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 Kimmage to City Centre Core Bus Corridor Scheme (hereafter referred to as the Proposed Scheme). The TIA also informs Chapter 6 (Traffic & Transport) in Volume 2 of the Environmental Impact Assessment Report (EIAR) for the Proposed Scheme which has assessed 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;
- 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) in Volume 2 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 of impacts and benefits of the Proposed Scheme covering all transport modes for both Construction and Operational Phases.

Proposed Scheme Description

The Proposed Scheme, as described in detail in Chapter 4 (Proposed Scheme Description)in Volume 2 of the EIAR, will be approximately 3.7km in length and will commence on R817 Kimmage Road Lower at the junction with the R818 on Terenure Road West and Kimmage Road West, and R817 Fortfield Road. The Proposed Scheme will continue along R817 Kimmage Road Lower towards the City Centre, via the R137 on Harold's Cross Road, Clanbrassil Street Upper and Lower and New Street South. Priority for buses will be provided along the entire route, consisting primarily of dedicated bus lanes in both directions where feasible, with alternative measures, such as bus gates, proposed at particularly constrained locations such as much of R817 Kimmage Road Lower, Harold's Cross Park West and short sections of R137 Clanbrassil Street Upper and Lower in alternate directions. A complementary cycle route is also proposed at the southern end of the proposed scheme, to the west of the core corridor via quiet streets.

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

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 Movement: An assessment has been carried out to determine the potential impact that the Proposed Scheme will have on projected volume of people moving along the corridor 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 transit 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

A detailed review of the existing traffic and transport conditions within the redline boundary of the Proposed Scheme has been undertaken, specifically for pedestrian, cycling, bus services and priority measures, general traffic and parking / loading facilities. The baseline conditions have been informed by several site visits of the local environment, comprehensive traffic surveys, and a desktop review of the most recent aerial photography.

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

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

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

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

to the R817 Kimmage Road Lower / R137 Harold's Cross Road junction at the northern end of Harold's Cross Park.

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

Section 2 is approximately 400m long and consists of R137 Harold's Cross Road between the R137 Harold's Cross Road / R817 Harold's Cross Road junction and the R137 Harold's Cross Road / R111 Parnell Road / R137 Clanbrassil Street Upper / R111 Grove Road junction.

Section 3 of the Proposed Scheme consists of 290m of R137 Clanbrassil Street Upper, 500m of R137 Clanbrassil Street Lower and 300m of R137 New Street South.

Potential Impacts

Construction Phase

During the Construction Phase, the Proposed Scheme will have temporary **Low Negative** impacts to pedestrian and parking and loading.

The Proposed Scheme will have temporary **Medium Negative** impacts on cycle and bus access. Where cycle tracks are affected by construction, a safe route will be provided past the work area, and where practicable, provisions for matching existing facilities for cyclists will be made.

The impact on general traffic is anticipated to be a **Medium Negative** and temporary impact due to the short-term nature of any restrictions. It is anticipated that traffic flows along the scheme will to be maintained in both directions. There may be a requirement for some localised temporary lane closures for short durations of the daytime and night-time, 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 impact of construction traffic is anticipated to result in a **Low Negative** and temporary impact due to the low numbers of vehicles anticipated which are and below the thresholds set out in the Transport Assessments Guidelines.

Summary of Construction Phase Potential Impacts

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

Operational Phase

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; and
- 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 assessment demonstrates the following:

- **Pedestrian Infrastructure:** The Proposed Scheme consists of measures to enhance the existing pedestrian infrastructure along the direct study area. A Level of Service (LoS) junction assessment has been undertaken using a set of five criteria to determine the impact that the Proposed Scheme has for pedestrians. The assessments demonstrate in the Do Minimum scenario, 41% of the junctions assessed had LoS ratings of D or below, 55% had a C rating, and just 3% had a B rating. In the Do Something scenario, i.e. following the development of the Proposed Scheme, 93% of the assessed junctions had the highest A / B LoS ratings, and 7% C ratings.

  Overall, the scheme will have **Medium Positive** impacts in Sections 1 and 2 and a **Low Positive** impact in Section 3;
- **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 assessments demonstrate in the Do Minimum scenario, 71% of the route sections assessed had LoS ratings of C or below and 29% had a B rating. In the Do Something scenario, 86% of the assessed route sections had A or B LoS ratings, and 14% C ratings.

  Overall, the scheme will have **Low Positive** impacts in Sections 1 and 2 and a **Medium Positive** impact in Section 3;
- **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. Overall, the scheme will have **Medium Positive** impacts in Sections 1 and 3 and a **Low Positive** impact in Section 2;
- **Parking and Loading**: A qualitative impact assessment has been undertaken of the Proposed Scheme impacts on the existing parking and loading. The results of the assessment demonstrate that the changes to the parking and loading provision will result in an overall loss of -46 spaces (-39 spaces in Section 1, +12 spaces in Section 2 and -19 spaces in Section 3) Given the nature of the loss in parking and the availability of alternative spaces in the indirect study area, the impact is expected to be Low Negative in Sections 1, 2 and 3;
- **People Movements:** Given the proposed amendments to the pedestrian, cycling, bus and parking / loading infrastructure outlined above, the Proposed Scheme will have greater capacity to facilitate movement of people travelling along the corridor. A quantitative impact assessment has been undertaken using outputs from the NTA's ERM and LAM, comparing the Do Minimum and Do Something peak hour scenarios for each forecast year (2028, 2043). The results of the assessment

demonstrate that there will be an increase of 29% and 36% in the number of people travelling along the Proposed Scheme during the 2028 AM and PM Peak Hours respectively. During the 2043 scenario there will be an increase of 15% and 18% in the number of people travelling along the Proposed Scheme during the AM and PM Peak Hours. The analysis also shows that there will be an increase of 9.1% and 9.9% in the number of passengers boarding buses during the 2028 AM and PM Peak Hours respectively. During the 2043 scenario there will be an increase of 10.7% and 12.2% in the number of 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 result in a **High Positive** impact;

- **Bus Network Performance Indicators:** A micro-simulation modelling assessment has been developed and network performance indicators established for 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 26% and 17% during the AM and PM Peak hours of the Opening Year (2028) and the Design Year (2043). Based on the AM and PM peak hours alone, this equates to 6.3 hours of savings in 2028 and 6.8 hours in 2043, when compared to the Do Minimum combined across all buses. On an annual basis this equates to approximately 4,300 hours of bus vehicle savings in 2028 and 5,600 hours in 2043, when considering weekday peak periods only. Journey time variation and reliability are shown to improve in all Do Something scenarios compared to the Do Minimum. Overall, it is anticipated that the improvements to the network performance indicators for bus users along the Proposed Scheme will have a **High Positive** impact;
- **General Traffic Network Performance Indicators:** There will be an overall reduction in operational capacity for general traffic along the direct study area, given the proposed infrastructural changes to the existing road layout outlined above. This reduction in operational capacity for general traffic will create some level of 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. 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 implementation.

  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 -5.7% and 0.89%, therefore a **Low Negative** impact is anticipated; and
- **Cumulative Summary:** In general, total trip demand (combining all transport modes) will increase into the future in line with population and employment growth. A greater share of the demand will be by sustainable modes (Public transport, Walking, Cycling)

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

  In the Opening Year (2028) 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 14% increase in cycling trips each day. In the Design Year (2043) scenario, it is estimated that for people travelling within the 500m catchment area (including City Centre) there will be a 4% increase in public transport trips, 8% decrease in general traffic trips (i.e. motorists) and a 13% increase in cycling trips in the morning peak period and a 6% increase in public transport, 6% decrease in general traffic and a 10% increase in cycling trips each day.

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

In the Opening Year (2028) 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 Opening Year (2028) 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 Design Year (2043) AM and PM Peak Hour scenarios, increase in total passengers boarding all public transport services will be 7% and 8% respectively, and the increase in passengers boarding bus services will increase by 11% and 14% respectively.

Overall, the Proposed Schemes are expected to deliver a high positive impact to People Movement by sustainable modes.

Summary and Conclusions

The Proposed Scheme, between Kimmage and the City Centre, comprises the development of improved bus priority. 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 Operational Phase, the Proposed Scheme will deliver positive impacts to the quality in terms of People Movement, pedestrian, cycling and bus infrastructure during the Operational Phase. These improvements will help to provide a more attractive alternative to the private car and promote a modal shift to walking, cycling and public transport, allowing for greater capacity along the corridor to facilitate the sustainable movement of people as population and employment levels grow in the future.

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

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

On the whole, the Proposed Scheme will make a significant contribution to the overall aims of BusConnects, the GDA Transport Strategy and allow the city to grow sustainably into the future, which would not be possible in the absence of the Proposed Scheme

1. Introduction

This TIA presents a comprehensive review of the traffic and transport impacts associated with the Proposed Scheme, which has informed the production of Chapter 6 (Traffic & Transport) in Volume 2 of the EIAR. The TIA should be read in conjunction with Chapter 6 (Traffic & Transport) in Volume 2 of the EIAR.

The Proposed Scheme, as described in detail in Chapter 4 (Proposed Scheme Description) in Volume 2 of the EIAR, will be approximately 3.7km in length and will commence on R817 Kimmage Road Lower at the junction with the R818 on Terenure Road West and Kimmage Road West, and R817 Fortfield Road. The Proposed Scheme will continue along R817 Kimmage Road Lower towards the City Centre, via the R137 on Harold's Cross Road, Clanbrassil Street Upper and Lower and New Street South. Priority for buses will be provided along the entire route, consisting primarily of dedicated bus lanes in both directions where feasible, with alternative measures, such as bus gates, proposed at particularly constrained locations such as much of R817 Kimmage Road Lower, Harold's Cross Park West and short sections of R137 Clanbrassil Street Upper and Lower in alternate directions. A complementary cycle route is also proposed at the southern end of the proposed scheme, to the west of the core corridor via quiet streets.

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

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

Table 1.1: Summary of Changes as a result of the Proposed Scheme

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

The Proposed Scheme is shown in 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
BCIDD-ROT-GEO_GA-0011_XX_00-DR-CR-9001	General Arrangement
BCIDA-ACM-GEO_CS-0011_XX_00-DR-CR-9001	Typical Cross Sections
BCIDA-ACM-TSM_GA-0011_XX_00-DR-CR-9001	Traffic Signs and Road Markings
BCIDA-ACM-TSM_SJ-0011_XX_00-DR-TR-9001	Junction System Design

1.1.1 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; and
- 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.

1.1.1.1 People Movement

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

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

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

1.1.1.2 Preliminary Design Guidelines

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

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

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

The outputs of the calculator provided an initial estimate of the green times and vehicle capacity movements based on inputs and assumptions for each junction along the Proposed Scheme. The calculator provided an estimate of the People Movement for the junction in question (by mode) and was used to adjust proposals with a view to maximising the total person throughput at each junction along the Proposed Scheme during the iterative design process, described further below. Details on the development of junction designs along the Proposed Scheme are included in TIA Appendix 2 (Junction Design Report).

The People Movement Calculation and the identification of available general traffic capacity from this initial exercise was enhanced further by the Proposed Scheme Transport Models described in Section 4.3 below.

1.1.2 Iterative Design Process and Mitigation by Design

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

Diagram 1.1 below illustrates this process whereby the emerging design for the Proposed Scheme have been tested using the transport models as part the iteration. The transport models provided an understanding of the benefits and impacts of the proposals (mode share changes, traffic redistribution, bus performance etc.) with traffic flow information also informing other environmental disciplines (such as Air Quality, Noise and Vibration, Climate etc.) which in turn allowed feedback of potential impacts into the design process to allow for changes and in turn mitigation to be embedded in the designs. The design process included physical changes (e.g., cycle lane widening) and adjustments to traffic signals including changes to staging, phasing and green times to limit traffic displacement to the greatest extent possible as well as traffic management arrangements and / or turn bans where appropriate. This ensured that any displaced traffic was kept to a minimum and was maintained on higher capacity roads, whilst continuing to meet scheme objectives along the Proposed Scheme.

The iterative process concluded when the design team were satisfied that the Proposed Scheme met its required objectives (maximising the people movement capacity of the Proposed Scheme) and that the environmental

impacts and level of residual impacts were reduced to a minimum whilst ensuring the scheme objectives remained satisfied.

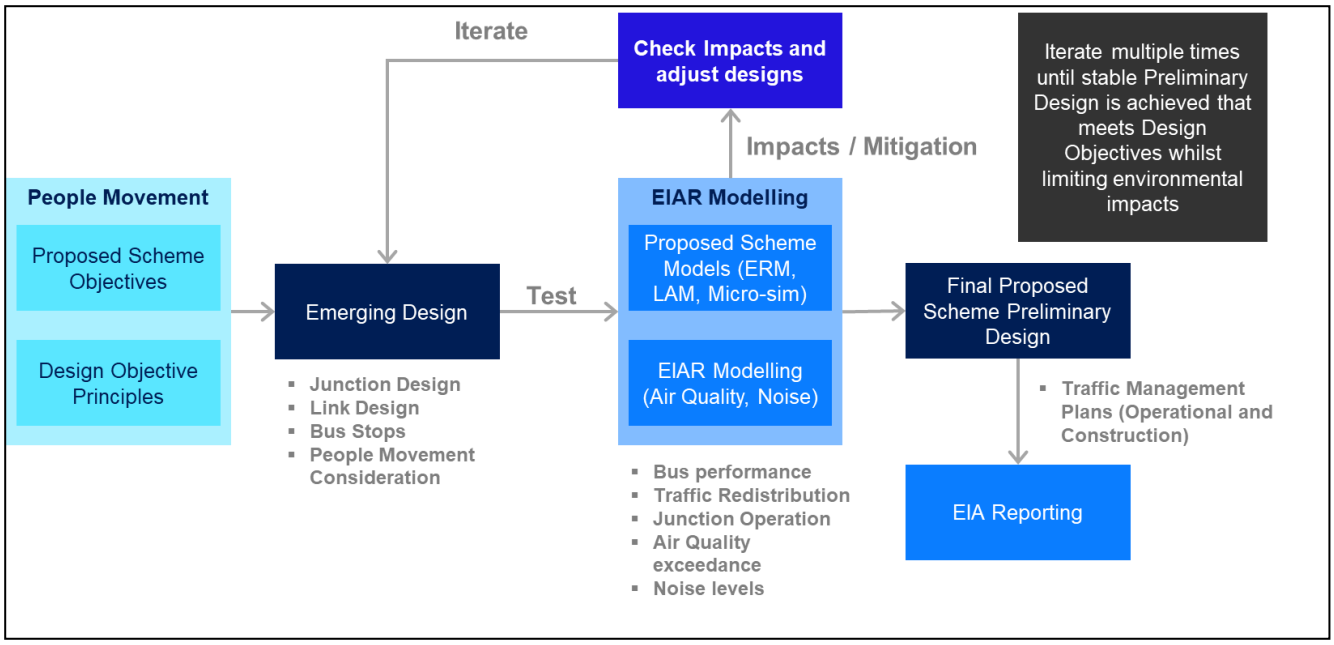

Diagram 1.1: Proposed Scheme Impact Assessment and Design Interaction

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

1.2 Purpose and Structure of This Report

This TIA includes the comprehensive assessment of impacts and benefits of the Proposed Scheme covering all transport modes for both Construction and Operational Phases. The TIA also informs Chapter 6 (Traffic & Transport) in Volume 2 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 0; and
- **'Do Something'** – The 'Do Something' scenario represents the likely traffic and transport conditions of the direct and indirect study areas including for any transportation schemes which have taken place, been approved or are planned for implementation, **with** the Proposed Scheme in place (i.e. the Do Minimum scenario with the addition of the Proposed Scheme). The Do Something scenario has been broken into two phases:
    - **Construction Phase (Construction Year (2024)) –** This phase represents the single worst-case period which will occur during the construction of the Proposed Scheme; and
    - **Operational Phase (Opening Year (2028), Design Year (2043)) –** This phase represents when the Proposed Scheme is fully operational.

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

- **Section 2 – Study Area:** This Section sets out both the direct and indirect study areas of the TIA;
- **Section 3 – Policy Context:** This Section sets out the national, regional and local policy context;
- **Section 4 - Assessment Methodology:** This Section sets out the proposed method of assessment for the quantitative and qualitative perspectives;
- **Section 5 – Baseline Environment**: This Section will set out the baseline conditions against which the Proposed Scheme has been assessed;
- **Section 6 – Potential Impacts:** This Section 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 Section 4. It considers both operational and construction scenarios;
- **Section 7 – Cumulative Assessment:** This Section 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;
- **Section 8 – Summary and Conclusions**: This Section provides a summary of the TIA and the conclusions which can be drawn from it; and
- **Section 9** – **References**: contains the traffic and transport sources referred to within this TIA.

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 4 for further details on the threshold applied in relation to traffic volume changes used in the definition of the indirect study area).

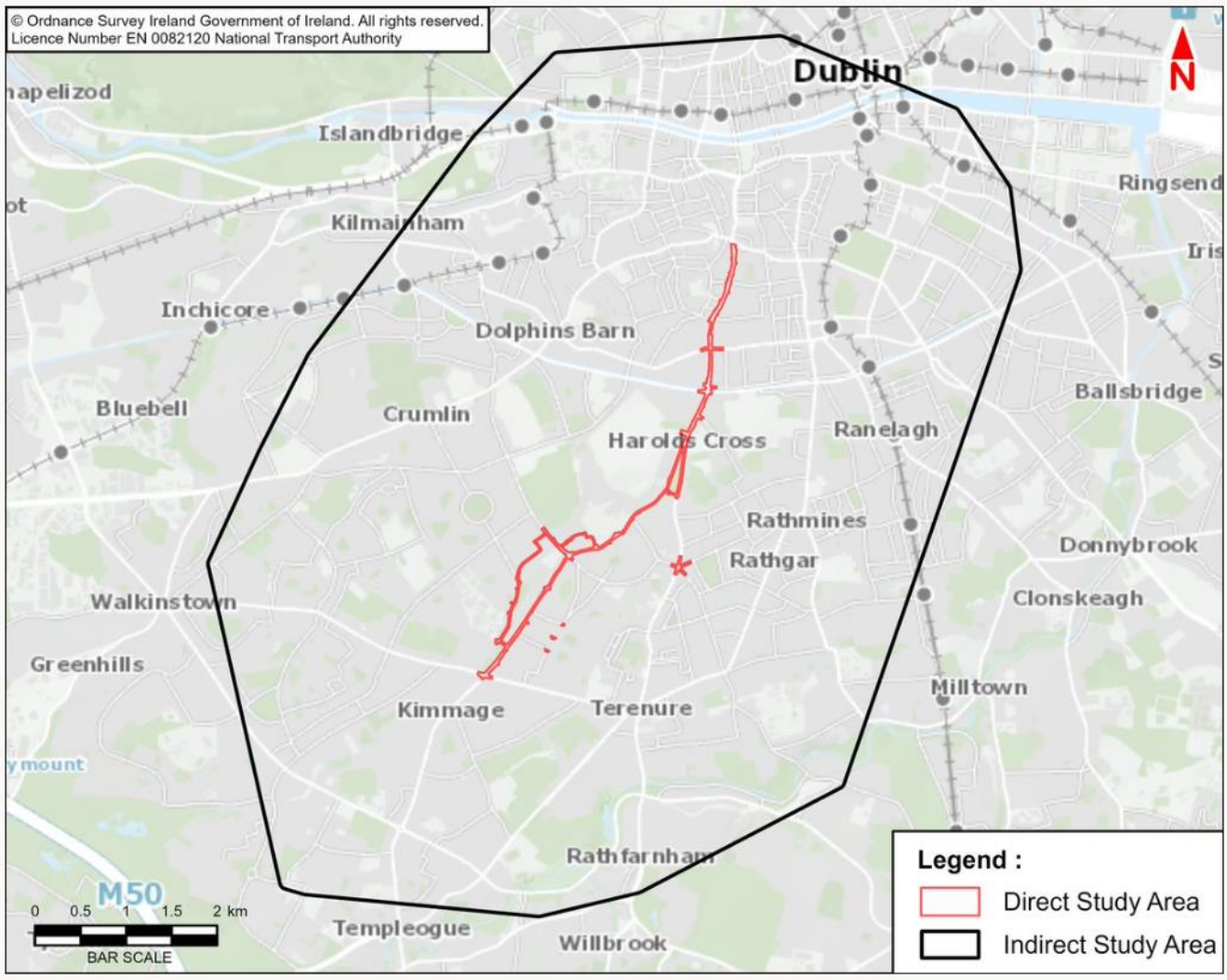

Diagram 2.1: Proposed Scheme Indirect Study Area

3. Policy Context

This Section 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 TIA, which supports Chapter 6 (Traffic & Transport) in Volume 2 of the EIAR, follows the Traffic and Transport Assessment Guidelines and offers an impartial description of the likely impacts of the Proposed Scheme, outlining both its positive and negative aspects.

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

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

3.1.4 Traffic Management Guidelines

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

A core component of the 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 this section.

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 (2022-2042) by investing in projects such as New Metro Link, DART Expansion Programme, BusConnects in Dublin'.*

It also allows for the development of:

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

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

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

The National Development Plan (NDP) (2021 - 2030) (Department of Public Expenditure and Reform, 2021) 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'.

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

The draft National Investment Framework for Transport in Ireland (NIFTI) (DoT 2021) was recently published by the DoT 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.

As outlined, 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 number least three of the NIFTI investment priorities, including; protecting and renewing Dublin's public transport network, enabling better mobility for people across the Dublin City-region, and supporting the decarbonization of Dublin's transport network. Smarter Travel: A Sustainable Transport Future (2009 – 2020).

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

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

Smarter Travel: A Sustainable Transport Future (2009 – 2020) (DoT 2019c) 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 Proposed 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) (DoT 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 2021 – 2030.

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

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

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

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

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

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

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

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

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

- Maintaining and renewing the strategically important elements of the existing land transport system;
- Addressing urban congestion; and
- Maximize 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 industrialization and foster innovation: Target 9.1: Develop quality, reliable, sustainable and resilient infrastructure, including regional and transborder infrastructure, to support economic development and human wellbeing, with a focus on affordable and equitable access for all.'*
>
> *'Goal 11: Make cities and human settlements inclusive, safe, resilient and sustainable: 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 and the BusConnects proposals overall.

3.2.10 Climate Action Plan (2023)

The Climate Action Plan (Department of the Taoiseach, 2023) is the second update to Ireland's Climate Action Plan 2019 (Government of Ireland 2019) and was launched on 21 December 2022. The Climate Action Plan 2023 sets out the sectoral emissions ceilings and the implementation of carbon budgets. The Climate Action Plan 2023 is a roadmap to deliver a halving of Irelands emissions by 2030.

The transport sector has an aim of a 50% reduction in emissions by 2030. The 'Avoid' (reduce or avoid the need for travel – land use planning), 'Shift' (Shift to more environmentally friendly modes – public transport, active travel), 'Improve' (Improve the energy efficiency of vehicle technology- vehicle efficiency, clean fuels) approach has been adopted to help achieve these targets. The Climate Action Plan 2021 (Government of Ireland 2021b) targets have been updated to include '*a 20% reduction in total vehicle kilometres, a reduction in fuel usage, and significant increases to sustainable transport trips and modal share'*

BusConnects, and improvements to the bus fleet, are identified in policy TR/23/35 as being a central component of this objective

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

3.3 Regional Policy

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

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

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

The NTA priorities are set out, as follows:

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

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

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

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

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

3.3.2 Greater Dublin Area Cycle Network Plan (2022)

The GDACNP 2013 (NTA 2013) set out the investment for cycle infrastructure by the relevant agencies within the region. The 2022 Greater Dublin Area Cycle Network (NTA 2022c) forms part of the Greater Dublin Area Transport Strategy 2022 – 2042 (NTA 2022a) (as adopted in January 2023) and is a component of the Greater Dublin Area Transport Strategy 2022 – 2042.

The 2022 Greater Dublin Area Cycle Network comprises a table of contents and a series of figures related to the cycle network. However, the 'main body' of the Greater Dublin Area Transport Strategy 2022 – 2042 contains relevant text related to the 2022 Greater Dublin Area Cycle Network, the key aspects of which have been set out below.

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

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

The 2022 Greater Dublin Area Cycle Network aims for 322km of Primary cycle network, 1,060 Secondary cycle network and 954km of Greenway routes.

The Greater Dublin Area Transport Strategy 2022 – 2042 sets out 'Measure CYC1 – GDA Cycle Network' which outlines the following:

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

Step 5 of 'developing the transport strategy' states that it seeks to:

> *'Incorporate the GDA Cycle Network Plan, road schemes, park & ride plans and other infrastructure / service proposals.'*

It is outlined that a key growth enabler of the Greater Dublin Area Transport Strategy 2022 – 2042 includes the '*Delivery of the cycle network set out in the Greater Dublin Area Cycle Network Plan inclusive of key commuter routes and urban greenways on canal, river and coastal corridors*'.

The 2022 Greater Dublin Area Cycle Network demonstrates a further commitment by the NTA to provide an enhanced cycle network within the GDA. BusConnects Dublin, of which the Proposed Scheme forms a part of, will deliver the infrastructure necessary to expand and enhance the cycle network in line with the objectives of the 2022 Greater Dublin Area Cycle Network..

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

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

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

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

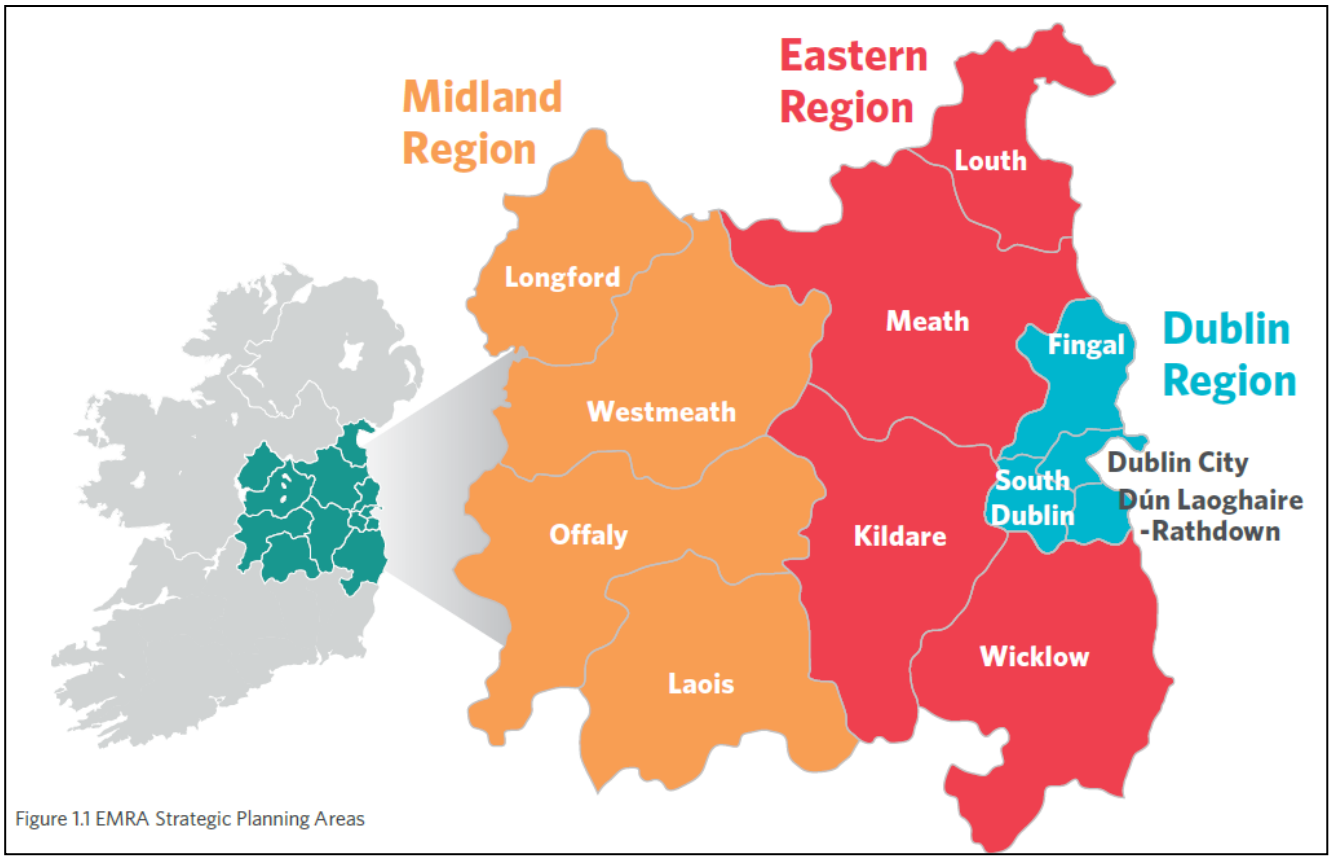

Diagram 3.2: RSES Planning Areas

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

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

> *'RPO5.2: Support the delivery of key sustainable transport projects including Metrolink, DART and LUAS expansion programmes, BusConnects and the Greater Dublin Metropolitan Cycle Network and ensure that future development maximizes 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 2022 – 2028 (hereafter referred to as the DCDP 2022-2028) (DCC 2022) was adopted on 2 November 2022 and came into effect on 14 December 2022 and guides how the city will develop to meet the needs of its residents, visitors and workers. 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 (MT1) states that Dublin City Council (DCC) will:

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

Policy MT3 makes specific reference to the promotion of an integrated transport network:

'To support and promote the sustainability principles set out in National and Regional documents to ensure the creation of an integrated transport network that services the needs of communities and businesses of Dublin City and the region.'

Policy SMT16 is aimed at improving waking and cycling throughout the City, it states the Council will:

'… prioritise the development of safe and connected walking and cycling facilities and prioritise a shift to active travel for people of all ages and abilities, in line with the city's mode share targets.'

The Proposed Scheme incorporates upgrades to pedestrian and cycle infrastructure along CBC11 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 Local Area Plan for the Liberties Area (2009)

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

The Liberties LAP (Dublin City Council, 2009) is bounded by the River Liffey to the north, R137 Patrick Street to the east and St. James Hospital to the west. To the south the LAP covers the R110 Cork Street and extends to include Brown St S, Oscar Square, Mill Street and Fumbally Lane. The Liberties LAP outlines the development opportunities up to 2020 for the western segment for the inner-city including those for regeneration and required infrastructure improvements.

- Overarching objectives of LAP which are of relevance to the Proposed Scheme include the following:
- To provide for appropriate social and community infrastructure to support the existing population, which is growing and becoming increasingly diverse;
- To promote the principles of good urban design including improving connectivity and enhancing the legibility and permeability of the Liberties in relation to the wider cityscape
- To create a high-quality network of public spaces, parks and streets;

- To promote sustainable modes of transport by making them convenient and attractive including walking and cycling routes and by facilitating the provision of public transport infrastructure and optimising its use; and
- To encourage environmental sustainability by improving biodiversity, facilitating recycling, and minimising the use of non-renewable resources including energy.

Critically, the LAP identifies a vision where convenient and reliable public transport is the main mode of transportation and rat running is reduced due to traffic calming and improved traffic management. This aligns with the goals of the Proposed Scheme.

3.5 Legislation

There is no legislation specifically relevant to this TIA.

4. Assessment Methodology

This Section of the TIA details the methodologies used to assess the impacts of the Proposed Scheme on the baseline environment.

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

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

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

Where possible 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 methods which are based upon traffic 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 and photographs used to record locations of particular importance. This ensures an up to date record of the existing environment was used to complete the qualitative assessment. The surveys focussed on the following aspects which are relevant to the assessment:

- Provision for the movement of pedestrians, cyclists and vehicles;
- Location of, and facilities at, bus stops; and
- 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 TIA:

- Road Network: Functional Class of each road link in the road network, which is a hierarchical classification of roads based on reality, used to determine a logical and efficient route for a traveler. 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 Section 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 counts and locate gaps in observed information across the model area. This review was used to define a specification for additional counts which were commissioned for the area. The combination of new commissioned counts, and existing available information, provided a comprehensive dataset for calibration and validation.

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

4.1.2.1 Existing Data Review (Gap Analysis)

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

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

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

Information on bus passenger volumes was already available and included in the modelling process as part of the ERM base model calibration and validation. The source of this data was 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 up to date 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 in February 2020 (Pre COVID- 19) with the surveyed counts used as inputs to the model calibration and validation process of the strategic model and micro-simulation model. The two types of counts used in the study are Junction Traffic 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

Count Type	Data Collection Company	Number of Counts	Dates
JTC	Nationwide	58	21/11/2019 (Thursday)
ATC	Nationwide	8	21/11/2019 - 28/11/2019

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 were taken for an entire week. In some cases, the ATC counts were repeated for a second week to account for data-collection issues. 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 within the study area of the Proposed Scheme;
- 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 5.1.

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 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, the two datasets were linked. After importing both the road assignment model and TomTom networks into the GIS environment, ensuring both datasets are in the same coordinate system, the selected routes were then linked using a spatial join functionality.

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

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

4.1.2.3.4 TomTom Data Application

The processed journey time data was used to validate the LAM and the micro-simulation models at an end-to-end travel time level, with intermediate segment travel times used to inform the calibration of both models. Further information about the journey time validation process can be found in TIA Appendix 1 (Transport Modelling Report).

4.2 Appraisal Method for the Assessment of Impacts

4.2.1 Overview

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

- Outlining the Assessment Topics; and
- Determining the Predicted Magnitude of Impacts.

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

4.2.2 Outlining the Assessment Topics

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

- The qualitative assessments are as follows:
  - **Pedestrian Infrastructure:** The changes to the quality of the pedestrian infrastructure as a result of the Proposed Scheme;
  - **Cycling Infrastructure:** The changes to the quality of the cycling infrastructure as a result of the Proposed Scheme;
  - **Bus Infrastructure:** The changes to the quality of the bus infrastructure as a result of the Proposed Scheme; and

- **Parking / Loading:** The changes to the availability of parking and loading as a result of the Proposed Scheme.

- The quantitative assessments are as follows:
  - **People Movements:** An assessment has been carried out to determine the potential impact that the Proposed Scheme will have on projected volume of people moving along the Proposed Scheme 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.

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 using the following scenarios:

- **Do Minimum** – This scenario represents the likely conditions of the road network with all major committed transportation schemes in place that will impact on the use of public transport and private car, without the Proposed Scheme.
- **Do Something** – This scenario represents the likely conditions of the road network with all major committed transportation schemes in place that will impact on the use of public transport and private car, with the Proposed Scheme (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 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 typically applied in the United States, as well as Australia and New Zealand, and have their basis in Highway Capacity Manual and, particularly for bus network assessments, in the Transit Capacity and Quality of Service Manual (TRB 2013).

LoS concepts are not target based or rigid in their application and bespoke versions are developed to suit the particular receiving environment of the scheme under consideration or the particular user problems that the scheme and/or project is seeking to address. A mix of quantitative and qualitative indicators can be used and summarised as a LoS. The process enables integrated planning and decision making across all modes rather than any specific mode which can create a bias in the assessment process (e.g. focussing 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.

4.2.3.2 Movement of People

To support the 'Objective' led approach to the design of junctions along the Proposed Scheme (i.e. with a focus on the movement of people rather than vehicles), a People Movement at Signal (PMS) Calculator has been developed from first principles based on TRL guidance[1].

The 'Objective' led approach involves the prioritisation of people movement, focussing on maximising the throughput of sustainable modes (i.e. Walking, Cycling and Bus modes) in advance of the consideration and management of general vehicular traffic (private car) movements at junctions.

The PMS calculator was developed to provide an initial estimate of green time allocation for all movements at a typical junction, as proposed in the design guidelines used for the Proposed Scheme Infrastructure Works, 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 are underpinned by:

- The number of buses required to be accommodated along the Proposed Scheme;
- An estimate of Peak Hour cycling demand based on 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 PMS calculator is based on the junction arrangements as proposed in the design guidelines used for the Proposed Scheme Infrastructure Works, for both 3 and 4-arm variations. The outputs of the calculator provided the designer with an initial estimate of the green times and vehicle capacity movements based on designer 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 by the designer to adjust their proposals with a view to maximising the total person throughput at each junction along the Proposed Scheme.

The Movement of People Calculation and vehicular capacity from this initial exercise was enhanced further by the Proposed Scheme Transport Models described below.

4.3 Transport Modelling Methodology

A multi-tiered transport modelling approach has been adopted. 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[2] 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 NTA's East Regional Model (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

[1] UK – Department of Transport Research Report 67 - THE PREDICTION OF SATURATION FLOWS FOR ROAD JUNCTIONS CONTROLLED BY TRAFFIC SIGNALS https://trl.co.uk/sites/default/files/RR067.pdf

- Cycling.

