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 Templeogue / Rathfarnham to City Centre Core Bus Corridor Scheme (hereafter referred to as the Proposed Scheme). The TIA also informs Chapter 6 of the EIAR (Traffic and Transport) for the Proposed Scheme which will assess the impacts and significance of those impacts in relation to the receiving environment of the Proposed Scheme.

The aim of the Proposed Scheme is to provide enhanced walking, cycling and bus infrastructure on this key access corridor in the Dublin region, which will enable and deliver efficient, safe, and integrated sustainable transport movement along the corridor. The objectives of the CBC Infrastructure Works, applicable to the Traffic and Transport assessment of the Proposed Scheme are to:

- Enhance the capacity and potential of the public transport system by improving bus speeds, reliability and punctuality through the provision of bus lanes and other measures to provide priority to bus movement over general traffic movements;
- Enhance the potential for cycling by providing safe infrastructure for cycling, segregated from general traffic wherever practicable;
- Support the delivery of an efficient, low carbon and climate resilient public transport service, which supports the achievement of Ireland's emission reduction targets;
- Enable compact growth, regeneration opportunities and more effective use of land in Dublin, for present and future generations, through the provision of safe and efficient sustainable transport networks;
- Improve accessibility to jobs, education and other social and economic opportunities through the provision of improved sustainable connectivity and integration with other public transport services; and
- Ensure that the public realm is carefully considered in the design and development of the transport infrastructure and seek to enhance key urban focal points where appropriate and feasible.

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

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

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

Proposed Scheme Description

The Proposed Scheme, as described in detail in in Chapter 4 (Proposed Scheme Description) of the EIAR, has an overall length of approximately 10km from end to end online with additional offline upgrades and quiet street treatment of approx. 2km and 1.5km respectively. The Proposed Scheme will be comprised of two main alignments, namely from Templeogue to Terenure (3.7km), and from Rathfarnham to the City Centre (6.3km). The Templeogue to Terenure section will commence on the R137 Tallaght Road, east of the M50 junction 11 interchange. From here, the Proposed Scheme is routed via the R137 along Tallaght Road and Templeogue Road, through Templeogue Village, to Terenure Cross, where it joins the Rathfarnham to City Centre section. The Rathfarnham to City Centre section will commence on the R821 Grange Road at the junction with Nutgrove Avenue, and is routed along the R821 Grange Road, the R115 Rathfarnham Road, the R114 Rathfarnham Road, Terenure Road East, Rathgar Road, Rathmines Road Lower, Richmond Street South, Camden Street Upper and Lower and Wexford Street as far as the junction with the R110 at Kevin Street Lower and Cuffe Street where priority bus lanes end. From Cuffe Street to Dame Street along Redmond's Hill, Aungier Street, and South Great

George's Street the route will involve a traffic lane and a cycle track in both directions where it will join the prevailing traffic management regime in the city centre. In addition to the above, an alternative cycle facility will be provided along Harold's Cross Road / Terenure Road North between Terenure Cross and Parkview Avenue, as well as along Bushy Park Road, Wasdale Park, Wasdale Grove, Zion Road and Orwell Road.

Assessment Methodology

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

The qualitative assessments are as follows:

- **Pedestrian Infrastructure**: The changes to the quality of the pedestrian infrastructure as a result of the Proposed Scheme;
- **Cycling Infrastructure**: The changes to the quality of the cycling infrastructure as a result of the Proposed Scheme;
- **Bus Infrastructure**: The changes to the quality of the bus infrastructure because of the Proposed Scheme; and
- **Parking / Loading**: The changes to the availability of parking and loading because of the Proposed Scheme.

The quantitative assessments are as follows:

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

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

Baseline Environment

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

Overall baseline cycling infrastructure provision on the corridor consists of 64% cycle priority outbound (18% cycle track, 26% mandatory cycle lane, 20% advisory cycle lane), with 46% inbound (13% cycle track, 1% mandatory cycle lane, 32% advisory cycle lane).

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

- Section 1 - Tallaght Road to Rathfarnham Road;
- Section 2 - Nutgrove Avenue to Terenure Road North – Grange Road, Rathfarnham Road;
- Section 3 - Terenure Road North to Charleville Road – Terenure Road East, Rathgar Road; and

- Section 4 - Charleville Road to Dame Street.

Potential Impacts

Construction Phase

The impacts during the construction phase are outlined in Table 0.1. During the construction phase, the Proposed Scheme will have temporary **Low Negative** impacts to pedestrian, bus access and parking and loading and a **Medium Negative** impact to cyclists.

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 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. Therefore, the impact on general traffic redistribution is anticipated to be a **Medium Negative** and temporary impact due to the short-term nature of any restrictions.

The impact of construction traffic is anticipated to result in a temporary **Slight Negative** impact due to the low numbers of vehicles anticipated which are and below the thresholds set out in the Transport Assessments Guidelines.

Table 0.1 Summary of Potential Construction Phase Impacts

Assessment Topic	Effect	Potential Impact
Walking	Restrictions to pedestrians along Proposed Scheme.	Low, Negative and Temporary
Cycling	Restrictions to cyclists along Proposed Scheme	Medium, Negative and Temporary
Bus	Restrictions to public transport along Proposed Scheme.	Low, 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	Slight Negative and Temporary

Operational Phase

The Proposed Scheme will deliver positive impacts to the quality in terms of People Movement, pedestrian, cycling and bus infrastructure during the operational phase. These improvements will help to provide an attractive alternative to the private car and promote a modal shift to walking, cycling and public transport, allowing for greater capacity along the corridor to facilitate the sustainable movement of people.

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

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

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

- **Pedestrian Infrastructure**: The Proposed Scheme consists of measures to enhance the existing pedestrian infrastructure along the direct study area. A Level of Service (LoS) junction assessment was undertaken using a set of five criteria to determine the impact that the Proposed Scheme has for pedestrians. The results of the impacted junctions demonstrate that the LoS during the Do Minimum scenario consists predominantly of the low C/ D / E ratings. During the Do Something scenario, i.e. following the development of the Proposed Scheme, the LoS consists predominantly of the highest A / B ratings, with the exception of two Cs. Overall, the improvements to the quality of the pedestrian infrastructure will have a **Medium Positive Impact** on all four sections of the Proposed Scheme.

- **Cycling Infrastructure**: The Proposed Scheme also consists of measures to enhance the existing cycling infrastructure along the direct study area. A LoS assessment was undertaken using an adapted version of the NTA's National Cycle Manual Quality of Service (QoS) Evaluation criteria. The results of the assessment demonstrate that the LoS during the Do Minimum scenario consists of C ratings. During the Do Something scenario, the LoS consists predominantly of the highest A / B ratings, with the exception of one C (along the proposed quiet cycle route section between Bushey Park Road to Orwell Road). Given the quality of the existing cycling infrastructure along the Proposed Scheme, the improvements will have a **Medium Positive Impact** on Section 3 and Section 4 of the Proposed Scheme and a **Low Positive Impact** on Section 1 and Section 2 of the Proposed Scheme.

- **Bus Infrastructure**: The implementation of the Proposed Scheme will result in improvements in the quality of bus infrastructure provision along the direct study area. A qualitative impact assessment has been undertaken based on the provision of bus priority, pedestrian accessibility and changes to the bus stop facilities. The results of the assessment demonstrate that the improvements to the quality of the bus infrastructure will have a **Medium Positive Impact** on Section 1, Section 2 and Section 3 and a **Low Positive Impact** on Section 4 of the Proposed Scheme.

- **Parking and Loading**: A qualitative impact assessment has been undertaken of the Proposed Scheme impacts on the existing parking and loading. The results of the assessment demonstrate that the changes to the parking and loading provision will result in an overall loss of 54 parking spaces and five loading bays within the redline boundary of the Proposed Scheme (-7 spaces in Section 2, -32 (including 5 loading spaces) in Section 3 and -20 spaces in Section 4). Given the nature of the loss in parking and the availability of alternative spaces in the indirect study area, the impact is expected to have a **Negligible impact** on Section 2 and Section 3 and a **Low Negative Impact** on Section 4 of the Proposed Scheme. There is no parking facilities in Section 1.

- **People Movement:** Given the proposed amendments to the pedestrian, cycling, bus and parking / loading infrastructure outlined above, the Proposed Scheme will have greater capacity to facilitate the sustainable movement of people travelling along the corridor. A quantitative impact assessment has been undertaken using outputs from the NTA's ERM and LAM, comparing the Do Minimum and Do Something peak hour scenarios for each forecast year (2028, 2043). The results of the assessment demonstrate that there will be an increase of 74% and 71% 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 48% and 55% in the number of people travelling along the Proposed Scheme during the AM and PM Peak Hours respectively These increases are all due to the increased sustainable modes people movement facilitated by the Proposed Scheme.

  The analysis also shows that there will be an increase in 14.7% and 16.9% of passengers boarding buses during the 2028 AM and PM Peak hours respectively. During the 2043 scenario there will be an increase in 10.5% and 11.5% of passengers boarding buses during the AM and PM Peak Hours respectively. Overall, it is adjudged that the Proposed Scheme will have a **High Positive Impact** on the sustainable movement of people along the corridor.

- **Bus Network Performance Indicators**: A micro-simulation model assessment has been developed and network performance indicators established for bus operations along Proposed Scheme. The results of the assessment demonstrate that the total bus journey times on all modelled bus services will improve by between 8% and 12% during the AM and PM Peak hours of the 2028 Opening Year and 2043 Design Year. Based on the AM and PM peak hours alone, 7.4 hours of

savings in 2028 and 6.2 hours in 2043, when compared to the Do Minimum combined across all buses. Overall it is anticipated that the improvements to the network performance indicators for bus users along the Proposed Scheme will have a **High impact.**

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

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

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

In general, total trip demand (combining all transport modes) will increase into the future in line with population In general, total trip demand (combining all transport modes) will increase into the future in line with population and employment growth. A greater share of the demand will be by sustainable modes (Public transport, Walking, Cycling) as facilitated by the GDA Strategy implementation.

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

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

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

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

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

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

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

Summary and Conclusions

The Proposed Scheme, along the Templeogue to Terenure, and from Rathfarnham to the City Centre, comprises the development of improved bus priority along the majority of its route. This TIA provides a robust assessment of the scheme through qualitative assessment and quantitative analysis using a suite of multi-modal transport modelling tools.

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

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

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

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

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

1. Introduction

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

The Proposed Scheme is routed along the via the R137 along Tallaght Road and Templeogue Road, through Templeogue Village, to Terenure Cross, where it joins the Rathfarnham to City Centre section. The Rathfarnham to City Centre section will commence on the R821 Grange Road at the junction with Nutgrove Avenue, and is routed along the R821 Grange Road, the R115 Rathfarnham Road, the R114 Rathfarnham Road, Terenure Road East, Rathgar Road, Rathmines Road Lower, Richmond Street South, Camden Street Upper and Lower and Wexford Street as far as the junction with the R110 at Kevin Street Lower and Cuffe Street where priority bus lanes end.

Throughout the Proposed Scheme cycle facilities will be substantially improved with segregated cycle tracks provided along the links and protected junctions with enhanced signalling for cyclists provided at junctions. Where space for a segregated cycle track is not available on the main corridor an alternative cycle route via quiet roads is proposed. Throughout the Proposed Scheme pedestrian facilities will be upgraded and additional signalised crossings provided.

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

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

Total Length of Proposed Scheme		**10km (+3.5km offline cycle routes)**
Bus priority	**Existing (km)**	**Proposed Scheme (km)**
Bus Lanes		
Inbound	4.4	6.1
Outbound	1.5	5.4
Bus Priority Through Traffic Management		
Inbound	0.1	2.9
Outbound	0.3	3.0
Total Bus Priority (both directions)	6.3	17.4 (+175%)
Bus Measures		
Proportion of Route with Bus Measures	32%	87%
Cycle Facilities Segregated		
Inbound	1.3	9.6
Outbound	1.8	10.3
Cycle Facilities – Non segregated		
Inbound	3.3	1.7
Outbound	4.6	1.7
Cyclist Facilities – Overall		
Total Cyclist Facilities (both directions)	11	23.3 (+112%)
Proportion segregated	28%	85.4%
Pedestrian Facilities		
Number of Pedestrian Signal Crossings	76	106

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

Table 1.2: List of Drawings

Drawing Series Number	Description
BCIDA-ACM-GEO_GA-0001_XX_00-DR-CR-9001	General Arrangement
BCIDA-ACM-GEO_CS-0001_XX_00-DR-CR-9001	Typical Cross Sections
BCIDA-ACM-TSM_GA-0001_XX_00-DR-CR-9001	Traffic Signs and Road Markings
BCIDA-ACM-TSM_SJ-0001_XX_00-DR-TR-9001	Junction System Design

1.1 Aim and Objectives of the Proposed Scheme

The aim of the Proposed Scheme is to provide enhanced walking, cycling and bus infrastructure on this key access corridor in the Dublin region, which will enable and deliver efficient, safe, and integrated sustainable transport movement along the corridor. The objectives of the the core bus corridor (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 planning and design of the Proposed Scheme has been guided by these aims and objectives.

1.1.1 People Movement

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

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

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

1.1.2 Preliminary Design Guidelines

To support the 'People Movement' led approach to the design of the Proposed Scheme, the Preliminary Design Guidance Booklet for BusConnects Core Bus Corridors (PDGB) (NTA 2021) (refer to Appendix A4.1 in Volume 4 of 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, focusing on maximising the throughput of sustainable modes (i.e. Walking, Cycling and Bus modes) in advance of the consideration and management of general vehicular traffic (private car) at junctions.

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

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

The outputs of the calculator provided an initial estimate of the green times and vehicle capacity movements based on inputs and assumptions for each junction along the Proposed Scheme. The calculator provided an estimate of the People Movement for the junction in question (by mode) and was used to adjust proposals with a view to maximising the total person throughput at each junction along the Proposed Scheme during the iterative design process, described further below in Section 6.2.3. Details on the development of junction designs along the Proposed Scheme are included in TIA Appendix 2 (Junction Design Report).

The People Movement Calculation and the identification of available general traffic capacity from this initial exercise was enhanced further by the Proposed Scheme Transport Models described in Section 3.4 below.

1.2 Iterative Design Process and Mitigation by Design

Throughout the development of the Preliminary Design for the Proposed Scheme there have been various design stages undertaken based on a common understanding of the maturity of the design at a given point in time. Part of this process, and the reason for developing a multi-tiered modelling framework (described in Section 4.3.1), was to ensure the environmental and transport impacts were mitigated to the greatest extent possible during design development and to enable information on potential impacts to be provided from the various Environmental Impact Assessment (EIA) and Transport Impact Assessment (TIA) disciplines back into the design process for consideration and inclusion in the proposals This resulted in mitigation being embedded into the design process by the consideration of potential environmental impacts throughout the Preliminary Design development. A multi-tiered modelling framework (described in Section 4.3.1) was developed to support this iterative design process,

Diagram 1.1 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 traffic displacement was kept to a minimum and was maintained on higher capacity roads, whilst continuing to meet scheme objectives along the Proposed Scheme.

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

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

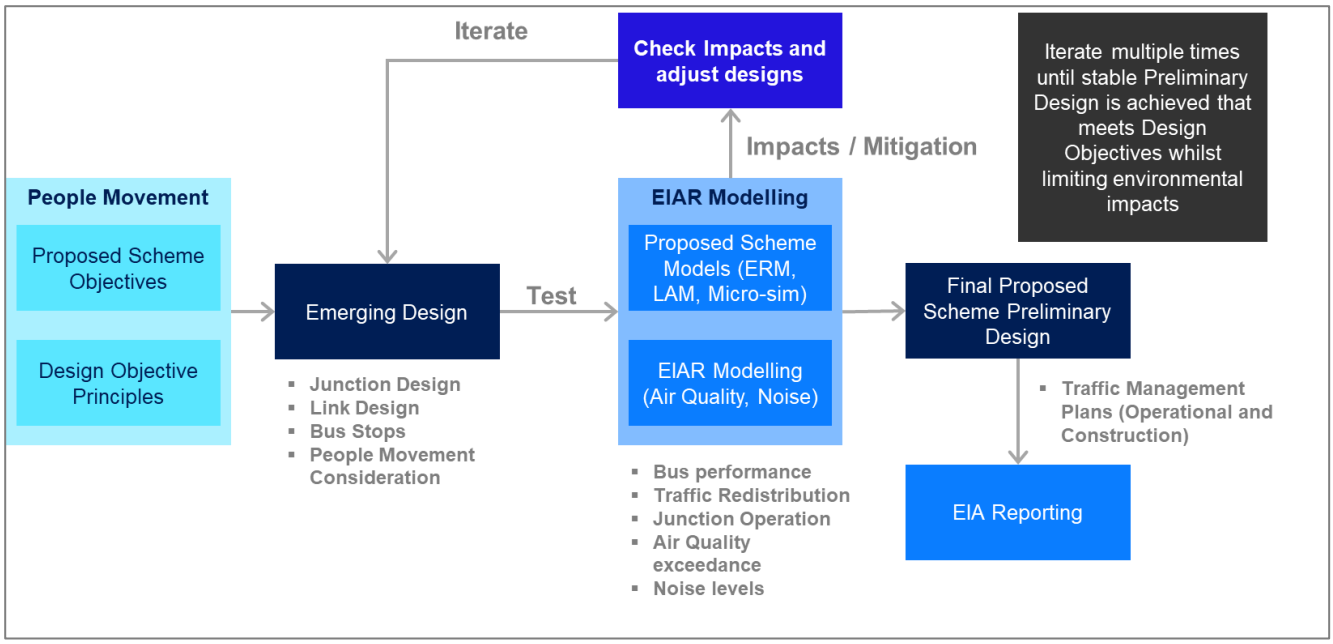


Diagram 1.1: Proposed Scheme Impact Assessment and Design Interaction

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

1.3 Purpose and Structure of This Report

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

The traffic and transport impacts assessment have been undertaken in accordance with latest guidance, which includes the 'Guidelines on the Information to be contained in Environmental Impact Assessment Reports' (EPA 2017), 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 6.3 (Baseline Environment). This scenario forms the reference case by which to compare the Proposed Scheme ('Do Something') for the qualitative assessments only.
- **'Do Minimum'** – The 'Do Minimum' scenario (Opening Year 2028, Design Year 2043) represents the likely traffic and transport conditions of the direct and indirect study areas including for any transportation schemes which have taken place, been approved or are planned for implementation, **without** the Proposed Scheme in place. This scenario forms the reference case by which to compare the Proposed Scheme ('Do Something') for the quantitative assessments. Further detail on the scheme and demand assumptions within this scenario are included further below in section **6.1.3**.
- **'Do Something'** – The 'Do Something' scenario represents the likely traffic and transport conditions of the direct and indirect study areas including for any transportation schemes which have taken place, been approved or are planned for implementation, **with** the Proposed Scheme in place (i.e. the Do Minimum scenario with the addition of the Proposed Scheme). The Do Something scenario has been broken into two phases:
    - **Construction Phase (Construction Year 2024) –** This phase represents the single worst-case period which will occur during the construction of the Proposed Scheme; and
    - **Operational Phase (Opening Year 2028, Design Year 2043) –** This phase represents when the Proposed Scheme is fully operational.

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

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

2. Study Area

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

- **Direct Study Area** – The Proposed Scheme (i.e. the transport network within the red line boundary); and
- **Indirect Study Area** – This is the area of influence the Proposed Scheme has on changing traffic volumes above a defined threshold with reference to TII's Traffic and Transport Assessment Guidelines (May 2014) (see Section 6.2.3.1.3 for further details on the threshold applied in relation to traffic volume changes used in the definition of the indirect study area).

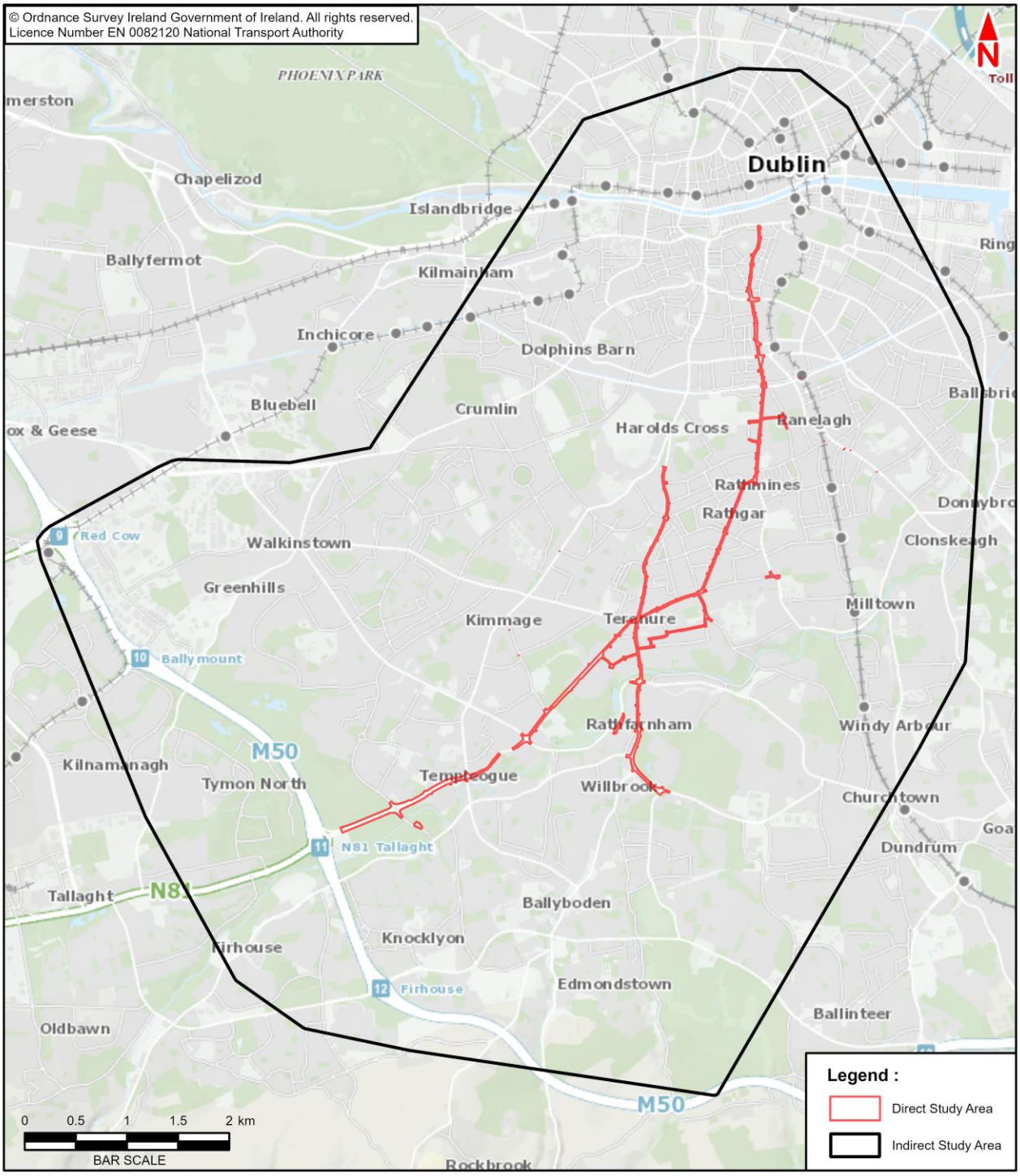


Diagram 2.1: Proposed Scheme Direct & Indirect Study Area

3. Policy Context

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

3.1 National Guidelines

3.1.1 Traffic and Transport Assessment Guidelines

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

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

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

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

The guidelines aim to provide a framework to promote an integrated approach to development, ensuring that proposals promote more efficient use of investment in transportation infrastructure which reduces travel demand and promotes road safety and sustainable travel. The document is considered best practice guidance for the assessment of transport impacts related to changes in traffic flows due to proposed developments and is generally an appropriate means of assessing the traffic and transport impact of additional trips on the surrounding road network.

3.1.2 Design Manual for Urban Roads and Streets

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

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

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

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

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

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

- Connected Networks - To support the creation of integrated street networks which promote higher levels of permeability and legibility for all users, and with emphasis on more sustainable forms of transport;

- Multi-Functional Streets - The promotion of multi-functional, place-based streets that balance the needs of all users within a self-regulating environment;
- Pedestrian Focus - The quality of the street is measured by the quality of the environment for the user hierarchy pedestrians considered first; and
- Multi-disciplinary Approach – Greater communication and co-operation between design professionals through the promotion of a plan-led, multidisciplinary approach to design.

3.1.3 Traffic Signs Manual

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

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

3.1.4 Traffic Management Guidelines

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

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

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

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

3.2 National Policy

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

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

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

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

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

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

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

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

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

It also allows for the development of:

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

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

3.2.2 National Development Plan (NDP) (2018- 2027)

The National Development Plan (NDP) (2018- 2027) (Department of Public Expenditure and Reform, 2018) sets out the investment priorities that will underpin the implementation of the NPF, through a total investment of approximately €116 billion to ensure ongoing employment maintenance and creation, with appropriate regional development. This investment is also to provide clarity to the construction sector, allowing the industry to provide the capacity and capability required to deliver the Government's long-term investment plans.

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

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

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

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

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

The draft National Investment Framework for Transport in Ireland (NIFTI) (Department of Transport, 2021) was recently published by the Department of Transport (DTTS) for public consultation in March 2021. The purpose of the NIFTI is to support the delivery of the Project Ireland 2040 NPF and NDP by providing a strategic framework for future transport investment that is aligned with their spatial objectives and the National Strategic Outcomes

(NSOs). The NIFTI has been developed to ensure decision making in land transport investment enables the NPF, supports the Climate Action Plan, and promotes positive social, environmental, and economic outcomes throughout Ireland. NIFTI establishes four investment priorities and objectives, of which new projects must align with at least one:

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

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

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

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

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

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

3.2.5 National Cycle Policy Framework

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

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

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

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

3.2.6 Statement of Strategy (2016 – 2019)

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

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

DTTS's high level goal for land transport is:

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

This will be sought with an emphasis on:

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

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

3.2.7 Road Safety Strategy

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Diagram 3.1 The 17 Sustainable Development Goals

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

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

> *'Goal 9: Build resilient infrastructure, promote inclusive and sustainable industrialisation and foster innovation: Target 9.1: Develop quality, reliable, sustainable and resilient infrastructure, including regional and transborder infrastructure, to support economic development and human wellbeing, with a focus on affordable and equitable access for all.'*
>
> *'Goal 11: Make cities and human settlements inclusive, safe, resilient and sustainable: By 2030, provide access to safe, affordable, accessible and sustainable transport systems for all, improving road safety, notably by expanding public transport, with special attention to the needs of those in vulnerable situations, women, children, persons with disabilities and older persons.'*

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

3.2.10 Climate Action Plan

The Climate Action Plan (CAP) 2023 (Government of Ireland 2023) is the second update to Irelands CAP 2019 and was launched on the 21st December 2022. The 2023 CAP sets out the sectoral emissions ceilings and the implementation of carbon budgets. The CAP 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. CAP 2021 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'*

Section 15.2.2 'Recalibration of the Decarbonisation Pathway for Transport' states that the NTA Modelling team revalidated and recalibrated the decarbonisation pathway for CAP21. It goes on to say that this exercise *'identified additional measures to delivering 50% emissions abatement by 2030.'* It further outlines that: *'The range of measures modelled includes known public transport schemes as set out in the National Development Plan (NDP);* (inter alia) *further acceleration of road space reallocation towards public and active travel modes; car-free urban centres'*.

Section 15.3.3 '*Avoid and Shift'* sets out the following:

> *'Greater prioritisation and reallocation of existing road space towards public transport and active travel will be a key supporting element for the new DMS. This already forms a crucial element of the BusConnects programme in each of our five cities. It is also a key recommendation from the OECD's Redesigning Ireland's Transport for Net Zero report.'*

Section 15.3.3 '*Shift'* outlines the following in regard to '*Major Public Transport Infrastructure Programme':*

> '*Key milestones have already been achieved on major infrastructural projects, including BusConnects in each of our 5 cities and the Greater Dublin Area's DART+ Programme and Metrolink, which will continue to be progressed through public consultations and the planning systems.'*

Table 15.7 *'Key Actions to Deliver Abatement in Transport for the Period 2023-2025'* includes under the measure *'Major Public Transport Infrastructure Programme'* and the heading *'Shift'* (inter alia) '*Advance BusConnects programme in 5 cities'* under the actions for 2023, 2024 and 2025.

The delivery of the Proposed Scheme will provide the transport infrastructure required to deliver sustainable transport options that will support the key actions set out in the Climate Action Plan 2023. The Proposed Scheme will expand, enhance and connect to pedestrian and cycle networks and will assist in facilitating modal shift. It is clear that the targets set out within CAP 2023 are closely linked to the delivery of key transport infrastructure projects, such as the BusConnects Programme and therefore the Proposed Scheme.

3.3 Regional Policy

3.3.1 Greater Dublin Area Transport Strategy 2022 – 2042

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

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

The NTA priorities are set out, as follows:

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

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

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

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

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

3.3.2 Greater Dublin Area Cycle Network Plan

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

- **Primary:** Main cycle arteries that cross the urban area and carry most cycle traffic – target quality of service (QoS) of two abreast + overtaking width = 2.5m;

- **Secondary:** Link between principle cycle routes and local zones – target QoS of single file + overtaking width = 1.75m; and
- **Feeder:** Cycle routes within local zones and/or connection from zones to the network levels above.

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

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

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

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

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

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

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

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

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

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

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

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

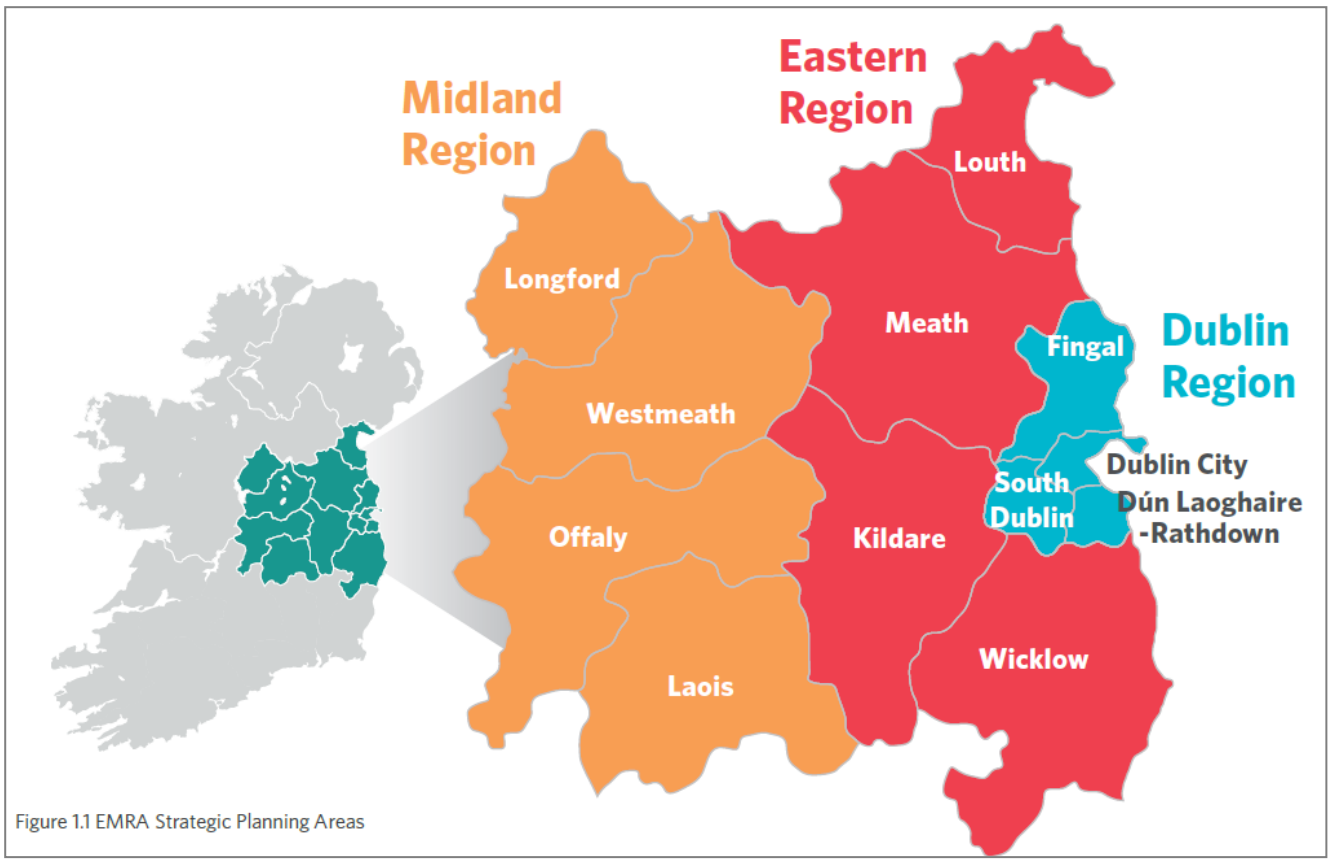


Diagram 3.2: RSES Planning Areas

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

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

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

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

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

Extract from RSES RPO8.9 (Table 8.3: Bus Projects for the Region)
Core Bus Corridors comprising 16 radial routes and 3 orbital routes in Dublin
Regional Bus Corridors connecting the major regional settlements to Dublin
Dublin Metropolitan Bus Network Review
Network reviews for the largest settlements across EMRA, with a view to providing local bus services
Review of bus services between settlements

Extract from RSES RPO8.9 (Table 8.3: Bus Projects for the Region)
Review of local bus services throughout EMRA, including services to small towns and villages and the rural transport programme
New interchange and bus hub facilities
New fare structures
Enhances passenger information
Improvements to bus waiting facilities
Integrated time tabling of bus and rail into a coherent national and regional network

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

3.3.4 Dublin City Council Development Plan (2022 – 2028)

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

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

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

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

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

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

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

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

SMT22 goes on to state the support of delivering key sustainable transport projects such as BusConnecs to help provide an integrated public transport network with efficient interchange between transport modes is key. It is therefore clear that BusConnects and the delivery of same is an important objective of the DCDP. The DCDP fully

supports the BusConnects Programme of works and its policy/objectives are aligned with the Proposed Scheme. The Proposed Scheme will deliver the infrastructure necessary to provide a sustainable transport system, to support the enhancement and growth of the cycle and pedestrian network and achieve a modal shift.

3.3.5 Dublin City Centre Transport Study

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

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

The key objectives of the Transport Strategy are to:

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

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

3.4 Local Policy

3.4.1 South Dublin County Development Plan (2022 – 2028)

The South Dublin County Development Plan (SDCDP) (South Dublin County Council, 2022) sets out the land use framework to guide future development with a focus placed on the places of residence, the places of work, and how people interact and move between these places while protecting the environment. The aim is to progress to a more sustainable development pattern for South Dublin in the immediate and long-term future up to 2040 and beyond.

SDCDP covers the administrative area of South Dublin County, which is 223 sq. kilometres in extent, as shown in Diagram 3.3. The County extends from the River Liffey to the Dublin Mountains and borders the administrative areas of Dublin City, Fingal, Dun Laoghaire Rathdown, Wicklow and Kildare.

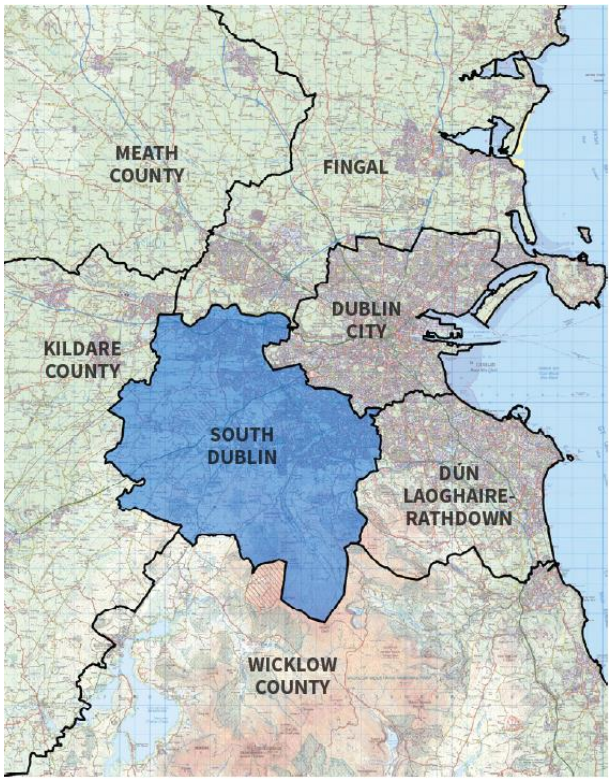


Diagram 3.3 South Dublin Regional Context

The Plan sets out in Chapter 7 (Sustainable Movement) that the key transport vision is to *'Increase the number of people walking, cycling and using public transport and reduce the need for car journeys, resulting in a more active and healthy community, a more attractive public realm, safer streets, less congestion, reduced carbon emissions, better air quality, and a positive climate impact'.*

The overarching Transport and Movement policy (SM1) is to promote ease of movement within, and access to South Dublin by *'integrating sustainable land-use planning with a high-quality sustainable transport and movement network for people and goods.'* The policy includes a transition to more sustainable travel modes including walking (15% target mode share), cycling (10% target mode share) and public transport (25% target mode share).

In line with the overarching policy, '*SM1 Objective 3'* states the requirement: *'To support the delivery of key sustainable transport projects including DART and Luas expansion programmes, BusConnects and the Greater Dublin Metropolitan Cycle Network in accordance with RPO 5.2 of the RSES/MASP.' (Emphasis Added).*

Policy SM2 Walking and Cycling, notes the need to *'re-balance movement priorities towards more sustainable modes of transportation by prioritising the development of walking and cycling facilities and encouraging a shift to active travel for people of all ages and abilities.'*

Policy SM3 Public Transport, notes the need to *'promote a significant shift from car-based travel to public transport in line with County targets and facilitate the sustainable development of the County by supporting and guiding national agencies in delivering major improvements to the public transport network.'*

The BusConnects scheme is featured within this document, as a key programme to improve public transport, ensure safe cycling facilities and address climate change: '*Transition to public transport will be aided by improvements in the pipeline including the roll-out of BusConnects which will include proposals for six new dedicated bus routes through the County. BusConnects will provide a redesigned more efficient bus network with high frequency spines, new orbital routes and increased bus services.'*

The Proposed Scheme satisfies this aspiration and thus can be considered to align with the SDCDP 2022-2028.

3.4.2 Dun Laoghaire Rathdown County Council Development Plan (2022 – 2028)

The Dún Laoghaire-Rathdown County Development Plan (DLRCDP) (Dún Laoghaire-Rathdown County, 2022) sets out the policies for the continuing sustainable development of the County for the period 2022 to 2028. This supersedes the 2016-2022 version of the document. The overall vision of the DLRCDP is:

"to embrace inclusiveness, champion quality of life through healthy placemaking, grow and attract a diverse innovative economy and deliver this in a manner that enhances our environment for future generations.."

The policies in the DLRCDP that the Proposed Scheme aligns with are:

- "to expand attractive public transport alternatives to car transport as set out in 'Smarter Travel, A Sustainable Transport Future' and subsequent updates; the NTA's 'Transport Strategy for the Greater Dublin Area 2016-2035' and the NTAs 'Integrated Implementation Plan 2019-2024' and subsequent updates by optimising existing or proposed transport corridors, interchanges, developing new park and rides, taxi ranks and cycling network facilities at appropriate locations. (Consistent with NPO64 of the NPF, RPO 4.40, 5.2, 8.3 and 8.8 of the RSES)." [T5]
- "to co-operate with the NTA and other relevant agencies to facilitate the implementation of the bus network measures as set out in the NTA's 'Greater Dublin Area Transport 2016-2035' and 'Integrated Implementation Plan 2019-2024' and the BusConnects Programme, and to extend the bus network to other areas where appropriate subject to design, environmental assessment, public consultation, approval, finance and resources. (Consistent with RPO 8.9 of the RSES)." [T6]
- "to secure the development of a high quality, fully connected and inclusive walking and cycling network across the County and the integration of walking, cycling and physical activity with placemaking including public realm permeability improvements. (Consistent with NPO 27 and 64 of the NPF and RPO 5.2 of the RSES)." [T11]

The significant improvements to the walking, cycling and bus infrastructure along the Proposed Scheme directly align with these policies.

3.5 Legislation

There is no legislation specifically relevant to this TIA.

4. Assessment Methodology

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

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

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

The traffic and transport impact assessments have been undertaken in accordance with the 'Guidelines on the Information to be contained in Environmental Impact Assessment Reports' (EPA 2017), the 'Traffic and Transport Assessment Guidelines' (TII 2014), the National Cycle Manual (NTA 2011) and the UK Design Manual for Roads & Bridges (DMRB) Environmental assessment and monitoring (formerly HA 205/08, HD 48/08, IAN 125/15, and IAN 133/10), LA104 Revision 1 (Highways England, 2020).

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

4.1 Data Collection and Collation

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

4.1.1 Qualitative Assessment Data Collection

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

4.1.1.1 Site Surveys

A walkover of the route of the Proposed Scheme was undertaken to ensure an up-to-date record of the existing environment was used to complete the qualitative assessment. The surveys focussed on the following aspects which are relevant to the assessment:

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

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

4.1.1.2 Mapping Data

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

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

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

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

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

4.1.2 Quantitative Assessment Data Collection

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

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

4.1.2.1 Existing Data Review (Gap Analysis)

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

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

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

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

4.1.2.2 Commissioned Traffic Survey Data

Due to the scale of the Proposed Scheme, a full set of consistent updated traffic counts for a neutral period e.g. November / February when schools, colleges were in session was completed for the Proposed Scheme. Traffic surveys were undertaken 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 microsimulation model. The two types of counts used in the study are Junction Turning Counts (JTCs) and Automatic Traffic Counts (ATCs).

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

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

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

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

An overview of the commissioned data is provided Table 4.1.

Table 4.1: Survey Overview

Survey Type	Company	Number	Date
JTC	IDASO LTD	23	Thursday 13/2/2020
ATC	IDASO LTD	8	Wednesday 5/2/2020 – Friday 13/2/2020

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

The ATCs were taken for an entire week. The vehicle categories surveyed are motorcycles, cars, LGVs, OGV 1, OGV 2 and PSVs. The ATC data provides information on:

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

Summary information related to the JTCs and ATCs collected for the Proposed Scheme is shown 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 anonymised travel time information covering six areas of Ireland and for certain categories of road.

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

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

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

4.1.2.3.3 TomTom Data Processing

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

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

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

4.1.2.3.4 TomTom Data Application

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

4.2 Appraisal Method for the Assessment of Impacts

4.2.1 Overview

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

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

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

4.2.2 Outlining the Assessment Topics

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

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

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

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

4.2.3 Determining the Predicted Magnitude of Impacts

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

The impact assessments have been carried out in relation to the following scenarios:

- **'Do Minimum'** – The 'Do Minimum' scenario (Opening Year 2028, Design Year 2043) represents the likely traffic and transport conditions of the direct and indirect study areas including for any transportation schemes which have taken place, been approved or are planned for implementation, without the Proposed Scheme in place. This scenario forms the reference case by which to compare the Proposed Scheme ('Do Something') for the quantitative assessments.
- **Do Something** – The 'Do Something' scenario represents the likely traffic and transport conditions of the direct and indirect study areas including for any transportation schemes which have taken place, been approved or are planned for implementation, **with** the Proposed Scheme in place (i.e. the Do Minimum scenario with the addition of the Proposed Scheme). The Do Something scenario has been broken into two phases:
  - **Construction Phase (Construction Year 2024) –** This phase represents the single worst-case period which will occur during the construction of the Proposed Scheme.
  - **Operational Phase (Opening Year 2028, Design Year 2043) –** This phase represents when the Proposed Scheme is fully operational.

The assessment of changes of between the Do Minimum and Do Something scenarios have been presented in either a positive, negative or neutral magnitude of impacts as a result of the Proposed Scheme, depending on the assessment topic. A high, medium, low or negligible rating has been applied to each impact assessment to determine the Magnitude of Impact. Refer to Section 6 for further information on the methodology in applying these ratings for each assessment.

4.2.3.1 Level of Service Impact Assessment

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

The concept of LoS was originally developed in the United States' Transportation Research Board's (TRB) Highway Capacity Manual (TRB 2000). Under this concept, potential values for a performance measure are divided into six ranges, with each range assigned a letter grade ranging from "A" (highest quality) to "F" (lowest quality). LoS concepts are applied universally throughout the world, and have their basis in Highway Capacity Manual and, particularly for bus network assessments, in the Transit Capacity and Quality of Service Manual (TRB 2003).

LoS concepts are not target based or rigid in their application and bespoke versions are developed to suit the particular receiving environment of the scheme under consideration or the particular user problems that the scheme and/or project is seeking to address. A mix of quantitative and qualitative indicators can be used and

summarised as a LoS. The process enables integrated planning and decision making across all modes rather than any specific mode which can create a bias in the assessment process (e.g. focusing on Car Volume over Capacity (V/C)). It is intended that the LoS framework for the Proposed Scheme will provide an easily understandable summary of the impact of each assessment topic, where applied.

4.3 Transport Modelling Methodology

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

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

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

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

4.3.1 Proposed Scheme Transport Models

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

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

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

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

4.3.1.1 Transport Modelling Hierarchy

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

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

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

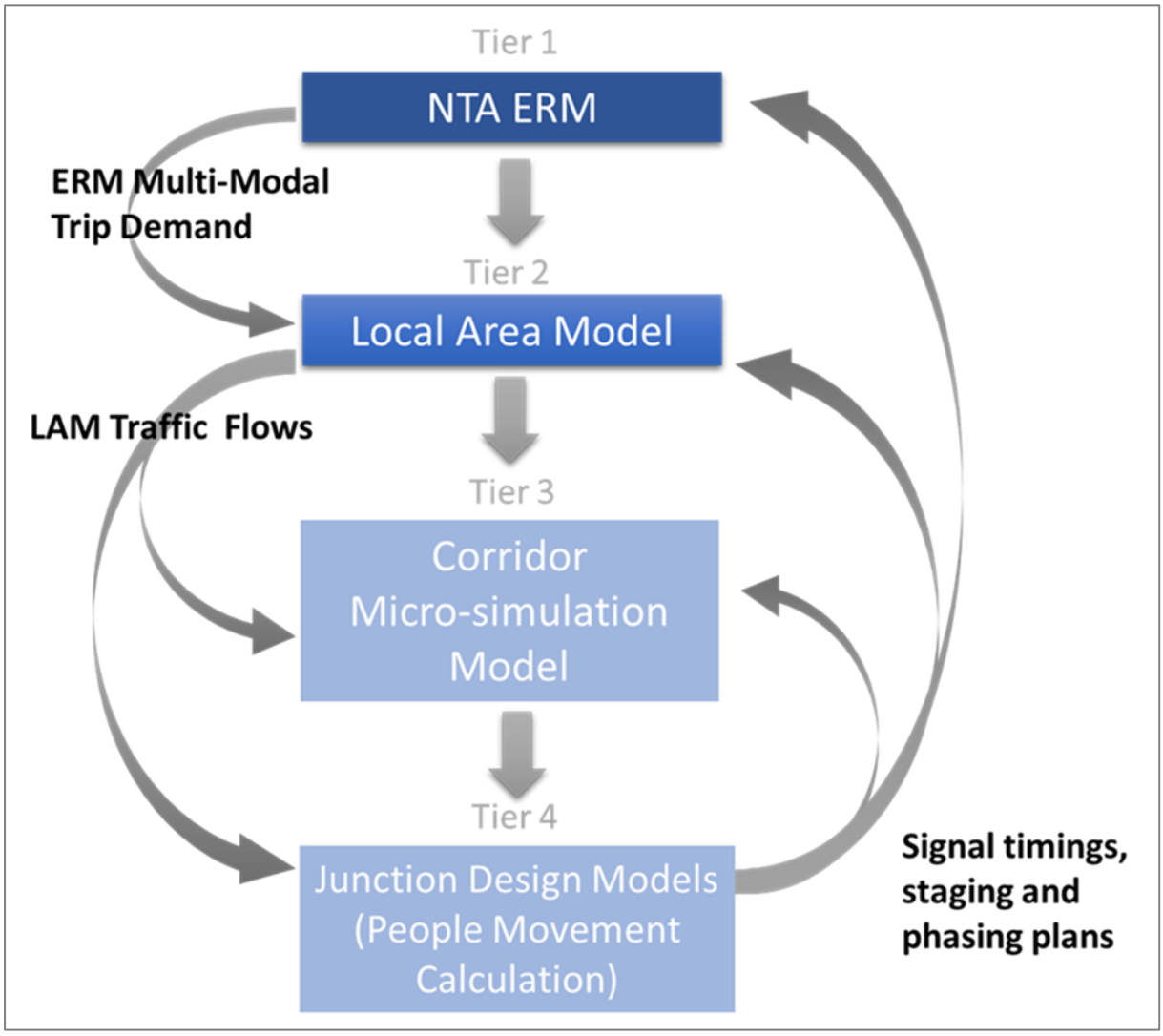


Diagram 4.1: Proposed Scheme Modelling Hierarchy

Further detail on the transport model development process, the traffic data inputs used, the calibration, validation and forecast model development for the suite of transport models can be found in the Transport Modelling Report, in TIA Appendix 1 (Transport Modelling Report) and TIA Appendix 2 (Junction Design Report) in Volume 4 of the EIAR.

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

Table 4.2: Modelling Tool and Purpose

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

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

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

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

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

4.3.1.2.1 Purpose of the RMS

The NTA uses the RMS to help inform decisions required during strategy development and to assess schemes and policy interventions that are undertaken as part of its remit. The RMS has been developed to provide the NTA with the means to undertake comparative appraisals of a wide range of potential future transport and land use options, and to provide evidence to assist in the decision-making process. Examples of how the RMS can assist the NTA include testing new public transport schemes by representing the scheme in the assignment networks, testing demand management measures by, for example, changing the cost of parking or number of parking spaces within the regional model or testing the impacts of new land use by changing the planning data assumptions within the NDFM.

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

4.3.1.2.2 RMS Components

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

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

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

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

The ERM is comprised of the following key elements:

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

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

4.3.1.2.3 The use of the ERM for the Proposed Scheme

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

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

4.3.1.3 Local Area Model (LAM)

To support the detailed assessment of the Proposed Scheme a more disaggregated urban area traffic model has been developed, as a cordoned model from the ERM, that incorporates the most up to date traffic survey data. The LAM provides an appropriate level of detail required to inform the various disciplines and levels of decision making within the Proposed Scheme Infrastructure Works e.g., capturing the impact of redistribution of traffic on

streets and roads not included within the strategic detail of the ERM. As such, a Local Area Model (LAM) has been developed to support the assessment of the Proposed Scheme.

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

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

4.3.1.3.1 Count Data for Calibration and Validation

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

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

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

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

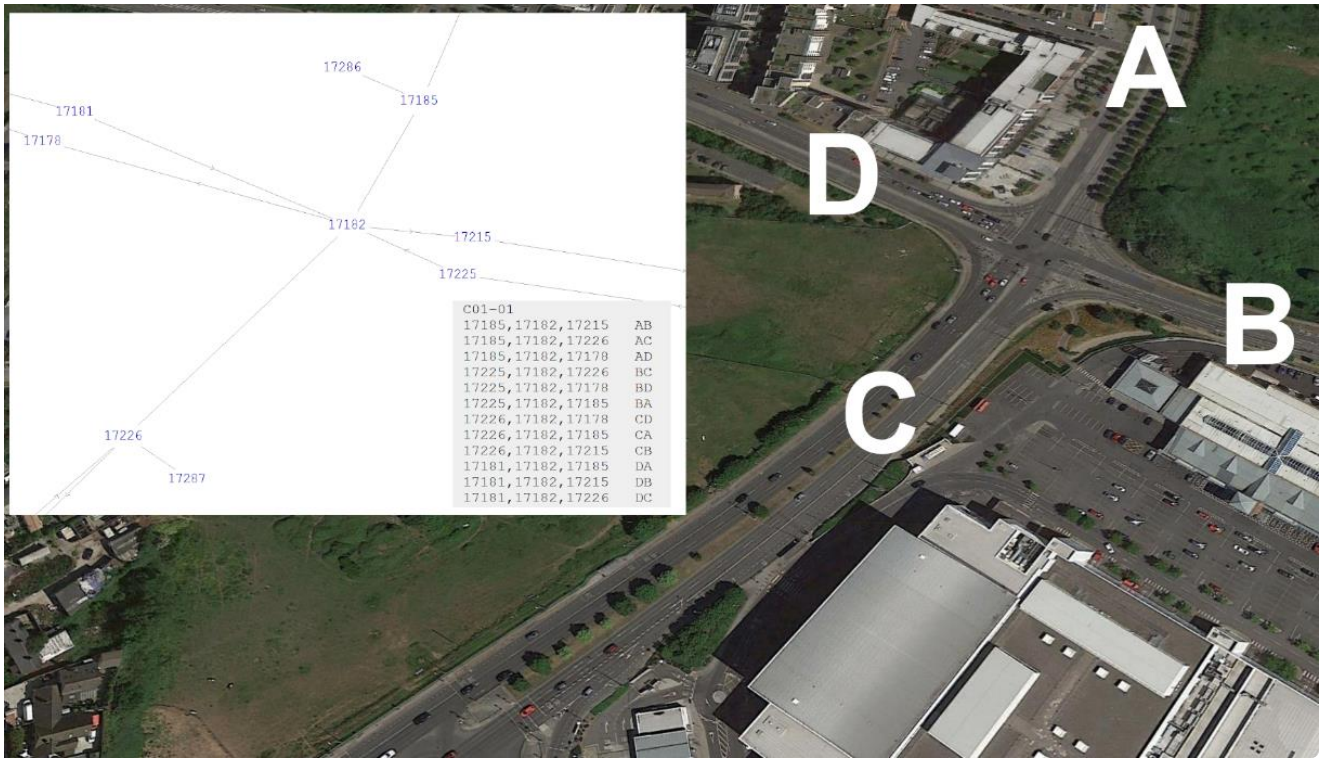


Diagram 4.2: Bus Connects LAM Node Matching (Junction C01-01)

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

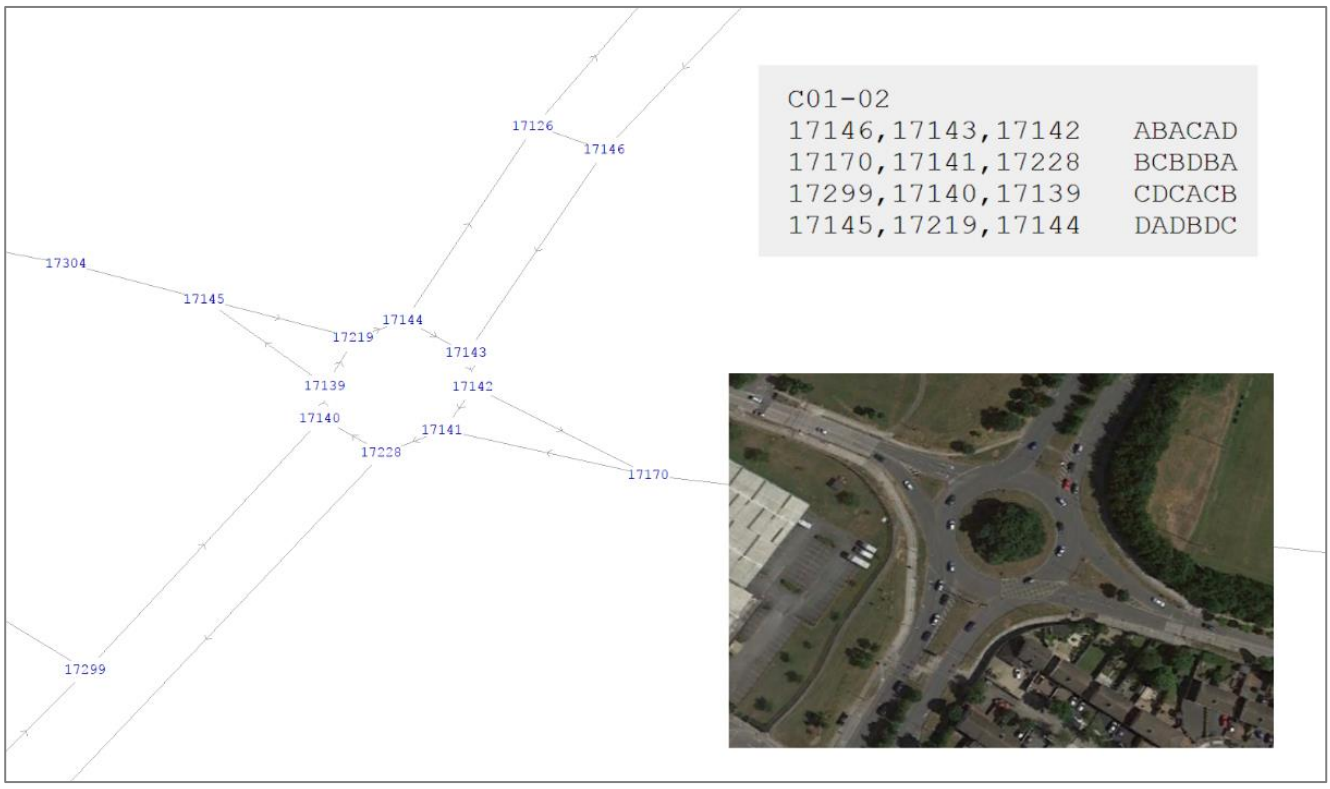


Diagram 4.3: Bus Connects LAM Node Matching (Junction C01-02)

4.3.1.4 Proposed Scheme Micro-Simulation Model

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

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

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

Diagram 4.4: Proposed Scheme Microsimulation Model Network

4.3.1.4.1 Role of the Corridor Micro-Simulation Models

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

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

4.3.1.5 Junction Design Models

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

4.3.1.5.1 Role of the Junction Design Models

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

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

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

5. Baseline Environment

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

Overall baseline cycling infrastructure provision on the corridor consists of 64% cycle priority outbound (18% cycle track, 26% mandatory cycle lane, 20% advisory cycle lane), with 46% inbound (13% cycle track, 1% mandatory cycle lane, 32% advisory cycle lane).

5.1 Bus Journey Times

Bus services along the Proposed Scheme currently operate within a constrained and congested environment, with 18% priority outbound and 44% priority inbound on the corridor. An examination of Automatic Vehicle Location (AVL, collected by the NTA) data indicates that the current standard deviation for journey times of buses on the corridor is 11 minutes on both the Templeogue to Terenure and Rathfarnham to City Centre sections of the Proposed Scheme. With any further increases in traffic levels, this variability of bus speeds is expected to be exacerbated, thus impacting further on bus passengers. In addition, longer and less reliable bus services will require operators to use additional buses to maintain headways to fill gaps created in the timetable. Aligned to this, the remaining sections of unprioritised bus network can lead to bunching of buses which, in turn, means stops can become overcrowded, creating delays in boarding and alighting and an unbalanced 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 busiest junction in the study area is the Tallaght Road/M50 junction (77,994 daily movements). The next busiest junctions are:

- Templeogue Road/Spawell Link Road (59,414 daily movements);
- Templeogue Road/Cypress Grove (40,104 daily movements);
- Rathfarnham Road/Dodder Park Road junction (37,170 daily movements); and
- Redmonds Hill/Cuffe St (36,405 daily movements).

The least busy junction in the study area is the Brighton Square/Garville Avenue junction with 4,124 daily movements.

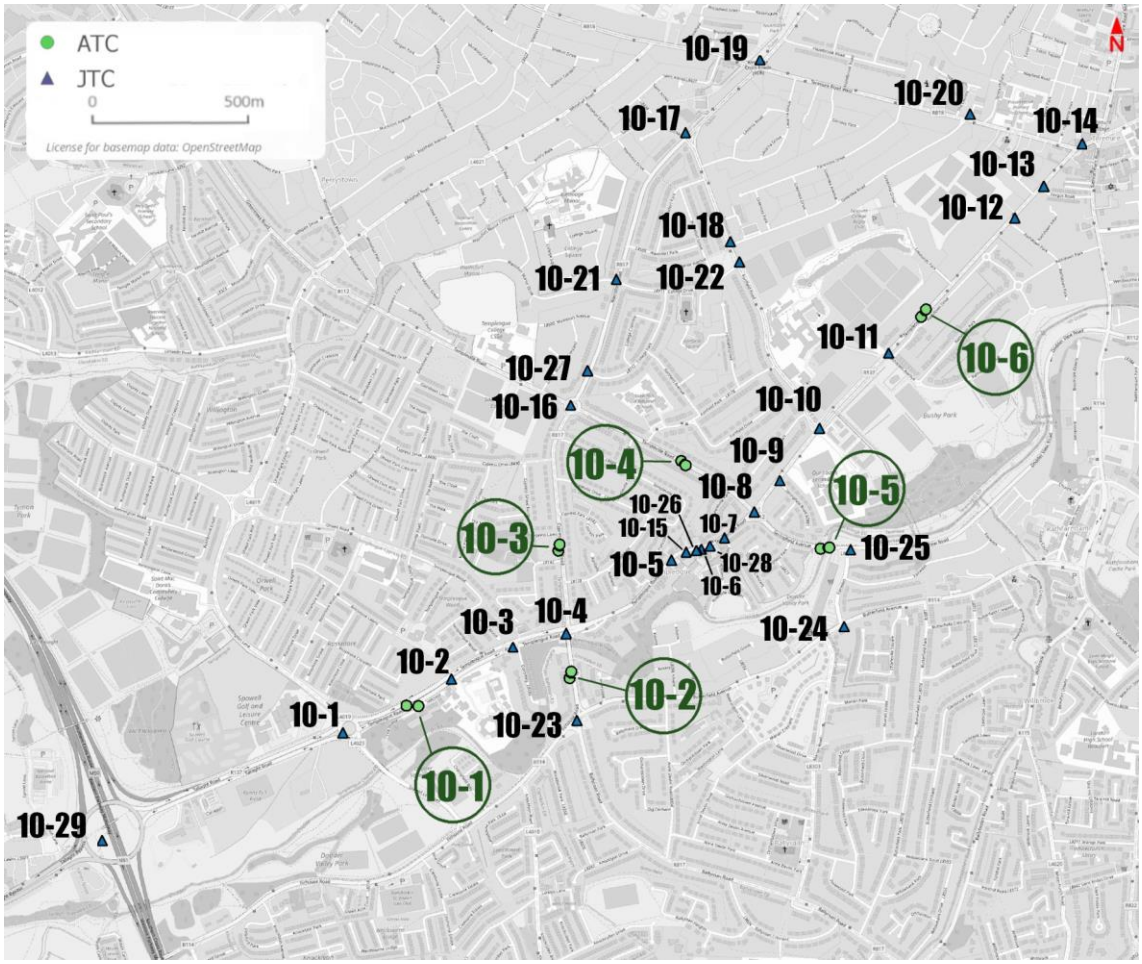
Table 5.1: JTC Locations and Daily, AM and PM Movements

Junction identifier	Junction name	Type	Daily movements	AM Movements	PM Movements
10-1	Templeogue Road/Spawell Link Road	Priority	59,414	4,242	4,594
10-2	Templeogue Road/Cheeverstown House	Priority	30,722	1,858	2,140
10-3	Templeogue Road/Corrybeg	Priority	29,633	1,869	2,099
10-4	Templeogue Road/Cypress Grove	Signals	40,104	2,738	2,994
10-5	Templeogue Road/Templeogue Business Centre	Priority	18,255	1,115	1,333
10-6	Templeogue Road/Maxol Exit	Priority	18,614	1,145	1,365
10-7	Templeogue Road/Riverside Cottages	Priority	18,500	1,146	1,368
10-8	Templeogue Road/Springfield Ave	Signals	33,975	2,519	2,577
10-9	Templeogue Road/Springfield Road	Priority	19,242	1,523	1,389
10-10	Templeogue Road/Bushy Park House	Signals	22,818	1,981	1,701
10-11	Templeogue Road/Rathdown Ave	Priority	17,597	1,339	1,250

Junction identifier	Junction name	Type	Daily movements	AM Movements	PM Movements
10-12	Templeogue Road/Rathdown Park	Priority	14,688	946	1,077
10-13	Templeogue Road/Fergus Road	Priority	14,141	923	1,042
10-14	Terenure Pl/Templeogue Road	Signals	22,763	1,548	1,621
10-15	Maxol Entrance/ Templeogue Road	Priority	18,635	1,133	1,346
10-16	Wainsfort Road/Templeville Road	R4	33,754	2,320	2,654
10-17	Fortfield Road/Fortfield Road	Priority	19,014	1,260	1,437
10-18	Greenlea Road/Fortfield Road	Priority	81,91	1,032	632
10-19	Kimmage Road/Terenure Road	Signals	34,672	2,665	2,577
10-20	Terenure Road/Greenlea Road	Signals	10,781	876	828
10-21	Wainsfort Road/College Dr	Priority	18,677	1,225	1,369
10-22	Fortfield Road/College Dr	Priority	8,827	1,153	670
10-23	Old Bridge Road/Butterfield Ave	Signals	30,242	2,423	2,355
10-24	Fairways/Butterfield Ave	Signals	19,395	1,596	1,412
10-25	Dodder View Road/Fairways	Signals	23,113	1,892	1,833
10-26	Templeogue Road/The Morgue Carpark	Priority	18,037	1,111	1,328
10-27	Wainsfort Road/College Park	Priority	17,990	1,191	1,342
10-28	Templeogue Road/The Morgue Carpark	Priority	18,436	1,129	1,318
12-1	Templeogue Road/Springfield Ave	Signals	24,661	1,721	1,913
12-2	Grange Road/St Mary's Boys National School	Priority	18,799	1,230	1,439
12-3	Rathfarnham Road/ Grange Road	Signals	25,588	1,744	1,990
12-4	Rathfarnham Road/ Rathfarnham Road	Signals	26,725	1,829	2,060
12-5	Rathfarnham Road/Castleside Drive	Signals	20,265	1,378	1,594
12-6	Rathfarnham Road/Rathfarnham Road	Priority	17,425	1,233	1,358
12-7	Rathfarnham Road/Dodder Park Road	Signals	37,170	2,591	2,837
12-8	Rathfarnham Road/Rathfarnham Road	Signals	20,442	1,631	1,464
12-9	Rathfarnham Road/Bushy Park Road	Signals	20,888	1,758	1,511
12-10	Rathfarnham Road/Rathfarnham Road	Priority	14,804	1,177	1,064
12-11	Rathfarnham Road/Beechlawn Way	Priority	15,513	1,198	1,062
12-12	Terenure Cross	Signals	34,978	2,509	2,426
12-13	Terenure Road E/Terenure Road E	Priority	17,343	1,128	1,232
12-14	Terenure Road E/St Josephs Church	Priority	16,411	1,123	1,154
12-15	Healthfield Road/Terenure Road E	Priority	17,445	1,229	1,207
12-16	Terenure Road E/Car Park Entrance	Priority	16,645	1,177	1,150
12-17	Brighton Road/ Terenure Road E	Priority	17,724	1,271	1,208
12-18	Rathgar Road/Orwell Road	Signals	29,697	2,237	2,201
12-19	Rathgar Road/Highfield Road	Signals	23,906	1,855	1,706
12-20	Rathgar Road/Rathgar Road	Priority	17,358	1,211	1,339
12-21	Rathgar Road/Garville Road	Priority	19,074	1,364	1,495
12-22	Rathgar Road/Frankfort Ave	Signals	21,479	1,540	1,717
12-23	Rathgar Road/Rathgar Road	Signals	17,637	1,258	1,322
12-24	Charleville Road/Rathgar Road	Signals	22,808	1,510	1,680
12-25	Rathgar Road/Rathmines Road Upper	Signals	29,681	1,964	2,166
12-26	Rathmines Road lower/Rathgar Road	Signals	27,830	1,972	2,031

Junction identifier	Junction name	Type	Daily movements	AM Movements	PM Movements
12-27	Rathmines Road Lower/Castlewood Ave	Signals	27,938	1,939	2,000
12-28	Rathmines Road Lower/Rathmines Road Lower	Signals	23,885	1,935	1,802
12-29	Rathmines Road Lower/Parker Hill	Priority	23,371	1,978	1,780
12-30	Rathmines Road Lower/Observatory Ln	Priority	22,136	1,743	1,713
12-31	Rathmines Road Lower/Richmond Hill	Priority	24,247	1,927	1,848
12-32	Rathmines Road Lower/Rathmines Road Lower	Priority	18,693	1,435	1,480
12-33	Rathmines Road/Grove Road	Signals	35,983	2,942	2,624
12-34	Richmond St/Charlemont Mall	Signals	19,506	1,775	1,551
12-35	Richmond St/Gordon Place	Priority	17,068	1,183	1,285
12-36	Camden St Upper/Harcourt Road	Signals	35,476	2,400	2,347
12-37	Camden St Upper/Charlotte Way	Signals	34,895	2,282	1,999
12-38	Camden St Lower/Camden St Lower	Signals	23,120	1,298	1,591
12-39	Camden St Lower/Camden Pl	Priority	22,193	1,251	1,460
12-40	WexfoRoad Road/Montague St	Priority	22,982	1,295	1,530
12-41	Redmonds Hill/Cuffe St	Signals	36,405	2,294	2,098
12-42	Aungier St/Digges St Upper	Priority	21,216	1,314	1,258
12-43	Aungier St/York St	Signals	20,359	1,245	1,237
12-44	Aungier St/LongfoRoad St Lower	Signals	22,641	998	1,591
12-45	South Great Georges St/Stephen St Lower	Signals	20,379	1,050	1,363
12-46	South Great Georges St/Fade St	Priority	17,845	819	1,128
12-47	South Great Georges St/Exchequer St	Priority	17,951	854	1,194
12-48	Dame St/South Great Georges St	Signals	26,316	1,482	1,678
12-49	Mountpleasant Ave Upper/Charleston Road	Signals	15,869	1,089	1,214
12-50	Harold's Cross Road/Kenilworth Square N	Signals	28,124	2,239	2,022
12-51	Harolds Cross Road/Leinster Road	Signals	20,348	1,494	1,361
12-52	Mountpleasant Ave Lower/Mountpleasant Ave Upper	Priority	6,022	722	359
12-53	Canal Road/Mountpleasant Ave Lower	Priority	20,918	1,791	1,457
12-54	Harold's Cross Road/Brighton Square	Priority	16,361	1,501	1,161
12-55	Rathmines Road Upper/The Turrets	Priority	10,643	889	898
12-56	Rathmines Road Upper/Rathmines Road Upper	Priority	11,345	963	992
12-57	Rathmines Road Upper/Cowper Mews	Priority	12,556	1,178	1,047
12-58	Rathmines Road Upper/Palmerston Park	Signals	17,892	1,360	1,432
12-59	Villiers Road/Highfield Road	Priority	6,669	567	450
12-60	Neville Road/Highfield Road	Priority	6,913	587	474
12-61	Templeogue Ave/Highfield Road	Priority	7,954	740	517
12-62	Grosvenor Road/Grosvenor Road	R3	7,176	672	570
12-63	Garville Ave/Rathgar Ave	Signals	8,784	927	754
12-64	Castlewood Ave/Castlewood Park	Priority	10,302	710	697
12-65	Belgrove Square N/Belgrave Square W	Priority	9,555	696	658

Junction identifier	Junction name	Type	Daily movements	AM Movements	PM Movements
12-66	Charleston Road/Charleston Road	Priority	12,216	795	996
12-67	Ranelagh Road/Cullenswood Road	Signals	23,000	1,756	1,588
12-68	Ranelagh Road/Mountpleasant Pl	Priority	16,395	1,283	1,259
12-69	Ranelagh Road/Northbrook Road	Priority	16,556	1,328	1,270
12-70	Ranelagh Road/Dartmouth Road	Priority	16,390	1,335	1,307
12-71	Charlemont Bridge/Grand Parade	Signals	31,903	2,493	2,351
12-72	Charlemont St/Charlemont Pl	Signals	18,027	1,780	1,635
12-73	Harcourt St/Adelaide Road	Signals	24,858	1,343	1,779
12-74	Harcourt St/Hatch St	Signals	20,923	1,387	1,292
12-75	St Stephens Green (W)/St Stephens Green (S)	Signals	26,110	1,621	1,978
12-76	Terenure Road N/Whitton Road	Priority	15,335	1,379	1,059
12-77	HaRoadols Cross Road/Brighton Sq	Priority	15,723	1,517	1,064
12-78	Main St/Butterfield Ave	Signals	14,100	1,026	1,119
12-79	Kenilworth Sq/Rathgar Ave	Priority	8,436	846	746
12-80	Brighton Sq (E)/Garville Ave	Priority	4,124	588	397



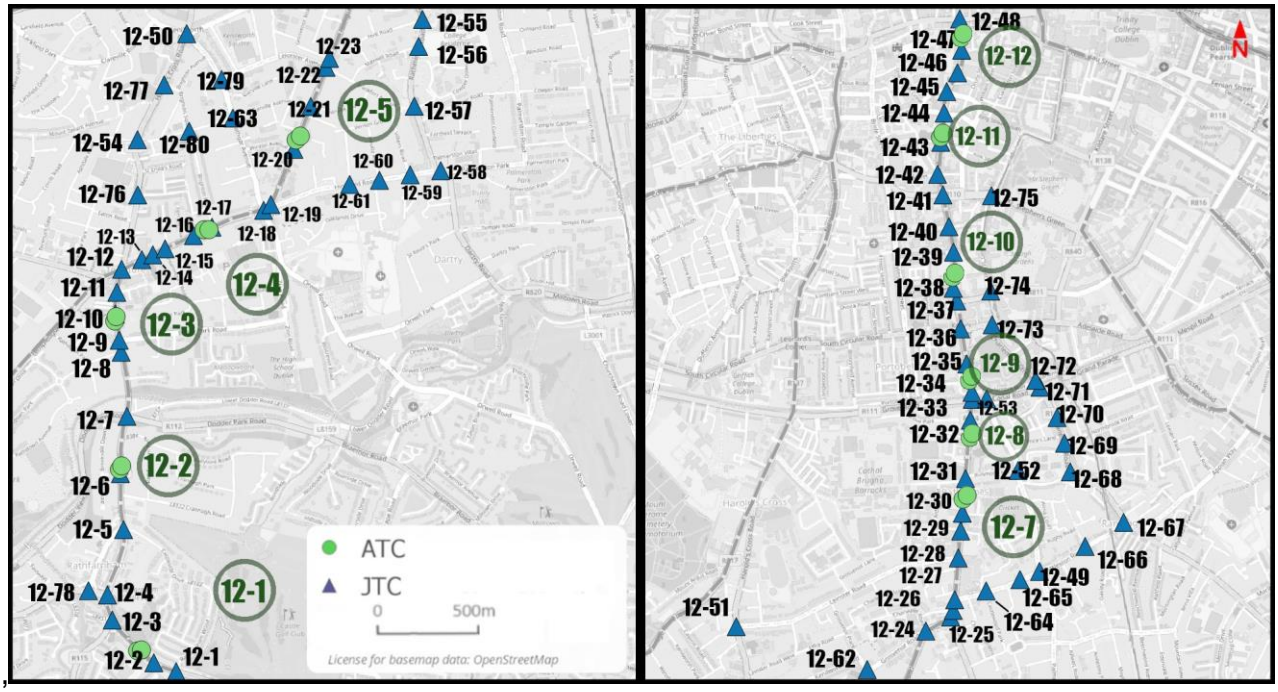


Diagram 5.1: ATC and JTC Traffic Count Locations

5.2.2 Automatic Traffic Counts (ATCs)

Table 5.2 displays the ATCs collected for the Proposed Scheme, the locations of which are shown in the locations of which are shown in Diagram 5.1. The highest ATC daily flows are on the Tallaght Road west of Spawell Link Road. Some ATC counts did not have reliable counts for a full week and were excluded from the dataset.

