Chapter 03
Consideration of Reasonable Alternatives

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3. Consideration of Reasonable Alternatives

3.1 Environmental Impact Assessment Directive Requirements

Article 5(1)(d) of Directive 2011/92/EU of the European Parliament and of the Council of 13 December 2011 on the assessment of the effects of certain public and private projects on the environment, as amended by Directive 2014/52/EU of the European Parliament and of the Council of 16 April 2014 amending Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment (the 'EIA Directive') requires that the Environmental Impact Assessment Report (EIAR) contains '*a description of the reasonable alternatives studied by the developer, which are relevant to the project and its specific characteristics, and the main reasons for the option chosen, taking into account the effects of the project on the environment*'.

In addition, Annex IV to the EIA Directive provides that the EIAR shall include:

> '*A description of the reasonable alternatives (for example in terms of project design, technology, location, size and scale) studied by the developer, which are relevant to the proposed project and its specific characteristics, and an indication of the main reasons for selecting the chosen option, including a comparison of the environmental effects.*'

In addition, given the proposed road development for which approval is sought in this instance, Section 50(2)(b)(iv) of Number 14 of 1993 - Roads Act, 1993, as amended (hereafter referred to as the Roads Act), states that the EIAR shall contain the following information:

> '…*a description of the reasonable alternatives studied by the road authority or the Authority, as the case may be, which are relevant to the proposed road development and its specific characteristics, and an indication of the main reasons for the option chosen, taking into account the effects of the proposed road development on the environment*'.

Section 50(2)(b)(vi) of the Roads Act also requires that '*any additional information specified in Annex IV* [quoted above] *that is relevant to the specific characteristics of the particular proposed road development or type of proposed road development and to the environmental features likely to be affected*' also be included in the EIAR.

Accordingly, this Chapter of the EIAR describes the reasonable alternatives studied and the main reasons for the selection of the proposed Ballymun / Finglas to City Centre Core Bus Corridor Scheme (hereafter referred to as the Proposed Scheme), taking into account the effects on the environment.

It considers the alternatives at three levels:

- Strategic Alternatives;
- Route Alternatives; and
- Design Alternatives.

The reasonable alternatives studied which are relevant to the Proposed Scheme and its specific characteristics are described in the subsequent sections of this Chapter.

3.2 Strategic Alternatives

3.2.1 Transport Strategy for the Greater Dublin Area 2016 – 2035

The Transport Strategy for the Greater Dublin Area 2016 – 2035 (hereafter referred to as the GDA Transport Strategy) was prepared by the National Transport Authority (NTA) (NTA 2016a) pursuant to Section 12 of Number 15 of 2008 - Dublin Transport Authority Act 2008 and approved by the Minister for Transport, Tourism and Sport in February 2016, in accordance with sub-section 12(13) of that Act.

The GDA Transport Strategy provides a comprehensive framework to guide the development of transport across the Greater Dublin Region over the period of the Strategy. Careful consideration was undertaken of the transport requirements across the seven counties located in the Greater Dublin Area (GDA), and the GDA Transport Strategy then formulated the appropriate transport responses to those requirements.

Various studies and reports were undertaken in the development of the GDA Transport Strategy, including:

- Area-based studies covering the GDA area;
- Demand Management Study;
- Core Bus Network Study;
- Park and Ride Study;
- Transport Modelling Analysis; and
- Environmental reports.

Specifically, a Strategic Environmental Assessment (SEA) was undertaken on the GDA Transport Strategy (NTA 2016b). As set out in the Environmental Report, in respect of which the SEA of the GDA Transport Strategy was undertaken, a number of reasonable alternative strategies were devised and assessed, taking into account the objectives and the geographical scope of the GDA Transport Strategy. The provisions of the GDA Transport Strategy (including bus-based transport modes), were evaluated for potential significant effects, and measures integrated into the GDA Transport Strategy on foot of SEA recommendations in order to ensure that potential adverse effects were mitigated. In considering the alternative modes on a corridor basis, the environmental assessment undertaken considered that bus-based projects could contribute towards facilitating the achievement of Ireland's greenhouse gas (GHG) emission targets in terms of emissions per passenger per kilometre.

In addition to direct studies and analyses undertaken as part of the GDA Transport Strategy preparation work, the GDA Transport Strategy also took into account prior reports and plans in relation to transport provision. These prior studies included, *inter alia*, the following:

- Greater Dublin Area Cycle Network Plan (hereafter referred to as the GDA Cycle Network Plan) (NTA 2013);
- Bus Rapid Transit (BRT) Core Dublin Network Report (hereafter referred to as the BRT Core Dublin Network Report) (NTA 2012a);
- Fingal / North Dublin Transport Study (NTA 2015);
- Review of the DART Expansion Programme;
- Various prior Luas studies (including Line B2 (Bray), Line D1 (Finglas), Line F1 and F2 (Lucan and Liberties) and Line E; and
- Analysis carried out for the Greater Dublin Area Draft Transport Strategy 2011 -2030 (NTA 2012b).

Given the importance of bus transport as the main public transport mode for the overall region, the delivery of an efficient and reliable bus system forms an important element of the GDA Transport Strategy, integrated appropriately with the other transport modes. As Dublin is a low-density city with a large geographic footprint, there are few areas with the size and concentration of population necessary to support rail based public transport, and the bus system remains essential to serve the needs of much of the region.

The bus system has continued to remain an essential element of public transport infrastructure since the publication of the GDA Transport Strategy. The bus system in the Dublin Metropolitan Area carried 159 million passengers in 2019 (the last full year before the COVID-19 pandemic), compared with 48 million passengers on

Luas and 36 million passengers on the DART and rail commuter services over the same year. Converting to percentage figures, the bus system accounts for 65% of public transport passenger journeys in the Dublin Region, roughly two thirds of all public transport passengers, with Luas carrying 20% and DART and commuter rail services delivering the remaining 15%.

The area-based studies referenced above provided an appraisal of existing and future land use and travel patterns, including identifying trends and issues, within eight transport corridors as presented in Image 3.1 (Figure 3.8 in the GDA Transport Strategy). These corridors were also divided into Outer Hinterland, Outer Metropolitan, and Inner Metropolitan areas in terms of character.

Image 3.1: GDA Transport Strategy Corridors

The development of the GDA Transport Strategy took into account the data and analysis provided through the supporting studies and background information and formulated an overall integrated transport system to serve the needs of the GDA up to 2035. In relation to public transport, the GDA Transport Strategy set out a network of heavy rail, metro, light rail and bus proposals, with those networks combining to serve the overall public transport needs of the region.

The Proposed Scheme aligns generally with the broader Corridor A in the GDA Transport Strategy which extends from the core City Centre area northwards to Drogheda, via the North Inner City, Ballymun, Dublin Airport, Swords, and Balbriggan. There is a significant amount of population and employment growth planned for the larger urban areas within this corridor, including Swords, Balbriggan, South Drogheda, Clongriffin, Ballymun, Donabate and the Airport environs.

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. These are set out in the subsequent sections.

3.2.2 'Do Nothing' Alternative

The GDA Transport Strategy (NTA 2016a) was developed as the economy was emerging from the post 2008 economic downturn. In turn, the GDA Transport Strategy set out a number of key challenges and opportunities within the GDA:

- Suburbanisation and the spread of population, employment and other land uses has continued;
- Arising from the above trend, the mode share of car use continues to increase;
- Car ownership, a key determinant of car use, is likely to increase further, up to saturation levels;
- Cycling has increased significantly in numbers and in mode share;
- Recovery is occurring in public transport use, but not in its mode share;
- Encouraging non-car use for trips to education is a significant challenge;
- There is no spare capacity on the M50 Motorway;
- Protecting and enhancing access to the ports and Dublin Airport is a strategic priority; and
- Current economic growth will mean that within the next few years, overall levels of travel demand are likely to exceed the travel demand experienced in 2006 and 2007, prior to the downturn.

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.

Ultimately, few areas within the GDA have the size and concentration of population to support rail-based public transport. For most transport corridors in Dublin, bus transport represents the most appropriate transport solution.

In terms of the out-workings of a strategic 'Do Nothing' Alternative, it should be noted that, currently, the bus network is characterised by discontinuity, whereby corridors have dedicated bus lanes along less than one third of their lengths on average which means that for most of the journey, buses and cyclists are competing for space with general traffic and are negatively affected by the increasing levels of congestion. This lack of segregated space for different road users results in delayed buses and unreliable journey times for passengers. Issues related to frequency, reliability and a complex network have persisted for many years and will continue to do so without further intervention. In the absence of enhanced frequencies, journey time and reliability, the ability to attract new passengers is limited, particularly from private car and also impacts on the ability of the bus network to retain passengers and acts as a demotivator to travel by bus. Within the extents of the route of the Proposed Scheme, bus lanes are currently provided on approximately 47% and 51% of the route outbound and inbound respectively of which significant portions of the route are shared with cyclists and or parking lanes, which can in turn impact on bus reliability.

Adopting a Do Nothing approach to infrastructure improvements, would be likely to result in an exacerbation of the problems arising from discontinuity, such as delayed buses and unreliable journey times. The capacity and potential of the public transport system would remain restricted by the existing deficient and inconsistent provision of bus lanes and the resulting sub-standard levels of bus priority and journey-time reliability. As such, in addition to the continuation of issues relating to existing bus services, future bus services, including the Bus Network Redesign currently being implemented as part of the wider BusConnects Programme, would also suffer from the same lack of journey-time reliability. This would severely impact the attractiveness of public transport as an alternative to private car usage for those who need to travel to / from various locations along the route of the Proposed Scheme.

In addition, without the provision of safe cycling infrastructure, intended as part of the Proposed Scheme, there would also continue to be an insufficient level of safe segregated provision for cyclists who currently, and in the future, would be otherwise attracted to use the route of the Proposed Scheme. Whilst, in the 'Do Nothing' Alternative, ongoing improvements may be provided along the route of the existing corridor extents. This is likely to be piecemeal and disconnected without the wide-strategic benefits to be derived from the Proposed Scheme.

In addition, with the 'Do Nothing' Alterative, there would not be significant strategic investment in improvements to the pedestrian environment. Rather, improvements would be limited to relatively limited interventions, for example, ongoing maintenance of existing footpaths and adjacent public spaces. The 'Do Nothing' Alternative would not result in improvements to encourage more journeys generally at a local level by active travel, including connecting to and from bus stops for all pedestrians, and in particular improving facilities for the mobility and visually impaired.

For all of these reasons, and having regard to these environmental considerations in particular, a 'Do Nothing' Alternative is not considered to be a viable reasonable alternative relative to the outcomes which can be realised by the Proposed Scheme.

3.2.3 Bus Rapid Transit Alternative

BRT has emerged in recent years as an effective, cost efficient and high-quality public transport system. As BRT is a relatively new mode of transport, there are various definitions and interpretations as to what BRT comprises and there are many different forms of BRT systems in operation worldwide. Definitions of BRT range from a Quality Bus Corridor (QBC) to being a fully guided, fully segregated bus system.

The BRT Core Dublin Network Report, prepared in 2012 (NTA 2012a) at feasibility study level, investigated the demand, technical, environmental, and economic feasibility of a proposed core BRT network. The feasibility study recommended that further and more detailed work should proceed on two cross city corridors, namely, the Blanchardstown to University College Dublin (UCD)) corridor and the Malahide Road (Clongriffin) to Tallaght corridor.

Prior to the completion of these studies, the GDA Transport Strategy (NTA 2016a) identified the development of a number of Core Bus Corridors as BRT schemes, including the Ballymun and Finglas via Phibsborough to the City Centre corridor. These BRT routes formed part of the overall Core Bus Corridor network set out in the GDA Transport Strategy. As design and planning work progressed on the Core Bus Corridors, it became clear that the level of differentiation between the BRT corridors and the other Core Bus Corridors would, ultimately, be limited, and that all the corridors should be developed to a consistent standard, providing a more integrated, legible and coherent overall bus system.

By way of illustration of the similarities between the BRT option and Core Bus Corridors, all of the Core Bus Corridors are proposed to be developed to provide a high level of priority for the bus vehicles, which is an essential component of a BRT system. Integrated, cashless ticketing systems are planned under the overall BusConnects Programme, delivering the type of functionality often required for a BRT system. While different types of vehicles are used around the world on BRT schemes, the longer routes present in Dublin, due to the low-density nature of the city, favours the use of double deck vehicles on both BRT and conventional Core Bus Corridors, given the better ratio of seated to standing passengers on such vehicles.

Accordingly, it is intended that all of the BusConnects Dublin - Core Bus Corridor Infrastructure Works (hereafter referred to as the CBC Infrastructure Works), including the Proposed Scheme, will be developed to provide a BRT level of service, rather than establishing a separate mode on some corridors. Consequently, the Proposed Scheme, as a separate BRT mode, was not progressed given the limited differentiation from the Core Bus Corridors and the advantages identified above of a unified integrated bus system.

Environmentally, the BRT option compared to the Core Bus Corridor proposal would be more impactful in terms of construction impacts, including flora and fauna, heritage, air and noise. BRT typically requires continuous unbroken physical lane infrastructure to achieve high-priority. This would involve significantly more land take and potentially involve demolition of buildings at pinch-points. In the case of the Core Bus Corridor proposals, bus-priority can be achieved through short lengths at pinch-points by the use of signal control priority.

3.2.4 Light Rail Alternative

The appropriate type of public transport provision in any particular case is predominately determined by the likely quantum of passenger demand along the particular public transport route.

For urban transport systems, bus-based transport is the appropriate public transport mode for passenger demand levels of up to 4,000 passengers per hour per direction (International Association of Public Transport (UITP 2009)). Light rail provision would generally be appropriate to cater for passenger demand of between 3,500 and about 7,000 passengers per hour per direction. Passenger demand levels above 7,000 passengers per hour per direction would generally be catered for by heavy rail or metro modes, which would usually be expected to serve a number of major origins or destinations along a particular corridor. In the case of both the bus and light rail modes, higher levels of passenger demand than the above stated figures can be accommodated under specific conditions.

The development of the GDA Transport Strategy (NTA 2016a) considered the likely public transport passenger demand levels across the region using the NTA's transport model and took into account the other studies referenced above, in addition to studies that had been carried out to investigate a potential light rail scheme within the area of this corridor. Likely passenger flows were identified to be within the capacity of bus transport, without reaching the quantum of passenger demand which would support the provision of higher capacity rail solutions.

