Bonneagar Iompair Éireann
Transport Infrastructure Ireland

NTA
Údarás Náisiúnta Iompair
National Transport Authority

Luas Finglas

Environmental Impact Assessment Report 2024

Appendix A4.1: Option Selection Report (Stage 1)

BARRY TRANSPORTATION
egis GROUP
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Project Ireland 2040
Building Ireland's Future

Bonneagar Iompair Éireann
Transport Infrastructure Ireland

Luas Finglas

Options Selection Report
STAGE 1

LFIN-ADW-0003

August 2019

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1 EXECUTIVE SUMMARY

Transport Infrastructure Ireland has been instructed by the National Transport Authority to undertake a Stage 1 Option Selection Report for Luas Finglas. The purpose of the report is to identify and bring forward a number of plausible and feasible light rail options for further consideration, which could extend from the existing Luas network to the Finglas area and enhance the public transport offer in the area.

Policy Context

Various policy documents (at both national and regional level) have referenced the potential extension of Luas Green Line services beyond the current terminus at Broombridge into the Finglas area, including:

- Project Ireland 2040: National Development Plan 2018 – 2027; and
- NTA Transport Strategy for the Greater Dublin Area 2016-2035.

Furthermore, it is notable that Finglas Village is indicated as a Key District Centre (KDC) within the Dublin City Development Plan 2016-2022, stating:

"*All of the designated KDCs closely align to public transport rail corridors, with the exception of two (Finglas and Northside) which perform an important regeneration role for local communities. This development plan will reinforce the KDCs as sustainable anchors for the suburbs*."

Scheme Objectives

The high level objectives for the scheme are as follows:

- Serve the existing and future demand.
- Provide a safe, frequent, reliable, efficient and environmentally friendly public transport connection from the M50 (where it also serves a strategic Park & Ride) to the city centre, via Finglas and Broombridge, through the use of part of the existing Luas Green Line.
- Reduce public transport journey times between Charlestown-Finglas and the city centre.

The framing of more scheme specific objectives was undertaken in accordance with the appraisal criteria set out in the guidance provided by the Department of Transport, Tourism and Sport (DTTaS), namely the *Common Appraisal Framework* (CAF) *for Transport Projects and Programmes* (March 2016); in the areas of Economy; Safety; Environment; Accessibility and Social Inclusion; Integration and Physical Activity.

Study Area

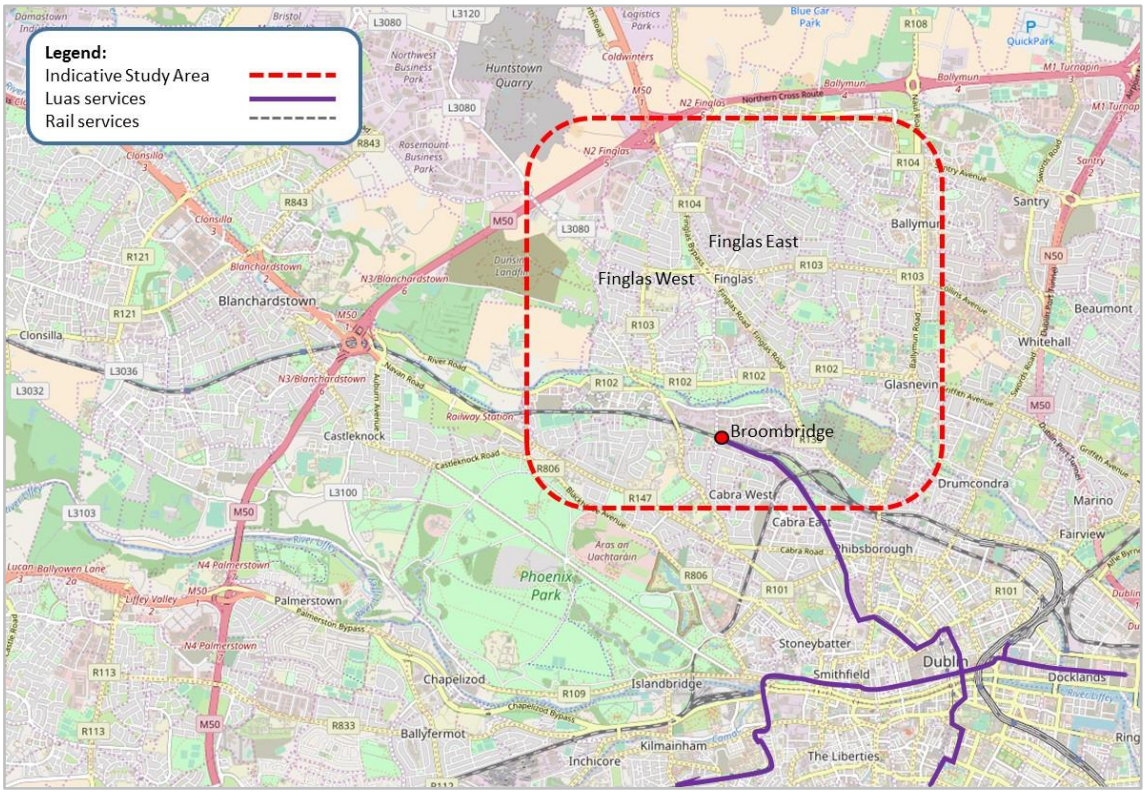
The NTA Transport Strategy states:

"Finglas Luas is intended to extend Luas Cross City from its terminus at Broombridge to the north of Finglas. 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."

Therefore, the study area is defined as an area that would capture all potential options between the current Luas Green Line and a location in the vicinity of the of the M50 / N2 junction, serving the Finglas area. The overall study area is shown in Figure 1 below. In general, the southern extents of the study area encompass the northern sections of the current Luas Green Line; extends northwards encompassing the M50 / N2

junction and the lands surrounding it. To the east, the study area extends as far as the Ballygall/Willow Park Road axis in order to limit overlap between the potential catchments of Luas Finglas and MetroLink.

Figure 1 Luas Finglas Study Area



Route Options Assessment

Starting off from a spiders web of the area, twenty nine potential end to end route options were created. The twenty nine route options were then assessed via a two-step process, in which a broad assessment of the suitability of all options against the high level objectives (screening) was undertaken. This assessment evaluated each potentially viable route option in terms of its ability to achieve the high level scheme objectives. Any route options which did not pass the screening step were removed from further consideration.

The options emerging from this process (fourteen remaining) were then taken forward and assessed using a more detailed multi-criteria analysis (MCA1). Each of the options were assessed within the MCA1 step in accordance with the CAF guidelines. The MCA1 process considered each option against scheme objectives set out under the CAF appraisal criteria: Economy, Safety, Environment, Accessibility and Social Inclusion and Integration. Each of the options were assessed against sub-criteria objectives under these main criteria.

The result of this process was a collection of feasible route options (three route options) which are to be taken to a more detailed Multi Criteria Analysis (MCA2) including Cost Benefit Analysis (CBA); from which an Emerging Preferred Route will be selected.

The options to be brought forward to the MCA2 process are shown graphically overleaf.

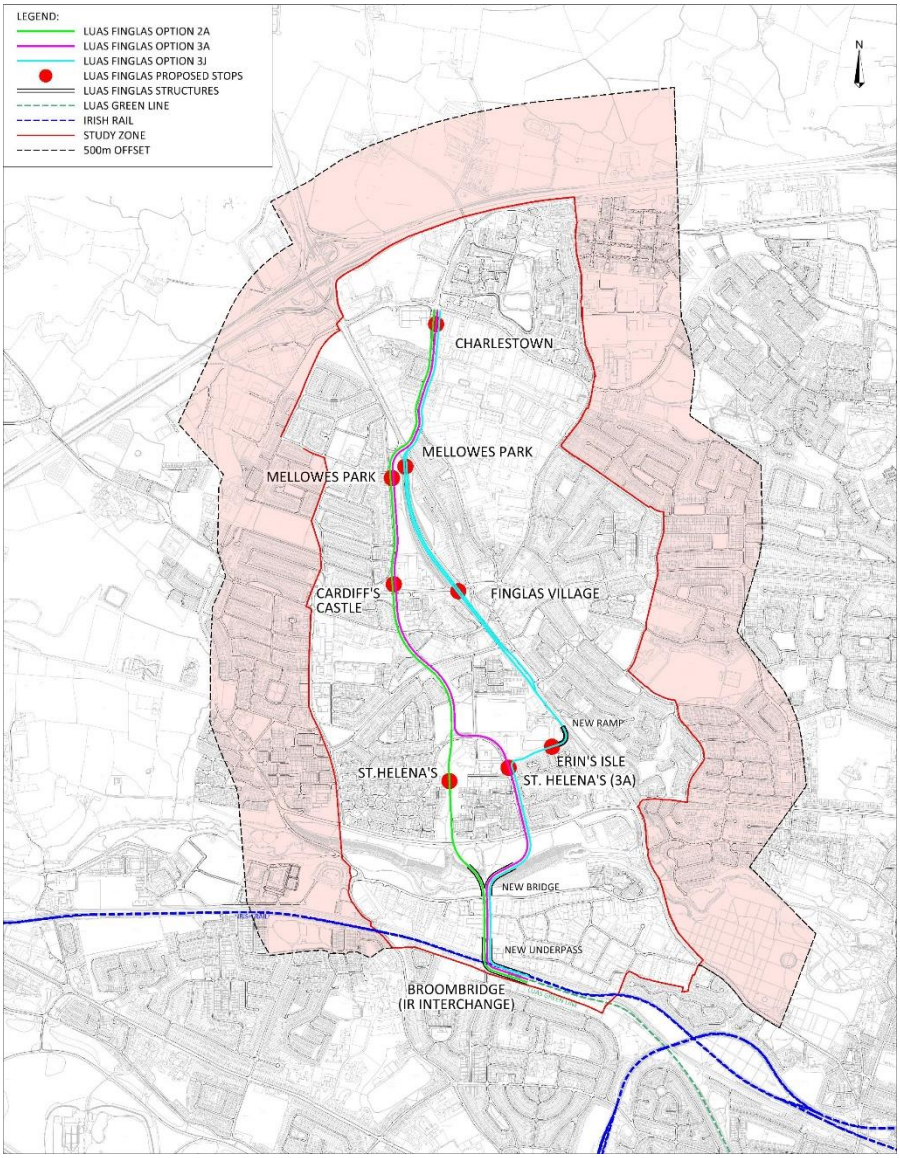
These three options are representative of the whole Study Area as they span from Finglas West (2A-3A), to East (3J).

The emerging options span from 3.5km to 3.9km in length, count 4 stops (including the terminus in Charlestown) and have a potential for good operational segregation from other modes.

All shortlisted options have the potential to deliver a fast connection between Charlestown at the M50-N2 interchange and Broombridge, with an estimated runtime of between 13.5 and 15 minutes, thereby meeting the objectives of the scheme while improving public transport accessibility in Finglas.

The current high level design offers large potential for all the three shortlisted options to be further optimised within the Stage 2. An example of this is for Option 3J, currently assessed in its configuration with two single tracks running within the bus lanes of the R135. This option offers significant scope for further improvements, subject to a more detailed analysis, whereby the two tracks could run off-road on either side of the R135. For this more detailed analysis a further step in the design of the corridors shall be progressed at the beginning of Stage 2.

Figure 2 Luas Finglas Route Options for further analysis (MCA2)



Next Steps

This report identifies a set of (3) potential route options, enabling the extension of the Luas Green Line north to the Finglas area.

The next project stage will be to carry out a more detailed analysis of these options, with further steps in the optimisation and design of the corridors and to finally assess the 'short list' of options developed within this study in a more detailed multi criteria assessment (MCA2) process, which will include a Cost Benefit Analysis (CBA) of each option. Following the completion of the MCA2 process, it is anticipated that an Emerging Preferred Route (EPR) will be selected.

Subsequent to this, a preliminary design of the EPR will commence in which the initial concept will be further refined and updated.

2 INTRODUCTION AND BACKGROUND

2.1 Overview

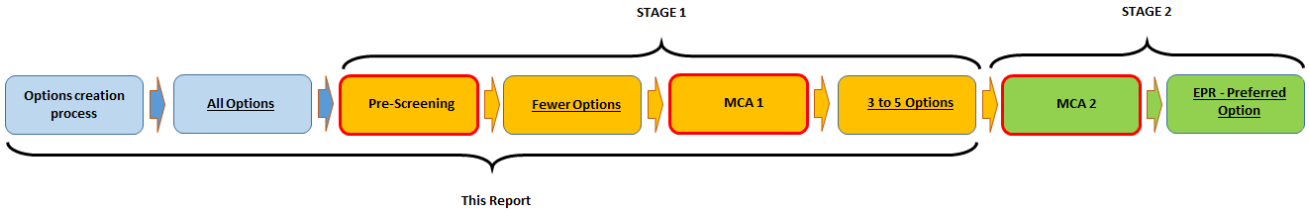
This document forms a Stage 1 Option Selection Report, the purpose of which is to identify and bring forward a number of plausible and feasible light rail options which could extend the existing Luas network to the Finglas area and enhance the public transport offer in the area.

This document describes the various processes in which a 'long list' of light rail options were created, explored and assessed. The document describes a two-step process in which a broad assessment of the suitability of all options against high level objectives (screening) was undertaken and a more detailed multi-criteria analysis (MCA1) carried out with respect to the remaining options which passed through the screening step.

The result of this study is a 'short list' of options to be taken forward to Stage 2, from which an Emerging Preferred Route will be selected following a more detailed analysis (MCA2), including Cost Benefit Analysis (CBA).

The general process by which an Emerging Preferred Option will be selected is shown graphically in Figure 3.

Figure 3 Luas Finglas Options Selection workflow chart

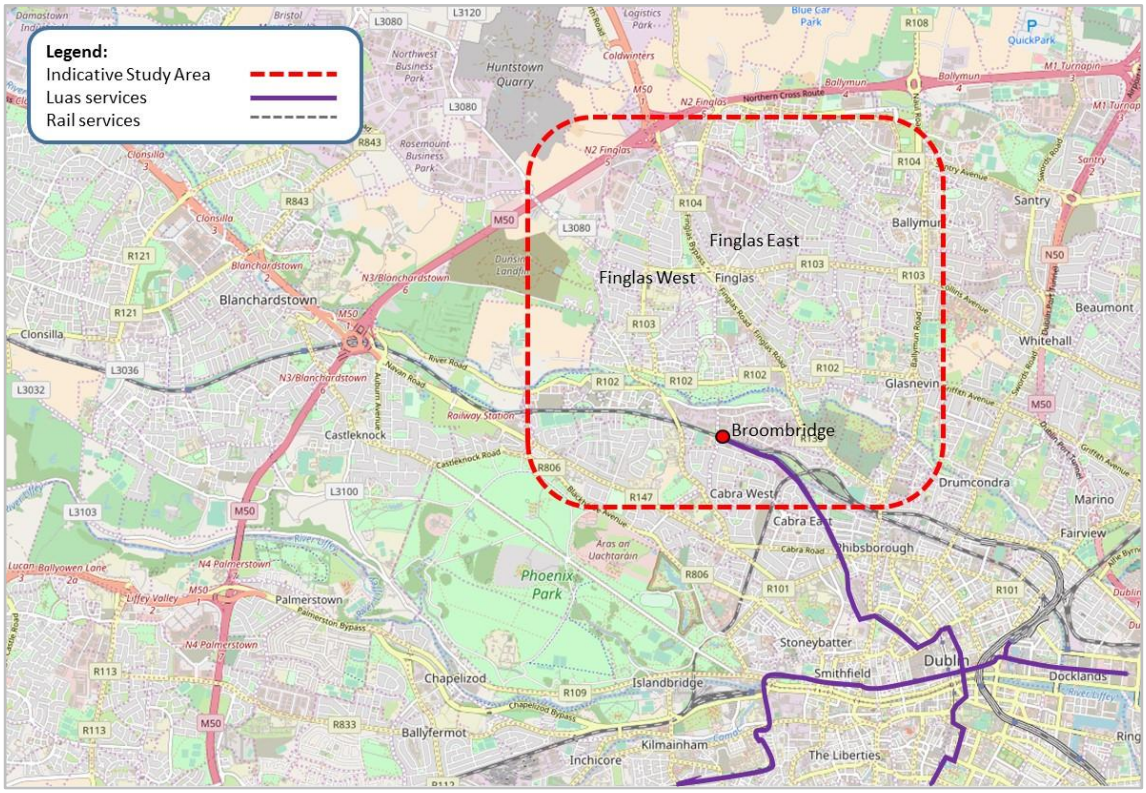


2.2 Background Information

Luas Cross City was opened to the public in December 2017 and for the first time extended Luas services to suburbs within the northern environs of Dublin City Centre with a terminus at Broombridge. The terminus at Broombridge also provides an interchange with a suburban rail line into Dublin City Centre.

Finglas forms a suburb of Dublin City located approximately 6-7km northwest of the City Centre. A major expansion of Finglas Village occurred in the 1950s with the development of an extensive network of housing estates to mainly re-house north inner-city Dublin residents. However, in recent decades the suburb of Finglas became quite marginalised. There have been efforts in recent years to overcome local challenges and revitalise the area to create a sustainable community with stronger social, economic and physical connections to the greater city area. A map of Luas Cross City in the context of the subject study area is shown below.

Figure 4 Luas Finglas Indicative Study Area in the context of Dublin City



Various policy documents advocate the sustainable development and regeneration of the city of Dublin alongside its inner suburbs. A key driver in this policy is to enhance the public transport offer to support sustainable mobility. A number of policy documents have specifically referenced the extension of Luas Green Line services beyond the current terminus at Broombridge into Finglas including:

- Project Ireland 2040: National Development Plan 2018 – 2027; and
- NTA Transport Strategy for the Greater Dublin Area 2016-2035.

This report focuses on the creation of all technically feasible Light Rail Transit (LRT) corridor options that would enable the potential expansion of Luas services into the Finglas area of Dublin by extending Luas Cross City in the vicinity of its current terminus at Broombridge to a suitable area located close to the M50-N2 interchange.

2.3 Previous Studies

Two separate studies on a Luas extension from Broombridge to the area surrounding Finglas were undertaken in 2010 and 2013 by the RPA (Railway Procurement Agency); the organisational function of which has been transferred to TII following the merger with the NRA (National Roads Authority).

The 2010 study "*Luas Line D1 – Broombridge to Metro West via Finglas – Route Corridor Identification and Feasibility Report*" commenced with an in-depth analysis of the area (largely informed via a 'spiderweb' approach; and resulted in a set of eight preferred options. Within the "spiderweb" assessment, every single possible section within the area was analysed independently and assessed in relation to its suitability for a Luas corridor.

That study was based, as the title refers, on connecting the unconstructed Luas Cross City line (Luas BXD at the time) with Metro West, another light rail scheme under consideration at that time. Metro West was envisaged as an orbital Luas based system running parallel to the M50 and between the outer suburban areas, linking Tallaght to Metro North at Dardistown (north of Ballymun). Since the Metro West project is no longer part of transport strategies and plans for Dublin, several of the conclusions of the 2010 study are no longer valid.

Nonetheless, the 'spiderweb' analysis undertaken within that study remains valid and is of use for the current course of study, in particular its considerations regarding the suitability of the existing roads network in accommodating a Luas corridor.

The initial 'spiderweb' and the conclusions of the 2010 study are shown in the following figures, including the shortlisted eight options.

Figure 5 2010 RPA Study – Spiderweb analysis

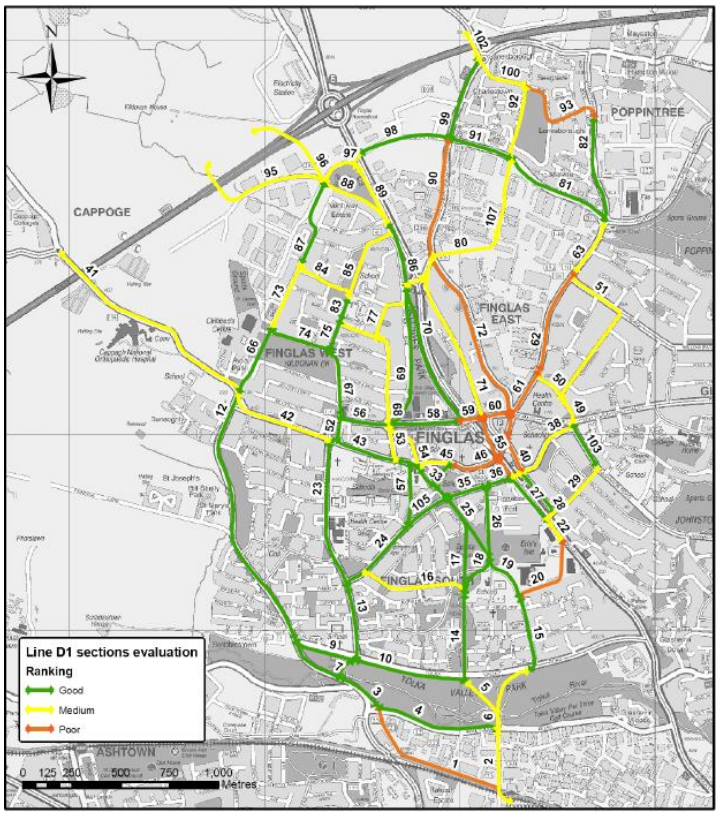


Figure 6 2010 RPA Study – Eight preferred route options to Cappoge – Kildonan – Meakstown Metro West Stops

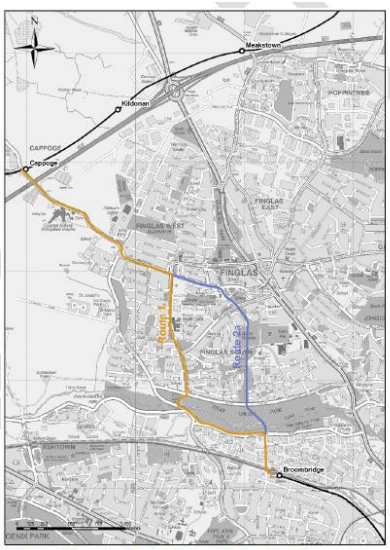


Figure 2a- Selected corridors to Cappoge

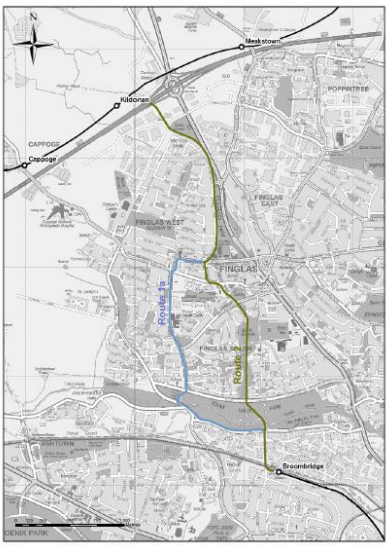


Figure 2b - Selected corridors to Kildonan

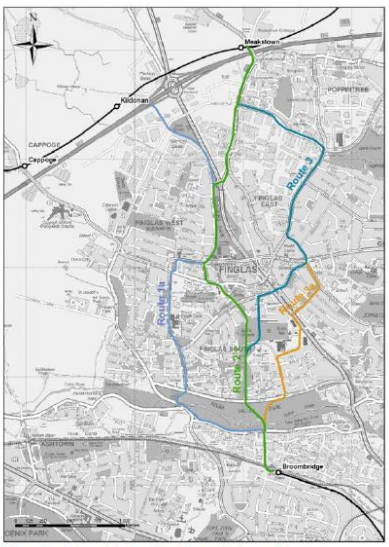
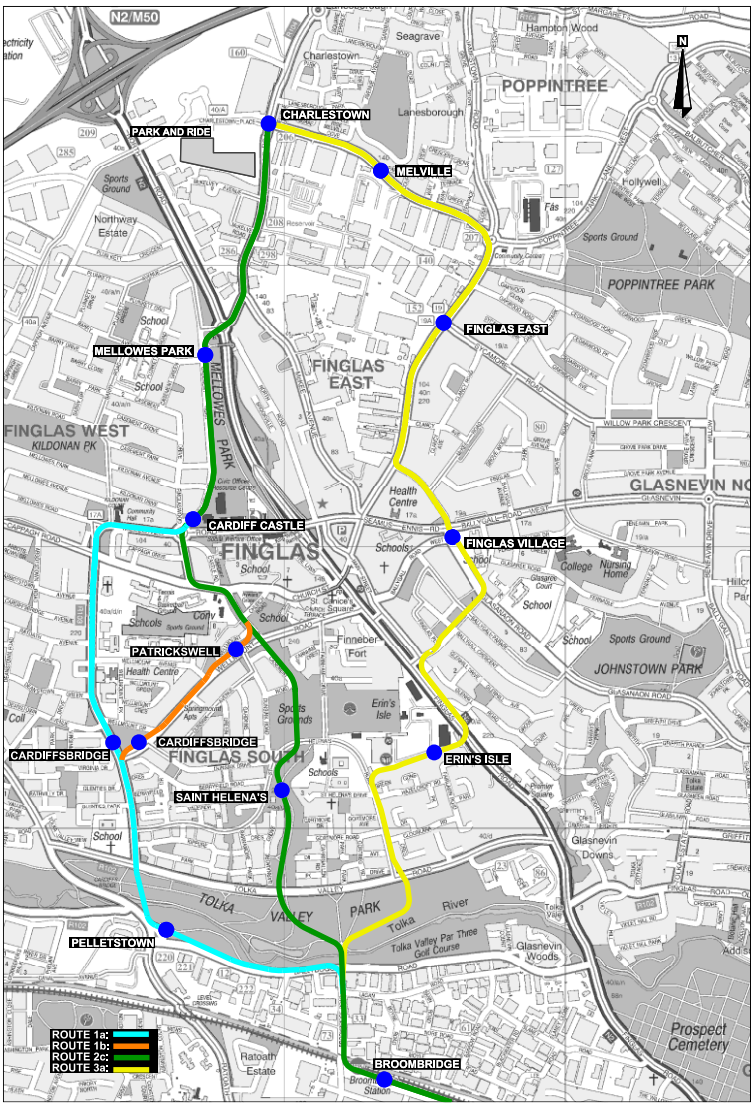


Figure 2c - Selected corridors to Meakstown

The 2013 study "*Luas Line D1 – Analysis of Route Options"* built upon the conclusions of the previous study and analysed in technical detail some of the emerging corridors of the 2010 study. This study did not create any new options and or look into transport planning or environmental considerations such as demand, catchment and costs versus benefits.

It concluded that from a merely technical viewpoint the best option was 2c, shown in green in Figure 7, and the second best options were 1b and 1a, shown in orange and cyan in Figure 7 below.

Figure 7 2013 RPA Study – Preferred route options, with option 2c (green) prevailing in technical terms



3 TRANSPORT PLANNING AND POLICY CONTEXT

3.1 Project Ireland 2040

Project Ireland 2040 was launched by the Government in February 2018 and includes the National Planning Framework to 2040 and the National Development Plan 2018-2027. The National Planning Framework (NPF) recognises under:

- National Strategic Outcome 1 Compact Growth - the need to cater for more compact growth in our cities and towns and ensure a transition to more sustainable modes of travel;
- National Strategic Outcome 4 Sustainable Mobility – the need to expand an attractive public transport network and work towards a transition to more sustainable travel;
- National Strategic Outcome 8 Transition to a Low Carbon and Climate Resilient Society – related to the above there is an emphasis on a transition to sustainable travel, a reduction in congestion and emissions and a related improvement in environmental conditions.

The recently published Project Ireland 2040: National Development Plan 2018-2027 (NDP), sets out investment priorities that are aligned with the NPF in order to support the vision of the NPF through the delivery of ten National Strategic Outcomes.

Luas Finglas is mentioned as a strategic transport project within the NDP and is expected to deliver on some of the key National Strategic Outcomes. The NDP identifies the Luas network expansion to Finglas as a project to be brought forward through the pre-appraisal and early planning phases.
"*In line with the National Transport Authority's Transport Strategy for the Greater Dublin Area 2016-2035, undertake appraisal, planning and design of* ***LUAS network*** *expansion to Bray,* ***Finglas****, Lucan, Poolbeg…"*
The NDP also makes mention of a Park and Ride programme with a facility in the Finglas area as an investment action, with potential to act as supporting infrastructure for a Luas service:

"*Park-and-Ride Programme: strategic park and ride sites plus investment in parking facilities at rail, Luas and bus locations, for example, Swords,* ***Finglas****, Dunboyne, Liffey Valley, Naas Road, Carrickmines, Woodbrook and Greystones and with national development of BusConnects, for example, Galway, Cork, Limerick and Waterford."*

The investment actions outlined within the NDP for the Greater Dublin Area up to and beyond 2027 are presented graphically within Figure 5.3 of the NDP document. This image is also shown below for reference.

It should be noted that both documents provide support for the NTA Transport Strategy for the Greater Dublin Area 2016 – 2035 and acknowledge that the NTA has a more detailed remit in that area. The NPF states that:

"*Delivering the key rail projects set out in the Transport Strategy for the Greater Dublin Area including Metro Link, DART expansion and the Luas green line link to Metro Link*" are key future growth enablers for Dublin.

Figure 8 Investment Actions in Public Transport Network for Greater Dublin Area up to 2027

3.2 Regional Planning Guidelines for the Greater Dublin Area 2010 – 2022

The Regional Planning Guidelines support the key transport policy documents published by the National Transport Authority – *Transport Strategy for the Greater Dublin Area 2016-2035* and the Department of Transport *Smarter Travel A Sustainable Transport Future.* Their shared objective is to:

'reduce dependency on car travel and long distance commuting, increase public transport modal share and encourage walking and cycling, improve quality of life and accessibility for all, improve economic competitiveness through maximising efficiency of the public transport system, alleviating congestion and infrastructural bottlenecks, minimising environmental impact by reducing localised air pollution and greenhouse gasses and improving security of energy supply by reducing dependency on imported fossil fuels.'

Chapter 6.3.1 of the Regional Planning Guidelines (Public Transport) acknowledges the ambitious national targets for modal shift patterns to greener transport and a requirement for shorter and more sustainable commuter patterns. In order to achieve this, a number of measures are identified to direct and integrate land use with investment in public transport:

- Focusing new development into sustainable compact urban areas served by high capacity and well developed public transport systems
- Integration of systems and services across public transport networks

- Improving choice and opportunities for reduced car travel and promotion of higher densities for employment uses around public transport nodes

Elsewhere, the Regional Planning Guidelines support:

- sustainable land use planning based on the social, cultural and environmental needs of the people of Dublin and mid-east regions
- consolidated growth in metropolitan areas and key towns – strong active urban places with strong transport links
- connectivity between strategic employment centres, recognising that economic growth relies on public transport investment
  The protection and enhancement of green infrastructure, heritage and the environment.

3.3 NTA Transport Strategy for the Greater Dublin Area 2016-2035

In April 2016, the NTA published the Transport Strategy for the Greater Dublin Area 2016-2035.
In addition to a core bus corridor and service through Finglas alongside a strategic Park and Ride site at the N2/M50 junction, the Transport Strategy also supports the potential Luas extension to Finglas*:*

"*Extension of Luas Cross City to Finglas, utilising the new Luas Cross City line to provide a light rail link to the Finglas area."*

The Transport Strategy goes on to provide some additional detail:

"Finglas Luas is intended to extend Luas Cross City from its terminus at Broombridge to the north of Finglas. 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. These proposals will serve the significant levels of forecast travel demand from this corridor to the city centre and Grangegorman".

