Appendix A6.1
Transport Impact Assessment Report

Contents

Executive Summary

Introduction

The purpose of this document is to provide a comprehensive Transport Impact Assessment (TIA) of the proposed Ringsend to City Centre Core Bus Corridor Scheme (hereafter referred to as the Proposed Scheme). The TIA also informs Chapter 6 of the EIAR (Traffic and Transport) for the Proposed Scheme which will assess the impacts and significance of those impacts in relation to the receiving environment 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;
- Enhance the potential for walking by improving the pedestrian infrastructure on the corridor;
- 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 the EIAR.

In line with the above objectives, this TIA is focused on the concept of the "movement of people" rather than the "movement of vehicles". The emphasis of the design philosophy is on maximising the capacity of the Proposed Scheme to move more people by sustainable modes whilst providing for the necessary movement of general traffic along it.

This TIA includes the comprehensive assessment impacts and benefits of the Proposed Scheme covering all transport modes for both the Construction and Operational Phases.

Scheme Description

The Proposed Scheme, as described in detail in in Chapter 4 (Proposed Scheme Description) of the EIAR, has an overall length of approximately approximately 4.3km (2 x 1.6km along the River Liffey Quays and 1.1km of shared user route through Ringsend to Sean Moore Road), and is routed along the north and south quays, linking the city centre with the Docklands and an onward cycling connection to Ringsend and Irishtown, all within the County of Dublin and within the Dublin City Council (DCC) administrative area.

Assessment Methodology

The assessment of the Proposed Scheme in relation to the baseline transport environment required a qualitative assessment of changes to the transport environment, as well as quantitative analysis undertaken using a suite of multi-modal transport modelling tools which have been developed for the Proposed Scheme Infrastructure Works.

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 because of the Proposed Scheme; and
- Parking / Loading: The changes to the availability of parking and loading because of the Proposed Scheme.

The quantitative assessments are as follows:

- People Movement: An assessment has been carried out to determine the potential impact that the Proposed Scheme will have on projected volume of people moving along the corridor by sustainable modes during the Operational Phase only;
- Bus Performance Indicators: The changes to the projected operational efficiency for buses as a result of the Proposed Scheme;
- General Traffic: The direct and indirect impacts on general traffic using the Proposed Scheme and surrounding road network; and
- Network-Wide Performance Indicators: The strategic changes to queuing, total travel times, total travel distance and average network speed.

The changes between the Do Minimum and Do Something scenarios have been presented in either a positive, negative or negligible / neutral magnitude of impacts as a result of the Proposed Scheme, dependant on the assessment topic. A high, medium, low or negligible rating has been applied to each impact assessment to determine the Magnitude of Impact. Where appropriate, the changes in conditions between the Do Minimum and Do Something scenarios are outlined using a Level of Service (LoS) approach. This concept allows a straightforward comparison of two differing scenarios using a series of metrics specifically developed for this purpose.

Baseline Environment

A detailed review of the existing traffic and transport conditions within the redline boundary of the Proposed Scheme has been undertaken, specifically for pedestrian, cycling, bus services and priority measures, general traffic and parking / loading facilities. 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.

For the purpose of describing the Proposed Scheme it has been split into the following three sections:

- 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.

Section 1 of the Proposed Scheme will commence at the Talbot Memorial Bridge and will proceed eastwards along the North and South Quays and will conclude on either side of the Tom Clarke East Link Bridge.

Section 2 of the Proposed Scheme consists of a new public transportation opening bridge, the River Dodder Public Transport Bridge, over the River Dodder at its confluence with the River Liffey.

Section 3 of the Proposed Scheme will commence from the southern end of the Tom Clarke East Link Bridge at the junction with the proposed River Dodder Public Transport Bridge and will proceed to the junction of R131 Sean Moore Road and R802 Beach Road.

Potential Impacts

Construction Phase

The impacts during the Construction Phase are outlined in Table 0.1. During the Construction Phase, the Proposed Scheme will have **Low Negative** and temporary impacts to pedestrian access and parking and loading whilst it will have **Medium Negative** and temporary impacts to cyclist and bus access. General traffic redistribution is not anticipated to be a significant issue during the construction phase, however there will be a requirement for some localised temporary road closures for short durations of the daytime and / or night-time. Therefore, the impact on general traffic redistribution is anticipated to be a **Medium Negative** and temporary impact. The impact of construction traffic is anticipated to result in a **Low Negative** and temporary impact due to the low numbers of vehicles anticipated which are and below the thresholds set out in the Transport Assessments Guidelines.

Table 0.1: Summary of Potential Construction Phase Impacts

Assessment Topic	Effect	Potential Impact
Pedestrian Access	Restrictions to pedestrians along Proposed Scheme.	Low Negative
Cycling Access	Restrictions to cyclists along Proposed Scheme	Medium Negative
Bus Access	Restrictions to public transport along Proposed Scheme.	Medium Negative
Parking and Loading	Restrictions to parking / loading along Proposed Scheme.	Low Negative
General Traffic	Restrictions to general traffic along Proposed Scheme	Medium Negative
	Additional construction traffic flows upon surrounding road network	Low Negative

Operational Phase

The Proposed Scheme will deliver positive impacts to the quality in terms of People Movement, pedestrian, cycling and bus infrastructure during the Operational Phase. 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.

Although it is recognised that there will be some negative impacts for general traffic and parking / loading availability, the Proposed Scheme will deliver strong positive impacts to the quality of pedestrian, cycling and bus infrastructure during the Operational Phase providing for enhanced levels of People Movement in line with the scheme objectives. These improvements will help to provide an attractive alternative to the private car and promote a modal shift to walking, cycling and public transport, allowing for greater capacity along the corridor to facilitate the sustainable movement of people as population and employment levels grow in the future.

Accordingly, it is concluded that the Proposed Scheme will deliver benefits from a sustainable transport point of view and will not result in a significant deterioration to the existing traffic conditions on the local road network during the operational phase, meeting the aim of the Proposed Scheme to provide enhanced walking, cycling and bus infrastructure, enabling and delivering efficient, safe, and integrated sustainable transport movement along the corridor.

This TIA demonstrates that the Proposed Scheme results in the following impacts:

- **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 **Low Positive impact** in Section 1, 2 and 3 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. Overall, the improvements will have a **Low Positive impact** in Section 1 and 2 and a **Medium Positive impact** in Section 3 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 **High Positive** impact.

- **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 **High Positive impact** in Section 1 and Section 2 and a **Negligible impact** along Section 3 the Proposed Scheme.

- **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 **Negligible impact** in Section 1,2 and 3 of the Proposed Scheme.

- **People Movement:** Given the proposed amendments to the pedestrian, cycling, bus and parking / loading infrastructure outlined above, the Proposed Scheme will have greater capacity to facilitate 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.

  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 High Positive impact 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 **High Positive impact**.

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

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

  The results of the assessment demonstrate that the surrounding road network largely has the capacity to accommodate the redistributed general traffic as a result of the Proposed Scheme. The majority of assessed junctions that required further traffic analysis have V / C ratios that are broadly similar before and after the Proposed Scheme.

  Overall, it has been determined that the impact of the reduction in general traffic flows along the Proposed Scheme will be a **Low Positive impact** whilst the impact of the redistributed general traffic along the surrounding road network will have a **Low Negative impact.**

- **Network Wide Performance Indicators:** Given the impacts to the traffic conditions outlined above, there will be a knock-on effect to the operational efficiency of the road network beyond the direct and indirect study areas. A quantitative impact assessment has been undertaken using outputs from the NTA's ERM and LAM to determine the conditions to queuing, travel times, travel distances and network speeds during the Do Minimum and Do Something scenarios. The results of the assessment demonstrate that the impacts to the network wide performance indicators range between -0.5% and 1.16% and will therefore have a **Negligible impact.**

- **Cumulative Summary:** 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, Walking, Cycling)

  The analysis indicates that the 12 BusConnects Proposed Schemes in place, there will be a high positive impact on sustainable mode share. The schemes will prevent any increase in private car traffic within the study area and will instead result in a reduction in car trips below 2020 levels.

  In the 2028 Opening Year scenario, it is estimated that for people travelling within the 500m catchment area (including City Centre) there will be a 12% increase in public transport trips, 2% decrease in general traffic trips (i.e. motorists) and a 14% increase in cycling trips in the AM Peak Hour and a 12% increase in public transport, 3% decrease in general traffic and a 12% increase in cycling trips each day (7am-7pm). In the 2043 Design Year scenario, it is estimated that for people travelling within the 500m catchment area (including City Centre) there will be a 6% increase in public transport trips, 6% decrease in general traffic trips (i.e. motorists) and a 10% increase in cycling trips in the morning peak hour and a 7% increase in public transport, 7% decrease in general traffic and a 11% increase in cycling trips each day (7am-7pm).

  General traffic levels reduce more in 2043 than when compared to 2028 due to the increased level of additional non-bus public transport infrastructure and services (MetroLink, Luas extensions and DART+ from the GDA Strategy) in tandem with the road capacity reduction measures as part of the Proposed Scheme leading to increased usage on all public transport modes.

  The modelling outputs for the 2028 Cumulative Opening Year scenario demonstrate that there is a high growth in bus patronage along all the Proposed Schemes in the AM Peak Hour. The bigger increases occur in the inbound direction on the Blanchardstown to City Centre, the Rathfarnham to

City Centre and the Bray to City Centre schemes where the loadings reach more than 2,000 additional passengers per Hour compared to the Do Minimum scenario.

In the 2028 Opening Year AM Peak Hour scenario with the Proposed Schemes in place, there will be an estimated 10% more passenger boardings across all public transport services and 17% more boardings on bus services. In the 2028 Opening Year PM Peak Hour scenario with the Proposed Schemes in place, there will be an estimated 11% increase in total passengers boarding Public transport services and 18% more passengers boarding buses services.

In the 2043 Design Year AM and PM Peak Hour scenarios, increase in total passengers boarding all public transport services will be 7% and 8% respectively, and the increase in passengers boarding bus services will increase by 11% and 14% respectively.

Overall, the Proposed Schemes are expected to deliver a **High Positive** Cumulative Impact on People Movement by sustainable modes.

Summary and Conclusions

The Proposed Scheme, routed along the northern and southern quay carriageways between R802 Talbot Memorial Bridge and R131 Tom Clarke East Link Bridge, comprises the development of improved bus priority along the entire route. This TIA provides a robust assessment of the scheme through qualitative assessment and quantitative analysis using a suite of multi-modal transport modelling tools.

During the Construction Phase, the Proposed Scheme will have **Low Negative** and temporary impacts to pedestrian access and parking and loading whilst it will have **Medium Negative** and temporary impacts to cyclist and bus access. General traffic redistribution is not anticipated to be a significant issue during the construction phase, however there will be a requirement for some localised temporary road closures for short durations of the daytime and / or night-time. Therefore, the impact on general traffic redistribution is anticipated to be a **Medium Negative** and temporary impact. The impact of construction traffic is anticipated to result in a **Low Negative** and temporary impact due to the low numbers of vehicles anticipated which are and below the thresholds set out in the Transport Assessments Guidelines.

During the Operational Phase, the Proposed Scheme will deliver positive impacts to the quality in terms of People Movement, pedestrian, cycling and bus infrastructure during the Operational Phase. These improvements will help to provide a more 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.

1. Introduction

This TIA presents a comprehensive review of the traffic and transport impacts associated with the Proposed Scheme, which has informed the production of the EIAR Traffic & Transport chapter. The TIA should be read in conjunction with the EIAR chapter and is included as Appendix A6.1 (Transport Impact Assessment Report) to the EIAR.

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.

Table 1.1 summarises the changes which will be made to the existing transport environment along the corridor as a result of the Proposed Scheme.

Table 1.1: 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
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

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
Number of Residential Properties with Land Acquisition	Not applicable	0 Residential

The Proposed Scheme is supported by a series of drawings which are contained in Volume 3 of the EIAR. The following drawings (listed in Table 1.2) should be read in conjunction with this TIA.

Table 1.2: 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

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;
- Enhance the potential for walking by improving the pedestrian infrastructure on the corridor;
- 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.

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 optimization 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 that basis.

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 the 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, focusing 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 below in Section 6.2.3. Details on the development of junction designs along the Proposed Scheme are included in TIA Appendix 2 (Junction Design Report).

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 3.4.

1.1.3 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, and the reason for developing a multi-tiered modelling framework (described in Section 4.3.1), 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 4.3.1) was developed to support this iterative design process.

Diagram 1.1 illustrates this process whereby the emerging design for the Proposed Scheme have been tested using the transport models as part the iteration. The transport models provided an understanding of the benefits and impacts of the proposals (mode share changes, traffic redistribution, bus performance etc.) with traffic flow information also informing other environmental disciplines (such as Air Quality, Noise and Vibration, Climate etc.) which in turn allowed feedback of potential impacts into the design process to allow for changes and in turn

mitigation to be embedded in the designs. The design process included physical changes (e.g., cycle lane widening) and adjustments to traffic signals including changes to staging, phasing and green times to limit traffic displacement to the greatest extent possible as well as traffic management arrangements and/or turn bans where appropriate. This ensured that any displaced traffic was kept to a minimum and was maintained on higher capacity roads, whilst continuing to meet scheme objectives along the Proposed Scheme.

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

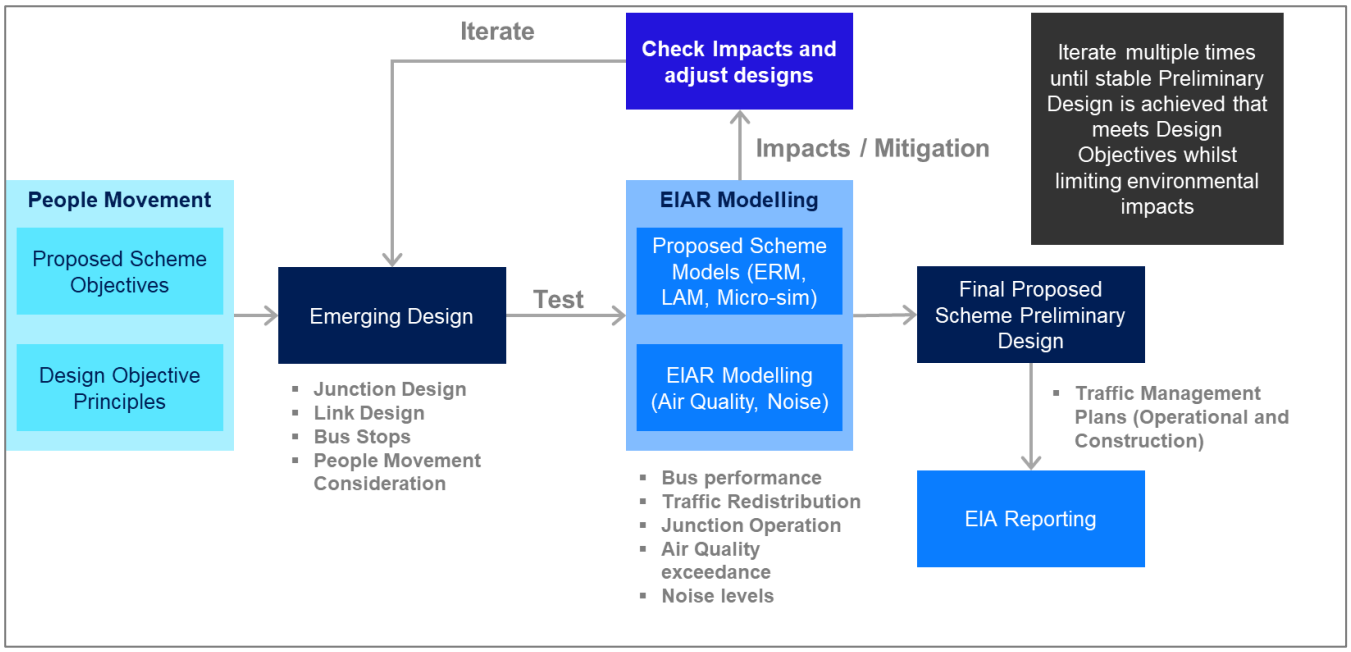

Diagram 1.1: Proposed Scheme Impact Assessment and Design Interaction

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.

1.2 Purpose and Structure of This Report

This TIA includes the comprehensive assessment of impacts and benefits of the Proposed Scheme covering all transport modes for both Construction and Operational Phases. The TIA also informs the Traffic and Transport chapter of the EIAR for the Proposed Scheme which assesses the impacts and significance of those impacts in relation to the receiving transport environment of the Proposed Scheme.

The traffic and transport impacts assessment have been undertaken in accordance with latest guidance, which includes the 'Guidelines on the Information to be contained in Environmental Impact Assessment Reports' (EPA 2022), the 'Traffic and Transport Assessment Guidelines' (TII 2014), the National Cycle Manual (NTA 2011) and the UK Design Manual for Roads & Bridges (DMRB) Environmental assessment and monitoring (formerly HA 205/08, HD 48/08, IAN 125/15, and IAN 133/10), LA104 Revision 1 (Highways England, 2020).

The assessment of traffic and transport impacts and benefits of the Proposed Scheme considers the following transport receptors:

- Pedestrians / mobility impaired;
- Cyclists;
- Buses;
- General traffic; and
- On-street parking, off-street parking, loading, taxis.

In addition, the following modes of transport are considered as part of the modelling:

- Public Transport;
- Traffic including private car, taxis and goods vehicles;
- Walking; and
- Cycling.

The impact assessments have been carried out based on 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, which has been outlined in Section 5 (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 6.3.
- **'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; and
    - **Operational Phase (Opening Year 2028, Design Year 2043) –** This phase represents when the Proposed Scheme is fully operational.

The remaining structure of the report is set out as follows:

- **Chapter 2 – Study Area:** This chapter sets out both the direct and indirect study areas of the TIA;
- **Chapter 3 – Policy Context:** This chapter sets out the National, regional and local policy with which the proposed scheme should accord;
- **Chapter 4 – Assessment Methodology:** This chapter sets out the proposed method of assessment for the quantitative and qualitative perspectives;
- **Chapter 5 – Baseline Environment**: This chapter will set out the baseline conditions against which the Proposed Scheme has been assessed;
- **Chapter 6 – Potential Impacts:** This chapter provides an overview of the Proposed Scheme;
- **Chapter 7 - Cumulative Assessment:** This chapter provides an assessment of the cumulative impact of the Proposed Scheme in conjunction with the other eleven Proposed Schemes within the BusConnects Dublin – Core Bus Corridor Infrastructure Works;
- **Chapter 7 – Proposed Scheme Specific Assessment:** This chapter provides the assessment of the Proposed Scheme in both the Construction and the Operational Phase. It focusses on walking, cycling, bus, general traffic and parking and loading using the methods set out in Chapter 4. It considers both operational and construction scenarios;
- **Chapter 8 – Summary and Conclusions**: This chapter provides a summary of the TIA and the conclusions which can be drawn from it; and
- **Chapter 9** – **References**: contains the traffic and transport sources referred to within this chapter.

2. Study Area

The direct and indirect impacts have been considered with reference to the following study area extents (as shown in Diagram 2.1):

- **Direct Study Area** – The Proposed Scheme (i.e. the transport network within the red line boundary – the boundary of the physical works of the scheme); 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 6.4.1.4.6 for further details on the threshold applied in relation to traffic volume changes used in the definition of the indirect study area).

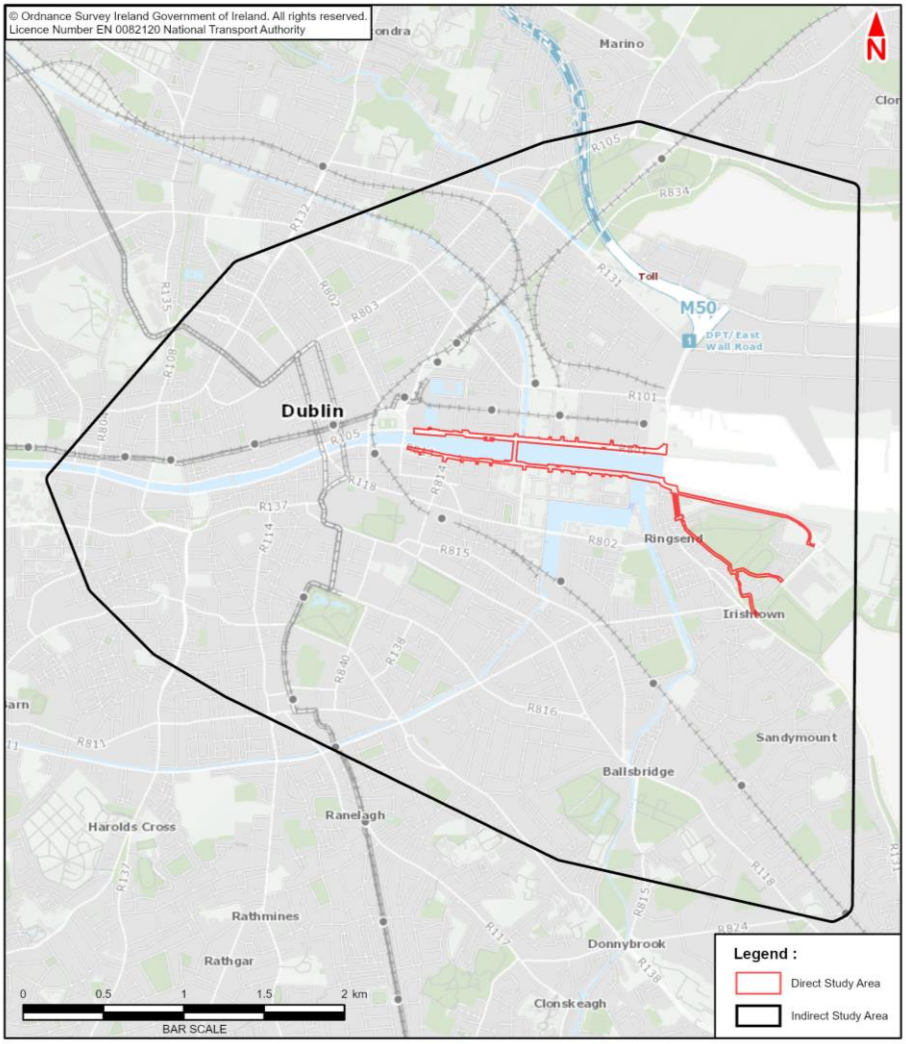

Diagram 2.1: Proposed Scheme Indirect Study Area

3. Policy Context

This chapter outlines the national, regional and local transport and planning policies applicable to the Proposed Scheme. Alignment of the Proposed Scheme with current planning policy at all levels is an important determining factor in planning decisions. Through this summary of policy, the following sections demonstrate that the Proposed Scheme has this alignment and thus is compliant with transport and planning policies.

3.1 National Guidelines

3.1.1 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.

3.1.2 Design Manual for Urban Roads and Streets

The Design Manual for Urban Roads and Streets (DMURS) (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.

3.1.3 Traffic Signs Manual

The Traffic Signs Manual (DTTS, 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.

3.1.4 Traffic Management Guidelines

The Traffic Management Guidelines (DTTS, 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:

- Environmental improvement;
- Congestion relief;
- Capacity improvement;
- Safety;
- Accessibility;
- Economic vitality; and
- Politics.

The Proposed Scheme has been designed and assessed with reference to the set of guidance documents listed throughout Section 3.1.

3.2 National Policy

3.2.1 National Planning Framework - Ireland 2040 Our Plan (NPF) (2018)

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

- the National Planning Framework - Ireland 2040 Our Plan (NPF) (2018); and
- the National Development Plan (2018- 2027).

Project Ireland 2040 provides the framework for future development and investment in Ireland and is the overall Plan from which other, more detailed plans will take their lead, including city and county development plans and regional strategies. The National Planning Framework (NPF) (Department of Housing, Local Government and Heritage, 2020) is a tool to assist the achievement of more effective regional development.

The NPF now represents the overarching national planning policy document, of direct relevance to the planning functions of regional and planning authorities, including An Bord Pleanála. The NPF is the successor to The National Spatial Strategy (NSS), published in November 2002 and has a statutory basis.

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

> *'...The development of an improved bus-based system, with better orbital connectivity and integration with other transport networks...'*
>
> *'...Delivery of the metropolitan cycle network set out in the Greater Dublin Area Cycle Network Plan inclusive of key commuter routes and urban greenways on the canal, river and coastal corridors.'*

It is a policy of the NPF (Objective 74) to secure the alignment of the NPF and the National Development Plan (NDP) through delivery of the National Strategic Outcomes. The BusConnects scheme is identified in National Strategic Outcome 4, 'Sustainable Mobility', which includes the delivery of:

> *'…key public transport objectives of the Transport Strategy for the Greater Dublin Area (2016-2035) by investing in projects such as New Metro Link, DART Expansion Programme, BusConnects in Dublin'.*

It also allows for the development of:

> *'a comprehensive network of safe cycling routes in metropolitan areas to address travel needs.'*

By enhancing travel by both public transport and active modes the Proposed Scheme accords with the National Planning Framework.

3.2.2 National Development Plan (NDP) (2021-2030)

The National Development Plan (NDP) (2021 - 2030) (Department of Public Expenditure and Reform, 2018) sets out the investment priorities that will underpin the implementation of the NPF, through a total investment of approximately €116 billion to ensure ongoing employment maintenance and creation, with appropriate regional development. This investment is also to provide clarity to the construction sector, allowing the industry to provide the capacity and capability required to deliver the Government's long-term investment plans.

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

The NDP promotes the BusConnects proposals, of which the Proposed Scheme forms part, and requires improvements cycles networks such as those included in the scheme. Therefore, the Proposed Scheme is aligned with the NDP.

3.2.3 Draft National Investment Framework for Transport in Ireland (NIFTI) (2021)

The draft National Investment Framework for Transport in Ireland (NIFTI) (Department of Transport, 2021) was recently published by the Department of Transport (DTTS) for public consultation in March 2021. The purpose of the NIFTI is to support the delivery of the Project Ireland 2040 NPF and NDP by providing a strategic framework for future transport investment that is aligned with their spatial objectives and the National Strategic Outcomes (NSOs). The NIFTI has been developed to ensure decision making in land transport investment enables the NPF, supports the Climate Action Plan, and promotes positive social, environmental, and economic outcomes throughout Ireland. NIFTI establishes four investment priorities and objectives, of which new projects must align with at least one:

- Decarbonisation;
- Protection and Renewal;
- Mobility of People and Goods in Urban Areas; and
- Enhanced Regional and Rural Connectivity.

The development of BusConnects is aligned with Project Ireland 2040, and by extension the NIFTI. The principle of the overall BusConnects programme aligns with at least three of the NIFTI investment priorities; protecting and renewing Dublin's public transport network, enabling better mobility for people across the Dublin City-region, and supporting the decarbonisation of Dublin's transport network.

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

Smarter Travel: A Sustainable Transport Future (2009 – 2020) (DTTS, 2019) presents an overall policy framework for sustainable transport in Ireland. The policy sets out a vision, goals and targets to be achieved, and outlines 49 actions that form the basis for achieving a more sustainable transport future. The relevant parts of this policy to the BusConnects scheme are set out in Chapter 4 and 5, as follows:

> *Chapter 4: Actions to Encourage Smarter Travel: 'Action 4 - The delivery of public transport, cycling and promotion of more sustainable travel patterns generally in many existing urban centres can only be achieved through retrofitting. We will require local authorities to prepare plans to retrofit areas towards creating sustainable neighbourhoods so that walking and cycling can be the best options for local trips, for example to reach local facilities such as shops and schools.'*
>
> *Chapter 5: Actions to Deliver Alternative Ways of Travelling: 'Action 12 - Implement more radical bus priority and traffic management measures to improve the punctuality and reliability of bus services and to support more efficient use of bus fleets. This may involve making some urban streets car-free, creating tram-like priorities in others and making greater use of roads/hard shoulders by buses.'*

The Proposed Scheme will support these actions in providing improvements to pedestrian and cycle amenities along the proposed route, whilst also providing greater reliability for road-based public transport.

3.2.5 National Cycle Policy Framework

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

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

Objective 2 of the NCPF is to *'ensure that the urban road infrastructure (with the exception of motorways) is designed / retrofitted so as to be cyclist-friendly and that traffic management measures are also cyclist friendly.'* This involves junction treatment and traffic management, including combined bus and cycle priority measures.

The Proposed Scheme supports the objectives of the NCPF through the provision bus and cycle priority measures.

3.2.6 Statement of Strategy (2016 – 2019)

The Statement of Strategy (Department of Transport, Tourism and Sport (DTTS), 2019) is the DTTS's primary strategic plan and sets out the key priorities for the period 2016 – 2019. It details the Government's high-level goals and objectives, providing the framework for more detailed planning and individual performance management. The strategy mission is:

> *'to shape the safe and sustainable development of transport, tourism, and sport, to support economic growth and social progress.'*

DTTS's high level goal for land transport is:

'to best serve the needs of society and the economy through safe, sustainable and competitive transport networks and services.'

This will be sought with an emphasis on:

- Safety;
- Enhancing services;
- Facilitating and promoting more sustainable forms of transport, including walking and cycling;
- Achieving value-for-money; and
- Promoting sound governance.

The Proposed Scheme will contribute to improved road safety through improvement works at key junctions and upgrades to the pedestrian and cyclist infrastructure along the proposed route. The Proposed Scheme will enhance bus, walking and cycling services which will, in turn, facilitate and promote travel by these modes.

3.2.7 Road Safety Strategy (2021 – 2030)

The Road Safety Strategy 2021– 2030 (RSA 2021) works towards achieving 'Vision Zero' which is to achieve the long term goal of eliminating deaths and serious injuries in road traffic collisions by 2050. The strategy '*involves the promotion of the safer modes (e.g., public transport, such as bus and rail travel), and the promotion and provision of safe road environments for otherwise healthy, active modes. This includes walking and cycling, where the risks of death and serious injury in the event of a collision are higher than for protected in-vehicle road users*.'

The Road Safety Strategy acknowledges that '*The promotion and increased uptake of public transport can greatly contribute to fatality and serious injury reductions over the course of the 2021-2023 strategy'*. It continues '*The substantial societal benefits of increased active travel (i.e. walking or cycling) must also be acknowledged in light of Ireland's climate objectives, including reduced emissions, traffic congestion and noise pollution, and increased physical activity and its related health benefits*.'

A key action of Phase 1 of the strategy, during the 2021 – 2025 period is to '*construct 1,000km of segregated walking and cycling facilities to provide safe cycling and walking arrangements for users of all ages'.*

The Proposed Scheme will provide the infrastructure necessary to facilitate a public transport network which the Strategy acknowledges is a 'safer mode' of travel.

The Proposed scheme will contribute to improved road safety through improvement works at junctions and upgrades to the pedestrian and cycling infrastructure along the route. The Proposed Scheme provides for significant additional segregation between active travel users and the public road to help enhance safety.

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

The Capital Plan (Department of Public Expenditure and Reform, 2015) presented the findings of a Government-wide review of infrastructure and capital investment policy and outlined the Government's commitment to ensuring that the country's stock of infrastructure is capable of facilitating economic growth. The plan identifies the need to improve public transport facilities noting:

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

The transport capital allocation in the plan is largely framed by the recommendations and priorities set out in the 2015 DTTS Strategic Investment Framework for Land Transport, which centre on:

- Maintaining and renewing the strategically important elements of the existing land transport system;
- Addressing urban congestion; and
- Maximise the contribution of land transport networks to our national development.

The Capital Plan key objective is to provide €3.6 billion of Public Transport Investment including further upgrading of Quality Bus Corridors. The Proposed Scheme is consistent with these recommendations, priorities and objectives as set out in the DTTS investment framework, and the Capital Plan.

3.2.9 The Sustainable Development Goals National Implementation Plan (2018 – 2020)

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

The 2030 Agenda aims to deliver a more sustainable, prosperous, and peaceful future for the entire world, and sets out a framework for how to achieve this by 2030. This framework is made up of 17 Sustainable Development Goals (SDGs) which cover the social, economic and environmental requirements for a sustainable future which are shown in Diagram 3.1.

Diagram 3.1 The 17 Sustainable Development Goals

The Sustainable Development Goals National Implementation Plan (Department of the Environment, Climate and Communications, 2018) is in direct response to the 2030 Agenda for Sustainable Development and provides a whole-of-government approach to implement the 17 Sustainable Development Goals (SDGs) above.

The Plan also sets out 19 specific actions to implement over the duration of this first SDG National Implementation Plan. The BusConnects scheme aligns with Goals 9 and 11 as they include the following targets:

> *'Goal 9: Build resilient infrastructure, promote inclusive and sustainable industrialisation and foster innovation: Target 9.1: Develop quality, reliable, sustainable and resilient infrastructure, including regional and transborder infrastructure, to support economic development and human wellbeing, with a focus on affordable and equitable access for all.'*

> *'Goal 11: Make cities and human settlements inclusive, safe, resilient and sustainable: By 2030, provide access to safe, affordable, accessible and sustainable transport systems for all, improving road safety, notably by expanding public transport, with special attention to the needs of those in vulnerable situations, women, children, persons with disabilities and older persons.'*

The above goals align with the aim of the Proposed Scheme.

3.2.10 Climate Action Plan

The Climate Action Plan (Department of the Taoiseach, 2019) sets out the strategy of the Irish Government for tackling the climate change crisis and seeks to achieve a zero-carbon energy systems objective for Irish society and in the process, create a resilient, vibrant and sustainable country.

A central pillar of this plan is the role that transport can play in reducing our carbon footprint and improving air quality in our towns and cities. The plan acknowledges that the delivery of improved public transport will lead to a modal shift away from unsustainable transport choices and go a large way to the decarbonization challenge that lies ahead.

BusConnects, and improvements to the bus fleet, are identified in the Climate Action Plan as being a central component of this objective, as noted in the following actions which are extracted from the plan:

> *'Implement major sustainable-mobility projects such as DART Expansion, Metro Link, and the BusConnects Programme. BusConnects targets a 50% increase in bus passenger numbers over the lifetime of the project in our major cities.*
>
> *Expand sustainable-travel measures, including a comprehensive cycling and walking network for metropolitan areas of Ireland's cities, with a particular emphasis on safety of cyclists. We shall also expand greenways and develop over 200km of new cycling network under BusConnects.*
>
> *Establish a new fare structure in BusConnects which will encourage flexible use of an integrated public transport network. We committed to transition to Low-Emission Vehicles, including electric buses, for the urban public bus fleet, with no diesel-only purchases from 1 July 2019, and will set a roadmap for all public PSO urban bus fleets to become LEVs by 2035.'*

By enhancing public and active travel networks the Proposed Scheme will encourage the use of these modes and reduce reliance on private car. Therefore, the Proposed Scheme is aligned with the Climate Action Plan.

3.3 Regional Policy

3.3.1 Transport Strategy for the Greater Dublin Area (2022 – 2042)

The Transport Strategy for the Greater Dublin Area 2022-2042 (NTA 2022) (hereafter described as the GDA) was published for consultation on the 9 November 2021. It was adopted in January 2023 and replaces the previous Transport Strategy for the Greater Dublin Area 2016-2035. The overall aim of the strategy is '*To provide a sustainable, accessible and effective transport system for the Greater Dublin Area which meets the region's climate change requirements, serves the needs of urban and rural communities, and supports the regional economy'.* A key focus of the strategy is to enable increased use of other transport modes to meet environmental, economic and social objectives related to emissions, congestion and car dependency. It sets a clear direction towards a 50% reduction in CO_2 emissions within the GDA area by 2030.

Section 1 'Introduction' reaffirms that '*Investment in bus priority and bus service improvements – BusConnects Dublin'* is a '*Major Project provided for in the strategy'*.

The NTA priorities are set out, as follows:

1. 'Priority 1. '*Undertake strategic transport planning seeking the optimal alignment of land use and transport policy and practice, enabling an increased proportion of travel by sustainable transport modes'*;
2. Priority 2. '*Promote the use of more sustainable modes of transport'*; and
3. Priority 3. '*Implement an effective infrastructure investment programme that delivers sustainable and public transport infrastructure in a cost effective manner*.'

Section 9.3 'International Gateways' comments that: '*This strategy incorporates MetroLink, BusConnects Dublin and demand management measures which will enhance and protect essential access to Dublin Airport, and ensure that it will operate in a sustainable fashion in terms of landside transport.*'

Section 9.4 'Design and Planning of Schemes' sets out: *'In designing and planning transport infrastructure schemes, it can be tempting for agencies, stakeholders and the public to focus on the one primary objective of the scheme, without giving due attention to the myriad other aspects which need to be considered and the wider benefits which may accrue. Examples of this include the step-change in the quality of the cycle network proposed as part of BusConnects Dublin'*

Section 9.5.2 'Major Interchange Facilities/Mobility Hubs' references that '*Under BusConnects Dublin, a number of interchanges are currently in development and as the DART+ and light rail projects currently being designed are progressed, additional facilities will be developed.'* It further comments that *'Dublin Airport also comprises a major interchange facility with multiple bus services converging at this location, as well as a major taxi facility. This interchange will be enhanced through the delivery of MetroLink and improved local and orbital bus services as part of BusConnects.'* It continues at section 9.5.3 in regard to *'Other Interchanges'* that *' With the introduction of significantly enhanced orbital bus services as part of BusConnects Dublin, it is anticipated that the role of interchange will increase*.'

There is added emphasis on the delivery of public transport, active travel and enhanced accessibility to sustainable modes of transport in the GDA, all of which the Proposed Scheme will help to deliver.

3.3.2 Greater Dublin Area Cycle Network Plan

The Greater Dublin Area Cycle Network Plan (National Transport Authority (NTA), 2013) was adopted by the NTA in early 2014 following a period of consultation with the public and various stakeholders. This plan forms the strategy for the implementation of a high quality, integrated cycle network for the Greater Dublin Area. This involved the expansion of the urban cycle network from 500km to 2,480km comprising a mixture of cycle tracks and lanes, cycle ways and infrastructure-free cycle routes in low traffic environments. Within the urban network, this would consist of a series of routes categorised as follows:

- **Primary:** Main cycle arteries that cross the urban area and carry most cycle traffic – target quality of service (QoS) of two abreast + overtaking width = 2.5m;
- **Secondary:** Link between principle cycle routes and local zones – target QoS of single file + overtaking width = 1.75m; and
- **Feeder:** Cycle routes within local zones and/or connection from zones to the network levels above.

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

The revised GDACNP 2022 forms part of the GDA Transport Strategy (as adopted in January 2023) and is a component of the transport strategy.

The 2022 GDACNP is a review of the 2013 plan to ensure a fit for purpose cycle network for all users and trip types. The network comprises of the following routes:

- Primary;
- Secondary;
- Feeder;
- Greenway; and
- Inter-urban.

It aims for 322km of Primary cycle network, 1,060 Secondary cycle network and 954km of Greenway routes.

The Greater Dublin Area Transport Strategy 2022, sets out Measure CYC1 - GDA Cycle Network which outlines the following:

'It is the intention of the NTA and the local authorities to deliver a safe, comprehensive, attractive and legible cycle network in accordance with the updated Greater Dublin Area Cycle Network.'

3.3.3 Regional Spatial and Economic Strategy for the Eastern and Midlands Region (2019-2031)

A Regional Spatial and Economic Strategy (RSES) is a strategic plan and investment framework to shape future growth and to better manage regional planning and economic development throughout the region.

The RSES (Eastern and Midland Regional Assembly, 2019) builds on the foundations of Government policy in Project Ireland 2040, which combines spatial planning with capital investment, and has been prepared from an extensive bottom up consultation process. It is an integrated cohesive policy document that provides a Spatial Strategy to manage future growth in the region. It identifies regional assets, opportunities and pressures and provides appropriate policy responses in the form of Regional Policy Objectives.

The region includes three subregions or Strategic Planning Areas (SPAs), namely the Midland, Eastern and Dublin SPAs, as shown in Diagram 3.2.

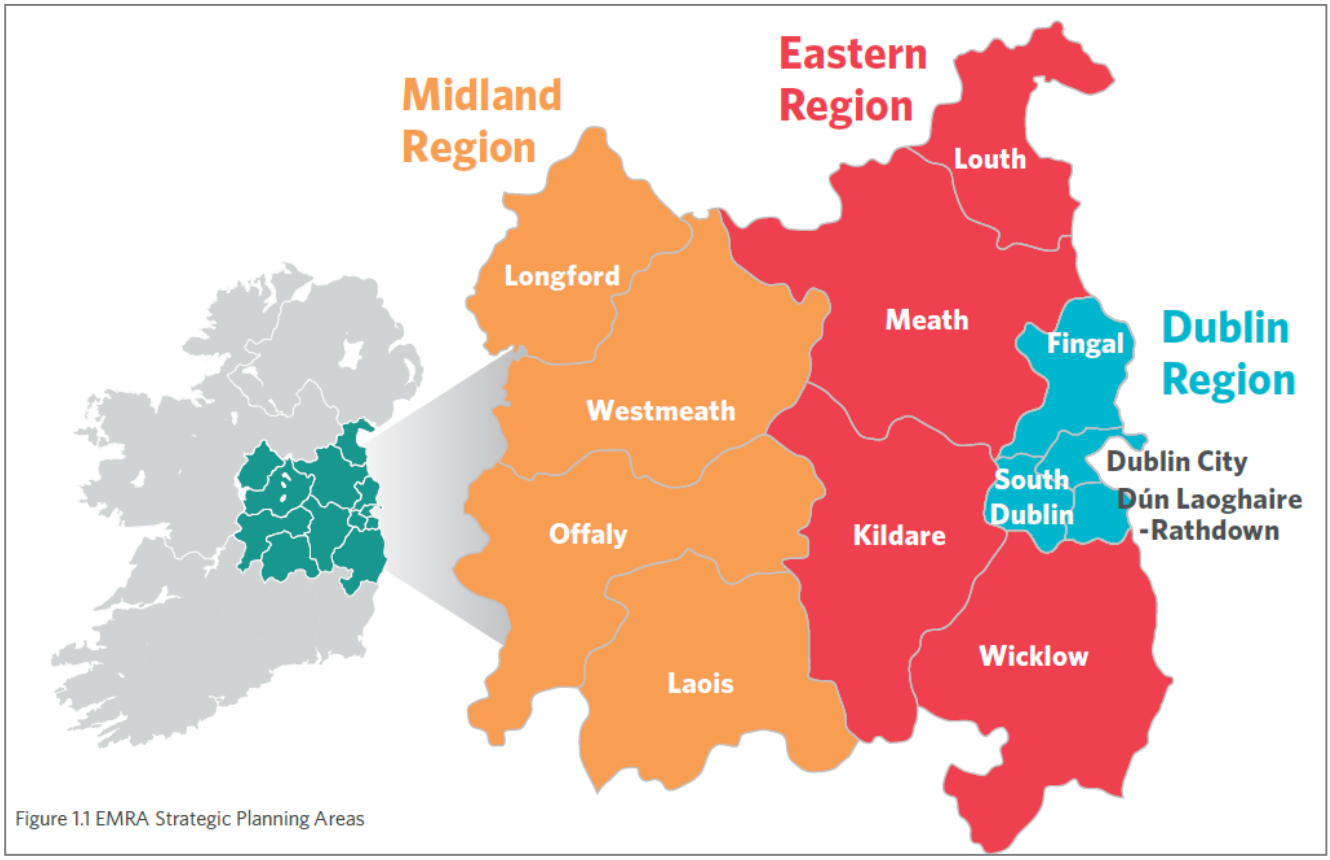

Diagram 3.2: RSES Planning Areas

Dublin City and suburbs is considered in the context of the Dublin Metropolitan Area Strategic Plan (MASP) and is dealt with in greater detail in Chapter 5 of the RSES. The principles underpinning the development of the MASP include the effective integration of transport planning with spatial planning policies, from regional down to local level and the alignment of associated transport and infrastructure investment priorities. The national policy in metropolitan areas is to increase sustainability through greater alignment of land use and transport.

The RSES highlights the BusConnects scheme as a key transport infrastructure investment in the metropolitan area as set out in national policy. The MASP Sustainable Transport Regional Policy Objectives (RPO) are:

> *'RPO5.2: Support the delivery of key sustainable transport projects including Metrolink, DART and LUAS expansion programmes, BusConnects and the Greater Dublin Metropolitan Cycle Network and ensure that future development maximises the efficiency and protects the strategic capacity of the metropolitan area transport network, existing and planned.'*

'RPO 8.9: The RSES supports delivery of the bus projects…subject to the outcome of appropriate environmental assessment and the planning process.'

Table 3.1: Extract from RSES RPO8.9 – Bus Projects for the Region

Extract from RSES RPO8.9 (Table 8.3: Bus Projects for the Region)
Core Bus Corridors comprising 16 radial routes and 3 orbital routes in Dublin
Regional Bus Corridors connecting the major regional settlements to Dublin
Dublin Metropolitan Bus Network Review
Network reviews for the largest settlements across EMRA, with a view to providing local bus services
Review of bus services between settlements
Review of local bus services throughout EMRA, including services to small towns and villages and the rural transport programme
New interchange and bus hub facilities
New fare structures
Enhances passenger information
Improvements to bus waiting facilities
Integrated time tabling of bus and rail into a coherent national and regional network

The RSES highlights the wider BusConnects proposals as a project, given that the Proposed Scheme fall within this it can be considered to be aligned with it.

