

Chapter 03

Consideration of Reasonable Alternatives

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3. Consideration of Reasonable Alternatives

3.1 Environmental Impact Assessment Requirements

Article 5(1)(d) of Directive 2011/92/EU, as amended by Directive 2014/52/EU (“the EIA Directive”) requires that an 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 the Roads Act 1993, as amended (“the Roads Act”) states that 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 [as 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 Clongriffin to City Centre Scheme (hereafter referred to as the “Proposed Scheme” or “proposed development”), 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 GDA Transport Strategy

The Transport Strategy for the Greater Dublin Area 2016-2035 ("**GDA Transport Strategy**") was prepared by the NTA pursuant to section 12 of the 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 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 & Ride Study;
- Transport Modelling Analysis; and
- Environmental reports.

Specifically, a Strategic Environmental Assessment (SEA) was undertaken on the GDA Transport Strategy (NTA 2016). 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 strategy. The provisions of the GDA Transport Strategy (including bus-based transport modes), were evaluated for potential significant effects, and measures integrated into the 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 kilometer.

In addition to direct studies and analyses undertaken as part of the 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:

- GDA Cycle Network Plan (2013);
- Bus Rapid Transit – Core Network Report (2012);
- Fingal / North Dublin Transport Study (2015);
- Review of the DART Expansion Programme (2015);
- Various prior Luas studies (including Line B2 (Bray), Line D1 (Finglas), Line F1, and F2 (Lucan and Liberties), and Line E (2008); and
- Analysis carried for a 2011 Draft Transport Strategy.

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 the 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 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.

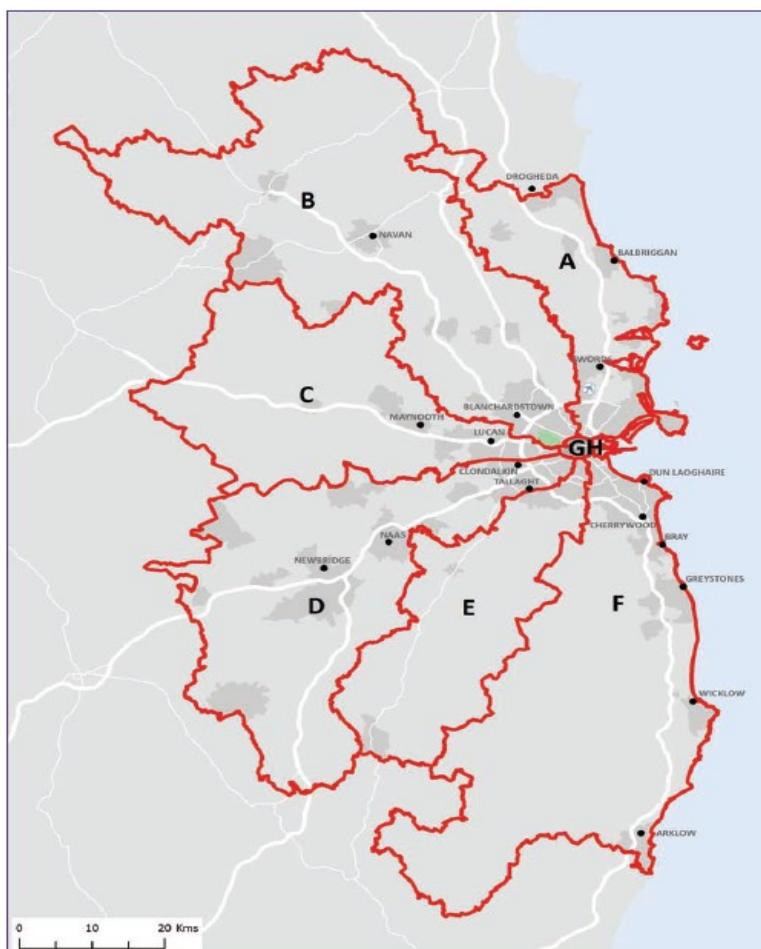


Image 3.1: Transport Strategy Corridors

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 Clongriffin to City Centre Core Bus Corridor Scheme is largely located in Corridor A in the GDA Transport Strategy which extends from the core City Centre area through to Swords and North County Dublin and on towards Drogheda. The Proposed Scheme is within the Inner Metropolitan segment traversing through largely low to medium density suburban areas.

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 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 Clongriffin to City Centre Core Bus Corridor Scheme, bus lanes are currently provided on approximately 68% and 79% of 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” Alternative, 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 alternative relative to the outcomes which can be realised by the Clongriffin to City Centre Core Bus Corridor Scheme.

3.2.3 Bus Rapid Transit (BRT) Alternative

Bus Rapid Transit (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.

A Bus Rapid Transit (BRT) – Core Network Report, prepared in 2012 (NTA 2012) 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.

Further consideration was given to a Clongriffin to City Centre BRT scheme, which included route option identification and analysis, selection of an Emerging Preferred route for the corridor and development of the design for the emerging preferred route.

Prior to the completion of these studies, the GDA Transport Strategy identified the development of a number of Core Bus Corridors as BRT schemes, including the Malahide Road (Clongriffin) to Tallaght 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 CBCs, 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 bus corridors, given the better ratio of seated to standing passengers on such vehicles.

Accordingly, it is intended that all of the Core Bus Corridor 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 CBCs and the advantages identified above of a unified integrated bus system.

Environmentally the BRT option compared to the CBC 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 landtake and potentially involve demolition of buildings at pinch-points. In the case of the CBC 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 (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 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 set out various studies undertaken for the GDA Transport Strategy. Arising from these studies and the specific assessment and transport modelling work undertaken for the 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 upgrade of the DART on the Northern Line to provide more capacity as well as a potential extension of the electrification of the Northern line to Drogheda as part of the DART Expansion programme. It was considered that there would be insufficient demand to justify the provision of a light rail alternative, particularly given the low to medium density nature of development in this corridor.

Similar to BRT environmentally the light rail option compared to the CBC 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 landtake and potentially involve demolition of buildings at pinch-points. In the case of the CBC proposals bus-priority can be achieved through short lengths at pinch-points by the use of signal-control priority.

3.2.5 Metro Alternative

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 identified that a metro solution would not be economically justified within the area covered by this corridor. Accordingly, the GDA Transport Strategy included a bus solution supplemented by increased capacity provision on the DART line along this corridor and a potential extension of the electrification of the Northern Line to Drogheda as the appropriate public transport arrangement.

In addition, 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.

Environmentally the metro option compared to the CBC proposal would be more impactful in terms of construction impacts, including flora and fauna, heritage, air and noise. Metro systems require unbroken physical lane infrastructure to achieve high-priority. This would involve significantly more landtake and potentially involve demolition of buildings at pinch-points. In the case of the CBC proposals bus-priority can be achieved through short lengths at pinch-points by the use of signal-control priority.

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 CBC 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 landtake and potentially involve 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. 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 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 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. 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.

In addition to a potential new heavy rail solution, the potential upgrade to the existing DART Coastal Northern Rail line which is contained within the broader corridor was considered as part of the development of the GDA Strategy. In 2015, the NTA carried out a review of the key transport infrastructure projects that were proposed to support the growth of the Greater Dublin Region. This included a review of the DART Expansion Scheme which included DART Underground, the Fingal/North Dublin Study and a study of the orbital movements around Dublin all designed to inform the GDA Transport Strategy. Image 3.2 below shows the various projects in the DART Expansion Programme.

