Chapter 06
Traffic & Transport

Contents

6. Traffic & Transport

6.1 Introduction

This Chapter of the Environmental Impact Assessment Report (EIAR) has considered the potential traffic and transport impacts associated with the Construction and Operational Phases of the Kimmage to City Centre Core Bus Corridor Scheme (hereafter referred to as the Proposed Scheme).

The Chapter describes the traffic and transport impacts in accordance with the requirements of the relevant Environmental Protection Agency's (EPA) Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (hereafter referred to as the EPA Guidelines) (EPA 2022). To accompany this Chapter, a Traffic Impact Assessment (TIA) has been prepared. The TIA presents a comprehensive review of the traffic and transportation impacts associated with the Proposed Scheme, which has informed the production of this Chapter. The TIA should be read in conjunction with this EIAR Chapter and is included as Appendix A6.1 in Volume 4 of this EIAR.

The Proposed Scheme, as described in detail in Chapter 4 (Proposed Scheme Description), will be approximately 3.7km in length and will commence on R817 Kimmage Road Lower at the junction with the R818 on Terenure Road West and Kimmage Road West, and R817 Fortfield Road. The Proposed Scheme will continue along R817 Kimmage Road Lower towards the City Centre, via the R137 on Harold's Cross Road, Clanbrassil Street Upper and Lower and New Street South. Priority for buses will be provided along the entire route, consisting primarily of dedicated bus lanes in both directions where feasible, with alternative measures, such as bus gates, proposed at particularly constrained locations such as much of R817 Kimmage Road Lower, Harold's Cross Park West and short sections of R137 Clanbrassil Street Upper and Lower in alternate directions. A complementary cycle route is also proposed at the southern end of the proposed scheme, to the west of the core corridor via quiet streets.

Pedestrian facilities will be upgraded, and additional signalised crossings will be provided.

The contents of Table 6-1 summarises the changes which will be made to the existing transport environment along the corridor as a result of the Proposed Scheme.

Table 6-1: Summary of Changes as a Result of the Proposed Scheme

Features	Existing (km)	Proposed Scheme (km)
Bus Lanes		
Inbound	0.9	1.55
Outbound	0.4	1.6
Bus Priority through Traffic Management		
Inbound	0	2.15
Outbound	0	2.1
Total Bus Priority (both directions)	1.3	7.4
Bus Measures		
Proportion of Route with Bus Priority Measures	18%	100%
Cycle Facilities – Segregated (excluding Quiet Street Treatment)		
Inbound	0	1.75
Outbound	0	1.75
Cyclist Facilities – Non-Segregated		
Inbound	2.8	2.25
Outbound	3.2	2.25
Cyclist Facilities – Overall		
Total Cyclist Facilities (both directions)	2.8	4.0
Proportion Segregated (including Quiet Street Treatment)	3.2	4.0
Other Features		
Number of Traffic Signal Controlled Junctions	9	11
Number of Pedestrian Signal Crossings (including at junctions)	35	47

The Proposed Scheme, as described in Chapter 4 (Proposed Scheme Description) is supported by a series of drawings, which are contained in Volume 3 of this EIAR. The following drawings (listed in Table 6-2) should be read in conjunction with this Chapter.

Table 6-2: List of Drawings

Drawing Series Number	Description
BCIDD-ROT-GEO_GA-0011_XX_00-DR-CR-9001	General Arrangement
BCIDA-ACM-GEO_CS-0011_XX_00-DR-CR-9001	Typical Cross Sections
BCIDA-ACM-TSM_GA-0011_XX_00-DR-CR-9001	Traffic Signs and Road Markings
BCIDA-ACM-TSM_SJ-0011_XX_00-DR-TR-9001	Junction System Design

Cumulative impacts of traffic and transport, along with other topics can be found in Chapter 21 (Cumulative Impacts & Environmental Interactions) of this EIAR as well as Appendix A6.1 (TIA Report) in Volume 4 of this EIAR.

6.1.1 Aim and Objectives of the Proposed Scheme

The aim of the Proposed Scheme 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 of the BusConnects Dublin – Core Bus Corridor Infrastructure Works (hereafter referred to as the CBC Infrastructure Works), applicable to the traffic and transport assessment of the Proposed Scheme 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.

The planning and design of the Proposed Scheme has been guided by these aims and objectives, with the need for the Proposed Scheme described in detail in Chapter 2 (Need for the Proposed Scheme) of this EIAR.

6.1.1.1 People Movement

The aims and objectives outlined above are underpinned by the central concept and design philosophy of '***People Movement'.*** People Movement is the concept of the optimisation of roadway space and / or the prioritisation of the movement of people over the movement of vehicles along the route and through the junctions along the Proposed Scheme. The aim being the reduction of journey times for higher person carrying capacity modes (bus, walking and cycling), which in turn provides significant efficiencies and benefits to users of the transport network and the environment.

A typical double-deck bus takes up the same road space as three standard cars but typically carries 50-100 times the number of passengers. On average, a typical double-deck bus carries approximately 60-70 passengers making the bus typically 20 times more efficient in providing people movement capacity within the equivalent spatial area of three cars. These efficiency gains can provide a significant reduction in road network congestion where the equivalent car capacity would require 50 or more vehicles based on average occupancy levels. Consequently, by prioritising the movement of bus over cars, significantly more people can be transported along the limited road space available. Similarly, cyclists and pedestrians require significantly less roadway space than general traffic users to move safely and efficiently along the route. Making space for improved pedestrian infrastructure and segregated cycle tracks can significantly benefit these sustainable modes and encourage greater use of these modes.

With regards to this Traffic and Transport Chapter, People Movement is the key design philosophy, and the Proposed Scheme impacts (both positive and negative) have been assessed on this basis.

6.1.1.2 Preliminary Design Guidelines

To support the 'People Movement' led approach to the design of the Proposed Scheme, the Preliminary Design Guidance Booklet for BusConnects Core Bus Corridors (PDGB) (National Transport Authority (NTA 2021)) (refer to Appendix A4.1 in Volume 4 of this EIAR) was developed. This guidance document was prepared to ensure that a consistent design approach was taken across the various BusConnects Schemes and that the objectives of the project are achieved. A 'People Movement' led design involves the prioritisation of people movement, focussing on maximising the throughput of sustainable modes (i.e. Walking, Cycling and Bus modes) in advance of the consideration and management of general vehicular traffic (private car) at junctions.

In support of this approach, a project specific People Movement at Signal Calculator (PMSC) was developed. The PMSC was applied at the initial design development stage, to provide an initial estimate of green time allocation for all movements at a typical junction, on the basis that sustainable mode movements should be accommodated foremost to maximise people movement with the remaining green time allocated to general traffic movements. The calculations were underpinned by:

- The number of buses required to be accommodated along the Proposed Scheme, as per the BusConnects Network Re-design proposals;
- The provision of a high Level of Service (LoS) for cyclists at each junction along the Proposed Scheme; and

- The pedestrian crossing width and crossing timing requirements based on the provision of a high LoS for pedestrians at each junction along the Proposed Scheme.

The outputs of the calculator provided an initial estimate of the green times and vehicle capacity movements based on inputs and assumptions for each junction along the Proposed Scheme. The calculator provided an estimate of the People Movement for the junction in question (by mode) and was used to adjust proposals with a view to maximising the total person throughput at each junction along the Proposed Scheme during the iterative design process, described further in Section 6.2.3. Details on the development of junction designs along the Proposed Scheme are included in Appendix A6.3 (Junction Design Report) in Volume 4 of this EIAR.

The People Movement Calculation and the identification of available general traffic capacity from this initial exercise was enhanced further by the Proposed Scheme Transport Models described in Section 6.2.

6.1.2 Iterative Design Process and Mitigation by Design

Throughout the development of the Preliminary Design for the Proposed Scheme there have been various design stages undertaken based on a common understanding of the maturity of the design at a given point in time. Part of this process was to ensure the environmental and transport impacts were mitigated to the greatest extent possible during design development and to enable information on potential impacts to be provided from the various Environmental Impact Assessment (EIA) and Transport Impact Assessment (TIA) disciplines back into the design process for consideration and inclusion in the proposals This resulted in mitigation being embedded into the design process by the consideration of potential environmental impacts throughout the Preliminary Design development. A multi-tiered modelling framework (described in Section 6.2.3) was developed to support this iterative design process.

Image 6.1 below illustrates this process whereby the emerging design for the Proposed Scheme have been tested using the transport models as part the iteration. The transport models provided an understanding of the benefits and impacts of the proposals (mode share changes, traffic redistribution, bus performance etc.) with traffic flow information also informing other environmental disciplines (such as Air Quality, Noise and Vibration, Climate etc.) which in turn allowed feedback of potential impacts into the design process to allow for changes and in turn mitigation to be embedded in the designs. The design process included physical changes (e.g., cycle lane widening) and adjustments to traffic signals including changes to staging, phasing and green times to limit traffic displacement to the greatest extent possible as well as traffic management arrangements and/or turn bans where appropriate. This ensured that any displaced traffic was kept to a minimum and was maintained on higher capacity roads, whilst continuing to meet scheme objectives along the Proposed Scheme.

The iterative process concluded when the design team were satisfied that the Proposed Scheme met its required objectives (maximising the people movement capacity of the Proposed Scheme) and that the environmental impacts and level of residual impacts were reduced to a minimum whilst ensuring the scheme objectives remained satisfied.

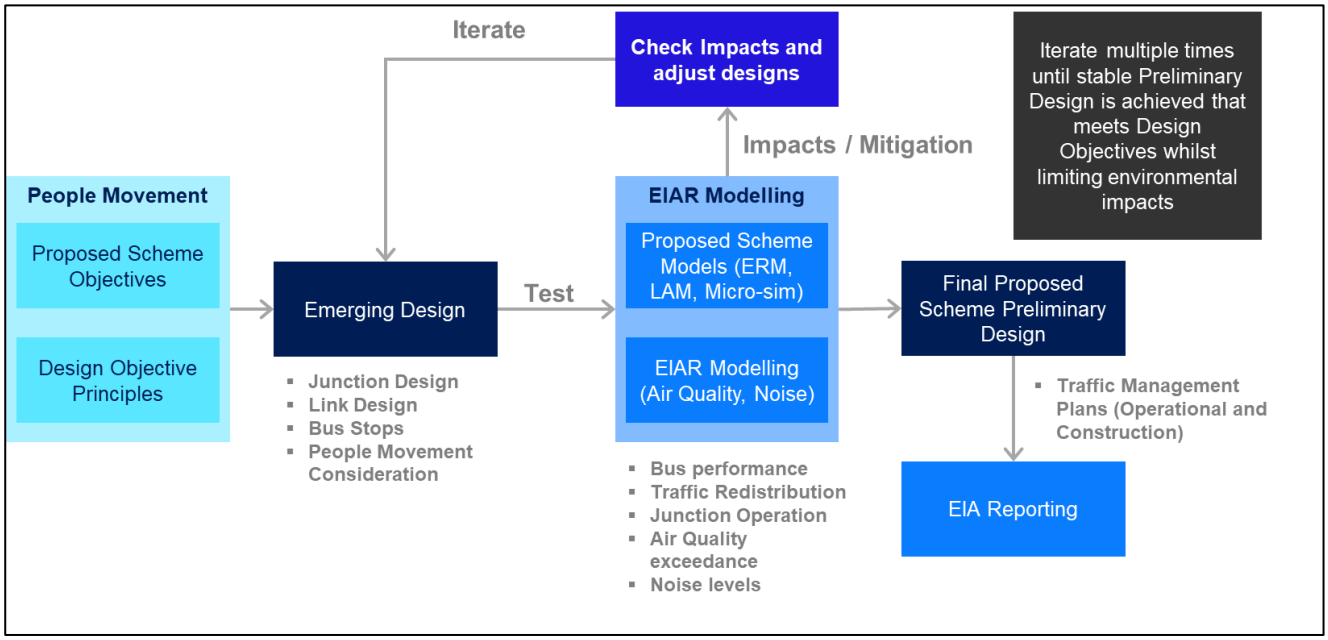


Image 6.1: Proposed Scheme Impact Assessment and Design Interaction

The impacts presented in this chapter are based on the final Preliminary Design for the Proposed Scheme which includes the embedded mitigation developed as part of the iterative design process described above.

6.2 Methodology

The methodology for the traffic and transport related impacts of the Proposed Scheme has incorporated a number of key references and inter-related stages, which can be outlined in the following sections.

6.2.1 Study Area

The direct and indirect impacts have been considered with reference to the following study area extents (as shown in Image 6.2):

- **Direct Study Area** – The Proposed Scheme (i.e. the transport network within the red line boundary); and
- **Indirect Study Area** – This is the area of influence the Proposed Scheme has on changing traffic volumes above a defined threshold with reference to Transport Infrastructure Ireland's (TII's) Traffic and Transport Assessment Guidelines (May 2014) (TII 2014) (see Section 6.4.6.2.7 for further details on the threshold applied in relation to traffic volume changes used in the definition of the indirect study area).

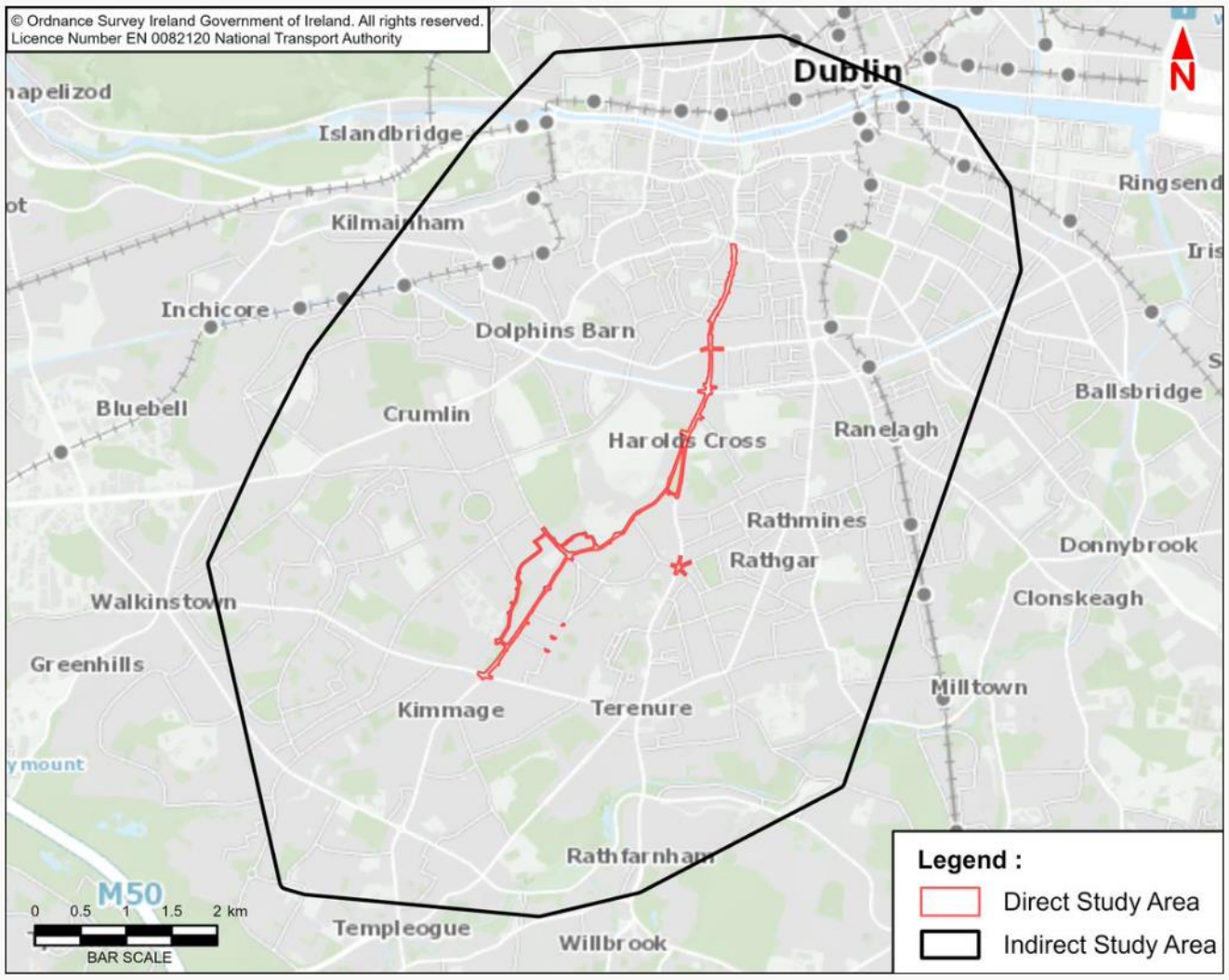


Image 6.2: Proposed Scheme Direct and Indirect Study Area

6.2.2 Relevant Guidelines, Policy and Legislation

The policies and legislation which are applicable to this Chapter are detailed in Chapter 2 (Need for the Proposed Scheme) of the EIAR and in Appendix A6.1 (TIA Report) in Volume 4 of this EIAR. The specific traffic and transport guidelines which have informed this Chapter are detailed in turn below.

6.2.2.1 Traffic and Transport Assessment Guidelines

To determine the traffic and transport impact that the Proposed Scheme has in terms of an increase in general traffic flows on the direct and indirect study areas, a robust assessment has been undertaken, with reference to TII's most recent Traffic and Transport Assessment Guidelines (TII 2014).

This document is considered best practice guidance for the assessment of transport impacts related to changes in traffic flows due to proposed developments and is an appropriate means of assessing the impact of general traffic trip redistribution on the surrounding road network.

According to Section 1.3 of the Traffic and Transport Assessment Guidelines (TII 2014):

> *'a Traffic and Transport Assessment is a comprehensive review of all the potential transport impacts of a proposed development or re-development, with an agreed plan to mitigate any adverse consequences'.*

The guidelines aim to provide a framework to promote an integrated approach to development, ensuring that proposals promote more efficient use of investment in transportation infrastructure which reduces travel demand and promotes road safety and sustainable travel.

The TIA, which supports this Chapter, follows the Traffic and Transport Assessment Guidelines and offers an impartial description of the likely impacts of the Proposed Scheme, outlining both its positive and negative aspects.

6.2.2.2 Design Manual for Urban Roads and Streets

The Design Manual for Urban Roads and Streets (DMURS) (Government of Ireland 2019) promotes an integrated street design approach within urban areas (i.e. cities, towns and villages) focused on:

- Influence by the type of place in which the street is located; and
- Balancing the needs of all users.

A further aim of DMURS is to put well designed streets at the heart of sustainable communities to promote access by walking, cycling and public transport.

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

DMURS is underpinned by a holistic design-led approach, predicated on a collaborative and consultative design process. There is specific recognition of the importance to create secure and connected places that work for all, characterised by creating new and existing streets as attractive places with high priority afforded to pedestrians and cyclists while balancing the need for appropriate vehicular access and movement.

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

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

The Proposed Scheme has been designed and assessed with reference to these guidelines.

6.2.2.3 Traffic Signs Manual (Chapter 8: Temporary Traffic Measures and Signs for Roadworks)

The Traffic Signs Manual (Department of Transport (DoT 2019a)) promotes safety, health and welfare for road workers and users. The manual details the traffic signs which may be used on roads in Ireland, including sign layout, sign symbols, the circumstances in which they are required, and the associated rules for positioning them.

Of direct relevance to the assessment of traffic and transport impacts, Chapter 7 – Road Markings outlines the function of road markings, the legalities of road markings and the application of road markings on roads in Ireland. Chapter 8 – Temporary Traffic Measures and Signs for Roadworks outlines the application of temporary traffic management (TTM) at work sites on public roads; this Chapter offers instructions and guidance to road users in relation to the use of TTM and outlines the signs to be used at roadworks.

6.2.2.4 Traffic Management Guidelines

The Traffic Management Guidelines (DoT 2019b) provides guidance on a number of issues including, but not limited to; traffic planning, traffic calming and management, incorporation of speed restraint measures and the provision of suitably designed facilities for public transport users and vulnerable road users.

A core component of the Traffic Management Guidelines is rooted in decision making and balancing priorities, including those that are in conflict with one another. The Traffic Management Guidelines identify common objectives to be addressed when managing the transport network:

- Environment Improvement;
- Congestion Relief;
- Capacity Improvement;
- Safety;
- Accessibility;
- Economic Vitality; and
- Politics.

The Proposed Scheme has been designed and assessed with reference to these guidelines. In addition to the above key guidelines, the Proposed Scheme has been designed and assessed with reference to a set of policy and guidance documents outlined in Section 6.7 of this Chapter.

6.2.3 Proposed Scheme Impact Assessment Modelling Tools

This Section summarises the various transport modelling tools that have been developed and used to inform the preparation of the TIA and this Chapter of the EIAR. The purpose of each tool has been detailed and its use for each element of the Proposed Scheme assessment has been defined.

The modelling tools that have been developed as part of the assessment, do not work in isolation, but instead work as a combined modelling system driven by the NTA's East Regional Model (ERM) as the primary source for multi-model demand and trip growth. Demand information is then passed to the cordoned Local Area Model (LAM), corridor micro-simulation models and junction models which have been refined and calibrated to represent local conditions to a greater level of detail than that contained in the ERM.

In summary, there are four tiers of transport modelling which have been used to assess the impacts of the Proposed Scheme:

- **Tier 1 (Strategic Level):** The NTA's ERM is the primary tool which has been used to undertake the strategic modelling of the Proposed Scheme and has provided the strategic multi-modal demand outputs for the proposed forecast years;
- **Tier 2 (Local Level):** A LAM has been developed to provide a more detailed understanding of traffic movement at a local level. The LAM is a subset model created from the ERM and contains a more refined road network model used to provide consistent road-based outputs to inform the TIA, Environmental Impact Assessment (EIA) and junction design models. This includes information such as road network speed data and traffic redistribution impacts for the Operational Phase. The LAM also provides traffic flow information for the micro-simulation model and junction design models and has been used to support junction design and traffic management plan testing;
- **Tier 3 (Corridor Level):** A micro-simulation model of the full 'end to end' corridor has been developed for the Proposed Scheme. The primary role of the micro-simulation model has been to support the ongoing development of junction designs and traffic signal control strategies and to provide bus journey time information for the determination of benefits of the Proposed Scheme; and
- **Tier 4 (Junction Level):** Local junction models have been developed, for each junction along the Proposed Scheme to support local junction design development. These models are informed by the outputs from the above modelling tiers, as well as the junction designs which are, as discussed above, based on people movement prioritisation.

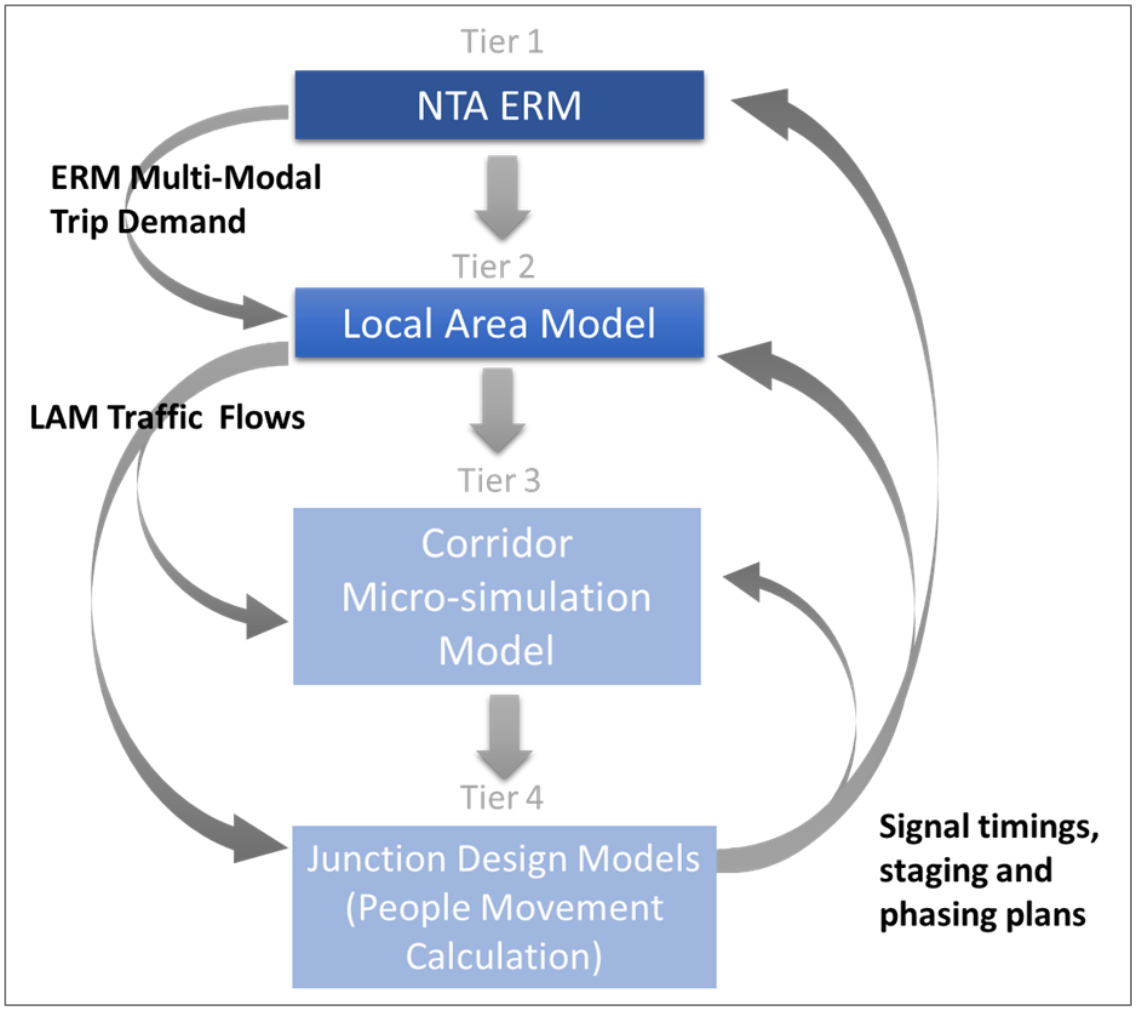


Image 6.3: Proposed Scheme Modelling Hierarchy

Further detail on the transport model development process, the traffic data inputs used, the calibration, validation and forecast model development for the suite of transport models can be found in Appendix A6.2 (Transport Modelling Report) and Appendix A6.3 (Junction Design Report) in Volume 4 of this EIAR.

6.2.4 Appraisal Method for the Assessment of Impacts

6.2.4.1 Overview

This Section details the methodologies that have been used to assess the potential traffic and transport impacts of the Proposed Scheme during both the Construction and Operational Phases. The assessments have been carried out as follows:

- Outlining the Assessment Topics;
- Determining the Predicted Magnitude of Impacts;
- Defining the Sensitivity of the Environment; and
- Determining the Significance of Effects.

The above approach has been carried out in accordance with procedures described in the EPA Guidelines (EPA 2022) and methodologies outlined in the Traffic and Transport Assessment Guidelines (TII 2014), using a Multi-Modal LoS approach.

6.2.4.2 Outlining the Assessment Topics

The traffic and transportation impacts have been broken down into the following assessment topics for both the Construction and Operational Phases:

- The qualitative assessments are as follows:
  - **Pedestrian Infrastructure**: The changes to the quality of the pedestrian infrastructure as a result of the Proposed Scheme;
  - **Cycling Infrastructure:** The changes to the quality of the cycling infrastructure as a result of the Proposed Scheme;
  - **Bus Infrastructure:** The changes to the quality of the bus infrastructure as a result of the Proposed Scheme; and
  - **Parking / Loading:** The changes to the availability of parking and loading as a result of the Proposed Scheme.
- The quantitative assessments, which have been undertaken using the Proposed Scheme modelling tools described previously, are as follows:
  - **People Movement:** An assessment has been carried out to determine the potential impact that the Proposed Scheme will have on the projected volume of people (by mode – Walking, Cycling, Bus and General Traffic) moving along the Proposed Scheme during the Operational Phase only;
  - **Bus Performance Indicators**: The changes to the projected journey times and reliability for buses as a result of the Proposed Scheme; and
  - **General Traffic:** The direct and indirect impacts on general traffic using the Proposed Scheme and surrounding road network.

6.2.4.3 Determining the Predicted Magnitude of Impacts

The methodology used for determining the predicted magnitude of impacts has considered the traffic and transport conditions of the environment before and after the Proposed Scheme is in place.

The impact assessments have been carried out using the following scenarios:

- **'Do Nothing'** – The 'Do Nothing' scenario represents the current baseline traffic and transport conditions of the direct and indirect study areas **without** the Proposed Scheme in place and other GDA Strategy projects, which has been outlined in Section 6.3 (Baseline Environment). This scenario forms the reference case by which to compare the Proposed Scheme ('Do Something') for the qualitative assessments only;
- **'Do Minimum'** – The 'Do Minimum' scenario (Opening Year (2028), Design Year (2043)) represents the likely traffic and transport conditions of the direct and indirect study areas including for any transportation schemes which have taken place, been approved or are planned for implementation, **without** the Proposed Scheme in place. This scenario forms the reference case by which to compare the Proposed Scheme ('Do Something') for the quantitative assessments. Further detail on the Proposed Scheme and demand assumptions within this scenario are included further below in Section 6.4.4; and
- **'Do Something'** – The 'Do Something' scenario represents the likely traffic and transport conditions of the direct and indirect study areas including for any transportation schemes which have taken place, been approved or are planned for implementation, **with** the Proposed Scheme in place (i.e. the Do Minimum scenario with the addition of the Proposed Scheme). The Do Something scenario has been broken into two phases:
  - Construction Phase (Construction Year (2024)) – This phase represents the single worst-case period which will occur during the construction of the Proposed Scheme; and
  - Operational Phase (Opening Year (2028), Design Year (2043)) – This phase represents when the Proposed Scheme is fully operational.

The assessment of changes between the Do Minimum and Do Something scenarios have been presented in either a positive, negative or neutral magnitude of impact as a result of the Proposed Scheme, depending on the assessment topic. A high, medium, low or negligible rating has been applied to each impact assessment to

determine the Magnitude of Impact. Refer to Section 6.4 for further information on the methodology in applying these ratings for each assessment.

6.2.4.3.1 Level of Service Impact Assessment

To outline the changes in conditions between the Do Minimum and Do Something scenarios a LoS approach has been developed for the impact assessments, where appropriate. This concept allows a straightforward comparison of two differing scenarios using a series of metrics specifically developed for this purpose.

The concept of LoS was originally developed in the United States' Transportation Research Board's (TRB) Highway Capacity Manual (TRB 2000). Under this concept, potential values for a performance measure are divided into six ranges, with each range assigned a letter grade ranging from "A" (highest quality) to "F" (lowest quality). LoS concepts are applied universally throughout the world, and have their basis in Highway Capacity Manual and, particularly for bus network assessments, in the Transit Capacity and Quality of Service Manual (TRB 2013).

LoS concepts are not target based or rigid in their application and bespoke versions are developed to suit the particular receiving environment of the scheme under consideration or the particular user problems that the scheme and / or project is seeking to address. A mix of quantitative and qualitative indicators can be used and summarised as a LoS. The process enables integrated planning and decision making across all modes rather than any specific mode which can create a bias in the assessment process (e.g. focusing on Car Volume over Capacity (V/C)). It is intended that the LoS framework for the Proposed Scheme will provide an easily understandable summary of the impact of each assessment topic, where applied.

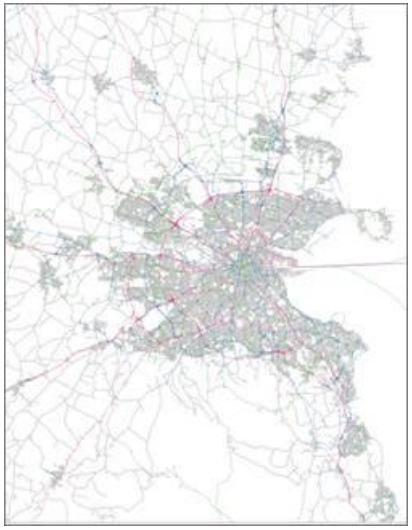
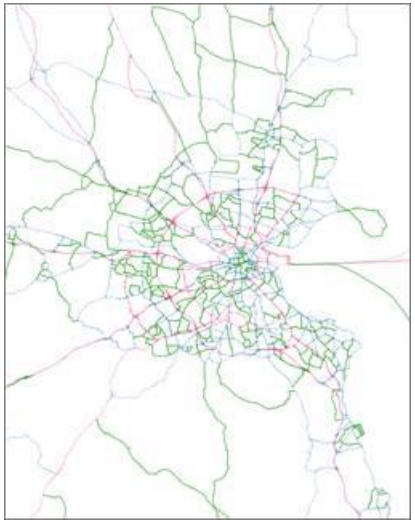
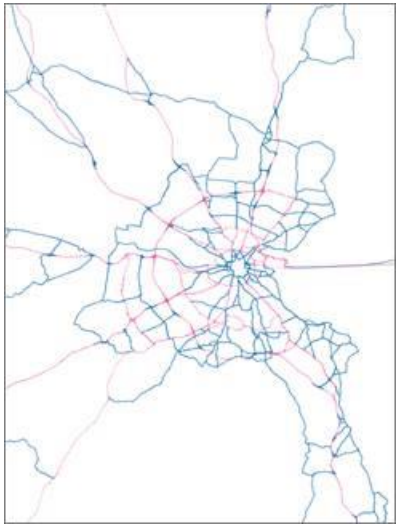
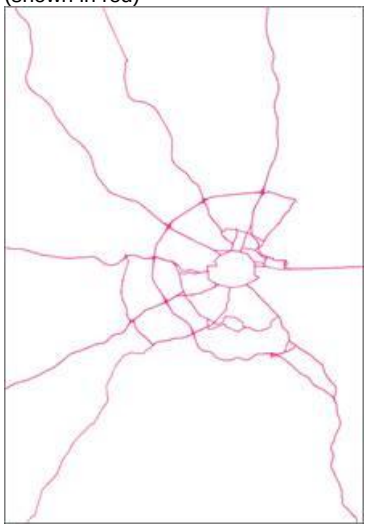
6.2.4.4 Defining the Sensitivity of the Environment

The impact assessment sensitivities established for this Chapter have been informed using the following data sources:

- OpenStreet Map – to identify community facilities, and open spaces within 50m of the Proposed Scheme; and
- The LAM (NavStreets) and Google Traffic data – to identify the capability of roads to cater for traffic volumes and existing congested junctions / road links.

The content of Table 6-3 outlines the two sets of sensitivity ratings that have been applied to the impact assessments, depending on whether the assessment location is within the direct or indirect study area.

Table 6-3: BusConnects Traffic and Transport Sensitivities

Assessment Area	Sensitivity			
	High	**Medium**	**Low**	**Negligible**
Proposed Scheme / Direct Study Area Sensitivities	Sections of the Proposed Scheme that are in the vicinity of community facilities such as schools or colleges, neighbourhood centres; AND currently experiencing congestion for pedestrians, cyclists, buses or general traffic	Sections of the Proposed Scheme that currently experience congestion for pedestrians, cyclists, buses or general traffic that have not been identified as high sensitivity	Sections of the Proposed Scheme near public open space, nature conservation areas, residential areas that have not been identified as medium or high sensitivity	Areas of low sensitivity to traffic flows i.e. isolated sites or areas with a high standard road network
Indirect Study Area Sensitivities	Category 5: Low capacity, low operating speeds. Local and minor roads. (shown in grey) 	Category 4: High capacity, moderate operating speeds. Roads connecting between neighbourhoods. (shown in green) 	Category 3 roads: *High capacity, high* operating speeds (less than Category 2). Roads connecting Category 2 roads. (shown in blue) 	Category 1: High capacity, high operating speeds. Roads connecting between major cities or urban areas; and Category 2: Roads connecting Category 1 roads, enabling high capacity through and between cities (shown in red) 

6.2.4.5 Determining the Significance of Effects

The Significance of Effects rating has been established using Table 6-4, which was derived from Figure 3.4 of the EPA Guidelines (EPA 2022). This enables the sensitivities and magnitudes of impact to determine the significance of a particular impact. For example, a section of a scheme or project with a high sensitivity and a long-term medium positive impact would have a predicted 'Positive, Very Significant and Permanent' impact. A section of a scheme or project with a low sensitivity and a short-term low negative impact would have a predicted 'Negative, Slight and Temporary' impact.

Table 6-4: Significance of Effects Matrix for Traffic and Transport Chapter

		Sensitivity of Existing Environment			
		High	Medium	Low	Negligible
Description Impact	High	Profound	Very Significant	Moderate	Slight
	Medium	Very Significant	Significant	Moderate	Not Significant
	Low	Moderate	Moderate	Slight	Not Significant
	Negligible	Not Significant	Not Significant	Not Significant	Imperceptible

The definitions for the Significance of Effects ratings for the Proposed Scheme ranging from Imperceptible to Profound are outlined in Table 6-5.

Table 6-5: EIAR Impact Significances

Significance of Effects (EPA)	Typical Criteria Descriptors
Imperceptible	An effect capable of measurement but without significant consequences.
Not Significant	An effect which causes noticeable changes in the character of the environment but without significant consequences
Slight	An effect which causes noticeable changes in the character of the environment without affecting its sensitivities.
Moderate	An effect that alters the character of the environment in a manner that is consistent with existing and emerging baseline trends.
Significant	An effect which, by its character, magnitude, duration or intensity alters a sensitive aspect of the environment.
Very Significant	An effect which, by its character, magnitude, duration or intensity significantly alters most of a sensitive aspect of the environment.
Profound	An effect which obliterates sensitive characteristics

Potential mitigation and monitoring measures have been considered for assessments that result in a negative and significant or higher impact (i.e. significant, very significant or profound).

6.2.5 Data Collection and Collation

The assessment of the traffic and transport impacts of the Proposed Scheme has two distinct parts namely, qualitative methods which consider the physical changes to transport networks, and quantitative methods which are based upon traffic modelling. The following sections describe the data collection and collation for each method of assessment.

6.2.5.1 Qualitative Assessment Data Collection

This Section discusses the data collection undertaken to inform the qualitative assessment metrics set out in Section 6.4.6.1.

6.2.5.1.1 Site Surveys

A walkover of the route of the Proposed Scheme was undertaken and photographs were used to record locations of particular importance. This ensures an up to date record of the existing environment was used to complete the qualitative assessment. The surveys focused on the following aspects which are relevant to the assessment:

- Provision for the movement of pedestrians, cyclists and vehicles;
- Location of, and facilities at, bus stops; and
- Existing parking and loading facilities.

These surveys were supplemented by specially commissioned aerial orthophotography along the full length of the Proposed Scheme.

6.2.5.1.2 Mapping Data

Three sources of mapping data have been used to inform the analysis, Ordnance Survey Mapping (OSM), NavStreets and OpenStreet Map.

OSM is created by Ordnance Survey Ireland which provides detailed mapping for a variety of uses. For the Traffic and Transport Chapter, OSM has been used to establish accurate road naming and the location of physical highway features.

NavStreets is a street-level GIS dataset which covers the Republic of Ireland, including the Greater Dublin Area. Two sets of data from this dataset have been used to inform the EIAR:

- Road Network: Functional Class of each road link in the road network, which is a road type indicator, reflecting traffic speed and volume, as well as the importance and connectivity of the road. The Functional Class information has been used to help inform the metrics for identifying the sensitivities of roads in the indirect study area; and
- Points of Interest: NavStreets contains information on a wide range of “points of Interest”. This has been referred to when identifying sensitive community receptors, such as schools, healthcare facilities, places of worship, retail clusters, etc, when determining how sensitive a particular location is to changes in terms of traffic and transport facilities.

OSM and NavStreets have been supplemented by OpenStreet Map which is an open-source database of geographic data (i.e. Points of Interest, Land Use and Places of Worship). This has been used to further identify community facilities and open spaces in proximity to the Proposed Scheme.

Information on bus passenger volumes was already available and included in the modelling process as part of the ERM base model calibration and validation, which includes the annual canal and M50 Motorway cordon counts as well as ticketing data.

6.2.5.2 Quantitative Assessment Data Collection

This Section discusses the data collection undertaken to inform the quantitative assessment metrics set out in Section 6.4.6.2. Further detail can be found in Appendix A6.2 (Transport Modelling Report) in Volume 4 of this EIAR.

6.2.5.2.1 Existing Data Review (Gap Analysis)

A review of existing traffic survey data available for the area of interest was undertaken from the following sources:

- NTA Traffic Count Database: A mixture of Automatic Traffic Counts (ATC) and Junction Turning Counts (JTC) from previous studies covering a range of years; and
- TII Counters: Permanent TII ATCs located on national strategic roads across the network with data publicly available online.

The NTA, Dublin City Council and the other local authorities undertake periodic counts within their administrative areas in connection with their own local schemes. These surveys are conducted throughout the year and a limited set of data was available within the area of the Proposed Scheme.

Information on bus passenger volumes was already available and included in the modelling process as part of the ERM base model calibration and validation, which includes the annual canal and M50 Motorway cordon counts as well as ticketing data.

6.2.5.2.2 Commissioned Traffic Survey Data

Due to the scale of the CBC Infrastructure Works, the Proposed Scheme required a full set of consistent updated traffic counts for a neutral period (e.g. November / February when schools, colleges were in session). Traffic surveys were undertaken in November 2019 and February 2020 (pre-COVID-19) with the surveyed counts used as inputs to the model calibration and validation process of the strategic model and micro-simulation model. The two types of counts used in the study are JTCs and ATCs.

6.2.5.2.2.1 Junction Turning Counts

The JTCs are 24-hour counts broken down into 15-minute segments over a full day. All main junctions along the Proposed Scheme have been included and provide information on the volume, and types of vehicles, making turning movements at each location. This data is utilised within the models to ensure that the flow of vehicles through the main junctions on the network is being represented accurately.