3.3.4 Dublin City Council Development Plan (2022 – 2028)

The 2022 – 2028 DCDP (DCC, 2022) was adopted on the 2nd of November 2022 and came into effect on the 14th of December, it guides how the city will develop to meet the needs of its residents, visitors and workers. The vision for the city is:

The vision of the DCDP is to establish champion compact city living, distinct character, a vibrant culture, and a diverse, smart, green, innovation-based economy. DCC aims to establish the city as one of Europe's most sustainable, dynamic, and resourceful city regions. The DCDP places sustainable transport as a core principle in the future development of the city:

'Within the next 10 years, Dublin will have an established international reputation as one of Europe's most sustainable, dynamic and resourceful city regions. Dublin, through the shared vision of its citizens and civic leaders, will be a beautiful, compact city, with a distinct character, a vibrant culture and a diverse, smart, green, innovation-based economy. It will be a socially inclusive city of urban neighbourhoods with excellent community and civic infrastructure based on the principles of the 15 minute city, all connected by an exemplary public transport, cycling and walking system and interwoven with a high quality bio-diverse, green space network. In short, the vision is for a capital city where people will seek to live, work, experience, invest and socialise, as a matter of choice.'

In 'Translating the Core Strategy into Development Plan Policies and Objectives', the core strategy has the following supports:

'The Core Strategy will promote development and appropriate intensification along the routes of the three key public transport projects to be developed over the development plan period comprising Bus Connects (2021 – 2023)'

The DCDP recognises that increasing capacity on public transport including bus corridors is a means to promoting modal change and active travel.

Policy SMT1 Modal Shift and Compact Growth states ' *To continue to promote modal shift from private car use towards increased use of more sustainable forms of transport such as active mobility and public transport, and to work with the National Transport Authority (NTA), Transport Infrastructure Ireland (TII) and other transport agencies in progressing an integrated set of transport objectives to achieve compact growth.'*

Policy SMT16 Walking, Cycling and Active Travel states, ' *To prioritise the development of safe and connected walking and cycling facilities and prioritise a shift to active travel for people of all ages and abilities, in line with the city's mode share target*s.'

SMT22 goes on to state the support of delivering key sustainable transport projects such as BusConnecs to help provide an integrated public transport network with efficient interchange between transport modes is key. It is therefore clear that BusConnects and the delivery of same is an important objective of the DCDP. The DCDP fully supports the BusConnects Programme of works and its policy/objectives are aligned with the Proposed Scheme. The Proposed Scheme will deliver the infrastructure necessary to provide a sustainable transport system, to support the enhancement and growth of the cycle and pedestrian network and achieve a modal shift.

3.3.5 Dublin City Centre Transport Study

The National Transport Authority (NTA) and Dublin City Council (DCC) published a set of proposals to enhance overall movement in Dublin City Centre and to improve the attractiveness of the city centre for shoppers, tourists, workers, and residents.

The Transport Study (DCC and NTA, 2016) has been developed as an input into the Dublin City Development Plan (DCCDP) 2016-2022 and sets down a framework for how Dublin City's transport network can be redefined to cater for this increased demand, by better utilising the existing infrastructure available, and by moving towards a more sustainable and efficient use of the public realm within the city centre.

The key objectives of the Transport Strategy are to:

1) Protect the investment that has been, and continues to be made in public transport across the city;
2) Guarantee the future development potential of the City Centre, and improve confidence in the ability of the City Centre to be the key focus of future investment;
3) Increase the capacity, reliability and use of public transport into and within the City Centre;
4) Improve the quality of service for cycling and walking, with particular emphasis on the 'core' City Centre;
5) Ensure that the city develops in a way which will provide a better living and working environment for residents and visitors alike; and,
6) Provide an agreed framework for continued transport investment within the City Centre.

The Proposed Scheme directly contributes towards achieving objectives 3 and 4 of the Transport Strategy.

3.4 Local Policy

3.4.1 St. George's Quay Local Area Plan (2012)

The Local Area Plan (LAP) is a statutory document that acts according to requirements set out in the Planning & Development Act of 2000 and the related Amendment of 2002.

The St. George's Quay Local Area Plan (LAP) (Dublin City Council 2012) was officially extended in 2017 for a further five-year period and is in accordance with the provisions of the DCDP (2011-2017). It provides an overall strategy to support and facilitate delivery of a strong character area, consolidating the areas as a major employment hub benefiting from excellent public transport connectivity, linking the City Centre to Docklands with a focus on sustainable development.

The St. George's LAP is bounded by River Liffey to the north, Trinity College Dublin Campus to the south, Lombard Street to the east and Hawkins Street to the west. Section 1 of the Proposed Scheme (Talbot Memorial Bridge to Tom Clarke East Link Bridge, approximately 530m in length) routes through the St. George's Quay area.

Overarching objectives of St. George's LAP which are of relevance to the Proposed Scheme include the following:

- To promote a mixed-use character for the George's Quay area to support the creation of a vibrant central city district;
- To promote economic development and employment creation as part of a mixed used sustainable approach to the future development of the George's Quay area;
- To achieve a high quality urban environment through a network of attractive streets and public spaces framed by well-designed quality buildings which contribute positively to their setting using the principles of good urban design;
- To support the continuing role of the Georges Quay area as an active mixed housing community; and
- To deliver a quality movement infrastructure which prioritises public transport, walking and cycling, which manages an appropriate role for the private car and which underpins the livelihood and liveability of the George's Quay area and the city.

Critically it includes aspirations for 'investment in enhanced bus services through the life of the local area plan'. This investment is recognized as key given the longer timeframe to the final delivery of larger infrastructure projects such as Metro North and DART underground. Hence, quality of bus services is considered important in the local area for the foreseeable future.

The Proposed Scheme satisfies this aspiration and thus can be considered aligned with the St. George's Quay LAP.

3.4.2 Poolbeg West Strategic Development Zone (2016)

The Planning and Development Act 2000 provides for the designation of a Strategic Development Zone (SDZ) to facilitate development which in the opinion of the Government is of economic or social importance to the State. All developments must be consistent with the objectives of the SDZ Planning Scheme and where policies, objectives, principles, or standards are not specifically addressed in the SDZ Planning Scheme, those in the Dublin City Development Plan shall apply.

Poolbeg West (Dublin City Council 2019) is one of the three SDZs located within the Dublin City Council (DCC) Area. The Planning Scheme for Poolbeg West was undertaken in 2017 by the DCC. The vision for the Poolbeg Peninsula aims to connect with the transport infrastructure and social and economic fabric of the city, to create a new high quality 'place' that is unique, and to protect the surrounding environment and ongoing functions of the port and municipal facilities.

Poolbeg West SDZ consists of an area between Pigeon House Road, Sean Moore Road, Sean Moore Park and extends in an easterly direction along Sandymount Strand as far as Irishtown Nature Park. The northern boundary of the Poolbeg West SDZ Planning Scheme is immediately adjacent to the Proposed Scheme.

Overarching objectives of Poolbeg West SDZ which are of relevance to the Proposed Scheme include the following:

- To provide strong social, economic, and transportation connections between Poolbeg West and the rest of the city, including the central area;
- To promote the integration of Poolbeg West with the surrounding communities of Irishtown, Ringsend and Sandymount; and
- To establish a new urban neighbourhood, with a mixed tenure, that sustains the future population and workforce of Poolbeg West and complements and enhances the services available in surrounding communities.

Proposed Dodder Bridge will extend the Liffey Corridor spine by connecting Britain Quay with York Road, and thus connect Grand Canal Dock directly with Ringsend and Poolbeg. The Pembroke East A location east of the

proposed Dodder bridge has potential to provide new housing locations close to people's place of work, improving quality of life and enabling healthy and environmentally friendly modes of commuting. Critically it cites that new connections to and from the SDZ to the city centre along the south quays will be through the development of 'Sustainable Transport Corridors' which prioritize pedestrian, cyclist and public transport movements.

The Proposed Scheme forms part of this sustainable transport corridor and hence, is aligned to the objectives of Poolbeg SDZ.

3.4.3 North Lotts and Grand Canal Dock Strategic Development Zone (2012)

Parts of the Dublin Docklands area at North Lotts and Grand Canal Dock were designated as a Strategic Development Zone in December 2012. The Planning Scheme for North Lotts and Grand Canal Dock was undertaken in November 2013 by the DCC. The Planning scheme aims to sustain a critical mass necessary to support a vibrant mixed-use urban quarter and to attract inward investment.

The North Lotts and Grand Canal Dock SDZ (Dublin City Council 2014) comprises of some 66ha of the overall 520ha Dublin Docklands Area as set out in the Dublin Docklands Masterplan 2008. The SDZ lands extend north and south of the river at a strategic location; North Lotts immediately adjoins the IFSC and Grand Canal Dock is in close proximity to the city's central business district and south city retail core area. The Samuel Beckett Bridge provides a vital link between the two locations north and south of the Liffey. Section 1 of the Proposed Scheme (Talbot Memorial Bridge to Tom Clarke East Link Bridge) routes through the SDZ.

Overarching objectives of North Lotts and Grand Canal Dock SDZ which are of relevance to the Proposed Scheme include the following:

- To investigate the potential to create physical linkages between the emerging spatial clusters in the docklands and clusters in the rest of city, as well as fostering collaborative network synergies between the clusters on a city-wide basis;
- To support the role of existing schools in the wider neighbourhood in community development through provision of enhanced connections (walking and cycling routes);
- To promote the development of street infrastructure, walking and cycling routes and public transport routes to enhance connections between residential areas and the community facilities that exist in the wider neighbourhood; and
- To provide a linkage to Poolbeg through Dodder Bridge which would enable the provision of increased bus transport to serve the entire area as well as providing an important pedestrian and cyclist link eastwards to link residents with Dublin Bay.

Critically it cites a potential to connect the Grand Canal Dock area back to the city centre through additional bus services/routes, including a dedicated Quality Bus Corridor.

The Proposed Scheme can be considered aligned with the North Lotts and Grand Canal Dock SDZ.

3.5 Legislation

There is no legislation specifically relevant to this TIA.

4. Assessment Methodology

This chapter of the TIA details the methodologies used to assess the impacts of the Proposed Scheme on the receiving transport environment.

The assessment of the Proposed Scheme in relation to the baseline transport environment requires a qualitative assessment of changes to the transport environment, as well as quantitative analysis undertaken using a suite of multi-modal transport modelling tools which have been developed for the Proposed Scheme.

The assessment of traffic and transport benefits and impacts of the Proposed Scheme requires an approach which can provide information on, for example, the mode share changes along the route, people movement by different modes of transport travelling along the corridor as well as traffic re-routing impacts on the surrounding road network. The approach requires an assessment of bus, pedestrian and cycle operations and bus reliability with a focus on the movement of people along the route.

The traffic and transport impact assessments have been undertaken in accordance with the 'Guidelines on the Information to be contained in Environmental Impact Assessment Reports' (EPA 2022), the 'Traffic and Transport Assessment Guidelines' (TII 2014), the National Cycle Manual (NTA 2011) and the UK Design Manual for Roads & Bridges (DMRB) Environmental assessment and monitoring (formerly HA 205/08, HD 48/08, IAN 125/15, and IAN 133/10), LA104 Revision 1 (Highways England, 2020). A range of transport modelling tools which sit within the framework of the NTA's Eastern Regional Model (ERM) have been used.

Where relevant a Level of Service (LoS) has been derived for each mode of travel. The benefits of this approach are outlined subsequently.

4.1 Data Collection and Collation

The TIA has two distinct parts, qualitative methods which consider the physical changes to transport networks and quantitative assessments which are based upon outputs from the transport modelling. The following sections describe the data collection and collation for each method of assessment.

4.1.1 Qualitative Assessment Data Collection

This section discusses the data collection undertaken to inform the qualitative assessment metrics set out in Section 4.2 and Section 6.

4.1.1.1 Site Surveys

A walkover of the route of the Proposed Scheme was undertaken to ensure 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
- Current parking and loading facilities.

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

4.1.1.2 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 TIA 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.

4.1.2 Quantitative Assessment Data Collection

The following chapter provides an overview of the data collection exercise undertaken to facilitate the calibration and validation of the Local Area Model (LAM), Proposed Scheme micro-simulation and junction models. Existing data sources were reviewed to identify available traffic counts and locate gaps in observed information across the model area. This review was used to define a specification for additional counts which were commissioned for the area. The combination of new commissioned counts, and existing available information, provided a comprehensive dataset for calibration and validation.

This section discusses the data collection undertaken to inform the quantitative assessment metrics set out in Section 6. Further detail can be found in TIA Appendix 1 (Transport Modelling Report).

4.1.2.1 Existing Data Review (Gap Analysis)

A review of existing traffic survey data available for the model area 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 Automatic Traffic Counters (ATCs): 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.

4.1.2.2 Commissioned Traffic Survey Data

Due to the scale of the Proposed Scheme, a full set of consistent updated traffic counts for a neutral period e.g. November / February when schools, colleges were in session was completed for the Proposed Scheme. Traffic surveys were undertaken between January and February 2020 (Pre COVID- 19) with the surveyed counts used as inputs to the model calibration and validation process of the strategic model and microsimulation model. The two types of counts used in the study are Junction Turning Counts (JTCs) and Automatic Traffic Counts (ATCs).

The various components of traffic have different characteristics in terms of operating costs, growth and occupancy. The surveys used the most common vehicle categories, as defined in the COBA (Cost Benefit Analysis) Manual:

- Cars: Including taxis, estate cars, 'people carriers' and other passenger vehicles (for example, minibuses and camper vans) with a gross vehicle weight of less than 3.5 tonnes, normally ones which can accommodate not more than 15 seats. Three-wheeled cars, motor invalid carriages, Land

Rovers, Range Rovers and Jeeps and smaller ambulances are included. Cars towing caravans or trailers are counted as one vehicle unless included as a separate class;

- Light Goods Vehicles (LGV): Includes all goods vehicles up to 3.5 tonnes gross vehicle weight (goods vehicles over 3.5 tonnes have sideguards fitted between axles), including those towing a trailer or caravan. This includes all car delivery vans and those of the next larger carrying capacity such as transit vans. Included here are small pickup vans, three-wheeled goods vehicles, milk floats and pedestrian controlled motor vehicles. Most of this group is delivery vans of one type or another;
- Other Goods Vehicles (OGV 1): Includes all rigid vehicles over 3.5 tonnes gross vehicle weight with two or three axles. Also includes larger ambulances, tractors (without trailers), road rollers for tarmac pressing, box vans and similar large vans. A two or three axle motor tractive unit without a trailer is also included;
- Other Goods Vehicles (OGV 2): This category includes all rigid vehicles with four or more axles and all articulated vehicles. Also included in this class are OGV1 goods vehicles towing a caravan or trailer; and
- Buses and Coaches (PSV): Includes all public service vehicles and work buses with a gross vehicle weight of 3.5 tonnes or more, usually vehicles with more than 16 seats.

An overview of the commissioned data is provided Table 4.1.

Table 4.1: Survey Overview

Survey Type	Company	Number	Date
JTC	IDASO LTD	33	Thursday 30/01/2020
ATC	IDASO LTD	4	28/01/2020 –03/02/2020

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.

The ATCs were taken for an entire week. The vehicle categories surveyed are motorcycles, cars, LGVs, OGV 1, OGV 2 and PSVs. 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.

Summary information related to the JTCs and ATCs collected for the Proposed Scheme is shown subsequently.

4.1.2.3 Road and Bus Journey Time Data

4.1.2.3.1 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.

4.1.2.3.2 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 Custom Area Analysis dataset through the TomTom TrafficStats portal. The NTA has an agreement with TomTom to provide anonymised 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.

4.1.2.3.3 TomTom Data Processing

In order to compare the journey times of specific links and routes between the TomTom data and the road assignment models developed for the Proposed Scheme, 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 be 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 LAM and micro-simulation model could be validated along the Proposed Scheme.

4.1.2.3.4 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 TIA Appendix 1 (Transport Modelling Report).

4.2 Appraisal Method for the Assessment of Impacts

4.2.1 Overview

This section provides an overview of 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; and
- Determining the Predicted Magnitude of Impacts.

Further detail on the assessment methodologies is provided in Section 6.

4.2.2 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 are as follows:
  - **People Movements:** An assessment has been carried out to determine the potential impact that the Proposed Scheme will have on the projected volume of people moving along the Proposed Scheme by sustainable modes during the Operational Phase only;
  - **Bus Performance Indicators:** The changes to the projected operational efficiency for buses as a result of the Proposed Scheme;
  - **General Traffic:** The direct and indirect impacts that will occur for the general traffic conditions on the Proposed Scheme and surrounding road network; and
  - **Network-Wide Performance Indicators:** The strategic changes to queuing, total travel times, total travel distance and average network speed.

4.2.3 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 in relation to the following scenarios:

- **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.
- **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 impacts 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 for further information on the methodology in applying these ratings for each assessment.

4.2.3.1 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.

4.3 Transport Modelling Methodology

A multi-tiered transport modelling approach has been developed. The NTA's East Regional Model (ERM) was the primary modelling tool and provided the overarching information on forecast travel demand for each mode of transport. The ERM was supported by other modelling tools which provide more granular level traffic information and allow for detailed and refined modelling at a local network and junction level. For this purpose, a cordoned (sub-set model) corridor-wide, road (motorised vehicle only) based Local Area Model (LAM) in combination with a multi-modal corridor micro-simulation model and local junction models have been used which work in tandem with the ERM.

Through the multi-tiered transport modelling approach, the following modes of transport have been considered:

- Public Transport including inter-urban rail, suburban rail, DART, light rail (Luas), bus, and MetroLink;
- Traffic including private car, taxis and goods vehicles;
- Walking; and
- Cycling.

Further detail on the modelling can be found in TIA Appendix 1 (Transport Modelling Report) of the EIAR which details the model development, data inputs, calibration and validation and forecast model development for the suite of models used to support the assessment.

4.3.1 Proposed Scheme Transport Models

This section sets out the various transport modelling tools that have been developed and used to inform the preparation of the TIA and Chapter 6 (Traffic and Transport) of the EIAR and has supported design decisions. The purpose of each tool is detailed and the use of the tool for each element of the Proposed Scheme is defined.

The modelling tools that have been developed do not work in isolation but instead work as a combined modelling system driven by the ERM as the primary source for multi-model demand and trip growth etc. which is passed from the ERM to the cordoned local area model, microsimulation models and junction models for the Proposed Scheme which have been refined and calibrated to represent local conditions to a greater level of detail then that contained within the ERM.

Importantly, no one tool can provide the full set of modelling data required to inform both the EIAR and TIA requirements and to support design iterations and decisions e.g. the ERM via the LAM has provided road traffic flow information (for example Annual Average Daily Traffic (AADT) and link speed data which has been used to inform Air Quality and Noise models).

The micro-simulation model is the most appropriate tool to provide the end-to-end bus journey times for the Proposed Scheme based on the detailed interaction of vehicle movements along the corridor. In addition, the LAM has been used directly for supporting design development decisions and to assist with an understanding of the implications of banned turns and potential trip redistribution away from the Proposed Scheme during both the Construction and Operational Phases.

4.3.1.1 Transport Modelling Hierarchy

There are four tiers of transport modelling which are used to assess the Proposed Scheme and these are detailed below and shown graphically in Diagram 4.1.

- **Tier 1 (Strategic Level):** The NTA's ERM is the primary tool which has been used to undertake the strategic modelling of the Proposed Scheme and has provided the strategic multi-modal demand outputs for the 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.

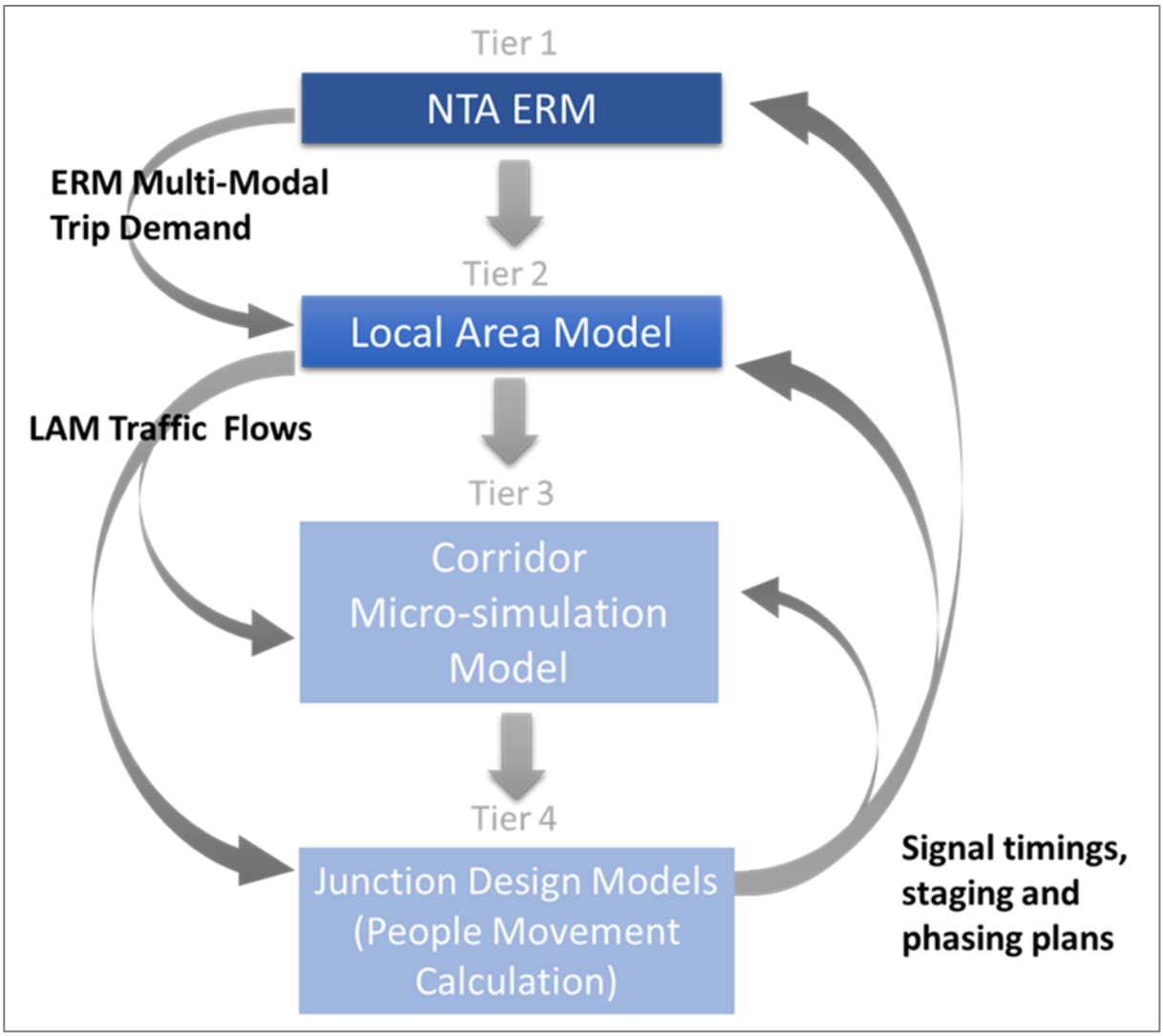

Diagram 4.1: Proposed Scheme Modelling Hierarchy

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 the Transport Modelling Report, in TIA Appendix 1 (Transport Modelling Report) and TIA Appendix 2 (Junction Design Report) in Volume 4 of the EIAR.

The purpose of each of the modelling tools is summarised in Table 4.2.

Table 4.2: Modelling Tool and Purpose

Tool	Purpose	Inputs
NTA ERM	Forecast Multi-Modal demand impacts Proposed Scheme including both area wide and corridor level Mode share Policy assessment (e.g. demand management) Donor Network for LAM	NTA Forecast Planning Data (2020,2028,2043) Future year Proposed Scheme information (Traffic signal plans and timings)
Local Area Model (LAM)	General Traffic Redistribution impacts Link Flows (AADTs) Link Speeds Junction turning flows Construction Strategy and Traffic Management measure testing Donor network for Proposed Scheme Micro-sim model	Traffic surveys Journey time data ERM forecast matrices Proposed Scheme designs Proposed Scheme Traffic signal plans and timings
Micro-simulation Model	Operational features Design validation Person delay measurement Bus journey times Queue formation Scheme visualisation	LAM demand matrices Proposed Scheme designs Proposed Scheme Traffic signal plans and timings
Junction Design Models / People Movement Calculation	Junction design tool Proposed Scheme signal plan and timing development People Movement Calculation	Junction Turning flows from LAM

The following sections describe in further detail each of the modelling tools used to inform this TIA and their role within the assessment of the Proposed Scheme.

4.3.1.2 NTA Regional Modelling System (RMS) and East Regional Model (ERM)

The East Regional Model is part of the NTA's Regional Modelling System (RMS) for Ireland that allows for the appraisal of a wide range of potential future transport and land use alternatives. The RMS comprises the National Demand Forecasting Model (NDFM); five large-scale, detailed, multi-modal regional transport models; and, a suite of Appraisal Modules. The five regional models comprising the RMS are focussed on the travel to-work areas for Dublin (represented by the aforementioned East Regional Model (ERM)), for Cork (represented by the South West Regional Model (SWRM)), for Limerick (represented by the Mid-West Regional Model (MWRM)), for Galway (represented by the West Regional Model (WRM)) and for Waterford (represented by the South East Regional Model (SERM)).

The key attributes of the five regional models include; full geographic coverage of each region, detailed representations of all major surface transport modes including active modes, road and public transport networks and services, and of travel demand for five time periods (AM, 2 Inter-Peaks, PM and Off-Peak). The RMS encompasses behavioural models calibrated to 2017 National Household Travel Survey [1] data that predict changes in trip destination and mode choice in response to changing traffic conditions, transport provision and/or policies which influence the cost of travel.

4.3.1.2.1 Purpose of the RMS

The NTA uses the RMS to help inform decisions required during strategy development and to assess schemes and policy interventions that are undertaken as part of its remit. The RMS has been developed to provide the NTA with the means to undertake comparative appraisals of a wide range of potential future transport and land use options, and to provide evidence to assist in the decision-making process. Examples of how the RMS can

assist the NTA include testing new public transport schemes by representing the scheme in the assignment networks, testing demand management measures by, for example, changing the cost of parking or number of parking spaces within the regional model or testing the impacts of new land use by changing the planning data assumptions within the NDFM.

The RMS includes the 2016 Census/POWSCAR and 2017 National Household Travel Survey (NHTS) data sets and the NTA has included a range of improvements to the main model components where identified and implemented. These improvements include improving and making changes to such elements as the NDFM, development of the Long-Distance Model, updated zoning, networks, and parking modules; best-practice discrete choice modelling using the NHTS and POWSCAR datasets to estimate the parameters of the behavioural models, improved model runtimes, and general model functionality improvements.

4.3.1.2.2 RMS Components

The NTA RMS comprises of the following three main components, namely:

- The National Demand Forecasting Model (NDFM);
- 5 Regional Models (including the ERM); and
- A suite of Appraisal Modules.

The NDFM takes input attributes such as land-use data, population etc., and estimates the total quantity of daily travel demand produced by, and attracted to, each of the 18,641 Census Small Areas in Ireland.

The ERM is a strategic multi-modal transport model representing travel by all the primary surface modes – including, walking and cycling (active modes), and travel by car, bus, rail, tram, light goods and heavy goods vehicles, and broadly covers the Leinster province of Ireland including the counties of Dublin, Wicklow, Kildare, Meath, Louth, Wexford, Carlow, Laois, Offaly, Westmeath, and Longford, plus Cavan and Monaghan.

The ERM is comprised of the following key elements:

- **Trip End Integration:** The Trip End Integration module converts the 24-hour trip ends output by the NDFM into the appropriate zone system and time period disaggregation for use in the Full Demand Model (FDM);
- **The Full Demand Model (FDM):** The FDM processes travel demand, carries out mode and destination choice, and outputs origin-destination travel matrices to the assignment models. The FDM and assignment models run iteratively until an equilibrium between travel demand and the cost of travel is achieved; and
- **Assignment Models:** The Road, Public Transport, and Active Modes assignment models receive the trip matrices produced by the FDM and assign them in their respective transport networks to determine route choice and the generalised cost for each origin and destination pair.

Destination and mode choice parameters within the ERM have been calibrated using two main sources: Census 2016 Place of Work, School or College - Census of Anonymised Records (2016 POWSCAR), and the Irish National Household Travel Survey (2017 NHTS).

4.3.1.2.3 The use of the ERM for the Proposed Scheme

The NTA's ERM is the most sophisticated modelling tool available for assessing complex multi modal movements within an urban context. This provides a consistent framework for transport assessments. The ERM is the ideal tool to use as a basis for the assessment of the Proposed Scheme and to estimate its multi-modal impact. In addition, it provides the platform to forecast future trip demand and distribution.

The NTA ERM is, therefore, the primary high-level modelling tool for the strategic transport assessment of the Proposed Scheme and provides the sole source of multi-modal forecast trip / person demand for each of the scenarios assessed. The ERM provides the strategic impacts and benefits of the Proposed Scheme and the outputs from the ERM provide key inputs to the TIA and EIAR.

4.3.1.3 Local Area Model (LAM)

To support the detailed assessment of the Proposed Scheme a more disaggregated urban area traffic model has been developed, as a cordoned model from the ERM, that incorporates the most up to date traffic survey data. The LAM provides an appropriate level of detail required to inform the various disciplines and levels of decision making within the Proposed Scheme Infrastructure Works e.g., capturing the impact of redistribution of traffic on streets and roads not included within the strategic detail of the ERM. As such, a Local Area Model (LAM) has been developed to support the assessment of the Proposed Scheme.

The LAM is compatible with the ERM road network, being a direct extraction from the ERM road model, but with the addition of extra road network and zoning detail. The LAM is calibrated and validated with the most recent 2019/2020 traffic survey data and journey time information, which ensures that the model reflects 'on-the-ground' conditions for the Proposed Scheme in February 2020 (e.g. prior to COVID-19 restrictions).

The LAM which is a more refined version of the road network model component of the ERM has been used throughout the Proposed Scheme development to provide all road-based outputs to inform the TIA, EIA and junction design models. i.e. AADTs, road network speed data, traffic re-distribution impacts during construction and operation of the Proposed Scheme. The LAM also provides traffic flow information for the corridor micro-simulation models and junction design models.

4.3.1.3.1 Count Data for Calibration and Validation

A full set of consistent updated traffic counts for a neutral period was completed for the Proposed Scheme. Traffic surveys were undertaken in and February 2020 (Pre COVID- 19) with the surveyed counts used as inputs to the model calibration and validation process.

Private cars and taxis were aggregated as a single vehicle type for input to the LAM model. The OGV1 and OGV2 categories were also aggregated as HGVs. PSVs are modelled as fixed routes with a specific frequency in the model (as per timetabled services) and as such were not included in the model inputs. Separate input files were prepared for the following time periods.

- AM: 0800-0900;
- Lunch Time (LT): 1200-1300;
- School Run (SR): 1500-1600;
- PM: 1700-1800; and
- Off Peak (OP): 2000-2100.

The JTCs were merged into a 'flat format' database which permits the extraction of counts grouped by modelled hour (AM, LT, SR or PM) and modelled vehicle category (Car, LGV or HGV). Turn count records were given a unique movement identifier (AB, AC, AD etc). These identifiers were then associated with their respective nodes in the LAM. In some cases, there is a unique one-to-one relationship between the turn counts and the LAM network as shown in Diagram 4.2.

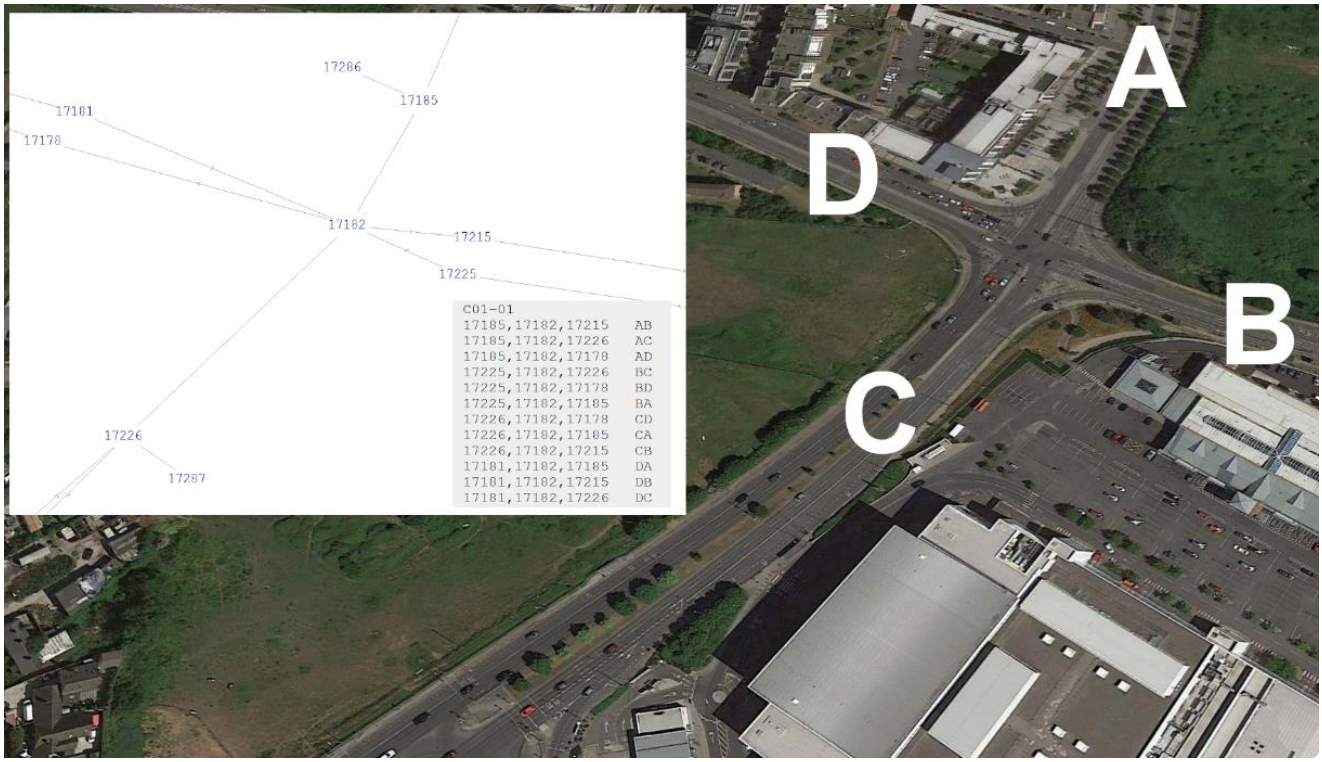

Diagram 4.2: Bus Connects LAM Node Matching (Junction C01-01)

The flows for complex junctions were obtained by combining certain turning movement flows, as shown in Diagram 4.3

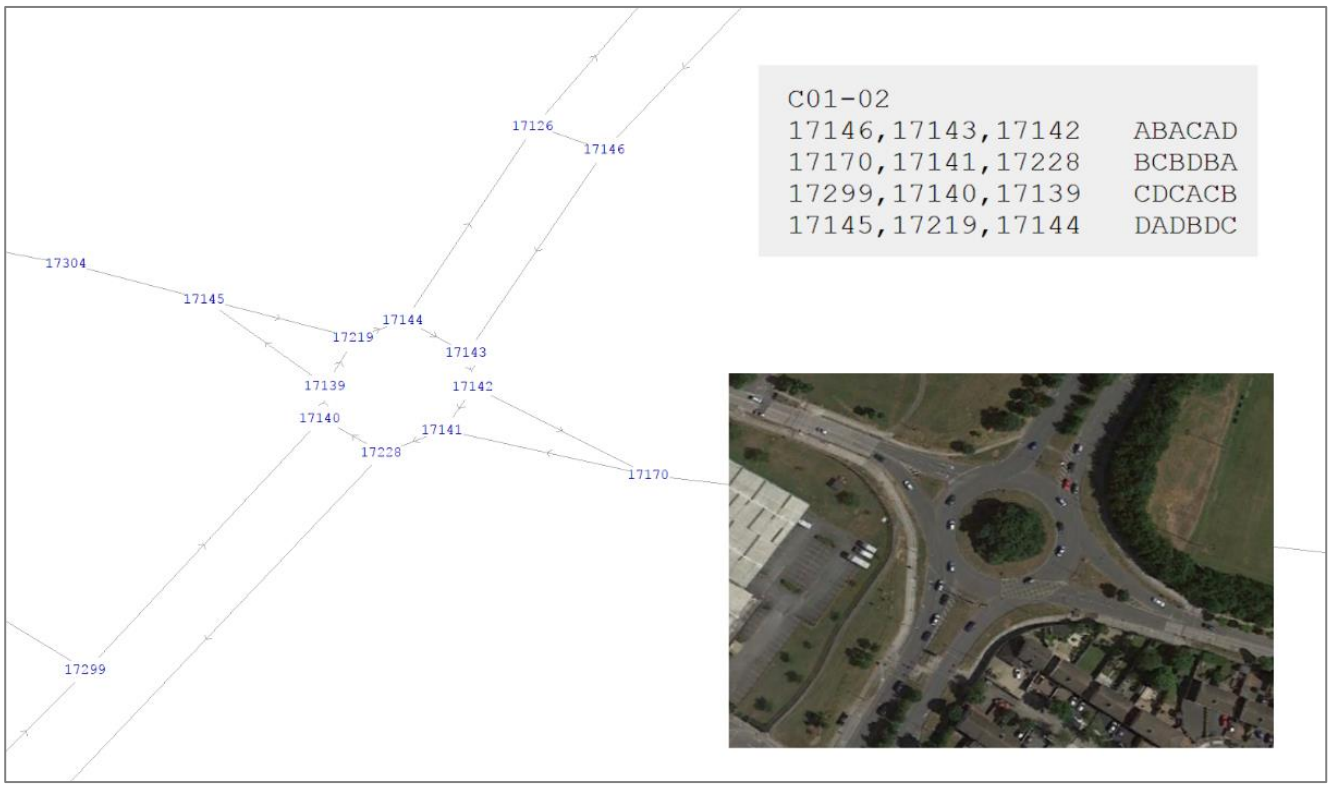

Diagram 4.3: Bus Connects LAM Node Matching (Junction C01-02)

4.3.1.4 Proposed Scheme Micro-Simulation Model

A micro-simulation model has been developed for the full continuous 'end-to-end' route of the Proposed Scheme. The 'end-to-end' corridor micro-simulation model has been developed to assist in the operational validation of the scheme designs and to provide visualisation of scheme operability along with its impacts and benefits.

The term 'end-to-end' refers to the point of model 'entry' (start of Proposed Scheme) to the point of model 'exit' (end of Proposed Scheme) rather than the actual bus service terminus points which, in most cases, lie outside of the modelled area. The modelling of the Proposed Scheme displays the differences in travel time for buses along the full length of the Proposed Scheme, including delay at individual locations.

The Proposed Scheme Micro-simulation model network is shown in Diagram 4.4.

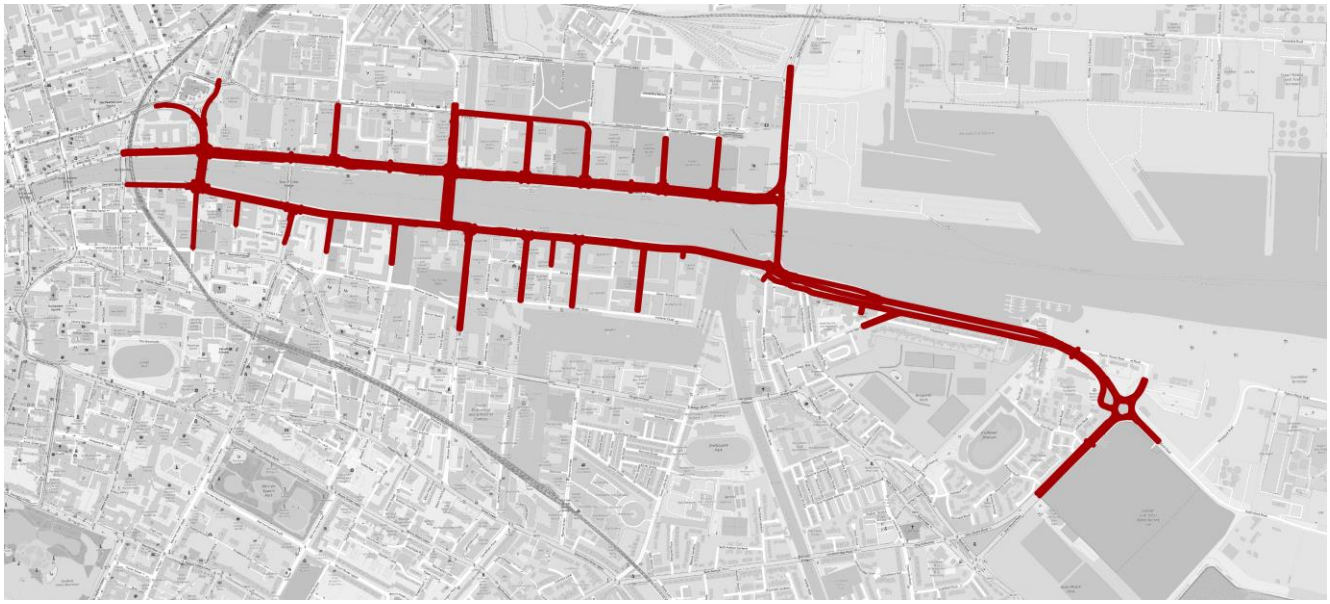

Diagram 4.4: Proposed Scheme Microsimulation Model Network

4.3.1.4.1 Role of the Corridor Micro-Simulation Models

The Proposed Scheme micro-simulation model has provided key information on end-to-end bus and car journey times along the Proposed Scheme. The Proposed Scheme micro-simulation model is supplied traffic flow information from the LAM and uses consistent information from the junction design models, in terms of signal plans, green times, staging, phasing and offsets. 3D Visualisations of sections of the Proposed Scheme have been developed based on the 2D models to help visualise and demonstrate the benefits and impacts of the scheme to stakeholders.

Overall, the Proposed Scheme micro-simulation model has provided key transport metric inputs to the TIA in terms of operational features, vehicle interaction, person level delay and bus journey time and reliability performance.

4.3.1.5 Junction Design Models

The fourth tier of modelling in the modelling hierarchy to support the assessment of the Proposed Scheme is the individual junction design models that have been developed for junctions along the Proposed Scheme. These junction design models are supplied with traffic flow information from the LAM and from the micro-simulation model for the Proposed Scheme. The LAM, Micro-simulation and local junction models contain consistent design, transport demand, signal phasing and staging information. Further information is contained in TIA Appendix 2 (Junction Design Report).

4.3.1.5.1 Role of the Junction Design Models

The junction design models have been used to inform junction design considerations as part of the formulation of the Preliminary Design for the Proposed Scheme. The junction models have been developed for standalone junction assessments and for combinations of secondary (off-line to Proposed Scheme) junctions. The junction models have been used in combination with the Proposed Scheme micro-simulation model at 'hot-spot' locations for operational testing and 'proof of concept' development of the preferred design.

The junction design models are important supporting design tools for analysis of the design proposals and have informed the development of signal plans and phasing at junctions along the Proposed Scheme. The junction models have been used to inform the LAM and Proposed Scheme micro-simulation model, with information such as design amendments, signal plans and timings being fed back in the iterative process where appropriate.

As part an iterative process, the resultant scheme designs were then re-modelled in the ERM, LAM and micro-simulation models to understand the strategic and corridor specific issues and inform the preparation of the TIAs and EIARs and the planning submission for the Proposed Scheme.

5. Baseline Environment

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.

5.1 Bus Journey Times

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.

5.2 Traffic Count Data

5.2.1 Junction Turning Counts (JTCs)

Table 5.1 displays the JTCs collected for the Proposed Scheme, the locations of which are shown in Diagram 5.1. The results demonstrate that the busiest junction (40,527 daily movements) within the direct study is a four-arm signalised junction between R801 Custom House Quay / R802 Memorial Road / R802 Talbot Memorial Bridge. The next busiest junctions are:

- R105 Eden Quay / R802 Gardiner Street Lower / R801 Custom House Quay / R802 Butt Bridge (33,943 daily movements);
- R105 George's Quay / R802 Butt Bridge / R802 Tara Street (33,608 daily movements);
- R801 North Wall Quay / R131 East Wall Road / R131 Tom Clarke Bridge (31,650 daily movements); and
- R802 Tara Street / Townsend Street (30,645 daily movements).

