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 & transport impacts associated with the Construction and Operational Phases of the Ringsend to City Centre 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) guidance on the information to be contained in EIARs. To accompany this chapter, a Transport Impact Assessment (TIA) has been prepared. The TIA presents a comprehensive review of the traffic and transport impacts associated with the Proposed Scheme, which has informed the production of this EIAR Traffic & Transport chapter. The TIA should be read in conjunction with this EIAR chapter and is included as Appendix A6.1 (Transport Impact Assessment Report).

The Proposed Scheme, as described in detail in Chapter 4 (Proposed Scheme Description), is routed along the northern and southern quay carriageways between R802 Talbot Memorial Bridge and R131 Tom Clarke East Link Bridge. There is also a cycling connection onto Ringsend and Irishtown, between R131 Tom Clarke East Link Bridge and R131 Sean Moore Road.

The Proposed Scheme comprises the development of bus priority and cycling facilities along the northern and southern quay carriageways between R802 Talbot Memorial Bridge and R131 Tom Clarke East Link Bridge. Alterations to cycle infrastructure are proposed along the entire route including throughout the residential settlement between R131 Tom Clarke East Link Bridge and R131 Sean Moore Road. The design of the Proposed Scheme consists of bus priority measures and dedicated two-way off-road cycle tracks adjacent to the River Liffey and a cycle route between R131 Tom Clarke East Link Bridge and R131 Sean Moore Road, incorporating sections of segregations, and shared areas between cyclists, pedestrians and local car traffic.

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) Length: 4.3km (comprising of 2 x 1.6km along the River Liffey Quays and 1.1km cycle route through Ringsend and Irishtown to Sean Moore Road
Bus Lanes		
Inbound	0.6	2.35
Outbound	0.5	1.85
Bus Priority through Traffic Management		
Inbound	0.0	0.85
Outbound	0.0	0.65
Total Bus Priority (both directions)	1.1	5.7 (+375%)
Bus Measures		
Proportion of Route (along River Liffey Quays) with Bus Priority Measures	34.0%	89.0%
Cycle Facilities – Segregated		
Inbound	1.9	4.0
Outbound	2.3	4.0
Cyclist Facilities – Non-segregated		
Inbound	0.1	0.3
Outbound	0.8	0.3

Features	Existing (km)	Proposed Scheme (km) Length: 4.3km (comprising of 2 x 1.6km along the River Liffey Quays and 1.1km cycle route through Ringsend and Irishtown to Sean Moore Road
Total Cyclist Facilities (both directions)	5.1	8.6 (+69%)
Proportion Segregated (including Quiet Street Treatment)	82.0%	93.0%
Other Features		
Number of Traffic Signal Controlled Junctions	11	14
Number of Signal Crossings	37	50
Number of Residential Properties with Land Acquisition	Not applicable	0 Residential

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 the 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
BCIDA-ACM-GEO_GA-0016_XX_00-DR-CR-9001	General Arrangement
BCIDA-ACM-GEO_CS-0016_XX_00-DR-CR-9001	Typical Cross Sections
BCIDA-ACM-TSM_GA-0016_XX_00-DR-CR-9001	Traffic Signs and Road Markings
BCIDA-ACM-TSM_SJ-0016_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 in Appendix A6.1 (Transport Impact Assessment Report).

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 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) (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 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 Level of Service 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 6.1.2.

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.

Diagram 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.

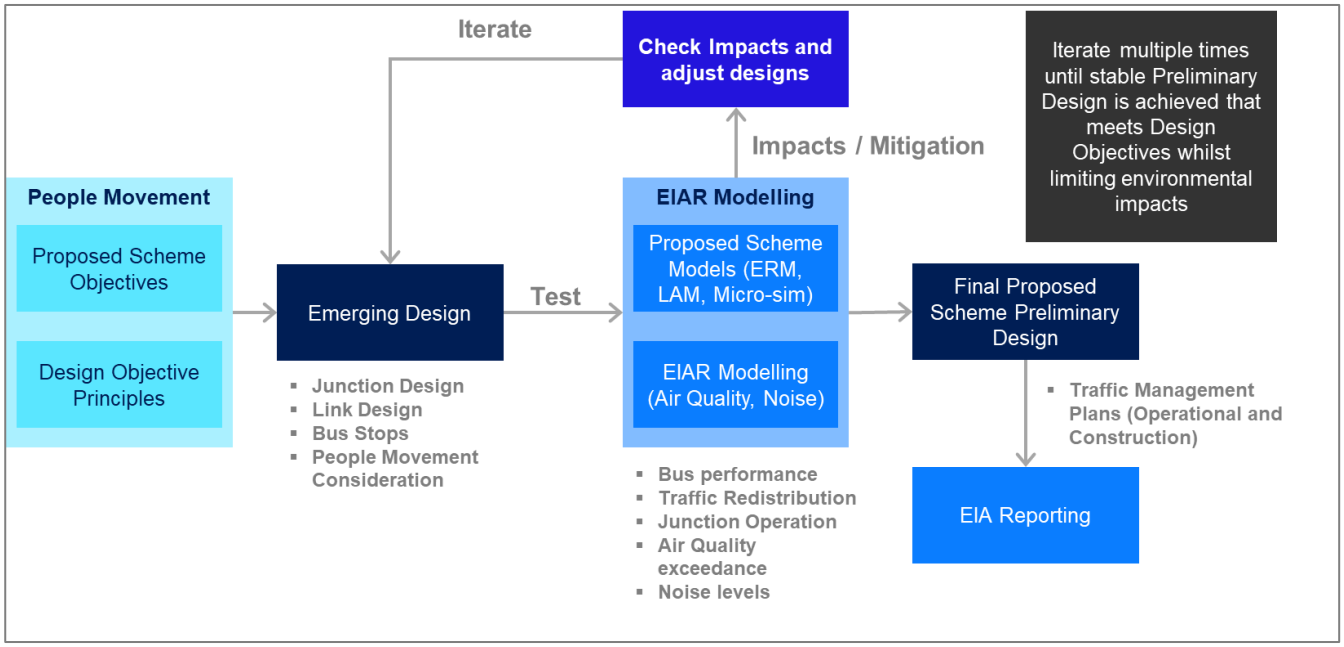


Diagram 6.1 Proposed Scheme Impact Assessment and Design Interaction

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 have been 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 Diagram 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 TII's Traffic and Transport Assessment Guidelines (May 2014) (see Section 6.4.6.3.8 for further details on the threshold applied in relation to traffic volume changes used in the definition of the indirect study area).

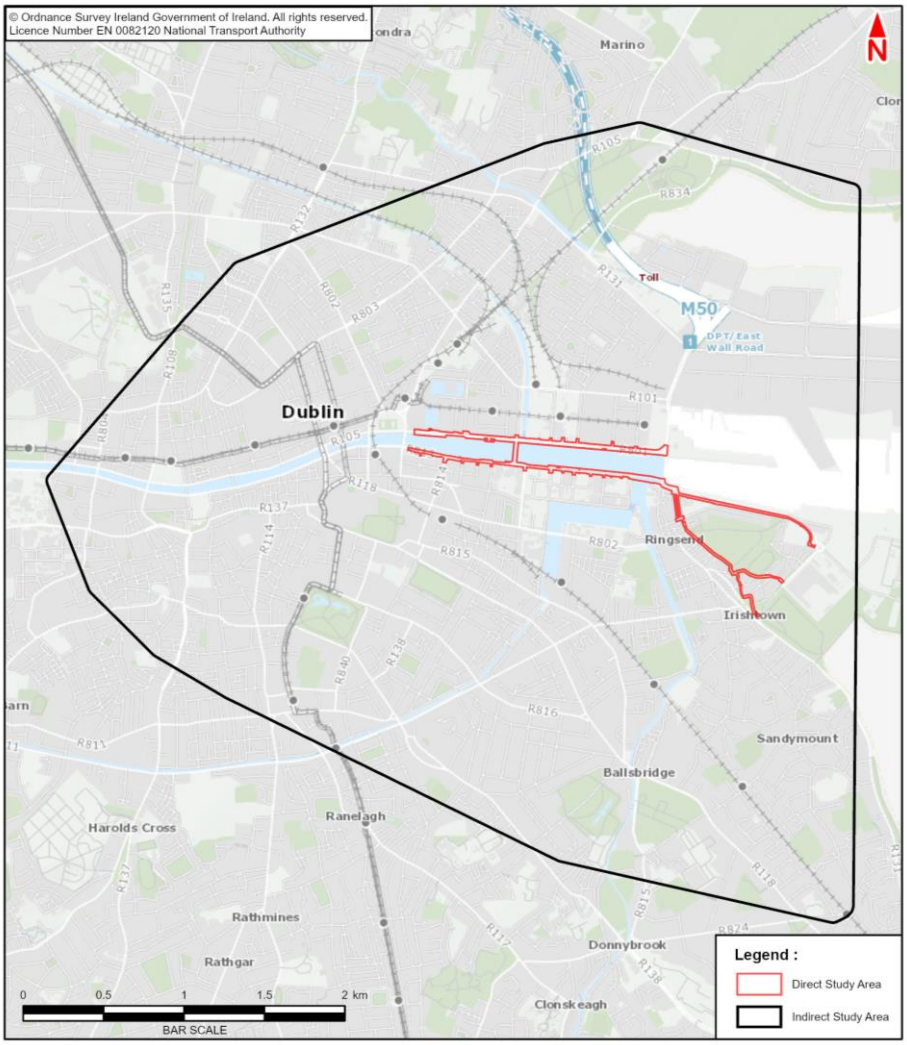


Diagram 6.2: Proposed Scheme Direct and Indirect Study Area

6.2.2 Relevant Guidelines, Policy and Legislations

The policies and legislation which are applicable to the Traffic & Transport chapter are detailed in Chapter 2 (Need for the Proposed Scheme) of the EIAR and in Appendix A6.1 (Transport Impact Assessment Report). The specific traffic and transport guidelines which have informed this chapter are detailed in turn.

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 Transport Infrastructure Ireland's (TII) 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 document is considered best practice guidance for the assessment of transport impacts related to changes in traffic flows due to proposed developments and is generally an appropriate means of assessing the traffic and transport impact of additional trips on the surrounding road network. The TIA, which supports this EIAR 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) (Department of Transport, Tourism and Sport (DTTS) 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 this Manual 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 this Manual apply to the design of all urban roads and streets (with a speed limit of 60 km/h or less), except: (a) Motorways (b) In exceptional circumstances, certain urban roads and streets with the written consent of Sanctioning Authorities.

The Manual 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), 2019) 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, 2019) 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 Guidelines is rooted in decision making and balancing priorities, including those that are in conflict with one another. The Guidelines identifies 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 6.9 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 East Regional Model (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 Local Area Model (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, 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.

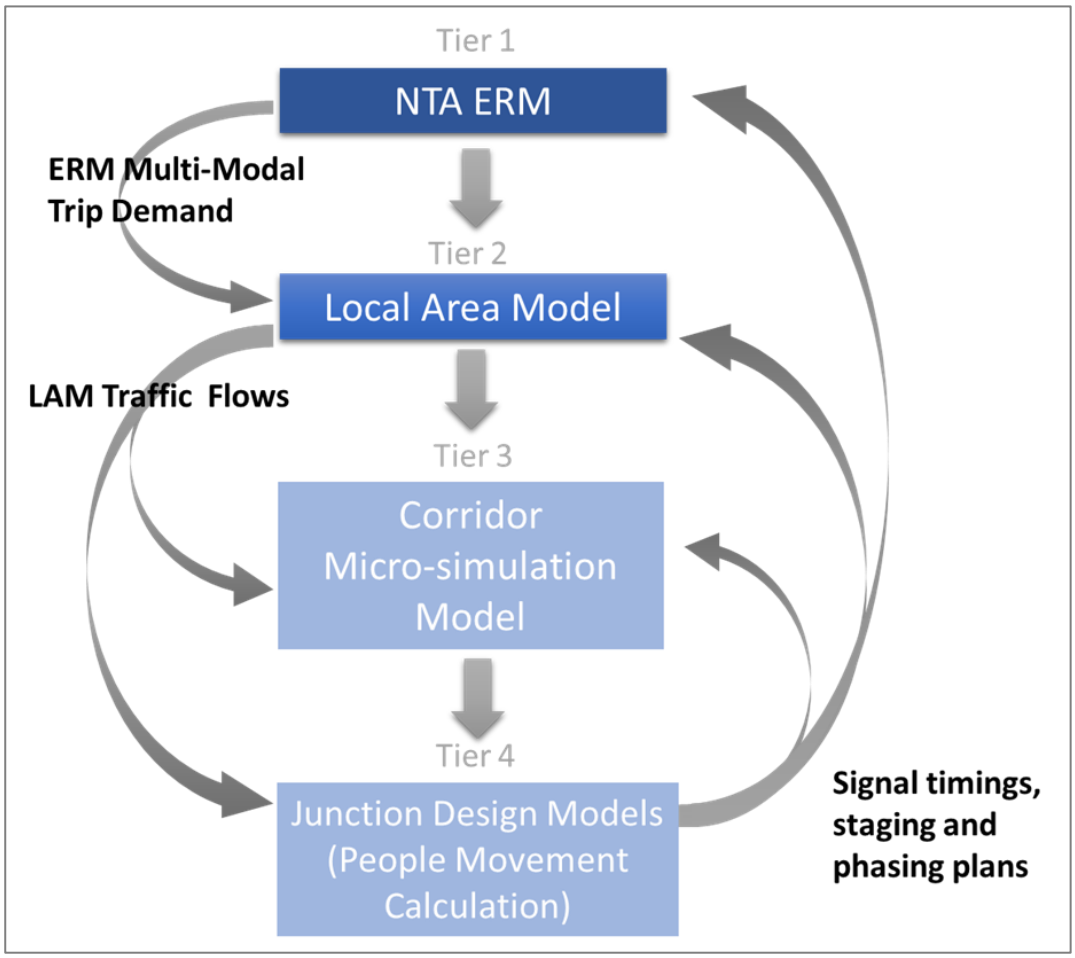


Diagram 6.3: Proposed Scheme Modelling Hierarchy

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 Guidelines to be Contained in EIARs (EPA 2022) and methodologies outlined in the 'Traffic and Transport Assessment Guidelines (TII 2014), using a Multi-Modal Level of Service (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 scheme and demand assumptions within this scenario are included further below in Section 6.4.3.

- **'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.
    - 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 Level of Service (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 2003).

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.

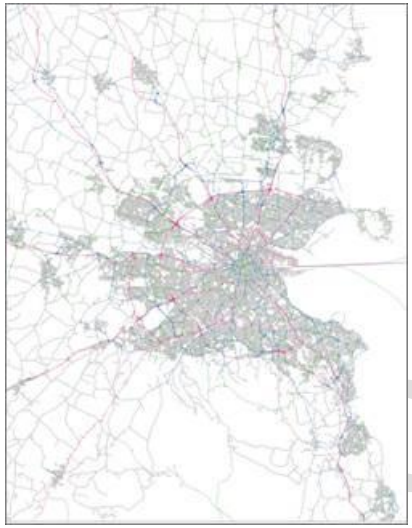
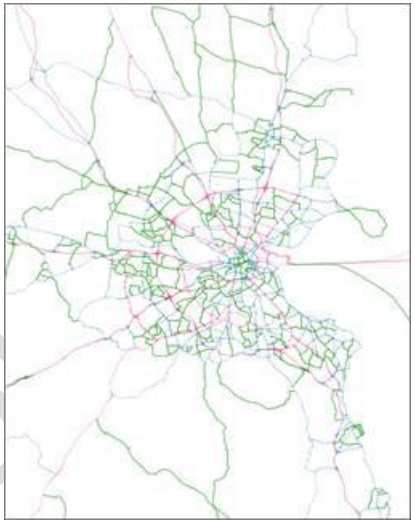
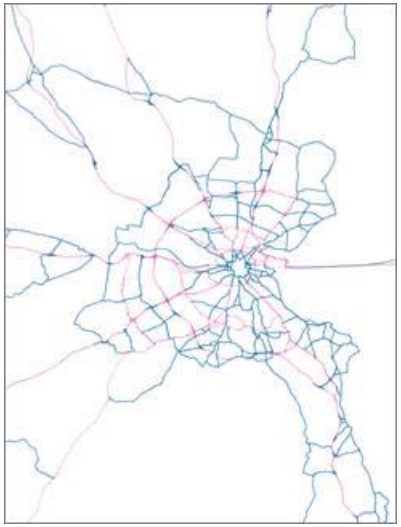
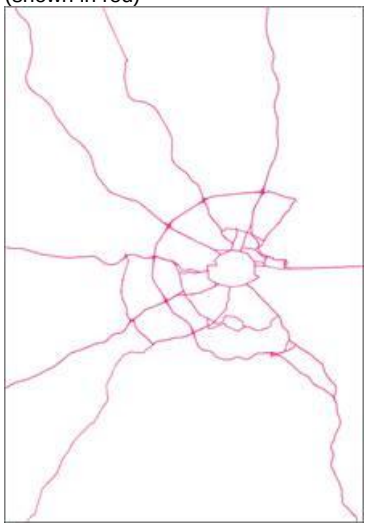
6.2.4.4 Defining the Sensitivity of the Environment

The impact assessment sensitivities established for the Traffic and Transport 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 3.5 of the EPA Guidelines on EIARs. This enables the sensitivities and magnitudes of impact to determine the significance of a particular impact. For example, a section of a Proposed Scheme 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 Proposed Scheme 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 impact of significant or higher (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 6.4.6.2.

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 focussed 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.
- 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 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 6.4.6.3. Further detail can be found in Appendix A6.2 (Transport Modelling Report).

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 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) 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 Junction Turning Counts (JTCs) and Automatic Traffic Counts (ATCs).

6.2.5.2.2.1 Junction Turning Counts (JTCs)

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 (ATCs)

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 (Transport Impact Assessment 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 desktop review of the most recent aerial photography.

Overall, cycling infrastructure is provided for 58% of the corridor. Along the North Quays, cycling infrastructure provision on the corridor consists of 88% cycle priority outbound and 75% inbound. Along the South Quays, cycling infrastructure provision on the corridor consists of 88% cycle priority outbound and 56% cycle priority inbound. There is limited current provision to the east of the River Dodder.

Bus services along the Proposed Scheme currently operate within a constrained and congested environment, with 19% priority outbound and 19% priority inbound on the corridor. Any further increases in traffic levels are likely to exacerbate issues along the route. 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 remaining sections of unprioritised bus network can lead to bunching 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 scheme has been divided into three no. 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: Talbot Memorial Bridge to Tom Clarke East Link Bridge;
- Section 2: Dodder Public Transport Opening Bridge (DPTOB); and
- Section 3: Tom Clarke East Link Bridge to Sean Moore Road.

6.3.2 Section 1 – Talbot Memorial Bridge to Tom Clarke East Link Bridge

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 R802 Talbot Memorial Bridge to R131 Tom Clarke East Link Bridge.

Section 1 consists of 350m of R801 Custom House Quay, 1.25km of R801 North Wall Quay, 350m of R813 City Quay, 1km of Sir John Rogerson's Quay (part of which covers the R813 regional road), as well as the R802 Talbot Memorial Bridge and Samuel Beckett Bridge that cross over the River Liffey. The Scherzer Bridges are a key feature of Section 1 currently creating a width constraint along the North Quay between Talbot Memorial Bridge and Sean O'Casey Bridge.

6.3.2.1 Pedestrian Infrastructure

R801 Custom House Quay, R801 North Wall Quay, R813 City Quay, Sir John Rogerson's Quay (part of which covers the R813 regional road), R802 Talbot Memorial Bridge and Samuel Beckett Bridge are well served by pedestrian infrastructure with footpaths and street lighting on both sides of the carriageways. Typically, the width of the footpaths varies between 1.8m and 4.0m.

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 R802 Talbot Memorial Bridge / R802 Memorial Road / R801 Custom House Quay junction provides direct signalised crossings on the southern and western arms. Indirect signalised crossings are provided on the northern and eastern arm which are both staggered by pedestrian refugee islands;
- A direct signalised crossing is provided across R801 Custom House Quay adjacent to Sean O'Casey Bridge;
- The three-arm R801 North Wall Quay / R801 Custom House Quay / Commons Street junction provides direct signalised crossings on each arm;
- A direct signalised crossing is provided across R801 North Wall Quay adjacent to Excise Walk;
- The four-arm R801 North Wall Quay / Samuel Beckett Bridge / Guild Street junction provides direct signalised crossings on each arm;
- The three-arm R801 North Wall Quay / Park Lane junction provides direct signalised crossings on each arm;
- The three-arm R801 North Wall Quay / New Wapping Street New junction provides direct signalised crossings on each arm; and
- The three-arm R801 North Wall Quay / North Wall Avenue junction provides direct signalised crossings on each arm.
- The three-arm R813 Sir John Rogerson's Quay / R813 Forbes Street junction provides direct signalised crossings on each arm;
- The three-arm R813 Sir John Rogerson's Quay / R813 Cardiff Lane junction provides direct signalised crossings on the eastern and southern arms;
- The four-arm R813 Sir John Rogerson's Quay / R813 Samuel Beckett Bridge junction provides one indirect signalised crossing on the northern arm which is staggered by a pedestrian refuge island;
- The three-arm R813 City Quay / R814 Lombard Street East junction provides indirect signalised toucan crossings on all arms which are staggered by pedestrian refuge islands; and
- The four-arm R813 City Quay / R802 Talbot Memorial Bridge / R105 George's Quay / R802 Moss Street junction provides three indirect signalised toucan crossings on the eastern, southern, and western arm which are all staggered by pedestrian refuge islands.

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 A6.5.1 (Pedestrian Impact Assessment) in Volume 4 of this EIAR.

6.3.2.2 Cycling Infrastructure

To the north of River Liffey (R801 Custom House Quay and R801 North Wall Quay), a westbound cycle track, of variable width is located adjacent to the westbound carriageway between R802 Talbot Memorial Bridge and Samuel Beckett Bridge. The cycle track discontinues at three locations, firstly at the Scherzer Bridges, at George's Dock for approximately 40m and between Sean O'Casey Bridge and Common Street for approximately 150m and near the small retail premises opposite Excise Walk for approximately 80m. There is no alternative cycling provision where the cycle track discontinues at Scherzer Bridges whilst a combined bus and cycle lane is provided for some of the length between Sean O'Casey Bridge and Common Street and all of the length opposite Excise Walk. Whilst segregated from traffic, there is no physical separation between the cycle track and pedestrians.

East of Samuel Beckett Bridge, a predominately two-way cycle track adjacent to the westbound carriageway is provided up to Tom Clarke Bridge. The cycle track is approximately 2.3m wide. There are small sections where the cycle track discontinues and where westbound cyclists are directed to a narrow (approximately 1.0m wide) cycle lane. Whilst segregated from traffic, there is no physical separation between the cycle track and pedestrians.

An eastbound cycle lane, of varying widths, located to the north of River Liffey between Talbot Memorial Bridge and Park Lane. The cycle lane is not continuous and discontinues in places to accommodate combined bus and cycle lanes as well as narrow sections such as the Scherzer Bridges.

To the south of River Liffey (R813 City Quay and Sir John Rogerson's Quay), a bi-directional cycle track of approximately 3.0m wide is located adjacent to the eastbound carriageway between R802 Talbot Memorial Bridge and Forbes Street. To the east, the cycle track narrows to approximately 1.5m to 2.0m in width and displays no white line to segregate cyclists travelling in opposing directions.

There are cycle tracks situated on both sides of R802 Talbot Memorial Bridge and Samuel Beckett Bridge. The cycle tracks on R802 Talbot Memorial Bridge are approximately 1.5m wide. On Samuel Beckett Bridge, the cycle track on the western side is approximately 1.5m wide and the cycle track on the eastern side is approximately 2.6m wide and has broken white line and associated marking showing bi-directional use.

To the south of R802 Talbot Memorial Bridge, toucan crossings are provided to facilitate western and northern movements at the junction. Toucan crossings are also provided at the R813 City Quay / R814 Lombard Street East junction and the R813 Sir John Rogerson's Quay / Samuel Beckett Bridge. To the north of the Samuel Beckett Bridge, segregated crossings for pedestrians and cycles are incorporated into the signals and therefore, cyclists have some shared green time with vehicular traffic and some with pedestrians.

There are limited cycle parking stands along / in the vicinity of Section 1 of the Proposed Scheme. Six Sheffield Stands (able to accommodate up to 12 bicycles) are located on R813 Sir John Rogerson's Quay immediately east of the junction with R814 Lombard Street East.

Cycle hire scheme stands are provided at the following points along / in the vicinity of Section 1 of the Proposed Scheme. These include e-bike hire:

- 30 stands available located on R801 Custom House Quay east of Butt Bridge;
- 30 stands available located on R801 Custom House Quay west of Sean O'Casey Bridge;
- 40 stands available located on R801 North Quay Wall west of Excise Walk;
- 40 stands available located on R801 North Quay Wall west of Park Lane;
- 40 stands available located on R801 North Quay Wall west of Slate Street;
- 40 stands available located on R801 North Quay Wall west of North Wall Avenue;
- 20 stands available located on R105 George's Quay west of Talbot Memorial Bridge;
- 20 stands available located on R813 City Quay east of Creighton Street; and
- 40 stands available located on Lime Street approximately 40m south of R813 Sir John Rogerson's Quay.

The existing cycle facilities along Section 1 of the Proposed Scheme are illustrated in Appendix A6.4 (Baseline Figures).

6.3.2.3 Bus Infrastructure

6.3.2.3.1 Bus Priority Measures

Bus lanes are provided along Section 1 of the Proposed Scheme to the north of River Liffey at the following locations (aside from intermittent breaks and junctions):

- Eastbound on R801 Custom House Quay from east of Scherzer Rolling Lift Bridge for approximately 75m, operating between 07:00 and 19:00, Monday to Saturday;
- Eastbound on R801 North Wall Quay from west of New Wapping Street to west of R131 East Wall Road, operating between 07:00 and 19:00, Monday to Saturday.
- Westbound on R801 Custom House Quay from Scherzer Rolling Lift Bridge to Talbot Memorial Bridge for approximately 110m, operating 24 hours a day, Monday to Sunday;
- Westbound on R801 Custom House Quay / North Wall Quay from west of Excise Walk to Sean O'Casey Bridge, operating between 07:00 and 19:00, Monday to Saturday; and
- Westbound on R801 North Wall Quay from New Wapping Street to The Convention Centre Dublin, operating between 07:00 and 19:00, Monday to Saturday.

Additionally, there are dedicated bus lanes in both directions throughout Samuel Becket Bridge save for a short section along the northbound carriageway.

There is currently no bus priority infrastructure along Section 1 of the Proposed Scheme to the south of River Liffey (R813 City Quay and Sir John Rogerson's Quay).

6.3.2.3.2 Bus Stop Facilities

There are currently ten bus stops along Section 1 of the Proposed Scheme. All ten bus stops within the redline boundary are located to the north of River Liffey (R801 Custom House Quay and R801 North Wall Quay). The inbound stops are as follows:

- Stop 6252 (123531, 123521) on R801 Custom House Quay, outside Dublin Docklands Dublin City Council;
- Stop 7397 on R801 North Wall Quay, east of Excise Walk;
- Stop 7398 (123511) on R801 North Wall Quay, opposite The Convention Centre Dublin; and
- Stop 7611 on R801 North Wall Quay, west of New Wapping Street.

The outbound stops are:

- Stop 2498 (135272) on R801 Custom House Quay, outside the International Financial Services Centre;
- Stop 2499 (101971, 135361) on R801 Custom House Quay, east of Exchange Place;
- Stop 7216 on R801 North Wall Quay, west of Samuel Beckett Bridge;
- Stop 2500 (7216, 100431) on R801 North Wall Quay, west of Samuel Beckett Bridge;
- Stop 2501 on R801 North Wall Quay, west of New Wapping Street; and
- Stop 7623 (106421) on R801 North Wall Quay, east of North Wall Avenue.

Out of the ten stops, one stop has real-time information (stop 7216) whilst no stops have shelter or seating. Along Section 1, all bus stops are provided inline and the majority (seven of the ten) are within bus lanes.

Table 6.6 outlines the availability of bus stop facilities at the existing ten bus stops along Section 1 of the Proposed Scheme.

Table 6.6: Section 1 - Availability of Bus Stop Facilities (of a total 10no. Bus Stops)

Bus Stop Facility	Number of bus stops in baseline with Facility	Percentage of Bus Stops in baseline with Facility
RTPI	1	10%
Timetable information	8	80%
Shelter	0	0%
Seating	0	0%
Accessible Kerbs	8	80%
Indented Drop Off Area	0	0%

The existing bus facilities along Section 1 of the Proposed Scheme are illustrated in Appendix A6.4 (Baseline Figures). The 33 bus services which operate along Section 1 of the Proposed Scheme are outlined in Table 6.7.

Table 6.7: Section 1 - Bus Service Frequency

Service	Route	Typical Service Frequency	
		Weekday	Weekend
33x	R801 Custom House Quay – D'Ollier St – Port Tunnel – M1 – Hearse Road - Skerries	15 minutes	No Service
33d	R801 Custom House Quay / St. Stephen's Green - D'Olier St.- M1- Donabate - Portrane	Daily	No Service
41x	UCD Belfield - Knocksedan	three times a day	No Service
126	Connolly Station – Newlands Cross – Saggart – Kill – Johnstown – Naas – Newbridge – Curragh – Kildare	15 minutes from 12:05 PM - 11:05 PM	15 minutes from 12:05 PM - 11:05 PM
126a	Connolly Station – Newlands Cross – Saggart – Kill – Johnstown – Naas – Newbridge – Curragh – Kildare	Hourly	Hourly Saturday, No Service Sunday
126b	Connolly Station – Newlands Cross – Saggart – Kill – Johnstown – Naas – Newbridge – Curragh – Kildare	Hourly	Hourly Saturday, No Service Sunday
126t	Connolly Station – Newlands Cross – Saggart – Kill – Johnstown – Naas – Newbridge – Curragh – Kildare	Hourly	Hourly Saturday, No Service Sunday
130a	Connolly Station – Bachelors Walk – Carriglea Ind Est – Naas – Two Mile House – Kilcullen – Ballyshannon NS – Kilmead – Leinster Street	Four times a day	Four times a day
191	Eden Quay – R801 Custom House Quay – R801 Custom House Quay - R801 North Wall Quay - East Wall Rd - Courtlough - Balrothery - Balbriggan - Clonard Cross – Gormanston - Stamullen - Gormanston	30 minutes from 4:30 PM – 6:45 PM	No Service
193	St Stephens Green – Merrion Street – Westland Row – R801 Custom House – IFSC – R801 North Wall Quay – Nine Mile Stone – Ashbourne	Daily	Daily
194	St Stephens Green – Merrion Street – Westland Row – R801 Custom House – IFSC – R801 North Wall Quay – Nine Mile Stone – Ashbourne	Daily	Daily
194-a	UCD – Donnybrook – Merrion Street – St Stephens Green – Merrion Square Eden Quay – Convention Centre – Ashbourne - Ratoath	2 times a day	No Service
194-x	UCD – Donnybrook – Merrion Street – St Stephens Green – Merrion Square Eden Quay – Convention Centre – Ashbourne - Ratoath	2 times a day	No Service
505-x	Eden Quay – IFSC - Dublin Airport - Dublin Road – Rathingle - Swords - Malahide Road	15 minutes from 4:10 PM to 7:00 PM	No Service
506-x	Broadmeadow Road – Swords - Drinan, Link Road - East Wall Road - Convention Centre – R801 Custom House Quay - Dublin, Marlborough Street	15 minutes from 7:15 AM - 8:01 AM	No Service
142	Rathmines - Richmond Street South - Camden Street - George's Street - Dame Street - R801 North Wall Quay - Church Road - Torcaill	10 minutes from 4:35 PM - 5:05 PM	No Service
151	Docklands -Dame St. / Ormond Quay - Dolphin's Barn - Drimnagh Rd. - Parkwest - Foxborough	20 minutes	20 – 30 minutes
179	UCD – R801 Custom House – N3 – Navan – Gibstown – Nobber – Kingscourt – Shercock Main Street – Cootehill Market Street	Six times a day	Twice a day

Service	Route	Typical Service Frequency	
		Weekday	Weekend
400	Dublin City (R801 Custom House) – Belfast (Glengall Street)	Hourly	Hourly
500	Berwick Walk - The Gallops - 50 Brides Glen Park - Applewood Avenue East - Estuary Court - Swords Bypass - Malahide Road - Lakeshore Drive - Drinan Link Road - R801 North Wall Quay – R801 Custom House Quay - Eden Quay	15 minutes from 6:15 AM to 11:00 PM	15 minutes from 7:30 AM to 9:30 PM (Saturday) and 8:45 AM to 6:45 PM (Sunday)
504	Lakeshore Drive - Drinan Link Road - R801 North Wall Quay – R801 Custom House Quay - Eden Quay	Daily	No Service
505	Eden Quay - Exchange Place - Holywell Lane - Lakeshore Drive - Cedar Grove - Forest Fields Road - Hawthorn Park - Ballintrane Wood - Main Street - Malahide Road	No Service	15 minutes from 4:05 AM to 6:05 PM (Saturday) and 3:45 AM to 6:15 PM (Sunday)
506	4-8 Eden Quay - 13 Exchange Place - Holywell Lane - Mountgorry Way - Ashley Drive - Mantua Park - Glen Ellan Park - Glen Ellan Road - 7 Castleview Lawns - Glen Ellan Road - 63 Valley View - Murrough Road	15 minutes from 4:30 PM to 6:20 PM	No Service
507	Berwick Walk • The Gallops • 50 Brides Glen Park • Applewood Avenue East • Estuary Court • Swords Bypass • Seamount View • Mountgorry Way • Holywell Distributor Road • Drinan Link Road • R801 North Wall Quay • 1 R801 Custom House Quay • Eden Quay	15 minutes from 7:40 AM to 9:10 AM	No Service
533	Grand Canal Dock – Pearse Station – Pearse Street – R801 Custom House Quay – IFSC – R801 Custom House Quay – R801 North Wall Quay – East Wall – Donabate - Portrane	Hourly	No Service
534	Grand Canal Dock – Pearse Station – Pearse Street – R801 Custom House Quay – IFSC – R801 Custom House Quay – R801 North Wall Quay – East Wall – Donabate - Portrane	Hourly	No Service
703	Killiney – Dalkey – Glasthule – Dun Laoghaire – Monkstown – Blackrock – Booterstown – Merrion Road – Ballsbridge – Docklands – R801 North Wall Quay – Dublin Airport	Hourly	Hourly
737	R801 North Wall Quay - Essex Street East • Saint Corban's Place • Poplar Square	15 minutes from 12:00 AM to 11:00 PM	15 minutes from 12:00 AM to 11:00 PM
747	Heuston Rail Station - O'Connell St - BusÁras (Central Bus Station) - Dublin Airport	Eight times a day	Eight times a day
757	Camden Street (Charlotte Way) - Merrion Sq. - International Financial Services Centre (IFSC) - Dublin Airport	Seven times a day	Seven times a day
833	Grand Canal Dock – Pearse Station – R801 Custom House Quay – IFSC – Northwall Quay – East Wall - Lusk	15 minutes	No Service
902	North Wall – Docklands - Connolly Station - Ifsc R801 Custom House Quays - Custom House Quay - R801 North Wall Quay - City North Hotel - Dundalk	Daily	No Service
903	Dundalk - North Wall – Docklands - Connolly Station – R801 Custom House Quays – R801 Custom House Quay – R801 North Wall Quay	Daily	No Service
912	Grange Rath - Donacarney - Bettaghastown Cross – Bettystown - North Wall - Connolly Station – R801 Custom House Quays - Jury's Inn Custom House Quay - R801 North Wall Quay - The 3arena	Daily	No Services

6.3.2.4 General Traffic

6.3.2.4.1 R801 Custom House Quay

R801 Custom House Quay is a two-way carriageway positioned on the northern bank of the River Liffey subject to a speed limit of 50km/h in both directions. The Section 1 of the Proposed Scheme includes R801 Custom House Quay between R802 Talbot Memorial Bridge and Commons Street, extending for approximately 350m.

