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 Liffey Valley to City Centre 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 Proposed Scheme is being planned to enable and deliver efficient, safe and integrated sustainable transport movement along the corridor. To achieve this overall objective, the National Transport Authority (NTA) has identified the following objectives:

- 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 will commence on the Fonthill Road at the tie in point with the new Liffey Valley Shopping Centre Bus Interchange and Road Improvement Scheme. The Proposed Scheme will continue along Fonthill Road where it will turn left onto Coldcut Road and continues to the bridge over the M50, subsequently turning right onto Ballyfermot Road. The Proposed Scheme will travel through Ballyfermot Village and continue onto Sarsfield Road, whilst city bound general traffic will be diverted via Le Fanu Road and Kylemore Road.

The Proposed Scheme will continue along Sarsfield Road, turning right at the junction with Con Colbert Road before turning right again onto Grattan Crescent. The Proposed Scheme will then turn right onto Emmet Road and will continue along Old Kilmainham, Mount Brown, James's Street and Thomas Street. At Cornmarket, the Proposed Scheme will turn right onto High Street. At the junction with Nicholas Street and Winetavern Street the Proposed Scheme will tie into the existing traffic management regime in the City Centre.

The design consists primarily of dedicated bus lanes in both directions where feasible, with alternative measures proposed, such as bus gates, at particularly constrained locations. Significant amendments to pedestrian and cycle facilities and traffic management are also proposed as part of the Proposed Scheme.

For the purposes of describing the Proposed Scheme it has been split into three sections as follows:

- Section 1: Liffey Valley to Le Fanu Road;
- Section 2: Le Fanu Road to Sarsfield Road; and
- Section 3: Sarsfield Road to City Centre.

Assessment Methodology

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 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 Movements: 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 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 the transient queues, overcapacity queues, 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

Section 1 of the Proposed Scheme consists of a 2.9km length comprising Fonthill Road, R833 Coldcut Road and R833 Ballyfermot Road, spanning from the roundabout south of Liffey Valley Shopping Centre on Fonthill Road to Le Fanu Road.

At present, footpaths and street lighting extend for the majority of the length of Section 1. Cycling facilities are discontinuous along this section and, where present, consist of cycle lanes, cycle tracks and combined bus and cycle lanes. There are no bus lanes currently present along Fonthill Road whilst bus lanes along this section are intermittent along R833 Coldcut Road and R833 Ballyfermot Road.

Section 2 of the Proposed Scheme consists of 2.6km of R833 Ballyfermot Road and Sarsfield Road from Le Fanu Road to R839 Inchicore Road.

Footpaths are present on either side of the carriageway along Section 2 vary between 1.8m and 2m in width. Cycle facilities are intermittent and vary in quality and predominately consist of shared bus and cycle lanes or cycle lanes. Bus lanes are available in short segments along Section 2. Notably, a bus gate is in place at the Sarsfield Road / R839 Inchicore Road junction which limits westbound traffic on Sarsfield Road to buses only.

Section 3 commences at the Sarsfield Road / R839 Inchicore Road Junction and has a length of approximately 3.7km. It spans a length between R839 Memorial Road and Thomas Street.

In addition to the main corridor, additional improvements are proposed along residential streets which run broadly parallel to a section of R810 James Street to the south (Newington Lane, Basin View, St. James's Avenue, Grand Canal Place and Echlin Street) between the James's Street / Newington Lane Junction and James's Street / Echlin Street Junction.

Currently, footpaths are available along both sides of Memorial Road and R810 Emmet Road, R810 Old Kilmainham, R810 Mount Brown, R810 James Street and R810 Thomas Street. Footpath widths vary between 1.6 and 3m. The provision of dedicated cycling facilities is discontinuous and varies throughout Section 3.

Bus lane provision is limited along R839 Inchicore Road, R839 Grattan Crescent, R810 Emmet Road, R810 Old Kilmainham. Eastbound and westbound bus lanes are provided for most of the length of R810 James Street and R810 Thomas Street between Bow Lane West to R810 High Street.

Predicted Impacts

Construction Phase

The impacts during the Construction Phase are outlined in the table below. During the Construction Phase, the Proposed Scheme will have low negative impacts to pedestrian and bus infrastructure and parking and loading and a medium negative impact to cycling infrastructure. 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 day. Therefore, the impact on general traffic redistribution is anticipated to be a medium negative impact. The impact of construction traffic is anticipated to result in a low negative impact due to the low numbers of vehicles anticipated which are and below the thresholds set out in the Transport Assessments Guidelines.

Summary of Construction Phase Predicated Impacts

Assessment Topic	Effect	Predicted Impact
Pedestrian Infrastructure	Restrictions to pedestrians along Proposed Scheme	Low negative
Cycling Infrastructure	Restrictions to cyclists along Proposed Scheme	Medium negative
Bus Infrastructure	Restrictions to public transport along Proposed Scheme	Low 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 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. 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 of ratings ranging from B to F. During the Do Something scenario, i.e. following the development of the Proposed Scheme, the LoS consists predominantly of the highest A / B ratings, with the exception of three Cs. Overall, the improvements to the quality of the pedestrian infrastructure will have a **Medium Positive impact** in Section 1, 2 and 3 of the Proposed Scheme.
- **Cycling Infrastructure:** The Proposed Scheme also consists of measures to enhance the existing cycling infrastructure along the direct study area. A LoS assessment was undertaken using an adapted version of the NTA's National Cycle Manual Quality of Service (QoS) Evaluation criteria. The results of the assessment demonstrate that the LoS during the Do Minimum scenario consists predominantly of C / D ratings. During the Do Something scenario, the LoS consists predominantly of the highest A / B ratings, with the exception of one C and four Ds. At three of the four locations which have a D rating in the Do Something, no bespoke cycle provision is proposed however a proposed local bus gates will greatly reduce through traffic creating an environment more conducive to cycling. Overall, the improvements to the quality of the cycling infrastructure will have a **High Positive impact** in Section 1, 2 and 3 of the Proposed Scheme.
- Bus Infrastructure: The implementation of the Proposed Scheme will result in improvements in the quality of bus infrastructure provision along the direct study area. A qualitative impact assessment has been undertaken based on the provision of bus priority, pedestrian accessibility, and changes to the bus stop facilities. The results of the assessment demonstrate that the improvements to the quality of the bus infrastructure will have a **Medium Positive impact** in Section 1, 2 and 3 of 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 188 spaces (-62 spaces in Section 1, -16 spaces in Section 2 and -110 spaces in Section 3) relative to an overall retention of 4,461 spaces. Given the nature of the loss in parking and the availability of alternative spaces in the indirect study area, the impact is expected to be **Low Negative** along 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 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 in the number of people travelling along the corridor by sustainable modes of 54% and 52% during the 2028 AM and PM Peak respectively. During the 2043 scenario there will be an increase of 74% and 92% in the number of people travelling along the Proposed Scheme by sustainable modes during the AM and PM Peak Hours respectively. The analysis also shows that there will be an increase in 5.4% and 5.1% of passengers boarding buses during the 2028 AM and PM Peak Hours respectively. During the 2043 scenario there will be an increase in 7.0% and 7.6% of passengers boarding buses during the AM and PM Peak Hours respectively. Overall, it is anticipated that the increases to the total number of people travelling along the Proposed Scheme will be a **High Positive impact**.

- **Bus Network Performance Indicators:** The Proposed Scheme will also benefit from improvements to the capacity of the road network to cater for future bus services accessing the Proposed Scheme. A micro-simulation model assessment has been developed to extract network performance indicators of the bus operations along the 'end to end' corridor. The results of the assessment demonstrate that the total bus journey times on all modelled bus services will improve by between 11% and 17% during the AM and PM Peak hours of the 2028 Opening Year and 2043 Opening Year + 15 Years.
- A LoS assessment was also undertaken using an adapted version of the Coefficient of Variation of Headways and the Fixed-Route Headway Adherence LoS (United States' TRB 2013) to determine the overall bus journey time reliability and bus service schedule reliability. The results of the assessment demonstrate that the bus journey time reliability achieves a LoS of B during all Do Minimum scenario and a LoS of A during all Do Something scenario. The bus services schedule reliability achieves a LoS of D/C during the Do Minimum scenario and a LoS B during three of the four, Do Something scenarios (a LOS C is anticipated in the 2043 AM Do Something). Overall, it is anticipated that the improvements to the network performance indicators for bus users along the Proposed Scheme will result in a **Medium 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 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 medium 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 performance indicators range between -1% and 3% and will therefore have a **Low Negative 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 with 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) compared to the Do Minimum scenario. 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 11% increase in public transport trips, 4% decrease in general traffic trips (i.e. motorists) and a 15% increase in cycling trips in the morning peak hour and a 9% increase in public transport, 5% decrease in general traffic and a 13% increase in cycling trips each day (7am-7pm) compared to the Do Minimum scenario.

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 modelling outputs for the 2028 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 larger 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 boarding 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 9% respectively, and the increase in passengers boarding bus services will increase by 23% and 22% respectively.

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

Summary and Conclusions

The Proposed Scheme, commencing on Fonthill Road adjacent to the Liffey Valley Shopping Centre and extending to High Street in Dublin City Centre, 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 temporary **Low Negative impacts** to pedestrian cycling, bus access and parking and loading. 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. Therefore, the impact on general traffic redistribution is anticipated to be a temporary **Medium Negative impact**. The impact of construction traffic is anticipated to result in a temporary **Low Negative 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 for 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) of the EIAR, is tied in with the new Liffey Valley Shopping Centre Bus Interchange and Road Improvement Scheme. The Proposed Scheme will continue along Fonthill Road where it will turn left onto Coldcut Road and continues to the bridge over the M50, subsequently turning right onto Ballyfermot Road. The Proposed Scheme will travel through Ballyfermot Village and continue onto Sarsfield Road, whilst city bound general traffic will be diverted via Le Fanu Road and Kylemore Road.

The Proposed Scheme will continue along Sarsfield Road, turning right at the junction with Con Colbert Road before turning right again onto Grattan Crescent. The Proposed Scheme will then turn right onto Emmet Road and will continue along Old Kilmainham, Mount Brown, James's Street and Thomas Street. At Cornmarket, the Proposed Scheme will turn right onto High Street. At the junction with Nicholas Street and Winetavern Street the Proposed Scheme will tie into the existing traffic management regime in the City Centre.

The Proposed Scheme comprises the development of bus priority along the entire route, from the new bus interchange facility on the northern boundary of the Liffey Valley Shopping Centre to High Street / Nicholas Street Junction. The design consists primarily of dedicated bus lanes in both directions where feasible, with alternative measures proposed, such as bus gates, at particularly constrained locations. Significant changes to pedestrian and cycle facilities and traffic management are also proposed as part of the Proposed Scheme.

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

Total Length of Proposed Scheme	**9.2km**	
Bus Priority	**Existing (km)**	**Proposed Scheme (km)**
Bus Lanes		
Inbound	2.3	6.5
Outbound	1.9	5.9
Bus Priority through Traffic Management		
Inbound	0	2.7
Outbound	0	3.3
Total Bus Priority (both directions)	4.2	18.4 (+338%)
Bus Measures		
Proportion of Route with Bus Priority Measures	22%	100%
Cycle Facilities – Segregated		
Inbound	1.4	6.4
Outbound	0.8	6.4
Cyclist Facilities – Non-segregated		
Inbound	2.9	0
Outbound	2.6	0.5
Cyclist Facilities – Overall		
Total Cyclist Facilities (both directions)	7.7	13.3 (+73%)
Proportion Segregated (including Quiet Street Treatment)	12%	72%
Other Features		
Number of Traffic Signal Controlled Junctions	23	27
Number of Signal Crossings	71	102

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
BCIDB-JAC-GEO_GA-0007_XX_00-DR-CR-9001	General Arrangement
BCIDB-JAC-GEO_CS-0007_XX_00-DR-CR-9001	Typical Cross Sections
BCIDB-JAC-TSM_GA-0007_XX_00-DR-CR-9001	Traffic Signs and Road Markings
BCIDB-JAC-TSM_SJ-0007_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 Appendix A6.1 (TIA) – Sub 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.

1.2 Iterative Design Process and Mitigation by Design

Throughout the development of the Preliminary Design for the Proposed Scheme there have been various design stages undertaken based on a common understanding of the maturity of the design at a given point in time. Part of this process, 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.

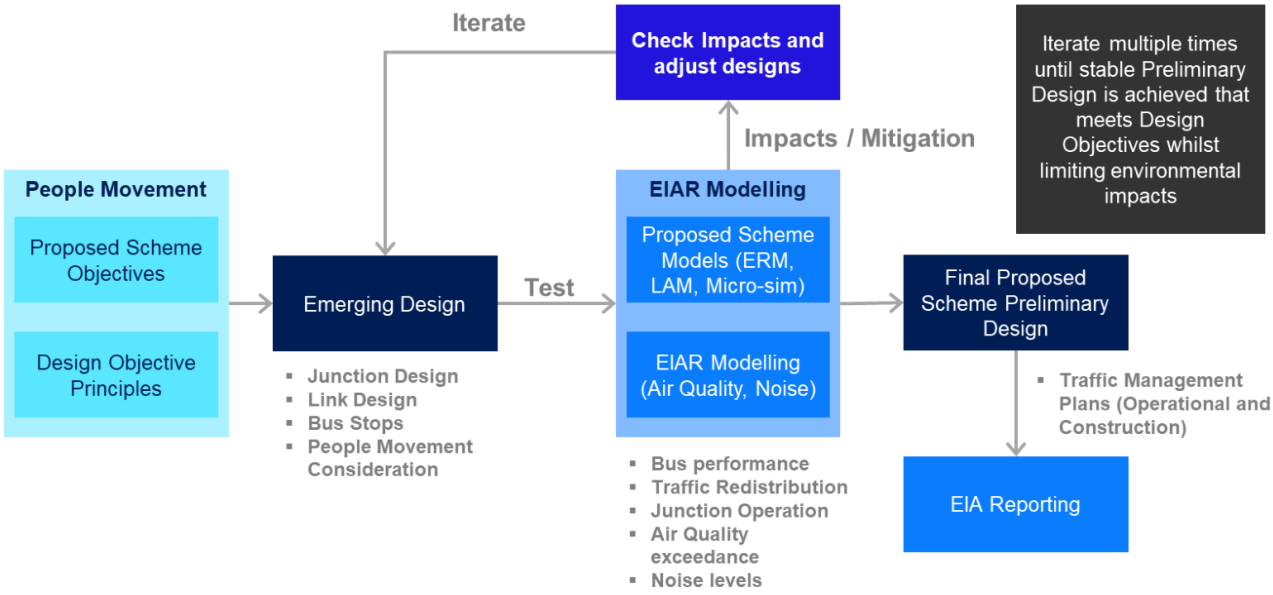

Diagram 1.1: Proposed Scheme Impact Assessment and Design Interaction

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.

1.3 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: Liffey Valley Direct and 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) (DTTAS 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 (DTTAS, 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 (DTTAS, 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) (2018- 2027)

The National Development Plan (NDP) (2018- 2027) (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 states that investment in public transport infrastructure will be accelerated to support the development of an integrated and sustainable national public transport system consistent with the NPF's National Strategic Outcomes of 'Sustainable Mobility' as well as 'Compact Growth'. It outlines that the programmes and underlying projects proposed for delivery during the period up to 2027 which includes the BusConnects scheme, as follows:

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

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 (DTTAS) 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) (DTTAS, 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) (DTTAS, 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 (DTTAS), 2019) is the DTTAS'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.'*

DTTAS'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

The Road Safety Strategy (2013-2020) (Road Safety Authority (RSA), 2019) sets out targets to be achieved in terms of road safety in Ireland, with the primary target defined as follows:

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

The Strategy goes on to state that:

> *'…the attractiveness of walking depends strongly on the safety of the infrastructure provided. Collisions involving pedestrians account for 1 in 5 fatalities annually.'*

> *'…collisions involving cyclists account for 1 in 25 road deaths annually, and many collisions involving cyclists lead to serious head injuries.'*

The document sets out strategies for engineering and infrastructure that can effectively reduce collisions. The Proposed Scheme incorporates measures that will contribute to improving road safety in the form of upgrades to key junctions, and new / upgraded pedestrian and cycle infrastructure along the corridor.

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 DTTAS Strategic Investment Framework for Land Transport, which centre on:

- Maintaining and renewing the strategically important elements of the existing land transport system;
- Addressing urban congestion; 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 DTTAS 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 (2016 – 2035)

The Transport Strategy for the Greater Dublin Area (2016 – 2035) (National Transport Agency (NTA), 2016) provides a framework for the planning and delivery of transport infrastructure and services in the Greater Dublin Area (GDA) over the next two decades.

The Strategy outlines that the GDA is heavily reliant on the bus network and the existing infrastructure is of varying standards and levels of continuity. It therefore identifies the Core Bus Network for the GDA which represents the most important bus routes in the region; generally characterised by a high frequency of bus services, high passenger volumes and with significant trip attractors located along the route.

The GDA Transport Strategy states:

> *'In order to ensure an efficient, reliable and effective bus system, it is intended, as part of the Strategy, to develop the Core Bus network to achieve, as far as practicable, continuous priority for bus movement on the portions of the Core Bus Network within the Metropolitan Area.'*

The NTA has recently published an Issues Paper to commence the review of the Strategy. The purpose of the review is to assess the implementation of the current plan thus far and look to produce an updated Strategy setting

out the framework for investment in transport infrastructure and services up to 2042. BusConnects is identified as a major project by the Issues Paper, stating that the BusConnects Core Bus Corridors element is due to go to planning in 2021.

To complement this Strategy, the NTA devised an Integrated Implementation Plan 2019-2024. It sets out an infrastructure investment programme, integrated service plan and actions to be undertaken by the NTA over the Plan period. A core element of this Plan relates to the delivery of the BusConnects programme.

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 involves 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 will 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.

By enhancing cycling facilities, the Proposed Scheme accords with the Greater Dublin Area Cycle Network Plan.

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.

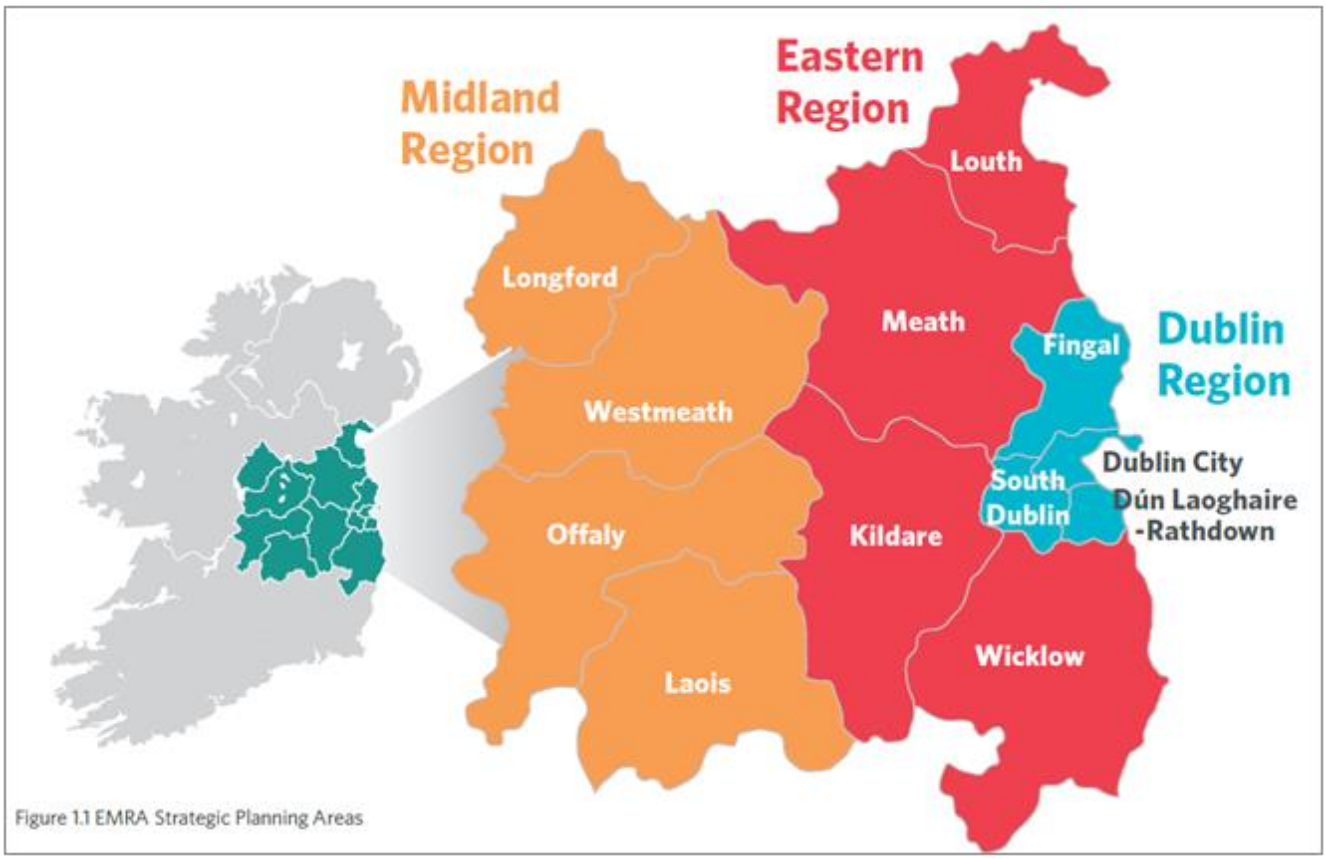

Diagram 3.2: RSES Planning Areas

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 (2016 – 2022)

The Dublin City Development Plan (CDP) (Dublin City Council, 2016) sets out policies and objectives to guide how and where development will take place in the city over the lifetime of the Plan. It provides an integrated, coherent spatial framework within the context of national policies to ensure the city is developed in an inclusive way which improves the quality of life for its citizens, whilst also being a more attractive place to visit and work. The entirety of the Proposed Scheme falls within the remit of the DCDP.

The vision for the city is:

> *'…within the next 25 to 30 years, Dublin will have an established international reputation as one of Europe's most sustainable, dynamic and resourceful city regions.'*

DCDP supports and encourages the uptake of sustainable travel modes to achieve a modal shift through various policies and objectives outlined in the Plan. Mobility and Transport Policy 2 (MT2) states that Dublin City Council (DCC) will:

> *'…promote modal shift from private car use towards increased use of more sustainable forms of transport such as cycling, walking and public transport, and to co-operate with the NTA, Transport Infrastructure Ireland (TII) and other transport agencies in progressing an integrated set of transport objectives.'*

Policy MT4 makes specific reference to the promotion and facilitation of improvements to the bus network in order to achieve strategic transport objectives.

Policy MT7 is to implement walking and cycling improvements at thoroughfares and junctions and develop new and safe routes. Policy MT11 is to promote improved permeability for both cyclists and pedestrians in existing urban areas. The BusConnects scheme incorporates upgrades to pedestrian and cycle infrastructure along the Proposed Scheme and at key junctions.

The Proposed Scheme incorporates upgrades to pedestrian and cycle infrastructure along the Proposed Scheme and at key junctions thus can be considered in alignment with the DCDP.

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 South Dublin County Development Plan

The South Dublin County Development Plan (SDCDP) 2016-2022 provides a framework for the proper planning and sustainable development of South Dublin and sets out an overall strategy and policy objectives.

The SDCDP (South Dublin County Council, 2016) includes aspirations for 'Long Term High Capacity Public Transport' part of which links Liffey Valley Shopping Centre with an onward route to the City Centre via Coldcut Road and Ballyfermot Road.

The Proposed Scheme satisfies this aspiration and thus can be considered to align with the SDCDP 2016-2022.

3.4.2 Draft South Dublin County Development Plan Issues Paper

The SDCDP (2016-2022) is currently undergoing statutory review. As part of this process, an Issues Paper (South Dublin County Council, 2020) has been published to present an overview of the current and future (2022 – 2028) high-level, strategic issues facing South Dublin.

BusConnects is highlighted within the Issues Paper as an important element of sustainable transport in the area, especially for the Clondalkin / Clonburris / Grange Castle neighbourhood to cater for existing demand and for projected population and employment growth.

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).

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 Appendix A6.1 (TIA) – Sub 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 November and December 2019 (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	84	Thu 28/11/2019, Thu 13/2/2020
ATC	IDASO LTD	10	21/11/2019 - 2/12/2019

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 are taken over an entire 2-week period. 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 in Section 0.

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 Appendix A6.1 (TIA) – Sub 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 Movement:** 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 Appendix A6.1 (TIA) – Sub 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.

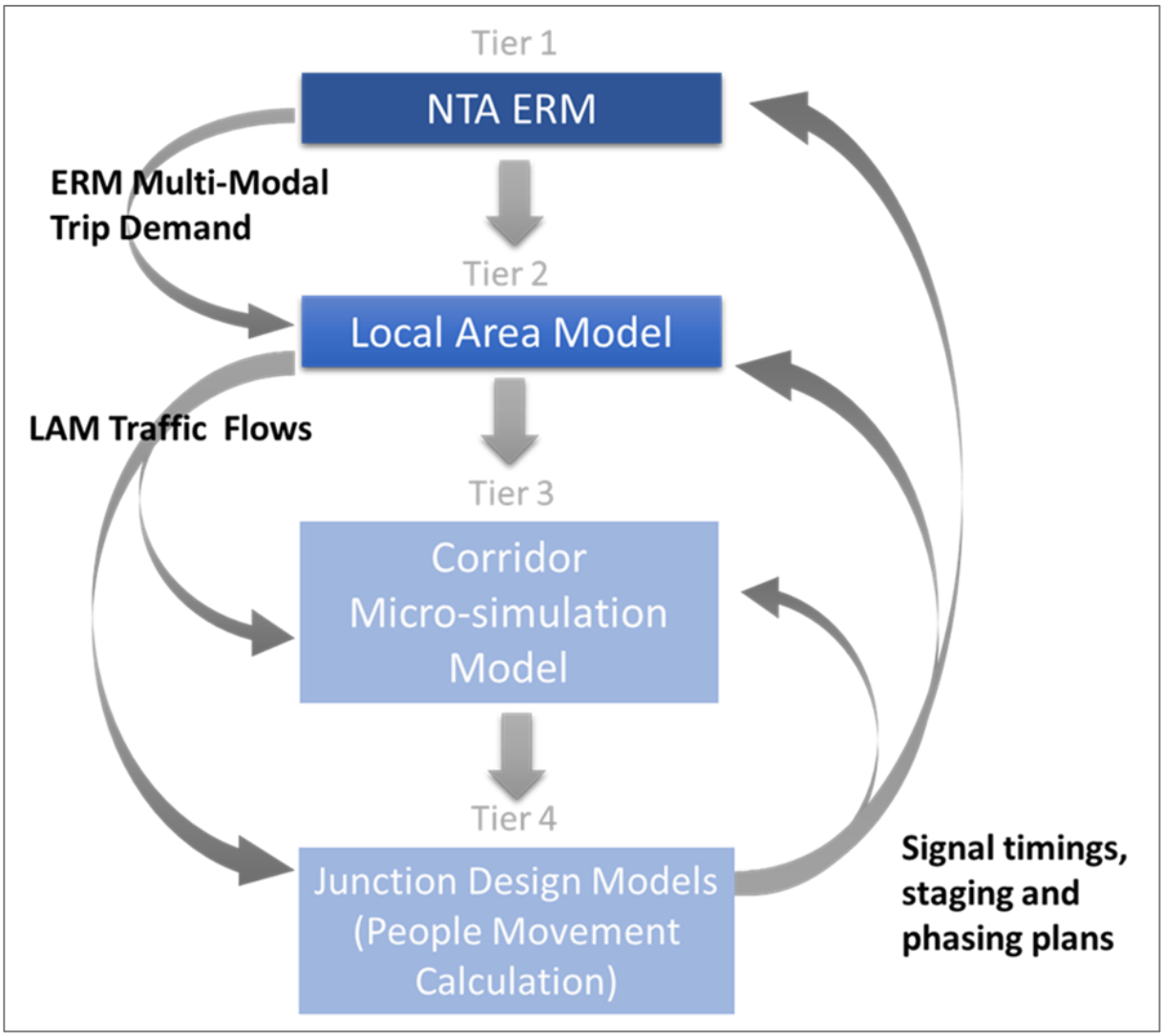

Diagram 4.1: Proposed Scheme Modelling Hierarchy

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 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.

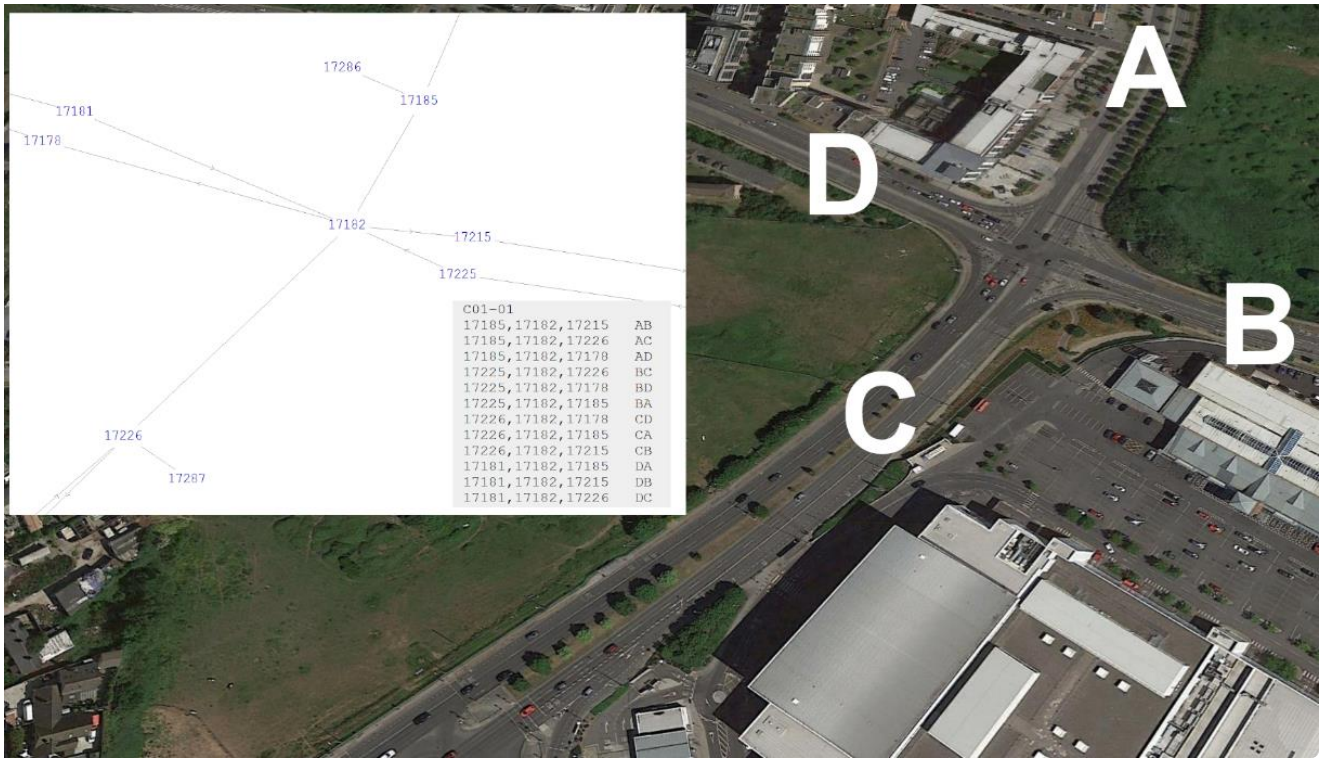

Diagram 4.2: Bus Connects LAM Node Matching (Junction C01-01)

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

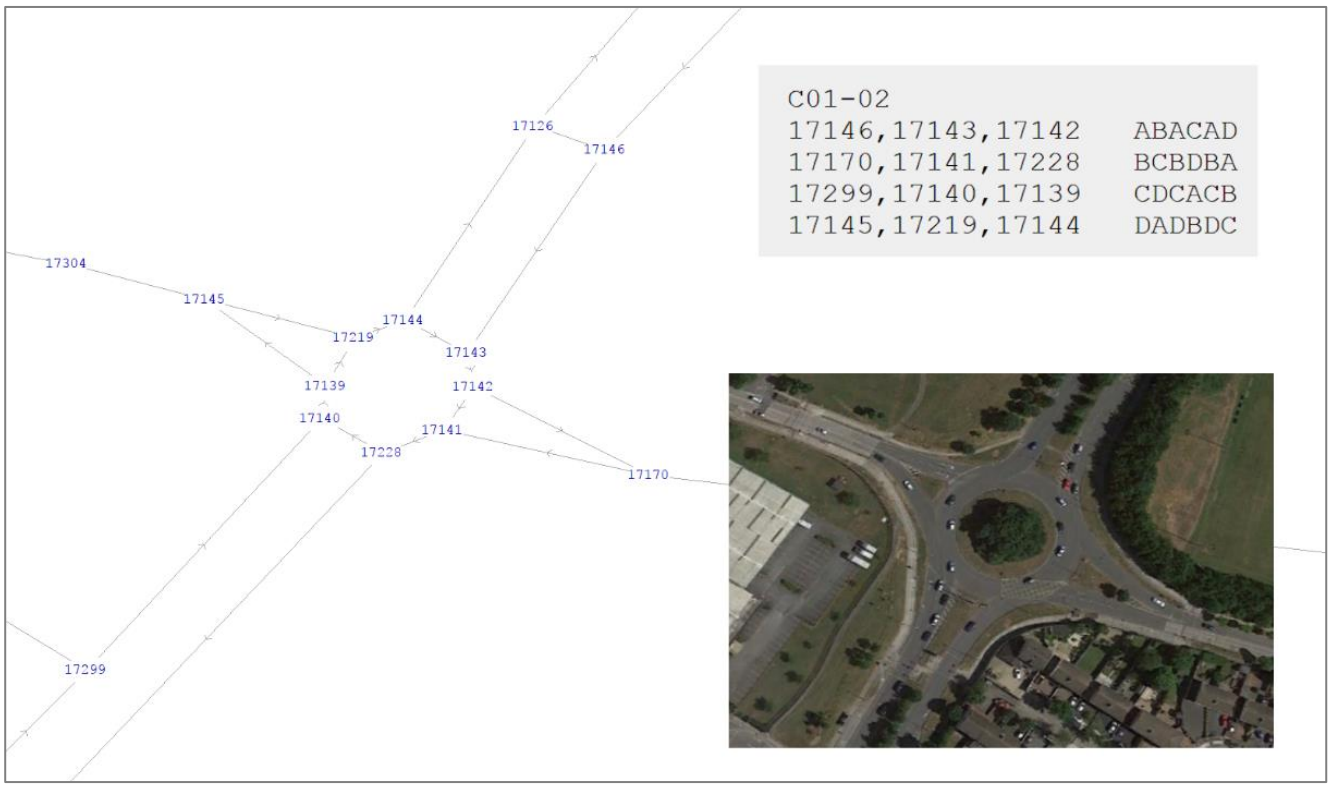

Diagram 4.3: Bus Connects LAM Node Matching (Junction C01-02)

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.

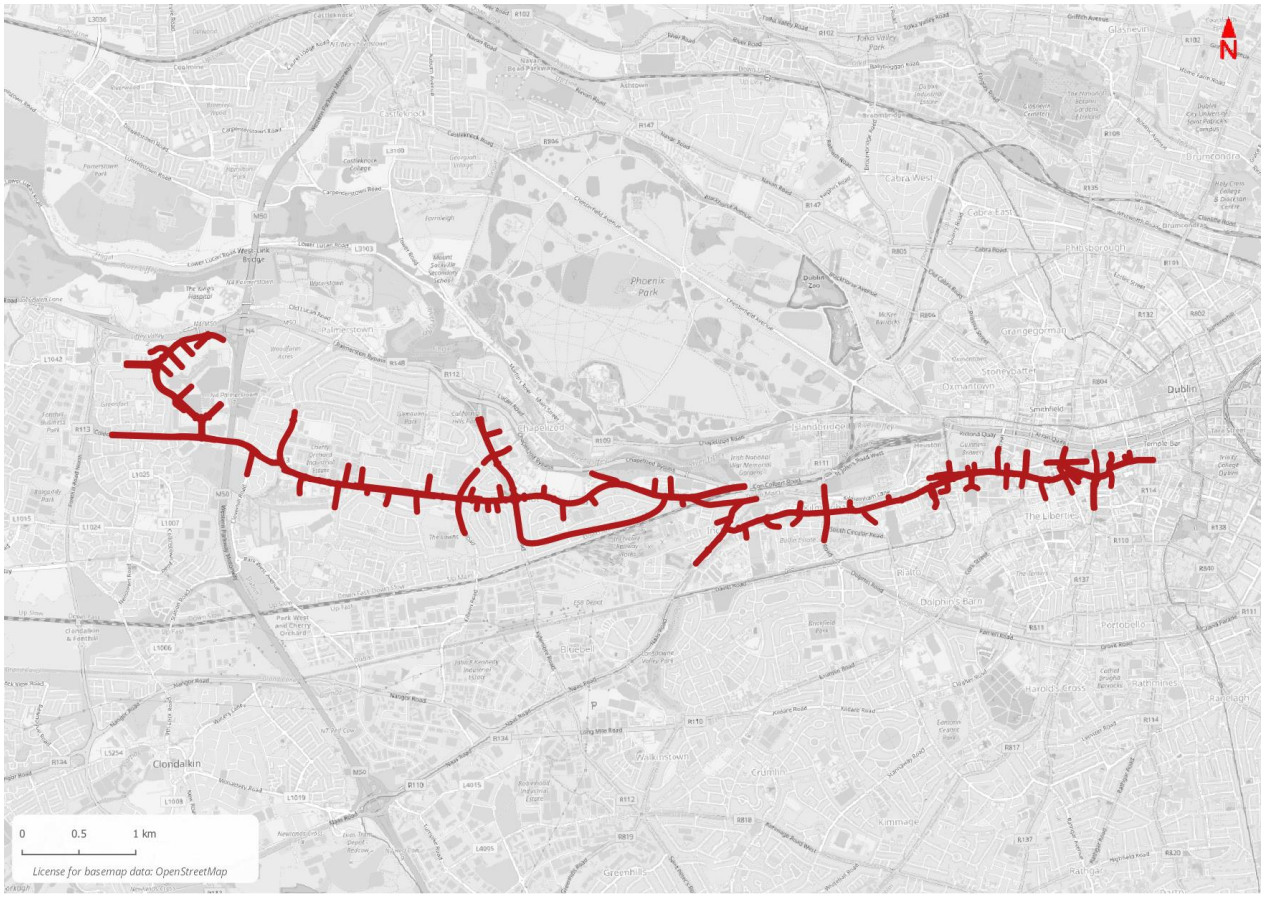

Diagram 4.4: Proposed Scheme Microsimulation Model Network

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 Appendix A6.1 (TIA) – Sub 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,

Overall, cycling infrastructure provision on the corridor currently consists of 47% cycle priority inbound (15% segregated cycle tracks and 32% non-segregated cycle lanes) and 37% cycle priority outbound (9% segregated cycle tracks and 28% non-segregated cycle lanes).

5.1 Bus Journey Times

Bus services along the Proposed Scheme currently operate within a constrained and congested environment. An examination of Automatic Vehicle Location (AVL) database maintained by the NTA (gathered from the onboard AVL system which records a range of bus journey time information) indicates that the current standard deviation for journey time of buses on the corridor is 12 minutes. With any further increases in traffic levels, these issues are expected to be exacerbated. While impacting upon bus passengers, longer and less reliable bus services also require operators to use additional buses to maintain headways to fill gaps created in the timetable. Aligned to this, the current unprioritised network leads to clustering of buses which, in turn, means stops can become overcrowded, creating delays in boarding and alighting and the imbalanced use of bus capacity.

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 and Diagram 5.2. The JTCs demonstrate that the busiest junction in terms of daily vehicle movements are as follows:

- High Street/Bridge Street (45,313 daily movements)
- Fonthill Road/Coldcut Road (37,604 daily movements)
- Bridge Street/Cook Street (37,184 daily movements)
- Fonthill Road/Liffey Valley Green Car Park (36,002 daily movements)

The least busy surveyed junction in the study area in terms of daily vehicle movements is the Fonthill Road/Liffey Valley Red Car Park Junction (7,316 daily movements).

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

Junction Identifier	Junction Name	Type	Daily Movements (Vehs)	AM Movements (Vehs)	PM Movements (Vehs)
7-1	Fonthill Road/Liffey Valley Red Car Park	Roundabout	7,316	218	479
7-2	Fonthill Road/Liffey Valley Yellow Car Park	Roundabout	22,602	591	1,626
7-3	Fonthill Road/Liffey Valley Green Car Park	Roundabout	36,002	201	2,275
7-4	Fonthill Road/Liffey Valley service access	Roundabout	26,854	850	1,932
7-5	Fonthill Road/Liffey Valley B&Q access	Roundabout	28,023	888	2,007
7-6	Fonthill Road/Coldcut Road	Signals	37,604	1,913	2,839
7-7	Coldcut Road/Cloverhill Riad	Signals	32,362	2,190	2,150
7-8	Kennelsfort Road/Ballyfermot Road	Signals	29,416	2,024	1,984
7-9	Ballyfermot Road/Cherry Orchard Football	Signals	19,473	1,231	1,370
7-10	Ballyfermot Road/Clifden Road	Priority	19,119	1,205	1,005
7-11	Drumfinn Road/Ballyfermot Road	Signals	22,009	1,497	1,155
7-12	Le Fanu Road/Ballyfermot Road	Signals	26,861	1,966	1,591

Junction Identifier	Junction Name	Type	Daily Movements (Vehs)	AM Movements (Vehs)	PM Movements (Vehs)
7-13	Chapelizod Hill Road/Kylemore Road	Signals	18,646	1,707	1,294
7-14	Kylemore Road/Ballyfermot Road	Priority	34,646	2,422	2,314
7-15	St Laurence's Road/Sarsfield Road	Priority	17,346	1,261	1,367
7-16	Sarsfield Road/Landen Road	Signals	17,705	1,364	1,375
7-17	St Marys Ave W/Sarsfield Road	Signals	17,453	1,386	1,361
7-18	Con Colbert Road/Sarsfield Road	Signals	17,418	1,373	1,303
7-19	Inchicore Road/Grattan Cres	Signals	18,725	1,342	1,398
7-20	R839 Grattan Cres/R810 Emmet Road	Signals	27,354	1,803	1,855
7-21	Memorial Road/Inchicore Road	Signals	14,005	829	1,114
7-22	Emmet Road/St Vincent Street W	Priority	18,504	1,300	1,188
7-23	Emmet Road/Bulfin Road	Priority	18,481	1,263	1,176
7-24	Emmet Road/Luby Road	Priority	13,385	862	825
7-25	S Circular Road/Old Kilmainham	Signals	32,278	2,237	1,913
7-26	Shannon Terrace/Old Kilmainham	Priority	14,758	873	826
7-27	Bow Lane W/James Street	Signals	23,773	1,688	1,571
7-28	James Street/Echlin Street	Priority	25,184	1,798	1,532
7-29	Watling Street/R810 Thomas Street	Signals	23,976	1,682	1,508
7-30	Bridgefoot Street/Thomas Street	Signals	31,374	2,211	2,028
7-31	R810 Thomas Street/Meath Street	Signals	25,003	1,824	1,536
7-32	Cornmarket/Francis Street	Signals	25,478	1,860	1,356
7-33	High Street/Bridge Street	Signals	45,313	3,036	2,076
7-34	Winetavern Street/Christchurch	Signals	58,503	3,673	3,237
7-35	James Street/Unnamed Road	Priority	19,249	1,214	996
7-36	Grattan Cres/Inchicore Terrace S	Priority	19,318	1,346	1,429
7-37	Winetavern Street/Cook Street	Priority	17,495	1,107	1,187
7-38	Lower Bridge Street/Cook Street	Signals	37,184	2,508	1,980
7-39	Bridgefoot Street/Oliver Bond Street	Priority	16,006	1,313	1,091
7-40	Sth Circular Rd./ Old Kilmainham	Signals	21,727	1,563	1,337
7-41	Dolphin Rd/ Grand Canal View	Signals	22,198	1,698	1,516
7-42	Brookfield Rd/ Adelaide Terrace	Priority	9,394	671	579
7-43	Brookfield Road/ South Circular Road	Signals	18,886	1,383	1,105

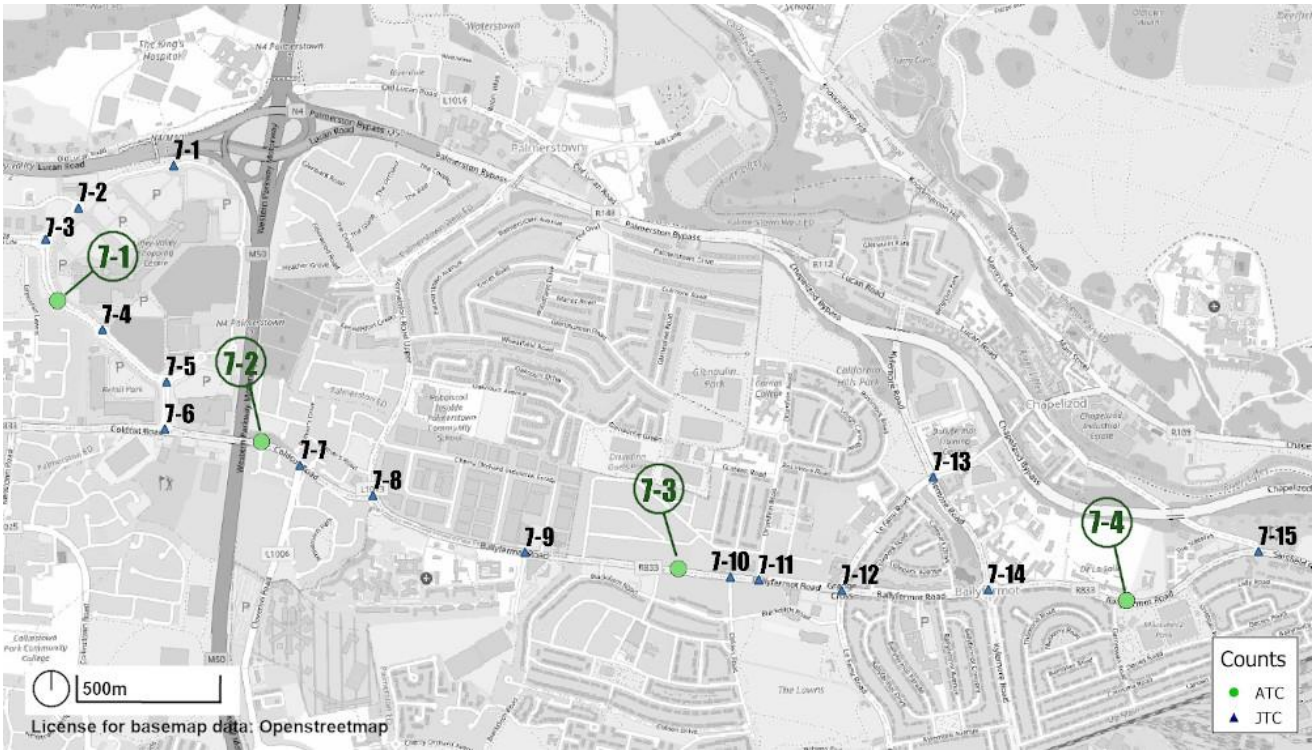

Diagram 5.1: ATC and JTC Traffic Counts Location (Section 1 and Section 2)

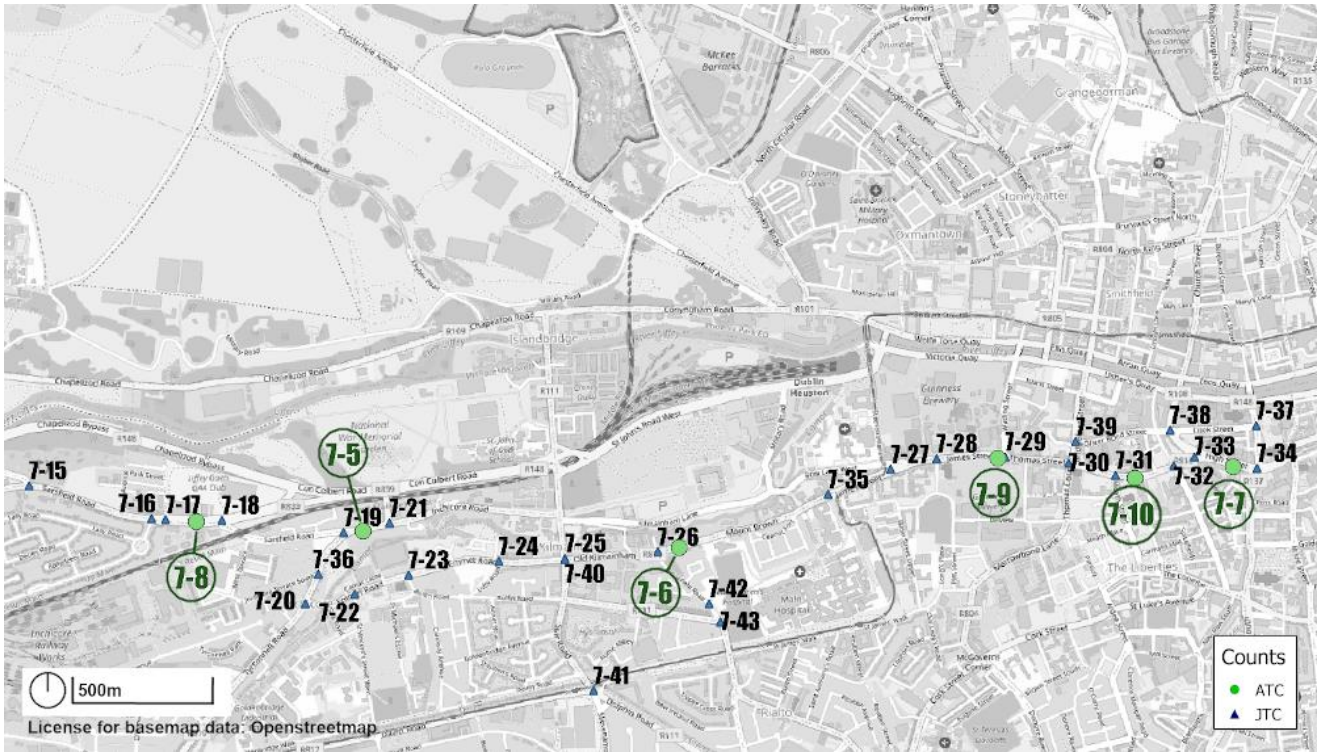

Diagram 5.2: ATC and JTC Traffic Counts Location (Section 2 and Section 3)

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 and Diagram 5.2. The highest ATC daily vehicle flows are on High Street (eastbound) followed by the flows on Thomas Street east of Meath Street (eastbound).

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

ATC Identifier	ATC Location	Direction	Daily Movements (Vehs)	AM Movements (Vehs)	PM Movements (Vehs)
7.1A	Fonthill Road between Red Car Park and B&Q	Eastbound	8,652	501	545
7.1B		Westbound	6,916	190	533
7.2A	Coldcut Road east of M50	Eastbound	12,394	580	1,039
7.2B		Westbound	13,133	1,003	801
7.3A	Ballyfermot Road west of Clifden Road	Eastbound	7,669	531	375
7.3B		Westbound	6,666	358	231
7.4A	Ballyfermot Road east of Garryowen Road	Eastbound	excluded	excluded	excluded
7.4B		Westbound	excluded	excluded	excluded
7.5A	Inchicore Road west of Memorial	Eastbound	7,051	424	618
7.5B		Westbound	3,894	240	245
7.6A	Old Kilmainham at National Children's Hospital	Eastbound	7,575	444	357
7.6B		Westbound	4,844	267	241
7.7A	High Street	Eastbound	19,365	1,330	1,004
7.7B		Westbound	7,051	424	618
7.8A	Sarsfield Road at Liffey Gaels GAA	Eastbound	3,894	240	245
7.8B		Westbound	excluded	excluded	excluded
7.9A	Thomas Street west of Watling Street	Eastbound	excluded	excluded	excluded
7.9B		Westbound	excluded	excluded	excluded
7.10A	Thomas Street east of Meath Street	Eastbound	14,045	636	633
7.10B		Westbound	7,263	372	687

5.3 Baseline Conditions

5.3.1 Overview

In describing the baseline conditions, the Proposed Scheme has been divided into three sections as outlined below.

- Section 1 - Liffey Valley to Le Fanu Road;
- Section 2 - Le Fanu Road to Sarsfield Road; and
- Section 3 - Sarsfield Road to City Centre.

5.3.2 Section 1 – Liffey Valley to Le Fanu Road

This Section outlines the baseline environment for walking, cycling, bus services, general traffic and parking / loading facilities along Section 1 of the Proposed Scheme, Liffey Valley to Le Fanu Road.

This section commences at the four-arm Fonthill Road junction, adjacent to McDonald's The route comprises 2.9km of Fonthill Road, R833 Coldcut Road, and R833 Ballyfermot Road, finishing at R833 Ballyfermot Road/Le Fanu Road Junction.

5.3.2.1 Pedestrian Infrastructure

Footpaths are provided on both sides of the carriageway along Fonthill Road, R833 Coldcut Road and R833 Ballyfermot Road, with the exception of the southern side of the R833 Coldcut Road / Kennelsfort Road Upper / R833 Ballyfermot Road three-arm signalised junction, where the footpath is routed through the adjacent Cherry Orchard residential estate. Street lighting is provided on both sides of the carriageway between Liffey Valley and Le Fanu Road.

The footpaths vary in width along this section of the Proposed Scheme and there are a number of pinch points below the minimum width of 1.8m. For example, the existing footpath tapers into the cycle lane before abruptly merging into a shared surface pedestrian / cycle way across the M50 Motorway at the eastern side of the R833 Coldcut Road / M50 Motorway Bridge.