6.2.5.2.2.2 Automatic Traffic Counts

The ATC data provides information on:

- The daily and weekly profile of traffic along the Proposed Scheme; and
- Busiest time periods and locations of highest traffic demand on the network.

The ATCs were taken for an entire week. A summary of the collected data can be found in Appendix A6.1 (TIA Report) in Volume 4 of this EIAR.

6.2.5.2.3 Road and Bus Journey Time Data

6.2.5.2.3.1 Bus Journey Time Data

Bus journey time data for the Proposed Scheme was provided by the NTA from the Automatic Vehicle Location (AVL) dataset used to monitor bus performance. The data provides information on bus travel time and dwell times at existing bus stops and has been used to inform the development of the transport models used to assess the impacts of the Proposed Scheme.

6.2.5.2.3.2 TomTom Road Journey Time Data

Road journey time data for the Proposed Scheme models has been sourced from TomTom, who calculate journey times using vehicle position data from GPS-enabled devices and provide this on a commercial basis to a number of different users. The NTA purchased a license to access the anonymised Custom Area Analysis dataset through the TomTom Traffic Stats portal. The NTA has an agreement with TomTom to provide travel time information covering six areas of Ireland and for certain categories of road.

Data is provided based on the area specified by the agreement. However, the date and time range of the data can be specified by the user. For the development of the strategic model and micro-simulation models, the following query on the data was applied:

- 2019 weekdays (Monday to Thursday) from mid-January until end of November, excluding all bank holidays and days close to those dates.

The data is provided in the form of a GIS shapefile and accompanying travel time database file. The shapefile contains topographical details for each road segment, which is linked to the travel time database via a unique link ID. The database file then contains average and median travel time, average and median speed, the standard deviation for speed, the number of observations and percentile speeds ranging from 5 to 95 for each link.

6.2.5.2.3.3 TomTom Data Processing

In order to compare the journey times of specific links and routes between the TomTom data and the road assignment models, the two datasets were linked. After importing both the road assignment model and TomTom networks into the GIS environment, ensuring both datasets are in the same coordinate system, the selected routes were then linked using a spatial join functionality.

Before applying the data to the models, it was checked to ensure that it was fit for purpose. The review included checks of the number of observations that form the TomTom average and median times and checks of travel times against Google Maps travel times.

The TomTom Custom Area Analysis dataset was processed to provide observed journey times against which the strategic and micro-simulation models could be validated along the Proposed Scheme route.

6.2.5.2.3.4 TomTom Data Application

The processed journey time data was used to validate the LAM and the micro-simulation models at an end-to-end travel time level, with intermediate segment travel times used to inform the calibration of both models. Further information about the journey time validation process can be found in Appendix A6.2 (Transport Modelling Report) in Volume 4 of this EIAR.

6.3 Baseline Environment

6.3.1 Overview

This Section provides an overview of the existing traffic and transport conditions within the redline boundary of the Proposed Scheme. The baseline conditions have been informed by several site visits of the local environment, comprehensive traffic surveys, and a desk study of the most recent aerial photography.

Overall cycling infrastructure provision on the corridor consists of 76% cycle priority outbound (0% cycle track, 76% non-segregated), with 86% inbound (0% segregated, 86% non-segregated).

Bus services along the Proposed Scheme currently operate within a constrained and congested environment. An examination of AVL data indicates that the current standard deviation for journey time of buses on the corridor varies by up to 9 minutes, with predicted future traffic increases, these issues are expected to be exacerbated. While impacting upon bus passengers, longer and less reliable bus services also require operators to use additional buses to maintain headways to fill gaps created in the timetable. Aligned to this, the current un-prioritised network leads to clustering of buses which, in turn, means stops can become overcrowded, creating delays in boarding and alighting and the imbalanced use of bus capacity.

In describing the baseline conditions, the Proposed Scheme has been divided into three sections. The three sections are outlined as follows and are illustrated in Figure 6.1, Figure 6.2a and Figure 6.2b in Volume 3 of this EIAR:

- **Section 1** – R817 Kimmage Road Lower from Kimmage Crossroads to the Junction with Harold's Cross Road;
- **Section 2** – R137 Harold's Cross Road from Harold's Cross Park to Grand Canal; and
- **Section 3** – R137 Clanbrassil Street Upper and Lower and R137 New Street South from the Grand Canal to the Patrick Street Junction.

6.3.2 Section 1 – R817 Kimmage Road Lower from Kimmage Crossroads to the Junction with Harold's Cross Road

This Section outlines the baseline environment for walking, cycling, bus services, general traffic and parking / loading facilities along Section 1 of the Proposed Scheme from Kimmage Crossroads to the junction with Harold's Cross Road.

Section 1 is approximately 2.2km long and consists mainly of R817 Kimmage Road Lower, along with the Harold's Cross Road carriageways (R137) on the eastern side of Harold's Cross Park. Section 1 runs from the R817 Kimmage Road Lower / R818 Terenure Road West / R817 Fortfield Road / R818 Kimmage Road West junction to the R817 Kimmage Road Lower / R137 Harold's Cross Road junction at the northern end of Harold's Cross Park.

A secondary cycle route will also be designated, in parallel to R817 Kimmage Road Lower, along Poddle Park, Bangor Road, and Blarney Park to Sundrive Road. From Sundrive Road, cyclists will be able to proceed via a new connection to Mount Argus Way and Mount Argus View where a proposed steel boardwalk structure will be provided beside the River Poddle at the Stone Boat feature

6.3.2.1 Pedestrian Infrastructure

The walking facilities along Section 1 of the Proposed Scheme include reasonably wide, well-lit footpaths on both sides of the R817 Kimmage Road Lower as far as the southern end of Harold's Cross Park. Alongside Harold's Cross Park, there is a wide footpath on the western side of R817 Kimmage Road Lower, and a narrow path (<1.5m) on the eastern side adjoining the park. R137 Harold's Cross Road (adjacent to Harold's Cross Park) only includes a footpath along the western side of the carriageway. The footpaths vary in width and on occasion drops below the minimum width of 1.8m, creating a pinch point.

There are several controlled pedestrian crossings along Section 1 of the Proposed Scheme which benefit from tactile paving and dropped kerbs which can be found at the following locations:

- The four-arm R817 Kimmage Road Lower / R818 Terenure Road West / R817 Fortfield Road / R818 Kimmage Road West junction has staggered partly signalised pedestrian crossings on the northern and eastern arms;
- A direct signalised pedestrian crossing is provided across R817 Kimmage Road Lower, approximately 15m north of Corrib Road;
- The four-arm R817 Kimmage Road Lower / Larkfield Avenue / Sundrive Road junction has direct pedestrian signalised crossings on each arm;
- A direct signalised pedestrian crossing is provided across Sundrive Road approximately 15m south east of Blarney Park;
- The three-arm R817 Kimmage Road Lower / Mount Argus View junction has one direct signalised pedestrian crossing across the major road of R817 Kimmage Road Lower;
- A direct signalised pedestrian crossing is provided across R817 Kimmage Road Lower, approximately 15m north-west of Priory Road;
- A direct signalised pedestrian crossing is provided across R817 Harold's Cross Road, immediately north of Mount Argus Road;
- A staggered signalised pedestrian crossing is provided across R817 Harold's Cross Road and R137 Harold's Cross Road with the footpath around the northern tip of Harold's Cross Park acting as a refugee island;
- A direct signalised pedestrian crossing is provided across R137 Harold's Cross Road immediately south of Parkview Avenue; and
- The five-arm R137 Harold's Cross Road / Kenilworth Square North / Rathgar Avenue / Kenilworth Park junction has direct pedestrian signalised crossings on each arm.

Uncontrolled crossings across priority junctions at side roads benefit from dropped kerbs. The locations of the pedestrian crossings are illustrated in Figure 6.3a in Volume 3 of this EIAR.

Further details of the baseline pedestrian facilities (i.e. routing, directness, accessibility, crossing and footpath widths) at each junction along Section 1 of the Proposed Scheme is included in Appendix A6.4 – Appendix A6.4.1 (Pedestrian Infrastructure Assessment)) in Volume 4 of this EIAR.

6.3.2.2 Cycling Infrastructure

The cycle facilities along Section 1 of the Proposed Scheme consist of advisory cycle lanes (typical width of 1.5m) in both directions along R817 Kimmage Road Lower, and a mixture of advisory cycle lanes (typical width of 1.5m) and combined bus and cycle lanes along R817 Harold's Cross Road and R137 Harold's Cross Road, either side of Harold's Cross Park. There are no existing cycle facilities along the proposed quiet cycle route of Poddle Park, Bangor Road, Blarney Park, Sundrive Road, Mount Argus Square, Mount Argus Way, Mount Argus Avenue and Mount Argus View.

The operational hours of the existing cycle infrastructure along Section 1 of the Proposed Scheme are displayed below:

- Northbound advisory cycle lanes along R817 (Kimmage Road Lower and Harold's Cross Road) operate between 07.00hrs and 10.00hrs from Monday to Saturday;
- Southbound advisory cycle lanes along R817 (Kimmage Road Lower and Harold's Cross Road) operate between 16.00hrs and 19.00hrs from Monday to Saturday;
- Southbound advisory cycle lanes along R137 Harold's Cross Road) operate between 07.00hrs and 19.00hrs from Monday to Saturday; and
- All combined bus lanes along Harold's Cross Road (both R817 and R137) operate between 07.00hrs to 10.00hrs and 12.00hrs to 19.00hrs from Monday to Saturday.

Cycle parking is provided at the following locations along and within the vicinity of Section 1 of the Proposed Scheme:

- Two Sheffield stands along R817 Kimmage Road Lower outside shops to the north of Corrib Road;
- Five Sheffield stands along Sundrive Road next to the junction with R817 Kimmage Road Lower;
- Five Sheffield stands along R817 Kimmage Road Lower outside the entrance to the Mount Argus Catholic Church;
- Three Sheffield stands along R317 Harold's Cross Road to the south of the entrance to Harold's Cross Educate Together Secondary School; and
- Further cycle parking at Sundrive Road Shopping Centre and within Harold's Cross Park.

The existing cycle facilities along Section 1 of the Proposed Scheme are illustrated in Figure 6.4a in Volume 3 of this EIAR.

Further details of the baseline cycling facilities (i.e. level of segregation from vehicles, capacity for cycling two abreast and / or overtaking, and junction treatment) along the length of Section 1 of the Proposed Scheme is included in Appendix A6.4 - A6.4.2 (Cycling Impact Assessment) in Volume 4 of this EIAR.

6.3.2.3 Bus Infrastructure

6.3.2.3.1 Bus Priority Measures

There are limited bus lanes along Section 1. At the northern end of the section a northbound combined bus and cycle lane commences to the north of the R137 Kimmage Road Lower / St Clare's Avenue junction and extends through R137 Harold's Cross Road Junction.

There are no bus lanes at the R137 Harold's Cross Road / Kenilworth Park Junction, although there is a northbound bus lane on the southern approach that terminates 70m in advance of the stop line. The northbound bus lane recommences 20m north of the junction, with a tapered entry that extends back to the junction.

6.3.2.3.2 Bus Stop Facilities

There are currently 16 bus stops along Section 1 of the Proposed Route (seven inbound stops on R137 Harold's Cross Road towards the City Centre, seven outbound stops on R137 Harold's Cross Road and two orbital stops located on Sundrive Road).

The inbound stops are:

- Stop 2438 north of R817 Kimmage Road Lower;
- Stop 2439 south of Ravensdale Park;
- Stop 2440 north of Aideen Avenue;
- Stop 2441 south of Sundrive Road;
- Stop 2442 north of Priory Road;
- Stop 2443 north of Kenilworth Park; and
- Stop 2444 north of Mount Argus Road to the west Harold's Cross Park.

The outbound stops are:

- Stop 2394 south of Ravensdale Park;
- Stop 2393 south of Kimmage Court;
- Stop 2392 south of Sundrive Road;
- Stop 2391 south of Priory Road;
- Stop 2390 south of Kenilworth Park;
- Stop 2389 north of Mount Argus Road to the west Harold's Cross Park; and
- Stop 1292 east of Harold's Cross Park.

Orbital stops are:

- Stop 2497 on Sundrive Road to cater to eastbound services; and
- Stop 2485 on Sundrive Road to cater to eastbound services.

Table 6-6 outlines the availability of bus stop facilities at the existing 16 bus stops along Section 1 of the Proposed Scheme.

Table 6-6: Section 1 - Availability of Bus Stop Facilities (of a Total 16 Bus Stops)

Bus Stop Facility	Number of Bus Stops in Baseline with Facility	Percentage of Bus Stops in Baseline with Facility
RTPI	3	19%
Timetable Information	12	75%
Shelter	8	50%
Seating	8	50%
Accessible Kerbs	14	88%
Indented Drop Off Area	0	0%
Total	**16**	

There are three bus stops with real time information screens and shelter / seating (Stop 2438, Stop 2441 and Stop 2497) whilst a further five stops have shelter / seating only (Stop 2439, Stop 2393, Stop 2443, Stop 2444 and Stop 1292).

The bus stops cater for eight Dublin Bus and Go-Ahead Ireland routes (9, 16, 16c, 18, 49, 54a, 83, 83a). The services available from these stops are outlined in Table 6-7.

Table 6-7: Section 1 - Bus Service Frequency

Service	Route	Typical Service Frequency	
		Weekday	Weekend
9	Charlestown – Beneavin Rd – Botanic Rd – O'Connell St – South Circular Rd – Limekiln Ave.	15 minutes	20 - 30 minutes
16	Dublin Airport – Santry – Skylon Hotel – Drumcondra Rail Station – O'Connell St. – Kelly's Corner – Harold's Cross – Terenure – Grange Rd. – Ballinteer (Kingston)	15 minutes	15 minutes
16c	As service 16, to city centre only. Service 16c replaces 16 after 11pm.	50 minutes	No Services
18	Palmerstown – Ballyfermot - Kimmage – Rathmines- Ranelagh – Ballsbridge – Sandymount (intersecting orbital route at Sundrive Cross)	20 minutes	30 minutes
49	Pearse Street - Leonard's Corner - Templeogue Village -The Mill / Old Bawn Rd. - Tallaght	20 - 30 minutes	30 minutes
54a	Pearse Street (Trinity College Dublin) – Harold's Cross Green – Spawell – Old Blesssington Rd. (The Square) – Ellensborough / Kiltipper Way	30 minutes	60 minutes
83	Harristown - Glasanaon Rd. - Church St. - College St. - Lwr. Camden St. -Sundrive Rd. (Stannaway Rd.) - Stannaway Ave.	10 minutes	10 – 15 minutes
83c	As service 83. Service 83c replaces 83 after 11pm on weekends.	No Services	20 minutes

6.3.2.4 General Traffic

6.3.2.4.1 R817 Kimmage Road Lower

R817 Kimmage Road Lower in Section 1 of the Proposed Scheme is a two-way carriageway, with a speed limit of 50km/h. For much of the length, R817 Kimmage Road Lower has one lane in each direction except for turning lanes at junctions. The carriageway varies in width from approximately 16m (in the vicinity of the R817 Kimmage Road Lower / Fortfield Road / R818 Terenure Road West Road Junction where there are two lanes and hatching) to approximately 5.5m (north of Kimmage Court). Generally, the carriageway is approximately 7.5m in width where there are only single lanes in each direction.

Most junctions along R817 Kimmage Road Lower are minor priority junctions providing access to residential streets and commercial properties. The priority junctions provide signage and road markings such as broken white lines and, in some instances, yellow box markings to ensure vehicles can enter and exit the minor arms easily.

The existing major junction arrangements along the section are as follows:

- R817 Kimmage Road Lower, Fortfield Road and R818 Terenure Road West Road;
- R817 Kimmage Road Lower and Ravensdale Park;
- R817 Kimmage Road Lower, Sundrive Road and Larkfield Avenue;
- R817 Kimmage Road Lower and Mount Argus View; and
- R817 Kimmage Road Lower and R137 Harold's Cross Road.

In addition, the R137 Harold's Cross Road / Kenilworth Park Junction, located to the east of the corridor, forms part of the Proposed Scheme.

The characteristics of each major junction are described in turn below, alongside satellite images which are extracts from Figure 6.6 in Volume 3 of this EIAR.

R817 Kimmage Road Lower / Fortfield Road / R818 Terenure Road West Road four-arm signalised junction: This junction has staggered signalised pedestrian crossings on the north-western, north-eastern, and south-eastern arms.

The north-western arm approach consists of one left-turn lane of approximately 60m length, one straight-ahead lane and one right-turn lane all of which are around 2.5m in width. The left-turn lane is priority controlled whilst

the straight-ahead and right-turn lane are signal controlled. The north-western arm exit consists of one general traffic lane approximately 5.5m in width. A pedestrian refuge island separates the approach and exit lanes.

The north-eastern arm approach consists of an advisory cycle lane within the general traffic lane, one left-turn and ahead lane and right-turn lane which are approximately 3.1m in width. There is an advance stop line for cyclists and the cycle lane continues straight ahead across the junction. A priority controlled left-turn lane is provided. The north-eastern arm exit consists of one advisory cycle lane and one general traffic lane which increases to two lanes approximately 20m north of the junction. A pedestrian refuge island separates the approach and exit lanes.

The south-eastern arm approach arm consists of two lanes - one left-turn and ahead lane and one right-turn lane with varying widths although becoming wider towards the stop line. The south-eastern arm exit consists of one general traffic lane which is approximately 6m in width. A pedestrian refuge island separates the approach and exit lanes on this arm.

The south-western arm approach consists of one advisory cycle lane and a single lane from which all movements are permitted. Approximately 12m north of the stop line, a priority controlled left turn lane is provided. There is an advance stop line for cyclists at this approach and the cycle lane continues straight ahead across the junction. The south-western arm exit consists of one advisory cycle lane and one general traffic lane.

These characteristics are shown in Image 6.1.

Image 6.1: R817 Kimmage Road Lower / Fortfield Road / R818 Terenure Road West Road Four-Arm Signalised Junction

R817 Kimmage Road Lower / Ravensdale Park three-arm signalised junction: This junction includes a yellow box road marking in the centre of the junction and uncontrolled crossings on the north-western and south-western arms.

The north-western arm approach consists of an advisory cycle lane within a single general traffic lane from which all movements are permitted. There is an advance stop line for cyclists on this approach. The north-western arm exit consists of one traffic lane.

The north-eastern arm approach consists of an advisory cycle lane and a single general traffic lane from which all movements are permitted. The lane is around 6.2m in width and allows on street parking. There is an advance stop line for cyclists at this approach and the cycle lane continues straight ahead across the junction. The north-eastern arm exit consists of an advisory cycle lane and a single general traffic lane.

The south-western arm approach consists of an advisory cycle lane, a left-turn lane, and a straight-ahead lane of which are around 3.0m in width. No road markings or signage indicates the lane designations on approach. The cycle lane continues straight ahead across the junction. The south-western arm exit consists of an advisory cycle

lane and a single general traffic lane. There is a traffic island in the centre of the junction which separates approaching and exiting traffic on the south-western arm.

These characteristics are shown in Image 6.2.

Image 6.2: R817 Kimmage Road Lower / Ravensdale Park Three-Arm Signalised Junction

R817 Kimmage Road Lower / Sundrive Road / Larkfield Avenue four-arm signalised junction: This junction has signalised pedestrian crossings on all arms.

The north-western arm approach flares to two lanes approximately 60m in advance of the junction and consists of one left-turn and ahead lane and one right-turn lane, in general these lanes around 3.0m in width. The north-western arm exit consists of one general traffic lane, approximately 5m in width. A pedestrian refuge island separates the approach and exit lanes.

The eastern arm approach consists of an advisory cycle lane and one general traffic lane from which all movements are permitted. The cycle lane continues straight ahead across the junction. The north-eastern arm exit consists of a layby for parking, an advisory cycle lane and one general traffic lane.

The south-eastern arm approach consists of a left-turn lane and a straight-ahead lane with approximate widths of 3m each. Vehicles on this approach are not permitted to turn right. The south-eastern exit consists of one general traffic lane, approximately 3.5m in width.

The south-western arm approach consists of an advisory cycle lane (approximately 1m in width) and one general traffic lane from which all movements are permitted. The cycle lane continues straight ahead across the junction. The south-western arm exit consists of an advisory cycle lane and one general traffic lane.

These characteristics are shown in Image 6.3.

Image 6.3: R817 Kimmage Road Lower / Sundrive Road and Larkfield Avenue Four-Arm Signalised Junction

R817 Kimmage Road Lower / Mount Argus View three-arm signalised junction: This three-arm signalised junction includes a yellow box road marking in its centre, a signalised pedestrian crossing on the eastern arm and an uncontrolled crossing on the northern arm.

The northern arm approach consists of apriority controlled left-turn lane and a signalised general traffic lane for right-turning vehicles with widths of around 3.5m and 3.2m respectively. A pedestrian refuge island separates the left-turn lane and right-turn lane. The northern arm exit consists of a single general traffic lane.

The eastern arm approach consists of an advisory cycle lane, a straight-ahead lane and right-turn lane which commences approximately 30m in advance of the junction. In total this approach has a width of approximately 6.2m. The cycle lane along this arm continues straight ahead across the junction. The eastern arm exit arm consists of an advisory cycle lane and one general traffic lane. A hatched median separates the approach and exit lanes on this arm.

The western arm approach consists of an advisory cycle lane, a short, priority controlled left-turn lane and a signalised straight-ahead traffic lane. The lane widths vary on approach. The cycle lane continues straight ahead across the junction. The western arm exit arm consists of an advisory cycle lane and one general traffic lane. A hatched median separates the approach and exit lanes on this arm.

These characteristics are shown in Image 6.4.

Image 6.4: R817 Kimmage Road Lower / Mount Argus View Three-Arm Signalised Junction

R817 Kimmage Road Lower / R137 Harold's Cross Road three-arm priority junction: This junction includes a yellow box road marking on the R817 Kimmage Road Lower northbound carriageway. A solid white line road marking, preventing overtaking, commences approximately 40m south of the junction and extends north to the R137 Harold's Cross Road / Mount Argus Road junction.

The R817 Kimmage Road Lower carriageway consists of an advisory cycle lane (approximately 1.2m wide) and one general traffic lane (each measuring approximately 3m in width) in each direction.

The south-eastern arm approach consists of a general traffic lane and is controlled by a stop line and signage. The south-eastern arm exit consists of one general traffic lane.

These characteristics are shown in Image 6.5.

Image 6.5: R817 Kimmage Road Lower / Harold's Cross Road Three-Arm Priority Junction

R137 Harold's Cross Road / Kenilworth Park five-arm signalised junction: This junction has signalised pedestrian crossings on all arms.

The northern arm approach consists of an advisory cycle lane, one left-turn and ahead lane of approximately 20m length and one straight-ahead lane. No right turn is permitted from this approach. Whilst lane indication arrows indicate two traffic lanes there are no lane lines, the total width of the traffic approach is around 4.3m. The advisory cycle lane continues straight ahead across the junction. The northern arm exit consists of an advisory cycle lane

and one general traffic lane approximately 5.5m in width. A combined bus and cycle lane commences approximately 10m north of the junction.

The north-eastern arm approach consists of one left-turn and ahead lane and one right-turn lane. Whilst lane indication arrows indicate two traffic lanes there are no lane lines, the total width of the traffic approach is around 4.0m. The north-eastern arm exit consists of one general traffic lane approximately 4.5m in width.

The south-eastern arm approach consists of one general traffic lane, approximately 3.5m in width from which right turns are not permitted. The south-eastern arm exit consists of one general traffic lane approximately 4.3m in width. A pedestrian refuge island separates the approach and exit lanes on this arm.

The south-western arm approach consists of one advisory cycle lane and two general traffic lanes (each approximately 3.1m in width). One lane caters for left-turn and ahead traffic whilst the other caters for right-turn and ahead traffic. The advisory cycle lane continues straight ahead across the junction. The south-western arm exit consists of an advisory cycle lane and one general traffic lane approximately 4.3m in width.

The western arm approach consists of one left-turn and ahead lane and right-turn and ahead lane which are each approximately 2.9m in width. The western arm exit consists of one general traffic lane approximately 5.3m in width.

6.3.2.4.2 R817 Harold's Cross Road

R187 Harold's Cross Road in Section 1 of the Proposed Scheme is a two way, 50km/h carriageway with one lane in both directions from its junction with R817 Kimmage Road Lower to the R817 Harold's Cross Road / R137 Harold's Cross Road junction.

Most junctions along R187 Harold's Cross Road in Section 1 of the Proposed Scheme are minor priority junctions providing access to residential street and commercial properties. The existing major signalised junctions are as follows:

R817 Harold's Cross Road / Mount Argus Road; and

R137 Harold's Cross Road / R137 Harold's Cross Road.

R817 Harold's Cross Road / Mount Argus Road three-arm signalised junction: This junction includes yellow box road markings on R817 Harold's Cross Road and Mount Argus Road and a signalised pedestrian crossing on the northern arm.

The northern arm approach consists of an advisory cycle lane (approximately 1.2m in width) which continues through the junction and one general traffic lane. The northern arm exit also consists of an advisory cycle lane (approximately 1.2m in width) and one general traffic lane. There is a short loading bay adjacent to the exit arm.

The southern approach arm consists of an advisory cycle lane (approximately 1.2m in width) continues through the junction and one general traffic lane. The south-eastern arm exit also consists of an advisory cycle lane (approximately 1.2m in width) and one general traffic lane.

The south-western arm approach consists of one general traffic lane from which all movements are permitted. The approach lane is adjoined by the access / egress to St Peter and St Paul's Patriarchal Metochion Church and Mount Jerome Crematorium. As such, the yellow box on Mouth Argus Road prevents queuing on the approach to the R817 Harold's Cross Road / Mount Argus Road which would restrict access to the church and crematorium. The south-western arm exit consists of a single general traffic lane.

These characteristics are shown in Image 6.6.

Image 6.6: R817 Harold's Cross Road / Mount Argus Road Three-Arm Signalised Junction

R137 Harold's Cross Road / R137 Harold's Cross Road three-arm signalised junction: This junction includes yellow box road marking and signalised pedestrian crossings on the south-eastern and south-western arms.

The northern approach consists of an advisory cycle lane, a left-turn lane (to R137 Harold's Cross Road, east of Harold's Cross Park) and a right-turn lane (to R137 Harold's Cross Road, west of Harold's Cross Park) with lane widths of approximately 4.0m and 3.7m, respectively. The advisory cycle lane caters to left-turning cyclists travelling to the east of Harold's Cross Park and continues through the junction. The approach lanes are staggered, separated by a kerbed traffic island and operate at different signal phases as there are no conflicting traffic movements for the right-turning traffic. A raised median separates the approach and exit lanes on this arm. The northern exit consists of a single lane for traffic and one for buses with on street parking alongside the carriageway.

The south-eastern arm approach consists of a short advisory cycle lane within a combined bus and cycle lane and one straight-ahead general traffic lane. From this approach, left-turn movements are not permitted. The approach has a total width of around 6.7m. The cycle lane commences approximately 10m in advance of the junction and continues across the junction. The south-eastern arm exit consists of an advisory cycle lane and one general traffic lane.

The south-western arm approach consists of a combined bus and cycle lane and one straight-ahead general traffic lane. From this approach, right-turn movements are not permitted. The south-western arm exit consists of an advisory cycle lane and one general traffic lane.

These characteristics are shown in Image 6.7.

Image 6.7: R137 Harold's Cross Road / R137 Harold's Cross Road Three-Arm Signalised Junction

6.3.2.4.3 Off Corridor Residential Streets

The residential streets which run broadly parallel to R817 Kimmage Road Lower to the north-west (Poodle Park, Bangor Road, Blarney Park, Church Park Avenue, Mount Argus Way and Mount Argus View) have two-way carriageways with no centre line markings to separate traffic travelling in opposite directions. The roads are subject to a speed limit of 30km/h and Poodle Park, Bangor Road and Blarney Park are subject to a 3.5t weight restriction. Derravaragh Road is located to the southeast of R817 Kimmage Road Lower and runs broadly parallel to R817, between the R817 Kimmage Road Lower / Hazelbrook Road Junction and R817 Kimmage Road Lower / Aideen Avenue Junction. The residential street is two-way with no centre line marking to separate traffic travelling in opposite directions. Derravaragh Road is subject to a speed limit of 30km/h. Traffic calming measures and street lighting are provided along Derravaragh Road, including traffic closures on the south-western arm of the Derravaragh Road / Aideen Drive Junction and on the south-eastern arm of the Derravaragh Road / Aideen Avenue Junction.

The R137 Harold's Cross Road and Kenilworth Park Junction is located southeast of R817 Kimmage Road Lower. Kenilworth Park, Harold's Cross Road and Rathgar Avenue are two-way with a centre line marking to separate traffic travelling in opposite directions; Kenilworth Square North is two-way with no centre line. All the adjoining roads are subject to a speed limit of 30km/h. Traffic calming measures and street lighting are provided along the residential streets of Kenilworth Square North, Kenilworth Park and Rathgar Avenue.

6.3.2.5 Existing Parking / Loading

Along Section 1 of the Proposed Scheme there is a total of 760 existing parking / loading spaces. Of the existing parking spaces, 437 spaces are located along the Proposed Scheme corridor and the remaining 323 spaces are located along side roads within approximately 250m of the Proposed Scheme.

Parking and loading spaces along Section 1 of the Proposed Scheme comprise:

- On Ravensdale Park, to the north-west of R817 Kimmage Road Lower, there is a short length of informal kerbside parking with sufficient space for approximately seven cars;
- On R817 Kimmage Road Lower between Ravensdale Park and Sundrive Road there is a section of informal kerbside parking with sufficient space for approximately 232 cars. Parking adjacent to the northbound carriageway is available the exception of 07.00hrs to 10.00hrs Monday to Saturday when a cycle lane is in use. Parking adjacent to the southbound carriageway is available the exception of 16.00 to 19.00 Monday to Saturday when a cycle lane is in use;
- On the south-west arm of the R817 Kimmage Road Lower / Sundrive Road / Larkfield Avenue junction there is a private car park with permit parking spaces for 52 cars;

- On the south-west arm of the R817 Kimmage Road Lower / Sundrive Road / Larkfield Avenue junction there are two taxi rank parking spaces, 13 informal parking spaces and a private car park with Pay and Display parking space for 24 cars;
- On the northeast arm of the R817 Kimmage Road Lower / Sundrive Road / Larkfield Avenue junction there are four informal parking spaces;
- On R817 Kimmage Road Lower between Sundrive Road and Harold's Cross Park there is a section of informal kerbside parking with sufficient space for approximately 80 cars. Parking adjacent to the northbound carriageway is available the exception of 07.00 to 10.00 Monday to Saturday when a cycle lane is in use. Parking adjacent to the southbound carriageway is available the exception of 16.00 to 19.00 Monday to Saturday when a cycle lane is in use;
- On R817 Kimmage Road Lower, at the entrance to The Church of Mount Argus and The Shrine of Saint Charles, there are 13 Pay and Display parking spaces;
- On R817 Kimmage Road Lower, opposite the Kenilworth Park junction, there are six permit parking spaces;
- On Harold's Cross Road, to the south of Harold's Cross Park, there are four permit parking spaces; and
- Outside Mount Argus Apartments there are six permit spaces.

There are a number of side streets which can be used by local residents and visitors / businesses throughout this section. In total there are approximately 327 parking spaces on Hazelbrook Road, Riversdale Grove, Corrib Road, Hazel Park, Kimmage Court, Aideen Avenue, Saint Martin's Park, Kimmage Grove, Priory Road, Westfield Road, Kenilworth Park, Casimir Road and Mount Argus Road.

6.3.3 Section 2 – R137 Harold's Cross Road from Harold's Cross Park to Grand Canal

This Section outlines the baseline environment for walking, cycling, bus services, general traffic, and parking / loading facilities along Section 2 of the Proposed Scheme from Harold's Cross Park to the Grand Canal. Section 2 is approximately 400m long and consists of R137 Harold's Cross Road between the R137 Harold's Cross Road / R817 Harold's Cross Road junction and the R137 Harold's Cross Road / R111 Parnell Road / R137 Clanbrassil Street Upper / R111 Grove Road Junction.

6.3.3.1 Pedestrian Infrastructure

The walking facilities along Section 2 of the Proposed Scheme include reasonably wide, well-lit footpaths on both sides of the R137 Harold's Cross Road carriageway between Harold's Cross Park and the Grand Canal.

There are several controlled pedestrian crossings along Section 2 of the Proposed Scheme which benefit from tactile paving and dropped kerbs which can be found at the following locations:

- A direct signalised pedestrian crossing is provided across R137 Harold's Cross Road approx. 10m north of Mount Drummond Avenue; and
- The four-arm R137 Clanbrassil Street Upper / R111 Grove Road / R137 Harold's Cross Road / R111 Parnell Road junction has direct signalised pedestrian crossings on each arm.

Uncontrolled crossings across priority junctions at side roads benefit from dropped kerbs. The locations of the pedestrian crossings are illustrated in Figure 6.3a in Volume 3 of this EIAR.

Further details of the baseline pedestrian facilities (i.e. routing, directness, accessibility, crossing and footpath widths) at each junction along Section 2 of the Proposed Scheme is included in Appendix A6.4 – Appendix A6.4.1 (Pedestrian Infrastructure Assessment).

6.3.3.2 Cycling Infrastructure

The cycle facilities along Section 2 of the Proposed Scheme consist of a mix of advisory cycle lanes (typical width of 1.5m) and combined bus and cycle lanes in both directions that operate between 07.00hrs to 10.00hrs and 12.00hrs to 19.00hrs from Monday to Saturday.

Cycle parking is provided at the following locations along and within the vicinity of Section 2 of the Proposed Scheme:

- Five Sheffield stands along R137 Harold's Cross Road to the south of St Clare's Convent National School; and
- Three Sheffield stands along R137 Harold's Cross Road to the south of Greenmount Avenue.

The existing cycle facilities along Section 2 of the Proposed Scheme are illustrated in Figure 6.4a in Volume 3 of this EIAR.

Further details of the baseline cycling facilities (i.e. level of segregation from vehicles, capacity for cycling two abreast and / or overtaking, and junction treatment) along the length of Section 2 of the Proposed Scheme is included in Appendix A6.4 – Appendix A6.4.2 (Cycling Impact Assessment) in Volume 4 of this EIAR.

6.3.3.3 Bus Infrastructure

6.3.3.3.1 Bus Priority Measures

There is a northbound bus lane between the north of the R817 Harold's Cross Road / R137 Harold's Cross Road Junction and the south of the R137 Harold's Cross Road / R111 Grove Road / R111 Parnell Road Junction. A southbound combined bus and cycle lane commences south of the R137 Harold's Cross Road / R111 Grove Road / R111 Parnell Road Junction and extends to 80m north of the R817 Harold's Cross Road / R137 Harold's Cross Road Junction. The bus lanes are delineated by lane markings except for between the R137 Harold's Cross Road / Mount Drummond Junction and R137 Harold's Cross Road / Armstrong Street Junction where the northbound bus lane (for approximately 80m) is marked with bollards. A variable messaging sign is provided in advance of this segment informing on the operation of the bus lane.

Along Section 2, the northbound and southbound combined bus and cycle lanes are in operation between 07:00hrs and 10:00hrs and 12:00hrs and 19:00hrs, Monday to Saturday.

6.3.3.3.2 Bus Stop Facilities

There are currently three bus stops along Section 2 of the Proposed Scheme (two 'inbound' stops towards the city centre and one 'outbound' stop).

The inbound stops are:

- Stop 1344 north of Our Lady's Hospice & Care Services entrance; and
- Stop 1345 north of Le Vere Terrace.

The outbound stop is:

- Stop 1291 south Le Vere Terrace.

Table 6-8 outlines the availability of bus stop facilities at the existing three bus stops along Section 2 of the Proposed Scheme.

Table 6-8: Section 2 - Availability of Bus Stop Facilities (of a Total Three Bus Stops)

Bus Stop Facility	Number of Bus Stops in Baseline with Facility	Percentage of Bus Stops in Baseline with Facility
RTPI	3	100%
Timetable Information	3	100%
Shelter	3	100%
Seating	3	100%
Accessible Kerbs	3	100%
Indented Drop Off Area	0	0%
Total Stops	**10**	

All three existing bus stops along Section 2 of the Proposed Scheme comprise real time information screens, shelter, seating and accessible kerbs.

The bus stops cater for five Dublin Bus routes (9, 16, 16c, 49 and 54a). The services available from these stops are outlined in Table 6-8.

6.3.3.4 General Traffic

6.3.3.4.1 R137 Harold's Cross Road

R137 Harold's Cross Road in Section 2 of the Proposed Scheme is a two-way carriageway, with a speed limit of 50km/h. For much of the length, R137 Harold's Cross Road has a single traffic lane and bus lane in each direction. The carriageway width varies from approximately 5.5m to approximately 13m where two lanes in each direction are available.

Most junctions along R137 Harold's Cross Road are minor priority junctions providing access to residential street and commercial properties. The priority junctions provide signage and road markings such as broken white lines and, in some instances, yellow box markings to ensure vehicles travelling are able to turn in and out of the minor arms.

The existing major junction arrangement along Section 2 comprises R137 Harold's Cross Road / R111 Grove Road / R111 Parnell Road.

R137 Harold's Cross Road / R111 Grove Road / R111 Parnell Road four-arm signalised junction: This junction which includes signalised pedestrian crossings on all four arms.

The northern arm approach consists of an advisory cycle lane, a left-turn lane, and a straight-ahead lane and has a total width of around 6.0m. Vehicles from this approach are not permitted to turn right to R111 Parnell Road. There is an advanced stop line for cyclists and the advisory cycle lane continues through the junction. The northern arm exit consists of an advisory cycle lane and one general traffic lane. Goods vehicles are not permitted to enter the northern arm exit.

The eastern arm approach consists of an advisory cycle lane and one general traffic lane. Vehicles from this approach are not permitted to turn right to R137 Clanbrassil Street Upper. There is an advanced stop line for cyclists and the advisory cycle lane continues through the junction. The eastern arm exit consists of an advisory cycle lane and one general traffic lane. A pedestrian refuge island separates the approach and exit lanes on this arm.

The southern arm approach consists of an advisory cycle lane, a left-turn and ahead lane, and a right-turn and ahead lane with a total width of approximately 6.1m. There is an advanced stop line for cyclists and the advisory cycle lane continues through the junction. The southern arm exit consists of an advisory cycle lane and one general traffic lane.

The western arm approach consists of a mandatory cycle lane (which general traffic is not permitted to enter), which becomes an advisory cycle lane through the junction and a straight-ahead lane which flares approximately 12m in advance of the junction to provide a right-turn lane. The western arm exit consists of a mandatory cycle lane and one general traffic lane. A hatched median separates the approach and exit lanes on this arm.

These characteristics are shown in Image 6.8.

Image 6.8: R137 Harold's Cross Road / R111 Grove Road / R111 Parnell Road Four-Arm Signalised Junction

6.3.3.5 Existing Parking / Loading

Along Section 2 of the Proposed Scheme there are a total of 78 existing parking / loading spaces. Of the existing parking spaces, 19 spaces are located along the Proposed Scheme corridor and the remaining 59 spaces are located along side roads within approximately 250m of the scheme.

Parking and loading spaces along Section 2 of the Proposed Scheme comprise:

- On R137 Harold's Cross Road (east of Harold's Cross Park) there are 17 permit parking spaces;
- On R137 Harold's Cross Road (north of Harold's Cross Park) there are 17 parking spaces. Of these, 10 are Pay and Display parking spaces adjacent to the northbound carriageway, six are Pay and Display parking spaces adjacent to the southbound carriageway and one is a Disabled parking space adjacent to the southbound carriageway; and
- On R137 Harold's Cross Road there are two Pay and Display parking spaces located adjacent to the southbound carriageway to the north of Armstrong Street.

There are a number of side streets which can be used by local residents and visitors / businesses throughout this section. In total there are approximately 59 parking spaces on Greenmount Avenue, Mount Drummond Avenue, Le Vere Terrace and Armstrong Street.

6.3.4 Section 3 – R137 Clanbrassil Street Upper and Lower and R137 New Street South from the Grand Canal to the Patrick Street Junction

This Section outlines the baseline environment for walking, cycling, bus services, general traffic and parking / loading facilities along Section 3 of the Proposed Scheme from the Grand Canal to Patrick Street Junction. Section 3 of the Proposed Scheme consists of approximately 290m of R137 Clanbrassil Street Upper, 500m of R137 Clanbrassil Street Lower and 300m of R137 New Street South.

6.3.4.1 Pedestrian Infrastructure

The walking facilities along Section 3 of the Proposed Scheme include reasonably wide, well-lit footpaths on both sides of the R137 Clanbrassil Street Lower, R137 Clanbrassil Street Upper and R137 New Street South between Grand Canal and R110 Kevin Street Upper.

There are several controlled pedestrian crossings along Section 3 of the Proposed Scheme which benefit from tactile paving and dropped kerbs which can be found at the following locations:

- The four-arm R137 Clanbrassil Street Lower / R811 South Circular Road / R137 Clanbrassil Street Upper Junction has direct signalised pedestrian crossings on each arm;
- A direct signalised pedestrian crossing is provided across R137 Clanbrassil Street Lower approx. 20m south of Lombard Street West;
- A direct signalised pedestrian crossing is provided across R137 Clanbrassil Street Lower approx. 10m north of Clanbrassil Terrace;
- The four-arm R137 New Street South / Long Lane / R137 Clanbrassil Street Lower / Malpas Street Junction has a staggered signalised pedestrian crossing across the southern arm;
- The three-arm R137 New Street South / R110 Kevin Street Upper Junction has a direct signalised pedestrian crossing across the eastern arm; and
- The four-arm R137 Patrick Street / R110 Kevin Street Upper / R137 New Street South / R110 Dean Street Junction includes a mixture of direct and staged signalised pedestrian crossings across each arm.

