

**South Circular Road to Bishops Quay Cycle
Scheme**

Options Report

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1 Introduction

Limerick City and County Council (LCCC) has appointed PUNCH Consulting Engineers to prepare the design for the proposed South Circular Road (SCR) to Bishops Quay Cycle Scheme.

The proposed route of the scheme will cover a distance of approximately 2.6km connecting the suburbs of Raheen/Dooradoyle within Limerick's city centre as outlined in Figure 1-1 below.

The project is proposed to tie in with the *Arthurs Quay Park to Condell Road Cycle Scheme* at Bishops Quay at the northern end of the proposed route and with the *St Nessan's Road/Dooradoyle Road Cycle Scheme* at the Ballykeefe Roundabout at the southern end of the route.

There are numerous trip attractors along the city route including Mary Immaculate College, St. Clements College, Scoil Mháthair Dé, and both Laurel Secondary school and Laurel Hill Coláiste are schools/colleges located on South Circular Road.

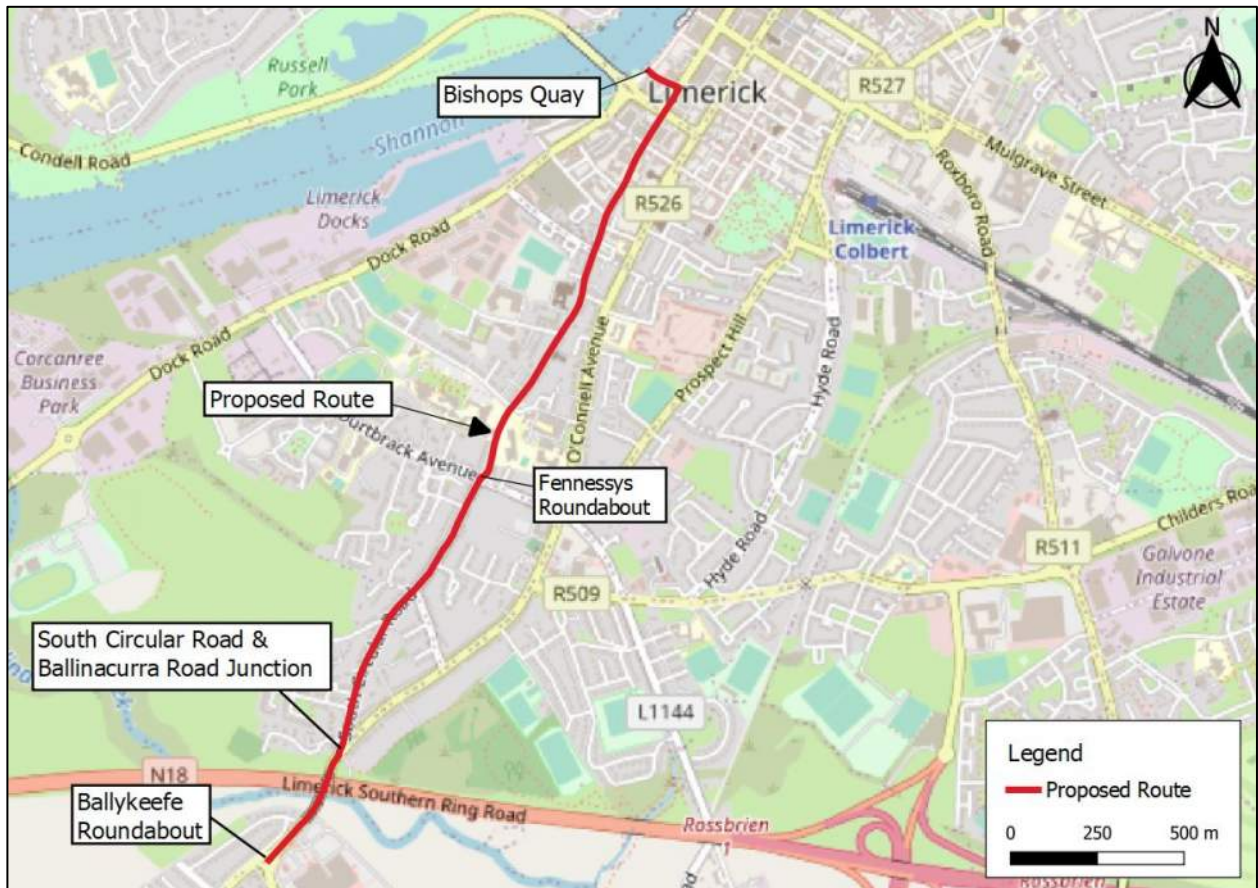


Figure 1-1: Project Extents (Ref: <https://www.openstreetmap.org/copyright>)

1.1 Project Objectives

The objectives for this project set out by LCCC include:

- I. To improve safety, comfort and security for cyclists and pedestrians;
- II. To provide safe cycle facilities;
- III. To improve the crossing facilities for pedestrians and cyclists;
- IV. To comply with the revised draft Limerick Shannon Metropolitan Area Transport Strategy (LSMATS);
- V. To provide junction solutions in line with the Principles of Sustainable Safety, that meets with the five needs of cyclists and the target Quality of Services outlined in the National Cycle Manual (NCM) (A or A+);
- VI. To design a facility that complies with the National Cycle Manual, June 2011 (Including any subsequent updates), published by the National Transport Authority and the Design Manual for Urban Roads and Streets and any other relevant guidelines.

The scheme is split into six sections as discussed in Section 2 of this report due to the varying environment along the length of the scheme. A number of design options are assessed for each section. Options are then compared using Multi-Criteria Analysis (MCA) methodology.

1.2 Route Selection Background

RPS Group completed a Route Options Assessment for Mary Immaculate College to Limerick's City Centre on behalf of LCCC in February 2015 which looked at various options for part of this proposed route and identified the 'Alternative Green Route' - South Circular Road to Bishops Quay - as the preferred route. This formed the basis of this project brief.

The Limerick Metropolitan Cycle Network Plan (LMCNP) was developed in 2016 by ARUP in partnership with LCCC and the National Transport Authority (NTA) (further described in Section 3.3.4 of this report). Section 4.3 of the LMCNP identifies route options for the Raheen Network. SCR is a key connector between the large residential area of Raheen and Dooradoyle to the city. The alternative routes of Ballinacurra Road and Dock Road have significantly higher AADTs, which would not be preferred for cyclists.

As shown below in Figure 1-2, following the route option selection process, the LMCNP proposed primary, secondary, feeder and greenway cycle routes in this area. This scheme aims to deliver a section of the primary route as shown below in Figure 1-2.

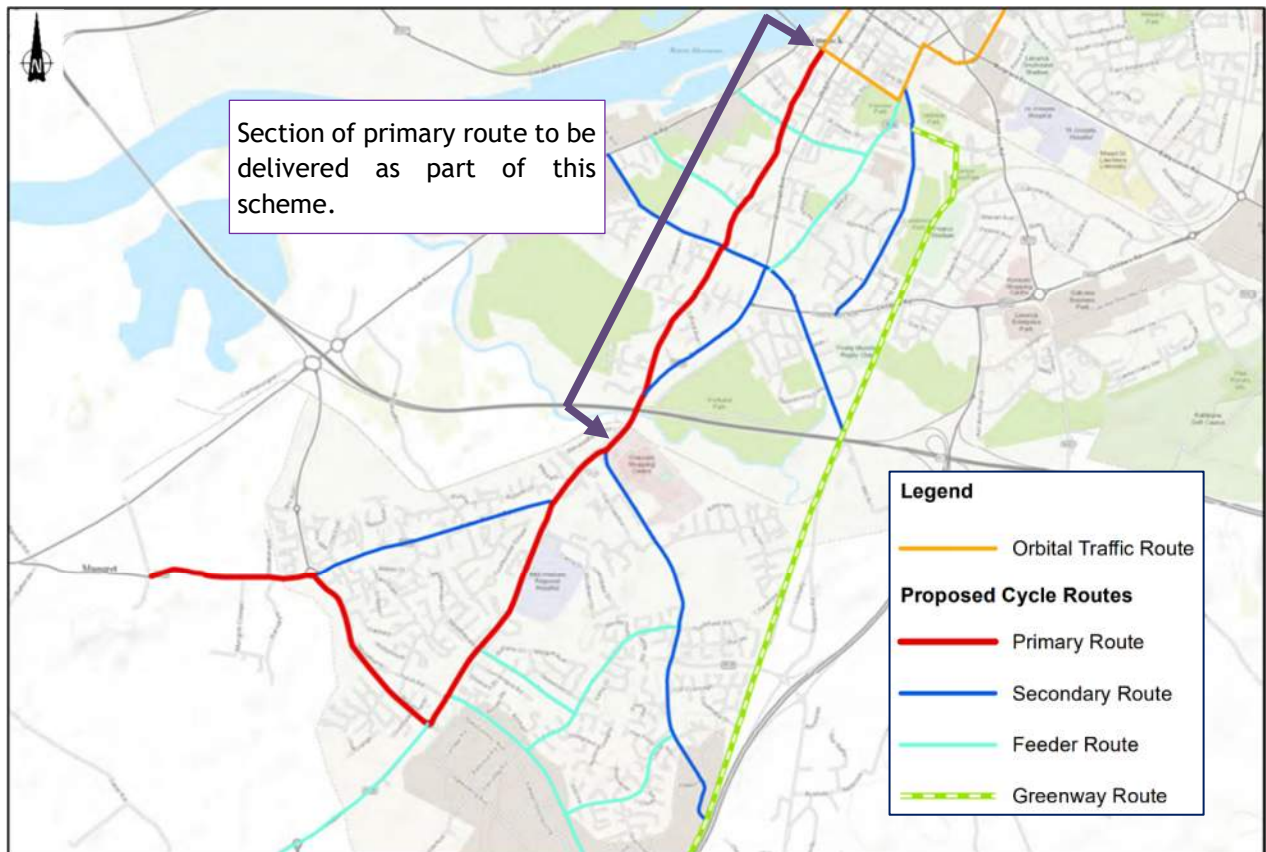


Figure 1-2: Excerpt from LMCNP Proposed Raheen Cycle Network

This section of the route has also been identified as a primary route in the revised draft LSMATS Cycle Network (further described in Section 3.3.1) and will be a key cycle link between Dooradoyle/Mungret/Raheen and the City Centre.

2 Study Area

Given the length (2.6km) of the proposed scheme and the changing urban environment along the route (one-way/two-way, level of traffic etc) the route has been divided into six separate sections for consideration in this Options Report.

Section 1 - Ballinacurra Road from Ballykeeffe Roundabout to South Circular Road

Section 2 - South Circular Road from Ballinacurra Road to Fennessy's Roundabout

Section 3 - South Circular Road from Fennessy's Roundabout to Laurel Hill Avenue

Section 4 - South Circular Road from Laurel Hill Avenue to Henry St

Section 5 - Henry St from South Circular Road to Lower Mallow Street

Section 6 - Connection from Lower Mallow St to Bishops Quay

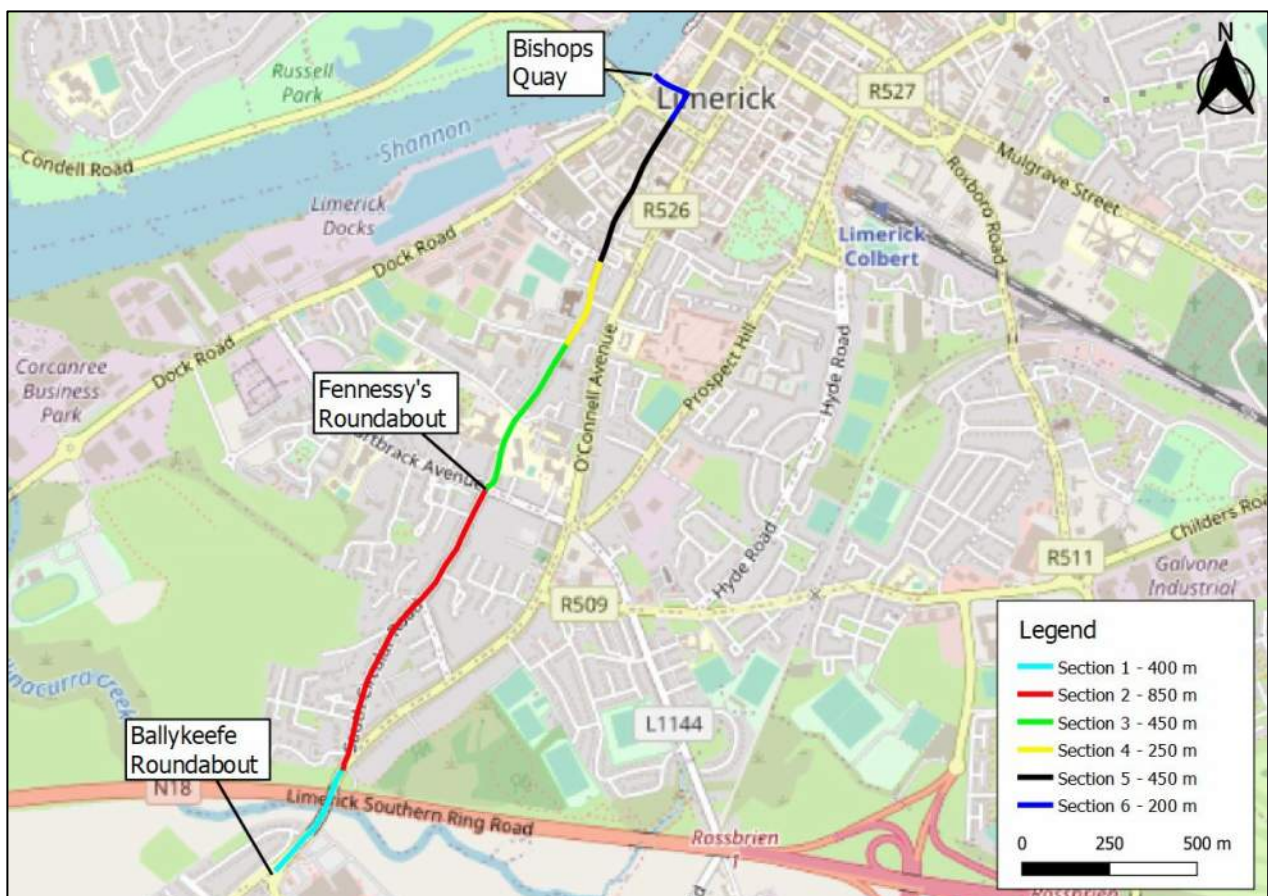


Figure 2-1: Sections of Project Extents (Ref: <https://www.openstreetmap.org/copyright>)

2.1 Existing Road Network

The proposed cycle route follows the road north of Ballykeeffe Roundabout through SCR and Henry St and onto Bishops Quay. There are a number of existing junctions and roundabouts along the route.

The road widths, parking and traffic flow vary along the length of the scheme. The existing environment of each section is described in more detail in Section 5.

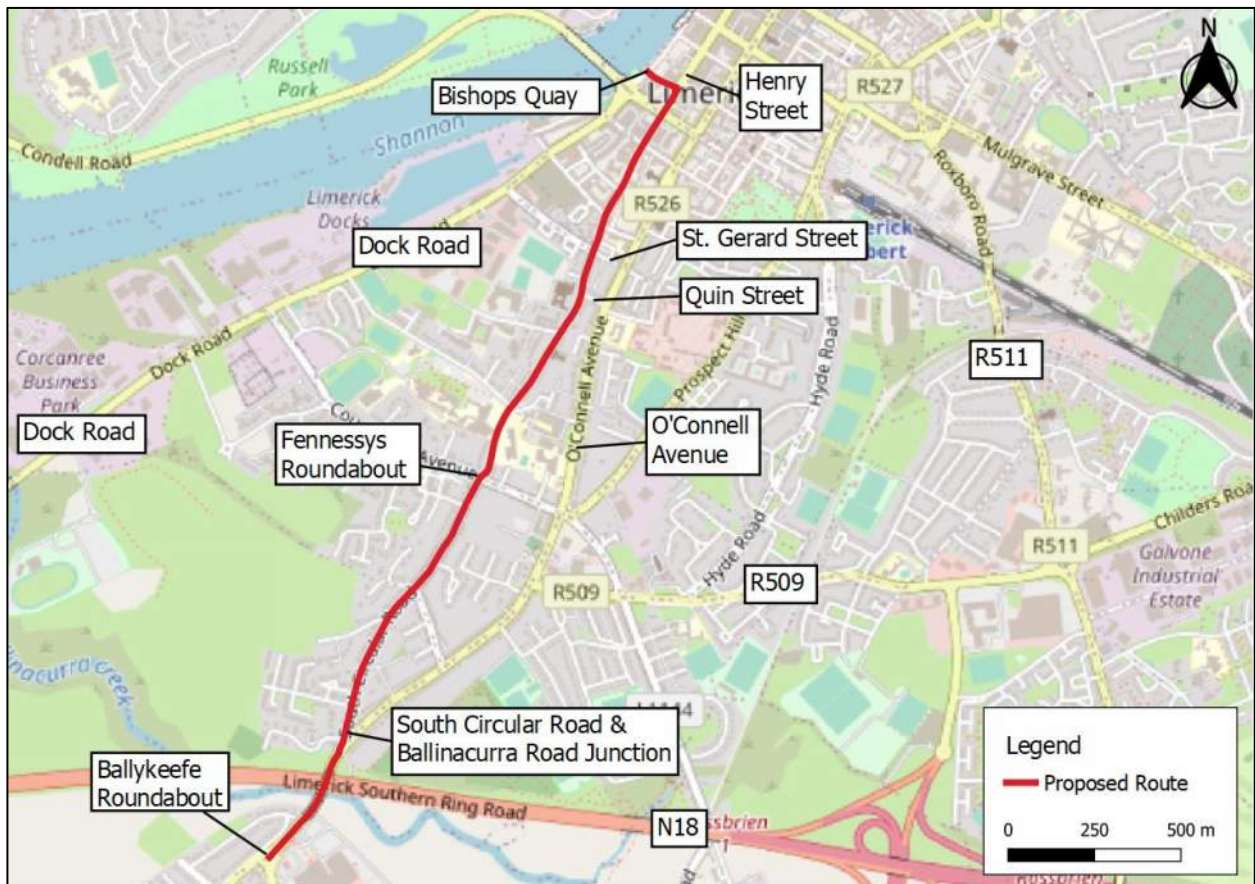


Figure 2-2: Existing Road Network (Ref: <https://www.openstreetmap.org/copyright>)

2.2 Existing Traffic Conditions

The entire route has a 50km/hr speed zone designation.

A number of traffic surveys have been carried out and consulted for this report. The most detailed survey was carried out by IDASO in April 2022, which included the following:

1. 13 Junction Turning Counts (JTC) over two days including pedestrians and cyclists, refer to Figure 2-5 for survey locations
2. Origin Destination survey over two days to determine existing travel patterns and volumes of traffic on the route
3. One week of Automated Traffic Counts to capture speed on SCR
4. Car Parking survey on the SCR between Ballinacurra Road and Quin St

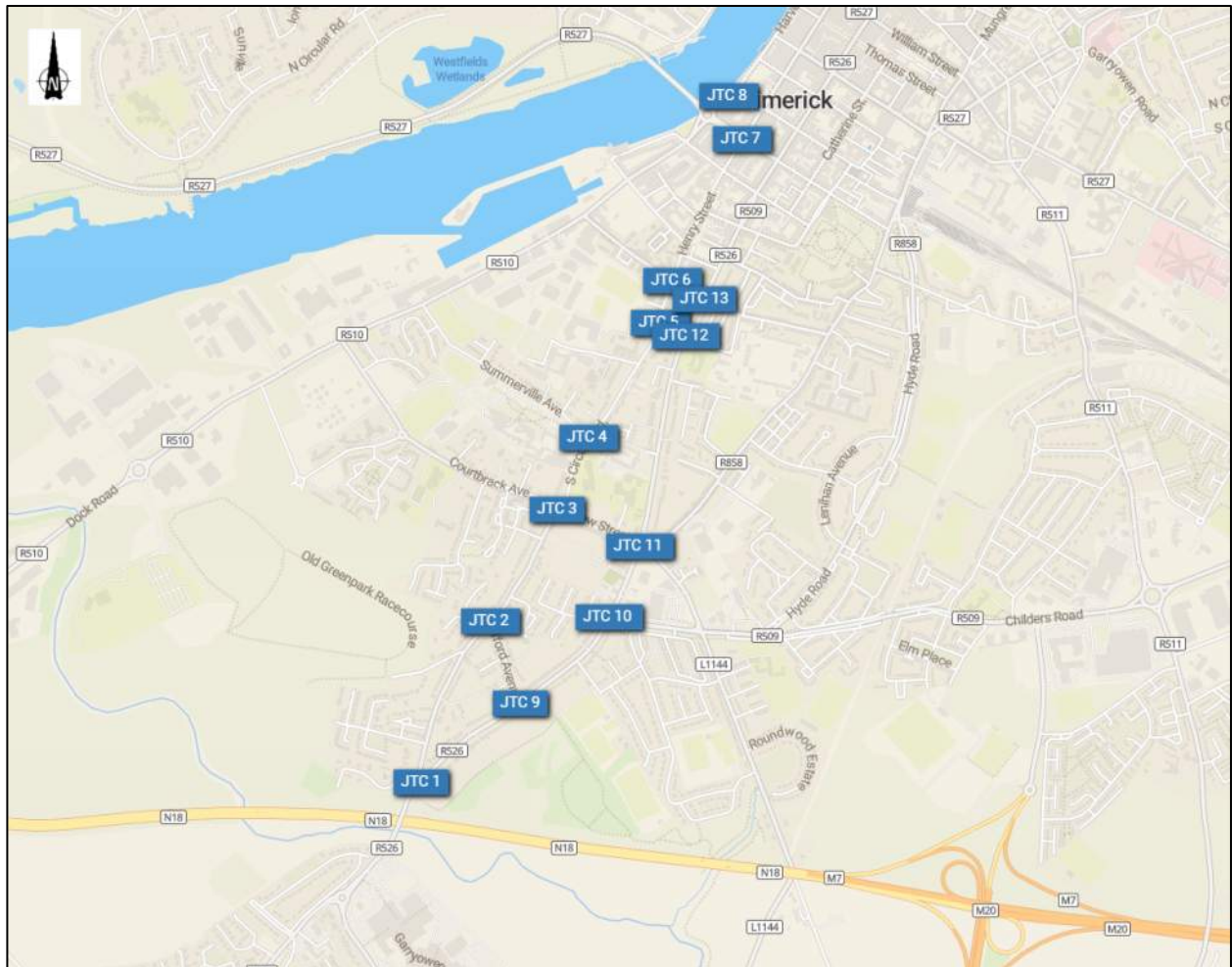


Figure 2-3 : Traffic Survey Locations (Ref: IDASO Traffic Surveys)

4 JTCs along South Circular Road were also initially completed by NDC on Tuesday 12th October 2021 between Ballinacurra Road and Summerville Avenue.

A speed survey carried out by Viacount II was also completed on Section 2 of SCR on Tuesday-Wednesday 28-29th September 2021.

The April 2022 surveys were undertaken at a time when nearby schools and Mary Immaculate College were fully open outside of the Easter holidays, and the government was not advising work from home during the Covid-19 pandemic. While it could be argued that an increased proportion of individuals would have continued to work from home during this time period in comparison with pre-covid, it is expected this change in behaviour will become the norm in future years and it is therefore deemed the traffic survey results are appropriate for future analysis. No adjustments to surveyed flows have been made in any calculations for this scheme.

Approximate AADTs on the route have been derived from the survey information received in accordance with TII Project Appraisal Guidelines Unit 16.2 Expansion Factors for Short Period Traffic Counts as deemed appropriate for a high-level study of AADTs for this scheme. The results, based on the April 2022 surveys, are shown in Figure 2-6.

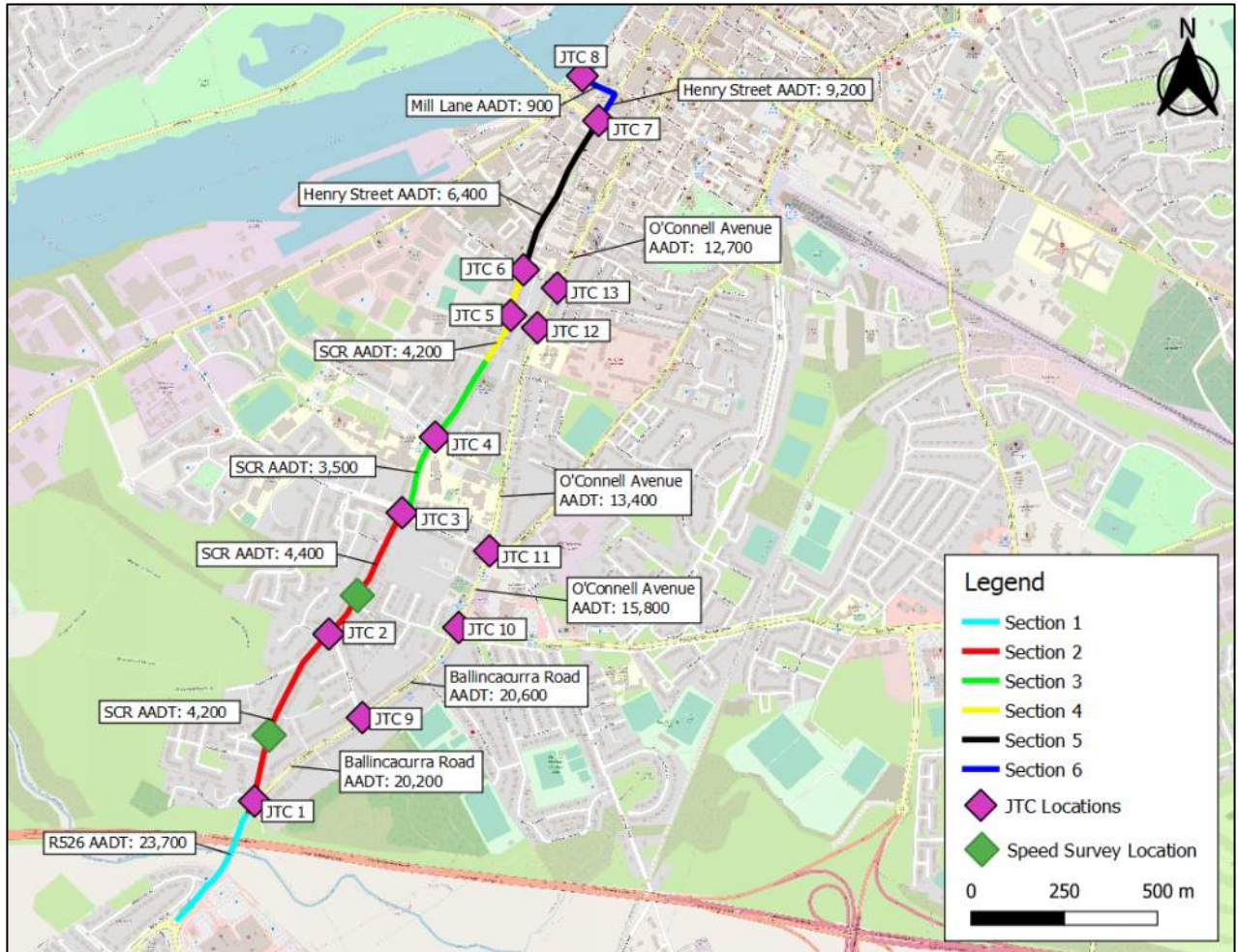


Figure 2-4 : AADTs Calculated for the Route April 2022 (Ref: <https://www.openstreetmap.org/copyright>)

2.3 Road Safety Statistics

A Road Safety Audit for the proposed scheme will be undertaken at the relevant stages of the scheme in line with the Road Safety Audit Guidelines published by Transport Infrastructure Ireland.