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 Fonthill Road / Fonthill Road Roundabout has signalised crossings on both the eastern and western arms. Both crossings are staggered with pedestrian refuge islands, which include guard rails, to allow pedestrians to cross in stages;
- The three-arm R833 Coldcut Road / Fonthill Road signalised junction provides crossings on the northern and eastern arms. The northern and eastern arm crossings are staggered due to the slip lanes on the northeastern and northwestern arms; the traffic islands allow pedestrians to cross in stages. The traffic islands do not have guard rails;
- The three-arm R833 Coldcut Road / Cloverhill Road signalised junction provides two crossings on the eastern and southern arms. Both crossings are staggered with pedestrian refuge islands, which include guard rails, to allow pedestrians to cross in stages;
- The three-arm R833 Coldcut Road / R833 Ballyfermot Road / R833 Kennelsfort Road Upper signalised junction provides crossings on the northern and western arms. The crossings are staggered due to slip lanes on the northwestern arms and southwestern arms; the traffic islands allow pedestrians to cross in stages. The crossings do not have guard rails;
- A pelican crossing across R833 Ballyfermot Road, adjacent to C&F Quadrant Ltd. The crossing is staggered with pedestrian refuge islands, which include guard rails, to allow pedestrians to cross in stages;
- The three-arm R833 Ballyfermot Road / Cherry Orchard signalised junction provides direct crossings on the southern and eastern arms arm. Each crossing provides a pedestrian refuge island, which does not have guard rails;
- The three-arm R833 Ballyfermot Road / Cleggan Park Junction provides a direct signalised crossing on the western arm and a raised table on the northern arm;
- The three-arm R833 Ballyfermot Road / R833 Blackditch Drive Junction provides one direct signalised crossing on the western arm with a pedestrian refuge island, which does not have guard rail;
- The three-arm R833 Ballyfermot Road / Clifden Road Junction provides a direct signalised crossing on the southern arm;
- The three-arm R833 Ballyfermot Road / Drumfinn Road Junction provides two direct signalised crossings on the northern and western arm. The western arm has a pedestrian refuge island, which does not have guard rails;
- A pelican crossing across R833 Ballyfermot Road, adjacent to Homesavers Ltd. The crossing provides a direct signalised crossing; and
- The four-arm R833 Ballyfermot Road / Le Fanu Road Junction provides a direct signalised crossing on each arm. Uncontrolled crossings across priority junctions at side roads benefit from dropped kerbs.

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 Appendix A6.1 (TIA) – Sub 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 Appendix A6.1 (TIA) – Sub Appendix 4 (Impact Assessments).

5.3.2.2 Cycling Infrastructure

Cycle facilities are provided along most of the length of Section 1 of the Proposed Scheme, comprising of cycle tracks, cycle lanes (including advisory lanes), and combined bus and cycle lanes.

Between Liffey Valley Shopping Centre and the R833 Coldcut Road / Fonthill Road Junction, a two-way cycle track exists along the south-western carriageway of Fonthill Road. At the Fonthill Road / Fonthill Road Junction, two-way cycle tracks provide links to the north and north-east of the junction. Shared facilities and toucan crossings are provided at the eastern and western arms of Fonthill Road / Fonthill Road Roundabout.

Along R833 Coldcut Road, eastbound cycling facilities are intermittent. An eastbound combined bus and cycle lane terminates approximately 150m west of the R833 Coldcut Road / Fonthill Road Junction, from here there are no eastbound cycle facilities until approximately 110m east of the M50 Motorway Bridge. At this point, a combined bus and cycle lane commences for approximately 150m. The combined bus and cycle lane is in operation 24 hours a day. As the combined bus and cycle lane terminates, an eastbound cycle track commences and stretches for approximately 140m. Approximately 35m from the approach of the R833 Coldcut Road / R833 Ballyfermot Road / Kennelsfort Road Upper Junction, an eastbound advisory cycle lane (those which general traffic are permitted to enter) is available.

Along R833 Ballyfermot Road, eastbound cycling facilities consist of cycle lanes, combined bus and cycle lanes and cycle tracks. Approximately 20m south of R833 Coldcut Road / R833 Ballyfermot Road / Kennelsfort Road Upper Junction, an advisory eastbound cycle lane merges with a combined bus and cycle lane for approximately 210m. The combined bus and cycle lane is in operation from Monday to Saturday between the hours of 07:00hrs and 19:00hrs. As the bus lane terminates, an advisory cycle lane commences and is available for approximately 340m, of which 250m falls within a combined bus and cycle lane, extending to the east of the R833 Ballyfermot Road / Cherry Orchard Industrial Estate (Lidl) Junction. At this point, the combined bus and cycle lane continues until approximately 60m east of the R833 Ballyfermot Road / Blackditch Road Junction. An eastbound cycle lane / cycle track is available on adjacent service roads and terminates approximately 185m west of the R833 Ballyfermot Road / Le Fanu Road Junction.

Along R833 Ballyfermot Road in the westbound direction, a cycle lane / cycle track is available on adjacent service roads for approximately 680m. The cycle lane / cycle track commences approximately 200m west of the R833 Ballyfermot Road / Le Fanu Road Junction and extends to approximately 20m west of the R833 Ballyfermot Road / Cleggan Park Junction. From here, there is a 60m section where no westbound cycle facilities are available, before an advisory cycle lane commences. The advisory cycle lane extends for approximately 270m, temporarily terminating after 85m before commencing for a further 280m. Approximately 110m on the approach to the Coldcut Road / R833 Ballyfermot Road Junction, westbound cyclists are directed to a cycle track and along a residential service road, prior to joining a cycle lane adjacent to R833 Coldcut Road.

Along R833 Coldcut Road, the cycle track extends from the R833 Coldcut Road / R833 Ballyfermot Road Junction until approximately 60m on the approach to the Cloverhill Road Junction, where it temporarily ceases prior to restarting approximately 80 west of R833 Coldcut Road / Cloverhill Road Junction. Cycle facilities are not provided over the M50 Motorway Bridge. To the west of the bridge a cycle track is available for approximately 100m before merging with a combined bus and cycle lane for the R833 Coldcut Road / Fonthill Road Junction. The combined bus and cycle lane is in operation 24 hours a day. To the west of the R833 Coldcut Road / Fonthill Road Junction, a combined bus and cycle lane is available for westbound cyclists.

Cycle parking stands are provided at the following points within the redline boundary of the Proposed Scheme:

- Three Sheffield stands (able to accommodate 6 bicycles) along R833 Ballyfermot Road westbound carriageway, west of the R833 Ballyfermot Road / Le Fanu Road Junction; and
- Two Sheffield stands (able to accommodate 4 bicycles) along R833 Ballyfermot Road eastbound carriageway, east of the R833 Ballyfermot Road / Le Fanu Road Junction;

- Cycle parking stands are provided at the following points in the vicinity of the Proposed Scheme, albeit, outside of the redline boundary:
- Cycle parking stands are provided at the following points in the vicinity of the Proposed Scheme, albeit, outside of the redline boundary:
- Seven Sheffield standards (able to accommodate 14 bicycles) along Le Fanu Road northbound carriageway, outside Ballyfermot Dental Surgery;
- 15 curved steel 'toast rack' cycle stands (able to accommodate 30 bicycles) within the grounds of Cherry Orchard Hospital; and
- Eight Sheffield stands located outside Ballyfermot Primary Care Centre (able to accommodate 16 bicycles).

There is no designated cycle hire scheme parking racks within Section 1 of the Proposed Scheme.

The existing cycle facilities along Section 1 of the Proposed Scheme are illustrated in Figure 6.4a in Appendix A6.1 (TIA) – Sub 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 Appendix A6.1 (TIA) – Sub Appendix 4 (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 at the following locations (aside from intermittent breaks and junctions)

- An eastbound combined bus and cycle lane of approximately 150m in length is located between R833 Coldcut Road / Coldcut Crescent and R833 Coldcut Road / Cloverhill Road approximately 1600m in an eastbound direction from R833 Coldcut Road / Kennelsfort Road Upper / Ballyfermot Road Junction;
- An eastbound combined bus and cycle lane of approximately 210m in length is located between R833 Coldcut Road / Kennelsfort Road Upper / Ballyfermot Road Junction and Ballyfermot Rd / Cherry Orchard Hospital approximately 30m in a south-eastbound direction from R833 Coldcut Road / Kennelsfort Road Upper / Ballyfermot Road Junction; and
- An eastbound combined bus and cycle lane of approximately 500m in length is located between the R833 Ballyfermot Road / Cherry Orchard Industrial Estate Junction and 60m east of the R833 Ballyfermot Road / Blackditch Road Junction.

5.3.2.3.2 Bus Stop Facilities

There are currently 15 bus stops along Section 1 of the Proposed Scheme, between Liffey Valley and the R833 Ballyfermot Road / Le Fanu Road Junction. The inbound stops are as follows:

- Stop 2686 on R833 Coldcut Road outside TradePoint;
- Stop 7510 on R833 Coldcut Road to the east of the R833 Coldcut Road / M50 Motorway Bridge;
- Stop 4799 on R833 Ballyfermot Road west of Cherry Orchard Industrial Estate;
- Stop 2205 on R833 Ballyfermot Road west of Cherry Orchard Industrial Estate;
- Stop 2687 on R833 Ballyfermot Road west of Lidl;
- Stop 2688 on R833 Ballyfermot Road adjacent to Blackditch Drive;
- Stop 2689 on R833 Ballyfermot Road west of Ballyfermot Community Civic Centre; and
- Stop 2696 on R833 Ballyfermot Road east of Drumfinn Road.

The outbound stops are:

- Stop 2674 on R833 Coldcut Road outside The Coldcut Club;

- Stop 4798 on R833 Coldcut Road west of R833 Kennelsfort Road Upper;
- Stop 2206 on R833 Ballyfermot Road opposite Cherry Orchard Industrial Estate;
- Stop 2673 on R833 Ballyfermot Road west of Ballyfermot Primary Care Centre;
- Stop 2672 on R833 Ballyfermot Road east of R833 Ballyfermot Road / Blackditch Drive Junction;
- Stop 2688 on R833 Ballyfermot Road west of Ballyfermot Community Civic Centre; and
- Stop 2656 on R833 Ballyfermot Road outside Homesavers Ltd.

Out of the 15 bus stops, one bus stop (stop 4798, Coldcut Road) is located within an indented drop off area. Of the remaining 14 bus stop, the following six stops are situated inline within bus lanes:

- Dublin Bus Sports, stop 2674;
- Ballyfermot Road, stop 4799;
- Cherry Orchard Hospital, stop 2205;
- Cherry Orchard IE, stop 2687;
- Cleggan Park, stop 2688; and
- Ballyfermot, stop 269

At three bus stops (Cloverhill Road stop 7510, Cherry Orchard Hospital stop 2206, and Cherry Orchard IE stop 2673) a pole and timetable are provided and at one stop (Cherry Orchard Hospital stop 2205) a pole and real time information system are provided. All the remaining bus stops provide shelter and seating as a minimum, with the exception of bus stop 4799 which does not provide seating.

The content of Table 5.3 outlines the availability of bus stop facilities at the existing 15 bus stops along Section 1 of the Proposed Scheme.

Table 5.3: Section 1 - Availability of Bus Stop Facilities (of a Total 15 Bus Stops)

Bus Stop Facility	Number of Bus Stops in Baseline with Facility	Percentage of Bus Stops in Baseline with Facility
RTPI	4	27%
Timetable Information	13	87%
Shelter	11	73%
Seating	10	67%
Accessible Kerbs	4	27%
Indented Drop Off Area	1	7%

The existing bus facilities along Section 1 of the Proposed Scheme are shown in Figure 6.5a which is an extract from Appendix A6.1 (TIA) – Sub Appendix 3 (Maps). The bus services which operate along Section 1 are outlined in Table 5.4.

Table 5.4: Bus Service Frequency

Service	Route	Typical Service Frequency	
		Weekday	Weekend
76	Tallaght (The Square) – Clondalkin Village – Neilstown Road (Coldcut Road) – Ballyfermot - Chapelizod	20 minutes	30 minutes
76a	Tallaght (The Square) – Clondalkin Village – Neilstown Road (Coldcut Road) – Ballyfermot – Chapelizod – Blanchardstown Centre	50 minutes	No Services
26	Merrion Square – O'Connell Bridge – Parkgate Street – Chapelizod - N4 Palmerstown – Liffey Valley Shopping Centre	30 minutes	60 minutes
40	Charlestown Shopping Centre – Finglas Village – St Helena's Road – Dorset Street Lower – Inchicore – Ballyfermot Road – Neilstown Road – Liffey Valley Shopping Centre	10 minutes	30 minutes
18	Sandymount – Ballsbridge – Pembroke Lane – Rathgar – Crumlin Hospital – Long Mile Road – Ballyfermot Road – Kennelsfort Road – Palmerstown Village – Old Lucan Road	20 minutes	30 minutes
79	Aston Quay – St Johns Road – Kylemore Road – Ballyfermot Road	20 minutes	30 minutes
79a	Aston Quay – St Johns Road – Kylemore Road – Ballyfermot Road	20 minutes	30 minutes

5.3.2.4 General Traffic

5.3.2.4.1 Fonthill Road

Within Section 1 of the Proposed Scheme, Fonthill Road is a dual carriageway road with a speed limit of 50km/h. The opposing flows along the two lanes are separated by a grass verge for much of its length. The highway is bounded by grass verges, which provides separation to pedestrian routes, behind which are trees, separating the highway from the Liffey Valley Shopping Centre car parks, and fences or further verges which lead towards adjacent dwellings. The roundabout junctions south of the Liffey Valley Shopping Centre and southeast of the Liffey Valley Retail Park have two-lane entries and exits.

There is one existing major junction arrangement along Fonthill Road:

- R833 Coldcut Road / Fonthill Road three arm signalised junction.

R833 Coldcut Road / Fonthill Road three arm signalised junction: This is a three-arm signalised junction with pedestrian crossing facilities along the northern and eastern arms. A grass verge median divides each arm.

The western arm consists of an ahead lane and a non-signalised, left turn slip lane with a yield sign on the approach. The western arm exit consists of two general traffic lanes and a dedicated bus lane. The northern arm consists of a left-turn slip lane and two right-turn lanes on the approach. The northern arm exit consists of two general traffic lanes. The eastern arm consists of a dedicated bus lane of 75m length, an ahead lane and a right-turn lane of 75m length. The eastern arm exit consists of one general traffic lane of 7.5m width.

These characteristics are shown Image 5.1.

Image 5.1: R833 Coldcut Road / Fonthill Road Junction

5.3.2.4.2 R833 Coldcut Road

The R833 Coldcut Road in Section 1 of the Proposed Scheme is a two-way carriageway which is subject to a speed limit of 50km/h. The carriageway width varies between 7.5m (at the M50 Motorway Bridge) and 20m (where there are bus lanes and left-turn slips) and travels in a straight alignment east to west from Fonthill Road, over the M50 Motorway. It then extends in a south-east to north-west direction, before reaching R833 Ballyfermot Road.

The existing major junction arrangements along R833 Coldcut Road from Fonthill Road to R833 Ballyfermot Road are as follows:

- R833 Coldcut Road and Cloverhill Road Junction; and
- R833 Coldcut Road and R833 Ballyfermot Road / Kennelsfort Road Upper Junction

R833 Coldcut Road / Cloverhill Road Junction: This junction is a three-arm signalised junction with staggered pedestrian crossings on the south-eastern and south-western arms.

The north-western arm consists of a dedicated bus lane, an ahead lane and a right-turn lane of 60m length on the approach. The dedicated bus lane continues through the junction and is segregated from the general traffic lanes with a median strip and separate signal heads. The north-western arm exit consists of one general traffic lane of 5.5m in length.

The south-eastern arm consists of a left-turn lane of approximately 60m length and an ahead lane on the approach. The south-eastern exit consists of a dedicated bus lane and a general traffic lane which both merge into one general traffic lane approximately 50m south-east of the junction. The south-western arm consists of one general traffic lane on the approach arm. Cloverhill Road consists of a single lane. The south-western exit consists of a general traffic lane of approximately 4.5m in width.

These characteristics are shown in Image 5.2.

Image 5.2: R833 Coldcut Road / Cloverhill Road Junction

R833 Coldcut Road / R833 Ballyfermot Road / Kennelsfort Road Upper Junction: This junction is a three-arm signalised junction with pedestrian crossings on the northern and western arms. The northern arm has a cycle lane, an ahead lane and a right-turn lane of 30m length. The northern arm exit consists of a cycle lane and one general traffic lane.

The southern arm consists of a left-turn slip lane of approximately 28m and an ahead lane. The southern arm exit consists of an on-road cycle lane and one general traffic lane. The on-road cycle lane merges into a with-flow bus lane approximately 25m south of the junction. The western arm consists of a left-turn slip lane of approximately 40m, an on-road cycle lane and a right-turn lane. The western arm exit consists of one general traffic lane.

These characteristics are shown in Image 5.3.

Image 5.3: R833 Coldcut Road / R833 Ballyfermot Road Junction

5.3.2.4.3 Ballyfermot Road

R833 Ballyfermot Road in Section 1 of the Proposed Scheme is a two-way carriageway which is subject to a speed limit of 50km/h and varies in width between 8m to 12m. Following the R833 Coldcut Road / R833 Ballyfermot Road / Kennelsfort Road Upper signalised junction, the carriageway travels in a relatively straight alignment east to west. R833 Ballyfermot Road benefits from traffic calming measures such as speed bumps and horizontal deflections. There is also a weight restriction zone of 3.5 tonnes along R833 Ballyfermot Road, which commences at Cherry Orchard.

The westbound arrangement consists of a single vehicular lane whilst the eastbound arrangement mainly consists of two vehicular lanes; a dedicated bus lane and a standard traffic lane. The bus lane merges into the general traffic lane in some locations, for example after the pedestrian crossing at Cherry Orchard Hospital and after the yellow box entrance into the residential development serving house numbers 430 to 504 Ballyfermot Road, to the north of the carriageway.

It should also be noted that there are several site access roads facilitating residential dwellings, which run parallel to R833 Ballyfermot Road and are separated by a footpath or grass verge.

The three-arm priority junctions along R833 Ballyfermot Road into the Cherry Orchard Estate and commercial developments comprise a mix of arrangements offering left and right turning lanes where required.

These characteristics are shown in Image 5.4.

Image 5.4: Priority Junctions with Cloiginn Park and Blackditch Road

The existing major junction arrangements along R833 Ballyfermot Road from Kennelsfort Road Upper to Le Fanu Road are as follows:

- R833 Ballyfermot Road and Cherry Orchard Football Club Junction;
- R833 Ballyfermot Road and Drumfinn Road Signalised Junction; and
- R833 Ballyfermot Road and Le Fanu Road Junction.

R833 Ballyfermot Road / Cherry Orchard Football Club three-arm signalised junction: This junction is a three-arm signalised junction with pedestrian crossings along the eastern and southern arms and a yellow box in the centre of the junction. There is a non-signalised priority junction approximately 45m east of this junction which provides access into Cherry Orchard Industrial Estate.

The western arm consists of a left-turn lane, an ahead lane and a right-turn lane on the approach. The approaching lanes have buff-coloured surface material and an advance stacking location for cyclists. The western arm exit consists of an on-road cycle lane and general traffic lane.

The eastern arm consists of an on-road cycle lane and one general traffic lane on the approach. The approaching lane has buff coloured surface material. The eastern arm exit consists of an on-road cycle lane, a left-turn lane and an ahead lane.

The southern arm consists of an on-road cycle lane, a left-turn lane, another on-road cycle lane and a right-turn lane. The approach traffic lanes have buff coloured surface material whilst the cycle lanes have red coloured surface material. An advanced stop line is also provided for cyclists on the approach of the southern arm. The southern arm exit consists of an on-road cycle lane and a general traffic lane.

These characteristics are shown in Image 5.5.

Image 5.5: R833 Ballyfermot Road / Cherry Orchard Football Club Junction

R833 Ballyfermot Road / Drumfinn Road Signalised Junction: This is a three-arm junction with pedestrian crossings on the northern and western arms. There is an existing residential access road which runs parallel to the R833 Ballyfermot Road major arm to the south of the western side and both sides to the west. The junction benefits from a yellow box marking in its centre.

The western arm consists of a cycle lane, an ahead lane and a right-turn into the residential site access road which runs parallel to R833 Ballyfermot Road. The western arm exit consists of one general traffic lane. The northern arm consists of one general traffic lane on the approach. The northern arm exit consists of one general traffic lane. The eastern arm consists of an ahead lane and a right-turn lane, approximately 40m in length. The eastern arm exit consists of one general traffic lane.

These characteristics are shown in Image 5.6.

Image 5.6: R833 Ballyfermot Road / Drumfinn Road Junction

R833 Ballyfermot Road / Le Fanu Road four-arm signalised junction: This is a four-arm signalised junction with pedestrian crossings on all arms.

The western arm consists of a cycle lane, an ahead and left-turn lane and an ahead and right-turn lane. The approaching lane has an advanced stacking location for cyclists. The western arm exit consists of one general traffic lane. The northern arm consists of an ahead and left-turn lane and an ahead and right-turn lane. The approaching lane has an advanced stacking location for cyclists. The northern arm exit consists of one general traffic lane.

The eastern arm consists of an ahead and left-turn lane with a prohibition on right-turning movements. The approaching lane also has an advanced stop line for cyclists. The eastern arm exit consists of one general traffic lane. The southern arm consists of a left-turn lane and an ahead and right-turn lane. The approaching lane also has an advanced stacking location for cyclists. The southern arm exit consists of one general traffic lane.

These characteristics are shown in Image 5.7.

Image 5.7: R833 Ballyfermot Road / Le Fanu Road Junction

5.3.2.5 Existing Parking / Loading

Along Section 1 of the Proposed Scheme there is a total of 1,866 existing parking / loading spaces. Of the existing parking spaces, 186 spaces are located immediately along to the Proposed Scheme and the remaining 1,680 spaces located along side roads. Parking / loading spaces along this section of the Proposed Scheme comprises of the following:

- 147 informal spaces, all of which are located along R833 Ballyfermot Road (or local access roads immediately adjacent):
- Six informal spaces are located on R833 Ballyfermot Road between Cherry Orchard Service station and Cleegan Park, adjacent to the eastbound carriageway;
- 50 informal spaces are located on R833 Ballyfermot Road between Cleegan Road and Ballyfermot Community Centre, adjacent to the eastbound carriageway;
- 35 informal spaces are located on R833 Ballyfermot Road between Blackditch road and Clifden Road, adjacent to the westbound carriageway;
- 25 informal spaces are located on R833 Ballyfermot Road between Clifden Road and O'Shea's Pub, adjacent to the westbound carriageway;
- 31 informal spaces are located on R833 Ballyfermot Road between Drumfinn and Le Fanu Local Access Road, adjacent to the eastbound carriageway;
- 38 paid spaces, all of which are located along R833 Ballyfermot Road. The majority of paid spaces (26 spaces) are located in front of commercial properties adjacent to the westbound carriageway (west of the Le Fanu Road Junction). A further nine spaces are located in front of commercial properties adjacent to the eastbound carriageway (west of the Le Fanu Road Junction) whilst three are located outside O'Shea's pub;
- One disabled space located in front of commercial properties adjacent to the westbound carriageway (west of the Le Fanu Road Junction); and
- Approximately 1,680 informal parking spaces located along various side roads within 200-250m of the Proposed Scheme.

5.3.3 Section 2 – Le Fanu Road to Sarsfield Road

This Section outlines the baseline environment for walking, cycling, bus services, general traffic and parking / loading facilities along Section 2 of the Proposed Scheme, between Le Fanu Road and Sarsfield Road.

This section extends for approximately 2.6km in length and consists of R833 Ballyfermot Road and Sarsfield Road.

5.3.3.1 Pedestrian Infrastructure

Along Section 2 of the Proposed Scheme, footpaths and street lighting are provided on both sides of the carriageway, the footpath width varies between 1.8m and 2.0m.

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

- The three-arm R833 Ballyfermot Road / Colepark Avenue junction provides a direct signalised crossing on the eastern arm;
- The three-arm R833 Ballyfermot Road / Unnamed Road signalised junction provides a direct signalised crossings on each arm;
- The pelican crossing across R833 Ballyfermot Road provides a direct signalised crossing adjacent to Church of Our Lady of the Assumption;
- The pelican crossing across R112 Kylemore Road provides a direct signalised crossing adjacent to St Michael's National School;
- The pelican crossing across R112 Kylemore Road provides a direct signalised crossing adjacent to the Kylemore Music College;
- The pelican crossing across R833 Ballyfermot Road provides a direct signalised crossing west of St. Gabriel's Primary School;
- The pelican crossing across R833 Ballyfermot Road provides a direct signalised crossing adjacent to De La Salle, Ballyfermot;
- The three-arm R833 Ballyfermot Road / O'Hogan Road signalised junction provides a direct signalised crossing on the eastern arm. The crossing provides a pedestrian refuge island which does not have guard rails;
- The three-arm R833 Sarsfield Road / Landen Road signalised junction provides crossings on the eastern arm and on the southern arm. The eastern arm provides an indirect signalised crossing staggered by a pedestrian refuge island with guard rails. The southern arm provides a direct signalised crossing;
- The three-arm R833 Sarsfield Road / R833 Con Colbert Road / Sarsfield Road signalised junction provides an indirect signalised crossing on the eastern arm which is staggered by pedestrian refuge islands with guard rails; and

Uncontrolled crossings across priority junctions at side roads benefit from dropped kerbs. The location of pedestrian crossings is illustrated in Figure 6.3b in Appendix A6.1 (TIA) – Sub Appendix 3 (Maps).

Further details of the baseline pedestrian facilities (i.e. routing, directness, accessibility, crossing and footpath widths) at each junction along Section 2 of the Proposed Scheme is included in Appendix A6.1 (TIA) – Sub Appendix 4 (Impact Assessments).

5.3.3.2 Cycling Infrastructure

Along the R833 Ballyfermot Road, eastbound cycle facilities are intermittent and vary in quality. From the three-arm R833 Ballyfermot Road / Colepark Road Junction, there is a combined bus and cycle lane for approximately 90m. The combined bus and cycle lane is in operation from Monday to Saturday between the hours of 07:00hrs and 19:00hrs. At the eastern arm of the four-arm R833 Ballyfermot Road / R112 Kylemore Road Junction, a cycle lane commences and continues eastbound, alternating between a cycle lane and cycle track, before terminating at the three-arm R833 Sarsfield Road / R833 Con Colbert Road / Sarsfield Road Junction. An eastbound cycle lane exists approximately 15m on the approach to the three-arm Sarsfield Road / R839 Grattan Crescent Junction.

From the three-arm Sarsfield Road / R839 Grattan Crescent Junction, a westbound combined bus and cycle lane extends along the majority of the link. The combined bus and cycle lane is in operation 24 hours a day. Immediately west of the three-arm R833 Sarsfield Road / R833 Con Colbert Road / Sarsfield Road Junction, a westbound combined bus and cycle lane extends until the three-arm R833 Sarsfield Road / Landen Road Junction. The combined bus and cycle lane is in operation from Monday to Saturday between the hours of 07:00hrs and 19:00hrs. From here, a westbound advisory cycle lane commences until approximately 50m on the approach to the three-arm R833 Ballyfermot Road / R833 Sarsfield Road / St. Laurence's Road Junction.

Along the R833 Ballyfermot Road, westbound cycle facilities are intermittent. West of the three-arm R833 Ballyfermot Road / R833 Sarsfield Road / St. Laurence's Road Junction, an advisory cycle lane commences along R833 Ballyfermot Road, temporarily terminating on approach to the three-arm R833 Ballyfermot Road / O'Hogan Road Junction and the three-arm R833 Ballyfermot Road / Garryowen Road Junction. The advisory cycle lane merges into a combined bus and cycle lane approximately 150m on the approach to the four-arm R833 Ballyfermot Road / R112 Kylemore Road Junction and extends for approximately 120m. The combined bus and cycle lane is in operation between Monday and Saturday from 07:00 to 10:00, and 16:00 to 19:00hrs. A combined bus and cycle lane extends for 90m from R833 Ballyfermot Road / Ballyfermot Avenue to the three-arm R833 Ballyfermot Road / Ballyfermot Parade Junction. The combined bus and cycle lane is in operation between Monday and Saturday from 07:00 to 10:00, and 16:00 to 19:00hrs.

Cycle parking stands are provided at the following points along of the Proposed Scheme (inside the redline boundary):

- Seven Sheffield stands (able to accommodate 14 bicycles) along the access road parallel to the eastbound R833 Ballyfermot Road carriageway, outside McLoughlin's Butchers; and
- Four Sheffield stands (able to accommodate 8 bicycles) along the R833 Ballyfermot Road westbound carriageway.

Cycle parking stands are provided at the following point in the vicinity of the Proposed Scheme, albeit, outside of the redline boundary;

- 9 Sheffield stands available located on R839 Inchicore Road adjacent to Hilton Dublin Kilmainham (able to accommodate 18 bicycles).

There are 26 designated cycle hire scheme parking racks in the vicinity of the Proposed Scheme, albeit, outside of the redline boundary, located along the R839 Inchicore Road, outside Kilmainham Gaol.

The existing cycle facilities along Section 2 of the Proposed Scheme is illustrated in Figure 6.4b in Appendix A6.1 (TIA) – Sub 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 2 of the Proposed Scheme is included in Appendix A6.1 (TIA) – Sub Appendix 4 (Impact Assessments).

5.3.3.3 Bus Infrastructure

5.3.3.3.1 Bus Priority Measures

Bus priority measures are provided along Section 2 of the Proposed Scheme at the following locations (aside from intermittent breaks and junctions):

- An eastbound combined bus and cycle lane of approximately 90m in length is located between R833 Ballyfermot Road / Colepark Avenue Junction and R833 Ballyfermot Road / Ballyfermot Avenue Junction;
- A westbound combined bus and cycle lane of approximately 90m in length is located between R833 Ballyfermot Road / Ballyfermot Avenue Junction and R833 Ballyfermot Road / Ballyfermot Parade Junction;
- A westbound combined bus and cycle lane of approximately 120m in length is located between R833 Ballyfermot Rd / R112 Kylemore Rd roundabout and R833 Ballyfermot Rd / Garryowen Road

junction approximately 40m in an eastern direction from R833 Ballyfermot Rd / R112 Kylemore Rd roundabout. It is in operation from 07:00 to 10:00, and 16:00 to 19:00, Monday to Saturday; and

- A westbound combined bus and cycle lane of approximately 520m in length is located between R833 Sarsfield Rd / First Avenue junction and R839 Grattan Cres / Sarsfield Rd junction approximately 1200m in an eastern direction from R833 Sarsfield Rd / First Avenue junction. It is in operation from 07:00 to 19:00 Monday to Saturday. It is briefly discontinued as the road carriageway passes underneath a railway bridge.

5.3.3.3.2 Bus Stop Facilities

There are currently 16 bus stops along Section 2 of the Proposed Scheme. The inbound stops are as follows:

- Stop 2697 on R833 Ballyfermot Road east of Ballyfermot Parade;
- Stop 5007 on R112 Kylemore Road north of Covent Lawns;
- Stop 2713 on R833 Ballyfermot Road adjacent to St. Gabriel's Primary School;
- Stop 2714 on R833 Ballyfermot Road adjacent to Mount La Salle;
- Stop 2715 on R833 Ballyfermot Road east of O'Hogan Road;
- Stop 2716 on R833 Sarsfield Road east Longmeadows Pitch and Putt;
- Stop 2718 on R833 Sarsfield Road east of St Mary's Avenue West; and
- Stop 2719 on Sarsfield Road east of Woodfield Avenue.

The outbound stops are:

- Stop 2655 on R833 Ballyfermot Road east of Ballyfermot Parade;
- Stop 4414 on R112 Kylemore Road north of Covent Lawns;
- Stop 2712 on R833 Ballyfermot Road west of Lynch's Lane;
- Stop 2711 on R833 Ballyfermot Road adjacent to Mount La Salle;
- Stop 2710 on R833 Ballyfermot Road west of O'Hogan Road;
- Stop 2709 on R833 Sarsfield Road opposite Longmeadows Pitch and Putt;
- Stop 2644 on R833 Sarsfield Road east of St Mary's Avenue West; and
- Stop 2643 on Sarsfield Road west of Woodfield Avenue

Out of the 16 bus stops, no stops are indented from the carriageway. Three bus stops provide real-time information whilst all stops except one (stop 2710) provide timetable information.

The content of Table 5.5 outlines the availability of facilities at the existing 16 bus stops along Section 2 of the Proposed Scheme.

Table 5.5 Section 2 - Availability of Bus Stop Facilities (of a Total 16 Bus Stops)

Bus Stop Facility	Number of Bus Stops in Baseline with Facility	Percentage of Bus Stops in Baseline with Facility
RTPI	3	19%
Timetable Information	15	94%
Shelter	10	63%
Seating	9	56%
Accessible Kerbs	5	31%
Indented Drop Off Area	0	0%

The existing bus facilities along Section 2 of the Proposed Scheme are illustrated in Figure 6.5b in Appendix A6.1 (TIA) – Sub Appendix 3 (Maps). The bus services that operate along Section 2 are outlined in Table 5.6.

Table 5.6: Bus Service Frequency Along Section 2 of the Proposed Scheme

Service Route	Route	Typical Service Frequency	
		Weekday	Weekend
860	Dame Street – Westmoreland – Aston Quay – Wood Quay – Usher Quay – Victoria Quay – St Johns Road – Con Colbert Road – Sarsfield Road – Ballyfermot Road – Kylemore Road – Kylemore Park – New Nangor Road – Park West Plaza	Hourly	Hourly
79A, 79, 18, 40, 76, 76A	See Table 5.4	See Table 5.4	See Table 5.4

5.3.3.4 General Traffic

5.3.3.4.1 R833 Ballyfermot Road

Within Section 2 of the Proposed Scheme, R833 Ballyfermot Road comprises of a two-way carriageway, with one-lane in both directions for much of its length. There are short stretches which have dedicated bus lanes of between 50m and 90m in length on either side of the road. The speed limit on this section is 50km/h.

The majority of junctions along the remainder of R833 Ballyfermot Road are priority controlled, leading to residential or commercial developments, and accompanied with road markings and signage. The existing major junction arrangements along R833 Ballyfermot Road from Le Fanu Road to R833 Sarsfield Road are as follows:

- R833 Ballyfermot Road / Colepark Avenue three-arm priority junction; and
- R833 Ballyfermot Road / R112 Kylemore Road Junction four-arm roundabout junction.

The characteristics of each major junction are described in turn below.

R833 Ballyfermot Road / Colepark Avenue three-arm priority junction: This junction consists of road markings and a solid traffic island in the centre of the R833 Ballyfermot Road carriageway to restrict motorists from turning right onto Colepark Avenue.

These characteristics are illustrated in Image 5.8.

Image 5.8: R833 Ballyfermot Road Priority Junctions with Colepark Drive and Ballyfermot Avenue

R833 Ballyfermot Road / R112 Kylemore Road Junction four-am roundabout junction: This junction has yield markings on all arms. The junction has short two-lane entries on the approaches of the northern, southern, and western arms and a single lane on the eastern arm. All exit arms consist of one general traffic lane.

These characteristics are illustrated in Image 5.9.

Image 5.9: R833 Ballyfermot Road / R112 Kylemore Road Junction

5.3.3.4.2 R112 Kylemore Road

R112 Kylemore Road, between Chapelizod Hill Road and R833 Ballyfermot Road, comprises of a two-way carriageway, with one-lane in both directions. There are no dedicated bus lanes or cycling facilities for its entire length (400m). Along R112 Kylemore Road, there is one priority junction (R112 Kylemore Road / Convent Lawns priority junction) which leads to residential developments and educational facilities.

There is one existing major junction arrangement along R112 Kylemore Road, between R833 Ballyfermot Road and Chapelizod Hill Road:

- R112 Kylemore Road / Chapelizod Hill Road / Le Fanu Road four-arm signalised junction.

The characteristics of this major junction are described in turn below.

R112 Kylemore Road / Chapelizod Hill Road / Le Fanu Road four-arm signalised junction: This junction consists of road markings in the centre of the R112 Kylemore Road carriageway. All entry and exit arms consist of one general traffic lane.

These characteristics are illustrated in Image 5.10.

Image 5.10: R112 Kylemore Road / Chapelizod Hill Road / Le Fanu Road Junction

5.3.3.4.3 R833 Sarsfield Road

R833 Ballyfermot Road terminates at the St. Laurence's Road priority junction, where R833 Sarsfield Road begins. R833 Sarsfield Road is a two-way carriageway and varies in width between 7.5m and 20m. The road is subject to a 50km/h speed limit and features horizontal deflection traffic calming measures.

At the R833 Sarsfield Road / Landen Road three-arm priority junction, the carriageway widens into a two-lane dual arrangement with opposing flows separated by a grass verge for approximately 200m, before continuing south-east at the junction with R833 Con Colbert Road. To the east the carriageway continues under the Iarnród Éireann railway bridge which has a 4.37m height restriction. The carriageway reduces to a single lane under the bridge which is operated by a yield sign and road markings on the north-western approach.

5.3.3.5 Existing Parking / Loading

The existing conditions for parking and loading for Section 2 of the Proposed Scheme are as follows:

- 63 paid parking spaces, all of which are located along R833 Ballyfermot Road (or local access roads immediately adjacent). 24 of the paid spaces are located to the west of Ballyfermot Village centre and 39 are located to the east;
- Four loading spaces, all of which are located along R833 Ballyfermot Road (or local access roads immediately adjacent). Two of the paid spaces are located to the west of Ballyfermot Village centre and two are located to the east;
- Five taxi bays, all of which are located to the along R833 Ballyfermot Road to the west of Ballyfermot Village centre;
- Two disabled parking spaces which are located along R833 Ballyfermot Road to the east of Ballyfermot Village centre;
- 94 informal spaces, of which 23 spaces are located adjacent to the R833 Ballyfermot Road / R112 Kylemore Road Roundabout, 44 spaces are along Kylemore Road and 27 spaces are along R833 Sarsfield Road;
- 23 informal spaces around R833 Ballyfermot Road / R112 Kylemore Road roundabout - 10 spaces to the north-west, five spaces to the south-west and eight spaces to the south-east;
- 44 informal spaces along Kylemore Road to the north of the R833 Ballyfermot Road / R112 Kylemore Road roundabout;
- 25 informal spaces along R833 Sarsfield Road at the car park on the corner of the R833 Sarsfield Road / First Avenue Junction, adjacent to the eastbound carriageway; and
- Two informal spaces along R833 Sarsfield Road at the Sarsfield Medical Centre Layby, adjacent to the westbound carriageway.

A further 694 informal parking spaces are located along various side roads running parallel to the main carriageway within 200-250m of the Proposed Scheme.

5.3.4 Section 3 – Sarsfield Road to City Centre

This Section outlines the baseline environment for walking, cycling, bus services, general traffic and parking / loading facilities along Section 3 of the Proposed Scheme between R833 Sarsfield Road and Dublin City Centre.

This section commences at the R839 Inchicore Road / R839 Grattan Crescent / R833 Sarsfield Road Junction and has a length of approximately 3.7km. It spans a length between R839 Memorial Road and Thomas Street. In addition to the main corridor, additional changes are proposed along residential streets which run broadly parallel to a section of R810 James Street to the south (Newington Lane, Basin View, St. James's Avenue, Grand Canal Place and Echlin Street) between the James's Street / Newington Lane Junction and James's Street / Echlin Street Junction.

5.3.4.1 Pedestrian Infrastructure

Along R839 Memorial Road, tree lined footpaths are provided on either side of the carriageway and are over 2.0m wide. To the south, along R839 Inchicore Road and R839 Grattan Crescent, footpaths with streetlights are

provided on either side of the carriageway. The footpath along R839 Inchicore Road is less than 1.8m in width while footpaths along R839 Grattan Crescent are broadly 1.8m in width.

R810 Emmet Road consist of footpaths on either side of the carriageway of between 1.8m and 2m in width and signal-controlled pedestrian crossings at the major signalised junctions. The pedestrian facilities along R810 Old Kilmainham and R810 Mount Brown comprise of 1.6m to 2m wide footpaths along both sides of the carriageway. For the majority of this length the residential dwellings open directly onto the public footpaths. There are a number of pinch points where the footpath falls below the minimum requirement of 1.8m.

The pedestrian facilities along R810 James Street and R810 Thomas Street comprise of 1.7m to 3m wide footpaths along both sides of the carriageway. Street lighting is provided throughout.

There are several pedestrian crossings along Section 3 of the Proposed Scheme. Signalised pedestrian crossing facilities can be found at the following locations:

- The three-arm Sarsfield Road / R839 Inchicore Road / R839 Grattan Crescent junction provides indirect signalised crossings on the eastern and western arms. Both crossings are staggered by pedestrian refuge islands with guard rails.
- The R148 Con Colbert Road / R148 Chapelizod Bypass / R839 Memorial Road three-arm signalised junction has signalised crossings on two of the three arms. A direct signalised crossing is provided on the southern arm and an indirect signalised crossing is provided on the western arm;
- The R839 Memorial Road / R839 Inchicore Road three-arm signalised junction has indirect signalised crossings on each arm, facilitated by a refuge island at the centre of the junction;
- The R839 Inchicore Road / R839 Grattan Crescent / R833 Sarsfield Road three-arm signalised junction has indirect signalised crossings on the eastern and western arm. The crossings are staggered by a pedestrian refuge island;
- There is a pelican crossing on the R839 Grattan Crescent immediately south of Inchicore Terrace South. The crossing is direct with dropped kerbs and tactile paving;
- The R839 Grattan Crescent / R810 Emmet Road / R810 Tyrconnell Road three-arm signalised junction has crossings on all arms. There northern and eastern arms have direct signalised crossings whilst the southern arm has a pedestrian refuge island between the approach and exit arms;
- There is a pelican crossing on the R810 Emmet Road between Spa Road and Camac Close. The crossing is direct with dropped kerbs and tactile paving;
- There is a pelican crossing on the R810 Emmet Road east of Bulfin Road. The crossing is direct with a pedestrian refuge island, dropped kerbs and tactile paving;
- There is a pelican crossing on the R810 Emmet Road west of Turvey Avenue. The crossing is direct with a pedestrian refuge island, dropped kerbs and tactile paving;
- The R810 Emmet Road / R111 South Circular Road / R810 Old Kilmainham Road four-arm signalised junction has direct signalised crossing on all arms;
- There is a pelican crossing on R810 Mount Brown east of O'Reilly Avenue. The crossing is direct with a pedestrian refuge island, dropped kerbs and tactile paving;
- The R810 James Street / James Hospital three-arm junction provides an indirect signalised crossing on the eastern arm which is staggered using the central reservation for pedestrian refuge and there are guard rails;
- The R810 James Street / Bow Lane West three-arm junction has an indirect signalised crossing on the southern arm which is staggered using the central reservation for pedestrian refuge and there are guard rails;
- The R810 James Street / Echlin Street three-arm priority junction has signalised crossing on the eastern arm. The crossing is direct with a pedestrian refuge island, dropped kerbs and tactile paving;
- The R810 James Street / Watling Street three-arm signalised junction has signalised crossings on the northern and western arms. Both crossings are direct and the western arm crossing as a pedestrian refuge island separating the approach and exit lanes;
- There is a pelican crossing on R810 Thomas Street east of Crane Street / Roe Lane. The crossing is direct with a pedestrian refuge island, dropped kerbs and tactile paving;

- The R810 Thomas Street / R804 Bridgefoot Street / R804 Thomas Court four-arm signalised junction has signalised crossings on the northern and eastern arms. The signalised crossing on the northern arm is indirect with a pedestrian refuge island and there are guard rails. The signalised crossing on the eastern arm is direct with a pedestrian refuge island;
- The R810 Thomas Street / R804 Meath Street three-arm signalised junction has a direct signalised crossing on the southern and western arms;
- There is a pelican crossing on R810 Thomas Street to the west of John's Lane west. The crossing is direct and has dropped kerbs and tactile paving;
- The R810 Thomas Street / St Augustine Street / Francis Street four-arm signalised junction has direct signalised crossings on all arms of the junction;
- The R108 Cornmarket / R810 High Street three-arm signalised junction has indirect signalised pedestrian crossings on the north-western and eastern arms. The crossings on each arms are staggered by two pedestrian refuge islands; and
- The R108 High Street / R137 Christchurch Place / R137 Nicholas Street / Winetavern Street four-arm signalised junction provides signalised crossings on all arms of the junction. All signalised crossings at the junction are indirect with the exception of the crossing on the northern street which is direct.

Uncontrolled crossings across priority junctions at side roads benefit from dropped kerbs. The location of pedestrian crossings is illustrated in Figure 6.3c in Appendix A6.1 (TIA) – Sub 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 Appendix A6.1 (TIA) – Sub Appendix 4 (Impact Assessments).

5.3.4.2 Cycling Infrastructure

Cycle facilities are discontinuous and vary in provision along Section 3 of the Proposed Scheme. Where available, cycle facilities predominately comprise combined bus and cycle lanes or cycle lanes.

Along R839 Grattan Crescent, there is southbound (inbound) cycle provision only. A southbound (inbound) combined bus and cycle lane extends from the R839 Inchicore Road / R839 Grattan Crescent / R833 Sarsfield Road Junction to the R839 Grattan Crescent / Inchicore Terrace South Junction. The combined bus and cycle lane operates Monday to Saturday between 07:00 and 10:00 and 16:00 and 19:00.

Along R810 Emmet Road, there is limited cycling infrastructure with the exception of an eastbound (inbound) combined bus and cycle lane between the R810 Emmet Road / Myra Close Junction and the R810 Emmet Road / Old Kilmainham / R111 South Circular Road Junction. The combined bus and cycle lane operates Monday to Saturday between 07:00 and 19:00. From the R810 Emmet Road / Old Kilmainham / R111 South Circular Road Junction, there is no cycle provision until the R810 James Street / Bow Lane West Junction.

Along R810 James Street various eastbound (inbound) and westbound (outbound) cycle provision in available. In the eastbound direction, a combined bus and cycle lane extends between the R810 James Street / Bow Lane West Junction and the R810 Thomas Street / St Augustine Street / Francis Street Junction, aside from intermittent breaks and junctions. The combined bus and cycle lane operates Monday to Saturday between 07:00 and 10:00 and 16:00 and 19:00. East of the R810 Thomas Street / St Augustine Street / Francis Street Junction, an advisory eastbound cycle lane extends to the R108 High Street / R137 Christchurch Place / R137 Nicholas Street / Winetavern Street Junction. In the westbound direction, a combination of advisory cycle lanes, mandatory cycle lanes and combined bus and cycle lane extend between the R108 High Street / R137 Christchurch Place / R137 Nicholas Street / Winetavern Street Junction and the R810 James Street / James Hospital Junction. The combined bus and cycle lane operates Monday to Saturday between 07:00 and 10:00 and 16:00 and 19:00.

Cycle parking stands are provided at the following points along of the Proposed Scheme (within the redline boundary):

- 10 Sheffield stands available located on R839 Grattan Cres adjacent to Inchicore Medical Centre (able to accommodate 20 bicycles);

- One Sheffield stands available located on R839 Grattan Crescent immediately south of Inchicore Terrace South (able to accommodate two bicycles);
- Two Sheffield stands available located on R839 Grattan Crescent approximately 50m south of the Inchicore Terrace South (able to accommodate four bicycles);
- Four Sheffield stands available located on R810 Emmet Road eastbound, immediately west of Spa Road (able to accommodate eight bicycles);
- Three Sheffield stands available located on R810 Emmet Road westbound, immediately west of Spa Road (able to accommodate six bicycles);
- Five Sheffield stands available located on R810 Emmet Road outside Inchicore Library (able to accommodate 10 bicycles);
- Seven Sheffield stands available adjacent to R810 James Street, along Ewington Lane (able to accommodate 14 bicycles);
- Three Sheffield stands available located along R810 James Street east of the R810 James Street / Echlin Street Junction (able to accommodate six bicycles);
- Four Sheffield stands located along R810 James Street eastbound, outside McCanns Public House (able to accommodate eight bicycles);
- Six Sheffield stands available located on R810 James Street eastbound, opposite Parish Of Saint James (able to accommodate 12 bicycles);
- 13 Sheffield stands available located on R810 James Street eastbound, opposite Guinness Open Gate Brewery (able to accommodate 26 bicycles);
- 9 Sheffield stands available located along R810 James Street westbound (able to accommodate 18 bicycles);
- Four Sheffield stands available located along the eastbound carriageway of R810 Thomas Street, east of the three-arm R810 James Street / Watling Street Junction (able to accommodate eight bicycles);
- Nine Sheffield stands available located along the eastbound carriageway of R810 Thomas Street, east of the three-arm R810 James Street / Roe Lane Junction (able to accommodate 18 bicycles);
- 12 Sheffield stands available located on R810 Thomas Street east of the R810 Thomas Street / R804 Bridgefoot Street Junction (able to accommodate 24 bicycles);
- Two Sheffield stands available located on R810 Thomas Street westbound, outside Saint Catherine's Church of Ireland (able to accommodate four bicycles);
- Four Sheffield stands available located on R810 Thomas Street east of the R810 Thomas Street / R804 Bridgefoot Street Junction (able to accommodate eight bicycles);
- Three Sheffield stands available located on the R810 Cornmarket slip road (able to accommodate six bicycles);
- Five Sheffield stands available located on R108 High Street at St. Audoen's Park entrance (able to accommodate 10 bicycles); and
- 10 Sheffield stands available located on High Street eastbound (able to accommodate 20 bicycles).

There are designated cycle hire scheme parking racks along Section 3 of the Proposed Scheme at the following locations:

- 24 designated cycle hire scheme parking racks located along R810 Emmet Road, west of R111 South Circular Road;
- 14 designated cycle hire scheme parking racks located along Mount Brown, outside Emo;
- 32 designated cycle hire scheme parking racks located along R810 James Street, outside Guinness Open Gate Brewery; and
- 16 designated cycle hire scheme parking racks located along Bridge Street Upper, t St. Audoen's Park entrance.

There are also cycle parking stands in the vicinity of the Proposed Scheme, albeit, outside of the redline boundary, including e-bike hires.

The existing cycle facilities along Section 3 of the Proposed Scheme are illustrated in Figure 6.4c in Appendix A6.1 (TIA) – Sub 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 Appendix A6.1 (TIA) – Sub Appendix 4 (Impact Assessments).

5.3.4.3 Bus Infrastructure

5.3.4.3.1 Bus Priority Measures

Bus priority measures are provided along Section 3 of the Proposed Scheme at the following locations (aside from intermittent breaks and junctions):

- Northbound along R839 Grattan Crescent for approximately 50m on the approach to the R839 Inchicore Road / R839 Grattan Crescent / R833 Sarsfield Road Junction;
- Southbound along R839 Grattan Crescent to the R839 Inchicore Road / R839 Grattan Crescent / R833 Sarsfield Road Junction and south of the R839 Grattan Crescent / Inchicore Terrace South Junction, operating Monday to Saturday between 07:00 – 10:00 and 12:00 – 19:00;
- Eastbound along R810 Emmet Road between the R810 Emmet Road / Myra Close Junction and west of the R810 Emmet Road / R111 South Circular Road / R810 Old Kilmainham Road, operating Monday to Saturday between 07:00 – 19:00;
- Eastbound along R810 James Street for approximately 60m on the exit arm of the R810 James Street / St James Hospital Junction;
- In both directions along R810 James Street between the R810 James Street / Bow Lane West Junction and the R810 Thomas Street / St Augustine Street / Francis Street Junction, operating Monday to Saturday between 07:00 – 10:00 and 12:00 – 19:00; and
- Westbound along R108 High Street between the R108 High Street / R137 Christchurch Place / R137 Nicholas Street / Winetavern Street and the R108 Cornmarket / R810 High Street Junction.

5.3.4.3.2 Bus Stop Facilities

There are 23 bus stops along Section 3 of the Proposed Scheme, between R833 Sarsfield Road and City Centre. The inbound stops are as followed:

- Stop 1989 on R810 Emmet Road west of Camac Close;
- Stop 1990 on R810 Emmet Road west of Myra Close;
- Stop 1992 on R810 Emmet Road between R111 South Circular Road and Luby Road;
- Stop 1993 on R810 Old Kilmainham west of Kearn's Place;
- Stop 1994 on R810 Mount Brown outside Millbrook Court;
- Stop 1995 R810 James Street east of St James Hospital;
- Stop 1996 R810 James Street adjacent Echlin Street;
- Stop 1997 on R810 James Street west of Watling Street;
- Stop 1998 on R810 Thomas Street east of R804 Bridgefoot Street;
- Stop 1999 on R810 Thomas Street between John Street West and Augustine Street; and
- Stop 2001 on R108 High Street is located to the south-west of R108 Cornmarket.

The outbound stops are:

- Stop 2642 on R839 Grattan Crescent south of Kilmainham Bottle Bank;
- Stop 1947 on R810 Emmet Road east of St Vincent Street West;
- Stop 1946 R810 Emmet Road west of Bulfin Road;
- Stop 1945 on R810 Emmet Road between R111 South Circular Road and Luby Road;
- Stop 1944 on R810 Old Kilmainham between Brookfield Road and Kearn's Place;
- Stop 1943 on R810 Mount Brown adjacent to St James's Court Mount Brown;

- Stop 1942 on R810 James Street west of St James Hospital;
- Stop 1941 on R810 James St between Bow Lane West and Echlin Street;
- Stop 1940 on R810 James Street west of Watling Street;
- Stop 1939 on R810 Thomas Street east of R804 Bridgefoot Street;
- Stop 1938 on R810 Thomas Street west of Francis Street; and
- Stop 1937 on R108 High Street between R137 Nicholas Street and Back Lane.

Of the 23 bus stops, one stop (stop 1996) is indented whilst all other bus stops are inline along the carriageway.

The majority of the bus stops provide timetables and over half of the stops provide shelters. Real time passenger information is provided at 13 stops.

The content of Table 5.7 outlines the availability of bus stop facilities at the existing 23 bus stops along Section 3 of the Proposed Scheme.

Table 5.7: Availability of Bus Stop Facilities Along Section 3 Summary (of a Total 23 Bus Stops)

Bus Stop Facility	Number of Bus Stops in Baseline with Facility	Percentage of Bus Stops in Baseline with Facility
RTPI	13	57%
Timetable Information	21	91%
Shelter	13	57%
Seating	9	39%
Accessible Kerbs	8	35%
Indented Drop Off Area	1	4%

The existing bus facilities along Section 3 of the Proposed Scheme are illustrated in Figure 6.5c in Appendix A6.1 (TIA) – Sub Appendix 3 (Maps). The bus services that operate along Section 3 are outlined in Table 5.8.

Table 5.8: Bus Service Frequency Along Section 3 of the Proposed Scheme

Service Route	Route	Typical Service Frequency	
		Weekday	Weekend
69	Hawkins Street – Parkgate St – Tyrconnell Road – Naas Road – Clondalkin Village – Green Isle Hotel - Rathcoole	45 minutes	60 minutes
68	Newcastle – Greenogue Business Park – Cherrywood Villas – Clondalkin Village – Bulfin Road – Camden Street – Burgh Quay	70 minutes	No Services
13	Harristown – Main Street Ballymun – Drumcondra Rail Station – O'Connell Street – St James Hospital – Tyrconnell Road – Naas Road – Clondalkin Village – Grange Castle	10 minutes	30 minutes
126	Dublin (DCU) – Belfield – Kildare Street – Busaras – Connolly Luas Stop – Castlewarden – Kill – Johnstown Village – Naas – Newbridge – Milltown – Rathangan – Brownstown (The Curragh) – Kildare (Boyles)	45 minutes	No services
51X	Dunawley – Cherrywood Villas – Old Nangor Road – Clondalkin Village – Monastery Road – Naas Road – St Johns Road – North Quays – Hawkins Street – Westland Row – Merrion Square – Baggot Street – Waterloo Road – Morehampton Road	Daily	No Services
68X	Greenogue Business Park - Newcastle – Peamount – Nangor Road – New Nangor Road – Naas Road – Robinhood Industrial Estate – Oblates Church – Emmet Road – James Street – Thomas Street – Lord Edward Street – Dame Street – Hawkins Street	Daily	No Services
123	Walkinstown – St James Hospital – O'Connell St – Ballybough R - Marino	10 minutes	20 minutes
40	See Table **5.4**	See Table **5.4**	See Table **5.4**

5.3.4.4 General Traffic

5.3.4.4.1 Sarsfield Road

A short section of Sarsfield Road between the rail bridge and its junction with Grattan Crescent appears in Section 3. The length terminates at the three-arm signalised junction with R839 Inchicore Road, approximately 300m east

of the bridge. All junctions along Sarsfield Road are priority controlled, leading to residential or commercial developments, and accompanied with road markings and signage.