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

ATC identifier	ATC location	Direction	Daily movements	AM Movements	PM Movements
10-1A	Templeogue Road west of Spawell Link Road	Eastbound	14,272	953	967
10-1B		Westbound	13,126	826	728
10-2A	Old Bridge Road (R817)	Northbound	7,367	432	729
10-2B		Southbound	4,159	419	244
10-3A	Cypress Grove (R817)	Northbound	8,737	655	561
10-3B		Southbound	9,431	482	824
10-4A	Templeville Road	Northbound	6,730	440	514
10-4B		Southbound	5,713	423	487
10-5A	Springfield Avenue	Northbound	9,520	782	771
10-5B		Southbound	8,012	611	651
10-6A	Templeogue Road west of Lakelands Park	Northbound	excluded	excluded	excluded
10-6B		Southbound	excluded	excluded	excluded
12-1A	Grange Road south of Willbrook Road	Northbound	10,419	606	765
12-1B		Southbound	8,856	682	575
12-2A	Rathfarnham Road south of Dodder View Road	Northbound	8,294	674	437
12-2B		Southbound	8,713	381	838
12-3A	Rathfarnham Road south of Fergus Road	Northbound	7,281	601	454
12-3B		Southbound	6,913	392	529
12-4A	Rathfarnham Road south of Brighton Road	Northbound	8,549	685	438
12-4B		Southbound	7,755	332	634
12-5A		Northbound	8,128	358	750

ATC identifier	ATC location	Direction	Daily movements	AM Movements	PM Movements
12-5B	Rathgar Road south of Auburn Villas	Southbound	8,719	710	393
12-7A	Rathmines Road north of Leinster Road	Northbound	excluded	excluded	excluded
12-7B		Southbound	excluded	excluded	excluded
12-8A	Rathmines Road south of Grove Park Road	Northbound	excluded	excluded	excluded
12-8B		Southbound	excluded	excluded	excluded
12-9A	Richmond Street south of Lennox Street	Northbound	excluded	excluded	excluded
12-9B		Southbound	excluded	excluded	excluded
12-11A	Aungier Street north of York Street	Northbound	7,660	329	306
12-11B		Southbound	7,603	392	434
12-12A	Georges Street south of Dame Street	Northbound	excluded	excluded	excluded
12-12B		Southbound	excluded	excluded	excluded

5.3 Baseline Conditions

5.3.1 Overview

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

- Section 1 - Tallaght Road to Rathfarnham Road;
- Section 2 - Nutgrove Avenue to Terenure Road North – Grange Road, Rathfarnham Road;
- Section 3 - Terenure Road North to Charleville Road – Terenure Road East, Rathgar Road; and
- Section 4 - Charleville Road to Dame Street.

5.3.2 Section 1 –Tallaght Road to Rathfarnham Road

This section of the chapter outlines the baseline environment for walking, cycling, bus services, general traffic and parking / loading facilities along Section 1 of the Proposed Scheme, between junction 11 of the M50 and the R114 Rathfarnham Road at Terenure Cross. Section 1 commences on the R137 Tallaght Road east of the M50 junction 11. Section 1 is approximately 3.7km in length and consists of the R137 Tallaght Road and R137 Templeogue Road up to Terenure Cross.

5.3.2.1 Pedestrian Infrastructure

The R137 Tallaght Road and Templeogue Road between the Spawell Roundabout and the R817 Cypress Grove Road benefit from a segregated footpath on the northern side of the road of approximately 3.0m wide. On the southern side of the road there are intermittent walking facilities. There is a roadside footpath which provides access to the Spawell Service Station, but this is followed by a break in provision of approximately 385m without any crossing facilities. The path re-emerges as a segregated footpath beginning at a bus stop to the west of the four-arm roundabout with Spawell Road and is then continuous along the R137 Templeogue Road.

Between the junctions with the R817 Cypress Grove Road and the R112 Templeville Road, footpaths and public lighting are provided on both sides of the R137 Templeogue Road. In general, the footpaths are approximately 1.8m wide. Shared walking and cyclist space is present adjacent to the R137 Templeogue Road, west of the Templeogue Road / Templeogue House junction. Between the R112 Templeville Road and Fortfield Road, the footpath along the southern side of the R137 Templeogue Road becomes segregated from the carriageway by an approximately 2.0m wide grass verge. The footpath on the northern side of the carriageway is approximately 1.5m wide.

From Fortfield Road to the R114 Rathfarnham Road, there is a narrow roadside footpath along northern side of the carriageway of approximately 1.5m wide. The pedestrian facilities on the southern side of the road are segregated from the carriageway by a stone wall and approximately 3.0m wide grass verge from Fortfield Road for approximately 750m north-east until the pedestrian and cycle access to Rathdown Drive; at this point they re-join Templeogue Road. There is streetlighting throughout.

Rathdown Drive, Rathdown Crescent and Rathdown Park are residential streets which broadly run parallel to the R137 Templeogue Road and provide an alternative link to the R114 Rathfarnham Road (Section 2 of the Proposed Scheme) which bypasses Terenure Village Centre. There is a footpath of approximately 1.8m wide provided the southern side of Rathdown Drive, and on both sides of the road along Rathdown Crescent and Rathdown Park. Controlled pedestrian crossing facilities (i.e. signalised and/or zebra crossings) can be found at the following locations and benefit from dropped kerbs and tactile paving:

- On each arm of Spawell Roundabout, a four-arm roundabout between the R137 Tallaght Road, L4019 Wellington Lane, R137 Templeogue Road and L4023 Spawell Road (staggered toucan crossing with guard rails on the southern, eastern and western arms and a direct crossing on the northern arm);
- At the accesses to The Contract Bridge Association of Ireland on the northern side of the road and Cheeverstown House on the southern side of the road (staggered toucan crossing with guard rails, both substandard in relation to width);

- On two arms of the four arm signalised crossroads junction between the R137 Templeogue Road, R187 Cypress Grove Road and R817 Old Bridge Road, on all but the R137 Templeogue Road eastern and southern arms (staggered toucan crossing with guard rails);
- A signalised raised table crossing in Templeogue Village, approximately 18m east of the service station exit;
- Across all arms of the signalised crossroads junction at the R137 Templeogue Road, R112 Templeville Road and R112 Springfield Avenue (standard crossing with guard rails).
- Across the R137 Templeogue Road northern and southern arms of the signalised crossroads junction with Fortfield Road and Bushy Park House (pelican crossings without guard rails). The two minor arms have uncontrolled crossings;
- At the access to Rathdown Avenue and Terenure College there is a pelican crossing across the R137 Templeogue Road (without guard rails);
- At the access to Lakelands Park there is a pelican crossing across the R137 Templeogue Road (without guard rails); and
- Across the R137 Templeogue Road and R818 Terenure Road West arms of the three-arm signalised junction immediately west of Terenure Cross (pelican crossings without guard rails).

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 in TIA Appendix 3 (Maps).

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

5.3.2.2 Cycling Infrastructure

Existing cycle facilities along Section 1 of the Proposed Scheme are as follows:

- Segregated two-way cycle track approximately 2.0m wide on the northern side of the R137 Tallaght Road and Templeogue Road between the M50 Interchange and the access to Templeogue House. The path links to the overbridge crossing of the M50 Motorway which provides pedestrian and cycle access to Tallaght to the west. The two-way cycle track is off-road, offering an increased level of service to users;
- Segregated cycle track for approximately 785m on the R137 Tallaght Road, to the east of Cheeverstown House;
- On-road cycle lanes of approximately 1.25m wide on R817 Cypress Grove Road, mandatory 70m, and then on-road advisory cycle lanes present;
- Through Templeogue Village, the cycle lane moves off-road for approximately 130m where it is segregated from the carriageway by parking bays;
- At the R137 Templeogue Road / R112 Templeville Road / R112 Springfield Avenue signalised crossroads, there are toucan crossings while at the Fortfield Road signalised junction, cyclists are required to share green time with the vehicular traffic phase or dismount and cross at the pedestrian crossings;
- On-road advisory cycle lane approximately 1.25m wide approaching the junction with the R112 Templeville Road and Springfield Avenue;
- On-road advisory cycle lane approximately 1.0m wide, travelling 1km northbound on R137 Templeogue Road, from the Terenure College access gate;
- Two-way off-road shared walking and cyclist facility through Bushy Park travelling southbound; and
- On-road advisory cycle lane of approximately 1.0m wide between Rathdown Drive and Terenure Cross at Rathfarnham Road.

There are three locations of Sheffield cycle parking stands in proximity to Section 1 of the Proposed Scheme. The first is located to the east of Templeogue Village where there are four stands (able to accommodate up to eight bicycles). Another is located on Rathdown Avenue to the north of Bushy Park also comprising four stands. At the corner of Terenure Cross, on the eastern side of the R114 Rathfarnham Road, there are a further six Sheffield stands (able to accommodate up to 12 bicycles). These six Sheffield stands are also designated Bleeperbike

cycle parking racks. There are no DublinBikes cycle hire locations along Section 1 of the Proposed Scheme. The existing cycle facilities along Section 1 of the Proposed Scheme are illustrated in Figure 6.4a in Volume 3 in TIA Appendix 3 (Maps).

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

5.3.2.3 Bus Infrastructure

5.3.2.3.1 Bus Priority Measures

Bus lanes are intermittent along Section 1 of the Proposed Scheme, but are present at the following locations:

- In both directions between Spawell Service Station and Spawell Roundabout, operating 24 hours;
- Northbound between Spawell Roundabout and 90m west of R817 Cypress Grove Road, operating 24 hours (no designated bus lane southbound, however, there are three traffic lanes);
- Northbound between the east of Templeogue Village (out the Hollingsworth Cycles shop) and Springfield Avenue/ Templeville Road.
- Between the majority of Springfield Road and Fortfield Road, operating 24 hours; and
- Northbound for approximately 420m from Rathdown Avenue, operating Monday to Saturday between 07:00 – 10:00 and 12:30 – 19:00.

5.3.2.3.2 Bus Stop Facilities

There are currently 19 bus stops along Section 1 of the Proposed Scheme: The inbound stops are as follows:

- Stop 2599 on R137 Tallaght Road, 100m west of Wellington Lane;
- Stop 2600 on R137 Templeogue Road, at Cheeverstown House;
- Stop 1155 on R137 Templeogue Road, 100m east of R817 Cypress Grove Road;
- Stop 1157 on R137 Templeogue Road, in the centre of Templeogue;
- Stop 1158 on R137 Templeogue Road, 30m north of Springfield Road;
- Stop 1159 on R137 Templeogue Road, 90m north of Fortfield Road;
- Stop 1160 on R137 Templeogue Road, 70m north of Rathdown Avenue;
- Stop 1161 on R137 Templeogue Road, 30m north of Lakelands Park;
- Stop 1162 on R137 Templeogue Road, 30m north of Rathdown Park; and
- Stop 1163 on R137 Templeogue Road, 60m north of Fergus Road.

The outbound stops are:

- Stop 1121 on R137 Templeogue Road, 80m north of Fergus Road;
- Stop 1122 on R137 Templeogue Road, 40m south of Rathdown Park;
- Stop 1123 on R137 Templeogue Road, 30m south of Lakelands Park;
- Stop 1124 on R137 Templeogue Road, 50m north of Rathdown Avenue;
- Stop 1125 on R137 Templeogue Road, 90m south of Bushy Park House;
- Stop 1127 on R137 Templeogue Road, in the centre of Templeogue;
- Stop 1130 on R137 Templeogue Road, 60m east of R817 Cypress Grove Road;
- Stop 2550 on R137 Templeogue Road, 40m west of Cheeverstown access; and
- Stop 2551 on R137 Tallaght Road, 130m west of Wellington Lane.

Bus stops in Templeogue Village are indented, alongside stop 1130, all other bus stops are situated inline with bus lanes. The majority of bus stops comprise static timetable information and accessible kerbs while only four include RTPI. Just under half of bus stops include shelters and seating.

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

Table 5.3: Section 1 – Availability of Bus Stop Facilities (of a Total 19 no. Bus Stops)

Bus Stop Facility	Number of Bus Stops in Baseline with Facility	Percentage of Bus Stops in Baseline with Facility
RTPI	4	21%
Timetable information	14	74%
Shelter	8	42%
Seating	6	32%
Accessible Kerbs	11	58%
Indented Drop Off Area	3	16%

The existing bus facilities along Section 1 of the Proposed Scheme are illustrated in Figure 6.5a in TIA Appendix 3 (Maps). The bus services which operate along Section 1 are outlined in Table 5.4.

Table 5.4: Section 1 – Bus Service Frequency

Service	Route	Typical Service Frequency	
		Weekday	Weekend
15	Clongriffin – Killester Park – St Joseph's School – Connolly Rail Station – Richmond Hill – Templeogue Post Office – Templeogue Bridge – Ballycullen Road	10 minutes	30 minutes
49	Pearse Street – Kenilworth Park - Templeogue Post Office – Templeogue Bridge – Ballycullen Road – Old Bawn Road – Tallaght (The Square)	30 minutes	45 minutes
49N	D'Olier Street – Rathgar Road – Templeogue Road – Dodder Valley Park – Old Bawn Road – Belgard Square – Mayberry Road	NA	120 minutes (3 services run at 00:00; 02:00; 04:00)
54A	Trinity College – Dublin City South – Templeogue College – Tallaght Road – Basketball Arena – Tallaght Village – Tallaght Hospital - Tallaght (The Square) – Marlfield Drive	30 minutes	30 minutes (Saturday), 60 (Sunday)
65	Poolbeg Street – Richmond Hill – Templeogue Post Office – Templeogue Bridge – Cheeverstown House – Spawell Centre – Tallaght Hospital – Killinarden – Valleymount Road	60-120 minutes	90-120 minutes
65B	Poolbeg Street – Richmond Hill – Templeogue Post Office – Templeogue Bridge – Greenfield Park – Old Bawn Road – Jobstown – Citywest – Bianconi Avenue	60 minutes	60 minutes

5.3.2.4 General Traffic

5.3.2.4.1 R137 Templeogue Road

The R137 Tallaght Road (west of the Spawell Roundabout) and R137 Templeogue Road are dual carriageways with three lanes in both directions (two lanes for all traffic and a bus lane) with the dual arrangements as far as the Cypress Grove Road junction. The carriageway is subject to a 60km/h speed limit before reducing to 50km/h west of Corrybeg estate. Following the Cypress Grove Road junction the R137 Templeogue Road carriageway becomes single lane in both directions with non-continuous sections of bus lane as far Terenure Place.

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

- Spawell four-arm roundabout;
- R137 Templeogue Road / R817 Cypress Grove Road and Old Bridge Road four-arm signalised junction;
- R137 Templeogue Road / R112 Templeville Road and Springfield Avenue four arm signalised junction;
- R137 Templeogue Road / Fortfield Road / Bushy Park House four arm signalised junction; and
- R137 Templeogue Road / R818 Terenure Road West / R137 Terenure Place three-arm signalised junction.

The characteristics of each major junction is described in turn below, alongside satellite images which are extracts from Figure 6.6 in TIA Appendix 3 (Maps).

Spawell four-arm Roundabout: The R137 Tallaght Road has three entry lanes, the left lane is for left movements only (except buses), the centre lane is for ahead movements only and the right lane is for ahead and right movements. There are two lanes for exiting onto the R137 Tallaght Road. The R137 Templeogue Road also has three entry lanes (same arrangement) and three exit lanes, two of which are for all traffic and one for buses only.

The L4019 Wellington Lane has two entry lanes, the left lane for all movements and the right lane for right turn only movements, and two lanes on exit from the roundabout which shortly merge into one lane. The L4023 Spawell Road has an entry lane for left movements, one for ahead and left movements and a right turn flare lane. There are two lanes on exit from the roundabout onto the L4023 Spawell Road, merging to one lane.

These characteristics are illustrated in Image 5.1.

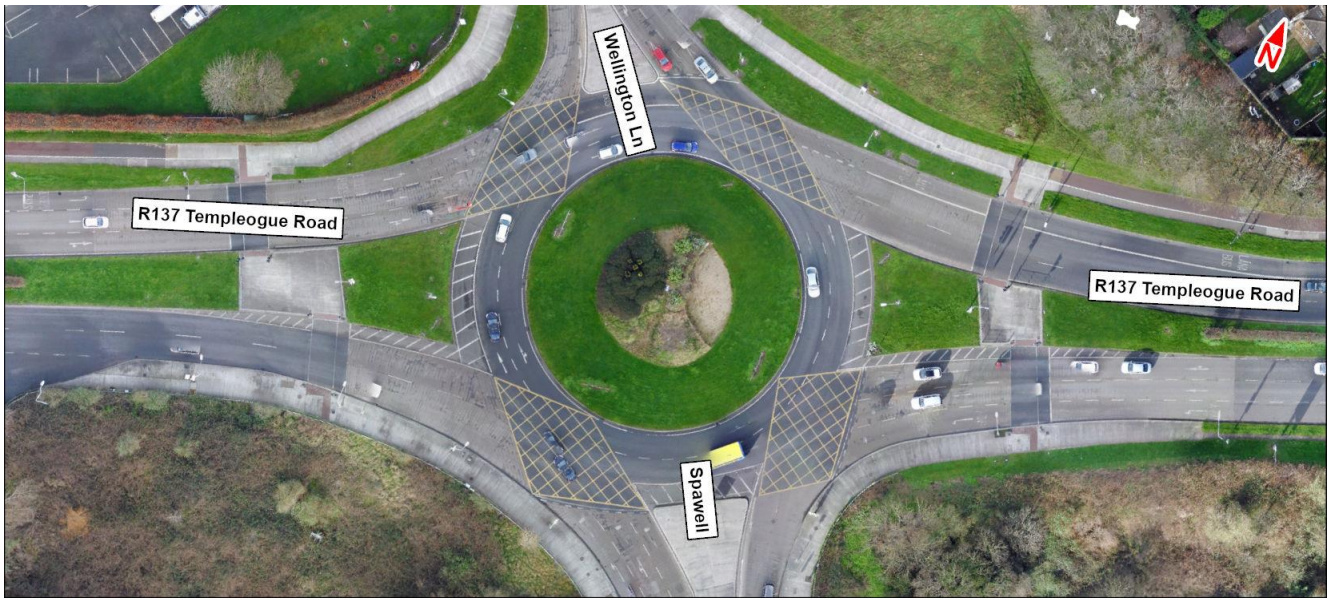


Image 5.1: Spawell Roundabout

R137 Templeogue Road / R817 Cypress Grove Road / Old Bridge Road four-arm signalised junction: At the R137 Templeogue Road / R817 four-arm signalised crossroads, the R137 Templeogue Road eastbound approach arm has a left turn lane, an ahead lane and two right turn lanes segregated by a traffic island. The westbound exit has two lanes onto this arm.

The R137 Templeogue Road East arm has three lanes, the left lane for left turn and ahead movements, the centre lane for ahead movements only and the far side lane for right turn movements only. There is storage in the yellow box of the crossroads for one vehicle turning right from three of the arms (all except the R137 Templeogue Road West arm). The eastbound exit is a wide single lane of approximately 4m in width and a mandatory cycle lane approximately 1.25m wide.

The R187 Cypress Grove Road approach arm has two lanes, one for left and ahead movements and the one for right turn movements. There is a mandatory cycle lane approaching the junction approximately 1.25m wide with an advanced stacking location, and a raised cycle lane by approximately 25.0m from the main carriageway exiting from the junction. The road markings of the exit lane onto the R817 Cypress Grove is a single lane of approximately 6.0m wide.

The R817 Old Bridge Road approach arm has a left slip lane and a single lane for ahead and right turn movements for buses only. Both lanes are signal-controlled. There is an advanced stacking location on this arm and there are advisory cycle lanes both approaching (for left and ahead movements) and exiting the junction of approximately 1.25m wide. There are two lanes on exit from the junction onto the R817 Old Bridge Road.

The characteristics of the junction are illustrated by Image 5.2

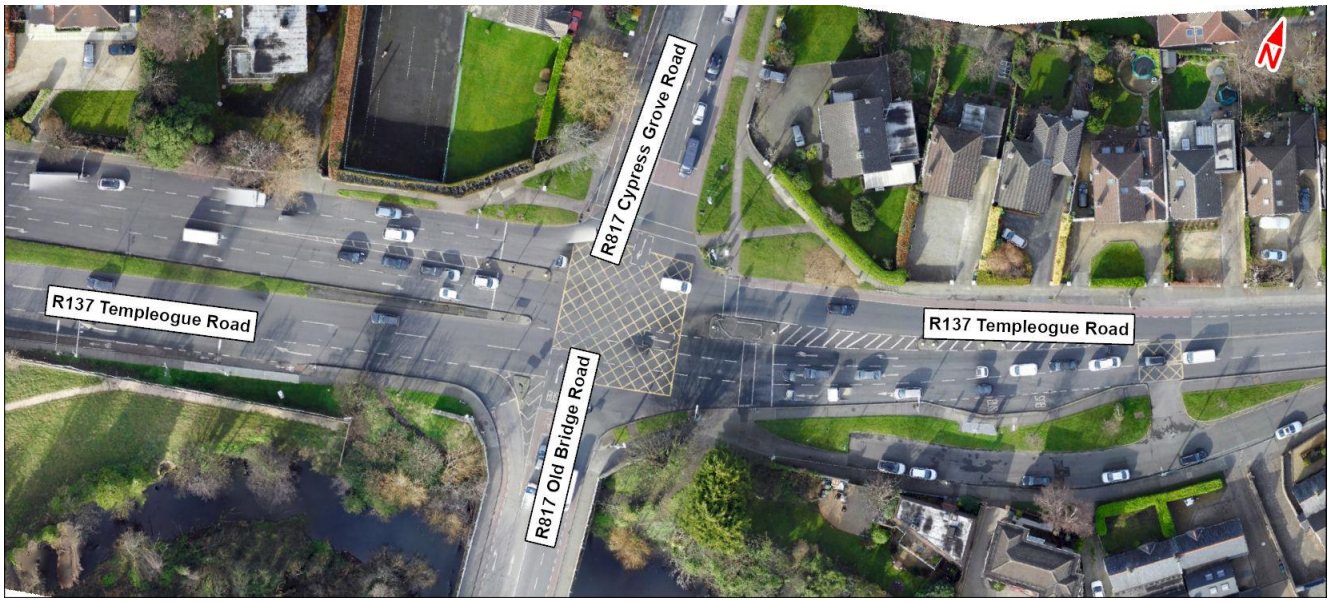


Image 5.2: R137 Templeogue Road / R817 Cypress Grove Road / Old Bridge Road Signalised Junction

R137 Templeogue Road / R112 Templeville Road / R112 Springfield Avenue four-arm signalised junction: At the four-arm R137 Templeogue Road / R112 signalised crossroads junction, the R137 Templeogue Road South arm has two entry lanes, one for left turn movements and one for ahead movements. Right turn movements onto the R112 Springfield Avenue are not permitted. The exit lane onto this arm is marked as a wide single lane but could accommodate two vehicles side-by-side before narrowing into single file approximately 40.0m from the junction.

The R137 Templeogue Road North entry arm has one lane for ahead and right turn movements and a priority controlled left slip lane that bypasses the signals and gives way to traffic exiting onto the R112 Springfield Avenue. The exit lane onto the R137 Templeogue Road North is a wide single lane of around 6.0m that could accommodate two vehicles side-by-side for approximately 30.0m away from the junction before moving to single file.

The R112 Templeville Road approach arm has two lanes, one for left and ahead movements and one for right turn movements. There is a marked right turn storage box beyond the pedestrian crossing for one vehicle. There is a single lane exit onto this arm. The centre of the junction is a yellow box and each arm has traffic islands.

The R112 Springfield Avenue approach arm has one lane for ahead movements, one lane for right turn movements and a priority controlled left slip lane that bypasses the signals and gives way to traffic exiting onto the R137 Templeogue Road. There is a single lane exit onto this arm.

The characteristics of the junction are illustrated by Image 5.3

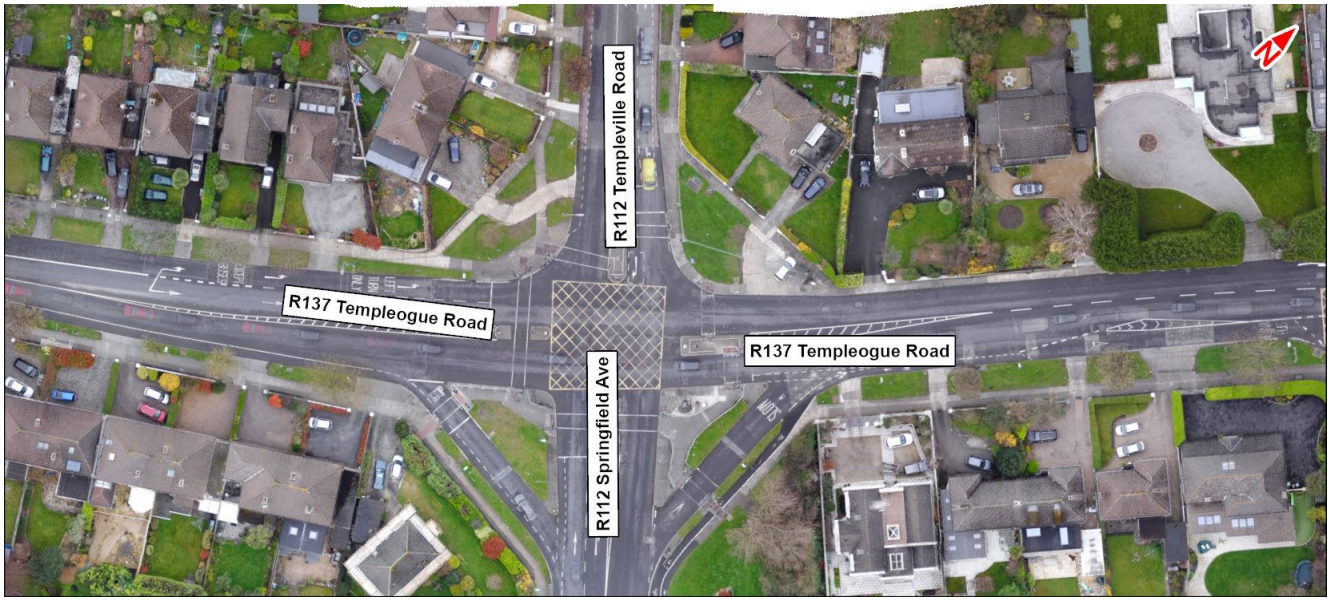


Image 5.3: R137 Templeogue Road / R112 Templeville Road / R112 Springfield Avenue Junction

R137 Templeogue Road / Fortfield Road / Bushy Park House four-arm signalised junction: The R137 Templeogue Road South arm has two entry lanes, the left lane for left turn movements and the right lane for straight ahead and right turn movements. The road markings show one lane exiting onto this arm of approximately 6.0m wide, therefore, able to accommodate two vehicles side-by-side for approximately 40.0m before the left lane becomes a bus lane. The entry and exit lanes are separated by a traffic island and there is a yellow box between the exit lane onto this arm and the R137 Templeogue Road North approach lanes.

The R137 Templeogue Road North arm has one lane entry with a flare lane for left turn movements onto Bushy Park House and to allow vehicles travelling ahead to overtake a vehicle waiting to turn right onto Fortfield Road. There is one lane exiting onto this arm.

Fortfield Road has two lanes on approach to the junction, the left lane for left turn movements and the right lane for ahead and right turn movements onto the R137 Templeogue Road with a right turn filter arrow operating. The exit lane onto this arm is approximately 6.0m wide. The entry and exit lanes are separated by a traffic island.

The Bushy Park House arm has two lane entry, the left lane for left turn and ahead movements and the right lane for right turn movements only. There is one exit lane onto this arm. The entry and exit lanes are separated by an approximately 6.0m wide traffic island. These characteristics are illustrated by Image 5.4

Image 5.4: R137 Templeogue Road / Fortfield Road / Bushy Park House Junction

R137 Templeogue Road / R818 Terenure Road West / R137 Terenure Place junction three-arm signalised junction: This is a three-arm signalised Y-shaped junction approximately 80.0m east of Terenure Cross. The R137 Templeogue Road and R818 Terenure Road West arms both have one lane approaching and exit the junction respectively. Right turn movements from the R137 Templeogue Road onto the R818 Terenure Road West and vice versa, are not permitted. A left turn movement is allowed from the R137 Templeogue Road to R818 Terenure Road West.

The R137 Terenure Place has two lanes approaching the junction, the left lane for ahead movements (to the R137 Templeogue Road) and the right lane for right turn movements (to R818 Terenure Road West) which are controlled by separate signal timings. There is one lane exiting onto the R137 Terenure Place. There is a yellow box in the centre of the junction.

These characteristics are illustrated by Image 5.5

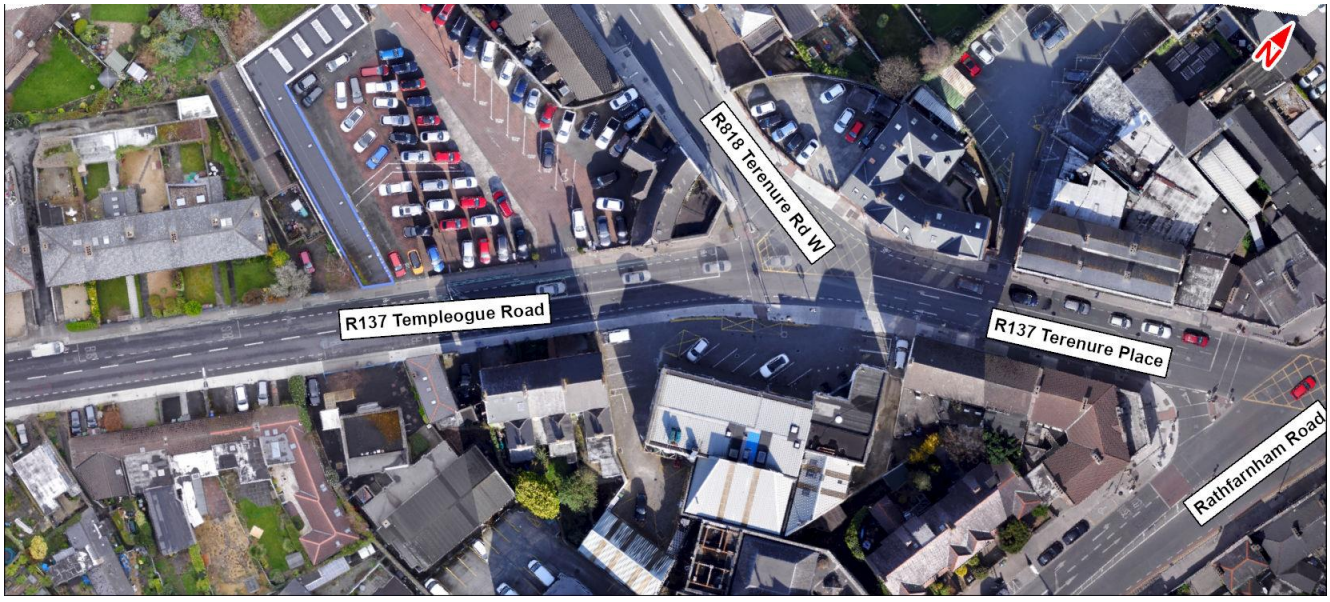


Image 5.5: R137 Templeogue Road / R818 Terenure Road West / R137 Terenure Place Junction

As part of the Proposed Scheme, the residential streets of Rathdown Drive, Rathdown Crescent and Rathdown Park will comprise an alternative route for cyclists between the R137 Templeogue Road and R114 Rathfarnham Road which bypasses the busy Terenure Cross junction. These street have thus been considered in the baseline. These residential streets are single carriageway with traffic calming measures in the form of raised speed tables.

The key junction arrangements along this alternative cycle route of Section 1 of the Proposed Scheme are as follows:

- Rathdown Drive / Rathdown Crescent three-arm roundabout;
- Rathdown Crescent / Rathdown Park four-arm roundabout; and

Rathdown Drive / Rathdown Crescent three-arm roundabout: The Rathdown Drive east arm of this roundabout comprises one lane in either direction and leads to a no through road. The Rathdown Drive west arm of this roundabout does not contain any road markings, with the exception of double yellow lines on one side of the road. Rathdown Crescent comprises a single carriageway with one lane travelling in each direction.

The roundabout provides cyclist only access to the R137 Templeogue road via the northern (arm) access. A bollard is present at this access to present vehicular traffic entering and exiting the roundabout.

These characteristics are illustrated in Image 5.6

Image 5.6: Rathdown Drive / Rathdown Crescent Roundabout

Rathdown Crescent / Rathdown Park four-arm roundabout: This roundabout is located between the Rathdown Drive / Rathdown Crescent roundabout and the Rathdown Avenue / Rathdown Crescent roundabout. Each arm of this roundabout has a single entry and an exit lane.

These characteristics are illustrated in Image 5.7

Image 5.7: Rathdown Crescent / Rathdown Park Roundabout

5.3.2.5 Existing Parking & Loading

There is no formal parking present along Section 1 of the Proposed Scheme. The following parking is present at the alternative cycle route, showing parking within the vicinity, however this is noted as informal parking:

- Informal on-street parking is permitted along the residential streets of Rathdown Drive, Rathdown Crescent and Rathdown Park with double yellow lines present approaching and at the corners of junctions. There are no loading bays along these residential streets.

5.3.3 Section 2 – Nutgrove Avenue to Terenure Road North – Grange Road, Rathfarnham Road

This Section outlines the baseline environment for walking, cycling, bus services, general traffic and parking and loading facilities along Section 2 of the Proposed Scheme, between the R821 Nutgrove Avenue and R137 Terenure Road North.

This Section of the Proposed Scheme consists of the R821 Grange Road and the R114 Rathfarnham Road running from the signalised junction with Nutgrove Avenue / Rathfarnham Wood to Terenure Cross, the four arm signalised junction between the R137 Terenure Road North, R114 Terenure Road East, R114 Rathfarnham Road and R137 Terenure Place (which is the end of Templeogue Section of the Proposed Scheme). Section 2 of the Proposed Scheme is approximately 1.8km in length and travels through a predominantly residential area.

A proposed alternative quiet route for cyclists as part of the Proposed Scheme travels eastbound from the R114 Rathfarnham Road to the R114 Terenure Road East comprising the residential streets; Bushy Park Road, Wasdale Park, Wasdale Grove, Victoria Road, Zion Road and Orwell Road. This provides a quiet cycle route connection between Sections 2 and 3 of the Proposed Scheme.

5.3.3.1 Pedestrian Infrastructure

There are continuous walking facilities provided along Section 2 of the Proposed Scheme, with footways and public lighting provided on both sides of the carriageway along the entirety of this section. In general, the footways are approximately 1.8m wide.

Between the start of the Proposed Scheme, at the R822 Grange Road, and the R115 Rathfarnham Road / R821 Grange Road / R115 Willbrook Road three-arm signalised junction, the footway on the north-eastern side of the road also accommodates an off-road cycle path which is delineated by a white line.

Along Bushy Park Road, Wasdale Park, Wasdale Grove, Victoria Road and Zion Road and Orwell Road there are footways on each side of the carriageway with a minimum width of 1.8m wide.

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

- At three arms of the R821 Nutgrove Avenue and Grange Road / L8385 Rathfarnham Wood / R822 Grange Road four-arm signalised junction. A traffic island with pedestrian refuge is present at the R822 Grange Road arm;
- At the R822 Grange Road and R115 Willbrook Road arms of the three-arm signalised junction with the R115 Rathfarnham Road, there are signalised crossings. A traffic island with pedestrian refuge is present on the R115 Willbrook Road arm;
- Across the dual carriageway section of the R114 Rathfarnham Road, approximately 100m south of the car park access for Rathfarnham Castle, there is a staggered pelican crossing with guardrails;
- At the four-arm signalised junction between the R114 Rathfarnham Road, L8103 Castleview and L4014 Main Street, across all arms except the R114 Rathfarnham Road North arm. Traffic islands with pedestrian refuge are present at the L8103 Castleview and R114 Rathfarnham South arms;
- At each arm of the four-arm signalised junction between the R114 Rathfarnham Road and the R112 Dodder View and Dodder Park Roads, there are signalised crossings on all arms. There is pedestrian refuge on the traffic islands on the R112 arms;
- Across the R114 Rathfarnham Road North and Bushy Park Road arms of the signalised three arm junction there are pelican crossings without guardrails. There is also a pedestrian refuge on the traffic island in the R114 Rathfarnham Road North arm;
- At Terenure Cross, there are staggered signalised crossings with guard rails of the R137 Terenure Place and Terenure Road North Arms. The crossings of the R114 Rathfarnham Road and Terenure Road East are uncontrolled. Pedestrian refuge on the traffic islands are present on all crossings except for R114 Terenure Road East arm; and
- At all arms at the Orwell Road / Zion Road three-arm signalised junction there are signalised pedestrian crossings. The slip road from Zion Road onto Orwell Road has an uncontrolled crossing.

Uncontrolled crossings across priority junctions at side roads benefit from dropped kerbs. The locations of the pedestrian crossings are illustrated in Figure 6.3b in TIA Appendix 3 (Maps).

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

5.3.3.2 Cycling Infrastructure

Existing cycle facilities along Section 2 of the Proposed Scheme are as follows:

- Off-road cycle facility travelling southbound on Grange Road between the R822 Grange Road and the R115 Willbrook Road. Cyclists share the bus lane travelling northbound;
- On-road mandatory cycle lanes approximately 1.25m wide approximately 50m south of Crannagh Road to Brookvale Road; and
- On-road cycle lane travelling southbound for the majority of carriageway between Brookvale Road and the R114 Terenure Road East. The cycle lane varies between advisory and mandatory. Cyclists share the bus lane travelling northbound.

There are a total of 11 Sheffield cycle parking stands (able to accommodate up to 22 bicycles) along the L4014 Main Street. There are five Sheffield cycle parking stands and six secure parking lockers at bus stop 1329 on Grange Road, outside the St Mary's School access. Immediately north of the R114 Rathfarnham Road / R122 Dodder Park Road and Dodder View Road junction, there are a further four Sheffield stands (able to accommodate up to eight bicycles) on the eastern side of the road. There are no DublinBikes cycle hire locations along Section 2 of the Proposed Scheme.

The existing cycle facilities along Section 2 of the Proposed Scheme is illustrated in Figure 6.4b in TIA Appendix 3 (Maps).

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

5.3.3.3 Bus Facilities

5.3.3.3.1 Bus Priority Infrastructure

Bus lanes are intermittent along Section 2 of the Proposed Scheme, but are present at the following locations:

- Northbound between the R821 Nutgrove Avenue and R115 Willbrook Road, operating Monday to Saturday between 07:00 – 19:00;
- In both directions between the R114 Butterfield Avenue and L4014 Main Street, operating Monday to Saturday between 07:00 – 19:00;
- Northbound between Brookvale Road and the R112 Dodder View Road, operating Monday to Saturday between 07:00 – 19:00;
- Northbound between Westbourne Road and Rathdown Park, operating Monday to Saturday between 07:00 – 10:00 and 12:30 – 19:00; and
- Northbound between Fergus Road and the R114 Terenure Road East, operating Monday to Saturday between 07:00 – 10:00 and 12:30 – 19:00.

Outside of the above locations, there is no bus lane provision. Therefore, there is very limited bus lane provision travelling southbound.

5.3.3.3.2 Bus Stop Facilities

There are 18 bus stops along Section 2 of the Proposed Scheme. The inbound stops are as follows:

- Stop 1329 on R821 Grange Road, 80m west of Rathfarnham Wood;
- Stop 1330 on R821 Grange Road, 70m south of Willbrook Road;
- Stop 1331 on R114 Rathfarnham Road, 90m north of Butterfield Avenue;
- Stop 1332 on R114 Rathfarnham Road, 30m north of Village Green;
- Stop 1333 on R114 Rathfarnham Road, 100m north of Brookvale Road;
- Stop 1334 on R114 Rathfarnham Road, 60m north of R112 Dodder Park Road;
- Stop 7293 on R114 Rathfarnham Road, 50m north of Westbourne Road;
- Stop 1335 on R114 Rathfarnham Road, 40m north of Bushy Park Road; and
- Stop 1336 on R114 Rathfarnham Road, opposite Beechlawn Way.

The outbound stops are:

- Stop 1320 on R822 Grange Road, 30m south of R821 Nutgrove Avenue;
- Stop 1299 on R114 Rathfarnham Road, 10m south of Cormac Terrace;
- Stop 1300 on R114 Rathfarnham Road, 45m north of Westbourne Road;
- Stop 1301 on R114 Rathfarnham Road, 50m south of Dodder Park Road;
- Stop 1302 on R114 Rathfarnham Road, 30m north of Crannagh Road;
- Stop 1303 on R114 Rathfarnham Road, 90m south of Castleside Drive;
- Stop 1304 on R114 Rathfarnham Road,60m north of Butterfield Avenue; and
- Stop 1305 on R821 Grange Road, 80m south of Willbrook Road.
- Stop 1306 on R821 Nutgrove Road, 50m east of Grange Road.

All bus stops along this section are inline along the carriageway, usually accommodated within the bus lane. The majority of bus stops along this section do not have RTPI but do provide basic timetable information. Approximately half of the bus stops provide shelters and seating and most provide accessible kerbs.

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

Table 5.5: Section 2 – Availability of Bus Stop Facilities (of a Total 18 no. Bus Stops)

Bus Stop Facility	Number of Bus Stops in Baseline with Facility	Percentage of Bus Stops in Baseline with Facility
RTPI	2	11%
Timetable information	15	83%
Shelter	11	61%
Seating	10	55%
Accessible Kerbs	16	89%
Indented Drop Off Area	0	0%

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

Table 5.6: Section 2 – Bus Service Frequency

Service	Route	Typical Service Frequency	
		Weekday	Weekend
15B	Merrion Square – Rathmines St Mary's College – Rathfarnham Dodder Park – Ballyboden Road – Stocking Lane – Knockylon Dalriada	15 minutes	15 minutes (Saturday), 30 minutes (Sunday)
15D	Merrion Square – Rathmines St Mary's College – Rathgar Village – Terenure Meadowbank – Rathfarnham Castle – Ballyboden Road – Edmonstown Ballyboden Church	2 services (15:00 and 16:45)	NA
16	Dublin Airport – Clogrhan Service Station – Drumcondra Rail Station – Terenure Cross – The Grande – Ballinteer	12 minutes	15 minutes
17	Blackrock Station – Notre Dame School – St Mary's School – Terenure Cross – Royston Village – Rialto Church	20 minutes	30 minutes
17D	Dundrum Luas – Whitebarn Road – Rathfarnham Road – Crannagh Road – Terenure – Kimmage Road West – Armagh Road – Clogher Road – Rialto Church	1 service (06:40)	1 service (06:40 Saturday, 09:40 Sunday)
61	Eden Quay – Ramleh Park – Nutgrove Avenue – Rathfarnham Church – Grange Golf Club – Reckett's Factory – Rockbrook	75 minutes	60 minutes
75	Tallaght (The Square) - Tallaght Hospital – Willbrook Road – Rathfarnham Wood – Hazel Villas – Foxrock Church – Deansgrange Village – Kill of The Grange – Dun Laoghaire Station	30 minutes	30 minutes
75A	Tallaght (The Square) - Tallaght Hospital – Willbrook Road – Rathfarnham Wood – Hazel Villas – Foxrock Church – Deansgrange Village – Kill Valley – Dun Laoghaire Station	2 services (06:42 and 07:42)	NA

5.3.3.4 General Traffic

5.3.3.4.1 R114 Grange Road / Rathfarnham Road

The R114 Grange Road / Rathfarnham Road along Section 2 of the Proposed Scheme is single carriageway, generally with one lane for all traffic in each direction and intermittent sections with an additional lane for buses. For a section of approximately 300m between the junctions with the R114 Butterfield Avenue and the L8103 Castleside Drive, the road has a general traffic lane and a bus lane in both directions. The road generally travels in a south to north direction and is subject to 50km/h speed limit.

The existing major junction arrangements along Section 2 of the Proposed Scheme are as follows:

- R821 Nutgrove Avenue and Grange Road / L8385 Rathfarnham Wood / R822 Grange Road four-arm signalised junction;
- R115 Rathfarnham Road / Grange Road / Willbrook Road three-arm signalised junction;
- R114 Rathfarnham Road / R115 Rathfarnham Road / R114 Butterfield Avenue three-arm signalised junction;
- R114 Rathfarnham Road / L8103 Castleside Drive / L4014 Main Street four-arm signalised junction;
- R114 Rathfarnham Road / R112 Dodder Park Road / R112 Dodder View Road;
- R114 Rathfarnham Road / Rathdown Park three-arm signalised junction;
- R114 Rathfarnham Road / Bushy Park Road three-arm signalised junction; and
- Terenure Cross four-arm signalised junction.

The characteristics of each major junction is described in turn below, alongside satellite images which are extracts from Figure 6.6 in TIA Appendix 3 (Maps).

R821 Nutgrove Avenue and Grange Road / L8385 Rathfarnham Wood / R822 Grange Road four-arm signalised junction: The R821 Grange Road and Nutgrove Avenue arms of the junction each have two lanes approaching and one exit lane.

The R821 Grange Road arm left lane is for left and ahead movements and the right lane is for right turn movements. There is storage beyond the stop line for one vehicle waiting to turn right onto the R822 Grange Road.

The R821 Nutgrove Avenue approach arm left lane is for left movements and the right lane is for ahead and right turn movements. The L8385 Rathfarnham Wood arm has one lane approaching and exiting the junction. The R822 Grange Road arm has two lanes approaching the junction, the left lane is for left turn movements and the right lane is for ahead and right turn movements. An advanced stacking location is provided for ahead and right turn movements by cyclists There is one lane exiting onto this arm and a traffic island between the entry and exit lanes. The centre of the junction comprises a yellow box.

These characteristics are illustrated in Image 5.8

Image 5.8: R821 Grange Road / R821 Nutgrove Avenue / L83485 Rathfarnham Wood / R822 Grange Road Junction

R115 Rathfarnham Road / Grange Road / Willbrook Road three-arm signalised junction: This junction is approximately 340m north of the start of this route section. The R115 Rathfarnham Road arm comprises two entry lanes, one each for ahead and right turn movements, and two exit lanes. A priority junction with the L8451 St Mary's Avenue leads off this arm immediately north of the junction.

The R821 Grange Road arm comprises two entry lanes, one each left and ahead movements and a single lane on exit from the junction. The R115 Willbrook Road comprises one entry and exit lane separated by a traffic island. The centre of the junction comprises a yellow box. These characteristics are indicated by Image 5.9.

Image 5.9: R115 Rathfarnham Road / R115 Willbrook Road / R821 Grange Road Junction

R114 Rathfarnham Road / R115 Rathfarnham Road / R114 Butterfield Avenue three-arm signalised junction: This junction is located approximately 100m north of the R115 Rathfarnham Road / R821 Grange Road / R115 Willbrook Road junction. The R114 Rathfarnham Road North arm has three approach lanes and two exit lanes, one of which is a bus lane. Two approach lanes are allocated for ahead movements and the far side lane is for right turn movements. There is storage beyond the stop line for one vehicle turning right onto the R114 Butterfield Avenue. The R115 Rathfarnham Road South arm has two entry lanes, the left for left turn movements and the right for ahead movements and has two exit lanes.

The R114 Butterfield Avenue arm has three entry lanes; one for left turn movements and two for right turn movements onto R115 Rathfarnham Road South, the far side of which is a flare lane of approximately 90.0m long. The right and left turn movements are controlled by separate signal heads. There are two lanes exiting onto the R114 Butterfield Avenue. Each arm of the junction features traffic islands and there is a yellow box across the R114 Rathfarnham Road southbound movement.

The characteristics of this junction are illustrated in Image 5.10.

Image 5.10: R114 Rathfarnham Road / R114 Butterfield Avenue / R115 Rathfarnham Road Junction (Right)

R114 Rathfarnham Road / L8103 Castleside Drive / L4014 Main Street four-arm signalised junction: This junction has one lane on entry and exit from the junction at both the L8103 Castleside Drive and L4014 Main Street arms. The R114 Rathfarnham Road North and South arms each have three entry lanes, one for right, ahead and left movements respectively and two exit lanes. Both arms have a central reservation and provide a storage box for one vehicle waiting to turn right from the R114 Rathfarnham Road North onto the L4014 Main Street and from the R114 Rathfarnham Road South onto the L8103 Castleside Drive, marked by white lining. The signals include a right turn filter arrow phase for each of these movements.

These characteristics are illustrated in Image 5.11.

Image 5.11: R114 Rathfarnham Road / L8103 Castleside Drive / L4014 Main Street Junction

R114 Rathfarnham Road / R112 Dodder Park Road / R112 Dodder View Road four-arm signalised junction: This is a four-arm signalised junction. Each arm provides three entry lanes. The R114 Rathfarnham Road North and South arms have a lane each for right, ahead and left turn movements respectively and one lane on exit from the junction without traffic islands.

The R112 Dodder Park Road and Dodder View Road allocate the left lane for left and ahead movements, the middle lane for ahead movements only and the right lane for right movements only. Both arms also provide a wide single lane exit, of approximately 6.0m and able to accommodate two vehicles side-by-side, before shortly indicating a merge arrow to merge into one lane approximately 40.0m away from the junction. There are traffic islands present on the R112 Dodder Park Road and Dodder View Road arms.

These characteristics are illustrated in Image 5.12.

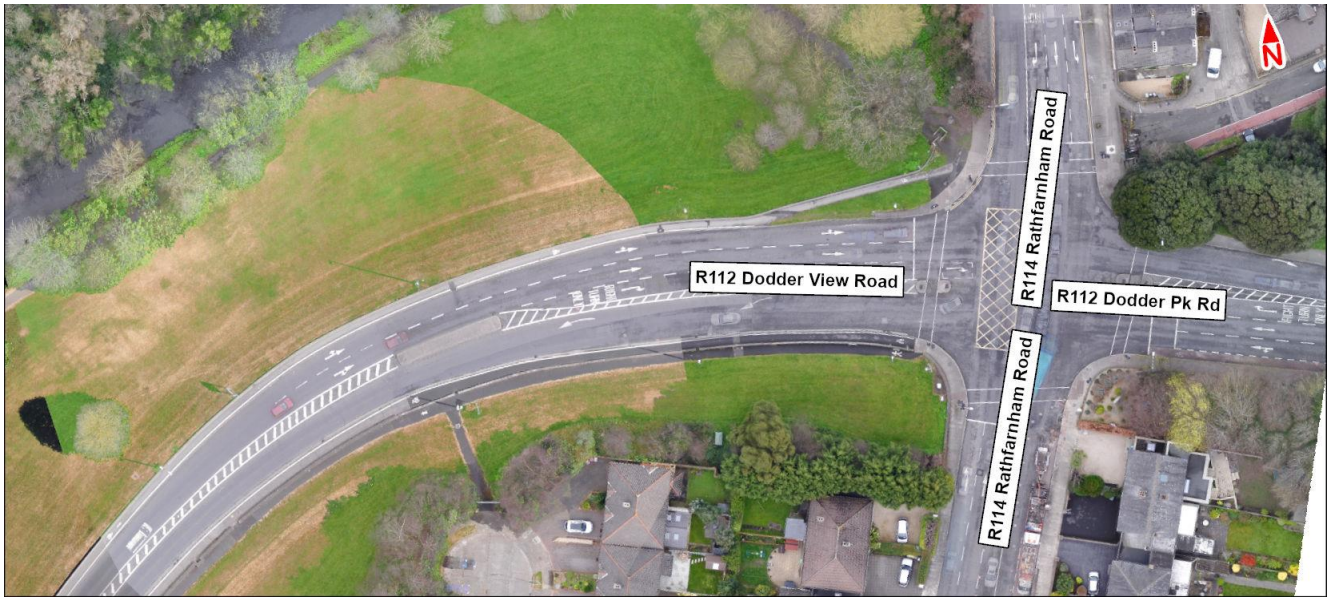


Image 5.12: R114 Rathfarnham Road / R112 Dodder Park Road / R112 Dodder View Road Junction

R114 Rathfarnham Road North and South / Rathdown Park three-arm signalised junction: The R114 Rathfarnham Road North arm has two entry lanes, one for ahead and for right turn movements respectively, and two exit lanes. The R114 Rathfarnham Road South arm has two entry lanes with an advanced stacking location. The left lane is for left turn movements and the right lane is for ahead movements. There is a single exit lane onto the R114 Rathfarnham Road South arm. The Rathdown Park arm has one entry and exit lane respectively, separated by a traffic island. There is a yellow box in the centre of the junction.

R114 Rathfarnham Road North and South / Bushy Park Road three-arm signalised junction: Approximately 50.0m north of the junction described above is another three-arm signalised junction which comprises R114 Rathfarnham Road North and South, and Bushy Park Road. The R114 Rathfarnham Road North arm has one entry and exit lane separated by a traffic island. An advanced stacking location is provided. The Bushy Park Road arm has two entry lanes, the left lane is for left turn movements and the right lane allows left and right turn movements. There is a single exit lane onto this arm of approximately 4.0m wide. The R114 Rathfarnham Road South arm has two entry and exit lanes respectively. The left entry lane is for ahead movements and the right is for right turn movements. An advanced stacking location is provided and there is a yellow box in the centre of the junction.

Both above junctions can be seen in Image 5.13.

Image 5.13: R114 Rathfarnham Road / Rathdown Park Junction (Right) and R114 / Bushy Park Road Junction (Left)

Terenure Cross four-arm signalised junction: This junction comprises the R137 Terenure Road North, R114 Terenure Road East, R114 Rathfarnham Road and R137 Terenure Place arms. The R137 Terenure Road North arm has two entry lanes and an approximately 6.0m wide single exit lane separated by a traffic island. The left entry lane is for left and ahead movements and the right lane is for right and ahead movements. An advanced stacking location is provided, and the cycle lane continues through the junction.

The R114 Terenure Road East arm has one entry and exit lane respectively with a left turn filter arrow phase for movements onto the R114 Rathfarnham Road. An advanced stacking location is provided.

The R114 Rathfarnham Road arm has two entry lanes and a one exit lane separated by a traffic island. The left lane is for left turn movement (except buses) and becomes a yield to the R137 Terenure Place by way of a short slip lane, beyond the stop line. The right lane is for ahead movements only as right turns onto the R114 Terenure Road East are not permitted. An advanced stacking location is provided.

The R137 Terenure Place arm comprises one lane entry for left and ahead movements with a right turn flare lane of approximately 11.0m in length. The right turn movement is restricted to buses only from Monday to Saturday between the hours of 07:00 – 10:00 and 16:00 – 19:00. Outside these times, general traffic can turn right. Exit onto the R137 Terenure Place is one lane which shortly widens to two lanes. There is a yellow box in the centre of the junction.

The characteristics of this junction are illustrated in Image 5.14.

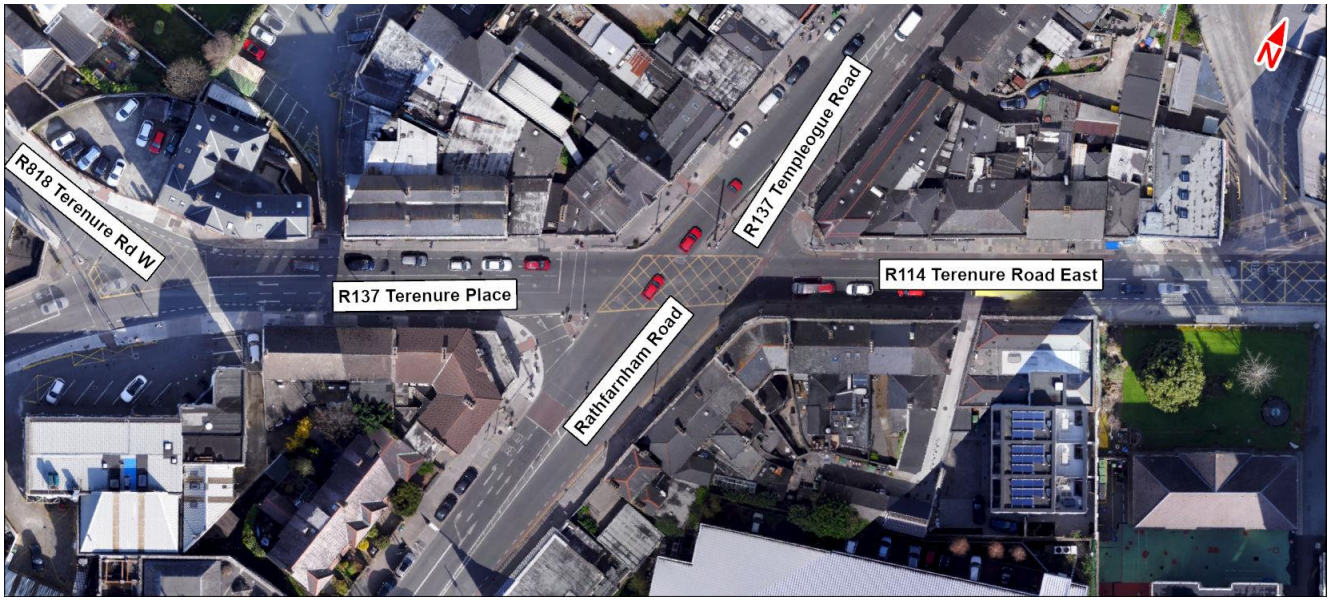


Image 5.14: Terenure Cross Junction

5.3.3.4.2 Orwell Road

Within the redline boundary of the Proposed Scheme, Orwell Road is a single carriageway routing in a north-south direction between Zion Road and the R114 Terenure Road East. There is one lane of traffic travelling in each direction and double yellow lines on both sides of the road.

The key junction along this section of road is the following:

Orwell Road / Zion Road three-arm signalised junction: The Orwell Road north arm has two lanes approaching and exiting the junction respectively. The left approach lane is for straight ahead movements and the right lane is for right turn movements onto Zion Road. One exit lane leads from Orwell Road south and the other leads from a left-slip lane from Zion Road. There is a yellow box across the two approach lanes in front of the St Peter's School access.

The Orwell Road south arm has a single lane approaching and exiting the junction respectively. There is a yellow box in the centre of the junction across the Orwell Road northbound lane, in front of Zion Road.

Zion Road has a single lane approaching and exiting the junction respectively, with an additional left-slip lane onto the Orwell Road north arm, yielding to northbound traffic along Orwell Road.

These features are illustrated in Image 5.15.

Image 5.15: Orwell Road / Zion Road Signalised Junction

5.3.3.5 Existing Parking & Loading

There are parking or loading restrictions along most of Section 2 of the Proposed Scheme, which is marked by double yellow lines throughout. Parking can be found at the following locations:

- Seven designated pay and display and permit parking spaces on Grange Road/ Rathfarnham Road between Grange Road and Dodder Park Road, immediately north of St Mary's Avenue; and
- 14 designated pay and display and permit spaces and one disabled space on the R114 Rathfarnham Road between Cormac Terrace and Terenure Road East.

Further parking is provided on side roads and off-street car parks along Section 2 of the Proposed Scheme:

- A number of off-street spaces at the Bring Centre car park, off Grange Road and adjacent to the R821 Nutgrove Avenue / R821 Grange Road / R822 Grange Road signalised junction;
- 14 designated pay and display and permit spaces on Fergus Road in operation from 07:00-24:00 Monday – Saturday; and
- Informal spaces on Cormac Terrace.

There are no loading bays along Section 2 of the Proposed Scheme.

5.3.4 Section 3 – Terenure Road North to Charleville Road – Terenure Road East, Rathgar Road

This Section outlines the baseline environment for walking, cycling, bus services, general traffic and parking / loading facilities along Section 3 of the Proposed Scheme, between R137 Terenure Road North and Charleville Road. This Section of the Proposed Scheme runs from the R137 Terenure Road North at Terenure Cross to the four-arm junction between the R114 Rathgar Road East and South, Grosvenor Road and Charleville Road. The extent of Section 3 of the Proposed Scheme is approximately 1.8km in length and travels through a predominately residential area between Terenure, Rathgar and Rathmines Village Centres.

Additionally, the Proposed Scheme includes the R137 Terenure Road North and R137 Harold's Cross Road which run parallel to Section 3 of the Proposed Scheme between the R137 Terenure Road East and Parkview Avenue where it links to the Kimmage to City Centre Core Bus Corridor. This section of Proposed Scheme is approximately 1.5km in length.

5.3.4.1 Pedestrian Infrastructure

There are footways and public lighting on both sides of the carriageway along the entirety of Section 3 of the Proposed Scheme that are approximately 2.0m wide.

There is a similar level of footway provision along the proposed link to the Kimmage to City Centre Core Bus Corridor via the R137 Terenure Road North and R137 Harold's Cross Road. There are pinch points present on the R137 Terenure Road North, for example, at the Mc Morrough Road junction.

Additionally, the following priority junctions include a raised table facility on the minor arm which manages vehicle speeds and in turn, aids pedestrians crossing:

- R114 Terenure Road East / Greenmount Road priority junction;
- R114 Terenure Road East / Brighton Road priority junction;
- R114 Rathgar Road / Winton Avenue priority junction;
- R114 Rathgar Road /Garville Road priority junction;
- R114 Rathgar Road / Grosvenor Road priority junction;
- R137 Terenure Road North / Whitton Road priority junction;
- R137 Terenure Road North / St Enda's Road priority junction;
- R137 Harold's Cross Road / Brighton Square (South) priority junction;
- R137 Harold's Cross Road / Mount Tallant Avenue; and
- R137 Harold's Cross Road / Brighton Square (North) priority junction.

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

- Across the R114 Terenure Road East adjacent to Aldi Supermarket there is a toucan crossing;
- At each arm of the R114 Terenure Road East / Rathgar Avenue / R114 Rathgar Road / Orwell Road four-arm signalised junction there are crossings;
- At each arm of the R114 Rathgar Road North and South / Frankfort Avenue / Leicester Avenue four-arm signalised junction there are crossings;
- Across the R114 Rathgar Road South and Grosvenor Road arms of the four-arm signalised junction at the end of this section there are signalised crossings. The Grosvenor Road arm crossing is without guard rails and the R114 Rathgar Road South crossing is staggered with pedestrian refuge on the traffic island and has guard rails;
- Across the R137 Terenure Road North adjacent to the access to Terenure Road Car Park there is a pelican crossing;
- Across the R137 Terenure Road North, immediately south of the Ashdale Road priority junction there is a toucan crossing;
- At each arm of the R137 Harold's Cross Road North and South / Kenilworth Square North / Rathgar Avenue / Kenilworth Park five-arm signalised junction there are crossings on all arms. A traffic island offering pedestrian refuge is provided on the Rathgar Avenue arm;
- Across the R137 Harold's Cross Road, immediately south of the Tivoli Avenue priority junction there is a pelican crossing; and
- Across the R137 Harold's Cross Road, immediately south of the Harold's Cross Road and Parkview Avenue priority junctions, there is a toucan crossing.

Uncontrolled crossings across priority junctions at side roads benefit from dropped kerbs. The locations of the pedestrian crossings are illustrated in Figure 6.3c in Volume 3 TIA Appendix 3 (Maps).

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

5.3.4.2 Cycling Infrastructure

Existing cycling facilities along Section 3 of the Proposed Scheme are as follows:

- On-road advisory cycle lane approximately 1.5m wide in both directions between Terenure Cross and Brighton Road;
- Shared cycle/ bus lanes R114 Terenure Road East / Rathgar Avenue / R114 Rathgar Road / Orwell Road four-arm signalised junction within Rathgar Village; and
- On-road mandatory cycle lane approximately 1.75m wide travelling southbound from Rathgar Village to Charleville Road. Cyclists share the bus lane travelling northbound. There is however, an advisory on-road cycle lane travelling northbound at the beginning and end of this section of approximately 1.25m wide.

There is a total of 21 Sheffield cycle parking stands able to accommodate up to 42 bicycles at various locations along this section of the Proposed Scheme, and a further 11 stands a short distance from this section along the R114 Rathfarnham Road and Highfield Road.

The additional offline link along the R137 Terenure Road North and R137 Harold's Cross Road has intermittent on-road cycle lanes and bus lanes. On-road cycle lanes are provided in both directions between Terenure Cross and Mount Tallant Avenue. From Mount Tallant Avenue to Laundry Lane, there is an on-road cycle lane travelling southbound while cyclists share the bus lane travelling northbound. There is then a small section of cycle lanes in both directions between Laundry Lane and Kenilworth Park, and then between Tivoli Avenue and the R137 Harold's Cross Road / Parkview Avenue / Harold's Cross Road four-arm priority junction. From Kenilworth Park to Tivoli Avenue, cyclists share the bus lane travelling northbound.

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

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

5.3.4.3 Bus Infrastructure

5.3.4.3.1 Bus Priority Measures

Bus lanes are intermittent along this route, but are present at the following locations:

- In both directions between Brighton Road and Rathgar Avenue, operating Monday to Saturday between 07:00 – 10:00 and 12:00 – 19:00;
- Northbound from Rathgar Avenue to Charleville Road, operating Monday to Friday between 07:00 – 10:00 and 16:00 – 19:00; and
- Intermittent northbound bus lanes from the start of Harold's Cross Road to 80.0m south of the Tivoli Road junction, from Mountain View Avenue to the 1343 bus stop, all operating Monday to Saturday between 07:00 – 10:00 and 12:00 – 19:00.

5.3.4.3.2 Bus Stop Facilities

There are 13 bus stops along Section 3 of the Proposed Scheme between the R137 Terenure Road North and Charleville Road. The inbound stops are as follows:

- Stop 1164 on R114 Terenure Road East, 50m west of Greenmount Road;
- Stop 1165 on R114 Terenure Road East, 100m east of Brighton Road;
- Stop 1166 on R114 Rathgar Road, 30m south of Winton Avenue;
- Stop 1167 on R114 Rathgar Road, 30m north of Garville Avenue;
- Stop 1168 on R114 Rathgar Road, 45m north of Grosvenor Road; and
- Stop 1169 on R114 Rathgar Road, opposite Rathmines Park;

The outbound stops are:

- Stop 1078 on R114 Rathgar Road, 40m north of Rathgar Place;
- Stop 1079 on R114 Rathgar Road, 60m south of Frankfort Avenue;
- Stop 1080 on R114 Rathgar Road, 60m north of Highfield Road;
- Stop 1081 on R114 Rathgar Road, 60m north of Highfield Road;
- Stop 1082 on R114 Terenure Road East, 80m west of Orwell Road;
- Stop 1083 on R114 Terenure Road East, 30m west of Brighton Road; and
- Stop 1085 on R114 Terenure Road East, 80m east of Terenure Road North.

Along the R137 Terenure Road North and R137 Harold's Cross Road, there are 13 bus stops. The inbound stops are as follows:

- Stop 1337 on R137 Terenure Road North, 50m south of Eaton Road;
- Stop 1338 on R137 Terenure Road North, 20m south of Whitton Road;
- Stop 1339 on R137 Harold's Cross Road, 45m north of Ashdale Road;
- Stop 1340 on R137 Harold's Cross Road, 45m north of Mount Tallant Avenue;
- Stop 1341 on R137 Harold's Cross Road, 15m south of Kenilworth Lane West;
- Stop 1342 on R137 Harold's Cross Road, 20m north of Tivoli Avenue; and
- Stop 1343 on R137 Harold's Cross Road, 50m south of Parkview Avenue.

The outbound stops are:

- Stop 1293 on R137 Harold's Cross Road, 25m south of Parkview Avenue;
- Stop 1294 on R137 Harold's Cross Road, 80m north of Leinster Road West;
- Stop 1295 on R137 Harold's Cross Road, 75m south of Rathgar Avenue;
- Stop 1296 on R137 Harold's Cross Road, 50m south of Mount Tallant Avenue;
- Stop 1297 on R137 Terenure Road North, 25m south of Whitton Road; and
- Stop 1298 on R137 Terenure Road North, 30m south of Elm Park Terrace.

Only a small proportion of the bus stops provide real-time information and around a third provide shelters and seating. The majority of the bus stops along this section are flag and pole stops, and provide timetable information and accessible kerbs, and all bus stops are inline along the carriageway.

Other than the above locations, there is no bus lane provision along this route and very limited bus lane provision travelling southbound.

Table 5.7 outlines the availability of bus stop facilities at the existing 13 bus stops between the R137 Terenure Road North and Charleville Road.

Table 5.7: Section 3 – Availability of Bus Stop Facilities (of a Total 13no. Bus Stops)

Bus Stop Facility	Number of Bus Stops in Baseline with Facility	Percentage of Bus Stops in Baseline with Facility
RTPI	2	15%
Timetable information	10	77%
Shelter	4	31%
Seating	4	31%
Accessible Kerbs	12	92%
Indented Drop Off Area	0	0%

Table 5.8 outlines the availability of bus stop facilities at the existing 13 bus stops along the R137 Terenure Road North and Harold's Cross Road.