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

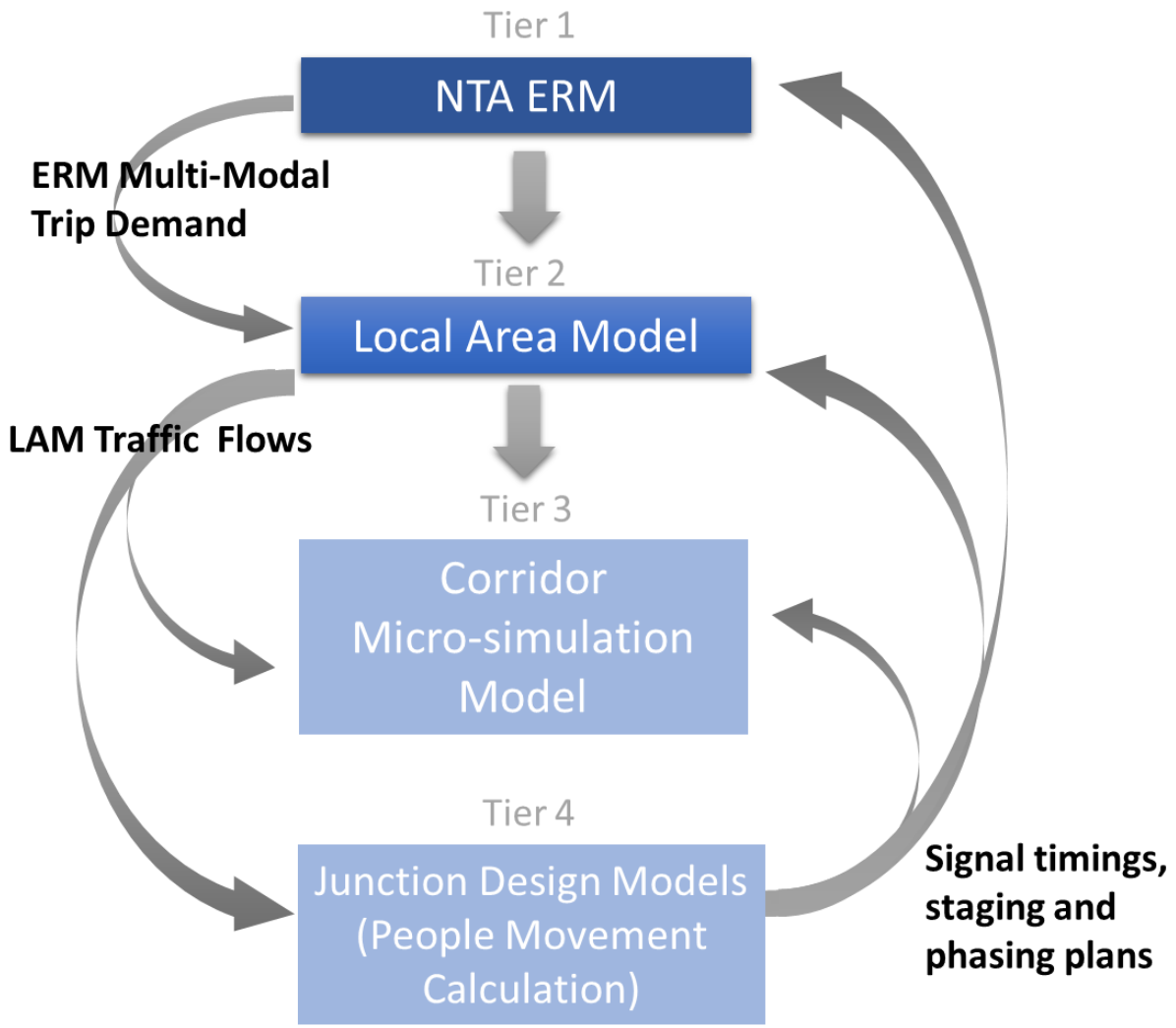

Diagram 4.1: Proposed Scheme Modelling Hierarchy

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[3] 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 disaggregate urban area traffic model, the Local Area Model (LAM) has been developed, as a cordoned model from the ERM, that could incorporate 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.

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 Infrastructure Works 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 November 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 and as such were not included in the model inputs. PCL counts are 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 SATURN network as shown in Diagram 4.2

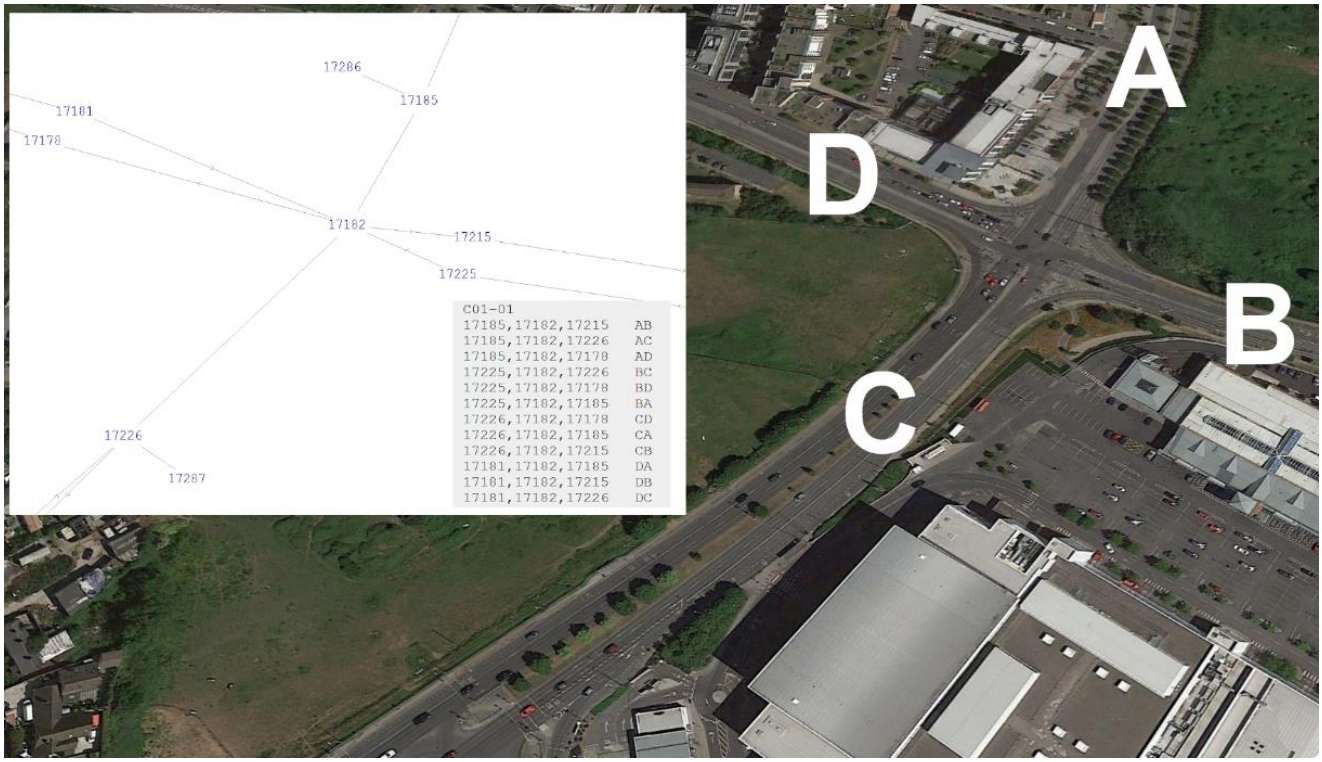

Diagram 4.2: Bus Connects LAM Node Matching (Junction C01-01)

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

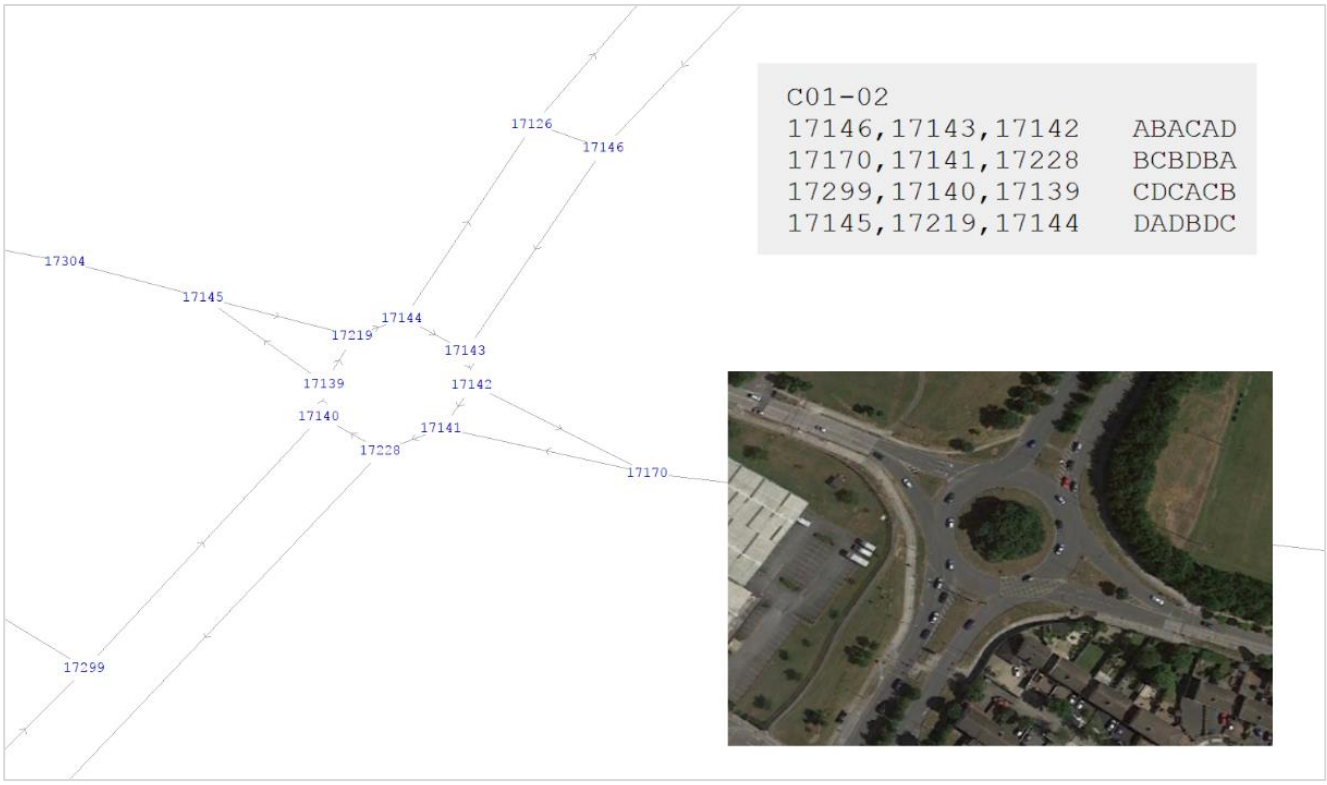

Diagram 4.3: Bus Connects LAM Node Matching (Junction C01-02)

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.

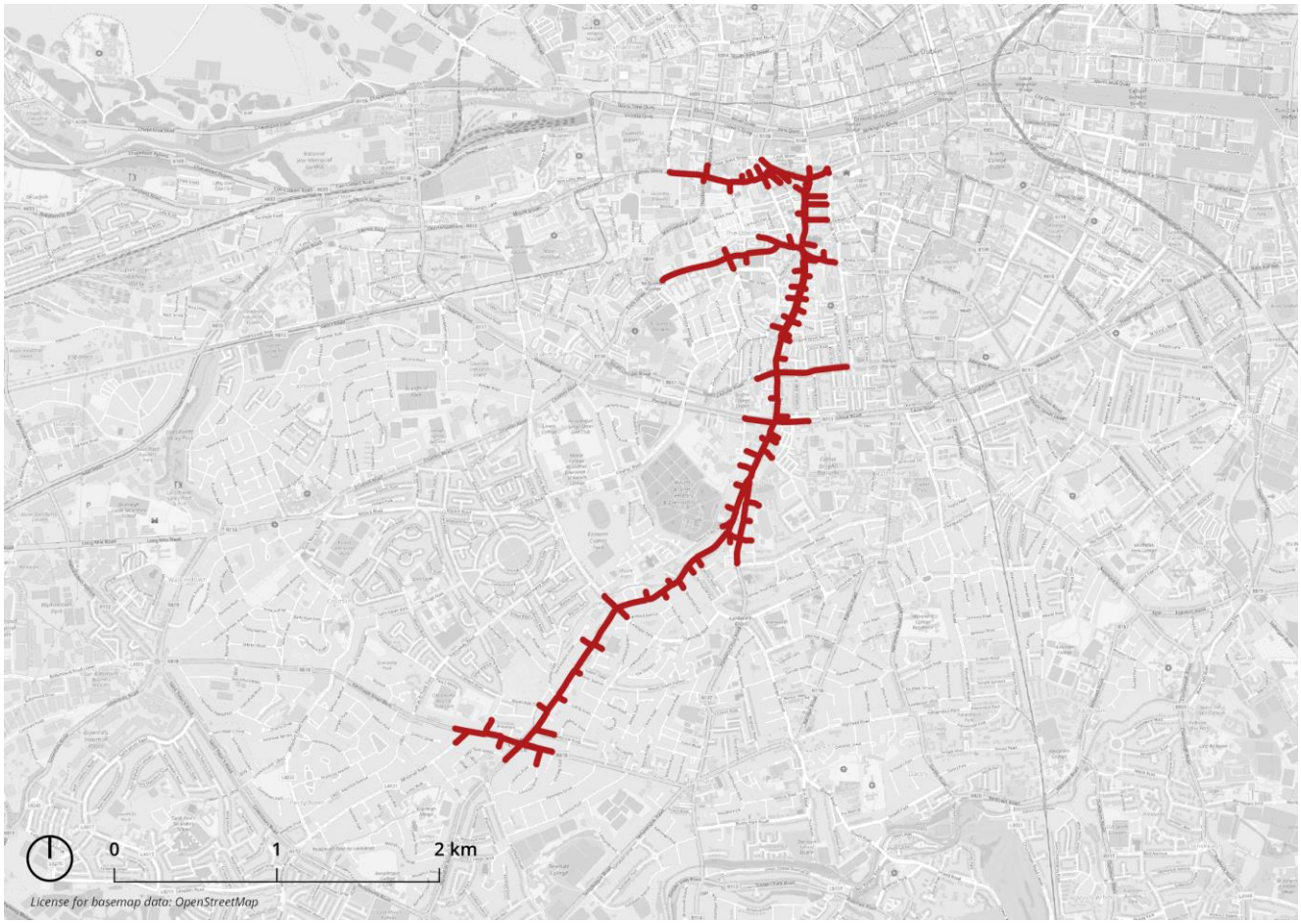

Diagram 4.4: Proposed Scheme Microsimulation Model Network

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 comprises of 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, Corridor Micro-simulation and local junction models contain consistent design, transport demand, signal phasing and staging information. Further information is contained in TIA Appendix 2 (Junction Design Report).

4.3.1.5.1 Role of the Junction Design Models

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

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

The resultant scheme designs have been modelled in the ERM, LAM and corridor models to understand the strategic and corridor specific issues and inform the preparation of the TIAs and EIARs and the planning submissions for the Proposed Scheme.

5. Baseline Environment

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

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

5.1 Bus Journey Times

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

5.2 Traffic Count Data

5.2.1 Junction Turning Counts (JTCs)

Table 5.1 displays the JTCs collected for the Proposed Scheme, the locations of which are shown in Diagram 5.1. The JTC results demonstrate the Patricks Street / Kevin Street Junction is the busiest junction in terms of daily vehicle movements (51,686 daily movements). The next busiest junctions are as follows:

- Harold's Cross Road / Parnell Road (43,070 daily movements)
- Leonard's Corner (40,008 daily movements)
- Kimmage Crossroads (35,085 daily movements)
- Harold's Cross Road / Our Lady's Hospice (31,144 daily movements)

Table 5.1: JTC Locations

Junction Identifier	Junction Name	Junction Type	Daily Movements	AM Movements	PM Movements
11-1	Wainsfort Road / Fortfield Road	Priority	19,084	1,279	1,571
11-2	Whitehall Road / Kimmage Road West	Signals	18,949	1,501	1,337
11-3	Kimmage Crossroads (KCR)	Signals	35,085	2,657	2,599
11-4	Kimmage Road Lower / Hazelbrook Road	Priority	26,211	2,052	1,952
11-5	Kimmage Road Lower / Ravensdale Park	Signals	28,364	2,325	2,063
11-6	Ravensdale Park / Poddle Park	Priority	10,232	1,123	805
11-7	Poddle Park / Clonard Road	Priority	5,020	520	466
11-8	Bangor Road / Blarney Park	Priority	4,075	444	394
11-9	Kimmage Road Lower / Corrib Road	Priority	22,051	1,644	1,515
11-10	Neagh Road / Nevin Road	Priority	2,667	430	220
11-11	Kimmage Road Lower / Aideen Avenue	Priority	21,845	1,788	1,492
11-12	Larkfield Grove / Larkfield Gardens	Priority	2,238	317	176
11-13	Kimmage Road Lower / St. Martin's Park	Priority	18,953	1,171	1,311
11-14	Kimmage Road Lower / Sundrive Road	Signals	29,474	2,185	2,111

Junction Identifier	Junction Name	Junction Type	Daily Movements	AM Movements	PM Movements
11-15	Sundrive Road / Blarney Park	Priority	17,452	1,181	1,246
11-16	Sundrive Road / Stannaway Road	Signals	21,107	1,303	1,631
11-17	Sundrive Road / Clogher Road	Signals	26,000	1,960	2,028
11-18	Larkfield Park / Larkfield Gardens	Priority	9,318	853	738
11-19	Larkfield Park / Clareville Road	Priority	9,579	891	752
11-20	Apple green service station	Priority	18,901	1,493	1,240
11-21	Atlas Tyres	Priority	17,888	1,120	1,217
11-22	Tyreland	Priority	17,869	1,119	1,210
11-23	Hennessy Glass & Battery World	Priority	17,824	1,118	1,205
11-24	Keith Finn Cars	Priority	17,757	1,116	1,202
11-25	Circle/ K Service Station	Priority	17,986	1,118	1,222
11-26/11-27	Sundrive Shopping Centre	Priority	19,018	-	-
11-28	Clareville Road / Priory Road	Priority	9,382	769	760
11-29	Clareville Road / Westfield Road	Priority	9,668	727	774
11-30	Clareville Road / Kenilworth Park	Priority	11,860	963	955
11-31	Kenilworth Park / Harold's Cross Road	Signals	28,275	2,238	2,037
11-32	Harold's Cross Road / Tivoli Avenue	Priority	16,836	1,291	1,048
11-33	Kimmage Road Lower / Mount Argus View	Signals	17,213	1,345	1,217
11-34	Kimmage Road Lower / Mount Argus Church	Priority	17,338	1,382	1,259
11-35	Kimmage Road Lower / Priory Road	Priority	17,207	1,394	1,231
11-36	Kimmage Road Lower / Westfield Road	Priority	17,140	1,386	1,267
11-37	Kimmage Road Lower / Kenilworth Park	Priority	17,471	1,430	1,309
11-38	Kimmage Road Lower / Casimir Road	Priority	16,425	1,265	1,238
11-39	Kimmage Road / Harold's Cross Park (McGowan's)	Priority	17,101	1,280	1,266
11-40	Mount Argus Road / Mount Jerome Cemetery	Signals	15,410	1,106	1,187
11-41	Harold's Cross Road / Harold's Cross Park North	Signals	30,554	2,222	2,207
11-42	Harold's Cross Road / Our Lady's Hospice	Priority	31,144	2,242	2,239
11-43	Harold's Cross Road / Greenmount Avenue	Priority	30,678	2,223	2,202
11-44	Harold's Cross Road / Mount Drummond Avenue	Priority	30,044	2,170	2,158
11-45	Harold's Cross Road / Parnell Road	Signals	43,070	3,102	2,895
11-46	Parnell Road / Greenmount Lane	Priority	17,150	1,312	1,219
11-47	Gordon's Fuel Merchant & Neighbours	Priority	24,478	1,577	1,687
11-48	Leonard's Corner	Signals	40,008	2,506	2,682
11-49	Clanbrassil Street / St. Vincent Street	Priority	22,880	1,463	1,473
11-50	Clanbrassil Street / Lombard Street West	Priority	25,123	1,580	1,625
11-51	Clanbrassil Street / Donovan Lane	Priority	25,673	1,720	1,624
11-52	Blackpitts / Donovan Lane	Priority	3,235	358	256
11-53	Clanbrassil Street / Long Lane	Signals	28,542	1,871	1,885

Junction Identifier	Junction Name	Junction Type	Daily Movements	AM Movements	PM Movements
11-54	Kevin Street Link	Signals	28,519	1,811	1,837
11-55	Patricks Street / Kevin Street	Signals	51,686	3,148	3,331
11-56	South Circular Road / Heytesbury Street	Signals	24,979	1,468	1,759
11-57	Heytesbury Street / Camden Row	Signals	12,927	858	1,018
11-58	Kevin Street / Bride Street	Signals	28,914	1,716	2,029

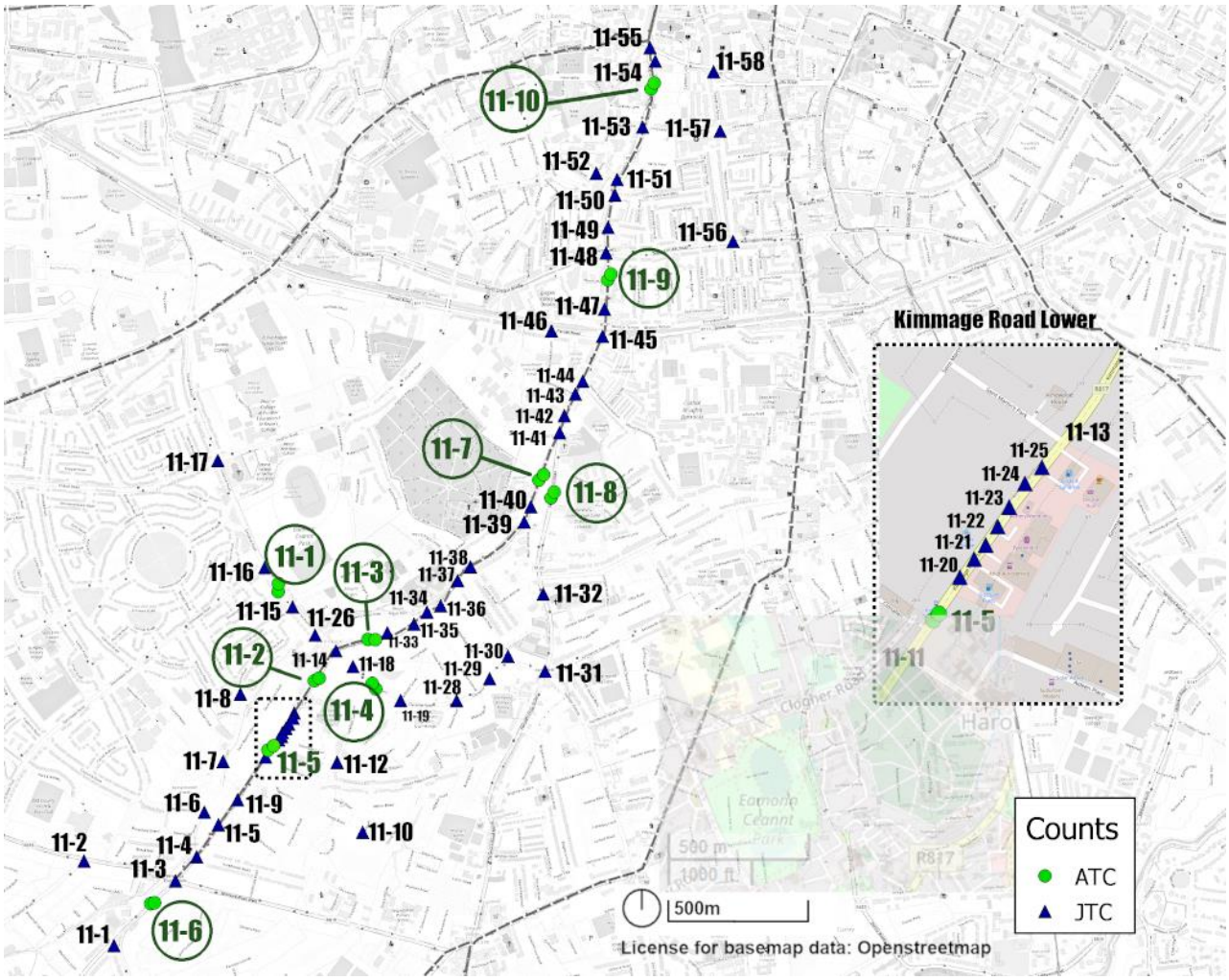

Diagram 5.1: Automatic Turning Counts (ATCs) and JTC Traffic Counts Locations

5.2.2 Automatic Turning Counts (ATCs)

Table 5.2 displays the ATCs collected for the Proposed scheme, the locations of which are shown in Diagram 5.1. The highest ATC daily flows are on Fortfield Road south of the Kimmage Cross Roads. Some ATC counts did not have reliable counts for a full week and were excluded from the dataset.

Table 5.2: ATC Locations

ATC identifier	ATC Location	Direction	Daily Movements	AM Movements	PM Movements
11.1A	Sundrive Road	Southbound	7,218	482	539
11.1B		Northbound	8,574	530	638
11.2A	Kimmage Road (south of Sundrive Road)	Southbound	7,830	241	648
11.2B		Northbound	8,921	726	479
11.3A	Kimmage Road (north of Sundrive Road)	Northbound	8,680	874	470
11.3B		Southbound	7,330	303	629
11.4A	Larkfield Park	Northbound	3,689	321	250
11.4B		Southbound	4,366	382	377
11.5A	Kimmage Road (north of Aideen Avenue)	Northbound	8,820	855	417
11.5B		Southbound	8,730	446	672
11.6A	Fortfield Road	Northbound	8,349	638	482
11.6B		Southbound	9,113	503	837
11.7A	Harold's Cross Park (west)	Northbound	6,663	538	339
11.7B		Southbound	6,147	160	596
11.8A	Harold's Cross Park (east)	Northbound	6,456	433	340
11.8B		Southbound	8,398	392	648
11.9A	Clanbrassil Street (south of Leonard's Corner)	Northbound	excluded	excluded	excluded
11.9B		Southbound	excluded	excluded	excluded
11.10A	New Street (south of Kevin Street)	Northbound	excluded	excluded	excluded
11.10B		Southbound	excluded	excluded	excluded

5.3 Baseline Conditions

5.3.1 Overview

In describing the baseline conditions, the Proposed Scheme has been divided into three sections in accordance with the proposed design (see Chapter 4 (Proposed Scheme Description) in Volume 2 of the EIAR):

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

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

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

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

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

5.3.2.1 Pedestrian Infrastructure

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

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

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

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

Further details of the baseline pedestrian facilities (i.e. routing, directness, accessibility, crossing and footpath widths) at each junction along Section 1 of the Proposed Scheme are included in TIA Appendix 4 (Pedestrian Infrastructure Assessment).

5.3.2.2 Cycling Infrastructure

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

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

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

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

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

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

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

5.3.2.3 Bus Infrastructure

5.3.2.3.1 Bus Priority Measures

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

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

5.3.2.3.2 Bus Stop Facilities

There are currently 16 bus stops along Section 1 of the Proposed Route – seven inbound stops on R137 Harold's Cross Road towards the city centre, seven outbound stops on R137 Harold's Cross Road and two orbital stops located on Sundrive Road. The existing bus facilities along Section 1 of the Proposed Scheme are illustrated in Figure 6.5a in Volume 3 of the EIAR.

The inbound stops are:

- Stop 2438 north of R817 Kimmage Road Lower;
- Stop 2439 south of Ravensdale Park;
- Stop 2440 north of Aideen Avenue;
- Stop 2441 south of Sundrive Road;
- Stop 2442 north of Priory Road;
- Stop 2443 north of Kenilworth Park; and

- Stop 2444 north of Mount Argus Road to the west Harold's Cross Park.

The outbound stops are:

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

Orbital stops are:

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

Table 5.3 outlines the availability of bus stop facilities at the existing 16 bus stops along Section 1 of the Proposed Scheme.

Table 5.3: Section 1 - Availability of Bus Stop Facilities (of a Total 16 Bus Stops)

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

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

The bus stops cater for eight Dublin Bus and Go-Ahead Ireland routes (9, 16, 16c, 18, 49, 54a, 83, 83a). The services available from these stops are outlined in Table 5.4.

Table 5.4: Section 1 - Bus Service Frequency

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

5.3.2.4 General Traffic

5.3.2.4.1 R817 Kimmage Road Lower

R817 Kimmage Road Lower in Section 1 of the Proposed Scheme is a two-way carriageway, with a speed limit of 50km/h. For much of the length, R817 Kimmage Road Lower has one lane in each direction except for turning lanes at junctions. The carriageway varies in width from approximately 16.0m (in the vicinity of the R817 Kimmage Road Lower / Fortfield Road / R818 Terenure Road West Road junction where there is two lanes and hatching) to approximately 5.5m (north of Kimmage Court). Generally, the carriageway is approximately 7.5m in width where there are only single lanes in each direction.

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

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

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

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

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

The north-western arm approach consists of one left-turn lane of approximately 60m length, one straight-ahead lane and one right-turn lane all of which are around 2.5m in width. The left-turn lane is priority controlled whilst the straight-ahead and right-turn lane are signal controlled. The north-western arm exit consists of one general traffic lane approximately 5.5m in width. A pedestrian refuge island separates the approach and exit lanes.

The north-eastern arm approach consists of an advisory cycle lane within the general traffic lane, one left-turn and ahead lane and right-turn lane which are approximately 3.1m in width. There is an advance stop line for

cyclists and the cycle lane continues straight ahead across the junction. A priority controlled left-turn lane is provided. The north-eastern arm exit consists of one advisory cycle lane and one general traffic lane which increases to two lanes approximately 20m north of the junction. A pedestrian refuge island separates the approach and exit lanes.

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

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

These characteristics are shown in Image 5.1.

Image 5.1: R817 Kimmage Road Lower / Fortfield Road / R818 Terenure Road West Road Four-Arm Signalised Junction

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

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

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

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

These characteristics are shown in Image 5.2.

Image 5.2: R817 Kimmage Road Lower / Ravensdale Park Three-Arm Signalised Junction

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

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

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

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

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

These characteristics are shown in Image 5.3.

Image 5.3: R817 Kimmage Road Lower / Sundrive Road and Larkfield Avenue Four-Arm Signalised Junction

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

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

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

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

These characteristics are shown in Image 5.4.

Image 5.4: R817 Kimmage Road Lower / Mount Argus View Three-Arm Signalised Junction

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

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

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

These characteristics are shown in Image 5.5.

Image 5.5: R817 Kimmage Road Lower / Harold's Cross Road Three-Arm Priority Junction

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

The northern arm approach consists of an advisory cycle lane, one left-turn and ahead lane of approximately 20m length and one straight-ahead lane. No right turn is permitted from this approach. Whilst lane indication arrows indicate two traffic lanes there are no lane lines, the total width of the traffic approach is around 4.3m. The advisory cycle lane continues straight ahead across the junction. The northern arm exit consists of an advisory cycle lane and one general traffic lane approximately 5.5m in width. A combined bus and cycle lane commences approximately 10m north of the junction.

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

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

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

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

5.3.2.4.2 R137 Harold's Cross Road

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

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

- R817 Harold's Cross Road / Mount Argus Road; and
- R137 Harold's Cross Road / R137 Harold's Cross Road.

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

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

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

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

These characteristics are shown in Image 5.6.

Image 5.6: R817 Harold's Cross Road / Mount Argus Road Three-Arm Signalised Junction

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

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

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

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

These characteristics are shown in Image 5.7.

Image 5.7: R137 Harold's Cross Road / R137 Harold's Cross Road Three-Arm Signalised Junction

5.3.2.4.3 Off Corridor Residential Streets

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

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

5.3.2.5 Existing Parking / Loading

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

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

- On Ravensdale Park, to the north-west of R817 Kimmage Road Lower, there is a short length of informal kerbside parking with sufficient space for approximately seven cars;
- On R817 Kimmage Road Lower between Ravensdale Park and Sundrive Road there is a section of informal kerbside parking with sufficient space for approximately 232 cars. Parking adjacent to the northbound carriageway is available the exception of 07.00hrs to 10.00hrs Monday to Saturday

when a cycle lane is in use. Parking adjacent to the southbound carriageway is available the exception of 16.00 to 19.00 Monday to Saturday when a cycle lane is in use;

- On the south-west arm of the R817 Kimmage Road Lower / Sundrive Road / Larkfield Avenue junction there is a private car park with permit parking spaces for 52 cars;
- On the south-west arm of the R817 Kimmage Road Lower / Sundrive Road / Larkfield Avenue junction there are two taxi rank parking spaces, 13 informal parking spaces and a private car park with Pay and Display parking space for 24 cars;
- On the northeast arm of the R817 Kimmage Road Lower / Sundrive Road / Larkfield Avenue junction there are four informal parking spaces;
- On R817 Kimmage Road Lower between Sundrive Road and Harold's Cross Park there is a section of informal kerbside parking with sufficient space for approximately 80 cars. Parking adjacent to the northbound carriageway is available the exception of 07.00 to 10.00 Monday to Saturday when a cycle lane is in use. Parking adjacent to the southbound carriageway is available the exception of 16.00 to 19.00 Monday to Saturday when a cycle lane is in use;
- On R817 Kimmage Road Lower, at the entrance to The Church of Mount Argus and The Shrine of Saint Charles, there are 13 Pay and Display parking spaces;
- On R817 Kimmage Road Lower, opposite the Kenilworth Park junction, there are six permit parking spaces;
- On Harold's Cross Road, to the south of Harold's Cross Park, there are four permit parking spaces; and
- Outside Mount Argus Apartments there are six permit spaces.

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

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

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

5.3.3.1 Pedestrian Infrastructure

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

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

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

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

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

5.3.3.2 Cycling Infrastructure

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

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

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

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

Further details of the baseline cycling facilities (i.e. level of segregation from vehicles, capacity for cycling two abreast and / or overtaking, and junction treatment) along the length of Section 2 of the Proposed Scheme are included in TIA Appendix 4 (Cycling Infrastructure Assessment).

5.3.3.3 Bus Infrastructure

5.3.3.3.1 Bus Priority Measures

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

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

5.3.3.3.2 Bus Stop Facilities

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

The inbound stops are:

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

The outbound stop is:

- Stop 1291 south Le Vere Terrace.

Table 5.5 outline the availability of bus stop facilities at the existing six bus stops along Section 2 of the Proposed Scheme.

Table 5.5: Section 2 - Availability of Bus Stop Facilities Summary (of a Total Three Bus Stops)

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

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

The bus stops cater for five Dublin Bus routes (9, 16, 16c, 49 and 54a). The services available from these stops are outlined in Table 5.4.

5.3.3.4 General Traffic

5.3.3.4.1 R137 Harold's Cross Road

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

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

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

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

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

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

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

The western arm approach consists of a mandatory cycle lane (which general traffic is not permitted to enter), which becomes an advisory cycle lane through the junction and a straight-ahead lane which flares approximately

12m in advance of the junction to provide a right-turn lane. The western arm exit consists of a mandatory cycle lane and one general traffic lane. A hatched median separates the approach and exit lanes on this arm.

These characteristics are shown in Image 5.8.

Image 5.8: R137 Harold's Cross Road / R111 Grove Road / R111 Parnell Road Four-Arm Signalised Junction

5.3.3.5 Existing Parking / Loading

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

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

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

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

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

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

5.3.4.1 Pedestrian Infrastructure

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

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

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

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

Further details of the baseline pedestrian facilities (i.e. routing, directness, accessibility, crossing and footpath widths) at each junction along Section 3 of the Proposed Scheme are included in TIA Appendix 4 (Pedestrian Infrastructure Assessment).

5.3.4.2 Cycling Infrastructure

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

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

- 4 Sheffield stands along R137 Clanbrassil Street Lower to the north of the junction with R811 South Circular Road;
- 5 Sheffield stands along R137 Clanbrassil Street Lower immediately south of Donovan Lane;
- 8 Sheffield stands along R137 Clanbrassil Street Lower to the north of Donovan Lane;
- 4 Sheffield stands along R137 Clanbrassil Street Lower immediately south of Malpas Street;
- 5 Sheffield stands along R137 New Street South immediately south of Fumbally Lane;
- 9 Sheffield stands along R137 New Street South immediately north of Fumbally Lane;
- 10 Sheffield stands along R137 New Street South opposite Cathedral View Court;
- 4 Sheffield stands along R137 New Street South immediately south of the R110 Kevin Street Upper slip road;
- 5 Sheffield stands along R137 Patrick Street at the R137 Patrick Street / R110 Kevin Street Upper / R137 New Street South / R110 The Coombe junction; and
- 14 Sheffield stands along R110 The Coombe at the R137 Patrick Street / R110 Kevin Street Upper / R137 New Street South / R110 The Coombe junction.

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

Further details of the baseline cycling facilities (i.e. level of segregation from vehicles, capacity for cycling two abreast and / or overtaking, and junction treatment) along the length of Section 3 of the Proposed Scheme are included in TIA Appendix 4 (Cycling Infrastructure Assessment).

