenilworth Square junction to Terenure Cross. This link has traffic lanes in both directions with partial one-way bus lanes, there are commercial on-street parking spaces on both sides on the approach to Terenure Village. There is potential to widen this section with land take from portions of front gardens to provide dedicated CBC lanes. There are significant pinch points on the approach to Terenure Village and by Mayfield Cafe which would require shared running or building acquisition. This link is on a GDA CNP secondary route and on-road advisory cycle tracks are provided. This is considered a viable route option for this CBC.	Pass
<b>L 1.24</b>	Residential	Rathgar Avenue. One all vehicle lane in each direction and footpaths both sides. Narrow residential street with building lines close to the road on both sides. On-street parking on both sides and traffic calming speed humps. Link forms part of a GDA CNP feeder route and there are currently no cycle facilities provided. There are several pinch points which would prevent the widening of the road to provide CBC infrastructure. This is not considered a viable route option for this CBC.	Fail
<b>L 1.25</b>	Residential	Terenure Road West. One all vehicle lane in each direction and footpaths on both sides. This link forms part of a GDA NCP secondary route and no cycle facilities provided at present. Widening of the road to provide bus lanes would require considerable land take of front gardens. There is a pinch point on the approach to Terenure Cross and it is likely buses would experience significant delays here. Providing bus priority through Terenure cross roads via this link is not considered feasible as two right turning movements would be required and space is limited by the proximity of buildings on either side of the road. This is not considered a viable route option for this CBC.	Pass

The outcome of the sift can be seen in the **Figure 5.2**. Links shown in red failed the sift and those in blue have passed.



**Figure 5.2 Sifting Results**



### 5.3 Removal of Disconnected Links

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

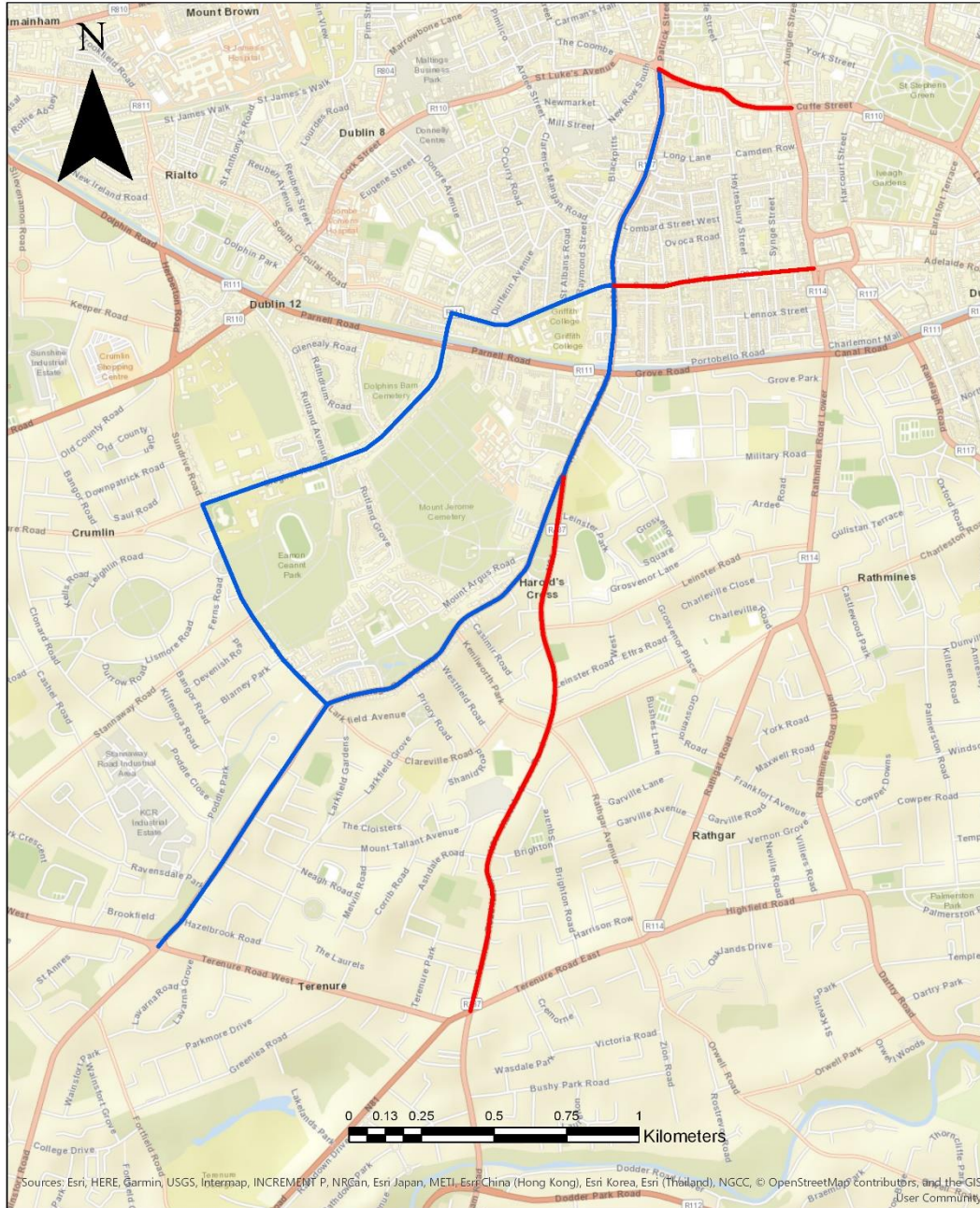


Figure 5.3 Removal of Disconnected Links

## 5.4 Sifting Conclusion

Following the Stage 1 sift, 9 of the 25 links assessed passed the initial sifting stage and were progressed to the next assessment stage. These links are presented in Figure 5.4 below.



Figure 5.4 Route Options Remaining After Stage 1 Assessment



## 6 STAGE 2: ROUTE OPTIONS ASSESSMENT

### 6.1 Introduction

Following the Stage 1 sifting process the nine remaining links are assembled together to form two viable route options, as follows:

- Route Option 1: Using Clanbrassil Street, South Circular Road, Clogher Road, Sundrive Road and Kimmage Road Lower
- Route Option 2: Using Clanbrassil Street, Harold's Cross Road and Lower Kimmage Road

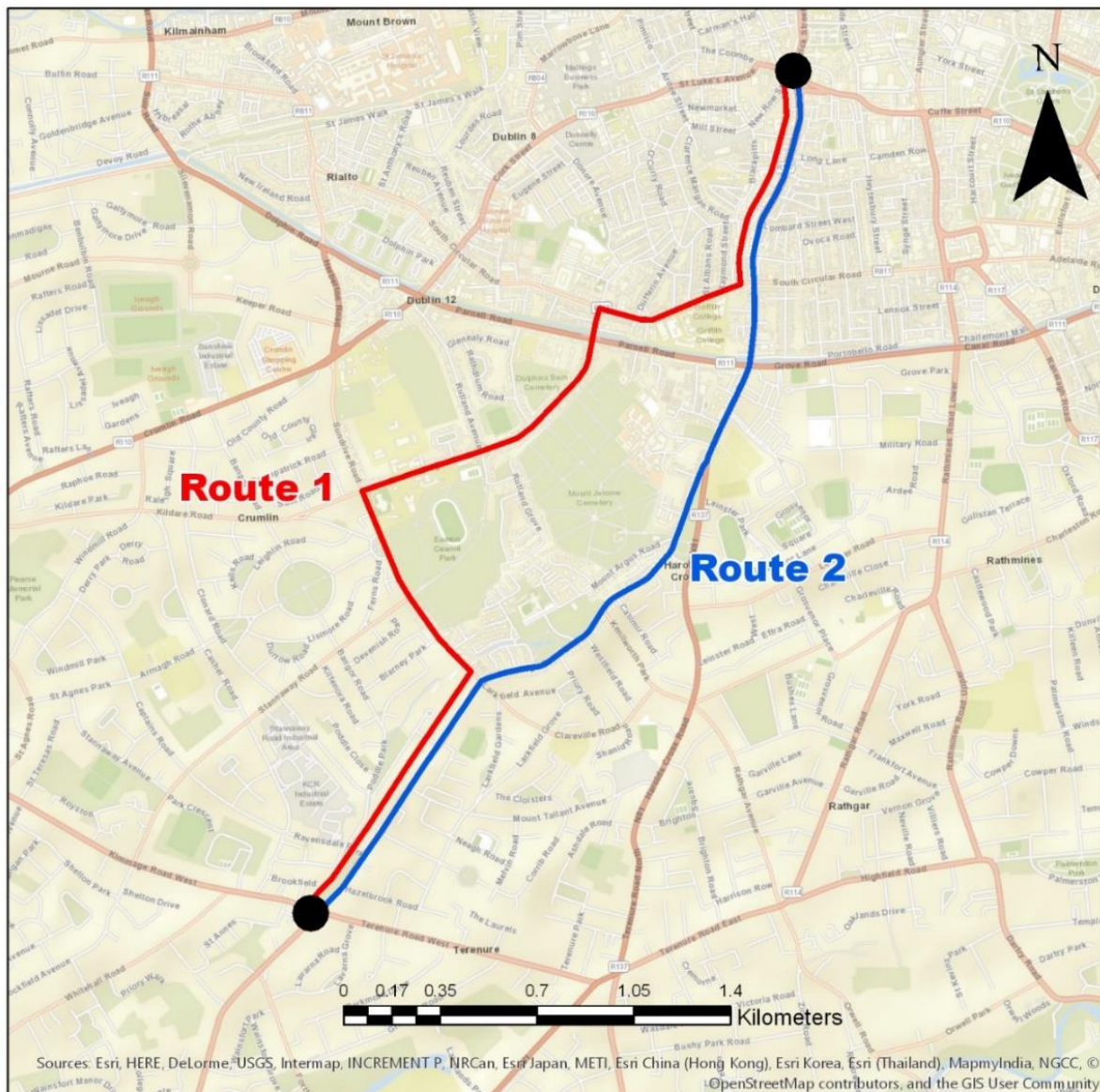


Figure 6.1 Route Options

Both Routes 1 and 2 are constrained by the narrow road cross sections available, and it would not be possible to provide bus priority as well as cycle facilities on these routes. In accordance with the scheme objectives provision of bus priority has been prioritised over cycle facilities and alternative routes will be used for cyclists on both route options.

The section of Route 2 on Kimmage Road Lower between Harold's Cross Park and Sundrive Road is particularly constrained and provision of bus priority while maintaining two-way traffic movements is not considered feasible. On this section two options for bus priority are considered, these are discussed in Chapter 6.3.

An outbound one-way system for general traffic, as used in schemes 2A and 2B, was preferred over an inbound one-way system for the following reasons;

- The traffic congestion at the most constrained section adjacent to McGowan's pub, where shared running would be required, is much more severe in an inbound direction. The outbound one-way option provides much better bus priority for inbound buses through this section.
- The detour route for traffic is preferable for the outbound one-way option as it would not require the introduction of a new right turning movement at the Harold's Cross Road-Kenilworth Square Junction
- Allowing general traffic to enter the city by this route but not allowing it to leave the city using the same route would lead to a greater amount of traffic entering the city centre and lead to an overall increase in congestion. This would not be the case with the outbound one-way option.