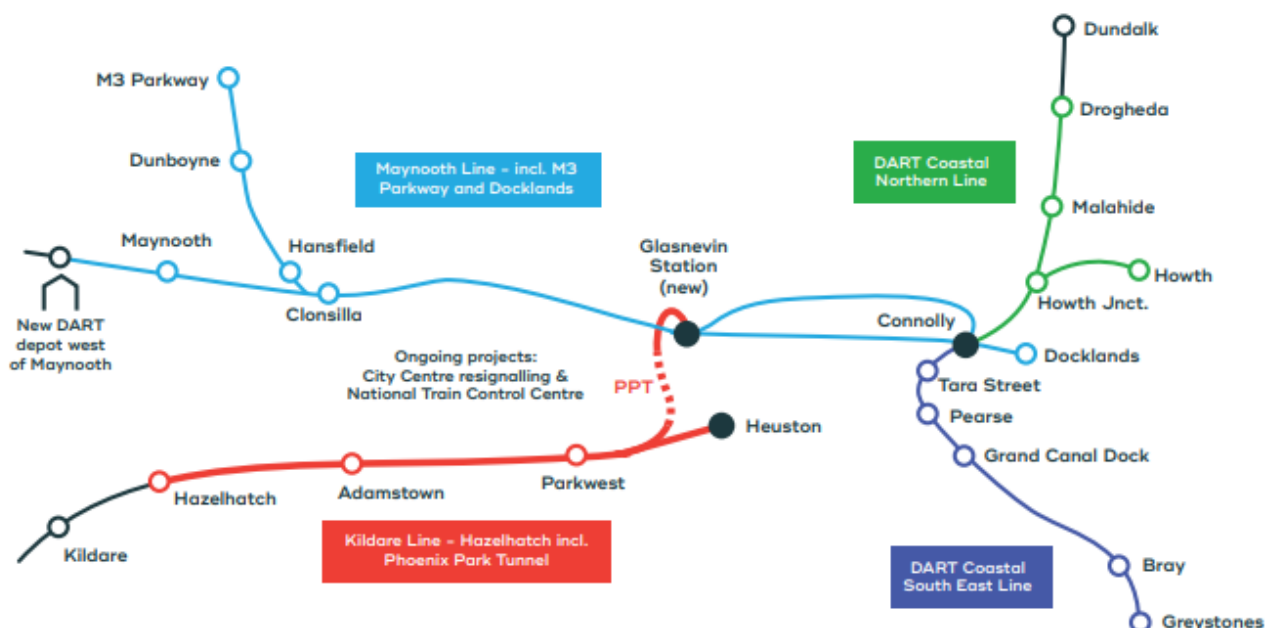


Image 3.2: DART Expansion Programme (Source: Irish Rail Website)

Accordingly, the GDA Transport Strategy included the upgrade of the DART Coastal Northern Line and extension of the of the rail line electrification to Drogheda, as part of a phased delivery of DART Expansion, supplemented with a higher quality bus solution along this Transport Strategy Corridor as the appropriate public transport configuration. Environmentally the combination of rail upgrade involving limited construction works and the upgrade of the Proposed Scheme to achieve high-quality bus priority and safer cycling and walking infrastructure represent a balanced strategy by limiting the overall construction impact while enhancing the capacity for sustainable people-movement options.

3.2.7 Demand Management Alternative

One of the primary aims of the GDA Transport Strategy 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 and 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 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 GDA Transport Strategy is to significantly increase the capacity, and subsequent use, of the public transport system, focusing on the overall BusConnects Programme in the case of the bus system, the DART+ Programme in the case of heavy rail, and the Luas/Metro 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 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 minimize maintenance frequencies.

Ultimately, however, alternatives have to be able to accomplish the objectives of the project 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) A **Feasibility and Options Report** was concluded in 2018, setting out the initial route options and concluding with the identification of an Emerging Preferred Route;
- 2) A first round of non-statutory **Public Consultation** was undertaken on the Emerging Preferred Route from 14 November 2018 to 29 March 2019;
- 3) Development of **Draft Preferred Route Option** (April 2019 to March 2020). Informed by feedback from the first round of public consultation, stakeholder and community engagement and the availability of additional design information, the design of the Emerging Preferred Route evolved with further alternatives considered;
- 4) A second round of non-statutory **Public Consultation** was undertaken on the Draft Preferred Route Option 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 Preferred Route Option** 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 Preferred Route Option from 04 November 2020 to 16 December 2020; and
- 7) Finalisation of **Preferred Route Option**. Informed by feedback from the overall public consultation process, continuing stakeholder engagement and the availability of additional design information, the Preferred Route Option, 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 impact 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 physically footprint of the 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 Preferred Route Option for the Proposed Scheme. Environmental specialists have been involved in the iteration of key aspects of the Proposed Scheme with the engineering design 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 CBC infrastructure. The assessment had regard to Recorded Monuments and Protected Structures (RMPs), Sites of Archaeological or Cultural Heritage and on buildings listed on the National Inventory of Architectural Heritage adjacent to the corridor;
- **Flora and Fauna** - The provision of the CBC could have negative impacts on flora and fauna, for example, through construction of new infrastructure through green field sites;
- **Soils and Geology** - Construction of infrastructure necessary for the provision of the CBC 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 CBC infrastructure may include aspects (for example structures) with the potential to impact on hydrology;
- **Landscape and Visual** - Provision of CBC 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 CBC infrastructure (e.g., the 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 and Options Report identified feasible options along the corridor, assessed these options and arrived at the Emerging Preferred Route, which then formed the basis of the first phase of public consultation. A summary of the process is described below.

The Feasibility and Options Reports used a two-stage assessment process to determine the Emerging Preferred Route, 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 aspects (summarised in Section 3.3) 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 (described in Section 3.3.2) in accordance with the Department of Transport Document “Common Appraisal Framework for Transport Projects and Programmes”

The study area for the corridor comprised of two main sections. Section 1 examined feasible route options from Belmayne to Fairview and Section 2 examined feasible route options from Fairview to the city centre. Section 2 no longer forms part of the CBC route assessment, as this portion of the corridor is being developed by Dublin City Council under the Clontarf to City Centre Cycle & Bus Priority project (which has planning approval), which interfaces with the Proposed Scheme at Marino Mart at the Malahide Road/Clontarf Road junction. Further discussion on the Section 1 route options assessment process is provided below. The potential for cumulative impacts as a result of the Proposed Scheme in combination with the Clontarf to City Centre Cycle & Bus Priority project is assessed in Chapter 21 (Cumulative Impacts & Environmental Interactions).

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), that could accommodate a Core Bus Corridor was identified for each study area section as shown in Image 3.3 (extracted from the Feasibility and Options Report).



Image 3.3: Section 1 (Belmayne to Fairview) Spider's Web of Route Options extracted from Feasibility and Options Report

The initial “spider’s web” was narrowed down having considered 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 issues, high-level environmental aspects (as summarized in Section 3.3 and an analysis of population catchments. Numerous links forming part of the “spider’s web” 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. For example, Collins Avenue East (Link L1.54 in Image 3.3), which is a residential road with on-street parking and residential accesses on both side and also a primary route on the GDA Cycle Network Plan, was not advanced to Stage 2 assessment. This road has no cycle facilities and construction of the Proposed Scheme infrastructure would require significant land take from gardens to provide dedicated bus lanes and would also result in the complete removal of residential parking in several gardens along the route. Such construction works would have negative GHG impacts and added to the overall route length. This was therefore not considered a viable route option for the Proposed Scheme.

Arising from consideration of the various permutations possible in respect of the “spider’s web”, 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 3.4.