5.3.4.4.2 R839 Memorial Road

R839 Memorial Road is a one-way, two-lane carriageway, approximately 100m in length, connecting R839 Inchicore Road to the south with R148 Con Colbert Road to the north. The carriageway varies in width from 7.5m at the southern side to 5m at the northern side. The carriageway also changes in speed limit from 50km/h to 60km/h approximately 20m south of the R839 Memorial Road / R148 Con Colbert three-arm signalised junction.

The existing major junction arrangements along R839 Memorial Road are as follows:

- R148 Chapelizod Bypass / R148 Con Colbert Road / R839 Memorial Road; and
- R839 Inchicore Road / R839 Memorial Road.

The characteristics of each major junction are described in turn below.

R148 Chapelizod Bypass / R148 Con Colbert Road / R839 Memorial Road three-arm signalised junction: This junction has signalised pedestrian crossings on the southern and western arms.

The eastern arm approach consists of a combined bus and cycle lane and two straight-ahead general traffic lanes. No left turn to R839 Memorial Road is permitted from this arm. The eastern exit arm consists of a combined bus and cycle lane and two general traffic lanes.

The southern arm is a one-way road and consists of two general traffic approach lane: one left and right turn lane and one right turn only lane.

The western approach arm consists of a combined bus and cycle lane, which continues through the junction, and two straight-ahead general traffic lanes. No right turn to R839 Memorial Road is permitted from this arm. The western exit arm consists of a combined bus and cycle lane and two general traffic lanes.

These characteristics are illustrated in Image 5.11.

Image 5.11: R148 Chapelizod Bypass / R148 Con Colbert Road / R839 Memorial Road

5.3.4.4.2.1 R839 Inchicore Road / R839 Memorial Road

R839 Inchicore Road / R839 Memorial Road three-arm signalised junction: This junction comprises a pedestrian refuge area in its centre, forming left-turn and right-turn slip lanes between R839 Inchicore Road and R839 Memorial Road.

The western arm consists of one left-turn lane on its approach while the western exit also has just one general traffic lane. The northern arm consists of two one-way lanes travelling north, from the western and eastern arms, with the western lane having right of way and the eastern lane operated by a 'Yield' sign.

The eastern arm consists of a cycle lane, an ahead lane, a left-turn lane and another two-way cycle lane. There is a 3.5 tonne weight restriction introduced at the approach of the ahead lane on the eastern arm.

These characteristics are illustrated in Image 5.12.

Image 5.12: R839 Inchicore Road / R839 Memorial Road Junction

5.3.4.4.3 R839 Inchicore Road

The Proposed Scheme will use a 150m long stretch of R839 Inchicore Road which is the only section of R839 Inchicore Road which has two-way flow in the vicinity of the Proposed Scheme. The carriageway is approximately 6.5m in width and has a continuous white line in its centre to restrict overtaking. All vehicular traffic travelling in an eastern direction along R839 Inchicore Road has to turn left onto R839 Memorial Road to the north.

There is one major junction along R839 Inchicore Road:

- R839 Inchicore Road / R839 Grattan Crescent / R833 Sarsfield Road three-arm signalised junction.

R839 Inchicore Road / R839 Grattan Crescent / R833 Sarsfield Road three-arm signalised junction: This junction provides two pedestrian refuge areas, separating each lane of the junction, along the north-western arm and eastern arm.

The north-western arm consists of an ahead lane onto R839 Inchicore Road and a right-turn lane onto R839 Grattan Road. The north-western arm exit consists of one general traffic lane.

The eastern arm consists of one-lane on the approach with right running banned for vehicles accept buses and cycles travelling from R839 Inchicore Road to R833 Sarsfield Road. The eastern arm exit consists of one general traffic lane.

The south-western arm consists of a left-turn bus lane onto R833 Sarsfield Road and an ahead only lane for all other vehicular traffic onto R839 Inchicore Road.

These characteristics are illustrated in Image 5.13.

Image 5.13: R839 Inchicore Road / R839 Grattan Crescent / Sarsfield Road Junction

5.3.4.4.4 R839 Grattan Crescent

R839 Grattan Crescent is a two-way carriageway of approximately 260m in length, connecting R810 Tyrconnell Road to the south with R839 Inchicore Road to the north. The carriageway is approximately 11m in width and has a continuous white line to restrict overtaking.

The carriageway generally consists of two lanes in one direction and a single lane in the other. Approximately 50m south of the R839 Inchicore Road / R839 Grattan Crescent / Sarsfield Road three-arm signalised junction, the single lanes along both directions of R839 Grattan Crescent diverge into two lanes.

The north-east facing traffic diverges into an ahead only lane and a left-turn bus lane onto Sarsfield Road. The south-west facing traffic diverges into a standard lane and a with-flow near side bus lane, which operates from Monday to Saturday between the hours of 07:00hrs to 10:00hrs and 16:00hrs to 19:00hrs.

The majority of junctions along R839 Grattan Crescent are standard priority junctions, which provide appropriate road markings such as broken white lines and yellow box markings to allow vehicles travelling in and out of the minor arms. The arrangement of the remaining signalised junction is outlined below.

There is one major junction along R839 Grattan Crescent:

- R839 Grattan Crescent / R810 Emmet Road / R810 Tyrconnell Road three-arm signalised junction
- R839 Grattan Crescent / R810 Emmet Road / R810 Tyrconnell Road three-arm signalised junction: This junction includes a yellow box road marking in the centre of the junction and pedestrian crossings on all arms.
- The northern arm consists of a left-turn lane and an ahead lane on the approach. An advanced stacking location for cyclists is also located on the approach. The northern arm exit consists of one general traffic lane.
- The eastern arm consists of left and right turn lanes on the approach. An advanced stacking location for cyclists is also located on the approach. The eastern arm exit consists of one general traffic lane.
- The southern arm consists of an ahead lane and a right-turn lane on the approach. The southern arm exit consists of one general traffic lane. It also provides a pedestrian refuge area in the centre of the carriageway.

These characteristics are illustrated in Image 5.14.

Image 5.14: R839 Grattan Crescent / R810 Emmet Road / R810 Tyrconnell Road Junction

5.3.4.4.5 R810 Emmet Road

Following R839 Grattan Crescent, the Proposed Scheme will continue eastwards along R810 Emmet Road, which is approximately 900m in length, before reaching the R810 Emmet Road / R811 South Circular Road / R810 Old Kilmainham four-arm signalised junction.

R810 Emmet Road is a two-way carriageway with a single lane for general traffic in each direction. The carriageway is subject to a speed limit of 50km/h and benefits from traffic calming measures such as vertical deflection and road markings to delineate horizontal deflections.

At its western side the carriageway has a narrow width of approximately 5.5m with one-lane in both directions. Approximately 500m west of this, the carriageway widens to approximately 12m, at which point a with-flow near side bus lane is introduced along with hatched road markings to narrow the lane widths.

The majority of junctions along R810 Emmet Road are standard priority junctions, which provide road markings such as broken white lines and yellow box markings to allow vehicles travelling in and out of the minor arms.

There is one major junction along R810 Emmet Road:

- R810 Emmet Road / R811 South Circular Road / R810 Old Kilmainham four-arm signalised junction

R810 Emmet Road / R811 South Circular Road / R810 Old Kilmainham four-arm signalised junction: This junction consists of two-lane approaches on all, with no right-turn restrictions on the eastern and western arms. There is a 3.5 tonne weight restriction on the eastern arm.

These characteristics are illustrated in Image 5.15.

Image 5.15: R810 Emmet Road / R811 South Circular Road / R810 Old Kilmainham

5.3.4.4.6 R810 Old Kilmainham to R810 Mount Brown

The Proposed Scheme will continue east along R810 Old Kilmainham and R810 Mount Brown, which is approximately 800m in length, before reaching R810 James Street. It is a two-way carriageway with one-lane in both directions and a broken white line in its centre. The carriageway is approximately 7.5m in width and subject to a speed limit of 50km/h.

The junctions along R810 Old Kilmainham and R810 Mount Brown are priority controlled, leading to residential or commercial developments, and accompanied with road markings and signage.

5.3.4.4.7 R810 James Street

R810 James Street commences at the R810 Mount Brown / R810 James Street / Ceannt Fort three-arm priority junction and continues in an east to west direction. The carriageway introduces a bus lane in both directions following the signalised access to Saint James's Hospital. At this point the Luas Red Line turns east onto R810 James Street and travels in a parallel direction to the carriageway for approximately 200m before turning north towards Heuston Station.

The priority junctions along R810 James Street provide signage and road markings such as broken white lines and yellow box markings to allow vehicles travelling in and out of the minor arms.

The existing major signalised junctions are as follows:

- R810 James Street / Saint James's Hospital;
- R810 James Street / Bow Lane West; and
- R810 James Street/Watling Street/R810 Thomas Street.

R810 James Street / Saint James's Hospital three-arm signalised junction: This junction includes a yellow box road marking in the centre of the junction and pedestrian crossings on the southern and eastern arms.

The western arm consists of two general traffic lanes on the approach, and one general traffic lane on exit.

The eastern arm consists of a cycle lane, a combined tram and general traffic lane and a general traffic lane on the approach. The eastern arm does not permit left-turning movements into the southern arm, except for trams. The vehicular lane is shared with the Luas Red Line. The eastern arm exit consists of a dedicated bus lane and a general traffic lane.

The southern arm consists of a single general traffic lane and is priority controlled with a dual arrangement. Opposing flows are separated by a landscaped median strip at the approach to the junction. The southern arm exit consists of one general traffic lane.

These characteristics are illustrated in Image 5.16.

Image 5.16: R810 James Street / Saint James's Hospital Access Junction

R810 James Street / Bow Lane West three-arm signalised junction: This junction includes a yellow box road marking in the centre of the eastern junction. At the western sections of the junction there is a signalised pedestrian crossing on the western arm and an informal pedestrian crossing on the northern arm.

At the western section of the junction, the eastern approach arm consists of a combined bus and cycle lane (in which parking is permitted outside of operational hours), a straight-ahead general traffic lane and a right-turn filter lane, approximately 50m in length. The eastern exit arm consists of a combined bus and cycle lane and one general traffic lane. This arm contains a traffic island which separates opposing traffic flows.

At the western section of the junction, the western approach arm consists of a combined bus and cycle lane and a general traffic lane. The combined bus and cycle lane commences approximately 15m prior to the junction. The western exit arm consists of a mandatory cycle lane and one general traffic lane. This arm contains a traffic island which separates opposing traffic flows.

At the western section of the junction, the northern approach arm consists of a mandatory left -turn cycle lane and a left turn general traffic lane. No right turn is permitted from this arm. The northern exit arm consists of one general traffic lane.

At the western section of the junction, the northern arm consists of one general traffic approach lane and one general traffic exit lane.

These characteristics are illustrated in Image 5.17.

Image 5.17:R810 James Street / Bow Lane West

R810 James Street / Watling Street / R810 Thomas Street three-arm signalised junction: This junction consists of a two-lane, one-way minor arm to allow vehicular traffic to access R810 James Street and R810 Thomas Street.

The junction access into Diageo operates as a priority-controlled access at the eastern arm, with a yellow box road marking to keep the access clear.

These characteristics are illustrated in image 5.18.

Image 5.18: R810 James Street / Watling Street / R810 Thomas Street Junction

5.3.4.4.8 R810 Thomas Street

R810 Thomas Street commences at the R810 James Street / Watling Street / R810 Thomas Street three-arm signalised junction and continues in an east to west direction. R810 Thomas Street continues as a two-way, two-lane carriageway with a bus lane and vehicular lane in both directions.

The priority junctions along R810 Thomas Street provide signage and road markings such as broken white lines and yellow box markings to allow vehicles travelling in and out of the minor arms.

The existing major signalised junctions are as follows:

- R810 Thomas Street / Bridgefoot Street / R804 Thomas Court;

- R810 Thomas Street / R804 Meath Street; and
- R810 Thomas Street / Francis Street / St. Augustine Street.

R810 Thomas Street / Bridgefoot Street / R804 Thomas Court three-arm signalised junction: This junction includes a yellow box road marking in the centre of the junction and pedestrian crossings along the northern and eastern arms.

The western arm consists of two lanes with a cycle lane that starts at the approach. The western arm exit consists of a cycle lane, a dedicated bus lane and a general traffic lane.

The northern arm consists of a cycle lane, a left-turn lane and an ahead and right-turn lane with an advanced stacking location for cyclists on the approach. The northern arm exit consists of one general traffic lane.

The eastern entry arm consists of a cycle lane, a dedicated bus lane and a general traffic lane on the approach. The eastern arm exit mirrors this, also consisting of an on-road cycle lane, a dedicated bus lane and a general traffic lane.

The southern arm is priority controlled. Right turning movements from the eastern arm onto Bridgefoot Street are not permitted between the hours of 07:00hrs and 10:00hrs and 16:00hrs and 19:00hrs.

These characteristics are illustrated in Image 5.19.

Image 5.19: R810 Thomas Street / Bridgefoot Street / R804 Thomas Court Junction

R810 Thomas Street / R804 Meath Street three-arm signalised junction: This junction consists of a two-lane, one-way minor arm to allow vehicular traffic to access R810 Thomas Street.

The western arm consists of a cycle lane and an ahead lane on the approach, with a prohibition for right-turning traffic onto R804 Meath Street. The western arm exit consists of a general traffic lane.

The eastern arm consists of one general traffic lane on the approach, with a restriction on left-turning traffic onto R804 Meath Street. The eastern arm exit consists of a dedicated bus lane and a general traffic lane.

The southern arm is a one-way carriageway which consists of a left-turn lane and a right-turn lane.

These characteristics are illustrated in Image 5.20.

Image 5.20: R810 Thomas Street / R804 Meath Street Junction

R810 Thomas Street / Francis Street / St. Augustine Street four-arm signalised junction: This junction consists of three arms operated by signal control and a fourth, the southern arm (Francis Street), operated by priority control. Pedestrian crossings are provided at all arms. A yellow box road marking is provided in the centre of the junction.

The northern arm (St. Augustine Street) consists of two lanes and operates one-way southbound. The eastern arm consists of two lanes on the approach and two lanes on the exit. The southern arm (Francis Street) consists of a single lane and is a one-way southbound carriageway. The western arm consists of two lanes on the approach and one lane on the exit.

These characteristics are illustrated in Image 5.21.

Image 5.21: R810 Thomas Street / Francis Street / St. Augustine Street Junction

5.3.4.4.9 R108 High Street

This short section of R108 High Street is included within the Proposed Scheme and is a six-lane dual carriageway with opposing directions separated by a narrow median strip.

Eastbound, it comprises two general traffic lanes, alongside a bus lane. Westbound, it has three general traffic lanes and an advisory cycle lane.

There is one major junction along R108 High Street:

- R810 Thomas Street / R108 High Street (Cornmarket) Junction three-arm signalised junction

R810 Thomas Street / R108 High Street (Cornmarket) Junction three-arm signalised junction: This junction has a yellow box in the centre and pedestrian crossings across the northern and eastern arms.

The northern arm consists of two lanes travelling ahead onto R108 High Street and two lanes travelling right onto R810 Thomas Street on the approach. The northern arm exit consists of a general traffic lane. The opposing flows are divided by pedestrian refuge areas.

The eastern arm consists of an on-road cycle lane, an ahead lane and two right-turn lanes on the approach. The eastern arm exit consists of an on-road cycle lane and three general traffic lanes.

The western arm consists of two general traffic lanes on the approach and two general traffic lanes on the exit.

These characteristics are illustrated in Image 5.22.

Image 5.22: R810 Thomas Street / R108 High Street Junction

5.3.4.4.10 Off Corridor Streets (Proposed Quiet Street)

In addition to the main corridor, additional improvements are proposed along residential streets which run broadly parallel to the south of R810 James Street between the James's Street / Newington Lane Junction and James's Street / Echlin Street Junction. The proposed quiet street covers Newington Lane, Basin View, St. James's Avenue, Grand Canal Place and Echlin Street, all of which are subjects to a 30km/h speed limit.

Newington Lane and Basin View have two-way carriageways with no centre line markings to separate traffic travelling in opposite directions. For the most part, the carriageway widths are constrained by on-street parking. Traffic calming measures (raised tables) are located along the carriageway to reinforce the 30km/h speed limit.

St. James's Avenue is a one-way carriageway permitting eastbound vehicles. The street is subject to a 3.5t weight restriction and parking restrictions in the form of double yellow lines are on the southern side of the carriageway.

Grand Canal Place and Echlin Street have two-way carriageways with no centre line markings to separate traffic travelling in opposite directions.

5.3.4.5 Existing Parking / Loading

Along Section 3 of the Proposed Scheme there is a total of 1,953 existing parking / loading spaces. Of the existing parking spaces, 373 spaces are located along the Proposed Scheme corridor and the remaining 1,580 spaces are located along side roads.

Parking / loading spaces along this section of the Proposed Scheme comprises of the following (see Table 6.13 for further details):

- 248 paid parking spaces, the majority of which (127 spaces) are located on R810 Emmet Road whilst 18 paid spaces are located on R839 Grattan Road, 18 are located on R810 Old Kilmainham, 37 on R810 Mount Brown, two on Bow Lane West, 11 on R810 James Street, 32 on R810 Thomas Street and three on R108 High Street;
- 18 loading spaces, of which three are located on R839 Grattan Crescent, one is located on R810 Emmet Road, one on R810 Mount Brown, one on Bow Lane West, one on R810 James Street, seven on R810 Thomas Street and four on R108 High Street;
- Eight disabled parking spaces, of which three are located on R839 Grattan Crescent, one is located on R810 Emmet Road, one on R810 Mount Brown and three on R810 Thomas Street; and
- 99 informal parking spaces located along Newington Lane, Basin Street Lower, Saint James's Avenue, Grand Canal Place and Echlin Street.

A further 1,580 informal parking spaces are located along various side roads running parallel to the main carriageway within 200-250m of the Proposed Scheme.

6. Potential Impacts

6.1 Characteristics of the Proposed Scheme

The Proposed Scheme comprises the development of bus priority along the entire route, from the new bus interchange facility on the northern boundary of the Liffey Valley Shopping Centre to High Street / Nicholas Street Junction. Improved cycle infrastructure is to be provided along the majority of the route, including a quiet street cycle route for westbound cyclists to avoid the Luas tracks via Echlin Street to connect James's Hospital and James's Street.

The design of the Proposed Scheme consists primarily of dedicated bus lanes in both directions where feasible, with alternative measures proposed, such as bus gates, at particularly constrained locations. Significant changes to pedestrian and cycle facilities and traffic management are also proposed as part of the Proposed Scheme.

6.2 Do Nothing Scenario

With regards to this TIA, the 'Do Nothing' scenario means there would be no changes to existing transport infrastructure and hence, 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 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 2016-2035 (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 2035;

- 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. 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, DART+ Tunnel, Luas line extensions to Lucan, Finglas and Bray are all fully operational.

Appendix A6.1 (TIA) – Sub 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.

6.3.2 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. This is shown diagrammatically in Diagram 6.2.

Total trip demand (indicated by the dashed line) will increase into the future in line with demographic growth (population and employment levels etc.). To limit the growth in car traffic and to ensure that this demand growth is catered for predominantly by sustainable modes, a number of measures will be required, that include improved sustainable infrastructure and priority measures delivered as part of the NDP/GDA Strategy. In addition to this, demand management measures will play a role in limiting the growth in transport demand, predominantly to sustainable modes only. The result will be only limited or no increases overall in private car travel demand. The Proposed Scheme will play a key role in this as part of the wider package of GDA Strategy measures.

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

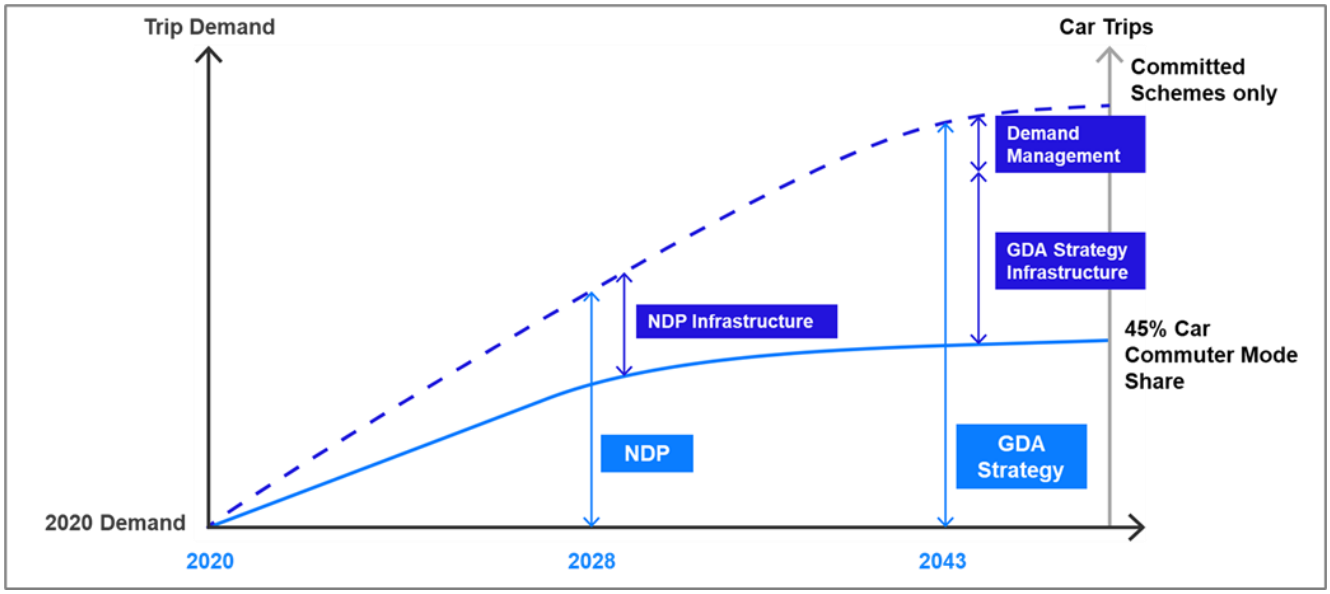

Diagram 6.1: Trip Demand Growth and the GDA Strategy

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, a proxy for a suite of demand management measures is included in the Do Minimum in line with the target to achieve a maximum 45% car driver commuter mode share target, across the GDA, as outlined in the Strategy.

6.3.3 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 proposed Construction Compounds, construction plant and equipment. This assessment, as outlined herein, provides an overview of the potential traffic and transport impacts of the Construction Phase based on the information set out in Chapter 5 (Construction) of the EIAR.

A Construction Environmental Management Plan (CEMP) has been prepared and is included as Appendix A5.1 in Volume 4 of the EIAR. The CEMP 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 Description of Construction Works

The Proposed Scheme has been divided into two principal sections. The division line between sections has been determined by grouping similar carriageway types together. These sections have been further subdivided into 13 sub-sections, according to the types of construction works required. The sections / sub-sections are the following (as shown in Diagram 6.2):

- Section 1: Liffey Valley to Le Fanu Road
  - **Section 1a:** Liffey Valley Shopping Centre to M50 Overbridge
  - **Section 1b:** M50 Overbridge to Ballyfermot Road
  - **Section 1c:** Ballyfermot Road to Cherry Orchard Service Station
  - **Section 1d:** Cherry Orchard Service Station to Le Fanu Road
- Section 2: Le Fanu Road to Sarsfield Road
  - **Section 2a:** Le Fanu Road to Kylemore Road
  - **Section 2b:** Kylemore Road to St. Laurence's Road
  - **Section 2c:** St. Laurence's Road to Con Colbert Road
- Section 3: Sarsfield Road to City Centre
  - **Section 3a:** Con Colbert Road to Emmet Road
  - **Section 3b:** Emmet Road to South Circular Road
  - **Section 3c:** South Circular Road Junction to Bow Lane West
  - **Section 3d:** Bow Lane West to Cornmarket
  - **Section 3e:** Cornmarket to High Street

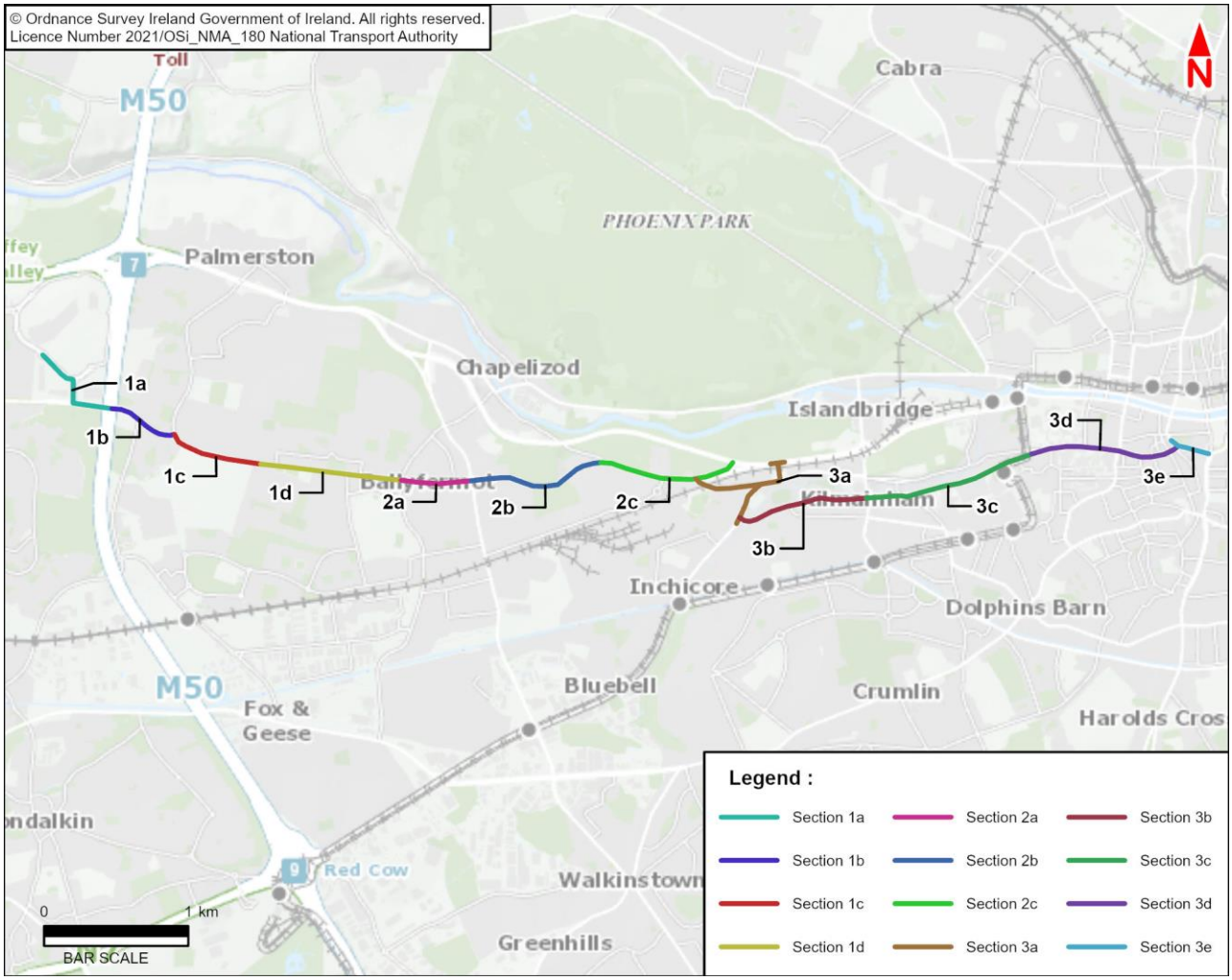

Diagram 6.2: Proposed Subsections of Construction Phase

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

6.4.2 Construction Programme

An outline, indicative programme for the Proposed Scheme is provided in Chapter 5 (Construction) of the EIAR. The Proposed Scheme is estimated to require some 30 months (approximately) to complete, however, individual activities will have shorter durations. Works are envisaged to proceed concurrently on multiple work-fronts to minimise the overall construction duration.

6.4.3 Construction Route

The Construction Compound locations have been selected based on where there is the most available space, in close proximity to the majority of the Proposed Scheme major works and with access to the National and Regional Road network. The Construction Compounds will be located at the following sites:

- Construction Compound LV1: Fonthill Road;
- Construction Compound LV2: Coldcut Road; and
- Construction Compound LV3: Con Colbert Road.

Access to and egress from the Construction Compounds will occur via dedicated Construction Access Routes. The appointed contractor's CTMP shall include measures for managing traffic in and out of the compound. Access

to and egress from the Construction Compounds will be permitted via dedicated Construction Access Routes and will utilise the existing access points where practicable. The Construction Compounds are likely to contain a site office, and welfare facilities for NTA personnel and contractor personnel. Limited car parking will be allowed at the Construction Compounds. Materials such as topsoil, subsoil, concrete, rock etc., may be stored at the Construction Compounds for crushing and / or reuse. Items of plant and equipment may also be stored within the Construction Compounds.

The appointed contractor will be responsible for developing the final layout and use of the Construction Compounds 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 Compounds, 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 along the National roads such as the close by M50 and N4 and from the local Regional road network. It is assumed that all National and Regional roads including the Regional routes in the immediate vicinity of the Proposed Scheme will be used to supply/remove this material.

It is envisaged that construction vehicles will travel to and from the construction works via the following road network (as shown in Diagram 6.3):

- M50 Motorway;
- N4 Lucan Road;
- R108;
- R111;
- R112;
- R113;
- R148;
- R804;
- R810;
- R833; and
- R839.

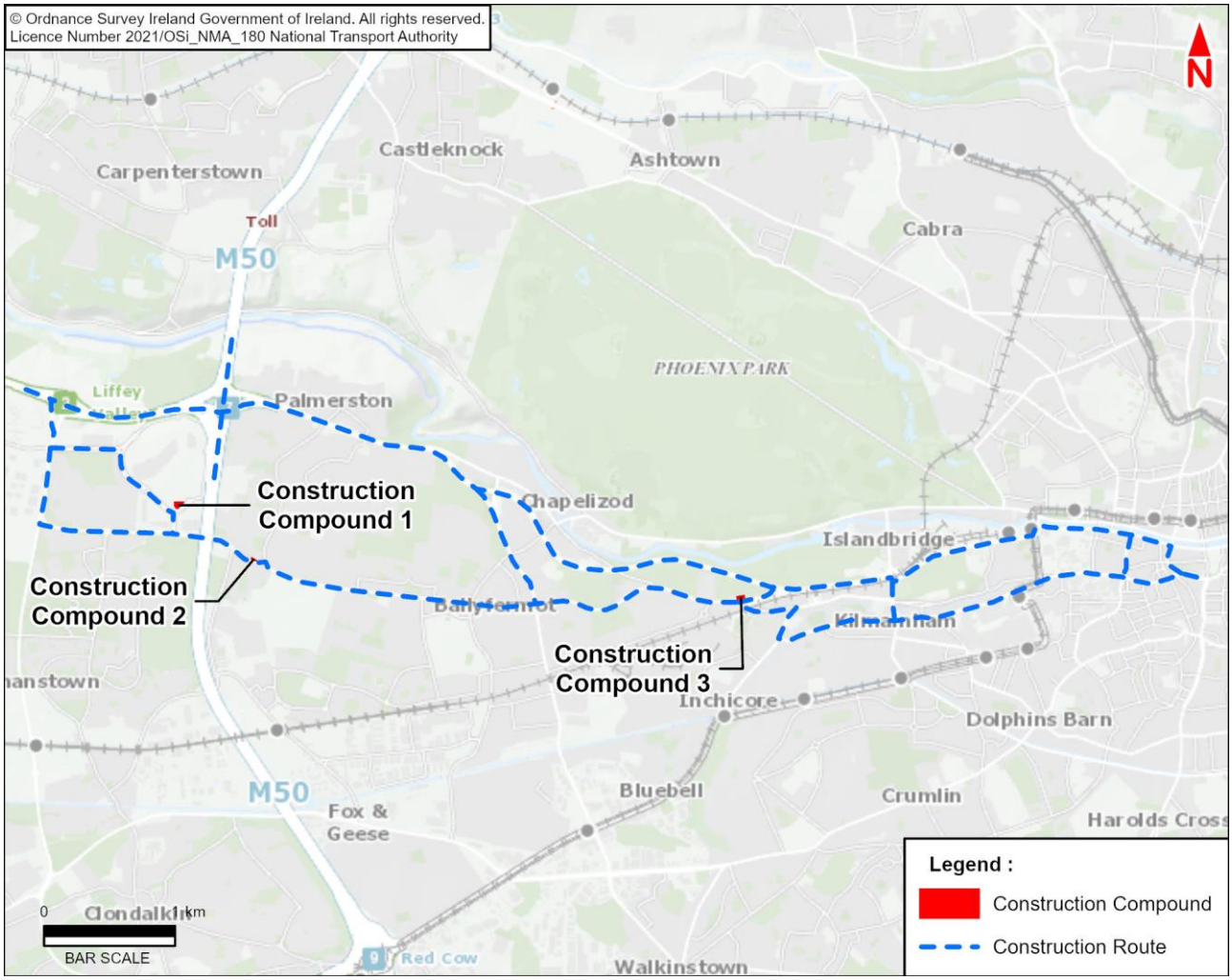

Diagram 6.3: Proposed Construction Routes and Main Compound Locations

6.4.4 Predicted Construction Impact

6.4.4.1 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 DTTAS'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.

6.4.4.2 Pedestrian Provisions

As described in Chapter 5 (Construction) of the EIAR, pedestrians may be 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, will be maintained.

Due consideration will be given to pedestrian provisions in accordance with Section 8.2.8 of the Transport's 'Traffic Signs Manual, Chapter 8 Temporary Traffic Measures and Signs for Roadworks' (DTTAS 2019a) and the DTTAS Temporary Traffic Management Design Guidance (DTTAS 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. Therefore, pedestrian impacts as a result of scheme construction are expected to be **Low Negative**.

6.4.4.3 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 DTTAS Chapter 8, Temporary Traffic Measures and Signs for Roadworks of the Traffic Signs Manual (DTTAS 2019a) and the DTTAS Temporary Traffic Management Design Guidance (DTTAS 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. Cycling impacts as a result of scheme construction are expected to be **Medium Negative**.

6.4.4.4 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. Public transport impacts as a result of scheme construction are expected to be **Low Negative**.

6.4.4.5 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. Parking and loading impacts as a result of scheme construction are expected to be **Low Negative**.

6.4.4.6 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. Impacts of traffic restrictions during scheme construction are expected to be **Medium Negative**.

6.4.4.7 General Traffic Redistribution

Significant impacts due to general traffic redistribution away from the direct study area are not anticipated during the Construction Phase based on the intended nature of the progressive works along the corridor whereby traffic

flows are to be maintained in both directions. There may be a requirement for some localised temporary lane closures for short durations of the day, which will involve consultation between the appointed contractor and relevant authorities. Access for general traffic to existing residential and commercial units immediately adjacent to the Proposed Scheme is to be accommodated throughout the Construction Phase.

The appointed contractor will develop a CTMP that gives due consideration to provision of local access requirements and designates appropriate diversion routes in the case where localised temporary closures are required. Overall, for these reasons, the impact on general traffic redistribution is anticipated to be Negative and Short Term due to the temporary nature of any restrictions.

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 the proposed Bus Gate at Mount Brown were in place and Sections 2a, 3a, and 6b were under construction concurrently. Further details on the impacts assessment can be found within these chapters. Traffic redistribution impacts as a result of scheme construction are expected to be **Low Negative**.

6.4.4.7.1 Construction Traffic Generation

Site Operatives: It is expected that there will be 250 to 270 staff directly employed across the Proposed Scheme, rising to 300 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 Compounds will be limited. Vehicle-sharing will be encouraged, subject to public health guidelines, where travel by private vehicle is a necessity e.g. for transporting heavy equipment. A combination of CSMMP measures, as well as work shift patterns, means that fewer than 10 trips by private vehicle are envisaged to and from site during peak periods.

Heavy Goods Vehicles (HGVs): Additional construction traffic will be generated during the Construction Phase of the Proposed Scheme, for the purpose of the following:

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

Chapter 5 (Construction) of this EIAR provides a breakdown of the expected operation for the Construction Phase of the Proposed Scheme. It should be noted that the CTMP of Appendix A5.1 (CEMP) in Volume 4 of this EIAR will control vehicular movement along the construction route, including restrictions on the number of HGVs accessing and egressing the construction site areas throughout the day to mitigate the impacts to general traffic on the surrounding road network. For this assessment, the maximum number of HGVs expected to be in operation across the Proposed Scheme during peak haulage activities is 34 vehicles. In a typical hour during peak haulage activity of the Proposed Scheme, 40% of HGVs are anticipated to be in operation. This equates to 14 HGVs in operation. A total of 14 two-way truck movements are expected in a typical hour during peak haulage activity of the Proposed Scheme. HGV movements will be managed during the periods of 07:00 to 09:00 and 17:00 to 19:00 to minimise the impact of construction related traffic.

Overall Peak Hour Impacts: The contents of Table 6.1 outline the anticipated maximum construction traffic generation by site operatives and HGVs during the AM and PM Peak Hours.

Table 6.1: 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	14	0	14	34	74
PM Peak Hour	0	14	10	14	34	74

Given that the above impacts are below the thresholds set out in TII's Guidelines for Transport Assessments, it is considered appropriate to define the potential general traffic impacts of the Construction Phase to be **Low Negative**. Therefore, no further analysis is required for the purpose of this assessment. It should be noted that further detail on the restrictions to construction vehicle movements during the peak periods of the day will be contained within the appointed contractor's CTMP prior to construction.

An outline CTMP can be found in Appendix A5.1 (Construction Environmental Management Plan) in Volume 4 of the EIAR.

6.4.4.8 Construction Phase Summary

Table 6.2 presents a summary of the predicted impacts of the Proposed Scheme during Construction Phase.

Table 6.2: Summary of Construction Phase Predicted Impacts

Assessment Topic	Effect	Predicted Impact
Pedestrian Infrastructure	Restrictions to pedestrians along Proposed Scheme.	Low Negative
Cycling Infrastructure	Restrictions to cyclists along Proposed Scheme	Medium Negative
Bus Infrastructure	Restrictions to public transport along Proposed Scheme.	Low 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

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 4. Table 6.3 outlines the assessment criteria for each junction.

Table 6.3: 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 6.4 displays the LoS rating based on the number of indicators met.

Table 6.4: 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 6.5 have been used to describe the potential impact, based on the changes in the Qualitative Pedestrian LoS rating.

Table 6.5: 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.

The contents of Table 6.6 outline the assessment criteria with reference to the corresponding LoS ratings.

Table 6.6: 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 6.7 have been used to describe the potential impact, based on the changes in the Qualitative Cycling LoS rating.

Table 6.7: 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 6.8.

Table 6.8: 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 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.

6.5.2.2 Section 1 – Liffey Valley to Le Fanu Road

6.5.2.2.1 Pedestrian Infrastructure

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

- Footpaths with a minimum running width of 2.0m;
- Upgrade of roundabouts along Fonthill Road to protected junctions to provide direct, signalised pedestrian crossings on all arms of the junctions;
- Raised tables across side streets at minor junction to provide pedestrian priority;
- Upgrade of existing pelican crossing along Ballyfermot Road west of the Ballyfermot Road / Cherry Orchard Industrial Estate Site Access junction to a new direct Toucan crossing;
- Replacement of the signalised pelican crossing along Ballyfermot Road to the west of the Blackditch Drive priority junction, with a raised table crossing;

- Provision of a new raised table crossing along Ballyfermot Road to the west of the Ballyfermot Road / Clifden Road junction; and
- Removal of the existing pelican crossing along Ballyfermot Road west of the Ballyfermot Road / Le Fanu Road junction.

The assessment of the qualitative impacts on the pedestrian facilities at the junctions along Section 1 of the Proposed Scheme are summarised in Table 6.9. A detailed breakdown of the assessment at each impacted junction, including a list of the junctions which experience no change, can be found in Appendix A6.1 (TIA) – Sub Appendix 4 (Impact Assessments).

Table 6.9: Section 1 - Significance of Effects for Pedestrian Impact during Operational Phase

Junctions	Chainage	Do Minimum LoS	Do Something LoS	Impact
Fonthill Road Roundabout	A430-A500	E	A	High
Fonthill Road Roundabout	A150-A200	E	A	High
Fonthill Road / Coldcut Road	B-30-B30	E	B	Medium
Coldcut Road / Dublin City Services Sports & Social Club entrance	B100-B120	D	B	Medium
Coldcut Road / Coldcut Crescent	B390-B410	C	B	Low
Coldcut Road / Cloverhill Road	B450-B500	E	A	High
Coldcut Road / Kennelsfort Road Upper / Ballyfermot Road	B720 - B750	E	A	High
Mid-link crossing on Ballyfermot Road	B1020-B1040	C	A	Medium
Ballyfermot Road / Cherry Orchard Industrial Estate Site Access	B1190-B1210	D	B	Medium
Ballyfermot Road / Cherry Orchard Football Club Site Access	B1300-B1350	D	A	Medium
Ballyfermot Road / Cherry Orchard Industrial Estate Site Access / 2 no. priority junctions	B1350-B1450	D	B	Medium
Ballyfermot Road / Cleggan Park priority junction	B1500-B1550	C	B	Low
Mid-link crossing on Ballyfermot Road	B1700-B1720	B	A	Low
Mid-link crossing on Ballyfermot Road	B1870-B1890	N/A	A	High
Ballyfermot Road / Clifden Road	B2000-B2040	C	A	Medium
Ballyfermot Road / Drumfinn Road	B2090-B2130	C	A	Medium
Mid-link crossing across Ballyfermot Road service road access	B2150-B2170	D	B	Medium
Mid-link crossing on Ballyfermot Road	B2240-B2250	B	A	High
Mid-link crossing across Ballyfermot Road service road access	B2280-B2300	D	B	Medium
Ballyfermot Road / Le Fanu Road	B2350-B2400	C	A	Medium
Section Summary		**D**	**B**	**Medium**

The contents of Table 6.9 demonstrate that the Proposed Scheme will have a positive long-term impact on the quality of the pedestrian infrastructure along Section 1 of the Proposed Scheme during the Operational Phase.

The LoS during the Do Minimum scenario ranges between B and E, with 11 of the 20 impacted junctions along this section given low D / E ratings. These ratings have been determined using the previously referenced assessment criteria set out in Table 6.3. The LoS will improve to an A/B rating at all impacted junctions in the Do Something scenario. The proposed improvements to the existing pedestrian facilities include 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. 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 **Medium Positive impact** to the quality of the pedestrian infrastructure along Section 1 of the Proposed Scheme, during the Operational Phase, which aligns with the overarching aim to provide enhanced walking infrastructure on the corridor.

6.5.2.2.2 Cycling Infrastructure

The following section sets out the qualitative impacts on the cycling receptor for Section 1 of the Proposed Scheme. The results are summarised in Table 6.10, along with the accompanying sensitivity for each section and the resultant significance of impact.

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

- Cycle lanes widths of 2.0m for the majority of Section 1. The exception to this is through Ballyfermot village where the cycle lane width reduces to 1.5m at a minimum;
- Upgrade of roundabouts along Fonthill Road to protected junctions for cyclists;
- Proposed changes to existing signalised junctions to feature continuous cycle lanes across all arms of the junction or feature green signal priority for cyclists;
- Upgrade of existing pelican crossing along Ballyfermot Road west of the Ballyfermot Road / Cherry Orchard Industrial Estate Site Access junction to a new direct Toucan crossing;
- Routing of cycle tracks behind on street parking to ensure cyclist safety; and
- Proposed provision of continuous cycle bypasses at all bus stops.

The contents of Table 6.10 outlines outline the cycling qualitative assessment along Section 1 of the Proposed Scheme, which sets out the overall Do Minimum LoS and the Do Something LoS and the description of impact. A detailed breakdown of the assessment along each section can be found in Appendix A6.1 (TIA) – Sub Appendix 4 (Impact Assessments).

Table 6.10: Section 1 - Cycling Impact During Operational Phase

Location	Chainage	Do Minimum LoS	Do Something LoS	Impact
Liffey Valley Roundabout to R833 Coldcut Road	A0 - A500	C	A	Medium
Fonthill Road to Ballyfermot Road	B0 - B 800	D	A	High
Coldcut Road to Le Fanu Road	B800 - B2400	D	B	Medium
Section Summary		**D**	**A**	**High**

The content of Table 6.10 demonstrates the Proposed Scheme will have a positive long-term impact on the cycling environment between Liffey Valley and Le Fanu Road.

The Do Minimum LoS is D which has been determined using the previously referenced assessment criteria set out in Table 6.6. In the Do Something scenario, the LoS improves to A along the majority of Section 1 of the Proposed Scheme, as a result of the provision of well-separated cycle lanes in both directions which traverse priority junctions and continue through signalised junction with protected treatment as part of the Proposed Scheme. Between Coldcut Road and Le Fanu Road, the cycle lanes width reduces to 1.5m at a minimum.

Overall, it is anticipated that there will be **High Positive impact** to the quality of the cycling infrastructure along Section 1 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'.

6.5.2.2.3 Bus Infrastructure

This section provides an assessment of the changes in the quality of bus stop infrastructure provision as a result of Section 1 of the Proposed Scheme, including upgrades and any relocations. Improvement in bus priority measures will reduce the interaction between buses and general traffic and reduce the likelihood of delays. Any relocations of bus stops which need to be carried through to the EIAR for significance assessment are identified.

There are 15 existing bus stops along this section of the Proposed Scheme. Table 6.11 presents a summary of the changes in the number and location of bus stops along Section 1 of the Proposed Scheme.

Table 6.11: Section 1 - Overview of Amendments to Bus Stop Locations

Direction	Stop	Chainage	Do Something	Comment
Inbound	N/A	A220	New	A new bus stop will be provided on Fonthill Road, approximately 50m to the north-west of Fonthill roundabout (located south-east of Liffey Valley Shopping Centre).
Outbound	N/A	A230	New	A new bus stop will be provided on Fonthill Road, approximately 50m to the north-west of Fonthill roundabout (located south-east of Liffey Valley Shopping Centre).
Outbound	2674	B60	Retained	Bus stop to be retained.
Inbound	2686	B71	Retained	Bus stop to be retained.
Outbound	N/A	B350	New	A new bus stop is proposed to be located approximately 100m west of Cloverhill Road, across from inbound bus stop 7510.
Inbound	7510	B385	Retained	Bus stop to be retained.
Outbound	4798	B665	Retained	Bus stop to be retained.
Inbound	N/A	B675	New	A new bus stop is proposed to be located approximately 80m west of R833 Coldcut Road/ R833 Ballyfermot Junction, across from westbound bus stop 4798.
Inbound	4799	B830	Removed	Bus stop 4799 is proposed to be removed.
Inbound	2205	B1040	Relocated	Bus stop is proposed to be relocated 72m further east of existing location.
Outbound	2206	B1040	Relocated	Bus stop is proposed to be relocated 49m west of existing location.
Inbound	2687	B1253	Removed	Bus stop 2687 is proposed to be removed.
Outbound	2673	B1268	Removed	Bus stop 2673 is proposed to be removed.
Inbound	2688	B1465	Relocated	Bus stop is proposed to be relocated 113m further west of existing location.
Outbound	2672	B1490	Relocated	Bus stop is proposed to be relocated 117m further west of existing location.
Inbound	2689	B1840	Relocated	Bus stop is proposed to be relocated 26m west of existing location.
Outbound	2668	B1845	Relocated	Bus stop is proposed to be relocated 65m to the west of its current location.
Inbound	2696	B2190	Retained	Bus stop to be retained.
Outbound	2656	B2248	Relocated	Bus stop is proposed to be relocated 27m to the east of its current location.

Under the proposals, there will be a total of 16 bus stops along Section 1 of the Proposed Scheme, with one additional stop between Liffey Valley and Le Fanu Road. The layout of new bus 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 6.12 provides a summary of the improvements to the bus stop infrastructure along Section 1 of the Proposed Scheme, with reference to the number and percentage of bus stops that provide each facility in the Do Minimum and Do Something scenarios.

Table 6.12: Section 1 - Overview of Changes in Bus Stop Facilities

Bus Stop Facility	Do Minimum		Do Something		Comment
	No. of Stops	Percentage of Stops	No. of Stops	Percentage of Stops	
RTPI	4	27%	16	100%	It is proposed that all bus stops provide real-time information.
Timetable information	13	87%	16	100%	It is proposed that all bus stops provide timetable information.
Shelter	11	73%	16	100%	It is proposed that all bus stops provide a shelter.
Seating	10	67%	16	100%	It is proposed that all bus stops provide seating.
Accessible Kerbs	4	27%	16	100%	It is proposed that all bus stops provide accessible kerbs.
Indented Drop Off Area	1	7%	0	0%	All proposed bus stops will be located inline within bus lanes.
Total Stops	**15**		**16**		One additional outbound stop than Do Minimum.

Table 6.12 indicates that there are significant improvements to the bus stop facilities along Section 1 of the Proposed Scheme.

It is proposed that all 16 bus stops are located within dedicated bus lanes and therefore will not impact the flow of general traffic. It is proposed that all bus stops provide real time / timetable information, accessible kerbs, bus shelters and seating throughout Section 1 of the Proposed Scheme are assessed as providing an overall **High Positive impact** for bus passengers. All proposed facilities have been designed in accordance with BusConnects Preliminary Design Guidance which has been developed with cognisance to the relevant disability guidance.

6.5.2.2.4 Parking and Loading

The Proposed Scheme will impact on existing parking along Section 1 and the main areas of parking changes are as follows:

- The reduction from six to five informal general residential parking spaces on the northern side of Ballyfermot Road between Cherry Orchard Service station and Cleegan Park. At this location, it is proposed to remove the existing parallel access roads and the formalise the parking arrangement, creating space to provide segregated bus and cycle infrastructure. There are approximately 50 parking spaces along the side streets within 100m of this location;
- The reduction from 50 to 47 informal general residential parking space on the northern side of Ballyfermot Road between Cleegan Park and Clifden Road. At this location, it is proposed to remove the existing parallel access roads and the formalise the parking arrangement, creating space to provide segregated bus and cycle infrastructure. The majority of residential properties adjacent to these lost spaces have off-street parking within driveways and there are approximately 390 parking spaces along the side streets within 100m of this location;
- The reduction from 35 to 29 informal general residential parking space on the southern side of Ballyfermot Road between Cleegan Park and Clifden Road through the removal of existing parallel access roads and formalisation of parking. This revised parking arrangement enables the creation of space to provide segregated bus and cycle infrastructure and formalised parking bays and results in the loss of six car parking spaces at this location. The majority of residential properties adjacent to these lost spaces have off-street parking within driveways and there are approximately 250 parking spaces along the side streets within 100m of this location;
- The removal of 25 informal general residential parking space on the southern side of Ballyfermot Road between Clifden Road and the mid-link pedestrian crossing through the removal of the existing parallel access road. This removal enables the creation of space to provide segregated bus and cycle infrastructure. The majority of residential properties adjacent to these lost spaces have off-street parking within driveways and there are approximately 85 parking spaces along the side streets within 100m of this location;
- The removal of three Pay and Display commercial parking spaces on the southern side of Ballyfermot Road at O'Shea's. This removal enables the creation of space to provide segregated

bus and cycle infrastructure. Due to the availability of parking spaces on the surrounding residential streets and the availability of 14 Pay and Display spaces further east on the approach to R833 Ballyfermot Road / Le Fanu Road Junction;;

- The reduction from 26 to 17 Pay and Display commercial parking spaces on the southern side of Ballyfermot Road between the mid-link pedestrian crossing and Le Fanu Road. The existing parking arrangement at this location comprises angled parking spaces and it is proposed to revise the arrangement to create space to provide segregated bus and cycle infrastructure and formalised parallel parking bays. This will result in the loss of 9 car parking spaces at this location and the relocation of the disabled parking bay approximately 30m east of the current location. There are approximately 55 parking spaces on side streets within 100m of this location; and
- The removal of nine Pay and Display commercial parking spaces on the northern side of Ballyfermot Road on the northwest corner of R833 Ballyfermot Road / Le Fanu Road Junction. This removal enables the creation of space to provide segregated bus and cycle infrastructure. There are approximately 55 parking spaces on side streets within 100m of this location and 14 Pay and Display spaces retained to the south of this location.

The contents of Table 6.13 presents a summary of the proposed changes to parking along Section 1 of the Proposed Scheme.

Table 6.13: Section 1 – Overall Changes in Parking / Loading Spaces

Street	Parking Type	Number of Parking Spaces		
		Do Minimum	Do Something	Change
R833 Ballyfermot Road (including local access road)	Informal	147	112	-35
	Paid	38	17	-21
	Disabled	1	0	-1
Side streets	Informal Parking (approximate)	1,680	1,680	0
Total		**1,866**	**1,809**	**-57**

As shown in Table 6.13, there will be a reducing of 57 parking spaces across Section 1 as a result of the Proposed Scheme balanced against an overall retention of 1,809 spaces along the corridor and in adjacent streets.

The Proposed Scheme will provide significant improvement to the walking, cycling and bus facilities encouraging the use of sustainable modes of transport, which will ultimately reduce the demand for parking along with the availability of adjacent parking. Overall, the impact of this loss of parking is considered to have a **Low Negative impact.**

6.5.2.3 Section 2 – Le Fanu Road to Sarsfield Road

6.5.2.3.1 Pedestrian Infrastructure

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

- The majority of footpaths along Section 2 with a minimum running width of 2.0m;
- Upgrade the existing Kylemore Road / Ballyfermot Road roundabout junction to a signalised junction to provide direct, signalised pedestrian crossings on all arms of the junctions;
- Raised tables across side streets at minor junction to provide pedestrian priority;
- Upgrade of existing pelican crossings along Ballyfermot Road to provide a new direct Toucan crossing;
- Provision of new toucan crossings along Ballyfermot Road to the east of the Ballyfermot Road / Garryowen Road junction and to the west of the Ballyfermot Road / O'Hogan Road junction; and
- Closure of O'Hogan Road, reducing pedestrian and vehicle interaction along the westbound carriageway.

The assessment of the qualitative impacts on the walking infrastructure for Section 2 of the Proposed Scheme is summarised in Table 6.14. A detailed breakdown of the assessment at each impacted junction, including a list of the junctions which experience no change, can be found in Appendix A6.1 (TIA) – Sub Appendix 4 (Impact Assessments).