The Transport Strategy also makes the following point in relation to Park and Ride facilities which could support the expansion, contribute to modal shift and enhance accessibility from the suburbs into the city via the M50:

"Develop a network of strategic rail-based park and ride facilities at appropriate points where rail services intersect with the national road network, adjacent to, or outside of, the M50. These facilities are, or would be, located at Swords, ***Finglas****, Dunboyne, Liffey Valley, Naas Road, Carrickmines, Woodbrook and Greystones."*

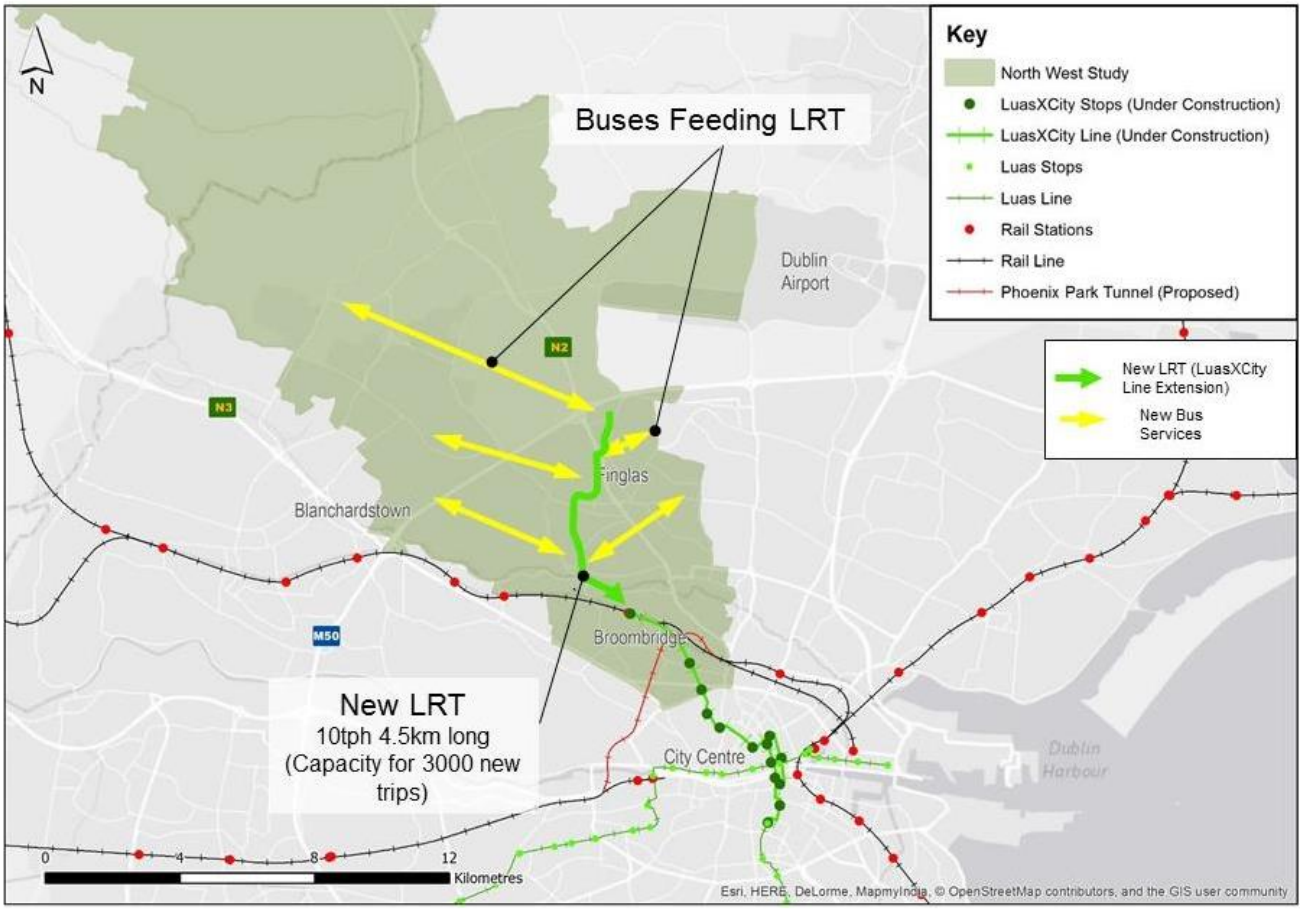
Figure 9 Transport strategy for the Greater Dublin Area-P&R strategy

It is also worth noting the North West Corridor Study (2015), a study the NTA commissioned in support of the Transport Strategy for the Greater Dublin Area. The North West Corridor Study area extended to the north west of Dublin City and encompassed the areas of Finglas, Cabra, Phibsborough and as far north as Ashbourne, Tyrrelstown and Ballycoolin. The study was commissioned to examine the future transport needs of the area, in particular public transport options that would meet the growth in travel demand to the year 2035. Consideration was given to existing public transport services, alongside the performance of the strategic road network. Based on the level of demand identified, considering functionality and cost, a set of appropriate public transport solutions were devised and brought forward into the Transport Strategy.

The package of measures which emerged from this study are as follows and presented graphically below:

- Extension of the Luas Green line from Broombridge to a terminus close to the N2/M50 junction;
- Park and Ride provision to be catered for at this terminus;
- Proportionate deployment, with stops every 800 metres, of bus feeder services to support access to the corridor services across the Study Area catchment; and
- Feeder buses from Tyrrelstown to the terminus in the period until 2035.

Figure 10 North West Corridor Study - Emerging Preferred Option



The measures explored within the North West Corridor Study were adopted and overlaid within the NTA Transport Strategy. Notwithstanding the Luas expansion, the NTA Transport Strategy also identified the need for core bus corridors out to the Finglas area alongside the subject Luas expansion. These 'next generation' core bus corridors have been further developed as part of BusConnects. A section of bus corridor between Finglas and Phibsborough has been identified as a radial core bus corridor for improvement. The provision of improved bus services alongside an expansion of Luas services into the area (both forming part of the NTA Transport Strategy) will provide Finglas with a much improved public transport offer.

3.4 NTA Draft Integrated Implementation Plan 2019-2024

The National Transport Authority recently initiated consultation on the Draft Integrated Implementation Plan 2019 – 2024. This plan set outs a draft of the short term transport investment programme within the Greater Dublin Area.

With respect to the scheme, the Implementation Plan reaffirms the NTAs intention to support the *'planning and design of future extensions to the light rail network*', including the extension of Luas to Finglas. This is in addition to the NTA plans for improvements of a core bus corridor between Finglas and Phibsborough.

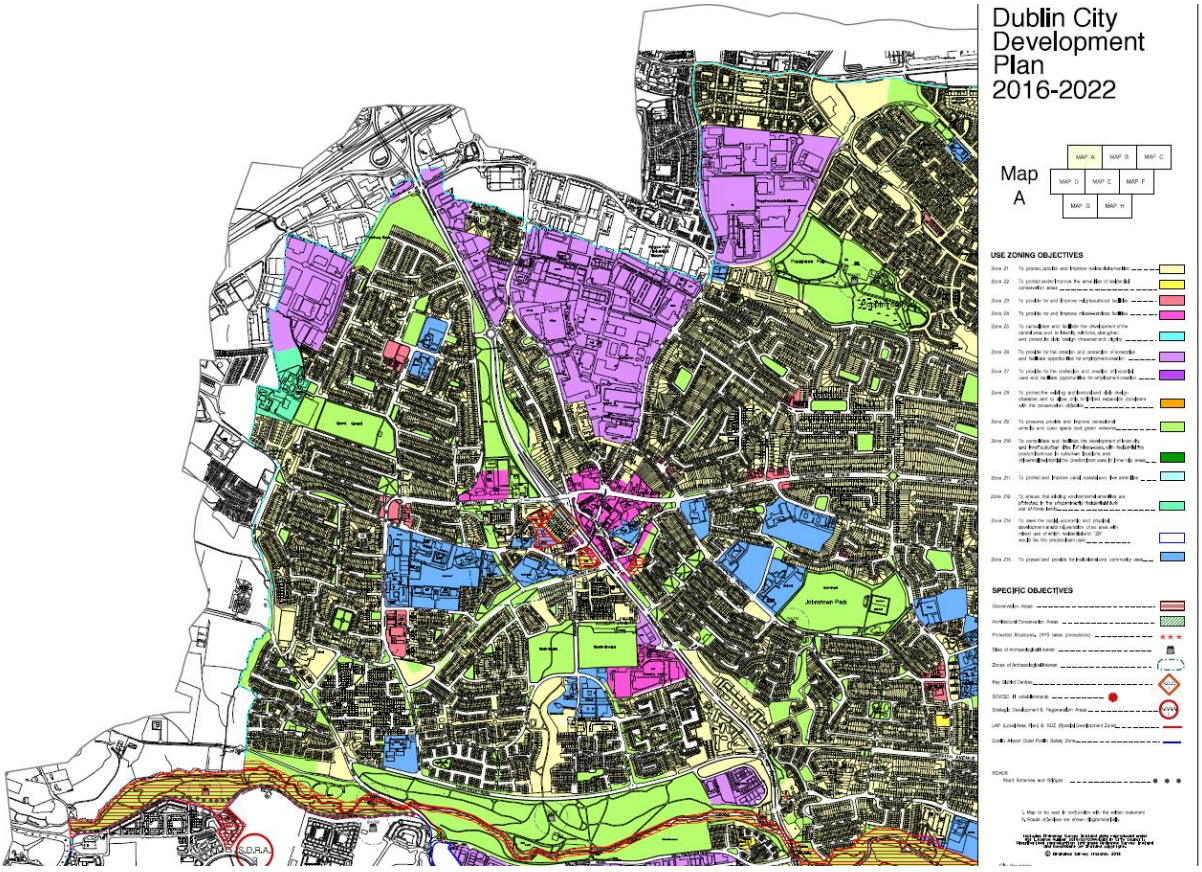
3.5 Dublin City Council Development Plan

The large majority of the Luas Finglas Study Area falls within Dublin City Council lands.

The Dublin City Development Plan (2016-2022) sets out policies and objectives to guide how and where development will take place in the city over the lifetime of the Plan. It provides an integrated, coherent spatial framework to ensure the city is developed in an inclusive way.

Dublin City Development Plan 2016-2022 Map A covers the majority of the Finglas study area. As can be seen in the following Figure, Map A suggests that the Luas Finglas study area encompasses land uses such as residential and recreational amenities, industrial areas, institutional, community facilities and mixed-services facilities.

Figure 11 Dublin City Development Plan 2016-2022 Zoning Map set A showing the area of Finglas



It is noted that while Finglas Village is indicated as a Key District Centre (K.D.C. n.4), the two existing large industrial estates of "Broombridge" and "Jamestown" are indicated as areas for the "Creation and protection of enterprises and facilitate opportunities for employment creation".

While the potential future land-uses within the Broombridge Industrial Estate is less influential in relation to the catchment of the new Luas Finglas as it is already served by Broombridge Luas stop, it is recognised that the long term future use of the Jamestown area is key to shaping the future Luas corridor between Finglas Village and Charlestown, both in terms of its catchment and its alignment.

Within the Dublin City Development Plan 2016 – 2022, Dublin City Council (DCC) identifies Finglas as a key district centre i.e. top tier urban centres outside of the city centre. The Development Plan notes that:

"All of the designated KDCs closely align to public transport rail corridors, with the exception of two (Finglas and Northside) which perform an important regeneration role for local communities. This development plan will reinforce the KDCs as sustainable anchors for the suburbs."

Furthermore, DCC state that "Higher densities will be promoted in the city centre, within KDCs, SDRAs and within the catchment of high capacity public transport."

This is reflected in Objectives SC 13 and MT01:

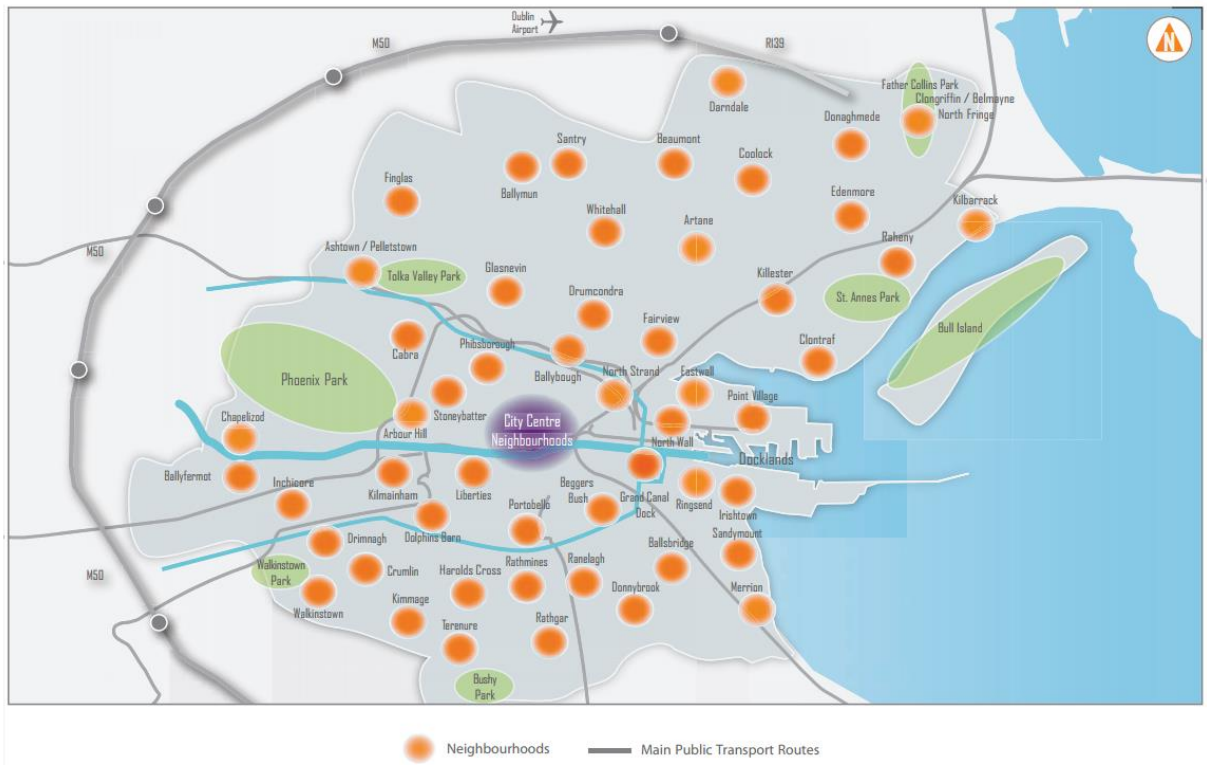
"*To promote sustainable densities, particularly in public transport corridor*..."

"*To encourage intensification and mixed-use development* ***along existing and planned public transport corridors*** *and at transport nodes where sufficient public transport capacity and accessibility exists to meet the sustainable transport requirements of the development, having regard to conservation policies set out elsewhere in this plan and the need to make best use of urban land. Dublin City Council will seek to prepare SDZs, LAPs or other plans for areas surrounding key transport nodes, where appropriate, in order to guide future sustainable development*."

Following on from this the Development Plan has ambitions in relation to neighbourhood quality as set out in Objective SN1:

"*To promote good urban neighbourhoods throughout the city which are well designed, safe and suitable for a variety of age groups and tenures, which are robust, adaptable,* ***well served by local facilities and public transport****, and which contribute to the structure and identity of the city, consistent with standards set out in this plan*."

Figure 12 Dublin City Development Plan 2016-2022 – A City of Neighbourhoods



The Development Plan makes the following statement in relation to the NTA Transport Strategy:

"*DCC policy on public transport will be implemented in collaboration with the NTA's Transport Strategy for the Greater Dublin Area 2016–2035*".

In this regard the Dublin City Development Plan has the following objective in respect of the Luas expansion to Finglas within Chapter 8 Movement & Transport:

"*Key public transport elements of this strategy include* ***- Luas to*** *Lucan,* ***Finglas*** *and Poolbeg, and also Green Line enhancements*".

The Development Plan also makes a commitment that "*it is policy to protect route alignments from inappropriate development*".

Policy Objectives MT3 and MT4 are set out below:

"*To support and facilitate the development of an integrated* ***public transport network*** *with efficient interchange between transport modes, serving the existing and future needs of the city in association with relevant transport providers, agencies and stakeholders*."

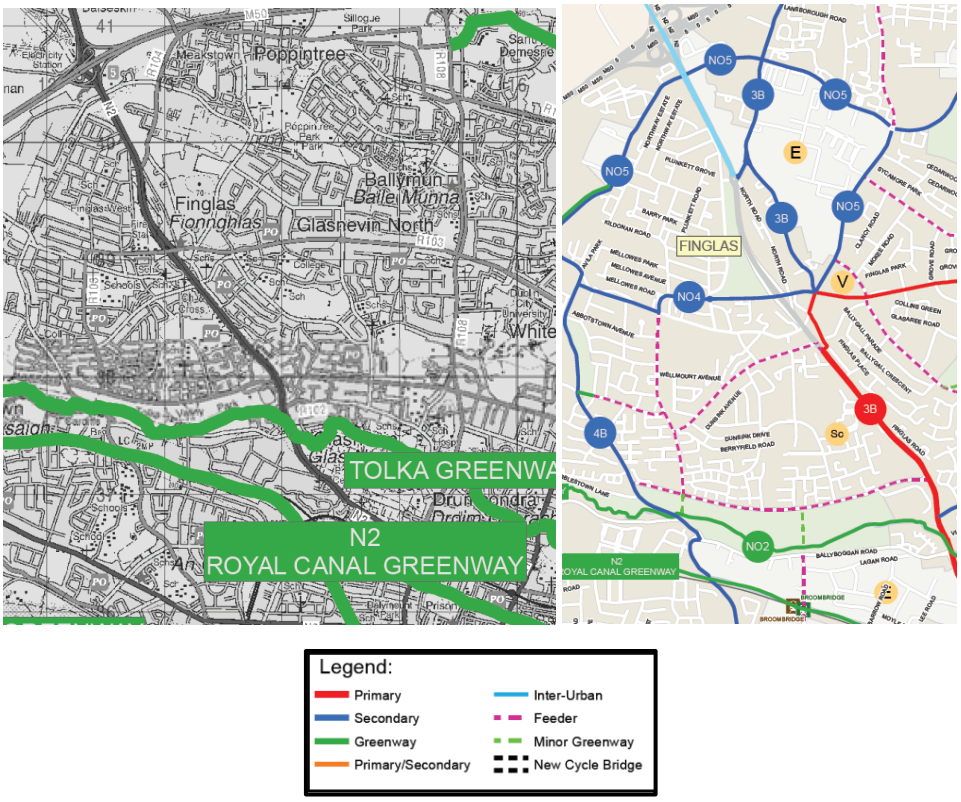
"*To promote and facilitate the provision of Metro, all heavy elements of the DART Expansion Programme including DART Underground (rail interconnector), the electrification of existing lines,* ***the expansion of Luas****, and improvements to the bus network in order to achieve strategic transport objectives*."

3.6 Greater Dublin Area Cycle Network Plan

In December 2013, the National Transport Authority published the Greater Dublin Area Cycle Network Plan (GDACNP), delivering on the commitment to ensure that cycling as a transport mode is supported, enhanced and exploited in order to achieve strategic objectives and reach national goals (10% of all journeys being made by bike by 2020), in line with the NCPF (National Cycle Policy Framework).

As part of the GDACNP, two sets of plans were published for the planned Dublin cycling network, the Greenway Network and the Cycle Network within the Luas Finglas study area and are shown below.

Figure 13 Dublin Metropolitan Greenway Network and Proposed Cycle Network Dublin North Central– drawing screenshots from GDACNP



Routes categorisation is:

- Primary: main cycle arteries that cross the urban area and carry most cycle traffic. Target cross section should be 2.5m.
- Secondary: Link between principal cycle routes and local zones. Target cross section should be 1.75m.

Two Greenways ("N2 Royal Canal" and "Tolka") and a series of Primary, Secondary and Feeder lanes intersect the Luas Finglas study area.

Primary cycle lanes are mainly running along Finglas Road and Seamus Ennis Road from the Five Arms junction in Finglas Village. Secondary cycle lanes are running along both sides of the Jamestown Industrial Estate (Jamestown Road-Melville Road and McKee Avenue) and along Mellowes Road-Cappagh Road.

Feeder lanes run along Wellmount, Tolka Valley and Cardiffsbridge Roads in Finglas West and Glasanaon Road and Clune Road in Finglas East.

Due consideration is given in the rest of the study to where the Luas corridor runs parallel, intersects, or generally interferes with one of the existing or planned cycle facilities.

3.7 P&R Statutory Documents

Various policy documents advocate the need for a P&R facility in the vicinity of the N2/M50 junction or the Finglas area. Indeed, the need for a P&R is mentioned specifically in the following documents:

- *Project Ireland 2040: National Development Plan 2018-2027* – mentions the need for a strategic P&R within an overall P&R Programme at a number of rail, bus and Luas locations including Finglas;
- *NTA Transport Strategy for the Greater Dublin Area 2016-2035* – indicates a Luas service 'with a strategic park and ride site at the N2/M50 junction' at the northern terminus of the line;

4 SCHEME OBJECTIVES

4.1 High Level Objectives

Luas Finglas will have the following high level objectives:

- Serving existing and future demand for travel;
- Providing a safe, frequent, reliable, efficient and sustainable public transport connection from the M50 and the strategic P&R located at the M50-N2 interchange to the city centre via Finglas and Broombridge through the use of part of the existing Luas Green Line; and
- Reducing public transport journey times between Charlestown-Finglas and the city centre.

4.2 Specific Objectives

The framing of scheme specific objectives was undertaken in accordance with the guidance provided in the Department of Transport, Tourism and Sport (DTTaS) Common Appraisal Framework (March 2016). These guidance documents include a recommendation that project objectives are established based on each of the following criteria:

- Economy;
- Safety;
- Environment;
- Accessibility & Social Inclusion;
- Integration; and
- Physical Activity (if applicable).

On the basis of the needs and characteristics of the Finglas area, and responding to the aspirations of national and strategic policy documentation, a series of defined objectives were developed. The objectives which are presented below are intended to allow a focused definition of options which can be examined both quantitatively and qualitatively against a series of required criteria.

The following are initial objectives and are likely to evolve as the scheme is developed from Stage 1 to Stage 2.

Economy

- To cater for existing and future demand for travel along the Finglas corridor;
- To reduce public transport journey times and improve public transport journey time reliability between Charlestown-Finglas and Phibsborough-Grangegorman-City Centre;
- To support the economic development and regeneration of Finglas, Charlestown and the surrounding areas; and
- To provide an attractive alternative (through the provision of a P&R facility on the nearby strategic road network alongside a high quality public transport corridor) to motorists who currently travel to the City Centre from districts outside of the M50.

Safety

- To improve safety for transport users by increasing the use of rail based public transport.

Environment

- To minimise the adverse environmental impacts (including the reduction of noise and air impacts) associated with the current traffic patterns in the area.[1]

Accessibility & Social Inclusion

From an accessibility and social inclusion perspective the key objectives of this scheme are:

- To increase access to employment, education, healthcare and other services for socially disadvantaged and deprived areas within the City through the provision reliable, fast and frequent public transport services within the area;
- To improve active mode and public realm facilities in the areas, to support regeneration; and
- Enhance the public transport offer that may encourage and support investment and employment in the wider area.

Integration

The proposed scheme is required to integrate with general policies and plans under the headings of Transport, Land Use, Geographical and Government Policy. The following objectives are outlined for integration:

- To support the integration objectives set out in European, National, Regional and Local Planning policy;
- To support objectives of the NTA Transport Strategy for the Greater Dublin Area in terms of public transport, walking and cycling facilities; and
- To integrate with the existing public transport network.

Physical Activity

It is anticipated that the proposed scheme will provide a more attractive alternative to travel by private car and may reduce car modal share. Therefore the following objective is outlined to physical activity:

- To promote additional walking and cycling in the area by providing additional public transport offer.

[1] This is also in consideration of the wider beneficial effects that a reduction of public/private road traffic would have on Prospect-Botanic Road, Phibsborough and the Doyle's Corner/North Circular Road junction, where the large majority of N2-Finglas generated traffic flows through from/to city centre.

5 HIGH LEVEL DESIGN PRINCIPLES – RAIL AND ROAD

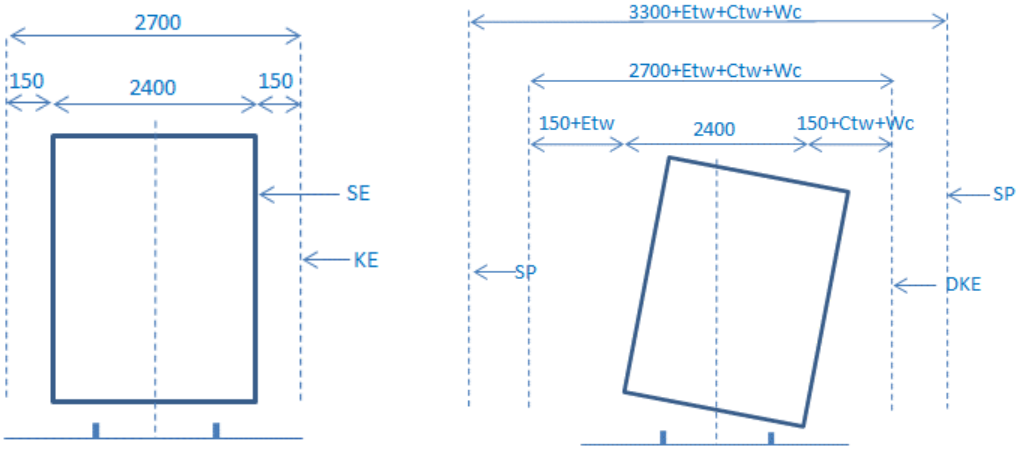
Luas Finglas infrastructure will be fully compatible and interoperable with the rest of the Luas network and will comply with all relevant technical standards and specifications in terms of structures, road-works, track-works, rail types, wheel-rail interface, electrical installations, systems, stops, accessibility, architectural and building regulations, drainage works, and ancillary works.

In particular, in order to ensure full compatibility with the rest of the Luas Green Line, the following high level technical specifications will apply:

1. Vehicle Static Envelope (SE) width 2.4m, length 55m.

2. Kinematic Envelope (KE) width of a single track on straight sections 2.7m (to be widened in curve and canted sections to the DKE- Developed Kinematic Envelope).

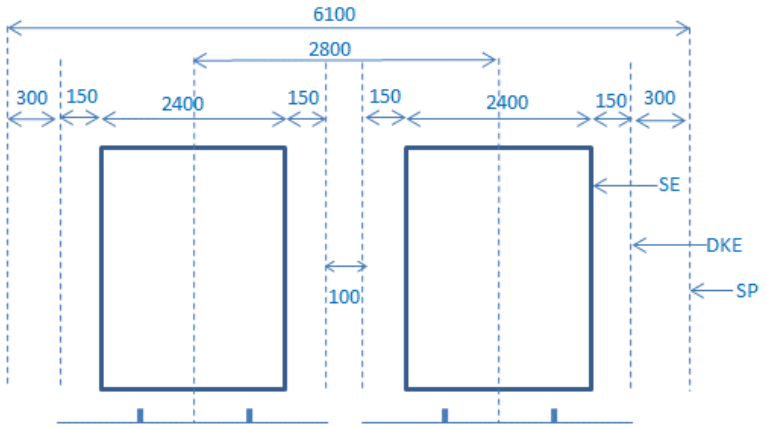
Figure 14 Luas standard SE, KE, DKE and SP



3. Swept Path (SP) width of a single track on straight sections 3.3m (to be widened in curve and when superelevation applies).

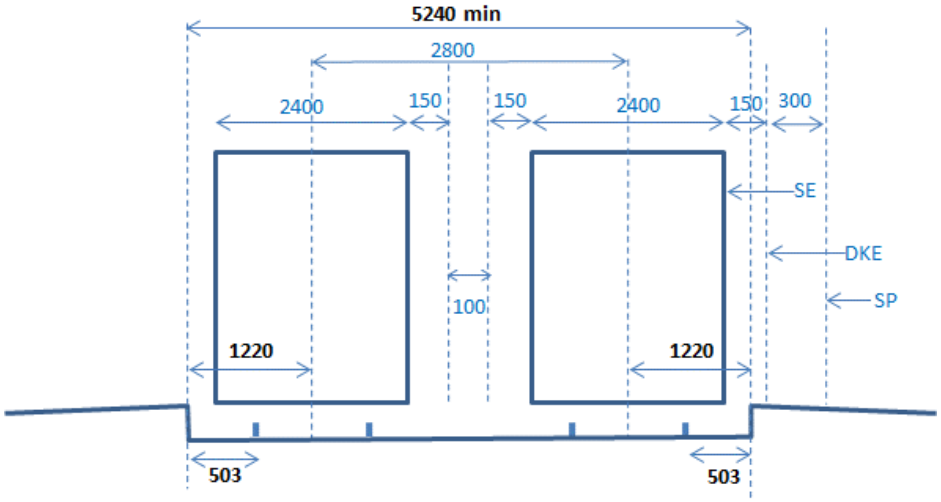
4. Minimum double track corridor width between SPs 6.1m.

Figure 15 Double track on straight Luas standard SE, DKE and SP



5. Platform lengths 55m plus 6m ramps and 3m pedestrian crossing on either side, total 73m

Figure 16 Typical Luas cross section at stop – lateral platforms



6. All stops provided with canopy and seating (wherever possible depending on local conditions and available space), passenger information displays (PIDs), ticket vending machines (TVM) in number sufficient for the expected boarding demand, emergency call button, ticket validators, CCTV, public address system (PA), bins and lighting system, all as per Luas standard.

7. Track alignment: absolute minimum horizontal curvature R25m, preferred minimum horizontal curvature R50m, maximum cant C120mm, desirable maximum longitudinal gradient 4% (6% absolute limit).

8. Overhead Conductor System (OCS) installed on poles (central-lateral-cantilevered) and building fixings, with 750 Volts. Expected additional 2 to 3 new ESS (Electric Sub-Stations).

9. Track types:
    a. Segregated off-street: ballast-slab-green. Slab track will be kept to a minimum and preference will be given to the adoption of green track wherever possible though parks and verges.
    b. Segregated on-street: green-embedded with granite setts-embedded with asphalt finish.
    c. Shared: embedded with asphalt finish.

Figure 17 Typical Luas track systems (clockwise from upper left: ballast, embedded, green slab)

In terms of road cross sectional requirements (with primary cycle lanes), the typical cross sections below show the most typical arrangements of on street segregated, on street shared (one or two tracks) and off-street tracks.

Those cross sections do not take into account “kerb-side” activity such as on street parking, loading/unloading or bus stops and are therefore to be intended as typical only. A case by case cross sectional arrangement has been developed for some of the key areas for all options, and those specific cross sections are presented in Annex 3.

Figure 18 Typical cross section of central on-street Luas reservation corridor

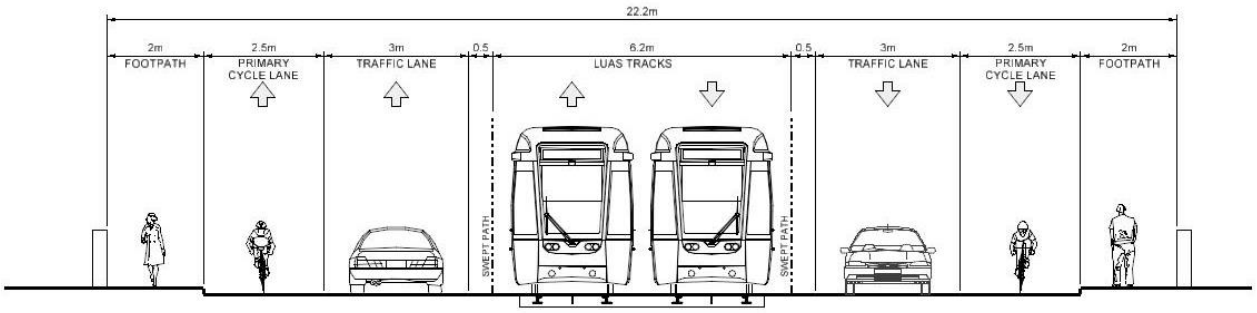


Figure 19 Typical cross section of lateral on-street Luas corridor (segregated, with 3.5m median)

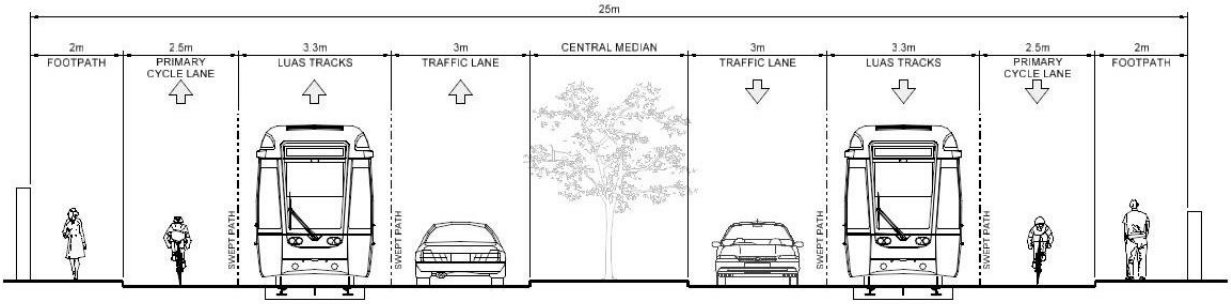


Figure 20 Typical cross section of on-street Luas corridor (shared)

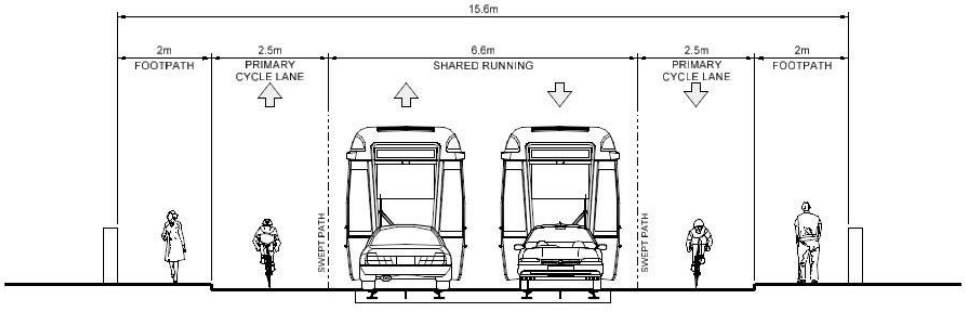


Figure 21 Typical cross section of on-street Luas corridor (one track shared – one track segregated)

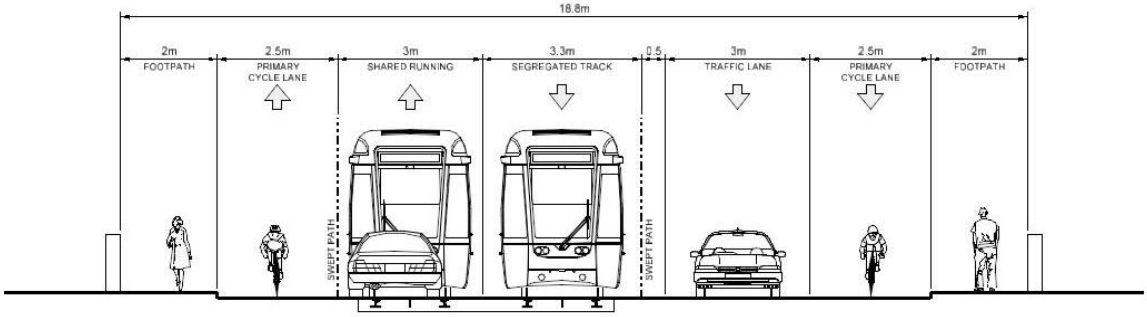
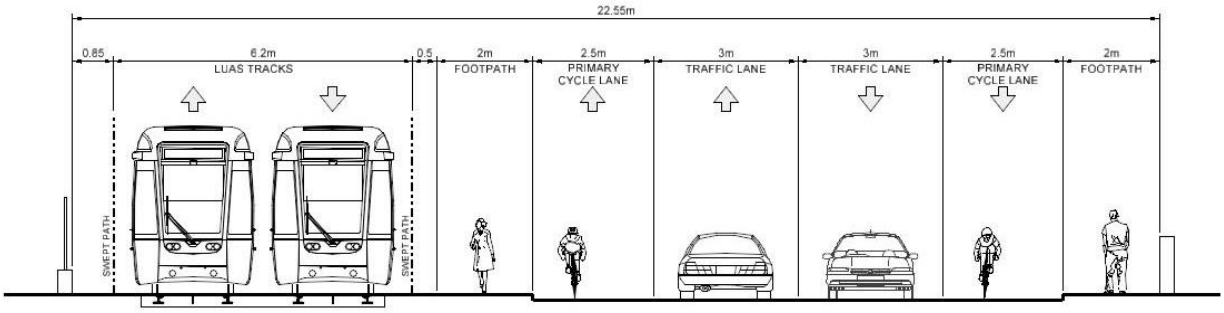


Figure 22 Typical cross section of off-street Luas corridor (segregated)



5.1 Depot and Stabling Yard

In order to facilitate a potential extension of light rail services to Finglas, the Luas Green Line will require additional trams to be operated at the necessary frequency. The future fleet depends on the runtime and the headway (or frequency).