Typically, the carriageway comprises two traffic lanes in each direction (of which one is a bus lane). The carriageway narrows at the Scherzer Bridges to one lane in each direction. As such, the carriageway width varies between 5.0m and 13.0m.

The one existing major junction along the section is the R801 Custom House Quay / R802 Memorial Road / R802 Talbot Memorial Bridge junction.

R801 Custom House Quay / R802 Memorial Road / R802 Talbot Memorial Bridge four-arm signalised junction: This junction has a signal-controlled pedestrian crossings on each arm.

The western arm approach consists of two general traffic lanes (for straight-ahead movements only) and a cycle lane marked with cycle lane bollards. A straight-ahead advisory cycle lane extends through the junction. The western exit arm consists of one designated bus lane. The approach and exit arms are separated by hatching and a central reservation.

The northern arm of the junction is a one-way carriageway that consist of four approach lanes: one general traffic left-turn bypass lane that is mirrored by on-road cycle lanes, two general traffic lanes for straight-ahead movements and one combined bus and cycle lane for right-turn movements. A straight-ahead advisory cycle lane extends through the junction.

The eastern arm approach consists of two lanes, one general traffic lane for left-turn movements and one bus lane for straight-ahead buses. The exit arm consists of two general traffic lanes and an advisory cycle lane. The approach and exit arms are separated by a central reservation.

The southern arm of the junction is a one-way carriageway that crosses over the River Liffey and is known as the Talbot Memorial Bridge. The arm consists of three southbound only general traffic lanes and a southbound advisory cycle lane with hatching separating cyclists from general traffic.

These characteristics are shown in Image 6.1.

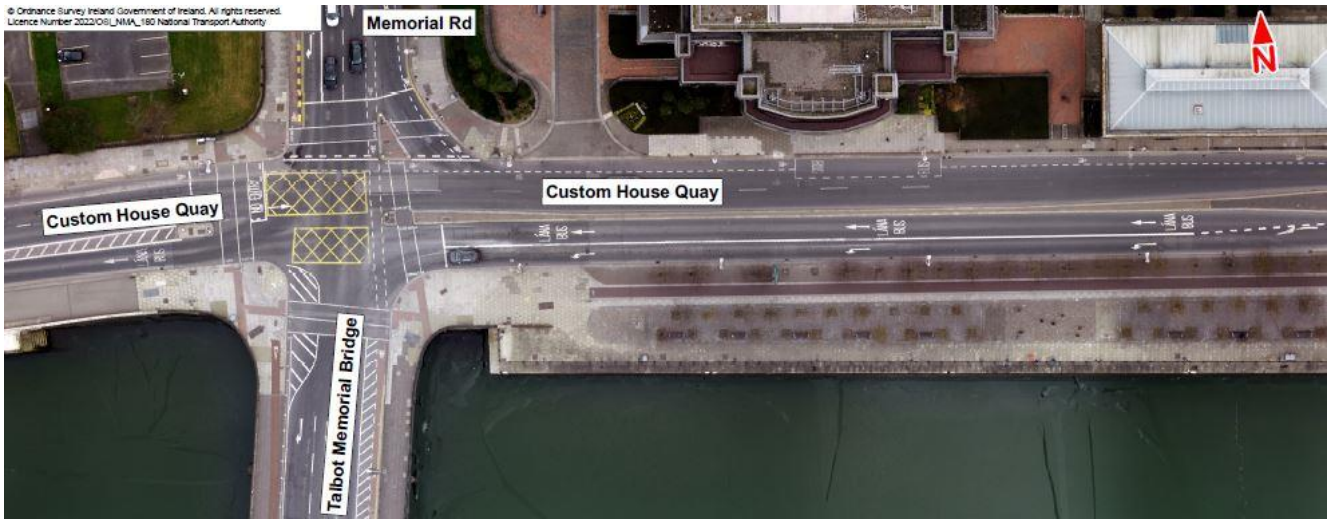


Image 6.1: R801 Custom House Quay / R802 Memorial Road / R802 Talbot Memorial Bridge Junction

6.3.2.4.2 R801 North Wall Quay

R801 North Wall Quay is a two-way carriageway along the northern bank of the River Liffey and has a total length of approximately 1.25km between Commons Street and R131 Tom Clarke East Link Bridge. The carriageway is subject to a speed limit of 50km/h and has a width which varies between 8m and 13m.

The existing major junction arrangements along R801 North Wall Quay includes R801 North Wall Quay / Guild Street / Samuel Beckett Bridge.

R801 North Wall Quay / Guild Street / Samuel Beckett Bridge four-arm signalised junction: This junction has advanced stop lines for cyclists and signal-controlled crossings for pedestrians on all arms.

The western approach arm consists of a cycle lane marked with cycle lane bollards, a combined ahead and left turning general traffic lane and a right turn general traffic lane. The western arm exit consists of a single general traffic lane.

The northern approach arm consists of a combined ahead and left turning general traffic lane and a right turn general traffic lane on the offside. The northern arm exit consists of a mandatory cycle lane and a single general traffic lane.

The eastern approach arm consists of one combined ahead and right turning general traffic lane with no left turn permitted. Approximately 60m east of the junction a bus lane and general traffic merge into a single lane for all traffic. No left turn is permitted from this arm. The southern arm exit consists of an advisory cycle lane and a single general traffic lane.

The southern approach arm (Samuel Becket Bridge) consists of two general traffic lanes, one left-turn lane (which converts from a bus lane to a general traffic lane 50m south of the junction) and one ahead lane. The southern arm exit consists of a bus lane and a general traffic lane.

Image 6.2 shows the existing arrangement of the R801 North Wall Quay / Guild Street / Samuel Beckett Bridge Junction.

Image 6.2: R801 North Wall Quay / Guild Street / Samuel Beckett Bridge Junction

6.3.2.4.3 R813 City Quay

R813 City Quay is positioned on the southern bank of the River Liffey between R802 Talbot Memorial Bridge and Creighton Street and has a total approximate length 400m. The carriageway is subject to a speed limit of 30km/h and has a width of approximately 7.5m.

The majority (approximately 300m) of R813 City Quay within Section 1 extends between R802 Talbot Memorial Bridge and R814 Lombard Street East is a one-way, two-lane carriageway for eastbound vehicles. East of R814 Lombard Street East, R813 City Quay is a two-way carriageway with one lane in each direction.

The existing major junction arrangements along R813 City Quay are as follows:

- R105 George's Quay / R802 Talbot Memorial Bridge / R813 City Quay / R802 Moss Street; and
- R813 City Quay / R814 Lombard Street East.

R105 George's Quay / R802 Talbot Memorial Bridge / R813 City Quay / R802 Moss Street four-arm junction: The junction features four arms of one-way traffic, which allows vehicles crossing the R802 Talbot Memorial Bridge to turn right (westbound) on to R105 George's Quay, continue forward (southbound) on to R802 Moss Street, or turn left (eastbound) on to R813 City Quay. Signals are provided to regulate pedestrian and cycle crossing purposes.

The western, eastern and southern arms all include two lanes exiting the junction, whilst the northern arm (R802 Talbot Memorial Bridge) features three lanes of traffic allowing vehicles to turn left, right or continue forwards. A segregated two-way cycle track exists on the eastern side of the R802 Talbot Memorial Bridge that wraps around on to the eastern arm of R813 City Quay.

Image 6.3 shows the existing arrangement of the R105 George's Quay / R802 Talbot Memorial Bridge / R813 City Quay / R802 Moss Street junction.

Image 6.3: R105 George's Quay / R802 Talbot Memorial Bridge / R813 City Quay / R802 Moss Street Junction

R813 City Quay / R814 Lombard Street East Junction three-arm signalised junction: This junction includes a pedestrian refuge area in its centre, which shapes the curvature of the left and right turn slip lanes.

The western arm, R813 City Quay, is a one-way carriageway consisting of an ahead lane and a right turn only lane turning right onto R814 Lombard Street East. The eastern arm is a two-way carriageway consisting of a single lane in both directions. The westbound lane turns left onto R814 Lombard Street East. The southern arm, R814 Lombard Street East, is a one-way, southbound carriageway comprising of two vehicular lanes.

Image 6.4 shows the existing arrangement of the R813 City Quay / R814 Lombard Street East junction.

Image 6.4: R813 City Quay / R814 Lombard Street East Junction

6.3.2.4.4 Sir John Rogerson's Quay

Sir John Rogerson's Quay is located on the southern bank of the River Liffey and has a total approximate length of 1km, extending between Creighton Street and the mouth of the River Dodder. Sir John Rogerson's Quay can be split into two different sections, the western section between Creighton Street and Cardiff Lane (approximately 400m) that is part of regional road R813, and the eastern section between Cardiff Lane and the River Dodder (approximately 600m) that does not carry a regional road designation. Much of the road is a two-way carriageway, however a short section of approximately 140m between Samuel Beckett Bridge and Lime Street is a one-way westbound only carriageway.

The majority of Sir John Rogerson's Quay is subject to a speed limit of 30km/h, however a short section (approximately 70m) between Samuel Beckett Bridge and Cardiff Lane is subject to a speed limit of 50km/h. The carriageway width varies between 6.0m and 8.0m, save for the short one way section where a width is reduced to approximately 3.2m for very a short length.

The existing major junction arrangements along Sir John Rogerson's Quay are as follows:

- R813 Sir John Rogerson's Quay / Samuel Beckett Bridge; and
- R813 Sir John Rogerson's Quay / Sir John Rogerson's Quay / R183 Cardiff Lane.

R813 Sir John Rogerson's Quay / Samuel Beckett Bridge three-arm junction: This junction consists of three arms with a toucan signalised crossing across the northern / eastern arms.

Travel between the northern and eastern arms is largely uncontrolled apart from a toucan signalised crossing that allows pedestrians and cyclists to continue their journey along the southern bank of the River Liffey. The northern arm approach comprises of one bus lane and one general traffic lane. The bus lane terminates at the toucan crossing and two general traffic lanes are located on the eastern arm exit. No travel to the western arm is permitted from the northern arm.

The eastern arm approach consists of two general traffic lanes, one for straight ahead vehicles to R813 Sir John Rogerson's Quay and one for right turning vehicles to Samuel Beckett Bridge. Along Samuel Beckett Bridge, a bus lane commences approximately 20m north of the toucan crossing.

The western arm is a one-way exit arm comprised of one general traffic lane.

Image 6.5 shows the existing arrangement of the R813 City Quay / R814 Lombard Street junction.

Image 6.5: R813 Sir John Rogerson's Quay / Samuel Beckett Bridge & R813 Sir John Rogerson's Quay / Sir John Rogerson's Quay / R813 Cardiff Lane Junctions

R813 Sir John Rogerson's Quay / Sir John Rogerson's Quay / R183 Cardiff Lane three-arm signalised junction: This junction has signal-controlled pedestrian crossings on the eastern and southern arms.

The western arm consists of a short dual carriageway section, in which there are two general traffic lanes in both directions. Both directions feature a straight-ahead lane and right turning lane.

The eastern arm consists of a two-way carriageway with one general traffic lane in both directions.

The southern arm consists of two general traffic lanes approaching the junction and one general traffic lane existing the junction.

Image 6.5 shows the existing arrangement of the R813 Sir John Rogerson's Quay / Sir John Rogerson's Quay / R813 Cardiff Lane junction.

6.3.2.4.5 Samuel Beckett Bridge

Samuel Beckett Bridge is a cable stayed bridge approximately 150m in length, comprising of a two-way carriageway with two lanes (a general lane and bus lane) in both directions separated by a central median which supports 31 cable stays.

6.3.2.5 Existing Parking / Loading

There is parking directly along Section 1 of the Proposed Scheme at the following locations:

- Lay-by adjacent to the eastbound lane of R801 Custom House Quay outside of Hilton Garden Inn that provides three spaces for loading and drop-off purposes;
- Five taxi rank spaces adjacent to the eastbound lane of R801 North Wall Quay outside of The Convention Centre Dublin;
- Seven designated paid parking spaces adjacent to the eastbound lane of R801 North Wall Quay to the east of Park Lane;
- Nine informal parking spaces positioned adjacent to the eastbound lane of R801 North Wall Quay to the west of Castleforbes Road;
- Two disabled, two loading and eight designated paid parking spaces adjacent to the eastbound lane of R801 North Wall Quay positioned between Castleforbes Road and North Wall Avenue;
- Three informal parking spaces adjacent to the westbound lane of R801 North Wall Quay, positioned to the west of North Wall Avenue;
- A further 22 loading parking spaces positioned at various locations along R801 North Wall Quay;

- 14 informal parking spaces along R813 City Quay outside residential properties to the west of R814 Lombard Street East;
- 13 permit parking and one disabled space along R813 City Quay outside residential properties to the east of R814 Lombard Street East;
- Five designated paid parking and two loading parking spaces along R813 Sir John Rogerson's Quay outside mobile phone store;
- Two loading bays adjacent to the westbound lane of R813 Sir John Rogerson's Quay to the west of R813 Cardiff Lane;
- Three taxi rank and 14 designated paid parking spaces adjacent to the westbound lane of Sir John Rogerson's Quay outside the Riverside Two building;
- Eight designated paid parking spaces adjacent to the westbound lane of Sir John Rogerson's Quay positioned between Forbes Street and Asgard Street;
- Five designated paid parking spaces and one disabled parking space adjacent to the westbound lane of Sir John Rogerson's Quay positioned between Asgard Street and Blood Stoney Road;
- 14 designated paid parking spaces adjacent to the westbound lane of Sir John Rogerson's Quay positioned outside the Matheson Building;
- Four designated paid parking spaces adjacent to the westbound lane of Sir John Rogerson's Quay positioned outside Butler's Court; and
- Eight permit parking spaces adjacent to the westbound lane of Sir John Rogerson's Quay positioned between Chapman Walk and Stevens Walk.

6.3.3 Section 2 – Dodder Public Transport Opening Bridge (DPTOB)

Section 2 of the Proposed Scheme consists of the proposed DPTOB that is to be constructed over the mouth of the River Dodder between Sir John Rogerson's Quay and the R131 East Link regional road. There is currently no road bridge at this location and therefore no baseline environment to report in relation to walking, cycling, bus services, general traffic and parking / loading facilities.

6.3.4 Section 3 – Tom Clarke East Link Bridge to Sean Moore Road

This section outlines the baseline environment for walking, cycling, bus services, general traffic and parking / loading facilities along Section 3 of the Proposed Scheme that covers a residential area between R131 Tom Clarke East Link Bridge and R131 Sean Moore Road. This Section consists of 340m of York Road, 720m of Pigeon House Road, 140m of Pembroke Cottages, 60m of Cambridge Park, 400m route through Ringsend Park, 200m cycle route adjacent to Strand Street and R802 Bayview, and 80m of R802 Beach Road.

6.3.4.1 Pedestrian Infrastructure

Footpaths next to St Patrick's Rowing Club link together the footpaths of R131 Tom Clarke East Link Bridge and York Road. Along the southern side of York Road and Pigeon House Road a footpath, approximately 1.8m wide, extends to the junction with R131 Sean Moore Road. No footpath is available on the northern side of York Road and Pigeon House Road.

The pedestrian facilities along Pembroke Cottages (west), comprises a footpath along the western side of the road directly adjacent to the boundaries of house numbers 44 – 52. The walking facilities along Pembroke Cottages (east), comprises a footpath along both sides of the road directly adjacent to the boundaries of house numbers 1 – 43. Both carriageways can be accessed by pedestrians from York Road to the north and Cambridge Road to the south via standard vehicular priority junctions.

The access road into Cambridge Park has footpaths, approximately 2.3m wide, on both sides of the carriageway. The footpaths reduce in width to approximately 1.2m along the cul de sac at the pedestrian access into Ringsend Park.

A footpath of between 1.8m and 2.5m wide is available within Ringsend Park, which links Cambridge Park, Rope Walk Place, Saint Patrick's Villas and the Irishtown Stadium car park directly to Ringsend Park. Separate footpath

links of approximately 2.0m width are also available on the southern side of the Irishtown Stadium which connect to R131 Sean Moore Road and Beach Road, via Kerlogue Road, Bremen Avenue and Bremen Road.

There is one controlled pedestrian crossing along Section 3 of the Proposed Scheme which benefits from tactile paving and dropped kerbs which can be found at the following location:

- Mid-link staggered signal-controlled crossing on R131 Link Road / Pigeon House Road, located to the north of the junction with R131 Sean Moore Road.

Uncontrolled crossings across priority junctions at side roads benefit from dropped kerbs. The locations of the pedestrian crossings are illustrated in Figure 6.3c 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 A6.5.1 (Pedestrian Impact Assessment) in Volume 4 of this EIAR.

6.3.4.2 Cycling Infrastructure

There is currently limited dedicated cycle infrastructure along Section 3 of the Proposed Scheme between R131 Tom Clarke East Link Bridge and R131 Sean Moore Road. For the majority of Section 3, existing cyclists share carriageway space with general traffic. Within Ringsend Park (between Cambridge Park and Irishtown Stadium) and between Irishtown Stadium and Bremen Road, an informal shared cyclist / pedestrian path is available.

6.3.4.3 Bus Infrastructure

There are currently no dedicated bus facilities along Section 3 of the Proposed Scheme and thus no baseline to report in relation to these features.

6.3.4.4 General Traffic

6.3.4.4.1 York Road

York Road is a two-way carriageway and consists of one lane in each direction. The carriageway is subject to a speed limit of 30km/h and has double yellow lines, to prevent parking, on its southern side for the majority of its length. The existing major junction arrangement along York Road is the York Road / Cambridge Road / Pigeon House Road three-arm mini roundabout junction.

York Road / Cambridge Road / Pigeon House Road three-arm mini roundabout: This junction has limited pedestrian crossings.

All approaching arms to this mini roundabout consist of a single lane with yield markings and broken white lines. The exit lane of each arm is a single lane, separated by splitter islands at the roundabout entry. The circulation lane has road markings to demonstrate the circulatory carriageway.

Image 6.6 illustrates the existing arrangement of the York Road / Cambridge Road / Pigeon House Road junction.

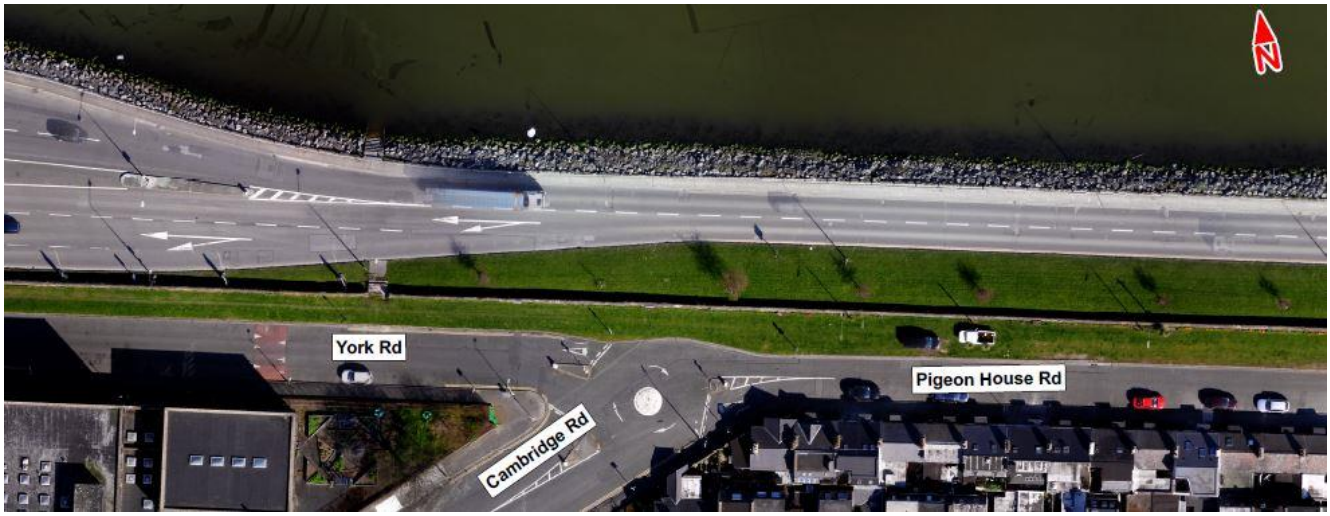


Image 6.6: York Road / Cambridge Road / Pigeon House Road Junction

6.3.4.4.2 Pigeon House Road

Pigeon House Road is a two-way carriageway with a width of approximately 4.8m. The carriageway is subject to a speed limit of 30km/h and has vertical traffic calming throughout its length. The carriageway travels along the northern boundary of a residential development for approximately 700m running broadly parallel to the R131 East Link Road. It connects to the wider network at five-arm roundabout junction with R131 Sean Moore Road, although this link is temporarily closed at the time of writing.

6.3.4.4.3 Pembroke Cottages

There are two roads adjacent to one other both known as Pembroke Cottages. The westernmost of the two roads is a two-way carriageway that can be accessed by vehicle from the south via Cambridge Road but features a dead-end with a pedestrian only access from the north via York Road. The two-way carriageway narrows towards its northern end however feature a width of approximately 4.0m for its majority.

The easternmost of the two roads is a one-way northbound carriageway with a width of approximately 6.5m with on-street parking on both sides. Vehicular traffic can access the carriageway via Cambridge Road from the south, however ‘no entry’ traffic signs restrict vehicles from accessing the road from the north via York Road.

The existing key junction arrangements along Pembroke Cottages are as follows:

- York Road / Pembroke Cottages three-arm priority junction; and
- Cambridge Road / Pembroke Cottages (eastern) / Cambridge Park four-arm uncontrolled staggered junction.

York Road / Pembroke Cottages three-arm priority junction: This junction comprises of a two-way major arm and a one-way minor arm restricted by 'NO ENTRY' road markings.

Image 6.7 illustrates the existing arrangement of the York Road / Pembroke Cottages junction.

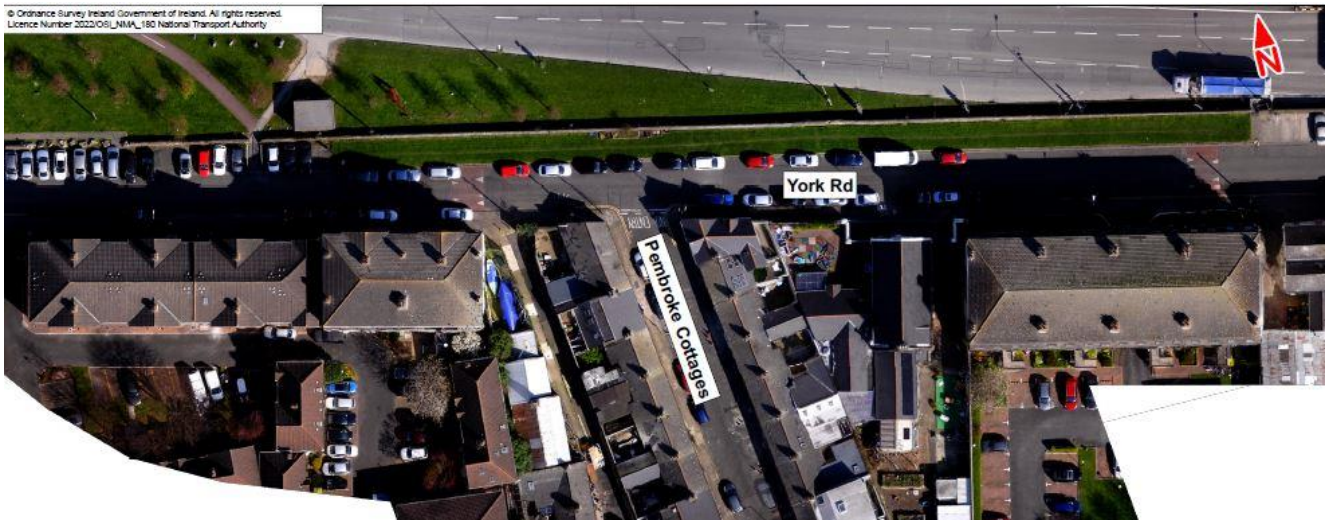


Image 6.7: York Road / Pembroke Cottages Junction

Cambridge Road / Pembroke Cottages (eastern) / Cambridge Park four-arm uncontrolled staggered junction: This junction includes traffic calming measures and no-stopping yellow zig-zag lines on the eastern arm.

The northern arm comprises of a one-way road with traffic signs that prohibit the entrance of goods vehicles exceeding 3.5 tonnes. The eastern and western arm includes a two-way carriageway with a traffic calming measure on the eastern arm. The southern arm consists of one combined approach and exit traffic lane approximately 4.5m wide which facilitates all movements.

Image 6.8 illustrates the existing arrangement of the Cambridge Road / Pembroke Cottages (eastern) / Cambridge Park junction.

Image 6.8: Cambridge Road / Pembroke Cottages (eastern) Cambridge Park

6.3.4.5 Existing Parking / Loading

There is a total of 237 existing parking spaces along Section 3 of the Proposed Scheme. Parking and loading spaces along Section 3 of the Proposed Scheme comprises of the following:

- 79 informal parking spaces along York Road;

- 76 informal parking spaces along Pigeon House Road between Cambridge Road and Cambridge Avenue;
- 15 informal parking spaces along Pembroke Cottages (western);
- 50 informal and one disabled parking spaces along Pembroke Cottages (eastern);
- Seven informal parking spaces along Cambridge Park; and
- Eight informal parking spaces and one disabled parking space along Stand Street.

There is further side-street parking within proximity to the main corridor, however, these parking spaces have not been detailed due to the lack of predicted parking changes.

6.4 Potential Impacts

This section presents potential impacts that may occur due to the Construction and Operation of the Proposed Scheme, taking into account the Proposed Scheme design in the absence of any further 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 is then 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 Project Description).

6.4.2 Do Nothing' Scenario

With regards to this Traffic and Transport 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 assessment 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 (GDA) Transport Strategy 2022-2042 (GDA Strategy), with a partial implementation by 2028, in line with National Development Plan (NDP) 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) and National Development Plan (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 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 BusConnects CBC 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, Luas line extensions to Lucan, Finglas and Bray are all fully operational.

Appendix A6.2 (Transport Modelling Report) 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, Regional Spatial and Economic Strategy (RSES) for the Eastern and Midland region 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 (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.

The GDA Strategy (along with existing supply side capacity constraints e.g., 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 (indicated by the dashed line) 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/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 Strategy proposals, there are no specific demand management measures included in the Do Minimum scenario in the 2028 Opening year, 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 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 'Do Something' 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 Project Description).

6.4.5 Construction Phase

This section considers the potential temporary traffic and transport impacts that construction of the Proposed Scheme will have on the direct and indirect study areas during the 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 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).

A Construction Environmental Management Plan (CEMP) has been prepared and is included as Appendix A5.1 in Volume 4 of this EIAR. The CEMP which 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 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, 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. These sections have been further subdivided into six sub-sections, according to the types of constructions works required. The sections / sub-sections are the following (as shown in Diagram 6.4):

- **Section 1**: Talbot Memorial Bridge to Tom Clarke East Link Bridge;
  - **Section 1a:** Talbot Memorial Bridge to Samuel Beckett Bridge (North Quays);
  - **Section 1b:** Talbot Memorial Bridge to Samuel Beckett Bridge (South Quays);
  - **Section 1c**: Samuel Beckett Bridge to Tom Clarke East Link Bridge (North Quays);
  - **Section 1d:** Samuel Beckett Bridge to Tom Clarke East Link Bridge (South Quays);
- **Section 2:** Dodder Public Transport Opening Bridge; and
- **Section 3**: Tom Clarke East Link Bridge to Sean Moore Road.

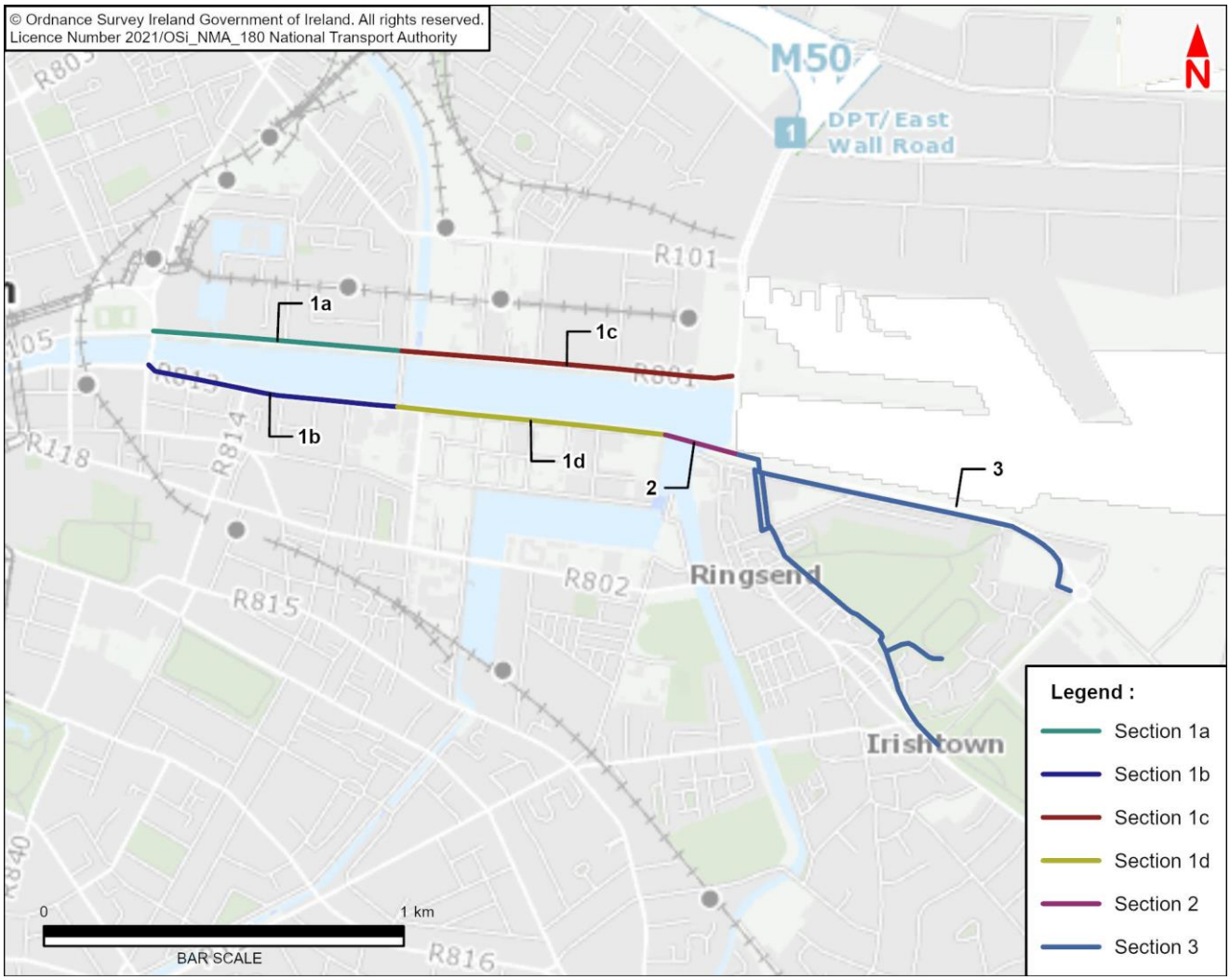


Diagram 6.4: Proposed Subsections of Construction Phase

6.4.5.2 Construction Programme

An indicative programme for the Proposed Scheme is provided in Chapter 5 (Construction) of this report which assumes for the purposes of the EIAR assessment that the DPTOB and the other elements of the Proposed Scheme are constructed concurrently. The Proposed Scheme is estimated to require approximately 30 months to complete, (assuming both the DPTOB and the other scheme elements are constructed concurrently) however, individual activities will have shorter durations. Works are envisaged to proceed concurrently on multiple work-fronts to minimise the overall construction duration. This has been done in order to minimise traffic disruption and facilitate the ease of movement of sustainable modes, bus services and goods along the Proposed Scheme. As outlined in the Chapter 5, it is envisaged that the DPTOB will be constructed under a separate Construction Contract from the remainder of the Proposed Scheme, therefore it is possible that the construction of the DPTOB could be undertaken in a different sequence (e.g., either independently of the other elements or overlapping with them).