Table 5.8: R137 Terenure Road North and Harold's Cross Road – Availability of Bus Stop Facilities (of a Total 13no. Bus Stops)

Bus Stop Facility	Number of Bus Stops in Baseline with Facility	Percentage of Bus Stops in Baseline with Facility
RTPI	4	31%
Timetable information	13	100%
Shelter	9	69%
Seating	5	39%
Accessible Kerbs	12	92%
Indented Drop Off Area	1	8%

The existing bus facilities along Section 3 of the Proposed Scheme are illustrated in Figure 6.5c in TIA Appendix 3 (Maps). The bus services which operate along Section 3 are outlined in Table 5.9.

Table 5.9: Section 3 – Bus Service Frequency Along Rathfarnham

Service Route	Route	Typical Service Frequency	
		Weekday	Weekend
14	Beaumont – St Joseph's School – Richmond Hill – Rathgar Road – Mount Carmel Hospital – Ballinteer – Dundrum Luas Station	15 minutes	15 minutes (Saturday), 20 minutes (Sunday)
15	Ballycullen Road – Templeougue Ashfield College – Terenure College – Rathmines – Dublin Eden Quay – Belmayne – Clongriffen Station	8 minutes	15 minutes
15A	Merrion Square – Dame Street – Rathmines – Rathgar Village – Terenure Road West – Kimmage Road West - Greenhills Limekiln Avenue	20 minutes	20 minutes (Saturday), 30 minutes (Sunday)
15B	Merrion Square South – Rathmines Road Lower – Rathgar Village – Terenure Meadow Bank – Ballyboden Boden Park – Stocking Hill – Knockylon Dalriada	15 minutes	15 minutes (Saturday), 20 minutes (Sunday)
15D	Merrion Square South – Dame Street – Rathmines Road Lower – Rathgar Village – Terenure Meadowbank – Rathfarnham Castle – Ballyboden Road – Ballyboden Church	2 services (15:00 and 16:45)	NA
16	Dublin Airport – Clogrhan Service Station – Drumcondra Rail Station – Terenure Cross – The Grande – Ballinteer	12 minutes	12 minutes (Saturday), 15 minutes (Sunday)
49	College Street – Harolds Cross – Rathgar Mount Tallant Avenue -Terenure College – Firhouse College – Belgard Square South	30 minutes	30 minutes (Saturday), 60 minutes (Sunday)
65	Poolberg Street – Richmond Hill – Templeogue Post Office – Templeogue Bridge – Cheeverstown House – Spawell Golf Range – Tallaght (The Square) – Jobstown – Saggart Road	60 minutes	90 minutes
65B	Poolberg Street – Richmond Hill – Templeogue Post Office – Templeogue Bridge – Greenfield Park – Old Bawn Road – Jobstown – Citywest	60 minutes	60 minutes

5.3.4.4 General Traffic

5.3.4.4.1 R114 Terenure Road East and R114 Rathgar Road

Section 3 of the Proposed Scheme runs from the R137 Terenure Road North at Terenure Cross junction to the four-arm junction at R114 Rathgar Road East and South, Grosvenor Road and Charleville Road. The extent of Section 3 is approximately 1.8km in length and travels through a predominately residential area between Terenure, Rathgar and Rathmines Village Centres. The route generally comprises one traffic lane in each direction and an additional bus lane (northbound only) from the junction with Brighton Road. The route travels in an east-west direction along R114 Terenure Road East before travelling in a predominantly south to north direction along R114 Rathgar Road. This section is subject to 50km/h speed limit.

The existing major junction arrangements along Section 3 of the Proposed Scheme are as follows:

- R114 Terenure Road East / Rathgar Avenue / R114 Rathgar Road / Orwell Road four- arm signalised junction;

- R114 Rathgar Road North and South / Frankfort Avenue / Leicester Avenue four- arm signalised crossroads junction; and
- R114 Rathgar Road East and South / Grosvenor Road / Charleville Road three- arm signalised junction.

R114 Terenure Road East / Rathgar Avenue / R114 Rathgar Road / Orwell Road four-arm signalised junction: This junction is located approximately 630m east of Terenure Cross. The R114 Terenure Road East arm has two entry lanes and one exit lane. The left lane entry is for left and ahead movements and the right lane for ahead movements only. No right turn movements onto Orwell Road are permitted. An advanced stacking location for cyclists is provided. The Rathgar Avenue arm has one entry lane and one exit lane. Right turns onto the R114 Terenure Road East are not permitted.

The R114 Rathgar Road arm has a two-lane entry and exit. The road markings are faded, but it can be seen that the left lane is for left turn movements only as there is a filter arrow phase. Therefore, the right lane is for ahead movements only. Right turns onto Rathgar Avenue are not permitted. This arm has a traffic island and Highfield Road gives way to the R114 Rathgar Road approximately 30.0m back from the stop line at the signals. An advanced stacking location is provided.

The Orwell Road arm has two narrow entry lanes (approximately 2.5m wide each) and one exit lane. The left lane is for left turn and ahead movements and the right lane is for right turn movements only. There is right turn filter arrow phase in addition to the left and ahead phase. The centre of the junction comprises a yellow box and advanced stacking locations on the main arms.

Highfield Road joins this junction, approximately 40m to the northwest. Highfield Road has a single lane for entering and exiting the junction respectively with generous corner radii. It is left turn only, therefore, right turn movements onto the R114 Rathgar Road northbound are not permitted. In addition, there is a left turn slip lane with parking bays for loading activities only. There is a yellow box in front of the Highfield Road arm across the two R114 Rathgar Road southbound lanes.

These characteristics are illustrated in Image 5.16.

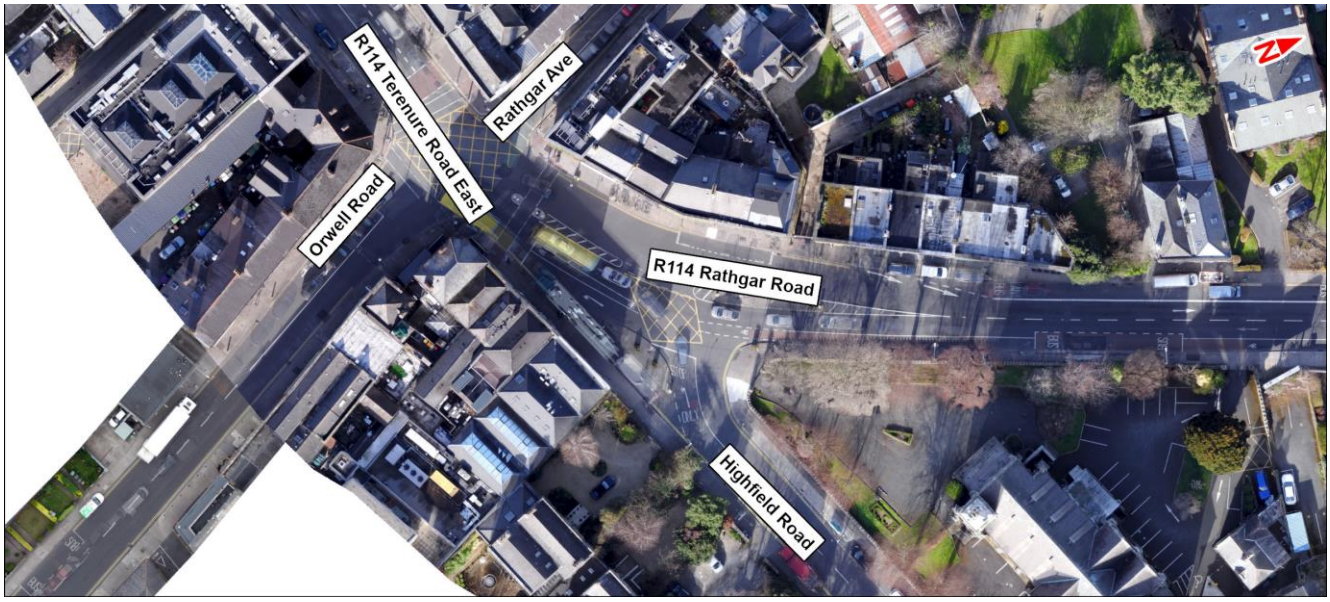


Image 5.16: R114 Terenure Road East / Rathgar Avenue / Orwell Road Junction

R114 Rathgar Road / Frankfort Avenue / Leicester Avenue four-arm signalised crossroads junction: This junction has one entry and exit lane on all arms except from the R114 Rathgar Road South arm which has a two-lane approach. The left entry lane is for left and ahead movements and the right lane is for ahead and right turn movements.

There are no traffic islands of filter phases at this junction. The centre of the junction comprises a yellow box and advanced stacking locations on the main arms. The cycle lanes continue through the junction as advisory lanes. These characteristics are illustrated by Image 5.17.

Image 5.17: R114 Rathgar Road / Frankfort Avenue / Leicester Avenue Junction

R114 Rathgar Road / Grosvenor Road / Charleville Road three-arm signalised junction: There is one-way entry into Charleville Road accessed from the junction. Grosvenor Road and the R114 Rathgar Road South arms both have one lane on entry and exit from the junction.

The R114 Rathgar Road East arm has two lane entry, with the left lane for left turn movements and the right lane for ahead movements only. Right turn onto Charleville Road is not permitted from this arm. The cycle lanes travelling southbound continues through the junction as an advisory lane.

The R114 Rathgar Road South has a traffic island between the entry and exit lanes. Right turn movements from Grosvenor Road to the R114 Rathgar Road South are not permitted. There is a yellow box in front of the Charleville Road access.

These characteristics are illustrated in Image 5.18.

Image 5.18: R114 Rathgar Road / Grosvenor Road / Charleville Road Junction

5.3.4.4.2 R137 Terenure Road North and R137 Harold's Cross Road

The existing major junction arrangements along the R137 Terenure Road North and R137 Harold's Cross Road are as follows:

- R137 Harold's Cross Road / Ashdale Road / Brighton Square staggered four-arm priority junction;
- Kenilworth Cross – R137 Harold's Cross Road North and South / Kenilworth Square North / Rathgar Avenue / Kenilworth Park five-am signalised junction; and
- R137 Harold's Cross Road / Leinster Road three-arm signalised junction.

R137 Harold's Cross Road / Ashdale Road / Brighton Square staggered four-arm priority junction: The R137 Harold's Cross Road is single carriageway with one traffic lane plus an on-road cycle lane travelling in each direction at this junction. There is a toucan crossing along the R137 Harold's Cross Road approximately 2.0m south of the Ashdale Road arm.

The Ashdale Road arm is approximately 5.5m wide and has a single lane approaching and existing the junction respectively. There is on-street parking on the southern side of the road, approximately 8.0m back from the stop line.

The Brighton Square arm is approximately 9.0m wide and has a single lane approaching and existing the junction respectively. There are on-street parking bays on the northern side of the road, approximately 8.5m back from the stop line. There is also a raised table across the stop line.

Along the R137 Harold's Cross Road, in front of the Ashdale Road and Brighton Square arms, there is a yellow box across both traffic lanes. These characteristics are illustrated in Image 5.19.

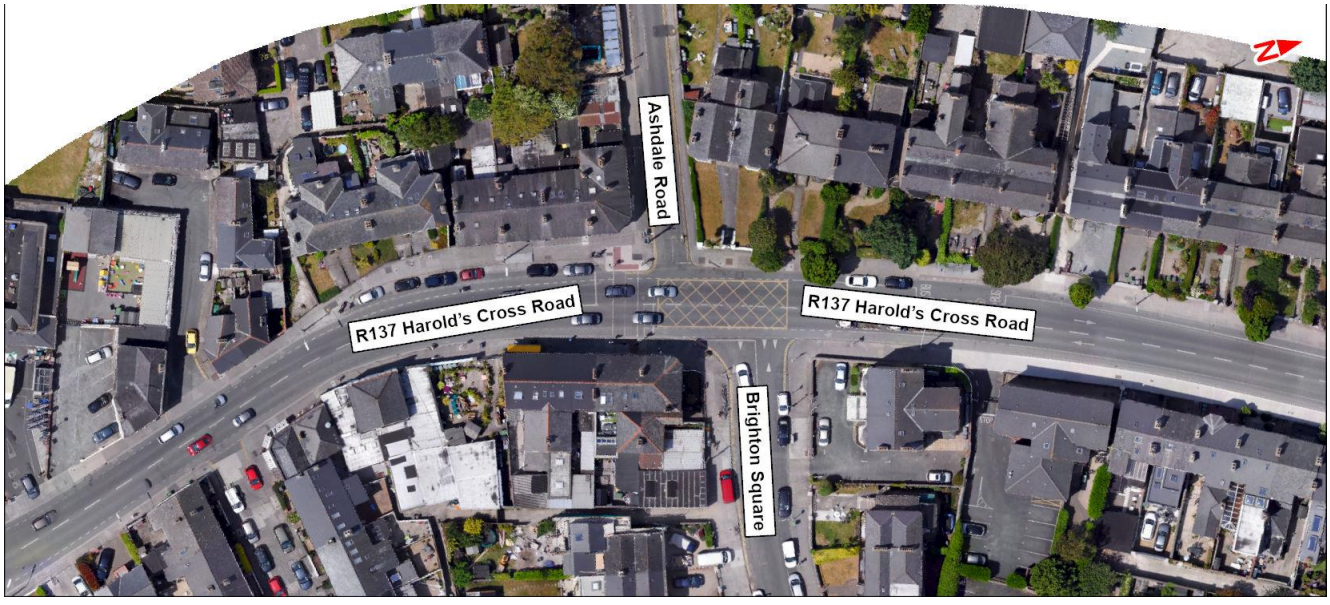


Image 5.19: R137 Harold's Cross Road / Ashdale Road / Brighton Square Priority Junction

R137 Harold's Cross Road North and South / Kenilworth Square North / Rathgar Avenue / Kenilworth Park five-am signalised junction: The R137 Harold's Cross Road North arm has two approach lanes and two exit lanes with the nearside exit lane a bus lane. Both approach lanes are allocated for ahead movements, and the nearside lane is also allocated for left turn movements. No right turn is permitted onto Kenilworth Park.

The R137 Harold's Cross Road South arm has two approach lanes and a wide single exit lane of approximately 4m (excluding the cycle lane). The left approach lane is allocated for left and ahead movements and the right lane is allocated for right and ahead movements.

The Kenilworth Square North arm a narrow two-lane approach (approximately 4.5m wide) and a single lane exit. The Rathgar Avenue arm has a single lane approach and exit from the junction with a traffic island separating the lanes.

The Kenilworth Park arm has two lanes approaching and exiting the junction. The left approach lane is allocated for left and ahead movements and the right lane is allocated for right and ahead movements. There is a yellow box along the R137 Harold's Cross Road for northbound and southbound movements, in front of the Kenilworth Park arm.

These characteristics are illustrated in Image 5.20.

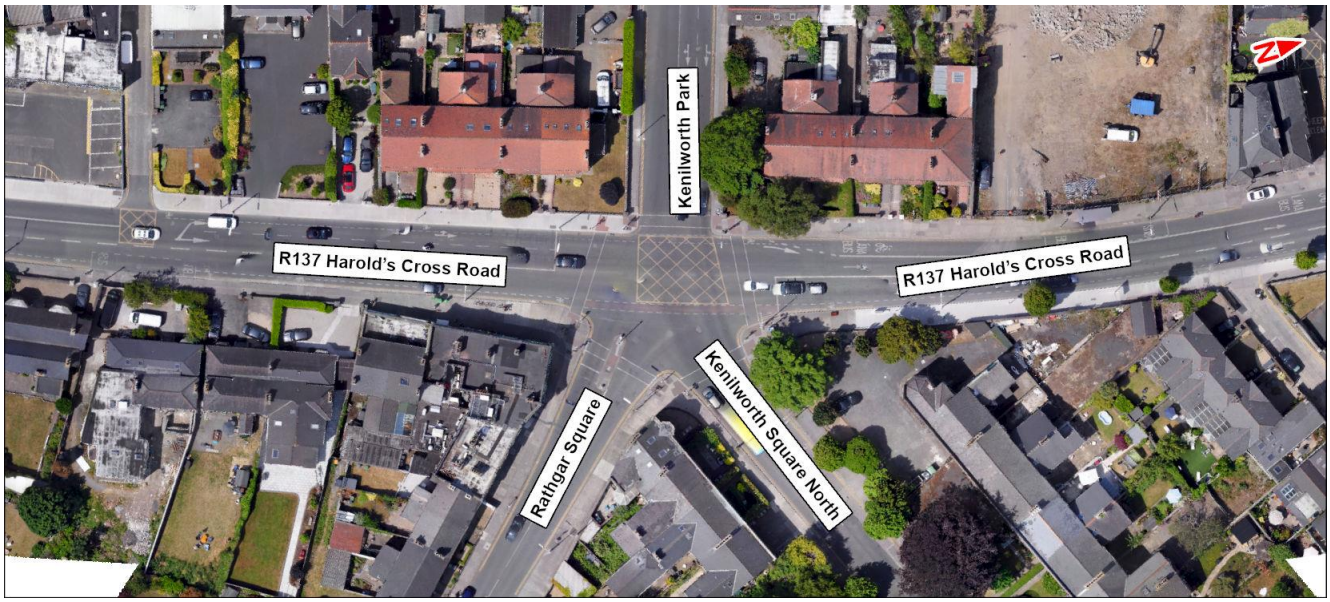


Image 5.20: Kenilworth Cross Junction

R137 Harold's Cross Road / Leinster Road three-arm signalised junction: The R137 Harold's Cross North and South arms have a single lane approaching and exiting the junction with advanced stacking locations for cyclists provided. Cycle lanes continue along the R137 Harold's Cross Road through the junction. The Leinster Road arm has a two lane approach and single lane exit without any facilities for cyclists. Left turning movements are permitted from the nearside lane only and right turning movements are permitted from the outside lane only.

These characteristics are illustrated in Image 5.21.

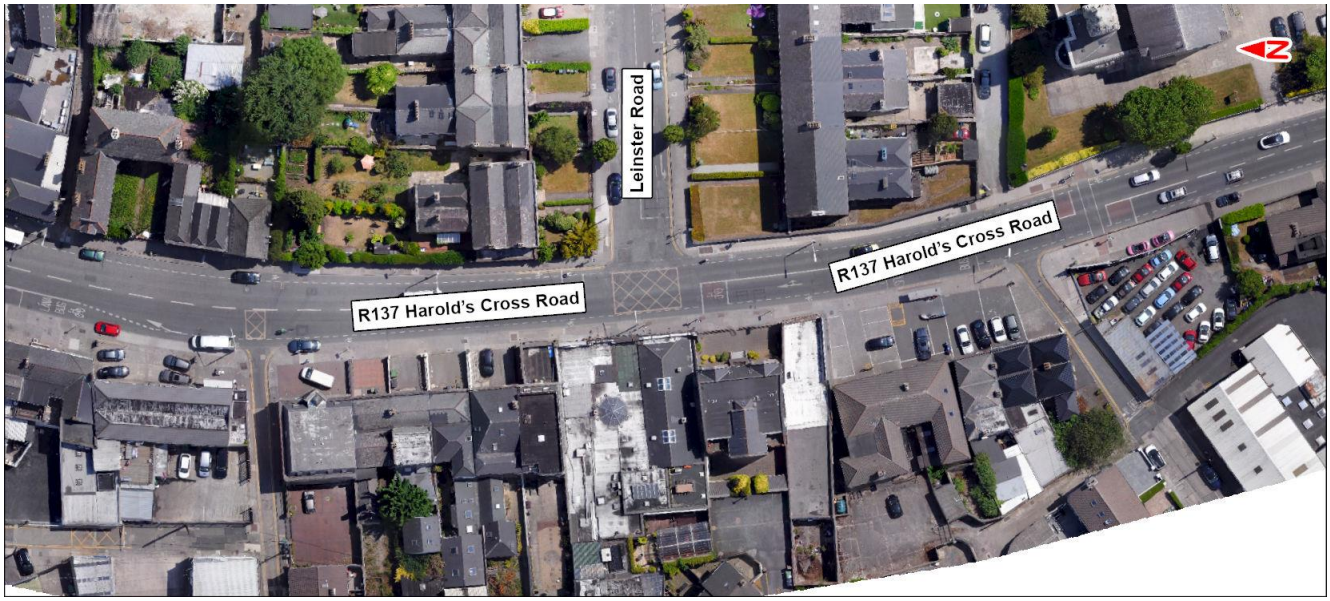


Image 5.21: R137 Harold's Cross Road / Leinster Road Junction

5.3.4.5 Existing Parking / Loading

The majority of Section 3 of the Proposed Scheme is free of on-street parking and loading due to the residential nature of the area and that most properties have driveways leading off the main road to park their vehicles. There are no double yellow line road markings, therefore, occasional parked vehicles are observed within the bus lane (which is only in operation on weekday peaks).

Parking can be found at the following locations along Section 3 of the Proposed Scheme:

- Six pay and display spaces and one disabled space on Terenure Road East, west of the Rathgar Avenue / Orwell Road junction;
- Six pay and display and permit spaces and six loading bay spaces on Rathgar Road, at the Highfield Road junction;
- Two shared loading bays/ pay and display parking spaces and two further pay and display parking spaces on Terenure Road North between Terenure Place and Yewland's Terrace;
- Two shared loading bays/ pay and display parking spaces and nine further pay and display parking spaces on Terenure Road North between Yewland's Terrace and Rathmore Villas;
- Five pay and display parking spaces and four taxi rank spaces on Terenure Road North between Rathmore Villas and Eagle Hill Avenue;
- Two shared loading bays/ pay and display parking spaces and two further pay and display parking spaces on Terenure Road North between Eagle Hill Avenue and Whitton Road;
- Six pay and display and permit spaces on Terenure Road North between West Hampton Place and Ashdale Road;
- Fifteen pay and display and permit spaces on Harold's Cross Road between Ashdale Road and Mount Tallant; and
- Eight pay and display spaces on Harold's Cross Road between Kenilworth Lane West and Leinster Road.

There are several side streets with designated pay and display and permit parking, with direct access from this corridor.

5.3.5 Section 4 – Charleville Road to Dame Street

This Section outlines the baseline environment for walking, cycling, bus services, general traffic and parking / loading facilities along Section 4 of the Proposed Scheme, between Charleville Road and the R137 Dame Street. This Section of the Proposed Scheme runs from the four-arm junction between R114 Rathgar Road, Grosvenor

Road and Charleville Road to the end of the Rathfarnham to City Centre section of the Proposed Scheme at the R137 Dame Street.

Section 3 of the Proposed Scheme is approximately 2.6km long and travels northwards through an urban residential and retail area between Rathmines Village centre and the south of the City Centre.

5.3.5.1 Pedestrian Infrastructure

There is continuous footway provision on both sides of the carriageway along this final section. Along the frontage of the retail units in Rathmines Village Centre, the footway is approximately 3.0m wide which is considered adequate for an area with a mid-high level of pedestrian activity in accordance with DMURS.

Outside of Rathmines Village, where there is a more residential nature, the footway reduces to approximately 1.8m wide which is considered adequate as there is likely to be less pedestrian activity here. Public street lighting is provided throughout. There is generally wide and smooth footways on both sides of the carriageway to the north of Canal Road, along the frontage for various retail units.

Given the urban nature of this section of route, there are numerous uncontrolled crossings across priority junctions that benefit from dropped kerbs and a large number of controlled pedestrian crossings along this Proposed Scheme section which benefit from tactile paving and dropped kerbs which can be found at the following locations:

- At the R114 Rathgar Road and R820 Rathmines Road Upper arms of the three-arm signalised junction (pelican crossings). The crossing of R114 Rathgar Road is split into two stages and the crossings of Rathmines Road Upper is split into three stages, one of which is staggered with pedestrian refuge on the traffic island and with guard rails;
- At the R114 Rathmines Road Lower North and Castlewood Avenue arms of the three-arm priority junction there are pelican crossings. This includes pedestrian refuge on the traffic island in the R114 Rathmines Road Lower North arm and a tactile paving build-out at the corner between here and Castlewood Avenue to aid pedestrian movement;
- At the R114 Rathmines Road Lower South and Leinster Road arms of the three-arm signalised junction (pelican crossings without guard rails);
- Across the R114 Rathmines Road Lower adjacent to Aldi Supermarket, approximately 30.0m north of the priority junction with Williams park (pelican crossing without guard rails);
- Across the R114 Rathmines Road Lower prior to the priority junction with Military Road (pelican crossing without guard rails);
- Across the R114 Rathmines Road Lower approximately 25m north of the priority junction with Lissenfield and adjacent to the Church of Mary (pelican crossing without guard rails); and
- Across three arms of the R114 Richmond Street South / R111 Cheltenham Place / R114 Rathmines Road Lower / R111 Grove Road four arm signalised crossroads junction (on all arms except the R114 Rathmines Road Lower arm) (pelican crossing without guard rails).
- At the R114 Richmond Street South and Charlemont Mall arms of four arm signalised junction immediately north of the canal (pelican crossings without guard rails);
- Across the R114 Richmond Street South approximately 50m north of the R114 / Charlemont Mall / Richmond Row four arm signalised junction (pelican crossing without guard rails);
- At two arms of the R114 Camden Street Upper / R114 Harcourt Road / R114 Richmond Street South / R811 Harrington Street four arm signalised junction (all arms except the R114 Camden Street Upper arm and R811 Harrington Street arm, which has an unsignalised crossing) (pelican crossing without guard rails);
- On the minor slip road to the south of the R114 Camden Street Upper / R114 Harcourt Road / R114 Richmond Street South / R811 Harrington Street four arm signalised junction (Richmond Street South/ Richmond Street South);
- At two arms of the R114 Camden Street Lower / R811 Charlotte Way / R114 Camden Street Upper three-way signals (across the R114 Camden Street Lower and Upper arms). This is a staggered pelican crossing which splits each crossing into two stages across one large central traffic island with pedestrian refuge (without guard rails);
- Across the R114 Camden Street Lower approximately 60m north of priority junction with Grantham Street (pelican crossing without guard rails);

- Across the R114 Camden Street Lower, immediately north of priority junctions with Pleasants Street and Camden Place (pelican crossing without guard rails);
- At each arm of the R114 Redmonds Hill / R110 Cuffe Street / R114 Wexford Street / R110 Kevin Street Lower four arm signalised junction (pelican crossings without guard rails). Crossings of the R114 Wexford Street and R110 Kevin Street Lower arms are each split into two stages with pedestrian refuge on the traffic islands due to slip lanes. The crossings of the R114 Redmonds Hill and R110 Cuffe Street and each split into three stages with pedestrian refuge on the traffic islands due to slip lanes;
- Across the R114 Aungier Street immediately north of the Whitefriar Place and York Street priority junctions (pelican crossing without guard rails);
- At three arms of the R114 Aungier Street North and South / Longford Street Little / Longford Street Great four arm signalised crossroads junction (all but the R114 Aungier Street South arm) (pelican crossing without guard rails);
- At all arms of the R114 South Great George's Street / Stephen Street Lower / R114 Augier Street / Stephen Street Upper four arm signalised crossroads junction (pelican crossing without guard rails);
- Across the R114 South Great George's Street arm immediate north of the priority junction with Exchequer Street (pelican crossing with pedestrian refuge island and without guard rails); and
- At each arm of the R137 Dame Street East and West / R114 South Great George's Street three arm signalised junction (pelican crossing without guard rails).

Uncontrolled crossings across priority junctions at side roads benefit from dropped kerbs. The locations of the pedestrian crossings are illustrated in Figure 6.3d in TIA Appendix 3 (Maps).

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

5.3.5.2 Cycling Infrastructure

Existing cycle facilities along Section 4 of the Proposed Scheme are as follows:

- On-road cycle lanes travelling southbound approximately 1.75m wide between Charleville Road and R111 Canal Road;
- Intermittent on-road cycle lanes approximately 1.75m wide in both directions between R111 Canal Road and R137 Dame Street. Where there is no cycle lane, cyclists share the road with a bus lane;
- On-road mandatory cycle lanes and a clearway operational 24 hours a day, travelling northbound between Charlemont Mall and R811 Harrington Street (approximately 260m length); and
- On-road advisory cycle lanes or shared cycle and bus lanes travelling northbound between the R811 Harrington Street to R137 Dame Street. Travelling southbound, they are typically advisory or within the bus lane.

Given the urban nature of Section 4 of Proposed Scheme, there are numerous cycle parking locations along the R114 at regular intervals. Within Rathmines Village Centre, there are approximately 86 Sheffield stands (able to accommodate up to 172 bicycles). Between the R111 Canal Street and R110 Cuffe Street, there are approximately 93 Sheffield stands (able to accommodate up to 186 bicycles). Finally, between the R110 Cuffe Street and R137 Dame Street, there are approximately 69 Sheffield stands (able to accommodate up to 138 Bicycles) and five 'Hoop' stands.

In addition, the DublinBikes cycle hire scheme has numerous bicycle stations along the neighbouring streets of the R114 between the R111 Canal Street and R137 Dame Street.

The existing cycle facilities along Section 4 of the Proposed Scheme are illustrated in Figure 6.4d in TIA Appendix 3 (Maps).

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

5.3.5.3 Bus Infrastructure

5.3.5.3.1 Bus Priority Measures

Bus lanes are intermittent along this route, but are present at the following locations:

- Northbound from Swanville Place to Lennox Street, operating Monday to Saturday between 07:00 – 10:00 and 12:00 – 19:00;
- Southbound between the R114 Harcourt Road and Camden Place, operating Monday to Saturday between 07:00-10:00 and 12:00-19:00;
- Northbound between Grantham Street and Camden Row, operating Monday to Saturday between 07:00-10:00 and 12:00-19:00;
- Southbound between the R110 Cuffe Street and Longford Street Lower, operating Monday to Saturday between 07:00 – 19:00; and
- Northbound between Stephen Street Upper and the R137 Dame Street, operating Monday to Saturday between 07:00 – 19:00.

5.3.5.3.2 Bus Stop Facilities

There are 24 bus stops along Section 4 of the Proposed Scheme. The inbound City Centre stops are as follows:

- Stop 1170/4527 on R114 Rathgar Road, 50m east of Charleville Road;
- Stop 1069 on R114 Rathmines Road Lower, 40m south of Leinster Square;
- Stop 1070 on R114 Rathmines Road Lower, 20m south of Williams Park;
- Stop 1071 on R114 Rathmines Road Lower, 15m north of Richmond Hill;
- Stop 4528 on R114 Rathmines Road Lower, 30m south of Grove Park;
- Stop 1072 on R114 Richmond Street South, 40m south of Lennox Street;
- Stop 7577 on R114 Camden Street Lower, 20m south of Grantham Street;
- Stop 1352 on R114 Camden Street Lower, 40m north of Grantham Street;
- Stop 1353 on R114 Camden Street Lower, 60m north of Pleasants Street;
- Stop 1354 on R114 Aungier Street, 60m north of Peter Row;
- Stop 1355 on R114 Aungier Street, 50m north of Whitefriar Place;
- Stop 7578 on R114 South Great George's Street, 25m north of Fade Street; and
- Stop 1357 on R114 South Great George's Street, 45m north of Fade Street.

The outbound stops are:

- Stop 1282 on R114 South Great George's Street, 20m north of Fade Street;
- Stop 4456 on R114 Aungier Street, 40m north of Whitefriar Place;
- Stop 7579 on R114 Redmond's Hill, 30m south of Digges Street Upper;
- Stop 1285 on R114 Camden Street Lower, 30m north of Grantham Street;
- Stop 1016 on R114 South Richmond Street, 30m south of Lennox Street;
- Stop 1017 on R114 Rathmines Road Lower, 20m north of Grove Park;
- Stop 1018 on R114 Rathmines Road Lower, opposite Lissenfield;
- Stop 1019 on R114 Rathmines Road Lower, 50m south of Military Road;
- Stop 1020 on R114 Rathmines Road Lower, opposite Williams Park;
- Stop 1076 on R114 Rathmines Road Lower, 40m north of Swanville Place; and
- Stop 1077 on R114 Rathgar Road, 40m west of Rathmines Road Upper.

Approximately half of the bus stops along this section provide shelters and seating and all but one of the bus stops are accommodated inline along the carriageway, with the exception of Bus Stop 1070 in Rathmines.

Other than the above locations, there is no bus lane provision along this route. Therefore, there is very limited bidirectional bus lane provision along this section.

Table 5.10 outlines the availability of bus stop facilities at the existing 24 bus stops between Charleville Road and the R137 Dame Street.

Table 5.10: Section 4 – Availability of Bus Stop Facilities (of a Total 24 no. Bus Stops)

Bus Stop Facility	Number of Bus Stops in Baseline with Facility	Percentage of Bus Stops in Baseline with Facility
RTPI	19	79%
Timetable information	23	96%
Shelter	14	58%
Seating	13	54%
Accessible Kerbs	22	92%
Indented Drop Off Area	1	4%

The existing bus facilities along Section 4 of the Proposed Scheme are illustrated in Figure 6.5a in in TIA Appendix 3 (Maps). The bus services which operate along Section 1 are outlined in Table 5.11.

Table 5.11: Section 4 – Bus Service Frequency

Service Route	Route	Typical Service Frequency	
		Weekday	Weekend
9	Charlestown – Jamestown – Ballymun Road – Phibsboro Shopping Centre – Harold's Cross – Limekiln Avenue	15 minutes	15 minutes
14	Beaumont – St Joseph's School – Richmond Hill – Rathgar Road – Mount Carmel Hospital – Ballinteer – Dundrum Luas Station	15 minutes	15 minutes (Saturday), 20 minutes (Sunday)
15	Ballycullen Road – Templeougue Ashfield College – Terenure College – Rathmines – Dublin Eden Quay – Belmayne – Clongriffen Station	8 minutes	15 minutes
15A	Merrion Square – Dame Street – Rathmines – Rathgar Village – Terenure Road West – Kimmage Road West - Greenhills Limekiln Avenue	20 minutes	20 minutes (Saturday), 30 minutes (Sunday)
15D	Merrion Square South – Dame Street – Rathmines Road Lower – Rathgar Village – Terenure Meadowbank – Rathfarnham Castle – Ballyboden Road – Ballyboden Church	2 services (15:00 and 16:45)	NA
15B	Merrion Square South – Rathmines Road Lower – Rathgar Village – Terenure Meadow Bank – Ballyboden Boden Park – Stocking Hill – Knockylon Dalriada	15 minutes	15 minutes (Saturday), 20 minutes (Sunday)
16	Dublin Airport – Clogrhan Service Station – Drumcondra Rail Station – Terenure Cross – The Grande – Ballinteer	12 minutes	12 minutes (Saturday), 15 minutes (Sunday)
18	Palmerstown – Crumlin Hospital – Harolds Cross – Terenure – Rathmines – Dublin City South – Ballsbridge – Sandymount Station	20 minutes	20 minutes
65	Poolberg Street – Richmond Hill – Templeogue Post Office – Templeogue Bridge – Cheeverstown House – Spawell Golf Range – Tallaght (The Square) – Jobstown – Saggart Road	60 minutes	90 minutes
65B	Poolberg Street – Richmond Hill – Templeogue Post Office – Templeogue Bridge – Greenfield Park – Old Bawn Road – Jobstown – Citywest	60 minutes	60 minutes
68	Hawkins Street – Canal Bridge – Bluebell – Castle Park – Woodlands – Peamount Road – Greenogue Business Park	60 minutes	75 minutes
68A	Hawkins Street – Whitefriars Street – Victoria Street – National Stadium – Rialto Church – Goldenbridge Avenue – Bulfin Road	3 Services (16:00; 17:00; 18:15)	NA
83	Harristown – Grove Park – Phibsboro Shopping Centre – Wood Quay – Rathmines Road – Stannaway Avenue	10 minutes	15 minutes
83A	Harristown – Grove Park – Phibsboro Shopping Centre – Wood Quay – Rathmines Road – Stannaway Avenue	60 minutes	60 minutes
122	Ashington – Cabra Road – South Circular Road – Drimnagh Road	10 minutes	20 minutes
140	Ballymun IKEA – Mellows Park – Fingals Road –Phibsboro Shopping Centre – Richmond Hill - Rathmines	15 minutes	15 minutes (Saturday), 20 minutes (Sunday)
142	Wendell Avenue – Malahide Station – Docklands Convention Centre – Merrion Square West - Rathmines Road Upper – University College of Dublin	5 Services (Every 10 minutes between 07:10 and 07:55)	NA

5.3.5.4 General Traffic

Between Charleville Road and the R111 Canal Road, the R114 comprises Rathgar Road and Rathmines Road Lower which is a continuous single carriageway road generally with one lane travelling in each direction and an additional bus lane travelling northbound only. The road travels in a south to north direction and is subject to 50km/h speed limit.

Between the R111 Canal Road and R137 Dame Street, the R114 generally comprises three traffic lanes; one lane of traffic in each direction with an additional bus lane intermittently in the northbound and southbound directions. In many sections the opposing lanes are segregated by lit bollards and / or a white hatched central reservation. The speed limit reduces to 30km/h closer to the City Centre from the junction with R811 Harcourt Road.

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

- R114 Rathgar Road and Rathmines Road Lower / R820 Rathmines Road Upper three-arm signalised junction;
- R114 Rathmines Road Lower North and South / Castlewood Avenue three-arm signalised junction;
- R114 Rathmines Road Lower North and South / Leinster Road three-arm signalised junction;
- R114 Rathmines Road Lower / Military Road / Richmond Hill staggered four-arm priority junction;
- R114 Richmond Street South / R111 Canal Road / R114 Rathmines Road Lower / R111 Grove Road four-arm signalised crossroads junction;
- R114 Richmond Street South / Charlemont Mall / Richmond Row four-arm signalised junction;
- R114 Camden Street Upper / R114 Harcourt Road / R114 Richmond Street South / R811 Harrington Street four-arm signalised crossroads junction;
- R114 Camden Street Lower / R811 Charlotte Way junction three-way signals junction;
- R114 Redmonds Hill / R110 Cuffe Street / R114 Wexford Street / R110 Kevin Street Lower four-arm signalised junction with slip lanes;
- R114 Aungier Street North and South / Longford Street Lower / Longford Street Little four-arm signalised junction;
- R114 South Great George's Street / Stephen Street Lower / R114 Aungier Street / Stephen Street Upper four-arm signalised junction; and
- R137 Dame Street East and West / R114 South Great George's Street three-arm signalised junction.

R114 Rathgar Road / R114 Rathmines Road Lower / R820 Rathmines Road Upper three arm signalised junction: This junction is located in Rathmines Village Centre. The R114 Rathmines Road Lower arm has two lanes on entry and exit from the junction respectively. The left lane is for left turn movements and the right lane is for ahead movements. There is a left turn filter phase when turning onto the R820 Rathmines Road Upper. Cyclists making this left turn can bypass the signals.

The R820 Rathmines Road Upper arm has a three-lane entry and one lane exit from the junction. The left lane is for left turn movements onto the R114 Rathgar Road and is controlled by a separate signal head on a traffic island to the right turn lanes onto the R114 Rathmines Road Lower. The right turn lanes are separated from the exit lane by another traffic island.

The R114 Rathgar Road arm has two entry lanes and a single exit lane. The left lane is for ahead movements only and the right lane is for ahead and right turn movements onto R820 Rathmines Road Upper. There is a traffic island between the entry and exit lanes. There is a yellow box between the R114 Rathgar Road entry and exit lanes onto the R114 Rathmines Road Lower.

These features are illustrated in Image 5.22.

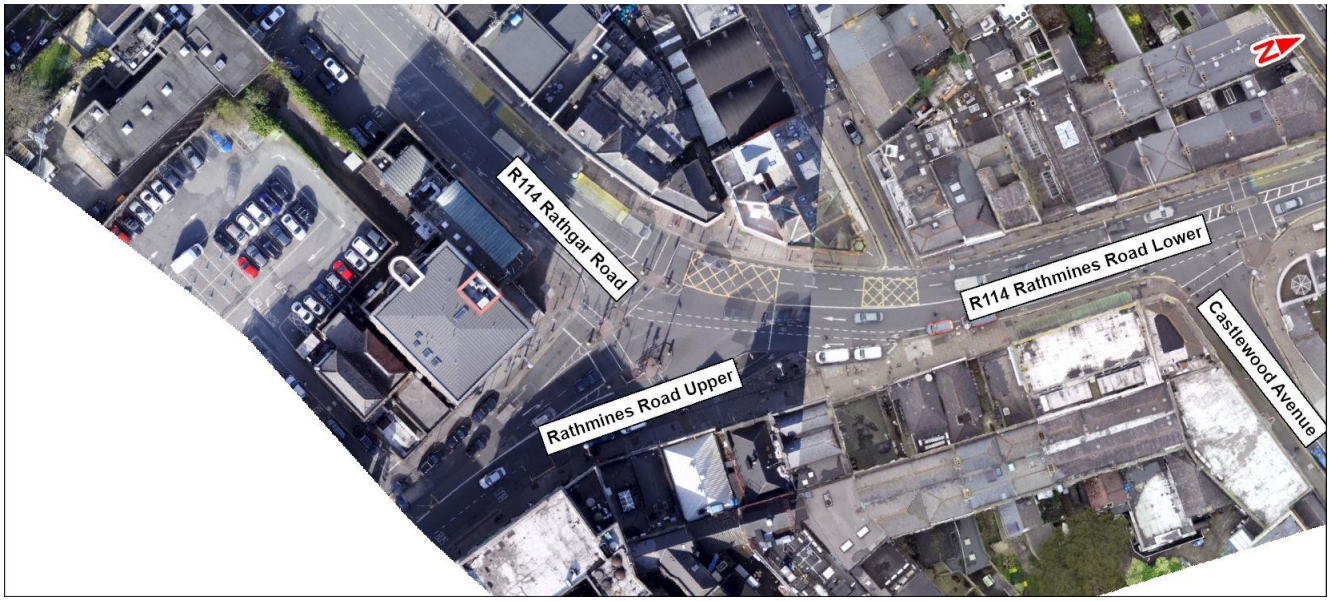


Image 5.22: R114 Rathgar Road / R114 Rathmines Road Lower / R820 Rathmines Road Upper Junction

R114 Rathmines Road Lower / Castlewood Avenue three-arm signalised junction: The R114 Rathmines Road Lower North arm has one entry lane and one exit lane, plus an on-road cycle lanes in both directions. The entry and exit lane are separated by a traffic island. Left turn movements to Castlewood Avenue are not permitted.

The R114 Rathmines Road Lower South has two entry lanes, the left lane for ahead movements and the right lane for right turn movements, and a single exit lane. There are signal heads for the ahead movement and right turn movement onto Castlewood Avenue, to provide separate green phases for these movements. There are cycle lanes in both directions that continue through the junction.

The Castlewood Avenue arm has a one entry and exit lane respectively. It is left turn only from this arm onto the R114 Rathmines Road Lower South, therefore, this movement can share green time with the R114 Rathmines Road Lower South ahead and right turn movements.

These features are illustrated in Image 5.23.

Image 5.23: R114 Rathmines Road Lower / Castlewood Avenue Junction

R114 Rathmines Road Lower / Leinster Road three-arm signalised junction: This junction is located approximately 250m north of the previous junction. The R114 Rathmines Road Lower North arm comprises two entry lanes, the right of which is a right turn flare lane of approximately 25m in length and has a right turn filter phase. The left lane is for ahead movements only and the exit onto this arm is a single lane. An advanced stacking location for cyclists is provided.

The R114 Rathmines Road Lower South arm has two entry lanes and one exit lane. The left lane is for left turn movements onto Leinster Road and the right lane is for ahead movements. The signals operate a left turn filter phase.

Leinster Road has one lane on entry and exit from the junction. Left turn movements onto the R114 Rathmines Road Lower North are permitted only. There is a yellow box in the centre of the junction.

These features are illustrated in Image 5.24.

Image 5.24: R114 Rathmines Road Lower / Leinster Road Junction

R114 Rathmines Road Lower / Military Road / Richmond Hill staggered four-arm priority junction: The R114 Rathmines Road Lower has two lanes travelling northbound, a bus lane and general traffic lane, and one traffic lane plus an on-road cycle lane travelling southbound. There is a signalised pedestrian crossing approximately 13.0m south from the Military Road arm.

Military Road is approximately 8.5m wide and has no lane / stop line road markings. There is a loading bay on the southern side of the road approximately 10.0m back from the assumed stop line, and on-street parking on both sides of the road approximately 25.0m back from the stop line. There is a yellow box in front of the Military Road arm across all traffic lanes of R114 Rathmines Road Lower.

Richmond Hill is approximately 6.0m wide and has no lane / stop line road markings. Double yellow lines are present on both sides of the road. There is a yellow box in front of the Richmond Hill arm over the R114 Rathmines Road Lower southbound traffic lane.

These features are illustrated in Image 5.25.

Image 5.25: R114 Rathmines Road Lower / Military Road / Richmond Hill Priority Junction

R114 Richmond Street South / R111 Canal Road / R114 Rathmines Road Lower / R111 Grove Road four arm signalised crossroads junction: This junction is immediately south of Lock C7 of the Grand Canal. Both R114 Richmond Street South and Rathmines Street Lower arms of the junction have two entry lanes, the left lane for left and ahead movements and the right lane for ahead movements only. Right turns are not permitted from either arm.

The R114 Richmond Street South arm has a single exit lane and the R114 Rathmines Street Lower has a single exit lane that is approximately 6.0m wide, therefore wide enough for two vehicles side-by-side which merges into one lane of traffic approximately 20.0m away from the junction.

The R111 Canal Road and Grove Road arms each have one entry and exit lane. Right turn movements from the R111 Grove Road to the R114 Rathmines Road Lower are not permitted, but vehicles can turn right between the R111 Canal Road and the R114 Richmond Street South. The centre of the junction has yellow box and advisory cycle lanes continue through the junction between the R111 Canal Road and Grove Road. All arms except Rathmines Road Lower provide advanced stacking locations for cyclists. The features of the junction are illustrated in Image 5.26.

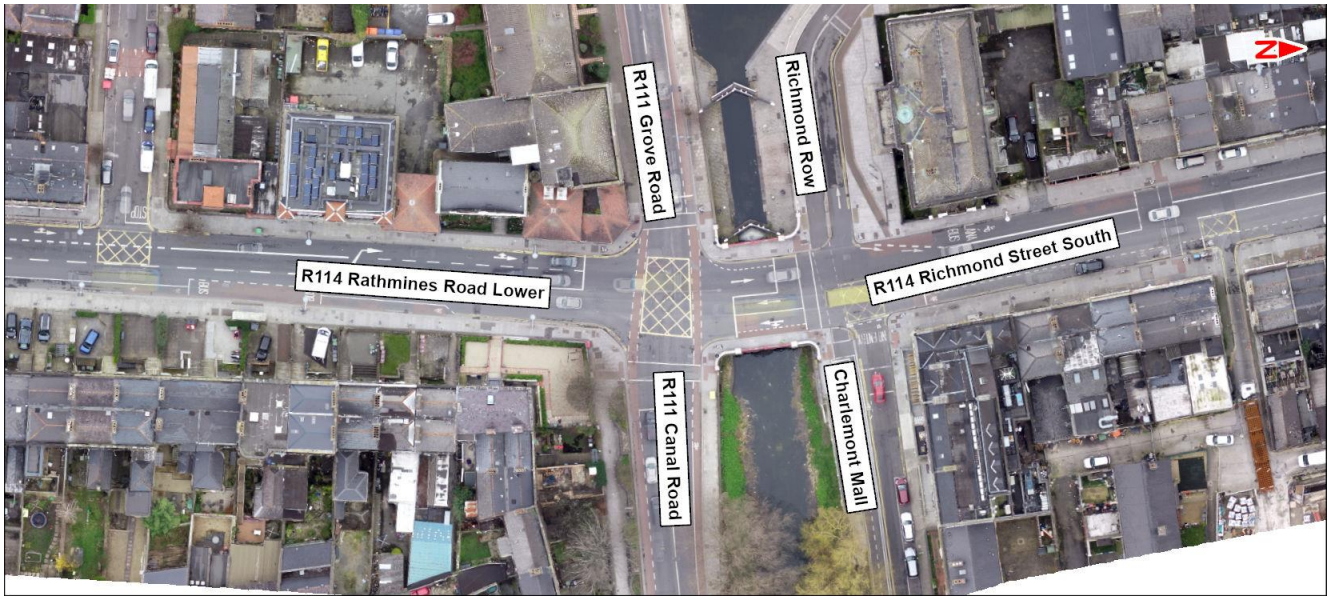


Image 5.26: Richmond Street South / R111 Canal Road / R114 Rathmines Road Lower / R111 Grove Road Signalised Junction

R114 Richmond Street South / Charlemont Mall / Richmond Row four arm signalised junction: The R114 Richmond Street South arms of the junction comprises one lane entry and two-lane exit. Vehicles can either travel ahead to continue along the R114 or turn into Richmond Row.

Charlemont Mall and Richmond Row are one-way westbound and comprises a single traffic lane of approximately 3.5m wide and a bi-directional segregated cycle track. There a is yellow box in the centre of the junction between the Richmond Street South and Charlemont Mall approaches and advanced stacking locations. These features are illustrated in Image 5.27.

Image 5.27: R114 Rathmines Road Lower / R111 Grove Road / R111 Cheltenham Place Junction and R114 Richmond Street South / Charlemont Mall / Richmond Row Junction

R114 Camden Street Upper / R114 Harcourt Road / R114 Richmond Street South / R811 Harrington Street four arm signalised crossroads junction: The R114 Camden Street Upper has one entry lane (for buses and cyclists only) and two exit lanes separated by hatched white road markings.

The R114 Harcourt Road is one-way traveling westbound and there are four lanes entering the junction, two of which are for ahead movements as left turns onto the R114 Richmond Street South are not permitted at the junction, and two are for turning right onto The R114 Camden Street Upper. The lanes are separated by a traffic island. There is a left turn slip road that joins the R114 Richmond Street South prior to the signalised junction.

The R114 Richmond Street South has two entry lanes and one exit lane for buses and cyclists only, separated by lit bollards. The left lane is for left and ahead movements and the right lane is for ahead movements. General traffic (i.e. all but buses and cyclists) wishing to travel southbound must route in a circular motion around Harcourt Centre, using Harcourt Street and the left turn followed by yield to the R114 Richmond Street South.

The R811 Harrington Street has two entry lanes and two exit lanes that merge into a single lane shortly after the junction. The entry and exit lanes are separated by a traffic island. Both entry lanes are for left turn movements onto the R114 Camden Street Upper, given the one-way system here.

There are two yellow boxes between the R114 Harcourt Road entry / R811Harrington Street exit, and the R114 Richmond Street South entry / R114 Camden Street Upper exit.

These features are illustrated by Image 5.28.

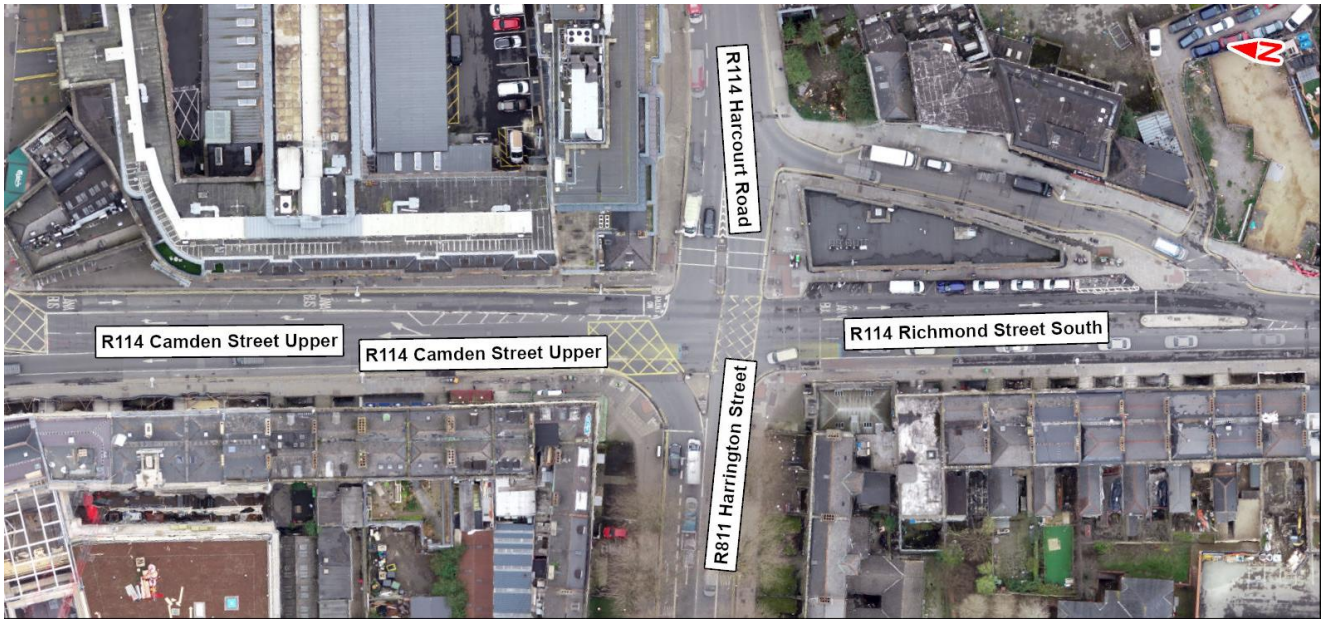


Image 5.28: R114 Camden Street Upper / R114 Harcourt Road / R114 Richmond Street South / R811 Harrington Street Junction

R114 Camden Street Lower / R811 Charlotte Way junction 3-way signalised junction: This junction facilitates the one-way system around Harcourt Centre. Buses and cyclists only can travel southbound along the R114 Camden Street Upper, therefore, there is one lane for buses making the ahead movements a one lane for all other vehicles turning left onto the R811 Charlotte Way which are controlled by separate signal timings.

The R114 Camden Street Upper travelling northbound has three lanes, two for making the right turn movement onto the R811 Charlotte Way and one for straight ahead movements.

The R811 Charlotte Way is one-way travelling eastbound and is approximately 10.0m wide, therefore able to accommodate three cars side-by-side. There are two yellow boxes between the R144 Camden Street Lower onto the R811 Charlotte Way.

These features are illustrated in Image 5.29.

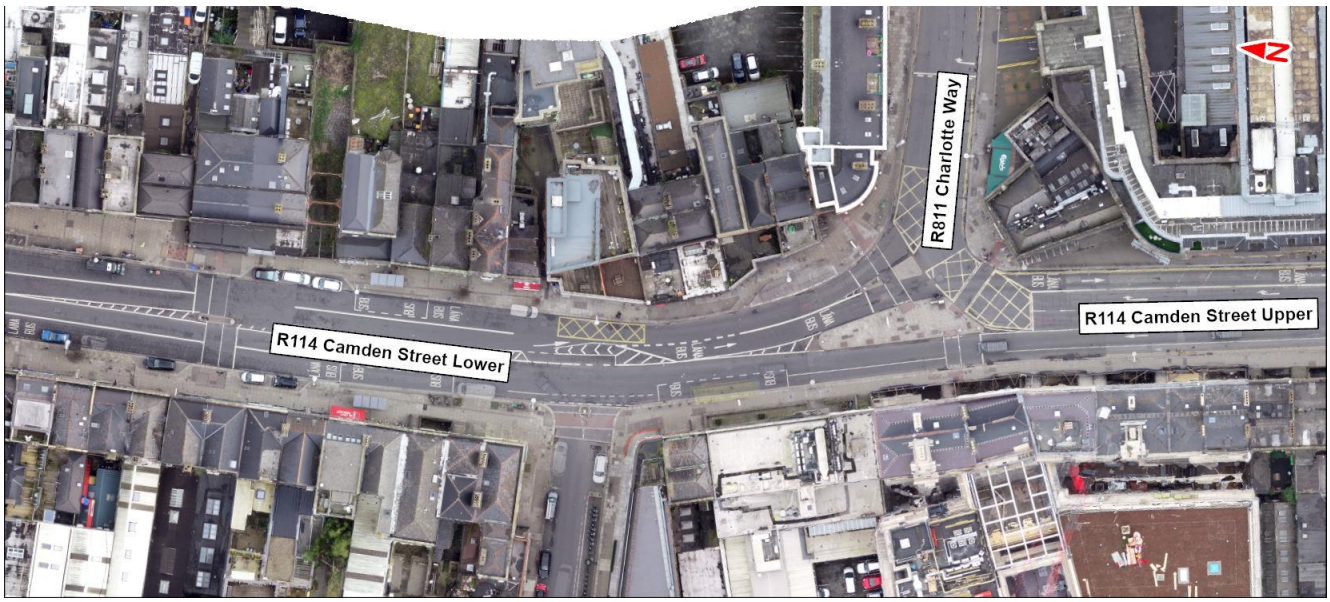


Image 5.29: R114 Camden Street Lower / R811 Charlotte Way Junction

R114 Redmonds Hill / R110 Cuffe Street / R114 Wexford Street / R110 Kevin Street Lower four arm signalised junction with slip lanes: The R114 Redmonds Hill arm has a two lane entry with an additional left slip lane onto the R110 Cuffe Street, which yields to the R110 Cuffe Street but also has a signal to allow pedestrian crossing movements. The two lanes are for ahead movements, with the left lane for buses only. Right turn movements onto the R110 Kevin Street Lower are not permitted.

The R110 Cuffe Street arm is a dual carriageway with three lanes entering the junction and two lanes exiting. The left lane is for left and ahead movements, the centre land is for ahead movements only and the right lane is for right movements only. The left lane flares to become a left slip lane yielding to the R114 Wexford Street with a signal to allow pedestrian crossing movements.

The R114 Wexford Street has one entry and exit lane respectively and the possible movements are left or ahead only.

The R110 Kevin Lower Street has one entry and exit lane respectively, but also includes a left slip lane which yields to the R114 Redmonds Hill but has a signal to allow pedestrian crossing movements. Right turn movements from the R110 Kevin Street Lower onto the R114 Wexford Street are not permitted.

The centre of the junction comprises a yellow box and the cycle lanes continue through the junction as advisory lanes between the R114 Redmonds Hill and Wexford Street, and from the R110 Kevin Street Lower to Cuffe Street.

These features are illustrated by Image 5.30.

Image 5.30: R114 Redmonds Hill / R110 Cuffe Street / R114 Wexford Street / R110 Kevin Street Lower Junction

R114 Aungier Street / Longford Street Lower / Longford Street Little four arm signalised junction: Longford Street Lower and Longford Street Little are both one-way travelling westbound. Longford Street Lower comprises two entry lanes, the left for left turn and ahead movements and the right for ahead and right turn movements. The exit lane onto Longford Street Little is a single lane of approximately 6.0m wide which can accommodate two vehicles side-by-side.

The R114 Aungier Street North arm has one entry and exit lane respectively and there is an advanced stacking location. Left turn movements are not permitted onto Longford Street Lower due to the one-way system.

The R114 Aungier Street South arm has one entry lane for left turn and ahead movements as right turn movements onto Longford Street Lower are not permitted due to the one-way system. There is also an advanced stacking location and the cycle lane continues through the junction to the R114 Aungier Street North (advisory

lane). There is a single exit lane approximately 6.5m wide, therefore able to accommodate two vehicles side-by-side, but vehicles quickly merge into the right lane and the left lane becomes a bus lane.

These features are illustrated by Image 5.31.

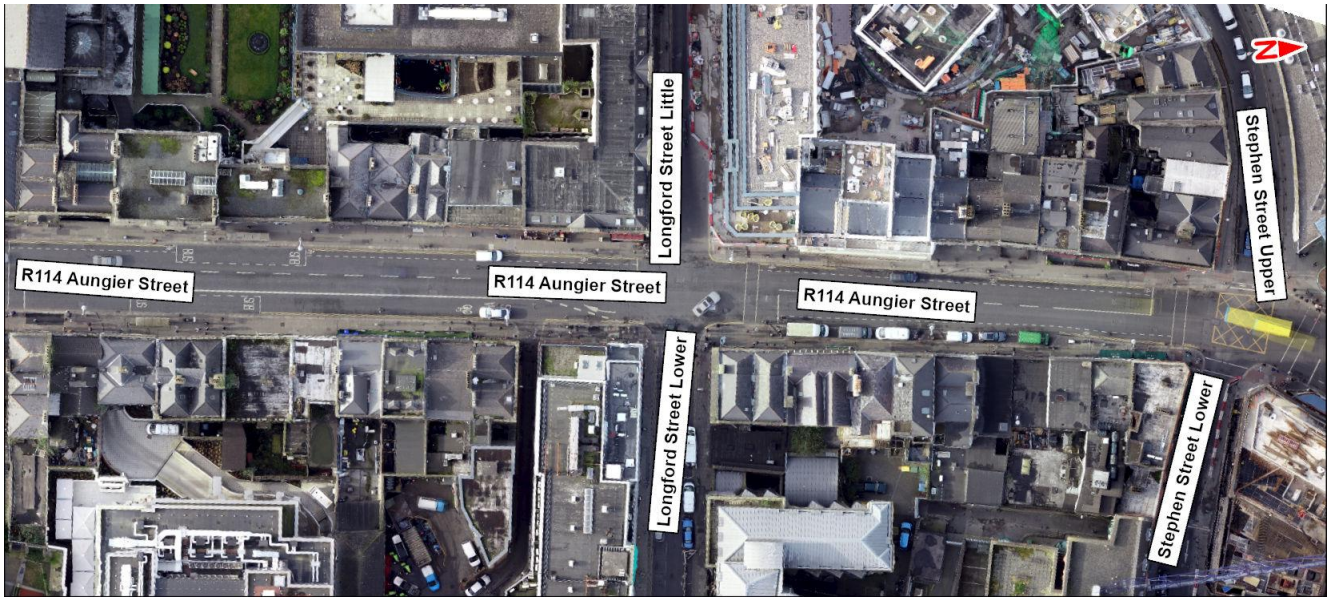


Image 5.31: R114 Aungier Street / Longford Street Lower / Longford Street Little Junction

R114 South Great George's Street / Stephen Street Lower / R114 Aungier Street / Stephen Street Upper four arm signalised junction: Stephen Street Upper and Lower are both one-way travelling eastbound. Stephen Street Upper comprises two entry lanes, the left for left turn movements and the right for ahead and right turn movements. The cycle lane travels between the lanes and there is an advanced stacking location.

The R114 South Great George Street arm has one entry lane for ahead and left movements. Right turn movements are not permitted due to the one-way system. There is a single exit lane approximately 6.5m wide, therefore able to accommodate two vehicles side-by-side, but vehicles quickly merge into the right lane and the left lane becomes a bus lane. The cycle lane continues through the junction between the R114 South Great George Street and Aungier Street as an advisory lane.

The R114 Aungier Street arm comprises one entry and exit lane respectively. Ahead movements only are permitted. The centre of the junction comprises a yellow box.

These features are illustrated by Image 5.32.

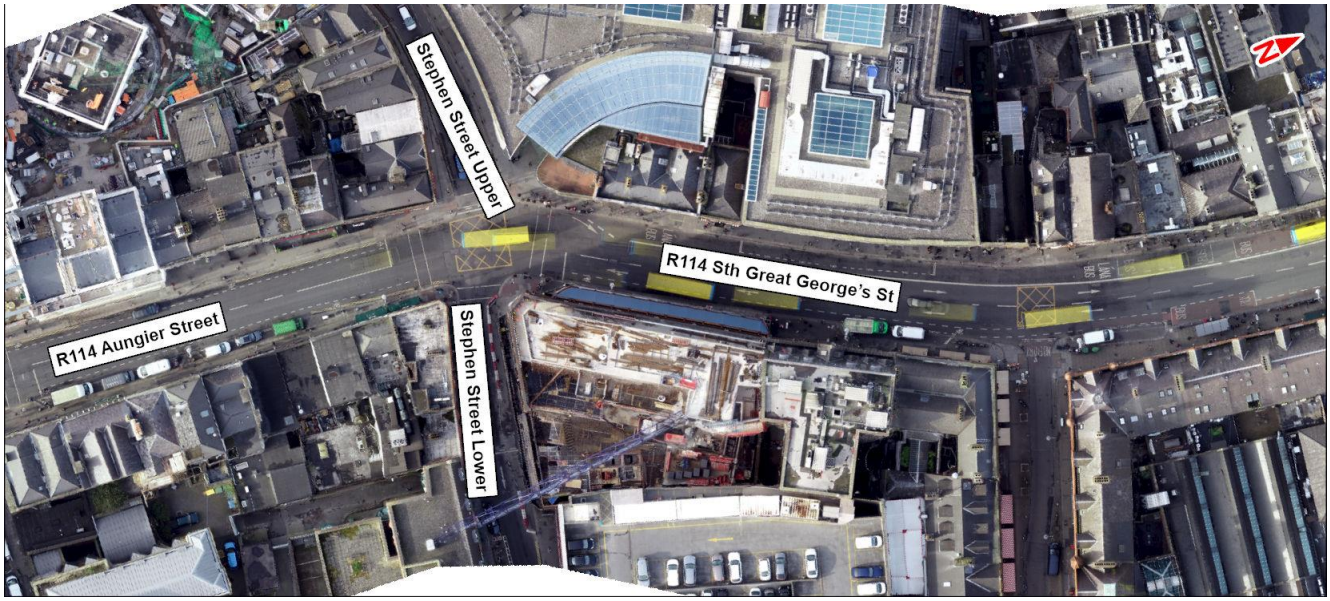


Image 5.32: R114 / Stephen Street Lower / Stephen Street Upper Junction

R137 Dame Street / R114 South Great George's Street three arm signalised junction: This junction marks the end of the Rathfarnham to City Centre section of the Proposed Scheme. The R137 Dame Street East comprises two entry lanes and an approximately 6.0m wide exit lane which can accommodate two vehicles side-by-side, with the left lane becoming a bus lane shortly after the junction. The left entry lane is for left turn movements and the right lane is for ahead movements.

The R114 South Great George's Street also has two entry lanes and a single exit lane. The left lane is for left turn movements which all general traffic must make as the right turn onto the R137 Dame Street East is for buses only. There is a separate signal head to control each movement.

The R137 Dame Street West arm has two entry lanes and an approximately 6.0m wide entry lane which can accommodate two vehicles side-by-side. Right turn movements onto the R114 South Great George's Street are not permitted, therefore, both entry lanes are for ahead movements. The centre of the junction comprises a yellow box.

These features are illustrated by Image 5.33.

Image 5.33: R137 Dame Street / R114 South Great George's Street Junction

5.3.5.5 Existing Parking / Loading

Parking can be found at the following locations along Section 4 of the Proposed Scheme:

- Approximately four loading bays (14 spaces) on Rathmines Road Lower, between Rathmines Road Upper and Grove Road. These are operational 07:00-17:00 Monday- Friday.
- 21 residential designated pay and display and permit parking spaces and one loading bay space on Military Road;
- Approximately eight commercial pay and display and permit spaces and three loading bays (six spaces) on Richmond Street South;
- 20 designated pay and display and permit parking spaces, of which four spaces act as a taxi rank from 20:00-06:00 Monday – Sunday, and four loading bays (eight spaces) on Camden Street Lower;
- Nine commercial designated pay and display and permit parking spaces, one disabled pay and two loading bays (five spaces) on Wexford Street;
- One loading bay (five spaces) on Redmond's Hill;
- Three loading bays (eight spaces) on Aungier Street; and
- Four loading bays (11 spaces) which act as a taxi rank from 20:00-06:00 Monday – Sunday and a separate taxi rank for five spaces on South Great George's Street.

There are approximately 497 on-street parking spaces within 200m of the area, along a number of side streets, alongside a number of private car parks.

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6. Potential Impacts

6.1.1 Characteristics of the Proposed Scheme

The Proposed Scheme is routed along the via the R137 along Tallaght Road and Templeogue Road, through Templeogue Village, to Terenure Cross, where it joins the Rathfarnham to City Centre section. The Rathfarnham to City Centre section will commence on the R821 Grange Road at the junction with Nutgrove Avenue, and is routed along the R821 Grange Road, the R115 Rathfarnham Road, the R114 Rathfarnham Road, Terenure Road East, Rathgar Road, Rathmines Road Lower, Richmond Street South, Camden Street Upper and Lower and Wexford Street as far as the junction with the R110 at Kevin Street Lower and Cuffe Street where priority bus lanes end.

Throughout the Proposed Scheme cycle facilities will be substantially improved with segregated cycle tracks provided along the links and protected junctions with enhanced signalling for cyclists provided at junctions. Where space for a segregated cycle track is not available on the main corridor an alternative cycle route via quiet roads is proposed. Throughout the Proposed Scheme pedestrian facilities will be upgraded and additional signalised crossings provided.

6.1.2 'Do Nothing' Scenario

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

6.1.3 'Do Minimum' Scenario

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

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

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

6.1.3.1 Do Minimum Transport Schemes

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

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

- The GDA Strategy is the approved statutory transportation plan for the region, providing a framework for investment in transport within the region up to 2042;

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

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

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

6.1.3.2 Do Minimum Transport Demand

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

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

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

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

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

6.1.4 '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) of the EIAR.

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

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

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

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

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

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

6.1.5.1 Description of Construction Works

The Proposed Scheme has been divided into four primary sections. The division line between sections has been determined by grouping similar carriageway types together. These sections have been further subdivided into 18 sub-sections, according to the types of construction works required. The sections / sub-sections are:

- **Section 1:** Tallaght Road, Templeogue Road to Rathfarnham Road:
  - **Section 1a:** M50 to Spawell Roundabout;
  - **Section 1b:** Spawell Roundabout;
  - **Section 1c:** Spawell Roundabout to Cypress Grove Junction;
  - **Section 1d:** Cypress Grove Junction to Templeville Road;
  - **Section 1e:** Templeville Road to Rathdown Avenue;
  - **Section 1f:** Rathdown Avenue to Terenure Road North; and
  - **Section 1g:** Rathdown Crescent, Rathdown Park, Bushy Park Road, Wasdale Park, Wasdale Road, Wasdale Grove, Victoria Road, Zion Road and Orwell Road.
- **Section 2:** Nutgrove Avenue to Terenure Road North – Grange Road, Rathfarnham Road:
  - **Section 2a:** Grange Road Junction to Main Street Junction;
  - **Section 2b:** Main Street Junction to Dodder Park Road;
  - **Section 2c:** Dodder Park Road to Terenure Junction;
  - **Section 2d:** Rathfarnham Junction to Mount Tallant Avenue; and
  - **Section 2e:** Mount Tallant Avenue to Harold's Cross.
- **Section 3:** Terenure Road North to Charleville Road – Terenure Road East, Rathgar Road:
  - **Section 3a:** Terenure Junction to Rathgar Avenue; and
  - **Section 3b:** Rathgar Avenue to Rathmines Road.
- **Section 4:** Charleville Road to Dame Street;
  - **Section 4a:** Rathgar Road to Grove Road;
  - **Section 4b:** Grove Road to Cuffe Street;
  - **Section 4c:** Cuffe Street to Dame Street; and
  - **Section 4d:** Offline Sections.