Section 3.2.1 sets out various studies undertaken for the GDA Transport Strategy. Arising from these studies and the specific assessment and transport modelling work undertaken for the GDA Transport Strategy, it was concluded that a bus-based transport system would be the proposed public transport solution in the corridor of the Proposed Scheme. The proposed transport solution would be supplemented by the extension of the Luas Cross City to the Finglas Area (Finglas Luas). This will provide a high capacity radial service from this large suburb into the City Centre. It is also intended to provide a strategic park and ride at the terminus of this line on the N2 National Road close to the M50 Motorway. These proposals will serve the significant levels of forecast travel demand from this corridor to the City Centre and Grangegorman. Arising from the various studies and analysis that had been carried out, and the specific assessment and transport modelling work undertaken for the GDA Transport Strategy, it was concluded that a high quality bus-based transport system supplemented by the implementation of the Finglas Luas, would be part of the proposed public transport solution in the corridor of the Proposed Scheme.

Similar to BRT, environmentally, the light rail option compared to the Core Bus Corridor proposal would be more impactful in terms of construction impacts, including flora and fauna, heritage, air and noise. Light rail requires continuous unbroken physical lane infrastructure to achieve high-priority. This would involve significantly more land take and potentially involve demolition of buildings at pinch-points. In the case of the Core Bus Corridor proposals, bus-priority can be achieved through short lengths at pinch-points by the use of signal control priority.

3.2.5 Metro Alternatives

As highlighted above, when considering the appropriate transport systems to meet the expected transport demand, metro systems are a higher capacity form of light rail, generally designed for peak hour passenger numbers exceeding about 7,000 passengers per hour per direction, and often catering for multiples of that level.

Given the consideration of light rail provision, and the level of likely public passenger use along this overall corridor assessed in the transport modelling work, the development of the GDA Transport Strategy (NTA 2016a) identified that a metro solution would be economically justified within the area covered by this corridor.

Therefore, it is intended to develop the light rail Metro system along this corridor through the implementation of the following project:

- New Metro North (now MetroLink).

3.2.5.1 MetroLink

This new Metro line will provide a high-speed, high-capacity, high-frequency public transport link from the City Centre to Dublin Airport and Swords. The MetroLink will serve a large number of significant destinations, including

Ballymun, Dublin City University (DCU) and the Mater Hospital, and will interchange with other rail and bus services in the vicinity of Drumcondra, O'Connell Street and St. Stephen's Green.

Arising from the various studies and analysis that had been carried out, and the specific assessment and transport modelling work undertaken for the GDA Transport Strategy (NTA 2016a), it was concluded that a high quality bus-based transport system supplemented by the implementation of MetroLink, would be part of the proposed public transport solution in the corridor of the Proposed Scheme, as the development of an underground metro would not remove the need for additional infrastructure to serve the residual bus needs of the area covered by the Proposed Scheme, nor would it obviate the need to develop the cycling infrastructure required along the route of the Proposed Scheme.

3.2.6 Heavy Rail Alternative

Commuter heavy rail systems are generally designed for high levels of passenger demand, usually designed to carry in excess of 10,000 passengers per hour per direction. Where a surface corridor does not already exist in a built-up urban area, there are major challenges in creating sufficient surface space for such provision, requiring large amounts of property acquisition and building demolition.

For those reasons, new heavy rail projects running at surface level are rarely developed in built-up urban areas. Instead, underground rail links, including metro schemes, are deployed to avoid the severe impacts that would accompany a new surface rail line. Environmentally, the heavy rail option compared to the Core Bus Corridor proposal would be more impactful in terms of construction impacts, including flora and fauna, heritage, air and noise. Heavy rail requires unbroken physical lane infrastructure to achieve high-priority. This would involve significantly more land take and potentially involve the demolition of buildings at pinch-points.

The appropriate locations for new heavy rail provision were carefully considered in the development of the GDA Transport Strategy (NTA 2016a). Having regard to the level of likely public passenger use (demand) along the overall corridor of the Proposed Scheme assessed in the transport modelling work, the development of the GDA Transport Strategy did not consider that a new heavy rail solution would be required along this corridor and would not be economically justifiable, in addition to having severe property implications for surface provision.

In relation to underground provision, this issue was considered as part of the metro analysis, given the similarity of underground heavy rail and underground metro schemes. This analysis concluded that a metro system would be more appropriate, and therefore, an underground heavy rail solution was not brought forward for this corridor.

Similar to the metro considerations, the provision of an underground heavy rail solution would not remove the need for additional infrastructure to serve the residual bus needs of the area covered by the Proposed Scheme, nor would it obviate the need to develop the cycling infrastructure required along the route of the Proposed Scheme.

As mentioned previously, environmentally, the heavy rail option compared to the Core Bus Corridor proposal would be more impactful in terms of construction impacts, requiring continuous unbroken physical infrastructure and involving significantly more land take and potentially involving demolition of buildings. In the case of the Core Bus Corridor proposals, bus-priority can be achieved through short lengths at pinch-points by the use of signal control priority.

3.2.7 Demand Management Alternative

One of the primary aims of the GDA Transport Strategy (NTA 2016a) is to significantly reduce demand for travel by private vehicles, particularly during the commuter peaks, and to encourage use of walking, cycling and public transport. One of the mechanisms to achieve such reduction of private vehicle use is the use of measures to discourage travel by car (i.e. demand management).

Demand management can take many different forms from restricting car movement or car access through regulatory signage and access prohibitions, to parking restrictions, to fiscal measures such as tolls, road pricing, congestion charging, fuel / vehicle surcharges and similar. All of these approaches discourage car use through physical means or by adding additional costs to car use such that it becomes more expensive and alternative

modes become more attractive. A key success factor of demand management is greater use of alternative travel modes, in particular public transport.

However, in the case of Dublin, the existing public transport system does not currently have sufficient capacity to cater for large volumes of additional users. In the case of the bus system, the increasing levels of traffic congestion over recent years prior to the COVID-19 pandemic has added to bus delays and means that additional bus fleet and driver resources have been utilised simply to maintain existing timetables, rather than adding overall additional capacity. The objective of the overall GDA Transport Strategy is to significantly increase the capacity, and subsequent use of the public transport system, focussing on the overall BusConnects Programme in the case of the bus system, the DART+ Programme in the case of heavy rail, and the Luas / MetroLink programme in the case of light rail.

Congestion is a significant contributor to GHG emissions, and the related negative environmental impacts associated with poor air quality, noise levels, and related health and quality of life consequences. Demand management measures need to be associated with positive environmental benefits that can be achieved when commuters change modes to high-quality public transport, walking, and cycling that can help reduce GHG emissions and bring associated health benefits. The objective of the GDA Transport Strategy to significantly increase the capacity, and subsequent use of these alternative modes requires that the necessary physical infrastructure is necessary to deliver the efficiencies to make the mode-shift attractive and environmentally beneficial.

In advance of a significant uplift in overall public transport capacity in the Dublin Metropolitan Area, the implementation of major demand management measures across that area would be unsuccessful. Effectively, constraining people from making journeys by car and requiring them to use other modes, without those modes having the necessary capacity to cater for such transfer, would not deliver an effective overall transport system. Instead, the capacity of the public transport system needs to be built up in advance of, or in conjunction with, the introduction of major demand management measures in the Dublin Metropolitan Area. This is especially true in the case of the bus system where a major increase in bus capacity through measures such as the Proposed Scheme would be required for the successful implementation of large scale demand management initiatives.

While the foregoing addresses the dependency of demand management measures on public transport capacity, it is equally correct that the provision of greatly enhanced cycling facilities will also be required to cater for the anticipated increase in cycling numbers, both in the absence of demand management measures and, even more so, with the implementation of such measures. Demand management initiatives by themselves will not deliver the level of segregated cycling infrastructure required to support the growth in that mode. Consequently, the progression of demand management proposals will not secure the enhanced safe cycling infrastructure envisaged under the Proposed Scheme.

Accordingly, the implementation of demand management measures would not remove the need for additional infrastructure to serve the bus transport needs of the corridor covered by the Proposed Scheme, nor would it obviate the need to develop the cycling infrastructure required along the route of the Proposed Scheme.

3.2.8 Technological Alternatives

Technological advances have opened-up new areas of potential in the delivery of transportation infrastructure. Driverless trains and smart highways are two examples. Some of these initiatives, such as driverless trains, are now in use. Technological advancements relating to car use have the potential to improve road safety by reducing potential for driver error, and with the use of global positioning systems (GPS), to be guided to the most efficient route. A shift to electric vehicles will help reduce GHG emission impacts, but road space is limited, and three typical cars (electric or otherwise) still take the same road space for up to 12 occupants that a typical double-deck bus requires to carry up to 90 occupants. The environmental impact of continuing to build more road space for low-occupancy vehicles is unsustainable from both the construction environmental impact and operational environmental impact perspectives. Despite advancements in road-user technology, road congestion is not reducing as populations grow, and old inner-city areas of Dublin do not have space to add more car lanes.

The shift to hybrid and ultimately electric buses will reduce both noise and air quality impacts. The evolution of bike-share schemes and advancements in electric bike technology means that cycling is increasing in

attractiveness and for longer distances. This attractiveness is only for the few however, if cycling infrastructure in the form of safe segregated facilities is not available.

While road construction is costly and has a negative GHG impact there are little advancements in construction technology that present any viable alternatives when conversion of road infrastructure involves reconfiguration of lanes for bus priority, safer segregated cycle tracks and improved pedestrian facilities, or even more significantly for rail-related infrastructure. Road right-of-way space is still shared with multiple underground and overhead utilities that may require to be relocated, and road materials require to be resilient to minimise maintenance frequencies.

Ultimately, however, alternatives have to be able to accomplish the objectives of the Proposed Scheme in a satisfactory manner and should also be feasible including in terms of technology and other relevant criteria. In this context, there is no evidence that such developments will displace the need for mass transit, which is essential to the operation of a modern city. Accordingly, the need to improve the overall bus system will still remain.

Overall, while certain technological advances do provide new opportunities in the transport area, particularly in the area of information provision, they do not yet provide viable alternatives to the core need to provide for the movement of more people by non-car modes, including the provision of safe, segregated cycling facilities. Accordingly, there are no viable technological alternatives to meet the transport needs of this sector of the city.

3.3 Route Alternatives

Following on from the strategic alternatives considered earlier, this Section sets out the route alternatives which were considered as part of the process to establish the Proposed Scheme. Development of the Proposed Scheme has evolved in the following stages:

1) Two separate **Feasibility Study and Options Assessment Reports** were concluded in 2017 for the Finglas Section and in 2018 for the Ballymun Section of the Proposed Scheme, respectively, setting out the initial route options and concluding with the identification of the 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 the Draft Preferred Route Option (PRO)** (April 2019 to March 2020). Informed by feedback from the first round of public consultation, stakeholder engagement and community 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 subsequent to 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 updated Draft PRO from 4 November 2020 to 16 December 2020; and
7) Finalisation of the **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.

Alternative route options have been considered in a number of areas during the iterative design of the Proposed Scheme, such as the location of offline cycle routes and the road layout in constrained locations. The iterative development of the Proposed Scheme has also been informed by a review of feedback and new information received during each stage of public consultation and as data, such as topographical surveys, transport and environmental information was collected and assessed. In addition, the potential for climate impacts was considered in all phases of the design process for the Proposed Scheme. As the design progressed, climate was indirectly affected in a positive way by refining the design at each stage through reducing the physical footprint of the Proposed Scheme, coupled with the inclusion of technological bus priority measures.

Key environmental aspects have been considered during the examination of reasonable alternatives in the development of the PRO for the Proposed Scheme. Environmental specialists have been involved in the iteration of key aspects of the Proposed Scheme with the BusConnects Infrastructure team.

The following key environmental aspects were considered:

- **Archaeological, Architectural and Cultural Heritage** – there is the potential for impacts on archaeological, architectural and cultural heritage when providing Core Bus Corridor infrastructure. The assessment had regard to the Record of Monuments and Places (RMPs), sites of archaeological or cultural heritage and on buildings listed on the National Inventory of Architectural Heritage (NIAH) adjacent to the corridor;
- **Flora and Fauna** - The provision of the Core Bus Corridor could have negative impacts on flora and fauna, for example, through the construction of new infrastructure through greenfield sites;
- **Soils and Geology** - Construction of infrastructure necessary for the provision of the Core Bus Corridor has the potential to negatively impact on soils and geology. For example, through land acquisition and ground excavation. There is also the potential to encounter ground contamination from historical industries;
- **Hydrology** - The provision of Core Bus Corridor infrastructure may include aspects (for example structures) with the potential to impact on hydrology;
- **Landscape and Visual** - Provision of Core Bus Corridor infrastructure has the potential to negatively impact on the landscape and visual aspects of the area, for example, by the removal of front gardens or green spaces or the altering of streetscapes, character and features;
- **Noise, Vibration and Air** - Provision of Core Bus Corridor infrastructure (e.g. construction activities), has the potential to negatively impact on noise, vibration and air quality along a scheme, for example, through construction works;
- **Land Use and the Built Environment** - This criterion assesses the impact of each option on land use character, and measured impacts which would prevent land from achieving its intended use, for example through land acquisition, removal of parking spaces or severance of land; and
- **Climate** - Construction works involve negative GHG emissions impacts, while operational efficiencies of public transport, walking and cycling through modal shift from car usage has the potential to reduce GHG impacts.

3.3.1 Initial High Level Route Alternatives

The Feasibility Study and Options Assessment Reports identified feasible options along the corridor, assessed these options and arrived at an EPR. Two reports were published relating to the Proposed Scheme: the Ballymun to City Centre Core Bus Corridor Feasibility Study and Options Assessment Report (NTA 2016c) and the Finglas – Phibsborough Feasibility Study and Options Assessment Report (NTA 2016d). These reports formed the basis for the first phase of public consultation. A summary of the process is described below:

The Feasibility Study and Options Assessment Reports used a two-stage assessment process to determine the EPR, comprising:

- Stage 1 – an initial high-level route options assessment, or ‘sifting’ process, which appraised routes in terms of ability to achieve scheme objectives and whether they could be practically delivered. The assessment included consideration of the potential high level environmental constraints as well as other indicators such as land take (particularly the impact on residential front gardens); and
- Stage 2 - Routes which passed the Stage 1 assessment were taken forward to a more detailed qualitative and quantitative assessment. All route options that progressed to this stage were compared against one another using a detailed Multi-Criteria Analysis (MCA) in accordance with the Department of Transport (DoT) document, Common Appraisal Framework for Transport Projects and Programmes (DoT 2016).