The Road Safety Authority provides collision statistics online for Irish roads. Refer to Figure 2-5 for site specific statistics. Items to note from the records are:

1. There are a number of minor collisions recorded along the proposed route, many of which are noted as involving bicycles and pedestrians.
2. Two serious incidents are noted along the route with one of those serious incidences involving a cyclist on a Saturday morning in 2014.
3. There are a number of serious incidences in the vicinity of the route (on O’Connell Avenue, Henry St and Dock Road) that note the circumstances of the vehicular incident as ‘pedestrian’.
4. There are no fatalities noted on the proposed route.
5. There was a fatal pedestrian daytime incident in 2010 on O’Connell Avenue, a nearby parallel road to SCR.
6. There was a fatal pedestrian daytime incident in 2006 on Henry St, just north of Mill Lane at the northern end of the proposed scheme.

In summary, there are opportunities available to improve the safety of cyclists and pedestrians along the proposed route and in its vicinity. O’Connell Avenue in particular could be seen as a hostile environment for both cyclists and pedestrians given the statistics available. The provision of a safer route for vulnerable road users onto the SCR should improve the above statistics in the overall area.

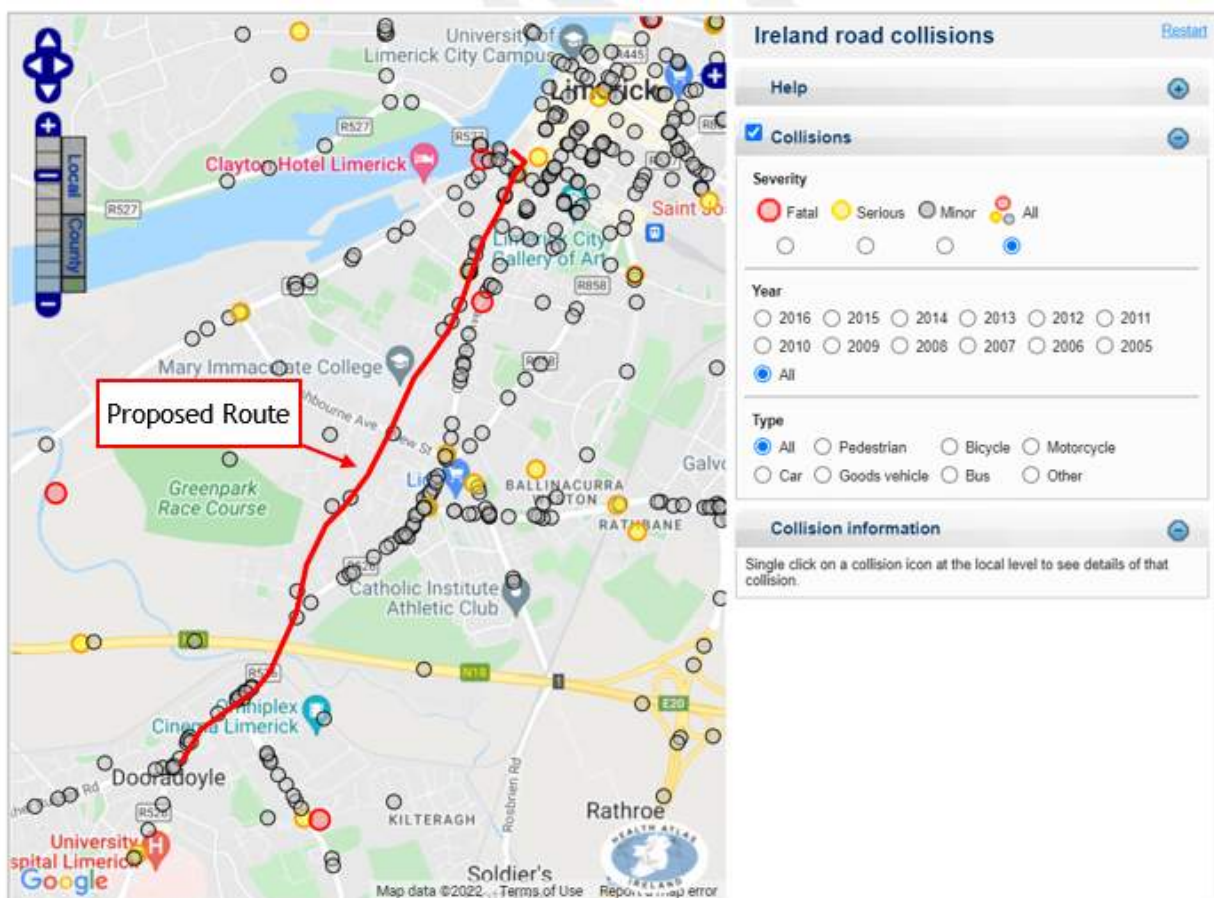


Figure 2-5 : Road Safety Statistics adjacent to the development site available at:
<https://www.rsa.ie/en/RSA/Road-Safety/RSA-Statistics/Collision-Statistics/Ireland-Road-Collisions/>

3 Policy Context and Design Guidance

3.1 National Planning Policy

3.1.1 Climate Action Plan (2021)

The Climate Action Plan 2021 details the plan to reduce greenhouse emissions by 2030 with the goal of reaching net-zero emissions by 2050. The plan outlines the proposals for achieving these goals and also envisages a positive effect on both the economy and society in Ireland.

The transport network in Ireland will play a key role in reaching the goals set out in the plan. Investments in walking, cycling and public transport will promote a modal shift reducing the level of private car use in the country.

3.1.2 Project Ireland 2040

Project Ireland 2040 is an initiative set up by the Irish Government to make Ireland better for everyone. The policy recognises that economic and social progress go hand in hand and so prioritises people's wellbeing. The overall objective of the policy is to provide comprehensive social, economic and cultural infrastructure.

3.1.3 National Planning Framework

The National Planning Framework (NPF), part of Project Ireland 2040, is the Government's high-level strategic plan for shaping future growth and development was published in March 2018. The NPF sets out ten National Strategic Outcomes (NSOs) which the framework aims to deliver.

A strategic investment priority under the National Development Plan 2018-2027 is public investment in environmentally sustainable public transport systems in major urban areas, as a primary enabler for National Strategic Outcomes under the NPF relating to compact growth.

National Strategic Outcome 4 - Sustainable Mobility

In accordance with National Strategic Outcome 4, this scheme will provide a coherent, interconnected and safe cycle network. The cycle network will cater for all ages and abilities and will allow for a range of cycling activities to occur, including commuting, leisure and tourism. The proposal will improve the liveability and quality of life for the local population and will build on existing infrastructure already in place

3.1.4 National Investment Framework for Transport in Ireland

The Department of Transport has published the National Investment Framework for Transport in Ireland (NIFTI). The document is a high-level strategic framework to support the consideration and prioritisation of future investment in land transport. NIFTI was developed to ensure investment is aligned with the National Planning Framework and the delivery of the ten National Strategic Outcomes.

3.1.5 National Sustainable Mobility Policy

In April 2022, the Department of Transport published the "National Sustainable Mobility Policy" (NSMP) and the supporting "NSMP Action Plan 2022-2025". These documents align with the existing Project Ireland 2040 Framework. The purpose of the policy is described as follows:

"To set out a strategic framework to 2030 for active travel and public transport to support Ireland's overall requirement to achieve a 51% reduction in carbon emissions by the end of this decade"

The strategies principal targets are outlined below:

"To deliver at least 500,000 additional daily active travel and public transport journeys and a 10% reduction in kilometres driven by fossil fuelled cars by 2030 in line with metrics for transport set out in the Climate Action Plan 2021".

The “NSMP Action Plan 2022-2025” outlines 10 no. goals which comprise of a total of 91 no. core actions. Furthermore, the owner, support organisation, timeline and output of each action item is defined. The 10 no. goals are as follows:

Safe and Green Mobility

- 1- Improve mobility safety
- 2- Decarbonise public transport
- 3- Expand availability of sustainable mobility in metropolitan areas
- 4- Expand availability of sustainable mobility in rural areas
- 5- Encourage people to choose sustainable mobility over the private car

People Focused Mobility

- 6- Take a whole of journey approach to mobility, promoting inclusive access for all
- 7- Design infrastructure according to universal design principles and hierarchy of road user’s model
- 8- Promote sustainable mobility through research and citizen engagement

Better Integrated Mobility

- 9- Better integrate land use and transport planning at all levels
- 10- Promote smart and integrated mobility through innovative technologies and development of appropriate regulation

The main action items to be considered / that impact the proposed development are as follows:

- **No. 4:** Continue to protect and renew road infrastructure for all road users including sustainable mobility users.
- **No.17:** Develop pedestrian enhancement plans for the five metropolitan areas.
- **No.19:** Deliver additional cycling infrastructure projects in the five cites. (Complements CAP action 233, RSS action 5)
- **No.78:** Deliver metropolitan area transport strategies in the cites. (Complements CAP actions 254 and 256)

Action Item no.78 above aims to deliver metropolitan area transport strategies to the five cities and prepare local transport plans for the regional growth centres and key towns. The Limerick & Shannon and Metropolitan Area Transport Strategy is described in the Regional Planning Policy Section 3.3 of this report.

Table 3-1 below shows 2016 Census data on population means of travel in Limerick City & County, therefore a lot more work to get people cycling was and is still needed to meet the policy objectives. Motor car usage for both driver and passenger-shared accounts for much of the means of travel to work, school or college (64.5%). Walking, cycling and public transport make up much of the remainder (22.7%), (Census 2016, Profile 6 - Commuting in Ireland, Table E6011).

Table 3-1: 2016 Census - Population Means of Travel - Limerick City and County

Means of Travel	Number of Persons	Percentage
On foot	17,139	14.1%
Bicycle	1,835	1.5%
Bus, minibus or coach	8,504	7.0%
Train, DART or LUAS	177	0.1%

Motorcycle or scooter	235	0.2%
Motor car: Driver	52,289	43.0%
Motor car: Passenger	26,146	21.5%
Van	5,095	4.2%
Other, incl. lorry	526	0.4%
Work mainly at or from home	3,914	3.2%
Not stated	5,865	4.8%

Based on the above cycling figure of 1.5% and the lack of existing continuous cycle facilities in the area, the proposed cycling facilities on this route have the potential for a significant modal shift in the existing modes of transport to favour cycling. Modal shift in city and suburbs is also known to be higher compared with county locations given the potential for shorted trips.

3.2 National Design Guidance

3.2.1 National Cycle Manual 2011

An update to this manual is anticipated to be published by the NTA in 2022.

The National Cycle Manual (NCM) takes into account the Principles of Sustainable Safety in order to provide a safe traffic environment for all road users, including cyclists. The manual recommends the below five requirements necessary to meet the needs of the cyclist:

1. Road Safety

All networks must seek to optimise road safety for all road users, including cyclists. Cycle infrastructure is to include proven safe measures as any perception of a lack of safety could be a deterrent to cycling.

2. Coherence

Cycling networks should link all main origin and destination zones / centres for cyclists and should carry the majority of cycle traffic. As a result, cycling routes should be logical and continuous.

3. Directness

Cycling infrastructure should be as direct as possible, minimising any delays or detours. A well-designed urban cycle network should confer an advantage in terms of average distance or journey time when compared with other transport networks.

4. Attractiveness

The cycling environment along a route should be pleasant and interesting.

5. Comfort

Cycling infrastructure should be designed, built and maintained for ease of use and for comfort. This is particularly important for beginners, tourists and recreational cyclists. Cycling comfort can be achieved through providing effective width for cycling links; well-drained high-quality surfacing; improving shelter; minimising stopping, delays, detours etc.

The four elements that determine the width of a cycle track are:

- A. The space to the left of the cyclist
- B. The space required to support the cycling regime
- C. The space to the right of the cyclist
- D. Additional Features

By integrating the above four elements into the design of cycle infrastructure, an optimum cycle facility is obtained. The table below outlines the space required for the above elements which aids in calculating the required width of the cycle track.

A Inside Edge	B Cycling Regime	C Outside Edge	D Additional Features
Kerb 0.25m 	Single File 0.75m 	30kph, 3.0m wide lane 0.50m 	Uphill 0.25m Sharp bends 0.25m
Channel Gully 0.25m 	Single File + Overtaking, Partially using next lane 1.25m 	50kph, 3.0m wide lane 0.75m 	Cyclist stacking, Stopping and starting 0.50m
Wall, Fence or Crash Barrier 0.65m 	Basic Two-Way 1.75m 	Raised kerb, dropped Kerb or physical barrier 0.50m 	Around primary schools, Interchanges, or for larger tourist bikes 0.25m
Poles or Bollards 0.50m 	Single File + Overtaking, Partially using next lane 2.00m 	Kerb to vegetation etc. (ie. cycleway) 0.25m 	Taxi ranks, loading, line of parked cars 1.00m (min 0.8m)
	2 Abreast + overtaking (tracks and cycleways) 2.50m 		Turning pocket cyclists 0.50m

Figure 3-1: Cycle Track Width Calculator - National Cycle Manual 2011

3.2.2 Design Manual for Urban Roads and Streets

The Design Manual for Urban Roads & Streets (DMURS) was prepared for the Department of Transport, Tourism and Sport and the Department of Environment, Community and Local Government. DMURS provides guidance on designing urban roads and streets. IT presents the principles, approaches and standards for urban areas where speed limits are below 60km/hr.

The manual places a significant emphasis on car dominance in Ireland and the implications this has had regarding the pedestrian and cycle environment. The document encourages more sustainable travel patterns and safer streets by proposing a hierarchy for user priorities. As per Section 2.2.2 and Figure 2-21 extract over, this hierarchy places pedestrians at the top, indicating that walking is the most sustainable form of transport and that by prioritising pedestrians first, the number of short car journeys can be reduced and public transport made more accessible. Second in the hierarchy are cyclists with public transport third in the hierarchy and private motor vehicles at the bottom. By placing private vehicles at the bottom of the hierarchy, the document indicates that there should be a balance on street networks and cars should no longer take priority over the needs of other users.

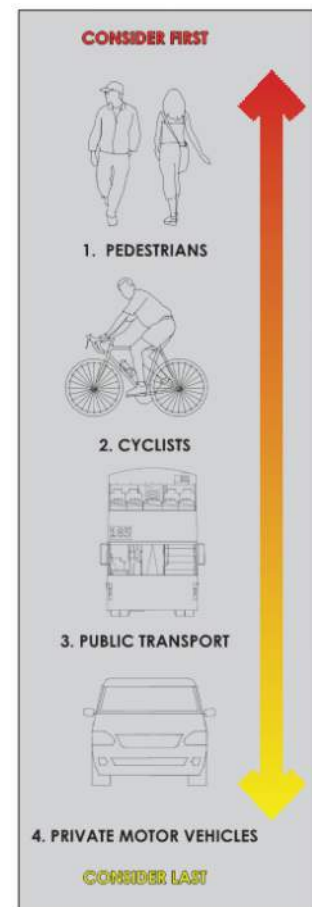


Figure 3-3: DMURS User Hierarchy Extract - Figure 2-21

3.3 Regional Planning Policy

3.3.1 Limerick Shannon Metropolitan Area Transport Strategy (Revised Draft)

The Revised Draft Limerick-Shannon Metropolitan Area Transport Strategy 2040 (LSMATS) has been developed by the National Transport Authority in collaboration with Limerick City and County Council, Clare County Council and Transport Infrastructure Ireland (TII). The National Planning Framework 2040 (NPF) envisages that the Limerick-Shannon Metropolitan Area (LSMA) will become the growth engine of the Mid-West Region with projected growth of at least 50% during the period up to 2040. This projected population and associated economic growth will result in a significant increase in the demand for travel. There is a legacy of car dependency in the LSMA. This has contributed to a wide range of economic, environmental and social issues including longer commutes, declining urban centres, poor public health, reduced air quality and noise pollution.

To mitigate this, land use and transport planning will be far more closely aligned. This will discourage the use of the private car, particularly for short trips, in order to fundamentally change how people move around the LSMA. This requires a more efficient use of valuable street and road space and a prioritisation of walking, cycling and public transport.

The vision for Revised Draft LSMATS is to deliver a high-quality, accessible, integrated and more sustainable transport network that supports the role of the Limerick Shannon Metropolitan Area as the major growth engine of the Mid-West Region, an internationally competitive European city region and main international entry to the Atlantic Corridor.

Cycling is a low cost, sustainable and growing mode of transport. Limerick City has a lot of untapped potential to become a haven for cyclists with its flat topography, compact design and the fact that a journey from the City Centre to the urban edge can be undertaken in less than 30-mins.

High-quality infrastructure and supporting measures are required to cultivate a cycling culture in the LSMA, and to give all individuals the choice to cycle, including:

- I. Identification of Primary, Secondary, Inter-Urban, Feeder and Greenway Routes, and Quiet Ways to develop a comprehensive cycle network across the LSMA;
- II. Facilities designed to NCM standards;
- III. Full or light segregation from other modes to ensure safety and comfort for all road users;
- IV. Local traffic calming, lower speed limits and junction treatments, particularly at complex junctions in an urban context; and
- V. Supporting measures including the public Bike Share Scheme, end-of-trip facilities, and behavioural change initiatives.

Figure 3-2 is an extract from LSMATs showing the proposed route identified as primary cycle route for the city.

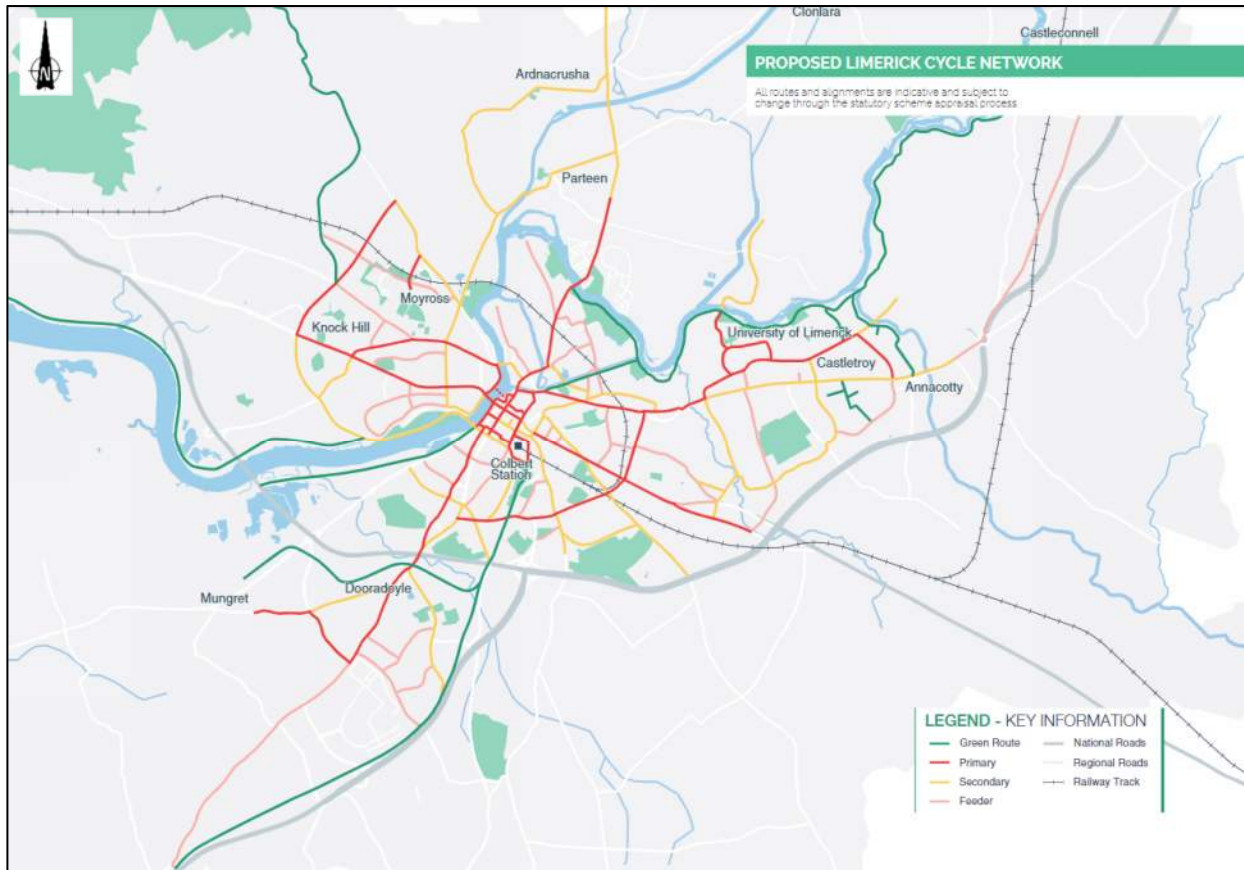


Figure 3-2: Proposed Limerick Cycle Networks as per LSMATS

3.3.2 Limerick 2030 Vision: An Economic and Spatial Plan for Limerick

The “Limerick 2030 an Economic and Spatial Plan for Limerick” was launched in 2013, as a once in a generation plan developed to guide the economic, social and physical renaissance of Limerick City Centre and the wider County/Mid-West Region.

The plan sets out a very clear framework that integrates economic development with spatial planning, all underpinned by dedicated bespoke marketing. It has the support of all the major public and private stakeholders in Limerick.

Two of the key objectives relating to the spatial plan include:

- I. To create a high quality and safe urban environment attractive to investors, employers, residents and tourists which generates a sense of pride in the City;
- II. To create quality strategic gateways to the City Centre, thereby making it a welcoming experience for visitors.

3.3.3 Limerick Development Plan (2022-2028)

The Limerick Development Plan 2022-2028 sets out detailed Policies under Chapter 7 -Sustainable Mobility and Transport, which seeks to create a transport system that offers real choice so that more sustainable transport alternatives are available, including the promotion of cycling and walking as safe, sustainable and healthy transport options. The policies reflect national policy as articulated in “National Sustainable Mobility Policy”.

To deliver on the Development Plan’s visions, a number of key items and Strategic Outcomes need to be met. In relation to this project, the Development Plan sets out to reduce car dependency by promoting walking, cycling and public transport. Future development and enhanced connectivity are to be met by providing an appropriate level of road infrastructure, road capacity and traffic management.

- Promote cycling and walking as healthy modes of transport.
- Implement the measures contained in the National Cycle Policy Framework (NCPF) and the National Sustainable Mobility Policy produced by the Department of Transport.
- Establish a complete network of cycleways throughout the City.
- Facilitate the implementation and delivery of the Final Limerick Shannon Metropolitan Area Transport Strategy.
- Design a city cycle network with emphasis placed on promoting safety and shortening journey time. The cycle network will be a combination of dedicated cycle lanes on the road and dedicated off road cycle-lanes. The network will be clearly identifiable through signposting and road marking.
- Continually upgrade the condition of existing footpaths and cycleways.
- Provide controlled crossings at locations where they are warranted.
- Limerick City Council will provide secure cycle parking at locations around the City.
- Will require that secure covered cycle parking facilities be provided close to building entrances for new office blocks, apartment blocks, schools, shopping centres etc.
- Require planning applicants to demonstrate that their development proposals will be easily accessible by pedestrians, cyclists and public transport users.
- Require planning applicants where appropriate to submit detailed designs of the facilities required by cyclists.
- To facilitate the extension, improvement, and development of the riverside walkways and footpaths along the Shannon River and its tributaries while ensuring the conservation value of the designated River areas are maintained.

3.3.4 Limerick Metropolitan Cycle Network Plan

The Limerick Metropolitan Cycle Network Plan (LMCNP) was developed in 2016 as a means of building on the National Cycle Manual, with a vision to develop a consistent, clear and continuous network of urban and suburban cycle networks throughout the Limerick Metropolitan Area to ensure cycling becomes a realistic choice as a mode of transport. This includes individual route plans for the city centre and suburban areas including the Raheen Cycle Network which includes the SCR to Bishops Quay Cycle Lanes as a Primary Route.

Figure 3-3 below shows an excerpt from the LMCNP for the proposed Raheen Cycle Network.

