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Lucan to
City Centre

Draft Preferred Route Options Report

November 2020



Project Ireland 2040
Building Ireland's Future

BUS CONNECTS

SUSTAINABLE TRANSPORT FOR A BETTER CITY.

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Work in Progress - Draft

Glossary of Technical Terms

Signal Controlled Bus Priority - Signal Control Bus Priority uses traffic signals to enable buses to get priority ahead of other traffic on single lane road sections, but it is only effective for short distances. This typically arises where the bus lane cannot continue due to obstructions on the roadway. An example might be where a road has pinch-points where it narrows due to existing buildings or structures that cannot be demolished to widen the road to make space for a bus lane. It works through the use of traffic signal controls (typically at junctions) where the bus lane and general traffic lane must merge ahead and share the road space for a short distance until the bus lane recommences downstream. The general traffic will be stopped at the signal to allow the bus pass through the narrow section first and when the bus has passed, the general traffic will then be allowed through the lights

Bus Gate – A Bus Gate is a sign-posted short length of stand-alone bus lane. This short length of road is restricted exclusively to buses, taxis and cyclists plus emergency vehicles. It facilitates bus priority by removing general through traffic along the overall road where the bus gate is located. General traffic will be directed by signage to divert away to other roads before they arrive at the Bus Gate.

Cycle Lane – A cycle lane is a lane on the carriageway that is reserved either exclusively or primarily for cycling and is separated from general traffic or bus lanes by road markings.

Cycle Track – A cycle track is a separate section of the road dedicated for cycling only. This space will generally be isolated from other vehicular traffic by a physical kerb.

Virtual Bus Priority – This refers to cases where physical bus priority (i.e. bus lanes) is not provided, and instead, bus priority is provided within the general traffic lane through the use of signal controlled priority or bus gates to control the movements of general traffic.

Quiet Street Treatment – Where CBC roadway widths cannot facilitate cyclists without significant impact on bus priority, alternative cycle routes are explored for short distances away from the CBC bus route. Such offline options may include directing cyclists along streets with minimal general traffic other than car users who live on the street. They are called Quiet Streets due to the low amount of general traffic and are deemed suitable for cyclists sharing the roadway with the general traffic without the need to construct segregated cycle tracks or painted cycle lanes. The Quiet Street Treatment would involve appropriate advisory signage for both the general road users and cyclists.

Protected Junctions - Refers to junctions, which provide physical kerb buildouts to protect cyclists through the junction. Due to the inherently complex nature of mixed mode movements at junctions, the provision for cyclists at junctions is a critical factor in managing conflict and providing safe junctions for all road users. As such, this is the preferred layout for signalised junctions as part of the CBC Infrastructure Works.

Greenway – A greenway is a recreational corridor for non-motorised journeys, developed in an integrated manner which enhances both the environment and quality of life of the surrounding area. These routes should meet satisfactory standards of width, gradient and surface condition to ensure that they are both user-friendly and low-risk for users of all abilities.

Executive Summary

Introduction

The purpose of this report is to present an overview of the draft Preferred Route Option (PRO) for the 'Lucan to City Centre' Core Bus Corridor (CBC) as well as describing the options assessed, and changes made to the scheme since the first round of public consultation in 2019.

The aim of delivering the Lucan to City Centre CBC is to provide enhanced walking, cycling and bus infrastructure on this key access corridor in the Dublin region, which will enable and deliver efficient, safe, and integrated sustainable transport movement along the corridor.

The objectives are to:

- Enhance the capacity and potential of the public transport system by improving bus speeds, reliability and punctuality through the provision of bus lanes and other measures to provide priority to bus movement over general traffic movements;
- Enhance the potential for cycling by providing safe infrastructure for cycling, segregated from general traffic wherever practicable;
- Support the delivery of an efficient, low carbon and climate resilient public transport service, which supports the achievement of Ireland's emission reduction targets;
- Enable compact growth, regeneration opportunities and more effective use of land in Dublin, for present and future generations, through the provision of safe and efficient sustainable transport networks;
- Improve accessibility to jobs, education and other social and economic opportunities through the provision of improved sustainable connectivity and integration with other public transport services; and
- Ensure that the public realm is carefully considered in the design and development of the transport infrastructure and seek to enhance key urban focal points where appropriate and feasible.

Scheme Overview & Assessment Process

The Lucan to City Centre CBC commences at Junction 3 on the N4 and it is routed via the N4 as far as Junction 7 (M50), and via the R148 along the Chapelizod Bypass, Con Colbert Road and St John's Road West as far as Frank Sherwin Bridge, where it will join the prevailing traffic management regime on the South Quays.

Where substantial revisions have been made to the design since the publication of the Emerging Preferred Route (EPR) option in January 2019, options have been assessed using a Multi-Criteria Assessment to determine the draft preferred option. The methodology used is consistent with that carried out during the initial route optioneering work which informed the EPR Option. This additional assessment does not supersede work done during earlier stages but rather complements it and is a direct response to issues raised by the public during the public consultation process. This assessment has also been carried out in the context of more detailed information now available, including topographical survey.

The following list highlights the material scheme changes between the published EPR Option and the draft PRO:

- Provision of a two-way cycle track from the Lucan Road at N4 Junction 3 inside the existing boundary of the Hermitage Golf Club and Hermitage Hospital, then along the Old Lucan Road in Palmerstown where it connects to existing facilities leading to Chapelizod village.
- Relocation of the existing bus stops at Liffey Valley Shopping Centre some 200m further west and a new bridge over the N4 that links with the proposed bus interchange within Liffey Valley Shopping Centre, to provide higher quality pedestrian facilities.
- Introduction of a westbound, bus only, right turn lane at the Oval junction to facilitate buses turning into Palmerstown village.

- Provision of an eastbound right turn lane at Memorial Road to facilitate movements that are being impacted by the revised traffic management measures associated with the Liffey Valley CBC in Inchicore.
- The introduction of a northbound right turn lane at the South Circular Road junction to allow vehicles to turn right from the South Circular Road to St Johns Road West.
- Removal and replacement of additional trees along St Johns Road West so that facilities for both taxis and bicycles can be provided on the approach to the train station.

Work in Progress - Draft

1.1 Introduction

The Transport Strategy for the Greater Dublin Area 2016 – 2035 sets out a network of the bus corridors forming the “Core Bus Network” for the Dublin region. Sixteen indicative radial core bus corridors were initially identified for redevelopment. This is shown in Figure 1-1 below (extract from Transport Strategy for the Greater Dublin Area 2016-2035):

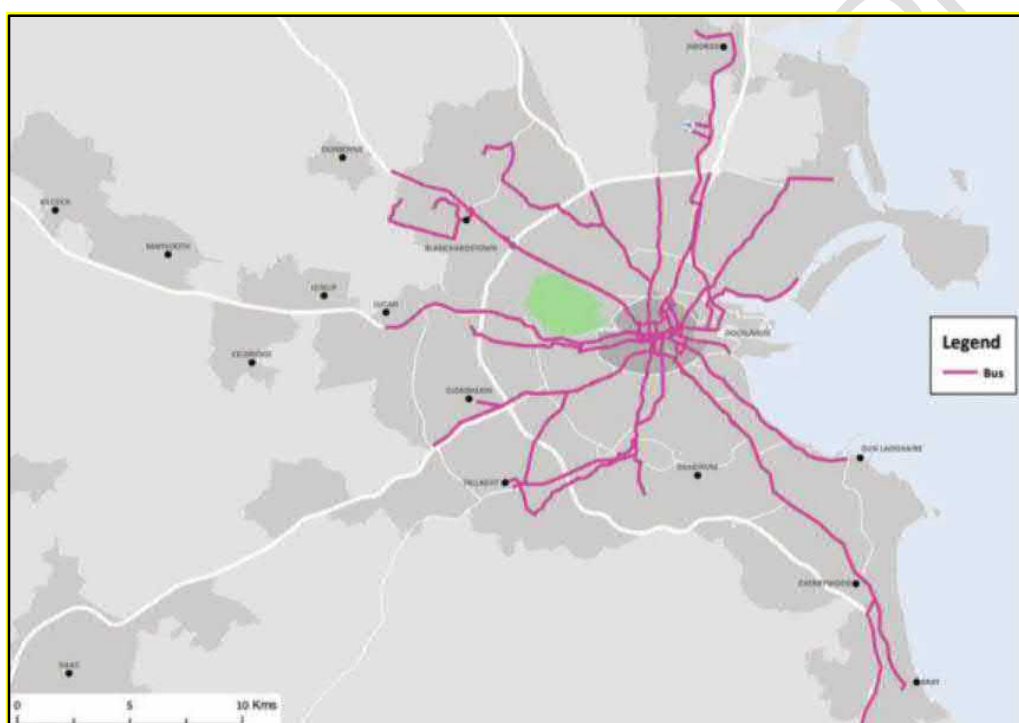


Figure 1-1: 2035 Core Bus Network – Radial Corridors

- Clongriffin to City Centre Core Bus Corridor;
- Swords to City Centre Core Bus Corridor;
- Ballymun to City Centre Core Bus Corridor;
- Finglas to Phibsborough Core Bus Corridor;
- Blanchardstown to City Centre Core Bus Corridor;
- Lucan to City Centre Core Bus Corridor;
- Liffey Valley to City Centre Core Bus Corridor;

- Clondalkin to Drimnagh Core Bus Corridor;
- Greenhills to City Centre Core Bus Corridor;
- Tallaght to Terenure Core Bus Corridor;
- Kimmage to City Centre Core Bus Corridor;
- Rathfarnham to City Centre Core Bus Corridor;
- Bray to City Centre Core Bus Corridor;
- UCD Ballsbridge to City Centre Core Bus Corridor;
- Blackrock to Merrion Core Bus Corridor; and
- Ringsend to City Centre Core Bus Corridor.

1.2 Background

The aim of the CBC Infrastructure Works is to provide enhanced walking, cycling and bus infrastructure on key access corridors in the Dublin region, which will enable and deliver efficient, safe, and integrated sustainable transport movement along these corridors.

The objectives are to:

- Enhance the capacity and potential of the public transport system by improving bus speeds, reliability and punctuality through the provision of bus lanes and other measures to provide priority to bus movement over general traffic movements;
- Enhance the potential for cycling by providing safe infrastructure for cycling, segregated from general traffic wherever practicable;
- Support the delivery of an efficient, low carbon and climate resilient public transport service, which supports the achievement of Ireland's emission reduction targets;
- Enable compact growth, regeneration opportunities and more effective use of land in Dublin, for present and future generations, through the provision of safe and efficient sustainable transport networks;
- Improve accessibility to jobs, education and other social and economic opportunities through the provision of improved sustainable connectivity and integration with other public transport services; and
- Ensure that the public realm is carefully considered in the design and development of the transport infrastructure and seek to enhance key urban focal points where appropriate and feasible.

In June 2018 the National Transport Authority (NTA) published the Core Bus Corridors Project Report. The report was a discussion document outlining proposals for the delivery of a CBC network across Dublin. The 'Lucan to City Centre CBC' is identified in this document as forming part of the radial Core Bus Network, designated as 'Route 6'. The BusConnects radial CBC network is shown in Figure 1-2.

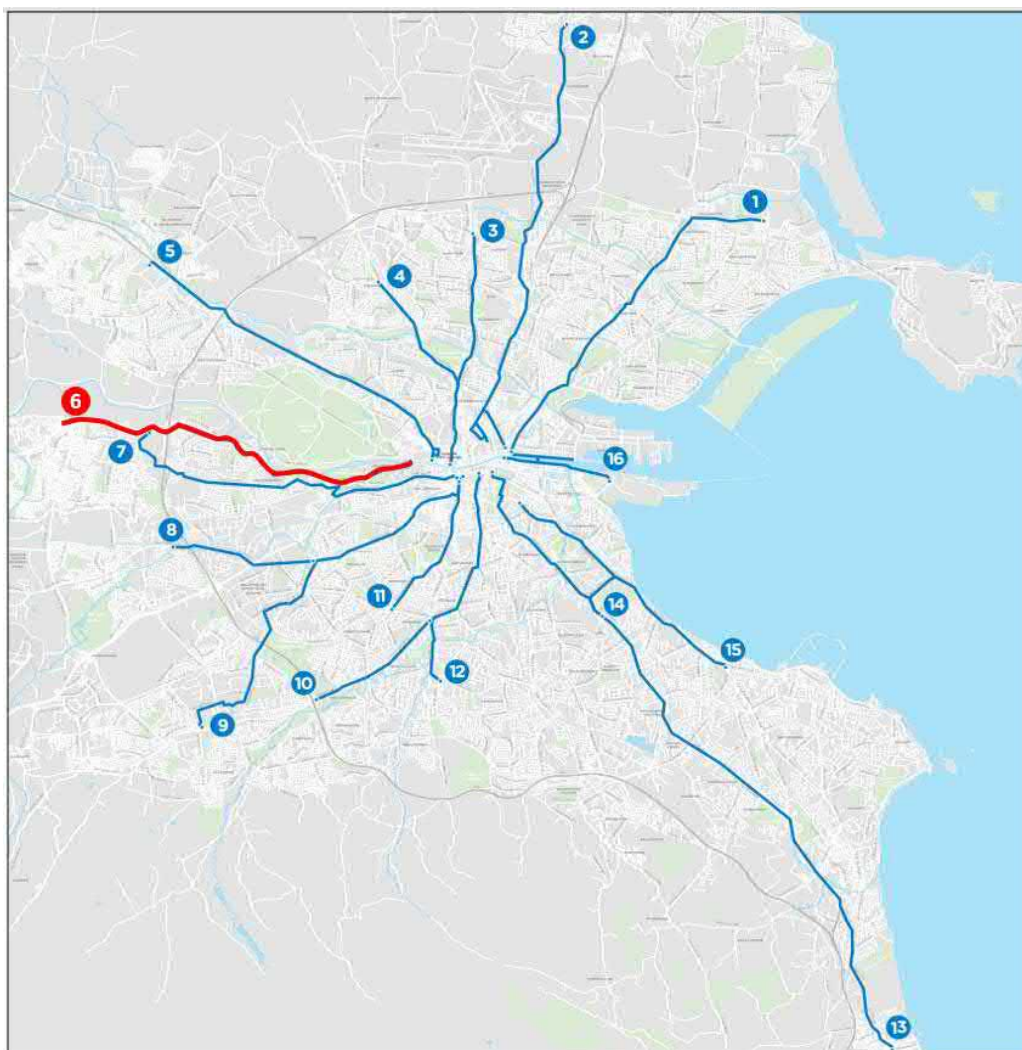


Figure 1-2: BusConnects Radial CBC Network (the CBC highlighted)

Following this, a public consultation for the sixteen radial CBCs took place on a phased basis from November 2018 until May 2019. As part of this process the 'Lucan to City Centre Core Bus Corridor CBC Option Study Feasibility Report', henceforth referred to as the 'Feasibility Report', was published, which identified feasible options along the corridor, assessed these options and arrived at an EPR Option. Submissions were invited from the public to provide comment on the EPR Option proposals and to inform subsequent design stages. A second round of public consultation commenced on 4th March 2020 and ran until the 17th of April 2020 when submissions were once again invited from the public on the draft PRO.

A comprehensive review of feedback received during both public consultations has been undertaken. Based on this review, as well as availability of new information (e.g. topographical survey), alternative options have been considered in a number of areas along the Lucan to City Centre route which seek to address issues of concern to the public, as well as general refinements to the scheme to reduce the overall impact of the proposals, while still achieving the objectives of the scheme.

This report presents a summary of the issues raised in the public consultations and details the alternative options considered, and assessment of same, in order to identify a draft Preferred Route Option (PRO).

1.3 Approach for this Report

This 'Draft Preferred Route Option Report has been prepared for the Lucan to City Centre CBC (the CBC), which will build on the previous 'Lucan to City Centre Core Bus Corridor CBC Feasibility Report'.

The Study Area Analysis and Multi Criteria Analysis for the previously proposed feasible route options are considered to still be valid unless otherwise detailed and updated in this draft PRO Report. Any additional design work or optioneering has been assessed against the previously identified EPR Option in order to determine the draft PRO. Additional design development and the resulting updated draft PRO drawings referenced in this report have been based on;

- Updated topographical survey information;
- Output from engagement and consultation activities on the EPR Option and draft Preferred Route Option Proposals;
- Clarifications to the previous assessment in the 'Lucan to City Centre Core Bus Corridor CBC Feasibility Report';
- Further design development and options assessment; and
- Change in the extent of the scheme.

1.4 Report Structure

The structure for the remainder of this report is set out as follows:

- Chapter 2: Planning and Policy Context – This chapter outlines the general background information to the CBC Infrastructure Works. It also outlines the policy context in which the CBC was developed and presents the concept of the CBC network as outlined in the Transport Strategy for the Greater Dublin Area 2016-2035 (NTA 2015) and the CBC Infrastructure Works.
- Chapter 3: Background and Public Consultation – This chapter outlines the summary of the non-statutory public consultation process.
- Chapter 4: Study Area – In this chapter, the study area for the CBC is detailed. The integration of the scheme with existing and planned transport networks is considered, along with considerations of the scheme for other road users.
- Chapter 5: Review of the 'Lucan to City Centre Core Bus Corridor CBC Feasibility Report' – This chapter is a summary of the options assessment that was previously carried out in each section of the 'Lucan to City Centre Core Bus Corridor CBC Feasibility Report'. An assessment has been made on the validity of the previous options assessment in the context of additional information collected, including through more detailed survey work undertaken and feedback from the public consultation process. Issues arising and material changes resulting from the design development are detailed.
- Chapter 6: Option Assessment – This chapter subsequently updates the previous options assessment work undertaken in light of the additional considerations set out in Chapter 5.
- Chapter 7: Draft Preferred Route Option – This chapter gives the overall conclusions of the options assessment process and describes the draft PRO proposal.
- Chapter 8: Next Steps – This chapter details the “next steps” in the delivery of the CBC.

The Appendix contains background information for this corridor including the Route Feasibility and Options Assessment Report (see Appendix C) and the Emerging Preferred Route Brochure (see Appendix D).

2. Planning and Policy Context

2.1 Introduction

This chapter reviews the proposed road project in the context of national, regional and local transport and planning policy for the Lucan to City Centre CBC, hereafter referred to as the proposed development.

Specific details for each of the policies and how the proposed road development complies with these, and more local and regional policies, are outlined below.

National Policy

- Project Ireland 2040 – National Planning Framework
- Department of Transport: Statement of Strategy, 2016 - 2019
- Smarter Travel: A Sustainable Transport Future (2009 – 2020)
- National Cycle Policy Framework (2009)
- Road Safety Strategy (2013 – 2020)
- Building on Recovery: Infrastructure and Capital Investment, 2016 - 2021
- The Sustainable Development Goals National Implementation Plan 2018-2020
- Climate Action Plan (2019)

Regional Policy

- Transport Strategy for the Greater Dublin Area, 2016-2035
- Greater Dublin Area Cycle Network Plan
- Regional Spatial and Economic Strategy Eastern and Midlands Region (2019 -2031)
- South Dublin County Council Development Plan 2016-2022
- Dublin City Council Development Plan 2016-2022

Local Policy

- Liffey Local Area Plan
- Liberties Local Area Plan
- Heuston & Environs Local Area Plan

2.2 Project Ireland 2040 – National Planning Framework

Project Ireland 2040 was launched by the Government in February 2018 and includes two elements:

- the National Planning Framework (2018), and
- the National Development Plan (2018- 2027).

Project Ireland 2040 will provide the framework for future development and investment in Ireland.

It is the overall Plan from which other, more detailed plans will take their lead, hence the title, National Planning 'Framework', including city and county development plans and regional strategies. The National Planning Framework will be a tool to assist the achievement of more effective regional development. The National Planning Framework also has statutory backing.

2.2.1 National Planning Framework

The National Planning Framework now represents the overarching national planning policy document, of direct relevance to the planning functions of regional and planning authorities, including An Bord Pleanála.

The National Planning Framework (NPF) is the successor to The National Spatial Strategy (NSS), published in November 2002 and has a statutory basis. The National Planning Framework is a planning framework to guide development and investment over the coming years.

The NPF states that the key future growth enablers for Dublin include

“...The development of an improved bus-based system, with better orbital connectivity and integration with other transport networks...”

“...Delivery of the metropolitan cycle network set out in the Greater Dublin Area Cycle Network Plan inclusive of key commuter routes and urban greenways on the canal, river and coastal corridors ...”;

It is a policy of the NPF (Objective 74) to secure the alignment of the National Planning Framework and the National Development Plan through delivery of the National Strategic Outcomes. National Strategic Outcome 4, ‘Sustainable Mobility, includes for the delivery of:

*“key public transport objectives of the Transport Strategy for the Greater Dublin Area 2016-2035 by investing in projects such as New Metro Link, DART Expansion Programme, BusConnects in Dublin
“It also allows for the development of “a comprehensive network of safe cycling routes in metropolitan areas to address travel needs”*

2.2.2 National Development Plan

The National Development Plan 2018 – 2027 (NDP) sets out the investment priorities that will underpin the implementation of the National Planning Framework, through a total investment of approximately €116 billion. This represents a very substantial commitment of resources and is expected to move Ireland close to the top of the international league table for public investment.

This level of capital spending will ensure ongoing employment maintenance and creation with appropriate regional development. It will also provide clarity to the construction sector, allowing the industry to provide the capacity and capability required to deliver Government’s long-term investment plans.

The NDP also illustrates the commitment to reforming how public investment is planned and delivered. This is being achieved through a decisive shift to integrated regional investment plans, stronger co-ordination of sectoral strategies and more rigorous selection and appraisal of projects to secure value-for-money.

The NDP states that investment in public transport infrastructure will be accelerated to support the development of an integrated and sustainable national public transport system consistent with the NPF National Strategic Outcomes of Sustainable Mobility as well as Compact Growth.

It outlines that the programmes and underlying projects proposed for delivery during the period to 2027 includes:

“Delivery of the full BusConnects programme for all of Ireland’s cities (inclusive of ticketing systems, bus corridors, additional capacity, new bus stops and bus shelters etc.” and “Delivery of comprehensive cycling and walking network for Ireland’s cities”.

2.3 Department of Transport: Statement of Strategy, (2016 - 2019)

This strategy sets out objectives and actions which are designed to support continuing economic recovery, fiscal consolidation, job creation and social development. It notes that:

“Ireland’s land transport system – comprising our road and rail networks, together with bus, rail and taxi services – is of fundamental importance to both societal and economic wellbeing”

The strategy includes an action for:

“appropriate public spending and investment in efficient, sustainable, integrated and accessible land transport networks and services”.

The strategy supports the Implement the Road Safety Strategy 2013-2020 and the remaining safety actions in the National Cycling Framework 2009-2020.

2.4 Smarter Travel: A Sustainable Transport Future (2009 – 2020)

Smarter Travel, A Sustainable Transport Future (2009 – 2020) presents an overall policy framework for sustainable transport in Ireland. The policy sets out a vision, goals and targets to be achieved, and outlines 49 actions that form the basis for achieving a more sustainable transport future. The relevant parts of this policy are set out in the following chapters:

Chapter 4: Actions to Encourage Smarter Travel

“Action 4 - The delivery of public transport, cycling and promotion of more sustainable travel patterns generally in many existing urban centres can only be achieved through retrofitting. We will require local authorities to prepare plans to retrofit areas towards creating sustainable neighborhoods so that walking and cycling can be the best options for local trips, for example to reach local facilities such as shops and schools”.

Chapter 5: Actions to Deliver Alternative Ways of Travelling

“Action 12 - Implement more radical bus priority and traffic management measures to improve the punctuality and reliability of bus services and to support more efficient use of bus fleets. This may involve making some urban streets car-free, creating tram-like priorities in others and making greater use of roads/hard shoulders by buses”.

The proposed development will directly support this action in providing improvements to pedestrian and cycle amenities along the proposed route, whilst also providing greater reliability for road based public transport.

2.5 National Cycle Policy Framework (2009)

In support of the Smarter Travel policy, the National Cycle Policy Framework was also adopted by Government in 2009 and includes the following statements and commitments, as stated in the Executive Summary:

Vision / Reasons to Promote Cycling

“The mission is to promote a strong cycling culture in Ireland. The vision is that all cities, towns, villages and rural areas will be bicycle friendly. Cycling will be a normal way to get about, especially for short trips. Cycling contributes to improved quality of life and quality of the public realm, a stronger economy and business environment, and an enhanced environment. A culture of cycling will have developed in Ireland to the extent that 10% of all trips will be by bike by 2020”.

Under the Interventions – Planning and Infrastructure (Chapter 2), it goes on to state that:

“Transportation infrastructure designs need to be cycle friendly”.

“The focus needs to be on [...] Reducing volumes of through traffic, especially HGVs, in city and town centres and especially in the vicinity of schools and colleges.”

The proposed development will support the objectives of the National Cycling Policy Framework primarily through the provision of segregated and offline cycling facilities.

2.6 Road Safety Strategy (2013 – 2020)

The Road Safety Authority (RSA) Road Safety Strategy (2013 – 2020), sets out targets to be achieved in terms of road safety in Ireland as well as policy to achieve these targets. The primary target of this strategy is defined as follows:

“A reduction of road collision fatalities on Irish roads to 25 per million population or less by 2020 is required to close the gap between Ireland and the safest countries. This means reducing deaths from 162 in 2012 to 124 or fewer by 2020. A provisional target for the reduction of serious injuries by 30% from 472 (2011) to 330 or fewer by 2020 or 61 per million population has also been set” (p. 1).

The Strategy states that:

“the attractiveness of walking depends strongly on the safety of the infrastructure provided. Collisions involving pedestrians account for 1 in 5 fatalities annually” and that “collisions involving cyclists account for 1 in 25 road deaths annually, and many collisions involving cyclists lead to serious head injuries.”

The document sets out strategies for engineering and infrastructure in terms of the benefits that they can have in reducing collisions. The provision of the proposed development furthers this strategy in terms of improving the road infrastructure and helping achieving reduction in collisions.

2.7 Building on Recovery: Infrastructure and Capital Investment Plan (2016-2021)

This Capital Plan was published by the Department of Public Expenditure and Reform in September 2015. It presented the findings of a Government-wide review of infrastructure and capital investment policy and outlined the Government’s commitment to ensuring that the country’s stock of infrastructure is capable of facilitating economic growth.

This report identifies the need to improve public transport facilities noting:

“It is therefore essential that road, rail and public transport networks are developed and maintained to the standard required to ensure the safe and efficient movement of people and freight. In addition, getting people out of cars and onto public transport has a key role to play in reducing Ireland’s carbon emissions, by providing a viable, less polluting alternative to car and road transport for many journeys.”

The transport capital allocation in this Capital Plan is largely framed by the recommendations and priorities set out in the 2015 Department of Transport, Tourism and Sport (DTTaS) *Strategic Investment Framework for Land Transport*, which centre on:

- maintaining and renewing the strategically important elements of the existing land transport system
- addressing urban congestion
- maximise the contribution of land transport networks to our national development

The Capital Plan incorporates the following key objectives relevant to this proposed development:

- €3.6 billion of Public Transport Investment including further upgrading of Quality Bus Corridors,

The proposed development is consistent with these recommendations, priorities and objectives as set out in the DTTaS 2015 investment framework, and the Capital Plan.

2.8 The Sustainable Development Goals National Implementation Plan (2018-2020)

In September 2015, Transforming Our World, the 2030 Agenda for Sustainable Development (the 2030 Agenda) was adopted by all 193 Members States of the United Nations (UN).

The 2030 Agenda aims to deliver a more sustainable, prosperous and peaceful future for the entire world, and sets out a framework for how to achieve this by 2030. This framework is made up of 17 Sustainable Development Goals which cover the social, economic and environmental requirements for a sustainable future.



Figure 2-1: Sustainable Development Goals

The Sustainable Development Goals National Implementation Plan 2018 - 2020 is in direct response to the 2030 Agenda for Sustainable Development and provides a whole-of-government approach to implement the 17 Sustainable Development Goals.

The Plan also sets out 19 specific actions to implement over the duration of this first Sustainable Development Goals National Implementation Plan.

The proposed development aligns with Goals 9 and 11 as they include the following targets:

Table 2-1: Sustainable Development Goals and Targets aligned with the proposed development

| Goal 9. Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation | |
|---|---|
| Target 9.1 | Develop quality, reliable, sustainable and resilient infrastructure, including regional and transborder infrastructure, to support economic development and human wellbeing, with a focus on affordable and equitable access for all |
| Goal 11. Make cities and human settlements inclusive, safe, resilient and sustainable | |
| Target 11.2 | By 2030, provide access to safe, affordable, accessible and sustainable transport systems for all, improving road safety, notably by expanding public transport, with special attention to the needs of those in vulnerable situations, women, children, persons with disabilities and older persons. |

2.9 Climate Action Plan (2019)

The Climate Action Plan was published in November 2019 by the Department of the Taoiseach. This document sets out the strategy of the Irish government for tackling the climate change crisis and seeks to achieve a zero carbon energy systems objective for Irish society and in the process, create a resilient, vibrant and sustainable country.

A central pillar of this plan is the role that transport can play in reducing our carbon footprint and improving air quality in our towns and cities. The plan acknowledges that the delivery of improved public transport will lead to a modal shift away from unsustainable transport choices and go a large way to the decarbonization challenge that lies ahead. BusConnects, and improvements to the bus fleet, are identified in the Climate Action Plan as being a central component of this objective as noted in the following actions which are extracted from the plan.

Implement major sustainable-mobility projects such as DART Expansion, Metro Link, and the BusConnects Programme. BusConnects targets a 50% increase in bus passenger numbers over the lifetime of the project in our major cities.

Expand sustainable-travel measures, including a comprehensive cycling and walking network for metropolitan areas of Ireland's cities, with a particular emphasis on safety of cyclists. We shall also expand greenways, and, develop over 200km of new cycling network under BusConnects.

Establish a new fare structure in BusConnects which will encourage flexible use of an integrated public transport network. We committed to transition to Low-Emission Vehicles, including electric buses, for the urban public bus fleet, with no diesel-only purchases from 1 July 2019, and will set a roadmap for all public PSO urban bus fleets to become LEVs by 2035.

2.10 Transport Strategy for the Greater Dublin Area, 2016-2035

The NTA published the Transport Strategy for the GDA, 2016 – 2035 at the beginning of 2016. The strategy identifies a “Core Bus Network”, representing the most important bus routes within the GDA, generally characterised by high passenger volumes, frequent services and significant trip attractors along the routes. The identified core network comprises sixteen radial bus corridors, three orbital bus corridors and six regional bus corridors.

The Strategy states that it is intended to provide continuous bus priority, as far as is practicable, along the core bus routes. This will result in a more efficient and reliable bus service with lower journey times, increasing the attractiveness of public transport in these areas and facilitating a shift to more sustainable modes of transport.

2.11 Greater Dublin Area Cycle Network Plan

The GDA Cycle Network Plan was adopted by the NTA in early 2014 following a period of consultation with the public and various stakeholders. This plan forms the strategy for the implementation of a high quality, integrated cycle network for the Greater Dublin Area.

The Lucan scheme interacts with various existing and proposed cycle routes, these include Primary corridors (S01 and 5) in addition to secondary corridors (S05 and S06). The route also interchanges with the Liffey Greenway and the River Camac Greenway.

During the course of the analysis carried out to identify the preferred core bus corridor, the provision of these cycle routes was considered at all stages. Therefore, as part of the analysis, any upgrading of infrastructure to provide bus priority also provides cycling infrastructure, where practical, to the appropriate level and quality of service (as defined by the NTA National Cycle Manual) required for primary and secondary cycle routes.

2.12 Regional Spatial and Economic Strategy - Eastern and Midlands Region (2019 -2031)

The Regional Spatial and Economic Strategy (RSES) sets out a 12-year strategic development framework for the Eastern and Midlands Region. The Strategy's aim is to support the National Planning Framework Ireland 2040 and sets out a development framework to guide development in the region.

The RSES replaces the Regional Planning Guidelines. The objective of the RSES is to support the implementation of the National Planning Framework (NPF) – Ireland 2040 and the economic policies and objectives of the Government by providing a long-term planning and economic framework which is consistent with the NPF. The RSES provides a long-term regional level strategic planning and economic framework for the Eastern and Midlands Region.