5.3.4.3 Bus Infrastructure

5.3.4.3.1 Bus Priority Measures

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

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

5.3.4.3.2 Bus Stop Facilities

There are currently nine bus stops along Section 3 of the Proposed Route – five 'inbound' stops towards the city centre and four 'outbound' stops.

The inbound stops are:

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

The outbound stops are:

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

Table 5.6 outlines the availability of bus stop facilities at the existing nine bus stops along this section of the Proposed Scheme.

Table 5.6: Section 3 - Availability of Bus Stop Facilities (of a Total Nine Bus Stops)

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

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

The bus stops cater for five Dublin Bus routes (9, 16, 16c, 49 and 54a). The services available from these stops are outlined in Table 5.4.

5.3.4.4 General Traffic

5.3.4.4.1 R137 Clanbrassil Street Upper / R137 Clanbrassil Street Lower

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

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

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

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

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

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

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

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

These characteristics are shown in Image 5.9.

Image 5.9: R137 Clanbrassil Street / R811 South Circular Road Four-Arm Signalised Junction

5.3.4.4.2 R137 New Street South

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

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

The existing major junction arrangements are as follows:

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

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

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

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

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

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

These characteristics are shown in Image 5.10.

Image 5.10: R137 New Street South / Malpas Street / Long Lane Four-Arm Signalised Junction

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

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

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

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

These characteristics are shown in Image 5.11.

Image 5.11: R137 New Street South / R110 Kevin Street Upper (south) Three-Arm Signalised Junction

5.3.4.5 Existing Parking / Loading

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

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

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

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

6. Predicted Impacts

6.1 Characteristics of the Proposed Scheme

The characteristics of the Proposed Scheme are described in detail in Chapter 4 (Proposed Scheme Description) in Volume 2 of the EIAR.

6.2 Do Nothing Scenario

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

6.3 Do Minimum Scenario

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

For the qualitative analysis, the assessment is in relation to the conditions of the existing transport network, which have been outlined in Section 5 (Baseline Environment) corresponding with a Do Nothing scenario. As a result of the COVID-19 pandemic a number of temporary transport mobility measures have been implemented. Due to their temporary status, the measures are not considered a permanent long-term feature of the receiving environment, and as such, have not been considered in the impact assessments.

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

6.3.1.1 Do Minimum Transport Schemes

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

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

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

The Do Minimum scenarios (in both 2028 and 2043) include all other elements of the BusConnects Programme of projects (apart from the CBC Infrastructure Works elements) (i.e. the new BusConnects routes and services

(as part of the Revised Dublin Area Bus Network), new bus fleet, the Next Generation Ticketing and integrated fare structure proposals) are included in the Do Minimum scenarios.

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

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

6.3.1.2 Do Minimum Transport Demand

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

It is envisaged that the population will grow by 11% up to 2028 and 25% by 2043 (above 2016 census data levels). Similarly, employment growth is due to increase by 22% by 2028 and 49% by 2043 (Source: NTA Reference Case Planning Sheets 2028, 2043).

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

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

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

6.4 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) in Volume 2 of the EIAR.

6.5 Construction Phase

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

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

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

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

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

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

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

6.5.1 Description of Construction Works

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

- **Section 1:** R817 Kimmage Road Lower from Kimmage Cross Roads to Junction with Harold's Cross Road:
  - **Section 1a:** Kimmage Cross Roads to Ravensdale Park;
  - **Section 1b:** R817 Kimmage Road Lower - Ravensdale Park / Sundrive / Harold's Cross; and
  - **Section 1c:** Kenilworth Park / Harold's Cross Road Junction.
- **Section 2: Harold's Cross Road from Harold's Cross Park to Grand Canal;**
- **Section 3:** Clanbrassil Street Upper and Lower and New Street South from the Grand Canal to the Patrick Street Junction:
  - **Section 3a:** Grand Canal Bridge / Clanbrassil Street Upper;
  - **Section 3b:** Clanbrassil Street Upper / Clanbrassil Street Lower; and
  - **Section 3c:** Clanbrassil Street Lower / New Street South.

The location of each section along the Proposed Scheme is shown in Diagram 6.1.

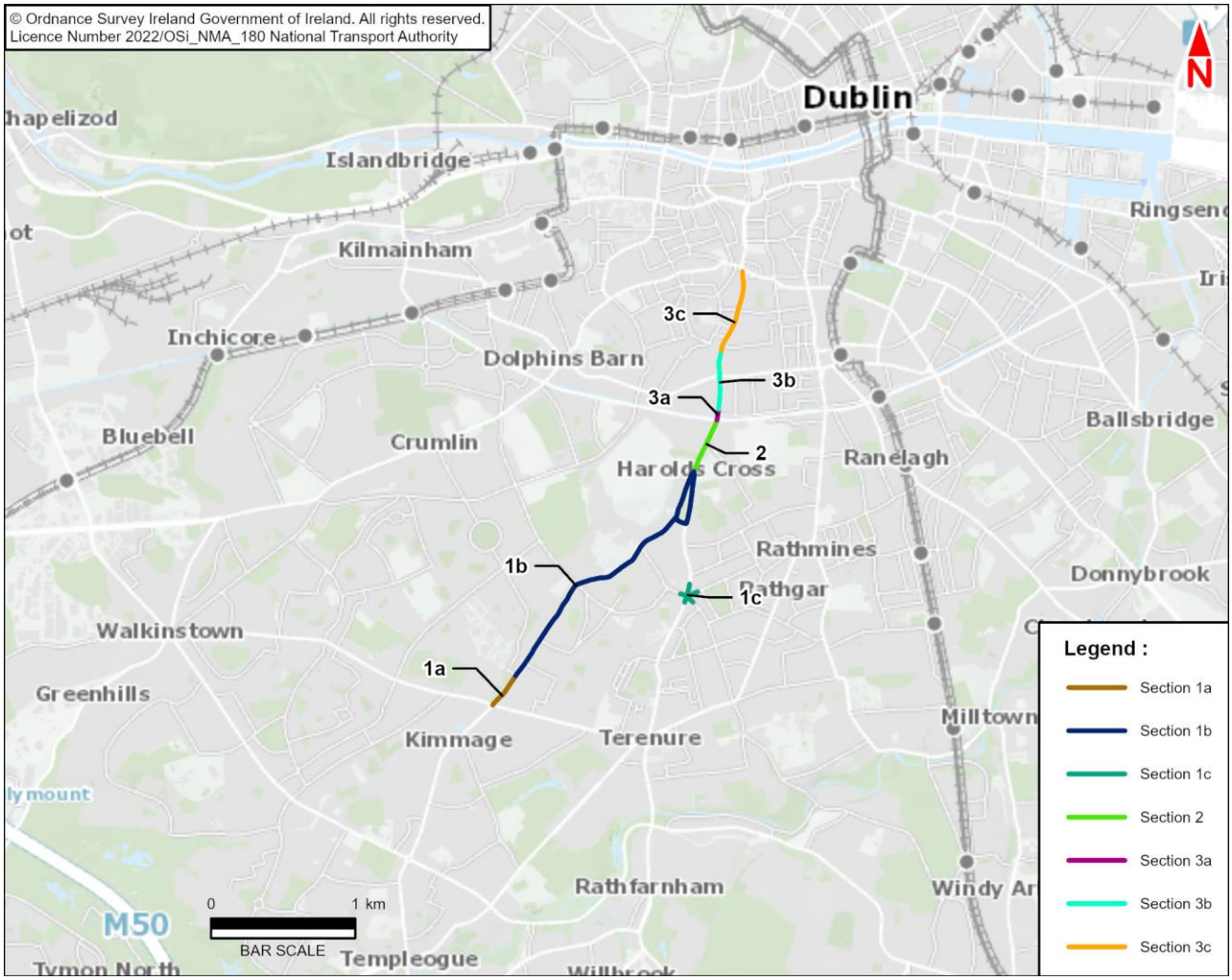

Diagram 6.1: Proposed Sub-Sections of Construction Phase

6.5.2 Construction Programme

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

6.5.3 Construction Access Route

Access to and egress from the Construction Compounds will be permitted via dedicated construction access routes for vehicles. The haulage of material on-site is anticipated to be minimal. There will however be the removal of excavated material and the delivery of construction materials to site. It is anticipated that the exporting and delivery of materials will be executed as efficiently as possible along national roads such as the close by M50 Motorway and from the Regional Road network. It is assumed that all National and Regional Roads including the Regional Roads in the immediate vicinity of the Proposed Scheme will be used to supply / remove this material, where practicable, to minimise use of the local road network.

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

- M50 Motorway.

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

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

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

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

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

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

Diagram 6.2 illustrates the proposed construction access route to and from the main Construction Compounds.

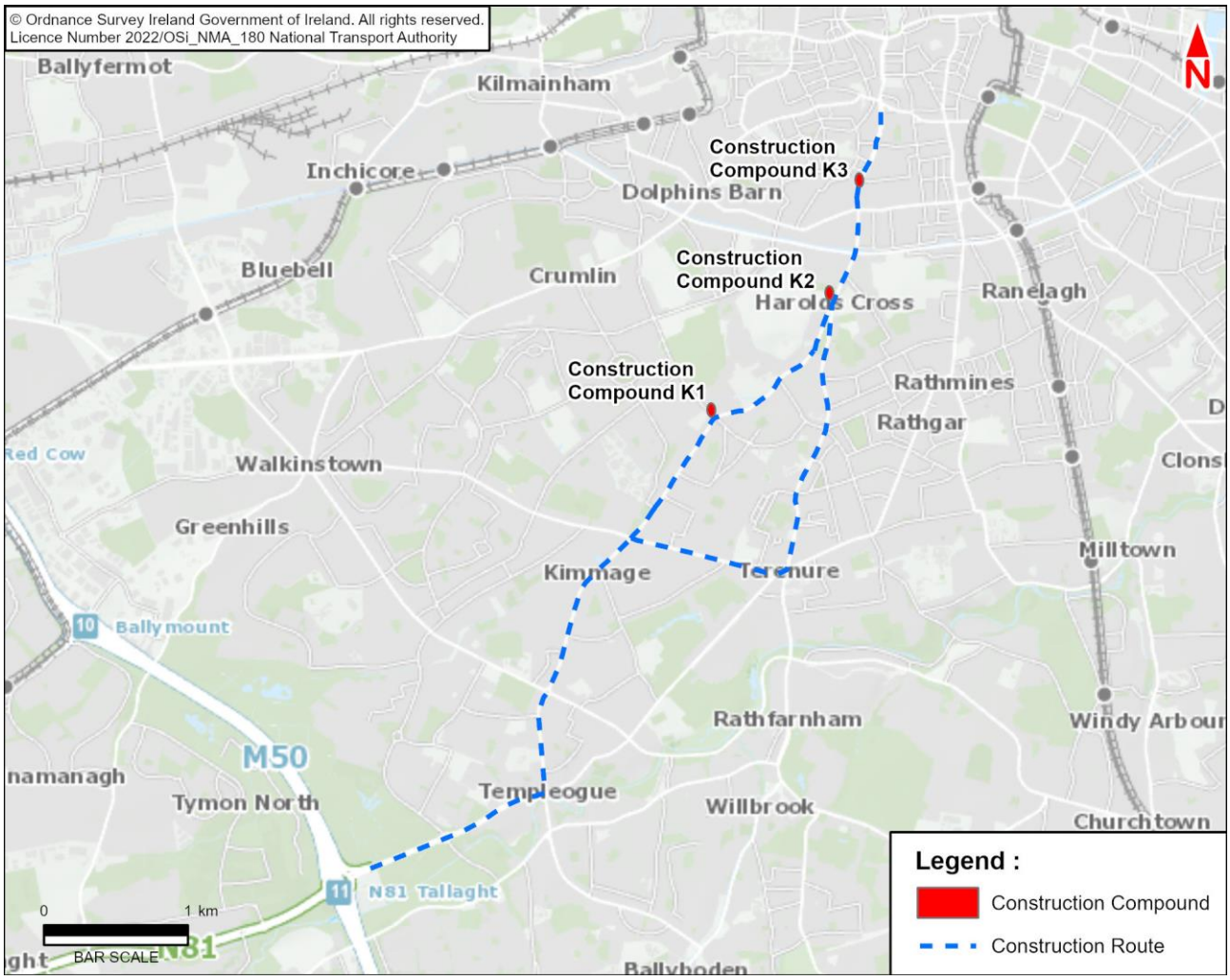

Diagram 6.2: Proposed Construction Access Route and Construction Compound Locations

6.5.4 Potential Construction Impact

Construction of the Proposed Scheme has the potential to impact people's day-to-day activities along the corridor while the works are underway. Chapter 5 (Construction) in Volume 2 of the EIAR and the CEMP (Appendix A5.1 in Volume 4 of the EIAR), identify impactful activities, considers their effect, and identify mitigation measures to reduce or remove their impact, insofar as practicably possible.

For construction activities on or adjacent to public roads, all works will be undertaken in accordance with the Traffic Signs Manual, Chapter 8 Temporary Traffic Measures and Signs for Roadworks and associated guidance (DoT 2019a; 2019b). Chapter 5 (Construction) in Volume 2 of the EIAR contains temporary traffic management proposals for the Proposed Scheme. These proposals maintain a safe distance between road users and road workers, depending on the type of construction activities taking place and the existing site constraints. Temporary diversions, and in some instances temporary road closures, may be required where a safe distance cannot be maintained to undertake works necessary to complete the Proposed Scheme. All road closures and diversions will be determined by the NTA, who may liaise with the local authority and An Garda Siochana, as necessary. The need for temporary access restrictions will be confirmed with residents and businesses prior to their implementation.

6.5.4.1 Pedestrian Provisions

As described in Chapter 5 (Construction) in Volume 2 of the EIAR, pedestrians will be temporarily impacted by construction activities along the direct study area. Pedestrian diversions and temporary surface footpaths will be used to facilitate pedestrian movements around construction activities. Access to local amenities, such as bus stops, traffic crossings, private dwellings, and businesses, may be temporarily altered but access will be maintained.

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

6.5.4.1.1 Cycling Provisions

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

6.5.4.1.2 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) in Volume 2 of the EIAR. Wherever practicable, bus services will be prioritised over general traffic. However, the temporary closure of sections of existing dedicated bus lanes may be required to facilitate the construction of new bus priority infrastructure that is being developed as part of the Proposed Scheme. It is also likely that some existing bus stop locations may need to be temporarily relocated to accommodate the works. In such cases operational bus stops will be safely accessible to all users. The impact is considered to have a **Medium Negative** impact public transport users.

6.5.4.1.3 Parking and Loading

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

6.5.4.1.4 General Traffic

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

6.5.4.1.5 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 effect on general traffic redistribution is anticipated to be **Medium Negative and Short Term** due to the temporary nature of any restrictions.

6.5.4.1.6 Construction Traffic Generation

Site Operatives: As described in Chapter 5 (Construction) in Volume 2 of the EIAR, it is anticipated there will be 20 to 30 personnel directly employed across the Proposed Scheme, rising to 50 personnel at peak construction.

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

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

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 / demolition waste material.

Chapter 5 (Construction) in Volume 2 of the EIAR provides a breakdown of the expected operation for the construction of the Proposed Scheme during each subsection. It should be noted that the CTMP will control

vehicular movement along the construction route, including restrictions on the number of HGVs accessing and egressing the construction works throughout the day to mitigate the impacts to general traffic on the surrounding road network.

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

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

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

Overall Peak Hour Impacts: Table 6.1 identifies 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	4	0	4	18	27
PM Peak Hour	0	4	10	4	18	27

Given that the above impacts are below the thresholds set out in TII's Guidelines for Transport Assessments (TII 2014), it is considered appropriate to define the potential general traffic impacts of the Construction Phase to be **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 in Volume 4 of the EIAR.

6.5.5 Construction Phase Summary

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

Table 6.2: Summary of Construction Phase Potential Impacts

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

6.6 Operational Phase

6.6.1 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.

6.6.2 Qualitative Assessment

6.6.2.1 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 five 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.

6.6.2.1.1 Pedestrian Infrastructure

The impacts to the quality of the pedestrian infrastructure as a result of the Proposed Scheme have been considered with reference to any changes to the existing pedestrian facilities along footpaths and crossing locations within the direct study area. Reference has been made to the overall changes along the full length of the Proposed Scheme and the impact assessment primarily focuses only on the pedestrian facilities at junctions to provide a direct comparison between the Do Minimum and Do Something scenarios.

Where the Proposed Scheme introduces a change to a junction layout, the 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 (or raised table treatment) and road markings for pedestrians (including able-bodied, wheelchair users, mobility impaired and pushchairs)?
Widths	Are there adequate footpath and crossing widths in accordance with national standards?

A LoS rating has been applied to each junction for both the Do Minimum and Do Something scenarios based on whether the above indicators have been met. Table 6.4 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

6.6.2.1.2 Cycling Infrastructure

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

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

Table 6.6 outlines 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	Crossings at signalised junctions for cyclists along Proposed Scheme / Protected junctions not already classified as A+ for junction treatment
B	On-road cycle lanes or carriageway designated as 'quiet cycle 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

6.6.2.1.3 Bus Infrastructure

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

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

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

The magnitude of impact of the Proposed Scheme, applied to the qualitative review of the above factors, is set out in Table 6.8.

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.

6.6.2.1.4 Parking and Loading

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

- Designated Paid Parking;
- Permit Parking;

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

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

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

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

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

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

6.6.2.2.1 Pedestrian Infrastructure

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

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

The assessment of the qualitative impacts on the pedestrian infrastructure for Section 1 of the Proposed Scheme are summarised in Table 6.9. A detailed breakdown of the assessment at each impacted junction, including a list of the junctions which experience no change, can be found in TIA Appendix 4 (Pedestrian Infrastructure Assessment).

Table 6.9: Section 1 – Pedestrian Impact during Operational Phase

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

The content of Table 6.9 demonstrates that the Proposed Scheme will have a long-term positive impact on the quality of the pedestrian infrastructure at junctions within Section 1.

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

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

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

6.6.2.2.1.1 Cycling Infrastructure

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

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

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

The contents of Table 6.10 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. TIA Appendix 4 (Cycling Infrastructure Assessment) outlines in further detail the methodology behind each LoS rating given to the Do Minimum and Do Something scenarios.

Table 6.10: Section 1 – Cycling Impact during Operational Phase

Locations	Chainage	Do Minimum LoS	Do Something LoS	Impact
Main Corridor (R817 & R137 Regional Roads)				
R817 Kimmage Road Lower: R818 Terenure Road West to Ravensdale Park	A0 – A300	B	A	Low Positive
R817 Kimmage Road Lower: Ravensdale Park to Sundrive Road	A300 – A1100	B	C	Low Negative
R817 Kimmage Road Lower: Sundrive Road to Mount Argus View	A1100 – A1300	B	B	Negligible
R817 Kimmage Road Lower: Mount Argus View to Harold's Cross Road	A1300 – A1950	B	B	Negligible
R817 Harold's Cross Road (adjacent to Harold's Cross Park)	A1950 – A2300	C	B	Low Positive
R137 Harold's Cross Road (adjacent to Harold's Cross Park)	B10000 – B10400	C	B	Low Positive
R137 Harold's Cross Road / Kenilworth Square North / Rathgar Avenue / Kenilworth Park	J90050	D	B	Medium Positive
Poddle Cycleway				
Poddle Cycleway: Ravensdale Park to Sundrive Road	G60000 – G60900	D	B	Medium Positive
Sundrive Road: Blarney Park to R817 Kimmage Road Lower	G60900 – G61100	D	C	Low Positive
Poddle Cycleway: Sundrive Road to R817 Kimmage Road Lower	G61050 – H70340	D	B	Medium Positive
Section Summary		**C**	**B**	**Low Positive**

The LoS ratings of the cycling facilities during the Do Minimum scenario ranges from B to D, with the D ratings occurring along the proposed quiet cycle route and the R137 Harold's Cross Road / Kenilworth Square North / Rathgar Avenue / Kenilworth Manor five-arm junction.

During the Do Something scenario, the LoS ratings range from A to C, with several locations receiving a positive impact, some receiving a negligible impact, and the R817 Kimmage Road Lower between Ravensdale Park and Sundrive Road receiving a negative impact in which the LoS ratings changes from B to C. This negative impact is expected to be offset by a reduction in vehicular traffic along the route created by the proposed bus gates. Such a reduction will create an over environment more conducive to cycling without the need for physical measures. Furthermore, the length of the route which sees this negative impact runs parallel to the Poddle Cycleway which offers cyclists a more cycle friendly alternative should they not feel comfortable cycling along the main corridor.

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

6.6.2.2.2 Bus Infrastructure

This section provides and assessment of the changes in the quality of bus stop infrastructure provision as a result of the Proposed Scheme between Kimmage Cross Roads and the Harold's Cross Road Junction, including upgrades and any relocations. Any relocations of bus stops which need to be carried through to the EIAR for significance assessment are identified.

There are currently 16 bus stops along this section of the Proposed Route – seven 'inbound' stops towards the city centre, seven 'outbound' stops and two orbital stops. Table 6.11 presents an overview of the changes in the number and location of bus stops as a result of the Proposed Scheme.

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

Direction	Stop	Chainage	Do Something	Comment
Inbound	2438	A -110	Rationalised / Removed	Stop 2438 to be combined with Stop 2439 at a new location approximately 100m north of the current location. Therefore, existing Stop 2438 is removed.
Inbound	New	A-204	New	New inbound stop proposed between the existing Stop 2438 and 2439.
Outbound	2394	A-237	Relocated	Stop 2394 to be moved approximately 100m south of existing location.
Inbound	2439	A-264	Rationalised / Removed	Stop 2439 to be combined with Stop 2438 at a new location approximately 50m south of the current location. Therefore, existing Stop 2439 is removed.
Outbound	2393	A-499	Retained	Stop 2393 to be retained at the existing location
Inbound	2440	A-654	Retained	Stop 2440 to be retained at the existing location
Outbound	2392	A-982	Relocated	Stop 2392 to be moved approximately 25m north of existing location
Inbound	2441	A-1039	Relocated	Stop 2441 to be moved approximately 20m north of existing location
Eastbound	2497	N/A	Relocated	Stop 2497 to be moved approximately 70m south east of the existing location
Westbound	2485	N/A	Retained	Stop 2485 to be retained at the existing location
Outbound	2391	A-1362	Relocated	Stop 2391 to be moved approximately 10m south west of existing location
Inbound	2442	A-1407	Retained	Stop 2442 to be retained at the existing location
Outbound	2390	A-1589	Retained	Stop 2390 to be retained at the existing location
Inbound	2443	A-1643	Retained	Stop 2443 to be retained at the existing location
Inbound	2444	A-2033	Retained	Stop 2444 to be retained at the existing location
Outbound	2389	A-2100	Relocated	Stop 2391 to be moved approximately 85m south of existing location
Outbound	1292	B-10320	Retained	Stop 1292 to be retained at the existing location

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

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

The content in Table 6.12 indicates that there are improvements to the bus stop facilities along Section 1 of the Proposed Scheme. It is proposed that all bus stops provide real time / timetable information, and accessible kerbs. It is also proposed for all bus stops along the section to provide shelter and seating. There are also no indented bus bays proposed along Section 1, which alleviates the risk of re-entry delays to the operation of buses.

Overall, the improvements to bus facilities with regards to the provision of real-time information, shelters, seating and accessible kerbs throughout Section 1 of the Proposed Scheme is assessed as providing an overall **Medium Positive impact** for bus passengers.

6.6.2.2.3 Parking and Loading

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

- There are currently seven informal parking spaces on Ravensdale Park located adjacent to Poddle Park. It is proposed to formalise the existing parking providing four spaces and therefore removing three of the seven spaces. Given the retention of four spaces at this location and the additional informal parking available on surrounding residential streets, impact of this loss is assessed as a **Low Negative** impact;
- There are currently 22 informal, part-time parking spaces southwest of the R817 Kimmage Road Lower / Sundrive Road Junction, adjacent to the R817 Kimmage Road Lower southbound carriageway. It is proposed to remove a total of six spaces, and to allow full-time use of the remaining 16 spaces. 52 off-street permit parking spaces will be available on the opposite side of the street and most residential properties have off-street parking at the rear. The impact of removing six part-time spaces, balanced against the enhancement to full-time for the remaining 16 spaces, is assessed as having a **Negligible** impact;
- There are currently 52 off-street, permit parking spaces located within a private car park on the southwest arm of the R817 Kimmage Road Lower / Sundrive Road / Larkfield Avenue junction. It is proposed to formalise parking arrangements at this location however there will be no change to the overall number of parking spaces at this location. The impact of this formalisation is assessed as having a **Negligible** impact;
- There are currently two taxi rank parking spaces on the southwest arm (Sundrive Road) of the R817 Kimmage Road Lower / Sundrive Road / Larkfield Avenue junction. It is proposed to remove the two

taxi spaces and provide cycle lanes along this section of Sundrive Road. Three taxi bays are proposed in a car park located 20m northwest of the existing location to mitigate this loss. The impact of removing two taxi spaces, balanced against the provision of three taxi spaces to the northwest is assessed as having a **Negligible** impact;

- There are currently 17 informal spaces on the southwest arm (Sundrive Road) of the R817 Kimmage Road Lower / Sundrive Road / Larkfield Avenue junction. It is proposed to remove all 14 informal parking spaces and provide cycle lanes along this section of Sundrive Road. The impact of removing 14 informal spaces alongside the reduction in available Pay & Display parking spaces to the south (detailed below) is assessed as having a **Low Negative** impact;
- There are currently 24 Pay & Display parking spaces on the southwest arm (Sundrive Road) of the R817 Kimmage Road Lower / Sundrive Road / Larkfield Avenue junction. It is proposed to reduce the number of parking spaces from 24 to 12 Pay & Display spaces plus three taxi spaces. The impact of removing 12 Pay & Display parking spaces alongside the removal of informal parking spaces to the north (detailed above) is assessed as having a **Low Negative** impact;
- There are currently four informal parking spaces on the northeast arm (R817 Kimmage Road Lower) of the R817 Kimmage Road Lower / Sundrive Road / Larkfield Avenue junction. It is proposed to formalize the parking at this location by removing one space and providing three designated parking bays. There is surrounding parking available immediately to the south-west (16 informal spaces and 42 permit spaces) and 100m to the north-west (12 off-street Pay and display). The impact of removing one informal parking space at this location is assessed as having a **Negligible** impact; and
- There are currently two permit parking spaces located south of the R137 Harold's Cross Park Junction adjacent to the southbound carriageway. It is proposed to remove both spaces to provide continuous cycle facilities. The ten permit spaces to the south will be retained. The impact of removing three spaces, balanced against the available surrounding parking, is assessed as having a **Low Negative** impact

The contents of Table 6.13 presents a summary of the parking and loading spaces during the Do Minimum and Do Something scenarios and the resulting change in parking along Section 1.

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

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

As shown in Table 6.13, the proposed amendments to parking / loading will result in a loss of 39 spaces along Section 1. Where parking is removed, the impact varies between negligible and slight. The overall impact of the changes is assessed as a **Low Negative** impact**,** primarily as a result of the loss of informal and Pay & Display parking at the R817 Kimmage Road Lower / Sundrive Road / Larkfield Avenue junction. This impact is considered acceptable in the context of the planned outcome of the Proposed Scheme, which is to improve accessibility to this local area (on foot, by bicycle and bus) for residents and visitors to local shops and businesses.

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

6.6.2.3.1 Pedestrian Infrastructure

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

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

The assessment of the qualitative impacts on the pedestrian infrastructure for Section 2 of the Proposed Scheme 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 TIA Appendix 4 (Pedestrian Infrastructure Assessment).

Table 6.14: Section 2 – Pedestrian Impact during Operational Phase

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

The contents of Table 6.14 demonstrate that the Proposed Scheme will have a positive impact on the quality of the pedestrian infrastructure along Section 2 between Harold's Cross Park and Grand Canal during the Operational Phase.

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

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

6.6.2.3.2 Cycling Infrastructure

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

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

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

Table 6.15 presents the overall Do Minimum LoS and Do Something LoS ratings for each segment within Section 2, along with the resultant impact assessment. A detailed breakdown of the assessment can be found in TIA Appendix 4 (Cycling Infrastructure Assessment).

Table 6.15: Section 2 Cycling Impact during Operational Phase

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

The content of Table 6.15 demonstrate that the Proposed Scheme will have a positive impact on the cycling environment along Section 2 between Harold's Cross Park and Grand Canal during the Operational Phase.

The LoS rating of the cycling facilities during the Do Minimum and Do Something scenarios are equal to C and B respectively. The improvement in LoS rating is as a result of improved segregation for cyclists and junction treatment in the form of cycle lanes traversing priority junctions and continuing through signalised junctions with protected treatment as part of the Proposed Scheme.

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

6.6.2.3.3 Bus Infrastructure

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

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	1344	A-2388	Rationalised / Removed	Stop 1344 to be combined with Stop 1345 at a new location approximately 150m north of the current location. Therefore, existing Stop 1344 is removed.
Inbound	New	A-2531	New	New inbound stop proposed between the existing Stop 1344 and 1345.
Outbound	1291	A-2550	Retained	Stop 1291 to be retained at the existing location.
Inbound	1345	A-2576	Rationalised / Removed	Stop 1345 to be combined with Stop 1344 at a new location approximately 40m south of the current location. Therefore, existing Stop 1345 is removed.

As presented in Table 6.16, it is proposed to reduce the number of bus stops along Section 2 from three to two, through the rationalisation of two bus stops (1344 and 1345) on the inbound carriageway. These are proposed to be replaced by a single stop between them.

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

Table 6.17 outlines that there few change to the bus stop facilities along Section 2 of the Proposed Scheme other than the rationalisation of bus stops. It is proposed that all bus stops provide real time / timetable information, shelter, seating, and accessible kerbs.

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

Due to the improvement to passenger facilities and the minimal anticipated impact of the removal of one bus stop, it is predicted that the Proposed Scheme will have an overall **Low Positive** impact on the bus stop facilities along Section 2.

6.6.2.3.4 Parking and Loading

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

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

The contents of Table 6.18 display a summary of the parking and loading spaces during the Do Minimum and Do Something scenarios and the resulting change in parking along Section 2.

Table 6.18 Section 2 Parking Provision

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

As shown in Table 6.18 the proposed amendments to parking / loading will result in an overall increase of 12 parking spaces along Section 2. Where parking is removed, the impact varies between negligible and low. The overall impact is assessed as **Low Negative**. This slight effect is considered acceptable in the context of the planned outcome of the Proposed Scheme, which is to improve accessibility to this local area (on foot, by bicycle and bus) for residents and visitors to local shops and businesses.

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

6.6.2.4.1 Pedestrian Infrastructure

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

- Footpaths to include a minimum running width of 2m;
- Existing signalised pedestrian crossings across R137 Clanbrassil Street Lower to be upgraded to direct Toucan crossings;

- A new direct pedestrian crossing to be provided across R137 New Street South to the south of the R110 Kevin Street Upper slip road;
- Raised tables to be provided or retained across side streets to act as a traffic calming measures and to assist with regards to pedestrian movement;
- All new or upgraded signalised pedestrian crossings to include adequate tactile paving, dropped kerbs, road markings and crossings widths in line with the recent guidance; and
- Various junction layouts to be upgraded to reduce the speed of passing vehicles and provide a safer environment for pedestrians.

The assessment of the qualitative impacts on the pedestrian infrastructure for Section 3 of the Proposed Scheme 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 TIA Appendix 4 (Pedestrian Infrastructure Assessment).

Table 6.19: Section 3 – Pedestrian Impact during Operational Phase

Junctions	Chainage	Do Minimum LoS	Do Something LoS	Impact
R137 Clanbrassil Street Upper / Windsor Terrace	A2675 – A2725	C	B	Low Positive
R137 Clanbrassil Street Upper / Clanbrassil Close	A2800 – A2850	C	B	Low Positive
R137 Clanbrassil Street Upper / Wesley Place	A2850 – A2900	C	B	Low Positive
R137 Clanbrassil Street Lower / R811 South Circular Road / R137 Clanbrassil Street Upper	A2950 – A3000	C	A	Medium Positive
R137 New Street South / Long Lane / R137 Clanbrassil Street Lower / Malpas Street	A3425 – A3475	C	B	Low Positive
R137 New Street South / Cathedral View Court	A3575 – A3625	C	B	Low Positive
R137 New Street South / R110 Kevin Street Upper	A3675 – A3725	C	B	Low Positive
R137 Patrick Street / R110 Kevin Street Upper / R137 New Street South / R110 The Coombe	A3725 – A3775	D	A	Medium Positive
Section Summary		**C**	**B**	**Low Positive**

The content of Table 6.14 demonstrates that the Proposed Scheme will have a positive impact on the quality of the pedestrian infrastructure between Grand Canal and the Patrick Street Junction.

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

Overall, it is anticipated that there will be **Low Positive Impact** to the quality of the pedestrian infrastructure along Section 3 of the Proposed Scheme, during the Operational Phase, which aligns with the overarching aim to provide enhanced walking infrastructure on the corridor.

6.6.2.4.2 Cycling Infrastructure

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

- The provision of cycle tracks in both directions with a minimum width of 1.5m;
- Removal of existing cycle lanes and changing the combined bus lanes to bus only lanes;

- Upgrading existing signalised junctions to protected junctions for cyclists;
- Inclusion of toucan crossings across R137 Clanbrassil Street Upper
- Routing of cycle tracks behind on street parking to ensure cyclist safety; and
- Proposed provision of continuous cycle bypasses at all bus stops.

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

The content of Table 6.20 presents the overall Do Minimum LoS and Do Something LoS ratings for each segment within Section 3, along with the resultant impact assessment. A detailed breakdown of the assessment can be found in TIA Appendix 4 (Cycling Infrastructure Assessment).

Table 6.20 Section 3 - Cycling Qualitative Assessment

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

The content of Table 6.20 demonstrate that the Proposed Scheme will have a long-term significant positive impact on the quality of the pedestrian infrastructure at road junctions within Section 3.

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

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

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

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

6.6.2.4.3 Bus Infrastructure

There are currently nine bus stops along this section of the Proposed Route – five 'inbound' stops towards the city centre and four 'outbound' stops.

Table 6.21 presents a summary of the changes in the number and location 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	1290	A-2810	Retained	Stop 1290 to be retained at the existing location
Inbound	1347	A-2848	Retained	Stop 1347 to be retained at the existing location
Outbound	New	A-3029	New	New outbound stop proposed.
Inbound	2634	A-3046	Retained	Stop 2634 to be retained at the existing location
Inbound	2635	A-3200	Rationalised / Removed	Stop 2635 to be combined with Stop 2636 at a new location approximately 80m north of the current location. Therefore, existing Stop 2635 is removed.
Outbound	2388	A-3249	Rationalised / Removed	Stop 2388 to be combined with Stop 2387 at a new location approximately 100m north of the current location. Therefore, existing Stop 2388 is removed.
Inbound	New	A-3280	New	New inbound stop proposed between the existing Stop 2635 and 2636.
Outbound	New	A-3350	New	New inbound stop proposed between the existing Stop 2388 and 2387.
Inbound	2636	A-3490	Rationalised / Removed	Stop 2636 to be combined with Stop 2635 at a new location approximately 200m south of the current location. Therefore, existing Stop 2636 is removed.
Outbound	2387	A-3500	Rationalised / Removed	Stop 2387 to be combined with Stop 2388 at a new location approximately 100m north of the current location. Therefore, existing Stop 2387 is removed.
Outbound	2386	A-3655	Retained	Stop 2386 to be retained at the existing location
Inbound	5097	A-3660	Retained	Stop 5097 to be retained at the existing location

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

Table 6.22 provides a summary of the improvements to the bus stop infrastructure along Section 3, 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: Section 3 - Overview of changes in Bus Stop Facilities

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

The contents of Table 6.22 demonstrates that there are improvements to the bus stop facilities along Section 3 of the Proposed Scheme. It is proposed that all bus stops provide real time / timetable information, and accessible kerbs. It is also proposed for all bus stops along the section to provide shelter and seating except for Stop 1290 which has insufficient space. There are also no indented bus bays proposed along Section 3, which alleviates the risk of re-entry delays to the operation of buses.

The improvements in the provision of real-time information, shelters, seating and accessible kerbs throughout Section 3 is assessed as providing an overall **Medium Positive impact** for bus passengers.