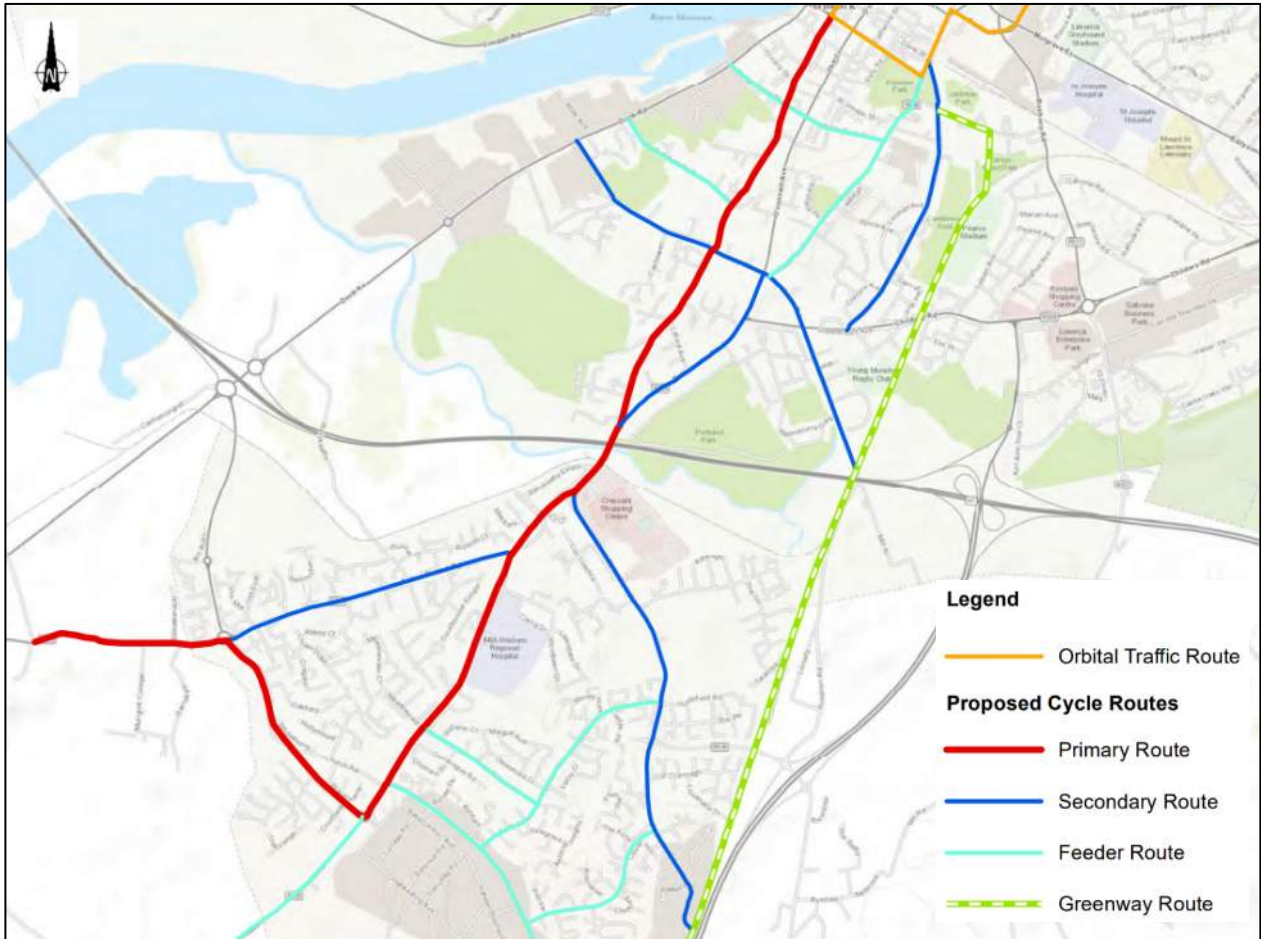


Figure 3-3: Excerpt from LMCNP Proposed Raheen Cycle Network

4 Design Option Assessment Methodology

4.1 Introduction

A Multi Criteria Analysis (MCA) was adopted to assess the design options for the proposed scheme.

The Department of Transport, Tourism and Sport issued guidelines on a Common Appraisal Framework (CAF) for Transport Projects and Programmes in 2016, and was updated in 2021, which outlines the criteria for carrying out an MCA. The criteria are measures of performance by which the different options for the scheme are judged. The criteria of the CAF guidelines are as follows:

1. Economy
2. Integration
3. Cycling Infrastructure
4. Accessibility and Social Inclusion
5. Safety
6. Environment
7. Physical Activity

4.2 MCA Criteria

The above criteria are explained in the following sections:

4.2.1 Economy

a. Capital Cost

The Project Approval Guidelines December 2020 puts the project within Band 2 (€0.5M-10m) for Capital Investment Projects.

A high-level cost appraisal was carried out by Edward Cotter Partnership (ECP) in accordance with NTA Cost Management Guidelines 2021, Option Comparison Cost Estimate, in order to determine the ranking of different options assessed for each section of the route.

4.2.2 Integration

a. Land Use Policy

This section reviews the extent to which each option is in accordance with planned development and provide economic opportunities. The level of compliance of the proposed options with Local Area Plans, masterplans or specific objectives in the Limerick Development Plan was also assessed under this criterion.

b. Public Transport Network Integration

This criterion reviews the effect each option would have on the existing public transport network and it's potential to maximise public transport usage and reach.

c. Cycle Network Integration

The main route was largely defined as part of the brief and this criterion assesses particular cycling facilities per section to optimise integration of the network.

d. Pedestrian Network Integration

This criterion assesses the options for quality and continuity of pedestrian facilities.

e. **Traffic Network Integration**

A comparative assessment of the expected traffic impact on vehicles, HGVs and public transport of each option was undertaken based on professional judgement and an understanding of traffic conditions in the Study Area derived from traffic survey data.

4.2.3 **Cycle Infrastructure**

a. **Functionality**

The criterion proposes that a design that is fit for its purpose is safer. The functions are either movement or place related.

b. **Homogeneity**

This criterion specifies that reducing the relative speed, mass and directional difference of different road users sharing the same space increases safety.

c. **Legibility**

The principle of legibility is that a road environment is safer if all road users can read and understand it.

d. **Forgivingness**

The principle of forgiveness is that environments that contribute to benign outcomes of accidents are safer.

e. **Self-Awareness**

The principle of self-awareness is that where road users are aware of their own abilities and limitation to negotiate a road environment, the environment is safer.

4.2.4 **Accessibility and Social Inclusion**

a. **Deprived Geographic Areas**

This criterion assesses the impact the proposed facility will have on the area. All options explored (other than the “Do Nothing” scenario) relate to the provision of cycling facilities which will improve accessibility and social inclusion.

4.2.5 **Safety**

Safety is concerned with the impact of the investment on the number of transport related accidents.

a. **Pedestrian Safety:**

This criterion assesses the safety of pedestrians for each option. This is predominately concerned with footpath facilities and road crossings proposed for each option.

b. **Cycle Safety:**

This criterion assesses the safety of cyclists for each option. This is predominately concerned with the level of cycle segregation provided as well as the quality of that provision.

4.2.6 Environment

a. Flora & Fauna

This criterion assesses the impact on specific flora or fauna or on defined habitats should the construction, presence or the operation of transport infrastructure impact on this.

b. Soils, Geology & Hydrology:

This criterion assesses the impact of the options on soil and geology as a result of land-take and possible ground excavation.

c. Landscape & Visual:

This criterion assesses the potential to impact on townscape/streetscape quality.

d. Air Quality:

Provision of traffic and bus infrastructure has the potential to impact on both the air quality and noise environment.

e. Land Use Character:

This criterion assesses each option in terms of the impact that the proposals have on the character of the street. This is assessed in terms of the relevant policies outlined for the area; for each option proposals to accommodate for sustainable travel modes.

4.2.7 Physical Activity

This criterion assesses the impact of the potential health benefits associated with each option. All options explored (other than the “Do Nothing” scenario) relate to the provision of cycling facilities which will improve physical activity.

4.3 Design Option Assessment Methodology

A Project Appraisal Balance Sheet (PABS) was used to summarise the impacts of the project based on the outputs of the quantitative and qualitative assessments carried out as part of the MCA. The expected impacts of the proposed works are summarised using PABS which aids in prioritising the options.

For each criterion reviewed, a five-point scale was used to compare the proposed design options. The scale ranges from having significant advantages to significant disadvantages over other scheme options as outlined in Table 4-1 below.

Table 4-1: Design Options Colour Coded Ranking Scale

Colour	Description
Green	Significant advantages over the other options
Light Green	Some advantages over other options
Yellow	Neutral compared to other options
Orange	Some disadvantages over other options
Red	Significant disadvantages compared to other options

5 Design Options & MCA

5.1 Section 1 - Ballinacurra Road from Ballykeeffe Roundabout to SCR

Table 5-1: Section 1 Existing Conditions

Section 1 Existing Conditions	
Section Length	400m
Existing Speed Limit	50km/hr
AADT	24,000
Traffic Flow	Two-Way
Total Corridor Width	Typical 20.6m
Footpaths	Approximately 3m wide either side
Cyclist Facilities	1 x outbound at grade cycle track (2m) with chevron painting (0-2m wide) dividing cyclists from the traffic. The outbound cycle track ends just before a dedicated left turn lane into the Crescent Shopping Centre, refer to Figure 5 1.
Vehicular lanes	Typically, 3.3m wide
Additional Notes	<p>Designated inbound bus lane (3.6-3.8m wide) which begins after the northbound bus stop, yields to traffic turning onto SCR and then continues along Ballinacurra Road</p> <p>There are bus stops on both sides of Ballinacurra Road near the Ballykeeffe Roundabout.</p> <p>This section of Ballinacurra Road crosses the N18 at a steep gradient of approximately 5% on both approaches over a large bridge structure.</p>

This section extends from the bus stop on the northern arm of the Ballykeefe Roundabout to the junction with SCR. Ballykeeffe Roundabout is a three-arm, two lane entry roundabout with pedestrian crossings on both Ballinacurra Road and Dooradoyle Road. South of Ballykeeffe Roundabout, St Nessian's Road and Dooradoyle Road are also being considered for Active Travel upgrades including changes being proposed to Ballykeeffe Roundabout which will be fully coordinated with this project in due course. There is a distinct break point between the two projects at the bus stop upgrade on the northern arm of the Ballykeeffe Roundabout.

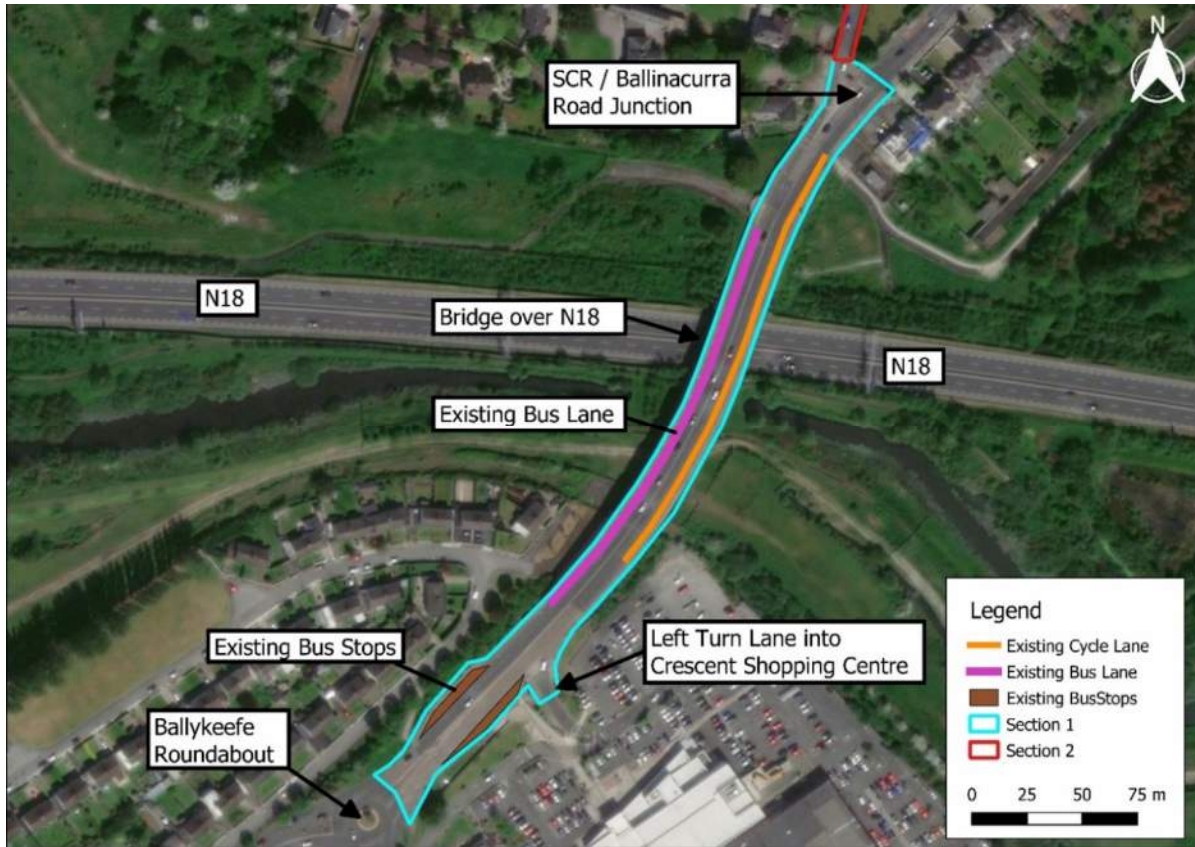


Figure 5-1: Section 1 Extents (Image Ref: <https://www.bing.com/maps>)

Section 1 - Do Nothing Scenario

No changes proposed to the pedestrian or cyclist environment in this scenario. The inbound cyclist shares the carriageway with the vehicular traffic. There is an outbound at grade cycle track provided over the N18, this track ends short of the 40m long left turn lane into the Crescent Shopping centre before the Ballykeefe Roundabout.

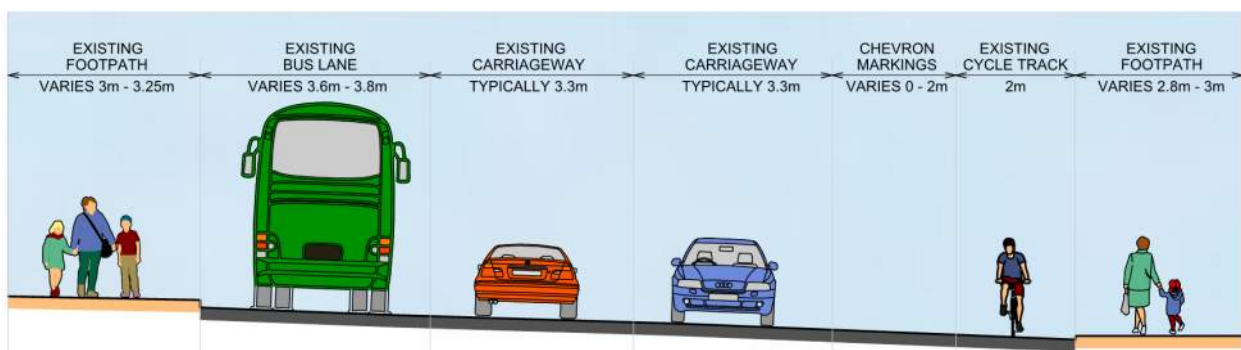


Figure 5-2: Typical Section 1 Do Nothing Scenario Cross Section Ballinacurra Rd

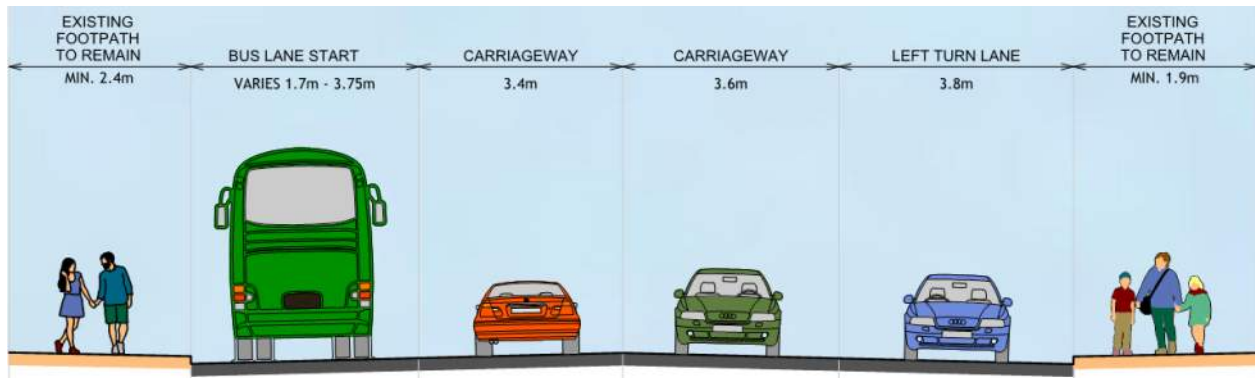


Figure 5-3: Section 1 Do Nothing Scenario Cross Section Ballinacurra Rd at Left Turn Lane into Crescent



Figure 5-4: Image of Existing At-Grade Cycle Track ending at left turn lane for Crescent Shopping Centre (© Google)

Section 1 - Option A - Two Way Cycle Track

This option involves removing the existing at grade cycle track on the south side of the road and shifting the bus and vehicular lanes southwards to allow space for the two-way cycle track on the northern side. The inbound cyclist will be catered for in the two-way track starting from the bus stop at the Ballykeefe Roundabout.

Ballinacurra Rd (city side of SCR junction) is identified as a secondary route and is currently a popular route for cyclists. Outbound Cyclists on this route will be accommodated by a crossing at the SCR/Ballinacurra Rd junction to allow them to use the two-way track. Connectivity with the Baggott Estate access can also be provided for at the SCR junction.

Table 5-2: Two-Way Cycle Track Width Calculator

Cycle Track Width Calculator			
A: Inside Edge	B: Cycling Regime	C: Outside Edge	D: Additional Features
Kerb	2 abreast + overtaking	Physical Barrier	Uphill
0.25	2.5m	0.5m	0.25m
Total Minimum Width: 3.5m			

The two-way cycle track in this option can be widened where the existing carriageway allows which assists the cyclist with the steep (max. 5%) gradients over the N18 bridge. Segregation will be achieved by the installation of a bolt down kerb over the bridge.

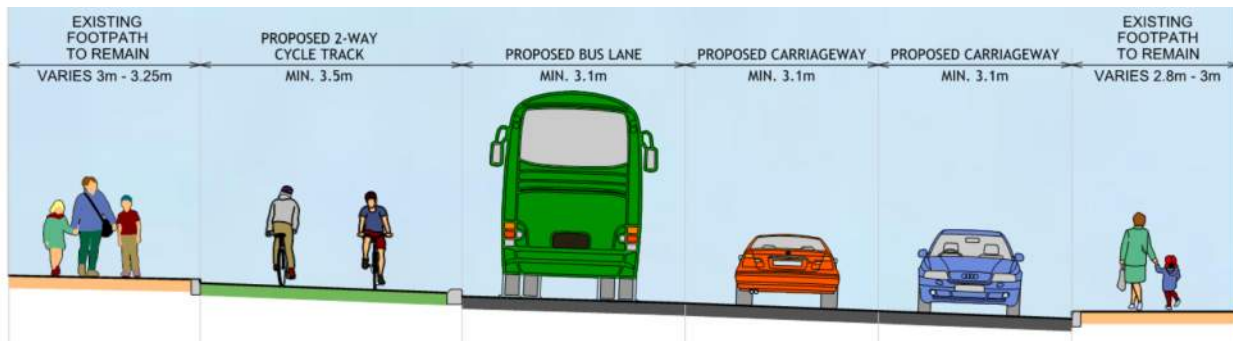


Figure 5-5: Typical Section 1 Option A Cross Section Ballinacurra Rd - Two Way Cycle Track with Bus Lane shifted & existing at grade cycle track removed

There is an existing left turn lane into the Crescent Shopping Centre which creates a long pinch point of approximately 40m which leaves 2.75m remaining available for the proposed two-way cycle track at the pinch point. The minimum basic 2-way cycle track can still be maintained at this section as shown in the table and figure below. Bollards will be provided at this pinch point for added protection of the cyclist.

Table 5-3: Two-Way Cycle Track Width Calculator at left turn lane

Cycle Track Width Calculator			
A: Inside Edge	B: Cycling Regime	C: Outside Edge	D: Additional Features
Kerb	Basic Two-way	Physical Barrier	Uphill
0.25	1.75m	0.5m	0.25m
Total Minimum Width: 2.75m			

The junction into the Crescent Shopping Centre will also be updated to a standard junction with DMURS compliant entry radii.

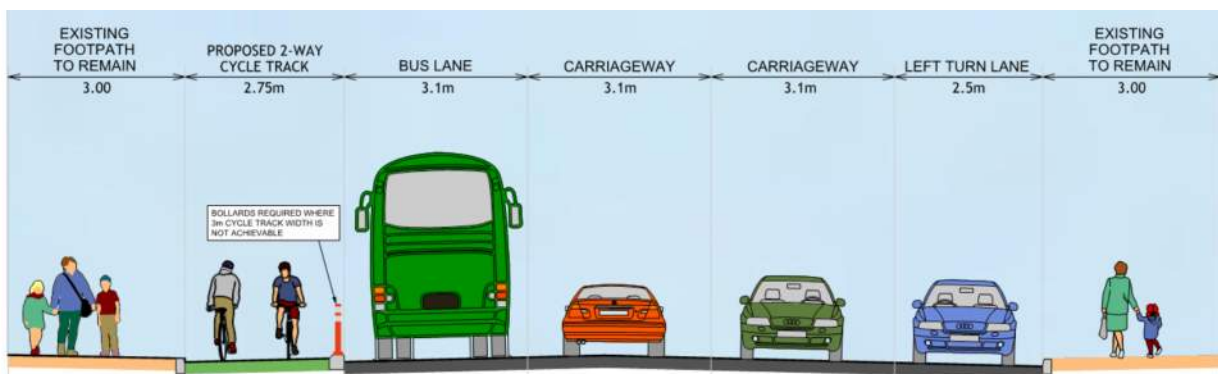


Figure 5-6: Section 1 Option A Cross Section Ballinacurra Rd - Two Way Cycle Track at Left Turn Lane into Crescent - reduced width of cycle track

Section 1 - Option B - Standard Cycle Tracks on both sides

Provide a new inbound cycle track on the Ballinacurra Road and maintain and extend the existing outbound at grade cycle track and existing footpaths. Segregation of the cyclist is achieved with a bolt down kerb. The bus lane can be maintained.

Table 5-4: Standard Cycle Tracks Width Calculator

Cycle Track Width Calculator			
A: Inside Edge	B: Cycling Regime	C: Outside Edge	D: Additional Features
Kerb	Single File	Physical Barrier	Uphill
0.25	0.75m	0.5m	0.25m
Total Minimum Width: 1.75m			

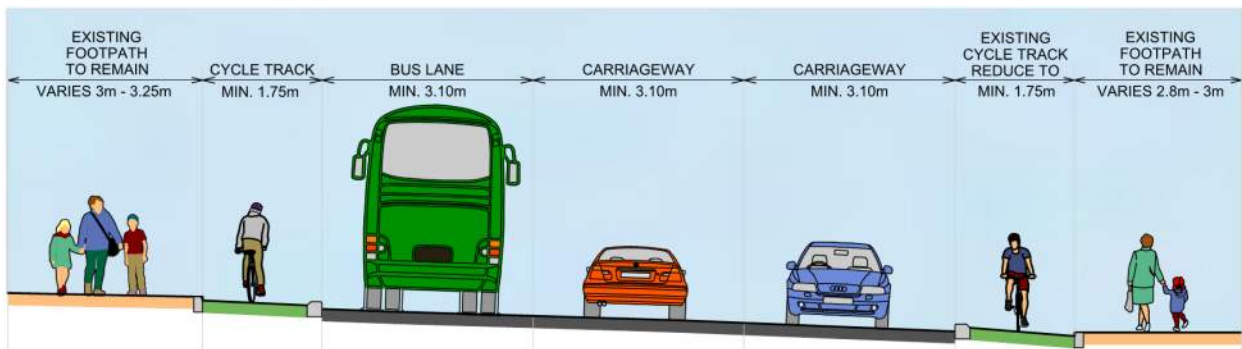


Figure 5-7: Typical Section 1 Option B Cross Section Ballinacurra Rd - Standard Cycle Tracks on both sides

There is an existing left turn lane into the Crescent Shopping Centre which creates a long pinch point of approximately 40m and if the 2 standard cycle tracks are provided on both sides to their NCM minimum width requirements then the left turn lane into the Crescent needs to be removed. See section below which shows the left turn lane maintained with only 2m remaining available for the start of the bus lane at the pinch point which is not acceptable for a primary bus route for the city.

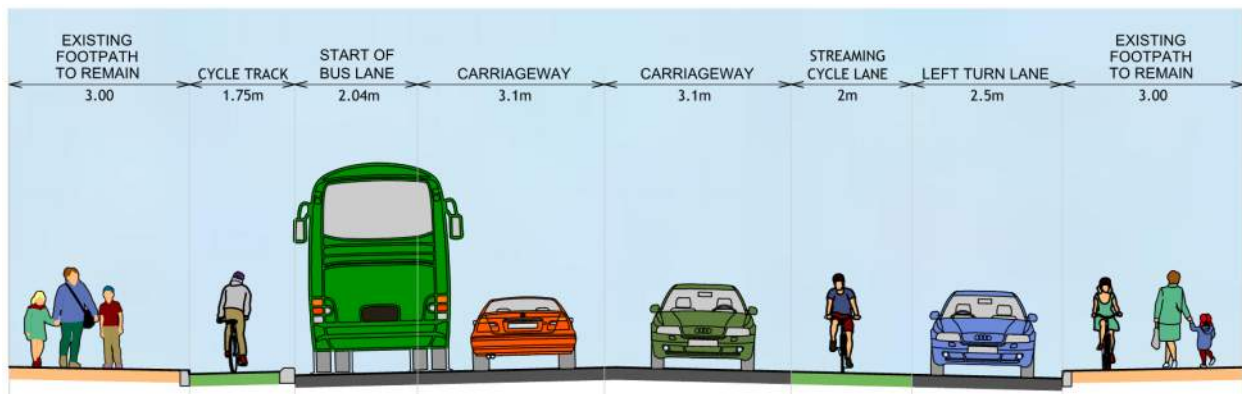


Figure 5-8: Section 1 Option B Cross Section Ballinacurra Rd - Standard Cycle Tracks on both sides at Pinch Point with Left Turn Lane into Crescent remaining - section not used

Therefore, it is concluded that this option requires the removal of the left turn lane into the Crescent. The corresponding section for this option remains as per Figure 5-9 above for the full length. The junction into the Crescent Shopping Centre would be updated to standard junction with DMURS compliant entry radii.

Section 1 - Option C - Shared Cyclist/Pedestrian Facility

Widening the existing footpaths to allow for cyclists to be segregated from the carriageway. Segregation of the pedestrian / cyclist could also be considered. All existing vehicular traffic lanes can be maintained. Alterations to footpaths and drainage on the bridge over the N18 would need to be approved by TII.