The elected members of the Eastern and Midlands Regional Assembly (EMRA) agreed to make the Regional Spatial and Economic Strategy (RSES) 2019-2031, on June 28th 2019. The RSES includes a Metropolitan Area Strategic Plan (MASP) for Dublin as set out in Project Ireland 2040 – National

Planning Framework (NPF). The MASP provides, for the first time, a 12 to 20 year strategic planning and investment framework for the Dublin metropolitan area. The vision of the Dublin MASP will be to:

“build on our strengths to become a smart, climate resilient and global city region, expanding access to social and economic opportunities and improved housing choice, travel options and quality of life for people who live, work, study in or visit the metropolitan area”

To achieve the vision, the MASP identifies nine Guiding Principles for the sustainable development of the Dublin Metropolitan Area. The proposed development aligns with the MASP under the following principle;

“Integrated Transport and Land use – To focus growth along existing and proposed high quality public transport corridors and nodes on the expanding public transport network and to support the delivery and integration of ‘BusConnects’, DART expansion and LUAS extension programmes, and Metro Link, while maintaining the capacity and safety of strategic transport networks”.

A number of Regional Policy Objectives are included in the RSES which support the proposed development.

RPO 5.2: Support the delivery of key sustainable transport projects including Metrolink, DART and LUAS expansion programmes, BusConnects and the Greater Dublin Metropolitan Cycle Network and ensure that future development maximises the efficiency and protects the strategic capacity of the metropolitan area transport network, existing and planned.

RPO 8.9: The RSES supports delivery of the bus projects set out in Table 8.3 (Figure 2.3) subject to the outcome of appropriate environmental assessment and the planning process.

| Table 8.3: Bus Projects for the Region |
|--|
| Core Bus Corridors comprising 16 radial routes and 3 orbital routes in Dublin |
| Regional Bus Corridors connecting the major regional settlements to Dublin |
| Dublin Metropolitan Bus Network Review |
| Network reviews for the largest settlements across EMRA, with a view to providing local bus services |
| Review of bus services between settlements |
| Review of local bus services throughout EMRA, including services to small towns and villages and the rural transport programme |
| New interchange and bus hub facilities |
| New fare structures |
| Enhanced passenger information |
| Improvements to bus waiting facilities |
| Integrated timetabling of bus and rail into a coherent national and regional network |

Figure 2-2: Bus Projects for the Region

2.13 South Dublin County Council Development Plan (2016-2022)

The South Dublin County Council (SDCC) Development Plan includes transport and mobility policies and objectives to promote the sustainable development of the County by supporting and guiding national agencies in delivering major improvements to the public transport network and to ensure existing and planned public transport services provide an attractive and convenient alternative to the car.

The Development Plan recognises that one of the major challenges facing the County during the life of this Plan is the need to promote and provide for sustainable transport options, whilst maintaining the effectiveness of the County's road network.

In terms of transport infrastructure, the following Policies and Objectives (Table 2-2 and 2-3) have been identified in the County Development Plan which support the proposed development:

Table 2-2: SDCC Development Plan Overarching Objectives aligned with the proposed development

| Transport and Mobility Policy 1 Overarching | |
|---|---|
| TM1 Objective 1: | To support and guide national agencies in delivering major improvements to the transport network. |
| TM1 Objective 2: | To spatially arrange activities around, and improve access to, existing and planned public transport infrastructure and services. |
| TM1 Objective 3: | To focus on improvements to the local road and street network that will better utilise existing road space and encourage a transition towards more sustainable modes of transport, while also ensuring sufficient road capacity exists for the residual proportion of the trips which will continue to be taken by private vehicle. |
| TM1 Objective 5: | To balance the needs of road users and the local community with the need to support the development of a sustainable transportation network. |
| TM1 Objective 6: | To support the delivery of sufficient public transport and road capacity to facilitate sustainable new development in the County. |

The Development Plan outlines the policy of SDCC to promote the sustainable development of the County by supporting and guiding national agencies in delivering major improvements to the public transport network and to ensure existing and planned public transport services provide an attractive and convenient alternative to the car.

Table 2-3: SDCC Development Plan Objectives for Public Transport aligned with the proposed development

| Transport and Mobility Policy 2 Public Transport | |
|--|---|
| TM2 Objective 1: | To secure the implementation of major public transport projects as identified within the relevant public transport strategies and plans for the Greater Dublin Area. |
| TM2 Objective 2: | To establish future public transport routes that will support the County's medium to long term development, in particular orbital routes |
| TM2 Objective 3: | To generate additional demand for public transport services through integrated land use planning and maximising access to existing and planned public transport services throughout the network |
| TM2 Objective 4: | To create an interlinked network that maximises the efficiency of existing services, reduces overall journey times and facilitates easy exchanges between modes and/or routes |

These objectives result in SDCC identifying a number of actions outlined below:

- *Work with the NTA to secure the extension and expansion of the Core Bus Network and other bus services to serve new areas of employment, housing and tourism potential, whilst also improving the efficiency and frequency of services within more established areas.*
- *Identify opportunities for multi-modal interchange and transport hubs at key locations (such as Centres, cross cutting infrastructure) to increase the efficiency and flow of public transport services.*

The Development Plan identifies (Table 2-4) the need to re-balance movement priorities towards more sustainable modes of transportation by prioritising the development of walking and cycling facilities within a safe and traffic calmed street environment.

Table 2-4: SDCC Development Plan Objectives for walking and cycling aligned with the proposed development

| Transport and Mobility Policy 3 Walking and Cycling | |
|---|---|
| TM3 Objective 1: | To create a comprehensive and legible County-wide network of cycling and walking routes that link communities to key destinations, amenities and leisure activities with reference to the policies and objectives contained in Chapter 9 (Heritage, Conservation and Landscape) particularly those that relate to Public Rights of Way and Permissive Access Routes |
| TM3 Objective 3: | To ensure that all streets and street networks are designed to prioritise the movement of pedestrians and cyclists within a safe and comfortable environment for a wide range of ages, abilities and journey types. |

The Development Plan provides maps of the area indicating the proposed zoning. The western portion of the Lucan to City Centre CBC falls within Map 2. From this map it has been identified that the proposed route interacts with the following items of note;

- West of the M50 the route runs adjacent to the River Liffey / Hermitage / Quarryvale areas, zoned HA, to protect and enhance the outstanding natural character and amenity of the Liffey Valley area;
- East of the M50 the route runs adjacent to Palmerstown village, zoned VC, to protect, improve and provide for the future development of village centres; and
- Towards the boundary with Dublin City Council the route runs adjacent to the proposed Natural Heritage Area (pNHA) of the River Liffey.

2.14 Dublin City Council Development Plan (2016-2022)

The Dublin City Council (DCC) Development Plan recognises the challenge that Transport has in making an important contribution to make towards achieving a sustainable city. These key challenges for the City are outlined as follows:

- *Effective integration of land-use and transportation, and the management of access and mobility.*
- *Pro-active engagement and collaboration with communities to bring about further modal shift and effective mobility management.*
- *The expansion of the strategic cycle network along all major water bodies including the River Liffey and the canals.*
- *Improving the city centre environment for pedestrians through public realm enhancements and through improvement of the strategic pedestrian network.*
- *Ensuring maximum benefits are achieved from public transport improvements including Luas cross-city and the anticipated Bus Rapid Transit network.*
- *Managing city centre road-space to best address the competing needs of public transport, pedestrians, cyclists, and the private car.*

- *Increasing significantly the existing mode share for active modes, i.e. walking and cycling, and supporting the forthcoming National Policy Framework for Alternative Fuels Infrastructure.*

Therefore, sustainable forms of transport such as public transport, walking, and cycling are strongly promoted in this plan, which takes a pro-active approach to influencing travel behaviour and effective traffic management.

Table 2-5: DCC Development Plan Objectives for Modal Change and Active Travel aligned with the proposed development

| <i>Movement and Transport: Promoting Modal Change and Active Travel</i> | |
|---|--|
| MT2: | Whilst having regard to the necessity for private car usage and the economic benefit to the city centre retail core as well as the city and national economy, to continue to promote modal shift from private car use towards increased use of more sustainable forms of transport such as cycling, walking and public transport, and to co-operate with the NTA, Transport Infrastructure Ireland (TII) and other transport agencies in progressing an integrated set of transport objectives. Initiatives contained in the government's 'Smarter Travel' document and in the NTA's draft transport strategy are key elements of this approach. |

Table 2-6: DCC Development Plan Objectives for Public Transport aligned with the proposed development

| <i>Movement and Transport: Public Transport</i> | |
|---|--|
| MT3: | To support and facilitate the development of an integrated public transport network with efficient interchange between transport modes, serving the existing and future needs of the city in association with relevant transport providers, agencies and stakeholders. |
| MT4: | To promote and facilitate the provision of Metro, all heavy elements of the DART Expansion Programme including DART Underground (rail interconnector), the electrification of existing lines, the expansion of Luas, and improvements to the bus network in order to achieve strategic transport objectives. |
| MT5: | To work with the relevant transport providers, agencies and stakeholders to facilitate the integration of active travel (walking, cycling etc.) with public transport, thereby making it easier for people to access and use the public transport system. |
| MT6: (i) | To work with Iarnród Éireann, the NTA, Transport Infrastructure Ireland (TII) and other operators to progress a coordinated approach to improving the rail network, integrated with other public transport modes to ensure maximum public benefit and promoting sustainable transport and improved connectivity. |

Volume 3 of the Dublin City Development Plan (2016-2022) provides maps of the Dublin Metropolitan area indicating the proposed zoning. The eastern section of the Lucan to City Centre CBC, falls across Maps D and E. From these maps it has been identified that the proposed route interacts with the following items of note:

- Map D – the route runs adjacent to the River Liffey Conservation Area,
- Map E – the route runs adjacent to the Conservation Areas associated with the Memorial Gardens and Royal Kilmainham Hospital.

The Dublin City Council (DCC) Development Plan recognises the challenge that Transport has in making an important contribution to make towards achieving a sustainable city. These key challenges for the City are outlined as follows:

- *Effective integration of land-use and transportation, and the management of access and mobility.*
- *Pro-active engagement and collaboration with communities to bring about further modal shift and effective mobility management.*
- *The expansion of the strategic cycle network along all major water bodies including the River Liffey and the canals.*
- *Improving the city centre environment for pedestrians through public realm enhancements and through improvement of the strategic pedestrian network.*

- *Ensuring maximum benefits are achieved from public transport improvements including Luas cross-city and the anticipated Bus Rapid Transit network.*
- *Managing city centre road-space to best address the competing needs of public transport, pedestrians, cyclists, and the private car.*
- *Increasing significantly the existing mode share for active modes, i.e. walking and cycling, and supporting the forthcoming National Policy Framework for Alternative Fuels Infrastructure.*

2.15 Liffey Valley Local Area Plan (extended 2013)

This Local Area Plan was adopted by the elected members of South Dublin County Council on 10th March 2008 and subsequently extended in 2013 for a further five years.

The local Area Plan was supported by a detailed traffic and transport assessment incorporating a major traffic modelling exercise. Some of the key findings of this assessment were

- *A combination of roads, public transport, cycle/pedestrian improvements and demand management measures are required to accommodate the increase in forecast traffic. Public Transport improvements will include improvements to existing Bus services and the provision of new 'shuttle' services.*
- *The model found that 80% of trips to the Liffey Valley site are by private car. Public transport trips including (cycle/pedestrian users) currently account for approximately 18% of the transport market to the Liffey Valley Centre.*
- *A Mobility Management Plan – and effective monitoring of the Mobility Management Plan – is crucial to the delivery of the transport and development proposals.*

The Local Area Plan sets out a number of objectives that support the proposed development:

- *To ensure that transport infrastructure within the Town Centre is upgraded in tandem with new development.*
- *To facilitate expansion of the public transport network through enhanced bus services within and accessing the Town Centre.*
- *To ensure that the design and layout of the new town centre optimises opportunity for access to the Town Centre by 'alternative modes of transport' such as public transport, walking or cycling.*

2.16 The Aim of the Bus Connects Core Bus Corridor Infrastructure Works

The aim of the CBC Infrastructure Works is to provide enhanced walking, cycling and bus infrastructure on key access corridors in the Dublin region, which will enable and deliver efficient, safe, and integrated sustainable transport movement along these corridors. These works are fundamental to addressing the congestion issues in the Dublin region with the population due to grow by 25% by 2040, bringing it to almost 1.55m.

Across Dublin, 67% of public transport journeys each day are made by bus, carrying three and four times the number of passengers that travel on the Luas or Dart and commuter rail. The popularity of cycling to work has also increased in popularity, up by 43% since 2011. Through the development of continuous bus priority and segregated cycle tracks the CBC can meet the growing demand for fast, reliable, punctual and convenient bus journeys in and out of the city centre, and safe cycling facilities for this growing number of cyclists.

2.17 The Core Bus Corridor Objectives

The objectives are to:

- Enhance the capacity and potential of the public transport system by improving bus speeds, reliability and punctuality through the provision of bus lanes and other measures to provide priority to bus movement over general traffic movements;
- Enhance the potential for cycling by providing safe infrastructure for cycling, segregated from general traffic wherever practicable;
- Support the delivery of an efficient, low carbon and climate resilient public transport service, which supports the achievement of Ireland's emission reduction targets;
- Enable compact growth, regeneration opportunities and more effective use of land in Dublin, for present and future generations, through the provision of safe and efficient sustainable transport networks;
- Improve accessibility to jobs, education and other social and economic opportunities through the provision of improved sustainable connectivity and integration with other public transport services; and
- Ensure that the public realm is carefully considered in the design and development of the transport infrastructure and seek to enhance key urban focal points where appropriate and feasible.

3. Background and Public Consultation

3.1 Existing Bus Services

The Lucan Corridor is primarily used by Dublin Bus Routes 25 (Dodsborough to Merrion Square) and Route 66 (Maynooth/Leixlip to Merrion Square), providing a variety of services between Lucan (Ballyowen Road) and Heuston Station. The corridor is also used by several regional bus services.

Figure 3-1 indicates the route for the Dublin Bus 25B service, which runs along the Chapelizod Bypass, although it is noted that several other services serve Chapelizod village.

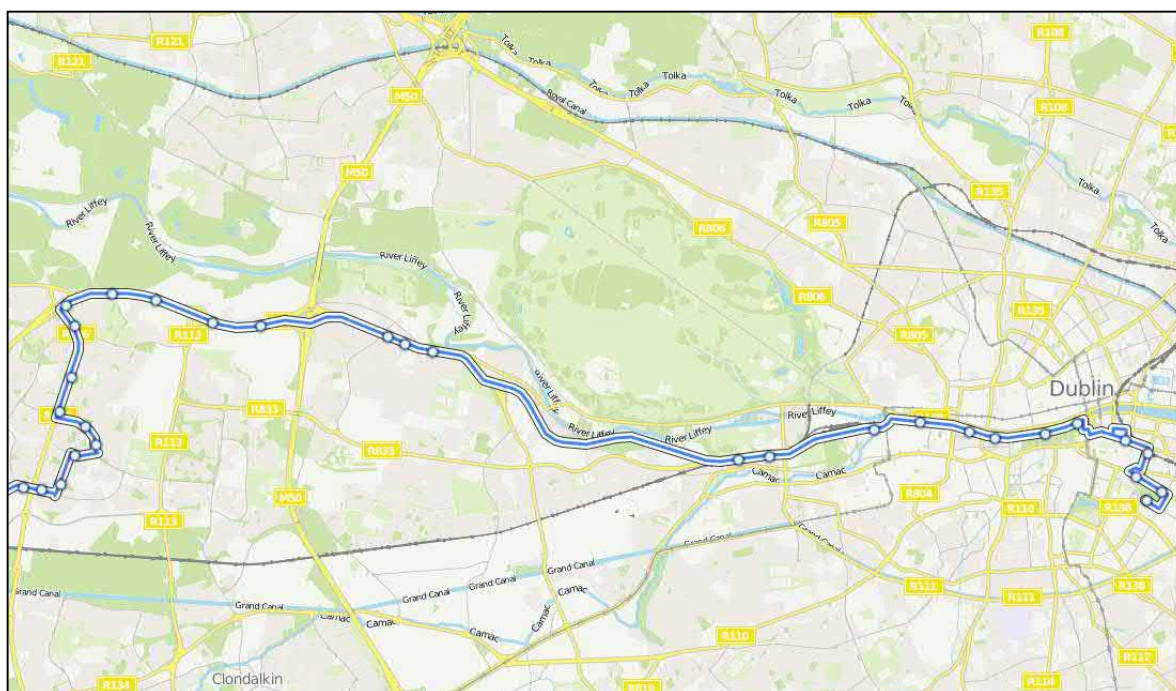


Figure 3-1: Dublin Bus Route 25B (Source: Moveitapp.com)

Currently the route has bus lanes over most of its length and journey times for the bus route between Heuston Station and Ballyowen Road during the AM and PM peak hours of bus operation (08:00-09:00 – 18:00-19:00) are observed to vary between 17 minutes and 21 minutes in the inbound direction and between 17 minutes and 20 minutes in the outbound direction.

Information obtained from the Bus Routes Automatic Vehicle Location (AVL) data over a typical period in 2019 was reviewed as part of the design development. This focused on variation and the cumulative time during the inbound AM peak hour and the outbound PM peak hour. This indicated that there is a reasonably consistent journey time along this corridor, which reflects the presence of existing bus lanes. However, there is some noticeable variation in journey time between the N4 Junction 2 (Hermitage Clinic) and the R149 Palmerstown Bypass / the Oval junction during both peak periods. This is consistent with observations on site and the lack of bus priority across the M50 and through the highly congested junctions on the Palmerstown Bypass.

3.2 Lucan to City Centre CBC Feasibility Report & Emerging Preferred Route Option

The Lucan to City Centre Core Bus Corridor Feasibility Study was undertaken by appointed consultants CSEA. The resulting findings were reported in the Feasibility Report, which was published in December 2016, prior to the first public consultation. This previous report is available on the BusConnects website.

The Feasibility study area was divided into four sections:

- Section 1: N4 Junction 5 (Celbridge/Leixlip) to N4 Junction 3 (Ballyowen/Lucan);
- Section 2: N4 Junction 3 (Ballyowen/Lucan) to Kennelsfort Road Upper;
- Section 3: Kennelsfort Road Upper to Con Colbert Road; and
- Section 4: Con Colbert Road to City Centre.

For Section 1, between Junction 5 and Junction 3, the existing N4 was identified as the Preferred Route Option.

3.3 Dublin Area Revised Bus Network

In 2017, the NTA began work on reviewing the Dublin Area Bus Network, in collaboration with Bus Operators and other stakeholders (incl. local authorities). Jarrett Walker and Associates, a transport planning practice with specific expertise in bus network redesign, was appointed to provide advice and technical support. The “Dublin Area Bus Network Redesign” project was launched by the NTA, which looked at the existing bus network and the radial Core Bus Network identified in the GDA Transport Strategy. The output from the Bus Network Review was published and available for public comment in August 2018 and again in October 2019.

Figure 3-2 indicates the final output from this study and illustrates that the C Spine route from the city centre along the R148 and the N4 terminates at N4 Junction 3 (Ballyowen / Lucan). West of this point, there is a three-way split of future services, with some branch routes (C1 and C2) running along Ballyowen Road, other branch routes (C3 and C4) running through Lucan village and various peak time routes continuing along the N4.

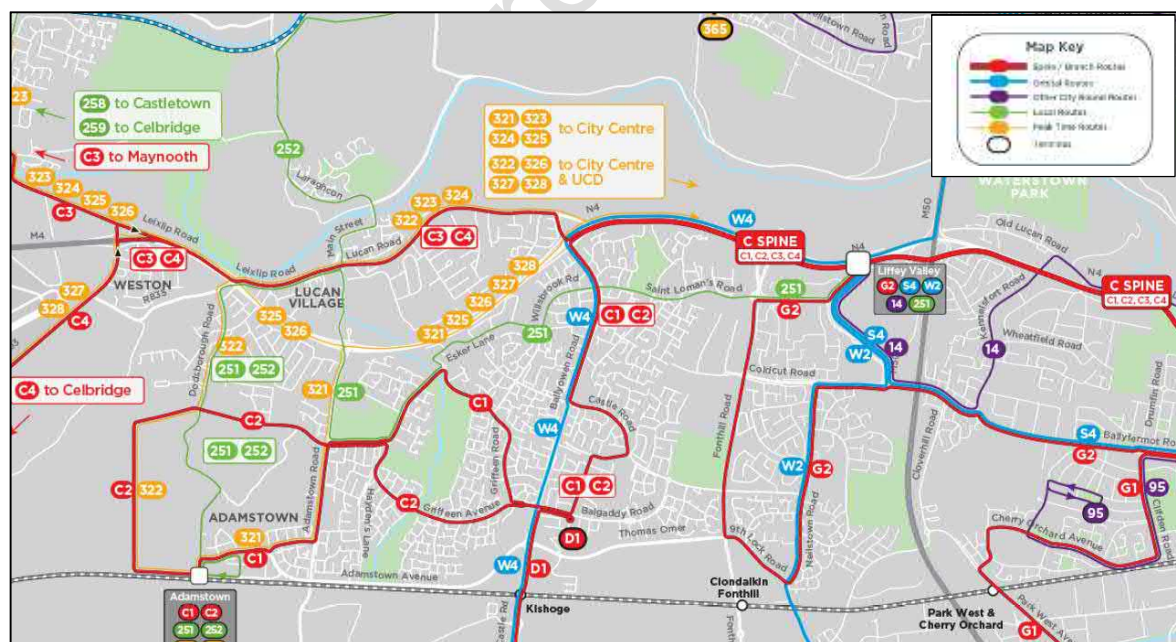


Figure 3-2: Revised Bus Network – Start of C-Spine, Lucan

As such, the decision was taken to exclude Section 1, Junction 5 to Junction 3, of the route in the Emerging Preferred Route Option for the Lucan to City Centre CBC, with the scheme commencing at N4 Junction 3 (Ballyowen / Lucan) to serve the C Spine route.

3.4 First Non-Statutory Public Consultation – Emerging Preferred Route Option

The first non-statutory public consultation on the BusConnects Core Bus Corridor Emerging Preferred Route Options took place on a phased basis. The first phase of consultation occurred from 14th November 2018 to 29th March 2019. The second phase ran from 23rd January 2019 to the 30th April 2019 and the final phase ran from 26th February 2019 until the 31st May 2019. The Lucan corridor was in the first phase of the consultation.

Following the conclusion of the consultation period on the 31st of May 2019, the National Transport Authority (NTA)'s appointed Engineering Designers (ED's) considered all feedback received and undertook a review of the proposed design, AECOM (in association with Mott MacDonalds) was appointed as designer for the Lucan to City Centre CBC. A summary report of the consultation is available on the BusConnects website.

In total there were 44 submissions for the Lucan to City Centre CBC with 135 comments. The submissions received ranged from personal submissions from residents and commuters to detailed proposals from public bodies, specialists, various associations and private sector businesses. These submissions comprised emails, letters and meeting notes recorded by the NTA.

The responses received provided a wide spectrum of views, with many of the views raising concern with the scheme or specific elements. The feedback received was compiled and summarised in the Lucan to City Centre CBC Non-Statutory Consultation Report which is available on the BusConnects website. A summary of the core issues raised in the consultation responses follows:

- Starting Point of the Lucan to City Centre CBC;
- N4 Junction 3 safety and design issues;
- Physical issues that negatively impact cyclists;
- Issues raised regarding increased congestion;
- Environmental queries;
- Heuston Station design issues;
- Bus Stop Locations;
- Chapelizod Bypass – rerouting of services;
- Loss (Property value, revenue, loss of function / parking, future planning gain etc.)
- Left turn slip lanes;
- Old Lucan Road to Palmerstown traffic issues; and
- New Ideas and suggestions.

The issues raised during the 1st public consultation have been considered as part of the route options assessment process in determining the Draft Preferred Route Option. The Emerging Preferred Route Option proposals were amended to address some of the issues raised in submissions, including incorporating suggestions and recommendations from local residents, community groups and stakeholders.

3.5 Development of Draft Preferred Route Option

Following the 1st Public Consultation process, the submissions were reviewed and considered as part of the design preparation for the Draft Preferred Route Option for the Lucan to City Centre CBC. The concept design proposals were subsequently amended to address some of the issues raised in submissions, including incorporating suggestions and recommendations from local residents, community groups and stakeholders.

Additional design options have been considered during the development of the Draft Preferred Route Option. These have been assessed against the previously identified Emerging Preferred Route Option, or the full list of options in the previous Multi Criteria Analyses which are discussed in Chapter 5 and 6, based on:

- Updated topographical survey information;
- Output from subsequent engagement and consultation activities that have taken place since the previous Preferred Route Option was last issued;
- Further design development and options assessment; and
- Additional option development and assessment.

Following the Public Consultation, and further design developments, the key scheme route amendments undertaken during the development of the Preferred Route Option are detailed below:

- Provision of a two-way cycle track from the Lucan Road at N4 Junction 3 inside the boundary of the Hermitage Golf Club and Hermitage Hospital, then along the Old Lucan Road in Palmerstown where it connects to existing facilities leading to Chapelizod village. This two-way cycleway will form part of Primary Cycle Route 06 included in the GDA Cycle Network.
- Relocation of the existing bus stops at Liffey Valley Shopping Centre some 200m further west to provide more weaving length for the buses to negotiate the M50 interchange more safely, improved segregation from the existing carriageway, and a new bridge over the N4 that links with the proposed bus interchange within Liffey Valley Shopping Centre, to provide higher quality pedestrian facilities.
- Introduction of a westbound, bus only, right turn lane at the Oval junction to facilitate buses turning into Palmerstown village.
- Provision of an eastbound right turn lane at Memorial Road to facilitate movements that are being impacted by the revised traffic management measures associated with the Liffey Valley CBC in Inchicore.
- The introduction of a northbound right turn lane at the South Circular Road junction to allow vehicles to turn right from the South Circular Road to St Johns Road West.
- Removal and replacement of additional trees along St Johns Road West so that facilities for both taxis and bicycles can be provided on the approach to the train station.

3.6 Second Non-Statutory Public Consultation – Draft Preferred Route Option

The draft PRO was published in March 2020 and a second round of public consultation commenced on 4th March 2020 and ran until the 17th of April 2020.

Due to Covid 19 restrictions being imposed by Government in mid-March the planned Public Information Events were impacted. Consequently, there were just 18 submissions for the Lucan to City Centre CBC with 67 comments. The submissions received ranged from personal submissions from residents and commuters to detailed proposals from public bodies, specialists, various associations and private sector businesses. These submissions comprised emails, letters and meeting notes recorded by the NTA.

The submissions covered a wide spectrum of views. A number of the submissions were supportive of the scheme; some others had only qualified support. Some submissions identified positives within the scheme, while challenging other elements of the overall scheme. A summary of the core issues raised in the consultation responses follows:

- Negative feedback;
 - the starting point for the CBC at N4 Junction 3;
 - cyclists not being prioritised in Palmerstown or Chapelizod.
- Cyclist safety – raised tables & continuity;
- Pedestrian safety at crossings;
- Old Lucan Road - 2-way cycle track & speed limit;

- Kennelsfort Road junction – staggered pedestrian crossing;
- Concerns about increased congestion;
- Disability access – junctions generally, tactile paving and bus stops;
- Pedestrian priority zone – width of provision;
- Suggestions and new ideas.

The observations raised during the second public consultation have been considered in the further development of the draft PRO.

Subsequently it was determined by the NTA that a third non-statutory public consultation would be conducted prior to finalising the PRO.

Work in Progress - Draft

4. Study Area

4.1 Introduction

In the previously completed Feasibility Report, the defined study area was divided into 4 sub areas, as shown in Figure 4-1.

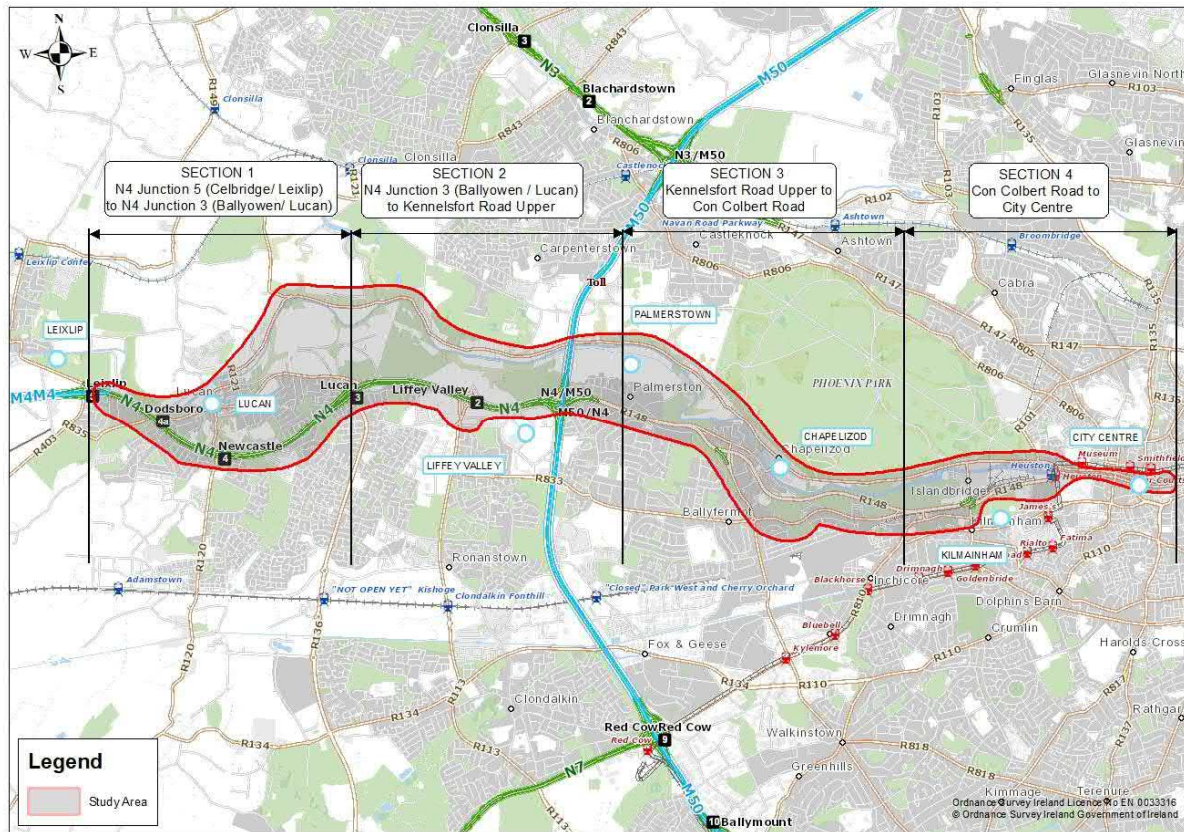


Figure 4-1: Study Area

4.2 Study Area Sections

As described in paragraph 3.3 above, prior to the first public consultation the decision was taken to omit Section 1 of the route between N4 Junction 5 and N4 Junction 3. Following the first public consultation it was determined that the width of the study area for the scheme did not need to be amended and therefore remained as extending from N4 Junction 3 to the city centre.

The revised study area is divided into the three remaining sections:

- Section 1: N4 Junction 3 (Ballyowen/Lucan) to Kennelsfort Road Upper;
- Section 2: Kennelsfort Road Upper to Con Colbert Road; and
- Section 3: Con Colbert Road to City Centre.

4.3 Physical Constraints and Opportunities

There are a number of potential constraints and opportunities, both natural (i.e. existing natural environment) and physical (the built environment), which constrain route options for the proposed scheme within the defined study area including:

- The River Liffey acts as a constraint to the northern extents of the study area.
- The Kildare Rail line provides a constraint to the southern extents of the study area towards the eastern end of the route.
- Availability of space between existing building lines in some locations.

- Existing and committed future development along the route, which act as a constraint but could also give rise to a potential opportunity.
- Existing monuments and protected structures.
- Various rail and motorway bridges
- Public parks.
- Free flow junction between N4 and M50.
- Need to maintain traffic flow in key areas, such as traffic exiting from the city centre onto the R148.
- Luas Red Line at Heuston Station.

A significant opportunity for this corridor is that existing high-quality bus lanes are present along much of the route, which provides a potential opportunity to provide a very high degree of bus priority if the remaining pinch points can be removed. The corridor also passes close to one of the largest shopping centers in Dublin, which will generate passenger numbers outside of peak hours making this corridor much more effective.