Uncontrolled crossings across priority junctions at side roads benefit from dropped kerbs. The locations of the pedestrian crossings are illustrated in Figure 6.3a in Volume 3 of this EIAR.

Further details of the baseline pedestrian facilities (i.e. routing, directness, accessibility, crossing and footpath widths) at each junction along Section 3 of the Proposed Scheme is included in Appendix A6.4 - Appendix A6.4.1 (Pedestrian Infrastructure Assessment) in Volume 4 of this EIAR.

6.3.4.2 Cycling Infrastructure

The cycle facilities along Section 3 of the Proposed Scheme consists of a mixture of advisory cycle lanes (typical width of 1.5m) and combined bus and cycle lanes along R137 Clanbrassil Street Upper, R137 Clanbrassil Street Lower and R137 New Street South. The northbound cycle infrastructure operates between 07.00hrs to 10.00hrs and 12.00hrs to 19.00hrs from Monday to Saturday, however, there are no limits on the operational hours for the southbound lanes.

Cycle parking is provided at the following locations along and within the vicinity of Section 3 of the Proposed Scheme:

- Four Sheffield stands along R137 Clanbrassil Street Lower to the north of the junction with R811 South Circular Road;
- Five Sheffield stands along R137 Clanbrassil Street Lower immediately south of Donovan Lane;
- Eight Sheffield stands along R137 Clanbrassil Street Lower to the north of Donovan Lane;
- Four Sheffield stands along R137 Clanbrassil Street Lower immediately south of Malpas Street;
- Five Sheffield stands along R137 New Street South immediately south of Fumbally Lane;
- Nine Sheffield stands along R137 New Street South immediately north of Fumbally Lane;

- Ten Sheffield stands along R137 New Street South opposite Cathedral View Court;
- Four Sheffield stands along R137 New Street South immediately south of the R110 Kevin Street Upper slip road;
- Five Sheffield stands along R137 Patrick Street at the R137 Patrick Street / R110 Kevin Street Upper / R137 New Street South / R110 The Coombe Junction; and
- Fourteen Sheffield stands along R110 The Coombe at the R137 Patrick Street / R110 Kevin Street Upper / R137 New Street South / R110 The Coombe Junction.

The existing cycle facilities along Section 3 of the Proposed Scheme are illustrated in Figure 6.4a in Volume 3 of this EIAR.

Further details of the baseline cycling facilities (i.e. level of segregation from vehicles, capacity for cycling two abreast and / or overtaking, and junction treatment) along the length of Section 3 of the Proposed Scheme is included in Appendix A6.4 - Appendix A6.4.2 (Cycling Impact Assessment) in Volume 4 of this EIAR.

6.3.4.3 Bus Infrastructure

6.3.4.3.1 Bus Priority Measures

A northbound combined bus and cycle lane is provided for approximately 80m from north of Robert Emmet Bridge to the R137 Clanbrassil Street Upper / Wesley Place Junction. Between the R137 Clanbrassil Street Upper / Wesley Place Junction and the R137 Clanbrassil Street Lower / Lombard Street West Junction, there is no bus priority provision. At the R137 Clanbrassil Street Lower / Lombard Street West Junction, a northbound combined bus and cycle lane commences for approximately 500m to approximately 30m north of the R137 New Street South / Cathedral View Court Junction. The bus lanes are in operation between 07:00hrs and 10:00hrs and 12:00hrs and 19:00hrs, Monday to Saturday. Outside of operational hours the lanes can be used by all traffic.

No southbound bus lanes are provided along Section 3 of the Proposed Scheme.

6.3.4.3.2 Bus Stop Facilities

There are currently nine bus stops along Section 3 of the Proposed Route (five ‘inbound’ stops towards the city centre and four ‘outbound’ stops).

The inbound stops are:

- Stop 1347 north of Clanbrassil Close;
- Stop 2634 south St Vincent Street South;
- Stop 2635 opposite Lombard Street West;
- Stop 2636 north of Malpas Street; and
- Stop 5097 north of Cathedral Court.

The outbound stops are:

- Stop 1290 opposite Clanbrassil Close;
- Stop 2388 north of St Kevin Parade;
- Stop 2387 between Long Lane and New Street Gardens; and
- Stop 2386 south of Kevin Street Upper.

Table 6-9 outlines the availability of bus stop facilities at the existing nine bus stops along this section of the Proposed Scheme.

Table 6-9: Section 3 - Availability of Bus Stop Facilities (of a Total Nine Bus Stops)

Bus Stop Facility	Number of Bus Stops in Baseline with Facility	Percentage of Bus Stops in Baseline with Facility
RTPI	1	11%
Timetable Information	6	67%
Shelter	3	33%
Seating	1	11%
Accessible Kerbs	9	100%
Indented Drop Off Area	6	67%

There is one existing bus stop along Section 3 with a real time information screen (Stop 1347). One existing stop has a shelter and seating (Stop 2636) whilst a further two bus stops have a shelter only (Stop 2635 and Stop 2388).

The bus stops cater for five Dublin Bus routes (9, 16, 16c, 49 and 54a). The services available from these stops are outlined in Table 6-9.

6.3.4.4 General Traffic

6.3.4.4.1 R137 Clanbrassil Street Upper / R137 Clanbrassil Street Lower

R137 Clanbrassil Street Upper in Section 3 of the Proposed Scheme commences north of the R137 Harold's Cross Road / R111 Grove Road / R111 Parnell Road Junction. R137 Clanbrassil Street Upper is a two-way carriageway and varies in width between 8m and 15m. The road is subject to a 50 km/h speed limit and becomes increasingly urban in nature towards the city centre. To the north of the R137 Clanbrassil Street Upper / R811 South Circular Road Junction, R137 Clanbrassil Street Upper becomes R137 Clanbrassil Street Lower. To the north of the R137 Clanbrassil Street Lower / Lombard Street West, the northbound and southbound carriageway are separated by a landscaped median which extends to where R137 Clanbrassil Street Lower becomes R137 New Street South.

Many junctions along R137 Clanbrassil Street Upper / R137 Clanbrassil Street Lower are minor priority junctions providing access to residential streets and commercial properties. The priority junctions provide signage and road markings such as broken white lines and, in some instances, yellow box markings to allow vehicles travelling in and out of the minor arms.

The existing major junction arrangement along R137 Clanbrassil Street Upper / R137 Clanbrassil Street Lower comprises R137 Clanbrassil Street Upper / R811 South Circular Road Junction.

R137 Clanbrassil Street Upper / R811 South Circular Road four-arm signalised junction: This junction includes a yellow box road marking in the centre of the junction and signalised pedestrian crossings on all arms.

The northern arm approach consists of a cycle lane delineated by Orca cycle lane separators, a left-turn and ahead lane, a straight-ahead lane and a right-turn lane with a total width of approximately 8.5m. There is an advanced stop line for cyclists and the cycle lane continues through the junction. The northern arm exit consists of a cycle lane delineated by Orca cycle lane separators and two general traffic lanes. A pedestrian refuge island separates the approach and exit lanes on the arm.

The eastern arm approach consists of a left-turn lane and a straight-ahead lane with a total width of around 5.9m. Right-turn movements from this approach to R137 Clanbrassil Street Lower are not permitted. The eastern arm exit consists of one general traffic lane.

The southern arm approach consists of an cycle lane delineated by Orca cycle lane separators, a left-turn and ahead lane, and a right-turn lane with a total width of around 6.5m. There is an advanced stop line for cyclists and the advisory cycle lane continues through the junction. The southern arm exit consists of an advisory cycle lane and one general traffic lane. A pedestrian refuge island separates the approach and exit lanes on this arm.

The western arm approach consists of a left-turn traffic lane and one straight-ahead lane with lane widths of around 2.9m each. From this approach, right-turn movements to R137 Clanbrassil Street Upper are not permitted. The western arm exit consists of one general traffic lane.

These characteristics are shown in Image 6.9.

Image 6.9: R137 Clanbrassil Street / R811 South Circular Road Four-Arm Signalised Junction

6.3.4.4.2 R137 New Street South

R137 New Street South commences at the R137 Clanbrassil Street Lower / Malpas Street / Long Lane junction. R137 New Street South in Section 3 of the Proposed Scheme is a two-way carriageway and is approximately 15.0m in width. The road is subject to a 50 km/h speed limit and, for the most part, has a landscaped median separating the northbound and southbound carriageways.

Most junctions along R137 New Street South are minor priority junctions providing access to residential streets and commercial properties. The priority junctions provide signage and road markings such as broken white lines and, in some instances, yellow box markings to allow vehicles travelling in and out of the minor arms.

The existing major junction arrangements are as follows:

- R137 New Street South / Malpas Street / Long Lane; and
- R137 New Street South / R110 Kevin Street Upper.

R137 New Street South / Malpas Street / Long Lane four-arm signalised junction: This junction includes a yellow box road marking in the centre of the junction and a signalised pedestrian crossing on the southern arm.

The northern arm approach consists of an advisory cycle lane, two straight-ahead lanes and a right-turn flare which commences approximately 30m in advance of the junction. The advisory cycle continues through the junction. At the stop line of the junction the total width of the carriageway is approximately 9.5m. There is an advanced stop line for cyclists and the advisory cycle lane continues through the junction. No left-turn movements to Long Lane are permitted. The northern arm exit consists of a combined bus and cycle lane and a general traffic lane.

The eastern arm consists of a single approach lane measuring approximately 4.1m in width. No traffic is permitted to enter Long Lane.

The southern arm approach consists of a advisory cycle lane, which commences approximately 7m in advance of the junction, a left-turn traffic lane and a straight-ahead traffic lane with a total width of around 6.6m. The left-turn traffic lane begins approximately 20m in advance of the junction replacing a combined bus and cycle lane. No right-turn movements to Long Lane are permitted. There is an advanced stop line for cyclists on this approach.

The southern arm exit consists of a cycle lane delineated by Orca cycle lane separators and two general traffic lanes. A staggered pedestrian refuge island separates the approach and exit lanes on this arm.

The western arm approach consists of one general traffic lane which permits left-turn and right-turn movements. No straight-ahead movements to Long Lane are permitted. The western arm exit consists of one general traffic lane.

These characteristics are shown in Image 6.10.

Image 6.10: R137 New Street South / Malpas Street / Long Lane Four-Arm Signalised Junction

R137 New Street South / R110 Kevin Street Upper (south) three-arm signalised junction: This junction includes a yellow box road marking on the R137 New Street South northbound carriageway and a signalised pedestrian crossing on the eastern arm.

The northern arm approach consists of a cycle lane delineated by Orca cycle lane separators and two straight-ahead lanes with a total width of 6.9m. An advisory cycle lane continues through the junction. No left-turn movements to R110 Kevin Street Upper are permitted from this approach. The northern arm exit consists of three general traffic lanes. A landscaped median separates the approach and exit lanes on this arm.

The eastern arm approach consists of an advisory cycle lane, a left-turn lane and a right-turn lane. Lane widths vary and accommodate a mandatory central cycle lane on approach to the stop line. There is an advanced stop line for cyclists on this approach. No traffic is permitted to enter R110 Kevin Street Upper at this junction.

The southern arm approach consists of two ahead lanes one of which is marked as a left turn lane in preparation for the subsequent junction. No right-turn movements to R110 Kevin Street Upper are permitted from this approach. The southern arm exit consists of an advisory cycle lane and two general traffic lanes. A landscaped median separates the approach and exit lanes on this arm.

These characteristics are shown in Image 6.11.

Image 6.11: R137 New Street South / R110 Kevin Street Upper (south) Three-Arm Signalised Junction

6.3.4.5 Existing Parking / Loading

Along Section 3 of the Proposed Scheme, there is a total of 199 existing parking / loading spaces. Of the existing parking spaces, 60 spaces are located along the Proposed Scheme corridor and the remaining 139 spaces are located along side roads approximately 250m of the Proposed Scheme.

Parking and loading spaces along Section 3 of the Proposed Scheme comprise:

- On R137 Clanbrassil Street Upper between Emmet Bridge and South Circular Road, there are 11 Pay and Display / permit parking spaces, of which eight are located adjacent to the northbound carriageway and three are located adjacent to the southbound carriageway;
- On R137 Clanbrassil Street Lower between South Circular Road and Lombard Street West, there are 21 Pay and Display / permit parking spaces, of which 11 are located adjacent to the northbound carriageway and 10 are located adjacent to the southbound carriageway;
- At St Vincent Street Car Park, there are 10 Pay and Display / permit parking spaces;
- On R137 Clanbrassil Street Lower between Lombard Street West and Daniel Street, there are seven parking / loading spaces, of which three are loading spaces and one is a disabled space which are located adjacent to the northbound carriageway whilst a further three loading spaces are located adjacent to the southbound carriageway; and
- On R137 Clanbrassil Street Lower north of Daniel Street, there are 11 parking / loading spaces, of which five are loading spaces and five are Pay and Display / permit parking spaces which are located adjacent to the northbound carriageway whilst a further one loading bay is located adjacent to the southbound carriageway.

There are a number of side streets which can be used by local residents and visitors / businesses throughout this section. In total there are approximately 139 parking spaces on Windsor Terrace, Clanbrassil Close, Wesley Place, St. Vincent Street South, Donovan Lane, Lombard Street West, Saint Kevin's Parade, Daniel Street, Clanbrassil Terrace, Malpas Street and Long Street.

6.4 Potential Impacts

This Section presents potential impacts that may occur due to the Proposed Scheme, in the absence of mitigation. This informs the need for mitigation or monitoring to be proposed (refer to Section 6.5). Predicted 'residual' impacts taking into account any proposed mitigation are presented in Section 6.6.

6.4.1 Characteristics of the Proposed Scheme

The characteristics of the Proposed Scheme are described in detail in Chapter 4 (Proposed Scheme Description).

6.4.2 Do Nothing' Scenario

With regards to this Chapter, the 'Do Nothing' scenario means there would be no changes to existing transport infrastructure, so infrastructure provision for buses, pedestrians and cyclists would remain the same. The streetscape would continue to be based around the movement and parking requirements of private cars instead of people. High levels of traffic are associated with discouraging pedestrian and cyclist activity and this activity would be further discouraged as traffic congestion remains the same or increases. The baseline situation of congestion and journey time reliability issues for buses would also continue, and potentially be exacerbated over time as traffic congestion increases in line with travel demand growth.

6.4.3 Do Minimum Scenario

The 'Do Minimum' scenario represents the likely traffic and transport conditions of the direct and indirect study areas **without** the Proposed Scheme in place. This scenario forms the reference case by which to compare the Proposed Scheme ('Do Something'). The Opening Year for the Proposed Scheme is assumed to be 2028, with a Design Year (opening + 15 years) assumed to be 2043.

For the qualitative analysis, the assessment is in relation to the conditions of the existing transport network, which have been outlined in Section 6.3 (Baseline Environment) corresponding with a Do Nothing scenario. As a result of the COVID-19 pandemic a number of temporary transport mobility measures have been implemented. Due to their temporary status, the measures are not considered a permanent long-term feature of the receiving environment, and as such, have not been considered in the impact assessments.

For the quantitative analysis (i.e. the transport modelling elements of the impact assessment), the Do Minimum scenario is based on the 'likely' conditions of the transport network and includes for any known permanent improvements or changes to the road or public transport network that have taken place, been approved or are planned for implementation. The transport schemes and demand assumptions within the Do Minimum scenario are detailed below.

6.4.3.1 Do Minimum Transport Schemes

The core reference case (Do Minimum) modelling scenarios (Opening Year (2028) and Design Year (2043)) are based on the progressive roll-out of the Greater Dublin Area Transport Strategy 2022 - 2042 (hereafter referred to as the GDA Strategy) (NTA 2022), with a partial implementation by 2028, in line with National Development Plan 2021-2030 (NDP) (Government of Ireland 2021) investment priorities and the full implementation by 2043.

The GDA Strategy provides an appropriate transport receiving environment for the assessment of the Proposed Scheme for the following reasons:

- The GDA Strategy is the approved statutory transportation plan for the region, providing a framework for investment in transport within the region up to 2042;
- The GDA Strategy provides a consistent basis for the 'likely' future receiving environment that is consistent with Government plans and Policies National Planning Framework (NPF) (Government of Ireland 2018) and the NDP; and
- Schemes within the GDA Strategy are a means to deliver the set of objectives of the GDA Strategy. The sequencing and delivery of the strategy is defined by the implementation plan, but the optimal outcome of aiming to accommodate all future growth in travel demand on sustainable modes underpins the GDA Strategy.

The Do Minimum scenarios (in both 2028 and 2043) include all other elements of the BusConnects Programme of projects (apart from the CBC Infrastructure Works elements) (i.e. the new BusConnects routes and services (as part of the Revised Dublin Area Bus Network), new bus fleet, the Next Generation Ticketing and integrated fare structure proposals) are included in the Do Minimum scenarios.

In 2028, other notable Do Minimum transport schemes include the roll out of the DART+ Programme, Luas Green Line capacity enhancement and the Greater Dublin Area Cycle Network Plan implementation (excluding the CBC Infrastructure Works elements). As outlined above, the 2043 Do Minimum scenario assumes the full implementation of the GDA Strategy schemes, so therefore assumes that proposed major transport schemes such as MetroLink, and Luas line extensions to Lucan, Finglas, Poolbeg and Bray are all fully operational.

Appendix A6.2 (Transport Modelling Report) in Volume 4 of this EIAR contains further information on the modelling assumptions contained within the Do Minimum scenario including the full list of transport schemes included.

6.4.3.2 Do Minimum Transport Demand

The transport demand changes for the 2028 and 2043 assessment years have been included in the analysis contained within this Chapter, using travel demand forecasting, which accounts for increases in population and economic activity, in line with planned growth contained within the NPF (Government of Ireland 2018), the Eastern and Midland Regional Assembly (EMRA) Regional Spatial and Economic Strategy (RSES) (EMRA 2019) and the local development plans for the GDA local authorities.

It is envisaged that the population will grow by 11% up to 2028 and 25% by 2043 (above 2016 census data levels). Similarly, employment growth is due to increase by 22% by 2028 and 49% by 2043 (Source: NTA Reference Case Planning Sheets 2028, 2043). The assessment also assumes that goods vehicles (heavy goods vehicles (HGVs) and light goods vehicles (LGVs)) continue to grow in line with forecasted economic activity with patterns of travel remaining the same. For example, the assessment assumes a 45% and 77% increase in goods traffic versus the base year in 2028 and 2043, respectively.

The GDA Strategy (NTA 2022) (along with existing supply side capacity constraints such as parking availability, road capacity etc.) has the effect of limiting the growth in car demand on the road network into the future. Total trip demand will increase into the future in line with demographic growth (population and employment levels etc.). To limit the growth in car traffic and to ensure that this demand growth is catered for predominantly by sustainable modes, a number of measures will be required, that include improved sustainable infrastructure and priority measures delivered as part of the NDP (Government of Ireland 2021) / GDA Strategy. In addition to this, demand management measures will play a role in limiting the growth in transport demand, predominantly to sustainable modes only. The result will be only limited or no increases overall in private car travel demand. The Proposed Scheme will play a key role in this as part of the wider package of GDA Strategy measures.

In general, total trip demand (combining all transport modes) will increase into the future in line with population and employment growth. A greater share of the demand will be by sustainable modes (Public Transport (PT), Walking, Cycling). Private car demand may still grow in some areas but not linearly in line with demographics, as may have occurred in the past.

In terms of the transport modelling scenarios for the traffic and transport assessment, as per the GDA Strategy proposals, there are no specific demand management measures included in the Do Minimum scenario in the Opening Year (2028), other than constraining parking availability in Dublin at existing levels. For the Design Year (2043) scenario, demand management is included in the Do Minimum in line with the GDA Strategy's Core Demand Management Measures; Reduction of free workplace parking in urban areas, increased parking charges in urban areas and adjustment of traffic signal timings across the metropolitan area to better facilitate movement by sustainable modes.

6.4.4 DoSomething Scenario

The Do Something scenario represents the likely conditions of the direct and indirect study areas with the Proposed Scheme in place. The traffic and transport elements of the Proposed Scheme are presented in detail in Chapter 4 (Proposed Scheme Description).

6.4.5 Construction Phase

The Do Something scenario represents the likely conditions of the direct and indirect study areas with the Proposed Scheme in place. The traffic and transport elements of the Proposed Scheme are presented in detail in Chapter 4 (Proposed Scheme Description).

Chapter 5 (Construction) of the EIAR has been prepared to demonstrate the likely approach that will be taken to construct the Proposed Scheme, while it also provides an overview of the construction activities necessary to undertake the works, including information on proposed Construction Compounds, construction plant and equipment. This assessment, as outlined herein, provides an overview of the potential traffic and transport impacts of the Construction Phase based on the information set out in Chapter 5 (Construction) of the EIAR.

A Construction Environmental Management Plan (CEMP) has been prepared and is included as Appendix A5.1 in Volume 4 of the EIAR. The CEMP will be updated and finalised by the appointed contractor prior to construction commencing. The CEMP comprises the construction mitigation measures, which are set out in the EIAR, and will be updated with any additional measures which may be required by the conditions attached to An Bord Pleanála's decision. Implementation of the CEMP will ensure disruption and nuisance are kept to a minimum during the Construction Phase. The CEMP has regard to the guidance contained in the TII Guidelines for the Creation, Implementation and Maintenance of an Environmental Operating Plan (TII 2007), and the handbook published by Construction Industry Research and Information Association (CIRIA) in the UK, Environmental Good Practice on Site Guide, 4th Edition (CIRIA 2015).

All of the content provided in the CEMP will be implemented in full by the appointed contractor and its finalisation will not affect the robustness and adequacy of the information presented and relied upon in this EIAR.

As with any construction project, the appointed contractor will be obliged to prepare a comprehensive Construction Traffic Management Plan (CTMP). In preparing the CTMP for the proposed works, the appointed contractor will be required to give consideration, where practicable, to facilitate and identify opportunities for the maximum movement of people during the construction period through implementing the following hierarchy of transport mode users:

- Pedestrians;
- Cyclists;
- Public Transport; and
- General Traffic.

Access will be maintained for emergency vehicles along the Proposed Scheme, throughout the Construction Phase.

6.4.5.1 Description of Construction Works

The Proposed Scheme has been divided into three principal sections. The division line between sections has been determined by group similar carriageway types together. These sections have been further subdivided into seven sub-sections, according to the types of construction works required. The sections / sub-sections are the following:

- **Section 1:** R817 Kimmage Road Lower from Kimmage Cross Roads to Junction with Harold's Cross Road:
  - **Section 1a:** Kimmage Cross Roads to Ravensdale Park;
  - **Section 1b:** R817 Kimmage Road Lower - Ravensdale Park / Sundrive / Harold's Cross; and
  - **Section 1c:** Kenilworth Park / Harold's Cross Road Junction.

- **Section 2**: Harold's Cross Road from Harold's Cross Park to Grand Canal; and
- **Section 3:** Clanbrassil Street Upper and Lower and New Street South from the Grand Canal to the Patrick Street Junction:
  - **Section 3a:** Grand Canal Bridge / Clanbrassil Street Upper;
  - **Section 3b:** Clanbrassil Street Upper / Clanbrassil Street Lower; and
  - **Section 3c:** Clanbrassil Street Lower / New Street South.

The location of each section along the Proposed Scheme is shown in Image 6.4.

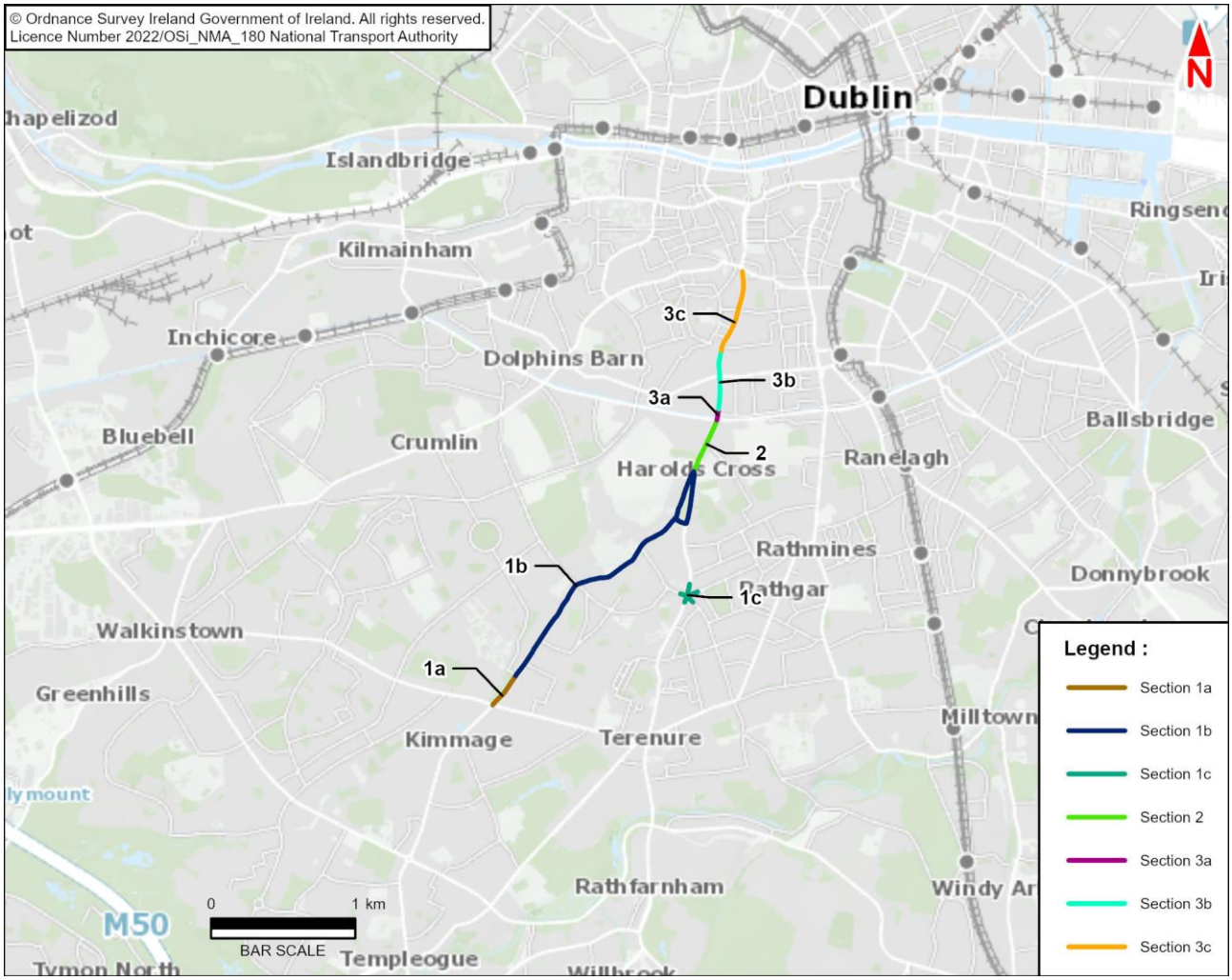


Image 6.4: Proposed Sub-Sections of Construction Phase

6.4.5.2 Construction Programme

An outlined, the indicative programme for the construction of the Proposed Scheme is provided in Chapter 5 (Construction). The Construction Phase of the Proposed Scheme is estimated to require 18 months (approximately) to complete. Works are envisaged to proceed concurrently on multiple work-fronts to minimise the overall construction duration.

6.4.5.3 Construction Access Route

Access to and egress from the Construction Compounds will be permitted via dedicated construction access routes for vehicles. The haulage of material on-site is anticipated to be minimal. There will however be the removal of excavated material and the delivery of construction materials to site. It is anticipated that the exporting and

delivery of materials will be executed as efficiently as possible along national roads such as the close by M50 Motorway and from the Regional Road network. It is assumed that all National and Regional Roads including the Regional Roads in the immediate vicinity of the Proposed Scheme will be used to supply / remove this material, where practicable, to minimise use of the local road network.

The following National Road is expected to be used as construction vehicle access routes during the Construction Phase of the Proposed Scheme:

- M50 Motorway.

The following Regional Roads are expected to be used as construction access routes during the Construction Phase of the Proposed Scheme:

- R805 R137 Tallaght Road - Templeogue Road;
- R817 Cypress Road - Kimmage Road Lower;
- R137 Spawell Road and Terenure Road North;
- R817 Fortfield Road –Kimmage Road Lower; and
- R818 Terenure Road West.

Given the length and varying nature of each sub-section, it is proposed to establish three Construction Compounds for the duration of the works. These are:

- **Construction Compound K1:** Sundrive Road;
- **Construction Compound K2:** Our Lady's Hospice; and
- **Construction Compound K3:** Clanbrassil Street Lower.

These areas will be used to store construction materials, cater for employee facilities and may also provide limited space for employee parking.

In addition to the Construction Compounds, welfare facilities will be provided along the Proposed Scheme. The contractor, when appointed, may identify other (or additional) Construction Compound locations, subject to gaining all necessary approvals.

Image 6.5 illustrates the proposed construction access route to and from the main Construction Compounds.

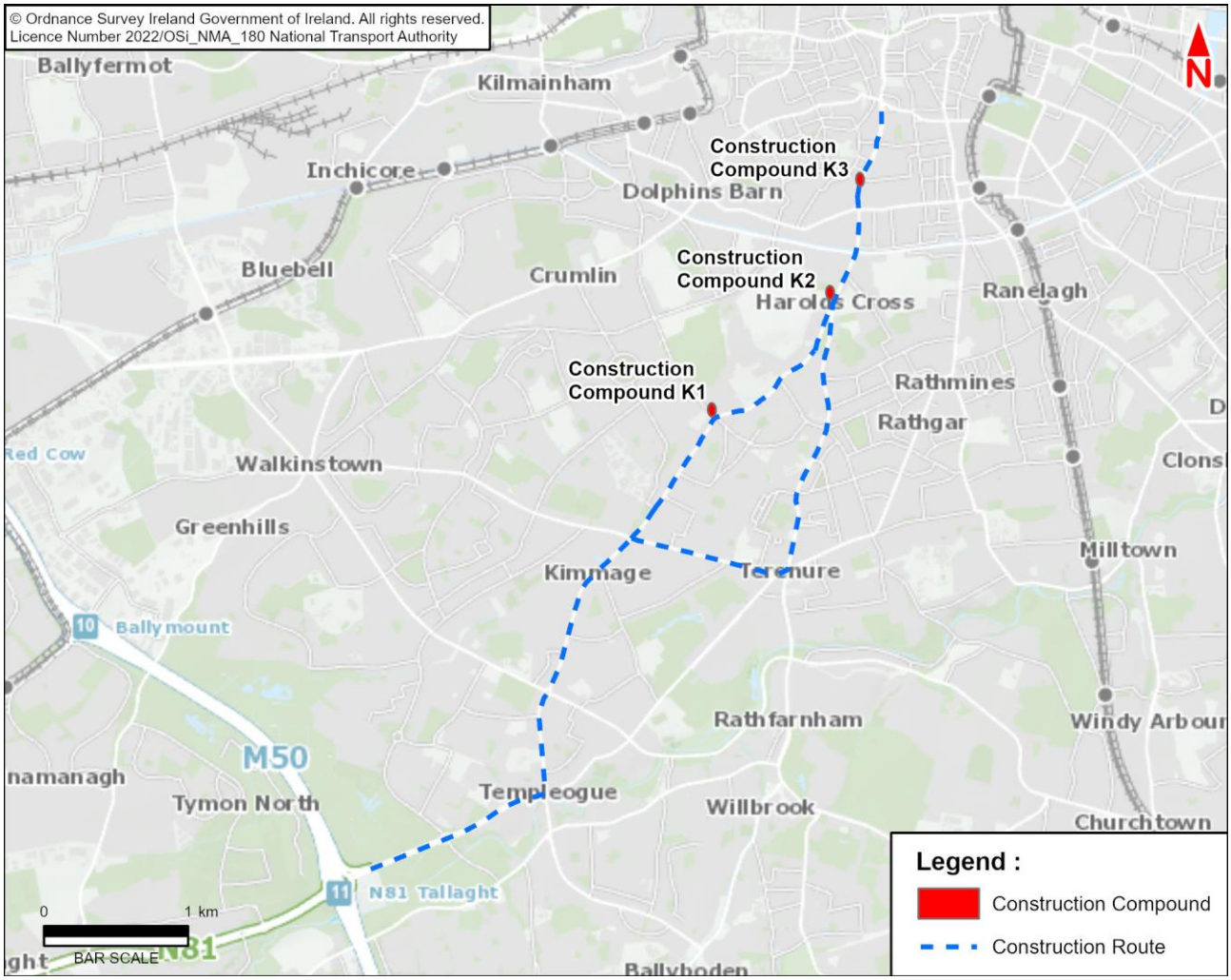


Image 6.5: Proposed Construction Access Route and Construction Compound Locations

6.4.5.4 Potential Construction Impact

Construction of the Proposed Scheme has the potential to impact people's day-to-day activities along the corridor while the works are underway. Chapter 5 (Construction) of the EIAR and the CEMP (Appendix A5.1 in Volume 4 of the EIAR), identify impactful activities, considers their effect, and identify mitigation measures to reduce or remove their impact, insofar as practicably possible.

For construction activities on or adjacent to public roads, all works will be undertaken in accordance with the Traffic Signs Manual, Chapter 8 Temporary Traffic Measures and Signs for Roadworks and associated guidance (DoT 2019a; 2019b). Chapter 5 (Construction) of the EIAR contains temporary traffic management proposals for the Proposed Scheme. These proposals maintain a safe distance between road users and road workers, depending on the type of construction activities taking place and the existing site constraints. Temporary diversions, and in some instances temporary road closures, may be required where a safe distance cannot be maintained to undertake works necessary to complete the Proposed Scheme. All road closures and diversions will be determined by the NTA, who may liaise with the local authority and An Garda Siochana, as necessary. The need for temporary access restrictions will be confirmed with residents and businesses prior to their implementation.

6.4.5.4.1 Pedestrian Provisions

As described in Chapter 5 (Construction), pedestrians will be temporarily impacted by construction activities along the direct study area. Pedestrian diversions and temporary surface footpaths will be used to facilitate pedestrian movements around construction activities. Access to local amenities, such as bus stops, traffic crossings, private dwellings, and businesses, may be temporarily altered but access will be maintained.

Due consideration will be given to pedestrian provisions in accordance with Section 8.2.8 of Chapter 8, Temporary Traffic Measures and Signs for Roadworks of the Traffic Signs Manual (DoT 2019a) and the Temporary Traffic Management Design Guidance (DoT 2019b), to ensure the safety of all road users, in particular pedestrians (including able-bodied pedestrians, wheel-chair users, mobility impaired pedestrians, pushchair users etc.). Therefore, where footpaths are affected by construction, a safe route will be provided past the works area, and where practicable, provisions will be made for matching existing facilities for pedestrians. Due consideration will also be given to the need for temporary ramps, and measures for accessible users, where changes in elevation are temporarily introduced to facilitate works and footpath diversions. Entrance points to the construction zone will be controlled as required. The impact is considered to have a **Negative, Slight and Temporary** effect to pedestrians.

6.4.5.4.2 Cycling Provisions

Cyclists may be temporarily impacted by construction activities along the Proposed Scheme corridor. As part of Temporary Traffic Management arrangements, the appointed contractor will give due consideration to cyclist provision in accordance with Section 8.2.8 of Chapter 8, Temporary Traffic Measures and Signs for Roadworks of the Traffic Signs Manual (DoT 2019a) and the Temporary Traffic Management Design Guidance (DoT 2019b), including the use of site-based risk assessments. Therefore, where cycle tracks are affected by construction, a safe route will be provided past the work area, and where practicable, provisions for matching existing facilities for cyclists will be made. The impact is considered to have a **Negative, Moderate and Temporary** effect to cyclists.

6.4.5.4.3 Public Transport Provisions

Existing public transport routes will be maintained throughout the duration of the Construction Phase of the Proposed Scheme (notwithstanding potential for occasional road closures / diversions as described in Chapter 5 (Construction) of the EIAR. Wherever practicable, bus services will be prioritised over general traffic. However, the temporary closure of sections of existing dedicated bus lanes may be required to facilitate the construction of new bus priority infrastructure that is being developed as part of the Proposed Scheme. It is also likely that some existing bus stop locations may need to be temporarily relocated to accommodate the works. In such cases operational bus stops will be safely accessible to all users. The impact is considered to have a **Negative, Moderate and Temporary** effect to public transport users.

6.4.5.4.4 Parking and Loading

Parking and loading locations may be temporarily impacted by construction activities along the Proposed Scheme corridor. There may be temporary restrictions to on-street parking and loading facilities. The appointed contractor will discuss temporary traffic management measures with the road authority and directly affected residents / businesses with the aim of minimising disruption. The impact is considered to have a **Negative, Slight and Temporary** effect to parking and loading.

6.4.5.4.5 General Traffic

The Proposed Scheme will be constructed to ensure the mitigation of disturbance to residents, businesses, and existing traffic. Localised temporary lane or road closures may be required for short periods. Details of indicative temporary traffic management measures to facilitate construction of the Proposed Scheme are included in Chapter 5 (Construction). All road closures and diversions will be determined by the NTA, who may liaise with the local authority and An Garda Síochána, as necessary. It should be noted that access will be maintained for emergency vehicles along the Proposed Scheme, throughout the Construction Phase.

6.4.5.4.5.1 General Traffic Redistribution

Significant impacts due to general traffic redistribution away from the direct study area are not anticipated during the Construction Phase based on the intended nature of the progressive works along the corridor whereby traffic flows are to be maintained in both directions. There may be a requirement for some localised temporary lane closures for short durations of the day, which will involve consultation between the appointed contractor and relevant authorities. Access for general traffic to existing residential and commercial units immediately adjacent to the Proposed Scheme is to be accommodated throughout the Construction Phase.

The outline CTMP (see Appendix A5.1 in Volume 4 of the EIAR) will ensure that designated diversion routes will be in place and local access will be accommodated as required. Overall, for these reasons, the impact on general traffic redistribution is anticipated to be **Negative, Moderate, and Temporary** due to the temporary nature of any restrictions.

6.4.5.4.5.2 Construction Traffic Generation

Site Operatives: As described in Chapter 5 (Construction) of this EIAR, it is anticipated there will be 20 to 30 personnel directly employed across the Proposed Scheme, rising to 50 personnel at peak construction.

Typical work hours on site are expected to be between 07:00hrs and 23:00hrs on weekdays and between 08:00hrs and 16:30hrs on Saturdays, with personnel working across early and late shifts. Night-time and Sunday working will be required to facilitate street works that cannot be undertaken during daytime / evening conditions. The planning of such works will take consideration of sensitive receptors, in particular any nearby residential areas.

The appointed contractor will prepare a Construction Stage Mobility Management Plan (CSMMP), which will be developed prior to construction, as described in Appendix A5.1 CEMP in Volume 4 of this EIAR, to actively discourage personnel from using private vehicles to travel to site. The CSMMP will promote the use of public transport, cycling and walking by personnel. Private parking at the Construction Compounds will be limited. Vehicle-sharing will be encouraged, subject to public health guidelines, where travel by private vehicle is a necessity (e.g., for transporting heavy equipment). A combination of CSMMP measures, as well as work shift patterns, means that fewer than 10 trips by private vehicle are envisaged to and from site during peak periods.

HGVs: Additional construction traffic will be generated during the Construction Phase of the Proposed Scheme, for the purpose of the following:

- Clearance of existing site material and waste;
- Deliveries of construction material; and
- Removal of construction / demolition waste material.

Chapter 5 (Construction) provides a breakdown of the expected operation for the construction of the Proposed Scheme during each sub-section. It should be noted that the CTMP will control vehicular movement along the construction access route, including restrictions on the number of HGVs accessing and egressing the construction works throughout the day to mitigate the impacts to general traffic on the surrounding road network.

Based on construction activities associated with the Proposed Scheme, the maximum number of HGVs expected to be in operation across the Proposed Scheme during peak haulage activities is nine vehicles.

Peak haulage activities are expected to take place during the period of Year 1 Q2 and Q3, with works ongoing at Section 1a, Section 2, Section 3a and Section 3b and during the period of Year 1 Q4 and Year 2 Q1, with works ongoing at Section 1b, Section 2, Section 3a, and Section 3c.

In a typical hour during peak haulage activity of the Proposed Scheme, 40% of HGVs are anticipated to be in operation, which equates to four HGVs in total. A total of four two-way truck movements are therefore expected in a typical hour during peak haulage activity of the Proposed Scheme.

Overall Peak Hour Impacts: Table 6-10 identifies the anticipated maximum construction traffic generation by site operatives and HGVs during the AM and PM Peak Hours.

Table 6-10: Anticipated Maximum Construction Traffic Generation during Construction Phase

Peak Hour	Arrivals		Departures		Total Two-Way Traffic Flows (Vehicles)	Total Two-Way Traffic Flows (PCUs)
	Car / Van (1 PCU)	HGV (2.3 PCUs)	Car / Van (1 PCU)	HGV (2.3 PCUs)		
AM Peak Hour	10	4	0	4	18	27
PM Peak Hour	0	4	10	4	18	27

Given that the above impacts are below the thresholds set out in TII's Guidelines for Transport Assessments (TII 2014), it is considered appropriate to define the potential general traffic impacts of the Construction Phase to be **Negative, Slight and Temporary.** Therefore, no further analysis is required for the purpose of this assessment.

It should be noted that further detail on the restrictions to construction vehicle movements during the peak periods of the day will be contained within the appointed contractor's CTMP prior to construction. An outline CTMP can be found in Appendix A5.1 in Volume 4 of the EIAR.

6.4.5.5 Construction Phase Summary

Table 6-11 presents a summary of the potential impacts of the Proposed Scheme during the Construction Phase.