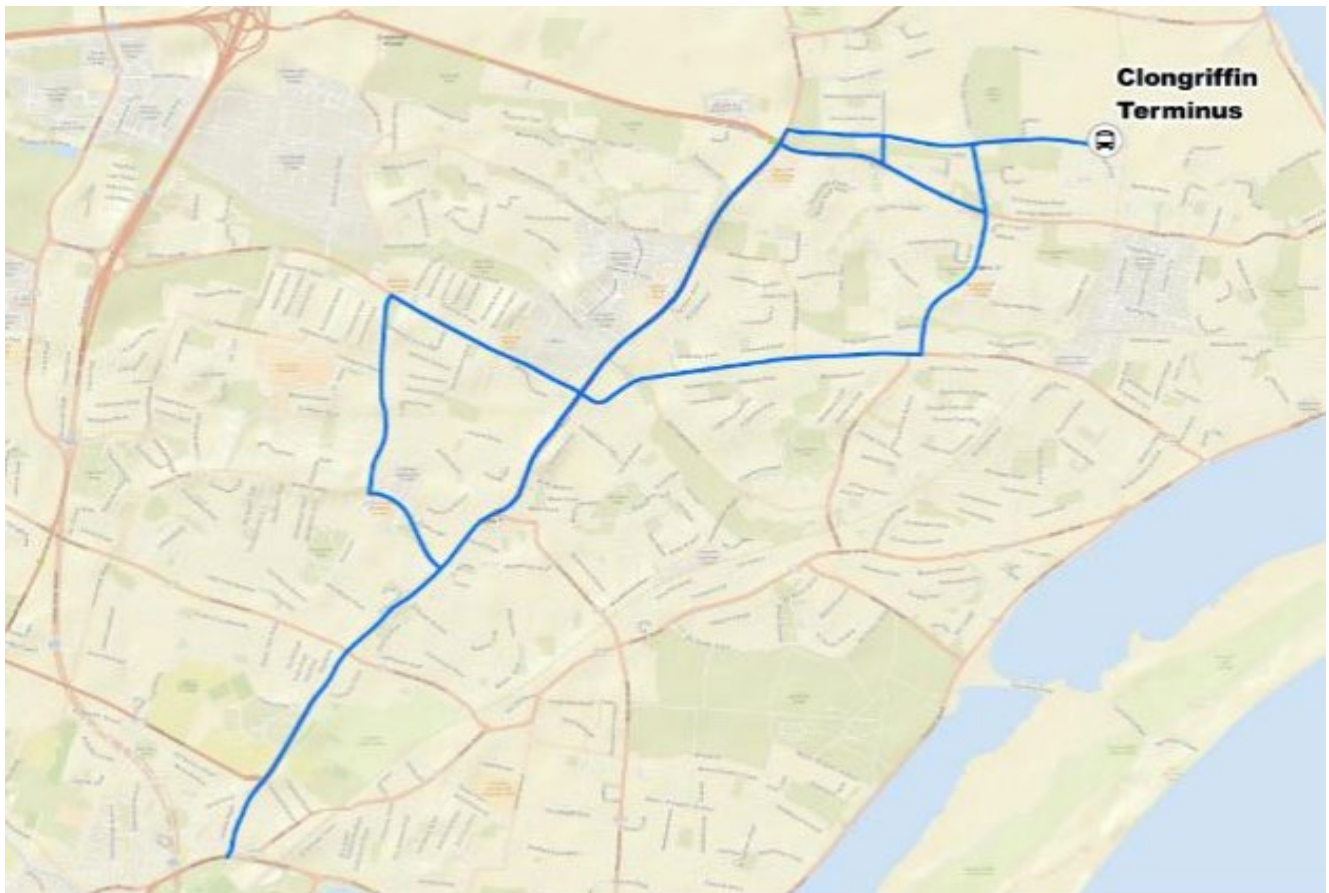


Image 3.4: Route Options from Initial Sift

3.3.2 Stage 2 – Route Options Assessment

Following completion of 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 evaluated using a multi-criteria assessment. The 'Common Appraisal Framework for Transport Projects and Programmes' published by the Department of Transport, Tourism and Sport (DTTAS), March 2016, requires schemes to undergo a 'Multi-Criteria Analysis' (MCA) which evaluated the route options under the assessment criteria set out below:

1. Economy
2. Safety
3. Integration
4. Accessibility & Social Inclusion
5. Environment

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 Emerging Preferred Route:

- **Archaeological, Architectural and Cultural Heritage** – there is the potential for impacts on archaeological, architectural and cultural heritage when providing CBC infrastructure. The assessment had regard to Recorded Monuments and Protected Structures (RMPs), Sites of Archaeological or Cultural Heritage and on buildings listed on the National Inventory of Architectural Heritage adjacent to the corridor;
- **Flora and Fauna** - The provision of the CBC could have negative impacts on flora and fauna, for example, through construction of new infrastructure through green field sites;
- **Soils and Geology** - Construction of infrastructure necessary for the provision of the CBC 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 CBC infrastructure may include aspects (for example structures) with the potential to impact on hydrology;
- **Landscape and Visual** - Provision of CBC 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 CBC infrastructure (e.g., the construction activities), has the potential to negatively impact on noise, vibration and air quality along a scheme. For example, through construction works. The impact was quantified on whether the road is moving closer to a sensitive receptor, for example road widening or new realignment; and
- **Land Use and the Built Environment** - This criterion assesses the impact of an 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.

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. The route was sub divided into two sub-sections (see Image 3.5) for further assessment and refinement with the second sub section consisting of one feasible route from the initial sifting exercise.