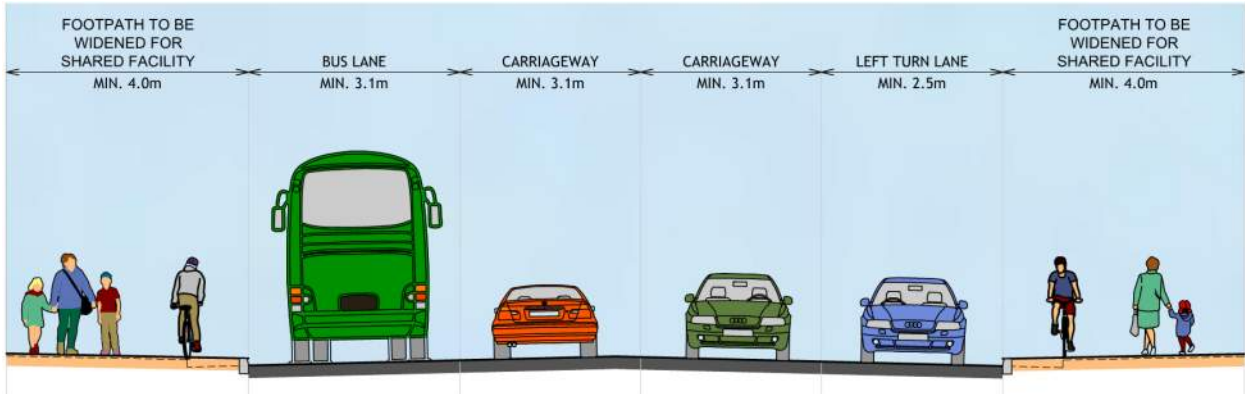


Figure 5-10: Typical Section 1 Option C Cross Section Ballinacurra Rd - Shared Facility at Left Turn Lane into Crescent

Other options considered for Section 1 but discounted:

Section 1 - Option D - Standard Cycle Lanes

Based on the NCM, Standard cycle lanes on road with no segregation are not suitable for AADT >10,000 and speeds >30km/hr.

5.1.1 Section 1 - Design Options MCA

Table 5-5: Section 1 MCA Summary

Assessment Criteria	Assessment Sub-Criteria	Do Nothing Scenario	Option A Two Way Cycle Track	Option B Standard Cycle Tracks	Option C Shared Ped/Cyclist Facility
1. Economy	1a. Capital Cost	Green	Orange	Orange	Red
2. Integration	2a. Land Use Policy	Orange	Green	Green	Green
	2b. Public Transport Network Integration	Yellow	Yellow	Yellow	Yellow
	2c. Cycle Network Integration	Orange	Green	Green	Green
	2d. Pedestrian Network Integration	Yellow	Yellow	Yellow	Yellow
	2e. Traffic Network Integration	Green	Green	Orange	Green
3. Cycle Infrastructure	3a. Functionality	Orange	Green	Green	Green
	3b. Homogeneity	Orange	Green	Green	Green
	3c. Legibility	Orange	Green	Green	Green
	3d. Forgivingness	Orange	Green	Green	Green
	3e. Self-Awareness	Orange	Green	Green	Green
4. Accessibility and Social Inclusion	3a. Deprived Geographic Areas	Orange	Green	Green	Green
5. Safety	4a. Pedestrian Safety	Green	Green	Green	Orange
	4b. Cycle Safety	Orange	Green	Green	Green
6. Environment	5a. Flora & Fauna	Yellow	Yellow	Yellow	Yellow
	5b. Soils, Geology & Hydrology	Yellow	Yellow	Yellow	Yellow
	5c. Landscape & Visual	Yellow	Yellow	Yellow	Yellow
	5d. Air Quality/ Noise & Vibration	Orange	Green	Green	Green
	5e. Land Use Character	Yellow	Yellow	Yellow	Yellow
7. Physical Activity	6a. Health Benefits	Orange	Green	Green	Green

Section 1 - Preferred Option

All Options score quite closely in the MCA, however **the two-way cycle track option (Option A)** is slightly better overall and is deemed the most suitable solution due to the results of the following sections of the MCA also concluding a two-way cycle track as preferred for the route.

5.2 Section 2 - SCR from Ballinacurra Road to Fennessy's Roundabout

Table 5-6: Section 2 Existing Conditions

Section 2 Existing Conditions	
Section Length	850m
Existing Speed Limit	50km/hr; 85th Percentile: 46km/hr from 2022 surveys
AADT	4,400
Traffic Flow	Two-Way
Total Corridor Width	7.8-12.5m
Footpaths	Approximately 0.8-2.9m wide. Approximately 160m of the section has no footpath on the eastern side (near Fennessy's Roundabout)
Cyclist Facilities	None
Vehicular lanes	2.75-3.6m
Additional Notes	There are a number of speed ramps along the heavily residential area.

There is no designated parking on this section of SCR however residential overnight parking does occur regularly. The majority of the houses along this section also have private off-street parking available. The April 2022 parking survey found that the zone between Lifford Avenue and Fennessy's Roundabout is the most heavily used for overnight parking with approximately 11 vehicles parked overnight in this 300m zone. The area just south of Greenpark Avenue also had approximately 8 overnight parked vehicles during the survey.

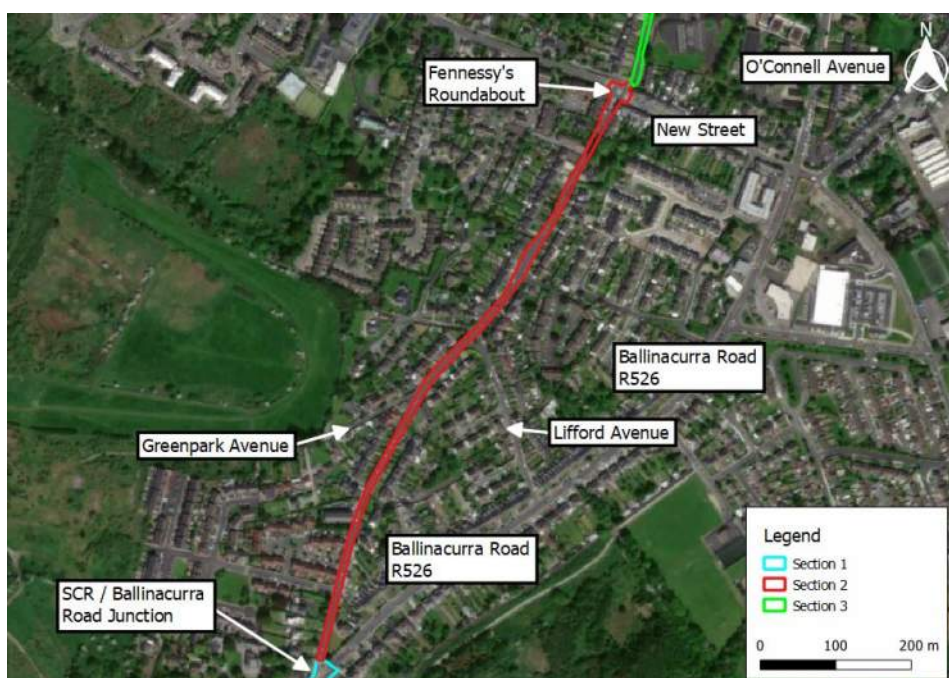


Figure 5-11: Section 2 Extents (Image Ref: <https://www.bing.com/maps>)

The results of the April 2022 speed survey for this section of the route are shown below in Figure 5-12.

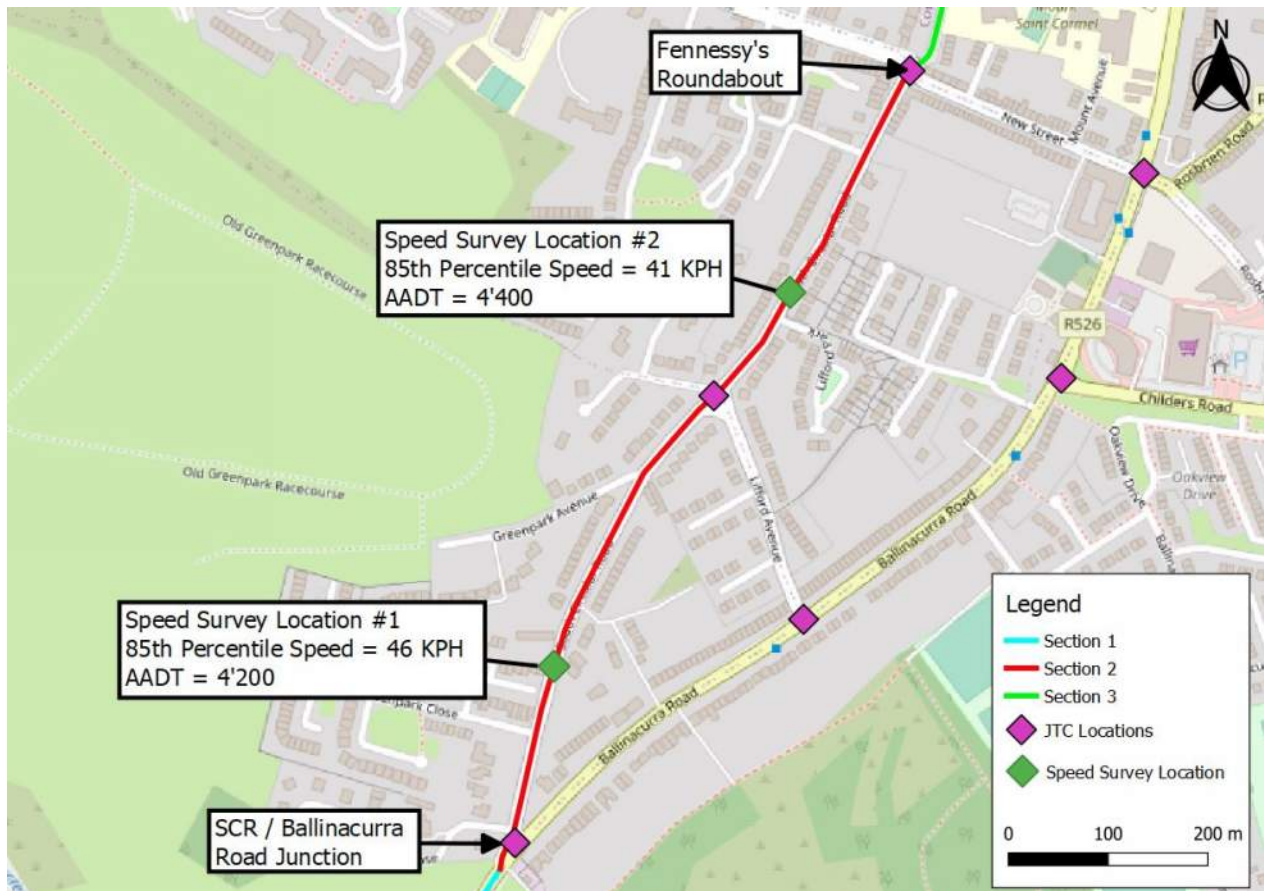


Figure 5-12: SCR Speed Survey April 2022 (Ref: <https://www.openstreetmap.org/copyright>)

Additionally, the speed survey carried out by Viacount II on SCR in September 2021 recorded 85th percentile speeds of 28km/hr in the same zone as shown above.

The above traffic and speed survey data results do not account for future baseline traffic growth on SCR. However, given the proposed pedestrian and cycle improvements along SCR and the proposed public transport improvements along Ballinacurra Road as part of the revised draft LSMATS, modal shift to sustainable transport modes will help offset future traffic growth. Additionally, recent residential planning approvals in the area (Greenpark) provide for pedestrian/cyclist access only onto SCR.

The formalisation of carriageway width and filtered permeability proposals set out in the options below would also act as measures to further reduce the “actual speed” of traffic along Section 2. This would further increase safety for cyclists and also increase the traffic volume threshold as per the NCM. The above comments in relation to future traffic growth are an observation highlighting that in a worst-case scenario, all proposals set out in this section are still conservative in nature.

Filtered Permeability Discussion

SCR is residential in nature on this Section 2 and is often considered a ‘rat run’ for traffic accessing the city as an alternative route to Ballinacurra Road. The Origin Destination traffic survey conducted in April 2022 confirmed that approximately 40% of the traffic on this section of SCR throughout the day was just passing through the area. This indicates that alternative routes such as Ballinacurra Road could have been used by these vehicles and shows there is an opportunity to reduce the traffic volumes further in this section. With existing AADTs of 4,400 in this section there is the potential to reduce the AADT on this section to approximately 2,640 which would be a much more attractive cycling environment.

In order to reduce traffic volumes on this residential section of the road the option of making the entire SCR a one-way vehicular road was initially considered. However, due to the number of residential properties requiring access via SCR it was considered difficult to achieve.

Instead, the option of reducing traffic volumes on SCR between Fennessy’s Roundabout and Lifford Avenue/Lifford Gardens was considered appropriate to implement. Where filtered permeability is proposed as an option on this section, it is proposed to restrict vehicular access to Fennessy’s Roundabout via SCR at Lifford Avenue. This will involve the provision of planter boxes along the centre line for approximately 15m and additional signage on SCR. The planter boxes will stop vehicular traffic continuing or turning onto SCR towards Fennessy’s Roundabout but will allow cyclists with an opening of 1.5m, refer to Figure below.

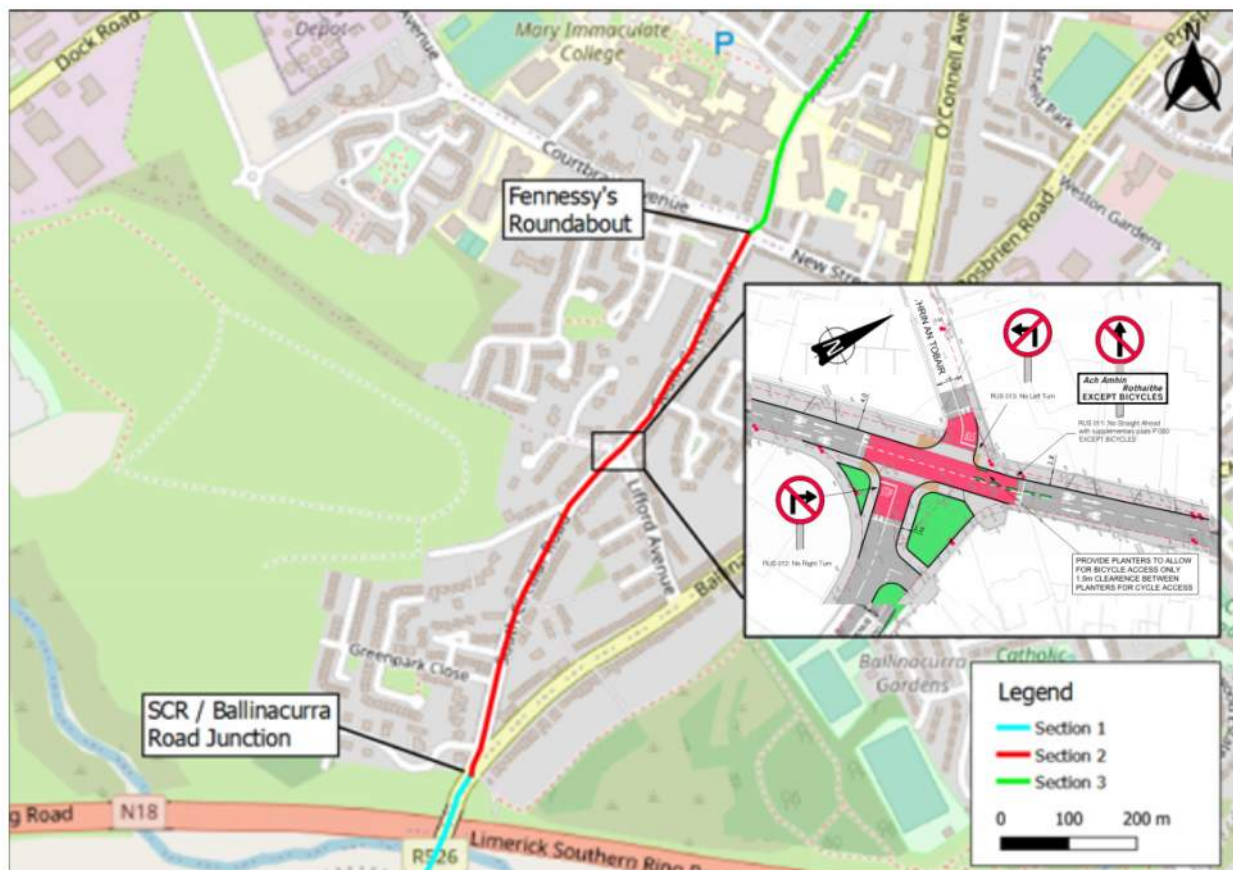


Figure 5-13: Filtered Permeability Proposed Location (Ref: <https://www.openstreetmap.org/copyright>)

Filtered permeability has been assessed under the options considered for the MCA in this Section.

If implemented, filtered permeability will require monitoring. Periodic traffic surveys will be conducted to monitor traffic volumes to assess whether predictions are being met. Alternative proposals will be considered if traffic volumes are not acceptable.

Fennessy’s Roundabout

The NCM recommends segregation of cyclists at roundabouts where traffic volumes are greater than 6,000 vehicles per day. A traffic survey taken at Fennessy’s Roundabout in April 2022 showed approximately 10,000 PCUs at the junction throughout each day. The AM Peak occurred at 08:00-09:00 and the PM Peak occurred at 17:00-18:00, refer to Figure 5-14. The SCR traffic represents approximately 40% of the junction traffic. Cyclists are predominantly using SCR on this route, refer to Figure 5-15.

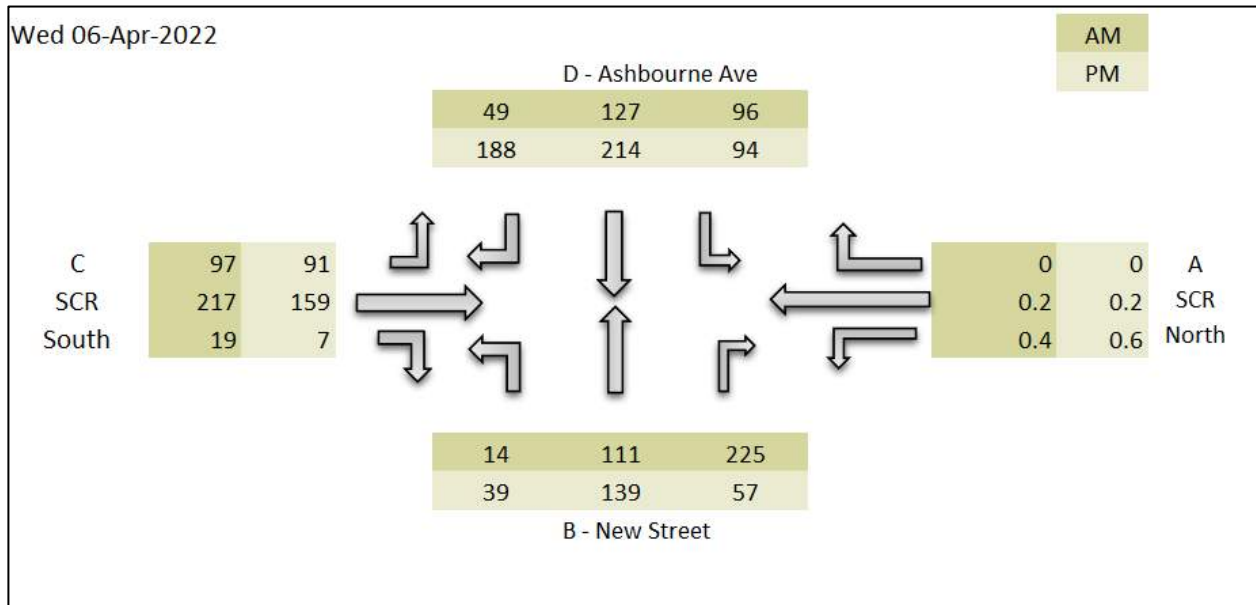


Figure 5-14: Peak Hour Traffic flows at Fennessy’s Roundabout on 6th April 2022

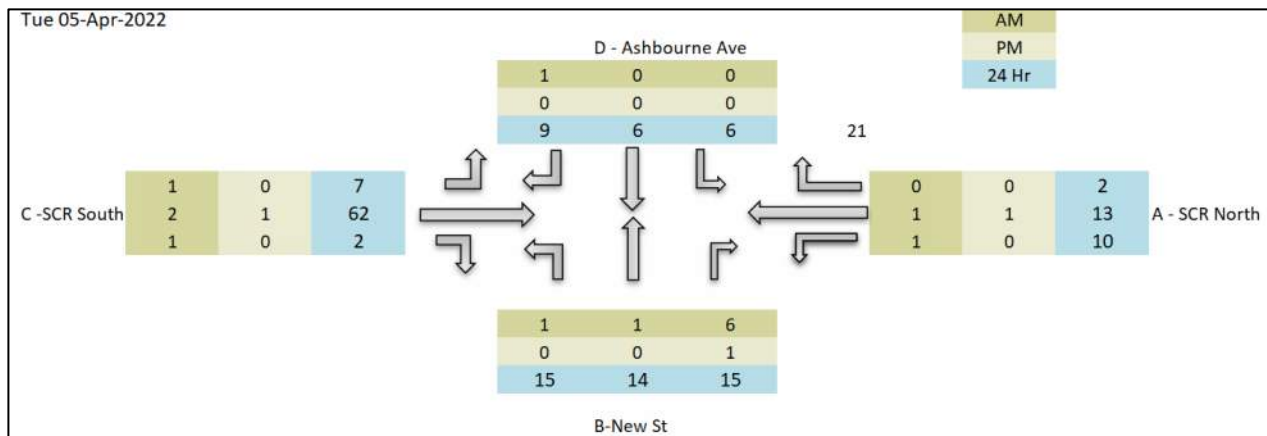


Figure 5-15: Cyclist Movements at Fennessy’s Roundabout on 5th April 2022

Given the high AADTs experienced on the existing roundabout, segregation of the cyclist from the roundabout in accordance with the NCM was considered. However, it is not possible to segregate the cyclist fully and maintain a roundabout configuration due to the existing building constraints at the corner of New St and SCR.

Options A-C include for upgrading Fennessy’s Roundabout to a signal-controlled junction. The configuration of the signal-controlled junction is different for each option and is shown under each option heading. As allowed for in Section 2.17 of DN-GEO-03044, a departure from the standard design of the stop line on New St is required for the signalisation of Fennessy’s Roundabout junction in all options in order to improve the loss of intervisibility from New St as indicated in the design images shown.

Section 2 - Do Nothing Scenario

No changes proposed to the pedestrian or cyclist environment in this scenario. The cyclist shares the carriageway with the vehicular traffic. Existing footpaths are below 1.8m width in many locations. No upgrades proposed to Fennessy's Roundabout.

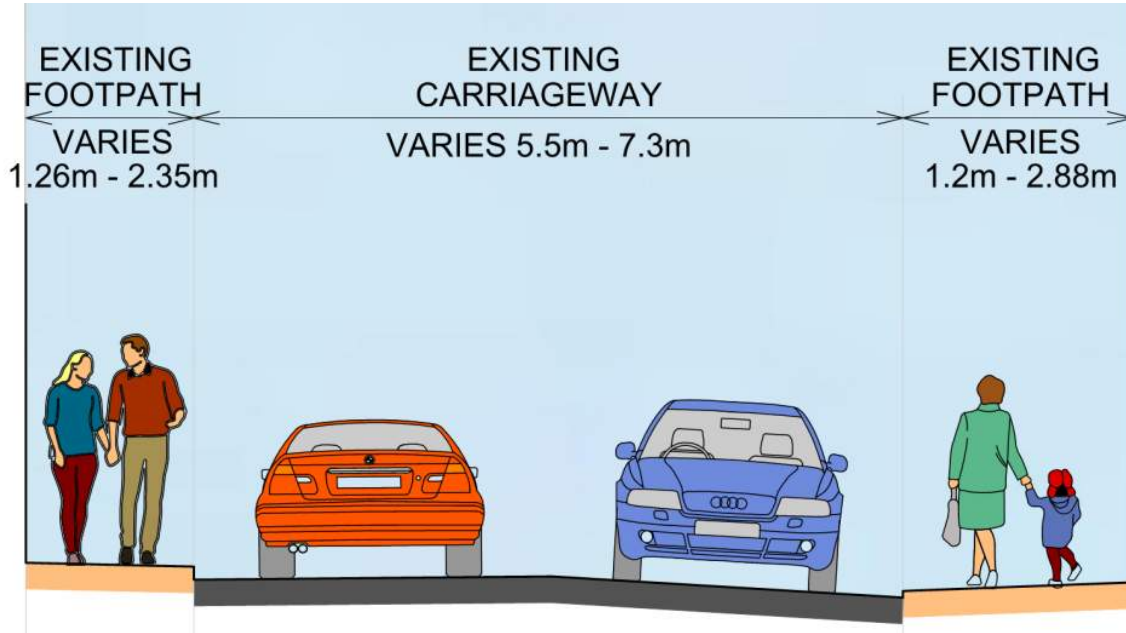


Figure 5-16: Typical Section 2 Do Nothing Scenario Cross Section South Circular Rd

Section 2 - Do Minimum Scenario 1 - Shared Carriageway - Signage & Linemarking Only

This Do Minimum scenario involves providing additional signage and linemarking to highlight the cyclist within the shared carriageway as per the current scenario. No physical improvements to the carriageway geometry are proposed in this option therefore pedestrian facilities remain substandard in many locations. No upgrades proposed to Fennessy's Roundabout. The speed limit will be reduced to 30km/hr in this option.

