Non-Technical Summary

Contents

1. Introduction

This document is the Non-Technical Summary (NTS) of the Environmental Impact Assessment Report (EIAR) for the Belfield / Blackrock to City Centre Core Bus Corridor Scheme (referred to as the Proposed Scheme throughout this NTS). The Proposed Scheme will support integrated sustainable transport use through infrastructure improvements for active travel (both walking and cycling), and the provision of enhanced bus priority measures for existing (both public and private) and all future services who will use the corridor.

The Proposed Scheme which has a total length of approximately 8.3km is comprised of two main alignments in terms of the route it follows; namely the Blackrock to City Centre section and along Nutley Lane.

The Blackrock to City Centre section commences on the R113 at Temple Hill, approximately 80m to the north of the R827 Stradbrook Road, travels along the N31 Frascati Road, the R118 Rock Road / Merrion Road / Pembroke Road, the R816 Pembroke Road / Baggot Street Upper / Baggot Street Lower, turns onto Fitzwilliam Street Lower and terminates at the junction of Mount Street Upper / Merrion Square South / Merrion Square East.

The Nutley Lane section of the Proposed Scheme will commence at the tie-in with the signalised junction on the R138 Stillorgan Road on the southern end of Nutley Lane, travel along Nutley Lane and will terminate at the junction with the R118 Merrion Road.

Further infrastructure improvements along the R138 Stillorgan Road, including the R138 Nutley Lane Junction, will be provided by a separate Core Bus Corridor Scheme, the 'Bray to City Centre Core Bus Corridor Scheme'.

The route of the Proposed Scheme is presented in **Image 1.1**, and general arrangement drawings of the Proposed Scheme are appended to this NTS.

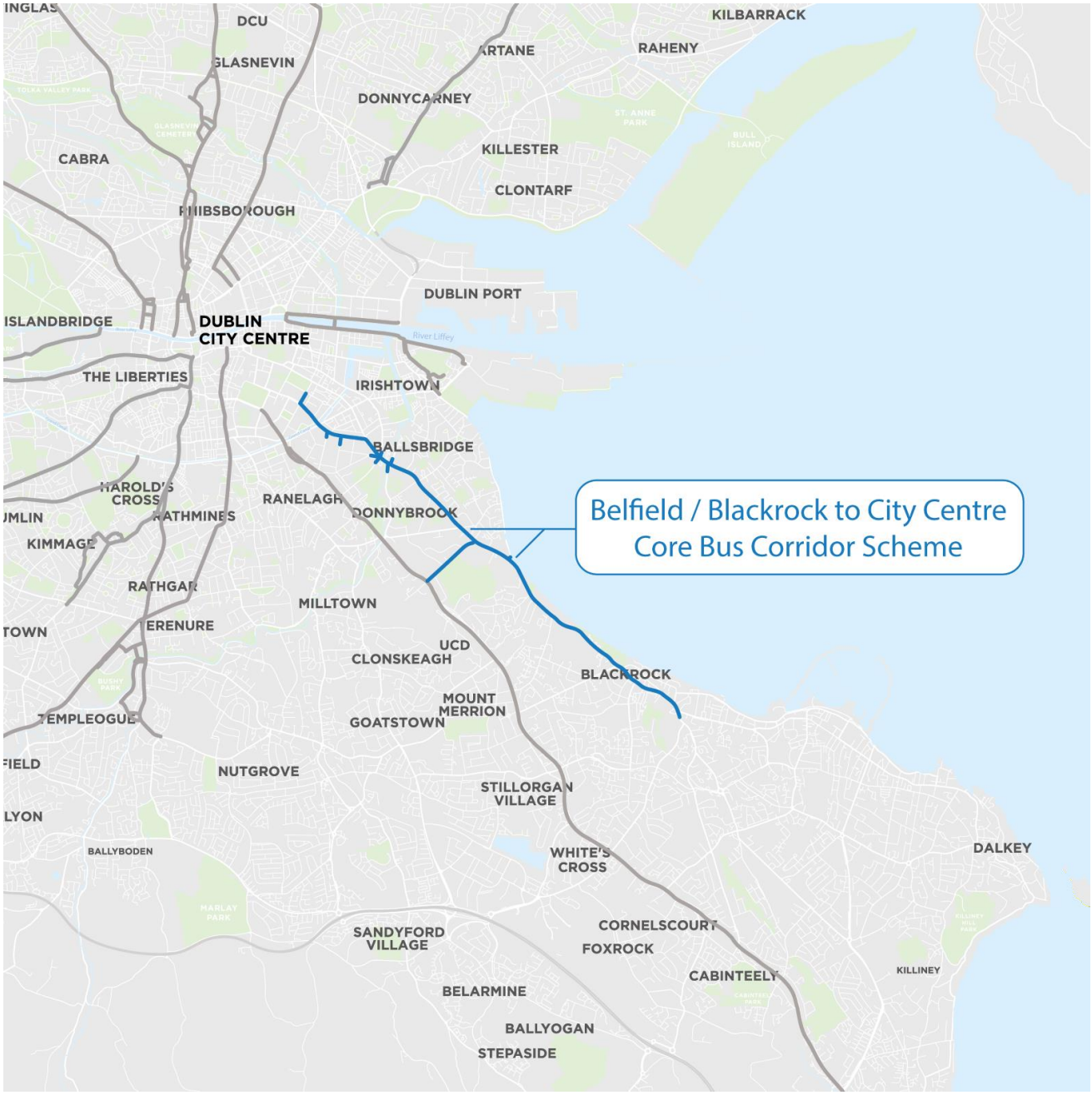

Image 1.1: Route of the Proposed Scheme

The Proposed Scheme would significantly enhance travel by public transport by providing bus priority as well as improved pedestrian and cycling infrastructure. Currently this access corridor is characterised by traffic congestion and while there are existing bus lanes on some of the route, buses and cyclists are competing for space with general traffic for part of the journey, making it less attractive for pedestrians, cyclists and bus users.

Through the provision of increased bus priority infrastructure, the Proposed Scheme will improve both the overall journey times for buses along the route and their journey time reliability.

In addition to the improvements to bus journey times and journey time reliability, the Proposed Scheme will provide benefits for cyclists and pedestrians. The scheme design has been developed having regard to the relevant accessibility guidance and universal design principles so as to provide access for all users.

The provision of dedicated cycling infrastructure along the Proposed Scheme will make cycling trips safer and more attractive. In this regard, the Proposed Scheme delivers substantial elements of the National Transport Authority (NTA) Greater Dublin Area Cycle Network Plan (hereinafter referred to as the GDA Cycle Network Plan) (NTA 2013), much of which does not currently have adequate provision - as well as linking with other existing and proposed cycling schemes and sustainable transport modes, contributing towards the development of a comprehensive cycling network for Dublin.

Several urban realm upgrades, including widened footpaths, high quality hard and soft landscaping and street furniture would be provided in areas of high activity to contribute towards a safer, more attractive environment for pedestrians.

The primary objective of the Proposed Scheme, therefore, is the facilitation of modal shift from car dependency through the provision of walking, cycle, and bus infrastructure enhancements thereby contributing to an efficient, integrated transport system and a low carbon and climate resilient City.

The Proposed Scheme is one of 12 schemes to be delivered under the BusConnects Dublin - Core Bus Corridors Infrastructure Works (hereinafter called the CBC Infrastructure Works). The CBC Infrastructure Works is one of the initiatives within the NTA's overall BusConnects programme. The BusConnects programme seeks to greatly improve bus services in Irish cities, including Dublin, so that journeys by bus will be fast, reliable, punctual, convenient, and affordable. The proposed CBC Infrastructure Works are illustrated in **Image 1.2**.

Image 1.2: CBC Infrastructure Works

It is envisaged that the CBC Infrastructure Works, once completed, will deliver the radial Core Bus Corridors identified in the NTA's Transport Strategy for the Greater Dublin Area 2016-2035 (referred to as the GDA Transport Strategy) (NTA 2016).

1.1 Aims and Objectives

The aim of the Proposed Scheme is to provide improved 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 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.

The outcomes achieved from delivering the Proposed Scheme will be:

- An attractive, resilient, equitable public transport network better connecting communities and improving access to work, education and social activity;
- To facilitiate a transport infrastructure network that prioritises walking and cycling and a mode shift to public transport; and
- To support increased economic and social potential through integrated land-use and transport planning to reduce the time burden of travel.

1.2 Role of the National Transport Authority (NTA)

The NTA is a statutory non-commercial body, which operates under the aegis of the Department of Transport. The NTA was established on foot of the Dublin Transport Authority Act 2008 (as amended) (the "2008 Act").

In the case of the Proposed Scheme, the functions of the NTA include undertaking the design and planning process, seeking (and obtaining) all development consents including related compulsory acquisition approvals from An Board Pleanála, and constructing the Proposed Scheme (if approved).

2. Environmental Impacts Assessment Process

2.1 EIA Process

Environmental Impact Assessment is a systematic and an iterative process that examines the potential environmental impacts of a proposed scheme and establishes appropriate design and mitigation measures to avoid, reduce or offset impacts.

The EIAR reports the findings of an assessment of the environmental impacts of the Proposed Scheme. The purpose of the EIAR is to:

- Describe the baseline conditions before any work on the Proposed Scheme has commenced;
- Describe the Proposed Scheme;
- Describe the assessment methodologies used to assess the potential environmental impacts of the Proposed Scheme;
- Describe environmental issues and any likely significant effects which may arise during the Construction and Operational Phases of the Proposed Scheme;

- Consider the potential cumulative impacts as a result of potential impacts from other schemes in combination with the predicted impacts of the Proposed Scheme;
- Propose mitigation measures to reduce or avoid these impacts; and
- Identify the significant residual impacts which occur after the proposed mitigation measures have been implemented.

All assessments have been carried out in accordance with best practice and applicable guidelines. Some chapters of the EIAR use specific guidelines related purely to that particular discipline.

This NTS is Volume 1 of the EIAR and presents a summary of the EIAR, including key aspects of the Proposed Scheme and the associated beneficial and adverse impacts of importance.

The EIAR documents have been divided into the following Volumes for ease of use:

- Volume 1 – NTS (this document);
- Volume 2 – Main Report;
- Volume 3 – Figures; and
- Volume 4 – Appendices.

3. Need for the Proposed Scheme

3.1 Context

Private car dependence causes significant congestion, affecting our quality of life, our urban environment, and road safety. As the population of the Greater Dublin Area is projected to rise to almost 1.5 million by 2040, there will be an increased demand for travel on roads which do not currently have the capacity for more traffic. Therefore, enhanced sustainable transport options are needed. Without intervention, traffic congestion will lead to longer and less reliable pedestrian, cycle, and bus journeys throughout the region and this will affect the quality of people's lives. On the other hand, sustainable transport infrastructure helps create more sustainable communities and healthier places, while also stimulating our economic development. It contributes to good health and well-being when delivered effectively.

3.2 Project Ireland 2040 - National Development Plan 2021-2030

Under the heading 'Major National Infrastructure Projects' the National Development Plan 2021-2030 sets out a selection of 'Sustainable Mobility' projects included in the Plan as 'Strategic Investment Priorities'. The Proposed Scheme, forming part of the Core Bus Corridors Infrastructure Works within the overall BusConnects Programme is identified as a component of a Strategic Investment Priority, with an associated investment commitment, which has been determined as central to the delivery of the National Planning Framework vision. Delivering the Proposed Scheme will provide the infrastructure needed to help us move from excessive dependence on private car to walking, cycling and public transport.

3.3 Climate Action Plan 2021

The Climate Action Plan 2021 sets out at a National level how Ireland is to halve its emissions by 2030 (51% reduction) and reach net zero no later than 2050. The Climate Action Plan is a road map to delivering Ireland's climate ambition. There are 475 actions identified that extend to all sectors of the economy aiming to transform Ireland into a low carbon nation over the next three decades.

In regard to modal shift the Climate Action Plan 2021 sets out that:

> *'The proposed pathway in transport is focused on accelerating the electrification of road transport, the use of biofuels, and a modal shift to transport modes with lower energy consumption (e.g. public and active transport)'.*

Promoting more sustainable travel modes is seen as critical for climate policy. It offers an opportunity to '*improve our health, boost the quality of our lives, meet the need of our growing urban centres and connects our rural, urban and suburban communities'.*

BusConnects is referenced as a major transport project that will help to deliver the 500,000 additional sustainable journeys. A key goal of the plan is to provide citizens with reliable and realistic sustainable transport options. The Climate Action Plan further states:

> '*The new approach to public transport will be based on a vision of an integrated public transport network, enabling short, medium and long distance trips for people in every part of Ireland. This will mean increasing the frequency of existing rail and bus services, and expanding the bus network through the Connecting Ireland approach.'*

The Proposed Scheme is needed to support the key actions set out in the Climate Action Plan 2021. At a local level, the Proposed Scheme directly supports the provision of sustainable transport options to meet travel demand. The Proposed Scheme will expand, enhance, and connect to pedestrian and cycle networks and will help to deliver compact growth on zoned development lands close to the Proposed Scheme.

3.4 Greater Dublin Area Transport Strategy

The Greater Dublin Area Transport Strategy 2016 - 2035 (referred to as the GDA Transport Strategy) is an essential component for the orderly development of the Greater Dublin Area (GDA) over the next 20 years. The purpose and primary objective of the GDA Transport Strategy is *'to contribute to the economic, social and cultural progress of the Greater Dublin Area by providing for the efficient, effective and sustainable movement of people and goods'.*

The Proposed Scheme is needed to support the implementation of the GDA Transport Strategy in regard to improving the pedestrian environment along the Proposed Scheme, while taking cognisance of and supporting pedestrian and urban realm planning objectives locally. In addition, the Proposed Scheme will improve the existing streetscape/urban realm setting along the corridor. This will include the provision of significantly enhanced crossing facilities, and the introduction of new and improved landscaping provisions along the corridor, and complimentary planting regime and streetscape improvements at key locations will also enhance the character of the surrounding built environment along the corridor.

The Proposed Scheme supports the implementation of the GDA Cycle Network Plan as it will provide infrastructure that will support and enhance cycling as a transport mode, including the delivery of infrastructure for specific routes identified as part of the cycle network plan.

As part of the GDA Transport Strategy the Core Bus Network is to be developed to achieve a continuous priority for bus movement on sections of the Core Bus Network within the Metropolitan area. This is to be achieved through enhanced bus lane provisions and the removal of delays along the routes, and thus enabling the bus to provide a move more quickly than cars along these routes.

The Proposed Scheme is needed to support by the GDA Transport Strategy in so far as it will provide infrastructure required to facilitate a continuous priority for bus movement on sections of the Core Bus network within the Metropolitan area. The Proposed Scheme is needed to help realise the objectives of the GDA Transport Strategy by making the bus a faster option for commuters than car-based transport.

The NTA prepared the Core Bus Network Report for the Dublin Metropolitan Area in 2015, which identified those routes upon which there needed to be a focus on high capacity, high frequency, and reliable bus services, and where investment in bus infrastructure should be prioritised and concentrated. The Core Bus Network is defined as a set of primary orbital and radial bus corridors which operate between the larger settlement centres in the Dublin Metropolitan Area.

The development and implementation of priority infrastructure on the Core Bus Network is needed to ensure that delays are minimised, reliability is improved and use of buses is made more attractive.

There are two main bus corridors in the south east Dublin area. There is high quality inbound and outbound bus infrastructure on much of the N11 and R138. While there are small gaps in bus infrastructure provision, it represents the longest and most complete bus corridor in the Dublin Metropolitan Area. While there is a high level of bus service provision along this corridor, in the inbound direction there are no bus lanes in the Blackrock Village area, nor from the Lansdowne Road junction to the City Centre, with intermittent gaps in bus lane provision along Rock Road and Merrion Road. Outbound there is a significant gap without bus lane provision along the Merrion Road and there is no bus infrastructure along this corridor south of Blackrock Park.