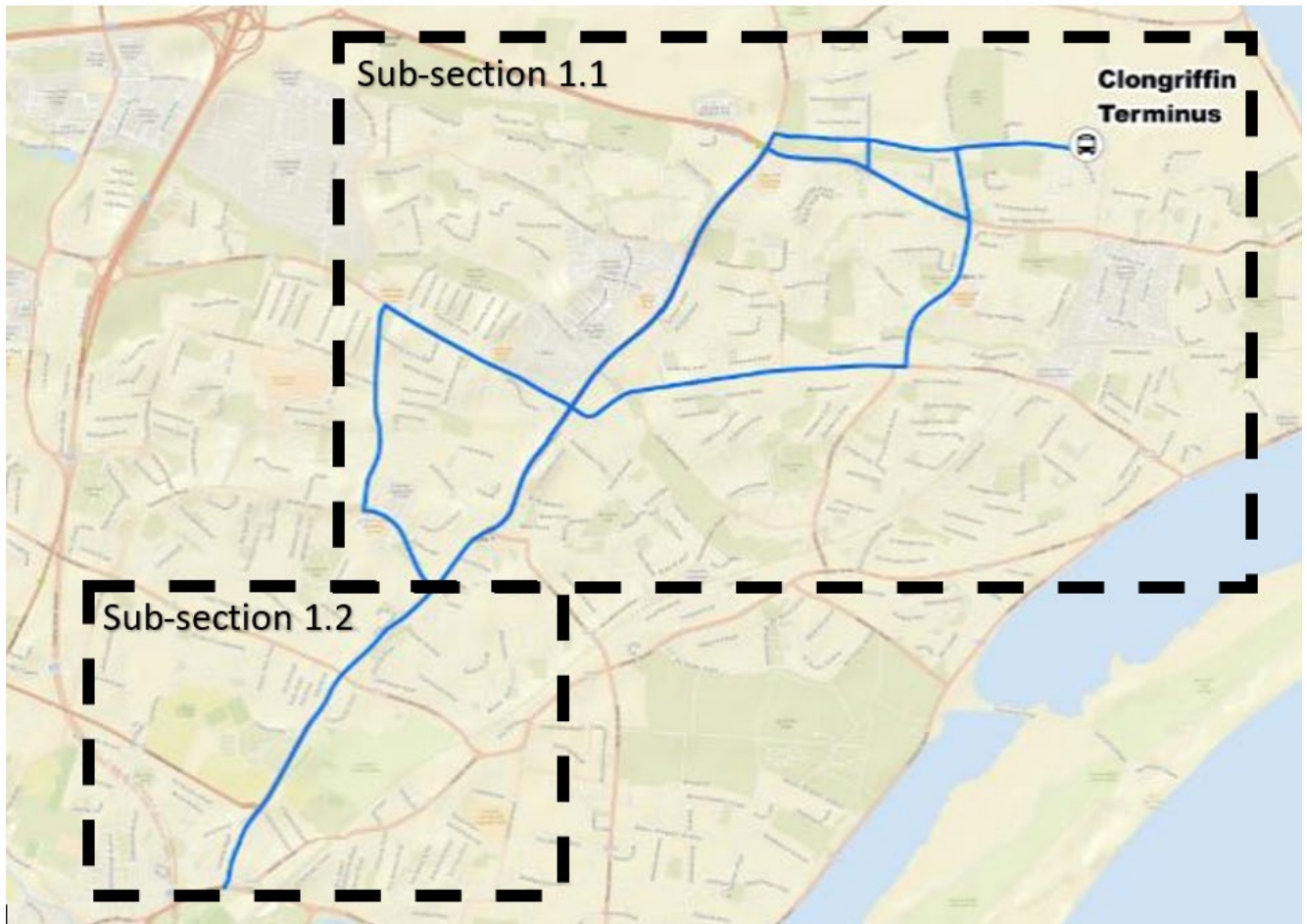


Image 3.5: Stage 2 Route options sub-section division

3.3.2.1 Sub-Section 1.1: Route Options Assessment

Following the Stage 1 sifting process, four viable route options for sub-section 1.1, were taken forward for assessment and further refinement with Clongriffin Dart Station noted as the terminus as follows:

- Route Option 1: Using Clongriffin Main Street, Malahide Road, Oscar Traynor Road and Kilmore Road;
- Route Option 2: Using Clongriffin Main Street and Malahide Road;
- Route Option 3: Using Grange Road, Tonlegee Road and Malahide Road; and
- Route Option 4: Using Grange Road, Tonlegee Road, Oscar Traynor Road, and Kilmore Road.

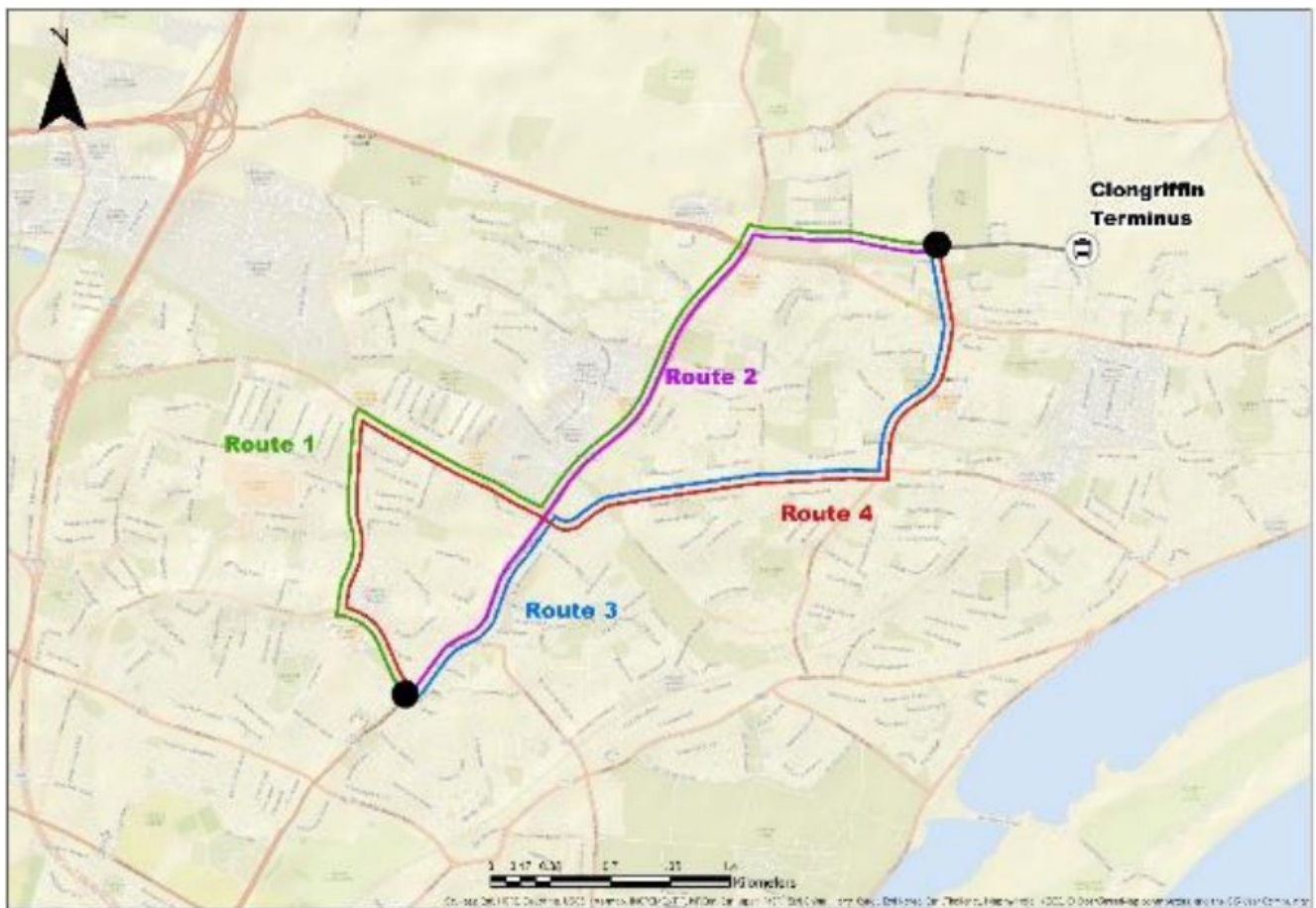


Image 3.6: Sub-Section 1.1 (Clongriffin to Artane) Route Options

Route Option 1 commences at the junction of Hole in the Wall Road and Clongriffin Main Street, from here the bus travels along Clongriffin Main Street, to join the Malahide Road via the Belmayne Main Street and Belmayne Avenue Scheme proposed by Dublin City Council (which has been granted planning approval). Clongriffin Main Street already has dedicated bus lanes and the Belmayne Main Street and Belmayne Avenue Scheme, also incorporates dedicated bus lanes. A new “bus only” junction will be constructed where Main Street meets Malahide Road and signals will provide priority for buses using the CBC route. Road widening and realignment will be required to provide bus lanes on the Malahide Road section. The route continues south and turns west onto Oscar Traynor Road and travels via Kilmore Road to return to the Malahide Road. Further south along the Malahide Road existing bus lanes are utilised by the CBC and segregated cycle lanes are provided by using existing verge space or by reducing the width of the median where appropriate. The existing roundabout at Priorswood Road junction would be upgraded to a signalised junction.

Route Option 2 provides a similar routing from the Hole in the Wall Road junction to Malahide road. From here the route continues south along the Malahide Road until it reaches the junction with Kilmore Road providing a more direct alternative route to Route Option 1.

Route Option 3 and 4 provide a similar alternative route from the Hole in the Wall Road junction to Oscar Traynor Road travelling south along Grange Road and Tonleegge Road. Option 3 turns south at Oscar Traynor Road along Malahide Road until it reaches the junction with Kilmore Road. Option 4 follows a similar alignment to that of Route Option 1 from Oscar Traynor Road via Kilmore Road and back to Malahide Road.

As mentioned previously, each route option was evaluated using a multi-criteria assessment with one of the primary criteria being ‘Environment’, under which there was 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 2 had significant advantages when compared to the other options as there were no RMP sites in proximity to the route and no protected structures directly affected.