6.6.2.4.4 Parking and Loading

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

- There are four Pay & Display / permit parking spaces located south of the R137 Clanbrassil St. Upper / Clanbrassil Close Junction adjacent to the R137 Clanbrassil St. Upper northbound carriageway. It is proposed to remove one space at this location. Given the marginal reduction and retention of surrounding permit parking the impact of this loss is deemed to have a **Negligible** impact;
- There are three Pay & Display / permit parking spaces located north of the R137 Clanbrassil St. Upper / Clanbrassil Close Junction adjacent to the R137 Clanbrassil St. Upper southbound carriageway. It is proposed to remove all spaces at this location to enable provision of bus and cycle facilities. Most residential properties have off-street parking and on-street permit parking is available within the vicinity (three spaces approximately 55m north and three spaces approximately 45m south). The impact of the loss of three spaces is deemed to have a **Low Negative** impact;
- There are four Pay & Display / permit parking spaces located north of the R137 Clanbrassil St. Upper / Wesley Place Junction adjacent to the R137 Clanbrassil St. Upper northbound carriageway. It is proposed to remove one space at this location. The loss of one space, balanced with the retention of three Pay & Display / permit parking spaces, is deemed to have a **Negligible** impact;
- There is a total of 21 Pay and Display / permit parking spaces on R137 Clanbrassil Street Lower between South Circular Road and Lombard Street West of which 11 are located adjacent to the northbound carriageway and 10 are located adjacent to the southbound carriageway. It is proposed to remove all 21 spaces between South Circular Road and Lombard Street West to provide continuous

cycle facilities. Off-street residential parking is available to the rear of the properties, two additional parking spaces are proposed in Vincent Street car park (Bottle Bank) and five additional Pay and Display / permit spaces are proposed approximately 100m to the north. The impact of this loss, balanced with the provision of seven additional spaces in the vicinity, is deemed to have a **Low Negative term** impact; and

- There is one loading bay on the R137 New Street South southbound carriageway south of the R137 New Street South / Kevin Street Upper Junction. It is proposed to relocate the bay approximately 15m south of the current location which is deemed to have a **Negligible** impact.

Table 6.23 presents a summary of the parking and loading spaces during the Do Minimum and Do Something scenarios and the resulting change in parking along Section 3 of the Proposed Scheme.

Table 6.23 Section 3 Parking Provision

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

As shown in Table 6.23 the proposed amendments to parking / loading will result in a loss of 19 spaces along Section 3. Where parking is removed, the impact varies between negligible and low. The overall significance of effect is assessed as a **Low Negative** impact primarily as a result of the loss of Pay & Display / permit parking on R137 Clanbrassil Street Lower between South Circular Road and Lombard Street West. This slight effect is considered acceptable in the context of the planned outcome of the Proposed Scheme, which is to improve accessibility to this local area (on foot, by bicycle and bus) for residents and visitors to local shops and businesses.

6.6.2.5 Summary of Corridor-Wide Infrastructure Works

6.6.2.5.1 Pedestrian Infrastructure

The Proposed Scheme will increase the number of controlled pedestrian crossings from 35 in the Do Minimum to 47 in the Do Something scenario, equating to a 70% increase.

6.6.2.5.2 Cycling Infrastructure

The Proposed Scheme will provide 1.75km inbound and 1.75km outbound of segregated cycle facilities which is an increase from only 0km in both directions in the Do Minimum scenario. In turn, there will be a decrease in non-segregated cycle facilities in the Do Something scenario compared to the Do Minimum as these facilities will be upgraded to segregated facilities in most cases.

6.6.2.5.3 Bus Priority Infrastructure

The Proposed Scheme will provide 1.5km inbound and 1.4km outbound of bus lanes across the corridor. This is an increased from 0.9km inbound and 0.4km outbound in the Do Minimum scenario. Overall, the Proposed Scheme will provide bus priority measures along the entirety of the corridor.

6.6.3 Quantitative Assessment

This quantitative assessment has been prepared with reference to the modelling outputs obtained from the four-tiered modelling approach outlined in Section 4.3. The following assessment topics have been considered:

- People Movements
  - 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:
  - Reductions in general traffic flows 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.

6.6.3.1 People Movements

6.6.3.1.1 Overview

In order to understand the benefit of the Proposed Scheme with regards to the Movement of People following the implementation of the proposed infrastructure measures, a quantitative People Movement assessment has been undertaken using outputs 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:

- 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). This provides an estimate of the modal share changes on the direct study area as a result of the Proposed Scheme measures; and
- People Movement by Bus:
  - AM and PM Peak Hour Bus Passenger Loadings along the Proposed Scheme for each forecast year (2028, 2043)
  - Total Passengers Boarding Buses on bus routes that use any part of the Proposed Scheme for each forecast year (2028, 2043).

6.6.3.1.2 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 and PM peak periods for each forecast year (2028, 2043).

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

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

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

6.6.3.1.2.1 2028 AM Peak Hour People Movements

Diagram 6.3 illustrates the People Movement by mode inbound towards the city centre during the AM Peak Hour in 2028.

Diagram 6.3 Weighted Average People Movement by Mode during 2028 AM Peak Hour

As indicated in Diagram 6.3, there is a reduction of 50% in the number of people travelling via car, an increase of 80% in the number of people travelling via bus and an increase of 8% in people walking or cycling along the Proposed Scheme during the AM Peak Hour.

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 is conservative in terms of the predicted cycling mode share. The Proposed Scheme has been designed to cater for much higher levels of cycling uptake than modelled outputs, to cater for long-term trends in travel behaviours as people make sustainable travel lifestyle choices, which would otherwise not be achievable in the absence of the Proposed Scheme.

The content 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 29% increase in people moved as a result of the Proposed Scheme and 56% increase in people moved by sustainable modes (Public Transport, Walk, Cycle).

Table 6.24: 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 Hour	Public Transport	950	50%	1,710	69%	760	80%
		General Traffic	480	25%	240	10%	-240	-50%
		Walking	210	11%	150	6%	-60	-29%
		Cycling	270	14%	370	15%	100	37%
		Combined Walk / Cycle	480	25%	520	21%	40	8%
		Sustainable Modes Total	1,430	75%	2,230	90%	800	**56%**
		Total	1,910	100%	2,470	100%	560	**29%**

6.6.3.1.2.2 2028 PM Peak Hour People Movements

Diagram 6.4 illustrates the People Movement by mode travelling outbound from the city centre during the PM Peak Hour.

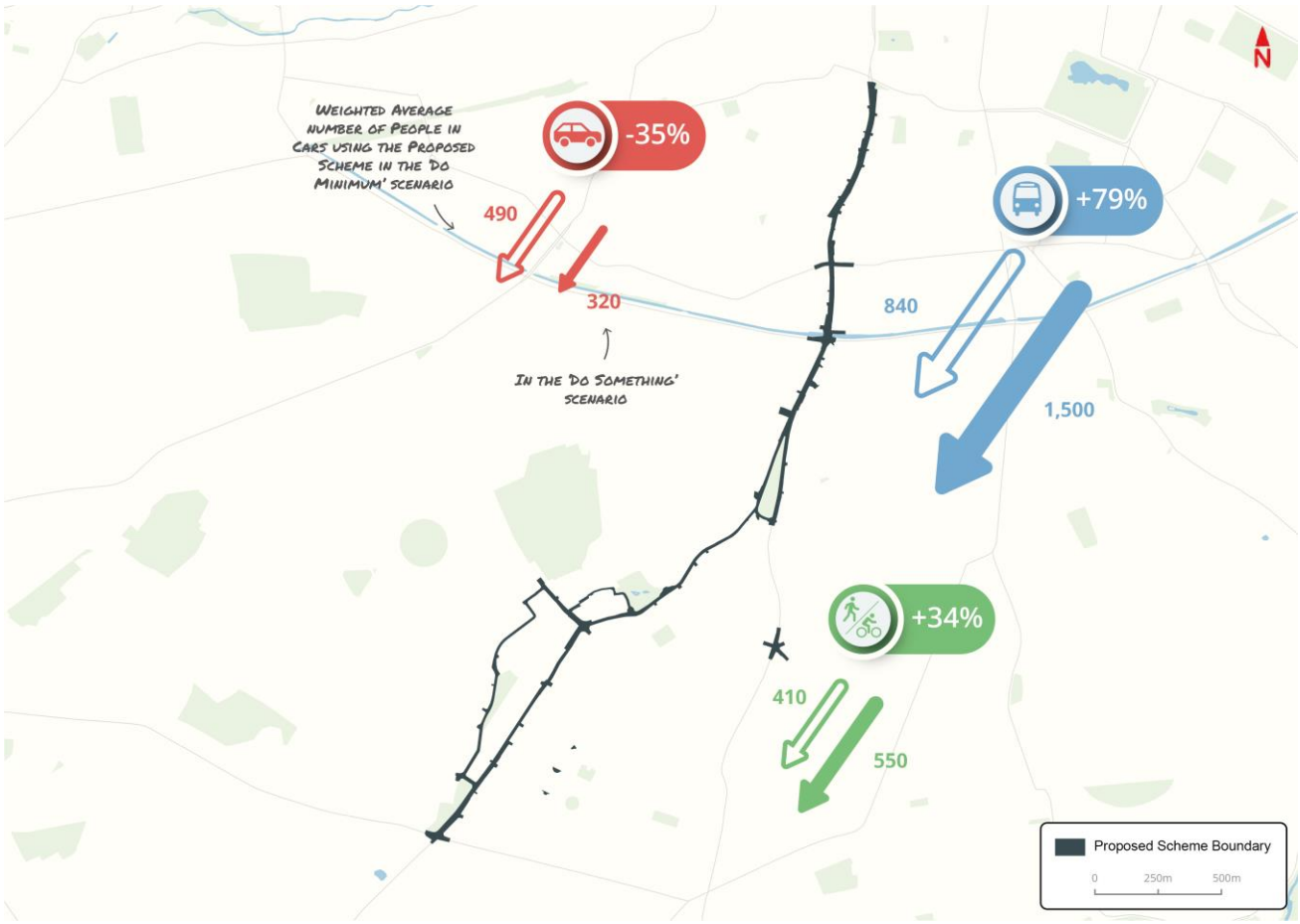

Diagram 6.4 Weighted Average People Movement by Mode during 2028 PM Peak Hour

As indicated in Diagram 6.4, there is a reduction of 35% in the number of people travelling via car, an increase of 79% in the number of people travelling via bus and an increase in 34% in the number of people walking or cycling along the Proposed Scheme during the PM Peak Hour.

The content in Table 6.25 outlines the difference in modal split between the Do Minimum and Do Something scenarios for each mode of travel in an outbound direction from the City Centre during the PM Peak Hour. The results indicate 36% increase in people moved as a result of the Proposed Scheme and 64% increase in people moved by sustainable modes (Public Transport, Walk, Cycle).

Table 6.25 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 (%)
Inbound towards the City Centre	PM Peak Hour	Public Transport	840	48%	1,500	63%	660	79%
		General Traffic	490	28%	320	14%	-170	-35%
		Walking	210	12%	170	7%	-40	-19%
		Cycling	200	11%	380	16%	180	90%
		Combined Walk / Cycle	410	24%	550	23%	140	34%
		Sustainable Modes Total	1,250	72%	2,050	86%	800	**64%**
		Total	1,740	100%	2,370	100%	630	**36%**

6.6.3.1.2.3 2043 AM Peak Hour People Movements

Diagram 6.5 illustrates the People Movement by mode inbound towards the city centre during the AM Peak Hour in 2043.

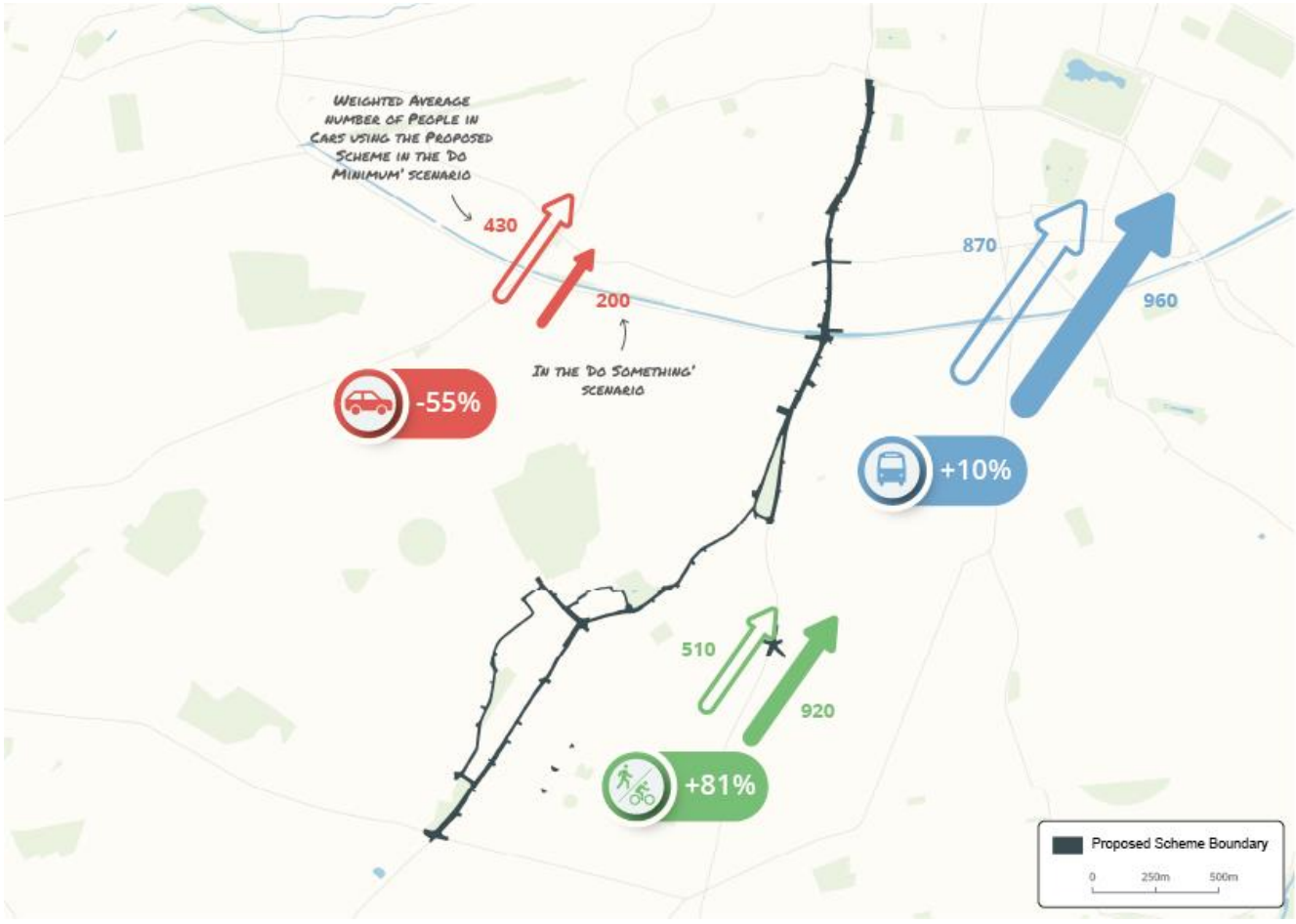

Diagram 6.5 Weighted Average People Movement by Mode during 2043 AM Peak Hour

As indicated in Diagram 6.5, there is a decrease of 55% in the number of people travelling via car, an increase of 10% in the number of people travelling via bus and an increase of 81% in the number of people walking and cycling along the Proposed Scheme during the AM Peak Hour. The content in Table 6.26 outlines the difference in modal split between the Do Minimum and Do Something scenarios for each mode of travel in an inbound direction towards the City Centre during the AM Peak Hour. The results indicate a 15% increase in people moved as a result of the Proposed Scheme and 36% increase in people moved by sustainable modes (Public Transport, Walk, Cycle).

Table 6.26 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 Hour	General Traffic	430	24%	195	9%	-234	-55%
		Public Transport	868	48%	956	46%	88	10%
		Walking	231	13%	271	13%	40	17%
		Cycling	277	15%	648	31%	371	134%
		Combined Walk/Cycle	509	28%	919	44%	411	81%
		Total Sustainable Modes	1,377	76%	1,875	91%	499	36%
		Total	**1,807**	**100%**	**2,071**	**100%**	**264**	**15%**

6.6.3.1.2.4 2043 PM Peak Hour People Movements

Diagram 6.6 illustrates the People Movement by mode travelling outbound from the city centre during the PM Peak Hour in 2043.

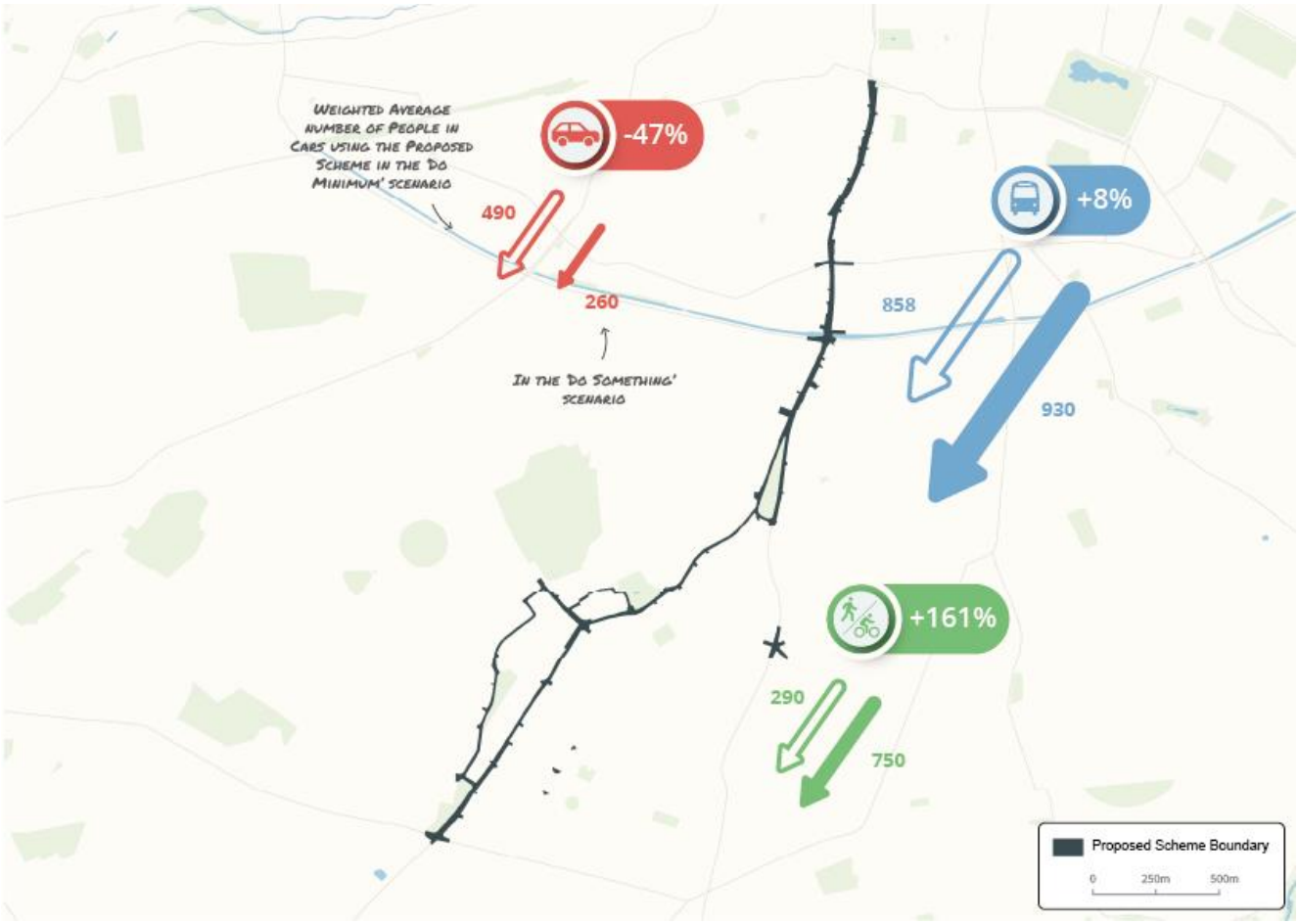

Diagram 6.6 Weighted Average People Movement by Mode during 2043 PM Peak Hour

As indicated in Diagram 6.6, there is a decrease of 47% in the number of people travelling via car, an increase of 8% in the number of people travelling via bus and an increase of 161% in the number of people walking and cycling along the Proposed Scheme during the PM Peak Hour.

The content in Table 6.27 outlines the difference in modal split between the Do Minimum and Do Something scenarios for each mode of travel in an outbound direction from the City Centre during the PM Peak Hour. The results indicate 18% increase in people moved as a result of the Proposed Scheme and 46% increase in people moved by sustainable modes (Public Transport, Walk, Cycle).

Table 6.27 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	490	30%	262	14%	-228	-47%
		Public Transport	858	53%	927	48%	70	8%
		Walking	86	5%	181	9%	95	111%
		Cycling	200	12%	565	29%	365	183%
		Combined Walk/Cycle	285	17%	746	39%	460	161%
		Total Sustainable Modes	1,143	70%	1,673	86%	530	46%
		Total	**1,633**	**100%**	**1,934**	**100%**	**302**	**18%**

6.6.3.1.3 People Movements 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.

6.6.3.1.3.1 2028 AM Peak Hour Bus Passengers

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

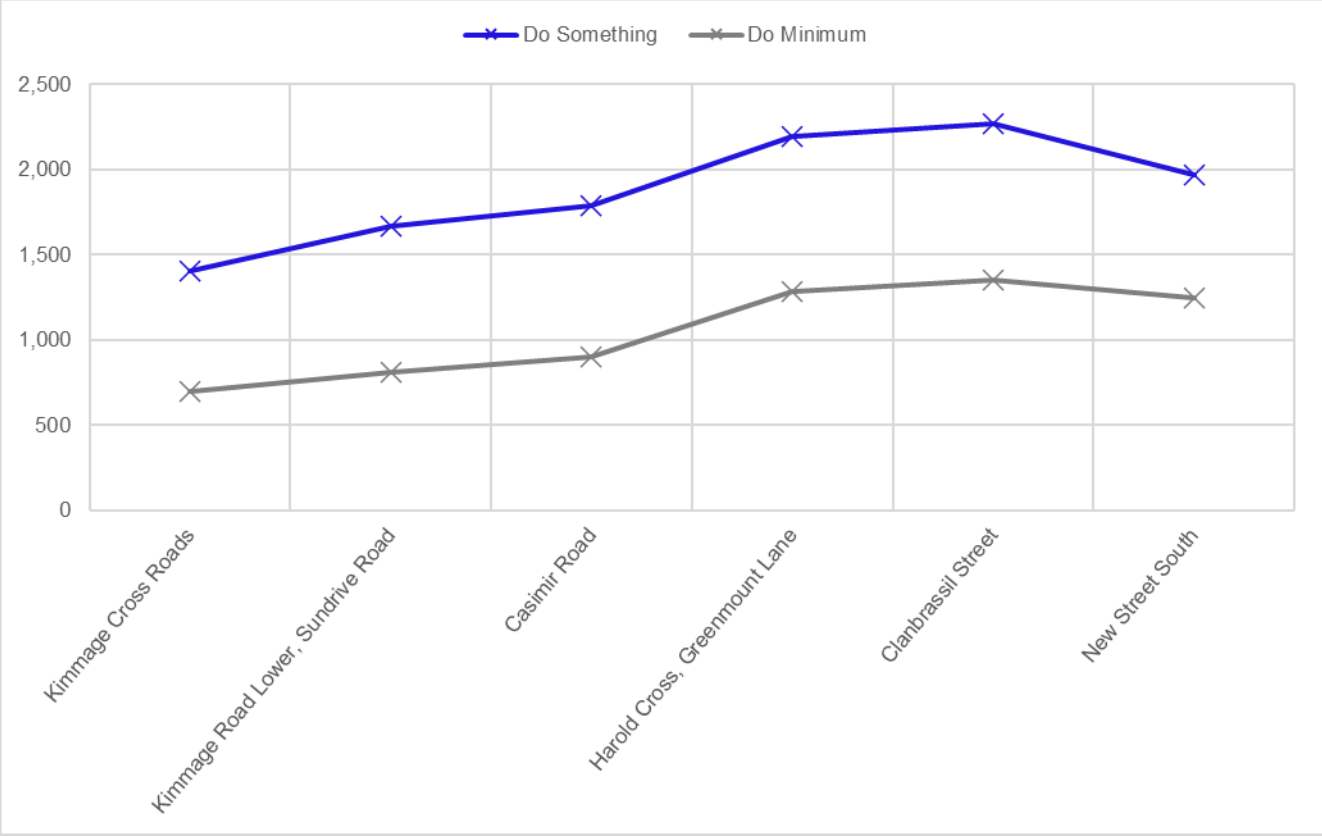

Diagram 6.7 2028 AM Peak Hour Passenger Volume Along Proposed Scheme (inbound direction)

Diagram 6.7 shows higher levels of bus passenger loadings all along the Proposed Scheme with a peak loading at the intersection with Clanbrassil Street where the volume of passengers reaches 2,250 in the AM Peak hour, compared to approximately 1,350 in the Do Minimum scenario.

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

6.6.3.1.3.2 2043 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 2043.

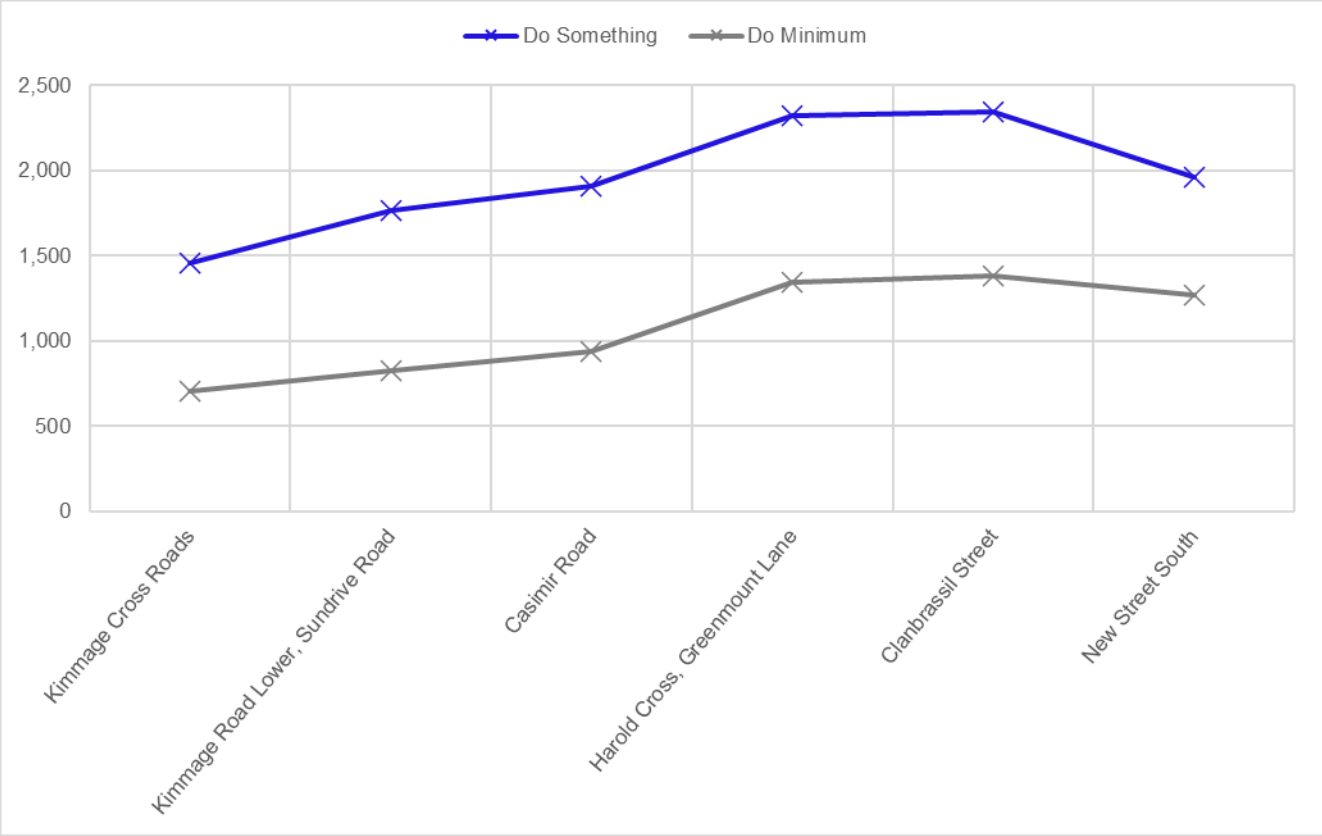

Diagram 6.8 2043 AM Peak Hour Passenger Volume Along Proposed Scheme (inbound direction)

Diagram 6.8 shows higher levels of passenger loadings along the Proposed Scheme with a peak at the intersection with Clanbrassil Street where the volume of passengers reaches 2,350 in the AM Peak hour, compared to approximately 1,400 in the Do Minimum scenario.

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

6.6.3.1.3.3 2028 PM Peak Hour Bus Passengers

Diagram 6.9 presents the passenger loading profile comparing the Do Minimum and Do Something scenarios in the PM Peak Hour in the inbound direction in 2028.

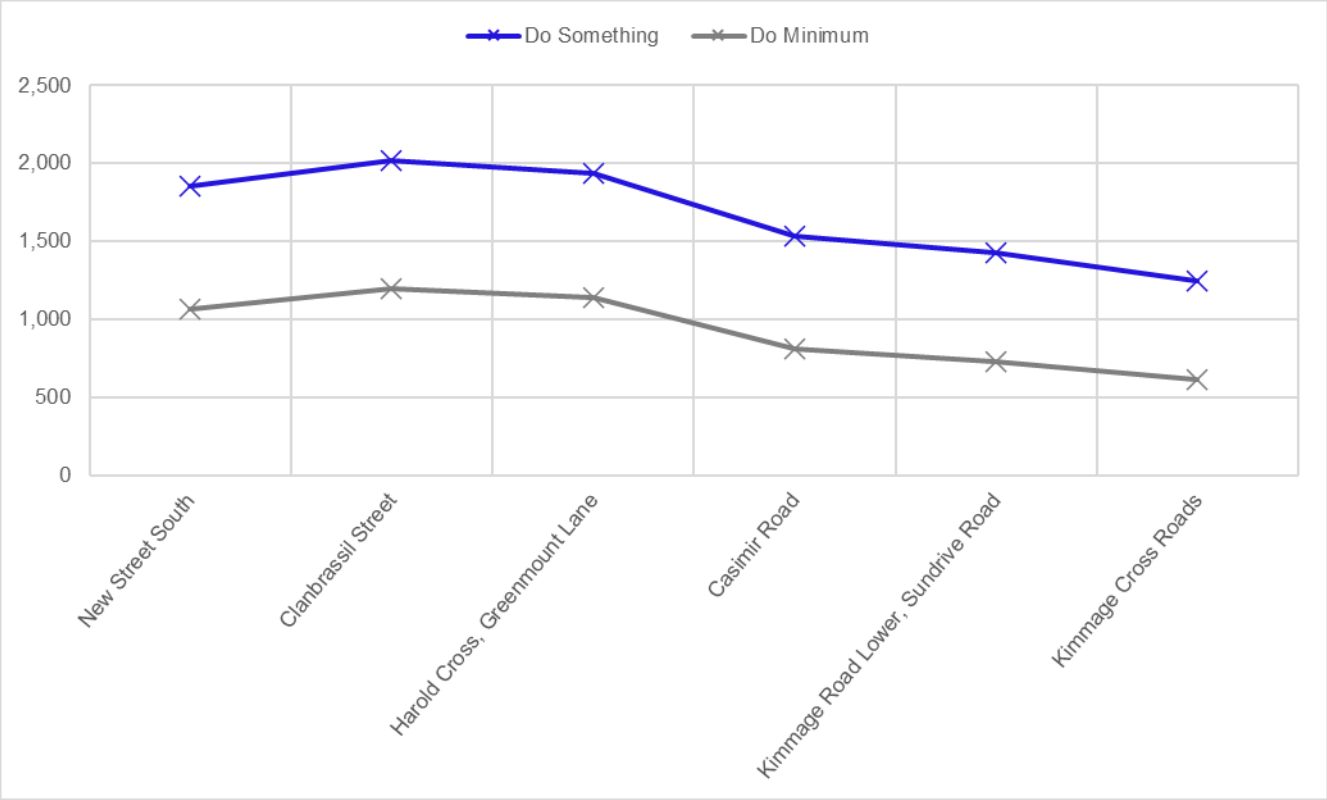

Diagram 6.9 2028 PM Peak Hour Passenger Volume Along Proposed Scheme (outbound direction)

Diagram 6.9 shows a peak in the number of passengers at the intersection with Clanbrassil Street, where the loadings reach approximately 2,000 passengers in the Do Something scenario, compared to 1,200 passengers in the Do Minimum. The loadings reduce steadily until the southern end of the scheme as passengers alight.

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

6.6.3.1.3.4 2043 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 2043.

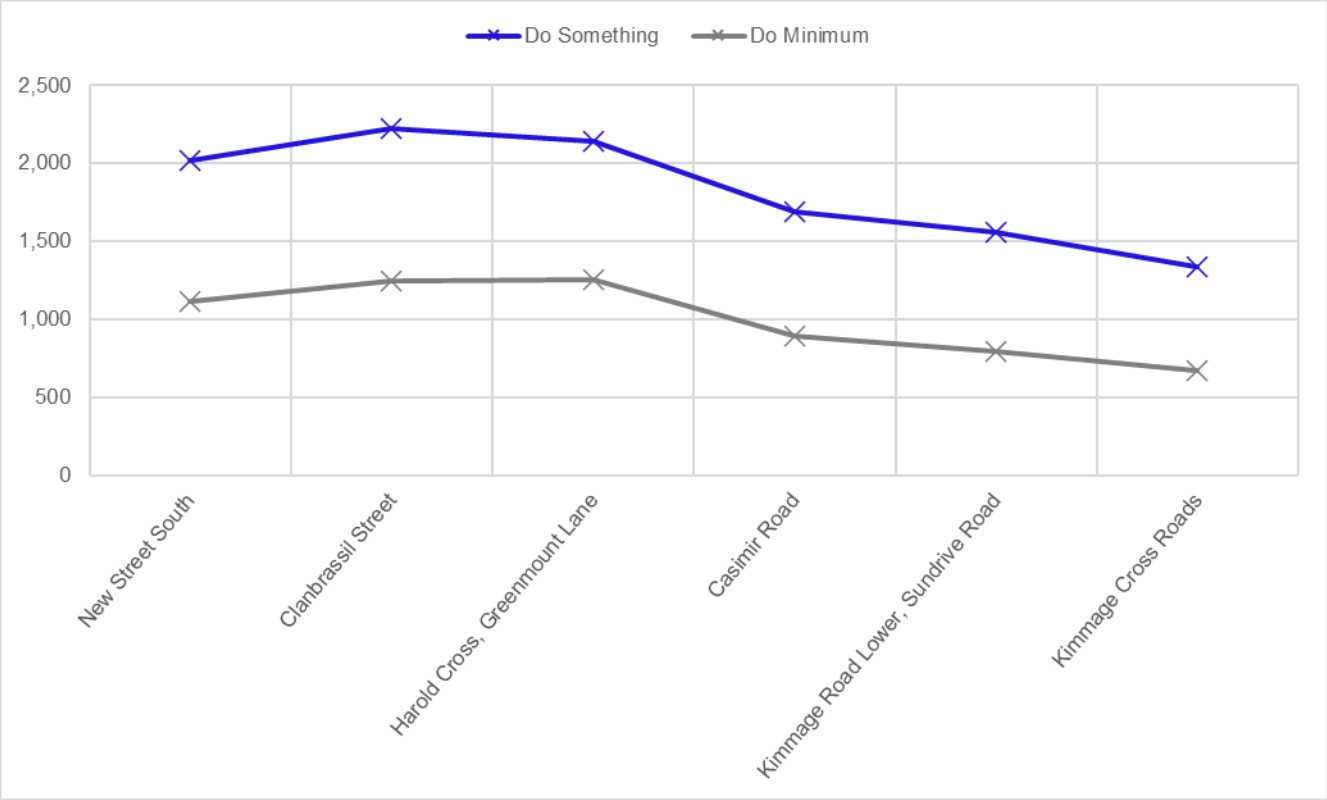

Diagram 6.10 2043 PM Peak Hour Passenger Volume Along Proposed Scheme (outbound direction)

Diagram 6.10 shows a peak in the number of passengers at the intersection with Clanbrassil Street, where the bus loadings reach approximately 2,200 passengers in the Do Something scenario, compared to 1,200 passengers in the Do Minimum. The loadings are then reduced steadily until the southern end of the scheme.

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

6.6.3.1.3.5 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 boardings on bus routes that use any part of the Proposed Scheme (including those stops not directly on the Proposed Scheme) in both 2028 and 2043 forecast years. The results for the Opening Year (2028) 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 No. of Boardings	Difference (%)
AM Peak Hour	12,420	13,550	1,130	9.1%
PM Peak Hour	10,440	11,470	1,030	9.9%

The content of Table 6.28 shows that there will be a 9.1% increase in people boarding bus routes which use the Proposed Scheme during the 2028 AM Peak Hour. This represents an addition of 1,130 passengers in the AM Peak hour.

In the 2028 PM Peak hour, there will be a 9.9% increase in people boarding bus routes which use the Proposed Scheme, representing an additional 1,030 passengers. The comparison results for the Design Year (2043) scenario are indicated in Table 6.29.

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 No. of Boardings	Difference (%)
AM Peak Hour	12,670	14,020	1,350	10.7%
PM Peak Hour	10,540	11,830	1,290	12.2%

The content of Table 6.29 shows that there will be a 10.7% increase in people boarding bus routes which use the Proposed Scheme during the AM Peak Hour. This represents an addition of 1,350 passengers in the AM Peak hour.