The Proposed Scheme 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 journey times and reliability improvements which the Proposed Scheme provides. This in turn will support the potential to increase the bus network capacity of services operating along the corridor and thereby further increasing the attractiveness of public transport. In addition to this, the significant segregation and safety improvements to walking and cycling infrastructure that is a key feature of the Proposed Scheme will further maximize the movement of people travelling sustainably along the corridor and will therefore cater for higher levels of future population and employment growth. The scheme has been designed to be accessible by all users.

In the absence of the Proposed Scheme bus services will be operating in a more congested environment, leading to higher journey times for bus and lower reliability which will lead to reduced levels of public transport use, making the bus system far less attractive and less resilient to higher levels of growth. The absence of walking and cycling measures, provided in the Proposed Scheme, will significantly limit the potential to grow those modes into the future. Overall, the Proposed Scheme will make a significant contribution to the overall aims and objectives of BusConnects, the GDA Strategy and allow the city to grow sustainably into the future, which would not be possible in the absence of the Proposed Scheme.

4. Consultation

Public participation has been an integral part of the development of the Proposed Scheme from the outset. Non-statutory consultation was carried out, in three phases (one in relation to Emerging Preferred Route (EPR) and two in relation to the Preferred Route Option (PRO)), to inform the public and stakeholders of the development of the Proposed Scheme from an early stage and to seek feedback and participation throughout its development.

The primary objective of the non-statutory public consultation process was and is to provide opportunities for members of the public and interested stakeholders to contribute to the planning and design of the Proposed Scheme and to inform the development process. Public participation in the planning and design of the Proposed Scheme was encouraged from an early stage through on-the-ground engagement and information and media campaigns.

The non-statutory consultation process assisted in:

- The establishment of a sufficiently robust environmental baseline for the Proposed Scheme and its surroundings;
- The identification, early in the process, of specific concerns and issues relating to the Proposed Scheme so that they could be appropriately accounted for in the design and assessment scope; and
- Ensuring the appropriate involvement of the public and stakeholders in the design and assessment process.

These consultations are briefly described below.

4.1 EPR Option Consultation

The first phase of public consultation carried out was based on the EPR and this ran from the 26 February 2019 to 31 May 2019.

The issues raised during the first non-statutory public consultation process were considered as part of the route options assessment process and in determining the preferred route. The EPR proposals were amended to address the issues raised in submissions where possible, incorporating suggestions and recommendations from residents, community groups and stakeholders, where appropriate. These amendments were incorporated into the design and informed the PRO design-development which was subsequently also published for non-statutory public consultation.

At the initiation of the public consultation process, a Community Forum was established with the aim of facilitating communication between community representatives, elected representatives and the BusConnects Infrastructure team. Community Forum meetings took place, where the Community Forum was provided with an update on the design for the Proposed Scheme and given the opportunity to ask questions of the project team and provide feedback.

4.2 PRO Consultations

The PRO non-statutory public consultation took place from 4 March 2020 to 30 April 2020. The public were invited to make written submissions in relation to the published proposals to the BusConnects Infrastructure team either through an online form, by email or by post. Due to the COVID-19 pandemic all further planned events scheduled after 12 March 2020 were postponed. In deference to the submissions which had already been received, the decision was made not to cancel the consultation.

The NTA held a third round of public consultation prior to finalising the PRO in November 2020 and this took place from 4 November 2020 to 16 December 2020. This third round was carried out using virtual consultation rooms, offering a 'call-back' facility along with descriptions, supporting documentation and mapping of the draft PRO as well as information on all revisions, if any, made since the second round of non-statutory public consultation in March 2020.

The issues raised during the second and third rounds of public consultation have been considered as part of the final PRO and formed the basis of the preliminary design.

4.3 Consultation with Prescribed Bodies and Other Consultees

In addition to the public consultation on the Proposed Scheme, the BusConnects Infrastructure team undertook consultation during the preparation / development of the EIAR with prescribed bodies and relevant non-statutory consultees.

During the development of the EIAR, prescribed bodies (including the Department of Communications, Climate Action and the Environment, the Department of Transport, Dublin City Council, the Heritage Council) and relevant non-statutory consultees were provided with a report outlining the proposed approach to the environmental assessment and were invited to comment. Feedback from this consultation was also used to inform the EIAR and the preliminary design proposals.

4.4 Consultation with Landowners

There has been ongoing engagement with landowners whose properties will be impacted, or potentially affected, as the design development for the Proposed Scheme has progressed, from the earliest stages of the project in 2019 through to the Autumn of 2021. This engagement has overlapped with the public consultations (in March 2020 and December 2020). A letter drop was also carried out in Summer 2020 to request access to properties to undertake more detailed surveys. Additional letters were sent to affected landowners in May 2021 and December 2021 offering further engagement. Over the course of the engagements, affected property owners have had the opportunity to discuss different aspects of the Proposed Scheme with the design team. Follow-up conversations have been facilitated as a result of these letters on request. In addition, a further attempt was made to contact those occupiers that had yet to make contact by visiting each property during October 2021. Where no one answered the door, a letter was placed through the letterbox again requesting the occupiers to contact the NTA.

4.5 Consultation with Local Residents and Business Groups

Throughout the design development of the Proposed Scheme from the initiation of the first non-statutory public consultation in February 2019 the NTA facilitated consultation on request with small local resident groups and with business interests on/adjacent to the route. Similar to the Community Forum meetings such events facilitated discussion on the design for the Proposed Scheme and attendees were given the opportunity to ask questions of the BusConnects Infrastructure team and provide feedback.

5. Alternatives Considered

5.1 Strategic Alternatives

The Proposed Scheme has been developed following careful consideration of alternatives. The GDA Transport Strategy, and its associated Strategic Environmental Assessment, considered several of strategic options relevant to the Proposed Scheme.

The consideration of alternative options included a 'Do Nothing' Scenario. This is a scenario where the Proposed Scheme would not be progressed. This option was deemed to be unacceptable as traffic congestion throughout the GDA is particularly high, with the number of cars on the road increasing and significant daily traffic delays. Without intervention, potential impacts could worsen for the region, including:

- Continued growth of traffic congestion;
- Impacts on the ability of the region to grow economically due to increased congestion;
- Longer journey times and increased travel stress will diminish quality of life; and
- Environmental emissions targets will not be met.

The NTA carried out a review of the existing transport network and future forecasts of travel demand in Dublin. This review was further broken down into an assessment of existing and future land use and travel patterns and identified trends and issues within eight transport corridors. Based on these assessments, the most practical set of transport service proposals was set out for each of the eight corridors, combining to form the overall integrated transport system for the GDA up to 2035 in the GDA Transport Strategy.

The Proposed Scheme aligns generally with Corridor F in the GDA Transport Strategy which extends from the core City Centre area through to the south east business districts of Wicklow, based around the N/M11 route and containing both the DART and Luas Green Line. The Strategic Development Zone of Cherrywood is in this corridor.

Through the work undertaken in the preparation of the GDA Transport Strategy, including its supporting studies, various alternatives to deal with the transport needs which are intended to be addressed by the Proposed Scheme were identified and considered.

Other strategic alternatives considered included:

- Bus Rapid Transit;
- Light Rail;
- Metro;
- Heavy Rail;
- Demand Management; and
- Technological Alternatives.

The Proposed Scheme has been developed to provide a level of service similar to Bus Rapid Transit. The GDA Transport Strategy has concluded that new heavy rail and light rail/metro alternatives would not be justified by the predicted level of demand. However, the existing DART line will be upgraded and extended as part of the GDA Transport Strategy.

Demand management and technological alternatives, such as congestion charges, road pricing, electric vehicles on their own would not remove the need for additional bus transport or cycling infrastructure along the route of the Proposed Scheme.

5.2 Route Alternatives

Alternative route options have been extensively considered during the design development of the Proposed Scheme. The development of the design has also been informed by a review of feedback and new information received during each stage of public consultation and as the level of data, such as surveys, transport and environmental data was collected and assessed.

It should be noted that the initial route selection comprised of two separate sections (i) the UCD Ballsbridge to City Centre section and (ii) the Blackrock to Merrion section. However, as a result of careful consideration of the alternative route options, these two sections have now been combined in a single route as the Proposed Scheme. The principal reasons for combining the UCD Ballsbridge to City Centre section and the Blackrock to Merrion section into the Proposed Scheme include: their geographical association, functional interdependence and the fact that the Blackrock to Merrion section joins the UCD Ballsbridge to City Centre section at the junction of Nutley Lane and the Merrion Road and shares the remaining section of the route from that junction to the City Centre.

Development of the Proposed Scheme has evolved in the following stages:

1) A **Feasibility and Options Reports** which are associated with the Proposed Scheme (Dún Laoghaire to City Centre Core Bus Corridor Options Study – Feasibility and Options Assessment and Ballsbridge to UCD Bus Corridor Route Options Assessment) were prepared in early 2016 which identified and assessed feasible options along the corridors and ultimately arrived at an Emerging Preferred Route (EPR);
2) A first round of non-statutory **Public Consultation** was undertaken on the EPR from 26 February 2019 to 31 May 2019;
3) Development of **Draft Preferred Route Options** (April 2019 to March 2020). Informed by feedback from the first round of public consultation, stakeholder engagement and the availability of additional design information, the design of the EPR evolved with further alternatives considered;
4) A second round of non-statutory **Public Consultation** was undertaken on the draft PRO from 4 March 2020 to 17 April 2020. Due to the introduction of Covid-19 restrictions, some planned in-person information events were cancelled, leading to a decision to hold a third consultation later in the year;
5) Further development of an updated **Draft PRO** was undertaken after the second round of public consultation, which took account of submissions received, continuing stakeholder engagement and additional design information;
6) A third round of non-statutory **Public Consultation** was undertaken on the updates Draft PRO in November 2020; and
7) Finalisation of **PRO**. Informed by feedback from the overall public consultation process, continuing stakeholder engagement and the availability of additional design information, the PRO, being the Proposed Scheme, was finalised.

The initial route alternatives considered covered a wide network of roads between:

- Fitzwilliam Street Lower and UCD Campus including Nutley Lane; and
- Merrion Road, from its junction with Nutley Lane, to Rock Road the N31 and the junction of Temple Hill/ Monkstown Road and Stradbrook Road.

These were narrowed down using a high-level qualitative method based on professional judgement and a general appreciation for existing physical conditions / constraints including environmental considerations within the study area.

The alternative route options were then evaluated under the following criteria:

- Economy;
- Safety;
- Integration;
- Accessibility & Social Inclusion; and
- Environment.

Careful consideration for alternative cycling route options was also fundamental in the process of defining the EPR.

Informed by the appraisal of alternative route options, the EPR was identified. That EPR is summarised as follows:

> *'The UCD to City Centre Core Bus Corridor commences at the junction of Fitzwilliam Street Lower and Baggot Street Lower in the city centre. The corridor continues through Baggot Street Upper, Pembroke Road and Merrion Road. At St. Vincent's Hospital, the corridor runs along Nutley Lane onto the R138 Stillorgan Road where it joins the Bray to City Centre City Core Bus Corridor that runs by, and connects to, the UCD Campus.'* and
>
> *'The Blackrock to Merrion Core Bus Corridor commences on the R118 Merrion Road at its junction with Nutley Lane. Buses are proposed to be routed along Rock Road joining the N31 at the Mount Merrion Avenue junction. The proposed scheme terminates at the junction of Temple Hill/ Monkstown Road and Stradbrook Road. Priority for buses and cyclists is provided along the entire route, consisting primarily of dedicated bus lanes in each direction, and continuous segregated cycle tracks. The Blackrock to Merrion Core Bus Corridor connects to the route of the UCD to City Centre Core Bus Corridor at the junction of Merrion Road and Nutley Lane, providing a continuous route from Blackrock to the City Centre.'*

5.3 Design Alternatives

Following the completion of the public consultation process in relation to the EPR, various amendments were made to the scheme proposals to address some of the issues raised in submissions, including incorporating suggestions and recommendations from residents, community groups, business, elected representatives, and stakeholders, and / or arising from the availability of additional information. These amendments were incorporated into the designs and informed a Draft PRO. Alternatives considered during the development of the Draft PRO included the following:

- Fitzwilliam Street was not previously assessed as part of the EPR. The Draft PRO considered four design options and determined that the provision of two bus lanes, traffic lanes, cycle lanes and footways and the removal of parking and loading along Fitzwilliam Street Lower as the preferred option. The preferred option when compared with the other options was considered to align with the objectives of the scheme and provided fully segregated bus and cycle facilities in both directions while maintaining access for general traffic;
- The EPR Option along Pembroke Road (between Baggot Street Upper to Northumberland Road) would impact on mature trees and antique railings. Four design options were considered along Pembroke Road (between Baggot Street Upper to Northumberland Road). The preferred option, which includes the provision of two traffic lanes and a Bus Gate at the western end of Pembroke Road, will not require permanent land take and will also result in reduced on-street tree removal when compared to other options; and
- Consultation on the EPR Option for Nutley Lane highlighted concerns regarding the proposed impact to residential gardens, removal of on-street trees, and a number of safety concerns relating to conflict between vehicles accessing driveways and the users of the footpath, cycle track and bus lane. The Draft PRO considered a number of options for the principal route and the cycle route. The preferred option provides two bus lanes for the entire length of Nutley lane and a two-way cycle track for the majority of Nutley Lane. This option was considered the preferred option as it will provide continuous bus priority and cycle facilities, reduces tree removal and land acquisition, and maintain local access when compared to the other options.

Furthermore, the Proposed Scheme includes other localised design changes which were made based on feedback received during the second round of public consultation and dialogue with stakeholders. For example, the Proposed Scheme requires road widening on Merrion Road at the location of the Gateway at Bloomfield House which is of Regional Importance. The design considered three options to relocate the historical arch. The preferred option will relocate Bloomfield Gateway to the west within the grounds of St Vincent's Hospital and maintains the reference between the arch and its location on the historic mapping.

The assessment of alternatives took account of environmental impacts, alongside other relevant factors including the economy, safety, and accessibility, to arrive at the Proposed Scheme.

6. Description of the Proposed Scheme

The Proposed Scheme which has a total length of approximately 8.3km is comprised of two main alignments in terms of the route it follows; namely the Blackrock to City Centre section and along Nutley Lane.

The Blackrock to City Centre section commences on the R113 at Temple Hill, approximately 80m to the north of the R827 Stradbrook Road, travels along the N31 Frascati Road, the R118 Rock Road / Merrion Road / Pembroke Road, the R816 Pembroke Road / Baggot Street Upper / Baggot Street Lower, turns onto Fitzwilliam Street Lower and terminates at the junction of Mount Street Upper / Merrion Square South / Merrion Square East.

The Nutley Lane section of the Proposed Scheme will commence at the tie-in with the signalised junction on the R138 Stillorgan Road on the southern end of Nutley Lane, travel along Nutley Lane and will terminate at the junction with the R118 Merrion Road.

The design of the Proposed Scheme has evolved through comprehensive design iteration with particular emphasis on minimising the potential for environmental impacts, where practicable, whilst ensuring the objectives of the Proposed Scheme are attained. In addition, feedback received from the comprehensive consultation programme undertaken throughout the option selection and design development process has been incorporated where appropriate.

The Proposed Scheme has been developed to ensure that the principles of universal design are integrated fully in the design, providing access for all users, and eliminating barriers to disabled people.

A typical BusConnects road layout is shown in **Image 6.1**.