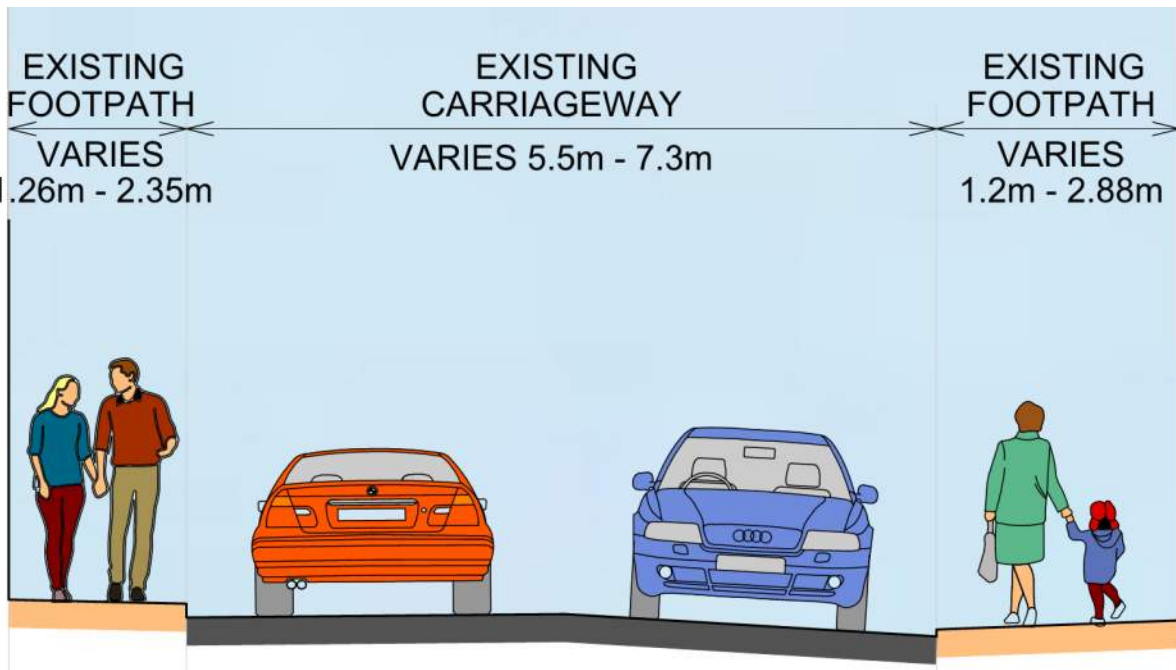


Figure 5-17: Typical Section 2 Do Minimum Scenario Cross Section South Circular Rd

Section 2 - Do Minimum Scenario 2 - Shared Carriageway - Signage & Linemarking & Filtered Permeability

As per Do Minimum Scenario 1 with no physical improvements to the carriageway geometry proposed in this option.

Filtered permeability of vehicular traffic between Lifford Avenue and Fennessy’s Roundabout is included for in this option assessed. As noted above, this will involve the installation of planter boxes and signage on SCR for ‘Local Access Only’. The planter boxes will stop vehicular traffic (but allow cyclists) continuing or turning onto SCR at Lifford Avenue towards Fennessy’s Roundabout.

Section 2 - Option A1 - Shared Carriageway - Traffic Calming

Option A1 plans to maintain existing two-way vehicular traffic and identify cyclists to share the main road carriageway. The cyclist will be expected to travel in the main vehicular carriageway. The existing carriageway will be reduced to 5m wide by widening the western footpath to provide traffic calming along this section of the route. As per section 4.3.1 of the NCM, a mixed/shared street is the ideal solution for a street less than 5.5m in width. The speed limit will be reduced to 30km/hr in this option.

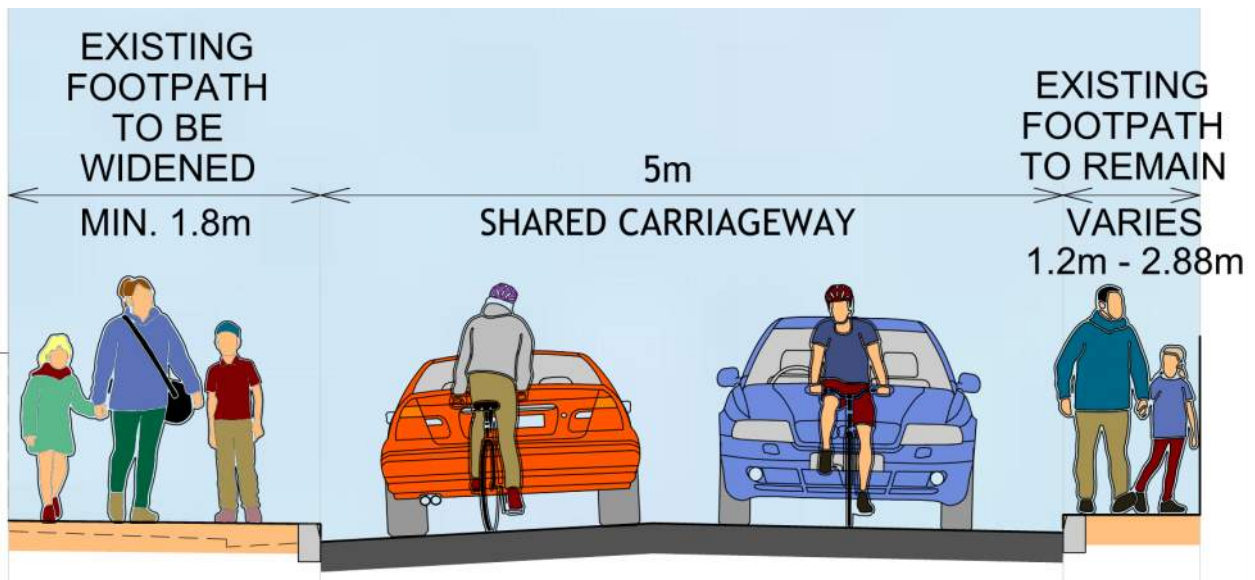


Figure 5-18: Typical Section 2 Option A1 & A2 Cross Section South Circular Rd - Do Minimum Shared Carriageway

Section 2 - Option A2 - Shared Carriageway - Traffic Calming & Filtered Permeability

Option A2 is similar to Option A1 but it also introduces a filtered permeability section as per the Do Minimum Scenario 2 discussed above in an effort to reduce vehicular traffic even lower than existing.

Upgrading of Fennessy’s Roundabout is included for in Options A1 & A2; refer to Figure below for proposed design of the signal-controlled junction for a shared carriageway.

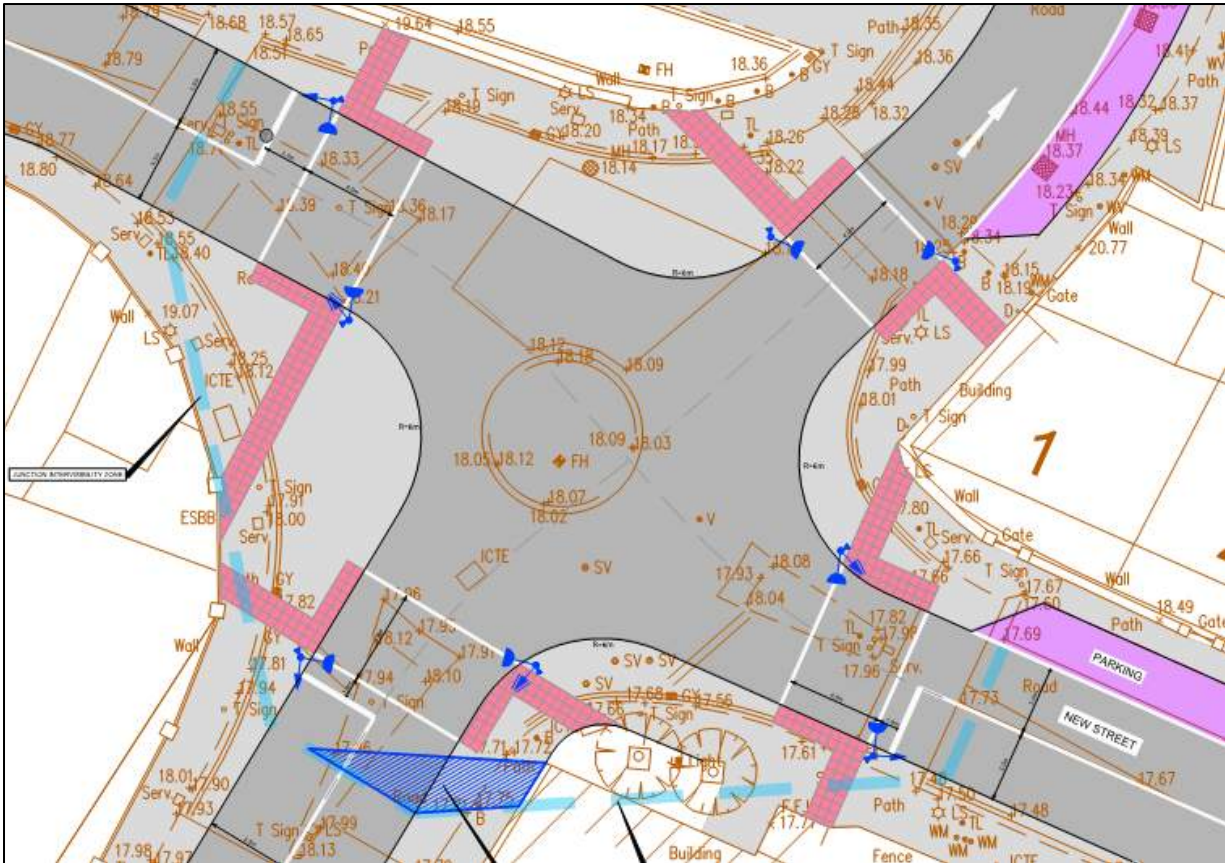


Figure 5-19: Proposed signalisation of Fennessy's Roundabout for Section 2 Option A1 & A2 Shared Carriageway

Section 2 - Option B1 - Two Way Cycle Track Entire Length

It is not possible to provide a two-cycle track and two-way vehicular traffic at any point along this section of SCR given the current cross-sectional extents between boundary walls. One-way traffic on SCR is required to facilitate a two-way cycle track in this section. The sketch provided below shows the implications of the traffic route changes required in the local area as a result of a one-way vehicular traffic system on the entire section for this option.

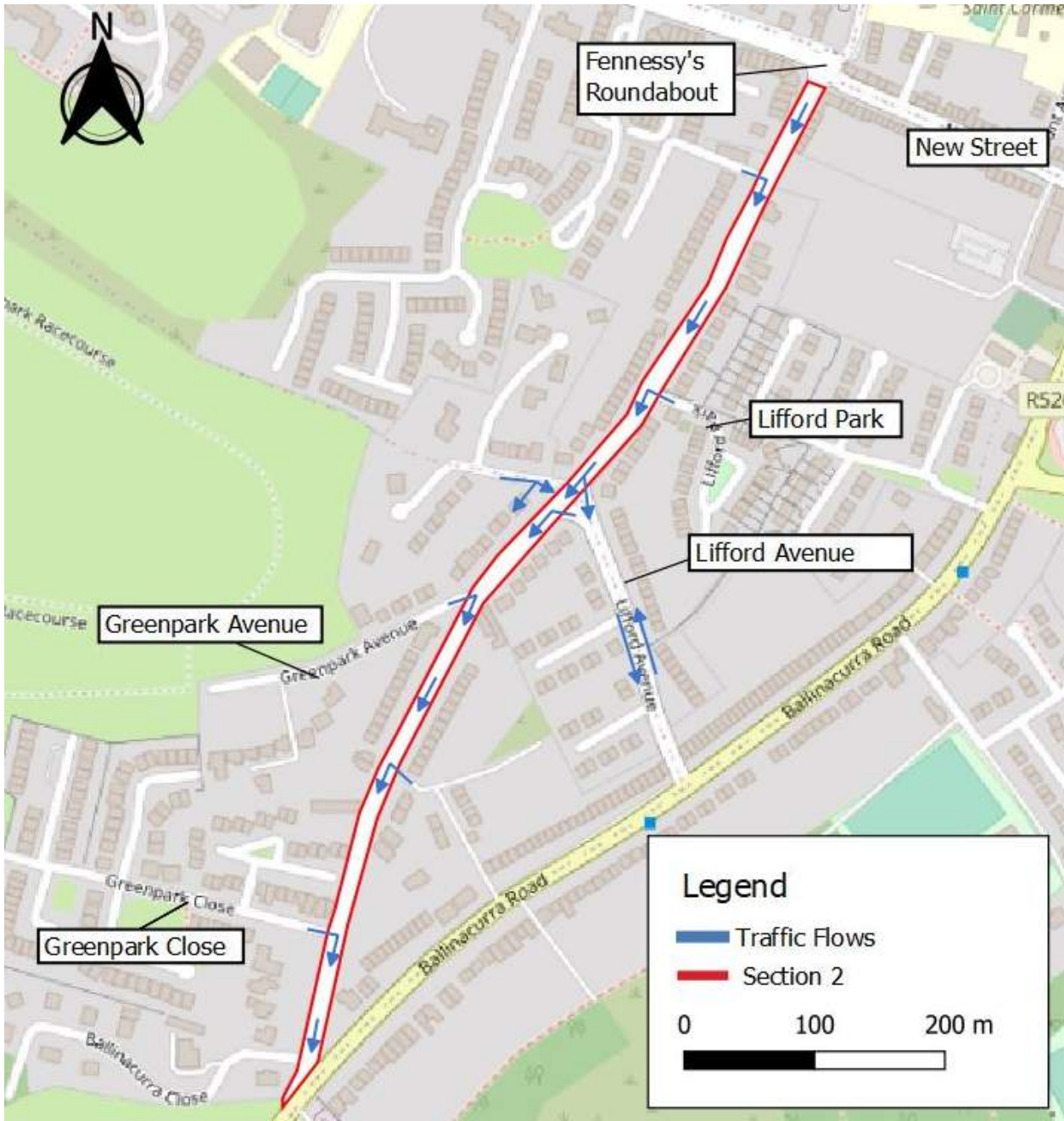


Figure 5-20: Section 2 One-Way Traffic Implications in Options B & C for entire section (Image Ref: <https://www.bing.com/maps>)

The 3m wide proposed two-way cycle track and a 2.75m wide one-way carriageway can fit in the pinch points of the existing carriageway width if no changes to the sub-standard width pedestrian facilities are made. Vertical segregation can be achieved in the new cross section to be provided.

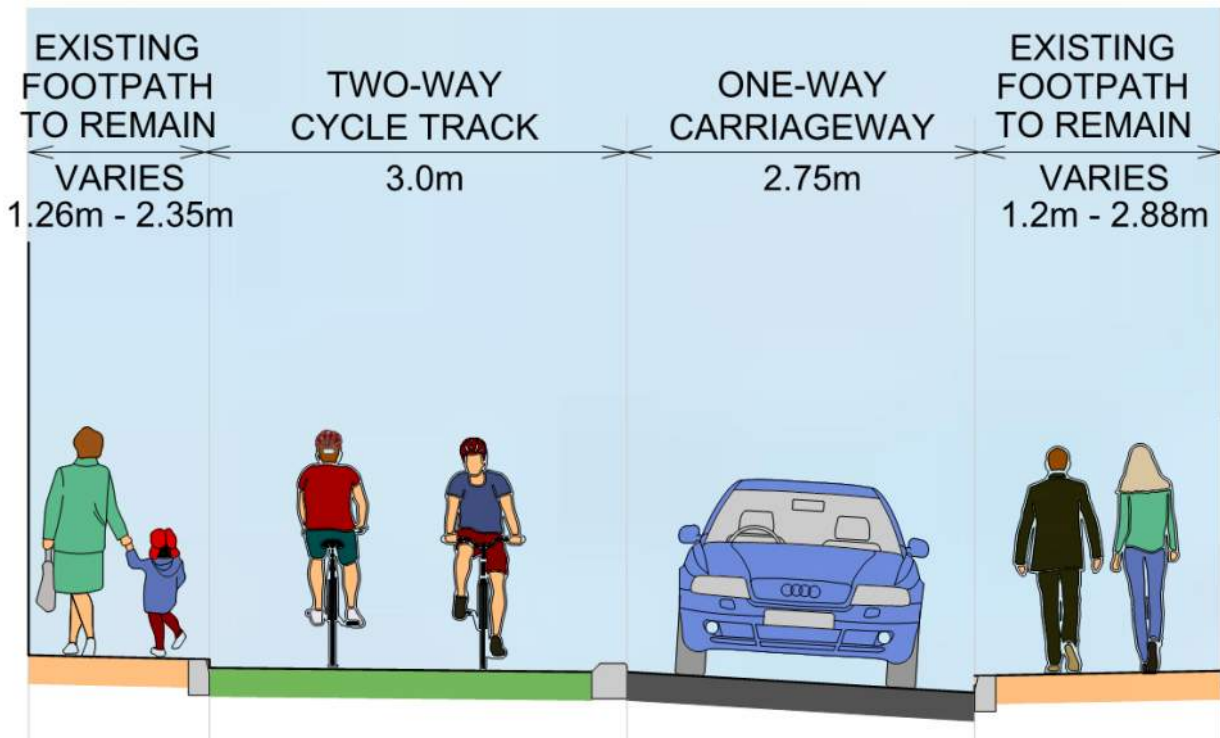


Figure 5-21: Typical Section 2 Option B Cross Section South Circular Rd - Two Way Cycle Track (at pinch point)

Additionally, the cycle track width would need to be reduced to 2.75m for a length of 80m between Lifford Avenue and Lifford Park due to a localised pinch point, refer to minimum width calculator below in accordance with NCM below to prove that this would still be acceptable.

Table 5-7: Two-Way Cycle Track Width Calculator

Cycle Track Width Calculator			
A: Inside Edge	B: Cycling Regime	C: Outside Edge	D: Additional Features
Kerb	Basic Two-way	Physical Barrier	N/A
0.25	1.75m	0.5m	N/A
Total Minimum Width: 2.5m			

Upgrading of Fennessy's Roundabout is included for in this option, refer to Figure below for proposed design of the signal-controlled junction for the Two-Way Cycle Track Option.

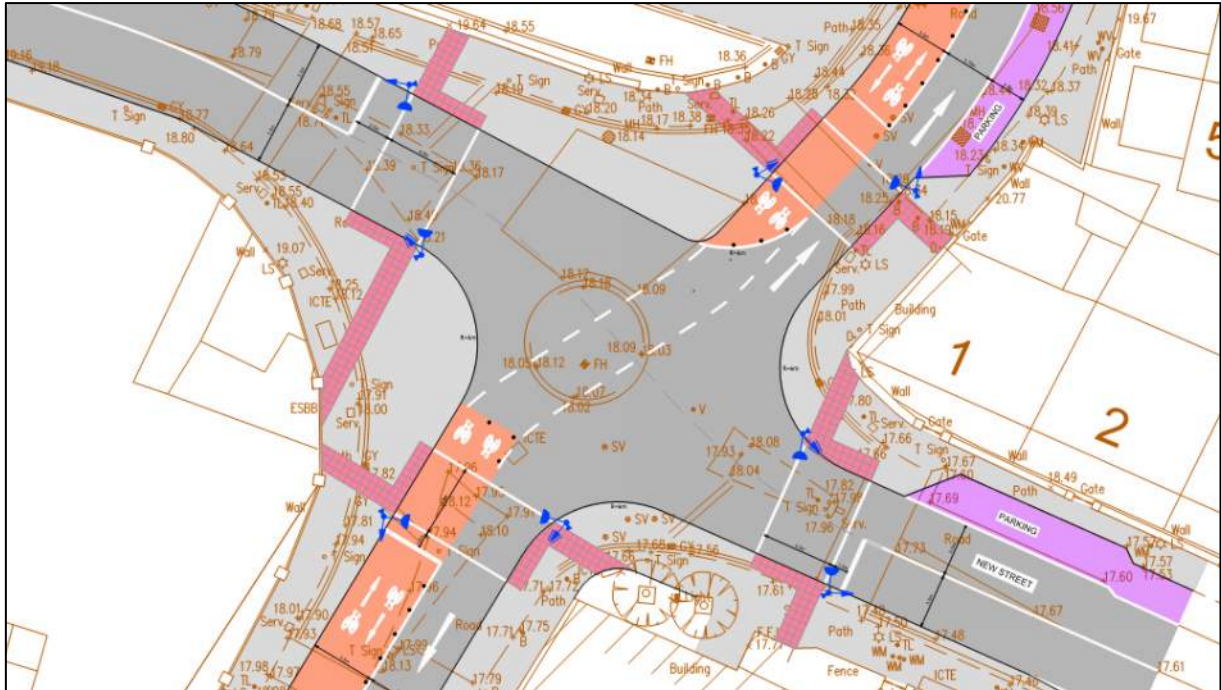


Figure 5-22: Proposed signalisation of Fennessy's Roundabout for Section 2 Option B1 & B2 Two-Way Track

Section 2 - Option B2 - Two Way Cycle Track between Lifford Avenue and Fennessy's Roundabout

Following review of the entire route as a one-way traffic option it was acknowledged that the benefit of the reduced traffic volumes could still be felt if the one-way vehicular traffic flow were only implemented for the section between Lifford Avenue and Fennessy's Roundabout as per the filtered permeability options discussed previously. The sketch provided below shows the implications of the traffic route changes required in the local area as a result of a two-way cycle track and one-way vehicular traffic system on the section between Lifford Avenue and Fennessy's Roundabout only for this option.

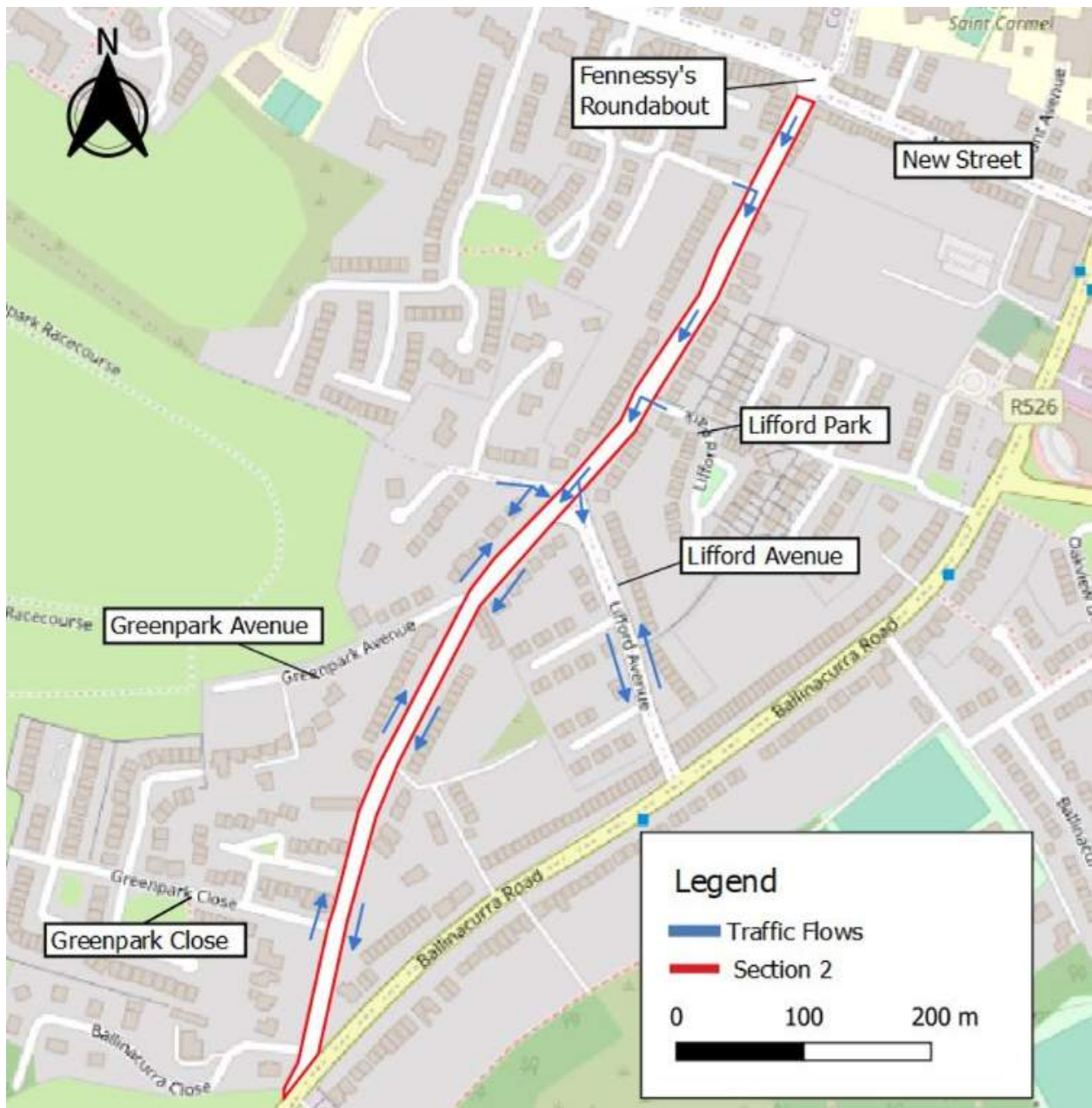


Figure 5-23: Section 2 One-Way Traffic Implications in Options B2 for section between Lifford Avenue and Fennessy's Roundabout (Image Ref: <https://www.bing.com/maps>)

A shared carriageway would be provided in the section between Ballinacurra Road and Lifford Avenue. This option has less of an impact on local residents regarding traffic flow changes and parking while still providing reduced traffic volumes for the shared carriageway section.

Section 2 - Option C - Contra Flow

It is not possible to provide a contra flow track and two-way vehicular traffic at many points along this section of SCR given the current cross-sectional extents between boundary walls. The one-way traffic implications discussed in Option B1 & B2 above are the same for this option. The cyclist in the outbound lane will be expected to travel with vehicular traffic. In this option, the footpaths can be widened as the Contra Flow track only needs to be 2.5m wide and the minimum 2.75m carriageway can be provided for the entire length. Vertical segregation can be achieved in the new cross section to be provided.