With regard to Flora and Fauna it was considered that Route Options 2 and 3 were similar, with some impacts anticipated along these route options such as the loss of scattered mature trees within and alongside the route along the Malahide Road, where fringes of amenity grassland/parkland, roadside verges and central median including planted trees would be impacted. However, in comparison it was considered that Route Options 3 and 4 would give rise to greater flora and fauna impacts owing to the loss of mature trees, areas of greater ecological value and faunal connectivity and therefore had some disadvantages over the other options.

For the Soils and Geology sub-criterion, Route Options 1, 3 and 4 were considered to be similar in terms of their potential for impact, with some disturbance of soils and geology expected with the area of land take required and therefore had some disadvantages when compared to Route Option 2. Route Option 2 by comparison is considered to have some advantages as it requires a lower area of land take and localized impacts on soils and geology.

All four route options were considered neutral when compared against one another under the Hydrology sub-criterion.

Route Option 2 was considered to have some advantages over the other three options with regard to landscape and visual impacts as it would make use of the existing Malahide Road corridor utilising the existing bus lanes and there were considered to be no particular landscape or visual sensitivities. Route Options 1, 3 and 4 were considered to be similar in having some disadvantages compared to Route Option 2. There was considered to be potential high visual impact on properties on a number of roads including Grange Road, Tonlegee Road, Oscar Traynor Road and Kilmore Road due to road widening and removal of grass trees and verges.

For the Noise and Air Quality sub-criteria it is acknowledged for all options that should traffic move closer to receptors (or traffic volumes increase) there may be an increase in noise or in pollutant concentrations with respect to Air Quality. All four options could give rise to positive and negative impacts. However in comparison to the other 3 options, Route Option 2 was considered to have some advantages as this option would result in the lowest number of properties being affected in terms of land take (and thereby moving infrastructure closer to the least number of properties).

When the options were considered under the Land Use and Built Environment sub-criteria, Route Options 1, 3 and 4 were considered to have some disadvantages when compared to Route Option 2. The three options had a greater potential to impact open spaces (along Kilmore Road, Grangemore Park and by the Santry River). In addition, Route Options 1 and 4 would require removal of greater numbers of residential and commercial parking when compared to Route Option 2. Route Option 2 was therefore considered to have some advantages given the lower impact on existing land use character and the built environment.

Route Options 1 and 4 provide for a slightly higher population density than the other options due to the longer routing in a residential catchment. Of the four options shown above Route Option 2 provides the most direct route to the Malahide Road providing fast and more reliable bus journey times than the other options. It is also noted this option provides the best alignment with the primary cycle network routing for GDA cycle network strategy and aligns with the provisions of the Belmayne Local Area Plan.

Route Option 2 was identified as the preferred option for this section. With regard to the consideration of the Environment criterion, Route Option 2 was considered to have some advantages when compared to the other options due to the significantly lower land take and construction works that would be required because of the existing bus lanes and wide road reservation. Option 2 was therefore brought forward into the Emerging Preferred Route.

3.3.2.2 Sub-Section 1.2: Route Options Assessment

Following the Stage 1 sifting process, the remaining links in this section (from Kilmore Road to Clontarf Road), were assembled together to form one viable direct route, which along with the Malahide Road section was brought forward into the Emerging Preferred Route (see Image 3.5).

This route commences at the junction of Malahide Road and Kilmore Road, from here the route travels south along the Malahide Road via the junction with Griffith Avenue until it reaches the junction with Clontarf Road.

Between Kilmore Road and Griffith Avenue, there is not considered to be another reasonable alternative option for this section. Therefore, in this section option, the Malahide Road will be widened to provide bus lanes on the sections where they do not currently exist, and new segregated cycle lanes will be provided for the whole length. Road widening can mostly be facilitated with land take from public green areas, parks, playing fields of Ardscoil Ris and land from Clontarf Golf Club. However, land take from portions of front gardens would be required either side of the junction with Collins Avenue. In these sections, the cross section will be reduced to minimise land take as no suitable alternate cycle routes were found. The section between Elm Road and Donnycarney Road is particularly constrained and over this section the widths of the cycle tracks have been reduced to 1.5m each in order to balance the need for residential parking and cycle safety. A number of gardens south of Collins Avenue junction will be affected. Parking capacity in these gardens will be reduced, but parking will still be available in the gardens. All junctions will be upgraded to provide bus priority and enhanced pedestrian/cyclist facilities.

The Malahide Road would be widened to provide bus lanes on the sections where they do not currently exist, and new segregated cycle lanes will be provided for. As a result of the widening, land take would be required from public and private ownership boundaries.

From Griffith Avenue to Clontarf Road, the road cross section is particularly constrained. It was not considered feasible to provide dedicated bus, cycle and traffic lanes in both directions along Malahide Road between Clontarf Road and Griffith Avenue, as this would have had a greater impact on residential properties in the area including the removal of off-street parking in the front of a number of the properties with no suitable alternatives available. Consequentially four scheme arrangements were considered in detail for assessment of alternative cross-section configurations along the corridor between Griffith Avenue and Clontarf Road, as shown in Image 3.7.