Table 5.1: JTC Locations and Daily, AM and PM Movements

Junction Identifier	Junction Name	Type	Daily Movements	AM Movements	PM Movements
16-1	Custom House Quay/Memorial Road	Signals	40527	3450	2491
16-2	North Wall Quay/Commons Street	Signals	19441	1503	1267
16-4	City Quay/Memorial Road	Priority	30273	2605	1949
16-5	City Quay/Lombard Street	Signals	19846	1696	1526
16-6	City Quay/Creighton Street	Priority	8012	956	788
16-7	Sir John Rogerson's Quay/Lime Street	Priority	6389	674	686
16-8	Sir John Rogerson's Quay/Cardiff Lane	Signals	24182	2132	1709
16-9	Lombard Street/Townsend Street	Signals	20614	1812	1273
16-10	Creighton Street/Hanover Street East	Priority	4129	458	259
16-11	Lime Street/Hanover Street East	Priority	5869	636	546
16-12	Cardiff Lane/Hanover Street East	Signals	21832	1721	1202
16-13	North Wall Quay/Park Lane	Signals	14172	1072	1099

Junction Identifier	Junction Name	Type	Daily Movements	AM Movements	PM Movements
16-14	North Wall Quay/New Wapping Street	Signals	14782	1294	1139
16-15	North Wall Quay/Castleforbes Road	Priority	12101	958	889
16-16	North Wall Quay/North Wall Avenue	Priority	11305	897	810
16-17	North Wall Quay/East Wall Road	Priority	31650	2434	2252
16-18	Sir John Rogerson's Quay/Forbes Street	Priority	7641	909	725
16-19	Sir John Rogerson's Quay/Blood Stoney Road	Priority	3476	349	268
16-20	Sir John Rogerson's Quay/Benson Street	Priority	2555	246	198
16-21	Misery Hill/Hibernian Road	Priority	5932	527	352
16-22	Misery Hill/Forbes Street	Priority	6628	859	694
16-23	Forbes Street/Lazer Lane	Priority	6758	838	596
16-24	Hanover Quay/Blood Stoney Road	Priority	2800	320	290
16-25	Sean Moore Road/East Link Road	Priority	25065	1859	1620
16-26	Cambridge Road/York Road	Priority	2373	210	288
16-27	Sean Moore Road/Beach Road	Signals	27526	2125	1572
16-28	Eden Quay/Rosie Hackett Bridge	Signals	16282	1196	947
16-29	Rosie Hackett Bridge/Burgh Quay	Signals	19421	1062	1437
16-30	Eden Quay/Butt Bridge	Signals	33943	2085	2484
16-31	George's Quay/Butt Bridge	Signals	33608	1718	2598
16-32	Moss Street/Townsend Street	Signals	8280	1025	471
16-33	Tara Street/Townsend Street	Signals	30645	2119	2145
16-34	D'Olier Street/College Street	Signals	20967	1494	974

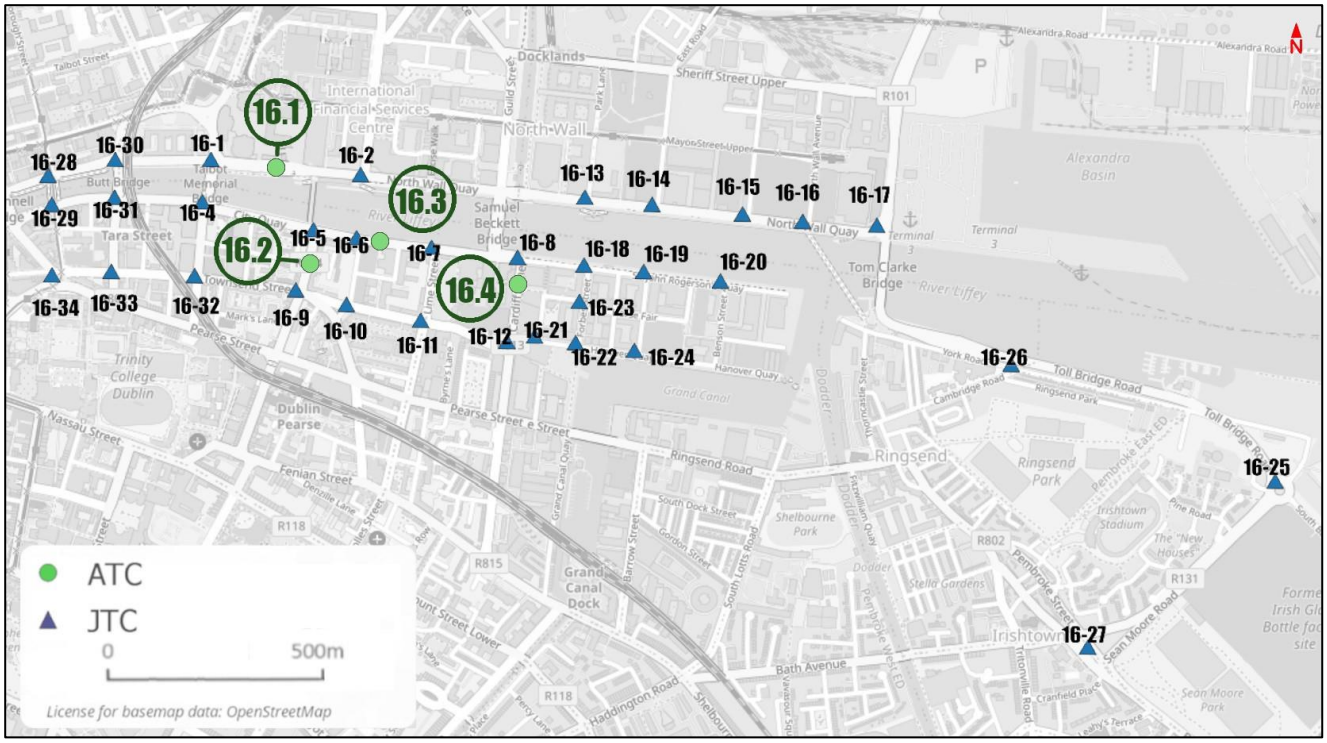

Diagram 5.1: ATC and JTC Traffic Count Locations

5.2.2 Automatic Traffic Counts (ATCs)

Table 5.2 displays the ATCs collected for the Proposed Scheme, the locations of which are shown in Diagram 5.1. The highest ATC daily flows in one direction are along R814 Lombard Street East, whilst the highest ATC dual direction daily flows are along R108 Custom House Quay at George's Dock.

Table 5.2: ATC Locations, Daily, AM and PM Movements

ATC Identifier	ATC Location	Direction	Daily Movements	AM Movements	PM Movements
16.1A	Custom House Quay at Georges Dock	Eastbound	9299	589	523
16.1B		Westbound	5352	336	359
16.2A	Lombard Street East	Southbound	11519	641	743
16.3A	Sir John Rogerson's Quay	Westbound	7000	373	315
16.3B		Eastbound	7023	364	332
16.4A	Cardiff Lane	Northbound	5784	349	363
16.4B		Southbound	5420	378	367

5.3 Baseline Conditions

5.3.1 Overview

In describing the baseline conditions, the scheme has been divided into three no. sections in accordance with the proposed design. The three sections are outlined as follows:

- 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.

5.3.2 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.

5.3.2.1 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 TIA Appendix 3 (Maps).

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 TIA Appendix 4.1 (Pedestrian Infrastructure Assessment).

5.3.2.2 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 Figure 6.4a in TIA Appendix 3 (Maps).

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

5.3.2.3 Bus Infrastructure

5.3.2.3.1 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).

5.3.2.3.2 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 5.3 outlines the availability of bus stop facilities at the existing ten bus stops along Section 1 of the Proposed Scheme.

Table 5.3: 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 Figure 6.5a in TIA Appendix 3 (Maps). The bus services which operate along Section 1 are outlined in Table 5.4.

Table 5.4: 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

Service	Route	Typical Service Frequency	
		Weekday	Weekend
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
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

5.3.2.4 General Traffic

5.3.2.4.1 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 5.1.

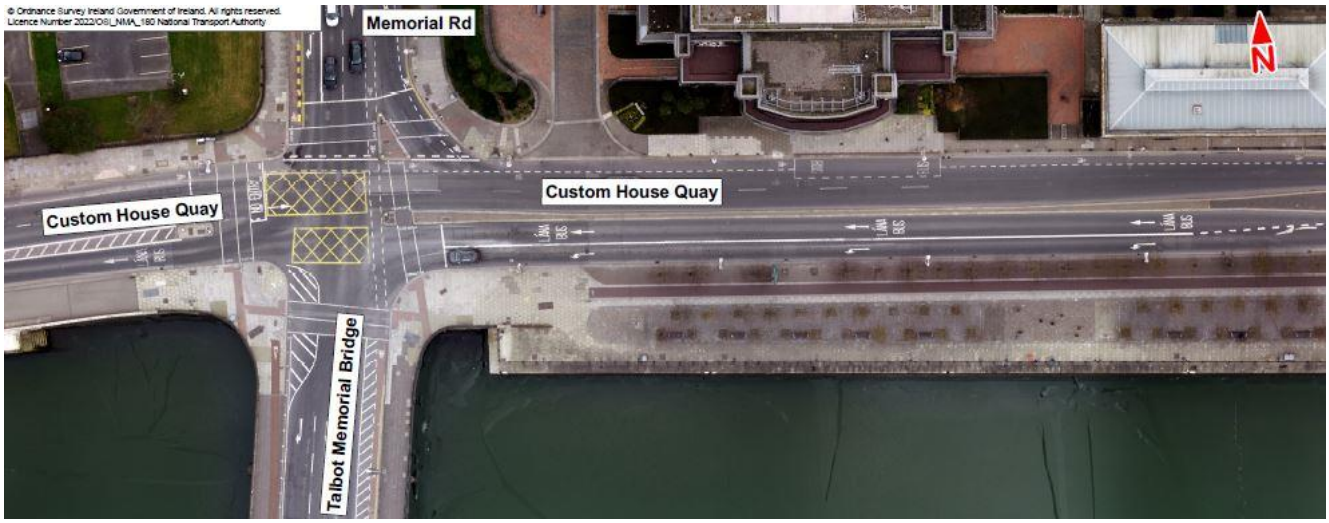

Image 5.1: R801 Custom House Quay / R802 Memorial Road / R802 Talbot Memorial Bridge Junction

5.3.2.4.1 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 5.2 shows the existing arrangement of the R801 North Wall Quay / Guild Street / Samuel Beckett Bridge Junction.

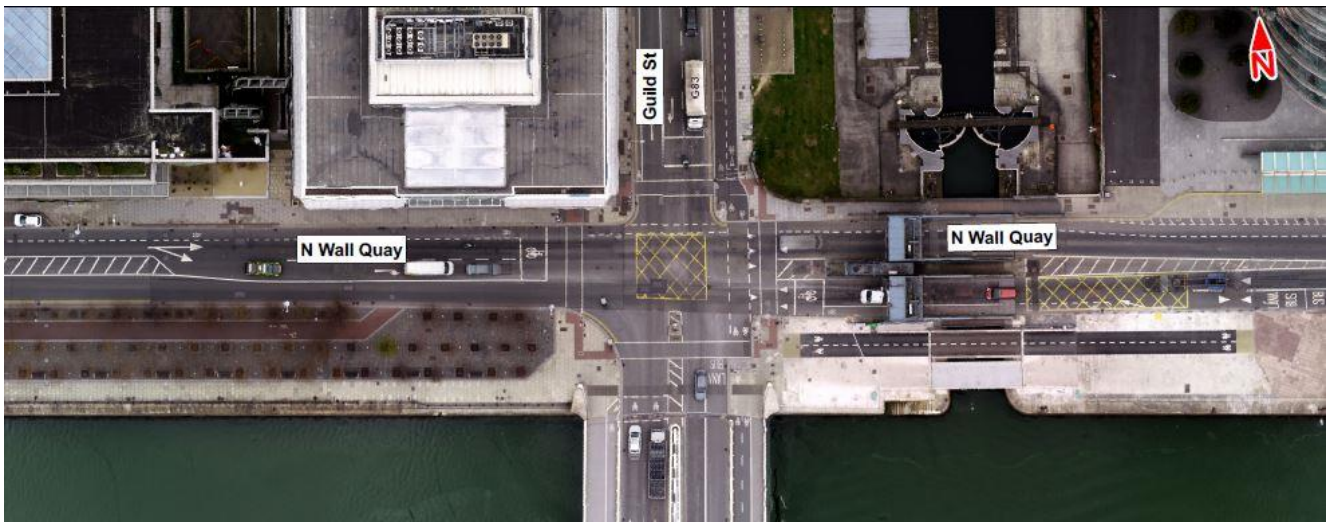

Image 5.2: R801 North Wall Quay / Guild Street / Samuel Beckett Bridge Junction

5.3.2.4.1 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 5.3 shows the existing arrangement of the R105 George's Quay / R802 Talbot Memorial Bridge / R813 City Quay / R802 Moss Street junction.

Image 5.3: 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 5.4 shows the existing arrangement of the R813 City Quay / R814 Lombard Street East junction.

Image 5.4: R813 City Quay / R814 Lombard Street East Junction

5.3.2.4.2 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 5.5 shows the existing arrangement of the R813 City Quay / R814 Lombard Street junction.

Image 5.5: 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 5.5 shows the existing arrangement of the R813 Sir John Rogerson's Quay / Sir John Rogerson's Quay / R813 Cardiff Lane junction.

5.3.2.4.3 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.

5.3.2.5 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.

5.3.3 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.

5.3.4 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.

5.3.4.1 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 location of pedestrian crossings is illustrated in Figure 6.3b in TIA Appendix 3 (Maps).

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 TIA Appendix 4.1 (Pedestrian Infrastructure Assessment).

5.3.4.2 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 informally shared cyclist / pedestrian path is available.

The existing cycle facilities along Section 3 of the Proposed Scheme is illustrated in Figure 6.4c in TIA Appendix 3 (Maps).

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

5.3.4.3 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.

5.3.4.4 General traffic

5.3.4.4.1 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 5.6 illustrates the existing arrangement of the York Road / Cambridge Road / Pigeon House Road junction.

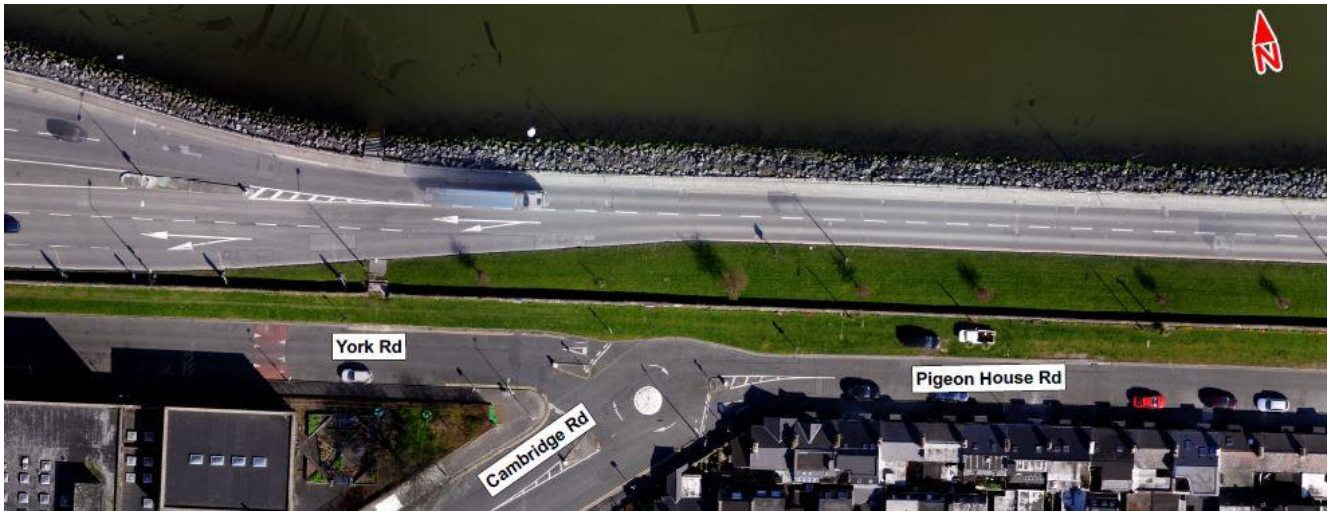

Image 5.6: York Road / Cambridge Road / Pigeon House Road Junction

5.3.4.4.2 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.

5.3.4.4.3 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 5.7 illustrates the existing arrangement of the York Road / Pembroke Cottages junction.

Image 5.7: 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 5.8 illustrates the existing arrangement of the Cambridge Road / Pembroke Cottages (eastern) / Cambridge Park junction.

Image 5.8: Cambridge Road / Pembroke Cottages (eastern) Cambridge Park

5.3.4.5 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. Potential Impacts

6.1 Characteristics of the Proposed Scheme

The Proposed Scheme comprises the development of improved bus priority along the northern and southern quay carriageways between R802 Talbot Memorial Bridge and R131 Tom Clarke East Link Bridge, whilst improved cycle infrastructure is to be provided 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 dedicated bus lanes (in both directions where feasible), dedicated cycle tracks and a quite cycle route between R131 Tom Clarke East Link Bridge and R131 Sean Moore Road, where local traffic and cyclists share the carriageways of local residential roads.

6.2 '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.

6.3 '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 5 (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.

6.3.1.1 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.

TIA Appendix 1 (Transport Modelling Report) contains further information on the modelling assumptions contained within the Do Minimum scenario including the full list of transport schemes included.

6.3.1.2 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 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 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 in overall demand for travel by private car. 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.

6.3.2 '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 Scheme Description) of the EIAR.

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

A Construction Environmental Management Plan (CEMP) has been prepared and is included as Appendix A5.1 in Volume 4 of the EIAR. The CEMP 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 the EIAR, and will be updated with any additional measures which may be required by the conditions attached to An Bord Pleanála's decision. Implementation of the CEMP will ensure disruption and nuisance are kept to a minimum during the Construction Phase. The CEMP has regard to the guidance contained in the TII Guidelines for the Creation, Implementation and Maintenance of an Environmental Operating Plan, 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 TIA.

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.

6.4.1.1 Description of Construction Works

The Proposed Scheme has been divided into two principal sections. These sections have been further subdivided into six sub-sections, according to the types of construction works required. The sections / sub-sections are the following (as shown in Diagram 6.1):

- 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.

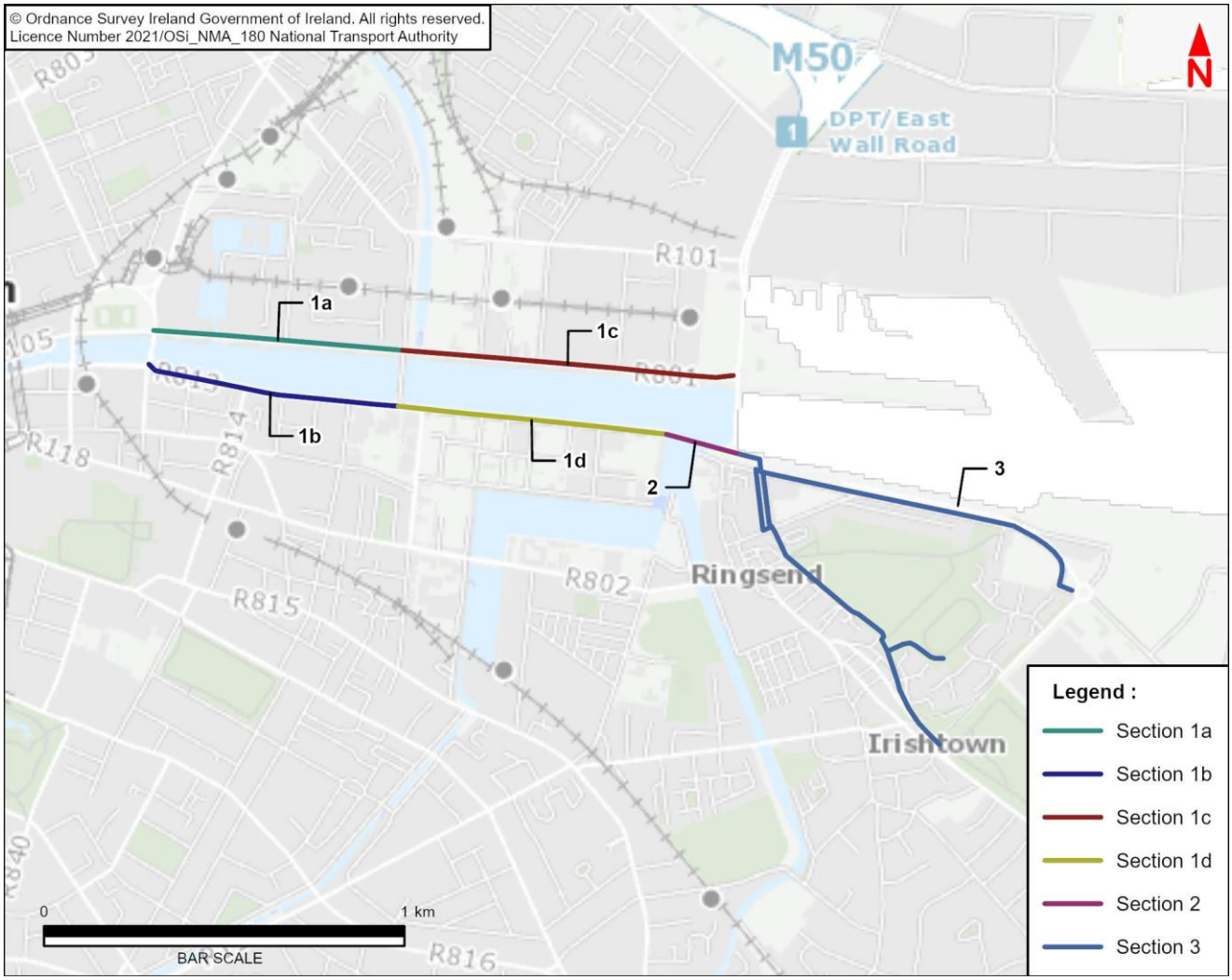

Diagram 6.1: Proposed Subsections of Construction Phase

6.4.1.2 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).

6.4.1.3 Construction Route

The locations of four Construction Compounds have been identified at the following locations, as displayed in Diagram 6.2:

- Construction Compound RI1 located along North Wall Quay, at George's Dock, north of the existing Scherzer Bridges;
- Construction Compound RI2 located along North Wall Quay, at Spencer Dock, north of the existing Scherzer Bridges;
- Construction Compound RI3 located at the end of Sir John Rogerson's Quay; and
- Construction Compound RI4 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 6.2):

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

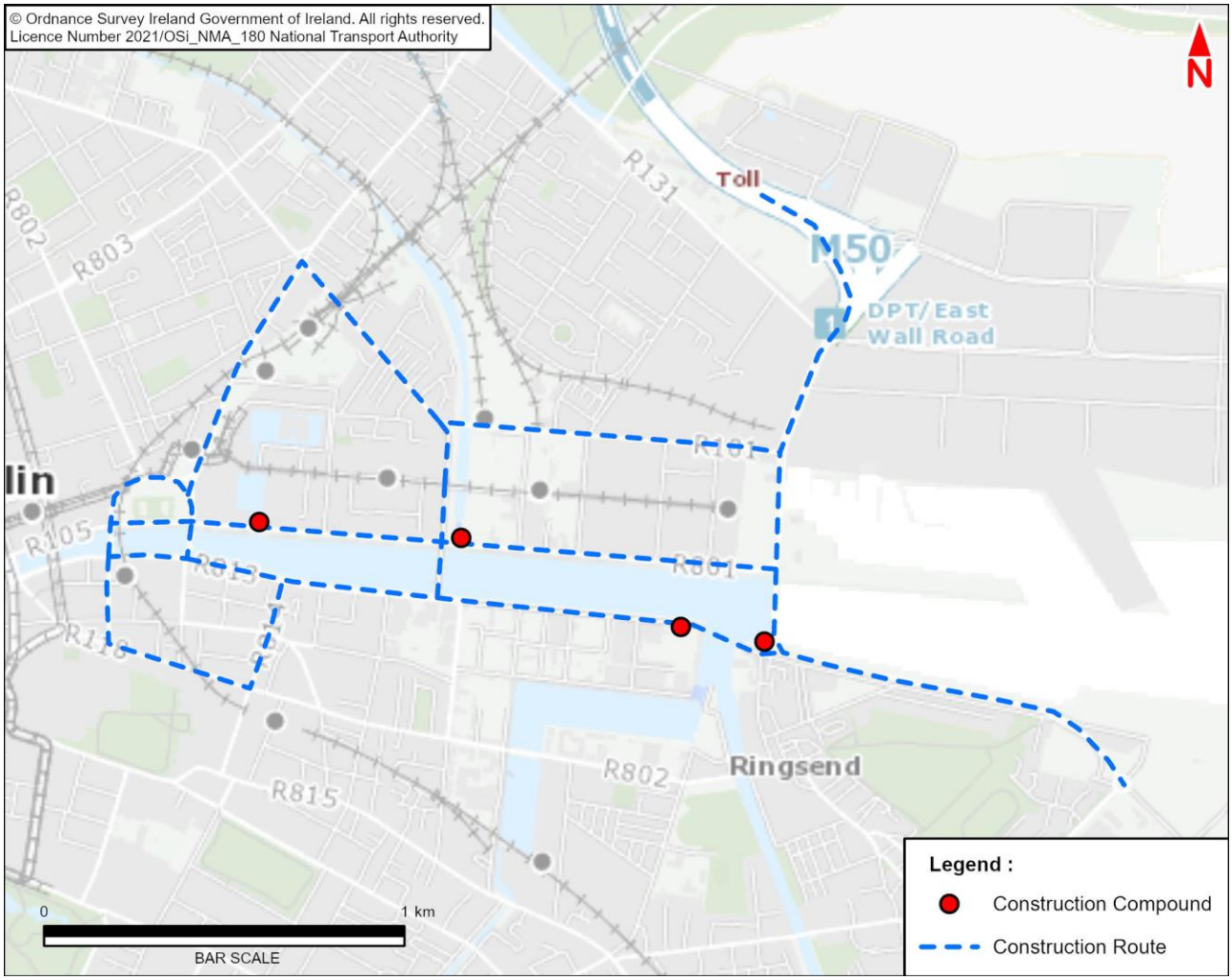

Diagram 6.2: Proposed Construction Routes and Compound Location

6.4.1.4 Potential Construction Impact

6.4.1.4.1 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) of the EIAR and the CEMP (Appendix A5.1 in Volume 4 of the 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 DTTS's 'Traffic Signs Manual, Chapter 8 Temporary Traffic Measures and Signs for Roadworks' and associated guidance. Chapter 5 (Construction) of the EIAR 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.

6.4.1.4.2 Pedestrian Provisions

As described in Chapter 5 (Construction) of the EIAR, 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 work 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, provisions for matching existing facilities for pedestrians. Due consideration will also be given to the need for temporary ramps, and measures for accessible users, where changes in elevation are temporarily introduced to facilitate works and footpath diversions. Entrance points to the construction zone will be controlled as required.

6.4.1.4.3 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, and where practicable, provisions for matching existing facilities for cyclists will be made.

6.4.1.4.4 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 the EIAR. Wherever practicable, bus services will be prioritised over general traffic. However, the temporary closure of sections of existing dedicated bus lanes may be required to facilitate the construction of new bus priority infrastructure that is being developed as part of the Proposed Scheme. It is also likely that some existing bus stop locations may need to be temporarily relocated to accommodate the works. In such cases operational bus stops will be safely accessible to all users.

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.

6.4.1.4.5 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.

6.4.1.4.6 General Traffic

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

6.4.1.4.6.1 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. 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 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.

Table 6.1 below presents the assessment of key junctions along the diversion route for the AM peak hour for the construction year scenario.

Table 6.1: 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
			<85%	85% - 100%	>100%	<85%	85% - 100%	>100%	
Amiens Street	Negligible	Amiens Street / Portland Row / North Strand Road / Seville Place			✓			✓	Low
Seville Place	Negligible	Seville Place / Sheriff Street Upper / Guild Street	✓				✓		Low
Memorial Road	Negligible	Memorial Road / Custom House Quay		✓			✓		Negligible
East Wall Road	Negligible	East Wall Road / Sheriff Street Upper	✓			✓			Negligible
Sheriff Street Upper	Low	New Wapping Street / East Road / Sheriff Street Upper	✓			✓			Negligible

Table 6.2 below presents the assessment of key junctions along the diversion route for the PM peak hour for the construction year scenario.

Table 6.2: 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
			<85%	85% - 100%	>100%	<85%	85% - 100%	>100%	
Amiens Street	Negligible	Amiens Street / Portland Row / North Strand Road / Seville Place		✓		✓			Low Positive
Seville Place	Negligible	Seville Place / Sheriff Street Upper / Guild Street	✓			✓			Negligible
Memorial Road	Negligible	Memorial Road / Custom House Quay		✓		✓			Low Positive
East Wall Road	Negligible	East Wall Road / Sheriff Street Upper	✓			✓			Negligible
Sheriff Street Upper	Low	New Wapping Street / East Road / Sheriff Street Upper		✓		✓			Low Positive

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 6.3 below.

Table 6.3: Selected Journey Times Construction Phase

Journey Time (in Minutes)	AM	PM
Route 1 (Existing westbound route) – Westbound on North Wall Quay from Tom Clarke Bridge to Talbot Memorial Bridge (Distance 1.6km)	4.5	4.2
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)	8.2	6.7
Difference	**3.8**	**2.6**

The results indicate that the travel time for the maximum travel distance via the diversion route will result in an increase of 3.8 and 2.6 mins 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.

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 medium 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.

6.4.1.4.6.2 Construction Traffic Generation

Site Operatives: 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 the 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 the 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 6.4 outline the anticipated maximum construction traffic generation by site operatives and HGVs during the AM and PM Peak Hours.

Table 6.4: 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 **Medium Negative impact**. Therefore, no further analysis is required for the purpose of this assessment.

It should be noted that further detail on the restrictions to construction vehicle movements during the peak periods of the day will be contained within the appointed contractor's CTMP prior to construction.

6.4.1.5 Construction Phase Summary

The contents of Table 6.5 present a summary of the potential impacts of the Proposed Scheme during Construction Phase.

Table 6.5: Summary of Construction Phase Potential Impacts

Assessment Topic	Effect	Potential Impact
Walking	Restrictions to pedestrians along Proposed Scheme.	Low Negative
Cycling	Restrictions to cyclists along Proposed Scheme	Medium Negative
Bus	Restrictions to public transport along Proposed Scheme.	Medium Negative
Parking and Loading	Restrictions to parking / loading along Proposed Scheme.	Low Negative
General Traffic	Restrictions to general traffic along Proposed Scheme	Medium Negative
	Additional construction traffic flows upon surrounding road network	Medium Negative

6.5 Operational Phase

6.5.1 Overview

As previously noted, 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 movements) impact analysis, which are outlined in the following sections.

6.5.2 Qualitative Assessment

6.5.2.1 Qualitative Assessment Methodology

The structure of the qualitative assessment is consistent with the Baseline Environment (Section 5) 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.

6.5.2.1.1 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 potential impact on pedestrians has been assessed using a set of criteria, which has been derived from a set of industry standards and guidance listed in Section 3. Table 6.6 outlines the assessment criteria for each junction.

Table 6.6: 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 and road markings for pedestrians (including able-bodied, wheelchair users, mobility impaired and pushchairs)?
Widths	Are there adequate footpath and crossing widths in accordance with national standards?

A LoS rating has been applied to each junction for both the Do Minimum and Do Something scenarios based on whether the above indicators have been met. Table 6.7 displays the LoS rating based on the number of indicators met.

Table 6.7: 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 6.8 have been used to describe the potential impact, based on the changes in the Qualitative Pedestrian LoS rating.

Table 6.8: 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

6.5.2.1.2 Cycling Infrastructure

The potential 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 (NTA, 2011) have been adapted for use in assessing the cycling qualitative impact along the Proposed Scheme. The refined cycling facilities criteria are as follows:

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

Table 6.9 outlines the assessment criteria with reference to the corresponding LoS ratings.

Table 6.9: 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 6.10 have been used to describe the potential impact, based on the changes in the Qualitative Cycling LoS rating.

Table 6.10: Description of Impact for Cycling Qualitative Assessment

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

6.5.2.1.3 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; 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 6.11.

Table 6.11: Magnitude of Impact for Bus Users Qualitative Assessment

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

6.5.2.1.4 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.

Impact 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.

6.5.2.1.5 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.

6.5.2.1.5.1 Pedestrian Infrastructure

The key infrastructural changes to the pedestrian link along Section 1 and 2 of the Proposed Scheme are the following:

- 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 pinchpoints 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 facilities at the junctions along Section 1 and 2 of the Proposed Scheme are summarised in Table 6.12. A detailed breakdown of the assessment at each impacted junction, including a list of the junctions which experience no change, can be found in TIA Appendix 4.1 (Pedestrian Infrastructure Assessment).

Table 6.12: Section 1 & 2 – Significance of Effects for Pedestrian Impact during Operational Phase

Junctions	Chainage	Do Minimum LoS	Do Something LoS	Impact
R801 Custom House Quay / R802 Talbot Memorial Bridge / R802 Memorial Bridge	A1600 – A1700	B	A	Low Positive
R801 Custom House Quay / Commons Street / R801 North Wall Quay	A1225 – A1275	A	B	Low Negative
R801 North Wall Quay / Salesforce Tower Site Access	A625 – A650	E	B	Medium Positive
R801 North Wall Quay / Castleforbes Road	A300 – A350	B	A	Low Positive
R813 City Quay / R814 Lombard Street East	B10250 – B10300	C	A	Medium Positive
R813 Sir John Rogerson's Quay / Lime Street	B10550 – B10600	C	B	Low Positive
R813 Sir John Rogerson's Quay / R813 Cardiff Lane / Sir John Rogerson's Quay	B10750 – B10800	C	B	Low Positive
Sir John Rogerson's Quay / Asgard Road	B11000 – B11050	C	B	Low Positive
Sir John Rogerson's Quay / Blood Stoney Road	B11050 – B11100	C	A	Medium Positive
Sir John Rogerson's Quay / Britain Quay	B11150 – B11200	C	B	Low Positive
Sir John Rogerson's Quay / Benson Street	B11250 – B11300	C	B	Low Positive
Section Summary		**C**	**B**	**Low Positive**

The contents of Table 6.12 demonstrate that the Proposed Scheme will have a positive 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 6.6. 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.

Overall, it is anticipated that there will be **Low Positive** impact 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.

6.5.2.1.5.2 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 6.13, along with the accompanying sensitivity for each section and the resultant significance of impact.

The key cycling improvements 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 6.13 outline the cycling qualitative assessment along Section 1 and 2 of the Proposed Scheme, which sets out the overall Do Minimum LoS and the Do Something LoS and the description of impact. Please refer to TIA Appendix 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 6.13: Section 1 &2 – Cycling Impact during Operational Phase

Location	Chainage	Do Minimum LoS	Do Something LoS	Impact
Talbot Memorial Bridge: R801 Custom House Quay to R813 City Quay	A1613 – B10000	C	A	Medium Positive
R801 Custom House Quay and R801 North Wall Quay: Talbot Memorial Bridge to Samuel Beckett Bridge	A1613 – A900	C	A	Medium Positive
Samuel Beckett Bridge: R801 North Wall Quay to R813 Sir John Rogerson's Quay	A900 – B10700	B	B	Negligible
R801 North Wall Quay: Samuel Beckett Bridge to Tom Clarke Bridge	A900 – A0	C	A	Medium Positive
R813 City Quay and R813 Sir John Rogerson's Quay: Talbot Memorial Bridge to Samuel Beckett Bridge	B10000 – B10750	A	A	Negligible
R183 Sir John Rogerson's Quay: Samuel Beckett Bridge to Forbes Street	B10750 – B10950	C	A	Medium Positive
R183 Sir John Rogerson's Quay: Forbes Street to River Dodder	B10950 – B11427	B	A	Low Positive
Section Summary		**B**	**A**	**Low Positive**

The contents of Table 6.13 demonstrate that the Proposed Scheme will have a positive impact 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. 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.

Overall, it is anticipated that there will be **Low Positive** impact to the quality of the cycling infrastructure along Section 1 and 2 of the Proposed Scheme, during the Operational Phase. The Proposed Scheme provides a betterment to the existing cycling infrastructure which, in the Do Minimum scores an overall B. Due to the relatively good existing cycling infrastructure, this impact is considered to be Low.

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 **High Positive** impact.

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'.

6.5.2.1.5.3 Bus Infrastructure

This section provides an assessment of the changes in the quality of bus stop infrastructure provision as a result of the Proposed Scheme along Section 1 and 2, including upgrades and any relocations. Any relocations of bus stops which need to be carried through to the EIAR for significance assessment are identified.

There are currently 10 bus stops along Section 1 & 2 of the Proposed Scheme. Table 6.14 presents a summary of the changes in the number and location of bus and coach stops along Section 1 & 2 of the Proposed Scheme.

Table 6.14: Section 1 & 2 – Overview of Amendments to Bus / Coach Stop Locations

Direction	Stop	Chainage	Do Something	Comment
Outbound	2498	A1540	Retained	Stop 2498 to be retained
Inbound	6252	A1400	Retained	Stop 6252 to be retained
Outbound	2499	A1320	Retained	Stop 2499 to be retained
Inbound	N / A	A1230	New	New inbound coach stop proposed
Outbound	7216	A1040	Rationalised	Existing stop 7216 to be combined with stop 2500
Outbound	2500	A1000	Retained	Stop 2500 to be retained
Inbound	7397	A1000	Relocated	Stop 7397 to be moved approximately 60m to the east of the existing location
Inbound	N / A	A825	New	New inbound coach stop proposed
Inbound	7398	A780	Relocated	Stop 7398 to be moved approximately 50m to the east of existing location
Outbound	2501	A755	Relocated	Stop 2501 to be moved approximately 145m to the west of the existing location
Inbound	7611	A610	Rationalised	Stop 7611 to be combined with stop 7398

Direction	Stop	Chainage	Do Something	Comment
Inbound	N / A	A460	New	New inbound coach stop proposed
Outbound	N / A	A455	New	New outbound coach stop proposed
Outbound	7623	A140	Relocated	Stop 7623 to be moved approximately 40m to the east of the existing location and to be replaced as a coach stop.
Inbound	N / A	A100	New	New inbound coach stop proposed
Inbound	N / A	B10149	New	New inbound bus stop proposed
Inbound	N / A	B10610	New	New inbound bus stop proposed
Inbound	N / A	B10845	New	New inbound bus stop proposed
Outbound	N / A	B10870	New	New outbound bus stop proposed
Outbound	N / A	B11200	New	New outbound bus stop proposed
Inbound	N / A	B11245	New	New inbound bus stop proposed

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.

Table 6.15 provides a summary of the improvements to the bus stop infrastructure (excluding coach stops) along Section 1 & 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 6.15 Section 1 & 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 to the south are proposed within bus lanes.

Bus Stop Facility	Do Minimum		Do Something		Comment
	No. of Stops	Percentage of Stops	No. of Stops	Percentage of Stops	
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.

Table 6.15 indicates that there are significant improvements to the bus stop facilities along Section 1 & 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 stops 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 stop 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 6.15, 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 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.

6.5.2.1.5.4 Parking and Loading

The proposals will impact on existing parking along Section 1 & 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;
- 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;
- 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;
- 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. Rear building deliveries to Home Building Finance Ireland can be provided via the private road of Slate Street;
- 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. Surrounding paid off-street parking is available approximately 600m to the west (Euro Car Parks Convention Centre) and 700m to the north-east (Euro Car Parks Point Square);
- 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. Surrounding paid off-street parking is available at Euro Car Parks Convention Centre and Euro Car Parks Point Square and there are nearby 20 parking spaces along the adjacent North Wall Avenue; 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. Surrounding paid off-street parking is available and there are 20 parking spaces along the adjacent North Wall Avenue.

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. Surrounding parking is available on the adjacent Cardiff Lane (11 spaces) and Forbes Street (21 spaces);
- 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. It is proposed to retain wider surrounding parking is available on adjacent roads such as Forbes Street (21 spaces) and Blood Stoney Road (11 spaces);
- 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 and parking on adjacent roads such as Blood Stoney Road (11 spaces) will be retained;
- 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. Parking is available on adjacent roads such as Blood Stoney Road (11 spaces) and on Benson Street (26 spaces);
- 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. It is proposed to retain fourteen designated paid parking spaces approximately 80m to the west of the discussed parking spaces and wider surrounding parking is available on Benson Street (26 spaces); 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 contents of

Table 6.16 present a summary of the proposed changes to parking along Section 1 & 2 of the Proposed Scheme.

Table 6.16: Section 1 & 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 6.16, 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 **Low Negative impact.** 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.

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

6.5.2.1.6.1 Pedestrian Infrastructure

The key infrastructure changes to 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 facilities at the junctions along Section 3 of the Proposed Scheme are summarised in Table 6.17. A detailed breakdown of the assessment at each impacted junction, including a list of the junctions which experience no change, can be found in TIA Appendix 4.1 (Pedestrian Infrastructure Assessment).

Table 6.17: Section 3 – Significance of Effects for Pedestrian Impact during Operational Phase

Junctions	Chainage	Do Minimum LoS	Do Something LoS	Impact
York Road / Pembroke Cottages	E0025 – E0075	C	B	Low Positive
Pembroke Cottages / Cambridge Road / Cambridge Park	F50150 – F50200	D	A	Medium Positive
Ringsend Park shared path / Irishtown Stadium	F50660 – F50680	B	A	Low Positive
Pedestrian path / Kerlogue Road	F50760 – F50780	C	A	Medium Positive
Bayview / R131 Sean Moore Road / Beach Road	F50880 – F50920	D	B	Medium Positive
R131 Sean Moore Road / Beach Road (south-westbound)	F50950 - F51000	D	B	Medium Positive
Section Summary		**C**	**B**	**Low Positive**

Table 6.17 demonstrates 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 6.6. 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 **Low Positive** impact 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.

6.5.2.1.6.2 Cycling Infrastructure

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;
- A quiet cycle route, on which cyclists will share priority with vehicular traffic, is proposed along the existing carriageways of York Road and Pigeon House Road providing a link to the R131 Sean Moore Road Roundabout, as well as on the existing carriageways of Pembroke Cottages and Cambridge Park providing a link to Ringsend Park;
- Proposed access amendments for cyclists between Cambridge Park (road) and Ringsend Park (park) through the provision of a cycle gate and dropped kerbs;
- A proposed 4.0m wide shared use route for pedestrians and cyclists extending along the western edge of Ringsend Park between Cambridge Park and Irishtown Stadium (approximately 0.4km in length);
- A proposed 3.0m wide shared use route for pedestrians and cyclists extending between Strand Street and Bremen Road alongside the Irishtown Athletics Stadium; and
- A proposed 3.0m wide two-way cycle track between Strand Street and R131 Sean Moore Road with a toucan crossing at the R131 Sean Moore Road / R802 Bayview junction and raised tables at the R131 Sean Moore Road / R802 Beach Road junction.

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

The contents of Table 6.18 outline the cycling qualitative assessment along Section 3 of the Proposed Scheme, with reference to the accompanying sensitivity for each section and the resultant Significance of Impact. A detailed breakdown of the assessment along each section can be found in TIA Appendix 4.2 (Cycling Infrastructure Assessment).

Table 6.18: Section 3 – Cycling Impact during Operational Phase

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

The contents of Table 6.18 demonstrate that the scheme will have a positive impact 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 the all of 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.

Overall, it is anticipated that there will be **Medium Positive** impact to the quality of the cycling infrastructure along Section 3 of the Proposed Scheme during the Operational Phase. 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'.

6.5.2.1.6.3 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 are proposed along this section therefore, a **Negligible** impact is anticipated.

6.5.2.1.6.4 Parking and Loading

The proposals will have a **Negligible** impact on existing parking along Section 3 of the Proposed Scheme. 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 6.19 present a summary of the proposed changes to parking along Section 3 of the Proposed Scheme between the Do Minimum and Do Something scenarios.

Table 6.19: 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 6.19, 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 a **Negligible impact**.

6.5.2.1.7 Summary of Corridor-Wide Infrastructure Works

6.5.2.1.7.1 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.

6.5.2.1.7.2 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.

6.5.2.1.7.3 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.

6.5.2.1.7.4 Parking & 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.

6.5.3 Quantitative Assessment

This quantitative assessment has been prepared with reference to the modelling outputs obtained from the four-tiered modelling approach outlined in Section 4.3. 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:
  - Flow changes on the Direct Study Area; and
  - Redistributed flows and Junction Capacity Outputs on the Indirect Study Area.
- Overall Road Network-Wide Performance Indicators
  - Queuing;
  - Total Travel Times;
  - Total Travel Distance; and
  - Average Network Speed.

6.5.3.1 People Movement

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 Do Something 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).

6.5.3.1.1 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.

6.5.3.1.1.1 2028 AM Peak Hour People Movement

Diagram 6.3 illustrates the bi-directional People Movement by mode during the AM Peak Hour in 2028.