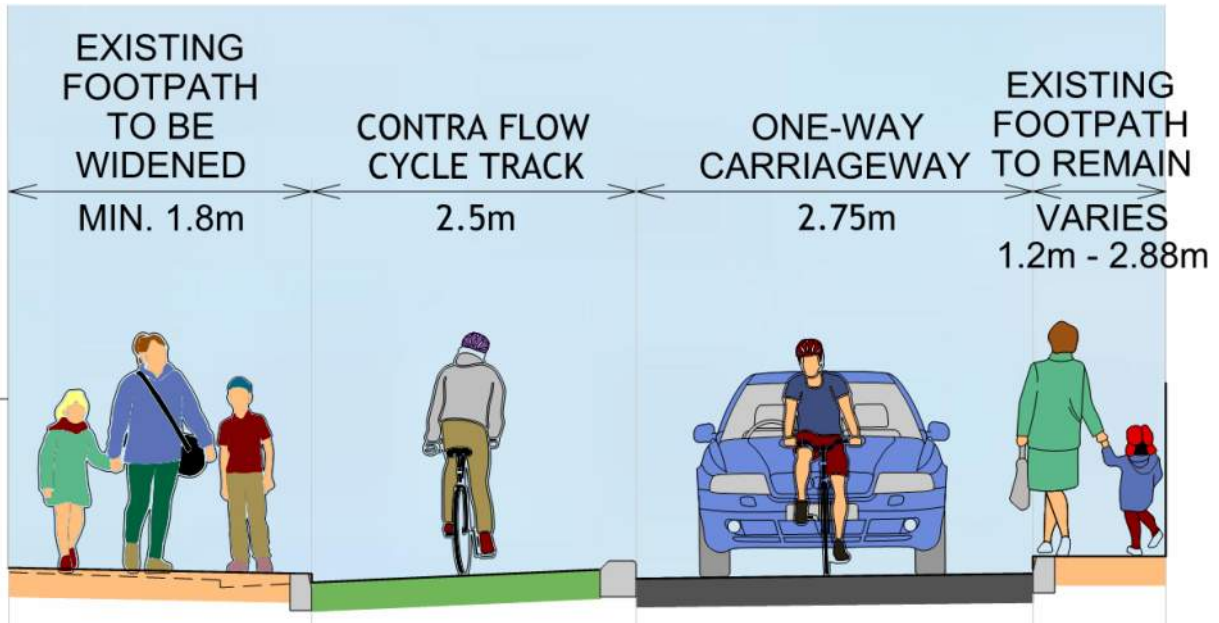


Figure 5-24: Typical Section 2 Option C Cross Section South Circular Rd - Contra Flow (at pinch point)

Upgrading of Fennessy’s Roundabout is included for in this option, refer to Figure below for proposed design of the signal-controlled junction for the Contra Flow Option.

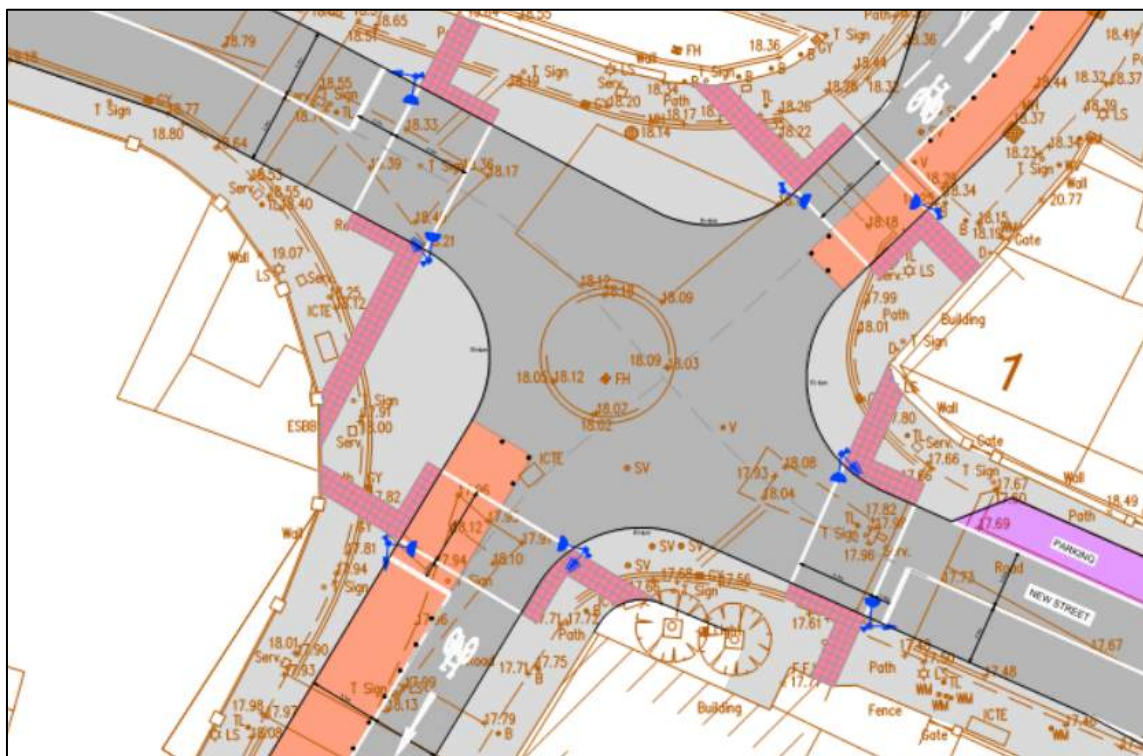


Figure 5-25: Proposed signalisation of Fennessy’s Roundabout for Section 2 Option C Contra Flow

5.2.1 Section 2 - Design Options MCA

Table 5-8: Section 2 MCA Summary

Assessment Criteria	Assessment Sub-Criteria	Do Nothing Scenario	Do Minimum Scenario 1 Signage & Linemarking Only	Do Minimum Scenario 2 Signage & Linemarking & Filtered Permeability	Option A1 Shared Carriage	Option A2 Shared Carriage with Filtered Permeability	Option B1 2-Way Cycle Track entire length	Option B2 2-Way Cycle Track from Lifford Ave.	Option C Contra Flow
1. Economy	1a. Capital Cost	Green	Orange	Orange	Red	Red	Red	Red	Red
2. Integration	2a. Land Use Policy	Orange	Orange	Orange	Green	Green	Green	Green	Green
	2b. Public Transport Network Integration	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow
	2c. Cycle Network Integration	Red	Red	Orange	Orange	Green	Green	Green	Green
	2d. Pedestrian Network Integration	Orange	Orange	Orange	Green	Green	Orange	Orange	Green
	2e. Traffic Network Integration	Green	Green	Green	Green	Green	Red	Orange	Red
3. Cycle Infrastructure	3a. Functionality	Orange	Orange	Orange	Orange	Green	Green	Green	Green
	3b. Homogeneity	Orange	Orange	Orange	Green	Green	Green	Green	Green
	3c. Legibility	Orange	Green	Green	Green	Green	Green	Green	Green
	3d. Forgivingness	Orange	Orange	Orange	Orange	Orange	Green	Green	Green
	3e. Self-Awareness	Orange	Green	Green	Green	Green	Green	Green	Green
4. Accessibility and Social Inclusion	3a. Deprived Geographic Areas	Orange	Orange	Orange	Green	Green	Green	Green	Green
5. Safety	4a. Pedestrian Safety	Orange	Orange	Orange	Green	Green	Orange	Green	Green
	4b. Cycle Safety	Orange	Orange	Orange	Green	Green	Green	Green	Green
6. Environment	5a. Flora & Fauna	Orange	Orange	Orange	Green	Green	Green	Green	Green
	5b. Soils, Geology & Hydrology	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow
	5c. Landscape & Visual	Orange	Orange	Orange	Green	Green	Green	Green	Green
	5d. Air Quality/ Noise & Vibration	Orange	Green	Green	Green	Green	Green	Green	Green
	5e. Land Use Character	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow
7. Physical Activity	6a. Health Benefits	Orange	Green	Green	Green	Green	Green	Green	Green

Section 2 - Preferred Option

The Do Minimum Scenarios do not give the desired outcome for a Primary Cycle Route.

Options A2 & B1 score equally best in the MCA. The implications for traffic route changes as a result of the two-way cycle track will be contentious to implement due to local access change requirements and loss of parking provision in the residential area therefore Option A2, the Shared Carriageway with Filtered Permeability, is considered the overall preferred option in this section. The filtered permeability has the opportunity, based on traffic surveys, to reduce the AADTS on this section of the route by approximately 40% and therefore be an effective solution that would be considered more attractive to local residents.

Filtered permeability will require monitoring. Periodic traffic surveys will be conducted to monitor traffic volumes. Alternative proposals will be considered if traffic volumes are not acceptable.

5.3 Section 3 - SCR from Fennessy's Roundabout to Laurel Hill Avenue

Table 5-9: Section 3 Existing Conditions

Section 3 Existing Conditions	
Section Length	450m
Existing Speed Limit	50km/hr
AADT	3,500
Traffic Flow	One-Way inbound
Total Corridor Width	7.7-9.2m
Footpaths	Approximately 2m wide footpaths. There are some short sections of footpath that are 1.6m due to obstructions but generally the footpath widths are adequate as per DMURS. Approximately 130m of the section has no footpath on the eastern side (from Scoil Mathar De to Mary Immaculate).
Cyclist Facilities	None
Vehicular lanes	3.75-4m
Additional Notes	2m wide parking bays (48 No.) mostly on the western side of the majority of the section

Two pedestrian crossings are present on this stretch of road; the first is at Fennessy's Roundabout and the second is located outside Mary Immaculate College.

The gradient travelling northward to Summerville Avenue is uphill and it goes downhill from Summerville Avenue into the city.

There is existing two-hour paid parking on this section. The majority of the houses along this section also have private off-street parking available. The April 2022 parking survey found that the zone between Fennessy's Roundabout and Summerville Avenue was utilised mostly overnight with approximately 15 overnight parked vehicles utilising the 23 existing spaces closer to Fennessy's Roundabout. The spaces closer to Mary Immaculate College are used more so during the daytime hours and free during night-time hours. Parking between Summerville Avenue and Laurel Hill Avenue was almost consistent throughout the 48-hour survey with an average of 14 cars using the 25 existing spaces.

There is a bus stop at Mary Immaculate College, however this is served by the 735 bus only. The route of this bus is from Limerick Institution of Technology to Dublin Airport and runs four times daily between 8:55 and 14:55. There is an existing TFI Bike stand on Summerville Avenue at Mary Immaculate College.

Although this route is one-way inbound towards Henry Street, the April 2022 traffic survey shows a daily total of 33 cyclists (Wednesday 6th of April) travelling southbound towards Fennessy's roundabout. This highlights the importance of providing adequate two-way cycle infrastructure to facilitate the safe movement of outbound cyclists.



Figure 5-26: Section 3 Extents (Image Ref: <https://www.bing.com/maps>)

Section 3 - Do Nothing Scenario

No changes proposed to the pedestrian or cyclist environment in this scenario. The inbound cyclist shares the carriageway with the vehicular traffic and there is no provision for the outbound cyclist.

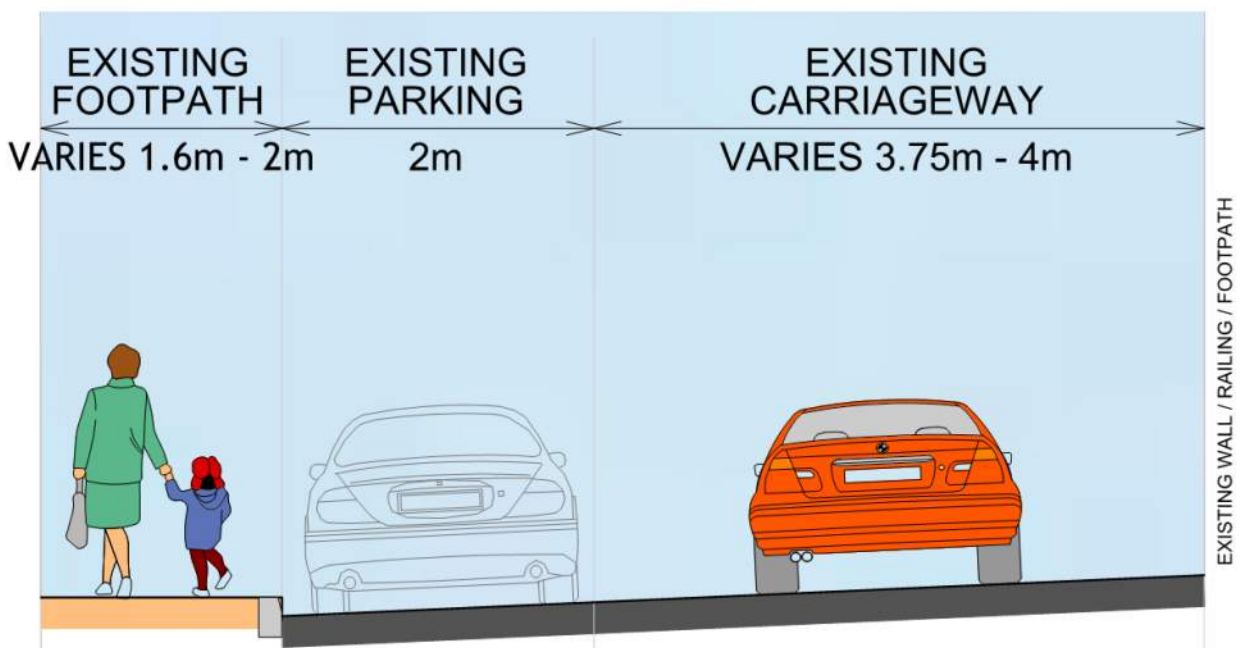


Figure 5-27: Typical Section 3 Do Nothing Scenario Cross Section SCR between Fennessy's Roundabout and Laurel Hill Avenue

Section 3 - Option A - Two-Way Cycle Track

A 3m wide two-way cycle track to be provided along the existing car parking lane and segregated from the existing one-way carriageway allows for cyclists to travel along this section of SCR without having to interact with vehicular travel. 43 existing parking spaces will be removed from this section in this option.

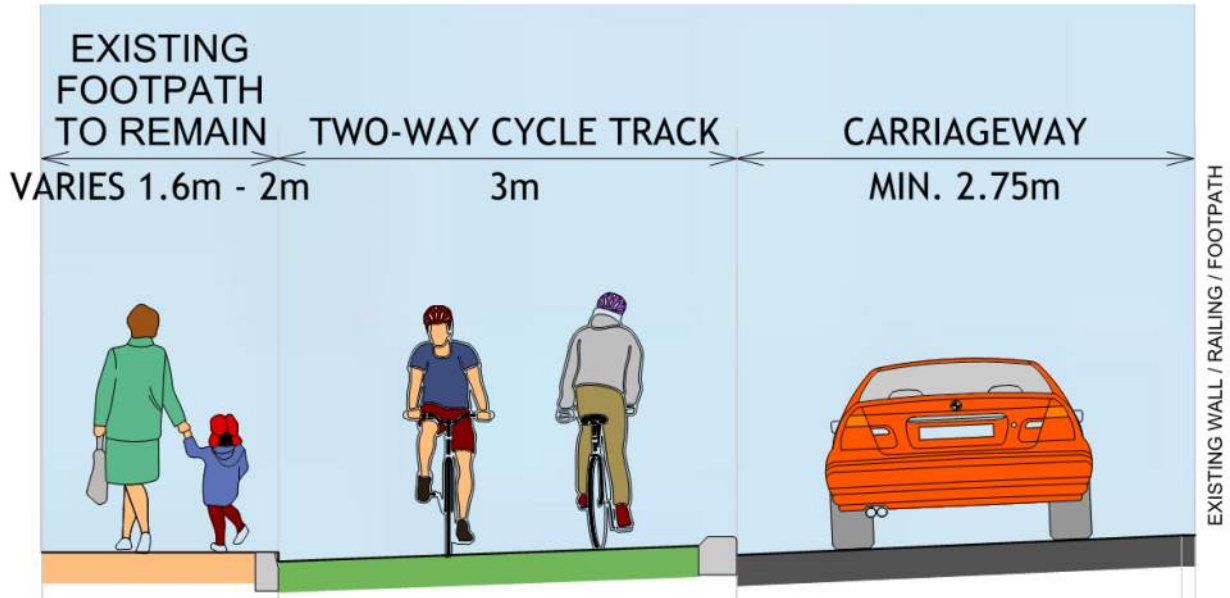


Figure 5-28: Typical Section 3 Option A Cross Section SCR - Two Way Cycle Track between Fennessy's Roundabout and Laurel Hill Ave

Section 3 - Option B - Contra Flow

A contra flow track to be provided on the existing one-way road for cyclists to travel outbound to Fennessy's Roundabout. The inbound cyclist will travel on the relocated carriageway with the vehicular traffic. 43 existing parking spaces will be removed from this section in this option.

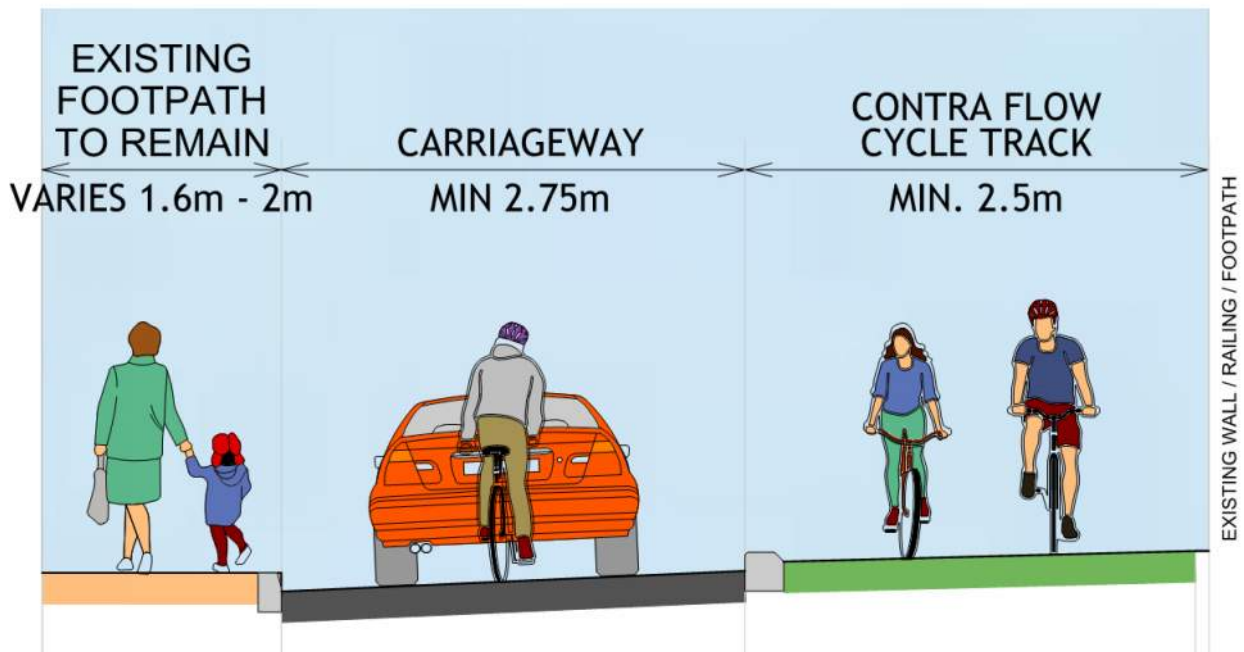


Figure 5-29: Typical Section 3 Option B Cross Section SCR - Contra Flow Cycle Track between Fennessy's Roundabout and Laurel Hill Ave

Other options considered for Section 3 but discounted:

Section 3 - Option C - Shared Carriageway

This option would maintain the existing scenario with additional cyclist signage. The option was discounted as the outbound cyclist would not be catered for in the one-way vehicular sections and on a primary cycle route this is not acceptable.

Section 3 - Option D - Standard Cycle Lane

One way cycle lanes in both directions were considered for this section but there is not adequate space available given the current cross-sectional extents between boundary walls.

5.3.1 Section 3 - Design Options MCA

Table 5-10: Section 3 MCA Summary

Assessment Criteria	Assessment Sub-Criteria	Do Nothing Scenario	Option A Two Way Cycle Track	Option B Contra Flow
1. Economy	1a. Capital Cost	Green	Orange	Orange
	2a. Land Use Policy	Orange	Green	Green
2. Integration	2b. Public Transport Network Integration	Yellow	Yellow	Yellow
	2c. Cycle Network Integration	Orange	Green	Green
	2d. Pedestrian Network Integration	Orange	Green	Green
	2e. Traffic Network Integration	Yellow	Yellow	Yellow
	3a. Functionality	Orange	Green	Green
3. Cycle Infrastructure	3b. Homogeneity	Orange	Green	Green
	3c. Legibility	Orange	Green	Green
	3d. Forgivingness	Orange	Green	Green
	3e. Self-Awareness	Orange	Green	Green
4. Accessibility and Social Inclusion	3a. Deprived Geographic Areas	Orange	Green	Green
5. Safety	4a. Pedestrian Safety	Orange	Green	Green
	4b. Cycle Safety	Orange	Green	Green
6. Environment	5a. Flora & Fauna	Orange	Green	Green
	5b. Soils, Geology & Hydrology	Yellow	Yellow	Yellow
	5c. Landscape & Visual	Orange	Green	Green
	5d. Air Quality/ Noise & Vibration	Orange	Green	Green
	5e. Land Use Character	Yellow	Yellow	Yellow
7. Physical Activity	6a. Health Benefits	Orange	Green	Green

Section 3 - Preferred Option

Based on the MCA shown above, Option A, the two-way cycle track is the overall preferred option in this section due to the increased safety provided for the fully segregated cyclist on this section where only one-way traffic is currently allowed.

5.4 Section 4 - SCR from Laurel Hill Avenue to Henry St

Table 5-11: Section 4 Existing Conditions

Section 4 Existing Conditions	
Section Length	250m
Existing Speed Limit	50km/hr
AADT	4,200
Traffic Flow	One-Way inbound
Total Corridor Width	9.4-13.4m
Footpaths	Approximately 1.8-2.5m wide footpaths. There are some short sections of footpath that are approximately 1.6m wide (and a very short section of only 750mm wide footpath on the eastern side near Laurel Hill Avenue) but generally the footpath widths are adequate as per DMURS.
Cyclist Facilities	None
Vehicular lanes	3.3-4.5m
Additional Notes	<p>3m wide right turn lane for Quin St access</p> <p>2m wide parking bays (20 No.) mostly on the western side of the Section. In the wider sections car parking is available on both sides of the road. This is considered the pinch point on the Section and was considered in detail for this Section.</p> <p>There are a number of existing speed ramps and the gradient is downhill travelling northward into the city.</p>

Parking between Laurel Hill Avenue and St Alphonsus St was almost consistent throughout the 48hour April parking survey with an average of 14 spaces being utilised including overnight.

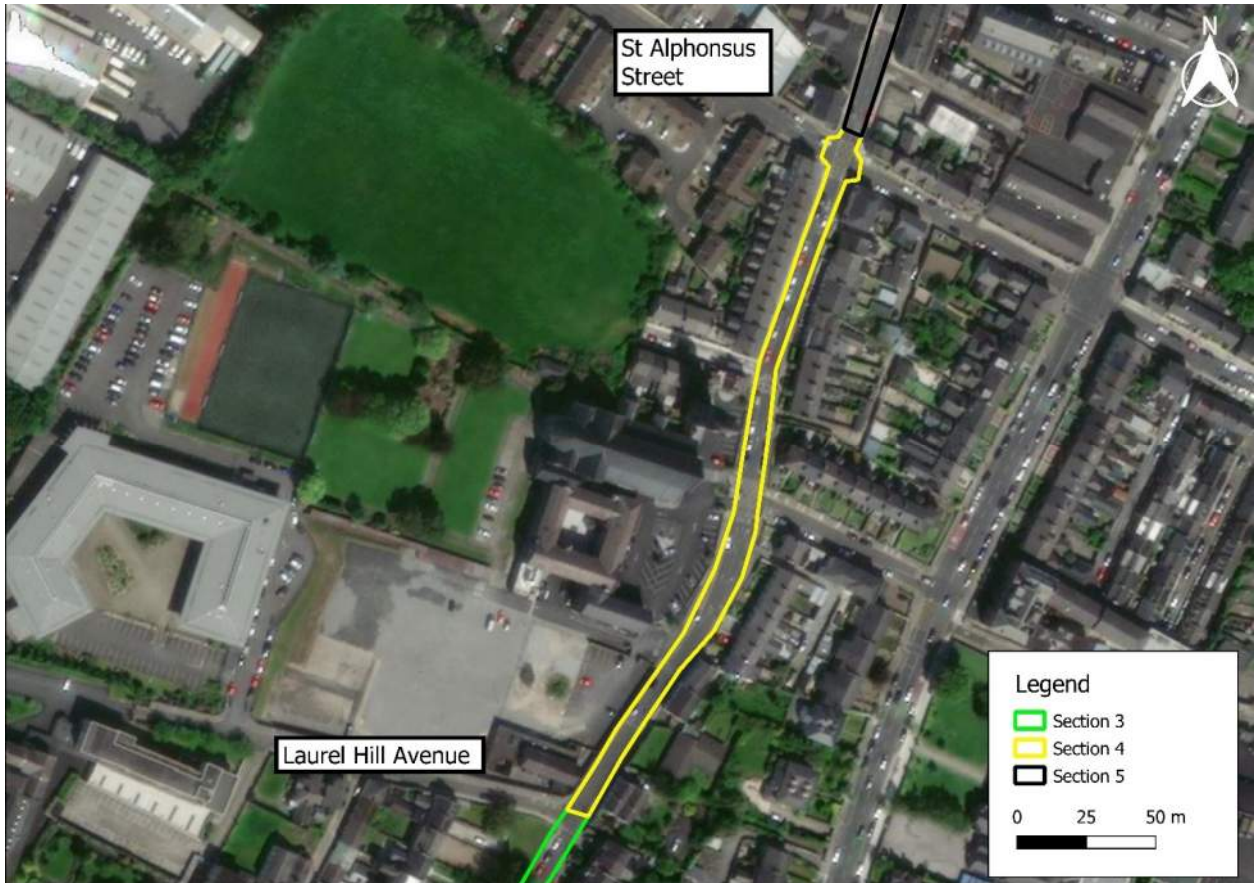


Figure 5-30: Section 4 Extents (Image Ref: <https://www.bing.com/maps>)

Between Laurel Hill Avenue and Quin St (approximately 130m) the carriageway widens out significantly to approximately 7m. The following sections assess the tightest carriageway width constraint.

Section 4 - Do Nothing Scenario

No changes proposed to the pedestrian or cyclist environment in this scenario. The inbound cyclist shares the carriageway with the vehicular traffic and there is no provision for the outbound cyclist.