4.4 Integration with Existing and Proposed Public Transport Network

One of the key objectives of the proposed CBC scheme is to enhance interchange between the various modes of public transport operating in the city and wider metropolitan area, both now and in the future. The Emerging Preferred Route Option was developed to provide improved existing or new interchange opportunities with other transport services, including:

- Liffey Valley to City Centre CBC at a few locations;
- The Luas Red Line at Heuston Station;
- Existing Dublin Bus services at numerous locations along the route; and
- Future orbital Dublin Bus routes such as the Tallaght to Blanchardstown, Tallaght to Liffey Valley and city centre orbital services, see Figure 4-2 below.

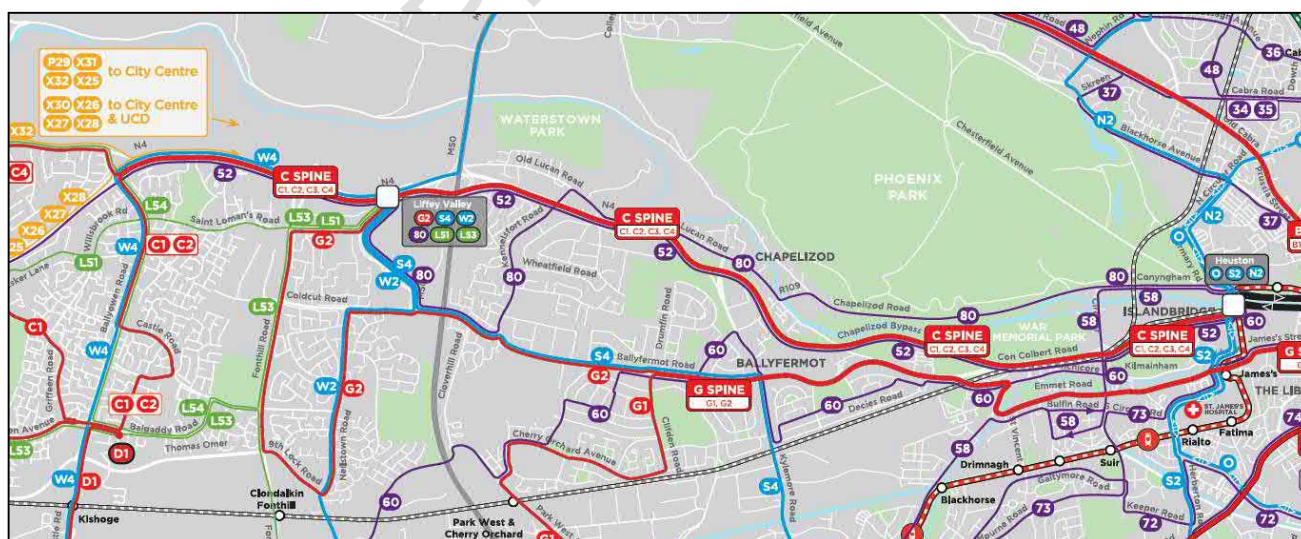


Figure 4-2: Extract from Future Bus Network Plan for the study area

4.5 Combability with Other Road Users

A key objective of the proposed scheme is to improve pedestrian and cyclist facilities along the route. In general, segregated facilities (i.e. off-road) should be proposed for these modes.

As referenced earlier, the GDA Cycle Network Plan was adopted by the NTA in early 2014 and there are primary (Routes 6, S05) and secondary (Routes S04, S06, NO5) cycle routes identified along the Lucan to City Centre CDC, see Figure 4-3 below. The route also interchanges with the Liffey Greenway and River Camac Greenway. During the course of the analysis carried out to identify the preferred core bus corridor, the provision of these cycle routes was considered at all stages.

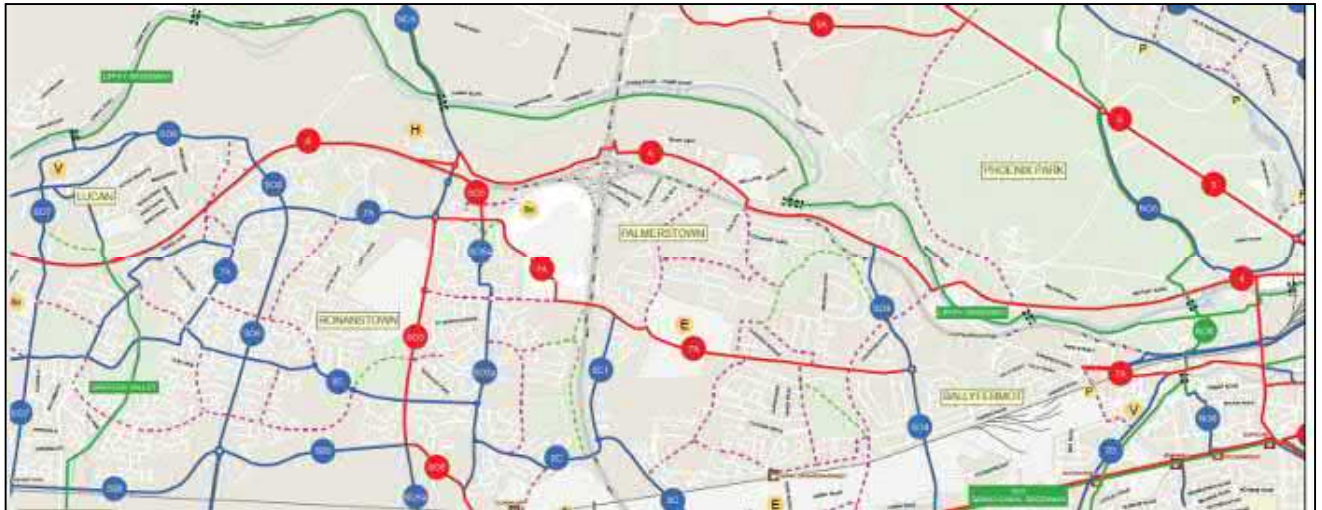


Figure 4-3: Extract for the GDA Cycle Network Plan for the Study Area

Where it is considered impractical to construct pedestrian or cycle facilities along a section of the CBC, such facilities need to be provided along a suitable alternative route. Where segregated cycle facilities cannot be provided along the CBC route and there is no suitable routing alternative, it may be possible for cyclists to share the bus lane with other vehicles. However, such proposals need careful consideration and design to ensure the safety of cyclists, with additional mitigation measures, such as traffic calming measures and other urban realm design solutions possibly required.

General traffic flow and local access will generally be maintained along the CBC although it is inevitable that there will be impacts on traffic capacity along the route associated with the reallocation of road space to CBC priority and cycle facilities and the introduction of turning movement restrictions. Any reductions in traffic carrying capacity of the road network may need to be considered in the context of the overall planned significant increase in quality and level of service of other modes (including increased capacity provision) on the CBC once implemented.

5. Review of Previous Feasibility and Options Assessment Study

5.1 Introduction

Following a comprehensive review of the potential route options within the study area a 2-stage assessment process was used to narrow down the number of routes available to one optimal route per each of the four sections of the study area. These four routes then converged to form the overall Emerging Preferred Route (EPR) Option which was presented at public consultation for information and feedback.

As part of the consultation process, the preparation of the Feasibility Report served to give the public a greater insight to how the process took place in addition to providing a transparency to the process of elimination used to determine the optimal route, given the information available and best engineering judgement.

This chapter provides a summary of the outcome of the options assessment also outlines the main material changes. These are: changes as a result of the topographical survey, changes due to public consultation (first and second rounds) and community engagement, inconsistencies in the previous assessment, areas in the previous assessment that require clarification and additional option assessment and development.

5.2 Assessment Methodology

The development of the Emerging Preferred Option during the feasibility stage was carried out in 2 stages. The first stage was a high-level route options assessment or 'sifting' process which appraised several potentially viable route options.

5.2.1 Stage 1 – Route Options Assessment – Sifting Stage

A 'spider's web' of route options was produced that would accommodate the objectives of the CBC for the study area as shown in Figure 5-1 below.

As part of the sifting stage each of the route options were assessed using a high level qualitative method, based on professional judgement and general appreciation for existing constraints and conditions within the study area that could be ascertained from available surveys and site visits.

This exercise screened and assessed technically feasible route options, based on distinct, project specific objectives. In addition to being assessed on their individual merits, routes were also screened relative to each other allowing some routes to be ruled out if more suitable alternatives existed.

This assessment stage focused on engineering constraints together with a desktop study, identifying high level environmental constraints and population catchment analysis.

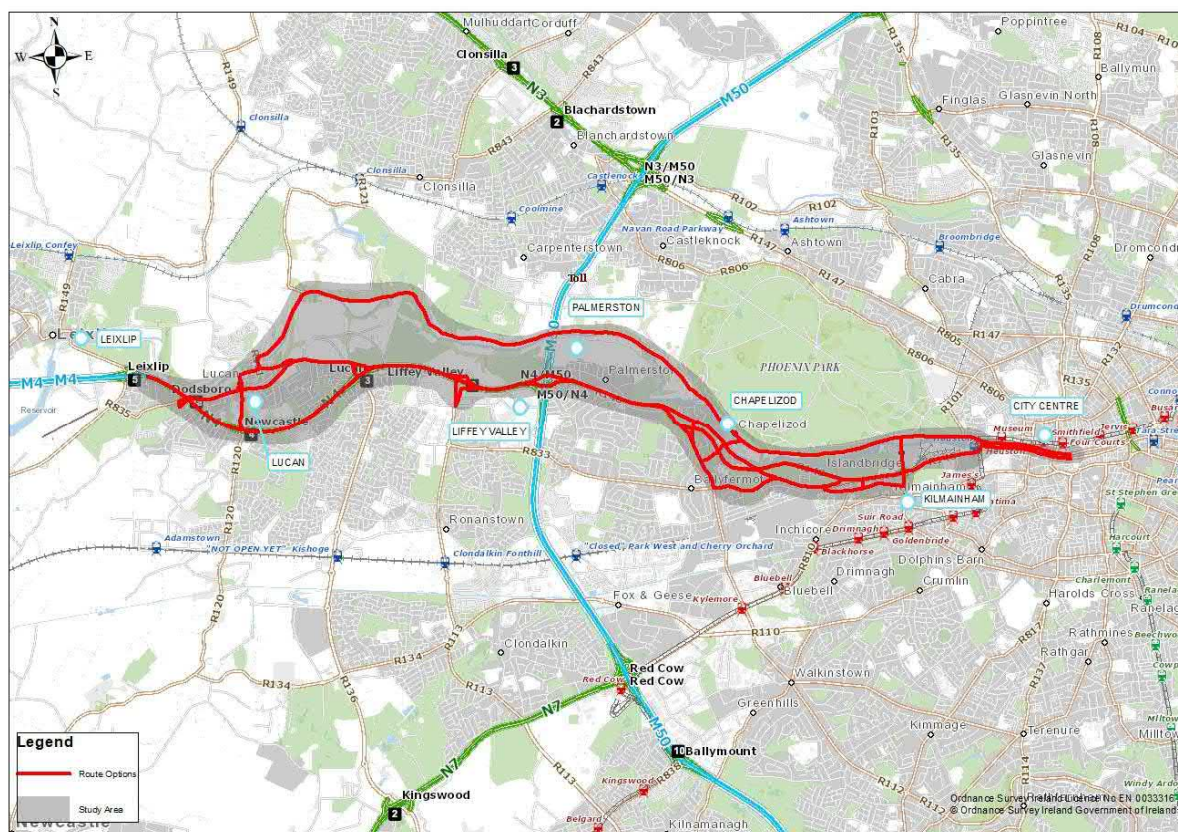


Figure 5-1: Spiders Web of Route Options

5.2.2 Stage 2 – Route Options Assessment – Detailed Assessment

Following completion of Stage 1, the remaining potentially viable options were progressed to Stage 2 of the assessment process. This process involved a more detailed qualitative and qualitative assessment using criteria established to compare the route options.

The indicative scheme for each route option was then progressed to a multi-criteria assessment. The 'Common Appraisal Framework for Transport Projects and Programmes' published by the Department of Transport, Tourism and Sport (DTTAS), March 2016, requires schemes to undergo a 'Multi-Criteria Analysis' (MCA) under the following criteria;

- Economy;
- Integration;
- Accessibility and Social Inclusion;
- Safety;
- Environment; and
- Physical Activity.

Physical Activity was scoped out of the multi-criteria assessment at this stage. This was due to all route options carried forward, promote physical activity equally and as such it was not considered to be a key differentiator between route options.

Table 5-1 presents a summary of the CBC assessment criteria and sub criteria used as part of the Stage 2 detailed route options assessment process. Different options were assessed and ranked against each other in accordance with the five point scale presented in Table 5-2.

Table 5-1: Assessment Criteria

| Assessment Criteria | Assessment Sub-Criteria |
|-------------------------------------|---|
| 1. Economy | 1.a. Capital Cost |
| | 1.b. Transport Reliability and Quality (Journey Time) |
| 2. Integration | 2.a. Land Use Integration |
| | 2.b. Residential Population and Employment Catchments |
| | 2.c. Transport Network Integration |
| | 2.d. Cycle Network Integration |
| 3. Accessibility & Social Inclusion | 3.a. Key Trip Attractors (Education/Health/Commercial/Employment) |
| | 3.b. Deprived Geographic Areas |
| 4. Safety | 4.a. Road User Safety |
| 5. Environment | 5.a. Archaeology and Cultural Heritage |
| | 5.b. Architectural Heritage |
| | 5.c. Flora & Fauna |
| | 5.d. Soils and Geology |
| | 5.e. Hydrology |
| | 5.f. Landscape and Visual |
| | 5.g. Air Quality |
| | 5.h. Noise & Vibration |
| | 5.i. Land Use Character |

Table 5-2: Assessment Ranking

| Assessment Ranking | Description |
|--------------------|---|
| | Significant advantages over the other options |
| | Some advantages over the other options |
| | Neutral compared to other options |
| | Some disadvantages over other options |
| | Significant disadvantages compared to other options |

5.3 Emerging Preferred Route (EPR) Option

The Feasibility Report concluded that the EPR Option should follow the N4 / R148 corridor from Junction 5 of the N4 to Heuston Station.

As described in paragraph 3.3, following the Dublin Area Bus Network Redesign, and prior to the first public consultation, the decision was taken to omit the section of the route between N4 Junction 5 and N4 Junction 3.

Following the first public consultation, this decision was reviewed in light of submissions received from members of the public. It was reconfirmed that in the future bus services network, as shown in Figure

3-2, the C Spine route from the city centre along the R148 and the N4 is proposed to terminate at N4 Junction 3 (Ballyowen / Lucan). West of this point, a three-way split of future services is proposed, with some branch routes (C1 and C2) running along Ballyowen Road, other branch routes (C3 and C4) running through Lucan village and various peak time routes continuing along the N4.

In view of this it was concluded that the extents of the EPR Option should remain as presented in the EPR, between N4 Junction 3 to the City Centre.

The extents of the study area for this reduced length of scheme was also reviewed and it was concluded that this remained valid.

In addition, the assessment process and details outlined in the Feasibility and Options Assessment Report were reviewed. This confirmed that the assessment of the various route options remained valid and that the EPR identified in the Feasibility Report along the N4 / R148 corridor remained the optimum routing for the Lucan to City Centre CBC.

As such, the EPR Option was reviewed for the three remaining sections listed below:

- Section 1: N4 Junction 3 (Ballyowen/Lucan) to Kennelsfort Road Upper;
- Section 2: R148, Kennelsfort Road Upper to Con Colbert Road; and
- Section 3: R148, Con Colbert Road to city centre (Heuston Station).

The EPR Option for each section is described in the following sections and areas identified for re-examination are highlighted.

5.4 Section 1 - N4 Junction 3 (Ballyowen/Lucan) to Kennelsfort Road Upper

5.4.1 EPR Option

This section commences at Junction 3 on the N4 Lucan Road and follows this route as far as the M50 interchange. Here the designation of the route changes to the R148 Regional Road and continues to the Kennelsfort Road Upper junction.

As part of the EPR Option it was intended to retain the existing bus lane layout on the overbridge and to extend the existing bus lane on Ballyowen Road as far as the junction with Lucan Road. The junction was to be modified to accommodate this bus lane and improved cycle facilities. On the Lucan Road the EPR Option proposed to extend the existing bus lane as far as the existing roundabout junction. A new cycle track was also proposed to be provided. To accommodate this change, it was proposed to use limited land take from the adjacent green space.

On the westbound off slip ramp, it was intended to provide a continuous bus lane from the N4 to the junction with Ballyowen Road. It was proposed to widen the off-ramp on both sides to provide for this bus lane and a new cycle track. It was identified that some landtake may be required to the south of the off-ramp. On a limited section of this route, a shared footway/ cycleway was to be provided to reduce the requirement of land take in this area.

On the N4 it was proposed to maintain the existing city centre bound bus lane. A new segregated cycle track was also proposed on this side of the existing road requiring some limited land take from the adjacent green space. For outbound traffic it was intended to retain the existing segregated general traffic lane and to introduce a bus lane to east of the Ballyowen Lane junction. This would tie back into the existing bus lane to the east of the existing footbridge adjacent to Mount Andrew Court. This existing footway / cycleway facility was to be upgraded. The revised layout would require some limited land take from adjacent properties.

At the N4 Junction 2, the EPR Option intended to retain the existing bus lane and bus stop facilities on the eastbound off ramp and link the new cycle way to the existing cycle network at the junction. It was proposed to provide a new toucan crossing at this section of the junction, and to provide a new bus lane on the eastbound off slip road. It was also proposed to provide a bus lane in each direction on the overbridge. From the N4 junction 2, cyclists are directed onto the Old Lucan Road running parallel to and on the north side of the N4.

On the M50 junction, it was proposed to maintain the bus lane with two general traffic lanes in both directions through the junction. Cyclists would be directed over the existing foot/cycle bridge over M50 on to the Old Lucan Road.

Between the M50 Junction and Kennelsfort Road Junction it was proposed to maintain the existing arrangements of a single bus lane and two general traffic lanes on the city centre bound R148 and one general traffic lane for through traffic & a bus lane on the outbound route.

5.3.2 Areas Identified for Re-examination

Following the Public Consultation feedback and design updates the areas described below were identified for re-examination as part of this report.

- The standard of facilities for cyclists along the route; and
- The location of bus stops serving Liffey Valley shopping centre.

Cyclist Facilities

Arising from the previous Feasibility and Options Assessment Study, the EPR Option generally considered only the impact of buses with specific focus on the incorporation of the CBC into existing bus routes/facilities to ensure the accessibility and inclusion of the scheme into local communities. As described below, a number of comments were raised in the first public consultation questioning the adequacy of the cycle facilities included in the Emerging Preferred Route Option and expressing the view that the cycle facilities proposed had not been fully considered.

- A concern was raised outlining in the cyclist's safety coming off the N4 west-bound slip road, as cyclists were to be positioned between traffic lanes.
- A significant number of comments made note of the stop-start nature of the cyclist's journey in the EPR Option between N4 Junction 2 and Junction 3, with comments stating that there was a lack of continuity for cyclists at minor junctions/accesses to private properties.
- Some submissions raised the issue of shared surfaces along the route and the hazards this could pose; it was expressed that shared surfaces offered a low level of service for all users and put vulnerable and disabled users at risk when mixed with higher speed cyclists.
- Some concern was raised about the lack of specific facilities for cyclists along the Old Lucan Road between the N4 Junction 2 and the M50.

In order to address the concerns raised, the layouts of all junctions along the corridor were reviewed with a view to improving cycle provision and safety. In addition, the decision was taken to investigate if alternative proposals for cycle facilities could be developed.

In addition, as can be seen in Figure 5-2, it was noted that Primary Cycle Route 06 of the GDA Proposed Cycle Network Plan is proposed to run between N4 Junction 3 and the city centre.

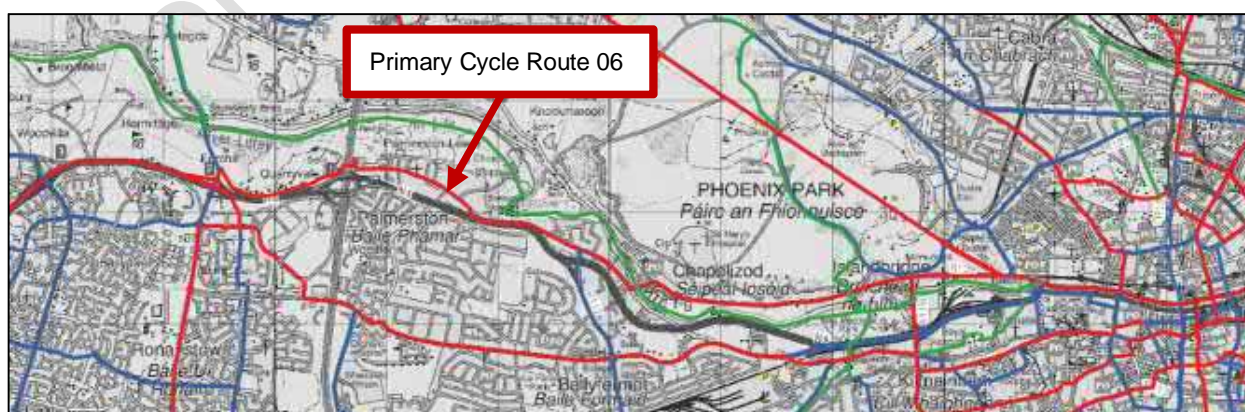


Figure 5-2: Extract of GDA Cycle Network Plan

From N4 Junction 3 to the start of the Chapelizod Bypass this Primary Cycle Route follows the route of the Lucan to City Centre CBC. This presented an opportunity to incorporate the design of this cycle route into the Lucan to City Centre CBC, which had the potential to provide significantly enhanced cyclist facilities along the full length of this section of the route when compared to those included in the Emerging Preferred Route Option proposals.

In addition, the standard of provision for cyclists on the Ballyowen Road and the at the junction with the Lucan Road were reviewed, with a view to providing enhanced facilities.

Bus Stops at Liffey Valley Shopping Centre

As part of the overall BusConnects programme, Liffey Valley is identified as one of the key interchange locations on the future bus network, see Figure 5-3 below.

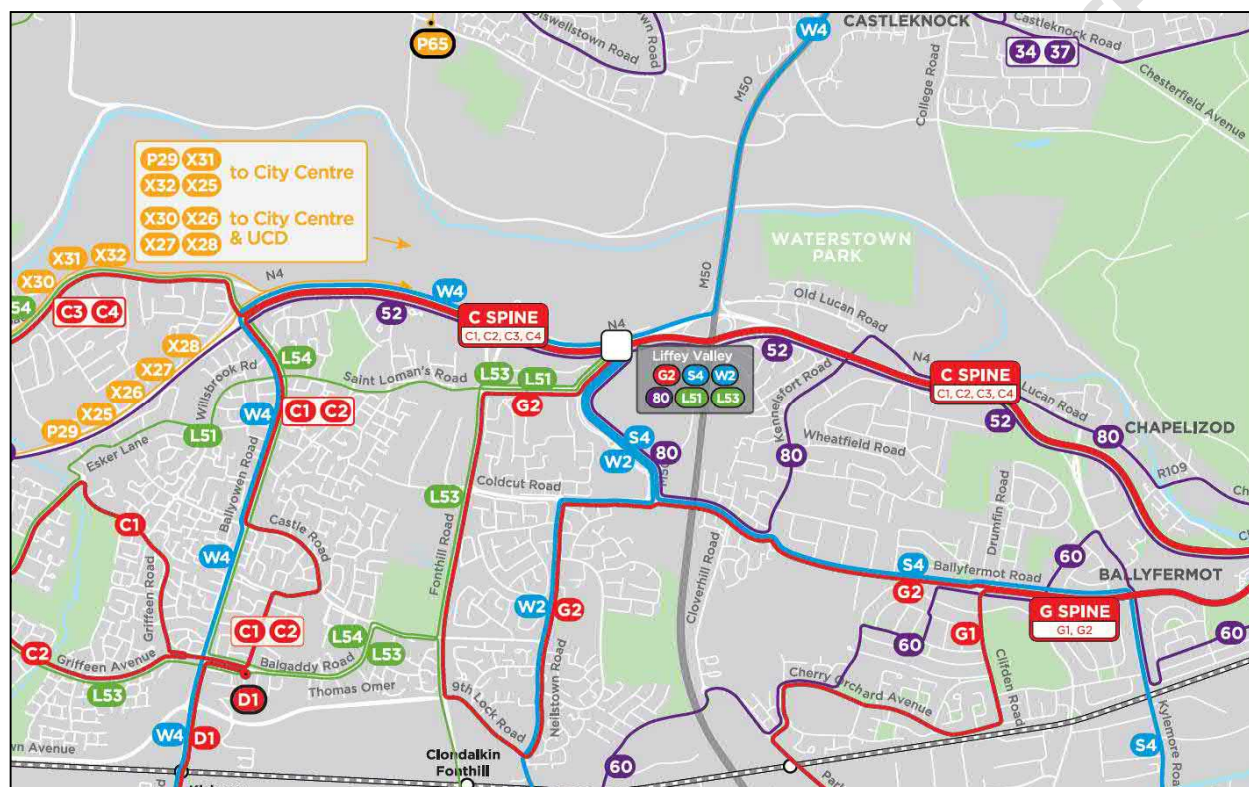


Figure 5-3: Extract from Future Bus Network

Proposals for the Liffey Valley to City Centre CBC, which starts at Liffey Valley shopping centre, included a public transport interchange at this location. This is to facilitate passenger transfers between a variety of radial services (C Spine and G spine), orbital services (W4, S4) and local services. The interchange would also allow transfer of passengers between these and the various, express and regional services operating along the N4.

It was evident that the location of the existing pedestrian / cyclist bridge connecting the bus stops on the N4 at this location with Liffey Valley shopping centre did not provide a direct link to the future public transport interchange. In addition, the existing bus stops were not of an adequate size and standard to serve future anticipated demand.

Therefore, it was considered appropriate to review the location and standard of bus stop provision, with a view to developing an enhanced connection to the proposed interchange within shopping centre site and provide the necessary standard of passenger and pedestrian facilities.

Furthermore, feedback from stakeholders indicated that the existing bus stops serving Liffey Valley shopping centre presented traffic operational issues with regards to weaving movements between buses and N4 traffic. The possibility of providing increased weaving lengths to enable buses and general traffic to negotiate the N4 / M50 interchange more safely was also considered.

5.5 Section 2 – R148, Kennelsfort Road Upper to Con Colbert Road

5.5.1 EPR Option

It was intended to modify the Kennelsfort Road Lower junction to improve pedestrian crossing facilities, and to provide new cycling facilities along Kennelsfort Road Lower. Cyclist would be directed along the Old Lucan Road and would be linked to an existing shared footway/cycleway located on the north of the R148 at the start of the Chapelizod Bypass. This cycle route would link to the R112 Lucan Road at Glenaulin Drive.

Between Kennelsfort Road Junction and Con Colbert Road Junction the EPR Option followed the existing R148 Palmerstown Bypass and Chapelizod Bypass. Along this section it was proposed to maintain a single bus lane and two general traffic lanes in both directions. The EPR Option intended to provide a bus lane on the R112 Kilemore Road on-ramp road. It was also proposed to provide new bus stop facility serving Chapelizod Hill Road. Some limited land take would be required to facilitate these works. It was proposed to provide cycle tracks on both the on and off ramps at Con Colbert Road.

5.5.2 Areas identified for Re-examination

Following the Public Consultation feedback and design updates the areas described below were identified for re-examination as part of this report.

- The standard of facilities for cyclists along the route; and
- The possibility of introducing a westbound, bus only, right turn lane at the R148 / Oval junction.

Cyclist Facilities

The layouts of all junctions along the corridor have been reviewed with a view to providing improved cycle provision and safety.

As stated in Section 5.3.2 above, the EPR Option generally considered only the impact of buses. Following the first public consultation, some submissions highlighted the lack of specific facilities for cyclists along the Old Lucan Road in Palmerstown village. In particular, concern was raised about the speed of traffic and amount of uncontrolled parking along this section of carriageway.

In addition, it was noted that there was poor cyclist connectivity for the residents to the south of the R148 to access Palmerstown village, which presented an opportunity to provide improved facilities.

In order to address the concerns raised, the decision was taken to investigate if alternative proposals for cycle facilities could be developed. As with the previous section, it was noted that there was an opportunity to incorporate the design of Primary Cycle Route 06 of the GDA Proposed Cycle Network Plan into the Lucan to City Centre BusConnects corridor, which had the potential to provide much enhanced cyclist facilities compared to those included in the Emerging Preferred Route Option proposals.

Bus-only Right Turn at the Oval

It was noted that the Bus Network Redesign proposed a new Route 80 to serve the Old Lucan Road in Palmerstown village via the junction with the Oval, see Figure 5-4 below. In order to provide priority for this service in the westbound direction consideration was given to the possibility of introducing a westbound, bus only, right turn lane at the Oval junction.



Figure 5-4: Extract from Bus Network

5.6 Section 3 – R148 Con Colbert Road to City Centre (Heuston Station)

5.6.1 EPR Option

From the Con Colbert Road junction, the EPR Option proposed that continuous bus lanes, two general traffic lanes and cycle tracks be maintained in their current configuration. Cycle lanes were proposed on Memorial Road.

The existing South Circular Road Junction was proposed to be modified to accommodate additional bus lane and cycle track provision. Along St John's Road West, between the South Circular Road Junction and the junction into the Heuston South Quarter Development, continuous bus lanes and two general traffic lanes would be maintained in their current configuration.

Between the Heuston South Quarter junction and the Frank Sherwin Bridge the EPR Option provided for one bus lane and one single general traffic lane on both inbound and outbound directions on St John's Road West. In addition, cycle tracks were intended to be provided in both directions. This new arrangement would be accommodated by widening the road into the existing central median. It was proposed to retain the existing taxi rank at Heuston Station and to locate the cycle track between the footway and the taxi rank spaces. The proposed works would tie into the road network at Wolfe Tone Quay and Victoria Quay.

5.6.2 Areas identified for Re-examination

Following the Public Consultation feedback and design updates the areas described below were identified for re-examination as part of this report.

- The standard of facilities for cyclists along the route; and
- The possibility of facilitating additional turning movements at the Memorial Road and South Circular Road junctions.

Cyclist Facilities

The layouts of all junctions along the corridor have been reviewed with a view to providing improved cycle provision and safety.

Facilitating Additional Turning Movements

It was noted that the Liffey Valley to City Centre CBC included revised traffic management measures that resulted in it being desirable to provide an eastbound right turn lane at Memorial Road and a northbound right turn lane at the South Circular Road junction, to allow vehicles to turn right from the South Circular Road to St Johns Road West.

Therefore, consideration has been given to the possibility facilitating these additional turning movements.

5.7 Summary

In reviewing the Emerging Preferred Route Option, it can be concluded that all three Sections are following the optimum routing.

As described above, there are a number of potential design amendments to elements of the Emerging Preferred Route Option. Consideration has been given to the need for a further assessment to ascertain if they should be included in Preferred Route Option.

These potential amendments are:

Section 1

- i. Improvement in cyclist facilities by the provision of a segregated two-way cycle track from the Lucan Road at N4 Junction 3 inside the existing boundary of the Hermitage Golf Club, then along the Old Lucan Road either side of the M50 to Palmerstown village where it would connect to existing facilities leading to Chapelizod village. This two-way cycleway will form part of Primary Cycle Route 06 included in the GDA Cycle Network;
- ii. Relocation of the existing bus stops at Liffey Valley Shopping Centre some 200m further west, with improved segregation from the existing carriageway and a new bridge over the N4 that links with the proposed bus interchange within Liffey Valley Shopping Centre to provide higher quality pedestrian facilities and also provide more weaving length for the buses to negotiate the M50 interchange more safely;

Section 2

- iii. Introduction of a westbound, bus only, right turn lane at the Oval junction to facilitate buses serving route 80 to be able to turn into Palmerstown village;

Section 3

- iv. Provision of an eastbound right turn lane at Memorial Road to allow vehicles to turn right from Con Colbert Road to facilitate movements that are being impacted by the revised traffic management measures associated with the Liffey Valley CBC in Inchicore; and
- v. Introduction of a northbound right turn lane at the South Circular Road junction to allow vehicles to turn right from the South Circular Road to St Johns Road West to facilitate movements that are being impacted by the revised traffic management measures associated with the Liffey Valley CBC in Inchicore.

While none of these potential proposals alter the route option, within Section 1, item i), the segregated two-way cycleway, and item ii), the relocated bus stops and new pedestrian bridge, both involve significant additional infrastructure and investment. It is therefore considered that detailed assessments are warranted for these two items. The assessment of the options for these two material changes are discussed in the following chapter.