Table 6-11: Summary of Construction Phase Potential Impacts

Assessment Topic	Effect	Potential Impact
Pedestrian Provisions	Restrictions to pedestrians along Proposed Scheme.	Negative, Slight and Temporary
Cycling Provisions	Restrictions to cyclists along Proposed Scheme	Negative, Moderate and Temporary
Public Transport Provisions	Restrictions to public transport along Proposed Scheme.	Negative, Moderate and Temporary
Parking and Loading	Restrictions to parking / loading along Proposed Scheme.	Negative, Slight and Temporary
General Traffic	Restrictions to general traffic along Proposed Scheme	Negative, Moderate and Temporary
	Additional construction traffic flows upon surrounding road network	Negative, Slight and Temporary

6.4.6 Operational Phase

The impact assessment for the Operational Phase has been outlined in terms of a qualitative (walking, cycling, bus infrastructure and parking / loading) and quantitative (bus journey times / reliability, general traffic and people movement) impact analysis, which are outlined in the following sections.

6.4.6.1 Qualitative Assessment

6.4.6.1.1 Qualitative Assessment Methodology

The structure of the qualitative assessment is consistent with the baseline environment (Section 6.3) where the Proposed Scheme has been split into three sections. This has allowed for a more detailed analysis of the quality of the infrastructure proposals per section. The approach for each qualitative assessment is outlined below.

6.4.6.1.1.1 Pedestrian Infrastructure

The impacts to the quality of the pedestrian infrastructure as a result of the Proposed Scheme have been considered with reference to any changes to the existing pedestrian facilities along footpaths and crossing locations within the direct study area. Reference has been made to the overall changes along the full length of

the Proposed Scheme and the impact assessment primarily focuses only on the pedestrian facilities at junctions to provide a direct comparison between the Do Minimum and Do Something scenarios.

Where the Proposed Scheme introduces a change to a junction layout, the impact on pedestrians has been assessed using a set of criteria which has been derived from guidance listed in Section 6.7. The contents of Table 6-12 outline the assessment criteria for each junction.

Table 6-12: Pedestrian Junction Assessment Criteria

Aspect	Indicator
Routing	Are pedestrian crossings (signalised or uncontrolled) available on all arms?
Directness	Where crossings are available, do they offer direct movements which do not require diversions or staggered crossings i.e., no or little delay required for pedestrians to cross in one direct movement?
Vehicular speeds	Are there measures in place to promote low vehicular speeds, such as minimally sized corner radii and narrow carriageway lane widths?
Accessibility	Where crossings exist, are there adequate tactile paving, dropped kerbs (or raised table treatment) and road markings for pedestrians (including able-bodied, wheelchair users, mobility impaired and pushchairs)?
Widths	Are there adequate footpath and crossing widths in accordance with national standards?

A LoS rating has been applied to each junction for both the Do Minimum and Do Something scenarios based on whether the above indicators have been met.

Table 6-13: Pedestrian Junction Assessment LoS

LoS	Indicators Met (of a Total of 5)
A	5
B	4
C	3
D	2
E	1
F	0

When comparing the Do Minimum and Do Something scenarios for pedestrians, the terms outlined in Table 6-14 have been used to describe the potential impact, based on the changes in the Qualitative Pedestrian LoS rating.

Table 6-14: Description of Impact for Pedestrian Qualitative Assessment

Magnitude of Impact	Change in LoS Rating
High	4 to 5
Medium	2 to 3
Low	1
Negligible	0

To establish the significance of effect for the impacts of the pedestrian infrastructure, as a result of the Proposed Scheme, a sensitivity rating has been applied to each junction in accordance with the methodology set out in Section 6.2.4.

6.4.6.1.1.2 Cycling Infrastructure

The impacts to the quality of the cycling infrastructure as a result of the Proposed Scheme have been considered with reference to the changes in physical provision for cyclists provided during the Do Minimum and Do Something scenarios. The NTA's National Cycle Manual (NTA 2011) Quality of Service (QoS) Evaluation criteria have been

adapted for use in assessing the cycling qualitative impact along the Proposed Scheme. The refined cycling facilities criteria are as follows:

- **Segregation:** a measure of the separation between vehicular traffic and cycling facilities;
- **Number of adjacent cyclists / width:** the capacity for cycling two abreast and / or overtaking ('2+1' accommodates two abreast plus one overtaking); and
- **Junction Treatment:** a measure of the treatment of cyclist traffic at existing junctions.

Table 6-15: Cycling Assessment Criteria

LoS	Segregation	No. of adjacent cyclists/width		Junction treatment
A+	High degree of separation. Minimal delay	2+1	2.5m	Cyclists get green signal priority at signalised junctions / has priority across uncontrolled junctions
A	Well separated at mid-link with some conflict at intersections	1+1	2.0m	Crossings at signalised junctions for cyclists along Proposed Scheme / Protected junctions not already classified as A+ for junction treatment
B	On-road cycle lanes or carriageway designated as 'quiet cycle **r**outes'	1+1	1.75m	Cyclists share green time with general traffic and cycle lanes continue through the junction, for junctions not already classified as A or A+ for junction treatment
C	Bicycle share traffic or bus lanes	1+0	1.25m	Cyclists share green time with general traffic with cycle facilities (advanced stacking locations / cycle lanes) available up to the junction but don't continue through
D	No specific bicycle facilities	1+0	0.75m	No specific bicycle facilities

As the cycle provision varies along the corridor, each section of the Proposed Scheme has been further separated into smaller sub-sections in order to apply the cycling assessment criteria appropriately.

When comparing the Do Minimum and Do Something scenarios for cyclists, the terms outlined in Table 6-16 have been used to describe the potential impact, based on the changes in the Qualitative Cycling LoS rating.

Table 6-16: Description of Impact for Cycling Qualitative Assessment

Magnitude of Impact	Change in LoS Rating
High	3 to 4
Medium	2
Low	1
Negligible	0

To establish the significance of effect for the impacts of the cycling infrastructure, as a result of the Proposed Scheme, a sensitivity rating has been applied to each assessed section in accordance with the methodology set out in Section 6.2.4.

6.4.6.1.1.3 Bus Infrastructure

The implementation of the Proposed Scheme will result in changes in the quality of bus infrastructure provision along the route, including dedicated bus lanes and bus stop upgrades / relocations. Improvement in bus priority measures will reduce the interaction between buses and general traffic and reduce the likelihood of delays.

The qualitative impact assessment has been undertaken based on the following factors:

- Provision of bus lanes;
- Pedestrian accessibility; and
- Changes to the existing bus stop facilities:

- Real-time information;
- Timetable information;
- Shelters;
- Seating;
- Accessible kerbs (containment Kassel kerbs); and
- Provision of indented drop off areas / in-line stops as appropriate.

The magnitude of impact of the Proposed Scheme, applied to the qualitative review of the above factors, is set out in Table 6-17.

Table 6-17: Magnitude and Type of Impact for Bus Users Qualitative Assessment

Impact	Description of Impact / Proposed Changes
High positive	Significant benefit for bus stop users with no disbenefits
Medium positive	Positive impact for bus stop users with benefits outweighing any minor disbenefits.
Low positive	Slight benefit for users with benefits outweighing any disbenefits.
Negligible impact	Marginal impact to user buses where any benefits or disbenefits are offset.
Low negative	Slight negative impact for users with disbenefits marginally outweighing benefits.
Medium negative	Negative impact for bus users with benefits not outweighing any disbenefits.
High negative	Complete removal of provision.

To establish the significance of effect for the impacts of the bus infrastructure, as a result of the Proposed Scheme, a sensitivity rating has been applied to each assessed section in accordance with the methodology set out in Section 6.2.4.

6.4.6.1.1.4 Parking and Loading

The potential impacts of the Proposed Scheme on parking and loading provision have been assessed through a comparison of the availability of spaces or lengths of bay in the Do Minimum and Do Something scenarios. The assessment considers the impact of any changes on the general availability of parking and loading in the vicinity of the Proposed Scheme. It classifies parking into the following categories:

- Designated Paid Parking;
- Permit Parking;
- Disabled Permit Parking;
- Loading / Unloading (in designated Loading Bays);
- Loading / Unloading (outside designated Loading Bays);
- Taxi Parking (Taxi Ranks);
- Commercial vehicles parked for display (car sales); and
- Informal Parking (i.e. parking alongside the kerb which is unrestricted).

This qualitative assessment has also taken into account nearby parking, which is defined as alternative parking locations along side roads within 200m to 250m of the Proposed Scheme.

Significance ratings for the impacts of any changes in parking provision have been generated for each specific instance of change and for each section of the Proposed Scheme. The ratings are based upon professional judgement and experience and consider:

- The magnitude of change in parking availability;
- The availability of alternative parking; and
- Nearby land uses, such as businesses.

Note that the parking and loading assessment has been undertaken as a qualitative analysis based on the above criteria and does not generate a resulting LoS rating.

6.4.6.1.2 Section 1 – R817 Kimmage Road Lower from Kimmage Cross Roads to the Junction with Harold's Cross Road

6.4.6.1.2.1 Pedestrian Infrastructure

The key infrastructural changes to the pedestrian link along Section 1 of the Proposed Scheme are the following:

- Footpaths to include a minimum running width of 2m for the majority of the section;
- The following junctions to be upgraded to include direct signalised pedestrian crossings on each arm of the junction:
  - R817 Kimmage Road Lower / R818 Terenure Road West / R817 Fortfield Road / R818 Kimmage Road West; and
  - R817 Kimmage Road Lower / Ravensdale Park.
- Toucan crossings to be provided across R817 Kimmage Road Lower, to the north of Hazelbrook Road and to the south of Mount Argus View;
- Raised tables to be provided or retained across side streets to act as a traffic calming measures and to assist with regards to pedestrian movement;
- All new or upgraded signalised pedestrian crossings to include adequate tactile paving, dropped kerbs, road markings and crossings widths in line with the recent guidance;
- Various junction layouts to be upgraded to reduce the speed of passing vehicles and provide a safer environment for pedestrians; and
- Removal of the directly adjacent footway to the south of Harold's Cross Park.

The assessment of the qualitative impacts on the pedestrian infrastructure for Section 1 of the Proposed Scheme are summarised in Table 6-18, along with the accompanying sensitivity for each junction and the resultant significance of effect. A detailed breakdown of the assessment at each junction can be found in Appendix A6.4 – Appendix A6.4.1 (Pedestrian Infrastructure Assessment) in Volume 4 of this EIAR.

Table 6-18: Section 1 - Significance of Effects for Pedestrian Impact during Operational Phase

Junctions	Chainage	Do Minimum LoS	Do Something LoS	Impact	Sensitivity	Significance of Effect
R817 Kimmage Road Lower / R818 Terenure Road West / R817 Fortfield Road / R818 Kimmage Road West	A0 – A100	F	A	High	High	Positive, Profound
R817 Kimmage Road Lower / Hazelbrook Road	A150 – A200	D	B	Medium	Low	Positive, Moderate
R817 Kimmage Road Lower / Ravensdale Park	A300 – A350	E	A	High	Low	Positive, Moderate
Ravensdale Park / Poddle Park (Adjacent)	G60000	E	B	Medium	Medium	Positive, Significant
R817 Kimmage Road Lower / Kimmage Court	A500 – A550	D	B	Medium	High	Positive, Moderate
R817 Kimmage Road Lower / Sundrive Road / Larkfield Avenue	A1050 – A1100	C	A	Medium	High	Positive, Very Significant
Sundrive Road / Blarney Park (Adjacent)	G60875 – G60925	E	A	High	Low	Positive, Moderate
R817 Kimmage Road Lower / Mount Argus View	A1250 – A1300	E	C	Medium	Medium	Positive, Significant
R817 Kimmage Road Lower / Mount Argus Catholic Church	A1425 – A1475	D	B	Medium	Medium	Positive, Significant
R817 Harold's Cross Road / Mount Argus Road	A1975 – A2025	E	C	Medium	High	Positive, Very Significant
R137 Harold's Cross Road / Parkview Avenue / Harold's Cross Road	B10000 – B10050	C	B	Low	Medium	Positive, Moderate
R137 Harold's Cross Road / Harold's Cross Educate Together Secondary School	B10125 – B10175	C	B	Low	Medium	Positive, Moderate
R137 Harold's Cross Road / Leinster Park	B10250 – B10300	C	B	Low	Low	Positive, Slight
R817 Harold's Cross Road / R137 Harold's Cross Road	A2250 – A2300	C	B	Low	Low	Positive, Slight
R137 Harold's Cross Road / Kenilworth Square North / Rathgar Avenue / Kenilworth	J90025 – J90075	B	A	Low	High	Positive, Moderate
Section Summary		**D**	**B**	**Medium**	**Medium**	**Positive, Significant**

The contents of Table 6-18 demonstrate that the Proposed Scheme will have a Positive and Long-Term impact on the quality of the pedestrian infrastructure along Section 1 between R818 Terenure Road West and Harold's Cross Park during the Operational Phase.

The LoS during the Do Minimum scenario ranges from B to F, with 14 of the 15 impacted junctions rated at C or lower. These ratings have been determined using the previously referenced assessment criteria set out in Table 6-12. During the Do Something scenario, the LoS will improve to ratings ranging from A to C, with 13 of the 15 impacted junctions equal to B or higher. This is because of the proposed amendments to the existing pedestrian facilities in the form of additional crossing locations, increased pedestrian directness, provision of traffic calming measures to reduce vehicle speeds, improved accessibility and increased footpath and crossing widths. All proposed facilities have been designed in accordance with the principles of DMURS (Government of Ireland 2019) and the National Disability Authority (NDA) Building for Everyone: A Universal Design Approach (NDA 2020) with regards to catering for all users, including those with disabilities.

At Harold's Cross Park, it is proposed that the footpath on its northern side is removed between its junction with Parkview Avenue and a point approximately 16m east of its junction with Kimmage Road Lower. This is to facilitate road widening for two-way traffic on the access route between the proposed Bus Gates to Mount Jerome Cemetery and Mount Argus Road. Doing so maintains parking for residential properties on the southern side of the road for which there is no alternative. The loss of the footpath is not expected to impact upon pedestrians due to the available alternative route through Harold's Cross Park itself which many already use as a more attractive option than walking alongside the vehicular carriageway.

Overall, it is anticipated that there will be **Positive, Significant and Long-Term** effect to the quality of the pedestrian infrastructure along Section 1 of the Proposed Scheme during the Operational Phase, which aligns with the overarching aim to provide enhanced walking infrastructure on the corridor. This is despite the loss of a short section of footway along the southern side of Harold's Cross Park due to the already well used alternatives. A detailed breakdown of the assessment at each impacted junction, including a list of the junctions which experience no change, can be found in Appendix A6.4 – Appendix A6.4.1 (Pedestrian Infrastructure Assessment) in Volume 4 of this EIAR.

6.4.6.1.2.2 Cycling Infrastructure

The following Section sets out the qualitative impacts on the cycling receptor for Section 1 of the Proposed Scheme. The key cycling infrastructural changes along Section 1 of the Proposed Scheme are the following:

- The provision of cycle tracks or cycle lanes in both directions for the majority of the section with a minimum width of 1.5m;
- Changing the combined bus and cycle lanes to bus only lanes;
- Quiet cycle route in which cyclists have equal priority with vehicles to be provided along Poodle Park, Bangor Road, Blarney Park, Mount Argus Square, Mount Argus Way, Mount Argus Avenue and Mount Argus View, and to be known as the Poddle Cycleway;
- Additional cycle tracks to be provided along Ravensdale Park and Sundrive Road that tie in with the proposed Poddle Cycleway;
- The southern end of Poddle Park to be closed to motor vehicles, with specific cycle access to be provided signifying the start of a quiet cycle route;
- Upgrading existing signalised junctions to provide either cycle lanes that continue through the junction or a protected junction layout for cyclists; and
- The inclusion of new toucan crossings across R817 Kimmage Road Lower.

Along Section 1, the Proposed Scheme will provide a 60mm set down kerb segregation between the footpath and the cycle track. This is of particular importance in the context of providing for pedestrians with visual impairments, whereby the use of white line segregation is not as effective for establishing a clear understanding of the change of pavement use and potential for cyclist / pedestrian interactions. The cycle tracks will also be protected by a 120mm kerb on the carriageway side to provide segregation from vehicles.

The contents of Table 6-19 outline the cycling qualitative assessment along Section 1 of the Proposed Scheme, in which it sets out the overall Do Minimum LoS, the overall Do Something LoS and the description of impact. Please refer to Appendix A6.4 – Appendix A6.4.2 (Cycling Infrastructure Assessment) which outlines in further detail the methodology behind each LoS rating given to the Do Minimum and Do Something scenarios.

Table 6-19: Section 1 Cycling Impact During Operational Phase

Locations	Chainage	Do Minimum LoS	Do Something LoS	Impact	Sensitivity	Significance of Effect
Main Corridor (R817 & R137 Regional Roads)						
R817 Kimmage Road Lower: R818 Terenure Road West to Ravensdale Park	A0 – A300	B	A	Low	Medium	Positive, Moderate
R817 Kimmage Road Lower: Ravensdale Park to Sundrive Road	A300 – A1100	B	C	Low	Medium	Negative, Moderate
R817 Kimmage Road Lower: Sundrive Road to Mount Argus View	A1100 – A1300	B	B	Negligible	Medium	Not Significant
R817 Kimmage Road Lower: Mount Argus View to Harold's Cross Road	A1300 – A1950	B	B	Negligible	Medium	Not Significant
R817 Harold's Cross Road (adjacent to Harold's Cross Park)	A1950 – A2300	C	B	Low	Medium	Positive, Moderate
R137 Harold's Cross Road (adjacent to Harold's Cross Park)	B10000 – B10400	C	B	Low	Medium	Positive, Moderate
R137 Harold's Cross Road / Kenilworth Square North / Rathgar Avenue / Kenilworth Park	J90050	D	B	Medium	High	Positive, Very Significant
Poddle Cycleway						
Poddle Cycleway: Ravensdale Park to Sundrive Road	G60000 – G60900	D	B	Medium	Low	Positive, Moderate
Sundrive Road: Blarney Park to R817 Kimmage Road Lower	G60900 – G61100	D	C	Low	Low	Positive, Slight
Poddle Cycleway: Sundrive Road to R817 Kimmage Road Lower	G61050 – H70340	D	B	Medium	Low	Positive, Moderate
Section Summary		**C**	**B**	**Low**	**Medium**	**Positive, Moderate**

The contents of Table 6-19 demonstrate that the Proposed Scheme will have a **Positive, Moderate and Long-Term** effect on the overall cycling environment between R118 Terenure Road West and the northern tip of Harold's Cross Park during the Operational Phase.

The LoS ratings of the cycling facilities during the Do Minimum scenario ranges from B to D, with the D ratings occurring along the proposed quiet cycle route and the R137 Harold's Cross Road / Kenilworth Square North / Rathgar Avenue / Kenilworth Manor five-arm junction. These ratings have been determined using the previously referenced assessment criteria set out in Table 6-15. During the Do Something scenario, the LoS ratings range from A to C, with several locations receiving a positive impact, some receiving a negligible impact, and the R817 Kimmage Road Lower between Ravensdale Park and Sundrive Road receiving a negative impact in which the LoS ratings changes from B to C. This negative impact is expected to be offset by a reduction in vehicular traffic along the route created by the proposed bus gates. Such a reduction will create an over environment more conducive to cycling without the need for physical measures. Furthermore, the length of the route which sees this negative impact runs parallel to the Poddle Cycleway which offers cyclists a more cycle friendly alternative should they not feels comfortable cycling along the main corridor.

The findings of the cycling assessment fully aligns with the objective of the CBC Infrastructure Works, applicable to the traffic and transport assessment of the Proposed Scheme, to '*Enhance the potential for cycling by providing safe infrastructure for cycling, segregated from general traffic wherever practicable*'. A detailed breakdown of the

assessment along each section can be found in Appendix A6.4 – Appendix A6.4.2 (Cycling Infrastructure Assessment) in Volume 4 of this EIAR.

6.4.6.1.2.3 Bus Infrastructure

This assessment outlines the changes to bus stop infrastructure along Section 1 of the Proposed Scheme. It assesses any changes in the number or location of stops, and any changes to bus stop facilities.

There are currently 16 bus stops along this section of the Proposed Route – seven 'inbound' stops towards the city centre, seven 'outbound' stops and two orbital stops.

Under the proposals, there will be a total of 15 stops – six inbound, seven outbound and two orbital stops. It is proposed to remove / rationalise two inbound stops (Stop 2438 and 2439) and provide one new inbound stop between these stops. In addition to rationalising the inbound bus stops, it is proposed to relocate six of the existing bus stops

The contents of Table 6-20 outline a summary of the improvements to the bus stop infrastructure along Section 1 of the Proposed Scheme, with reference to the number and percentage of bus stops that provide each facility in the Do Minimum and Do Something scenarios.

Table 6-20: Overview of Changes in Bus Stop Facilities

Bus Stop Facility	Do Minimum		Do Something		Comment
	Number of stops	Percentage of stops	Number of stops	Percentage of stops	
RTPI (Real Time Passenger Information)	3	19%	15	100%	It is proposed that all bus stops provide real-time information.
Timetable information	12	75%	15	100%	It is proposed that all bus stops provide timetable information.
Shelter	8	50%	15	100%	It is proposed for all bus stops to provide shelter.
Seating	8	50%	15	100%	It is proposed for all bus stops to provide seating.
Accessible Kerbs	14	88%	15	100%	It is proposed that all bus stops provide accessible kerbs.
Indented Drop Off Area	0	0%	0	0%	The majority of the proposed bus stops are within bus lanes or within areas bounded by bus gates and hence do not impact the flow of general traffic.
Total number of stops	16		15		Reduction of one bus stop along Section 1.

The contents of Table 6-20 indicates that there are improvements to the bus stop facilities along Section 1 of the Proposed Scheme. It is proposed that all bus stops provide real time / timetable information, and accessible kerbs. It is also proposed for all bus stops along the section to provide shelter and seating. There are also no indented bus bays proposed along Section 1, which alleviates the risk of re-entry delays to the operation of buses.

Taking into account the provision of bus lanes, pedestrian accessibility and bus stop facilities outlined within this section, Table 6-21 outlines the bus qualitative impact assessment along Section 1 of the Proposed Scheme.

Table 6-21: Section 1 Bus Qualitative Impact during Operational Phase

Section	Chainage	Description of Impact	Magnitude and type of Impact	Sensitivity	Significance of Impact
R818 Terenure Road West to Sundrive Road	A0–A2300	• Rationalisation of bus stops to enhance spacing (removal of one bus stop has little impact to accessibility). • Significant improvements in the quality of bus stop facilities in this section. • Bus priority (either bus lanes / bus gates or bus signal priority) provided along the entirety of the corridor.	Medium	High	Positive, Very Significant

The rationalisation of bus stops, along with the improvements in the provision of real-time information, shelters, seating and accessible kerbs throughout Section 1 is assessed as providing a potential **medium positive** impact for bus passengers. This aligns with the overarching aim to provide enhanced bus infrastructure on the corridor and will result in a **Positive, Very Significant and Long-Term** effect on Section 1 of the Proposed Scheme.

6.4.6.1.2.4 Parking and Loading

The Proposed Scheme will impact on some existing parking and loading locations along Section 1. The areas of parking changes are as follows:

- There are currently seven informal parking spaces on Ravensdale Park located adjacent to Poddle Park. It is proposed to formalise the existing parking providing four spaces and therefore removing three of the seven spaces. Given the retention of four spaces at this location and the additional informal parking available on surrounding residential streets, impact of this loss is assessed as having a **Negative, Slight and Long-Term** effect;
- There are currently 22 informal, part-time parking spaces southwest of the R817 Kimmage Road Lower / Sundrive Road Junction, adjacent to the R817 Kimmage Road Lower southbound carriageway. It is proposed to remove a total of six spaces, and to allow full-time use of the remaining 16 spaces. 52 off-street permit parking spaces will be available on the opposite side of the street and most residential properties have off-street parking at the rear. The impact of removing six part-time spaces, balanced against the enhancement to full-time for the remaining 16 spaces, is assessed as having a **Negligible** effect;
- There are currently 52 off-street, permit parking spaces located within a private car park on the southwest arm of the R817 Kimmage Road Lower / Sundrive Road / Larkfield Avenue junction. It is proposed to formalise parking arrangements at this location however there will be no change to the overall number of parking spaces at this location. The impact of this formalisation is assessed as having a **Negligible** effect;
- There are currently two taxi rank parking spaces on the southwest arm (Sundrive Road) of the R817 Kimmage Road Lower / Sundrive Road / Larkfield Avenue junction. It is proposed to remove the two taxi spaces and provide cycle lanes along this section of Sundrive Road. Three taxi bays are proposed in a car park located 20m northwest of the existing location to mitigate this loss. The impact of removing two taxi spaces, balanced against the provision of three taxi spaces to the northwest is assessed as having a **Negligible** effect;
- There are currently 17 informal spaces on the southwest arm (Sundrive Road) of the R817 Kimmage Road Lower / Sundrive Road / Larkfield Avenue junction. It is proposed to remove 14 informal parking spaces and provide cycle lanes along this section of Sundrive Road. The impact of removing 14 informal spaces alongside the reduction in available Pay & Display parking spaces to the south (detailed below) is assessed as having a **Negative, Slight and Long-Term** effect;
- There are currently 24 Pay & Display parking spaces on the southwest arm (Sundrive Road) of the R817 Kimmage Road Lower / Sundrive Road / Larkfield Avenue junction. It is proposed to reduce the number of parking spaces from 24 to 12 Pay & Display spaces plus three taxi spaces. The impact of removing 12 Pay & Display parking spaces alongside the removal of informal parking spaces to the north (detailed above) is assessed as having a **Negative, Slight and Long-Term** effect; and

- There are currently four informal parking spaces on the northeast arm (R817 Kimmage Road Lower) of the R817 Kimmage Road Lower / Sundrive Road / Larkfield Avenue junction. It is proposed to formalize the parking at this location by removing one space and providing three designated parking bays. There is surrounding parking available immediately to the south-west (16 informal spaces and 42 permit spaces) and 100m to the north-west (12 off-street Pay and display). The impact of removing one informal parking space at this location is assessed as having a **Negligible** effect.
- There are currently two permit parking spaces located south of the R137 Harold's Cross Park Junction adjacent to the southbound carriageway. It is proposed to remove both spaces to provide continuous cycle facilities. The ten permit spaces to the south will be retained. The impact of removing three spaces, balanced against the available surrounding parking, is assessed as having a **Negative, Slight and Long-Term** effect;

The contents of Table 6-22 presents a summary of the parking and loading spaces during the Do Minimum and Do Something scenarios and the resulting change in parking along Section 1.

Table 6-22: Section 1 – Overall Changes in Parking / Loading Spaces

Street	Parking Type	Number of Parking Spaces		
		Do Minimum	Do Something	Change
Ravensdale Park	Informal	7	4	-3
R817 Kimmage Road Lower	Informal	312	306	-6
	Permit	52	52	0
	Pay & Display	13	13	0
Sundrive Road	Taxi	2	0	-2
	Informal	17	3	-14
	Pay & Display	24	12	-12
Harold's Cross Road along the east side of the Park	Pay and Display	12	10	-2
Mount Argus Apartments	Permit	6	6	0
Side street	Adjacent	315	315	0
Total		**760**	**721**	**-39**

As shown in Table 6-22, the proposed amendments to parking / loading will result in a loss of 39 spaces along Section 1. Where parking is removed, the impact varies between negligible and slight. The overall significance of effect is assessed as **Negative, Slight and Long-Term,** primarily as a result of the loss of informal and Pay & Display parking at the R817 Kimmage Road Lower / Sundrive Road / Larkfield Avenue junction. This slight effect is considered acceptable in the context of the planned outcome of the Proposed Scheme, which is to improve accessibility to this local area (on foot, by bicycle and bus) for residents and visitors to local shops and businesses.

6.4.6.1.3 Section 2 – R137 Harold's Cross Road from Harold's Cross Park to Grand Canal

6.4.6.1.3.1 Pedestrian Infrastructure

The key infrastructural changes to the pedestrian link along Section 2 of the Proposed Scheme are the following:

- Footpaths to include a minimum running width of 2m;
- New direct signalised pedestrian crossing across R137 Harold's Cross Road to the north of the access to St. Clare's Convent National School;
- Raised tables to be provided across side streets to act as a traffic calming measures and to assist with regards to pedestrian movement;
- All new or upgraded signalised pedestrian crossings to include adequate tactile paving, dropped kerbs, road markings and crossings widths in line with the recent guidance; and
- Various junction layouts to be upgraded to reduce the speed of passing vehicles and provide a safer environment for pedestrians.

The assessment of the qualitative impacts on the pedestrian infrastructure for Section 2 of the Proposed Scheme are summarised in Table 6-23, along with the accompanying sensitivity for each junction and the resultant significance of effect. A detailed breakdown of the assessment at each junction can be found in Appendix A6.4 – Appendix A6.4.1 (Pedestrian Infrastructure Assessment) in Volume 4 of this EIAR.

Table 6-23: Section 2 - Significance of Effects for Pedestrian Impact during Operational Phase

Junctions	Chainage	Do Minimum LoS	Do Something LoS	Impact	Sensitivity	Significance of Effect
R137 Harold's Cross Road / Our Lady's Hospice & Care Services	A2325 – A2375	D	B	Medium	Medium	Positive, Significant
R137 Harold's Cross Road / St Clare's Convent National School	A2350 – A2400	C	B	Low	Medium	Positive, Moderate
R137 Harold's Cross Road / Greenmount Avenue	A2425 – A2475	C	B	Low	High	Positive, Moderate
R137 Harold's Cross Road / Mount Drummond Avenue	A2475 – A5255	F	B	High	Medium	Positive, Very Significant
R137 Harold's Cross Road / Le Vere Terrace	A2550 – A2600	C	B	Low	Medium	Positive, Moderate
R137 Harold's Cross Road / Armstrong Street	A2575 – A2625	C	B	Low	High	Positive, Moderate
Section Summary		**D**	**B**	**Medium**	**Medium**	**Positive, Significant**

The contents of Table 6-23 demonstrate that the Proposed Scheme will have a Positive and Long-Term impact on the quality of the pedestrian infrastructure along Section 2 between Harold's Cross Park and Grand Canal during the Operational Phase.

The LoS during the Do Minimum scenario ranges from C to F, with four of the six impacted junctions rated at C. All impacted junctions will improve to a LoS B rating during the Do Something scenario. This is because of the proposed amendments to the existing pedestrian facilities in the form of additional crossing locations, increased pedestrian directness, provision of traffic calming measures to reduce vehicle speeds, improved accessibility and increased footpath and crossing widths. All proposed facilities have been designed in accordance with the principles of DMURS (Government of Ireland 2019) and the National Disability Authority (NDA) 'Building for Everyone: A Universal Design Approach' (NDA 2020) with regards to catering for all users, including those with disabilities.

Overall, it is anticipated that there will be **Positive, Significant and Long-Term** effect to the quality of the pedestrian infrastructure along Section 2 of the Proposed Scheme during the operational phase, which aligns with the overarching aim to provide enhanced walking infrastructure on the corridor. A detailed breakdown of the assessment at each impacted junction, including a list of the junctions which experience no change, can be found in Appendix A6.4 - Appendix A6.4.1 (Pedestrian Infrastructure Assessment) in Volume 4 of this EIAR.

6.4.6.1.3.2 Cycling Infrastructure

The following Section sets out the qualitative impacts on the cycling receptor for Section 2 of the Proposed Scheme. The key cycling infrastructural changes along Section 2 of the Proposed Scheme are the following:

- The provision of cycle tracks in both directions with a minimum width of 1.5m;
- Removal of existing cycle lanes and changing the combined bus lanes to bus only lanes;
- Upgrading existing signalised junctions to protected junctions for cyclists; and
- Proposed provision of continuous cycle bypasses at all bus stops.

Along Section 2, the Proposed Scheme will provide a 60mm set down kerb segregation between the footpath and the cycle track. This is of particular importance in the context of providing for pedestrians with visual impairments,

whereby the use of white line segregation is not as effective for establishing a clear understanding of the change of pavement use and potential for cyclist / pedestrian interactions. The cycle tracks will also be protected by a 120mm kerb on the carriageway side to provide segregation from vehicles.

The contents of Table 6-24 outline the cycling qualitative assessment along Section 2 of the Proposed Scheme, in which it sets out the overall Do Minimum LoS, the overall Do Something LoS and the description of impact. Please refer to Appendix A6.4 – Appendix A6.4.2 (Cycling Infrastructure Assessment) which outlines in further detail the methodology behind each LoS rating given to the Do Minimum and Do Something scenarios.

Table 6-24: Section 2 Cycling Impact during Operational Phase

Locations	Chainage	Do Minimum LoS	Do Something LoS	Impact	Sensitivity	Significance of Effect
R137 Harold's Cross Road: Harold's Cross Park to Grand Canal	A2300 – A2700	C	B	Low	High	Positive, Moderate
Section Summary		**C**	**B**	**Low**	**High**	**Positive, Moderate**

The content of Table 6-24 demonstrates that the Proposed Scheme will have a **Positive, Moderate and Long-Term** effect on the cycling environment between the northern tip of Harold's Cross Park and Grand Canal during the operational phase.

The LoS rating of the cycling facilities during the Do Minimum and Do Something scenarios are equal to C and B respectively. These ratings have been determined using the previously referenced assessment criteria set out in Table 6-15. The improvement in LoS rating is as a result of improved segregation for cyclists and junction treatment in the form of cycle lanes traversing priority junctions and continuing through signalised junctions with protected treatment as part of the Proposed Scheme.

The findings of the cycling assessment fully aligns with the objective of the CBC Infrastructure Works, applicable to the traffic and transport assessment of the Proposed Scheme, to '*Enhance the potential for cycling by providing safe infrastructure for cycling, segregated from general traffic wherever practicable*'. A detailed breakdown of the assessment along each section can be found in Appendix A6.4 – Appendix A6.4.2 (Cycling Infrastructure Assessment).

6.4.6.1.3.3 Bus Infrastructure

This assessment outlines the changes to bus stop infrastructure along Section 2 of the Proposed Scheme. It assesses any changes in the number or location of stops, and any changes to bus stop facilities.

There are currently three bus stops along this section of the Proposed Route (two 'inbound' stops towards the city centre and one 'outbound' stop).

It is proposed to reduce the number of bus stops along Section 2 from three to two, through the rationalisation of two bus stops (1344 and 1345) on the inbound carriageway. These are proposed to be replaced by a single stop between them.

The contents of Table 6-25 outline a summary of the improvements to the bus stop infrastructure along Section 2 of the Proposed Scheme, with reference to the number and percentage of bus stops that provide each facility in the Do Minimum and Do Something scenarios.

Table 6-25: Overview of Changes in Bus Stop Facilities Along the Proposed Route

Bus Stop Facility	Do Minimum		Do Something		Comment
	Number of stops	Percentage of stops	Number of stops	Percentage of stops	
Realtime information	3	100%	2	100%	No changes to timetable information. It is proposed that all bus stops provide real-time information.
Timetable information	3	100%	2	100%	No changes to timetable information. It is proposed that all bus stops provide timetable information.
Shelter	3	100%	2	100%	No changes to shelter. It is proposed for all bus stops to provide shelters.
Seating	3	100%	2	100%	No changes to seating. It is proposed for all bus stops to provide seating.
Accessible Kerbs	3	100%	2	100%	No changes to accessible kerbs. It is proposed that all bus stops provide accessible kerbs.
Indented Bus Bay	0	0%	0	0%	No changes to indented bus bays. The majority of proposed bus stops are within bus lanes or within areas bounded by bus gates and hence do not impact the flow of general traffic.
Total number of stops	3		2		Reduction of one bus stop along Section 2.

The content of Table 6-25 outlines that there few change to the bus stop facilities along Section 2 of the Proposed Scheme other than the rationalisation of bus stops. It is proposed that all bus stops provide real time / timetable information, shelter, seating, and accessible kerbs.

There are also no indented bus bays proposed along Section 2, which alleviates the risk of re-entry delays to the operation of buses. It should also be noted that the majority of bus stops are proposed within dedicated bus lanes and therefore will have a limited impact to the flow of general traffic.

Taking into account the provision of bus lanes, pedestrian accessibility and bus stop facilities outlined within this section, Table 6-26 outlines the bus qualitative assessment along Section 2 of the Proposed Scheme.

Table 6-26: Section 2 Bus Qualitative Impact during Operational Phase

Section	Chainage	Description of Impact	Magnitude of Impact	Sensitivity	Significance of Impact
Harold's Cross Park to Grand Canal	A2300–A2700	• Rationalisation of bus stops to enhance spacing (removal of one bus stop has little impact to accessibility).	Low Positive	High	Positive, Moderate

The changes to the bus facilities throughout Section 2 is assessed as providing a potential low positive impact for bus passengers. This aligns with the overarching aim to provide enhanced bus infrastructure on the corridor and will result in a **Positive**, **Moderate, and Long-Term** effect on Section 2 of the Proposed Scheme.

6.4.6.1.3.4 Parking and Loading

The Proposed Scheme will impact on some existing parking and loading locations along Section 2. The areas of parking changes are as follows:

- There are currently 10 permit parking spaces located north of the R137 Harold's Cross Road / Clare's Avenue Junction adjacent to the northbound carriageway. It is proposed to remove the 10 spaces at this location. To mitigate the impact of the removal of 10 spaces, a new off street car park comprising 22 permit / paid parking spaces is proposed approximately 40m north of this location. The impact of removing 10 spaces, balanced against the provision of 22 new spaces, is assessed as having a P**ositive, Moderate and Long-Term** effect;
- There are seven parking spaces located north of the R137 Harold's Cross Road / Clare's Avenue Junction adjacent to the southbound carriageway. Of these, six are permit parking and one is a designated disabled parking bay. It is proposed to remove two permit parking spaces. The remaining four permit spaces and one disabled space will be retained as formal parking bays. To offset the impact of the parking reduction new on-street permit / paid parking (four spaces) is proposed approximately 100m to the north of this location and off-street permit / paid parking (22 spaces) is proposed immediately adjacent to the northbound carriageway. The impact of removing four spaces, balanced against the provision of 22 new spaces, is assessed as having a **Negligible** effect;
- There are currently two permit parking spaces located south of the Grand Canal adjacent to the R137 Harold's Cross Road southbound carriageway. It is proposed to remove the spaces to provide continuous bus and cycle facilities along the carriageway. Due to the availability of alternative permit and Pay & Display parking on neighbouring roads (Armstrong Street and Harold's Cross Cottages) the impact is considered to have a **Negative, Slight and Long-Term** effect.

The contents of Table 6-27 presents a summary of the parking and loading spaces during the Do Minimum and Do Something scenarios and the resulting change in parking along Section 2.

Table 6-27: Section 2 – Overall Changes in Parking / Loading Spaces

Street	Parking Type	Number of Parking Spaces		
		Do Minimum	Do Something	Change
R137 Harold's Cross Road	Pay & Display / Permit	18	30	12
R137 Harold's Cross Road	Disabled	1	1	0
Side street	Adjacent	59	59	0
Total		**78**	**90**	**12**

As shown in Table 6-27, the proposed amendments to parking / loading will result in an overall increase of twelve parking spaces along Section 2. Where parking is removed, the impact varies between negligible and slight. The overall significance of effect is assessed as **Negative, Slight and Long-Term**. This slight effect is considered acceptable in the context of the planned outcome of the Proposed Scheme, which is to improve accessibility to this local area (on foot, by bicycle and bus) for residents and visitors to local shops and businesses.

6.4.6.1.4 Section 3 – R137 Clanbrassil Street Upper and Lower and R137 New Street South from the Grand Canal to the Patrick Street Junction

6.4.6.1.4.1 Pedestrian Infrastructure

The key infrastructural changes to the pedestrian link along Section 3 of the Proposed Scheme are the following:

- Footpaths to include a minimum running width of 2m;
- Existing signalised pedestrian crossings across R137 Clanbrassil Street Lower to be upgraded to direct Toucan crossings;
- A new direct pedestrian crossing to be provided across R137 New Street South to the south of the R110 Kevin Street Upper slip road;
- Raised tables to be provided or retained across side streets to act as a traffic calming measures and to assist with regards to pedestrian movement;

- All new or upgraded signalised pedestrian crossings to include adequate tactile paving, dropped kerbs, road markings and crossings widths in line with the recent guidance; and
- Various junction layouts to be upgraded to reduce the speed of passing vehicles and provide a safer environment for pedestrians.

The assessment of the qualitative impacts on the pedestrian infrastructure for Section 3 of the Proposed Scheme are summarised in Table 6-28, along with the accompanying sensitivity for each junction and the resultant significance of effect. A detailed breakdown of the assessment at each junction can be found in Appendix A6.4 – Appendix A6.4.1 (Pedestrian Infrastructure Assessment) in Volume 4 of this EIAR.

Table 6-28: Section 3 - Significance of Effects for Pedestrian Impact during Operational Phase

Junctions	Chainage	Do Minimum LoS	Do Something LoS	Impact	Sensitivity	Significance of Effect
R137 Clanbrassil Street Upper / Windsor Terrace	A2675 – A2725	C	B	Low	High	Positive, Moderate
R137 Clanbrassil Street Upper / Clanbrassil Close	A2800 – A2850	C	B	Low	Medium	Positive, Moderate
R137 Clanbrassil Street Upper / Wesley Place	A2850 – A2900	C	B	Low	Medium	Positive, Moderate
R137 Clanbrassil Street Lower / R811 South Circular Road / R137 Clanbrassil Street Upper	A2950 – A3000	C	A	Medium	High	Positive, Very Significant
R137 New Street South / Long Lane / R137 Clanbrassil Street Lower / Malpas Street	A3425 – A3475	C	B	Low	Negligible	Not Significant
R137 New Street South / Cathedral View Court	A3575 – A3625	C	B	Low	Low	Positive, Slight
R137 New Street South / R110 Kevin Street Upper	A3675 – A3725	C	B	Low	Low	Positive, Slight
R137 Patrick Street / R110 Kevin Street Upper / R137 New Street South / R110 The Coombe	A3725 – A3775	D	A	Medium	High	Positive, Very Significant
Section Summary		**C**	**B**	**Low**	**Medium**	**Positive, Moderate**

The contents of Table 6-28 demonstrate that the Proposed Scheme will have a Positive and Long-Term impact on the quality of the pedestrian infrastructure along Section 3 between Grand Canal and R110 Kevin Street Upper during the Operational Phase.