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

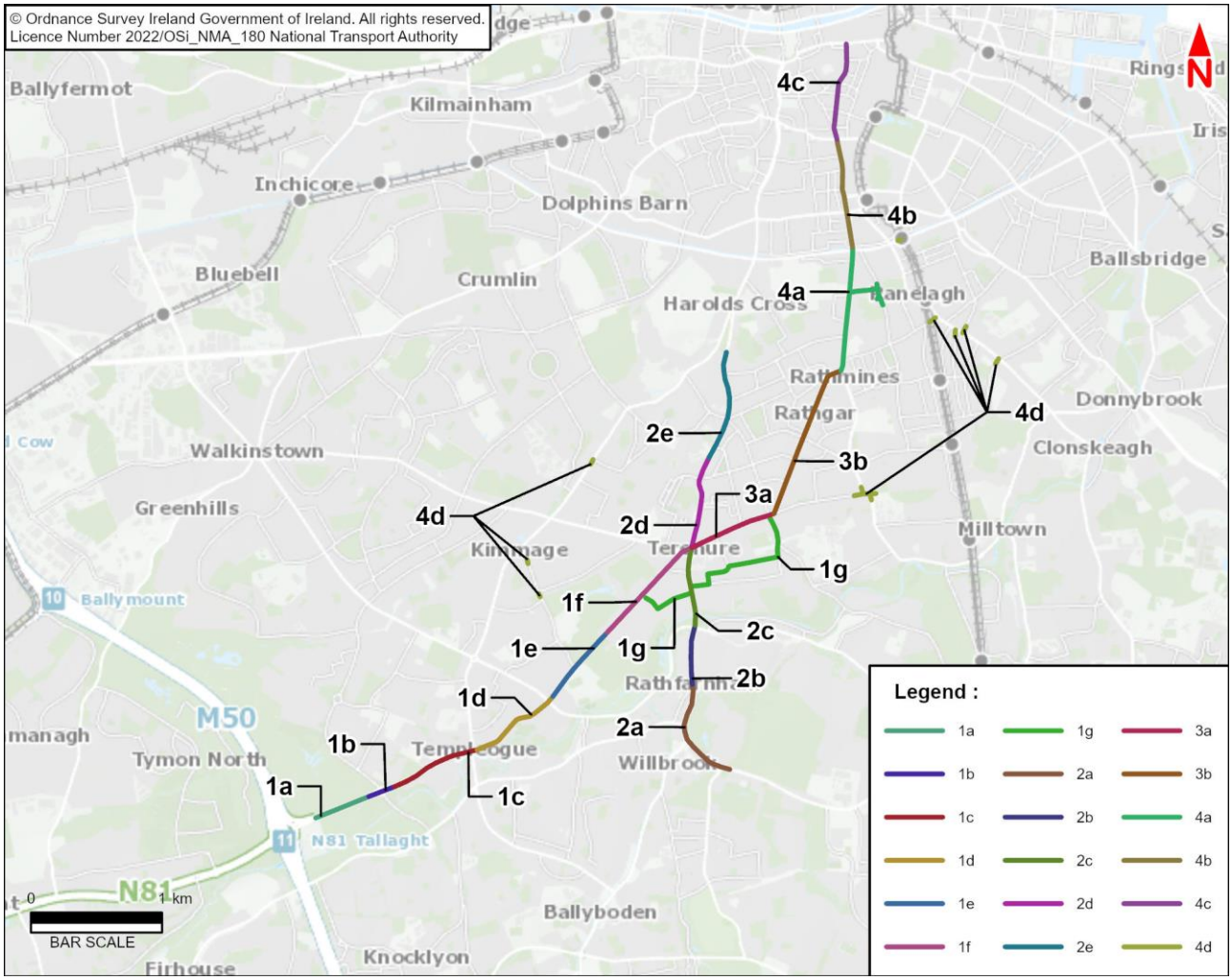

Diagram 6.1: Proposed Subsections of Construction Phase

6.1.5.2 Construction Programme

An indicative programme for the Proposed Scheme is provided in Chapter 5 (Construction) of this EIAR. The Proposed Scheme is estimated to require some 24 months (approximately) to complete, however, individual activities will have shorter durations.

In order to minimise traffic disruption along the Proposed Scheme, the works will be separated by as much distance as possible. The programme is driven by maximising the separation between sections under construction at the same time. Works are envisaged to proceed concurrently on multiple work-fronts to minimise the overall construction duration.

6.1.5.3 Construction Route

Construction Compound requirements to facilitate the Construction Phase of the Proposed Scheme are illustrated in Section 5.7 in Chapter 5 (Construction) of this EIAR. The Construction Compound locations have been selected due to the amount of available space, their relative locations near to the majority of the Proposed Scheme major works and access to the National and Regional Road network. The location of the Construction Compounds in relation to the Proposed Scheme are shown in Diagram 6.2.

The Construction Compounds will be located at the following sites:

- **Construction Compound TR1:** Spawell Roundabout;
- **Construction Compound TR2:** Terenure Road North;
- **Construction Compound TR3:** Dodder View Road;

- **Construction Compound TR4:** Military Road;
- **Construction Compound TR5:** Richmond Street South: and
- **Construction Compound TR6:** Spawell Link Road.

The appointed contractor's CTMP shall include measures for managing traffic accessing and egressing the Construction Compounds. The Construction Compounds will contain a site office, and welfare facilities for NTA personnel and appointed contractor personnel. Limited car parking will be allowed at the Construction Compounds, in line with the principles contained within the CEMP (Appendix A5.1 in Volume 4 of this EIAR).

The appointed contractor will be responsible for developing the final layout and use of the Construction Compound within the framework set out within the EIAR The Contractor may identify other (or additional) Construction Compound locations, subject to gaining all necessary approvals. In addition to the Construction Compound, temporary / portable welfare facilities will be provided along the Proposed Scheme.

The haulage of material on site is anticipated to be minimal. There will however be the removal of excavated material and the delivery of construction materials to site. It is anticipated that this exporting and delivery of materials will be executed as efficiently as possible using dedicated Construction Access Routes. Construction Vehicles will be directed to access work sections via the Proposed Scheme and dedicated routes on the National and Regional Road Network where practicable, to minimise use of the local road network.

The following National Roads are expected to be used as Construction Access Routes during the Construction Phase of the Proposed Scheme:

- M50 Motorway; and
- N81 National Road.

The following Regional Roads are expected to be used as Construction Access Routes during the Construction Phase of the Proposed Scheme:

- R111;
- R112;
- R114;
- R115;
- R137; and
- R817.

It is envisaged that construction vehicles will travel to and from the construction works via the following road network (as shown in Diagram 6.2). The routes have been guided by the requirement to overcome 'no right turn bans' at several junctions along the corridor to enable access to and from compound locations and worksites. The routes identified minimise the need for construction vehicles to make opposing right turn movements on streets with high volumes of pedestrians and cyclists; for example, construction vehicles can enter the City Centre via the R114 and exit the City Centre via the R137 as part of a one-way loop without the need for any right-turn movements.

Diagram 6.2: Proposed Construction Routes and Main Compound Location

6.1.5.4 Potential Construction Impact

6.1.5.4.1 Overview

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

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

6.1.5.4.2 Pedestrian Provisions

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

facilitate pedestrian movements around work areas. Access to local amenities, such as to bus stops, traffic crossings, private dwellings, and businesses, may be temporarily altered but access will be maintained.

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

6.1.5.4.3 Cycling Provisions

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

6.1.5.4.4 Public Transport Provisions

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

6.1.5.4.5 Parking and Loading

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

6.1.5.4.6 General Traffic

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

6.1.5.4.6.1 General Traffic Redistribution

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

relevant authorities. Access for general traffic to existing residential and commercial units immediately adjacent to the Proposed Scheme is to be accommodated throughout the Construction Phase.

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

For the purpose of Air Quality (Chapter 7), Climate (Chapter 8) and Noise & Vibration (Chapter 9) impacts assessments, a worst-case scenario for construction activities was considered for assessment purposes and has been modelled in the LAM based on a notional stage of construction whereby the Rathmines Bus Gate was in place as well as Sections 1d, 2a, 3a, 4b and 4d (Harold's Cross Road section) under construction concurrently. Further details on the impacts assessment can be found within these chapters.

6.1.5.4.6.2 Construction Traffic Generation

Site Operatives: As described in Chapter 5 (Construction) of this EIAR, it is expected that there will be approximately 200 personnel staff directly employed across the Proposed Scheme, rising to 250 personnel staff at peak construction. Typical work hours on site are between 07:00 and 23:00 with staff working across early and late shifts. The adopted shift patterns help minimise travel by personnel during the peak hour periods of 08:00 to 09:00 and 17:00 to 18:00. The appointed contractor will prepare a Construction Stage Mobility Management Plan (CSMMP) which will be developed prior to construction, as described in Appendix A5.1 CEMP of Volume 4 of this EIAR, to actively discourage personnel from using private vehicles to travel to site. The CSMMP will promote the use of public transport, cycling and walking by personnel. Private parking at the Construction Compound will be limited. Vehicle-sharing will be encouraged, subject to public health guidelines, where travel by private vehicle is a necessity e.g. for transporting heavy equipment. A combination of CSMMP measures, as well as work shift patterns, means that fewer than 10 trips by private vehicle are envisaged to and from site during peak periods

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

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

Chapter 5 (Construction) of this report 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. For this assessment it has been assumed that a maximum of 26 HGV trips will access / egress the construction works during the AM and PM Peak Hours.

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	26	0	26	66	130
PM Peak Hour	0	26	10	26	66	130

Given that the above impacts are minimal and comfortably below the thresholds set out in TII's Guidelines for Transport Assessments, it is considered appropriate to define the general traffic impacts of the construction phase to have a **Slight Negative and Temporary** impact. Therefore, no further analysis is required for the purpose of this assessment.

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

6.1.5.5 Construction Phase Summary

Table 6.2 presents a summary of the potential impacts of the Proposed Scheme during construction phase.

Table 6.2: Summary of Construction Phase Potential Impacts

Assessment Topic	Effect	Potential Impact
Walking	Restrictions to pedestrians along Proposed Scheme.	Low Negative and Temporary
Cycling	Restrictions to cyclists along Proposed Scheme	Medium Negative and Temporary
Bus	Restrictions to public transport along Proposed Scheme.	Low 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	Slight Negative and Temporary

6.2 Operational Phase

6.2.1 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.

6.2.2 Qualitative Assessment

6.2.2.1 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 four 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.

6.2.2.1.1 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 9. Table 6.3 outlines the assessment criteria for each junction.

Table 6.3: Pedestrian Junction Assessment Criteria

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

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

Table 6.4: Pedestrian Junction Assessment LoS

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

When comparing the Do Minimum and Do Something scenarios for pedestrians, the terms outlined in Table 6.5 have been used to describe the potential impact, based on the changes in the Qualitative Pedestrian LoS rating.

Table 6.5: Description of Impact for Pedestrian Qualitative Assessment

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

6.2.2.1.2 Cycling Infrastructure

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

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

Table 6.6 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	Toucan crossings at signalised junctions for cyclists along CBC / Protected junctions not already classified as A+ for junction treatment
B	On-road cycle lanes or carriageway designated as 'quiet cycle routes'	1+1	1.75m	Cyclists share green time with general traffic and cycle lanes continue through the junction, for junctions not already classified as A or A+ for junction treatment
C	Bicycle share traffic or bus lanes	1+0	1.25m	Cyclists share green time with general traffic with cycle facilities (advanced stacking locations / cycle lanes) available up to the junction but don't continue through
D	No specific bicycle facilities	1+0	0.75m	No specific bicycle facilities

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

When comparing the Do Minimum and Do Something scenarios for cyclists, the terms outlined in Table 6.7 have been used to describe the potential impact, based on the changes in the Qualitative Cycling LoS rating.

Table 6.7: Description of Impact for Cycling Qualitative Assessment

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

6.2.2.1.3 Bus Infrastructure

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

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

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

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

Table 6.8: Magnitude of Impact for Bus Users Qualitative Assessment

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

6.2.2.1.4 Parking and Loading

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

- Designated Paid Parking;
- Permit Parking;

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

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

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

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

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

6.2.2.1.5 Section 1 – R137 Tallaght Road, R137 Templeogue Road to R114 Rathfarnham Road

6.2.2.1.5.1 Pedestrian Infrastructure

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

- Footways with a minimum running width of 2.0m where possible through the scheme;
- Raised table treatments provided on priority side roads where the stop/yield line is located behind the raised table and footpath crossing to encourage a “courtesy crossing” for pedestrians, in line with the PDGB ;
- Additional pedestrian crossing on the southern arm of the R137 Templeogue Road / R817 Cypress Grove Road / R817 Old Bridge Road signalised junction;
- Toucan crossing at the R137 Templeogue Road/ Cheveerstown House junction widened to 4m;
- Provision of signalised crossings to Toucan Crossings on the northern and western arm at the R137 Templeogue Road / Fortfield Road / Bushy Park House signalised junction;
- The removal of slip lanes from the R137 Templeogue Road / R112 Templeville Road / R112 Springfield Avenue signalised junction;
- Conversion of Spawell Roundabout to a signalised junction with direct signalised crossings on the northern and southern arms;
- Informal path on the green to the north of Rathdown Drive to become a formalised footway;
- The removal of the shared walking and cyclist space to the west of Templeogue House, replaced by a new landscaped area for pedestrians; and
- A new pedestrian/ cycle only link, connecting the Rathdown Crescent / Rathdown Park roundabout to the green link at Rathdown Drive, merging with Rathdown Park to the east.

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 junction can be found in can be found in TIA Appendix 4.1 (Pedestrian Infrastructure Assessment).

Table 6.9: Section 1 – Pedestrian Impact during Operational Phase

Junctions	Chainage	Do Minimum LoS	Do Something LoS	Impact
Spawell Roundabout (roundabout to signalised junction)	J700	D	B	Medium Positive
R137 Templeogue Road / Substation Access / Corrybeg priority junction	J1250	D	B	Medium Positive
R137 Templeogue Road / R817 Cypress Grove Road / R817 Old Bridge Road signalised junction	J1450	E	C	Medium Positive
R137 Templeogue Road / Riverside Cottages priority junction	J2025	D	B	Medium Positive
R137 Templeogue Road / R112 Templeville Road / R112 Springfield Avenue signalised junction	J2150	D	A	Medium Positive
R137 Templeogue Road / Springfield Road priority junction	J2250	D	B	Medium Positive
R137 Templeogue Road / Fortfield Road / Bushy Park House signalised junction	J2450	F	B	High Positive
R137 Templeogue Road / Rathdown Avenue priority junction	J2800	C	A	Medium Positive
R137 Templeogue Road / Lakelands Park priority junction	J3100	D	B	Medium Positive
R137 Templeogue Road / Rathdown Park priority junction	J3375	D	B	Medium Positive
R137 Templeogue Road / Olney Crescent priority junction	J3450	D	B	Medium Positive
R137 Templeogue Road / Fergus Road / priority junction	J3500	D	B	Medium Positive
R137 Templeogue Road / R818 Terenure Road West / R137 Terenure Place signalised junction	J3700	D	B	Medium Positive
Rathdown Crescent / Rathdown Park roundabout (along alternative Quiet Route for Cyclists)	J3225	D	C	Low Positive
Rathdown Drive / Rathdown Crescent roundabout (along alternative Quiet Route for Cyclists)	J3225	D	A	Medium Positive
Rathdown Park four-arm priority junction (along alternative Quiet Route for Cyclists)	A1500	D	B	Medium Positive
Section Summary		D	**B**	**Medium Positive**

The assessment demonstrates that the Proposed Scheme will have a long long-term positive impact on the quality of the pedestrian infrastructure between the R137 Templeogue Road and R114 Rathfarnham Road. The LoS during the Do Minimum scenario ranges between C and F, with three of the 16 impacted junctions along this section being given a low E / F rating. These ratings have been determined using the previously referenced assessment criteria set out in Table 6.3.

During the Do Something scenario, i.e. following the development of the Proposed Scheme, 14 of the 16 impacted junctions along this section achieve the highest A / B ratings, with two junctions receiving a C rating. This is due

to the proposed improvements to the existing pedestrian facilities in the form of additional crossing locations, increased pedestrian directness, provision of traffic calming measures, improved accessibility facilities and increased footway and crossing widths.

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.

6.2.2.1.5.2 Cycling Assessment

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

- Toucan crossing at the R137 Templeogue Road/ Cheverstown House junction widened to 4m;
- Upgrade of signalised crossings to Toucan Crossings on the northern, eastern and western arm at the R137 Templeogue Road / Fortfield Road / Bushy Park House signalised junction;
- Upgrade of signalised crossing to a Toucan Crossing on the western arm of the R137 Templeogue Road / Rathdown Avenue priority junction;
- A new pedestrian/ cycle only link, connecting the Rathdown Crescent / Rathdown Park roundabout to the green link at Rathdown Drive, merging with Rathdown Park to the east.
- Maintaining the 3.5m wide bidirectional cycle track with 3.7m verge on the northern side of R137 Templeogue Road between the M50 Junction 11 and L4023 Spawell Road;
- Provision of continuous 2.0m wide cycle lanes in both directions along R137 Templeogue Road between L4023 Spawell Road and the R817 Cypress Grove Road;
- Provision of 1.5m wide cycle track travelling eastbound and a 1.5m wide cycle track with a 2.6m verge travelling westbound between R112 Templeville Road to Fortfield Road;
- Provision of a bidirectional cycle track with a width of 2.5m alongside a 1.5m footway from Fortfield Road to Rathdown Avenue;
- Provision of an alternative quiet route for cyclists along Rathdown Drive travelling parallel to the R137 Templeogue Road (vehicles will still be permitted to use this route). This route continues from Rathdown Drive onto Rathdown Crescent, followed by Rathdown Park to join the Rathfarnham Proposed Scheme;
- Provision of a 2.0m wide cycle track travelling southbound on the R137 Templeogue Road between Rathdown Crescent and the R137 Terenure Place. There will be no northbound provision along the R137 Templeogue Road, instead, cyclists would follow the proposed quiet route via Rathdown Park to join Section 2 at the R114 Rathfarnham Road, south of Bushy Park Road;
- Segregation of cyclists and pedestrians adjacent to the Templeogue Arch; currently opearting as a shared space;
- A reduction of speed to 30km/h for shared cyclists/ bus and traffic routes; and
- A number of island bus stops located along the Section 1, allowing a continuous cyclist movement behind the bus stop.

Along Section 1, the Proposed Scheme will provide a 60mm set down kerb segregation between the footway and the cycle track. This is of particular importance in the context of providing for pedestrians with visual impairments, whereby the use of white line segregation (as is the case in some areas of the baseline environment) is not as effective for establishing a clear understanding of the change of pavement use and potential for cyclist / pedestrian interactions. In addition, a full height 120mm upstand kerb between the carriageway and the cycle track is provided as part of the Proposed Scheme (120mm kerb height on the bus lane side and 60mm minimum kerb height on the cycle track side).

The contents Table 6.10 outlines 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. Please refer to TIA Appendix 4.2 (Cycling Infrastructure Assessment) which outlines in further detail the methodology behind each LoS rating given to the Do Minimum and Do Something scenarios.

Table 6.10: Section 1 – Cycling Impact during Operational Phase

Location	Chainage	Do Minimum LoS	Do Something LoS	Impact
Access junction for Cheeverstown House to R817 Cypress Grove Road	J1050 - J1500	C	A	Medium Positive
Templeogue Village to Fortfield Road	J2150 - J2500	C	B	Low Positive
Fortfield Road to Rathdown Avenue	J2500 - J2800	C	A	Medium Positive
Rathdown Avenue to Rathdown Crescent	J2800 - J3250	C	B	Low Positive
Rathdown Crescent to R137 Terenure Place	J3250 - A1800	C	B	Low Positive
Section Summary		**C**	**B**	**Low Positive**

Table 6.10 demonstrates that the Proposed Scheme will have a **Low Positive Impact** on the quality of the cycling infrastructure between the R137 Templeogue Road and R114 Rathfarnham Road.

The LoS during the Do Minimum scenario ranges between is C at all impacted routes along this section. These ratings have been determined using the previously referenced assessment criteria set out in Table 6.6. During the Do Something scenario, i.e. following the development of the Proposed Scheme, all impacted routes along this section achieve the highest A+/ A / B ratings. This is as a result of improved segregation for cyclists and junction treatment in the form of cycle lanes traversing priority junctions and continuing through signalised junctions with protected treatment as part of the Proposed Scheme, alongside an alternative cycle quiet route along Rathdown Avenue.

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'.

6.2.2.1.5.3 Bus Infrastructure

This section provides an assessment of the changes in the quality of bus stop infrastructure provision as a result of the Proposed Scheme along Section 1, 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 19 bus stops along Section 1 of the Proposed Scheme. Table 6.11 presents a summary of the changes in the number and location of bus stops along Section 1 of the Proposed Scheme.

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

Direction	Stop	Chainage	Action	Comment
Inbound	2599	J725	Retailed	N/A
Inbound	2600	J1100	Relocated	Location is closer to the pedestrian crossing thus facilitating better access to Cheeverstown House.
Inbound	1155	J1475	Relocated	This location would facilitate better access to the stop given proximity to Cypress Grove Road as well as improve potential for interchange with Route F1
Inbound	1157	J2000	Retained	N/A
Inbound	1158	J2275	Removed	Stop removed due to close proximity with other bus stops.

Direction	Stop	Chainage	Action	Comment
Inbound	1159	J2425	Relocated	Stop conveniently located to serve Templeogue Village.
Inbound	1160	J2825	Relocated	This location is closer to the pedestrian crossing better serving the Rathdown Area. Stop is also closer to the Terenure College Entrance.
Inbound	1161	J3250	Relocated	This location is closer to the proposed pedestrian crossing, and better serves the Rathdown Park catchment
Inbound	1162	J3375	Removed	Stop removed due to close proximity with other bus stops.
Inbound	1163	J3575	Relocated	This stop is located about 320m from both the previous and next stops. . It is appropriately located providing access to areas to the south of Terenure Village as well as the village itself with appropriate spacing between stops achieved. Locations enhances potential for interchange with Orbital Route S4.
Outbound	1121	J3600	Retained	NA
Outbound	1122	A3325	Removed	This stop is located just 250m before Stop 1123 and serves much of the same catchment area.
Outbound	1123	J3200	Relocated	Stop moved approximately 130m to the east. This location improves stop spacing, is located just after proposed pedestrian crossing and better serves the Rathdown Park Catchment.
Outbound	1124	J2850	Retained	NA
Outbound	1125	J2425	Retained	NA
Outbound	1127	J1950	Retained	Templeogue Village is subject to part VIII scheme and the existing stop is conveniently located to serve Templeogue Village.
Outbound	1130	J1375	Retained	NA
Outbound	2550	J1000	Retained	NA
Outbound	2551	J600	Retained	NA

It is proposed that there will be a total of 16 bus stops along Section 1 of the Proposed Scheme – eight inbound and eight outbound. This is three fewer outbound stops than in the Do Minimum. The layout of new bus stops is considered to better serve the existing and future catchment and be closer to existing and new pedestrian crossing facilities for improved convenience.

Table 6.12 outline a summary of the changes to the bus stop infrastructure along Section 1 of the Proposed Scheme, with reference to the number and percentage of bus stops that provide each facility in the Do Minimum and Do Something scenarios.

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

Bus Stop Facility	Do Minimum		Do Something		Comment
	No. of Stops	Percentage of Stops	No. of Stops	Percentage of Stops	
RTPI	4	21%	16	100%	It is proposed that all bus stops provide real-time information.
Timetable information	14	74%	16	100%	It is proposed that all bus stops provide timetable information.

Bus Stop Facility	Do Minimum		Do Something		Comment
	No. of Stops	Percentage of Stops	No. of Stops	Percentage of Stops	
Shelter	8	42%	12	75%	Shelter to be provided at all but three bus stops which are limited by spatial constraints
Seating	6	32%	12	75%	Shelter to be provided at all but three bus stops which are limited by spatial constraints.
Accessible Kerbs	11	58%	15	100%	Full provision.
Indented Drop Off Area	3	16%	1	6%	One bus stop will be indented.
Total Stops	19		16		Three fewer stops than Do Minimum.

Table 6.12 indicate that there are significant improvements to the bus stop facilities along Section 1 of the Proposed Scheme. It is proposed that one bus stop will be indented, all others all bus stops will be provided inline within dedicated bus lanes along the entirely of the corridor, meaning that buses will not incur delay when setting off after picking up passengers. Improvements in the provision of real-time information, shelters, seating and accessible kerbs at the bus stops throughout Section 1 of the Proposed Scheme are assessed as providing an overall positive impact for bus passengers. All proposed facilities have been designed in accordance with BusConnects Preliminary Design Guidance which has been developed with cognisance to the relevant accessibility guidance.

The Proposed Scheme improves the quality of existing bus infrastructure along Section 1 of the Proposed Scheme, which will provide long-term benefits for bus users and aligns with the overarching aim to provide enhanced bus infrastructure on the corridor. The impact for this section of the Proposed Scheme is **Medium Positive**.

6.2.2.1.5.4 Parking and Loading

There is no existing parking along Section 1 of the scheme.

6.2.2.1.6 Section 2 – R821 Nutgrove Avenue to R137 Terenure Road North

6.2.2.1.6.1 Pedestrian Infrastructure

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

- Footways with a minimum running width of 2.0m where possible through the scheme;
- Signalised crossing added to the western arm of the R821 Nutgrove Avenue / R821 Grange Road / R822 Grange Road signalised junction;
- Signalised crossing added to the western am of the R115 Rathfarnham Road / R821 Grange Road / R115 Willbrook Road signalised junction;
- Provision of signalised crossings on all arms at the R114 Rathfarnham Road / R115 Rathfarnham Road / R114 Butterfield Avenue signalised junction;
- Signalised crossing added to the northern arm of the R114 Rathfarnham Road / L4014 Main Street / L8103 Castleside Drive signalised junction;
- Signalised crossings added to the northern and western arms of the R114 Rathfarnham Road / Rathdown Park signalised junction
- Raised tables added to minor junctions along Section 2, including those along specified quiet route for cyclists (Victoria Road and Orwell Road);
- Tie into the proposed Dodder Greenway at the R114 Rathfarnham Road / R112 Dodder Park Road / R112 Dodder View Road signalised junction.

The assessment of the qualitative impacts on the Pedestrian Infrastructure for Section 2 of the Proposed Scheme are summarised in Table 6.13. A detailed breakdown of the assessment at each impacted junction, including a

list of the junctions which experience no change, can be found in TIA Appendix 4.1 (Pedestrian Infrastructure Assessment).

Table 6.13: Section 2 – Significance of Effects for Pedestrian Impact during Operational Phase

Junctions	Chainage	Do Minimum LoS	Do Something LoS	Impact
R821 Nutgrove Avenue / R821 Grange Road / R822 Grange Road signalised junction	A000	D	A	Medium Positive
R115 Rathfarnham Road / R821 Grange Road / R115 Willbrook Road signalised junction	A350	D	A	Medium Positive
R115 Rathfarnham Road / L8451 St Mary's Avenue priority junction	A375	D	A	Medium Positive
R114 Rathfarnham Road / R115 Rathfarnham Road / R114 Butterfield Avenue signalised junction	A475	E	A	High Positive
R114 Rathfarnham Road / L4014 Main Street / L8103 Castleside Drive signalised junction	A750	D	A	Medium Positive
R114 Rathfarnham Road / L8122 Crannagh Road priority junction	A900	D	B	Medium Positive
R114 Rathfarnham Road / L8068 Brookvale Road priority junction	A1000	D	B	Medium Positive
R114 Rathfarnham Road / L8384 Rathfarnham Park priority junction	A1150	D	B	Medium Positive
R114 Rathfarnham Road / R112 Dodder Park Road / R112 Dodder View Road signalised junction	A1250	C	A	Medium Positive
R114 Rathfarnham Road / Westbourne Road priority junction	A1400	D	B	Medium Positive
R114 Rathfarnham Road / Rathdown Park signalised junction	A1500	E	B	Medium Positive
R114 Rathfarnham Road / Bushy Park Road signalised junction	A1550	C	B	Low Positive
R114 Rathfarnham Road / Fergus Road priority junction	A1650	D	B	Medium Positive
R114 Rathfarnham Road / Cormac Terrace priority junction	A1700	D	B	Medium Positive
R114 Rathfarnham Road / Beechlawn Way priority junction	A1750	D	B	Medium Positive
R137 Terenure Road North / R114 Terenure Road East / R114 Rathfarnham Road / R137 Terenure Place priority junction	H000	D	A	Medium Positive
Orwell Road / Zion Road signalised junction (along alternative quiet route for cyclists)	B900	E	A	High Positive
Section Summary		**D**	**A**	**Medium Positive**

The contents of Table 6.13 demonstrates that the scheme will have a long-term positive impact on the quality of the pedestrian infrastructure between the R821 Nutgrove Avenue and R137 Terenure Road North.

The LoS during the Do Minimum scenario ranges between C and E, with three of the 17 impacted junctions along this section given a low E rating. These ratings have been determined using the previously referenced assessment criteria set out in Table 6.3.

The LoS will improve to an A / B rating at all impacted junctions in the Do Something scenario. This is as a result of the proposed improvements to the existing pedestrian facilities in the form of additional crossing locations, increased pedestrian directness, provision of traffic calming measures to reduce vehicle speeds, improved accessibility and increased footway and crossing widths. All proposed facilities have been designed in accordance with the principles of DMURS and the National Disability Authority (NDA) 'Building for Everyone: A Universal Design Approach' (NDA 2020) with regards to catering for all users, including those with disabilities.

Overall, it is anticipated that there will be **Medium Positive Impact** to the quality of the pedestrian infrastructure along Section 2 of the Proposed Scheme, during the Operational Phase, which aligns with the overarching aim to provide enhanced walking infrastructure on the corridor.

6.2.2.1.6.2 Cycling Infrastructure

The following section sets out the qualitative impacts on the cycling receptor for Section 2 of the Proposed Scheme. The results are summarised in Table 6.14, along with the resultant magnitude of impact.

- Provision of 2.0m wide cycle track in both directions with bypasses bus stops on the R821 Grange Road between R821 Nutgrove Avenue and Main Street;
- The cycle lanes bypass or continue past on-street parking at St Mary's Avenue and in Terenure Village;
- Upgrade of signalised crossing to a Toucan crossing on the northern arm of the R114 Rathfarnham Road / R112 Dodder Park Road / R112 Dodder View Road signalised junction;
- Upgrade of signalised crossings at to Toucan crossings on the eastern and northern arms of the R114 Rathfarnham Road / Bushy Park Road signalised junction;
- Upgrade of signalised crossings and uncontrolled crossings to Toucan crossings on all arms of the R137 Terenure Road North / R114 Terenure Road East / R114 Rathfarnham Road / R137 Terenure Place junction
- Tie into the proposed Dodder Greenway at the 114 Rathfarnham Road / R112 Dodder Park Road / R112 Dodder View Road signalised junction;
- Provision of 1.5m wide cycle track in both directions along the R114 Rathfarnham Road between the R112 Dodder View Road and Rathdown Park;
- Provision of 1.5m wide cycle track in both directions between Rathdown Park and the R137 Terenure Road North. The northbound cycle lane provides a bypass of a bus stop island and on-street parking bays; and
- Provision of an alternative quiet route between Rathdown Park and Orwell Road via Bushy Park Road, Wasdale Park, Wasdale Grove, Victoria Road and Zion Road. These streets will have 'quiet street treatment' whereby cyclists share the traffic lanes, but road markings indicate a 'cycle-friendly' route.

Along Section 2, the Proposed Scheme will provide a 60mm set down kerb segregation between the footway and the cycle track. This is of particular importance in the context of providing for pedestrians with visual impairments, whereby the use of white line segregation (as is the case in some areas of the baseline environment) is not as effective for establishing a clear understanding of the change of pavement use and potential for cyclist / pedestrian interactions. In addition, a full height 120mm upstand kerb between the carriageway and the cycle track is provided as part of the Proposed Scheme (120mm kerb height on the bus lane side and 60mm minimum kerb height on the cycle track side).

Table 6.14 outlines the cycling qualitative assessment along Section 2 of the Proposed Scheme, which sets out the overall Do Minimum LoS and the Do Something LoS and the description of impact. Please refer to TIA

Appendix 4.2 (Cycling Infrastructure Assessment) which outlines in further detail the methodology behind each LoS rating given to the Do Minimum and Do Something scenarios.

Table 6.14: Section 2 – Cycling Impact during Operational Phase

Location	Chainage	Do Minimum LoS	Do Something LoS	Impact
R821 Nutgrove Road to Butterfield Avenue	A000 – A475	C	A	Medium Positive
R114 Butterfield Avenue to Main Street	A475 - A750	C	A	Medium Positive
R112 Dodder View Road to Rathdown Park	A1250 - A1500	C	B	Low Positive
Rathdown Park to R137 Terenure Road North	A1500 - H000	C	B	Low Positive
Alternative Quiet Route: Bushy Park Road to Orwell Road	A1550 - A2500	D	C	Low Positive
Alternative Route: Orwell Road to R114 Terenure Road East	A2500	D	A	High Positive
Section Summary		**C**	**B**	**Low Positive**

Table 6.14 demonstrates demonstrate that the scheme will have a **Low Positive Impact** on the cycling environment between the R821 Nutgrove Avenue and R137 Terenure Road North.

The LoS rating during the Do Minimum scenario ranges between C and D, with two of the six impacted routes along this section being given a low D rating. These ratings have been determined using the previously referenced assessment criteria set out in Table 6.6. The LoS in the Do Something scenario is C for one route, B for two route and A for three routes. This is as a result of improved segregation for cyclists and junction treatment in the form of cycle lanes traversing priority junctions and continuing through signalised junctions with protected treatment as part of the Proposed Scheme.

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'.

6.2.2.1.6.3 Bus Infrastructure

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

There are currently 18 bus stops along Section 2 of the Proposed Scheme. Table 6.15 presents a summary of the changes in the number and location of bus stops along Section 2 of the Proposed Scheme.

Table 6.15: Section 2 – Overview of Amendments to Bus Stop Locations

Direction	Stop	Chainage	DoSomething	Comment
Inbound	1329	A100	Retained	N/A
Inbound	1330	A300	Retained	N/A

Direction	Stop	Chainage	DoSomething	Comment
Inbound	1331	A525	Relocated	This location improves the catchment area along Butterfield Avenue, and improves access to the southern end of Rathfarnham Village
Inbound	1132	A800	Retained	N/A
Inbound	1133	A1150	Relocated	This location is closer to the Junction with Dodder Park Rd and allows for this stop to be combined with existing stop 1334 thus improving bus stop spacing.
Inbound	1134	A1300	Removed	Stop removed due to close proximity with other bus stops.
Inbound	7293	A1450	Retained	N/A
Inbound	1335	A1600	Removed	Stop removed due to close proximity with other bus stops.
Inbound	1336	A1800	Relocated	This location brings the stop closer to Terenure Village thus providing better access to the village and improving potential for interchange with Orbital Route S4.
Outbound	1320	A025	Retained	N/A
Outbound	1299	A1700	Retained	N/A
Outbound	1300	A1300	Relocated	Stop moved approximately 75m south, closer to the Rathfarnham Road / Dodder Park Road junction.
Outbound	1301	A1050	Removed	Stop removed due to close proximity with other bus stops.
Outbound	1302	A950	Retained	N/A
Outbound	1303	A675	Retained	N/A
Outbound	1304	A550	Retained	N/A
Outbound	1305	A275	Retained	N/A
Outbound	1306	A025	Retained	N/A

Under the proposals, there will be a total of 15 bus stops along Section 2 – seven inbound and eight outbound. This is three fewer than the Do Minimum. The layout of new bus stops is considered to better serve the existing and future catchment and be closer to existing and new pedestrian crossing facilities for improved convenience.

Table 6.16 outline a summary of the changes 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 6.16: Section 2 – Overview of Changes in Bus Stop Facilities

Bus Stop Facility	Do Minimum		Do Something		Comment
	No. of Stops	Percentage of Stops	No. of Stops	Percentage of Stops	
RTPI	2	11%	15	100%	RTPI added to all bus stops.
Timetable information	15	83%	15	100%	It is proposed that all bus stops provide real-time information.
Shelter	11	61%	12	80%	Shelter to be provided at all but three bus stops which are limited by spatial constraints.
Seating	10	55%	12	80%	Seating to be provided at all but three bus stops which are limited by spatial constraints.

Bus Stop Facility	Do Minimum		Do Something		Comment
	No. of Stops	Percentage of Stops	No. of Stops	Percentage of Stops	
Accessible Kerbs	16	89%	15	100%	Full provision.
Indented Drop Off Area	1	0%	0	0%	All proposed bus stops will be located inline within bus lanes.
Total Stops	**18**		**15**		**Three fewer than the Do Minimum.**

The contents of Table 6.16 indicate that there are significant improvements to the bus stop facilities along Section 2 of the Proposed Scheme. It is proposed that all bus stops will be provided inline within dedicated bus lanes along the entirely of the corridor, meaning that buses will not incur delay when setting off after picking up passengers. Improvements in the provision of real-time information, shelters, seating and accessible kerbs at the bus stops throughout Section 2 of the Proposed Scheme are assessed as providing an overall positive impact for bus passengers. All proposed facilities have been designed in accordance with BusConnects Preliminary Design Guidance which has been developed with cognisance to the relevant accessibility guidance.

The Proposed Scheme improves the quality of existing bus infrastructure along Section 2 of the Proposed Scheme, which will provide long term benefits for bus users. The impact for this section of the Proposed Scheme is **Medium Positive**.

6.2.2.1.6.4 Parking and Loading

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

- The removal of seven pay and display and permit spaces out of 14 on the R114 Rathfarnham Road between Cormac Terrace and Terenure Road East to provide a cycle lane for northbound traffic.

Table 6.17 presents a summary of the proposed on-street changes along Rathfarnham Section 2 of the Proposed Scheme. In addition to the above there will be changes to the car park at Grange Road adjacent to the R821 Nutgrove Avenue / R821 Grange Road / R822 Grange Road signalised junction. Four off street parking spaces including two disabled bays and a set down area will be provided.

Table 6.17: Section 2 – Overall Changes in Parking / Loading Spaces

Location	Parking Type	Do Minimum	Do Something	Change
Grange Road/ Rathfarnham Road (between Grange Road and Dodder Park Road)	Permit Parking Pay & display: residential	7	7	0
R114 Rathfarnham Road: Between Cormac Terrace and R137 Terenure Road East	Permit Parking Pay & display: commercial	14	7	-7
	Disabled Bay	1	1	0
Total		**22**	**15**	**-7**

As shown in Table 6.17 there are approximately 22 current on-street parking spaces affected within the area of the Section 2 of the Proposed Scheme. Under the proposals, seven parking spaces will be lost, all commercial spaces. This change is considered to have a **Negligible impact**, due to the low numbers of spaces lost and the presence of a large number of similar types of spaces on side roads along Section 2. This is considered acceptable in the context of the aim of the Proposed Scheme, to provide enhanced walking, cycling and bus infrastructure on this key access corridor.

6.2.2.1.7 Section 3 – R137 Terenure Road North to Charleville Road

6.2.2.1.7.1 Pedestrian Infrastructure

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

- Footways with a minimum running width of 2.0m where possible through the scheme;
- Provision of signalised crossings on Terenure Road East, to the west of Brighton Road and Rathgar Road and south of Wesley Road;
- Toucan crossings added to all arms at the R114 Rathgar Road / Highfield Road priority junction;
- Signalised crossings added on the eastern arm of the R114 Rathgar Road / Grosvenor Road / Charleville Road signalised junction;
- Raised tables added to minor junctions along Section 3; including those along specified quiet route for cyclists (Terenure Road North and Harold's Cross Road)
- Toucan crossings provided on all arms of the Harold's Cross Road / Kenilworth Park / Kenilworth Square / Rathgar Avenue.

The assessment of the qualitative impacts on the pedestrian infrastructure for Section 3 of the Proposed Scheme is summarised in Table 6.18. A detailed breakdown of the assessment at each impacted junction, including a list of the junctions which experience no change, can be found in TIA Appendix 4.1 (Pedestrian Infrastructure Assessment).

Table 6.18: Section 3 – Significance of Effects for Pedestrian Impact during Operational Phase

Junctions	Chainage	Do Minimum LoS	Do Something LoS	Impact
R114 Terenure Road East / Heathfield Road / Greenmount Road priority junction	A2050	D	B	Medium Positive
R114 Terenure Road East / Ferrard Road priority junction	A2150	D	B	Medium Positive
R114 Terenure Road East / Brighton Road priority junction	A2250	C	A	Medium Positive
R114 Terenure Road East / Rathgar Park priority junction	A2450	C	B	Low Positive
R114 Rathgar Road / Orwell Road / R114 Terenure Road East / Rathgar Avenue signalised junction	A2500	B	A	Low Positive
R114 Rathgar Road / Highfield Road priority junction	A2550	F	A	High Positive
R114 Rathgar Road / Wesley Road priority junction	A2725	D	A	Medium Positive
R114 Rathgar Road / Winton Avenue priority junction	A2775	C	B	Low Positive
R114 Rathgar Road / Auburn Villas priority junction	A2825	C	B	Low Positive
R114 Rathgar Road / Garville Mews priority junction	A2875	D	B	Medium Positive

Junctions	Chainage	Do Minimum LoS	Do Something LoS	Impact
R114 Rathgar Avenue / Belleville Avenue priority junction	A2950	C	B	Low Positive
R114 Rathgar Avenue / Garville Avenue priority junction	A2975	D	B	Medium Positive
R114 Rathgar Avenue / Garville Road priority junction	A2975	C	B	Low Positive
R114 Rathgar Road / Frankford Avenue / Leicester Avenue signalised junction	A3150	C	A	Medium Positive
R114 Rathgar Road / Grosvenor Road priority junction	A3200	C	B	Low Positive
R114 Rathgar Road / Spire View Lane priority junction	A3550	D	B	Medium Positive
R114 Rathgar Road / Rathgar Place junction	A3375	D	B	Medium Positive
R114 Rathgar Road / Rathmines Park priority junction	A3500	C	B	Low Positive
R114 Rathgar Road / Grosvenor Road / Charleville Road signalised junction	A3650	F	A	High Positive
R137 Terenure Road North / Yewlands Terrace priority junction	H050	C	B	Low Positive
R137 Terenure Road North / Elm Park Terrace priority junction	H150	C	B	Low Positive
R137 Terenure Road North / Rathmore Villas priority junction	H175	D	B	Medium Positive
R137 Terenure Road North / Eaton Road priority junction	H225	D	B	Medium Positive
R137 Terenure Road North / Terenure Car Park Access / Eagle Hill Avenue priority junction	H250	D	A	Medium Positive
R137 Terenure Road North / Eaton Hall Access / Whitton Road priority junction	H325	C	B	Low Positive
R137 Terenure Road North / St Enda's Road priority junction	H425	C	B	Low Positive
R137 Terenure Road North / Westhampton Place / McMorrough Road priority junction	H475	D	B	Medium Positive
R137 Terenure Road North / Ashdale Road / Brighton Square priority junction	H550	C	B	Low Positive
R137 Harold's Cross Road / Mount Tallant Avenue priority junction	H725	C	B	Low Positive

Junctions	Chainage	Do Minimum LoS	Do Something LoS	Impact
R137 Harold's Cross Road / Brighton Square priority junction	H800	C	B	Low Positive
R137 Harold's Cross Road / Kenilworth Manor priority junction	H900	C	B	Low Positive
R137 Harold's Cross Road / Laundry Lane priority junction	H950	C	B	Low Positive
R137 Harold's Cross Road / Kenilworth Lane West priority junction	H1150	D	B	Low Positive
R137 Harold's Cross Road / Leinster Road West priority junction	H1200	D	B	Medium Positive
R137 Harold's Cross Road / Tivoli Avenue priority junction	H1350	C	A	Medium Positive
R137 Harold's Cross Road / Leinster Road signalised junction	H1400	C	A	Medium Positive
R137 Harold's Cross Road / Mountain View Avenue priority junction	H1450	C	B	Low Positive
Section Summary		**D**	**B**	**Medium Positive**

The contents of Table 6.18 demonstrates that the Proposed Scheme will have a long-term positive impact on the quality of the pedestrian infrastructure between the R137 Terenure Road North and Charleville Road.

The LoS during the Do Minimum scenario ranges between B and F, with 14 of the 37 impacted junctions along this section being given a low D / F rating. These ratings have been determined using the previously referenced assessment criteria set out in Table 6.3.

During the Do Something scenario, i.e. following the development of the Proposed Scheme, all of the impacted junctions along this section achieve the highest A / B ratings. This is as a result of the proposed improvements to the existing pedestrian facilities in the form of additional crossing locations, increased pedestrian directness, provision of traffic calming measures to reduce vehicle speeds, improved accessibility and increased footway and crossing widths. All proposed facilities have been designed in accordance with the principles of DMURS and Building for Everyone: A Universal Design Approach (NDA 2020) with regards to catering for all users, including those with disabilities.

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

6.2.2.1.7.2 Cycling Infrastructure

The following section sets out the qualitative impacts on the cycling receptor for Section 3 of the Proposed Scheme. The results are summarised in Table 6.19, along with the resultant magnitude of impact.

- Removal of the cycle lanes along the R114 Terenure Road East between the R137 Terenure Road North and Rathgar Avenue as an alternative quiet route is proposed via Bushy Park Road, Wasdale Park, Wasdale Grove, Victoria Road, Zion Road and Orwell Road;
- Along Orwell Road, the Proposed Scheme includes 2.0m wide cycle track in both directions to link to the R114 at the R114 Rathgar Road / Orwell Road / R114 Terenure Road East / Rathgar Avenue junction;

- Provision of 1.5m wide cycle track in both directions between Rathgar Avenue and Grosvenor Road.
- At the Charleville Road / R114 Rathgar Road / Grosvenor Road junction, advisory cycle lanes continue through the junction and there is kerb segregation for left-turn movements and right-turn movements will be made in two stages; and
- High quality 2.0m wide cycle track in both directions along the R131 Terenure Road North and Harold's Cross Road. The cycle lanes bypass or continue past on-street parking.
- Upgrade of signalised crossings to toucan crossings at the R114 Rathgar Road / Orwell Road / R114 Terenure Road East / Rathgar Avenue signalised junction;
- Upgrade of signalised crossings to toucan crossings at the R114 Rathgar Road / Frankfort Avenue / Leicester Avenue signalised junction;
- Upgrade of signalised crossing to a toucan crossing on the southern arm of the R137 Terenure Road North / Ashdale Road / Brighton Square junction;
- Upgrade of signalised crossing to a toucan crossing on the southern arm of the R137 Harold's Cross Road / Tivoli Avenue junction;
- Upgrade of signalised crossings to toucan crossings at the R137 Harold's Cross Road / Leinster Road signalised junction; and
- Toucan crossings provided on all arms of the Harold's Cross Road / Kenilworth Park / Kenilworth Square / Rathgar Avenue.

Along Section 3, the Proposed Scheme will provide a 60mm set down kerb segregation between the footway 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. In addition, a full height 120mm upstand kerb between the carriageway and the cycle track is provided as part of the Proposed Scheme (120mm kerb height on the bus lane side and 60mm minimum kerb height on the cycle track side).

Table 6.19 outlines the cycling qualitative assessment along Section 3 of the Proposed Scheme. Please refer to TIA Appendix 4.2 (Cycling Infrastructure Assessment) which outlines in further detail the methodology behind each LoS rating given to the Do Minimum and Do Something scenarios.

Table 6.19: Section 3 – Cycling Impact during Operational Phase

Location	Chainage	Do Minimum LoS	Do Something LoS	Impact
Rathgar Avenue to Grosvenor Road	A2500 - A3650	C	B	Low Positive
R114 Terenure Road East to Eaton Road	H000 - A200	C	A	Medium Positive
Eaton Road to Westhampton Place	H200 - H450	B	A	Low Positive
Westhampton Place to Mount Tallant Avenue	H450 - H700	B	A	Low Positive
Mount Tallant Avenue to Kenilworth Park	H700 - H1050	C	A	Medium Positive
Kenilworth Park to Parkview Avenue (joining Kimmage to City Centre Proposed Scheme)	H1050 - H1550	C	A	Medium Positive
Section Summary		**C**	**A**	**Medium Positive**

Table 6.19 demonstrates that the Proposed Scheme will have a long-term positive impact on the quality of the cycling infrastructure between the R137 Terenure Road North and Charleville Road.

The LoS during the Do Minimum scenario from has been given a B / C. These ratings have been determined using the previously referenced assessment criteria set out in Table 6.6. During the Do Something scenario, i.e. following the development of the Proposed Scheme, all of the impacted junctions along this section achieve the highest A/B ratings. This is due to the proposed improvements to the existing cycling facilities in the form of wider cycle lanes and protected treatment at signalised junctions.

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

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

6.2.2.1.7.3 Bus Infrastructure

This section provides an assessment of the changes in the quality of bus stop infrastructure provision as a result of the Proposed Scheme along the Section 3 of the Proposed Scheme. Any relocations of bus stops which need to be carried through to the EIAR for significance assessment are identified.

There are currently 26 bus stops along the whole Section 3 of the Proposed Scheme. Table 6.11 presents a summary of the changes in the number and location of bus stops along the main Terenure Road East and Rathgar Road spine of Section 3 of the Proposed Scheme. No changes to bus stop locations is being made to the alternative quiet route along this section.

Table 6.20: Section 3 – Overview of Amendments to Bus Stop Locations

Direction	Stop	Chainage	DoSomething	Comment
Inbound	1164	A2000	Retained	N/A
Inbound	1165	A2450	Relocated	This location brings the stop closer to Rathgar Village thus providing better access to the village and improving potential for interchange with Route 80.
Inbound	1166	A2800	Relocated	The proposed location lies in front of gardens with no vehicular entrances, allowing more space for the stop to be located here.
Inbound	1167	A3000	Removed	Stop removed due to close proximity with other bus stops
Inbound	1168	A3200	Retained	N/A
Inbound	1169	A3450	Removed	Stop removed due to close proximity with other bus stops
Outbound	1078	A3450	Removed	Stop removed due to close proximity with other bus stops
Outbound	1079	A3100	Retained	N/A
Outbound	1080	A2600	Removed	Stop removed due to close proximity with other bus stops
Outbound	1081	A2700	Retained	N/A
Outbound	1082	A2400	Retained	N/A
Outbound	1083	A2250	Removed	Stop removed due to close proximity with other bus stops
Outbound	1085	A1950	Retained	N/A

Under the Proposed Scheme, there will be a total of 22 bus stops along Section 3 with two fewer inbound, and two fewer outbound stops, than in the Do Minimum. The layout of new bus stops is considered to better serve the existing and future catchment and be closer to existing and new pedestrian crossing facilities for improved convenience

Table 6.21 outlines a summary of the improvements to the bus stop infrastructure along Section 3 of the Proposed Scheme, with reference to the number and percentage of bus stops that provide each facility in the Do Minimum and Do Something scenarios.

Table 6.21: Section 3 – Overview of Changes in Bus Stop Facilities

Bus Stop Facility	Do Minimum		Do Something		Comment
	No. of Stops	Percentage of Stops	No. of Stops	Percentage of Stops	
RTPI	6	23%	22	100%	It is proposed that all bus stops provide real-time information.
Timetable information	23	88%	22	100%	It is proposed that all bus stops provide timetable information.
Shelter	13	50%	15	68%	It is proposed that all but 7 bus stops along this section is be provided with a shelter.
Seating	9	35%	15	68%	It is proposed that all but 7 bus stops along this section is to be provided with seating.
Accessible Kerbs	24	92%	22	100%	It is proposed that all bus stops provide accessible kerbs.
Indented Drop Off Area	1	4%	0	0%	All stops inline.
Total Stops	**26**		**22**		Four fewer stops along Section 3 compared to the Do Minimum

The contents of Table 6.21 indicate that there are improvements to the bus stop facilities along Section 3 of the Proposed Scheme. All stops along this section will be inline, within dedicated bus lanes along the entirety of the corridor. Improvements in the provision of real-time information, shelters, seating and accessible kerbs at the bus stops throughout Section 3 of the Proposed Scheme are assessed as providing an overall positive impact for bus passengers. All proposed facilities have been designed in accordance with BusConnects Preliminary Design Guidance which has been developed with cognisance to the relevant accessibility guidance.

The Proposed Scheme improves the quality of existing bus infrastructure along Section 3 of the Proposed Scheme, which will provide long term benefits for bus users and aligns with the overarching aim to provide enhanced bus infrastructure on the corridor. The impact for this section of the Proposed Scheme is **Medium Positive**.

6.2.2.1.7.4 Parking and Loading

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

- Currently there are six pay and display and permit spaces on Terenure Road North between West Hampton Place and Ashdale Road. It is proposed that two of these will be removed due to the presence of a cycle lane.
- There are five pay and display parking spaces and four taxi rank spaces on Terenure Road North between Rathmore Villas and Eagle Hill Avenue. It is proposed that all five of the pay and display parking spaces are removed due to the presence of a bus stop and cycle lane Due to the availability of parking on various side streets in the vicinity.
- There are currently fifteen pay and display and permit spaces on Harold's Cross Road between Ashdale Road and Mount Tallant. Proposed changes will reduce this number down to zero due to the presence of a cycle lane.
- The removal of three pay and display and one loading bay space (three vehicles) on Rathagr Road, at Highfield Road. There are a large number of on-street spaces in the vicinity.

The contents of Table 6.22 present a summary of the proposerd changes to parking along Section 1 of the Proposed Scheme.

Table 6.22: Section 3 – Overall Changes in Parking / Loading Spaces

Location	Parking Type	Number of Parking Spaces		
		Do Minimum	Do Something	Change
R137 Terenure Road East (Northern Side);	Pay & display: commercial	6	6	0
	Disabled Bay	1	1	0
Terenure Road North between Terenure Place and Yewland's Terrace	Loading Bay	1 loading bay (2 spaces)	1 loading bay (2 spaces)	0
	Pay & display: commercial	2	2	0
Terenure Road North between Yewland's Terrace and Rathmore Villas	Pay & display: commercial	9	9	0
	Loading Bay	1 loading bay (2 spaces)	0	-1 loading bay (-2 spaces)
Terenure Road North between West Hampton Place and Ashdale Road	Permit Parking Pay & display	6	2	-4
Harold's Cross Road between Ashdale Road and Mount Tallant	Permit Parking Pay & display	15	0	-15
Harold's Cross Road between Kenilworth Lane West and Leinster Road	Pay & display	8	8	0
Terenure Road North between Eagle Hill Avenue and Whitton Road	Loading Bays	1 loading bay (2 spaces)	1 loading bay (2 spaces)	0
	Pay & display: commercial	2	2	0
Between Rathmore Villas and Eagle Hill Ave	Taxi Rank	4	4	0
	Pay & display	5	0	-5
Rathgar Road (between Rathgar Avenue and Rathmines Road Upper)	Permit Parking Pay & display	6	3	-3
	Loading Bays	2 loading bays (6 spaces)	1 loading bay (3 spaces)	-1 loading bay (-3 spaces)
Total		**76**	**44**	**-32**

As shown in Table 6.22, there are approximately 76 current parking spaces affected within the area of the Section 1 of the Proposed Scheme. Under the proposals, 32 parking spaces will be lost, mainly commercial parking spaces. This change is considered to have a **Negligible Impact** due to the low numbers of spaces lost and the presence of a large number of similar types of spaces within proximity to the affected locations. This is considered acceptable in the context of the aim of the Proposed Scheme, to provide enhanced walking, cycling and bus infrastructure on this key access corridor.

6.2.2.1.8 Section 4 – Charleville Road to R137 Dame Street

6.2.2.1.8.1 Pedestrian Infrastructure

The key infrastructure changes to pedestrian links along Section 4 of the Proposed Scheme are summarised as follows:

- Footways with a minimum running width of 2.0m;
- Provision of signalised crossings on the northern arm of the R114 Rathmines Road Lower / R820 Rathmines Road Upper / R114 Rathgar Road signalised Junction; alongside the upgrading to single stage crossings across this junction;

- Signalised crossing added to the southern arm of the R114 Rathmines Road Lower / Leinster Road signalised junction;
- Signalised crossing added to the eastern and western arms of the R114 Richmond Street South / Charlemont Mall / R114 Rathmines Road Lower / Richmond Row signalised junction;
- Signalised crossing added to the southern arm of the R114 Richmond Street South / R111 Cheltenham Place / R114 Rathmines Road Lower / R111 Grove Road signalised junction;
- Signalised crossings added to all arms of the R114 Camden Street Upper / R114 Harcourt Road / R114 Richmond Street South / R811 Harrington Street signalised junction; and
- Removal of slip lanes at the R114 Redmonds Hill / R110 Cuffe Street / R114 Wexford Street / R110 Kevin Street Lower signalised junction.

The assessment of the qualitative impacts on the pedestrian infrastructure for Section 4 of the Proposed Scheme are summarised in Table 6.23. A detailed breakdown of the assessment at each impacted junction, including a list of the junctions which experience no change, can be found in TIA Appendix 4.1 (Pedestrian Infrastructure Assessment).

Table 6.23: Section 4 – Significance of Effects for Pedestrian Impact during Operational Phase

Junctions	Chainage	Do Minimum LoS	Do Something LoS	Impact
R114 Rathmines Road Lower / R820 Rathmines Road Upper / R114 Rathgar Road signalised junction	A3750	E	A	High Positive
R114 Rathmines Road Lower / Wynnefield Road priority junction	A3800	C	B	Low Positive
R114 Rathmines Road Lower / Castlewood Avenue signalised junction	A3820	D	A	Medium Positive
R114 Rathmines Road Lower / Swanville Place priority junction	A3875	C	B	Low Positive
R114 Rathmines Road Lower / Swan Centre Car Park Access / Leinster Square priority junction	A3975	C	B	Low Positive
R114 Rathmines Road Lower / Leinster Road signalised junction	A4250	D	A	Medium Positive
R114 Rathmines Road Lower / Parker Hill / Williams Park priority junction	A4125	C	B	Low Positive
R114 Rathmines Road Lower / Observatory Lane priority junction	A4200	D	B	Medium Positive
R114 Rathmines Road Lower / Military Road priority junction	A4325	C	A	Medium Positive
R114 Rathmines Road Lower / Richmond Hill priority junction	A4375	D	B	Medium Positive
R114 Rathmines Road Lower / Lissenfield priority junction	A4425	C	A	Medium Positive
R114 Rathmines Road Lower / Blackberry Lane priority junction	A4525	D	B	Medium Positive

Junctions	Chainage	Do Minimum LoS	Do Something LoS	Impact
R114 Rathmines Road Lower / Grove Park priority junction	A4600	D	B	Medium Positive
R114 Richmond Street South / R111 Cheltenham Place / R114 Rathmines Road Lower / R111 Grove Road signalised junction	A4675	C	A	Medium Positive
R114 Richmond Street South / Charlemont Mall / R114 Rathmines Road Lower / Richmond Row signalised junction	A4700	C	B	Low Positive
R114 Richmond Street South / Richmond Place South priority junction	A775	C	A	Medium Positive
R114 Richmond Street South / Gordon Place / Lennox Place priority junction	A4875	C	B	Low Positive
R114 Camden Street Upper / R114 Harcourt Road / R114 Richmond Street South / R811 Harrington Street signalised junction	A4975	C	A	Medium Positive
R114 Camden Street Lower / Grantham Street priority junction	A5150	B	A	Low Positive
R114 Camden Street Lower / Camden Place / Pleasants Street priority junction	A5300	C	B	Low Positive
R114 Redmonds Hill / R110 Cuffe Street / R114 Wexford Street / R110 Kevin Street Lower signalised junction	A5550	D	A	Medium Positive
R114 Aungier Street / Digges Street Upper / R114 Redmonds Hill / Bishop Street priority junction	A5625	C	B	Low Positive
R114 Aungier Street / Bishop Street / Peter's Row Ppriority junction	A5650	D	B	Medium Positive
R114 Aungier Street / York Street / Whitefriar Place signalised junction	A5725	C	B	Low Positive
R114 Aungier Street / Longford Street Little / Longford Street Great signalised junction	A5900	C	B	Low Positive
R114 South Great George's Street / Stephen Street Lower / R114 Aungier Street / Stephen Street Upper	A5975	B	A	Low Positive
R114 South Great George's Street / Fade Street priority junction	A6025	C	B	Low Positive
R114 South Great George's Street / Exchequer Street priority junction	A6150	C	B	Low Positive
R114 South Great George's Street / Dame Lane priority junction	A6275	C	B	Low Positive
Section Summary		**C**	**A**	**Medium Positive**

Table 6.23 demonstrates that the scheme will have a long-term positive impact on the quality of the pedestrian infrastructure between Charleville Road and the R137 Dame Street.

The LoS during the Do Minimum scenario ranges between B and E, with nine of the 29 impacted junctions along this section being given a low D / E rating. These ratings have been determined using the previously referenced assessment criteria set out in Table 6.3.

During the Do Something scenario, i.e. following the development of the Proposed Scheme, all 29 of the impacted junctions along this section achieve the highest A / B ratings. This is as a result of the proposed improvements to the existing pedestrian facilities in the form of additional crossing locations, increased pedestrian directness, provision of traffic calming measures to reduce vehicle speeds, improved accessibility and increased footway and crossing widths. All proposed facilities have been designed in accordance with the principles of DMURS and 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 4 of the Proposed Scheme, during the Operational Phase, which aligns with the overarching aim to provide enhanced walking infrastructure on the corridor.

6.2.2.1.8.2 Cycling Infrastructure

The following section sets out the qualitative impacts on the cycling receptor for Section 4 of the Proposed Scheme. The results are summarised in Table 6.24, along with the resultant magnitude of impact.

- Provision of 2m wide cycle track in both directions between Charleville Road and the R111 Grove Road;
- Provision of 2m wide cycle track in both directions between the R111 Grove Road and Harrington Street;
- Provision of a continuous 1.5m wide cycle track in both directions between Grantham Street and the R110 Kevin Street; and
- Provision of 2.0m wide cycle track in both directions between Camden Row and R173 R137 Dame Street.

Along Section 4, the Proposed Scheme will provide a 60mm set down kerb segregation between the footway 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. In addition, a full height 120mm upstand kerb between the carriageway and the cycle track is provided as part of the Proposed Scheme (120mm kerb height on the bus lane side and 60mm minimum kerb height on the cycle track side).

The contents of Table 6.24 outlines the cycling qualitative assessment along Section 4 of the Proposed Scheme. Please refer to TIA Appendix 4.2 (Cycling Infrastructure Assessment) which outlines in further detail the methodology behind each LoS rating given to the Do Minimum and Do Something scenarios.

Table 6.24: Section 4 – Cycling Impact during Operational Phase

Location	Chainage	Do Minimum LoS	Do Something LoS	Impact
Charleville Road to Swanville Place	A3650 - A3850	B	A	Low Positive
Swanville Place to R111 Grove Road	A3850 - A4700	C	A	Medium Positive
R111 Grove Road to R811 Harrington Street	A4700 - A5000	C	A	Medium Positive

Location	Chainage	Do Minimum LoS	Do Something LoS	Impact
R811 Harrington Street to Grantham Street	A5000 - A5150	C	B	Low Positive
Grantham Street to Camden Row	A5150 - A5400	C	B	Low Positive
R110 Kevin Street Lower to Longford Street Great	A5550 - A5900	C	A	Medium Positive
Longford Street Great to Stephen Street Upper	A5900 - A6000	C	A	Medium Positive
Stephen Street Upper to R137 Dame Street	A6000 - A6300	C	A	Medium Positive
Summary		**C**	**A**	**Medium Positive**

Table 6.24 demonstrates that the Proposed Scheme will have a long-term positive impact on the quality of the cycling infrastructure between Charleville Road and the R137 Dame Street. The LoS during the Do Minimum scenario from has been given a B / C. These ratings have been determined using the previously referenced assessment criteria set out in Table 6.6.

During the Do Something scenario, i.e. following the development of the Proposed Scheme, all of the impacted junctions along this section achieve the highest A / B ratings. This is as a result of improved segregation for cyclists and junction treatment in the form of cycle lanes traversing priority junctions and continuing through signalised junctions with protected treatment as part of the Proposed Scheme.

Overall, it is anticipated that there will be **Medium Positive Impact** to the quality of the cycling infrastructure along Section 4 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'.

6.2.2.1.8.3 Bus Infrastructure

This section provides an assessment of the changes in the quality of bus stop infrastructure provision as a result of the Proposed Scheme along Section 4, 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 24 bus stops along Section 4 of the Proposed Scheme. Table 6.11 presents a summary of the changes in the number and location of bus stops along Section 4 of the Proposed Scheme.

Table 6.25: Section 4 – Overview of Amendments to Bus Stop Locations

Direction	Stop	Chainage	DoSomething	Comment
Inbound	1170/4527	A3700	Retained	N/A
Inbound	1069	A3925	Retained	N/A
Inbound	1070	A4125	Relocated	This location allows for an island bus stop to be provided. This location is only 200m from stop 1069, but this is deemed acceptable in this area which is more densely populated and where there are more trip attractors present.
Inbound	1071	A4375	Retained	N/A

Direction	Stop	Chainage	DoSomething	Comment
Inbound	4528	A4550	Retained	N/A
Inbound	1072	A4750	Retained	N/A
Inbound	7577	A5025	Removed	Stop removed due to close proximity with other bus stops
Inbound	1352	A5200	Retained	N/A
Inbound	1353	A5350	Retained	N/A
Inbound	1354	A5650	Retained	N/A
Inbound	1355	A5925	Relocated	This location better serves the Stephen S lower and King St S area as well as improves spacing between stops.
Inbound	7578	A6200	Removed	Stop removed due to close proximity with other bus stops
Inbound	1357	A6200	Relocated	The location better serves the Exchequer St, Georges St and Dame Street area. Additionally, more space is available at this location to provide a better bus stop / footpath arrangement.
Outbound	1282	A6100	Retained	N/A
Outbound	4456	A5800	Retained	N/A
Outbound	7579	A5600	Retained	N/A
Outbound	-	A5375	New	New bus stop approximately 20m south of the Camden Row/ Montague Street/Wexford Street/ Camden Street Lower junction
Outbound	1285	A5175	Retained	N/A
Outbound	1016	A4800	Retained	N/A
Outbound	1017	A4625	Retained	N/A
Outbound	1018	A4400	Retained	N/A
Outbound	1019	A4300	Removed	Stop removed due to close proximity with other bus stops
Outbound	1020	A4150	Retained	N/A
Outbound	1076	A3900	Retained	N/A
Outbound	1077	A3600	Retained	N/A

Under the Proposed Scheme, there will be a total of 22 bus stops along Section 4 with two fewer than in the Do Minimum. The layout of new bus stops is considered to better serve the existing and future catchment and be closer to existing and new pedestrian crossing facilities for improved convenience.

Table 6.26 outlines 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 6.26: Section 4 – Overview of Changes in Bus Stop Facilities

Bus Stop Facility	Do Minimum		Do Something		Comment
	No. of Stops	Percentage of Stops	No. of Stops	Percentage of Stops	
RTPI	19	79%	22	100%	It is proposed that all bus stops provide real-time information.

Bus Stop Facility	Do Minimum		Do Something		Comment
	No. of Stops	Percentage of Stops	No. of Stops	Percentage of Stops	
Timetable information	23	96%	22	100%	It is proposed that all bus stops provide timetable information.
Shelter	14	58%	14	68%	Shelters to be provided in all locations except those which are limited by spatial constraints. This equates to proposed provision at one more bus stop compared to the Do Minimum.
Seating	13	54%	14	68%	Seating to be provided in all locations except those which are limited by spatial constraints. This equates to proposed provision at four more bus stops compared to the Do Minimum.
Accessible Kerbs	22	92%	22	100%	Accessible kerbs provided at all bus stops i.e. equal provision overall to Do Minimum.
Indented Drop Off Area	1	4%	0	0%	All stops inline.
Total Stops	**24**		**22**		Two fewer along Section 4 compared to the Do Minimum

Table 6.26 indicates that there are improvements to the bus stop facilities along Section 4 of the Proposed Scheme. All stops along this section will be inline, within dedicated bus lanes along the entirety of the corridor. Improvements in the provision of real-time information, shelters, seating and accessible kerbs at the bus stops throughout Section 4 of the Proposed Scheme are assessed as providing an overall positive impact for bus passengers. All proposed facilities have been designed in accordance with BusConnects Preliminary Design Guidance which has been developed with cognisance to the relevant accessibility guidance.

The Proposed Scheme improves the quality of existing bus infrastructure along Section 4 of the Proposed Scheme, which will provide long term benefits for bus users and aligns with the overarching aim to provide enhanced bus infrastructure on the corridor. The impact for this section of the Proposed Scheme is **Low Positive**.

6.2.2.1.8.4 Parking and Loading

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

- Increase from four loading bays (14 spaces) to six loading bays (20 parking spaces) on Rathmines Road Lower, between Rathmines Road Upper and Grove Road.
- Removal of four spaces on Military Road, out of 21 residential pay and display spaces. There are a number of side streets which can be used by local residents.
- The reduction from 20 commercial pay and display spaces to 13 on Camden Street Lower due to the presence of a cycle lane.
- The removal of nine commercial pay and display spaces on Wexford Street. Loading bay parking spaces will be reduced from five to two one loading bay).
- There are currently three loading bays (8 spaces) existing on Aungier Street. This is going to be reduced to two loading bays (five spaces).
- On South Great George's Street, there are currently four loading bays (11 spaces), in the proposed scheme this will be reduced down to three loading bays (8 spaces).

Table 6.27 presents a summary of the proposed changes to parking along Section 4 of the Proposed Scheme between the Do Minimum and Do Something scenarios.

Table 6.27: Section 4 – Overall Changes in Parking / Loading Spaces

Location	Parking Type	Number of Parking Spaces		
		Do Minimum	Do Something	Change
Rathmines Road Lower, between Rathmines Road Upper and Grove Road.	Loading Bay	4 loading bays (14 spaces)	6 loading bays (20 spaces)	+ 2 loading bays (+6 spaces)

Location	Parking Type	Number of Parking Spaces		
		Do Minimum	Do Something	Change
Military Road	Loading Bay	1	1	0
	Informal Parking: pay and display residential	21	17	-4
Richmond Street South (between Lennox Street and Harcourt Road and Richmond Street)	Pay & display: commercial	8	8	0
	Loading Bays	3 loading bays (6 spaces)	3 loading bays (6 spaces)	0
Camden Street Lower (between Harcourt Road and Montague Street)	Pay & display: commercial	20	13	-7
	Disabled Bay	0	1	+1
	Loading Bay	4 loading bays (8 spaces)	5 loading bays (11 spaces)	+1 loading bay (+3 spaces)
Wexford Street	Loading Bay	2 loading bays (5 spaces)	1 loading bays (2 spaces)	-1 loading bays (-3 spaces)
	Pay & display: commercial	9	0	-9
	Disabled Bay	1	0	-1
Redmond's Hill	Loading Bay	1 loading bay (5 spaces)	1 loading bay (5 spaces)	0
Aungier Street	Loading Bay	3 loading bays (8 spaces)	2 loading bays (5 spaces)	-1 loading bays (-3 spaces)
South Great George's Street	Loading Bay	4 loading bays (11 spaces)	3 loading bays (8 spaces)	-1 loading bay (-3 spaces)
	Taxi Rank	5	5	0
Total		**122**	**102**	**-20**

As shown in Table 6.27, there are currently approximately 122 parking spaces affected along Section 4 of the Proposed Scheme and is it proposed that 20 of these spaces are removed. The Proposed Scheme will formalise the parking arrangements at these locations to improve the environment, particularly for pedestrians and cyclists. Given the local number of parking spaces being removed and availability of equivalent types of parking along adjacent streets within 200m of these locations (and typically within under 100m), the overall impact of this loss of parking is considered to have a **Low Negative Impact**. This is considered acceptable in the context of the aim of the Proposed Scheme, to provide enhanced walking, cycling and bus infrastructure on this key access corridor.

6.2.2.1.9 Summary of Corridor-Wide Infrastructure Works

6.2.2.1.9.1 Pedestrian Infrastructure

Overall, the Proposed Scheme will provide an average increase in footway area for pedestrians of 25% inbound and 28% outbound across the corridor compared to the Do Minimum scenario. The Proposed Scheme will increase the number of controlled pedestrian crossings from 76 in the Do Minimum to 106 in the Do Something scenario, equating to a 39% increase. Additionally, there will be an increase in the number of raised table crossings on side roads from 30 in the Do Minimum to 105 in the Do Something scenario, equating to a 250% increase.

Cycling Infrastructure

The Proposed Scheme will provide 9.6km inbound and 10.3km outbound of segregated cycle facilities which is an increase from only 1.3km and 1.8km respectively 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.

Overall, total cycle facilities (segregated and non-segregated) will be increased by 112% as part of the Proposed Scheme. The proportion of the corridor with segregated facilities (including quiet street treatment) will increase from 28% in the Do Minimum to 85.4% in the Do Something scenario.

With regards to cycle parking, 220 spaces are provided in the Do Minimum scenario. The Proposed Scheme will increase provision by 49% to a total of 328 spaces across the entire corridor in the Do Something scenario.

6.2.2.1.9.2 Bus Priority Infrastructure

The Proposed Scheme will provide 6.1km inbound and 5.4km outbound of bus lanes across the corridor. This is an increased from 4.4km inbound and 1.5km outbound in the Do Minimum scenario. Bus priority through traffic management will provided along 2.9km inbound and 3.0km outbound across the corridor. This is an increased from 0.1km inbound and 0.3km outbound in the Do Minimum scenario This contributes to an increase of 175% in total bus priority measures in both directions in the Do Something scenario compared to the Do Minimum. Overall, the Proposed Scheme will provide bus priority measures along 87% of the corridor in the Do Something scenario compared to 32% in the Do Minimum scenario.