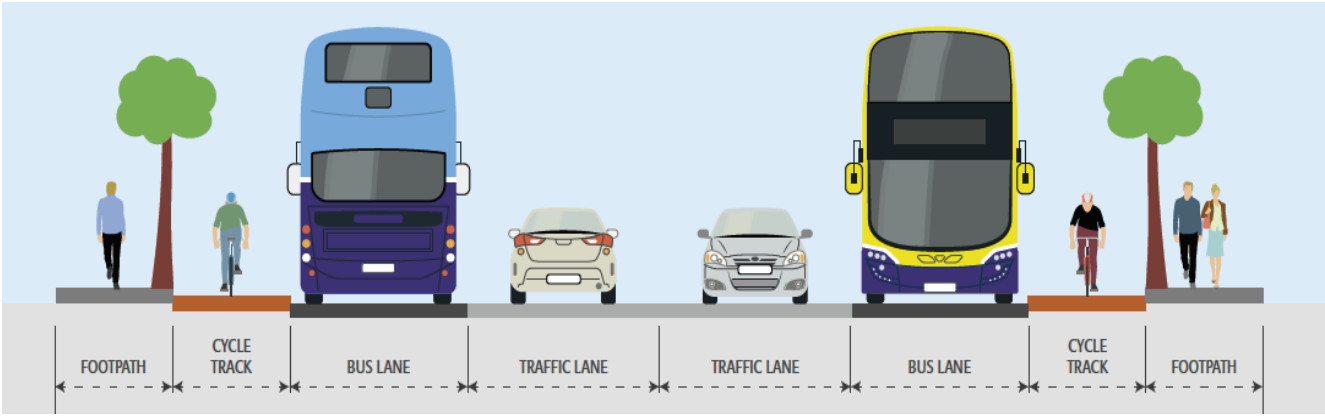

Image 6.1: Typical BusConnects Road Layout

The Proposed Scheme will make significant improvements to pedestrian and cycling facilities and to bus priority. Some of the key changes that will be made to the existing corridor as a result of the Proposed Scheme are the following:

- The number of pedestrian signal crossings will increase by 41% from 68 to 96 as a result of the Proposed Scheme;

- The proportion of segregated cycle facilities will increase from 4% on the existing corridor to 100% on the Proposed Scheme;
- The proportion of the route having bus priority measures will increase from 37% on the existing corridor to 100% on the Proposed Scheme.

The Proposed Scheme is described in the following geographical sections:

- Section 1: Stradbrook Road to Booterstown Avenue;
- Section 2: Booterstown Avenue to Nutley Lane;
- Section 3: Nutley Lane to Ballsbridge;
- Section 4: Ballsbridge to Merrion Square; and
- Section 5: Nutley Lane.

6.1 Section 1: Stradbrook Road to Booterstown Avenue

The Proposed Scheme commences to the south of the junction of Temple Hill / Monkstown Road, approximately 80m to the north of Stradbrook Road. Between the Monkstown Road and Booterstown Avenue junctions, it is proposed to provide a single bus lane, a single general traffic lane and a segregated cycle track arrangement in each direction, with the inbound bus lane commencing just south of the Monkstown Road junction.

Along with the relocation of an existing inbound bus stop to just north of the Temple Hill / Monkstown Road Junction, a new pedestrian crossing has been introduced on the northern arm of this junction. In the staging of this junction a dedicated on-demand right turn phase for buses only onto Monkstown Road, with detection from northbound general traffic lane, will be provided.

A raised table treatment is proposed at the access road to St. Vincent's Park, including on the access lane from Temple Hill, in order to improve pedestrian safety on the inbound side of Temple Hill. At this junction the Temple Road approach arm has been reduced to a single all-movements lane to enable the provision of cycle facilities while also providing an appropriate swept path for left-turning vehicles from Frascati Road to Temple Road.

General alterations to junctions along this section are proposed to improve cyclist safety, including the removal of the left turn slip lane from Rock Road to Rock Hill, and the provision of protected cycle tracks at other junctions with a number of additional dedicated cycle crossings provided where practicable.

The Proposed Scheme includes a controlled exit, for permitted vehicles only, provided from George's Avenue (South) onto Frascati Road. The proposed exit will include restrictions to general traffic in the carriageway of the left turn from George's Avenue (South) to Frascati Road, however cyclists and pedestrians will be able to pass through. Dedicated cycle crossing infrastructure on Frascati Road at George's Avenue is included in the design to reflect the existing, recently-constructed, arrangement.

Similarly, it is noted that the access and egress arrangements to the Frascati Centre have been designed so as to reflect the existing, newly-constructed, arrangement.

The Proposed Scheme requires a widening of the carriageway along Rock Road, adjacent to Blackrock Park.

A portion of the existing wall of Blackrock Park currently supports the road embankment, and as such is to be replaced with a new retaining wall at this location – between Ben Inagh Park and Castledawson residential development.

At the junction of Blackrock Clinic / Emmett Square on Rock Road, a new Toucan crossing is proposed across the eastern (outbound) arm with the existing pedestrian crossing on the western (inbound) arm converted to a Toucan crossing. It is noted that the existing time-plated turn ban from the outbound lane into Blackrock Clinic will be retained.

It is proposed to reverse the direction of Seafort Parade, including the separate entrance and exit from Rock Road. This intervention is proposed to improve visibility for vehicles exiting from Seafort Parade and remove the cross-road arrangement between Castledawson Avenue and Seafort Parade.

The proposed cross-section from Blackrock Clinic to Booterstown Avenue is such that it reduces the potential need for land acquisition along Willow Park School and reduces the extent of necessary land acquisition along Blackrock College and adjacent properties, while achieving the objectives of the Proposed Scheme.

The gates, railings, and piers forming the existing entrance to Blackrock College are to be rotated on the axis of the westernmost pier to accommodate the realigning of the adjacent boundary while preserving the symmetry of the protected entrance. A dedicated mid-block Toucan crossing is also proposed immediately west of the Blackrock College entrance.

6.2 Section 2: Booterstown Avenue to Nutley Lane

Between the Rock Road / Booterstown Avenue junction and the Merrion Road / Nutley Lane junction, it is proposed to provide a single bus lane, a single general traffic lane and a segregated cycle track arrangement in each direction along the majority of the route.

Between Strand Road and Booterstown Avenue (Booterstown DART Station), a two-way cycle track is proposed on the outbound/eastern side of the route. This integrates with the proposed East Coast Trail (Sutton to Sandycove Greenway) along this section.

The design of the Rock Road cross-section and layout between the junctions of Booterstown Avenue and Trimleston Avenue is such that it avoids the need for land acquisition and provides an improved access to the nearby school, while achieving the objectives of the Proposed Scheme. This also includes the removal of the existing dedicated right turn pocket into the western access to St. Helen's Road. Right turning into St. Helen's Road at this location will still be permitted, albeit from the single general traffic lane.

At the junction of the Elmpark Green Development on Merrion Road, along with providing a protected junction for cyclists the arrangement proposes the removal of the left turn slip lanes into and out of the development, as well as introducing a new pedestrian crossing on the western arm.

The Proposed Scheme includes works at the junction of Merrion Road and Strand Road ('Merrion Gates'), including the provision of segregated cycle facilities, the removal of the slip lane from Strand Road to Merrion Road (southbound) and the control of traffic exiting Strand Road utilising traffic signals. On the southern arm of the junction, a strip of parallel parking spaces is proposed on the outbound side.

The existing cut stone masonry archway located outside the Telford Nursing Home on the Merrion Road at the Merrion Gates junction will be carefully dismantled and re-erected at the back of the proposed footpath.

Between the Strand Road junction and Elm Court, it is proposed to provide a three-lane carriageway along this section with a footpath and cycle track in both directions. The carriageway will comprise two general traffic lanes (one in each direction) and one outbound bus lane. Priority for inbound buses will be provided via signal controlled priority at the Merrion Gates junction. A strip of parallel parking spaces is proposed to be provided on the outbound side in the vicinity of No. 264 to No. 270 Merrion Road.

The cross-section proposed between St. Vincent's University Hospital and Estate Avenue has been designed so as to minimise the extent of necessary land acquisition. The existing cut stone masonry archway (referred to as the Bloomfield Gate) located outside the Gas Networks Ireland (GNI) Above Ground Installation (AGI) between the old Gowan Motors site (143 Merrion Road) and SVUH will, however, need to be relocated due to the proposed road widening. It will be carefully dismantled and re-erected in an adjacent area along the northern boundary of SVUH, sited within the existing hedge fronting onto the plaza at the junction of Merrion Road and Nutley Lane.

At the access junction to SVUH from Merrion Road, it is proposed to reduce the radius of the existing left turn into SVUH and remove the dedicated right-turn lane into Merrion Avenue in order to improve cyclist safety and reduce the necessary land acquisition, while achieving the objectives of the Proposed Scheme.

6.3 Section 3: Nutley Lane to Ballsbridge

6.3.1 R118 Merrion Road

The R118 Merrion Road from Nutley Lane to Sandymount Avenue is sub-divided into three portions by its main junctions with Ailesbury Road and Shrewsbury Road.

A four-lane cross-section is proposed between Nutley Lane and Ailesbury Road. On the outbound approach to Nutley Lane, it is proposed to provide a bus priority signal at the pedestrian crossing between Ailesbury Road and Nutley Lane. This will permit buses accessing Nutley Lane to move into the right turn general traffic lane and complete their manoeuvre from this lane. This in turn facilitates continuous bus and cycle lanes along the R118 Merrion Road southbound through the junction.

Between Ailesbury Road and Shrewsbury Road, it is proposed to provide a three-lane carriageway along this stretch of Merrion Road with a footpath and cycle track in each direction and back-to-back bus lanes in opposite directions. The carriageway cross-section will comprise of two general traffic lanes (one in each direction) and one bus lane. The bus lane will be inbound (northbound) on the northern half of this stretch of Merrion Road (approaching Shrewsbury Road) and outbound (southbound) on the southern half of this stretch of Merrion Road (approaching Ailesbury Road). Signal controlled priority will be implemented to give buses priority along the stretch of road that buses share with general traffic. The direction in which the bus lanes travel changes in the vicinity of Wanderers Rugby Football Club (WFC). From WFC to Shrewsbury Road, only an inbound bus lane will be provided, while from WRC to Ailesbury Road, only an outbound bus lane is proposed. This will permit the retention of a number of existing trees and avoids the requirement for land acquisition from a number of properties in the vicinity of the Dutch Embassy.

The section between Shrewsbury Road and Sandymount Avenue is proposed as a four-lane carriageway with a bus lane and a general traffic lane in both directions. There are a number of mature trees located along the footway on this section of road and the proposed layout is such that it retains a number of trees where practicable.

A small section of land acquisition is proposed within the grounds of the Clayton Hotel Ballsbridge, Merrion Road, whereby a new footpath and cycle lane is proposed to run behind the existing trees at this location, with these trees to be retained. This will require land acquisition of a portion of the grass frontage and the realignment of a section of the boundary wall and railing of this property.

Also, along this section of the R118 Merrion Road, it is proposed to reduce the proposed footpath and cycle track widths locally in certain locations which aids in the retention of a number of trees. This locally reduces footpaths to a minimum width of 1.2m and cycle tracks to a minimum width of 1.4m over the short length of each pinch point.

6.3.2 Ballsbridge

The proposed road layout between Sandymount Avenue and Anglesea Road comprises a four-lane carriageway with a bus lane and a general traffic lane in both directions, and includes the removal of the traffic islands on Merrion Road at Serpentine Avenue with associated widening of the proposed footpath.

The left slip road from the R118 Merrion Road to Anglesea Road is proposed to be removed, with the relocation of the existing vehicular access to the City of Dublin Educational and Training Board (CDETB) premises on the corner of the junction to a new proposed vehicular access on Anglesea Road. The proposed access into the CDETB premises has been positioned to minimise the impact on historic railings. A new internal roadway arrangement is proposed as a result within the CDETB premises.

Entry to Ballsbridge Avenue from Ballsbridge Park is proposed to be located at the current exit, while a new exit to the north is proposed, taking cognisance of the extent to which Ballsbridge Park is a private road.

This will remove the requirement for vehicles to turn right onto Beatty's Avenue from the R118 in Ballsbridge Village.

On the eastern side of the Dodder River, it is proposed to provide a two-way cycle track from Anglesea Road to Beatty's Avenue connected by a Toucan crossing on the R118 in Ballsbridge Village. This integrates with the proposed Dodder Greenway.

6.4 Section 4: Ballsbridge to Merrion Square (Pembroke Road, Baggot Street and Fitzwilliam Street)

6.4.1 Ballsbridge Village

At the Ballsbridge Village junction of Shelbourne Road, Herbert Park and Elgin Road, it is proposed to introduce a left turn only entry into Elgin Road from Ballsbridge. At this junction, the re-alignment of the Herbert Park arm has been designed so as to minimise the impact on adjacent properties and to retain a number of existing trees to the east of the junction.

6.4.2 Pembroke Road

On Pembroke Road, from Elgin Road to Northumberland Road, 2m wide cycle tracks are proposed where practicable. It is proposed to reduce the width of the cycle tracks to 1.5m in places, in order to facilitate the retention of a number of existing trees along this section of Pembroke Road.

At the junction of Pembroke Road, Northumberland Road and Lansdowne Road, a right turn lane will be introduced from Pembroke Road onto Lansdowne Road to replace the right turn movement at Ballsbridge Junction (Pembroke Road to Shelbourne Road) that will be removed. The western approach to the junction will be reduced from two lanes to one lane. The existing slip lane which currently allows inbound traffic to bypass the junction, will be removed, resulting in all traffic being brought up to the junction to turn left on to Pembroke Road towards Baggot Street Upper. The existing kiosk which is currently located on the existing splitter island on the south-western corner of the junction will be relocated nearby to the new proposed urban realm as part of the proposed works. Any existing services to the existing kiosk will be retained at the new location.

A single Bus Gate is proposed on Pembroke Road, between the Eastmoreland Place and Waterloo Road junctions. This Bus Gate will ensure that the only traffic utilising Pembroke Road (during the hours of operation) will be local traffic with a destination on or close to Pembroke Road, as well as through buses and authorised vehicles. This removes the need for four traffic lanes including dedicated bus lanes along this section of Pembroke Road resulting in a cross-section of a general traffic lane in each direction and a cycle track in each direction, i.e. inbound and outbound buses will use the two general traffic lanes. This reduced quantum of lanes avoids any permanent land take along Pembroke Road which means that existing trees will be retained, with some on-street parking also retained. The existing footpath width along this section of the Proposed Scheme will also be retained and/or widened where practicable.

Access to Pembroke Road, between Northumberland Road and Eastmoreland Place, during the hours of operation of the proposed Bus Gate, will be maintained via the Lansdowne Road junction. Local access will also be maintained via Eastmoreland Place, Wellington Road and Raglan Road. Offline traffic management measures at Clyde Lane and at the Herbert Park / Pembroke Park junction are also proposed to prevent through traffic diverting inappropriately.

6.4.3 Baggot Street Upper

Along Baggot Street Upper, it is proposed to reduce the width of the existing carriageway. This is facilitated through the proposed installation of the Bus Gate at the western end of Pembroke Road with a short section of bus lane between the Eastmoreland Place and Waterloo Road junctions.

Eastbound general traffic on Baggot Street Upper will not be permitted to access Pembroke Road and vice versa for westbound traffic on Pembroke Road during the hours of operation of the proposed Bus Gate. Consequently, the existing right-turn lane from Baggot Street Upper to Waterloo Road will be retained and the existing straight-ahead general traffic lane towards Pembroke Road can be converted to a bus lane. The proposal includes providing dedicated cycle tracks through the Baggot Street Upper retail area while improving the urban realm. Some loading and parking will be retained in the Baggot Street Upper retail area with additional / compensatory parking / loading provided where practicable.

At the McCartney Bridge (also known as Macartney Bridge, Baggot Street Bridge), where Baggot Street Lower meets Baggot Street Upper, it is proposed to widen the existing footpaths on both sides of the bridge and introduce cycle tracks on both sides of the carriageway on the bridge. It is also proposed to reduce the number of lanes to one general traffic lane in each direction crossing the bridge which allows for the provision of improved widths for pedestrians and cyclists crossing the canal.

At Baggot Street Upper on the inbound approach to the Mespil Road junction, it is proposed to reduce the number of lanes at the junction from four to two. Signal controlled priority will be provided approaching the Mespil Road junction, where inbound (northbound) buses will be allowed to cross the bridge ahead of other traffic.

6.4.4 Baggot Street Lower

Along Baggot Street Lower, it is proposed to provide a bus lane in each direction, a general traffic lane in each direction, a cycle track in each direction and a footpath on both sides of the road. A similar signal controlled priority facility to that on Baggot Street Upper will be provided for buses travelling outbound from Baggot Street Lower to Upper. In order to optimise the operation of this arrangement, left and right turn bans are proposed from Herbert Place and Wilton Terrace respectively onto Macartney (Baggot) Bridge, as well as a right turn ban from Mespil Road onto Baggot Street Upper.