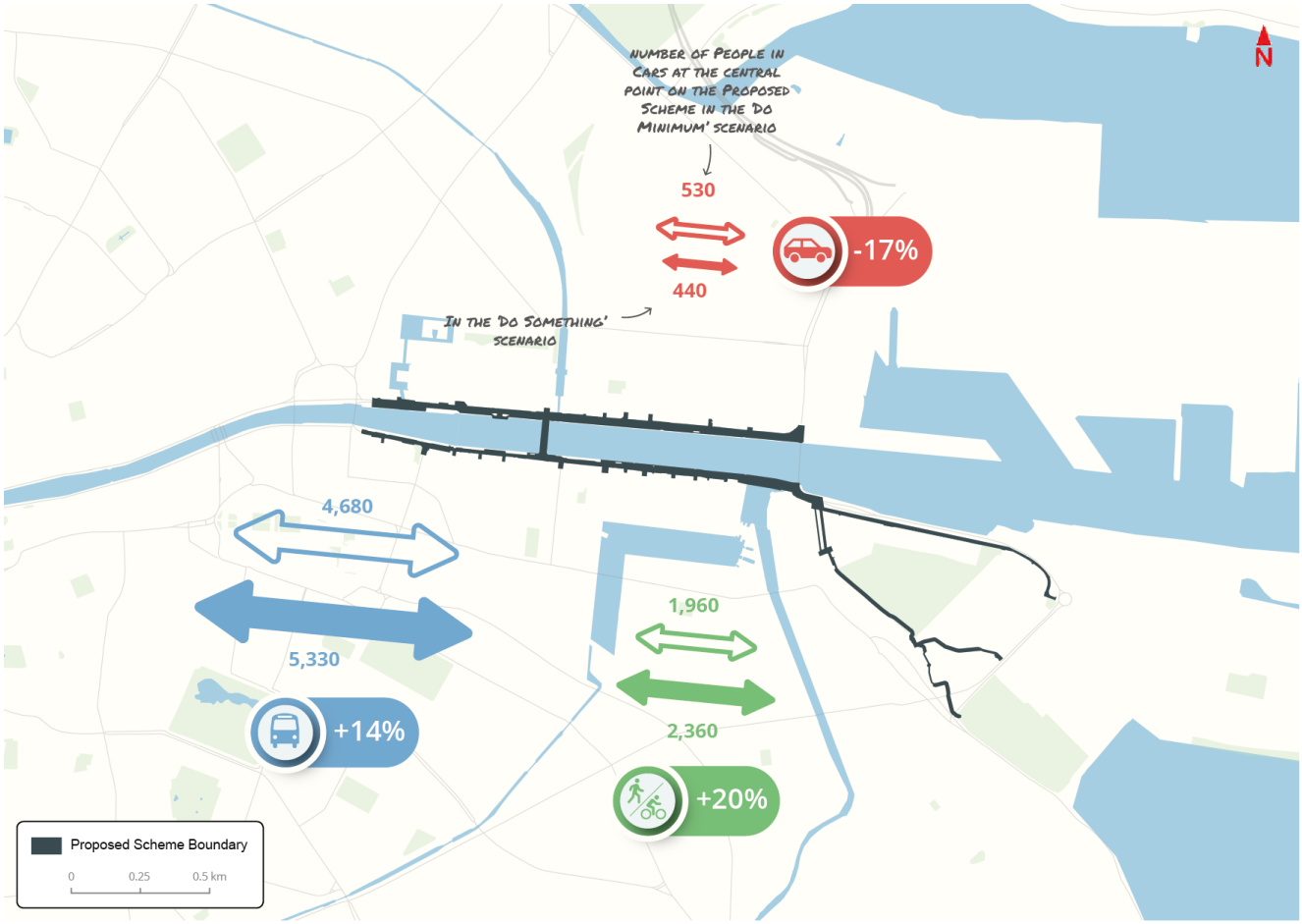

Diagram 6.3: People Movement by Mode travelling along the Proposed Scheme during 2028 AM Peak Hour

As indicated in Diagram 6.3, 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 must 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 6.20 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 6.20: 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%**

6.5.3.1.1.2 2028 PM Peak Hour People Movement

Diagram 6.4 illustrates the bi-directional People Movement by mode during the PM Peak Hour in 2028.

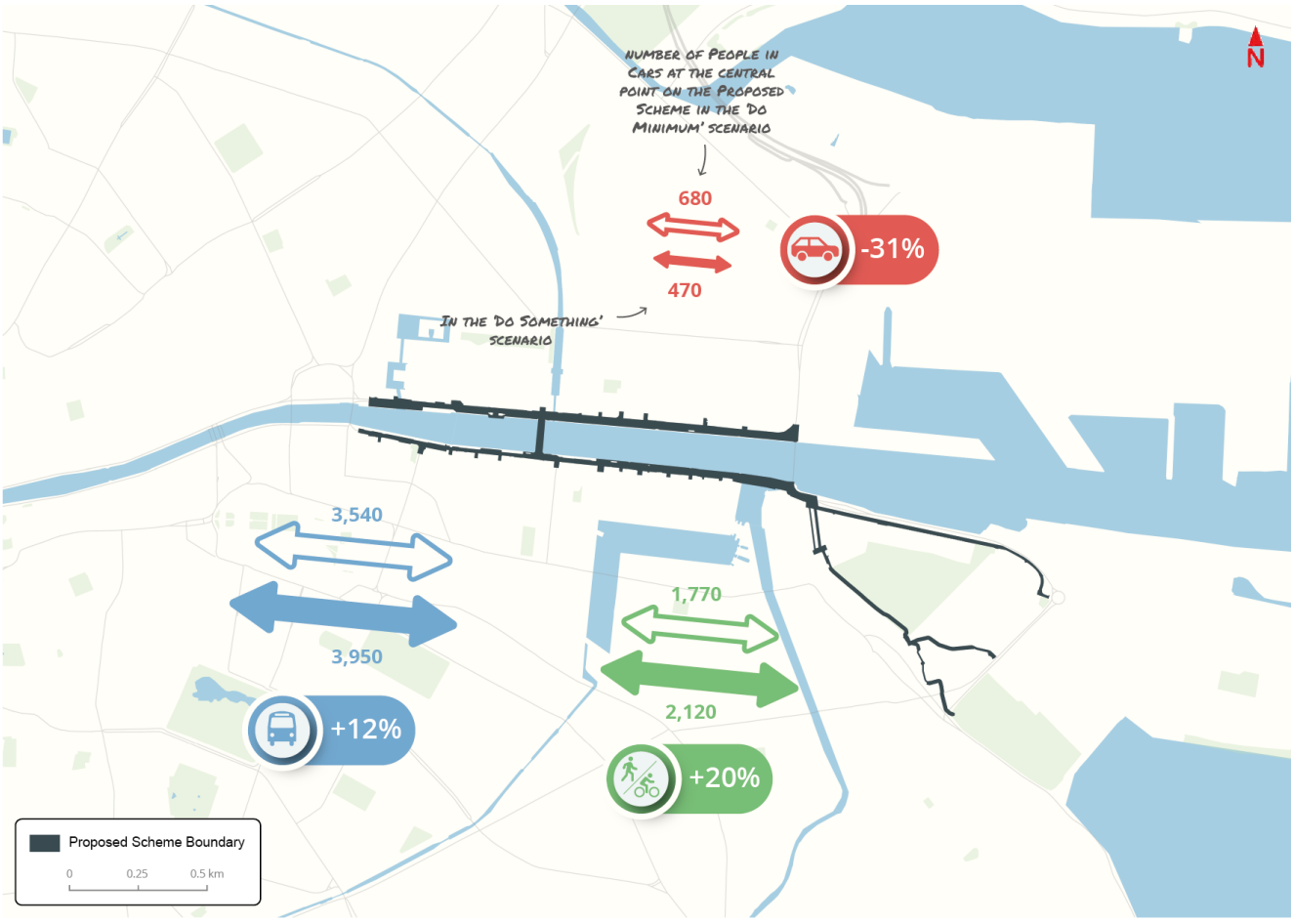

Diagram 6.4: People Movement by Mode travelling along the Proposed Scheme during 2028 PM Peak Hour

As indicated in Diagram 6.4, 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.

Table 6.21 outlines 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 6.21: 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%**

6.5.3.1.1.3 2043 AM Peak Hour People Movement

Diagram 6.5 illustrates the bi-directional People Movement by mode during the AM Peak Hour in 2043.

Diagram 6.5: People Movement by Mode travelling along the Proposed Scheme during 2043 AM Peak Hour

As indicated in Diagram 6.5, 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 6.22 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 21% 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 6.22: 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%**

6.5.3.1.1.4 2043 PM Peak Hour People Movement

Diagram 6.6 illustrates the bi-directional People Movement by mode during the PM Peak Hour in 2043.

Diagram 6.6: People Movement by Mode travelling along the Proposed Scheme during 2043 PM Peak Hour

As indicated in Diagram 6.6, 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 6.23 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 6.23: 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%**

6.5.3.1.2 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.

6.5.3.1.2.1 2028 AM Peak Hour Bus Passengers

Diagram 6.7 and Diagram 6.8 present the passenger loading profile comparing the Do Minimum and Do Something scenarios in the AM Peak Hour in the inbound direction in 2028.

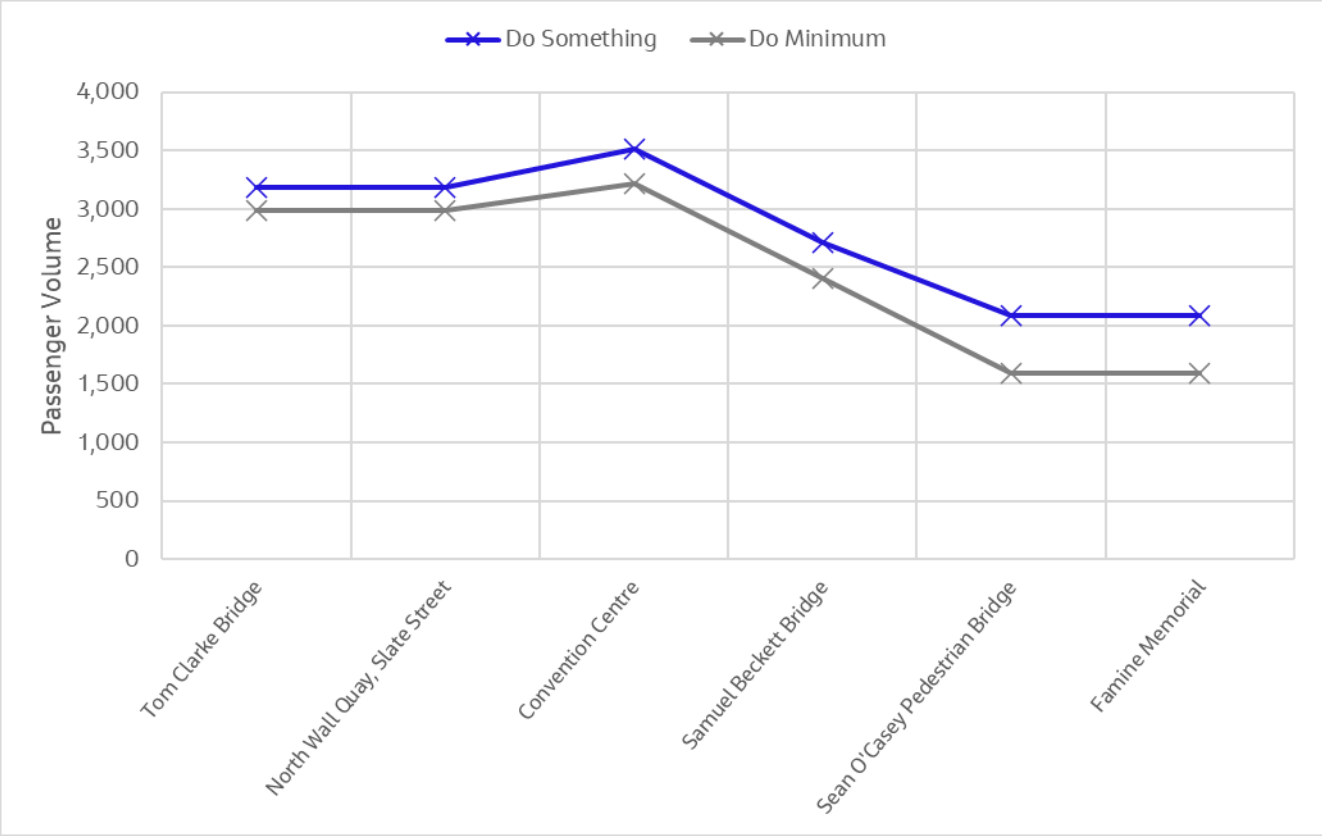

Diagram 6.7: 2028 AM Peak Hour Passenger Volume Along Proposed Scheme (inbound direction - North Quay)

Diagram 6.7 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.

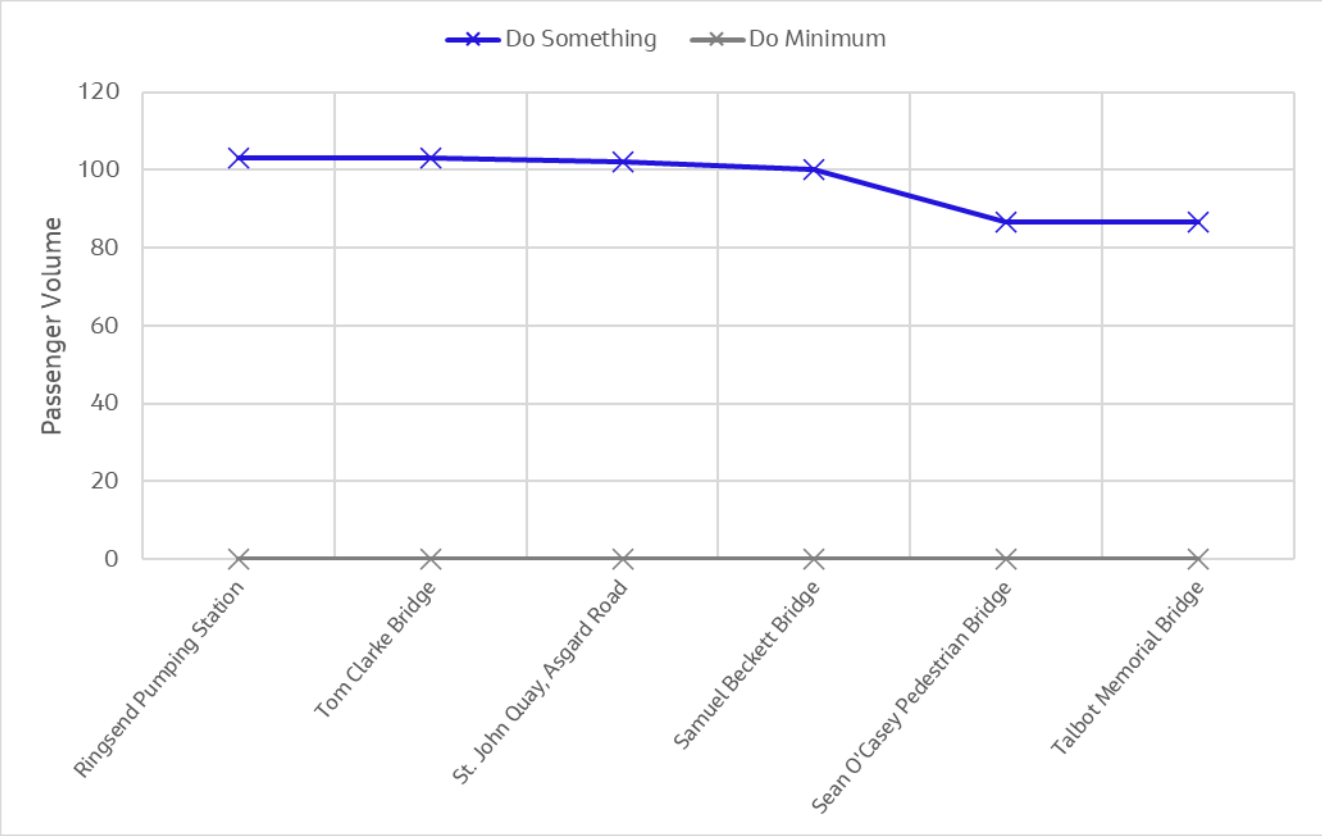

Diagram 6.8: 2028 AM Peak Hour Passenger Volume Along Proposed Scheme (inbound direction - South Quay)

Diagram 6.8 shows a peak in the number of passengers at the eastern end of the 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.

6.5.3.1.2.2 2043 AM Peak Hour Bus Passengers

Diagram 6.9 and Diagram 6.10 present the passenger loading profile comparing the Do Minimum and Do Something scenarios in the AM Peak Hour in the inbound direction in 2043.

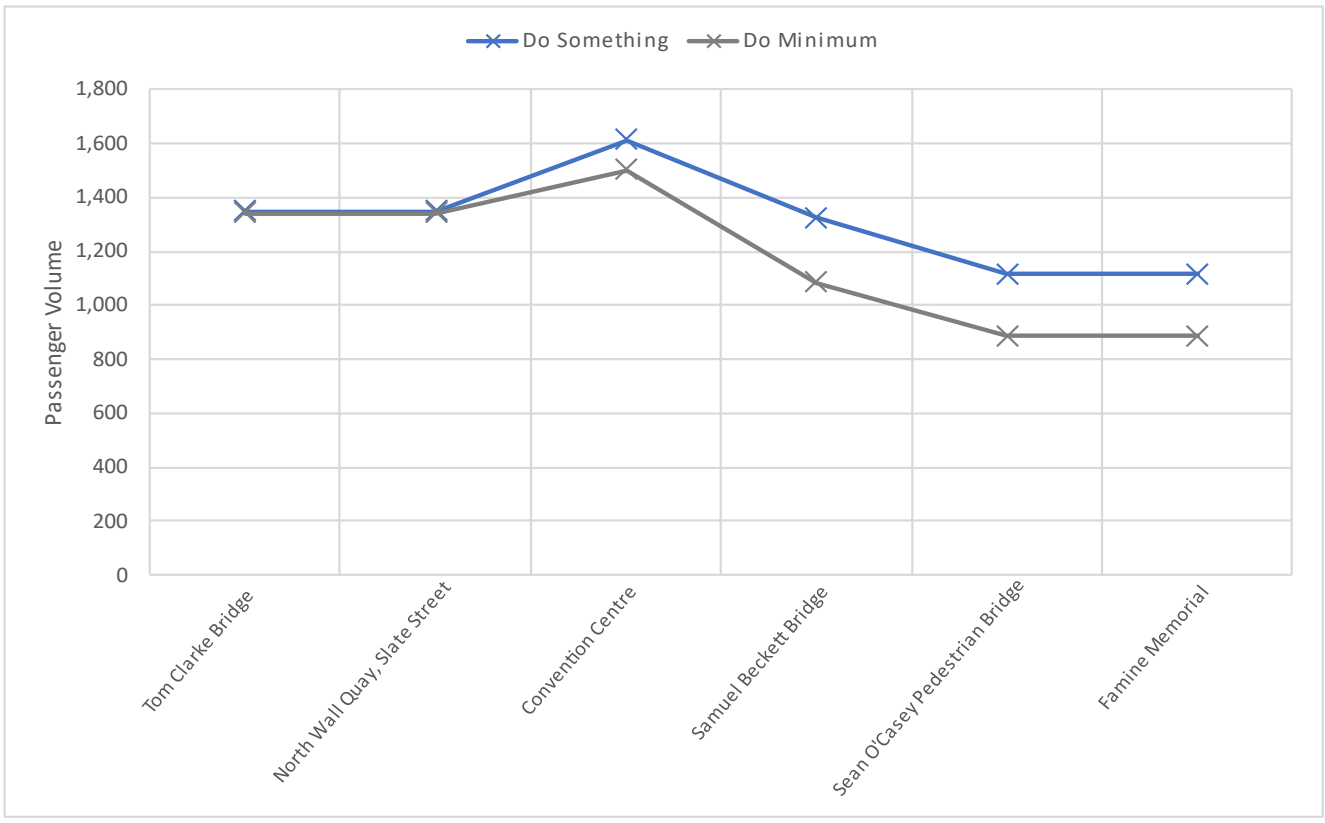

Diagram 6.9: 2043 AM Peak Hour Passenger Volume Along Proposed Scheme (inbound direction - North Quay)

Diagram 6.9 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.

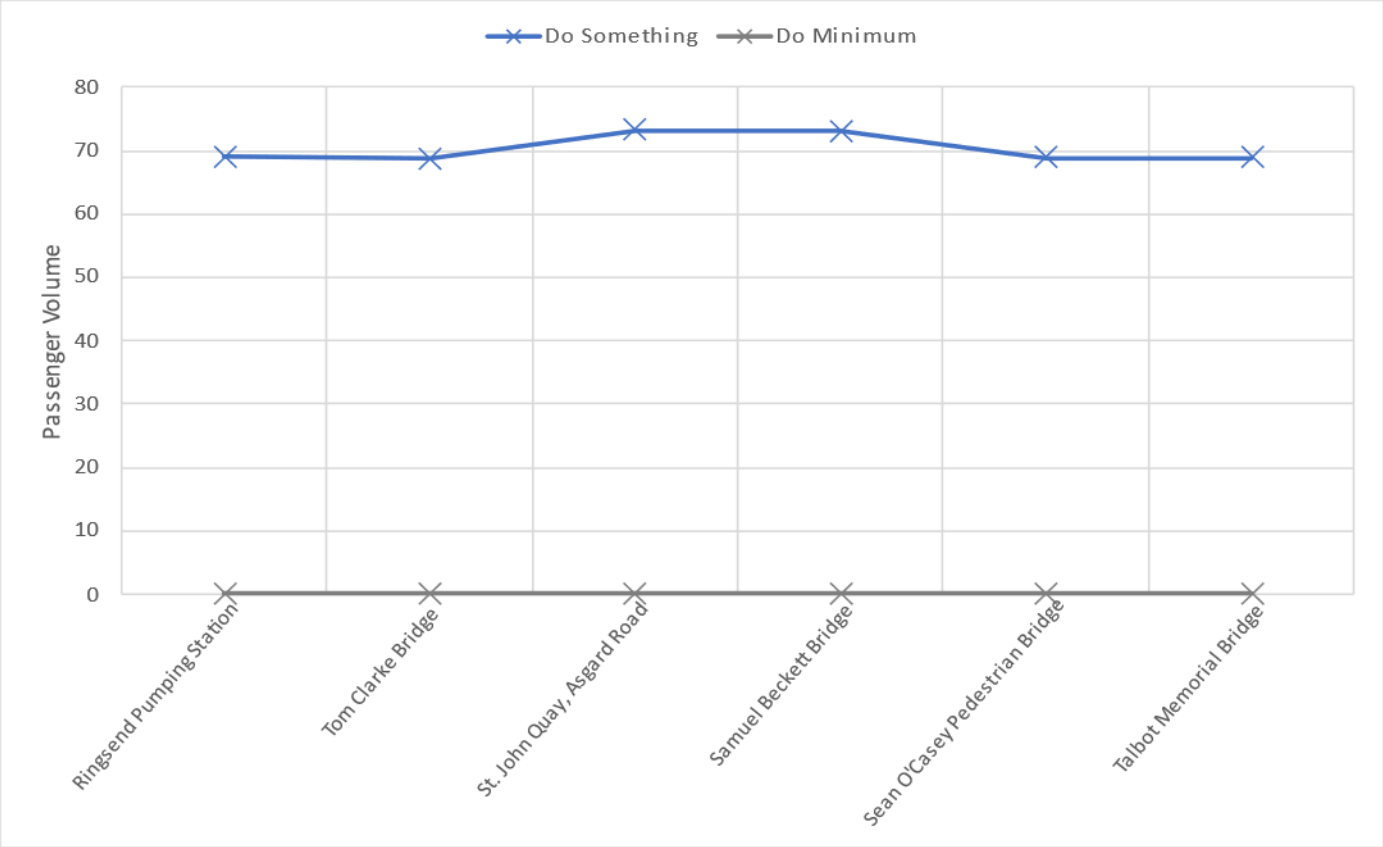

Diagram 6.10: 2043 AM Peak Hour Passenger Volume Along Proposed Scheme (inbound direction - South Quay)

Diagram 6.10 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.

6.5.3.1.2.3 2028 PM Peak Hour Bus Passengers

Diagram 6.11 and Diagram 6.12 present the passenger loading profile comparing the Do Minimum and Do Something scenarios in the PM Peak Hour in the outbound direction in 2028.

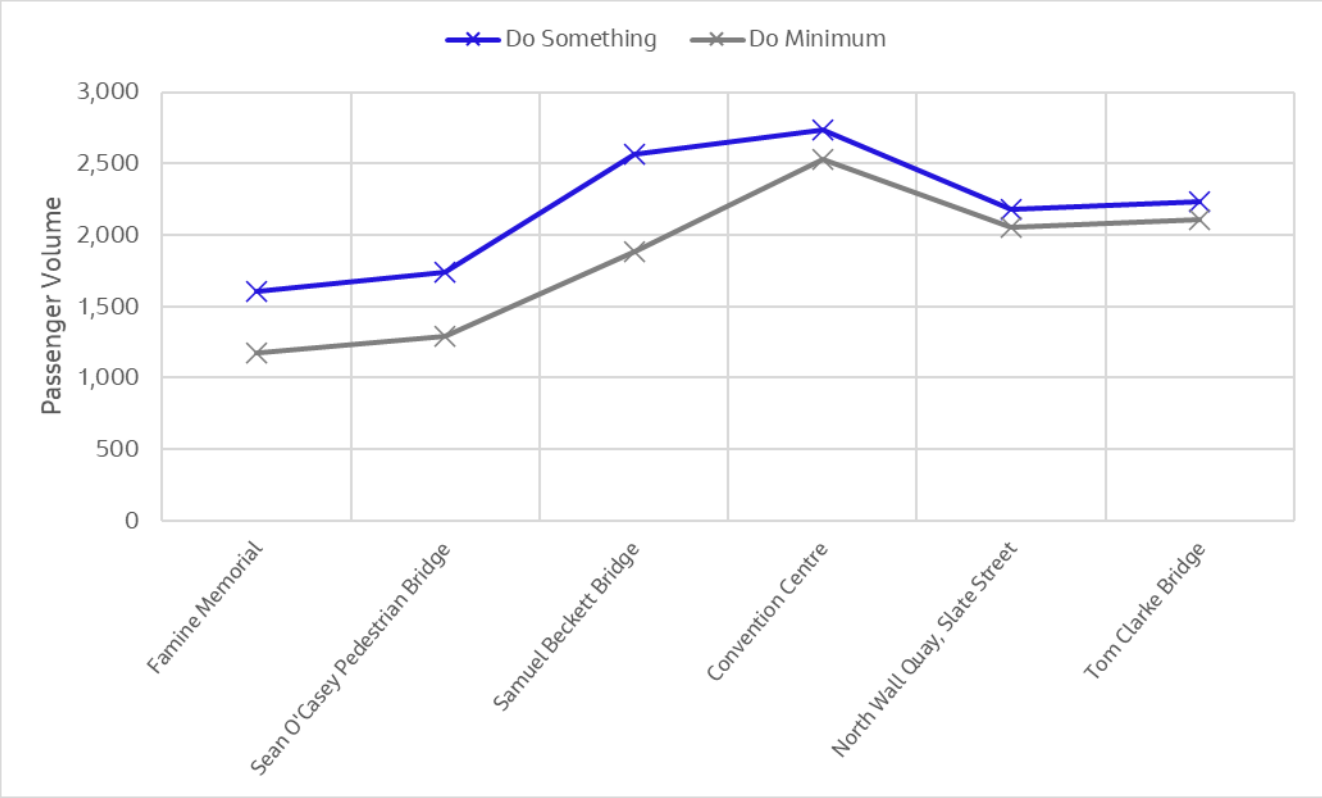

Diagram 6.11: 2028 PM Peak Hour Passenger Volume Along Proposed Scheme (outbound direction - North Quay)

Diagram 6.11 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.

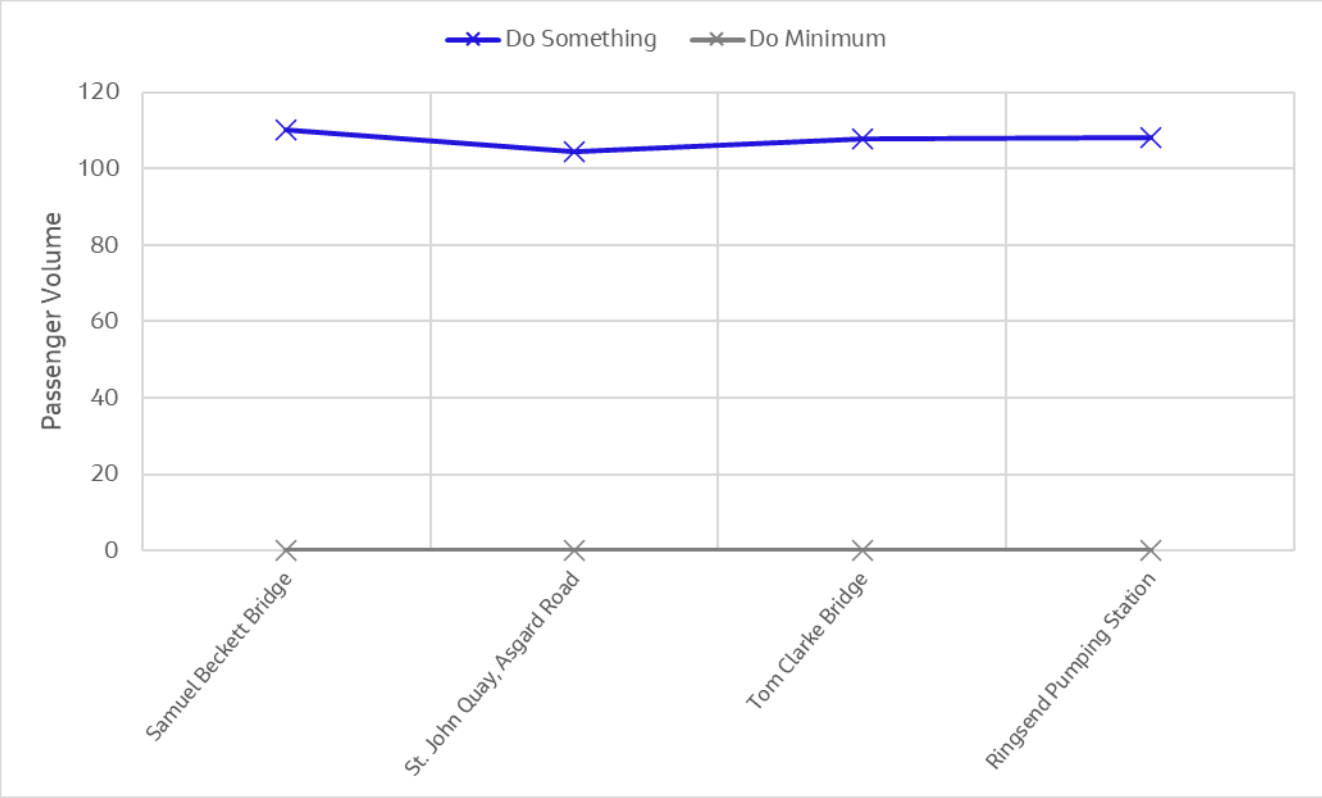

Diagram 6.12: 2028 PM Peak Hour Passenger Volume Along Proposed Scheme (outbound direction - South Quay)

Diagram 6.12 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.

6.5.3.1.2.4 2043 PM Peak Hour Bus Passengers

Diagram 6.13 and

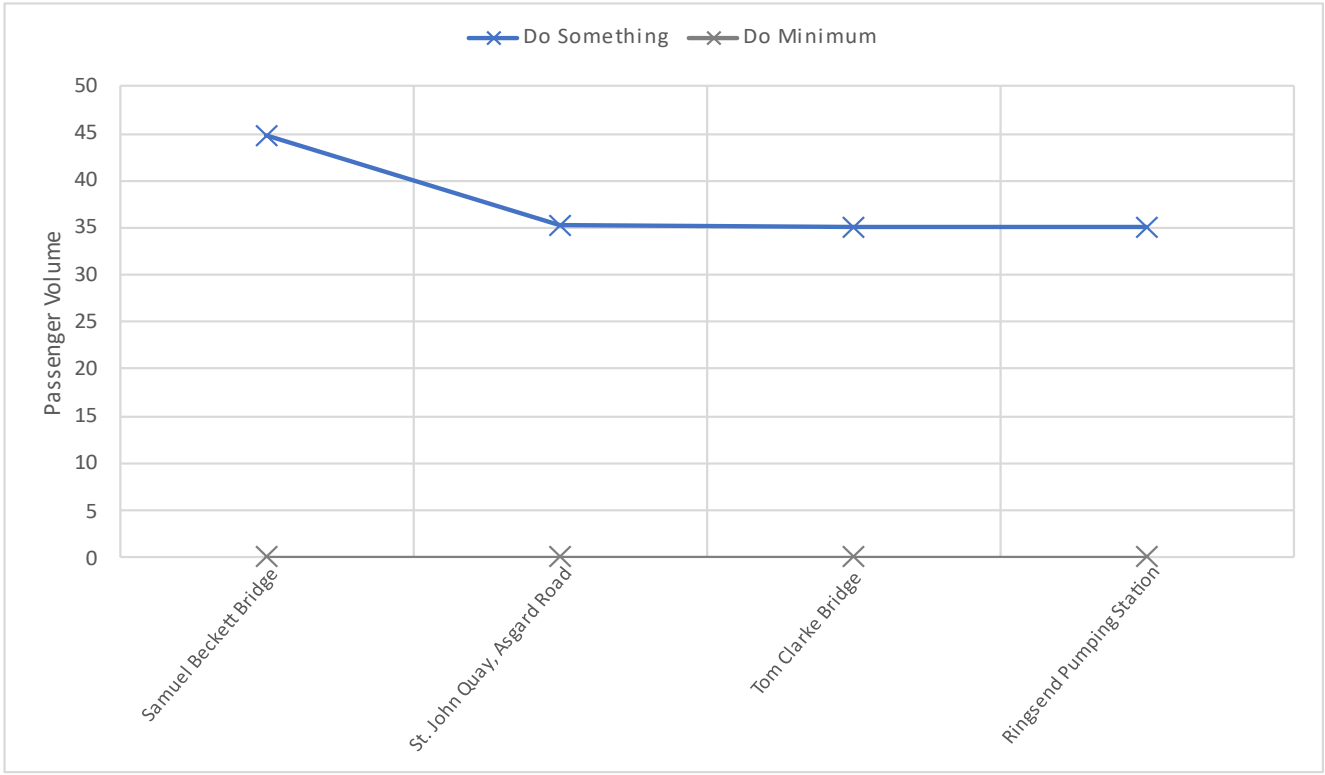

Diagram 6.14 present the passenger loading profile comparing the Do Minimum and Do Something scenarios in the PM Peak Hour in the outbound direction in 2043.

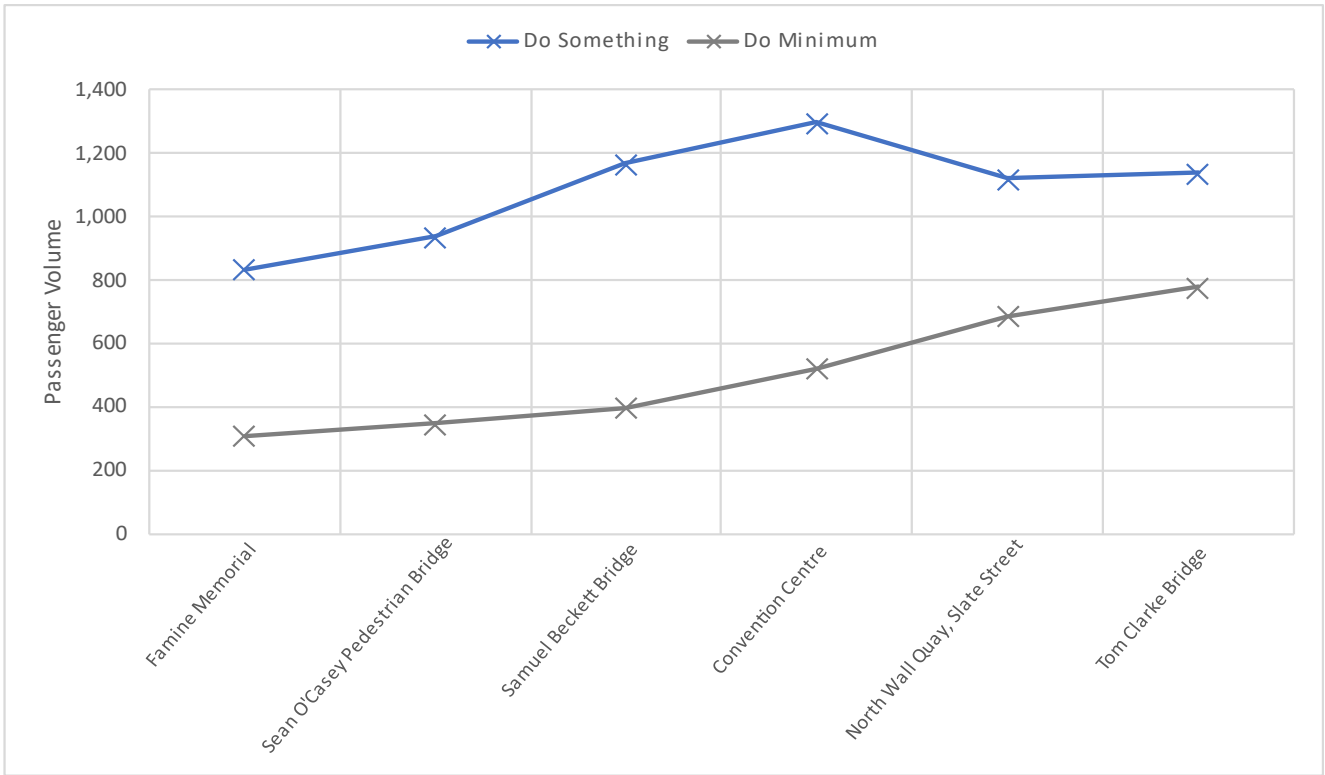

Diagram 6.13: 2043 PM Peak Hour Passenger Volume Along Proposed Scheme (outbound direction - North Quay)

Diagram 6.13 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 approximately 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.

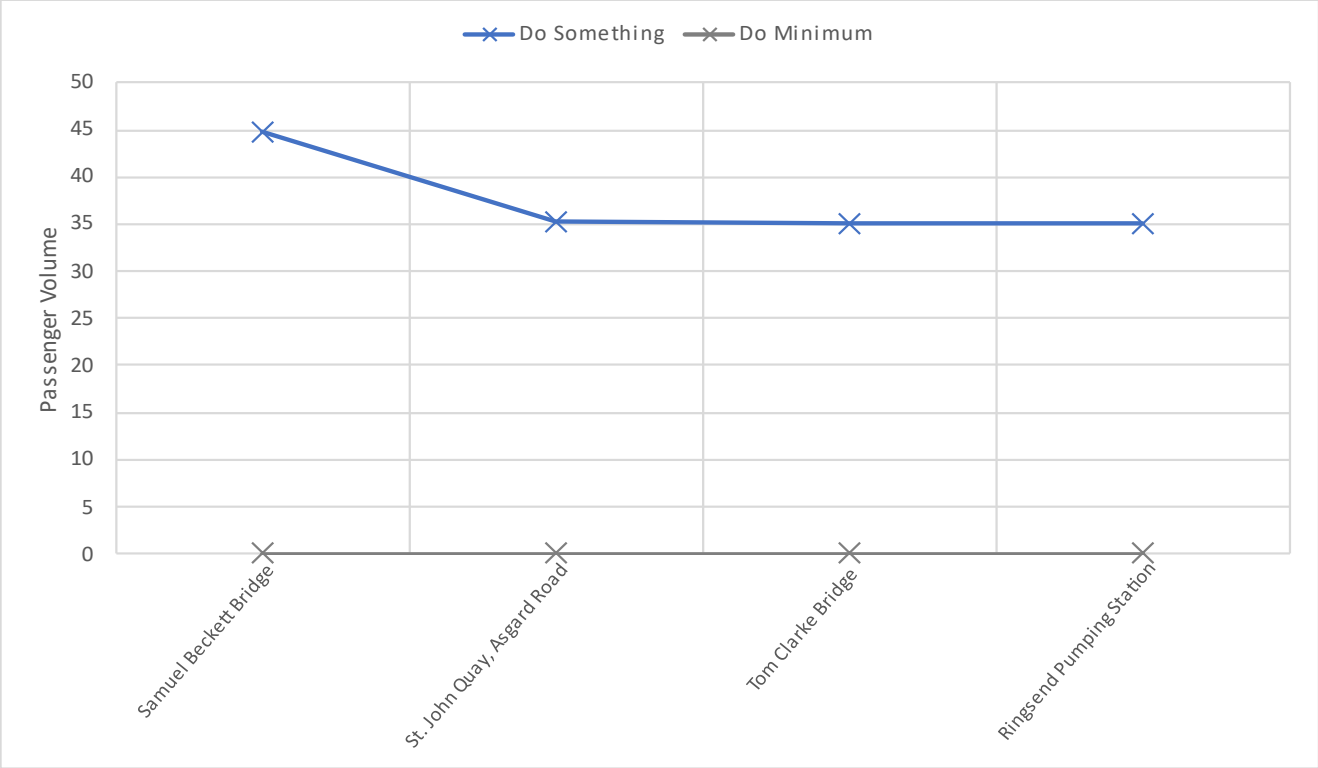

Diagram 6.14: 2043 PM Peak Hour Passenger Volume Along Proposed Scheme (outbound direction - South Quay)

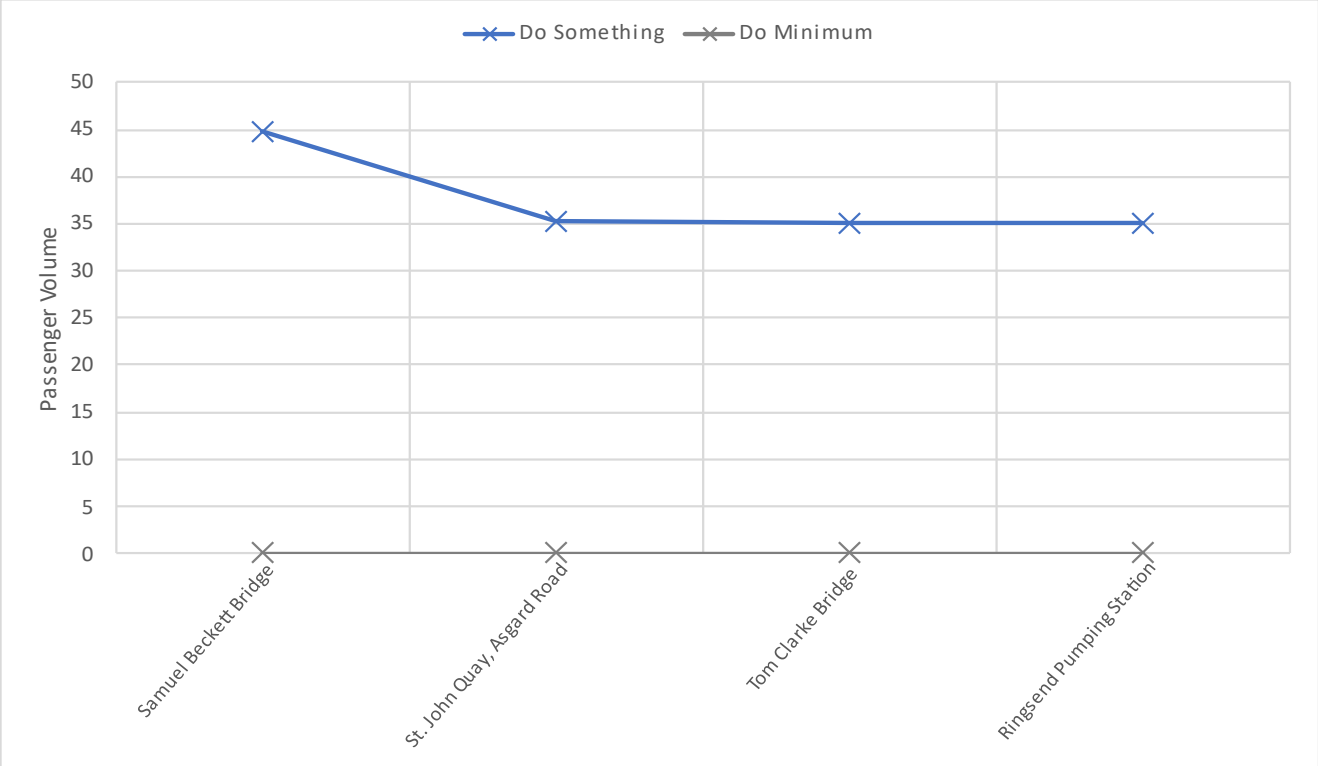

Diagram 6.14 shows a peak in the number of passengers at the eastern end of the Scheme, where the loadings reach approximately 45 passengers in the Do Something scenario. The number of bus passenger is broadly consistent all along the Proposed Scheme with an estimated 35 - 45 new passengers on the corridor, compared to the Do Minimum scenario where no buses run on the South Quay in the outbound direction.