The LoS during the Do Minimum scenario ranges from C to D, with seven of the eight impacted junctions rated at C. The LoS will improve to an A or B rating at all impacted junctions in the Do Something scenario. This is because of the proposed amendments to the existing pedestrian facilities in the form of additional crossing locations, increased pedestrian directness, provision of traffic calming measures to reduce vehicle speeds, improved accessibility and increased footpath and crossing widths. All proposed facilities have been designed in accordance with the principles of DMURS (Government of Ireland 2019) and the National Disability Authority (NDA) 'Building for Everyone: A Universal Design Approach' (NDA 2020) with regards to catering for all users, including those with disabilities.

Overall, it is anticipated that there will be **Positive, Moderate and Long-Term** effect to the quality of the pedestrian infrastructure along Section 3 of the Proposed Scheme during the operational phase, which aligns with the overarching aim to provide enhanced walking infrastructure on the corridor. A detailed breakdown of the assessment at each impacted junction, including a list of the junctions which experience no change, can be found in Appendix A6.4 – Appendix A6.4.1 (Pedestrian Infrastructure Assessment) in Volume 4 of this EIAR.

6.4.6.1.4.2 Cycling Infrastructure

The following section sets out the qualitative impacts on the cycling receptor for Section 3 of the Proposed Scheme. The key cycling infrastructural changes along Section 3 of the Proposed Scheme are the following:

- The provision of cycle tracks in both directions with a minimum width of 1.5m;
- Removal of existing cycle lanes and changing the combined bus lanes to bus only lanes;
- Upgrading existing signalised junctions to protected junctions for cyclists;
- Inclusion of toucan crossings across R137 Clanbrassil Street Upper
- Routing of cycle tracks behind on street parking to ensure cyclist safety; and
- Proposed provision of continuous cycle bypasses at all bus stops.

Along Section 3, the Proposed Scheme will provide a 60mm set down kerb segregation between the footpath and the cycle track. This is of particular importance in the context of providing for pedestrians with visual impairments, whereby the use of white line segregation is not as effective for establishing a clear understanding of the change of pavement use and potential for cyclist / pedestrian interactions. The cycle tracks will also be protected by a 120mm kerb on the carriageway side to provide segregation from vehicles.

The contents of Table 6-29 outline the cycling qualitative assessment along Section 3 of the Proposed Scheme, in which it sets out the overall Do Minimum LoS, the overall Do Something LoS and the description of impact. Please refer to Appendix A6.4 - Appendix A6.4.2 (Cycling Infrastructure Assessment) which outlines in further detail the methodology behind each LoS rating given to the Do Minimum and Do Something scenarios.

Table 6-29: Section 3 Cycling Impact during Operational Phase

Locations	Chainage	Do Minimum LoS	Do Something LoS	Impact	Sensitivity	Significance of Effect
R137 Clanbrassil Street Upper: Grand Canal to R811 South Circular Road	A2700 – A3000	C	B	Low	High	Positive, Moderate
R137 Clanbrassil Street Lower: R811 South Circular Road to Lombard Street West	A3000 – A3200	C	A	Medium	High	Positive, Very Significant
R137 Clanbrassil Street Lower & R137 New Street South: Lombard Street West to R110 Kevin Street Upper	A3200 – A3800	C	A	Medium	Medium	Positive, Significant
Section Summary		**C**	**A**	**Medium**	**High**	**Positive, Very Significant**

The contents of Table 6-29 demonstrates that the Proposed Scheme will have a **Positive, Very Significant and Long-Term** effect on the cycling environment between Grand Canal and R110 Kevin Street Upper during the operational phase.

The Proposed Scheme will see a substantial improvement to provision for cyclists across Robert Emmet Bridge. The current 1.5m advisory cycle lanes will be replaced with a 4m wide track on the western side with a separate lane providing significant right turning capacity into Windsor Terrace. Additionally, a segregated cycle track will be provided for southbound traffic on the eastern side.

The LoS ratings of the cycling facilities during the Do Minimum scenario for all three links of Section 3 are equal to C. During the Do Something scenario the LoS ratings increase to either an A or a B. The improvement in LoS rating is as a result of improved segregation for cyclists and junction treatment in the form of cycle lanes traversing priority junctions and continuing through signalised junctions with protected treatment as part of the Proposed Scheme.

The findings of the cycling assessment fully aligns with the objective of the CBC Infrastructure Works, applicable to the Traffic and Transport assessment of the Proposed Scheme, to '*Enhance the potential for cycling by*

providing safe infrastructure for cycling, segregated from general traffic wherever practicable'. A detailed breakdown of the assessment along each section can be found in Appendix A6.4 - Appendix A6.4.2 (Cycling Infrastructure Assessment) in Volume 4 of this EIAR.

6.4.6.1.4.3 Bus Infrastructure

This assessment outlines the changes to bus stop infrastructure along Section 3 of the Proposed Scheme. It assesses any changes in the number or location of stops, and any changes to bus stop facilities.

There are currently nine bus stops along this section of the Proposed Route (five 'inbound' stops towards the City Centre and four 'outbound' stops).

Under the proposals, there will be a total of eight stops (four 'inbound' stops towards the City Centre and four 'outbound' stops). It is proposed to rationalisation of two stops on the inbound carriageway (2635 and 2636) and outbound carriageway (2387 and 2388) and provide a new inbound and outbound stop between them. Additionally, a new outbound stop is proposed to the south of St. Vincent Street South.

The contents of Table 6-30 outline a summary of the improvements to the bus stop infrastructure along Section 3 of the Proposed Scheme, with reference to the number and percentage of bus stops that provide each facility in the Do Minimum and Do Something scenarios.

Table 6-30: Overview of Changes in Bus Stop Facilities along the Proposed Scheme Route

Bus Stop Facility	Do Minimum		Do Something		Comment
	Number of stops	Percentage of stops	Number of stops	Percentage of stops	
Realtime information	1	11%	8	100%	It is proposed that all bus stops provide real-time information.
Timetable information	6	67%	8	100%	It is proposed that all bus stops provide timetable information.
Shelter	3	33%	7	88%	It is proposed that a shelter be provided at all bus stops except Stop 1290 which has insufficient space.
Seating	1	11%	7	88%	It is proposed that seating be provided at all bus stops except Stop 1290 which has insufficient space..
Accessible Kerbs	9	100%	8	100%	It is proposed that all bus stops provide accessible kerbs.
Indented Bus Bay	6	67%	0	0%	It is proposed to remove 6 indented bus bays. The majority of proposed bus stops are within bus lanes or within areas bounded by bus gates and hence do not impact the flow of general traffic.
Total number of stops	9		8		Overall reduction of one bus stop along Section 3.

The content of Table 6-30 indicates that there are improvements to the bus stop facilities along Section 3 of the Proposed Scheme. It is proposed that all bus stops provide real time / timetable information, and accessible kerbs. It is also proposed for all bus stops along the section to provide shelter and seating except for Stop 1290 which has insufficient space. There are also no indented bus bays proposed along Section 3, which alleviates the risk of re-entry delays to the operation of buses.

Taking into account the provision of bus lanes, pedestrian accessibility and bus stop facilities outlined within this section, Table 6-31 outlines the bus qualitative assessment along Section 3 of the Proposed Scheme.

Table 6-31: Section 3 Bus Qualitative Impact during Operational Phase

Section	Chainage	Description of Impact	Magnitude of Impact	Sensitivity	Significance of impact
Grand Canal and the Patrick Street Junction	B2700–B3740	• Rationalisation of bus stops to enhance spacing (removal of one bus stop has little impact to accessibility). • Significant improvements in the quality of bus stop facilities in this section. • Bus priority (either bus lanes / bus gates or bus signal priority) provided along the entirety of the corridor.	Medium	High	Positive, Very Significant

The rationalisation of bus stops, along with the improvements in the provision of real-time information, shelters, seating and accessible kerbs throughout Section 3 is assessed as providing a potential **medium positive** impact for bus passengers. This aligns with the overarching aim to provide enhanced bus infrastructure on the corridor and will result in a **Positive, Very Significant and Long-Term effect** on Section 3 of the Proposed Scheme.

6.4.6.1.4.4 Parking and Loading

The Proposed Scheme will impact existing parking along Section 3. The main areas of parking changes are as follows:

- There are four Pay & Display / permit parking spaces located south of the R137 Clanbrassil St. Upper / Clanbrassil Close Junction adjacent to the R137 Clanbrassil St. Upper northbound carriageway. It is proposed to remove one space at this location. Given the marginal reduction and retention of surrounding permit parking the impact of this loss is deemed to have a **Negligible** effect;
- There are three Pay & Display / permit parking spaces located north of the R137 Clanbrassil St. Upper / Clanbrassil Close Junction adjacent to the R137 Clanbrassil St. Upper southbound carriageway. It is proposed to remove all spaces at this location to enable provision of bus and cycle facilities. Most residential properties have off-street parking and on-street permit parking is available within the vicinity (three spaces approximately 55m north and three spaces approximately 45m south). The impact of the loss of three spaces is deemed to have a **Slight, Negative and Long-Term** effect;
- There are four Pay & Display / permit parking spaces located north of the R137 Clanbrassil St. Upper / Wesley Place Junction adjacent to the R137 Clanbrassil St. Upper northbound carriageway. It is proposed to remove one space at this location. The loss of one space, balanced with the retention of three Pay & Display / permit parking spaces, is deemed to have a **Negligible** effect;
- There is a total of 21 Pay and Display / permit parking spaces on R137 Clanbrassil Street Lower between South Circular Road and Lombard Street West of which 11 are located adjacent to the northbound carriageway and 10 are located adjacent to the southbound carriageway. It is proposed to remove all 21 spaces between South Circular Road and Lombard Street West to provide continuous cycle facilities. Off-street residential parking is available to the rear of the properties, two additional parking spaces are proposed in Vincent Street car park (Bottle Bank) and five additional Pay and Display / permit spaces are proposed approximately 100m to the north. The impact of this loss, balanced with the provision of seven additional spaces in the vicinity, is deemed to have a **Slight, Negative and Long-Term** effect; and
- There is one loading bay on the R137 New Street South southbound carriageway south of the R137 New Street South / Kevin Street Upper Junction. It is proposed to relocate the bay approximately 15m south of the current location which is deemed to have a **Negligible** effect.

The contents of Table 6-32 presents a summary of the parking and loading spaces during the Do Minimum and Do Something scenarios and the resulting change in parking along Section 3.

Table 6-32: Section 3 – Overall Changes in Parking / Loading Spaces

Street	Parking Type	Number of Parking Spaces		
		Do Minimum	Do Something	Change
R137 Clanbrassil St. Upper	Pay & Display / Permit	11	6	-5
R137 Clanbrassil St. Lower	Pay & Display / Permit	31	12	-14
	Disabled	1	1	0
	Loading	11	11	0
R137 New Street South	Loading	1	1	0
Side street	Adjacent	139	139	0
Total		**199**	**180**	**-19**

As shown in Table 6-32 proposed amendments to parking / loading will result in a loss of 19 spaces along Section 3. Where parking is removed, the impact varies between negligible and slight. The overall significance of effect is assessed as **Negative, Slight and Long-Term,** primarily as a result of the loss of Pay & Display / permit parking on R137 Clanbrassil Street Lower between South Circular Road and Lombard Street West. This slight effect is considered acceptable in the context of the planned outcome of the Proposed Scheme, which is to improve accessibility to this local area (on foot, by bicycle and bus) for residents and visitors to local shops and businesses.

6.4.6.2 Quantitative Assessment

This quantitative assessment has been prepared with reference to the modelling outputs obtained from the four-tiered modelling approach outlined in Section 6.2. The following assessment topics have been considered:

- People Movement:
  - Peak Hour People Movement along the Proposed Scheme;
  - People Movement by Bus; and
  - Bus Boarding.
- Bus Network Performance Indicators:
  - Bus Journey Times; and
  - Bus Journey Time Reliability.
- General Traffic Network Performance Indicators:
  - Junction Capacity Outputs on the Direct Study Area; and
  - Redistributed flows and Junction Capacity Outputs on the Indirect Study Area.

6.4.6.2.1 People Movement

6.4.6.2.1.1 Overview

In order to understand the benefit of the Proposed Scheme with regards to the Movement of People following the implementation of the proposed infrastructure measures, a quantitative People Movement assessment has been undertaken using outputs from the NTA ERM and LAM and comparing the Do Minimum and Do Something peak hour scenarios for each forecast year (2028, 2043).

The assessment of People Movement includes the following metrics:

- The average number of people moved by each transport mode (i.e., Car, Bus, Walking and Cycling) along the corridor in the inbound and outbound direction. This metric is compared for the Do Minimum and Do Something scenarios in the AM and PM peak hours for each forecast year (2028, 2043). This metric provides an estimate of the modal share changes on the direct CBC as a result of the Proposed Scheme measures; and
- People Movement by Bus:
  - AM and PM peak hour Bus Passenger Loadings along the Proposed Scheme for each forecast year (2028, 2043); and

- Total Passengers Boarding Buses on bus routes that use any part of the Proposed Scheme for each forecast year (2028, 2043).

6.4.6.2.1.2 Peak Hour People Movement along the Proposed Scheme

To determine the impact that the Proposed Scheme has on modal share changes on the direct study area as a result of its implementation, the weighted average number of people moved by each mode (Car, Bus, Active Modes) has been extracted from the ERM / LAM. The analysis compares the Do Minimum and Do Something scenarios both in the inbound and outbound direction in the AM (08:00hrs to 09:00hrs) and PM (17:00hrs to 18:00hrs) peak hours for each forecast year (2028, 2043).

As outlined previously, the same demographic assumptions (population, employment levels) are included in both the Do Minimum and Do Something scenarios. The bus network and frequency assumptions are also the same in both scenarios and are in line with the BusConnects bus network proposals. It is acknowledged, therefore, that the assessment is conservative in terms of the level of people movement that is predicted in the Do Something scenario.

The Do Something scenario will facilitate opportunities to increase bus network capacity operating along the corridor due to the extensive priority provided. In addition to this, the significant segregation and safety improvements to walking and cycling infrastructure that is a key feature of the Proposed Scheme will further maximise the movement of people travelling sustainably along the corridor and will therefore cater for higher levels of future population and employment growth.

In the absence of the delivery of the Proposed Scheme, growth along this key corridor would continue to contribute to increased congestion and operational issues on the road network. The Proposed scheme delivers a reliable alternative to car-based travel that can support future sustainable growth and provide a positive contribution towards reducing carbon emissions.

6.4.6.2.1.3 2028 AM Peak Hour People Movement

Image 6.6 illustrates the People Movement by mode inbound towards the city centre during the AM Peak Hour in 2028.

Image 6.6: Weighted Average People Movement by Mode during 2028 AM Peak Hour

As indicated in Image 6.6, there is a reduction of 50% in the number of people travelling via car, an increase of 80% in the number of people travelling via bus and an increase of 8% in people walking or cycling along the Proposed Scheme during the AM Peak Hour. Table 6-33 outlines the difference in modal split between the Do Minimum and Do Something scenarios for each mode of travel in an inbound direction towards the City Centre during the AM Peak Hour. The results indicate 29% increase in people moved as a result of the Proposed Scheme and 56% increase in people moved by sustainable modes (Public Transport, Walk, Cycle).

Table 6-33: Modal Shift of 2028 AM Peak Hour along Proposed Scheme

Direction	Time Period	Mode of Transport	Do Minimum		Do Something		Difference	
			Hourly Trips	Modal Split (%)	Hourly Trips	Modal Split (%)	Hourly Trips	Difference (%)
Inbound towards the City Centre	AM Peak Hour	Public Transport	950	50%	1,710	69%	760	80%
		General Traffic	480	25%	240	10%	-240	-50%
		Walking	210	11%	150	6%	-60	-29%
		Cycling	270	14%	370	15%	100	37%
		Combined Walk / Cycle	480	25%	520	21%	40	8%
		Sustainable Modes Total	1,430	75%	2,230	90%	800	**56%**
		Total	1,910	100%	2,470	100%	560	**29%**

6.4.6.2.1.4 2028 PM Peak Hour People Movement

Image 6.7 illustrates the People Movement by mode travelling outbound from the city centre during the PM Peak Hour.

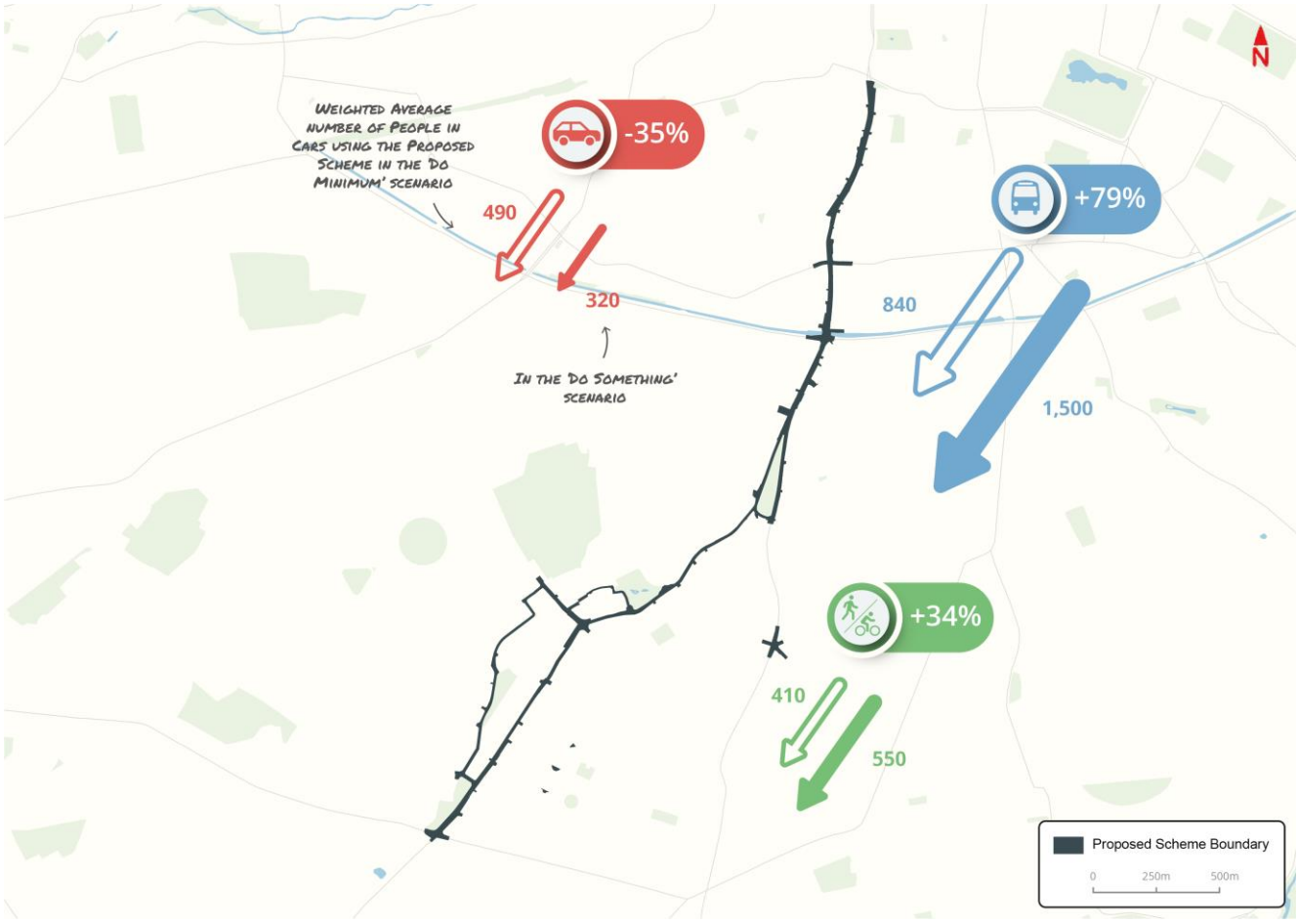


Image 6.7: Weighted Average People Movement by Mode during 2028 PM Peak Hour

As indicated in Image 6.7, there is a reduction of 35% in the number of people travelling via car, an increase of 79% in the number of people travelling via bus and an increase in 34% in the number of people walking or cycling along the Proposed Scheme during the PM Peak Hour.

Table 6-34 outlines the difference in modal split between the Do Minimum and Do Something scenarios for each mode of travel in an outbound direction from the City Centre during the PM Peak Hour. The results indicate 36% increase in people moved as a result of the Proposed Scheme and 64% increase in people moved by sustainable modes (Public Transport, Walk, Cycle).

Table 6-34: Modal Shift of 2028 PM Peak Hour along Proposed Scheme

Direction	Time Period	Mode of Transport	Do Minimum		Do Something		Difference	
			Hourly Trips	Modal Split (%)	Hourly Trips	Modal Split (%)	Hourly Trips	Difference (%)
Inbound towards the City Centre	PM Peak Hour	Public Transport	840	48%	1,500	63%	660	79%
		General Traffic	490	28%	320	14%	-170	-35%
		Walking	210	12%	170	7%	-40	-19%
		Cycling	200	11%	380	16%	180	90%
		Combined Walk / Cycle	410	24%	550	23%	140	34%

Direction	Time Period	Mode of Transport	Do Minimum		Do Something		Difference	
			Hourly Trips	Modal Split (%)	Hourly Trips	Modal Split (%)	Hourly Trips	Difference (%)
		Sustainable Modes Total	1,250	72%	2,050	86%	800	**64%**
		Total	1,740	100%	2,370	100%	630	**36%**

2043 AM Peak Hour People Movement

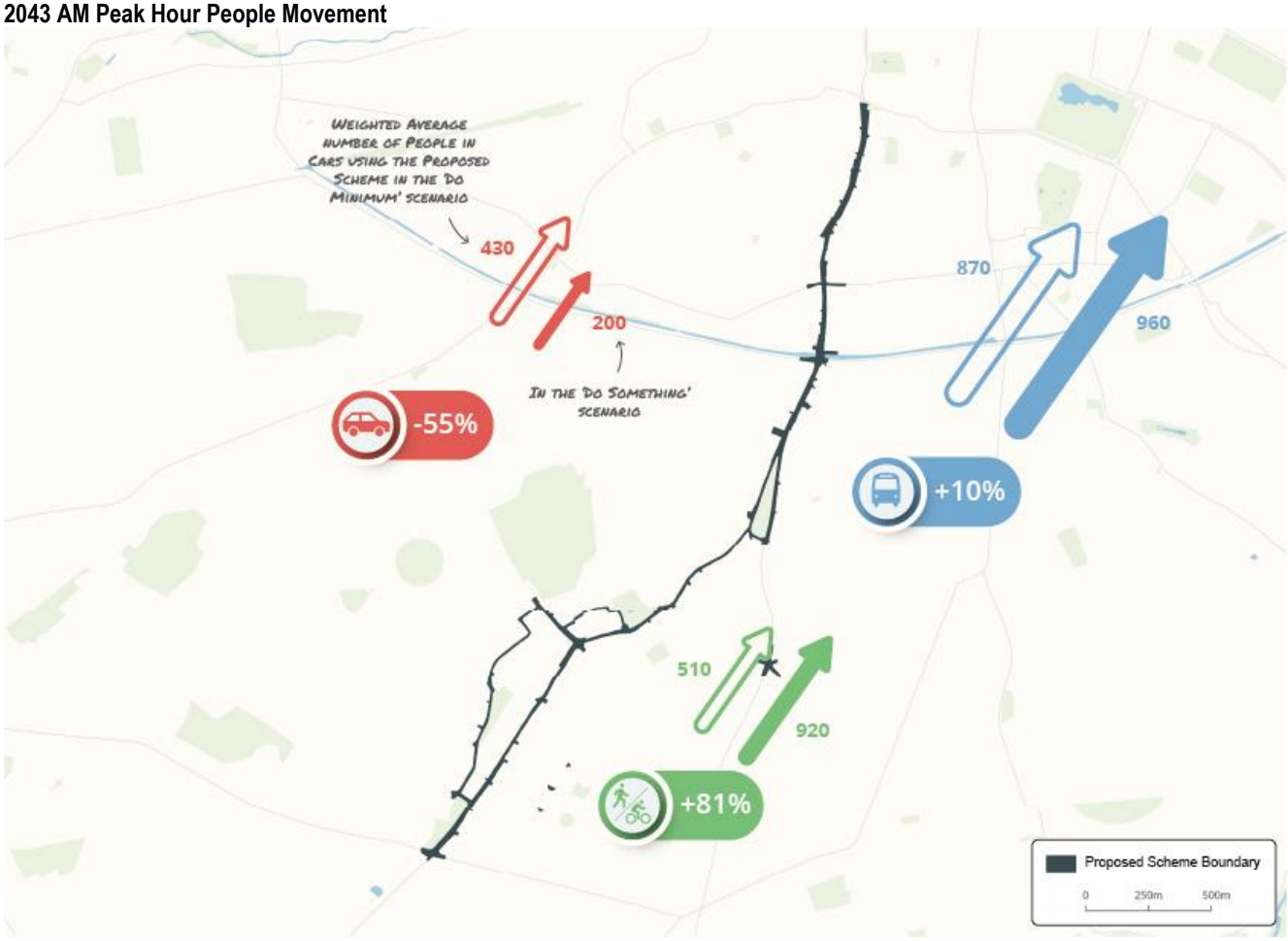


Image 6.8 illustrates the People Movement by mode inbound towards the City Centre during the AM Peak Hour in 2043.

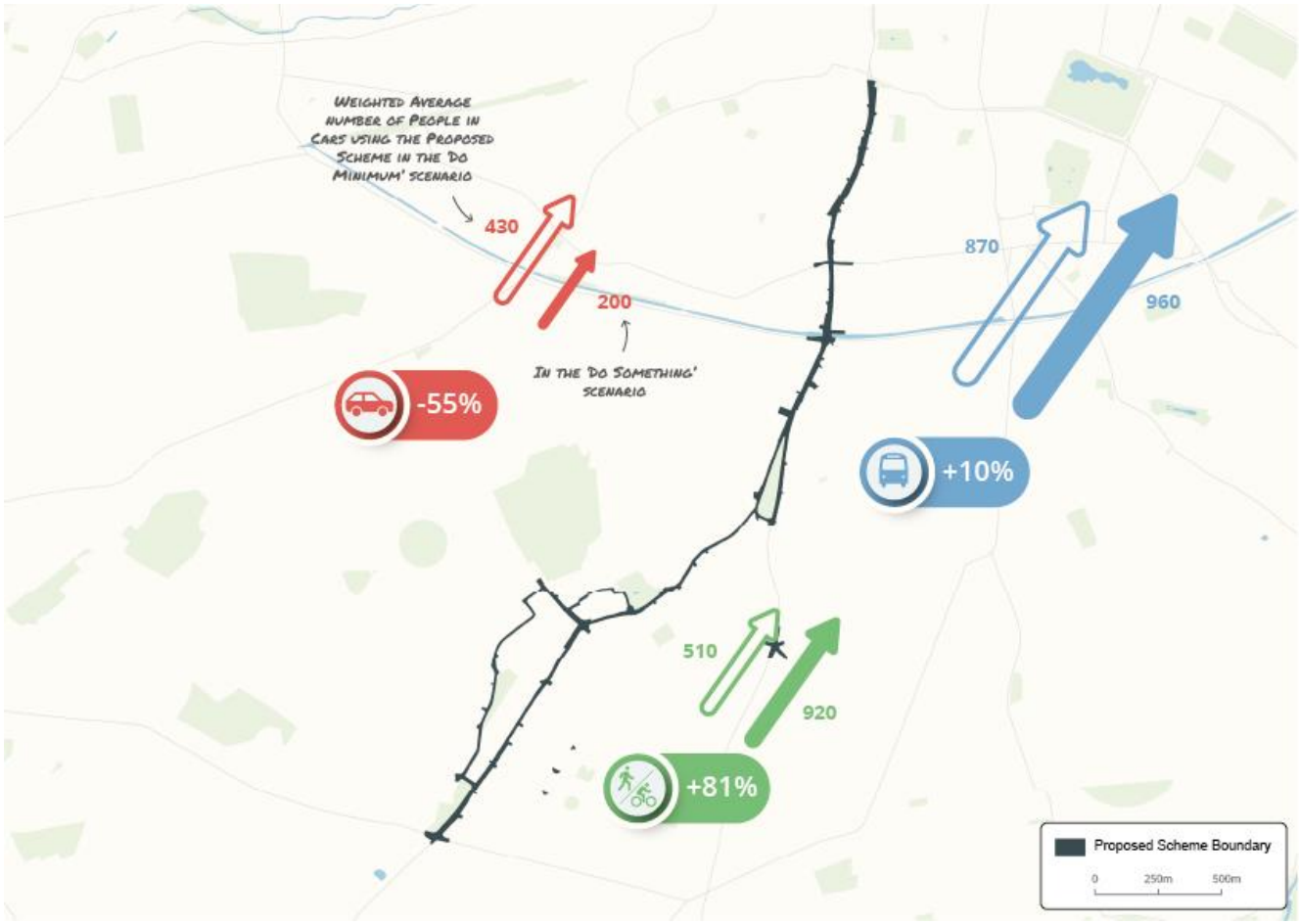


Image 6.8 Weighted Average People Movement by Mode during 2043 AM Peak Hour

Image 6.8, there is a decrease of 55% in the number of people travelling via car, an increase of 10% in the number of people travelling via bus and an increase of 81% in the number of people walking and cycling along the Proposed Scheme during the AM Peak Hour. Table 6-35 outlines the difference in modal split between the Do Minimum and Do Something scenarios for each mode of travel in an inbound direction towards the City Centre during the AM Peak Hour. The results indicate a 15% increase in people moved as a result of the Proposed Scheme and 36% increase in people moved by sustainable modes (Public Transport, Walk, Cycle).

Table 6-35 Modal Shift of 2043 AM Peak Hour along Proposed Scheme

Direction	Time Period	Mode of Transport	Do Minimum		Do Something		Difference	
			Hourly Trips	Modal Split (%)	Hourly Trips	Modal Split (%)	Hourly Trips	Difference (%)
Inbound towards the City Centre	AM Peak Hour	General Traffic	430	24%	195	9%	-234	-55%
		Public Transport	868	48%	956	46%	88	10%
		Walking	231	13%	271	13%	40	17%
		Cycling	277	15%	648	31%	371	134%
		Combined Walk / Cycle	509	28%	919	44%	411	81%
		Sustainable Modes Total	1,377	76%	1,875	91%	499	36%
		Total (All modes)	**1,807**	**100%**	**2,071**	**100%**	**264**	**15%**

6.4.6.2.1.5 2043 PM Peak Hour People Movement

Image 6.9 illustrates the People Movement by mode travelling outbound from the City Centre during the PM Peak Hour in 2043.

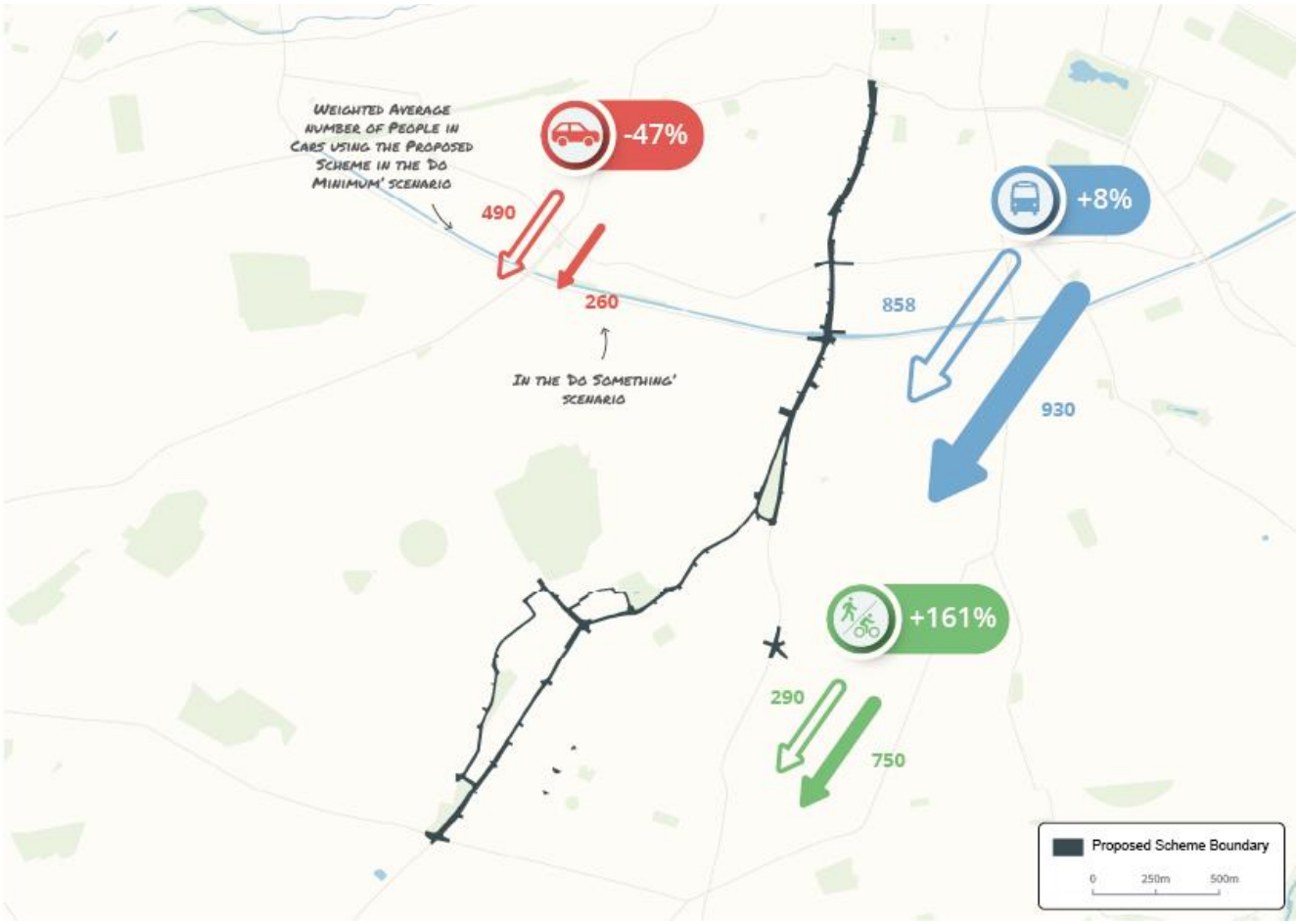


Image 6.9 Weighted Average People Movement by Mode during 2043 PM Peak Hour

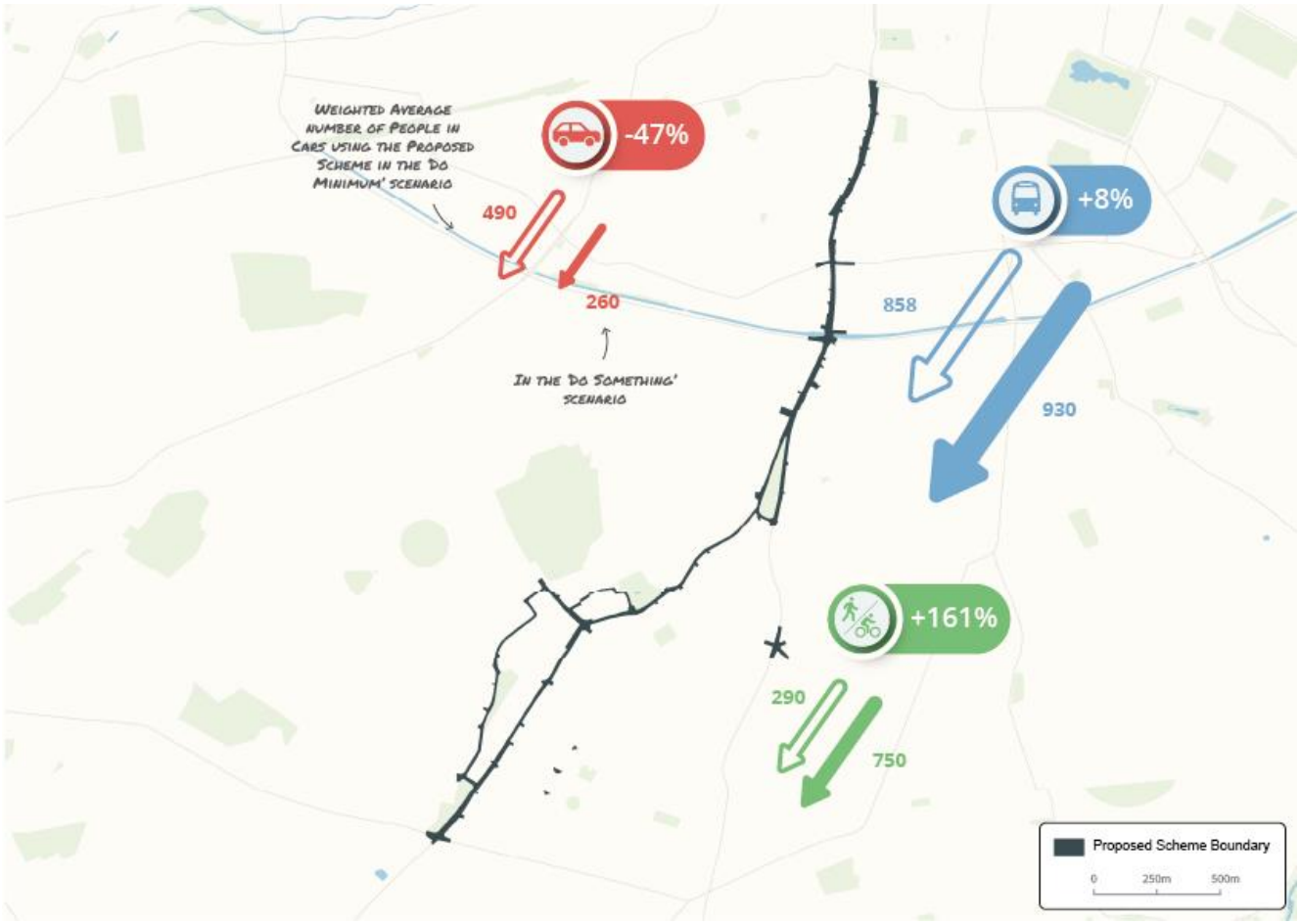


Image 6.9, there is a decrease of 47% in the number of people travelling via car, an increase of 8% in the number of people travelling via bus and an increase of 161% in the number of people walking and cycling along the Proposed Scheme during the PM Peak Hour.

Table 6-36 outlines the difference in modal split between the Do Minimum and Do Something scenarios for each mode of travel in an outbound direction from the City Centre during the PM Peak Hour. The results indicate 18% increase in people moved as a result of the Proposed Scheme and 46% increase in people moved by sustainable modes (Public Transport, Walk, Cycle).

Table 6-36 Modal Shift of 2043 PM Peak Hour along Proposed Scheme

Direction	Time Period	Mode of Transport	Do Minimum		Do Something		Difference	
			Hourly Trips	Modal Split (%)	Hourly Trips	Modal Split (%)	Hourly Trips	Difference (%)
Inbound towards the City Centre	PM Peak Hour	General Traffic	490	30%	262	14%	-228	-47%
		Public Transport	858	53%	927	48%	70	8%
		Walking	86	5%	181	9%	95	111%
		Cycling	200	12%	565	29%	365	183%
		Combined Walk / Cycle	285	17%	746	39%	460	161%
		Sustainable Modes Total	1,143	70%	1,673	86%	530	46%
		Total (All modes)	**1,633**	**100%**	**1,934**	**100%**	**302**	**18%**

6.4.6.2.2 People Movements by Bus

The following section presents the ERM demand outputs for People Movement by Bus. The results indicate that the improvements in bus priority infrastructure with the Proposed Scheme in place show a substantial increase in Bus patronage during the peak hours.

6.4.6.2.2.1 2028 AM Peak Hour Bus Passengers

Image 6.10 presents the passenger loading profile comparing the 'Do Minimum' and 'Do Something' scenarios in the AM Peak Hour in the inbound direction in 2028.