Once built, Luas Finglas will be operated as an extension of the Luas Green Line, which, as such, will be served by the existing two depots of Sandyford and Broombridge

In all scenarios, the need for additional stabling within the existing depots or a completely new depot would be common to all options, thus this options selection process remains unaffected in its methodology.

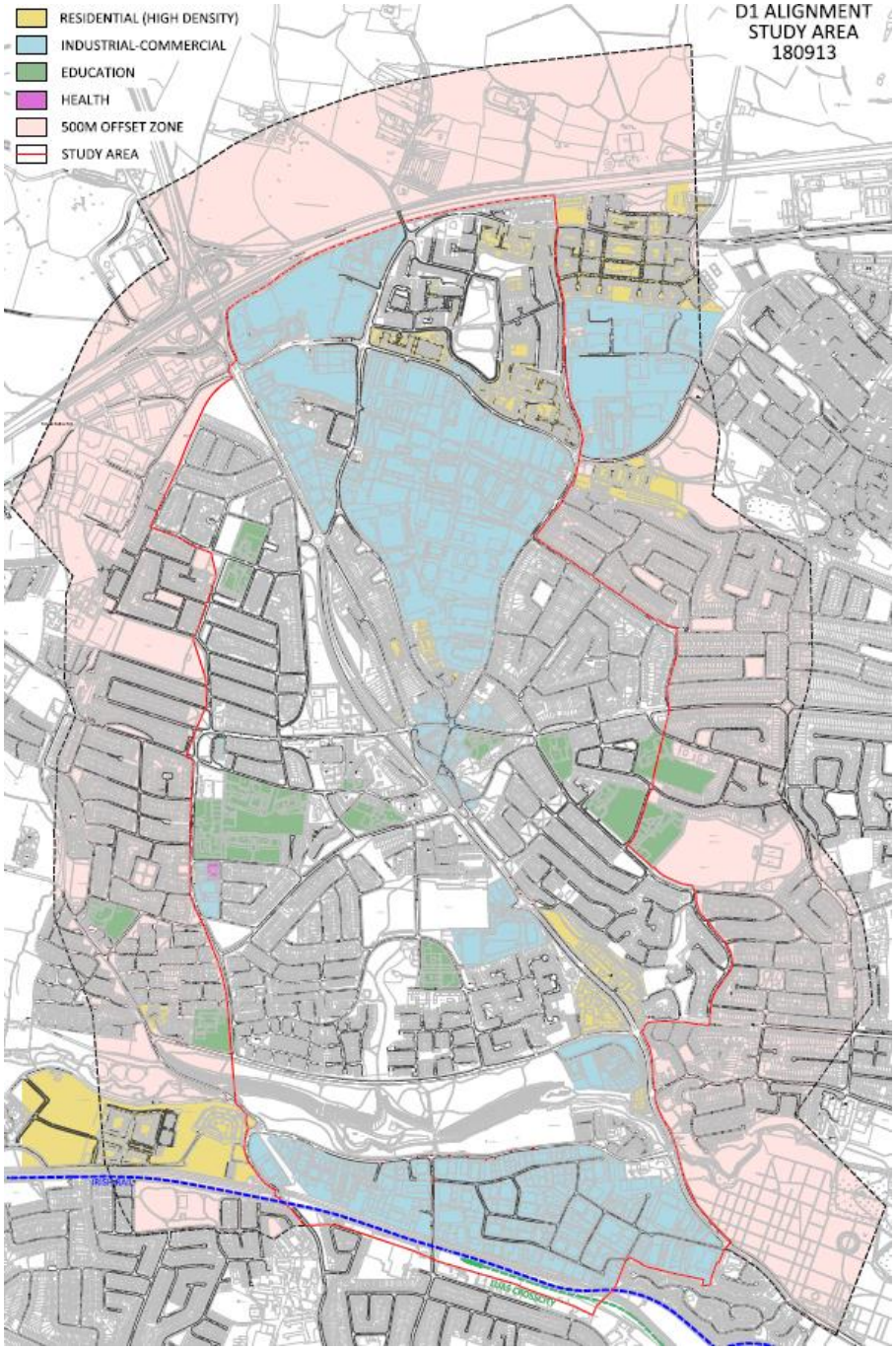
For an analysis of the depots scenarios, see *Annex 6 "Fleet estimation and analysis of the depots".*

6 STUDY AREA, OPPORTUNITIES, CONSTRAINTS AND PUBLIC TRANSPORT

6.1 Study Area, population and employment

The following map shows the detailed study area for the Luas Finglas Options Selection phase.

Figure 23 Luas Finglas detailed Study Area

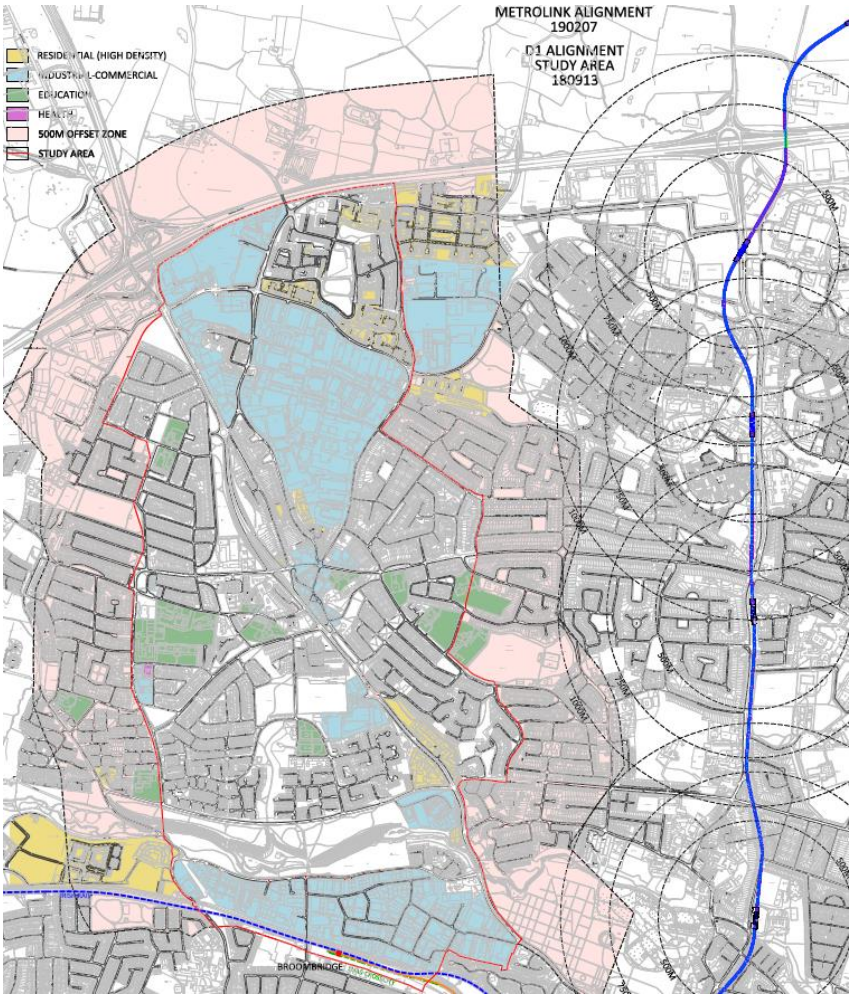


The infrastructural study area boundaries are indicated by the red line. The physical infrastructure associated with Luas Finglas is likely to be developed within this area. The shaded strip of land surrounding the Study Area shows a typically 500m offset to indicate the wider transport modelling/demand affected zone by the

future Luas Finglas. The northern study area boundary along the M50 is dotted to indicate a potential Luas Finglas extension outside the M50, in order to serve one of the possible shortlisted options for the P&R.

The physical study area has been extended to the east as far as Ballygall/Willow Park Road, which is a north-south axis parallel to Ballymun Road at an approximate distance of 1,000m. This is to avoid overlapping catchments with the MetroLink scheme.

Figure 24 Luas Finglas Study Area and MetroLink alignment and influence zones (1,000m)



To the west the physical study area has been extended to a 500m offset from Ratoath Road with a view to avoid the influence/catchment area extending outside of any urban areas.

Population and Employment within the Study Area

Data from the 2016 Census will be utilised to inform discussion within the following sections. To that end, use has been made of the 2016 Census mapping made publically available by the All-Island Research Observatory (AIRO). The study area is presented within the wider context of Dublin City in the following images.

Population density

The population densities across the City of Dublin are presented in the Figure below. As can be seen, there are a number of pockets with high population densities within the study area; a significant number of areas have densities in their several thousands per square kilometre.

Figure 25 Population Density – 2016 Census Data

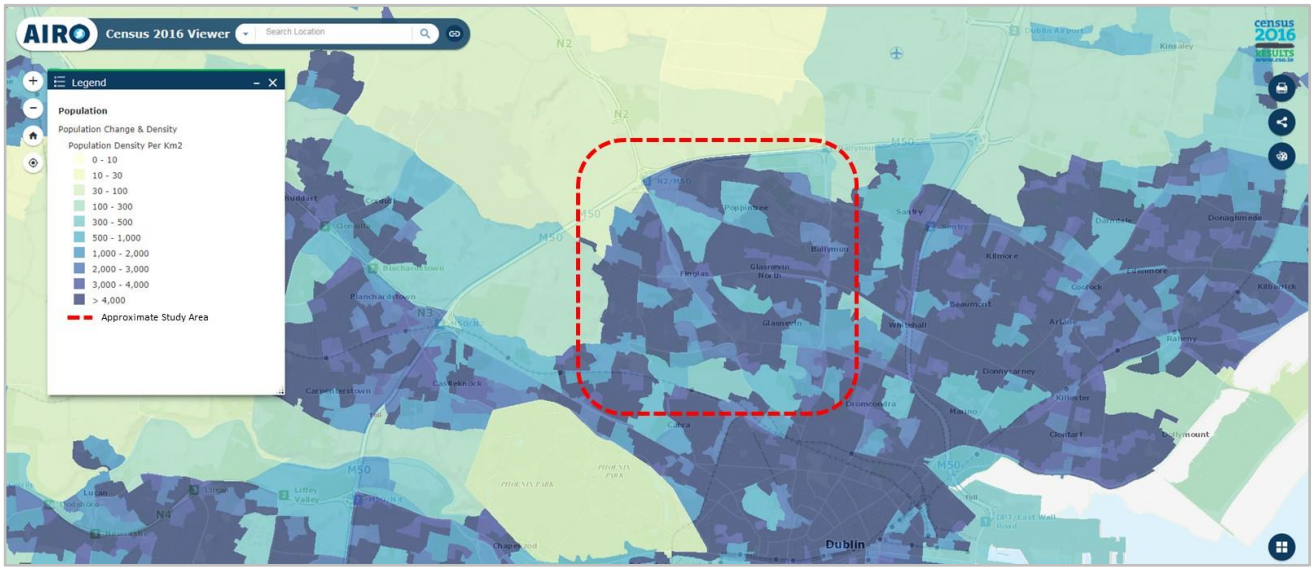
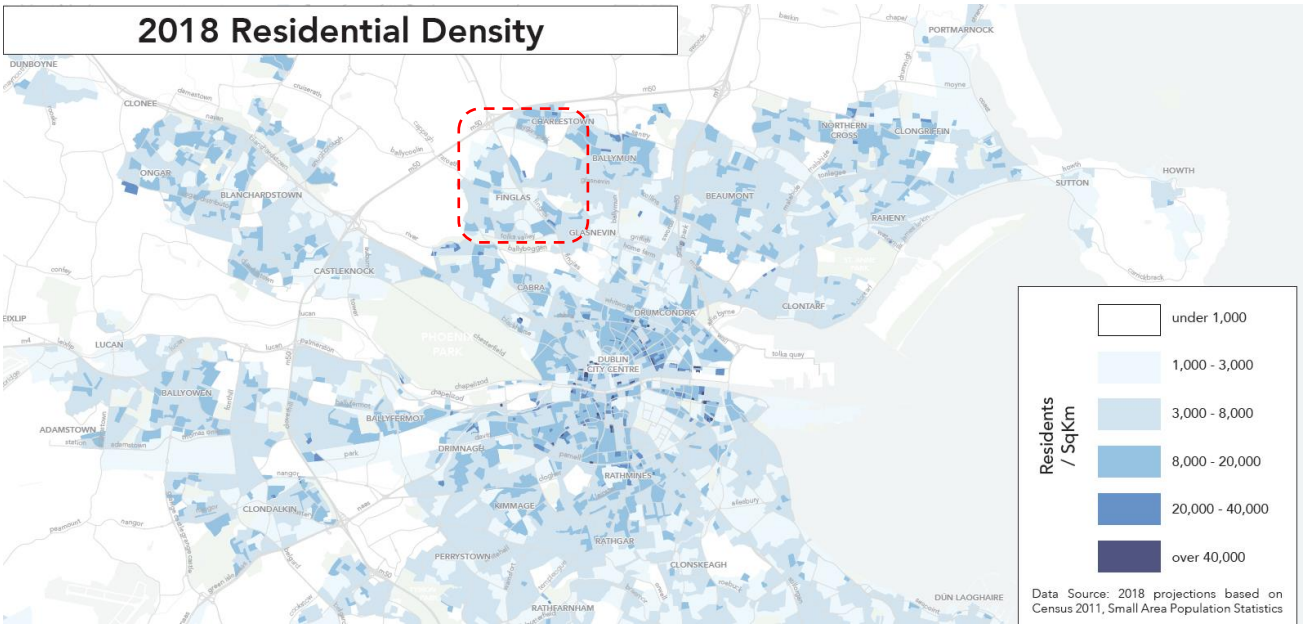


Figure 26 Population Density – source "Dublin Area Bus Network Redesign"



There has been a considerable increase of population and densities in the area between 2011 and 2016.

Figure 27 Population Growth – 2011 to 2016

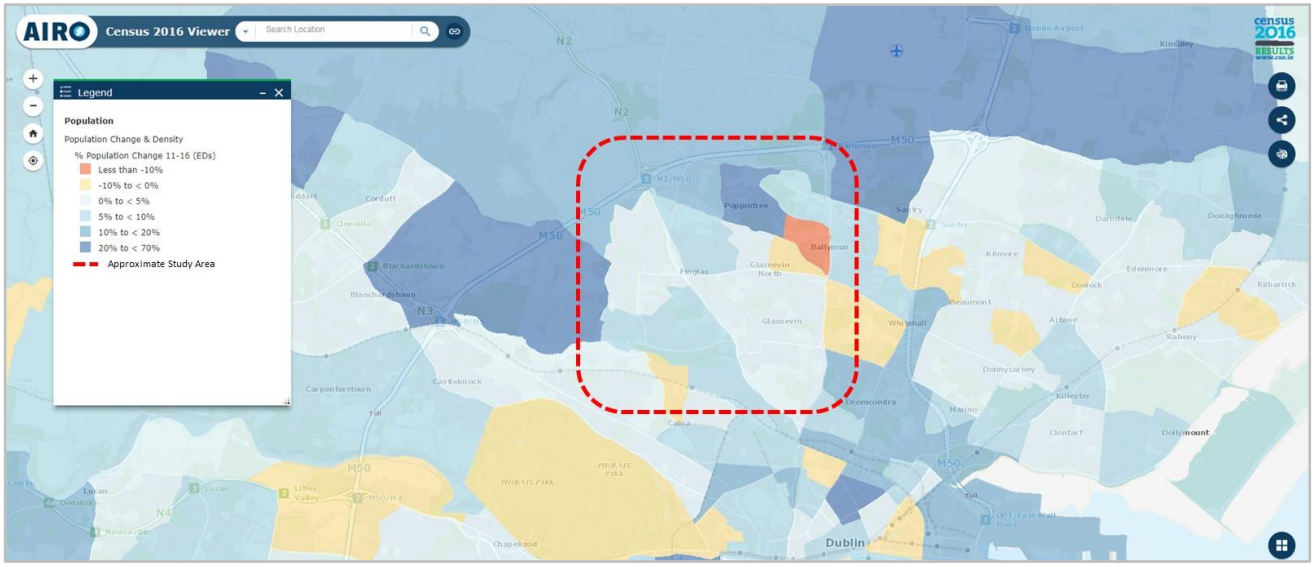


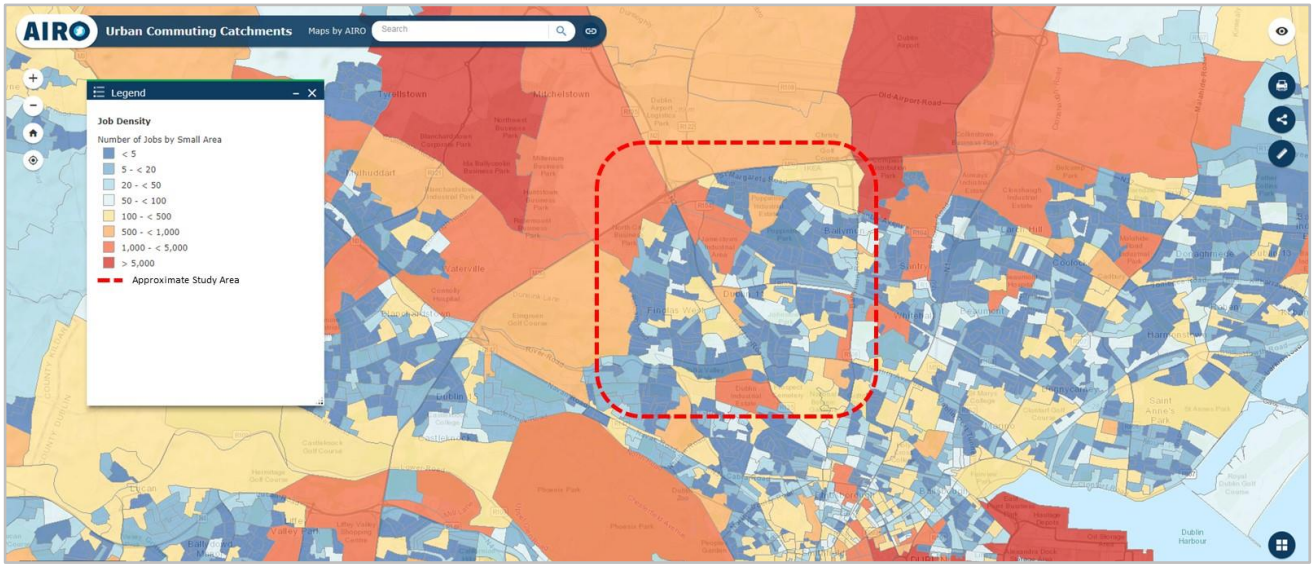
Figure 2.6 Population Growth – 2011 to 2016

As illustrated above, in the period 2011 to 2016, growth in the area has been varied but there has been growth nonetheless.

Employment density

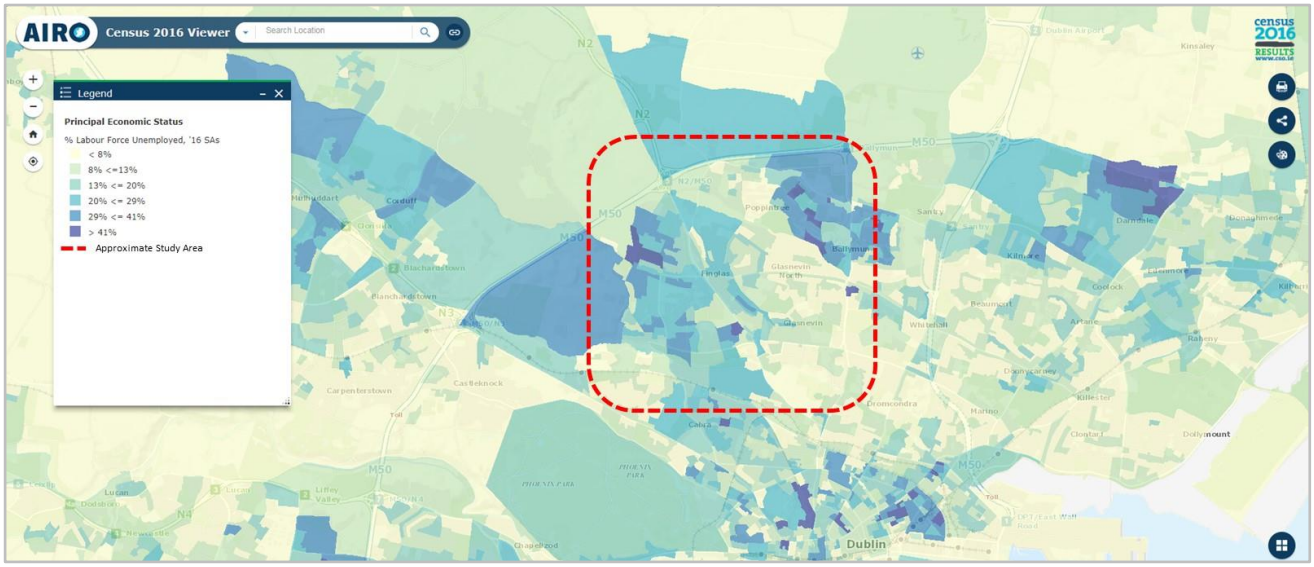
The plot below presents the number of jobs per small area. The plot indicates low job densities within the general study area with the exception of the Small Areas encompassing the Jamestown Industrial Estate and the Charlestown Shopping Centre (east of the R135). These two locations are likely to contribute to employment levels within the area. However, overall the Figure below indicates a low number of jobs within the general area. This would indicate a potential need to travel outside of the study area to attain employment.

Figure 28 Job Density – 2016 Census Data



Related to the above, the plot below provides an overview of the percentage of the labour force that that is unemployed. This plot indicates pockets of relatively high unemployment rates within the study area particularly to the west of the R135 road corridor.

Figure 29 Percentage of Labour Force Unemployed – 2016 Census Data



6.2 Opportunities

As shown in Figure 23, with the opening of Luas Cross City (December 2017), light rail services now enter the southern environs of the study area at Broombridge. The northern terminus of the Luas Green Line is now located approximately 3km - 4km from Finglas Village. As such, the presence of a Green Line spur between the City Centre and Broombridge provides an opportunity to capitalise on existing infrastructure, and enable the expansion of Luas services north of the Tolka Valley into the Finglas area. Indeed, this section of the Luas Green Line was designed and built to facilitate a future extension of Luas to Finglas from its current terminus.

The population and employment characteristics within the area also present opportunities. Analysis of the 2016 Census data demonstrates high population densities within the study area but low levels of job densities. This gives rise to a general need to travel outside of the study area for employment. Higher rates of unemployment are also evident within the study area. Furthermore, there is poor participation rates in third level study within the area. As such, there is high potential for growth in trip making in the area.

The study area is largely encompassed by the Finglas RAPID area. The Small Areas within the study area also indicate some sectors vulnerable to disadvantage as indicated within the Pobal Deprivation Index, with some areas being designated as 'Disadvantaged' and 'Very Disadvantaged'. Large sections of the study area are currently being targeted for social and economic regeneration.

In recent years, there have been efforts to overcome local challenges and revitalise the area to create a sustainable community with stronger social, economic and physical connections to the greater city area. Various policy documents advocate the sustainable development and regeneration of the city of Dublin alongside its inner suburbs, including the area of Finglas. A key driver in this policy is to enhance public transport offer to support sustainable mobility.

A number of policy documents have specifically referenced the extension of Luas Green Line services beyond the current terminus at Broombridge into Finglas, including:

- Project Ireland 2040: National Development Plan 2018 – 2027; and
- NTA Transport Strategy for the Greater Dublin Area 2016-2035.

Furthermore, Finglas Village has been identified as a Key District Centre (KDC) by Dublin City Council. The provision of Luas services in the area would support the vision outlined within these policy documents in terms of enabling at a macro level compact growth and sustainable mobility and thus assisting the transition to a low carbon and climate resilient society.

At a more local level, the provision of Luas services would provide enhanced mobility options to the population and employees within the Finglas area, which may in turn support the development and regeneration of the area, enhance options available to the population in the areas of employment and education and provide an attractive alternative to motorists who currently travel to the City Centre from districts outside of the M50. The enhanced public transport offer may also offer benefits for those located in 'Disadvantaged' and 'Very Disadvantaged' areas via enhanced accessibility to and from the City.

Existing and proposed bus services within the study area provide an important means of transport. However, these services suffer in terms of directness and journey time reliability during peak periods as a result of conditions at a number of bottlenecks on entering and exiting the City Centre. Introducing Luas services to the Finglas area provides an opportunity to enhance the public transport offer to a KDC by providing a fast and reliable service to and from the City Centre. The provision of Luas services may also provide opportunities to introduce and/or enhance facilities for active modes of travel as well as public realm facilities within the area.

6.3 Engineering Constraints

The Study Area has been thoroughly analysed in order to evaluate its permeability for potential Luas corridors. The permeability analysis has led to the creation of an "Engineering Constraints map" which shows the areas with lower permeability to Luas infrastructure for one or more of the following reasons:

1. Lack of physical space unless a significant amount of private properties is impacted and/or buildings are demolished
   This is generally the case where the existing roads are narrow, with a cross section below 7m plus footpaths (11m with no cycle-lanes). Roads with a cross section between 11m and 22m have not been eliminated at this initial stage on lack of physical space grounds only as traffic could be managed and/or banned in one or both directions, or one/both Luas tracks could be shared, although this is a less preferred option.

2. Local accesses, residential estates, or private roads
   With some case by case exceptions, generally local access roads are not to be considered suitable for running Luas tracks.

3. Cul-de-sac type roads
   This is a sub-group of the previous group, with the additional constraint of currently being blocked-off.

4. Roads with frequent sharp bends, where the Luas corridor would require several consecutive radii below 35m.

5. Industrial Estates (unless under current planning for redevelopment, in which case opportunities could arise to cross them).

Areas that are deemed not suitable for Luas alignments are shaded purple in Fig. 28. No route options will be developed through these areas.

Figure 30 Engineering Constraints Map of the Study Area

6.4 Environmental Constraints

Environmental constraints may impact the development of any proposals to improve public transport connectivity between Finglas and the city centre.

There are a number of internationally designated sites including Special Protection Areas (SPAs) and candidate Special Areas of Conservation (cSAC) located within a 15km buffer of Finglas and the city centre including the South Dublin Bay and River Tolka Estuary SPA and the North Dublin Bay SAC.

The Royal Canal is a proposed Natural Heritage Areas (pNHA) (Site Code 002103) and is therefore a designated site of national importance. The canal is characterised by managed bankside habitat with a narrow fringe of marginal aquatic vegetation and a diverse range of submerged aquatic species. A number of different habitats are found within the canal boundaries, e.g. hedgerow, and woodland. The diversity of species found along the length of the canal makes the site ecologically significant.

The one other significant surface water body, the River Tolka, is not a designated site. The River Tolka flows through the urban areas of the Tolka Valley Park, Botanic Gardens, Griffith Park and Fairview Park before discharging to the sea at the River Tolka Estuary. The River Tolka has a history of flooding with events recorded in 1954 and 2002.

Groundwater vulnerability ranges from moderate to extreme within the study area with the presence of rock near the surface or karst in places. There are no Geological Heritage Areas within the study area. However, Glasnevin Cemetery is considered a County Geological Site within the Dublin City Council Development Plan 2016-2022.

Tolka Valley Park is an important regional park situated over a former city landfill. It is approximately 50 hectares. The common frog (Rana temporaria) has been recorded within the park. The common frog is listed as 'Internationally Important' in the Red Data Book and was determined to have a poor conservation status by the National Parks and Wildlife Service due to a decrease in both its range and population. It is protected under Annex V of the EU Habitats Directive (92/43/EC).

There are a number of other smaller parks between Finglas and the City centre including Kildonan Park and Mellowes Park.

The River Tolka Greenway runs from Finglas Road to Rathoath Road. The Greenway is a 4km off-road cycling and walking route which links Glasnevin, Cabra, Finglas and Ashtown.

There are a significant number of noise sensitive receptors including residents and educational institutions between Finglas and the city centre. The Phase III strategic noise mapping completed by Dublin City Council in 2017 under the Environmental Noise Regulations identifies road traffic as the dominant environmental noise source with levels ranging from greater than 75dB to less than 55dB (Lden) across the study area.

The Environmental Protection Agency (EPA) monitor Particulate Matter (PM2.5) at Mellowes Park in Finglas. PM2.5 or 'fine' particulate matter is particle pollution made of a mixture of solids and liquids of size 2.5 µm or less. The EPA report that the air quality data measured at this site is 'good'.

A number of significant cultural heritage constraints are located within the study area for the proposed project. These cultural heritage constraints have statutory protection in accordance with the National Monuments Act (as amended) 1930-2014 and the Planning and Development Act (as amended) 2000-2017. Thirty five Recorded Monuments and Places (RMPs), 21 Protected Structures (RPSs) have been identified, with five Conservation Areas (CAs) also listed within the Dublin City Development Plan 2016-2022. These constraints cluster around the Royal Canal, the Tolka Valley Park, and the medieval village of Finglas. Tolka

Valley Park also borders Prospect Cemetery at Glasnevin (DCC RPS 2749) a significant cultural heritage constraint dominated by its iconic round tower housing the burial crypt of Daniel O'Connell, and surrounded by the graves of other notable political and religious leaders such as those of Charles Stewart Parnell, Sir Charles Gavan Duffy and Oliver Plunkett.

In the south of the study area lies the Royal Canal CA. The canal, its associated walls, tow paths and lock gates is of cultural and industrial heritage significance; it is crossed by two bridges which are protected structures namely Broombridge Bridge (DCC RPS 909) and H.S. Reilly Bridge (DCC RPS 913).

'Finglas Wood Bridge', facilitating crossing of the River Tolka, within Tolka Valley Park is also a Protected Structure (DCC RPS 906), while the park is a CA. Five RMPs are associated with both the park and the River Tolka and include the site of a medieval tower house (RMP DU014-076001-), a 17th century mill (RMP DU018-001----), and a possible medieval bridge (RMP DU014-075----).

The study area is dominated by the early medieval village of Finglas established in the 6th century by St Canice and further developed as an episcopal manor in the 12th century. Recorded Monuments within the town include the early medieval ecclesiastical complex, the episcopal manor, a Holy Well dedicated to St. Patrick and the remains of the town defences known as 'King William's Ramparts' (RMPs DU014-066002 – DU014-066017-). King William's Ramparts, St. Patrick's Well, and St. Canice's Church are also Protected Structures (DCC RPSs 8733, 8734, 8735 and 4851). 'Rose Hill' House to the east of the Main Street is both a recorded monument and a protected structure (RMP DU014-079---; DCC RPS 4850); the neighbouring Woodland Lodge (Towson's Cottage) is also a protected structure (DCC RPS 4849). Three CAs are located within Finglas Village.

Meakstown, just south of the M50 is the site of an 'extensive brick manor' recorded by the Civil Survey in 1654 (RMP DU014-020001-), to the west of which lies the site of Meakstown Castle (RMP DU014-020002-) with a further early medieval settlement lying to the east in Poppintree (RMP DU014-115---).