In order to maintain the existing historical lighting columns and the majority of existing trees located in the median, it is proposed to retain the existing median along Baggot Street Lower.

Some recessed parking bays are proposed on both sides of the road where practicable. A new Toucan crossing is proposed on Baggot Street Lower near the school (Scoil Chaitríona).

6.4.5 Fitzwilliam Street

Along Fitzwilliam Street Lower the proposed cross-section will provide a bus lanes and a general traffic lane in each direction, together with cycle tracks in each direction. No land acquisition will be required to provide this cross-section; however, it requires the removal of all parking along this section.

This main alignment of the Proposed Scheme ends at the junction of Fitzwilliam Street Lower with Mount Street Upper / Merrion Square South / Merrion Square East where it ties in with the existing environment.

6.5 Section 5: Nutley Lane (R138 Stillorgan Road to Merrion Road)

This alignment of the Proposed Scheme ties in with the existing signalised junction of the R138 Stillorgan Road and Nutley Lane. Proposed works to this junction include removing the existing left turn slip lane from Nutley Lane to the R138 Stillorgan Road, and providing a new two-way cycle crossing across the R138 Stillorgan Road on the eastern arm of the junction. Between the R138 Stillorgan Road and Nutley Road, a four lane cross-section is proposed, with a bus lane and a general traffic lane in each direction. It is proposed that a two-way

cycle track will be provided on the eastern side of Nutley Lane, continuing north past the entrance to Elm Park Golf & Sports Club. This proposed cross-section includes the requirement for land acquisition from the properties currently occupied by RTÉ and Eir.

Between the entrance to Elm Park Golf & Sports Club and the entrance to St. Vincent's University Hospital, no footpath is proposed on the Elm Park Golf & Sports Club side of road, however, a Toucan crossing will be provided just north of the access to Elm Park Golf & Sports Club. The proposed two-way, 3.0m wide, cycle track will continue on the Elm Park Golf & Sports Club side of Nutley Lane, as far as the SVUH access junction. The existing footpath and verge on the north-western (residential) side of this stretch of Nutley Lane, is proposed to be retained, which in turn allows the trees on this side of the road to also be retained. No land acquisition of any residential houses along this stretch of Nutley Lane will be required, however, to achieve the proposed cross section, land acquisition from the Elm Park Golf & Sports Club as well as SVUH will be required.

Toucan crossings are proposed at the SVUH access junction to connect the two-way cycle track to the single cycle tracks to the north.

At the access junction to SVUH, a right turn lane into the hospital is proposed which requires a curtailment of the receiving southbound bus lane in order to mitigate potential impact on the operation of internal roadways within the hospital. Southbound bus priority will be enabled through signal controlled priority provided on the northern arm.

From the access junction to SVUH to the junction of Nutley Lane with Merrion Road, the proposed cross-section comprises four lanes, including a bus lane and a general traffic lane in each direction with a single cycle track in each direction also. To achieve the proposed cross section along this stretch of Nutley Lane, land acquisition from the Merrion Shopping Centre as well as SVUH will be required.

7. Construction

The Construction Phase for the Proposed Scheme is anticipated to take approximately 24 months to complete. It will be constructed based on individual sectional completions that will individually have shorter durations typically ranging between three and thirteen months.

The construction of the Proposed Scheme will include the following activities:

- Site preparation and clearance works, including:
  - Land acquisition where temporary or permanent land take is required;
  - Installation of fencing and signage;
  - Protection of trees and vegetation to be retained;
  - Vegetation clearance and treatment of non-native invasive plant species;
  - Archaeological investigations;
  - Ground investigations;
  - Set up of the Construction Compound;
  - Installation of temporary lighting; and
  - Demolition of items such as walls, gates, fencing, lighting poles and bus stops.
- Road and street upgrades, including:
  - Excavation of the road surface;
  - Disruption / alterations to parking / loading provisions and access to premises;
  - Implementation of pedestrian and cyclist safety measures;
  - Temporary alterations to public transport services;
  - Implementation of any road closures or diversions;
  - Earthworks;
  - Works to cellars, if required;
  - Adjustment or upgrades to drainage;

    - Realignment, upgrades, replacement or protection of utilities and services;
    - Construction of pavement, including general traffic carriageways, bus lanes, on-road cycle tracks, off-road cycle tracks, off-line bus stops, traffic islands, off-line parking and loading bays;
    - Upgrades to Traffic Signal Junctions;
    - Upgrades of road furnishings (including street furniture, signage, lighting, bus stops (shelters, CCTV and information displays) and communication systems);
    - Boundary treatment and landscaping;
    - Works within Booterstown Marsh pNHA; and
    - Works at vehicular access/egress at Numbers 1 to 11 Pembroke Road.
- Structural Works including:
    - Construction of a retaining wall at Blackrock Park;
    - Relocation of Blackrock College Entrance Gates and Railings;
    - Relocation of the Merrion Gates Archway;
    - Relocation of the Bloomfield Gate Archway;
    - Relocation of Pembroke Kiosk; and
    - Construction of a ramped walkway at Grand Canal.
- Construction site decommissioning, including the removal of all construction facilities and equipment.

A Construction Compound will be located in Booterstown Car Park, within Blackrock Park, along the R118, opposite Willow Terrace. This Construction Compound will be used to store materials, plant, and equipment, to manage the activities from and to provide welfare facilities for construction personnel. Limited car parking will also be provided at this Construction Compound. The layout for the Construction Compound is shown in **Image 7.1.**

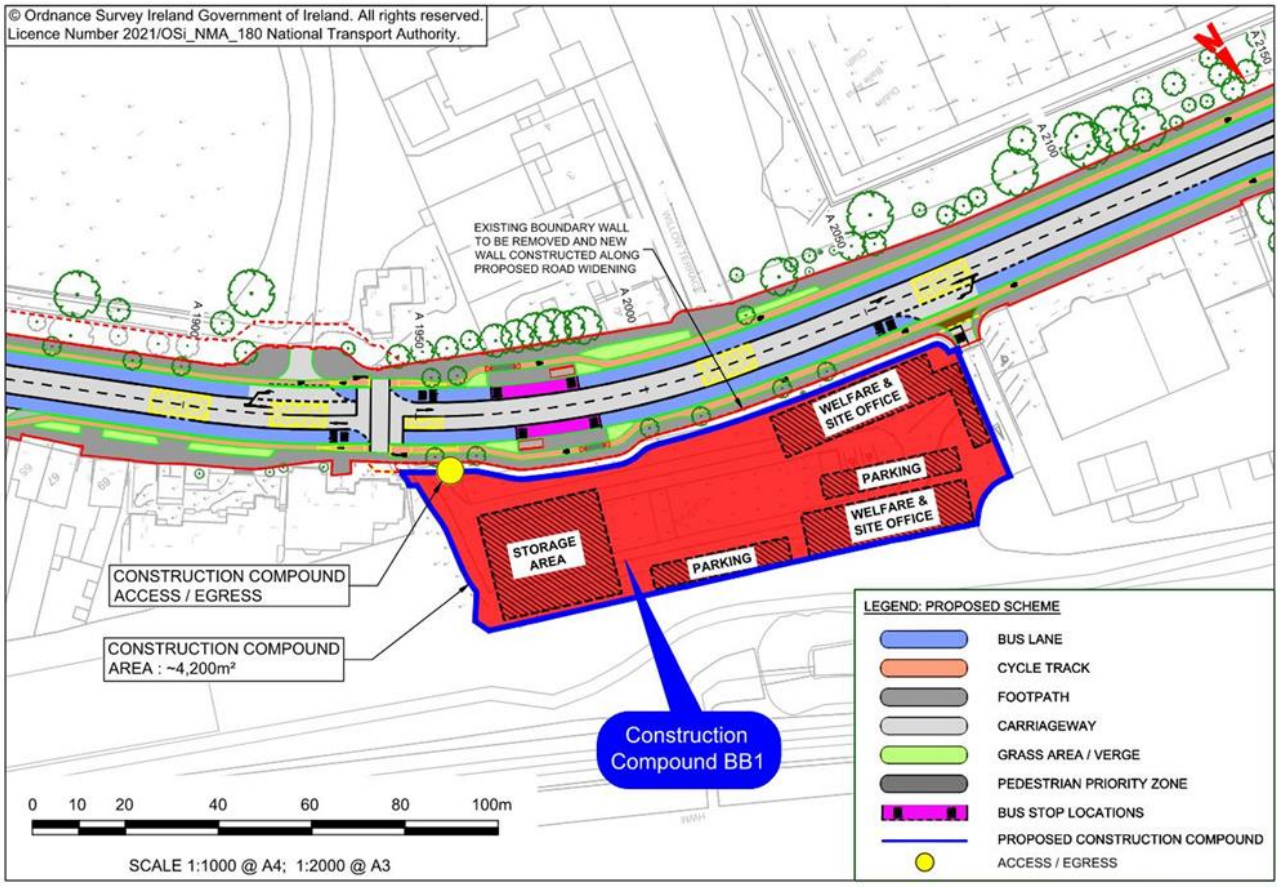

Image 7.1: Indicative Layout of Construction Compound BB1

7.1 Construction Environmental Management Plan

A Construction Environmental Management Plan (CEMP) has been prepared which describes the overall environmental management strategy that will be implemented during the Construction Phase of the Proposed Scheme. The CEMP includes the mitigation measures which will be implemented to provide environmental protection during the Construction Phase of the Proposed Scheme. The CEMP addresses construction traffic management, resource and waste management, invasive species management, surface water management and environmental incident response measures.

The CEMP will be updated by the NTA (the Employer for the construction works) prior to the commencement of the Construction Phase, so as to include any additional measures required pursuant to conditions attached to any decision to grant approval. The NTA shall set out the Employer's Requirements in the Construction Contract including all applicable mitigation measures identified in this EIAR, as well as additional measures required pursuant to conditions attached to any decision to grant approval.

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)

7.2 Construction Traffic Management Plan

A Construction Traffic Management Plan has been prepared, to demonstrate how the interface between the public and construction-related traffic will be managed and how vehicular movement will be controlled.

The roads and streets along the Proposed Scheme that will be upgraded will remain open to traffic, wherever practicable, during the Construction Phase. To maintain traffic movements, it will be necessary, in limited instances, to undertake some traffic diversions or lane restrictions locally to complete particular elements of the works.

Access to properties of owners/occupiers will be maintained as far as reasonably practicable. While there may be temporary constraints to access during the normal hours of work these will be communicated and arranged in consultation with the impacted users.. Access for emergency vehicles will also be maintained.

Wherever possible, cycle and pedestrian routes will also be maintained along the route throughout the duration of the construction works. If, necessary, alternative routes will be provided to facilitate both pedestrian and cycle movements. Bus services will be maintained, however some existing bus stop locations will need to be temporarily relocated to accommodate the works.

The works will be completed on a sectional basis along the corridor such that no areas will experience an extended period of construction disruption over the approximate 24-month duration. NTA will facilitate pro-active communication of the scheduled planned works by the appointed contractor to ensure that impacted individuals, businesses and communities are kept aware of upcoming likely temporary disruptions.

8. Environmental Impacts and Mitigation

The EIA process provides a valuable opportunity to reduce potential environmental impacts through design refinement, and this has formed an integral part of the design process for the Proposed Scheme, whilst ensuring the objectives of the Proposed Scheme are attained. In addition, feedback received from the comprehensive consultation programme undertaken throughout the option selection and design development has been incorporated where appropriate.

The design of the Proposed Scheme has been developed to a stage where all potential environmental impacts can be identified, and a fully informed environmental impact assessment can be carried out.

As outlined in Section 7.1, the NTA (the Employer for the construction works) shall set out the Employer's Requirements in the Construction Contract including all applicable mitigation measures identified in this EIAR, as well as additional measures required pursuant to conditions attached to any decision to grant approval. Procurement of the construction contractor will involve the determination that the appointed contractor is competent to carry out the works, including the effective implementation of the mitigation measures. The appointed contractor will be required to plan and construct the Proposed Scheme construction works in accordance with the Employer's Requirements, and the NTA will employ an Employer's Representative team with appropriate competence to administer and monitor the Construction Contract for compliance with the Employer's Requirements.

The following sections provide a summary of the assessments for each environmental topic and sets out the likely significant residual effects as a result of the construction and operation of the Proposed Scheme. The following environmental topics are described:

- Traffic & Transport;
- Air Quality;
- Climate;
- Noise & Vibration;
- Population;
- Human Health;
- Biodiversity;
- Water;
- Land Soils Geology & Hydrogeology;
- Archaeological & Cultural Heritage;

- Architectural Heritage;
- Landscape (Townscape) & Visual;
- Waste and Resources;
- Material Assets; and
- Risk of Major Accidents and / or Disasters; and
- Cumulative Impacts and Environmental Interactions.

8.1 Traffic & Transport

The traffic and transport impact assessment has two distinct parts: the physical changes to transport network, and traffic modelling.

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

- The assessments of physical changes:
  - **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 modelling-based assessment addresses:
  - **People Movements:** An assessment has been carried out to determine the potential impact that the Proposed Scheme will have on the projected volume of people (by mode – Walking, Cycling, Bus and General Traffic) moving along the Proposed Scheme during the Operational Phase;
  - **Bus Performance Indicators:** The changes to the projected journey times and reliability for buses as a result of the Proposed Scheme; and
  - **General Traffic:** The direct and indirect impacts that will occur for the general traffic conditions on the Proposed Scheme and surrounding road network.

For the Construction Phase temporary traffic management arrangements will be prepared in accordance with Department of Transport's 'Traffic Signs Manual, Chapter 8 Temporary Traffic Measures and Signs for Roadworks'. Measures to minimise the impacts associated with the Construction Phase will be implemented. A Construction Stage Mobility Management Plan, as described in the CEMP, will be prepared by the appointed contractor to encourage its personnel to travel to site by sustainable modes.

The assessment concludes that the impact during the Construction Phase will be negative, slight, and temporary in nature, and with the application of the proposed mitigation measures, the impact on traffic and transport will not be significant.

The impacts assessed for the Operational Phase determines how the Proposed Scheme integrates within the existing network and changes to traffic flows in the direct and indirect study area. The assessment demonstrates the following:

- **Pedestrian Infrastructure:** Overall, the improvements to the quality of the pedestrian infrastructure will have positive, significant and long-term effects in Sections 1, 2, 3 and 5 of the Proposed Scheme, and a positive, moderate and long-term effect in Section 3;
- **Cycling Infrastructure:** Given the quality of the existing cycling infrastructure along the Proposed Scheme, the improvements will have a positive, moderate and long-term effect in Sections 1 and 3 of the Proposed Scheme, and a positive, very significant and long-term effect in Sections 2, 4 and 5;

- **Bus Infrastructure:** The results of the assessment demonstrate that the improvements to the quality of the bus infrastructure will have a positive, very significant and long-term effect in Sections 1 and 5 of the Proposed Scheme, and a positive, moderate and long-term effect in Sections 2, 3 and 4;
- **Parking and Loading:** Given the nature of the loss in parking and the availability of alternative spaces in the indirect study area, the impact is expected to have a negative, slight and long-term effect across Sections 1, 2, 4 and 5 of the Proposed Scheme and a negligible effect in Section 3.
- **People Movements:** Overall, it is anticipated that the increases to the total number of people travelling through the Proposed Scheme will have a positive, very significant and long-term effect;
- **Bus Network Performance:** Overall it is anticipated that the improvements to the network performance for bus users along the Proposed Scheme will have a positive, very significant and long-term effect; and
- **General Traffic Network Performance:** Overall, it has been determined that the impact of the reduction in general traffic flows along the Proposed Scheme will be a positive, moderate and long-term effect whilst the impact of the redistributed general traffic along the surrounding road network will have a negative, slight and long-term effect. Thus overall, there will be no significant deterioration in the general traffic environment in the area.