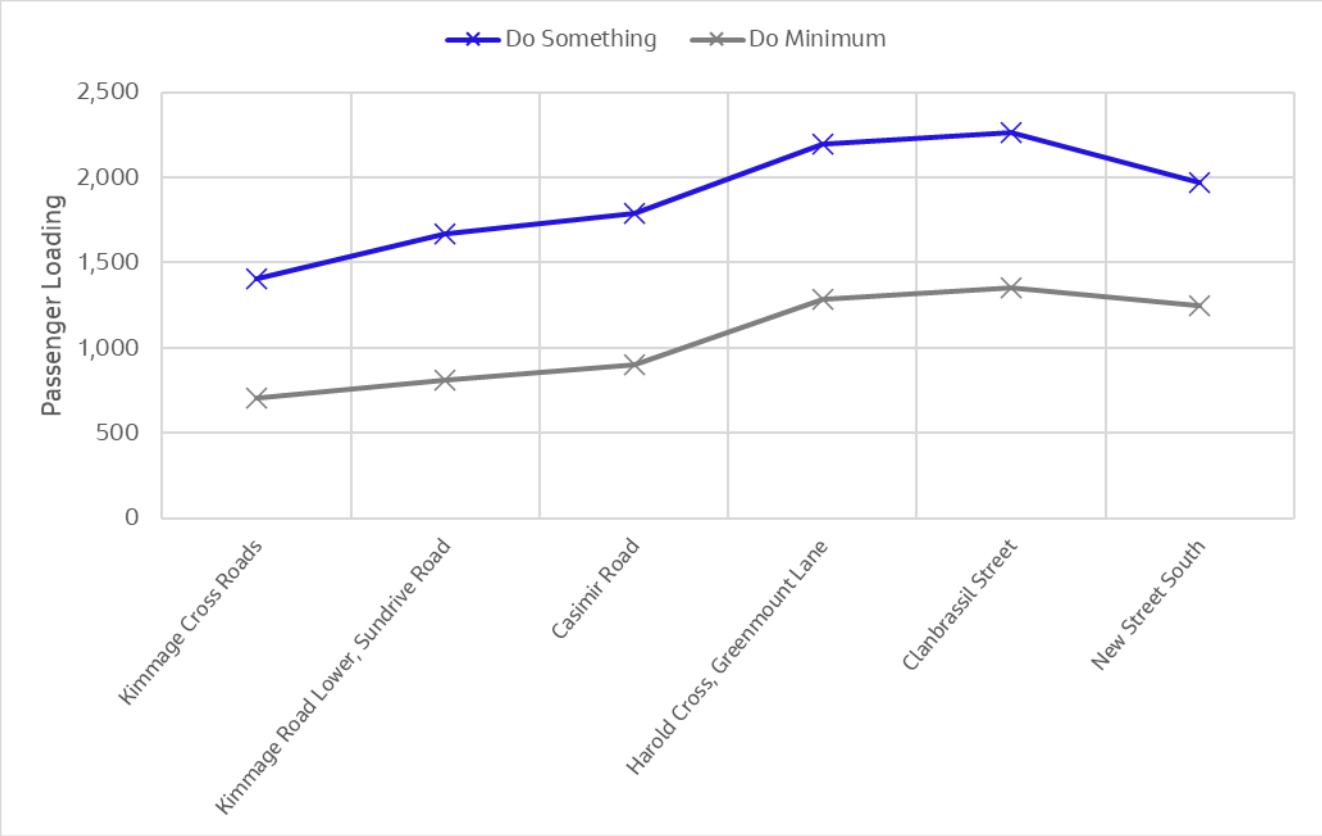


Image 6.10: 2028 AM Peak Hour Passenger Volume Along Proposed Scheme (inbound direction)

Image 6.10 shows higher levels of bus passenger loadings all along the Proposed Scheme with a peak loading at the intersection with Clanbrassil Street where the volume of passengers reaches 2,250 in the AM Peak hour, compared to approximately 1,350 in the 'Do Minimum' scenario.

There is a steady growth in bus patronage all along the Proposed Scheme and at the northern end of the Proposed Scheme, there are an estimated 700 additional passengers per hour in the inbound direction in the morning peak hour compared to the Do Minimum scenario.

6.4.6.2.2.2 2043 AM Peak Hour Bus Passengers

Image 6.11 presents the passenger loading profile comparing the 'Do Minimum' and 'Do Something' scenarios in the AM Peak Hour in the inbound direction in 2043.

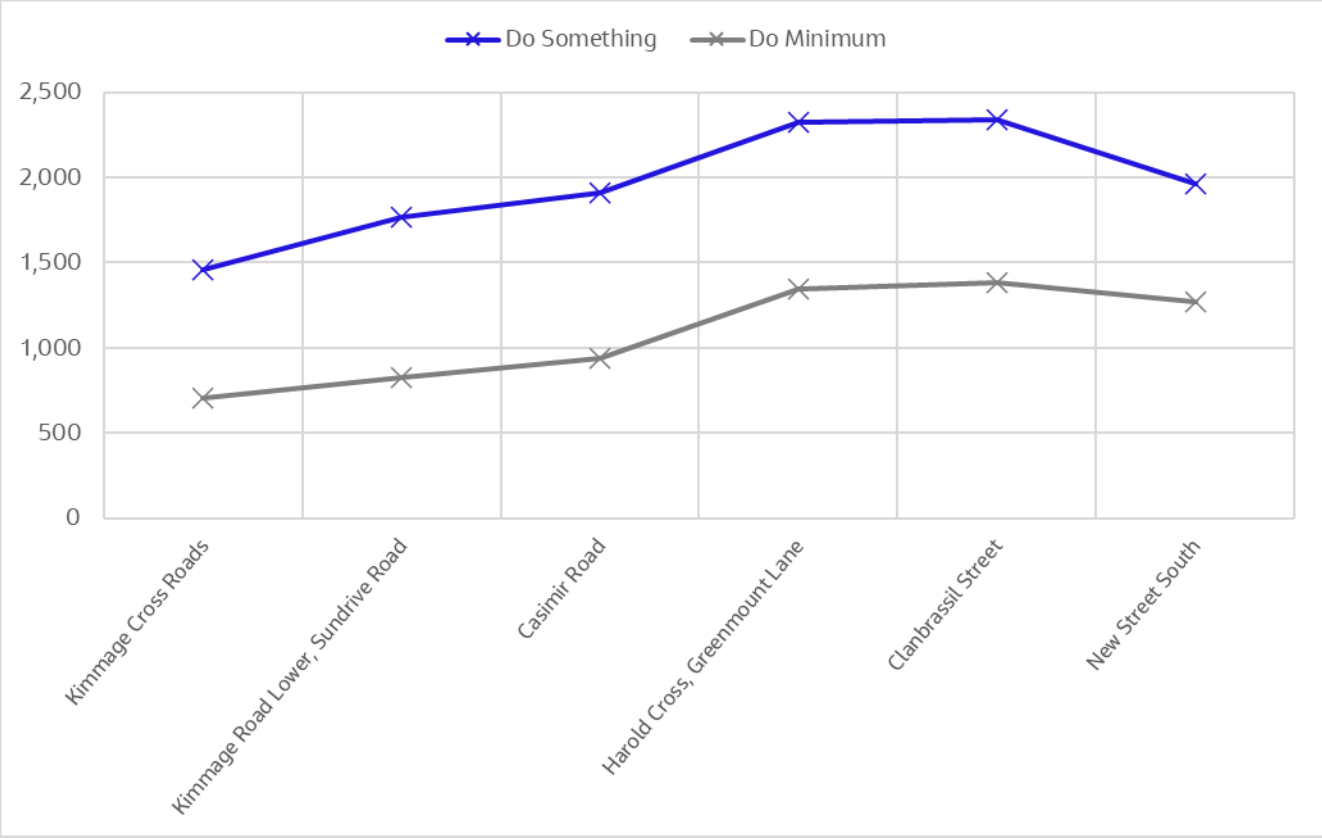


Image 6.11: 2043 AM Peak Hour Passenger Volume Along Proposed Scheme (inbound direction)

Image 6.11 shows higher levels of passenger loadings along the Proposed Scheme with a peak at the intersection with Clanbrassil Street where the volume of passengers reaches 2,350 in the AM Peak hour, compared to approximately 1,400 in the 'Do Minimum' scenario.

The increase in bus passengers remains at a high level along the Proposed Scheme with approximately 900 additional users on most of the corridor, compared to the 'Do Minimum' scenario.

6.4.6.2.2.3 2028 PM Peak Hour Bus Passengers

Image 6.12 presents the passenger loading profile comparing the 'Do Minimum' and 'Do Something' scenarios in the PM Peak Hour in the inbound direction in 2028.

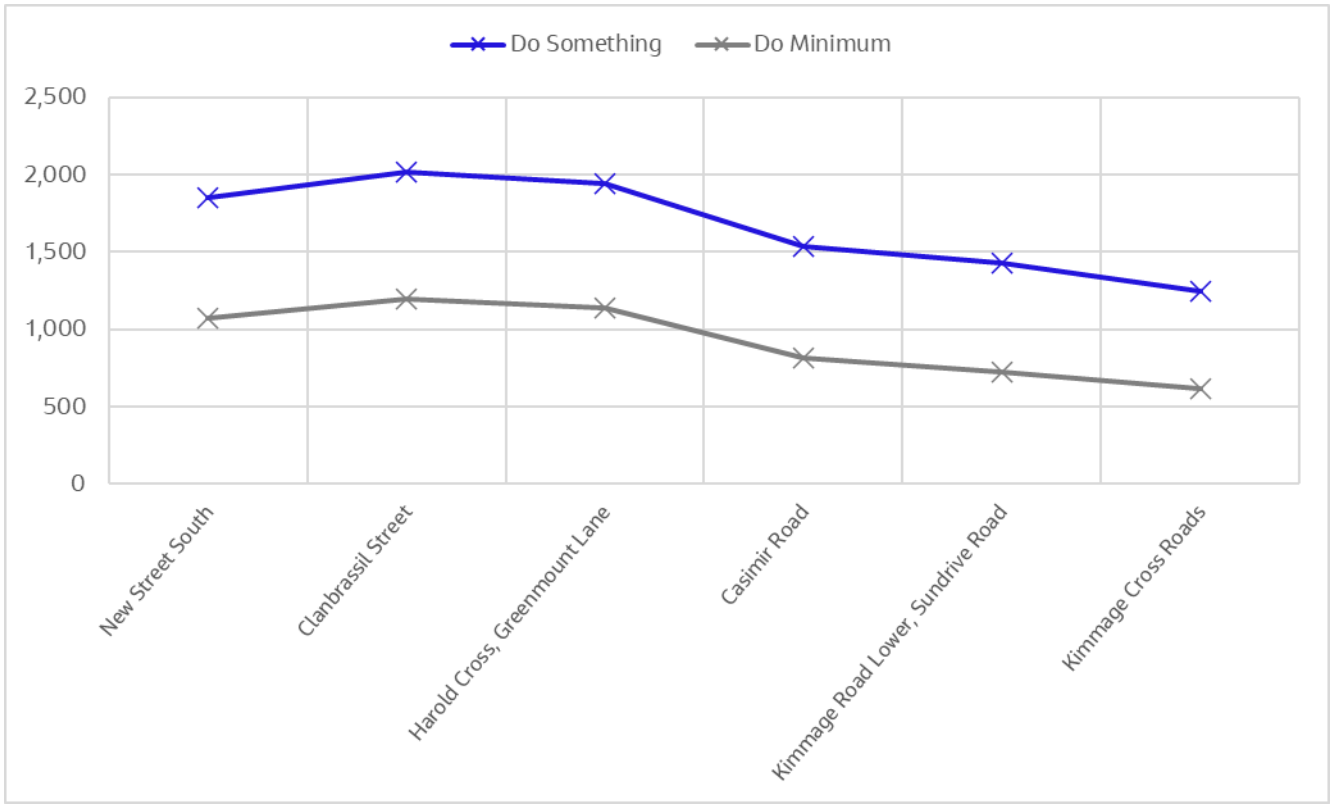


Image 6.12: 2028 PM Peak Hour Passenger Volume Along Proposed Scheme (outbound direction)

Image 6.12 shows a peak in the number of passengers at the intersection with Clanbrassil Street, where the loadings reach approximately 2,000 passengers in the 'Do Something' scenario, compared to 1,200 passengers in the 'Do Minimum'. The loadings reduce steadily until the southern end of the scheme as passengers alight.

The increase in bus passenger is consistent all along the Proposed Scheme with an estimated 650 to 800 additional passengers on the corridor, compared to the 'Do Minimum' scenario.

6.4.6.2.2.4 2043 PM Peak Hour Bus Passengers

Image 6.13 presents the passenger loading profile comparing the 'Do Minimum' and 'Do Something' scenarios in the PM Peak Hour in the outbound direction in 2043.

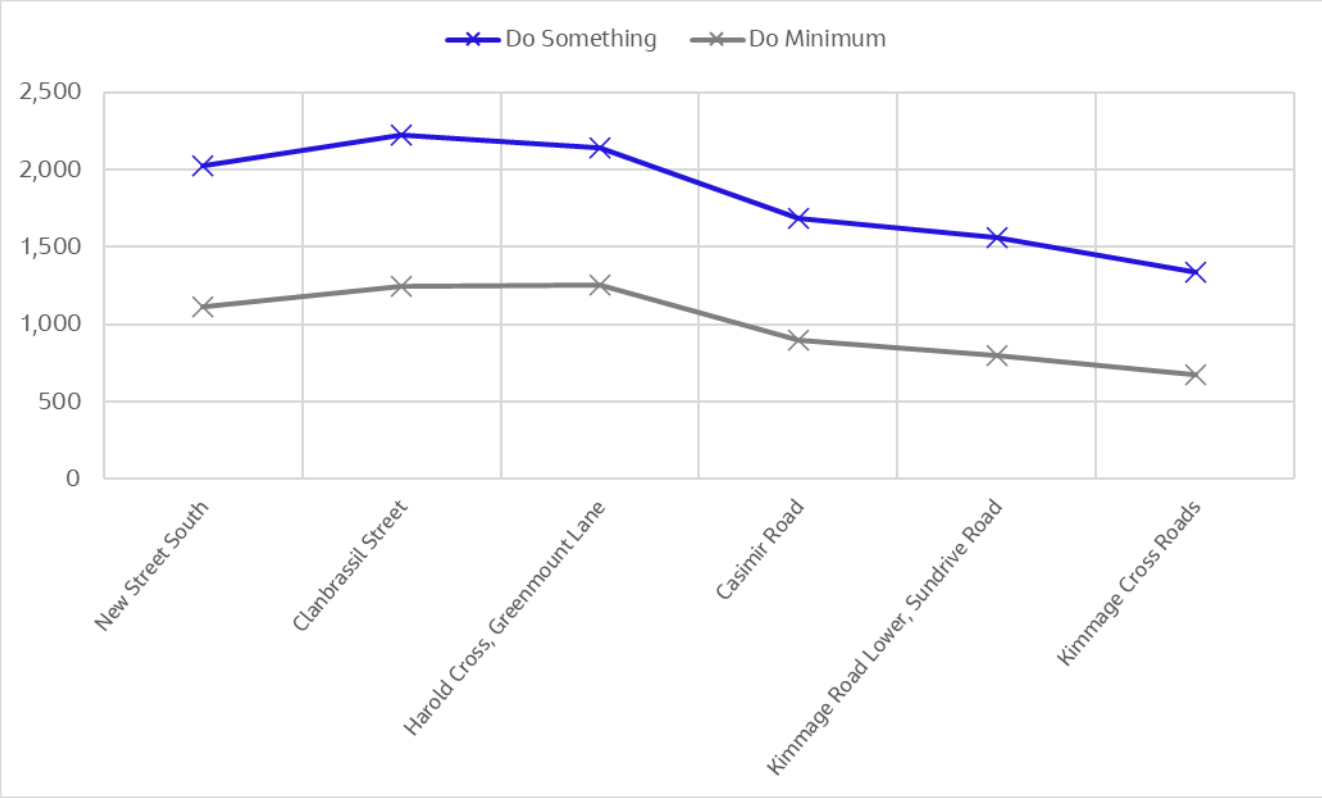


Image 6.13: 2043 PM Peak Hour Passenger Volume Along Proposed Scheme (outbound direction)

Image 6.13 shows a peak in the number of passengers at the intersection with Clanbrassil Street, where the bus loadings reach approximately 2,200 passengers in the 'Do Something' scenario, compared to 1,200 passengers in the 'Do Minimum'. The loadings are then reduced steadily until the southern end of the scheme.

The increase in bus passenger is consistent all along the Proposed Scheme with approximately 900 additional passengers on the Northern part of the corridor and approximately 700 additional passengers on the Southern part, compared to the 'Do Minimum' scenario.

6.4.6.2.2.5 Bus Boardings

Since many bus services commence and end further away from the direct alignment of the Proposed Scheme, an additional assessment has been undertaken to compare the total boardings on bus routes that use any part of the Proposed Scheme (including those stops not directly on the Proposed Scheme) in both 2028 and 2043 forecast years.

Table 6-37 2028 Peak Hour Bus Boardings on Routes using the Proposed Scheme (inc. boarding at stops outside Proposed Scheme)

Time Period	Do Minimum	Do Something	Difference in Boardings	Difference (%)
AM Peak Hour	12,420	13,550	1,130	9.1%
PM Peak Hour	10,440	11,470	1,030	9.9%

Table 6-37 shows that there will be a 9.1% increase in people boarding bus routes which use the Proposed Scheme during the 2028 AM Peak Hour. This represents an addition of 1,130 passengers in the AM Peak hour.

In the 2028 PM Peak hour, there will be a 9.9% increase in people boarding bus routes which use the Proposed Scheme, representing an additional 1,030 passengers.

Table 6-38 2043 Peak Hour Bus Boardings on Routes using the Proposed Scheme (inc. boarding at stops outside Proposed Scheme)

Time Period	Do Minimum	Do Something	Difference in Boardings	Difference (%)
AM Peak Hour	12,670	14,020	1,350	10.7%
PM Peak Hour	10,540	11,830	1,290	12.2%

Table 6-38 shows that there will be a 10.7% increase in people boarding bus routes which use the Proposed Scheme during the AM Peak Hour. This represents an addition of 1,350 passengers in the AM Peak hour.

In the PM Peak hour, there will be a 12.2% increase in people boarding bus routes which use the Proposed Scheme, representing an additional 1,290 passengers.

6.4.6.2.3 People Movement - Significance of Impact

The significance of the effect on the movement of People by sustainable modes with the Proposed Scheme in place has been appraised qualitatively, taking into account the changes in mode share, demand changes by mode along the Proposed Scheme as well as bus usage presented above. The impact of the Proposed Scheme has been adjudged to deliver a **Positive**, **Significant and Long Term** effect in terms of People Movement by sustainable modes. The Proposed Scheme can be shown to deliver significant improvements in people movement by sustainable modes along the Proposed Scheme corridor with reductions in car mode share due to the enhanced sustainable mode provision.

The findings of the People Movement assessment demonstrate that the Proposed Scheme aligns fully with the aims and objectives of the CBC Infrastructure Works, to 'provide enhanced walking, cycling and bus infrastructure on this key access corridor in the Dublin region, that will enable and deliver efficient, safe, and integrated sustainable transport movement along the corridor'.

6.4.6.2.4 Operational Impacts for Bus Passengers and Operators

6.4.6.2.4.1 Overview

The impacts of the Proposed Scheme for Bus Users and Operators have been assessed based on journey times and reliability metrics extracted from the micro-simulation model of the corridor.

Due to the stochastic nature of the micro-simulation software, model outputs based on the average of 10 simulation seed runs (Section 5.5.1 (Use of Seed Values) of the Traffic Modelling Guidelines (Transport for London 2010) recommends a minimum of five seed values) have been calculated between the point of Proposed Scheme entry and exit and compared against the corresponding Do Minimum scenarios.

6.4.6.2.4.2 Bus Journey Time and Reliability changes as a result of the Proposed Scheme

Inbound Direction

Average journey times for the inbound F1 service in 2028 Opening Year and in 2043 Design Year can be seen in Table 6-39. A breakdown of the changes in average journey times for all other bus services using the Proposed Scheme can be found in Appendix A6.4 – Appendix A6.4.3 (Average Bus Journey Times).

Table 6-39: F1 Service Bus Average Journey Times (Inbound Direction)

Peak Hour	Do Minimum (minutes)	Do Something (minutes)	Difference (minutes)	% Difference
2028 AM	22.9	15.5	-7.4	-32%
2028 PM	17.7	15.3	-2.4	-14%
2043 AM	20.9	15.5	-5.4	-26%
2043 PM	16.7	15.1	-1.6	-10%

Additional information regarding the range of journey times (minimum, maximum, average and standard deviation) for inbound F1 buses in the Do Minimum (red) and Do Something (blue) can be seen in Table 6-40 and Image 6.14 below. Each dot in the diagram represents the journey time for each individual bus in each scenario. A larger range of journey times are an indication of lower levels of reliability in a given scenario.

Table 6-40: F1 Service – Range of Journey Times (Inbound Direction)

Peak Hour	Do Minimum				Do Something			
	MIN	MAX	AVG	STDEV	MIN	MAX	AVG	STDEV
2028 AM	17.7	29.0	22.9	3	13.3	17.6	15.5	0.9
2028 PM	14.7	23.5	17.7	1.9	13.7	17.8	15.3	1.0
2043 AM	16.3	26.9	20.9	2.6	13.7	18.1	15.5	0.9
2043 PM	14.8	19.2	16.7	1.1	13.1	17.5	15.1	0.9

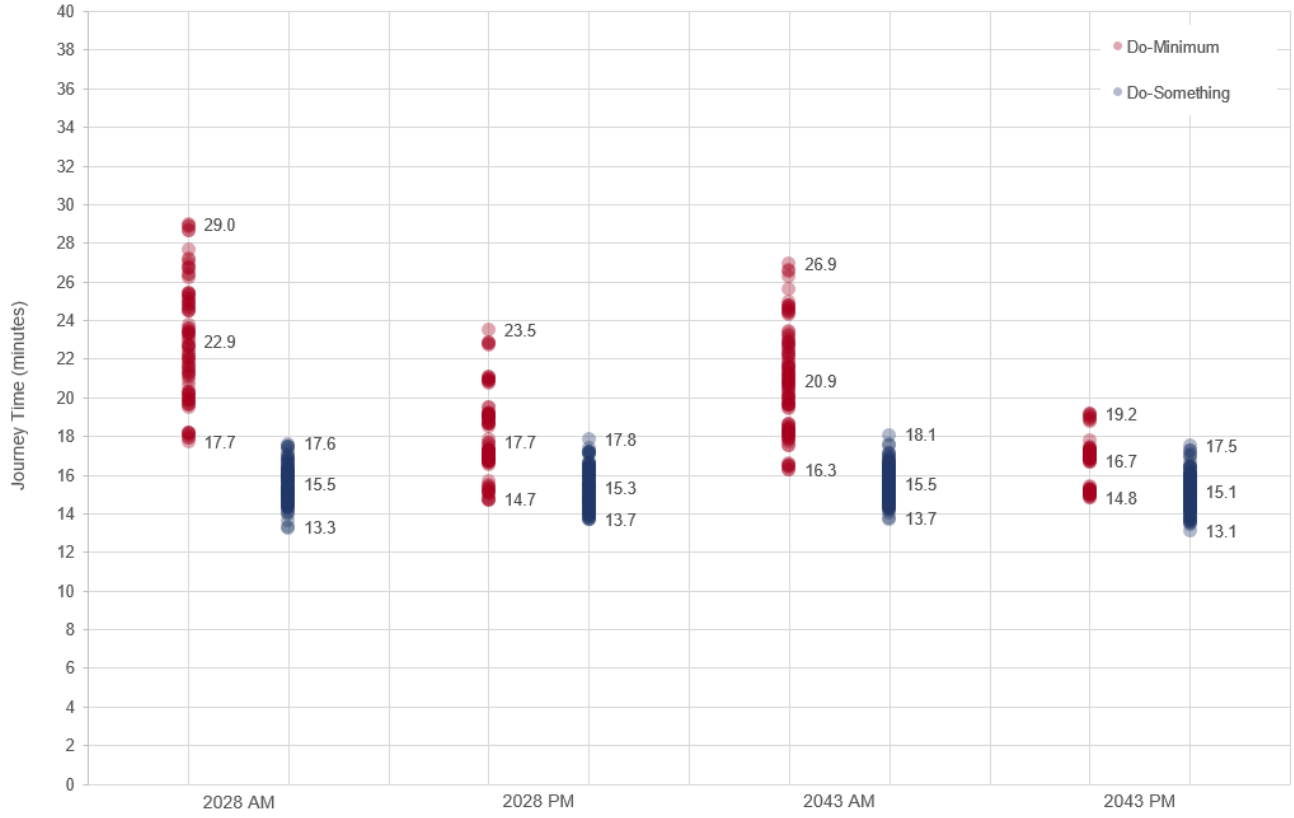


Image 6.14: F1 Bus Journey Times (Inbound Direction)

Based on the results presented in Table 6-39, the Proposed Scheme will deliver average inbound journey time savings for F1 service bus passengers of c7.4 minutes (32%) in 2028 and c5.4 minutes (26%) in 2043. Furthermore, results presented in Image 6.14 suggest an improvement in bus journey time reliability in all 4 core scenarios as indicated by the reduced ranges of journey times achieved with the individual durations focused much closer to the average journey times (lower standard deviation) in the Do Something scenario (blue dots) with the Proposed Scheme in place compared to the more dispersed range in the Do Minimum scenario (red dots).

Note that the variation in journey times shown above are based on one set of predicted flows for the Do Minimum and Do Something scenario. Traffic flows fluctuate daily which would mean that the variation in journey times would be much greater in the Do Minimum with any increases in traffic flows compared to the protection of journey time reliability provided by the bus priority measures that comprise the Proposed Scheme.

A comparison of average Do Minimum and Do Something journey times for the inbound F1 service are also illustrated in the cumulative time-distance graphs shown in Image 6.15 to Image 6.18

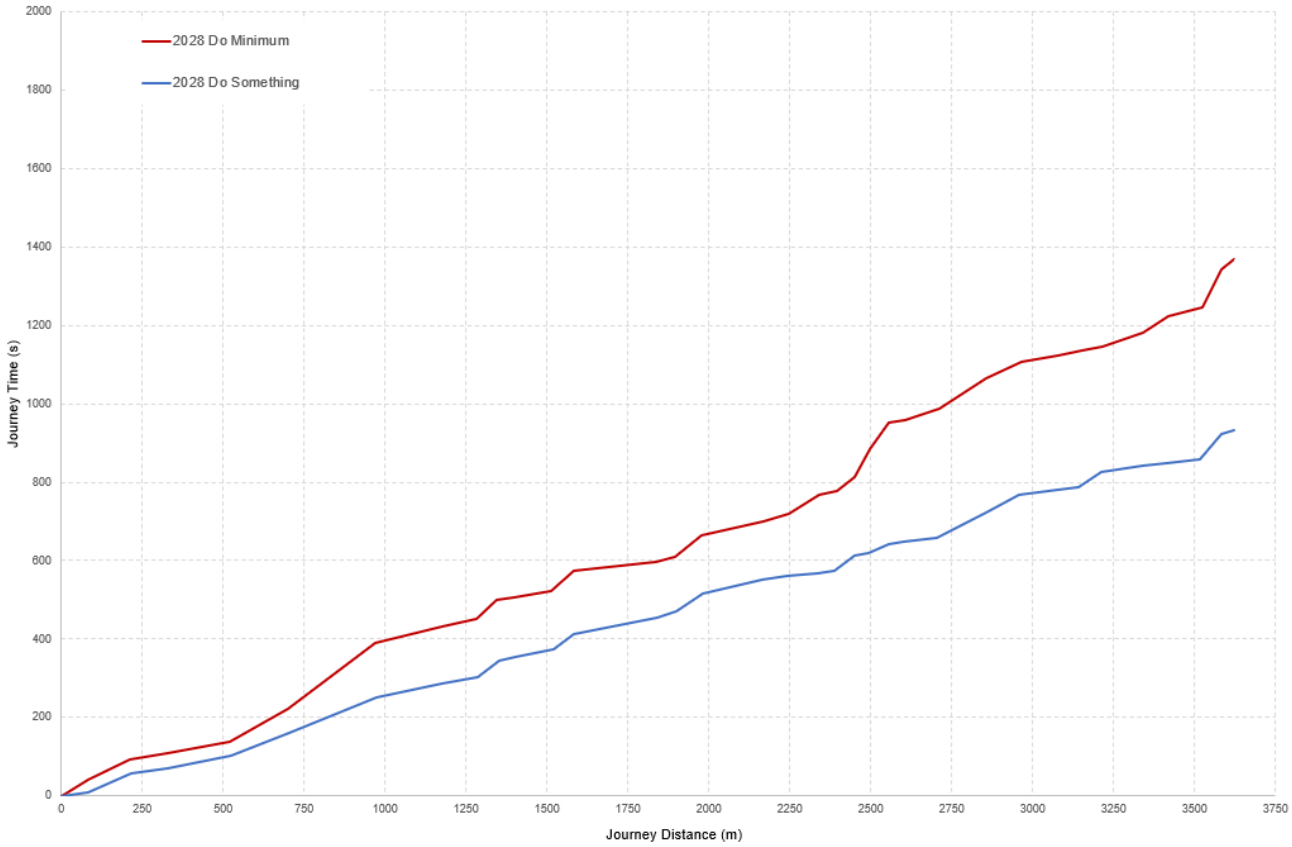


Image 6.15: F1 Bus Journey Time (2028 AM, Inbound)

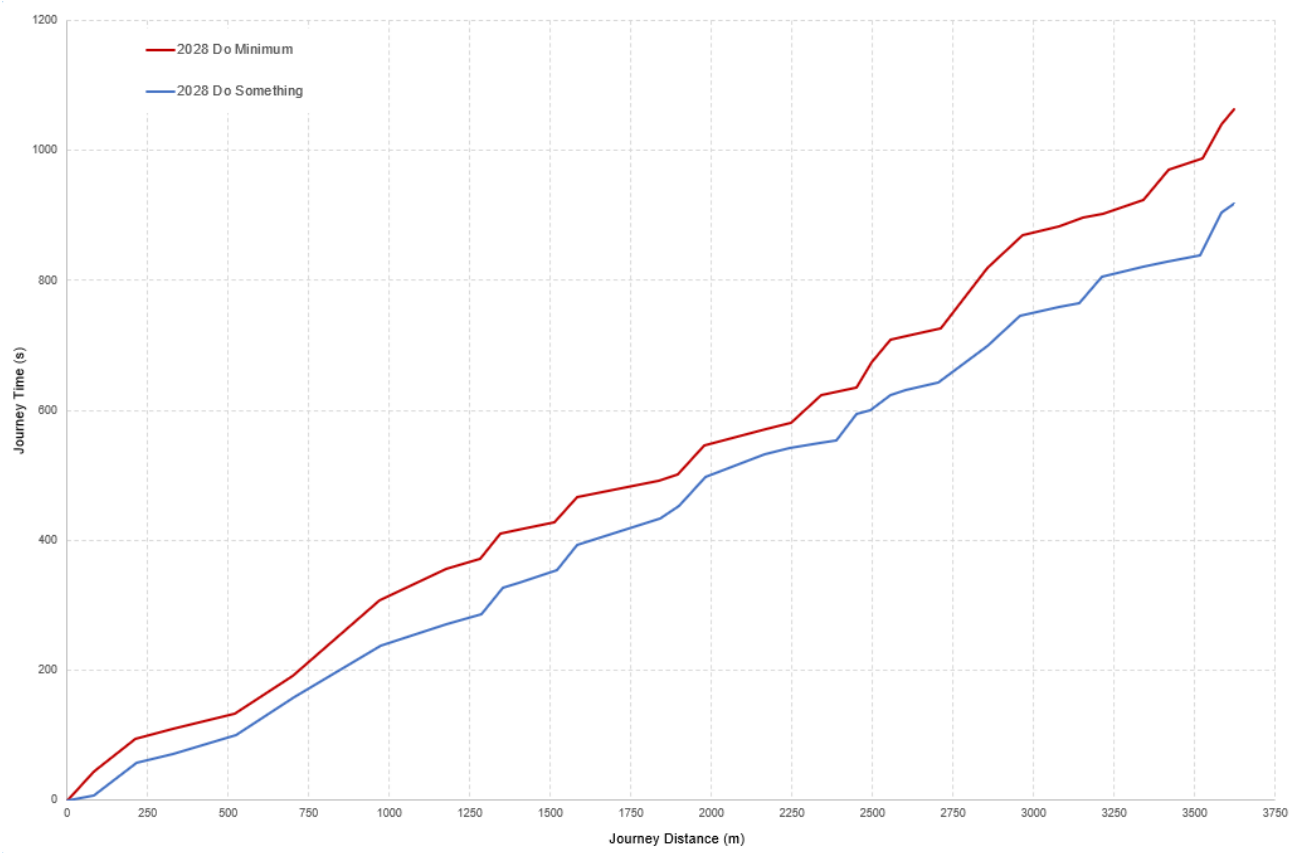


Image 6.16: F1 Bus Journey Time (2028 PM, Inbound)

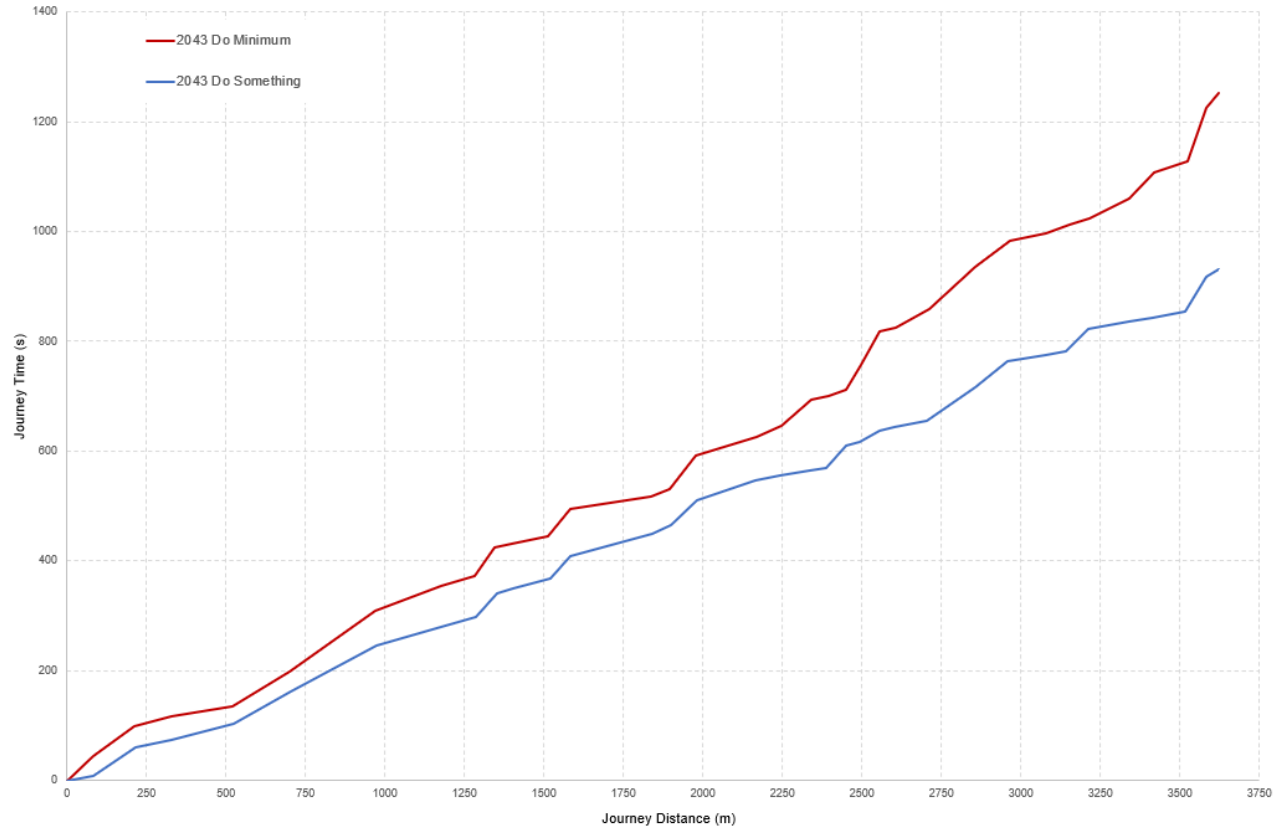


Image 6.17: F1 Bus Journey Time (2043 AM, Inbound)

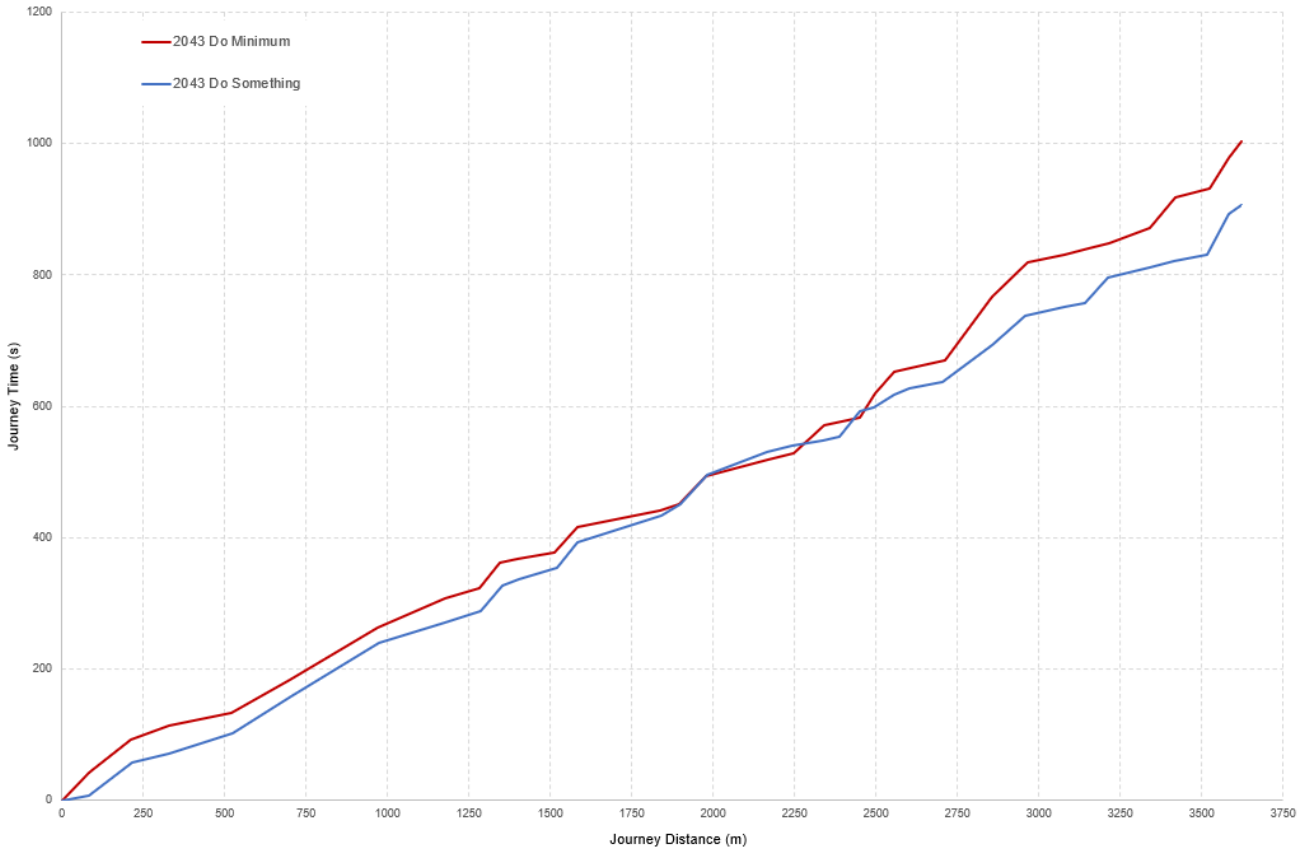


Image 6.18: F1 Bus Journey Time (2043 PM, Inbound)

Based on the results presented in Image 6.15 to Image 6.18, the Proposed Scheme is expected to deliver bus journey time savings in the AM and PM peaks. The most notable savings can be seen on the Kimmage Road Lower approach to the Sundrive Road crossroads and on the Harold's Cross Road approach to the Grand Canal. In both cases, the introduction of bus lanes up to the stop line and the separate phasing of previously conflicting movements can be shown to deliver benefits.

Outbound Direction

Average journey times for the outbound F1 service in the Opening Year (2028) and in the Design Year (2043) can be seen in Table 6-41. A breakdown of the changes in average journey times for all other bus services using the Proposed Scheme can be found in Appendix A6.4 – Appendix A6.4.3 (Average Bus Journey Times).

Table 6-41: F1 Service Bus Journey Times (Outbound Direction)

Peak Hour	Do Minimum (minutes)	Do Something (minutes)	Difference (minutes)	% Difference
2028 AM	16.5	14.4	-2.1	-13%
2028 PM	17.6	14.8	-2.8	-16%
2043 AM	15.8	14.3	-1.5	-9%
2043 PM	16.6	14.8	-1.8	-11%

Additional information regarding the range of journey times (minimum, maximum, average and standard deviation) for outbound F1 buses in the Do Minimum (red) and Do Something (blue) can be seen in Table 6-42 and Image 6.19 below. Each dot represents the journey time for each individual bus in each scenario. A larger range of journey times are an indication of lower levels of reliability.