## 6.2 Route Option 1 – Clogher Road/Sundrive Road

### Route Description

Route Option 1 is presented in Figure 6.2 and described as follows.

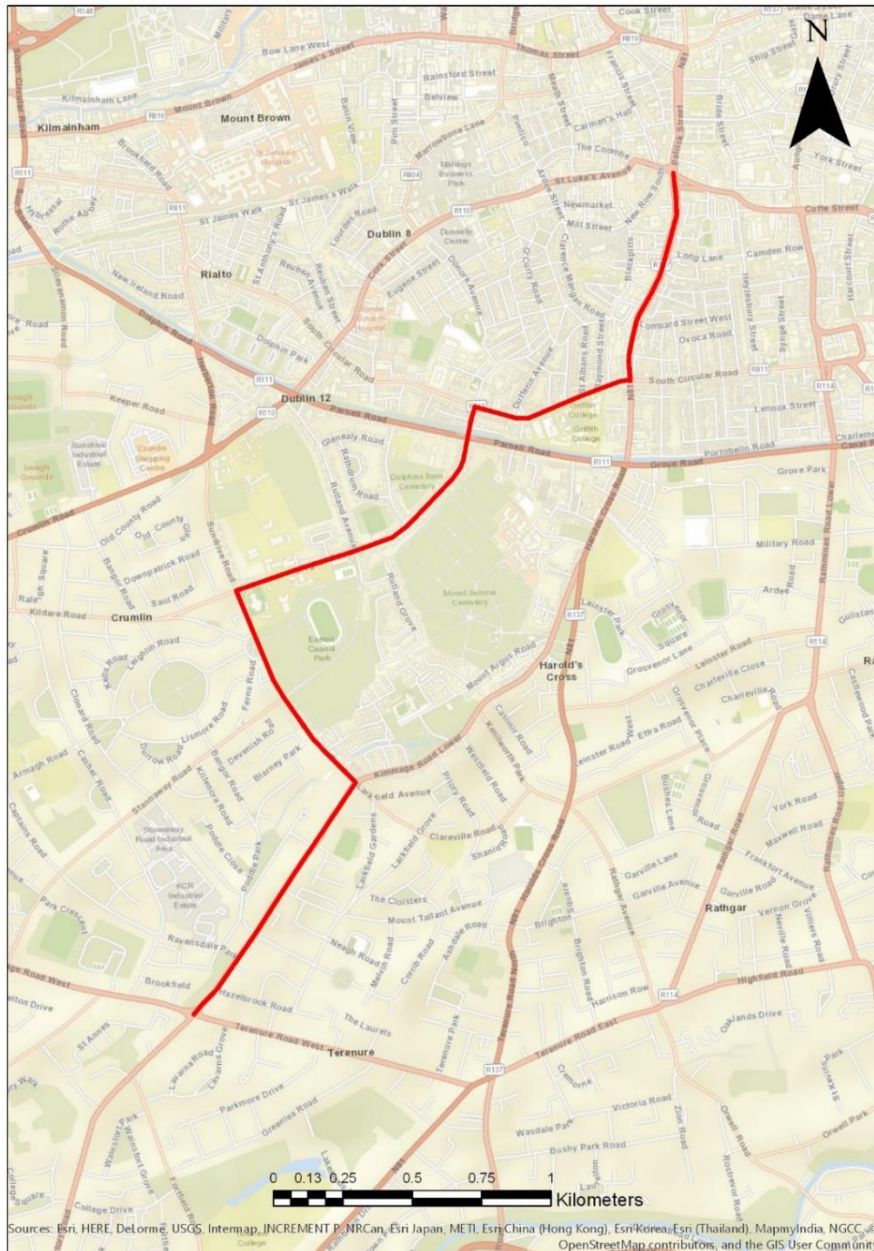


Figure 6.2 Route Option 1

**Outbound:** Route Option 1 would commence at the junction of Patrick Street and Kevin Street, from here the bus would continue south along Clanbrassil Street until it takes a right onto South Circular Road. It would then take a left onto Donore Avenue to cross the Grand Canal and join Clogher Road. The bus would then continue along Clogher Road until it takes a left turn onto Sundrive Road and then follow Kimmage Road Lower to reach the terminus at Kimmage Cross Roads.

**Inbound:** The inbound route would follow the same route as the outbound routing.

### Scheme Option 1 Indicative Scheme Design

Figure 6.3 illustrates the indicative scheme design for Scheme Option 1 as well as location of indicative cross-sections.

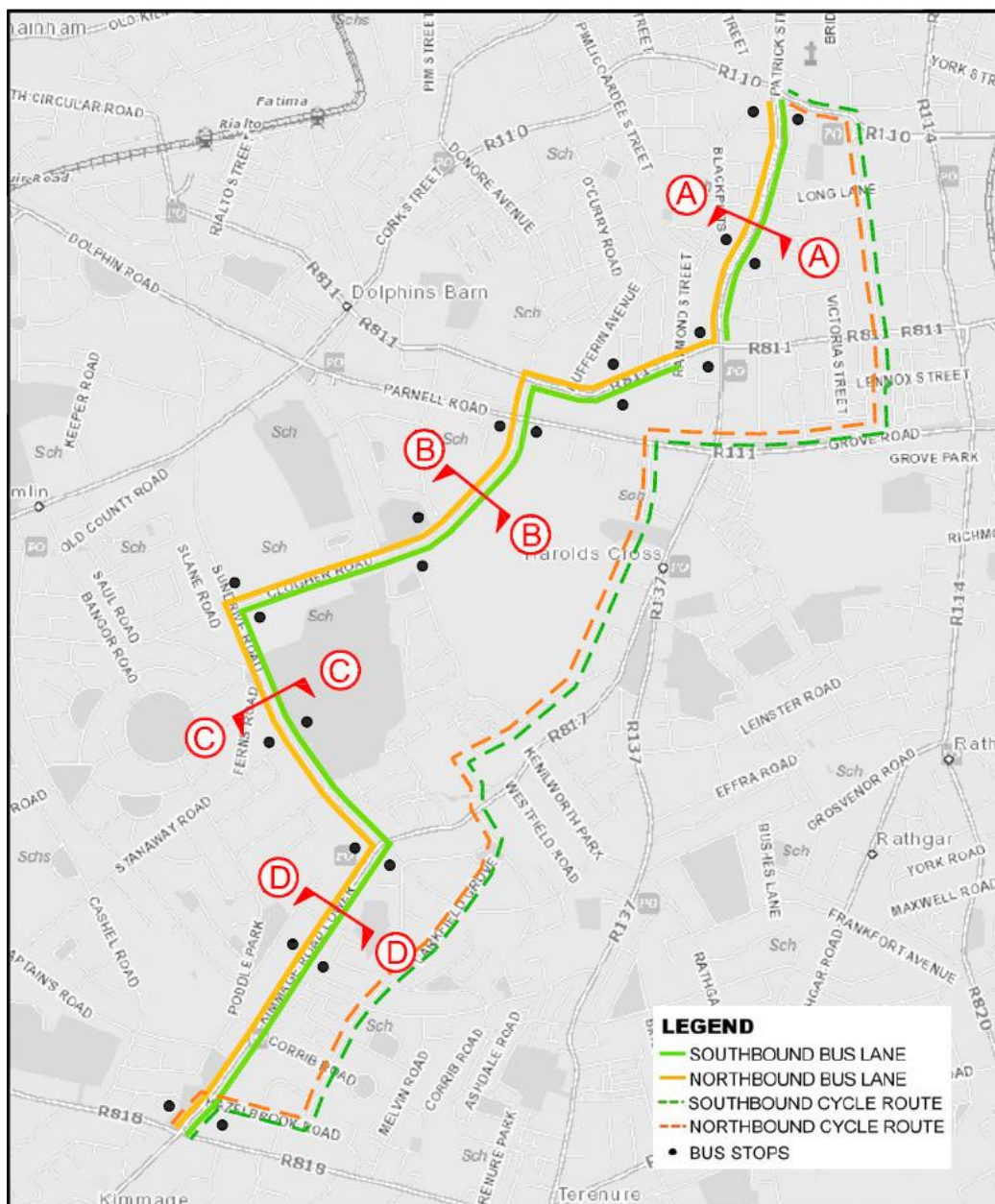


Figure 6.3 Scheme Option 1 Indicative Scheme Design

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

The existing inbound bus lane on Clanbrassil Street will be maintained, an outbound bus lane will be provided by removing the second lane for outbound traffic. Bus lanes will be provided on South Circular Road by reallocating road space and removal of on-street parking. Traffic signals will be used to provide bus priority for outbound buses for a 100m section on the eastern end of South Circular Road to avoid impacting on protected structures close to the junction as well avoiding some large potentially significant trees in the footpath.

Road widening would be required to provide bus lanes on Donore Avenue, Clogher Road and Sundrive Road, this can mostly be done by reallocating space from the existing wide footpaths. Some land take on Clogher Road would be required from portions of front gardens as well as green space from the grounds of Marist National School and St Bernadette’s Church. On-street parking and street trees would also need to be removed in some locations on all of these roads.

On Kimmage Road Lower road widening would be required to provide dedicated bus lanes in both directions. This would require land take from portions of front gardens along the route. The forecourt of a petrol station and a portacabin being used as a commercial premise would also be affected. On-street parking along this section would also need to be removed.