The Proposed Scheme will deliver positive impacts to the quality of pedestrian, cycling and bus infrastructure during the Operational Phase, improving people movement in line with the scheme objectives. These improvements will help to provide an attractive alternative to the private car and promote changes from the use of private cars 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 scheme design has been developed with cognisance of the relevant accessibility guidance and universal design principles so as to provide access for all users.

Although it is recognised that there will be some negative impacts for general traffic and parking / loading availability, the Proposed Scheme has been designed and outlined within this assessment to take cognisance of the relevant traffic and transport guidelines. The assessment demonstrates that there will be no significant deterioration in the general traffic environment in the study area as a consequence of meeting the scheme objectives of providing enhanced sustainable mode priority along the direct study area.

Given that the Proposed Scheme results in a positive impact for walking, cycling, bus and people movements, mitigation and monitoring measures have not been considered beyond those already incorporated as part of the Proposed Scheme. The impacts to general traffic and parking / loading, including mitigation measures are incorporated into the Proposed Scheme and no further mitigation measures are considered to be required.

Additionally analysis undertaken using the Proposed Scheme models has shown that the new bus infrastructure facilitates a significant level of resilience for bus services that will use the Proposed Scheme, from implementation into the future. The Proposed Scheme will provide a higher level of protection to bus journey time consistency and reliability and 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.

8.2 Air Quality

The air quality assessment involved a review of available published data, a review of applicable guidelines, air quality monitoring at sensitive locations along the Proposed Scheme and calculations to assess air quality impacts that may occur as a result of the Proposed Scheme.

The existing air quality along most parts of the Proposed Scheme meets National and European Union air quality standards. However, the annual mean limit value for Nitrogen dioxide (NO_2) was exceeded at monitoring locations on Leeson Street / Morehampton Road, Camden Street / Wexford Street, North Wall Quay, South Circular Road / Clanbrassil Street Lower and along Pearse Street in 2018/2019.

The impacts assessed for the Construction Phase include dust emissions from activities such as site clearance and preparation, utility diversions, road and junction construction works, and landscaping. Appropriate mitigation measures to ensure that construction dust nuisance is minimised will be implemented for the duration of the Construction Phase.

Air quality impacts associated with Construction Phase traffic and changes in traffic flows have also been assessed. The assessment concluded that Construction Phase traffic emissions will be neutral overall in the study area.

The assessment of potential air quality impacts associated with Construction Phase activities concludes that the works will be temporary and/or short-term in nature, and with the application of the proposed mitigation measures, the impact on air quality will not be significant.

No mitigation measures are required during the Operational Phase as the assessment identifies a generally negligible or beneficial impact on air quality in the vicinity of the Proposed Scheme. Some significant (moderate) adverse impacts have been identified at R138 Leeson Street and Donnybrook Road in 2028, where both baseline and future baseline NO_2 concentrations are modelled above or near the annual mean limit (40 µg/m^3) for NO_2.The impact from the Proposed Scheme in this area derives both from high baseline concentrations and an increase in traffic flows at this location due to the Proposed Scheme. However, these impacts are predicted to reduce to negligible by 2043. The assessment concludes that the overall the impact on air quality along the Proposed Scheme will neutral and long-term.

8.3 Climate

Climate is defined as the average weather over a period of time. Climate change is a significant change to the average weather, and while climate change is a natural phenomenon, human activities in recent years have negatively impacted on the climate, through the release of greenhouse gases.

The climate assessment involved a review of greenhouse gas emissions, a review of applicable guidelines and predictive calculations to assess climate impacts. The Proposed Scheme was also assessed in terms of its vulnerability to climate change.

The impacts assessed during the Construction Phase included emissions from activities such as site clearance, utility diversions, road widening and excavation works (where required), works at junctions and landscaping. Construction traffic routes are also assessed as part of the assessment. Construction traffic and the embodied carbon (i.e. the total energy required to make / produce and product of services) for any construction materials required will be the main sources of greenhouse gas emissions during construction.

Mitigation measures have been incorporated into the construction design with the goal of reducing the embodied carbon associated with the Construction Phase of the Proposed Scheme. These mitigation measures include the replacement, where practicable, of concrete containing Portland cement with concrete containing ground granulated blast furnace slag.

The Proposed Scheme is estimated to result in total Construction Phase greenhouse gas emissions of approximately 4,309 tonnes embodied CO_{2eq} for materials over the approximate 24-month construction period, equivalent to an annualised total of 0.004% of Ireland's national emissions in 2019 or 0.006% of Ireland's non-Emission Trading Scheme 2020 target.

Following the application of these mitigation measures, it is expected that there will be a short-term, negative, significant residual impact on climate as a result of the Construction Phase of the Proposed Scheme.

The Proposed Scheme will be an enabler to allow for further reductions in car mode share with corresponding transfer to public transport, walking and cycling modes. This can be achieved through signal optimisation, increased bus frequency, further growth in cycling and demand management measures. A greater increase in sustainable mode share will in turn lead to further reductions in greenhouse gas emissions, beyond those reported in the above assessment. The Proposed Scheme has the potential to reduce greenhouse gas emissions

equivalent to the removal of approximately 3,000 and 3,300 car trips per weekday from the road network in 2028 and 2043 respectively. This represents a significant contribution towards the national target of 500,000 additional trips by walking, cycling and public transport per day by 2030 as outlined as a target in the Government's 2021 Climate Action Plan.

The maintenance greenhouse gas emissions associated with the Operational Phase of the Proposed Scheme is predicted to generate 1.1kt CO_{2eq} over the predicted 60-year lifespan. Following the implementation of mitigation, this impact is predicted to be Negative, Significant and Permanent.

The operational traffic greenhouse gas emissions associated with the Operational Phase of the Proposed Scheme is predicted to be Positive, Significant and Permanent.

Overall, when the carbon emissions associated with the maintenance phase and the Operational Phase are combined, the net greenhouse gas emissions will be Positive, Significant and Permanent. Thus, the residual impact from Operational Phase traffic as a result of the Proposed Scheme will be Positive, Significant and Permanent.

The CBC Infrastructure Works will also support the delivery of government strategies outlined in the Climate Action Plan and the 2021 Climate Act by enabling sustainable mobility and delivering a sustainable transport system, aligning with the aims to provide enhanced walking, cycling and bus infrastructure on key access corridors in the Dublin region. This will subsequently enable and deliver integrated sustainable transport movement along these corridors. The CBC Infrastructure Works will provide connectivity and integration with other public transport services leading to more people availing of public transport.

By creating a resilient, accessible public transport network, BusConnects will provide an attractive alternative to private car travel, encouraging more passenger travel by more sustainable modes. As a result, a greater share of the demand will be by sustainable modes (public transport, walking and cycling).

8.4 Noise & Vibration

The noise and vibration assessment involved a review of available published baseline noise data, the completion of baseline noise and vibration monitoring to establish the current background levels, and a detailed noise and vibration impact assessment associated with the Construction and Operational Phases.

The baseline surveys determined that currently the main source of noise within the study area is road traffic with a small contribution from local urban and suburban sources such as pedestrian movements and commercial activities. There are no notable sources of vibration in the surrounding environment. Road traffic along the existing road network generates a negligible level of vibration that would not be perceptible to building occupants.

The potential impacts assessed for the Construction Phase included the generation of noise and vibration from utility diversions, road resurfacing and road widening works. Construction traffic routes were also assessed as part of the assessment.

For the duration of the Construction Phase, appropriate mitigation measures will be implemented, including the appropriate use of acoustic enclosures or screens where required to reduce noise as well as noise monitoring at sensitive receptors close to the working areas. The monitoring of vibration at identified sensitive buildings, will be undertaken where proposed works have the potential to be at or exceed the vibration limit values.

Following the application of these mitigation measures, it is expected that there will be no significant residual noise or vibration impacts, as a result of the Construction Phase of the Proposed Scheme.

The impacts assessed during the Operational Phase relate to changes in traffic noise levels along the Proposed Scheme as a result of reconfigured cross sections, to include new or upgraded bus lanes and predicted changes in traffic movement. The Proposed Scheme aligns with policy objectives to reduce populations exposure to traffic noise across the city through the incorporation of improved public transport, and increasing bus, train, and bicycle journeys.

The results of the noise assessment for the design year (2043) Operational Phase have determined that indirect long-term changes in traffic noise levels will be positive, imperceptible to slight to negative, moderate along the Proposed Scheme. Along the surrounding road network, very small changes in traffic noise levels will occur as a result of traffic redistribution off the Proposed Scheme during daytime periods only.

8.5 Population

The population assessment considered impacts on residential properties, community facilities and commercial businesses within the study area. The Population study area comprised 10 community areas: Monkstown, Newtownpark, Blackrock, Booterstown, Donnybrook, Merrion Road, Sandymount, Haddington Road, University (Newman) Church and Westland Row. The Proposed Scheme is comprised of two main alignments in terms of the route it follows; namely the Blackrock to City Centre Section and along Nutley Lane. The Blackrock to City Centre section will run from Temple Hill in the community area of Blackrock, along N31 Temple Road and N31 Frascati Road past a number of residential and small to large commercial premises. The Blackrock section of the Proposed Scheme will continue on to the R118 Rock Road and R118 Merrion Road on the border of Booterstown, bordered a mix of properties until St. Vincent's University Hospital. It will continue towards the City Centre through the community areas of Donnybrook, Sandymount and Haddington Road, to Baggot Street Lower between the community areas of University (Newman Church) and Westland Row. From Baggot Street Lower the Blackrock Section will cross the Grand Canal towards the City Centre where it will terminate.

The Nutley Lane section of the Proposed Scheme commences at the tie-in with the signalised junction on the R138 Stillorgan Road on the southern end of Nutley Lane, travel along Nutley Lane and will terminate at the junction with the R118 Merrion Road.

The impacts on population assessed for the Construction and Operational Phases include:

- Indirect amenity impacts on community facilities and commercial businesses from a combination of residual air, noise, traffic and visual impacts. Direct amenity impacts on commercial businesses that may impact on businesses ability to operate successfully;
- Temporary and permanent land acquisition from residential properties, community facilities and commercial businesses including reduction of front gardens, driveways, private landings and private parking spaces; and
- Changes in accessibility for walkers, cyclists, bus users and private vehicles along the Proposed Scheme and in the surrounding road network as a result of construction traffic, diversions and traffic management measures during the Construction Phase and redistributed general traffic during the Operational Phase.

The assessment concluded that there will be a negative, moderate to significant short-term impact on the community area at St. Vincent's University Hospital during the Construction Phase. Localised negative, significant and short-term land take impacts are also predicted at five residential properties due to permanent land take.

In addition, positive, moderate to significant and long-term impacts are expected on walkers, cyclists and bus users in the community areas of Blackrock, Booterstown, Merrion Road, Donnybrook and Haddington Road during the Operational Phase. Access to community facilities and commercial businesses via private vehicles is expected to be a positive, moderate impact on change in access along the Proposed Scheme and a negative, moderate impact on change in access in the surrounding road network.

In achieving the aims and objectives of the Proposed Scheme, it will provide an attractive alternative to the use of private vehicles and promoting a modal shift to walking, cycling and public transport, allowing for greater capacity along the corridor to access residential, community and commercial receptors.

8.6 Human Health

The interaction of factors such as individual characteristics, lifestyle and 'wider determinants of health' (the physical, social and economic environment) have an important influence on the health of a population. These are illustrated in **Image 8.1**.

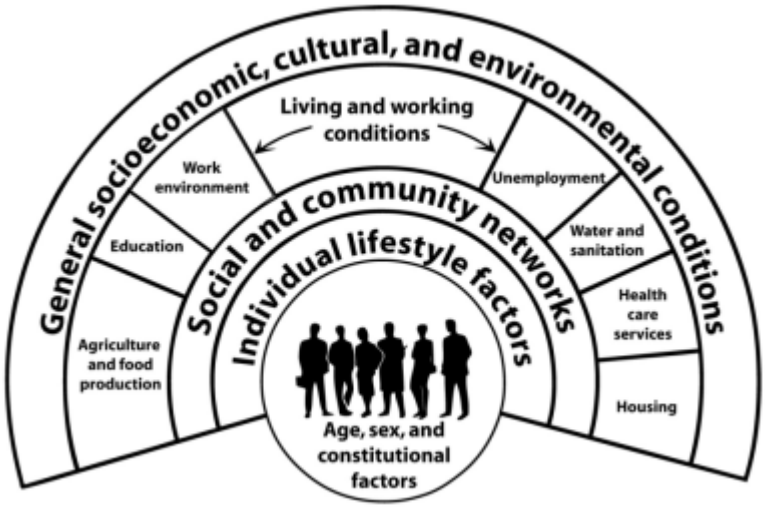

Image 8.1: Wider Determinants of Health (Source: Dahlgren and Whitehead 1991)

A related issue, is that of the social inequalities of health, which are the unfair and avoidable differences in health status across groups in society. The aim of this assessment was to identify the wider determinants of health that would likely be affected by the Proposed Scheme and how those impacts are associated with health outcomes.

Currently, Dublin's population has a better overall health status than average for Ireland with lower death rates.

Levels of air pollution within Dublin are almost entirely within the EU limit values for nitrogen dioxide and particulate matter.

Exposure to traffic noise causes annoyance and, in very high levels of exposure, is linked to several other adverse health outcomes. There is widespread exposure in the study area to noise levels which exceed the levels set by the World Health Organization to prevent adverse health outcomes. However, the noise levels experienced are typical of an urban environment.

Temporarily increased traffic congestion because of traffic management measures and diversions during construction would likely cause frustration and annoyance particularly for commuters and people travelling to appointments. Construction noise and vibration, as well as dust may cause annoyance for some nearby residents and workers. The temporary to short-term nature of these impacts means that no lasting impact on health is likely.

There may be a requirement for some works to take place at night. This will temporarily increase the likelihood of sleep disturbance to the nearby residential population as a result of noise associated with the construction works. During the day there is risk of sleep disturbance due to construction noise for shift workers. Mitigation measures to control and limit noise associated with the construction works are included in the EIAR.

The need for pedestrian and cycle diversions around areas of construction works may increase the risk of collisions, unless appropriately designed and managed. Cyclists and pedestrians are more vulnerable to injury and death in the event of a collision and so need greater protection. Construction traffic management has been considered to outline measures deemed necessary to provide protection for pedestrians and cyclists in each location of the Proposed Scheme. With these measures in place the risks will be mitigated. Since the construction works will be short-term overall and temporary, the Proposed Scheme is not likely to result in any increased exposure to risk for pedestrians and cyclists over and above trends in the current street environment in Dublin. In addition, access to St. Vincent's University Hospital will be maintained and the Construction Traffic Management Plan will set out measures to minimise any delay for emergency response vehicles.

No other health effects are considered likely from the Construction Phase of the Proposed Scheme.

The Proposed Scheme will create opportunities for building in regular physical activity into daily life through the improved pedestrian and cycling facilities, as well as through walking to and from bus stops. It is predicted that this will result in positive health outcomes as some people will change their travel behaviours and benefit from increased regular physical activity as a result.

With mitigation in place, people living near some of the proposed new bus stops may experience a new noise source. A small proportion of residents may experience an increase in traffic noise from redirected traffic along some streets. However, for most people, there will be no perceptible change in environmental noise from the Proposed Scheme.

Reductions in general through-traffic, improved pedestrian infrastructure and improvements to the streetscape are likely to encourage more social interaction along the Proposed Scheme, resulting in positive health outcomes such as good mental wellbeing. The new public transport infrastructure is expected to bring improved journey times and improved reliability for public transport journeys, resulting in improved mental health outcomes such as reduced stress, as well as improved access to health, employment, education, and leisure services.

The inclusion of bus priority measures and improvements to pedestrian and cyclist infrastructure will support safer and more equitable access for those who do not or cannot use a car. This is expected to have positive impacts on health, by addressing these wider determinants and health inequalities. In addition the urban environment would be improved and easier to use for a wider variety of pedestrians, including the visually impaired, wheelchair users and the persons with mobility impairment.

No other health hazards or likely health outcomes have been identified as relevant for the Operational Phase of the Proposed Scheme.

8.7 Biodiversity

The biodiversity (ecology) assessment involved a review of available published data to identify any features of ecological value and field surveys of habitats, bats, ground mammals, birds, amphibians (frogs and common newts) and reptiles.