At the start of the Stage 1 assessment, an initial ‘spider’s web’ of potential route options (consisting of in excess of 70 individual links for the Ballymun Section and in excess of 40 individual links for the Finglas Section) that could accommodate a Core Bus Corridor were identified for each study area section, as shown in Image 3.3 for the Ballymun Section and Image 3.4 for the Finglas Section of the Proposed Scheme (extracted from the

Feasibility Study and Options Assessment Reports). It is noted that at Stage 1 the study area for the Ballymun Section was divided into three Study Area Sections (SAS), as follows (see Image 3.2 for the extent of these SAS):

- SAS 1 – Northern Terminus off Ballymun Road between Junction with Santry Avenue and M50 Interchange No 4;
- SAS 2 – Ballymun Road / Santry Avenue Junction to Griffith Avenue; and
- SAS 3 – Griffith Avenue to Church Street.

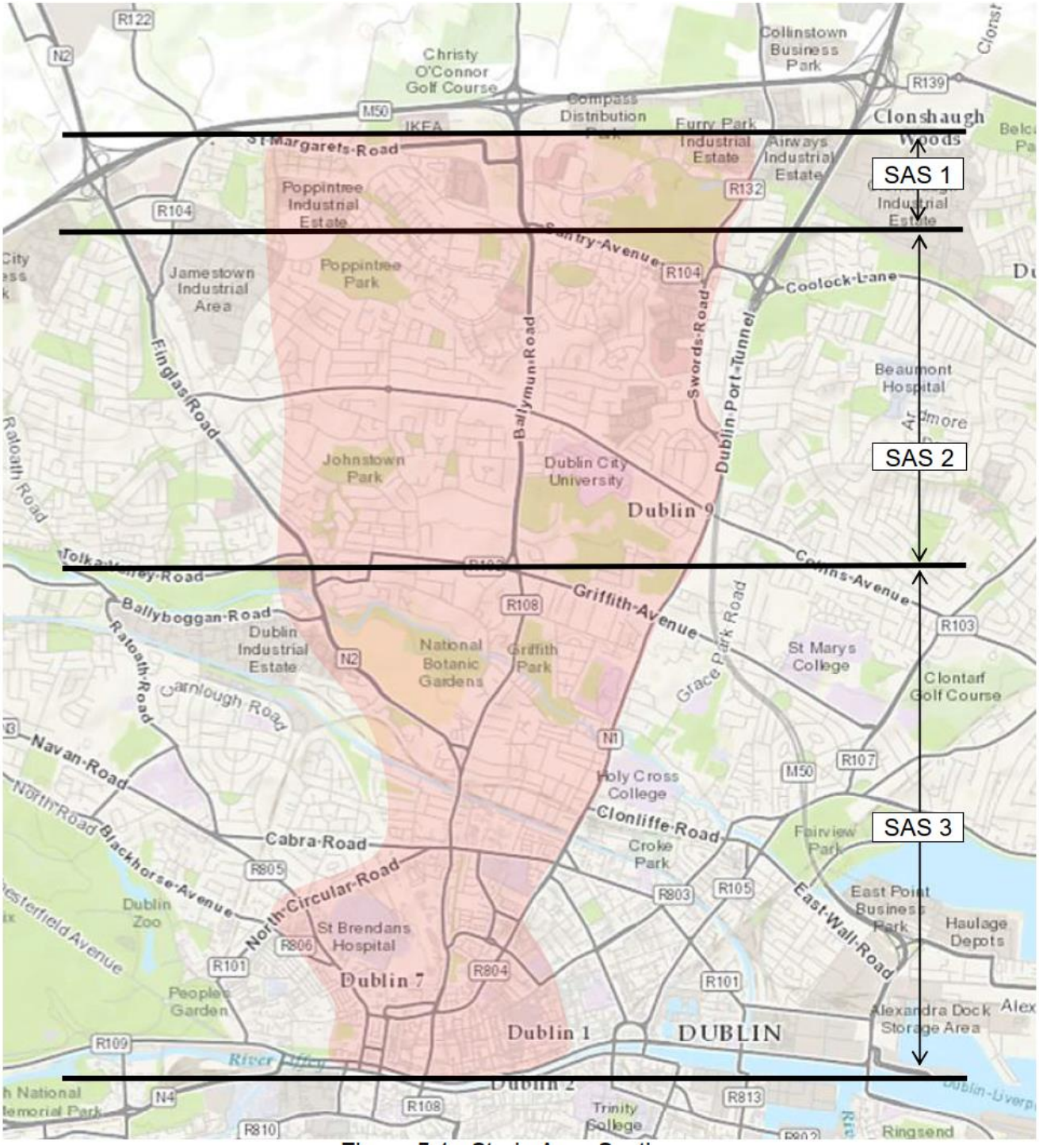

Image 3.2: Stage 1 Study Area Sections on the Ballymun Section (SAS 1 to SAS 3)

Image 3.3: Spider's Web of Route Options Extracted from Feasibility Study and Options Assessment Report (Ballymun Section)

Image 3.4: Section 2 (M50 to Phibsborough) Spider's Web of Route Options Extracted from Feasibility Study and Options Assessment Report (Finglas Section)

The initial 'spider's webs' were narrowed down using a high-level qualitative method based on professional judgement and a general appreciation for existing physical conditions / constraints within the study area. This exercise examined and assessed technically feasible route options, based upon specific objectives. In addition to being assessed on their individual merits, routes were also assessed relative to each other enabling some routes to be ruled out if more suitable alternatives existed.

The Stage 1 assessment considered engineering constraints, high-level environmental constraints and an analysis of population catchments. Numerous links forming part of the 'spider's webs' were not brought forward to the Stage 2 assessment due to space constraints, lack of appropriate adjacent linkages to form a coherent end-to-end route, unsuitability of particular routes, the need for significant land take from residential properties and related construction GHG impacts.

Arising from consideration of the various permutations possible in respect of the 'spider's webs', a reduced number of coherent end-to-end options were identified for further assessment. In arriving at these options, those links which failed the initial sifting stage were removed as well as those links that were disconnected and could not clearly form part of the end-to-end options. These options are presented in Image 3.5 to Image 3.8.

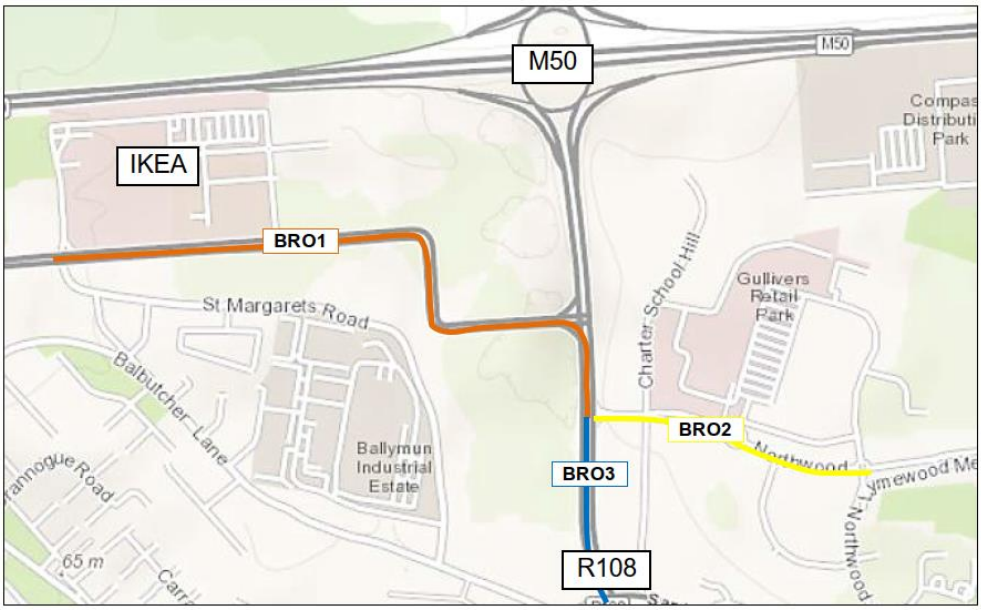

Image 3.5: Route Options from Initial Sift for SAS 1 (Ballymun Section)

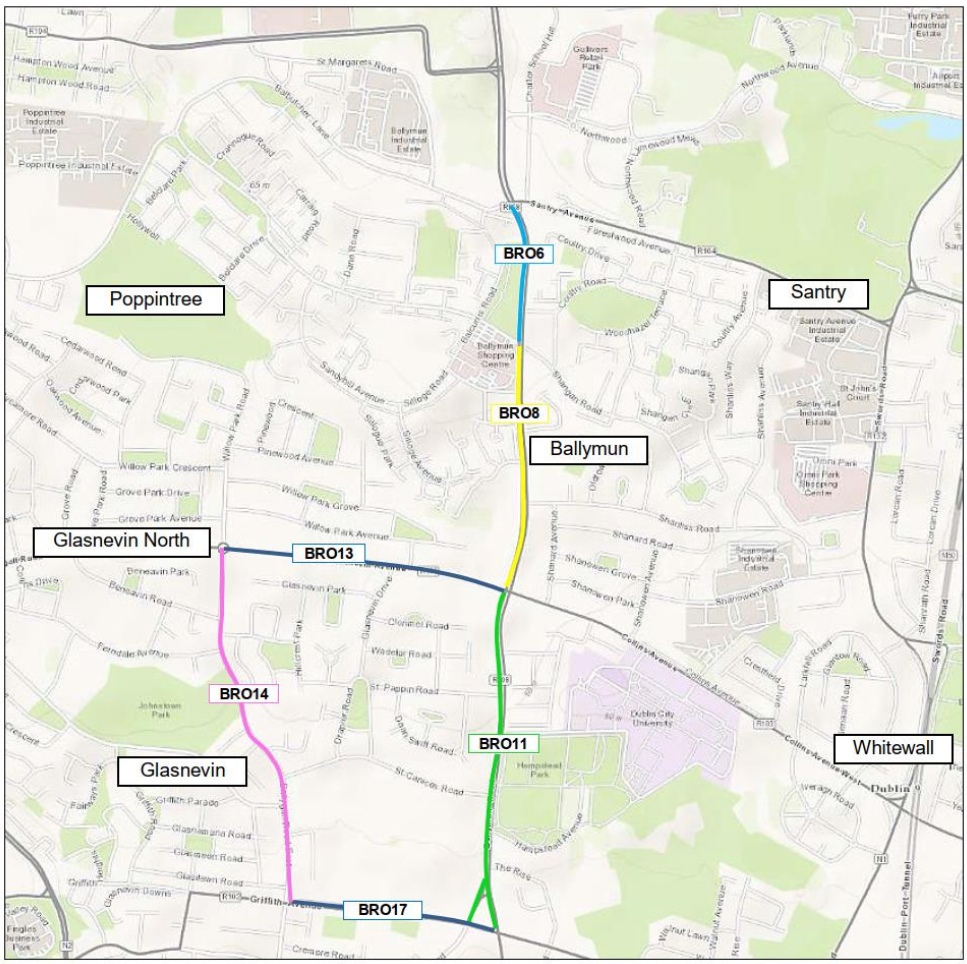

Image 3.6: Route Options from Initial Sift for SAS 2 (Ballymun Section)

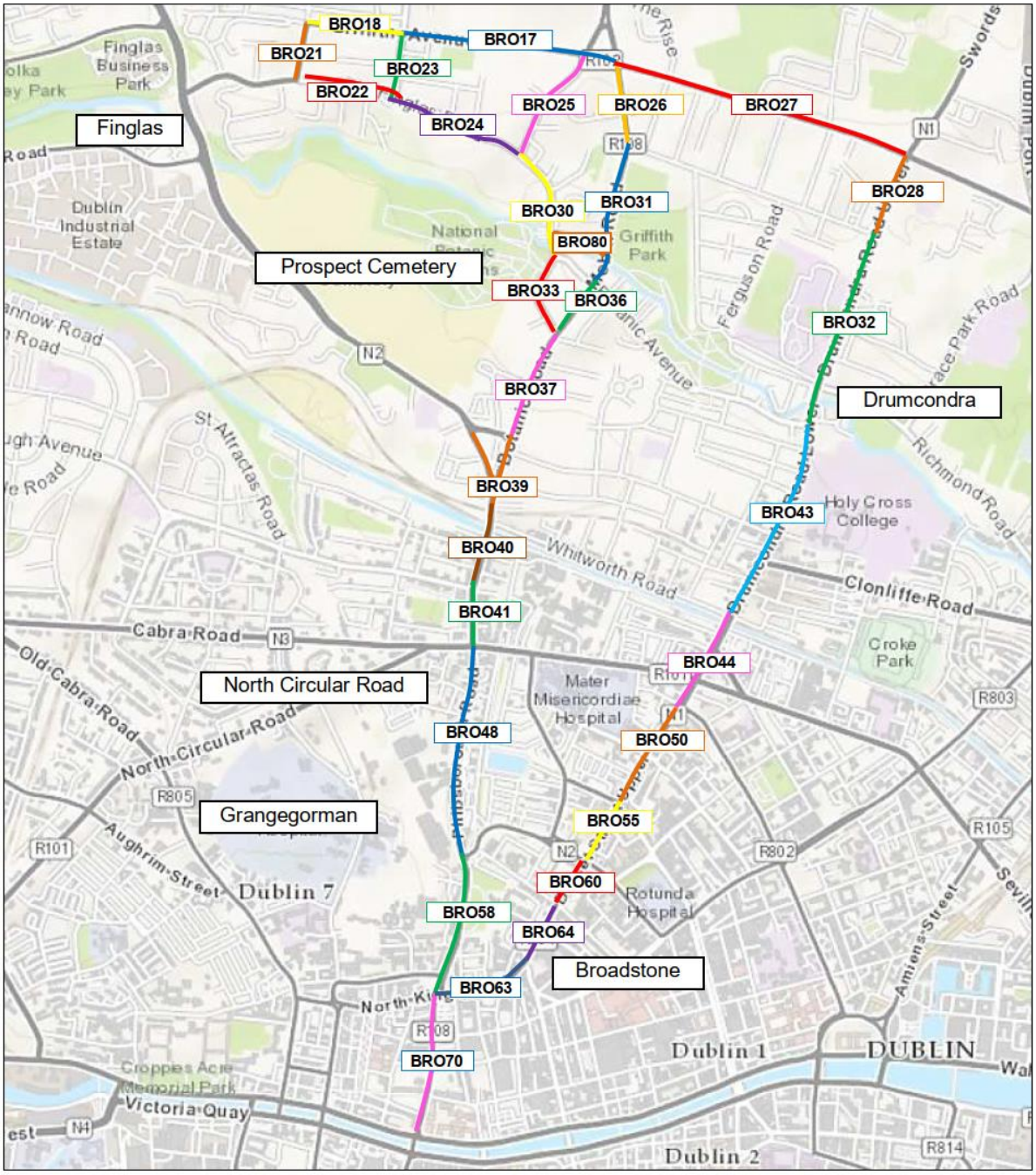

Image 3.7: Route Options from Initial Sift for SAS 3 (Ballymun Section)

Image 3.8: Route Options from Initial Sift (Finglas Section)

3.3.2 Stage 2 – Route Option Assessment

Following completion of the Stage 1 initial appraisal, the remaining reasonable alternatives options were progressed to Stage 2 of the assessment process. This process involved a more detailed qualitative and quantitative assessment using criteria established to compare the route options.