Within Sections 2 and 3, items iii), iv) and v) all involve relatively minor modifications to the layout of a single junction and the proposals are considered to be part of the evolving design development. As such there is no option assessment required within Section 2 and Section 3.

6. Options Assessment

6.1 Section 1: N4 Junction 3 (Ballyowen/Lucan) to Kennelsfort Road Upper

6.1.1 Introduction

As described earlier, following the first Public Consultation, the material changes to be considered during the development of the Preferred Route Option are:

- Improvement in cyclist facilities by the provision of a two-way cycle track from the Lucan Road at N4 Junction 3 inside the boundary of the Hermitage Golf Club, then along the Old Lucan Road in Palmerstown where it connects to existing facilities leading to Chapelizod village. This two-way cycleway will form part of Primary Cycle Route 06 included in the GDA Cycle Network.
- Relocation of the existing bus stops at Liffey Valley Shopping Centre some 200m further west, with improved segregation from the existing carriageway and a new bridge over the N4 that links with the proposed bus interchange within Liffey Valley Shopping Centre to provide higher quality pedestrian facilities and also provide more weaving length for the buses to negotiate the M50 interchange more safely.

6.1.2 Cyclist Facilities Option Considered

6.1.2.1 Alternative Option Considered

In considering alternative cyclist proposals, a concept scheme was developed for a two-way cycle track along the northern side of the N4, as shown in Figure 6-1 below.

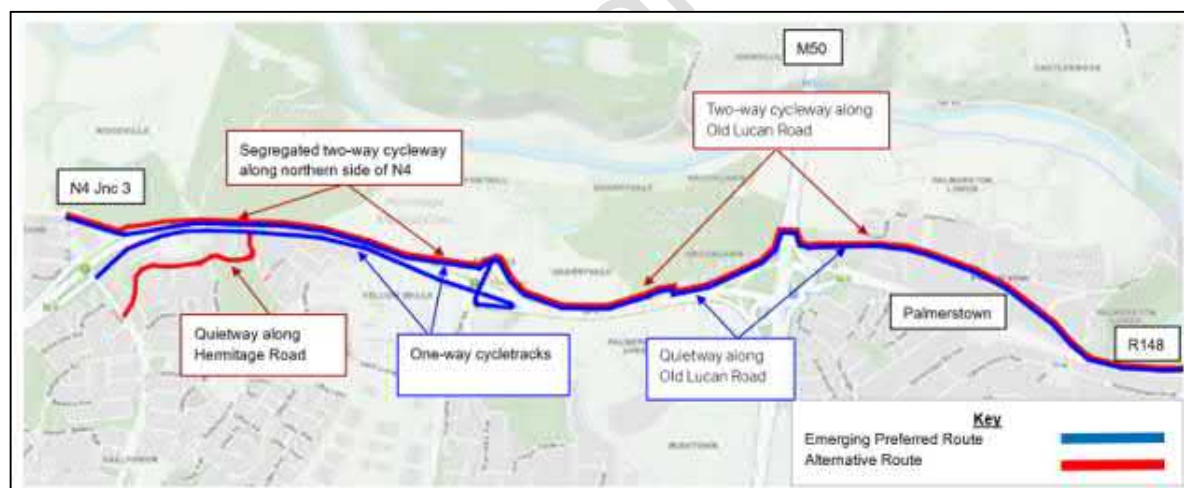


Figure 6-1: Alternative Concept for Cycle Track

The EPR Option and alternative option are described below.

Emerging Preferred Route (EPR) Cycle Option

Eastbound a one-way cycle lane runs down the Lucan Road parallel to the bus lane and then follows the N4 Junction 3 entry slip running parallel to the bus lane on the existing shared footpath/ single cycle track. The cycle track then continues along N4 Junction 2 exit slip road, crossing over the R113 and running down Old Lucan Road as a proposed Quietway.

East of the M50 the cycle route continues along the Old Lucan Road as a proposed Quietway and runs through Palmerstown village to the start of the R148 Chapelizod Bypass. Here it connects to the existing Pedestrian Priority Zone running parallel to the R148 (separated by a verge) and continues down the R112 towards Chapelizod village.

Westbound the route commences at the N4 Junction 2 and continues along the N4 running next to the bus lane on the main carriageway up to Junction 3 making use of existing cyclist facilities. On the approach to the N4 Junction 3 westbound slip road, the one-way cycle lane will run alongside the bus lane utilising the service road running parallel to the N4.

At the signalised junction with Ballyowen Road at the western end of the slip the cycle lane is located between the left-hand turn and straight-ahead lane. This section of the road will require widening to allow the planned works to take place which will require land take from adjacent thirteen private residences and 1 commercial property. In addition to the land acquisition there would also be a requirement to remove a number of mature trees to facilitate the widening. There would also be a stretch of shared area near Ballyowen Lane (~270m).

Alternative Concept Design Option

Starting at the commencement of the scheme the two-way cycle track runs along the northern side of the R835 Lucan Road and then along the access road towards the Hermitage Golf Course. It then runs along the southern edge of the golf club and the Hermitage Clinic lands. This will require the acquisition of a strip of land from the adjacent fields, the golf club, as well as the Hermitage Clinic lands.

East of the N4 Junction 2 the option continues as a segregated two-way cycle facility along the Old Lucan Road before making use of the existing pedestrian / cyclist bridge crossing of the M50. East of the M50 the option continues as a segregated two-way cycle facility along the northern side of Old Lucan Road, running through Palmerstown village before connecting to the existing Pedestrian Priority Zone at the start of the Chapelizod Bypass. At this point Primary Cycle Route 06 deviates from the BusConnects corridor and continues down the R112 towards Chapelizod village.

6.1.2.2 Options Assessment

Overall, the alternative route helps reduce the stop-start nature of that which was raised at the public consultation. The alternative option improves the safety of cyclist greatly by taking cyclists offline, as well as improving safety for pedestrians by reducing shared spaces. Furthermore, the proposed improvements will make for a significantly more pleasant journey for cyclists using the route as they will no longer be cycling directly next to traffic lane of the N4 dual carriageway.

Locating the two-way cycleway on the northside of the N4 reduces the number of intersections with junctions and accesses to private properties. This increases the safety of the cyclists using facilities along the route, as well as reducing journey times for those using the route. The Emerging Preferred Route Option intersected with twelve private accesses and junctions between N4 junction 2 and Junction 3, compared to just two in the alternative option.

The introduction of a segregated two-way cycle track will eliminate the need for cyclists to use the shared area at Junction 2 of the N4 in the westbound direction; in the EPR Option they will have to use the shared route to link the single lane westbound and eastbound routes.

Although the alternative option requires significantly more land take than the EPR Option, it reduces the number of commercial and residential properties impacted. This was a key concern highlighted at the public consultation as many thought it would impact upon their house values.

The alternative option will have a significant impact on trees and hedgerows along the northern boundary of the N4 between Junction 3 and Junction 2, including the need to remove a large number of trees along the southern edge of the Hermitage Golf Club, whereas the EPR Option has no such comparable impact.

The assessment rankings are shown in Table 6-1 below. Details of the assessment are presented in Appendix A and summarised in Table 6-2 below.

Table 6-1: Assessment Ranking

| Assessment Ranking | Description |
|--------------------|---|
| | Significant advantages over the other options |
| | Some advantages over the other options |
| | Neutral compared to other options |
| | Some disadvantages over other options |
| | Significant disadvantages compared to other options |

Table 6-2: Assessment Summary

| Assessment Criteria | EPR Option | Alternative Option |
|----------------------------------|------------|--------------------|
| Economy | | |
| Integration | | |
| Accessibility & Social Inclusion | | |
| Safety | | |
| Environment | | |
| Overall | | |

6.1.2.3 Conclusion and Preferred Route Option

In conclusion the Preferred Option for the cyclist facilities will be the Alternative Option, as despite the higher capital cost and adverse impact on existing trees and hedgerows (which would be replanted), there would be significant advantages in transport reliability and quality, as well as improved integration, accessibility and, in particular, significantly improved safety in comparison to the Emerging Preferred Route Option. Overall it will provide a significantly improved cycle facility for the Primary Cycle Route 06.

The provision of this segregated two-way cycleway in the Draft Preferred Route Option represents a material change to the Emerging Preferred Route Option.

6.1.3 Liffey Valley bus stops

6.1.3.1 Alternative Option Considered

As identified in Section 5.3.2 above, as part of the BusConnects programme, Liffey Valley is identified as one of the key interchange locations on the future bus network. This is to facilitate passenger transfers between a variety of radial services (C Spine and G spine), orbital services (W4, S4) and local services. The interchange would also allow transfer of passengers between these and the various, express and regional services operating along the N4.

In considering alternative arrangements for the bus stops, it was evident that the location of the existing pedestrian / cyclist bridge connecting the bus stops on the N4 with Liffey Valley shopping centre did not provide a direct link to the future public transport interchange. In addition, the existing bus stops were not of an adequate size and standard to serve future anticipated demand.

Therefore, it was considered appropriate to review the location and standard of bus stop provision, with a view to developing an enhanced connection to the proposed interchange within shopping centre site and provide the necessary standard of passenger and pedestrian facilities.

Emerging Preferred Route (EPR) Option

The EPR Option proposals maintained the existing arrangement and provision at this location with no changes proposed.

In the eastbound direction a single length bus layby is provided, with a ramped access to the shared pedestrian / cyclist bridge over the N4 dual carriageway connecting to the Liffey Valley shopping centre site. For buses leaving the stop and heading towards the R148 towards the city centre there is a very short length for them to weave with N4 traffic that is heading towards the M50 northbound, with a significant speed differential between the two movements.

In the westbound direction there is a similar provision of a single length bus layby, with a ramped access to the shared pedestrian / cyclist bridge over the N4 dual carriageway. For buses entering this stop there is a very short length for them to weave with N4 traffic that has come from the M50 northbound.

Figure 6-2 below shows the EPR Option.

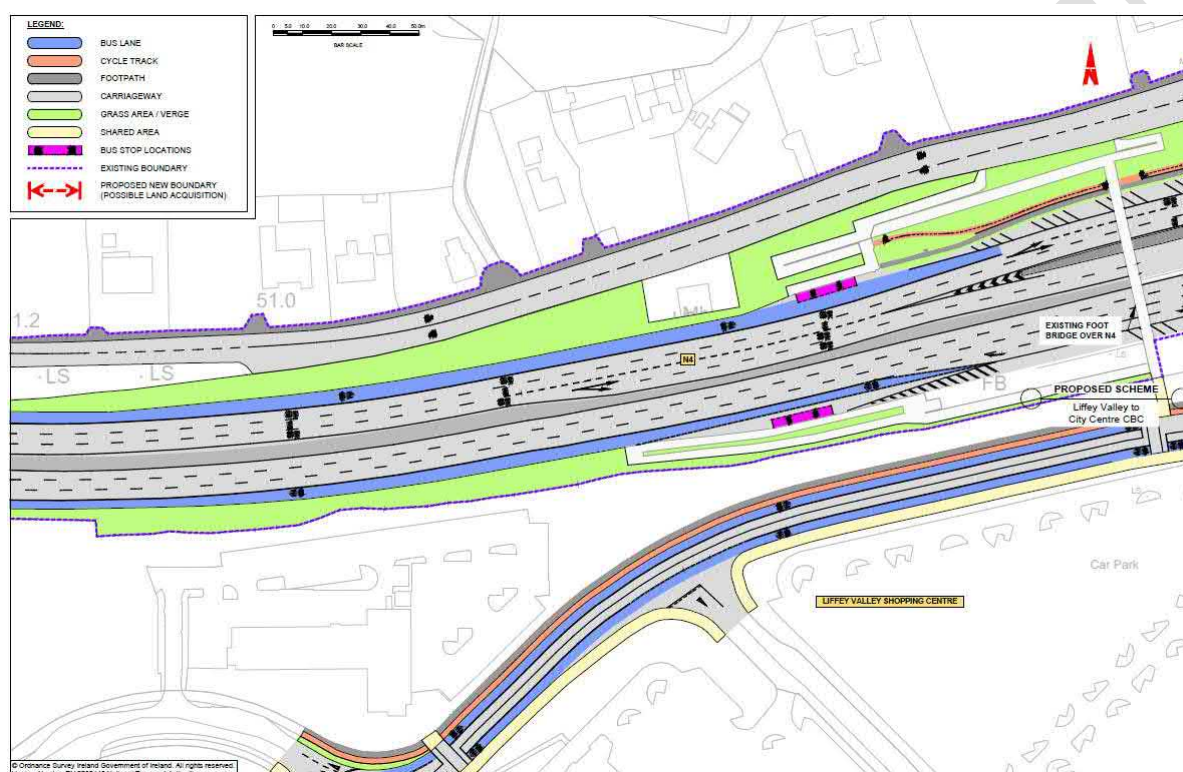


Figure 6-2: EPR Option - Liffey Valley Bus Stops

Alternative Concept Design Option

Alternative proposals were developed to relocate the existing bus stops some 200m further west, with segregation from the existing carriageway and a significant increase in length to allow multiple buses to use the bus stop at the same time. In order to provide an enhanced connection to the proposed bus interchange within shopping centre site, a new pedestrian bridge is proposed over the N4, with associated ramps and steps.

These alternative proposals provide the appropriate level of pedestrian facilities, which are of a significantly higher quality than the EPR Option. Furthermore, the alternative arrangements provide increased weaving lengths to enable buses and general traffic to negotiate the N4 / M50 interchange more safely.

The alternative proposals developed are shown in Figure 6-3 below.

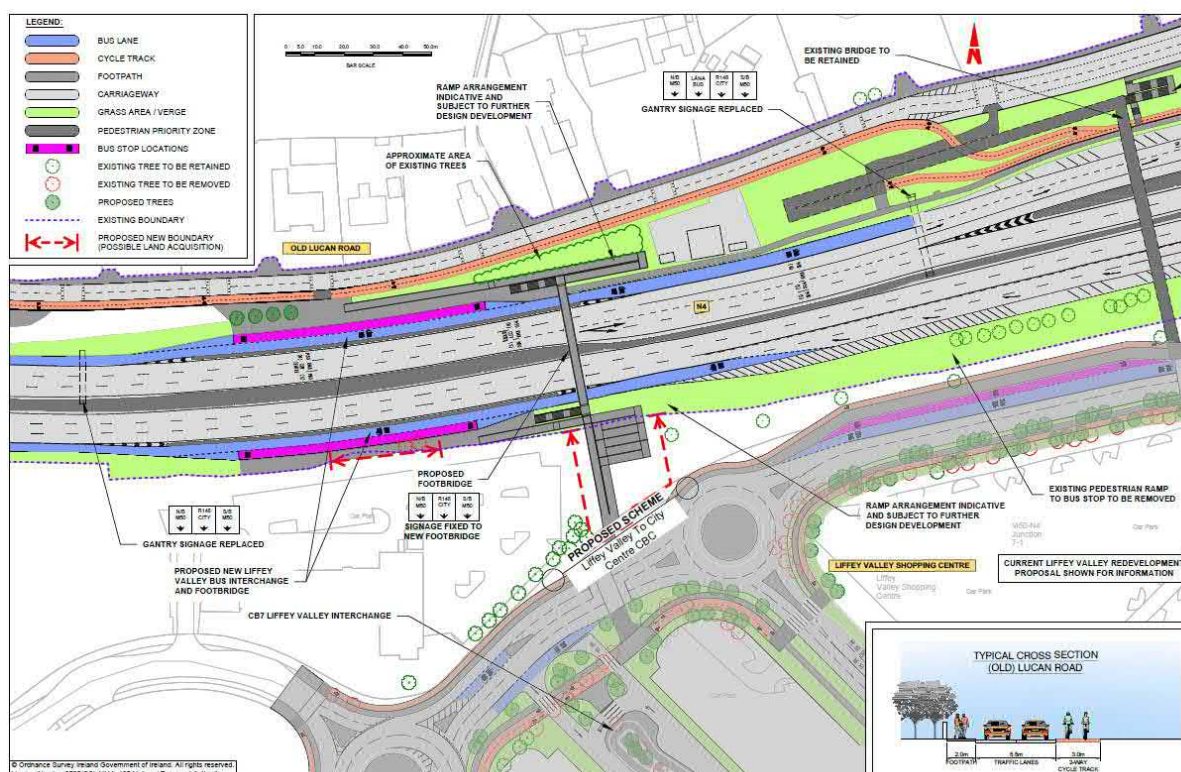


Figure 6-3: Alternative Option - Liffey Valley Bus Stops

6.1.3.2 Options Assessment

Overall, the alternative proposals have a number of advantages over the EPR Option. Primarily these centre around the improved integration with policy and the wider BusConnects proposals, associated with the connection to the Liffey Valley transport interchange. In essence, the EPR Option will not achieve the necessary standard required at this important transport node. The additional capital investment associated with the alternative proposals is offset by a greater reliability and quality of transport provision.

The EPR Option does not address existing safety concerns of associated with the bus stops, safety of passenger and bus weaving movements on the N4 carriageway, both eastbound and westbound. The alternative proposals address all these and represent a significant advantages in this respect.

While a small number of trees will be lost by the construction of the new ramps and bus stop on the northern side of the N4 in the alternative proposal, this is not considered significant in the overall environmental assessment, with opportunities for urban realm proposals at this location.

Details of the assessment are presented in Appendix A and summarised in Table 6-3 below.

Table 6-3: Assessment Summary

| Assessment Criteria | Option 1 (EPR) | Option 2 (Alt) |
|----------------------------------|----------------|----------------|
| Economy | | |
| Integration | | |
| Accessibility & Social Inclusion | | |
| Safety | | |
| Environment | | |
| Overall | | |

6.1.3.3 Conclusion and Preferred Route Option

In conclusion the Draft Preferred Route Option for the Liffey Valley bus stops will be the Alternative Option, as despite the higher capital cost, there would be significant advantages in transport reliability and quality, as well as it being more advantageous through improved integration, accessibility and, in particular, significantly improved safety in comparison to the Emerging Preferred Route Option.

The provision of these revised bus stop arrangements in the Draft Preferred Route Option represents a material change to the Emerging Preferred Route Option.

6.2 Summary

The Draft Preferred Route Option for the Lucan to City Centre CBC is confirmed as commencing at Junction 3 of the N4 and following the corridor along the N4 (Lucan Road) and the R148 (Palmerstown Bypass, Chapelizod Bypass, Con Colbert Road and St John's Road West) as far as the city centre at Heuston Station, as shown in Figure 6-4 below.



Figure 6-4: – Lucan to City Centre – Draft Preferred Route Option
(© OpenStreetMap contributors)

7. Draft Preferred Route Option

7.1 Introduction

Chapter 5 presented the sections of the Emerging Preferred Route Option that is recommended to be taken forward as the Draft Preferred Route Option and it also identified locations where further appraisal was necessary. Chapter 6 of this report presented an appraisal of all scheme amendments considered for Lucan to City Centre CBC. Following this appraisal, the preferred options for the amendments have been incorporated into the route from the Feasibility Report to form an end-to-end Draft Preferred Route Option.

In updating the design of the Draft Preferred Route Option, it is apparent that there are three distinct sections of the route. The extents of these three distinct sections vary slightly from those considered in the Feasibility Report and are as follows:

- Section 1: N4 Junction 3 to M50 Junction 7 – N4 Lucan Road
- Section 2: M50 Junction 7 to R148 Con Colbert Road – Chapelizod Bypass
- Section 3: R148 Con Colbert Road to Frank Sherwin Bridge – St Johns Road West

This chapter presents and describes these three sections of the Draft Preferred Route Option identified and the Draft Preferred Route Option scheme design. The Draft Preferred Route Option scheme design drawings are included in Appendix D of this report.

7.2 Draft Preferred Route Option Description

7.2.1 Section 1: N4 Junction 3 to M50 Junction 7 – N4 Lucan Road

It is proposed to commence this CBC at Junction 3 on the N4 Lucan Road. In the EPR Option the existing lane arrangement on the Ballyowen Road bridge over the N4 was maintained. It is now proposed to include cycle lanes in each direction in lieu of the right turning lane for the N4 westbound on-slip. However, the right-turn movement to the N4 westbound slip will still be permitted.

At the Ballyowen Road junction with the Lucan Road, the layout has been modified from that shown in the EPR Option to remove the left-turn lanes. Additionally, the location of the existing bus stop on the Lucan Road has been maintained. As a result, there is no longer a need for land acquisition from the Woodville Lawn estate.

On the N4 it is proposed to maintain the existing city centre bound bus lane. Over the full length of this section of the CBC, a segregated two-way cycle track is proposed on the northern side of the N4. This represents a change from the EPR Option which primarily retained the existing one-way cycle lanes in each direction. In the vicinity of the Hermitage Golf Club land acquisition will be required to provide this cycle track which will connect to the existing foot/cycle bridge over the N4 adjacent to the Mount Andrew estate.

Eastwards of this location the two-way cycle track continues on the north side of the N4 and will require some additional land acquisition from the Hermitage Clinic lands. The two-way cycle track then runs along the eastbound off slip at Junction 2. From here the segregated two-way cycle track runs along the south side of the Old Lucan Road before connecting to the foot/cycle bridge that crosses the M50. The Old Lucan Road will be narrowed, and traffic calmed.

On the south side of the N4 a Pedestrian Priority Zone is provided between existing foot/cycle bridge over the N4 adjacent to the Mount Andrew estate and Ballyowen Lane. From there a quiet cycle way is proposed along Hermitage Road to Ballyowen Road. The provision of the two-way segregated cycle track along the northern side of the N4 avoids the need for a segregated one-way cycle track on the southern side of the N4 and along the westbound off slip at Junction 3. As a result, there is no longer a need for land acquisition along the majority of the southern boundary of the N4 between Junctions 3 and 2.

When compared to the EPR Option, the latest proposals represent a significant improvement to the bus stop provision in the vicinity of the Liffey Valley Shopping Centre. The bus stops themselves are moved some 150m further west, segregated from the adjacent N4 carriageway and increased in length. To better serve the increased bus stop capacity the existing foot/cycle bridge will be removed and replaced by a new, similar bridge adjacent to the new bus stop locations, some 200m further west from the existing footbridge. The position of this new bridge aligns with the proposed public transport interchange within the Liffey Valley Shopping Centre. The relocation of the bus stops allows for an increased weaving length for all eastbound traffic approaching the M50 interchange and for all westbound traffic exiting the M50 interchange. In addition, it is proposed that the existing foot/cycle bridge be retained and used for cyclists only, with the new bridge used for pedestrians only, which whilst maintaining the same level of accessibility will provide an improved level of service and reduce overall capital cost of the scheme.

On the M50 junction, it is proposed to maintain the bus lane with two general traffic lanes in both directions through the junction as per the EPR Option. Cyclists will be directed over the existing foot/cycle bridge over M50 on to the Old Lucan Road.

7.2.2 Section 2: M50 Junction 7 to R148 Con Colbert Road – Chapelizod Bypass

Between the M50 junction and Kennelsfort Road junction, it is proposed to maintain a single bus lane and two general traffic lanes on the city centre bound route, as well as one general traffic lane for through traffic & a bus lane on the outbound route, as per the EPR Option proposals.

A segregated two-way cycle track is proposed to run along the north side of the Old Lucan Road from the foot/cycle bridge crossing the M50, through Palmerstown village connecting to the pedestrian priority zone at the start of the Chapelizod Bypass. This represents a change from the EPR Option. This proposed cycle track then runs along the east side of Kennelsfort Road Lower before crossing the R148 Palmerstown Bypass via a new Toucan Crossing on the east side of the junction. It then connects to a new Toucan Crossing on Kennelsfort Road Upper.

On the westbound carriageway of the R148 west of Kennelsfort Road a revised lane arrangement maintains two lanes for general traffic, whereas the EPR Option had proposed to restrict general traffic to a single lane.

At the R148 signalised junction with the Old Lucan Road/the Oval a new westbound, bus only, right turn lane is provided on the R148 to facilitate bus services serving Palmerstown Village. An additional strip of land acquisition will be required from the western edge of the petrol filling station at this location to accommodate this new bus movement which was not included in the EPR Option. In addition, new bus stops are provided on the Old Lucan Road to serve Mill Lane/Stewarts Hospital.

Between Kennelsfort Road junction and Con Colbert Road junction, it is proposed to maintain a single bus lane and two general traffic lanes in each direction, as per the EPR Option. The existing bus lane and public transport signals on the R112 Kylemore Road on-ramp will be retained. In the EPR Option a new at-grade signalised crossing of the R148 Chapelizod Bypass was proposed serving the new bus stops on the bridge over Chapelizod Hill Road. In the latest proposals a revised access ramp and steps arrangement avoids the need for any crossing of the R148 by making use of the existing Chapelizod Hill Road underpass. Additionally, the speed limit for the bus lanes along the full length of the Chapelizod bypass will be reduced from 80km/hr to 60km/hr.

7.2.3 Section 3: R148 Con Colbert Road to Frank Sherwin Bridge – St John's Road West

As per the EPR Option, between the Con Colbert Road junction and the South Circular Road junction continuous bus lanes, two general traffic lanes and segregated cycle tracks will be maintained in their current configuration. In the EPR Option there was no change to the existing traffic movements at the junction between the Con Colbert Road and Memorial Road. In the revised proposals, an eastbound right-turning lane is proposed at this junction to facilitate the changes to Memorial Road included in Liffey Valley CBC. As a consequence of this additional turning lane the existing pedestrian crossing facility would be moved to the east side of the junction.

At the South Circular Road junction, a short right turn lane on South Circular Road is provided in the northbound direction to compensate for restricted turns included in the Liffey Valley CBC.

Between the South Circular Road junction and the junction into the Heuston South Quarter Development, continuous bus lanes and two general traffic lanes will be maintained in their current configuration, as per the EPR Option. Between the Heuston South Quarter Development junction and the Frank Sherwin Bridge one bus lane and one single general traffic lane is proposed in each direction, also as per the EPR Option. Along St Johns Road West additional trees will need to be removed and replaced so that facilities for both taxis and bicycles can be provided on the approaches to Heuston Station. An Urban Realm landscaping improvement is proposed along the affected length of the road as far as the train station. This includes the removal of the pedestrian guard railing and new planting, which will result in a net increase in the number of trees along the road.

7.3 Carbon

In developing the Draft PRO, consideration has been given to the carbon generated by the scheme during construction. Many of the changes made to the scheme design since the EPR proposal have resulted in a change in the construction carbon generated by the scheme. Notable changes that reduced carbon include the following:

- Retention of existing kerb lines at several locations, significantly reducing the construction works on this section;
- Retention of the greater lengths of the existing median on St John's Road West with the existing trees within the median; and
- A change that will generate an increase in carbon is the addition of a new footbridge over the N4 at the proposed Liffey Valley public transport interchange.

Construction carbon will continue to be considered and assessed as part of the evolving scheme design and the preparation of the supporting EIAR documentation.

7.4 Summary

The Draft Preferred Route Option is approximately 10km long from end to end. The updated concept scheme design drawings show the extent of the infrastructure proposed to deliver this corridor and the length of the primary interventions are summarised in Table 7-1 below.

Table 7-1 Summary of Bus and Cycle Interventions on the Clondalkin to Drimnagh CBC.

| Intervention | Existing (km) | Proposed (km) |
|---|---------------|-----------------------|
| Bus Priority | | |
| Bus Lanes | | |
| Inbound | 7.7 | 9.5 |
| Outbound | 5.9 | 8.0 |
| Virtual Bus Lanes | | |
| Inbound | 0 | 0 |
| Outbound | 0 | 0 |
| Total Bus Priority (both directions) | 13.6 | 17.5 (+29%Change) |
| Cycle Facilities | | |
| Cycle Lanes – Segregated | | |
| Inbound | 0.8 | 6.6 |
| Outbound | 1.0 | 6.7 |
| Cycle Lanes – Non-segregated | | |
| Inbound | 1.2 | 0.9 |
| Outbound | 1.9 | 0.9 |
| Total Cycle Facilities (both directions) | 4.9 | 15.1 (+208%Change) |

8. Next Steps

This report has identified a Draft Preferred Route Option for the bus infrastructure along this Core Bus Corridor for which an updated concept design has been developed.

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

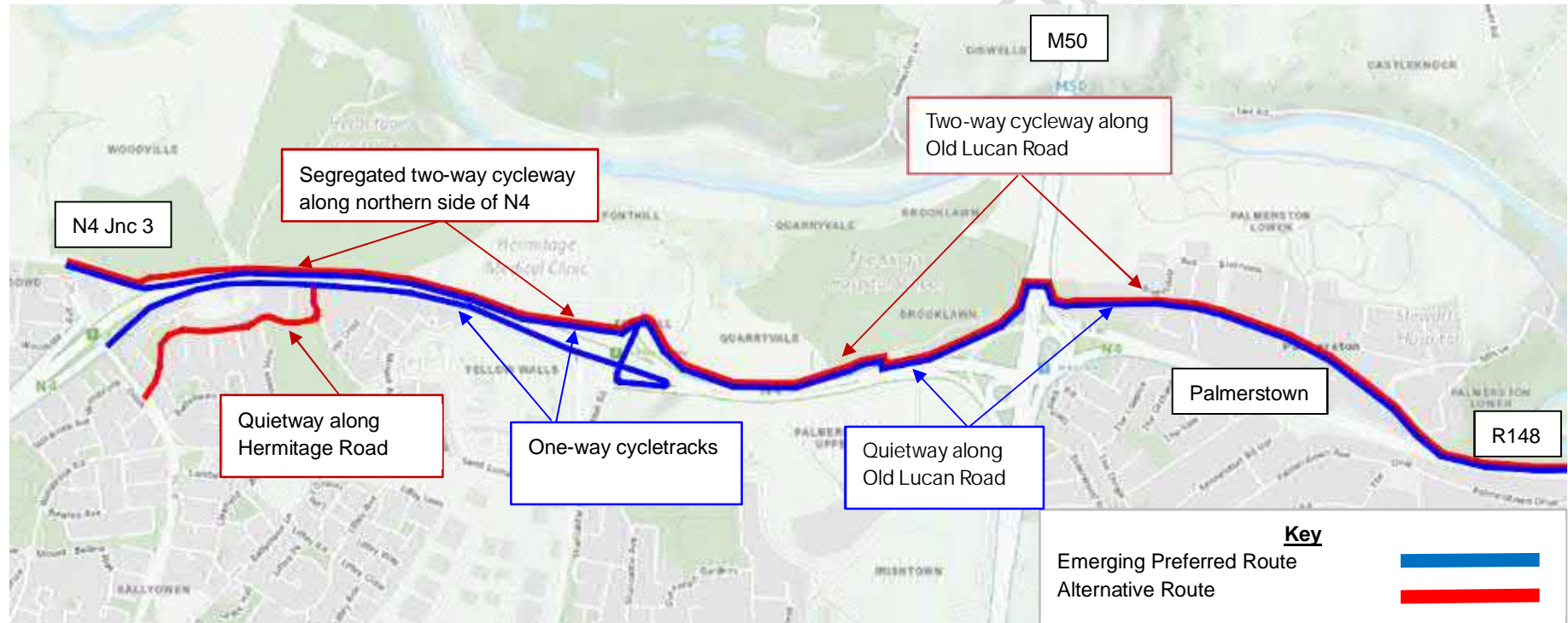
This Preliminary Design will form the basis of the planning consent process for the scheme, which will require a development consent application to be made directly to An Bord Pleanála, due to the nature and extent of the proposed works.