The Proposed Scheme runs immediately alongside two single European sites, namely South Dublin Bay SAC at the Merrion Gates and South Dublin Bay and River Tolka Estuary SPA at Booterstown Marsh. The Proposed Scheme boundary overlaps the SAC and SPA boundaries by 2.7m^2 and 4.3m^2, respectively, where habitats within these areas do not currently correspond to QI habitats, and / or habitats on which QI / SCI species of nearby habitats rely on for foraging, resting / roosting and / or commuting on.

The next nearest site is North Dublin Bay SAC and North Bull Island SPA at 4.7km distance, to the north-east of the Proposed Scheme.

The main habitats within the Proposed Scheme include mixed broadleaf woodland, hedgerows, treelines, scrub, flower beds and borders, grassland and buildings and artificial surfaces. The study identified:

- Booterstown Marsh, which partially falls within the Proposed Scheme boundary and is documented as supporting a number of coastal Annex I habitats within the marsh's wetland complex;
- Three bat species (Leisler's bat, Common pipistrelle bat, Soprano pipistrelle bat);
- Potential Roost Features (locations where bats rest) in four trees which are located within the scheme boundary. All four trees will be retained in the Proposed Scheme;
- No evidence of badgers;
- No otter signs were found during survey;
- No evidence of amphibians or reptiles; and
- A total of 75 breeding bird species and 44 wintering bird species.

Potential impacts on biodiversity for the Construction Phase may arise from:

- Site preparation and clearance;

- Removal of existing boundaries, pavements, lighting columns, bus stops, and signage;
- Protection and / or diversion of buried services;
- Reconnection of existing and new drainage infrastructure into the existing surface water drainage infrastructure;
- Road widening, pavement reconstruction, and kerb improvements;
- Temporary and permanent land take;
- Installation of new bus stops and junction modifications;
- Property boundary reinstatement, signage replacement; installation of lighting columns; and
- Landscaping and tree planting.

A range of mitigation measures will be implemented to avoid or reduce negative impacts on biodiversity during the Construction Phase, including retaining groups of trees identified to contain potential roost features for bats where practicable, and planting new street trees. Invasive species management will be implemented to mitigate any risk of the Proposed Scheme contributing to the spread of invasive species during the Construction Phase.

The assessment concluded that with the application of the proposed mitigation measures, the impact on biodiversity during construction will be not significant beyond the local level.

Although there is a small overlap with the boundaries of the South Dublin Bay SAC and the South Dublin Bay and River Tolka Estuary SPA, the Proposed Scheme boundary does not overlap with any Annex I habitats listed as a Qualifying Interest of the SAC, or habitats considered to support the SCI species of the SPAs, or have an impact on the conservation objectives of these, or any other, European sites.

While unlikely, in a worst case scenario, a potential likely significant air quality effects on the Grand Canal pNHA could occur as result of the operation of the Proposed Scheme. However, this would be at no greater than a local geographic scale. This predicted impact is based on conservative assumptions regarding background pollutant concentrations and the improvement in vehicle fleet emission rates in years to come. In reality, total pollutant concentrations (and the magnitude of change) are likely to be lower than those reported in the EIAR.

In addition, potential impacts on designated European sites are specifically assessed in the Natura Impact Statement (NIS), which also forms part of this application. The conclusion of the NIS is that the Proposed Scheme will not adversely affect the integrity of any European site.

8.8 Water

The water assessment involved a desk based study and the completion of field surveys to establish the current surface water conditions to identify the likely impacts of the Proposed Scheme.

The Proposed Scheme will be located within the River Liffey catchment which is mainly urban and industrial in character. The waterbodies relevant to the Proposed Scheme are:

- Brewery Stream_010, which is made up of a number of small watercourses which are not hydrologically connected to each other;
- Booterstown Marsh and Nutley Stream. The marsh is the only remaining saltmarsh in South Dublin Bay. It is located between the R118 Rock Road, DART Railway Line and the culverted Booterstown Stream. It is a proposed Natural Heritage Area (pNHA);
- Dublin Bay, which is a United Nations Educational, Scientific and Cultural Organization (UNESCO) Biosphere Reserve. The Biosphere covers most of Dublin Bay (300km^2) and aims to ensure the protection of its water quality and biodiversity (Dublin Bay Biosphere 2020). There are a number of European designated habitats within Dublin Bay;
- Dodder_050, which is the most downstream segment of the River Dodder, which has a total catchment area of approximately 168km^2 and rises on the northern flanks of the Dublin Mountains, flowing north through the Upper and Lower Glenasmole reservoirs and onward through South Dublin, becoming tidal near Lansdowne Road before entering the River Liffey at Ringsend;

- Grand Canal Main Line (Liffey and Dublin Bay), which is an artificial waterbody, primarily used for recreation. Constructed in the 18th century, the Grand Canal traverses the country from Dublin to Shannon for approximately 131km.

The current European Union Water Framework Directive (WFD) status of the waterbodies, and their At Risk (of not achieving its WFD objectives) status is as follows:

- Brewery Stream_010: has Moderate ecological status; is Under Review for its At Risk status;
- Dublin Bay: has Good Ecological Status (GES); is Not At risk of being able to maintain GES;
- Dodder_050: has Moderate status; is At Risk of not achieving GES; and
- Grand Canal Main Line (Liffey and Dublin Bay): has Good Ecological Potential (GEP); is Not At Risk of being able to maintain GEP.

The surface water along the Proposed Scheme corridor currently drains into a surface water system which discharges into the Brewery Stream_010, Dublin Bay and combined sewers and on to Ringsend WwTP. The main existing pressure on water quality relates to urban runoff and overflows from the foul and combined sewer network.

A Flood Risk Assessment has been completed for the Proposed Scheme which determined that the Proposed Scheme will be in Flood Zone A where the probability of flooding from rivers and the sea is high.

The impacts assessed during the Construction Phase include impacts from construction runoff and watercourse disturbance due to utility diversions, road resurfacing and road realignments.

During the Construction Phase, the water quality of all four waterbodies could potentially be impacted by surface water runoff containing fine sediments, accidental spillages and accidental leakages of construction materials via surface water system connections. There is also the potential to disruption to local drainage networks if they are required to be diverted to allow construction works to take place.

Surface water management is addressed in the CEMP, which details control and mitigation measures for avoiding, preventing, or reducing any significant adverse impacts on the surface water environment during the Construction Phase of the Proposed Scheme. These include a requirement for an environmental incident response plan; the control of runoff of fine sediments; the management of storage of materials / fuels, and the management of vehicles and plant. Additionally, site specific measures are proposed to avoid or reduce negative impacts related to the Construction Compound at Blackrock Park car park, the movement of the boundary wall at Booterstown Marsh and the upgrade of a walkway alongside the Grand Canal.

Following the implementation of the mitigation measures no significant remaining impacts are anticipated on any water body as result of the Construction Phase of the Proposed Scheme.

The impacts assessed during the Operational Phase include the potential surface water impacts associated with areas of impermeability and traffic displacement. During the Operational Phase, the design of the Proposed Scheme will ensure that there will be no net increase in surface water runoff rates to any of the connected waterbodies, using a combination of sustainable drainage systems in the form of filter drains and bioretention systems, which also reduce the potential risks to water quality from routine road contaminants.

In the Operational Phase the infrastructure (including the sustainable drainage systems) will be maintained by the Local Authorities, and will be subject to their management procedures. No additional mitigation is required, and no impacts are anticipated on any water body as result of the Operational Phase of the Proposed Scheme.

8.9 Land, Soils, Geology & Hydrogeology

The land, soils and geology and hydrogeology assessment involved a desk-based study of publicly available information, historic ground investigations and a scheme walkover survey.

The geology (soils and rock) beneath the study area of the Proposed Scheme mainly comprises made ground, alluvium and glacial till derived from limestone which are underlain by limestone rock. The land within the study

area is mainly used for urban developments, including but not limited to; industrial, commercial, residential, and recreational. Moving away from the City Centre there are also marine, agricultural, and forested areas in the region.

Aquifers (which store / produce groundwater) within the study area of the Proposed Scheme are classified as 'Locally Important' (moderately productive in local zones) or 'Poor' (generally unproductive except for local zones), in terms of their ability to produce water.

As the Proposed Scheme is in an urban environment, there is the potential for some contaminated ground in the study area. The assessment of contaminated land focused on the footprint and directly on either side of the Proposed Scheme unless there is likely to be a pathway connecting the possible source of contamination to the footprint of the Proposed Scheme with potential sources outlined and assessed.

The impacts assessed during the Construction Phase of the Proposed Scheme include:

- Loss or damage of topsoil;
- Excavation of potentially contaminated ground;
- Loss of future quarry or pit reserves;
- Loss or damage/contamination of parts of an aquifer; and
- Change to groundwater regime

Appropriate mitigation measures will be implemented to avoid or reduce negative impacts on land, soils, geology and hydrogeology during the Construction Phase. It is expected that there will be no residual construction impacts on land, soils, geology and hydrogeology.

The impacts assessed during the Operational Phase include the potential land, soils, geology and hydrogeology impacts associated with changes to water supply and the pollution of groundwater and watercourses.

In the Operational Phase the infrastructure will be maintained by the Local Authorities, and will be subject to their management procedures to ensure that the correct measures to be taken in the event of any accidental spillages and this will reduce the potential for any impact.

It is predicted that there will be no residual operational impacts on land, soils, geology and hydrogeology.

8.10 Archaeological & Cultural Heritage

The archaeological and cultural heritage assessment involved a desk-based review of published and unpublished documents, historical mapping and a field survey and has been carried out according to best practice and guidelines relating to archaeological and cultural heritage.

The lands within the study area occupied the coastal hinterland south of the historic city of Dublin, forming part of the Pembroke estates of the Fitzwilliam family until the lands began to be sold off after the First World War. The area had seen considerable change in the mid-19th century when the railway was introduced along the coast from Dublin to Kingstown (present Dun Laoghaire). It was followed by the construction of country villas and the expansion of residential development in formerly small villages, like Blackrock. This was a time when Dublin City was expanding, and the new wealthy merchants and upper middle class began to take advantage of easier access into the city from the more pleasant countryside south of the urban centre. By the 1930s, the large-scale construction of suburban housing around Ballsbridge, Mount Merrion, Booterstown and Blackrock began. Several of the archaeological sites in the study area are associated with the Fitzwilliam family, such as the sites of Baggotrath Castle on Eastmoreland Place and of Merrion Castle on Merrion Road.

There are six archaeological heritage features on the Records of Monuments and Places / Sites and Monuments Record, five on the Dublin City Industrial Heritage Record, and five cultural heritage assets that have the potential to be impacted within the Proposed Scheme.

The main potential impacts on archaeology and cultural heritage as a result of construction works could arise from:

- Pavement construction, repairs, and reconstruction works;
- Road resurfacing works;
- Piling and;
- Any excavations of soil, including landscaping works and ground disturbance for utility works.

There is the potential for the discovery of previously unknown below ground archaeological features, materials, and deposits along the Proposed Scheme.

The mitigation measures proposed to avoid or reduce negative impacts on archaeological and cultural heritage during the Construction Phase include the provision for and funding of the necessary archaeological monitoring, inspection and excavation works that will be required during and prior to construction.

There will be no Operational Phase impacts as a result of the Proposed Scheme and no mitigation is required.

With the implementation of the proposed mitigation measures, it is expected that there will be no residual impacts on archaeological and cultural heritage.

8.11 Architectural Heritage

The architectural heritage assessment included a desk-based study including a review of all available relevant and published and unpublished documents, and field surveys, which were carried out to identify known architectural heritage sites, and to identify any previously unrecorded features.

The presence of milestones on the Rock Road and Pembroke Road indicate that it was one of the main routes from Blackrock to the City Centre. Baggot Street was known as the Road to Blackrock in 1800.

By the 18th century Newtown was known as the Black Rock after a rock outcrop on the shore. Blackrock, Williamstown and Booterstown were small villages in the 18th century. The Frascati Road is named after Frascati or Frescati House an 18th century house which was the home of Lord Edward Fitzgerald, one of the leaders of the 1798 rebellion. The house was demolished in the early 1980s. It was one of a number of demesnes or villas which were built in the vicinity of Blackrock and Booterstown in the 18th century.

Merrion Road is named after the Fitzwilliam's of Merrion. The lands along the Proposed Scheme occupied the coastal hinterland south of Dublin, forming part of the Pembroke Estate of the Fitzwilliam family from 15th-century until the lands began to be sold off after the First World War.

The village of Merrion developed around the old demesne which is shown on the first edition Ordinance map of 1843. Like Blackrock, Merrion and Ballsbridge were small villages in the 18th century. The bridge crossing the River Dodder (RMP DU018-059) was named 'Ball's Bridge' during the late 17th century, taking its name from the Ball family, a well-known Dublin merchant family in the 1500s and 1600s. The present triple arched stone was built in 1835, replacing an earlier stone bridge dating to 1791, which in turn replaced an earlier structure on the site. It was widened under Kaye Parry & Ross in 1904.

Blackrock, Booterstown Merrion and Ballsbridge expanded in the 19th century, particularly following construction of the Dublin to Kingstown (present Dún Laoghaire) railway in 1843. This was a time when Dublin City was expanding, and the new wealthy merchants and upper middle class began to take advantage of easier access into the city from the more pleasant countryside south of the urban centre. Though a number of villas existed along the route in the 18th century, the 19th century witnessed an increase in their number.

A number of churches were built including St. John the Baptist Church in Blackrock (DLR RPS 221) in 1842 and Saint Andrew's Presbyterian Church (DLR RPS 165) Mount Merrion Avenue. Christchurch was also built on Carysfort Avenue. It survived until the middle of the 20th century when it was demolished, and its grounds converted to a car park on the corner of the Frascati Road.

Ballsbridge also expanded with the development of terraces along Pembroke Road, Ballsbridge Terrace, Eglinton Road and Shelbourne Road. Pembroke Road dated to 1834 though cartographic evidence indicates that it was previously known as the road to Merrion and Blackrock. It is named after the 11th Earl of Pembroke, who inherited the principal portion of the property of the 7th Viscount Fitzwilliam in 1816. Pembroke Road is dominated by 19th century terraced houses, those on the south side having very long front gardens. The migration from the City Centre and the grown in the suburbs of Blackrock, Booterstown Merrion and Ballsbridge led to the establishment of Townships in Pembroke (Ballsbridge) and Blackrock in 1863. These townships developed public parks, library buildings, town halls and housing.

Baggot Street formed one of the ancient routeways out of the city of Dublin and is named after Robert Lord Baggot to whom the manor of Baggotrath was granted in 1280. The site of Baggotrath Castle (DU018-055) is located on the north side of Baggot Street Upper, between Nos.44-46. The castle was involved in the Battle of Rathmines in 1649 It was associated with the Fitzwilliam family in the 14th century (Ball 1902). In the beginning of the 19th century the ruins of Baggotrath Castle were completely demolished. Baggot Street Upper is commercial in character but again contains predominantly 19th century buildings and 20th century office blocks.

The Proposed Scheme crosses the Grand Canal at McCartney Bridge (DCC RPS 872) which was built in 1790 as part of the Circular Line of the Canal which was completed in 1796 with the opening of Grand Canal Dock to the east. Baggot Street Lower, Fitzwilliam Street and Merrion Square are dominated by terraces of red brick houses of 18th or early 19th century date. Baggot Street Lower was developed in the late eighteenth and early nineteenth centuries as part of the eastward expansion of the Georgian city under the Fitzwilliam Estate. Baggot Street Lower was planned in the late 1780s, but progress was hampered by recession in the 1790s and the majority of buildings were constructed in the early nineteenth century. Baggot Street Lower is characterized by terraced houses and commercial premises with their associated granite paving, and street furniture.