6.5.3.1.2.5 Bus Boardings

Since many bus services commence and end further away from the direct alignment of the Proposed Scheme, an additional assessment has been undertaken to compare the 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 6.24.

Table 6.24: 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	19,960	660	3.4%
PM Peak Hour	13,580	14,010	430	3.2%

The contents of Table 6.24 show that there will be a 3.4% increase in people boarding bus routes which use the Proposed Scheme during the 2028 AM Peak Hour. This represents an addition of 660 passengers in the AM Peak Hour.

In the 2028 PM Peak Hour, there will be a 3.2% increase in people boarding bus routes which use the Proposed Scheme, representing an additional 430 passengers.

The comparison results for the 2043 Design Year scenario are indicated in Table 6.25.

Table 6.25: 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 6.25 show that there will be a 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.

6.5.3.1.3 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 **High Positive** 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 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'.

6.5.3.1.4 Operational Impacts for Bus Passengers and Operators

6.5.3.1.4.1 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.

6.5.3.1.4.2 Bus Journey Time and Reliability - 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 4.3, 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 6.26. 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 6.26: "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 6.27 and Diagram 6.15. 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 6.27: "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
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

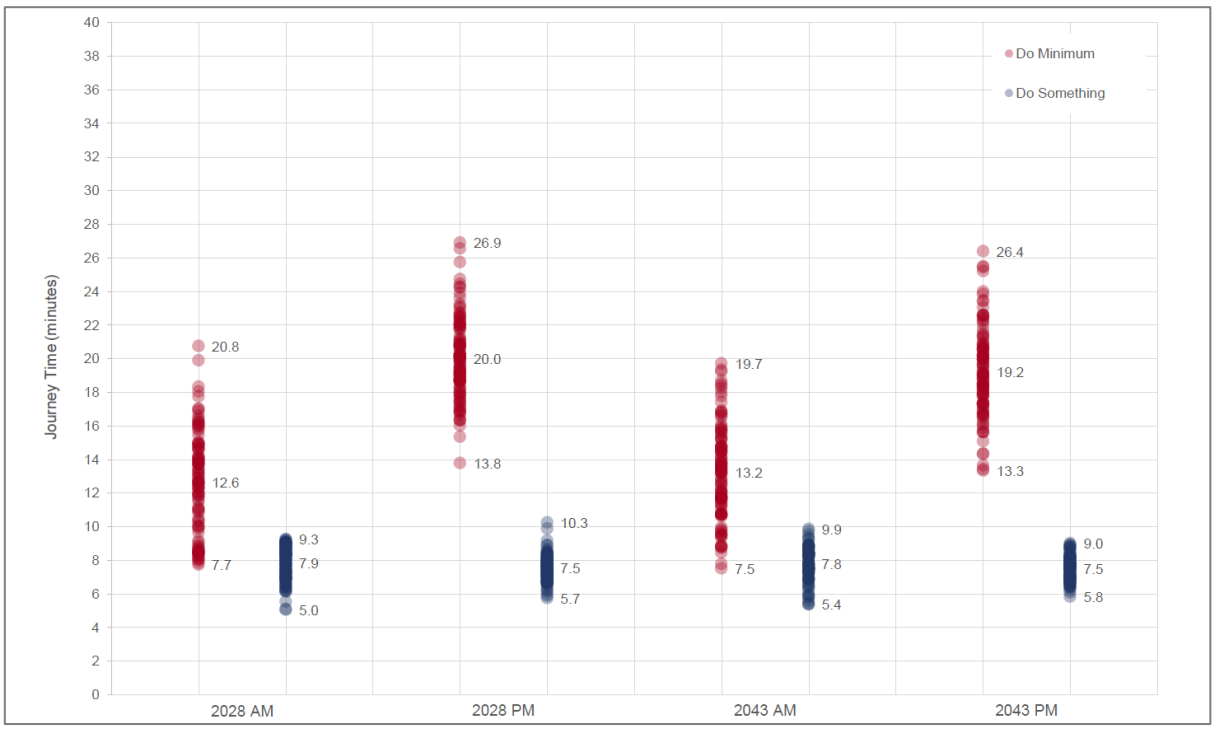

Diagram 6.15: "No Name" Service - Bus Journey Times (Inbound Direction)

Based on the modelling results presented within Table 6.26, 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 6.27 and Diagram 6.15 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 6.16 to Diagram 6.19.

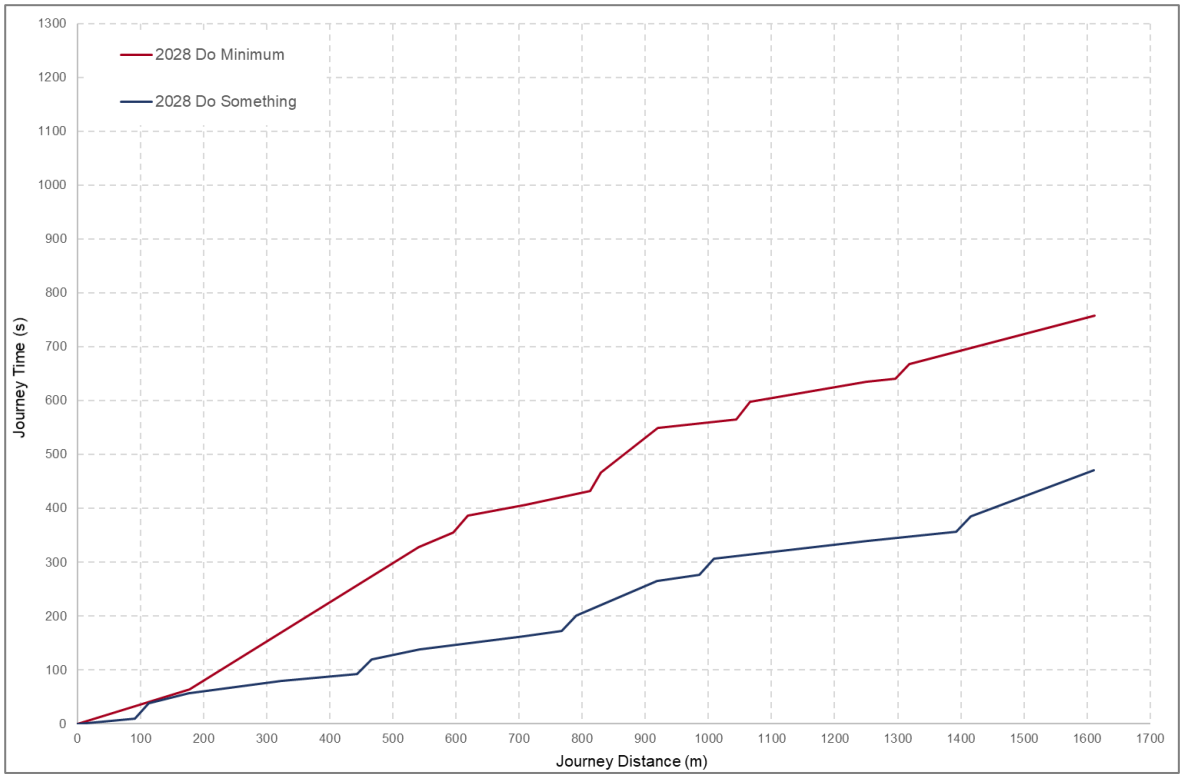

Diagram 6.16: "No Name" Bus Journey Times – North Wall Quay (2028 AM, Inbound)

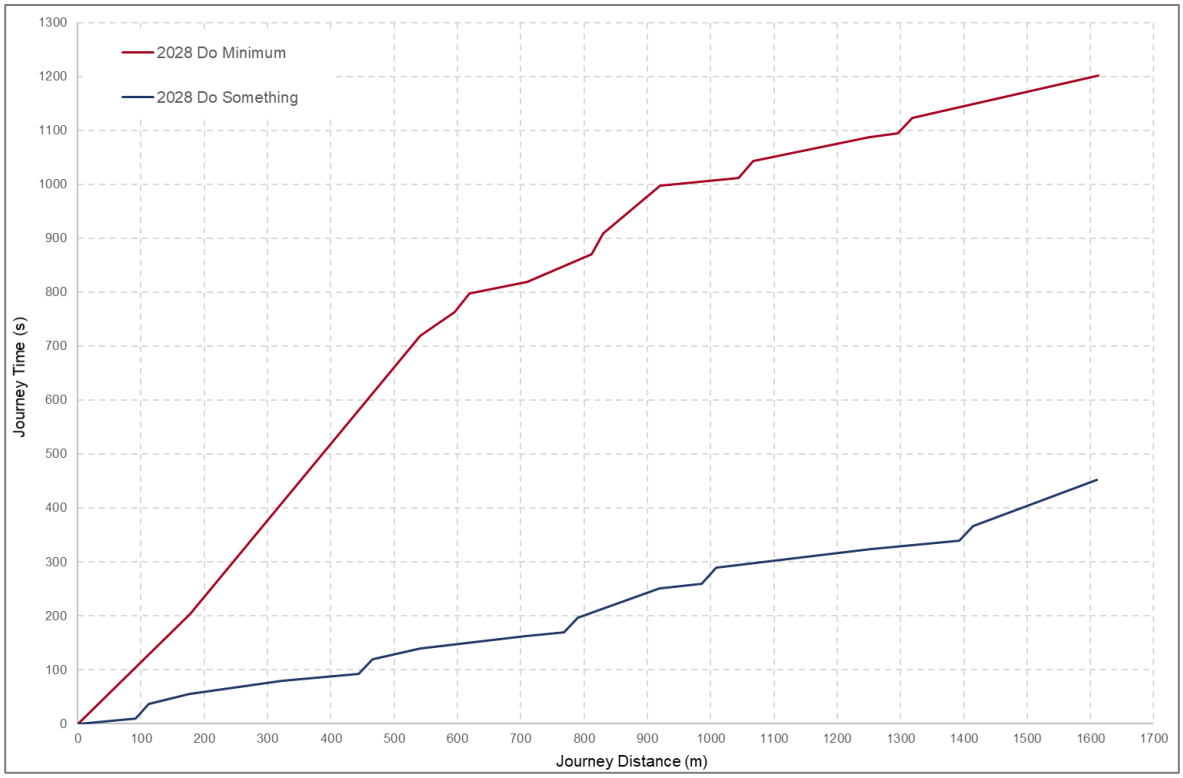

Diagram 6.17: "No Name" Bus Journey Times – North Wall Quay (2028 PM, Inbound)

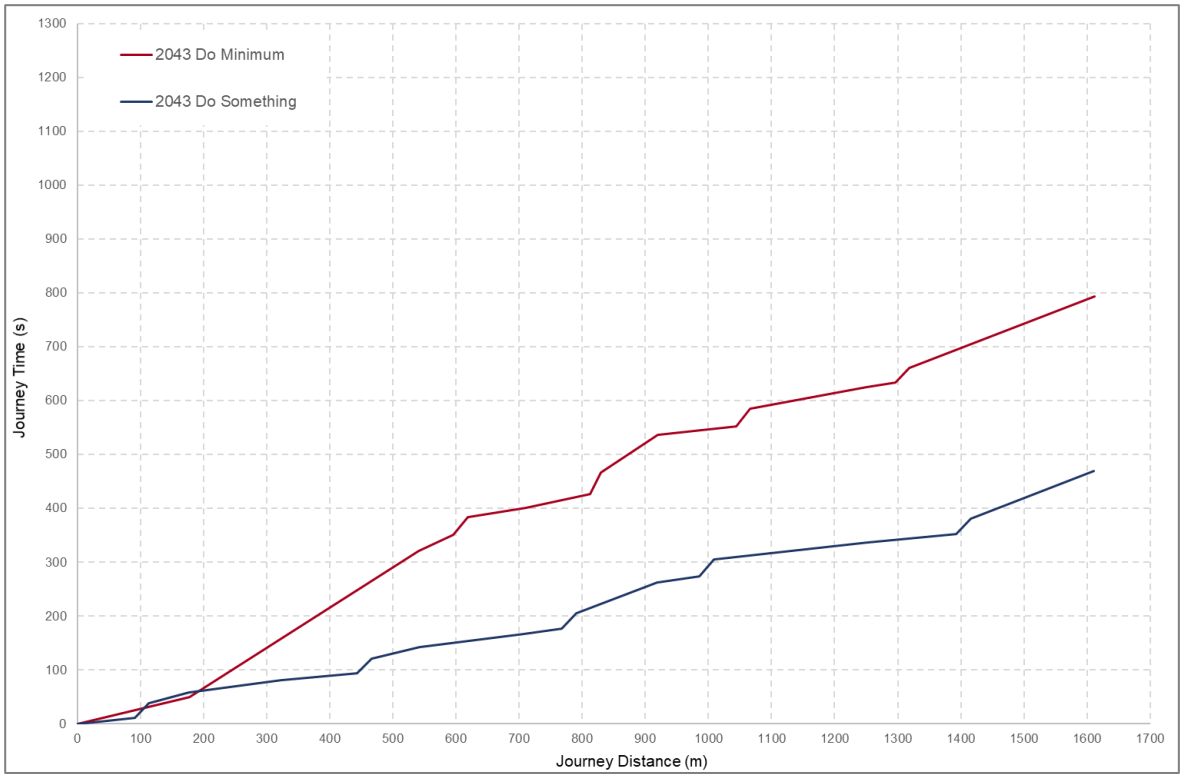

Diagram 6.18: "No Name" Bus Journey Times – North Wall Quay (2043 AM, Inbound)

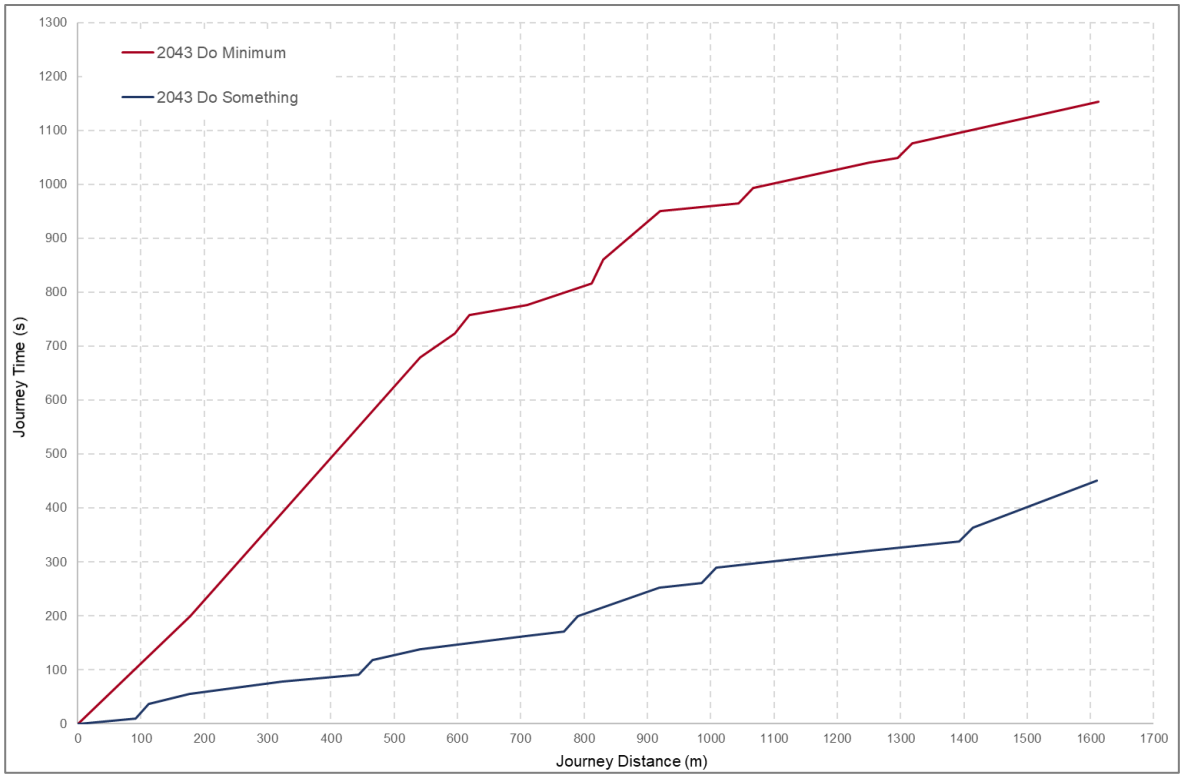

Diagram 6.19: "No Name" Bus Journey Times – North Wall Quay (2043 PM, Inbound)

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 6.28. 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 6.28: "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 6.29 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 6.29: "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

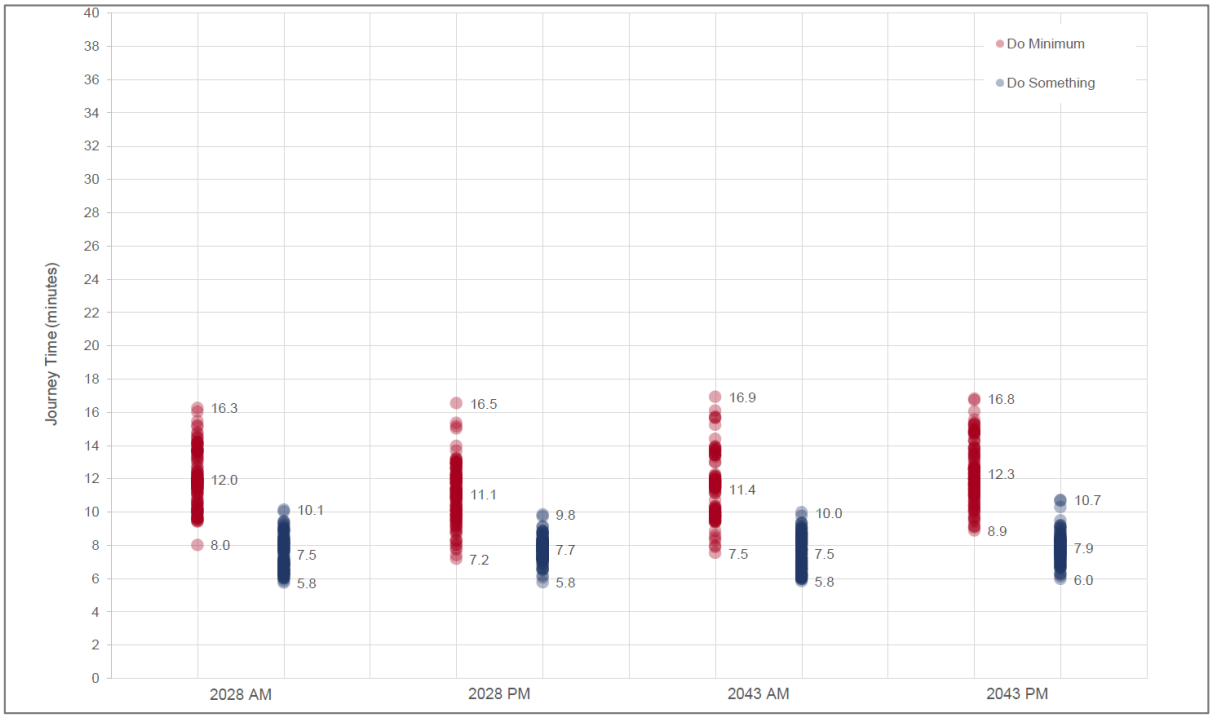

Diagram 6.20: "No Name" Bus Journey Times (Outbound Direction)

Based on the modelling results presented within Table 6.28, 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 6.29 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 outbound “No Name” bus service are also illustrated in the cumulative time-distance graphs shown in Diagram 6.21 to Diagram 6.24.

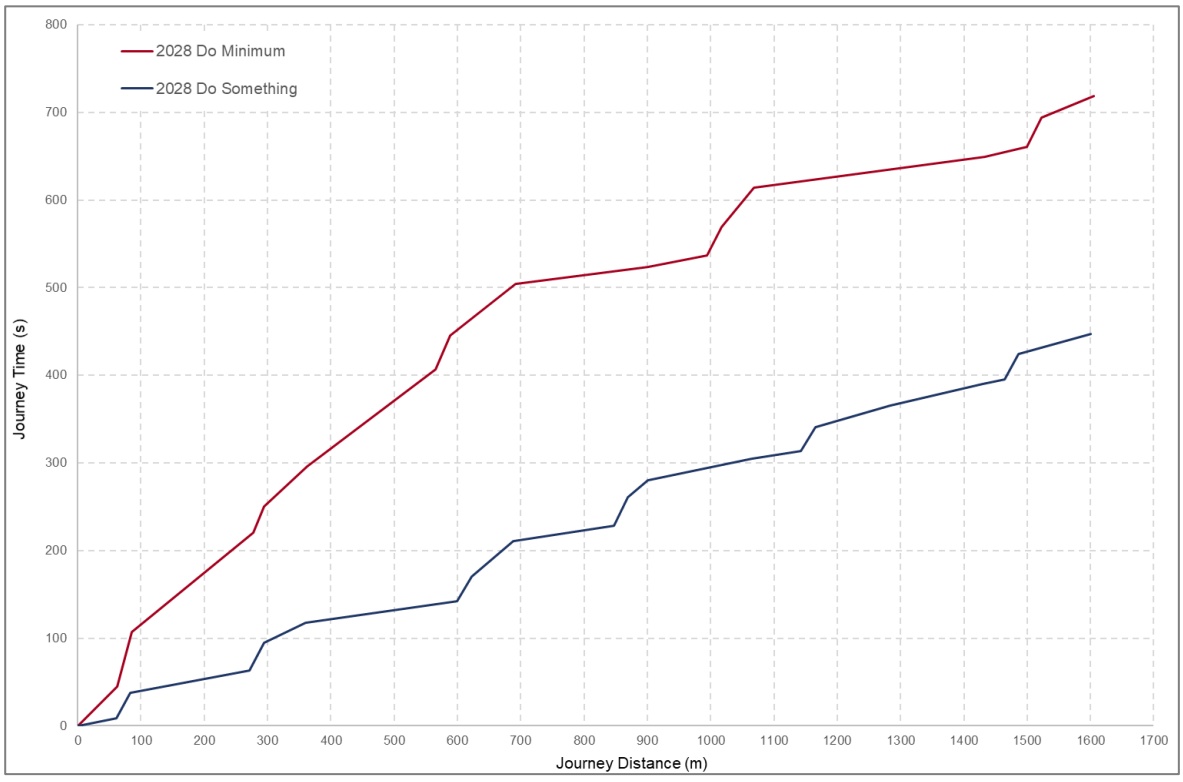

Diagram 6.21: “No Name” Bus Journey Times: North Wall Quay (2028 AM, Outbound)

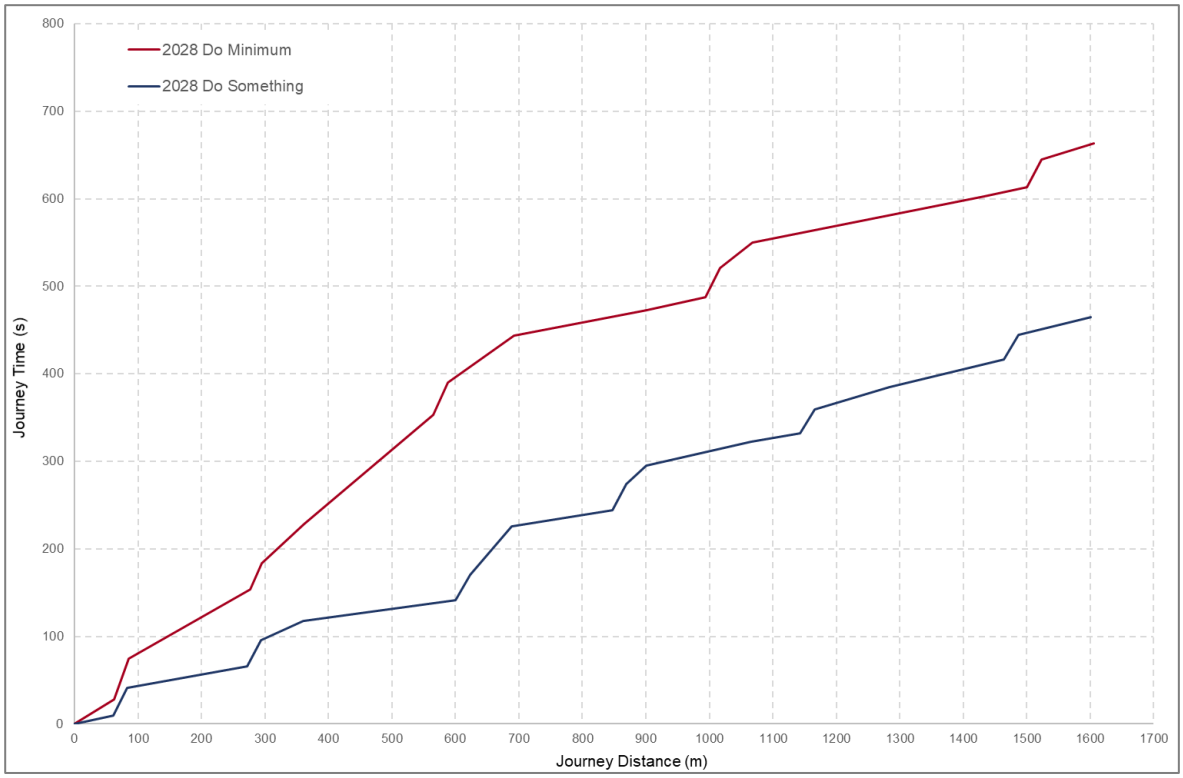

Diagram 6.22: "No Name" Bus Journey Times: North Wall Quay (2028 PM, Outbound)

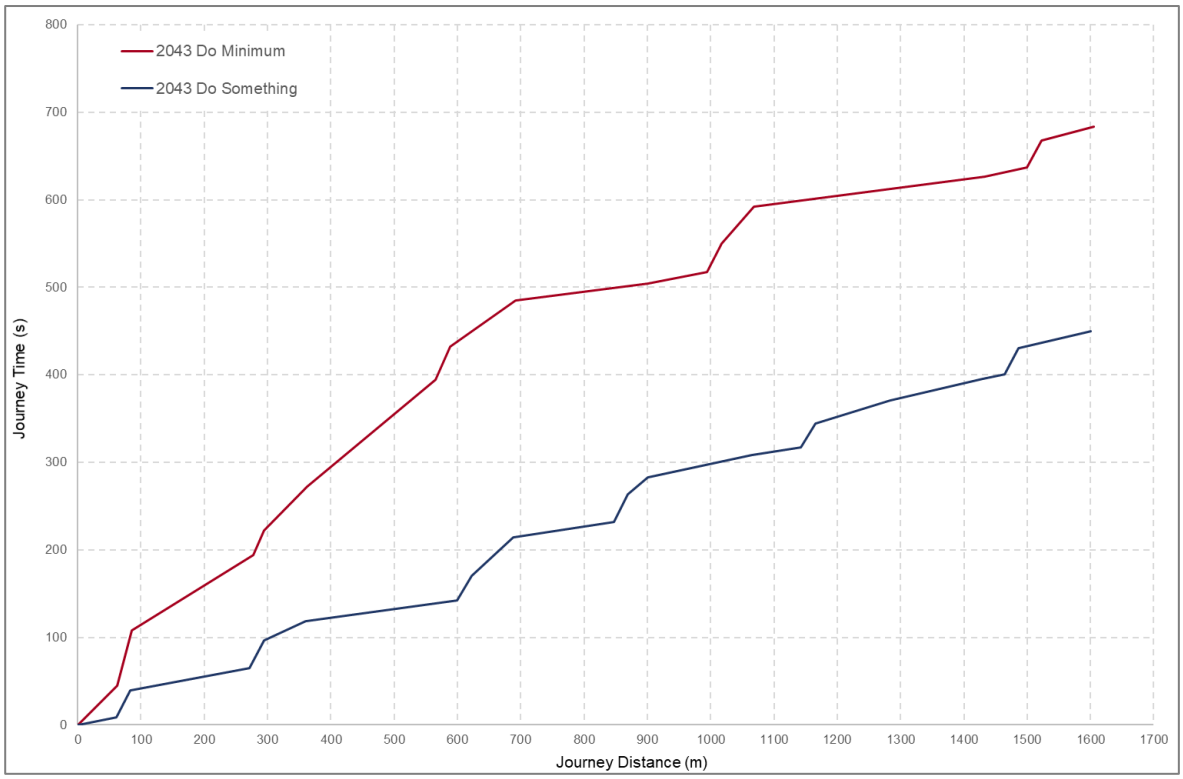

Diagram 6.23: "No Name" Bus Journey Times: North Wall Quay (2043 AM, Outbound)

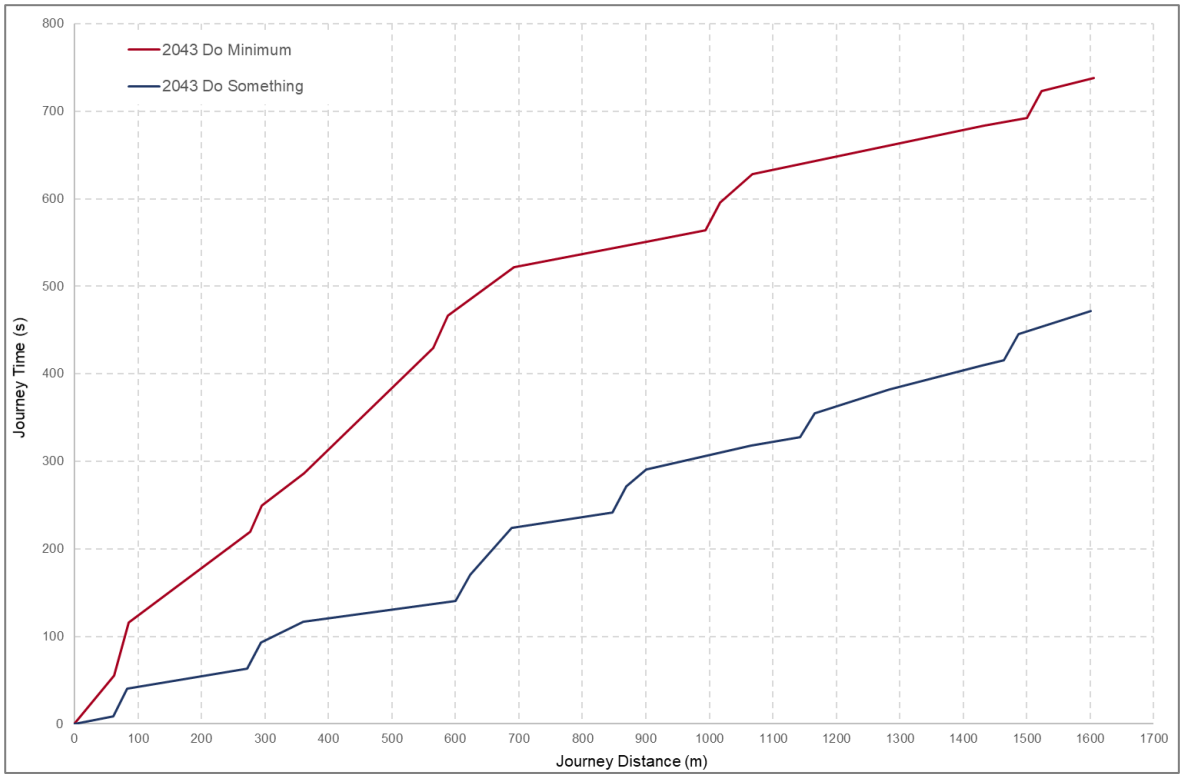

Diagram 6.24: "No Name" Bus Journey Times: North Wall Quay (2043 PM, Outbound)

6.5.3.1.4.3 Total Journey Time Changes for all Proposed Scheme Bus Services

The change in total bus journey time for all buses travelling along the Proposed Scheme, is shown in Table 6.30 in vehicle minutes.

Table 6.30: 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 6.30, 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.

6.5.3.1.5 Bus Users Assessment Summary

The findings of the Bus User assessment shows that the Proposed Scheme fully aligns with the aims and objectives of the CBC Infrastructure Works, to 'Enhance the capacity and potential of the public transport system by improving bus speeds, reliability and punctuality through the provision of bus lanes and other measures to provide priority to bus movement over general traffic movements'.

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

6.5.3.1.6 Increased Bus Frequency - Resilience Sensitivity Analysis

6.5.3.1.6.1 Background

For the purposes of the TIA / EIAR and the transport modelling undertaken, 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 TIA 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.

6.5.3.1.6.2 Resilience Testing

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

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

The bus service frequency, along the busiest section, on the North Quays, in the 2028 Do Minimum model and in the 2028 Do Something Resilience testing models is outlined in Table 6.31.

Table 6.31: 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 6.32 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 6.32: "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	12.6	12.7	+1%	7.9	8.0	+1%
2028 PM	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 6.25. The diagram displays the maximum, minimum and average journey times for the "No Name" bus services modelled.

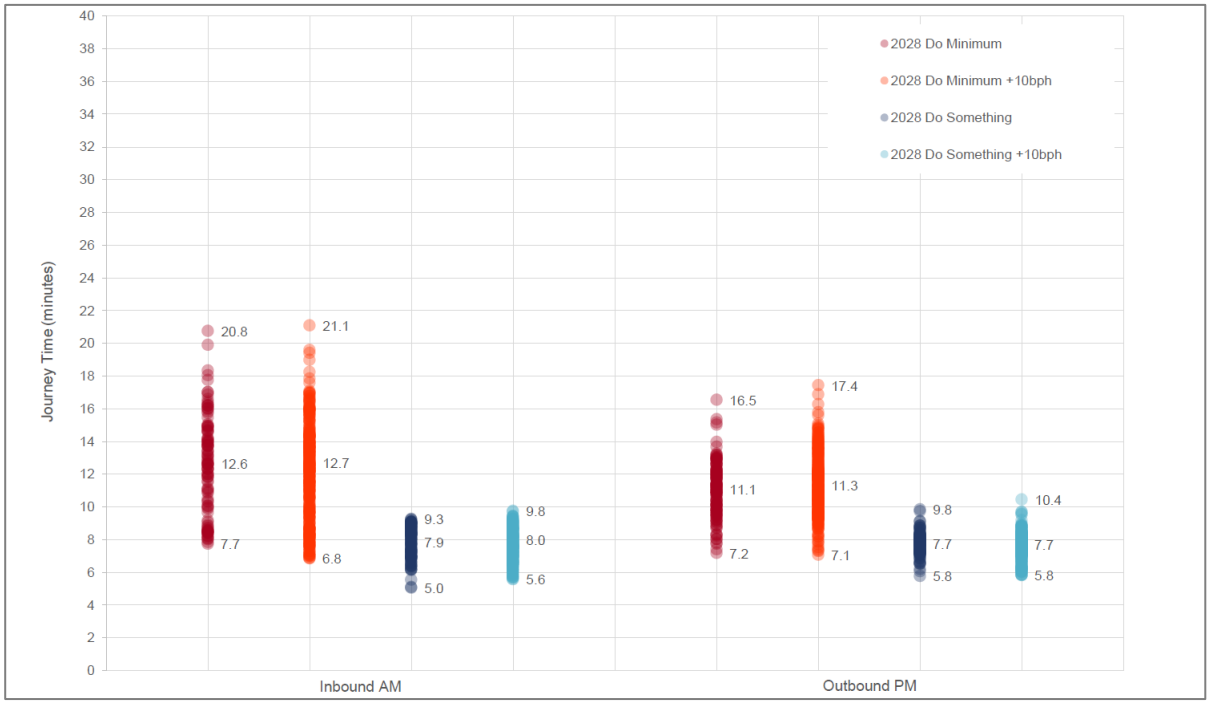

Diagram 6.25: Resilience Testing Bus Journey Time Reliability Indicators - Scenario Testing– Opening Year (2028)

As can be seen from Table 6.32 and Diagram 6.25 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 25 buses per direction per hour 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 larger change in bus journey times of up to approximately 2 minutes on average per bus is experienced (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.

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

6.5.3.2 General Traffic Assessment

6.5.3.2.1.1 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 likely 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.

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.

Reduction in General Traffic: For this assessment, the reductions in general traffic flows have been described as a positive impact to the environment.

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 measures to improve priority for bus, cycle and walking facilities.

Localised junction models have been developed using industry standard modelling packages such as LinSig and Junctions 9 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 model using the iterative traffic modelling process described in Section 3 of this TIA. The full outputs of the results are included in TIA Appendix 2 (Junction Design Report).

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 more 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 6.26 provides a snapshot from the guidance which outlines "Advisory Thresholds for Traffic and Transport Assessment Where National Roads are Affected".

Where applications affect national roads a Transport Assessment should be requested if the thresholds in Table 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.

Diagram 6.26 Extract from the Traffic and Transport Assessments 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[2] in the vicinity of the Proposed Scheme, not only National Roads. This ensures a robust and rigorous assessment has 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 or on 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. This further assessment is outlined in the following sections.

[2] Part II of The Roads Act 1993 sets out the current classification of roads as National (National Primary and National Secondary), Regional and Local (Local Tertiary and Local Secondary). The road types are governed by the default speed limit of the road. National Roads are TII owned whilst Regional and Local Roads are owned by the associated Local Authority.

6.5.3.2.2 General Traffic Flow Difference - AM Peak Hour

Diagram 6.27 illustrates the difference in traffic flows on the road links in the AM Peak Hour for the 2028 Opening Year. Please see TIA Appendix 4.7 (General Traffic Assessment) for the full LAM outputs.

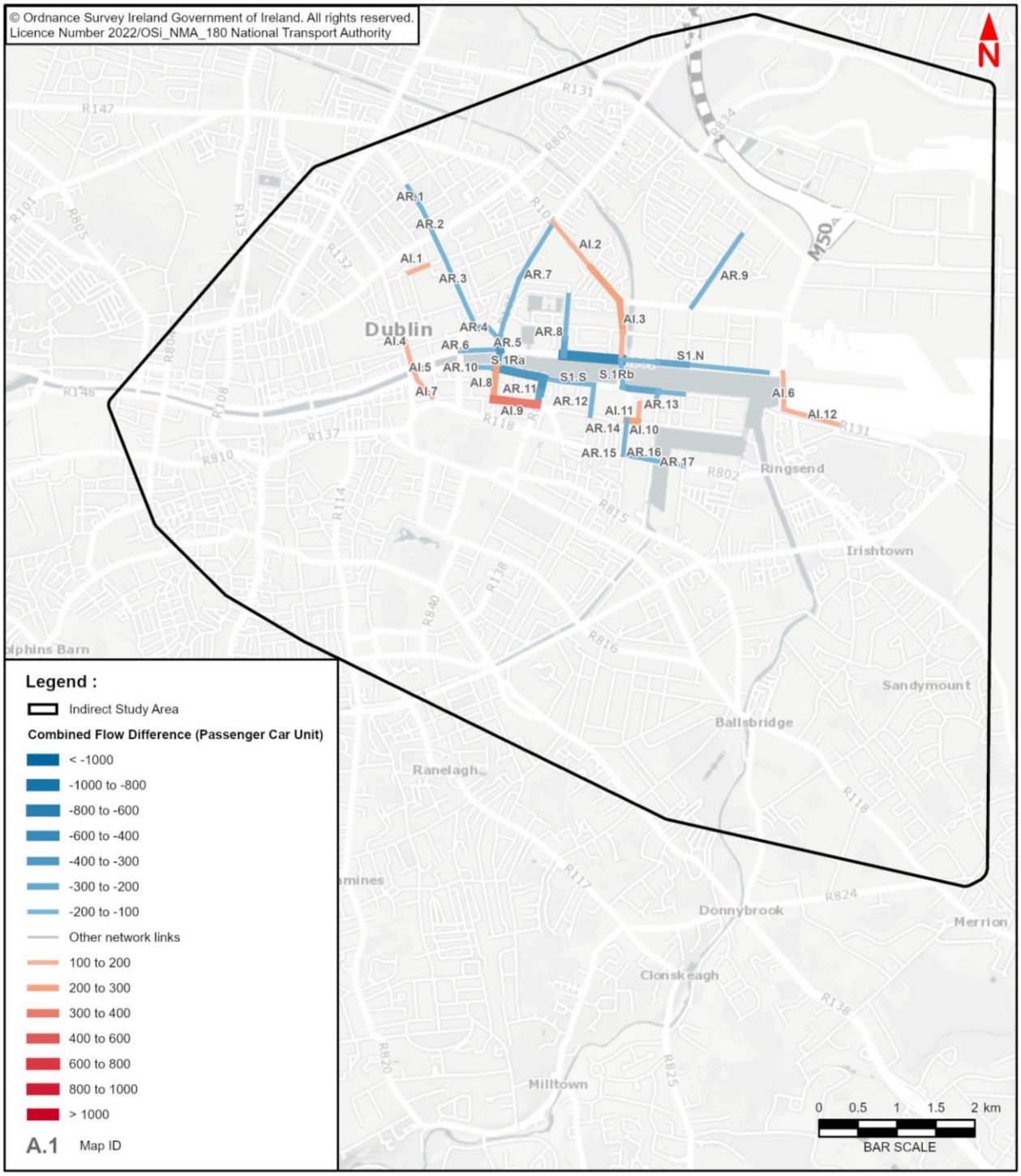

Diagram 6.27: Flow Difference on Road Links (Do Minimum vs. Do Something), AM Peak Hour, 2028 Opening Year

6.5.3.2.2.1 Impact on Direct Study Area (AM Peak Hour)

Direct Reductions in General Traffic: 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 6.27, 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 6.33.

Table 6.33: 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 6.33 demonstrate that there is a 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 **Low Positive** impact 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.

6.5.3.2.2.2 Impact on Indirect Study Area (AM Peak Hour)

Indirect Reductions in General Traffic: In addition to the general traffic flow reductions occurring along the direct study area, there are key reductions in general traffic noted along certain road links within the indirect study area during the AM Peak Hour. The key reductions in traffic flows along the indirect study area during the AM Peak Hour are outlined in Table 6.34.

Table 6.34: 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
	AR.16	R802 Pearse Street	1363	1256	-107
	AR.17	R802 Grand Canal Bridge	1404	1295	-108

The contents of Table 6.34 outline that there is a 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 **Low Positive impact** on the indirect study area.

Indirect Increases in General Traffic: The road links which experience additional traffic volumes of over 100 combined flows are illustrated by the orange / red lines in Diagram 6.27. 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 6.35.

Table 6.35: Road Links where the 100 Flow Additional Traffic Threshold is Exceeded (AM Peak Hour)

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 6.35 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.

6.5.3.2.3 General Traffic Flow Difference - PM Peak Hour

Diagram 6.28 illustrates the difference in traffic flows on road links in the PM Peak Hour for the 2028 Opening Year. TIA Appendix 4.7 (General Traffic Assessment) provides further details of the LAM outputs.

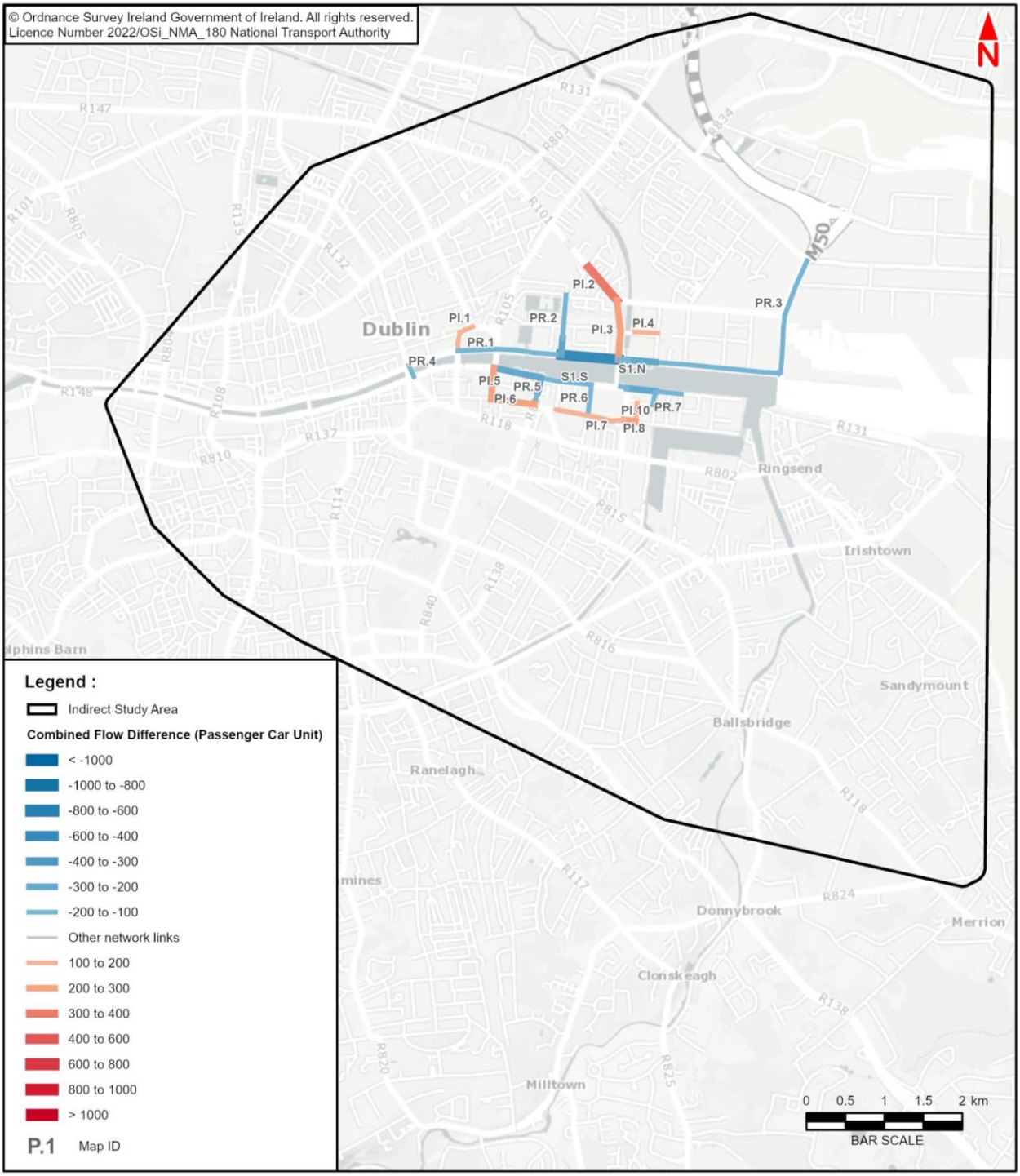

Diagram 6.28: Flow Difference on Road Links (Do Minimum vs. Do Something), PM Peak, 2028 Opening Year

6.5.3.2.3.1 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 the Proposed Scheme during the PM Peak Hour, as illustrated by the blue lines in Diagram 6.28, which indicates where a reduction of at least -100 combined traffic flows occur.