Table 6.14: Section 2 - Significance of Effects for Pedestrian Impact during Operational Phase

Junctions	Chainage	Do Minimum LoS	Do Something LoS	Impact
Ballyfermot Road / Colepark Avenue	B2480- B2500	E	B	Medium
Ballyfermot Road / Ballyfermot Parade	B2530- B2560	D	B	Medium
Ballyfermot Road / Colepark Drive Avenue	B2750-B2770	D	B	Medium
Kylemore Road / Ballyfermot Road	D0 - B2900	C	A	Medium
Mid-link crossing on Ballyfermot Road	B3020-B3040	B	A	Low
Mid-link crossing on Ballyfermot Road	B3230-B3250	B	A	Low
Ballyfermot Road / Garryowen Road	B3300 - B3330	C	B	Low
Mid-link crossing: Ballyfermot Road	B3370	N/A	A	High
Ballyfermot Road / O'Hogan Road	B3550-B3580	D	B	Medium
Mid-link crossing: Ballyfermot Road	B3820	N/A	A	High
Sarsfield Road / St Laurence's Road	B3830-B3850	D	B	Medium
Sarsfield Road / Landen Road	B4270 - B4300	D	B	Medium
Sarsfield Road / St Marys Avenue West	B4320 - B4350	D	B	Medium
Ballyfermot Road / Sarsfield Road / Con Colbert Road	B4500 - B4600	E	A	High
Sarsfield Road / Inchicore Road / Grattan Crescent	E400 - E457	F	A	High
Section Summary		**D**	**B**	**Medium**

The content of Table 6.14 demonstrates that the Proposed Scheme will have a long-term positive impact on the quality of the pedestrian infrastructure along Section 2 of the Proposed Scheme during the Operational Phase. The LoS during the Do Minimum scenario ranges between B and F, with nine of the 15 junctions along this section given a D or lower. These ratings have been determined using the previously referenced assessment criteria set out in Table 6.3. The LoS will improve to an A / B rating at all impacted junctions in the Do Something scenario. This a result of the proposed improvements 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 **Medium Positive impact** to the quality of the pedestrian infrastructure along Section 2 of the Proposed Scheme during the Operational Phase which aligns with the overarching aim to provide enhanced walking infrastructure on the corridor.

6.5.2.3.2 Cycling Infrastructure

The following section sets out the qualitative impacts on the cycling receptor for Section 2 of the Proposed Scheme. The results are summarised in Table 6.15, along with the accompanying sensitivity for each section and the resultant significance of impact.

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

- Increase in cycle lane widths along Section 2 to provide cycle lanes between 1.5m to 2.0m in width where possible;
- Upgrade the existing Kylemore Road / Ballyfermot Road roundabout junction to a protected junction for cyclists;
- Proposed changes to existing signalised junctions to feature continuous cycle lanes across all arms of the junction or feature green signal priority for cyclists;

- Provision of cycle tracks along both sides of Kylemore Road from south of the Chapelizod Hill Road to Ballyfermot Road;
- Upgrade of existing pelican crossings along Ballyfermot Road to provide a new direct Toucan crossing;
- Provision of new toucan crossings along Ballyfermot Road to the east of the Ballyfermot Road / Garryowen Road junction and to the west of the Ballyfermot Road / O'Hogan Road junction; and
- Proposed provision of continuous cycle bypasses at all bus stops.

Along Section 2, the Proposed Scheme will provide a 60mm set down kerb segregation between the footpath and the cycle track. This is of particular importance in the context of providing for pedestrians with visual impairments, whereby the use of white line segregation is not as effective for establishing a clear understanding of the change of pavement use and potential for cyclist / pedestrian interactions. The cycle tracks will also be raised 120mm from the carriageway to provide segregation from vehicles.

The contents of Table 6.15 outlines the cycling qualitative assessment along Section 2 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 Appendix A6.1 (TIA) – Sub Appendix 4 (Impact Assessment).

Table 6.15: Section 2 - Cycling Impact During Operational Phase

Location	Chainage	Do Minimum LoS	Do Something LoS	Impact
Le Fanu Road to Kylemore Road	B2400 - B2800	D	B	Medium
Chapelizod Rd to Ballyfermot Road	D0 - D448	D	C	Low
Kylemore Road to Saint Laurence's Road	B2800 - B3800	D	B	Medium
Saint Laurence's Road to Con Colbert Road	B3800 - B4700	D	B	Medium
R833 Sarsfield Road: Con Colbert Road to Inchicore Road	E0 - E457	D	D	Negligible
Section Summary		**D**	**C**	**Low**

The content of Table 6.15 demonstrates that the Proposed Scheme will have a long-term positive impact on the quality of the cycling infrastructure along Section 2 of the Proposed Scheme.

The Do Minimum LoS is D which has been determined using the previously referenced assessment criteria set out in Table 6.6. In the Do Something scenario, the LoS improves to an overall C. Three of the five segments improve from a D to a B LoS rating, as a result of the provision of well-separated cycle lanes in both directions which traverse priority junctions and continue through signalised junction with protected treatment as part of the Proposed Scheme.

Along Kylemore Road between Chapelizod Hill Road to Ballyfermot Road, cycle tracks are proposed on both sides of the carriageway where there is currently limited cycling infrastructure provision. Cyclists have priority at junctions along Kylemore Road with the exception of at the Kylemore Road / Chapelizod Hill Road / Le Fanu Road Junction where no changes to the junction are proposed.

Along R833 Sarsfield Road, between Con Colbert Road and Inchicore Road, the LoS rating is D in the Do Minimum and Do Something scenario. There are no changes proposed to cycling infrastructure due to width constraints associated with the Sarsfield Road Bridge, a single span simply supported steel bridge, which crosses the railway line. Along this section, the westbound bus gate at the Sarsfield Road / Inchicore Road / Grattan Crescent junction is retained. Furthermore, there is an alternative cycle route into the city centre via Inchicore Road.

Overall, it is anticipated that there will be **Low Positive impact** to the quality of the cycling infrastructure along Section 2 of the Proposed Scheme during the Operational Phase. The findings of the cycling assessment 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'.

6.5.2.3.3 Bus Infrastructure

This section provides an assessment of the changes in the quality of bus stop infrastructure provision as a result of Section 2 of the Proposed Scheme, including upgrades and any relocations. Improvement in bus priority measures will reduce the interaction between buses and general traffic and reduce the likelihood of delays. Any relocations of bus stops which need to be carried through to the EIAR for significance assessment are identified.

There is currently a total of 16 bus stops along Section 2. Table 6.16 presents a summary of the changes in the number and location of bus stops along Section 2 of the Proposed Scheme.

Table 6.16: Section 2 - Overview of Amendments to Bus Stop Locations

Direction	Stop	Chainage	Do Something	Comment
Inbound	5007	D220	Retained	Bus stop to be retained.
Outbound	4414	D272	Retained	Bus stop to be retained.
Inbound	2697	B2590	Retained	Bus stop to be retained.
Outbound	2655	B2600	Retained	Bus stop to be retained.
Outbound	2712	B2930	Relocated	Bus stop is proposed to be relocated 170m west of the existing location.
Inbound	2713	B2990	Relocated	Bus stop is proposed to be relocated 10m west of the existing location.
Inbound	2714	B3350	Retained	Bus stop to be retained.
Outbound	2711	B3380	Retained	Bus stop to be retained.
Outbound	2710	N/A	Removed	Bus stop 2710 is proposed to be removed.
Inbound	2715	N/A	Removed	Bus stop 2715 is proposed to be removed.
Inbound	2716	B3795	Relocated	Bus stop is proposed to be relocated 5m east of the existing location.
Outbound	2709	B3800	Relocated	Bus stop is proposed to be relocated 162m east of the existing location.
Inbound	2718	B4140	Relocated	Bus stop is proposed to be relocated 25m west of the existing location.
Outbound	2644	B4370	Relocated	Bus stop is proposed to be relocated 17m west of the existing location.
Outbound	2643	E310	Retained	Bus stop to be retained.
Inbound	2719	E371	Retained	Bus stop to be retained.

Under the proposals, there will be a total of 14 bus stops along Section 2 with one fewer inbound, and one fewer outbound stops than in the Do Minimum. The layout of new bus 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 6.17 provides a summary of the improvements to the bus stop infrastructure along Section 2 of the Proposed Scheme, with reference to the number and percentage of bus stops that provide each facility in the ‘Do Minimum’ and ‘Do Something’ scenarios.

Table 6.17: Section 2 - Overview of Changes in Bus Stop Facilities

Bus Stop Facility	Do Minimum		Do Something		Comment
	No. of Stops	Percentage of Stops	No. of Stops	Percentage of Stops	
RTPI	3	19%	14	100%	It is proposed that all bus stops provide real-time information.
Timetable information	15	94%	14	100%	It is proposed that all bus stops provide timetable information.
Shelter	10	63%	14	100%	It is proposed that all bus stops provide a shelter.
Seating	9	56%	14	100%	It is proposed that all bus stops provide seating.
Accessible Kerbs	5	31%	14	100%	It is proposed that all bus stops provide accessible kerbs.
Indented Drop Off Area	0	0%	0	0%	All proposed bus stops will be located inline within bus lanes.
Total Stops	**16**		**14**		Two fewer stops than the Do Minimum.

Table 6.17 indicates that there are improvements to the bus stop facilities along Section 2 of the Proposed Scheme. The rationalisation in the number of stops from 16 to 14 will result in improvements to bus journey times while maintaining appropriate spacing between bus stops

It is proposed that all bus stops along this section will be inline, within dedicated bus lanes along the entirety of the corridor. Improvements in the provision of real-time information, shelters, seating, and accessible kerbs at the bus stops throughout Section 2 of the Proposed Scheme are assessed as providing an overall **Medium Positive impact** for bus passengers. All proposed facilities have been designed in accordance with BusConnects Preliminary Design Guidance which has been developed with cognisance to the relevant disability guidance.

6.5.2.3.4 Parking and Loading

The Proposed Scheme will impact on existing parking along Section 2 and the main areas of parking changes are as follows:

- The reduction from 39 to 29 Pay and Display commercial parking spaces on the eastern side of Ballyfermot Parade. This change is to facilitate the provision of safe footpaths and cycle tracks at this location. Whilst 10 Pay and Display parking spaces will be lost at this location, the loading bays and disabled parking spaces will be retained / relocated within 30m of the current location and there are approximately 275 parking spaces on side streets within 100m of this location;
- The reduction from 10 to eight informal parking spaces on the north-western corner of the R833 Ballyfermot Road / R112 Kylemore Road Roundabout adjacent to the Church of Our Lady of the Assumption. It is proposed to upgrade the existing roundabout to a signalised protected junction which will improve pedestrian, cyclist and bus infrastructure whilst parking at this location will be formalised;
- The provision of three additional informal parking spaces on the south-western corner of the R833 Ballyfermot Road / R112 Kylemore Road Roundabout. It is proposed to upgrade the existing roundabout to a signalised protected junction which will improve pedestrian, cyclist and bus infrastructure whilst parking at this location will be formalised. The additional parking spaces at this location take the total number spaces on the south-western corner from five to eight;
- The provision of two additional informal parking spaces on the south-eastern corner of the R833 Ballyfermot Road / R112 Kylemore Road Roundabout. It is proposed to upgrade the existing roundabout to a signalised protected junction which will improve pedestrian, cyclist and bus infrastructure whilst parking at this location will be formalised. The additional parking spaces at this take the total spaces on the south-eastern corner from eight to 10;
- The provision of two additional informal parking spaces on R112 Kylemore Road (northbound). At this location it is proposed to formalise the existing parking provision to provide a cycle track along R112 Kylemore Road. Through the formalisation of parking, it is proposed to provide two additional parking spaces bringing the total spaces from 20 to 22;

- The reduction from 24 to 22 informal parking spaces on R112 Kylemore Road (southbound). At this location it is proposed to formalise the existing parking provision to provide a cycle track along R112 Kylemore Road. Through the formalisation of parking, it is proposed to remove four parking spaces at this location. It is proposed to provide of two additional informal spaces along the northbound carriageway and there are approximately 70 parking spaces on side streets within 100m of this location;
- The reduction from 25 to 20 informal commercial parking spaces on the northeast arm of R833 Sarsfield Road / First Avenue Junction. This reduction enables the creation of space to provide segregated bus and cycle infrastructure. Due to the retention of 20 spaces and approximately 55 parking spaces on side streets within 100m of this location; and
- The removal of two informal parking spaces outside Sarsfield Medical Centre, along R833 Sarsfield Road. It is proposed to remove both of the existing spaces, to enable changes to R833 Sarsfield Road, which will provide a relocated bus stop, bus priority and enhanced pedestrian and cyclists facilities.

The contents of Table 6.18 present a summary of the proposed changes to parking along Section 2 of the Proposed Scheme between the Do Minimum and Do Something scenarios.

Table 6.18: Section 2 – Overall Changes in Parking / Loading Spaces

Street	Parking Type	Number of Parking Spaces		
		Do Minimum	Do Something	Change
R833 Ballyfermot Road	2	2	0	0
	23	26	3	3
	4	4	0	0
	86	76	-10	-10
	5	5	0	0
R112 Kylemore Road	44	44	0	0
R833 Sarsfield Road	27	20	-7	-7
Side streets	690	690	0	0
Total		**881**	**867**	**-14**

As shown in Table 6.18, there is currently approximately 881 parking spaces affected along Section 2 of the Proposed Scheme and it is proposed that 14 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. Considering the overall retention of 867 spaces compared to a loss of 14 represents a **Low Negative impact**, which is considered appropriate in the context of the aim of the Proposed Scheme, to provide enhanced walking, cycling and bus infrastructure on this key access corridor.

6.5.2.4 Section 3 – Sarsfield Road to City Centre

6.5.2.4.1 Pedestrian Infrastructure

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

- General widening along the section to ensure the desirable minimum footway width for the Proposed Scheme is 2.0m or an absolute minimum width of 1.8m at constrained areas;
- Widening of the footpath along R839 Grattan Crescent as well as the provision of a new toucan crossing between Grattan Crescent Park and Inchicore National School;
- New toucan crossing provided on R810 James Street to the east of Ceannt Fort
- Raised tables across side streets at minor junction to provide pedestrian priority;
- Proposed speed limit reduction from 50km/h to 30km/h along Old Kilmainham, Mount Brown and James Street and from 40km/h to 30km/h along Thomas Street; and
- Significant works at the R810 Thomas Street / R108 High Street (Cornmarket) Junction to create additional space for pedestrians at the junction.

The assessment of the qualitative impacts on the walking infrastructure for Section 3 of the Proposed Scheme is summarised in Table 6.19. A detailed breakdown of the assessment at each impacted junction, including a list of the junctions which experience no change, can be found in Appendix A6.1 (TIA) – Sub Appendix 4 (Impact Assessments).

Table 6.19: Section 3 - Significance of Effects for Pedestrian Impact During Operational Phase

Junctions	Chainage	Do Minimum LoS	Do Something LoS	Impact
Memorial Road / Con Colbert Road	B5080-B5110	E	B	Medium
Memorial Road / Inchicore Road	B5100 - B5200	E	A	High
Mid-link crossing: Grattan Crescent	B5490	N/A	A	High
Grattan Crescent / Grattan Crescent Park Entrance	B5500-B5510	C	B	Low
Inchicore Terrace South	B5550-B5560	D	C	Low
Grattan Crescent / Emmet Road / Tyrconnell Road	B 5600 - B5700	C	A	Medium
Emmet Road / Spa Road	B5720-B5740	C	B	Low
Emmet Road / St Vincent's Street West	B5800 - B5850	D	B	Medium
Mid-link crossing: Emmet Road	B6040	C	A	Medium
Emmet Road / Myra Close	B6130 - B6200	D	B	Medium
Mid-link crossing: Emmet Road	B6310	B	A	Low
Emmet Road / Turvey Avenue / Luby Road	B6300 - B6350	D	B	Medium
Mount Brown / Unnamed Road	B7040-B7060	F	C	Medium
Mount Brown / Unnamed Road	B7100 – B7120	D	B	Medium
Mid-link crossing: James Street	B7400	N/A	A	High
James's Street / Bow Lane West	B7700 - B7800	D	B	Medium
James's Street / Echlin Street	B7900 - B7930	C	B	Low
James's Street / Guinness Pharmacy Site Entrance	B7930-B7940	E	B	Medium
Bridgefoot Street / Thomas Street / Thomas Court	B8350 - B8400	E	C	Medium
R810 Thomas Street / R108 High Street (Cornmarket) Junction	B8800 - B8900	E	A	High
Section Summary		**D**	**B**	**Medium**

The content of Table 6.19 demonstrates that the Proposed Scheme will have a long-term positive impact on the quality of the pedestrian infrastructure along Section 3 of the Proposed Scheme during the Operational Phase.

The LoS during the Do Minimum scenario ranges from B to F, with 12 of the 21 impacted junctions along this section given the low D / E / F ratings. These ratings have been determined using the previously referenced assessment criteria set out in Table 6.3.

The LoS will improve to an A / B rating at 17 of the 21 impacted junctions. Three junctions are rated as a C in the Do Something, these junctions improve from a D, E and F rating in the Do Minimum. This is as a result of the proposed improvements 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 **Medium 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.

6.5.2.4.2 Cycling Infrastructure

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

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

- Proposed 2.0m wide cycle tracks to be provided on both sides of R839 Memorial Road between R148 Con Colbert Road and R839 Inchicore Road;
- Proposed combined bus and cycle lanes to be provided along southbound link of R839 Grattan Crescent between Sarsfield Road and R810 Emmet Road. Therefore, replacing the disconnected combined use bus lanes currently in place along R839 Grattan Crescent;
- Eastbound and westbound combined use bus lanes to be provided along sections of R810 Emmet Road between St. Vincent Street West and R111 South Circular Road;
- Proposed Quiet Street to the south of the Proposed Scheme, along Newington Lane, Basin View, St. James's Avenue, Grand Canal Place and Echlin Street. Local vehicular access will continue to be provided but through-traffic will not be permitted. A contra-flow cycle lane is proposed along St. James's Avenue;
- Proposed changes to existing signalised junctions of R839 Memorial Road / R839 Inchicore Road Junction, R810 Thomas Street / Watling Street Junction, R810 Thomas Street / Bridgefoot Street Junction, and R810 Thomas Street / High Street Junction, to feature green signal priority for cyclists; and
- Due to the high foot traffic at the Cornmarket Junction, the existing kerb lines have been retained where practicable to retain the existing pedestrian areas. To accommodate standard carriageway widths, cycleways have been designed to minimum 1.5m widths.

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 (as is the case in some areas of the baseline environment) is not as effective for establishing a clear understanding of the change of pavement use and potential for cyclist / pedestrian interactions. The cycle tracks will also be raised 120mm from the carriageway to provide segregation from vehicles.

The contents of Table 6.20 outline the cycling qualitative assessment along Section 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 Appendix A6.1 (TIA) – Sub Appendix 4 (Impact Assessments).

Table 6.20: Section 3 - Cycling Impact during Operational Phase

Location	Chainage	Do Minimum LoS	Do Something LoS	Impact
Con Colbert Road to Inchicore Road	B5100 - B5200	D	B	Medium
Memorial Road to Emmet Road	B5200 - B5600	D	D*	Negligible
R810 Emmet Road / Grattan Crescent to South Circular Road	B5600 - B6600	D	D*	Negligible
South Circular Road to Bow Lane West	B6600 - B7850	D	D*	Negligible
Quiet Street: Newington Lane / Basin View / St. James's Avenue / Grand Canal Place / Echlin Street	B7550-B7900	D	B**	Medium
Bow Lane West to St Augustine Street	B7850 - B8750	D	B	Medium
St Augustine Street to High Street	B8750 - B9017	C	B	Low
Section Summary		**D**	**C**	**Low**

*although no bespoke cycle provision is offered in these sections, local bus gates will greatly reduce through traffic creating an environment more conducive to cycling.

**although there is limited bespoke cycle provision offered along these streets, the creation of a Quiet Street with restricted vehicle flow will greatly reduce traffic speeds resulting in an environment more conducive to cycling and offers an alternative route to James's Street.

The content of Table 6.20 demonstrates that the Proposed Scheme will have a Positive, Moderate and Long-term effect on the cycling environment along Section 3 of the Proposed Scheme, between Sarsfield Road and the City Centre.

The LoS during the Do Minimum scenario ranges between a C and D rating, with six of the seven sections scoring a low D rating. These ratings have been determined using the previously referenced assessment criteria set out in Table 6.6. In the Do Something scenario, the LoS increases to a B rating in all instances where improvement occurs along four of the seven sections. This is due to the proposed improvements to the existing cycling facilities in the form of increased segregation, improvements to the cycle way widths and cycling priority at junctions. Three locations see no change in the LoS rating however, whilst no bespoke cycle provision is offered in these locations as part of the Proposed Scheme, local bus gates will greatly reduce through traffic creating an environment more conducive to cycling.

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

6.5.2.4.3 Bus Infrastructure

This section provides an assessment of the changes in the quality of bus stop infrastructure provision as a result of Section 3 of the Proposed Scheme, including upgrades and any relocations. Improvement in bus priority measures will reduce the interaction between buses and general traffic and reduce the likelihood of delays. Any relocations of bus stops which need to be carried through to the EIAR for significance assessment are identified.

There are nine existing stops along Section 3 of the Proposed Scheme. Table 6.21 presents a summary of the changes in the number and locations of bus stops along Section 3 of the Proposed Scheme.

Table 6.21: Section 3 - Overview of Amendments to Bus Stop Locations

Direction	Stop	Chainage	Do Something	Comment
Outbound	2642	B5436	Removed	Bus stop 2642 is proposed to be removed.
Outbound	1947	B5740	Relocated	Bus stop is proposed to be relocated 130m west of the existing location.
Inbound	1989	B5790	Retained	Bus stop to be retained
Outbound	1946	B5983	Retained	Bus stop to be retained
Inbound	1990	B6055	Relocated	Bus stop is proposed to be relocated 32m west of the existing location.
Outbound	1945	B6422	Retained	Bus stop to be retained
Inbound	1992	B6500	Relocated	Bus stop is proposed to be relocated 25m east of the existing location.
Inbound	1993	B6757	Retained	Bus stop to be retained
Outbound	1944	B6842	Retained	Bus stop to be retained
Inbound	1994	B7122	Retained	Bus stop to be retained
Outbound	1943	B7200	Retained	Bus stop to be retained
Outbound	1942	B7466	Retained	Bus stop to be retained
Inbound	1995	B7575	Retained	Bus stop to be retained
Outbound	1941	B7850	Retained	Bus stop to be retained
Inbound	1996	B7900	Retained	Bus stop to be retained
Outbound	1940	B8070	Retained	Bus stop to be retained
Inbound	1997	B8100	Retained	Bus stop to be retained
Inbound	1998	B8426	Retained	Bus stop to be retained
Outbound	1939	B8437	Retained	Bus stop to be retained
Outbound	1938	B8694	Retained	Bus stop to be retained
Inbound	1999	B8689	Retained	Bus stop to be retained
Inbound	2001	B8925	Retained	Bus stop to be retained
Outbound	1937	B8970	Retained	Bus stop to be retained

Under the proposals, there will be a total of 22 bus stops along Section 3 of the Proposed Scheme – 11 inbound and 11 outbound stops. This is one fewer outbound stops than in the Do Minimum. The layout of new bus 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 6.22 provides a summary of the improvements to the bus stop infrastructure along Section 3 of the Proposed Scheme, with reference to the number and percentage of bus stops that provide each facility in the 'Do Minimum' and 'Do Something' scenarios.

Table 6.22: Overview of changes in bus stop facilities along the Proposed Route

Bus Stop Facility	Do Minimum		Do Something		Comment
	Number of Stops	Percentage of Stops	Number of Stops	Percentage of Stops	
Realtime information	13	57%	22	100%	It is proposed that all bus stops provide real-time information.
Timetable Information	21	91%	22	100%	It is proposed that all bus stops provide timetable information.
Shelter	13	57%	21	100%	It is proposed that an additional 10 out of the total 21 bus stops long this section is to be provided with shelter. (Chainage: B5790, B6055, B6757, B7122, B7200, B7466, B7575, B8437, B8900 and B8950)
Seating	9	39%	22	100%	It is proposed that an additional 14 out of the total 22 bus stops long this section is to be provided with seating. (Chainage: B5790, B6055, B6757, B7122, B7200, B7466, B7575, B7840, B8437, B8426, B8689, B8694, B8900 and B8950)
Accessible Kerbs	8	35%	22	100%	It is proposed that all bus stops provide accessible kerbs.
Indented Bus Bay	1	4%	0	100%	It is proposed to remove 1 indented bus bay. The majority of proposed bus stops are within bus lanes or within areas bounded by bus gates and hence do not impact the flow of general traffic.
Total Number of stops	23		22		Reduction of one bus stop along Section 3.

Table 6.22 demonstrates there are significant improvements to the bus stop facilities along Section 3 of the Proposed Scheme.

It is proposed that all bus stops provide real time / timetable information, accessible kerbs, bus shelters and seating. It is proposed to remove one indented bus bay along Section 3. This will alleviate the risk of re-entry delays to the operation of buses. It should also be noted that the majority of bus stops are located within dedicated bus lanes and therefore will not impact the flow of general traffic. The Proposed Scheme, therefore, has an overall **High Positive impact** on the bus stop facilities along Section 3. All proposed facilities have been designed in accordance with BusConnects Preliminary Design Guidance which has been developed with cognisance to the relevant disability guidance.

6.5.2.4.4 Parking and Loading

The proposals will impact on existing parking along Section 3 of the Proposed Scheme and the main changes are as follows:

- The removal of nine Pay and Display parking spaces on the western side Grattan Crescent, behind Inchicore National School, to facilitate combined bus and cycle lanes in both directions and enhanced pedestrian facilities. The disabled parking bay at this location will be relocated approximately 10m to the north of the current position. There are over 30 parking spaces on side streets within 100m of this location;
- The reduction from seven to five Pay and Display parking spaces on the eastern side Grattan Crescent, adjacent to Grattan Crescent Park, to facilitate combined bus and cycle lanes in both directions and enhanced pedestrian facilities. The two disabled bays at this location will be relocated approximately 10m to the north of the current position. Five Pay and Display parking spaces will be retained and there are over 30 parking spaces on side streets within 100m of this location;
- The removal of two “Pay and Display” parking spaces at the lower east layby along Grattan Crescent to provide bus priority and enhanced pedestrian facilities. Considering there are over 30 parking spaces on side streets within 100m of this location;
- The removal of three permit parking spaces along R810 Emmet Road, between Grattan Crescent and Spa Road, to enable changes to R810 Emmet Road which will provide enhanced pedestrian facilities. There are over 30 parking spaces on side streets within 100m of this location;

- The reduction from seven to three permit parking spaces along R810 Emmet Road, between Spa Road and St. Vincent Street West, to provide bus priority and enhanced pedestrian facilities. Three permit parking spaces will be retained and there are over 30 parking spaces within 100m of this location on surrounding streets;
- The reduction from 19 to 11 permit parking spaces along R810 Emmet Road, between St. Vincent Street West and Camac Close, to provide bus priority and enhanced pedestrian facilities. 11 permit parking spaces will be retained and there are over 50 parking spaces on side streets within 100m of this location;
- The removal of nine permit parking spaces along R810 Emmet Road, between St. Vincent Street West and Bulfin Road, to provide bus priority and enhanced pedestrian facilities. 11 permit parking spaces opposite this location along the eastbound link of R810 Emmet Road will be retained. There are over 50 parking spaces on side streets within 100m of this location;
- The reduction from 19 to 10 permit parking spaces along R810 Emmet Road, between Camac Close and Myra Close, to provide bus priority and enhanced pedestrian facilities. The remaining 12 permit parking spaces will be retained and there are over 100 parking spaces on side streets within 100m of this location;
- The reduction from 38 to 18 permit parking spaces along R810 Emmet Road, between Bulfin Road and Luby Road, to provide bus priority and enhanced pedestrian facilities. The remaining 18 permit parking spaces will be retained and there are over 100 alternative parking spaces within 100m of this location on surrounding streets;
- The increase from 18 to 34 permit parking spaces along R810 Emmet Road, between Myra Close and South Circular Road. Taking cognisance of the loss of 20 permit parking spaces along the westbound link between Bulfin Road and Luby Road and the availability of over 100 parking spaces on side streets within 100m of this location on surrounding streets;
- The increase from 15 to 16 permit parking spaces along R810 Emmet Road, between Luby Road and South Circular. Taking cognisance of the loss of 20 permit parking spaces along the westbound link between Bulfin Road and Luby Road and the availability of over 100 alternative parking spaces within 100m of this location on surrounding streets;
- The removal of two Pay and Display parking spaces along Bow Lane West to provide enhanced pedestrian and cyclist facilities. There are over 30 alternative parking spaces within 100m of this location on surrounding streets;
- The removal of nine Pay and Display parking spaces along R810 James Street, between Echlin Street and Crane Street, to provide bus priority and enhanced pedestrian and cyclist facilities. There are over 40 alternative parking spaces within 100m of this location on surrounding streets;
- The removal of two Pay and Display parking spaces along R810 James Street, between Bow Lane West and Watling Street to provide bus priority and enhanced pedestrian and cyclist facilities. There are over 40 alternative parking spaces within 100m of this location on surrounding streets;
- The removal of one loading bay along R810 James Street, between Bow Lane West and Watling Street to provide bus priority and enhanced pedestrian and cyclist facilities. One existing loading bay along Bow Lane West to the west is retained;
- The removal of five Pay and Display parking spaces along R810 Thomas Street, between Thomas Court and Meath Street to provide bus priority and enhanced pedestrian and cyclist facilities. There are over 300 alternative parking spaces within 100m of this location on surrounding streets;
- The reduction from two to one loading bay along R810 Thomas Street, between Thomas Court and Meath Street, to provide bus priority and enhanced pedestrian and cyclist facilities. One loading bay is retained / relocated;
- The removal of five Pay and Display parking spaces along R810 Thomas Street, between Meath Street and Francis Street, to provide enhanced pedestrian and cyclist facilities. There are over 300 alternative parking spaces within 100m of this location on surrounding streets;
- The removal of five loading bays along R810 Thomas Street, between Meath Street and Francis Street, to provide bus priority and enhanced pedestrian and cyclist facilities. Two loading bays are proposed to the east of this location (along the Cornmarket left turn slip);

- The removal of two loading bays along R810 Thomas Street, between Meath Street and Francis Street, to provide bus priority and enhanced pedestrian and cyclist facilities. One loading bay is retained to the east (along the Cornmarket left turn slip);
- The conversion of seven full-time taxi ranks to part-time taxi ranks along R810 Thomas Street, between Meath Street and Francis Street;
- The removal of five Pay and Display parking spaces along the R810 Cornmarket left turn slip road to provide bus priority and enhanced pedestrian and cyclist facilities. There are over 50 alternative parking spaces within 100m of this location on surrounding streets;
- The provision of one disabled parking bays the R810 Cornmarket left turn slip road. Taking cognisance of the removal of two disabled parking bays between R810 Cornmarket and Winetavern Street along High Street;
- The provision of two loading bays the R810 Cornmarket left turn slip road. Taking cognisance of the removal of one loading bay between Thomas Court and Meath Street, the removal of five loading bays between Meath Street and Francis Street, and the removal of three loading bays between R810 Cornmarket and Winetavern Street along High Street;
- The removal of four Pay and Display parking spaces along High Street between R810 Cornmarket and Winetavern Street, to provide bus priority and enhanced pedestrian and cyclist facilities. There are approximately 12 alternative parking spaces within 100m of this location on surrounding streets;
- The removal of three loading bays along High Street between R810 Cornmarket and Winetavern Street, to provide bus priority and enhanced pedestrian and cyclist facilities; and
- The reduction from 99 to 95 informal parking spaces along the proposed quiet route. It is proposed to remove nine spaces along this route - one along Newington Lane and eight spaces on Saint James's Avenue.

The contents of Table 6.23 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 6.23: Section 3 – Overall Changes in Parking / Loading Spaces

Street	Parking Type	Number Parking Spaces		
		Do Minimum	Do Something	Change
R839 Grattan Crescent	Paid	18	5	-13
	Disabled	3	3	0
	Loading	3	3	0
R810 Emmet Road	Paid	128	93	-35
	Loading	1	1	0
	Disabled	1	1	0
R810 Old Kilmainham / R810 Mount Brown	Paid	45	45	0
	Disabled	1	1	0
R810 James Street / Bow Lane West	Paid	13	0	-13
	Loading	1	1	-1
R810 Thomas Street / High Street	Paid	22	0	-22
	Loading	15	3	-12
	Disabled	3	1	-2
	Taxi	7	7	0
Quiet Route (Newington Lane / Basin Street Lower / Saint James's Avenue / Grand Canal Place / Echlin Street)	Informal	99	95	-4
Side streets	Informal Parking (approximate)	1580	1580	0
Total		1915	1805	-102

As shown in Table 6.23, the Proposed Scheme will provide substantial improvements to sustainable transport infrastructure. Considering the overall retention of 1,915 spaces compared to a loss of 102, represents a potential

Low Negative impact, which is considered appropriate in the context of the aim of the Proposed Scheme, to provide enhanced walking, cycling and bus infrastructure on this key access corridor.

6.5.3 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 Network-Wide Performance Indicators:
  - Queueing;
  - Total Travel Times;
  - Total Travel Distance; and
  - Average Network Speed.

6.5.3.1 People Movement

6.5.3.1.1 Overview

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

The assessment of People Movement includes the following metrics:

- The average number of people moved by each mode (Car, Bus, Walking and Cycling) comparing the Do Minimum and Do Something scenarios both in the inbound and outbound direction in the AM and PM peak periods for each forecast year (2028, 2043); and
- People Movement by Bus
  - AM and PM Peak Hour Bus Passenger Loadings along the Proposed Scheme for each forecast year (2028, 2043)
  - Total Passengers Boarding Buses on bus routes that use any part of the Proposed Scheme for each forecast year (2028, 2043)

6.5.3.1.2 Peak Hour People Movement along the Proposed Scheme

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

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

the assessment is conservative in terms of the level of people movement that is predicted in the Do Something scenario. The Do Something scenario will facilitate opportunities to increase bus network capacity operating along the corridor due to the extensive priority provided. In addition to this, the significant segregation and safety improvements to walking and cycling infrastructure that is a key feature of the Proposed Scheme will further maximise the movement of people travelling sustainably along the corridor and will therefore cater for higher levels of future population and employment growth. In the absence of the delivery of the Proposed Scheme, growth along this key corridor would continue to contribute to increased congestion and operational issues on the road network. The Proposed scheme delivers a reliable alternative to car-based travel that can support future sustainable growth and provide a positive contribution towards reducing carbon emissions

6.5.3.1.2.1 2028 AM Peak Hour People Movement

Diagram 6.4 illustrates the People Movement by mode inbound towards the City Centre during the AM Peak Hour in 2028 along the proposed scheme corridor.

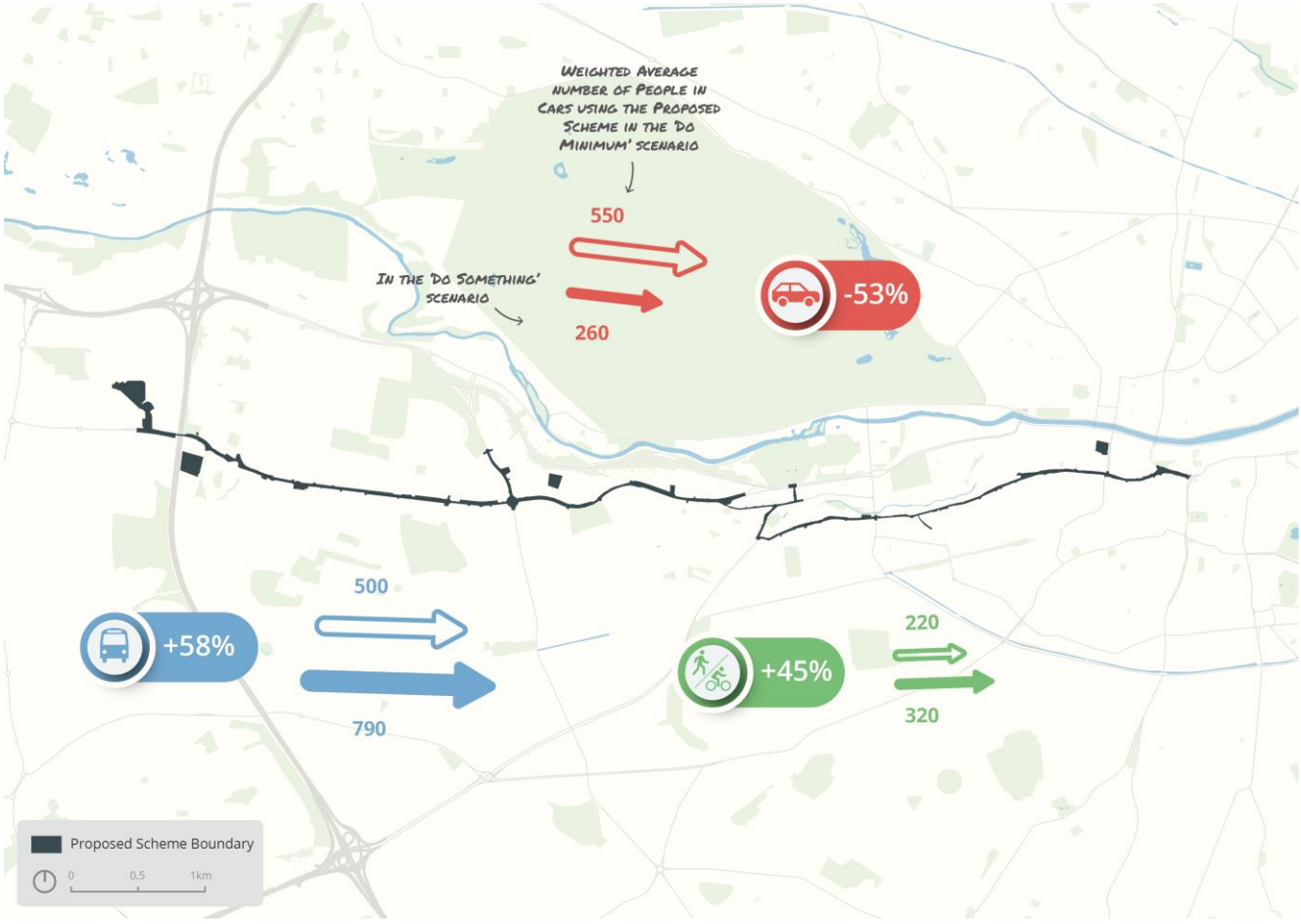

Diagram 6.4: People Movement by Mode travelling along the Proposed Scheme during 2028 AM Peak Hour

As indicated in Diagram 6.4, there is a reduction of 53% in the number of people travelling via car, an increase of 58% in the number of people travelling via bus and an increase of 45% in the number of people walking or cycling along the Proposed Scheme during the AM Peak Hour. It should be noted that the model predicts limited change in total walking trips between each scenario. This is due to the fact that walking trips in the Do Minimum scenario are also transferring to public transport and cycling as a result of the improved provision for these modes with any new pedestrians 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 6.24 outlines the difference in modal split between the Do Minimum and Do Something scenarios for each mode of travel in an inbound direction towards the City Centre during the AM Peak Hour. The results indicate an 8% increase in total people moved as a result of the Proposed Scheme and 54% increase in people moved by sustainable modes (Public Transport, Walk, Cycle).

Table 6.24: Modal Shift of 2028 AM Peak Hour along Proposed Scheme

Direction	Time Period	Mode of Transport	Do Minimum		Do Something		Difference	
			Hourly Trips	Modal Split (%)	Hourly Trips	Modal Split (%)	Hourly Trips	Difference (%)
Inbound towards the City Centre	AM Peak Period	General Traffic	550	43%	260	19%	-290	-53%
		Public Transport	500	39%	790	58%	290	58%
		Walking	160	13%	170	12%	10	6%
		Cycling	60	5%	150	11%	90	150%
		Combined Walk/Cycle	220	17%	320	23%	100	45%
		Tot. Sustainable Modes	**720**	**57%**	**1,110**	**81%**	**390**	**54%**
		Total	**1,270**	**100%**	**1,370**	**100%**	**100**	**8%**

6.5.3.1.2.2 2028 PM Peak Hour People Movement

Diagram 6.5 illustrates the People Movement by mode travelling outbound from the City Centre during the PM Peak Hour along the proposed scheme corridor.

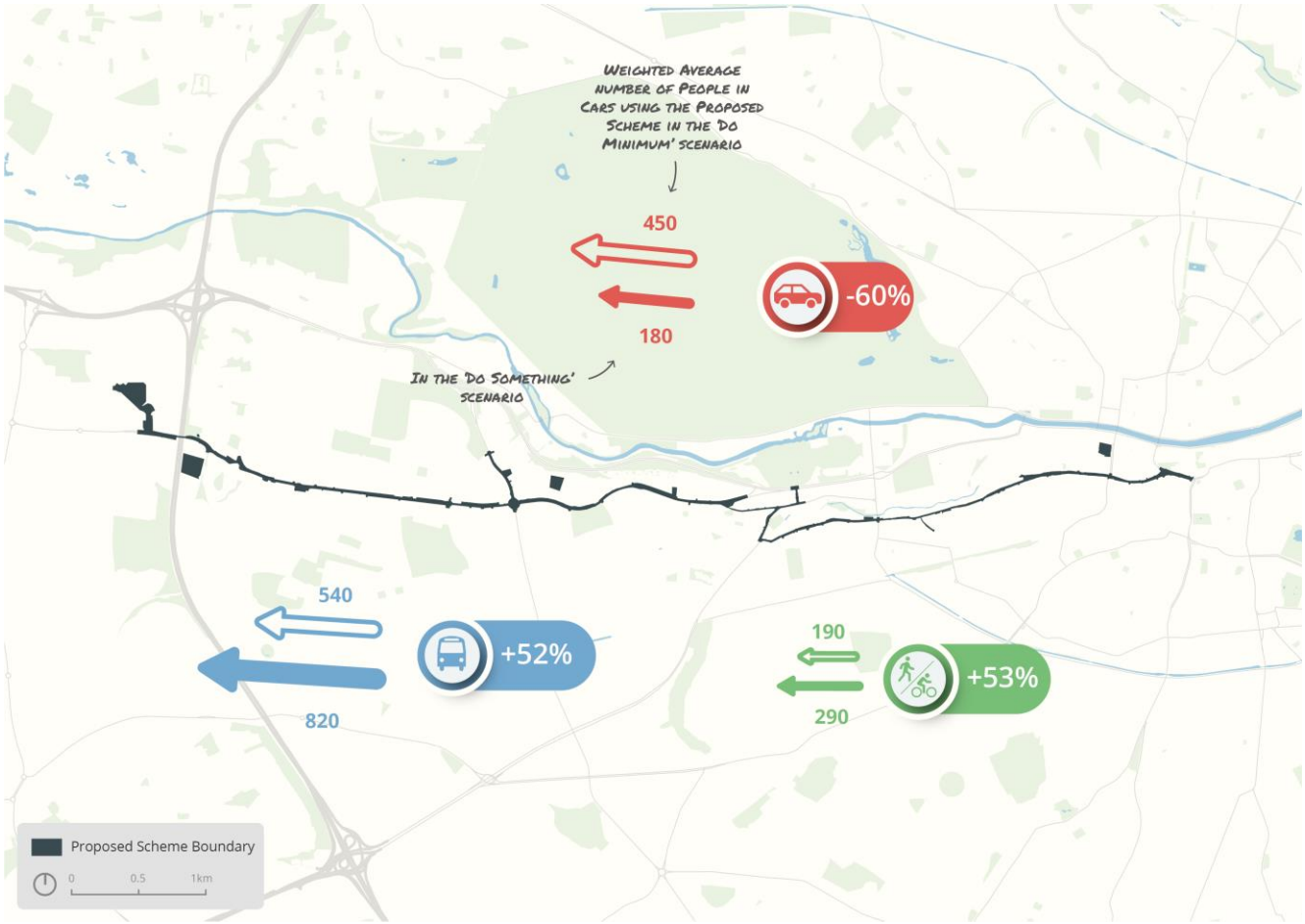

Diagram 6.5: People Movement by Mode travelling along the Proposed Scheme during 2028 PM Peak Hour

As indicated in Diagram 6.5, there is a reduction of 60% in the number of people travelling via car, an increase of 52% in the number of people travelling via bus and an increase of 53% in the number of people walking or cycling along the Proposed Scheme during the PM Peak Hour.

The contents of Table 6.25 outline the difference in modal split between the Do Minimum and Do Something scenarios for each mode of travel in an outbound direction from the City Centre during the PM Peak Hour. The results indicate 9% increase in total people moved as a result of the Proposed Scheme and 52% increase in people moved by sustainable modes (Public Transport, Walk, Cycle).

Table 6.25: 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 (%)
Outbound from the City Centre	PM Peak Period	General Traffic	450	38%	180	14%	-270	-60%
		Public Transport	540	46%	820	64%	280	52%
		Walking	130	11%	140	11%	10	8%
		Cycling	60	5%	150	12%	90	150%
		Combined Walk/Cycle	190	16%	290	22%	100	53%
		Tot. Sustainable Modes	**730**	**62%**	**1,110**	**86%**	**380**	**52%**
		Total	**1,180**	**62%**	**1,290**	**86%**	**110**	**9%**

6.5.3.1.2.3 2043 AM Peak Hour People Movement

Diagram 6.6 illustrates the People Movement by mode inbound towards the City Centre during the AM Peak Hour in 2043 along the proposed scheme corridor.

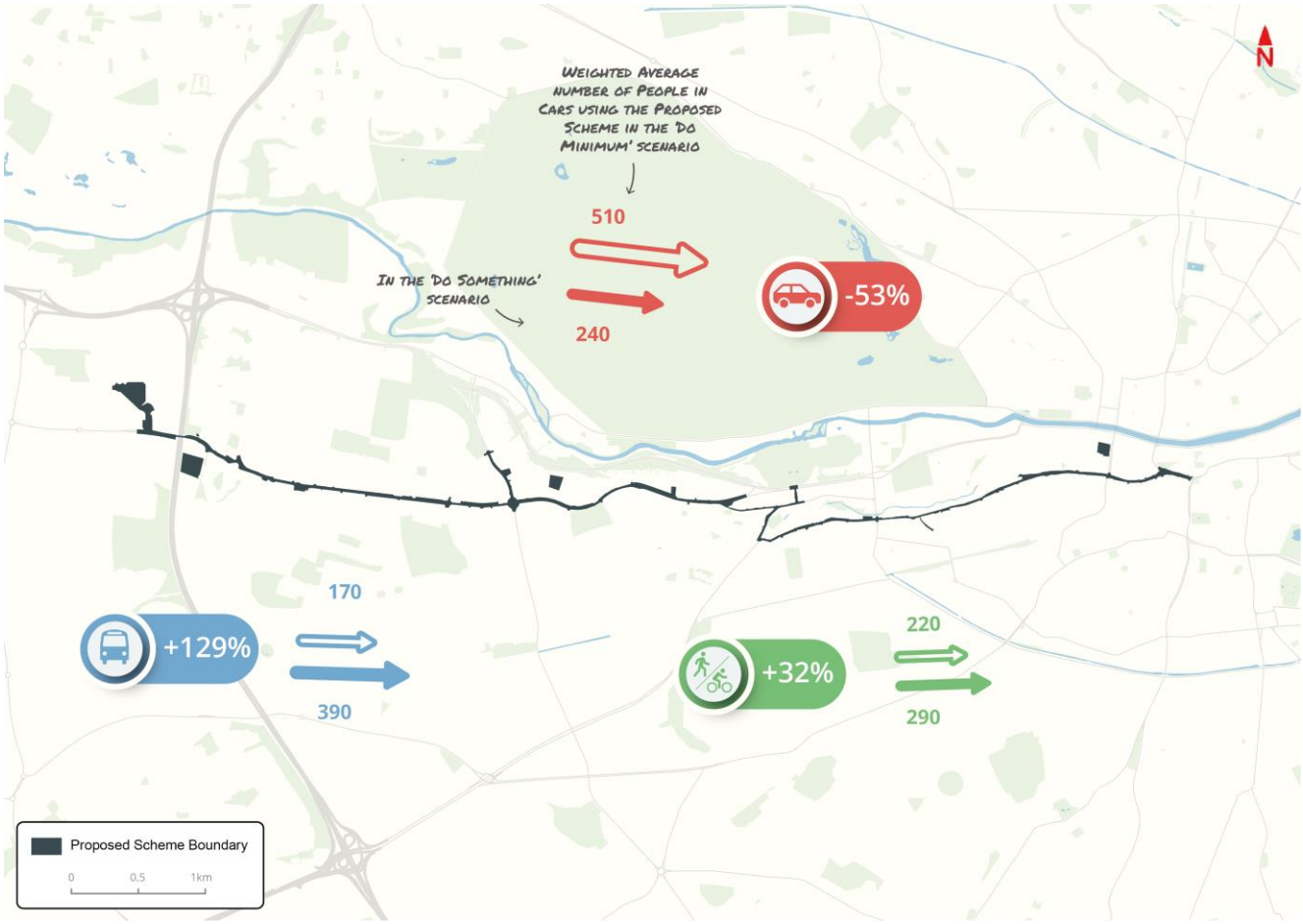

Diagram 6.6: People Movement by Mode travelling along the Proposed Scheme during 2043 AM Peak Hour

As indicated in Diagram 6.6, there is a decrease of 53% in the number of people travelling via car, an increase of 129% in the number of people travelling via bus and an increase of 32% in the number of people walking and cycling along the Proposed Scheme during the AM Peak Hour.

The contents of Table 6.26 outline the difference in modal split between the Do Minimum and Do Something scenarios for each mode of travel in an inbound direction towards the City Centre during the AM Peak Hour. The results indicate a 2% increase in total people moved as a result of the Proposed Scheme and 74% increase in people moved by sustainable modes (Public Transport, Walk, Cycle).

Table 6.26: Modal Shift of 2043 AM Peak Hour along Proposed Scheme

Direction	Time Period	Mode of Transport	Do Minimum		Do Something		Difference	
			Hourly Trips	Modal Split (%)	Hourly Trips	Modal Split (%)	Hourly Trips	Difference (%)
Inbound towards the City Centre	AM Peak Period	General Traffic	510	57%	240	26%	-270	-53%
		Public Transport	170	19%	390	42%	220	129%
		Walking	180	20%	180	20%	0	0%
		Cycling	40	4%	110	12%	70	175%
		Combined Walk/Cycle	220	24%	290	32%	70	32%
		Tot. Sustainable Modes	**390**	**43%**	**680**	**74%**	**290**	**74%**
		Total	**900**	**100%**	**920**	**100%**	**20**	**2%**

6.5.3.1.2.4 2043 PM Peak Hour People Movement

Diagram 6.7 illustrates the People Movement by mode travelling outbound from the City Centre during the PM Peak Hour in 2043 along the proposed scheme corridor.

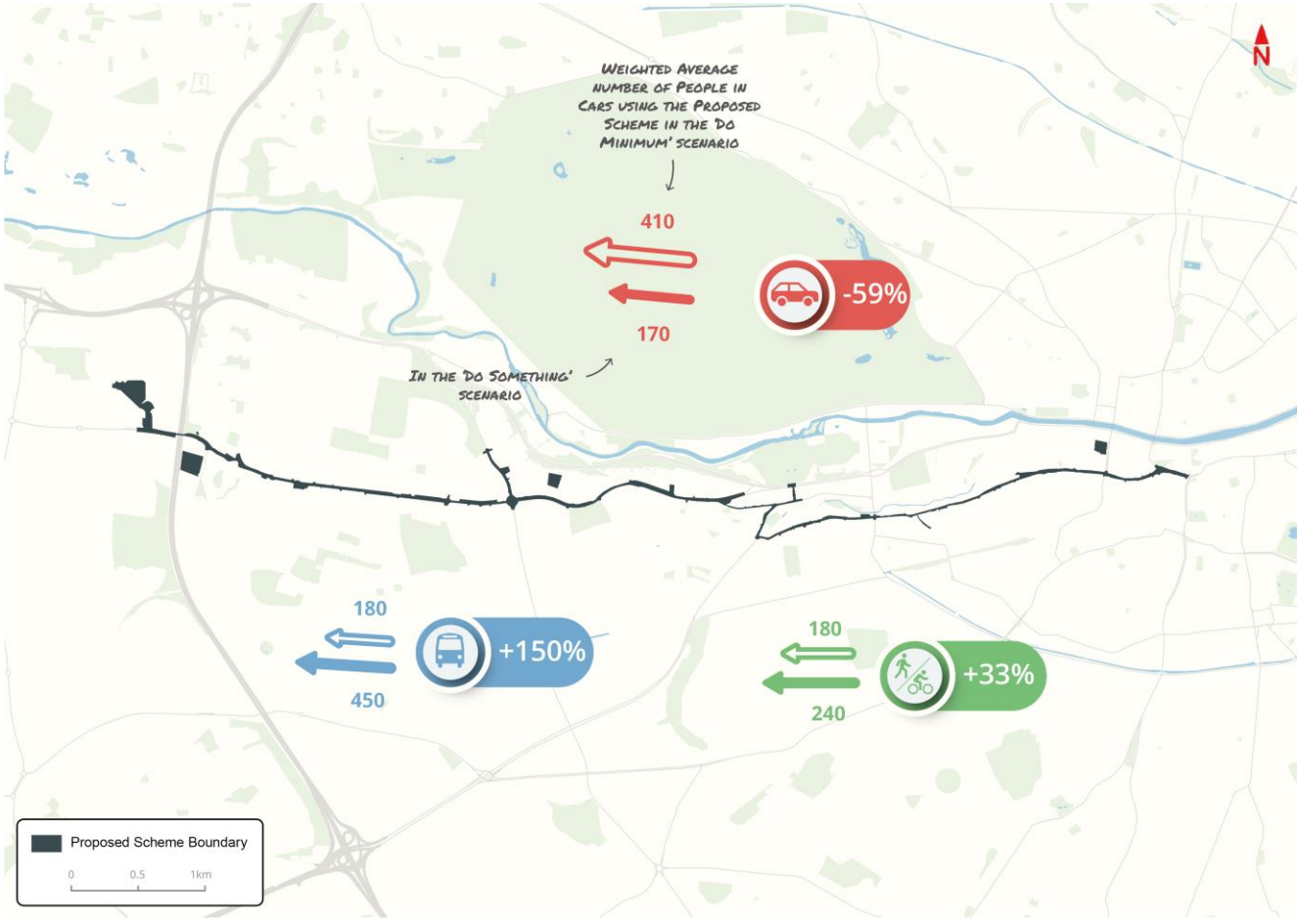

Diagram 6.7: People Movement by Mode travelling along the Proposed Scheme during 2043 AM Peak Hour

As indicated in Diagram 6.7, there is a decrease of 59% in the number of people travelling via car, an increase of 150% in the number of people travelling via bus and an increase of 33% in the number of people walking and cycling along the Proposed Scheme during the PM Peak Hour.

The contents of Table 6.27 outline the difference in modal split between the Do Minimum and Do Something scenarios for each mode of travel in an outbound direction from the City Centre during the PM Peak Hour. The

results indicate a 12% increase in total people moved as a result of the Proposed Scheme and 92% increase in people moved by sustainable modes (Public Transport, Walk, Cycle).