Work in Progress - Draft

Appendix A - Multi Criteria Analysis Tables

Work in Progress - Draft

Cycle Facilities: EPR Option and Alternative Option



| Assessment Ranking | Description |
|--------------------|---|
| | Significant advantages over the other options |
| | Some advantages over the other options |
| | Neutral compared to other options |
| | Some disadvantages over other options |
| | Significant disadvantages compared to other options |

| Assessment Criteria | Sub -Assessment Criteria | Emerging Preferred Route Option | Alternative Option |
|---------------------|--------------------------|---|---|
| 1. Economy | 1.a. Capital Cost | <p>Indicative Infrastructure Costs € include;</p> <ul style="list-style-type: none"> Provide new bus and cycle facilities along parallel side road on WB N4 by widening. This requires the frontal land take of gardens or property owned by adjacent residences (13no.) and commercial areas (1 no.) Provide widening at Jct. 3 E/B road along a 90m length required to meet the cycle width requirement due to a bus lane been introduced down the slip road onto N4. New cycle and bus lane facilities provided near the existing footbridge over the N4 which requires widening and land take to facilitate all the required lanes. Two proposed new Toucan crossings located North of the N4 off the main carriageway. Proposed Quietway along (old) Lucan road either side of the M50. Two single cycle lanes are to be provided on both sides of Kennelsfort Road Lower. This requires widening in certain locations and the associated land take, with certain bay parking been set back at the eastern end of the road. It also results in reducing the width along the whole of road. <p>Land Acquisition costs €include;</p> <ul style="list-style-type: none"> 1856m² private land Properties affected: <ul style="list-style-type: none"> Gardens and frontal land take of 11no. houses along Heritage Gardens Commercial land take nr. Jct.3 WB. Frontal land take of 2 houses nr. existing footbridge over N4. Private car spaces in front of Palmerstown Lodge. | <p>Indicative Infrastructure Costs €€€ include;</p> <ul style="list-style-type: none"> 3.5m 2-way cycle way along Lucan Road WB from junction with R835 to start of Jct.3 WB slip (land take required). Alteration of gate arrangement to the golf club. A 3.5m 2-way cycle track is to be provided parallel to footpath running behind existing Hermitage Golf Club. Existing wall is to be lowered with new proposed wall and railings behind cycleway. Existing footpath from existing foot and cycle bridge on N4 to start of entry of Jct.2 slip WB to be widened to provide 3.5m 2-way cycleway and 2m footpath running parallel to N4 (land take required). The segregated 2-way cycle lane is to continue down (old) Lucan Road. The road is proposed to have traffic calming measures applied such as road narrowing (to 5.5m), speed bumps and raised tables at junctions with other minor roads. This is to be applied on both sides of the M50. <p>Land Acquisition Costs €include;</p> <ul style="list-style-type: none"> 2,465m² private land (an additional 3,950m² is required to acquire access to Hermitage Golf Club) Properties and land affected: <ul style="list-style-type: none"> Hermitage Golf Club (undeveloped land) Access Road to Hermitage Gold Club Sureweld International (Industrial Land) Private car parking lost in front of Palmerstown Lodge (Kennelsfort Road Lower) Hermitage Golf Club access road Sureweld International (Industrial space) 1no. Residential / Commercial properties affected |

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| | | | |
| | 1.b. Transport Reliability and Quality | <ul style="list-style-type: none"> Stop start route Indirect route Low quality facilities, shared use, on road in places | <ul style="list-style-type: none"> Shorter, direct route leading to reduced journey times High quality segregated facilities for full length |
| | | | |
| 1 Economy | Summary | | |
| 2. Integration | 2.a. Land Use Integration | <ul style="list-style-type: none"> The route integrates well with land use zoning identified in the county development plans linking well with residential, recreational and retail zones. | <ul style="list-style-type: none"> The route integrates well with land use zoning identified in the county development plans linking well with residential, recreational and retail zones. |
| | | | |
| | 2.b. Residential Population and Employment Catchments | <ul style="list-style-type: none"> The difference between the residential and employment catchments of the two options, are considered insignificant. | <ul style="list-style-type: none"> The difference between the residential and employment catchments of the two options, are considered insignificant. |
| | | | |
| | 2.c. Transport Network Integration | <ul style="list-style-type: none"> The EPR Option proposals impact on the pedestrian facilities along the route in an adverse manner through conflict points at a number of locations. | <ul style="list-style-type: none"> The alternative proposals provide fully segregated facilities that have no impact on the pedestrian facilities along the route. |
| | | | |
| | 2.d. Cycle Network Integration | The proposed route consists of 2 single (varying width) cycle lanes running down the existing the GDC's Primary Route 6 (generally on-line) which are proposed to be extended to improve continuity, along both sides of the carriageway parallel to the N4 between Jct.3 and Jct.2 before continuing down (old) Lucan Road. Beyond Jct.2 of the N4 a Quietway will be provided along (old) Lucan road to allow the continuation of the Primary Route 6 towards Chapelizod. | The proposed route is a 2 -way (3.5m) segregated cycle lane extending the existing GDC's Primary Route 6 running parallel to the east-bound carriageway in a high quality manner and no longer along the west-bound carriageway or running on the carriageway. This provides fully segregated cycle routes to improve its continuity and safety of the cyclists on the Primary cycle network |

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| | | <p>The route interacts with the other following Primary and Secondary cycle routes in a more disjointed manner;</p> <p>West bound;</p> <ul style="list-style-type: none"> Connects directly to secondary Route SO6 Connects directly to Proposed Primary Route SO5 (yet to be constructed) Connects via shared space to Secondary Route 7A Connects via ~550m of shared space to secondary Route NO5 that connects to the Liffey Greenway (both proposed) Liffey Greenway (Via ~550m distance of travel along shared space and route NO5; Yet to be constructed). <p>East bound:</p> <ul style="list-style-type: none"> Connects directly to Secondary Route 7A Secondary Route NO5 (Yet to be Constructed) Connects to Liffey Greenway via Route NO5 (Yet to be Constructed) | <p>The Route also interacts with the following Primary and Secondary cycle routes;</p> <ul style="list-style-type: none"> Quietway connects directly to secondary Route SO6 Connects via Pedestrian Priority Zone to Secondary Route 7A Connects to Secondary route NO5 and Liffey Greenway (both proposed) Safer continuation of Primary Route 6 to Chapelizod and proposed Liffey Greenway with reduction of pedestrian priority zones and widening of these areas if required segregated widths of the footway and cycleway cannot be achieved. Furthermore, the addition of the segregated cycleway along (old) Lucan road and associated calming works. |
| 2 Integration | Summary | | |
| 3. Accessibility & Social Inclusion | 3.a. Key Trip Attractors (Education/ Health/ Commercial/ Employment) | <p>Accessibility for cyclists along route is provided but in a disjointed manner</p> <p>Education;</p> <ul style="list-style-type: none"> The Kings Hospital School Foothill Lodge Lucan (Nursery) Stewarts School The Oval Creche and Montessori School Sunflowers Creche <p>Retail/Leisure;</p> <ul style="list-style-type: none"> Liffey Valley Shopping Centre Lucan Retail Park Hermitage Golf Club <p>Health;</p> <ul style="list-style-type: none"> Hermitage medical Clinic Saint Loman's Hospital Ballydowd Special care Unit | <p>While this option serves the same key trip attractors, accessibility for cyclists to these attractors along route is significantly improved in all cases</p> <p>Education;</p> <ul style="list-style-type: none"> The Kings Hospital School Foothill Lodge Lucan (Nursery) Stewarts School The Oval Creche and Montessori School Sunflowers Creche <p>Retail/Leisure;</p> <ul style="list-style-type: none"> Liffey Valley Shopping Centre Lucan Retail Park Hermitage Golf Club <p>Health;</p> <ul style="list-style-type: none"> Hermitage medical Clinic Saint Loman's Hospital Ballydowd Special care Unit |

| | | | |
|---|----------------------------------|--|---|
| | 3.b. Deprived Geographical Areas | Route option serves areas of Affluent to Marginally Below Average means from Pobal Deprivation Index. | Route option serves areas of Affluent to Marginally Below Average means from Pobal Deprivation Index. |
| | | | |
| 3 Accessibility & Social Inclusion | Summary | | |
| 4. Road User Safety | 4.a. Road User Safety | <p>One factor raised by the NTA in the GDA area cycle plan was the importance of reducing the interaction of cyclists with accesses, parking and other interfaces which could impede a cyclist. Below is a list of all junctions that impede cyclists along the N4 (old Lucan Road not included in this analysis as it is a Quietway);</p> <p>East bound junction interactions:</p> <ul style="list-style-type: none"> Exit from commercial premises (nr. Jct.3) Exit from Texaco Petrol Garage (entrance and exit) Ballyowen Lane Access road to St. Loman's Hospital Jct. 2 Entry Slip road onto N4 (proposed Toucan Crossing) 5 private accesses to residential properties <p>West bound Junction interactions;</p> <ul style="list-style-type: none"> Access road to Hermitage Road Golf Club Private access to Sureweld International 1 private access to residential properties <p>No. of road junctions intercepting the route: 7</p> <p>No. of points where giving way to pedestrians is required (Required length of Shared Area required for continuity of cycle route): 2 (~2150m).</p> <p><i>It should be noted that along the length of Old Lucan Road a Quietway will be proposed not a cycle lane. As well as this, cyclists will have to share the cycle lane with buses at constrained locations where bus stops are required, causing more possible conflict locations.</i></p> | <p>As can be seen below from the list below there are significantly less interactions with junctions and accesses compared to that of option 1 as the choice was made to remove the cycle lane running parallel to the N4 EB. The proposed route along the east bound carriageway is in line with the criteria set out in the GDA area cycle plan to reduce cyclists' interactions with accesses and junctions;</p> <ul style="list-style-type: none"> Private access to Sureweld International 1 private access to residential properties <p>The segregated 2-way cycle lane runs up Jct.2 towards (old) Lucan road and continues either side of the M50 so it can continue up the R112 towards Chapelizod along Primary route 6 and join up with the proposed Liffey Greenway.</p> <p>Cyclist safety will be reviewed based on encounters with other forms of transport/pedestrians along the duration of the route.</p> <p>No. of road junctions intercepting the route: 2</p> <p>No. of points where giving way to pedestrians is required (Required length of Pedestrian Priority Zone required for continuity of cycle route): 4 (~1160m)</p> <p><i>It should be noted that Hermitage road is a proposed Quietway to link communities south of the N4 to the cycle lane via the existing pedestrian footbridge.</i></p> <p>The alternative option provides a far safer environment for cyclists travelling along the N4</p> |

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| 4 Road User Safety | Summary | | |
| 5. Environment | 5.a. Archaeology and Cultural Heritage | <ul style="list-style-type: none"> No recorded National monuments along the route. | <ul style="list-style-type: none"> No recorded National Monuments along the route. |
| | | | |
| | 5.b. Architectural Heritage | <ul style="list-style-type: none"> There is no significant difference in the impact of the two options on properties of Architectural heritage in the National Inventory directly adjacent to the proposed new cycle route. | <ul style="list-style-type: none"> There is no significant difference in the impact of the two options on properties of Architectural heritage in the National Inventory directly adjacent to the proposed new cycle route. |
| | | | |
| | 5.c. Flora and Fauna | <p><u>Impact on Trees</u></p> <p>Land take is generally frontal land take from residential and industrial areas so the overall impact on flora and fauna especially trees is minimal, however the locations of the trees that maybe required to be removed are listed below.</p> <p>Removal of trees maybe required in the following locations;</p> <ul style="list-style-type: none"> Eastern end of Lucan Rd. (nr. Jct.3 of N4) - Land take of ~ 2m required, which will result in the loss of a considerable number of mature trees. Widening of Jct.3 exit slip of N4 W/B – Land take will reduce the verge and take a number of mature trees. <p>No Watercourses or open bodies of water are impacted.</p> | <p><u>Impact on Trees</u></p> <p>A considerable amount of land take is required north of the N4 of predominantly grassed verges and grassland, along with a large number of trees to be removed, although much of this will be replanted.</p> <p>Removal of trees maybe required in the following locations;</p> <ul style="list-style-type: none"> Eastern end of Lucan Rd. (nr. Jct.3 of N4) – Land take of ~ 2m required, which will result in the loss of a considerable number of mature trees. Northern carriageway of N4 from Jct.3 to Jct.2 - Land take of 3m – 4.5m required, which will result in the loss of a considerable number of mature trees. Jct.2 entry slip of N4 E/B – No land take however the verge will be reduced and there is a possibility of trees to be removed. <p>No Watercourses or open bodies of water are impacted.</p> |

| | | | |
|--|---------------------------|--|---|
| | | | |
| | 5.d. Soils and Geology | In general, the route uses the existing carriageway reservation for the majority of its route. In areas where widening is required there is little risk of affecting the existing geology of the area. | In general, the route uses the existing carriageway reservation for the majority of its route. In areas where widening is required there is little risk of affecting the existing geology of the area. |
| | | | |
| | 5.e. Hydrology | There are no areas along this route identified at being at high/medium risk from fluvial flooding. The route does not cross any major watercourses and is unlikely to affect the local hydrology. | There are no areas along this route identified at being at high/medium risk from fluvial flooding. The route does not cross any major watercourses and is unlikely to affect the local hydrology. |
| | | | |
| | 5.f. Landscape and Visual | <p>In general, this route makes use of the existing cycle tracks/roads along the N4, R148 and (old) Lucan Road. However, there is some widening of the carriageway required at certain locations along the N4 resulting in effects to existing boundaries and landscaping. Most prominently the loss of the northern verge on Lucan Road near Jct.3 and the loss of frontal facing residential and commercial land due to the widening of the N4 Jct.3 slip.</p> <p>There is minimal overall impact to the nearby FCC Landscape Character Areas and Highly Sensitive areas that have been highlighted to the North of the road corridor.</p> | <p>The route follows the existing roads along the N4, R148 and (old) Lucan road. However, a significant amount of widening is required along the northern edge of the carriageway to provide the 2-way segregated cycle path causing a loss of recreational ground (Hermitage Golf Club). This will result in effects to existing boundaries and landscaping.</p> <p>There is minimal overall impact to the nearby FCC Landscape Character Areas and Highly Sensitive areas that have been highlighted to the North of the road corridor.</p> |
| | | | |
| | 5.g. Air Quality | The proposed cycle route does not affect the existing traffic in the area. However, the land take in certain areas may result in the loss of trees. This will likely increase the amount of dust and other pollutants that may result in a reduction of air quality which will impact sensitive receptor locations along the route. | The proposed cycle route does not affect the existing traffic in the area. However, the land take in certain areas will result in a significant loss of trees. This will likely increase the amount of dust and other pollutants that may result in a reduction of air quality which will impact sensitive receptor locations along the route. |
| | | | |

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|----------------------|--------------------------|---|--|
| | 5.h. Noise and Vibration | <ul style="list-style-type: none"> There is no significant difference in the impact of the two options on noise and vibration. | There is no significant difference in the impact of the two options on noise and vibration. |
| | | | |
| | 5.i. Land Use Character | <ul style="list-style-type: none"> There is no significant difference in the impact of the two options on land use character. | <ul style="list-style-type: none"> There is no significant difference in the impact of the two options on land use character. |
| | | | |
| 5 Environment | Summary | | |



| Assessment Ranking | Description |
|--------------------|---|
| | Significant advantages over the other options |
| | Some advantages over the other options |
| | Neutral compared to other options |
| | Some disadvantages over other options |
| | Significant disadvantages compared to other options |

| Assessment Criteria | Sub -Assessment Criteria | Emerging Preferred Route Option | Alternative Option |
|---------------------|--|---|--|
| 1 Economy | 1.a. Capital Cost | <p>Indicative Infrastructure Costs €</p> <ul style="list-style-type: none"> There are no changes proposed to the existing arrangements. <p>Land Acquisition costs €</p> <ul style="list-style-type: none"> No land acquisition is required. | <p>Indicative Infrastructure Costs € include;</p> <ul style="list-style-type: none"> New pedestrian bridge across the N4, with associated ramps and steps New segregated bus stops and associated pedestrian waiting areas <p>Land Acquisition Costs € include;</p> <ul style="list-style-type: none"> 500m² private land is required to provide the connection through to the Liffey Valley shopping centre Properties and land affected: <ul style="list-style-type: none"> Grassed area within Liffey Valley shopping centre |
| | | | |
| | 1.b. Transport Reliability and Quality | <ul style="list-style-type: none"> Indirect connection route to the transport interchange Sub-standard, poor quality, bus stop, passenger and pedestrian facilities. Inadequate provision to cater for demand | <ul style="list-style-type: none"> Shorter, direct route for bus passengers leading to new transport interchange High quality segregated facilities that meet the appropriate standard and cater for forecast demand |
| | | | |
| 1 Economy | Summary | | |

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|---|--|--|---|
| 2 Integration | 2.a. Land Use Integration | <ul style="list-style-type: none"> The proposal does not integrate with the proposed land use associated with the new transport interchange within the shopping centre, nor with the development proposals for the Liffey Valley shopping centre. | <ul style="list-style-type: none"> The proposal integrates fully with the proposed land use for the new transport interchange within the shopping centre and the proposed development. |
| | | | |
| | 2.b. Residential Population and Employment Catchments | <ul style="list-style-type: none"> The difference between the residential and employment catchments of the two options, and access to the route, are considered insignificant. | <ul style="list-style-type: none"> The difference between the residential and employment catchments of the two options, and access to the route, are considered insignificant. |
| | | | |
| | 2.c. Transport Network Integration | <ul style="list-style-type: none"> The EPR Option proposals do not integrate with other elements of the Transport network, specifically the new transport interchange which is a key component of the Bus Network Redesign and BusConnects. | <ul style="list-style-type: none"> The alternative proposals provide fully integrate with the wider BusConnects proposals |
| | | | |
| | 2.d. Cycle Network Integration | <ul style="list-style-type: none"> The EPR Option proposals maintain a shared bridge and ramps for bus passengers and cyclists wishing to access the shopping centre. | <ul style="list-style-type: none"> The alternative proposals allow for cyclists to be segregated from bus passengers and provide improved connectivity & integration to the Primary Cycle Route 06 |
| | | | |
| 2 Integration | Summary | | |
| 3 Accessibility & Social Inclusion | 3.a. Key Trip Attractors (Education/ Health/ Commercial/ Employment) | There are no changes to accessibility for bus passengers with the EPR Option. | The alternative option will provide improved accessibility to the Liffey Valley shopping centre, as well as to many other areas via improved connectivity to the proposed transport interchange. |
| | | | |
| | 3.b. Deprived Geographical Areas | Route option serves areas of Affluent to Marginally Below Average means from Pobal Deprivation Index. | Route option serves areas of Affluent to Marginally Below Average means from Pobal Deprivation Index. |
| | | | |
| 3 Accessibility & Social Inclusion | Summary | | |













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|--------------------|--|---|--|
| 4 Road User Safety | 4.a. Road User Safety | The EPR Option does not address existing safety issues and may lead to new concerns associated with increased numbers of bus passengers using bus stops on a high speed dual carriageway. | <p>The alternative proposals provide significantly safer bus stops, which will be segregated from the dual carriageway with a larger waiting and circulation area.</p> <p>The proposals also significantly increase the weaving lengths for eastbound buses and N4 traffic heading to the M50 northbound, as well as westbound buses and traffic coming from the M50 northbound.</p> |
| | | | |
| 4 Road User Safety | Summary | | |
| 5 Environment | 5.a. Archaeology and Cultural Heritage | <ul style="list-style-type: none"> No recorded National monuments in this location. | <ul style="list-style-type: none"> No recorded National Monuments in this location. |
| | | | |
| | 5.b. Architectural Heritage | <ul style="list-style-type: none"> No areas of architectural heritage in this location. | <ul style="list-style-type: none"> No areas of architectural heritage in this location. |
| | | | |
| | 5.c. Flora and Fauna | <p><u>Impact on Trees</u></p> <p>- None</p> <p>No Watercourses or open bodies of water are impacted.</p> | <p><u>Impact on Trees</u></p> <p>A number of existing trees will be lost to facilitate the construction of the new eastbound bus stop.</p> <p>No Watercourses or open bodies of water are impacted.</p> |
| | | | |
| | 5.d. Soils and Geology | No works are proposed. | The proposed construction of the new bridge and associated ramps will be founded on bedrock which is shallow at this location. There is not anticipated to be any environmental concerns in respect of soils and geology. |

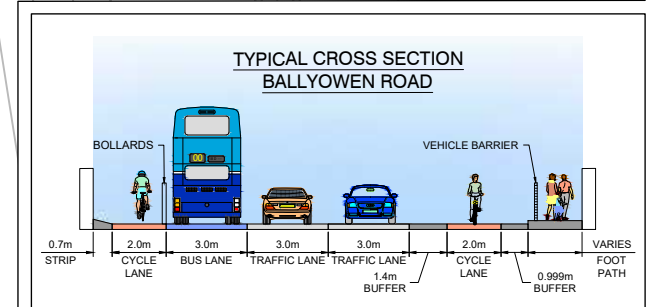
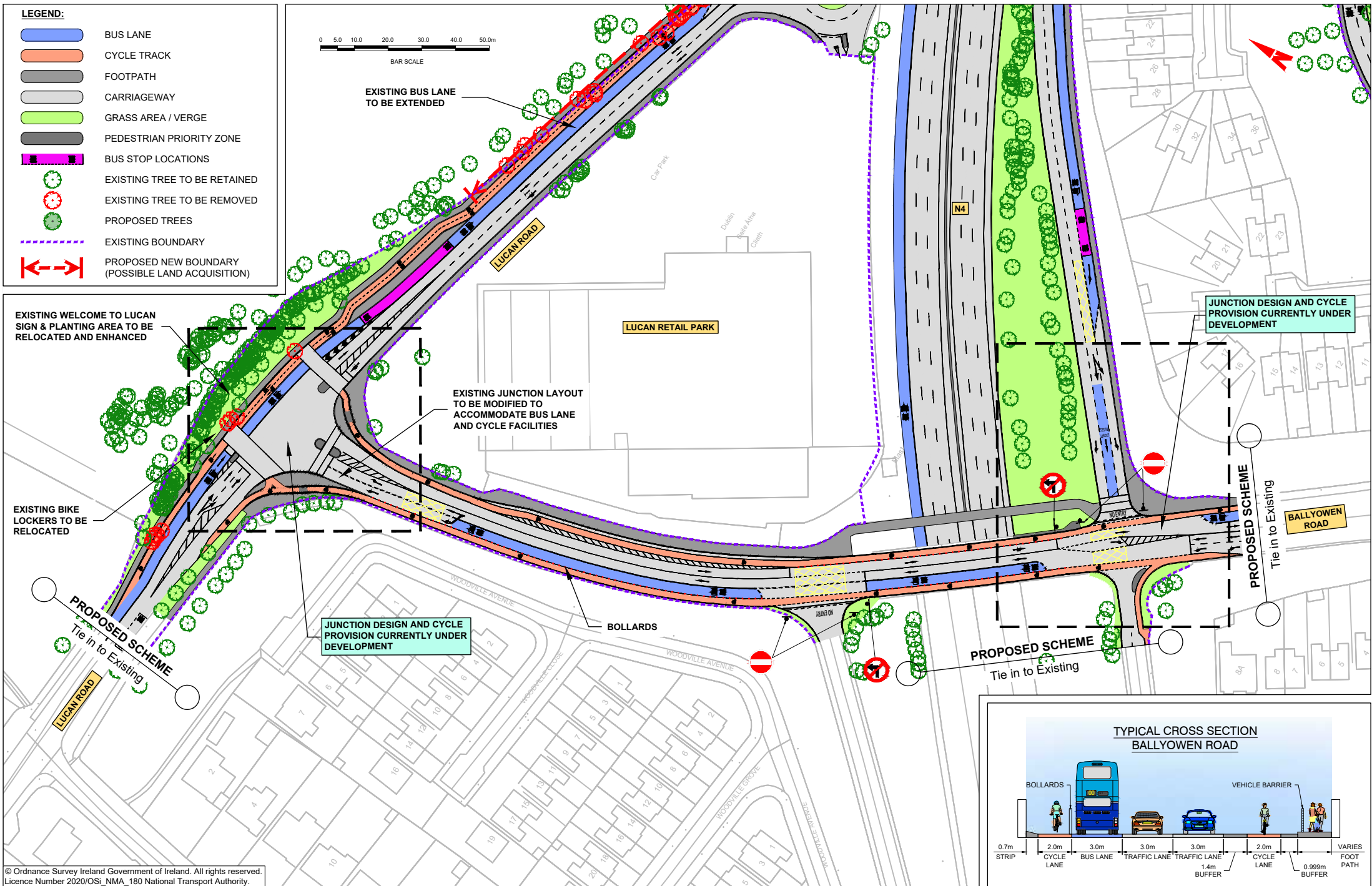
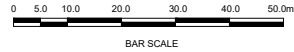
| | | | |
|----------------------|---------------------------|---|---|
| | | | |
| | 5.e. Hydrology | There are no areas at this location identified as being at high/medium risk from fluvial flooding. The route does not cross any major watercourses and is unlikely to affect the local hydrology. | There are no areas at this location identified as being at high/medium risk from fluvial flooding. The route does not cross any major watercourses and is unlikely to affect the local hydrology. |
| | | | |
| | 5.f. Landscape and Visual | There is no significant difference in the impact of the two options on landscape and visual aspects. | There is no significant difference in the impact of the two options on landscape and visual aspects. |
| | | | |
| | 5.g. Air Quality | There is no significant difference in the impact of the two options on air quality. | There is no significant difference in the impact of the two options on air quality. |
| | | | |
| | 5.h. Noise and Vibration | There is no significant difference in the impact of the two options on noise and vibration. | There is no significant difference in the impact of the two options on noise and vibration. |
| | | | |
| | 5.i. Land Use Character | <ul style="list-style-type: none"> There is no significant difference in the impact of the two options on land use character. | <ul style="list-style-type: none"> There is no significant difference in the impact of the two options on land use character. |
| | | | |
| 5 Environment | Summary | | |

Appendix B – Draft Preferred Route Option Drawings for Lucan to City Centre CBC

Work in Progress - Draft

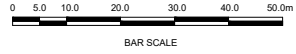
LEGEND:

-  BUS LANE
-  CYCLE TRACK
-  FOOTPATH
-  CARRIAGEWAY
-  GRASS AREA / VERGE
-  PEDESTRIAN PRIORITY ZONE
-  BUS STOP LOCATIONS
-  EXISTING TREE TO BE RETAINED
-  EXISTING TREE TO BE REMOVED
-  PROPOSED TREES
-  EXISTING BOUNDARY
-  PROPOSED NEW BOUNDARY (POSSIBLE LAND ACQUISITION)

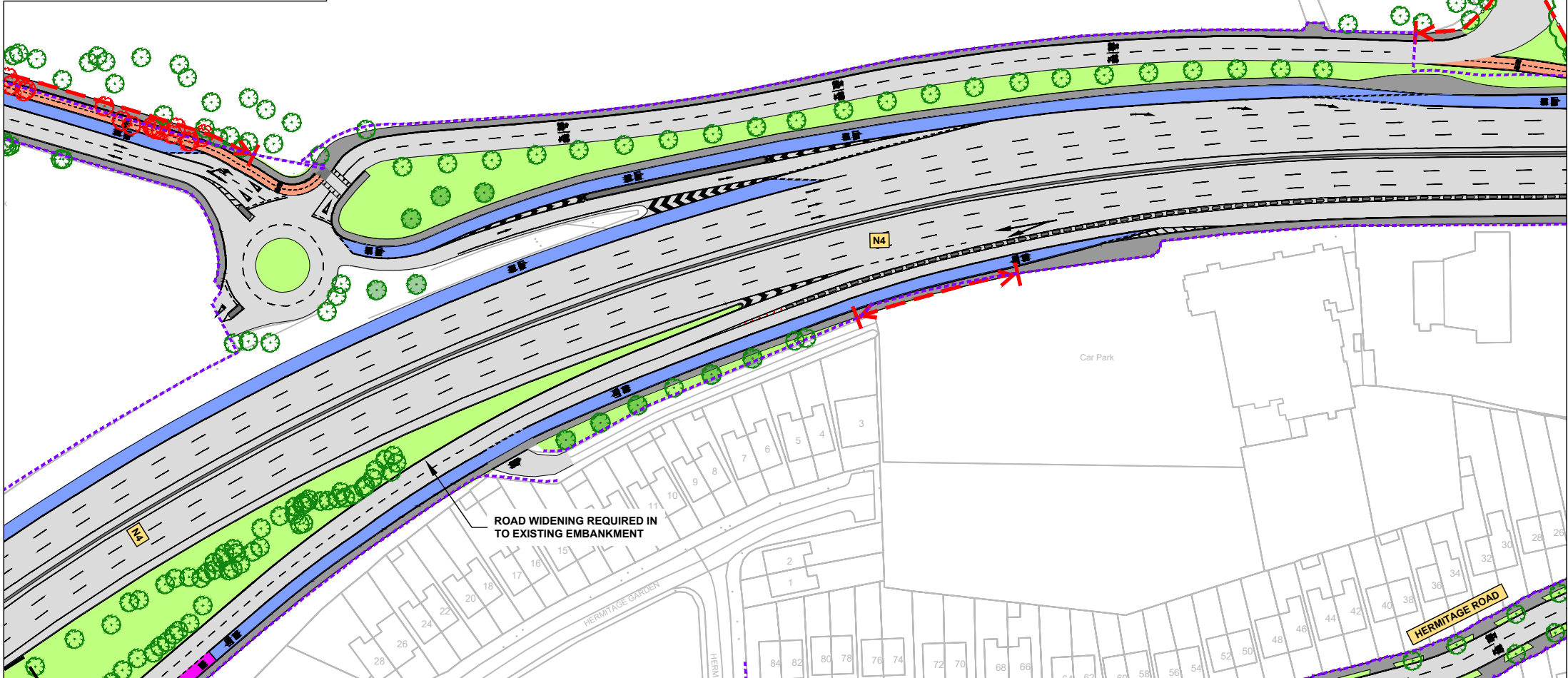


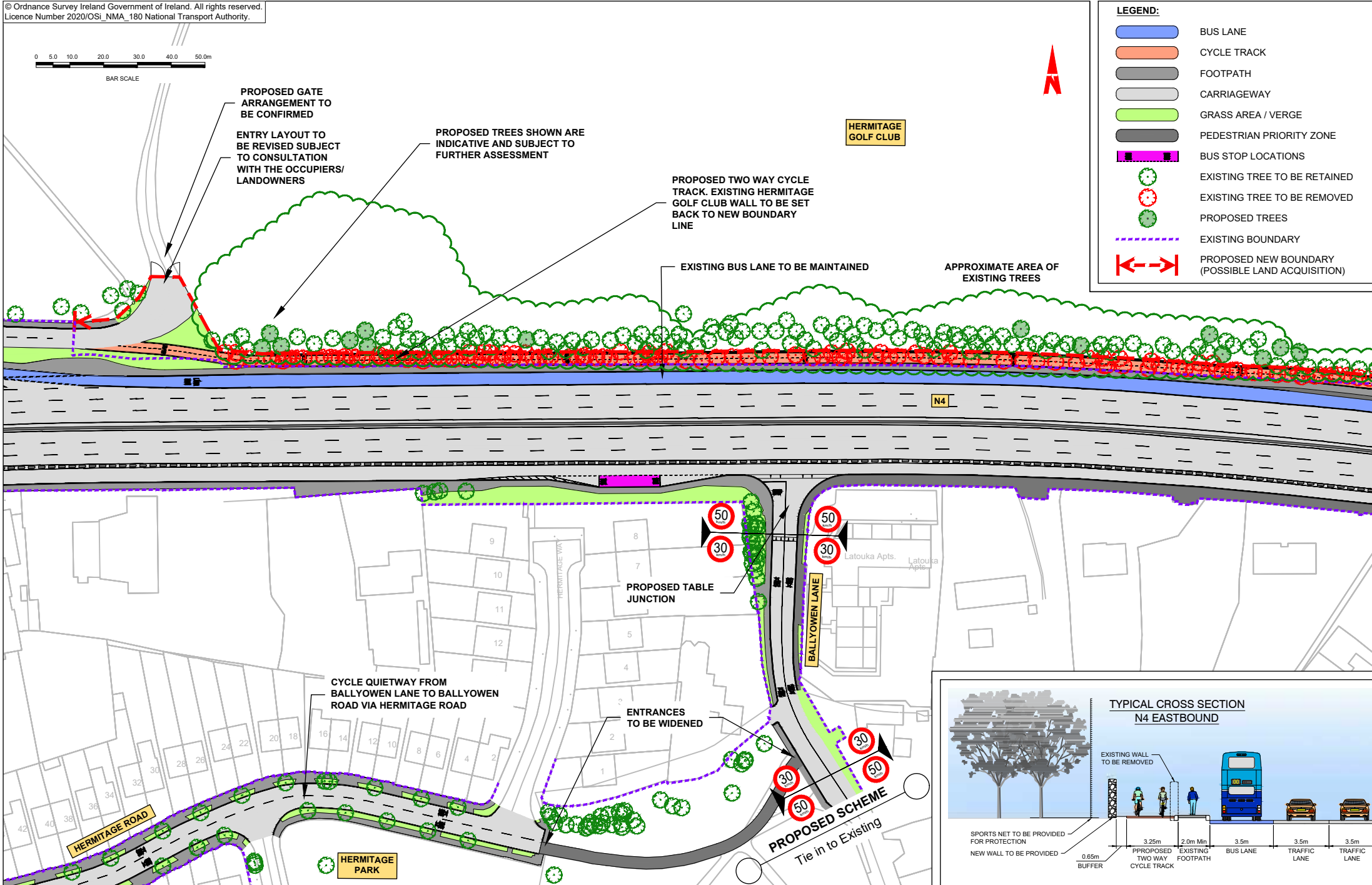
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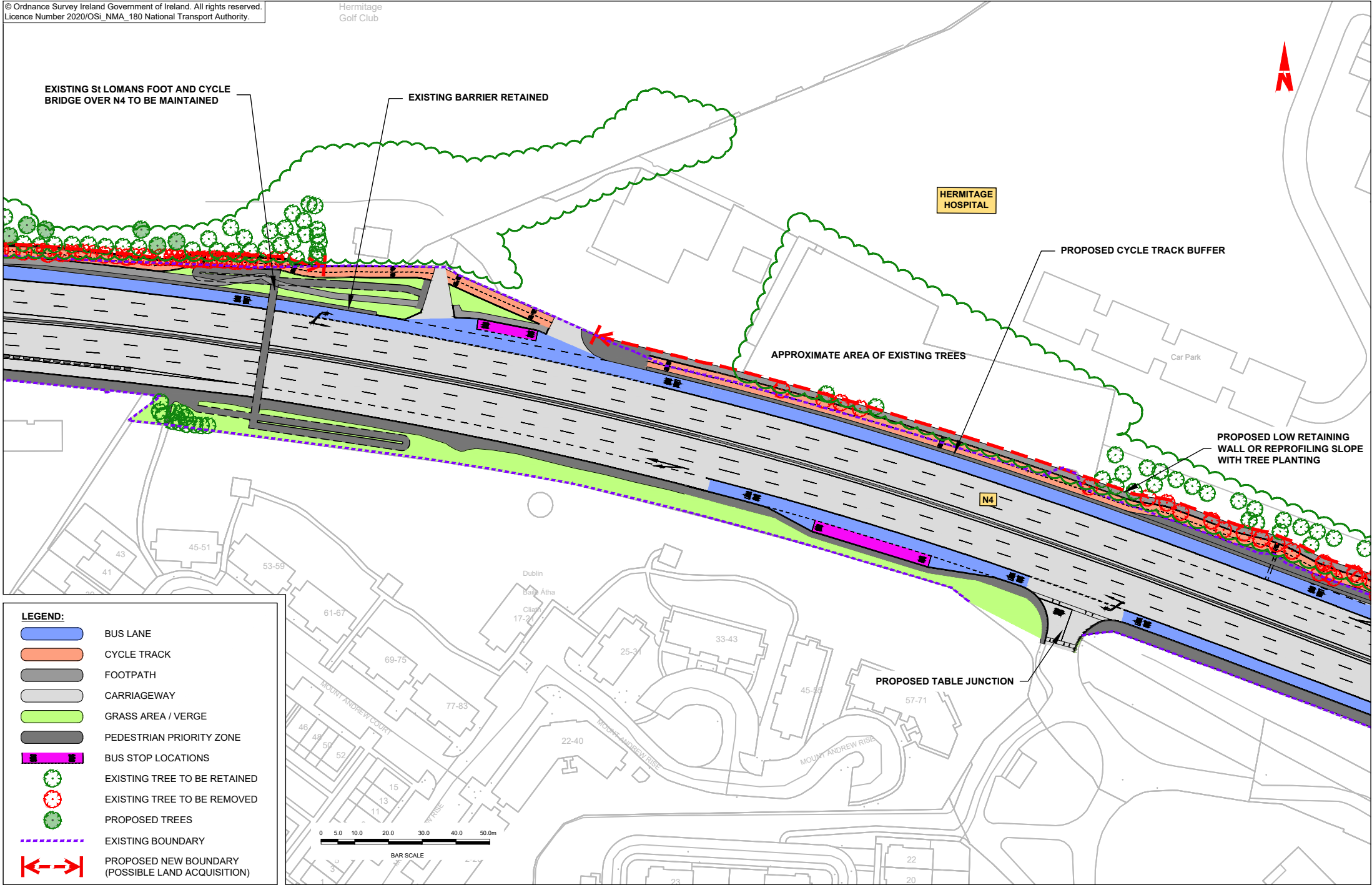
- BUS LANE
- CYCLE TRACK
- FOOTPATH
- CARRIAGEWAY
- GRASS AREA / VERGE
- PEDESTRIAN PRIORITY ZONE
- BUS STOP LOCATIONS
- EXISTING TREE TO BE RETAINED
- EXISTING TREE TO BE REMOVED
- PROPOSED TREES
- EXISTING BOUNDARY
- PROPOSED NEW BOUNDARY
(POSSIBLE LAND ACQUISITION)