6.4.5.3 Construction Route

The locations of four Construction Compounds have been identified at the following locations, as displayed in Diagram 6.5:

- **Construction Compound R1**: located along North Wall Quay, at George's Dock, north of the existing Scherzer Bridges;
- **Construction Compound R2**: located along North Wall Quay, at Spencer Dock, north of the existing Scherzer Bridges;
- **Construction Compound R3a/R3b**: located at the end of Sir John Rogerson's Quay; and
- **Construction Compound R4**: located southwest of the Tom Clarke East Link Bridge.

The appointed contractor's CTMP shall include measures for managing traffic in and out of the compounds. Access to and egress from the Construction Compound will be permitted via dedicated Construction Access Routes. The appointed contractor will be responsible for developing the final layout and use of the Construction Compound within the framework set out within the EIAR The Contractor may identify other (or additional) Construction Compound locations, subject to gaining all necessary approvals. In addition to the Construction Compound, temporary / portable welfare facilities will be provided along the Proposed Scheme.

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 using dedicated Construction Access Routes. Construction vehicles will be directed to access work sections via the Proposed Scheme and dedicated routes on the National and Regional Road Network where practicable, to minimise use of the local road network. The following National and Regional roads are envisaged to form dedicated Construction Access Routes for construction vehicles to travel to and from the construction works (as shown in Diagram 6.5):

- M1;
- Dublin Port Tunnel;
- M50 Motorway;
- R101;
- R105;
- R118
- R131;
- R801;
- R802;
- R813; and
- R814.

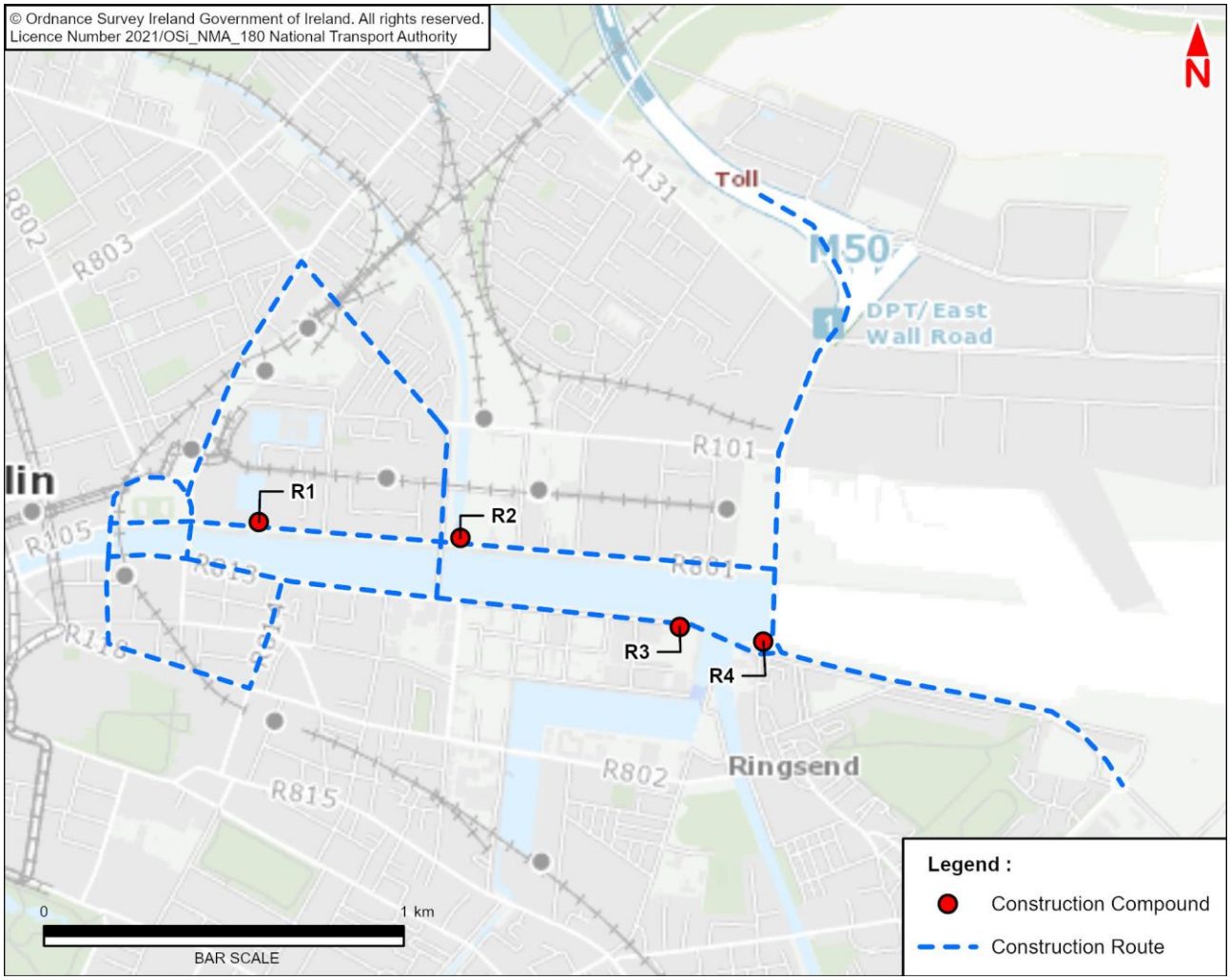


Diagram 6.5 Proposed Construction Route and Compound Locations

6.4.5.4 Predicted Construction Impact

6.4.5.4.1 Overview

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) and the CEMP (Appendix A5.1 in Volume 4 of this EIAR), identify impactful activities, considers their effect, and identifies mitigation measures to reduce or remove their impact insofar as practicably possible.

For construction activities on or adjacent public roads, all works will be undertaken in accordance with Department of Transport's 'Traffic Signs Manual, Chapter 8 Temporary Traffic Measures and Signs for Roadworks' and associated guidance. Chapter 5 (Construction) contains temporary traffic management proposals for the Proposed Scheme. These proposals maintain safe distance between road users and road workers, depending on the type of construction activities taking place and 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.

6.4.5.4.2 Pedestrian Provisions

As described in Chapter 5 (Construction), pedestrians may be temporarily impacted by construction activities along the Proposed Scheme corridor. Pedestrian diversions and temporary surface footpaths will be used to

facilitate pedestrian movements around works areas. Access to local amenities, such as to 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 the DTTS Chapter 8, Temporary Traffic Measures and Signs for Roadworks of the Traffic Signs Manual (DTTS 2019a) and the DTTS Temporary Traffic Management Design Guidance (DTTS 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, this provision will match 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.

6.4.5.4.3 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 the DTTS Chapter 8, Temporary Traffic Measures and Signs for Roadworks of the Traffic Signs Manual (DTTS 2019a) and the DTTS Temporary Traffic Management Design Guidance (DTTS 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 if practicable, although these facilities may not the of the same standard as those temporarily lost. Lengths without such provisions will be minimised so far as practicable and along which cyclists may be required to share the carriageway with vehicles. Pedestrians and cyclists will be facilitated around the Scherzer Bridge worksites. The impact is considered to have **a Negative, Moderate and Temporary effect** to cyclists.

6.4.5.4.4 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 this 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.

Due to the limited existing bus operations on the south bank roads of the River Liffey (R813 City Quay, R813 Sir John Rogerson's Quay and Sir John Rogerson's Quay) or along the residential roads of Section 2, impacts on bus operations in this area during construction will be minimal. The impact is considered to have **a Negative, Moderate and Temporary effect** to public transport users.

6.4.5.4.5 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/business with the aim of minimising disruption. The impact is considered to have **a Negative, Slight and Temporary effect** to parking and loading.

6.4.5.4.6 General Traffic

Road closures and diversions will need to be carried out during the Construction Phase of the Proposed Scheme. Where necessary, road closures and diversions will take into consideration the impact on road users, residents, businesses etc. Road closures and diversions will be carried out with regard to the Traffic Signs Manual. All road closures and diversions will be determined by the NTA, in consultation with the local authority and An Garda Síochána, as necessary. The road closures and diversions proposed, are described in further detail in Chapter 5

(Construction). As mentioned previously, access will be maintained for emergency vehicles along the Proposed Scheme, throughout the Construction Phase.

6.4.5.4.6.1 General Traffic Redistribution

Significant impacts due to general traffic redistribution away from the direct study area are not anticipated during the Construction Phase due to the relatively low traffic volumes and based on the intended nature of the progressive works along sections of the corridor whereby traffic flows, as far as practicable, are to be maintained in both directions. Some lane closures, however, will be required along parts of the Proposed Scheme and these proposed diversion routes are described in further detail in Chapter 5 (Construction).

Restrictions on general traffic along the North Quays (Sections 1a and 1c) are anticipated to be in place for a period of up to 20 months to facilitate works along these sections and in particular at the Scherzer Bridges. General traffic inbound to the City Centre will be diverted onto Sheriff Street, Seville Place and Amiens Street, to facilitate public transport priority inbound. General traffic and public transport traffic outbound from the City Centre will be reduced to a shared single lane. One direction of traffic (general traffic and public transport outbound and public transport only inbound) will be allowed through each of the Scherzer Bridges, controlled by a stop / go system of temporary traffic lights for the 20-month period. The proposed diversion route is shown on Diagram 6.6 below.

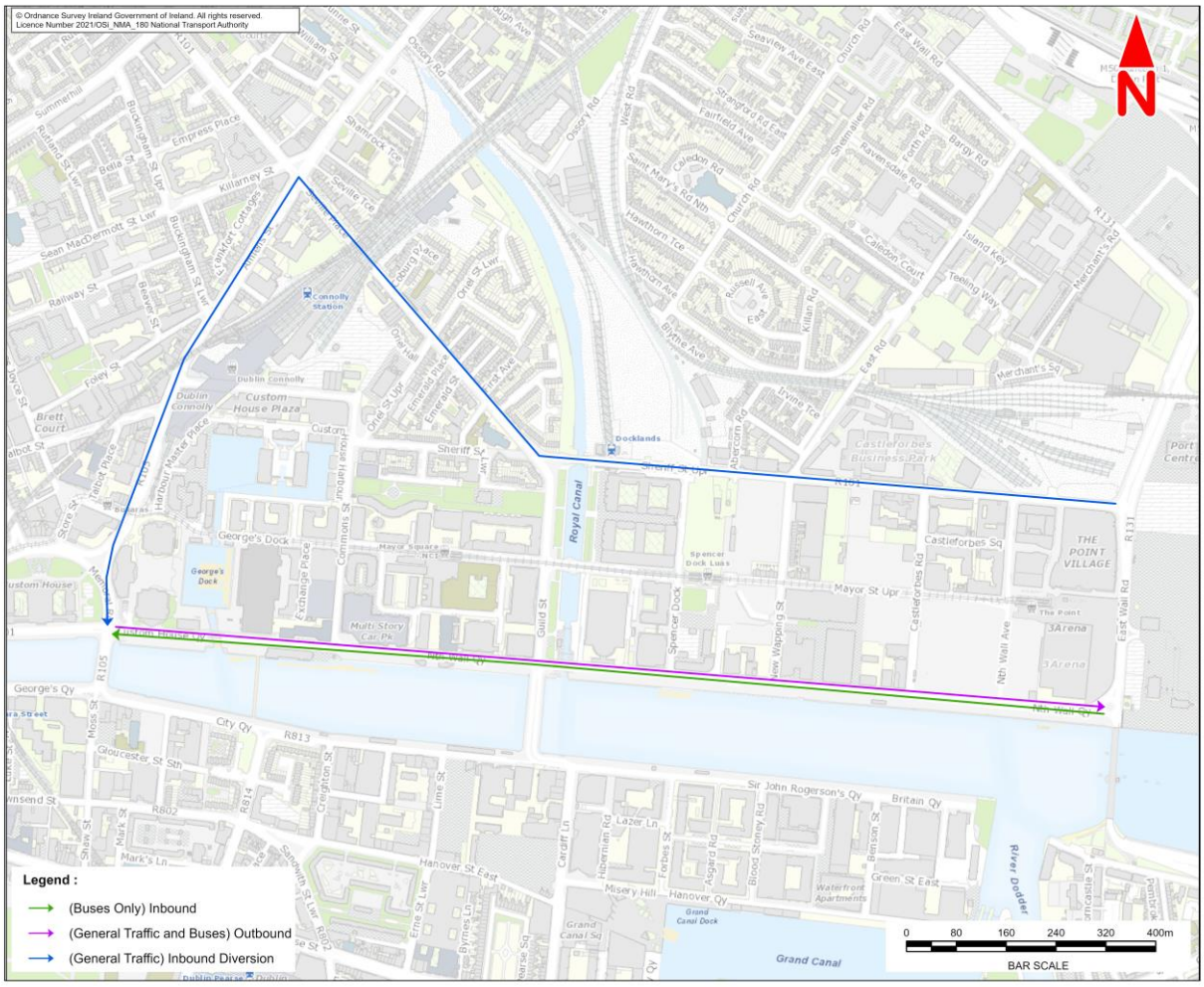


Diagram 6.6 Construction Phase Diversion Route

An existing 7.5t weight restriction exists on the western end of Sheriff Street (between Abercorn Road and Guild Street). This restriction would continue to remain in place during the period of the works. Heavy Goods Vehicles (HGVs) requiring a permit to enter the Dublin City Council HGV Restricted Zone, shown on Diagram 6.7 below,

would not divert via Sheriff Street but would instead use the various other designated HGV routes as permitted to reach their destination,

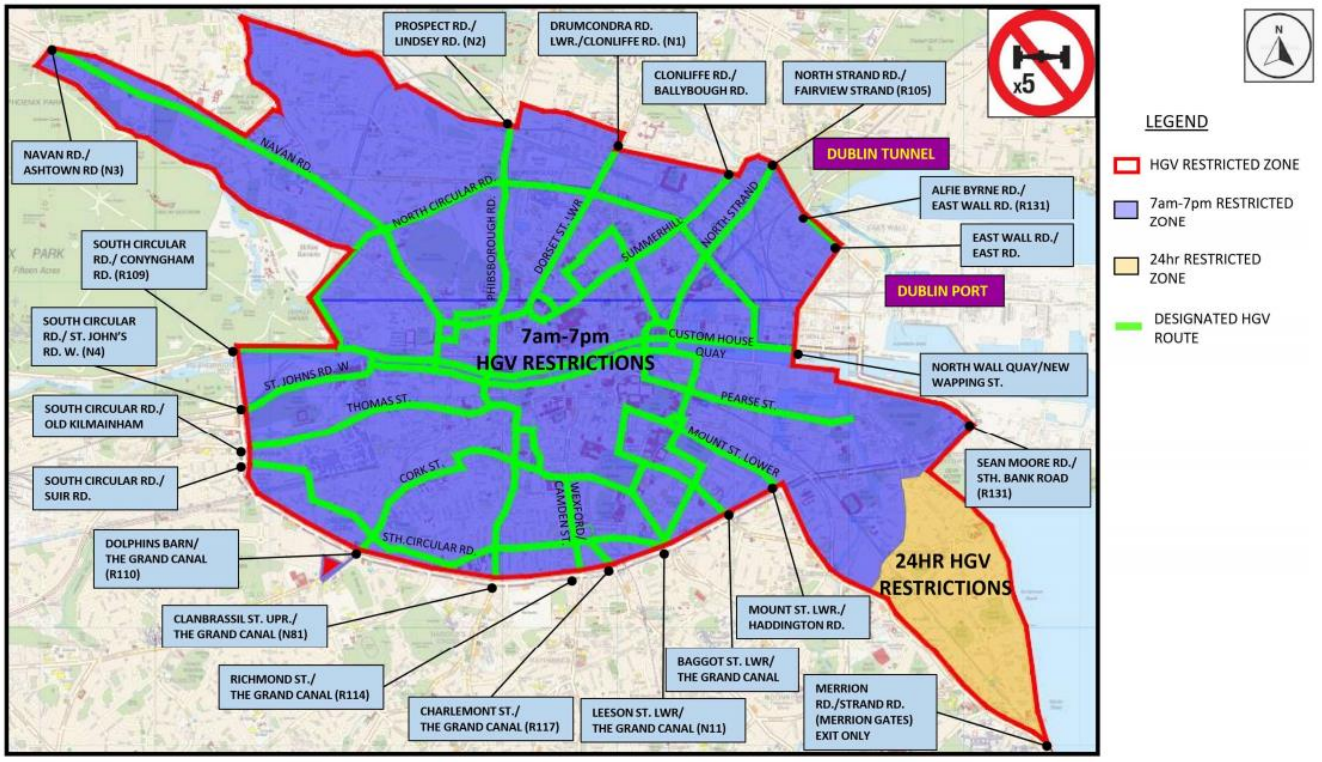


Diagram 6.7 HGV Restricted Zone Map (Source: Dublin City Council)

An assessment has been carried out in the LAM to model the impacts of the temporary diversion route on general traffic and junctions along the route. The volume of diverted traffic is predicted to be approximately 140 and 250 passenger car units (PCUs) in the AM and PM peak hour periods respectively. This equates to an approximate additional 2-4 vehicles per minute during the peak hours.

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 for a junction have been identified with reference to the arm which experiences the maximum V / C ratio. This has been done in order to ensure a conservative and worst-case assessment of impacts**.**

A V / C ratio of below 85% indicates that a junction is operating well, with spare capacity, with traffic not experiencing queuing or delays throughout the hour. A value of 85% to 100% indicates that the junction is approaching its theoretical capacity with traffic possibly experiencing occasional queues and delays within the hour. A value of over 100% indicates that a junction is operating above its theoretical capacity and traffic experiences queues and delays regularly within the hour. 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 on EIAR. Further detail on this process is detailed in Section 6.4.6.3.8.5.

Table 6.8 below presents the assessment of key junctions along the diversion route for the AM peak hour for the construction year scenario.

Table 6.8: Volume over Capacity Ratios at Key Junctions (Do Minimum vs. Do Something), AM Peak, Construction Year

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%		
Amiens Street	Negligible	Amiens Street / Portland Row / North Strand Road / Seville Place			✓			✓	Low	Not Significant
Seville Place	Negligible	Seville Place / Sheriff Street Upper / Guild Street	✓				✓		Low	Not Significant
Memorial Road	Negligible	Memorial Road / Amiens Street	✓			✓			Negligible	Imperceptible
	Negligible	Memorial Road / Custom House Quay		✓			✓		Negligible	Imperceptible
East Wall Road	Negligible	East Wall Road / Sheriff Street Upper	✓			✓			Negligible	Imperceptible
Sheriff Street Upper	Low	New Wapping Street / East Road / Sheriff Street Upper	✓			✓			Negligible	Not Significant
Guild Street	Negligible	North Wall Quay / Guild Street / Samuel Beckett Bridge		✓			✓		Negligible	Imperceptible

Table 6.9 below presents the assessment of key junctions along the diversion route for the PM peak hour for the construction year scenario.

Table 6.9: Volume over Capacity Ratios at Key Junctions (Do Minimum vs. Do Something), PM Peak, Construction Year

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%		
Amiens Street	Negligible	Amiens Street / Portland Row / North Strand Road / Seville Place		✓		✓			Low Positive	Not Significant
Seville Place	Negligible	Seville Place / Sheriff Street Upper / Guild Street	✓			✓			Negligible	Imperceptible
Memorial Road	Negligible	Memorial Road / Amiens Street	✓			✓			Negligible	Imperceptible
	Negligible	Memorial Road / Custom House Quay		✓		✓			Low Positive	Not Significant
East Wall Road	Negligible	East Wall Road / Sheriff Street Upper	✓			✓			Negligible	Imperceptible
Sheriff Street Upper	Low	New Wapping Street / East Road / Sheriff Street Upper		✓		✓			Low Positive	Not Significant
Guild Street	Negligible	North Wall Quay / Guild Street / Samuel Beckett Bridge		✓			✓		Negligible	Imperceptible

The assessment has found that the junctions along the diversion route experience limited impact in terms of capacity (ranging from Imperceptible to Not Significant). Some of the junctions experience positive capacity effects due to the removal of some traffic that would have otherwise travelled via the quays and through these junctions. Further analysis within the LAM has shown that spare capacity is available to allow the junctions to be re-optimised (a reallocation of available green time) to accommodate the change in traffic flows, as required during the period of the temporary diversion.

Further analysis has been done comparing journey times within the LAM comparing the westbound traffic route from Tom Clarke Bridge via North Wall Quay versus the diversion route via Sheriff Street, Seville Place and Amiens Street to Talbot Memorial Bridge. The analysis is presented in Table 6.10 below.

Table 6.10: Selected Journey Times Construction Phase

Route	AM (hr:min:sec)	PM (hr:min:sec)
Route 1 (Existing westbound route) – Westbound on North Wall Quay from Tom Clarke Bridge to Talbot Memorial Bridge (Distance 1.6km)	00:04:28	00:04:10
Route 2 (Westbound TMP Diversion route) – Westbound from Tom Clarke Bridge to Sheriff Street, Seville Place and Amiens Street to Talbot Memorial Bridge (Distance 2.65km)	00:08:14	00:06:43
Difference	00:03:46	00:02:33

The results indicate that the travel time for the maximum travel distance via the diversion route will result in an increase of 03:46 and 02:33 (min:sec) in the AM and PM peaks respectively. The increase in travel time is consistent with the increase in the required diversion route distance from 1.6km via North Wall Quay to 2.65km via the diversion route (+1.05km) and no significant additional travel time as a result of congestion and delay is anticipated. The increased travel time is considered acceptable for a temporary period to facilitate the construction of the Proposed Scheme.

It is intended that access for general traffic to existing residential and commercial units immediately adjacent to the Proposed Scheme is to be accommodated throughout the Construction Phase as far as practicable.

The appointed contractor will further develop a CTMP that gives due consideration to provision of local access requirements and designates appropriate diversion routes in the case where localised temporary lane closures are required. Overall, for the reasons outlined above, the impact on general traffic redistribution is anticipated to have a **Negative, Moderate and Short-term** effect.

For the purpose of Air Quality (Chapter 7), Climate (Chapter 8) and Noise & Vibration (Chapter 9) impacts assessments, a worst-case scenario for construction activities was considered for assessment purposes and has been modelled in the LAM based on a notional stage of construction whereby Sections 1a, 1c and 1d were under construction concurrently. Further details on the impacts assessment can be found within these chapters.

6.4.5.4.6.2 Construction Traffic Generation

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

Typical work hours on site are between 07:00 and 23:00 with staff working across early and late shifts. The adopted shift patterns help minimise travel by personnel during the peak hour periods of 08:00 to 09:00 and 17:00 to 18:00.

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 Compound 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.

Heavy Goods Vehicles (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 waste material.

Chapter 5 (Construction) of this EIAR provides a breakdown of the expected operation for the construction of the Proposed Scheme during each subsection. It should be noted that the CTMP will control vehicular movement along the construction 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, a maximum of 24 HGV trips are estimated to access / egress the construction works during the AM and PM Peak Hours.

Overall Peak Hour Impacts: The contents of Table 6.11 outline the anticipated maximum construction traffic generation by site operatives and HGVs during the AM and PM Peak Hours.

Table 6.11: 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	24	0	24	58	120
PM Peak Hour	0	24	10	24	58	120

The above impacts are marginally above the thresholds set out in TII's Guidelines for Transport Assessments for permanent changes in flow. Given the impacts of construction are temporary and will be managed through the CTMP to be minimised so far as possible, it is considered appropriate to define the general traffic impacts of the Construction Phase to have a **Negative, Moderate and Short-term effect**.

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.

6.4.5.5 Construction Phase Summary

The contents of Table 6.12 present a summary of the predicted impacts of the Proposed Scheme during Construction Phase.

Table 6.12 Summary of Construction Phase Predicted Impacts

Assessment Topic	Effect	Predicted Impact
Pedestrian Access	Restrictions to pedestrians along Proposed Scheme.	Negative, Slight and Temporary
Cycling Access	Restrictions to cyclists along Proposed Scheme	Negative, Moderate and Temporary
Bus Access	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 Short-term
	Additional construction traffic flows upon surrounding road network.	Negative, Moderate and Short-term

6.4.6 Operational Phase

6.4.6.1 Overview

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.

6.4.6.2 Qualitative Assessment

6.4.6.2.1 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 two 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.

6.4.6.2.1.1 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 6.9. The contents of Table 6.13 outline the assessment criteria for each junction.

Table 6.13: 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?

The LoS rating demonstrated in Table 6.14 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 6.14: 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 6.15 have been used to describe the impact, based on the changes in the Qualitative Pedestrian LoS rating.

Table 6.15: 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.

6.4.6.2.1.2 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's 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.

The contents of

Table **6.16** outlines the assessment criteria with reference to the corresponding LoS ratings.

Table 6.16: 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	Toucan crossings at signalised junctions for cyclists along CBC / Protected junctions not already classified as A+ for junction treatment
B	On-road cycle lanes or carriageway designated as 'quiet cycle routes'	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 subsections 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 6.17 have been used to describe the impact, based on the changes in the Qualitative Cycling LoS rating.

Table 6.17 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.

6.4.6.2.1.3 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;
- Bus stop provision; and
- Changes to the existing bus stop facilities:
    - Real-time information;
    - Timetable information;
    - Shelters;
    - Seating;
    - Accessible kerbs (containment Kassel kerbs); and
    - Removal of indented drop off areas, where appropriate.

The magnitude of impact of the Proposed Scheme, applied to the qualitative review of the above factors, is set out in Table 6.18.

Table 6.18: Magnitude of Impact for Bus Users Qualitative Assessment

Impact	Description of Impact / Proposed Changes
High positive	Significant benefit for bus 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.

6.4.6.2.1.4 Parking and Loading

The 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 (baseline environment) and Do Something scenarios. The assessment has taken the parking information and 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 account of adjacent parking on side streets which is defined as alternative parking locations along side roads within 200 – 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.

6.4.6.2.2 Section 1 – Talbot Memorial Bridge to Tom Clarke East Link Bridge & Section 2 – Dodder Public Transport Opening Bridge (DPTOB)

The qualitative impacts of the operational phase for Sections 1 and 2 of the Proposed Scheme have been assessed as one, due to the short nature of Section 2 (DPTOB) and its lack of baseline environment.

6.4.6.2.2.1 Pedestrian Infrastructure

The key infrastructure changes to the pedestrian links along Section 1 and 2 of the Proposed Scheme are as follows:

- The provision of the Dodder Public Transport Opening Bridge (DPTOB) at the eastern end of Sir John Rogerson's Quay will provide a connection to East Link Road for pedestrians crossing the Dodder River. This will greatly enhance pedestrian connectivity in the area by linking the employment and entertainment areas of the river's west side with the residential and amenity areas to the east;
- To the north of River Liffey (R801 Custom House Quay and R801 North Wall Quay) it is proposed to provide pedestrian boardwalks at pinch points adjacent to the River Liffey between Sean O'Casey Bridge and Commons Street and at Excise Walk;
- Upgrades to R801 Custom House Quay / R802 Talbot Memorial Bridge Junction, R801 North Wall Quay / Castleforbes Road Junction, R813 City Quay / R814 Lombard Street East Junction to provide direct and signalised pedestrian crossings on all arms;
- Widening of the signalised crossing on the eastern arm of the Commons Street Junction and removal of the signalised pedestrian crossing on the western side of the junction; and

- Implementation of raised tables on the following side roads: east of the Convention Centre Dublin, Salesforce Tower Site Access, Prince Street South, Lime Street, Asgard Road, Blood Stoney Road, Britain Quay and Benson Street.

The assessment of the qualitative impacts on the Pedestrian Infrastructure for Section 1 and 2 of the Proposed Scheme are summarised in Table 6.19 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 A6.5.1 (Pedestrian Infrastructure Assessment).

Table 6.19: Section 1 & 2 – Significance of Effects for Pedestrian Impact during Operational Phase

Junctions	Chainage	Do Minimum LoS	Do Something LoS	Impact	Sensitivity	Significance of Effect
R801 Custom House Quay / R802 Talbot Memorial Bridge / R802 Memorial Bridge	A1600 – A1700	B	A	Low	Negligible	Not Significant
R801 Custom House Quay / Commons Street / R801 North Wall Quay	A1225 – A1275	A	B	Low	Low	Negative Slight
R801 North Wall Quay / Salesforce Tower Site Access	A625 – A650	E	B	Medium	Negligible	Not Significant
R801 North Wall Quay / Castleforbes Road	A300 – A350	B	A	Low	Negligible	Not Significant
R813 City Quay / R814 Lombard Street East	B10250 – B10300	C	A	Medium	Low	Positive Moderate
R813 Sir John Rogerson's Quay / Lime Street	B10550 – B10600	C	B	Low	Medium	Positive Moderate
R813 Sir John Rogerson's Quay / R813 Cardiff Lane / Sir John Rogerson's Quay	B10750 – B10800	C	B	Low	Medium	Positive Moderate
Sir John Rogerson's Quay / Asgard Road	B11000 – B11050	C	B	Low	Negligible	Not Significant
Sir John Rogerson's Quay / Blood Stoney Road	B11050 – B11100	C	A	Medium	Negligible	Not Significant
Sir John Rogerson's Quay / Britain Quay	B11150 – B11200	C	B	Low	Negligible	Not Significant
Sir John Rogerson's Quay / Benson Street	B11250 – B11300	C	B	Low	Negligible	Not Significant
Section Summary		**C**	**B**	**Low**	**Low**	**Positive Slight**

The contents of Table 6.19 demonstrate that the Proposed Scheme will have a positive long-term impact on the quality of the pedestrian infrastructure between R802 Talbot Memorial Bridge and R131 Tom Clarke East Link Bridge during the Operational Phase.

The LoS during the Do Minimum scenario ranges from A and E, with eight of the 11 impacted junctions rated at C or lower. These ratings have been determined using the previously referenced assessment criteria set out in Table 6.13. The LoS will improve to a A/ B rating at all impacted junctions in the Do Something scenario. This is as a result 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 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.

Furthermore, the introduction of the Dodder Public Transport Bridge will create a new pedestrian link across the mouth of the River Dodder. This will greatly enhance pedestrian connectivity in the area by linking the employment and entertainment areas of the river's west side with the residential and amenity areas to the east. Therefore, this can be considered a **Positive, Profound, and Long-term effect**.

Overall, it is anticipated that there will be **Positive, Slight and Long-term effect** to the quality of the pedestrian infrastructure along Section 1 and 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 A6.4.1 (Pedestrian Infrastructure Assessment).

6.4.6.2.2.2 Cycling Infrastructure

The following section sets out the qualitative impacts on the cycling receptors for Section 1 and 2 of the Proposed Scheme. The results are summarised in Table 6.20, along with the accompanying sensitivity for each section and the resultant significance of impact.

The key cycling infrastructure changes along Section 1 and 2 of the Proposed Scheme can be summarised as follows:

- Provision of continuous two-way cycle tracks along the northern and southern banks of the River Liffey. This will extend along R801 Custom House Quay and R801 North Wall Quay, to the north, and along R813 City Quay and R813 Sir John Rogerson's Quay, to the south, between R802 Talbot Memorial Bridge and R131 Tom Clarke East Link Bridge. Typically, the two-way cycle tracks will be 3m wide or, at a minimum, 2.5m wide. These cycle tracks will integrate with existing cycle infrastructure to the west of the scheme
- The provision of the DPTOB at the eastern end of Sir John Rogerson's Quay will include cycle tracks and a connection to East Link Road where a quite cycle route will commence at York Road. Design under development as part of the DPTOB Scheme;
- All existing cycle lanes along R801 Custom House Quay and R801 North Wall Quay carriageways between R802 Talbot Memorial Bridge and R131 Tom Clarke Bridge to be removed to accommodate bus lanes in both directions;
- Provision of two-way cycle tracks on the eastern side of Talbot Memorial Bridge;
- Improved cycling facilities at junctions along R801 Custom House Quay, R801 North Wall Quay and R813 Sir John Rogerson's Quay. The location of the cycle tracks on the bank of the River Liffey, cyclists will be able to bypass several junctions whilst access to and egress from side streets will be facilities at signalised junctions with toucan crossings. Junctions are typically protected junctions with cycle crossing points on each arm of the junction. Where cyclists share green time with general traffic, cycle lanes continue through the junction; and
- Improved connectivity with wider cycle provisions / schemes. This includes a tie-in to the proposed Liffey Cycle Scheme to the west of the Talbot Memorial Bridge and considerations of the River Dodder Greenway, the Grand Canal and Royal Canal Premium Cycle Routes and the East Coast Trail / National Route N5.

Along Section 1 and 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 (as is the case in some areas of the baseline environment) 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 raised 120mm from the carriageway to provide segregation from vehicles.