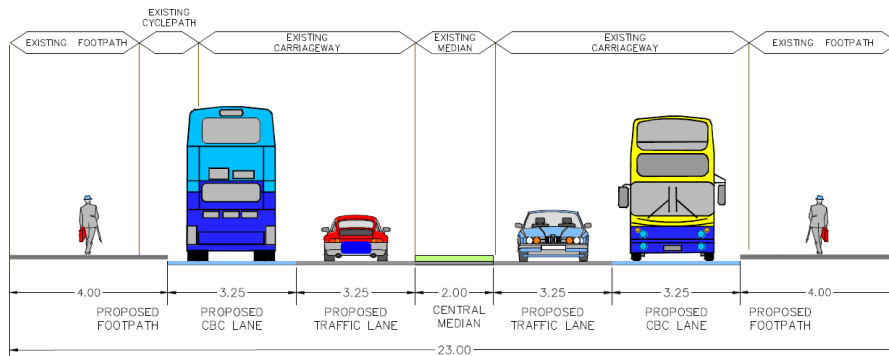


Figure 6.4 Cross Section A-A

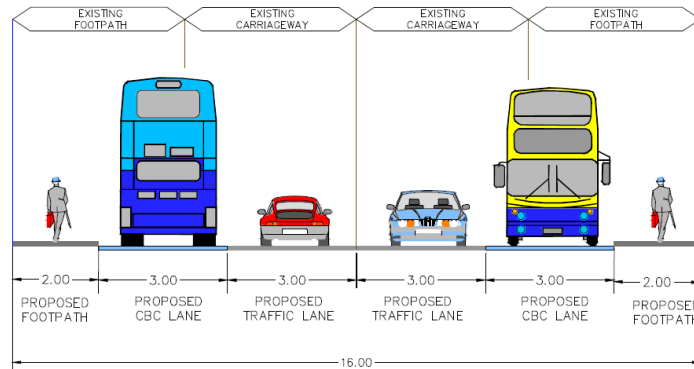


Figure 6.5 Cross Section B-B

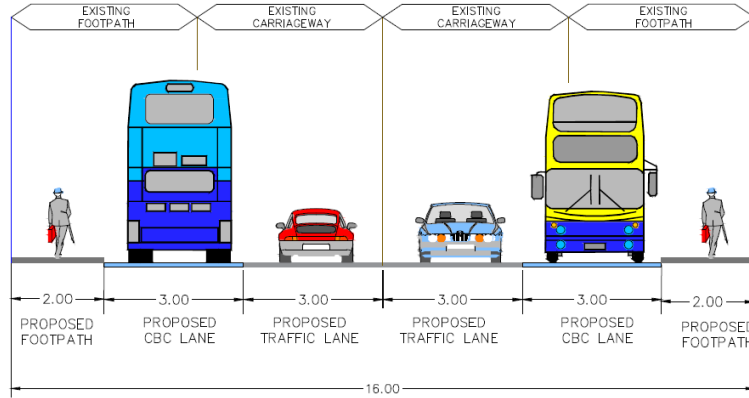


Figure 6.6 Cross Section C-C

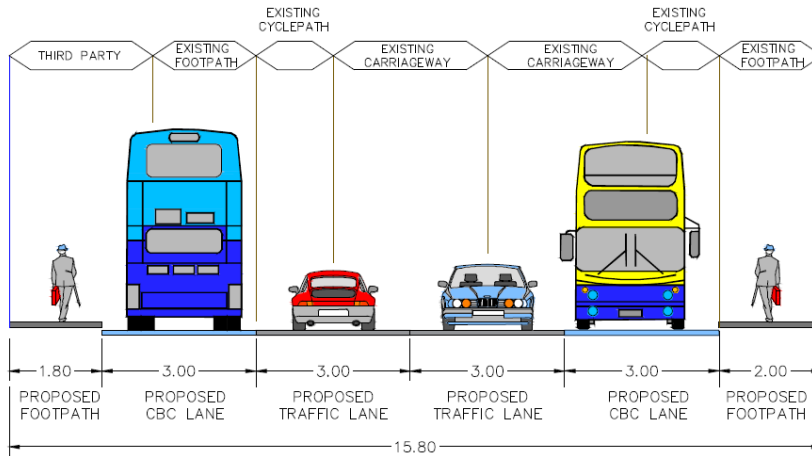


Figure 6.7 Cross Section D-D



**Cycle Route:**

Describing the route in an outbound direction the proposed cycle scheme would travel down Kevin Street, New Bride Street, Heytesbury Street, Stamer Street and Martin Street. From here it would cross a new bridge over the Grand Canal to join Grove Road and continue to Greenmount Lane. Cyclists would then travel along a newly constructed cycle route through the lands of Our Lady's Hospice and over the culverted River Poddle alongside the grounds of Mount Jerome Cemetery. Cyclists would then follow the route along the existing roads of Mount Argus Park, Priory Road, Larkfield Grove, Derravaragh Road and Hazel Brook Road to reach Kimmage Cross Roads

Cycle tracks would be provided in both directions on Kevin Street, this can be achieved by reallocating road space from traffic lanes. A two-way cycle track would be provided on New Bride Street, to provide the space for this the street would be restricted to one-way only in a southbound direction for motorists. This two-way cycle lane would extend just past the junction with Long Lane and Heytesbury Street would be made into a cul-de-sac at this location, with only cyclists allowed to pass through. Inbound motorists would be diverted onto Arnott Street to avoid the need for a U-Turn and similarly outbound motorists would be diverted onto Camden Row or Long Lane. This traffic restriction would reduce traffic volumes and speeds on Heytesbury Street like in the "environmental area" which currently exists to the South of South Circular Road, it is proposed that cyclists and motorists would share road space on Heytesbury Street.

Stamer Street and Martin Street are within this existing "environmental area" and are currently low volume low speed roads and again cyclists would share road space with motorists. Construction works on these roads would be limited to signage, road marking, alterations to speed humps and road resurfacing if required. A new pedestrian/cyclist bridge and length of boardwalk would also be constructed over the Grand Canal to link to the cycle lanes on Grove Road.

The junctions on Kevin Street, with Clanbrassil Street and New Bride Street, would be upgraded to enhance pedestrian and cyclist facilities, some traffic lanes would be removed to provide additional road space for cyclists and to reduce the overall footprint of the junctions. The junction at New Bride Street/Long Lane would also be upgraded to cater for the new traffic and cyclist layouts.

The existing cycle lanes along Grove Road and the carriageway on Greenmount Lane would be resurfaced, a new cycle track through the Grounds of Our Lady's Hospice would be constructed to join to the existing roads within the Hospice.

Significant site clearance and construction works will be required to construct the new cycle route to join to the existing roads within Our Lady's Hospice to Mount Argus Road by building over the culverted River Poddle alongside Mount Jerome Cemetery.

Mount Argus Road, Priory Road, Larkfield Grove, Derravaragh Road and Hazelbrook Road are low speed/low volume roads and cyclists will share road space with general traffic. Construction works would be limited to road marking, alterations to speed humps and resurfacing if required

### 6.3 Route Option 2 – Kimmage Road Lower

#### Route Description

Route Option 2 is presented in Figure 6.8 and described as follows.

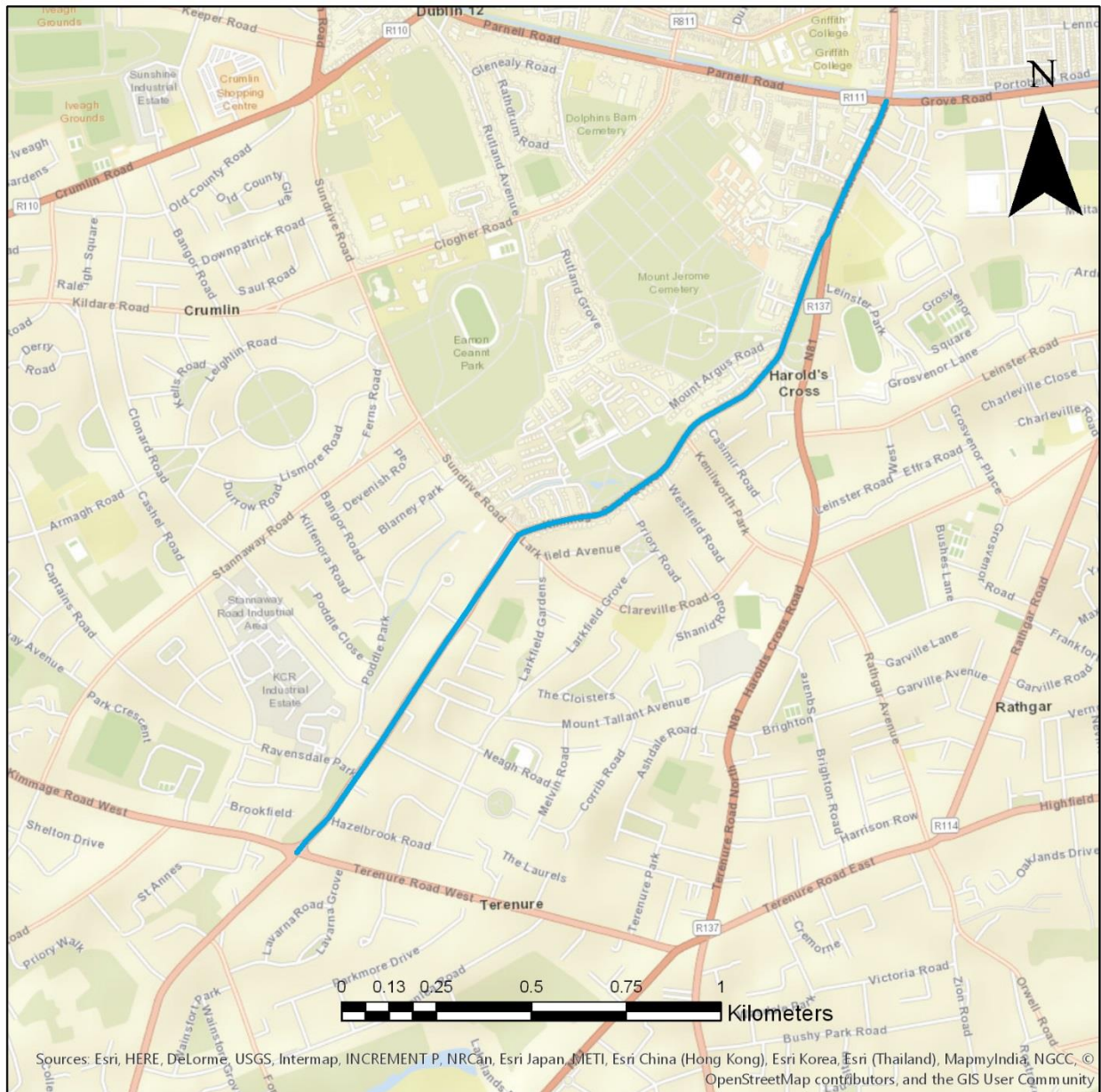


Figure 6.8 Route Option 2

**Outbound:** The route would commence at the junction of Patrick Street and Kevin Street, from here the bus would travel south along Clanbrassil Street and over Harold’s Cross Bridge. The bus would then continue on Harold’s Cross Road passing to the west Harold’s Cross Park and on to Kimmage Road Lower to reach the terminus at Kimmage Cross Roads

**Inbound:** The inbound route would follow the same route as the outbound routing.



### Scheme Option 2A Indicative Scheme Design

Figure 6.9 illustrates the indicative scheme design for Scheme Option 2A as well as the location of indicative cross-sections.