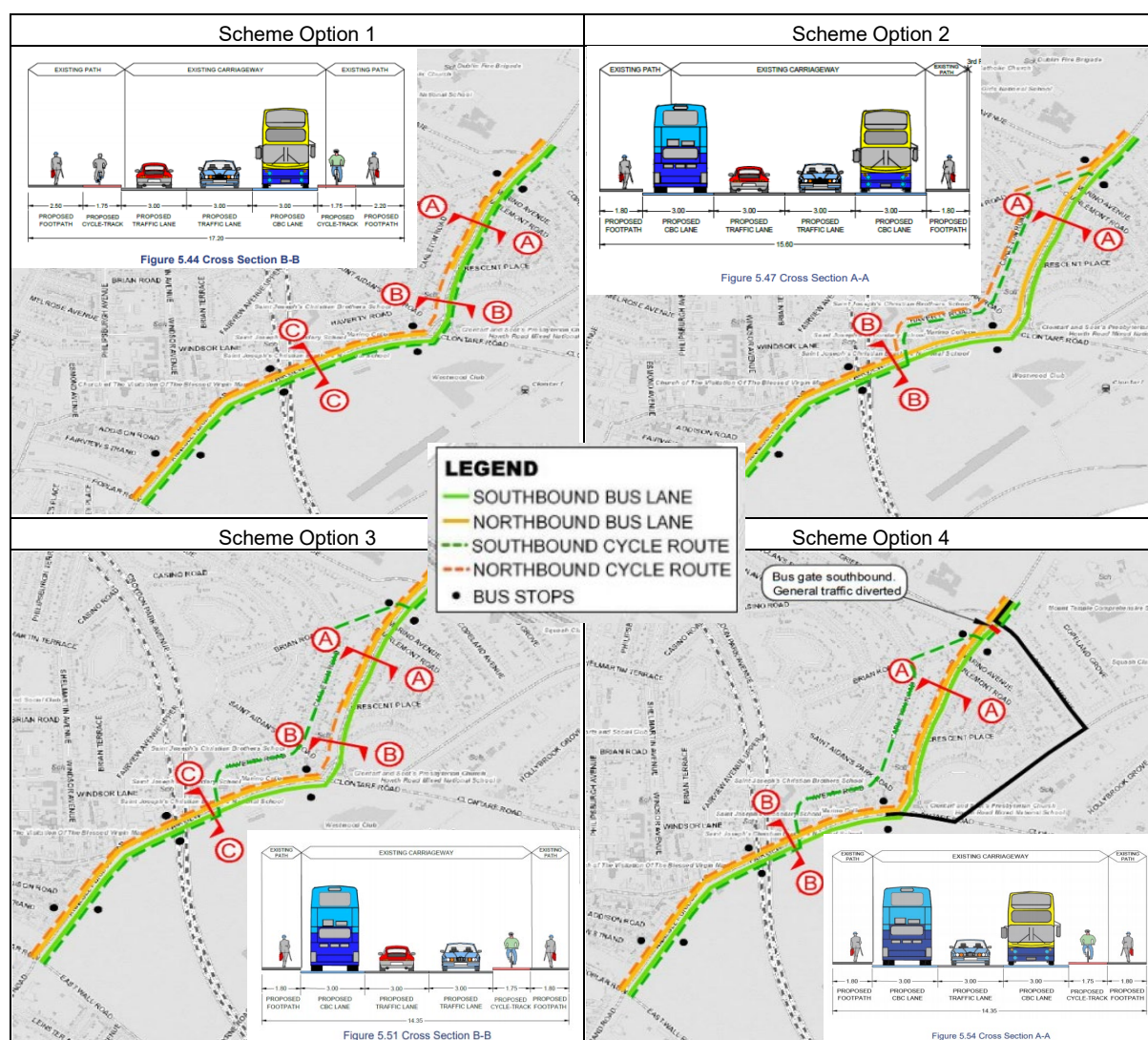


Image 3.7: Alternative Options between Griffith Avenue and Clontarf Road

Scheme Option 1 provides bus and cycle lanes in both directions from Griffith Avenue to Clontarf Road with the exception that outbound buses would be required to share a lane with traffic for an approximate 200m length at the southern end of Malahide Road. Significant land take is required from front gardens of residential properties to achieve this cross section.

Scheme Option 2 is similar to Scheme Option 1 except that both inbound and outbound cyclists would be diverted along Haverty Road and Brian Road and this would allow continuous bus lanes to be provided in both directions between Clontarf Road and Griffith Avenue and by comparison reducing the land take requirements at certain sections as a result of the diverted offline cycle facilities.

Scheme Option 3 differs from Scheme Option 2 by diverting only the inbound cyclists along Haverty Road and Brian Road. Outbound cyclists remain on Malahide Road and similar to Scheme Option 1 a portion of bus lane would be removed for the outbound buses at the southern end of Malahide Road.

Scheme Option 4 explores a different approach whereby inbound traffic is diverted along Copeland Avenue and Howth Road. Inbound cyclists would be diverted similar to Scheme Option 3 along Haverty Road and Brian Road.

As mentioned previously each route option was evaluated using a multi-criteria assessment with one of the primary criteria being 'Environment', under which there was 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 2 and Route Option 4 were considered to have some advantages over the other two route options. While there is the potential for burials to be uncovered within the RMP Zone of Archaeological Potential for Fairview Park any surviving features are likely to have been disturbed by the existing road. In addition no protected structures would be directly affected. Route Options 1 and 3 were considered to have some disadvantages over the other two route options because as well as the potential for burials to be uncovered in Fairview Park, these options could affect the boundaries of two protected structures on the Malahide Road.

With regard to Flora and Fauna it was considered that Route Options 1 and 2 had some disadvantages over Route Options 3 and 4 with minor impacts on habitats anticipated due to land take from gardens.

All four route options were considered neutral when compared against one another under the Soils and Geology and Hydrology sub-criteria with each scheme have similar levels of impact as a result of proposed land take and flood risk potential respectively.

Route Options 2 and 4 were considered to have some advantages over the other two route options with regard to landscape and visual impacts. Options 2 and 4 had lower potential for impact in terms of the landscape impact on architectural conservation and protected structures, the streetscape and visual impact on some properties on Malahide Road.

For the Noise and Air Quality sub-criteria it is acknowledged for Route Options 1 to 3 that should traffic move closer to receptors (or traffic volumes increase) there may be an increase in noise or in pollutant concentrations with respect to Air Quality. These three options could give rise to positive and negative impacts. However in comparison to Route Option 4, the other three route options were considered not to have the potential to give rise to significant Noise and Air Quality Impacts. Route Option 4 was considered to have significant disadvantages when compared to the other three options as the diversion of traffic onto Copeland Avenue has the potential to result in Noise and Air Quality impacts.

When the options were considered under the Land Use and Built Environment sub-criteria, Route Options 1 and 4 and were considered to have some disadvantages when compared to Route Options 2 and 3. Route Option 1 would require considerable change to land use including land acquisition, while Route Option 4 would require significant changes in traffic management infrastructure and considerable changes in traffic volumes along Copeland Avenue. Route Options 2 and 3 would result in less impact in terms of land use compared to the other two route options.

It was determined that Scheme Option 2, diverting inbound and outbound cyclists along Haverty Road and Brian Road, offered the most feasible preferred route option on the balance of the various primary criteria evaluated within this section. Scheme Option 2 achieves a lower estimated capital cost than other options, dedicated bus lanes in both directions offering a resilient solution for bus journey reliability, and it was more favourable from an environmental perspective due to the reduced widening requirements (and therefore land take) against Option 1 and 3. Scheme Option 2 favoured also better from an air quality and noise considerations point of view associated with the traffic diversions on Scheme Option 4.

Scheme Option 2 was identified as the preferred option for this section and was brought forward into the Emerging Preferred Route. A further option was also explored in the development of the Preferred Route Option as discussed in Section 3.4.1.2.

3.3.3 Cycling Options

Consideration of alternative cycling route options was fundamental in the process of defining the Emerging Preferred Route. In general, the Emerging Preferred Route proposed to align with the primary route 1C on the Greater Dublin Area Cycle Network Plan which is generally routed along the Malahide Road.

In the following locations it was determined to be beneficial from an environmental perspective to include alternative roads:

- utilise a short access road in the vicinity of Coolock village as a quiet street for outbound cyclists. Along this section, the cyclists will remain in the vicinity of and parallel to the Malahide Road. This alternative has the environmental benefit of eliminating the necessity to remove existing verge trees;
- utilise St Brendan's Avenue as a quiet street for inbound cyclists from between St. Brendan's Drive to Mask Road. Along this section the cyclists remain in the vicinity of and parallel to the Malahide Road. This alternative has the environmental benefit of eliminating the necessity to remove existing verge trees between St Brendan's Avenue and Malahide Road; and
- divert cyclists and utilise Brian Road, Carleton Road, Haverty Road as quiet streets for both inbound and outbound cyclists between Marino Mart/Marglann Marino junction to Malahide Road/ Brian Road junction. This portion is considered the most prominent cycle diversion along the corridor. By utilising this diversion, the impact of land take from residential properties (and the number of properties affected), on the Malahide Road between Clontarf Road and Marino Avenue has been significantly reduced/eliminated.

3.3.4 Emerging Preferred Route

Informed by the appraisal of options as set out in earlier section, the Emerging Preferred Route was identified. The Emerging Preferred Route is summarised as follows:

'The Core Bus Corridor (CBC) commences at Clongriffin DART Station, and is routed via Clongriffin Main Street which will be extended to join the Malahide Road at a new junction to the north of Clare Hall Junction. The CBC is then routed via Malahide Road to the junction with Marino Mart / Fairview. From here the CBC ties into a separate project, Clontarf to City Centre Cycle Scheme [now the approved Clontarf to City Centre Cycle & Bus Priority project] currently proposed by Dublin City Council.'

A public consultation on this Emerging Preferred Route was undertaken from 14 November 2018 to 29 March 2019, providing feedback which was then meaningfully considered in the further development of the scheme proposal.

Following the Emerging Preferred Route consultation, the design of the scheme was further developed through to the draft Preferred Route Option. This process is described in Section 3.4. In developing the draft Preferred Route Option, it was decided that the section between Clongriffin DART Station to Malahide Road via Clongriffin Main Street be no longer included as part of the Proposed Scheme – refer to Section 3.4.1.1 for further detail.