Fitzwilliam Street was also developed in the eighteenth and early nineteenth century as part of the Fitzwilliam Estate, appearing on Barker's 1762 map of Merrion Square. The building of houses along the street began about 1780. It is part of the 'Georgian Mile', an almost continuous row of Georgian houses running from Merrion Square to Leeson Street Lower. The row of houses was uninterrupted until the development of the Electricity Supply Board Offices in the 1965 resulted in the demolition of 17 Georgian houses on the east side of Fitzwilliam Street Lower. The Proposed Scheme terminates at Merrion Square, one of the best-preserved Georgian streetscapes in Ireland.

The first edition Ordinance map of 1843 indicates that Nutley Lane was a narrow lane connecting the Stillorgan and Merrion Roads with few features along it. The most significant were the demesnes of Nutley House (NIAH 2440) and Montrose House (DCC RPS 7847) but there were also nurseries on the north side of the lane. The lane was widened in the 20th century. Little of the demesne of Nutley House remains but is retained within Elm Park Golf & Sports Club. Similarly, the demesne (NIAH 2427) of Montrose House (DCC RPS 7847) was developed as the campus of Radio Teilifís Éireann in the 1960s.

The main potential impacts on architectural heritage during the Construction Phase will include:

- Direct impacts to the boundaries (walls, railings etc.) and entrance gates of protected structures and other architectural heritage features where road widening is required;
- Direct impacts to street furniture (i.e. lamp posts, post boxes etc.) due to land acquisition, construction works to pavements, changes in the layout of footpaths and landscaping works;
- Indirect impacts as a result of the potential for damage to sensitive structures in areas where the construction works for the Proposed Scheme come into close contact with these structures;
- Indirect impacts as a result of the potential for damage to protected structures due to increased vibration from construction vehicles; and
- Visual impacts on the setting of protected structures or buildings or structures of architectural heritage interest, historic streetscapes and views which will temporarily impact on their setting during the Construction Phase.

The mitigation measures proposed to avoid or reduce negative impacts on architectural heritage during the Construction Phase include:

- Appropriate recording, protection, removal, storage and reinstatement of boundaries and street furniture; and
- The retention or replacement of trees along the Proposed Scheme.

The main potential impacts on architectural heritage during the Operational Phase will be:

- Impacts associated with visual changes on architectural heritage resources (including from the proposed locations of bus shelters which have been carefully considered), as well as impacts on the setting of these resources due to traffic changes. New paving, new tree planting and landscaping will generally have a positive impact on the historic environment and character of streets along the Proposed Scheme; and
- Impacts where the Proposed Scheme requires physical changes to, or the repositioning of, heritage features.

With the implementation of the proposed mitigation measures, it is expected that there will be no significant residual impacts on architectural heritage.

8.12 Landscape (Townscape) & Visual

The landscape (townscape) and visual assessment included a desk based review of available information including aerial photography and mapping of the Proposed Scheme. Route walkovers were carried out to verify desk based findings and this included field surveys of specific areas.

Along the section of the Proposed Scheme from Stradbrook Road to Booterstown Avenue the townscape is made up of a major road passing through an outer suburban village and along coastal corridor with attractive town / coastal parks. The area is primarily residential with a major retail centre and local retail uses and services.

From Booterstown Avenue to Nutley Lane the townscape is composed of outer suburban areas close to a coastal corridor with a coastal nature park at southern end. The route is partially enclosed by residential and mixed-use areas, including major institutional lands at St Vincent's University Hospital. There are coastal views and notable historic entrance arches at St. Mary's Centre (Telford Nursing Home) and at Bloomfield near St. Vincent's University Hospital.

From Nutley Lane to Ballsbridge the area is characterised by outer city suburbs with some embassies, hotel and institutional uses. The streetscape is attractive and tree-lined with period residential properties.

From Ballsbridge to Merrion Square the character is inner-city village becoming progressively more urban with terraced buildings. There is some mature street tree planting. Ballsbridge is an attractive suburban 'village' node on a river crossing. There are visually-pleasing Georgian streetscapes and the Royal City of Dublin Hospital is a notable landmark.

The Nutley Lane section of the scheme is outer-city suburban residential with a single carriageway road corridor connecting major roads at Merrion and Stillorgan dual carriageway. There are major sports grounds at Elm Park, a major campus at RTÉ, and hospital grounds at St. Vincent's University Hospital.

Consideration of the potential landscape (townscape) and visual impacts have been important in defining the Proposed Scheme design. The scheme has undergone iterative design development with the aim of minimising potential negative impacts as far as practicable and this has also helped define suitable improvements to the urban realm. Examples of design changes that have been incorporated into the Proposed Scheme design, and which have led to a reduction in predicted landscape and visual impacts include:

- The junction of the Rock Road and Mount Merrion Avenue has been reconfigured with the removal of the left-turn slip lanes and improved cycle facilities through a Protected Junction for Cyclists, resulting in urban realm improvements;
- Along the Merrion Road, a three-lane option with back-to-back bus lanes and signal-controlled bus priority is proposed between Shrewsbury Road and Ailesbury Road to reduce the impacts on properties, resulting in a subsequent reduction in tree loss;

- On Pembroke Road there is no longer any permanent land take required within the Proposed Scheme as a result of a proposed Bus Gate which allows the reduction of the cross-section from four vehicular lanes to two vehicular lanes – as such, tree loss on Pembroke Road is reduced and there is no permanent impact on boundary walls / railings nor trees within private lands; and
- The Proposed Scheme retains the existing median on Baggot Street Lower, which was previously proposed to be removed, as such retaining the existing trees and heritage lamp standards.

The main potential landscape (townscape) and visual impacts during the Construction Phase will include:

- Site mobilisation and establishment, fencing and hoarding of the Construction Compound and works areas - including within private areas / gardens;
- Site demolition, including removal of boundaries, kerbs, verges, surfaces, landscape areas, trees, and plantings – including boundary fences, walls, and plantings within private areas / gardens;
- Site activity and visual disturbance from general construction works and the operation of construction machinery both within the site and at the Construction Compound;
- Construction works involving diversion of existing underground / overground services and utilities, provision of new services and utilities, drainage features and connections, etc.;
- Site activity and construction works involved in the construction of new carriageways, kerbings, footpaths and cycleways, bus stops and signage, reinstatement of boundaries / provision of new boundaries and landscape reinstatement works / provision of new landscape, etc.; and
- Decommissioning of construction works areas and Construction Compound.

Construction of the Proposed Scheme will require property acquisition (temporary and / or permanent) from a number of residential properties. Temporary fencing / hoarding will be erected and access to property for the owners/ occupiers will be maintained for the landowner as far as reasonably practicable. Works will require removal and reinstatement of existing roadside boundary walls, railings, entrances gates, together with areas of existing garden plantings, garden accesses and garden features.

Appropriate measures to avoid or reduce negative landscape (townscape) and visual impacts during the Construction Phase will be implemented, including ensuring that trees and vegetation to be retained within and adjoining the works area will be protected. Works required within the root protection area (RPA) of trees to be retained will follow a project specific arboricultural methodology for such works.

While mitigation for the Construction Phase is focused on protecting any landscape features that are to be kept and providing as much visual screening from construction works as possible, it will not be possible or practical to mitigate against impacts on landscape (townscape) and visual characteristics resulting from the removal of mature trees to facilitate construction.

With the implementation of the proposed mitigation measures, it is expected that there will be significant or very significant, negative, short-term impacts on all townscape sections of the scheme during construction. There will be very significant, negative, short-term townscape / visual impacts on Residential Conservation Areas, protected structures, amenity designations, preserved views and properties in temporary acquisition. There will also be significant, negative, short-term landscape/visual impacts on Conservation Areas, properties in temporary acquisition with no loss of trees, properties fronting the scheme with minimal direct contact, and trees and vegetation.

The main potential landscape (townscape) and visual impacts during the Operational Phase will include:

- Alterations in the corridor of the existing road / street;
- Changes in traffic, pedestrian and cycle movements;
- Modifications of areas of private property / gardens / boundaries; and
- Adjustments to other areas / boundaries.

Alterations in the road corridor and changes in traffic, pedestrian and cycle movements will be features of the Proposed Scheme. Changes in road corridors, including in traffic signalisation, signage, and in carriageway allocation and traffic movements are a common and regular aspect of active road and traffic management in urban

roads and streets. Therefore, such aspects may be considered as a dynamic part of the receiving streetscape environment. It is expected that there will be significant slight or moderate long-term impacts on the townscape of Sections 1, 2, 3 and 5 of the Proposed Scheme, with a positive moderate significant impact predicted along Section 4 of the Proposed Scheme. There will be locally significant, negative, long-term townscape/visual impacts at Blackrock Park and at other amenity areas. A negative, moderate / significant and long-term impact is predicted on Residential Conservation Areas, protected structures, at residential and non-residential properties in permanent acquisition, and trees and vegetation.

The Proposed Scheme has been subject to an iterative design development process which has sought insofar as possible to avoid or reduce negative impacts, including townscape and visual impacts. Nevertheless, the Proposed Scheme will give rise to some degree of townscape and visual effect, most notably during the Construction Phase. These impacts arise especially where there is temporary and / or permanent acquisition of lands associated with residential or other properties including amenities, and where tree removal is required. The Proposed Scheme includes for replacement of disturbed boundaries, reinstatement of the Construction Compound, return of temporary acquisition areas, and for additional tree and other planting where possible along the Proposed Scheme.

In the Operational Phase residual effects will remain for properties experiencing permanent land acquisition and in the loss of trees along all sections of the Proposed Scheme, excluding the section from Ballsbridge to Merrion Square. However, the Proposed Scheme will also provide for a significantly enhanced level of service for public transport and for pedestrian / cycle connectivity. Likewise, the Proposed Scheme provides for improvements in the urban realm, which will provide positive long-term effects for the townscape and visual character in areas such as Pembroke Road, Baggot Street and Fitzwilliam Street.

8.13 Waste & Resources

This waste and resources assessment included identifying the types of waste that could be generated by the Proposed Scheme, as well as the potential for reuse of materials. This assessment included a desk-based review of relevant policy and legislation, and data on waste generation and waste and resources management.

Sustainable waste and resource management principles have been incorporated into the design of the Proposed Scheme and these principles will also be applied in line with the Circular Economy Model (see **Image 8.2**) throughout the Construction and Operational Phases. This will ensure that waste generation will be minimised.

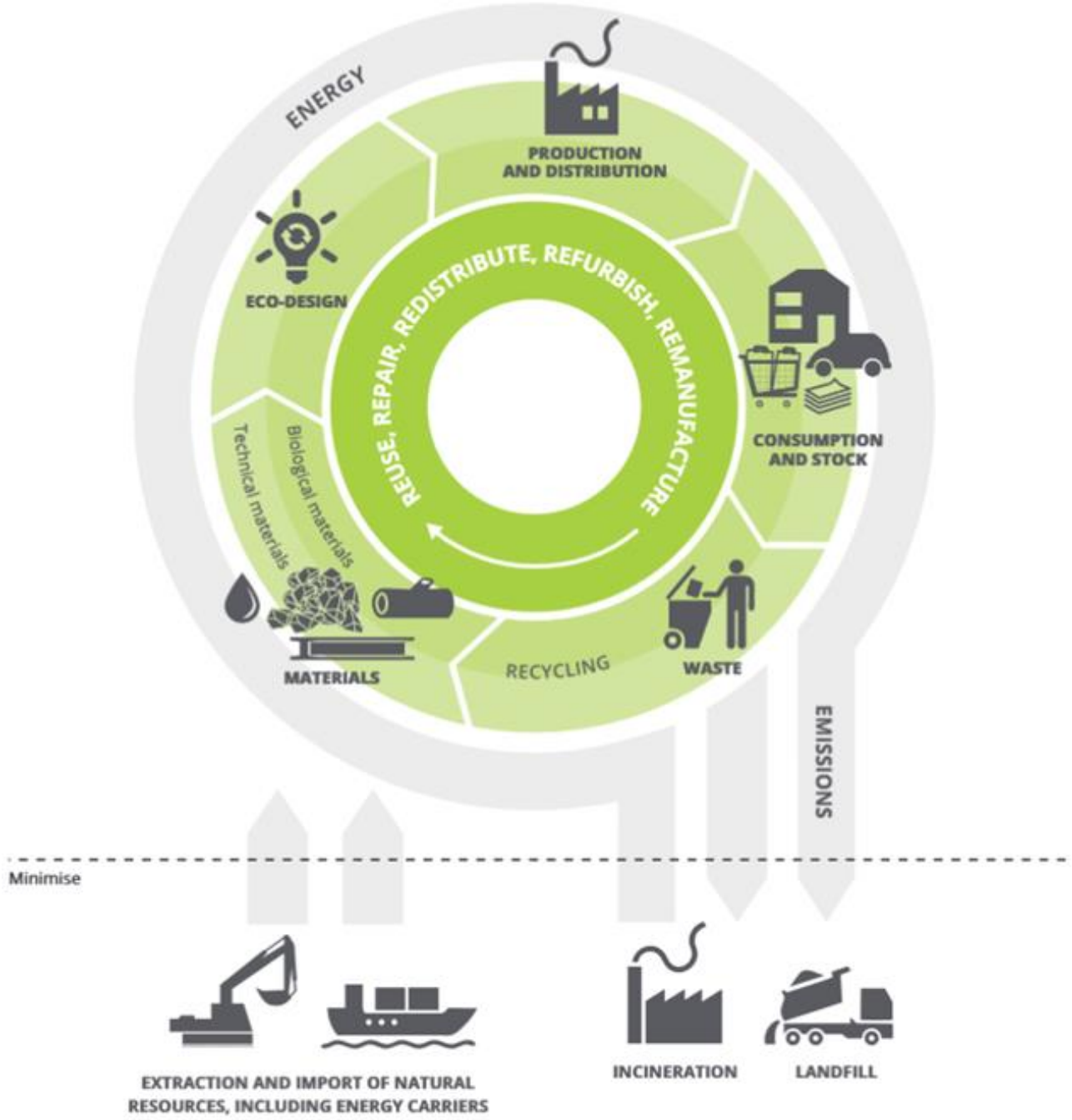

Image 8.2: A Simplified Model of the Circular Economy for Materials and Energy (European Environment Agency (EEA) 2016)

In Ireland, the most recently available published data records that 8.8 million tonnes of construction and demolition waste was generated in 2019. This represented an increase of 2.6 million tonnes from 2018. Of this waste, 7.5 million tonnes was comprised of soil and stones and these make up 77% of the current construction and demolition waste stream.

In Ireland, municipal waste (i.e., typical household waste types) is made up of household waste as well as commercial and other waste that, because of its type, is similar to household waste. According to the Environmental Protection Agency, Ireland generated 3.1 million tonnes of municipal waste and recycled 37% of this waste in 2019.

The main construction elements that are likely to result in potential impacts on waste and resources will include:

- Construction and reconstitution of cycleways, pathways, road widening and urban realm improvements;
- Removal of trees, concrete kerbs, walls, fences and gates;
- Modification to signalised junctions;
- New street furniture, including traffic lights and bus stops, and landscaping works;
- Minor utility diversions and / or protections will be required; and
- Excavation of pavements and carriageways.

A range of mitigation measures will be implemented to avoid or reduce negative impacts on waste and resources during the Construction Phase, including minimising waste disposal. Opportunities for reuse of materials, by-products and wastes will be sought throughout the Construction Phase of the Proposed Scheme. This will be managed through the Construction Phase by the appointed contractor through the implementation of a Construction and Demolition Resource and Waste Management Plan.

The approximately 2,000 tonnes of demolition waste that will be generated as a result of the Proposed Scheme is equivalent to 0.02% of the construction and demolition waste management baseline in the Eastern-Midlands Waste Region. The predicted impact of Demolition Waste during the Construction Phase is adverse, not significant, and short-term. The total forecast of surplus excavation material from the Proposed Scheme will be approximately 76,000 tonnes. and is equivalent to 0.71% of the construction and demolition waste management baseline for the Eastern-Midlands Waste Region. There is potential for incorporating reused aggregates in the Proposed Scheme, and this will be done where practicable. In addition, where practicable the remaining material will be reused. The predicted impact of excavation waste during the Construction Phase, is adverse, slight, and short-term.