The contents of Table 6.20 outline the cycling qualitative assessment along Section 1 and 2 of the Proposed Scheme, sets out the overall Do Minimum LoS and the Do Something LoS and the description of impact. Please refer to 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 6.20: Section 1 and 2 – Cycling Impact during Operational Phase

Location	Chainage	Do Minimum LoS	Do Something LoS	Impact	Sensitivity	Significance of Effect
Talbot Memorial Bridge: R801 Custom House Quay to R813 City Quay	A1613 – B10000	C	A	Medium	Medium	Positive Significant
R801 Custom House Quay and R801 North Wall Quay: Talbot Memorial Bridge to Samuel Beckett Bridge	A1613 – A900	C	A	Medium	High	Positive Very Significant
Samuel Beckett Bridge: R801 North Wall Quay to R813 Sir John Rogerson's Quay	A900 – B10700	B	B	Negligible	Medium	Not Significant
R801 North Wall Quay: Samuel Beckett Bridge to Tom Clarke Bridge	A900 – A0	C	A	Medium	Low	Positive Moderate
R813 City Quay and R813 Sir John Rogerson's Quay: Talbot Memorial Bridge to Samuel Beckett Bridge	B10000 – B10750	A	A	Negligible	High	Not Significant
R183 Sir John Rogerson's Quay: Samuel Beckett Bridge to Forbes Street	B10750 – B10950	C	A	Medium	High	Positive Very Significant
R183 Sir John Rogerson's Quay: Forbes Street to River Dodder	B10950 – B11427	B	A	Low	Negligible	Not Significant
Section Summary		**B**	**A**	**Low**	**Medium**	**Positive Moderate**

The contents of Table 6.20 demonstrate that the Proposed Scheme will have a **Positive, Moderate and Long-term effect** on the cycling environment between R802 Talbot Memorial Bridge and R131 Tom Clarke East Link Bridge during the Operational Phase.

The LoS rating of the cycling facilities during the Do Minimum scenario ranges from A and C, in which four out of the seven locations include a LoS rating of C. These ratings have been determined using the previously referenced assessment criteria set out in

Table **6.16**. During the Do Something scenario the LoS ratings increase to mostly A with one junction receiving a B rating. This 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.

Furthermore, the introduction of the Dodder Public Transport Bridge will create a new cycling link across the mouth of the River Dodder. This will greatly enhance cycling connectivity in the area by linking the employment and entertainment areas of the river's west side with the residential and amenity areas to the east. Therefore, this can be considered a **Positive, Profound, and Long-term effect**.

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'.

6.4.6.2.2.3 Bus Infrastructure

It is proposed that there will be a total of thirteen bus stops and seven coach stops along Section 1 and 2 of the Proposed Scheme. To the north of the River Liffey, its proposed there will be seven bus stops and seven coach stops, whilst to the south of the River Liffey there will be six bus stops. The layout of new bus and coach stops is

considered to better serve the existing and future catchment and be closer to existing and new pedestrian crossing facilities for improved convenience.

The key bus / coach infrastructure changes along Section 1 and 2 of the Proposed Scheme can be summarised as follows:

- To the north of the River Liffey, continuous bus lanes are proposed in both directions on Custom House Quay and North Wall Quay between the Talbot Memorial Bridge and the Tom Clarke Bridge. In addition to the continuous bus lanes, bus priority is protected through bus signal priority, right-turning restrictions at various junctions;
- To the south of the River Liffey, intermittent bus lanes are proposed between Lombard Street East and Talbot Memorial Bridge (westbound) and between Forbes Street and Samuel Beckett Bridge (westbound). The Dodder Public Transport Bridge will provide access for eastbound and westbound buses between Sir John Rogerson's Quay and R131 East Link. Along the South Quay, junction alterations are proposed to reduce congestion impacting bus journey times;
- Along the North Quay, three new outbound coach stops and four new inbound coach stops are proposed. It is also proposed to rationalise two inbound bus stops (7216 and 2500) and two outbound stops (7398 and 7611), providing one combined inbound stop and one combined outbound stop in their place. The separation of bus and coach stops along this section enables the indentation of coach stops, reducing delay to local bus services when loading; and
- Along the South Quay, two new outbound bus stops and four new inbound bus stops are proposed.

The contents of Table 6.21 summarise the changes to bus stop infrastructure (excluding coach stops) along Section 1 and 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 6.21: Section 1 and 2 – Overview of Changes in Bus Stop Facilities (excluding coach stops)

Bus Stop Facility	Do Minimum		Do Something		Comment
	No. of Stops	Percentage of Stops	No. of Stops	Percentage of Stops	
RTPI	1	10%	13	100%	It is proposed that all bus stops along Section 1 and 2 provide real-time information.
Timetable information	8	80%	13	100%	It is proposed that all bus stops along Section 1 and 2 provide timetable information.
Shelter	0	0%	13	100%	It is proposed that all bus stops along Section 1 and 2 provide a shelter.
Seating	0	0%	13	100%	It is proposed that all bus stops along Section 1 and 2 provide seating.
Accessible Kerbs	8	80%	13	100%	It is proposed that all bus stops along Section 1 and 2 provide accessible kerbs.
Indented Drop Off Area	0	0%	0	0%	It is proposed that all bus stops along Section 1 and 2 are either inline or island type bus stops. All bus stops along the north quay are proposed within bus lanes whilst two bus stops along the south quay are proposed within bus lanes.
Total Bus Stops	**10**		**13**		A total of 13 bus stop are proposed. Furthermore, an additional seven separated coach stops are proposed along the North Quay.

The contents of Table 6.21 indicate that there are significant improvements to the bus stop facilities along Section 1 and 2 of the Proposed Scheme. It is proposed that all bus stops provide real-time information, timetable information, shelter, seating and accessible kerbs. All bus stops are proposed as either inline or island bus stop types. To the north of the River Liffey, it is proposed that all seven bus stops will be provided inline within dedicated bus lanes, meaning that buses will not incur delay when setting off after picking up passengers. To the south of the River Liffey, two of the six bus stops will be provided inline within dedicated bus lanes whilst the remaining four will be located within the general carriageway.

In addition to the bus information shown in Table 6.21, seven separated coach stops are proposed along the North Quay– three along the outbound carriageway and four along the inbound carriageway. All are proposed to provide timetable information and accessible kerbs whilst one stop is proposed to provide seating and a shelter. Three of the seven proposed coach stops will be indented whilst four will be provided inline within bus lanes.

Improvements in the provision of real-time information, shelters, seating and accessible kerbs at the bus and coach stops throughout Section 1 and Section 2 of the Proposed Scheme are assessed as providing an overall positive impact for bus / coach passengers. All proposed facilities have been designed in accordance with BusConnects Preliminary Design Guidance which has been developed with cognisance to the relevant accessibility guidance.

Taking into account the provision of bus lanes, and bus stop provision and facilities outlined within this section, Table 6.22 outlines the bus qualitative assessment along Section 1 and 2 of the Proposed Scheme.

Table 6.22: Section 1 & 2 – Bus Qualitative Impact during Operational Phase

Section	Chainage	Description of Impact	Impact	Sensitivity of Environment	Significance of Effect
Section 1: Custom House Quay & North Wall Quay	A0 - A1613	• Bus priority provided along the entirety of the corridor; • Number of bus / coach stops increased from 10 to 14 through rationalisation of two bus stops and provision of seven new coach stops; • Bus stops are located in more convenient locations for communities and access to signalised crossings; and • Significant improvements to bus stop facilities.	High	High	Positive Profound
Section 1: City Quay & Sir John Rogerson's Quay	B10000 - B11400	• Six new bus stops with adequate facilities; • Provision of westbound bus lanes along sections of the South Quay; and • The inclusion of bus services along this section (where currently there is none).	High	High	Positive Profound
Section 2: Dodder Public Transport Opening Bridge	B11400 - B11628	• New bus services proposed to cross over the Dodder Public Transport Opening Bridge in both directions.	High	Low	Positive Moderate

As indicated in Table 6.22, the Proposed Scheme improves the quality of existing bus infrastructure along Section 1 and 2 of the Proposed Scheme, which will provide long-term benefits for bus users and aligns with the overarching aim to provide enhanced bus infrastructure on the corridor. The impact for this section of the Proposed Scheme is High Positive. The sensitivity of environment rating ranges between 'high' and 'low'. This results in an overall **Positive, Very Significant and Long-term effect** on this section.

6.4.6.2.2.4 Parking and Loading

The Proposed Scheme will impact on existing parking and loading facilities along Section 1 and 2 of the Proposed Scheme. The main areas of parking and loading changes along R801 North Wall Quay are as follows:

- There are currently two loading bays located adjacent to the eastbound lane of R801 North Wall Quay, outside the Citibank Holdings Ireland Limited office building immediately east of the R801 North Wall Quay / Commons Street junction. It is proposed that both loading bays are removed to enable the provision of a new eastbound indented bus stop. The impact of this change is considered to have a **Negative, Slight and Long-term effect**;
- There are currently five taxi rank spaces adjacent to the eastbound lane of R801 North Wall Quay, to the west of Park Lane. It is proposed that all five spaces are removed to enable the provision of a continuous eastbound bus lane, as well as an in-lane bus stop. The impact of this change is considered to have a **Negative, Moderate and Long-term effect**;
- There are currently seven designated paid parking spaces adjacent to the eastbound lane of R801 North Wall Quay, immediately east of the junction between R801 North Wall Quay and Park Lane. It is proposed that all seven spaces are removed to enable the provision of a continuous eastbound bus lane. The impact of the loss is less than first though due to the surrounding paid off-street

parking available (Euro Car Parks Convention Centre) within 300m, however the impact of this change is considered to have a **Negative, Slight and Long-term effect**;

- There are currently five loading bays located adjacent to R801 North Wall Quay, outside Home Building Finance Ireland, of which two are adjacent to the eastbound lane and three adjacent to the westbound lane. It is proposed that all five spaces are removed to enable the provision of continuous bus lanes in both directions. Although rear building deliveries to Home Building Finance Ireland can be provided via the private road of Slate Street, the impact of this change is considered to have a **Negative, Moderate and Long-term effect**;
- There are currently nine informal parking spaces adjacent to the eastbound lane of R801 North Wall Quay, to the west of the junction between R801 North Wall Quay and Castleforbes Road. It is proposed that all nine spaces are removed to enable the provision of a continuous eastbound bus lane. Due to the surrounding paid off-street parking available approximately 600m to the west (Euro Car Parks Convention Centre) and 700m to the north-east (Euro Car Parks Point Square), the impact of this change is considered to have a **Negative, Slight and Long-term effect**;
- There are currently twelve parking spaces adjacent to the eastbound lane of R801 North Wall Quay, to the east of the junction between R801 North Wall Quay and Castleforbes Road. Of which, eight are designated paid parking spaces, two are disabled permit parking spaces and two are loading bays. It is proposed that all twelve parking spaces are removed to enable the provision of a continuous eastbound bus lane. Due to the surrounding paid off-street parking (at Euro Car Parks Convention Centre and Euro Car Parks Point Square) and the nearby 20 parking spaces along the adjacent North Wall Avenue, the overall impact of this change is considered to have a **Negative, Slight and Long-term effect**; and
- There are currently three informal parking spaces positioned adjacent to the westbound lane of R801 North Wall Quay, to the west of the North Wall Avenue junction. It is proposed that the three spaces are removed to enable the provision of a continuous westbound bus lane. Due to the surrounding paid off-street parking and the nearby 20 parking spaces along the adjacent North Wall Avenue, the impact of this change is considered to have a **Negative, Slight and Long-term effect.**

The main areas of parking and loading changes along Sir John Rogerson's Quay are as follows:

- There are currently three taxi rank and fourteen designated paid parking spaces adjacent to the westbound lane of Sir John Rogerson's Quay, between the adjacent R813 Cardiff Lane and Forbes Street. It is proposed that all taxi rank and designated paid parking spaces are removed. Due to the available parking on the adjacent Cardiff Lane (11 spaces) and Forbes Street (21 spaces), the overall impact of this change is considered to have a **Negative, Slight and Long-term effect**;
- There are currently eight designated paid parking spaces adjacent to the westbound lane of Sir John Rogerson's Quay, immediately east of the junction between Sir John Rogerson's Quay and Forbes Street. It is proposed that all eight parking spaces are removed. Due to the availability of parking on adjacent roads such as Forbes Street (21 spaces) and Blood Stoney Road (11 spaces), the impact of this change is considered to have a **Negative, Slight and Long-term effect**;
- There are currently five designated paid parking spaces and one disabled parking bay adjacent to the westbound lane of Sir John Rogerson's Quay, between Blood Stoney Road and Asgard Road. It is proposed to reduce the number of designated paid parking spaces from five to three, therefore removing two spaces. The one disabled parking space will be retained. Due to the availability of parking on adjacent roads such as Blood Stoney Road (11 spaces), the impact of this change is considered to have a **Negative, Slight and Long-term effect**;
- There are currently 14 designated paid parking spaces adjacent to the westbound lane of Sir John Rogerson's Quay, between Blood Stoney Road and Britain Quay. It is proposed to reduce the number of designated paid parking spaces from 14 to seven, therefore removing seven spaces. Due to the availability of parking on adjacent roads such as Blood Stoney Road (11 spaces) and on Benson Street (26 spaces), the impact of this change is considered to have a **Negative, Slight and Long-term effect**;
- There are currently four designated paid parking spaces adjacent to the westbound lane of Sir John Rogerson's Quay, immediately west of the junction between Sir John Rogerson's Quay and Benson Street. It is proposed, due to the location of a new bus stop, that all four parking spaces are removed. Due to the retention of fourteen designated paid parking spaces approximately 80m to the west of

the discussed parking spaces, as well as the available parking on Benson Street (26 spaces), the impact of this change is considered to have a **Negative, Slight and Long-term effect**; and

- There are currently eight permit parking spaces adjacent to the westbound lane of Sir John Rogerson's Quay, to the east of the junction between Sir John Rogerson's Quay and Benson Street. It is proposed that all eight spaces are removed with alternative parking available on Benson Street (26 spaces). The impact of this change is considered to have a **Negative, Moderate and Long-term effect**.

The contents of Table 6.23 present a summary of the proposed changes to parking along Section 1 and 2 of the Proposed Scheme.

Table 6.23: Section 1 and 2 – Overall Changes in Parking / Loading Spaces

Location	Parking Type	Do Minimum	Do Something	Change
R801 Custom House Quay	Loading/Unloading	3	3	0
R801 North Wall Quay	Designated Paid Parking	15	0	-15
	Disabled Permit Parking	2	0	-2
	Informal Parking	12	0	-12
	Loading/Unloading	24	15	-9
	Side Street	20	20	0
	Taxi Parking	5	0	-5
Sir John Rogerson's Quay (section of which is part of the R813 road)	Designated Paid Parking	50	15	-35
	Disabled Permit Parking	1	1	0
	Loading/Unloading	4	4	0
	Permit Parking	8	0	-8
	Side Street	69	69	0
	Taxi Parking	3	0	-3
R813 City Quay	Disabled Permit Parking	1	1	0
	Informal Parking	14	14	0
	Permit Parking	13	13	0
	Side Street	98	98	0
Total		**342**	**253**	**-89**

As shown in Table 6.23, there are currently approximately 342 parking spaces along Section 1 and 2 of the Proposed Scheme and is it proposed that 89 of these spaces are removed. The Proposed Scheme will formalise the parking arrangements at these locations to improve the environment, particularly for pedestrians and cyclists. Given the availability of equivalent types of parking along adjacent streets within 200m of these locations (and typically within under 100m), the overall impact of this loss of parking is considered to have a **Negative, Slight and Long-term effect**. This effect is considered acceptable in the context of the aim of the Proposed Scheme, to provide enhanced walking, cycling and bus infrastructure on this key access corridor.

6.4.6.2.3 Section 3 – Tom Clarke East Link Bridge to Sean Moore Road

6.4.6.2.3.1 Pedestrian Infrastructure

The key infrastructure changes to the pedestrian links along Section 3 of the Proposed Scheme are summarised as follows:

- Upgrades to pedestrian facilities in Ringsend Park to provide a wider shared use facility between Cambridge Park and Strand Street. At the access to Irishtown Stadium and the junction with Kerlogue Road, a raised table is proposed to maintain pedestrian priority;

- Changes at the Bayview / R131 Sean Moore Road / Beach Road junction to provide a signalised toucan crossing on the eastern arm;
- Changes at the R131 Sean Moore Road / Beach Road/ Cranfield Place junction to replace the signalised crossing on the R131 Sean Moore Road left turn slip lane and replace it with raised tables which extend across the entire width of R131 Sean Moore Road;
- Implementation of raised tables and zebra crossings at the following locations to reduce speeds and increase ease of crossing: the York Road / Pembroke Cottages junction and Cambridge Road / Cambridge Park junction;
- Additional traffic calming measures along York Road and Pigeon House Road; and
- Improved lighting between East Link Toll Plaza and Tom Clarke Bridge and through Ringsend Park.

The assessment of the qualitative impacts on the Pedestrian Infrastructure for Section 3 of the Proposed Scheme are summarised in Table 6.24 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 A6.4.1 (Pedestrian Infrastructure Assessment).

Table 6.24: Section 3 - Significance of Effects for Pedestrian Impact during Operational Phase

Junctions	Chainage	Do Minimum LoS	Do Something LoS	Impact	Sensitivity	Significance of Effect
York Road / Pembroke Cottages	E0025 – E0075	C	B	Low	Low	Positive Slight
Pembroke Cottages / Cambridge Road / Cambridge Park	F50150 – F50200	D	A	Medium	Low	Positive Moderate
Ringsend Park shared path / Irishtown Stadium	F50660 – F50680	B	A	Low	Low	Positive Slight
Pedestrian path / Kerlogue Road	F50760 – F50780	C	A	Medium	Negligible	Not Significant
Bayview / R131 Sean Moore Road / Beach Road	F50880 – F50920	D	B	Medium	Medium	Positive Significant
R131 Sean Moore Road / Beach Road (south-westbound)	F50950 - F51000	D	B	Medium	Negligible	Not Significant
Section Summary		**C**	**B**	**Low**	**Low**	**Positive Slight**

The contents of Table 6.24 demonstrate that the Proposed Scheme will have a positive long-term impact on the quality of the pedestrian infrastructure between R131 Tom Clarke East Link Bridge to R131 Sean Moore Road during the Operational Phase.

The LoS during the Do Minimum scenario includes ratings of C /D and one B. These ratings have been determined using the previously referenced assessment criteria set out in Table 6.13.

The LoS will improve to ratings of A and B at the impacted junctions in the Do Something scenario. This is as a result 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 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, Slight 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 A6.4.1 (Pedestrian Infrastructure Assessment).

6.4.6.2.3.2 Cycling Infrastructure

The following section sets out the qualitative impacts on the cycling infrastructure for Section 3 of the Proposed Scheme. The results are summarised in Table 6.20, along with the accompanying sensitivity for each section and the resultant significance of impact.

The key cycling amendments along Section 3 of the Proposed Scheme can be summarised as follows:

- A proposed 3.5m wide two-way cycle track, approximately 105m in length, to connect the proposed DPTOB to the proposed quiet cycle route on York Road. The cycle track is proposed to connect to York Road to the west of Thorncastle Street and west of Pembroke Cottages;
- From the southern end of the Tom Clarke East Link Bridge at the junction of the proposed DPTOB, a two way cycle track will extend for 100m to York Road.
- From York Road the cycle route will follow quiet local streets at Pembroke Cottages and Cambridge Park to Ringsend Park, where the existing footpath along the western boundary of the park will be improved to a 4m wide shared path with pedestrian priority;
- From the southern end of Ringsend Park, a segregated cycle track will be provided along Strand Street, Pembroke Street, and R802 Beach Road to R131 Sean Moore Road;
- A branch cycle route from the southern end of Ringsend Park will skirt around Irishtown Stadium to provide a direct connection to the Poolbeg SDZ lands via Bremen Road; and
- A branch cycle route will share the quiet residential streets along York Road and Pigeon House Road to Poolbeg, where Quiet Street Treatment will be provided (in addition to the existing traffic calming measures that are already provided).

The contents of Table 6.25 outline the cycling qualitative assessment along Section 3 of the Proposed Scheme, which sets out the overall Do Minimum LoS and the Do Something LoS and the description of impact. Appendix A6.4.2 (Cycling Infrastructure Assessment) outlines further details of the methodology behind each LoS rating given to the Do Minimum and Do Something scenarios.

Table 6.25: Section 3 – Cycling Impact during Operational Phase

Location	Chainage	Do Minimum LoS	Do Something LoS	Impact	Sensitivity	Significance of Effect
York Road: Pembroke Cottages to Cambridge Road	E40050 – E40300	D	A	High	Low	Positive Moderate
Pigeon House Road: Cambridge Road to Sean Moore Road Roundabout	E40300 – E41019	D	A	High	Low	Positive Moderate
Pembroke Cottages and Cambridge Park: York Road to Ringsend Park	F50000 – F50300	D	A	High	Low	Positive Moderate
Ringsend Park: Cambridge Park to Irishtown Stadium	F50300 – F50700	C	A	Medium	Medium	Positive Significant
Irishtown Stadium to Bremen Road	H70000 – H70233	A	A+	Low	Medium	Positive Moderate
Irishtown Stadium to Sean Moore Park	F50700 – F50992	D	B	High	Medium	Positive Very Significant
Section Summary		**C**	**A**	**Medium**	**Low**	**Positive Moderate**

The contents of Table 6.25 demonstrate that the Proposed Scheme will have a **Positive, Moderate and Long-term effect** on the cycling environment between R131 Tom Clarke East Link Bridge and R131 Sean Moore Road.

The LoS of the cycling facilities will improve along all of the Section 3 of the Proposed Scheme. The increased LoS ratings is as a result of improved facilities for cyclists in the form of quiet cycle routes, raised tables and toucan crossings at junctions for cyclist priority 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'.

6.4.6.2.3.3 Bus Infrastructure

At present there are no existing bus stops along Section 3 of the Proposed Scheme. No changes to bus facilities in the form of bus stops or bus priority is proposed along this section, as such an **Imperceptible and Long-term effect** is anticipated.

6.4.6.2.3.4 Parking and Loading

The Proposed Scheme is expected to have little impact on the existing parking and loading facilities along Section 3 of the Proposed Scheme, with an overall increase of one parking space. There are approximately 237 current parking spaces affected within the area of the Section 3 of the Proposed Scheme. Under the proposals, two informal parking spaces will be removed whilst one additional disabled permit bay and two additional designated parking bays are proposed.

The contents of Table 6.26 present a summary of the proposed changes to parking along Section 3 of the Proposed Scheme.

Table 6.26: Section 3 – Overall Changes in Parking / Loading Spaces

Location	Parking Type	Do Minimum	Do Something	Change
York Road	Informal Parking	79	79	0
Pigeon House Road	Informal Parking	76	76	0
Pembroke Cottages (western)	Informal Parking	15	15	0
Pembroke Cottages (eastern)	Informal Parking	50	50	0
	Disabled Permit Parking	1	1	0
Cambridge Park	Informal Parking	7	7	0
Strand Street	Informal Parking	8	6	-2
	Disabled Permit Parking	1	2	1
	Designated Paid Parking	0	2	2
Total		**237**	**238**	**1**

As shown in Table 6.26, there are approximately 237 current parking spaces affected within the area of the Section 3 of the Proposed Scheme. Under the proposals, two informal parking spaces will be removed whilst one additional disabled permit bay and two additional designated parking bays are proposed. These changes are considered to have an **Imperceptible and Long-term effect.**

6.4.6.2.4 Summary of Corridor-Wide Infrastructure Works

6.4.6.2.4.1 Pedestrian Infrastructure

Overall, the Proposed Scheme will provide an average increase in footway area for pedestrians of 13% inbound and 9% outbound across the corridor compared to the Do Minimum scenario. The Proposed Scheme will increase the number of controlled pedestrian crossings from 37 in the Do Minimum to 50 in the Do Something scenario, equating to a 35% increase. Additionally, there will be an increase in the number of raised table crossings on side roads from 6 in the Do Minimum to 18 in the Do Something scenario, equating to a 200% increase.

6.4.6.2.4.2 Cycling Infrastructure

Overall, the proportion of the Proposed Scheme with cycling facilities will increase by 69%. The proportion of segregated cycle facilities (including the quiet street treatment) will increase from 82% to 93%.

Along the North Quays, the Proposed Scheme will provide 1.6km inbound and 1.6km outbound of segregated cycle facilities which is an increase from the existing 1.1km inbound and 0.9km outbound segregated cycle facilities. In turn, there will be a decrease in non-segregated cycle facilities in the Do Something scenario compared to the Do Minimum (0.1km inbound and 0.8km outbound) as these facilities will be upgraded to segregated facilities.

Along the South Quays and Ringsend, the Proposed Scheme will provide 2.4km inbound and 2.4km outbound of segregated cycle facilities which is an increase from the existing 0.9km inbound and 1.4km outbound segregated cycle facilities. This includes the provision of a two-way cycle track in Ringsend and a spur to the Poolbeg Strategic Development Zone lands via Irishtown Stadium and Bremen Road. Additionally, there will be an increase in non-segregated cycle facilities in the Do Something scenario compared to the Do Minimum as Quiet Streets will be signed on York Road East and Pigeon House Road West.

6.4.6.2.4.3 Bus Priority Infrastructure

Along the North Quay, the Proposed Scheme will provide 1.6km inbound and 1.6km outbound of bus lanes. This is an increase from 0.6km and 0.5km of inbound and outbound bus lanes respectively within the Do Minimum scenario. Along the South Quay, the Proposed Scheme will provide 0.75km and 0.25km of inbound and outbound

bus lanes respectively. In addition, the Proposed Scheme will provide 0.85km inbound and 0.65km outbound of bus signal-controlled priority throughout the whole length of the scheme.

Overall, the total bus priority measures (bus lanes and signal-controlled priority), increases from 1.1km during the Do Minimum scenario to 5.7km within the Proposed Scheme. This results in a 375% increase. The proportion of Section 1 (River Liffey Quays) that features bus priority measures is only 34% during the Do Minimum scenario, however this percentage increases to 89% within the Proposed Scheme.

6.4.6.2.4.4 Parking and Loading

Whilst total parking provision will be reduced by 88 spaces as part of the Proposed Scheme, the majority of these spaces (48) are designated paid parking spaces. 14 of the spaces removed are informal spaces whilst nine are loading / unloading bays and eight are permit parking spaces. Eight taxi rank and one disabled spaces will be removed.

6.4.6.3 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.

6.4.6.3.1 People Movement Assessment

6.4.6.3.1.1 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 combined 2-way number of people moved by each mode (Car, Bus, Walking and Cycling) comparing the Do Minimum and DoSomething scenarios in the AM and PM peak periods for each forecast year (2028, 2043). This 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).

6.4.6.3.2 Peak Hour People Movement along the Proposed Scheme

To determine the impact that the Proposed Scheme has on modal share changes on the direct CBC as a result of its implementation, the modelled number of people moved by each mode (Car, Bus, Active Modes) has been

extracted from the ERM / LAM. The analysis compares the 2-way movement of people across both north and south quays in the Do Minimum and Do Something scenarios at a central point on the Proposed Scheme. The analysis has been produced for the AM and PM peak periods 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 are 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.

6.4.6.3.2.1 2028 AM Peak Hour People Movement

Diagram 6.8 illustrates the bi-directional People Movement by mode during the AM Peak Hour in 2028 along the Proposed Scheme corridor.

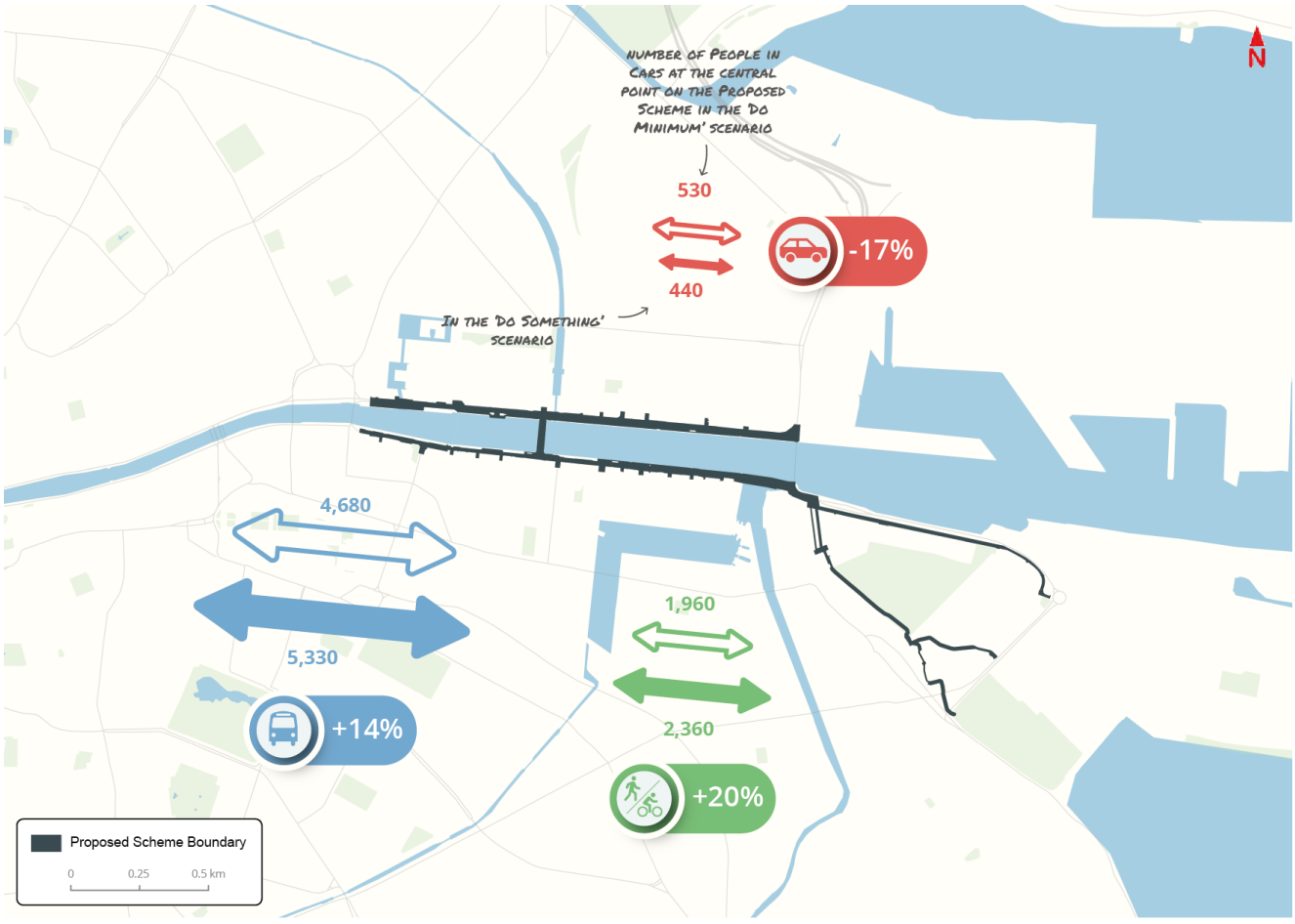


Diagram 6.8: People Movement by Mode during 2028 AM Peak Hour

As indicated in Diagram 6.8, there is a reduction of 17% in the number of people travelling via car, an increase of 14% in the number of people travelling via bus and an increase of 20% in people walking or cycling along the

Proposed Scheme during the AM Peak Hour. It should be noted that the model predicts limited change in total walking trips between each scenario. This is due to the fact that walking trips in the Do Minimum scenario are also transferring to public transport and cycling due to the improved provision with any new walkers transferring from car replacing these trips.

The Proposed Scheme will facilitate a step change in the level of segregated cycling provision in comparison with existing conditions along the entire length of the corridor. The transport modelling undertaken, is therefore conservative in terms of the predicted cycling mode share. The Proposed Scheme has been designed to cater for much higher levels of cycling uptake and this will provide the opportunity for a significant increase in the movement of people travelling sustainably along the corridor, which would otherwise not be achieved in the absence of the Proposed Scheme.

The contents of Table 6.27 outline the difference in modal split between the Do Minimum and Do Something scenarios for each mode of transport in both directions during the AM Peak Hour. The results indicate a 13% increase in people moved as a result of the Proposed Scheme and a 16% increase in people moved by sustainable modes (Public Transport, Walk, Cycle).

Table 6.27: 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 (%)
Bi-directional	AM Peak Period	General Traffic	530	7%	440	5%	-90	-17%
		Public Transport	4,680	65%	5,330	66%	650	14%
		Walking	1,210	17%	1,420	17%	210	17%
		Cycling	750	10%	940	12%	190	25%
		Combined Walking/Cycling	1,960	27%	2,360	29%	400	20%
		Sustainable Modes Total	**6,640**	**93%**	**7,690**	**95%**	**1,050**	**16%**
		Total (All modes)	**7,170**	**100%**	**8,130**	**100%**	**960**	**13%**

6.4.6.3.2.2 2028 PM Peak Hour People Movement

Diagram 6.9 illustrates the bi-directional People Movement by mode during the PM Peak Hour in 2028 along the Proposed Scheme corridor.