6.2.2.1.9.3 Parking & Loading

Whilst total parking provision will be reduced by 54 parking spaces and five loading bay spaces as part of the Proposed Scheme, the majority of these are commercial spaces and have a range alternative parking spaces within a 200m vicinity/ on side streets.

6.2.3 Quantitative Assessment

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

- People Movement:
  - Peak Hour People Movement along the Proposed Scheme;
  - People Movement by Bus; and
  - Bus Boarding.
- Bus Network Performance Indicators:
  - Bus Journey Times; and
  - Bus Journey Time Reliability.
- General Traffic Network Performance Indicators:
  - Flow changes on the Direct Study Area; and
  - Redistributed flows and Junction Capacity Outputs on the Indirect Study Area.
- Overall Road Network-Wide Performance Indicators
  - Queuing;
  - Total Travel Times;
  - Total Travel Distance; and
  - Average Network Speed.

6.2.3.1 People Movement

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

undertaken using outputs from the NTA ERM and LAM and comparing the Do Minimum and Do Something peak hour scenarios for each forecast year (2028, 2043).

The assessment of People Movement includes the following metrics:

- The 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 along the route as a result of the Proposed Scheme measures; and
- People Movement by Bus:
  - AM and PM peak hour Bus Passenger Loadings along the Proposed Scheme for each forecast year (2028, 2043); and
  - Total Passengers Boarding Buses on bus routes that use any part of the Proposed Scheme for each forecast year (2028, 2043).

6.2.3.1.1 Peak Hour People Movement along the Proposed Scheme

To determine the impact that the Proposed Scheme has on modal share in 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 hours (8-9am, 5-6pm) for each forecast year (2028, 2043).

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

6.2.3.1.1.1 <u>2028 AM Peak Hour People Movement</u>

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

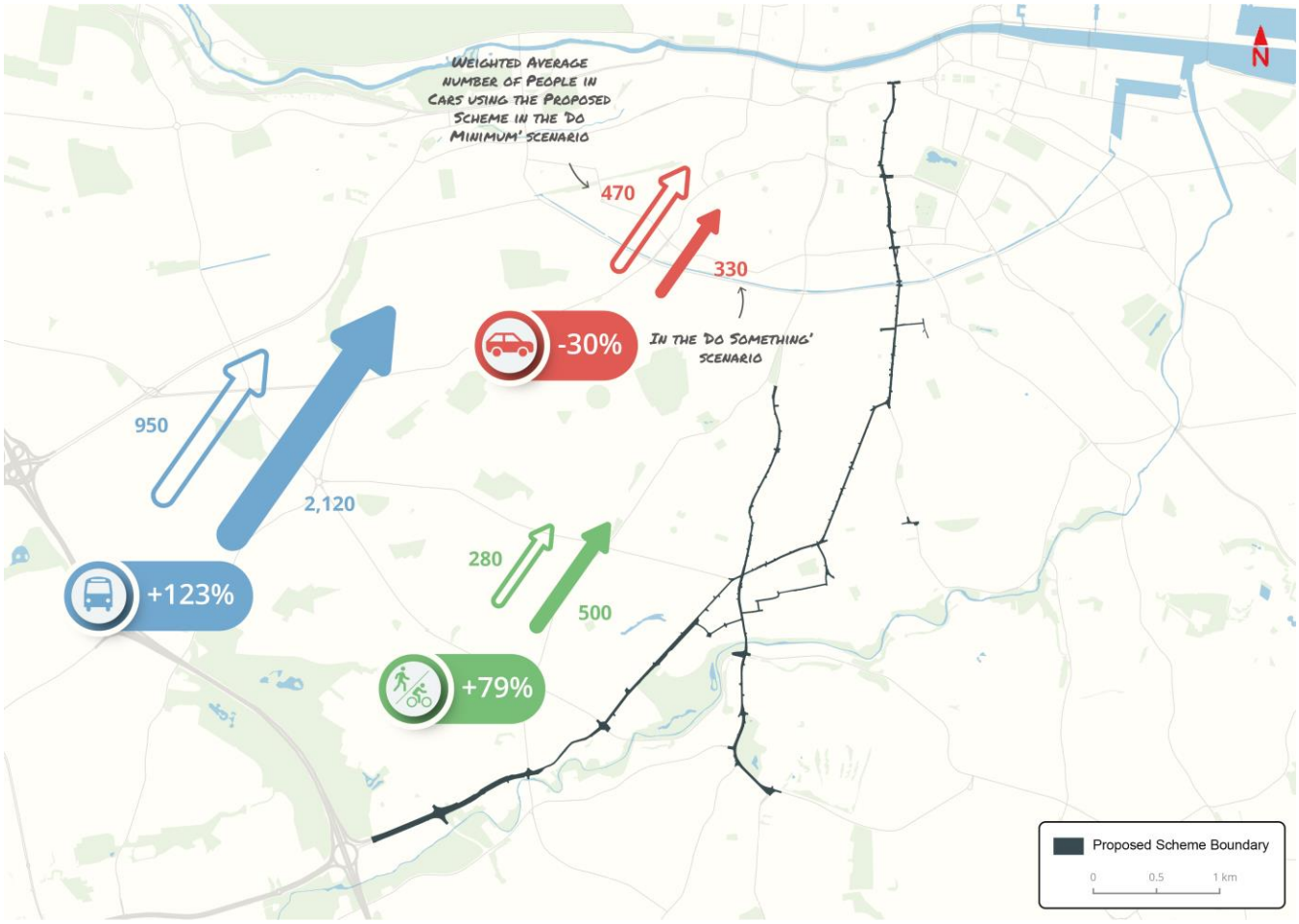

Diagram 6.3: Average People Movement by Mode during 2028 AM Peak Hour

As indicated in Diagram 6.3, there is a reduction of 30% in the number of people travelling via car, an increase of 123% in the number of people travelling via bus and an increase of 79% in people walking or cycling along the Proposed Scheme during the AM Peak Hour.

It should be noted that the model predicts limited change in total walking trips between each scenario. This is due to the fact that growth in walk trips is offset by some walking trips in the Do Minimum scenario transferring to public transport and cycling as a result of the improved provision for these modes with any new pedestrians transferring from car replacing these trips.

The Proposed Scheme will facilitate a step change in the level of segregated cycling provision in comparison with existing conditions along the entire length of the corridor. The transport modelling 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.

Table 6.28 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 74% increase in people moved as a result of the Proposed Scheme and 113% increase in people moved by sustainable modes (Public Transport, Walk, Cycle).

Table 6.28: 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 (%)
		General Traffic	470	28%	330	11%	-140	-30%

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	Public Transport	950	56%	2,120	72%	1,170	123%
		Walking	170	10%	140	5%	-30	-18%
		Cycling	110	6%	360	12%	250	227%
		Combined Walking/Cycling	280	16%	500	17%	220	79%
		Sustainable Modes Total	**1,230**	**72%**	**2,620**	**89%**	**1,390**	**113%**
		Total (All modes)	**1,700**	**100%**	**2,950**	**100%**	**1,250**	**74%**

6.2.3.1.1.2 2028 PM Peak Hour People Movement

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

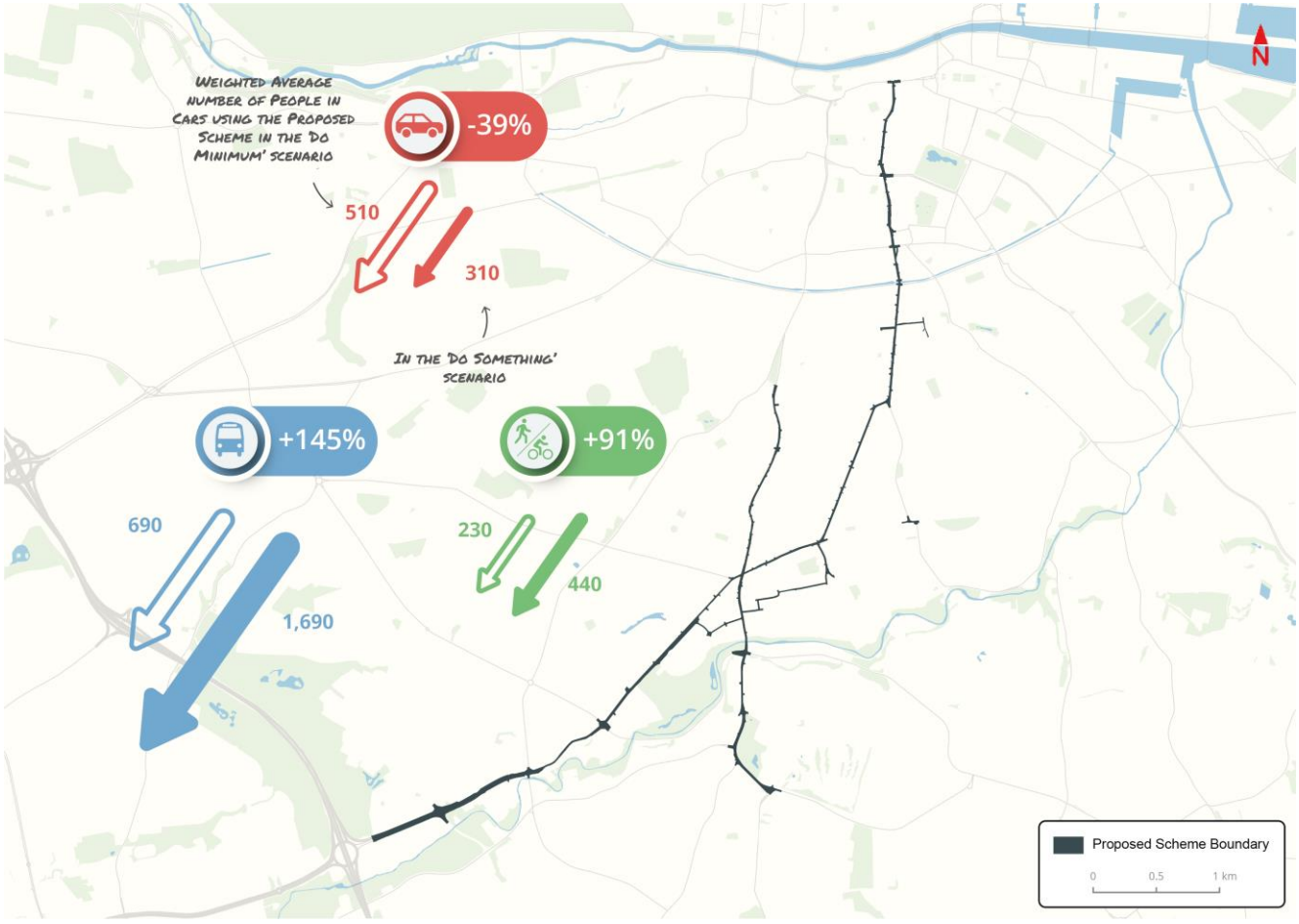

Diagram 6.4: Average People Movement by Mode during 2028 PM Peak Hour

As indicated in Diagram 6.4, there is a reduction of 39% in the number of people travelling via car, an increase of 145% in the number of people travelling via bus and an increase in 91% in the number of people walking or cycling along the Proposed Scheme during the PM Peak Hour. Table 6.29 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 71% increase in people moved as a result of the Proposed Scheme and 132% increase in people moved by sustainable modes (Public Transport, Walk, Cycle).

Table 6.29: Modal Shift of 2028 PM Peak Hour along Proposed Scheme

Direction	Time Period	Mode of Transport	Do Minimum		Do Something		Difference	
			Hourly Trips	Modal Split (%)	Hourly Trips	Modal Split (%)	Hourly Trips	Difference (%)
Outbound from the City Centre	PM Peak Period	General Traffic	510	36%	310	13%	-200	-39%
		Public Transport	690	48%	1,690	69%	1,000	145%
		Walking	150	10%	130	5%	-20	-13%
		Cycling	80	6%	310	13%	230	288%
		Combined Walking/Cycling	230	16%	440	18%	210	91%
		Sustainable Modes Total	**920**	**64%**	**2,130**	**87%**	**1,210**	**132%**
		Total (All modes)	**1,430**	**64%**	**2,440**	**87%**	**1,010**	**71%**

6.2.3.1.1.3 2043 AM Peak Hour People Movement

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

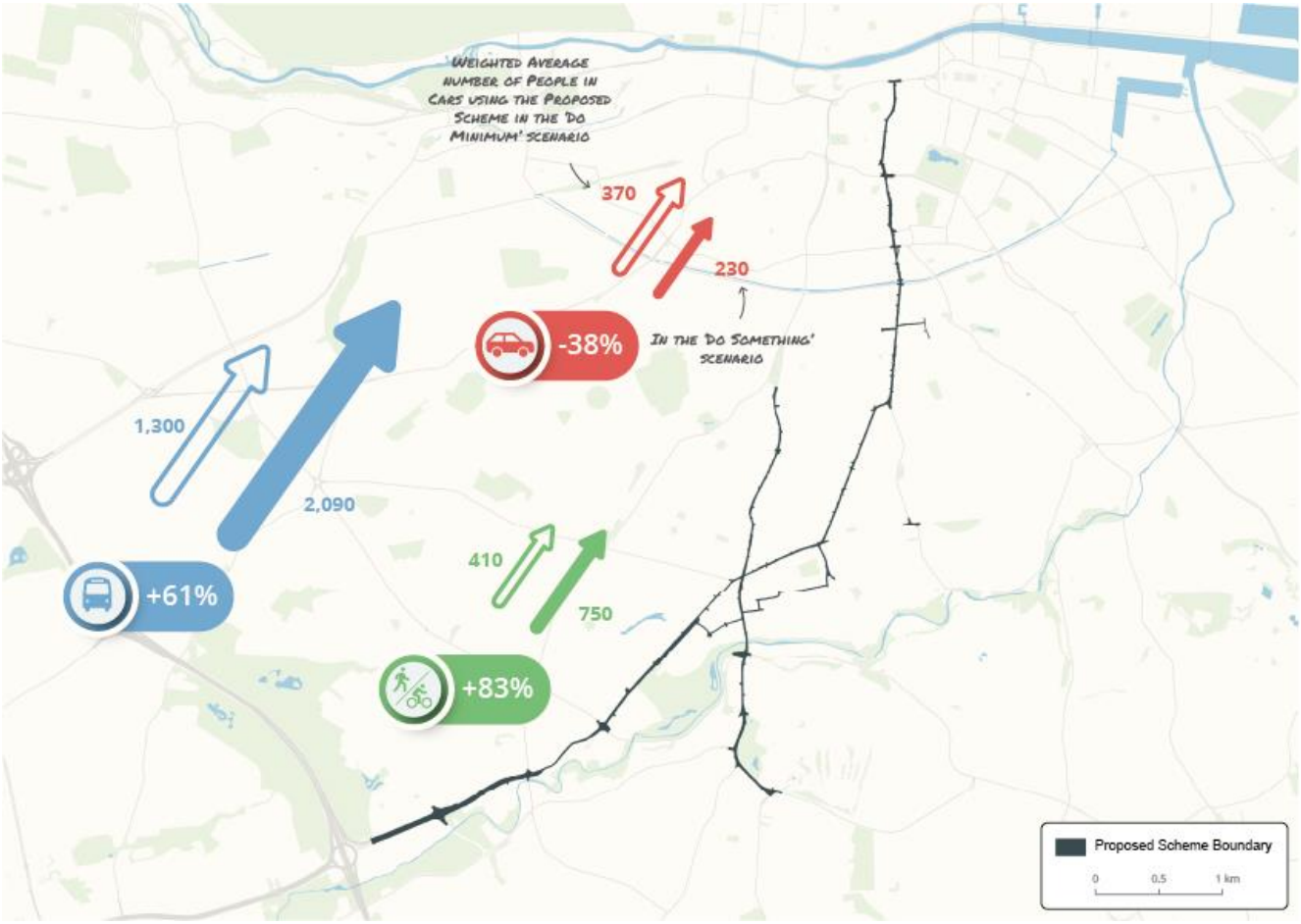

Diagram 6.5: Average People Movement by Mode during 2043 AM Peak Hour

As indicated in Diagram 6.5, there is a decrease of 38% in the number of people travelling via car, an increase of 61% in the number of people travelling via bus and an increase of 83% in the number of people walking and cycling along the Proposed Scheme during the AM Peak Hour. Table 6.30 outlines the difference in modal split between the Do Minimum and Do Something scenarios for each mode of travel in an inbound direction towards

the City Centre during the AM Peak Hour. The results indicate an 48% increase in people moved as a result of the Proposed Scheme and 67% increase in people moved by sustainable modes (Public Transport, Walk, Cycle).

Table 6.30: Modal Shift of 2043 AM Peak Hour along Proposed Scheme

Direction	Time Period	Mode of Transport	Do Minimum		Do Something		Difference	
			Hourly Trips	Modal Split (%)	Hourly Trips	Modal Split (%)	Hourly Trips	Difference (%)
Inbound towards the City Centre	AM Peak Period	General Traffic	370	18%	231	7%	-140	-38%
		Public Transport	1,298	62%	2,094	68%	797	61%
		Walking	196	9%	207	7%	12	6%
		Cycling	215	10%	546	18%	331	154%
		Combined Walking/Cycling	411	20%	753	24%	342	83%
		Sustainable Modes Total	**1,708**	**82%**	**2,847**	**93%**	**1,139**	**67%**
		Total (All modes)	**2,079**	**100%**	**3,078**	**100%**	**999**	**48%**

6.2.3.1.1.4 2043 PM Peak Hour People Movement

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

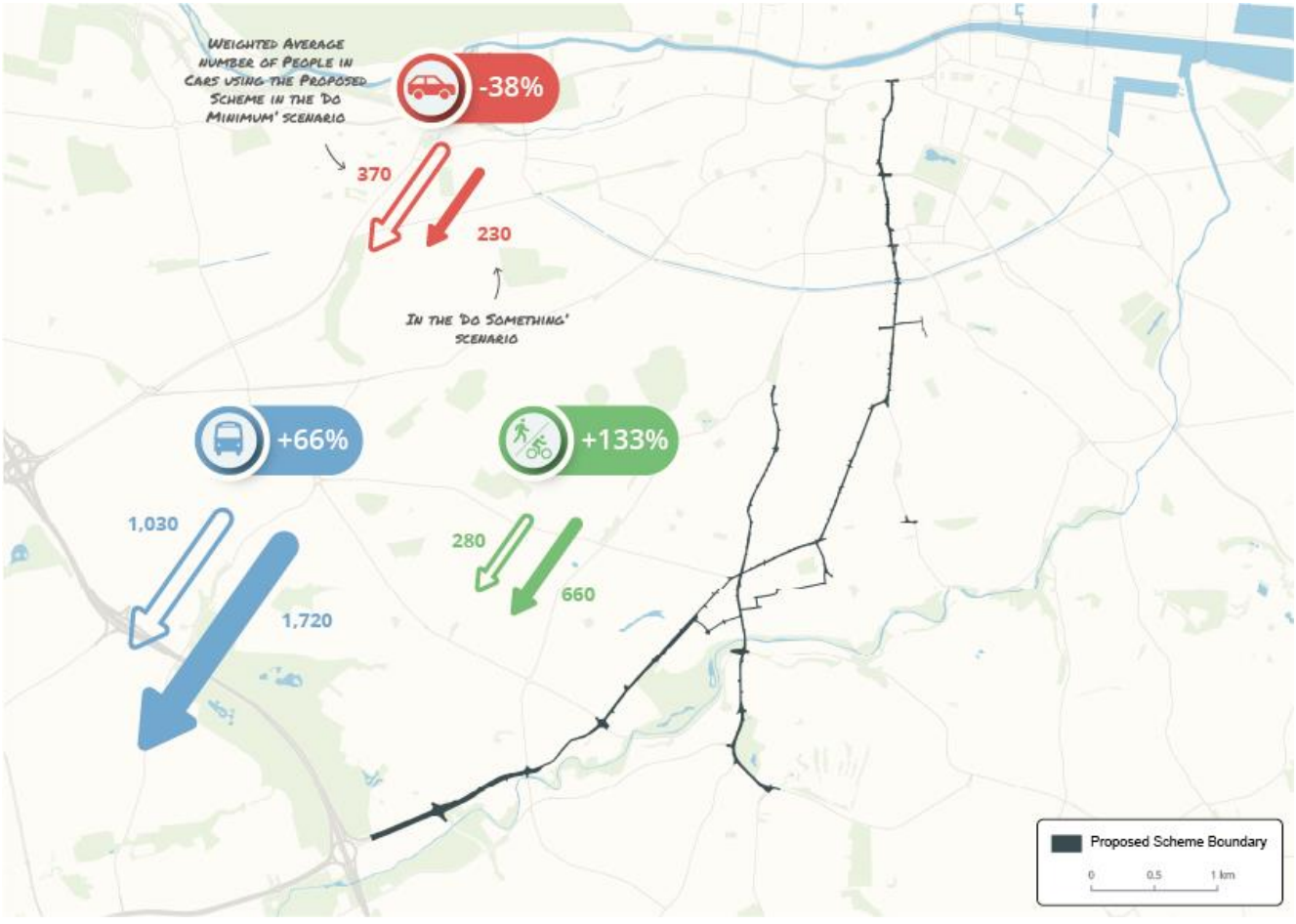

Diagram 6.6: Average People Movement by Mode during 2043 PM Peak Hour

As indicated in Diagram 6.6, there is a decrease of 38% in the number of people travelling via car, an increase of 66% in the number of people travelling via bus and an increase of 133% in the number of people walking and cycling along the Proposed Scheme during the PM Peak Hour. Table 6.31 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 55% increase in people moved as a result of the Proposed Scheme and 81% increase in people moved by sustainable modes (Public Transport, Walk, Cycle).

Table 6.31: 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	369	22%	230	9%	-139	-38%
		Public Transport	1,032	61%	1,715	66%	684	66%
		Walking	86	5%	173	7%	88	102%
		Cycling	198	12%	488	19%	289	146%
		Combined Walking/Cycling	284	17%	661	25%	377	133%
		Sustainable Modes Total	**1,316**	**78%**	**2,376**	**91%**	**1,061**	**81%**
		Total (All modes)	**1,685**	**100%**	**2,606**	**100%**	**921**	**55%**

6.2.3.1.2 People Movement by Bus

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

6.2.3.1.2.1 2028 AM Peak Hour Bus Passengers

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

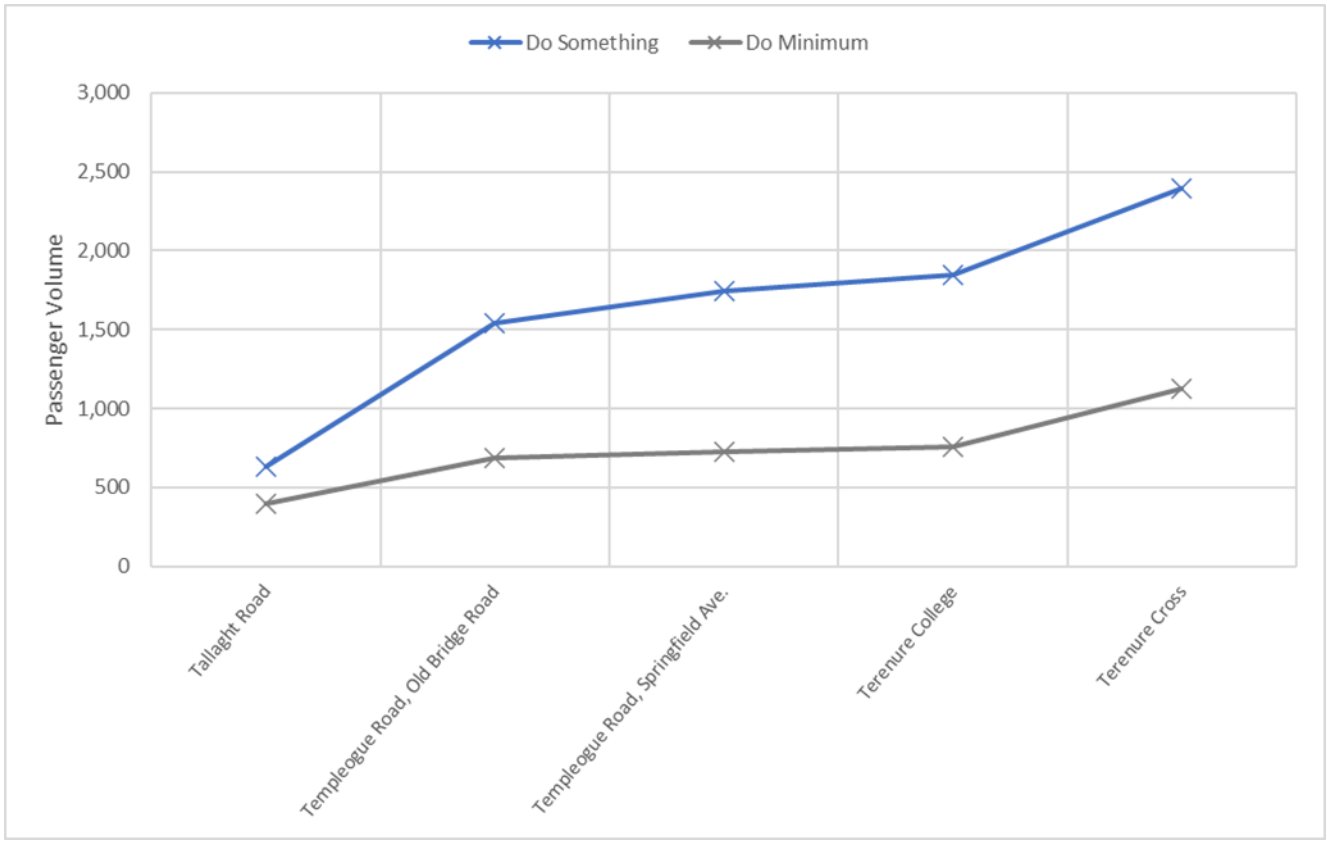

Diagram 6.7: 2028 AM Peak Hour Passenger Volume Along Proposed Scheme (inbound direction – Templeogue to Terenure)

Diagram 6.7 shows higher levels of bus passenger loadings along the Templeogue to Terenure section of the Proposed Scheme with a peak at Terenure Cross where the volume of passengers reaches 2,400 passengers in the AM Peak hour, compared to approximately 1,100 in the Do Minimum scenario.

The increase in bus passengers remains at a high level along this section of the Proposed Scheme with approximately 1,000 additional users on most of the corridor, compared to the Do Minimum scenario.

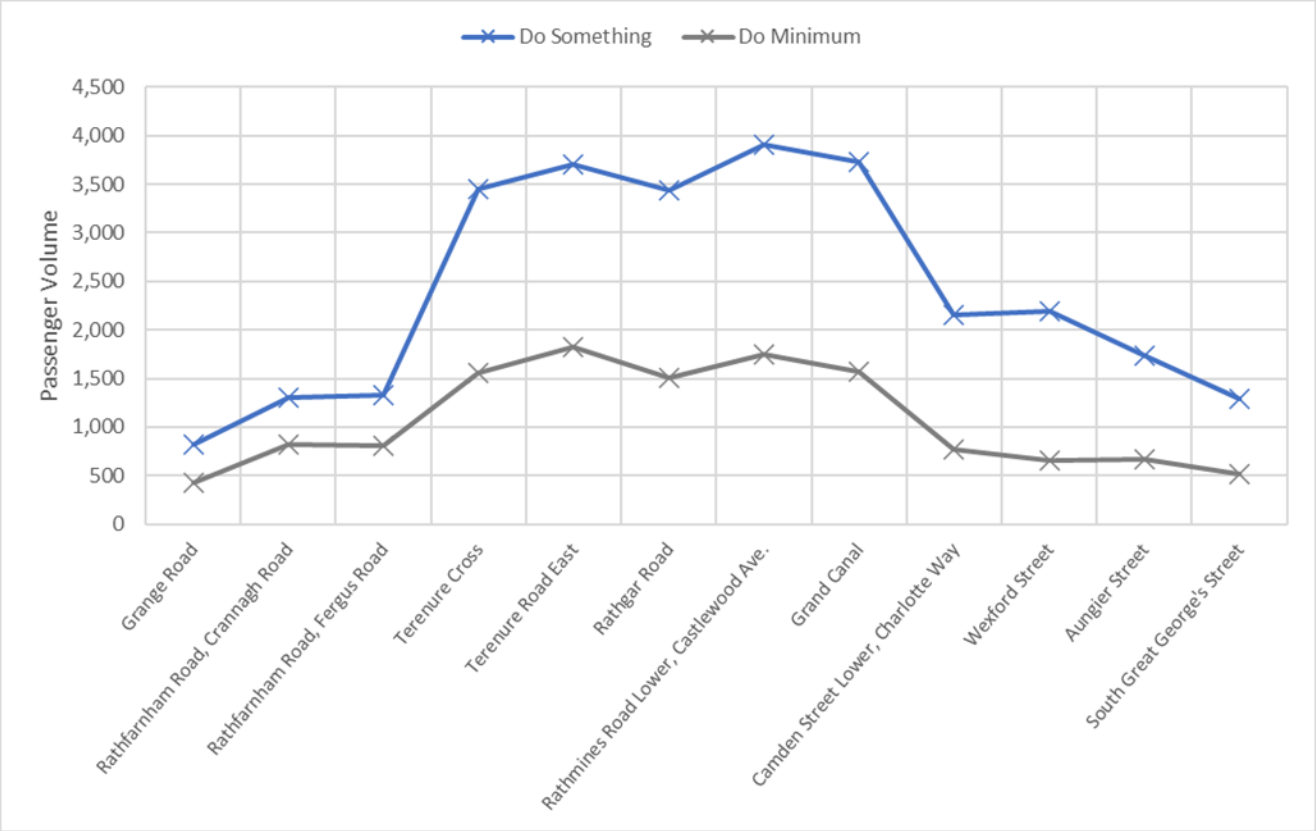

Diagram 6.8: 2028 AM Peak Hour Passenger Volume Along Proposed Scheme (inbound direction – Rathfarnham to City Centre)

Diagram 6.8 shows higher levels of bus passenger loadings along the Rathfarnham to City Centre section of the Proposed Scheme with a large increase at Terenure Cross where the two corridors join (the A2 and A4 services merge with the A1 and A3 services) and a peak at Rathmines Road Lower / Castlewood Avenue where the volume of passengers reaches 3,900 passengers in the AM Peak hour, compared to approximately 1,700 in the Do Minimum scenario.

The increase in bus passengers remains at a high level along the Proposed Scheme with approximately 2,000 additional users on the corridor between Terenure Cross and the Grand Canal, compared to the Do Minimum scenario.

6.2.3.1.2.2 2028 PM Peak Hour Bus Passengers

Diagram 6.9 and Diagram 6.10 present the passenger loading profile comparing the Do Minimum and Do Something scenarios in the PM Peak Hour in the outbound direction in 2028.

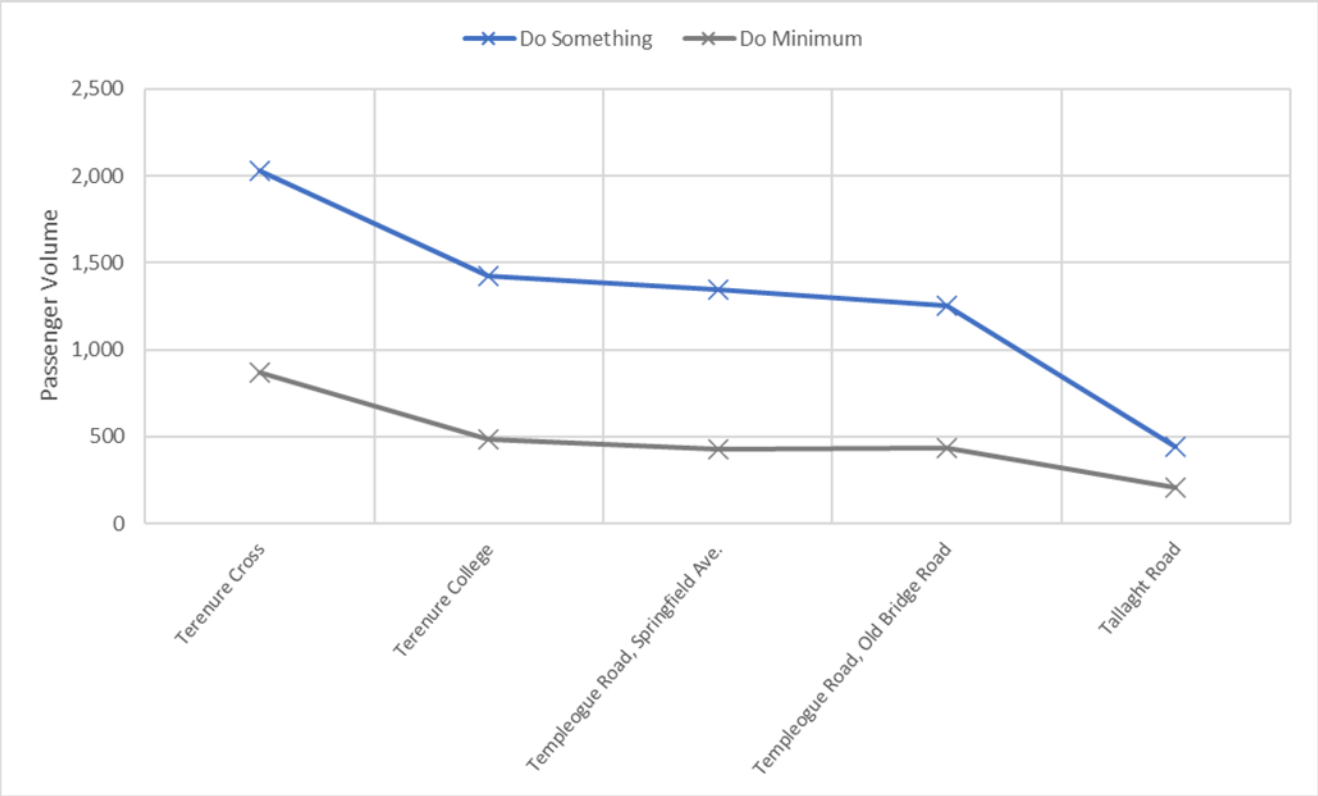

Diagram 6.9: 2028 PM Peak Hour Passenger Volume Along Proposed Scheme (outbound direction – Templeogue to Terenure)

Diagram 6.9 shows higher levels of bus passenger loadings along the Templeogue to Terenure section of the Proposed Scheme with a peak at Terenure Cross where the volume of passengers reaches 2,000 in the PM Peak hour, compared to approximately 850 in the Do Minimum scenario.

The increase in bus passengers remains at a high level along this section of the Proposed Scheme with approximately 1,000 to 1,200 additional users on most of the corridor, compared to the Do Minimum scenario.

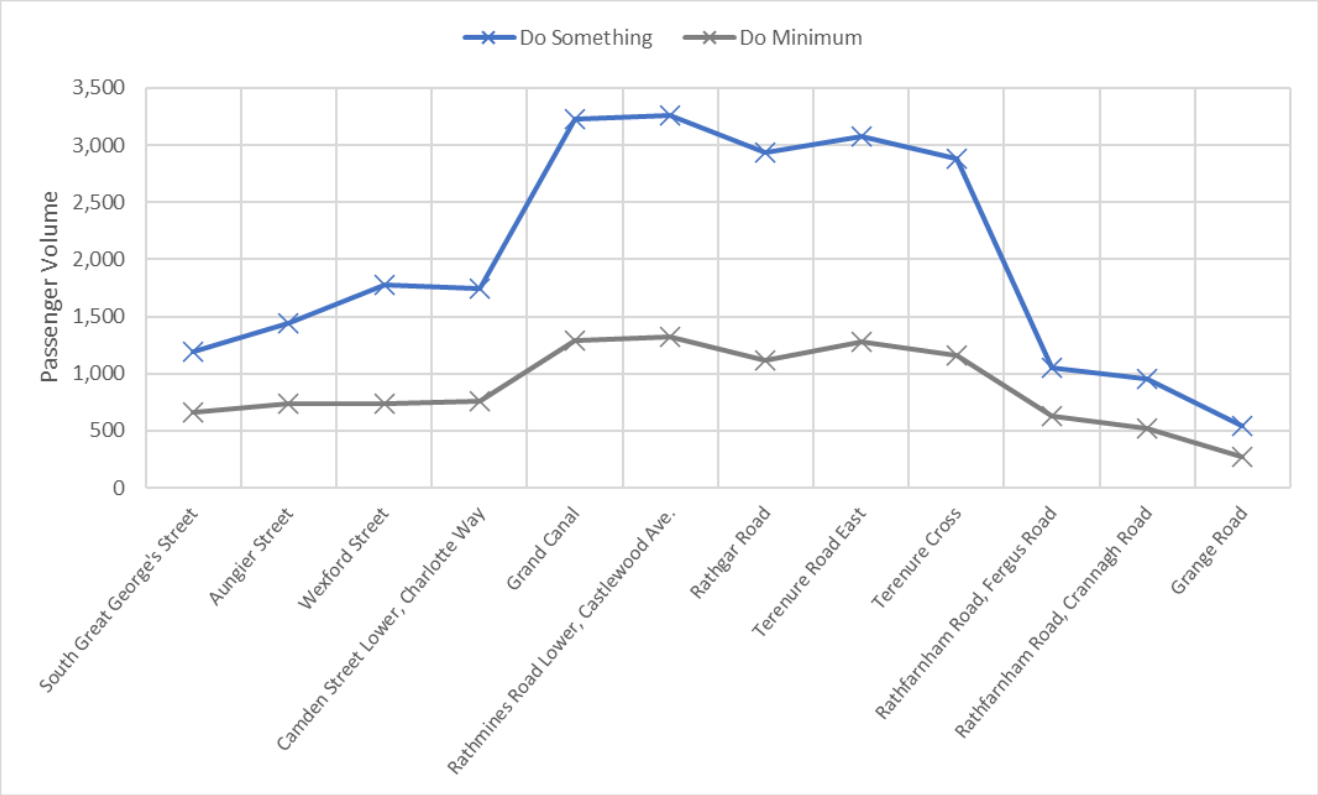

Diagram 6.10: 2028 PM Peak Hour Passenger Volume Along Proposed Scheme (outbound direction – Rathfarnham to City Centre)

Diagram 6.10 shows higher levels of bus passenger loadings along the Rathfarnham to City Centre section of the Proposed Scheme with a peak at the intersection with the Grand Canal, where the volume of passengers reaches 3,200 in the PM Peak hour, compared to approximately 1,300 in the Do Minimum scenario.

The increase in bus passengers remains at a high level along the Proposed Scheme with approximately 2,000 additional users on the corridor between the Grand Canal and Terenure Cross, compared to the Do Minimum scenario.

6.2.3.1.2.3 2043 AM Peak Hour Bus Passengers

Diagram 6.11 and Diagram 6.12 present the passenger loading profile comparing the Do Minimum and Do Something scenarios in the AM Peak Hour in the inbound direction in 2043.

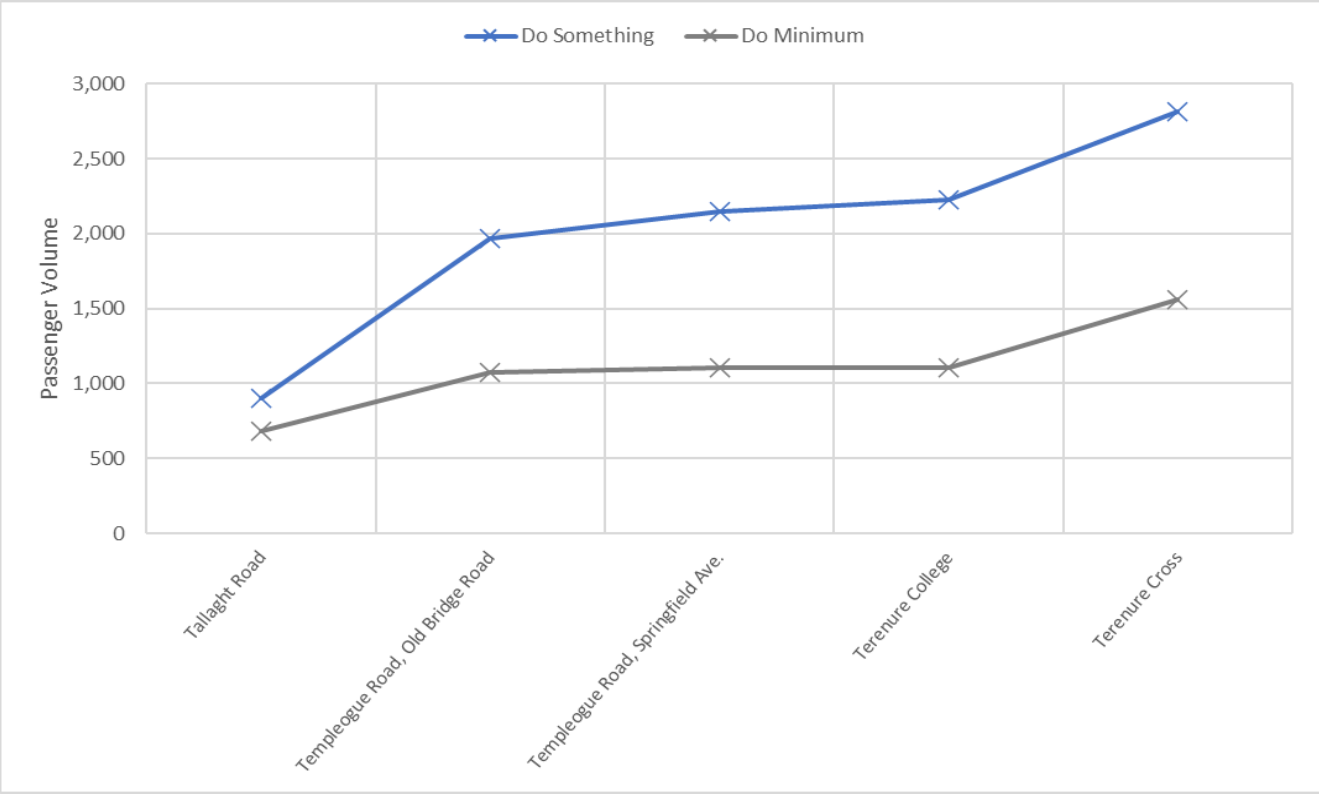

Diagram 6.11: 2043 AM Peak Hour Passenger Volume Along Proposed Scheme (inbound direction – Templeogue to Terenure)

Diagram 6.11 shows higher levels of bus passenger loadings along the Templeogue to Terenure section of the Proposed Scheme with a peak at Terenure Cross where the two corridors join (the A2 and A4 services merge with the A1 and A3 services) and where the volume of passengers reaches 2,900 in the AM Peak hour, compared to approximately 1,600 in the Do Minimum scenario.

The increase in bus passengers remains at a high level along this section of the Proposed Scheme with approximately 1,000 to 1,400 additional users on most of the corridor, compared to the Do Minimum scenario.

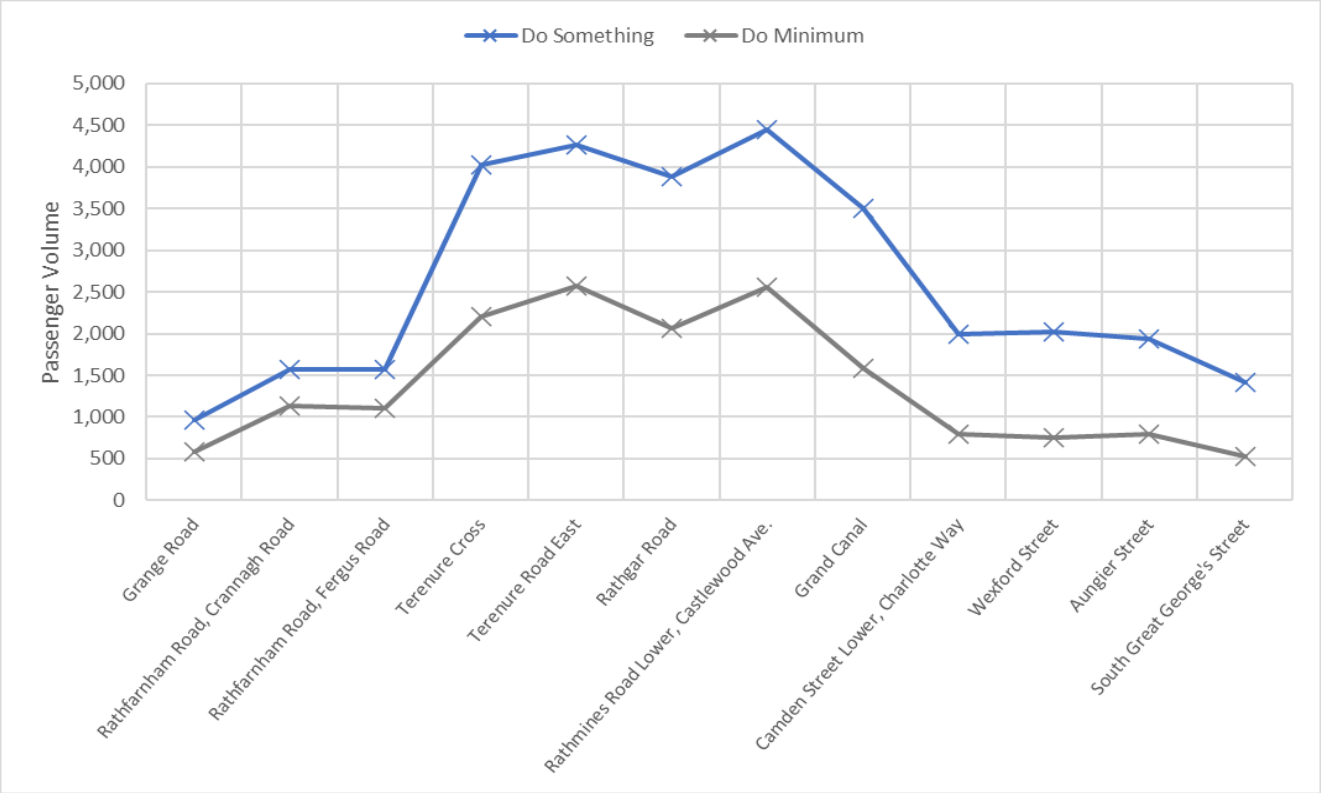

Diagram 6.12: 2043 AM Peak Hour Passenger Volume Along Proposed Scheme (inbound direction – Rathfarnham to City Centre)

Diagram 6.12 shows higher levels of bus passenger loadings along the Rathfarnham to City Centre section of the Proposed Scheme with a peak at the intersection between Rathmines Road Lower and Castlewood Avenue where the volume of passengers reaches 4,500 in the AM Peak hour, compared to approximately 2,500 in the Do Minimum scenario.

The increase in bus passengers remains at a high level along this section of the Proposed Scheme with approximately 2,000 additional users on the corridor between Terenure Cross and the Grand Canal, compared to the Do Minimum scenario.

6.2.3.1.2.4 2043 PM Peak Hour Bus Passengers

Diagram 6.13 and Diagram 6.14 present the passenger loading profile comparing the Do Minimum and Do Something scenarios in the PM Peak Hour in the outbound direction in 2043.

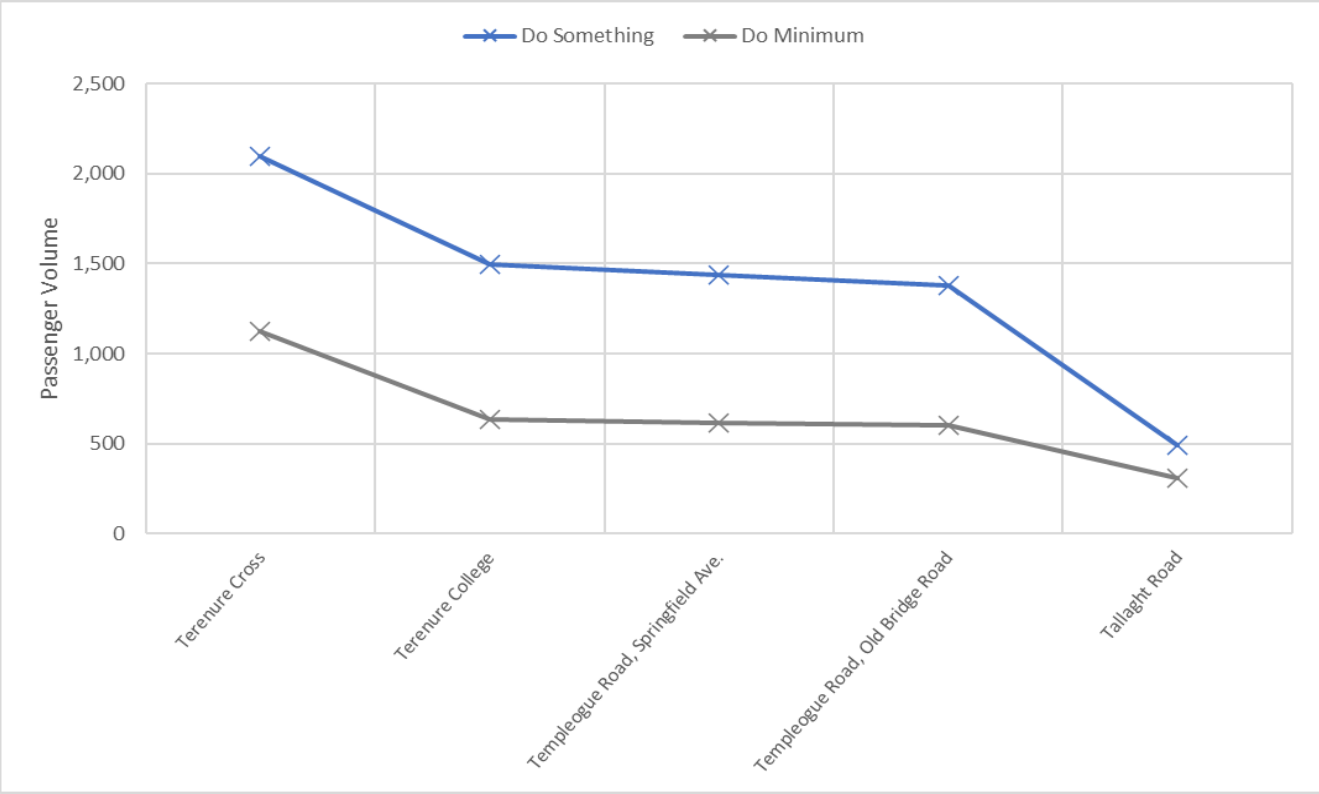

Diagram 6.13: 2043 PM Peak Hour Passenger Volume Along Proposed Scheme (outbound direction – Templeogue to Terenure)

Diagram 6.13 shows higher levels of bus passenger loadings along the Terenure to Templeogue section of the Proposed Scheme with a peak at Terenure Cross where the two corridors join (the A2 and A4 services merge with the A1 and A3 services) and where the volume of passengers reaches 2,300 in the PM Peak hour, compared to approximately 1,100 in the Do Minimum scenario.

The increase in bus passengers remains at a high level along this section of the Proposed Scheme with approximately 1,000 to 1,300 additional users on most of the corridor, compared to the Do Minimum scenario.

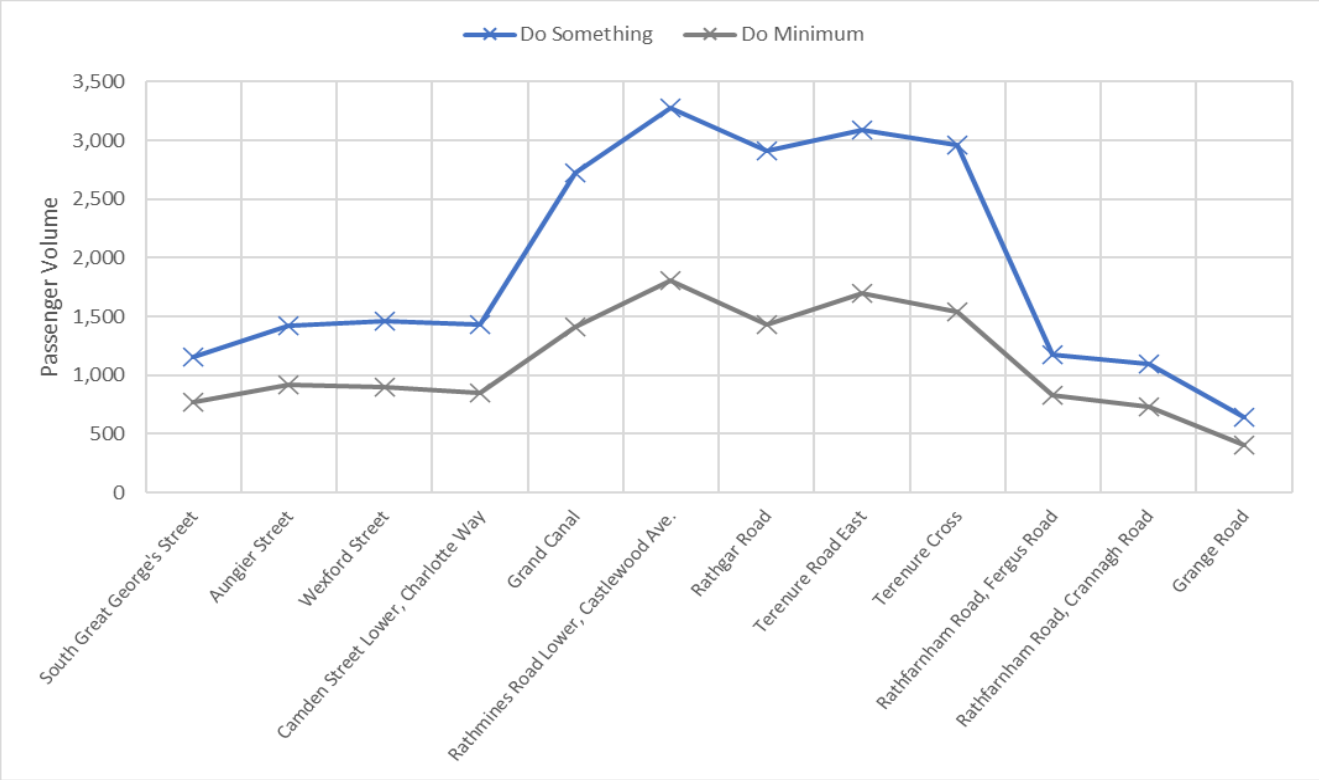

Diagram 6.14: 2043 PM Peak Hour Passenger Volume Along Proposed Scheme (outbound direction – Rathfarnham to City Centre)

Diagram 6.14 shows higher levels of bus passenger loadings along the Rathfarnham to City Centre section of the Proposed Scheme with a peak at the intersection between Rathmines Road Lower and Castlewood Avenue where the volume of passengers reaches 33,300 in the PM Peak hour, compared to approximately 1,800 in the Do Minimum scenario.

The increase in bus passengers remains at a high level along the Proposed Scheme with approximately 2,000 additional users on the corridor between the Grand Canal and Terenure Cross, compared to the Do Minimum scenario.

6.2.3.1.2.5 Bus Boardings

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

Table 6.32: 2028 Peak Hour Bus Boardings on Routes using the Proposed Scheme (inc. boarding at stops outside Proposed Scheme)

Time Period	Do Minimum	Do Something	Difference in Boardings	Difference (%)
AM Peak Hour	18,900	21,680	2,780	14.7%
PM Peak Hour	14,180	16,580	2,400	16.9%

Table 6.32 shows that there will be a 14.7% increase in people boarding bus routes which use the Proposed Scheme during the AM Peak Hour. This represents an addition of 2,780 passengers in the AM Peak hour.

In the PM Peak hour, there will be a 16.9% increase in people boarding bus routes which use the Proposed Scheme, representing an additional 2,400 passengers.

Table 6.33: 2043 Peak Hour Bus Boardings on Routes using the Proposed Scheme (inc. boarding at stops outside Proposed Scheme)

Time Period	Do Minimum	Do Something	Difference in Boardings	Difference (%)
AM Peak Hour	21,600	23,870	2,270	10.51%
PM Peak Hour	16,329	18,200	1,871	11.46%

Table 6.33 shows that there will be a 10.5% increase in people boarding bus routes which use the Proposed Scheme during the AM Peak Hour. This represents an addition of 2,270 passengers in the AM Peak hour.

In the PM Peak hour, there will be a 11.5% increase in people boarding bus routes which use the Proposed Scheme, representing an additional 1,871 passengers.

People Movement - Significance of Impact

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

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

6.2.3.1.3 Operational Impacts for Bus Passengers and Operators

6.2.3.1.3.1 Overview

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

Due to the stochastic nature of the micro-simulation software, model outputs based on the average of 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.

The results for bus services using the Templeogue to Terenure and Rathfarnham to City Centre sections of the Proposed Scheme have been presented separately so that bus services using the whole length of each section of the Proposed Scheme can be assessed.

Templeogue to Terenure Section

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

To give an overview of how the Proposed Scheme will impact on bus journey times along the corridor, outputs for the A3 service, which traverses the length of the Terenure section of Proposed Scheme, have been extracted from the model. As outlined in Section 6.4.3.1 the assessment is based in the context of the full implementation of the BusConnects network re-design in both the Do Minimum and Do Something scenarios, with this section of the Proposed Scheme servicing the A-Spine services.

Inbound Direction

Average journey times for the inbound A3 service in 2028 Opening Year and in 2043 Design Year can be seen in Table 6.34. A breakdown of the changes in average journey times for all other bus services using the Proposed Scheme can be found in Appendix A6.4.3 (Average Bus Journey Times).

Table 6.34: A3 Service Bus Average Journey Times (Inbound Direction)

Peak Hour	Do Minimum (minutes)	Do Something (minutes)	Difference (minutes)	% Difference
2028 AM	11.7	10.1	-1.6	-14%
2028 PM	11.0	9.9	-1.1	-10%
2043 AM	10.7	10.0	-0.7	-7%
2043 PM	10.8	9.8	-1.0	-9%

Additional information regarding the range of journey times (minimum, maximum, average and standard deviation) for inbound A3 buses in the Do Minimum (red) and Do Something (blue) can be seen in Table 6.35 and Diagram 6.15. Each dot in the diagram represents the journey time for each individual bus in each scenario. A larger range of journey times are an indication of lower levels of reliability in a given scenario.

Table 6.35: A3 Service – Range of Journey Times (Inbound Direction)

Peak Hour	Do Minimum				Do Something			
	MIN	MAX	AVG	STDEV	MIN	MAX	AVG	STDEV
2028 AM	8.9	14.3	11.7	1.2	8.7	12.8	10.1	0.9
2028 PM	9.0	13.3	11.0	1.0	8.2	12.2	9.9	0.8
2043 AM	8.7	14.0	10.7	1.0	8.4	12.1	10.0	0.7
2043 PM	8.6	12.8	10.8	0.9	8.2	11.2	9.8	0.7

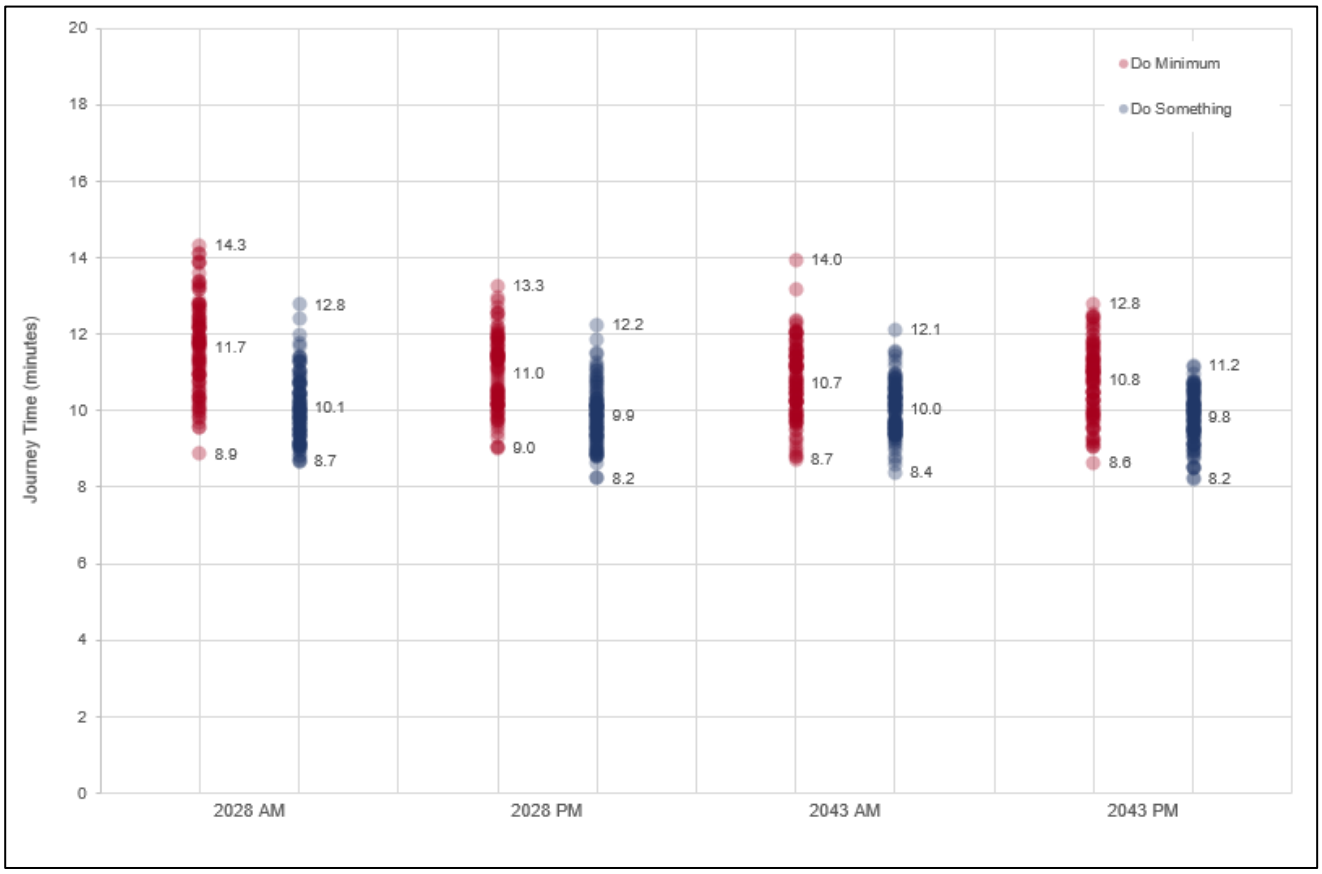

Diagram 6.15: A3 Bus Journey Times (Inbound Direction)

Based on the results presented in Table 6.34 the Proposed Scheme will deliver average inbound journey time savings for A3 service bus passengers of up to 1.6 minutes (14%) in 2028 (AM) and 0.7 minutes (7%) in 2043

(AM). Furthermore, results presented in Diagram 6.15 suggest an improvement in bus journey time reliability in all four scenarios, as indicated by the reduced ranges of journey times achieved with the individual durations focused much closer to the average journey times (lower standard deviation) in the Do Something scenario (blue dots) with the Proposed Scheme in place compared to the more dispersed range in the Do Minimum scenario (red dots).

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

A comparison of average Do Minimum and Do Something inbound journey times are also illustrated in the cumulative time-distance graphs shown in Diagram 6.16 to Diagram 6.19. Note that the cumulative time-distance graphs are also based on the A3 service, which captures the full extent of this section of the Proposed Scheme to Rathfarnham Road.

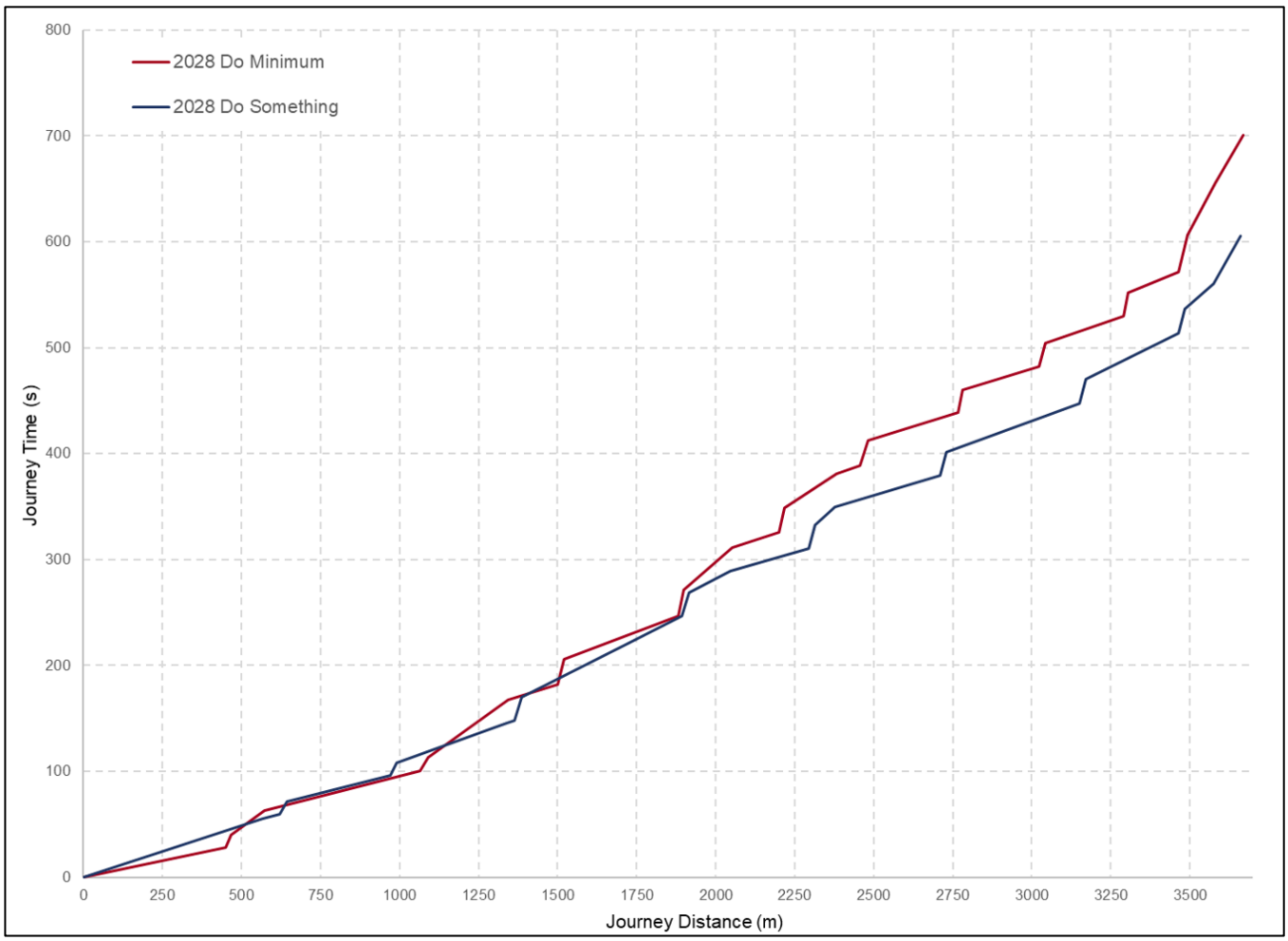

Diagram 6.16: A3 Bus Journey Time (2028 AM, Inbound)

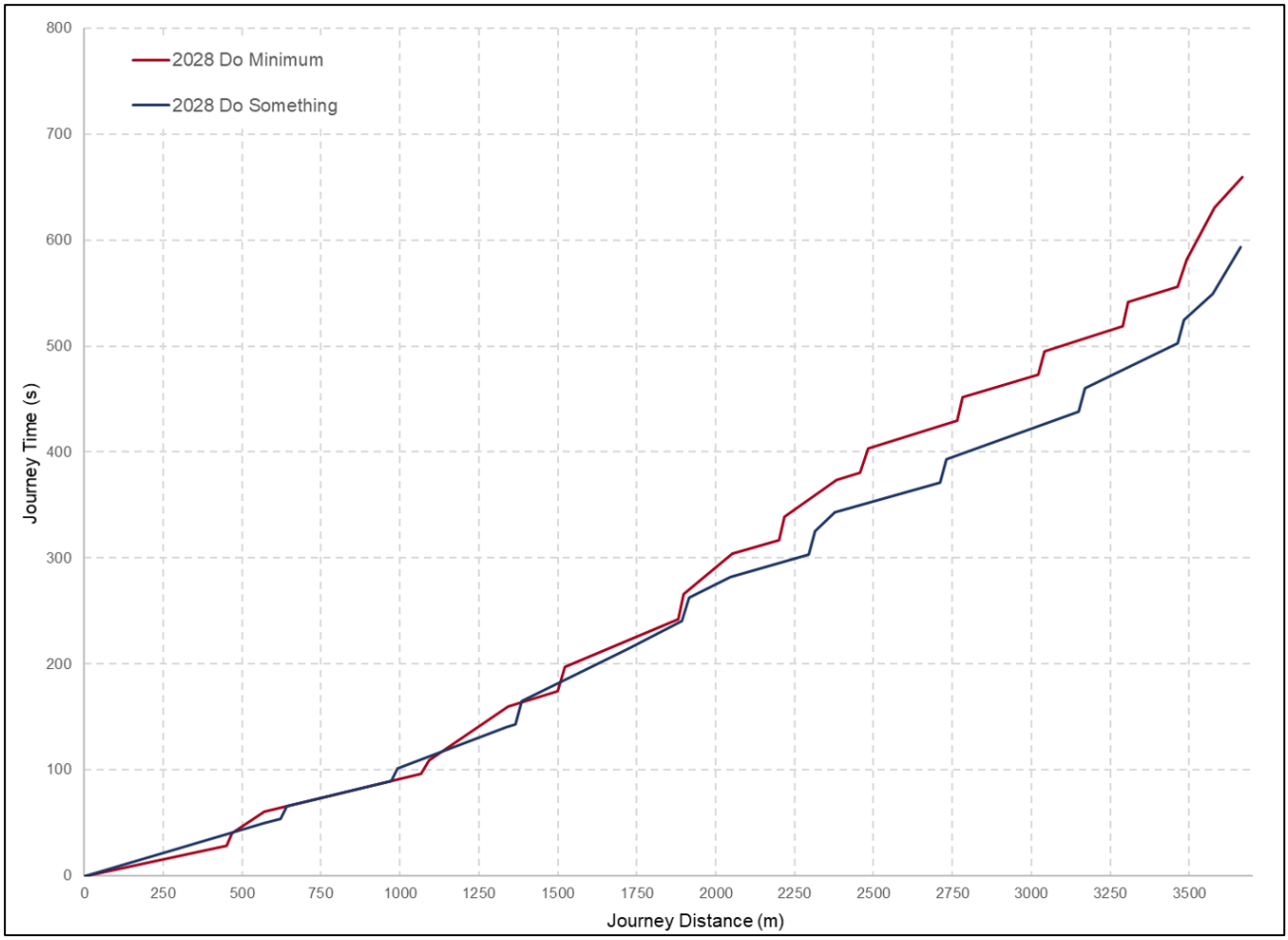

Diagram 6.17: A3 Bus Journey Time (2028 PM, Inbound)

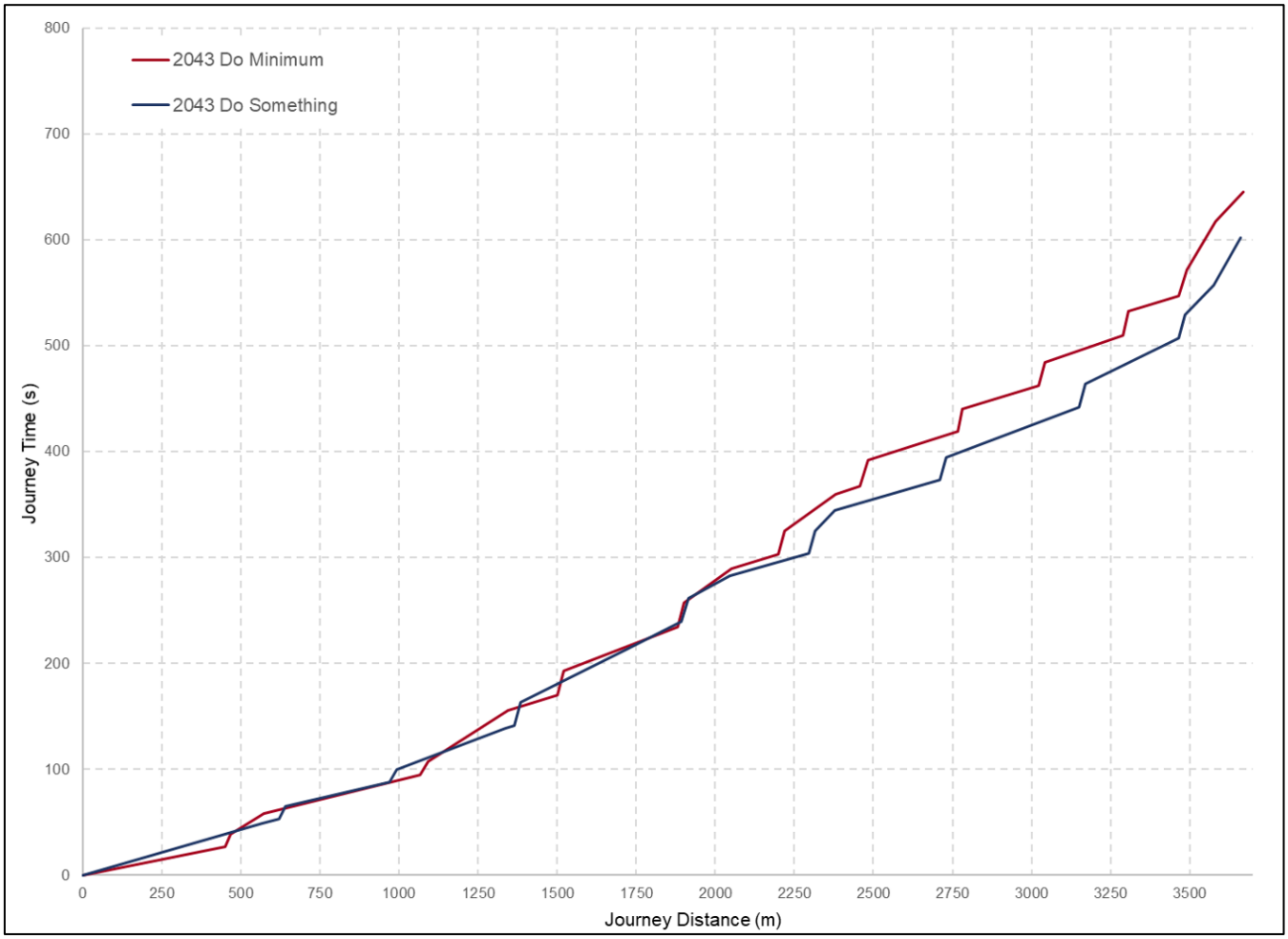

Diagram 6.18: A3 Bus Journey Time (2043 AM, Inbound)

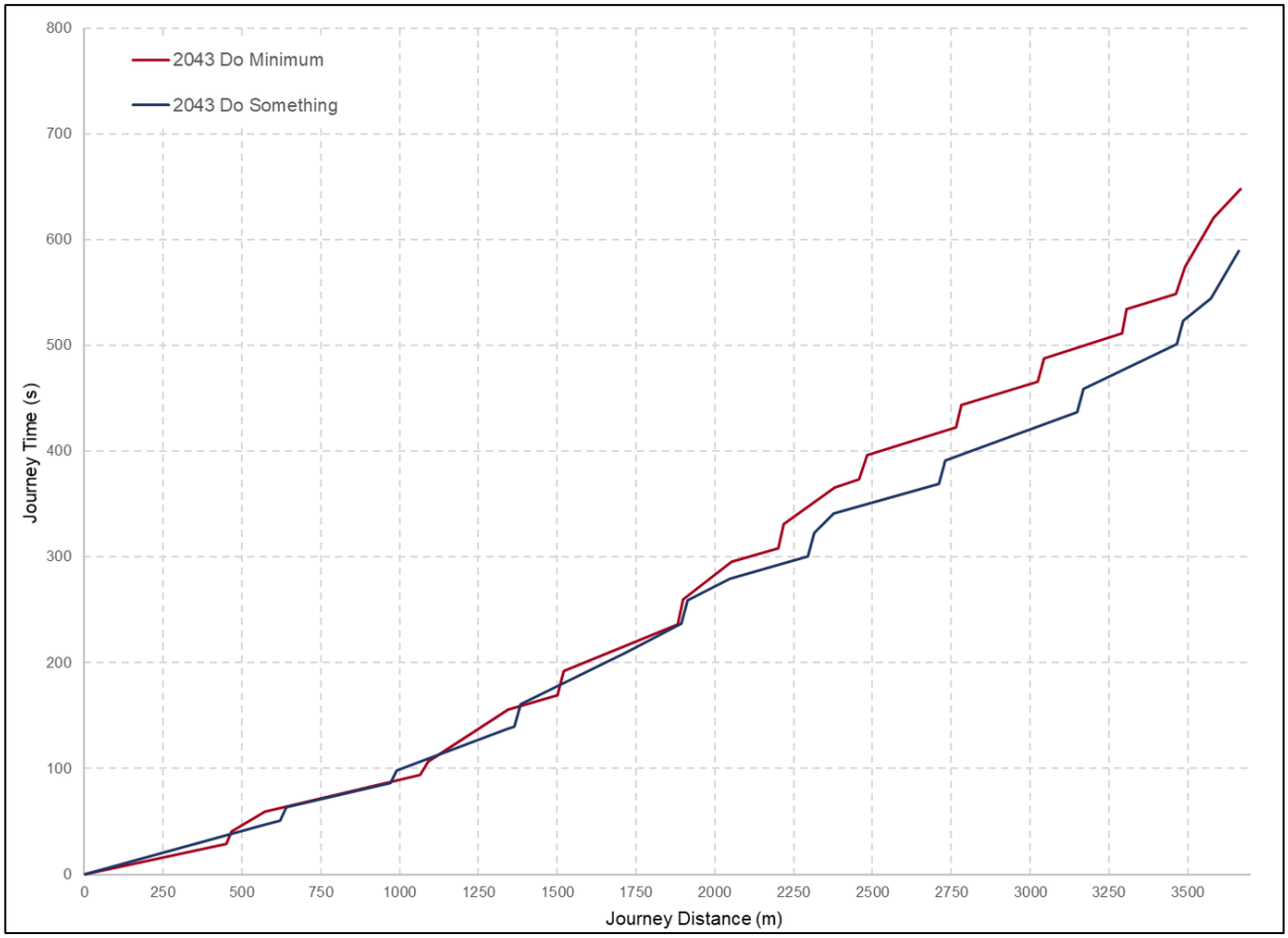

Diagram 6.19: A3 Bus Journey Time (2043 PM, Inbound)

Based on the results presented in Diagram 6.16 to Diagram 6.19 the Proposed Scheme is expected to deliver journey time savings, most notably on the section of Templeogue Road between the Spawell junction and Old Bridge Road/Cypress Grove Road and on the section of Templeogue Road between Templeville Road and Fortfield Road. This is due to the introduction of segments of inbound bus lane that provide an uninterrupted bus facility and bus priority 'hurry calls' signalling (use of traffic signal plans to give buses priority ahead of general traffic) offered to mainline buses as part of the Proposed Scheme.