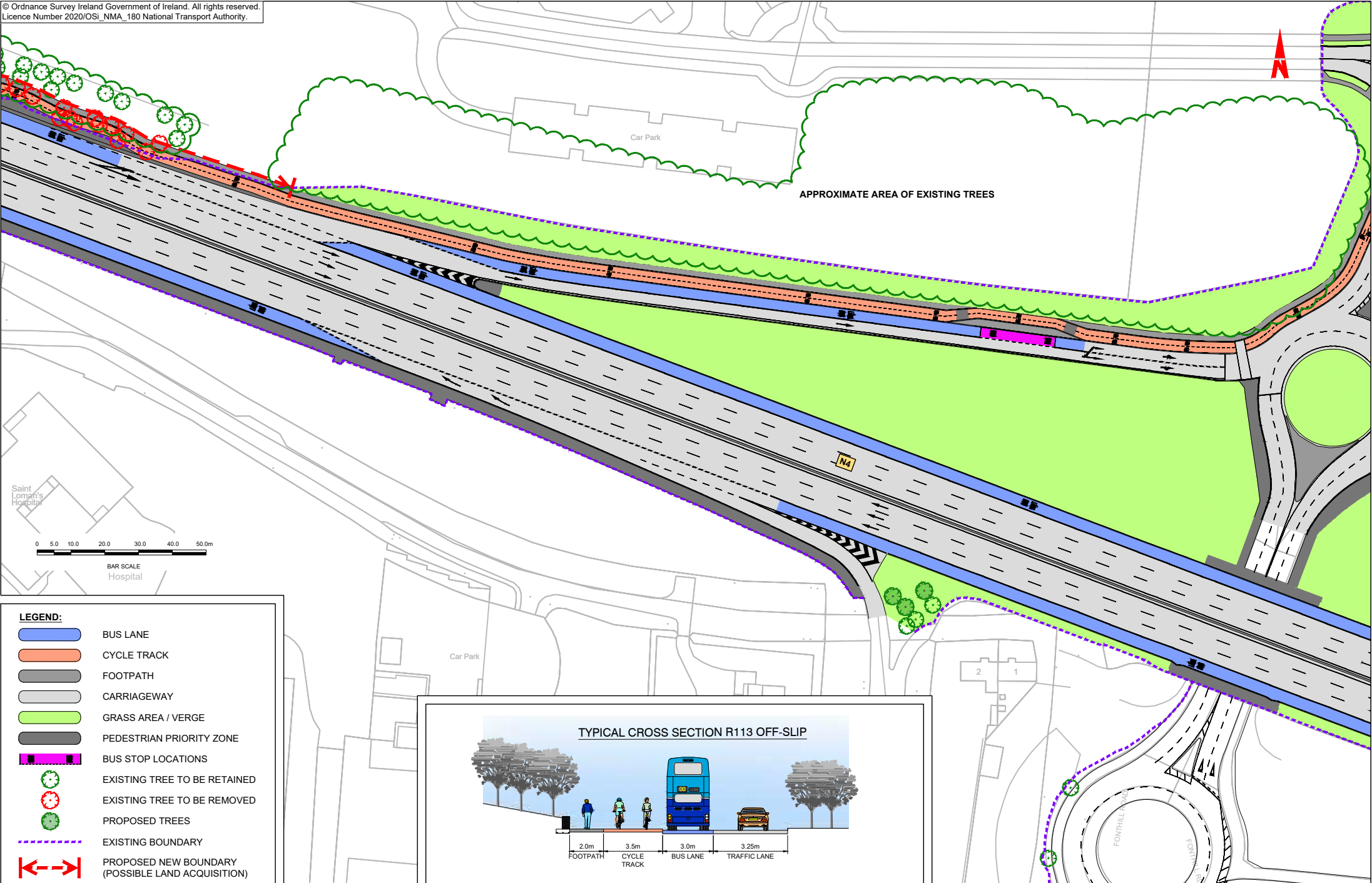


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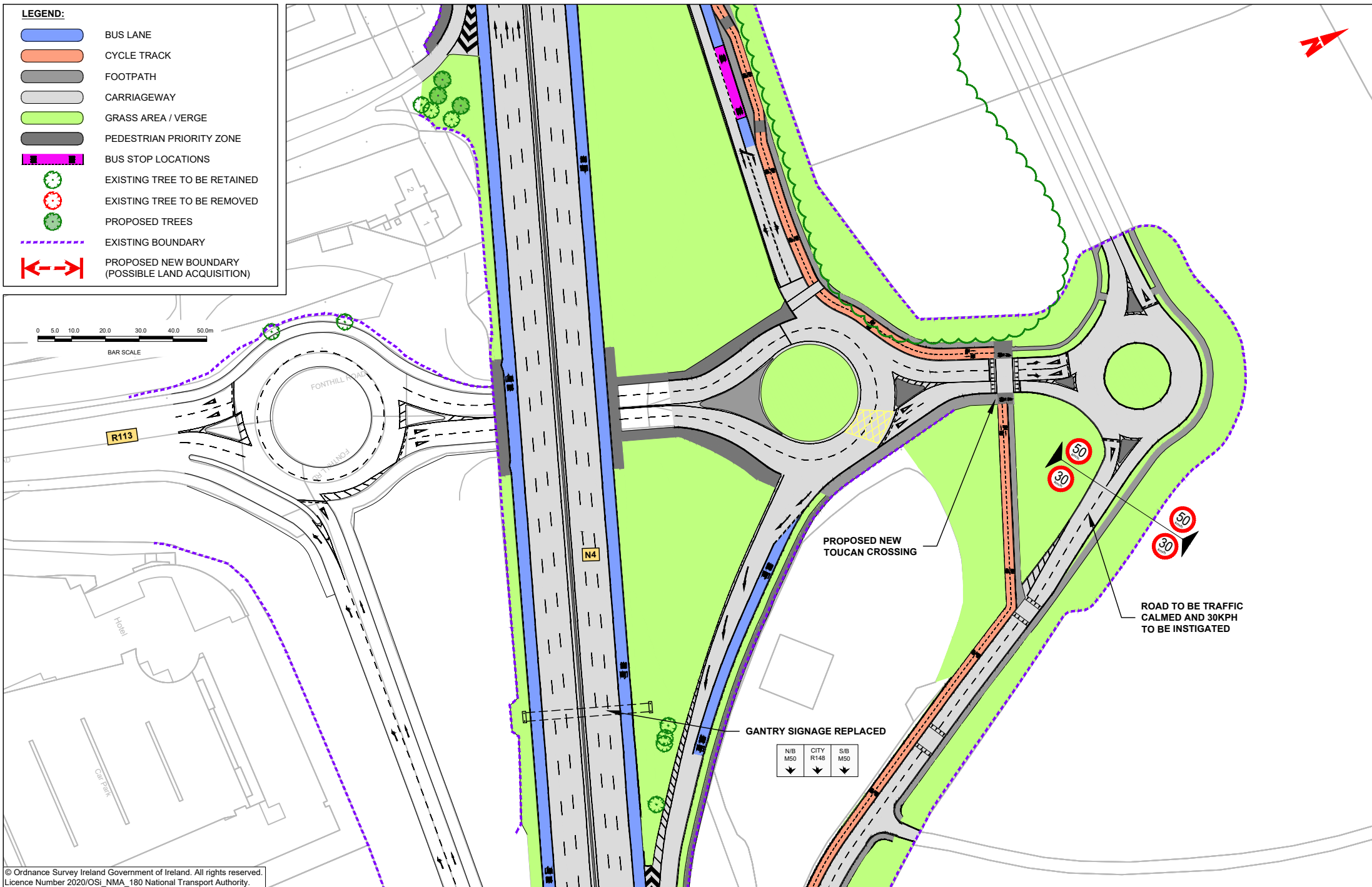


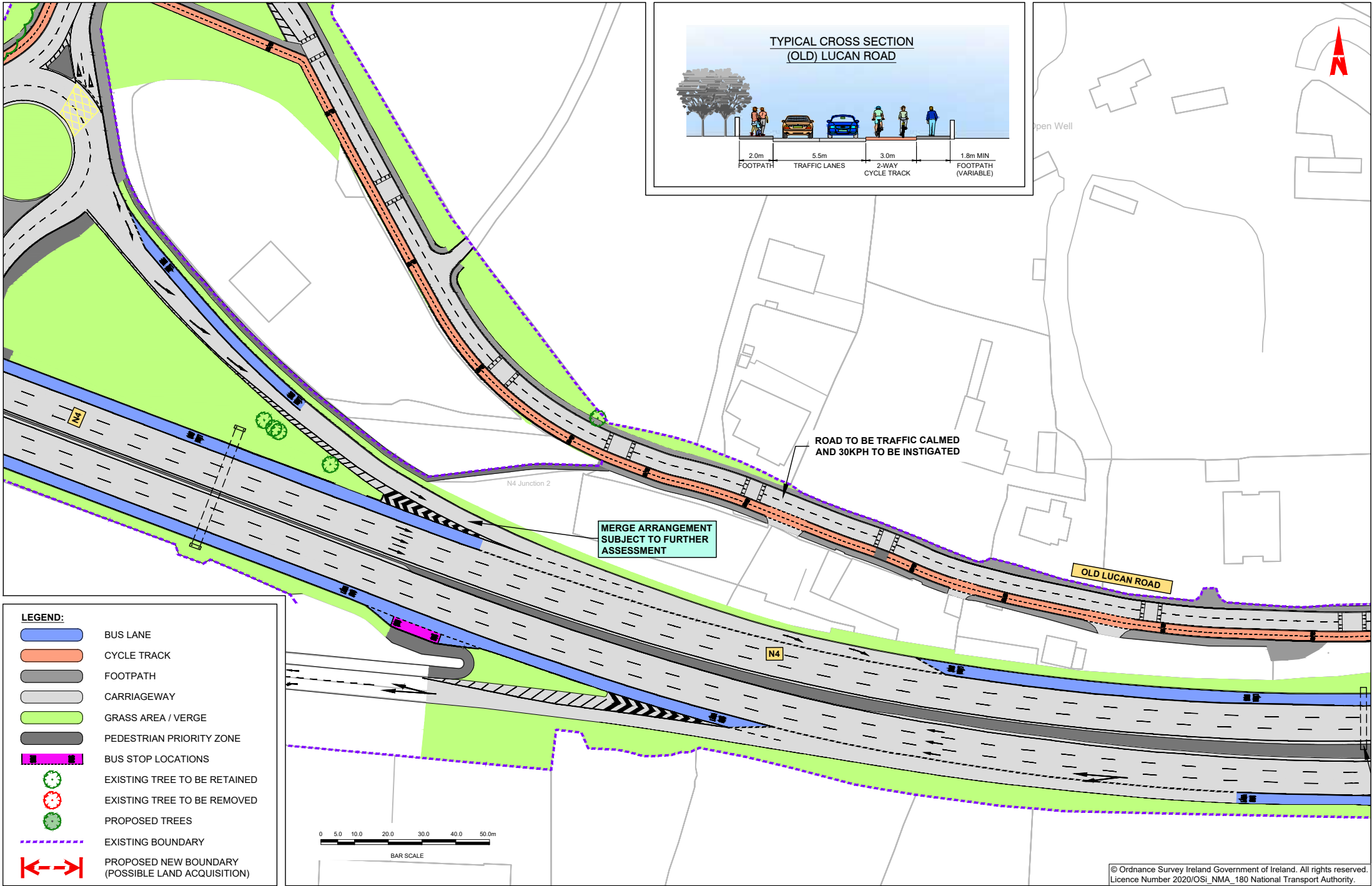
















LEGEND:

-  BUS LANE
-  CYCLE TRACK
-  FOOTPATH
-  CARRIAGEWAY
-  GRASS AREA / VERGE
-  PEDESTRIAN PRIORITY ZONE
-  BUS STOP LOCATIONS
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-  EXISTING TREE TO BE REMOVED
-  PROPOSED TREES
-  EXISTING BOUNDARY
-  PROPOSED NEW BOUNDARY (POSSIBLE LAND ACQUISITION)





LEGEND:

-  BUS LANE
-  CYCLE TRACK
-  FOOTPATH
-  CARRIAGEWAY
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-  BUS STOP LOCATIONS
-  EXISTING TREE TO BE RETAINED
-  EXISTING TREE TO BE REMOVED
-  PROPOSED TREES
-  EXISTING BOUNDARY
-  PROPOSED NEW BOUNDARY (POSSIBLE LAND ACQUISITION)



PRIVATE ACCESS TO
KINGS HOSPITAL

EXISTING STAIRS
TO BE RETAINED

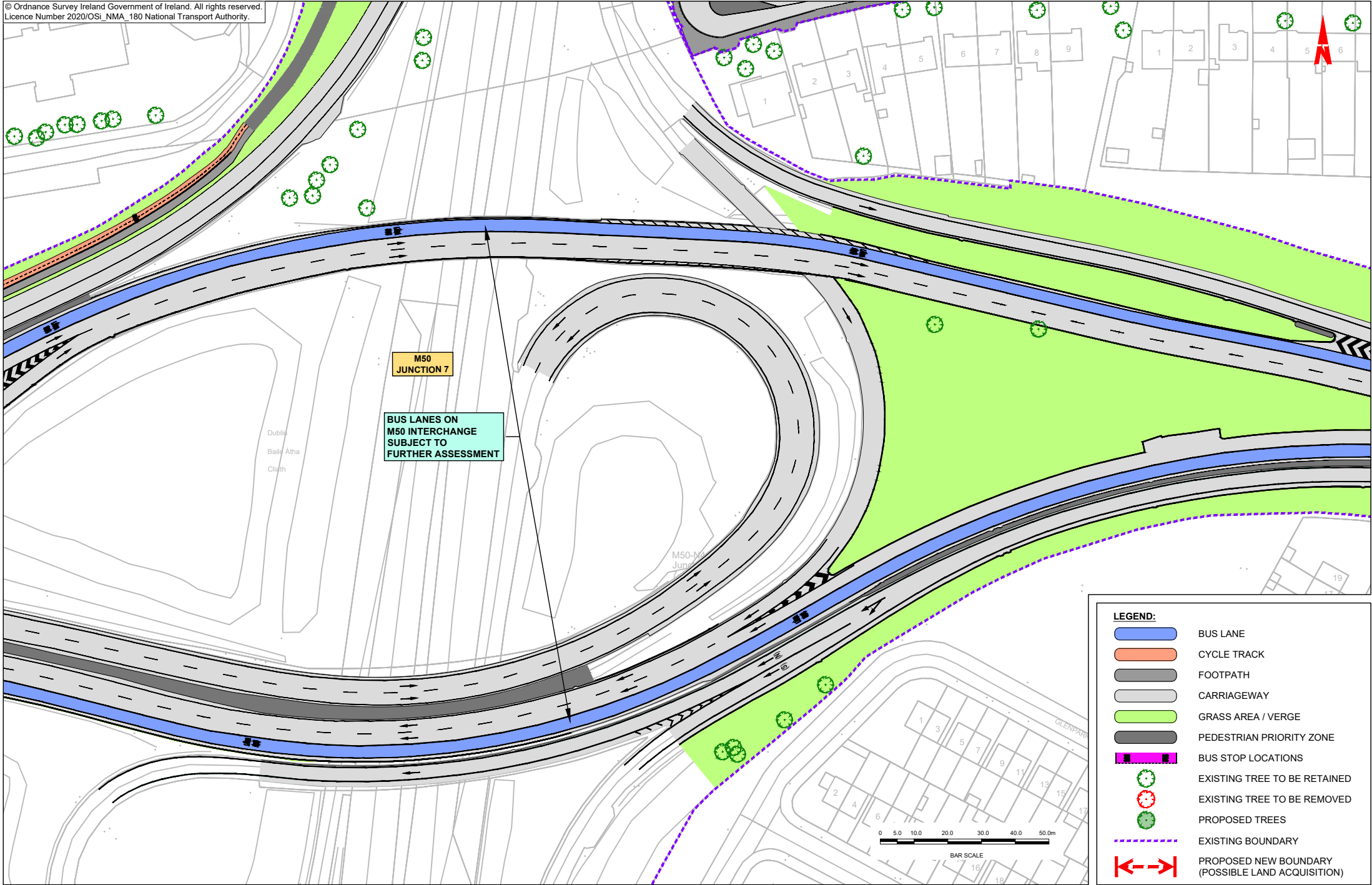
PROPOSED
TURNING HEAD

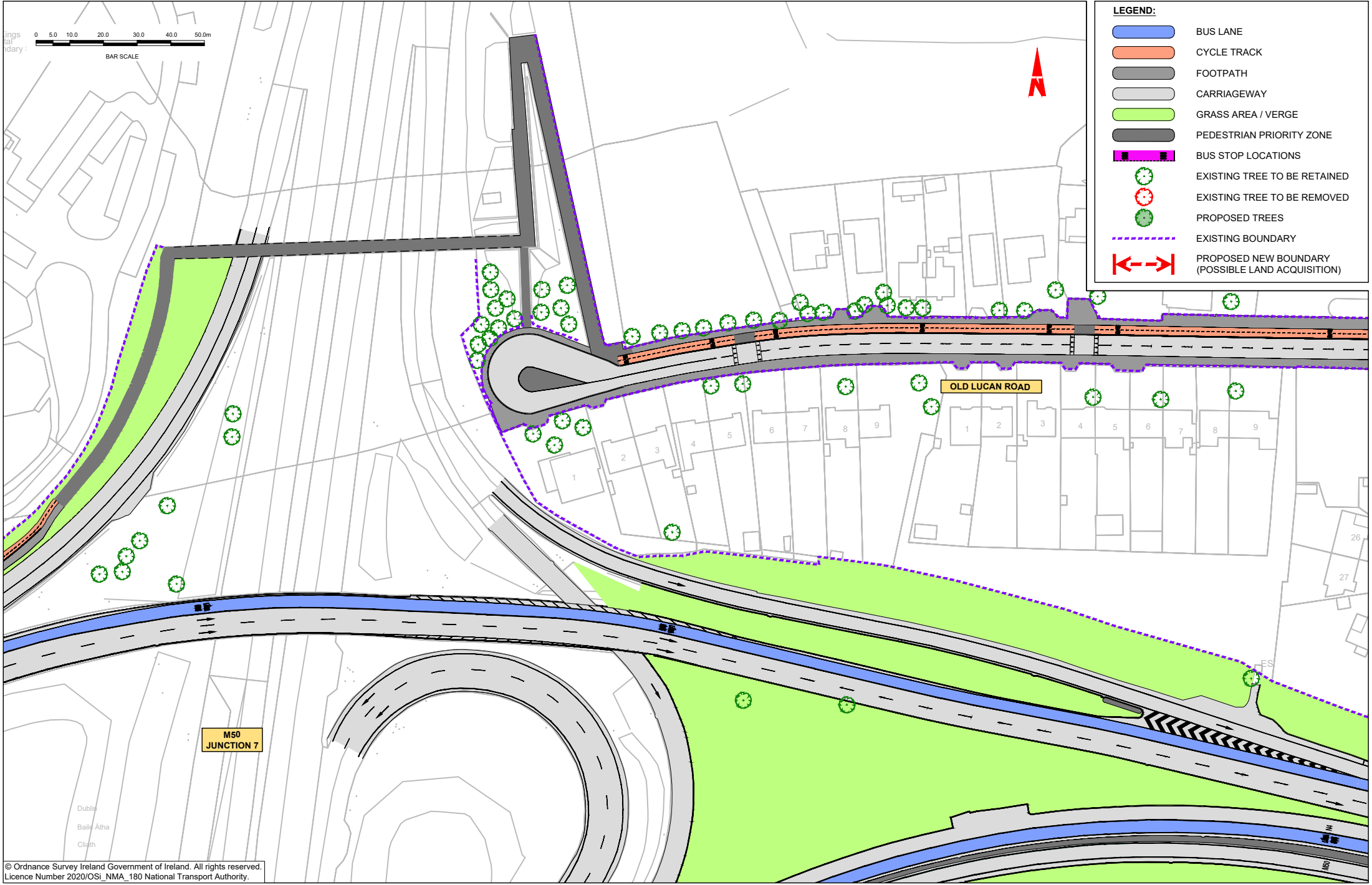
BOLLARDS

EXISTING BRIDGE TO
BE RETAINED













N4

Dublin
Bally Atha
Clash



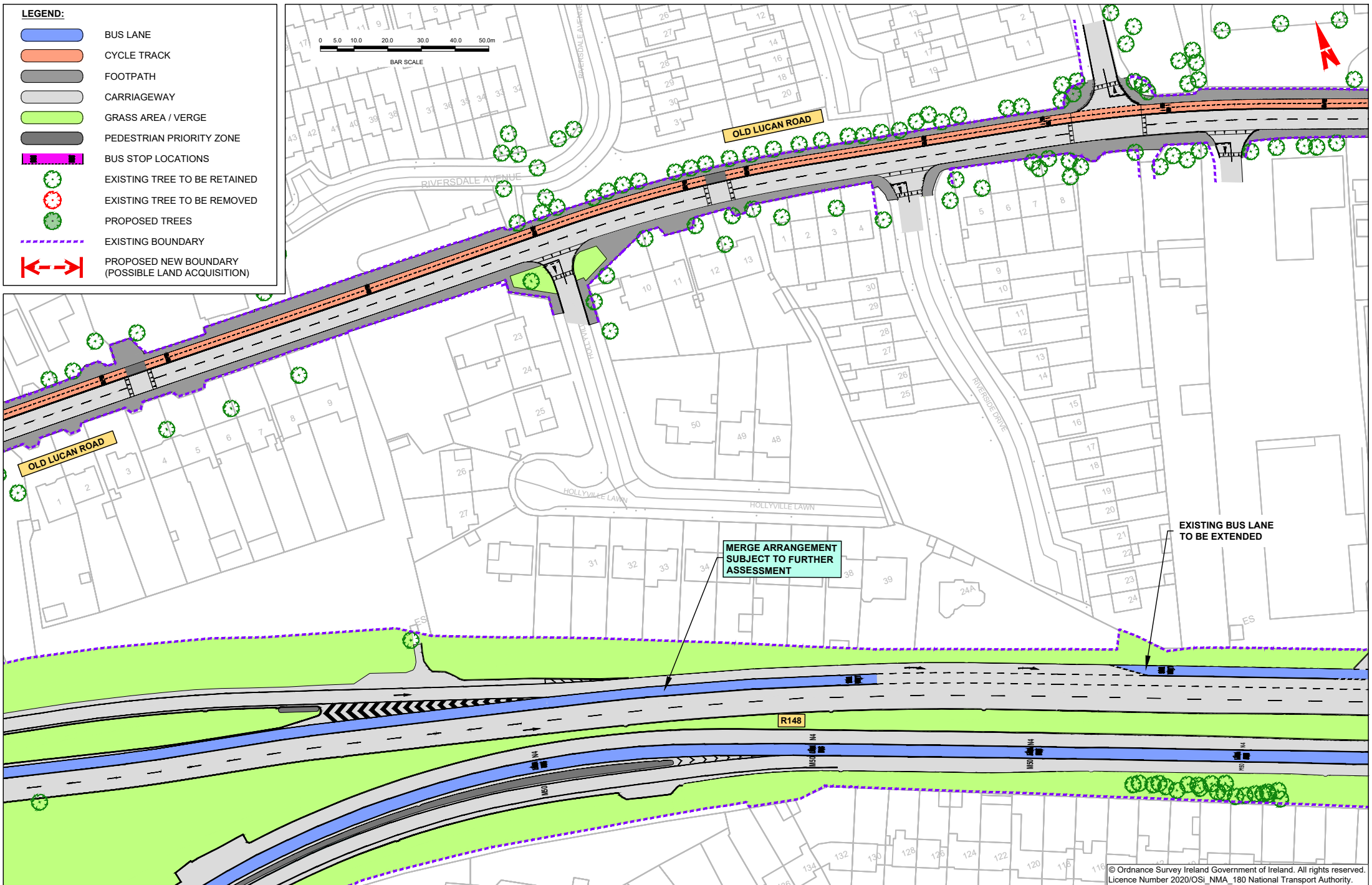


LEGEND:

-  BUS LANE
-  CYCLE TRACK
-  FOOTPATH
-  CARRIAGEWAY
-  GRASS AREA / VERGE
-  PEDESTRIAN PRIORITY ZONE
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-  EXISTING TREE TO BE REMOVED
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-  EXISTING BOUNDARY
-  PROPOSED NEW BOUNDARY (POSSIBLE LAND ACQUISITION)

0 5.0 10.0 20.0 30.0 40.0 50.0m

BAR SCALE















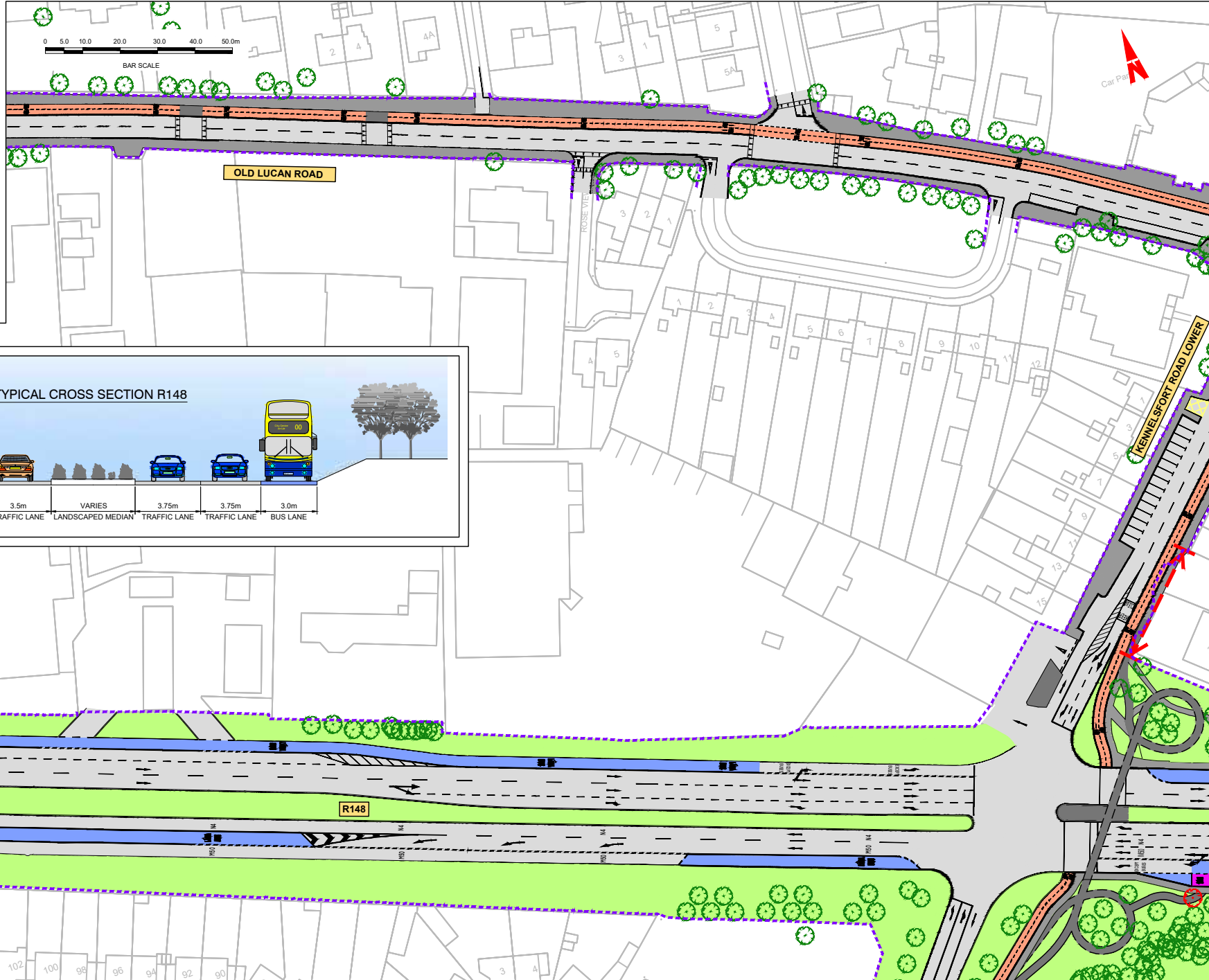
MERGE ARRANGEMENT
SUBJECT TO FURTHER
ASSESSMENT