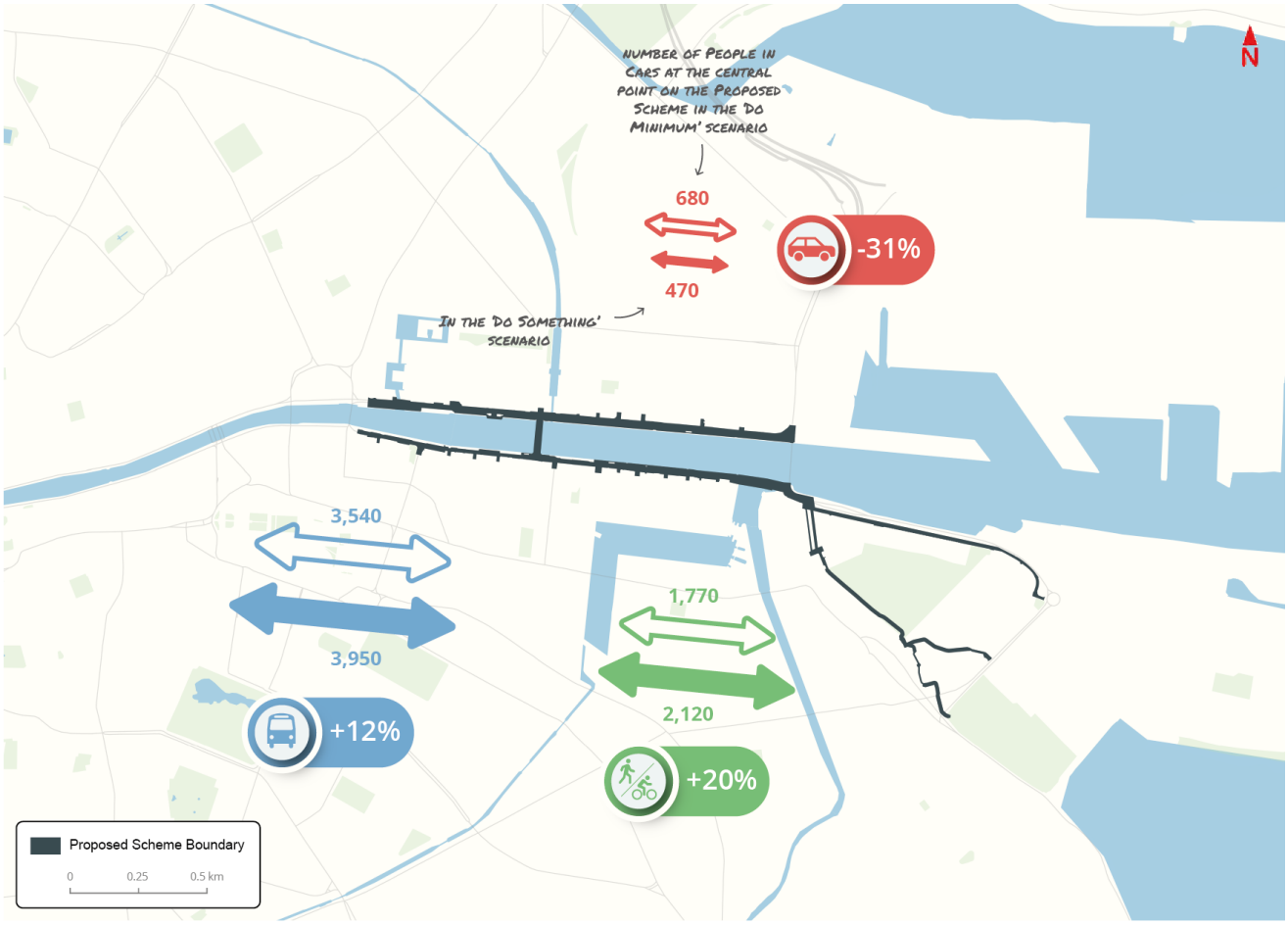


Diagram 6.9 People Movement by Mode during 2028 PM Peak Hour

As indicated in Diagram 6.9, there is a reduction of 31% in the number of people travelling via car, an increase of 12% in the number of people travelling via bus and an increase in 20% in the number of people walking or cycling along the Proposed Scheme during the PM Peak Hour.

The contents of Table 6.28 outline the difference in modal split between the Do Minimum and Do Something scenarios for each mode of transport in both directions during the PM Peak Hour. The results indicate a 9% increase in people moved as a result of the Proposed Scheme and a 14% increase in people moved by sustainable modes (Public Transport, Walk, Cycle).

Table 6.28: 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 (%)
Bi-directional	PM Peak Period	General Traffic	680	11%	470	7%	-210	-31%
		Public Transport	3,540	59%	3,950	60%	410	12%
		Walking	940	16%	1,110	17%	170	18%
		Cycling	830	14%	1,010	15%	180	22%
		Combined Walking/Cycling	1,770	30%	2,120	32%	350	20%
		Sustainable Modes Total	**5,310**	**89%**	**6,070**	**93%**	**760**	**14%**
		Total (All modes)	**5,990**	**100%**	**6,540**	**100%**	**550**	**9%**

6.4.6.3.2.3 2043 AM Peak Hour People Movement

Diagram 6.10 illustrates the bi-directional People Movement by mode during the AM Peak Hour in 2043 along the Proposed Scheme corridor.

Diagram 6.10 People Movement by Mode during 2043 AM Peak Hour

As indicated in Diagram 6.10, there is a decrease of 21% in the number of people travelling via car, an increase of 5% in the number of people travelling via bus and an increase of 86% in the number of people walking and cycling along the Proposed Scheme during the AM Peak Hour.

The contents of Table 6.29 outline the difference in modal split between the Do Minimum and Do Something scenarios for each mode of transport in both directions during the AM Peak Hour. The results indicate a 31% increase in people moved as a result of the Proposed Scheme and a 38% increase in people moved by sustainable modes (Public Transport, Walk, Cycle). The bus loadings in 2043 are lower in comparison to the 2028 opening year scenario due to the inclusion of MetroLink and the DART Underground scheme in the vicinity of the corridor by 2043.

Table 6.29: 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 (%)
Bi-directional	AM Peak Period	General Traffic	390	11%	310	7%	-80	-21%
		Public Transport	1,860	53%	1,950	42%	90	5%
		Walking	1,030	29%	1,390	30%	360	35%
		Cycling	220	6%	940	20%	720	327%
		Combined Walking/Cycling	1,250	36%	2,330	51%	1,080	86%
		Sustainable Modes Total	**3,110**	**89%**	**4,280**	**93%**	**1,170**	**38%**
		Total (All modes)	**3,500**	**100%**	**4,590**	**100%**	**1,090**	**31%**

6.4.6.3.2.4 2043 PM Peak Hour People Movement

Diagram 6.11 illustrates the bi-directional People Movement by mode during the PM Peak Hour in 2043 along the Proposed Scheme corridor.

Diagram 6.11 People Movement by Mode during 2043 PM Peak Hour

As indicated in Diagram 6.11, there is a decrease of 38% in the number of people travelling via car, an increase of 78% in the number of people travelling via bus and an increase of 98% in the number of people walking and cycling along the Proposed Scheme during the PM Peak Hour.

The contents of Table 6.30 outline the difference in modal split between the Do Minimum and Do Something scenarios for each mode of transport in both directions during the PM Peak Hour. The results indicate a 61% increase in people moved as a result of the Proposed Scheme and an 88% increase in people moved by sustainable modes (Public Transport, Walk, Cycle).

Table 6.30: 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 (%)
Bi-directional	PM Peak Period	General Traffic	560	22%	350	8%	-210	-38%
		Public Transport	1,020	39%	1,820	43%	800	78%
		Walking	800	31%	1,110	26%	310	39%
		Cycling	220	8%	910	22%	690	314%
		Combined Walking/Cycling	1,020	39%	2,020	48%	1,000	98%
		Sustainable Modes Total	**2,040**	**78%**	**3,840**	**92%**	**1,800**	**88%**
		Total (All modes)	**2,600**	**100%**	**4,190**	**100%**	**1,590**	**61%**

6.4.6.3.3 People Movement by Bus

The following section presents the ERM demand outputs for People Movement by Bus in terms of passenger loadings along the corridor. 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 compared to the Do Minimum scenario.

6.4.6.3.3.1 2028 AM Peak Hour Bus Passengers (Inbound Direction towards the City Centre)

Diagram 6.12 and Diagram 6.13 present the passenger loading profile comparing the Do Minimum and Do Something scenarios in the AM Peak Hour in the inbound direction towards the city centre in 2028.

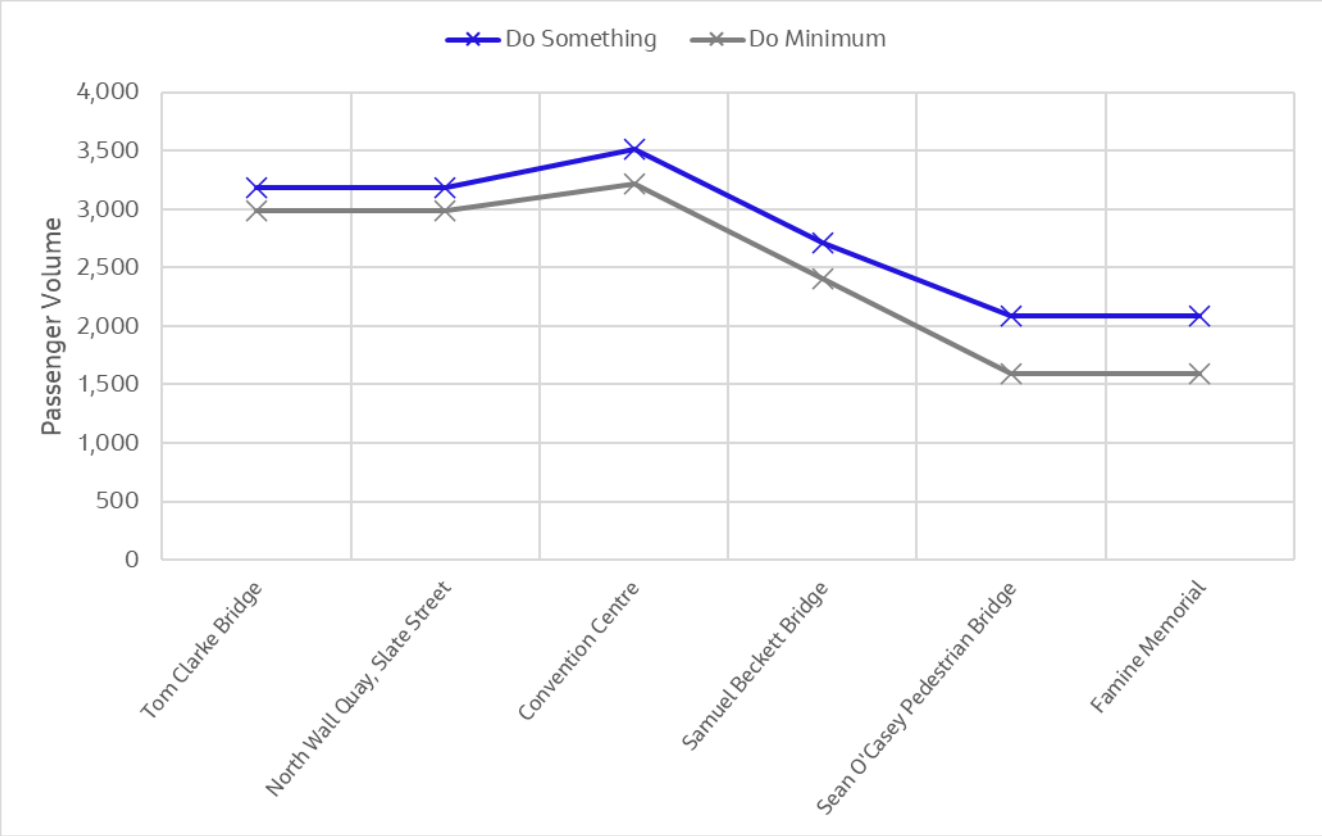


Diagram 6.12: 2028 AM Peak Hour Passenger Volume Along Proposed Scheme (inbound direction - North Quay)

Diagram 6.12 shows higher levels of bus passenger loadings all along the Proposed Scheme with a peak loading at the Convention Centre where the volume of passengers reaches 3,500 in the AM Peak Hour, compared to approximately 3,200 in the Do Minimum scenario.

The increase in bus passenger is consistent all along the Proposed Scheme with an estimated 200 to 300 additional passengers per hour on the corridor, compared to the Do Minimum scenario.

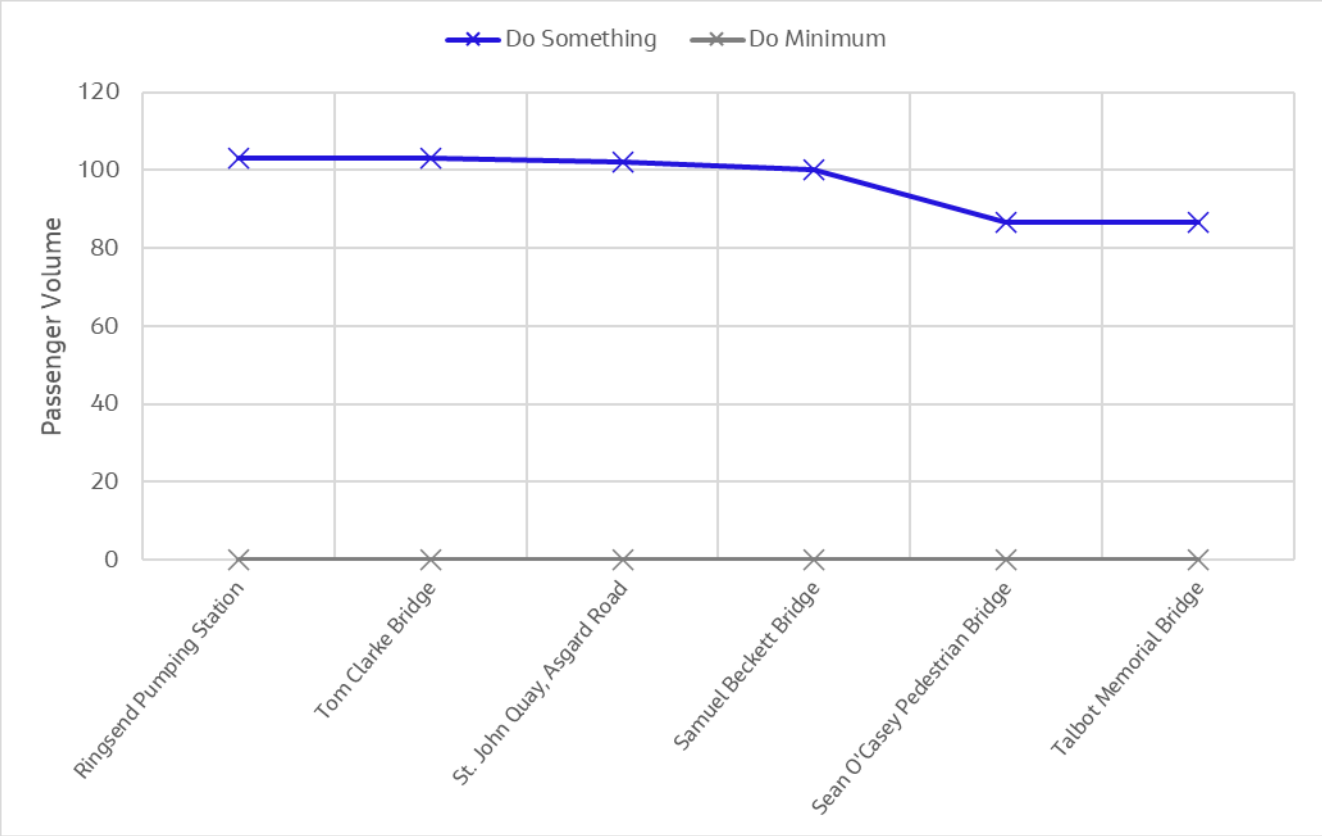


Diagram 6.13: 2028 AM Peak Hour Passenger Volume Along Proposed Scheme (inbound direction - South Quay)

Diagram 6.13 shows a peak in the number of passengers at the eastern end of the Proposed Scheme, where the loadings reach approximately 100 passengers in the Do Something scenario. It should be noted that the Do Something provides a new westbound route, via the proposed DPTOB, that is not in place in the Do Minimum scenario. The loadings reduce steadily until the western end of the scheme as passengers alight.

The number of bus passenger is consistent all along the Proposed Scheme with an estimated 100 new passengers on the corridor, compared to the Do Minimum scenario where no buses run on the South Quay in the inbound direction.

6.4.6.3.3.2 2043 AM Peak Hour Bus Passengers (Inbound Direction towards the City Centre)

Diagram 6.14 and Diagram 6.15 present the passenger loading profile comparing the Do Minimum and Do Something scenarios in the AM Peak Hour in the inbound direction towards the city centre in 2043.

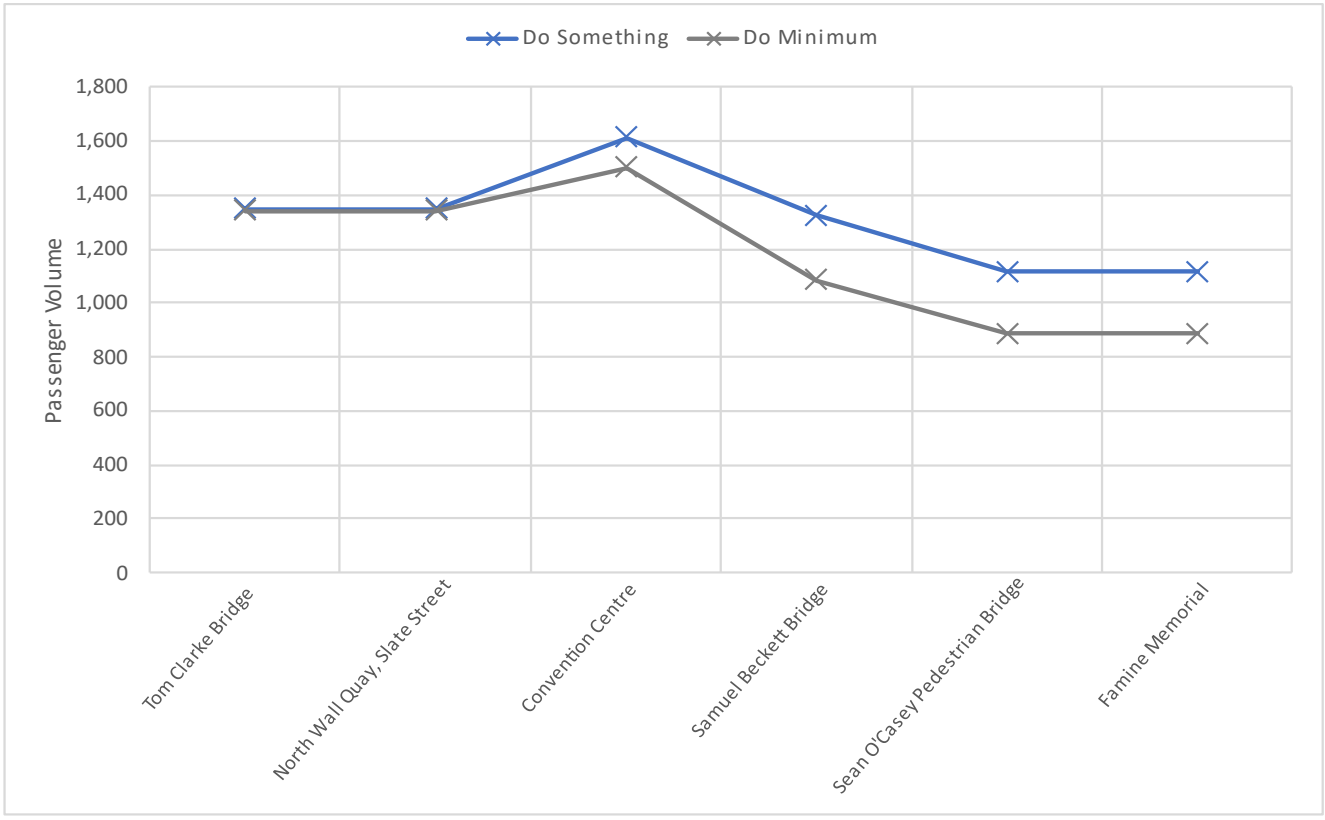


Diagram 6.14: 2043 AM Peak Hour Passenger Volume Along Proposed Scheme (inbound direction - North Quay)

Diagram 6.14 shows higher levels of bus passenger loadings all along the Proposed Scheme with a peak loading at the Convention Centre where the volume of passengers reaches 1,600 in the AM Peak hour, compared to approximately 1,500 in the Do Minimum scenario.

The increase in bus passenger is consistent all along the Proposed Scheme with an estimated 100 to 200 additional passengers on the corridor, compared to the Do Minimum scenario.

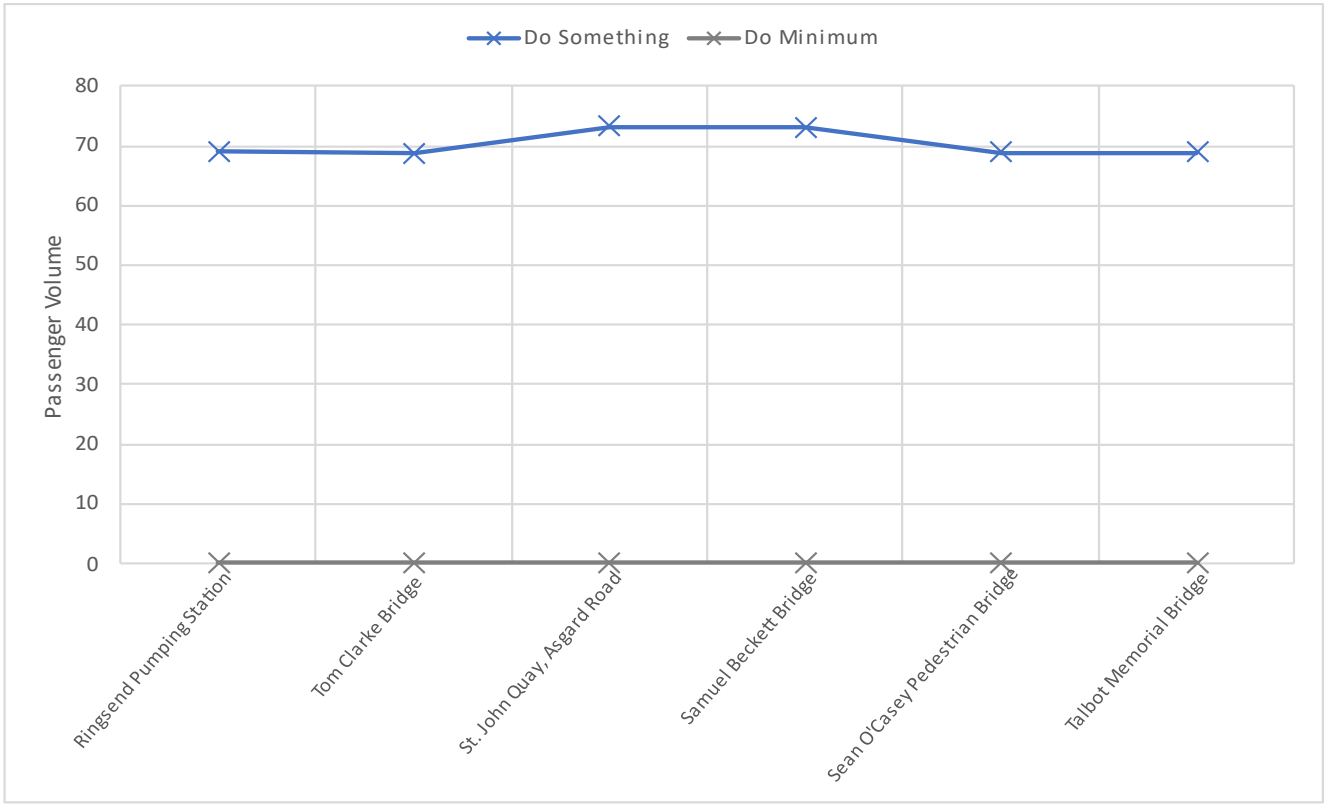


Diagram 6.15: 2043 AM Peak Hour Passenger Volume Along Proposed Scheme (inbound direction - South Quay)

Diagram 6.15 shows a peak in the number of passengers at the eastern end of the Scheme, where the loadings reach approximately 70 passengers in the Do Something scenario.

The number of bus passenger is consistent all along the Proposed Scheme with an estimated 70 new passengers on the corridor, compared to the Do Minimum scenario where no buses run on the South Quay in the inbound direction.

6.4.6.3.3.3 2028 PM Peak Hour Bus Passengers (Outbound direction from the City Centre)

Diagram 6.16 and Diagram 6.17 present the passenger loading profile comparing the Do Minimum and Do Something scenarios in the PM Peak Hour in the outbound direction from the city centre in 2028.

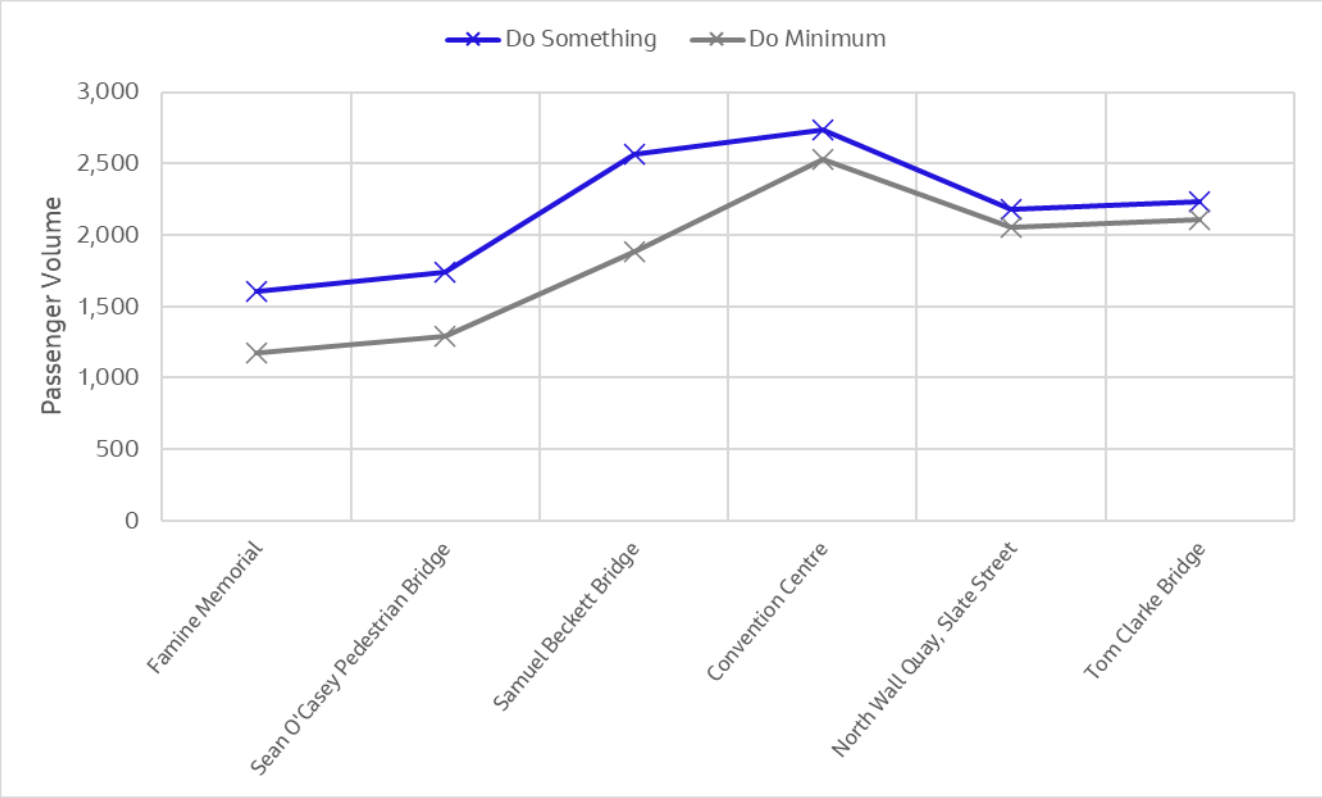


Diagram 6.16: 2028 PM Peak Hour Passenger Volume Along Proposed Scheme (outbound direction - North Quay)

Diagram 6.16 shows higher levels of bus passenger loadings all along the Proposed Scheme with a peak loading at the Convention Centre where the volume of passengers reaches 2,700 in the PM Peak hour, compared to approximately 2,500 in the Do Minimum scenario.

The increase in bus passenger is consistent all along the Proposed Scheme with an estimated 100 to 400 additional passengers on the corridor, compared to the Do Minimum scenario.

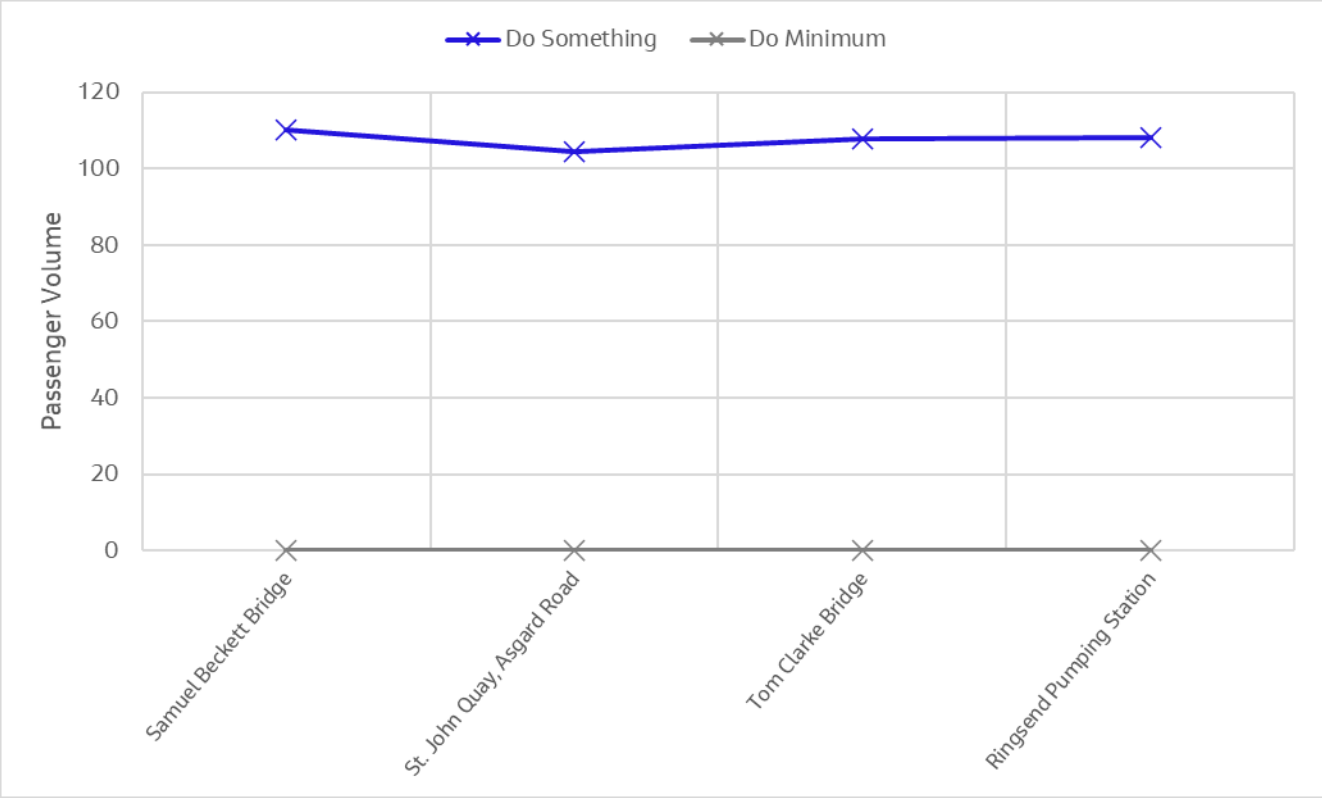


Diagram 6.17: 2028 PM Peak Hour Passenger Volume Along Proposed Scheme (outbound direction - South Quay)

Diagram 6.17 shows a peak in the number of passengers at the intersection with Samuel Beckett Bridge, where the loadings reach approximately 110 passengers in the Do Something scenario. The number of bus passenger is consistent all along the Proposed Scheme with an estimated 100 new passengers on the corridor, compared to the Do Minimum scenario where no buses run on the South Quay in the outbound direction.

6.4.6.3.3.4 2043 PM Peak Hour Bus Passengers (Outbound Direction from the City Centre)

Diagram 6.18 and

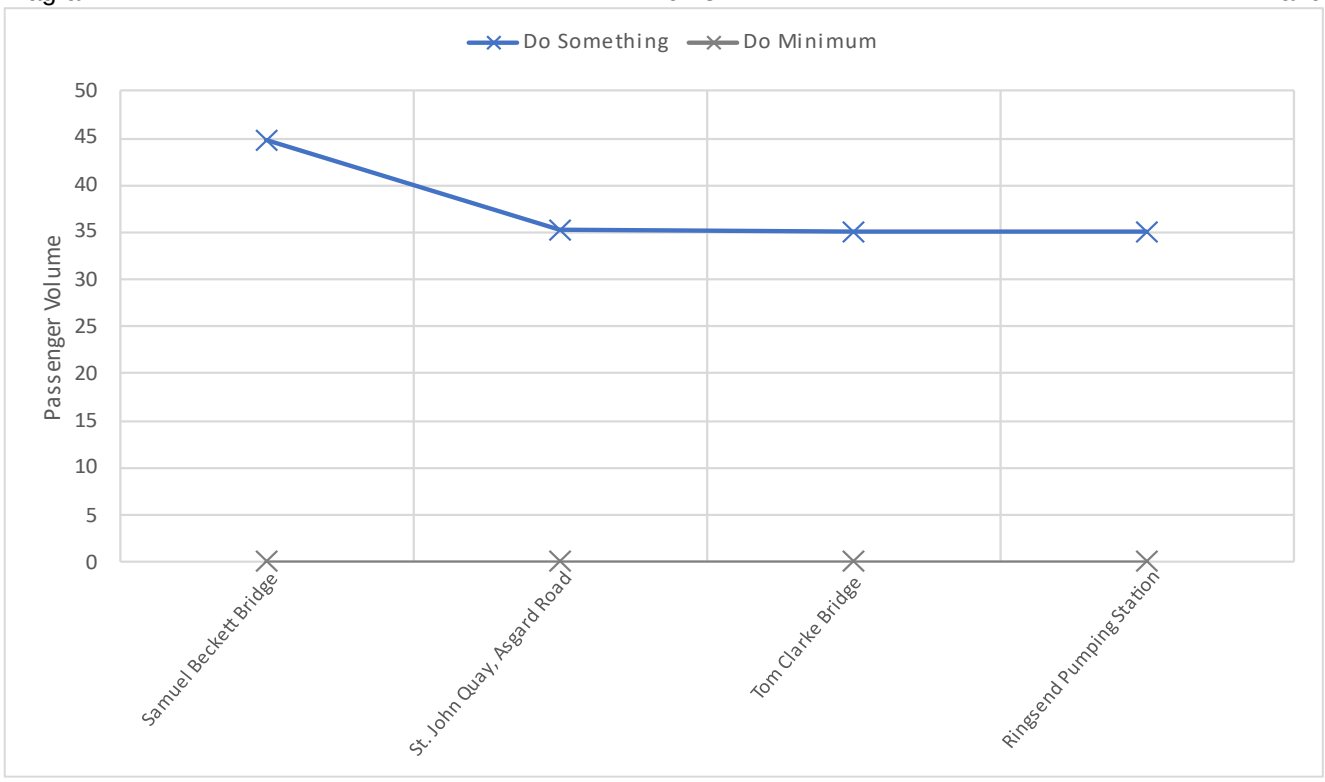


Diagram 6.19 present the passenger loading profile comparing the Do Minimum and Do Something scenarios in the PM Peak Hour in the outbound direction from the city centre in 2043.