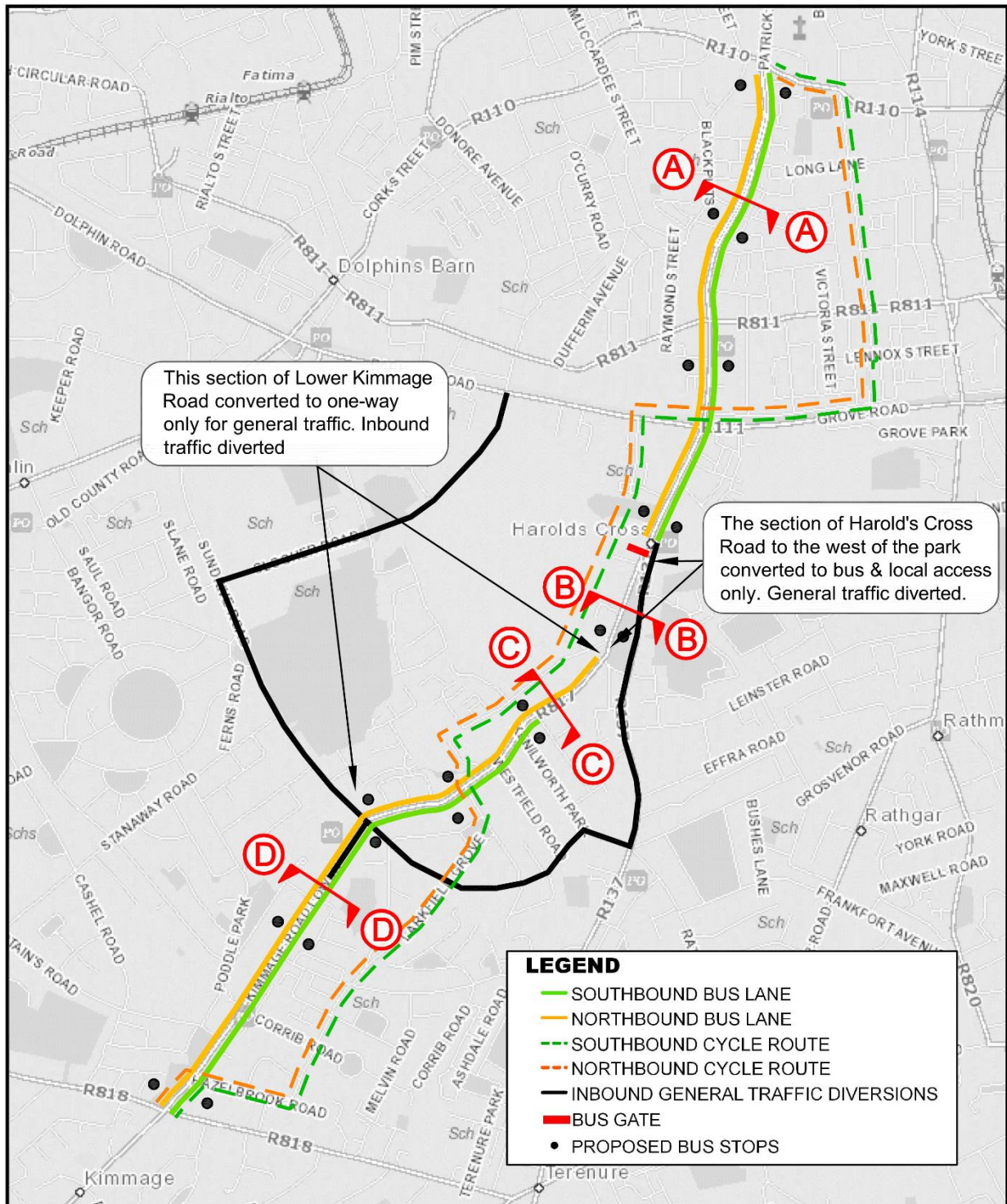


Figure 6.9 Scheme Option 2A Indicative Scheme Design

**Bus Stops:** A total of 10 bus stops would be provided in each direction along this route option.

For the section on Clanbrassil Street the existing inbound bus lane would be maintained and the second lane of outbound traffic would be converted to a bus lane. A new pedestrian bridge would be constructed to the west of Robert Emmet Bridge and some road widening would be required to provide bus lanes immediately to the north of the bridge. To the south of the bridge on Harold's Cross Road the existing bus lanes in both directions would be used.

The section of Kimmage Road Lower between Harold's Cross Park and Sundrive Road would be converted to one-way only for outbound general traffic. Inbound traffic would be rerouted either via Sundrive Road/ Clogher Road or via Larkfield Park/ Clareville Road/ Harold's Cross Road to approach the Grand Canal.

The section of the route along the western side of Harold's Cross Park would be converted to bus and local access only, with outbound through traffic being diverted around the eastern and southern sides of the park. Continuous bus lanes would be provided for inbound buses for the remainder of the route. Outbound buses would share a lane of traffic for a 250m section between the junctions at Harold's Cross Park and Casamir Road, this would avoid the purchase of McGowan's pub as well as impacting on residents along Kimmage Road Lower. There would be no land take required for this scheme.

The junction at the south west corner of Harold's Cross Park would be upgraded to a signalised junction to facilitate the rerouted outbound traffic and to provide some priority for outbound buses along the 250m shared section.

On Kimmage Road Lower south of the Sundrive Road junction two-way traffic would be maintained and road widening would be required to provide dedicated bus lanes in both directions. This would require land take from portions of front gardens along the route. The forecourt of a petrol station and a portacabin being used as a commercial premises would also be affected here. On-street parking along this section would also need to be removed.

The scheme would also require modification to the existing signalised junctions along the route to accommodate bus lanes and bus priority at traffic signals. The junctions at Clogher Road/Sundrive Road and the five-way cross roads in Harold's Cross would also be upgraded to facilitate the increase in traffic from the diversion routes

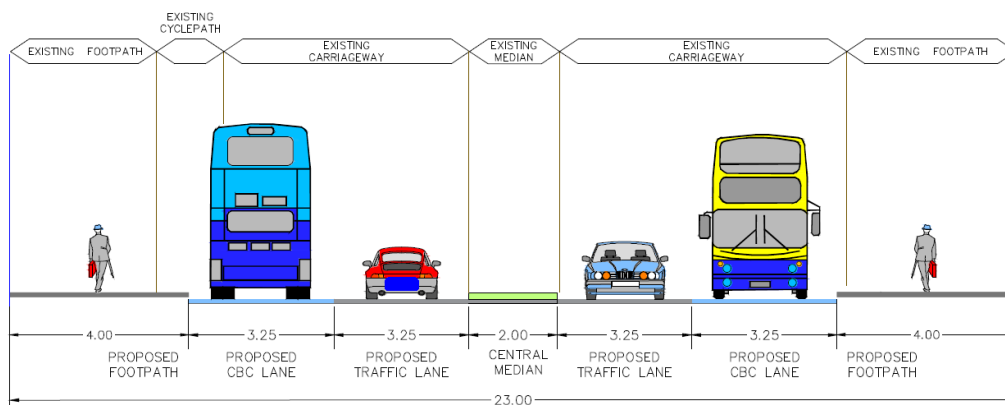


Figure 6.10 Cross Section A-A



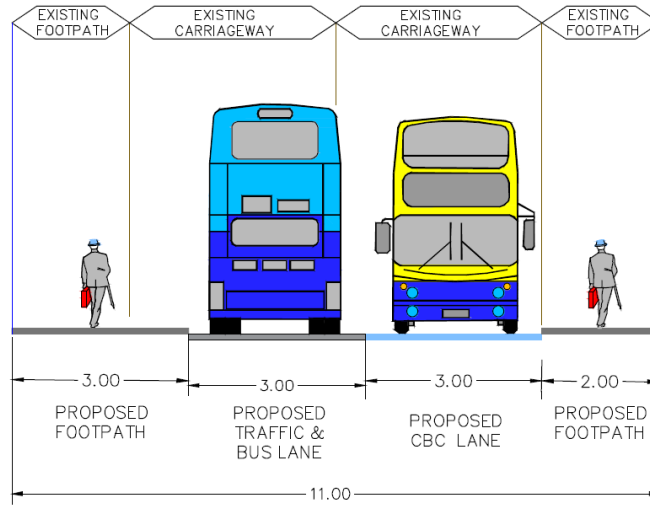


Figure 6.11 Cross Section B-B

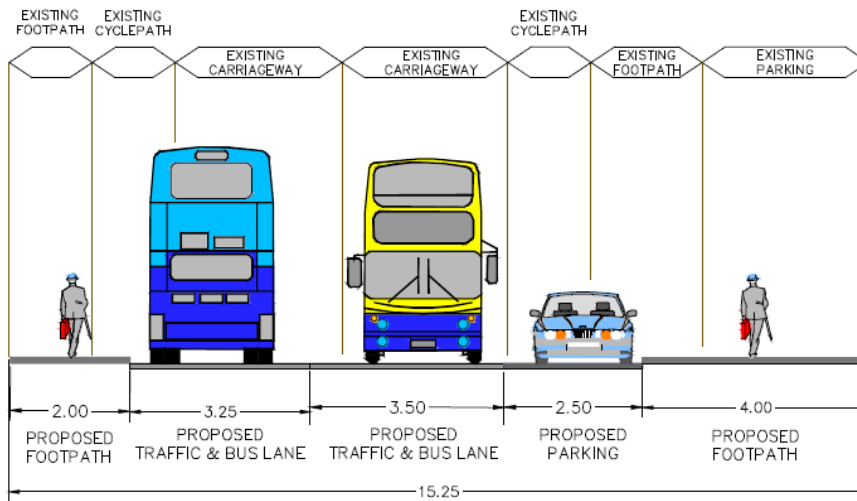


Figure 6.12 Cross Section C-C

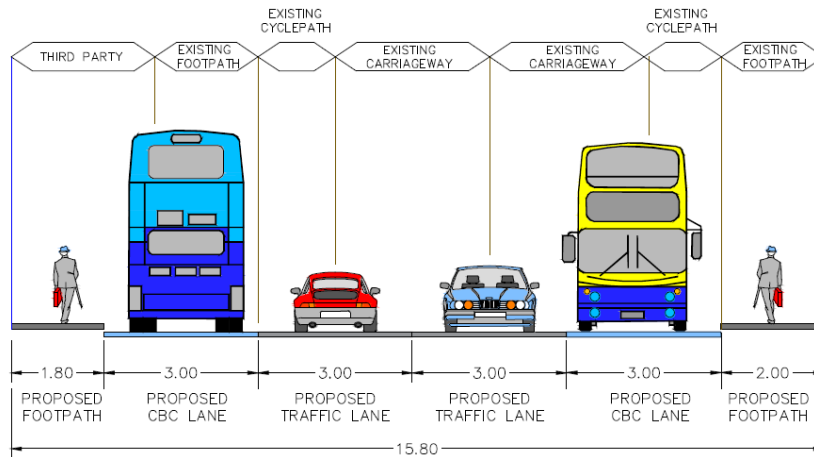


Figure 6.13 Cross Section D-D

**Cycle Route:**

Describing the route in an outbound direction the proposed cycle scheme would travel down Kevin Street, New Bride Street, Heytesbury Street, Stamer Street and Martin Street. From here it would cross a new bridge over the Grand Canal to join Grove Road and continue to Greenmount Lane. Cyclists would then travel along a newly constructed cycle route through the lands of Our Lady's Hospice and over the culverted River Poddle alongside the grounds of Mount Jerome Cemetery. Cyclists would then follow the route along the existing roads of Mount Argus Park, Priory Road, Larkfield Grove, Derravaragh Road and Hazel Brook Road to reach Kimmage Cross Roads

Cycle tracks would be provided in both directions on Kevin Street, this can be achieved by reallocating road space from traffic lanes. A two-way cycle track would be provided on New Bride Street, to provide the space for this the street would be restricted to one-way only in a southbound direction for motorists. This two-way cycle lane would extend just past the junction with Long Lane and Heytesbury Street would be made into a cul-de-sac at this location, with only cyclists allowed to pass through. Inbound motorists would be diverted onto Arnott Street to avoid the need for a U-Turn and similarly outbound motorists would be diverted onto Camden Row or Long Lane. This traffic restriction would reduce traffic volumes and speeds on Heytesbury Street like in the "environmental area" which currently exists to the south of South Circular Road, it is proposed that cyclists and motorists would share road space on Heytesbury Street.

Stamer Street and Martin Street are within this existing "environmental area" and are currently low volume low speed roads and again cyclists would share road space with motorists. Construction works on these roads would be limited to signage, road marking, alterations to speed humps and road resurfacing if required. A new pedestrian/cyclist bridge and length of boardwalk would also be constructed over the Grand Canal to link to the cycle lanes on Grove Road.