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

6.6.3.2 People Movement - Summary of Impact

Taking into account the changes in mode share, demand changes by mode along the Proposed Scheme and bus usage, the Proposed Scheme will have a **High Positive impact** on people movement by sustainable modes along the direct study area, particularly by bus, with reductions in car mode share due to the bus gate proposals and resulting mode shift.

6.6.3.3 Operational Impacts for Bus Passengers and Operators

6.6.3.3.1.1 Overview

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

Due to the stochastic nature of the micro-simulation software, model outputs based on the average of 20 simulation seed runs (minimum of 5 recommended as per Transport for London (2010) Traffic Modelling Guidelines) have been calculated between the point of Proposed Scheme entry and exit and compared against the corresponding Do Minimum scenarios.

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

Inbound Direction

Average journey times for the inbound F1 service in the Opening Year (2028) and in the Design Year (2043) 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 TIA Appendix 4 (Average Bus Journey Times).

Table 6.30: F1 Service Bus Average Journey Times (Inbound Direction)

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

Additional information regarding the range of journey times (minimum, maximum, average and standard deviation) for inbound F1 buses in the Do Minimum (red) and Do Something (blue) can be seen in Table 6.31 and Diagram

below. Each dot in the diagram represents the journey time for each individual bus in each scenario. A larger range of journey times are an indication of lower levels of reliability in a given scenario.

Table 6.31: F1 Service – Range of Journey Times (Inbound Direction)

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

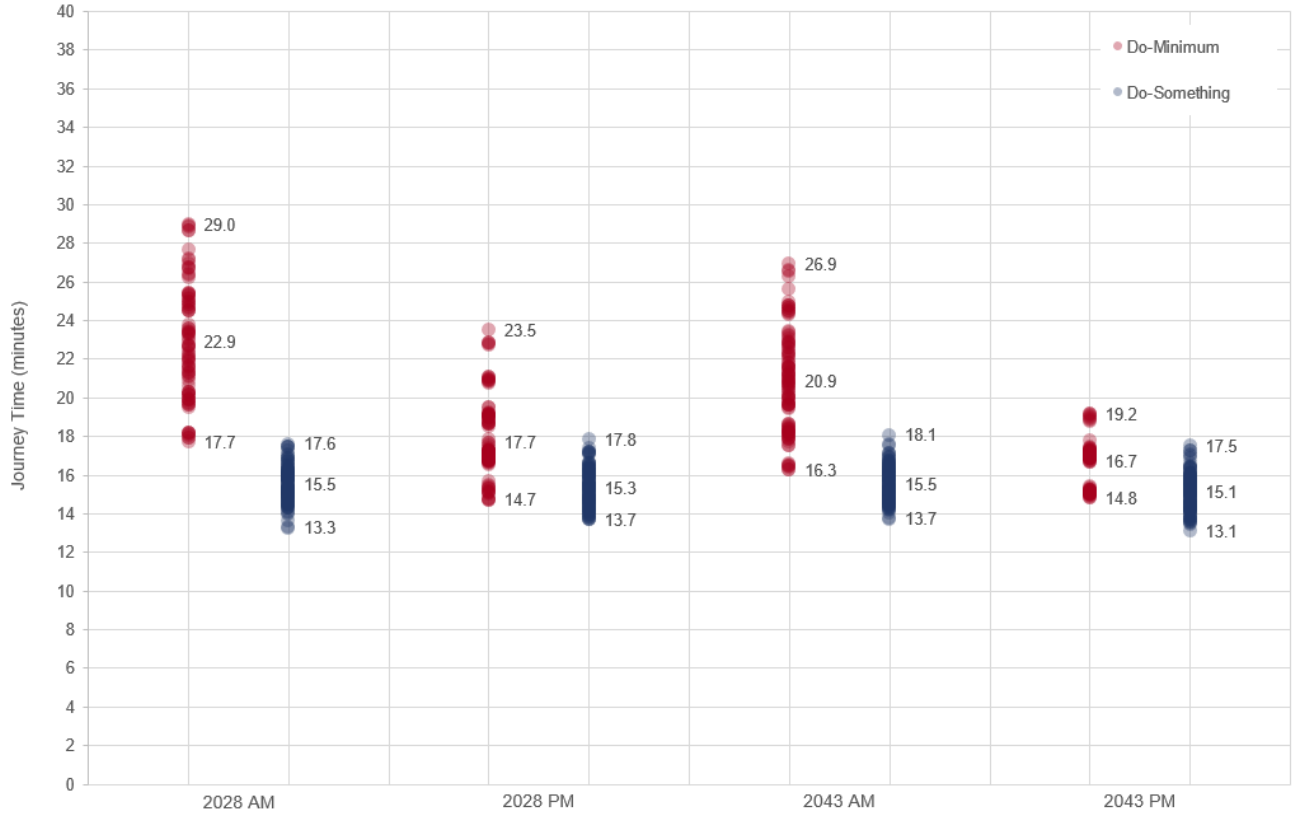

Diagram 6.11: F1 Bus Journey Times (Inbound Direction)

Based on the results presented in Table 6.30, the Proposed Scheme will deliver average inbound journey time savings for F1 service bus passengers of c. 7.4 minutes (32%) in 2028 and c. 5.4 minutes (26%) in 2043. Furthermore, results presented in Diagram 1 suggest an improvement in bus journey time reliability in all 4 core scenarios as indicated by the reduced ranges of journey times achieved with the individual durations focused much closer to the average journey times (lower standard deviation) in the Do Something scenario (blue dots) with the Proposed Scheme in place compared to the more dispersed range in the Do Minimum scenario (red dots).

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

A comparison of average Do Minimum and Do Something journey times for the inbound F1 service are also illustrated in the cumulative time-distance graphs shown in Diagram 6.12 to Diagram 6.15.

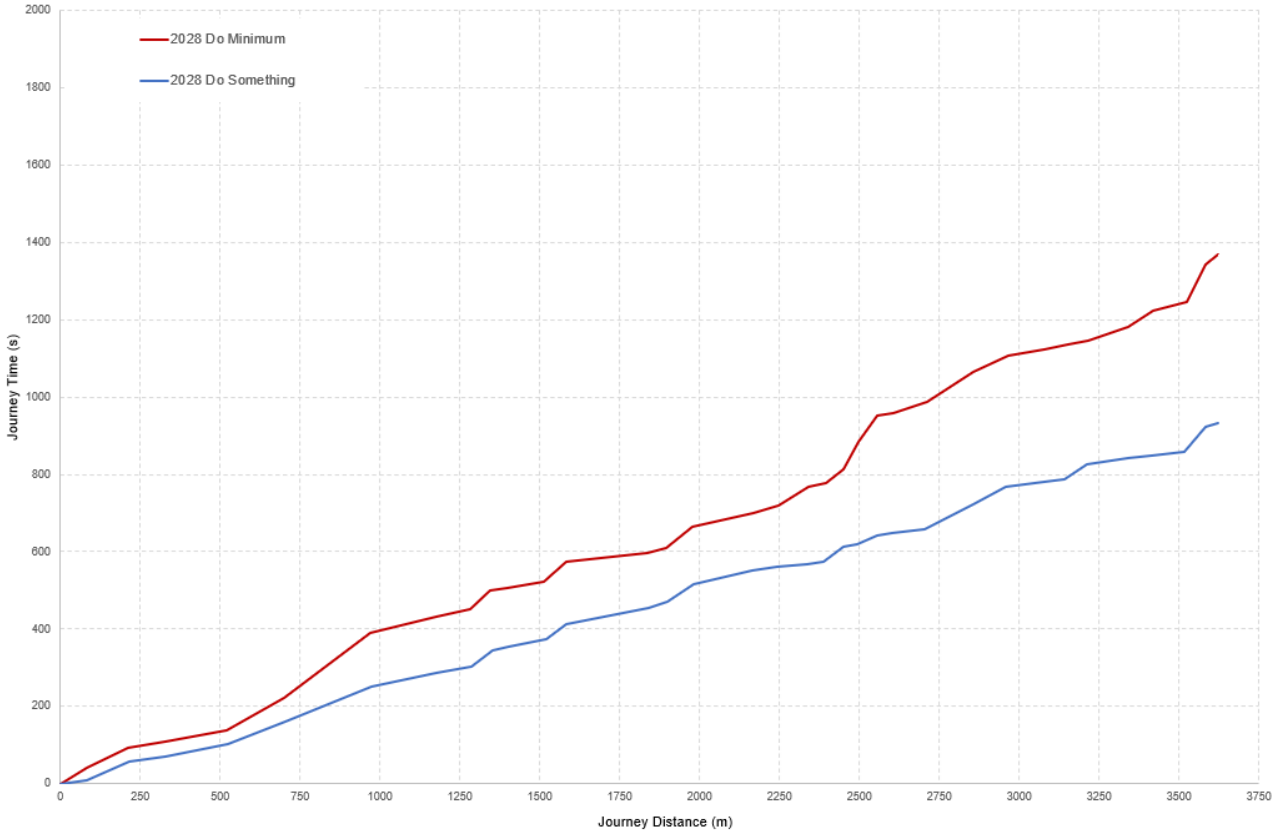

Diagram 6.12: F1 Bus Journey Time (2028 AM, Inbound)

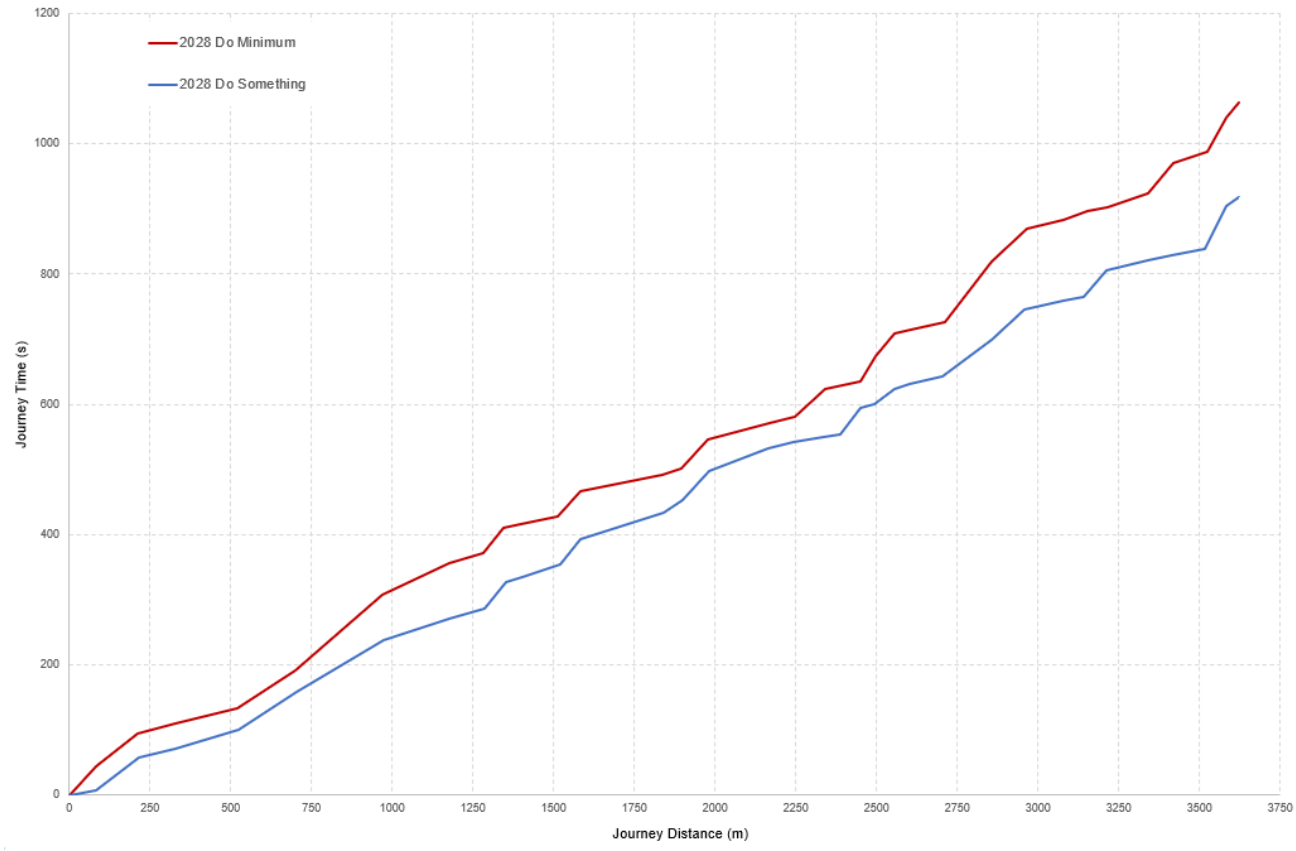

Diagram 6.13: F1 Bus Journey Time (2028 PM, Inbound)

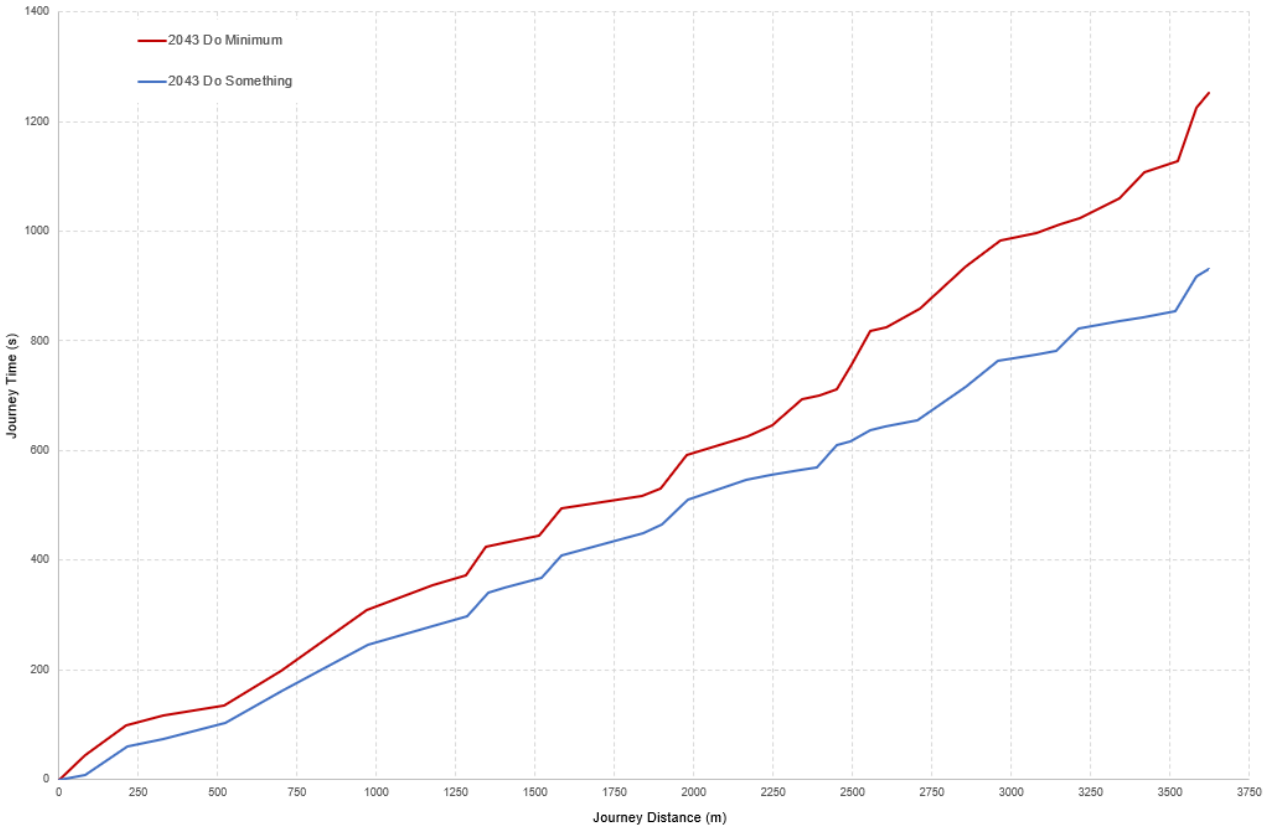

Diagram 6.14: F1 Bus Journey Time (2043 AM, Inbound)

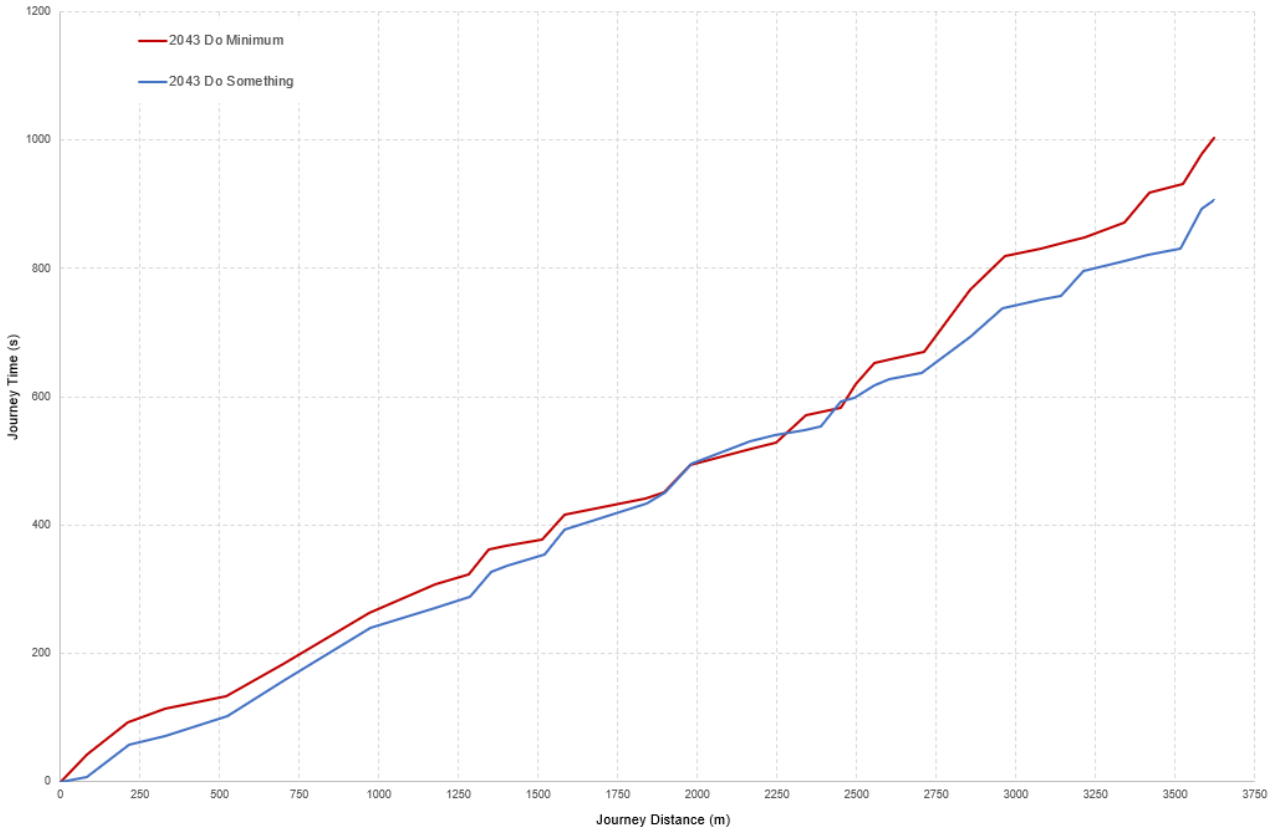

Diagram 6.15: F1 Bus Journey Time (2043 PM, Inbound)

Based on the results presented in Diagram 6.12 to Diagram , the Proposed Scheme is expected to deliver bus journey time savings in both the AM and PM peaks. The most notable savings can be seen on the Kimmage Road Lower approach to the Sundrive Road crossroads and on the Harold's Cross Road approach to the Grand Canal. In both cases, the introduction of bus lanes up to the stop line and the separate phasing of previously conflicting movements can be shown to deliver benefits. In the case of the AM peak, significant journey time and reliability savings are predicted in the Proposed Scheme versus the Do Minimum.

Outbound Direction

Average journey times for the outbound F1 service in the Opening Year (2028) and in the Design Year (2043) can be seen in Table 6.32. A breakdown of the changes in average journey times for all other bus services using the Proposed Scheme can be found in TIA Appendix 4 (Average Bus Journey Times).

Table 6.32: F1 Service Bus Journey Times (Outbound Direction)

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

Additional information regarding the range of journey times (minimum, maximum, average and standard deviation) for outbound F1 buses in the Do Minimum (red) and Do Something (blue) can be seen in Table 6.33 and Diagram 6.16 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: F1 Service – Range of Journey Times (Outbound Direction)

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

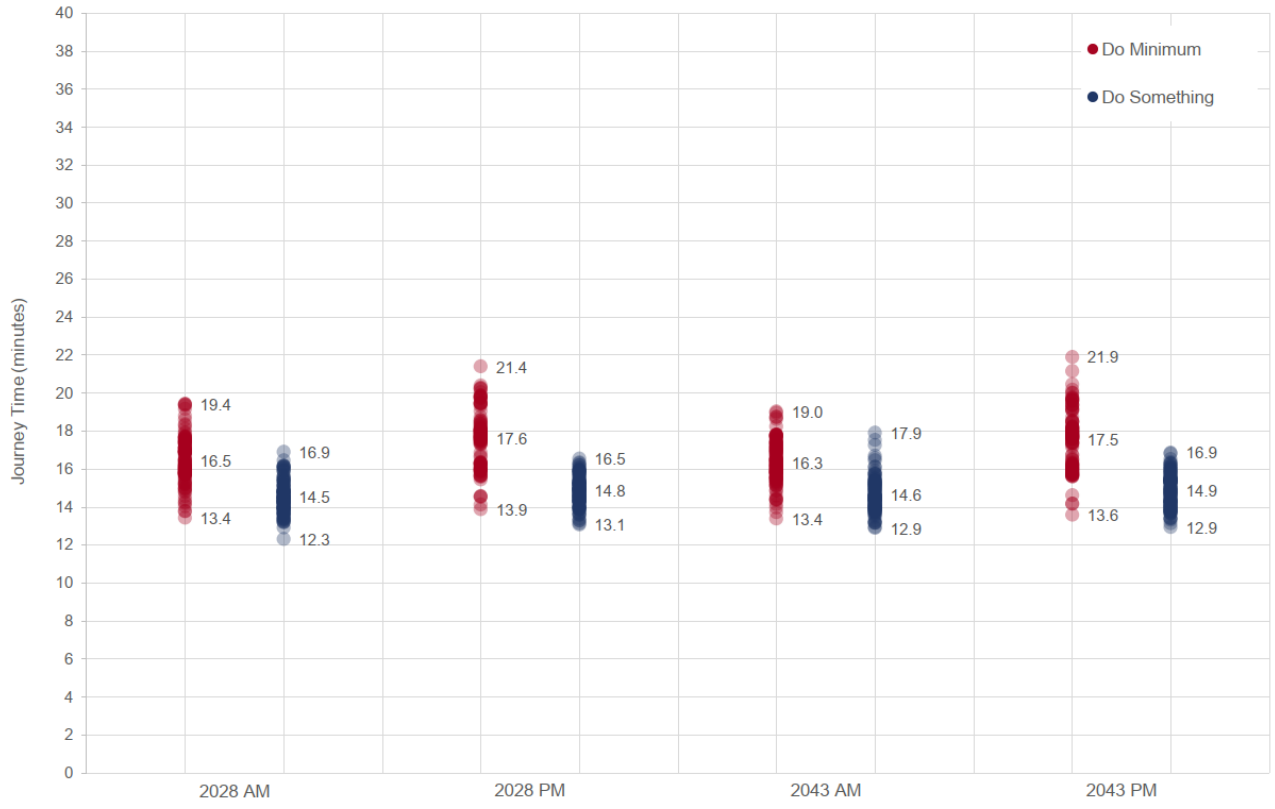

Diagram 6.16: F1 Bus Journey Times (Outbound Direction)

Based on the results presented in Diagram the Proposed Scheme will deliver average outbound journey time savings for F1 service bus passengers of up to c. 2.8 minutes (16%) in 2028 (PM) and c. 1.8 minutes (11%) in 2043 (PM). Furthermore, results presented in Diagram 6.16 suggest an improvement in bus journey time reliability in all four scenarios as indicated by the reduced ranges of journey times achieved with the durations focused much closer to the average journey times (lower standard deviation) in the Do Something scenario (blue dots) with the Proposed Scheme in place compared to the more dispersed range in the Do Minimum scenario (red dots). Note that the variation in journey times shown above are based on one set of predicted flows for the Do Minimum and Do Something scenario. Traffic flows fluctuate daily which would mean that the variation in journey times would be much greater in the Do Minimum with any increases in traffic flows compared to the protection of journey time reliability provided by the bus priority measures that comprise the Proposed Scheme.

A comparison of average Do Minimum and Do Something journey times for the F1 service for the outbound direction of travel illustrated in the cumulative time-distance graphs shown in Diagram 6.17 to Diagram 6.20.

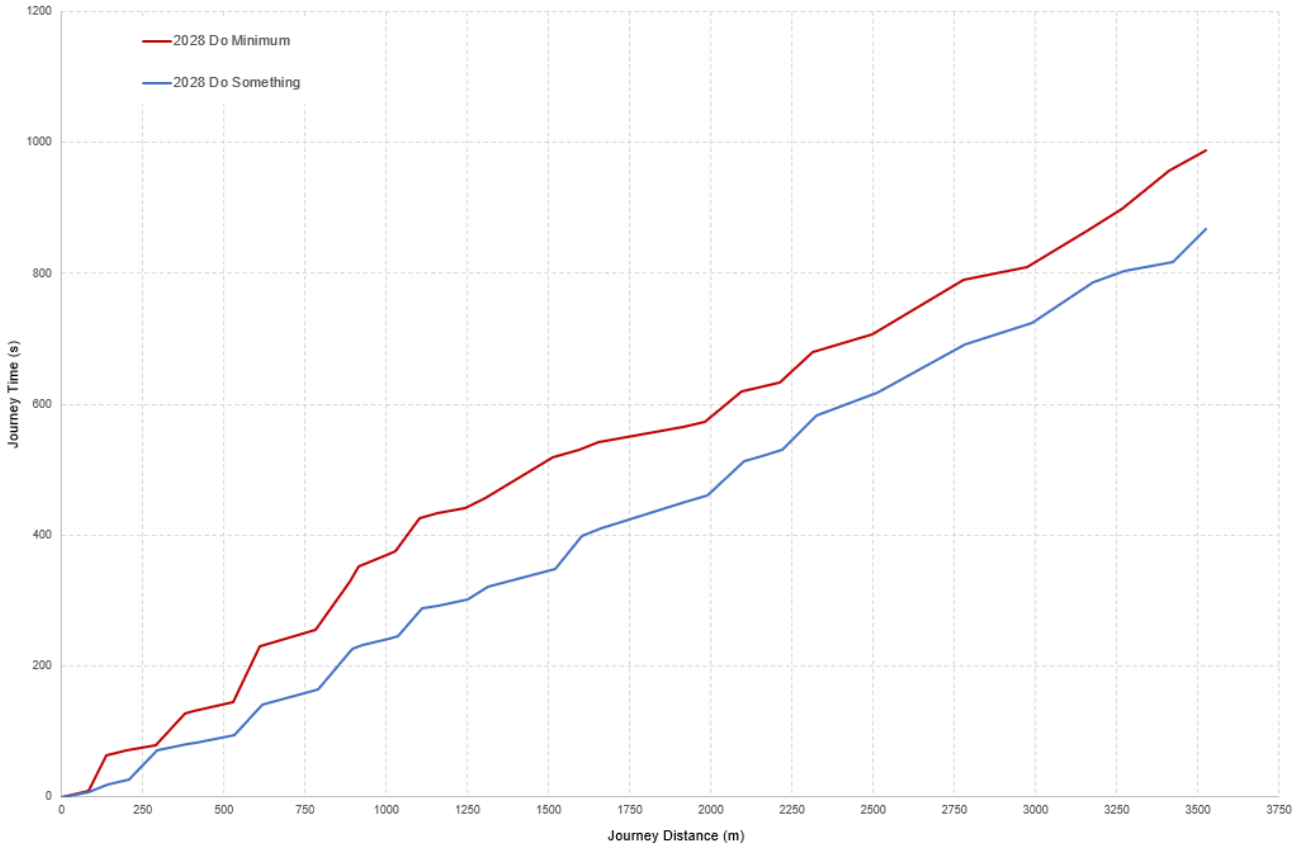

Diagram 6.1: F1 Bus Journey Time (2028 AM, Outbound)

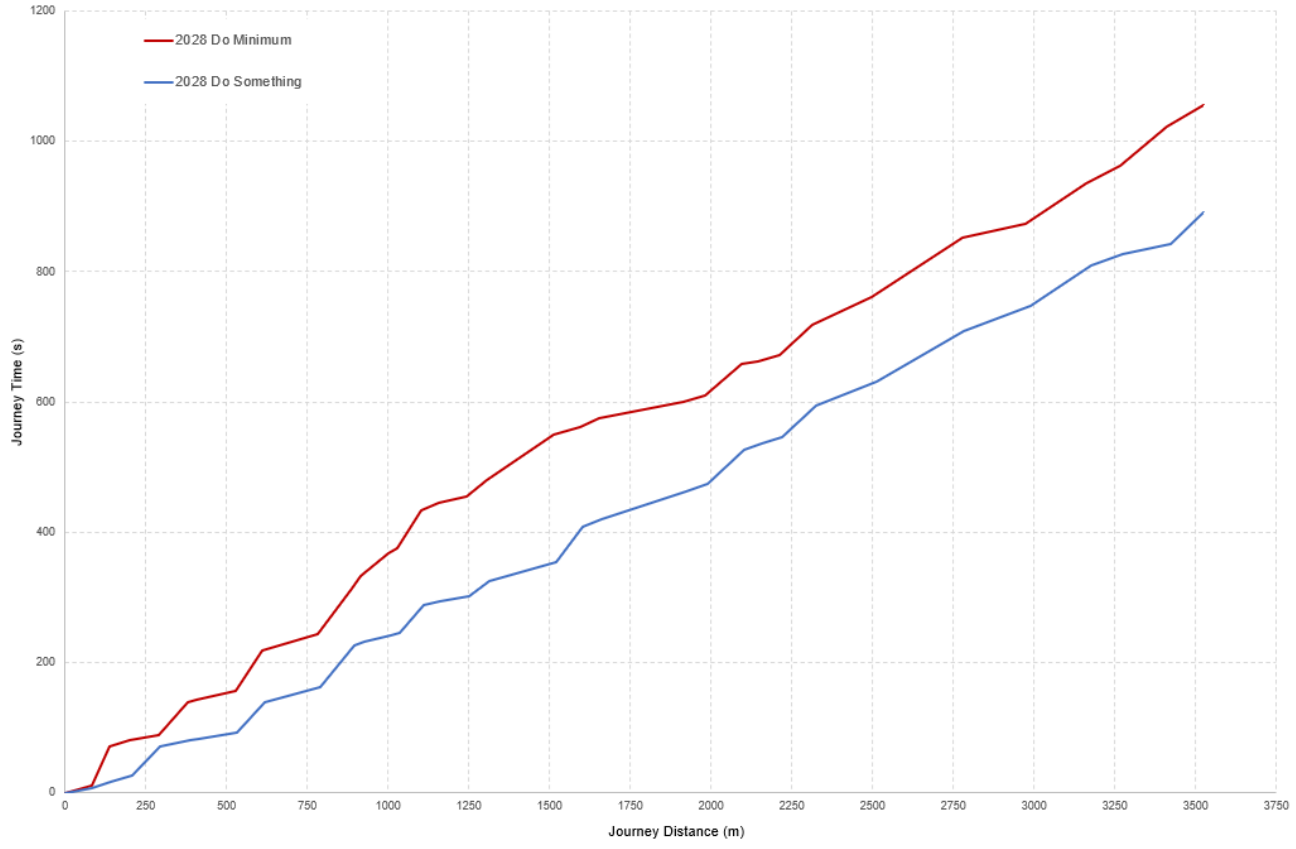

Diagram 6.2: F1 Bus Journey Time (2028 PM, Outbound)

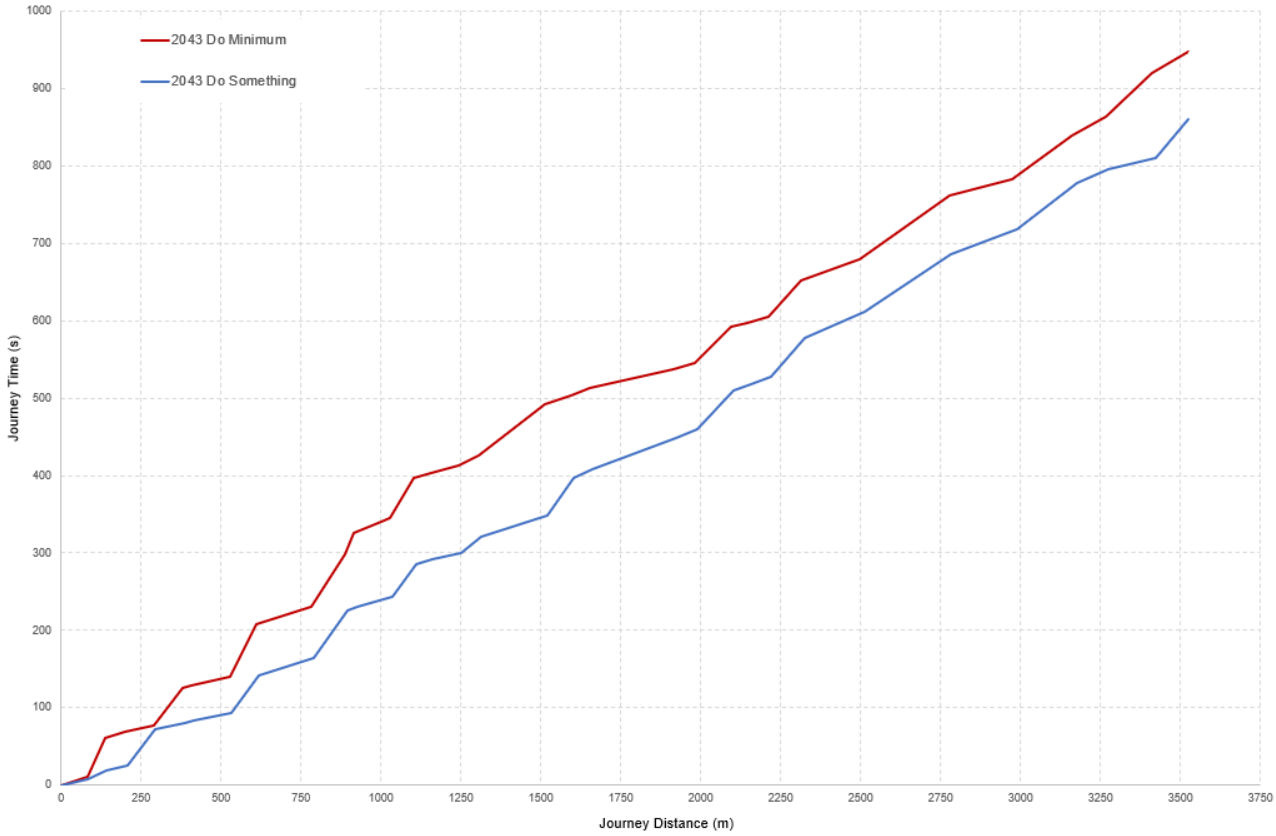

Diagram 6.3: F1 Bus Journey Time (2043 AM, Outbound)

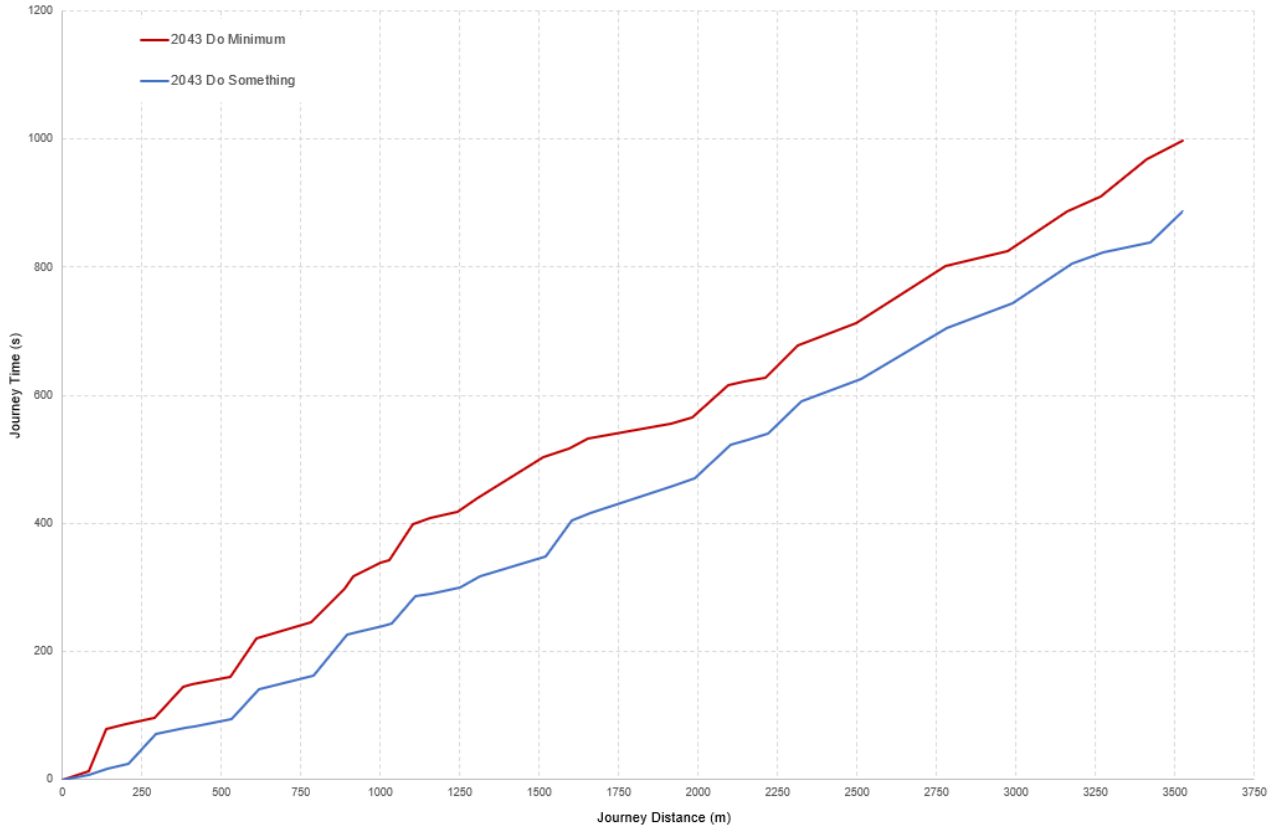

Diagram 64: F1 Bus Journey Time (2043 PM, Outbound)

Based on the results presented in Diagram 6.1 to Diagram 64, the Proposed Scheme is expected to deliver savings in bus journey time in both the AM and PM peaks. The most notable savings can be seen in the PM peak on the Clanbrassil Street Lower approach to the South Circular Road junction (Leonards Corner) and the Clanbrassil Street Upper approach to Windsor Terrace (Grand Canal). In both cases, the introduction of bus lanes up to the junction stop line can be seen to offer journey time and reliability savings versus the Do Minimum.