Table 6.27: 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 (%)
Outbound from the City Centre	PM Peak Period	General Traffic	420	54%	180	21%	-240	-57%
		Public Transport	180	23%	450	52%	270	150%
		Walking	140	18%	140	16%	0	0%
		Cycling	40	5%	100	11%	60	150%
		Combined Walk/Cycle	180	23%	240	28%	60	33%
		Tot. Sustainable Modes	**360**	**46%**	**690**	**79%**	**330**	**92%**
		Total	**780**	**46%**	**870**	**79%**	**90**	**12%**

6.5.3.1.3 People Movement by Bus

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

6.5.3.1.3.1 2028 AM Peak Hour Bus Passengers

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

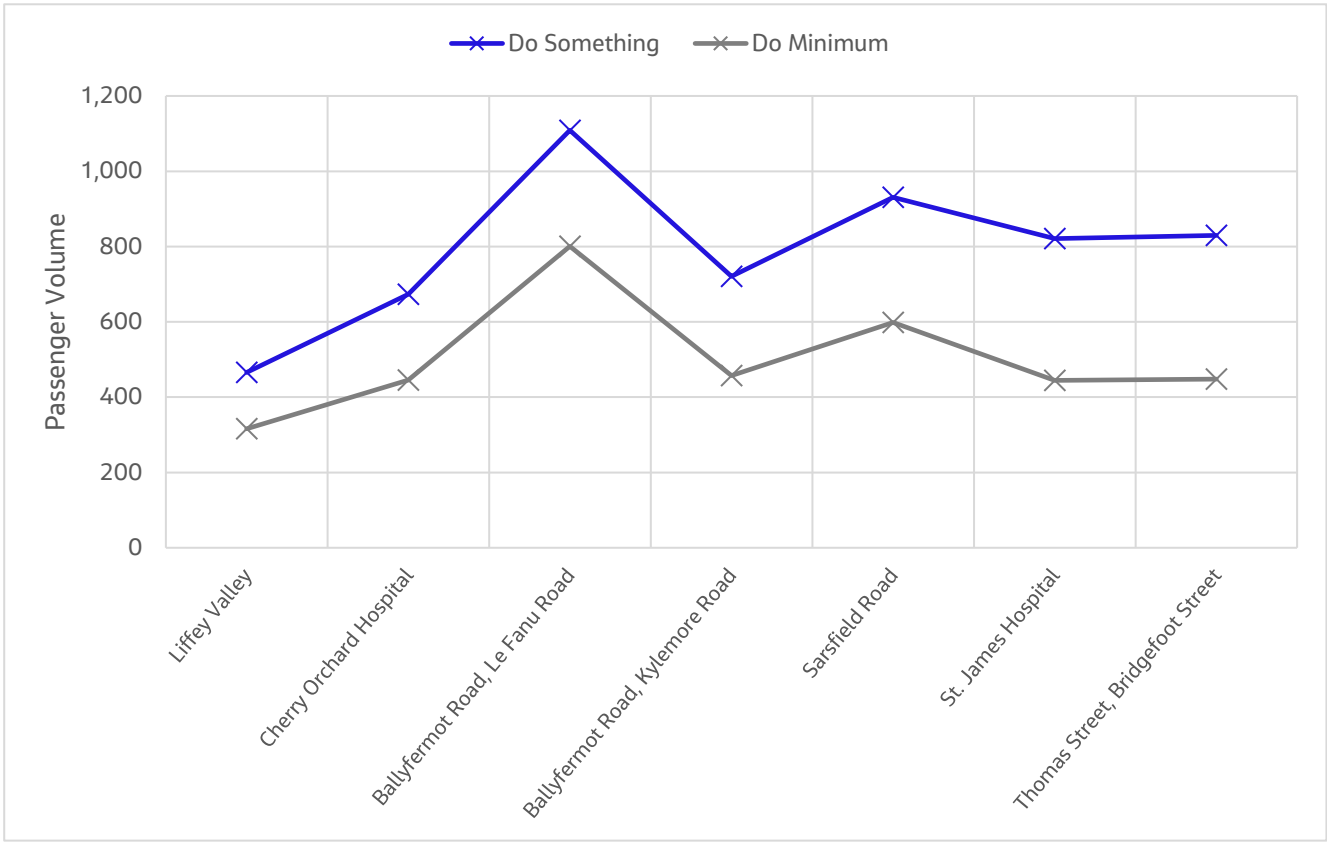

Diagram 6.8: 2028 AM Peak Hour Passenger Volume Along Proposed Scheme (inbound direction)

Diagram 6.8 shows higher levels of bus passenger loadings along the Proposed Scheme with a peak at the intersection with Le Fanu Road where the volume of passengers reaches 1,100 passengers in the AM Peak hour, compared to approximately 800 in the Do Minimum scenario.

The increase in bus passengers remains at a high level along the Proposed Scheme with approximately 200 to 400 additional users on the corridor, compared to the Do Minimum scenario.

6.5.3.1.3.2 2043 AM Peak Hour Bus Passengers

Diagram 6.9 presents the passenger loading profile comparing the Do Minimum and Do Something scenarios in the AM Peak Hour in the inbound direction in 2043. The overall bus patronage numbers are slightly lower than in 2028 due to the Lucan Luas scheme being in place in 2043, which shares a similar catchment, however notable improvements are still evident between the Do Minimum and Do Something scenarios.

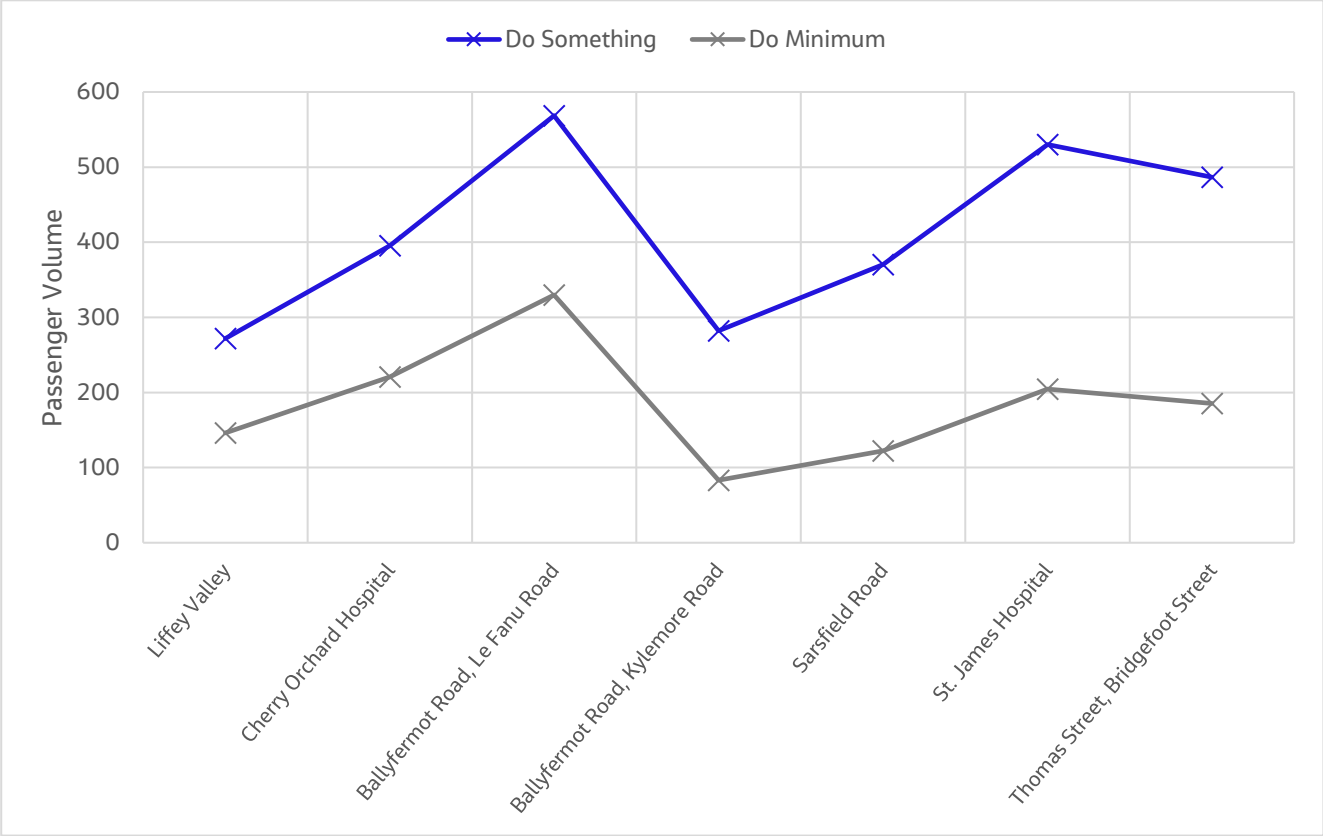

Diagram 6.9: 2043 AM Peak Hour Passenger Volume Along Proposed Scheme (outbound direction)

Diagram 6.9 shows higher levels of bus passenger loadings along the Proposed Scheme with a peak at the intersection with Le Fanu Road where the volume of passengers reaches 550 in the AM Peak Hour, compared to approximately 350 in the Do Minimum scenario.

The increase in bus passengers remains at a high level along the Proposed Scheme with approximately 150 to 300 additional users on the corridor, compared to the Do Minimum scenario.

6.5.3.1.3.3 2028 PM Peak Hour Bus Passengers

Diagram 6.10 presents the passenger loading profile comparing the Do Minimum and Do Something scenarios in the PM Peak Hour in the outbound direction in 2028.

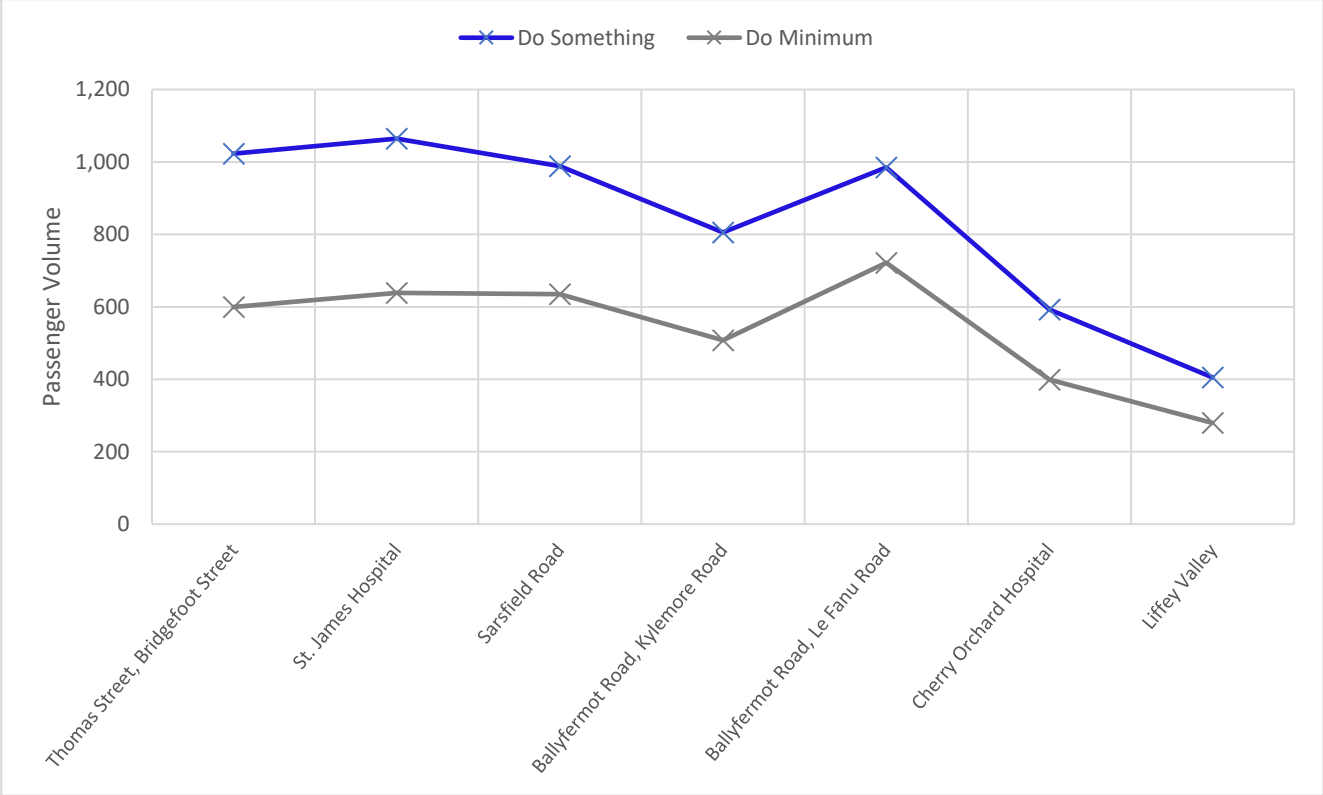

Diagram 6.10: 2028 PM Peak Hour Passenger Volume Along Proposed Scheme (outbound direction)

Diagram 6.10 shows higher levels of bus passenger loadings along the Proposed Scheme with a peak at St. James Hospital where the volume of passengers reaches 1,050 in the PM Peak Hour, compared to approximately 650 in the Do Minimum scenario.

The increase in bus passengers remains at a high level along the Proposed Scheme with approximately 200 to 400 additional users on most of the corridor, compared to the Do Minimum scenario.

6.5.3.1.3.4 2043 PM Peak Hour Bus Passengers

Diagram 6.11 presents the passenger loading profile comparing the Do Minimum and Do Something scenarios in the PM Peak Hour in the outbound direction in 2043.

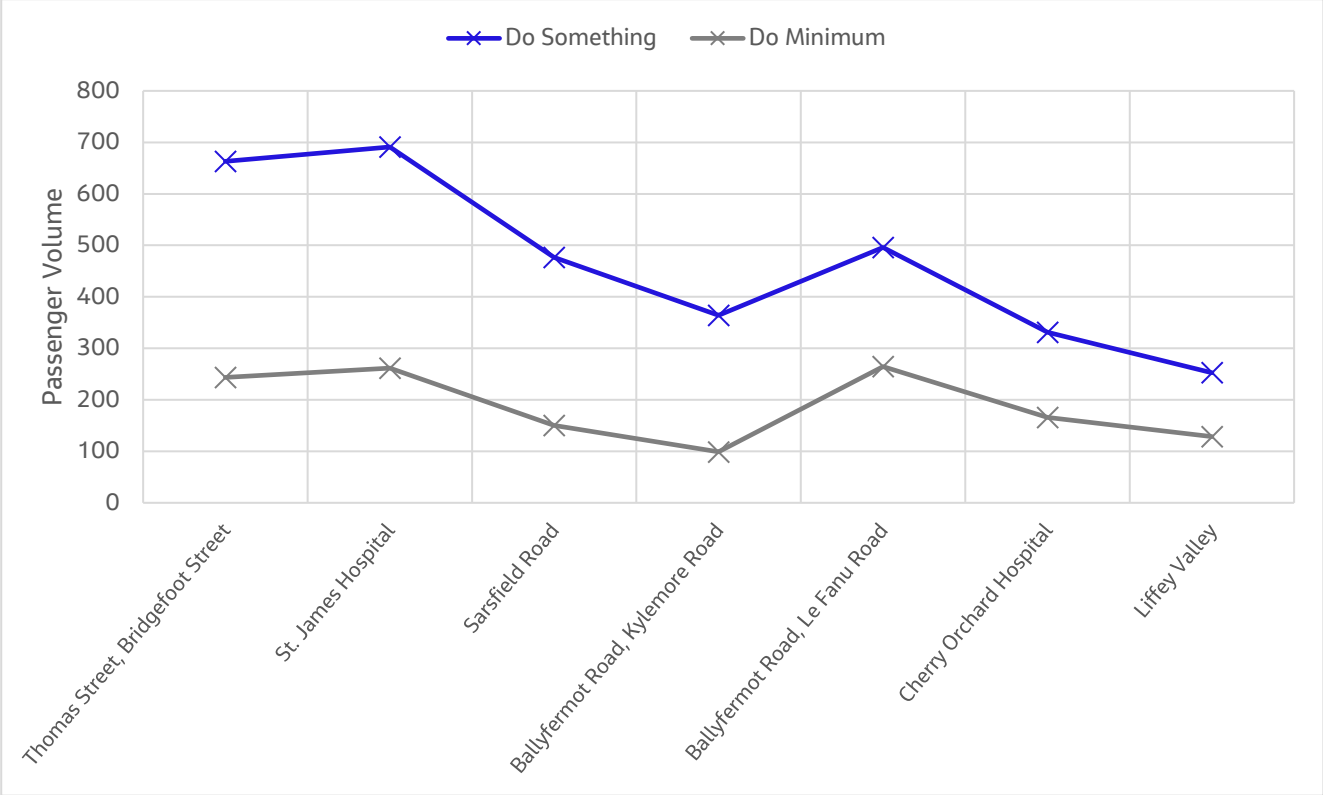

Diagram 6.11: 2043 PM Peak Hour Passenger Volume Along Proposed Scheme (outbound direction)

Diagram 6.11 shows higher levels of bus passenger loadings along the Proposed Scheme with a peak at St. James Hospital where the volume of passengers reaches 700 in the PM Peak hour, compared to approximately 250 in the Do Minimum scenario.

The increase in bus passengers remains at a high level along the Proposed Scheme with approximately 250 to 400 additional users on the corridor, compared to the Do Minimum scenario.

6.5.3.1.3.5 Bus Boardings

Since many bus services commence and end further away from the direct alignment of the Proposed Scheme, an additional assessment has been undertaken to compare the Do Minimum and Do Something total passengers boarding on bus routes that use any part of the Proposed Scheme (including those stops not directly on the Proposed Scheme) in both 2028 and 2043 forecast years. The results for the 2028 Opening Year scenario are indicated in Table 6.28.

Table 6.28: 2028 Peak Hour Bus Boardings on Routes using the Proposed Scheme (inc. boarding at stops outside Proposed Scheme)

Time Period	Do Minimum	Do Something	Difference in Boardings	Difference (%)
AM Peak Hour	16,140	17,010	870	5.4%
PM Peak Hour	13,220	13,890	670	5.1%

The contents of Table 6.28 show that there will be a 5.4% increase in people boarding bus routes which use any part of the Proposed Scheme during the AM Peak Hour. This represents an addition of 870 passengers in the AM Peak hour.

In the PM Peak hour, there will be a 5.1% increase in people boarding bus routes which use the Proposed Scheme, representing an additional 670 passengers.

Table 6.29: 2043 Peak Hour Bus Boardings on Routes using the Proposed Scheme (inc. boarding at stops outside Proposed Scheme)

Time Period	Do Minimum	Do Something	Difference in Boardings	Difference (%)
AM Peak Hour	14,180	15,170	990	7.0%
PM Peak Hour	11,530	12,410	880	7.6%

The contents of Table 6.29 shows that there will be a 7% increase in people boarding bus routes which use the Proposed Scheme during the AM Peak Hour. This represents an addition of 990 passengers in the AM Peak hour.

In the PM Peak hour, there will be a 7.6% increase in people boarding bus routes which use the Proposed Scheme, representing an additional 880 passengers.

6.5.3.1.4 People Movement – Significance of Impact

The significance of impact for the movement of People Movement by sustainable modes with the Proposed Scheme in place has been appraised qualitatively, taking into account the changes in mode share, demand changes by mode along the Proposed Scheme as well as bus usage presented above. The Proposed Scheme has been adjudged to deliver a **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'.

6.5.3.1.5 Operational Impacts for Bus Users

6.5.3.1.5.1 Overview

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

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

6.5.3.1.5.2 Bus Journey Time and Reliability

To give an overview of how the Proposed Scheme will impact on bus journey times along the corridor, outputs for the G2 service, which traverses the entire length of the Proposed Scheme, have been extracted from the model. As outlined in Section 6.4.3, 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, with the Proposed Scheme benefitting the G-Spine services.

Inbound Direction

Average journey times for the inbound G2 service in 2028 Opening Year and in 2043 Design Year can be seen in Table 6.30. A breakdown of the changes in average journey times for all other bus services using the Proposed Scheme can be found in Appendix A6.1 (TIA) – Sub Appendix 4 (Impact Assessments).

Table 6.30: G2 Service Bus Average Journey Times (Inbound Direction)

Peak Hour	Do Minimum (minutes)	Do Something (minutes)	Difference (minutes)	% Difference
2028 AM	36.5	27.1	-9.4	-26%
2028 PM	33.2	26.6	-6.6	-20%
2043 AM	36.1	27.0	-9.0	-25%
2043 PM	33.9	26.5	-7.4	-22%

Additional information regarding the range of journey times (minimum, maximum, average and standard deviation) for inbound G2 buses in the Do Minimum (red) and Do Something (blue) can be seen in Table 6.31 and Diagram 6.12 below. Each dot in the diagram represents the journey time for each individual bus in each scenario. A larger range of journey times are an indication of lower levels of reliability in each scenario.

Table 6.31: G2 Service – Range of Journey Times (Inbound Direction)

Peak Hour	Do Minimum				Do Something			
	MIN	MAX	AVG	STDEV	MIN	MAX	AVG	STDEV
2028 AM	28.4	44.8	36.5	3.5	24.3	30.6	27.1	1.3
2028 PM	28.0	38.0	33.2	2.0	24.6	28.7	26.6	1.0
2043 AM	30.0	45.3	36.1	3.3	24.2	30.4	27.0	1.4
2043 PM	28.4	40.8	33.9	2.6	23.9	30.6	26.5	1.2

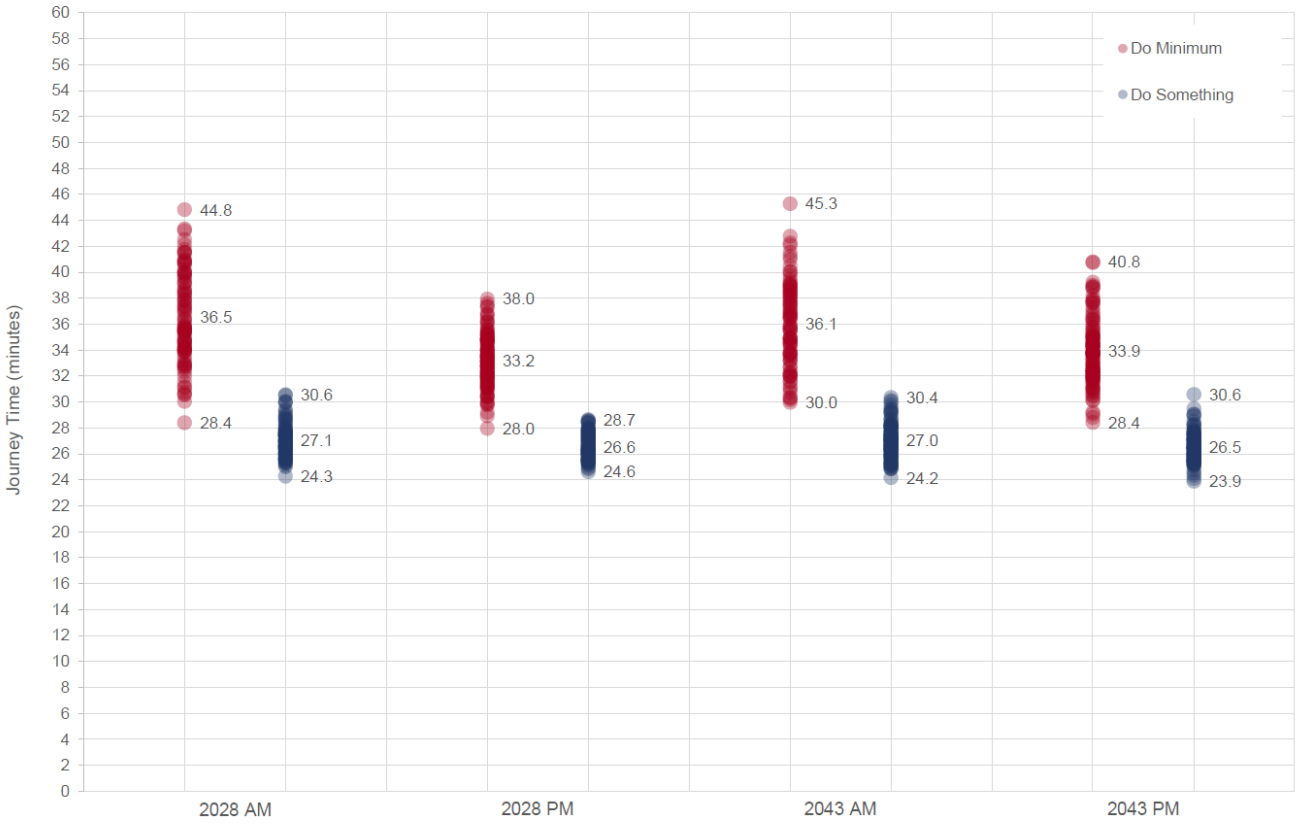

Diagram 6.12: G2 Bus Journey Times (Inbound Direction)

Based on the results presented in Table 6.30, the Proposed Scheme will deliver average inbound journey time savings for G2 service bus passengers of up to 9.4 minutes (26%) in 2028 (AM) and 9.0 minutes (25%) in 2043 (AM). Furthermore, results presented in Diagram 6.13 suggest an improvement in bus journey time reliability in

all four scenarios as indicated by the reduced ranges of journey times achieved. This is shown through 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 G2 service are also illustrated in the cumulative time-distance graphs shown in Diagram 6.13 to Diagram 6.16.

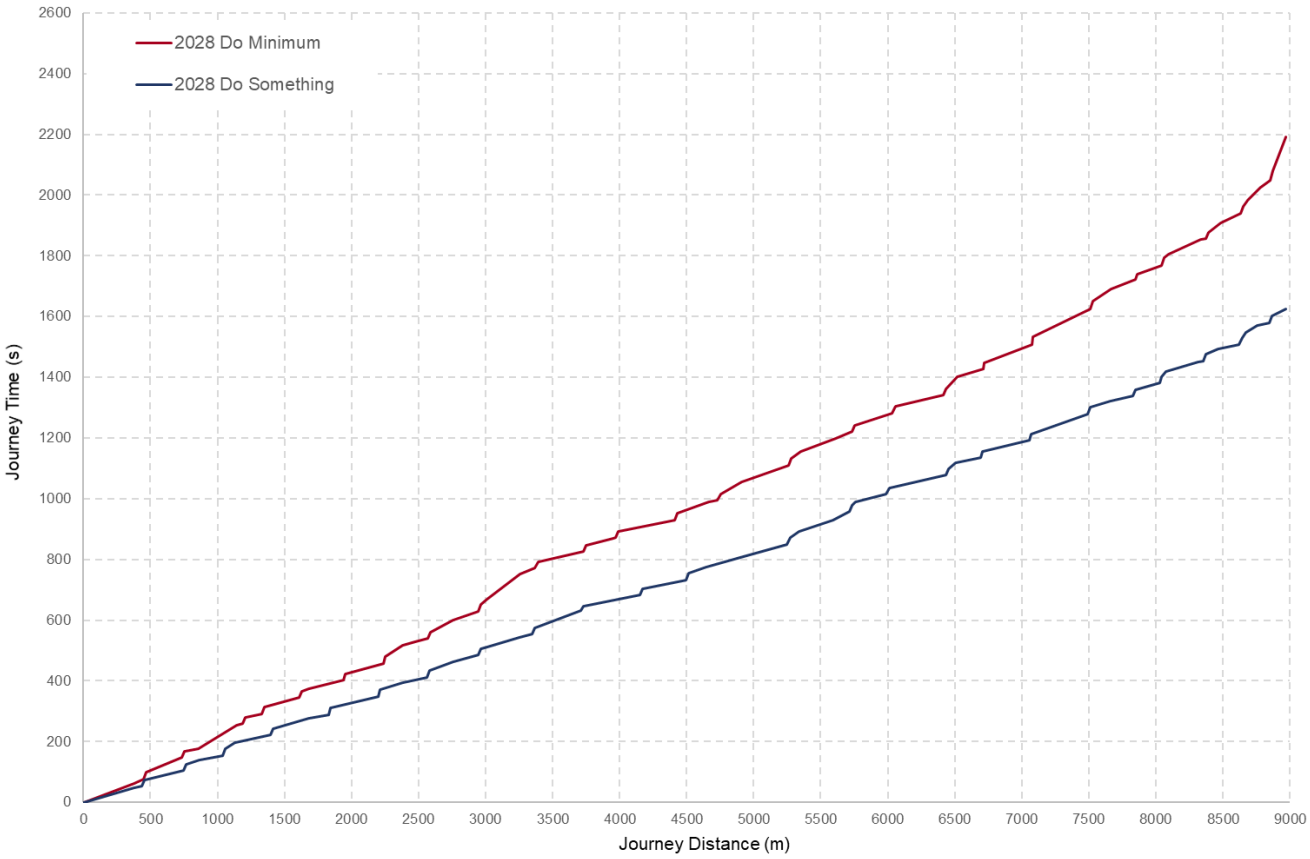

Diagram 6.13: G2 Bus Journey Time (2028 AM, Inbound)

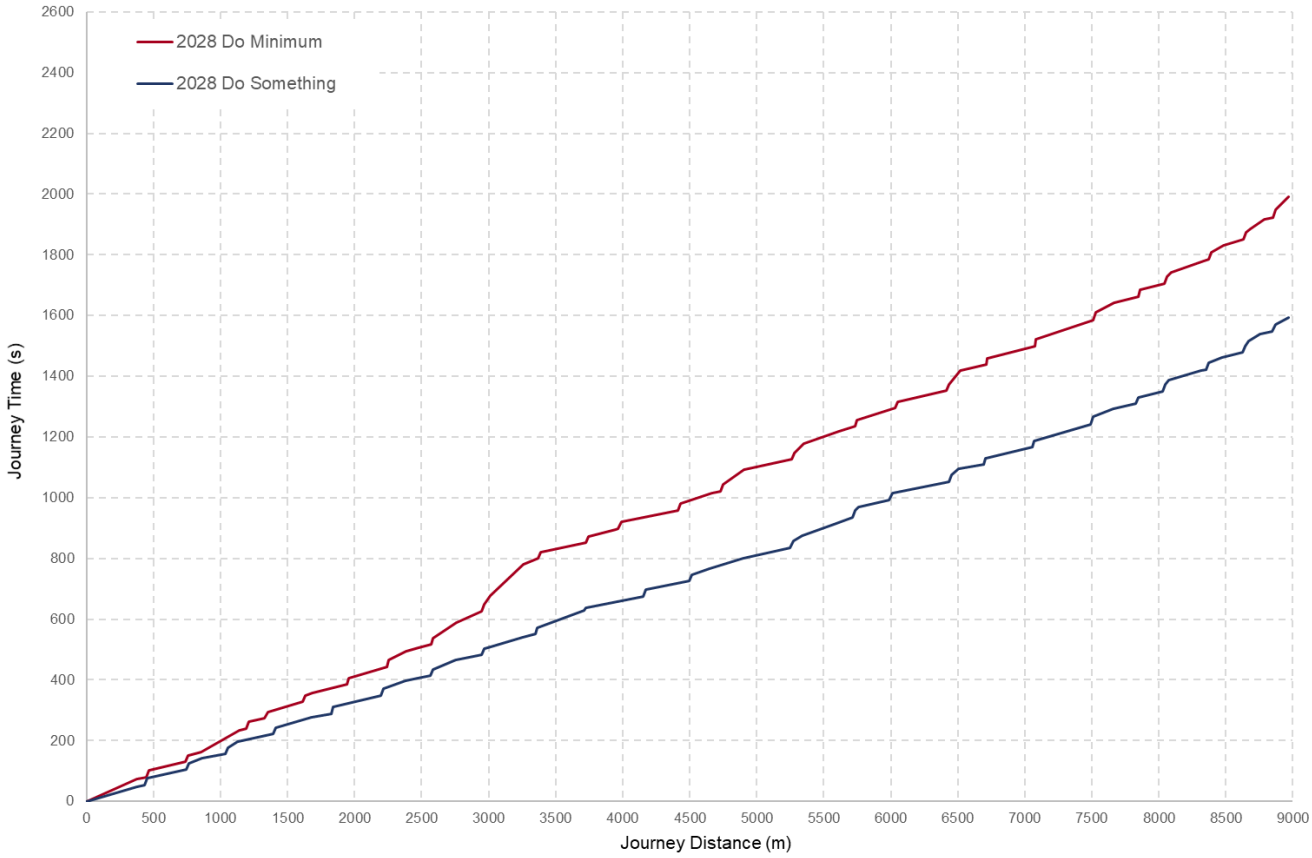

Diagram 6.14: G2 Bus Journey Time (2028 PM, Inbound)

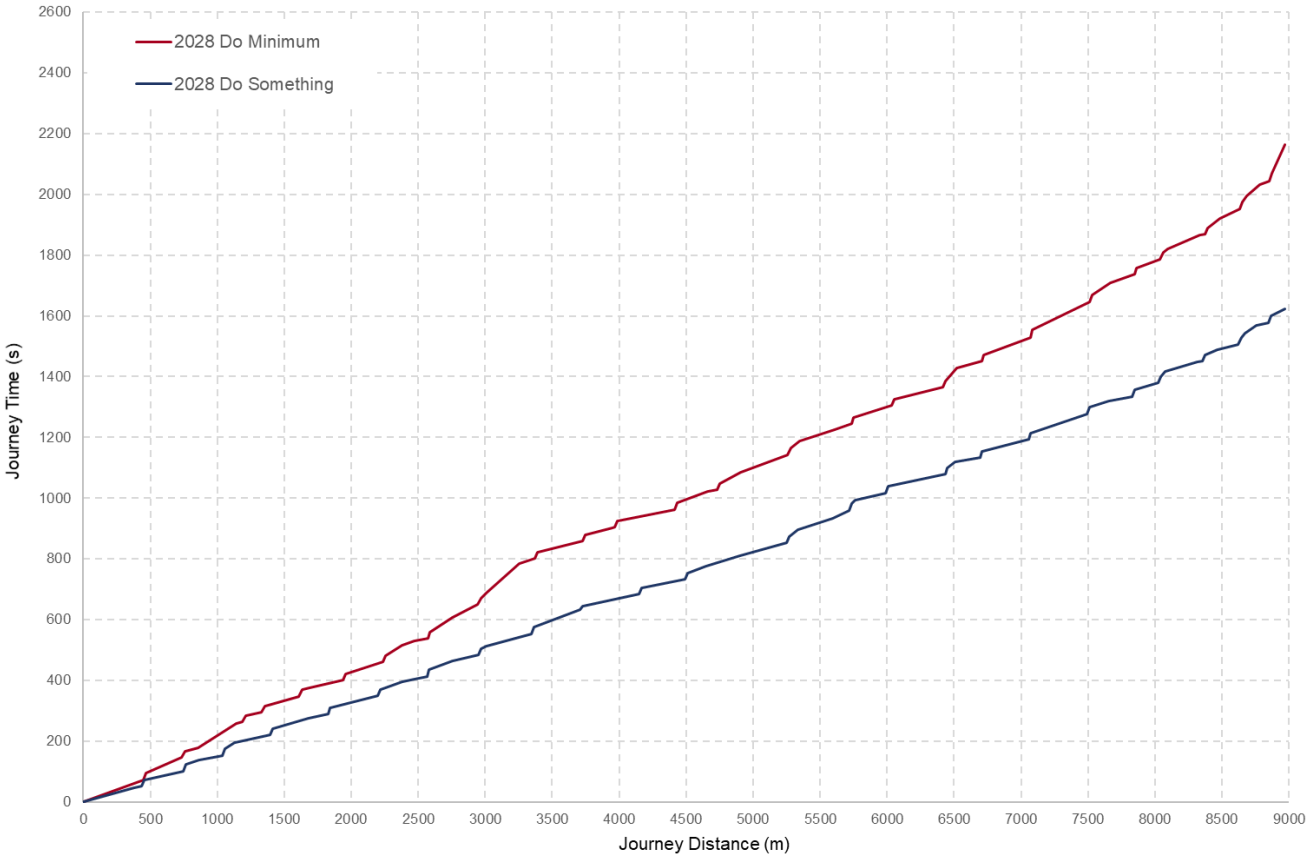

Diagram 6.15: G2 Bus Journey Time (2043 AM, Inbound)

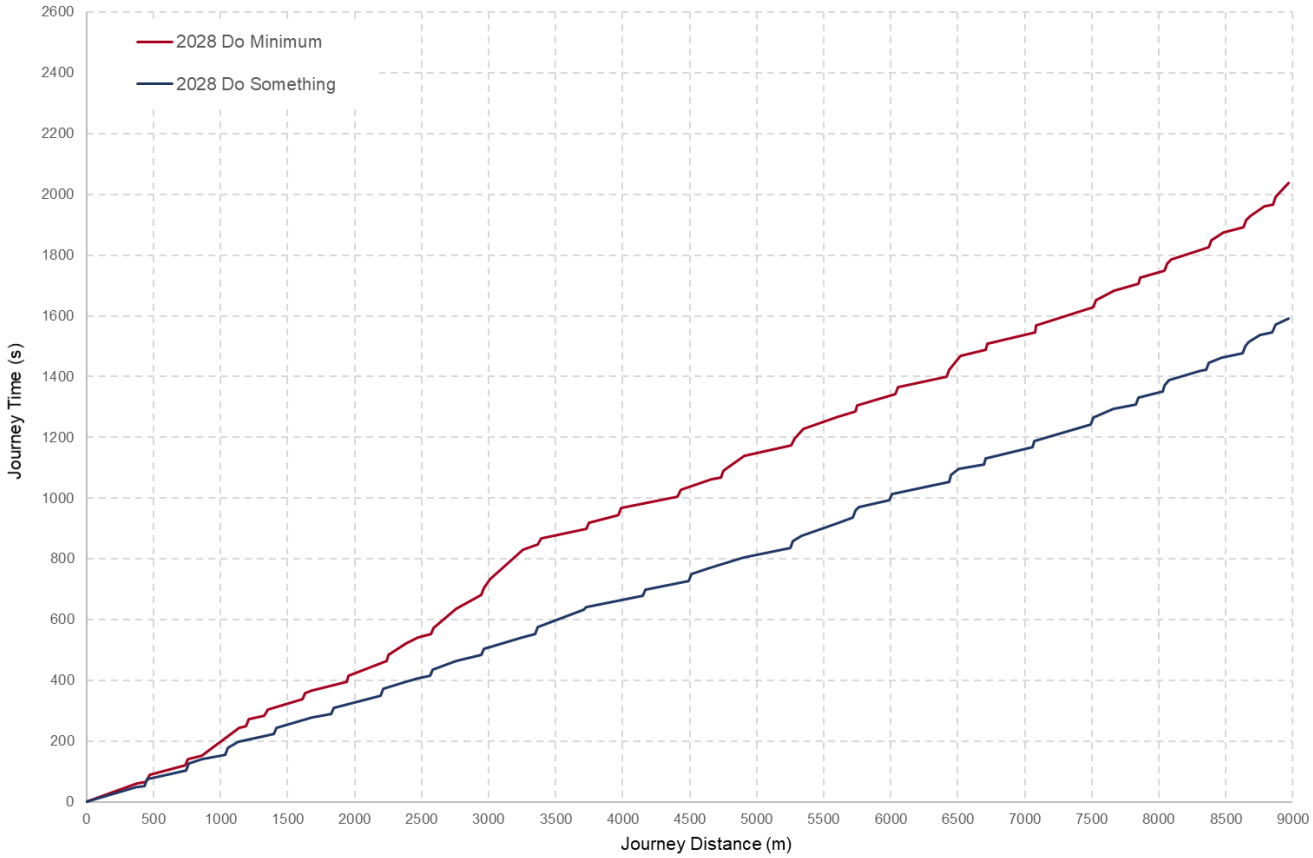

Diagram 6.16: G2 Bus Journey Time (2043 PM, Inbound)

Based on the results presented in Diagram 6.13 to Diagram 6.16, the Proposed Scheme is expected to deliver bus journey time savings on a number of critical sections. These include the length of Coldcut Road between Fonthill Road and Kennelsfort Road Upper, the section of Ballyfermot Road between Le Fanu Road and O'Hogan Road and Thomas Street / High Street between St Augustine Street and Nicolas Street. Outside of these sections, the junction improvements and bus priority 'hurry calls' modelled as part of the Proposed Scheme can be shown to create cumulative bus journey time savings over the Do Minimum.

Outbound Direction

Average journey times for the outbound G2 service in 2028 Opening Year and in 2043 Design Year can be seen in Table 6.30. A breakdown of the changes in average journey times for all other bus services using the Proposed Scheme can be found in Appendix A6.1 (TIA) – Sub Appendix 4 (Impact Assessments).

Table 6.32: G2 Service Bus Journey Times (Outbound Direction)

Peak Hour	Do Minimum (minutes)	Do Something (minutes)	Difference (minutes)	% Difference
2028 AM	29.5	26.9	-2.5	-9%
2028 PM	30.0	27.0	-3.0	-10%
2043 AM	29.9	26.9	-3.0	-10%
2043 PM	29.9	27.1	-2.9	-10%

Additional information regarding the range of journey times (minimum, maximum, average and standard deviation) for outbound G2 buses in the Do Minimum (red) and Do Something (blue) can be seen in Table 6.33 and Diagram 6.17 below. Each dot represents the journey time for each individual bus in each scenario. A larger range of journey times are an indication of lower levels of reliability.

Table 6.33: G2 Service – Range of Journey Times (Outbound Direction)

Peak Hour	Do Minimum				Do Something			
	MIN	MAX	AVG	STDEV	MIN	MAX	AVG	STDEV
2028 AM	25.2	34.3	29.5	1.7	24.5	29.3	26.9	1.0
2028 PM	25.1	35.0	30.0	1.9	24.6	29.3	27.0	1.1
2043 AM	25.8	35.4	29.9	2.1	24.1	30.5	26.9	1.2
2043 PM	26.1	36.1	29.9	2.0	23.9	30.2	27.1	1.2

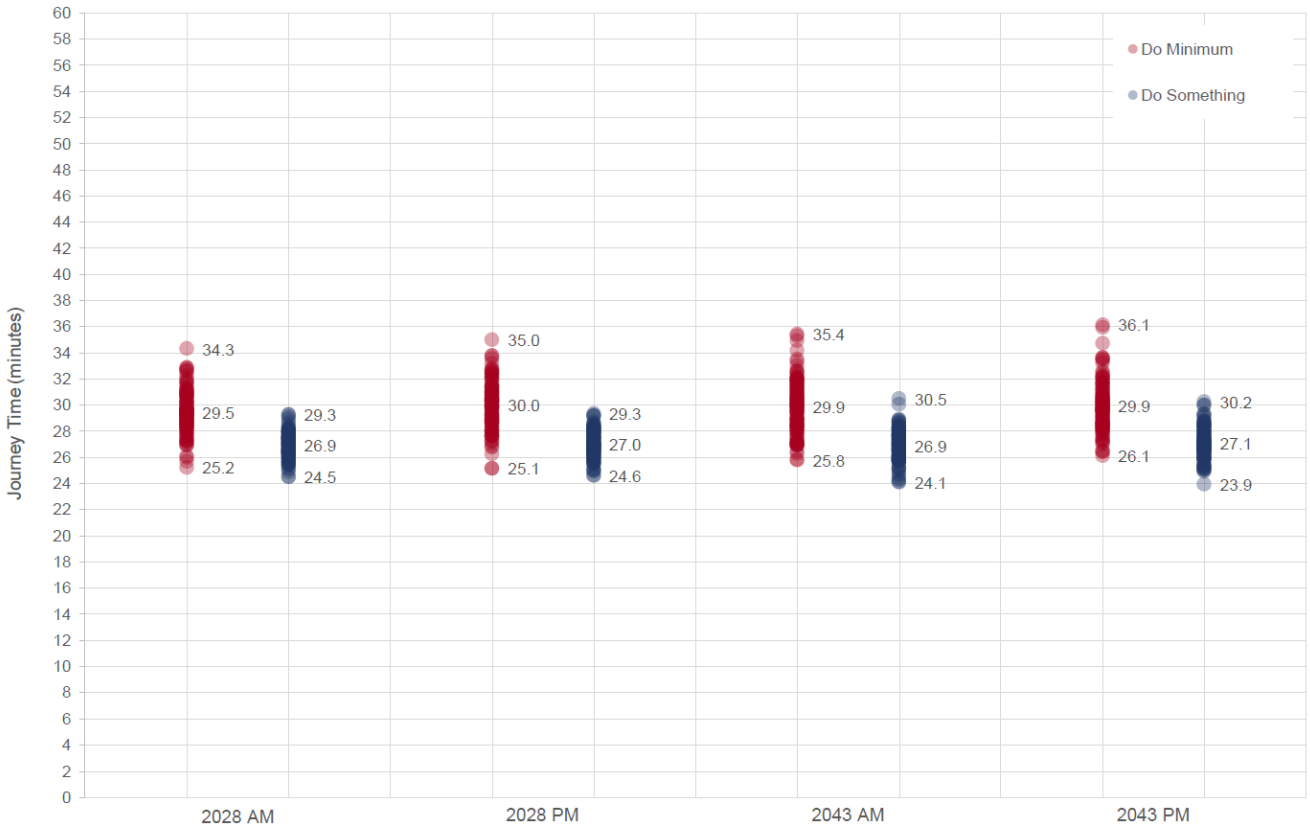

Diagram 6.17: G2 Bus Journey Times (Outbound Direction)

Based on the results presented in Table 6.30, the Proposed Scheme will deliver average outbound journey time savings for G2 service bus passengers of up to 3.0 minutes (10%) in 2028 (PM) and 3.0 minutes (10%) in 2043 (AM). Furthermore, results suggest an improvement in bus journey time reliability in all four scenarios as indicated by the reduced ranges of journey times achieved with the durations focused much closer to the average journey times (lower standard deviation) in the Do Something scenario (blue dots) with the Proposed Scheme in place compared to the more dispersed range in the Do Minimum scenario (red dots).

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

A comparison of average Do Minimum and Do Something journey times for the D2 service for the outbound direction of travel illustrated in the cumulative time-distance graphs shown in Diagram 6.18 to Diagram 6.21.

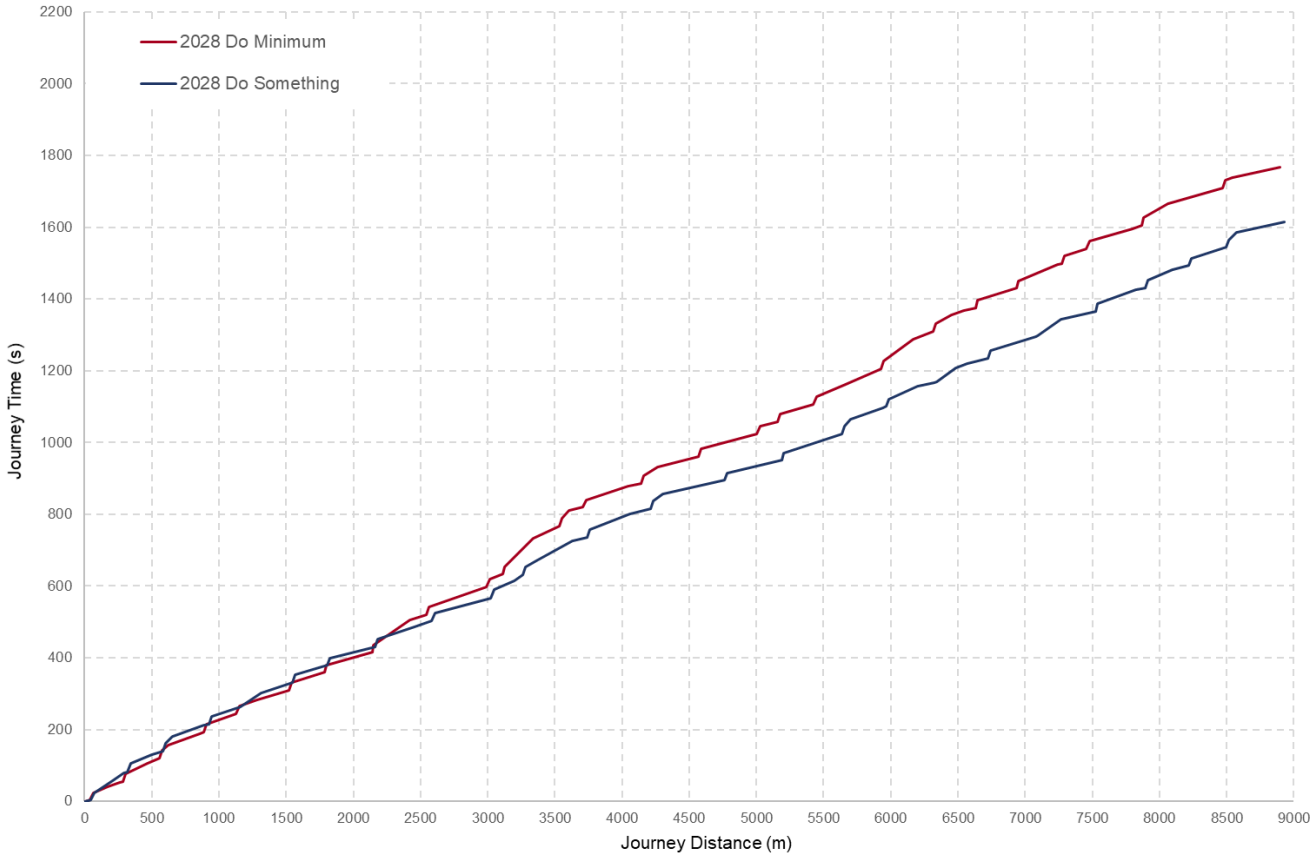

Diagram 6.18: G2 Bus Journey Time (2028 AM, Outbound)

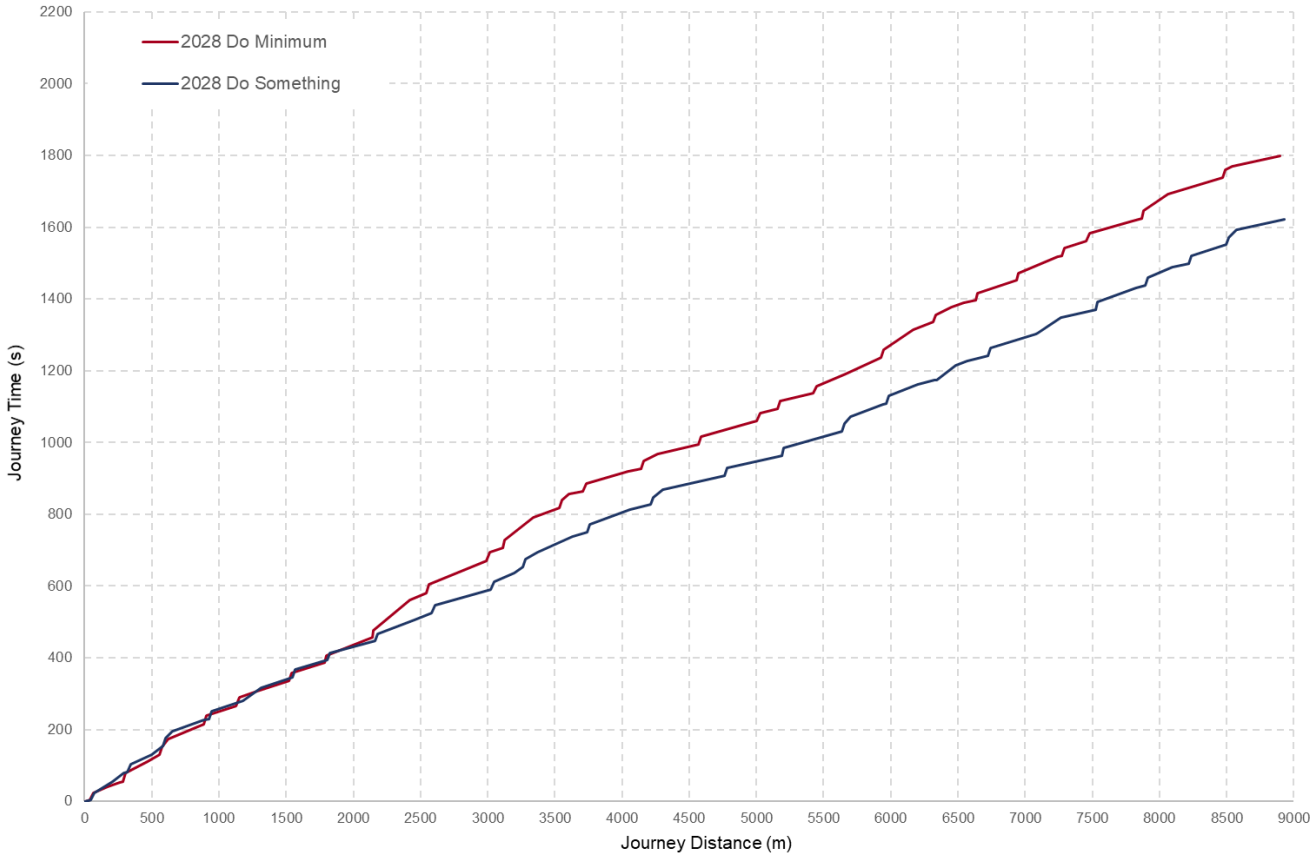

Diagram 6.19: G2 Bus Journey Time (2028 PM, Outbound)

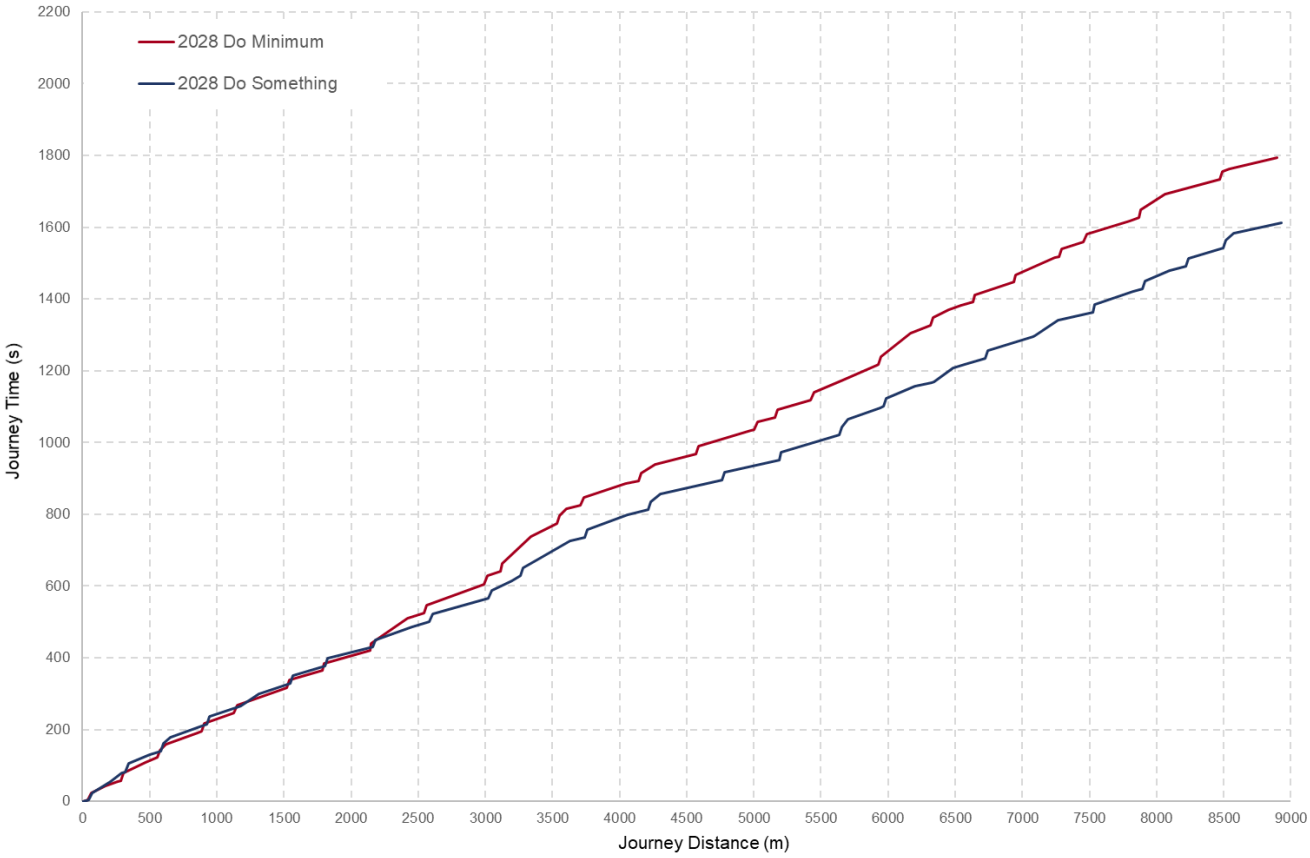

Diagram 6.20: G2 Bus Journey Time (2043 AM, Outbound)

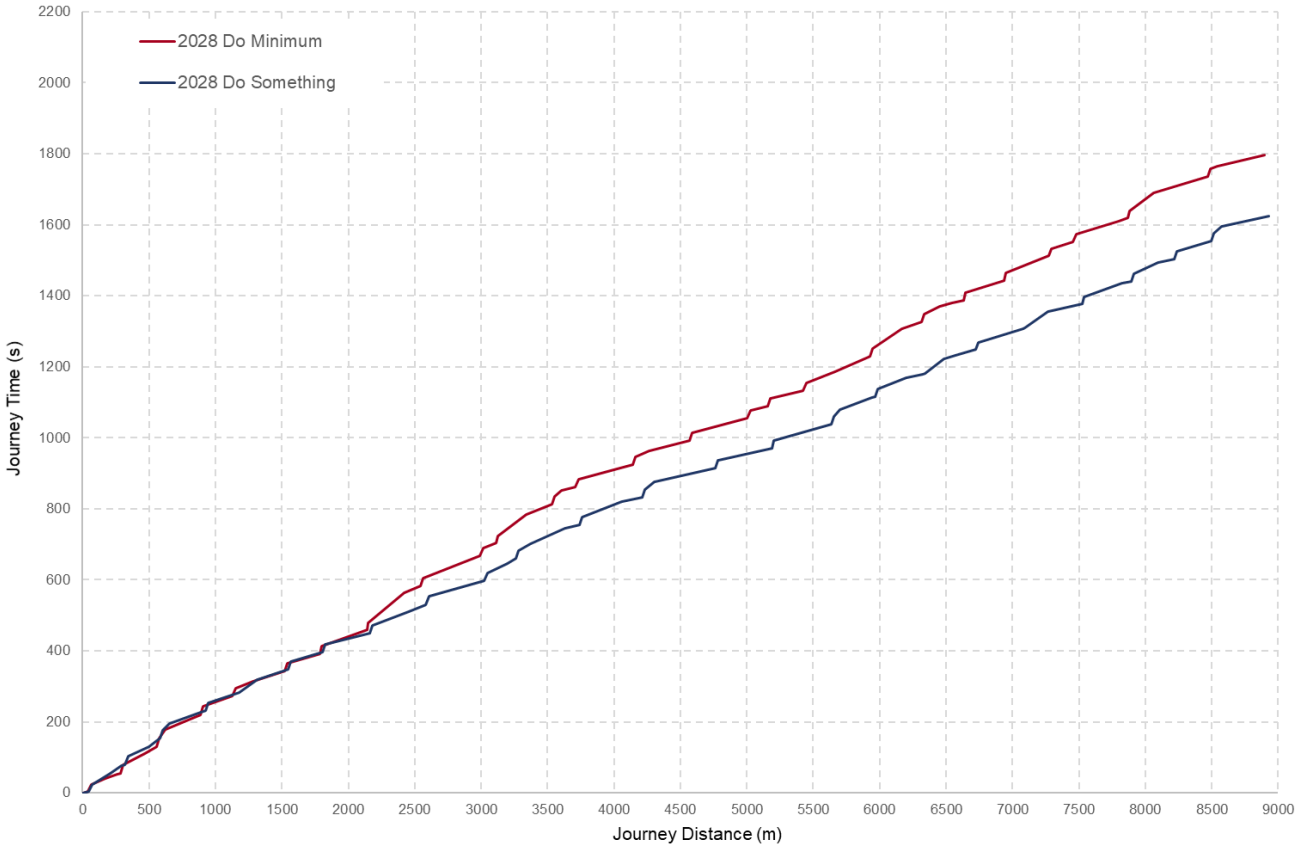

Diagram 6.21: G2 Bus Journey Time (2043 PM, Outbound)

Based on the results presented in Diagram 6.13 to Diagram 6.16, the Proposed Scheme is expected to deliver moderate bus journey time savings in the outbound direction along the Proposed Scheme. The greatest improvements can be seen between St James's Hospital and Tyconnell Road/Grattan Crescent and on the section of Ballyfermot Road between O'Hogan Road and Le Fanu Road. Outside of these sections, the bus priority 'hurry calls' modelled as part of the Proposed Scheme can be shown to create cumulative bus journey time savings over the Do Minimum.