EXISTING BUS LANE
TO BE EXTENDED

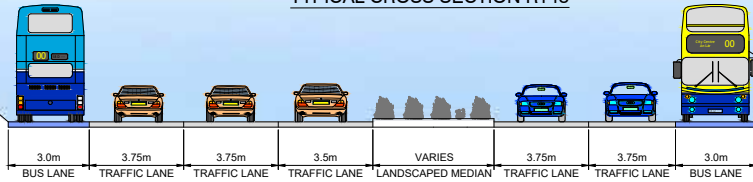
R148

LEGEND:

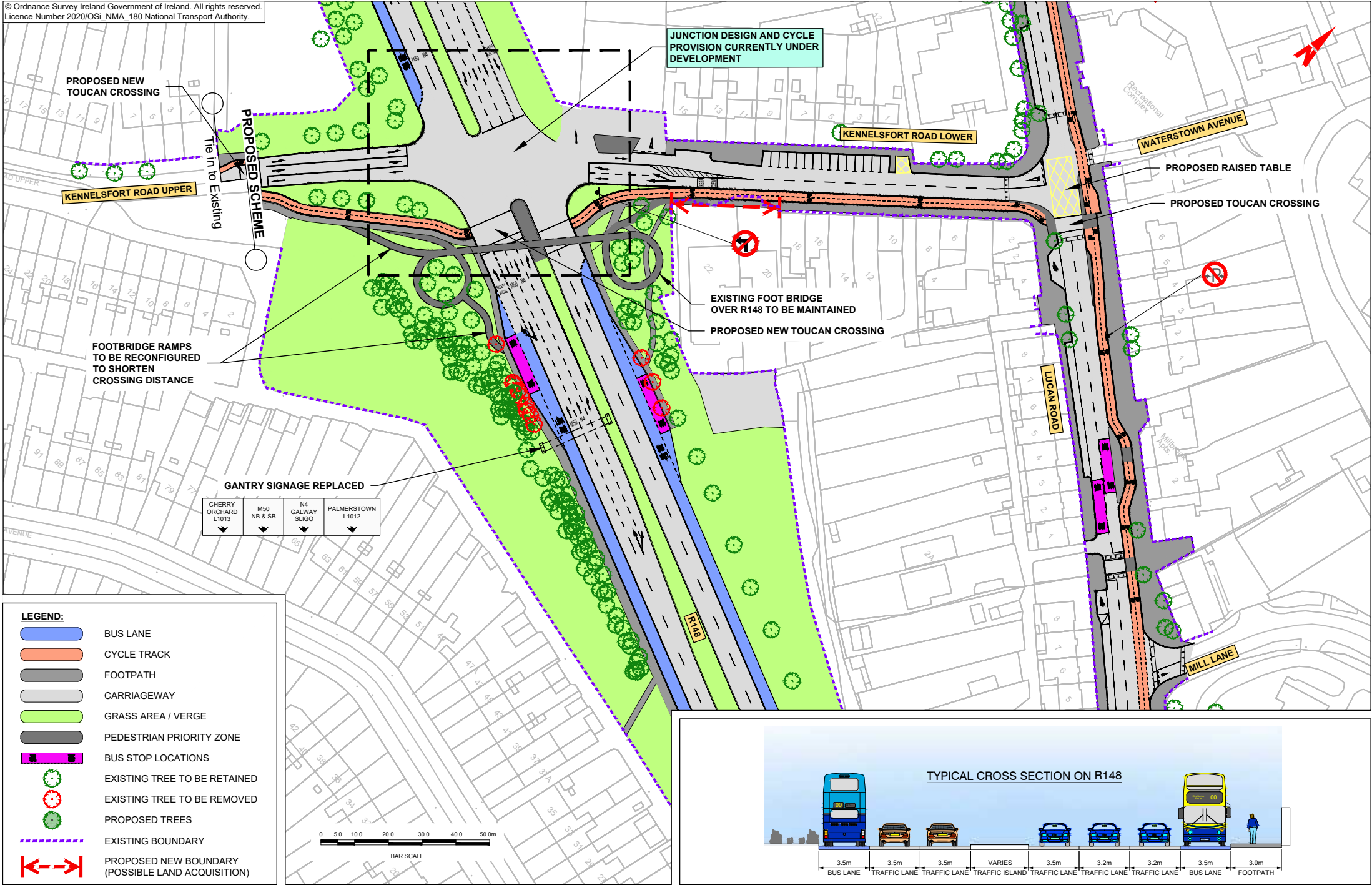
-  BUS LANE
-  CYCLE TRACK
-  FOOTPATH
-  CARRIAGEWAY
-  GRASS AREA / VERGE
-  PEDESTRIAN PRIORITY ZONE
-  BUS STOP LOCATIONS
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-  EXISTING TREE TO BE REMOVED
-  PROPOSED TREES
-  EXISTING BOUNDARY
-  PROPOSED NEW BOUNDARY (POSSIBLE LAND ACQUISITION)

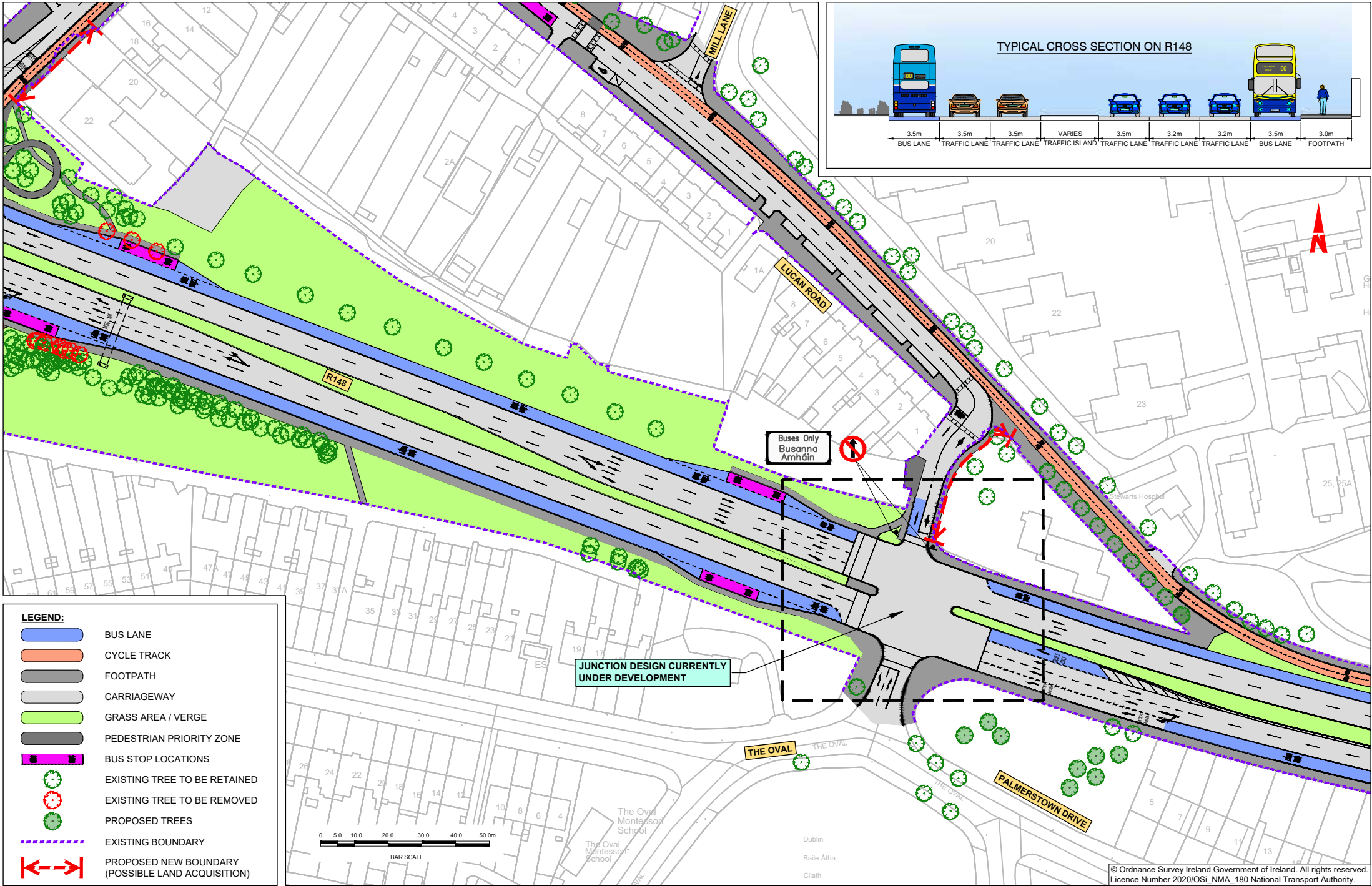


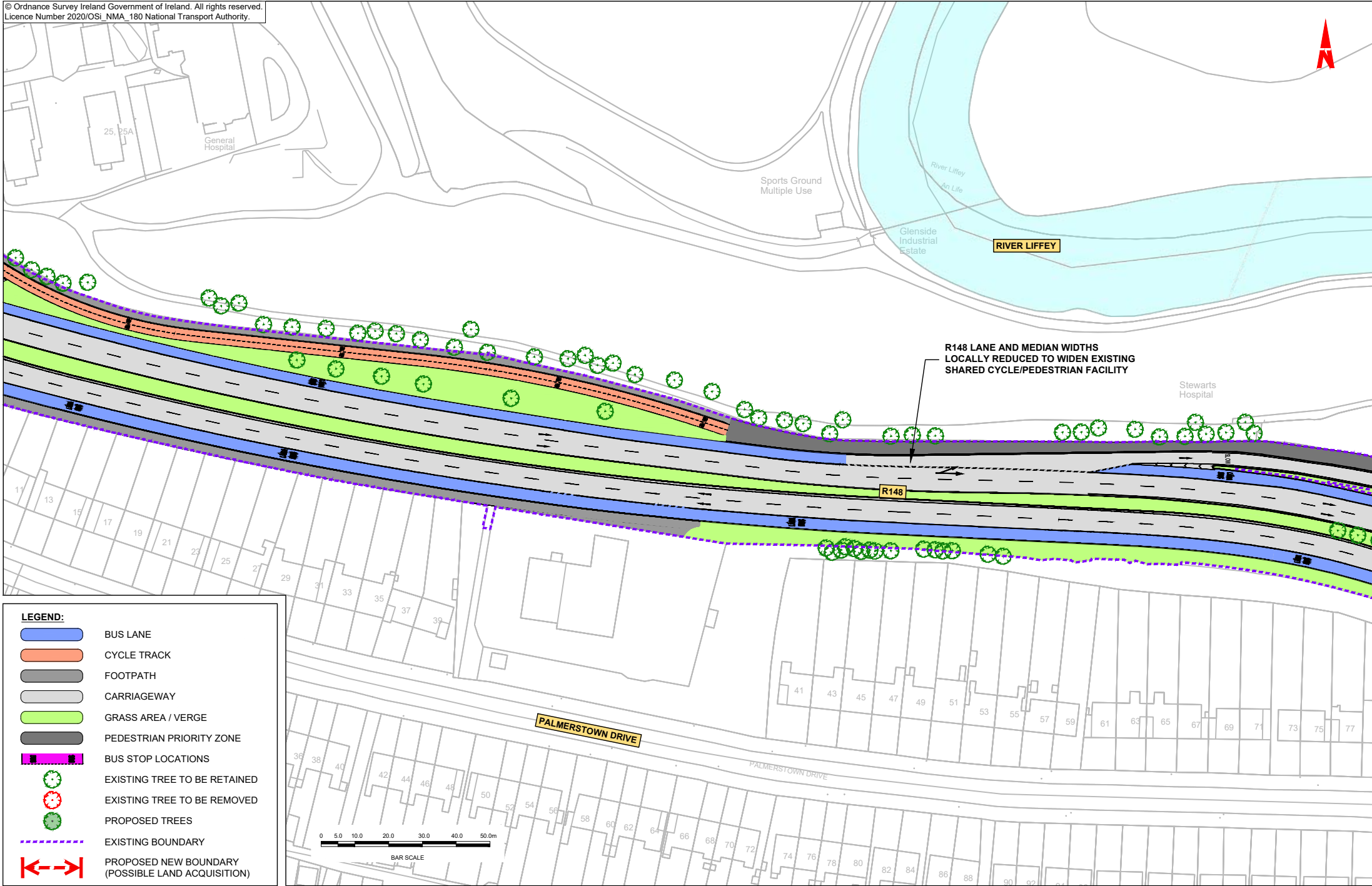
TYPICAL CROSS SECTION R148

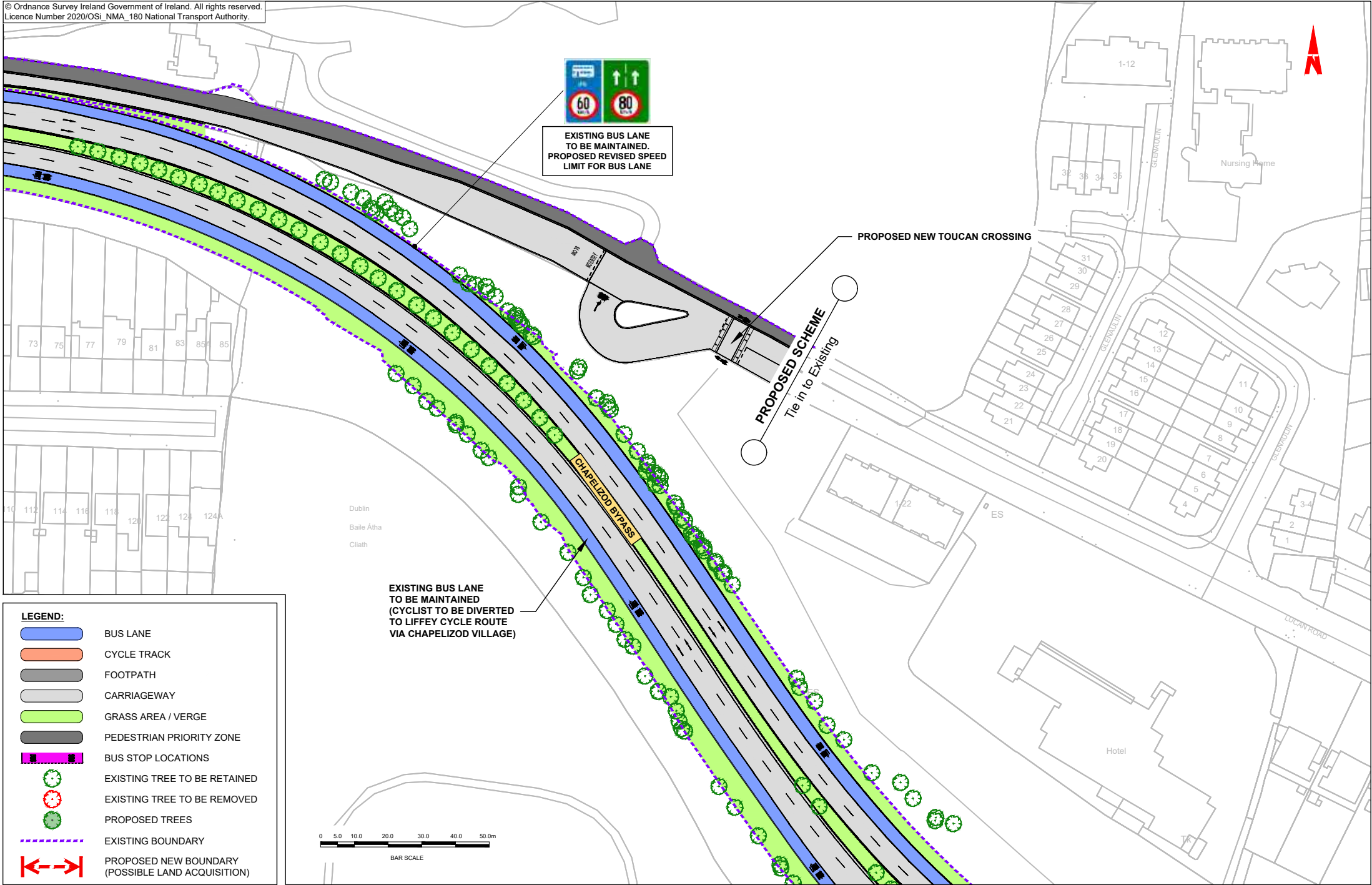


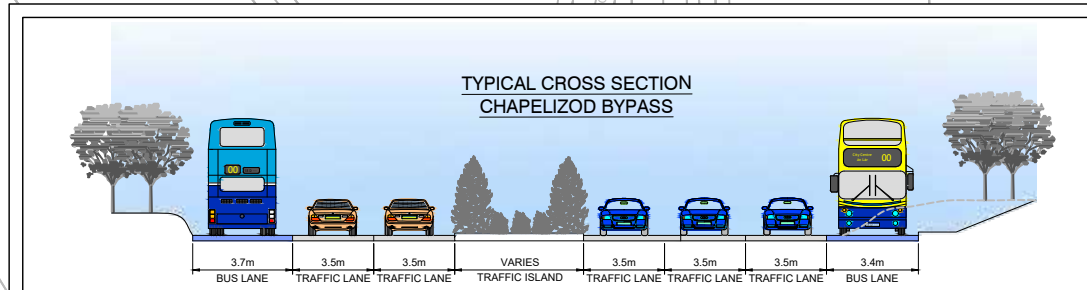
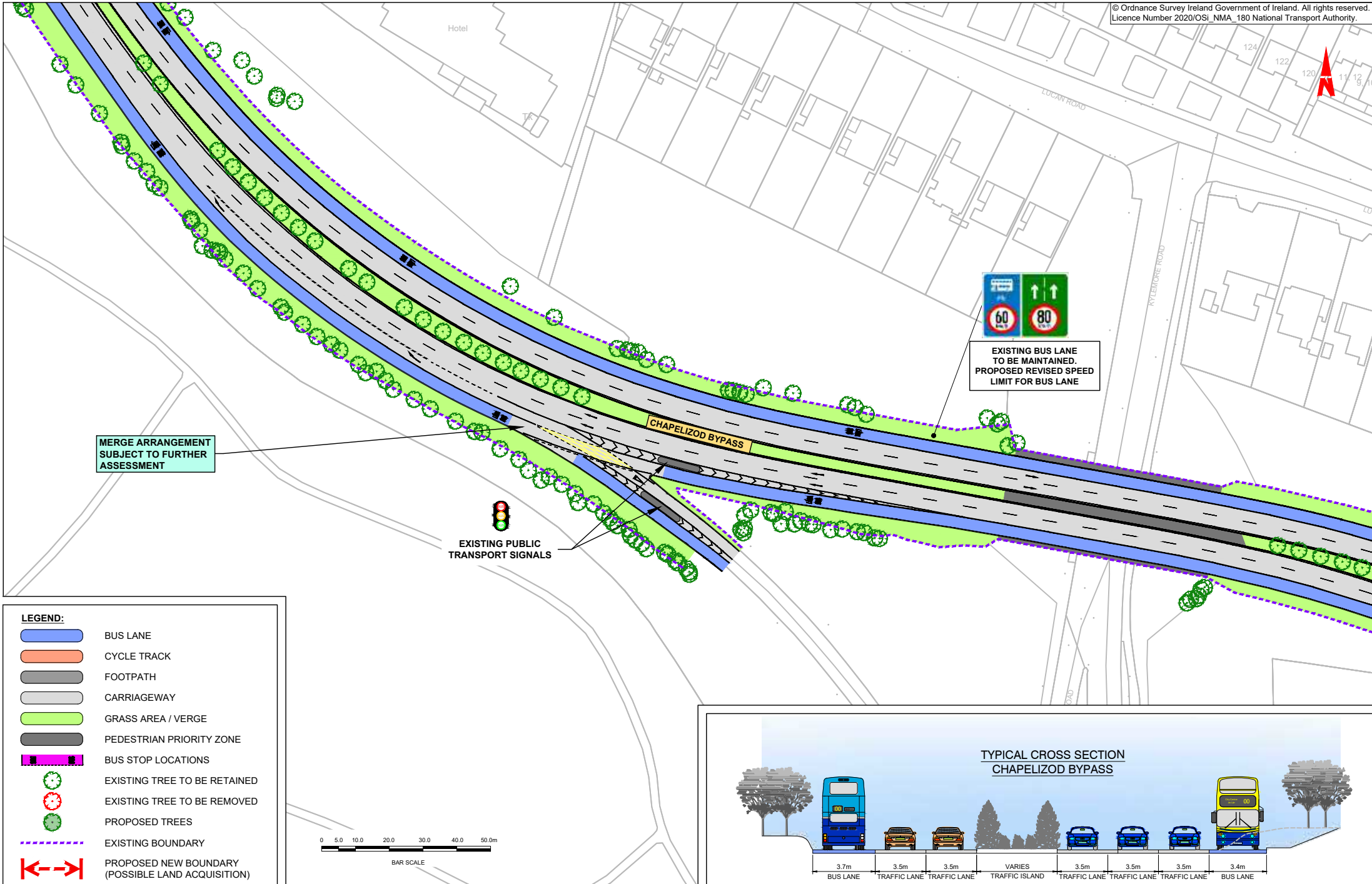
EXISTING BUS LANE
TO BE EXTENDED

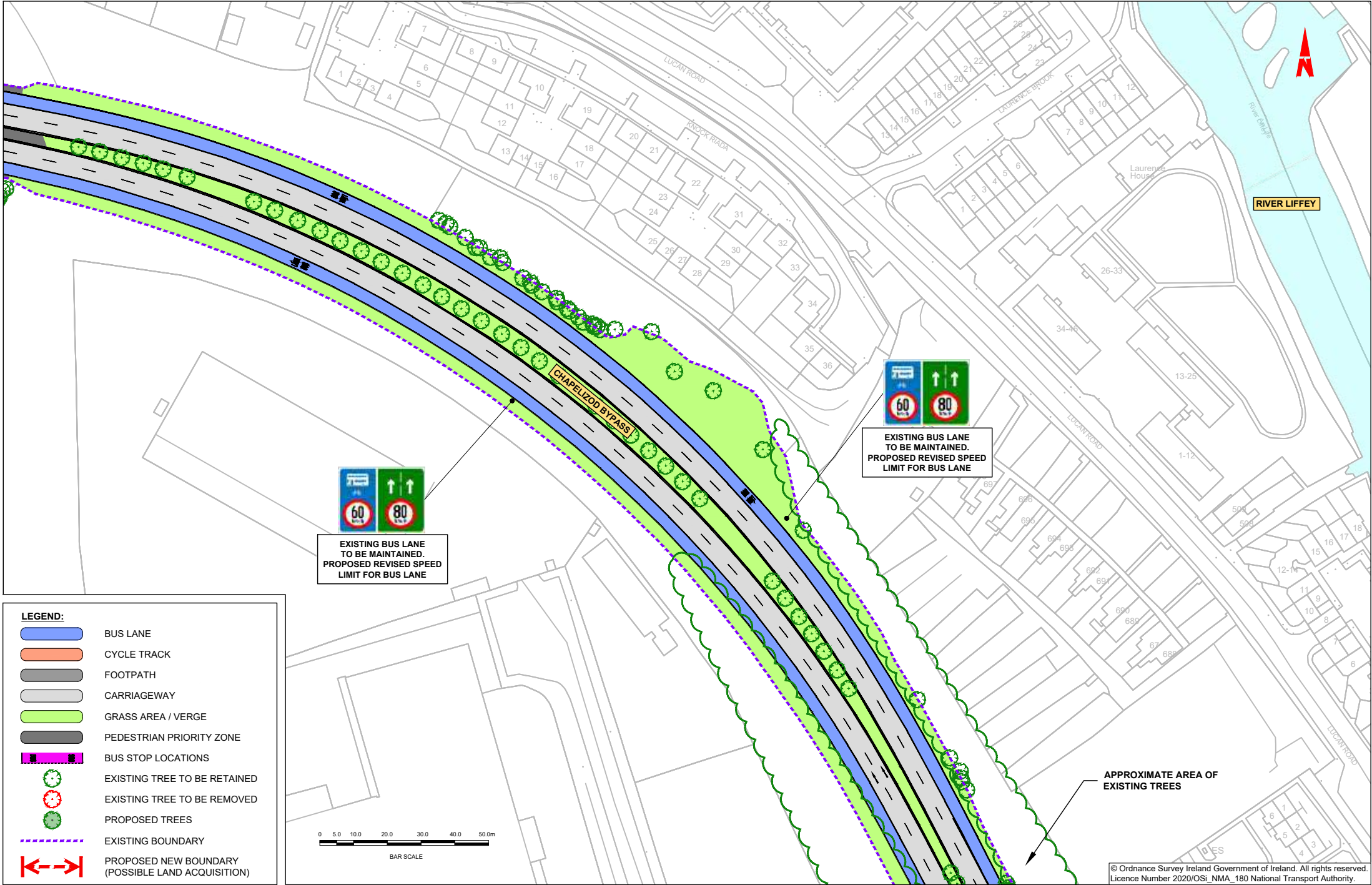




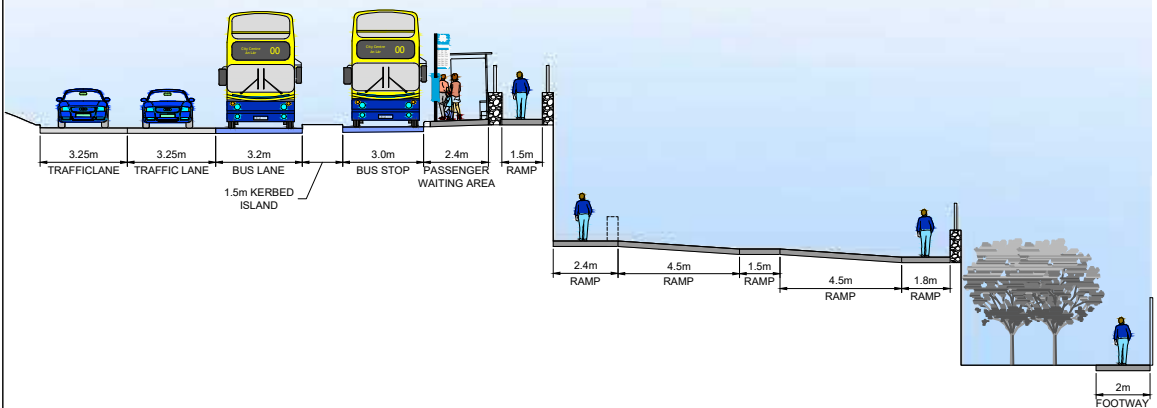






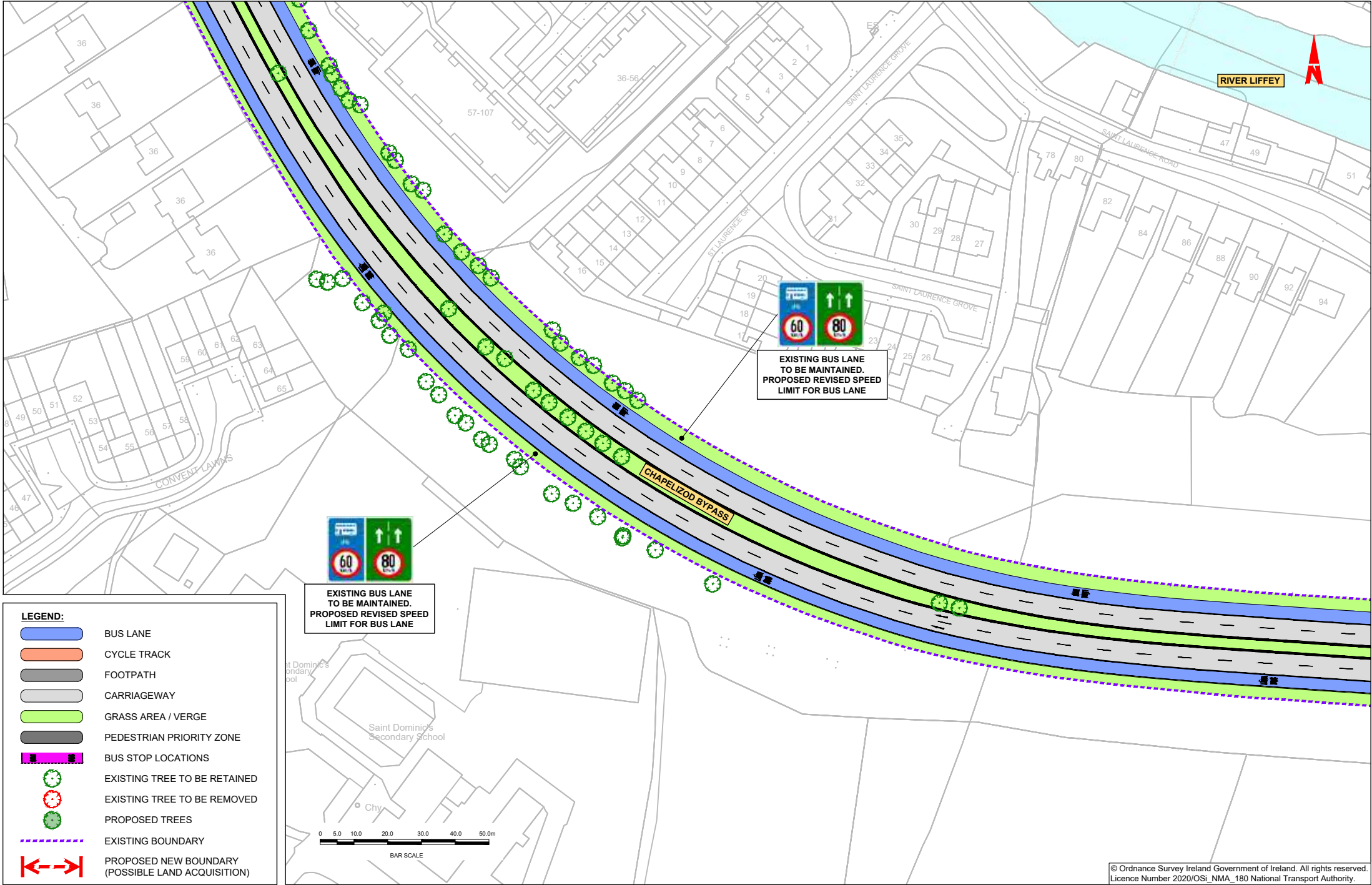


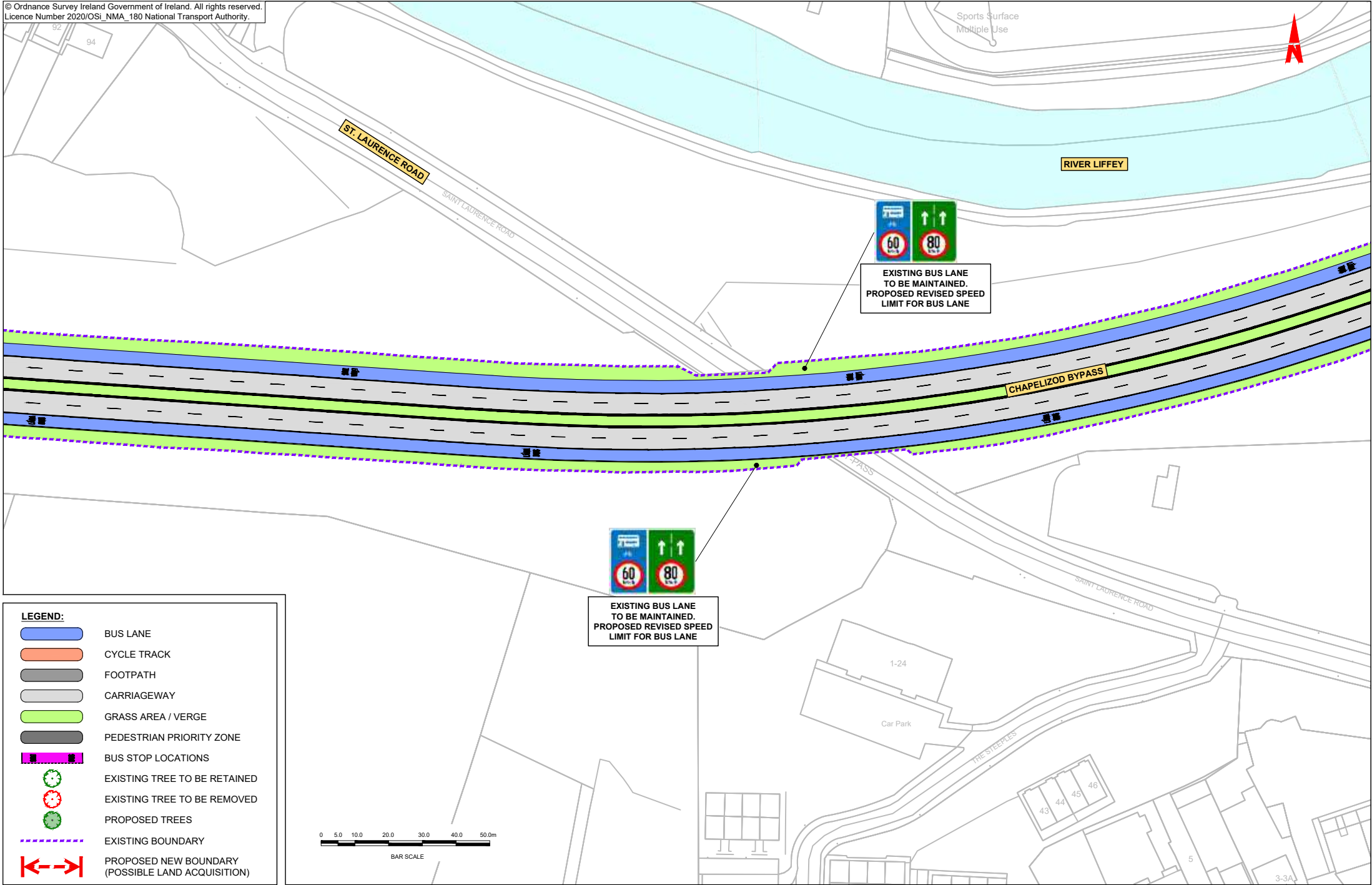
TYPICAL CROSS SECTION A-A
CHAPELIZOD BYPASS INBOUND







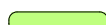







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LEGEND:

-  BUS LANE
-  CYCLE TRACK
-  FOOTPATH
-  CARRIAGEWAY
-  GRASS AREA / VERGE
-  PEDESTRIAN PRIORITY ZONE
-  BUS STOP LOCATIONS
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-  EXISTING TREE TO BE REMOVED
-  PROPOSED TREES
-  EXISTING BOUNDARY
-  PROPOSED NEW BOUNDARY (POSSIBLE LAND ACQUISITION)



RIVER LIFFEY

River Liffey
An Life

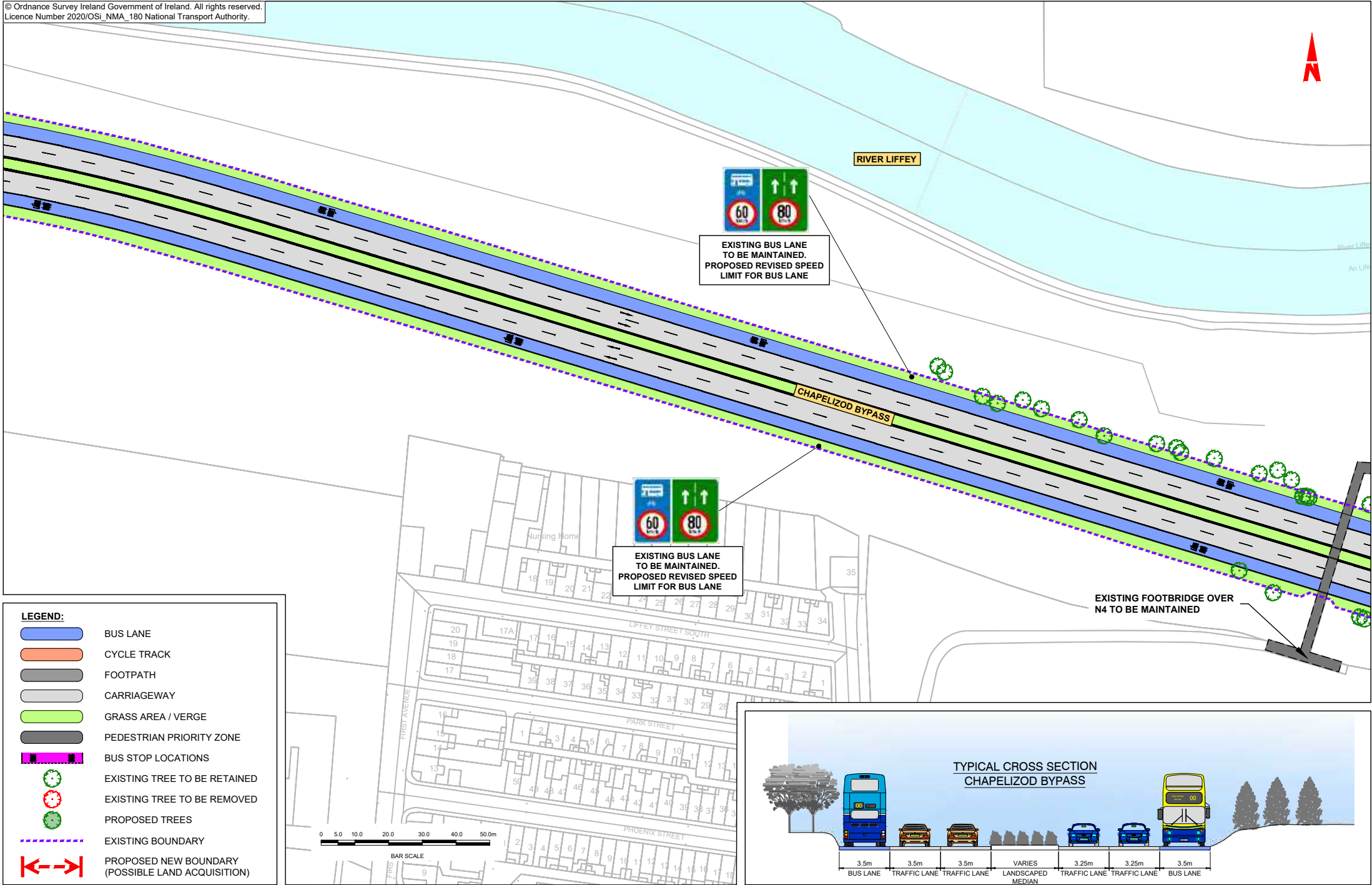
CHAPELIZOD BYPASS



EXISTING BUS LANE
TO BE MAINTAINED.
PROPOSED REVISED SPEED
LIMIT FOR BUS LANE

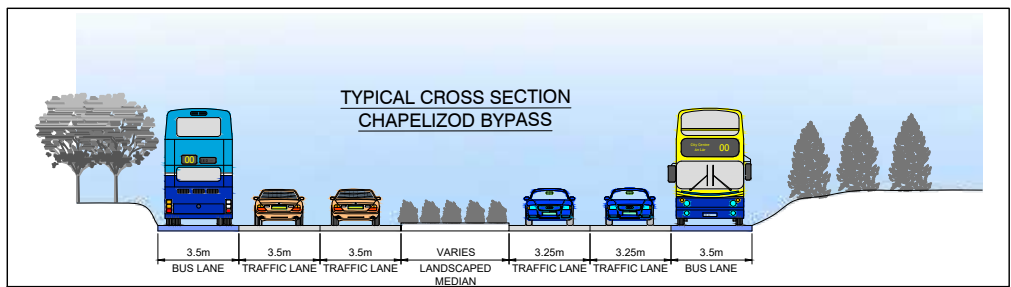


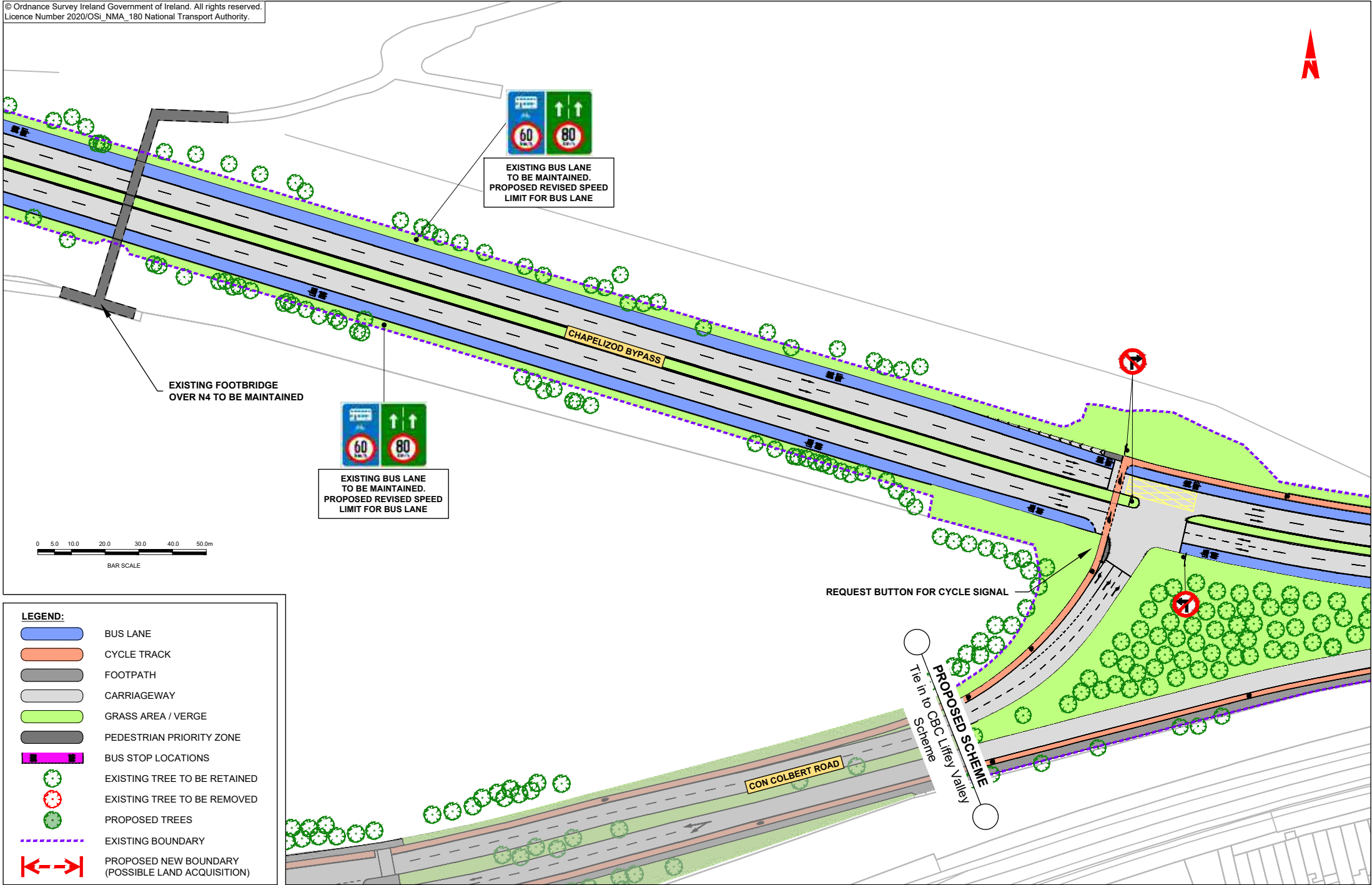
EXISTING BUS LANE
TO BE MAINTAINED.
PROPOSED REVISED SPEED
LIMIT FOR BUS LANE



LEGEND:

- BUS LANE
- CYCLE TRACK
- FOOTPATH
- CARRIAGEWAY
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- EXISTING BOUNDARY
- PROPOSED NEW BOUNDARY (POSSIBLE LAND ACQUISITION)















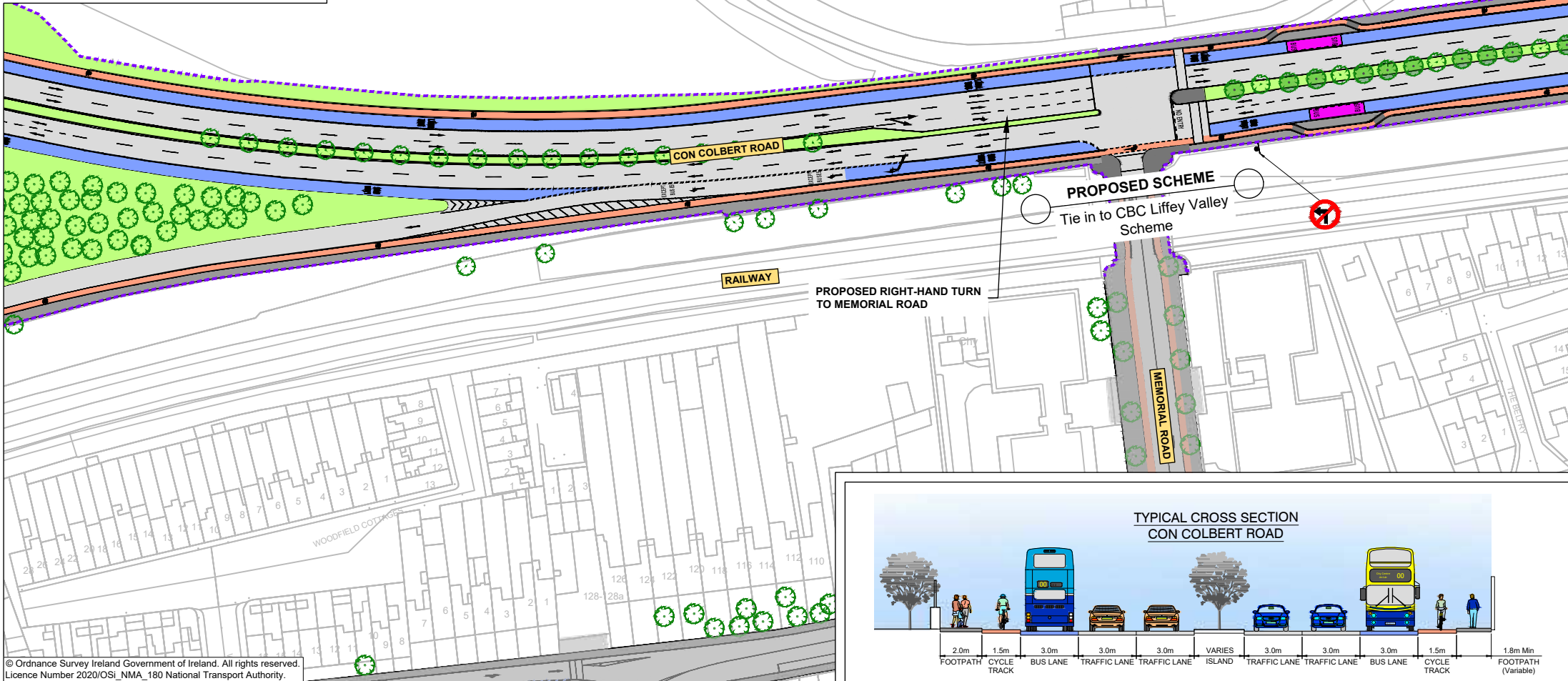
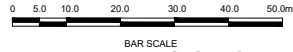


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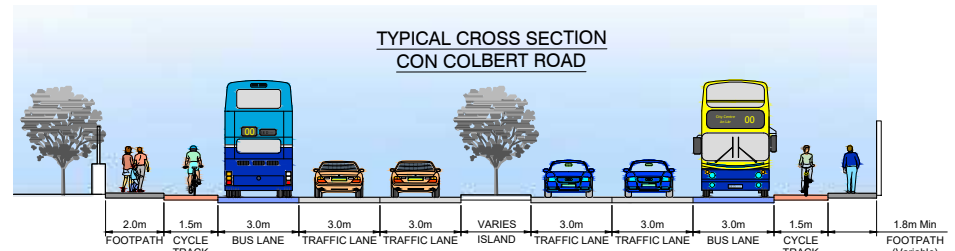
- BUS LANE
- CYCLE TRACK
- FOOTPATH
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- GRASS AREA / VERGE
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LEGEND:













-  BUS LANE
-  CYCLE TRACK
-  FOOTPATH
-  CARRIAGEWAY
-  GRASS AREA / VERGE
-  PEDESTRIAN PRIORITY ZONE
-  BUS STOP LOCATIONS
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-  EXISTING TREE TO BE REMOVED
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-  EXISTING BOUNDARY
-  PROPOSED NEW BOUNDARY (POSSIBLE LAND ACQUISITION)

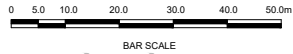


**TYPICAL CROSS SECTION
CON COLBERT ROAD**



LEGEND:

-  BUS LANE
-  CYCLE TRACK
-  FOOTPATH
-  CARRIAGEWAY
-  GRASS AREA / VERGE
-  PEDESTRIAN PRIORITY ZONE
-  BUS STOP LOCATIONS
-  EXISTING TREE TO BE RETAINED
-  EXISTING TREE TO BE REMOVED
-  PROPOSED TREES
-  EXISTING BOUNDARY
-  PROPOSED NEW BOUNDARY
(POSSIBLE LAND ACQUISITION)



Saint John
God Sp
School

Saint John Of
God Special
School

School

Gaelscoil
Inse
Chor

CON COLBERT ROAD

Beaconsfield
Courtyards

Church

ES













INCHICORE ROAD

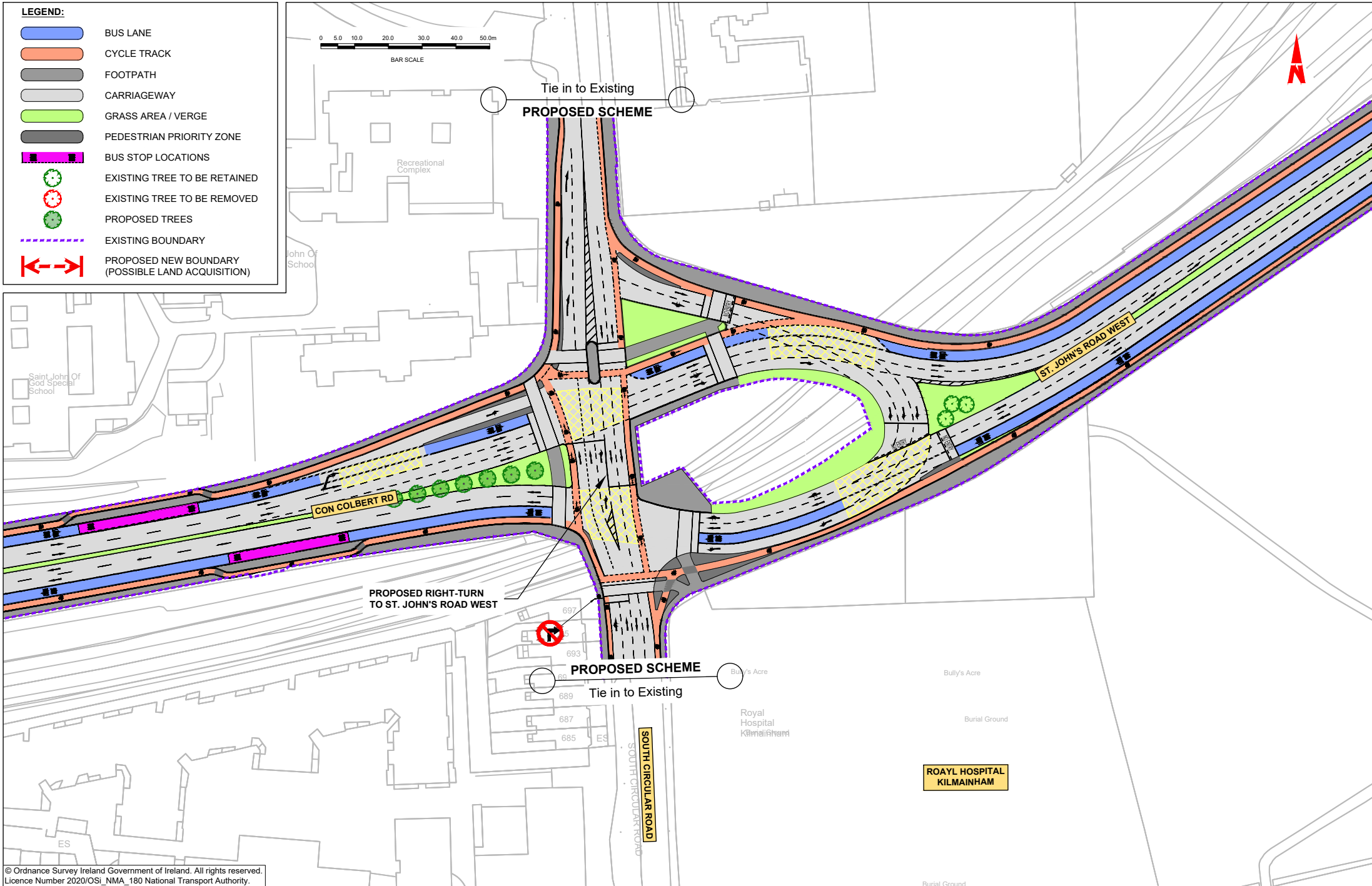
INCHICORE ROAD

INCHICORE ROAD













INCHICORE ROAD

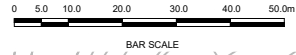
LEGEND:

-  BUS LANE
-  CYCLE TRACK
-  FOOTPATH
-  CARRIAGEWAY
-  GRASS AREA / VERGE
-  PEDESTRIAN PRIORITY ZONE
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LEGEND:

-  BUS LANE
-  CYCLE TRACK
-  FOOTPATH
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-  EXISTING TREE TO BE REMOVED
-  PROPOSED TREES
-  EXISTING BOUNDARY
-  PROPOSED NEW BOUNDARY (POSSIBLE LAND ACQUISITION)



RAILWAY

EXISTING TAXI LANE
TO BE REMOVED

Dublin
Bailie Atha
Cillich













PROPOSED SCHEME
Tie in to Existing

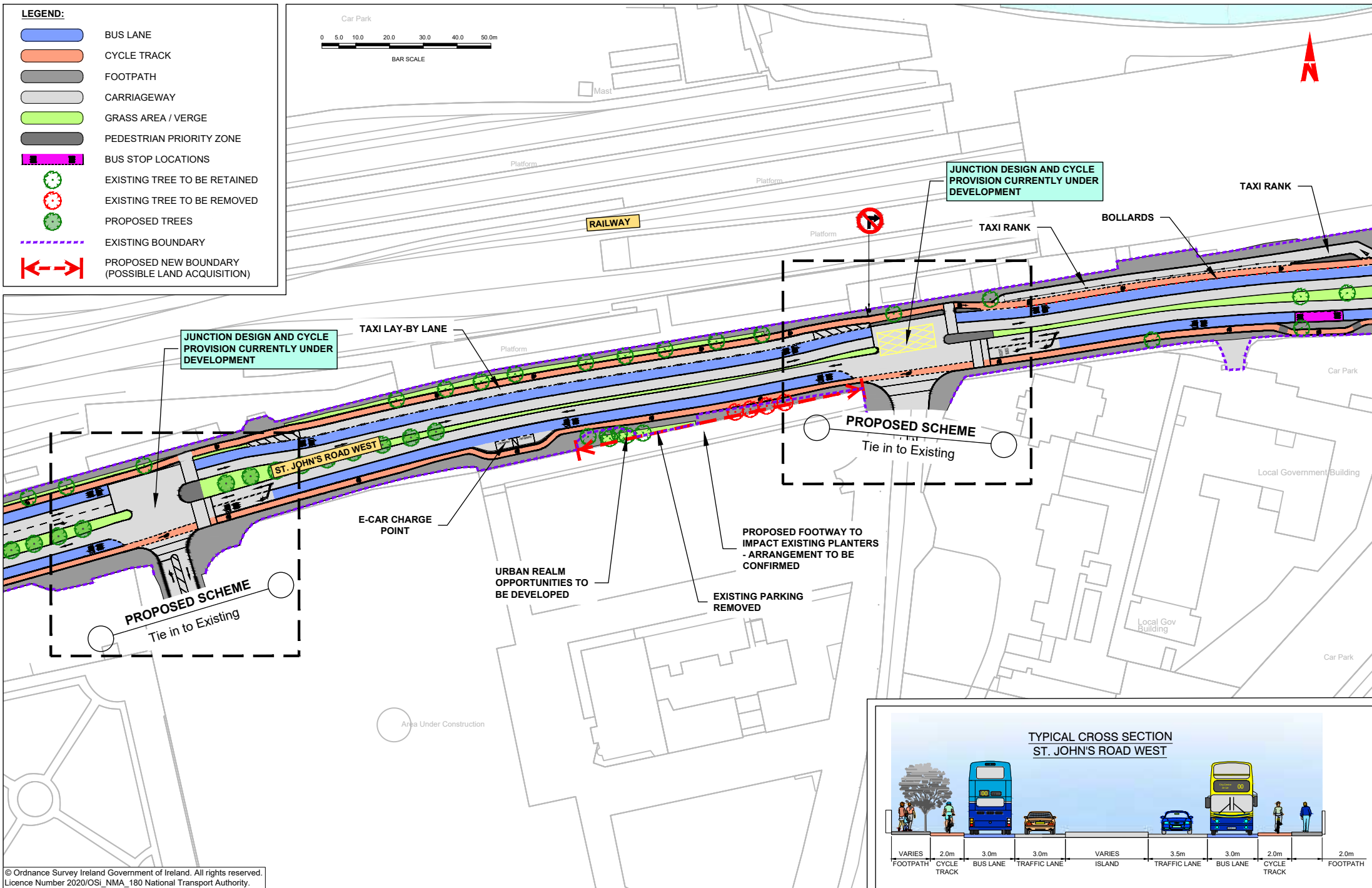
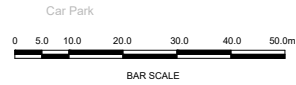
PROPOSED PLANTING
SCHEME TO FACILITATE
FORWARD VISIBILITY AND
MINIMISE MAINTENANCE

ROAYL HOSPITAL
KILMAINHAM

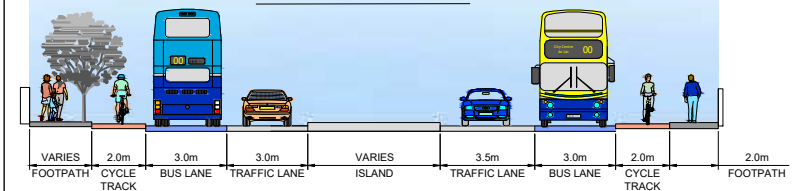
Royal
Hospital
Kilmainham

LEGEND:













-  BUS LANE
-  CYCLE TRACK
-  FOOTPATH
-  CARRIAGEWAY
-  GRASS AREA / VERGE
-  PEDESTRIAN PRIORITY ZONE
-  BUS STOP LOCATIONS
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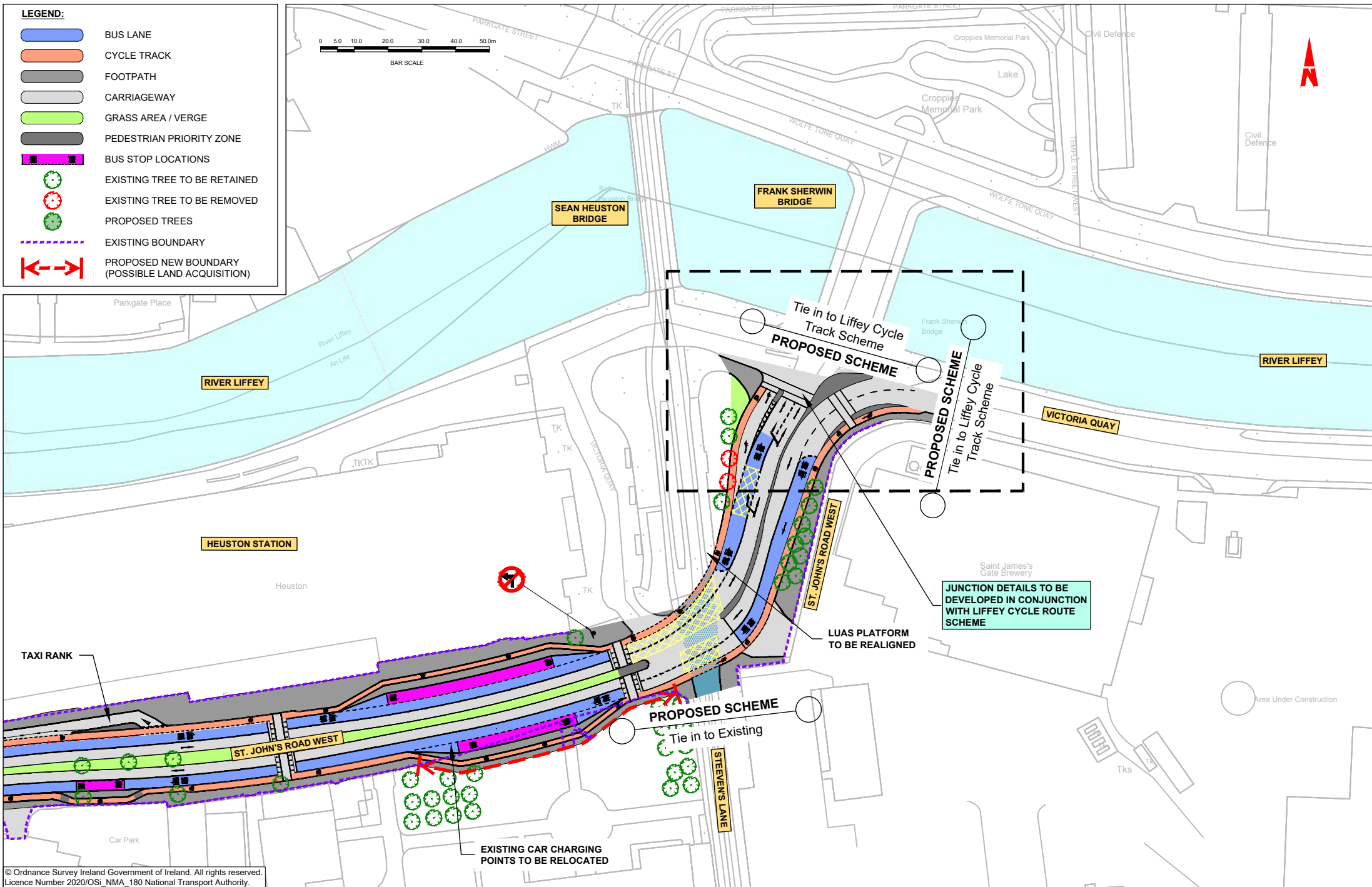
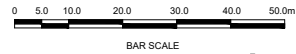


**TYPICAL CROSS SECTION
ST. JOHN'S ROAD WEST**



LEGEND:

-  BUS LANE
-  CYCLE TRACK
-  FOOTPATH
-  CARRIAGEWAY
-  GRASS AREA / VERGE
-  PEDESTRIAN PRIORITY ZONE
-  BUS STOP LOCATIONS
-  EXISTING TREE TO BE RETAINED
-  EXISTING TREE TO BE REMOVED
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Appendix C – Lucan to City Centre CBC Feasibility Report

Work in Progress - Draft

The Lucan to City Centre Options Study Feasibility Report is available on the NTA BusConnects Website, it can be accessed by clicking the links below:

<https://busconnects.ie/initiatives/core-bus-corridor-background-information/technical-documents/>

Lucan to City Centre:

- Options Study Feasibility Report
https://busconnects.ie/media/1384/rpt-16_080-004-lucan-to-city-centre-core-bus-corridor-options-study-feasibility-report.pdf
- Bus Corridor Map
https://busconnects.ie/media/1383/16_080_00_1155-1193-lucan-general-layout-final.pdf

Work in Progress - Draft

Appendix D – Emerging Preferred Route Public Consultation Brochure

Work in Progress - Draft

The Emerging Preferred Route Public Consultation Brochure and Drawings from January 2019 are available from the NTA BusConnects Website, and can be accessed by clicking on the links below:

<https://busconnects.ie/media/1356/busconnects-cbc6-lucan-to-city-centre-final-for-web-med-res.pdf>

Work in Progress - Draft