Based on the results presented in Diagram 6.17 to Diagram 6.20, the Proposed Scheme is expected to deliver savings in bus journey time in both the AM and PM peak. The most notable savings can be seen in the PM peak on the Clanbrassil Street Lower approach to the South Circular Road junction (Leonards Corner) and the Clanbrassil Street Upper approach to Windsor Terrace (Grand Canal). In both cases, the introduction of bus lanes up to the junction stop line can be seen to offer journey time and reliability savings versus the Do Minimum.

6.6.3.3.1.3 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	901.8	662.9	-238.8	-26%
2028 PM	800.1	662.3	-137.8	-17%
2043 AM	857.9	658.2	-199.7	-23%
2043 PM	753.3	663.5	-89.8	-12%

Based on the results presented in Table 6.34, modelling shows that the Proposed Scheme will reduce total bus journey times along the Proposed Scheme by up to 26% in 2028 and 23% in 2043. Based on the AM and PM peak hours alone, this equates to **c. 6.3 hours of savings in 2028 and 4.8 hours in 2043** combined across all buses when compared to the Do Minimum. On an annual basis this equates to approximately 4,700 hours of bus vehicle savings in 2028 and 3,600 hours in 2043, when considering weekday peak periods only.

6.6.3.3.2 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 **Medium Positive** impact overall.

6.6.3.3.3 Increased Bus Frequency - Resilience Sensitivity Analysis

6.6.3.3.3.1 Background

For the purposes of the 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 the 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.

6.6.3.3.3.2 Resilience Testing

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

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

The bus service frequency, along the busiest section, in the 2028 Do Minimum model and in the 2028 Do Something Resilience testing models is outlined in Table 6.35 below.

Table 6.35: Resilience Testing Bus Service Frequency Scenario Testing

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

Table 6.36 outlines the average journey times for the outbound F1 service in the Opening Year (2028).

Table 6.36: F1 Service – Average Bus Journey Times

Direction	Do Minimum (minutes)	Do Minimum (Additional Services) (minutes)	% Difference	Do Something (minutes)	Do Something - Additional Services (minutes)	% Difference
2028 Inbound AM	22.8	25.6	12.1%	15.5	15.3	-1.2%
2028 Outbound PM	17.6	17.7	0.4%	14.9	14.8	-0.1%

The results of the scenario testing with an additional 10 buses per direction per hour operating along the Proposed Scheme in the Opening Year (2028) are presented graphically in Diagram 6.17 below. The diagram displays the maximum, minimum and average journey times for each of the F1 bus services modelled.

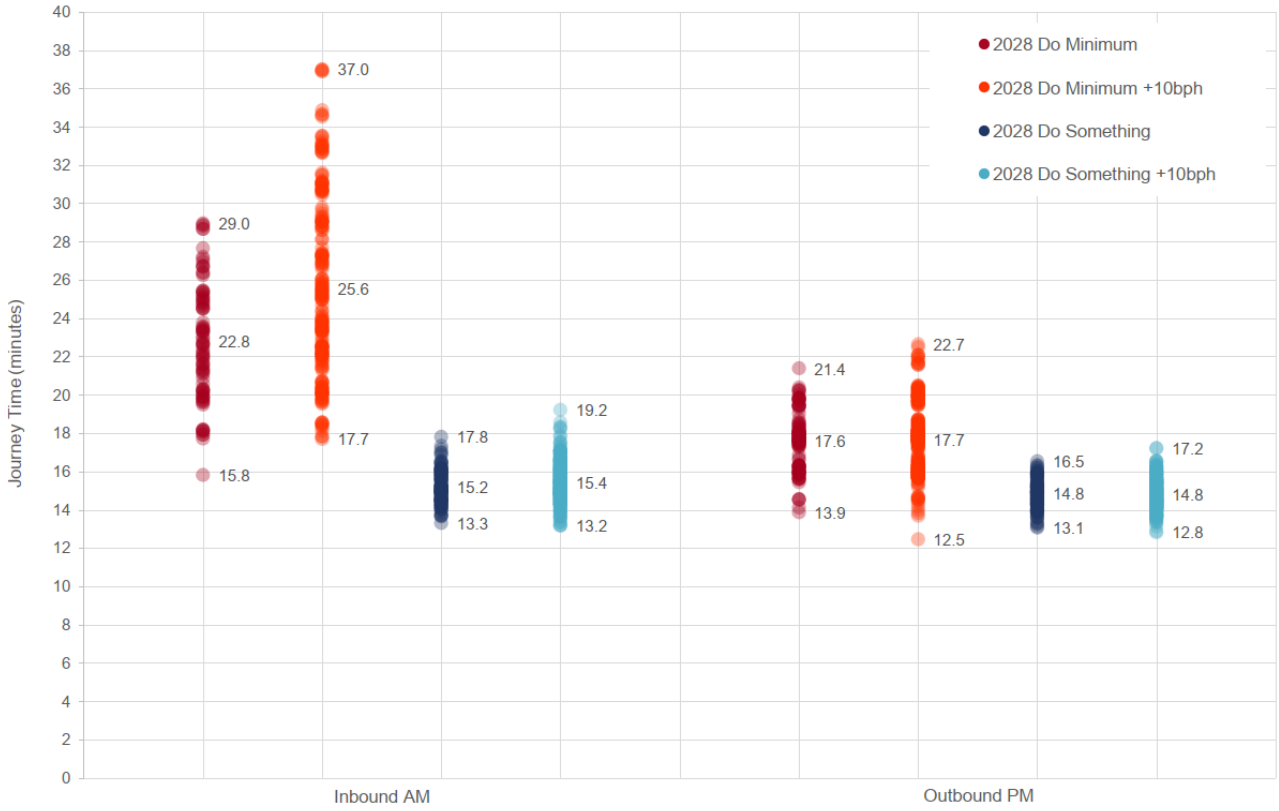

Diagram 6.17: Resilience Testing Bus Journey Time Reliability Indicators - Scenario Testing– Opening Year (2028)

As can be seen from the tables and Diagram 6.17, the results indicate a negligible change in Do Minimum and Do Something bus journey times even with an additional 10 services operating per direction per hour along the corridor. ***This highlights the benefit that the Proposed Scheme infrastructure improvements can provide in protecting bus journey time reliability and consistency, as passenger demand continues to grow into the future.***

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

Further details on the potential additional greenhouse gas (GHG) emissions savings that could occur from this resilience is outlined in Chapter 8 (Climate) in Volume 2 of the EIAR.

6.6.3.4 General Traffic Assessment

6.6.3.4.1 Overview

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

The purpose of this section is to assess the overall impact that any redistributed general traffic will have on both the direct and indirect study areas. It should be noted that the impacts presented in this TIA are based on the final Preliminary Design for the Proposed Scheme which includes embedded mitigation to limit environmental and traffic and transport impacts to a minimal level as part of the iterative design development work described previously above.

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

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

Localised junction models have been developed using industry standard modelling packages such as LinSig (a software tool by JCT Consultancy which allows traffic engineers to model traffic signals) and Junctions 9 (a software tool by TRL for the modelling and analysis of roundabout and priority junctions) to determine the appropriate staging, phasing, green times and operational capacity at all junctions along the direct study area. These junction models have been developed using consistent traffic flows as predicted and modelled in the ERM, LAM and micro-simulation models using the iterative traffic modelling process described in Section 1.1 of the EIAR. The full outputs of the results are available in the TIA Appendix 2 (Junction Design Report) which accompanies this application.

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 6.18 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 6.18: Extract from the Traffic and Transport Assessments Guidelines (PE-PDV-02045, TII 2014)

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

6.6.3.4.2 AM Peak Hour – General Traffic Flow Difference

Diagram 6.19 illustrates the difference in traffic flows on road links in the AM Peak Hour for the Opening Year (2028). TIA Appendix 4 (General Traffic Flow) provides further details of the LAM outputs.

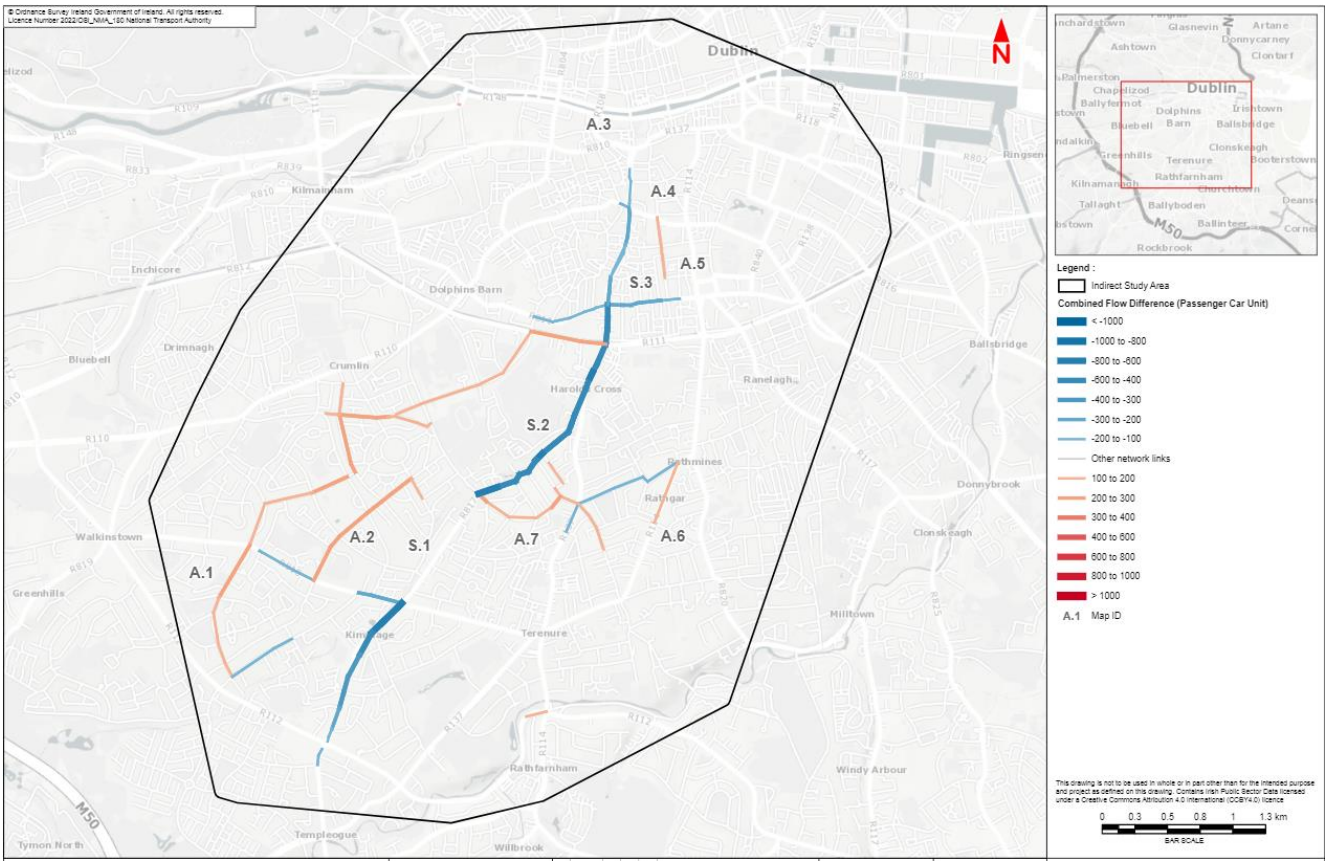

Diagram 6.19 Flow Difference on Road Links (Do Minimum vs. Do Something), AM Peak Hour, Opening Year (2028)

Impact on Direct Study Area (AM Peak Hour)

Direct Reductions in General Traffic: The LAM indicates that during the Opening Year (2028) scenario, there are reductions in general traffic noted along the Proposed Scheme during the AM Peak Hour, as illustrated by the blue lines in Diagram 6.19, which indicates where a reduction of at least -100 combined traffic flows occur.

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

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

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

As indicated in the contents of Table 6.37, the traffic reductions vary between --143 and -935 combined flows.

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

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

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

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

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

Impact on Indirect Study Area (AM Peak Hour)

Indirect Reductions in General Traffic: In addition to the general traffic flow reductions occurring along the direct study area, there are key reductions in general traffic noted along certain road links within the indirect study area during the AM Peak Hour. The key reductions in traffic flows along the indirect study area during the AM Peak Hour are outlined in Table 6.38.

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

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

As indicated in Table 6.38, the traffic reductions vary between 104 and -558 the traffic reductions vary between -111 and -286 combined flows along the surrounding road links.

Indirect Increases in General Traffic: The road links which experience additional traffic volumes of over 100 combined flows are illustrated by the orange / red lines in Diagram 6.19. These road links have been identified as experiencing traffic volumes above the additional traffic threshold and therefore require further analysis. The road links and associated flow difference between the Do Minimum and Do Something scenarios during the AM Peak Hour are outlined in Table 6.39.

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

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

As outlined in Table 6.39, the additional traffic on the road links that exceed the threshold for further assessment varies between +102 and +253 combined flows during the AM Peak Hour.

Overall Impact on Indirect Study Area: The redistributed traffic as a result of the Proposed Scheme results in a negative impact upon the road links identified in Table 6.39 during the AM Peak Hour.

Further junction capacity assessment has been undertaken along these road links to determine whether the above road links have the capacity to cater for the additional traffic volumes as a result of the Proposed Scheme. Operational capacity outputs (V/C ratios) 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. It should be noted that the worst performing arm of each junction has been used for the purpose of the assessment to ensure a conservative impact assessment is undertaken.

6.6.3.4.3 PM Peak Hour - General Traffic Flow Difference

Diagram 6.20 illustrates the difference in traffic flows on road links in the PM Peak Hour for the Opening Year (2028). TIA Appendix 4 (General Traffic Assessment) provides further details of the LAM outputs.

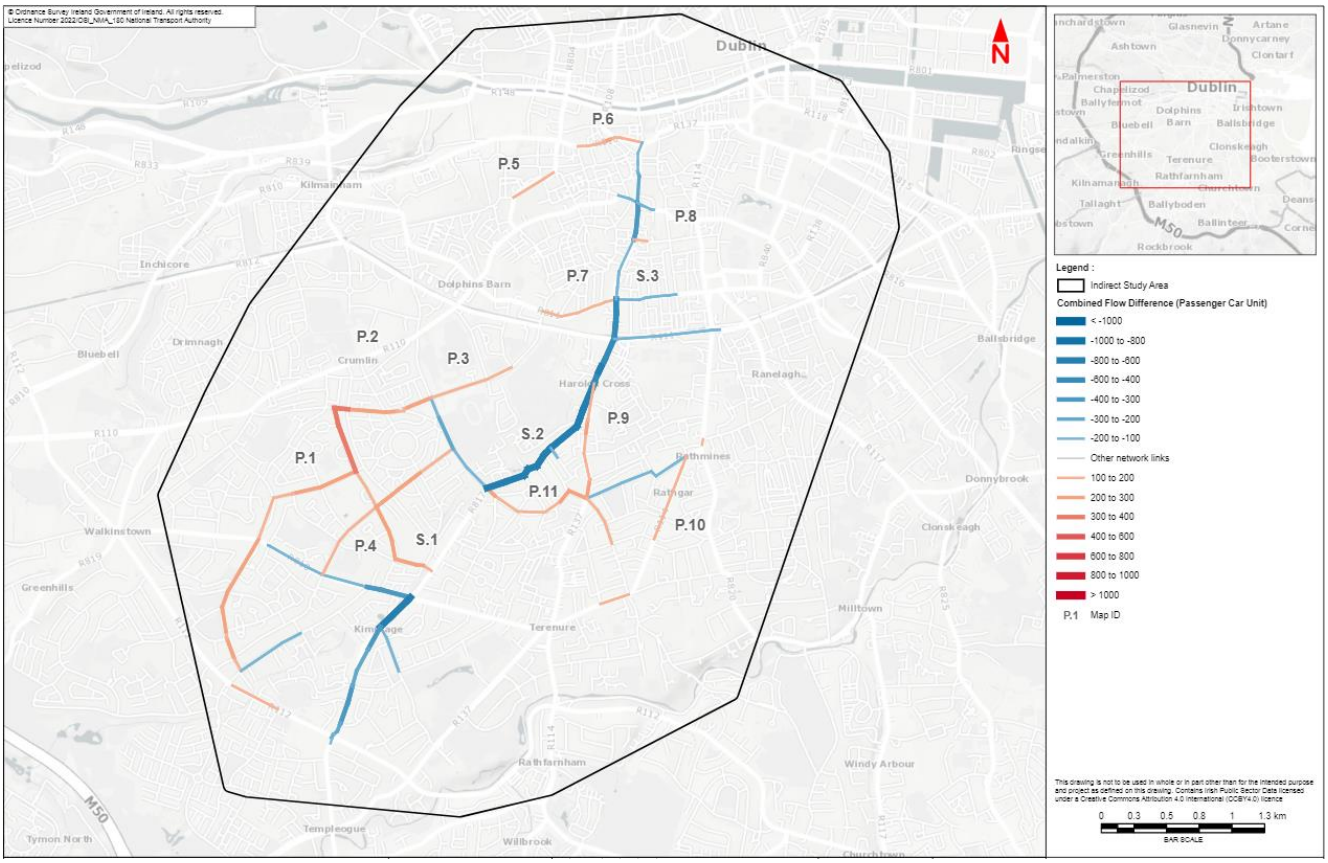

Diagram 6.20 Flow Difference on Road Links (Do Minimum vs. Do Something), PM Peak Hour, Opening Year (2028)

Impact on Direct Study Area (PM Peak Hour)

Direct Reductions in General Traffic Flows: The LAM indicates that during the Opening Year (2028) 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 6.20, 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 6.40.

Table 6.40 Road Links that Experience a Reduction of ≥100 Combined Flows during PM Peak Hour (Direct Study Area)

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

As indicated in Table 6.40, the traffic flow reductions vary between -218 and -1009 combined flows.

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

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

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

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

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

Impact on Indirect Study Area (PM Peak Hour)

Reductions in General Traffic Flows: In addition to the general traffic flow reductions occurring along the direct study area, there are key reductions in general traffic noted along certain road links within the indirect study area during the PM Peak Hour. The key reductions in traffic flows along the indirect study area during the PM Peak Hour are outlined in Table 6.41.

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

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

As indicated in Table 6.41, the traffic reductions vary between -123 and -622 combined flows along the surrounding road links.

Increases in General Traffic Flows: The key road links which experience additional traffic volumes in the PM Peak Hour are illustrated by the red lines in Diagram 6.20. These red lines indicate where an increase in at least 100 combined flows are occurring. The key increases in traffic flows along the indirect study area during the AM Peak Hour are outlined in Table 6.42.

Table 6.42 Road Links Where Link Threshold of 100 Combined Flows is Exceeded (PM Peak Hour)

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

As outlined in Table 6.42, the key road links which experience additional traffic flows vary between +103 and +351 combined flows along the surrounding road links, during the PM Peak Hour.

Overall Impact on Indirect Study Area: The redistributed traffic as a result of the Proposed Scheme results in a negative impact upon the road links identified in Table 6.42 during the PM Peak Hour.

Further junction capacity assessment has been undertaken along these road links to determine whether the above road links have the capacity to cater for the additional traffic volumes as a result of the Proposed Scheme. Operational capacity outputs (V/C ratios) 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. It should be noted that the worst performing arm of each junction has been used for the purpose of the assessment to ensure a conservative impact assessment is undertaken.

6.6.3.4.4 General Traffic Impact Assessment

This section details the magnitude of the impacts as a result of the redistributed general traffic on the indirect study area. Note that further assessment is presented in Chapter 6 (Traffic & Transport) in Volume 2 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 6.43.

Table 6.43: 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 6.44 have been used to describe the impact.

Table 6.44: 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 6.44, 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.

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

The contents of Table 6.45 outline the V / C ratios at the key local / regional road junctions in the AM Peak Hour for the Opening Year (2028). Table 6.45 shows only those junctions with a predicted impact of Low or higher. A table of results containing all of the assessed junctions is provided in TIA Appendix 4.

Table 6.45: Volume over Capacity Ratios at Key Junctions (Do Minimum vs. Do Something), AM Peak, Opening Year (2028)

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%	
Clogher Road	Medium	Clogher Road / Sundrive Road	✓				✓		Low

The results of the junction analysis shown in Table 6.45 demonstrate that of the 57 junctions assessed:

- One junction is anticipated to experience a Low Negative impact;
- 55 junctions are anticipated to experience Negligible impacts (not shown in Table 6.45); and
- One junction is anticipated to experience a Low Positive impact (not shown in Table 6.45).

Capacity issues (>100% V/C) are not noted at any junction in the AM Peak Hour in 2028 scenario. No further assessment into potential mitigation measures is therefore deemed to be required for junctions in the 2028 AM Peak Hour scenario.

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

The contents of Table 6.46 outline the V / C ratios at the key local / regional road junctions in the AM Peak Hour for the Design Year (2043). Table 6.46 shows only those junctions with a predicted impact of Low or higher. A table of results containing all of the assessed junctions is provided in TIA Appendix 4.

Table 6.46: Volume over Capacity Ratios at Key Junctions (Do Minimum vs. Do Something), PM Peak, Opening Year (2028)

Road Name	Road sensitivity	Junction Name	DM Max V / C Ratio			DS Max V / C Ratio			Magnitude of Impact
			≤85%	85% - 100%	>100%	≤85%	85% - 100%	>100%	
Kildare Road	High	Clogher Road / Kildare Road / Kildare Road	✓				✓		Low
South Circular Road	Medium	Donore Avenue / Donore Avenue / South Circular Road / South Circular Road	✓				✓		Low

The results of the junction analysis shown in Table 6.46 demonstrate that of the 79 junctions assessed:

- Two junctions are anticipated to experience a Low Negative impact;
- 76 junctions are anticipated to experience Negligible impacts (not shown in Table 6.46); and
- One junction is anticipated to experience a Low Positive impact (not shown in Table 6.46).

Capacity issues (>100% V/C) are noted at the following junctions:

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

Both of these junctions are predicted to be over 100% V / C in the Do Minimum scenario, and therefore any capacity issues are not a result of the Proposed Scheme.

No further assessment into potential mitigation measures is therefore deemed to be required for junctions in the 2028 PM Peak Hour scenario.

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

The V / C ratios at the key local / regional road junctions in the AM Peak Hour for the Design Year (2043) have been assessed. Of the 57 junctions assessed all are anticipated to experience negligible impacts. A table of results containing all of the assessed junctions is provided in TIA Appendix 4.

Capacity issues (>100% V/C) are not noted at any junction in the AM Peak Hour in 2043 scenario. No further assessment into potential mitigation measures is therefore deemed to be required for junctions in the 2043 AM Peak Hour scenario.

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

The contents of Table 6.47 outline the V / C ratios at the key local / regional road junctions in the PM Peak Hour for the Design Year (2043). Table 6.47 shows only those junctions with a predicted impact of Low or higher. A table of results containing all of the assessed junctions is provided in TIA Appendix 4.

Table 6.47: Volume over Capacity Ratios at Key Junctions (Do Minimum vs. Do Something), PM Peak, Design Year (2043)

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%	
Stannaway Road	Medium	Stannaway Road / Sundrive Road			ü			ü	Low

The results of the junction analysis shown in Table 6.47 demonstrate that of the 79 junctions assessed:

- One junction is anticipated to experience a Low Negative impact; and
- 78 junctions are anticipated to experience Negligible impacts (not shown in Table 6.47).

Capacity issues (>100% V/C) are noted at the following junctions:

- High Street / Nicholas Street / St Michaels Hill / Clanbrassil Street Upper / Christchurch Place;
- Stannaway Road / Sundrive Road; and
- St Agnes Road / Cromwellsfort Road / Kimmage Road West / Whitehall Road West.

All of these junctions are predicted to be over 100% V / C in the Do Minimum scenario, and therefore any capacity issues are not a result of the Proposed Scheme.

No further assessment into potential mitigation measures is therefore deemed to be required for junctions in the 2043 PM Peak Hour scenario.

6.6.3.4.5 Night-time Traffic Redistribution

The night-time period is defined as between 23:00 and 07:00. Analysis of traffic data during this period indicates that traffic levels are considerably lower and that junctions have a higher capacity for vehicular movement. 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 effects of traffic redistribution due to any of the Proposed Schemes will be **Negligible** during the night-time period.

6.6.3.4.6 General Traffic Impact Assessment Summary

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

Using the TII guidelines 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 roads that required further traffic analysis:

- **AM Peak Hour**: A total of 22 road links, as listed in Table 6.39.
- **PM Peak Hour:** A total of 26 road links, as listed in Table 6.42.

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 outputs for the worst-performing arm at each junction have been assessed.

<u>2028 Local / Regional Roads Assessment</u>

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 **Negligible.**

The junction analysis contained with the EIAR considers the sensitivity of each of the junctions, and combines this with the predicted magnitude of impact to produce an overall significance of effects. A summary of the TIA impacts is provided below:

- In the 2028 AM Peak Hour, 57 junctions were assessed:
    - One junction is anticipated to experience a Low Negative impact;
    - 55 junctions are anticipated to experience Negligible impacts; and
    - One junction is anticipated to experience a Low Positive impact.
- In the 2028 PM Peak Hour, 79 junctions were assessed:
    - Two junctions are anticipated to experience a Low Negative impact;
    - 76 junctions are anticipated to experience Negligible impacts; and
    - One junction is anticipated to experience a Low Positive impact

No mitigation measures are deemed to be required in either the AM or PM 2028 peak hours.

<u>2043 Local / Regional Roads Assessment</u>

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 **Negligible.**

The junction analysis contained with the EIAR considers the sensitivity of each of the junctions, and combines this with the predicted magnitude of impact to produce an overall significance of effects. A summary of the TIA impacts is provided below:

- In the 2043 AM Peak Hour, 57 junctions were assessed:
    - All 57 junctions are anticipated to experience Negligible impacts.
- In the 2043 PM Peak Hour, 79 junctions were assessed:
    - One junction is anticipated to experience a Low Negative impact; and
    - 78 junctions are anticipated to experience Negligible impacts.

No mitigation measures are deemed to be required in either the AM or PM 2043 peak hours.

Overall Summary

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

It should be noted that while some high impacts have been identified, these are at a small number of individual junctions, and effects will be short-lived and localised. 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 (DoT 2019c) 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 and in the context of the increased movement of people overall and by sustainable modes in particular. Therefore, the proposed impacts are considered acceptable when considered against the Scheme Objectives.

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.

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

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

The following indicators have been provided for both scenarios:

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

The content of Table 6.48 outlines the impact that the Proposed Scheme will have on the wider transport network, beyond the defined study areas.

Table 6.48: Network-Wide Performance Indicators

Scenario	Metric	Do Minimum	Do Something	% Difference	Magnitude and type of impact
Opening Year (2028) AM Peak Hour	Transient Queues (pcu.hrs)	18,690	18,730	+0.21%	Low Negative
	Over Capacity Queues (pcu.hrs)	5,335	5,232	-1.93%	
	Total Travel Times (pcu.hrs)	62,250	62,030	-0.35%	
	Total Travel Distance (pcu.kms)	2,020,000	2,013,000	-0.35%	
	Average Network Speed (km / h)	32.5	32.5	+0.00%	
Opening Year (2028) PM Peak Hour	Transient Queues (pcu.hrs)	17,980	18,009.5	+0.16%	Low Negative
	Over Capacity Queues (pcu.hrs)	4,660	4,653.4	-0.14%	
	Total Travel Times (pcu.hrs)	58,970	58,952.5	-0.03%	
	Total Travel Distance (pcu.kms)	1,943,000	1,938,947	-0.21%	
	Average Network Speed (km / h)	32.94	32.9	-0.12%	
Design Year (2043) AM Peak Hour	Transient Queues (pcu.hrs)	16,020	15,834	-1.16%	Negligible
	Over Capacity Queues (pcu.hrs)	5,113	4,972	-2.76%	
	Total Travel Times (pcu.hrs)	57,371	56,831	-0.94%	
	Total Travel Distance (pcu.kms)	1,996,533	1,986,198	-0.52%	
	Average Network Speed (km / h)	34.8	34.9	+0.29%	
Design Year (2043) AM Peak Hour	Transient Queues (pcu.hrs)	16,985	16,739	-1.45%	Negligible
	Over Capacity Queues (pcu.hrs)	5,280	4,979	-5.70%	
	Total Travel Times (pcu.hrs)	57,638	56,841	-1.38%	
	Total Travel Distance (pcu.kms)	1,936,806	1,925,347	-0.59%	
	Average Network Speed (km / h)	33.6	33.9	+0.89%	

The results of the assessment demonstrate that the impacts to the network performance indicators range between -5.7% and 0.89%, therefore a **Low Negative** impact is anticipated.

6.6.4 Operational Phase Summary

The contents of Table 6.49 present a summary of the predicted impacts of the Proposed Scheme during the Operational Phase.

Table 6.49: 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.	Low to Medium Positive
Cycling Infrastructure	Improvements to the quality of the cycling infrastructure along the Proposed Scheme.	Low to Medium Positive
	A low negative impact is anticipated on R817 Kimmage Road Lower between Ravensdale Park and Sundrive Road due to the removal of advisory cycle lanes for approximately 160m south of the R817 Kimmage Road Lower / Sundrive Road / Larkfield Avenue Junction. Due to the proposed implementation of a bus gate at Ravensdale Park and the proposed Poddle Cycle route, the low negative impact is not anticipated to be significant to cyclists.	
Bus Infrastructure	Improvements to the quality of the bus infrastructure along the Proposed Scheme.	Low to Medium Positive
Parking and Loading	A total loss of 51 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.	Low to High 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 6.6 (Operational Phase) and summarised in Table 6.49 above, the Proposed Scheme will deliver positive impacts to the quality in terms of People Movement, pedestrian, cycling and bus infrastructure during the Operational Phase. These improvements will help to provide an attractive alternative to the private car and promote a modal shift to walking, cycling and public transport, allowing for greater capacity along the corridor to facilitate the movement of people.

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

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

7. Cumulative Assessment

7.1 Construction Stage Cumulative Effects

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

7.2 Operational Stage Cumulative Impacts

7.2.1 Introduction

This Section reports the assessment of cumulative effects associated with the Operational Phase of the Proposed Scheme and other proposed BusConnects Schemes. 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 (Cumulative Impacts & Environmental Interactions) in Volume 2 of the EIAR.

7.2.2 Transport Schemes

As detailed in Section 4, the core reference case (Do Minimum) modelling scenarios (Opening Year (2028) and Design Year (2043)) are based on the progressive roll-out of the Greater Dublin Area (GDA) Transport Strategy 2022-2042 (GDA Strategy), with a partial implementation by 2028, in line with (National Development Plan (NDP) (Government of Ireland 2021) investment priorities) and the full implementation by 2043. To this end, the modelling scenarios developed for the operational assessment of the Proposed Scheme(s) inherently accounts for the cumulative effects of complementary committed and proposed transport schemes within the GDA region.

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

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

7.2.3 Transport Demand

Cumulative transport demand for the 2028 and 2043 assessment years have been included in the analysis contained within this TIA, using travel demand forecasting, which accounts for increases in population and economic activity, in line with planned growth contained within the NPF, Regional Spatial and Economic Strategy (RSES) for the Eastern and Midland region and the local development plans for GDA local authorities.

It is envisaged that the population will grow by 11% up to 2028 and 25% by 2043 (above 2016 census data levels). Similarly, employment is due to grow by 22% by 2028 and 49% by 2043 (Source: NTA Reference Case Planning Sheets 2028, 2043).

7.2.3.1 Strategic Trip Demand Assessment

As described previously in Section 0, 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 transport 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 this demand will be by sustainable modes (Public Transport (PT), Walking, Cycling). Private car demand may still grow in some areas but not linearly in line with demographics, as may have occurred in the past.

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

7.2.3.1.1 Trip Demand Growth within Study area of the Proposed Schemes.

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

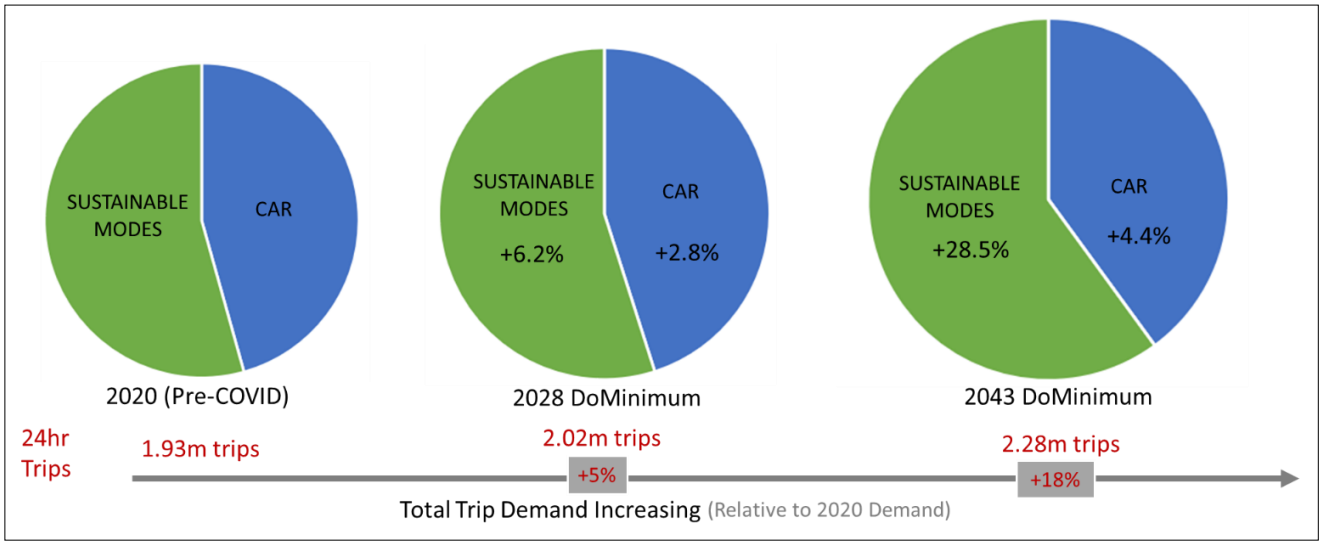

Diagram 7.1: Trip Demand Changes without the Proposed Schemes (in Relation to 2020 Demand)

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

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

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

7.2.3.1.2 Impacts of BusConnects Proposed Scheme Works on Travel Demand Growth

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

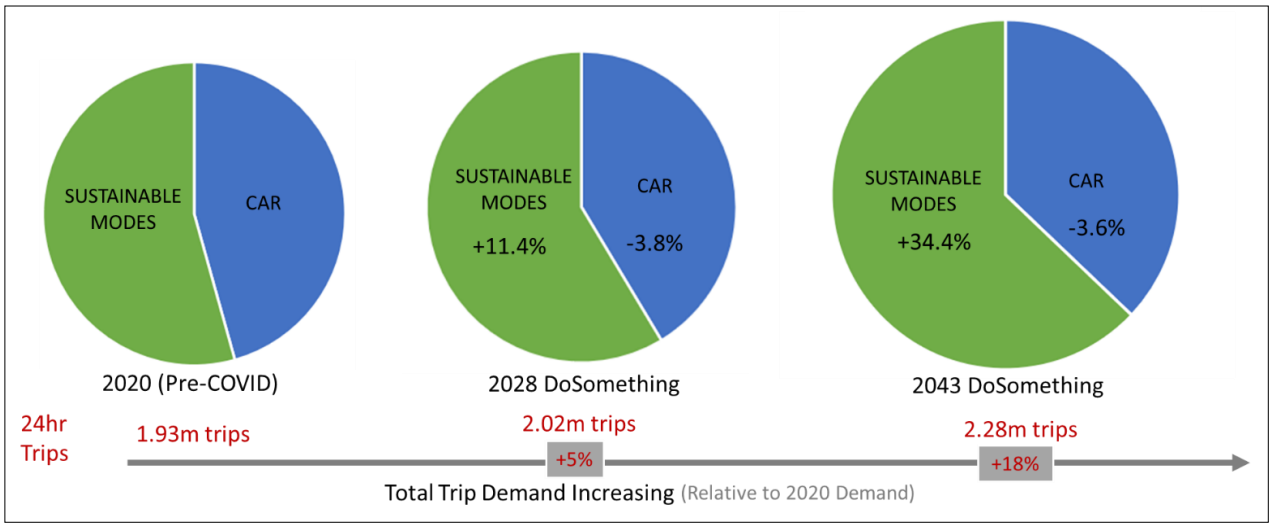

Diagram 7.2: Trip Demand Changes with the Proposed Schemes (in Relation to 2020 Demand)

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

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

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

7.2.4 People Movement Assessment

7.2.4.1 Overview

In order to understand the benefit with regards to the Movement of People following the full implementation of all 12 of the Proposed Schemes, a quantitative People Movement assessment has been undertaken using outputs of the modelling suite comparing the Do Minimum and Do Something Peak Hour scenarios for each forecast year (2028, 2043).