6.5 Existing and Future Public Transport Networks

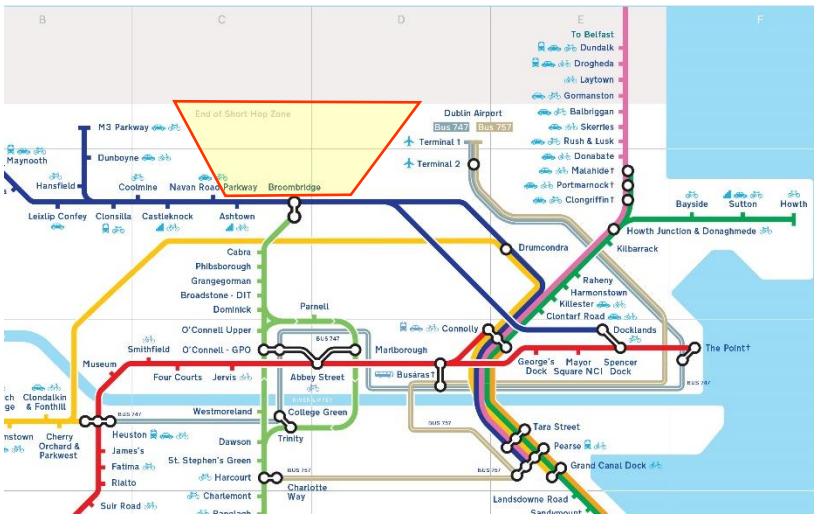
6.5.1 Existing Rail Based Network

In terms of rail services, only the southern portion of the study area is served by either light or heavy rail; the stops for which are located south of the Tolka Valley and Broombridge Industrial Estate. Indeed, both the Tolka Valley and the Industrial Estate form a significant barrier in terms of accessibility to areas to the north, particularly the Finglas area.

The suburban railway line provides services between Dublin Connolly and the towns of Sligo, Longford and Maynooth. A number of stations are situated within the southern sections of the study area, including Ashtown and Broombridge, with train services every 15 to 60 minutes to Connolly-Pearse stations (15 to 20 minutes run time).

Luas Green Line has a terminus in Broombridge, providing an interchange with this suburban rail line with services every 8 to 15 minutes to the city centre with 15 minutes run time to O'Connell Street-Marlborough Stop (23 minutes to St. Stephen's Green).

Figure 31 Schematic of Dublin Railway map and the Study Area

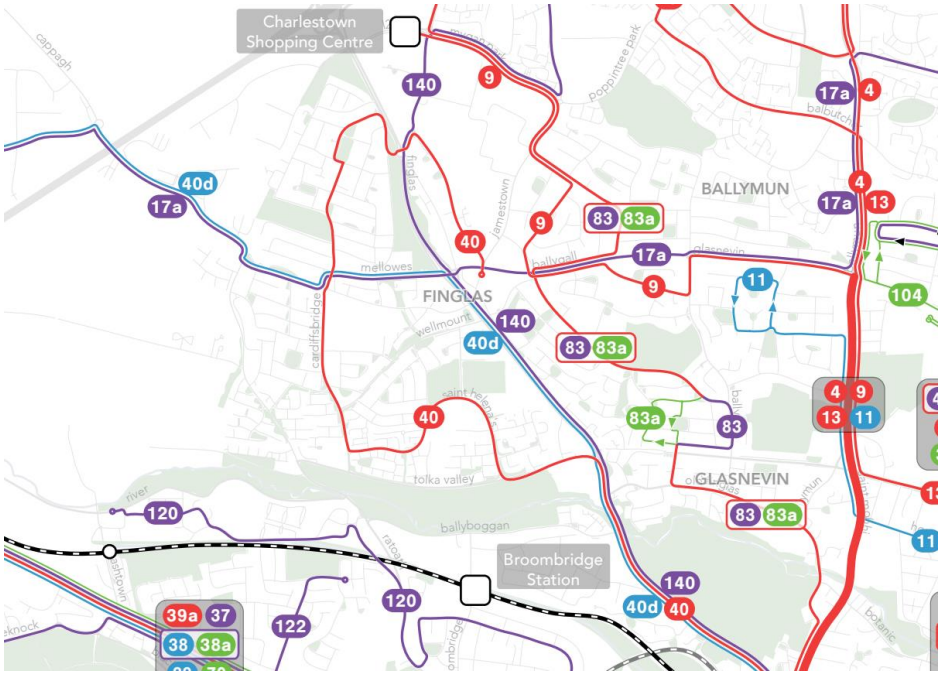


Notwithstanding the above, these rail services are quite remote from significant areas within the northern environs of the study area. Indeed, the key district centre of Finglas is also outside the catchment area of both the Ashtown and Broombridge train stations.

6.5.2 Existing Bus Network

The existing bus network in the area is shown in the following figure.

Figure 32 Existing Bus network in the Study Area



The three main bus routes connecting the area to the city centre are routes 40, 140 and 9.

- *Finglas West - Route 40*
  Buses every 10-15 minutes; journey times approximately 45 to 50 minutes off peak from Charlestown to O'Connell Street, serving Finglas Village and Finglas West-St. Helena's Road before joining Finglas Road and Drumcondra via Hart's Corner and Withworth Road
- *Finglas Road - Route 140*
  Buses every 10-15 minutes; journey times approximately 40 to 45 minutes off peak from Ikea to O'Connell Street, serving Finglas Village before joining the Finglas Road and Phibsborough via Hart's Corner
- *Finglas East - Route 9*
  Buses every 15 minutes, journey times approximately 35 to 40 minutes off peak from Charlestown to O'Connell Street, serving Finglas Village and Finglas East before joining Ballymun-Botanic Road and Phibsborough via Hart's Corner

The runtime, commercial speed, frequency and headways of all these routes are heavily affected by traffic congestion and fluctuation in runtime can be as much as 25%. A journey from Charlestown to the city centre can take close to 1 hour at peak times which is partially due to a significant portion of these bus services traversing the junction of the R108 and R135 and using a common route on approach to the City Centre i.e. R108 / Constitution Hill / Broadstone Road and the Drumcondra Road.

By way of example, journey time data on bus services for June 2018 has been collated (Finglas Village Centre to O'Connell Street) using the Google maps distance matrix API. Journey times and operating speeds for the AM period in the southbound direction are shown in Table 1 below.

Table 1 Journey Times on Dublin Bus Services – AM Period Southbound (From Finglas to O'Connell Street)

	Journey Times on Dublin Bus Services - AM Period southbound (minutes):					
Depart at:	**40**	**83**	**140**	**9**	**40d**	**40b**
06:00	41	34	28	38	-	-
06:30	41	-	28	-	33	-
07:00	43	-	31	-	-	31
07:30	-	-	31	-	37	-
08:00	44	-	33	-	-	37
08:30	-	-	34	-	33	-
09:00	45	44	35	-	-	-
09:30	45	44	31	-	-	-
10:00	45	-	31	39	-	28
10:30	41	-	31	39	-	-

Table 2 Operating Speeds on Dublin Bus Services – AM Period Southbound (From Finglas to O'Connell Street)

	Approximate Operating Speeds on Dublin Bus Services - AM Period southbound (km/h):					
Depart at:	**40**	**83**	**140**	**9**	**40d**	**40b**
06:00	11	13	16	12	-	-
06:30	11	-	16	-	14	-
07:00	10	-	15	-	-	15
07:30	-	-	15	-	12	-
08:00	10	-	14	-	-	12
08:30	-	-	13	-	14	-
09:00	10	10	13	-	-	-
09:30	10	10	15	-	-	-
10:00	10	-	15	12	-	16
10:30	11	-	15	12	-	-

As shown above, the operating speeds of southbound services during the AM peak is quite modest, Dublin Bus No. 140 appears to provide Finglas Village Centre with the most competitive journey time to Dublin City Centre. However, these relatively modest end to end speeds may be related to a number of issues including the directness of the routes, the number of junctions some routes travel through and the fact that most of the more important bus services serving the area utilise the corridors and bottlenecks discussed, in particular the junction of the R135 and the R108 at Cross Guns Bridge on Phibsborough Road. As a result, a sizeable share of bus services operating in the study area travel to the city centre via R108 / Constitution Hill / Broadstone Road or Whitworth Road and thus are subject to issues and constraints which potentially have a considerable impact on journey time reliability.

6.5.3 BusConnects

BusConnects is a large scale project by the NTA with the objective to improve the current bus system in the Dublin region. Part of the proposal comprises developing a network of "next generation" bus corridors on the busiest bus routes to make bus journeys faster, predictable and reliable.

BusConnects, among other aspects, aims to redesign the network of bus routes to provide a more efficient network, improving connectivity and carrying capacity, upgrading the fare structure and fare collection systems and providing new bus stops.

Figure 33 BusConnects Core Bus Corridors

The core bus corridor project intends to deliver 230kms of dedicated bus lanes and 200kms of cycle tracks along 16 of the busiest corridors in Dublin.

Following the submission of a Statutory Planning Application to An Bord Pleanála (expected in 2020), each corridor upgrade will take up to 2 years to complete, with the full network expected to be in operation by 2027.

A section of bus corridor between Finglas and Phibsborough along the Finglas Road has been identified as a radial core bus corridor for improvement within BusConnects. This is shown below.

Figure 34 BusConnects corridor from Finglas to Phibsborough

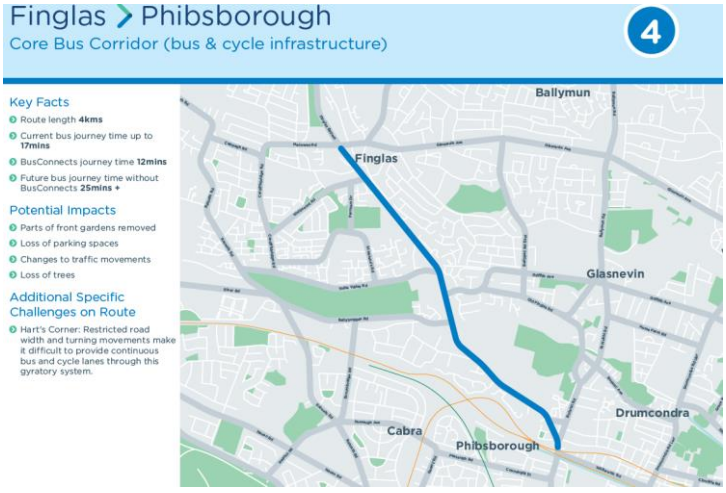
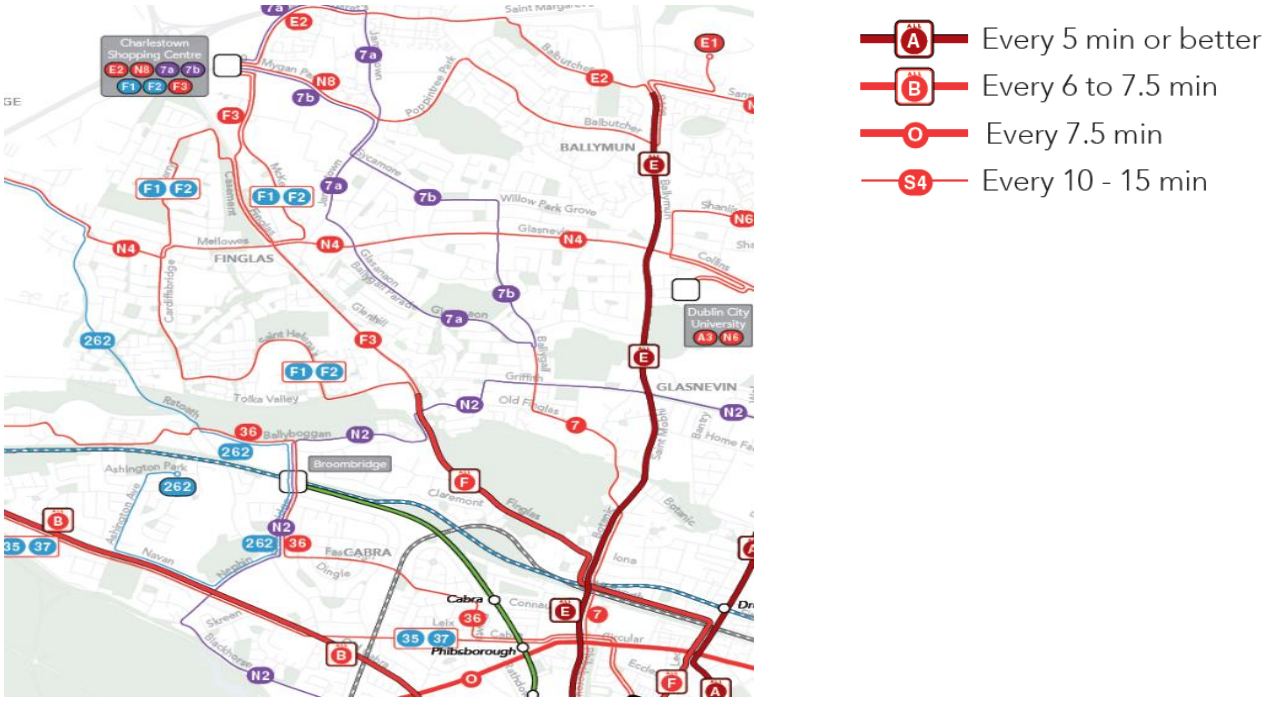


Figure 35 BusConnects corridor from Finglas to Phibsborough



According to this new layout, lines F1 and F2 run along the corridor of the current no. 40 bus route with an expected frequency every 10-15minutes and a runtime expected to be similar to the existing bus service or slightly improved. The F3 line runs along the current no. 140 bus corridor with an expected frequency every 5minutes and an improved runtime due to the implementation of the mentioned radial core bus corridor along the Finglas Road.

It is noted that all the 'F' lines converge through Hart's Corner at the junction of the R108 and R135, turn into Withworth Road proceed through Drumcondra and the city centre.

6.5.4 MetroLink

The MetroLink project is the development of a north-south urban railway service that will operate along the busy corridor between Swords and Charlemont, thereby connecting key destinations including Dublin Airport and the City Centre, with the Luas Green Line. It is anticipated that this corridor will be approximately 19km in length, provide 15 stations and provide Park & Ride facilities. It is planned to be operational by 2027, will have a final capacity of 20,000 passengers per hour per direction and a runtime between the Airport and the City Centre of approximately 20 minutes.

Figure 36 MetroLink route

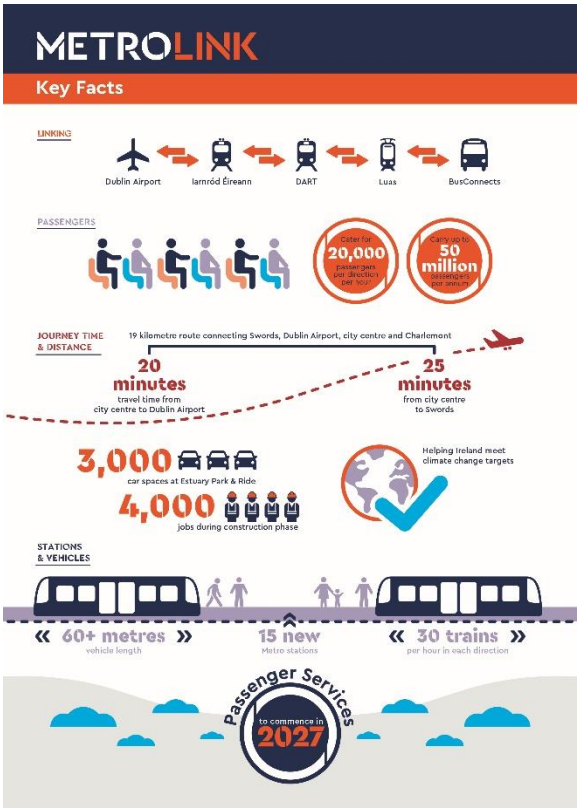
A considerable portion of the route will be underground including where it passes the city centre area and Dublin Airport.

North of the city centre MetroLink will be running underground under Ballymun Road from the St. Mobhi Road-Griffith Avenue Junction, ca. 1.5km to the East of Finglas Road, up to the M50, which it will cross on a grade separated structure located in close proximity to the M50 Junction 4, approximately 3km from Charlestown and the M50 Junction 5.

Figure 37 MetroLink route from Glasnevin to the M50 and Luas Finglas Study Area

MetroLink key facts are presented in the following slide.

Figure 38 MetroLink Key Facts



At the time of writing this report, the final alignment of MetroLink is still under consideration. However, based on information available it is reasonable to assume that the section of the MetroLink alignment adjacent to the Luas Finglas Study Area is not likely to change considerably.

7 FIXED POINTS OF THE CORRIDOR

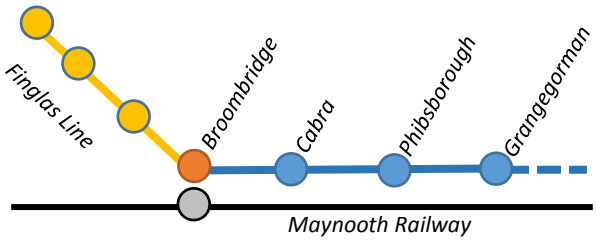
7.1 Start Point – Broombridge

In terms of selecting a location from which to launch Luas Finglas from the existing Luas Green Line, a number of options were explored and are discussed below.

The Luas Green Line terminus at Broombridge was designed to facilitate further extension of the network to the north. Nevertheless, it is appropriate to consider whether alternative tie-in points are feasible.

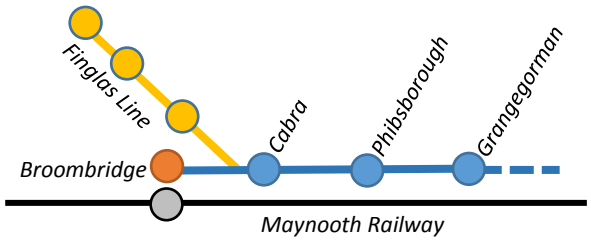
The first configuration shows the Luas Green Line simply being extended, with services continuing to Finglas or terminating at Broombridge if the demand along the Finglas line is lower.

Figure 39 Simple line extension from Broombridge – schematic



Any alternative to this configuration would entail the current Green Line bifurcating prior to reaching Broombridge.

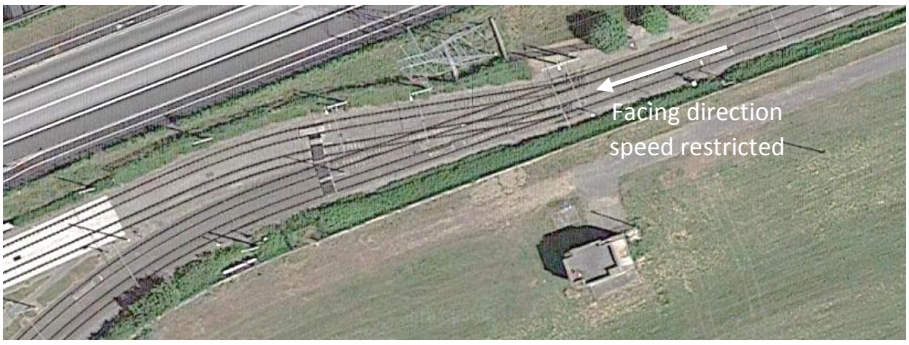
Figure 40 Line bifurcation before Broombridge - Double junction – schematic



This solution would have several drawbacks, both operational and technical, which are described below:

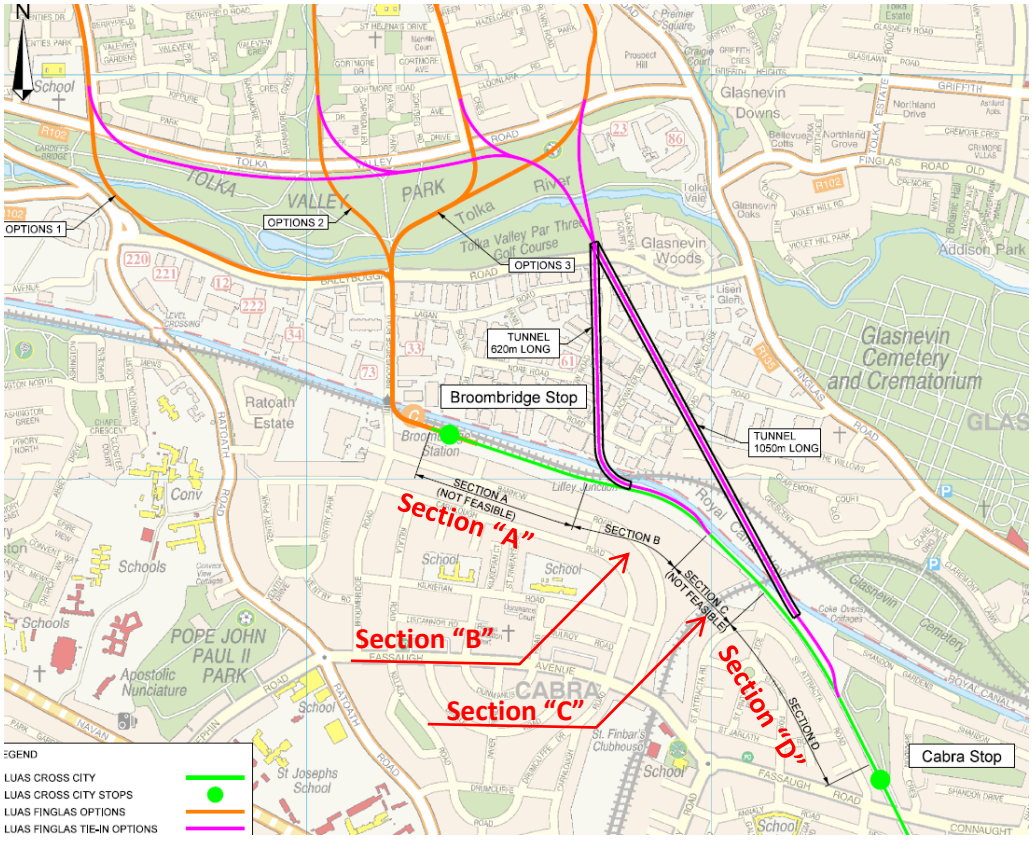
1. Luas Finglas would not serve the interchange with the Railway Commuter Service at Broombridge Station. All passengers between the commuter services and Finglas/Charlestown or vice-versa, would have to change twice; at Cabra between tram services and at Broombridge between tram and train.
2. The tram frequency to Luas Finglas or to the Broombridge branch would be reduced (potentially halved) in both directions and not all Luas Green Line services from the city centre would provide a connection to Broombridge interchange.
3. From a technical viewpoint, a mid-line tie-in (or bifurcation) would be similar to the current Luas Cookstown “double junction”. This would add technological and operational complexities, cost, and operational constraints with speed restrictions imposed along what is currently the fastest section of Luas Cross City.

Figure 41 Double track junction in Cookstown – Luas Red Line – aerial view



4. While a complex configuration like a double junction is the only solution for a line bifurcation, its construction and maintenance cost and operational impact shall be balanced by the benefits of serving two distant areas, each for a significant length. In this case, the bifurcation would fall in close proximity to one of the two terminuses (Broombridge), providing little justification for the bifurcation.
5. From a strictly technical viewpoint, extending the current Green Line from a location between Cabra and Broombridge would only be possible from two sections (indicated as "B" and "D" in the figure below) and would entail the construction of a section in tunnel of variable length, otherwise a significant number of properties would be impacted.

Figure 42 High level plan for the Luas Finglas tie-in options before Broombridge



It is important to remark that the Luas Cross City (LCC) section of the Luas Green Line was designed and built to terminate in Broombridge and facilitate a future extension of the Luas network to Finglas. This could be achieved either by setting the current stop platforms back by approximately 25m to facilitate the construction of the alignment in order to underpass both railway and canal on the east side of the Broombridge listed structure, or by keeping the current stop location and dipping the extended corridor beneath the southern approach ramp to the Broombridge structure, in order for the line to cross east-west and then curve towards the north to underpass both the railway and the canal. In both cases, retained cut sections and cut and cover sections will be needed to underpass the canal and the railway line, but their length would be a fraction of the previously discussed options.

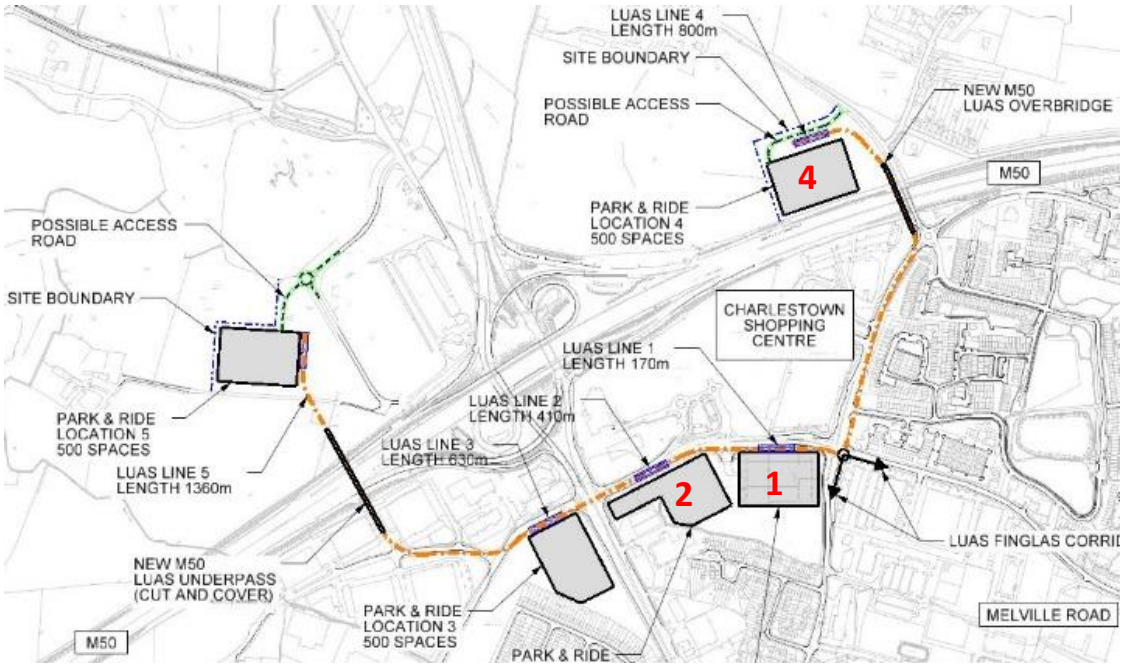
Another possible option which was developed in conjunction with the LCC design was for Luas Finglas to pass over the canal and the railway, although this would require a significant headroom to allow for future railway electrification.

All this considered it is recommended that the Luas Finglas is built with a direct tie-in west of the current Broombridge stop.

7.2 End Point and P&R – Charlestown

In October 2018, TII issued a document titled "*Luas Finglas P&R working paper" (Annex 7)* to the NTA, which analysed possible locations for a P&R, concluding that locations 1-2 (within the M50 in close proximity to Charlestown Shopping Centre) were to be preferred, with location 4 (outside the M50) being the second best option (see location options map below).

Figure 43 Luas Finglas P&R – General map of Options 1-2-3-4-5. Extract from "Luas Finglas P&R working paper"

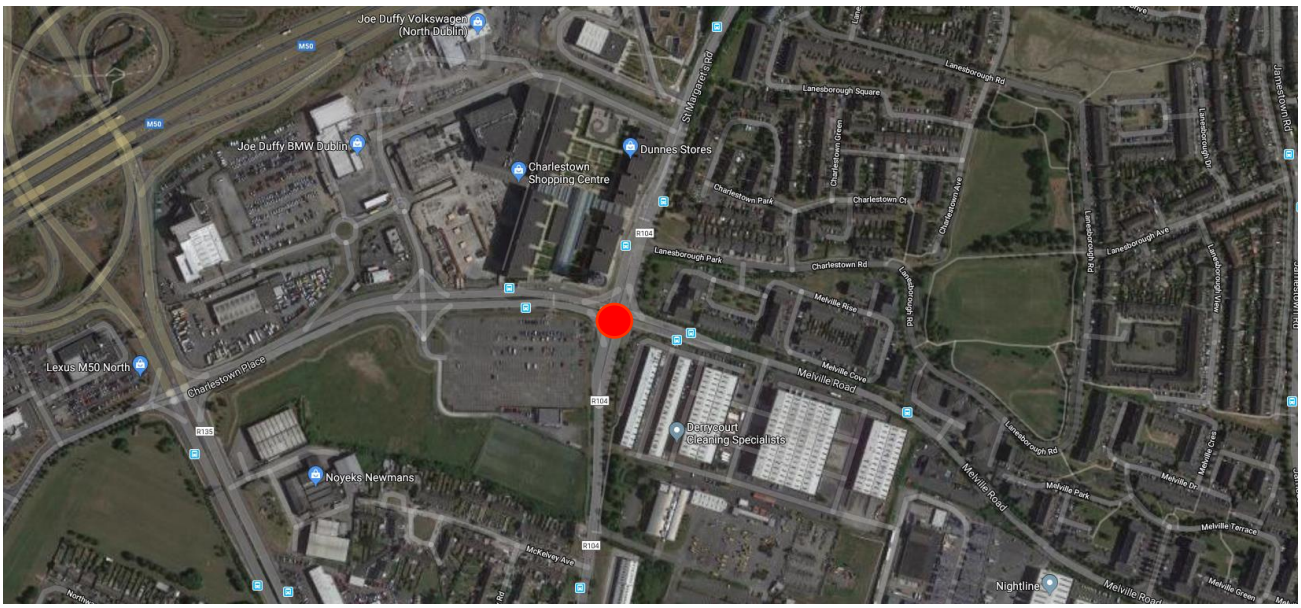


The same document also concluded that due to Options 1, 2 and 4 being located on the east side of the M50-N2 junction, the Luas Finglas alignment study could be progressed up to the common point located at the junction between St. Margaret's Road and Charlestown Place, after which point the P&R final location will dictate the last section of Luas Finglas alignment, which will be common to all options.

On the 5th of November 2018, a meeting was held between NTA and TII discussing the P&R location and it was agreed to progress the Luas Finglas Options Selection Study based on the above mentioned conclusions of the "*Luas Finglas P&R working paper*".

According to this, the Luas Finglas alignment study can be progressed up to the common point located at the junction between St. Margaret's Road and Charlestown Place, after which point the P&R final location will dictate the last section of Luas Finglas alignment, which will be common to all options and thus uninfluential.

Figure 44 Aerial views of the common point located at the junction between St. Margaret's Road and Charlestown Place



Charlestown as an end point of the alignment is also fully in line with all the strategic planning documents mentioned at the beginning of this report, and falls in close proximity to; Junction 5 of the M50, the Finglas Road, the Charlestown Shopping Centre, and a high density residential area.

8 OPTIONS DEVELOPMENT PROCESS

8.1 Option Development Methodology

8.1.1 Main Corridors

Luas Finglas starts in Broombridge, south of the Tolka Valley and west of the Finglas Road, and terminates in Charlestown, north of the Tolka Valley and east of the Finglas Road. Possible at grade route corridors linking the Broombridge Luas terminus to Charlestown at the R135-M50 interchange will thus have to cross both the Tolka Valley Park and the Finglas Road.

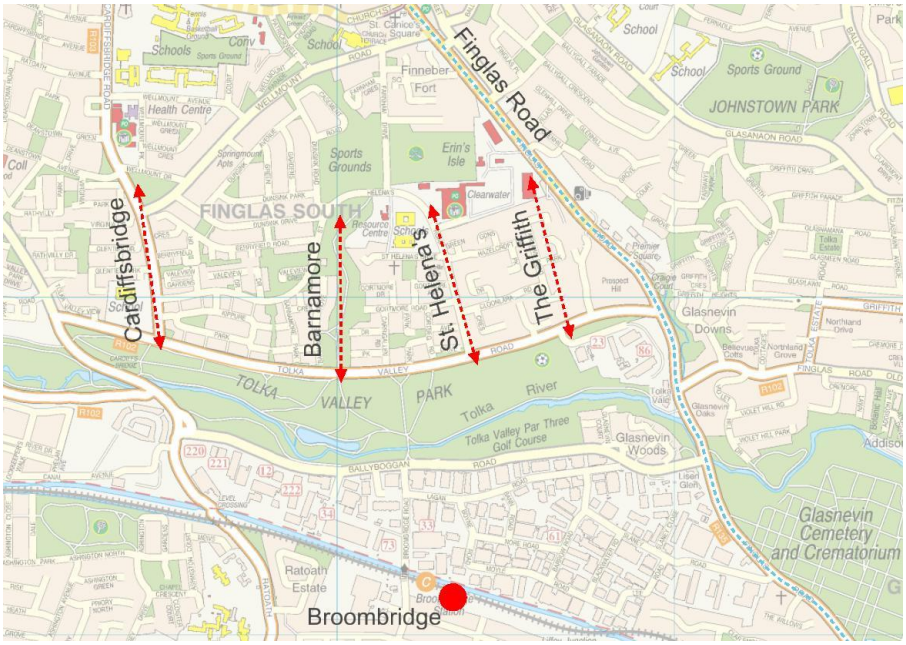
Several possible route options and sub-options are available to cross the Tolka Valley and Finglas Road, and are shown below. Generally, these options are formed within the Study Area and defined by the constraints identified within the Engineering Constraints Map.