The junctions on Kevin Street, with Clanbrassil Street and New Bride Street, would be upgraded to enhance pedestrian and cyclist facilities, some traffic lanes would be removed to provide additional road space for cyclists and to reduce the overall footprint of the junctions. The junction at New Bride Street/Long Lane would also be upgraded to cater for the new traffic and cyclist layouts.

The existing cycle lanes along Grove Road and the carriageway on Greenmount Lane would be resurfaced, a new cycle track through the Grounds of Our Lady's Hospice would be constructed to join to the existing roads within the Hospice.

Significant site clearance and construction works will be required to construct the new cycle route to join to the existing roads within Our Lady's Hospice to Mount Argus Road by building over the culverted River Poddle alongside Mount Jerome Cemetery.

Mount Argus Road, Priory Road, Larkfield Grove, Derravaragh Road and Hazelbrook Road are low speed/low volume roads and cyclists will share road space with general traffic. Construction works would be limited to road marking, alterations to speed humps and resurfacing if required

### Scheme Option 2B Indicative Scheme Design

Figure 6.14 illustrates the indicative scheme design for Scheme Option 2B as well as the location of indicative cross-sections.

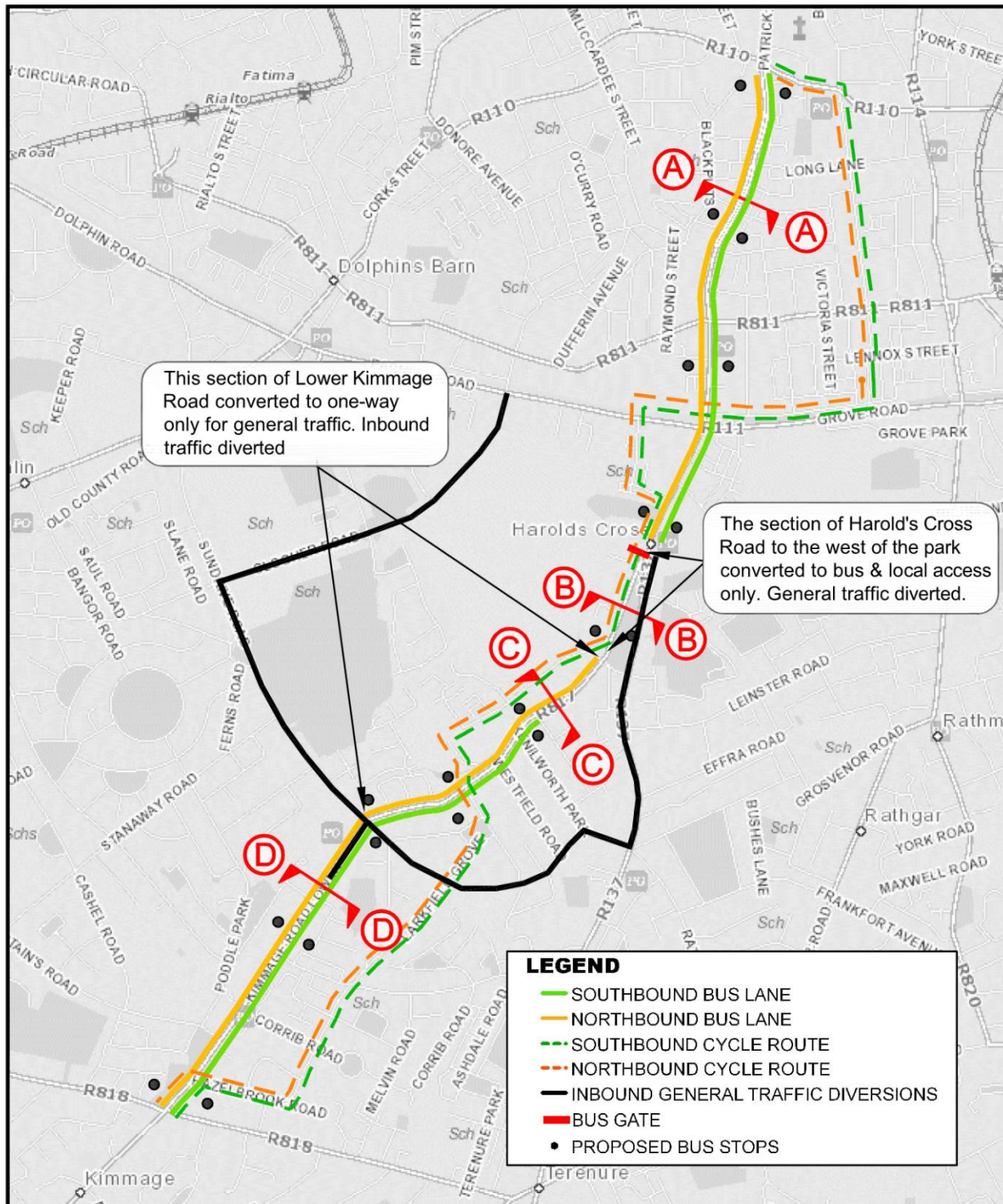


Figure 6.14 Scheme Option 2B Indicative Scheme Design

**Bus Stops:** A total of 10 bus stops would be provided in each direction along this route option.

**Bus Route:**

The bus route and priority measures for this scheme are the same as those proposed for Scheme 2A. The two schemes differ only on the proposed cycle route.

**Cycle Route:**

Describing the route in an outbound direction the proposed cycle scheme would travel down Kevin Street, New Bride Street, Heytesbury Street, Stamer Street and Martin Street. From here it would cross a new bridge over the Grand Canal to join Grove Road and continue to Greenmount Lane. Cyclists would then cycle out the entrance of Our Lady's Hospice and along Harold's Cross Road. Cyclists would then follow the existing roads of Mount Argus Park, Priory Road, Larkfield Grove, Derravaragh Road and Hazel Brook Road to reach Kimmage Cross Roads

This scheme deviates from Scheme 2A for the section between Our Lady's Hospice and Mount Argus Road. On the 100m section of Harold's Cross Road closest to the entrance to Our Lady's Hospice a two-way cycle track on the western side of the road would be constructed. This would involve removing the on-street parking from the front of 12 houses along the road, parking could be provided to the rear of the houses with land take from their back gardens and from Our Lady's Hospice. On the section of Harold's Cross Road to the west of Harold's Cross Park cyclists would share road space with local traffic and buses.

This scheme avoids the construction of a cycle track over the River Poddle alongside Mount Jerome Cemetery and through parts of Our Lady's Hospice.



### Scheme Option 2C Indicative Scheme Design

Figure 6.15 illustrates the indicative scheme design for Scheme Option 2C as well as the location of indicative cross-sections.

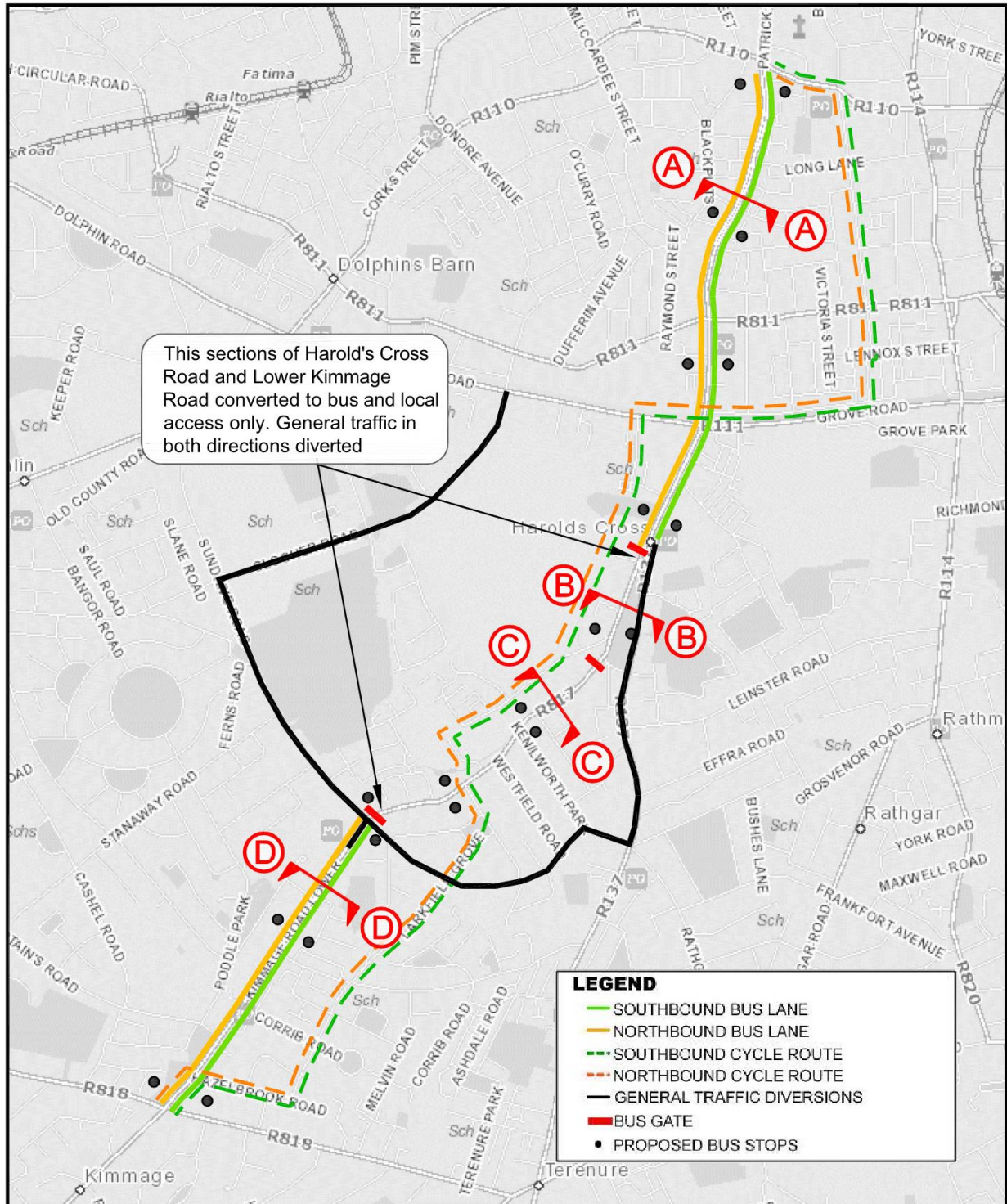


Figure 6.15 Scheme Option 2C Indicative Scheme Design

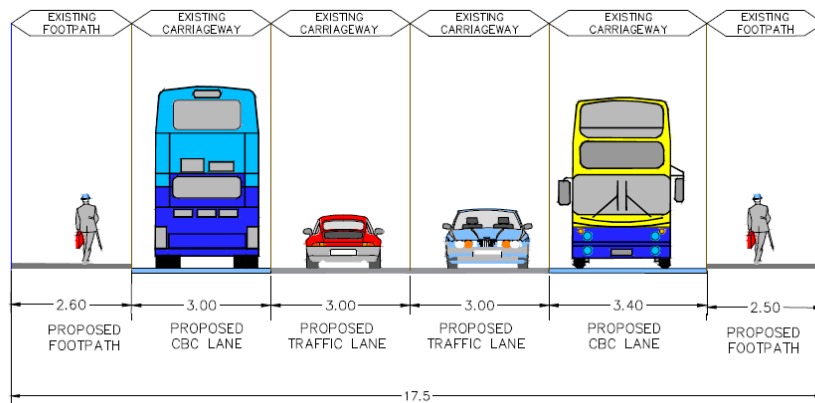
**Bus Stops:** A total of 10 bus stops would be provided in each direction along this route option.