The assessment of People Movement includes the following metrics:

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

7.2.4.2 Daily People Movement by Mode (Mode Share)

Daily (07:00hrs-19:00hrs – 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) (07:00hrs-10:00hrs) and All-day (07:00hrs-19:00hrs) period; and
- People travelling from the catchment area of the Proposed Schemes inbound towards the City Centre (defined as the Canal Cordon) in the Morning Peak period (AM) (07:00hrs-19:00hrs period)
  .

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

7.2.4.2.1 2028 Demand Changes by Mode

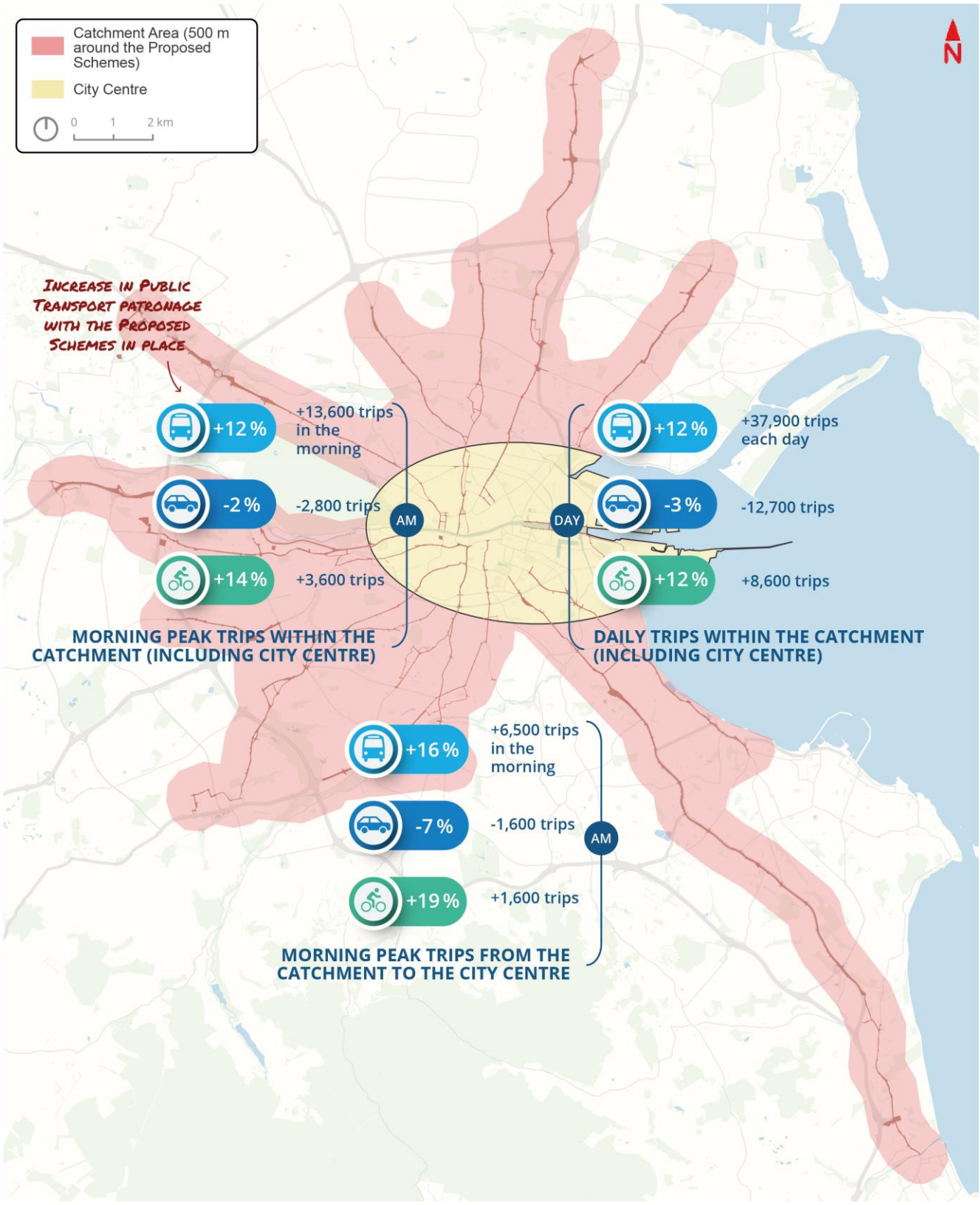

Diagram 7.3: Change in Trips by Mode within a 500m Catchment Area of the Proposed Schemes and the City Centre and Trips Originating from the Catchment Inbound to the City Centre in 2028

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

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

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

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

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

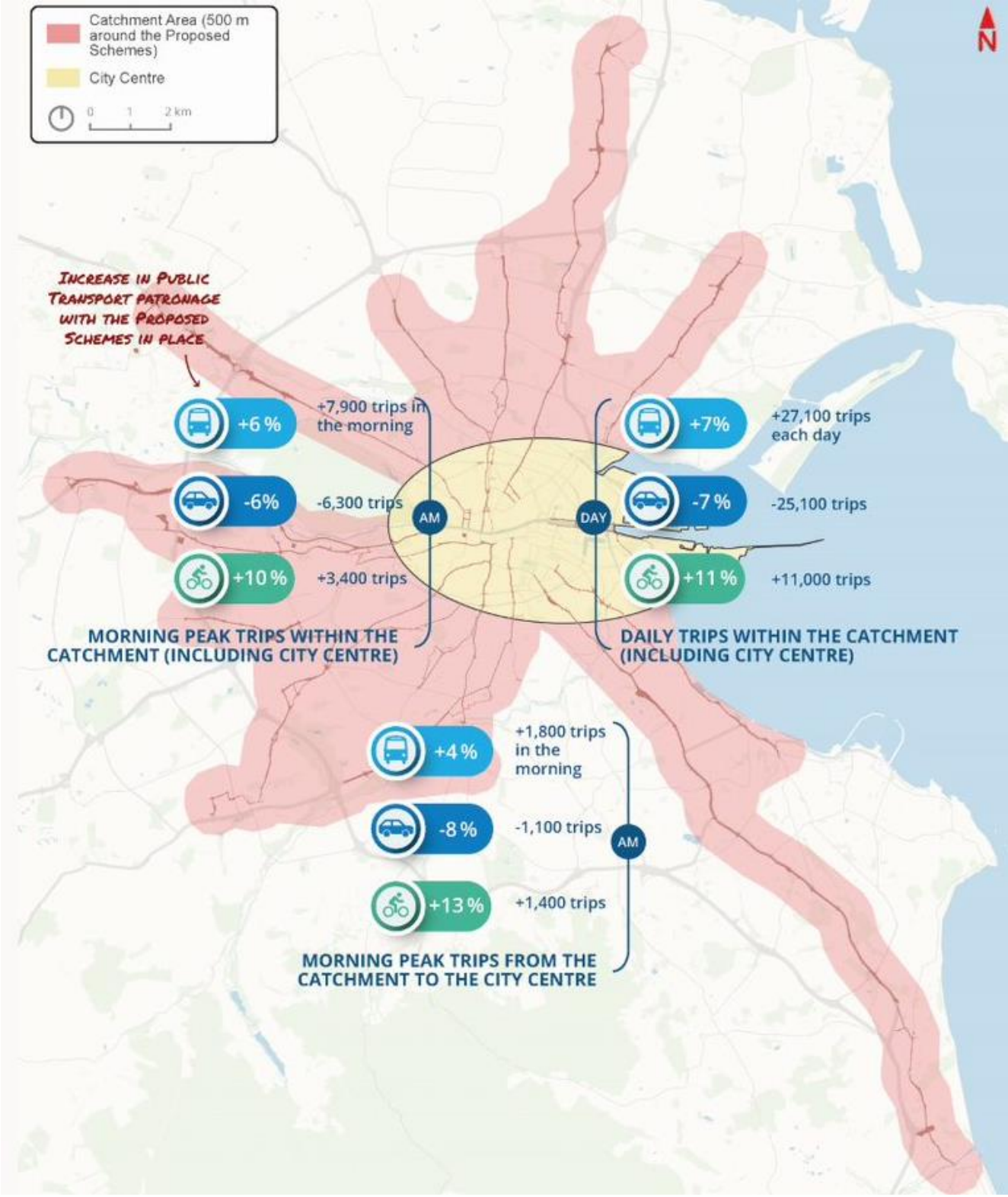

Diagram 7.4: Change in trips by mode within a 500m Catchment Area of the Proposed Schemes and the City Centre and Trips originating from the Catchment inbound to the City Centre in 2043

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

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

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

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

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

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

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

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

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

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

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

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

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

Peak Hour People Movement along the Proposed Schemes

To determine the cumulative impact that the implementation of the Proposed Schemes will have on modal share changes on the direct study areas, 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).

7.2.4.2.3 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.

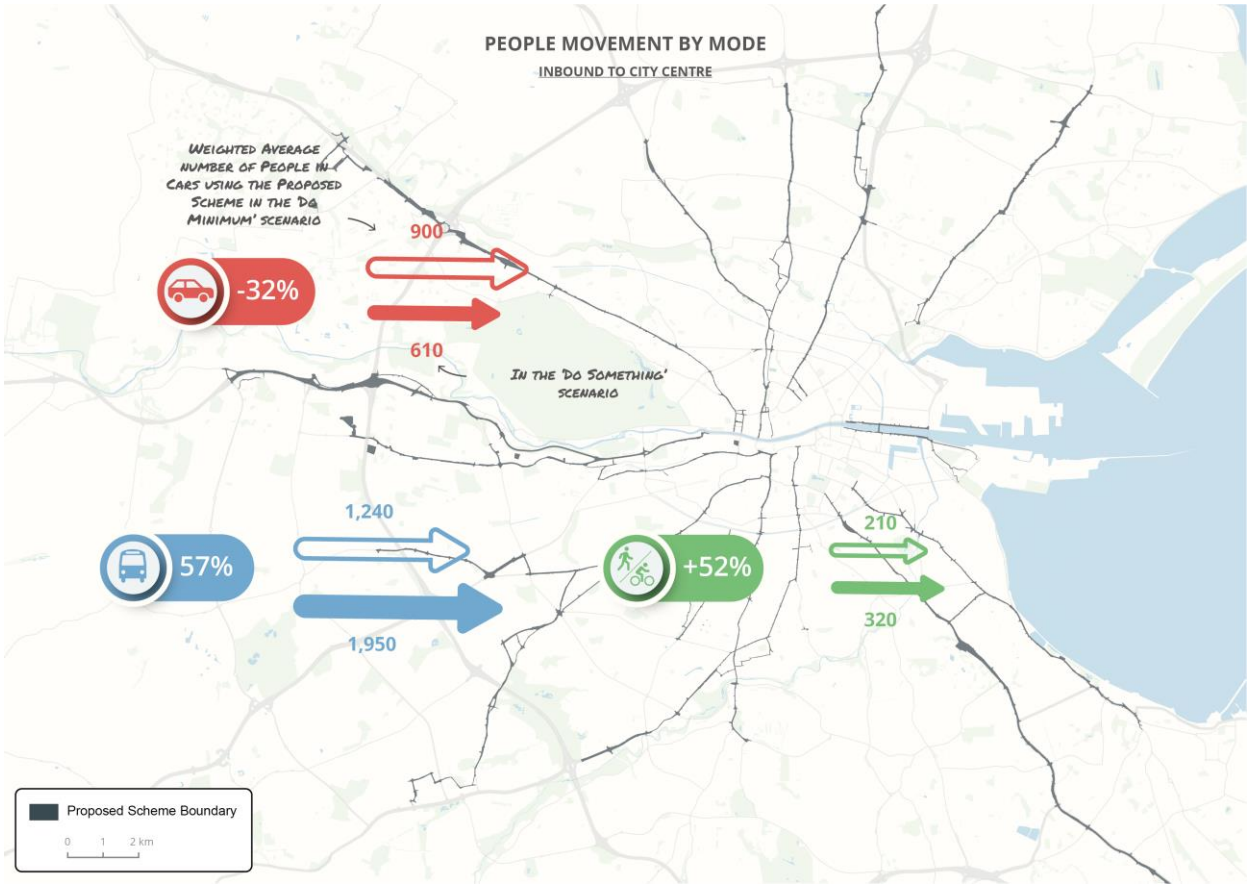

Diagram 7.5: Weighted Average People Movement by Mode during 2028 AM Peak Hour

As indicated in Diagram 7.5, on average across all Proposed Schemes, there is a predicted reduction of 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 7.5 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 7.5: 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%
		Combined Walking/Cycling	210	9%	320	11%	110	52%
		Sustainable Modes Total	**1,450**	**62%**	**2,270**	**79%**	**820**	**57%**
		Total (all modes)	**2,350**	**100%**	**2,880**	**100%**	**530**	**23%**

7.2.4.2.4 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.

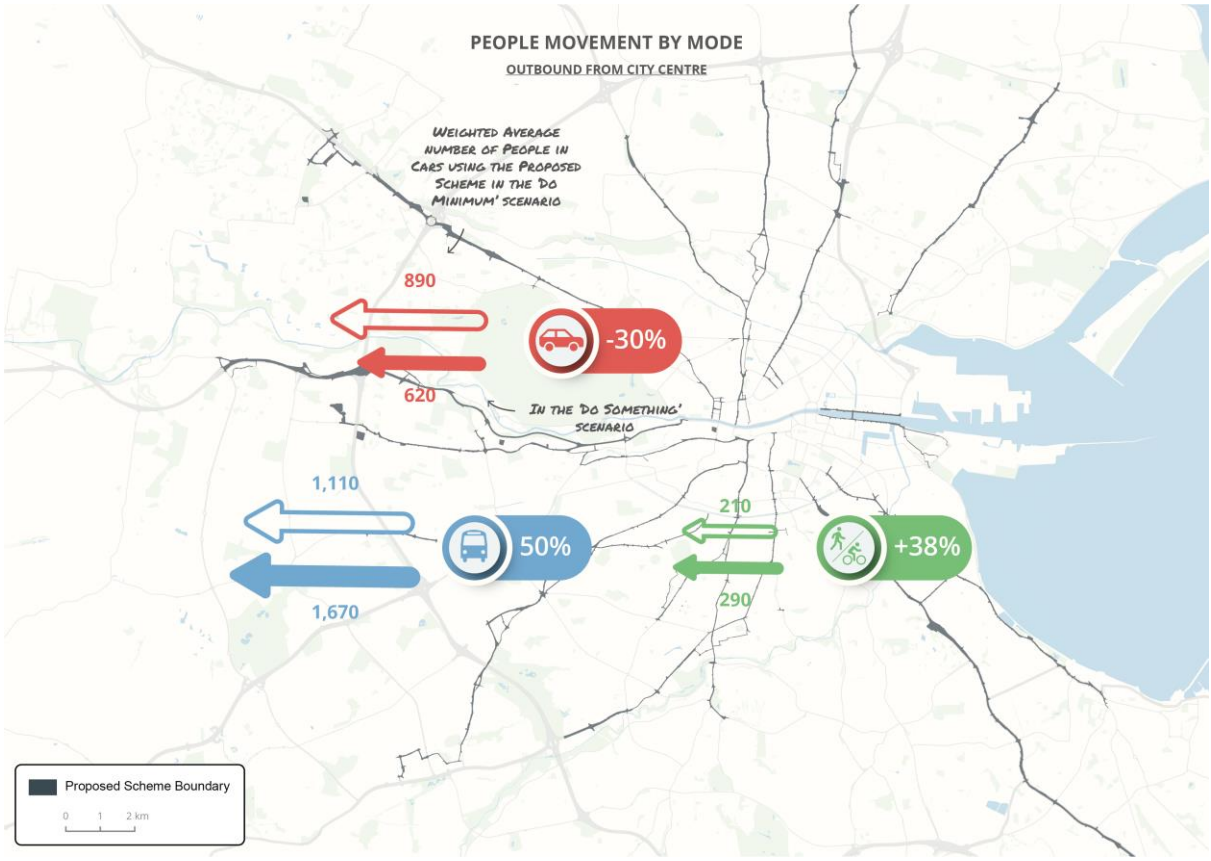

Diagram 7.6: Weighted Average People Movement by Mode during 2028 PM Peak Hour

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

Table 7.6 outlines the difference in modal split between the Do Minimum and Do Something (All Proposed Schemes) scenarios for each mode of transport in an outbound direction from the City Centre during the PM Peak

Hour. The results indicate a 17% increase in total people moved as a result of the Proposed Schemes and a 48% increase in people moved by sustainable modes (Public Transport, Walk, Cycle).

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

Direction	Time Period	Mode of Transport	Do Minimum		Do Something		Difference	
			Hourly Trips	Modal Split (%)	Hourly Trips	Modal Split (%)	Hourly Trips	Difference (%)
Outbound from the City Centre	PM Peak Period	General Traffic	890	40%	620	24%	-270	-30%
		Public Transport	1,110	50%	1,670	65%	560	50%
		Walking	150	7%	140	5%	-10	-7%
		Cycling	60	3%	150	6%	90	150%
		Combined Walking/Cycling	210	10%	290	11%	80	38%
		Sustainable Modes Total	**1,320**	**60%**	**1,960**	**76%**	**640**	**48%**
		Total (All modes)	**2,210**	**60%**	**2,580**	**76%**	**370**	**17%**

7.2.4.2.5 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.

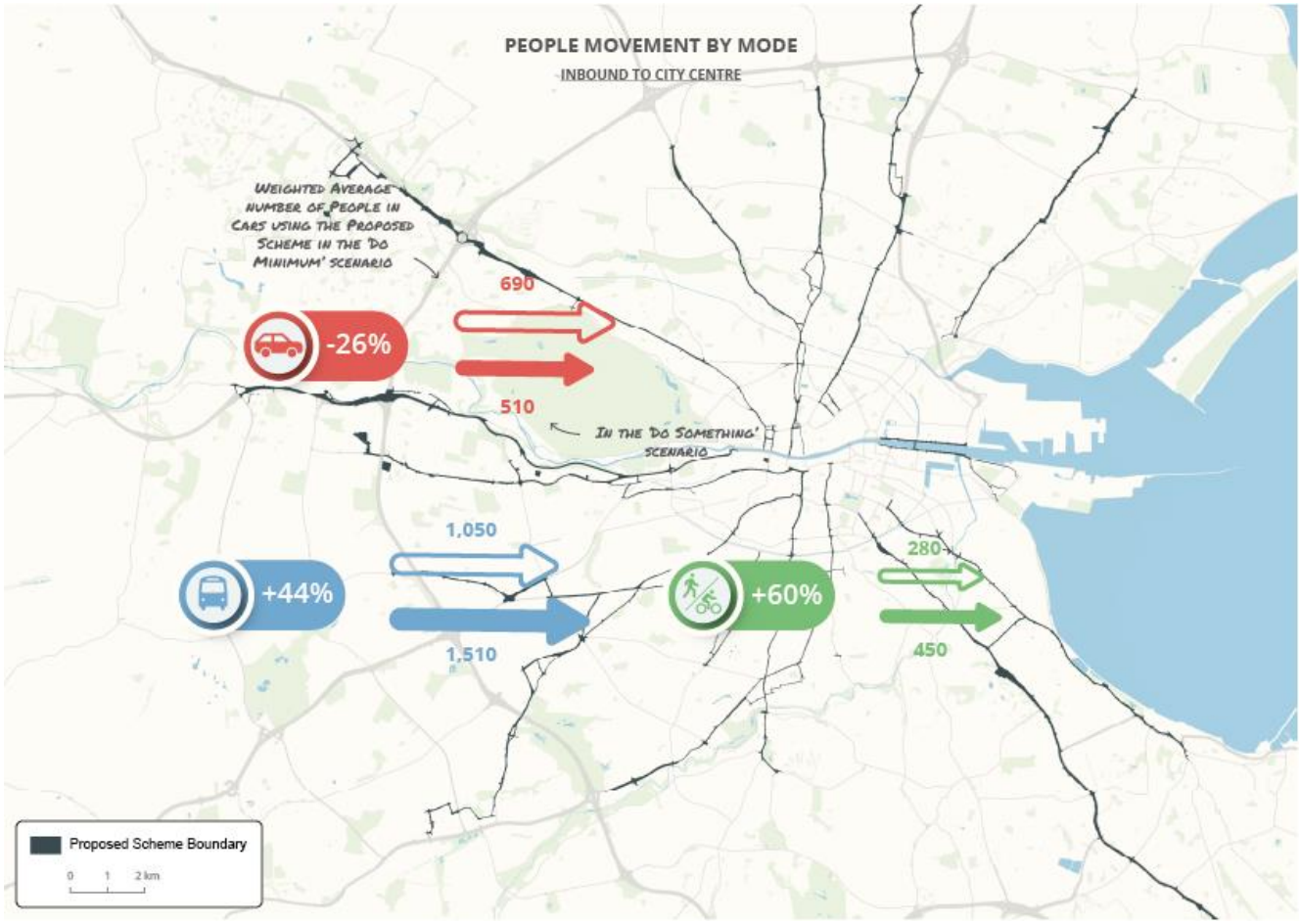

Diagram 7.7: Weighted Average People Movement by Mode during 2043 AM Peak Hour

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

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

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

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

7.2.4.2.6 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.

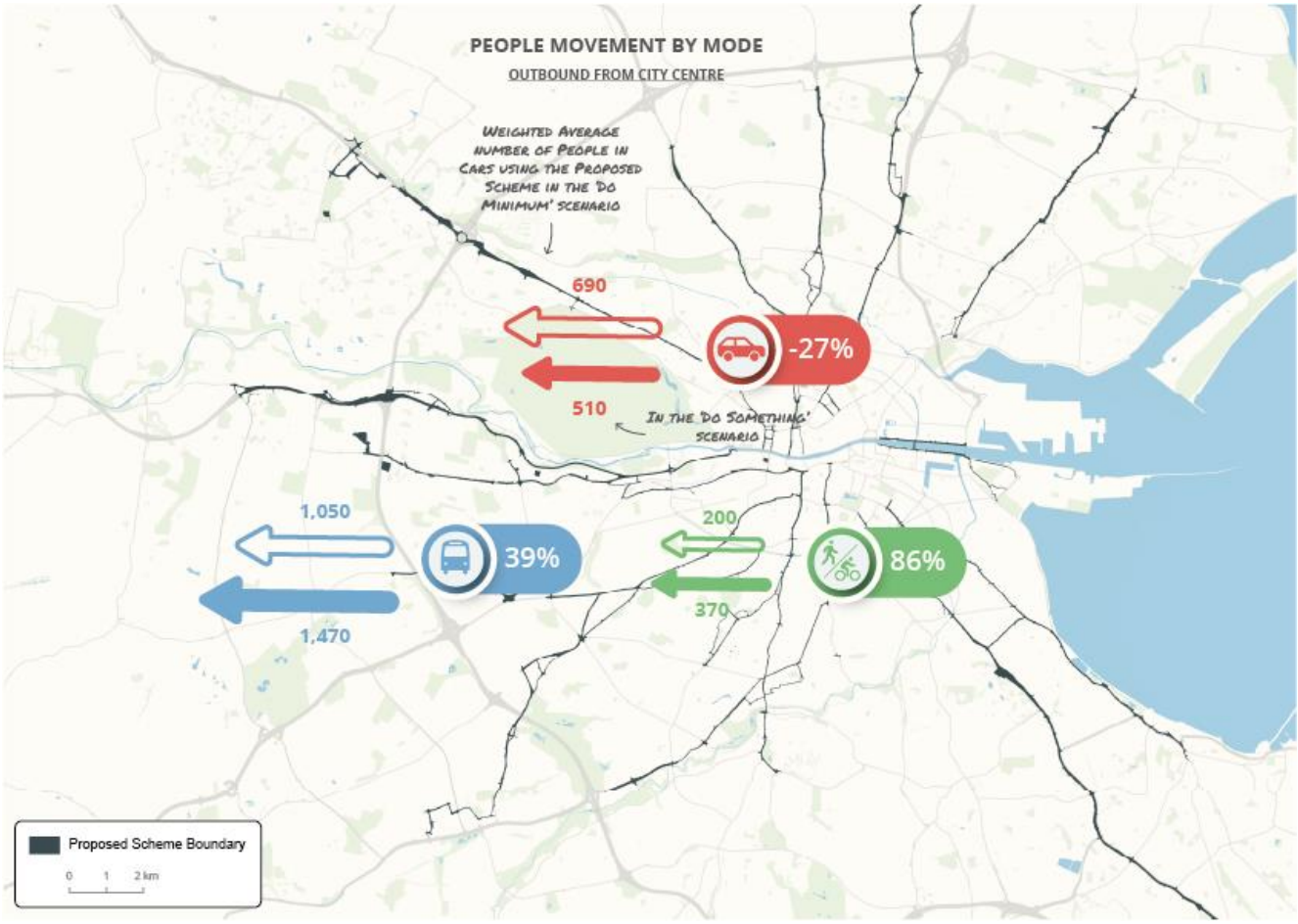

Diagram 7.8: Weighted Average People Movement by Mode during 2043 PM Peak Hour

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

Table 7.8 outlines the difference in modal split between the Do Minimum and Do Something (All Proposed Schemes) scenarios for each mode of transport in an outbound direction from the City Centre during the PM Peak Hour. The results indicate a 46% increase in total people moved as a result of the Proposed Schemes and a 81% increase in people moved by sustainable modes (Public Transport, Walk, Cycle).

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

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

7.2.4.3 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.

7.2.4.3.1 2028 AM Peak Hour Bus Passengers

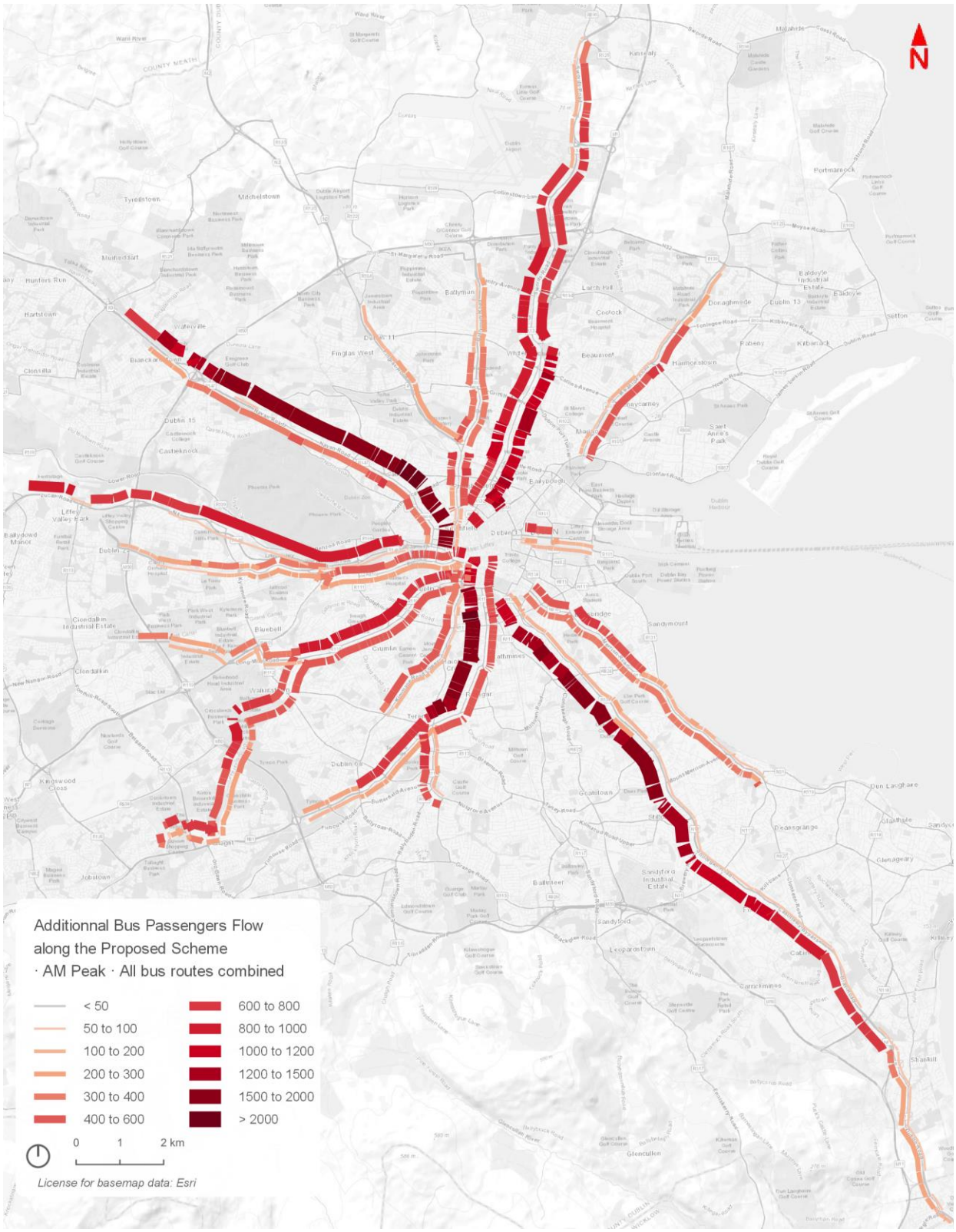

Diagram 7.9: AM Peak Hour Total Bus Passenger Flows Along the Proposed Schemes (All Bus Routes Combined)

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 Kimmage to City Centre Scheme shows an increase of approximately 600 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 Kimmage 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 (%)
Kimmage to City Centre Scheme	12,420	15,590	3,170	25.5%
All Schemes	85,990	101,760	15,770	18.3%

As shown above there will be a 25.5% increase in people boarding bus routes which use any part of the Kimmage Scheme during the AM Peak Hour. This represents an addition of 3,170 passengers.

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

7.2.4.3.2 2028 PM Peak Hour Bus Passengers

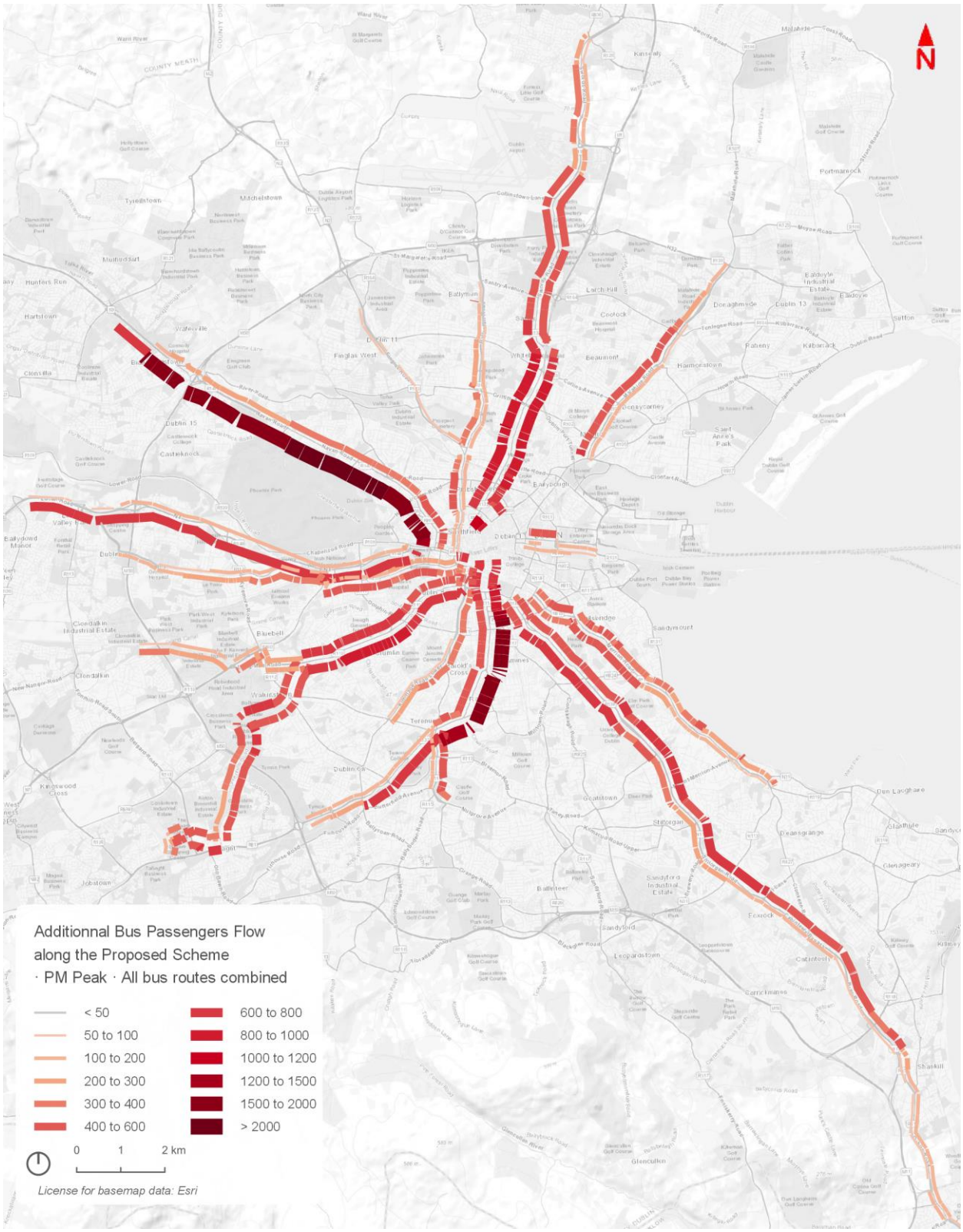

Diagram 7.10: PM Peak Hour Total Bus Passenger Flows Along the Proposed Schemes (All Bus Routes Combined)

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 Kimmage to City Centre Scheme shows an increase of approximately 400 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 Kimmage 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 (%)
Kimmage to City Centre Scheme	10,440	13,500	3,060	29.3%
All Schemes	71,280	85,170	13,890	19.5%

As shown in Table 7.10, there will be a 29.3% increase in people boarding bus routes which use any part of the Kimmage to City Centre Scheme during the PM Peak Hour. This represents an addition of 3,060 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.