Outbound Direction

Average journey times for the outbound A3 service in 2028 Opening Year and in 2043 Design Year can be seen in Table 6.36. A breakdown of the changes in average journey times for all other bus services using this section of the Proposed Scheme can be found in Appendix A6.4.3 (Average Bus Journey Times).

Table 6.36: A3 Service Bus Journey Times (Outbound Direction)

Peak Hour	Do Minimum (minutes)	Do Something (minutes)	Difference (minutes)	% Difference
2028 AM	10.7	9.3	-1.4	-13%
2028 PM	10.9	9.3	-1.6	-15%
2043 AM	10.4	9.3	-1.1	-11%
2043 PM	10.2	9.4	-0.8	-8%

Additional information regarding the range of journey times (minimum, maximum, average and standard deviation) for outbound A3 buses in the Do Minimum (red) and Do Something (blue) can be seen in Table 6.37 and Diagram

6.20. 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 6.37: A3 Service – Range of Journey Times (Outbound Direction)

Peak Hour	Do Minimum				Do Something			
	MIN	MAX	AVG	STDEV	MIN	MAX	AVG	STDEV
2028 AM	8.4	13.4	10.7	1.1	8.1	10.8	9.3	0.6
2028 PM	9.3	13.2	10.9	1.0	8.2	10.7	9.3	0.5
2043 AM	8.4	13.0	10.4	1.0	8.2	10.6	9.3	0.5
2043 PM	9.1	12.0	10.2	0.8	8.0	11.3	9.4	0.7

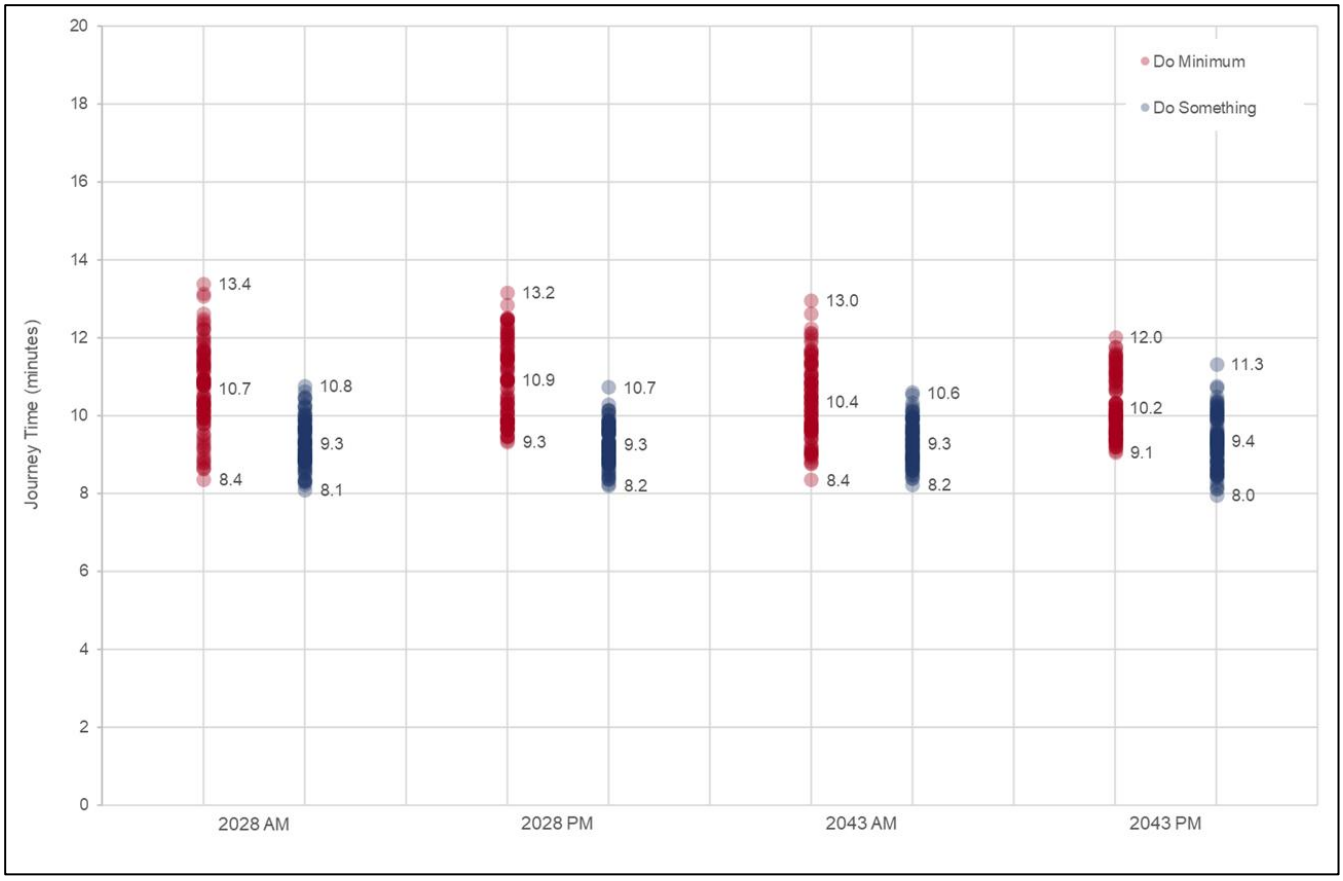

Diagram 6.20: A3 Bus Journey Times (Outbound Direction)

Based on the results presented in Table 6.37, the Proposed Scheme will deliver average outbound journey time savings for A3 service bus passengers of up to 1.6 minutes (15%) in 2028 (PM) and 0.8 minutes (8%) in 2043 (PM). Furthermore, results presented in Diagram 6.20 suggest an improvement in bus journey time reliability in all four scenarios as indicated by the reduced ranges of journey times achieved with the 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 outbound journey times are also illustrated in the cumulative time-distance graphs shown in Diagram 6.21 to Diagram 6.24. As above, the cumulative time-distance

graphs are also based on the A3 service, which captures the full extent of the Proposed Scheme to Rathfarnham Road.

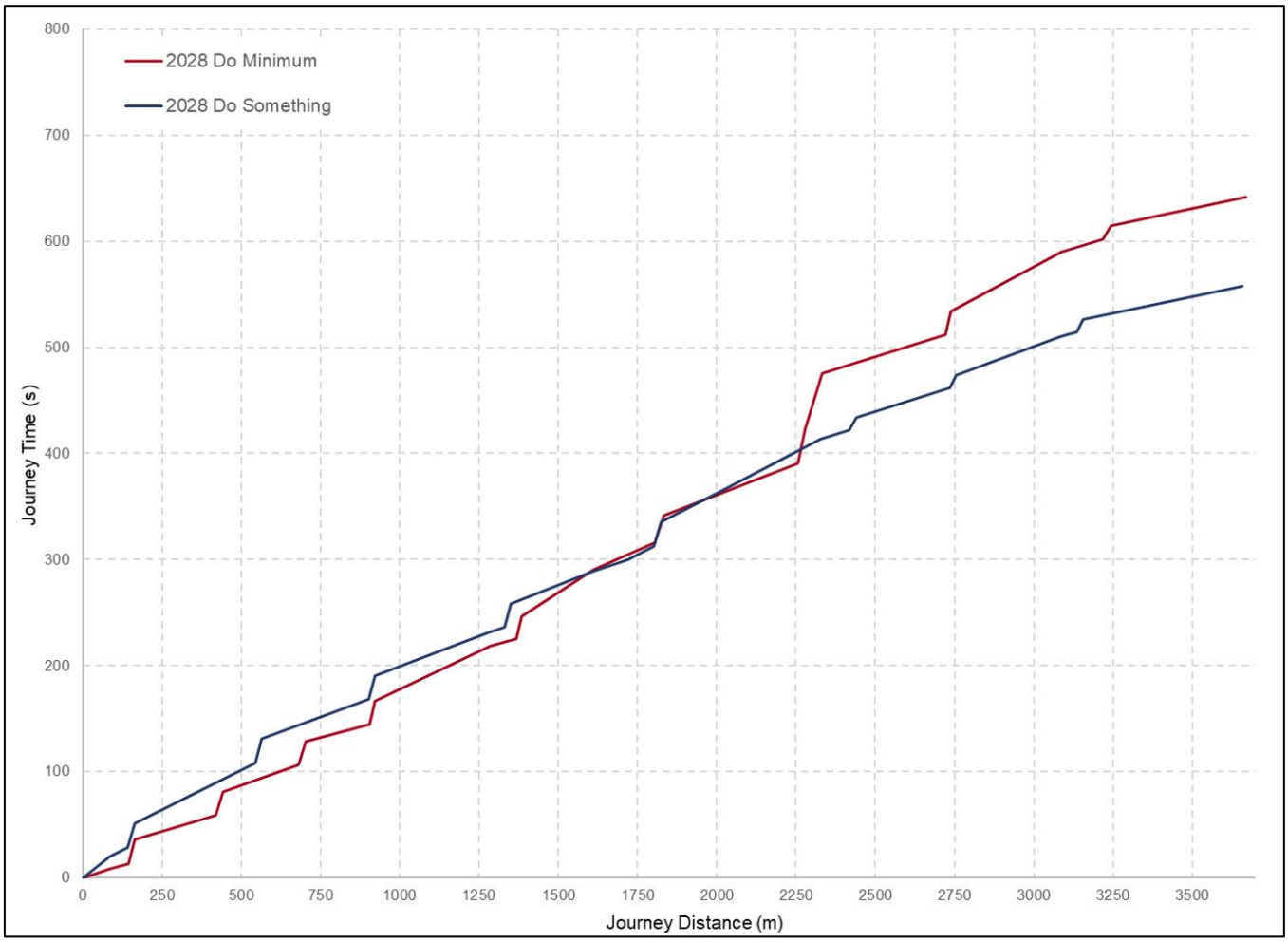

Diagram 6.21: A3 Bus Journey Time (2028 AM, Outbound)

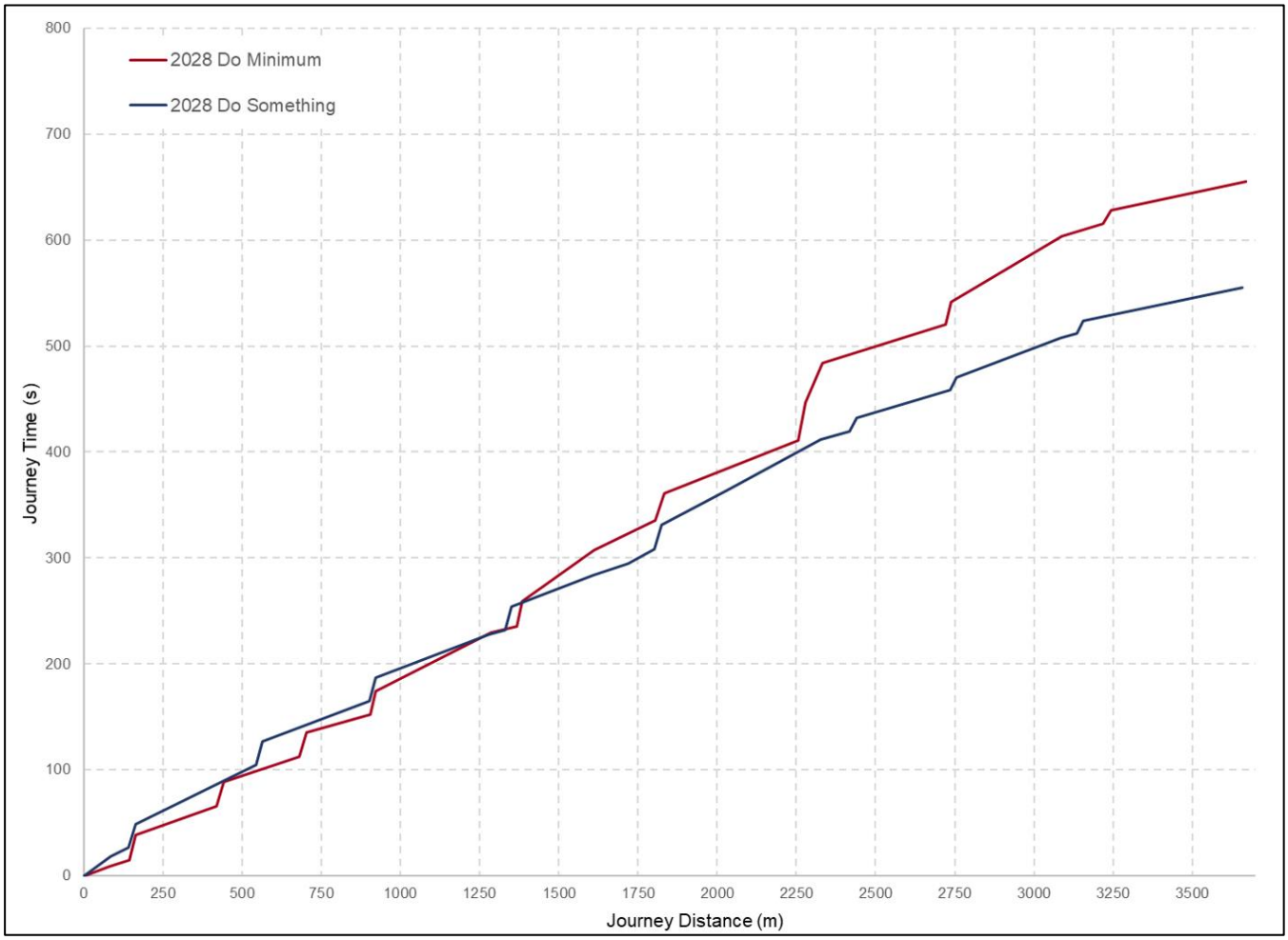

Diagram 6.22: A3 Bus Journey Time (2028 PM, Outbound)

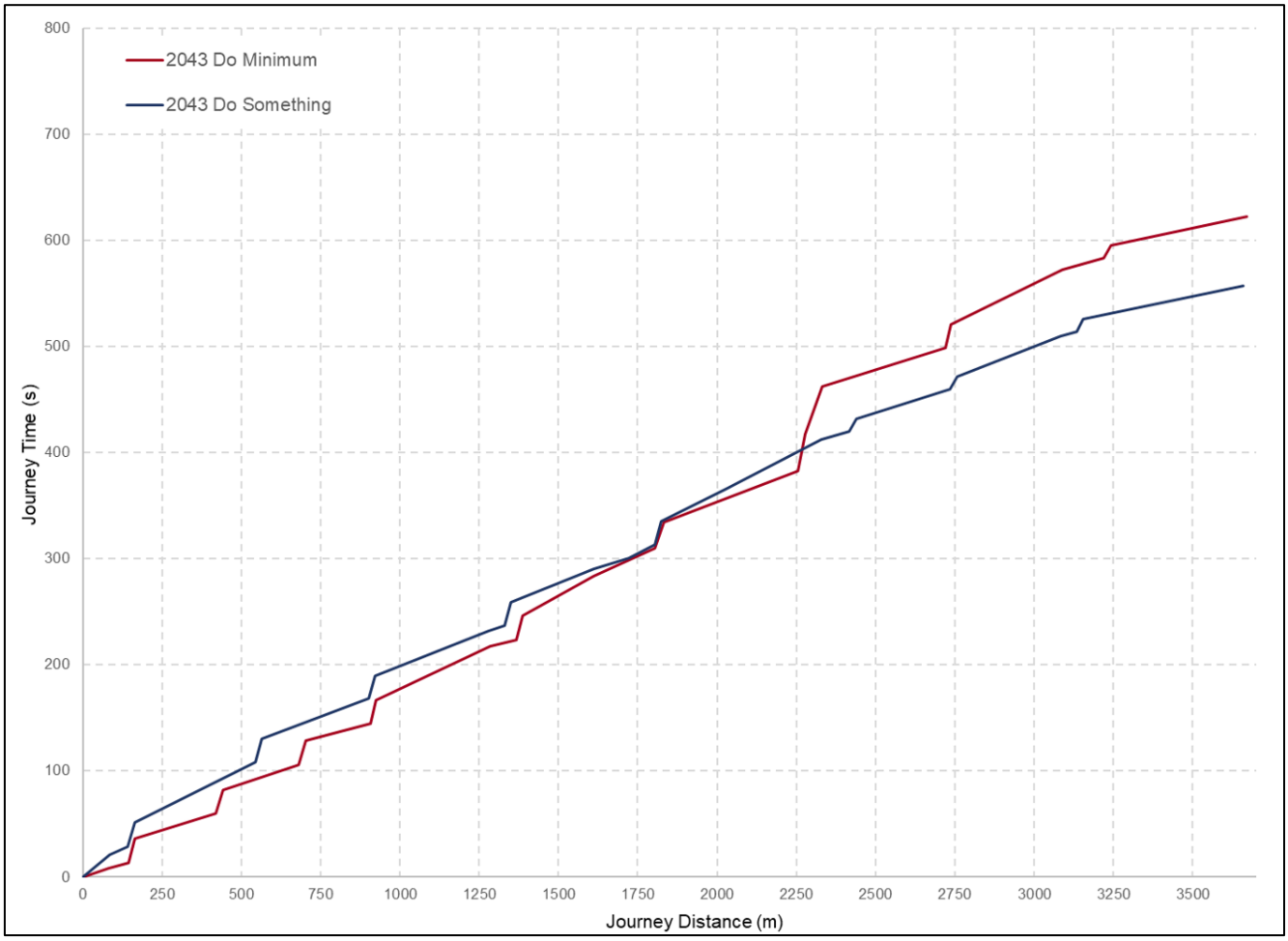

Diagram 6.23: A3 Bus Journey Time (2043 AM, Outbound)

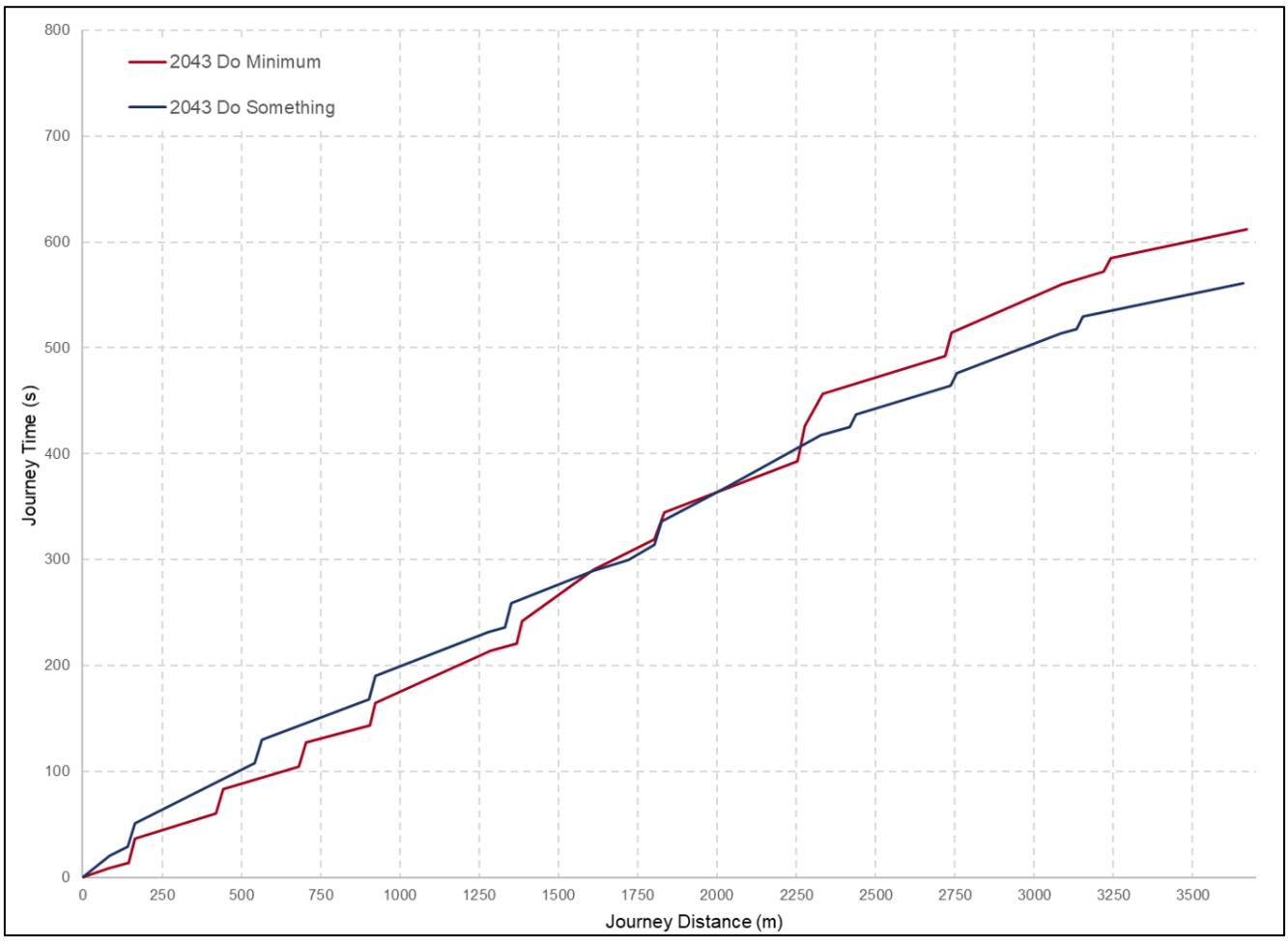

Diagram 6.24: A3 Bus Journey Time (2043 PM, Outbound)

Based on the results presented in Diagram 6.21 to Diagram 6.24 the Proposed Scheme is expected to deliver bus journey time savings, most notably on key sections such as outbound on Templeogue Road from Templeville Road to Old Bridge Road/Cypress Grove Road and from Old Bridge Road/Cypress Grove Road to the Spawell junction. This is due to the new segments of bus lane and provision of bus priority 'hurry calls' signalling as part of the Proposed Scheme.

At the Old Bridge Road/Cypress Grove Road junction, there is an existing bus stop on the east arm of the junction, and there is no bus priority at this location (i.e. there is neither a dedicated bus lane to the stop line nor bus priority 'hurry calls' signalling) in the Do Minimum scenario. As part of the Proposed Scheme, the outbound bus stop has been relocated to the west of the junction and bus priority introduced. The Proposed Scheme includes an outbound bus lane to the stop line in addition to bus priority 'hurry calls' signalling. As a result, the journey time savings of the Proposed Scheme notably accumulate from this particular junction.

Outside of these sections, bus lanes to junction stop lines and the bus priority 'hurry calls' signalling (use of traffic signal plans to give buses priority ahead of general traffic) offered to mainline buses as part of the Proposed Scheme can be shown to create cumulative bus journey time savings over the Do Minimum.

Rathfarnham to City Centre Section

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

To give an overview of how the Proposed Scheme will impact on bus journey times along the Rathfarnham to City Centre section of the Proposed Scheme, outputs for the A2 service, which traverses the entire length of the section, have been extracted from the model. As outlined in Section 6.4.3.1 the assessment is based in the context of the full implementation of the BusConnects network re-design in both the Do Minimum and Do Something scenarios, with this section of the Proposed Scheme servicing the A-Spine services.

When considering the results below, it should be noted that the Rathfarnham Road to City Centre section already includes a high proportion of bus priority measures in the form of bus lanes in the inbound direction. The Proposed Scheme seeks to address the remaining un-prioritised sections of bus priority with a combination of further sections of bus lane and signal control priority at pinch-points and junctions whilst also improving the pedestrian and cycling environment. The Proposed Scheme also introduces outbound bus priority with a combination of signal control priority and bus lanes, which are not currently included in the outbound direction on the Rathfarnham Road to City Centre section.

Inbound Direction

Average journey times for the inbound A2 service (which leaves the Proposed Scheme extents at the south arm of the Dame Street/South Great George's Street junction) in the 2028 Opening Year and in the 2043 Design Year can be seen in Table 6.38. A breakdown of the changes in average journey times for all other bus services using the Proposed Scheme can be found in Appendix A6.4.3 (Average Bus Journey Times).

Table 6.38: A2 Service Bus Average Journey Times (Inbound Direction)

Peak Hour	Do Minimum (minutes)	Do Something (minutes)	Difference (minutes)	% Difference
2028 AM	35.2	29.4	-5.8	-16%
2028 PM	31.1	29.1	-2.0	-6%
2043 AM	33.2	29.3	-3.9	-12%
2043 PM	30.7	29.3	-1.4	-5%

Additional information regarding the range of journey times (minimum, maximum, average and standard deviation) for inbound A2 buses in the Do Minimum (red) and Do Something (blue) can be seen in Table 6.39 and Diagram 28. 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 6.39: A2 Service – Range of Journey Times (Inbound Direction)

Peak Hour	Do Minimum				Do Something			
	MIN	MAX	AVG	STDEV	MIN	MAX	AVG	STDEV
2028 AM	31.1	40.7	35.2	2.0	25.9	32.4	29.4	1.5
2028 PM	25.8	35.0	31.1	2.2	24.1	33.2	29.1	1.8
2043 AM	29.8	37.6	33.2	1.7	23.3	32.9	29.3	1.6
2043 PM	25.4	34.7	30.7	1.9	25.8	33.6	29.3	1.7

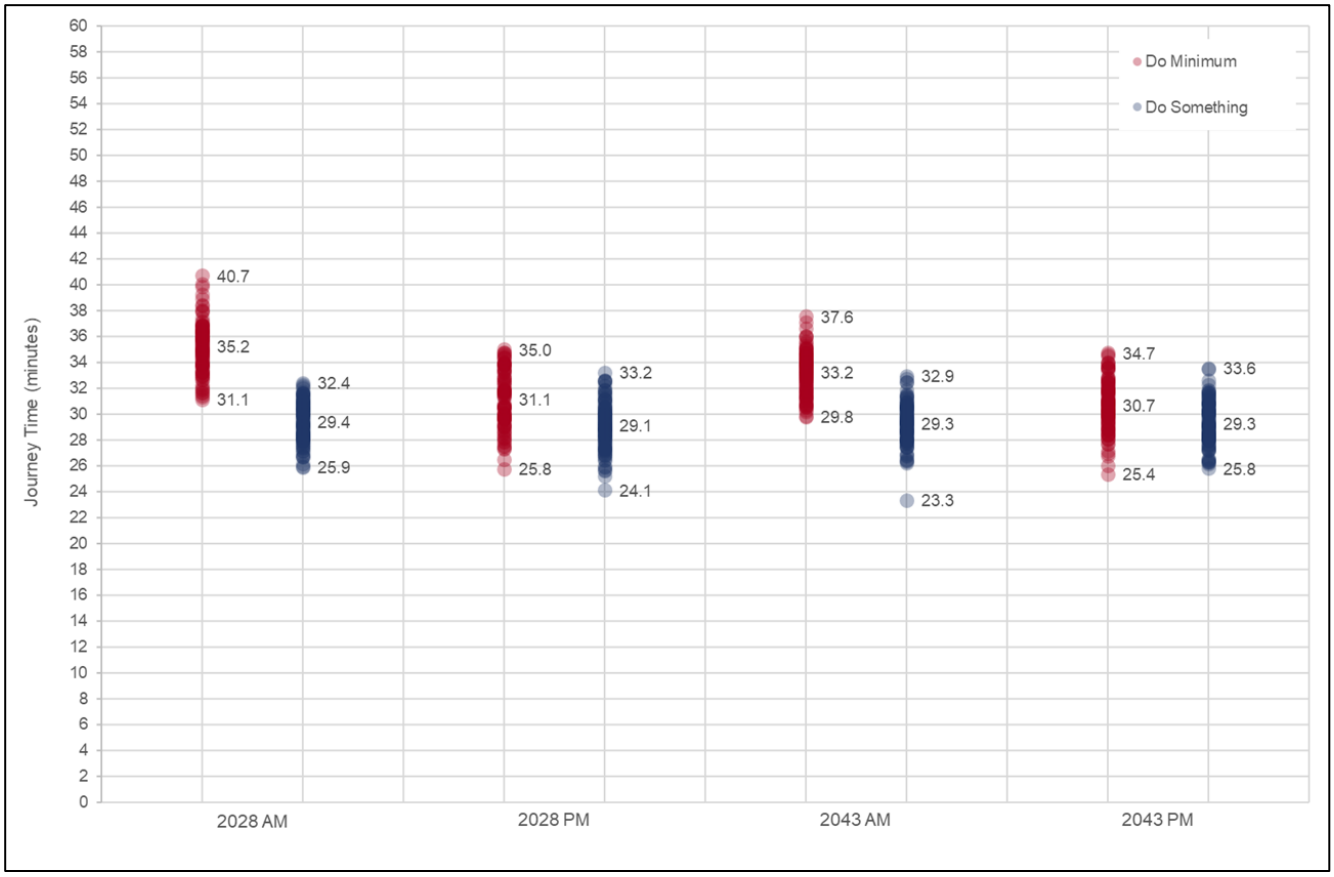

Diagram 6.25: A2 Bus Journey Times (Inbound Direction)

Based on the results presented in Table 6.39, the Proposed Scheme will deliver average inbound journey time savings for A2 service bus passengers of circa 6 minutes in the AM in 2028 and 4 minutes in the AM in 2043. Furthermore, results presented in Diagram 6.29 suggest an improvement in bus journey time reliability 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 A2 service are also illustrated in the cumulative time-distance graphs shown in Diagram 6.26 to Diagram 6.29.

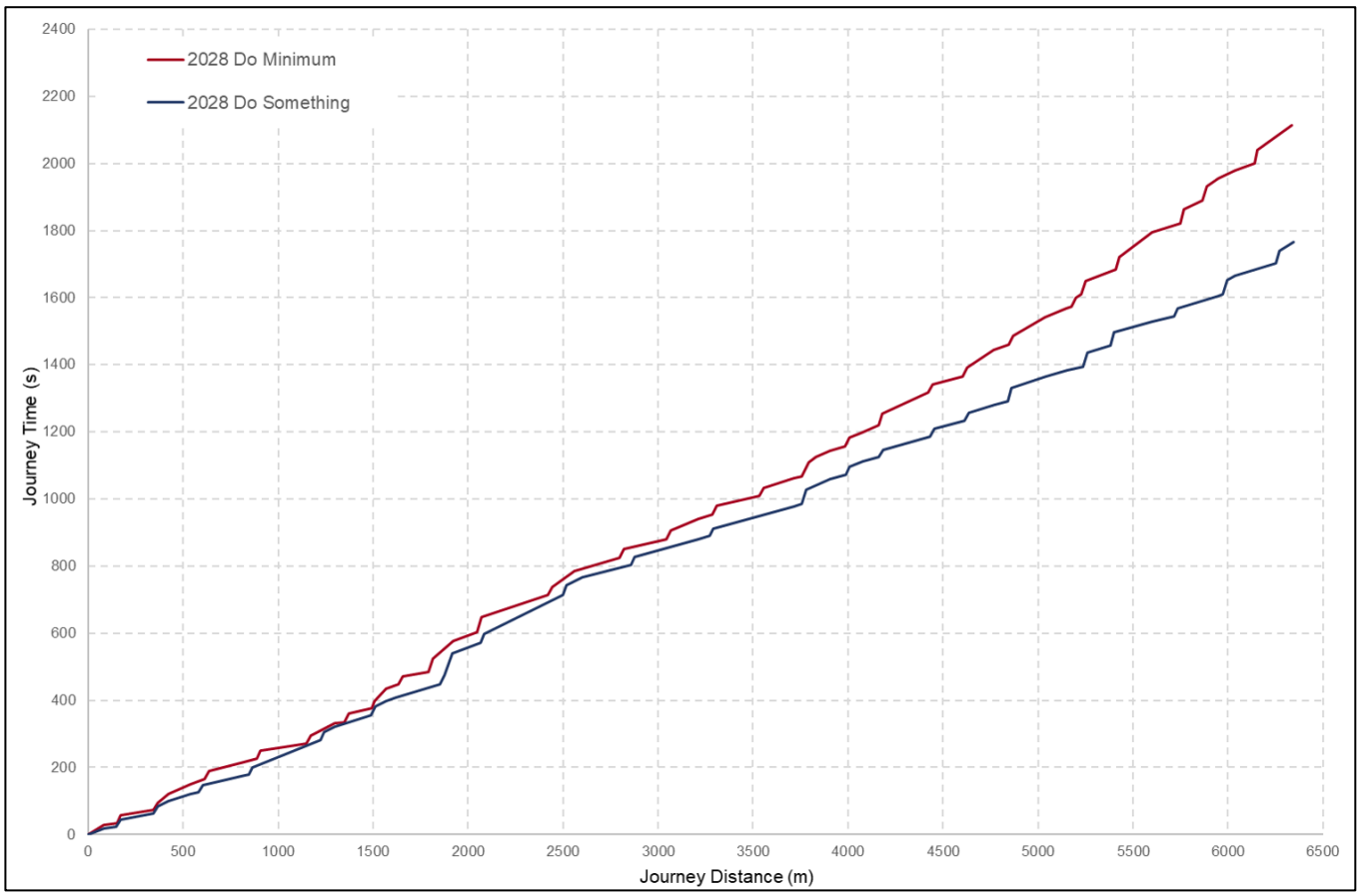

Diagram 6.26: A2 Bus Journey Time (2028 AM, Inbound)

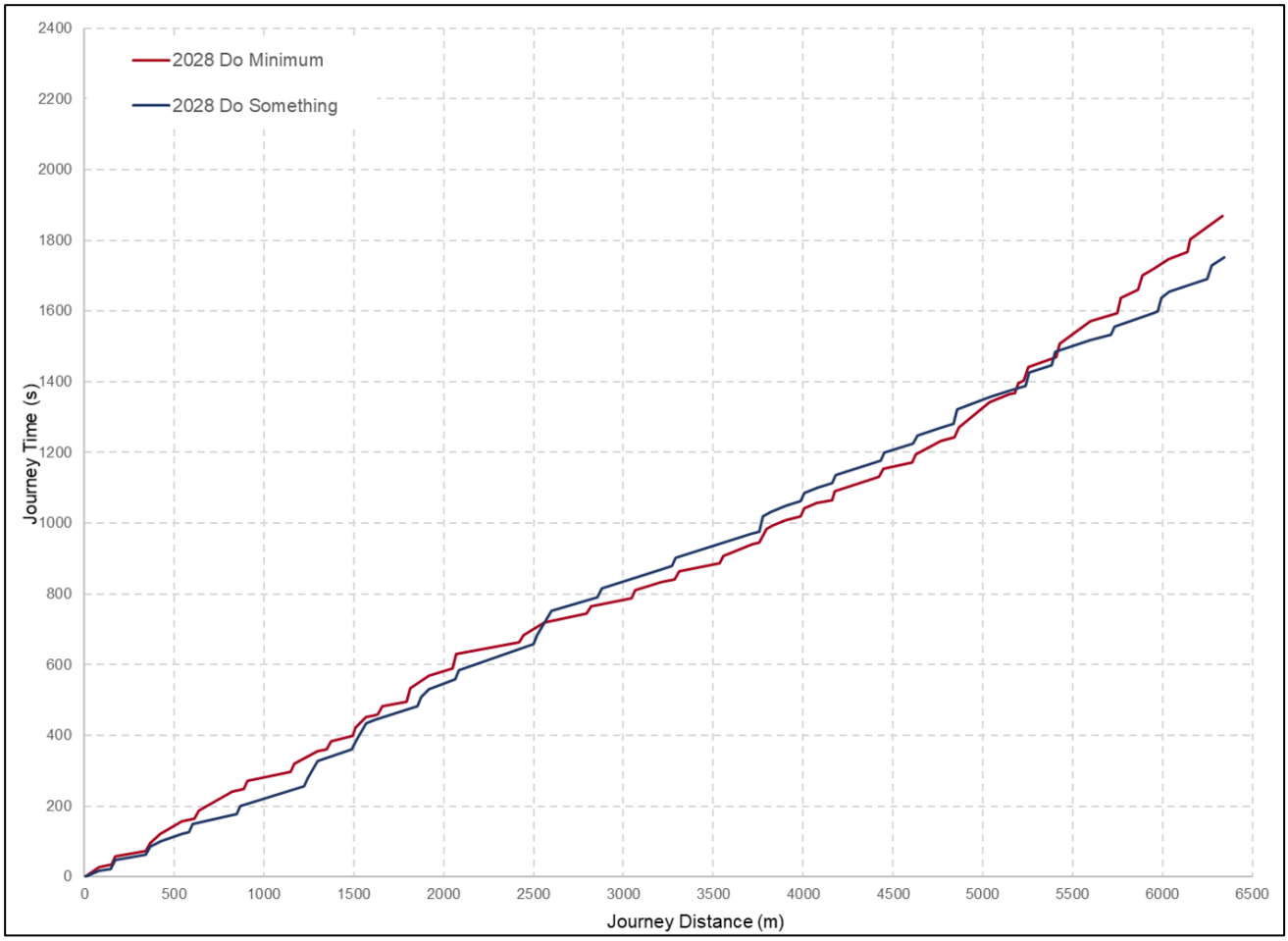

Diagram 6.27: A2 Bus Journey Time (2028 PM, Inbound)

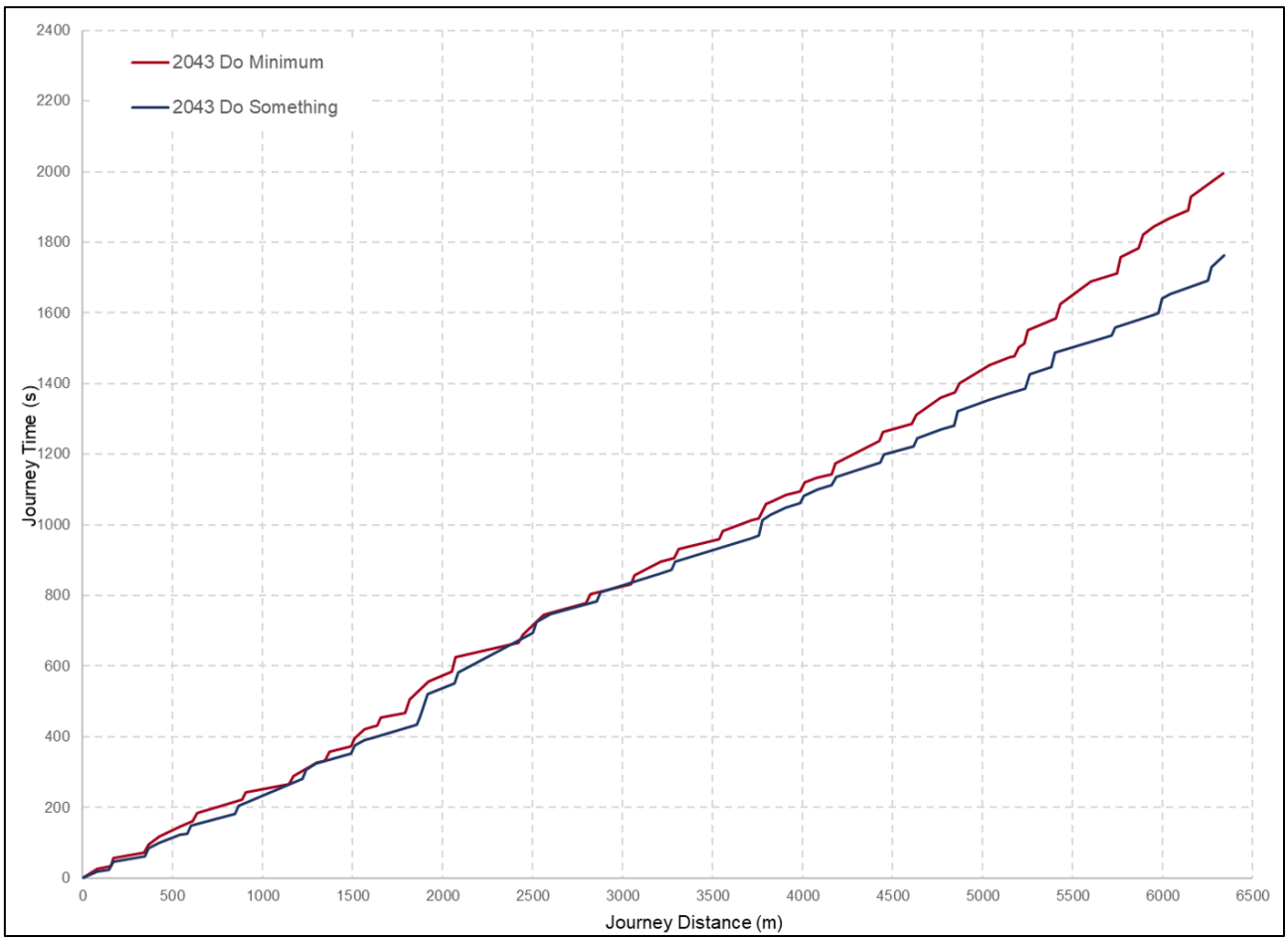

Diagram 6.28: A2 Bus Journey Time (2043 AM, Inbound)

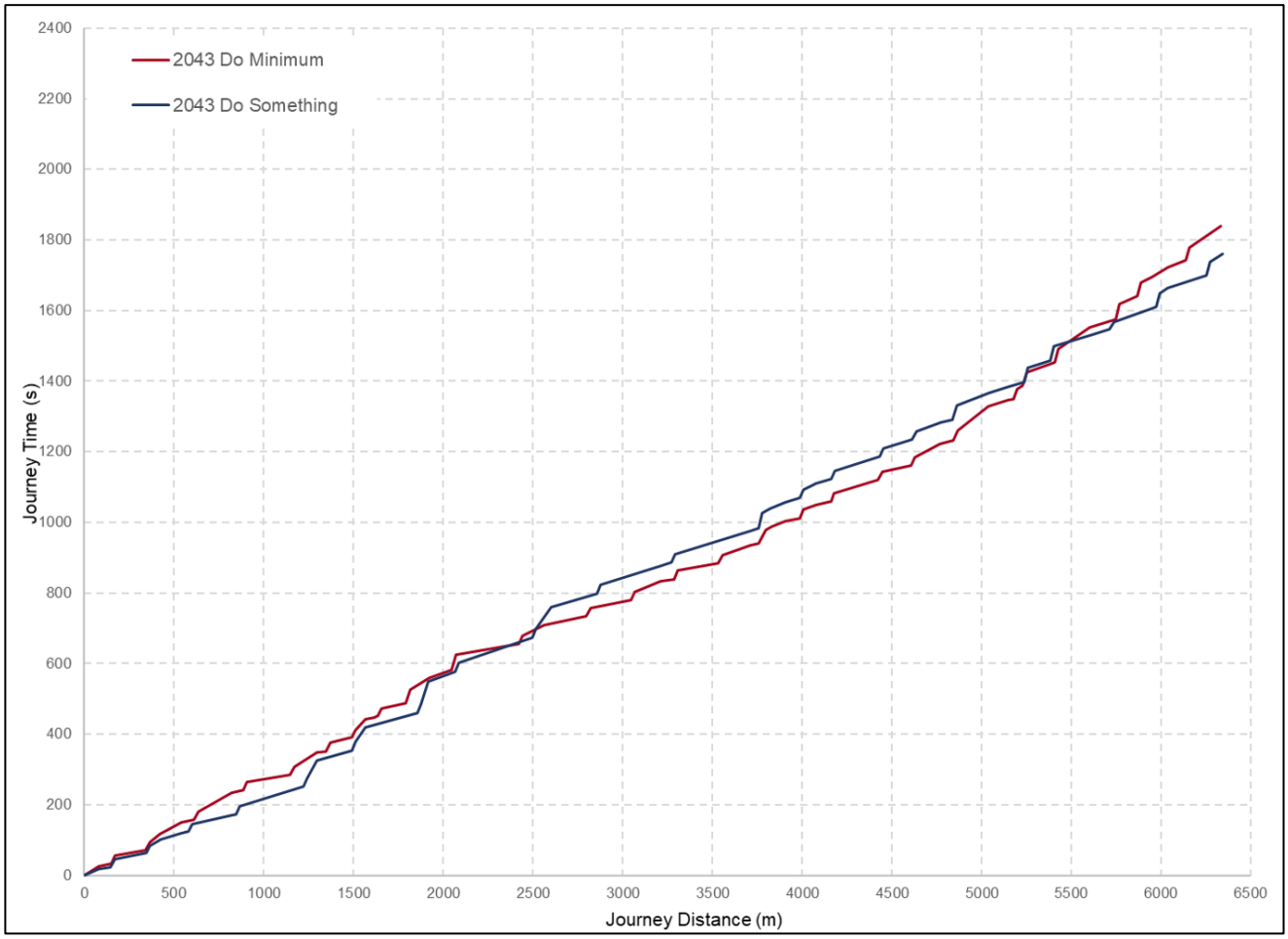

Diagram 6.29: A2 Bus Journey Time (2043 PM, Inbound)

Based on the results presented in Diagram 6.26 to Diagram 6.29, the Proposed Scheme offers considerable average bus journey time savings for the peak period (AM) direction, most notably on the sections of Rathfarnham Road between Bushy Park and Terenure Road and Rathgar Road between Charleville Road and Rathmines Road Upper. This is due to the introduction of continuous inbound bus lane to the stop line on Rathfarnham Road at Terenure Road and through the Charleville Road and Rathmines Road Upper junctions. The accumulation of inbound bus journey time savings is particularly notable from the Charleville Road and Rathmines Road Upper section, where bus priority 'hurry calls' signalling is provided.

There are a number of short sections of bus lane through the Dodder Park area, therefore, the level of bus priority is lower on Rathfarnham Road than other parts of the Proposed Scheme. In order to ensure adequate progression of traffic through this area, bus priority 'hurry calls' signalling is only provided in the peak period direction (i.e. inbound in the AM peak and outbound in the PM peak). Because of the lack of bus priority 'hurry calls' signalling in the non-peak direction, the Proposed Scheme offers modest inbound average journey time savings in the PM peak.

Outbound Direction

Average journey times for the outbound A2 service (which serves the Proposed Scheme extents from (Dame Street to Rathfarnham Wood), in 2028 Opening Year and in 2043 Design Year can be seen in Table 6.40. A breakdown of the changes in average journey times for all other bus services using the Proposed Scheme can be found in Appendix A6.4.3 (Average Bus Journey Times).

Table 6.40: A2 Service Bus Journey Times (Outbound Direction)

Peak Hour	Do Minimum (minutes)	Do Something (minutes)	Difference (minutes)	% Difference

2028 AM	29.5	28.9	-0.6	-2%
2028 PM	35.2	27.0	-8.2	-23%
2043 AM	28.4	28.1	-0.3	-1%
2043 PM	31.1	26.5	-4.6	-15%

Additional information regarding the range of journey times (minimum, maximum, average and standard deviation) for outbound A2 buses in the Do Minimum (red) and Do Something (blue) can be seen in Table 6.41 and Diagram 6.30. 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 6.41: A2 Service – Range of Journey Times (Outbound Direction)

Peak Hour	Do Minimum				Do Something			
	MIN	MAX	AVG	STDEV	MIN	MAX	AVG	STDEV
2028 AM	25.8	33.8	29.5	1.8	24.7	32.2	28.9	1.7
2028 PM	29.3	41.8	35.2	2.4	23.7	30.0	27.0	1.3
2043 AM	25.1	32.8	28.4	1.7	23.6	31.9	28.1	1.6
2043 PM	26.1	35.7	31.1	1.9	23.2	29.4	26.5	1.4

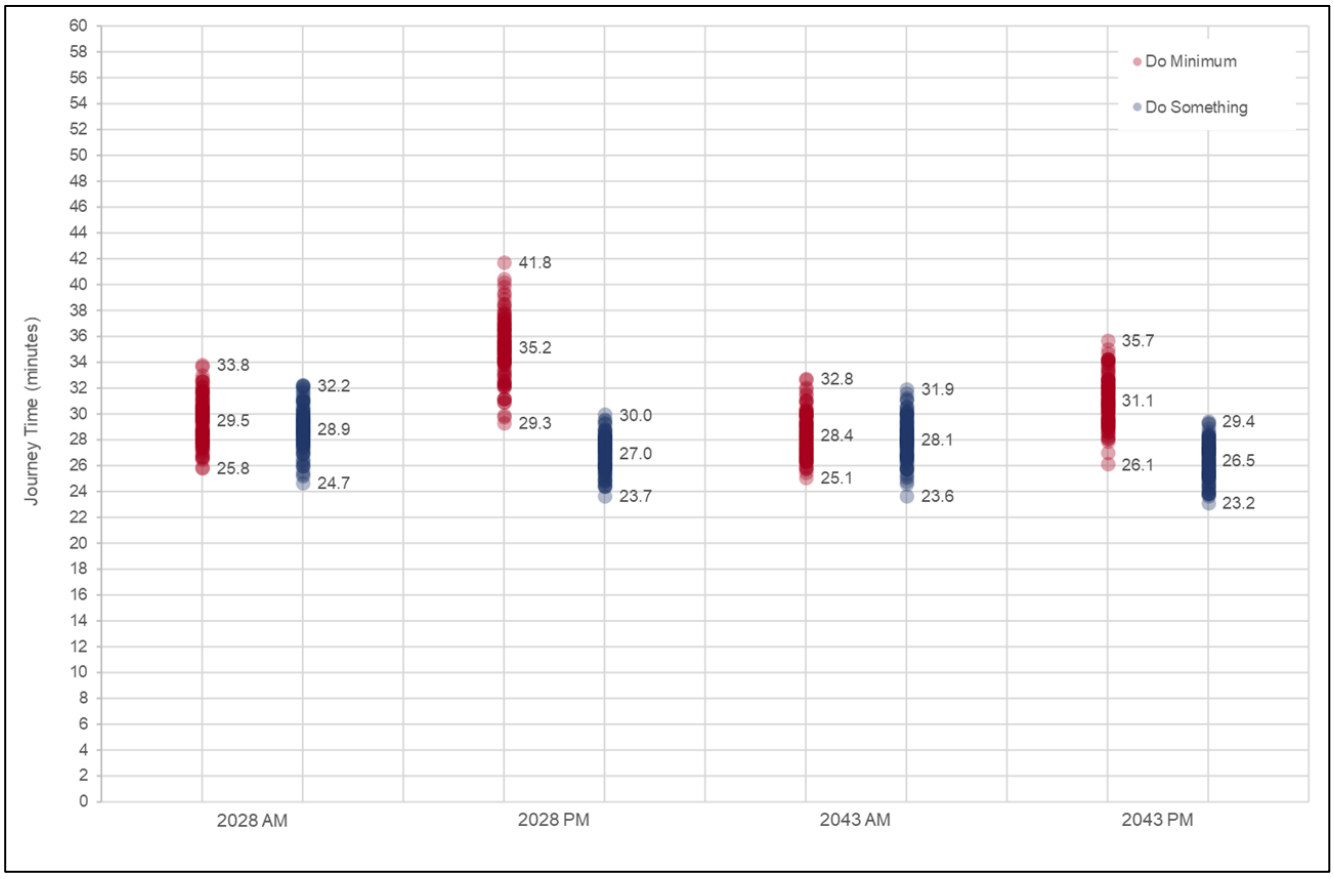

Diagram 6.30: A2 Bus Journey Times (Outbound Direction)

Based on the results presented in Table 6.41, the Proposed Scheme will deliver significant average outbound journey time savings, in the peak direction of travel, for A2 service bus passengers of up to 8.2 minutes (23%) in 2028 (PM) and 4.6 minutes (15%) in 2043 (PM). The Proposed Scheme will deliver modest journey time savings in the non-peak period direction. Furthermore, results presented in Diagram 6.30 suggest an improvement in bus journey time reliability in the two PM peak periods 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).

In the AM peak period in the outbound direction, the improvement in bus journey time reliability is not as notable. This is primarily due to variable journey times through the Terenure Road/Rathfarnham Road junction, where priority is given to the inbound buses. In the PM peak, bus priority 'hurry calls' signalling is provided in the outbound direction only to ensure adequate progression for general traffic through the junction. For this reason, the outbound journey time reliability improvements are more significant in the PM peak, which is appropriate being the peak direction of travel for bus users.

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 A2 service for the outbound direction of travel illustrated in the cumulative time-distance graphs shown in Diagram 6.31 to Diagram 6.34.

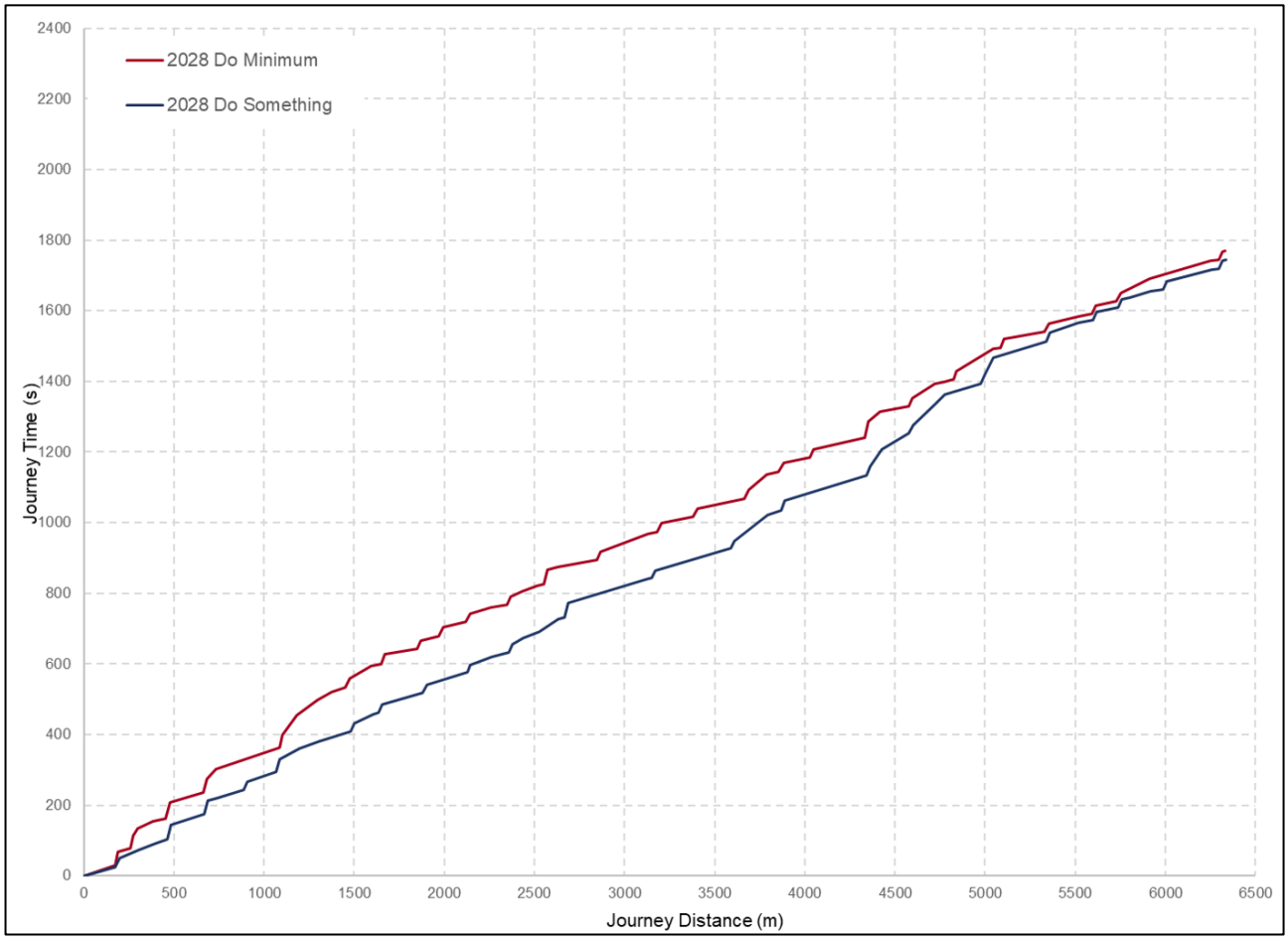

Diagram 6.31: A2 Bus Journey Time (2028 AM, Outbound)

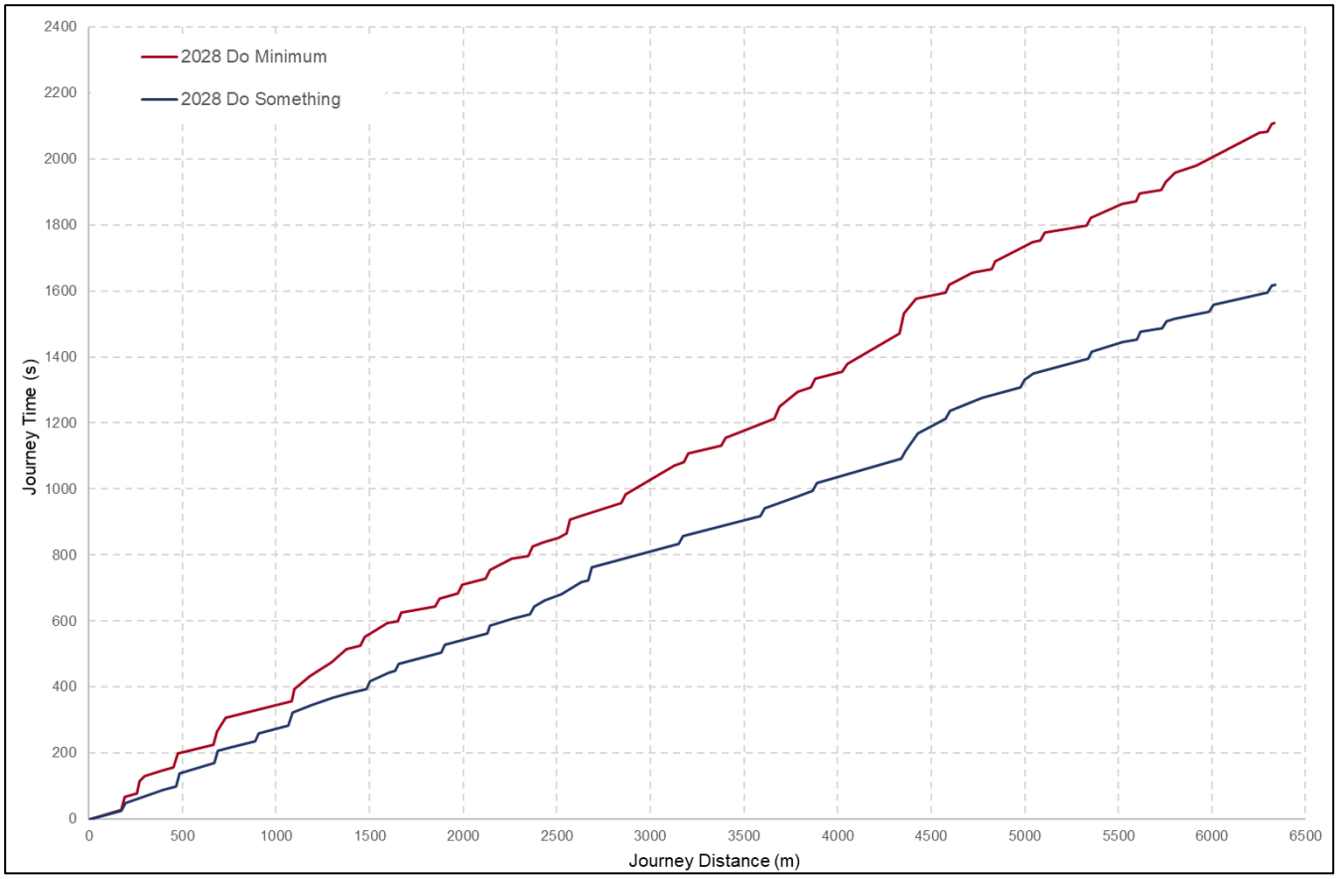

Diagram 6.32: A2 Bus Journey Time (2028 PM, Outbound)

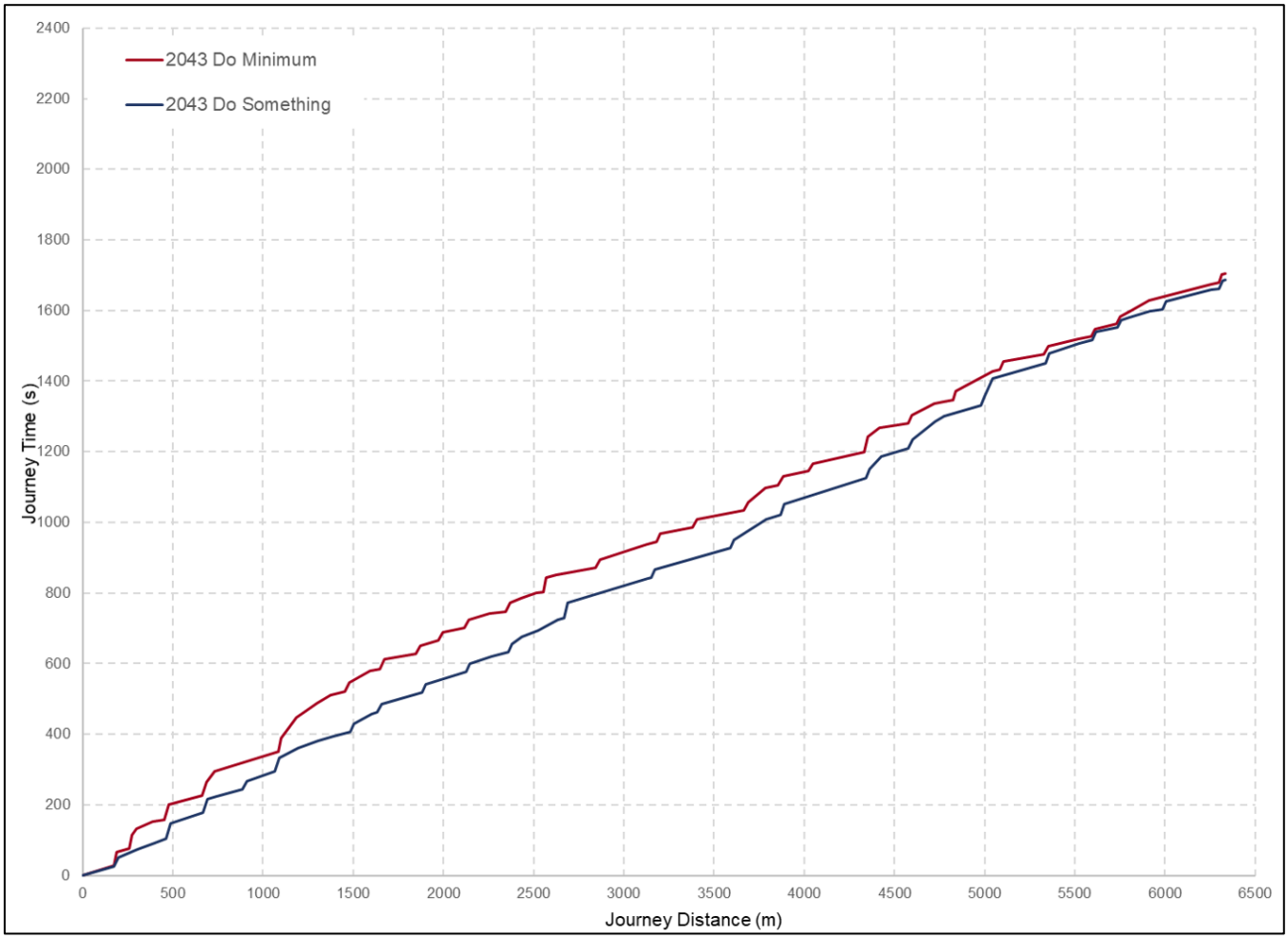

Diagram 6.33: A2 Bus Journey Time (2043 AM, Outbound)

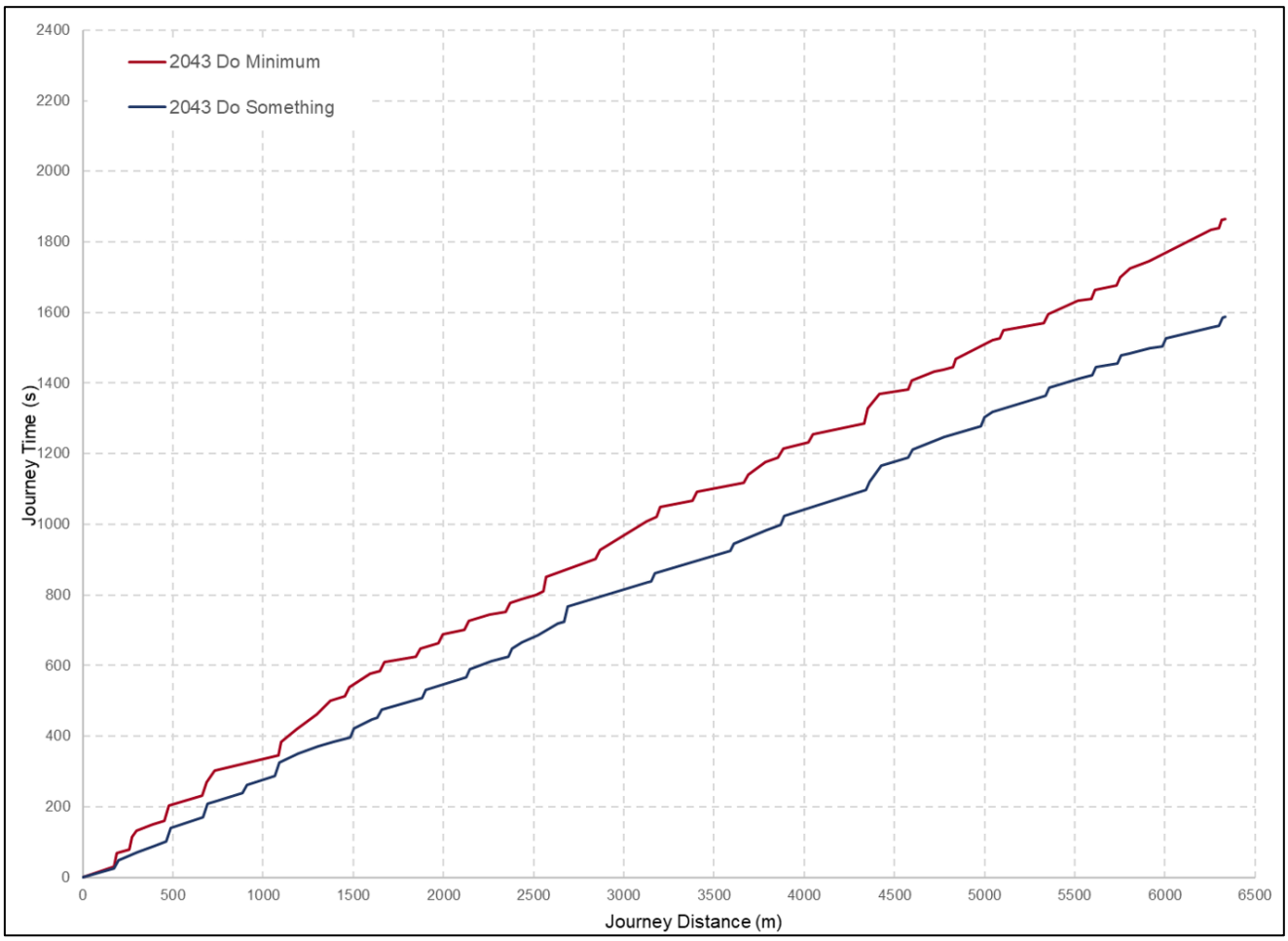

Diagram 6.34: A2 Bus Journey Time (2043 PM, Outbound)

Based on the results presented in Diagram 6.31 to Diagram 6.34, the Proposed Scheme offers considerable outbound average bus journey time savings for the peak period (PM) direction, most notably at the Harrington Street and Richmond Street junction and on Terenure Road East from Rathgar Avenue to Rathfarnham Road. The Proposed Scheme introduces a bus gate on the southern arm of the Harrington Street and Richmond Street junction. As a result, buses do not need to compete with general traffic flows for the single traffic lane. The bus gate from this location to Military Road/Rathmines Road provides significant bus journey time savings when combined with the bus priority 'hurry calls' signalling. The continuous bus lane on Terenure Road East from Rathgar Avenue to Rathfarnham Road and bus priority 'hurry calls' signalling at this location provide additional benefits.