6.5.3.1.5.3 Total Journey Time Changes for all Proposed Scheme Bus Services

The change in total bus journey time for all buses travelling along the Proposed Scheme, is shown in Table 6.34 in vehicle minutes.

Table 6.34: Total Bus Journey Time

Peak Hour	Do Minimum (vehicle.minutes)	Do Something (vehicle.minutes)	Difference (vehicle.minutes)	%Difference
2028 AM	1044.3	833.3	-211.0	-20%
2028 PM	959.7	834.7	-125.1	-13%
2043 AM	1039.7	831.3	-208.4	-20%
2043 PM	978.2	837.3	-140.9	-14%

Based on the results presented in Table 6.34, modelling shows that the Proposed Scheme will reduce total bus journey times along the Proposed Scheme by up to 20% in 2028 and 2043. Based on the AM and PM peak hours alone, this equates to **5.6 hours of savings in 2028 and 5.8 hours in 2043** combined across all buses when compared to the Do Minimum. On an annual basis this equates to approximately 4,200 hours of bus vehicle savings in 2028 and 4,400 hours in 2043, when considering weekday peak periods only.

6.5.3.1.6 Bus Users Assessment Summary

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

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

6.5.3.1.7 Increased Bus Frequency - Resilience Sensitivity Analysis

6.5.3.1.7.1 Background

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

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

6.5.3.1.7.2 Resilience Testing

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

To assess the resilience of the Proposed Scheme to cater for additional bus service frequency provision whilst maintaining a high level of bus journey time reliability, a separate analysis was undertaken in the Proposed Scheme micro-simulation model. In this analysis, the service frequency, in both directions of travel, 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 at St. James's Hospital (where the G Spine meets the O, S2, N2 services), in the 2028 Do Minimum model and in the 2028 Do Something Resilience testing models is outlined in Table 6.35 below.

Table 6.35: Resilience Testing Bus Service Frequency Scenario Testing

Scenario	Inbound (Buses per Hour)	Outbound (Buses per Hour)
Do Minimum	28	28
Do Something	28	28
Do Minimum - Additional Services Resilience Test	38	38
Do Something - Additional Services Resilience Test	38	38

Table 6.36 outlines the average AM journey times for the inbound G2 service, and the average PM journey times for the outbound G2 service in the 2028 Opening Year.

Table 6.36: G2 Service – Average Bus Journey Times

Direction	Do Minimum (minutes)	Do Minimum (Additional Services) (minutes)	% Difference	Do Something (minutes)	Do Something - Additional Services (minutes)	% Difference
2028 Inbound AM	36.5	37.7	+3.2%	27.1	27.3	+0.8%
2028 Outbound PM	30.0	30.9	+3.0%	27.0	27.3	+1.1%

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 6.22 below. The diagram displays the maximum, minimum and average journey times for each of the G2 bus services modelled.

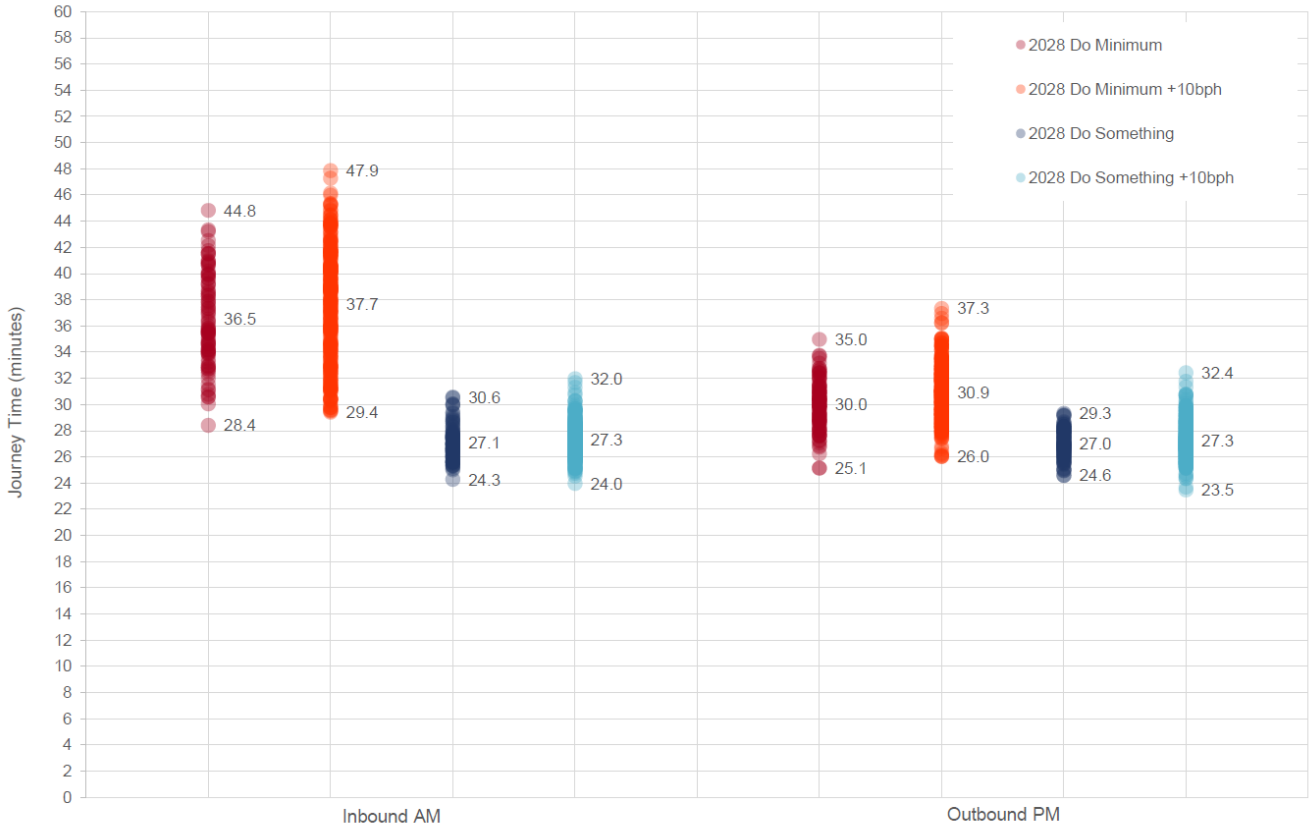

Diagram 6.22: Resilience Testing Bus Journey Time Reliability Indicators - Scenario Testing– Opening Year (2028)

As can be seen from Table 6.36 and Diagram 6.22 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 28 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 more severely impacted 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 c1.2 minutes on average per bus is experienced. ***This highlights the benefit that the Proposed Scheme infrastructure improvements can provide in protecting bus journey time reliability and consistency, as passenger demand continues to grow into the future.***

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

6.5.3.2 General Traffic Assessment

6.5.3.2.1 Overview

The Proposed Scheme aims to provide an attractive alternative to the private car and promote a modal shift away from the private car. Given the nature of the development, the Proposed Scheme will not result in additional trip generation on the surrounding road network and instead, will reduce general traffic volumes due to the projected modal shift from car to sustainable modes of transport, given the proposed implementation of improved bus, cycle and walking facilities along the direct study area.

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 increased priority for walking, cycling and bus facilities. This reduction in operational capacity for general traffic 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 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.

Refer to Appendix A6.1 (TIA) – Sub Appendix 2 (Junction Design Report) for further detail on the proposed staging arrangements and performance of the direct study area junctions along the Proposed Scheme

6.5.3.2.2 General Traffic Impact

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

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

Most 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.

It should be noted that in addition to this assessment, the Chapter 6 of the EIAR considers the significance of any impacts on the surrounding environment and a robust modelling exercise has been carried out by the Engineering Design team, in collaboration with the TIA team, to inform the design of the Proposed Scheme.

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 in Section 3 of this TIA. The full outputs of the results are available in Appendix A6.1 (TIA) – Sub 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 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 6.23 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 6.23 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 (as set out in Part II of The Roads Act 1993) 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.

6.5.3.2.3 General Traffic Flow Difference - AM Peak Hour

Diagram 6.24 illustrates the difference in traffic flows on road links during the AM Peak Hour for the 2028 Opening Year. Appendix A6.1 (TIA) – Sub Appendix 4 (Impact Assessments) provides further details on the full LAM outputs.

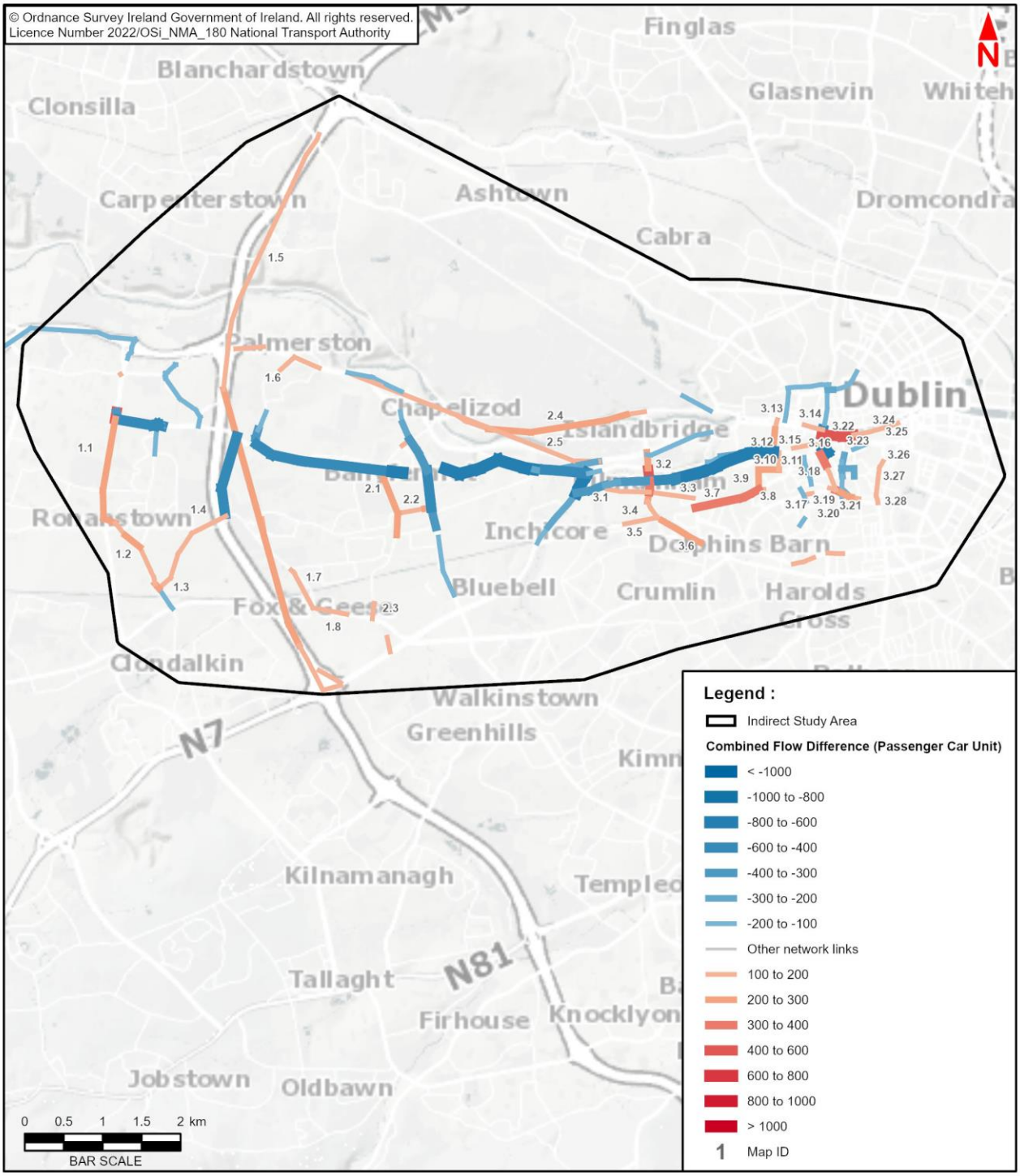

Diagram 6.24: Flow Difference on Road Links (Do Minimum vs Do Something), 2028 Opening Year - AM Peak Hour

6.5.3.2.3.1 Impact on Direct Study Area (AM Peak Hour)

Direct Reductions in General Traffic: The LAM demonstrates that during the 2028 AM Peak Hour scenario, there is a significant reduction in general traffic travelling along the main corridor as well as some adjacent road links, as illustrated by the blue links in Diagram 6.24. These blue links highlight roads and streets that experience a reduction of at least -100 combined traffic flows between the Do Minimum and Do Something scenarios.

The key reductions in traffic flows during the AM Peak Hour are outlined in Table 6.37.

Table 6.37 Road Links that Experience a Reduction of ≥ 100 Combined Flows during AM Peak Hour (Direct Study Area) (PCUs)

Section	Map I.D.	Road Name	Do Minimum Flows (PCUs)	Do Something Flows (PCUs)	Flow Difference (PCUs)
Section 1 - Liffey Valley to Le Fanu Road	S.1	Fonthill Road	544	399	-145
		R833 Coldcut Road	2000	1063	-937
		R833 Ballyfermot Road	1022	446	-576
Section 2 - Le Fanu Road to Sarsfield Road	S.2	R833 Ballyfermot Road	1080	206	-874
		R112 Kylemore Road	892	511	-382
		R833 Sarsfield Road	1238	573	-666
		Sarsfield Road	690	180	-510
Section 3 - Sarsfield Road to City Centre	S.3	R839 Inchicore Road	797	619	-178
		R839 Grattan Crescent	1287	576	-712
		R810 Emmet Road	1307	917	-390
		R810 Old Kilmainham	869	264	-606
		R810 Mount Brown	861	256	-606
		R810 James Street	1370	665	-706
		R810 Thomas Street	1474	653	-822
		R810 Cornmarket	1217	117	-1100
		R108 High Street	2148	815	-1333

As indicated in Table 6.37 demonstrate that the general traffic flow reductions along the direct study area vary between -145 and -1,333 during the AM Peak Hour of the 2028 Opening Year.

Along Section 1 of the Proposed Scheme there is a slight to very significant reduction of between -145 (Fonthill Road) and -937 (R833 Coldcut Road) in general traffic flows along the direct study area. However, along Section 2 of the Proposed Scheme there is a moderate to very significant reduction of between -382 (R112 Kylemore Road) and -874 (Ballyfermot Road) in general traffic flows along the direct study area. Whilst, along Section 3 of the Proposed Scheme there is a slight to profound reduction of between -178 (R839 Inchicore Road) and -1,333 (R108 High Street) in general traffic flows along the direct study area.

Overall, the reductions in general traffic flows along the direct study area during the AM Peak Hour of the 2028 Opening Year have been determined to have a **Medium Positive impact.**

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

6.5.3.2.3.2 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 6.38.

Table 6.38: Road Links that Experience a Reduction of ≥ 100 Combined Flows during AM Peak Hour (Indirect Study Area) (PCUs)

Section	Map I.D.	Road Name	Do Minimum Flows (PCUs)	Do Something Flows (PCUs)	Flow Difference (PCUs)
Adjacent to Section 1 - Liffey Valley to Le Fanu Road	S.1	N4	5302	5143	-159
		R113	1348	1159	-189
		Fonthill Road	1112	978	-134
		R833 Coldcut Road	1484	651	-833
		Neilstown Road	739	604	-134
		Ninth Lock Road	1514	1352	-162

Section	Map I.D.	Road Name	Do Minimum Flows (PCUs)	Do Something Flows (PCUs)	Flow Difference (PCUs)
		Cloverhill Road	1204	632	-572
		Kennelsfort Road Upper	1322	943	-379
Adjacent to Section 2 - Le Fanu Road to Sarsfield Road	S.2	R112 Kylemore Road	1408	859	-549
		R112 Lucan Road	813	674	-139
		R833 Con Colbert Road	401	172	-229
Adjacent to Section 3 - Sarsfield Road to City Centre	S.3	R810 Tyrconnell Road	1391	1164	-227
		R810 Naas Road	1494	1309	-185
		Bow Bridge	763	592	-171
		Bow Lane West	756	525	-231
		R148 St John's Road West	1525	1364	-161
		Chesterfield Avenue	830	712	-118
		R804 Blackhall Place	1495	1324	-172
		R804 Brunswick Street North	919	808	-111
		R108 Church Street Upper	1383	1240	-143
		R804 / R132 King Street North	1652	1440	-211
		R804 / R132 Bolton Street	1791	1622	-169
		R108 / R132 Church Street	1625	1431	-195
		R108 Father Mathew Bridge	2152	1685	-466
		R108 Bridge Street Lower	2587	1606	-980
		R108 Bridge Street Upper	2225	1057	-1168
		R137 Lord Edward Street	837	640	-196
		R137 Nicholas Street	658	440	-218
		Bride Road	676	468	-208
		Bride Street	954	731	-223
		R137 Patrick Street	675	468	-206
		St Patrick's Close	806	701	-105
		R137 New Street South	1130	1026	-104
		R804 Meath Street	344	168	-176
		Ardee Street	520	388	-132
		St Thomas Road	309	201	-107

As indicated in Table 6.38, the traffic reductions vary between -104 and -1,168 during the AM Peak Hour of the 2028 Opening Year.

Along Section 1 of the Proposed Scheme there is a slight to very significant reduction of between -134 (Neilstown Road) and -833 (R833 Coldcut Road) in general traffic flows along the indirect study area. However, along Section 2 of the Proposed Scheme there is a slight to significant reduction of between -139 (R112 Lucan Road) and -549 (R112 Kylemore Road) in general traffic flows along the indirect study area. Whilst, along Section 3 of the Proposed Scheme there is a slight to profound reduction of between -104 (R137 New Street South) and -1,168 (R108 Bridge Street Upper) in general traffic flows along the indirect study area.

Overall, the reductions in general traffic flows along the indirect study area during the AM Peak Hour of the 2028 Opening Year have been determined to have a **Low Positive** impact.

Indirect Increases in General Traffic: The key road links which experience additional traffic volumes are illustrated by the red links in Diagram 6.24 which indicates where an increase of at least 100 combined flows is occurring. The key increases in traffic flows along the indirect study area during the AM Peak Hour are outlined in Table 6.39.

Table 6.39: Road Links where the 100 Flow Additional Traffic Threshold is Exceeded (AM Peak Hour) (PCUs)

Section	Map I.D.	Road Name	Do Minimum Flows (PCUs)	Do Something Flows (PCUs)	Flow Difference (PCUs)
Adjacent to Section 1 – Liffey Valley to Le Fanu Road	1.1	R113 Fonthill Road North	1693	2099	406
	1.2	Ninth Lock Road	1095	1373	278
	1.3	Station Road	1118	1276	158
	1.4	Palmerston Way	1193	1364	172
	1.5	M50	6250	6459	209
	1.6	Kennelsfort Road Upper	930	1038	108
	1.7	Park West Avenue	1534	1637	103
	1.8	R134 New Nangor Road	1741	1851	110
Adjacent to Section 2 - Le Fanu Road to Sarsfield Road	2.1	Le Fanu Road	384	624	240
	2.2	Kylemore Avenue	169	406	237
	2.3	Killeen Road	1250	1373	123
	2.4	R109 Chapelizod Road	727	944	217
	2.5	R148 Chapelizod Bypass	1770	1956	186
Adjacent to Section 3 - Sarsfield Road to City Centre	3.1	Bulfin Road	539	730	190
	3.2	R111 South Circular Road	1376	1857	482
	3.3	R811 South Circular Road	1314	1437	123
	3.4	R111 Suir Road	629	830	201
	3.5	R812 Davitt Road	1268	1377	109
	3.6	R111 Dolphin Road	930	1192	262
	3.7	James's Walk	449	789	340
	3.8	Forbes Lane	339	523	184
	3.9	Grand Canal Place	559	828	269
	3.10	Bellevue	430	642	212
	3.11	Crane Street	262	365	103
	3.12	Watling Street	349	563	214
	3.13	Rory O'More Bridge	540	643	103
	3.14	R148 Arran Quay	1008	1124	116
	3.15	Oliver Bond Street	602	746	144
	3.16	Wormwood Gate	525	639	114
	3.17	R110 St Luke's Avenue	674	777	103
	3.18	Francis Street	94	475	381
	3.19	R110 The Coombe	1104	1405	301
	3.20	R110 Dean Street	1036	1343	308
	3.21	R110 Kevin Street Upper	773	987	214
	3.22	R148 Merchant's Quay	727	1136	408
	3.23	R148 Wood Quay	788	1247	459
	3.24	R148 Essex Quay	768	946	177
	3.25	R148 Wellington Quay	647	799	152
	3.26	R114 South Great George's Street	496	623	128
	3.27	R114 Aungier Street	454	612	158
	3.28	R114 Redmond Hill	909	1028	119

As presented in Table 6.39, the additional traffic on the key road links within the indirect study area varies between 103 and 482 combined flows during the AM Peak Hour of the 2028 Opening Year.

Along Section 1 of the Proposed Scheme there is a slight to significant increase of between 103 (Park West Avenue) and 406 (R113 Fonthill Road North) in general traffic flows along the indirect study area. However, along

Section 2 of the Proposed Scheme there is a slight increase of between 123 (Killeen Road) and 240 (Le Fanu Road) in general traffic flows along the indirect study area. Whilst, along Section 3 of the Proposed Scheme there is a slight to significant increase of between 103 (Rory O'More Bridge, St Luke's Avenue) and 482 (R111 South Circular Road) in general traffic flows along the indirect study area.

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.

6.5.3.2.3.3 National Roads – 5% Threshold Impact Assessment (AM Peak Hour)

On the basis of the assessment methodology specifically for national roads, whereby traffic exceeding 5% of the combined turning flows at junctions on or with national roads as a result of traffic redistribution associated with the Proposed Scheme, the junctions and associated flow difference between the Do Minimum and Do Something scenarios during the AM Peak Hour are outlined in Table 6.40.

Table 6.40: National Road Links where the 5% Additional Traffic Threshold is Exceeded (AM Peak Hour) (PCUs)

Junction	Total Do Minimum Turning Flows	Total Do Something Turning Flows	Turning Flow Difference	Percentage Difference
N4 Junction 2	9,723	9,687	-36	0%
M4 / M50 Junction 1	16,996	17,256	260	2%
M50 / N3 Junction	14,227	14,310	83	1%
M50 / N7 Junction	20,299	20,517	218	1%

The contents of Table 6.40 demonstrate that redistributed traffic from the Proposed Scheme will have a less than 5% impact on turning flows at junctions with national roads, therefore, no further assessment of the AM Peak Hour has been undertaken, aside from instances where the 100 combined flow of additional traffic threshold is exceeded, as shown in Diagram 6.23.

6.5.3.2.4 General Traffic Flow Difference – PM Peak Hour

Diagram 6.25 illustrates the difference in traffic flows on road links in the PM Peak Hour for the 2028 Opening Year. Appendix A6.1 (TIA) – Sub Appendix 4 (Impact Assessments) provides further details of the LAM outputs.

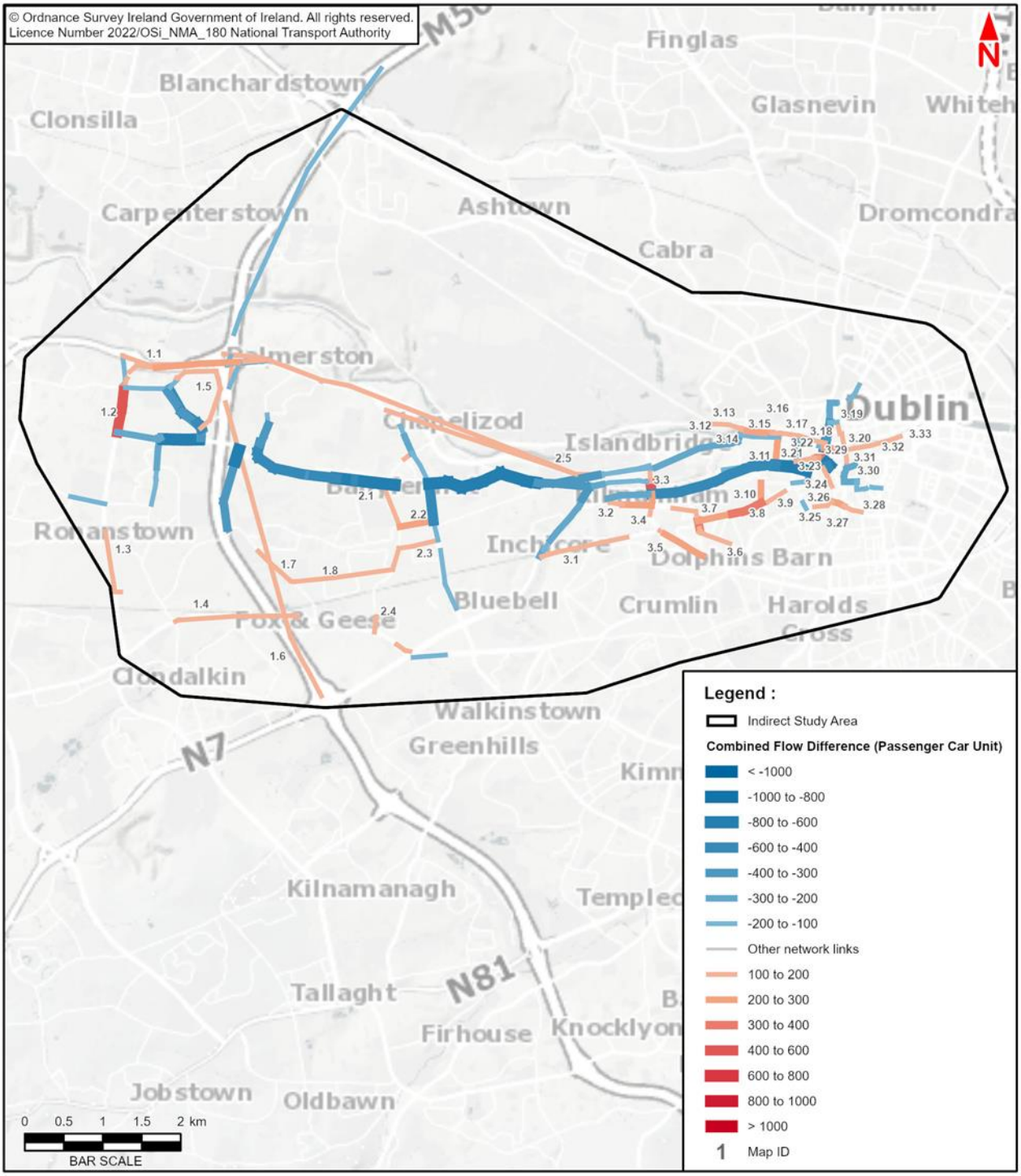

Diagram 6.25: Flow Difference on Road Links (Do Minimum vs. Do Something), PM Peak, 2028 Opening Year

6.5.3.2.4.1 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 6.25, 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 6.41.

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

Section	Map I.D.	Road Name	Do Minimum Flows (PCUs)	Do Something Flows (PCUs)	Flow Difference (PCUs)
Section 1 - Liffey Valley to Le Fanu Road	S.1	Fonthill Road	561	102	-469
		R833 Coldcut Road	2166	1155	-1011
		R833 Ballyfermot Road	1246	570	-677
Section 2 - Le Fanu Road to Sarsfield Road	S.2	R833 Ballyfermot Road	1195	147	-1048
		R112 Kylemore Road	1048	800	-249
		R833 Sarsfield Road	1159	502	-657
		Sarsfield Road	558	238	-320
Section 3 - Sarsfield Road to City Centre	S.3	R839 Inchicore Road	897	610	-286
		R839 Grattan Crescent	817	505	-312
		R810 Emmet Road	816	563	-253
		R810 Old Kilmainham	760	206	-554
		R810 Mount Brown	770	215	-555
		R810 James Street	1187	608	-578
		R810 Thomas Street	1178	313	-865
		R810 Cornmarket	1616	648	-968
		R108 High Street	1596	632	-964

As indicated in Table 6.41 the traffic flow reductions vary between -249 and -1,048 during the PM Peak Hour of the 2028 Opening Year.

Along Section 1 of the Proposed Scheme there is a significant to profound reduction of between –469 (Fonthill Road) and -1,011 (R833 Coldcut Road) in general traffic flows along the direct study area. However, along Section 2 of the Proposed Scheme there is a slight to profound reduction of between -249 (R112 Kylemore Road) and -1,048 (Ballyfermot Road) in general traffic flows along the direct study area. Whilst, along Section 3 of the Proposed Scheme there is a slight to very significant reduction of between -286 (R839 Inchicore Road) and -968 (R108 Cornmarket) in general traffic flows along the direct study area.

Overall, the reductions in general traffic flows along the direct study area during the PM Peak Hour of the 2028 Opening Year have been determined to have a **Medium Positive Impact.**

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

6.5.3.2.4.2 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. They key reductions in traffic flows along the indirect study area during the PM Peak Hour are outlined in Table 6.42.

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

Section	Map I.D.	Road Name	Do Minimum Flows (PCUs)	Do Something Flows (PCUs)	Flow Difference (PCUs)
Adjacent to Section 1 - Liffey Valley to Le Fanu Road	S.1	M50	643	487	-156
		R113	1056	911	-144
		Fonthill Road	348	59	-289
		R833 Coldcut Road	1577	959	-617
		Newlands Road	1559	1459	-100
		Neilstown Road	1333	1080	-253
		Cloverhill Road	1153	523	-631
		Kennelsfort Road Upper	1372	799	-574
Adjacent to Section 2 - Le Fanu Road to Sarsfield Road	S.2	R112 Kylemore Road	1206	803	-403
		R110 Long Mile Road	517	416	-101
		R833 Con Colbert Road	539	204	-335
Adjacent to Section 3 - Sarsfield Road to City Centre	S.3	R148 Chapelizod Bypass	1155	894	-261
		R839 Inchicore Road	264	142	-123
		R810 Tyrconnell Road	1114	879	-235
		R810 Naas Road	1389	1165	-224
		R148 St John's Road West	1090	879	-210
		R148 Victoria Quay	1900	1728	-171
		Bow Lane West	664	500	-164
		R804 Bridgefoot Street	391	275	-116
		R804 Meath Street	434	314	-119
		R804 Earl Street South	304	191	-113
		R108 Bridge Street Upper	1991	889	-1102
		R108 Bridge Street Lower	2262	1464	-798
		R148 Usher's Quay	1914	1795	-119
		R108 Father Mathew Bridge	1768	1343	-425
		R108 / R132 Church Street	1518	1204	-314
		Mary's Lane	287	180	-107
		R804 / R132 King Street North	1513	1300	-213
		R804 / R132 Bolton Street	1403	1271	-132
		R137 Christchurch Place	948	709	-240
		R137 Nicholas Street	1021	754	-267
		Bride Road	553	302	-251
		Bride Street	877	697	-181
		Golden Lane	578	474	-104
		Longford Street Little	378	263	-115
		Ardee Street	420	317	-103

As indicated in Table 6.42, the traffic reductions vary between -100 and -1,102 during the PM Peak Hour of the 2028 Opening Year.

Along Section 1 of the Proposed Scheme there is a slight to significant reduction of between -100 (Newlands Road) and -631 (Cloverhill Road) in general traffic flows along the indirect study area. However, along Section 2 of the Proposed Scheme there is a slight to significant reduction of between -101 (R110 Long Mile Road) and -403 (R112 Kylemore Road) in general traffic flows along the indirect study area. Whilst, along Section 3 of the Proposed Scheme there is a slight to profound reduction of between -103 (Ardee Street) and -1,102 (R108 Bridge Street Upper) in general traffic flows along the indirect study area.

Overall, the reductions in general traffic flows along the indirect study area during the AM Peak Hour of the 2028 Opening Year have been determined to have a **Low Positive impact.**

Increases in General Traffic Flows: The key road links which experience additional traffic volumes in the PM Peak Hour are illustrated by the red lines in Diagram 6.25. The road links and associated flow difference between the Do Minimum and Do Something scenarios during the PM Peak Hour are outlined in Table 6.43.

Table 6.43 Road Links Where Link Threshold of 100 Combined Flows is Exceeded (PM Peak Hour) (PCUs)

Section	Map I.D.	Road Name	Do Minimum Flows (PCUs)	Do Something Flows (PCUs)	Flow Difference (PCUs)
Adjacent to Section 1 – Liffey Valley to Le Fanu Road	1.1	N4	4821	5033	212
	1.2	R113 Fonthill Road North	1513	1992	479
	1.3	R113	1499	1652	153
	1.4	R134 New Nangor Road	2077	2206	130
	1.5	Fonthill Road	473	695	222
	1.6	M50	945	1097	152
	1.7	Park West Avenue	744	886	143
	1.8	Park West Road	844	1019	175
Adjacent to Section 2 - Le Fanu Road to Sarsfield Road	2.1	Le Fanu Road	589	729	141
	2.2	Kylemore Avenue	152	427	276
	2.3	Kylemore Park North	562	698	137
	2.4	Killeen Road	883	1012	129
	2.5	R148 Chapelizod Bypass	767	951	184
Adjacent to Section 3 - Sarsfield Road to City Centre	3.1	R812 Davitt Road	955	1113	158
	3.2	Bulfin Road	276	497	221
	3.3	R111 South Circular Road	1251	1731	480
	3.4	R111 Suir Road	562	691	128
	3.5	R111 Dolphin Road	1007	1239	232
	3.6	R811 South Circular Road	1356	1673	317
	3.7	James's Walk	596	908	311
	3.8	Forbes Lane	442	556	114
	3.9	R804 Marrowbone Lane	574	684	110
	3.10	Grand Canal Place	393	614	222
	3.11	Watling Street	224	480	256
	3.12	R109 Conyngham Road	1854	1982	128
	3.13	R109 Parkgate Street	1451	1559	108
	3.14	R148 Frank Sherwin Bridge	1666	1766	100
	3.15	R148 Wolfe Tone Quay	859	1082	223
	3.16	R148 Sarsfield Quay	1175	1351	176
	3.17	R149 Ellis Quay	907	1027	120
	3.18	R148 Arran Quay	907	1049	142
	3.19	Greek Street	276	459	182
	3.20	Chancery Place	341	502	161
	3.21	Oliver Bond Street	446	669	223
	3.22	Wormwood Gate	370	726	357
	3.23	St Augustine Street	81	190	109
	3.24	Francis Street	55	226	172
	3.25	R110 St Luke's Avenue	907	1027	120
	3.26	R110 The Coombe	756	857	100
	3.27	R110 Dean Street	1098	1299	201
	3.28	R110 Kevin Street Upper	1059	1262	203

Section	Map I.D.	Road Name	Do Minimum Flows (PCUs)	Do Something Flows (PCUs)	Flow Difference (PCUs)
	3.29	R148 Merchant's Quay	837	1018	180
	3.30	Winetavern Street	1600	1827	228
	3.31	R148 Wood Quay	822	983	161
	3.32	R148 Essex Quay	1625	1790	165
	3.33	R148 Wellington Quay	1434	1588	154

As outlined in Table 6.43, the additional traffic on these road links varies between 100 and 480 combined flows during the PM Peak Hour of the 2028 Opening Year.

Along Section 1 of the Proposed Scheme there is a slight to significant increase of between 130 (R134 New Nangor Road) and 479 (R113 Fonthill Road North) in general traffic flows along the indirect study area. However, along Section 2 of the Proposed Scheme there is a slight increase of between 129 (Killeen Road) and 276 (Kylemore Avenue) in general traffic flows along the indirect study area. Whilst, along Section 3 of the Proposed Scheme there is a slight to significant increase of between 100 (The Coombe, R148 Frank Sherwin Bridge) and 480 (R111 South Circular Road) in general traffic flows along the indirect study area.

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.

6.5.3.2.4.3 National Roads – 5% Threshold Impact Assessment (PM Peak Hour)

On the basis of the assessment methodology specifically for national roads, the junctions and associated flow difference between the Do Minimum and Do Something scenarios during the AM Peak Hour are outlined in Table 6.44.

Table 6.44: National Road Links where the 5% Additional Traffic Threshold is Exceeded (PM Peak Hour) (PCUs)

Junction	Total Do Minimum Turning Flows	Total Do Something Turning Flows	Turning Flow Difference	Percentage Difference
N4 Junction 2	98,30	9,778	-53	-1%
M4 / M50 Junction 1	17,165	17,195	30	0%
M50 / N3 Junction	13,657	13,694	37	0%
M50 / N7 Junction	20,248	20,299	50	0%

The contents of Table 6.44 demonstrate that redistributed traffic from the Proposed Scheme will have a less than 5% impact on turning flows at junctions with national roads, therefore, no further assessment of the national junctions in the PM Peak Hour has been undertaken.

6.5.3.2.5 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 6.45.

Table 6.45: 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 6.46 have been used to describe the impact.

Table 6.46: Magnitude of Impact for Redistributed Traffic

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

As indicated in Table 6.46, 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.

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

The contents of Table 6.47 outline the V / C ratios at the key local / regional road junctions in the AM Peak Hour for the 2028 Opening Year.

Table 6.47: Volume over Capacity Ratios at Key Junctions (Do Minimum vs. Do Something), AM Peak, 2028 Opening Year

Road Name	Road Sensitivity	Junction Name	DM Max V / C Ratio			DS Max V / C Ratio			Magnitude of Impact
			≤85%	85% - 100%	>100%	≤85%	85% - 100%	>100%	
Fonthill Road North	Low	Fonthill Road North / Saint Loman's Road	✓			✓			Negligible
Fonthill Road North	Low	Fonthill Road North / Coldcut Road	✓			✓			Negligible
Fonthill Road North	Low	Fonthill Road North / Coldcut Road		✓			✓		Negligible
Fonthill Road North	Low	Fonthill Road North / Newlands Road / Ronanstown Road		✓			✓		Negligible
Ninth Lock Road	Low	Ninth Lock Road / Fonthill Road North / Thomas Omer Way	✓			✓			Negligible
Ninth Lock Road	Medium	Ninth Lock Road / St Ronan's Avenue	✓			✓			Negligible
Ninth Lock Road	Medium	Ninth Lock Road / Neilstown Road	✓				✓		Low Negative
Ninth Lock Road	Medium	Ninth Lock Road / Clondalkin And Fonthill Station Approach	✓			✓			Negligible
Ninth Lock Road	Medium	Ninth Lock Road / Cappaghmore	✓			✓			Negligible
Ninth Lock Road	Medium	Ninth Lock Road / Station Road			✓			✓	Low Negative
Station Road	Medium	Station Road / Clondalkin Industrial Estate	✓			✓			Negligible

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%	
Station Road	Medium	Station Road / Cloverhill Road	✓			✓			Negligible
Palmerston Way	Medium	Station Road / Palmerstown Woods	✓			✓			Negligible
Palmerston Way	Medium	Cloverhill Road / Station Road / Park West Avenue	✓				✓		Low Negative
Kennelsfort Road Upper	Medium	Kennelsfort Road Upper / Palmerstown Avenue	✓			✓			Negligible
Park West Avenue	High	Park West Road / Park West Avenue	✓			✓			Negligible
New Nangor Road	Medium	Nangor Road / Riverview Business Park	✓			✓			Negligible
New Nangor Road	Medium	Nangor Road / Willow Road		✓			✓		Negligible
Le Fanu Road	Negligible	Kylemore Road / Le Fanu Road / Chapelizod Hill Road		✓		✓			Low Positive
Le Fanu Road	Medium	Colepark Drive / Le Fanu Road	✓			✓			Negligible
Le Fanu Road	High	Blackditch Road / Le Fanu Road	✓			✓			Negligible
Le Fanu Road	High	Le Fanu Road / Kylemore Avenue / Raheen Park	✓			✓			Negligible
Le Fanu Road	Medium	Killeen Road / Kylemore Park North	✓			✓			Negligible
Kylemore Avenue	High	Kylemore Avenue / Kylemore Drive	✓			✓			Negligible
Kylemore Avenue	High	Kylemore Avenue / Kylemore Road	✓			✓			Negligible
Killeen Road	Medium	Killeen Road / John F Kennedy Road	✓			✓			Negligible
Killeen Road	Medium	Nangor Road / Killeen Road	✓			✓			Negligible
Killeen Road	Medium	Killeen Road / Knockmitten Lane	✓			✓			Negligible
Killeen Road	Negligible	Naas Road / Killeen Road			✓			✓	Low Negative
Chapelizod Road	Low	Main Street / Chapelizod Road			✓			✓	Negligible
Chapelizod Road	Low	Chapelizod Road / Chapelizod Industrial Estate	✓			✓			Negligible
Chapelizod Road	Low	Chapelizod Road / Upper Glen Road	✓			✓			Negligible
Chapelizod Road	Low	Chapelizod Road / Kyber Road	✓			✓			Negligible
Chapelizod Road	Negligible	Chapelizod Road / Conyngham Road / South Circular Road			✓			✓	Low Negative
Chapelizod Bypass	Negligible	Con Colbert Road / Palmerston Bypass / Kennelsfort Road Upper			✓			✓	Low Negative
Chapelizod Bypass	Negligible	Con Colbert Road / Palmerston Bypass / The Oval / Old Lucan Road		✓			✓		Negligible
Chapelizod Bypass	Negligible	Chapelizod Bypass / Lucan Road	✓			✓			Negligible
Chapelizod Bypass	Negligible	Con Colbert Road / Chapelizod Bypass	✓			✓			Negligible
Chapelizod Bypass	Negligible	Con Colbert Road / Memorial Road			✓			✓	Low Negative
Bulfin Road	High	Bulfin Road / Bulfin Road / St Michaels Estate	✓			✓			Negligible
Bulfin Road	High	Bulfin Road / Southern Cross Avenue	✓			✓			Negligible
South Circular Road (R111)	Negligible	South Circular Road / St Johns Road West / Con Colbert Road	✓				✓		Low Negative
South Circular Road (R111)	Negligible	South Circular Road / Inchicore Road	✓			✓			Negligible
South Circular Road (R111)	Negligible	South Circular Road / Kilmainham Lane		✓			✓		Negligible
South Circular Road (R111)	Negligible	Suir Road / South Circular Road / Bulfin Road		✓			✓		Negligible
South Circular Road (R811)	Medium	South Circular Road / Rothe Abbey	✓			✓			Negligible
South Circular Road (R811)	Medium	South Circular Road / Rothe Abbey	✓			✓			Negligible

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%	
South Circular Road (R811)	Medium	South Circular Road / Brookfield Road	✓				✓		Low Negative
South Circular Road (R811)	Medium	South Circular Road / Dufferin Avenue	✓			✓			Negligible
South Circular Road (R811)	Medium	Washington Street / South Circular Road	✓			✓			Negligible
South Circular Road (R811)	Medium	South Circular Road / St Albans Road	✓			✓			Negligible
South Circular Road (R811)	Low	South Circular Road / Clanbrassil Street Lower / Clanbrassil Street Upper		✓			✓		Negligible
South Circular Road (R811)	Medium	South Circular Road / Spencer Street South / Longwood Avenue	✓			✓			Negligible
South Circular Road (R811)	Medium	South Circular Road / Emorville Avenue	✓			✓			Negligible
Suir Road	Negligible	Goldenbridge Avenue / Suir Road	✓			✓			Negligible
Suir Road	Negligible	Suir Road / O'Leary Road	✓			✓			Negligible
Davitt Road	Medium	Davitt Road / Benbulbin Road	✓			✓			Negligible
Dolphin Road	Medium	Dolphin Road / Slievenamon Road / Davitt Road	✓			✓			Negligible
Dolphin Road	Negligible	Dolphin Road / Slievenamon Road	✓			✓			Negligible
Dolphin Road	Negligible	Dolphin Road / Dolphin Road (north)	✓			✓			Negligible
Dolphin Road	Negligible	Dolphin Road / Dolphin Road (south)	✓				✓		Low Negative
Dolphin Road	Negligible	Herberton Road / Dolphin Road	✓				✓		Low Negative
James's Walk	Medium	South Circular Road / St James Walk	✓			✓			Negligible
James's Walk	High	St James's Walk / St Anthony's Road	✓			✓			Negligible
James's Walk	High	St James's Walk / Reuben Street	✓			✓			Negligible
James's Walk	High	Mallin Avenue / St James's Walk	✓			✓			Negligible
James's Walk	High	St James's Walk / Brandon Terrace	✓			✓			Negligible
Forbes Lane	High	Forbes Lane / Pim Street	✓			✓			Negligible
Forbes Lane	Medium	Forbes Lane / Marrowbone Lane	✓			✓			Negligible
Grand Canal Place	High	Pim Street / Market Street South	✓			✓			Negligible
Bellevue	High	Belview / School Street	✓				✓		Low Negative
Bellevue	High	Crane Street / Rainsford Street / Sugar House Lane	✓			✓			Negligible
Watling Street	Low	Watling Street / Island Street	✓			✓			Negligible
Rory O'More Bridge	Low	Watling Street / Victoria Quay / Usher's Island	✓				✓		Low Negative
Rory O'More Bridge	Low	Sarsfield Quay / Ellis Quay / Ellis Street	✓			✓			Negligible
Arran Quay	Low	Arran Street West / Arran Quay	✓			✓			Negligible
Arran Quay	Low	Lincoln Lane / Arran Quay	✓			✓			Negligible
Arran Quay	Low	Father Mathew Bridge / Church Street / Inns Quay / Arran Quay		✓			✓		Negligible
Oliver Bond Street	Low	Oliver Bond Street / Bridgefoot Street	✓			✓			Negligible
Oliver Bond Street	High	Oliver Bond Street / John Street West	✓			✓			Negligible
Oliver Bond Street	High	Oliver Bond Street / John Street West	✓			✓			Negligible
Wormwood Gate	High	St Augustine Street / Wormwood Gate / Oliver Bond Street	✓			✓			Negligible
Wormwood Gate	Low	Wormwood Gate / Cook Street / Bridge Street Upper / Bridge Street Lower	✓					✓	High Negative

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%	
St Luke's Avenue	Low	St Luke's Avenue / Ardee Street / Cork Street	✓			✓			Negligible
St Luke's Avenue	Low	St Luke's Avenue / Brabazon Place	✓			✓			Negligible
Francis Street	High	Francis Street / Dean Swift Square	✓			✓			Negligible
Francis Street	High	Francis Street / Swift's Alley	✓			✓			Negligible
Francis Street	High	Francis Street / Tomas Davis Street	✓			✓			Negligible
Francis Street	High	Francis Street / Garden View Court	✓			✓			Negligible
Francis Street	High	Francis Street / Carman's Hall	✓			✓			Negligible
The Coombe	Low	The Coombe / St Luke's Avenue	✓			✓			Negligible
The Coombe	Low	The Coombe / Francis Street	✓				✓		Low Negative
Dean Street	Low	The Coombe / New Row South	✓			✓			Negligible
Dean Street	Low	New Street South / Kevin Street Upper	✓			✓			Negligible
Kevin Street Upper	Low	New Street South / Kevin Street Upper	✓			✓			Negligible
Kevin Street Upper	Low	Kevin Street Upper / St Patrick's Close	✓			✓			Negligible
Kevin Street Upper	Low	New Bride Street / Kevin Street Lower	✓			✓			Negligible
Merchant's Quay	Low	Father Mathew Bridge / Merchant's Quay / Bridge Street Lower / Usher's Quay		✓		✓			Low Positive
Merchant's Quay	Medium	O'Donovan Rossa Bridge / Wood Quay / Merchant's Quay / Winetavern Street /		✓			✓		Negligible
Essex Quay	Medium	Fishamble Street / Wood Quay / Essex Quay	✓			✓			Negligible
Essex Quay	Medium	Grattan Bridge / Wellington Quay / Essex Quay / Parliament Street		✓			✓		Negligible
Wellington Quay	Medium	Wellington Quay / Eustace Street	✓			✓			Negligible
Wellington Quay	Medium	Wellington Quay / Fownes Street Lower	✓			✓			Negligible
Wellington Quay	Medium	Wellington Quay / Bedford Row / Aston Quay	✓			✓			Negligible
South Great George's Street	Medium	South Great George's Street / Fade Street	✓			✓			Negligible
South Great George's Street	Medium	South Great George's Street / Stephen Street Lower / Aungier Street / Stephen Street Upper	✓			✓			Negligible
Aungier Street	Medium	Aungier Street / Longford Street / Longford Street Little	✓			✓			Negligible
Aungier Street	Medium	Aungier Street / Whitefriar Place / York Street	✓			✓			Negligible
Aungier Street	Medium	Aungier Street / Aungier Place	✓			✓			Negligible
Aungier Street	Medium	Aungier Street / Peter Row	✓			✓			Negligible
Redmond's Hill	Medium	Digges Street Upper / Bishop Street / Aungier Street / Redmond's Hill	✓			✓			Negligible
Redmond's Hill	Low	Kevin Street Lower / Redmond's Hill / Wexford Street / Cuffe Street	✓			✓			Negligible

The results of the junction analysis illustrated in Table 6.47 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.