7.2.4.3.3 2043 AM Peak Hour Bus Passengers

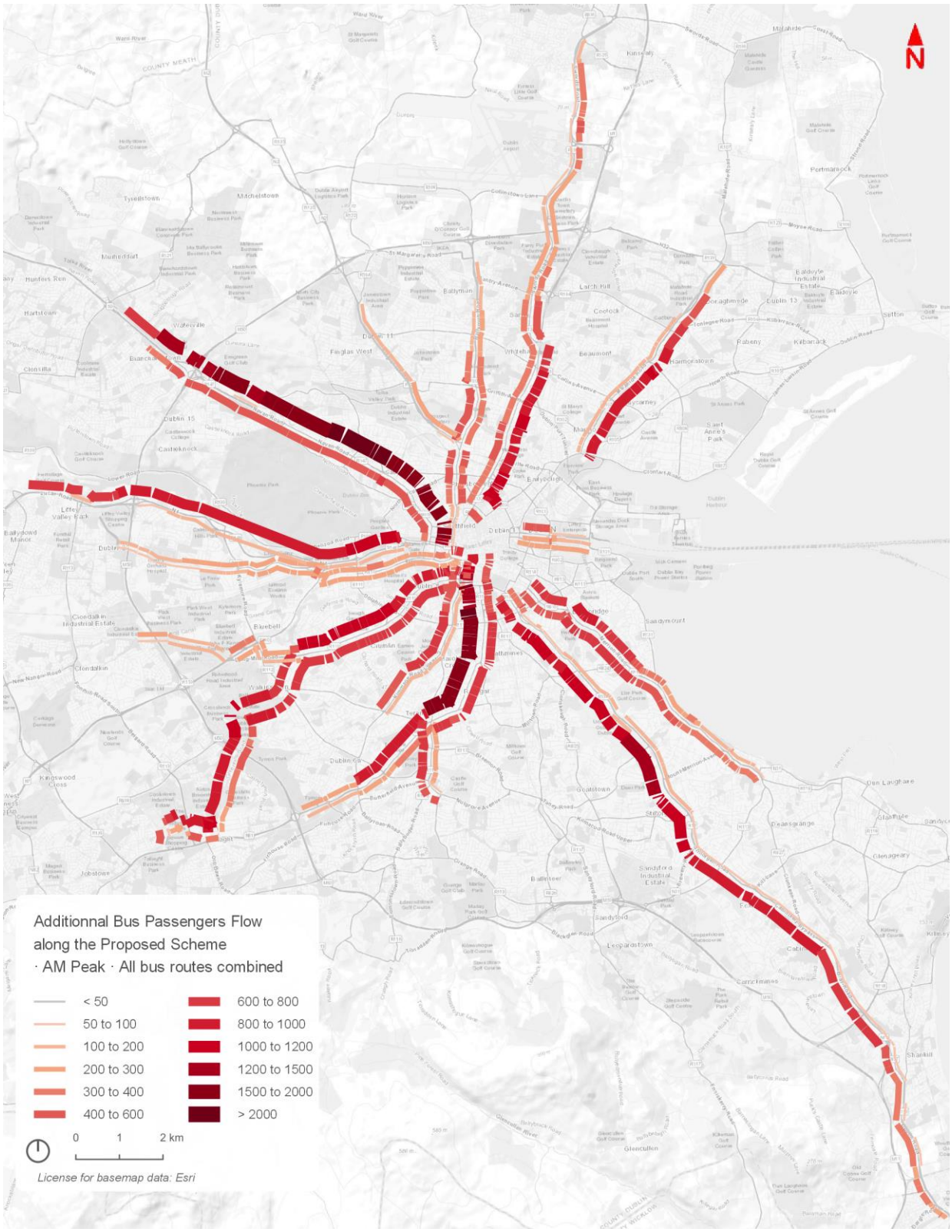

Diagram 7.11: AM Peak Hour Total Bus Passenger Flows Along the Proposed Schemes (All Bus Routes Combined)

As indicated in Diagram 7.11, there is a high growth in bus patronage along all the Proposed Schemes in the 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 Kimmage to City Centre Scheme shows an increase of approximately 700 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 Kimmage 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 (%)
Kimmage to City Centre Scheme	13,904	16,046	2,142	15.4%
All Schemes	95,028	118,552	23,524	24.75%

As shown in Table 7.11, there will be a 15.4% increase in people boarding bus routes which use any part of the Kimmage to City Centre Scheme during the AM Peak Hour. This represents an addition of 2,142 passengers in the AM Peak Hour.

There will be a 24.8% increase in people boarding bus routes which use any part of the Proposed Schemes, representing an additional 23,524 passengers due to the bus priority improvements.

7.2.4.3.4 2043 PM Peak Hour Bus Passengers

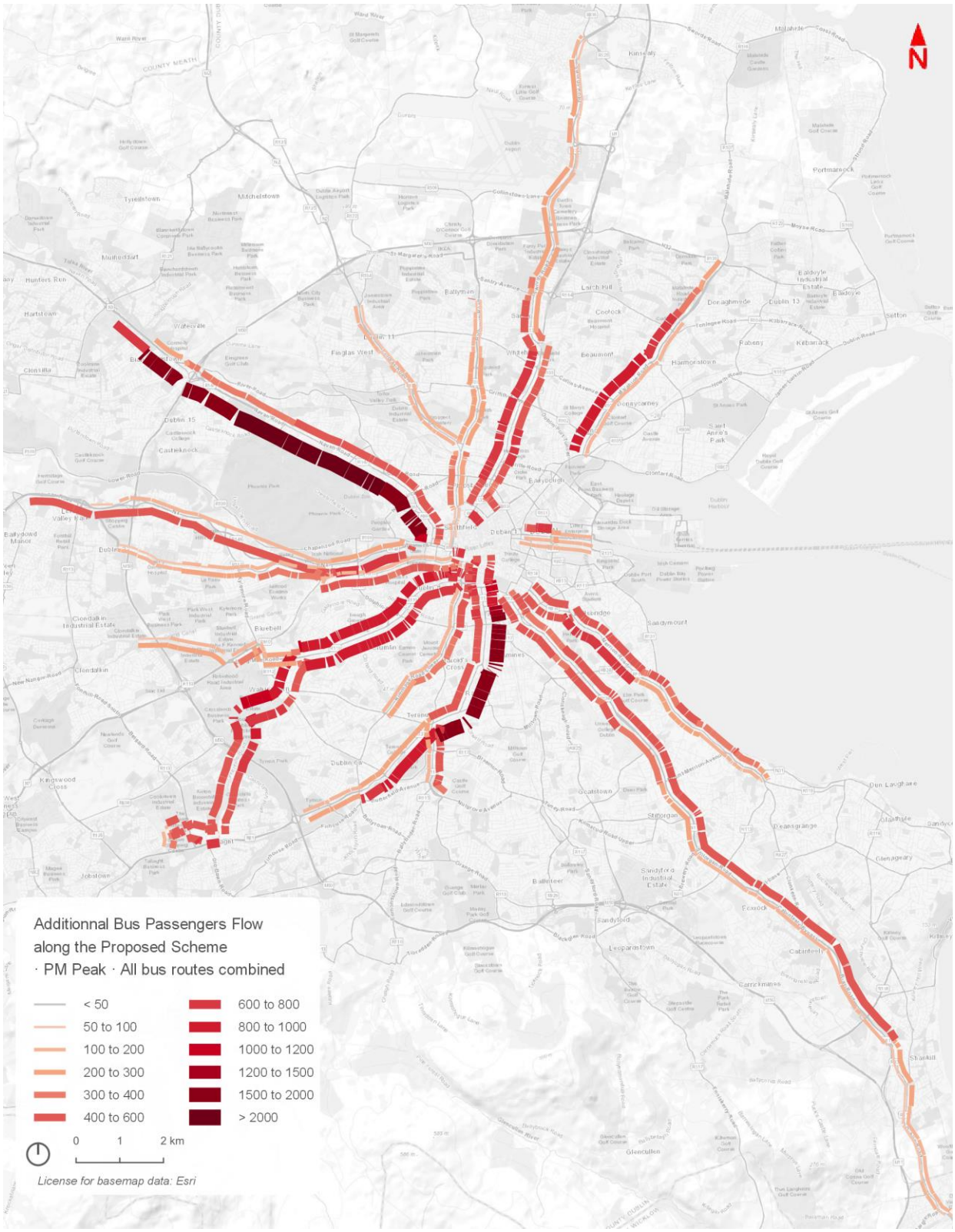

Diagram 7.12: PM Peak Hour Total Bus Passenger Flows Along the Proposed Schemes (All Bus Routes Combined)

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

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

Table 7.12 presents the total boardings on bus routes that use any part of the Proposed Scheme (including those stops not directly on the Proposed Scheme) in the 2043 PM Peak Hour for the Kimmage 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 (%)
Kimmage to City Centre Scheme	12,054	13,925	1,871	15.5%
All Schemes	78,116	98,393	20,277	25.96%

As shown in Table 7.12 there will be a 15.5% increase in people boarding bus routes which use any part of the Kimmage to City Centre Scheme during the PM Peak Hour. This represents an addition of 1,871 passengers in the AM Peak Hour.

There will be a 25.96% increase in people boarding bus routes which use any part of the Proposed Schemes, representing an additional 20,277 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 CBC Infrastructure Works applicable to the Proposed Scheme is to:

- Improve accessibility to jobs, education and other social and economic opportunities through the provision of improved sustainable connectivity and integration with other public transport services.

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

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

7.2.5.1 Passenger Boardings by Public Transport Mode

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

Table 7.13: 2028 AM Peak Hour PT Boardings

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

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

Table 7.14: 2028 PM Peak Hour PT Boardings

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

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

Table 7.15: 2043 AM Peak Hour PT Boardings

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

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

Table 7.16: 2043 PM Peak Hour PT Boardings

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

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

7.2.5.1.1 Public Transport Interchange

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

Table 7.17: 2028 AM Peak Hour Transfers between PT Modes

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

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

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

Table 7.18: 2043 AM Peak Hour Transfers between PT Modes

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

As shown above, with the roll out of the GDA Strategy the level of interchange increases substantially in the period from 2028 to 2043 without the Proposed Schemes. The total number of transfers between PT modes is expected to increase by 9% from 47,260 in the Do Minimum scenario to 51,390 in the Do Something scenario (with the Proposed Schemes in place). Transfers to buses predicted to increase by 14% from 18,410 to 20,920. This highlights the increased level of accessibility and transfer opportunities facilitated by the Proposed Schemes.

The Kimmage to City Centre Scheme does not have any direct interchange points with Luas, Rail or MetroLink stations.

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

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

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

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

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

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

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

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

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

7.2.6 General Traffic

7.2.6.1 Overview

The Proposed Scheme and the other proposed Core Bus Corridor Schemes aim to provide an attractive alternative to the private car and promote a modal shift to public transport, walking and cycling. As shown in the preceding sections, the transport modelling indicates that there will be a significant level of modal shift from car to more sustainable modes of travel. It is anticipated there will be a reduction in general traffic (car) trips of approximately 13,000 and 22,500 on a typical weekday (7:00hrs-19:00hrs) in 2028 and 2043 respectively. This represents the equivalent of the removal of up to 78km of traffic queues in 2028 and 135km by 2043 across the Dublin road network. For context, the queue reduction corresponds to approximately twice the length of the M50 Motorway in 2028 and almost three times the length of the M50 Motorway in 2043. This reduction in car demand facilitated by the Proposed Schemes will provide significant opportunities to manage the road network more effectively and promote greater movement of people by sustainable modes.

It is recognised, however, that there will be an overall reduction in operational capacity for general traffic along the direct study area of each of the Proposed Schemes given the proposed changes to the road layout and the rebalancing of priority to walking, cycling and bus. This reduction in operational capacity for general traffic along the Proposed Scheme (and the other proposed Core Bus Corridor Schemes) will likely create some level of trip redistribution onto the surrounding road network.

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

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

7.2.6.2 Assessment Considerations

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

Goods vehicles

The assessment also assumes that goods vehicles (HGVs and LGVs) continue to grow in line with forecasted economic activity with patterns of travel remaining the same. For example, the assessment assumes a 45% and 77% increase in goods traffic versus the base year in 2028 and 2043 respectively. This is considered a very

conservative assumption. It should be noted, however, that the 2023 Climate Action Plan (CAP) includes reference to a freight strategy for the region which will seek to further integrate smart technologies in logistics management and may include the regulation of delivery times as far as practicable to off-peak periods to limit traffic congestion in urban areas. The plan outlines measures to manage the increase in delivery and servicing requirements as the population grows, which may include the development of consolidation centres to limit the number of 'last-mile' trips made by larger goods vehicles with plans for higher use of smaller electric vans or cargo bikes for 'last-mile' deliveries in urban areas. As proposals for the above are at a pre-planning stage, it was not possible to account for them in the assessments and a worst-case assessment has been undertaken based on continued growth in goods traffic.

Cycling

The Proposed Scheme (and the other proposed Core Bus Corridor Schemes) will facilitate a step change in the level of segregated cycling provision in comparison with existing conditions along the entire length of the corridors. The representation of improvements to cycling infrastructure in the transport models follows a standard approach and are appropriate for the strategic nature of the model. Improvements are applied by way of an increase in cycling speed on the network where the improvements have been made, as well as new connectivity by way of new links as part of the proposals. Modelling cycling infrastructure improvements using speeds is a standard approach that means an increase in cycling mode share can be obtained through a reduction in the modelled cost of a journey by bicycle relative to other modes. This has been applied as part of the modelling of the Proposed Scheme to represent improvements with a cycling mode share of approximately 5-6% achieved. The transport modelling undertaken, is therefore conservative in terms of the predicted cycling mode share. This has the effect that predicted traffic levels are on the higher and conservative side in relation to a potential future receiving environment. This is appropriate for EIAR purposes as a reasonable worst-case has been assessed in terms of traffic levels on the road network.

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

Demand Management

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

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

7.2.6.3 General Traffic Flow Changes

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

As outlined in Section 6.6.3, the changes in traffic flows have been presented with reference to TII's Traffic and Transport Assessment Guidelines (TII 2014) (i.e., traffic redistribution resulting in an increase or decrease above 100 combined flows (i.e. in a two-way direction))) along roads in the vicinity of the Core Bus Corridors in the AM and PM Peak Hours are presented. The threshold aligns with an approximate one vehicle per minute increase or decrease per direction on any given road. This is a very low level of traffic change on any road type and ensures that a robust assessment of the changes in traffic levels are presented.

Diagram 7.13 and Diagram 7.14 below illustrate the difference in traffic flows (Do Minimum vs Do Something) on roads in the AM Peak Hour for the Opening Year (2028) and the Design Year (2043) with the Proposed Scheme and all other proposed Core Bus Corridor schemes in place. The diagrams are extracts from Figure 6.13 and 6.16 in TIA Appendix 3 (Maps). Reductions in traffic flows are indicated by the blue lines with increases in traffic flow indicated by the red lines.

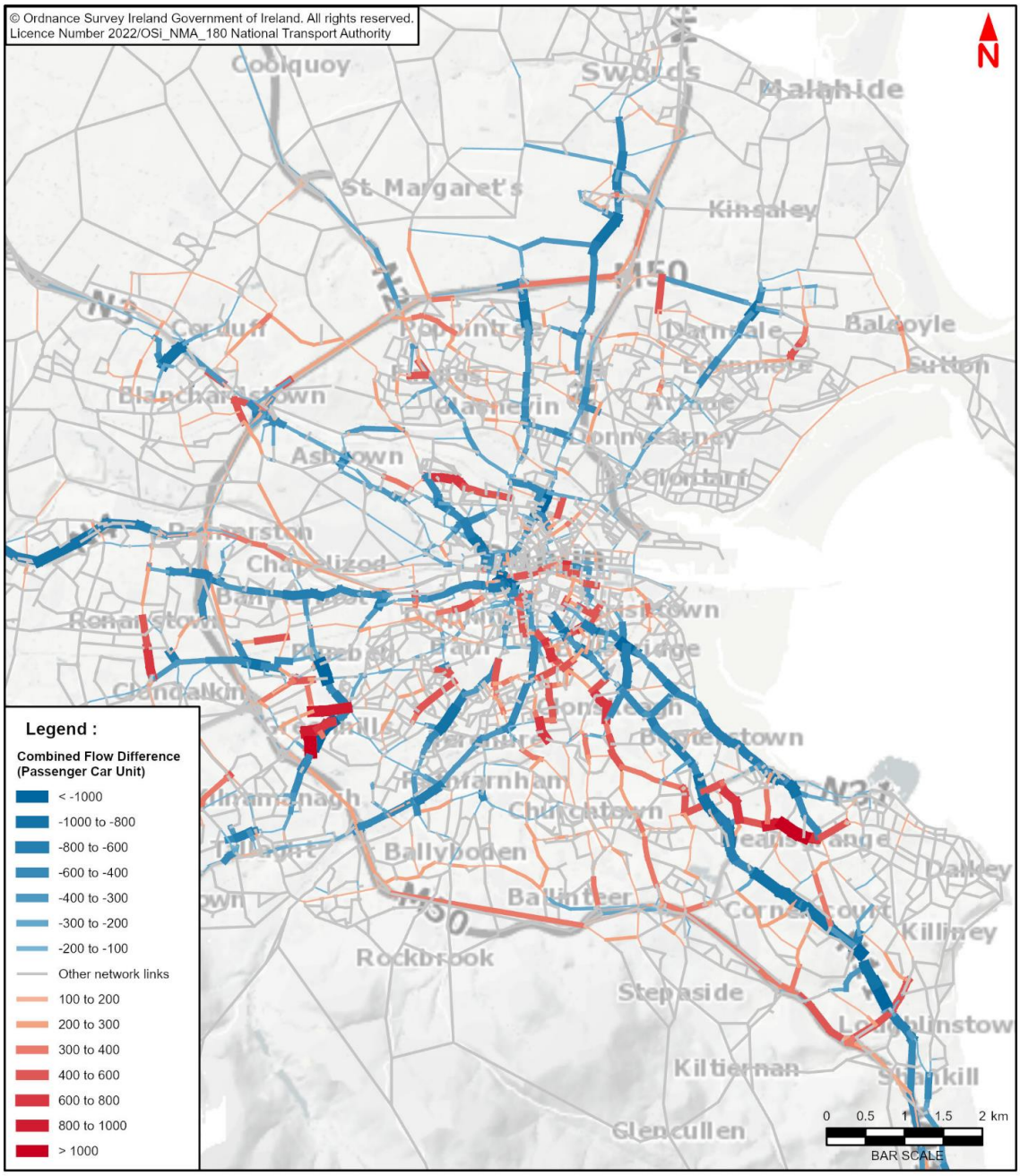

Diagram 7.13: Flow Difference on Road Links (Do Minimum vs. Do Something), AM Peak Hour, Opening Year (2028) – Cumulative Scenario

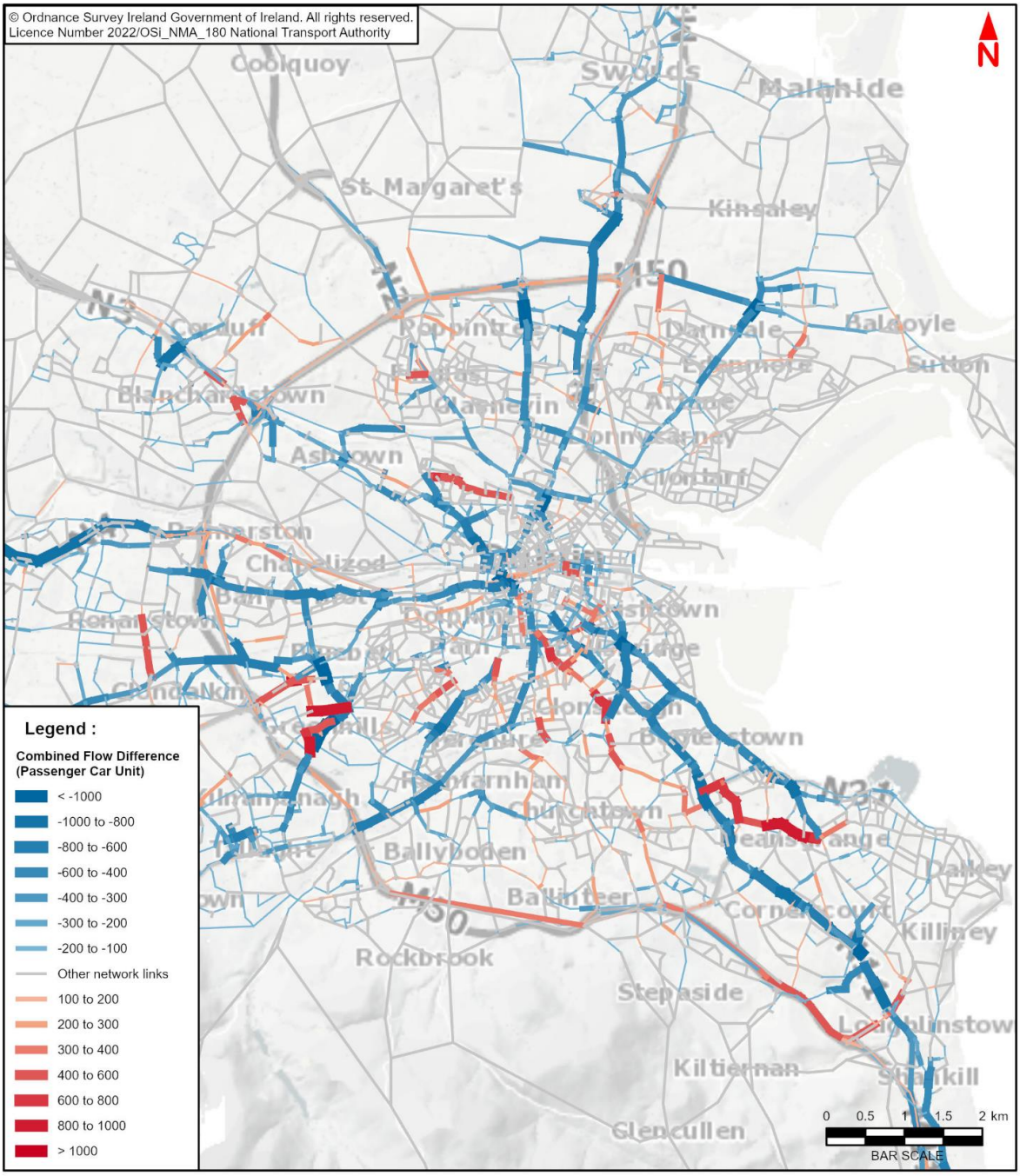

Diagram 7.14: Flow Difference on Road Links (Do Minimum vs. Do Something), AM Peak Hour, Design Year (2043) – Cumulative Scenario

Diagram 7.16 and Diagram 7.17 below illustrate the difference in traffic flows (Do Minimum vs Do Something) on roads in the PM Peak Hour for the Opening Year (2028) and the Design Year (2043) with the Proposed Scheme and all other proposed Core Bus Corridor schemes in place. The maps are extracts from Figure 6.14 and 6.16 in TIA Appendix 3 (Maps). Reductions in traffic flows are indicated by the blue lines with increases in traffic flow indicated by the red lines.

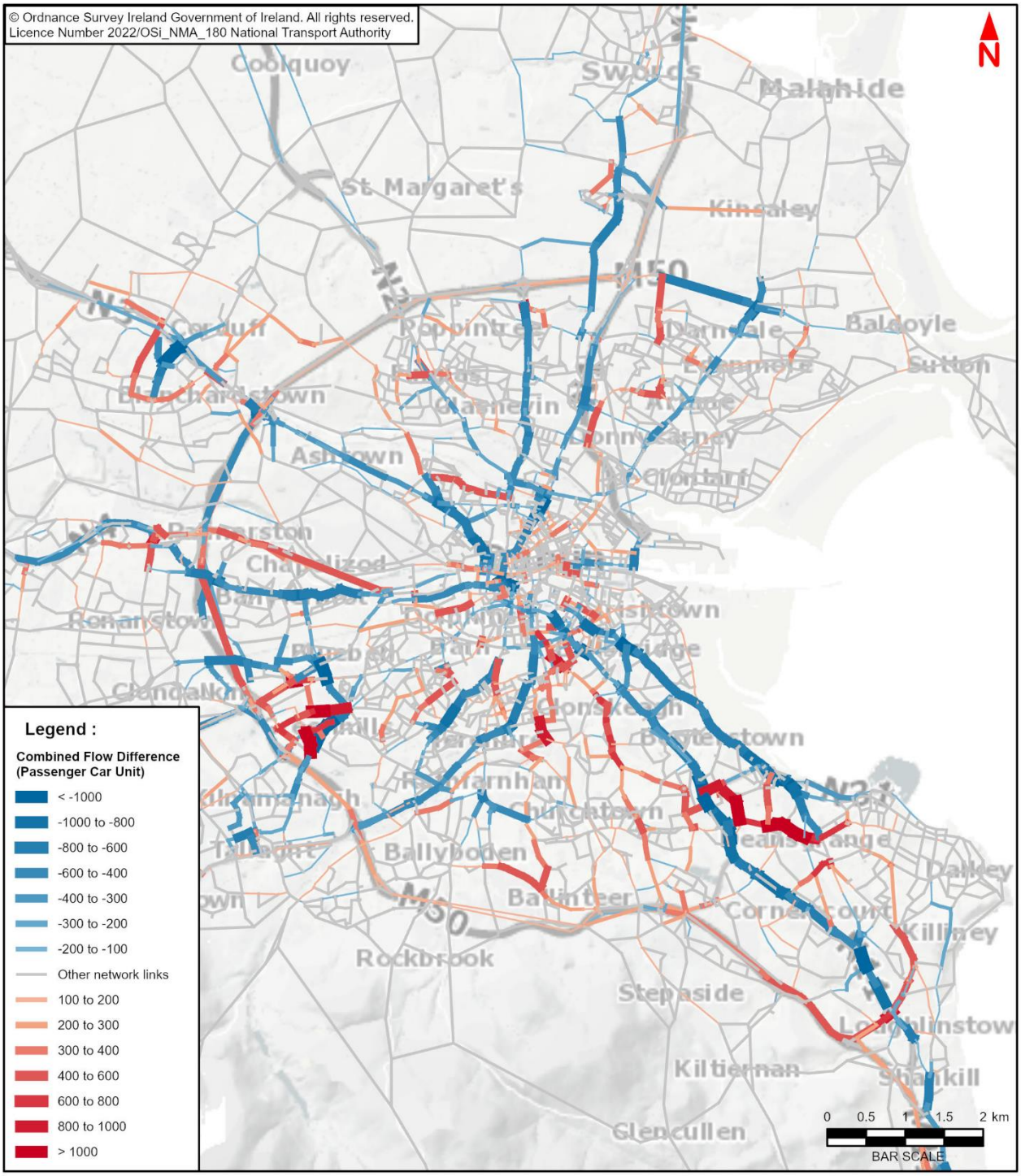

Diagram 7.15: Flow Difference on Road Links (Do Minimum vs. Do Something), PM Peak Hour, Opening Year (2028) – Cumulative Scenario

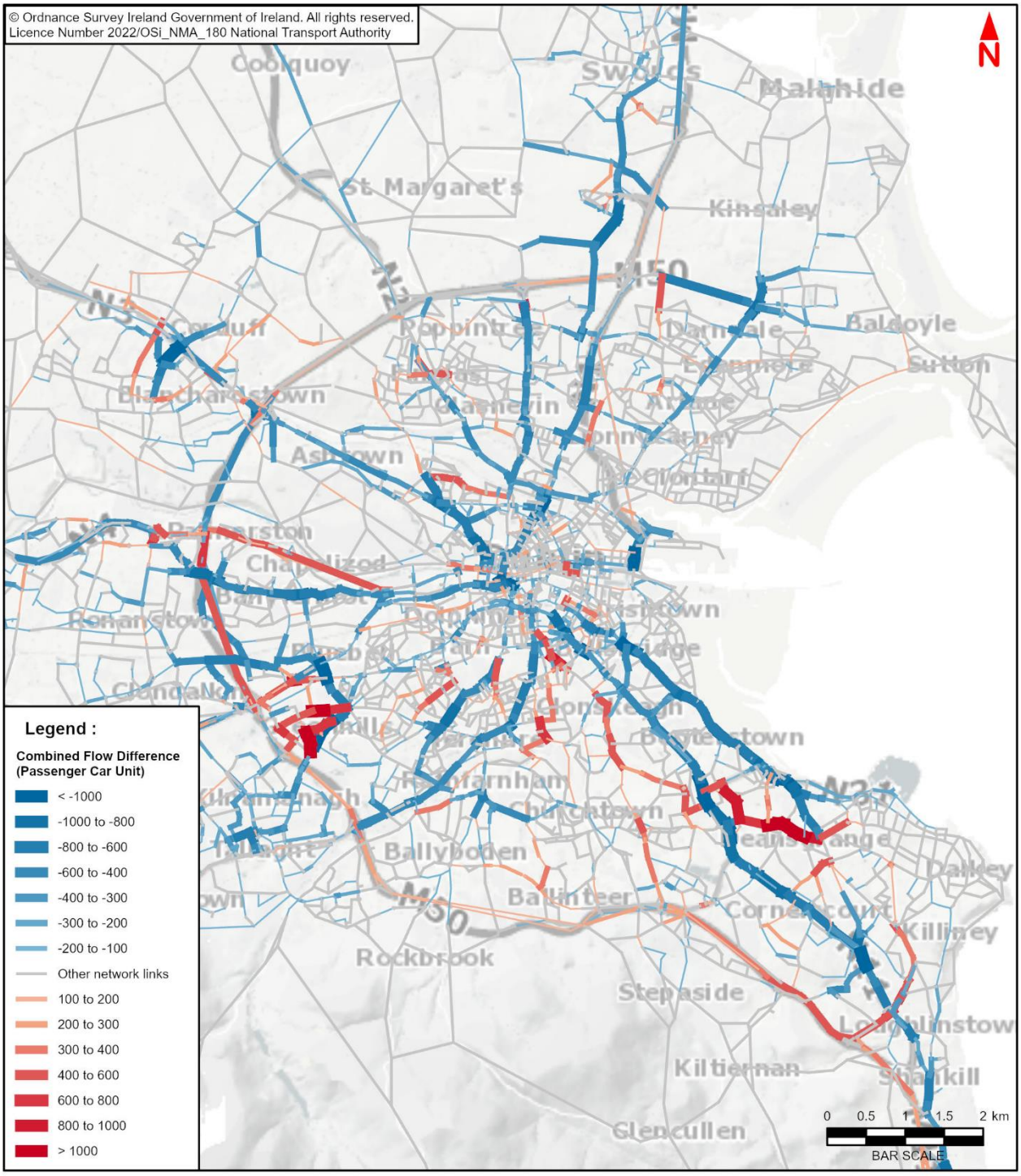

Diagram 7.16: Flow Difference on Road Links (Do Minimum vs. Do Something), PM Peak Hour, Design Year (2043) – Cumulative Scenario

7.2.6.4 Cumulative Traffic Flow Summary

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

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

7.2.7 People Movement – Cumulative Impact Summary

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

8. Summary and Conclusions

The Proposed Scheme, commencing on Kimmage Road Lower and extending to New Street South, comprises the development of improved bus priority along the entire route along with a quiet cycle route broadly parallel with the corridor. This TIA provides a robust assessment of the Proposed 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 pedestrians, bus users, and parking and loading facilities and a medium negative impact to cyclists in the short term. 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 in the short-term. The impact of construction traffic is anticipated to result in a low negative impact in the short-term due to the low numbers of vehicles anticipated which are and below the thresholds set out in the Transport Assessments Guidelines.

Table 8.1 Summary of Construction Phase Predicted Impacts

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

The impacts during the Operational Phase are outlined in Section 6.6. During the Operational Phase, the Proposed Scheme will deliver positive impacts in terms of People Movement, pedestrian, cycling and bus infrastructure. 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. Some negative impacts for general traffic and parking / loading availability may be anticipated, however the Proposed Scheme has been designed and outlined within this assessment to take cognisance in relevant traffic and transport guidelines. The assessment demonstrates that the Proposed Scheme can be readily utilised by sustainable modes and that the surrounding road network has the capacity to accommodate the associated traffic and transport impacts.

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 has been undertaken using a set of five criteria to determine the impact that the Proposed Scheme has for pedestrians. The assessments demonstrate in the Do Minimum scenario, 41% of the junctions assessed had LoS ratings of D or below, 55% had a C rating, and just 3% had a B rating. In the Do Something scenario, i.e. following the development of the Proposed Scheme, 93% of the assessed junctions had the highest A / B LoS ratings, and 7% C ratings.

  Overall, the scheme will have **Medium Positive** impacts in Sections 1 and 2 and a **Low Positive** impact in Section 3;
- **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 assessments demonstrate in the Do Minimum scenario, 71% of the route sections assessed had LoS ratings of C or below and 29% had a B rating. In the Do Something scenario, 86% of the assessed route sections had A or B LoS ratings, and 14% C ratings.

Overall, the scheme will have **Low Positive** impacts in Sections 1 and 2 and a **Medium Positive** impact in Section 3;

- **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. Overall, the scheme will have **Medium Positive** impacts in Sections 1 and 3 and a **Low Positive** impact in Section 2;
- **Parking and Loading**: A qualitative impact assessment has been undertaken of the Proposed Scheme impacts on the existing parking and loading. The results of the assessment demonstrate that the changes to the parking and loading provision will result in an overall loss of -46 spaces (-39 spaces in Section 1, +12 spaces in Section 2 and -19 spaces in Section 3) Given the nature of the loss in parking and the availability of alternative spaces in the indirect study area, the impact is expected to be **Low Negative** in Sections 1, 2 and 3;
- **People Movements:** Given the proposed amendments to the pedestrian, cycling, bus and parking / loading infrastructure outlined above, the Proposed Scheme will have greater capacity to facilitate movement of people travelling along the corridor. A quantitative impact assessment has been undertaken using outputs from the NTA's ERM and LAM, comparing the Do Minimum and Do Something peak hour scenarios for each forecast year (2028, 2043). The results of the assessment demonstrate that there will be an increase of 29% and 36% in the number of people travelling along the Proposed Scheme during the 2028 AM and PM Peak Hours respectively. During the 2043 scenario there will be an increase of 15% and 18% in the number of people travelling along the Proposed Scheme during the AM and PM Peak Hours. The analysis also shows that there will be an increase of 9.1% and 9.9% in the number of passengers boarding buses during the 2028 AM and PM Peak Hours respectively. During the 2043 scenario there will be an increase of 10.7% and 12.2% in the number of 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 result in a **High Positive** impact;
- **Bus Network Performance Indicators:** A micro-simulation modelling assessment has been developed and network performance indicators established for 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 26% and 17% during the AM and PM Peak hours of the Opening Year (2028) and the Design Year (2043). Based on the AM and PM peak hours alone, this equates to 6.3 hours of savings in 2028 and 6.8 hours in 2043, when compared to the Do Minimum combined across all buses. On an annual basis this equates to approximately 4,300 hours of bus vehicle savings in 2028 and 5,600 hours in 2043, when considering weekday peak periods only. Journey time variation and reliability are shown to improve in all Do Something scenarios compared to the Do Minimum. Overall, it is anticipated that the improvements to the network performance indicators for bus users along the Proposed Scheme will have 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 some level of 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. 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 implementation.

  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 -5.7% and 0.89%, therefore a **Low Negative** impact is anticipated; and
- **Cumulative Summary:** In general, total trip demand (combining all transport modes) will increase into the future in line with population and employment growth. A greater share of the demand will be by sustainable modes (Public transport, Walking, Cycling).

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

  In the Opening Year (2028) 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 14% increase in cycling trips each day. In the Design Year (2043) scenario, it is estimated that for people travelling within the 500m catchment area (including City Centre) there will be a 4% increase in public transport trips, 8% decrease in general traffic trips (i.e. motorists) and a 13% increase in cycling trips in the morning peak period and a 6% increase in public transport, 6% decrease in general traffic and a 10% increase in cycling trips each day.

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

  In the Opening Year (2028) 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 Opening Year (2028) 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 Design Year (2043) AM and PM Peak Hour scenarios, increase in total passengers boarding all public transport services will be 7% and 8% respectively, and the increase in passengers boarding bus services will increase by 11% and 14% respectively.

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

Table 8.2 presents a summary of the predicted impacts of the Proposed Scheme during the Operational Phase.

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.	Low to Medium Positive
Cycling Infrastructure	Improvements to the quality of the cycling infrastructure along the Proposed Scheme.	Low to Medium Positive
	**A low negative impact is anticipated on R817 Kimmage Road Lower between Ravensdale Park and Sundrive Road due to the removal of advisory cycle lanes for approximately 160m south of the R817 Kimmage Road Lower / Sundrive Road / Larkfield Avenue Junction. Due to the proposed implementation of a bus gate at Ravensdale Park and the proposed Poddle Cycle route, the low negative impact is not anticipated to be significant to cyclists.*	
Bus Infrastructure	Improvements to the quality of the bus infrastructure along the Proposed Scheme.	Low to Medium Positive
Parking and Loading	A total loss of 48 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.	Low to High 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

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

In the absence of the Proposed Scheme bus services will be operating in a more congested environment, leading to higher journey times and lower reliability for bus journeys. This limits their attractiveness to users which will lead to reduced levels of public transport use, making the bus system less resilient to higher levels of growth and leading to increased levels of car use and congestion. The absence of walking and cycling measures that the Proposed Scheme provides will also significantly limit the potential to grow those modes into the future. On the whole, the Proposed Scheme will make a significant contribution to the overall aims of BusConnects, the GDA Transport Strategy and allow the city to grow sustainably into the future, which would not be possible in the absence of the Proposed Scheme.

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