From the Tolka Valley Park there are four general corridors where the Luas can penetrate through the southern part of Finglas within the study area:

1. Cardiffsbridge Road
2. Barnamore Grove linear park
3. St Helena's Road
4. Back of The Griffith lane

Those four corridors are bordered to the West by Ratoath Road (outside the Study Area of Luas Finglas) and by Finglas Road to the East.

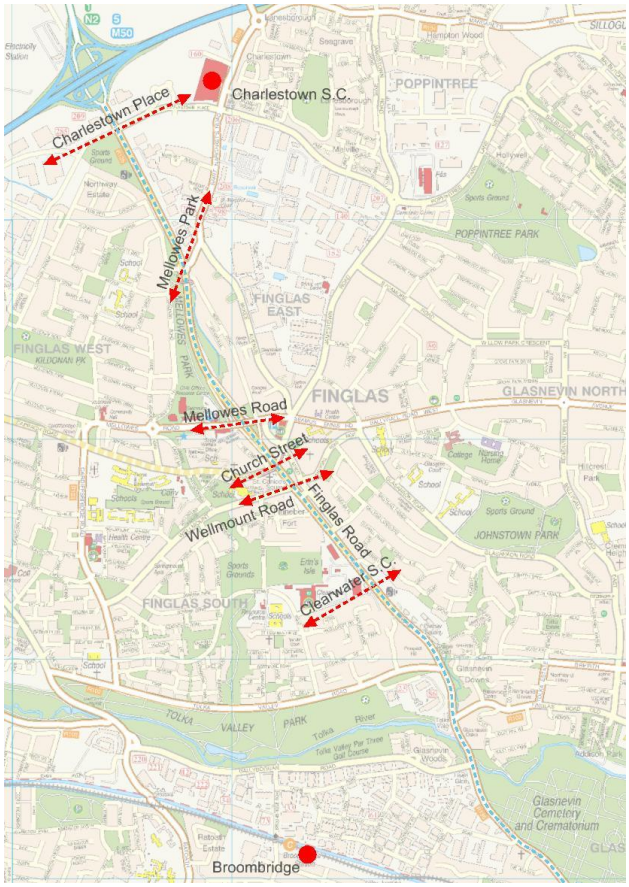
Figure 45 Four corridors from the Tolka Valley Park through the lower Finglas area



North of Tolka Valley Park, the Luas corridor could run along the four mentioned corridors until reaching any of the following six axes allowing the corridor to cross or join the R135 (in order from south to north):

1. Tesco-Clearwater Shopping Centre (at grade or grade separated, depending on the option)
2. Wellmount Road (at grade, this is currently a T junction)
3. Church Street (grade separated – would require a new Luas combined pedestrian bridge to replace the existing pedestrian bridge)
4. Mellowes Road (grade separated – using the existing road bridge or an adjacent structure possibly to the south of it)
5. Mellowes Park Finglas Road Roundabout (either at grade through the existing roundabout to be upgraded to signal controlled junction, or grade separated with the provision of a new Luas bridge)
6. Charlestown Place (at grade through the existing junction)

Figure 46 Six corridors crossing the R135

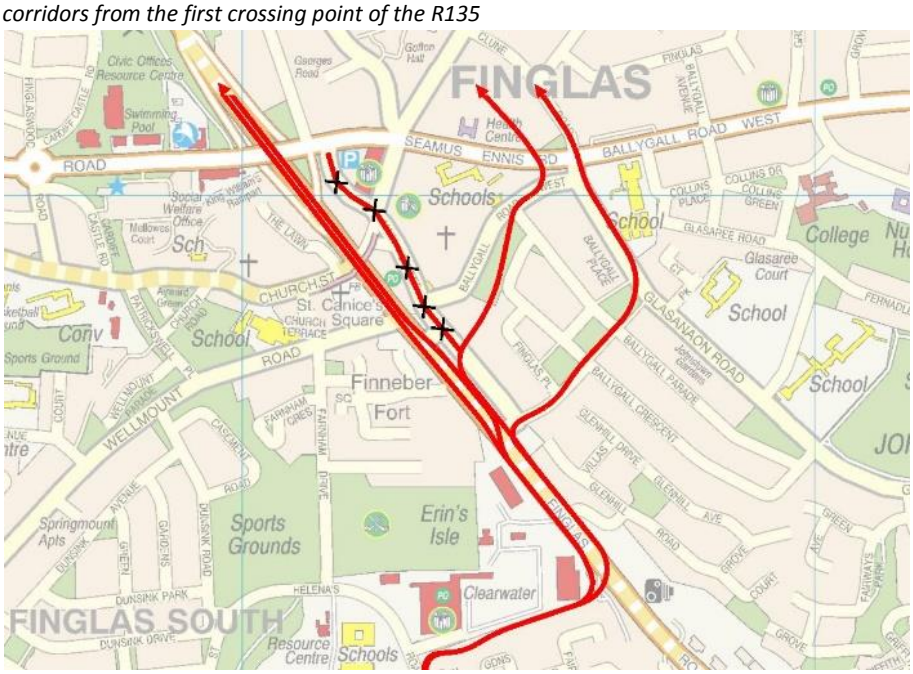


8.1.2 Potential corridors from the first crossing point of the R135 – Clearwater Shopping Centre

The first potential crossing point (Tesco-Clearwater) could be either at grade or elevated, depending on the specific option. It would bring the corridor parallel to the Finglas Road on its western or eastern side, depending on the option, while ramping down from the embankment or the overpass. It could then allow the corridor to stay on the Finglas Road up to the Mellowes Roundabout for approximately 1.8km, or to penetrate into Finglas East along Finglas Place/Ballygall Place or Ballygall Road West, to the north of the Rosehill House, and from then running on the back of the Village to the Jamestown Road (east side of the Jamestown Industrial Estate).

Corridors running through Old Finglas Road-Main Street have been considered and ruled out for the reasons explained in section 8.1.3.1.

Figure 47 Potential corridors from the first crossing point of the R135



8.1.3 Potential corridors from the second crossing point of the R135 – Wellmount Road at grade

The second potential crossing point (Wellmount Road) leads the corridor to join the R135 up to the Mellowes Roundabout for approximately 1.2km (within its bus lanes or where possible within new lateral corridors), or to cross the R135 (at a point where there is currently a staggered junction) in order to penetrate Finglas East to Ballygall Road West, to the north of the Rosehill House.

Figure 48 Potential corridors from the second crossing point of the R135

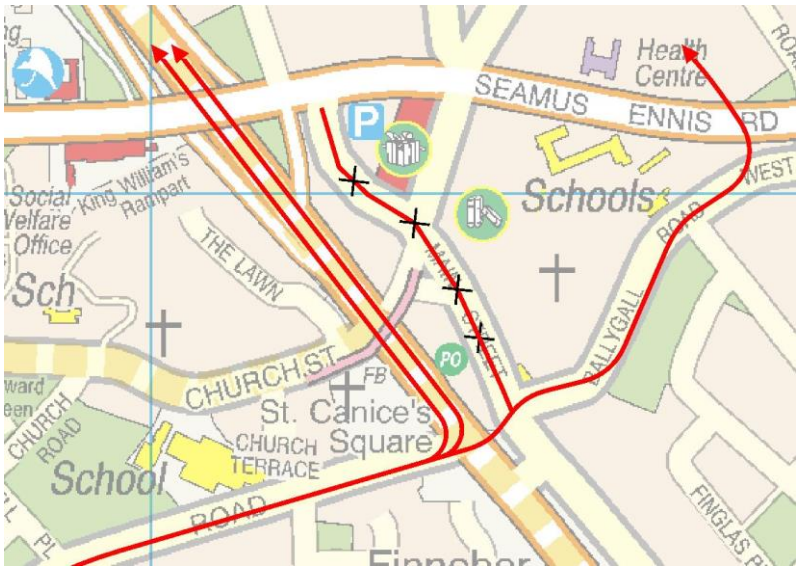


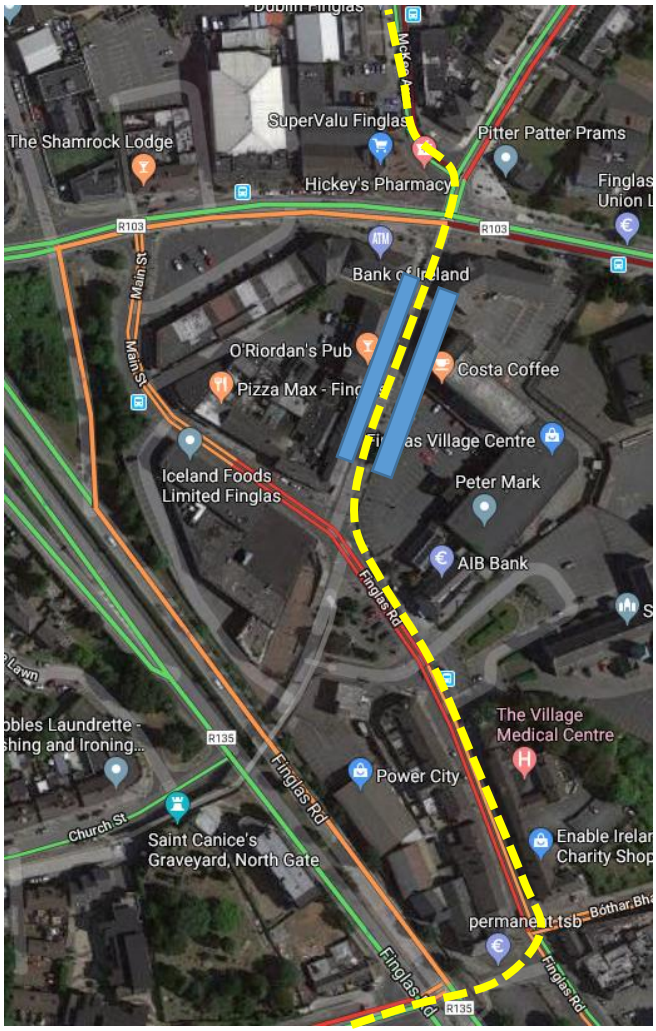
Figure 49 Wellmount Road looking towards the Finglas Road junction and Finglas East (source: Google Street View)

8.1.3.1 *Corridors running through the core of the Village, Old Finglas Road, Five Arms Junction*

Both for the first and second crossing point of the Finglas Road, corridors running from the R135 through the core of the Village along the Old Finglas Road/Main Street have not been considered further due to the constraints described below.

Figure 50 Old Finglas Road looking towards the Village (north) (source: Google Street View)

Figure 51 A possible alignment through the Old Finglas Road, Finglas Village Centre and the Five Arms Junction (aerial view with traffic information at 10am on a working day) – source Google Map.



A potential Luas alignment like the one indicated in the aerial map above, would have the following significant drawbacks:

1. The Luas alignment would have to be shared with traffic for approximately 750m given the very limited available cross section of 11m. This would prove detrimental for runtime and service reliability and would include the lower part of McKee Avenue and the approach and crossing of major junctions like the Five Arms Junction.
2. Old Finglas Road/Main Street is one of the main access roads between lower Finglas and the Village and also provides direct access to the R135 via a signal controlled junction. The current level of traffic congestion would have a negative impact on the operation of Luas. Blocking private traffic through this road would be necessary for this corridor to allow an efficient tramway operation. This measure would be very challenging on its own but could be made feasible as part of a major alternative traffic management plan for the whole area. Within this plan, access to shops and commercial activities would still have to be guaranteed. The lack of cross sectional space would prove a significant challenge in providing off-track loading bays while maintaining a good standard of pedestrian permeability.
3. The alignment for this section would consist of a series of tight curves (R25m) with a one-tram-vehicle distance between them. This means that the constant maximum speed for the entire section would be 10kph regardless of traffic conditions.
4. A Luas stop could only be located in proximity of Finglas Village Centre where the track would just emerge from a 25m curve. For alignment reasons the stop would have to be pushed north to a location very close to the Five Arms junction, occupying the full width of the road from building to building. That would also impact on vehicular access to properties along the road including the vehicular access to the Village Centre itself.
5. Negotiating the Five Arm Junction and the narrow cross section of the lower part of McKee Avenue, although common to other options, would be an additional significant drawback of this corridor.
6. An additional issue of this corridor are the steep gradient of the alignment with frequent stop-and-go for trams.

It is worth noting at this stage of the process that other Luas alignments through the core of Finglas Village have been created and assessed during the assessment process (see next 8.1.4 and 8.15).

8.1.4 Potential corridors from the third crossing point of the R135 – Church Street grade separated

The third potential crossing point (Church Street) crosses the R135 on a new elevated Luas/pedestrian/cyclists structure, approximately at the point where the pedestrian overbridge crosses it today.

It then penetrates Finglas East through the core of the Village Main Street and the "Five Arms" road junction (Main Street – Jamestown Street – Seamus Ennis Road), to then join either the east or the west road surrounding the Jamestown Industrial Estate.

It is noted that also these corridors would suffer part of the drawbacks indicated in chapter 8.1.3.1, with the exception of the issues along Main Street and the tight curvature. On a positive note, the absence of the tight curve coming from Main Street would allow the stop platforms to be located further south of the Five Arms Junction and that would release one traffic lane and reduce the impact on local accesses.

Figure 52 Potential corridor from the third crossing point of the Finglas Road

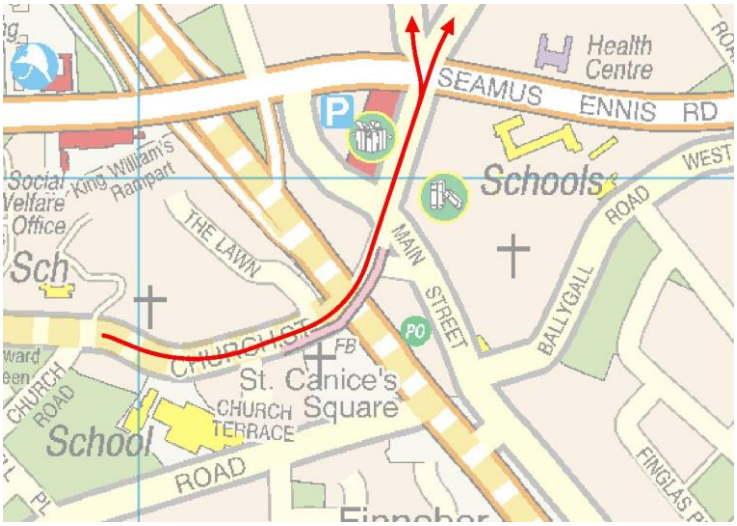


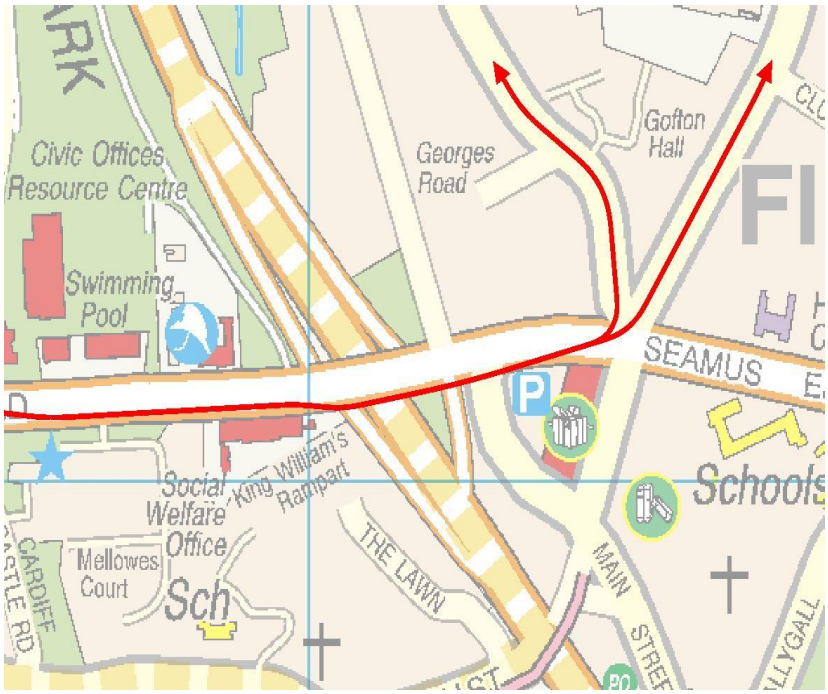
Figure 53 Church Street looking towards the Finglas Road, the current pedestrian overpass and the Saint Canice Church and Graveyard to the right

8.1.5 Potential corridors from the fourth crossing point of the R135 – Mellowes Road grade separated

The fourth potential crossing point (Mellowes Road) crosses the R135 over a new adjacent structure to the south of the existing road overpass, to penetrate Finglas East through the core of the Village Seamus Ennis Road and the Five Arms Junction (Main Street – Jamestown Street – Seamus Ennis Road), where it would turn north to Jamestown Road or McKee Avenue.

The current bridge has four traffic lanes (2 through, two turning onto slip roads to the Finglas Road) and both sides' footpaths. Neither cycle lanes, nor bus lanes are provided. It is proposed that the new Luas overpass would facilitate the construction of segregated cycle facilities and bus lanes (either shared with the Luas or separated).

Figure 54 Potential corridor from the fourth crossing point of the Finglas Road



At this early stage, given the highly detrimental effect on Luas operation of a shared section over the existing bridge and along Seamus Ennis Road, it has been decided to progress this alignment into the relevant options, assuming that it will run mostly on a dedicated off-road corridor to the south of Mellowes Road and over the R135 on a new structure adjacent to the existing road bridge. The corridor will then join Seamus Ennis Road to the south by taking part of the current retail area parking facility. It will finally cross the Five Arms Junction essentially creating a sixth arm. The Luas stop location is proposed on the bridge, to enhance its accessibility from both Finglas Village (East) and Finglas West, and the interchange potential with BusConnects routes running below the bridge.

Figure 55 Segregated Luas corridor and the new Luas Bridge to the south of the existing road bridge

8.1.6 Potential corridors from the fifth crossing point of the R135 – Mellowes Park Finglas Road Roundabout

The fifth potential crossing point (Mellowes Park roundabout) could cross the R135 either at grade (upgrading the roundabout to signal controlled junction) or over a new elevated structure, to join Finglas East via St. Margaret's Road.

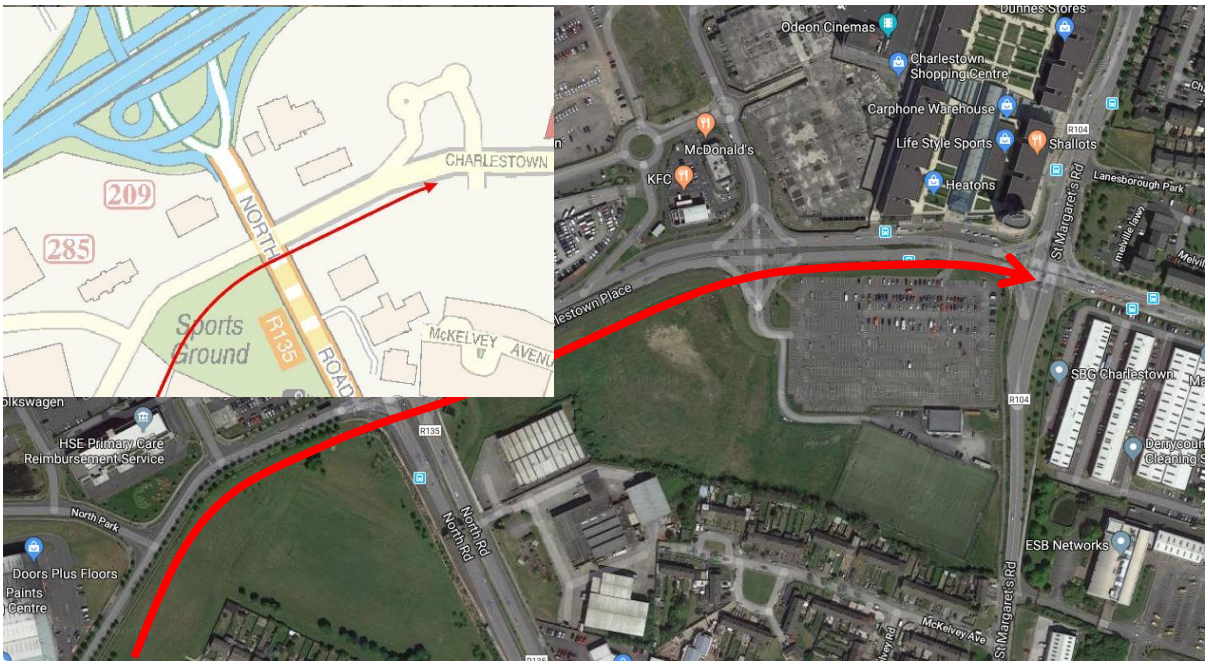
Figure 56 Potential corridor from the fifth crossing point of the Finglas Road

At this early stage it has been decided to progress the options assuming to cross the Road at grade.

8.1.7 Potential corridors from the sixth crossing point of the R135 – Charlestown Place

The sixth potential crossing point (Charlestown Place) could cross the R135 either at grade (through the existing signal controlled junction) or over a new elevated structure, to join Charlestown.

Figure 57 Potential corridor from the sixth crossing point of the Finglas Road

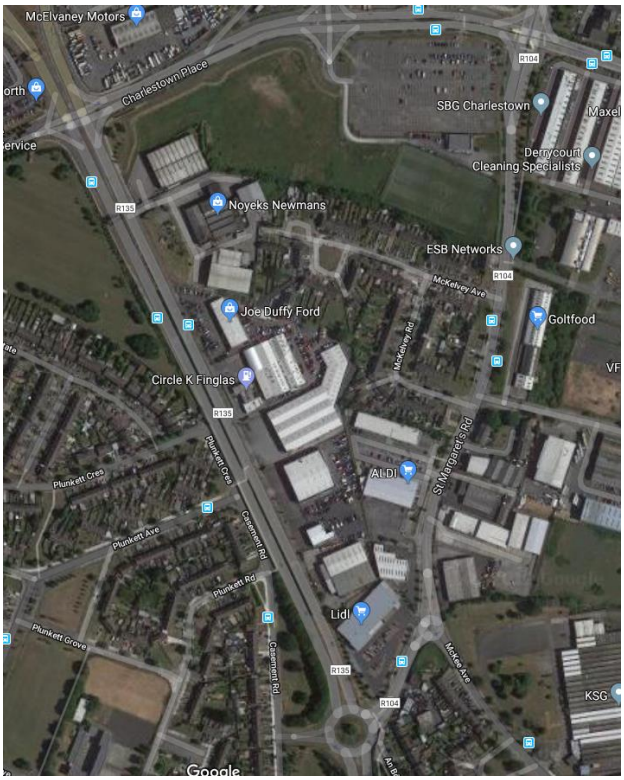


8.1.8 Potential discarded route along North Road-Charlestown Place

Within the upper end of the corridor, an alternative to St.Margaret's Road could be the corridor off road along the western side of the R135 as far as the large signal controlled junction with Charlestown Place. From there, the corridor would be crossing the R135 at grade or over a new elevated structure, as described avove (8.1.7) to run along the southern side of Charlestown Place (*indicated in black in the sketch below*).

Figure 58 St.Margaret's Road possible re-routing

Figure 59 Aerial image of the alternative route



This corridor would be 1.15km long from the Mellowes Roundabout, as opposed to 850m along St.Margaret's Road (approximately 300m longer).

Key strengths of this corridor are:

1. It would run fully segregated for most of the route with very little interferences with roads and pedestrians, there allowing higher operational speed of up to 50kph, whereas the St.Margaret's Road alignment would allow 30kph (indicatively).
2. It would have 3 road crossings instead of 5 with the current option (but two of those five are gated entrances into the Jamestown Industrial Estate which could be rationalised in the regeneration scenario).
3. It would not require land takes:
    a. within the Industrial area of Jamestown (approx. 8m wide strip), although taking land in Jamestown may not be necessary in a scenario of residential redevelopment (rezoning of the area);
    b. two industrial/commercial units located south of the Industrial Estate;
    c. part of the front gardens of 4 houses.
4. It would not impact on existing roads for most of its length (with the exception of approximately 200m along Casement Road-Punkett Crescent).
5. It would provide better accessibility for the Options 1-2 of the P&R (within the current Charlestown overflow car park).
6. It would require limited upgrading works to the Mellowes roundabout on the R135, as this sub-option would only cross a secondary arm of it (Casement Road).

Key weaknesses of this corridor are:

1. Approx. 300m longer than the current alignment along St.Margaret's Road (35% longer), making the cost likely higher. In fact, the benefit of the higher operational speed would be counterbalanced by the longer route. Runtime gains are expected to be in the range of 30 seconds only (or less if the R135 is crossed at grade, see below), particularly if the Jamestown Industrial Estate access gates are rationalised along St.Margaret's Road.
2. Indirect and less efficient alignment for the possible extension to the north of the M50 (particularly in case the P&R is located in that area (Option 4).
3. Lower accessibility to the Jamestown Industrial Estate, particularly important in the future scenario of re-zoning to residential/mixed use. It would provide little to no scope for integration of the Luas corridor within the potential future regeneration land.
4. Some impact on the green area north of Northway Estate and its sport pitches (approx. 270m by 8m strip). This area is currently zoned as Z9: "*To preserve, provide and improve recreational amenity and open space and green network*".
5. The road crossing of the R135 would be combined with Charlestown Place signal controlled junction, very close to the M50 junction 5, therefore critical in terms of capacity. Also, the crossing angle would be skew, as the Luas corridor would come from a parallel alignment to the R135; this would require moving the stop lines of the R135 outbound lanes further back, with additional detrimental effects on junction capacity.
6. To mitigate the negatives of point 5 above, the road crossing could be grade separated, but this would result in higher construction costs (the structure could be as long as 350m including bridge and retained ramps) and visual impact.
7. Potential impact on utilities along that corridor (water main, pumping station, to be further investigated).
8. Impact on Casement Road pinchpoint, where approximately 10 houses would have their front gardens impacted by up to 6m.

Based on this high level assessment, there do not appear to be strong reasons to bring this corridor further within the options creation process. St.Margaret's Road is believed to offer better opportunities, more strengths and less challenges, and it has a stronger potential in relation to the rezoning of the Jamestown Industrial Estate and the future possible extension of Luas Finglas over the M50.

The route along North Road and Charlestown Place is therefore not considered further in the options creation process.

8.2 Overall End-to-End Options Development

From the combination of those corridors, and taking into consideration the Engineering Constraints Map, 29 feasible end-to-end route options were created, named with a number and a letter each.

The number corresponds to one of the four lower corridors from the Tolka Valley (No.1 to Cardiffsbridge, No.2 to Barnamore Green, No.3 to St. Helena's and No.4 to The Griffith) and the letters correspond to the R135 crossing points.

Following this logic:

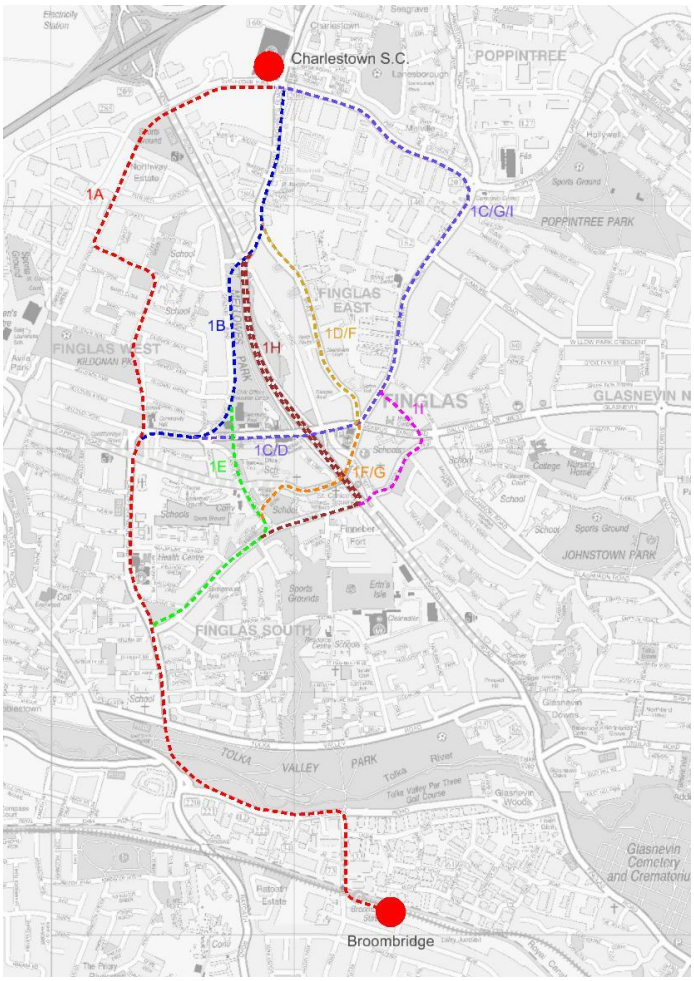
8.2.1 Options 1.

The variants within the Option 1 family are graphically shown overleaf:

- Option 1A runs all along the Cardiffsbridge Road-Kildonan Road-Finglas West, to cross the R135 at Charlestown Place (the last crossing before the M50),
- Option 1B runs along the Cardiffsbridge Road, turning east into Mellowes Road, north along Mellowes Park, to cross the R135 at grade at Mellowes Park roundabout, to then proceed along St. Margaret's Road,
- Option 1C runs along the Cardiffsbridge Road, turning east into Mellowes Road, to cross the R135 on a new structure parallel to the existing Mellowes Road overpass, to then proceed through Finglas Village and north along Jamestown Road on the east boundary of Jamestown Industrial Estate, and finally Melville Road.
- Option 1D runs along the Cardiffsbridge Road, turning east into Mellowes Road, to cross the R135 on a new structure parallel to the existing Mellowes Road overpass, to then proceed through Finglas Village and north along McKee Avenue on the west boundary of Jamestown Industrial Estate, and finally St. Margaret's Road.
- Option 1E is similar to 1B but instead of turning from Cardiffsbridge to Mellowes Road, it turns into Wellmount Road and then turns north to Mellowes Park crossing the R135 at grade at Mellowes Park roundabout, to then proceed along St. Margaret's Road.
- Option 1F follows Option 1D up to a point mid of Wellmount Road, where it turns north on a short back lane, to join Cappagh Road/Church Street. From there the Luas ramps up on to a new structure to replace the current pedestrian over-bridge, to join Finglas Village passing in front of Power City retail facility and join the Five Arms Junction, then travel north along McKee Avenue on the west boundary of Jamestown Industrial Estate, and finally along St. Margaret's Road.
- Option 1G follows all the way Option 1F, but at the Five Arms Junction it turns on the east side of the Jamestown Estate along Jamestown Road, Melville Road.
- Option 1H runs along the Cardiffsbridge Road, turning east into Wellmount Road all the way to the R135, to then join it and proceed along the R135 up to the roundabout, where it turns into St. Margaret's Road.
- Option 1I runs along the Cardiffsbridge Road, turning east into Wellmount Road all the way to the R135, which is then crossed by the Luas corridor at a new junction at Wellmount. From here, the option runs parallel to Ballygall Road West (north of Rosehill House), crossing Seamus Ennis Road, and taking a strip of a series of back gardens on the south side of Clune Road (currently up to 65m long back gardens), before joining Jamestown Road, and Melville Road. [2]

[2] there are three possible sub-options to the south of Finglas Village (shorter than 500m therefore grouped within the same option), are considered in order to join Jamestown Road on the east boundary of Jamestown Industrial Estate and finally Melville Road. Of the three sub-options, the one brought to the sifting stage is

Figure 60 Options 1s (1A-1B-1C-1D-1E-1F-1G-1H-1I)



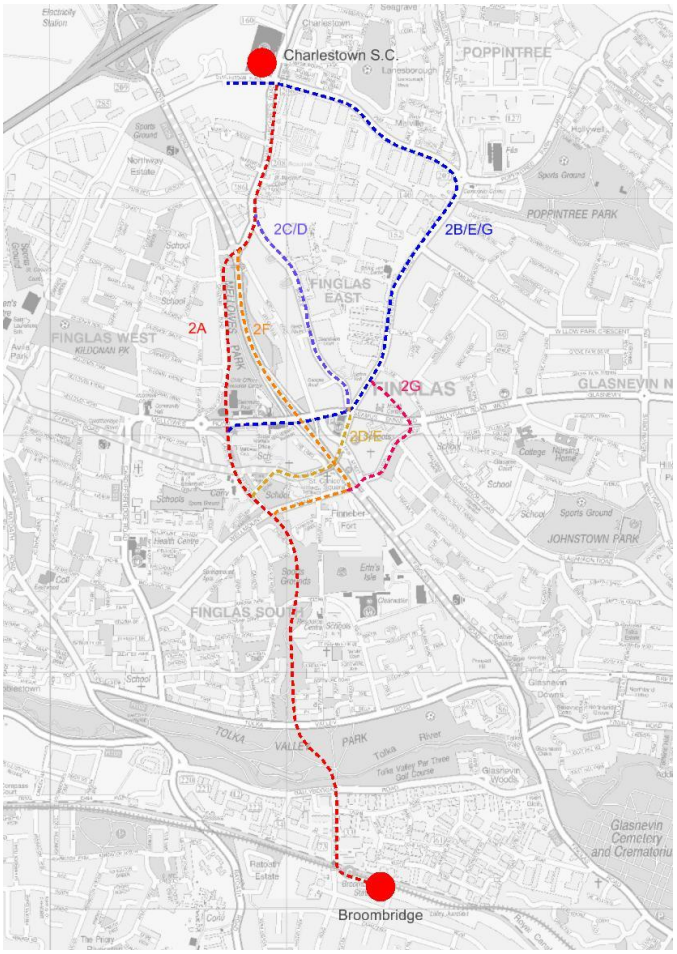
8.2.2 Options 2.