The indicative scheme for each route option was then progressed to a MCA. The Common Appraisal Framework for Transport Projects and Programmes (DoT 2016), requires schemes to undergo a MCA which evaluated route options under the assessment criteria set out below:

1. Economy;
2. Integration;
3. Accessibility and Social Inclusion;
4. Safety;
5. Physical Activity; and
6. Environment.

Although, it is noted, as set out in the Feasibility Study and Options Assessment Reports, Physical Activity was scoped out of the MCAs at this stage. This is because all route options were considered to promote physical activity equally, and as such, it was not considered to be a key differentiator between route options.

Under each headline criterion, a set of sub-criteria were used to comparatively evaluate the options. For the Environment criterion, the following sub-criteria were considered in the assessment to inform the EPR:

- Archaeological, Architectural and Cultural Heritage – there is the potential for impacts on archaeological, architectural and cultural heritage when providing Core Bus Corridor infrastructure. The assessment had regard to RMPs, sites of archaeological or cultural heritage and on buildings listed on the NIAH along or adjacent to the corridor;
- Flora and Fauna - The provision of the Core Bus Corridor infrastructure could have negative impacts on flora and fauna, through construction of new infrastructure through greenfield sites. These impacts were compared for each scheme option under this criterion;

- Soils and Geology - Construction of infrastructure necessary for the provision of the Core Bus Corridor infrastructure has the potential to impact on soils and geology. For example, through land acquisition and ground excavation. These considerations were compared for each scheme option under this criterion;
- Hydrology - The provision of Core Bus Corridor infrastructure has the potential to impact on surface water bodies as a result of land take (with particular emphasis on floodplains and flood zones). Any such impacts were considered for each scheme option under this criterion;
- Landscape and Visual - Provision of Core Bus Corridor infrastructure has the potential to impact on the townscape / streetscape as well as the landscape and visual aspects of the area, for example, by the removal of front gardens or green spaces or the altering of streetscapes, character and features. Different scheme options were compared, and any negative effects were considered under this criterion;
- Air Quality – The provision of Core Bus Corridor infrastructure has the potential to impact the air quality along the route. These effects were compared for each scheme option under this criterion in relation to the volumes of traffic and on whether the road is moving closer to a sensitive receptor, for examples road widening or new alignment;
- Noise and Vibration - Provision of Core Bus Corridor infrastructure (e.g. the construction activities) has the potential to negatively impact on noise and vibration along a scheme. These effects were compared for each scheme option under this criterion. The impact was quantified in relation to the volumes of traffic and on whether the road is moving closer to a sensitive receptor, for example, road widening or new realignment; and
- Land Use Character – The provision of Core Bus Corridor infrastructure has the potential to impact on land use character through land take, severance or reduction of viability which prevents or reduces it from being used for its intended use.

Route options were compared based on a five-point scale, ranging from having significant advantages to having significant disadvantages over other route options. Route options could also be considered neutral when no apparent advantages or disadvantages are identified across all scheme options.

3.3.2.1 Ballymun Section – Route Options Assessment

The Ballymun Section study area was divided into three SAS, as outlined in Section 3.3.1 and shown in Image 3.2.

3.3.2.1.1 SAS 1 (Northern Terminus): Stage 2 Route Options Assessment

Following the Stage 1 sifting process, two viable route options for Ballymun SAS 1 were taken forward for assessment and further refinement as follows:

- Northern Terminus Route Option 1 (NT1): A route option via St. Margaret's Road and a short section of Ballymun Road (R108); and
- Northern Terminus Route Option 2 (NT2): A route option via Northwood and a short section of Ballymun Road (R108).

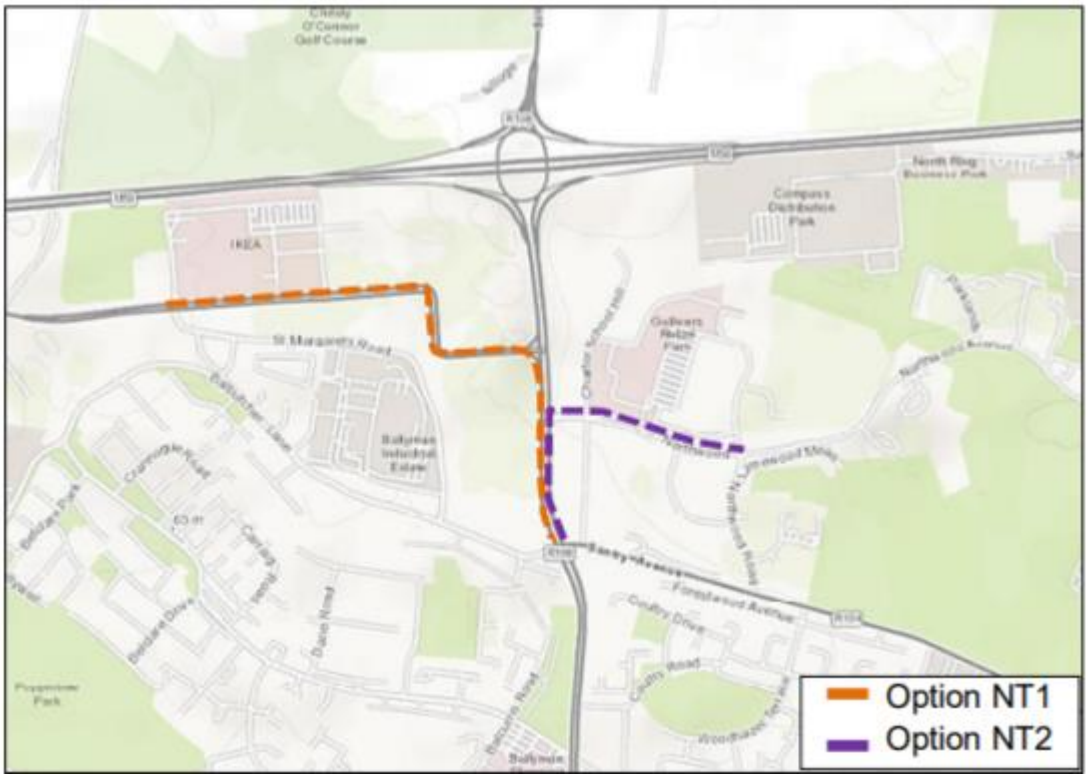

Image 3.9: SAS 1 (Northern Terminus) Route Options (Ballymun Section)

Option NT1 would commence at St. Margaret's Road, outside of IKEA and would travel from here to the junction with R108 Ballymun Road before turning south onto R108 Ballymun Road. At present, St. Margaret's Road typically consists of two traffic lanes and a bus lane with a footpath and cycle track on either side. A cycle lane is also provided on both sides of the road along some sections. The eastbound section of St. Margaret's Road consists of a single traffic lane and bus lane on approach to R108 Ballymun Road. The proposed interventions under Option NT1 would be to upgrade the existing bus lanes on St. Margaret's Road, generally involving re-marking the route, whilst also providing layover space for two buses at the northern terminus for the scheme. R108 Ballymun Road consists of a wide dual carriageway road with two and three wide traffic lane sections. No bus lanes are provided but there are footpaths and cycle lanes / tracks on both sides. As such, it is proposed to introduce bus lanes in both directions between the junctions of St. Margaret's Road and R104 Santry Avenue whilst improving the existing cycle tracks and footways. This could be achieved within the existing road reservation and / or public land and it is not expected that property acquisition will be required.

Option NT2 would commence adjacent to Gulliver's Retail Park on Northwood Avenue and would travel from here to the junction with R108 Ballymun Road before turning onto R108 Ballymun Road. The section of Northwood Avenue between R108 Ballymun Road and the proposed terminus location adjacent to the most western roundabout is a dual carriageway road at present. It is not intended as part of Option NT2 to introduce bus lanes in the place of one of the traffic lanes in each direction for a relatively short length. However, the introduction of the terminus facilities as per Option NT2 would require the relocation of the existing two-way cycle track and a level of land acquisition on what is essentially private land that is used as open space adjacent to Gulliver's Retail Park.

As mentioned previously, each route option was evaluated using a MCA with one of the primary criteria being 'Environment', under which there were a number of sub-criteria which each route option was considered against comparatively.

In terms of potential archaeological, architectural and cultural heritage impacts, it was considered that Route Option NT2 was similar when compared to Option NT1, as there were no recorded monuments or sites of archaeological and cultural heritage merit identified within this assessment area.

With regard to the sub-criteria of flora and fauna, soils and geology, hydrology, air quality, noise and land use character, both options were considered favourable as no appreciable impacts were identified in either option assessment areas.

In terms of the landscape and visual sub-criterion, it was considered that Option NT1 had advantages when compared to Option NT2, as no appreciable impacts were identified. For Option NT2, there would be the potential for localised negative impacts associated with the removal of areas of grass for the construction of a bus stop.

Option NT1 was identified as the preferred option for this section. With regard to the consideration of the Environment criterion, Option NT1 was considered to have some advantages when compared to Option NT2 due to the lower impact on the landscape and visual amenity. Option NT1 was therefore brought forward into the EPR.

Subsequently, the proposed BusConnects Network Redesign was modified in 2020 with the E-Spine branch routes at the northern end changed such that the part of Option NT1 on St. Margaret's Road was no longer necessary. Branch Route E2 will terminate in Northwood, for which Option NT2 is appropriate, although the bus priority measures would only be provided along R108 Ballymun Road. The final decision, for future flexibility, was to adopt a hybrid of the two options along R108 Ballymun Road from the junction of St. Margaret's Road southwards.

3.3.2.1.2 SAS 2 (Ballymun Area): Stage 2 Route Options Assessment

Following the Stage 1 sifting process, two viable route options for Ballymun SAS 2 were taken forward for assessment and further refinement, as follows:

- Ballymun Route Option 1 (BN1): A route option via R108 Ballymun Road; and
- Ballymun Route Option 2 (BN2): A route option via R108 Ballymun Road, Glasnevin Avenue, Ballygall Road East and Griffith Avenue.

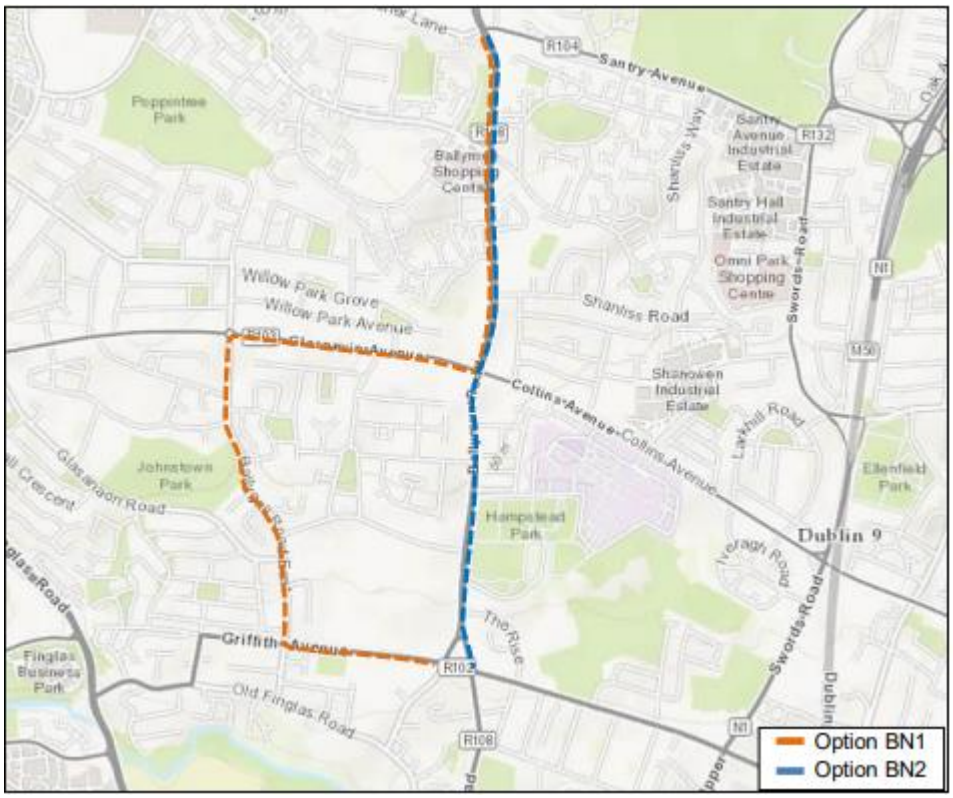

Image 3.10: SAS 2 (Ballymun Area) Route Options (Ballymun Section)

Option BN1 would continue along R108 Ballymun Road from its junction with R104 Santry Avenue / Balbutcher Lane and its junction with R102 Griffith Avenue / R108 St. Mobhi Road. The section of the R108 Ballymun Road

between the R104 Santry Avenue and R102 Griffith Avenue Junctions is a dual carriageway road at present with bus lanes for the entire length, although bus lanes generally do not lead up to stop lines at junctions. It is proposed as part of Option BN1 to provide continuous bus priority along the existing QBC route with some sections of physical segregation in the vicinity of junctions to limit the potential for private vehicles entering the bus lane. Segregated cycle facilities will be provided along the route which forms part of Primary Cycle Route 3A. There are a number of private dwelling driveways with direct access onto the portion of the route option considered as part of Option BN1, particularly on the western side of R108 Ballymun Road between the R103 Collins Avenue and R102 Griffith Avenue Junctions. There are also accesses to schools and parking areas for duplex residential units to the north of R103 Collins Avenue. Some residential land acquisition would be required on the inbound approach to the R102 Griffith Avenue Junction. This would take the form of a portion of front gardens.