**Bus Route:**

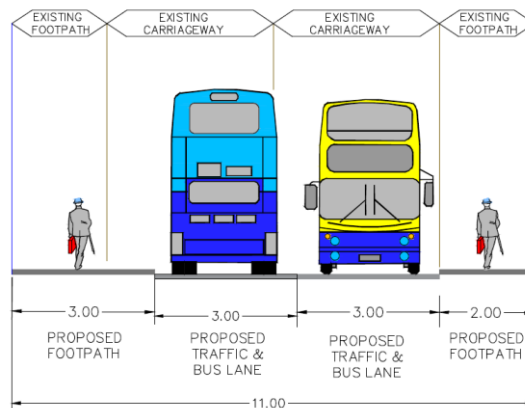
The bus route and priority measures for this scheme are the same as those proposed for Scheme 2A on the sections to the north of Harold’s Cross Park and to the south of Sundrive Road. The two schemes differ along the most constrained section of Lower Kimmage Road as described below.

The section of Kimmage Road Lower from the northern corner of Harold’s Cross Park to Sundrive Road would be converted to local access only and only buses would be permitted to use it as a through route. To achieve this, “bus gates” would be provided in three locations as shown in **Error! Reference source not found**. General traffic would not be permitted to pass these points. Both inbound and outbound traffic would be rerouted either via Sundrive Road/ Clogher Road or via Larkfield Park/ Clareville Road/ Harold’s Cross Road as shown in Figure 6.15. No land take would be required along this section for this scheme.

The scheme would require modification to the existing signalised junctions along the route to accommodate bus priority at traffic signals. The junctions at Clogher Road/Sundrive Road and the five-way cross roads in Harold’s Cross would also be upgraded to facilitate the increase in traffic from the diversion routes. Provision would be made for right turning traffic from Harold’s Cross Road onto Kenilworth Park for the outbound diversion.



**Figure 6.16 - Section A-A**



**Figure 6.17 - Section B-B**

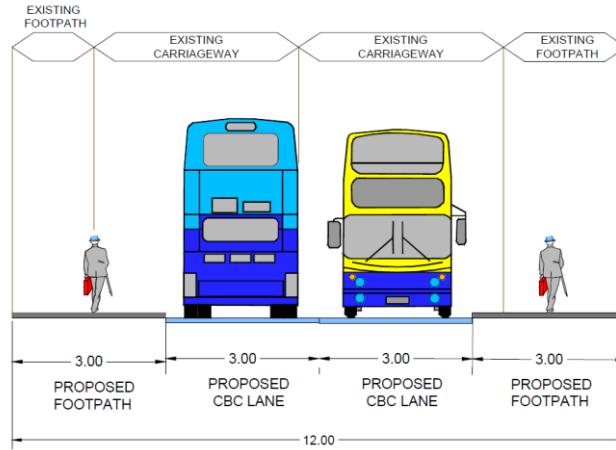


Figure 6.18 - Section C-C

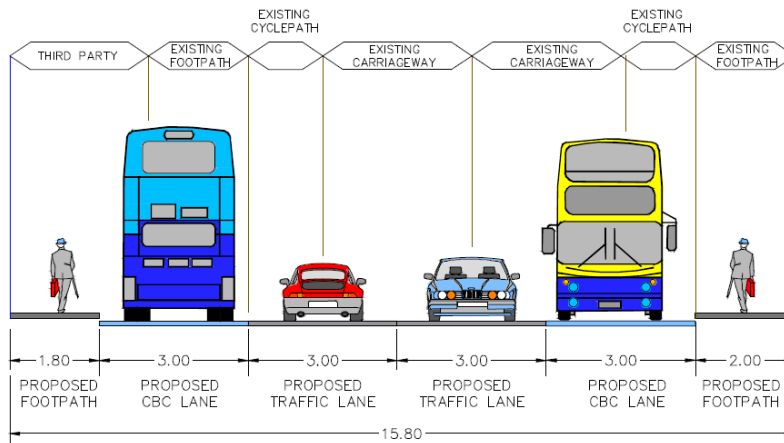


Figure 6.19 – D-D

**Cycle Route:**

The cycle route proposed is the same as that for Scheme 2A.



### Scheme Option 2D Indicative Scheme Design

Figure 6.20 illustrates the indicative scheme design for Scheme Option 2D as well as the location of indicative cross-sections.

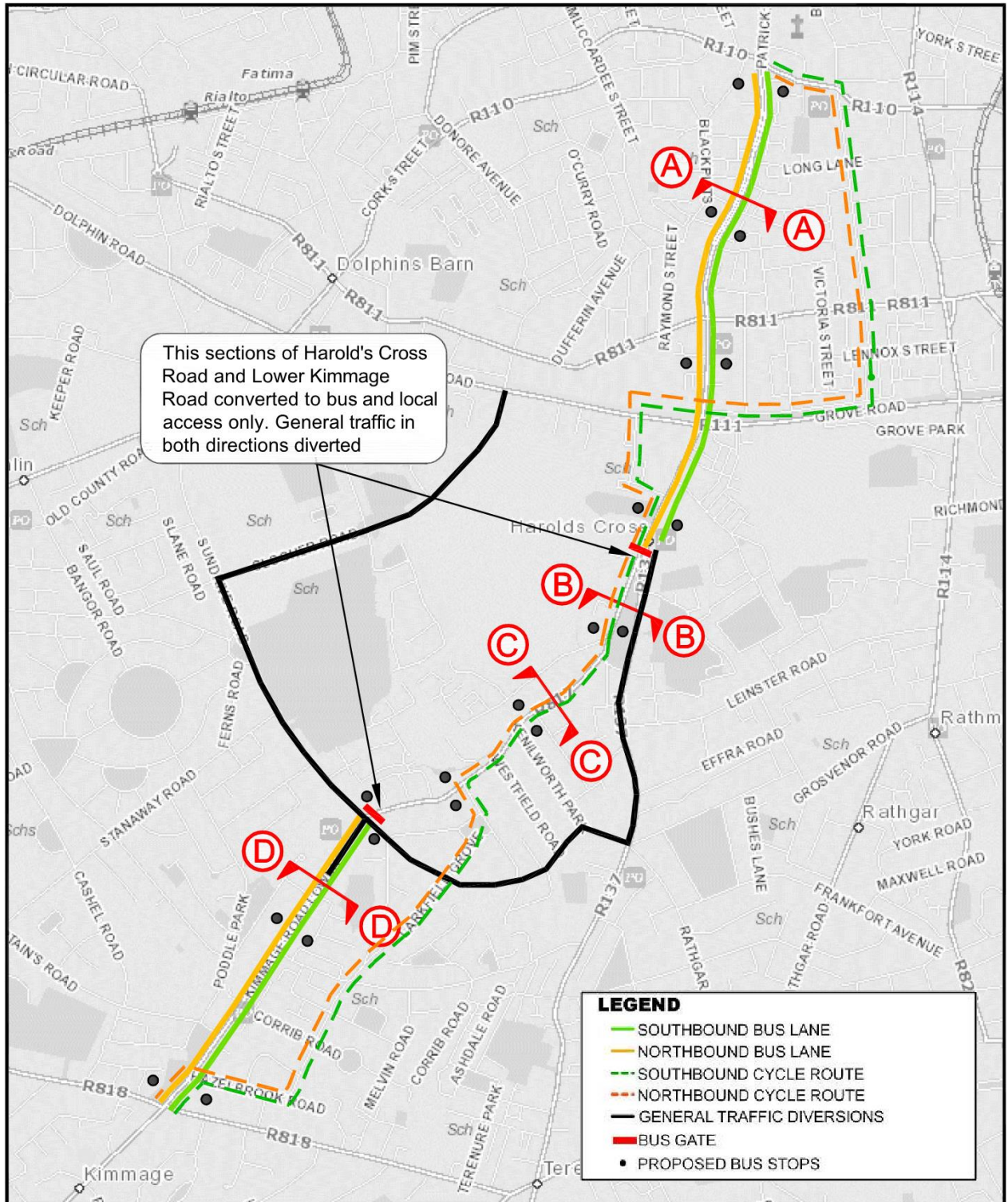


Figure 6.20 Scheme Option 2D Indicative Scheme Design

**Bus Stops:** A total of 10 bus stops would be provided in each direction along this route option.



**Bus Route:**

The bus route and priority measures for this scheme are the same as those proposed for Scheme 2C. The two schemes differ only on the proposed cycle route.

**Cycle Route:**

Describing the route in an outbound direction the proposed cycle scheme would travel down Kevin Street, New Bride Street, Heytesbury Street, Stamer Street and Martin Street. From here it would cross a new bridge over the Grand Canal to join Grove Road and continue to Greenmount Lane. Cyclists would then cycle out the entrance of Our Lady's Hospice and along Harold's Cross Road. Cyclists would then follow the existing roads of Lower Kimmage Road, Priory Road, Larkfield Grove, Derravaragh Road and Hazel Brook Road to reach Kimmage Cross Roads

This scheme deviates from Scheme 2C for the section between Our Lady's Hospice and Priory Road. On the 100m section of Harold's Cross Road closest to the entrance to Our Lady's Hospice a two-way cycle track on the western side of the road would be constructed. This would involve removing the on-street parking from the front of 12 houses along the road, parking could be provided to the rear of the houses with land take from their back gardens and from Our Lady's Hospice. On Lower Kimmage Road and the section of Harold's Cross Road to the west of Harold's Cross Park cyclists would share road space with local traffic and buses.

This scheme avoids the construction of a cycle track over the River Poddle alongside Mount Jerome Cemetery and through parts of Our Lady's Hospice.

## 6.4 Options Assessment

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

A summary of the ranking of options against the scheme sub-criteria is presented in Table 6.1 below.

**Table 6.1 Options Assessment Summary (Sub-Criteria)**

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

In terms of “Capital Cost” Scheme 1 has the highest capital cost as it has the longest route length and requires more private land take. There is little to choose between the other schemes although Schemes 2B and 2D are slightly cheaper as they do not involve the construction of a new 300m long cycle track over the River Poddle alongside Mount Jerome Cemetery

In terms of “Journey Time Reliability & Consistency”, the longer route length of Scheme 1 and the additional signalised junctions that the bus would need to pass through would result in longer and less reliable journey times and so it scores worse on this criterion. All other Schemes are considered equal

In terms of “Residential & Employment Catchment”, Schemes 2A-D all share the same bus stops and so have the same catchment. Route 1 serves a slightly greater catchment area than Route 2 due to its longer route length. However, it passes through areas of lower population density including alongside some large

parks and a graveyard and has a lower catchment per km travelled by the bus. On balance all schemes are considered equal under this criterion

In terms of “Public Transport Integration”, Schemes 2A-D are located roughly halfway between the proposed Rathfarnham and Greenhills CBCs and so would lead to a better overall catchment of the CBC network than Scheme 1 which passes closer to the Greenhills CBC

In terms of “Traffic Network Integration”, Scheme 1 is considered preferable as it requires no change to the existing traffic network, Scheme 2A and 2B would restrict Kimmage Road Lower to outbound only for general traffic and inbound traffic would be diverted. Schemes 2C and 2D would restrict through traffic in both directions (local access only) and both inbound and outbound traffic would be diverted.