The key reductions in traffic flows during the PM Peak Hour are outlined in Table 6.36.

Table 6.36: 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 6.36 demonstrate that there is a 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 **Low Positive** impact 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.

6.5.3.2.3.2 Impact on Indirect Study Area (PM Peak Hour)

Reductions in General Traffic Flows: In addition to the general traffic flow reductions occurring along the direct study area, there are key reductions in general traffic noted along certain road links within the indirect study area during the PM Peak Hour. The key reductions in traffic flows along the indirect study area during the PM Peak Hour are outlined in Table 6.37.

Table 6.37: 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 6.37 outline that there is a 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 **Low Positive** impact on the indirect study area.

Increases in General Traffic Flows: The road links which experience additional traffic volumes of over 100 combined flows are illustrated by the red lines in Diagram 6.28. The road links and associated flow difference between the Do Minimum and Do Something scenarios during the PM Peak Hour are outlined in Table 6.38.

Table 6.38: Road Links Where Link Threshold of 100 Combined Flows is Exceeded (PM Peak Hour)

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
South of the River Liffey	PI.5	R802 Moss Street	129	427	299
	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 6.38 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.

6.5.3.2.4 General Traffic Impact Assessment

This section details the magnitude of the impacts as a result of the redistributed general traffic on the indirect study area. Note that further assessment is presented in Chapter 6 of the EIAR which considers the junction sensitivities and the significant of effects.

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 TIA, operational capacity outputs of a junction have been identified with reference to the busiest arm which experiences the maximum V/C ratio.

A V / C ratio of below 85% indicates that traffic is operating well, with spare capacity, and does not experience queuing or delays throughout the hour. A value of 85% to 100% indicates that traffic is approaching its theoretical capacity and may experience occasional queues and delays within the hour. A value of over 100% indicates that traffic is operating above its theoretical capacity and experiences queues and delays regularly within the hour. The junctions have been described in the ranges outlined in Table 6.39.

Table 6.39: Junction Volume / Capacity Ranges

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

When comparing the V / C ratios during the Do Minimum and Do Something scenarios for the key junctions, the terms outlined in Table 6.40 have been used to describe the impact.

Table 6.40: 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 6.40, 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.

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

The contents of Table 6.41 outline the V / C ratios at the key local / regional road junctions in the AM Peak Hour for the 2028 Opening Year. 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 TIA Appendix 3 (Maps).

Table 6.41: Volume over Capacity Ratios at Key Junctions (Do Minimum vs. Do Something), AM Peak, 2028 Opening Year

Road Name	Junction Name	DM Max V / C Ratio			DS Max V / C Ratio			Magnitude of Impact
		<85%	85% - 100%	>100%	<85%	85% - 100%	>100%	
Cathal Brugha Street	Cathal Brugha Street / Cumberland Street North / Sean Macdermott Street Upper	✓				✓		Low Negative
	Cathal Brugha Street / Marlbrough Street	✓			✓			Negligible
Seville Place	Amiens Street / Portland Row / North Strand Road / Seville Place	✓				✓		Low Negative
	Seville Place / Oriel Street Lower / Oriel Street Upper	✓			✓			Negligible
	Seville Place	✓			✓			Negligible
Guild Street	Seville Place / Sheriff Street Upper / Guild Street	✓				✓		Low Negative
	Mayor Street Lower / Guild Street / Mayor Street Upper		✓			✓		Negligible
O'Connell Street Lower	O'Connell Street Lower / Sackville Place	✓			✓			Negligible
	O'Connell Street Lower	✓			✓			Negligible
	O'Connell Street Lower / Abbey Street Lower	✓			✓			Negligible
O'Connell Bridge	Bachelors Walk / O'Connell Street Lower / Eden Quay / O'Connell Bridge	✓			✓			Negligible
	Ashton Quay / O'Connell Bridge / Burgh Quay / D'Olier Street	✓			✓			Negligible
D'Olier Street	D'Olier Street	✓			✓			Negligible
	D'Olier Street / Burgh Quay	✓			✓			Negligible
	D'Olier Street	✓			✓			Negligible
	Fleet Street / D'Olier Street / Townsend Street / College Street	✓			✓			Negligible
Moss Street	Moss Street / Gloucester Street South	✓			✓			Negligible
Townsend Street	Townsend Street / Moss Street / Shaw Street	✓			✓			Negligible
	Townsend Street / Mark Street	✓			✓			Negligible
	Townsend Street / Prince's Street South	✓			✓			Negligible
Lombard Street East	Townsend Street / Lombard Street East	✓			✓			Negligible
Cardiff Lane	Hanover Street East / Cardiff Lane / Misery Hill		✓			✓		Negligible
Misery Hill	Misery Hill / Hibernian Road	✓			✓			Negligible
Hibernian Road	Hibernian Road / Lazer Lane	✓			✓			Negligible
Tom Clarke Bridge	North Wall Quay / East Wall Road / Tom Clarke Bridge	✓			✓			Negligible

The results of the junction analysis illustrated in Table 6.41 demonstrate that the majority of junctions are operating with a maximum V / C ratio of below 85% during the AM Peak Hour in the 2028 Opening Year.

The above demonstrates that the Proposed Scheme will have a **Negligible** impact on the majority of assessed junctions within the indirect study area, and **Low Negative** impacts at three of the assessed junctions.

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

The contents of Table 6.42 outline the V / C ratios at the key local / regional road junctions in the PM Peak Hour for the 2028 Opening Year. 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 6.10 in TIA Appendix 3 (Maps).

Table 6.42: Volume over Capacity Ratios at Key Junctions (Do Minimum vs. Do Something), PM Peak, 2028 Opening Year

Road Name	Junction Name	DM Max V / C Ratio			DS Max V / C Ratio			Description of Impact
		<85%	85% - 100%	>100%	<85%	85% - 100%	>100%	
Custom House Quay	Eden Quay / Beresford Place / Custom House Quay / Butt Bridge	✓			✓			Negligible
Beresford Place	Beresford Place / Custom House	✓			✓			Negligible
	Old Abbey Street / Beresford Place	✓			✓			Negligible
	Abbey Street Lower / Beresford Place		✓			✓		Negligible
Gardiner Street Lower	Gardiner Street Lower / Beresford Place	✓			✓			Negligible
Seville Place	Seville Place / Oriel Street Lower / Oriel Street Upper	✓			✓			Negligible
	Seville Place	✓			✓			Negligible
Guild Street	Seville Place / Sheriff Street Upper / Guild Street	✓			✓			Negligible
	Mayor Street Lower / Guild Street / Mayor Street Upper		✓			✓		Negligible
Mayor Street Upper	Mayor Street Upper	✓			✓			Negligible
Park Lane	Mayor Street Upper / Park Lane	✓			✓			Negligible
Moss Street	Moss Street / Gloucester Street	✓			✓			Negligible
Townsend Street	Townsend Street / Moss Street / Shaw Street	✓				✓		Low Negative
	Townsend Street / Mark Street	✓			✓			Negligible
	Townsend Street / Prince's Street South	✓			✓			Negligible
Lombard Street East	Townsend Street / Lombard Street East	✓			✓			Negligible
Hanover Street East	Townsend Street / Creighton Street / Hanover Street East	✓			✓			Negligible
Lime Street	Hanover Street East / Lime Street	✓			✓			Negligible
Cardiff Lane	Hanover Street East / Cardiff Lane / Misery Hill	✓				✓		Low Negative
Misery Hill	Misery Hill / Hibernian Road	✓			✓			Negligible
Hibernian Road	Hibernian Road / Lazer Lane	✓			✓			Negligible

The results of the junction analysis illustrated in Table 6.42 demonstrate that the majority of junctions are operating with a maximum V / C ratio of below 85% during the PM Peak Hour in the 2028 Opening Year.

The above demonstrates that the Proposed Scheme will have a **Negligible** impact on the majority of assessed junctions within the indirect study area, and **Low Negative** impacts at two of the assessed junctions.

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

The contents of Table 6.43 outline the V / C ratios at the key local / regional road junctions in the AM Peak Hour for the 2043 Design Year. 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 6.11 in TIA Appendix 3 (Maps).

Table 6.43: Volume over Capacity Ratios at Key Junctions (Do Minimum vs. Do Something), AM Peak, 2043 Design Year

Road Name	Junction Name	DM Max V / C Ratio			DS Max V / C Ratio			Magnitude of Impact
		<85%	85% - 100%	>100%	<85%	85% - 100%	>100%	
Cathal Brugha Street	Cathal Brugha Street / Cumberland Street North / Sean Macdermott Street Upper	✓			✓			Negligible
	Cathal Brugha Street / Marlbrough Street	✓			✓			Negligible
Seville Place	Amiens Street / Portland Row / North Strand Road / Seville Place	✓				✓		Low Negative
	Seville Place / Oriel Street Lower / Oriel Street Upper	✓			✓			Negligible
	Seville Place	✓			✓			Negligible
Guild Street	Seville Place / Sheriff Street Upper / Guild Street	✓			✓			Negligible
	Mayor Street Lower / Guild Street / Mayor Street Upper		✓			✓		Negligible
O'Connell Street Lower	O'Connell Street Lower / Sackville Place	✓			✓			Negligible
	O'Connell Street Lower	✓			✓			Negligible
	O'Connell Street Lower / Abbey Street Lower	✓			✓			Negligible
O'Connell Bridge	Bachelors Walk / O'Connell Street Lower / Eden Quay / O'Connell Bridge	✓			✓			Negligible
	Ashton Quay / O'Connell Bridge / Burgh Quay / D'Olier Street	✓			✓			Negligible
D'Olier Street	D'Olier Street	✓			✓			Negligible
	D'Olier Street / Burgh Quay	✓			✓			Negligible
	D'Olier Street	✓			✓			Negligible
	Fleet Street / D'Olier Street / Townsend Street / Colleg Street	✓			✓			Negligible
Moss Street	Moss Street / Gloucester Street South	✓			✓			Negligible
Townsend Street	Townsend Street / Moss Street / Shaw Street	✓			✓			Negligible
	Townsend Street / Mark Street	✓			✓			Negligible
	Townsend Street / Prince's Street South	✓			✓			Negligible
	Townsend Street / Lombard Street East	✓			✓			Negligible
Cardiff Lane	Hanover Street East / Cardiff Lane / Misery Hill		✓		✓			Low Positive
Misery Hill	Misery Hill / Hibernian Road	✓			✓			Negligible
Hibernian Road	Hibernian Road / Lazer Lane	✓			✓			Negligible

Road Name	Junction Name	DM Max V / C Ratio			DS Max V / C Ratio			Magnitude of Impact
		<85%	85% - 100%	>100%	<85%	85% - 100%	>100%	
Tom Clarke Bridge	North Wall Quay / East Wall Road / Tom Clarke Bridge	✓			✓			Negligible

The results of the junction analysis illustrated in Table 6.43 demonstrate that the majority of junctions are operating with a maximum V / C ratio of below 85% during the AM Peak Hour in the 2043 Design Year.

The above demonstrates that the Proposed Scheme will have a **Negligible** impact on the majority of assessed junctions within the indirect study area, a **Low Negative** impact at one junction and a **Low Positive** impact at one junction.

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

The contents of Table 6.44 outline the V / C ratios at the key local / regional road junctions in the PM Peak Hour for the 2043 Design Year. The location of these junctions and the V / C ratio comparison between the Do Minimum and Do Something scenarios in the 2043 PM Peak Hour are illustrated in Figure 6.12 in TIA Appendix 3 (Maps).

Table 6.44: Volume over Capacity Ratios at Key Junctions (Do Minimum vs. Do Something), PM Peak, 2043 Design Year

Road Name	Junction Name	DM Max V / C Ratio			DS Max V / C Ratio			Description of Impact
		<85%	85% - 100%	>100%	<85%	85% - 100%	>100%	
Custom House Quay	Eden Quay / Beresford Place / Custom House Quay / Butt Bridge	✓			✓			Negligible
Beresford Place	Beresford Place / Custom House	✓			✓			Negligible
	Old Abbey Street / Beresford Place	✓			✓			Negligible
	Abbey Street Lower / Beresford Place		✓			✓		Negligible
Gardiner Street Lower	Gardiner Street Lower / Beresford Place	✓			✓			Negligible
Seville Place	Seville Place / Oriel Street Lower / Oriel Street Upper	✓			✓			Negligible
	Seville Place	✓			✓			Negligible
Guild Street	Seville Place / Sheriff Street Upper / Guild Street	✓			✓			Negligible
	Mayor Street Lower / Guild Street / Mayor Street Upper		✓			✓		Negligible
Mayor Street Upper	Mayor Street Upper	✓			✓			Negligible
Park Lane	Mayor Street Upper / Park Lane	✓			✓			Negligible
Moss Street	Moss Street / Gloucester Street	✓			✓			Negligible
Townsend Street	Townsend Street / Moss Street / Shaw Street	✓			✓			Negligible
	Townsend Street / Mark Street	✓			✓			Negligible
	Townsend Street / Prince's Street South	✓			✓			Negligible
Lombard Street East	Townsend Street / Lombard Street East	✓			✓			Negligible
Hanover Street East	Townsend Street / Creighton Street / Hanover Street East	✓			✓			Negligible
Lime Street	Hanover Street East / Lime Street	✓			✓			Negligible

Road Name	Junction Name	DM Max V / C Ratio			DS Max V / C Ratio			Description of Impact
		<85%	85% - 100%	>100%	<85%	85% - 100%	>100%	
Cardiff Lane	Hanover Street East / Cardiff Lane / Misery Hill	✓			✓			Negligible
Misery Hill	Misery Hill / Hibernian Road	✓			✓			Negligible
Hibernian Road	Hibernian Road / Lazer Lane	✓			✓			Negligible

The results of the junction analysis illustrated in Table 6.44 demonstrate that the majority of junctions are operating with a maximum V / C ratio of below 85% during the PM Peak Hour in the 2043 Design Year.

The above demonstrates that the Proposed Scheme will have a **Negligible** impact on all of assessed junctions within the indirect study area.

6.5.3.2.5 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[3]. 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 impact of traffic redistribution due to any of the Proposed Schemes will be **Negligible** during the night-time period.

6.5.3.2.6 General Traffic Impact Assessment Summary – Indirect Study Area

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

Using the TII guidelines 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 an 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.

[3] Less pedestrian, cycling and bus demand requirements leading to higher level of general traffic green time allocation per typical signal cycle

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.

Overall, the majority of junctions have a Negligible impact whilst only a few junctions experience a Low Negative impact, therefore it is determined that there will be a **Low Negative** impact from the redistributed general traffic as a result of the Proposed Scheme. Given that the redistributed traffic will not lead to a significant deterioration of the operational capacity on the surrounding road network, no mitigation measures 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 impact during this period will be **Negligible**.

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

6.5.3.2.7 Network-Wide Performance Indicators for General Traffic (Indirect Study Area)

The traffic and transport analysis considers the impact that the Proposed Scheme will have on the road network, within the direct and indirect study areas. To further quantify the impact of the Proposed Scheme on the traffic and transport conditions, network-wide performance indicators have been extracted for the general traffic conditions beyond the defined study areas, covering the full LAM modelled area.

The following indicators have been provided for both scenarios:

- **Transient Queues** (pcu.hrs) represent delay caused by reduced speeds approaching junctions and by waiting time at junctions. It does not include delay created whilst stopped in queues at over capacity junctions;
- **Over Capacity Queues** (pcu.hrs) measures the time spent queuing as a result of junctions operating over capacity and is a measure of network congestion;
- **Total Travel Time** (pcu.hrs) is the sum of the time spent in transient queues, over capacity queues and link cruise time;
- **Total Travel Distance** (pcu.kms) is the total distance travelled by all the vehicles in the model; and
- **Average Network Speed** (km/hr) is the average speed of all the vehicles in the network over the modelled period. It's calculated by dividing total travel distance by total travel time.

The contents of Table 6.45 outline the impact that the Proposed Scheme will have on the wider transport network, beyond the defined study areas.

Table 6.45: Network-Wide Performance Indicators with Proposed Scheme in Place

Scenario	Metric	Do Minimum	Do Something	% Difference	Impact
2028 Opening Year AM Peak Hour	Transient Queues (pcu.hrs)	18,710	18,790	+0.43%	Low Negative
	Over Capacity Queues (pcu.hrs)	5,257	5,285	+0.53%	
	Total Travel Times (pcu.hrs)	62,190	62,240	+0.08%	
	Total Travel Distance (pcu.kms)	2,021,000	2,019,000	-0.10%	
	Average Network Speed (km / h)	32.49	32.44	-0.15%	
2028 Opening Year PM Peak Hour	Transient Queues (pcu.hrs)	17980	18,040	+0.33%	Negligible
	Over Capacity Queues (pcu.hrs)	4,708	4,670	-0.81%	
	Total Travel Times (pcu.hrs)	58,990	58,990	-/+0.00%	
	Total Travel Distance (pcu.kms)	1,941,000	1,939,000	-0.10%	
	Average Network Speed (km / h)	32.9	32.88	-0.06%	
2043 Opening Year AM Peak Hour	Transient Queues (pcu.hrs)	16,976.6	17,015.2	0.23%	Negligible
	Over Capacity Queues (pcu.hrs)	7,843.6	7,804.3	-0.50%	
	Total Travel Times (pcu.hrs)	62,947.1	62,913.7	-0.05%	
	Total Travel Distance (pcu.kms)	2,121,715.8	2,119,966.5	-0.08%	
	Average Network Speed (km / h)	33.7	33.7	0.00%	
2043 Opening Year AM Peak Hour	Transient Queues (pcu.hrs)	18,051.3	17,987.9	-0.35%	Negligible
	Over Capacity Queues (pcu.hrs)	9,733.5	9,846.7	1.16%	
	Total Travel Times (pcu.hrs)	64,882.5	64,901.6	0.03%	
	Total Travel Distance (pcu.kms)	2,049,703.5	2,048,047.0	-0.08%	
	Average Network Speed (km / h)	31.6	31.6	0.00%	

The results of the assessment demonstrate that the impacts to the network performance indicators range between -0.5% and 1.16%, therefore a negligble impact is anticipated.

6.5.4 Operational Phase Summary

The contents of Table 6.46 present a summary of the potential impacts of the Proposed Scheme during the Operational Phase.

Table 6.46:Summary of Potential Operational Phase Impacts

Assessment Topic	Effect	Potential Impact
Pedestrian Infrastructure	Improvements to the quality of the pedestrian infrastructure along the Proposed Scheme.	Low Positive
Cycling Infrastructure	Improvements to the quality of the cycling infrastructure along the Proposed Scheme.	Medium Positive
Bus Infrastructure	Improvements to the quality of the bus infrastructure along the Proposed Scheme.	High Positive
Parking and Loading	A total loss of 88 parking / loading spaces along the Proposed Scheme.	Negligible
People Movement	Increases to the total number of people travelling through the Proposed Scheme.	High Positive
Bus Network Performance Indicators	Improvements to journey time and reliability indicators for bus users along the Proposed Scheme.	High Positive
General Traffic Network Performance Indicators	Reduction in general traffic flows along the Proposed Scheme.	Low Positive
	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.	Low Negative
Network Wide Performance Indicators	Deterioration to the network-wide queuing capacity, travel times, travel distances and average network speeds beyond the direct and indirect study areas.	Low Negative

As outlined within Section 6.5 (Operational Phase) and summarised in Table 6.46 above, the Proposed Scheme will deliver positive impacts to the quality in terms of People Movement, pedestrian, cycling and bus infrastructure during the Operational Phase. 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 movement of people.

Although it is recognised that there will be some negative impacts for general traffic and parking / loading availability, the Proposed Scheme has been designed and outlined within this assessment to take cognisance in the relevant traffic and transport guidelines outlined in Section 9 (References). The assessment demonstrates that the Proposed Scheme can be readily utilised by sustainable modes and that the surrounding road network has the capacity to accommodate the associated traffic and transport impacts.

Accordingly, it is concluded that the Proposed Scheme will deliver strong benefits from a sustainable transport point of view and will not result in a significant deterioration to the existing traffic conditions on the local road network during the Operational Phase.

7. Cumulative Assessment

7.1 Construction Phase Cumulative Effects

The assessment of cumulative effects associated with the Construction Phase of the Proposed Scheme is contained within Chapter 21 (Cumulative Impacts & Environmental Interactions) in Volume 2 of the EIAR.

7.2 Operational Phase Cumulative Impacts

7.2.1 Introduction

This chapter also reports the assessment of cumulative effects associated with the Operational Phase of the Proposed Scheme. This includes the cumulative impacts of the Proposed Scheme on relevant transport receptors in combination with other existing and/or approved projects including all other Proposed BusConnects Schemes. The transport modelling undertaken as part of the Traffic and Transport assessment informs the cumulative impacts assessment of other environmental topics. Further details on the cumulative impacts of Air quality, Climate, Noise and vibration, Population and Human health are detailed within Chapter 21 of the EIAR.

7.2.2 Transport Schemes

As detailed in Section 6.1.1, 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) (Government of Ireland 2021) investment priorities) and the full implementation by 2043. To this end, the modelling scenarios developed for the operational assessment of the Proposed Scheme(s) inherently accounts for the cumulative effects of complementary committed and proposed transport schemes within the GDA region.

The GDA Strategy provides is an appropriate receiving environment for the assessment of cumulative effects for the following reasons:

- The GDA Strategy is the approved statutory transportation plan for the region, providing a framework for investment in transport within the region up to 2042;
- The GDA Strategy provides a consistent basis for the 'likely' future receiving environment that is consistent with Government plans and Policies (National Planning Framework (NPF) (Government of Ireland 2018) and 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 GDA Strategy.

7.2.3 Transport Demand

Cumulative transport demand for the 2028 and 2043 assessment years have been included in the analysis contained within this TIA, 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 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 is due to grow by 22% by 2028 and 49% by 2043 (Source: NTA Reference Case Planning Sheets 2028, 2043).

7.2.3.1 Strategic Trip Demand Assessment

As described previously in section 6.3, 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.

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 cumulative traffic and transport assessment, as per the GDA Strategy proposals, there are no specific demand management measures included in the Do Minimum reference case (receiving environment) scenario in the Opening Year (2028), other than constraining parking availability in Dublin at existing levels. For the Design Year (2043) scenario, demand management is included in the Do Minimum in line with the 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.

7.2.3.1.1 Trip Demand Growth within Study area of the Proposed Schemes

To understand the background levels of demand growth within the study area of the Proposed Schemes in the assessment years (2028, 2043), the 24-hour demand outputs by mode from the NTA ERM have been analysed. A buffer of 500m beyond the extent of the Proposed Schemes has been chosen to capture the population that is most likely to interact with the Proposed Schemes, and which could reasonably be exposed to cumulative effects in combination with other developments. Diagram 7.1 outlines the changes in total trip demand, comparing car demand with sustainable mode demand (public transport, walking and cycling). The figures are presented for both 2028 and 2043 Do Minimum scenarios (i.e., without the Proposed Schemes in place) in relation to the 2020 ERM demand levels.

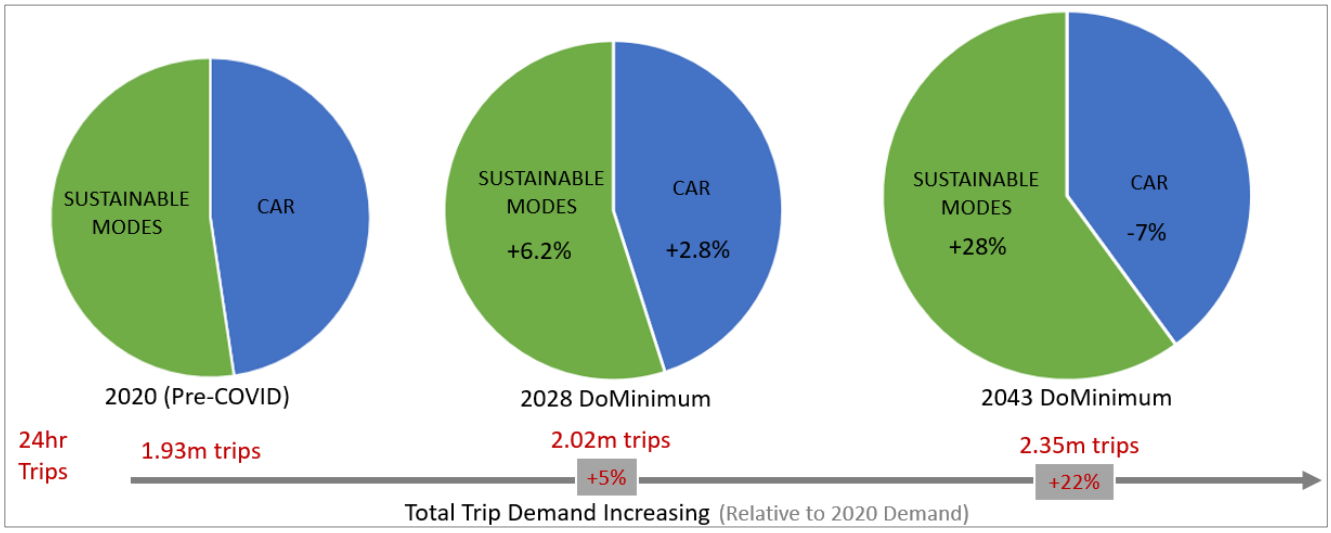

Diagram 7.1: Trip Demand Changes without the Proposed Schemes (in Relation to 2020 Demand)

As shown above, there are 1.93m trips[4] over a 24hr period within 500m of the Proposed Schemes. Total trip demand increases to 2.02m trips (5% increase) in 2028 and to 2.35m trips (+22% increase) in 2043.

[4] Trips to/from ERM zones within a 500m distance from the Proposed Scheme to/from any destination

In terms of the modal composition of the 5% increase in total demand in 2028, there will be a 6.2% increase in sustainable modes (PT, walk, cycle) and a 2.8% increase in private car demand above 2020 levels, without the Proposed Schemes in place. In 2043, the 22% increase in total trip demand (above 2020 levels) will be made up of a 28% increase in sustainable modes demand (PT, walk, cycle) and a 7% reduction in private car demand, compared to 2020 (pre-COVID 19) levels. The analysis indicates that even without the Proposed Schemes in place, other GDA Transport Strategy measures and road network capacity constraints mean that private car demand is not growing at the same rate as overall travel demand, and in fact car traffic levels will reduce below current / 2020 traffic levels.

The overall share of Sustainable modes trips on the network will increase from 49% in 2020, to 58% in 2028 and to 63% in 2043 with corresponding reductions in the private car share of overall travel demand.

7.2.3.1.2 Impacts of BusConnects Proposed Scheme Works on Travel Demand Growth

A similar assessment has been undertaken comparing 24-hour car demand with sustainable mode demand (public transport, walking and cycling) for both the 2028 and 2043 Do Something scenarios (i.e., with all Proposed Schemes in place) in relation to the 2020 ERM demand levels (and is shown in Diagram 7.2).

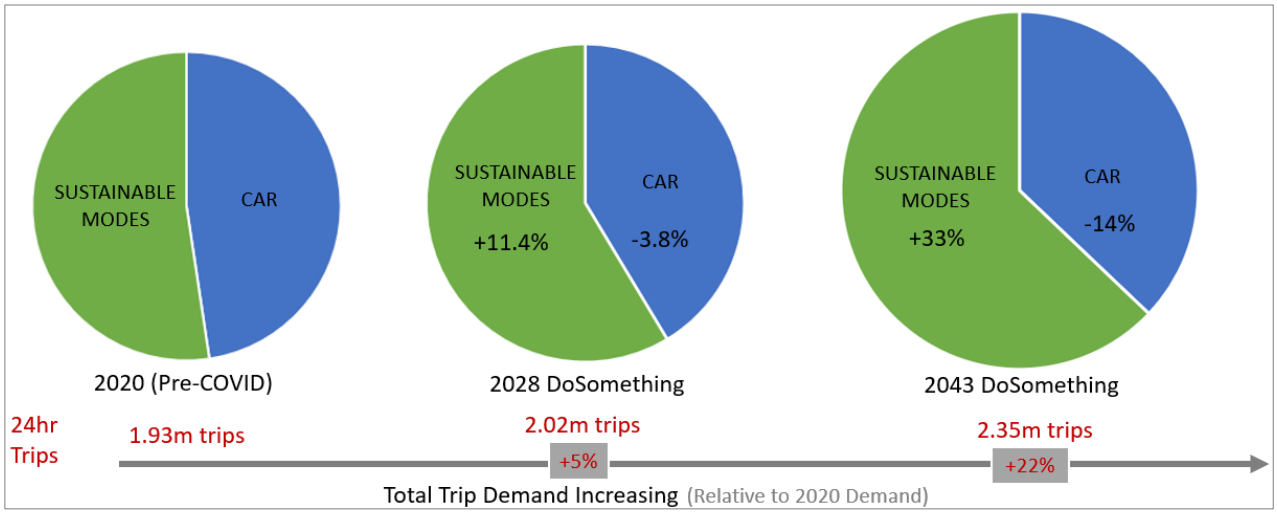

Diagram 7.2: Trip Demand Changes with the Proposed Schemes (in Relation to 2020 Demand)

As shown above, the same level of overall trip demand will occur, however, significantly higher levels of these trips will be made by sustainable modes due to the provision of the BusConnects Proposed Scheme Infrastructure Works. In terms of the modal composition of the 5% increase in total demand in 2028, there will be an 11.4% increase in sustainable modes (PT, walk, cycle) and a 3.8% decrease in private car demand compared to 2020 levels, with the Proposed Schemes in place. In 2043, the 22% increase in total trip demand (above 2020 levels) will be made up of a 33% increase in sustainable modes demand (PT, walk, cycle) and a 14% decrease in private car demand, compared to 2020 levels. The analysis indicates that the Proposed Schemes will have a significant impact on sustainable mode share. The schemes will prevent any increase in private car traffic within the study area and will instead result in a further substantial reduction in car trips below 2020 levels.

With the Proposed Schemes in place, the overall share of Sustainable modes trips on the network will increase from 49% in 2020, to 61% in 2028 and to 66% in 2043 with corresponding reductions in the private car share of overall travel demand.

7.2.4 People Movement Assessment

7.2.4.1 Overview

In order to understand the benefit with regards to the Movement of People following the full implementation of all 12 of the Proposed Schemes, a quantitative People Movement assessment has been undertaken using outputs

of the modelling suite 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:

- Daily Mode share changes within a 500m catchment[5] of the Proposed Schemes comparing the Do Minimum and Do Something scenarios for trips to the City Centre and trips to any destination in the 2028 and 2043 assessment years;
- The average number of people moved by each transport mode (i.e., Car, Bus, Walking and Cycling) along the corridor in the inbound and outbound direction. This metric is compared for the Do Minimum and Do Something scenarios in the AM and PM peak hours for each forecast year (2028, 2043). This metric provides an estimate of the modal share changes on the direct CBC corridor as a result of the Proposed Scheme measures; and
- People Movement by Bus
    - Total Passengers Boarding Buses on bus routes that use any part of the Proposed Schemes for each forecast year (2028, 2043).

7.2.4.2 Daily People Movement by Mode (Mode Share)

Daily (07:00-19:00 – weekday) mode share data has been extracted from the ERM for zones within a 500m catchment of the Proposed Schemes comparing the Do Minimum and Do Something scenarios for each of the forecast years (2028, 2043).

Diagram 7.3 and Diagram 7.4 illustrate the mode share changes (% increase and absolute) comparing the Do Minimum and Do Something (All Proposed Schemes) scenarios for Car, Public Transport and Cycling for the following:

- People travelling from the catchment area of the Proposed Schemes to any destination within the catchment (inclusive of the City Centre) in the Morning Peak period (AM) (07:00-10:00) and All-day (07:00-19:00) period; and
- People travelling from the catchment area[6] of the Proposed Schemes inbound towards the city centre (defined as the Canal Cordon) in the Morning Peak period (AM) 07:00-19:00 period.

[5] 500m recommended maximum walking distance to Core Bus Corridors - "Buses In Urban Development", CIHT 2018

[6] The analysis includes only trips from the defined catchment i.e., it does not include trips from external areas outside of the catchment that travel to the city centre

7.2.4.2.1 2028 Demand Changes by Mode

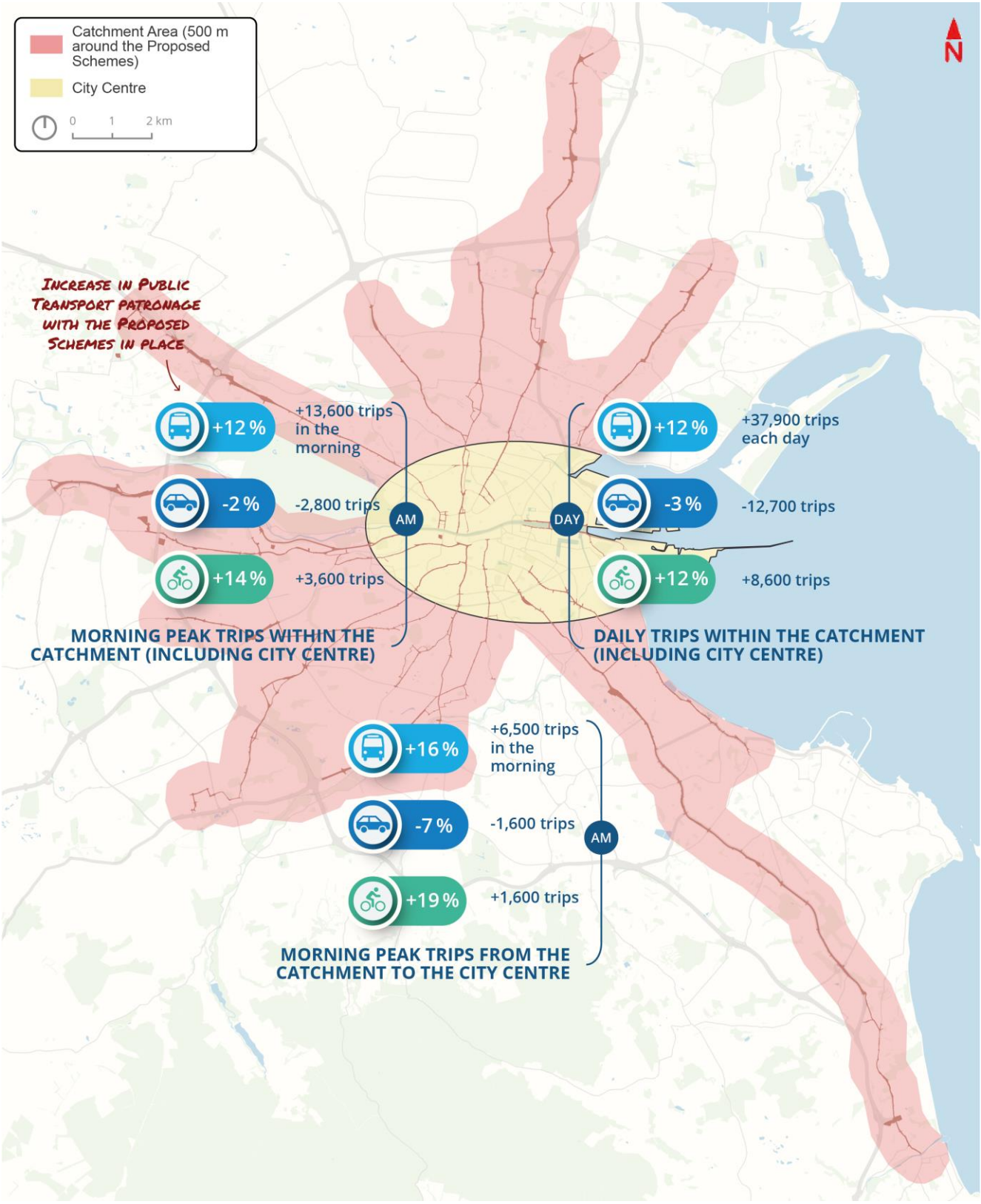

Diagram 7.3: Change in Trips by Mode within a 500m Catchment Area of the Proposed Schemes and the City Centre and Trips Originating from the Catchment Inbound to the City Centre in 2028

As indicated in Diagram 7.3, it is estimated that for people travelling within the 500m catchment area (including City Centre) there will be a 12% increase in public transport trips, 2% decrease in general traffic trips (i.e.

motorists) and a 14% increase in cycling trips in the morning peak period (07:00-10:00). Across the whole day (07:00-19:00), there will be a 12% increase in public transport, 3% decrease in general traffic and a 12% increase in cycling trips.

It is also estimated that for people travelling inbound to the city centre from the catchment area in the morning peak period there will be 16% increase in public transport trips, 7% decrease in general traffic trips (i.e. motorists) and a 19% increase in cycling trips.

Table 7.1 outlines the difference in trips and modal split between the Opening Year Do Minimum and Do Something scenarios for people travelling within the Catchment Area and the City Centre in the morning peak period and All-Day (07:00-19:00).

Table 7.1: 2028 Modal Share of Trips within a 500m Catchment Area from of the Proposed Schemes and the City Centre

Direction	Time Period	Mode of Transport	Do Minimum		Do Something		Difference	
			Daily Trips	Modal Split (%)	Daily Trips	Modal Split (%)	Daily Trips	Difference (%)
Within Catchment Area and City Centre	AM (07:00-10:00)	Public Transport	111,090	25.5%	124,700	27.7%	13,610	12.3%
		General Traffic	145,560	33.4%	142,730	31.7%	-2,830	-1.9%
		Cycling	25,670	5.9%	29,250	6.5%	3,580	13.9%
		Walking	154,000	35.3%	153,160	34.0%	-840	-0.5%
		Total	436,320	100%	449,840	100%	13,520	3.1%
Within Catchment Area and City Centre	Daily (07:00-19:00)	Public Transport	328,800	24.8%	366,730	27.0%	37,930	11.5%
		General Traffic	435,860	32.9%	423,140	31.2%	-12,720	-2.9%
		Cycling	70,680	5.3%	79,270	5.8%	8,590	12.2%
		Walking	487,880	36.9%	487,400	35.9%	-480	-0.1%
		Total	1,323,220	100%	1,356,540	100%	33,320	2.5%

As shown in Table 7.1, it is expected that there will be an approximate 3% (13,500) increase in People Movement within the Catchment Area (including City Centre) as a result of the Proposed Schemes in the morning peak period. The slight net increase in the total number of trips is due to the improved accessibility and reduced congestion for sustainable mode users provided with the Proposed Schemes in place. Over the whole day, approximately 46,000 additional trips will be made by bus and cycling.

It is also estimated that a modal shift will occur in the morning peak period consisting of an increase in Public Transport mode share from 25.5% to 27.7%, a decrease in general traffic share from 33.4% to 31.7% and an increase in the number of cyclists from 5.9% to 6.5%. The modal shift in the daily trips within the 500m catchment area and the City Centre will consist of an increase in Public Transport users from 24.8% to 27%, a decrease in general traffic share from 32.9% to 31.2% and an increase in the number of cyclists from 5.3% to 5.8%.

The number of walking trips is shown to remain broadly similar in the Do Something scenario. This is mainly due to a mode shift from walking to bus, due to the enhanced public transport provision in the Do Something scenario.

Table 7.2 outlines the difference in trips and modal split between the Opening Year Do Minimum and Do Something (All Proposed Schemes) scenarios for people travelling from the Catchment Area inbound towards the City Centre in the morning peak period.

Table 7.2: 2028 Modal Share of Trips Originating from a 500m Catchment Area from of the Proposed Schemes to the City Centre

Direction	Time Period	Mode of Transport	Do Minimum		Do Something		Difference	
			Daily Trips	Modal Split (%)	Daily Trips	Modal Split (%)	Daily Trips	Difference (%)
Within Catchment Area and City Centre	AM (07:00-10:00)	Public Transport	40,050	48.4%	46,500	52.5%	6,450	16.1%
		General Traffic	23,180	28.0%	21,540	24.3%	-1,640	-7.1%
		Cycling	8,530	10.3%	10,150	11.5%	1,620	19.0%
		Walking	11,030	13.3%	10,450	11.8%	-580	-5.3%
		Total	82,790	100%	88,640	100%	5,850	7.1%

As shown in Table 7.2, the modelling indicates that there will be an approximate 7% (6,000) increase in total People Movement travelling from the Catchment Area to the City Centre as a result of the Proposed Schemes in the morning peak period.

It is also indicated that a modal shift will occur consisting of an increase in Public Transport users from 48.4% to 52.5%, a decrease in general traffic mode share from 28% to 24.3% and an increase in the cycling mode share from 10.3% to 11.5% with the Proposed Schemes in operation.

7.2.4.2.2 2043 Demand Changes by Mode

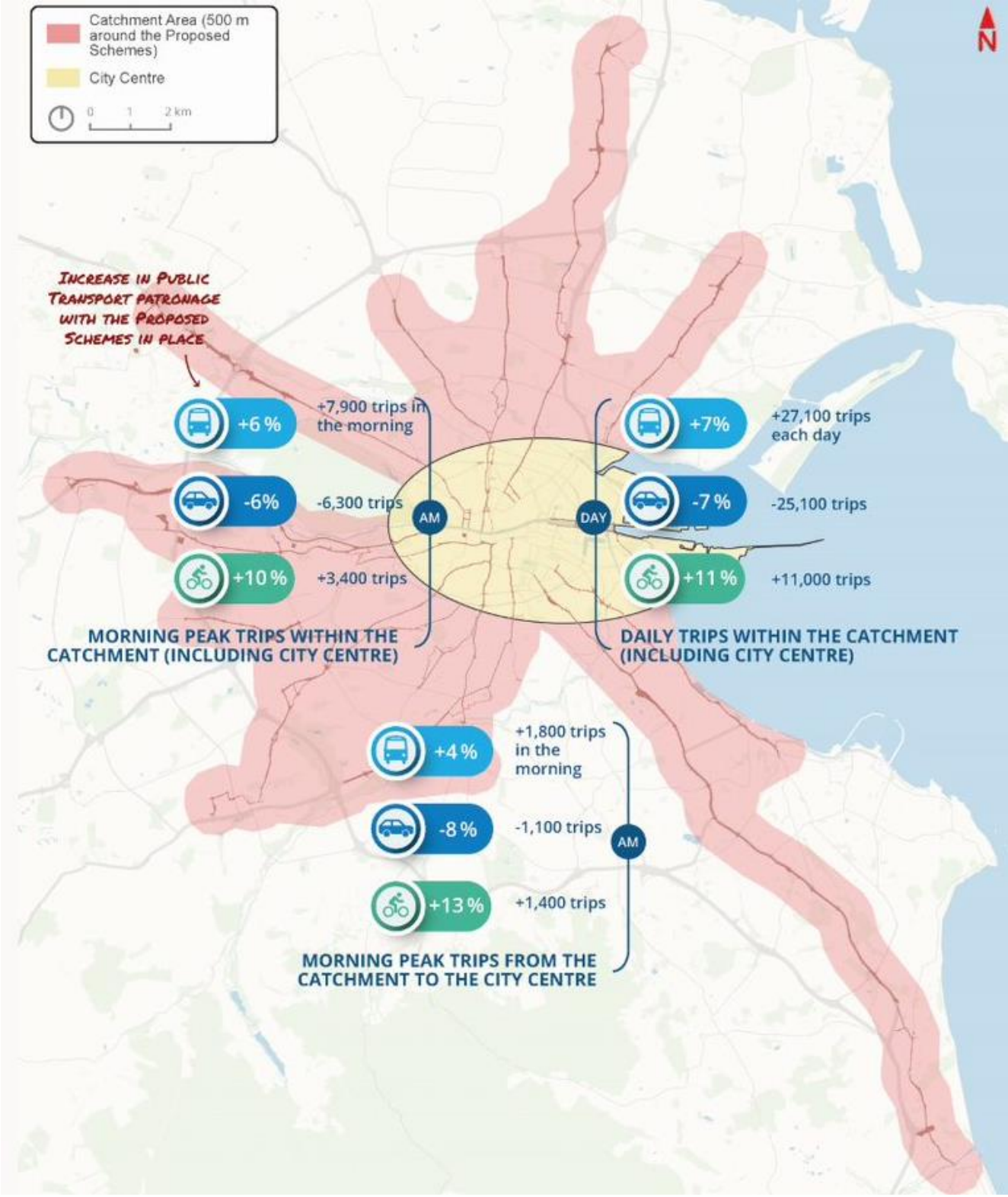

Diagram 7.4: Change in trips by mode within a 500m Catchment Area of the Proposed Schemes and the City Centre and Trips originating from the Catchment inbound to the City Centre in 2043

As indicated in Diagram 7.4, it is estimated that for people travelling within the 500m catchment area (including City Centre) there will be a 6% increase in public transport trips, 6% decrease in general traffic trips (i.e. motorists) and a 10% increase in cycling trips in the morning peak period and a 7% increase in public transport, 7% decrease in general traffic and a 11% increase in cycling trips each day (07:00-19:00).