3.4 Design Alternatives

3.4.1 Development of the Draft Preferred Route Option

Following the completion of the public consultation in relation to the Emerging Preferred Route, 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 Preferred Route Option.

This additional design development took account of:

- New and updated topographical survey information;
- Output from engagement and consultation activities on the Emerging Preferred Route and draft Preferred Route Option 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 Emerging Preferred Route, options were assessed using Multi-Criteria Assessment (MCA) to determine the Preferred Route Option. The MCA assessed any newly developed options against the previously identified Emerging Preferred Route. 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 Emerging Preferred Route.

Following this design development process, the draft Preferred Route Option (PRO) was identified. For ease of reference, the draft Preferred Route Option has been divided into two 'sections':

- Section 1 - Clongriffin Train Station to Griffith Avenue; and
- Section 2 - Griffith Avenue to Clontarf Road.

3.4.1.1 Section 1 - Clongriffin Train Station to Griffith Avenue

The Emerging Preferred Option originally proposed to commence the CBC at Clongriffin DART Station and was routed via Clongriffin Main Street to join the Malahide Road at a new junction (Mayne River Avenue / Malahide Road junction) to the north of Clare Hall Junction.. The Clongriffin Main Street already has dedicated bus lanes and a scheme proposed by Dublin City Council, Belmayne Main Street and Belmayne Avenue Scheme, also incorporates dedicated bus lanes (which has been granted planning approval). In light of the proposed Belmayne Main Street & Belmayne Avenue Scheme and it was determined that the project would provide suitable linkage to Clongriffin Dart Station (and therefore the infrastructure would not need to be provided as part of the Proposed Scheme), and as a consequence the start of the Proposed Scheme was revised to commence at the Mayne River Avenue / Malahide Road junction. Consequently the amended Section 1 CBC commences at Mayne River Avenue and is routed via Malahide Road to the junction with Griffith Avenue.

Between the Kilmore Road junction and Killester Avenue, the Emerging Preferred Route as outlined in the Feasibility and Option Assessment Report indicated that there was a cycle track and footpath alongside the carriageway in the northbound direction, towards Clongriffin. On review of this scheme it became apparent that this proposal would have had a significant impact on the existing boundary wall and approximately 20 mature trees would be lost. To minimise the impact on both the wall and the trees, it was decided to move both the cycle track and footpath away from the carriageway and into the adjacent green area. This revised option was considered to have some advantages in terms of lesser environmental impacts (cultural heritage, flora and fauna and landscape and visual), when compared to the preferred option described in the Feasibility and Option Assessment Report.

Between Killester Avenue junction and Collins Avenue, the Emerging Preferred Route as outlined in the Feasibility and Option Assessment Report indicated the setting back of a stone wall to the front of Thorndale Grove. On review of this scheme it became apparent that this proposal would have had a significant impact on the existing stone wall and approximately 22 mature and significant trees to the back of this wall. To minimise the impact on both the wall and the trees it was decided to adapt the proposal so as to retain the existing stone wall and all 22 no. trees and relocate the road eastwards into May Park. The revised proposal will thereby minimise the impact on the semi-mature trees within the Park. This will require the existing park fence to be removed and a new footpath and railing to be constructed within the Park. The revised proposal (of realigning the Malahide Road towards May Park) when compared to the EPR Option was considered be preferable from an environmental perspective and was therefore taken forward for design development.

Following on from public consultations, there were requests to minimise the impacts on the properties in Mornington Park on the Malahide Road. It was suggested that reducing the number of bus lanes from two to one would reduce the amount of land required by 3m.

Two options were considered utilising Signal Controlled Bus Priority as follows:

- Option 1: utilise Signal Controlled Priority on the inbound carriageway between Danieli Road and Kilmore Road.
- Option 2: utilise Signal Controlled Priority in the opposite direction on the outbound carriageway between Kilmore Road and Danieli Road.

In reviewing the options and taking the Proposed Scheme objectives into account, it is apparent that while there is benefit in both options in the reduction of land take and disturbance to residences, they do however have a significant disbenefit in regard to ensuring Bus Priority and maintaining the flow of traffic.

With regard to Signal Controlled Priority, it is necessary to consider the traffic implications both upstream and downstream of the area under consideration. For the Signal Controlled Priority to operate successfully, queues or tailbacks on the single (shared bus/traffic) lane portion cannot be allowed to develop, as this will result in delays on the bus service and therefore would undermine the bus priority objective.

For Option 1, the signalised junction at Kilmore Road would only allow 3 or 4 cars to queue before impacting on the shared lane section. The Bus Priority signal located at Danieli Road would control all inbound traffic and signalling at Kilmore Road. This would significantly increase the delay to all inbound traffic including buses and other traffic from Kilmore Road.

For Option 2, the signalised junction at Kilmore Road would need to hold general traffic outbound to give priority to the buses. The Bus Priority signal located at Kilmore Road would control all outbound traffic but would have to synchronise with the Ardlea Junction to ensure no tailbacks developed to such an extent that they prevent operation of the Bus Priority. There would be additional delays at Kilmore Road during the operation of the Bus Priority signals including the buses that utilise Kilmore Road. There is also the potential for increase in delay to all inbound traffic including traffic from Kilmore Road.

The PRO proposal has some advantages in terms of public transport network integration (e.g., better operation of the bus route), and has significant advantages with respect to traffic network integration (e.g., expected traffic impact of each route option) when compared to Options 1 and 2. When compared to the PRO Proposal Options 1 and 2 are not considered to enhance the capacity and potential of the public transport system. It will not improve bus speeds, reliability and punctuality through the provision of bus lanes and other measures to provide priority to bus movement over general traffic movements.

Options 1 and 2 has some advantages when compared to the PRO proposal in terms of environmental impact (e.g. reduced land take from residential gardens).

Notwithstanding that Options 1 and 2 have lesser environmental impacts (reduced landtake and associated disturbances to residences) when compared to the PRO proposal it is considered that both these options would not enhance the capacity and potential of the public transport system by improving bus speeds, reliability and punctuality through the provision of bus lanes and other measures to provide priority to bus movement over general traffic movements. Therefore the PRO proposal has been retained as the preferred option.

3.4.1.2 Section 2 - Griffith Avenue to Clontarf Road

The Emerging Preferred Route from Griffith Avenue to Fairview along the Malahide Road, was identified as the preferred route for buses, while cyclists were rerouted through Haverty Road and Brian Road. Following public consultation feedback, and review of more detailed topographical information, it was concluded that this part of the route required further consideration to ensure the correct routing was chosen to be taken forward as the Preferred Route Option. The following options were revisited in light of the above request and additional survey information:

- Consideration of Signal Controlled Priority on the inbound carriageway between Charlemont Road and Crescent Place; and
- Consideration of alternative cycling proposals between Griffith Avenue and Fairview.

Signal Controlled Priority on the inbound carriageway between Charlemont Road and Crescent Place was considered. In reviewing this proposal, and taking the Proposed Scheme objectives into account, it is considered that while there is benefit in the reduction of land take and disturbance to residences, they do however have a significant disadvantage in regard to ensuring Bus Priority and maintaining the flow of traffic. In considering Signal Controlled Priority it is necessary to look at the traffic implications both upstream and downstream of the area under consideration. For the Signal Controlled Priority to operate successfully queues or tailbacks on the single lane portion of the Signal Controlled Priority cannot be allowed to develop as this will prevent the signals from giving the Bus the priority.