In terms of “Pedestrian and Cyclist Integration”, Schemes 1, 2A and 2C all complete the primary route 9 on the Greater Dublin Area Cycle Network Plan which passes over the River Poddle. Scheme 2D provides a traffic calmed environment and the most direct route for cyclists. Schemes 2C and 2D provide wider more pedestrian friendly footpaths when compared to other schemes. On balance Scheme 2B is considered worse under this criterion, all other schemes score equally.

Under “Accessibility & Social Inclusion” Scheme 1 serves a higher number of high volume trip attractors including a number of schools and colleges. It also serves the RAPID areas in Crumlin and generally serves areas with a higher geographic deprivation index than Schemes 2A-D and so scores better under the “Deprived Geographic Areas” criterion.

In terms of “Flora & Fauna” Scheme 1 would involve the removal of semi-mature trees along Clogher Road and Donore Avenue as well as the removal of trees required to construct the cycle track over the River Poddle, while Schemes 2A and 2C would also require the removal of the trees along the Poddle. Schemes 2B and 2D would not require the removal of any of these trees and so score better under this criterion.

Route 1 involves some land take from portions of back gardens along Clogher Road, it would require the removal of a large number of trees from within footpaths and would require construction of a new pedestrian bridge over the Grand Canal which would have a visual effect on the adjacent protected bridge and so ranks worst on the “Landscape & Visual” criterion when compared to Schemes 2A-D.

In terms of “Land Use & Built Environment”, Scheme 1 would involve the highest amount of land take and also would require the removal of the largest amount of on-street parking, and as a result it scores badly. Schemes 2A-D would also require private land take and have an impact on on-street parking however all are considered to be less impactful overall than Scheme 1.

## 6.4.1 Conclusion

A summary of the assessment and a relative ranking for each of the five assessment criteria is shown below in Table 6.2

**Table 6.2 Route Options Assessment Summary (Main Criteria)**

Assessment Criteria	Scheme 1	Scheme 2A	Scheme 2B	Scheme 2C	Scheme 2D
Economy	Orange	Green	Green	Green	Green
Integration	Green	Green	Orange	Green	Green
Accessibility and Social Inclusion	Green	Orange	Orange	Orange	Orange
Safety	Yellow	Yellow	Yellow	Yellow	Yellow
Environment	Red	Orange	Green	Orange	Green

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

- It provides a high level of bus priority
- It has the lowest capital cost of all the schemes
- It provides better cycle and pedestrian integration than Scheme 2B
- Along with Scheme 2B it is considered to have the least environmental impact

Scheme 2D is identified as the preferred option and is brought forward into the Emerging Preferred Route as described in Chapter 8 and shown in the concept design drawings in Volume 3 of this report.

Scheme 2B is identified as the next preferred option and concept design drawings are included in Appendix C of this report. There is little to choose between the “bus gates” option on Scheme 2D and the “one-way system” on Scheme 2B, the differentiating factor between the two is the superior cycle and pedestrian facilities provided by Scheme 2D, in addition, the traffic calmed streets and wider footpaths would also be preferable to local residents.

Schemes 2A and 2C are not preferred as the benefits of providing the raised cycle track over the Poddle alongside Mount Jerome Cemetery are considered to be outweighed by the potential environmental impacts and the additional capital cost.

# 7 PROPOSED SCHEME

## 7.1 Emerging Preferred Route

Chapter 6 of this report presented an appraisal of all route options considered and recommended and emerging preferred route. This chapter of the report presents and describes this route and details the concept scheme design. The concept scheme design drawings are included in in Volume 3 of this report.

The Emerging Preferred Route is presented in Figure 7.1 below:

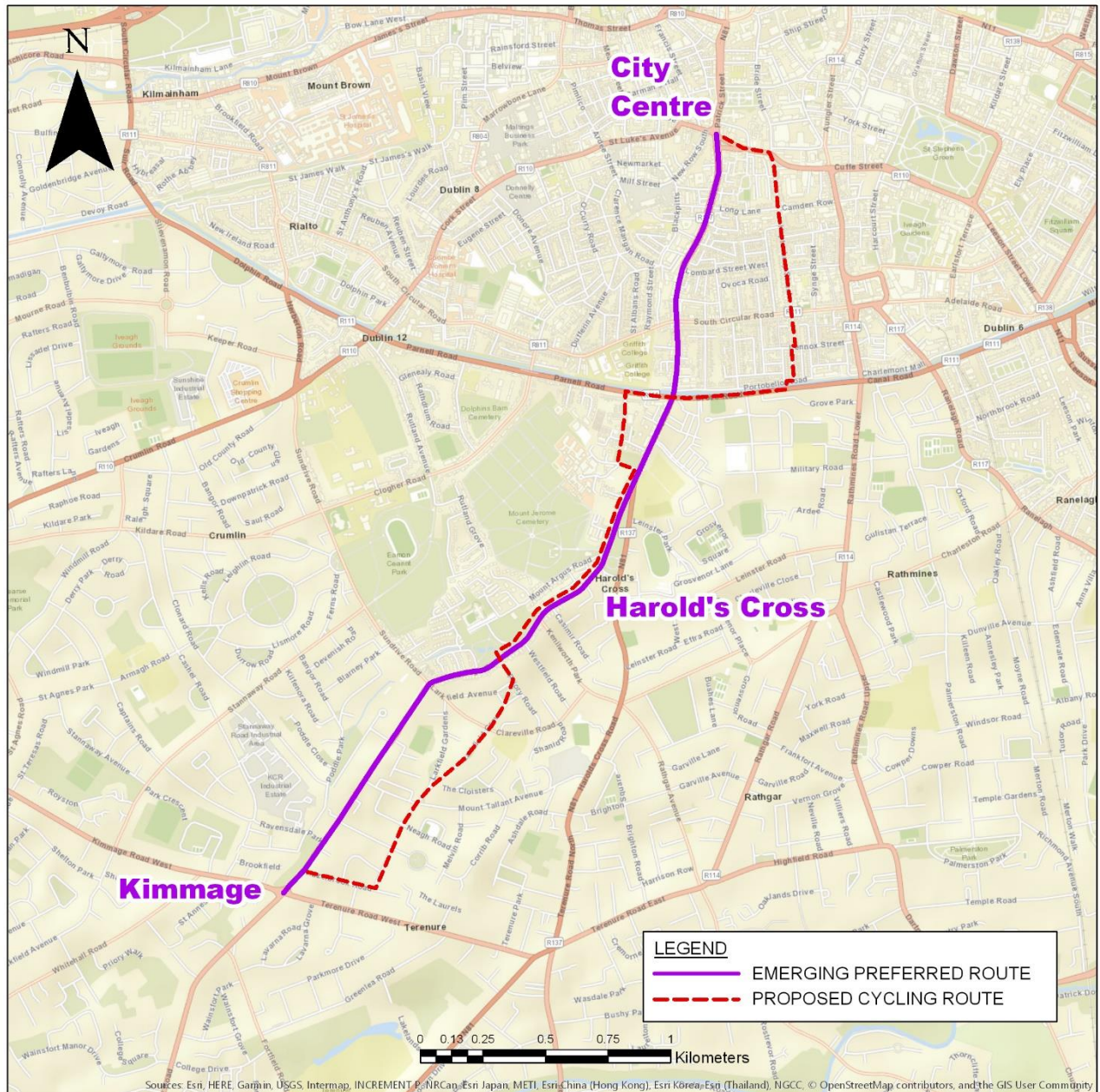


Figure 7.1 Emerging Preferred Route



## Bus Route

**Outbound:** The route would commence at the junction of Patrick Street and Kevin Street from here the bus would travel south along Clanbrassil Street and over Harold's Cross Bridge. The bus would then continue on Harold's Cross Road passing to the west Harold's Cross Park and on to Kimmage Road Lower to reach the terminus at Kimmage Cross Roads

**Inbound:** The inbound route would follow the same route as the outbound routing.

## Cycle Route

**Outbound:** Describing the route in an outbound direction the proposed cycle scheme would travel down Kevin Street, New Bride Street, Heytesbury Street, Stamer Street and Martin Street. From here it would cross a new bridge over the Grand Canal to join Grove Road and continue to Greenmount Lane. Cyclists would then cycle out the entrance of Our Lady's Hospice and along Harold's Cross Road. Cyclists would then follow the existing roads of Lower Kimmage Road, Priory Road, Larkfield Grove, Derravaragh Road and Hazel Brook Road to reach Kimmage Cross Roads

**Inbound:** The inbound route would follow the same route as the outbound routing.

## 7.2 Concept Scheme Design

### **Bus Route:**

On Clanbrassil Street, the existing inbound bus lane would be maintained, and the second lane for outbound traffic would be converted to a bus lane. A new pedestrian bridge would be constructed to the west of Robert Emmet Bridge and some road widening would be required to provide bus lanes immediately to the north of the bridge. To the south of the bridge on Harold's Cross Road the existing bus lanes in both directions would be used.

The section of Kimmage Road Lower from the northern corner of Harold's Cross Park to Sundrive Road would be converted to local access only and only buses would be permitted to use it as a through route. To achieve this, "bus gates" would be provided in three locations, general traffic would not be permitted to pass these points. Both inbound and outbound traffic would be rerouted either via Sundrive Road/ Clogher Road or via Larkfield Park/ Clareville Road/ Harold's Cross Road. No land take would be required along this section.

On Kimmage Road Lower, south of the Sundrive Road junction, two-way traffic would be maintained and road widening would be required to provide dedicated bus lanes in both directions. This would require land take from portions of front gardens along the route. The forecourt of a petrol station and a portacabin being used as a commercial premises would also be affected here. On-street parking along this section would also need to be removed.

The scheme would require modification to the existing signalised junctions along the route to accommodate bus priority at traffic signals. The junctions at Clogher Road/Sundrive Road and the five-way cross roads in Harold's Cross would also be upgraded to facilitate the increase in traffic from the diversion routes. Provision would be made for right turning traffic from Harold's Cross Road onto Kenilworth Park for the outbound diversion.



**Cycle Route:**

Cycle tracks would be provided in both directions on Kevin Street, this can be achieved by reallocating road space from traffic lanes. A two-way cycle track would be provided on New Bride Street, to provide the space for this the street would be restricted to one-way only in a southbound direction for motorists. This two-way cycle lane would extend just past the junction with Long Lane and Heytesbury Street would be made into a cul-de-sac at this location, with only cyclists allowed to pass through. Inbound motorists would be diverted onto Arnott Street to avoid the need for a U-Turn and similarly outbound motorists would be diverted onto Camden Row or Long Lane. This traffic restriction would reduce traffic volumes and speeds on Heytesbury Street like in the “environmental area” which currently exists to the South of South Circular Road, it is proposed that cyclists and motorists would share road space on Heytesbury Street.

Stamer Street and Martin Street are within this existing “environmental area” and are currently low volume low speed roads and again cyclists would share road space with motorists. Construction works on these roads would be limited to signage, road marking, alterations to speed humps and road resurfacing if required. A new pedestrian/cyclist bridge and length of boardwalk would also be constructed over the Grand Canal to link to the cycle lanes on Grove Road.