The modelling shows that for people travelling inbound to the city centre from the Catchment Area in the morning peak period there will be a 4% increase in public transport trips, 8% decrease in general traffic trips (i.e., motorists) and a 13% increase in cycling trips.

Table 7.3 outlines the difference in trips and modal split between the Opening Year Do Minimum and Do Something (All Proposed Schemes) scenarios for people travelling within the Catchment Area and the City Centre in the morning peak period and All Day (07:00-19:00).

Table 7.3: 2043 Modal Shift of Trips within a 500m Catchment Area from of the Proposed Schemes and the City Centre

Direction	Time Period	Mode of Transport	Do Minimum		Do Something		Difference	
			Daily Trips	Modal Split (%)	Daily Trips	Modal Split (%)	Daily Trips	Difference (%)
Within Catchment Area and City Centre	AM (07:00-10:00)	Public Transport	129,599	29.4%	137,493	30.8%	7,894	6.1%
		General Traffic	103,586	23.5%	97,233	21.8%	-6,353	-6.1%
		Cycling	36,596	8.3%	40,146	9.0%	3,550	9.7%
		Walking	171,570	38.9%	170,979	38.4%	-591.55	-0.3%
		Total	441,351	100%	445,851	100%	4,500	1.0%
Within Catchment Area and City Centre	Daily (07:00-19:00)	Public Transport	384,759	27.3%	411,921	28.9%	27,162	7.1%
		General Traffic	341,912	24.2%	316,802	22.2%	-25,110	-7.3%
		Cycling	102,803	7.3%	113,894	8.0%	11,091	10.8%
		Walking	582,146	41.2%	585,411	41%	3,266	0.6%
		Total	1,411,619	100%	1,428,028	100%	16,409	1.2%

As shown in Table 7.3, it is expected that there will be an approximate 1% (4,500) increase in People Movement travelling within the Catchment Area (including City Centre) as a result of the Proposed Schemes in the morning peak period. The slight net increase in the total number of trips is due to the improved accessibility and reduced congestion for sustainable mode users provided with all the Proposed Schemes in place. Over the whole day, approximately 38,300 additional trips will be made by bus and cycling, which is a significant increase, when considering that other elements of the GDA Strategy will be place in 2043.

It is also estimated that a modal shift will occur in the morning peak period consisting of an increase in Public Transport share from 29.4% to 30.8%, a decrease in general traffic share from 23.5% to 21.8% and an increase in cycling from 8.3% to 9.0%. The modal shift in the daily trips within the 500m catchment area and the City Centre will consist of an increase in Public Transport users from 27.3% to 28.9%, a decrease in general traffic from 24.2% to 22.2% and an increase in cyclists from 7.3% to 8.0%.

General traffic is seen to have much higher levels of reduction in 2043 than when compared to 2028 due to the increased level of non-bus public transport infrastructure (MetroLink, Luas extensions and DART+ from the GDA Strategy) in tandem with the road capacity reduction measures as part of the Proposed Scheme leading to increased usage on all public transport modes. The number of walking trips is shown to remain broadly similar in the Do Something scenario. This is mainly due to a mode shift from walking to bus, due to the enhanced public transport provision in the Do Something scenario.

Table 7.4 outlines the difference in trips and modal split between the Opening Year Do Minimum and Do Something (All Proposed Schemes) scenarios for people travelling from the Catchment Area inbound towards the City Centre in the morning peak period.

Table 7.4: 2043 Modal Shift of Trips originating from a 500m Catchment Area from of the Proposed Schemes to the City Centre

Direction	Time Period	Mode of Transport	Do Minimum		Do Something		Difference	
			Daily Trips	Modal Split (%)	Daily Trips	Modal Split (%)	Daily Trips	Difference (%)
Within Catchment Area and City Centre	AM	Public Transport	45,323	52.4%	47,098	53.4%	1,775	3.9%
		General Traffic	14,881	17.2%	13,761	15.6%	-1,121	-7.5%
		Cycling	11,127	12.9%	12,571	14.2%	1,444	13.0%
		Walking	15,188	17.6%	14,843	16.8%	-344.57	-2.3%
		Total	86,519	100%	88,272	100%	1,754	2.0%

As shown in Table 7.4, the modelling indicates that there will be an approximate 2% increase in total People Movement travelling from the Catchment Area to the City Centre as a result of the Proposed Schemes, in the morning peak period.

It is also indicated that a modal shift will occur consisting of an increase in Public Transport mode share from 52.4% to 53.4%, a decrease in general traffic mode share from 17.2% to 15.6% and an increase in the cycling mode share from 12.9% to 14.2%.

7.2.4.3 Peak Hour People Movement along the Proposed Schemes

To determine the cumulative impact that the Proposed Schemes will have on modal share changes on the direct study areas as a result of their implementation, the weighted average number of people moved by each mode (Car, Bus, Active Modes) has been extracted from the modelling suite. The analysis compares the Do Minimum and Do Something (All Proposed Schemes) scenarios both in the inbound and outbound direction in the AM and PM Peak Hour periods for each forecast years (2028, 2043).

7.2.4.3.1 2028 AM Peak Hour People Movement

Diagram 7.5 illustrates the average People Movement by mode, across all Proposed Schemes, inbound towards the City Centre during the AM Peak Hour in 2028.

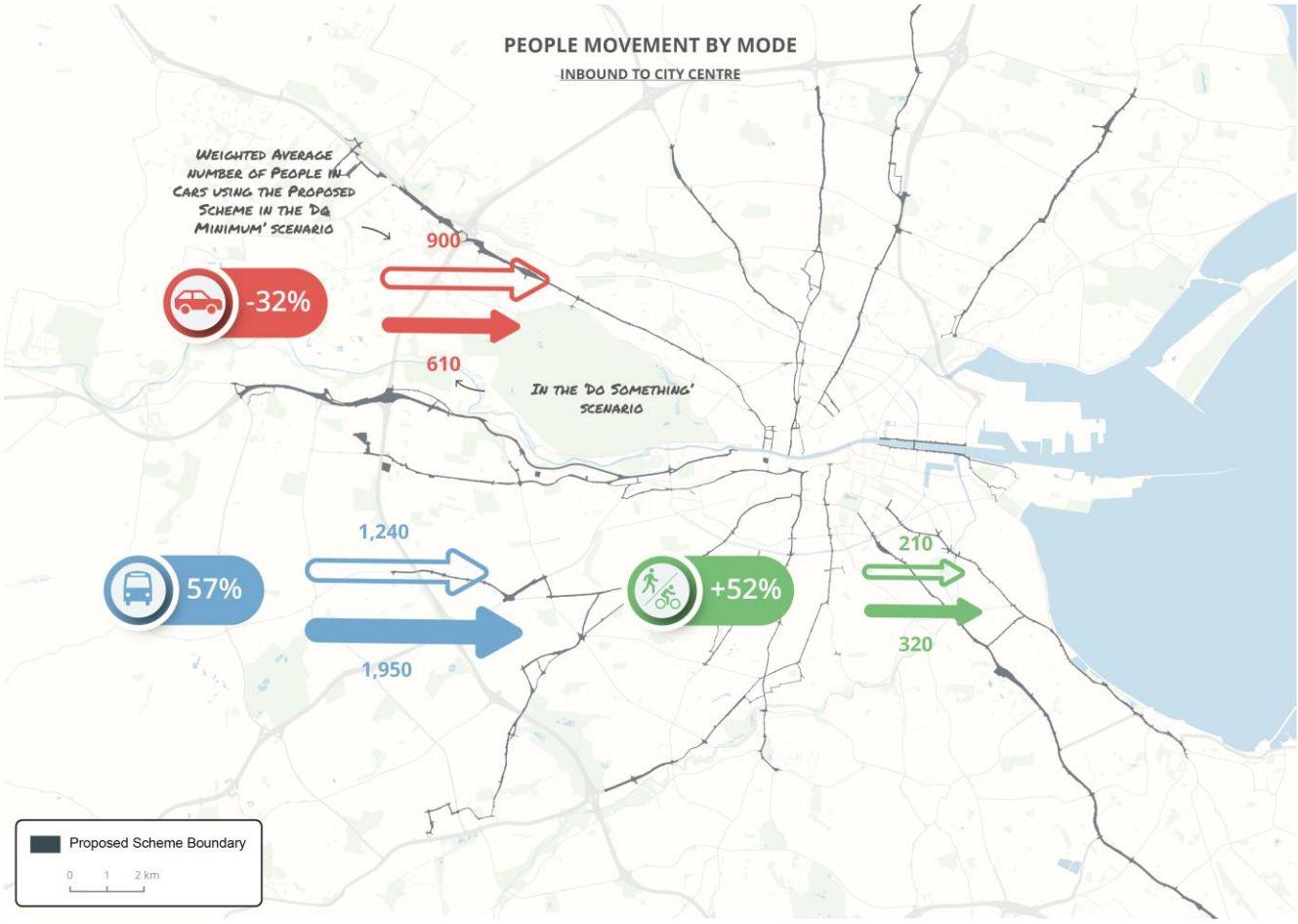

Diagram 7.5: Average People Movement by Mode during 2028 AM Peak Hour

As indicated in Diagram 7.5, on average across all Proposed Schemes, there is a predicted reduction of 32% in the number of people travelling via car, an increase of 57% in the number of people travelling via bus and an increase of 52% in people walking or cycling along the Proposed Schemes during the AM Peak Hour.

Table 7.5 outlines the difference in modal split between the Do Minimum and Do Something scenarios for each mode of transport in an inbound direction towards the City Centre during the AM Peak Hour. The results indicate a 23% increase in total people moved as a result of the Proposed Schemes and a 57% increase in people moved by sustainable modes (Public Transport, Walk, Cycle).

Table 7.5 Modal Shift of 2028 AM Peak Hour along Proposed Schemes

Direction	Time Period	Mode of Transport	Do Minimum		Do Something		Difference	
			Hourly Trips	Modal Split (%)	Hourly Trips	Modal Split (%)	Hourly Trips	Difference (%)
Inbound towards the City Centre	AM Peak Period	General Traffic	900	38%	610	21%	-290	-32%
		Public Transport	1,240	53%	1,950	68%	710	57%
		Walking	140	6%	140	5%	0	0%
		Cycling	70	3%	180	6%	110	157%

Direction	Time Period	Mode of Transport	Do Minimum		Do Something		Difference	
			Hourly Trips	Modal Split (%)	Hourly Trips	Modal Split (%)	Hourly Trips	Difference (%)
		Sustainable Modes Total	1,450	62%	2,270	79%	820	57%
		Total (all modes)	2,350	100%	2,880	100%	530	23%

7.2.4.3.2 2028 PM Peak Hour People Movement

Diagram 7.6 illustrates the average People Movement by mode, across all Proposed Schemes, travelling outbound from the city centre during the PM Peak Hour.

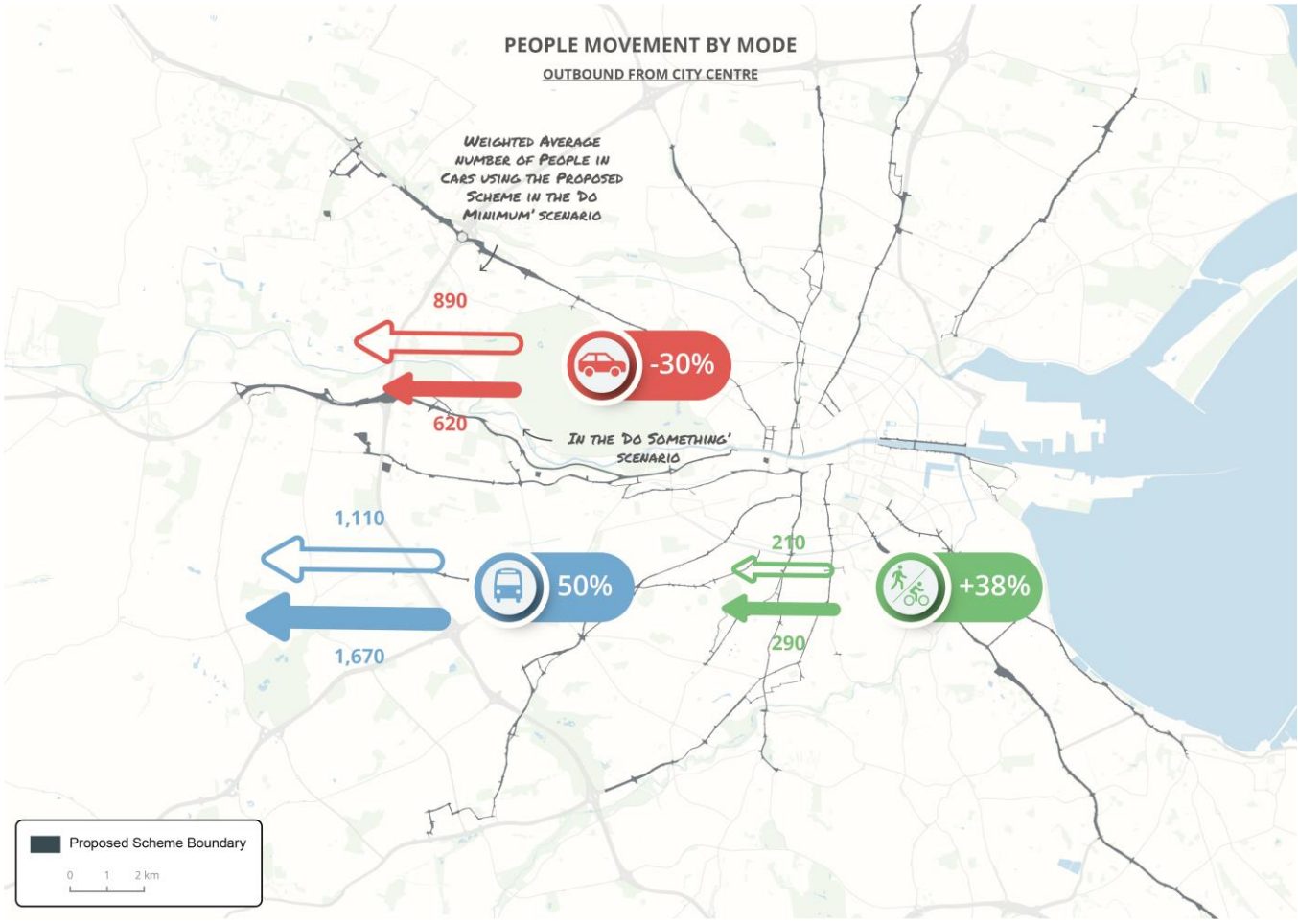

Diagram 7.6: Average People Movement by Mode during 2028 PM Peak Hour

As indicated in Diagram 7.6, on average across all Proposed Schemes, there is a predicted reduction of 30% in the number of people travelling via car, an increase of 50% in the number of people travelling via bus and an increase in 38% in the number of people walking or cycling along the Proposed Schemes during the PM Peak Hour.

Table 7.6 outlines the difference in modal split between the Do Minimum and Do Something (All Proposed Schemes) scenarios for each mode of transport in an outbound direction from the City Centre during the PM Peak Hour. The results indicate a 17% increase in total people moved as a result of the Proposed Schemes and a 48% increase in people moved by sustainable modes (Public Transport, Walk, Cycle).

Table 7.6: Modal Shift of 2028 PM Peak Hour along Proposed Schemes

Direction	Time Period	Mode of Transport	Do Minimum		Do Something		Difference	
			Hourly Trips	Modal Split (%)	Hourly Trips	Modal Split (%)	Hourly Trips	Difference (%)
Outbound from the City Centre	PM Peak Period	General Traffic	890	40%	620	24%	-270	-30%
		Public Transport	1,110	50%	1,670	65%	560	50%
		Walking	150	7%	140	5%	-10	-7%
		Cycling	60	3%	150	6%	90	150%
		Sustainable Modes Total	**1,320**	**60%**	**1,960**	**76%**	**640**	**48%**
		Total (All modes)	**2,210**	**100%**	**2,580**	**100%**	**370**	**17%**

7.2.4.3.3 2043 AM Peak Hour People Movement

Diagram 7.7 illustrates the average People Movement by mode, across all Proposed Schemes, inbound towards the City Centre during the AM Peak Hour in 2043.

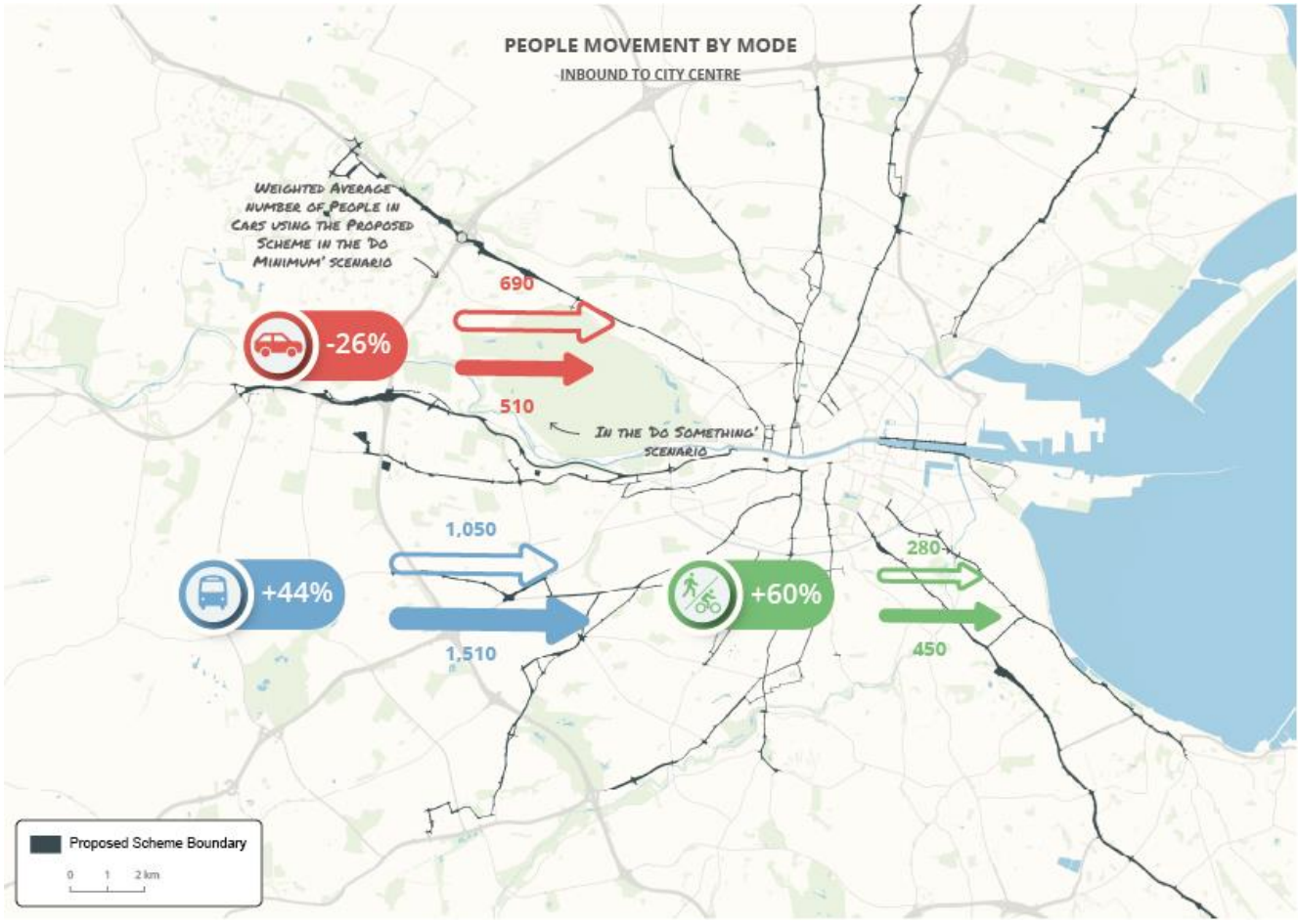

Diagram 7.7: People Movement by Mode during 2043 AM Peak Hour

As indicated in Diagram 7.7, on average across all Proposed Schemes, there is a predicted decrease of 26% in the number of people travelling via car, an increase of 44% in the number of people travelling via bus and an increase of 60% in the number of people walking and cycling along the Proposed Schemes during the AM Peak Hour.

Table 7.7 outlines the difference in modal split between the Do Minimum and Do Something (All Proposed Schemes) scenarios for each mode of transport in an inbound direction towards the City Centre during the AM Peak Hour. The results indicate a 47% increase in total people moved as a result of the Proposed Schemes and 60% increase in people moved by sustainable modes (Public Transport, Walk, Cycle).

Table 7.7: Modal Shift of 2043 AM Peak Hour along Proposed Schemes

Direction	Time Period	Mode of Transport	Do Minimum		Do Something		Difference	
			Hourly Trips	Modal Split (%)	Hourly Trips	Modal Split (%)	Hourly Trips	Difference (%)
Inbound towards the City Centre	AM Peak Period	General Traffic	690	34%	510	21%	-180	-26%
		Public Transport	1,053	52%	1,514	61%	461	44%
		Walking	150	7%	165	7%	16	10%
		Cycling	129	6%	280	11%	151	117%
		Combined Walk / Cycle	**278**	**14%**	**445**	**18%**	**167**	**60%**
		Sustainable Modes Total	**1,332**	**66%**	**1,960**	**79%**	**628**	**47%**
		Total (All modes)	**2,022**	**100%**	**2,469**	**100%**	**448**	**22%**

7.2.4.3.4 2043 PM Peak Hour People Movement

Diagram 7.8 illustrates the average People Movement by mode, across all Proposed Schemes, travelling outbound from the City Centre during the PM Peak Hour in 2043.

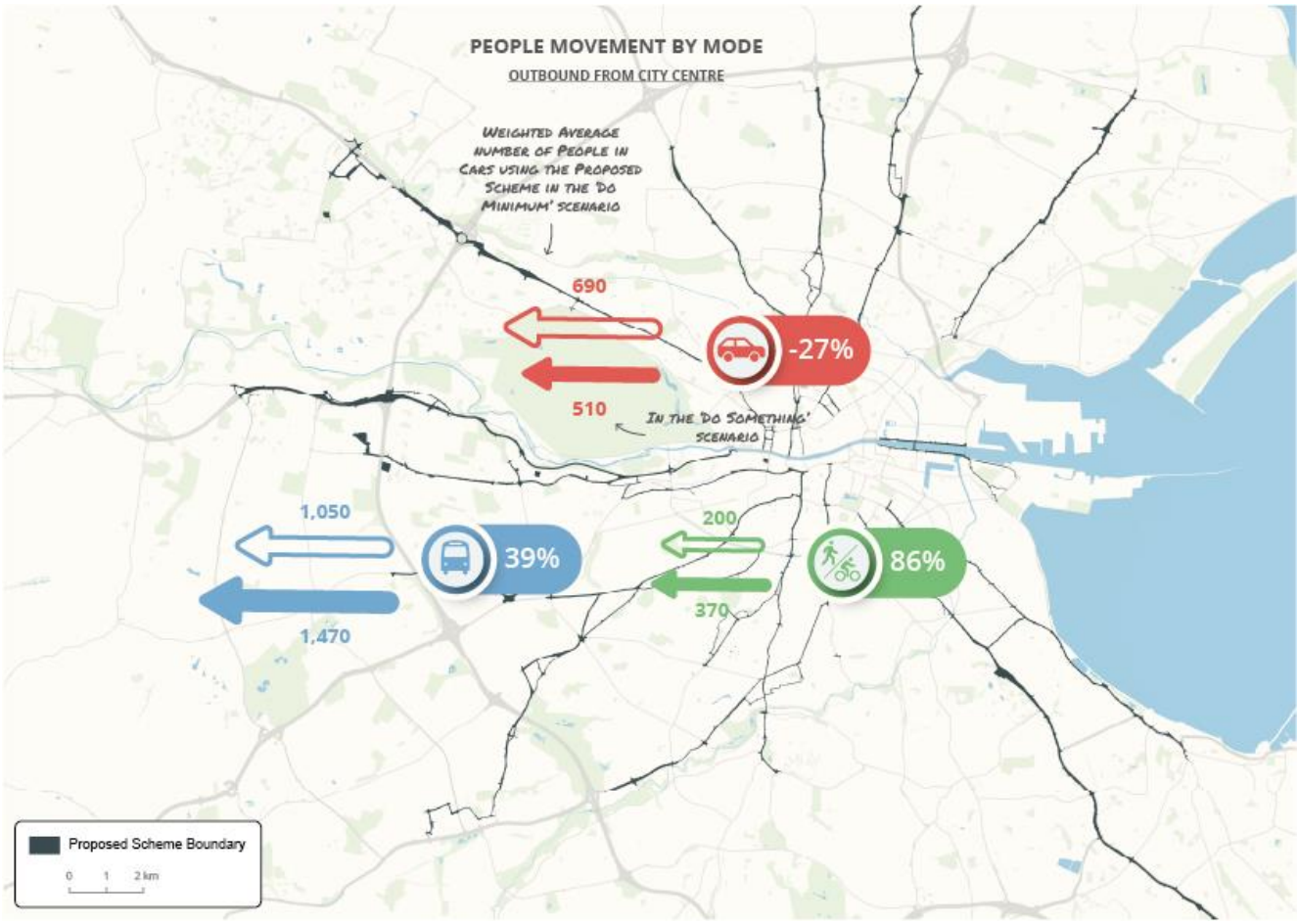

Diagram 7.8: Average People Movement by Mode during 2043 PM Peak Hour

As indicated in Diagram 7.8, on average across all Proposed Schemes, there is a predicted decrease of 27% in the number of people travelling via car, an increase of 39% in the number of people travelling via bus and an increase of 86% in the number of people walking and cycling along the Proposed Schemes during the PM Peak Hour in 2043.

Table 7.8 outlines the difference in modal split between the Do Minimum and Do Something (All Proposed Schemes) scenarios for each mode of transport in an outbound direction from the City Centre during the PM Peak Hour. The results indicate a 20% increase in total people moved as a result of the Proposed Schemes and a 46% increase in people moved by sustainable modes (Public Transport, Walk, Cycle).

Table 7.8: Modal Shift of 2043 PM Peak Hour along Proposed Schemes

Direction	Time Period	Mode of Transport	Do Minimum		Do Something		Difference	
			Hourly Trips	Modal Split (%)	Hourly Trips	Modal Split (%)	Hourly Trips	Difference (%)
Outbound from the City Centre	PM Peak Period	General Traffic	694	36%	509	22%	-185	-27%
		Public Transport	1,058	54%	1,470	63%	413	39%
		Walking	86	4%	128	5%	42	49%
		Cycling	113	6%	241	10%	129	114%
		Combined Walk / Cycle	**199**	**10%**	**369**	**16%**	**171**	**86%**
		Sustainable Modes Total	**1,256**	**64%**	**1,840**	**78%**	**583**	**46%**
		Total (All modes)	**1,950**	**100%**	**2,349**	**100%**	**399**	**20%**

7.2.4.4 Movement of People by Bus

The following section presents the modelling outputs for the Movement of People by Bus. The results indicate that the improvements in bus priority infrastructure with the Proposed Schemes in place results in a substantial increase in bus patronage during the Peak Hours and throughout the day.

Diagram 7.9 to Diagram 7.12 present the difference in passenger loadings (Do Something minus Do Minimum loadings) on the Proposed Schemes in 2028 and 2043, AM and PM Peak Hours.

7.2.4.4.1 2028 AM Peak Hour Bus Passengers

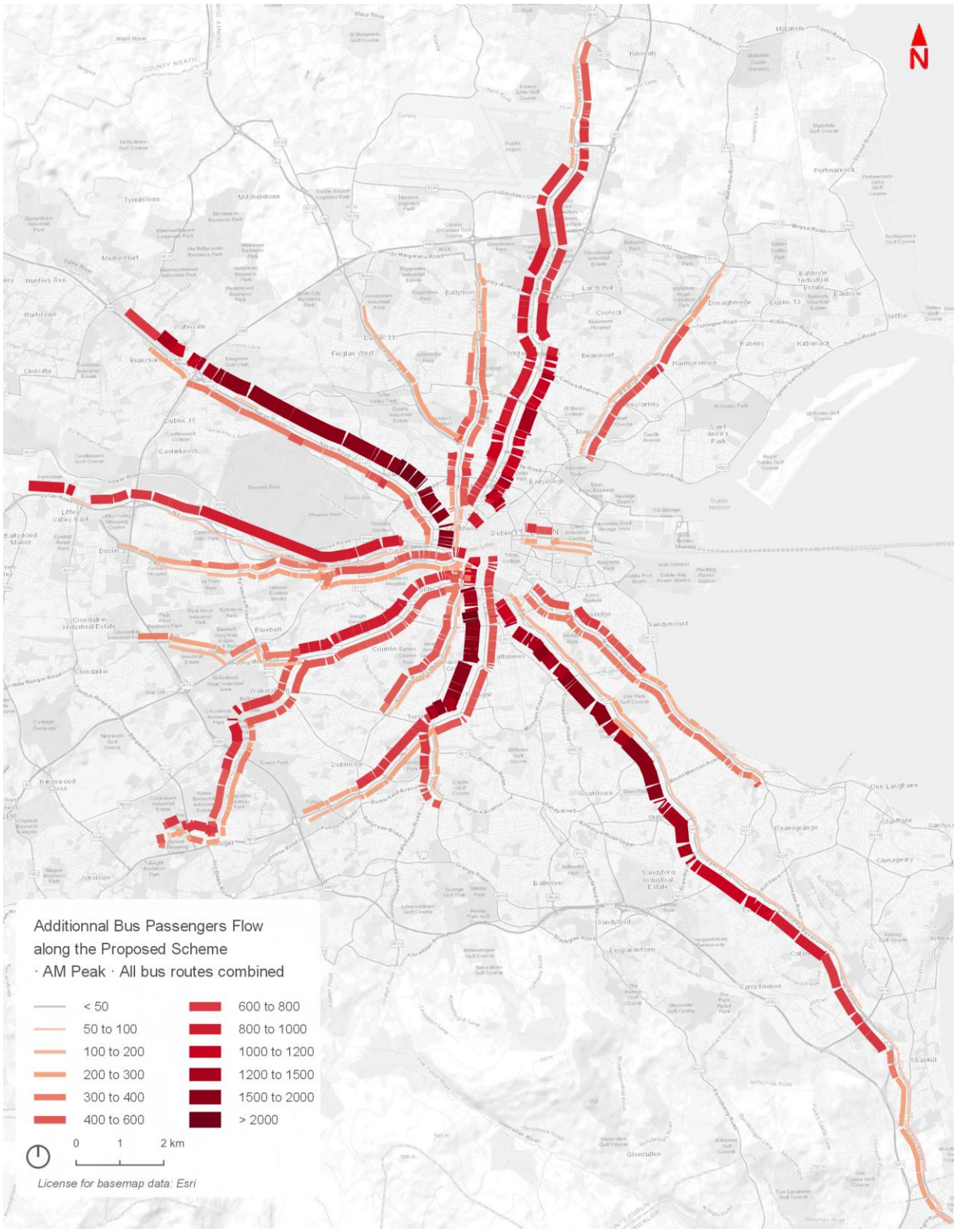

Diagram 7.9: AM Peak Hour Total Bus Passenger Flows Along the Proposed Schemes (All Bus Routes Combined)

As indicated in Diagram 7.9, there is a high growth in bus patronage along all the Proposed Schemes in the AM Peak Hour. Some of the bigger increases occur in the inbound direction on the Blanchardstown to City Centre, the Rathfarnham to City Centre and the Bray to City Centre schemes where the loadings reach more than 2,000

additional passengers per hour compared to the Do Minimum scenario. The Ringsend to City Centre Scheme shows an increase of approximately 300 passengers in the inbound direction in the 2028 AM Peak Hour.

Since many bus services commence and end further away from the direct alignment of the Proposed Schemes, but still benefit from the improvements provided, an assessment has been undertaken to compare the total passengers boarding 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 contents of Table 7.9 display the results for the 2028 AM Peak Hour for the Ringsend to City Core Bus Corridor Centre Scheme as well as for all Proposed Schemes.

Table 7.9: 2028 AM Peak Hour Bus Boardings on Routes using the Proposed Schemes (inc. boarding at stops outside Proposed Schemes)

Scheme	Do Minimum	Do Something	Difference in Boardings	Difference (%)
Ringsend to City Centre Scheme	19,300	20,620	1,320	6.8%
All Schemes	85,990	101,760	15,770	18.3%

As displayed in the contents of Table 7.9**,** there will be a 6.8% increase in people boarding bus routes which use any part of the Ringsend Scheme during the AM Peak Hour. This represents an addition of 1,320 passengers.

There will be a 18.3% increase in people boarding bus routes which use any part of the Proposed Schemes, representing an additional 15,770 passengers due to the bus priority improvements.

7.2.4.4.2 2028 PM Peak Hour Bus Passengers

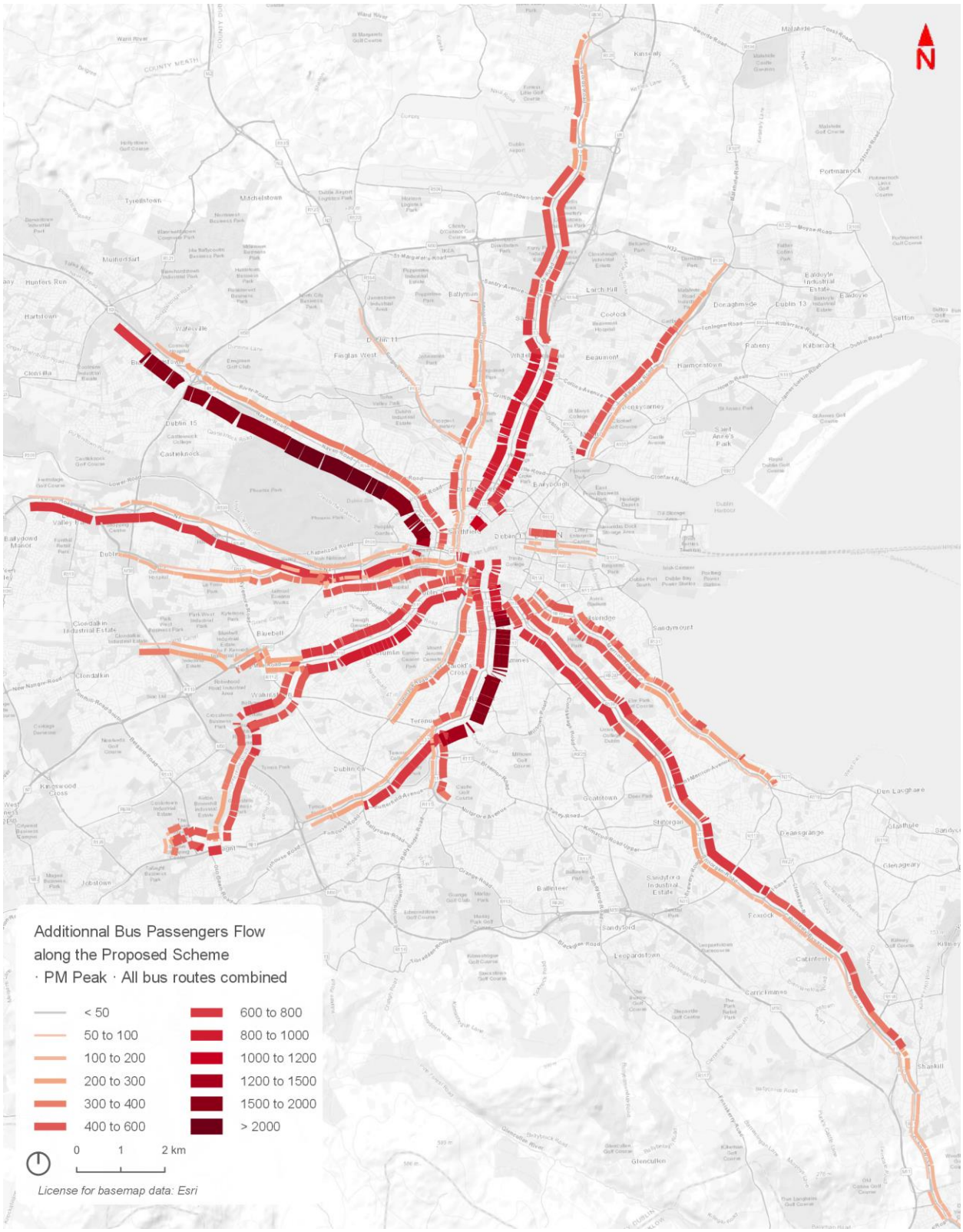

Diagram 7.10: PM Peak Hour Total Bus Passenger Flows Along the Proposed Schemes (All Bus Routes Combined)

As indicated in Diagram 7.10, there is a high growth in bus patronage along all the Proposed Schemes in the PM Peak Hour. Some of the bigger increases occur in the outbound direction on the Blanchardstown to City Centre and the Rathfarnham to City Centre where the loadings reach more than 2,000 additional passengers per hour

compared to the Do Minimum scenario. The Ringsend to City Centre Scheme shows an increase of approximately 600 passengers in the outbound direction.

The contents of Table 7.10 present the total passengers boarding bus routes that use any part of the Proposed Scheme (including those stops not directly on the Proposed Scheme) in the 2028 PM Peak Hour for the Ringsend to City Centre Scheme as well as for all Proposed Schemes.

Table 7.10: 2028 PM Peak Hour Bus Boardings on Routes using the Proposed Schemes (inc. boarding at stops outside Proposed Schemes)

Scheme	Do Minimum	Do Something	Difference in Boardings	Difference (%)
Ringsend to City Centre Scheme	13,580	14,370	790	5.8%
All Schemes	71,280	85,170	13,890	19.5%

As shown in Table 7.10, there will be a 5.8% increase in people boarding bus routes which use any part of the Ringsend to City Centre Core Bus Corridor Scheme during the PM Peak Hour. This represents an addition of 790 passengers.

There will be a 19.5% increase in people boarding bus routes which use any part of the Proposed Schemes, representing an additional 13,890 passengers due to the bus priority improvements.

7.2.4.4.3 2043 AM Peak Hour Bus Passengers

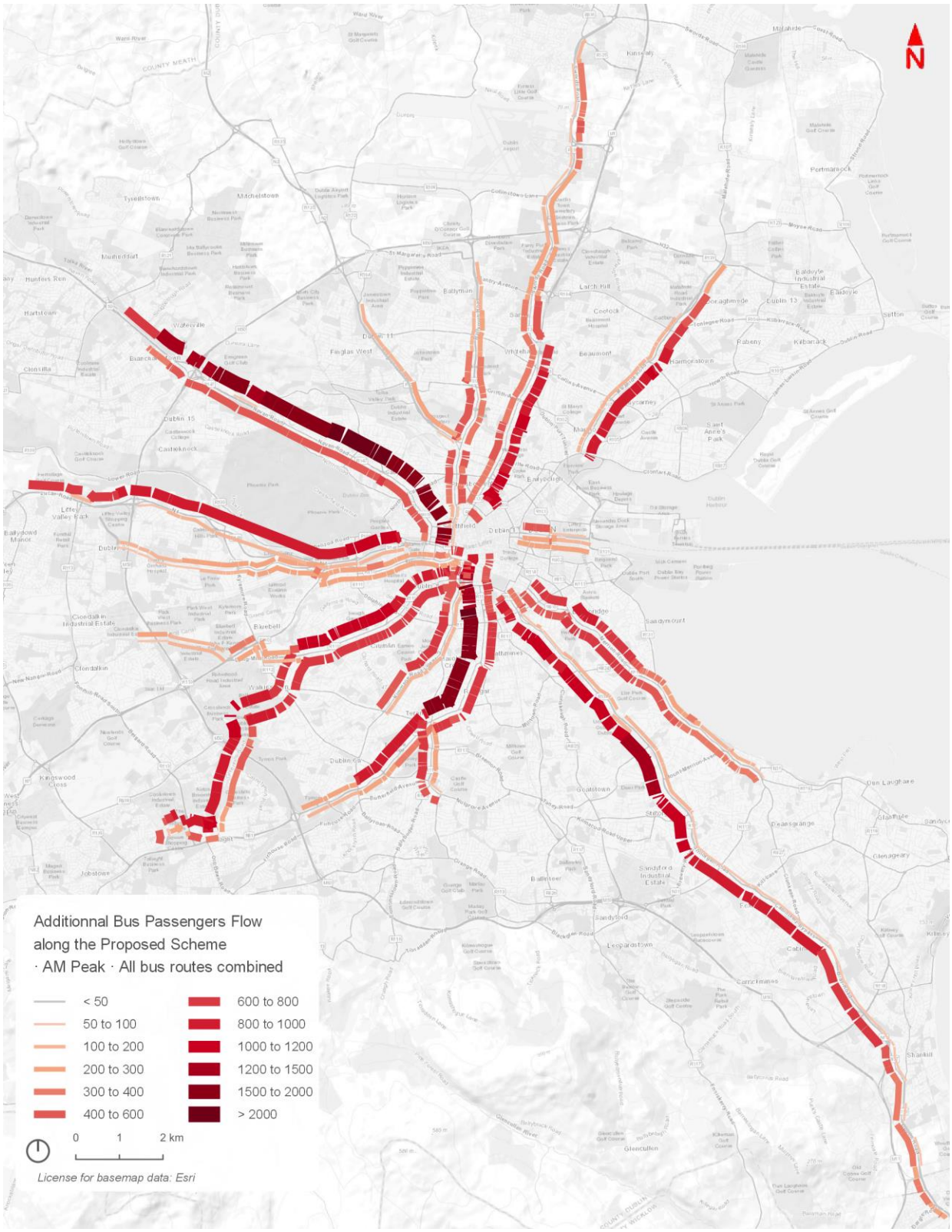

Diagram 7.11: AM Peak Hour Total Bus Passenger Flows Along the Proposed Schemes (All Bus Routes Combined)

As indicated in Diagram 7.11, there is a high growth in bus patronage along all the Proposed Schemes in the 2043 AM Peak Hour. Some of the bigger increases occur in the inbound direction on the Blanchardstown to City Centre and the Rathfarnham to City Centre where the loadings reach more than 2,000 additional passengers per

hour compared to the Do Minimum scenario. The Ringsend to City Centre Scheme shows an increase of approximately 400 passengers in the inbound direction.

Table 7.11 presents the total passengers boarding bus routes that use any part of the Proposed Scheme (including those stops not directly on the Proposed Scheme) in the 2043 AM Peak Hour for the Ringsend to City Centre Core Bus Corridor Scheme as well as for all Proposed Schemes.

Table 7.11: 2043 AM Peak Hour Bus Boardings on Routes using the Proposed Schemes (inc. boarding at stops outside Proposed Schemes)

Scheme	Do Minimum	Do Something	Difference in Boardings	Difference (%)
Ringsend to City Centre Scheme	17,703	21,005	3,302	18.7%
All Schemes	95,030	118,550	23,520	24.8%

As shown in Table 7.11, there will be a 18.7% increase in people boarding bus routes which use any part of the Ringsend to City Centre Core Bus Corridor Scheme during the AM Peak Hour. This represents an addition of 3,302 passengers in the AM Peak Hour.

There will be a 24.8% increase in people boarding bus routes which use any part of the Proposed Schemes, representing an additional 23,520 passengers due to the bus priority improvements.