Option BN2 would continue along R108 Ballymun Road, from its junction with R104 Santry Avenue / Balbutcher Lane, before turning westbound onto R103 Glasnevin Avenue and then onto Ballygall Road East before routing on to R102 Griffith Avenue. The proposals for the section of R108 Ballymun Road between R104 Santry Avenue and R103 Collins Avenue are similar to those outlined for this section under Option BN1. The remainder of Option BN2 includes for the realignment of R103 Glasnevin Avenue and Beneavin Drive / Ballygall Road to provide segregated facilities for buses, cyclists and pedestrians. The cycle lane provision on Glasnevin Avenue would be 2m wide lanes owing to the fact that this forms part of Primary Orbital Cycle Route NO4. The cycle lane provision on Ballygall Road would be 1.5m wide lanes owing to the fact that this forms part of Secondary Cycle Route 3D. It is also proposed to upgrade the R103 Glasnevin Avenue / Beneavin Drive Roundabout to a signalised junction to maximise bus priority and to improve cycle safety at this point. The provision of these facilities would require considerable acquisition of the front gardens (and car parking) of residential properties which front onto both sides of the roads along the R103 Glasnevin Avenue / Ballygall Road section of the route. It is also proposed to provide bus lanes and improved cycle facilities within the considerable road reservation of the western section of R102 Griffith Avenue. There are a number of private dwelling driveways with direct access onto the R103 Glasnevin Avenue / Ballygall Road section of the route option. There are also accesses to schools, a church and local retail along Ballygall Road.

With regard to the sub-criteria of archaeology and cultural heritage, soils and geology and hydrology, both options were considered favourable as no appreciable impacts were identified in either option assessment area.

In terms of potential architectural heritage impacts it was considered that Option BN1 had advantages when compared to Option BN2, as there were protected structures identified on both R108 Ballymun Road and Ballygall Road.

For the flora and fauna sub-criterion, Option BN1 had advantages when compared to Option BN2, as no appreciable impacts were identified. For Option BN2, there would be the potential for an impact due to the possible land take required at junctions and removal of green areas. The installation of bus lanes would also require the removal of existing trees.

For the landscape and visual sub-criterion, Option BN1 also had advantages when compared to Option BN2, as no appreciable impacts were identified. For Option BN2, there would be the potential for negative impacts associated with the re-engineering of mature housing estate roads. The removal of existing trees within the road reservation would also have adverse impacts.

In terms of air quality and noise and vibration, it was considered that Option BN1 had advantages when compared to Option BN2, as no appreciable impacts were identified. For Option BN2, there would be the potential for impacts due to increased trafficking of road networks and increased proximity of vehicles to houses and bus lanes if new bus lanes were installed.

Finally, in terms of the land use character sub-criterion, it was considered that Option BN1 had advantages when compared to Option BN2, as no appreciable impacts were identified. For Option BN2, possible impacts could occur due to the requirement for road widening and associated land acquisition.

Option BN1 was identified as the preferred option for this section. With regard to the consideration of the Environment criterion, Option BN1 was considered to have some advantages when compared to Option BN2 due to the lower impact on multiple environmental sub-criteria. Option BN1 was therefore brought forward into the EPR.

3.3.2.1.3 SAS 3 (Central Area): Stage 2 Route Options Assessment

Following the Stage 1 sift, two principal route options for SAS 3 of the study area were passed to the Stage 2 assessment, as outlined in Image 3.11.

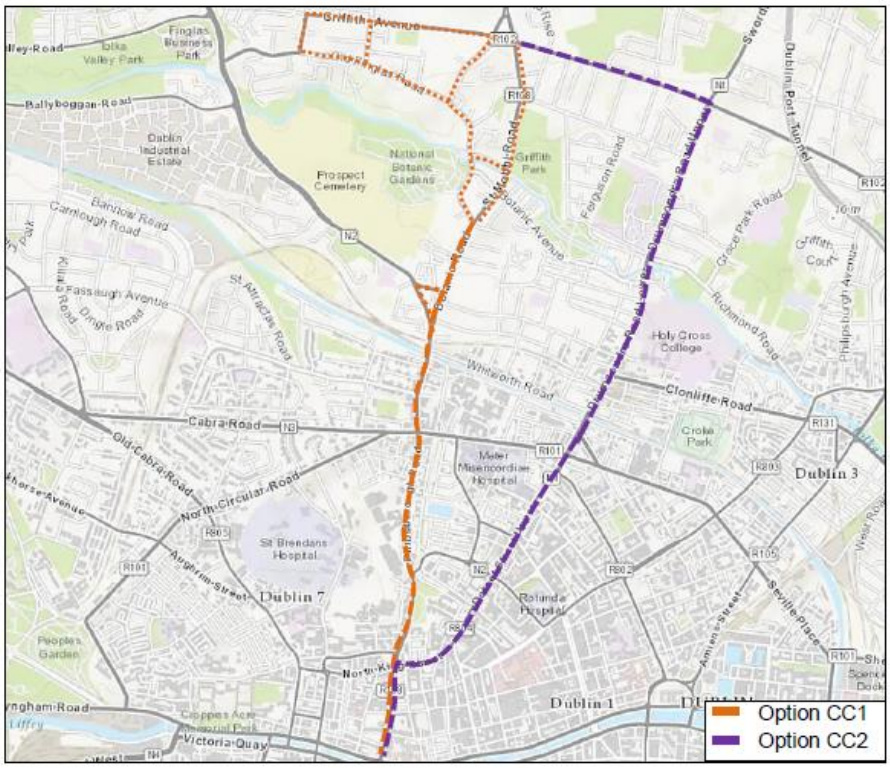

Image 3.11: SAS 3 Initial Route Options Under Consideration for Stage 2 (Ballymun Section)

However, within route option CC1, as shown in Image 3.11, there were a number of sections that had options that required consideration before being taken forward to form part the Stage 2 route option, namely (see Image 3.12):

- Section BC: Located between R102 Griffith Avenue and the junction of R108 Botanic Road / R108 St. Mobhi Road / Fairfield Road had 10 options (BC1 to BC10);
- Section BR: Located on R108 Botanic Road between the junction of R108 Botanic Road / R108 St. Mobhi Road / Fairfield Road and Hart's Corner (R108 Prospect Road / Phibsborough Road) had five options (BR1 to BR5); and
- Section CS: Located on R132 Church Street (common to CC2 as well) had seven options (CS1 to CS7).

Additional analysis (in the form of MCA) was undertaken in these sections (i.e., BC, BR and CS) with the preferred option emerging from each section being incorporated into the Stage 2 MCA for SAS 3 (i.e. forming Option CC1). These preferred options combined to form CC1, as presented in Image 3.13. In terms of environmental criteria, the preferred option for Section BC (BC10) was considered more advantageous than some other options in terms of flora and fauna, landscape and visual and land use character as it would retain trees along R108 St. Mobhi Road and had some disadvantages compared to other options in terms of archaeology and cultural heritage, architectural heritage, air quality and noise and vibration. In terms of environmental criteria, the preferred option for BR (BR4) would have less land acquisition than other options and less potential to impact protected structures than some other options. In terms of environmental criteria, the preferred option for CS (CS4) would also have less land acquisition needs than some other options.

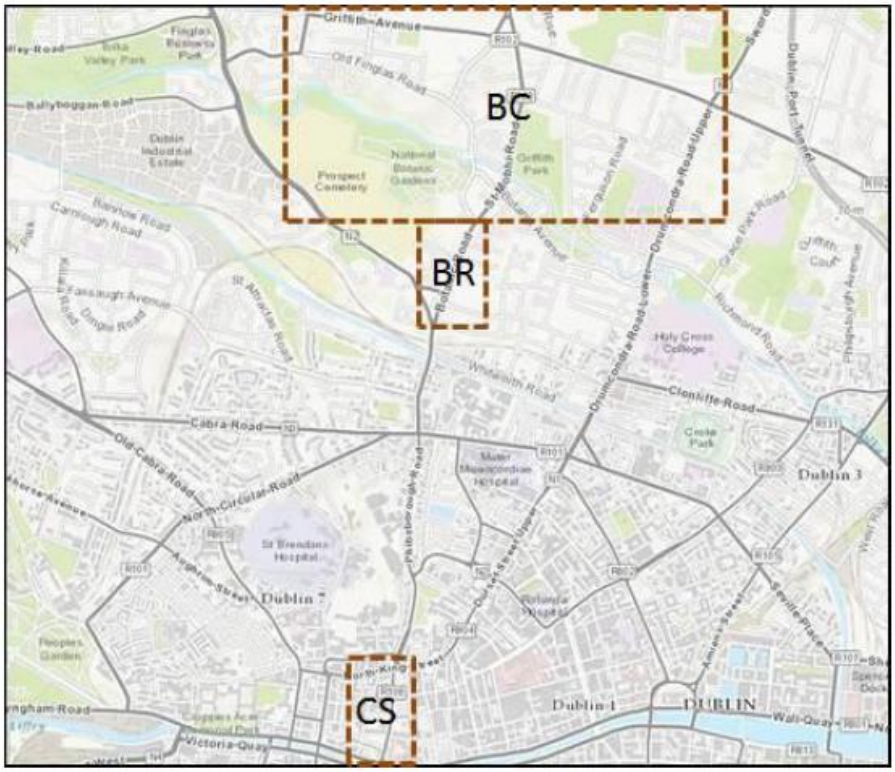

Image 3.12: SAS 3 Stage 2 Route Options Section Division (Ballymun Section)

Following the Stage 1 sifting process and some further analysis as outlined above for CC1, two viable route options for Ballymun SAS 3 were taken forward for assessment and further refinement, as follows:

- Central Area Route Option 1 (CC1): A route option via R108 Botanic Road / Phibsborough Road / R132 Church Street; and
- Central Area Route Option 2 (CC2): A route option via R102 Griffith Avenue / Drumcondra Road / Dorset Street / Bolton Street / North King Street / R132 Church Street.

Image 3.13: Ballymun Sub-Section 3 (Central Area) Route Options

Option CC1 would continue along the R108 on St. Mobhi Road, Botanic Road, Phibsborough Road, Constitution Hill and R132 Church Street. Option CC1 proposes to maintain the existing inbound bus lane on R108 St. Mobhi Road between R102 Griffith Avenue and Botanic Avenue as well as providing an outbound bus lane and segregated cyclist facilities in both directions on R108 St. Mobhi Road. It is proposed to introduce continuous inbound bus lanes on the R108 between St. Mobhi Road / Fairfield Road and Hart's Corner, whilst the junction of R108 Prospect Road / R135 Finglas Road / Hart's Corner will be realigned. Further route option proposals include:

- Widening of Cross Guns Bridge to include for a pedestrian cantilever;
- Providing a two-way bus lane in Phibsborough with parallel route for cyclists via Royal Canal Bank;
- Introducing bus lanes in both directions on R108 Phibsborough Road by the removal of on-street parking between Doyle's Corner and replacing traffic lanes with bus lanes on R108 Constitution Hill between R135 Western Way and R804 North King Street;
- Improving the existing cycle lane on R108 Constitution Hill between R135 Western Way and Coleraine Street. This route is identified as Secondary Route 2B; and
- Providing a greater length of segregated bus facilities on R132 Church Street.

This option would require the acquisition of a small portion of a number of front gardens from the east side of R108 St. Mobhi Road and also a portion of land from the Na Fianna GAA and Home Farm soccer grounds on this side of the road also. The provision of segregated bus facilities in both directions in Phibsborough would require land acquisition in the vicinity of the Shopping Centre.

Option CC2 would continue along R102 Griffith Avenue before turning onto Drumcondra Road / Dorset Street / Bolton Street / North King Street and on to R132 Church Street. Specifically, Option CC2 proposed:

- Introducing bus lanes on R102 Griffith Avenue between R108 St. Mobhi Road and Drumcondra Road Upper, requiring the removal of trees;
- Improving existing bus lane on R132 (Drumcondra Road Lower / Dorset Street) to provide continuous segregated facilities as per the Swords BRT proposals;
- Improving existing cycle lanes on R132 (Drumcondra Road Lower / Dorset Street) to provide continuous segregated facilities (Primary Cycle Route 2A);

- Providing improved bus facilities which would require the removal of on-street parking and / or private land acquisition on Bolton Street between Frederick Street North and Dominick Street; and
- Providing a greater length of segregated bus facilities on R132 Church Street.

This option would require limited private land acquisition in the vicinity of junctions. However, as mentioned above the removal of a large number of trees along R102 Griffith Avenue would be required.

In terms of potential archaeology and cultural heritage impacts, it was considered that Option CC2 had advantages when compared to Option CC1, as under Option CC1, a section of R108 Botanic Road runs through a Zone of Archaeological Potential (ZAP) (DU018-005) and a section of the route between R135 Western Way and R148 Inns Quay is entirely located within the ZAP that surrounds the historic core of Dublin City (DU018-020).

For the architectural sub-criterion, it was also considered that Option CC2 had advantages when compared to Option CC1, as under Option CC1, multiple protected structures are located immediately adjacent to the route section between Fairfield Road and R135 Western Way. In addition, 18 structures included within the NIAH survey are located immediately adjacent to the option. There are also multiple protected structures located immediately adjacent to this route section between R135 Western Way and R148 Inns Quay and 86 structures that are included within the NIAH survey located along the path immediately adjacent to the route option.

In terms of the flora and fauna, hydrology, air quality, noise and vibration and land use character sub-criteria, the impacts were deemed to be neutral between Option CC1 and Option CC2.

For the landscape and visual sub-criterion, Option CC1 had advantages when compared to Option CC2, as for Option CC2, the tree lines on R102 Griffith Avenue are particularly significant, as this is the only street in Dublin with a double line of trees on each side. Any impacts on these trees would be significantly detrimental to the character of the area.

Option CC1 was identified as the preferred option for this section. With regard to the consideration of the Environment criterion, Option CC1 was considered marginally less attractive. However, based on the overall MCA (including all five MCA criteria categories), Option CC1 was identified as the most effective route option for the following reasons:

- The directness of the route;
- The serving of a unique residential and employment catchment; and
- The retention of the QBC / Core Bus Corridor service on the R108 corridor would be consistent with serving future proposed land use planning objectives, including the redevelopment of Phibsborough and the Technological University of Dublin (TUD) Grangegorman Campus Development.

3.3.2.2 Finglas Section – Route Options Assessment

The Finglas Section route was sub divided into two sub-sections, as shown in Image 3.14 (see Section 3.3.2.2.1, for further assessment and refinement.