Capacity constraints are noted at the following junctions:

- Ninth Lock Road / Station Road (25236) – operates above 100% during both the Do Minimum and Do Something scenarios;

- Naas Road / Killeen Road (16181) – operates above 100% during both the Do Minimum and Do Something scenarios;
- Chapelizod Road / Main Street (12250) – operates above 100% during both the Do Minimum and Do Something scenarios. Although the V/C operates above 100% during both scenarios, in the Do Something scenario the V/C ratio reduces and is therefore considered to have a Negligible impact;
- Chapelizod Road / Conyngham Road / South Circular Road (12208) – operates above 100% during both the Do Minimum and Do Something scenarios;
- Chapelizod Bypass / Kennelsfort Road Lower / Kennelsfort Road Upper (22106) – operates above 100% during both the Do Minimum and Do Something scenarios;
- Chapelizod Bypass / Memorial Road (14124) – operates above 100% during both the Do Minimum and Do Something scenarios; and
- Wormwood Gate / Lower Bridge Street / Cook Street / Upper Bridge Street (6251) – operates below 85% during the Do Minimum scenario and increases to operate above 100% during the Do Something scenario.

The above demonstrates that the Proposed Scheme will have a negligible impact on the majority (95) of assessed local / regional road junctions (112) within the indirect study area. **Low Negative impacts** are experienced at 14 junctions whilst a **High Negative impact** is anticipated at one junction. A **Low Positive impact** is anticipated at two junctions.

Chapter 6 of the EIAR provided further information on the impact at these junctions, taking into account the junction sensitivity to establish the Significance of Effect.

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

The contents of Table 6.48 outline the V / C ratios at the key local / regional road junctions in the AM Peak Hour for the 2043 Design Year.

Table 6.48: Volume over Capacity Ratios at Key Junctions (Do Minimum vs. Do Something), AM Peak, 2043 DesignYear

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%	
Fonthill Road North	Low	Fonthill Road North / Saint Loman's Road	✓			✓			Negligible
Fonthill Road North	Low	Fonthill Road North / Coldcut Road	✓			✓			Negligible
Fonthill Road North	Low	Fonthill Road North / Coldcut Road		✓			✓		Negligible
Fonthill Road North	Low	Fonthill Road North / Newlands Road / Ronanstown Road			✓		✓		Low Positive
R113	Low	Ninth Lock Road / Fonthill Road North / Thomas Omer Way	✓			✓			Negligible
Ninth Lock Road	Medium	Ninth Lock Road / St Ronan's Avenue	✓			✓			Negligible
Ninth Lock Road	Medium	Ninth Lock Road / Neilstown Road		✓			✓		Negligible
Ninth Lock Road	Medium	Ninth Lock Road / Clondalkin And Fonthill Station Approach	✓			✓			Negligible
Ninth Lock Road	Medium	Ninth Lock Road / Cappaghmore	✓			✓			Negligible
Ninth Lock Road	Medium	Ninth Lock Road / Station Road			✓			✓	Low Negative
Station Road	Medium	Station Road / Clondalkin Industrial Estate	✓			✓			Negligible
Palmerston Way	Medium	Station Road / Cloverhill Road	✓			✓			Negligible
Palmerston Way	Medium	Station Road / Palmerstown Woods	✓			✓			Negligible
Palmerston Way	Medium	Cloverhill Road / Station Road / Park West Avenue	✓				✓		Low Negative

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%	
Kennelsfort Road Upper	Medium	Kennelsfort Road Upper / Palmerstown Avenue	✓			✓			Negligible
Park West Avenue	High	Park West Road / Park West Avenue	✓			✓			Negligible
New Nangor Road	Medium	Nangor Road / Riverview Business Park		✓			✓		Negligible
New Nangor Road	Medium	Nangor Road / Willow Road		✓			✓		Negligible
Le Fanu Road	Medium	Kylemore Road / Le Fanu Road / Chapelizod Hill Road		✓		✓			Low Positive
Le Fanu Road	Medium	Colepark Drive / Le Fanu Road	✓			✓			Negligible
Le Fanu Road	Medium	Blackditch Road / Le Fanu Road	✓			✓			Negligible
Kylemore Avenue	High	Le Fanu Road / Kylemore Avenue / Raheen Park	✓			✓			Negligible
Le Fanu Road	Medium	Killeen Road / Kylemore Park North	✓			✓			Negligible
Kylemore Avenue	High	Kylemore Avenue / Kylemore Drive	✓			✓			Negligible
Kylemore Avenue	High	Kylemore Avenue / Kylemore Road	✓			✓			Negligible
Killeen Road	Medium	Killeen Road / John F Kennedy Road	✓			✓			Negligible
Killeen Road	Medium	Nangor Road / Killeen Road	✓			✓			Negligible
Killeen Road	Medium	Killeen Road / Knockmitten Lane	✓			✓			Negligible
Naas Road	Negligible	Naas Road / Killeen Road			✓			✓	Low Negative
Chapelizod Road	Low	Main Street / Chapelizod Road			✓		✓		Low Positive
Chapelizod Road	Low	Chapelizod Road / Chapelizod Industrial Estate	✓			✓			Negligible
Chapelizod Road	Low	Chapelizod Road / Upper Glen Road	✓			✓			Negligible
Chapelizod Road	Low	Chapelizod Road / Kyber Road	✓			✓			Negligible
Chapelizod Road	Negligible	Chapelizod Road / Conyngham Road / South Circular Road			✓			✓	Low Negative
Chapelizod Bypass	Negligible	Con Colbert Road / Palmerston Bypass / Kennelsfort Road Upper			✓			✓	Low Negative
Chapelizod Bypass	Negligible	Con Colbert Road / Palmerston Bypass / The Oval / Old Lucan Road		✓			✓		Negligible
Chapelizod Bypass	Negligible	Chapelizod Bypass / Lucan Road	✓			✓			Negligible
Chapelizod Bypass	Negligible	Con Colbert Road / Chapelizod Bypass	✓			✓			Negligible
Chapelizod Bypass	Negligible	Con Colbert Road / Memorial Road			✓			✓	Low Negative
Bulfin Road	High	Bulfin Road / Bulfin Road / St Michaels Estate	✓			✓			Negligible
Bulfin Road	High	Bulfin Road / Southern Cross Avenue	✓			✓			Negligible
South Circular Road (R111)	Negligible	South Circular Road / St Johns Road West / Con Colbert Road	✓				✓		Low Negative
South Circular Road (R111)	Negligible	South Circular Road / Inchicore Road	✓				✓		Low Negative
South Circular Road (R111)	Negligible	South Circular Road / Kilmainham Lane		✓			✓		Negligible
South Circular Road (R111)	High	Suir Road / South Circular Road / Bulfin Road		✓			✓		Negligible
South Circular Road (R811)	Medium	South Circular Road / Rothe Abbey	✓			✓			Negligible
South Circular Road (R811)	Medium	South Circular Road / Rothe Abbey	✓			✓			Negligible

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%	
South Circular Road (R811)	Medium	South Circular Road / Brookfield Road	✓				✓		Low Negative
South Circular Road (R811)	Medium	South Circular Road / Dufferin Avenue	✓			✓			Negligible
South Circular Road (R811)	Medium	Washington Street / South Circular Road	✓			✓			Negligible
South Circular Road (R811)	Medium	South Circular Road / St Albans Road	✓			✓			Negligible
South Circular Road (R811)	Low	South Circular Road / Clanbrassil Street Lower / Clanbrassil Street Upper		✓			✓		Negligible
South Circular Road (R811)	Medium	South Circular Road / Spencer Street South / Longwood Avenue	✓			✓			Negligible
South Circular Road (R811)	Medium	South Circular Road / Emorville Avenue	✓			✓			Negligible
Suir Road	Negligible	Goldenbridge Avenue / Suir Road	✓			✓			Negligible
Suir Road	Negligible	Suir Road / O'Leary Road	✓			✓			Negligible
Davitt Road	Medium	Davitt Road / Benbulbin Road	✓			✓			Negligible
Davitt Road	Medium	Dolphin Road / Slievenamon Road / Davitt Road	✓			✓			Negligible
Dolphin Road	Negligible	Dolphin Road / Slievenamon Road	✓			✓			Negligible
Dolphin Road	Negligible	Dolphin Road / Dolphin Road (north)	✓			✓			Negligible
Dolphin Road	Negligible	Dolphin Road / Dolphin Road (south)	✓				✓		Low Negative
Dolphin Road	Negligible	Herberton Road / Dolphin Road	✓			✓			Negligible
South Circular Road (R811)	Medium	South Circular Road / St James Walk	✓			✓			Negligible
James's Walk	High	St James's Walk / St Anthony's Road	✓			✓			Negligible
James's Walk	High	St James's Walk / Reuben Street	✓			✓			Negligible
James's Walk	High	Mallin Avenue / St James's Walk	✓			✓			Negligible
James's Walk	High	St James's Walk / Brandon Terrace	✓			✓			Negligible
Forbes Lane	High	Forbes Lane / Pim Street	✓			✓			Negligible
Marrowbone Lane	Medium	Forbes Lane / Marrowbone Lane	✓			✓			Negligible
Bellevue	High	Pim Street / Market Street South	✓			✓			Negligible
Bellevue	High	Belview / School Street	✓				✓		Low Negative
Crane Street	High	Crane Street / Rainsford Street / Sugar House Lane	✓			✓			Negligible
Watling Street	Low	Watling Street / Island Street	✓			✓			Negligible
Rory O'More Bridge	Low	Watling Street / Victoria Quay / Usher's Island	✓			✓			Negligible
Rory O'More Bridge	Low	Sarsfield Quay / Ellis Quay / Ellis Street	✓			✓			Negligible
Arran Quay	Low	Arran Street West / Arran Quay	✓			✓			Negligible
Arran Quay	Low	Lincoln Lane / Arran Quay	✓			✓			Negligible
Arran Quay	Low	Father Mathew Bridge / Church Street / Inns Quay / Arran Quay		✓			✓		Negligible
Bridgefoot Street	Low	Oliver Bond Street / Bridgefoot Street	✓			✓			Negligible
Oliver Bond Street	High	Oliver Bond Street / John Street West	✓			✓			Negligible
Oliver Bond Street	High	Oliver Bond Street / John Street West	✓			✓			Negligible

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%	
Oliver Bond Street	High	St Augustine Street / Wormwood Gate / Oliver Bond Street	✓			✓			Negligible
Bridge Street Lower	Low	Wormwood Gate / Cook Street / Bridge Street Upper / Bridge Street Lower	✓					✓	High Negative
St Luke's Avenue	Low	St Luke's Avenue / Ardee Street / Cork Street	✓			✓			Negligible
St Luke's Avenue	Low	St Luke's Avenue / Brabazon Place	✓			✓			Negligible
Francis Street	High	Francis Street / Dean Swift Square	✓			✓			Negligible
Francis Street	High	Francis Street / Swift's Alley	✓			✓			Negligible
Francis Street	High	Francis Street / Tomas Davis Street	✓			✓			Negligible
Francis Street	High	Francis Street / Garden View Court	✓			✓			Negligible
Francis Street	High	Francis Street / Carman's Hall	✓			✓			Negligible
The Coombe	Low	The Coombe / St Luke's Avenue	✓			✓			Negligible
The Coombe	Low	The Coombe / Francis Street	✓				✓		Low Negative
Dean Street	Low	The Coombe / New Row South	✓			✓			Negligible
Dean Street	Low	New Street South / Kevin Street Upper	✓			✓			Negligible
Kevin Street Upper	Low	New Street South / Kevin Street Upper	✓			✓			Negligible
Kevin Street Upper	Low	Kevin Street Upper / St Patrick's Close	✓			✓			Negligible
Kevin Street Upper	Low	New Bride Street / Kevin Street Lower	✓			✓			Negligible
Bridge Street Lower	Low	Father Mathew Bridge / Merchant's Quay / Bridge Street Lower / Usher's Quay		✓		✓			Low Positive
Merchant's Quay	Medium	O'Donovan Rossa Bridge / Wood Quay / Merchant's Quay / Winetavern Street /		✓			✓		Negligible
Wood Quay	Medium	Fishamble Street / Wood Quay / Essex Quay	✓			✓			Negligible
Essex Quay	Medium	Grattan Bridge / Wellington Quay / Essex Quay / Parliament Street		✓			✓		Negligible
Wellington Quay	Medium	Wellington Quay / Eustace Street	✓			✓			Negligible
Wellington Quay	Medium	Wellington Quay / Fownes Street Lower	✓			✓			Negligible
Wellington Quay	Medium	Wellington Quay / Bedford Row / Aston Quay	✓			✓			Negligible
South Great George's Street	Medium	South Great George's Street / Fade Street	✓			✓			Negligible
Aungier Street	Medium	South Great George's Street / Stephen Street Lower / Aungier Street / Stephen Street Upper	✓			✓			Negligible
Aungier Street	Medium	Aungier Street / Longford Street / Longford Street Little	✓			✓			Negligible
Aungier Street	Medium	Aungier Street / Whitefriar Place / York Street	✓			✓			Negligible
Aungier Street	Medium	Aungier Street / Aungier Place	✓			✓			Negligible
Aungier Street	Medium	Aungier Street / Peter Row	✓			✓			Negligible
Aungier Street	Medium	Digges Street Upper / Bishop Street / Aungier Street / Redmond's Hill	✓			✓			Negligible
Kevin Street Lower	Low	Kevin Street Lower / Redmond's Hill / Wexford Street / Cuffe Street	✓			✓			Negligible

The results of the junction analysis illustrated in Table 6.48 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.

Capacity constraints are noted at the following junctions:

- Newlands Road / Fonthill Road North / Balgaddy Road (25375) – operates above 100% during the Do Minimum scenario but drops to between 85% and 100% during the Do Something scenario;
- Ninth Lock Road / Station Road (25236) – operates above 100% during both the Do Minimum and Do Something scenarios;
- Naas Road / Killeen Road (16181) – operates above 100% during both the Do Minimum and Do Something scenarios;
- Chapelizod Road / Main Street (12250) – operates above 100% during the Do Minimum scenario but drops to between 85% and 100% during the Do Something scenario;
- Chapelizod Road / Conyngham Road / South Circular Road (12208) – operates above 100% during both the Do Minimum and Do Something scenarios;
- Chapelizod Bypass / Kennelsfort Road Lower / Kennelsfort Road Upper (22106) – operates above 100% during both the Do Minimum and Do Something scenarios. Although the V/C operates above 100% during both scenarios, in the Do Something scenario the V/C ratio reduces and is therefore considered to have a Negligible impact;
- Chapelizod Bypass / Memorial Road (14124) – operates above 100% during both the Do Minimum and Do Something scenarios; and
- Wormwood Gate / Lower Bridge Street / Cook Street / Upper Bridge Street (6251) – operates below 85% during the Do Minimum scenario and increases to operate above 100% during the Do Something scenario.

The above demonstrates that the Proposed Scheme will have a negligible impact on the majority (95) of assessed local / regional road junctions (112) within the indirect study area. **Low Negative impacts** are experienced at 12 junctions whilst a **High Negative impact** is anticipated at one junction. A **Low Positive impact** is anticipated at four junctions.

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

The contents of Table 6.48 outline the V / C ratios at the key local / regional road junctions in the PM Peak Hour for the 2028 Opening Year.

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

Road Name	Road Sensitivity	Junction Name	DM Max V / C Ratio			DS Max V / C Ratio			Magnitude of Impact
			≤85%	85% - 100%	>100%	≤85%	85% - 100%	>100%	
R113	Low	Fonthill Road North / St Loman's Road	✓			✓			Negligible
Fonthill Road North	Low	Fonthill Road North / St Loman's Road			✓			✓	Negligible
Fonthill Road North	Low	Fonthill Road North / Coldcut Road		✓			✓		Negligible
R113	Low	Ninth Lock Road / Fonthill Road North / Thomas Omer Way			✓		✓		Low Positive
R113	Low	Fonthill Road North / Clondalkin And Fonthill Station Approach		✓			✓		Negligible
New Nangor Road	Medium	Nangor Road / Ninth Lock Road	✓			✓			Negligible
New Nangor Road	Medium	Nangor Road / Yellow Meadows Road			✓			✓	Low Negative
New Nangor Road	Medium	Nangor Road / Riverview Business Park	✓			✓			Negligible
New Nangor Road	Negligible	Naas Road / Nangor Road / Long Mile Road	✓			✓			Negligible
Fonthill Road	High	Fonthill Road (Liffey Valley Shopping Centre): Yellow Car Park Rbt	✓			✓			Negligible

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%	
Fonthill Road	High	Fonthill Road (Liffey Valley Shopping Centre): Yellow Car Park	✓			✓			Negligible
Fonthill Road	High	Fonthill Road (Liffey Valley Shopping Centre): Purple Car Park Rbt	✓			✓			Negligible
Fonthill Road	High	Fonthill Road (Liffey Valley Shopping Centre): Tesco Extra Rbt	✓			✓			Negligible
Park West Avenue	High	Park West Avenue / Cherry Orchard Green	✓			✓			Negligible
Park West Avenue	High	Park West Road / Park West Avenue	✓			✓			Negligible
Park West Road	High	Park West Road / Lavery Avenue	✓			✓			Negligible
Kylemore Road	Negligible	Kylemore Road / Le Fanu Road / Chapelizod Hill Road		✓		✓			Low Positive
Le Fanu Road	Medium	Colepark Drive / Le Fanu Road	✓			✓			Negligible
Le Fanu Road	Medium	Blackditch Road / Le Fanu Road	✓			✓			Negligible
Le Fanu Road	Medium	Le Fanu Road / Kylemore Avenue / Raheen Park	✓			✓			Negligible
Kylemore Avenue	High	Kylemore Avenue / Kylemore Drive	✓			✓			Negligible
Kylemore Road	High	Kylemore Avenue / Kylemore Road	✓			✓			Negligible
Kylemore Park North	High	Kylemore Park North / Kylemore Park West	✓			✓			Negligible
Kylemore Road	Negligible	Kylemore Road / Kylemore Park North	✓				✓		Low Negative
Killeen Road	Medium	Killeen Road / Kylemore Park North	✓			✓			Negligible
Killeen Road	Medium	Killeen Road / Park West Road		✓			✓		Negligible
Killeen Road	Medium	Killeen Road / John F Kennedy Road	✓			✓			Negligible
Killeen Road	Medium	Nangor Road / Killeen Road		✓			✓		Negligible
Chapelizod Bypass	Negligible	Con Colbert Road / Palmerston Bypass / Kennelsfort Road Upper			✓			✓	Negligible
Chapelizod Bypass	Negligible	Con Colbert Road / Palmerston Bypass / The Oval / Old Lucan Road			✓			✓	Low Negative
Chapelizod Bypass	Negligible	Chapelizod Bypass / Lucan Road	✓			✓			Negligible
Chapelizod Bypass	Negligible	Chapelizod Bypass / Kylemore Road	✓			✓			Negligible
Chapelizod Bypass	Negligible	Con Colbert Road / Chapelizod Bypass	✓			✓			Negligible
Chapelizod Bypass	Negligible	Con Colbert Road / Memorial Road			✓			✓	Low Negative
Davitt Road	Low	Davitt Road / Naas Road		✓				✓	Medium Negative
Davitt Road	Medium	Davitt Road / Kilworth Road	✓			✓			Negligible
Davitt Road	Medium	Davitt Road / Benbulbin Road	✓			✓			Negligible
Bulfin Road	High	Bulfin Road / Bulfin Road / St Michaels Estate	✓			✓			Negligible
Bulfin Road	High	Bulfin Road / Southern Cross Avenue	✓			✓			Negligible
South Circular Road (R111)	Negligible	South Circular Road / St Johns Road West / Con Colbert Road	✓			✓			Negligible
South Circular Road (R111)	Negligible	South Circular Road / Inchicore Road	✓			✓			Negligible
South Circular Road (R111)	Negligible	South Circular Road / Kilmainham Lane	✓				✓		Low Negative

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%	
South Circular Road (R111)	Negligible	Suir Road / South Circular Road / Bulfin Road	✓				✓		Low Negative
Suir Road	Negligible	Goldenbridge Avenue / Suir Road	✓			✓			Negligible
Dolphin Road	Negligible	Dolphin Road / Slievenamon Road / Davitt Road	✓			✓			Negligible
Dolphin Road	Negligible	Dolphin Road / Slievenamon Road	✓			✓			Negligible
Dolphin Road	Negligible	Dolphin Road / Dolphin Road (north)	✓			✓			Negligible
Dolphin Road	Negligible	Dolphin Road / Dolphin Road (south)	✓				✓		Low Negative
Dolphin Road	Negligible	Herberton Road / Dolphin Road	✓			✓			Negligible
South Circular Road (R811)	Medium	South Circular Road / Rothe Abbey	✓			✓			Negligible
South Circular Road (R811)	Medium	South Circular Road / Brookfield Road	✓			✓			Negligible
South Circular Road (R811)	Medium	South Circular Road / St James Walk	✓			✓			Negligible
South Circular Road (R811)	Medium	South Circular Road / Herberton Road / Glenmalure Park	✓				✓		Low Negative
South Circular Road (R811)	Medium	South Circular Road / Herberton Park	✓			✓			Negligible
South Circular Road (R811)	Medium	South Circular Road / St Anthony's Road	✓			✓			Negligible
South Circular Road (R811)	Medium	South Circular Road / Haroldville Avenue	✓			✓			Negligible
James's Walk	High	St James's Walk / St Anthony's Road	✓			✓			Negligible
James's Walk	High	St James's Walk / Reuben Street	✓			✓			Negligible
James's Walk	High	Mallin Avenue / St James's Walk	✓			✓			Negligible
James's Walk	High	St James's Walk / Brandon Terrace	✓			✓			Negligible
Marrowbone Lane	Medium	Forbes Lane / Marrowbone Lane	✓			✓			Negligible
Marrowbone Lane	Medium	Marrowbone Lane / Summer Street South	✓			✓			Negligible
Forbes Lane	High	Forbes Lane / Pim Street	✓			✓			Negligible
Grand Canal Place	High	Pim Street / Market Street South	✓			✓			Negligible
Watling Street	Low	Watling Street / Island Street	✓			✓			Negligible
Watling Street	Low	Watling Street / Victoria Quay / Usher's Island	✓			✓			Negligible
Conyngham Road	Negligible	Conyngham Road / Conyngham Road / Chesterfield Avenue	✓				✓		Low Negative
Conyngham Road	Negligible	Infirmary Road / Parkgate Street / Parkgate Street			✓			✓	Negligible
Parkgate Street	Low	Parkgate Street (R109) / Parkgate Street	✓			✓			Negligible
Wolfe Tone Quay	Low	Wolfe Tone Quay / Parkgate Street	✓			✓			Negligible
Wolfe Tone Quay	Low	Wolfe Tone Quay / Frank Sherwin Bridge	✓			✓			Negligible
Frank Sherwin Bridge	Low	Frank Sherwin Bridge / Victoria Quay / St Johns Road West	✓				✓		Low Negative
Wolfe Tone Quay	Low	Temple Street West / Wolfe Tone Quay	✓			✓			Negligible
Sarsfield Quay	Low	Liffey Street West / Sarsfield Quay / Wolfe Tone Quay	✓			✓			Negligible
Ellis Quay	Low	Sarsfield Quay / Ellis Quay / Ellis Street	✓			✓			Negligible

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%	
Ellis Quay	Low	Ellis Quay / Blackhall Place	✓			✓			Negligible
Ellis Quay	Low	Ellis Quay / John Street North	✓			✓			Negligible
Arran Quay	Low	Mellows Bridge / Arran Quay / Ellis Quay / Queen Street	✓			✓			Negligible
Arran Quay	Low	Arran Street West / Arran Quay	✓			✓			Negligible
Arran Quay	Low	Lincoln Lane / Arran Quay	✓			✓			Negligible
Arran Quay	Low	Father Mathew Bridge / Church Street / Inns Quay / Arran Quay	✓			✓			Negligible
Greek Street	High	Beresford Street / Marys Lane / Greek Street	✓			✓			Negligible
Chancery Place	High	Chancery Street / Chancery Place / Greek Street	✓			✓			Negligible
Chancery Place	Medium	Inns Quay / Inns Quay / O'Donovan Rossa Bridge / Chancery Place	✓			✓			Negligible
Bridgefoot Street	Low	Oliver Bond Street / Bridgefoot Street	✓			✓			Negligible
Oliver Bond Street	High	Oliver Bond Street / John Street West	✓			✓			Negligible
Oliver Bond Street	High	Oliver Bond Street / John Street West	✓			✓			Negligible
Wormwood Gate	High	St Augustine Street / Wormwood Gate / Oliver Bond Street	✓			✓			Negligible
Wormwood Gate	Low	Wormwood Gate / Cook Street / Bridge Street Upper / Bridge Street Lower	✓				✓		Low Negative
Francis Street	High	Francis Street / Dean Swift Square	✓			✓			Negligible
Francis Street	High	Francis Street / Swift's Alley	✓			✓			Negligible
Francis Street	High	Francis Street / Tomas Davis Street	✓			✓			Negligible
Francis Street	High	Francis Street / Garden View Court	✓			✓			Negligible
Francis Street	High	Francis Street / Carman's Hall	✓			✓			Negligible
St Luke's Avenue	Low	St Luke's Avenue / Brabazon Place	✓			✓			Negligible
The Coombe	Low	The Coombe / St Luke's Avenue	✓			✓			Negligible
The Coombe	Low	The Coombe / Francis Street	✓			✓			Negligible
Dean Street	Low	The Coombe / New Row South	✓			✓			Negligible
Dean Street	Low	New Street South / Kevin Street Upper	✓			✓			Negligible
Kevin Street Upper	Low	New Street South / Kevin Street Upper	✓			✓			Negligible
Kevin Street Upper	Low	Kevin Street Upper / St Patrick's Close	✓			✓			Negligible
Kevin Street Upper	Low	New Bride Street / Kevin Street Lower	✓				✓		Low Negative
Merchant's Quay	Low	Father Mathew Bridge / Merchant's Quay / Bridge Street Lower / Usher's Quay	✓				✓		Low Negative
Winetavern Street	Medium	O'Donovan Rossa Bridge / Wood Quay / Merchant's Quay / Winetavern Street /		✓			✓		Negligible
Winetavern Street	Medium	Winetavern Street / Cook Street / / Winetavern Street	✓			✓			Negligible
Winetavern Street	Low	High Street / Nicholas Street / St Michaels Hill / Christchurch Place			✓	✓			Medium Positive
Essex Quay	Medium	Fishamble Street / Wood Quay / Essex Quay	✓			✓			Negligible
Essex Quay	Medium	Grattan Bridge / Wellington Quay / Essex Quay / Parliament Street		✓			✓		Negligible

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%	
Wellington Quay	Medium	Wellington Quay / Eustace Street	✓			✓			Negligible
Wellington Quay	Medium	Wellington Quay / Fownes Street Lower	✓			✓			Negligible
Wellington Quay	Medium	Wellington Quay / Bedford Row / Aston Quay	✓			✓			Negligible

The results of the junction analysis illustrated in Table 6.48 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.

Capacity constraints are noted at the following junctions:

- St Loman's Road / Fonthill Road / Fonthill Road North (25129) – operates above 100% during both the Do Minimum and Do Something scenarios. Although the V/C operates above 100% during both scenarios, in the Do Something scenario the V/C ratio reduces and is therefore considered to have a Negligible impact;
- Thomas Omer Way / Ninth Lock Road (25235) – operates above 100% during the Do Minimum scenario but drops to between 85% and 100% during the Do Something scenario;
- New Nangor Road / Woodford Walk (25459) – operates above 100% during both the Do Minimum and Do Something scenarios;
- Chapelizod Bypass / Kennelsfort Road Lower / Kennelsfort Road Upper (22106) – operates above 100% during both the Do Minimum and Do Something scenarios. Although the V/C operates above 100% during both scenarios, in the Do Something scenario the V/C ratio reduces and is therefore considered to have a Negligible impact;
- Chapelizod Bypass / Lucan Road / The Oval (22107) – operates above 100% during both the Do Minimum and Do Something scenarios;
- Chapelizod Bypass / The Memorial (14124) – operates above 100% during both the Do Minimum and Do Something scenarios;
- Naas Road / Davitt Road (8392) – operates between 85% and 100% during the Do Minimum scenario and increases to operate above 100% during the Do Something scenario;
- Conyngham Street / Infirmary Road / Parkgate Street (3243) – operates above 100% during both the Do Minimum and Do Something scenarios; and
- High Street / Winetavern Street / Christchurch Place / Nicholas Street (6200) – operates above 100% during the Do Minimum scenario but drops to below 85% during the Do Something scenario.

The above demonstrates that the Proposed Scheme will have a negligible impact on the majority (94) of assessed local / regional road junctions (111) within the indirect study area. **Low Negative impacts** are experienced at 13 junctions whilst a **Medium Negative** is anticipated at one junction. A **Low Positive impact** is anticipated at two junctions and a **Medium Positive impact** is anticipated at one junction.

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

The contents of Table 6.50 outline the V / C ratios at the key local / regional road junctions in the PM Peak Hour for the 2043 Design Year.

Table 6.50: Volume over Capacity Ratios at Key Junctions (Do Minimum vs. Do Something), PM Peak, 2043 Design Year

Road Name	Road Sensitivity	Junction Name	DM Max V / C Ratio			DS Max V / C Ratio			Magnitude of Impact
			≤85%	85% - 100%	>100%	≤85%	85% - 100%	>100%	
R113	Low	Fonthill Road North / St Loman's Road	✓			✓			Negligible
Fonthill Road North	Low	Fonthill Road North / St Loman's Road			✓			✓	Low Negative
Fonthill Road North	Low	Fonthill Road North / Coldcut Road		✓			✓		Negligible
R113	Low	Ninth Lock Road / Fonhill Road North / Thomas Omer Way			✓		✓		Low Positive
R113	Low	Fonthill Road North / Clondalkin And Fonthill Station Approach			✓			✓	Low Negative
New Nangor Road	Medium	Nangor Road / Ninth Lock Road	✓			✓			Negligible
New Nangor Road	Medium	Nangor Road / Yellow Meadows Road			✓			✓	Negligible
New Nangor Road	Medium	Nangor Road / Riverview Business Park	✓			✓			Negligible
New Nangor Road	Negligible	Naas Road / Nangor Road / Long Mile Road	✓			✓			Negligible
Fonthill Road	High	Fonthill Road (Liffey Valley Shopping Centre): Yellow Car Park Rbt	✓			✓			Negligible
Fonthill Road	High	Fonthill Road (Liffey Valley Shopping Centre): Yellow Car Park	✓			✓			Negligible
Fonthill Road	High	Fonthill Road (Liffey Valley Shopping Centre): Purple Car Park Rbt	✓			✓			Negligible
Fonthill Road	High	Fonthill Road (Liffey Valley Shopping Centre): Tesco Extra Rbt	✓			✓			Negligible
Park West Avenue	High	Park West Avenue / Cherry Orchard Green	✓			✓			Negligible
Park West Avenue	High	Park West Road / Park West Avenue	✓			✓			Negligible
Park West Road	High	Park West Road / Lavery Avenue	✓			✓			Negligible
Kylemore Road	Negligible	Kylemore Road / Le Fanu Road / Chapelizod Hill Road		✓		✓			Low Positive
Le Fanu Road	Medium	Colepark Drive / Le Fanu Road	✓			✓			Negligible
Le Fanu Road	Medium	Blackditch Road / Le Fanu Road	✓			✓			Negligible
Le Fanu Road	Medium	Le Fanu Road / Kylemore Avenue / Raheen Park	✓			✓			Negligible
Kylemore Avenue	High	Kylemore Avenue / Kylemore Drive	✓			✓			Negligible
Kylemore Road	High	Kylemore Avenue / Kylemore Road	✓			✓			Negligible
Kylemore Park North	High	Kylemore Park North / Kylemore Park West	✓			✓			Negligible
Kylemore Road	Negligible	Kylemore Road / Kylemore Park North	✓				✓		Low Negative
Killeen Road	Medium	Killeen Road / Kylemore Park North	✓			✓			Negligible
Killeen Road	Medium	Killeen Road / Park West Road	✓				✓		Low Negative
Killeen Road	Medium	Killeen Road / John F Kennedy Road	✓			✓			Negligible
Killeen Road	Medium	Nangor Road / Killeen Road		✓			✓		Negligible
Chapelizod Bypass	Negligible	Con Colbert Road / Palmerston Bypass / Kennelsfort Road Upper			✓			✓	Negligible
Chapelizod Bypass	Negligible	Con Colbert Road / Palmerston Bypass / The Oval / Old Lucan Road			✓			✓	Low Negative
Chapelizod Bypass	Negligible	Chapelizod Bypass / Lucan Road	✓			✓			Negligible
Chapelizod Bypass	Negligible	Chapelizod Bypass / Kylemore Road	✓			✓			Negligible
Chapelizod Bypass	Negligible	Con Colbert Road / Chapelizod Bypass	✓			✓			Negligible
Chapelizod Bypass	Negligible	Con Colbert Road / Memorial Road			✓			✓	Low Negative

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%	
Davitt Road	Low	Davitt Road / Naas Road		✓			✓		Negligible
Davitt Road	Medium	Davitt Road / Kilworth Road	✓			✓			Negligible
Davitt Road	Medium	Davitt Road / Benbulbin Road	✓			✓			Negligible
Bulfin Road	High	Bulfin Road / Bulfin Road / St Michaels Estate	✓			✓			Negligible
Bulfin Road	High	Bulfin Road / Southern Cross Avenue	✓			✓			Negligible
South Circular Road (R111)	Negligible	South Circular Road / St Johns Road West / Con Colbert Road	✓			✓			Negligible
South Circular Road (R111)	Negligible	South Circular Road / Inchicore Road	✓			✓			Negligible
South Circular Road (R111)	Negligible	South Circular Road / Kilmainham Lane	✓				✓		Low Negative
South Circular Road (R111)	Negligible	Suir Road / South Circular Road / Bulfin Road	✓				✓		Low Negative
Suir Road	Negligible	Goldenbridge Avenue / Suir Road	✓			✓			Negligible
Dolphin Road	Negligible	Dolphin Road / Slievenamon Road / Davitt Road	✓			✓			Negligible
Dolphin Road	Negligible	Dolphin Road / Slievenamon Road	✓			✓			Negligible
Dolphin Road	Negligible	Dolphin Road / Dolphin Road (north)	✓			✓			Negligible
Dolphin Road	Negligible	Dolphin Road / Dolphin Road (south)	✓			✓			Negligible
Dolphin Road	Negligible	Herberton Road / Dolphin Road	✓			✓			Negligible
South Circular Road (R811)	High	South Circular Road / Rothe Abbey	✓			✓			Negligible
South Circular Road (R811)	Medium	South Circular Road / Brookfield Road	✓			✓			Negligible
South Circular Road (R811)	Medium	South Circular Road / St James Walk	✓			✓			Negligible
South Circular Road (R811)	Medium	South Circular Road / Herberton Road / Glenmalure Park	✓				✓		Low Negative
South Circular Road (R811)	Medium	South Circular Road / Herberton Park	✓			✓			Negligible
South Circular Road (R811)	Medium	South Circular Road / St Anthony's Road	✓			✓			Negligible
South Circular Road (R811)	Medium	South Circular Road / Haroldville Avenue	✓			✓			Negligible
James's Walk	High	St James's Walk / St Anthony's Road	✓			✓			Negligible
James's Walk	High	St James's Walk / Reuben Street	✓			✓			Negligible
James's Walk	High	Mallin Avenue / St James's Walk	✓			✓			Negligible
James's Walk	High	St James's Walk / Brandon Terrace	✓			✓			Negligible
Marrowbone Lane	Medium	Forbes Lane / Marrowbone Lane	✓			✓			Negligible
Marrowbone Lane	Medium	Marrowbone Lane / Summer Street South	✓			✓			Negligible
Forbes Lane	High	Forbes Lane / Pim Street	✓			✓			Negligible
Grand Canal Place	High	Pim Street / Market Street South	✓			✓			Negligible
Watling Street	Low	Watling Street / Island Street	✓			✓			Negligible
Watling Street	Low	Watling Street / Victoria Quay / Usher's Island	✓			✓			Negligible
Conyngham Road	Negligible	Conyngham Road / Conyngham Road / Chesterfield Avenue	✓			✓			Negligible

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%	
Conyngham Road	Negligible	Infirmary Road / Parkgate Street / Parkgate Street			✓		✓		Low Positive
Parkgate Street	Low	Parkgate Street (R109) / Parkgate Street	✓			✓			Negligible
Wolfe Tone Quay	Low	Wolfe Tone Quay / Parkgate Street	✓			✓			Negligible
Wolfe Tone Quay	Low	Wolfe Tone Quay / Frank Sherwin Bridge	✓			✓			Negligible
Frank Sherwin Bridge	Low	Frank Sherwin Bridge / Victoria Quay / St Johns Road West	✓				✓		Low Negative
Wolfe Tone Quay	Low	Temple Street West / Wolfe Tone Quay	✓			✓			Negligible
Sarsfield Quay	Low	Liffey Street West / Sarsfield Quay / Wolfe Tone Quay	✓			✓			Negligible
Ellis Quay	Low	Sarsfield Quay / Ellis Quay / Ellis Street	✓			✓			Negligible
Ellis Quay	Low	Ellis Quay / Blackhall Place	✓			✓			Negligible
Ellis Quay	Low	Ellis Quay / John Street North	✓			✓			Negligible
Arran Quay	Low	Mellows Bridge / Arran Quay / Ellis Quay / Queen Street	✓			✓			Negligible
Arran Quay	Low	Arran Street West / Arran Quay	✓			✓			Negligible
Arran Quay	Low	Lincoln Lane / Arran Quay	✓			✓			Negligible
Arran Quay	Low	Father Mathew Bridge / Church Street / Inns Quay / Arran Quay	✓				✓		Low Negative
Greek Street	High	Beresford Street / Marys Lane / Greek Street	✓			✓			Negligible
Chancery Place	High	Chancery Street / Chancery Place / Greek Street	✓			✓			Negligible
Chancery Place	High	Inns Quay / Inns Quay / O'Donovan Rossa Bridge / Chancery Place	✓			✓			Negligible
Bridgefoot Street	Low	Oliver Bond Street / Bridgefoot Street	✓			✓			Negligible
Oliver Bond Street	High	Oliver Bond Street / John Street West	✓			✓			Negligible
Oliver Bond Street	High	Oliver Bond Street / John Street West	✓			✓			Negligible
Wormwood Gate	High	St Augustine Street / Wormwood Gate / Oliver Bond Street	✓			✓			Negligible
Wormwood Gate	Low	Wormwood Gate / Cook Street / Bridge Street Upper / Bridge Street Lower	✓				✓		Low Negative
Francis Street	High	Francis Street / Dean Swift Square	✓			✓			Negligible
Francis Street	High	Francis Street / Swift's Alley	✓			✓			Negligible
Francis Street	High	Francis Street / Tomas Davis Street	✓			✓			Negligible
Francis Street	High	Francis Street / Garden View Court	✓			✓			Negligible
Francis Street	High	Francis Street / Carman's Hall	✓			✓			Negligible
St Luke's Avenue	Low	St Luke's Avenue / Brabazon Place	✓			✓			Negligible
The Coombe	Low	The Coombe / St Luke's Avenue	✓			✓			Negligible
The Coombe	Low	The Coombe / Francis Street	✓			✓			Negligible
Dean Street	Low	The Coombe / New Row South	✓			✓			Negligible
Dean Street	Low	New Street South / Kevin Street Upper	✓			✓			Negligible
Kevin Street Upper	Low	New Street South / Kevin Street Upper	✓			✓			Negligible
Kevin Street Upper	Low	Kevin Street Upper / St Patrick's Close	✓			✓			Negligible
Kevin Street Upper	Low	New Bride Street / Kevin Street Lower	✓			✓			Negligible
Merchant's Quay	Low	Father Mathew Bridge / Merchant's Quay / Bridge Street Lower / Usher's Quay	✓				✓		Low Negative

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%	
Winetavern Street	Medium	O'Donovan Rossa Bridge / Wood Quay / Merchant's Quay / Winetavern Street /		✓			✓		Negligible
Winetavern Street	Medium	Winetavern Street / Cook Street / / Winetavern Street	✓			✓			Negligible
Winetavern Street	Medium	High Street / Nicholas Street / St Michaels Hill / Christchurch Place			✓	✓			Medium Positive
Essex Quay	Medium	Fishamble Street / Wood Quay / Essex Quay	✓			✓			Negligible
Essex Quay	Medium	Grattan Bridge / Wellington Quay / Essex Quay / Parliament Street		✓			✓		Negligible
Wellington Quay	Medium	Wellington Quay / Eustace Street	✓			✓			Negligible
Wellington Quay	Medium	Wellington Quay / Fownes Street Lower	✓			✓			Negligible
Wellington Quay	Medium	Wellington Quay / Bedford Row / Aston Quay	✓			✓			Negligible

The results of the junction analysis illustrated in Table 6.50 demonstrate that the majority of junctions continue to operate with a maximum V / C ratio of below 85% during the PM Peak Hour in the 2043 Design Year and the Proposed Scheme.

It is noted that capacity issues arise at the following junctions:

- St Loman's Road / Fonthill Road / Fonthill Road North (25129) – operates above 100% during both the Do Minimum and Do Something scenarios;
- Thomas Omer Way / Ninth Lock Road (25235) – operates above 100% during the Do Minimum scenario but drops to between 85% and 100% during the Do Something scenario;
- R113 Roundabout (25220) – operates above 100% during both the Do Minimum and Do Something scenarios;
- New Nangor Road / Woodford Walk (25459) – operates above 100% during both the Do Minimum and Do Something scenarios;
- Chapelizod Bypass / Kennelsfort Road Lower / Kennelsfort Road Upper (22106) – operates above 100% during both the Do Minimum and Do Something scenarios. Although the V/C operates above 100% during both scenarios, in the Do Something scenario the V/C ratio marginally reduces and is therefore considered to have a Negligible impact;
- Chapelizod Bypass / Lucan Road / The Oval (22107) – operates above 100% during both the Do Minimum and Do Something scenarios;
- Chapelizod Bypass / The Memorial (14124) – operates above 100% during both the Do Minimum and Do Something scenarios;
- Conyngham Street / Infirmary Road / Parkgate Street (3243) – operates above 100% during the Do Minimum scenario but drops to between 85% and 100% during the Do Something scenario; and
- High Street / Winetavern Street / Christchurch Place / Nicholas Street (6200) – operates above 100% during the Do Minimum scenario but drops to below 85% during the Do Something scenario.

The above demonstrates that the Proposed Scheme will have a negligible impact on the majority (94) of assessed local / regional road junctions (111) within the indirect study area. **Low Negative impacts** are experienced at 13 junctions. A **Low Positive impact** is anticipated at three junctions and a **Medium Positive impact** is anticipated at one junction.

6.5.3.2.6 Night-time Traffic Redistribution

The night-time period is defined as between 23:00 and 07:00. An analysis of traffic data during this period indicates that traffic levels are considerably lower and that junctions have a higher capacity for vehicular movement due to less pedestrian, cycling and bus demand requirements leading to higher level of general traffic green time allocation per typical signal cycle. 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.

6.5.3.2.7 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;
- **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**: R113 Fonthill Road North, Ninth Lock Road, Station Road, Palmerston Way, M50, Kennelsfort Road Upper, Park West Avenue, R134 New Nangor Road, Le Fanu Road, Kylemore Avenue, Killeen Road, R109 Chapelizod Road, R148 Chapelizod Bypass, Bulfin Road, R111 South Circular Road, R811 South Circular Road, R111 Suir Road, R812 Davitt Road, R111 Dolphin Road, James's Walk, Forbes Lane, Grand Canal Place, Bellevue, Crane Street, Watling Street, Rory O'More Bridge, R148 Arran Quay, Oliver Bond Street, Wormwood Gate, R110 St Luke's Avenue, Francis Street, R110 The Coombe, R110 Dean Street, R110 Kevin Street Upper, R148 Merchant's Quay, R148 Wood Quay, R148 Essex Quay, R148 Wellington Quay, R114 South Great George's Street, R114 Aungier Street, R114 Redmond Hill; and
- **PM Peak Hour:** N4, R113 Fonthill Road North, R113, R134 New Nangor Road, Fonthill Road, M50, Park West Avenue, Park West Road, Le Fanu Road, Kylemore Avenue, Kylemore Park North, Killeen Road, R148 Chapelizod Bypass, R812 Davitt Road, Bulfin Road, R111 South Circular Road, R111 Suir Road, R111 Dolphin Road, R811 South Circular Road, James's Walk, Forbes Lane, R804 Marrowbone Lane, Grand Canal Place, Watling Street, R109 Conyngham Road, R109 Parkgate Street, R148 Frank Sherwin Bridge, R148 Wolfe Tone Quay, R148 Sarsfield Quay, R149 Ellis Quay, R148 Arran Quay, Greek Street, Chancery Place, Oliver Bond Street, Wormwood Gate, St Augustine Street, Francis Street, R110 St Luke's Avenue, R110 The Coombe, R110 Dean Street, R110 Kevin Street Upper, R148 Merchant's Quay, Winetavern Street, R148 Wood Quay, R148 Essex Quay, R148 Wellington Quay.

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.

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 impact is deemed to be negligible.

Capacity constraints arise at the following junctions during the AM Peak Hours and PM Peak Hours in the 2028 Opening Year and / or the 2043 Design Year:

- Ninth Lock Road / Station Road (25236)
- Naas Road / Killeen Road (16181)
- Chapelizod Road / Main Street (12250)
- Chapelizod Road / Conyngham Road / South Circular Road (12208)
- Chapelizod Bypass / Kennelsfort Road Lower / Kennelsfort Road Upper (22106)
- Chapelizod Bypass / Memorial Road (14124)
- Wormwood Gate / Lower Bridge Street / Cook Street / Upper Bridge Street (6251)
- St Loman's Road / Fonthill Road / Fonthill Road North (25129);
- New Nangor Road / Woodford Walk (25459)
- Chapelizod Bypass / Lucan Road / The Oval (22107)
- Naas Road / Davitt Road (8392)
- Conyngham Street / Infirmary Road / Parkgate Street (3243)
- R113 Roundabout (25220)

The majority of these junctions operate with a maximum V / C ratio of above 100% in both the Do Minimum and Do Something, therefore, the impact is considered to be **Low Negative**. This level of congestion is acceptable according to national guidance. Section 3.4.2 of DMURS (2019) recognises that a certain level of traffic congestion is an inevitable feature within urban networks and that junctions may have to operate at saturation levels for short periods of time during the Peak Hours of the day. Chapter 1 of the Smarter Travel Policy Document also acknowledges that it is not feasible or sustainable to accommodate continued demand for car use. It should therefore be considered that the traffic congestion that is outlined in the impact assessment is acceptable with regard to the urban location of the area in the context of the increased movement of people overall and on sustainable modes in particular.

Overall, 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.

6.5.3.2.8 Network-Wide Performance Indicators

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.

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 6.51 outline the impact that the Proposed Scheme will have on the wider transport network, beyond the defined study areas.

Table 6.51: 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)	18,720	19,030	1.63%	Low Negative
	Over Capacity Queues (pcu.hrs)	5,095	5,107	0.23%	
	Total Travel Times (pcu.hrs)	62,090	62,410	0.51%	
	Total Travel Distance (pcu.kms)	2,022,000	2,021,000	-0.05%	
	Average Network Speed (km / h)	32.57	32.38	-0.59%	
2028 Opening Year PM Peak Hour	Transient Queues (pcu.hrs)	18,020	18,190	0.93%	Low Negative
	Over Capacity Queues (pcu.hrs)	4,694	4,856	3.34%	
	Total Travel Times (pcu.hrs)	59,050	59,160	0.19%	
	Total Travel Distance (pcu.kms)	1,941,000	1,927,000	-0.73%	
	Average Network Speed (km / h)	32.87	32.57	-0.92%	
2043 Opening Year AM Peak Hour	Transient Queues (pcu.hrs)	18,070	18,410	1.85%	Low Negative
	Over Capacity Queues (pcu.hrs)	5,271	5,254	-0.32%	
	Total Travel Times (pcu.hrs)	61,610	61,910	0.48%	
	Total Travel Distance (pcu.kms)	2,057,000	2,054,000	-0.15%	
	Average Network Speed (km / h)	33.39	33.18	-0.63%	
2043 Opening Year PM Peak Hour	Transient Queues (pcu.hrs)	17,490	17,770	1.58%	Low Negative
	Over Capacity Queues (pcu.hrs)	4,392	4,493	2.25%	
	Total Travel Times (pcu.hrs)	58,030	58,250	0.38%	
	Total Travel Distance (pcu.kms)	1,944,000	1,932,000	-0.62%	
	Average Network Speed (km / h)	33.50	33.18	-0.96%	

The results of the assessment demonstrate that the impacts to the network wide performance indicators range between -1% and 3%, therefore a **Low Negative impact** is anticipated**.**

6.5.4 Operational Phase Summary

The contents of Table 6.52 present a summary of the predicted impacts of the Proposed Scheme during the Operational Phase.

Table 6.52: Summary of Predicted Operational Phase Impacts

Assessment Topic	Effect	Predicted Impact
Pedestrian Infrastructure	Improvements to the quality of the pedestrian infrastructure along the Proposed Scheme.	Medium Positive
Cycling Infrastructure	Improvements to the quality of the cycling infrastructure along the Proposed Scheme.	High Positive
Bus Infrastructure	Improvements to the quality of the bus infrastructure along the Proposed Scheme.	Medium Positive
Parking and Loading	A total loss of 188 parking / loading spaces along the Proposed Scheme.	Low Negative
People Movement	Increases to the total number of people travelling through the Proposed Scheme.	High Positive
Bus Network Performance Indicators	Improvements to the network performance indicators for bus users along the Proposed Scheme.	Medium Positive
General Traffic Network Performance Indicators	Reduction in general traffic flows along the Proposed Scheme.	Medium 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 6.52, the Proposed Scheme will deliver strong 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.

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

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

7. Cumulative Assessment

7.1 Construction Stage Cumulative Effects

The assessment of cumulative effects associated with the construction stage of the Proposed Scheme is contained within Chapter 21 of the EIAR.

7.2 Operational Stage Cumulative Impacts

7.2.1 Introduction

This chapter also reports the assessment of cumulative effects associated with operational stage 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, 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 2016-2035 (GDA Strategy), with a partial implementation by 2028, in line with (National Development Plan (NDP) 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 2035;
- 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.

7.2.3 Transport Demand

Cumulative transport demand 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 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 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 6.3.2, 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 Strategy proposals, there are no specific demand management measures included in the Do Minimum reference case (receiving environment) scenario in the 2028 Opening year, other than constraining parking availability in Dublin at existing levels. For the design year, 2043 scenario, a proxy for a suite of demand management measures is included in the Do Minimum in line with the target to achieve a maximum 45% car driver commuter mode share target, across the GDA, as outlined in the Strategy.

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[1] by mode from the NTA ERM have been analysed. Diagram 7.1 below 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.

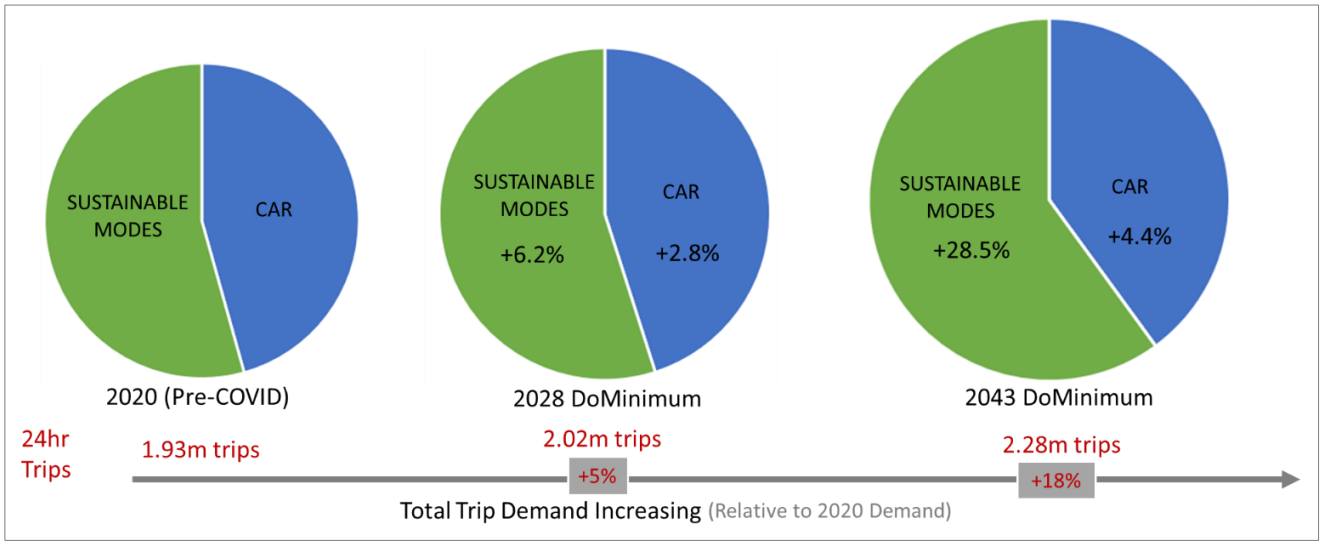

Diagram 7.1: Trip Demand Changes without the Proposed Schemes (in Relation to 2020 Demand)

As shown above, there are 1.93m trips[2] over a 24hr period within 500m of the Proposed Schemes. Total trip demand increases to 2.02m trips (5% increase) in 2028 and to 2.81m trips (+19% increase) in 2043.

[1] 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 Scheme, and which could reasonably be exposed to cumulative effects in combination with other developments

[2] 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 18% increase in total trip demand (above 2020 levels) will be made up of a 28.5% increase in sustainable modes demand (PT, walk, cycle) and a 4.4% increase in private car demand, over 2020 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, however, car traffic levels will still increase over current / 2020 traffic levels.

The overall share of Sustainable modes trips on the network will increase from 57% in 2020, to 58% in 2028 and to 62% 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 below).

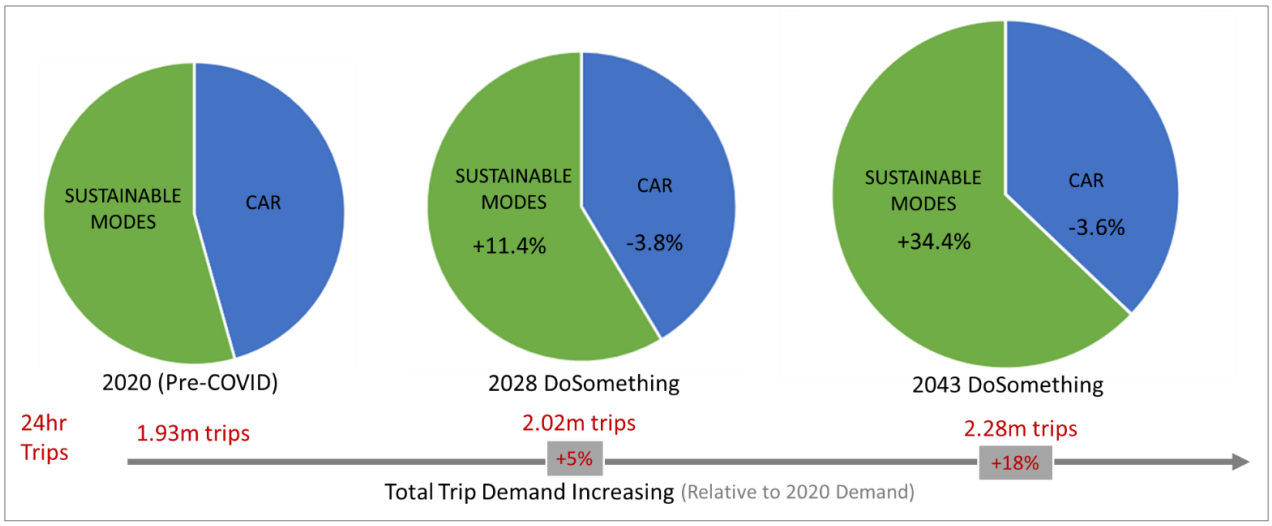

Diagram 7.2: Trip Demand Changes with the Proposed Schemes (in Relation to 2020 Demand)

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 18% increase in total trip demand (above 2020 levels) will be made up of a 33.4% increase in sustainable modes demand (PT, walk, cycle) and a 3.6% 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 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 57% in 2020, to 61% in 2028 and to 65% 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[3] 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 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 Scheme 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[4] 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.