Table 6-42: F1 Service – Range of Journey Times (Outbound Direction)

Peak Hour	Do Minimum				Do Something			
	MIN	MAX	AVG	STDEV	MIN	MAX	AVG	STDEV
2028 AM	13.4	19.4	16.5	1.2	12.8	16.1	14.4	0.7
2028 PM	13.9	21.4	17.6	1.5	13.1	17.6	14.8	0.9
2043 AM	13.3	19.2	15.8	1.1	12.6	15.9	14.3	0.7
2043 PM	13.6	21.7	16.6	1.7	12.9	16.9	14.8	0.9

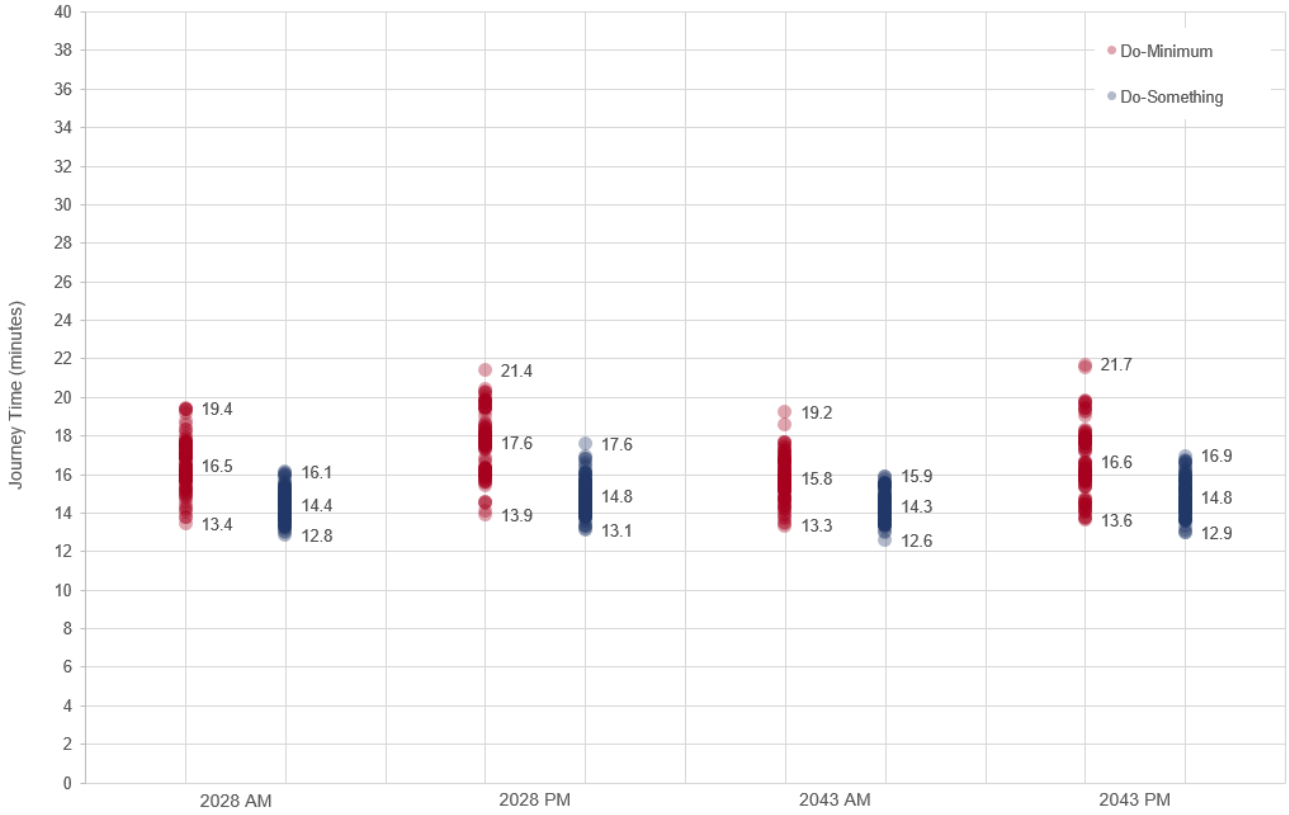


Image 6.19: F1 Bus Journey Times (Outbound Direction)

Based on the results presented in Table 6-41, the Proposed Scheme will deliver average outbound journey time savings for F1 service bus passengers of up to c. 2.8 minutes (16%) in 2028 (PM) and c. 1.8 minutes (11%) in 2043 (PM). Furthermore, results presented in Image 6.20 suggest an improvement in bus journey time reliability in all four scenarios as indicated by the reduced ranges of journey times achieved with the durations focused much closer to the average journey times (lower standard deviation) in the Do Something scenario (blue dots) with the Proposed Scheme in place compared to the more dispersed range in the Do Minimum scenario (red dots). Note that the variation in journey times shown above are based on one set of predicted flows for the Do Minimum and Do Something scenario. Traffic flows fluctuate daily which would mean that the variation in journey times would be much greater in the Do Minimum with any increases in traffic flows compared to the protection of journey time reliability provided by the bus priority measures that comprise the Proposed Scheme.

A comparison of average Do Minimum and Do Something journey times for the F1 service for the outbound direction of travel illustrated in the cumulative time-distance graphs shown in Image 6.20 to Image 6.23.

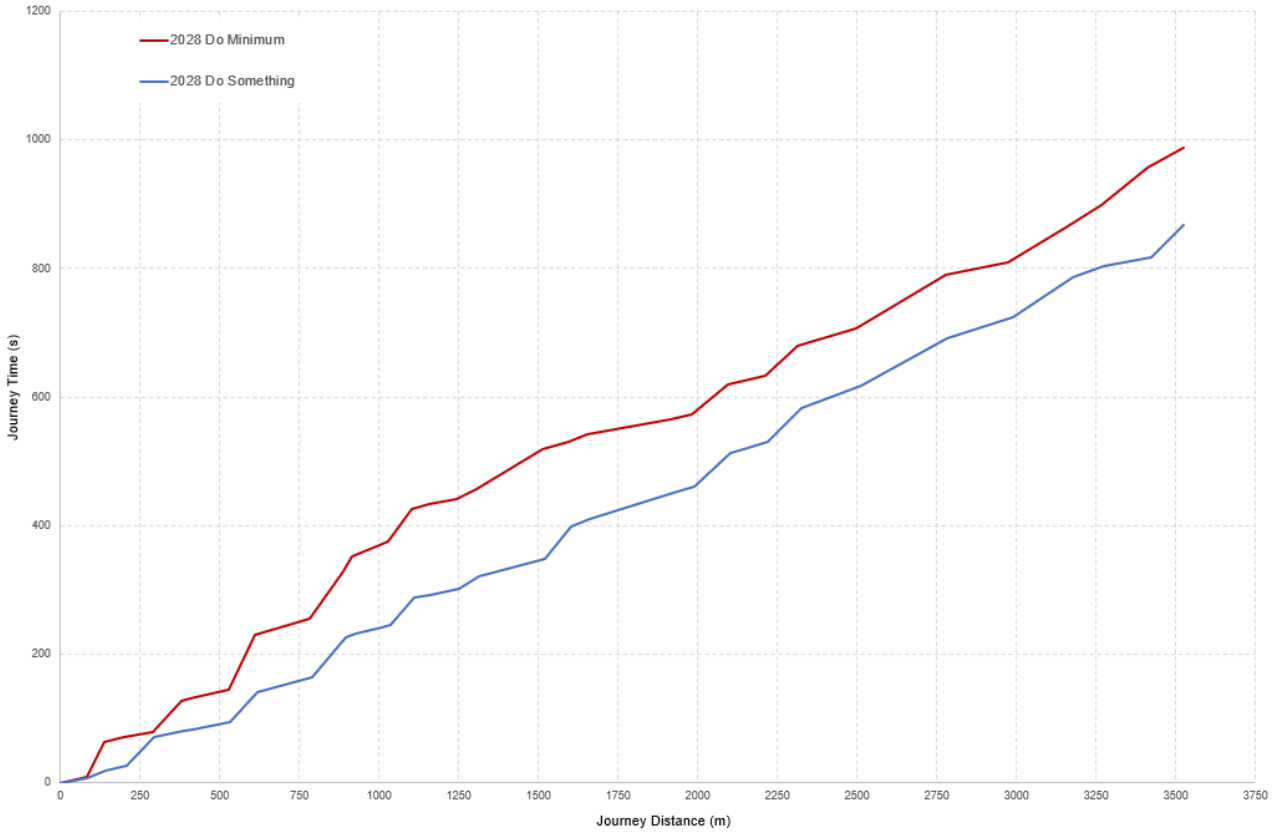


Image 6.20: F1 Bus Journey Time (2028 AM, Outbound)

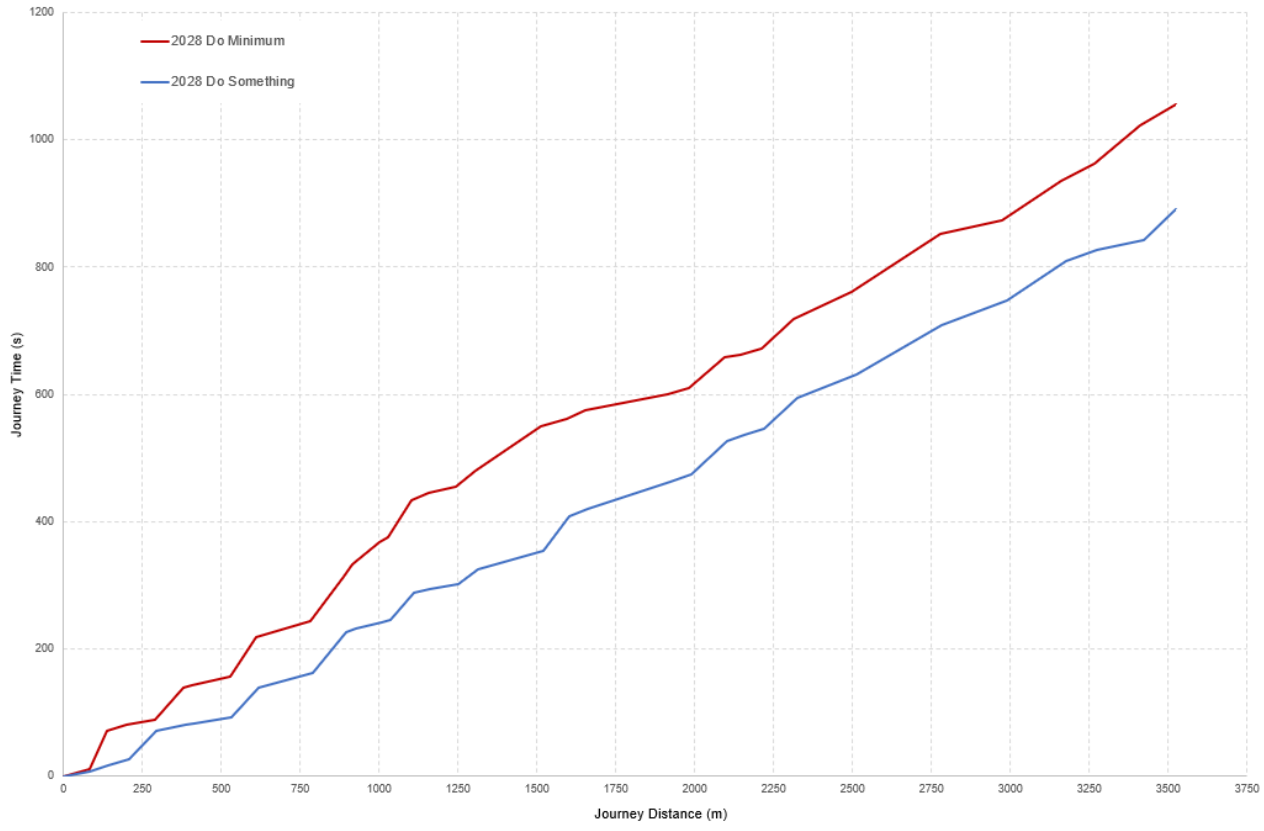


Image 6.21: F1 Bus Journey Time (2028 PM, Outbound)

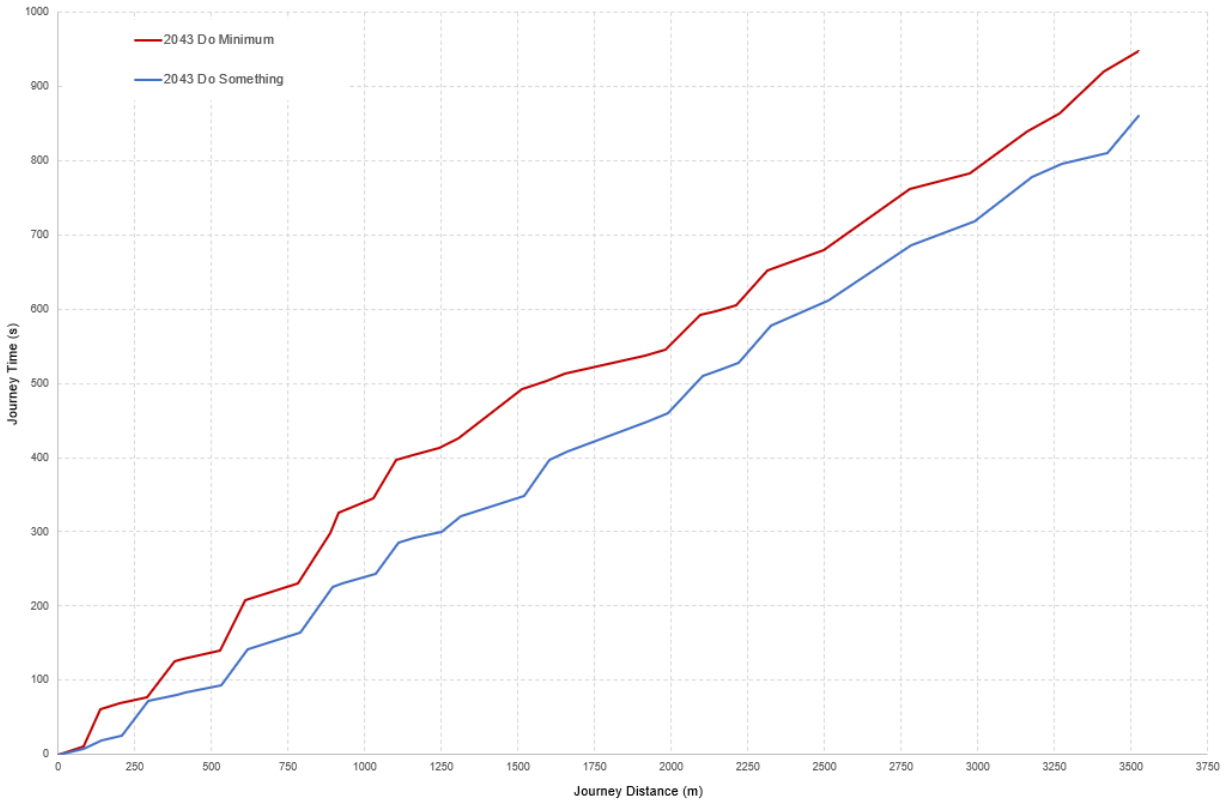


Image 6.22: F1 Bus Journey Time (2043 AM, Outbound)

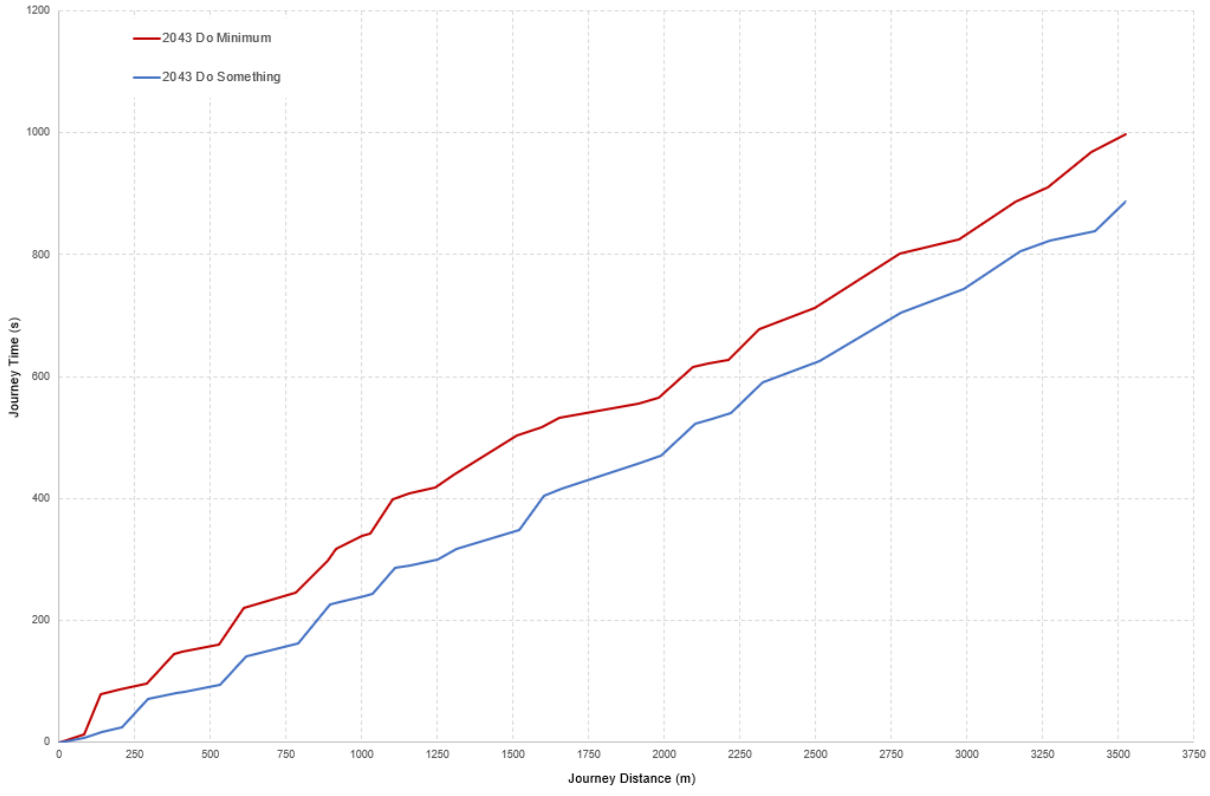


Image 6.23: F1 Bus Journey Time (2043 PM, Outbound)

Based on the results presented in Image 6.20 to Image 6.23, the Proposed Scheme is expected to deliver savings in bus journey time in both the AM and PM peaks. The most notable savings can be seen in the PM peak on the Clanbrassil Street Lower approach to the South Circular Road Junction (Leonard's Corner) and the Clanbrassil Street Upper approach to Windsor Terrace (Grand Canal). In both cases, the introduction of bus lanes up to the junction stop line can be seen to offer journey time and reliability savings versus the Do Minimum.

6.4.6.2.4.3 Total Journey Time Changes for all Proposed Scheme Bus Services

The change in total bus journey time for all buses travelling along the Proposed Scheme, is shown in Table 6-43 in vehicle minutes.

Table 6-43: Total Bus Journey Time

Peak Hour	Do Minimum (vehicle.minutes)	Do Something (vehicle.minutes)	Difference (vehicle.minutes)	%Difference
2028 AM	901.8	662.9	-238.8	-26%
2028 PM	800.1	662.3	-137.8	-17%
2043 AM	857.9	658.2	-199.7	-23%
2043 PM	753.3	663.5	-89.8	-12%

Based on the results presented in Table 6-43, modelling shows that the Proposed Scheme will reduce total bus journey times along the Proposed Scheme by up to 26% in 2028 and 23% in 2043. Based on the AM and PM peak hours alone, this equates to **c. 6.3 hours of savings in 2028 and 4.8 hours in 2043** combined across all buses when compared to the Do Minimum. On an annual basis this equates to approximately 4,700 hours of bus vehicle savings in 2028 and 3,600 hours in 2043, when considering weekday peak periods only.

6.4.6.2.5 Bus Users Assessment Summary

The findings of the Bus User assessment shows that the Proposed Scheme fully aligns with the aims and objectives of the CBC Infrastructure Works, 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'.

The significance of impact on bus users of the Proposed Scheme has been appraised using a qualitative assessment, taking the changes in journey time and journey reliability metrics presented above into consideration. The Proposed Scheme is considered to deliver a **Positive, Significant and Long-Term** impact overall.

6.4.6.2.6 Increased Bus Frequency - Resilience Sensitivity Analysis

6.4.6.2.6.1 Background

For the purposes of this EIAR and the transport modelling undertaken in support of the EIAR, no increase in bus service frequency beyond that planned under the current Bus Connects Network redesign proposals was assessed. The bus frequencies used in the modelling are based on the proposed service rollout as part of the BusConnects Network Redesign and are the same in both the Do Minimum and Do Something scenarios. This rollout is currently underway. The rationale for undertaking this approach was that the planning consent being sought and which this EIAR supports is solely for the infrastructural improvements associated with providing bus priority along the Proposed Scheme.

This analysis, however, is conservative as the bus priority infrastructure improvements and indeed the level of protection it will provide to bus journey time consistency and reliability will provide a significant level of resilience for bus services that will use the Proposed Scheme from implementation into the future. The resilience provided by the Proposed Scheme will allow the service pattern and frequency of bus services to be increased into the future to accommodate additional demand without having a significant negative impact on bus journey time reliability or the operation of cycle and pedestrian facilities. In order to assess this resilience and the potential impacts of this resilience on carbon emissions, an additional analysis has been undertaken, which is detailed below.

6.4.6.2.6.2 Resilience Testing

A key benefit of the provision of a resilient BusConnects Service network, one which can provide reliable and consistent journey times, is that it has potential to cater for further significant transfer from private car travel to more sustainable and environmentally friendly travel via public transport.

To assess the resilience of the Proposed Scheme to cater for additional bus service frequency provision whilst maintaining a high level of bus journey time reliability, a separate analysis was undertaken in the Proposed Scheme micro-simulation model. In this analysis, the service frequency, in both directions of travel, was increased to achieve a 10 buses per hour increase, at the busiest section, to assess whether the Proposed Scheme could cater for this increased service frequency whilst maintaining a high level of journey time reliability. The analysis was undertaken in the 2028 Minimum and Do Something models to assess whether the bus priority infrastructure was having the desired impact of protecting bus journey time reliability.

The bus service frequency, along the busiest section, in the 2028 Do Minimum model and in the 2028 Do Something Resilience testing models is outlined in Table 6-44 below.

Table 6-44: Resilience Testing Bus Service Frequency Scenario Testing

Scenario	Inbound (Buses per Hour)	Outbound (Buses per Hour)
Do Minimum	26	26
Do Something	26	26
Do Minimum - Additional Services Resilience Test	36	36
Do Something - Additional Services Resilience Test	36	36

Table 6-45 outlines the average journey times for the outbound F1 service in the Opening Year (2028).

Table 6-45: F1 Service – Average Bus Journey Times

Direction	Do Minimum (minutes)	Do Minimum (Additional Services) (minutes)	% Difference	Do Something (minutes)	Do Something - Additional Services (minutes)	% Difference
2028 Inbound AM	22.9	25.6	11.7%	15.5	15.3	-1.2%
2028 Outbound PM	17.6	17.7	0.4%	14.9	14.8	-0.1%

The results of the scenario testing with an additional 10 buses per direction per hour operating along the Proposed Scheme in the Opening Year (2028) are presented graphically in Image 6.24 below. The diagram displays the maximum, minimum and average journey times for each of the F1 bus services modelled.

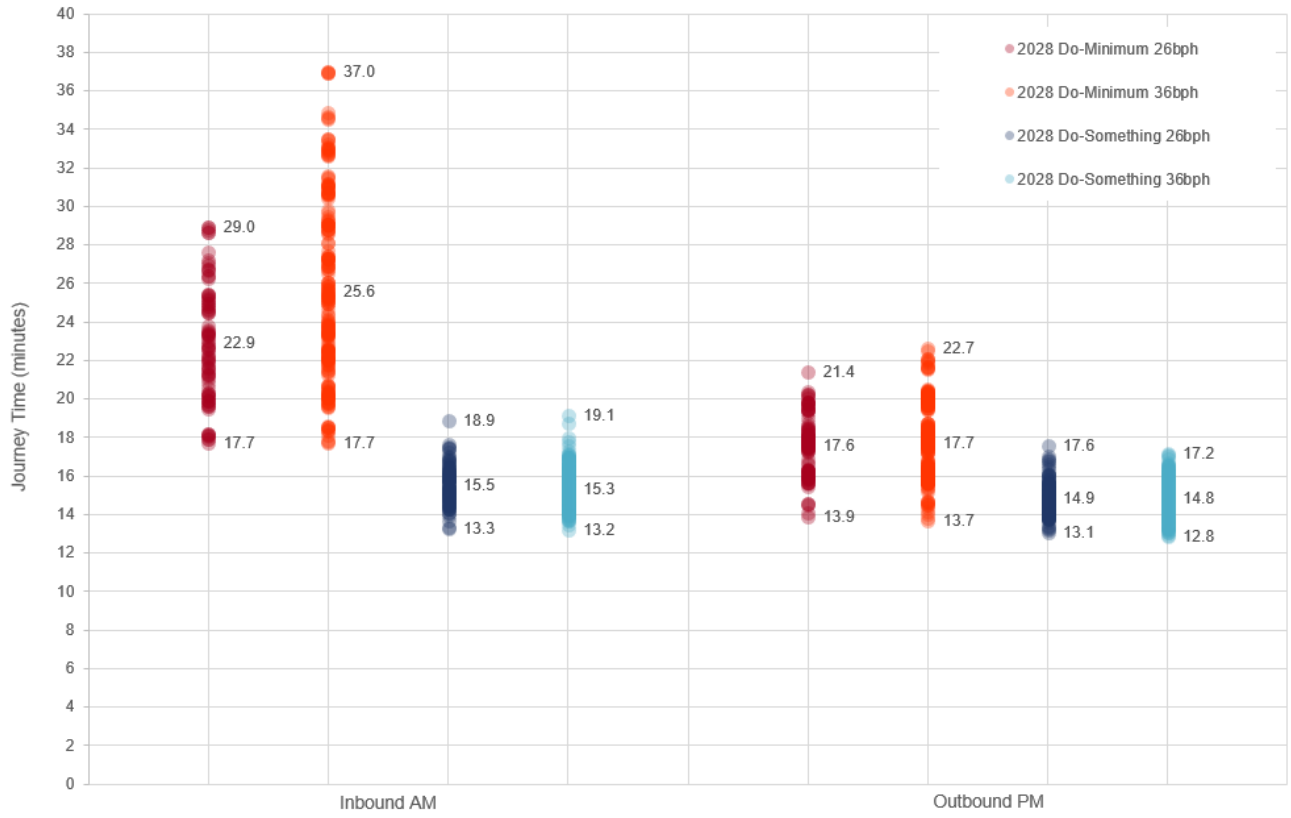


Image 6.24: Resilience Testing Bus Journey Time Reliability Indicators - Scenario Testing– Opening Year (2028)

As can be seen from Table 6-45 and Image 6.24 the results indicate that even with an additional 10 services operating per direction per hour along the Proposed Scheme, a high level of journey time reliability is maintained in the Do Something scenarios, comparable with the 26 buses per direction per hour results. The results indicate negligible change in journey times in the Do Something Resilience sensitivity test per bus. In the Do Minimum Resilience sensitivity test, however, bus journey time reliability is more severely impacted with additional services in place, particularly in the AM peak period. This highlights the benefit that the Proposed Scheme infrastructure improvements can provide in protecting bus journey time reliability and consistency, as passenger demand continues to grow into the future.

It must be noted that it was assumed the general traffic levels included in each scenario would remain static. If traffic levels were to increase (typical daily variations are in the order of +/- 15%) then the bus priority infrastructure would further protect journey time reliability and resilience in comparison with the Do Minimum scenario.

Further details on the potential additional greenhouse gas (GHG) emissions savings that could occur from this resilience is outlined in Chapter 8 (Climate).

6.4.6.2.7 General Traffic Assessment

6.4.6.2.7.1 Overview

The Proposed Scheme aims to provide an attractive alternative to the private car and promote a modal shift to public transport, walking and cycling. It is, however, recognised that there will be an overall reduction in operational capacity for general traffic along the direct study area given the proposed changes to the road layout and the rebalancing of priority to walking, cycling and bus. This reduction in operational capacity for general traffic along the Proposed Scheme will likely create some level of trip redistribution onto the surrounding road network.

It should be noted that the Do Minimum and Do Something scenarios are based on the assumption that travel behaviour will remain broadly consistent over time and that car demand, used for this assessment, represents a reasonable worst-case scenario. It is possible that societal trends in the medium to long-term may reduce car demand further due to the ongoing changes to travel behaviours and further shifts towards sustainable travel, flexibility in working arrangements brought on following COVID-19, and delayed car ownership trends that are emerging.

The assessment also assumes that goods vehicles (HGVs and LGVs) continue to grow in line with forecasted economic activity with patterns of travel remaining the same. For example, the assessment assumes a 45% and 77% increase in goods traffic versus the base year in 2028 and 2043 respectively. This is considered a very conservative assumption. It should be noted, however, that the Climate Action Plan 2023 (CAP) (Government of Ireland 2023) includes reference to DoT's Ireland's Road Haulage Strategy 2022-2031 (DoT 2023) which will seek to further integrate smart technologies in logistics management and may include the regulation of delivery times as far as practicable to off-peak periods to limit traffic congestion in urban areas. Ireland's Road Haulage Strategy 2022-2031 outlines measures to manage the increase in delivery and servicing requirements as the population grows. These measures may include the development of consolidation centres to limit the number of 'last-mile' trips made by larger goods vehicles with plans for higher use of smaller electric vans or cargo bikes for 'last-mile' deliveries in urban areas The purpose of this section is to assess the overall impact that any redistributed general traffic will have on both the direct and indirect study areas. It should be noted that the impacts presented in this chapter are based on the final Preliminary Design for the Proposed Scheme which includes embedded mitigation to limit environmental and traffic and transport impacts to a minimal level as part of the iterative design development work described previously above.

6.4.6.2.7.2 Significance of the General Traffic Impact

To determine the impact that the Proposed Scheme has in terms of general traffic redistribution on the direct and indirect study areas, the LAM Opening Year (2028) model results have been used to identify the difference in general traffic flows between the Do Minimum and Do Something scenarios and the associated level of traffic flow difference as a result of the Proposed Scheme. The assessment has been considered with reference to both the reductions and increases in general traffic flows along road links.

Significance of a Reduction in General Traffic: For this assessment, the reductions in general traffic flows have been described as a positive impact to the environment. The significance of this positive impact is outlined inTable 6-46.

Table 6-46: Significance of the Reduction in General Traffic Flows

Significance of Positive Impact	Description of Impact / Proposed Changes
Profound	< -1,000
Very Significant	-1,000 to -800
Significant	-800 to -400
Moderate	-400 to -300
Slight	-300 to -100
Not Significant	> -100

The majority of instances where a reduction in general traffic flow occurs are located along or nearby to the Proposed Scheme (i.e. the direct study area), where there are proposed measures to improve priority for bus, cycle and walking facilities.

Localised junction models have been developed using industry standard modelling packages such as LinSig (a software tool by JCT Consultancy which allows traffic engineers to model traffic signals) and Junctions 9 (a software tool by TRL for the modelling and analysis of roundabout and priority intersections) to determine the appropriate staging, phasing, green times and operational capacity at all junctions along the direct study area.

These junction models have been developed using consistent traffic flows as predicted and modelled in the ERM, LAM and micro-simulation models using the iterative traffic modelling process described in Section 6.2 of this Chapter. Further detail on the outputs from the localised junction models are available in the Appendix A6.3 (Junction Design Report) in Volume 4 of this EIAR.

Significance of an Increase in General Traffic: To determine the impact that the Proposed Scheme has in terms of an increase in general traffic flows on the direct and indirect study areas, a robust assessment has been undertaken, with reference to TII's Traffic and Transport Assessment Guidelines (TII 2014).

This document is considered best practice guidance for the assessment of transport impacts related to changes in traffic flows due to proposed developments and is an appropriate means of assessing the impact of general traffic trip redistribution on the surrounding road network.

Image 6.25 provides a snapshot from the guidance which outlines "Advisory Thresholds for Traffic and Transport Assessment Where National Roads are Affected".

Where applications affect national roads a Transport Assessment should be requested if the thresholds in Table 6-47*, below, are exceeded.*

Table 6-47; *Advisory Thresholds for Traffic and Transport Assessment Where National Roads are Affected*

Vehicle Movements	*100 trips in / out combined in the peak hours for the proposed development*
	Development traffic exceeds 10% of turning movements at junctions with and on National Roads.
	Development traffic exceeds 5% of turning movements at junctions with National Roads if location has potential to become congested or sensitive.

Traffic and Transport Assessment Guidelines PE-PDV-02045 May 2014, TII Publications

Image 6.25: Extract from the Traffic and Transport Assessment Guidelines (PE-PDV-02045) (TII 2014)

The basis of the guidance is to assess the impacts of additional trips that have been generated as part of a new development (for example, a new housing estate etc.). Noting that the guidance relates to National Roads only, for the purpose of this assessment, the principles of the guidance have been adapted for the assessment of the Proposed Scheme. This has been achieved by extending the threshold to cover all road types in the vicinity of the Proposed Scheme, not only National Roads. This ensures a robust and rigorous assessment is undertaken and that potential impacts on more localised or residential streets have been captured as part of the assessment.

The impact assessment of increases to the general traffic flows has used the following thresholds based on the above guidelines:

- **Local / Regional Roads:** Traffic redistribution results in an increase above 100 combined flows (i.e. in a two-way direction) along residential, local and regional roads in the vicinity of the Proposed Scheme in the AM and PM peak hours:
    - The threshold aligns with an approximate one vehicle per minute increase per direction on any given road. This is a very low level of traffic increase on any road type and ensures that a robust assessment of the impacts of redistributed traffic has been undertaken.
- **National Roads:** Traffic exceeds 5% of the combined turning flows at junctions with or on national roads in the AM and PM peak hours as a result of traffic redistribution comparing the Do Minimum to the DoSomething scenario with the Proposed Scheme in place:
    - The guidelines indicate that a 10% threshold may be used. However, to ensure a rigorous assessment in this instance the lower 5% threshold for turning movements has been utilised. Note, no national roads are located within the study area for the Proposed Scheme.

Where road links have been identified as experiencing additional general traffic flow increases which exceed the above thresholds, a further assessment has been undertaken by way of a traffic capacity analysis on the associated junctions along the affected links.

6.4.6.2.7.3 General Traffic Flow Difference - AM Peak Hour

Image 6.26 illustrates the difference in traffic flows on road links in the AM Peak Hour for the Opening Year (2028). Appendix A6.4 in Volume 4 of the EIAR provides further details of the LAM outputs.

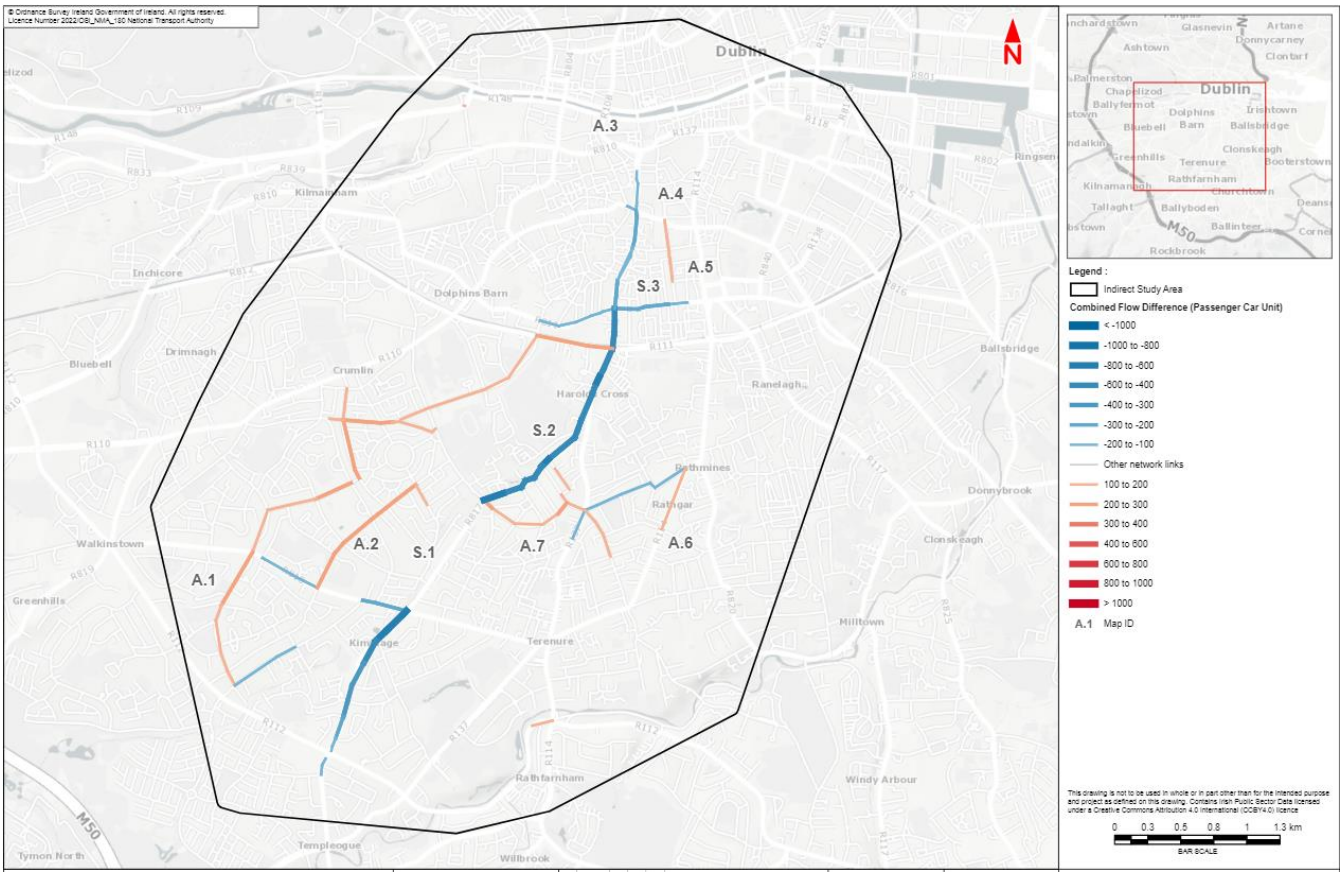


Image 6.26: Flow Difference on Road Links (Do Minimum vs. Do Something), AM Peak Hour, Opening Year (2028)

Impact on Direct Study Area (AM Peak Hour)

Direct Reductions in General Traffic: The LAM indicates that during the Opening Year (2028) scenario, there are reductions in general traffic noted along the Proposed Scheme during the AM Peak Hour, as illustrated by the blue lines in Image 6.26, which indicates where a reduction of at least -100 combined traffic flows occur.

The key reductions in traffic flows during the AM Peak Hour are outlined in Table 6-48.

Table 6-48: Road Links that Experience a Reduction of ≥ 100 Combined Flows during AM Peak Hour (Direct Study Area)

Location	Map I.D.	Road Name	Do Minimum Flows	Do Something Flows	Flow Difference
Section 1 – Cornmarket – Grand Canal	S.3	Clanbrassil Street	1214	783	-639
		Patrick Street	579	409	-170
		New St South	1178	881	-297
Section 2 – Grand Canal – Harold's Cross	S.2	Harold's Cross Road	1239	895	-344
		Kimmage Road Lower	1639	704	-935
Section 3 – Harold's Cross - Kimmage	S.1	Wainsfort Road	980	500	-480
		Cypress Road	1213	1070	-143

As indicated in Table 6-48, the traffic reductions vary between -143 and -935 combined flows.

Along Section 1 of the Proposed Scheme, Clanbrassil Street experiences a very significant reduction in up to -639 combined traffic flows. There is also a slight decrease of -297 flows on New Street South and -170 on Patrick Street.

Along Section 2, there is a significant reduction of -935 combined flows along Kimmage Road Lower and a decrease of -344 combined flows on Harold's Cross Road.

Along Section 3, there is a reduction of -480 on Wainsfort Road. Cypress Road experiences a reduction of -143.

Direct Increases in General Traffic: There are no anticipated increases greater than 100 combined two-way flows within the direct study area.

Overall Impact on Direct Study Area: In summary, there is a slight to profound reduction of between -143 and -935 combined general traffic flows along the direct study area during the AM Peak Hour in the Opening Year (2028). This is attributed to the Proposed Scheme and the associated modal shift as a result of its implementation. This reduction in general traffic flow has been determined as an overall potential **Positive, Slight to Very Significant and Long-Term** impact on the direct study area.

Impact on Indirect Study Area (AM Peak Hour)

Indirect Reductions in General Traffic: In addition to the general traffic flow reductions occurring along the direct study area, there are key reductions in general traffic noted along certain road links within the indirect study area during the AM Peak Hour. The key reductions in traffic flows along the indirect study area during the AM Peak Hour are outlined in Table 6-49.

Table 6-49: Road Links that Experience a Reduction of ≥100 Combined Flows during AM Peak Hour (Indirect Study Area)

Location	Map I.D.	Road Name	Do Minimum Flows	Do Something Flows	Flow Difference
Adjacent to Section 1 - North of Grand Canal	S.3	Harrington Street	1094	966	-128
		Dean Street	1033	915	-118
		The Coombe	1100	982	-118
		Rosedale Terrace	1173	887	-286
		South Circular Road	992	778	-214
Adjacent to Section 2 - South of Grand Canal	S.2/S.1	Dangan Road	777	641	-135
		Kenilworth Road	342	213	-130
		Kenilworth Square Nth	1172	892	-280
		Whitehall Road	416	255	-161
		Grosvenor Road	396	285	-111
		Grosvenor Place	429	311	-118

As indicated in Table 6-49, the traffic reductions vary between 104 and -558 the traffic reductions vary between -111 and -286 combined flows along the surrounding road links.

Indirect Increases in General Traffic: The key road links which experience additional traffic volumes are illustrated by the red lines in Image 6.27. These red lines indicate where an increase in at least 100 combined flows are occurring. The key increases in traffic flows along the indirect study area during the AM Peak Hour are outlined in Table 6-50.

Table 6-50: Road Links that Experience an Increase of at least +100 Combined Flows (AM Peak Hour)

Orientation	Map ID	Road Name	Do Minimum Flows	Do Something Flows	Flow Difference
North	A.4	Kevin Street Upper	202	309	107
	A.4	New Bride Street	590	693	103
	A.5	Heytesbury Street	566	670	104
West	A.2	Clonard Road	116	330	213
	A.2	Kildare Road	774	995	220
	A.2	Stannaway Road	353	605	253
	A.2	Armagh Road	1037	1261	225
	A.2	Clonmacnoise Road	324	460	136
	A.2	St Agnes Park	997	1186	189
	A.2	Lorcan O'Toole Park	242	471	230
	A.2	St Agnes Road	1317	1497	179
	A.2	Parnell Road	994	1222	228
	A.2	Clogher Road	909	1094	186
East	A.7	Adrian Avenue	696	834	138
	A.7	Larkfield Park	704	861	157
	A.7	Larkfield Avenue	903	1142	239
	A.7	Kenilworth Park	763	935	172
	A.7	Rathgar Avenue	597	793	196
	A.7	Clareville Road	712	930	218
	A.6	Rathgar Road	637	744	107
South	A.1	Whitehall Road West	708	931	223
	A.7	R112	1009	1111	102

As outlined in the contents of Table 6-50, the additional traffic on the road links that exceed the threshold for further assessment varies between +102 and +253 combined flows during the AM Peak Hour. These road links have been identified as experiencing additional traffic volumes over the defined threshold and therefore require further analysis which is presented later in this Chapter.