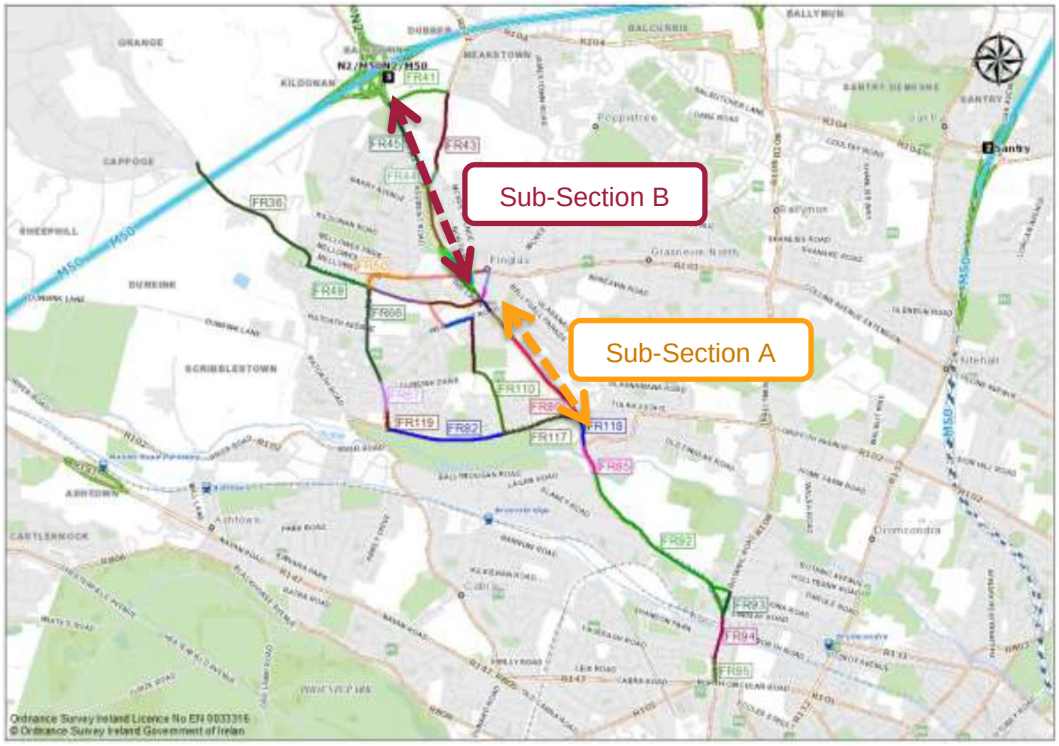

Image 3.14: Stage 2 Route Options Sub-Section Division (Finglas Section)

Subsequent to the Feasibility Study and Options Assessment Report, the overall Core Bus Corridor route was divided into three distinct sections as follows, for each to be progressed as separate schemes:

- Finglas Road between St. Margaret's Road and Hart's Corner (which is the Proposed Scheme in this EIAR);
- Tyrrelstown to Finglas Road (via Church Street, Finglas); and
- Charlestown to Finglas.

Therefore, only Finglas Sub-Section A of the route options assessment remains relevant to this Proposed Scheme (see Section 3.3.2.2.1).

3.3.2.2.1 Finglas Sub-Section A (Finglas South Area): Stage 2 Route Options Assessment

In Finglas Sub-Section A, four route options were identified for further assessment, as shown in Image 3.15.

These routes all start on Cappagh Road to the west of Finglas Village, as follows:

- Routes FP01(A) and FP01(B), the most northerly options are similar, linking from Cappagh Road north along Cardiffsbridge Road and then east along Mellowes Road to meeting the R135 Finglas Road interchange, with two variants at Finglas Village to connect to R135 Finglas Road on the eastern side;
- Route FP02 (the most westerly option shown in Blue on the map) diverts south from Cappagh Road along Cardiffsbridge Road and runs east along Tolka Valley Road to meet the R135 Finglas Road;
- Route FP03 continues straight along Cappagh Road to meet the R135 Finglas Road at Church Street and heads south along the R135 Finglas Road; and
- Route FP04 takes the least direct route to the R135 Finglas Road Junction with Tolka Valley Road, from Cappagh Road via Patrickswell Place, Wellmount Road, Farnham Drive and St. Helen's Road to Tolka Valley Road.

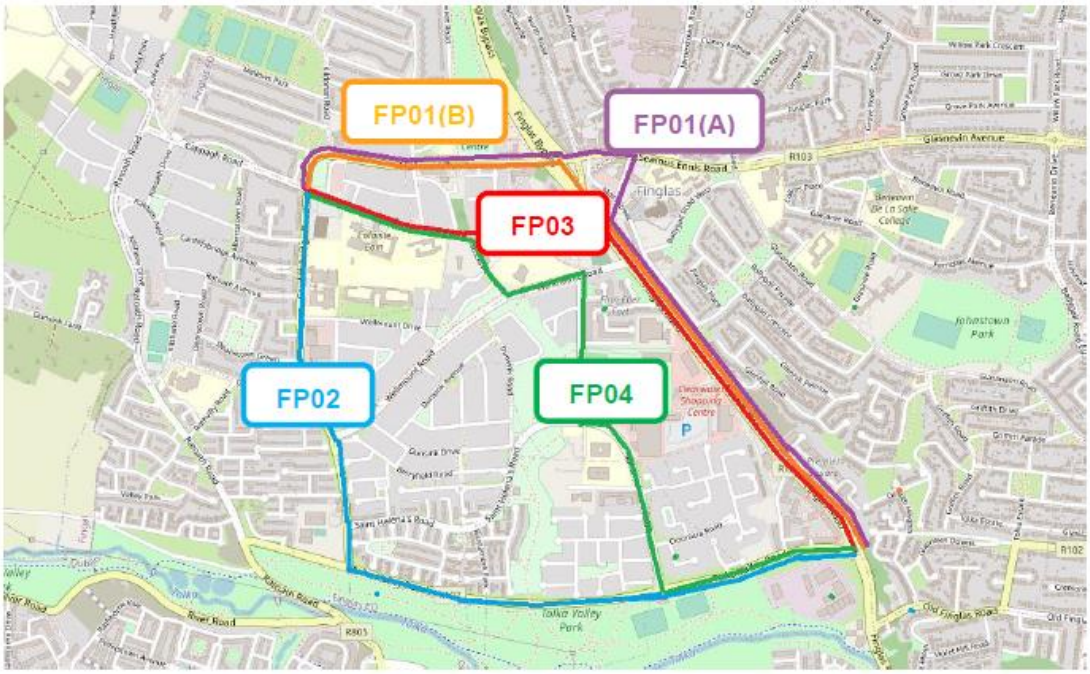

Image 3.15: Finglas Sub-Section A (Finglas South Area) Route Options

Option FP03 was identified as the preferred option for this section. With regard to the consideration of the Environment criterion, Option FP03 was considered to have some advantages when compared to all other options due to the lower impact on some environmental sub-criteria such as land use and character, landscape and visual and flora and fauna.

With the decision by NTA in 2019 to truncate the Finglas to Phibsborough Core Bus Corridor Scheme at Finglas Village, and not to extend it north-westwards to Cappagh and Tyrrelstown or northwards to the Charlestown Area at this stage, the various route options west of the R135 Finglas Road, or north beyond the Village were no longer progressed, and therefore, the Proposed Scheme was streamlined to an upgrade of the existing bus corridor along the R135 Finglas Road as far as the Mellowes Road Junction in Finglas Sub-Section A. In addition, a separate proposal has been brought forward from the GDA Transport Strategy (NTA 2016a) to extend the Luas Green Line northwards from Broombridge through Finglas West to Finglas Village and onwards as far as Charlestown to the north near the M50 Motorway (Luas Finglas). This light rail system service will replace the previous proposals for a Core Bus Corridor through the same catchment area.

3.3.3 Cycling Options

Consideration of alternative cycling route options was fundamental in the process of defining the EPR. In general the EPR was proposed to align with the primary Cycle Route 3 in the GDA Cycle Network Plan (NTA 2013) which is generally routed from the City Centre through Phibsborough along the Royal Canal Bank.

Where cycle facility options have been comparatively assessed in order to determine the preferred option for a cycle route, the assessment was based on a methodology that assesses options using the 'Five Needs of a Cyclist' outlined in the National Cycle Manual guidelines (NTA 2011), together with Capital Cost and Environmental Impacts. The cycle route options were assessed using the criteria and rationale presented in Table 3.1.

Table 3.1: Alternative Cycle Route Assessment Criteria

Appraisal Criteria	Rationale
1. Capital Cost	• Capital cost estimates consist of both the indicative infrastructure cost estimate and land acquisition costs; • The cycle route infrastructure cost examines the practicality and extent of works required to accommodate cycle route infrastructure along route options; • This criterion evaluates the likely costs associated with land acquisition and associated boundary/accommodation works for each route option. The assessment takes consideration of: o The number of adjacent public/commercial/ residential / industrial properties, from which land acquisition would be required as well as the extent (area) of land acquisition likely to be necessary; and o The costs associated with boundary/accommodation works.
2. Road Safety	• For the purposes of comparing route options, the extent of segregation and the number of junctions along the route has been used as a proxy for road safety. The number of junctions is effectively a measure of the number of potential conflicts on the route and therefore a measure of the potential for a collision; • The type of movement required by the cyclist at junctions on the route is also considered with routes where turning movements (either left or right) are required being assigned a lower ranking in terms of safety; • The quality of cycle provision practically achievable on route options has been assessed. For comparison purposes, the highest level of practical cycle provision achievable on each route has been determined and compared between route options.
3. Coherence	• This criterion considers whether a route option forms part of the GDA Cycle Network Plan (NTA 2013), with routes where CBC and designated Cycle Routes overlap given a higher designation in terms of benefits arising where cycle infrastructure can be provided as part of a proposed CBC scheme. In some instances, however it may be more appropriate to provide a parallel cycle track off the CBC route. Consideration is also given to cycle routes intersecting with the CBC route. The cycle route should also link the main origin and destination zones along the CBC route.
4. Directness	• For the purposes of comparing route options, the number of junctions, length of the route and the number of detours and gaps from the CBC has been used as a proxy for directness.
5. Attractiveness	• The cycling environment along the route should be pleasant and interesting. Monotony and lack of points of interest along the cycle route are unattractive to cyclists. Cycle routes should also be adequately lit so as not to deter evening and night-time use.
6. Comfort	• The quality of cycle provision practically achievable on route options has been assessed. For comparison purposes, the highest level of practical cycle provision achievable on each route has been determined and compared between route options.
7. Environmental	• The provision of segregated cycle tracks has the potential to impact on the archaeological, architectural and cultural heritage environment. At this stage of the assessment process, a conservative approach has been adopted in assessing the potential for impact and this is further described below. The provision of segregated cycle tracks has the potential to impact on flora and fauna, the townscape / streetscape along the route and on the land use character through land take, severance or reduction of viability which prevents or reduces it from being used for its intended use.

In the following locations it was determined to be beneficial to provide an alternative cycle route along quiet streets as follows:

- Through Phibsborough, along R108 Phibsborough Road over a length of 1.1km from the Royal Canal to R135 Western Way, the street is too narrow to accommodate both bus lanes and cycle tracks. The option of a three-lane layout with discontinuous bus lanes and bus priority signal control was considered, but this would have introduced greater risk for reliable bus operations. Instead, there is a suitable parallel cycle route, just 100m to the east of R108 Phibsborough Road, along Royal Canal Bank which will cater for the majority of cyclists along the corridor. It will link towards the City Centre via Geraldine Street and Blessington Street, or via R135 Western Way to Bolton Street. For local cycle trips it will be necessary to share the bus lanes through Phibsborough in a suitably low-speed 30km/h (kilometres per hour) environment;
- South of R135 Western Way, along R108 Constitution Hill and R132 Church Street, an additional cycle route was identified to extend through the Markets Area along quiet streets. This differs slightly from Cross-City Cycle Route C6 as shown in the GDA Cycle Network Plan, in that it follows the very quiet route of Anne Street North and St. Michan's Street, instead of the busier Beresford Street, Greek Street and Chancery Place. This option also passes closer to the heart of the Markets Area, while still joining the River Liffey only 25m east of O'Donovan Rossa Bridge; and

- At Hart's Corner where Cycle Routes 3A and 3B converge, an initial option considered one-way cycle tracks parallel to the one-way traffic gyratory system. However, there is a pinch-point at the southern end of R135 Finglas Road where a segregated cycle track would require narrowing of the footpath in front of a row of shops, which would be undesirable. Such an arrangement would also have required northbound cyclists towards Ballymun to travel around two sides of the triangle, with two crossings of busy traffic streams if coming from the east. A better alternative option was developed that would integrate with the proposed quiet street cycle route along Royal Canal Bank through Phibsborough, and with the Royal Canal Greenway, by provision of a segregated two-way cycle track along the eastern side of the traffic gyratory on R108 Prospect Road and R108 Botanic Road, which would displace one of the two southbound traffic lanes on that side.

3.3.4 Emerging Preferred Route

Informed by the appraisal of options, as set out in earlier sections, the EPR was identified.

The EPR for the Ballymun Section of the Proposed Scheme was summarised as follows:

> '*The Ballymun Core Bus Corridor (CBC) commences on the R108 Ballymun Road at its junction with Santry Avenue and Balbutcher Lane (Santry Cross) and is routed along Ballymun Road, St. Mobhi Road, Botanic Road, Prospect Road, Phibsborough Road, Constitution Hill and Church Street as far as Arran Quay, where it will join the prevailing traffic management regime on the North Quays.*'

The EPR for the Finglas Section of the Proposed Scheme was summarised as follows:

> '*The Finglas Core Bus Corridor commences on the R135 Finglas Road at the junction between the Finglas Road and St. Margaret's Road and is routed along the Finglas Road as far as Hart's Corner. At Hart's Corner inbound buses are routed along Prospect Way and Botanic Road, and outbound buses along Prospect Road. Priority for buses is provided along the entire route, consisting primarily of dedicated bus lanes in both directions. Continuous segregated cycle tracks are provided from Church Street junction to Hart's Corner. The Finglas Core Bus Corridor shares the route of the Ballymun Core Bus Corridor from Hart's Corner to Arran Quay*.'

A public consultation on this EPR was undertaken from 26 February 2019 to 31 May 2019, providing feedback which was then meaningfully considered in the further development of the scheme proposal.