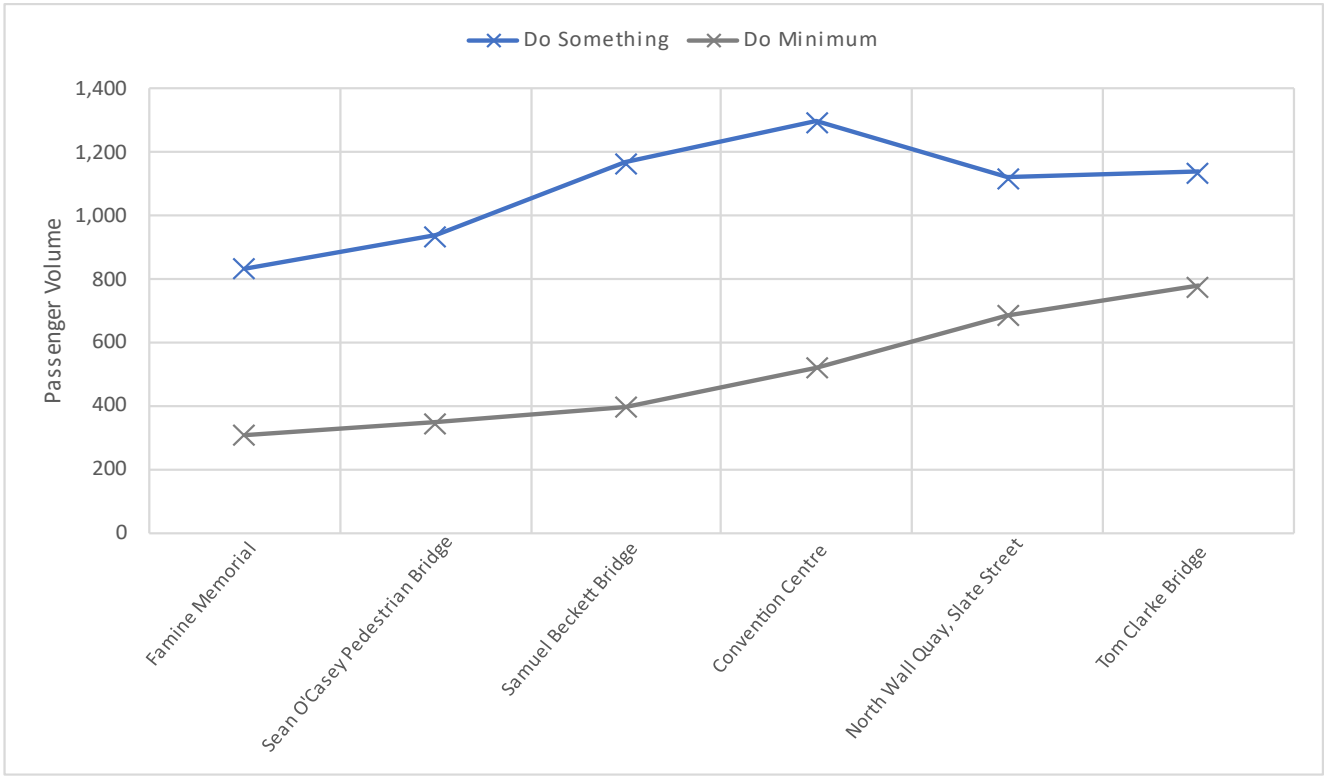


Diagram 6.18: 2043 PM Peak Hour Passenger Volume Along Proposed Scheme (outbound direction - North Quay)

Diagram 6.18 shows a peak in the number of bus passenger loadings all along the Proposed Scheme with a peak loading at the Convention Centre where the volume of passengers reaches 1,300 in the AM Peak hour, compared to approximately 500 in the Do Minimum scenario.

The increase in bus passenger is consistent all along the Proposed Scheme with an estimated 300 to 800 additional passengers on the corridor, compared to the Do Minimum scenario.

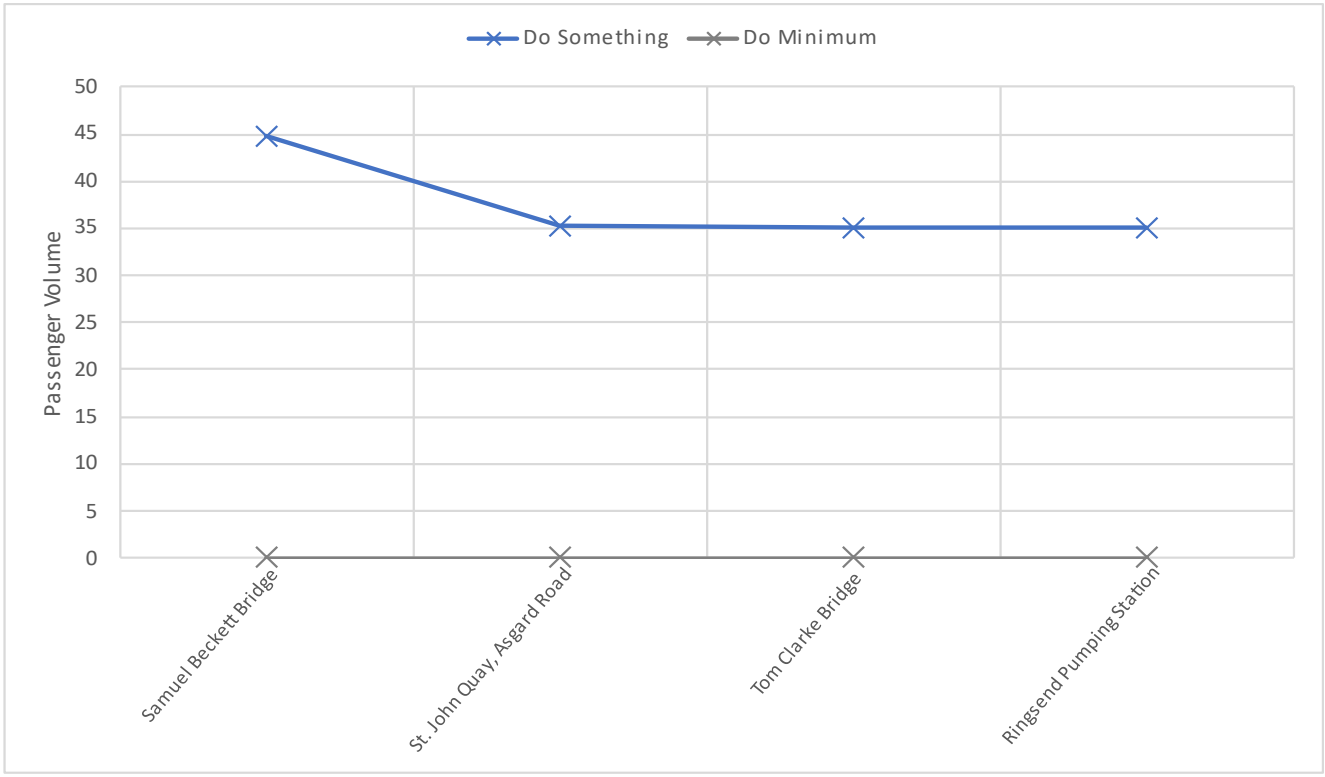


Diagram 6.19: 2043 PM Peak Hour Passenger Volume Along Proposed Scheme (outbound direction - South Quay)

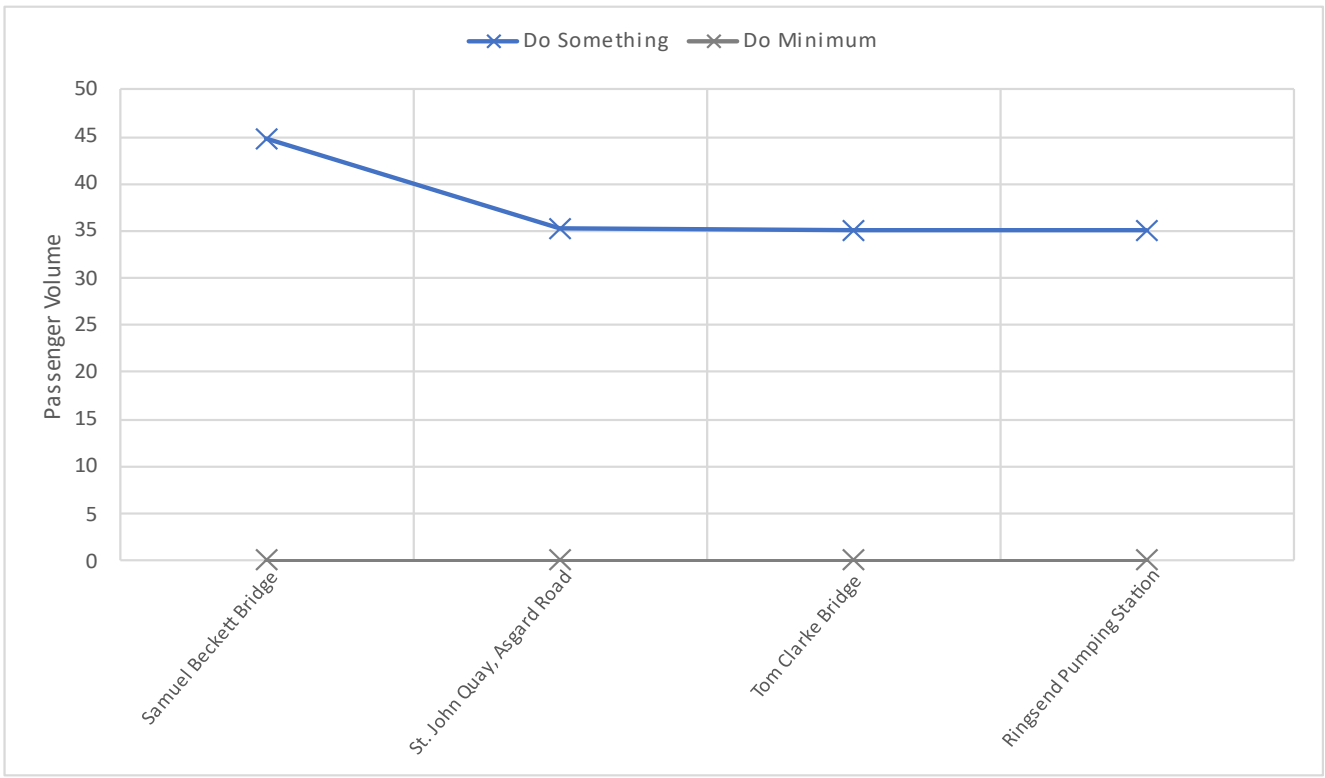


Diagram 6.19 shows a peak in the number of passengers at the eastern end of the Scheme, where the loadings reach approximately 45 passengers in the Do Something scenario. The number of bus passenger is broadly consistent all along the Proposed Scheme with an estimated 35 - 45 new passengers on the corridor, compared to the Do Minimum scenario where no buses run on the South Quay in the outbound direction from the city centre.

6.4.6.3.3.5 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 Do Minimum and Do Something total passengers boarding 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. The results for the 2028 Opening Year scenario are indicated in Table 6.31.

Table 6.31: 2028 Peak Hour Bus Boardings on Routes using the Proposed Scheme (inc. boarding at stops outside Proposed Scheme)

Time Period	Do Minimum (no. of boardings)	Do Something (no. of boardings)	Difference in No. of Boardings	Difference (%)
AM Peak Hour	19,300	19,670	370	1.9%
PM Peak Hour	13,580	13,920	340	2.5%

The contents of Table 6.31 show that there will be a 1.9% increase in people boarding bus routes which use the Proposed Scheme during the 2028 AM Peak Hour. This represents an addition of 370 passengers in the AM Peak Hour.

In the 2028 PM Peak Hour, there will be a 2.5% increase in people boarding bus routes which use the Proposed Scheme, representing an additional 340 passengers.

The comparison results for the 2043 Design Year scenario are indicated in Table 6.32.

Table 6.32: 2043 Peak Hour Bus Boardings on Routes using the Proposed Scheme (inc. boarding at stops outside Proposed Scheme)

Time Period	Do Minimum (no. of boardings)	Do Something (no. of boardings)	Difference in No. of Boardings	Difference (%)
AM Peak Hour	17,703	18,804	1,102	6.2%
PM Peak Hour	10,755	11,941	1,186	11.0%

The contents of Table 6.32 show that there will be 6.2 % increase in people boarding bus routes which use the Proposed Scheme during the AM Peak Hour. This represents an addition of 1,102 passengers in the AM Peak Hour.

In the PM Peak Hour, there will be a 11.0% increase in people boarding bus routes which use the Proposed Scheme, representing an additional 1,186 passengers.

6.4.6.3.4 People Movement – Significance of Impact

The significance of impact for the movement of People Movement 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 Proposed Scheme has been adjudged to deliver a **Positive, Significant and Long-term** impact 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, particularly by bus, with reductions in car mode share due to the enhanced sustainable mode provision. The provision of the new DPTOB (public transport, walking and cycle only) provides significant benefits in terms of people movement by sustainable modes on the southern quays.

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, which will enable and deliver efficient, safe, and integrated sustainable transport movement along the corridor'.

6.4.6.3.5 Operational Impacts for Bus Users

6.4.6.3.5.1 Overview

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

Due to the stochastic nature of the micro-simulation software, model outputs based on the average of 10 simulation seed runs (minimum of 5 recommended as per Transport for London (2010) Traffic Modelling Guidelines) have been calculated between the point of Proposed Scheme entry and exit and compared against the corresponding Do Minimum scenarios.

It is of note that no existing bus services travel along the South Quay carriageways (R813 City Quay, R813 Sir John Rogerson's Quay and Sir John Rogerson's Quay (non-regional road)) or Section 3 of the Proposed Scheme. Therefore, these parts of the proposed scheme have been excluded from this analysis.

6.4.6.3.5.2 North Quay Bus Services

To give an overview of how the Proposed Scheme will impact on bus journey times along the corridor, outputs for the various services, which traverses the North Quay carriageways (R801 Custom House Quay and R801 North Wall Quay) of the Proposed Scheme, have been extracted from the model. As outlined in Section 6.4 the assessment is based in the context of the full implementation of the BusConnects network re-design in both the Do Minimum and Do Something scenarios.

There is no one bus service which currently traverses the entire length of the north quay carriageways between R802 Talbot Memorial Bridge and R131 Tom Clarke East Link Bridge. For the purposes of reporting, a generic / no name bus route with a headway of 10 minutes has been created within the model operating between Tom Clarke Bridge and Talbot Memorial Bridge. The inbound and outbound outputs for this "no name" service have been extracted from the model.

Inbound Direction

The average journey times for the inbound "no name" bus service along the North Quay carriageways in 2028 Opening Year and in 2043 Design Year are presented within Table 6.33. A breakdown of the changes in average journey times for all bus services using the Proposed Scheme can be found in Appendix A6.4.3 (Average Bus Journey Times).

Table 6.33: "No Name" Service Bus Journey Times (Inbound Direction)

Peak Hour	Do Minimum (minutes)	Do Something (minutes)	Difference (minutes)	%Difference
2028 AM	12.6	7.9	-4.8	-38%
2028 PM	20.0	7.5	-12.5	-62%
2043 AM	13.2	7.8	-5.4	-41%
2043 PM	19.2	7.5	-11.7	-61%

Additional information regarding the range of journey times (minimum, maximum, average and standard deviation) for the "no name" inbound bus service that travels along the North Quay carriageways in the Do Minimum (red) and Do Something (blue) can be seen in Table 6.34 and Diagram 6.20. 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 6.34: "No Name" Service – Range of Journey Times (Inbound Direction)

Peak Hour	Do Minimum				Do Something			
	MIN	MAX	AVG	STDEV	MIN	MAX	AVG	STDEV
2028 AM	7.7	20.8	12.6	3.0	5.0	9.3	7.9	1.0

Peak Hour	Do Minimum				Do Something			
	MIN	MAX	AVG	STDEV	MIN	MAX	AVG	STDEV
2028 PM	13.8	26.9	20.0	2.4	5.7	10.3	7.5	0.7
2043 AM	7.5	19.7	13.2	2.8	5.4	9.9	7.8	0.9
2043 PM	13.3	26.4	19.2	2.7	5.8	9.0	7.5	0.7

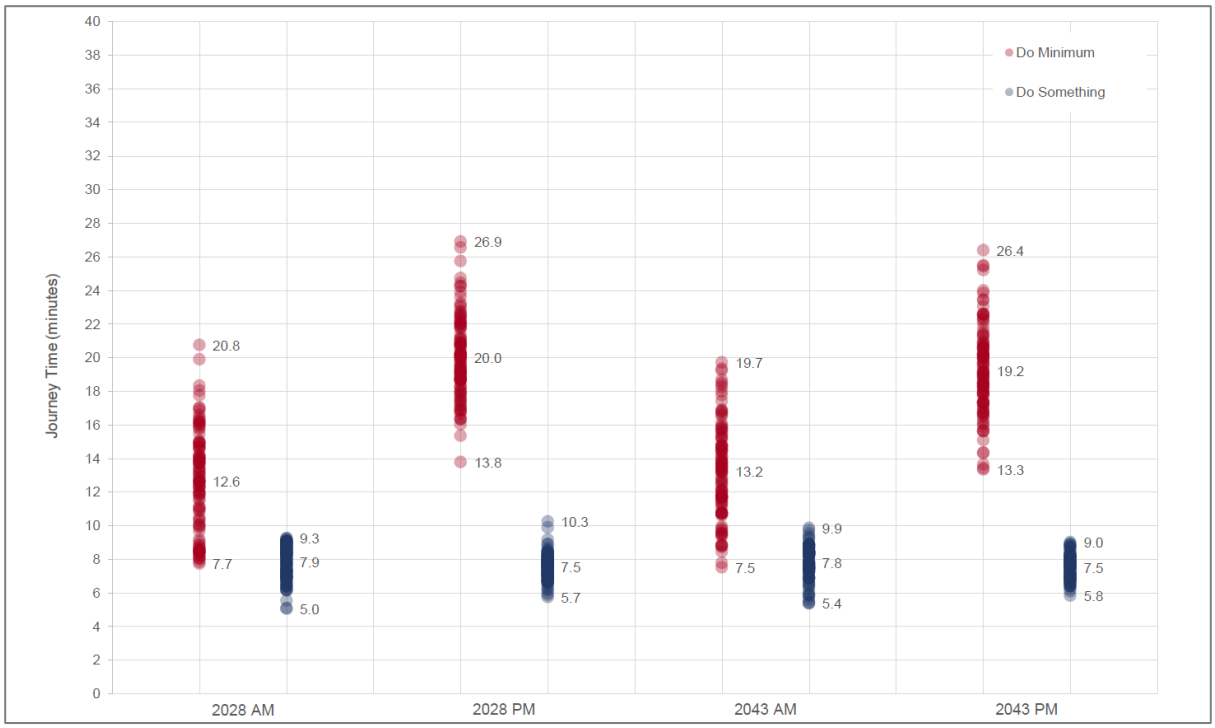


Diagram 6.20: "No Name" Service - Bus Journey Times (Inbound Direction)

Based on the modelling results presented within Table 6.33, the Proposed Scheme will deliver inbound journey time savings on the North Wall Quay of up to 62% or approximately 12.5 minutes. The majority of these savings can be attributed to the relocation of the existing Scherzer Bridges, and the introduction of a continuous bus lane along the length of the North Wall Quay as part of the Proposed Scheme.

Furthermore, results presented in Table 6.34 and Diagram 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 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 "No Name" bus service are also illustrated in the cumulative time-distance graphs shown in Diagram 6.21 to Diagram 6.24.

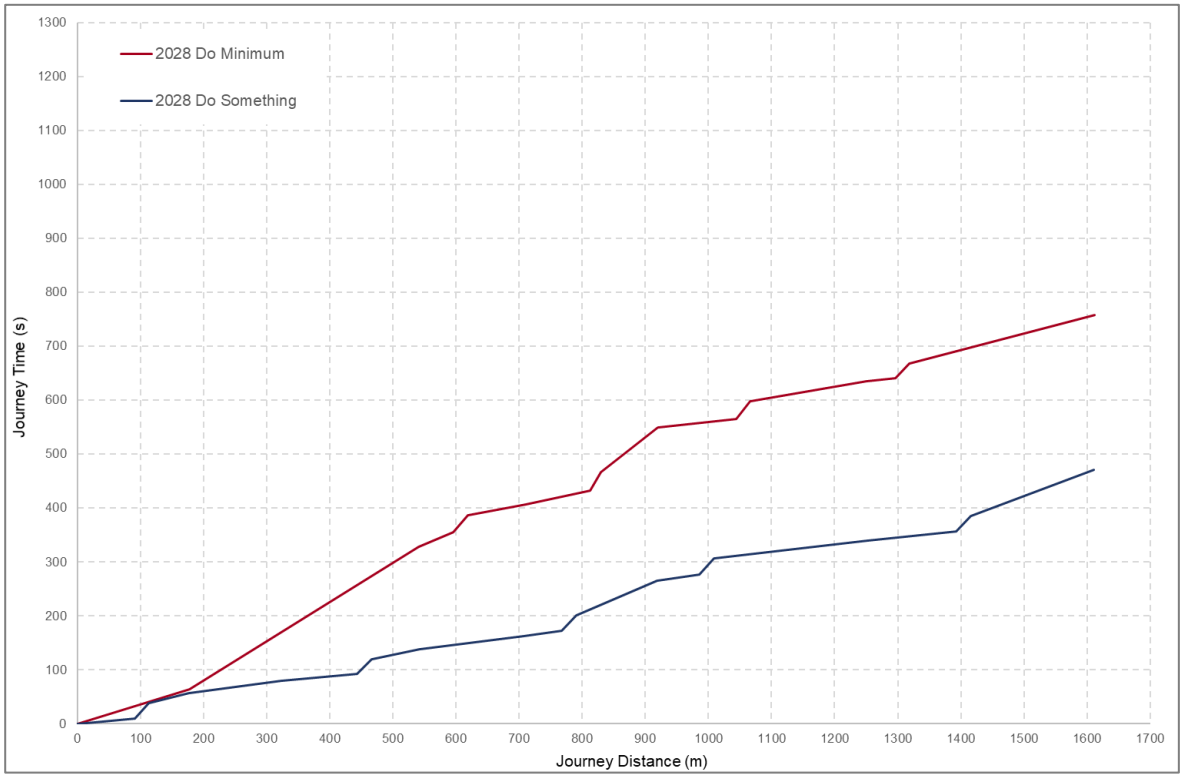


Diagram 6.21: "No Name" Bus Journey Times – North Wall Quay (2028 AM, Inbound)

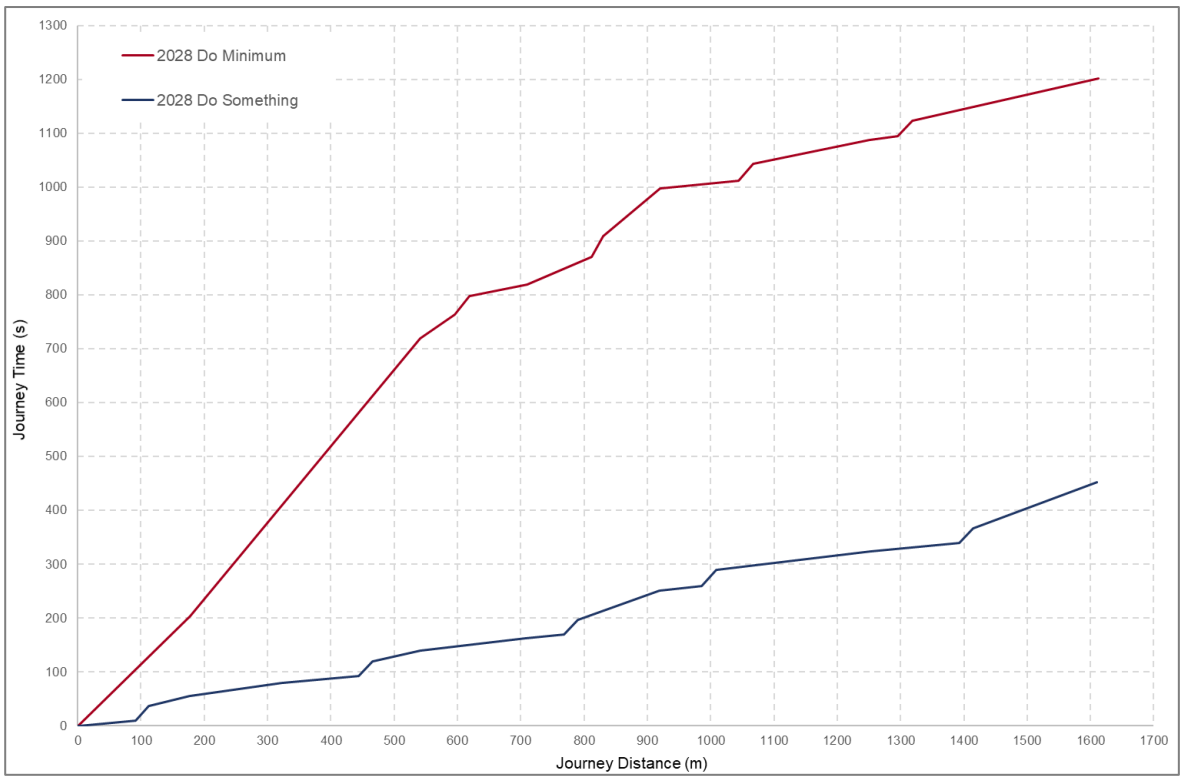


Diagram 6.22: "No Name" Bus Journey Times – North Wall Quay (2028 PM, Inbound)

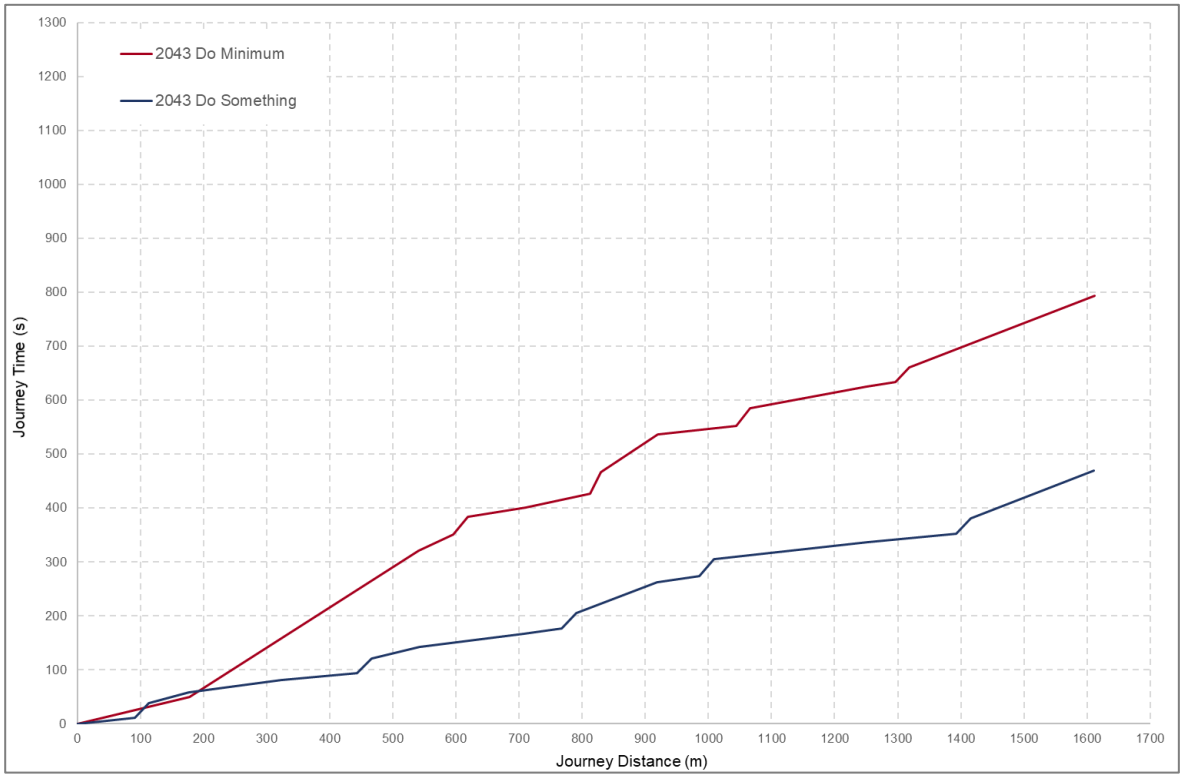


Diagram 6.23: "No Name" Bus Journey Times – North Wall Quay (2043 AM, Inbound)

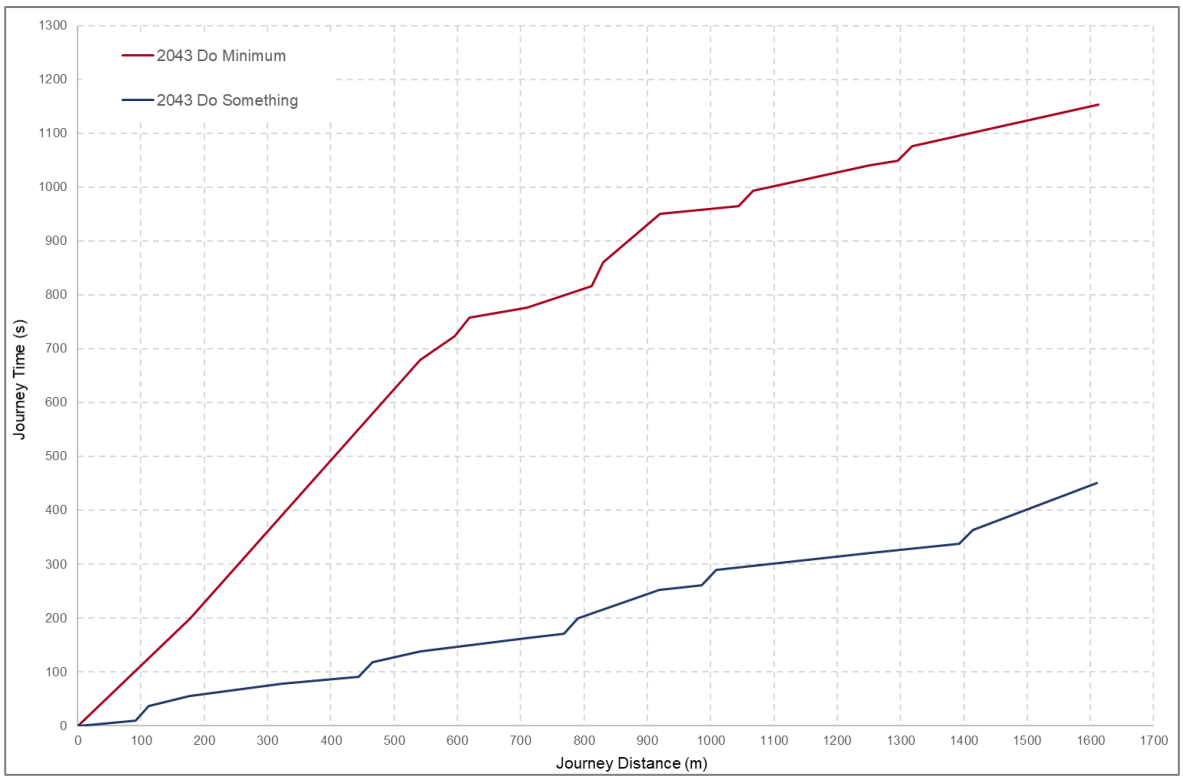


Diagram 6.24: "No Name" Bus Journey Times – North Wall Quay (2043 PM, Inbound)

Outbound Direction

The average journey times for the outbound "no name" bus service along the North Quay carriageways in 2028 Opening Year and in 2043 Design Year are presented within Table 6.35. A breakdown of the changes in average journey times for all other bus services using the Proposed Scheme can be found in Appendix A6.4.3 (Average Bus Journey Times).