At the Clontarf Junction, the H-Spine bus services and other city bound services (8,10,20,21,6) from Howth Road and Clontarf Road converge with the Malahide Road services and consequently impacts on bus priority for these

routes need to be considered. Significant signalling modifications to the Malahide Road arm of the Clontarf Road junction would be required to improve queuing within the shared bus and general traffic section on approach to the junction on Malahide Road to provide enhanced green times in addition to upstream queue management (throttling of flow). This would have a negative impact on these other services and are deemed to not be a viable option for optimum people movement when compared to the EPR Option. The junction between Clontarf Road and the Malahide Road is currently operating at capacity and it is considered that there is a high possibility of vehicles queuing back to Crescent Place and thus preventing inbound buses re-joining the Bus Lane. This would impact the reliability and punctuality of the inbound buses. For these reasons a dedicated bus lane is proposed to meet the objective to enhance the capacity and potential of the public transport system to provide priority to bus movement over general traffic movements. The Signal Controlled Priority option is not considered to meet the scheme objectives when compared to the EPR Option and is therefore not preferred.

An additional alternative option was considered to the four scheme options assessed during the EPR stage (Scheme Options 1 to 4 as previously discussed in Section 3.3.2.2) for diverting outbound cyclists only along Haverty Road and Brian Road. This additional alternative option was a variant of Scheme Option 3 described previously and this variant option proposed that inbound cyclists would remain on Malahide Road from the junction at Griffith Avenue and continue through to Clontarf Road with a new cycle lane. Similar to the previous EPR scheme options, this scheme would have no outbound bus lane until after the most constrained section at the southern end of Malahide Road. Whilst this option did provide a favourable approach for the directness of the inbound cycling regime, it would result in a less resilient approach to bus journey time and reliability due to the removal of the outbound bus lanes on Malahide Road.

In terms of the Environment aspects in the MCA, the main determining factor between the additional alternative option when compared to the other options already considered Scheme Options 1, 2, 3 is primarily the amount of private land take required on Malahide Road, and associated construction environmental impacts (air, noise, GHG). Scheme 1 requires the most, followed by Scheme Option 3, then the additional alternative option followed by Scheme Option 2 (although the difference between Scheme Options 3 and 2 is quite small). Of significance is the impact on the boundaries of 2 protected structures on Malahide Rd (62 & 64), while all options impact these boundaries (apart from Scheme Option 4), Option 2 has the least impact with a small setback of the boundary, whereas other options require a setback of approximately 2.0m. In terms of traffic network integration (e.g. expected traffic impact of each route option), Scheme Option 4 is less favourable than the other options due to traffic being diverted to the Swords Road.

On that basis, the additional alternative option was discounted as it does not meet the objective to enhance the capacity and potential of the public transport system to provide priority to bus movement over general traffic movements. Scheme Option 2 is therefore identified as the optimum routing for this section (and already identified previously in Section 3.3.2.2) and is therefore brought forward as the Preferred Route Option.

While the EPR routing is being carried forward as the PRO the following reasonable alternatives were also considered during the development of the draft PRO:

- Between Kilmore Road junction and Killester Avenue, it was proposed to move the northbound cycle track and footpath inside the adjacent green area to minimise any impact on the existing walls and trees. The EPR Option indicated that there was a Cycle Track and Footpath alongside the carriageway in the northbound direction, towards Clongriffin. On review of the EPR Option it became apparent that this proposal would have had a severe impact on the existing boundary wall and the environmental impact to approximately 20 mature trees when compared to the alternative option which minimised the impact on both the wall and the environmental impact on the mature trees. Therefore, the revised proposal, of setting back the footpath within the adjacent green area, was taken forward for design development.
- Between Killester Avenue junction and Collins Avenue, the road alignment was altered to allow the retention of the mature trees and stone wall. The EPR Option indicated the setting back of a stone wall to the front of Thorndale Grove. On review of the EPR Option it became apparent that it would have had a severe impact on the existing stone wall and approximately 22 mature trees to the back of this wall. An option was reviewed to retain the existing stone wall and relocate the road eastwards into Maypark. This resulted in existing southbound footpath would be converted to a cycle track and to minimise the impact on the semi-mature trees. Within the park it is proposed to utilise the existing footpath. This will require the existing park fence to be removed and a new footpath and railing to be constructed within the Park. The revised proposal is considered to have lesser environmental impacts (with regard to

mature and semi-mature trees), when compared to the EPR Option. Therefore the revised proposal, of realigning the Malahide Road towards May Park was taken forward for design development.

- Between Griffith Avenue junction and Clontarf Road junction, it was proposed to close Haverty Road to general traffic at St Aidan's Park Road to create a quiet street for cyclists. The EPR indicated that traffic movements on Haverty Road would remain as per the existing situation, which has a peak hour turn-ban. This turn-ban is ignored by a substantial number of drivers. Following feedback from the community where a request was made to prevent through-traffic using this road, an assessment of the option was carried out and it was determined that it is feasible to close Haverty Road to general traffic at St Aidan's Park Road end and thereby create a quiet street for residents and cyclists. The revised proposal is considered to have lesser environmental impacts when compared to the EPR Option because it will lead to a reduction in traffic on what is a narrow residential street. Therefore the revised proposal of closing Haverty Road to through traffic, was taken forward for design development.
- The layout was altered at Artane Cottages to move the widening away from the cottages to the other side of the road by making use of existing green area that was not previously considered. The altered layout is considered to have lesser environmental impacts when compared to the EPR Option because it will move the infrastructure (and therefore vehicular traffic) further away from these residential properties. The revised layout also minimises the impact on the existing trees in the existing green area opposite to the Artane cottages. Therefore, the altered layout at Artane Cottages was taken forward for design development.

3.4.2 Consideration following Preferred Route Option Consultation (March 2020)

The draft Preferred Route Option was published in March 2020 and a second round of public consultation occurred between 10 March 2020 to 17 April 2020. Due to Covid-19 restrictions in mid-March 2020, the planned Public Information Events were impacted. There was a total of 22 submissions received during this second round of public consultation.

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 Preferred Route Option were relatively small scale and no further option assessments using the MCA described in Section 3.4.1 were required.

Key changes for the Proposed Scheme implemented in the design of the updated Draft PRO include:

- The majority of junctions in the revised designs are now protected junctions, which provide physical kerb build outs to protect cyclists at junctions.

3.4.3 Further consideration following Preferred Route Option Consultation (November 2020)

This third round of public consultation on the draft Preferred Route Option 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.

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 Preferred Route Option include the following:

- Readjustment of the inbound alignment from the entrance of Clontarf Golf Club to Mount Temple entrance into the median resulting in reduced impact on the boundary of the Golf Club and the environmental benefit of reducing impact on mature boundary trees and vegetation. This change results in impacts on less mature trees within the median, but avoids impacts on the golf club boundary and associated mature trees and vegetation;
- A review of all junctions to better refine the layouts for all users. This resulted primarily in rearrangements of cycling and pedestrian arrangements at the junctions to provide better protection of users;
- A bus turnback facility was also incorporated on Priorswood Road to facilitate a bus route service end-point turnaround;

- Revised parking arrangement near Mornington Grove Lane (Spar Shop); and
- Removal of inbound section of cycle track on the Malahide Road junction with the Clontarf Road.

No major scheme design alternatives were considered to the Proposed Scheme following the draft PRO consultation. However, as referenced previously, it was decided that the section between Clongriffin DART Station to Malahide Road via Clongriffin Main Street would no longer be included as part of the Proposed Scheme. Clongriffin Main Street already has dedicated bus lanes and a scheme proposed by Dublin City Council, the Belmayne Main Street and Belmayne Avenue Scheme, incorporates dedicated bus lanes. For this reason, the objectives of this project are already met by the existing and proposed facilities and no additional measures are required to facilitate the movement of buses and cyclists between Malahide Road and Clongriffin DART Station.

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, the local authority 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;
- 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(1)(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

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