It is important to note that while there are existing, though segmented, bus lanes in the inbound direction. The outbound direction currently lacks dedicated bus lanes on the majority of this corridor. The Proposed Scheme introduces considerable bus priority infrastructure in the form of outbound bus lanes along key sections. This bus priority infrastructure contributes to the even greater bus journey time savings achieved in the outbound peak period (PM) direction.

As mentioned previously, there are a number of short sections of bus lane through the Dodder Park area, therefore, the level of bus priority is lower on Rathfarnham Road than other parts of the Proposed Scheme. In order to ensure adequate progression of traffic through this area, bus priority 'hurry calls' signalling is only provided in the peak period direction (i.e. inbound in the AM peak and outbound in the PM peak). Due to the lack of bus priority 'hurry calls' signalling in the non-peak direction, the Proposed Scheme offers modest inbound average journey time savings in the AM peak.

6.2.3.1.4 Total Journey Time Changes for all Proposed Scheme Bus Services

The change in total bus journey time for all buses travelling along both the Templeogue and Rathfarnham sections of the Proposed Scheme, is shown in Table 6.42.

Table 6.42: Total Bus Journey Time

Peak Hour	Do Minimum (vehicle.minutes)	Do Something (vehicle.minutes)	Difference (vehicle.minutes)	%Difference
2028 AM	2240.5	2059.5	-181.0	-8%
2028 PM	2195.2	1930.4	-264.9	-12%
2043 AM	2142.7	1962.8	-179.9	-8%
2043 PM	2050.8	1860.0	-190.8	-9%

Based on the results presented in Table 6.72 modelling indicates that the Proposed Scheme will reduce total bus journey times along the Proposed Scheme by up to 12% in 2028 and 9% in 2043. Based on the AM and PM peak hours alone, this equates to **7.4 hours of savings in 2028 and 6.2 hours in 2043** combined across all buses when compared to the Do Minimum. On an annual basis this equates to approximately 5,600 hours of bus vehicle savings in 2028 and 7,700 hours in 2043, when considering weekday peak periods only.

6.2.3.1.5 Bus Users Assessment Summary

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

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

6.2.3.1.6 Increased Bus Frequency - Resilience Sensitivity Analysis

6.2.3.1.6.1 Background

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

6.2.3.1.6.2 Resilience Testing

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

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

The bus service frequency, along the busiest section along Aungier Street, in the 2028 Do Minimum model and in the 2028 Do Something Resilience testing model is outlined in Table 6.43.

Table 6.43: Resilience Testing Bus Service Frequency Scenario Testing

Scenario	Inbound (Buses per Hour)	Outbound (Buses per Hour)
Do Minimum	46	46
Do Something	46	46
Do Minimum - Additional Services Resilience Test	56	56
Do Something - Additional Services Resilience Test	56	56

Table 6.44 outlines the average journey times for the inbound and outbound A2 service in the 2028 Opening Year scenarios. The A2 service has been chosen for the resilience testing as it represents the bus service which travels the longest distance along the Proposed Scheme.

Table 6.44: A2 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	35.2	37.7	7.0%	29.4	30.4	3.6%
2028 Outbound PM	35.2	36.9	4.9%	27.0	28.4	5.3%

The results of the scenario testing with an additional 10 buses per direction per hour operating along the Proposed Scheme in the 2028 Opening Year are presented graphically in Diagram 6.35. The diagram displays the maximum, minimum and average journey times for each of the A2 bus services modelled.

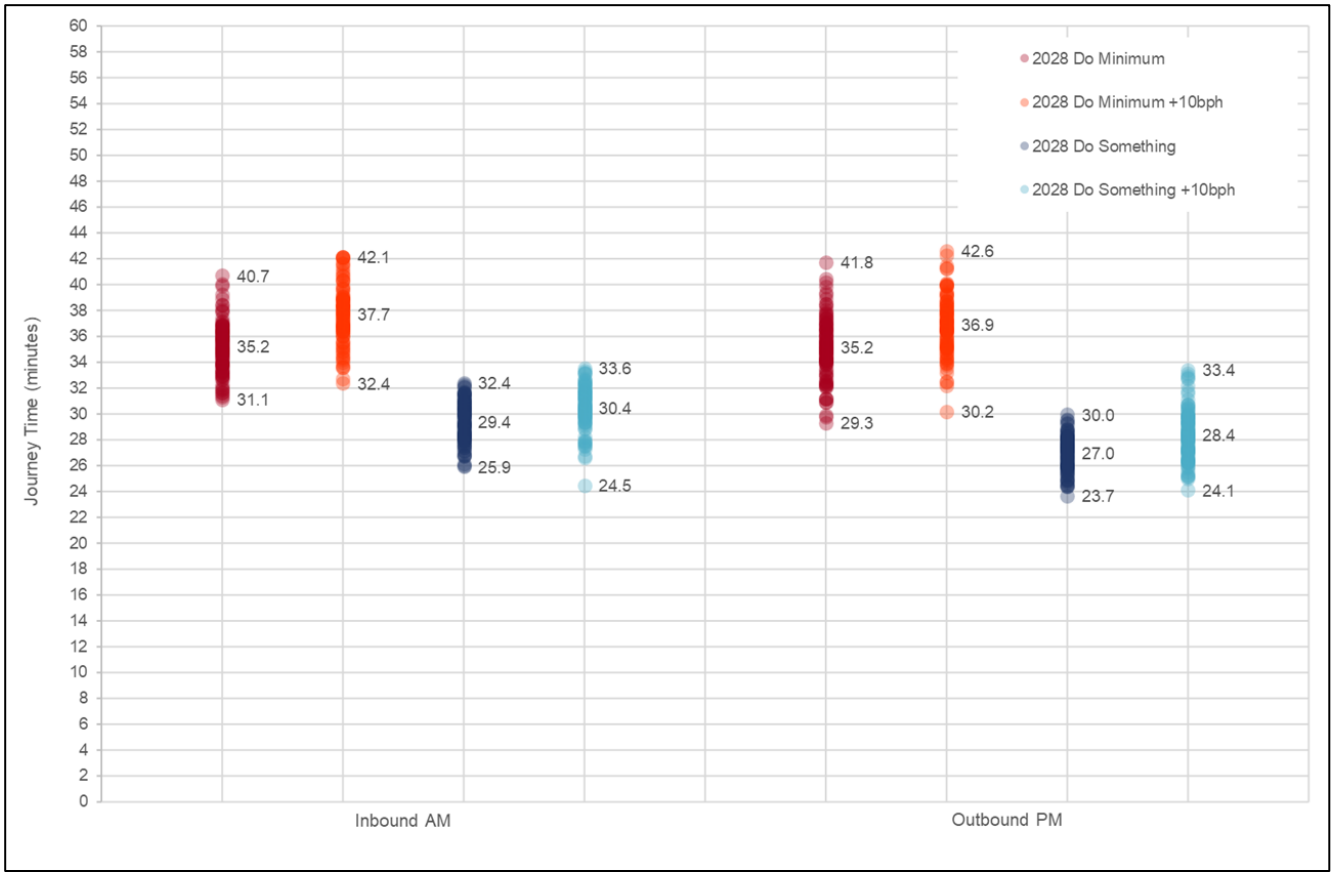

Diagram 6.35: Resilience Testing Bus Journey Time Reliability Indicators - Scenario Testing– Opening Year (2028)

As can be seen from Diagram 6.35 the modelling indicates that even with an additional 10 services operating per direction per hour along the Proposed Scheme, a high level of journey time reliability is maintained in the Do Something scenario, comparable with the 46 buses per direction per hour results. The results indicate limited change in average journey times in the Do Something Resilience sensitivity tests per bus. In the Do Minimum Resilience sensitivity test, journey times are more severely impacted, particularly in the AM peak inbound. In the Do Something Resilience sensitivity test bus journey time reliability is maintained with the additional services in place as indicated by the reduced range of journey times compared to the Do Minimum Resilience Test scenario. ***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 should be noted that it was assumed the general traffic levels included in each scenario would remain static. If traffic levels were to increase (typical daily variations are in the order of +/- 15%) then the bus priority infrastructure would further protect journey time reliability and resilience in comparison with the Do Minimum scenario.

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

6.2.3.1.7 General Traffic Assessment

6.2.3.1.7.1 Overview

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

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

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

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

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

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

Localised junction models have been developed using industry standard modelling packages such as LinSig and Junctions 9 to determine the appropriate staging, phasing, green times and operational capacity at all junctions along the direct study area. These junction models have been developed using consistent traffic flows as predicted and modelled in the ERM / LAM and micro-simulation model using the iterative traffic modelling process described in Section 3 of this TIA. The full outputs of the results are included in TIA Appendix 2 (Junction Design Report).

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

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

Diagram 6.36 is a snapshot from the guidance which outlines "Advisory Thresholds for Traffic and Transport Assessment Where National Roads are Affected".".

Where applications affect national roads a Transport Assessment should be requested if the thresholds in Table 2.2, below, are exceeded.

Table 2.2 Advisory Thresholds for Traffic and Transport Assessment Where National Roads are Affected

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

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

Diagram 6.36: Extract from the Traffic and Transport Assessment Guidelines (PE-PDV-02045, May 2014)

The basis of the guidance is to assess the impacts of additional trips that have been generated as part of a new development (for example, a new housing estate etc.). Noting that the guidance relates to National Roads only, for the purpose of this assessment, the principles of the guidance have been adapted for the assessment of the Proposed Scheme. This has been achieved by extending the threshold from National Roads only to cover all road types in the vicinity of the Proposed Scheme. This ensures a robust and rigorous assessment has been 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.

6.2.3.1.7.2 AM Peak Hour – General Traffic Flow Difference

Diagram 6.37 (extract from Figure 6.7 TIA Appendix 3 (Maps)) illustrates the difference in traffic flows on the road links in the AM Peak Hour for the 2028 Opening Year. Please refer to TIA Appendix 4.7 (General Traffic Assessment) for the full LAM outputs.

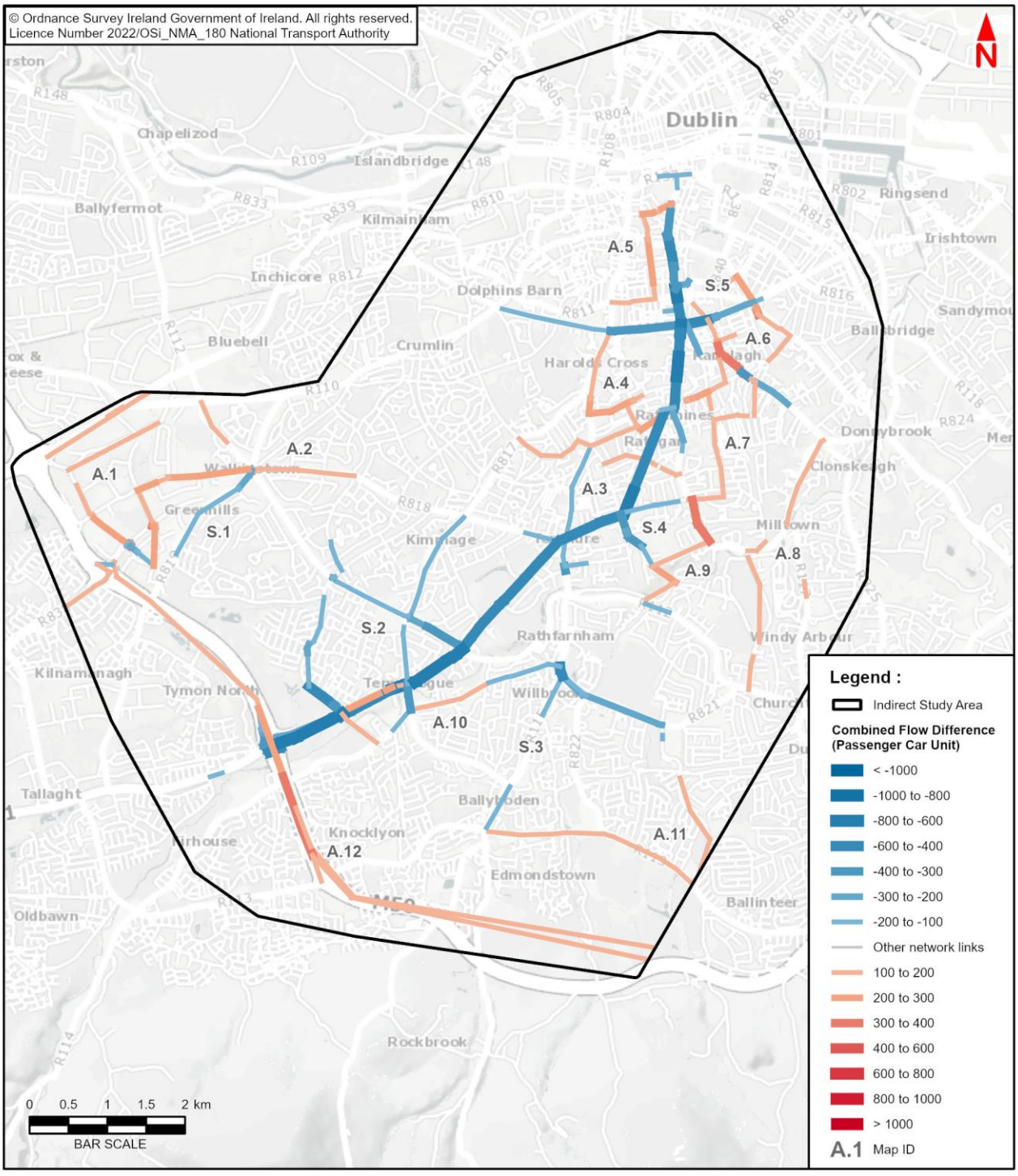

Diagram 6.37: Flow Difference on Road Links (Do Minimum vs. Do Something), AM Peak Hour, 2028 Opening Year

Impact on Direct Study Area (AM Peak Hour)

Direct Reductions in General Traffic: The LAM indicates that during the 2028 Opening Year scenario, there are reductions in general traffic noted along the Proposed Scheme during the AM Peak Hour, as illustrated by the blue lines in Diagram 6.37 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 6.45.

Table 6.45: Road Links that Experience a Reduction of ⩾ 100 Combined Flows during AM Peak Hour (Direct Study Area)

Location	Map ID	Road Name	Do Minimum Flow (pcu)	Do Something Flow (pcu)	Flow Difference (pcu)
Section 1 - R137 Templeogue Road to R114 Rathfarnham Road	S.2	Cypress Grove Road	1,108	926	-182
		Old Bridge Road	1,333	983	-350
		Tallaght Road	1,675	1,400	-275
		Templeville Road	1,036	689	-348
		Wellington Lane	2,141	1,851	-291
	S.4	Templeogue Road	665	212	-453
		Terenure Place	1,345	759	-586
		Terenure Road West	704	597	-107
Section 2 - R821 Nutgrove Avenue to R137 Terenure Road North	S.3	Butterfield Avenue	979	822	-158
		Grange Road	606	484	-122
		Nutgrove Avenue	1,275	995	-280
		Rathfarnham Road	1,336	843	-493
		Willbrook Road	798	602	-196
	S.4	Bushy Park Road	441	301	-141
		Rathfarnham Road	950	837	-114
Section 3 - R137 Terenure Road North to Charleville Road	S.4	Highfield Road	633	456	-177
		Orwell Road	1,175	876	-299
		Rathfarnham Road	1,025	875	-150
		Rathgar Road	603	109	-494
		Terenure Road East	838	436	-401
		Terenure Road North	977	824	-153
Section 4 - Charleville Road to R137 Dame Street	S.4	Charleville Road	144	30	-114
		Rathgar Road	817	672	-144
		Rathmines Road Lower	1,225	849	-376
		Rathmines Road Upper	578	328	-249
		Wynnefield Road	218	87	-131
	S.5	Aungier Street	456	202	-254
		Camden Street Lower	649	343	-306
		Camden Street Upper	416	200	-216
		Canal Road	1,062	550	-512
		Charlotte Way	1,087	797	-289
		Grove Road	1,018	663	-356

Location	Map ID	Road Name	Do Minimum Flow (pcu)	Do Something Flow (pcu)	Flow Difference (pcu)
		Lennox Street	280	96	-185
		Mountpleasant Avenue Lower	306	54	-252
		Rathmines Road Lower	902	366	-537
		Redmond's Hill	909	388	-521
		Richmond Hill	248	133	-114
		Richmond Street South	591	150	-442
		South Great George's Street	326	216	-110
		Wexford Street	634	221	-413

Table 6.45 demonstrates that there is a moderate to significant reduction of between -107 and -586 general traffic flows along the direct study area during the AM Peak Hour, which is attributed to the Proposed Scheme and the associated modal shift as a result of its implementation. This reduction in general traffic flow has been determined as an overall **Medium Positive impact** on the direct study area. The most significant effect occurs along the Terenure Place which is part of Section 1 of the Proposed Scheme.

Increases in General Traffic Flows: The road links which experience additional traffic volumes of over 100 combined flows are illustrated by the orange / red lines in Diagram 6.37. The road links and associated flow difference between the Do Minimum and Do Something scenarios during the PM Peak Hour are outlined in Table 6.46.

Table 6.46: Road Links that Experience an Increase of ≥100 Combined Flows during AM Peak Hour (Direct Study Area)

Location	Map ID	Road Name	Do Minimum Flow	Do Something Flow	Flow Difference
Section 1 - R137 Templeogue Road to R114 Rathfarnham Road	A.10	Spawell Link Road	796	991	+194
		Templeogue Road	805	1,040	+236
Section 3 - R137 Terenure Road North to Charleville Road	S.4	Kenilworth Park	760	885	+125
		Kenilworth Square North	381	511	+131
		Leicester Avenue	170	343	+173
	A.4	Grosvenor Road	402	637	+235
		Harolds Cross Road	1,017	1,265	+249
		Leinster Road	218	499	+281
Section 4 - Charleville Road to R137 Dame Street	A.5	Stephen Street Upper	310	516	+206

Capacity analysis of Direct Study Area junctions is available in TIA Appendix 2 (Junction Design Report).

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 6.47.

Table 6.47: Road Links that Experience a Reduction of ⩾100 Combined Flows during AM Peak Hour (Indirect Study Area)

Location	Map ID	Road Name	Do Minimum Flow (pcu)	Do Something Flow (pcu)	Flow Difference (pcu)
Eastern Side of Proposed Scheme	S.2	Firhouse Road	1,016	902	-114
		Old Bridge Road	1,356	1,008	-348
		Templeogue Road	1,128	498	-630
	S.3	Ballyboden Road	941	807	-134
		Butterfield Avenue	970	808	-163
		Nutgrove Avenue	1,148	871	-277
		Nutgrove Way	1,109	1,006	-103
	S.4	Braemor Road	597	497	-101
		Highfield Road	619	499	-119
		Orwell Road	1,148	1,013	-135
		Rathmines Road Upper	697	524	-172
	S.5	Canal Road	1,028	570	-458
		Charlotte Way	754	541	-213
		Dame Street	673	478	-195
		Grand Parade	864	605	-259
		Mespil Road	810	666	-144
		Ranelagh	1,266	1,035	-232
		Sandford Road	1,254	1,028	-226
Western Side of Proposed Scheme	S.1	Ballymount Road Upper	886	776	-111
		Calmount Road	748	647	-101
		Greenhills Road	1,598	1,419	-180
		Tallaght Bypass	2,624	2,515	-109
		Walkinstown Roundabout	1,055	935	-121
	S.2	Cypress Grove Road	1,191	1,041	-149
		Fortfield Road	1,178	1,064	-114
		Tallaght Bypass	1,405	1,298	-106
		Tallaght Interchange	1,046	852	-194
		Tallaght Road	1,212	963	-250
		Templeville Road	479	334	-145
		Wainsfort Road	925	821	-104
		Wellington Lane	1,346	1,171	-174
		Wellington Road	1,533	1,421	-111
		Whitehall Road West	803	695	-109
	S.4	Terenure Road West	704	597	-107
	S.5	Dame Street	624	502	-122
		Grove Road	974	643	-332
		Parnell Road	661	540	-121

As indicated in Table 6.47, the traffic reductions within the indirect study area vary between -101 and -630 combined flows along the surrounding road links. This reduction in general traffic flow has an average of -183 two-way flows, which has been determined as an overall **Low Positive impact** on the indirect study area.

Indirect Increases in General Traffic: The road links which experience additional traffic volumes of over 100 combined flows are illustrated by the orange / red lines in Diagram 6.37. 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 6.48.

Table 6.48: Road Links where the 100 Flow Additional Traffic Threshold is Exceeded (AM Peak Hour) (Indirect Study Area)

Location	Map ID	Road Name	Do Minimum Flow (pcu)	Do Something Flow (pcu)	Flow Difference (pcu)
Eastern Side of Proposed Scheme	A.06	Ashfield Road	363	495	+132
		Charlemont Street	762	874	+112
		Charleston Road	779	971	+192
		Hatch Street Lower	421	521	+100
		Leeson Street Lower	1,604	1,846	+241
		Leeson Street Upper	937	1,238	+301
		Mountpleasant Place	147	354	+207
		Northbrook Road	260	369	+109
		Oxford Road	155	270	+115
		Ranelagh	885	1,230	+345
		Ranelagh Road	970	1,349	+379
		The Appian Way	691	802	+112
	A.07	Ashfield Road	330	458	+128
		Beechwood Road	426	543	+117
		Belgrave Square East	122	228	+105
		Belgrave Square North	640	873	+232
		Castlewood Avenue	619	824	+206
		Dunville Avenue	357	510	+153
		Frankfort Avenue	120	311	+191
		Milltown Road	1,049	1,185	+136
		Palmerston Park	853	1,028	+175
		Palmerston Road	108	304	+196
	A.08	Churchtown Road Lower	764	877	+114
		Dundrum Road	739	849	+111
		Milltown Road	1,312	1,488	+177
	A.09	Churchtown Road Lower	741	845	+105
		Dartry Road	896	1,296	+400
		Lower Dodder Road	448	556	+108
		Orwell Park	585	736	+151
		Orwell Road	1,307	1,507	+201
	A.10	Butterfield Avenue	788	933	+145
		Spawell Link Road	833	1,029	+195
		Taylors Lane	841	992	+151
	A.11	Broadford Road	945	1,059	+114
		Grange Road	1,114	1,299	+185
		Stonemason'S Way	811	948	+137
		Taylors Lane	662	837	+175
	A.12	M50	5,714	6,023	+309

Location	Map ID	Road Name	Do Minimum Flow (pcu)	Do Something Flow (pcu)	Flow Difference (pcu)
		M50 On-Ramp	1,352	1,482	+130
Western Side of Proposed Scheme	A.01	Ballymount Avenue	585	895	+310
		Ballymount Cross Rbt	924	1,056	+132
		Ballymount Road Lower	955	1,181	+225
		Ballymount Road Upper	1,864	2,084	+220
		Calmount Road	399	722	+324
		Katharine Tynan Road	905	1,045	+140
		Limekiln Road	258	398	+140
		M50	4,256	4,449	+193
		M50 Ramps	450	608	+159
		Naas Road	1,425	1,555	+130
		Robinhood Road	993	1,095	+103
		Turnpike Road	1,218	1,402	+185
	A.02	Ballymount Road Lower	1,328	1,612	+285
		Cromwellsfort Road	914	1,034	+120
		Walkinstown Avenue	1,419	1,612	+193
		Walkinstown Rondabout	1,472	1,769	+297
	A.03	Clareville Road	701	854	+153
		Kenilworth Square South	145	330	+184
		Larkfield Avenue	903	1,076	+173
		Larkfield Park	700	849	+149
	A.04	Grosvenor Place	435	646	+211
		Harolds Cross Road	889	1,068	+179
		Kenilworth Road	348	481	+133
		Kenilworth Square North	348	474	+126
		Leinster Road	320	591	+271
	A.05	Bride Street	626	764	+138
		Golden Lane	629	855	+226
		Heytesbury Street	594	802	+208
		New Bride Street	590	800	+210
		South Circular Road	987	1,184	+197
		Stephen Street Upper	152	314	+162
	A.12	M50	4,708	4,929	+221
		Tallaght Interchange	734	969	+235

As outlined in Table 6.48 the additional traffic on the key road links within the indirect study area varies between 100 and 400 combined flows during the AM Peak Hour. Further junction capacity assessment has been undertaken along these road links to determine whether the above road links have the capacity to cater for the additional traffic volumes as a result of the Proposed Scheme.

Operational capacity outputs have been extracted from the LAM at the associated junctions along the subject road links to determine whether there is reserve capacity to facilitate the increase in traffic. The results are

presented in terms of the significance of the impact to the V / C ratio for each junction based on its sensitivity and magnitude of impact.

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

6.2.3.1.7.3 PM Peak Hour - General Traffic Flow Difference

Diagram 6.38 (extract from Figure 6.8 TIA Appendix 3 (Maps)) illustrates the difference in traffic flows on road links in the PM peak hour for the 2028 Opening Year. Please refer to TIA Appendix 4.7 (General Traffic Assessment) for the full LAM outputs

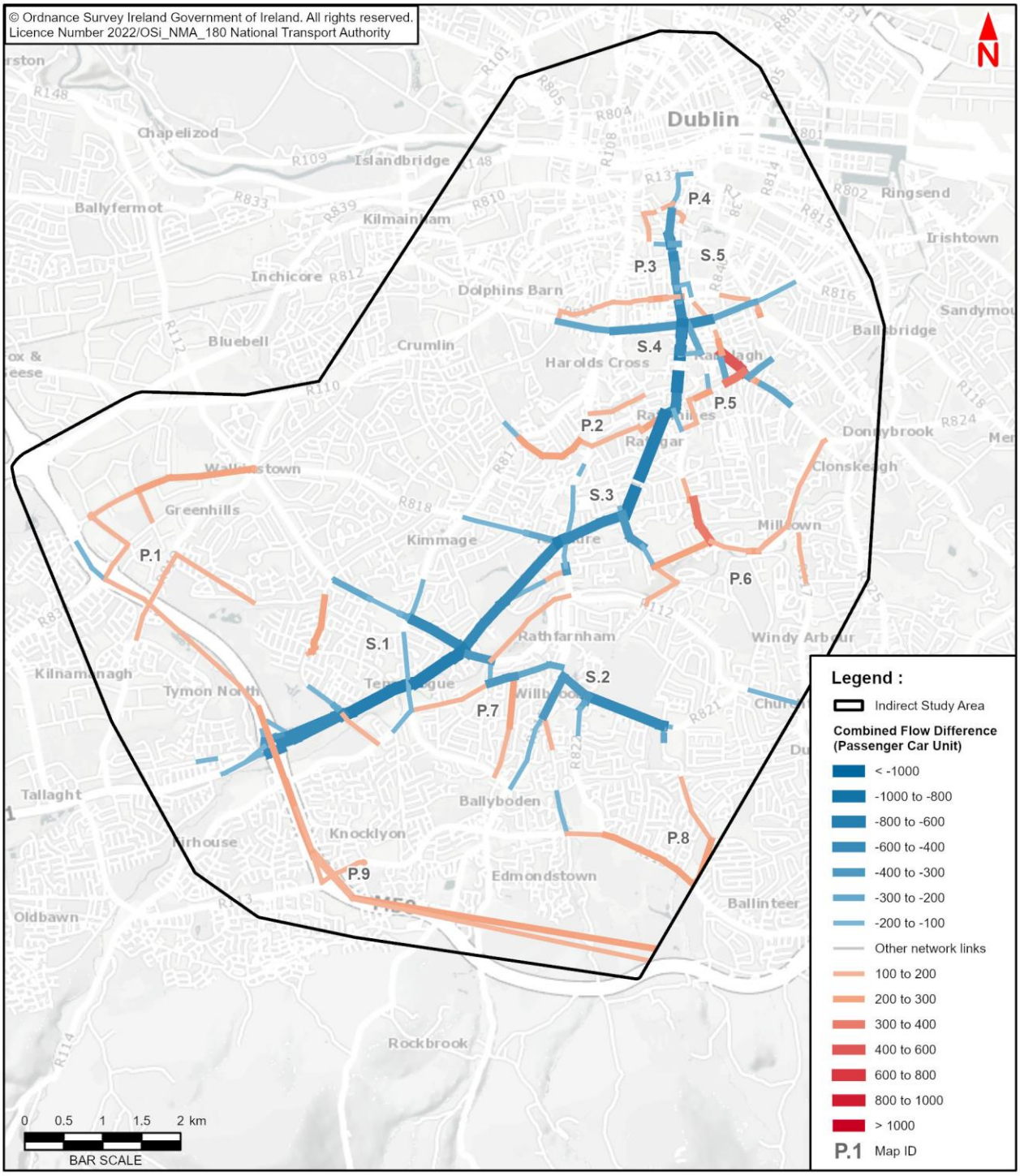

Diagram 6.38: Flow Difference on Road Links (Do Minimum vs. Do Something), PM Peak, 2028 Opening Year

Impact on Direct Study Area (PM Peak Hour)

Direct Reductions in General Traffic Flows: The LAM indicates that during the 2028 Opening Year scenario, there are key reductions in general traffic noted along the Proposed Scheme during the PM Peak Hour, as illustrated by the blue lines in Diagram 6.38 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 6.50.

Table 6.49 Road Links that Experience a Reduction of ⩾100 Combined Flows during PM Peak Hour (Direct Study Area)

Location	Map ID	Road Name	Do Minimum Flow (pcu)	Do Something Flow (pcu)	Flow Difference (pcu)
Section 1 - R137 Templeogue Road to R114 Rathfarnham Road	S.1	Cypress Grove Road	1,080	900	-180
		Old Bridge Road	1,242	1,087	-155
		Springfield Avenue	1,265	926	-339
		Tallaght Road	1,471	1,044	-427
		Templeogue Road	1,303	852	-451
		Templeville Road	972	558	-414
		Wellington Lane	2,241	1,960	-280
	S.2	Templeogue Road	864	462	-402
	S.3	Rathdown Park	171	30	-140
		Templeogue Road	864	462	-402
		Terenure Place	1,535	795	-740
		Terenure Road West	802	584	-218
Section 2 - R821 Nutgrove Avenue to R137 Terenure Road North	S.2	Butterfield Avenue	894	630	-264
		Grange Road	711	496	-215
		Nutgrove Avenue	1,279	736	-543
		Rathfarnham Road	1,610	765	-845
		Willbrook Road	979	667	-311
	S.3	Rathfarnham Road	980	826	-154
Section 3 - R137 Terenure Road North to Charleville Road	S.3	Harolds Cross Road	1,091	983	-107
		Orwell Road	1,140	813	-327
		Rathfarnham Road	1,014	833	-182
		Rathgar Avenue	756	649	-107
		Rathgar Road	782	70	-712
		Terenure Road East	903	386	-516
		Terenure Road North	1,034	926	-108
Section 4 - Charleville Road to R137 Dame Street	S.4	Canal Road	1,087	605	-482
		Grove Road	1,002	658	-345
		Mountpleasant Avenue Lower	300	58	-242
		Rathgar Road	1,072	581	-491
		Rathmines Road Lower	935	389	-546
		Rathmines Road Upper	521	331	-191
		Richmond Hill	319	149	-170
		Richmond Street South	314	116	-198
	S.5	Aungier Street	391	197	-194
		Camden Street Lower	532	246	-287
		Camden Street Upper	366	200	-166
		Charlotte Way	711	584	-127

Location	Map ID	Road Name	Do Minimum Flow (pcu)	Do Something Flow (pcu)	Flow Difference (pcu)
		Cuffe Street	1,107	893	-214
		Kevin Street Lower	1,046	932	-113
		Redmond's Hill	837	324	-513
		South Great George's Street	472	366	-105
		Wexford Street	535	171	-364

Table 6.50 demonstrates that there is a moderate to significant reduction of between -105 and -845 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 **Medium Positive impact** on the direct study area. The most significant effect occurs along the R14 Rathfarnham Road which is the main corridor of Section 2 of the Proposed Scheme.

Increases in General Traffic Flows: The road links which experience additional traffic volumes of over 100 combined flows are illustrated by the orange / red lines in Diagram 6.38. The road links and associated flow difference between the Do Minimum and Do Something scenarios during the PM Peak Hour are outlined in Table 6.50.

Table 6.50: Road Links that Experience an Increase of ≥100 Combined Flows during PM Peak Hour (Direct Study Area)

Location	Map ID	Road Name	Do Minimum Flow (pcu)	Do Something Flow (pcu)	Flow Difference (pcu)
Section 1 - R137 Templeogue Road to R114 Rathfarnham Road	P.7	Spawell Link Road	844	975	+131
		Templeogue Road	924	1,025	+100
Section 2 - R821 Nutgrove Avenue to R137 Terenure Road North	P.2	Rathdown Park	189	305	+116
	P.7	Dodderview Road	1,051	1,171	+120
		Rathdown Park	116	240	+124
Section 3 - R137 Terenure Road North to Charleville Road	P.2	Grosvenor Road	354	563	+209
		Kenilworth Park	719	893	+174
		Kenilworth Square North	330	498	+167
		Leinster Road	207	369	+162
Section 4 - Charleville Road to R137 Dame Street	P.4	Longford Street Little	262	426	+164
		Stephen Street Upper	222	333	+111

Capacity analysis of Direct Study Area junctions is available in TIA Appendix 2 (Junction Design Report).

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 6.51.

Table 6.51: Road Links that Experience a Reduction of ⩾100 Combined Flows during PM Peak Hour (Indirect Study Area)

Location	Map ID	Road Name	Do Minimum Flow (pcu)	Do Something Flow (pcu)	Flow Difference (pcu)
Eastern Side of Proposed Scheme	S.1	Firhouse Road	988	872	-116
		Old Bridge Road	1,249	1,096	-153
		Springfield Avenue	1,331	987	-344

Location	Map ID	Road Name	Do Minimum Flow (pcu)	Do Something Flow (pcu)	Flow Difference (pcu)
		Templeogue Road	1,302	680	-622
	S.2	Ballyboden Road	839	715	-124
		Butterfield Avenue	934	643	-290
		Churchtown Road Upper	1,222	1,098	-124
		Fairways	1,030	857	-173
		Grange Road	734	557	-177
		Nutgrove Avenue	754	612	-141
		Nutgrove Way	689	554	-135
		Whitechurch Road	613	512	-100
	S.3	Orwell Road	1,190	1,072	-118
	S.4	Canal Road	1,144	645	-499
		Chelmsford Road	648	404	-243
		Mount Pleasant Avenue Upper	299	189	-110
		Mountpleasant Place	315	49	-266
		Oxford Road	303	38	-266
		Ranelagh	1,301	1,009	-291
		Rathmines Road Upper	514	323	-190
		Sandford Road	1,336	1,071	-265
	S.5	Dame Street	574	440	-134
		Grand Parade	961	693	-268
		Harcourt Street	594	477	-116
		Mespil Road	943	838	-105
Western Side of Proposed Scheme	S.1	Cypress Grove Road	995	822	-173
		M50 Ramps	696	588	-108
		Tallaght Bypass	2,139	2,032	-108
		Tallaght Interchange	345	200	-145
		Tallaght Road	823	720	-103
		Templeville Road	1,036	908	-128
		Wainsfort Road	1,044	934	-109
		Wellington Lane	1,617	1,494	-123
	S.3	Sundrive Road	1,232	1,129	-104
		Terenure Road West	668	557	-111
	S.4	Grove Road	931	636	-295
		Parnell Road	1,011	734	-277

The LAM indicates that during the PM Peak hour in the 2028 Opening Year, there is a reduction in general traffic travelling along the Proposed Scheme, as illustrated by the blue links in Diagram 6.38.

The traffic flow reduction varies between -100 and -499 combined flows, with the largest reduction occurring on the Canal Road. This reduction in general traffic flow has an average of -193 two-way flows, which has been determined as an overall **Low Positive impact** on the indirect study area.

Increases in General Traffic Flows: The road links which experience additional traffic volumes of over 100 combined flows are illustrated by the red lines in Diagram 6.38.

The road links and associated flow difference between the Do Minimum and Do Something scenarios during the PM Peak Hour are outlined in Table 6.52.

Table 6.52: Road Links Where Link Threshold of 100 Combined Flows is Exceeded (PM Peak Hour) (Indirect Study Area)

Location	Map ID	Road Name	Do Minimum Flow (pcu)	Do Something Flow (pcu)	Flow Difference (pcu)
Eastern Side of Proposed Scheme	P.3	Adelaide Road	753	858	+105
		Charlemont Street	835	955	+120
	P.4	Mercer Street Lower	463	576	+113
		Noel Purcell Walk	290	471	+182
	P.5	Anglesea Mews	1,359	1,502	+146
		Anglesea Road	1,346	1,491	+280
		Belgrave Square North	614	894	+222
		Castlewood Avenue	614	836	+122
		Castlewood Park	23	144	+365
		Charleston Road	694	1,058	+105
		Church Avenue	185	290	+358
		Cullenswood Road	756	1,114	+232
		Leeson Street Upper	700	931	+169
		Milltown Road	868	1,037	+480
		Ranelagh	837	1,318	+216
		Ranelagh Road	1,227	1,442	+337
	P.6	Dartry Road	901	1,237	+105
		Dundrum Road	435	540	+118
		Lower Dodder Road	381	499	+260
		Milltown Road	1,188	1,448	+204
		Orwell Park	372	575	+131
		Orwell Road	1,326	1,457	+238
		Palmerston Park	802	1,040	+113
		Rathmines Road Upper	621	735	+126
	P.7	Butterfield Avenue	826	952	+241
		Butterfield Park	215	456	+119
		Dodderview Road	1,047	1,166	+132
		Spawell Link Road	885	1,016	+108
		Whitechurch Road	333	441	+188
	P.8	Broadford Road	712	899	+203
		Grange Road	884	1,086	+223
		Stonemason's Way	557	779	+150
		Taylors Lane	617	768	+286
	P.9	M50	4,281	4,567	+127
		M50 On-Ramp	583	710	+120
		Scholarstown Road	776	896	+136
		St Colmcilles Way	1,478	1,614	+105

As outlined in Table 6.52, the additional traffic on the key road links varies between 105 and 480 combined flows during the PM Peak Hour. These road links have been identified as experiencing additional traffic volumes over the threshold and require further assessment (detailed further below).

6.2.3.1.7.4 National Roads – 5% Threshold Impact Assessment

The assessment methodology specifically for national roads stipulates that traffic exceeding 5% of the combined turning flows at junctions on or with National Roads as a result of traffic redistribution associated with the Proposed Scheme requires further assessment.

In the context of the indirect study area for the Proposed Scheme, this assessment comprises consideration of the M50 and N81 national roads. All junctions along the M50 within the indirect study area have been assessed further in terms of junction capacity in the AM and PM Peak Hours as redistributed traffic flows exceeded the threshold for 100 combined flow of additional traffic (as outlined above for the AM and PM Peak Hours).

In terms of the N81, the results of redistributed traffic assessment demonstrate that a reduction of 67 and 150 combined flows will occur along this road link in the AM and PM Peak Hours respectively. Therefore, the additional 5% threshold impact assessment has not been required for the National Roads as part of this assessment.

6.2.3.1.7.5 General Traffic Impact Assessment

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

To understand the magnitude impact of the redistributed traffic, operational capacities have been extracted from the LAM.

The capacity of junctions within the LAM are expressed in terms of Volume to Capacity ratios (VoC ratios). The VoC 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 VoC 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 6.53.

Table 6.53:Junction Volume / Capacity Ranges

VoC 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 VoC ratios during the Do Minimum and Do Something scenarios for the key junctions, the terms outlined in Table 6.54 have been used to describe the impact.

Table 6.54: Magnitude of Impact for Redistributed Traffic

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

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

As indicated in Table 6.54, the changes in VoC ratios between the Do Minimum and Do Something scenarios result in either a positive, negative or negligible magnitude of impact.

The above analysis was carried out on the following scenarios:

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

The AM and PM Peak Hour flows are modelled as occurring between 08:00 to 09:00 and 17:00 to 18:00 respectively. The interpeak periods have not been analysed for this impact assessment as the AM and PM Peak Hour flows present an overall worst-case scenario. The full analysis tables for each scenario, demonstrating the Do Minimum and Do Something Peak Hour traffic flows and maximum V / C ratio for each junction assessed is detailed in Table 18 to Table 21 of TIA Appendix 4.4 (General Traffic Assessment).

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

Table 6.55 outline the maximum V / C ratios at the key local / regional road junctions in the AM Peak Hour for the 2028 Opening Year at junctions where the ratio exceeds 100% in the Do Something scenario, or where the impact is assessed as low or higher. The location of these junctions and the V / C ratio comparison between the Do Minimum and Do Something scenarios in the 2028 AM Peak Hour are illustrated in Figure 6.9 in Volume 3 of this EIAR.

Table 6.55: Volume over Capacity Ratios at Key Junctions (Do Minimum vs. Do Something), AM Peak, 2028 Opening Year

Road Name	Junction Name	Junction Sensitivity	DM Max V/C Ratio			DS Max V/C Ratio			Magnitude of Impact
			<85%	85% - 100%	>100%	<85%	85% - 100%	>100%	
Ranelagh Road	Ranelagh Road / Beechwood Avenue Lower	Low	✓				✓		Low
Ranelagh	Mountpleasant Place / Ranelagh / Ranelagh Road	Low	✓				✓		Low
Orwell Road	Lower Dodder Road / Orwell Road	Low	✓				✓		Low
Orwell Park	Orwell Park / Orwell Road	Medium	✓				✓		Low
Milltown Road	Churchtown Road Lower / Milltown Road	Low			✓			✓	Negligible
M50	M50 Jct 09	Negligible			✓			✓	Negligible
Katharine Tynan Road	Katharine Tynan Road / Sylvan Drive	Low			✓			✓	Negligible
Cromwellsfort Road	St Agnes Road / Cromwellsfort Road / Kimmage Road West / Whitehall Road West	Low			✓			✓	Negligible
Cromwellsfort Road	Walkinstown Rbt	Low		✓				✓	Medium
Ballymount Road Lower	Ballymount Avenue / Ballymount Road Lower	Medium			✓			✓	Negligible

The results of the junction analysis illustrated in Table 6.55 demonstrate that of the total of 133 junctions assessed, 108 junctions are operating with a maximum V / C ratio of below 85% in the Do Something scenarios in the AM Peak Hour in the 2028 Opening Year. A further 19 junctions are operating with a maximum V / C ratio of between

85% - 100%. Therefore, the majority of junctions continue to operate well within capacity with the Proposed Scheme in place.

Overall, the Proposed Scheme is considered to have a **Negligible impact** at 124 junctions within the indirect study area. Six of the 133 junctions assessed are shown to have a **Low Negative impact**, and one is shown to have **Medium Negative impact**.

Capacity issues are noted at the following six junctions:

- **Churchtown Road Lower / Milltown Road** – operates above 100% during both the Do Minimum and Do Something scenarios;
- **M50 Jct 09** – The Turnpike Road arm operates above 100% during both the Do Minimum and Do Something scenarios;
- **Katherine Tynan Road / Sylvan Drive** – operates above 100% during both the Do Minimum and Do Something scenarios;
- **St Agnes Road / Cromwellsfort Road / Kimmage Road West / Whitehall Road** West – operates above 100% during both the Do Minimum and Do Something scenarios;
- **Walkinstown Rbt (Cromwellsfort Road approach)** – operates between 85% – 100% during the Do Minimum and above 100% during the Do Something scenario; and
- **Ballymount Avenue / Ballymount Road Lower** – operates above 100% during both the Do Minimum and Do Something scenarios.

Five out of six of the junctions listed operate with a V / C ratio of above 100% in the Do Minimum scenario, therefore, the impact of Proposed Scheme is low or negligible and no further analysis or mitigation is required. At the remaining junction (Cromwellsfort Road approach to the Walkinstown Roundabout), the impact is **Medium Negative** it is considered that no mitigation is required. Closer inspection of the V / C ratio at this junction shows that the Do Minimum ratio is 99% increasing to 104% in the Do Something, which is a limited change in capacity as a result of the Proposed Scheme. Overall, there is a **Medium, Negative Impact** on these road links.

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

Table 6.57 outlines the V / C ratios at the key local / regional road junctions in the PM Peak Hour for the 2028 Opening Year at junctions where the ratio exceeds 100% in the Do Something scenario, or where the impact is assessed as low or higher. The location of these junctions and the V / C ratio comparison between the Do Minimum and Do Something scenarios in the 2028 PM Peak Hour are illustrated in Figure 6.10 in Volme 3 of this EIAR.

Table 6.56: Volume over Capacity Ratios at Key Junctions (Do Minimum vs. Do Something), PM Peak, 2028 Opening Year

Road Name	Junction Name	Junction Sensitivity	DM Max V/C Ratio			DS Max V/C Ratio			Magnitude of Impact
			<85%	85% - 100%	>100%	<85%	85% - 100%	>100%	
Anglesea Road	Ailesbury Rd / Anglesea Rd Jct	Negligible			✓			✓	Negligible
Clanbrassil Street Lower	Clanbrassil Street Lower / South Circular Road	Low			✓			✓	Negligible
Donore Avenue	Donore Avenue / South Circular Road	Medium	✓				✓		Low
Grange Road	Grange Road / Stonemason's Way	Low	✓				✓		Low
Greenhills Road	Greenhills Road / Castletymon Road	Medium			✓			✓	Negligible
M50	M50 Jct 12 (SB Off-slip)	Negligible			✓			✓	Negligible
Milltown Road	Churchtown Road Lower / Milltown Road	Low			✓			✓	Negligible
Palmerston Park	Palmerston Park / Sunbury Gardens	Low	✓				✓		Low
Ranelagh	Chelmsford Road / Ranelagh	Low	✓				✓		Low
Ranelagh	Cullenswood Road / Ranelagh	Low	✓				✓		Low
Ranelagh Road	Ranelagh Road / Beechwood Avenue Lower	Low	✓				✓		Low
Scholarstown Road	Scholarstown Rd Rbt	Low			✓			✓	Negligible

The results of the junction analysis illustrate that, of a total of 112 junctions assessed, 89 junctions are operating with a maximum V / C ratio of below 85% in the Do Something scenarios in the PM Peak Hour in the 2028 Opening Year. A further 17 junctions are operating with a maximum V / C ratio of between 85% - 100%. Therefore, the majority of junctions continue to operate well within capacity with the Proposed Scheme in place.

Overall, as a result of redistributed general traffic associated with the Proposed Scheme, the effect at 104 out of 112 junctions assessed is predicted to have a **Negligible impact** the Indirect Study Area. Six of the 120 junctions assessed are shown to have a **Low Negative impact**.

Capacity issues arise at the following six junctions:

- **Ailesbury Rd / Anglesea Rd Jct** – operates above 100% during both the Do Minimum and Do Something scenarios;
- **Clanbrassil Street Lower / South Circular Road** – operates above 100% during both the Do Minimum and Do Something scenarios;
- **Greenhills Road / Castletymon Road** – operates above 100% during both the Do Minimum and Do Something scenarios;
- **M50 Jct 12 (SB Off-slip) –** operates above 100% during both the Do Minimum and Do Something scenarios;
- **Churchtown Road Lower / Milltown Road** – operates above 100% during both the Do Minimum and Do Something scenarios; and
- **Scholarstown Rd Rbt** – operates above 100% during both the Do Minimum and Do Something scenarios.

The results demonstrate that all these junctions operate with a V / C ratio of above 100% in the Do Minimum scenario, therefore, the impact of Proposed Scheme is low or negligible and no further analysis or mitigation is required.

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

Table 6.57 outlines the V / C ratios at the key local / regional road junctions in the AM Peak Hour for the 2043 Design Year at junctions where the ratio exceeds 100% in the Do Something scenario, or where the impact is assessed as low or higher. The location of these junctions and the V / C ratio comparison between the Do

Minimum and Do Something scenarios in the 2043 AM Peak Hour are illustrated in Figure 6.11 in Volume 3 of this EIAR.

Table 6.57: Volume over Capacity Ratios at Key Junctions (Do Minimum vs. Do Something), AM Peak, 2043 Design Year

Road Name	Junction Name	Junction Sensitivity	DM Max V/C Ratio			DS Max V/C Ratio			Magnitude of Impact
			<85%	85% - 100%	>100%	<85%	85% - 100%	>100%	
Ballymount Road Lower	Ballymount Avenue / Ballymount Road Lower	Medium	✓				✓		Low
Cromwellsfort Road	St Agnes Road / Cromwellsfort Road / Kimmage Road West / Whitehall Road West	Low		✓				✓	Medium
Katharine Tynan Road	Katharine Tynan Road / Sylvan Drive	Low			✓			✓	Negligible
M50	M50 Jct 09	Negligible			✓			✓	Negligible
Milltown Road	Churchtown Road Lower / Milltown Road	Low	✓				✓		Low
Walkinstown Avenue	Walkinstown Avenue / Long Mile Road	Negligible			✓			✓	Negligible

The results of the junction analysis illustrated in Table 6.57 demonstrate that of the total of 134 junctions assessed, 122 junctions are operating with a maximum V / C ratio of below 85% in the Do Something scenarios in the AM Peak Hour in the 2043 Design Year. A further eight junctions are operating with a maximum V / C ratio of between 85% - 100%. Therefore, the majority of junctions continue to operate well within capacity with the Proposed Scheme in place.

Overall, the Proposed Scheme is considered to have a Positive or **Negligible impact** at 131 junctions within the indirect study area. **Negligible impact** at these junctions. The results demonstrate that only three out of the total 135 junctions assessed are expected to experience a **Low Negative impact.** Only one junction is expected to experience a **Medium Negative impact.**

Capacity issues arise at five junctions, however, the results demonstrate that all but one of these junctions operate with V / C ratios of above 100% in the Do Minimum scenario, therefore, the impact of Proposed Scheme is low or negligible and no further analysis or mitigation is required. At the remaining junction (Cromwellsfort Road - St Agnes Road / Cromwellsfort Road / Kimmage Road West / Whitehall Road West), the impact is **Medium** when combining the road sensitivity and magnitude of impact, therefore, it is considered that no mitigation is required. Closer inspection of the V / C ratio at this junction shows that the Do Minimum ratio is 99% increasing to 101% in the Do Something, which is a limited change in capacity as a result of the Proposed Scheme. Overall, there is a **Medium, Negative Impact** on these road links

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

Table 6.58 outlines the V / C ratios at the key local / regional road junctions in the PM Peak Hour for the 2043 Design Year at junctions where the ratio exceeds 100% in the Do Something scenario, or where the impact is assessed as low or higher. The location of these junctions and the V / C ratio comparison between the Do Minimum and Do Something scenarios in the 2043 PM Peak Hour are illustrated in Figure 6.12 in Volme 3 of this EIAR.

Table 6.58: Volume over Capacity Ratios at Key Junctions (Do Minimum vs. Do Something), PM Peak, 2043 Design Year

Road Name	Junction Name	Junction Sensitivity	DM Max V/C Ratio			DS Max V/C Ratio			Magnitude of Impact
			<85%	85% - 100%	>100%	<85%	85% - 100%	>100%	
Anglesea Road	Ailesbury Rd / Anglesea Rd Jct	Negligible			✓			✓	Negligible
Ballymount Road Upper	Ballymount Avenue / Ballymount Road Lower	Medium	✓					✓	Low
Greenhills Road	Greenhills Road / Castletymon Road	Medium			✓			✓	Negligible
Larkfield Avenue	Larkfield Avenue / Sundrive Road	Low	✓				✓		Low
M50	M50 Jct 12 (SB Off-slip)	Negligible			✓			✓	Negligible
Ranelagh	Cullenswood Road / Ranelagh	Low	✓				✓		Low
Calmount Road	Calmount Rd Rbt	Medium			✓			✓	Negligible
Scholarstown Road	Scholarstown Rd Rbt	Low			✓			✓	Negligible

The results of the junction analysis illustrated in Table 6.58 demonstrate that, of a total of 112 junctions assessed, 97 junctions are operating with a maximum V / C ratio of below 85% in the Do Something scenarios in the PM Peak Hour in the 2043 Design Year. A further nine junctions are operating with a maximum V / C ratio of between 85% - 100%. Therefore, the majority of junctions continue to operate well within capacity with the Proposed Scheme in place.

Overall, as a result of redistributed general traffic associated with the Proposed Scheme, the effect at 106 out of 112 junctions assessed is predicted to have a **Negligible impact** within the Indirect Study Area. Three of the 112 junctions assessed are shown to have a **Low Negative impact**, in the 2043 Design Year PM Peak Hour

In the 2043 PM Peak Hour, capacity issues arise at six junctions, five out of the six junctions operate with a maximum V / C ratio of above 100% in both the Do Minimum and Do Something scenarios and the significance of effect is considered to be Imperceptible or Not Significant. The remaining junction, Ballymount Road Upper / Greenhills Road, operates with a worst-arm V / C ratio of 82% in the Do Minimum increasing to 101% in the DoSomething, representing a minor change in capacity. Overall, there is a **Low, Negative Impact** on these road links

6.2.3.1.7.6 Night-time Traffic Redistribution

The night-time period is defined as between 23:00 and 07:00. An analysis of traffic data during this period indicates that traffic levels are considerably lower and that junctions have a higher capacity for vehicular movement[1]. Automatic Traffic Counter data demonstrates that, typically, within Dublin the night-time period has approximately 19% of the traffic levels compared to the morning peak hour (08:00-09:00). As a result, during the night-time period junctions do not experience flows in excess of capacity which would result in queuing and in turn potential re-distribution of traffic to alternative routes to avoid congestion. Therefore, the effects of traffic redistribution due to any of the Proposed Schemes will be **Negligible** during the night-time period.

6.2.3.1.7.7 General Traffic Impact Assessment Summary

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

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

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 further assessment is required:

- **Local / Regional Roads:** Traffic redistribution results in an increase above 100 combined flows (i.e. in a two-way direction) along residential, local and regional roads in the vicinity of the Proposed Scheme in the AM and PM peak hours;
- **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 a range of increases in traffic levels (exceeding 100 combined flows) within the study area from 100 to 400 combined flows during the AM Peak Hour, and from 105 to 480 combined flows during the PM Peak Hour.

This assessment comprises consideration of the M50 and N81 national roads within the indirect study area. All junctions along the M50 within the indirect study area have been assessed further in terms of junction capacity in the AM and PM Peak Hours as redistributed traffic flows exceeded the threshold for 100 combined flow of additional traffic (as outlined above for the AM and PM Peak Hours). The results of redistributed traffic assessment demonstrate that a reduction of 67 and 150 combined flows will occur along the N81 in the AM and PM Peak Hours respectively. Therefore, the additional 5% threshold impact assessment has not been required for the national roads as part of this assessment.

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

- The majority of assessed junctions have V / C ratios of below 85%, i.e. they are operating within capacity for all assessed years in the Do Minimum and Do Something scenarios. This indicates that these junctions will be able to accommodate the additional general traffic volumes redistributed as a result of the Proposed Scheme, and the effect is deemed **Negligible to Low Negative**
- At the small number of junctions indicating capacity constraints, the majority of these junctions operate with a maximum V / C ratio of above 100% in both the Do Minimum and Do Something, therefore, the impact is considered to be Negligible. This level of congestion is acceptable according to national guidance. Section 3.4.2 of DMURS (2019) recognises that a certain level of traffic congestion is an inevitable feature within urban networks and that junctions may have to operate at saturation levels for short periods of time during the Peak Hours of the day. Chapter 1 of the Smarter Travel Policy Document also acknowledges that it is not feasible or sustainable to accommodate continued demand for car use. It should therefore be considered that the traffic congestion that is outlined in the impact assessment is acceptable with regard to the urban location of the area in the context of the increased movement of people overall and on sustainable modes in particular. Therefore, the proposed impacts are considered acceptable when considered against the Scheme Objectives.

Overall Summary: Overall, it is determined that there will be a **Low Negative** impact from the redistributed general traffic as a result of the Proposed Scheme. Given that the redistributed traffic will not lead to a significant deterioration of the operational capacity on the surrounding road network, no mitigation measures have been considered to alleviate the impact outside of the direct study area.

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

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

To further quantify the impact of the Proposed Scheme on the traffic conditions within the indirect study area, additional network-wide performance indicators have been extracted from the LAM.

The following indicators have been provided:

- **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.

For brevity the above metrics have been presented in indicative terms of significance, as shown in Table 6.59.

Table 6.59 Network-Wide Performance Indicators - General Traffic (Indirect Study Area)

Scenario	Metric	DoMinimum	DoSomething	% Difference	Impact
2028 Opening Year AM Peak Hour	Transient Queues (pcu hr)	19,765	20,143	1.9%	Low Negative
	Over-capacity Queues (pcu hr)	7,636	7,775	1.8%	
	Total Travel Times (pcu hr)	67,586	68,164	0.9%	
	Total Travel Distance (pcu km)	2,143,206	2,145,057	0.1%	
	Average Speed (km/h)	31.7	31.5	-0.6%	
2028 Opening Year PM Peak Hour	Transient Queues (pcu hr)	19,065	19,577	2.7%	Low Negative
	Over-capacity Queues (pcu hr)	7,857	7,905	0.6%	
	Total Travel Times (pcu hr)	64,792	65,389	0.9%	
	Total Travel Distance (pcu km)	2,035,578	2,034,710	0.0%	
	Average Speed (km/h)	31.4	31.1	-1.0%	
2043 Opening Year AM Peak Hour	Transient Queues (pcu hr)	16,977	17,265	1.7%	Low Negative
	Over-capacity Queues (pcu hr)	7,844	7,861	0.2%	
	Total Travel Times (pcu hr)	62,947	63,269	0.5%	
	Total Travel Distance (pcu km)	2,121,716	2,121,785	0.003%	
	Average Speed (km/h)	33.7	33.5	-0.6%	
2043 Opening Year PM Peak Hour	Transient Queues (pcu hr)	18,051	18,282	1.3%	Low Negative
	Over-capacity Queues (pcu hr)	9,734	10,011	2.9%	
	Total Travel Times (pcu hr)	64,883	65,369	0.8%	
	Total Travel Distance (pcu km)	2,049,704	2,048,178	-0.1%	
	Average Speed (km/h)	31.6	31.3	-0.1%	

The results in Table 6.59 demonstrate that the changes to general traffic metrics as a result of the Proposed Scheme are typically in the range -1.0% to +2.9%, which is assessed as an overall **Low Negative impact.**

6.2.4 Operational Phase Summary

The contents of Table 6.60 present a summary of the potential impacts of the Proposed Scheme during the Operational Phase.

Table 6.60:Summary of Potential Operational Phase Impacts

Assessment Topic	Effect	Potential Impact
Pedestrian Infrastructure	Improvements to the quality of the pedestrian infrastructure along the Proposed Scheme.	Medium Positive
Cycling Infrastructure	Improvements to the quality of the cycling infrastructure along the Proposed Scheme.	Medium and Low Positive

Bus Infrastructure	Improvements to the quality of the bus infrastructure along the Proposed Scheme.	Medium and Low Positive
Parking and Loading	A total loss of 54 parking spaces and 5 loading bay spaces along the Proposed Scheme.	Negligible and Low Negative
People Movement	Increases to the total number of people travelling through the Proposed Scheme.	High Positive
Bus Network Performance Indicators	Improvements to journey time and reliability indicators for bus users along the Proposed Scheme.	High Positive
General Traffic Network Performance Indicators	Reduction in general traffic flows along the Proposed Scheme.	Medium Positive
	Redistributed general traffic along the surrounding road network in the indirect study area as a result of the reduction of reserve capacity along the Proposed Scheme.	Low Negative
Network Wide Performance Indicators	Deterioration to the network-wide queuing capacity, travel times, travel distances and average network speeds beyond the direct and indirect study areas.	Low Negative

The Proposed Scheme has been designed and outlined within this assessment to take cognizance of the relevant traffic and transport guidelines outlined in Chapter 9 (References). The assessment demonstrates that the Proposed Scheme will provide significantly enhanced facilities for sustainable modes, helping to provide an attractive alternative to the private car and promoting a modal shift to walking, cycling and public transport.

Despite some localised impacts, the assessment demonstrates that overall 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, allowing for greater capacity along the corridor to facilitate the movement of people, and will not result in a significant deterioration to the existing traffic conditions on the local road network during the operational phase.

7. Cumulative Assessment

7.1 Construction Phase Cumulative Effects

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

7.2 Operational Phase Cumulative Impacts

7.2.1 Introduction

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

7.2.2 Transport Schemes

As detailed in Section 6.1.3 the core reference case (Do Minimum) modelling scenarios (Opening year - 2028 and Design year - 2043) are based on the progressive roll-out of the Greater Dublin Area (GDA) Transport Strategy 2022-2042 (GDA Strategy), with a partial implementation by 2028, in line with (National Development Plan (NDP) investment priorities) and the full implementation by 2043. 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) and National Development Plan (NDP); and
- Schemes within the GDA Strategy are a means to deliver the set of objectives of the GDA Strategy. The sequencing and delivery of the strategy is defined by the implementation plan, but the optimal outcome of aiming to accommodate all future growth in travel demand on sustainable modes underpins the Strategy.

7.2.3 Transport Demand

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

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

7.2.3.1 Strategic Trip Demand Assessment

As described previously in section 6.1.3, the GDA Strategy (along with existing supply side capacity constraints e.g., parking availability, road capacity etc.) has the effect of limiting the growth in car demand on the road network into the future.

To limit the growth in car traffic and to ensure that this demand growth is catered for predominantly by sustainable modes, a number of measures will be required, that include improved sustainable infrastructure and priority measures delivered as part of the NDP/GDA Strategy. In addition to this, demand management measures will play a role in limiting the growth in transport demand, predominantly to sustainable modes only. The result will be only limited or no increases overall in private car travel demand. The Proposed Scheme will play a key role in this as part of the wider package of GDA Strategy measures.

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

In terms of the transport modelling scenarios for the cumulative traffic and transport assessment, as per the Strategy proposals, there are no specific demand management measures included in the Do Minimum reference case (receiving environment) scenario in the 2028 Opening year, other than constraining parking availability in Dublin at existing levels. For the design year, 2043 scenario, 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 Scheme, and which could reasonably be exposed to cumulative effects in combination with other developments. Diagram 7.1 below outlines the changes in total trip demand, comparing car demand with sustainable mode demand (public transport, walking and cycling). The figures are presented for both 2028 and 2043 Do Minimum scenarios (i.e., without the Proposed Schemes in place) in relation to the 2020 ERM demand levels.

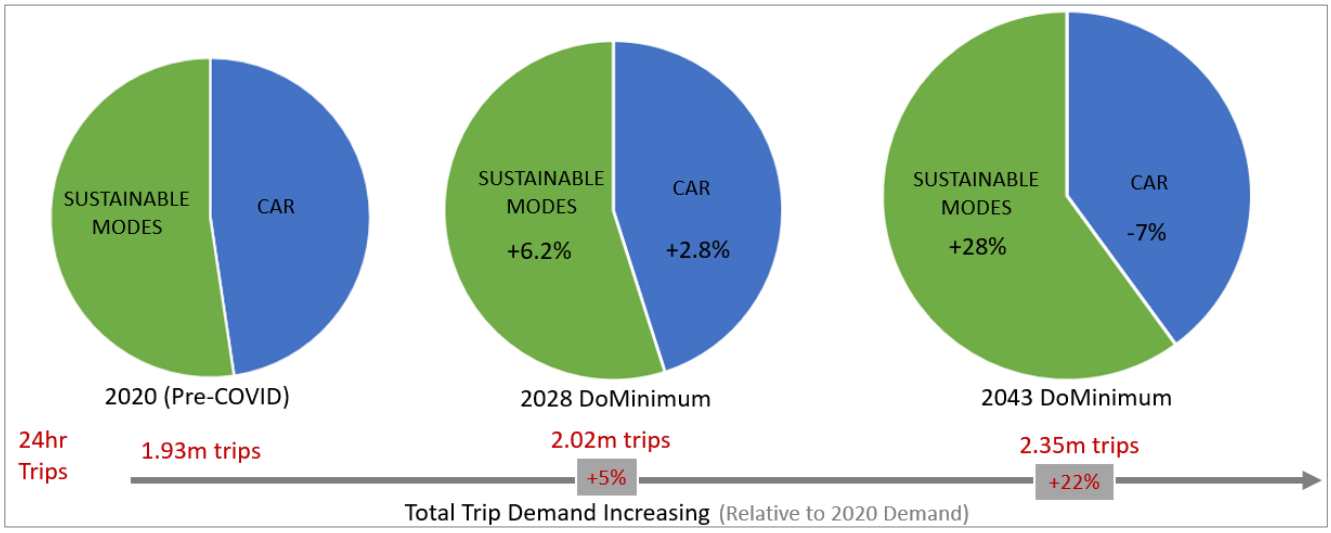

Diagram 7.1: Trip Demand Changes without the Proposed Schemes (in Relation to 2020 Demand)

As shown above, there are 1.93m trips[2] over a 24hr period within 500m of the Proposed Schemes. Total trip demand increases to 2.02m trips (5% increase) in 2028 and to 2.35m trips (+22% increase) in 2043.

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

In terms of the modal composition of the 5% increase in total demand in 2028, there will be a 6.2% increase in sustainable modes (PT, walk, cycle) and a 2.8% increase in private car demand above 2020 levels, without the Proposed Schemes in place. In 2043, the 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 below).

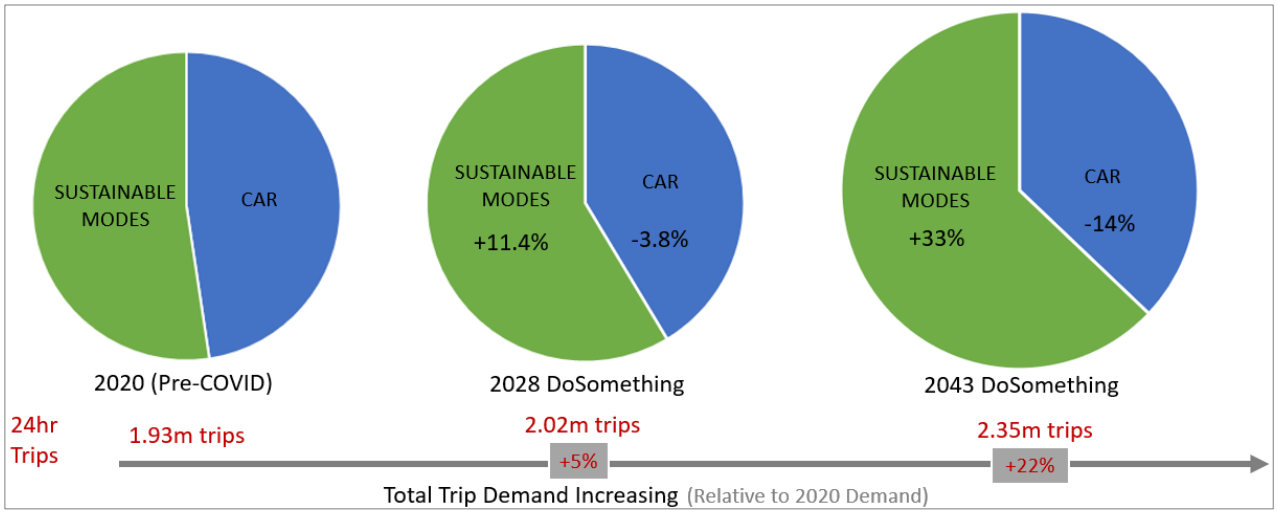

Diagram 7.2: Trip Demand Changes with the Proposed Schemes (in Relation to 2020 Demand)

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

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

7.2.4 People Movement Assessment

7.2.4.1 Overview

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

The assessment of People Movement includes the following metrics:

- Daily Mode share changes within a 500m catchment[3] of the Proposed Schemes comparing the Do Minimum and Do Something scenarios for trips to the City Centre and trips to any destination in the 2028 and 2043 assessment years;
- The average number of people moved by each transport mode (i.e., Car, Bus, Walking and Cycling) along the corridor in the inbound and outbound direction. This metric is compared for the Do Minimum and Do Something scenarios in the AM and PM peak hours for each forecast year (2028, 2043). This metric provides an estimate of the modal share changes on the direct CBC as a result of the Proposed Scheme measures; and
- People Movement by Bus:
    - Total Passengers Boarding Buses on bus routes that use any part of the Proposed Scheme for each forecast year (2028, 2043)

7.2.4.2 Daily People Movement by Mode (Mode Share)

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

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

- People travelling from the catchment area of the Proposed Schemes to any destination within the catchment (inclusive of the City Centre) in the Morning Peak period (AM) (07:00-10:00) and All-day (07:00-19:00) period; and
- People travelling from the catchment area[4] of the Proposed Schemes inbound towards the city centre (defined as the Canal Cordon) in the Morning Peak period (AM) 07:00-19:00 period.