The main potential impacts on waste and resources during the Operational Phase will be waste generated from road maintenance activities following completion of the Construction Phase. Maintenance operations will be undertaken under the jurisdiction of the Local Authorities and in accordance with their waste management plans. No additional mitigation or monitoring measures are considered necessary. The quantity of bitumen containing material generated, during the Operational Phase, over the assumed lifetime of the Proposed Scheme (assumed to be 60 years), will increase by approximately 9,900 tonnes. The predicted impact of operational construction and demolition waste will be adverse, not significant, and long-term.

With the implementation of the proposed mitigation measures, it is expected that there will be no residual significant impacts on waste and resources.

8.14 Material Assets

The material assets assessment was considered in terms of:

- Major utilities (both underground and overground) such as gas, water pipelines (drinking water pipelines and sewers) and storm water networks, electricity transmission lines and telecommunications lines;
- Manmade transport infrastructure such as roads, rail and canals; and
- Raw materials that are required to be imported for the Proposed Scheme.

This assessment included a desk based review of these material assets. Utility information was requested from relevant organisations and service providers.

Existing material assets within the Proposed Scheme include:

- Electricity Supply Board electricity lines (high, medium and low voltage) and associated infrastructure;
- Gas Networks Ireland gas mains (high, medium and low pressure) and associated infrastructure;
- Irish Water drinking water mains and associated infrastructure;

- Irish Water sewer lines (foul and combined sewers) and associated infrastructure;
- Local Authority surface water drainage network and associated infrastructure;
- Eir, Enet and Virgin Media telecommunications lines and associated infrastructure;
- Local Authority traffic signal ducting; and
- The Grand Canal.

Within the site of the Proposed Scheme, material is currently imported as part of regular maintenance activities which are undertaken on the existing roads, cycle lanes, footpaths, utilities and verges.

The main construction elements that are likely to result in potential impacts on material assets will include:

- The Construction Compound will require electricity to power temporary office and welfare facilities and for temporary lighting which will be required to be supplied via a connection to the grid network or a generator;
- The Construction Compound will require a water supply for welfare facilities and spraying to prevent dust, wherever necessary;
- The Construction Compound will require telecommunications access;
- The diversion of electricity lines in areas where there will be interfaces with the Proposed Scheme works;
- The diversion of underground watermains where there will be interfaces with the Proposed Scheme works;
- Upgrade works required to the surface water drainage network to accommodate for new road layouts and increased hardstanding;
- The diversion of gas infrastructure where there will be interfaces with the Proposed Scheme works;
- The diversion of telecommunications infrastructure where there will be interfaces with the Proposed Scheme works; and
- Importation of construction materials including concrete, metals, cement, road surface materials and landscaping materials. The amount of materials required for the Proposed Scheme will represent less than one percent of the Irish quantities manufactured per year.

The Proposed Scheme has been designed to minimise the impact on utility infrastructure. This includes avoiding interactions with major utility infrastructure, wherever possible. Where there are interfaces with existing utility infrastructure, these will be protected in place or diverted as necessary to prevent long-term disruption to services. Diversions and changes to the location or layout of any utility infrastructure have been accounted in the overall design of the Proposed Scheme.

All possible precautions will be taken to avoid unplanned disruptions to any services during the Construction Phase. Proposed utility works are based on available records, and preliminary site investigations. Prior to excavation works being commenced, localised confirmatory surveys will be undertaken to verify the results the pre-construction assessments undertaken and reported in this EIAR.

Consultation has taken place with the major utility companies, and the appointed contractor will continue to consult these companies, in liaison with the NTA. Where diversions are required and service disruptions to the surrounding properties are unavoidable, this will be planned with prior notification given to the impacted property owners.

The Proposed Scheme has also been designed to minimise the amount of major construction works required. When sourcing materials for the Proposed Scheme, the appointed contractor will carefully consider the sustainability of materials. Aspects considered will include the source, the material specification, production and transport costs, and the availability of the material. Construction materials will be managed on-site appropriately to prevent over-ordering and waste.

With the implementation of the proposed mitigation measures there will be no significant residual impacts on material assets as a result of the Proposed Scheme.

The main operational elements that are likely to result in potential impacts on material assets will include:

- The requirement for electricity connections for new lighting, for bus stop information and for junction signalling;
- The requirement for telecommunications connections at bus stops which contain real time passenger information, to allow the buses and the real time information to sync up with each other.

There will be no significant Operational Phase impacts on utility infrastructure. Due to the measures included in the design of the Proposed Scheme and the fact that there are minimal impacts predicted during the Operational Phase, no specific mitigation measures are required.

8.15 Risk of Major Accidents and / or Disasters

This assessment considered the potential significant impacts of the Proposed Scheme on the environment, resulting from its vulnerability to risks of major accidents and / or disasters during the Construction Phase and Operational Phase.

The risk assessment:

- Identified major accidents and / or disasters (i.e. unplanned incidents) that the Proposed Scheme may be vulnerable to; and
- Assessed the likely impacts and consequence of such incidents in relation to the environmental, social and economic receptors that may be affected.

A register of all potential risks and the associated potential impacts was developed for the Construction and Operational Phases of the Proposed Scheme. This register assumed a worst-case scenario, before any mitigation measures or emergency plans would be put in place to reduce the likelihood and potential impact of any major accidents and / or disasters.

Risks are rated by multiplying the likelihood rating (likelihood of a risk happening which ranges from extremely unlikely to very likely) with the consequence rating (level of consequences if a major accident and / or disaster occurred, which ranges from minor to catastrophic). This gives a risk score of low, medium or high. Low risk scores do not meet the definition of a major accident and / or disaster and high risk scores would be considered high risk and unacceptable for the development of the Proposed Scheme and would need to be designed out. Medium risk scores would require a level of mitigation that would reduce the level of impact.

For the Construction Phase, there were several risks that were deemed low and were not considered further. The following high risks were identified for the Construction Phase:

- Risk of pollution occurring to a watercourse or groundwater, most notably associated with the release of fine sediments during construction works; and
- Disruption to emergency response vehicles (fire, ambulance and guards).

The following medium level risks were identified for the Construction Phase:

- Risk of gas explosion due to striking underground gas mains during excavation works;
- Risk of structural damage / collapse of relocated structures;
- Risk of major road traffic accident resulting from a collision between construction traffic and public traffic, pedestrian and cyclist;
- Risk of accidents due to interface of construction works with other public transport infrastructure;
- Risk of spread of non-native invasive species during construction works, particularly during site clearance; and
- Risk of extreme weather events.

The Proposed Scheme complies with relevant design standards, which include measures to reduce the likelihood of risk events occurring.

Appropriate mitigation measures will be implemented during the Construction Phase, including the implementation of a Construction Environmental Response Plan and an Environmental Incident Response Plan. With the application of these mitigation measures, there are no remaining identified incidents or major accidents and / or disasters risk events that present a level of risk that would lead to significant impacts or environmental effects.

No significant risks were identified as likely to occur during the Operational Phase.

8.16 Cumulative Impacts and Environmental Interactions

This assessment considers the potential cumulative impacts and impact interactions as a result of potential impacts from other schemes in combination with the predicted impacts of the Proposed Scheme, and interactions between environmental aspects. The assessment included a consideration of the potential effects of other BusConnects Core Bus Corridor schemes as well as other projects.

Impact interactions between environmental aspects are generally addressed as part of the individual topic assessments, so for example the Population assessment included effects on community amenity, which relates to the interaction of impacts on air quality, visual amenity, traffic and transport, and noise and vibration.

The following sources were considered in identifying other relevant developments for the assessment of cumulative impacts:

- An Bord Pleanála website – for details of strategic infrastructure developments and strategic housing developments;
- Local Authority websites and the development plans – for details of allocations and areas for regeneration;
- National Planning Application Database – for downloadable list of planning applications sent from Local Authorities;
- National Transport Authority website – for details of major transport programmes. This included a review of the NTA's Transport Strategy for the Greater Dublin Area 2016 – 2035;
- Project Ireland 2040, which combines the National Development Plan and National Planning Framework. and its interactive mapper;
- Transport Infrastructure Ireland website – for details of major transport programmes;
- The EIA Portal maintained by the Department of Housing, Planning and Local Government – for applications for development consent accompanied by an EIAR; and
- Irish Water's website, which includes a page on its projects.

A combined worst-case scenario was considered, with the simultaneous construction of all the BusConnects schemes. Traffic modelling of this scenario identified the potential for large cumulative impacts on local road traffic. For this reason, it is not considered feasible or acceptable to construct all 12 schemes at the same time. Consequently, an alternative scenario was developed to identify a more realistic worst-case scenario for the traffic-related cumulative effects assessment. This scenario proposes a limitation on the number of schemes that can be constructed concurrently. This scenario was considered, in combination with the other identified major infrastructure project and major developments which could directly interface with the Proposed Scheme with regard to traffic and transport.

No likely significant cumulative effects relating to traffic and transport are predicted, over and above the effects of the Proposed Scheme assessed in isolation.

With regard to air quality, as the cumulative construction traffic effects will be broadly in line with those of the Proposed Scheme in isolation and the associated cumulative air quality effects will not be significant. Dust mitigation at the Construction Phase for the Proposed Scheme, with similar measures in place for other projects, will mean that overall cumulative effects of construction dust will be neutral.

The construction of a wide range of projects in Ireland over the construction period of BusConnects Dublin - Core Bus Corridors Infrastructure Works will result in the generation of embodied carbon. These developments include

local planning applications, major projects, and strategic developments with a varying extent of embodied carbon generation. Any increase in carbon emissions is assessed as a significant negative impact. The climate impact assessment of road traffic emissions from the Construction Phase of the Proposed Scheme cumulatively with the 11 other Core Bus Corridor Schemes predicts a temporary overall increase of 2.6% of carbon dioxide-equivalent emissions compared to a scenario without the Core Bus Corridor Schemes. A series of embedded mitigation measures have been incorporated into the design of the Core Bus Corridor Schemes with the goal of reducing the embodied carbon and traffic emissions associated with the Construction Phase of all Core Bus Corridor Schemes. For example, concrete containing Portland cement will be replaced with concrete containing ground granulated blast furnace slag which will save on embodied carbon across the 12 Core Bus Corridor Schemes.

On the basis that the more realistic worst-case scenario for construction traffic is predicted to result in traffic conditions which are broadly in line with the effect of implementing each of the Proposed Schemes in isolation, there would be no likely significant cumulative effect on traffic related noise over and above the effects of the Proposed Scheme assessed in isolation.

With regard to Biodiversity, the construction of the Proposed Scheme in combination with other projects, will not give rise to cumulative impacts higher than the predicted residual impacts identified for the Proposed Scheme on its own (significant at a local scale).

The Landscape (Townscape) and Visual assessment identified the potential for temporary indirect cumulative townscape and visual effects to occur if the DART+ Coastal South project was constructed with the Proposed Scheme. These effects are most likely to occur at locations where concurrent construction of both schemes have the potential to overlap, however, it is also likely that the extent of any such impacts will be localised and contained.

No other significant construction related cumulative effects were identified from the Proposed Scheme in combination with other projects (including the other Core Bus Corridor Schemes) over and above those identified in the standalone assessments.

For Operational Effects, the assessments assume all 12 proposed Bus Corridor Schemes would be operational, along with other identified projects and GDA Strategy projects included in the Do Minimum and Do Something scenarios. For traffic and transport, the assessment predicted that the Proposed Scheme and the other 11 Core Bus Corridor schemes are expected to facilitate a long term, profound positive cumulative effect on People Movement by sustainable modes. The Core Bus Corridor schemes are seen to enable significant improvements in People Movement by sustainable modes along the direct Core Bus Corridor routes, particularly by bus and cycling, with reductions in car mode share due to the enhanced sustainable mode provision. The Proposed Scheme and the other 11 Core Bus Corridor schemes provide for enhanced integration and efficiencies for all public transport modes by facilitating substantial increases in public transport average network wide travel speeds.

No new additional significant adverse air quality impacts are identified in the cumulative operational scenario compared with the standalone scenario.

The climate impact assessment predicts a negative, significant and permanent cumulative impact on climate during the maintenance phase. A significant and positive impact is predicted on climate in 2028 with a neutral impact in 2043 due to the predicted cumulative change in operational traffic and the significant mode shift from car to more sustainable modes (walking, cycling and public transport). Fewer climate benefits are seen in 2043 relative to 2028 due to the further electrification of the wider fleet in both the Do Minimum and Do Something scenarios.

The Core Bus Corridor Infrastructure Works will also support the delivery of government strategies outlined in the CAP (DCCAE 2019) and the 2021 Climate Act by enabling sustainable mobility and delivering a sustainable transport system. The Core Bus Corridor Infrastructure Works will provide connectivity and integration with other public transport services leading to more people availing of public transport, helping to further reduce GHG emissions.

Based on the analysis outlined above, it is concluded that the Core Bus Corridor Infrastructure Works achieves the project objectives in supporting the delivery of an efficient, low carbon and climate resilient public transport service, which supports the achievement of Ireland's emission reduction targets. The Core Bus Corridor

Infrastructure Works has the potential to reduce GHG emissions equivalent to the removal of approximately 105,500 and 102,200 car trips per weekday from the road network in 2028 and 2043 respectively. This represents a very significant contribution towards the national target of 500,000 additional trips by walking, cycling and public transport per day by 2030 as outlined as a target in the 2021 Climate Action Plan (CAP) (DCCAE 2021). It is concluded that, cumulatively, the Core Bus Corridor Infrastructure Works will make a significant contribution to carbon reduction.

No new additional significant adverse air quality impacts are identified in the cumulative operational scenario compared with the standalone scenario.

The potential changes in traffic noise due to the cumulative Operational Phase traffic impacts have been assessed and compared with those assessed for the standalone Proposed Scheme. The assessment has concluded that during the year of opening, 2028, higher initial short to moderate term impacts will be experienced along additional roads with all 12 Core Bus Corridor Schemes in place when the compared to the standalone Proposed Scheme. During the design year, 2043, traffic volumes are, for the majority, lower than the year of opening along the surrounding road network which result in lower calculated impacts along the same identified roads.

The only other significant operational cumulative impacts identified over and above the standalone scheme relate to human health. It was assessed that the proposals for the cycle network, the DART+ project, MetroLink, and the other 11 Core Bus Corridor schemes and the Proposed Scheme are complementary and could have a cumulative beneficial effect by encouraging active travel and increased use of public transport through offering a choice of routes. Due to the substantial size of overall population with the opportunity to benefit from the proposals, the effect is assessed as positive, very significant and long-term for health.

Significant impact interactions occur between the topics of population, human health, air quality, noise and vibration and traffic and transport. The assessments made for each of those topics considered those interactions both directly and indirectly. As an environmental factor, landscape and visual considerations have natural relationships with all other environmental factors. Some are direct relationships, e.g., population and visual impacts; biodiversity and landscape; land, soils and water and landscape; or the setting around features of cultural heritage etc. Others may be indirect, e.g., human health, air quality and landscape, material assets and landscape and visual aspects. These potential interactions have been incorporated into the relevant assessments.

9. What Happens Next?

The application for consent/approval, this EIAR and the Natura Impact Statement (NIS) may be viewed / downloaded on the following website: www.belfieldblackrockscheme.ie.

This application may also be inspected free of charge or purchased on payment of a specified fee (this fee shall not exceed the reasonable cost of making such a copy) for a period of 8 weeks commencing on the date of publication of the Proposed Scheme. Further details of these arrangements can be found at www.belfieldblackrockscheme.ie.

Submissions or observations may be made to An Bord Pleanála (Strategic Infrastructure Division), 64 Marlborough Street, Dublin 1, D01 V902 for a period of 8 weeks commencing on the date of publication of the Proposed Scheme relating to:

- The likely effects on the environment of the Proposed Scheme;
- The implications of the Proposed Scheme for proper planning and sustainable development in the area in which it is proposed to situate the Proposed Scheme; and
- The likely adverse effects of the Proposed Scheme on a European Site.

The Board may, in relation to an application submitted for approval under Section 51 of the Roads Act 1993 (as amended), by order, approve the Proposed Scheme, with or without modifications and subject to whatever environmental conditions it considers appropriate, or may refuse to approve the Proposed Scheme.