7.2.4.4.4 2043 PM Peak Hour Bus Passengers

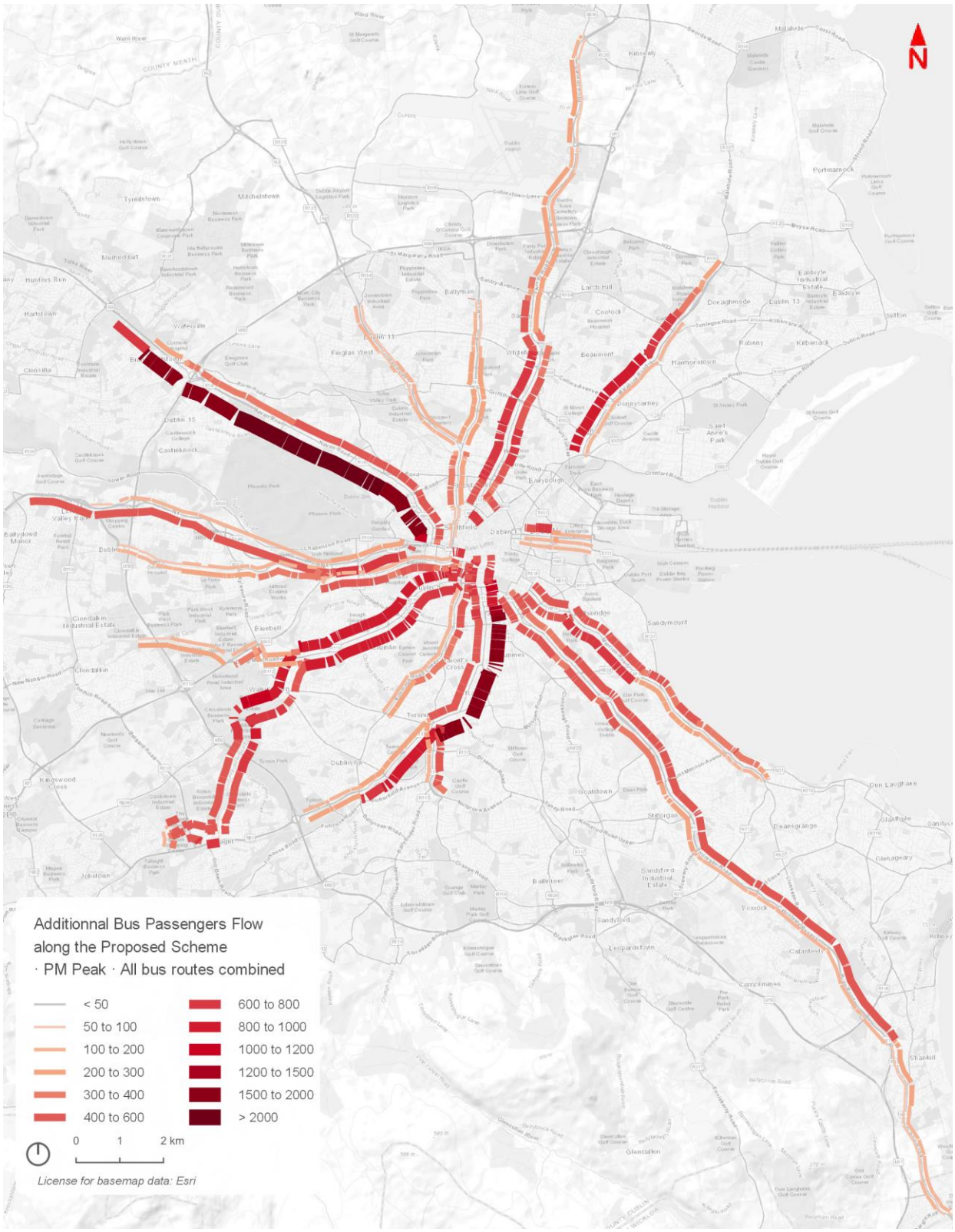

Diagram 7.12: PM Peak Hour Total Bus Passenger Flows Along the Proposed Schemes (All Bus Routes Combined)

As indicated in Diagram 7.12, there is a high growth in bus patronage along all the Proposed Schemes in the PM Peak Hour. Some of the bigger increases occur in the outbound direction on the Blanchardstown to City Centre and the Rathfarnham to City Centre where the loadings reach more than 2,000 additional passengers per hour

compared to the Do Minimum scenario. The Ringsend to City Centre Scheme shows an increase of approximately 600 passengers in the outbound direction.

Table 7.12 presents the total boardings on bus routes that use any part of the Proposed Scheme (including those stops not directly on the Proposed Scheme) in the 2043 PM Peak Hour for the Ringsend to City Centre Scheme as well as all Proposed Schemes.

Table 7.12: 2043 PM Peak Hour Bus Boardings on Routes using the Proposed Schemes (inc. boarding at stops outside Proposed Schemes)

Scheme	Do Minimum	Do Something	Difference in Boardings	Difference (%)
Ringsend to City Centre Scheme	10,755	13,552	2,797	26.0%
All Schemes	78,120	98,390	20,270	25.9%

As shown in Table 7.12, there will be an 26.0% increase in people boarding bus routes which use any part of the Ringsend to City Centre Core Bus Corridor Scheme during the PM Peak Hour. This represents an addition of 2,797 passengers in the AM Peak Hour.

There will be a 25.9% increase in people boarding bus routes which use any part of the Proposed Schemes, representing an additional 20,270 passengers due to the bus priority improvements.

7.2.5 Integration with Other Public Transport Modes

The aim of the CBC Infrastructure Works is to provide improved walking, cycling and bus infrastructure, which will enable and deliver efficient, safe, and integrated sustainable transport movement along the corridor. In tandem with this aim a key objective of the Works applicable to the Proposed Scheme is to:

- 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.

The modelling suite has been used to assess the change in connectivity and integration with other public transport services and the following section presents this assessment based on the following metrics:

- Total Boardings by Public Transport (PT) Mode (including non-bus modes);
- Level of interchange with other public transport services; and
- Average Public Transport Networkwide Travel Speeds.

7.2.5.1 Passenger Boardings by Public Transport Mode

The following section presents the number of passenger boardings by each of the PT sub-modes (Rail, Luas, Bus and Metro) within the Study Area. The results are presented in Table 7.13 for the Do Minimum and Do Something scenarios for the 2028 and 2043 assessment years in the AM and PM Peak Hour periods.

Table 7.13: 2028 AM Peak Hour PT Boardings

Public Transport Mode	Do Minimum	Do Something	Difference in Boardings	Difference (%)
Rail	26,060	25,820	-240	-1%
Luas	25,930	25,070	-860	-3%
Bus	81,790	95,710	13,920	17%
Total	**133,780**	**146,600**	**12,820**	**10%**

As presented in Table 7.13 with the Proposed Schemes in place, there will be an estimated 10% more passenger boardings across all PT services and 17% more boarding on bus services in the AM Peak Hour. The improved bus infrastructure results in slight reductions in boardings on Rail and Luas services, which will help provide additional resilience for these modes to accommodate future travel demand growth.

Table 7.14: 2028 PM Peak Hour PT Boardings

Public Transport Mode	Do Minimum	Do Something	Difference in Boardings	Difference (%)
Rail	30,150	30,990	840	3%
Luas	21,520	20,740	-780	-4%
Bus	72,370	85,730	13,360	18%
Total	**124,040**	**137,460**	**13,420**	**11%**

As presented in Table 7.14 with the Proposed Schemes in place, there will be an estimated 11% increase in total passengers boarding PT services and 18% more boardings on buses services in the PM Peak Hour in 2028. The improved bus infrastructure results in a slight reduction in boardings on Luas services, which will help provide additional resilience for this mode to accommodate future travel demand growth in the PM peak period. Rail boardings increase due to additional interchange between Rail and bus services.

Table 7.15: 2043 AM Peak Hour PT Boardings

Public Transport Mode	Do Minimum	Do Something	Difference in Boardings	Difference (%)
Rail	33,070	36,200	3,130	9%
Luas	46,370	46,330	-40	0%
Bus	90,110	100,050	9,940	11%
Metro	18,700	18,730	30	0%
Total	**188,250**	**201,310**	**13,060**	**7%**

As presented in Table 7.15, with the Proposed Schemes in place, there will be a predicted 7% increase in total passengers boarding PT services and a 11% increase in boardings on bus services in the AM Peak Hour in 2043. The improved bus infrastructure results in negligible changes in boardings on Luas and MetroLink services. Rail boardings increase due to additional interchange between Rail and bus services.

Table 7.16: 2043 PM Peak Hour PT Boardings

Public Transport Mode	Do Minimum	Do Something	Difference in Boardings	Difference (%)
Rail	36,200	34,700	-1,500	-4%
Luas	34,720	38,330	3,610	10%
Urban Bus	78,180	89,500	11,320	14%
Metro	12,660	11,680	-980	-8%
Total	**161,760**	**174,210**	**12,450**	**8%**

As presented in Table 7.16, with the Proposed Schemes in place, there will be an estimated 8% increase in total passengers boarding PT services and a 14% increase in boardings on bus services in the PM Peak Hour 2043. The improved bus infrastructure results in slight reductions in boardings on Rail and MetroLink services, which will help provide additional resilience for these modes to accommodate future travel demand growth. Luas boardings increase due to additional interchange between Luas and bus services. Luas boardings increase due to additional interchange between Luas and bus services.

7.2.5.1.1 Public Transport Interchange

To determine the impact the Proposed Schemes will have on the integration and complementarity between the different PT modes, the number of transfers between each PT modes (Bus, Rail, Luas and Metro) has been extracted from the modelling suite. The analysis compares the Do Minimum and Do Something in the AM Peak Hour period for each forecast year (2028, 2043).

Table 7.17: 2028 AM Peak Hour Transfers between PT Modes

	Do Minimum					Do Something			
To:	**Bus**	**Rail**	**Luas**	**Total**		**Bus**	**Rail**	**Luas**	**Total**
Bus	3,840	3,330	6,900	**14,070**		4,500	3,350	7,020	**14,870**
Rail	3,710	60	1,800	**5,570**		4,080	60	1,560	**5,700**
Luas	5,090	450	400	**5,940**		5,280	340	310	**5,930**
Total	**12,640**	**3,840**	**9,100**	**25,580**		**13,860**	**3,750**	**8,890**	**26,500**

As shown in Table 7.17, the total number of transfers between PT modes will increase by 4% from 25,580 in the Do Minimum scenario to 26,500 in the Do Something scenario, Transfers from Rail and Luas to buses will increase by 6% from 8,800 to 9,360 with the Schemes in place. This highlights the increased level of accessibility and transfer opportunities facilitated by the Proposed Schemes.

The contents of Table 7.18 present the predicted AM Peak Hour transfers between each PT Mode (including Metrolink) in 2043.

Table 7.18: 2043 AM Peak Hour Transfers between PT Modes

	Do Minimum					Do Something				
To:	**Bus**	**Rail**	**Luas**	**Metro**	**Total**	**Bus**	**Rail**	**Luas**	**Metro**	**Total**
Bus	4,850	5,740	9,220	3,890	**23,700**	7,000	5,730	10,540	4,430	**27,700**
Rail	4,900	100	3,630	2,480	**11,110**	4,080	90	3,670	2,370	**10,210**
Luas	6,210	1,050	850	500	**8,610**	7,200	930	860	620	**9,610**
Metro	2,450	980	410	0	**3,840**	2,640	870	360	0	**3,870**
Total	**18,410**	**7,870**	**14,110**	**6,870**	**47,260**	**20,920**	**7,620**	**15,430**	**7,420**	**51,390**

As shown above, with the roll out of the GDA Strategy the level of interchange increases substantially in the period from 2028 to 2043 without the Proposed Schemes. The total number of transfers between PT modes is expected to increase by 9% from 47,260 in the Do Minimum scenario to 51,390 in the Do Something scenario (with the Proposed Schemes in place). Transfers to buses predicted to increase by 17% from 23,700 to 27,700. This highlights the increased level of accessibility and transfer opportunities facilitated by the Proposed Schemes.

The Ringsend to City Centre scheme will run in close proximity with the LUAS Red Line in Docklands, although the transfers between them are expected to be limited as they both serve radial routes towards the City Centre.

7.2.5.2 Average Public Transport Network Wide Travel Speeds

In order to assess the travel time and integration efficiencies provided by the Proposed Schemes, an average per passenger PT network-wide travel speed metric has been extracted from the modelling suite[7]. The metric considers the average speed across all public transport modes for the entire Study Area which covers all Proposed Schemes.

Table 7.19: 2028 AM Peak Hour Average Journey Speed per PT Passenger (km/h)

Scenario	Do Minimum	Do Something	Speed Difference (%)
All Schemes Scenario	21.13	23.08	+9.2%

[7] This metric combines Public Transport Passenger Travel Time and Travel Distance and removes the variation in the number of trips between each scenario providing an indication of the overall efficiency of the PT network for each scenario.

As presented in In order to assess the travel time and integration efficiencies provided by the Proposed Schemes, an average per passenger PT network-wide travel speed metric has been extracted from the modelling suite. The metric considers the average speed across all public transport modes for the entire Study Area which covers all Proposed Schemes.

Table 7.19, with all Proposed Schemes operational, the average speed per PT passenger is expected to grow by 9.2%, representing a substantial increase in the average travel speeds for all PT users in 2028.

Table 7.20: 2043 AM Peak Hour Average Journey Speed per PT Passenger (km/h)

Scenario	Do Minimum	Do Something	Speed Difference (%)
All Schemes Scenario	21.03	22.85	+8.7%

As presented in Table 7.20, with all Proposed Schemes operational, the average speed per PT passenger is expected to grow by 8.7%, representing a substantial increase in the average travel speeds for all PT users in 2043.

7.2.6 General Traffic

7.2.6.1 Overview

The Proposed Scheme and the other proposed Core Bus Corridor schemes aim to provide an attractive alternative to the private car and promote a modal shift to public transport, walking and cycling. As shown in the preceding sections, the transport modelling indicates, that there will be a significant level of modal shift from car to more sustainable modes of travel. It is anticipated there will be a reduction in general traffic (car) trips of approximately 13,000 and 25,000 on a typical weekday (7am-7pm) in 2028 and 2043 respectively. This represents the equivalent of the removal of up to 78km of traffic queues in 2028 and 150km by 2043 across the Dublin road network. For context, the queue reduction corresponds to approximately twice the length of the M50 motorway in 2028 and almost four times the length of the M50 in 2043. This reduction in car demand facilitated by the schemes will provide significant opportunities to manage the road network more effectively and promote greater movement of people by sustainable modes.

It is recognised, however, that there will be an overall reduction in operational capacity for general traffic along the direct study area of each scheme 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 (and the other Proposed Core Bus Corridor Schemes) will likely create some level of trip redistribution onto the surrounding road network.

When all Core Bus Corridor schemes are operational, however, more people will be able to move in a more effective and efficient manner by sustainable modes.

To demonstrate this effect, a scenario has been modelled whereby the Proposed Scheme as well as all other proposed Core Bus Corridor schemes are operational in both 2028 and 2043.

7.2.6.2 Assessment Considerations

It should be noted that the Do Minimum and Do Something scenarios assume that travel behaviour will remain broadly consistent over the assessment period (2028-2043) and that car demand data used for this assessment, represents a reasonable worst-case scenario. It is anticipated, however, that societal trends in the medium to long term may reduce car demand further due to the ongoing changes to travel behaviour which would include further shifts towards sustainable travel; flexibility in working arrangements brought on following COVID-19 restrictions; and delayed car ownership trends that are emerging.

Goods vehicles

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.

Cycling

The Proposed Scheme (and the other proposed Core Bus Corridor Schemes) will facilitate a step change in the level of segregated cycling provision in comparison with existing conditions along the entire length of the corridors. The representation of improvements to cycling infrastructure in the transport models follows a standard approach and are appropriate for the strategic nature of the model. Improvements are applied by way of an increase in cycling speed on the network where the improvements have been made, as well as new connectivity by way of new links as part of the proposals. Modelling cycling infrastructure improvements using speeds is a standard approach that means an increase in cycling mode share can be obtained through a reduction in the modelled cost of a journey by bicycle relative to other modes. This has been applied as part of the modelling of the Proposed Scheme to represent improvements with a cycling mode share of approximately 5-7% achieved. The transport modelling undertaken, is therefore conservative in terms of the predicted cycling mode share. This has the effect that predicted traffic levels are on the higher and conservative side in relation to a potential future receiving environment. This is appropriate for EIAR purposes as a reasonable worst-case has been assessed in terms of traffic levels on the road network.

It should be noted, however, that the Proposed Scheme (and the other proposed Core Bus Corridor schemes) has been designed to cater for much higher levels of cycling uptake and the significant segregation and safety improvements to walking and cycling infrastructure. This will provide the opportunity for a significant increase in the movement of people travelling sustainably along the corridor and will therefore cater for higher levels of future population and employment growth and support higher cycling mode share levels, which would otherwise not be achieved in the absence of the proposals. The background environment changes with regards to cycling segregation and safety improvements will encourage more people to cycle in greater numbers.

Demand Management

The GDA Transport Strategy, of which the Proposed Scheme (and the other proposed Core Bus Corridor Schemes) are a key element of, aims to provide for the efficient, effective and sustainable movement of people and goods and to accommodate future travel growth in a managed and balanced way. Increased public transport provision, coupled with enhanced cycling and walking facilities in the urban areas, will enable a transition to more sustainable travel modes for many people in addition to providing the means to cater for much of the increased travel demand. However, without complementary demand management measures the full benefits of the Strategy will not be achieved.

The Proposed Scheme (and the other proposed Core Bus Corridor schemes) will be an enabler to allow for further reductions in car mode share with corresponding transfer to public transport, walking and cycling modes. Sustainable modes capacity is significantly enhanced by the Core Bus Corridors which in turn will support demand management measures which could be applied to meet climate emission targets. This growth in sustainable mode share cannot be accommodated in the absence of the Proposed Scheme (and the other proposed Core Bus Corridor schemes). A greater increase in sustainable mode share can be accommodated by the Core Bus Corridors which would in turn lead to further reductions in traffic levels, beyond those reported in this assessment.

7.2.6.3 General Traffic Flow Changes

To determine the impact that the Proposed Scheme (in combination with the other proposed Core Bus Corridor schemes) will have in terms of general traffic redistribution, the LAM Opening Year (2028) and Design Year (2043) model results have been used to identify the difference in general traffic flows between the Do Minimum and Do Something scenarios i.e. with and without all proposed Core Bus Corridor schemes in place.

The changes in traffic flows have been presented with reference to TII's Traffic and Transport Assessment Guidelines (May 2014) i.e., traffic redistribution resulting in an increase or decrease above 100 combined flows (i.e. in a two-way direction) along roads in the vicinity of the Core Bus Corridors in the AM and PM Peak Hours are presented. The threshold aligns with an approximate 1 vehicle per minute increase or decrease per direction on any given road. This is a very low level of traffic change on any road type and ensures that a robust assessment of the changes in traffic levels are presented.

Diagram 7.13 and Diagram 7.13 below illustrate the difference in traffic flows (Do Minimum vs Do Something) on roads in the AM Peak Hour for the 2028 Opening Year and 2043 Design Year with the Proposed Scheme and all other proposed Core Bus Corridor schemes in place. The diagrams are extracts from Figure 6.13 and 6.15 in TIA Appendix 3 (Maps). Reductions in traffic flows are indicated by the blue lines with increases in traffic flow indicated by the red lines.

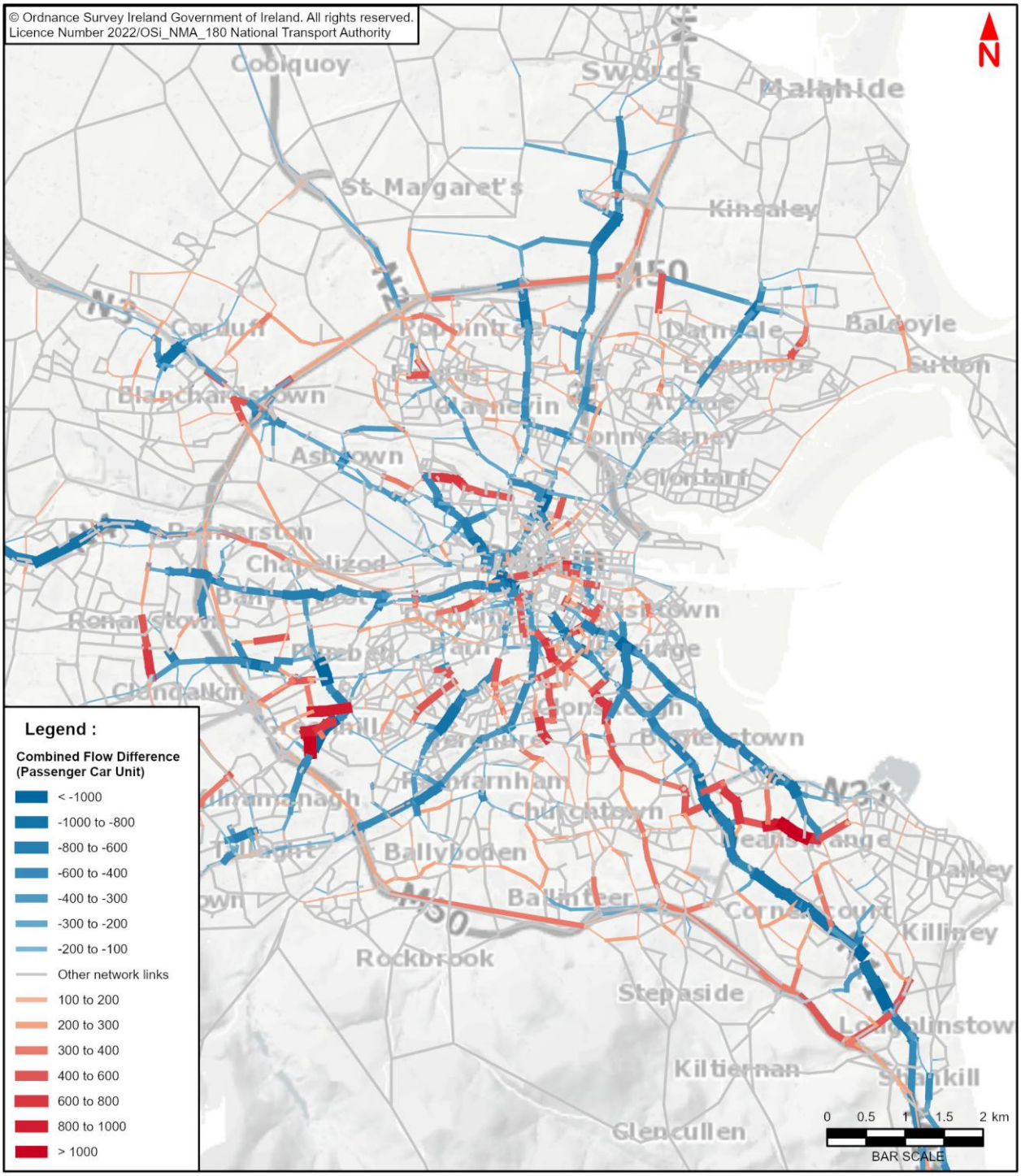

Diagram 7.13 Flow Difference on Road Links (Do Minimum vs. Do Something), AM Peak Hour, 2028 Opening Year – Cumulative Scenario

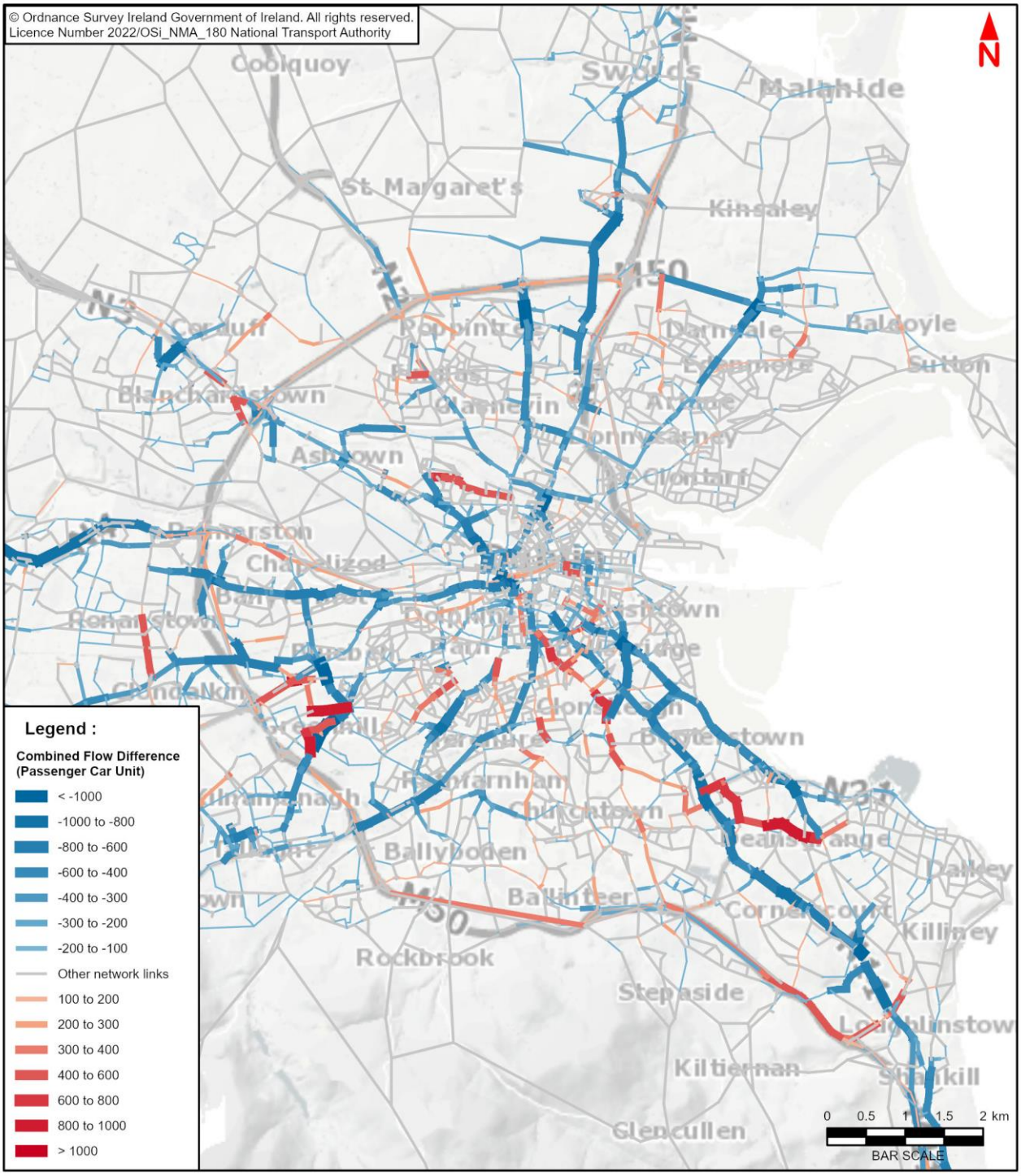

Diagram 7.14 Flow Difference on Road Links (Do Minimum vs. Do Something), AM Peak Hour, 2043 Design Year – Cumulative Scenario

Diagram 7.15 and Diagram 7.16 below illustrate the difference in traffic flows (Do Minimum vs Do Something) on roads in the PM Peak Hour for the 2028 Opening Year and 2043 Design Year with the Proposed Scheme and all other proposed Core Bus Corridor schemes in place. The maps are extracts from Figure 6.14 and 6.16 in TIA Appendix 3 (Maps). Reductions in traffic flows are indicated by the blue lines with increases in traffic flow indicated by the red lines.

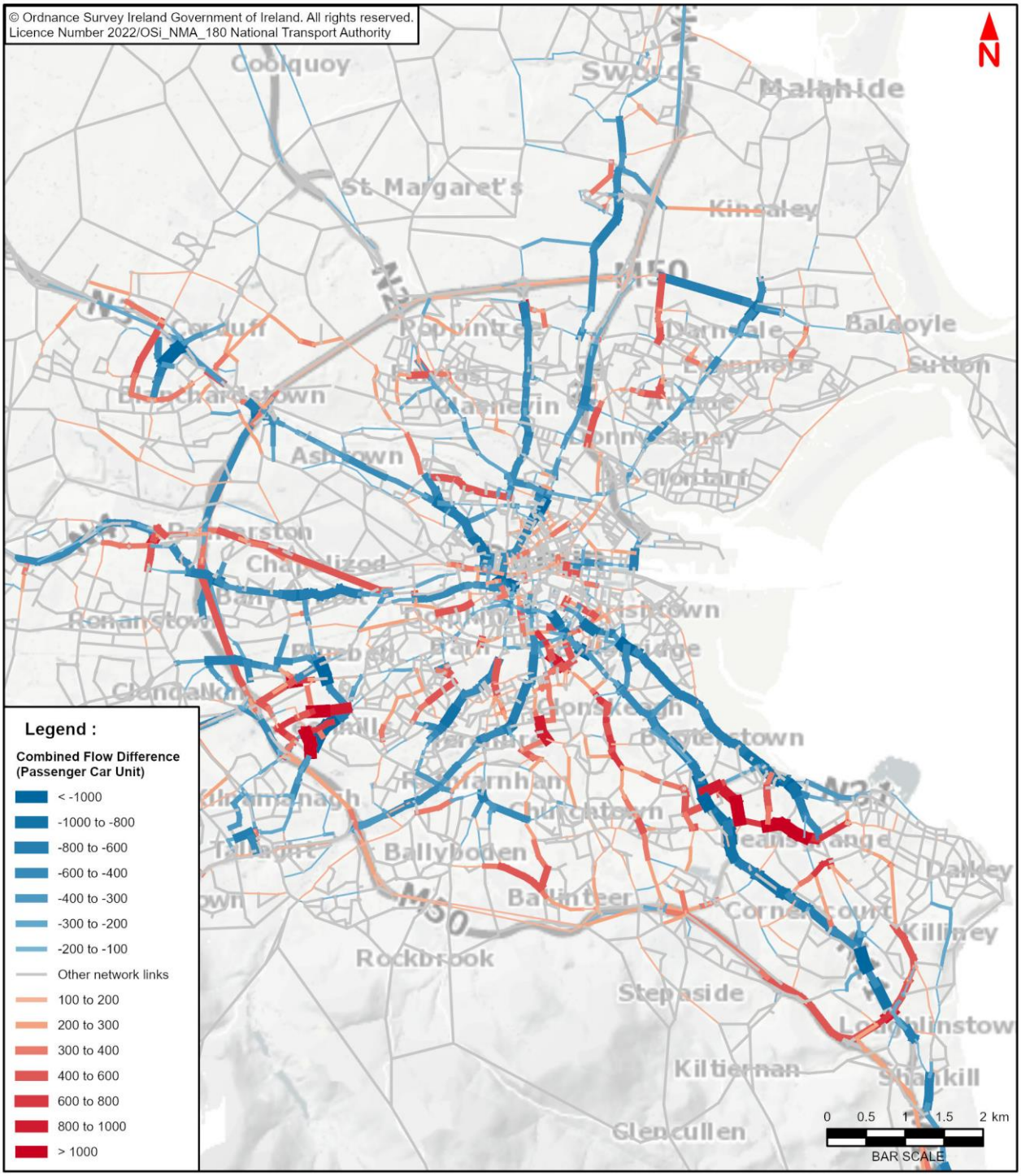

Diagram 7.15 Flow Difference on Road Links (Do Minimum vs. Do Something), PM Peak Hour, 2028 Opening Year – Cumulative Scenario

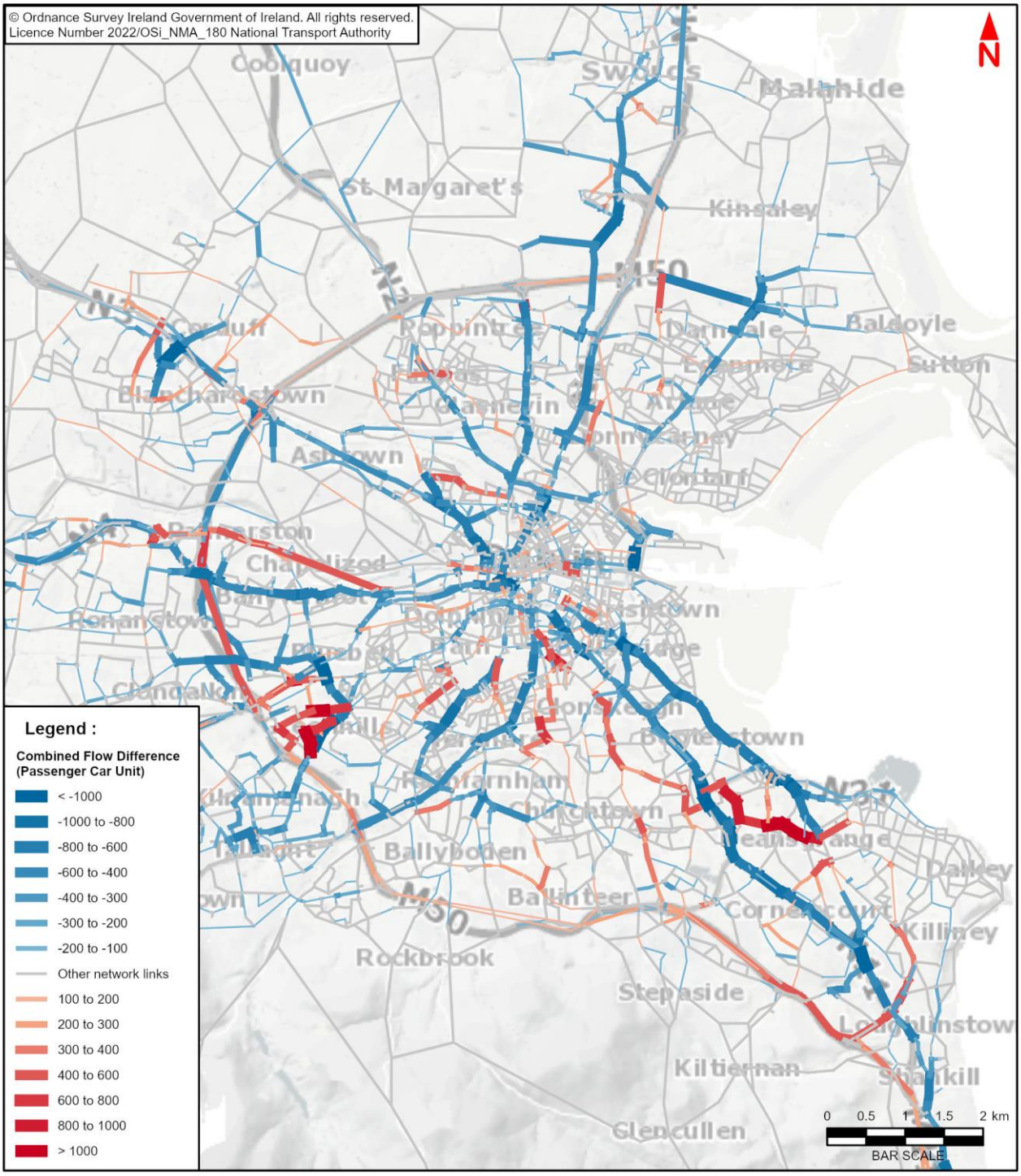

Diagram 7.16 Flow Difference on Road Links (Do Minimum vs. Do Something), PM Peak Hour, 2043 Design Year – Cumulative Scenario

7.2.6.4 Cumulative Traffic Flow Summary

As can be seen in the diagrams above, the level of traffic redistribution is shown to reduce between the Opening and Design years as further modal shift from car to sustainable modes occurs during the period, facilitated by the further roll out of the GDA Transport Strategy measures and, importantly, the sustainable mode capacity provided Core Bus Corridor schemes. As mentioned previously the implementation of all Core Bus Corridor schemes will facilitate the ability of the network to accommodate significant levels of additional travel growth by sustainable modes. It should be noted that higher levels of modal shift from car to sustainable modes are likely to occur either

during or before this period due to the requirement to achieve, for example, 2023 Climate Action Plan (CAP) (DCCAE 2021) targets with further policy measures, likely to be implemented. As the specifics of these policy measures have yet to be determined they are, therefore, not included in the transport modelling to ensure a conservative and reasonable worst-case assessment of effects.

7.2.7 People Movement – Cumulative Impact Summary

The cumulative impact for the movement of People Movement by sustainable modes with the Proposed Schemes in place has been appraised as a qualitative assessment, taking into account the changes in mode share, demand changes by mode along the Proposed Scheme (and the other Core Bus Corridors) as well as bus usage and integration with other public transport modes, as presented above. It is acknowledged that a certain level of residual traffic redistribution is likely, however, these increases are largely constrained to new road infrastructure (as part of the Proposed Schemes) and regional and distributor roads that are designed to cater for high volumes of traffic. The Proposed Schemes in combination have been adjudged to deliver a **High positive** overall impact on People Movement by sustainable modes. The Proposed Schemes can be shown to deliver significant improvements in People Movement by sustainable modes along the direct Proposed Scheme alignments, particularly by bus and cycling, with reductions in car mode share due to the enhanced sustainable mode provision. The Proposed Schemes provide for enhanced integration and efficiencies for all public transport modes by facilitating substantial increases in public transport average network wide travel speeds.

8. Summary and Conclusions

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 Proposed Scheme comprises the development of improved bus priority along the northern and southern quay carriageways between R802 Talbot Memorial Bridge and R131 Tom Clarke East Link Bridge, whilst improved cycle infrastructure is to be provided along the entire route including throughout the residential settlement between R131 Tom Clarke East Link Bridge and R131 Sean Moore Road. This TIA provides a robust assessment of the scheme through qualitative assessment and quantitative analysis using a suite of multi-modal transport modelling tools.

The impacts during the construction phase are outlined in Table 8.1. During the Construction Phase, the Proposed Scheme will have **Low Negative** and temporary impacts to pedestrian access and parking and loading whilst it will have **Medium Negative** and temporary impacts to cyclist and bus access. General traffic redistribution is not anticipated to be a significant issue during the construction phase, however there will be a requirement for some localised temporary road closures for short durations of the daytime and / or night-time. Therefore, the impact on general traffic redistribution is anticipated to be a **Medium Negative** and temporary impact. The impact of construction traffic is anticipated to result in a **Low Negative** and temporary impact due to the low numbers of vehicles anticipated which are and below the thresholds set out in the Transport Assessments Guidelines.

Table 8.1: Summary of Potential Construction Phase Impacts

Assessment Topic	Effect	Potential Impact
Pedestrian Access	Restrictions to pedestrians along Proposed Scheme.	Low Negative
Cycling Access	Restrictions to cyclists along Proposed Scheme	Medium Negative
Bus Access	Restrictions to public transport along Proposed Scheme.	Medium Negative
Parking and Loading	Restrictions to parking / loading along Proposed Scheme.	Low Negative
General Traffic	Restrictions to general traffic along Proposed Scheme	Medium Negative
	Additional construction traffic flows upon surrounding road network	Low Negative

During the Operational Phase, the Proposed Scheme will deliver strong positive impacts to the quality of pedestrian, cycling and bus infrastructure during the Operational Phase providing for enhanced levels of People Movement in line with the scheme objectives. These improvements will help to provide an attractive alternative to

the private car and promote a modal shift to walking, cycling and public transport, allowing for greater capacity along the corridor to facilitate the sustainable movement of people as population and employment levels grow in the future.

This TIA demonstrates that the Proposed Scheme results in the following impacts:

- **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 **Low Positive impact** in Section 1, 2 and 3 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. Overall, the improvements will have a **Low Positive impact** in Section 1 and 2 and a **Medium Positive impact** in Section 3 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 **High Positive** impact.

- **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 **High Positive impact** in Section 1 and Section 2 and a **Negligible impact** along Section 3 the Proposed Scheme.

- **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 **Negligible impact** in Section 1, 2 and 3 of the Proposed Scheme.

- **People Movement:** Given the proposed amendments to the pedestrian, cycling, bus and parking / loading infrastructure outlined above, the Proposed Scheme will have greater capacity to facilitate 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 in 3.4% and 3.2% of passengers boarding buses during the 2028 AM and PM Peak hours respectively. During the 2043 scenario there will be an increase in 6.2% and 11.0% of passengers boarding buses during the AM and PM Peak Hours respectively. Overall, it is adjudged that the Proposed Scheme will have a **High Positive Impact** 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 **High Positive impact**.

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

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

  The results of the assessment demonstrate that the surrounding road network largely has the capacity to accommodate the redistributed general traffic as a result of the Proposed Scheme. The majority of assessed junctions that required further traffic analysis have V / C ratios that are broadly similar before and after the Proposed Scheme.

  Overall, it has been determined that the impact of the reduction in general traffic flows along the Proposed Scheme will be a **Low Positive impact** whilst the impact of the redistributed general traffic along the surrounding road network will have a **Low Negative impact.**

- **Network Wide Performance Indicators:** Given the impacts to the traffic conditions outlined above, there will be a knock-on effect to the operational efficiency of the road network beyond the direct and indirect study areas. A quantitative impact assessment has been undertaken using outputs from the NTA's ERM and LAM to determine the conditions to queuing, travel times, travel distances and network speeds during the Do Minimum and Do Something scenarios. The results of the assessment demonstrate that the impacts to the network wide performance indicators range between 0.5% and 1.16% and will therefore have a **Negligible impact.**

- **Cumulative Assessment**: 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, Walking, Cycling) as facilitated by the GDA Strategy implementation.

  The analysis indicates that the 12 BusConnects Proposed Schemes in place, there will be a high positive impact on sustainable mode share. The schemes will prevent any increase in private car traffic within the study area and will instead result in a reduction in car trips below 2020 levels.

  In the 2028 Opening Year scenario, it is estimated that for people travelling within the 500m catchment area (including City Centre) there will be a 12% increase in public transport trips, 2% decrease in general traffic trips (i.e. motorists) and a 14% increase in cycling trips in the AM Peak Hour and a 12% increase in public transport, 3% decrease in general traffic and a 12% increase in

cycling trips each day (7am-7pm). In the 2043 Design Year scenario, it is estimated that for people travelling within the 500m catchment area (including City Centre) there will be a 6% increase in public transport trips, 6% decrease in general traffic trips (i.e. motorists) and a 10% increase in cycling trips in the morning peak hour and a 7% increase in public transport, 7% decrease in general traffic and a 11% increase in cycling trips each day (7am-7pm).

General traffic levels reduce more in 2043 than when compared to 2028 due to the increased level of additional non-bus public transport infrastructure and services (MetroLink, Luas extensions and DART+ from the GDA Strategy) in tandem with the road capacity reduction measures as part of the Proposed Scheme leading to increased usage on all public transport modes.

The modelling outputs for the 2028 Cumulative Opening Year scenario demonstrate that there is a high growth in bus patronage along all the Proposed Schemes in the AM Peak Hour. The bigger increases occur in the inbound direction on the Blanchardstown to City Centre, the Rathfarnham to City Centre and the Bray to City Centre schemes where the loadings reach more than 2,000 additional passengers per Hour compared to the Do Minimum scenario.

In the 2028 Opening Year AM Peak Hour scenario with the Proposed Schemes in place, there will be an estimated 10% more passenger boardings across all public transport services and 17% more boardings on bus services. In the 2028 Opening Year PM Peak Hour scenario with the Proposed Schemes in place, there will be an estimated 11% increase in total passengers boarding Public transport services and 18% more passengers boarding buses services.

In the 2043 Design Year AM and PM Peak Hour scenarios, increase in total passengers boarding all public transport services will be 7% and 8% respectively, and the increase in passengers boarding bus services will increase by 11% and 14% respectively.

Overall, the Proposed Schemes are expected to deliver a **High Positive** Cumulative Impact on People Movement by sustainable modes.

The impacts during the Operational Phase are summarised in Table 8.2.

Table 8.2:Summary of Potential Operational Phase Impacts

Assessment Topic	Effect	Potential Impact
Pedestrian Infrastructure	Improvements to the quality of the pedestrian infrastructure along the Proposed Scheme.	Low Positive
Cycling Infrastructure	Improvements to the quality of the cycling infrastructure along the Proposed Scheme.	Medium Positive
Bus Infrastructure	Improvements to the quality of the bus infrastructure along the Proposed Scheme.	High Positive
Parking and Loading	A total loss of 88 parking / loading spaces along the Proposed Scheme.	Negligible
People Movement	Increases to the total number of people travelling through the Proposed Scheme.	High Positive
Bus Network Performance Indicators	Improvements to journey time and reliability indicators for bus users along the Proposed Scheme.	High Positive
General Traffic Network Performance Indicators	Reduction in general traffic flows along the Proposed Scheme.	Low Positive
	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.	Low Negative
Network Wide Performance Indicators	Deterioration to the network-wide queuing capacity, travel times, travel distances and average network speeds beyond the direct and indirect study areas.	Low Negative

Assessment Topic	Effect	Potential Impact
Cumulative Assessment	The Proposed Scheme in tandem with other Core Bus Corridors and GDA Strategy schemes will facilitate substantial mode shift from car to sustainable modes.	High Positive

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.

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