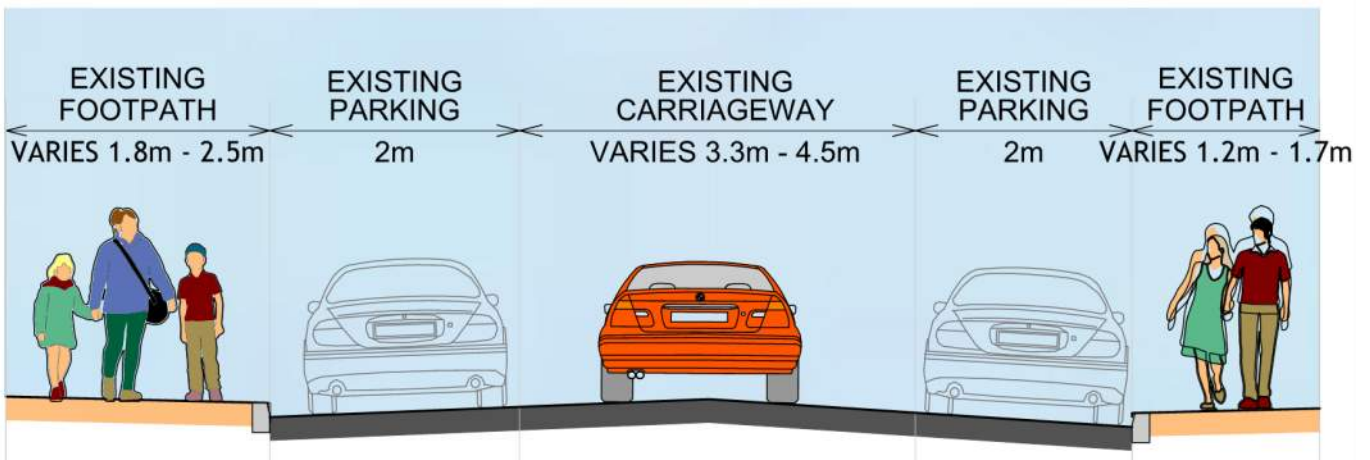


Figure 5-31: Typical Section 4 Do Nothing Scenario Cross Section SCR between Laurel Hill Avenue and Henry St

Section 4 - Option A - Two-Way Cycle Track

A 3m wide two-way cycle track to be provided along the western footpath and segregated from the existing one-way carriageway/parking allows for cyclists to travel along this section of SCR without having to interact with vehicular travel.

Table 5-12: Two-Way Cycle Track Width Calculator

Cycle Track Width Calculator			
A: Inside Edge	B: Cycling Regime	C: Outside Edge	D: Additional Features
Kerb	Basic Two-Way	Physical Barrier	Parked Cars
0.25	1.75m	0.5m	0.8m
Total Minimum Width: 2.5m + Parked Car hatching 0.8m			

Parking on the western side of the road will be lost as well as the right turn lane from SCR to Quin St. Minimum footpath widths are currently achieved on western side of road. The footpath on the other side will be widened where possible.

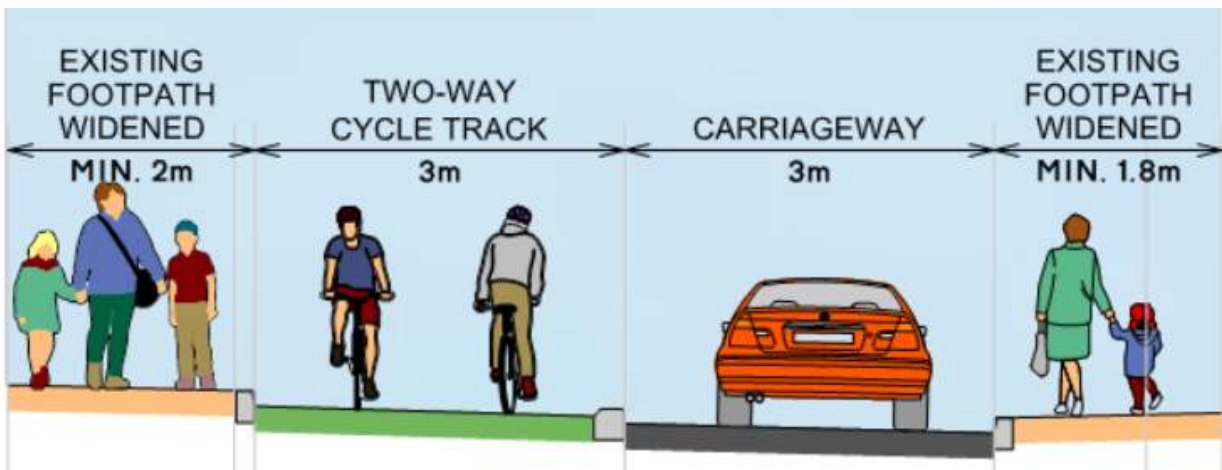


Figure 5-32: Typical Section 4 Option A Cross Section SCR - Two Way Cycle Track with parking between Laurel Hill Ave and Henry St

Section 4 - Option B - Contra Flow

A contra flow track to be provided on the existing one-way road for cyclists to travel outbound from Henry Street. The inbound cyclist will travel on the relocated carriageway with the vehicular traffic. Parking on the western side of the road will be lost as well as the right turn lane from SCR to Quin St. Some replacement parking can be provided in the upper wider section near Laurel Hill Avenue as per the cross section below. Minimum footpath widths are currently achieved on western side of road. The footpath on the other side which is much less frequently used is approximately 1.6m.

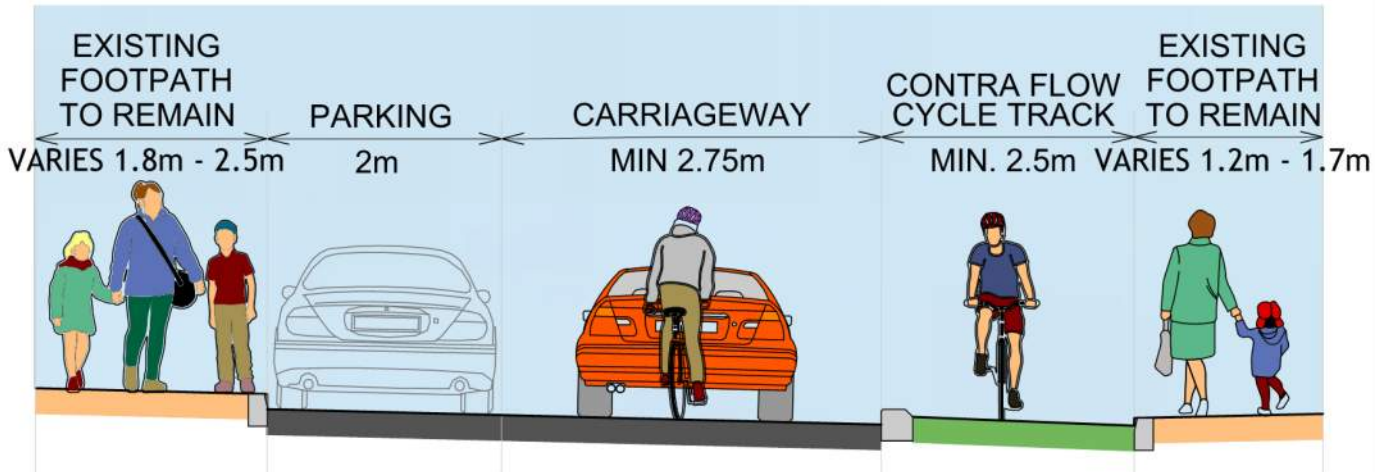


Figure 5-33: Typical Section 4 Option B Cross Section SCR - Contra Flow Cycle Track with parking between Laurel Hill Ave and Henry St

Other options considered for Section 4 but discounted:

Section 4 - Option C - Shared Carriageway

This option would maintain the existing scenario with additional cyclist signage. The option was discounted as the outbound cyclist would not be catered for in the one-way vehicular sections and on a primary cycle route this is not acceptable.

Section 4 - Option D - Standard Cycle Lane

One way cycle lanes in both directions were considered for this section but there is not adequate space available along the full length of this section given the current cross-sectional extents between boundary walls.

Additional Measures in Section 4:

In an extra effort to reduce vehicular traffic and possible conflict points on Section 4, the following measures are also proposed (and considered in the MCA) for all options explored:

1. Change Quin St to a one-way vehicular route from O’Connell St to South Circular Road. Additional parking can then be provided on Quin St.
2. Change Upper Henry St (between St Alphonsus St and Clontarf Place) to a one-way inbound vehicular route as a short extension to the one-way system on South Circular Road. St Gerald St becomes one-way between Henry St and O’Connell St.



Figure 5-34: Proposed Changes to Existing Traffic Flows (Ref: <https://www.openstreetmap.org/copyright>)

5.4.1 Section 4 - Design Options MCA

Table 5-13: Section 4 MCA Summary

Assessment Criteria	Assessment Sub-Criteria	Do Nothing Scenario	Option A Two Way Cycle Track	Option B Contra Flow
1. Economy	1a. Capital Cost	Green	Orange	Orange
2. Integration	2a. Land Use Policy	Orange	Green	Green
	2b. Public Transport Network Integration	Yellow	Yellow	Yellow
	2c. Cycle Network Integration	Orange	Green	Green
	2d. Pedestrian Network Integration	Orange	Green	Green
	2e. Traffic Network Integration	Yellow	Yellow	Yellow
3. Cycle Infrastructure	3a. Functionality	Orange	Green	Green
	3b. Homogeneity	Orange	Green	Green
	3c. Legibility	Orange	Dark Green	Green
	3d. Forgivingness	Orange	Dark Green	Green
	3e. Self-Awareness	Orange	Green	Green
4. Accessibility and Social Inclusion	3a. Deprived Geographic Areas	Orange	Green	Green
5. Safety	4a. Pedestrian Safety	Orange	Dark Green	Green
	4b. Cycle Safety	Orange	Dark Green	Green
6. Environment	5a. Flora & Fauna	Yellow	Yellow	Yellow
	5b. Soils, Geology & Hydrology	Yellow	Yellow	Yellow
	5c. Landscape & Visual	Orange	Green	Green
	5d. Air Quality/ Noise & Vibration	Orange	Green	Green
	5e. Land Use Character	Yellow	Yellow	Yellow
7. Physical Activity	6a. Health Benefits	Orange	Green	Green

Section 4 - Preferred Option

Based on the MCA shown above, Option A, the **two-way cycle track** is the overall preferred option in this section due to the increased safety provided for the fully segregated cyclist on this section where only one-way traffic is currently allowed.

5.5 Section 5 - Henry St from South Circular Road to Lower Mallow Street

Table 5-14: Section 5 Existing Conditions

Section 5 Existing Conditions	
Section Length	450m
Existing Speed Limit	50km/hr
AADT	6,400
Traffic Flow	Two-Way
Total Corridor Width	12.4-20.75m
Footpaths	Approximately 1.8m-5m wide footpaths either side.
Cyclist Facilities	None
Vehicular lanes	3.6-5.0m
Additional Notes	<p>2.1m wide parking bays (48 No.) on either side generally</p> <p>This area is less residential than the previous sections with more businesses located along the route.</p> <p>Lower Mallow St junction with Henry St is a busy signal-controlled junction.</p> <p>At the Lower Mallow Street junction travelling northwards, Henry Street becomes a three-lane one-way inbound route to the city.</p> <p>There are three pedestrian crossings along this section of the proposed route.</p> <p>This is not a bus route.</p>

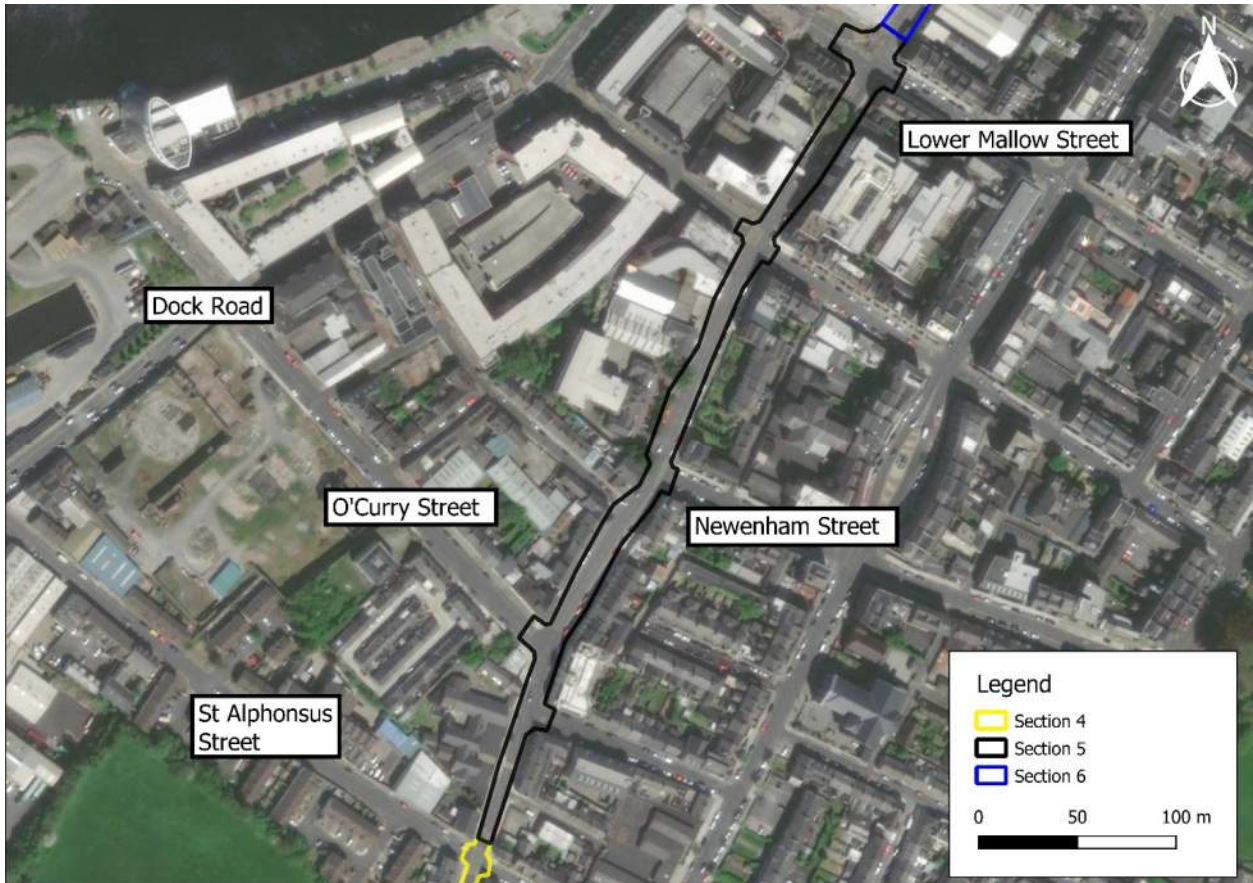


Figure 5-35: Section 5 Extents (Image Ref: <https://www.bing.com/maps>)

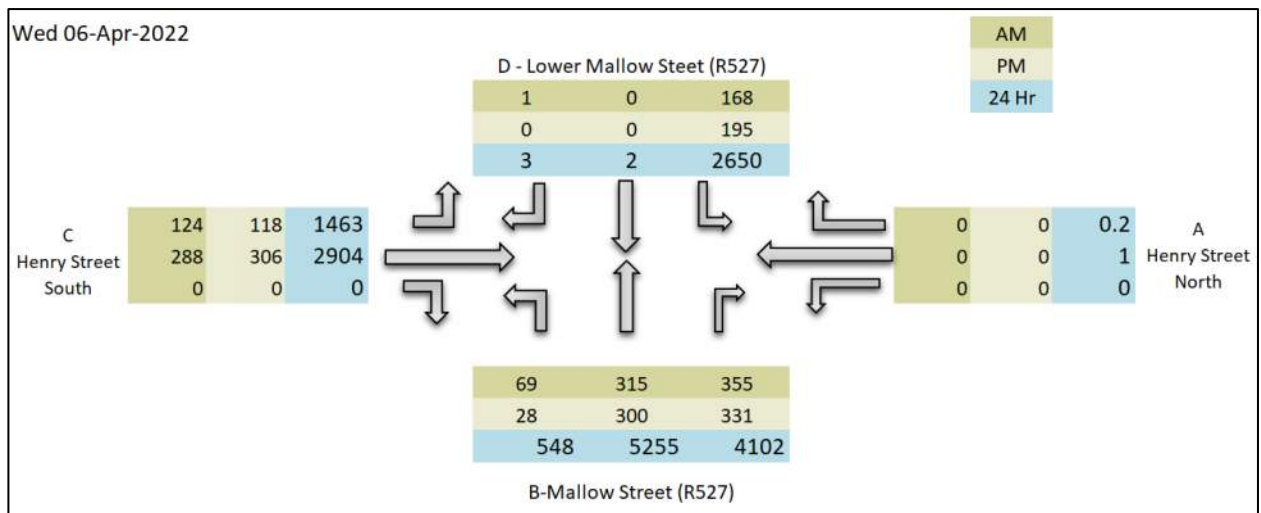


Figure 5-36: Peak Hour/24hour Traffic flows at Lower Mallow St/Henry St Junction on 6th April 2022

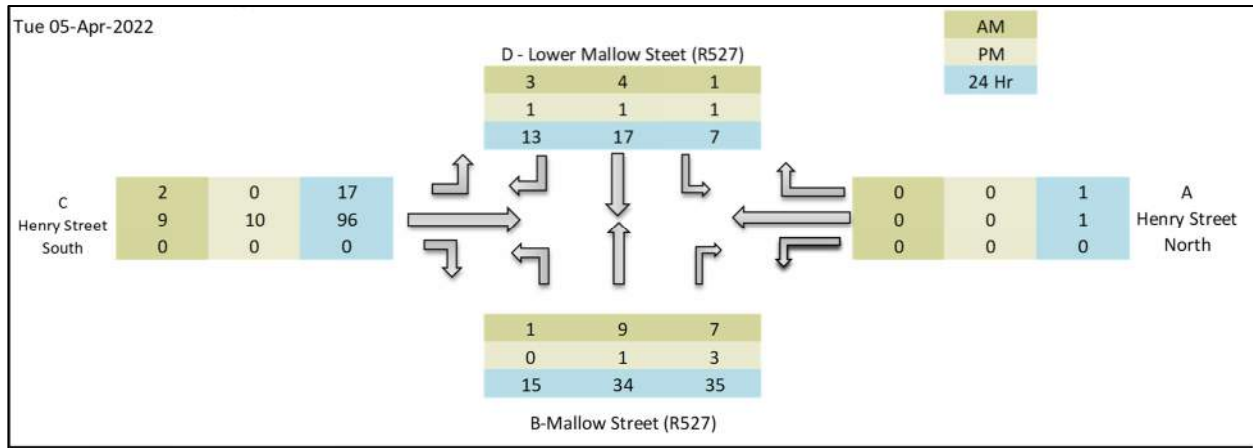


Figure 5-37: Peak Hour/24hour Cyclist Movements at Lower Mallow St/Henry St Junction on 5TH April 2022

Section 5 - Do Nothing Scenario

No changes proposed to the pedestrian or cyclist environment in this scenario. The cyclist shares the carriageway with the vehicular traffic.

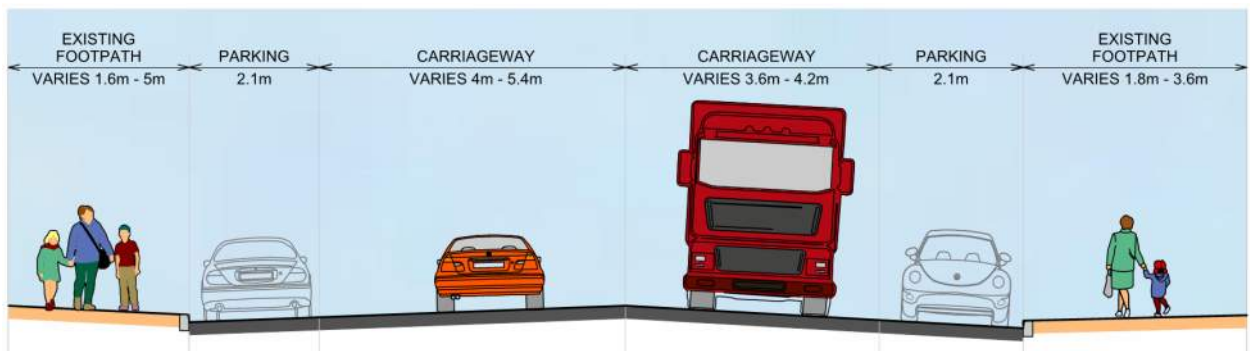


Figure 5-38: Typical Section 5 Do Nothing Scenario Henry St

Section 5 - Option A - Standard Cycle Tracks

Provide one-way cycle tracks on either side of Henry Street. Changes needed to accommodate this include:

1. Left turn lane at the Lower Mallow St junction with Henry St will be removed.
2. It is proposed to extend the inbound one-way vehicular traffic system which currently ends at St. Alphonsus St further along Henry St. to Clontarf Place.
3. Removal of parking in narrower sections.
4. Additional chevron markings are required on the northern inbound lane to provide a buffer for parked cars adjacent to the track.

Table 5-15: Standard Cycle Tracks Width Calculator

Cycle Track Width Calculator			
A: Inside Edge	B: Cycling Regime	C: Outside Edge	D: Additional Features
Kerb	Single File	Physical Barrier	Parked Cars
0.25	0.75m	0.5m	0.8m
Total Minimum Width: 1.5m + Parked Car hatching 0.8m			

Even with the removal of car parking on the southern side of the road, there is insufficient carriageway width available to provide cycle tracks on both sides of the road for a significant portion of this section. In these locations the outbound cyclist would need to share the carriageway and with the AADTs on this section it is not suitable to do so in accordance with the NCM.

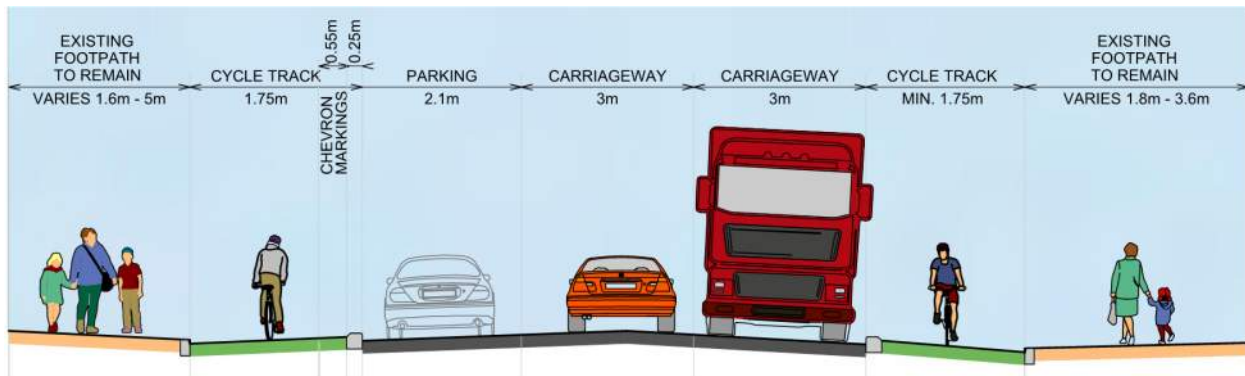


Figure 5-39: Typical Section 5 Option A Cross Section Henry St - Standard Cycle Tracks

Section 5 - Option B - Two-Way Cycle Track

Provide two-way cycle track from Alphonsus Street to Lower Mallow Street.

Table 5-16: Two-Way Cycle Track Width Calculator

Cycle Track Width Calculator			
A: Inside Edge	B: Cycling Regime	C: Outside Edge	D: Additional Features
Kerb	Basic Two-Way	Physical Barrier	Parked Cars
0.25	1.75m	0.5m	0.8m
Total Minimum Width: 2.5m + Parked Car hatching 0.8m			

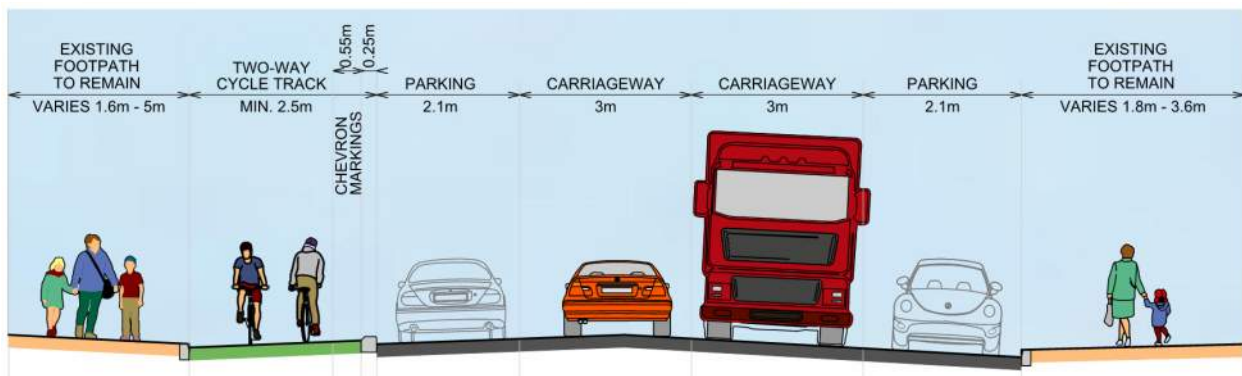


Figure 5-40: Typical Section 5 Option B Cross Section Henry St - Two Way Cycle Track

At the pinch points noted in Option A, the 2-way track can be accounted for the full length of the route. Changes needed to accommodate this option are similar to Option A with added improvements to the existing signal-controlled track junction to protect pedestrians and cyclists at the Lower Mallow St and Henry St junction as per the figure below. Changes at the junction include:

1. Removal of the left turn slip lane and island within the junction from Lower Mallow St onto Henry St - vehicular demand does not warrant the second lane and the removal of the lane reduces the crossing length for pedestrians and cyclists
2. Removal of the left turn lane from Henry St to Mill Lane - vehicular demand does not warrant the lane and the removal of the lane reduces the crossing length for pedestrians and cyclists
3. Garda parking can be maintained on Henry St
4. Separate signal control of the cyclists through the junction

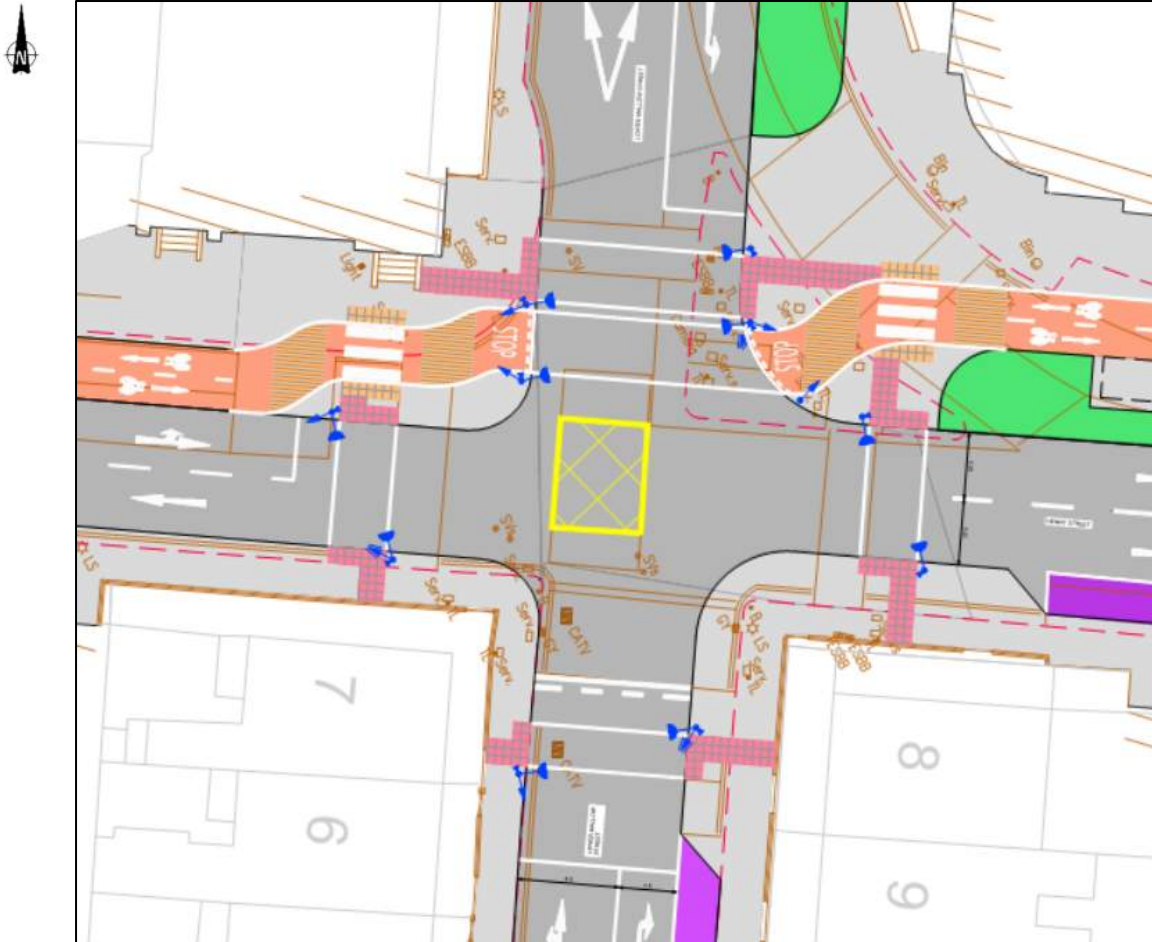


Figure 5-41: Proposed Changes to Lower Mallow St/Henry St Signal Controlled Junction
(Extract from drawing 211101-PUNCH-02-XX-DR-C-0405)

Other options considered for Section 5 but discounted:

Section 5 - Option C - Shared Footpath/Cycle Facility

A shared facility was considered however the number of existing junctions along this section deemed it unacceptable as the cyclist would not have priority on this primary cycle route.