Table 6.35: "No Name" Service Bus Journey Times (Outbound Direction)

Peak Hour	Do Minimum (minutes)	Do Something (minutes)	Difference (minutes)	%Difference
2028 AM	12.0	7.5	-4.5	-38%
2028 PM	11.1	7.7	-3.3	-30%
2043 AM	11.4	7.5	-3.9	-34%
2043 PM	12.3	7.9	-4.4	-36%

Additional information regarding the range of journey times (minimum, maximum, average and standard deviation) for the "No Name" outbound bus service that travels along the North Quay carriageways in the Do Minimum (red) and Do Something (blue) can be seen in Table 6.36 and Diagram 6.25. 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 6.36: "No Name" Service – Range of Journey Times (Outbound Direction)

Peak Hour	Do Minimum				Do Something			
	MIN	MAX	AVG	STDEV	MIN	MAX	AVG	STDEV
2028 AM	8.0	16.3	12.0	1.6	5.8	10.1	7.5	1.0
2028 PM	7.2	16.5	11.1	1.7	5.8	9.8	7.7	0.7
2043 AM	7.5	16.9	11.4	1.9	5.8	10.0	7.5	1.0
2043 PM	8.9	16.8	12.3	1.8	6.0	10.7	7.9	0.8

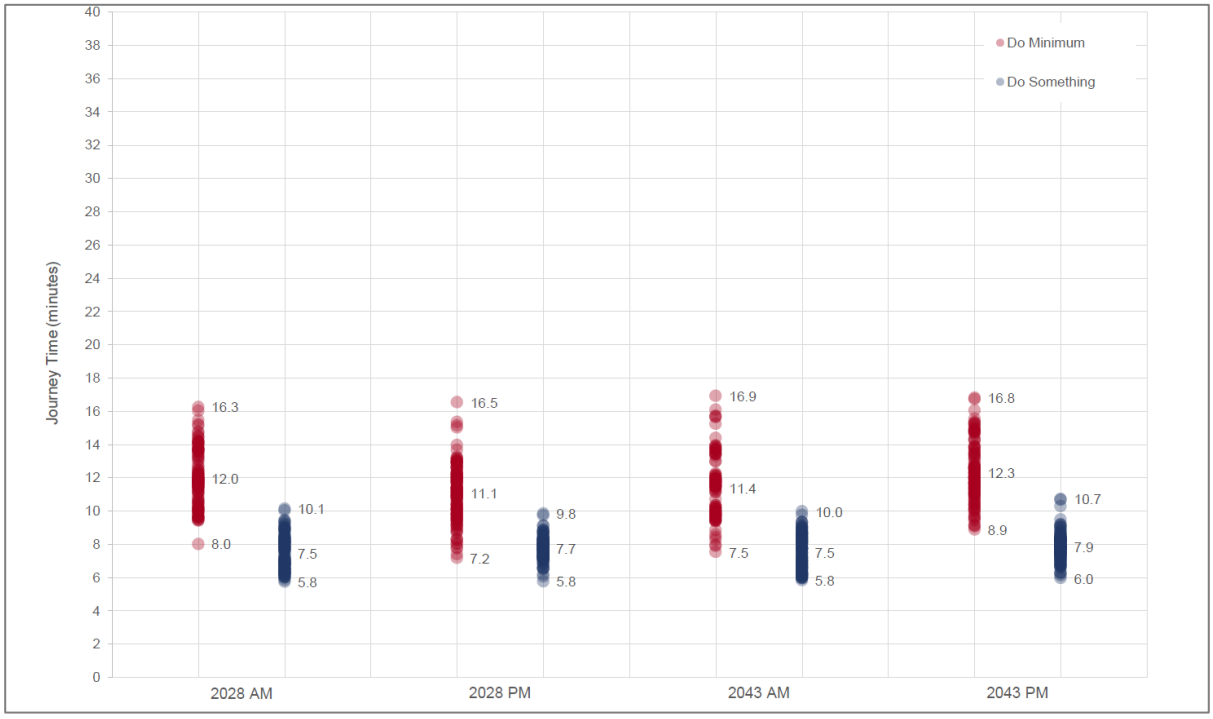


Diagram 6.25: "No Name" Bus Journey Times (Outbound Direction)

Based on the modelling results presented within Table 6.35, the Proposed Scheme will deliver outbound journey time savings on the North Wall Quay of up to 38% or approximately 4.5 minutes. The majority of these savings can be attributed to the introduction of a continuous bus lane along the length of the North Wall Quay and the banning of the right-turn at the Guild Street junction in the Do Something which, in the Do Minimum, causes delays.

Beyond the Guild Street junction, minimal improvements in bus journey times can be seen in the Proposed Scheme. This is due to the introduction of traffic signals at the North Wall Quay / Castleforbes Street junction and amendments to junction layouts to provide as enhanced pedestrian and cycle crossing facilities.

Furthermore, results presented in Table 6.36 and Diagram 6.25 suggest an improvement in bus journey time reliability in all four 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 outbound "No Name" bus service are also illustrated in the cumulative time-distance graphs shown in Diagram 6.26 to Diagram 6.29.

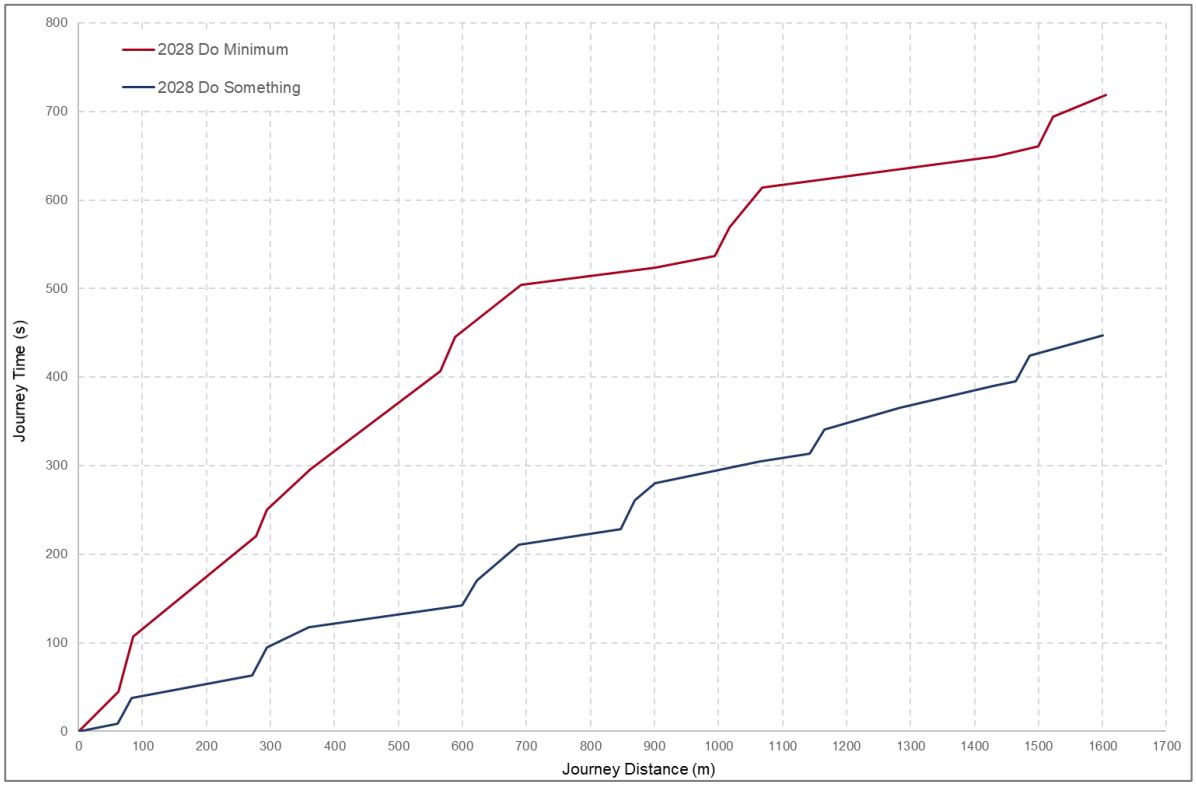


Diagram 6.26: "No Name" Bus Journey Times: North Wall Quay (2028 AM, Outbound)

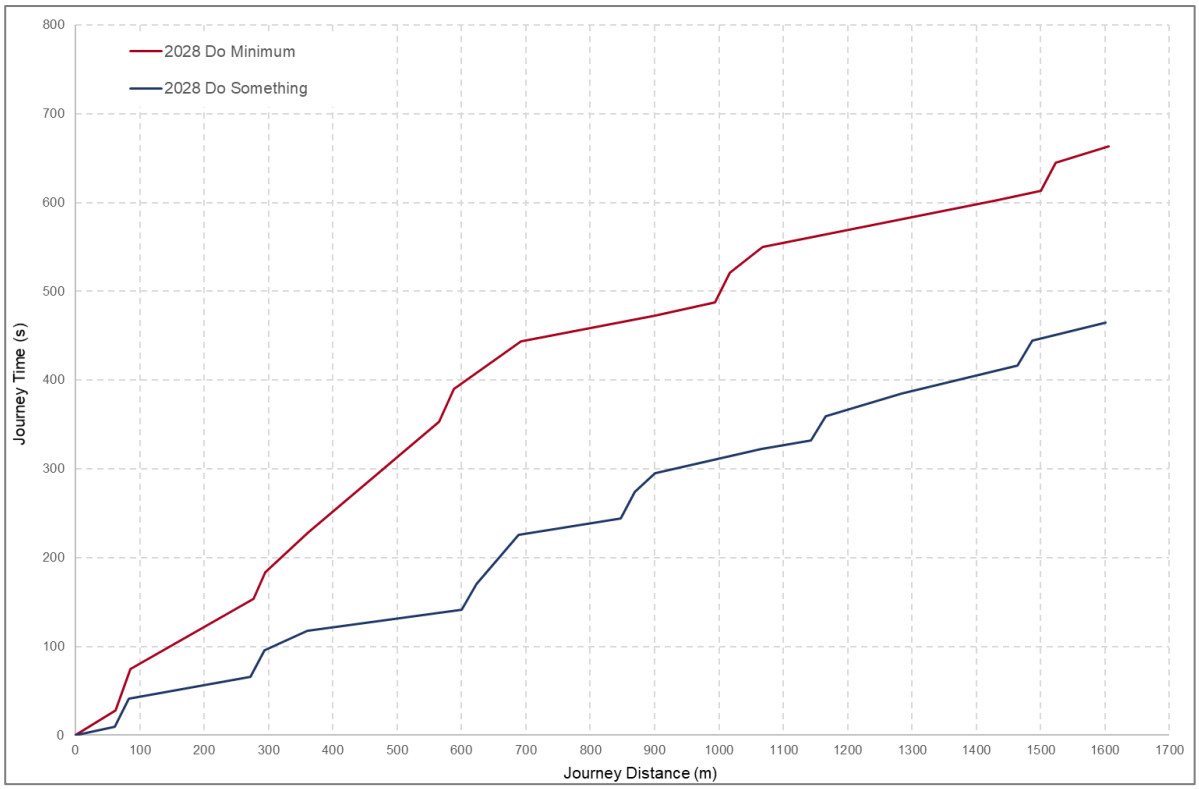


Diagram 6.27: "No Name" Bus Journey Times: North Wall Quay (2028 PM, Outbound)

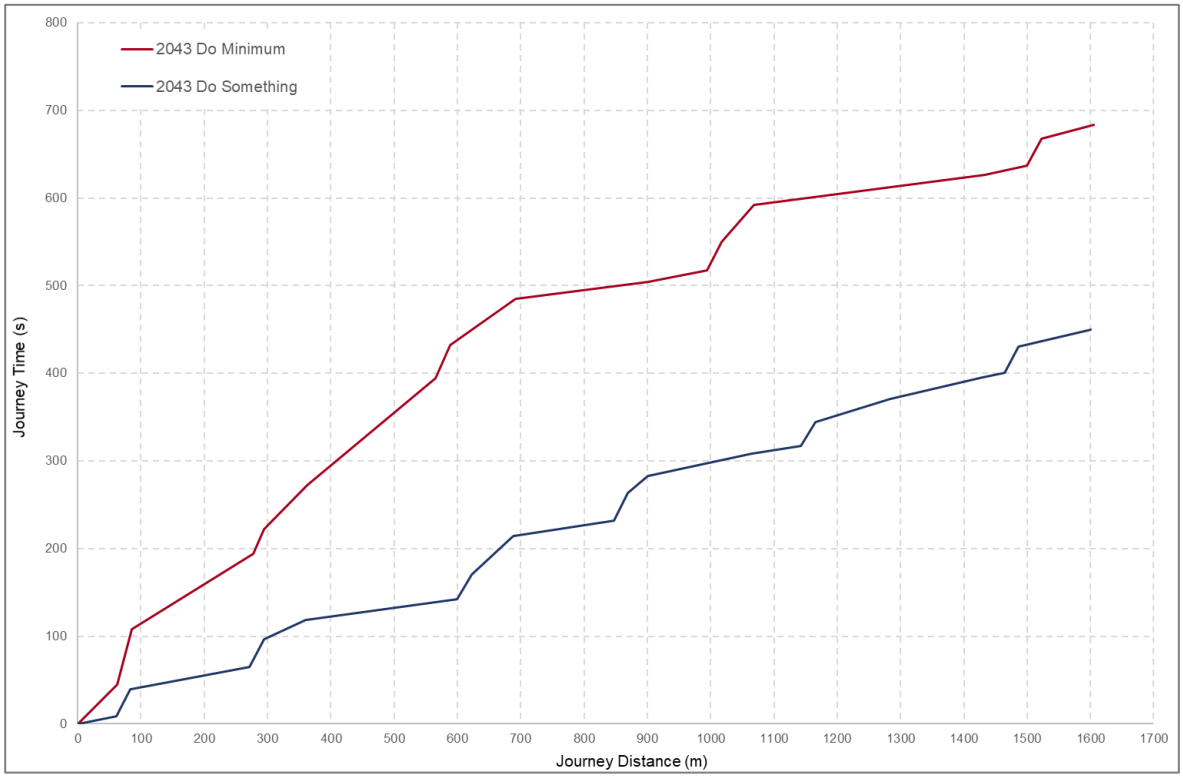


Diagram 6.28: "No Name" Bus Journey Times: North Wall Quay (2043 AM, Outbound)

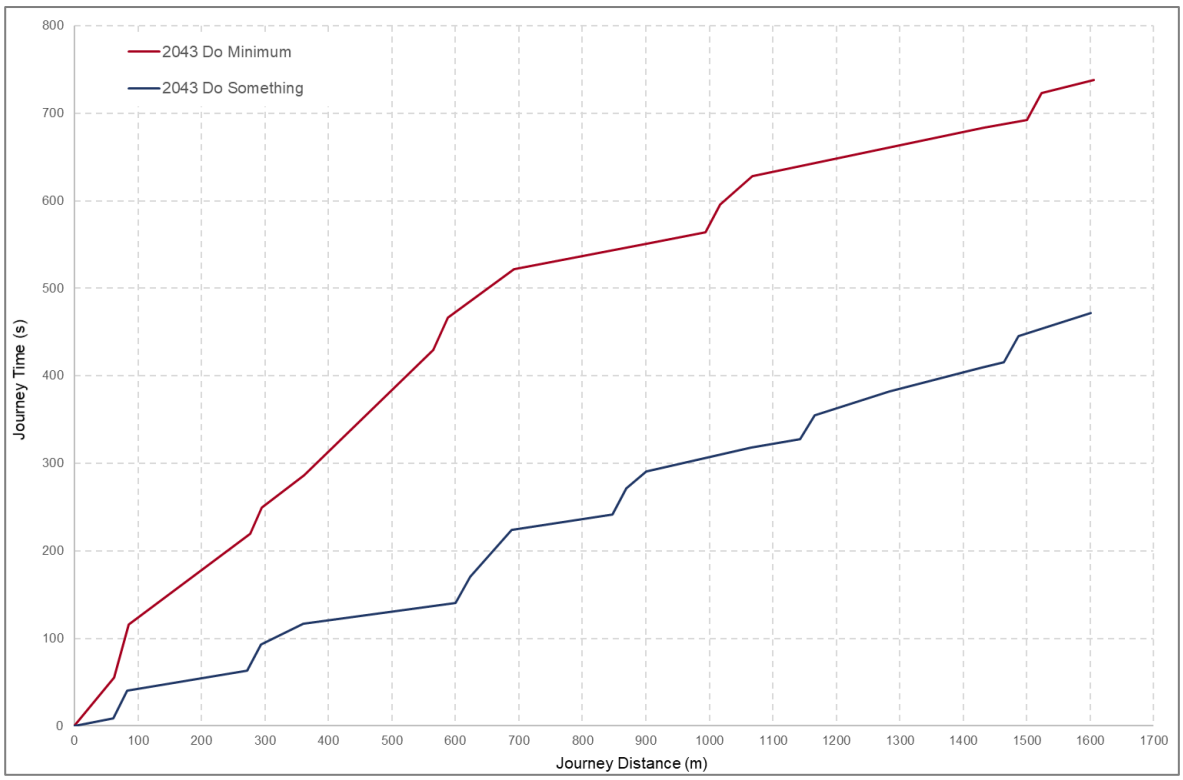


Diagram 6.29: "No Name" Bus Journey Times: North Wall Quay (2043 PM, Outbound)

6.4.6.3.5.3 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 6.37 in vehicle minutes.

Table 6.37: Total Bus Journey Times

Peak Hour	Do Minimum (vehicle.minutes)	Do Something (vehicle.minutes)	Difference (vehicle.minutes)	%Difference
2028 AM	972.9	585.3	-387.5	-40%
2028 PM	958.2	482.5	-475.7	-50%
2043 AM	1017.5	583.8	-433.7	-43%
2043 PM	1045.8	506.0	-539.8	-52%

Based on the results presented in Table 6.37, modelling shows that the Proposed Scheme will reduce total bus journey times along the Proposed Scheme by up to 50% in 2028 increasing to 52% in 2043. Based on the AM and PM peak hours alone, this equates to 14.4 hours of savings in 2028 and 16.2 hours in 2043 combined across all buses when compared to the Do Minimum. On an annual basis this equates to approximately 10,800 hours of bus vehicle savings in 2028 and 12,200 hours in 2043, when considering weekday peak periods only.

6.4.6.3.6 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, Very Significant and Long-term** impact overall.

6.4.6.3.7 Increased Bus Frequency - Resilience Sensitivity Analysis

6.4.6.3.7.1 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 BusConnects 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 subsequently.

6.4.6.3.7.2 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, for BusConnects services only, 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, on the North Quays, in the 2028 Do Minimum model and in the 2028 Do Something Resilience testing models is outlined in Table 6.38.

Table 6.38: Resilience Testing Bus Service Frequency Scenario Testing

Scenario	Inbound (Buses per Hour)	Outbound (Buses per Hour)
Do Minimum	56	58
Do Something	56	58
Do Minimum - Additional Services Resilience Test	66	68
Do Something - Additional Services Resilience Test	66	68

Table 6.39 outlines the average journey times for the inbound and outbound “No Name” bus service which travels along the North Quay Wall in the 2028 Opening Year.

Table 6.39: “No Name” Service – Average Bus Journey Times

Peak Hour	Do Minimum (minutes)	Do Minimum (Additional Services) (minutes)	% Difference	Do Something (minutes)	Do Something - Additional Services (minutes)	% Difference
2028 AM - Inbound	12.6	12.7	+1%	7.9	8.0	+1%
2028 PM – Outbound	11.1	11.3	+2%	7.7	7.7	0%

The results of the scenario testing with an additional 10 buses per direction per hour operating along the Proposed Scheme in the 2028 Opening Year are presented graphically in Diagram 6.30 below. The diagram displays the maximum, minimum and average journey times for the “No Name” bus services modelled.

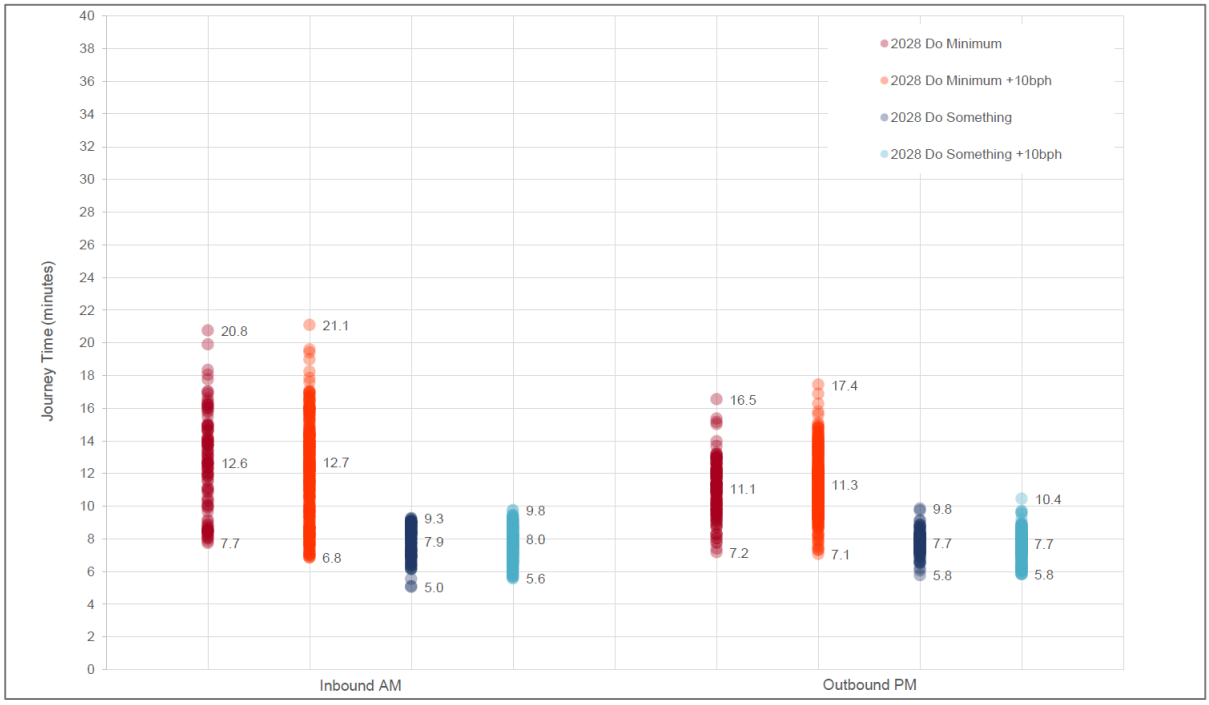


Diagram 6.30: Resilience Testing Bus Journey Time Reliability Indicators - Scenario Testing– Opening Year (2028)

As can be seen from Table 6.39 and Diagram 6.30 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 core scenario results. The results indicate negligible change in journey times in the Do Something Resilience sensitivity test per bus. Do Minimum Resilience sensitivity test, however, bus journey time reliability is impacted slightly more with additional services in place. The sensitivity test undertaken indicates that with the additional bus services in place in the Do Minimum scenario a further increase in the maximum journey time is experienced, particularly in the PM (outbound). ***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.

6.4.6.3.8 General Traffic Assessment

6.4.6.3.8.1 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 (CAP) (2023) includes reference to DoT's Ireland's Road Haulage Strategy 2022-2031 (RHS)(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.

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.

6.4.6.3.8.2 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 in the contents of Table 6.40.

Table 6.40 Significance of the Reduction in General Traffic Flows

Significance of Positive Impact	Description of Impact / Proposed Changes
Profound	< -1000
Very Significant	-1000 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 adjacent 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 EIAR. 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 (May 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.

Diagram 6.31 is 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 2.2, below, are exceeded.

Table 2.2 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

Diagram 6.31: Extract from the Traffic and Transport Assessment Guidelines (PE-PDV-02045, May 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 1 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/ 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.
    - 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.

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.

6.4.6.3.8.3 General Traffic Flow Difference - AM Peak Hour

Diagram 6.32 (extract from Figure 6.7 in Volume 3 of this EIAR) illustrates the difference in traffic flows on the road links in the AM Peak Hour for the 2028 Opening Year. Please see Appendix A6.4.4 (General Traffic Assessment) in Volume 4 of this EIAR for the full LAM outputs.

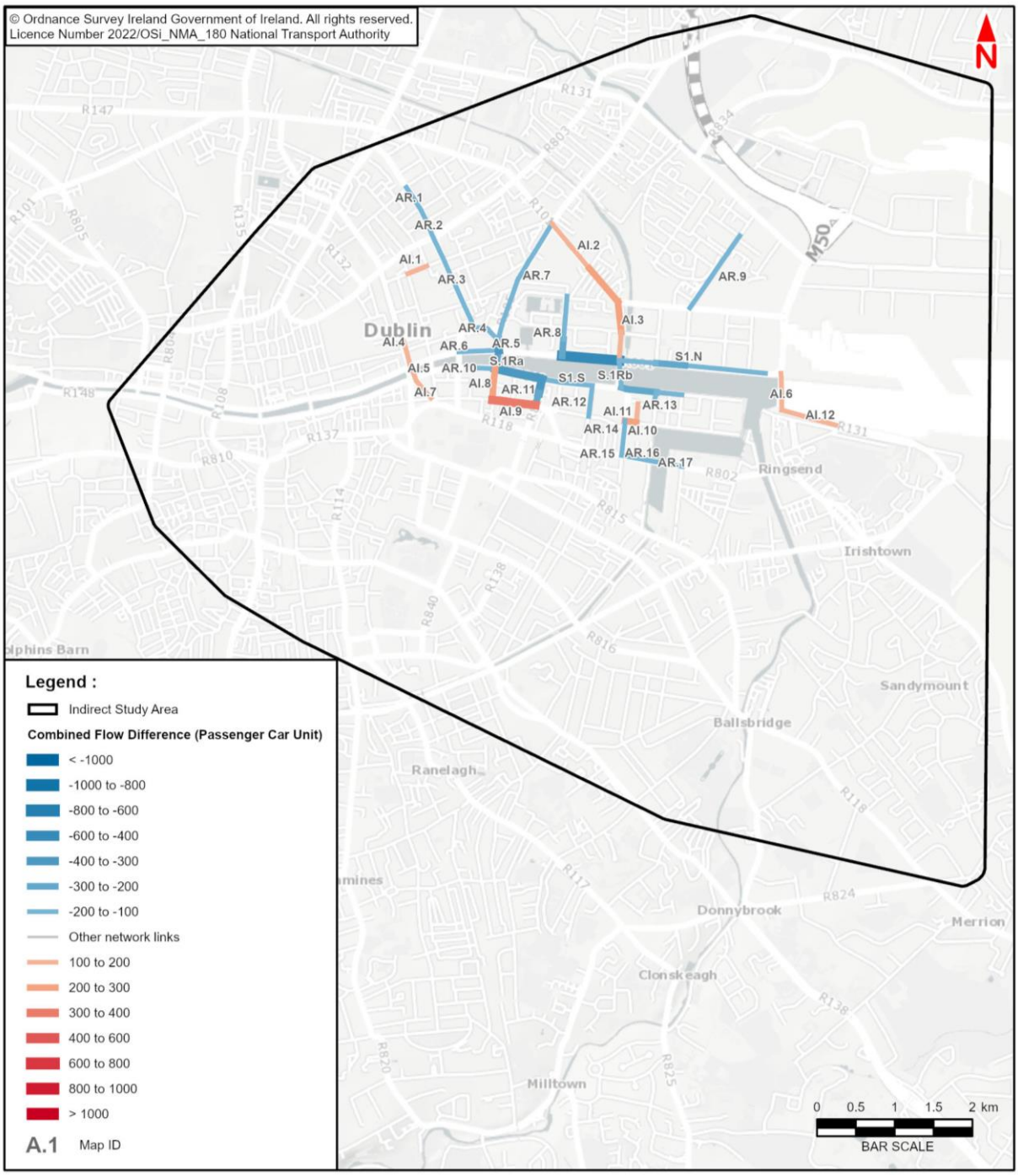


Diagram 6.32: Flow Difference on Road Links (Do Minimum vs. Do Something), AM Peak Hour, 2028 Opening Year

Impact on Direct Study Area (AM Peak Hour)

Direct Reductions in General Traffic Flows: The LAM indicates that, during the 2028 Opening Year scenario, there are reductions in general traffic noted along the Proposed Scheme during the AM Peak Hour, as illustrated by the blue lines in Diagram 6.32, 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 6.41.

Table 6.41: Road Links that Experience a Reduction of ≥ 100 Combined Flows during AM Peak Hour (Direct Study Area)

Location	Map ID	Road Name	Do Minimum Flows (PCUs)	Do Something Flows (PCUs)	Flow Difference (PCUs)
North of the River Liffey	S.1N	R801 North Wall Quay	1049	638	-411
River Liffey	S.1Ra	R802 Talbot Memorial Bridge	1940	1664	-276
	S.1Rb	Samuel Beckett Bridge	1396	1224	-172
South of the River Liffey	S.1N	R813 City Quay	1153	770	-383
		R813 Sir John Rogerson's Quay	1491	1233	-258
		Sir John Rogerson's Quay	554	337	-217

The contents of Table 6.41 demonstrate that there is a slight to significant reduction of between -172 and -411 in general traffic flows along the direct study area during the AM 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 **Positive, Slight and Long-term effect** on the direct study area.

There are no increases in traffic flows along the direct study area during the AM Peak Hour of the 2028 Opening Year.

Impact on Indirect Study Area (AM Peak Hour)

Indirect Reductions in General Traffic Flows: In addition to the traffic flow reductions occurring along the direct study area, there are key reductions in general traffic flows 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 of the 2028 Opening Year are outlined in Table 6.42.

Table 6.42: Road Links that Experience a Reduction of ≥ 100 Combined Flows during AM Peak Hour (Indirect Study Area)

Orientation	Map ID	Road Name	Do Minimum Flows (PCUs)	Do Something Flows (PCUs)	Flow Difference (PCUs)
North of the River Liffey	AR.1	R802 Mountjoy Square West	1260	1142	-118
	AR.2	R802 Gardiner Street Middle	1555	1432	-123
	AR.3	R802 Gardiner Street Lower	1490	1305	-185
	AR.4	R802 Beresford Place	1634	1479	-155
	AR.5	R802 Memorial Road	1719	1362	-358
	AR.6	R801 Custom House Quay	525	412	-113
	AR.7	R105 Amiens Street	627	459	-169
	AR.8	Commons Street	603	376	-227
	AR.9	East Road	677	524	-151
South of the River Liffey	AR.10	R105 George's Quay	538	437	-100
	AR.11	R814 Lombard Street East	725	415	-310
	AR.12	Lime Street	308	122	-186
	AR.13	Forbes Street	382	256	-126
	AR.14	R813 Cardiff Lane	1423	1309	-113
	AR.15	R813 Macken Street	1512	1349	-163

Orientation	Map ID	Road Name	Do Minimum Flows (PCUs)	Do Something Flows (PCUs)	Flow Difference (PCUs)
	AR.16	R802 Pearse Street	1363	1256	-107
	AR.17	R802 Grand Canal Bridge	1404	1295	-108

The contents of Table 6.42 outline that there is a slight to moderate traffic reduction within the indirect study area which varies between –100 and -358 combined flows along the surrounding road links. This reduction in general traffic flow has been determined as an overall **Positive, Slight and Long-term effect** on the indirect study area.

Indirect Increases in General Traffic Flows: The road links which experience additional traffic volumes of over 100 combined flows are illustrated by the orange / red lines in Diagram 6.32. These road links have been identified as experiencing traffic volumes above the additional traffic threshold and therefore require further analysis. The road links and associated flow difference between the Do Minimum and Do Something scenarios during the AM Peak Hour are outlined in Table 6.43.

Table 6.43: Road Links Exceeding the 100 Flow Additional Traffic Threshold during AM Peak Hour (Indirect Study Area)

Orientation	Map ID	Road Name	Do Minimum Flows (PCUs)	Do Something Flows (PCUs)	Flow Difference (PCUs)
North of the River Liffey	AI.1	Cathal Brugha Street	531	649	119
	AI.2	R101 Seville Place	1074	1290	216
	AI.3	Guild Street	1058	1301	244
	AI.4	O'Connell Street Lower	120	252	132
River Liffey	AI.5	O'Connell Bridge	174	306	132
	AI.6	R131 Tom Clarke Bridge	1034	1183	149
South of the River Liffey	AI.7	R138 D'Olier Street	251	367	116
	AI.8	R802 Moss Street	408	650	242
	AI.9	R802 Townsend Street	374	703	329
	AI.10	Misery Hill	476	683	206
	AI.11	Hibernian Road	435	587	152
	AI.12	R131 East Link Road	1040	1190	150

The contents of Table 6.43 outline that the additional traffic on the key road links within the indirect study area varies between 116 and 329 combined flows during the AM Peak Hour. Further junction capacity assessment has been undertaken along these road links to determine whether the above road links have the capacity to cater for the additional traffic volumes as a result of the Proposed Scheme.

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 the junction has been used for the purpose of the assessment to ensure a conservative impact assessment is undertaken.

6.4.6.3.8.4 General Traffic Flow Difference – PM Peak Hour

Diagram 6.33 (extract from Figure 6.8 in Volume 3 of this EIAR) illustrates the difference in traffic flows on road links in the PM Peak Hour for the 2028 Opening Year. Appendix A6.4.4 (General Traffic Assessment) provides further details of the LAM outputs.