The junctions on Kevin Street, with Clanbrassil Street and New Bride Street, would be upgraded to enhance pedestrian and cyclist facilities, some traffic lanes would be removed to provide additional road space for cyclists and to reduce the overall footprint of the junctions. The junction at New Bride Street/Long Lane would also be upgraded to cater for the new traffic and cyclist layouts.

The existing cycle lanes along Grove Road and the carriageway on Greenmount Lane would be resurfaced, a new cycle track through the Grounds of Our Lady’s Hospice would be constructed to join to the existing roads within the Hospice. On the 100m section of Harold’s Cross Road closest to the entrance to Our Lady’s Hospice a two-way cycle track on the western side of the road would be constructed. This would involve removing the on-street parking from the front of 12 houses along the road, alternative parking could be provided for these residents with land take from green areas of Our Lady’s Hospice. On Lower Kimmage Road and the section of Harold’s Cross Road to the west of Harold’s Cross Park cyclists would share road space with local traffic and buses.

Mount Argus Road, Priory Road, Larkfield Grove, Derravaragh Road and Hazelbrook Road are low speed/low volume roads and cyclists will share road space with general traffic. Construction works would be limited to road marking, alterations to speed humps and resurfacing if required.

## 7.3 Summary

### 7.3.1 Infrastructure Provision

The emerging preferred route measures approximately 3.7 km in total. Along the emerging preferred route existing bus infrastructure is provided along 900m (24%) in the inbound and 250m (7%) in the outbound direction.

The emerging preferred scheme would improve this to 2.5 km (68%) inbound and 2.5 km (68%) for the outbound direction. Full bus provision is not provided for 1.2 km along the western edge of Harold's Cross Park and a section of Lower Kimmage Road, as this stretch is also used for local access. However, buses would still benefit from a good level of bus priority as all through traffic would be removed. Cycle facilities would not be provided along the emerging preferred route however an off-route cycle track would be provided for the length of this scheme.

### 7.3.2 Cost Estimates

A high-level cost estimate for the scheme has been prepared based on the concept design drawings. According to this estimate the proposed CBC and cycle infrastructure cost is anticipated to be in the region of € 19 – 22 m. This is broken down further below.

#### **CBC Route.**

**Length of Scheme Section:** 3.7 km

**Indicative Infrastructure Cost:** € 12 - 14 million

**Indicative Land Acquisition Cost:** € 2 million

**Total Indicative Cost of Scheme Section:** € 14-16 million

#### **Cycle Route**

**Length of Scheme Section:** 4.6 km

**Indicative Infrastructure Cost:** € 5-6 million

**Indicative Land Acquisition Cost:** € 0.25 million

**Total Indicative Cost of Scheme Section:** € 5.25 - 6.25 million

### 7.3.3 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 54a bus route which overlaps with the emerging preferred route (between Patrick Street and Kimmage Cross Roads). 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.

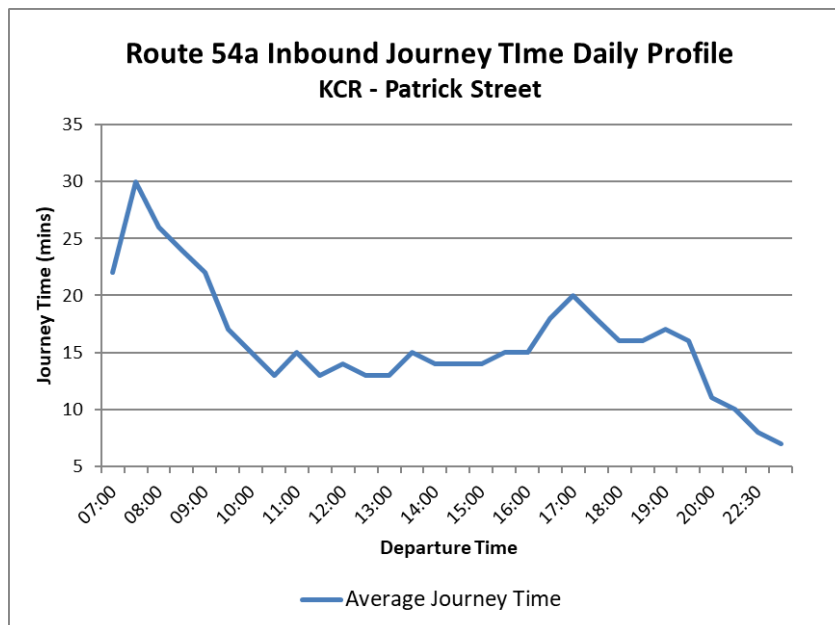


Figure 7.2 Existing Average Inbound Journey Times

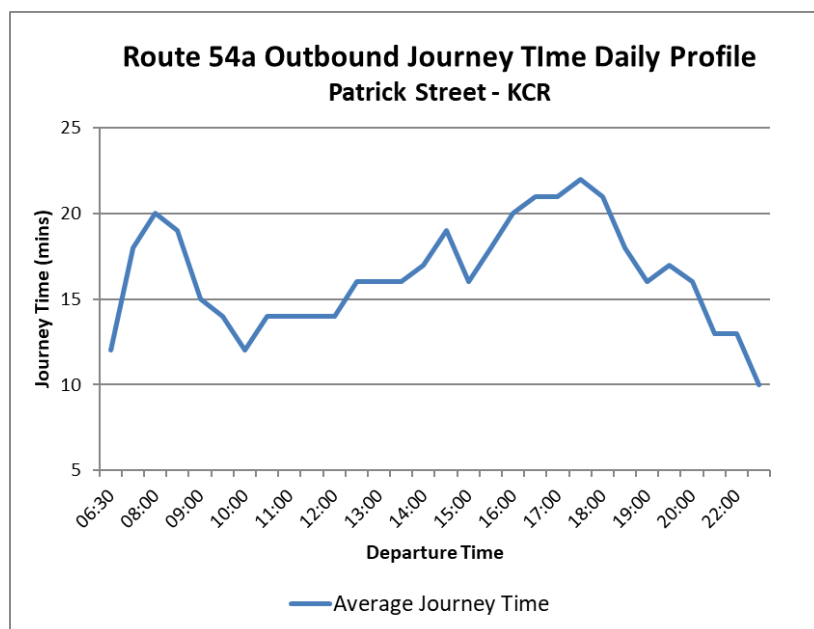


Figure 7.3 Existing Average Outbound Journey Times

The graphs presented in Figure 7.2 and Figure 7.3 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 26 and 13 minutes inbound and between 22 and 12 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 12 and 8 minutes inbound and between 17 and 10 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

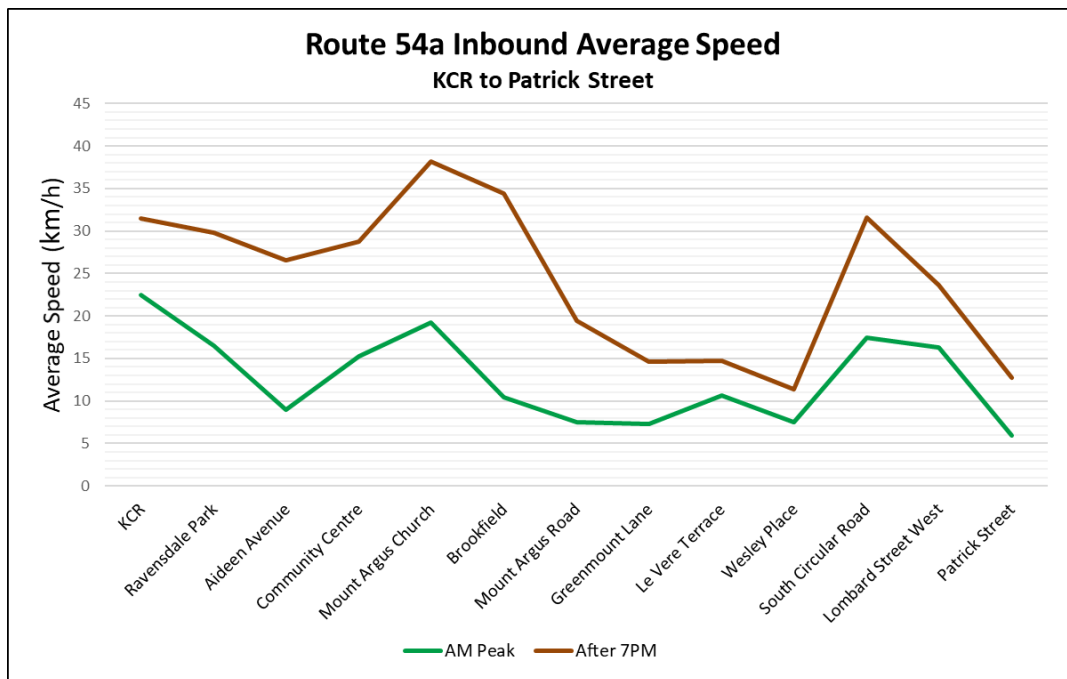


Figure 7.4 Existing Inbound Average Speed

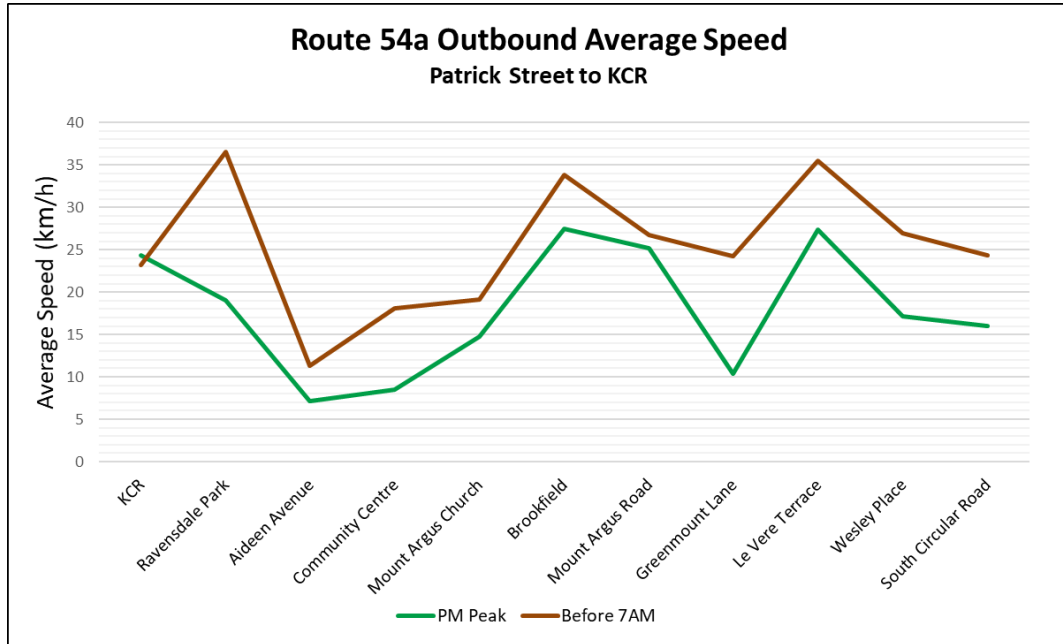


Figure 7.5 Existing Outbound Average Speed

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 7.4 and Figure 7.5 (these speeds exclude the 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.