The variants within the Option 2 family are graphically shown overleaf:

- Option 2A runs within the Barnamore-St. Helena's linear park, it then runs along the green belt crossing both Wellmount and Mellowes Roads mostly off-road, it joints the Mellowes Park to run north, crossing the R135 at grade at Mellowes Park roundabout, to then proceed along St. Margaret's Road.
- Option 2B is as per Option 2A up to Mellowes Road, where it turns east to cross the R135 on a new Luas bridge adjacent to the existing Mellowes Road overpass, to then proceed through Finglas Village, the Five Arms Junction, and north along Jamestown Road on the east boundary of Jamestown Industrial Estate, and finally Melville Road.
- Option 2C is as per Option 2B up to Five Arms Junction, where it turns north through McKee Avenue and then St. Margaret's (west side of the Industrial Estate).
- Option 2D is as per Option 2C up to where it crosses Wellmount Road; it then turns north and west on a short back lane, to join Cappagh Road/Church Street. From there the Luas ramps up on to a new structure to replace the current pedestrian over-bridge, to join Finglas Village passing in front of Power City retail and joins the Five Arms Junction and north along McKee Avenue on the west boundary of Jamestown Industrial Estate, and finally St. Margaret's Road.

- Option 2E follows all the way Option 2D, but at the Five Arms Junction it turns on the east side of the Jamestown Industrial Estate along Jamestown Road, Melville Road.
- Option 2F is as per Option 2A up to Wellmount Road, where it turns east on Wellmount Road, to join the R135 on Wellmount Road new junction. It then proceeds along the R135 up to the roundabout, where it turns into St. Margaret's Road.
- Option 2G runs within the Barnamore-St. Helena's linear park and turns into Wellmount Road and it crosses the R135 at a new junction at Wellmount. From here it runs in parallel with Ballygall Road West (north of Rosehill House), crossing Seamus Ennis Road, and taking a strip of a series of back gardens on the south side of Clune Road before joining Jamestown Road and Melville Road.[3]

Figure 61 Options 2s (2A-2B-2C-2D-2E-2F-2G)



[3] there are three possible sub-options to the south of Finglas Village (shorter than 500m therefore grouped within the same option), and are considered in order to join Jamestown Road on the east boundary of Jamestown Industrial Estate and finally Melville Road.

8.2.3 Options 3.

The variants within the Option 3 family are graphically shown overleaf:

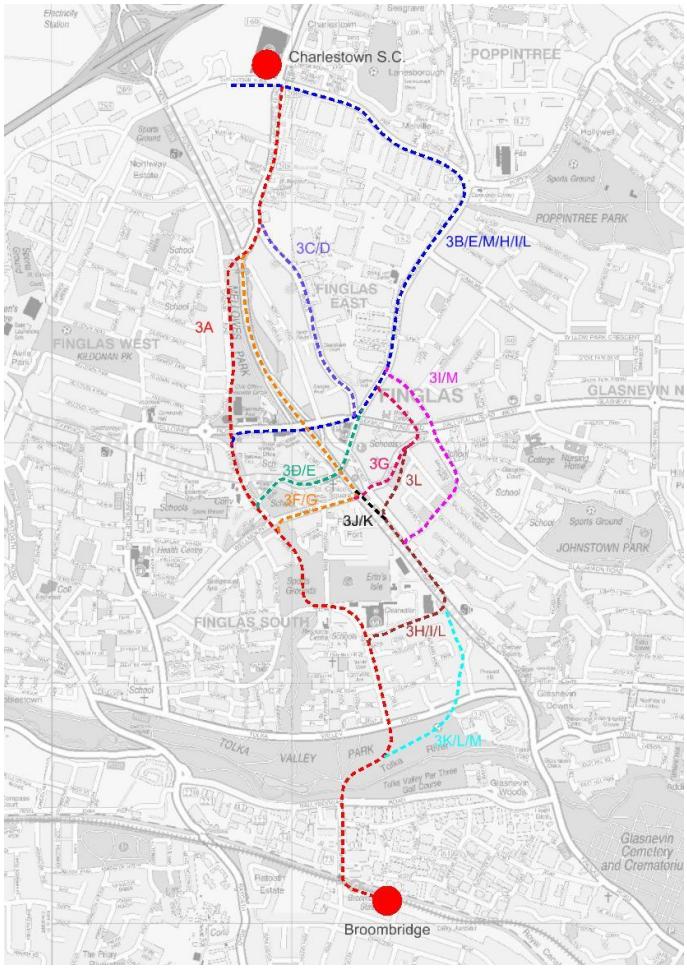
- Options 3A-B-C-D-E-F-G are similar to the corresponding Options 2A-B-C-D-E-F-G, with the difference being the initial 1km, where the corridor crosses the Tolka Valley to the east of the Options 2, in order for it to run along St. Helena's Road instead of the Barnamore -St. Helena's linear park.

Given their eastern position, Options 3s also give the opportunity to turn east and cross the R135 earlier than Options 1s and 2s and therefore five additional option 3s are created:

- Option 3H follows St. Helena's Road up to the rear entrance to the Tesco Clearwater shopping centre, where it turns into its carpark and runs along a southern strip of it, before veering north and crossing on a new curved bridge over the R135, to then join it off-road to the east while ramping down. It then turns towards to the south of Finglas Village, running in parallel with Ballygall Road West (north of Rosehill House), crossing Seamus Ennis Road, and taking a strip of a series of back gardens on the south side of Clune Road before joining Jamestown Road and Melville Road. A sub-option running on street along Clune Road is also possible.
- Option 3I follows St. Helena's Road up to the rear entrance to the Tesco Clearwater shopping centre, where it turns into its carpark and runs along a southern strip of it, before veering north and crossing over a new curved bridge over the R135, to then join it off-road to the east while ramping down. It then turns towards Finglas Place, running through the three green parks between Ballygall and Finglas Place, before joining Glasanaon and Clune Road and turning onto Jamestown Road and Melville Road.
- Option 3J follows St. Helena's Road up to the rear entrance to the Tesco Clearwater shopping centre, where it turns into its carpark and runs along a southern strip of it, before veering north parallel to the R135 (off-road to the west of it), crossing the Tesco junction at grade, and then splitting the tracks at the next signal controlled junction to join one bus lane in each direction and run all the way along the Finglas Road up to St. Margaret's Road. This option has no bridge over the R135 as only one track crosses it at an existing junction.
- Option 3K does not follow St. Helena's Road, but it turns further east in the Tolka Valley Park, to join a green strip of land east of St. Helena's (at the back of The Griffith). It then runs behind the Ardmore Care Choice nursing home (taking a strip of its rear carpark and access ramps to be reconfigured) to join the Finglas Road (off-road to the west of it) south-east of Clearwater Shopping Centre, crossing the Tesco junction at grade while on the west side of the R135. The corridor then splits the tracks at the next signal controlled junction, to join one bus lane in each direction and run all the way along the Finglas Road up to the St. Margaret's Road. This option has no bridge over the R135 as only one track crosses it at an existing junction.
- Option 3L, as Option 3K, also turns further east in the Tolka Valley Park, to join a green strip of land east of St. Helena's (at the back of The Griffith). It then runs behind the Ardmore CareChoice nursing home (taking a strip of its rear carpark and access ramps to be reconfigured) to join the Finglas Road (off-road to the west of it) south-east of Clearwater Shopping Centre, crossing the Tesco junction at grade while on the west side of the R135. The corridor then crosses R135 at grade at the next signal controlled junction, turning towards the south of the Finglas Village to run in parallel with Ballygall Road West (north of Rosehill House). It then crosses Seamus Ennis Road, and takes a strip of a series of back gardens on the south side of Clune Road before joining Jamestown Road and Melville Road. A sub-option running on street on Clune Road is also possible. There is no provision of a bridge over the Finglas Road in this option as the alignment (skew crossing) would require a long structure at the back of the nursing home, with severe visual and noise impacts on the adjacent multi storey buildings and would make the provision of a stop in this location technically challenging.

- Option 3M, as Option 3K and 3L, also turns further east in the Tolka Valley Park, to join a green strip of land east of St.Helena's (at the back of The Griffith). It then runs behind the Ardmore CareChoice nursing home (taking a strip of its rear carpark and access ramps to be reconfigured) to join the Finglas Road (off-road to the west of it) south-east of Clearwater Shopping Centre, crossing the Tesco junction at grade while on the west side of the R135. The corridor then crosses R135 at grade at the next signal controlled junction and turns towards Finglas Place, running through the three green parks between Ballygall and Finglas Place, before joining Glasanaon and Clune Road and turning onto Jamestown Road.

Figure 62 Options 3s (3A-3B-3C-3D-3E-3F-3G-3H-3I-3J-3K-3L-3M)



8.3 Summary of all Options

The following table contains a numerical summary of all options in terms of overall length (excluding Broombridge stop reconfiguration and the tracks north of Charlestown for tram reversing/stabling), an indicative number of stops excluding Broombridge and junctions with typology.

Table 3 Key data of all options

Option	Overall Route Details		Junctions		
	Length	Stops	Major Roundabouts Requiring Serious Alteration	Minor Junctions	Major Junctions
	(m)	*(n)*	*(Nr.)*	*(Nr.)*	*(Nr.)*
1A	4,520	5	0	23	5
1B	4,253	6	1	6	6
1C	5,549	6	0	16	7
1D	4,867	6	0	17	6
1E	4,176	5	1	11	6
1F	4,485	5	0	16	8
1G	5,165	5	0	15	9
1H	4,532	5	1	13	6
1I	5,345	5	0	18	6
2A	3,522	4	1	6	7
2B	4,716	4	0	15	7
2C	4,022	4	0	13	10
2D	3,840	4	0	11	9
2E	4,521	4	0	10	10
2F	3,798	4	1	8	6
2G	4,611	4	0	13	6
3A	3,702	4	1	10	6
3B	5,025	4	0	19	7
3C	4,252	4	0	20	6
3D	4,070	4	0	15	8
3E	4,751	4	0	14	9
3F	4,028	4	1	11	5
3G	4,841	4	0	17	4
3H	4,621	4	0	14	4
3I	4,651	4	0	15	5
3J	3,910	4	1	8	8
3K	3,879	4	1	6	8
3L	4,547	4	0	14	5
3M	4,614	4	0	15	6

The shortest option is 3.5km, the longest 5.6km. In terms of junctions the options span from a minimum of 13 to a maximum of 28 over an average length of 4.4km, approximately between 2.9 and 6.3 junctions per km. This demonstrates the large variability in terms of infrastructure of the 29 options, which has an impact on runtime, construction cost and level of safety.

9 SCREENING OF THE OPTIONS

This Stage 1 options selection process is carried out in two phases; the first, screening, is a broad assessment of the suitability of all options against the high level objectives of Luas Finglas, and the second, MCA1, is a more detailed multi-criteria analysis applied only to the options which passed the screening phase.

This chapter describes the screening phase.

9.1 Screening Methodology

The 29 end to end options identified have been assessed through an initial screening to verify their suitability against the high level objectives set for Luas Finglas.

The high level objectives are:

1. Serving existing and future demand for travel;
2. Providing a safe, frequent, reliable, efficient and sustainable public transport connection from the M50 and the strategic P&R located at the M50-N2 interchange to the city centre via Finglas and Broombridge through the use of part of the existing Luas Green Line; and
3. Reducing public transport journey times between Charlestown-Finglas and the city centre.

This screening stage generally considers the options across three broad categories: Engineering, Economy and Environment, in the context of the high level objectives as set.

Economy

Where practicable, an assessment of the potential catchment for each route corridor is undertaken at this stage to ensure that the routes being brought forward do not serve areas with little or no population or employment. The nature of the study area and the pattern of development results in all corridors serving the primary catchment areas with limited areas of little or no demand. On this basis no corridors were sifted out based on potential population and employment catchment.

A primary function of Luas Finglas is to serve a strategic Park & Ride while offering high quality alternative transport options tor car travel. A key component of a successful Park & Ride is providing direct, fast and reliable journeys.

In order to ensure that only options that meet the high level objectives of the scheme are brought forward to MCA, the following sifting objectives are adopted:

1. The line shall serve Finglas Village within a reasonable walking distance with the Village being centred on the Seamus Ennis Road between the Finglas Road and the “Five arms” junction.
2. The line shall provide a short and direct route between the two termini, to ensure competitive runtimes.
3. The line should facilitate a high level of segregation, and have a limited interaction with the road network, particularly in relation to the number of road junctions, which are detrimental to operational safety, reliability and runtime.

Environment

Based on an initial screening of environmental constraints, there were no environmental topics that warranted routes to be sifted at this stage e.g. Special Areas of Conservation, Protected Habitats, etc.

Engineering

The degree of curvature of the route has been taken into consideration at this stage. Routes with a significant number of curves below the radius of 50m, particularly if non-clustered around a section of the alignment, should be sifted out at this early stage.

In total, each option will be assessed in the screening stage against four criteria:

1. Demand, serving Finglas Village
2. Directness of the line (route length)
3. Road interaction and number of junctions crossed at grade
4. Alignment and curvature degree

9.2 Screening Assessment and Results

The following table shows the Options assessment for the pass/fail screening process.

- The Options failing on one or more criteria are sifted out and their corridors are presented in the figures following Table 4 for information (Fig.56).
- The Options that have passed this screening stage are then presented in more details with indicative stop locations in the following Chapter 10, to be assessed in the MCA1.

Table 4 Options assessment for pass/fail screening process

Option	Serving Finglas Village	Directness	Interaction with road/junctions	Alignment
1A	The line is too far from the core of the Village with a distance of 900 to 1,000m.	The line is direct but long, 4.5km approximately. This is mainly due to its route runnning all along the eastern edges of the Study Area. This length is still considered acceptable.	High number of road junctions, several of the current local roads will have to be signal controlled. Low level of segregation is possible on the upper part of the route.	Good alignment with few curves (2 clustered in the north section, prior to crossing the Finglas Road).
1B	The line does not serve properly the Village with a distance in excess of 600m.	The line is quite direct with just over 4km length.	Some interaction with roads in the lower part of alignment only, with an overall limited number of road junctions.	The alignment is good overall with very few curves, one of them potentially below 50m.
1C	The line passes through the middle of the Village with great potential for proximity service.	The line is very long with over 5.5km due to its corridor running perpendicular to the main north-south axis for a long stretch in order to pass from Finglas West to Finglas East.	Average to high road interaction also due to its length but not a show stopper.	Good alignment with few sharp curves.
1D	The line passes through the middle of the Village with great potential for proximity service.	The line is not direct, with a length of over 4.8km.	High road interaction with several at grade junctions particularly along McKee Avenue and Finglas Village.	Good alignment with few curves.
1E	The line runs some 400m from the core of the Village, which is considered acceptable in terms of level of service at this early stage.	The line is quite direct with a length of just over 4km. Its alignment is mostly north-south.	Some level of road interaction along Wellmount Road and St.Margaret's Road, but this is deemed manageable at design stage.	Overall an acceptable alignment despite the presence of 3 sharp curves (2 of which in and out Wellmount Road).
1F	Good level of service for the Village, with the line running through the Five Arms junction, large potential for a proximity stop location.	The line is long (just over 4.4km) but still quite direct.	High number of road junctions and severe impact on the road network in Church Street, where the new bridge would take most of the cross sectional width. Same significant impact is expected on the east side of the Finglas Road as well.	Significant amount of sharp curves (5) and a convoluted alignment in the Church Street area makes this option less attractive at this early stage.
1G	Good level of service for the Village, with the line running through the Five Arms junction, large potential for a proximity stop location.	The route is well over 5km in length as it links the opposite extremities of the Study Area, transversally to the main north-south direction. This corridor is not direct.	Some level of road interaction (in terms of road junctions), in addition to a severe impact on Church Street and Finglas Village.	Significant amount of sharp curves (5) and a convoluted alignment in the Church Street area.
1H	Good level of service for the Village, with the line running below the Mellowes Road bridge over the Finglas Road. Great potential for serving both sides of the Road and interchange with bus routes.	The line is just over 4.5km in length and while this is not the most direct route, it is considered acceptable at this early stage.	Some level of road interaction along Wellmount Road and St.Margaret's Road.	Good alignment with few curves (3) at a significant distance.
1I	The line passes peripheral to the south side of the core of the Village, but a stop could be located in close proximity.	The route is well over 5.3km in length as it links the opposite extremities of the Study Area, transversally to the main north-south direction.	The corridor passes through a high number of road junctions.	Good alignment with few curves at a significant distance, with the exception of the Village, where speed is limited by other operational constraints.

Option	Serving Finglas Village	Directness	Interaction with road/junctions	Alignment
2A	Acceptable service for the Village, with the line running some 400m west of its centre.	The line is one of the most direct, with only 3.5km length.	Very low road interaction, mostly along St.Margaret's Road.	Very good alignment with no sharp curves.
2B	Finglas Village is very well served with the possibility for a stop within the core of the Village or over a new adjacent bridge spanning over the Finglas Road with easy access from both sides.	The route is long, but still within an acceptable value (4.7km) at this early sifting stage, considering its service over the East side of the Study Area.	Some level of road interaction with quite an high number of road junctions, but the corridor still allows a good level of segregation particularly along the southern section.	Good alignment overall with one tight curve only.
2C	Finglas Village is very well served with the possibility for a stop within the core of the Village or over a new adjacent bridge spanning over the Finglas Road with easy access from both sides.	The route is direct, with a length of approx. 4km.	Higher level of road interaction than previous Option 2B with quite an high number of road junctions and shared sections north of the Village, but the corridor still allows a good level of segregation particularly along the southern section.	Good alignment overall with two tight curves only.
2D	Very good service for the Village, with the line running through its core.	The line is one of the most direct, with only 3.8km length.	High number of road junctions plus a severe impact on the road network in Church Street, where the new bridge would take most of the cross sectional width. Same significant impact is expected on the east side of the Finglas Road as well.	Although the alignment is convoluted around the Church Street section, this is clustered around one section only and still acceptable.
2E	Very good service for the Village, with the line running through its core.	The line is long (4.5km), but this is still considered an acceptable length at this early stage.	With the exception of the severe impact on Church Street, where the new bridge would take most of the cross sectional width, lower level of road interaction is expected along the rest of the route. This is deemed acceptable for this stage.	Although the alignment is convoluted around the Church Street section, this is clustered around one section only and still acceptable.
2F	Good level of service for the Village, with the line running below the Mellowes Road bridge over the Finglas Road. Great potential for serving both sides of the Road and interchange with bus routes.	The line is one of the most direct, with only 3.8km length.	Very low road interaction, mostly along St.Margaret's Road. The alignment along the Finglas Road can be either shared with bus lanes, or set back into a widened section of the road north of the overpass.	Good alignment with two sharp curves clustered together and in correspondence of a main road junction, where the speed will be limited by operational constraints.
2G	Reasonable level of service for the Village, with the line running some 400m to the south of its core.	The line is very long (4.6km), but this is an acceptable length at this early stage, also in consideration of it serving the western part of the Study Area.	Medium to high level of road interaction, mostly around Finglas Village, but still considered acceptable and manageable at this stage.	Acceptable alignment with three sharp curves, but quite clustered together in areas of low speed, will not pose a significant limitation to the operation of the corridor.

Option	Serving Finglas Village	Directness	Interaction with road/junctions	Alignment
3A	Acceptable service for the Village, with the line running some 400m west of its centre.	The line is one of the most direct, with only 3.7km length.	Acceptable level of road interaction, mostly along St. Helena's and St.Margaret's Roads.	Very good alignment with one sharp curve.
3B	Finglas Village is very well served with the possibility for a stop within the core of the Village or over a new adjacent bridge spanning over the Finglas Road with easy access from both sides.	The route is too long, over 5km. Other routes serve similar areas with shorter alignments.	High level of road interaction with quite an high number of road junctions particularly along St. Helena's Road and Jamestown Road/Five Arms junction in Finglas Village.	Acceptable alignment overall with two tight curves only.
3C	Finglas Village is very well served with the possibility for a stop within the core of the Village or over a new adjacent bridge spanning over the Finglas Road with easy access from both sides.	The route is of reasonable length, in around 4.2km.	Very high level of road interaction with quite a high number of road junctions and shared sections within the Village and north of it.	Acceptable alignment overall.
3D	Good service for the Village, with the line running through its core and potential for a stop just south of it.	The line is quite short and direct, despite the convoluted alignment through Church Street.	High number of road junctions together with a severe impact on the road network in Church Street, where the new bridge would take most of the cross sectional width.	Although the alignment is convoluted around the Church Street section, this is clustered around one section only and still acceptable.
3E	Good service for the Village, with the line running through its core and potential for a stop just south of it.	The line is very long (approx. 4.8km), even in consideration of its service to the north-east quadrant within the Study Area.	High number of road junctions in addition to the severe impact on the road network in Church Street, where the new bridge would take most of the cross sectional width.	Although the alignment is convoluted around the Church Street section, this is clustered around one section only and still acceptable.
3F	Good level of service for the Village, with the line running below the Mellowes Road bridge over the Finglas Road. Great potential for serving both sides of the Road and interchange with bus routes.	The line is 4km long, making this quite a direct corridor. This is mainly due to it running along the Finglas Road north of Wellmount Road.	Reasonably low road interaction, mostly along St.Margaret's Road. The alignment along the Finglas Road can be either shared with bus lanes, or set back into a widened section of the road north of the overpass.	Acceptable alignment with three sharp curves, two of which clustered together and in correspondence of a main road junction, where the speed will be limited by operational constraints.
3G	Reasonable level of service for the Village, with the line running some 400m to the south of its core.	The line is too long (over 4.8km). Other corridors serve similar areas with shorter routes.	Medium to high level of road interaction, mostly around Finglas Village, but still considered acceptable and manageable at this stage.	The alignment is too convoluted with a high number of non-clustered sharp curves over a long central section of the route.

Option	Serving Finglas Village	Directness	Interaction with road/junctions	Alignment
3H	Reasonably good level of service for the Village, with the line running some 300m from its centre.	The line is very long (over 4.6km) but this is not considered an absolute parameter, in consideration of the overall straightness (south-north direction) of the corridor.	Low to medium number of road junctions and a reasonably good level of interaction with the road network. The new bridge over the Finglas Road is also a plus.	The alignment is too convoluted, counting five long curves within the central section of the route. This, in combination with the relatively long route has potential to be highly detrimental for noise, operation (speed) and maintenance at this early stage.
3I	Reasonably good level of service for the Village, with the line running some 400m from its centre.	The line is very long (over 4.6km) but this is not considered an absolute parameter, in consideration of the overall straightness (south-north direction) of the corridor.	Low to medium number of road junctions and a reasonably good level of interaction with the road network. The new bridge over the Finglas Road is also a plus.	The alignment is too convoluted, counting five long curves within the central section of the route. This, in combination with the relatively long route is deemed to be significantly detrimental for noise, operation (speed) and maintenance at this early stage.
3J	Good level of service for the Village, with the line running below the Mellowes Road bridge over the Finglas Road. Great potential for serving both sides of the Road and interchange with bus routes.	The line is 3.9km long, which means it is very direct. This is mainly due to it running along the Finglas Road north of the Clearwater shopping centre.	Reasonably low road interaction, mostly along St.Margaret's Road. The alignment along the Finglas Road can be either shared with bus lanes, or set back into a widened section of the road north of the overpass.	Very good alignment with two clustered sharp curves.
3K	Good level of service for the Village, with the line running below the Mellowes Road bridge over the Finglas Road. Great potential for serving both sides of the Road and interchange with bus routes.	The line is very direct (less than 3.9km long). This is mainly due to it running along the Finglas Road north of the Clearwater shopping centre.	Low road interaction, mostly along St.Margaret's Road. The alignment along the Finglas Road can be either shared with bus lanes, or set back into a widened section of the road north of the overpass.	Very good alignment with virtually no sharp curves.
3L	Acceptable level of service for the Village, with the line running some 200m from the Five Arms junction.	The line is long as it runs over 4.5km reaching the east of Finglas Village, but it is acceptable for this stage of the sifting process.	Medium level of interaction with the road network and junctions, mostly along Jamestown Road and the east of Finglas Village. The alignment south of the Village has a good level of protection and segregation.	Acceptable alignment with three sharp curves, two of which clustered together and in correspondence of a potential stop location (Finglas Village), where the speed will be limited by operational constraints.
3M	Acceptable level of service for the Village, with the line running some 200m from the Five Arms junction.	The line is very long (4.6km), but still acceptable from a directness point of view, even in consideration of the areas served.	Medium to high level of interaction with the road network and junctions, mostly along Jamestown Road and the east of Finglas Village/Clune Road where the level of segregation will be low. The alignment south of the Village has a good level of protection and segregation.	Acceptable alignment with two sharp curves.

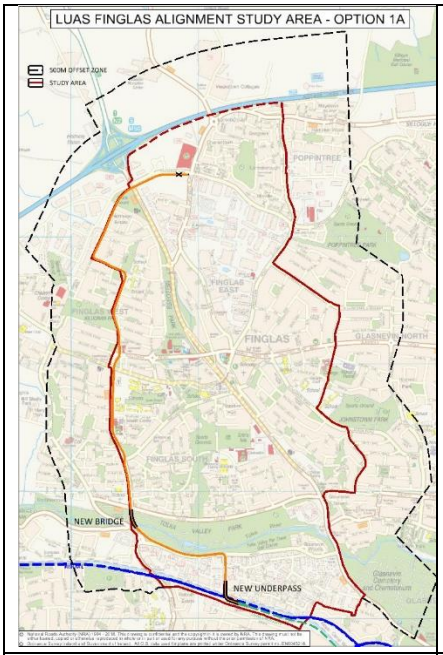
The following 15 route options have been sifted out:

1A, 1B, 1C, 1D, 1F, 1G, 1I

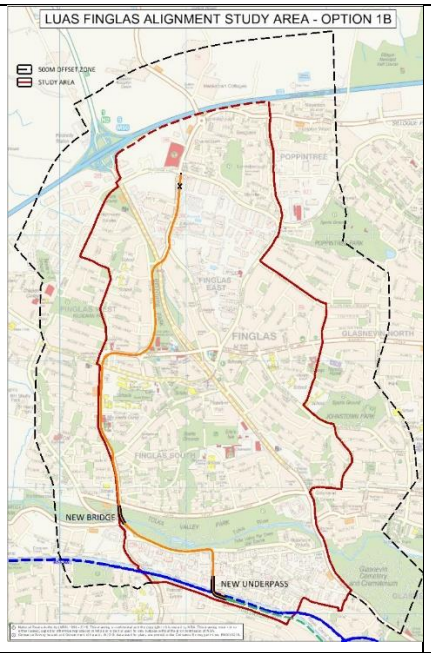
2D

3B, 3C, 3D, 3E, 3G, 3H, 3I

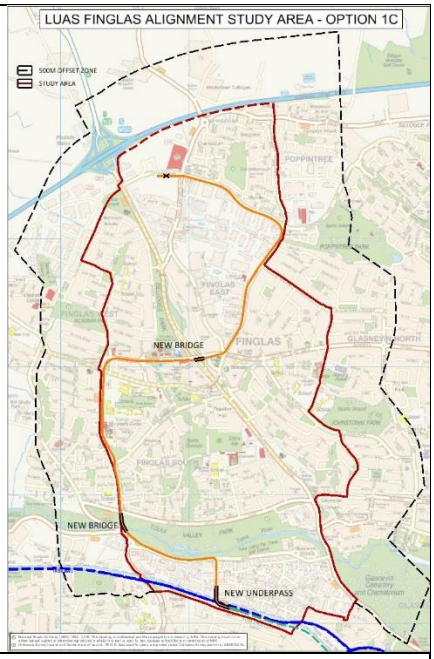
Figure 63 1st sift failed route options



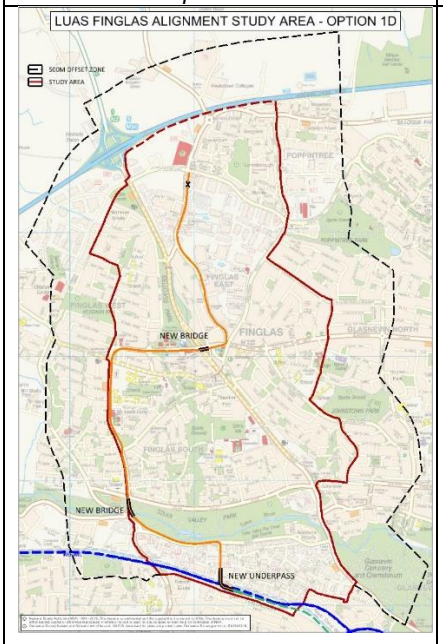
Option 1A



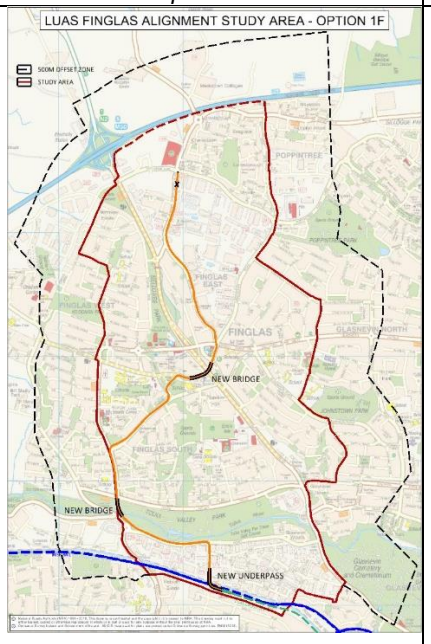
Option 1B



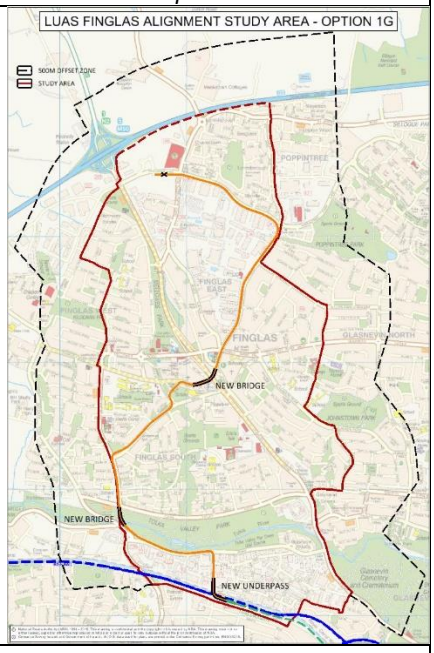
Option 1C



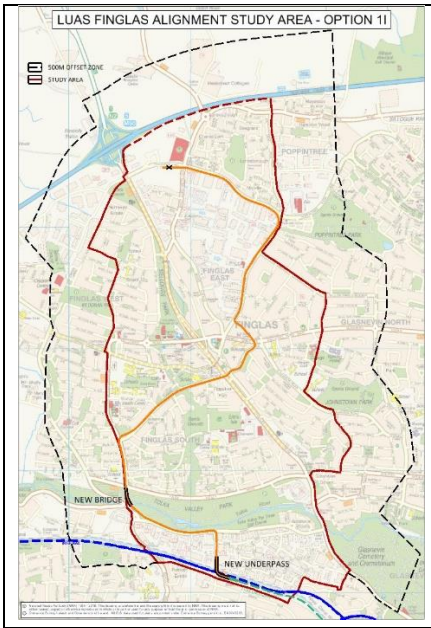
Option 1D



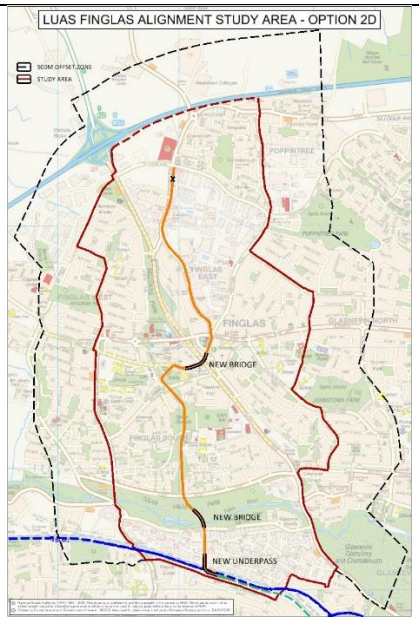
Option 1F



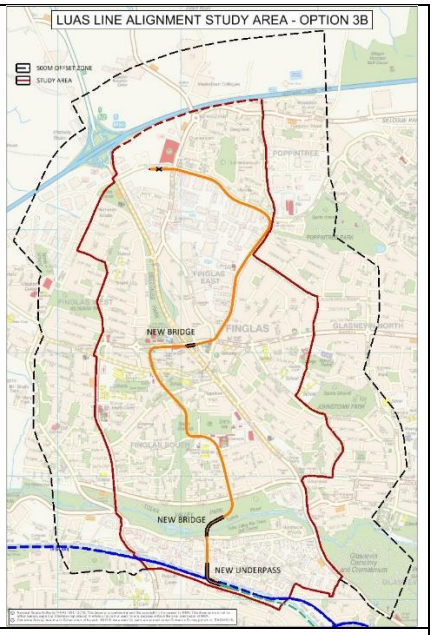
Option 1G



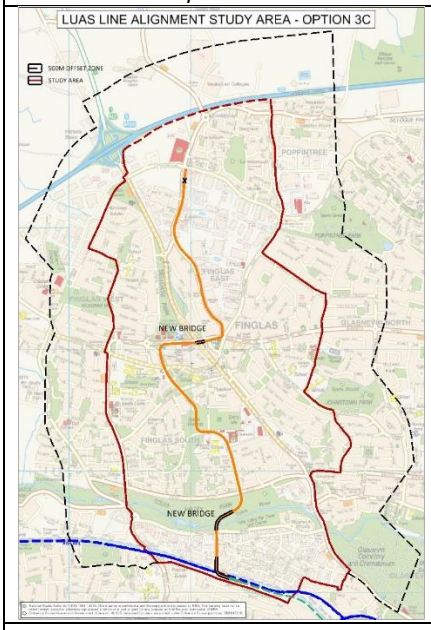
Option 1I



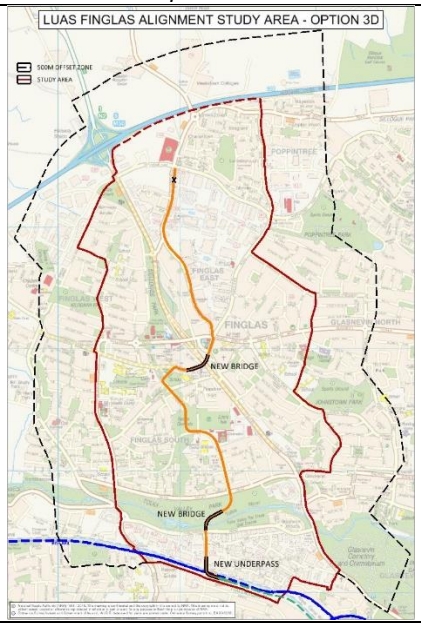
Option 2D



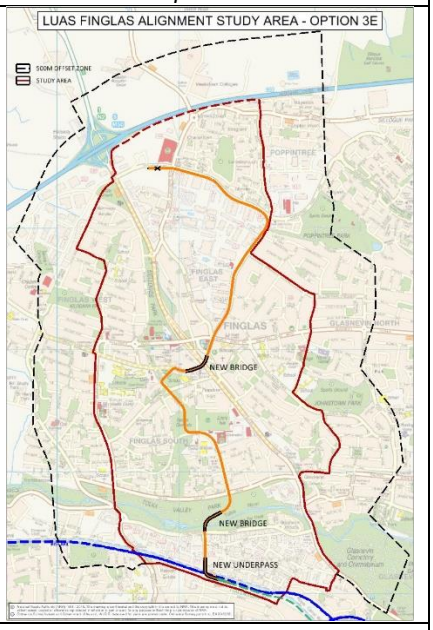
Option 3B



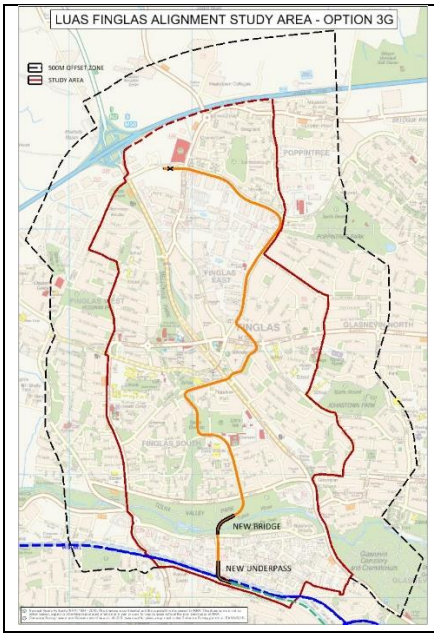
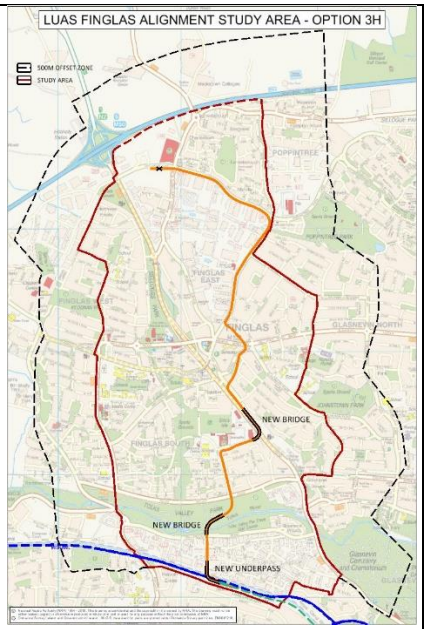
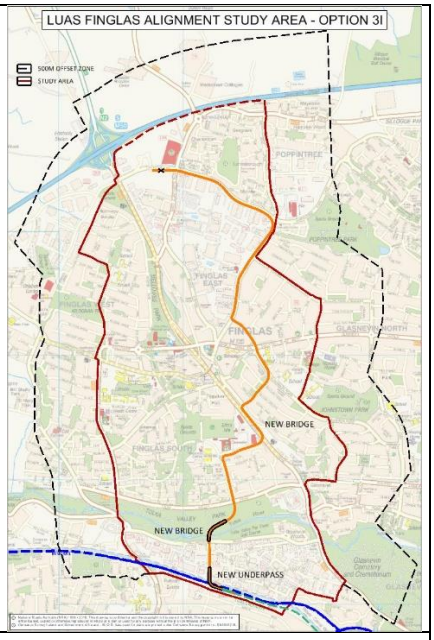
Option 3C



Option 3D



Option 3E

		
Option 3G	*Option 3H*	*Option 3I*

The following 14 route options are brought forward to the next stage (MCA1) and are presented in the next Chapter:

1E, 1H

2A, 2B, 2C, 2E, 2F, 2G

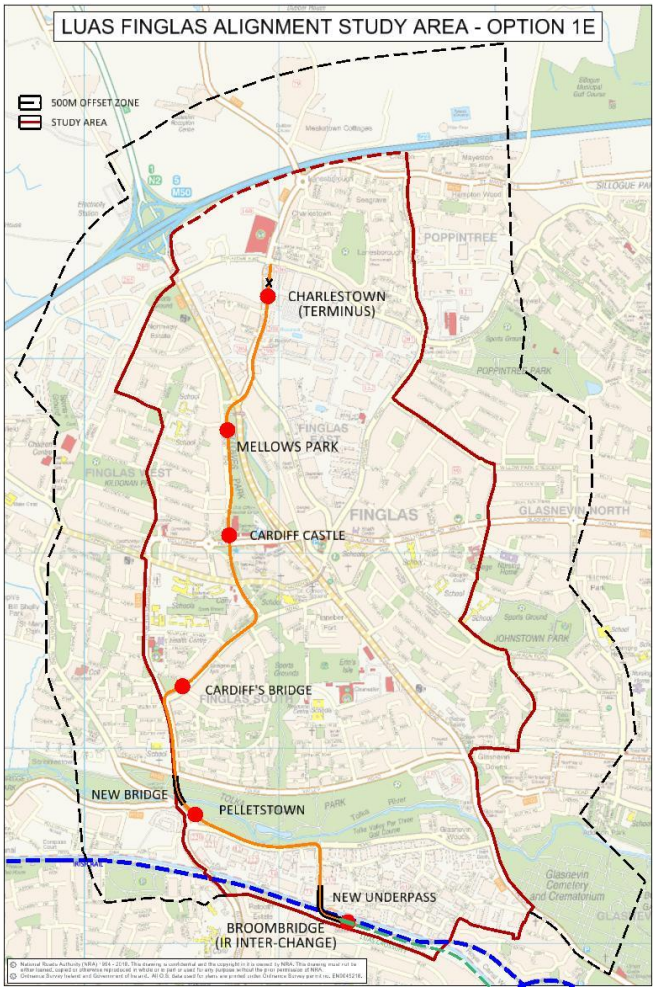
3A, 3F, 3J, 3K, 3L, 3M

10 DETAILED DESCRIPTION OF THE OPTIONS BROUGHT TO MCA1

10.1 Detailed Description of Options 1s

10.1.1 Option 1E

Figure 64 Option 1E



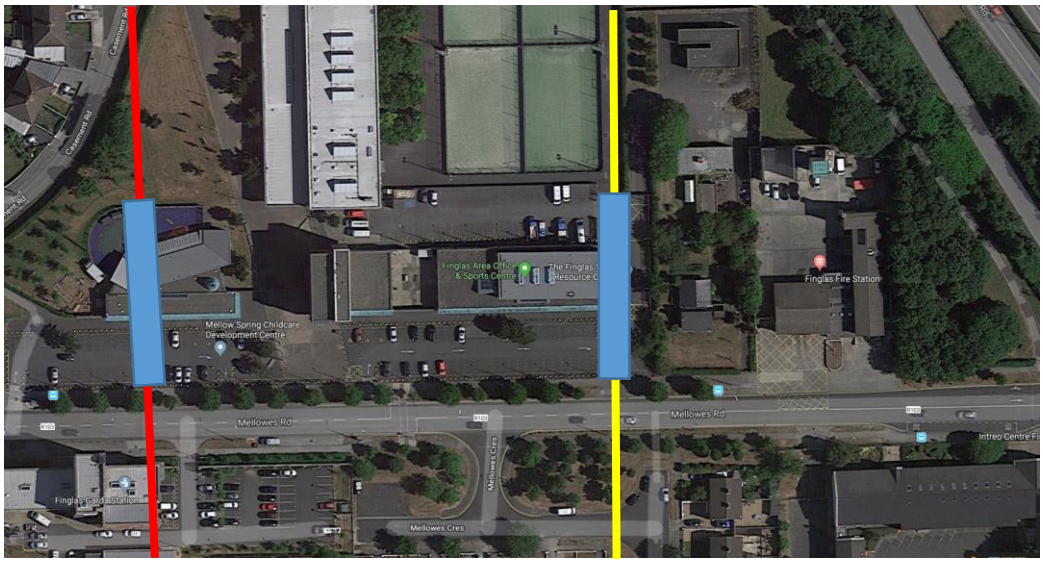
After leaving Broombridge stop the Luas underpasses the Royal Canal (subject to more detailed analysis) and runs through a strip of land within the Dublin Industrial Estate adjacent to Broombridge Road, Glasnevin, up to Ballyboggan Road. From there, running on grass track mainly within the current park boundaries (park fence is proposed to be relocated so the the Luas corridor runs adjacent to the public road), it reaches the high-density residential area of Pelletstown where a stop is provided in close proximity, within the Tolka Valley Park. It then crosses the easternmost part of the Tolka Valley Park on a new bridge structure (the longest among all the proposed structures in all the Options) that allows spanning the river and the deep valley and reaching the south end of Cardiffsbridge Road on its left hand side. From here, the Luas corridor runs again on grass track (land partially privately owned) except where crossing the streets. At the roundabout between Cardiffbridge Road and Wellmount Road it turns right onto the triangular green where Cardiff's Bridge stop is provided and then proceeds on on-street embedded tracks initially along the left side and later along the right side of Wellmount Road, sharing the road with private traffic. At the roundabout with Patrickswell Place the alignment turns sharply north into the grass verge on the left side of this road, then crosses Cappagh Road and proceeds along the green area on the right side of Cardiff Castle road up to Ravens Court. Here the line passes through the westernmost grass area of a housing estate and later through the Garda station car park (effectively severing the station from its car park) before reaching and crossing Mellowes Road.

From here it continues north through the Mellowes Spring Childcare Development Centre (the purpose built building to be demolished and relocated nearby) where the Cardiff Castle stop is provided.

After this stop the Luas continues heading north on grass tracks, running along the Mellowes Park most western boundary fence, up to the Mellowes Park stop, in close proximity with the roundabout with R135/Finglas Road and St. Margaret's Road. From here the alignment crosses the R135/Finglas Road and moves on the right side of St. Margaret's Road running mainly on private strips of land (factories front areas and some residential front gardens) or public green areas, up to its final stop and terminus on the northern end of this road, beside Charlestown car park.

A possible sub-option (shown in black in the sketch below) could be proposed where the tracks pass through the Mellowes Cres estate (instead of the Garda Station car park) via a double curve alignment and then cross the Mellowes Road some 130m further east then the original option. The alignment would finally join the Mellowes Park running along its eastern boundary (along the R135 cutting), with no interaction with the pedestrian access points to the park. In this corridor optimisation, the Finglas Village Stop would be located within the Dublin City park maintenance area, 150m closer to the Village, (350m from the Five Arms junction). The curved alignment through the Mellowes Cres Estate would impact on speed and runtime, but this would be mitigated by the proximity with two road junctions and the stop. Also, this alignment would allow higher operational speed along the Mellowes Park, due to the better segregation along the eastern edges of the park.

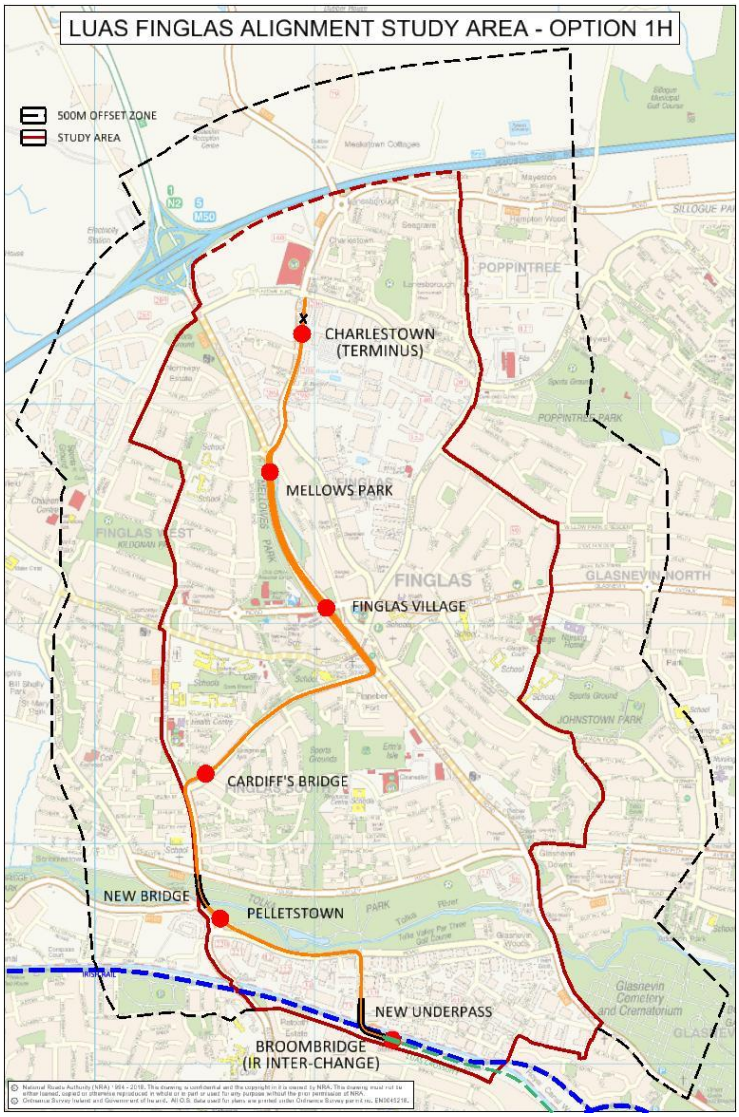
Figure 65 Mellowes Road and Park possible optimisation (yellow)



AS this is now considered as a potential sub-option, it will not form part of the MCA1 assessment and may be analysed within the Stage 2, if Option 1E gets shortlisted.

10.1.2 Option 1H

Figure 66 Option 1H



Option 1H follows the same alignment of option 1E up the roundabout between Wellmount road and Patrickswell Place where it continues along the right side of Wellmount road partially on grass track (grass verge at the right side of the road) and partially on on-street embedded track. At the junction with the R135, the line turns left onto the national road splitting in two to accommodate a single track on either side, sharing with the bus lanes.

Under the existing bridge that connects Mellowes road to Finglas Village, the homonymous stop of Finglas Village is provided.

The stop is located centred under the bridge or staggered on either side, with the track sharing the bus lane and the platforms set back under both bridge abutments (the platforms would have a reduced width at the abutments only). Lifts, stairs and/or ramps would be provided for passenger access from the Village at the bridge deck level to the Luas platforms.

The stop platform could be extended and combined with a bus stop to enhance accessibility and integration. In terms of passengers safety, stop platforms would be facing a bus lane as opposed to a fast and trafficked road lane, and a fence could be provided in the middle of the carriageway to mitigate against the risk of pedestrians crossing at grade the high speed road between the platforms. The stop location is very central between Finglas East and West, and only less than 200m away from the core of the Village.

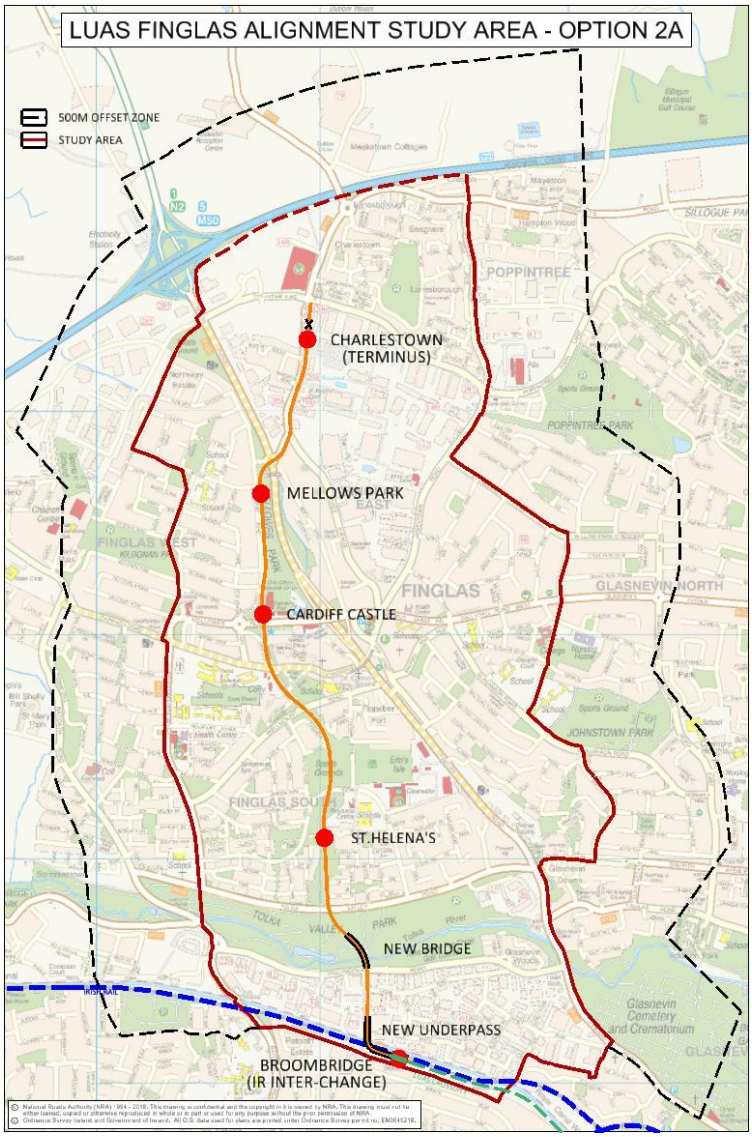
The line then proceeds along the R135 road up to the roundabout with St. Margaret's Road on the right, and Casement road on the left. From here, the two tracks are brought together to move to the right side of St. Margaret's Road, and running mainly on private strips of land (industrial front areas and some residential front gardens) or public green areas, it reaches its final stop and terminus on the northern end of this road, beside Charlestown surface overflow car park.

A possible sub-configuration of the corridor north of the bridge could see the Luas tracks pushed outside the bus lanes in a fully segregated single tracks configuration, into the current embankment slopes, through the provision of low retaining walls (effectively widening the current road).

10.2 Detailed Description of Options 2s

10.2.1 Option 2A

Figure 67 Option 2A



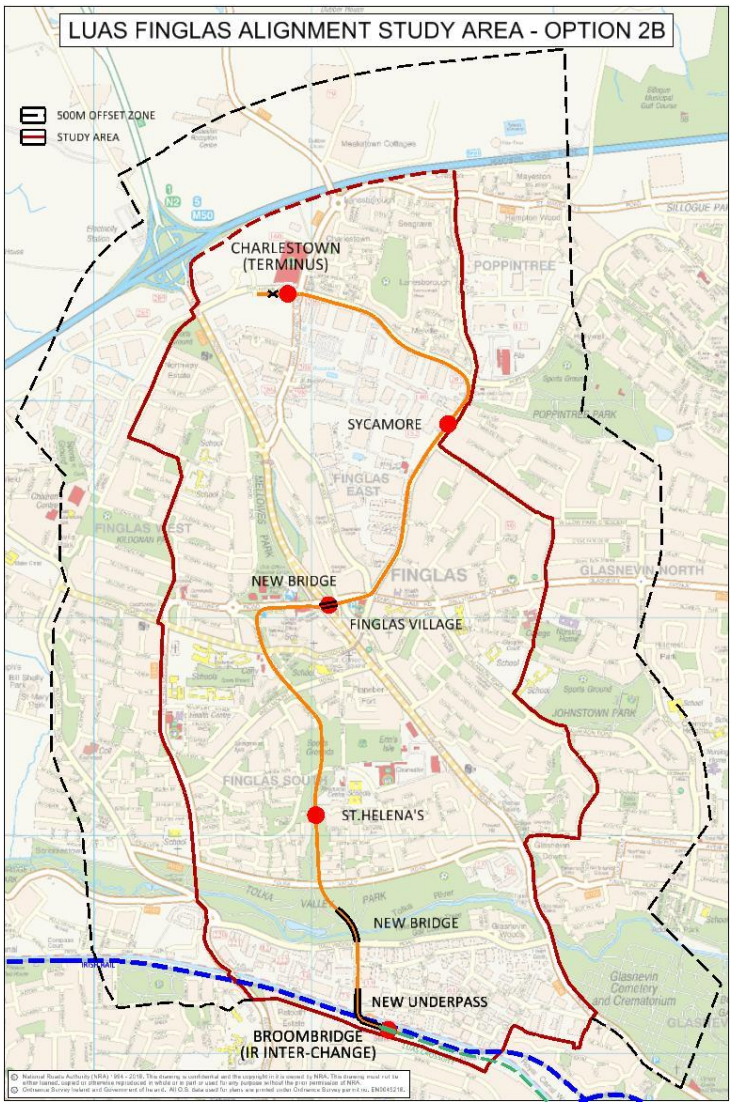
After leaving Broombridge stop the Luas underpasses the Royal Canal (subject to more detailed analysis) and through a strip of land within the Dublin Industrial estate adjacent to Broombridge Road, Glasnevin, up to Ballyboggan Road. From there, running on grass track, it penetrates the Tolka Valley Park to reach close to the Finglas Wood Bridge.

From here, it crosses the central part of the park on a new bridge structure that allows spanning the river and the valley and reaching Tolka Valley road. Here the line heads into the long strip of green land parallel to Barnamore Grove. Running approximately in the middle of this green area, on grass tracks, the Luas reaches St. Helena's road, where, close to the Finglas Youth service the stop of St' Helena's is provided. It then crosses St. Helena's road and proceeds northward, along the pathway that divides the sports grounds between Dunsink road and Farnham road, and slightly bending left continues running on the green up to Wellmount Road at the roundabout with Patrickswell Place. Here the Luas crosses Wellmount road and heads north into the grass verge on the left hand side of Patrickswell Place, (mainly on grass track except where it crosses the roads), and from there the alignment is as per Option 1E up to the its final stop and terminus beside Charlestown car park.

As for Option 1E, a possible sub-option could be proposed across Mellowes Road, where the tracks pass through the Mellowes Cres estate (instead of the Garda Station car park) via a double curve alignment and then cross the Mellowes Road some 130m further east then the original option. The alignment would finally join the Mellowes Park running along its eastern boundary (along the R135 cutting).

10.2.2 Option 2B

Figure 68 Option 2B



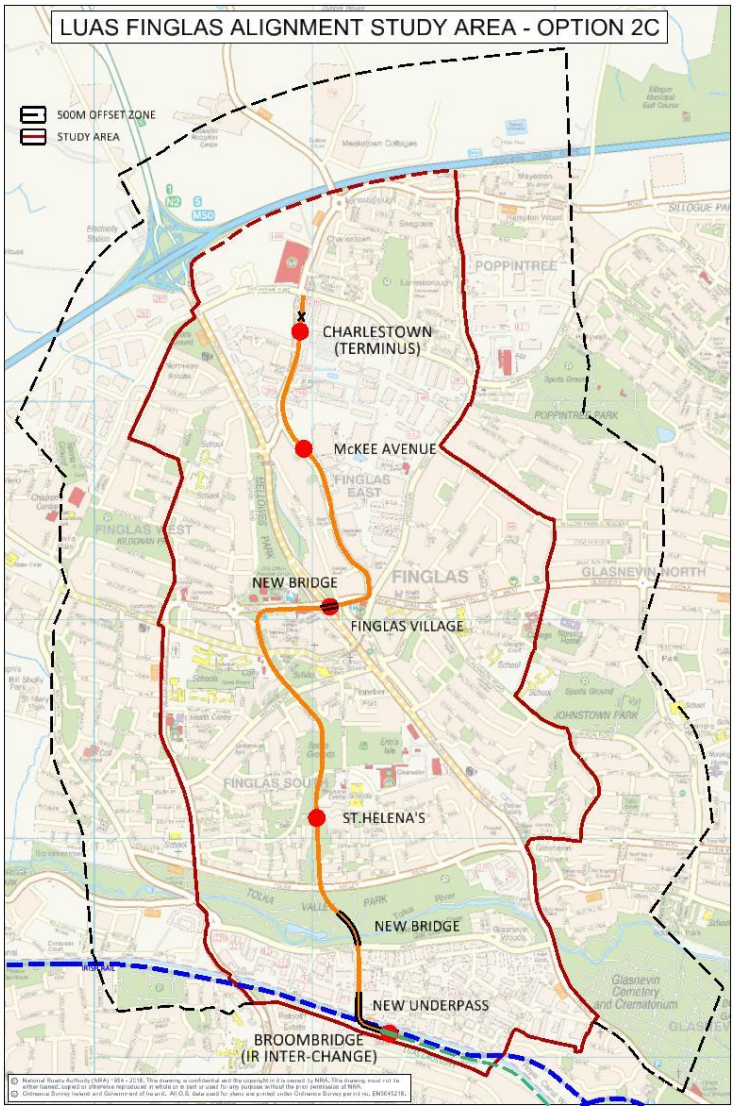
Option 2B follows the same alignment of Option 2A up to Wellmount road where, turning east through the Garda station car park, it then proceeds along the road. The alignment is now running on the right green side of the road (partially privately owned by the Intreo Centres & Social Welfare Offices of the Department of Social Protection) up to the two slip roads to the R135.

Here, a new bridge adjacent to the existing one (to its south side) allows the Luas to join Finglas Village. The bridge will also contain the homonymous stop of Finglas Village easily accessible from both sides. Thereafter the alignment crosses a private area (currently a car park) on segregate paved tracks, before sharing again the road with private traffic at the junction with Jamestown Road/McKee Avenue (the Five Arms Junction).

From this crossroads, the line heads north along Jamestown Road, sharing traffic up to Clune road, and afterwards on segregated grass track, acquiring a strip of land from the Jamestown Business Park easternmost side (land privately owned). Close to the northern end of this road the Sycamore Stop is provided just before the roundabout with Melville Road where the alignment turns west on the left side of this road, running on grass track (except where crossing the Jamestown Business Park entrances and St. Margaret's Road). The tracks are partially located on the existing footpath/grass verge and partially on an acquired strip of land currently part of the business park. Just after crossing St. Margaret's Road the line reaches its final stop and terminus at Charlestown Place, on the north side of the current overflow surface carpark.

10.2.3 Option 2C

Figure 69 Option 2C



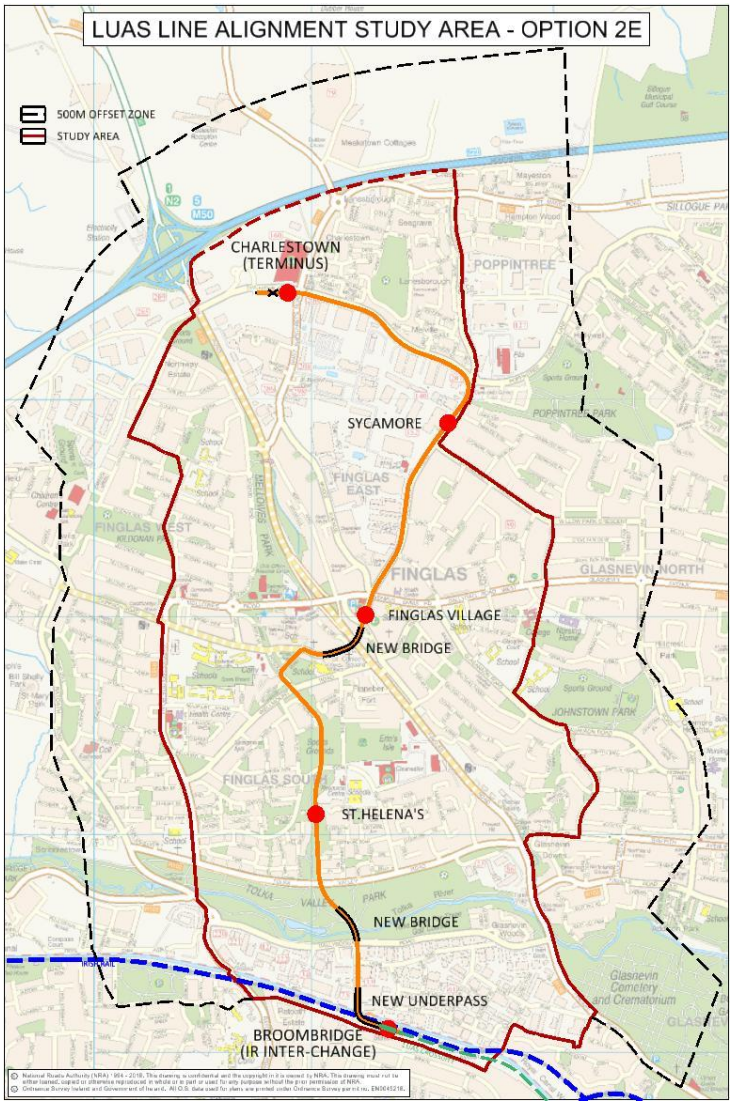
Option 2C follows the same alignment as Option 2B up to the Five Arms Junction where it turns straight north on the Plaza Area in front of the Supervalu and gets in the centre of McKee Avenue.

From this point, the Luas corridor shares with public traffic up to where it meets the rear wall of the Jamestown Business Park, where it proceeds mainly on grass track occupying a small strip of the western side of the industrial estate, on the right side of the road.

Nearly at the northern end of McKee Avenue, on the green area close to the entrance gate to the KSG headquarter offices, the McKee Ave stop is provided. Keeping running north, the alignment now crosses the roundabout with St. Margaret's Road and, mainly occupying private strips of land (factories front areas and some residential front gardens) or public green areas on the right side of this road, it finally reaches its final stop and terminus on the northern end of this road, beside the Charlestown car park.

10.2.4 Option 2E

Figure 70 Option 2E



Option 2E follows the same alignment as Option 2B for most of its route, with the exception of the central section.

At the mid-point of Patrickswell Place this option turns northeast into a narrow and walled back lane that runs along the St. Michael's Holy Faith Secondary School. A narrow strip of the school sports ground all along the back lane may have to be acquired to facilitate the alignment.

Where the back-lane meets Cappagh Road/Church Street the line turns right into the middle of Church Street where a bridge is built to span over the R135/Finglas Road (where a pedestrian bridge currently provides accessibility to the Village from Church Street).