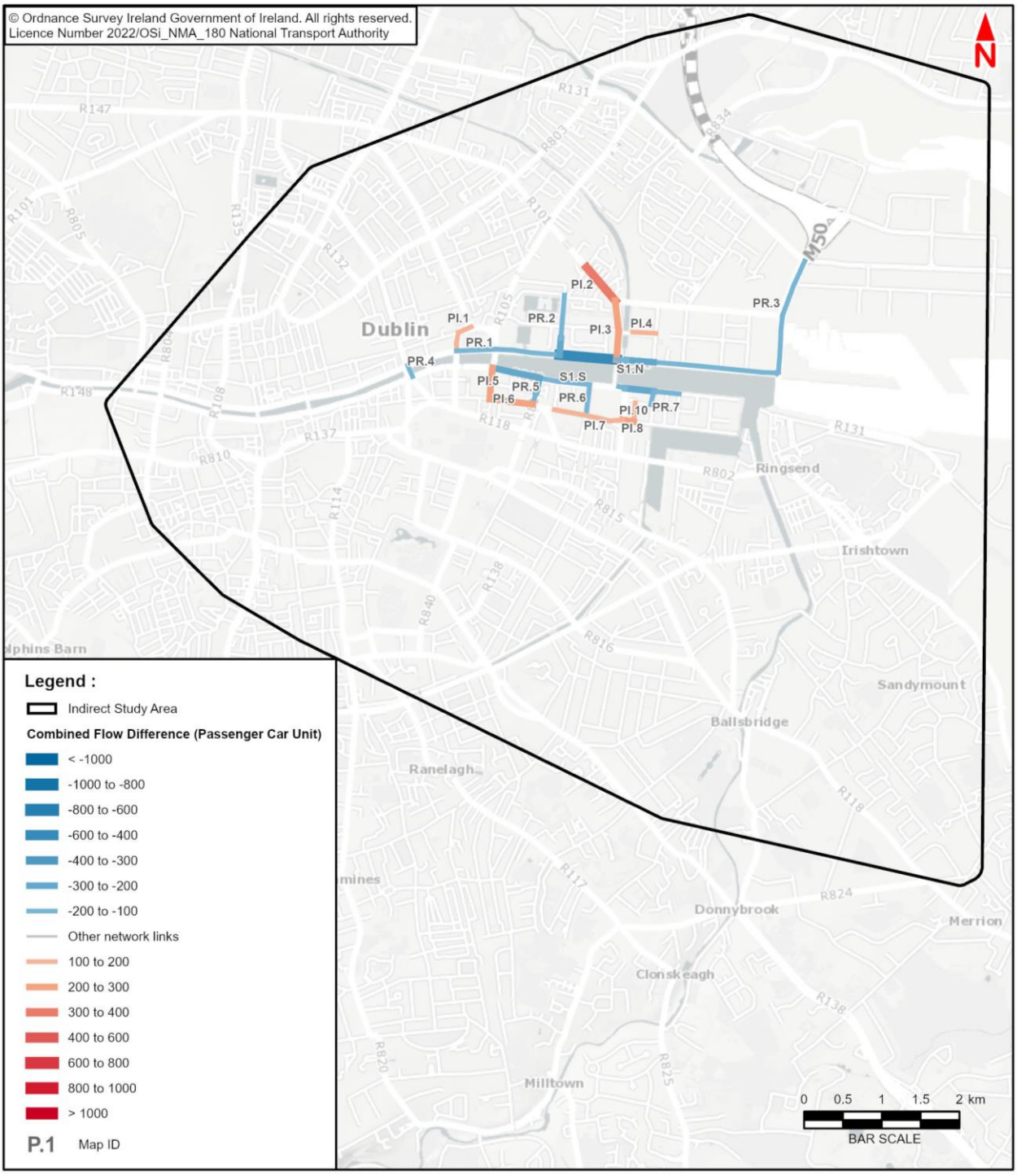


Diagram 6.33: Flow Difference on Road Links (Do Minimum vs. Do Something), PM Peak, 2028 Opening Year

Impact on Direct Study Area (PM Peak Hour)

Direct Reductions in General Traffic Flows: The LAM indicates that during the 2028 Opening Year scenario, there are key reductions in general traffic noted along Section 1 of the Proposed Scheme during the PM Peak Hour, as illustrated by the blue lines in Diagram 6.33, which indicates where a reduction of at least -100 combined traffic flow occurs.

The key reductions in traffic flows during the PM Peak Hour are outlined in Table 6.44.

Table 6.44: Road Links that Experience a Reduction of ≥100 Combined Flows during PM Peak Hour (Direct Study Area)

Location	Map I.D.	Road Name	Do Minimum Flows (PCUs)	Do Something Flows (PCUs)	Flow Difference (PCUs)
North of the River Liffey	S.1N	R801 Custom House Quay	974	781	-194
		R801 North Wall Quay	1045	522	-523
South of the River Liffey	S.1S	R813 City Quay	839	624	-215
		R813 Sir John Rogerson's Quay	1357	1214	-143
		Sir John Rogerson's Quay	583	345	-238

The contents of Table 6.44 demonstrate that there is a slight to significant reduction of between -143 and -523 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 **Positive, Slight and Long-term effect** on the direct study area.

There are no increases to general traffic flows along the direct study area during the PM Peak Hour of the 2028 Opening Year.

Impact on Indirect Study Area (PM Peak Hour)

Indirect Reductions in General Traffic Flows: In addition to the traffic flow reductions occurring along the direct study area, there are key reductions in traffic flows 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 of the 2028 Opening Year are outlined in Table 6.45.

Table 6.45: Road Links that Experience a Reduction of ≥100 Combined Flows during PM Peak Hour (Indirect Study Area)

Orientation	Map ID	Road Name	Do Minimum Flows (PCUs)	Do Something Flows (PCUs)	Flow Difference (PCUs)
North of the River Liffey	PR.1	R801 Custom House Quay	462	341	-121
	PR.2	Commons Street	616	369	-246
	PR.3	R131 East Wall Road	1363	1219	-144
River Liffey	PR.4	O'Connell Bridge	427	283	-144
South of the River Liffey	PR.5	R814 Lombard Street East	694	482	-212
	PR.6	Lime Street	196	81	-115
	PR.7	Forbes Street	430	277	-153

The contents of Table 6.45 outline that there is a slight traffic reduction within the indirect study area which varies between -115 and -246 combined flows along the surrounding road links. This reduction in general traffic flow has been determined as an overall **Positive, Slight and Long-term effect** on the indirect study area.

Indirect Increases in General Traffic Flows: The road links which experience additional traffic volumes of over 100 combined flows are illustrated by the orange / red lines in Diagram 6.33. These road links have been identified as experiencing traffic volumes above the additional traffic threshold and therefore require further analysis. The road links and associated flow difference between the Do Minimum and Do Something scenarios during the PM Peak Hour are outlined in Table 6.46.

Table 6.46: Road Links Exceeding the 100 Flow Additional Traffic Threshold during PM Peak Hour (Indirect Study)

Orientation	Map ID	Road Name	Do Minimum Flows (PCUs)	Do Something Flows (PCUs)	Flow Difference (PCUs)
North of the River Liffey	PI.1	R802 Beresford Place	1382	1510	127
	PI.2	R101 Seville Place	867	1222	355
	PI.3	Guild Street	963	1254	291
	PI.4	Mayor Street Upper	113	240	126
	PI.5	R802 Moss Street	129	427	299

Orientation	Map ID	Road Name	Do Minimum Flows (PCUs)	Do Something Flows (PCUs)	Flow Difference (PCUs)
South of the River Liffey	PI.6	R802 Townsend Street	229	526	297
	PI.7	Hanover Street East	235	388	153
	PI.8	Misery Hill	542	752	210
	PI.9	Hibernian Road	525	662	137

The contents of Table 6.46 outline that the slight additional traffic on key road links within the within the indirect study area varies between 126 and 355 combined flows during the PM Peak Hour. Further junction capacity assessment has been undertaken along these road links to determine whether the above road links have the capacity to cater for the additional traffic volumes as a result of the Proposed Scheme.

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 the junction has been used for the purpose of the assessment to ensure a conservative impact assessment is undertaken.

6.4.6.3.8.5 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 arm which experiences the maximum V/C ratio.

A V / C ratio of below 85% indicates that a junction is operating well, with spare capacity, with traffic not experiencing queuing or delays throughout the hour. A value of 85% to 100% indicates that the junction is approaching its theoretical capacity with traffic possibly experiencing occasional queues and delays within the hour. A value of over 100% indicates that a junction is operating above its theoretical capacity and traffic experiences queues and delays regularly within the hour. The junctions have been described in the ranges outlined in Table 6.47.

Table 6.47: Junction Volume / Capacity Ranges

V / C Ratio	Traffic Condition
≤85%	A junction is operating well within theoretical capacity.
85% - 100%	A junction is approaching theoretical capacity and may experience occasional queues and delays within the hour.
≥100%	A junction 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 6.48 have been used to describe the impact.

Table 6.48: Magnitude of Impact for Redistributed Traffic

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

As indicated in Table 6.48, 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 on EIAR.

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:

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

The AM and PM Peak Hour flows are modelled as occurring between 08:00 to 09:00 and 17:00 to 18:00 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. The full analysis tables for each scenario, demonstrating the Do Minimum and Do Something Peak Hour traffic flows and maximum V / C ratio for each junction assessed is detailed in Table 14 to Table 17 of Appendix A6.4.4 (General Traffic Assessment) in Volume 4 of this EIAR.

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

The contents of Table 6.49 outline the V / C ratios at the key local / regional road junctions in the AM Peak Hour for the 2028 Opening Year and the resultant magnitude of impact and significance of effect at each junction. The location of these junctions and the V / C ratio comparison between the Do Minimum and Do Something scenarios in the 2028 AM Peak Hour are illustrated in Figure 6.9 in Volume 3 of this EIAR.

Table 6.49: Volume over Capacity Ratios at Key Junctions (Do Minimum vs. Do Something), AM Peak, 2028 Opening Year

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%		
Cathal Brugha Street	High	Cathal Brugha Street / Cumberland Street North / Sean Macdermott Street Upper	✓				✓		Low Negative	Negative Moderate
		Cathal Brugha Street / Marlborough Street	✓			✓			Negligible	Not Significant
Seville Place	Negligible	Amiens Street / Portland Row / North Strand Road / Seville Place	✓				✓		Low Negative	Not Significant
		Seville Place / Oriel Street Lower / Oriel Street Upper	✓			✓			Negligible	Imperceptible
		Seville Place	✓			✓			Negligible	Imperceptible
Guild Street	Negligible	Seville Place / Sheriff Street Upper / Guild Street	✓				✓		Low Negative	Not Significant
		Mayor Street Lower / Guild Street / Mayor Street Upper		✓			✓		Negligible	Imperceptible
O'Connell Street Lower	Medium	O'Connell Street Lower / Sackville Place	✓			✓			Negligible	Not Significant
		O'Connell Street Lower	✓			✓			Negligible	Not Significant
		O'Connell Street Lower / Abbey Street Lower	✓			✓			Negligible	Not Significant
O'Connell Bridge	Medium	Bachelors Walk / O'Connell Street Lower / Eden Quay / O'Connell Bridge	✓			✓			Negligible	Not Significant
		Ashton Quay / O'Connell Bridge / Burgh Quay / D'Olier Street	✓			✓			Negligible	Not Significant
D'Olier Street	High	D'Olier Street	✓			✓			Negligible	Not Significant
		D'Olier Street / Burgh Quay	✓			✓			Negligible	Not Significant
		D'Olier Street	✓			✓			Negligible	Not Significant
		Fleet Street / D'Olier Street / Townsend Street / College Street	✓			✓			Negligible	Not Significant
Moss Street	High	Moss Street / Gloucester Street South	✓			✓			Negligible	Not Significant
Townsend Street	Medium	Townsend Street / Moss Street / Shaw Street	✓			✓			Negligible	Not Significant
		Townsend Street / Mark Street	✓			✓			Negligible	Not Significant
		Townsend Street / Prince's Street South	✓			✓			Negligible	Not Significant
Lombard Street East	Low	Townsend Street / Lombard Street East	✓			✓			Negligible	Not Significant
Cardiff Lane	Negligible	Hanover Street East / Cardiff Lane / Misery Hill		✓			✓		Negligible	Imperceptible
Misery Hill	High	Misery Hill / Hibernian Road	✓			✓			Negligible	Not Significant
Hibernian Road	High	Hibernian Road / Lazer Lane	✓			✓			Negligible	Not Significant
Tom Clarke Bridge	Low	North Wall Quay / East Wall Road / Tom Clarke Bridge	✓			✓			Negligible	Not Significant

The results of the junction analysis illustrated in Table 6.49 demonstrate that the majority of junctions are operating with a maximum V / C ratio of below 85% during the AM Peak Hour of the 2028 Opening Year and that the Proposed Scheme will have a negligible impact on the majority of assessed local / regional road links within the indirect study area.

The Cathal Brugha Street / Cumberland Street North / Sean MacDermott Street Upper (2150) junction is expected to have a low negative impact resulting in a **Negative, Moderate and Long-term effect**.

In summary, the effect of redistributed traffic associated with the Proposed Scheme is expected to result in a **Not Significant and Long-term effect** at 20 of the 25 assessed junctions, to result in an **Imperceptible and Long-term effect** at four of the 25 assessed junctions and to result in a **Negative, Moderate and Long-term effect** at one of the 25 assessed junctions.

The redistribution of traffic during the 2028 AM Peak Hour raises no impacts assessed as significant or greater impact.

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

The contents of Table 6.50 outline the V/C ratios at the key local / regional road junctions in the PM Peak Hour for the 2028 Opening Year and the resultant magnitude of impact and significance of effect at each junction. The location of these junctions and the V / C ratio comparison between the Do Minimum and Do Something scenarios in the 2028 PM Peak Hour are illustrated in Figure 6.9 in Volume 3 of this EIAR.

Table 6.50: Volume over Capacity Ratios at Key Junctions (Do Minimum vs. Do Something), PM Peak, 2028 Opening Year

Road Name	Road Sensitivity	Junction Name	DM Max V / C Ratio			DS Max V / C Ratio			Description of Impact	Significance of Effects
			<85%	85% - 100%	>100%	<85%	85% - 100%	>100%		
Custom House Quay	Low	Eden Quay / Beresford Place / Custom House Quay / Butt Bridge	✓			✓			Negligible	Not Significant
Beresford Place	Low	Beresford Place / Custom House	✓			✓			Negligible	Not Significant
		Old Abbey Street / Beresford Place	✓			✓			Negligible	Not Significant
		Abbey Street Lower / Beresford Place		✓			✓		Negligible	Not Significant
Gardiner Street Lower	Low	Gardiner Street Lower / Beresford Place	✓			✓			Negligible	Not Significant
Seville Place	Negligible	Seville Place / Oriel Street Lower / Oriel Street Upper	✓			✓			Negligible	Imperceptible
		Seville Place	✓			✓			Negligible	Imperceptible
Guild Street	Negligible	Seville Place / Sheriff Street Upper / Guild Street	✓			✓			Negligible	Imperceptible
		Mayor Street Lower / Guild Street / Mayor Street Upper		✓			✓		Negligible	Imperceptible
Mayor Street Upper	High	Mayor Street Upper	✓			✓			Negligible	Not Significant
Park Lane	High	Mayor Street Upper / Park Lane	✓			✓			Negligible	Not Significant
Moss Street	High	Moss Street / Gloucester Street	✓			✓			Negligible	Not Significant
Townsend Street	Medium	Townsend Street / Moss Street / Shaw Street	✓				✓		Low Negative	Negative Moderate

Road Name	Road Sensitivity	Junction Name	DM Max V / C Ratio			DS Max V / C Ratio			Description of Impact	Significance of Effects
			<85%	85% - 100%	>100%	<85%	85% - 100%	>100%		
		Townsend Street / Mark Street	✓			✓			Negligible	Not Significant
		Townsend Street / Prince's Street South	✓			✓			Negligible	Not Significant
Lombard Street East	Low	Townsend Street / Lombard Street East	✓			✓			Negligible	Not Significant
Hanover Street East	High	Townsend Street / Creighton Street / Hanover Street East	✓			✓			Negligible	Not Significant
Lime Street	Medium	Hanover Street East / Lime Street	✓			✓			Negligible	Not Significant
Cardiff Lane	Negligible	Hanover Street East / Cardiff Lane / Misery Hill	✓				✓		Low Negative	Not Significant
Misery Hill	High	Misery Hill / Hibernian Road	✓			✓			Negligible	Not Significant
Hibernian Road	High	Hibernian Road / Lazer Lane	✓			✓			Negligible	Not Significant

The results of the junction analysis illustrated in Table 6.50 demonstrate that the majority of junctions are operating with a maximum V / C ratio of below 85% during the PM Peak Hour of the 2028 Opening Year and that the Proposed Scheme will have a negligible impact on the majority of assessed local / regional road links within the indirect study area.

The Townsend Street / Moss Street / Shaw Street (6447) junction is expected to have a low negative impact resulting in a **Negative, Moderate and Long-term effect**.

In summary, the effect of redistributed traffic associated with the Proposed Scheme is expected to result in a **Not Significant and Long-term effect** at 16 of the 21 assessed junctions, to result in an **Imperceptible and Long-term effect** at four of the 21 assessed junctions, and to result in a **Negative, Moderate and Long-term effect** at one of the 21 assessed junctions.

The redistribution of traffic during the 2028 PM Peak Hour raises no significant impact.

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

The contents of Table 6.51 outline the V/C ratios at the key local / regional road junctions in the AM Peak Hour for the 2043 Design Year and the resultant magnitude of impact and significance of effect at each junction. The location of these junctions and the V / C ratio comparison between the Do Minimum and Do Something scenarios in the 2043 AM Peak Hour are illustrated in Figure 6.9 in Volume 3 of this EIAR.

Table 6.51 Volume over Capacity Ratios at Key Junctions (Do Minimum vs. Do Something), AM Peak, 2043 Design Year

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%		
Cathal Brugha Street	High	Cathal Brugha Street / Cumberland Street North / Sean Macdermott Street Upper	✓			✓			Negligible	Not Significant
		Cathal Brugha Street / Marlbrough Street	✓			✓			Negligible	Not Significant
Seville Place	Negligible	Amiens Street / Portland Row / North Strand Road / Seville Place	✓				✓		Low Negative	Not Significant
		Seville Place / Oriel Street Lower / Oriel Street Upper	✓			✓			Negligible	Imperceptible
		Seville Place	✓			✓			Negligible	Imperceptible
Guild Street	Negligible	Seville Place / Sheriff Street Upper / Guild Street	✓			✓			Negligible	Imperceptible
		Mayor Street Lower / Guild Street / Mayor Street Upper	✓			✓			Negligible	Imperceptible
O'Connell Street Lower	Medium	O'Connell Street Lower / Sackville Place	✓			✓			Negligible	Not Significant
		O'Connell Street Lower	✓			✓			Negligible	Not Significant
		O'Connell Street Lower / Abbey Street Lower	✓			✓			Negligible	Not Significant
O'Connell Bridge	Medium	Bachelors Walk / O'Connell Street Lower / Eden Quay / O'Connell Bridge	✓			✓			Negligible	Not Significant
		Ashton Quay / O'Connell Bridge / Burgh Quay / D'Olier Street	✓			✓			Negligible	Not Significant
D'Olier Street	High	D'Olier Street	✓			✓			Negligible	Not Significant
		D'Olier Street / Burgh Quay	✓			✓			Negligible	Not Significant
		D'Olier Street	✓			✓			Negligible	Not Significant
		Fleet Street / D'Olier Street / Townsend Street / Colleg Street	✓			✓			Negligible	Not Significant
Moss Street	High	Moss Street / Gloucester Street South	✓			✓			Negligible	Not Significant
Townsend Street	Medium	Townsend Street / Moss Street / Shaw Street	✓			✓			Negligible	Not Significant
		Townsend Street / Mark Street	✓			✓			Negligible	Not Significant
		Townsend Street / Prince's Street South	✓			✓			Negligible	Not Significant
		Townsend Street / Lombard Street East	✓			✓			Negligible	Not Significant
Cardiff Lane	Negligible	Hanover Street East / Cardiff Lane / Misery Hill			✓		✓		Low Positive	Not Significant
Misery Hill	High	Misery Hill / Hibernian Road	✓			✓			Negligible	Not Significant
Hibernian Road	High	Hibernian Road / Lazer Lane	✓			✓			Negligible	Not Significant
Tom Clarke Bridge	Low	North Wall Quay / East Wall Road / Tom Clarke Bridge	✓			✓			Negligible	Not Significant

The results of the junction analysis illustrated in Table 6.51 demonstrate that the majority of junctions are operating with a maximum V / C ratio of below 85% during the AM Peak Hour of the 2043 Design Year and that the Proposed Scheme will have a negligible impact on the majority of assessed local / regional road links within the indirect study area.

In summary, the effect of redistributed traffic associated with the Proposed Scheme is expected to result in a **Not Significant and Long-term effect** at 21 of the 25 assessed junctions, and to result in an **Imperceptible and Long-term effect** at four of the 25 assessed junctions.

The redistribution of traffic during the 2043 AM Peak Hour raises no significant impact.

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

The contents of Table 6.52 outline the V/C ratios at the key local / regional road junctions in the PM Peak Hour for the 2043 Design Year and the resultant magnitude of impact and significance of effect at each junction. 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 6.9 in Volume 3 of this EIAR.

Table 6.52: Volume over Capacity Ratios at Key Junctions (Do Minimum vs. Do Something), PM Peak, 2043 Design Year

Road Name	Road Sensitivity	Junction Name	DM Max V / C Ratio			DS Max V / C Ratio			Description of Impact	Significance of Effects
			<85%	85% - 100%	>100%	<85%	85% - 100%	>100%		
Custom House Quay	Low	Eden Quay / Beresford Place / Custom House Quay / Butt Bridge	✓			✓			Negligible	Not Significant
Beresford Place	Low	Beresford Place / Custom House	✓			✓			Negligible	Not Significant
		Old Abbey Street / Beresford Place	✓			✓			Negligible	Not Significant
		Abbey Street Lower / Beresford Place		✓			✓		Negligible	Not Significant
Gardiner Street Lower	Low	Gardiner Street Lower / Beresford Place	✓			✓			Negligible	Not Significant
Seville Place	Negligible	Seville Place / Oriel Street Lower / Oriel Street Upper	✓			✓			Negligible	Imperceptible
		Seville Place	✓			✓			Negligible	Imperceptible
Guild Street	Negligible	Seville Place / Sheriff Street Upper / Guild Street	✓			✓			Negligible	Imperceptible
		Mayor Street Lower / Guild Street / Mayor Street Upper		✓			✓		Negligible	Imperceptible
Mayor Street Upper	High	Mayor Street Upper	✓			✓			Negligible	Not Significant
Park Lane	High	Mayor Street Upper / Park Lane	✓			✓			Negligible	Not Significant
Moss Street	High	Moss Street / Gloucester Street	✓			✓			Negligible	Not Significant
Townsend Street	Medium	Townsend Street / Moss Street / Shaw Street	✓			✓			Negligible	Not Significant
		Townsend Street / Mark Street	✓			✓			Negligible	Not Significant
		Townsend Street / Prince's Street South	✓			✓			Negligible	Not Significant
Lombard Street East	Low	Townsend Street / Lombard Street East	✓			✓			Negligible	Not Significant

Road Name	Road Sensitivity	Junction Name	DM Max V / C Ratio			DS Max V / C Ratio			Description of Impact	Significance of Effects
			<85%	85% - 100%	>100%	<85%	85% - 100%	>100%		
Hanover Street East	High	Townsend Street / Creighton Street / Hanover Street East	✓			✓			Negligible	Not Significant
Lime Street	Medium	Hanover Street East / Lime Street	✓			✓			Negligible	Not Significant
Cardiff Lane	Negligible	Hanover Street East / Cardiff Lane / Misery Hill	✓			✓			Negligible	Imperceptible
Misery Hill	High	Misery Hill / Hibernian Road	✓			✓			Negligible	Not Significant
Hibernian Road	High	Hibernian Road / Lazer Lane	✓			✓			Negligible	Not Significant

The results of the junction analysis illustrated in Table 6.52 demonstrate that the majority of junctions are operating with a maximum V / C ratio of below 85% during the PM Peak Hour of the 2043 Design Year and that the Proposed Scheme will have a negligible impact on the majority of assessed local / regional road links within the indirect study area.

In summary, the effect of redistributed traffic associated with the Proposed Scheme is expected to result in a **Not Significant and Long-term effect** at 17 of the 21 assessed junctions, and to result in an **Imperceptible and Long-term effect** at five of the 21 assessed junctions.

The redistribution of traffic during the 2043 PM Peak Hour raises no significant impact.

6.4.6.3.8.6 Night-time Traffic Redistribution

The night-time period is defined as between 23:00 and 07:00. 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[1]. 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 (08:00-09:00). 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.

6.4.6.3.8.7 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 level of redistribution of general traffic away from the main corridor onto the surrounding road network.

Using the TII guidelines 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 Transport 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.

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

- **AM Peak Hour:** Cathal Brugha Street, Seville Place, Guild Street, O'Connell Street Lower, O'Connell Bridge, Tom Clarke Bridge, D'Olier Street, Moss Street, Townsend Street, Misery Hill, Hibernian Road and East Link Road; and
- **PM Peak Hour:** Beresford Place, Seville Place, Guild Street, Mayor Street Upper, Moss Street, Townsend Street, Hanover Street East, Misery Hill and Hibernian Road.

The general traffic impact assessment was undertaken by extracting operational capacities from the LAM at the key junctions along the above road links. 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. Mitigation measures have been considered at junctions where the significance of effect is predicted to be significant or higher.

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 within capacity for all assessed years in the Do Minimum and Do Something scenarios. This indicates that these junctions will be able to accommodate for the additional general traffic volumes redistributed, as a result of the Proposed Scheme and the effect is deemed **Imperceptible to Not Significant and Long-term.**
- No capacity constraints arise at any of junctions during either the AM or PM Peak Hour or either the 2028 Opening Year or 2043 Design Year.

Accordingly, across the study area as a whole, it is determined that there will be an overall **Negative, Slight and Long-term effect** from the redistributed general traffic as a result of the Proposed Scheme. This impact is considered acceptable in line with the scheme objectives and the considerable improvements for sustainable modes in the direct study area, with the consequential reduction in capacity for general traffic leading to some level of traffic redistribution.

Given that the redistributed traffic will not lead to a significant deterioration of the operational capacity on the surrounding road network, no additional mitigation measures, beyond what is included already in the design, have been considered to alleviate the impact outside of the direct study area.

During the night-time lower traffic flows aligned with more vehicular capacity at junctions will reduce or eliminate traffic redistribution from the Proposed Scheme corridor. Thus, the effect during this period will be **Negligible and Long-term**.

6.4.6.4 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 6.4.6 (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. All proposed facilities have been designed in accordance with BusConnects Preliminary Design Guidance which has been developed with cognisance to the relevant accessibility guidance. 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 C ratings, with the exception of three Bs and one A. During the Do Something scenario, i.e., following the development of the Proposed Scheme, the LoS consists of the highest A / B ratings. Overall, the improvements to the quality of the pedestrian infrastructure will have a **Positive, Slight and Long-term effect** along all Sections of the Proposed Scheme.
- **Cycling Infrastructure:** The Proposed Scheme also consists of measures to enhance the potential for cycling by providing safe infrastructure for cycling, segregated from general traffic (and pedestrians) wherever practicable 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 of predominately of C/D ratings with two B ratings and two A ratings. In the Do Something scenario, the LoS consists predominantly of the highest A / A+ ratings, with the exception of one B. Given the quality of the cycling infrastructure along the Proposed Scheme, the improvements will have a **Positive, Moderate and Long-term effect** in Sections 1, 2 and 3. Furthermore, the introduction of the Dodder Public Transport Bridge will create a new cycling link across the mouth of the River Dodder. This will greatly enhance cycling connectivity in the area by linking the employment and entertainment areas of the river's west side with the residential and amenity areas to the east. Therefore, this can be considered a **Positive, Profound, and Long-term effect**.
- **Bus Infrastructure:** The implementation of the Proposed Scheme will result in improvements in the quality of bus infrastructure provision along the direct study area. All proposed facilities have been designed in accordance with BusConnects Preliminary Design Guidance which has been developed with cognisance to the relevant accessibility guidance. A qualitative impact assessment has been undertaken based on the provision of bus priority, bus stop provision and changes to facilities. The results of the assessment demonstrate that the improvements to the quality of the bus infrastructure will have a Positive, **Profound** and Long-term effect in Section 1, a **Positive, Moderate and Long-term effect** along Section 2 and an **Imperceptible and Long-term effect** along Section 3 of the Proposed Scheme where no bus services are in operation.
- **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 88 spaces within the redline boundary of the Proposed Scheme (-89 spaces in Section 1 and +1 space 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 expected to have a **Negative, Moderate and Long-term** effect in Section 1 and 2 and an **Imperceptible and Long-term effect** in Section 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 the sustainable movement of people travelling along the corridor. A quantitative impact assessment has been undertaken using outputs from the NTA's ERM and LAM, comparing the Do Minimum and Do Something peak hour scenarios for each forecast year (2028, 2043). The results of the assessment demonstrate that there will be an increase of 13% and 9% in the number of people travelling along the Proposed Scheme during the 2028 AM and PM peak hours respectively. During the 2043 scenario there will be an increase of 31% and 61% in the number of people travelling along the Proposed Scheme during the AM and PM Peak Hours respectively. These increases are all due to the increased sustainable modes people movement facilitated by the Proposed Scheme.

The analysis also shows that there will be an increase of 3.4% and 3.2% 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 6.2% and 11.0% in the number of people travelling by bus during the AM and PM peak hours respectively. Overall, it is adjudged that the Proposed Scheme will have a **Positive, Significant and Long-term** effect on the sustainable movement of people along the corridor.

- **Bus Network Performance Indicators:** A micro-simulation modelling assessment has been developed and network performance indicators of the bus operations along the 'end to end' corridor. The Proposed Scheme will reduce total bus journey times along the Proposed Scheme by up to 50% in 2028 and 52% in 2043. Based on the AM and PM peak hours alone, this equates to **14.4 hours of savings in 2028 and 16.2 hours in 2043.** When compared to the Do Minimum combined across all buses. On an annual basis this equates to approximately 10,800 hours of bus vehicle savings in 2028 and 12,200 hours in 2043, when considering weekday peak periods only. Journey time variation and reliability are shown to improve in all Do Something scenarios compared to the Do Minimum. Overall, it is anticipated that the improvements in journey times and reliability for bus users along the Proposed Scheme will have a **Positive, Very Significant and Long-term effect.**
- **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 V / C 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. The majority of assessed junctions that required further traffic analysis have V / C ratios that are broadly similar before and after the Proposed Scheme implementation. The re-distribution of general traffic is expected to result in a **Imperceptible** to **Negative**, **Moderate and Long-term effect** at some junctions within the indirect study area.

The contents of Table 6.53 present a summary of the predicted impacts of the Proposed Scheme during the Operational Phase.

Table 6.53:Summary of Predicted Operational Phase Impacts

Assessment Topic	Effect	Predicted Impact
Pedestrian Infrastructure	Improvements to the quality of the pedestrian infrastructure along the Proposed Scheme.	Positive, Slight and Long-term
Cycling Infrastructure	Improvements to the quality of the cycling infrastructure along the Proposed Scheme.	Positive Moderate and Long-term
Bus Infrastructure	Improvements to the quality of the bus infrastructure along the Proposed Scheme.	Positive, Profound and Long-term to Imperceptible and Long-term
Parking and Loading	A total loss of 88 parking / loading spaces along the Proposed Scheme.	Imperceptible and Long-term to Negative, Moderate and Long-term
People Movement	Increases to the total number of people travelling through the Proposed Scheme.	Positive, Significant and Long-term

Assessment Topic	Effect	Predicted Impact
Bus Network Performance Indicators	Improvements to the network performance indicators for bus users along the Proposed Scheme.	Positive, Very Significant and Long-term
General Traffic Network Performance Indicators	Reduction in general traffic flows along the Proposed Scheme.	Positive, Slight 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 (Operational Phase) and summarised in Table 6.53, the Proposed Scheme will deliver 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 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 Transport 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. All of these changes combined 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 which will lead to reduced levels of public transport use, making the bus system less resilient to higher levels of growth and leading to increased levels of car use and congestion. 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, the GDA Transport Strategy and allow the city to grow sustainably into the future, which 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 a proposed Construction Compound, construction plant and equipment.

A Construction Environmental Management Plan (CEMP) has been prepared and is included as Appendix A5.1 in Volume 4 of this EIAR. The CEMP which 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, 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 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 Construction Traffic Management Plan 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 Department of Transport's 'Traffic Signs Manual, Chapter 8 Temporary Traffic Measures and Signs for Roadworks'. 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 Construction Stage Mobility Management Plan (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 Project 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 imbedded 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

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

DCC (2009). Local Area Plan for the Liberties Area

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DCC and NTA (2016). Transport Study

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DPER (2015). Building on Recovery: Infrastructure and Capital Investment (2016-2021)

DPER (2018). National Development Plan (2018- 2027)

DTTS (2009). National Cycle Policy Framework

DTTS (2019). Smarter Travel: A Sustainable Transport Future (2009 – 2020)

DTTS (2019). Traffic Management Guidelines

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DTTS (2021). Draft National Investment Framework for Transport in Ireland

DTTAS (2019). Design Manual for Urban Roads and Streets

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DTTS (2019). Traffic Signs Manual – Chapter 8, Temporary Traffic Measures and Signs for Roadworks

Department of the Environment, Climate and Communications (2018). Sustainable Development Goals National Implementation Plan

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

Eastern and Midland Regional Assembly (2019). Regional Spatial and Economic Strategy (2019-2031)

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

NAVTEQ (2011). The NavStreets Reference Manual

NTA (2011). National Cycle Manual

NTA (2013). Greater Dublin Area Cycle Network Plan

NTA (2016). Transport Strategy for the Greater Dublin Area (2016 – 2035)

RSA (2019). Road Safety Strategy (2013-2020)

TRB (2000) Highway Capacity Manual

TRB (2013) Transit Capacity and Quality of Service Manual

Transport for London (2010) Traffic Modelling Guidelines

TII (2014) Traffic and Transport Assessment Guidelines