Overall Impact on Indirect Study Area: The redistributed traffic as a result of the Proposed Scheme results in a negative impact upon the road links identified in Table 6-50 during the AM Peak Hour. In order to determine the significance of the negative impact, a further assessment has been carried out subsequently. Operational capacity outputs have been extracted from the LAM at the associated junctions along the subject road links to determine whether there is reserve capacity to facilitate the uplift in traffic. The results are presented in terms of the significance of the impact to the V / C ratio for each junction based on its sensitivity and magnitude of impact.

It should be noted that the worst performing arm of each junction has been used for the purpose of the assessment to ensure a conservative impact assessment is undertaken.

6.4.6.2.7.4 General Traffic Flow Difference - PM Peak Hour

Image 6.27 illustrates the difference in traffic flows on road links during the PM Peak Hour for the Opening Year (2028). Appendix A6.4 in Volume 4 of the EIAR provides further details of the LAM outputs.

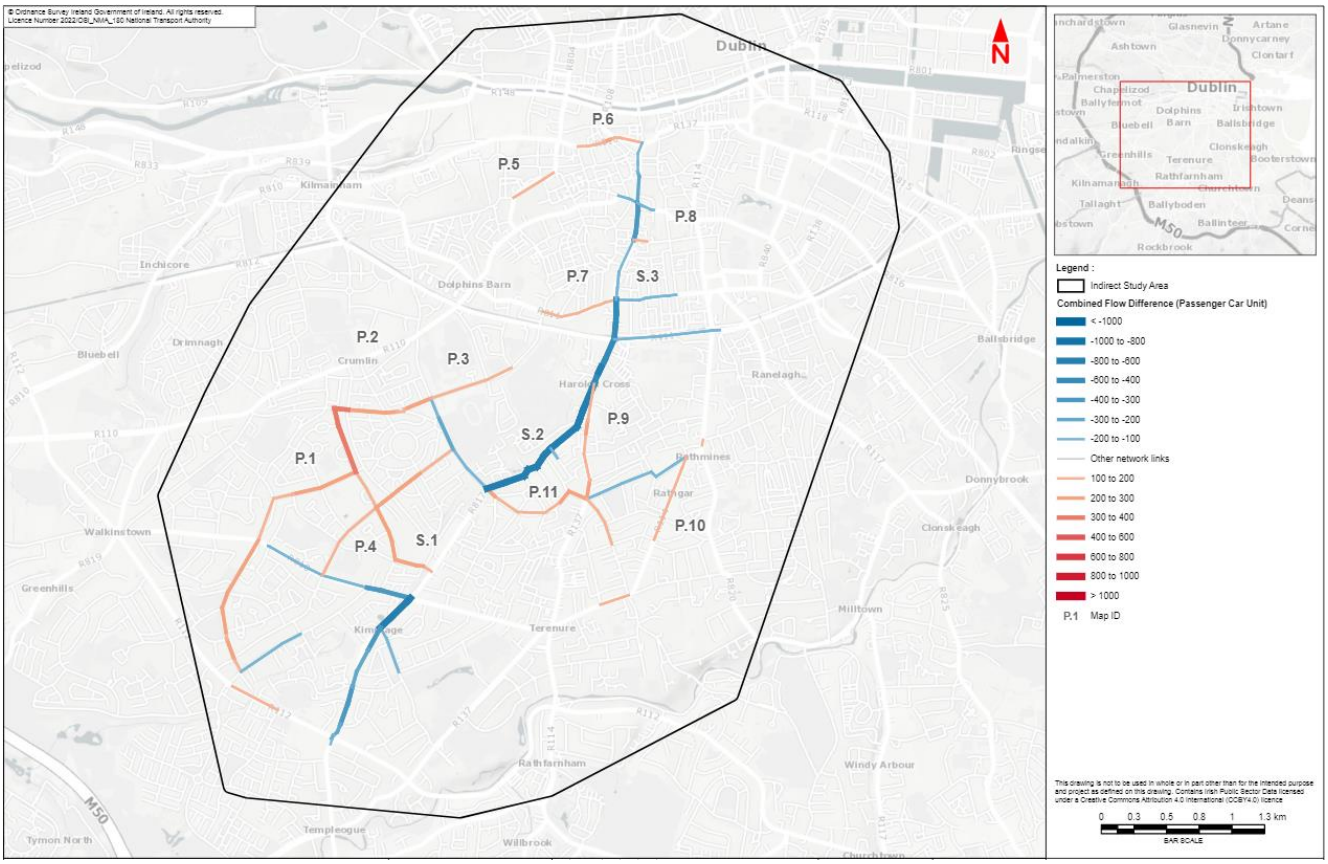


Image 6.27: **Flow Difference on Road Links (Do Minimum vs. Do Something), PM Peak Hour, Opening Year (2028)**

Impact on Direct Study Area (PM Peak Hour)

Direct Reductions in General Traffic Flows: In addition to the general traffic flow reductions occurring along the direct study area, there are key reductions in general traffic noted along certain road links within the indirect study area during the PM Peak Hour. They key reductions in traffic flows along the indirect study area during the PM Peak Hour are outlined in Table 6-51. The blue links indicate where a reduction of at least -100 combined traffic flows may occur.

The key reductions in traffic flows during the PM Peak Hour are outlined in Table 6-51.

Table 6-51: Road Links that Experience a Reduction of at least -100 Combined Flows during PM Peak Hour (Direct Study Area) (pcus)

Location	Map I.D.	Road Name	Do Minimum Flows	Do Something Flows	Flow Difference
Section 1 – Cornmarket – Grand Canal	S.3	Clanbrassil Street	1371	884	-487
		Patrick Street	687	469	-218
		New St South	1170	787	-383
Section 2 – Grand Canal – Harold's Cross	S.2	Harold's Cross Road	739	57	-682
		Kimmage Road Lower	1088	79	-1009
Section 3 – Harold's Cross - Kimmage	S.1	Cypress Road	508	381	-128
		Wainsfort Road	1096	705	-391

As indicated in Table 6-51, the traffic flow reductions vary between -218 and -1009 combined flows.

Along Section 1 of the Proposed Scheme, Clanbrassil Street experiences a reduction in up to -487 combined traffic flows. There are also reductions on Patrick Street with -218 and New Street South with -383.

Along Section 2, there is a significant reduction on Kimmage Road Lower of -1009. There is also a large reduction of -682 on Harold's Cross.

Along Section 3, there are reductions of -391 on Wainsfort Road and of -128 on Cypress Road.

Increases in General Traffic Flows: There are no anticipated increases greater than 100 combined two-way flows within the direct study area.

Overall Impact on Direct Study Area: In summary, there is a slight to significant reduction of between -218 and -1009 general traffic flows along the direct study area during the PM Peak Hour, which is attributed to the Proposed Scheme and the associated modal shift as a result of its implementation. This reduction in general traffic flow has been determined as an overall potential **Positive, Slight to Profound and Long-Term** impact which varies along differing streets within the direct study area.

Impact on Indirect Study Area (PM Peak Hour)

Reductions in General Traffic Flows: In addition to the general traffic flow reductions occurring along the direct study area, there are key reductions in general traffic noted along certain road links within the indirect study area during the PM Peak Hour. The key reductions in traffic flows along the indirect study area during the PM Peak Hour are outlined in Table 6-52.

Table 6-52: Road Links that Experience a Reduction of ≥100 Combined Flows during PM Peak Hour (Indirect Study Area)

Location	Map I.D.	Road Name	Do Minimum Flows	Do Something Flows	Flow Difference
Adjacent to Section 1 – North of Grand Canal	S.3	South Circular Road	897	773	-123
		Dean Street	1072	879	-192
		Kevin St Upper	806	607	-199
		The Coombe	1101	910	-191
		Grove Road	996	817	-179
		Canal Road	1077	899	-177
		Rosedale Terrace	1329	1134	-195
Adjacent to Section 2 - South of Grand Canal	S.2/S.1	Sundrive Road	1425	1201	-224
		Kenilworth Square Nth	338	143	-195
		Dangan Avenue	984	852	-132
		Fortfield Road	1399	777	-622
		Whitehall Road	265	111	-154
		Grosvenor Road	361	232	-130
		Grosvenor Place	400	267	-133

As indicated in Table 6-52, the traffic reductions vary between -123 and -622 combined flows along the surrounding road links.

Increases in General Traffic Flows: The key road links which experience additional traffic volumes in the PM Peak Hour are illustrated by the red links in Image 6.27 which indicate where an increase of at least 100 combined flows may occur. The road links and associated flow difference between the Do Minimum and DoSomething scenarios during the PM Peak Hour are outlined in Table 6-53.

Table 6-53: Road Links that Experience an Increase of at least +100 Combined Flows (Indirect study area, PM Peak Hour)

Orientation	Map ID	Road Name	Do Minimum Flows	DoSomething Flows	Flow Difference
North	P.6	Cornmarket	1183	1391	208
	P.7	South Circular Road	1157	1317	160
	P.8	Long Lane	101	234	133
	P.6	High Street	1510	1640	131
	P.5	Thomas Street	1215	1392	177
	P.5	Marrowbone Lane	570	704	134
West	P.3	Clogher Road	634	882	248
	P.2	Kildare Road	1221	1572	351
	P.4	Stannaway Road	317	584	266
	P.1	Cashel Road	916	1258	342
	P.1	Armagh Road	873	1100	227
	P.1	St Agnes Park	821	1033	212
	P.4	Lorcan O'Toole Park	245	370	125
	P.1	St Agnes Road	1153	1316	163
	P.4	Ravensdale Park	128	365	237
East	P.9	Harold's Cross Road	953	1206	253
	P.11	Kenilworth Park	719	970	251
	P.10	Rathgar Avenue	601	798	198
	P.11	Clareville Road	668	933	265
	P.11	Adrian Avenue	642	820	179
	P.11	Larkfield Park	636	831	195
	P.11	Larkfield Avenue	854	1127	273
	P.10	Rathgar Road	804	939	135
South	P.1	Whitehall Road West	557	776	219
	P.1	Templeville Road	899	1002	103
	P.10	Terenure Road East	877	998	121

As outlined in Table 6-53, the additional traffic on these road links varies between +103 and +351 combined flows during the PM Peak Hour. These road links have been identified as experiencing additional traffic volumes above the threshold outlined and therefore require further analysis which is presented later in this Chapter.

Overall Impact on Indirect Study Area: The redistributed traffic as a result of the Proposed Scheme results in a negative impact upon the road links identified in Table 6-53 during the PM Peak Hour. In order to determine the significance of the negative impact, a further assessment has been carried out subsequently. Operational capacity outputs have been extracted from the LAM at the associated junctions along the subject road links to determine whether there is reserve capacity to facilitate the uplift in traffic. The results are presented in terms of the significance of the impact to the V / C ratio for each junction based on its Sensitivity and Magnitude of Impact.

It should be noted that the worst performing arm of each junction has been used for the purpose of the assessment to ensure a conservative impact assessment is undertaken.

6.4.6.2.7.5 General Traffic Impact Assessment

Following the above threshold assessment, the following three-step approach has been undertaken to determine the significance of the negative impact as a result of the redistributed general traffic on the indirect study area:

Step 1 - Determination of Junction Sensitivity: Where road links experience additional traffic volumes of above the proposed thresholds, a review has been undertaken of its associated junctions using the following categories:

- **High Sensitivity (Category 5)** – Roads that cater for a lower volume of traffic than Category 4 with a lower speed limit (30km/h);
- **Medium Sensitivity (Category 4)** – Roads that can cater for a high volume of traffic with a moderate speed limit (30km/h – 50km/h), connecting neighbourhoods;
- **Low Sensitivity (Category 3)** – Roads that interconnect Category 2 type roads with a lower level of mobility than national roads; and
- **Negligible Sensitivity (Category 1 and Category 2)** – Roads that can cater for a high volume of traffic with a high speed limit (100km/h - 120km/h), between major metropolitan cities, i.e. national primary and secondary roads.

The above sensitivities / categories establish the characteristics of the surrounding road network impacted by the Proposed Scheme. The road link characteristics of the major arm of a junction has been used to determine the junction sensitivity. This has allowed for the identification of where more sensitive locations, in particular Category 5 roads / junctions, are impacted.

Step 2 – Determination of the Magnitude of Impact using Junction Analysis: To understand the magnitude impact of the redistributed traffic, operational capacities have been extracted from the LAM.

The capacity of junctions within the LAM are expressed in terms of Volume to Capacity ratios (V / C ratios). The V / C ratios represent the operational efficiency for each arm of a junction. For the purpose of this EIAR, operational capacity outputs of a junction have been identified with reference to the busiest arm which experiences the maximum V/C ratio.

A V / C ratio of below 85% indicates that traffic is operating well, with spare capacity, and does not experience queuing or delays throughout the hour. A value of 85% to 100% indicates that traffic is approaching its theoretical capacity and may experience occasional queues and delays within the hour. A value of over 100% indicates that traffic is operating above its theoretical capacity and experiences queues and delays regularly within the hour. The junctions have been described in the ranges outlined in Table 6-54.

Table 6-54 Junction Volume / Capacity Ranges

V / C Ratio	Traffic Condition
≤85%	Traffic is operating well within theoretical capacity.
85% - 100%	Traffic is approaching theoretical capacity and may experience occasional queues and delays within the hour.
≥100%	Traffic is operating above its theoretical capacity and experiences queues and delays quite regularly within the hour.

When comparing the V / C ratios during the Do Minimum and Do Something scenarios for the key junctions, the terms outlined in Table 6-55 have been used to describe the impact.

Table 6-55 Magnitude of Impact for Redistributed Traffic

		Do Something		
		≤85%	85% - 100%	>100%
Do Minimum	≤85%	Negligible	Low Negative	High Negative
	85% - 100%	Negligible	Negligible	Medium Negative
	>100%	Medium Positive	Negligible	Low Negative

As indicated in Table 6-55, the changes in V / C ratios between the Do Minimum and Do Something scenarios result in either a positive, negative or negligible magnitude of impact.

Step 3 – Determination of Significance of Effects: The magnitude of impact has been combined with the sensitivity of the road link to determine the Significance of Effect using the matrix shown in Table 6-4 which is based upon the EPA Guidelines (EPA 2022).

Potential mitigation measures have been considered at junctions where the significance of effect is predicted to be Significant or higher. At junctions where a Moderate effect or lower is predicted, further consideration has not been undertaken as moderate effects represent that which effects the 'character of the environment in a manner that is consistent with existing and emerging baseline trends' (as per Table 6-5).

The above analysis was carried out on the following scenarios:

- Opening Year (2028) – Do Minimum vs Do Something – AM Peak Hour;
- Design Year (2043) (Opening Year + 15 Years) – Do Minimum vs DoSomething – AM Peak Hour;
- Opening Year (2028) – Do Minimum vs DoSomething – PM Peak Hour; and
- Design Year (2043) (Opening Year + 15 Years) – Do Minimum vs DoSomething – PM Peak Hour.

The AM and PM Peak Hour flows have been identified as occurring between 08:00hrs to 09:00hrs and 17:00hrs to 18:00hrs, respectively. The interpeak periods have not been analysed for this impact assessment as the AM and PM Peak Hour flows present an overall worst-case scenario.

General Traffic Impact Assessment (Opening Year (2028)) – Indirect Study Area - AM Peak Hour

Table 6-56 presents the road links which have been identified in the General Traffic threshold assessment with reference to the capacity at their associated junctions during the 2028 AM Peak Hour. The results are presented in terms of the significance of the impact to the V / C ratio for each junction based on its sensitivity and magnitude of impact.

Table 6-56: Volume over Capacity Ratios at Key Junctions (Do Minimum vs. Do Something), AM Peak, Opening Year (2028)

Road Name	Road Sensitivity	Junction Name	Junction Sensitivity	DM Max V / C Ratio			DS Max V / C Ratio			Magnitude of Impact	Significance of Effects
				≤85%	85% - 100%	>100%	≤85%	85% - 100%	>100%		
Clogher Road	Medium	Clogher Road / Sundrive Road	High	✓				✓		Low	Moderate Negative

The results of the analysis presented in Appendix A6.4 and summarised in Table 6-56 demonstrate that the majority of junctions are operating at a maximum V / C ratio of below 85% during the AM Peak Hour in the 2028 scenario. This indicates that these junctions are operating well, with spare capacity that could accommodate additional traffic that may occur because of traffic redistribution following the delivery of the Proposed Scheme.

A negligible impact is predicted at 55 of the 57 junctions assessed. The effect of redistributed traffic associated with the Proposed Scheme is deemed **Not Significant and Long-Term** at 54 junctions of the 57 junctions assessed and **Imperceptible and Long-Term** at two of the junctions.

At the remaining junction, that of Clogher Road and Sundrive Road, the impact is **Negative, Moderate and Long Term**.

At the vast majority of the assessed junctions, performance is similar with or without the Proposed Scheme in place. As a result, the wider impact is expected to have **Negative, Slight and Long-Term** effect. Therefore, no further assessment into these junctions has been undertaken.

Given that the redistributed traffic will not lead to a significant deterioration of the operational capacity on the surrounding road network during the 2028 DoSomething scenario, no further mitigation measures have been considered to alleviate the impact outside of the direct study area.

General Traffic Impact Assessment (Opening Year (2028)) – Indirect Study Area - PM Peak Hour

Table 6-57 presents the road links which have been identified in the General Traffic threshold assessment with reference to the capacity at their associated junctions during the 2028 PM Peak Hour. The results are presented in terms of the significance of the impact to the V / C ratio for each junction based on its sensitivity and magnitude of impact.

Table 6-57: Volume over Capacity Ratios at Key Junctions (Do Minimum vs. Do Something), PM Peak, Opening Year (2028)

Road Name	Road Sensitivity	Junction Name	DM Max V / C Ratio			DS Max V / C Ratio			Magnitude of Impact	Significance of Effects
			≤85%	85% - 100%	>100%	≤85%	85% - 100%	>100%		
Kildare Road	High	Clogher Road / Kildare Road / Kildare Road	✓				✓		Low	Negative Moderate
South Circular Road	Medium	Donore Avenue / Donore Avenue / South Circular Road / South Circular Road	✓				✓		Low	Negative Moderate
St Agnes Road	Medium	St Agnes Road / Cromwellsfort Road / Kimmage Road West / Whitehall Road West			✓			✓	Negligible	Not Significant
Stannaway Road	Medium	Stannaway Road / Sundrive Road			✓			✓	Negligible	Not Significant

The results of the analysis presented in Appendix A6.4 and summarised in Table 6-57 demonstrate that the majority of junctions are operating at a maximum V / C ratio of below 85% during the PM Peak Hour in the 2028 scenario. This indicates that these junctions are operating well, with spare capacity that could accommodate additional traffic that may occur as a result of traffic redistribution following the delivery of the Proposed Scheme.

A negligible impact is predicted at 76 of the 79 junctions assessed. The effect of redistributed traffic associated with the Proposed Scheme is deemed **Not Significant and Long-Term** at 74 junctions of the 79 junctions assessed and **Imperceptible and Long-Term** at three of the junctions.

At two of these junctions the V / C ratio is over 100% in both the Do Something and Do Minimum scenarios those being:

- St Agnes Road / Cromwellsfort Road / Kimmage Road West / Whitehall Road West; and
- Stannaway Road / Sundrive Road.

At the remaining junctions (two) the impact is **Negative, Moderate and Long-Term,** those being.

- Clogher Road / Kildare Road / Kildare Road; and
- Donore Avenue / Donore Avenue / South Circular Road / South Circular Road.

Given that the redistributed traffic will not lead to a significant deterioration of the operational capacity on the surrounding road network during the 2028 Do Something scenario, no further mitigation measures have been considered to alleviate the impact outside of the direct study area.

General Traffic Impact Assessment (Design Year (2043_) – Indirect Study Area - AM Peak Hour

The results of the analysis presented in Appendix A6.4 demonstrate that all junctions are operating at a maximum V / C ratio of below 85% during the AM Peak Hour in the 2043 DoSomething scenario and experience a negligible Magnitude of Impact. This indicates that these junctions are operating well and could accommodate additional traffic that may occur as a result of traffic redistribution following the delivery of the Proposed Scheme. The Proposed Scheme is deemed to have an Imperceptible to Not Significant impact on the majority of junctions assessed

A **Negligible and Long-Term** impact is predicted at all 57 junctions assessed. The effect of redistributed traffic associated with the Proposed Scheme is deemed **Not Significant and Long-Term** at 55 junctions of the 57 junctions assessed and **Imperceptible and Long-Term** at two of the junctions.

At each junction assessed, performance is similar with or without the Proposed Scheme in place. As a result, the impact is expected to have a **Negative, Not Significant and Long-Term** effect at worst when combining the magnitude of the impact with the sensitivity of the road. Therefore, no further assessment into these junctions has been undertaken.

Given that the redistributed traffic will not lead to a significant deterioration of the operational capacity on the surrounding road network during the 2043 Do Something scenario, no further mitigation measures have been considered to alleviate the impact outside of the direct study area

General Traffic Impact Assessment (Design Year (2043)) – Indirect Study Area - PM Peak Hour

Table 6-58 outlines the V / C ratios at the key local / regional road junctions in the PM Peak Hour for the Design Year (2043) at junctions where the ratio exceeds 100% in the Do Something scenario, or the significance of effect is slight or higher. The location of these junctions and the V / C ratio comparison between the Do Minimum and Do Something scenarios in the 2043 PM Peak Hour are illustrated in Figure 6.12 in Volume 3 of this EIAR.

Table 6-58 Volume over Capacity Ratios at Key Junctions (Do Minimum vs. Do Something), PM Peak, Design Year (2043)

Road Name	Junction Name	Junction Sensitivity	DM Max V/C Ratio			DS Max V/C Ratio			Magnitude of Impact	Significance of Effects
			<85%	85% - 100%	>100%	<85%	85% - 100%	>100%		
High Street	High Street / Nicholas Street / St Michaels Hill / Clanbrassil Street Upper / Christchurch Place	High			✓			✓	Negligible	Not Significant
St Agnes Road	St Agnes Road / Cromwellsfort Road / Kimmage Road West / Whitehall Road West	Medium			✓			✓	Negligible	Not Significant
Stannaway Road	Stannaway Road / Sundrive Road	Medium			✓			✓	Low	Negative Moderate

The results of the analysis presented in Appendix A6.4 and summarised in Table 6-58 demonstrate that the majority of junctions are operating at a maximum V / C ratio of below 85% during the PM Peak Hour in the 2043 Do Something scenario and experience a negligible Magnitude of Impact. This indicates that these junctions are operating well and could accommodate additional traffic that may occur as a result of traffic redistribution following the delivery of the Proposed Scheme. The Proposed Scheme is deemed to have an Imperceptible to Not Significant impact on the majority of junctions presented in Table 6-58.

A **Negligible** impact is predicted at 78 of the 79 junctions assessed. The effect of redistributed traffic associated with the Proposed Scheme is deemed **Not Significant and Long-Term** at 76 junctions of the 79 junctions assessed and **Imperceptible and Long-Term** at two of the junctions. Of those junctions with impacts assessed as not significant two junctions have V / C ratios of over 100% in both the Do minimum and Do Something scenarios, those are:

- St Agnes Road / Cromwellsfort Road / Kimmage Road West / Whitehall Road West
- High Street / Nicholas Street / St Michaels Hill / Clanbrassil Street Upper / Christchurch Place

At the remaining junction, the impact is low (at one junction) and when combining the magnitude of impact with the road sensitivity, there is predominately a **Negative, Moderate and Long-Term** effect.

Given that the redistributed traffic will not lead to a significant deterioration of the operational capacity on the surrounding road network during the 2043 Do Something scenario, no further mitigation measures have been considered to alleviate the impact outside of the direct study area.

6.4.6.2.7.6 Night-Time Traffic Redistribution

The night-time period is defined as between 23:00hrs and 07:00hrs. An analysis of traffic data during this period indicates that traffic levels are considerably lower and that junctions have a higher capacity for vehicular movement due to lower pedestrian, cyclist and bus demand leading to higher levels of general traffic green time allocation. Automatic Traffic Counter data demonstrates that, typically, within Dublin the night-time period has approximately 19% of the traffic levels compared to the morning peak hour (08:00hrs to 09:00hrs). As a result, during the night-time period junctions do not experience flows in excess of capacity which would result in queuing and in turn potential re-distribution of traffic to alternative routes to avoid congestion. Therefore, the effects of traffic redistribution due to any of the Proposed Schemes will be **Negligible and Long Term** during the night-time period.

6.4.6.2.7.7 General Traffic Impact Assessment Summary

Given the improvements to bus priority, walking and cycling as a result of the Proposed Scheme, there will likely be an overall reduction in operational capacity for general traffic along the direct study area. This may in turn result in some redistribution of general traffic away from the main corridor onto the surrounding road network.

Using the TII Guidelines (TII 2014) as an indicator for best practice, the LAM Opening Year (2028) model results were used to identify the difference in traffic flows between the Do Minimum and Do Something scenarios. The following thresholds have been used to identify where a further assessment is required:

- **Local / Regional Roads:** Traffic redistribution results in an increase above 100 combined flows (i.e. in a two-way direction) along residential, local and regional roads in the vicinity of the Proposed Scheme in the AM and PM peak hours; and
- **National Roads:** Traffic exceeds 5% of the combined turning flows at junctions with / on / or with national roads in the AM and PM peak hours as a result of traffic redistribution comparing the Do Minimum to the Do Something scenario with the Proposed Scheme in place. Note, no national roads are included within the Study Area for the Proposed Scheme.

The threshold impact assessment identified the following roads that require further traffic analysis:

- **AM Peak Hour:** Adrian Avenue, Armagh Road, Clareville Road, Clogher Road, Clonard Road, Clonmacnoise Road, Heytesbury Street, Kenilworth Park, Kildare Road, Larkfield Avenue, Larkfield Road, Lorcan O'Toole Park, New Bride Street, Parnell Road, R112, Rathgar Road, Rathgar Avenue, St. Agnes Road, St. Agnes Park, Stannaway Road and Whitehall Road West; and
- **PM Peak Hour:** Adrian Avenue, Armagh Road, Cashel Road, Clareville Road, Clogher Road, Cornmarket, Harold's Cross Road, High Street, Kenilworth Park, Kildare Road, Larkfield Avenue, Larkfield Park, Long Lane, Lorcan O'Toole Park, Marrowbone Lane, Rathgar Avenue, Rathgar Road, Ravensdale Road, South Circular Road, St. Agnes Road, St. Agnes Park, Stannaway Road, Templeville Road, Terenure Road East, Thomas Street and Whitehall Road West.

The general traffic impact assessment on the indirect study area has been undertaken by extracting operational capacities from the LAM at the key junctions along the above road links identified in the threshold impact assessment.

The results are presented in terms of the significance of the change in V / C ratio for each junction based on its sensitivity and magnitude of impact. To undertake a robust assessment, the operational capacity outputs have been presented with reference to the worst performing arm of a junction that experiences the maximum V / C ratio.

The overall results of this assessment can be summarised as follows:

The majority of assessed junctions have V / C ratios of below 85% (i.e. they are operating well within capacity for all assessed years in both the Do Minimum and Do Something scenarios). This indicates that these junctions will be able to accommodate any additional general traffic volumes redistributed as a result of the Proposed Scheme. The effect of the Proposed Scheme on the majority of junctions is deemed **Imperceptible to Not Significant and Long-Term**.

No junctions are predicted to experience a significance of effect that is significant or higher.

It should be noted that while there are low impacts to the operational capacity in the indirect study area, this level of congestion is acceptable according to national guidance. Section 3.4.2 of DMURS (Government of Ireland 2019) recognises that a certain level of traffic congestion is an inevitable feature within urban networks and that junctions may have to operate at saturation levels for short periods of time during the peak hours of the day. Chapter 1 of the Smarter Travel Policy Document (DoT 2019c) also acknowledges that it is not feasible or sustainable to accommodate continued demand for car use. Therefore, it can be concluded that the traffic congestion that is outlined in the impact assessment is acceptable with regard to the urban location of the area.

Accordingly, it is determined that there will be an overall **Negative, Slight and Long-Term** impact from the redistributed general traffic as a result of the Proposed Scheme. Given that the redistributed traffic will not lead to a significant deterioration of the operational capacity on the surrounding road network, no further mitigation measures have been considered to alleviate the impact outside of the direct study area.

It should therefore be considered that the traffic congestion that is outlined in the impact assessment is acceptable with regard to the urban location of the area in the context of the increased movement of people overall and on sustainable modes in particular

6.4.6.3 Operational Phase Summary

The aim of the Proposed Scheme 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 of the CBC Infrastructure Works, applicable to the traffic and transport assessment of the Proposed Scheme 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.

Based on the information and analysis presented within Section 6.4 (Operational Phase), the assessment determines that the Proposed Scheme meets the above objectives and integrates within the receiving transport environment with minimal impacts during the Operational Phase. The assessment demonstrates the following:

- **Pedestrian Infrastructure:** The Proposed Scheme consists of measures to enhance the existing pedestrian infrastructure along the direct study area. A Level of Service (LoS) junction assessment was undertaken using a set of five criteria to determine the impact that the Proposed Scheme has for pedestrians. The results of the impacted junctions demonstrate that the LoS during the Do Minimum scenario consists predominantly of the lowest D / E / F ratings in the west of the scheme, with mostly C rating closer to the city centre. During the Do Something scenario, i.e. following the development of the Proposed Scheme, the LoS consists predominantly of the highest A / B ratings, with the exception of one C. Overall, the improvements to the quality of the pedestrian infrastructure will be **Positive, Moderate to Significant and Long-Term** in Section 1, Section 2 and Section 3 of the Proposed Scheme;

- **Cycling Infrastructure:** The Proposed Scheme also consists of measures to enhance the existing cycling infrastructure along the direct study area. A LoS assessment was undertaken using an adapted version of the NTA's National Cycle Manual Quality of Service (QoS) Evaluation criteria. The results of the assessment demonstrate that the LoS during the Do Minimum scenario consists predominantly of C / D ratings. During the Do Something scenario, the LoS consists predominantly of the highest A / B ratings, with the exception of two Cs. Given the quality of the existing cycling infrastructure along the Proposed Scheme, the improvements will be **Positive, Moderate and Long-Term** in Section 1**, Positive, Moderate and Long-Term** in Section 2 and **Positive, Very Significant and Long-Term** in Section 3;

- **Bus Infrastructure:** A qualitative impact assessment has been undertaken based on the provision of bus priority, pedestrian accessibility and changes to the bus stop facilities. The results of the assessment demonstrate that the improvements to the quality of the bus infrastructure will be **Positive, Very Significant and Long-Term** in Section 1 and 3 and **Positive, Moderate and Long-Term** in Section 2;

- **Parking and Loading:** A qualitative impact assessment has been undertaken of the Proposed Scheme impacts on the existing parking and loading. The results of the assessment demonstrate that the changes to the parking and loading provision will result in an overall loss of 46 spaces (-39 spaces in Section 1, +12 spaces in Section 2 and -19 spaces in Section 3). Given the nature of the loss in parking and the availability of alternative spaces in the indirect study area, the impact is deemed to be **Negative, Slight and Long-Term** in Section 1, 2 and 3 of the Proposed Scheme;

- **People Movement:** Given the proposed amendments to the pedestrian, cycling, bus and parking / loading infrastructure outlined above, the Proposed Scheme will have greater capacity to facilitate movement of people travelling through the corridor. A quantitative impact assessment has been undertaken using outputs from the NTA's ERM and LAM, comparing the Do Minimum and DoSomething peak hour scenarios for each forecast year (2028, 2043). The results of the assessment demonstrate that there will be an increase in 29% and 36% of people travelling through the Proposed Scheme during the 2028 AM and PM Peak Hours respectively. During the 2043 scenario there will be an increase in 22% and 20% of people travelling through the Proposed Scheme during the AM and PM Peak Hours respectively. The analysis also shows that there will be an increase of 9.1% and 9.9% in the number of people travelling by bus during the 2028 AM and PM peak hours respectively. During the 2043 scenario there will be an increase of 10.7% and 12.2% in the number of people travelling by bus during the AM and PM peak hours respectively. Overall, it is anticipated that the increases in people movement by sustainable modes (walking, cycling and bus) and the reductions in car mode share along the direct study area will have **Positive, Significant and Long-Term** impact**;**

- **Bus Network Performance Indicators:** The Proposed Scheme will also benefit from improvements to the capacity of the road network to cater for future bus services accessing the Proposed Scheme. A micro-simulation model assessment has been developed to extract network performance indicators of the bus operations along the 'end to end' corridor. The findings of the Bus User assessment shows that the Proposed Scheme fully aligns with the aims and objectives of the CBC Infrastructure Works, 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'.

The significance of impact on bus users of the Proposed Scheme has been appraised using a qualitative assessment, taking the changes in journey time and journey reliability metrics presented above into consideration. The Proposed Scheme is considered to deliver a **Positive, Significant and Long-Term** impact overall;

- **General Traffic Network Performance Indicators:** There will be an overall reduction in operational capacity for general traffic along the direct study area, given the proposed infrastructural changes to the existing road layout outlined above. This reduction in operational capacity for general traffic will create traffic redistribution from the Proposed Scheme onto the surrounding road network.

  The LAM Opening Year (2028) model results were used to identify the impact in traffic flows between the Do Minimum and Do Something scenarios. A reduction in general traffic flows along a road link has been described as a positive impact to the environment. The significance of the impact has been described in terms of the loss in traffic flows. An increase in general traffic flows along a road link has been described as a negative impact to the environment. Reference has been given to TII's Traffic and Transport Assessment Guidelines as an indicator for best practice, to determine the key road links that require further traffic analysis due to the increase in traffic. Operational capacities were extracted from the LAM at the associated junctions of the key road links to identify the impact that the Proposed Scheme will have on the Volume / Capacity ratios. The results are presented in terms of the significance of the impact to the V / C ratio for each junction based on its sensitivity and magnitude of impact.

  The results of the assessment demonstrate that the surrounding road network largely has the capacity to accommodate the redistributed general traffic as a result of the Proposed Scheme. Along the proposed scheme corridor, the direct study area, the impacts vary from **Slight to Profound but in all cases are Positive and Long Term**.

  Away from the scheme corridor, the indirect study area, the majority of assessed junctions that required further traffic analysis have V / C ratios that are broadly similar before and after the Proposed Scheme with the exception of three junctions where an increase in V / C ratio is anticipated to result in a **Negative, Moderate (or lower) and Long-Term** impact. Overall given these junctions form only a small part of the network the impacts of the traffic redistribution can be considered **Negative, Slight and Long-Term**.

Table 6-59 presents a summary of the predicted impacts of the Proposed Scheme during the Operational Phase.

Table 6-59: Summary of Potential Operational Phase Impacts

Assessment Topic	Effect	Potential Impact
Pedestrian Infrastructure	Improvements to the quality of the pedestrian infrastructure along the Proposed Scheme.	Positive, Moderate to Significant and Long-Term
Cycling Infrastructure	Improvements to the quality of the cycling infrastructure along the Proposed Scheme.	Positive, Moderate to Very Significant and Long-Term
Bus Infrastructure	Improvements to the quality of the bus infrastructure along the Proposed Scheme.	Positive, Moderate to Very Significant and Long-Term
Parking and Loading	A total loss of 94 parking / loading spaces along the Proposed Scheme.	Negative, Slight and Long-Term
People Movement	Increases to the total number of people travelling through the Proposed Scheme.	Positive, Significant and Long-Term
Bus Network Performance Indicators	Improvements to the network performance indicators for bus users along the Proposed Scheme.	Positive, Significant and Long-Term
General Traffic Network Performance Indicators	Reduction in general traffic flows along the Proposed Scheme.	Positive, Slight to Profound and Long-Term
	Redistributed general traffic along the surrounding road network in the indirect study area as a result of the reduction of reserve capacity along the Proposed Scheme.	Negative, Slight and Long-Term

As outlined within Section 6.4 and summarised in Table 6-59, the Proposed Scheme will deliver strong positive impacts to the quality of pedestrian, cycling and bus infrastructure during the Operational Phase providing for enhanced levels of People Movement in line with the scheme objectives. These improvements will help to provide an attractive alternative to the private car and promote a modal shift to walking, cycling and public transport, allowing for greater capacity and comfort along the corridor to facilitate the sustainable movement of people as population and employment levels grow in the future.

The Proposed Scheme will address sustainable mode transport infrastructure deficits while contributing to an overall integrated sustainable transport system as proposed in the GDA Strategy. It will increase the effectiveness and attractiveness of bus services operating along the corridor and will result in more people availing of public transport due to the faster, more reliable journey times which the Proposed Scheme provides. This in turn will support the future increase to the capacity of the bus network and services operating along the corridor and thereby further increasing the attractiveness of public transport. In addition to this, the significant segregation and safety improvements to walking and cycling infrastructure that is a key feature of the Proposed Scheme will further maximise the movement of people travelling sustainably along the corridor. The combined effect of these changes will therefore cater for higher levels of future sustainable population and employment growth.

In the absence of the Proposed Scheme, bus services will be operating in a more congested environment, leading to higher journey times and lower reliability for bus journeys. This limits their attractiveness to users, and this will lead to reduced levels of public transport use, making the bus system less resilient to higher levels of growth. The absence of walking and cycling measures that the Proposed Scheme provides will also significantly limit the potential to grow those modes into the future.

On the whole, the Proposed Scheme will make a significant contribution to the overall aims of BusConnects that is a key part of the GDA Strategy and will enable the city to grow sustainably into the future. This would not be possible in the absence of the Proposed Scheme.

6.5 Mitigation and Monitoring Measures

6.5.1 Construction Phase

Chapter 5 (Construction) has been prepared to demonstrate the likely approach that will be taken to construct the Proposed Scheme, while it also provides an overview of the construction activities necessary to undertake the works, including information on the proposed Construction Compounds, construction plant and equipment.

A CEMP has been prepared and is included as Appendix A5.1 in Volume 4 of this EIAR. The CEMP will be implemented (and developed further as required) by the appointed contractor prior to construction commencing. The CEMP comprises the construction mitigation measures, which are set out in this EIAR, and will be updated with any additional measures which may be required by the conditions attached to An Bord Pleanála's decision. Implementation of the CEMP will ensure disruption and nuisance are kept to a minimum during the Construction Phase. The CEMP has regard to the guidance contained in the TII Guidelines for the Creation, Implementation and Maintenance of an Environmental Operating Plan (TII 2007), and the handbook published by CIRIA in the UK, Environmental Good Practice on Site Guide, 4th Edition (CIRIA 2015). All of the content provided in this CEMP will be implemented in full by the appointed contractor and its finalisation will not affect the robustness and adequacy of the information presented and relied upon in this EIAR.

A detailed CTMP will be prepared and included in the CEMP, and subsequently implemented, by the appointed contractor prior to construction, including Temporary Traffic Management arrangements prepared in accordance with the Traffic Signs Manual, Chapter 8 Temporary Traffic Measures and Signs for Roadworks (DoT 2019a). The CTMP will be consulted upon with the road authority and will include measures to minimise the impacts associated with the Construction Phase upon the peak periods of the day. It will include imbedded mitigation measures which will assist to alleviate any negative impact as a result of the Construction Phase of the Proposed Scheme. The appointed contractor will also prepare and include in the CEMP a CSMMP which will be developed prior to construction, as described in the CEMP, to actively encourage its personnel to travel to site by sustainable means.

No further mitigation measures are therefore required to be considered as part of the Proposed Scheme.

6.5.2 Operational Phase

Given that the Proposed Scheme results in a positive impact for walking, cycling, bus and people movement, mitigation and monitoring measures have not been considered beyond those already incorporated as part of the Proposed Scheme.

The impacts to general traffic and parking / loading, including the mitigation measures incorporated into the Proposed Scheme have been outlined in Chapter 4 (Proposed Scheme Description) of this EIAR.

No further mitigation measures are required to be considered as part of the Proposed Scheme.

6.6 Residual Impacts

With the implementation of the embedded mitigation measures which have been included as part of the Proposed Scheme, the residual impacts associated with the assessment topics outlined in Section 6.4 remain the same.

6.7 References

DCC (2022). Dublin City Development Plan

CIRIA (2015). Environmental Good Practice on Site Guide, 4th Edition

DoT (2019a). Traffic Signs Manual

DoT (2019b). Traffic Management Guidelines

DoT (2019c). Smarter Travel

DoT (2023). Ireland's Road Haulage Strategy 2022-2031

EMRA (2019). Regional Spatial and Economic Strategy

EPA (2022). Guidelines on the Information to be Contained in Environmental Impact Assessment Reports.

Government of Ireland (2018). National Planning Framework

Government of Ireland (2019). Design Manual for Urban Roads and Streets

Government of Ireland (2021). National Development Plan 2021-2030

Government of Ireland (2023). Climate Action Plan 2023

NAVTEQ (2011). The NavStreets Reference Manual

NDA (2020). Building for Everyone: A Universal Design Approach

NTA (2011). National Cycle Manual

NTA (2022). Greater Dublin Area Cycle Network Plan

NTA (2021). Preliminary Design Guidance Booklet for BusConnects Core Bus Corridors

NTA (2022). Greater Dublin Area Transport Strategy 2022 - 2042

RSA (2019). Road Safety Strategy (2021-2030)

TII (2007). Guidelines for the Creation, Implementation and Maintenance of an Environmental Operating Plan

TII (2014). Traffic and Transport Assessment Guidelines

TRB (2000). Highway Capacity Manual

TRB (2013). Transit Capacity and Quality of Service Manual

Transport for London (2010). Traffic Modelling Guidelines