[3] 500m recommended maximum walking distance to Core Bus Corridors - "Buses In Urban Development", CIHT 2018

[4] 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

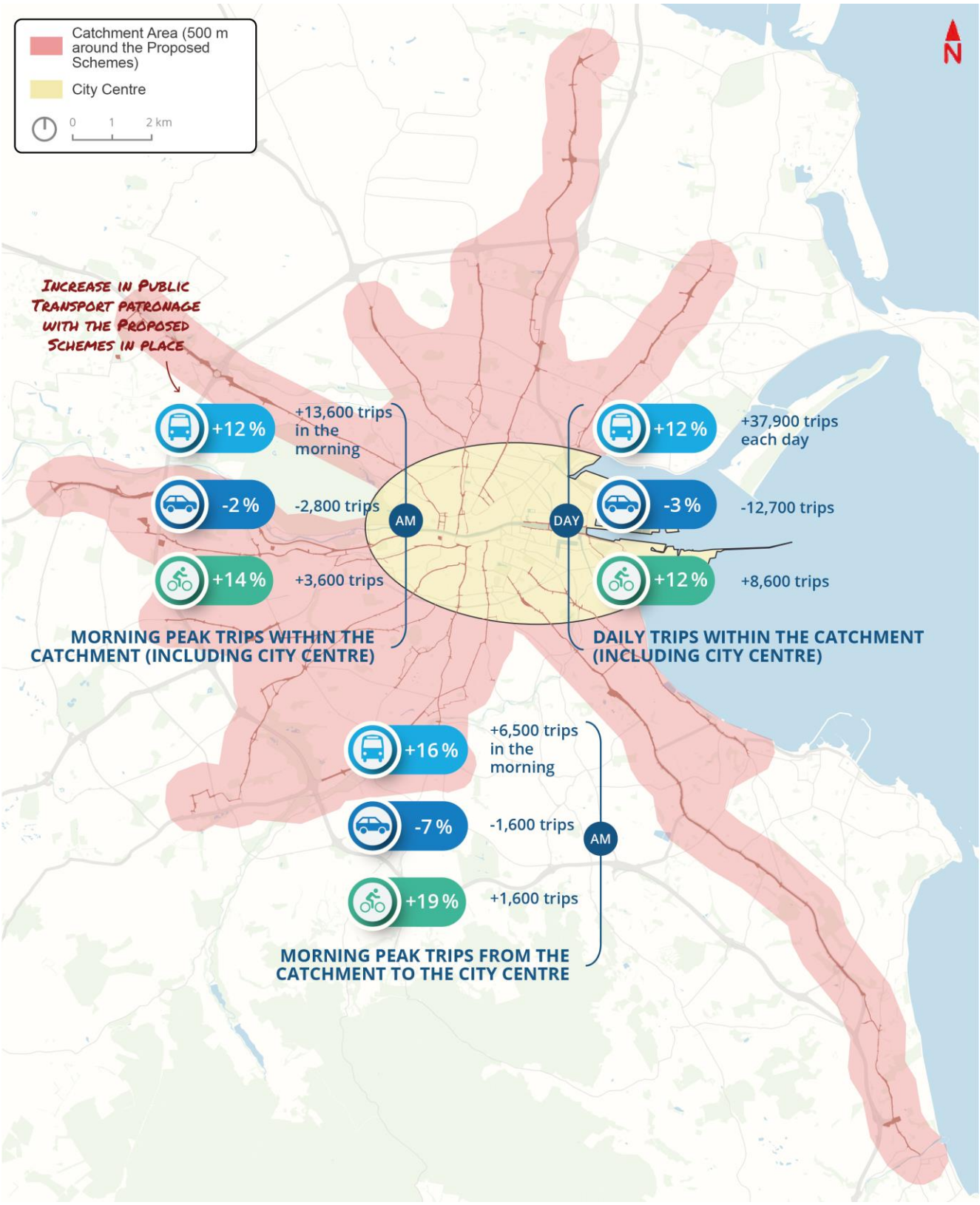

Diagram 7.3: Change in Trips by Mode Within a 500m Catchment Area of the Proposed Schemes and the City Centre and Trips Originating from the Catchment Inbound to the City Centre in 2028

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 and a 12% increase in public transport, 3% decrease in general traffic and a 12% increase in cycling trips each day (07:00-19:00).

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

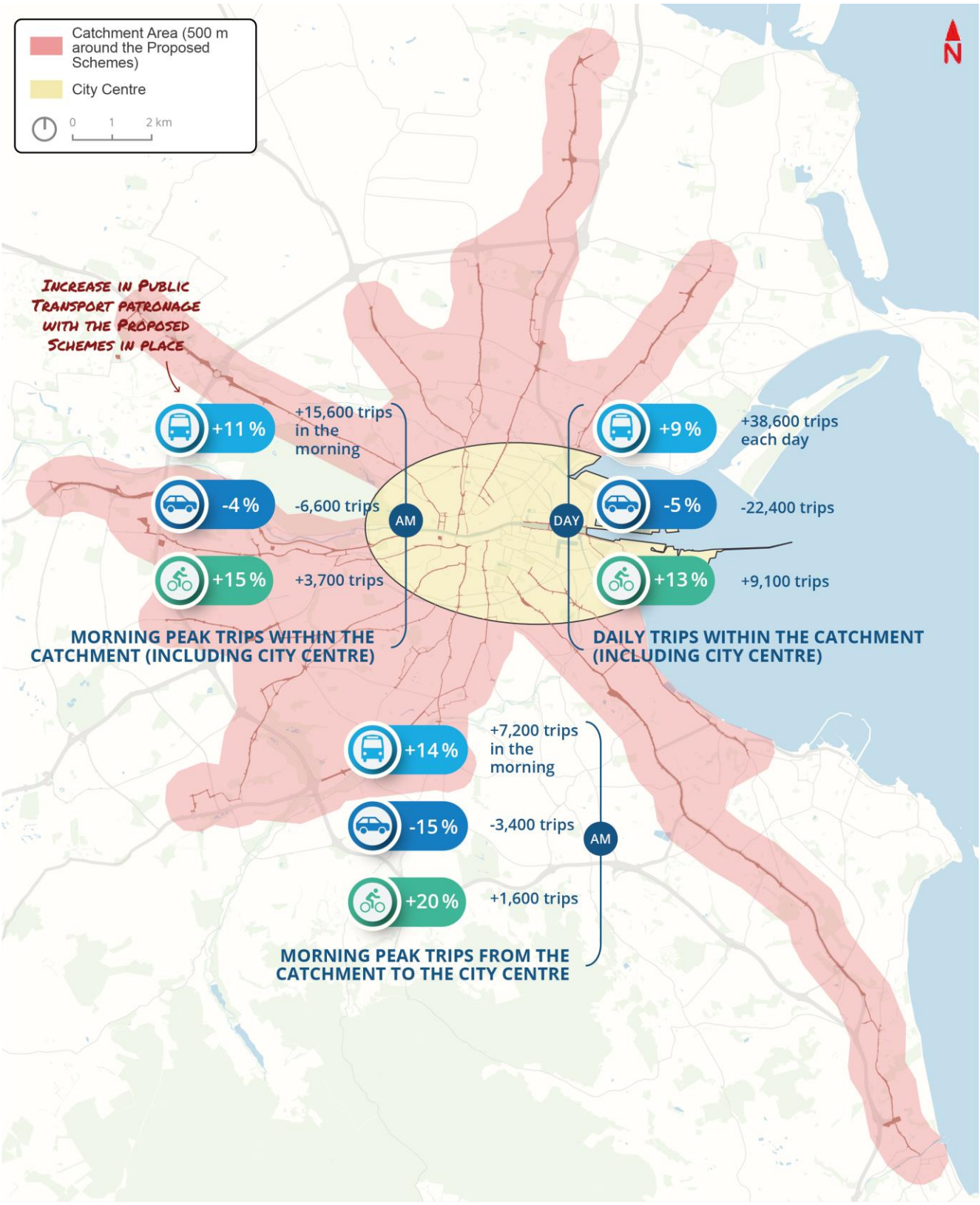

Diagram 7.4: Change in Trips by Mode Within a 500m Catchment Area of the Proposed Schemes and the City Centre and Trips Originating from the Catchment Inbound to the City Centre in 2043

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 11% increase in public transport trips, 4% decrease in general traffic trips (i.e.

motorists) and a 15% increase in cycling trips in the morning peak period and a 9% increase in public transport, 5% decrease in general traffic and a 13% 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 14% increase in public transport trips, 15% decrease in general traffic trips (i.e., motorists) and a 20% 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	144,880	29.4%	160,480	31.7%	15,600	10.8%
		General Traffic	156,670	31.8%	150,070	29.7%	-6,600	-4.2%
		Cycling	25,670	5.2%	29,410	5.8%	3,740	14.6%
		Walking	165,820	33.6%	165,890	32.8%	70	0.0%
		Total	493,040	100%	505,850	100%	12,810	2.6%
Within Catchment Area and City Centre	Daily (07:00-19:00)	Public Transport	444,900	29.4%	483,530	31.4%	38,630	8.7%
		General Traffic	473,200	31.3%	450,780	29.3%	-22,420	-4.7%
		Cycling	71,350	4.7%	80,400	5.2%	9,050	12.7%
		Walking	523,910	34.6%	526,400	34.2%	2,490	0.5%
		Total	1,513,360	100%	1,541,110	100%	27,750	1.8%

As shown in Table 7.3, it is expected that there will be an approximate 3% (12,800) 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 50,000 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 31.7%, a decrease in general traffic share from 31.8% to 29.7% and an increase in cycling from 5.2% to 5.8%. 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 29.4% to 31.4%, a decrease in general traffic from 31.3% to 29.3% and an increase in cyclists from 4.7% to 5.2%.

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	51,700	55.1%	58,880	59.8%	7,180	13.9%
		General Traffic	22,930	24.4%	19,490	19.8%	-3,440	-15.0%
		Cycling	7,940	8.5%	9,510	9.7%	1,570	19.8%
		Walking	11,240	12.0%	10,660	10.8%	-580	-5.2%
		Total	93,810	100%	98,540	100%	4,730	5.0%

As shown in Table 7.4, the modelling indicates that there will be an approximate 5% 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 55.1% to 59.8%, a decrease in general traffic mode share from 24.4% to 19.8% and an increase in the cycling mode share from 8.5% to 9.7%.

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.

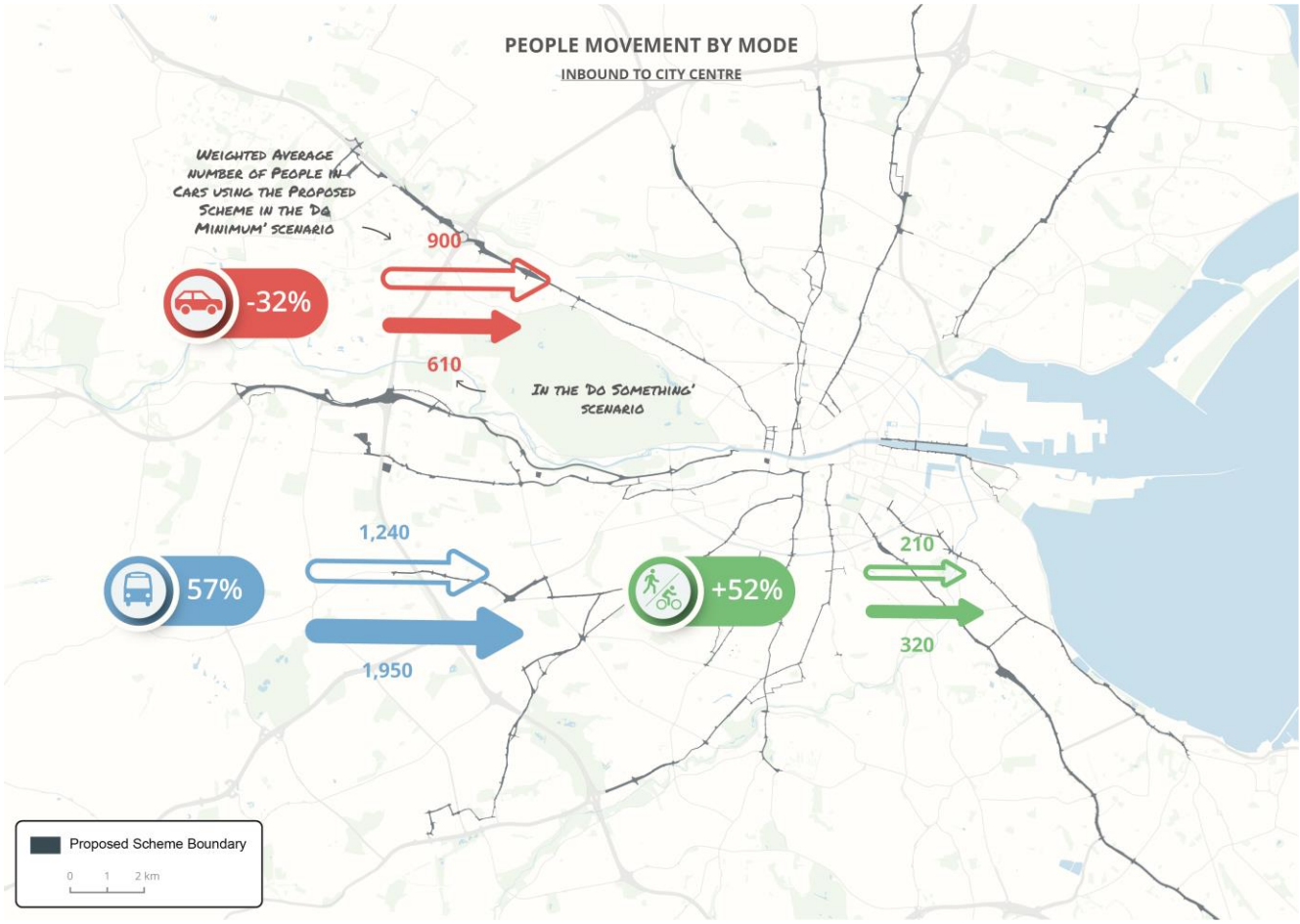

Diagram 7.5: People Movement by Mode During 2028 AM Peak Hour

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%
		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.

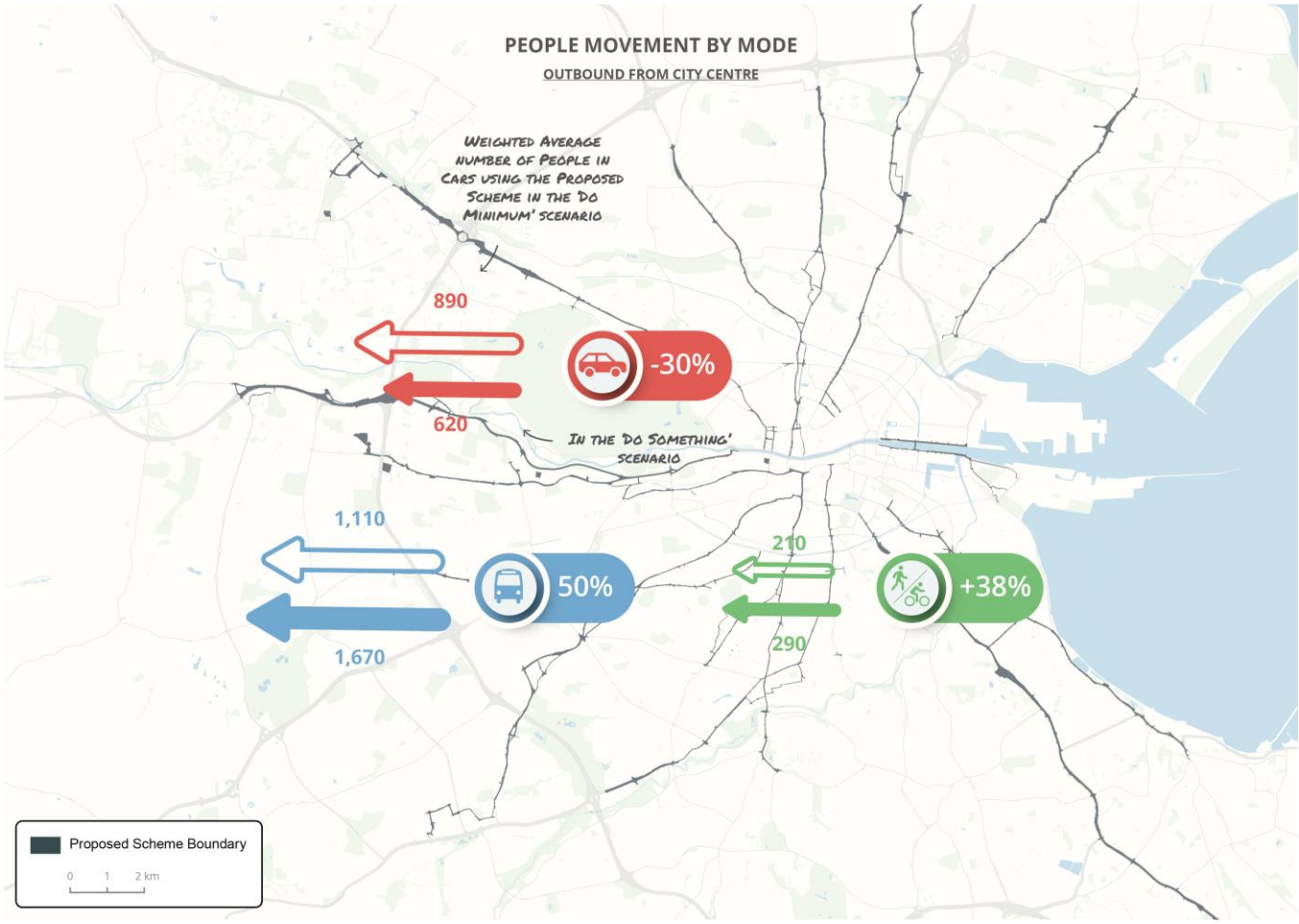

Diagram 7.6: People Movement by Mode During 2028 PM Peak Hour

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**	**60%**	**2,580**	**76%**	**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.

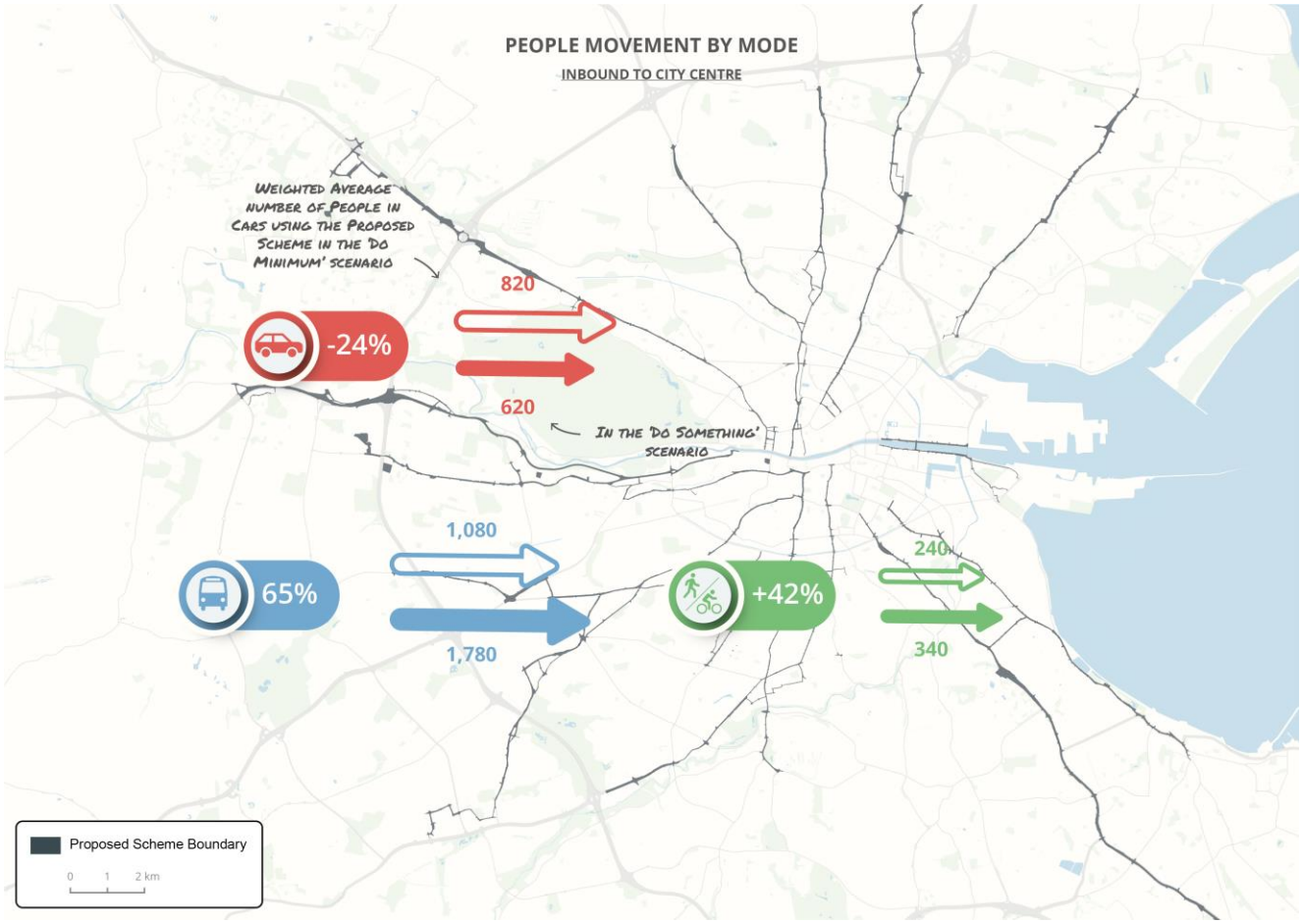

Diagram 7.7: People Movement by Mode during 2043 AM Peak Hour

As indicated in Diagram 7.7, on average across all Proposed Schemes, there is a predicted decrease of 24% in the number of people travelling via car, an increase of 65% in the number of people travelling via bus and an increase of 42% 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 28% increase in total people moved as a result of the Proposed Schemes and 61% 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	820	38%	620	23%	-200	-24%
		Public Transport	1,080	50%	1,780	65%	700	65%
		Walking	170	8%	160	6%	-10	-6%
		Cycling	70	3%	180	7%	110	157%
		Sustainable Modes Total	**1,320**	**62%**	**2,120**	**77%**	**800**	**61%**
		Total (All modes)	**2,140**	**100%**	**2,740**	**100%**	**600**	**28%**

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.

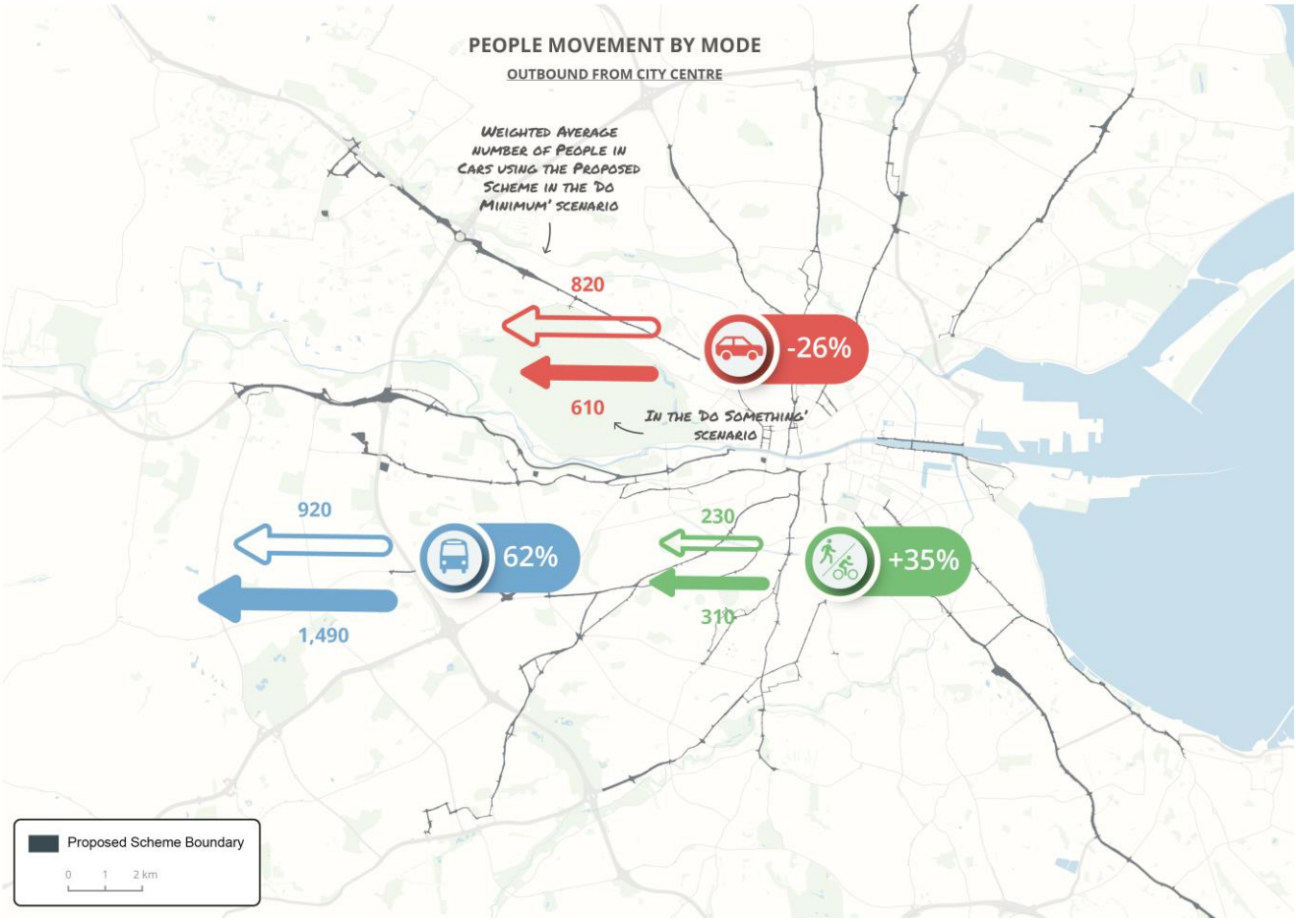

Diagram 7.8: People Movement by Mode during 2043 PM Peak Hour

As indicated in Diagram 7.8, on average across all Proposed Schemes, there is a predicted decrease of 26% in the number of people travelling via car, an increase of 62% in the number of people travelling via bus and an increase of 35% 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 22% 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 7.8: 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	820	42%	610	25%	-210	-26%
		Public Transport	920	47%	1,490	62%	570	62%
		Walking	180	9%	180	7%	0	0%
		Cycling	50	3%	130	5%	80	160%
		Sustainable Modes Total	**1,150**	**58%**	**1,800**	**75%**	**650**	**57%**
		Total (All modes)	**1,970**	**58%**	**2,410**	**75%**	**440**	**22%**

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

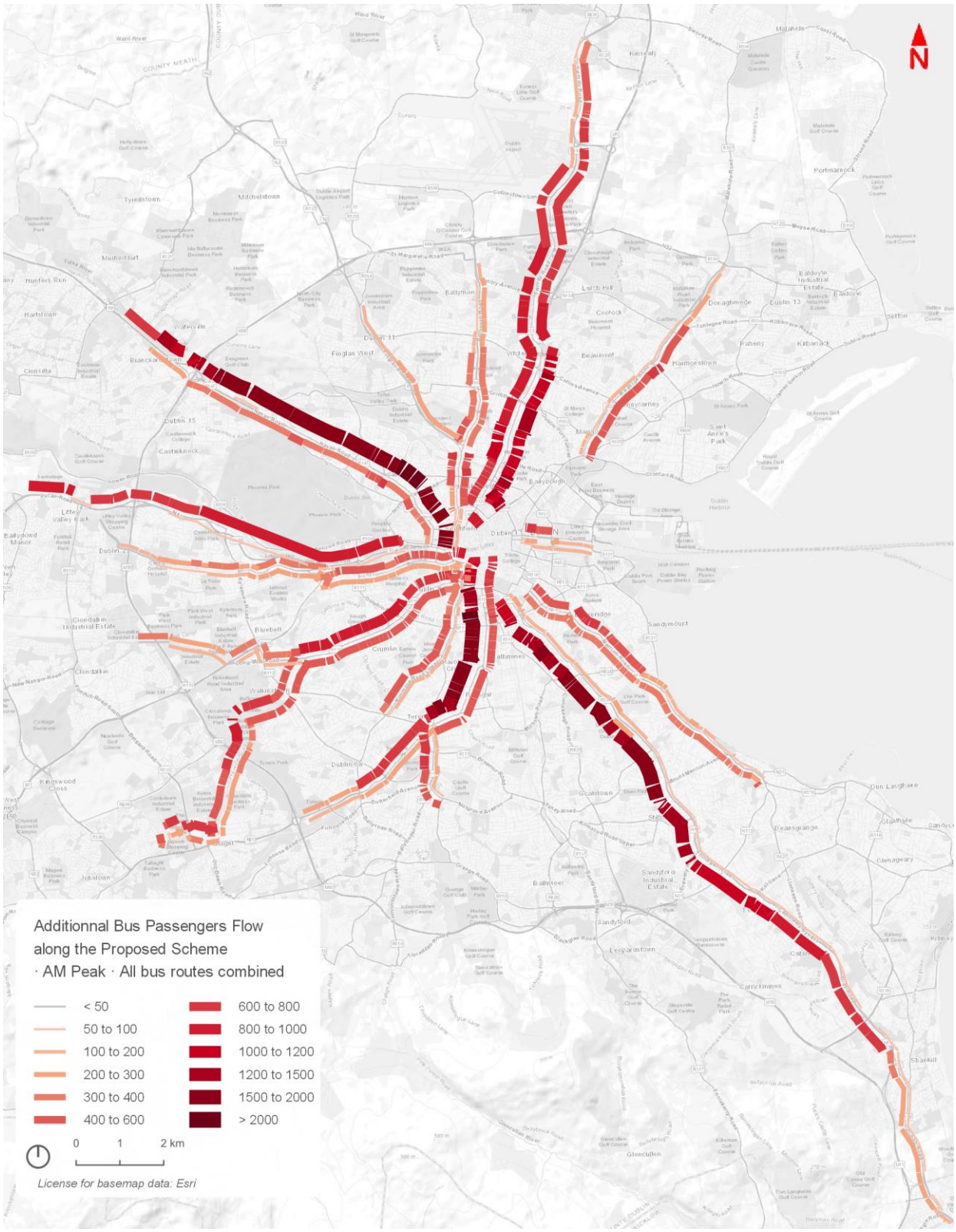

Diagram 7.9: AM Peak Hour Total Bus Passenger Flows Along the Proposed Schemes (All Bus Routes Combined)

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 Liffey Valley to City Centre Scheme shows an increase of approximately 900 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. Table 7.9 below displays the results for the 2028 AM Peak Hour for the Liffey Valley to City 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 (%)
Liffey Valley to City Centre Scheme	16,140	18,260	2,120	13.1%
All Schemes	85,990	101,760	15,770	18.3%

As shown above there will be a 13.1% increase in people boarding bus routes which use any part of the Liffey Valley Scheme during the AM Peak Hour. This represents an addition of 2,120 passengers.

There will be a 18% 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

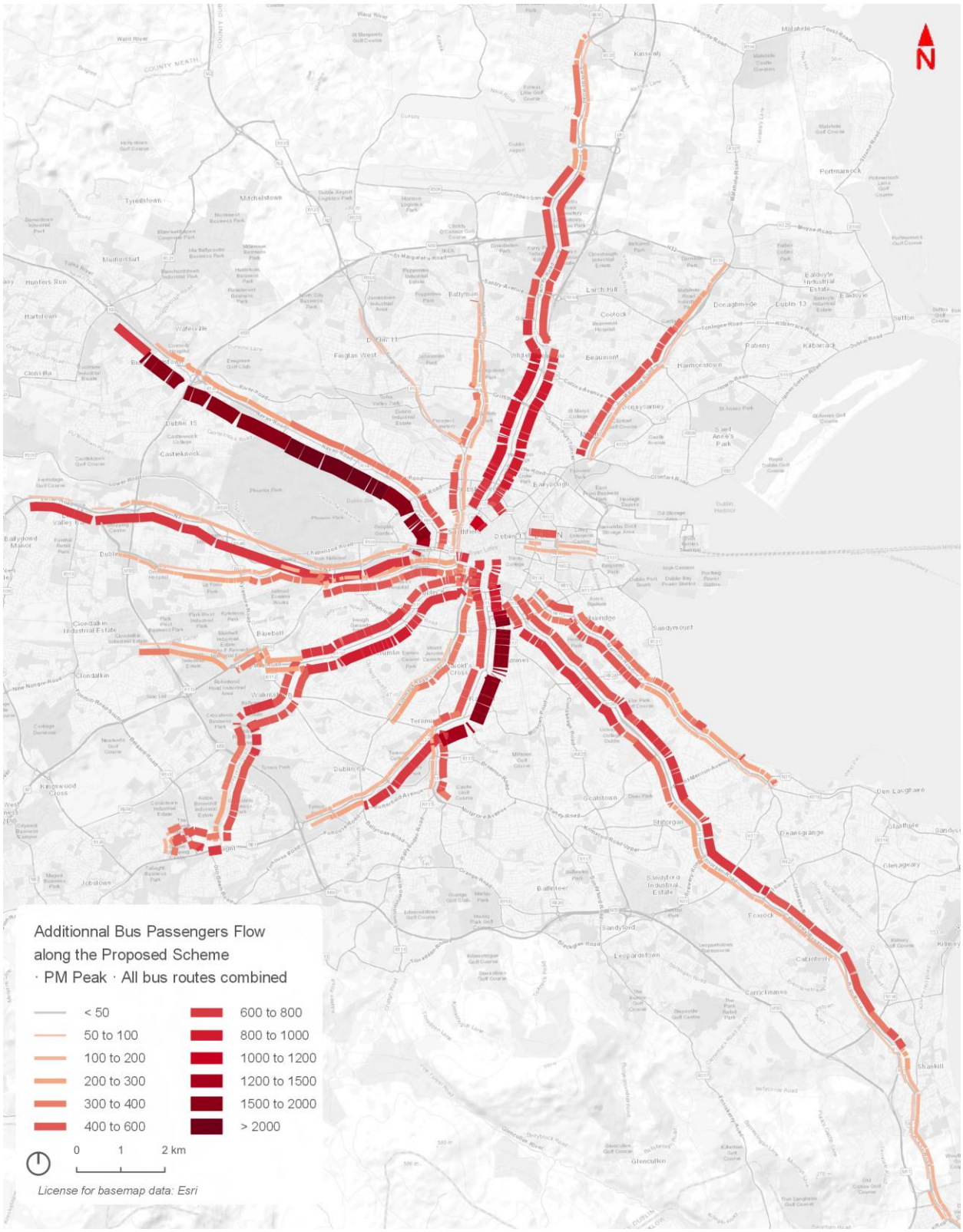

Diagram 7.10: PM Peak Hour Total Bus Passenger Flows Along the Proposed Schemes (All Bus Routes Combined)

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 Liffey Valley to City Centre Scheme shows an increase of approximately 700 passengers in the outbound direction.

Table 7.10 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 2028 PM Peak Hour for the Liffey Valley 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 (%)
Liffey Valley to City Centre Scheme	13,220	15,460	2,240	16.9%
All Schemes	71,280	85,170	13,890	19.5%

As shown in Table 7.10, there will be a 16.9% increase in people boarding bus routes which use any part of the Liffey Valley to City Centre Scheme during the PM Peak Hour. This represents an addition of 2,240 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

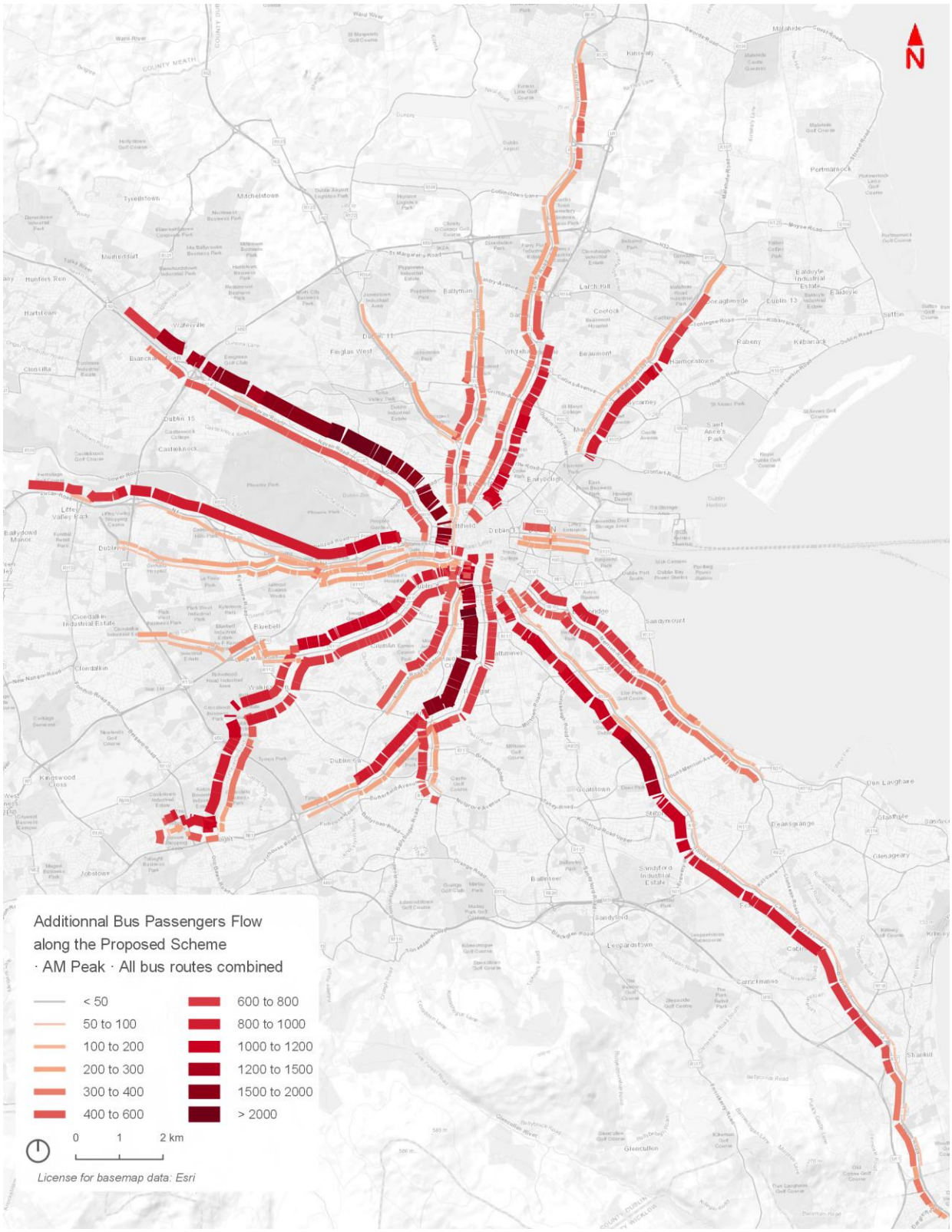

Diagram 7.11: AM Peak Hour Total Bus Passenger Flows Along the Proposed Schemes (All Bus Routes Combined)

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 Liffey Valley to City Centre Scheme shows an increase of approximately 800 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 Liffey Valley to City Centre 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 (%)
Liffey Valley to City Centre Scheme	14,180	17,290	3,110	21.9%
All Schemes	86,380	106,040	19,660	22.8%

As shown in 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 Liffey Valley to City Centre Scheme shows an increase of approximately 800 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 Liffey Valley to City Centre Scheme as well as for all Proposed Schemes.

Table 7.11, there will be a 21.9% increase in people boarding bus routes which use any part of the Liffey Valley to City Centre Scheme during the AM Peak Hour. This represents an addition of 3,110 passengers in the AM Peak Hour.

There will be a 22.8% increase in people boarding bus routes which use any part of the Proposed Schemes, representing an additional 19,660 passengers due to the bus priority improvements.

7.2.4.4.4 2043 PM Peak Hour Bus Passengers

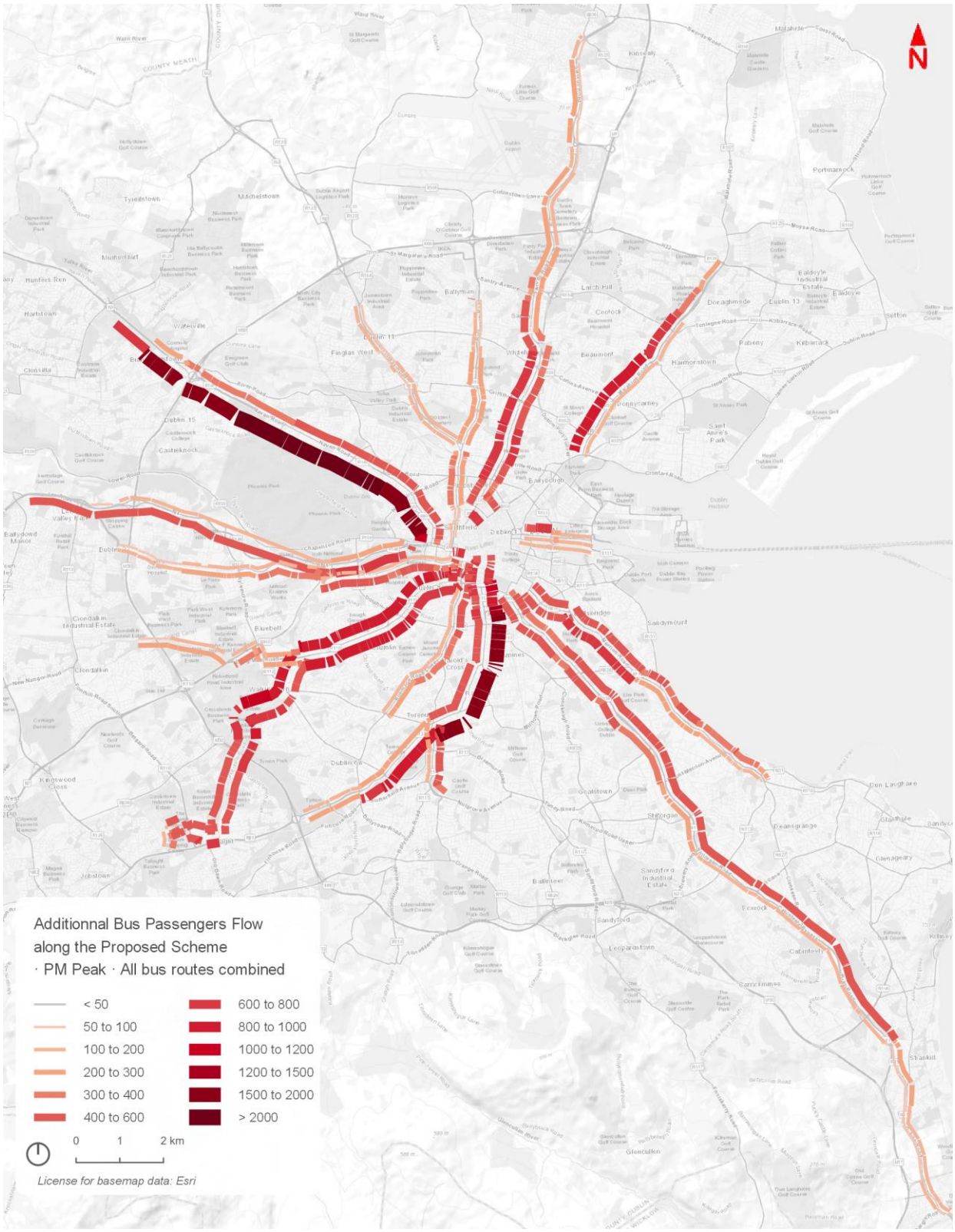

Diagram 7.12: 2043 PM Peak Hour Total Bus Passenger Flows Along the Proposed Schemes (All Bus Routes Combined)

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 Liffey Valley to City Centre Scheme shows an increase of approximately 500 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 Liffey Valley 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 (%)
Liffey Valley to City Centre Scheme	11,530	14,360	2,830	24.5%
All Schemes	72,910	89,280	16,370	22.5%

As shown in Table 7.12, there will be a 24.5% increase in people boarding bus routes which use any part of the Liffey Valley to City Centre Scheme during the PM Peak Hour. This represents an addition of 2,830 passengers in the AM Peak Hour.

There will be a 22.5% increase in people boarding bus routes which use any part of the Proposed Schemes, representing an additional 16,370 passengers due to the bus priority improvements.

7.2.5 Integration with Other Public Transport Modes

The aim of the Proposed Scheme 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.

Table 7.15: 2043 AM Peak Hour PT Boardings

Public Transport Mode	Do Minimum	Do Something	Difference in Boardings	Difference (%)
Rail	47,040	49,210	2,170	5%
Luas	37,560	34,890	-2,670	-7%
Bus	79,830	97,830	18,000	23%
Metro	18,520	17,960	-560	-3%
Total	**182,950**	**199,890**	**16,940**	**9%**

As presented in Table 7.15, with the Proposed Schemes in place, there will be a predicted 9% increase in total passengers boarding PT services and a 23% increase in boardings on bus services in the AM Peak Hour in 2043. The improved bus infrastructure results in slight reductions in boardings on Luas and MetroLink services, which will help provide additional resilience for these modes to accommodate future travel demand growth.

Table 7.16: 2043 PM Peak Hour PT Boardings

Public Transport Mode	Do Minimum	Do Something	Difference in Boardings	Difference (%)
Rail	55,240	56,730	1,490	3%
Luas	31,620	30,640	-980	-3%
Urban Bus	73,160	88,970	15,810	22%
Metro	14,290	13,760	-530	-4%
Total	**174,310**	**190,100**	**15,790**	**9%**

As presented in Table 7.16, with the Proposed Schemes in place, there will be an estimated 9% increase in total passengers boarding PT services and a 22% increase in boardings on bus services in the PM Peak Hour 2043. The improved bus infrastructure results in slight reductions in boardings on Luas and MetroLink services, which will help provide additional resilience for these modes to accommodate future travel demand growth.

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 Liffey Valley to City Centre scheme will interface with the LUAS Red Line at James's LUAS stop, although the transfers between them are expected to be limited as they both serve radial routes towards the City Centre.

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	2,690	4,680	5,600	4,420	**17,390**	3,670	5,480	6,130	4,520	**19,800**
Rail	3,390	3,970	2,430	1,670	**11,460**	4,720	4,010	2,220	1,590	**12,540**
Luas	4,530	1,230	430	1,650	**7,840**	4,780	980	370	1,360	**7,490**
Metro	2,940	960	1,320	0	**5,220**	3,270	830	1,090	0	**5,190**
Total	**13,550**	**10,840**	**9,780**	**7,740**	**41,910**	**16,440**	**11,300**	**9,810**	**7,470**	**45,020**

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 7% from 41,910 in the Do Minimum scenario to 45,020 in the Do Something scenario (with the Proposed Schemes in place) with transfers from Rail, Luas and Metrolink to buses predicted to increase by 18% from 10,860 to 12,770. This highlights the increased level of accessibility and transfer opportunities facilitated by the Proposed Schemes.

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[5]. The metric considers the average speed across all public transport modes for the entire Study Area which covers all Proposed Schemes.

[5] 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.

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

Scenario	Do Minimum	Do Something	Speed Difference (%)
Liffey Valley to City Centre Scheme	21.13	21.32	+0.9%
All Schemes Scenario	21.13	23.08	+9.2%

As presented in Table 7.19, the average networkwide speed per PT passenger is expected to grow by 0.9%, with the Liffey Valley Scheme only in operation in the AM Peak Hour in 2028. 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 (%)
Liffey Valley to City Centre Scheme	21.18	21.37	+0.9%
All Schemes Scenario	21.18	23.14	+9.3%

As presented in Table 7.20, the average networkwide speed per PT passenger is expected to grow by 0.9%, with the Liffey Valley Scheme only in operation in the AM Peak Hour in 2043. With all Proposed Schemes operational, the average speed per PT passenger is expected to grow by 9.3%, representing a substantial increase in the average travel speeds for all PT users in 2043.

7.2.6 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 Schemes as well as bus usage and integration with other public transport modes, as presented above. The Proposed Schemes have been adjudged to deliver a **High Positive 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, commencing at Fonthill Road and extending to High Street, 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.

The impacts during the Construction Phase are outlined in Table 8.1. During the Construction Phase, the Proposed Scheme will have **Low Negative impacts** to pedestrian and bus infrastructure and parking and loading and a M**edium Negative impact** to cycling infrastructure. 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 day. Therefore, the impact on general traffic redistribution is anticipated to be a **Medium Negative impact**. The impact of construction traffic is anticipated to result in a **Low Negative impact** due to the low numbers of vehicles anticipated which are and below the thresholds set out in the Transport Assessments Guidelines. All construction impacts will be temporary and end following completion of the works.

Table 8.1: Summary of Construction Phase Predicted Impacts

Assessment Topic	Effect	Predicted Impact
Pedestrian Infrastructure	Restrictions to pedestrians along Proposed Scheme.	Low negative
Cycling Infrastructure	Restrictions to cyclists along Proposed Scheme	Medium negative
Bus Infrastructure	Restrictions to public transport along Proposed Scheme.	Low 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. 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 of ratings ranging from B to F. During the Do Something scenario, i.e. following the development of the Proposed Scheme, the LoS consists predominantly of the highest A / B ratings, with the exception of three Cs. Overall, the improvements to the quality of the pedestrian infrastructure will have a **Medium Positive impact** in Section 1, 2 and 3 of the Proposed Scheme.

- **Cycling Infrastructure:** The Proposed Scheme also consists of measures to enhance the existing cycling infrastructure along the direct study area. A LoS assessment was undertaken using an adapted version of the NTA's National Cycle Manual Quality of Service (QoS) Evaluation criteria. The results of the assessment demonstrate that the LoS during the Do Minimum scenario consists predominantly of C / D ratings. During the Do Something scenario, the LoS consists predominantly of the highest A / B ratings, with the exception of one C and four Ds. At three of the four locations which have a D rating in the Do Something, no bespoke cycle provision is proposed however a proposed local bus gates will greatly reduce through traffic creating an environment more conducive to cycling. Overall, the improvements to the quality of the cycling infrastructure will have a **High Positive impact** in Section 1, 2 and 3 of the Proposed Scheme.
- Bus Infrastructure: The implementation of the Proposed Scheme will result in improvements in the quality of bus infrastructure provision along the direct study area. A qualitative impact assessment has been undertaken based on the provision of bus priority, pedestrian accessibility, and changes to the bus stop facilities. The results of the assessment demonstrate that the improvements to the quality of the bus infrastructure will have a **Medium Positive impact** in Section 1, 2 and 3 of 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 173 spaces (-57 spaces in Section 1, -14 spaces in Section 2 and -102 spaces in Section 3) relative to an overall retention of 4,514 spaces. Given the nature of the loss in parking and the availability of alternative spaces in the indirect study area, the impact is expected to be **Low Negative** along 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 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 in the number of people travelling along the corridor by sustainable modes of 54% and 52% during the 2028 AM and PM Peak respectively. During the 2043 scenario there will be an increase of 74% and 92% in the number of people travelling along the Proposed Scheme by sustainable modes during the AM and PM Peak Hours respectively. The analysis also shows that there will be an increase in 5.4% and 5.1% of passengers boarding buses during the 2028 AM and PM Peak Hours respectively. During the 2043 scenario there will be an increase in 7.0% and 7.6% of passengers boarding buses during the AM and PM Peak Hours respectively. Overall, it is anticipated that the increases to the total number of people travelling along the Proposed Scheme will be a **High Positive impact**.
- **Bus Network Performance Indicators:** The Proposed Scheme will also benefit from improvements to the capacity of the road network to cater for future bus services accessing the Proposed Scheme. A micro-simulation model assessment has been developed to extract network performance indicators of the bus operations along the 'end to end' corridor. The results of the assessment demonstrate that the total bus journey times on all modelled bus services will improve by between 11% and 17% during the AM and PM Peak hours of the 2028 Opening Year and 2043 Opening Year + 15 Years.
- A LoS assessment was also undertaken using an adapted version of the Coefficient of Variation of Headways and the Fixed-Route Headway Adherence LoS (United States' TRB 2013) to determine the overall bus journey time reliability and bus service schedule reliability. The results of the assessment demonstrate that the bus journey time reliability achieves a LoS of B during all Do Minimum scenario and a LoS of A during all Do Something scenario. The bus services schedule reliability achieves a LoS of D/C during the Do Minimum scenario and a LoS B during three of the four, Do Something scenarios (a LOS C is anticipated in the 2043 AM Do Something). Overall, it is

anticipated that the improvements to the network performance indicators for bus users along the Proposed Scheme will result in a **Medium 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 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 medium 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 performance indicators range between -1% and 3% and will therefore have a **Low Negative impact**.

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

Table 8.2:Summary of Predicted Operational Phase Impacts

Assessment Topic	Effect	Predicted Impact
Pedestrian Infrastructure	Improvements to the quality of the pedestrian infrastructure along the Proposed Scheme.	Medium Positive
Cycling Infrastructure	Improvements to the quality of the cycling infrastructure along the Proposed Scheme.	High Positive
Bus Infrastructure	Improvements to the quality of the bus infrastructure along the Proposed Scheme.	Medium Positive
Parking and Loading	A total loss of 188 parking / loading spaces along the Proposed Scheme.	Low Negative
People Movement	Increases to the total number of people travelling through the Proposed Scheme.	High Positive
Bus Network Performance Indicators	Improvements to the network performance indicators for bus users along the Proposed Scheme.	Medium Positive
General Traffic Network Performance Indicators	Reduction in general traffic flows along the Proposed Scheme.	Medium 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
Cumulative Assessment	Improvements to the quality of the pedestrian infrastructure along the Proposed Scheme.	Medium Positive

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