3.4 Design Alternatives

3.4.1 Development of the Draft Preferred Route Option

Following the completion of the public consultation process in relation to the EPR, various amendments were made to the scheme proposals to address a number of the issues raised in submissions, including incorporating suggestions and recommendations from local residents, community groups and stakeholders, and / or arising from the availability of additional information. These amendments were incorporated into the designs and informed a draft PRO.

This additional design development took account of:

- New and updated topographical survey information;
- Output from engagement and consultation activities on the EPR and draft PRO proposals;
- Further design development and options assessment; and
- Changes in the extent of the scheme.

Where substantial revisions had been made to the design since the publication of the EPR, options were assessed using MCA to determine the PRO. The MCA assessed any newly developed options (as discussed below) against the previously identified EPR. The methodology and MCA used were consistent with that carried out during the initial route optioneering work (including consideration of the relevant environmental aspects), which informed the identification of the EPR.

Following this design development process, the draft PRO was identified. For ease of reference, the draft PRO was divided into three 'sections' for the Ballymun Section and two 'sections' for the Finglas Section of the Proposed Scheme.

The three sections for the Ballymun Section include:

- Section 1 - St. Margaret's Road to Griffith Avenue;
- Section 2 - Griffith Avenue to Phibsborough (Royal Canal); and
- Section 3 - Phibsborough (Royal Canal) to Ormond Quay.

The two sections for the Finglas Section include:

- Section 4 - St. Margaret's Road Junction to Slaney Road Junction; and
- Section 5 - Slaney Road Junction to Prospect Way (Hart's Corner).

3.4.1.1 Section 1 - St. Margaret's Road to Griffith Avenue

The EPR proposal for this sub-section commenced at the Santry Cross junction at the northern end. Since bus services continue further north along R108 Ballymun Road, it was decided in the PRO to extend the Core Bus Corridor another 0.5km further north to the junction of R108 Ballymun Road and St. Margaret's Road, which would benefit the bus services to a greater degree.

Opportunities were identified for improvements or modifications to the design proposals for the following sub-sections:

- Sub-Section 1B: Ballymun Main Street between Shangan Road and Gateway Crescent:
  - Two options (Option A and B) were assessed for the section of Ballymun Main Street between Shangan Road and Gateway Crescent. One option (Option A) was to maintain the two general traffic lanes while the second option (Option B) looked at the reduction of the general traffic lanes down to one lane and to include on-street parking and additional street trees. There is currently a cluster of frontage activity that generate requirements for parking and loading along Ballymun Main Street. Part-time pay and display parking is permitted on the eastern side, but this is at the expense of operational time limitations for public transport and cycling facilities. On the western side, there is regular unauthorised parking activity that blocks the northbound bus lane, especially in the afternoon and evening. Traffic assessment found that the current two general traffic lanes provide more traffic capacity than is necessary. It was therefore decided to reduce the layout of Ballymun Main Street to one general traffic lane per direction, over the 250m length between the Shangan Road Junction and Gateway Crescent Junction. This option (Option B) will provide a significant enhancement of the urban realm by reducing the proportion of the street assigned for traffic movements. It will enable full-time parking bays to be provided on both sides of the street, with additional street trees, and full-time bus lanes and cycle tracks alongside. Overall, in terms of the sub-criteria under the Environment criterion, the preferred option (Option B) was more advantageous than Option A in terms of landscape and visual, and land use and built environment.
- Sub-Section 1C: Ballymun Road between Collins Avenue and St. Pappin Road:
  - Two options (Option A and B) were assessed for this sub-section. On R108 Ballymun Road, south of the R103 Collins Avenue Junction, there is the potential to provide formalised on-street car parking by reducing the number of general traffic lanes from two to one in the northbound direction. There is currently unauthorised parking and stopping activity at various times on the western side of R108 Ballymun Road associated with Our Lady of Victories National School on the western side. There is no vehicular drop-off zone at the school which gives rise to disorganised on-street parking at school collection times. This blocks the northbound cycle lane over a length of approximately 200m, as well as partially encroaching into the bus lane. The advantages of this refined road layout option (Option B) will be to protect the proposed cycle track and the bus lane from being impeded by parking, by providing designated parking on R108 Ballymun Road between St. Pappin Road and Our Lady of Victories National School. Overall, in terms of the sub-criteria under the Environment criterion, the preferred option (Option B) was more advantageous than Option A in terms of landscape and visual, and land use and built environment.

- Sub-Section 1D: The Griffith Avenue Traffic Gyratory System:
    - Two options (Option A and B) were assessed for this sub-section. It was originally proposed in the EPR (Option A) for a three-lane and one-way road layout, with a bus lane, a shared left-turn and straight ahead lane and a separate right-turn lane on R108 St. Mobhi Road on the southbound approach to the junction with R102 Griffith Avenue. The left-turn flow is quite high at this location because of the gyratory system that directs eastbound traffic from R102 Griffith Avenue West around the one-way system to share with traffic from R108 Ballymun Road along the 100m length of R108 St. Mobhi Road. This creates a significant conflict between left-turn traffic and straight-ahead bus and cyclist movements. An evaluation of the traffic demands at this location indicated that the removal of one of the three existing traffic lanes would be problematic and would overload the remaining two traffic lanes. It is clear therefore, that allocation of one of the three existing traffic lanes on this link to become a bus lane will require a reduction in the general traffic flows to match the reduced capacity of the two remaining traffic lanes. This can be achieved by removing the left-turn movement entirely and reversing the one-way system partially to divert the southbound to east traffic from R108 Ballymun Road around the western and southern sides of the triangle, to be joined by traffic from the west, which will be enabled to continue directly eastward along the southern arm. Thus, the left-turn conflict at R102 Griffith Avenue would be removed entirely for the benefit of buses, cyclists and pedestrians. The assessment concluded that the preferred option in Sub-Section 1D is Option B to reorganise the one-way traffic system to benefit the proposed bus corridor and cyclists. Overall, in terms of the sub-criteria under the Environment criterion, there was no appreciable difference between options.

3.4.1.2 Section 2 – Griffith Avenue to Phibsborough (Royal Canal)

- Bus Priority Options in Section 2:
    - Two options (Option A and B) were assessed for this section. In the EPR there were two potential options for bus priority and associated traffic management provided for public comment. Option A would provide for bus priority along R108 St. Mobhi Road and northbound through-traffic would be diverted to other routes to the west. Option B would require widening along R108 St. Mobhi Road to provide additional bus lanes; and
    - Following this review of the EPR proposals, the PRO chosen was Option A. This option will not require road widening on R108 St. Mobhi Road, instead providing a northbound Bus Gate at the northern end at R102 Griffith Avenue and restricting northbound traffic to local access only. Northbound through-traffic will be diverted to parallel routes to the west at two locations including a southern diversion point for regional traffic at Hart's Corner onto the R135 Finglas Road and a northern diversion point for local traffic at the Botanic Road Junction with R108 St. Mobhi Road. For traffic diverted along Botanic Road, the most direct alternative route would follow Glasnevin Hill and then turn right at the Met Éireann office onto the lower section of Ballymun Road, which is too narrow for increased two-way traffic. It was concluded that the most preferable option would be to direct this traffic to a wider and more suitable alternative route via Cremore Villas further west. To complement the diversion route, it is proposed that the southern end of Ballymun Road would be restricted to one-way traffic southbound between Claremont Avenue and Church Avenue to divert northbound traffic to the appropriate route. This will also assist residents in this area by formalising on-street parking due to an absence of driveways along the narrowest section of the street between Claremont Avenue and Church Avenue. Overall, in terms of the sub-criteria under the Environment criterion, the preferred option (Option A) was more advantageous than Option B in terms of landscape and visual.
- Road Layout Options in Section 2:
    - This 2.1km long section is quite complex with variations in the existing road width and layout and different constraints along seven discrete sub-sections (Sub-Section 2A to 2E):
        - Section 2A - St. Mobhi Road from Griffith Avenue to the River Tolka Bridge – A Bus Gate will be adopted at the northern end; no further layout options were identified for this assessment;
        - Three options (Option A, B and C) were assessed for Sub-Section 2B - St. Mobhi Road from the River Tolka Bridge to Botanic Avenue. Both options for the EPR proposals involved the removal of the existing parking on the eastern side of the street, south of the River Tolka Bridge. There is no off-street parking at the row of eight houses on the

eastern side of the street at No.66 to No. 80 St. Mobhi Road, and submissions from these residents objected to the removal of the existing parking. A further option was developed to widen on the western side, which was assessed to be the most preferrable option (Option B) as parking would be retained and there would be no impact to gardens. Overall, in terms of the sub-criteria under the Environment criterion, the preferred option (Option B) performed the same as Option A and was more advantageous than Option C in terms of air and noise, and land use and built environment, but less advantageous under the landscape and visual criterion;

- Three options (Option A, B and C) were assessed for Sub-Section 2C - St. Mobhi Road from Botanic Avenue to Botanic Road. In this sub-section the EPR for Option A proposed an adjusted road layout by narrowing the two existing wide general traffic lanes and removing the southbound cycle lane to accommodate a new southbound bus lane. The existing northbound traffic lane would become a bus lane and local access traffic would be diverted around the block via Botanic Road and Botanic Avenue. Segregated 2m wide cycle tracks would be provided in both directions on the verges and all the existing 26 street trees along this section would be removed in this scenario with proposed replacement trees to be planted between the cycle tracks and narrowed footpaths. Option B would involve road widening to provide two bus lanes and two traffic lanes, involving the removal of all the existing street trees and widening into the gardens of 16 houses on the eastern side to provide space for segregated 2m wide cycle tracks and 2m wide footpaths, but without verges or replacement trees. A third option (Option C) was developed with one bus lane in the southbound direction, two traffic lanes and narrow 1.25m wide cycle tracks behind the existing trees that would be retained with the footpaths narrowed to 1.8m. The assessment concluded that the preferred option in Sub-Section 2C was Option C. Overall, in terms of the sub-criteria under the Environment criterion, the preferred option (Option C) was more advantageous than Options A and B in terms of landscape and visual, and flora and fauna, and more advantageous than Option B for land use and built environment;
- Three options (Option A, B and C) were assessed for Sub-Section 2D - Botanic Road from St. Mobhi Road to Prospect Way. In this sub-section, the EPR proposed the reorganisation of the road layout from the existing two general traffic lanes with advisory cycle lanes to accommodate a new northbound bus lane. All modes (bus, traffic, and cyclists) would share a single southbound lane uphill for 250m, from the northern end until the start of a bus lane for the 150m length approaching the Prospect Way Junction. Northbound cyclists would share the bus lane in the downhill direction. Two other alternative options were assessed, which included Option B for a southbound bus lane and Option C for cycle tracks on both sides of the road and signal controlled priority for buses in both directions with no bus lane. The assessment concluded that the provision of cycle tracks was the most preferrable option (Option C) for Integration and Safety as there would be no gap in the cycle network and cycle tracks could be segregated in each direction, while bus priority would be achieved through bus priority signals on the approaches. Overall, in terms of the sub-criteria under the Environment criterion there was no appreciable difference between options; and
- Three options (Option A, B and C) were assessed for Sub-Section 2E – The Hart's Corner Traffic Gyratory including R108 Botanic Road south of Prospect Way, the southern end of R135 Finglas Road, Prospect Way and R108 Prospect Road to Whitworth Road just north of the Royal Canal at Phibsborough. The Finglas Section will join the Ballymun Section of the Proposed Scheme at this location, and they will share the Hart's Corner traffic gyratory. In the EPR (Option A), the cycle route followed the same circulation system as general traffic, with one-way cycle tracks around most of the traffic gyratory along both the R108 Prospect Road and Prospect Way arms in full, but only partially along the R135 Finglas Road on the western side north of Dalcassian Downs. Northbound cyclists were not provided with a segregated cycle track over a length of 260m northward from the Royal Canal to Dalcassian Downs, and they would have been required to share the bus lane over this section. On the Ballymun Section, cyclists intending to continue north along R108 Botanic Road are currently required to follow the traffic gyratory around two sides of the triangle at Hart's Corner and to cross two major traffic streams. Extensive road widening was required for Option

A with encroachment into gardens along the eastern side of R108 Botanic Road and the western side of R135 Finglas Road. A review of the cycling facilities at Hart's Corner identified an opportunity to remove one traffic lane on R108 Botanic Road for a two-way cycle track on the eastern and northern sides of the traffic gyratory. This would complement the proposed cycle route along Royal Canal Bank on the eastern side of Phibsborough with a continuation northward along the eastern side of R108 Prospect Road on the most direct link to R108 Botanic Road. A two-way link along Prospect Way will then connect to R135 Finglas Road. Two further options were developed with a two-way cycle track (Options B and C). Option B involved moderate road widening with much less need for land take from gardens compared to Option A, and with widening into a smaller number of longer gardens on the eastern side of R135 Finglas Road, rather than a large number of small gardens on the eastern side. In Option C, a short length of northbound bus lane was omitted on R135 Finglas Road, which minimised the need for road widening and encroachment into only a small number of gardens. This option (Option C) at Hart's Corner was assessed as the preferrable option as it would provide full segregation of cyclists with minimal road widening. Overall, in terms of the sub-criteria under the Environment criterion, there was no appreciable difference between options.

3.4.1.3 Section 3 - Phibsborough (Royal Canal) to Ormond Quay

- Sub-Section 3A - Phibsborough Road from Whitworth Road to Western Way and Royal Canal Bank Cycle Route. Two options (Option A and B) were assessed for the provision of bus priority and cycling facilities along this section. From the Royal Canal southwards, R108 Phibsborough Road varies in width and is typically 18m wide in the narrowest section south of the junction of Doyle's Corner at R101 North Circular Road. The street is too narrow for the provision of both segregated cycle tracks and bus lanes, for which an overall width of 22m would be necessary. Similar to R108 Botanic Road further north, the choice therefore is between bus lanes in both directions and no cycle tracks along R108 Phibsborough Road, with an alternative parallel quiet street cycle route along Royal Canal Bank (Option A), or a bus lane in one direction only with cycle tracks (Option B). The assessment concluded that the preferred option in Sub-Section 3A is Option A with bus lanes in both directions, and a separate cycle route along Royal Canal Bank which runs parallel to the east of R108 Phibsborough Road. Overall, in terms of the sub-criteria under the Environment criterion, there was no appreciable difference between options;
- Sub Section 3A at Cross Guns Bridge: Phibsborough Road crosses the Royal Canal at Cross Guns Bridge immediately south of the junction with Whitworth Road. The existing footpath on the western side of the bridge is very narrow at just 1.6m wide which is below the minimum standard, especially for such a busy location. In future it is expected that pedestrian activity across Cross Guns Bridge will increase dramatically when a new combined railway and metro station is opened just north of the bridge to serve the separately proposed DART+ West and MetroLink projects. It is desirable therefore to widen the western footpath on the bridge to at least 3m. There are two options for this:
    - Option A: to widen the western footpath by 1.4m and narrow the eastern footpath, with bus lanes retained in both directions; or
    - Option B: to omit the southbound bus lane for a short distance over the bridge to enable wide footpaths on both sides, and instead to use signal-controlled priority for buses at the Whitworth Road Junction.