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

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

7.2.4.2.1 2028 Demand Changes by Mode

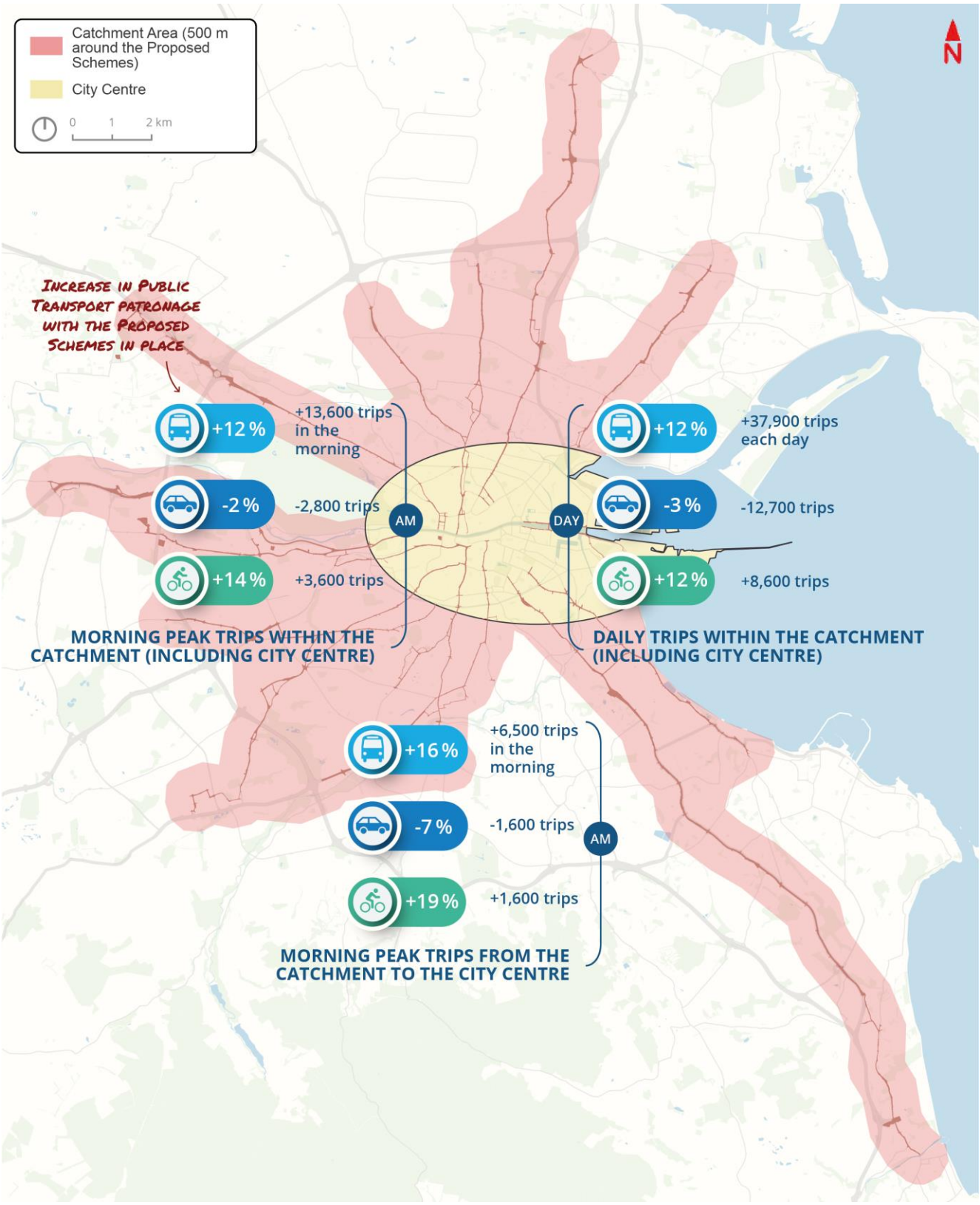

Diagram 7.3: Change in Trips by Mode within a 500m Catchment Area of the Proposed Schemes and the City Centre and Trips Originating from the Catchment Inbound to the City Centre in 2028

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

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

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

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

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

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

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

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

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

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

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

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

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

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

7.2.4.2.2 2043 Demand Changes by Mode

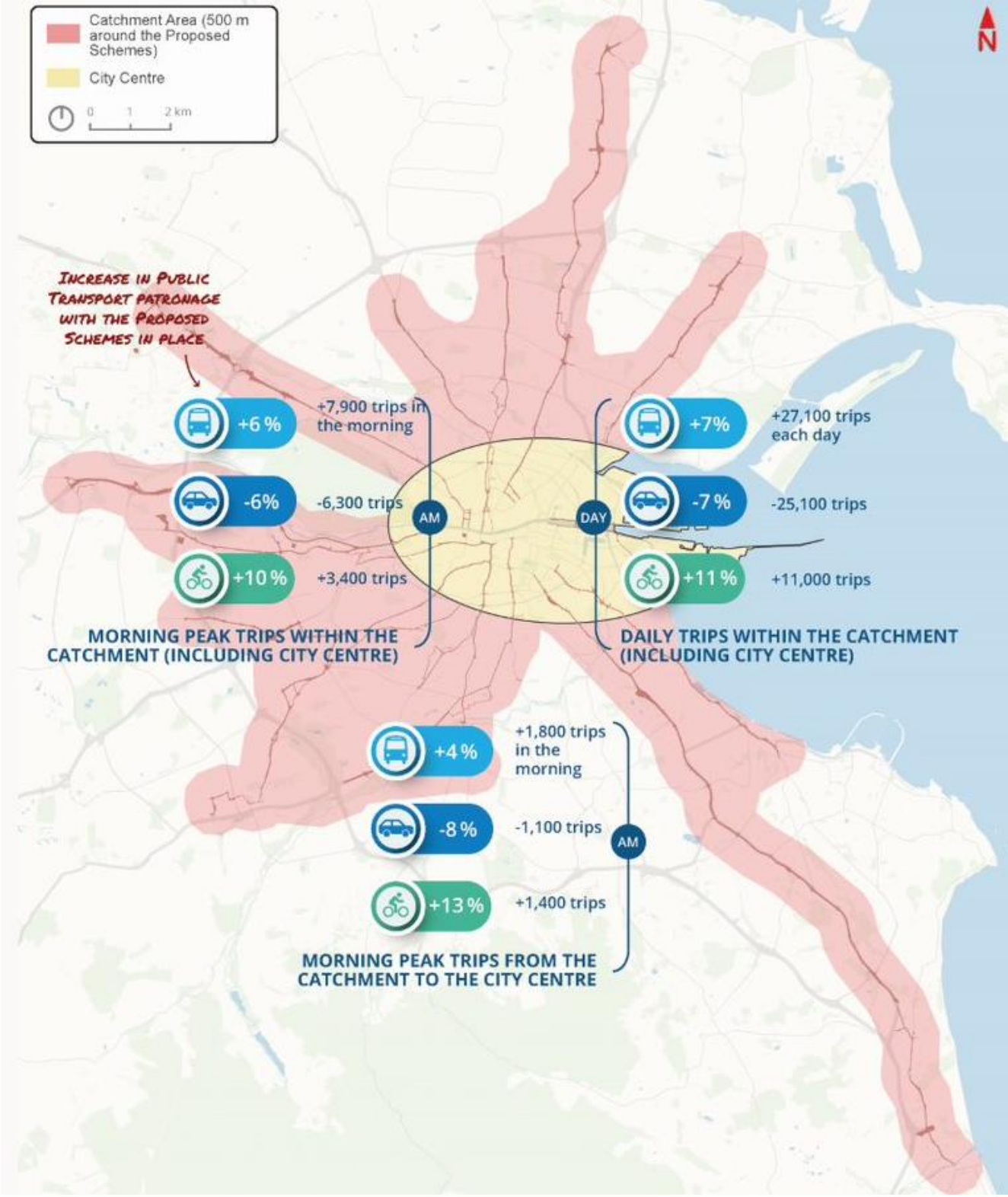

Diagram 7.4: Change in trips by mode within a 500m Catchment Area of the Proposed Schemes and the City Centre and Trips originating from the Catchment inbound to the City Centre in 2043

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

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

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

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

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

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

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

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

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

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

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

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

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

7.2.4.3 Peak Hour People Movement along the Proposed Schemes

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

7.2.4.3.1 2028 AM Peak Hour People Movement

Diagram 6.3 illustrates the average People Movement by mode, across all Proposed Schemes, inbound towards the City Centre during the AM Peak Hour in 2028.

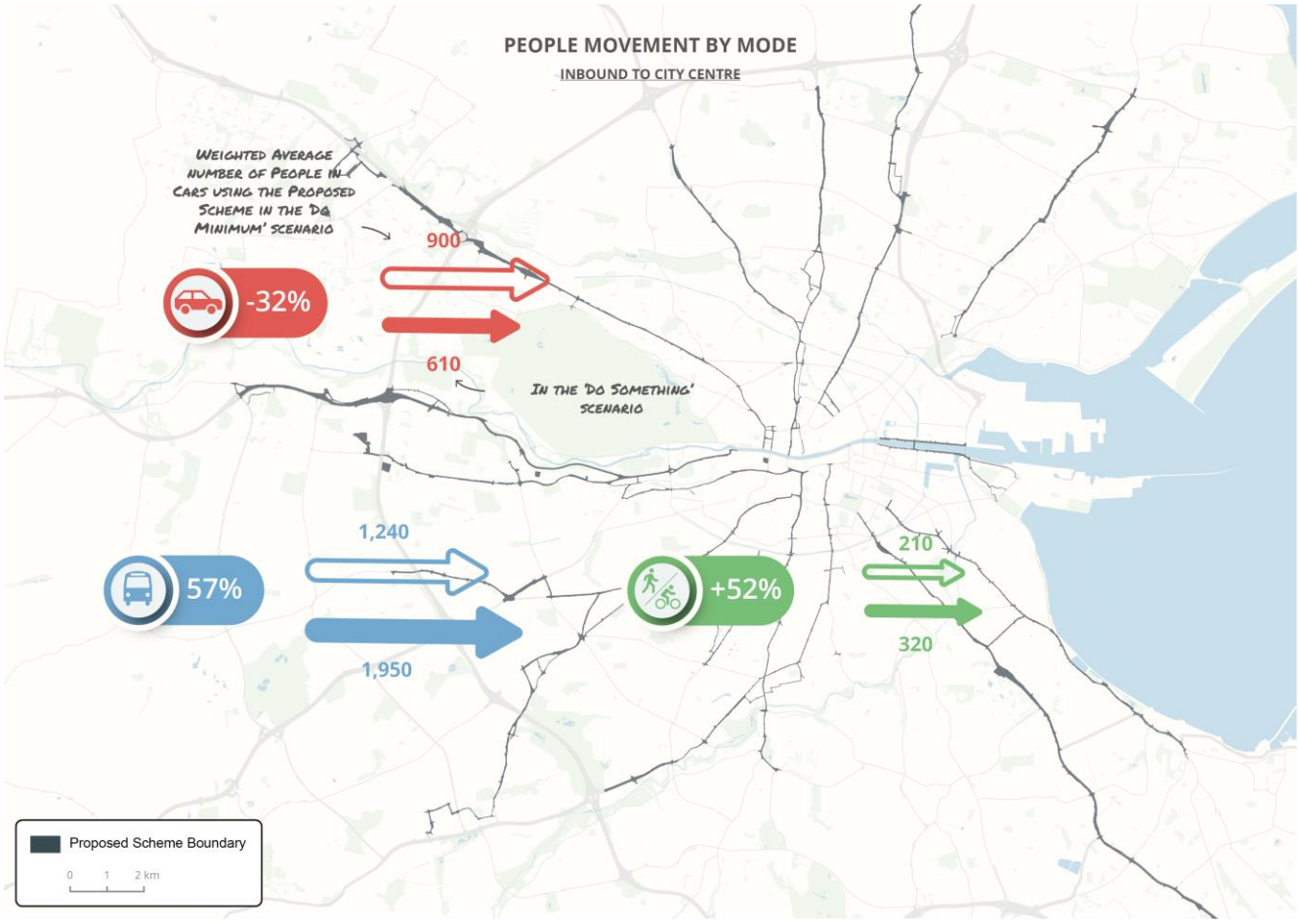

Diagram 7.5: People Movement by Mode during 2028 AM Peak Hour

As indicated in Diagram 6.3, on average across all Proposed Schemes, there is a predicted reduction of 32% in the number of people travelling via car, an increase of 57% in the number of people travelling via bus and an increase of 52% in people walking or cycling along the Proposed Schemes during the AM Peak Hour. It should be noted that the model predicts limited change in total walking trips between each scenario. This is due to the fact that walking trips in the Do Minimum scenario are also transferring to public transport and cycling due to the improved provision with any new walkers transferring from car replacing these trips.

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

Table 6.28 outlines the difference in modal split between the Do Minimum and Do Something scenarios for each mode of transport in an inbound direction towards the City Centre during the AM Peak Hour. The results indicate a 23% increase in total people moved as a result of the Proposed Schemes and a 57% increase in people moved by sustainable modes (Public Transport, Walk, Cycle).

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

Direction	Time Period	Mode of Transport	Do Minimum		Do Something		Difference	
			Hourly Trips	Modal Split (%)	Hourly Trips	Modal Split (%)	Hourly Trips	Difference (%)
Inbound towards the City Centre	AM Peak Period	General Traffic	900	38%	610	21%	-290	-32%
		Public Transport	1,240	53%	1,950	68%	710	57%
		Walking	140	6%	140	5%	0	0%
		Cycling	70	3%	180	6%	110	157%
		Sustainable Modes Total	**1,450**	**62%**	**2,270**	**79%**	**820**	**57%**
		Total (all modes)	**2,350**	**100%**	**2,880**	**100%**	**530**	**23%**

7.2.4.3.2 2028 PM Peak Hour People Movement

Diagram 6.4 illustrates the average People Movement by mode, across all Proposed Schemes, travelling outbound from the city centre during the PM Peak Hour.

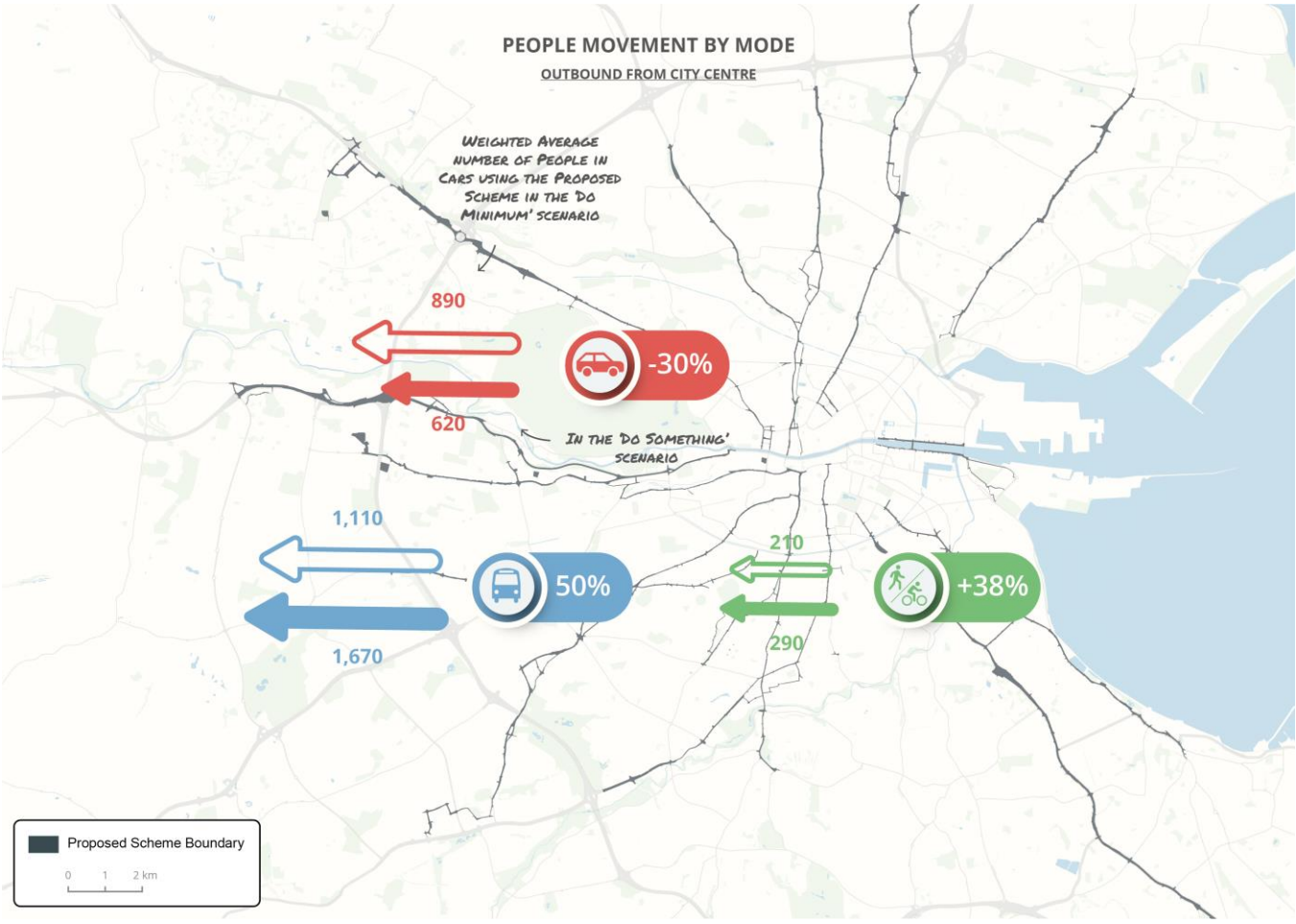

Diagram 7.6: People Movement by Mode during 2028 PM Peak Hour

As indicated in Diagram 6.4, 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 6.29 outlines the difference in modal split between the Do Minimum and Do Something (All Proposed Schemes) scenarios for each mode of transport in an outbound direction from the City Centre during the PM Peak

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

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

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

7.2.4.3.3 2043 AM Peak Hour People Movement

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

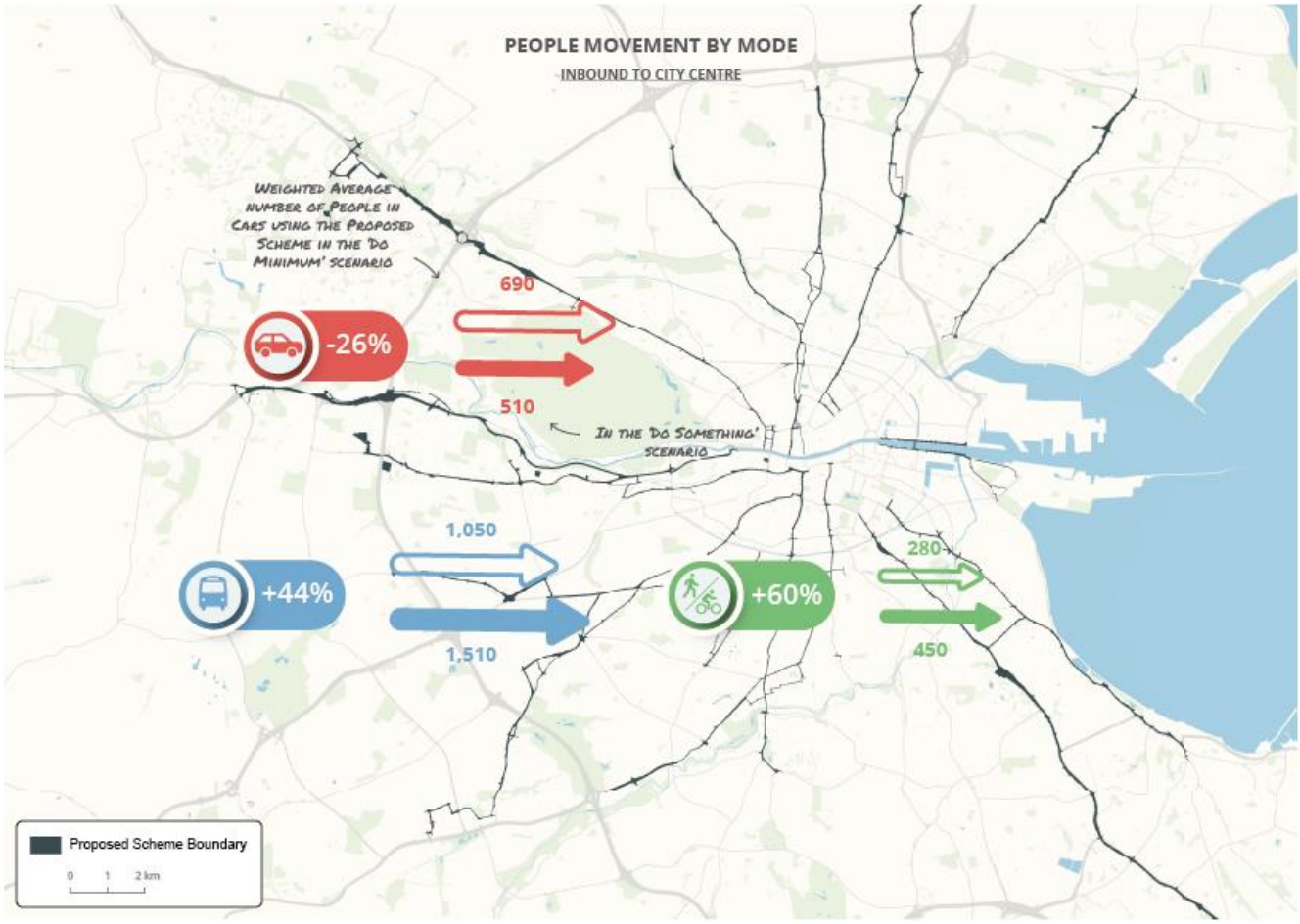

Diagram 7.7: People Movement by Mode during 2043 AM Peak Hour

As indicated in Diagram 7.7, on average across all Proposed Schemes, there is a predicted decrease of 26% in the number of people travelling via car, an increase of 44% in the number of people travelling via bus and an

increase of 60% in the number of people walking and cycling along the Proposed Schemes during the AM Peak Hour.

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

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

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

7.2.4.3.4 2043 PM Peak Hour People Movement

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

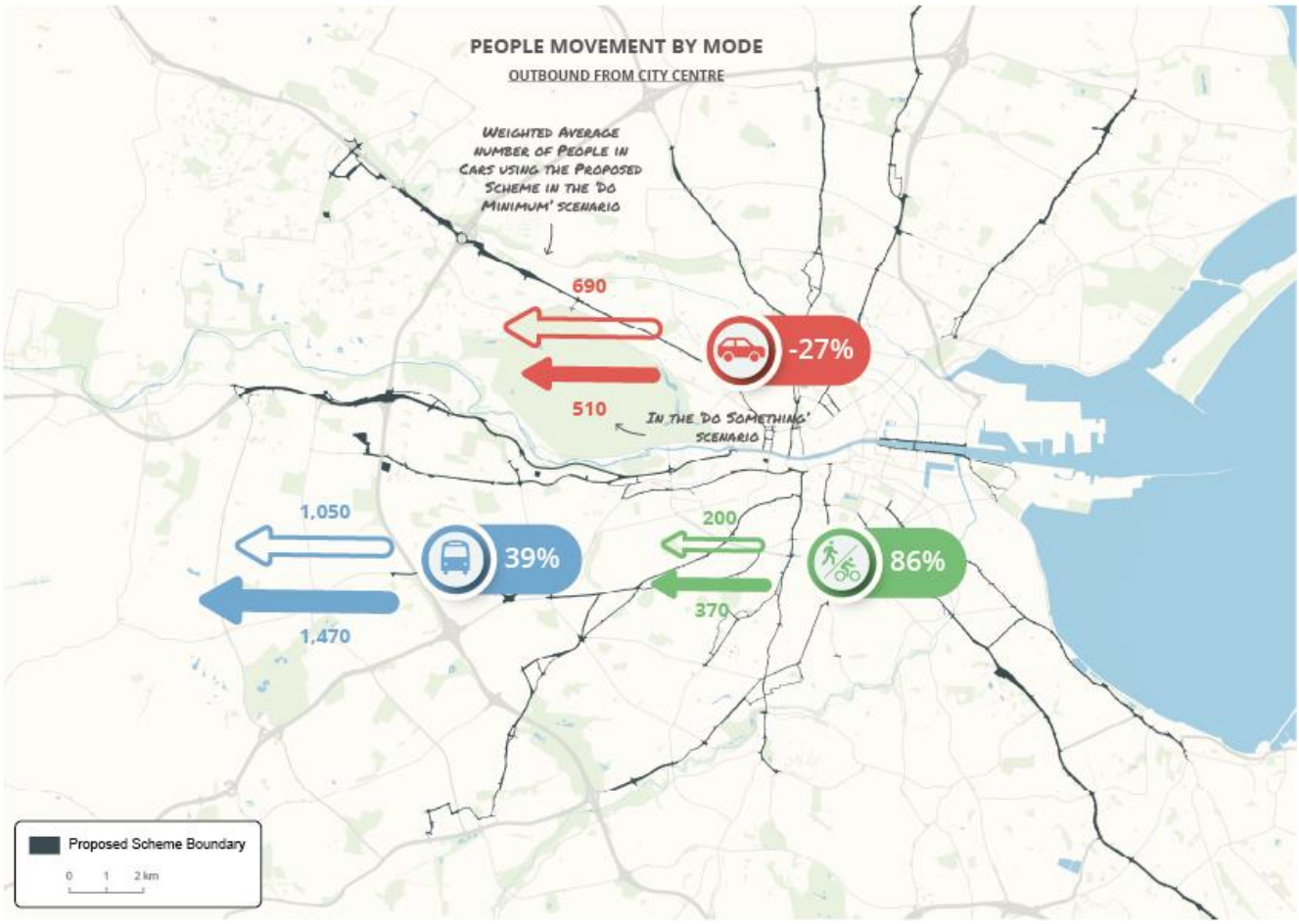

Diagram 7.8: People Movement by Mode during 2043 PM Peak Hour

As indicated in Diagram 7.8, on average across all Proposed Schemes, there is a predicted decrease of 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%**

7.2.4.4 Movement of People by Bus

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

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

7.2.4.4.1 2028 AM Peak Hour Bus Passengers

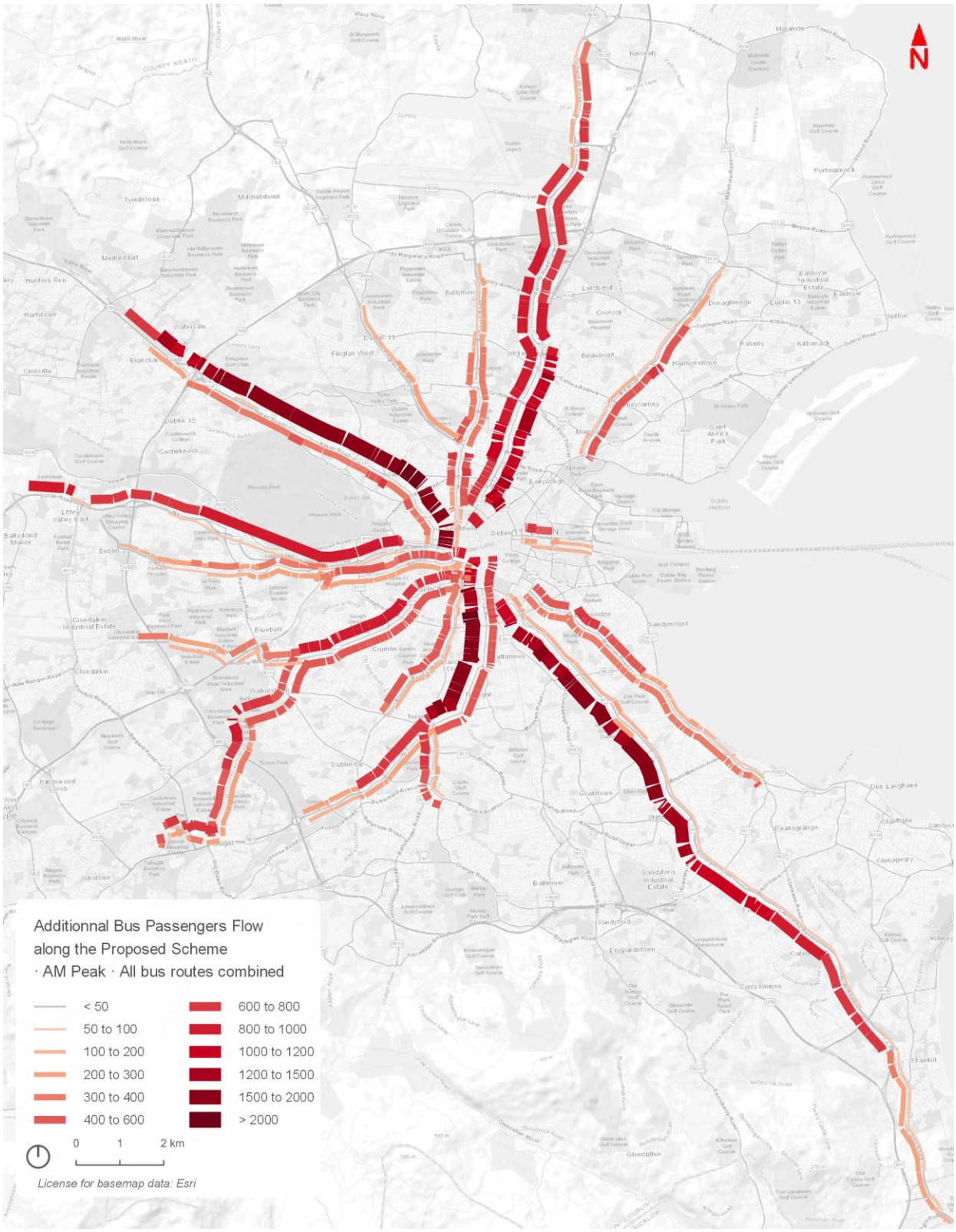

Diagram 7.9: AM Peak Hour Total Bus Passenger Flows Along the Proposed Schemes (All Bus Routes Combined)

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

Scheme shows an increase of approximately 3,000 passengers in the inbound direction in the 2028 AM Peak Hour (1,000 for the Templeogue to Terenure route section and 2,000 for the Rathfarnham to City Centre route section).

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 Templeogue/ Rathfarnham Core Bus Corridor Centre Scheme as well as for all Proposed Schemes.

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

Scheme	Do Minimum	Do Something	Difference in Boardings	Difference (%)
Templeogue/ Rathfarnham Bus Corridor Scheme	18,900	21,680	2,780	14.7%
All Schemes	85,990	101,760	15,770	18.3%

As shown above there will be a 14.7% increase in people boarding bus routes which use the Templeogue/ Rathfarnham Proposed Scheme during the AM Peak Hour. This represents an addition of 2,780 passengers in the AM Peak hour.

There will be a 18% increase in people boarding bus routes which use any part of the Proposed Schemes, representing an additional 15,770 passengers due to the bus priority improvements.

7.2.4.4.2 2028 PM Peak Hour Bus Passengers

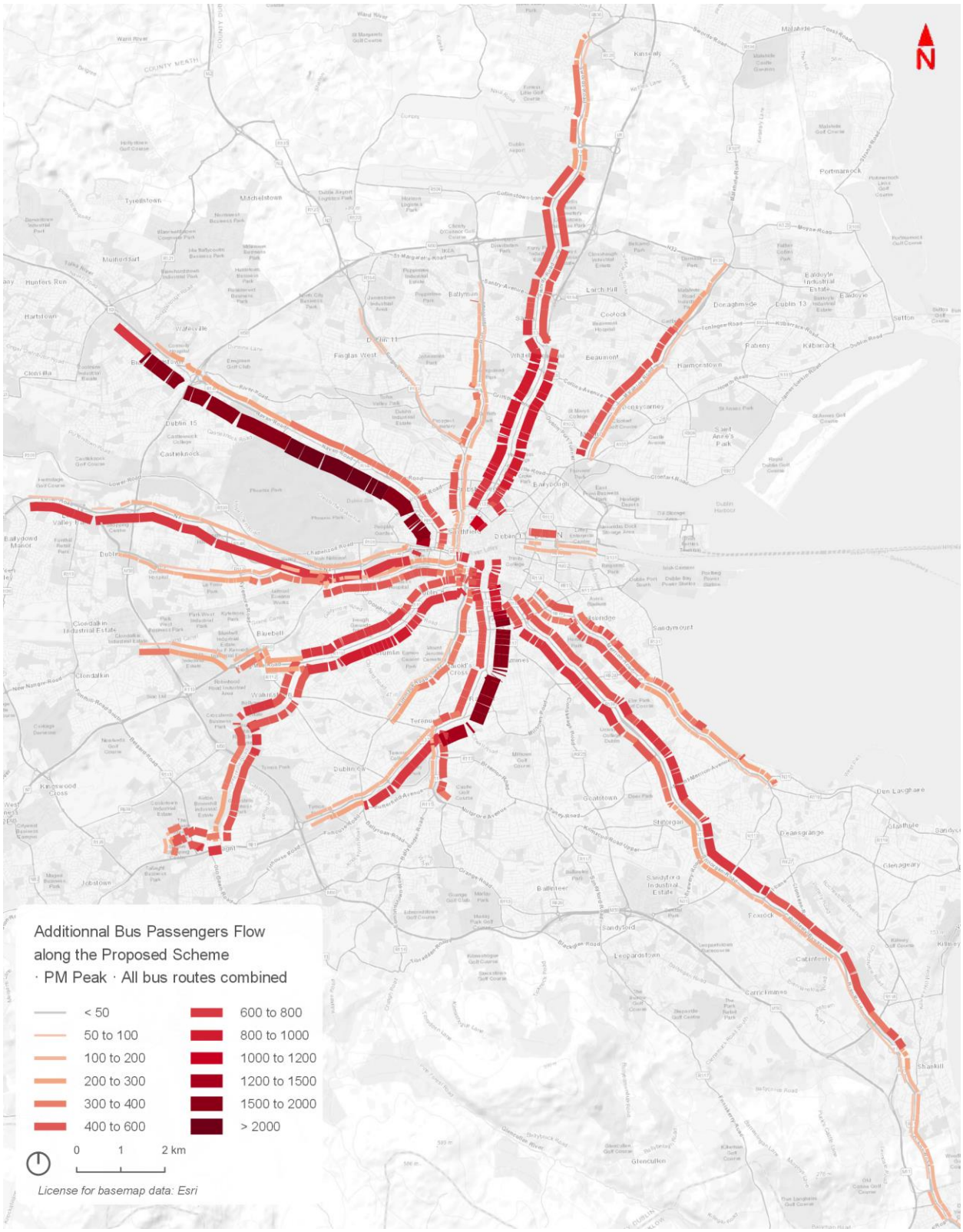

Diagram 7.10: PM Peak Hour Total Bus Passenger Flows Along the Proposed Schemes (All Bus Routes Combined)

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

approximately 3,000-3,200 passengers in the outbound direction (1,000-1200 for the Templeogue to Terenure route section and 2,000 for Rathfarnham to City Centre route section).

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 Templeogue/ Rathfarnham Core Bus Corridor 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 (%)
Templeogue/ Rathfarnham Bus Corridor Scheme	14,180	16,580	2,400	16.9%
All Schemes	71,280	85,170	13,890	19.5%

As shown in Table 7.10, there will be a 16.9% increase in people boarding bus routes which use the Templeogue/ Rathfarnham Proposed Scheme, representing an additional 2,400 passengers.

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

7.2.4.4.3 2043 AM Peak Hour Bus Passengers

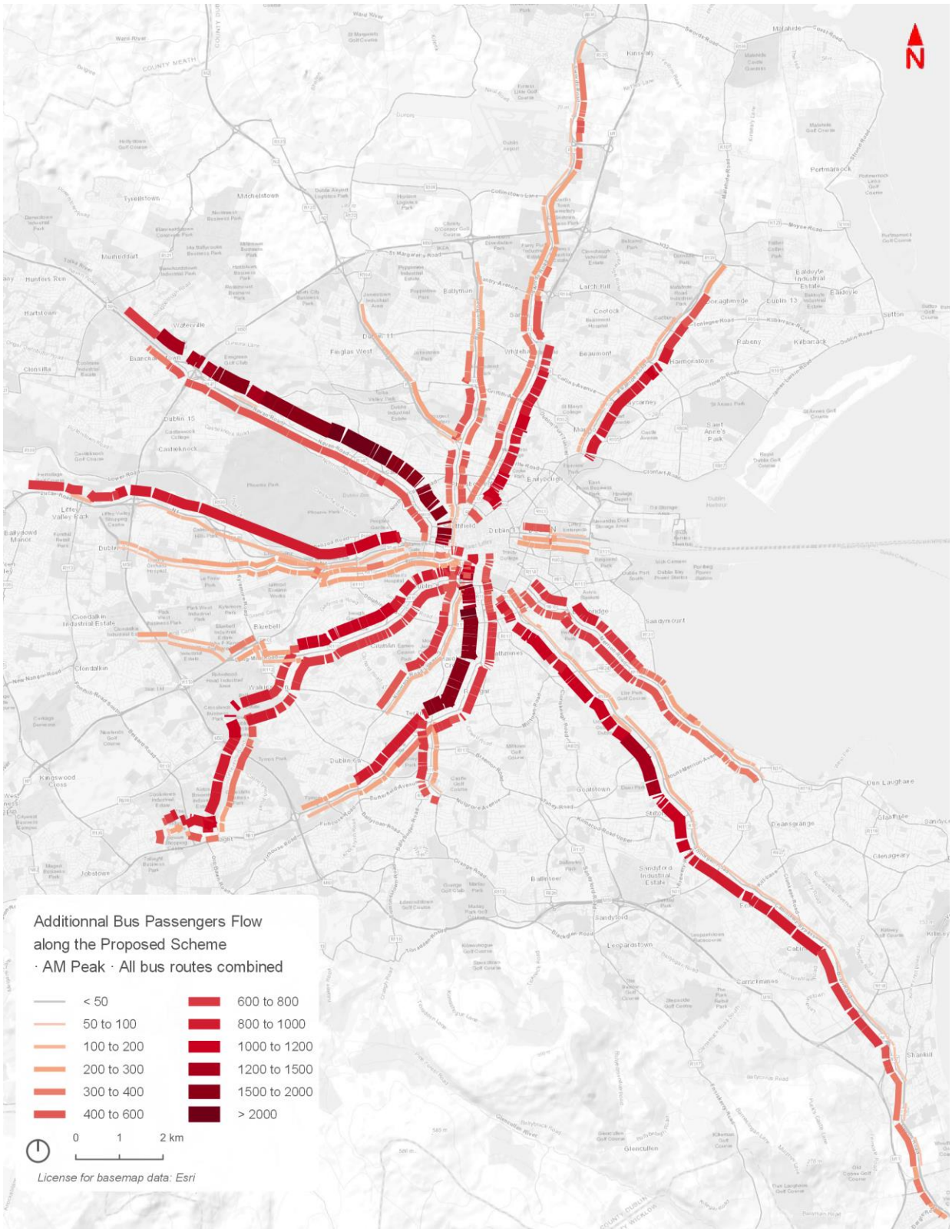

Diagram 7.11: AM Peak Hour Total Bus Passenger Flows Along the Proposed Schemes (All Bus Routes Combined)

As indicated in Diagram 7.11, there is a high growth in bus patronage along all the Proposed Schemes in the 2043 AM Peak Hour. Similar to 2028, the bigger increases occur in the inbound direction on the Blanchardstown to City Centre and the Rathfarnham to City Centre where the loadings reach more than 2,000 additional passengers per hour compared to the Do Minimum scenario. The Templeogue/ Rathfarnham Proposed Scheme

shows an increase of approximately 4,000 passengers in the inbound direction (1,600 for the Templeogue to Terenure route and 2,400 for Rathfarnham to City Centre route).

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 Templeogue/ Rathfarnham Bus Corridor Scheme as well as for all Proposed Schemes.

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

Scheme	Do Minimum	Do Something	Difference in Boardings	Difference (%)
Templeogue/ Rathfarnham Bus Corridor Scheme	21,600	23,870	2,270	10.5%
All Schemes	95,030	118,550	23,520	24.8%

As shown in Table 7.11, there will a 10.5% increase in people boarding bus routes which use the Templeogue/ Rathfarnham Proposed Scheme during the AM Peak Hour. This represents an addition of 2,270 passengers in the AM Peak hour

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

7.2.4.4.4 2043 PM Peak Hour Bus Passengers

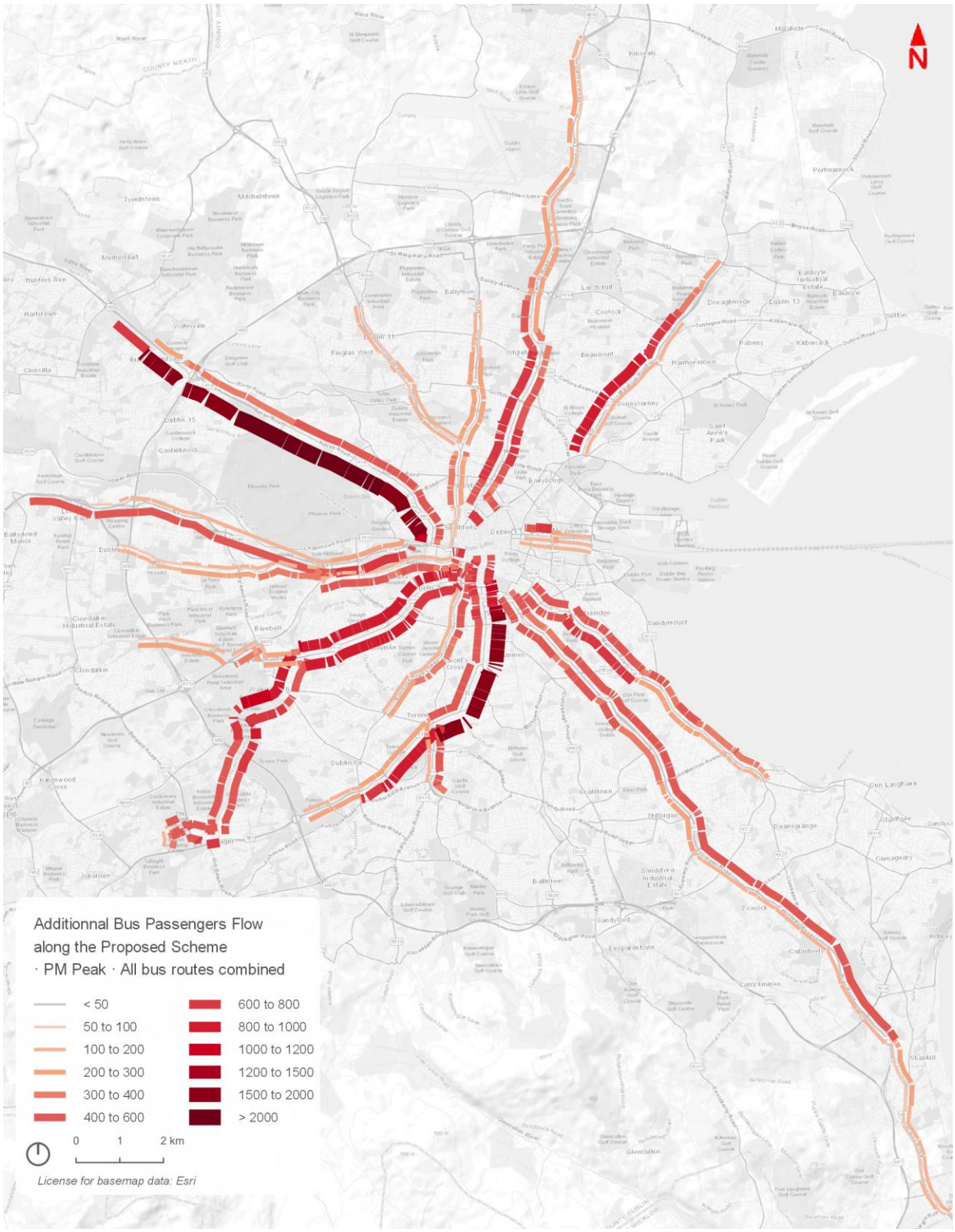

Diagram 7.12: PM Peak Hour Total Bus Passenger Flows Along the Proposed Schemes (All Bus Routes Combined)

As indicated in Diagram 7.12, there is a high growth in bus patronage along all the Proposed Schemes in the PM Peak Hour. Similar to 2028, 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 Templeogue/ Rathfarnham Bus Corridor Scheme shows an

increase of approximately 3,100 passengers in the outbound direction (1,100 for the Templeogue to Terenure route section and 2,000 for Rathfarnham to City Centre route section).

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 Templeogue/ Rathfarnham Core Bus Corridor 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 (%)
Templeogue/ Rathfarnham Core Bus Corridor Scheme	16,329	18,200	1,871	11.5%
All Schemes	78,120	98,390	20,270	26.0%

As shown in Table 7.12, there will be a 11.5% increase in people boarding bus routes which use the Templeogue/ Rathfarnham Proposed Scheme during the AM Peak Hour. This represents an addition of 1,871 passengers in the PM Peak hour.

There will be a 26% increase in people boarding bus routes which use the Proposed Scheme, representing an additional 20,270 passengers.

7.2.5 Integration with Other Public Transport Modes

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

- Improve accessibility to jobs, education and other social and economic opportunities through the provision of improved sustainable connectivity and integration with other public transport services.

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

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

7.2.5.1 Passenger Boardings by Public Transport Mode

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

Table 7.13: 2028 AM Peak Hour PT Boardings

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

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

Table 7.14: 2028 PM Peak Hour PT Boardings

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

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

Table 7.15: 2043 AM Peak Hour PT Boardings

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

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

Table 7.16: 2043 PM Peak Hour PT Boardings

Public Transport Mode	Do Minimum	Do Something	Difference in Boardings	Difference (%)
Rail	36,200	34,700	-1,500	-4%
Luas	34,720	38,330	3,610	10%
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 to buses will increase by 10% from 12,640 to 13,860 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.

7.2.5.2 Average Public Transport Network Wide Travel Speeds

In order to assess the travel time and integration efficiencies provided by the Proposed Schemes, an average per passenger PT network-wide travel speed metric has been extracted from the modelling suite[5]. The metric considers the average speed across all public transport modes for the entire Study Area which covers all Proposed Schemes.

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%

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

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

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

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

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

7.2.6 General Traffic

7.2.6.1 Overview

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

It is recognised, however, that there will be an overall reduction in operational capacity for general traffic along the direct study area of each scheme given the proposed changes to the road layout and the rebalancing of priority to walking, cycling and bus. This reduction in operational capacity for general traffic along the Proposed Scheme (and the other Proposed Core Bus Corridor Schemes) will likely create some level of trip redistribution onto the surrounding road network.

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

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

7.2.6.2 Assessment Considerations

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

Goods vehicles

The assessment also assumes that goods vehicles (HGVs and LGVs) continue to grow in line with forecasted economic activity with patterns of travel remaining the same. For example, the assessment assumes a 45% and 77% increase in goods traffic versus the base year in 2028 and 2043 respectively. This is considered a very conservative assumption. It should be noted, however, that the Climate Action Plan (CAP) (2023) includes reference to DoT's Ireland's Road Haulage Strategy 2022-2031 (RHS)(2023) which will seek to further integrate smart technologies in logistics management and may include the regulation of delivery times as far as practicable to off-peak periods to limit traffic congestion in urban areas. Ireland's Road Haulage Strategy 2022-2031 outlines

measures to manage the increase in delivery and servicing requirements as the population grows. These measures may include the development of consolidation centres to limit the number of 'last-mile' trips made by larger goods vehicles with plans for higher use of smaller electric vans or cargo bikes for 'last-mile' deliveries in urban areas.

Cycling

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

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

Demand Management

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

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

7.2.6.3 General Traffic Flow Changes

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

The changes in traffic flows have been presented with reference to TII's Traffic and Transport Assessment Guidelines (May 2014) i.e., traffic redistribution resulting in an increase or decrease above 100 combined flows (i.e. in a two-way direction) along roads in the vicinity of the Core Bus Corridors in the AM and PM Peak Hours are presented. The threshold aligns with an approximate 1 vehicle per minute increase or decrease per direction

on any given road. This is a very low level of traffic change on any road type and ensures that a robust assessment of the changes in traffic levels are presented.

Diagram 7.13 and Diagram 7.14 below illustrate the difference in traffic flows (Do Minimum vs Do Something) on roads in the AM Peak Hour for the 2028 Opening Year and 2043 Design Year with the Proposed Scheme and all other proposed Core Bus Corridor schemes in place. The diagrams are extracts from Figure 6.13 and 6.15 in TIA Appendix 3 (Maps). Reductions in traffic flows are indicated by the blue lines with increases in traffic flow indicated by the red lines.

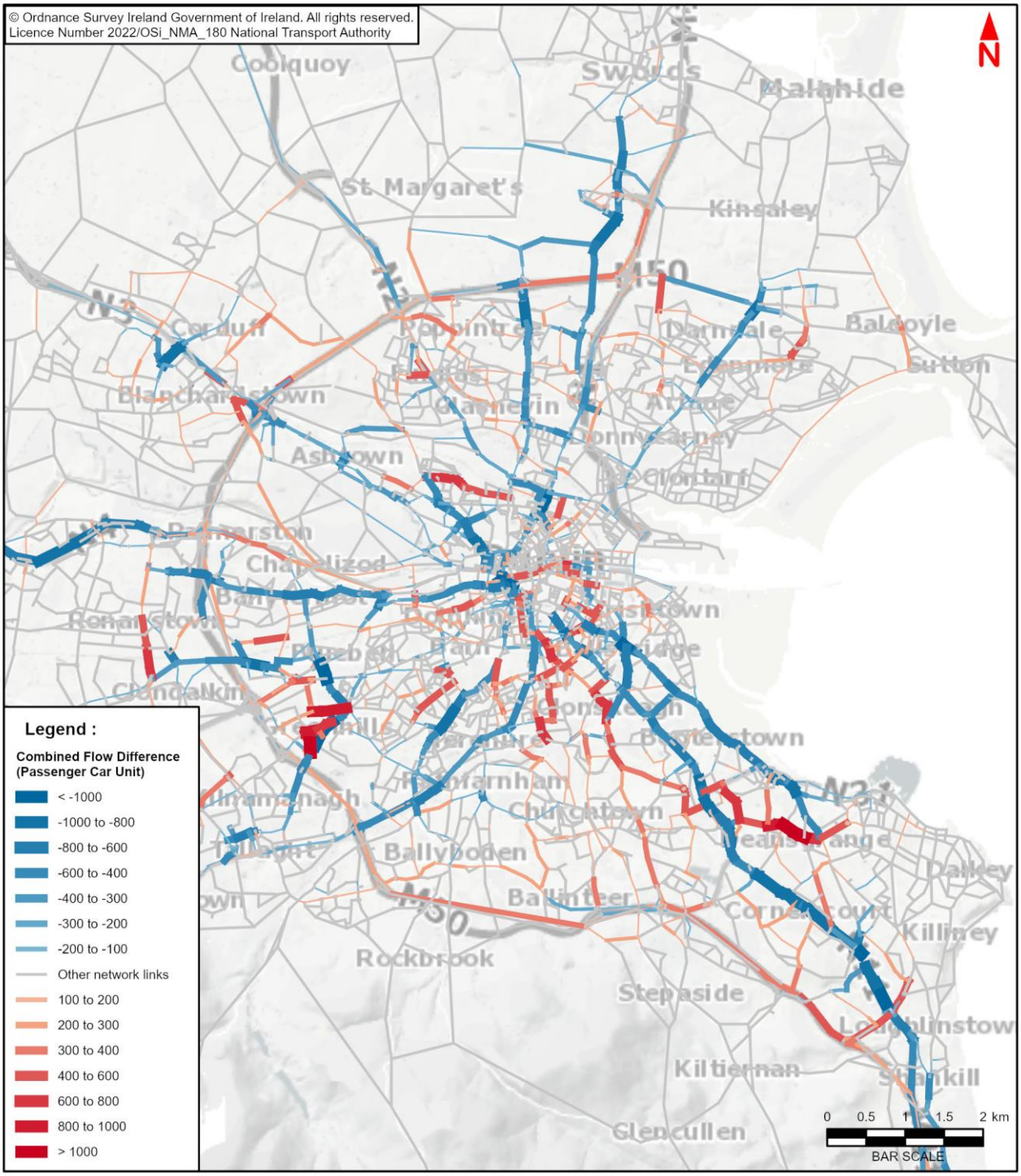

Diagram 7.13:Flow Difference on Road Links (Do Minimum vs. Do Something), AM Peak Hour, 2028 Opening Year – Cumulative Scenario

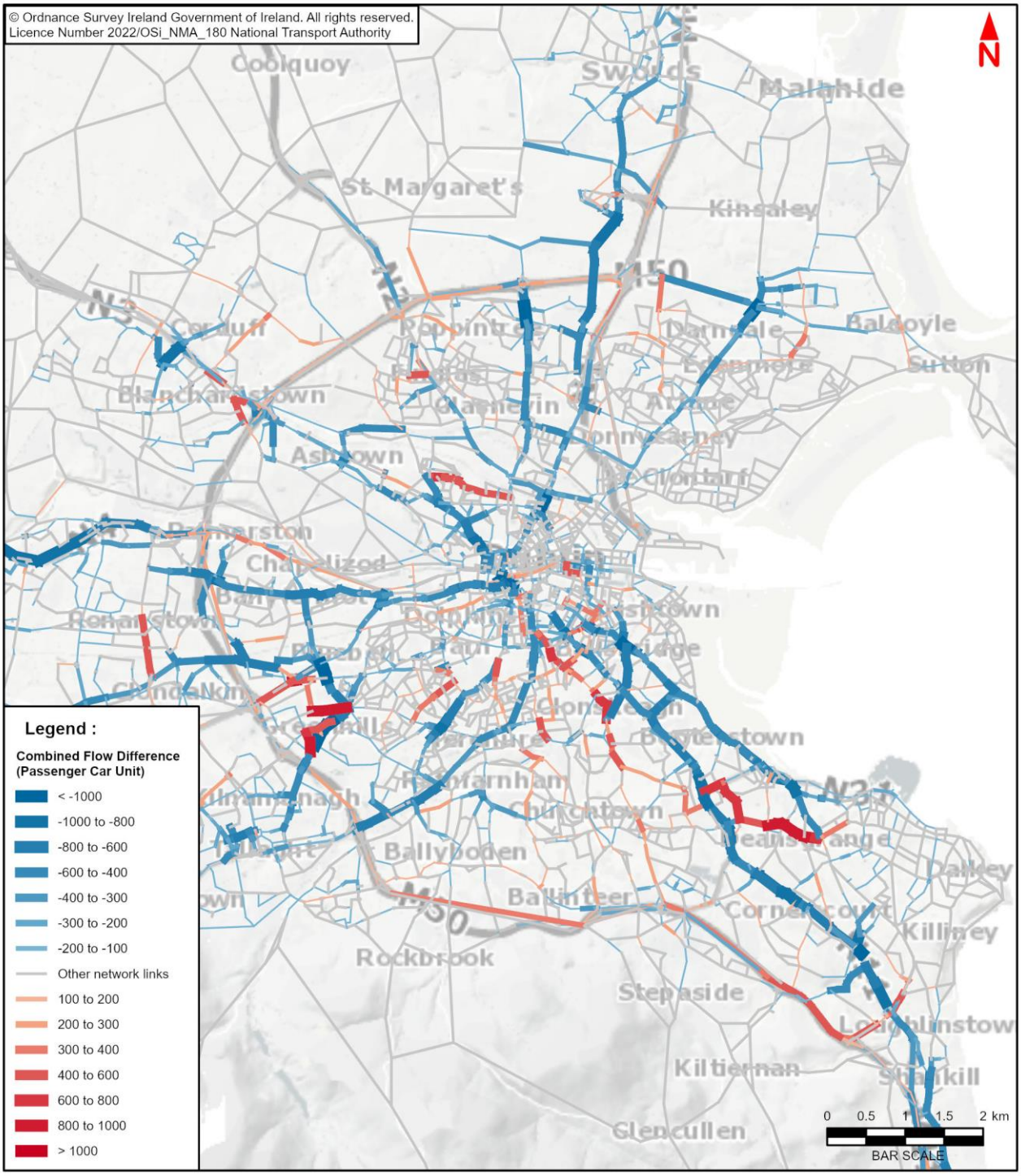

Diagram 7.14: Flow Difference on Road Links (Do Minimum vs. Do Something), AM Peak Hour, 2043 Design Year – Cumulative Scenario

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

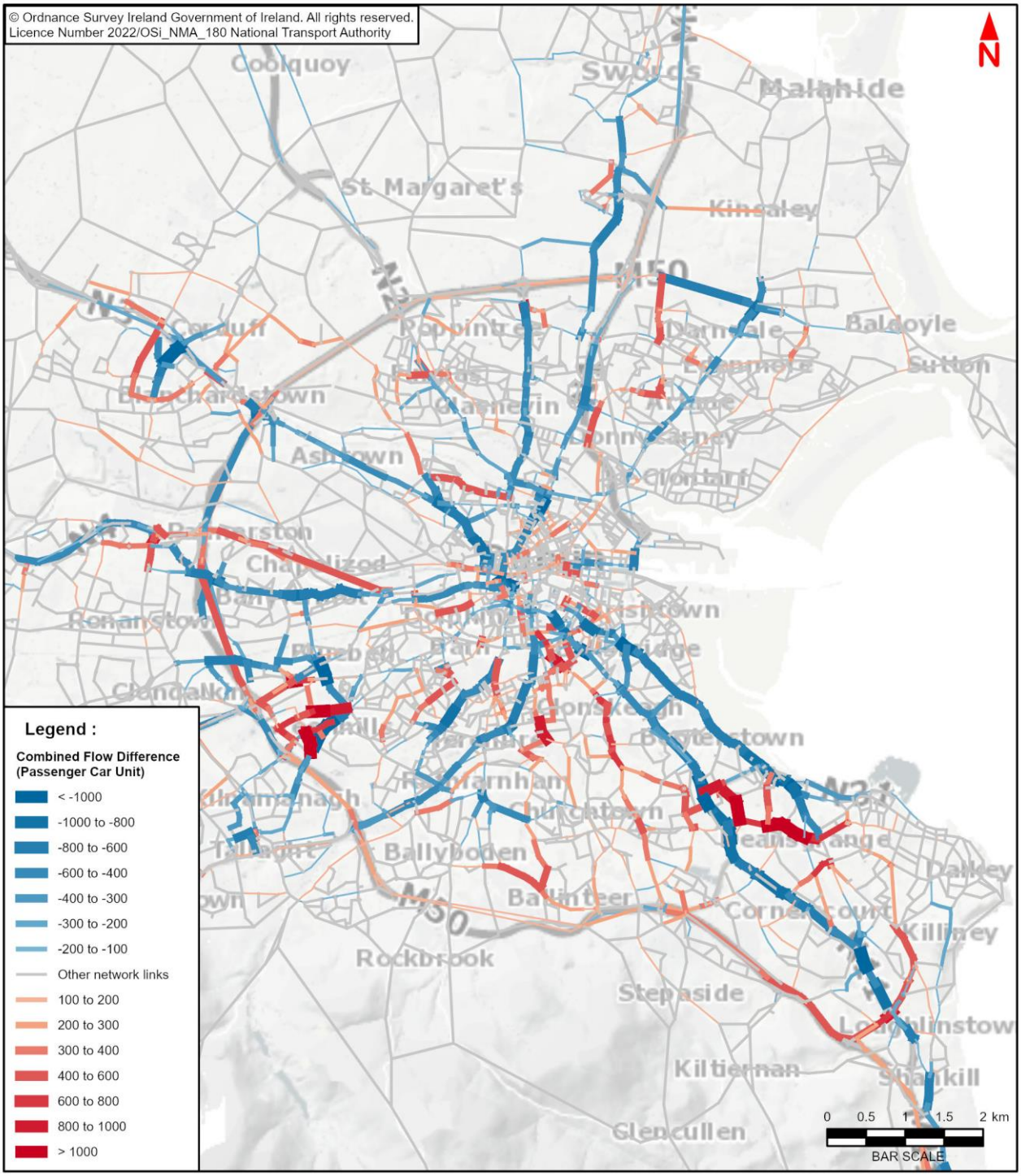

Diagram 7.15: Flow Difference on Road Links (Do Minimum vs. Do Something), PM Peak Hour, 2028 Opening Year – Cumulative Scenario

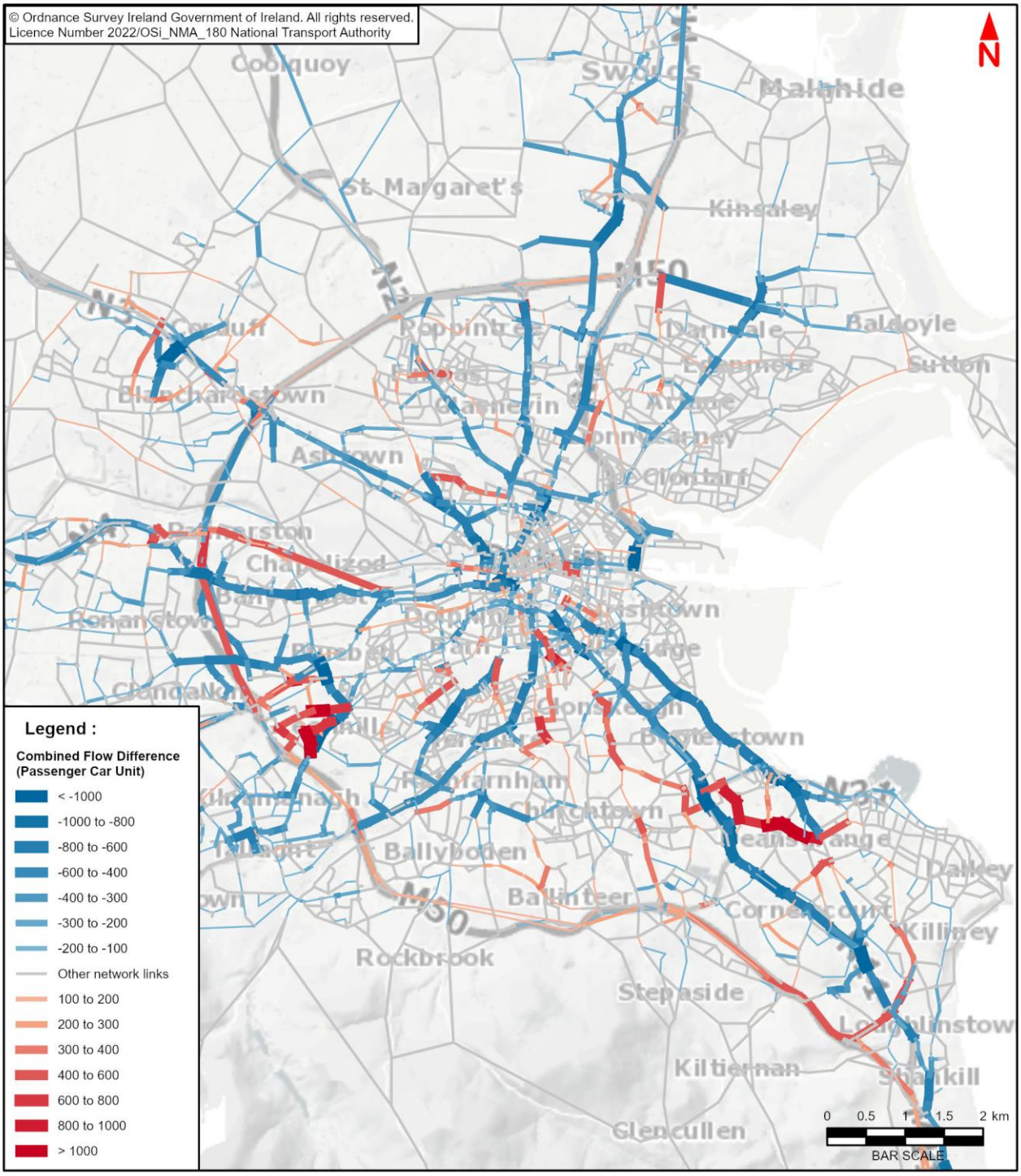

Diagram 7.16: Flow Difference on Road Links (Do Minimum vs. Do Something), PM Peak Hour, 2043 Design Year – Cumulative Scenario

7.2.6.4 Cumulative Traffic Flow Summary

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

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

7.2.7 People Movement – Cumulative Impact Summary

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

8. Summary and Conclusions

The aim of the Proposed Scheme is to provide enhanced walking, cycling and bus infrastructure on this key access corridor in the Dublin region, which will enable and deliver efficient, safe, and integrated sustainable transport movement along the corridor. The objectives of the CBC Infrastructure Works, applicable to the Traffic and Transport assessment of the Proposed Scheme, are to:

- Enhance the capacity and potential of the public transport system by improving bus speeds, reliability and punctuality through the provision of bus lanes and other measures to provide priority to bus movement over general traffic movements;
- Enhance the potential for cycling by providing safe infrastructure for cycling, segregated from general traffic wherever practicable;
- Support the delivery of an efficient, low carbon and climate resilient public transport service, which supports the achievement of Ireland's emission reduction targets;
- Enable compact growth, regeneration opportunities and more effective use of land in Dublin, for present and future generations, through the provision of safe and efficient sustainable transport networks;
- Improve accessibility to jobs, education and other social and economic opportunities through the provision of improved sustainable connectivity and integration with other public transport services; and
- Ensure that the public realm is carefully considered in the design and development of the transport infrastructure and seek to enhance key urban focal points where appropriate and feasible.

The Proposed Scheme, along the R107 Malahide Road from Mayne River Avenue to the R105 Marino Mart / R105 Clontarf Road, comprises the development of improved bus priority along the entire route. This TIA provides a robust assessment of the scheme through qualitative assessment and quantitative analysis using a suite of multi-modal transport modelling tools.

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

Table 8.1: Summary of Potential Construction Phase Impacts

Assessment Topic	Effect	Potential Impact
Walking	Restrictions to pedestrians along Proposed Scheme.	Low, Negative and Temporary
Cycling	Restrictions to cyclists along Proposed Scheme	Medium, Negative and Temporary
Bus	Restrictions to public transport along Proposed Scheme.	Low, 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	Slight, Negative and Temporary

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

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

- **Pedestrian Infrastructure**: The Proposed Scheme consists of measures to enhance the existing pedestrian infrastructure along the direct study area. A Level of Service (LoS) junction assessment was undertaken using a set of five criteria to determine the impact that the Proposed Scheme has for pedestrians. The results of the impacted junctions demonstrate that the LoS during the Do Minimum scenario consists predominantly of the low C/ D / E ratings. During the Do Something scenario, i.e. following the development of the Proposed Scheme, the LoS consists predominantly of the highest A / B ratings, with the exception of two Cs. Overall, the improvements to the quality of the pedestrian infrastructure will have a **Medium Positive Impact** on all four sections of the Proposed Scheme.

- **Cycling Infrastructure**: The Proposed Scheme also consists of measures to enhance the existing cycling infrastructure along the direct study area. A LoS assessment was undertaken using an adapted version of the NTA's National Cycle Manual Quality of Service (QoS) Evaluation criteria. The results of the assessment demonstrate that the LoS during the Do Minimum scenario consists of C ratings. During the Do Something scenario, the LoS consists predominantly of the highest A / B ratings, with the exception of one C (along the proposed quiet cycle route section between Bushey Park Road to Orwell Road). Given the quality of the existing cycling infrastructure along the Proposed Scheme, the improvements will have a **Medium Positive Impact** on Section 3 and Section 4 of the Proposed Scheme and a **Low Positive Impact** on Section 1 and Section 2 of the Proposed Scheme.

- **Bus Infrastructure**: The implementation of the Proposed Scheme will result in improvements in the quality of bus infrastructure provision along the direct study area. A qualitative impact assessment has been undertaken based on the provision of bus priority, pedestrian accessibility and changes to the bus stop facilities. The results of the assessment demonstrate that the improvements to the quality of the bus infrastructure will have a **Medium Positive Impact** on Section 1, Section 2 and Section 3 and a **Low Positive Impact** on Section 4 of the Proposed Scheme.

- **Parking and Loading**: A qualitative impact assessment has been undertaken of the Proposed Scheme impacts on the existing parking and loading. The results of the assessment demonstrate that the changes to the parking and loading provision will result in an overall loss of 54 parking spaces and five loading bay spaces within the redline boundary of the Proposed Scheme (-7 spaces in Section 2, -32 (including 5 loading bay spaces) in Section 3 and -20 spaces in Section 4). Given the nature of the loss in parking and the availability of alternative spaces in the indirect study area, the impact is expected to have a **Negligible impact** on Section 2 and Section 3 and a **Low Negative Impact** on Section 4 of the Proposed Scheme. There is no parking facilities in Section 1.

- **People Movement:** Given the proposed amendments to the pedestrian, cycling, bus and parking / loading infrastructure outlined above, the Proposed Scheme will have greater capacity to facilitate the sustainable movement of people travelling along the corridor. A quantitative impact assessment has been undertaken using outputs from the NTA's ERM and LAM, comparing the Do Minimum and Do Something peak hour scenarios for each forecast year (2028, 2043). The results of the assessment demonstrate that there will be an increase of 74% and 71% 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 48% and 55% in the number of people travelling along the Proposed Scheme during the AM and PM Peak Hours respectively. These increases are all due to the increased sustainable modes people movement facilitated by the Proposed Scheme.

  The analysis also shows that there will be an increase in 14.7% and 16.9% of passengers boarding buses during the 2028 AM and PM Peak hours respectively. During the 2043 scenario there will be an increase in 10.5% and 11.5% of passengers boarding buses during the AM and PM Peak Hours respectively. Overall, it is adjudged that the Proposed Scheme will have a **High Positive Impact** on the sustainable movement of people along the corridor.

- **Bus Network Performance Indicators**: A micro-simulation model assessment has been developed and network performance indicators established for bus operations along Proposed Scheme. The results of the assessment demonstrate that the total bus journey times on all modelled

bus services will improve by between 8% and 12% during the AM and PM Peak hours of the 2028 Opening Year and 2043 Design Year. Based on the AM and PM peak hours alone, 7.4 hours of savings in 2028 and 6.2 hours in 2043, when compared to the Do Minimum combined across all buses. Overall it is anticipated that the improvements to the network performance indicators for bus users along the Proposed Scheme will have a **High impact.**

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

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

  The results of the assessment demonstrate that the surrounding road network largely has the capacity to accommodate the redistributed general traffic as a result of the Proposed Scheme. The majority of assessed junctions that required further traffic analysis have V / C ratios that are broadly similar before and after the Proposed Scheme 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 from -1.0% to +2.9%, which is assessed as an overall **Low Negative impact.**

- **Cumulative Assessment**: In general, total trip demand (combining all transport modes) will increase into the future in line with population and employment growth. A greater share of the demand will be by sustainable modes (Public transport, Walking, Cycling) as facilitated by the GDA Strategy implementation.

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

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

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

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

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

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

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

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

Table 8.2:Summary of Potential Operational Phase Impacts

Assessment Topic	Effect	Potential Impact
Pedestrian Infrastructure	Improvements to the quality of the pedestrian infrastructure along the Proposed Scheme.	Medium Positive
Cycling Infrastructure	Improvements to the quality of the cycling infrastructure along the Proposed Scheme.	Low to Medium Positive
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 54 parking spaces and 5 loading bays along the Proposed Scheme.	Negligible and Low Negative
People Movement	Increases to the total number of people travelling through the Proposed Scheme.	High Positive
Bus Network Performance Indicators	Improvements to journey time and reliability indicators for bus users along the Proposed Scheme.	High Positive
General Traffic Network Performance Indicators	Reduction in general traffic flows along the Proposed Scheme.	Medium Positive
	Redistributed general traffic along the surrounding road network in the indirect study area as a result of the reduction of reserve capacity along the Proposed Scheme.	Low Negative
Network Wide Performance Indicators	Deterioration to the network-wide queuing capacity, travel times, travel distances and average network speeds beyond the direct and indirect study areas.	Low Negative
Cumulative Assessment	The Proposed Scheme in tandem with other Core Bus Corridors and GDA Strategy schemes will facilitate substantial mode shift from car to sustainable modes.	High Positive

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

In the absence of the Proposed Scheme bus services will be operating in a more congested environment, leading to higher journey times for and lower reliability for bus journeys. This

limits their attractiveness to users which will lead to reduced levels of public transport use, making the bus system less resilient to higher levels of growth and leading to increased levels of car use and congestion. The absence of walking and cycling measures that the Proposed Scheme provides will also significantly limit the potential to grow those modes into the future.

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

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