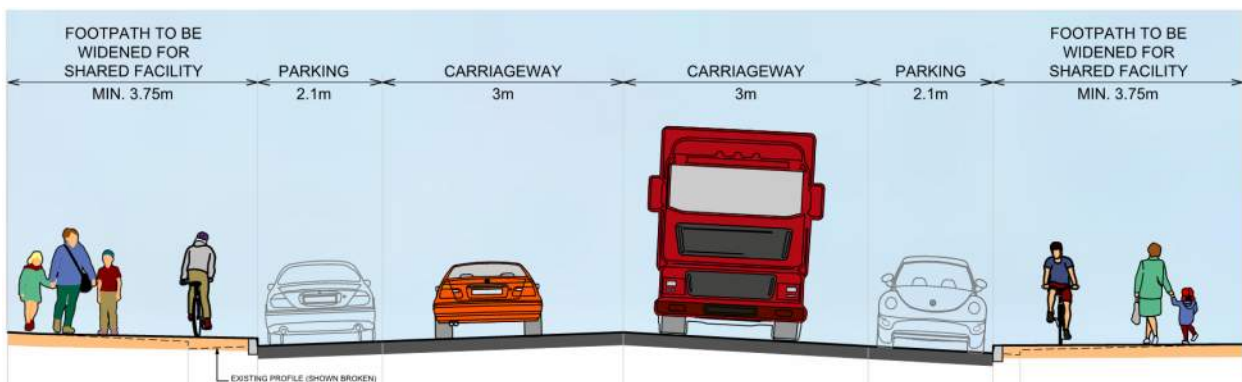


Figure 5-42: Typical Section 5 Option C Cross Section Henry St - Shared Footpath/Cycle

Section 5 - Option D - Shared Carriageway

The provision of an entirely (or partially/one side) shared carriageway was discounted based on the NCM Standard shared carriageways are not suitable for high AADTs.

5.5.1 Section 5 - Design Options MCA

Table 5-17: Section 5 MCA Summary

Assessment Criteria	Assessment Sub-Criteria	Do Nothing Scenario	Option A Standard Cycle Tracks	Option B Two Way Cycle Track
1. Economy	1a. Capital Cost	Green	Orange	Orange
2. Integration	2a. Land Use Policy	Orange	Green	Green
	2b. Public Transport Network Integration	Yellow	Yellow	Yellow
	2c. Cycle Network Integration	Orange	Green	Green
	2d. Pedestrian Network Integration	Orange	Green	Green
	2e. Traffic Network Integration	Green	Green	Orange
3. Cycle Infrastructure	3a. Functionality	Orange	Green	Green
	3b. Homogeneity	Orange	Green	Green
	3c. Legibility	Orange	Green	Green
	3d. Forgivingness	Orange	Green	Green
	3e. Self-Awareness	Orange	Green	Green
4. Accessibility and Social Inclusion	3a. Deprived Geographic Areas	Orange	Green	Green
5. Safety	4a. Pedestrian Safety	Orange	Green	Green
	4b. Cycle Safety	Orange	Green	Green
6. Environment	5a. Flora & Fauna	Yellow	Yellow	Yellow
	5b. Soils, Geology & Hydrology	Yellow	Yellow	Yellow
	5c. Landscape & Visual	Orange	Green	Green
	5d. Air Quality/ Noise & Vibration	Orange	Green	Green
	5e. Land Use Character	Yellow	Yellow	Yellow
7. Physical Activity	6a. Health Benefits	Orange	Green	Green

Section 5 - Preferred Option

Based on the MCA shown above, Option B, the **two-way cycle track** is the preferred option in this area of the scheme due the increased safety provided for the fully segregated cyclist on this section given the higher AADTs on this section of the route.

5.6 Section 6 - Connection to Bishops Quay

The existing scenario for the cyclist in this section is to travel in the existing vehicular traffic lanes. The end of Section 6 is proposed to tie in with the Arthurs Quay Park to Condell Road Cycle Lanes Project on Bishops Quay.

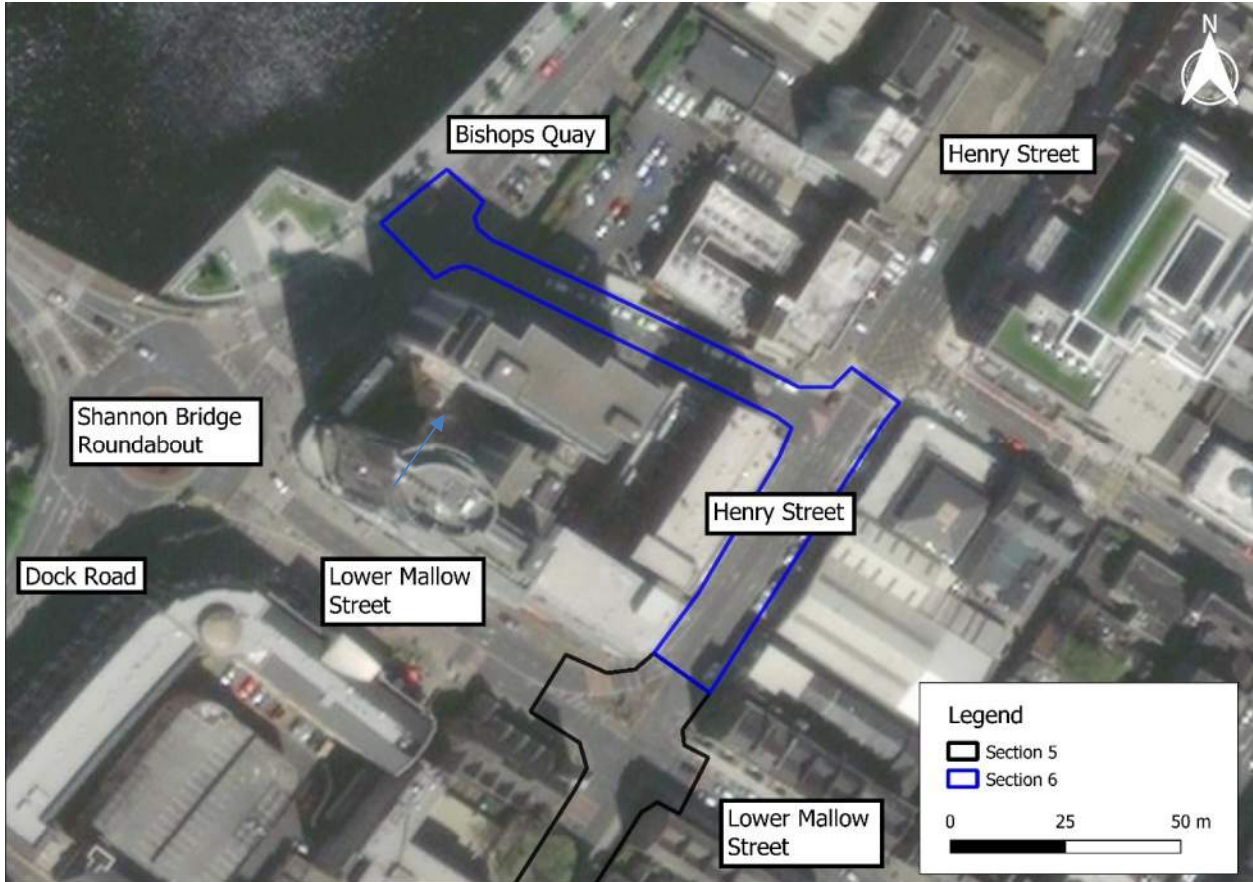


Figure 5-43: Section 6 Extents (Image Ref: <https://www.bing.com/maps>)

Section 6 Route Selection Discussion:

The original brief for the project defined the route connection to Bishops Quay via Mill Lane as does the revised Draft LSMATS. During design development it was requested to assess the viability of the alternative connection to Bishops Quay via Lower Mallow Street on Shannonbridge Roundabout.

Lower Mallow St has dual carriageways connecting Shannonbridge Roundabout to the signalised junction with Henry St.

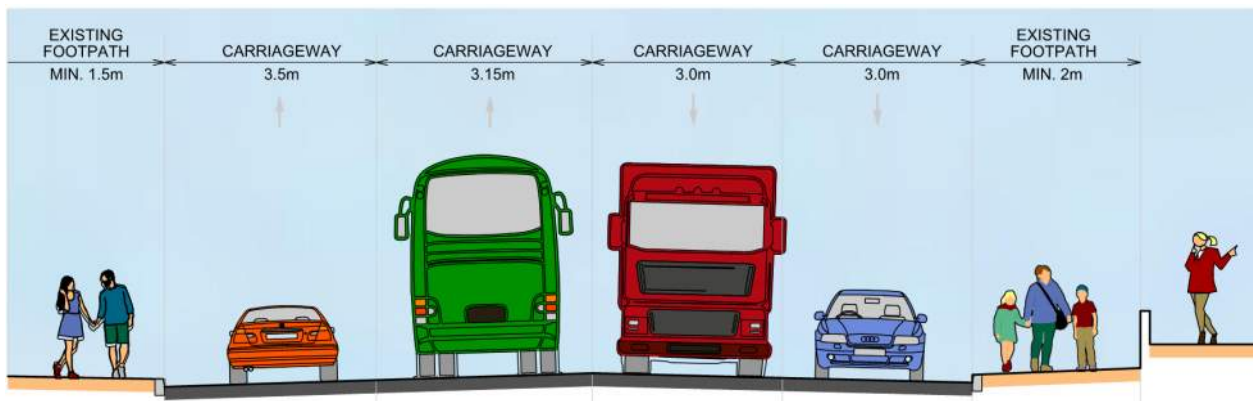


Figure 5-44: Existing Typical Cross Section Lower Mallow St

Provision of cycle lanes via this Lower Mallow St section were discounted for the following reasons:

1. Higher AADTs (8,900) than the Mill Lane (900) route
2. Significant upgrade works required at the Shannonbridge Roundabout to segregate cyclists as per NCM guidance for AADTs > 6000.

The Mill Lane route was considered a safer, more cost effective, better cycling environment in line with revised draft LSMATs objectives for cycling infrastructure options for cycle facilities.

Section 6 Route Existing Conditions:

Table 5-18: Section 6 Mill Lane Existing Conditions

Section 6 Existing Conditions - Mill Lane	
Section Length	100m
Existing Speed Limit	50km/hr
AADT	900
Traffic Flow	Mill Lane is one-way towards Bishops Quay at the upper section of the road and two-way at the Bishops Quay side providing access to Riverpoint
Total Corridor Width	11-11.6m
Footpaths	Approximately 1.8m-2m wide on either side
Cyclist Facilities	None
Vehicular lanes	3.2-3.6m
Additional Notes	2m wide garda designated parking bays (13 No.) Steep gradient approximately 5%

Table 5-19: Section 6 Henry St Existing Conditions

Section 6 Existing Conditions - Henry St	
Section Length	100m
Existing Speed Limit	50km/hr
AADT	9,200
Traffic Flow	One-Way Inbound
Total Corridor Width	20.6m
Footpaths	Approximately 1.9m-2.4m wide on either side
Cyclist Facilities	None
Vehicular lanes	2x 3.7m, converging lane also from Lower Mallow St
Additional Notes	3.5m wide left turn lane 2.4-3m wide parking on either side (13 No. including Garda and Disabled Parking)

Section 6 - Do Nothing Scenario

No changes proposed to the pedestrian or cyclist environment on Henry St or Mill Lane in this scenario. The cyclist shares the carriageway with the vehicular traffic. One-way sections of Mill Road and all of Henry St section do not cater for the outbound cyclist.



Figure 5-45: Typical Section 6 Do Nothing Scenario Mill Lane

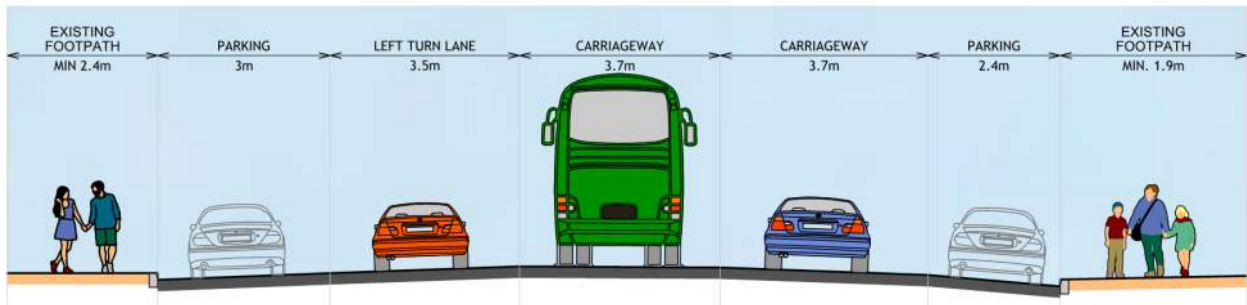


Figure 5-46: Typical Section 6 Do Nothing Scenario Henry St

Section 6 - Option A - Mill Lane - Two Way Cycle Track

Provide 3.5m wide two-way cycle track from Bishops Quay on the outbound side of Mill Lane via Henry St to the Signalised Junction. Designated Garda parking spaces would be lost as well as regular parking on Mill Lane. Mill Lane one-way vehicular traffic towards Bishops Quay will be extended for the full length.

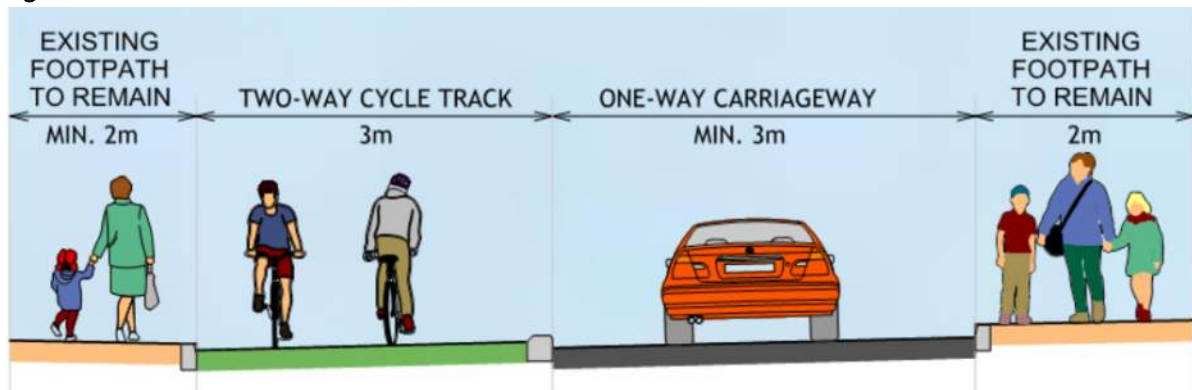


Figure 5-47: Typical Section 6 Option A Cross Section Mill Lane - Two Way Cycle Track

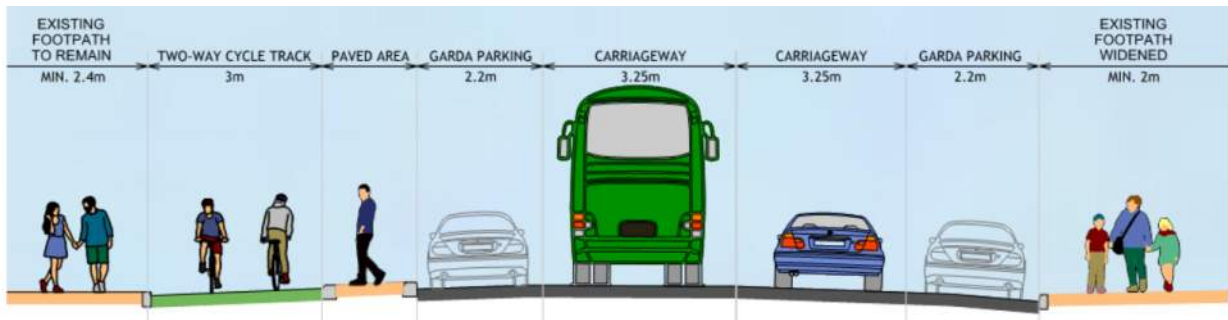


Figure 5-48: Typical Section 6 Option A Cross Section Henry St - Two Way Cycle Track

Section 6 - Option B - Shared Carriageway/Contra Flow

The provision of an entirely (or partially/one side) shared carriageway created complicated tie in points for the contra flow cyclist due to the three existing one-way lanes on Henry St. Continuity was not achievable for the outbound contra flow cyclists on Henry St given the existing 3 lanes of vehicular traffic.

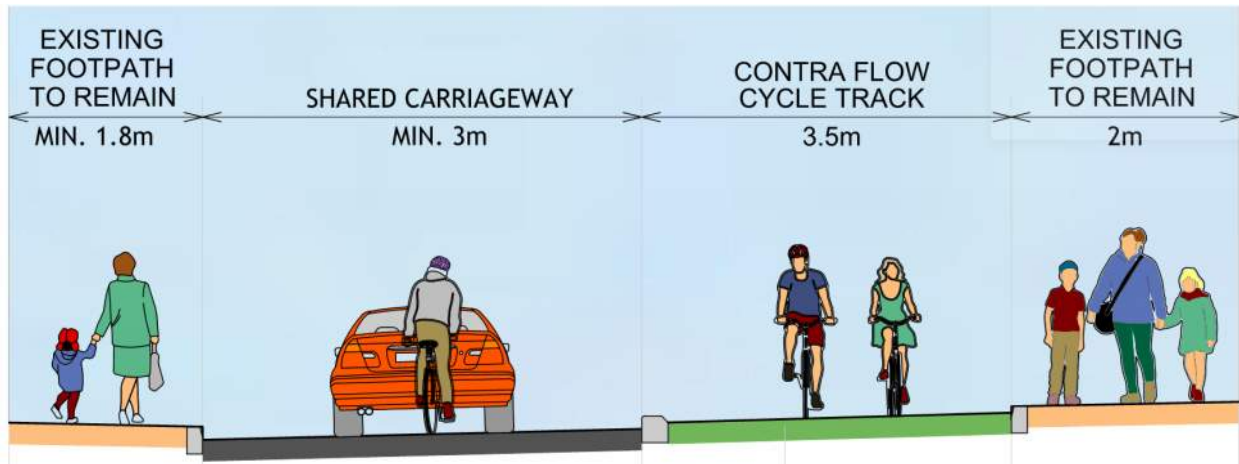


Figure 5-49: Typical Section 6 Option B Cross Section Mill Lane - Contra Flow

Other design options considered for Section 6 but discounted:

Section 6 - Option C - Standard Cycle Lanes

Standard cycle lanes are not viable on Mill Lane due to space constraints of the existing cross section and the sections of existing one-vehicular traffic. On Henry St, the AADTs would be too high (approximately 9000 AADT) to provide cycle lanes in accordance with the NCM. There would also need to be a short section of contra flow lane (against 3 inbound lanes) and continuity for the cyclist was considered too onerous for such a short section.

Section 6 - Option D - Shared Footpath/Cycle Facility

This option was discounted as the outbound cyclist would not be catered for in the one-way vehicular sections.

5.6.1 Section 6 - Design Options MCA

Table 5-20: Section 6 MCA Summary

Assessment Criteria	Assessment Sub-Criteria	Do Nothing Scenario	Option A Two Way Cycle Track	Option B Contra Flow
1. Economy	1a. Capital Cost	Green	Orange	Orange
	2a. Land Use Policy	Orange	Green	Green
2. Integration	2b. Public Transport Network Integration	Yellow	Yellow	Yellow
	2c. Cycle Network Integration	Orange	Green	Green
	2d. Pedestrian Network Integration	Orange	Green	Green
	2e. Traffic Network Integration	Green	Orange	Orange
	3a. Functionality	Orange	Green	Green
3. Cycle Infrastructure	3b. Homogeneity	Orange	Green	Green
	3c. Legibility	Orange	Green	Green
	3d. Forgivingness	Orange	Dark Green	Green
	3e. Self-Awareness	Orange	Green	Green
	4. Accessibility and Social Inclusion	3a. Deprived Geographic Areas	Orange	Green
5. Safety	4a. Pedestrian Safety	Orange	Green	Green
	4b. Cycle Safety	Orange	Dark Green	Green
6. Environment	5a. Flora & Fauna	Yellow	Yellow	Yellow
	5b. Soils, Geology & Hydrology	Yellow	Yellow	Yellow
	5c. Landscape & Visual	Orange	Green	Green
	5d. Air Quality/ Noise & Vibration	Orange	Green	Green
	5e. Land Use Character	Yellow	Yellow	Yellow
7. Physical Activity	6a. Health Benefits	Orange	Green	Green

Section 6 - Preferred Option

Based on the MCA shown above, Option A, the two-way cycle track is the overall preferred option in this section due the increased safety provided for the fully segregated cyclist on this section.

6 Emerging Preferred Option

Based on the MCA carried out on each distinct section along the selected route, the preferred option is for the provision of a segregated two-way cycle track. Section 2 remains as a shared carriageway with reduced AADTs due to application of Filtered Permeability at Lifford Avenue.

The continuity of providing a two-way cycle track along the majority of the route is seen as a positive result for the overall scheme and for the overall journey experience of the cyclist between the city and Dooradoyle.

The table below summarises the overall assessment for each section:

Table 6-1: Summary of MCA

Section	Preferred Option
<u>Section 1</u> Ballinacurra Road from Ballykeeffe Roundabout to South Circular Road	Two Way Cycle Track
<u>Section 2</u> SCR from Ballinacurra Rd to Fennessy’s Roundabout	Shared Carriageway with <i>Filtered Permeability</i>
<u>Section 3</u> SCR from Fennessy’s Roundabout to Laurel Hill Avenue	Two Way Cycle Track
<u>Section 4</u> SCR from Laurel Hill Avenue to Henry St	Two Way Cycle Track
<u>Section 5</u> Henry St from SCR to Lower Mallow St	Two Way Cycle Track
<u>Section 6</u> Connection to Bishops Quay via Mill Lane	Two Way Cycle Track

The Preliminary Design for the route will be progressed based on the MCA of preferred options discussed in the report.

7 Summary and Conclusion

South Circular Road to Bishops Quay Cycle Lanes Scheme presents an excellent opportunity to provide the primary connection for sustainable transport between south-west Limerick City and Limerick's City Centre. The scheme will improve safety primarily by reducing vehicular speeds and segregating users. The quality of service for walking and cycling will also be enhanced.

The proposed options prioritise the movement and safety of cyclists in line with national, regional and local policies that emphasise pedestrians and cyclists as the top of the movement hierarchy. The proposed route layout will promote a modal shift towards more sustainable modes of transport.

The purpose of the project is to provide a safe environment for cyclists to travel to and from the city centre. The overall aim is to provide cycle facilities along the entire length of SCR from the Ballykeeffe Roundabout to Bishop's Quay. As the main objective of the Revised Draft Limerick Shannon Metropolitan Area Transport Strategy is to deliver a high-quality, accessible, integrated and more sustainable transport network, this project aligns with the overall goal.

As discussed in Section 5 above, the six sections of the proposed route were assessed by reviewing a number of layout options for each section. The options for each section were presented and assessed using Multi-Criteria Analysis (MCA) under the following appraisal criteria:

1. Economy
2. Integration
3. Cycle infrastructure
4. Accessibility and Social Inclusion
5. Safety
6. Environment
7. Physical Activity

The results of the MCA showed that the two-way cycle track was the preferred option for five of the six sections of the proposed route which provides continuity through the scheme length. Section 2 remains as a shared carriageway with reduced AADTs in this residential area. The resulting options will provide an improved cycle environment with optimal facilities which will also improve the pedestrian environment in the area.