  The assessment concluded that the preferred option at Cross Guns Bridge was Option B with a northbound bus lane and signal-controlled priority for southbound buses, which will enable wide footpaths on both sides of the bridge. Overall, in terms of the sub-criteria under the Environment criterion, there was no appreciable difference between options;
- Sub Section 3A at the Royal Canal Bank - Where the Royal Canal Bank cycle route crosses R101 North Circular Road, it was proposed to provide an at-grade toucan signal crossing (Option A). The potential for an improved and grade-separated crossing at R101 North Circular Road was assessed. At present there is a level difference of

approximately 3m between the north and south Royal Canal Bank and R101 North Circular Road. On the southern side there is no ramp to connect the two streets, with a set of steps on the western side. In the EPR, cyclists and pedestrians would have been required to climb new ramps for the 3m level change and then wait for a traffic signal to cross the busy R101 North Circular Road. An alternative option (Option B) would be to provide a bridge under R101 North Circular Road to enable the north to south cycle route to pass through without cyclists having to climb the 3m level difference and to prevent delays of a traffic signal crossing. This option would involve greater cost and greater disruption during the Construction Phase including the loss of the existing landscaping until the area is reinstated and new landscaping is provided. However, Option B would provide a far superior facility for cyclists and pedestrians. It would also reinstate the integrity and continuity of the former canal route, where the original Blaquiere's Bridge was once located, and link the southern part of the linear park through to Phibsboro Library on the northern side. Overall, in terms of the sub-criteria under the Environment criterion, the preferred option (Option B) was more advantageous than Option A in terms of landscape and visual, heritage (architectural and archaeological), and land use and built environment; and

- Sub-Section 3B from Western Way to Ormond Quay - One adjustment is proposed to the EPR in this section with two options considered (Option A and B). For Option B, a two-way cycle track will be provided over a length of 200m along the eastern side of R108 Constitution Hill from the R135 Western Way Junction, alongside King's Inns Park to connect to Coleraine Street. Careful works will be required in the vicinity of the row of mature trees along the western side of R108 Constitution Hill, where a new footpath will be provided as part of the minor road widening to accommodate the proposed cycle tracks. From the southern corner of King's Inns Park, a quiet-street cycle route will be directed through the Markets Area along Coleraine Street, Lisburn Street, Linenhall Street, Anne Street North, George's Hill, St. Michan's Street, Ormond Square and Charles Street West to R148 Ormond Quay on the River Liffey. In combination with the proposed Royal Canal Bank cycleway, this would complete a 2.4km long separate cycle route all the way from the Royal Canal to the River Liffey that will avoid the main traffic route.

3.4.1.4 Section 4 –St. Margaret's Road Junction to Slaney Road Junction

The following alternatives were considered for the R135 Finglas Road between the R104 St. Margaret's Road Junction and the Slaney Road Junction:

- The addition of a northbound bus lane, north of Mellowes Road:
  - Two options (Option A and B) were assessed for this section. In the EPR option, it was proposed to widen the existing road carriageway on the Finglas Bypass in the northbound direction to provide a bus lane where there is none at present, over a length of 400m from the end of the existing merge ramp at the Mellowes Road Junction to the roundabout at R104 St. Margaret's Road Junction. The proposed road widening in Option A to accommodate a northbound bus lane, while maintaining two northbound general traffic lanes, would have required encroachment into the verge on the western side by up to 3m which would remove some of the existing landscaping along the boundary with Mellowes Park to the west. There is a single traffic lane in each direction along the rest of R135 Finglas Road and there is no benefit from the retention of two northbound traffic lanes, north of Mellowes Road, so Option B would convert one of the traffic lanes to a bus lane and thus avoid the need for road widening. The options assessment concluded Option B was preferred. Overall, in terms of the sub-criteria under the Environment criterion, the preferred option (Option B) was more advantageous than Option A in terms of land use and built environment.
- Impact on street trees for the provision of cycle tracks on Finglas Road:
  - Two options (Option A and B) were assessed for this section. The EPR proposed to provide segregated cycle tracks along the R135 Finglas Road dual carriageway between Wellmount Road and the Old Finglas Road over a length of 1.2km, by removal of the existing grass verges and trees along the edges of the road. An alternative option was identified (Option B) by narrowing the existing road carriageway to fit cycle tracks instead of converting the existing grass verges to segregated cycle tracks. The alternative option would reduce the

encroachment into the grass verges to just 0.5m at the outer edges in order to fit a 2m wide cycle track, but with localised narrowing to 1.5m when passing the trees. The cycle track would encroach by 1.5m onto the existing 7.5m wide road carriageway which would reduce the road carriageway to 6m in width. The options assessment concluded that it is preferable to minimise the impact on the existing environment in terms of the loss of existing trees, and to improve the cycling facilities by narrowing the existing road carriageway footprint and retaining the existing verges and trees along the road edges. Overall, in terms of the sub-criteria under the Environment criterion, the preferred option (Option B) was more advantageous than Option A in terms of flora and fauna, geology, hydrology and hydrogeology, and landscape and visual.

- Extension of the northbound cycle track to Mellowes Road:
    - An opportunity was found to extend the northbound cycle track by 250m northward from Church Street to Mellowes Road without any environmental disbenefits, to provide a more convenient link from primary Radial Cycle Route 3B to Orbital Route NO4, which are included in the GDA Cycle Network Plan (NTA 2013). In the absence of the extension of the northbound cycle track, cyclists wishing to reach the north-western area of Finglas would be likely to continue along the bus lane on the R135 Finglas Road dual carriageway and then take the slip ramp to Mellowes Road at the grade-separated junction on the Finglas Bypass. The layout on the existing wide single lane slip ramp will be realigned with a narrower traffic lane to include a bus lane and a 1.5m wide cycle track. Overall, in terms of the sub-criteria under the Environment criterion, the preferred option (Option B) was more advantageous than Option A in terms of flora and fauna, geology, hydrology and hydrogeology, and landscape and visual.

3.4.1.5 Section 5 - Slaney Road Junction to Prospect Way (Hart's Corner)

The following alternatives were considered for the R135 Finglas Road, between the Slaney Road Junction and Hart's Corner:

- Parking on R135 Finglas Road at Glasnevin Cemetery:
    - Two options (Option A and B) were assessed for this section. An opportunity was identified to create a larger off-road parking facility opposite Glasnevin Cemetery by minor widening into the adjoining public open space with some loss of grass area but retaining all of the existing trees. This would retain the same number of parking spaces as the existing arrangement, rather than losing half the parking as had been previously proposed in the EPR. The proposed new layout (Option B) will ensure traffic on R135 Finglas Road, particularly buses, will not be impacted by the manoeuvres required by drivers to parallel park. The increased provision of parking spaces will minimise the extent of overflow parking into Claremont Lawns. Overall, in terms of the sub-criteria under the Environment criterion, there was no appreciable difference between options.
- Road widening along R135 Finglas Road between Glasnevin Cemetery and Hart's Corner:
    - Two options (Option A and B) were assessed for this section. In the EPR, it was proposed to widen the R135 Finglas Road on the western side. This would have affected 20 properties, including 19 houses and St. Vincent's Secondary School. The road widening impact at properties with already short driveways would have adversely affected parking space within private lands. A review of the proposed design identified an alternative arrangement (Option B) with road widening on the eastern side of the street affecting fewer properties (10 houses compared to 19) with larger gardens that could retain off-street parking. In further refinement in Option C, it is no longer proposed to widen the R135 Finglas Road at the southern end, reducing the impact to only St. Vincent's Secondary School by road widening on the western side of the street and three gardens at properties at Bengal Terrace on the eastern side. Overall, in terms of the sub-criteria under the Environment criterion, the preferred option (Option C) was more advantageous than Options A or B in terms of landscape and visual, air and noise, and land use and built environment.

3.4.2 Consideration Following Draft Preferred Route Option Consultation (March 2020)

The draft PRO was published in March 2020 and a second round of public consultation occurred between 4 March 2020 and 17 April 2020. Due to COVID-19 restrictions in mid-March 2020, the planned Public Information Events were impacted. There was a total of 25 submissions received during this second round of public consultation, 22 for the Ballymun Section and three for the Finglas Section.

A number of changes to the design were made based on feedback received during the second round of public consultation and dialogue with stakeholders. However, the changes made to the draft PRO were relatively small scale and no further options assessments using the MCA described in Section 3.3.1 were required.

Key changes for the Ballymun Section of the Proposed Scheme implemented in the design of the updated draft PRO include:

- It is proposed to narrow Ballymun Main Street from two general traffic lanes to one general traffic lane in each direction over a 200m section in the town centre between Shangan Road and Gateway Crescent. This could facilitate the provision of full-time parking on both sides of the street with up to 50 new trees for enhancement of the town centre amenities and visual environment;
- It is proposed to maintain the existing bus and general traffic lanes in the southbound direction between R103 Collins Avenue and R102 Griffith Avenue, and to narrow from two general traffic lanes to one in the northbound direction over a 200m section between St. Pappin Road and 100m south of R103 Collins Avenue, while retaining a bus lane;
- It is proposed to provide 11 on-street parking spaces on the western side of the road south of Our Lady of Victories Primary Schools on R108 Ballymun Road;
- It is proposed to change to a partial two-way traffic operation on the western and southern sides of the R102 Griffith Avenue gyratory system. This will accommodate a southbound bus lane on R108 St. Mobhi Road upper, and remove left-turning traffic onto R102 Griffith Avenue eastbound, which will improve safety for cyclists and overall traffic efficiency;
- It is proposed to introduce traffic management measures on St Mobhi Drive that will restrict through traffic in the westbound direction only; and
- Bus stop locations have been modified in this revised proposal, with some bus stops relocated or removed to achieve better spacing between stops, while also ensuring that each stop is sited in the best location to serve surrounding neighbourhoods. These proposals will also ensure a more efficient bus network operation.

For the Finglas Section of the Proposed Scheme:

- It is proposed to extend the northbound cycle track at Finglas Village by 250m from Church Street to Mellowes Road to complete connectivity in the westward direction to Secondary Orbital Cycle Route N04 from the GDA Cycle Network Plan (NTA 2013); and
- Bus stop locations have been modified in this revised proposal, with some bus stops relocated or removed to achieve better spacing between stops, while also ensuring that each stop is sited in the best location to serve surrounding neighbourhoods. These proposals will also ensure a more efficient bus network operation.

3.4.3 Further Consideration Following Draft Preferred Route Option Consultation (November 2020)

This third round of non-statutory public consultation on the draft PRO took place from 4 November to 16 December 2020 and was held virtually due to the continuing effect of the COVID-19 pandemic and associated restrictions.

There were a total of 242 submissions received during this third round of public consultation (230 for the Ballymun Section and 12 for the Finglas Section), ranging from individual submissions by residents, commuters, and local representatives to detailed proposals from various associations.

Arising from the feedback received during this consultation process, a number of design amendments were identified, considered and, ultimately incorporated into the scheme proposals. The key changes included in the updated design of the draft PRO include the following:

- The need for widening of the southern end of R135 Finglas Road south of Prospect Way was removed through refinement of the road layout design to retain the existing footpath widths and with one less bus lane;
- Additional pedestrian crossings are proposed at Hart's Corner and on R108 Phibsborough Road at locations suggested by the local community;
- An extended urban realm area will be provided at the southern end of Hart's Corner in front of the shops and businesses in the central island area between R108 Botanic Road and R135 Finglas Road; and
- The western footpath on Cross Guns Bridge will be widened from less than 2m to 4m wide by omission of the southbound bus lane on the eastern side of the bridge. Segregated bus priority traffic signals at the Whitworth Road Junction will provide appropriate bus priority instead.

No major scheme design alternatives were considered to the Proposed Scheme following the draft PRO consultation.

3.5 Conclusion

The Proposed Scheme has been the subject of a systematic and comprehensive assessment of reasonable alternatives during the course of its development, informed by extensive engagement with residents, businesses, local authorities and other interested stakeholders, public representatives and the general public.

As described in this Chapter, a significant range of alternatives have been considered at three levels:

- Strategic alternatives, particularly with regard to the GDA Transport Strategy (NTA 2016a);
- Route alternatives; and
- Design alternatives, incorporating detailed local level design development.

The assessment of alternatives took account of environmental impacts, alongside other relevant factors including the economy, safety and accessibility, at all stages of the process.

It is considered that the examination of alternatives presented in this Chapter meets and exceeds the requirements of the EIA Directive and Section 50(2)(b)(iv) of the Roads Act (as amended), which states that an EIAR must contain '*a description of the reasonable alternatives studied by the road authority or the Authority, as the case may be, which are relevant to the proposed road development and its specific characteristics, and an indication of the main reasons for the option chosen, taking into account the effects of the proposed road development on the environment*'.

The Proposed Scheme is described in full in Chapter 4 (Proposed Scheme Description).

3.6 References

DoT (2016). Common Appraisal Framework for Transport Projects and Programmes

NTA (2011). National Cycle Manual

NTA (2012a). Bus Rapid Transit (BRT) Core Dublin Network

NTA (2012b). Greater Dublin Area Draft Transport Strategy 2011 -2030

NTA (2013). Greater Dublin Area. Cycle Network Plan

NTA (2016a). Transport Strategy for the Greater Dublin Area 2016 – 2035

NTA (2016b). Strategic Environmental Assessment of the Transport Strategy for the Greater Dublin Area 2016 – 2035

NTA (2016c). Ballymun to City Centre Core Bus Corridor Feasibility Study and Options Assessment Report

(NTA 2016d) Finglas – Phibsborough Feasibility Study and Options Assessment Report

UITP (2009). Public Transport: Making the right mobility choices

Directives and Legislation

Directive 2011/92/EU of the European Parliament and of the Council of 13 December 2011 on the assessment of the effects of certain public and private projects on the environment

Directive 2014/52/EU of the European Parliament and of the Council of 16 April 2014 amending Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment

Number 14 of 1993 - Roads Act, 1993 (as amended)

Number 15 of 2008 - Dublin Transport Authority Act 2008