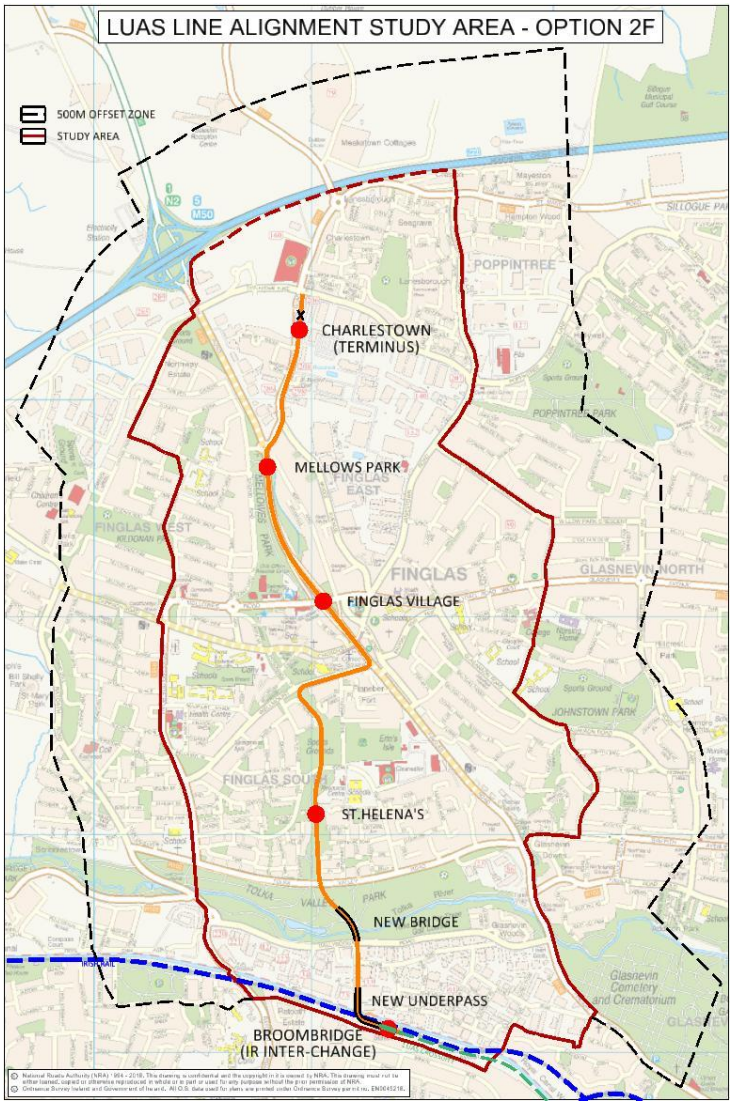
The line then joins the other side of the R135, landing on the lower part of Jamestown Road (south of the Five Arms Junction), where at least one track will be shared with traffic. That section of the road is currently one way system northbound, and this is likely to be preserved, with traffic reduced to one lane only and restricted to local access and delivery only. The Luas Stop in Finglas Village will be set back from the road, into the current Centre's carpark.

The alignment then crosses the Five Arms Junction and heads towards Jamestown Road, as per other options already described.

This option has a significant impact on Church Street and partly on Jamestown Road lower, as the cross sectional width of the roads will be almost entirely taken by the new fly-over. It is expected, subject to a more detailed analysis, that no traffic would be allowed under the new fly-over on the last part of Church Street, with the exception of restricted local access only (no more access to the R135 from Church Street at grade).

10.2.5 Option 2F

Figure 71 Option 2F



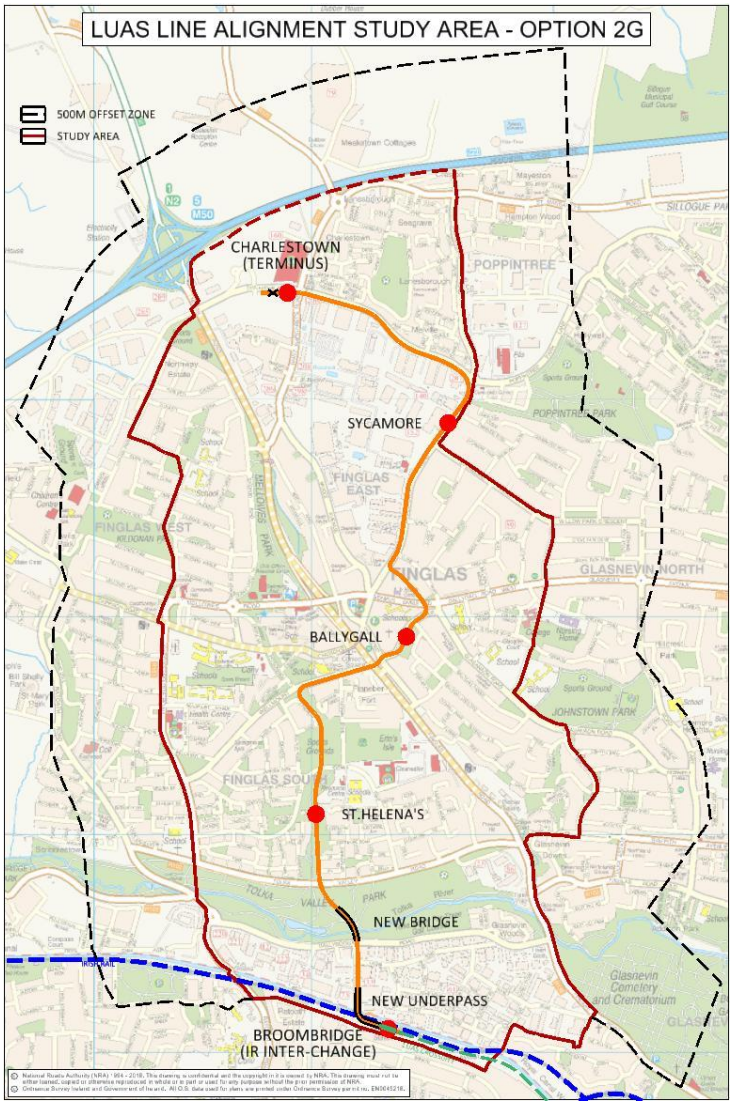
Option 2F follows the same alignment of Option 2B up to Wellmount road where, instead of crossing this road and proceeding north, it turns east joining the right side of Wellmount road, on segregated grass track (except where crossing public roads or private car park access).

From this point the alignment is the same as per Option 1H up to the final stop and terminus beside Charlestown car park, including running along the bus lanes of the R135 and providing a stop under or adjacent to the Finglas Village bridge.

Also for this option, north of the bridge, the Luas tracks could be pushed outside the bus lanes in a fully segregated single tracks configuration, into the current embankment slopes, through the provision of low retaining walls.

10.2.6 Option 2G

Figure 72 Option 2G



Option 2G follows the same alignment of Option 2F up to where Wellmount road reaches the N2/Finglas Road. Here the line crosses the R135 in a new at-grade signal controlled crossing and reaches the south side of Finglas village at the car park in front of Permanent TSB. Currently this is a signal controlled "T" junction as Wellmount road joins the R135 but does not cross it to Finglas Village.

From there veering slightly left, it gets into Ballygall Road West where it shares the road with private traffic for a short section until reaching the green between Finglas place and Ballygall road. Here Ballygall Stop is provided.

It then proceeds along Ballygall Road West up to the Scouts' Hall where it turns sharply left in the green area on the east side of the Hall. Then running northwest, the line crosses Seamus Ennis road and proceeds up to Jamestown road, through a new Luas corridor formed by taking a strip of land from a series of private back gardens on the south side of Clune Road (gardens' length varying between 56 and 67m).

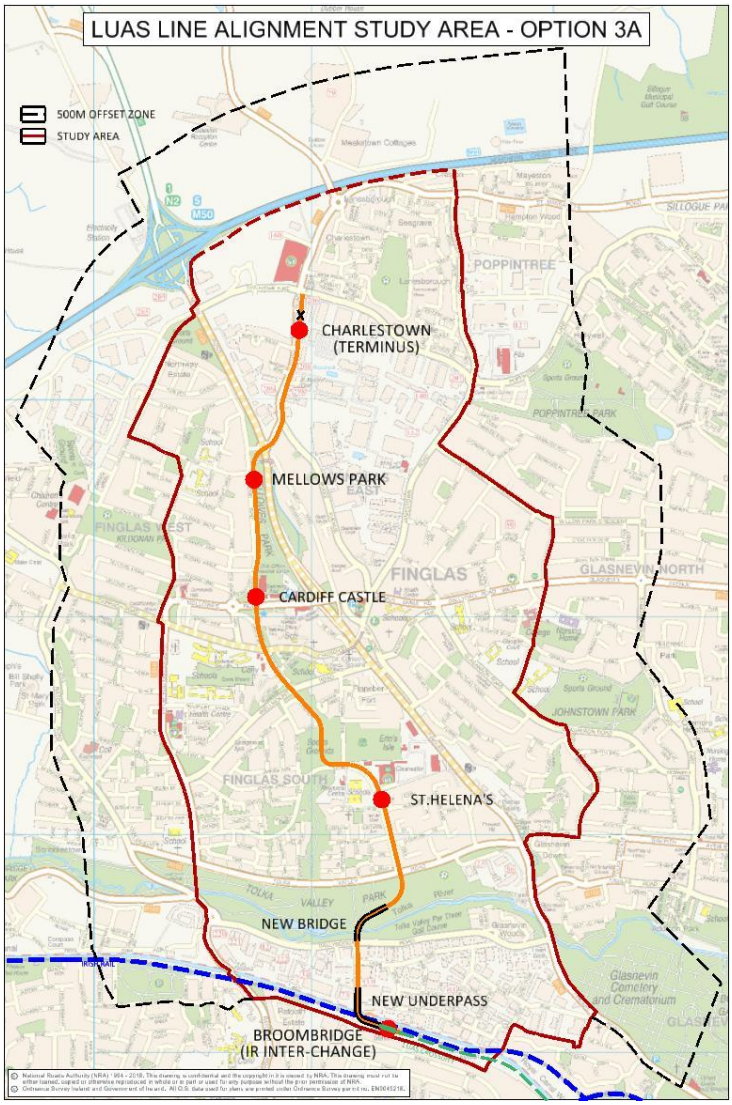
Bending right and sharing traffic up to Clune road, the Luas now moves on segregated grass track acquiring a strip of land from the Jamestown Business Park easternmost side (land privately owned).

From here the alignment is the same as per Option 2B up to its final stop and terminus at Charlestown Place, north of the surface carpark.

10.3 Detailed Description of Options 3s

10.3.1 Option 3A

Figure 73 Option 3A



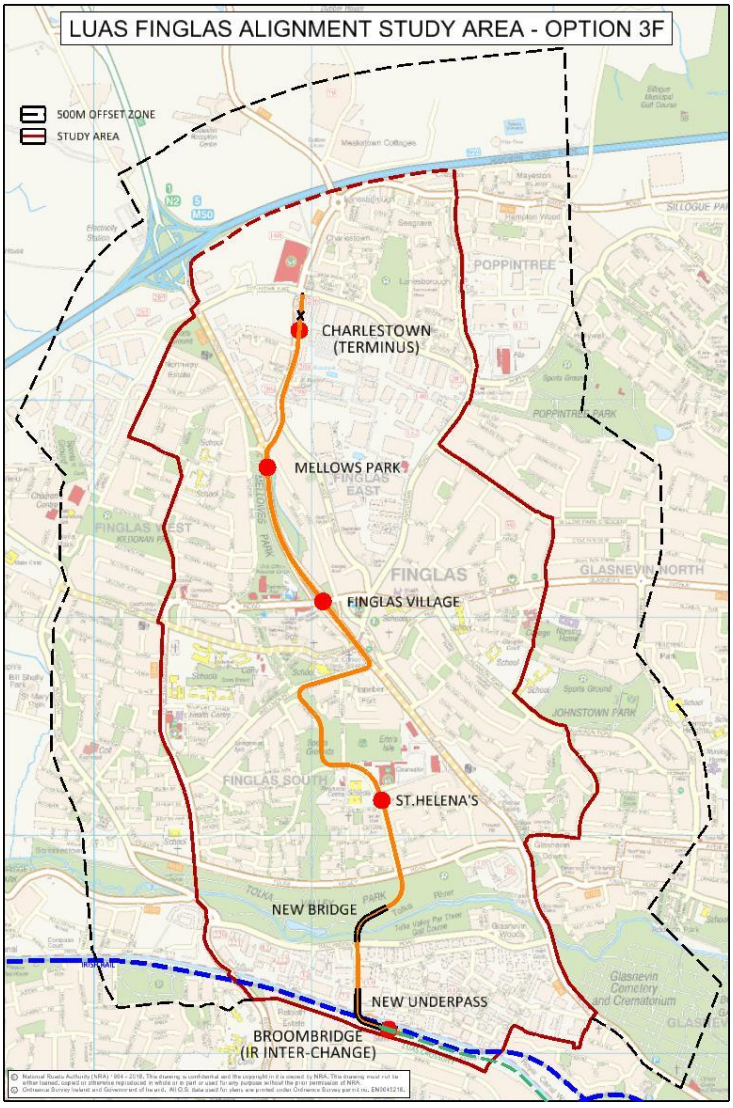
After leaving Broombridge stop the Luas underpasses the Royal Canal (subject to more detailed analysis) and through a strip of land within the Dublin Industrial estate adjacent to Broombridge Road, Glasnevin, up to Ballyboggan Road. From there, running on grass track, it penetrates the Tolka Valley Park to reach close to the Finglas Wood Bridge, it passes through the central part of the Tolka Valley Park on a new bridge structure that allows spanning the river and the valley and reaching Tolka Valley Road at the junction with St. Helena's road. It then runs along the right side of St. Helena's Road, on segregated grass track (mostly on public land but with some spots of private land take) up to the rear entrance to the Tesco Clearwater shopping centre, where St. Helena stop is provided. The line proceeds parallel to the road (now bending west), it crosses Farnham Drive and after some 60 meters it sharply bends right to proceed northward along the pathway that divides the sports grounds between Dunsink road and Farnham road.

From here the alignment is as per Option 2A up to its final stop and terminus on St. Margaret's road beside the Charlestown surface car park.

As for Options 1E and 2A, a possible sub-option could be proposed across Mellowes Road, where the tracks pass through the Mellowes Cres estate (instead of the Garda Station car park) via a double curve alignment and then cross the Mellowes Road some 130m further east then the original option. The alignment would finally join the Mellowes Park running along its eastern boundary (along the R135 cutting).

10.3.2 Option 3F

Figure 74 Option 3F

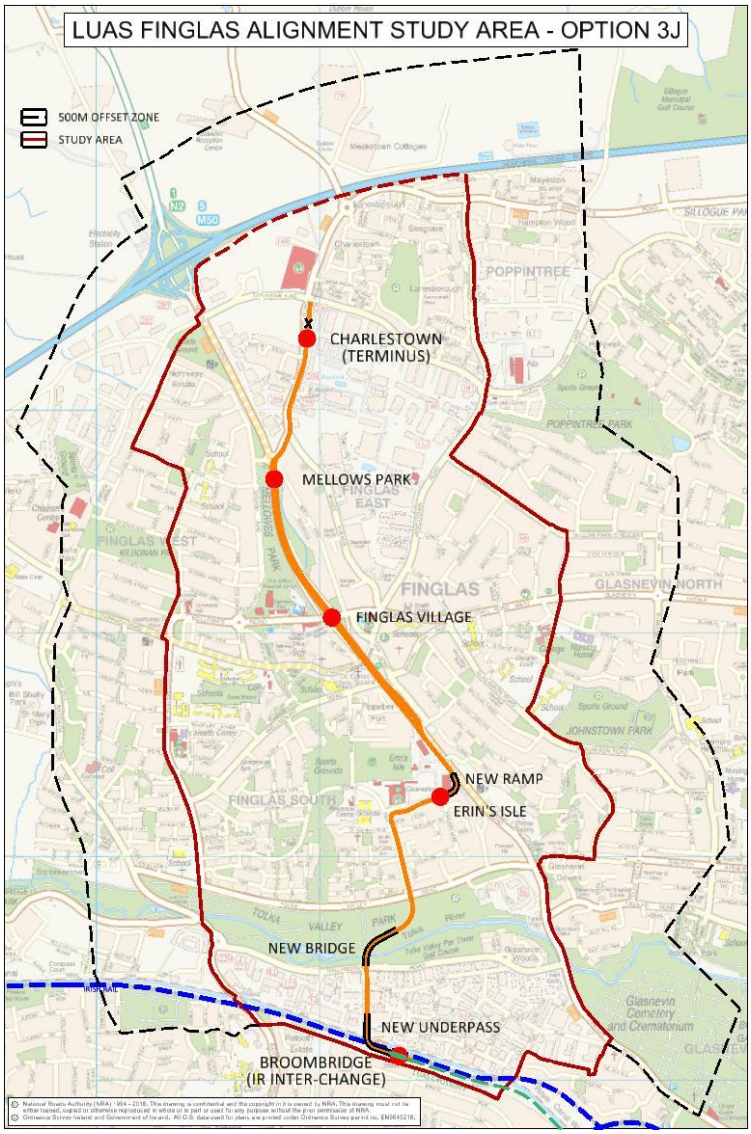


Option 3F follows the same alignment of Option 3A up to Wellmount Road where it turns east along this road, and from here it runs along the same corridor as Option 2F up to the final stop and terminus on St. Margaret's road beside Charlestown car park.

This option runs along the bus lanes of the R135 and has a stop under the Finglas Village bridge. North of the bridge, the Luas tracks could be shifted outside the bus lanes in a fully segregated single tracks configuration, into the current embankment slopes, through the provision of low retaining walls up to Mellowes Roundabout, where the two tracks are merged while crossing the R135.

10.3.3 Option 3J

Figure 75 Option 3J

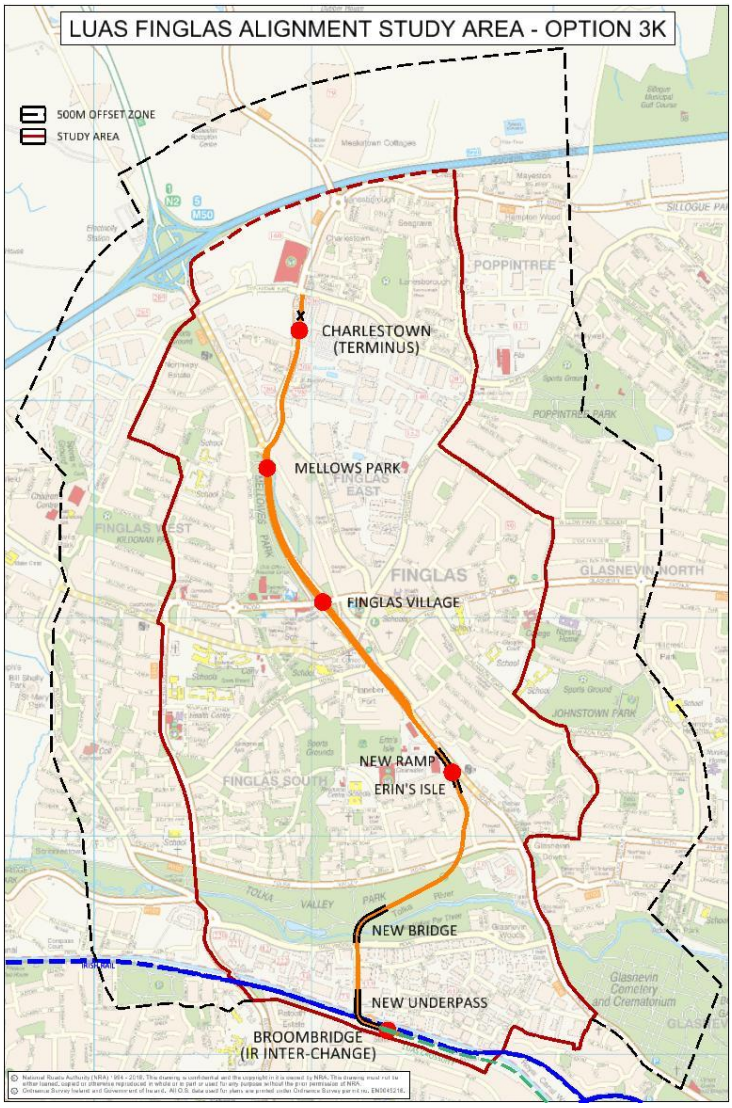


Option 3J follows the same alignment of Option 3A up to the rear entrance to the Tesco Clearwater shopping centre.

At this location it sharply turns east into the Tesco car park rear exit lane, and proceeds along this lane/car park spaces up to the DID/Maxi Zoo retail shops where Erin's Isle Stop is provided. To facilitate the Luas corridor through the Tesco car park, this will have to be rearranged and it is likely that a number of parking spaces along the southern boundary will be lost. From here the corridor enters a new retained ramp on the rear of the commercial sheds sloping down to join the R135. From there, the Luas runs northbound along the footpath/cycle lane/grass verge on the left side of the road on embedded track up to the junction with Finglas place. At that point the double track splits in two single embedded tracks (one of them, the southbound crosses at grade the road), located each on either side of the R135, sharing with the bus lanes. Below the existing bridge that connects Mellowes road to Finglas Village, the homonymous stop of Finglas Village is provided as for other previous options (detailed description of this is given before). From here the Luas follows the same alignment of Option 1H up to its final stop and terminus on the northern end of St Margaret's Road, beside Charlestown car park.

10.3.4 Option 3K

Figure 76 Option 3K



Option 3K follows the same alignment of option 3J with the exception of a section from the Tolka Valley Park new bridge structure up to the Clearwater shopping centre access lanes on the R135. In detail, after spanning the Tolka Valley over the new bridge structure, the alignment does not turn north towards the junction between Tolka Valley Road and St. Helena's road, but proceeds eastward along the park to cross Tolka Valley Road at the allotments of the Green View Community Gardens. It then continues northward taking a strip of allotments, private back gardens and public green spots at the back of the Prospect Hill Apartment block up to the rear of the Ardmore CareChoice nursing home.

Here, taking a strip of its rear carpark and access ramps to be reconfigured, it finally moves on a new ramp between retaining walls to join the R135 before the access lanes to the Clearwater shopping Centre. On the ramp structure the stop of Erin's Isle is provided.

From this point, the alignment is the same as per Option 3J up to its final stop and terminus on the northern end of St Margaret's Road, beside Charlestown car park.

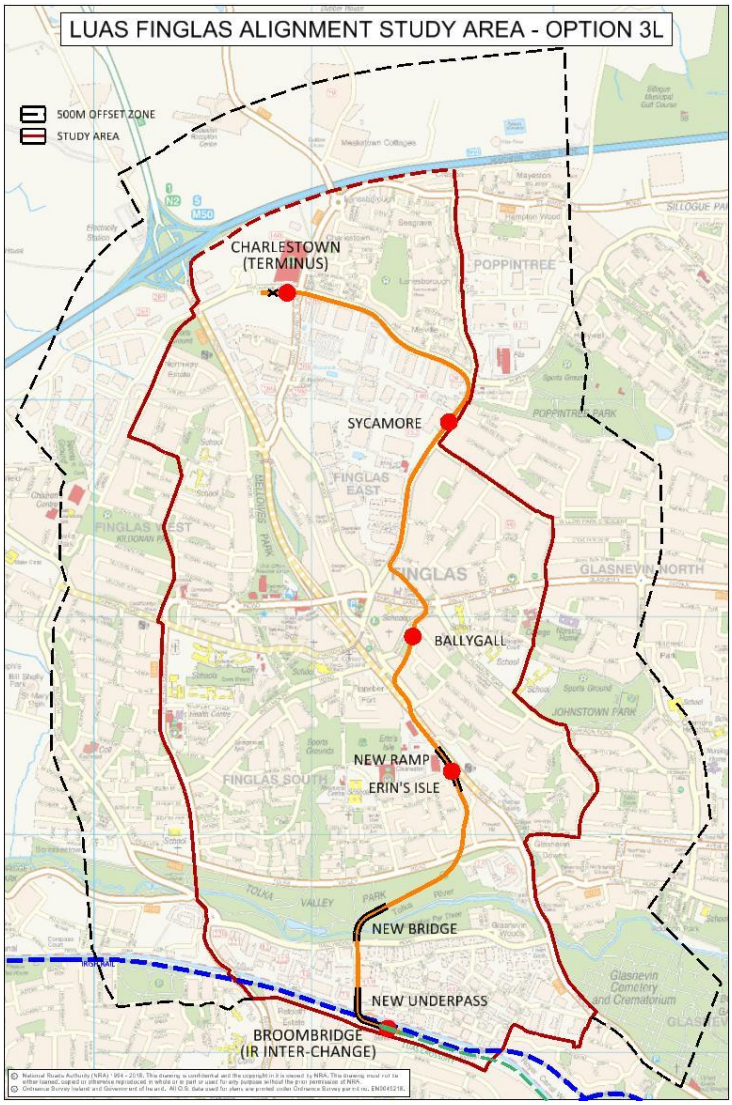
Variant

This option has a very short variant where the corridor passes through the allotments and then instead of veering on the back of the nursing home, it follows The Griffith to ramp down to the R135 and pass in front of the Ardmore CareChoice Nursing Home.

Figure 77 Option 3K variant around the nursing home

10.3.5 Option 3L

Figure 78 Option 3L



Option 3L follows the alignment of option 3K up to where Finglas Place joins the R135. From here the double track alignment crosses the R135 from the west to the east side to run on grass track on the small linear park confined between Finglas place and the Farnham House Gate Lodge.

Close to this Lodge it turns north-east to reach the small car park on the rear of Rosehill House and then the green between Finglas place and Ballygall road where the Ballygall Stop is provided.

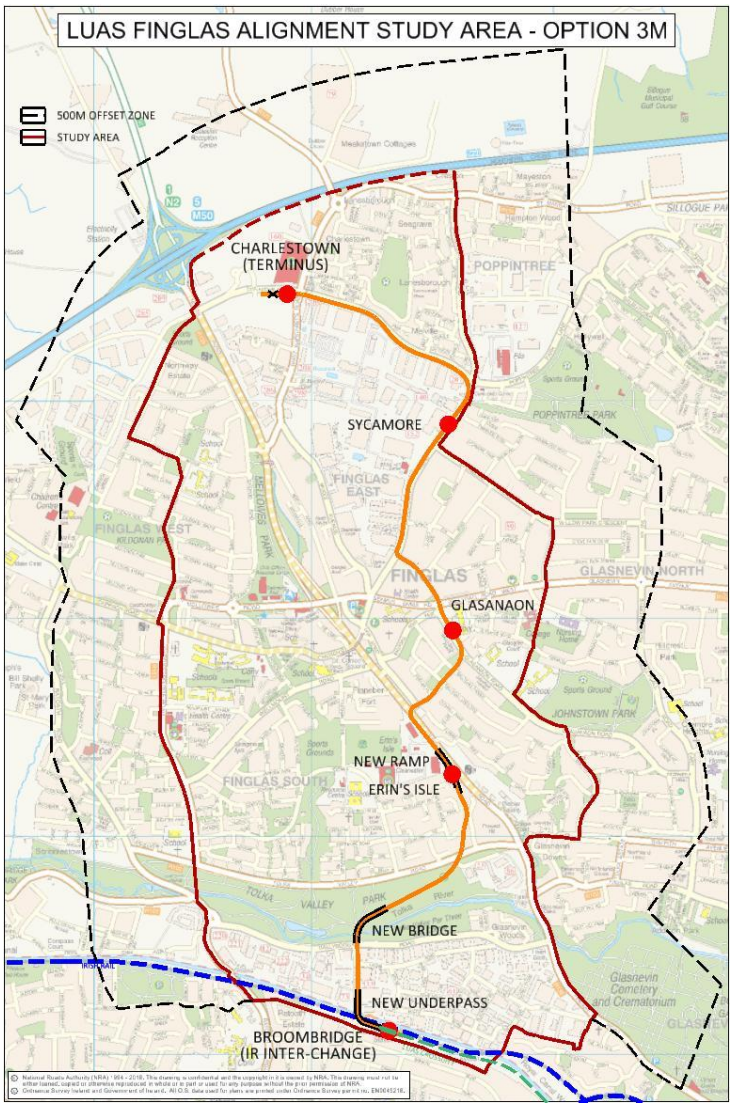
It then proceeds along Ballygall Road West up to the Scouts' Hall where it turns sharply left in the green area on the east side of the Hall and from this point the alignment is the same of Option 2G up to its final stop and terminus at Charlestown Place.

<u>Variant</u>

Also this option has a very short variant to pass in front of the Ardmore CareChoice Nursing Home.

10.3.6 Option 3M

Figure 79 Option 3M



Option 3M follows the alignment of option 3L up to where the R135 is joined by Finglas Place. From here the alignment crosses the R135 from the west to the east side to run along Finglas Place.

The corridor is shared with traffic on embedded track up to the three green areas between Finglas Place and Ballygall Place where the Luas moves on grass track on the left side of the road (except where crossing Ballygall Crescent and Ballygall Parade).

When it reaches Glasanaon Road it turns left and crosses the road to run on the green areas on the right side of the street up to the crossing with Seamus Ennis Road/ Ballygall Road West.

Close to the rear gate of the St Canice's Boys National School the stop of Glasanaon is provided. Here the Luas crosses the junction and heads northwest along the middle line of Clune road sharing with traffic up to Jamestown Road.

At the junction it crosses the street to run on segregated grass track on the left side, and from this point the alignment is back the same of Option 3L up to its final stop and terminus at Charlestown Place.

<u>Variant</u>

Also this option has a very short variant to pass in front of the Ardmore CareChoice Nursing Home.

10.4 Summary of all Options for MCA1

The following table contains a numerical summary of all 14 options in terms of overall length (excluding Broombridge stop reconfiguration and the tracks north of Charlestown for tram reversing/stabling), number of stops excluding Broombridge, shared and segregated track sections (segregated includes for both on-street and off-street), structures (over and under bridges) and junctions.

The detailed plans of the 14 options for MCA1 are contained within the Annex 2.

Table 5 Numerical summary of the 14 Options for the MCA1

Option	Overall Route Details						Structures			Junctions		
	Length	Stops	Segregated		Shared		Underbridge (Luas Under Road)	Overbridge (Luas Over Road)	Other	Major Roundabouts Requiring Serious Alteration	Minor Junctions	Major Junctions
	(m)	*(n)*	*(m)*	*(%)*	*(m)*	*(%)*	*(Nr.)*	*(Nr.)*	*(Nr.)*	*(Nr.)*	*(Nr.)*	*(Nr.)*
1E	4,176	5	2,640	63%	1,516	37%	1	1		1	11	6
1H	4,532	5	1,978	44%	2,534	56%	1	1		1	13	6
2A	3,522	4	2,513	71%	989	29%	1	1		1	6	7
2B	4,716	4	3,262	69%	1,434	31%	1	2		0	15	7
2C	4,022	4	2,483	62%	1,519	38%	1	2		0	13	10
2E	4,521	4	2,988	66%	1,513	34%	1	2		0	10	10
2F	3,798	4	1,913	50%	1,865	50%	1	1		1	8	6
2G	4,611	4	3,362	73%	1,229	27%	1	1		0	13	6
3A	3,702	4	2,687	73%	1,045	27%	1	1		1	10	6
3F	4,028	4	2,087	52%	1,921	48%	1	1		1	11	5
3J	3,910	4	1,608	41%	2,282	59%	1	1	1	1	8	8
3K	3,879	4	1,610	42%	2,249	58%	1	1	1	1	6	8
3L	4,547	4	3,379	74%	1,148	26%	1	1	1	0	14	5
3M	4,614	4	3,156	68%	1,438	32%	1	1	1	0	15	6

The shortest option is now 3.5km, the longest 4.7km. In terms of percentage of route segregation, the 14 options go from a minimum of 41% to a maximum of 74%, while in terms of junctions the options span from a minimum of 14 to a maximum of 23 over an average length of 4.3km.

11 MULTI-CRITERIA ASSESSMENT

In this section of the report, the 14 Options emerging from the screening process are assessed against each other within a multi-criteria analysis, in accordance with the CAF guidelines.

11.1 Multi-Criteria Analysis Stage 1

A multi-criteria analysis (MCA) was undertaken to consolidate the quantifiable and non-quantifiable impacts of each option. The MCA provides a valuable tool in prioritising schemes for investment and supporting decision making.

In this Stage 1 of the Luas Finglas options assessment, the MCA is called MCA1 and it is developed to facilitate a ranking of each option against a set of defined criteria. It comprises a more detailed qualitative and quantitative assessment of the 14 remaining options.

The MCA1 has been developed on the basis of the "Common Appraisal Framework (CAF) for Transport Projects and Programmes" guidelines and includes the following five appraisal criteria:

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

Table 6 presents a summary of the five appraisal criteria and related sub-criteria (or "Parameters") assessed within the MCA1.

Table 6 MCA1 Criteria and Parameters

Luas Finglas	*MCA1 Criteria and parameters*		
	Criteria		**Parameter**
1	Economy	1.1	Cost
		1.2	Catchment
		1.3	Journey time
2	Integration	2.1	Compatibility with Development Plans (Land Use)
		2.2	Integration with GDA Transport Policies and Networks
3	Environment	3.1	Material and cultural assets
		3.2	Natural aspects
4	Accessibility and social inclusion	4.1	Social inclusion
		4.2	Key attractors served
5	Safety	5.1	Public/Road interfaces/RSA collision maps

11.2 Scoring System

The 14 options have been scored by a panel of eight expert competent evaluators.

The assessment is based on a five point scale, generally ranging from delivering significantly better results than the other options, to delivering significantly lower results than the other options.

For illustrative purposes, this five-point scale is colour coded as presented below, with options showing significant advantages over other routes graded “dark green”, significant disadvantages over other routes graded “red”, orange and light green being adopted for “some” advantages/disadvantages and yellow being used for options which deliver comparable results to all other options.

The assessment is based on the rule that if only one option scores better than all the other options on a criterion, then that option will be given a green score (or dark green) and all other similarly scoring options will score orange or red.

Table 7 MCA1 Typical Scoring System

Significant disadvantages over other options	
Some disadvantages over other options	
Comparable to other options	
Some advantages over other options	
Significant advantages over other options	

11.3 Criteria and Parameters Assessment

This section of the report describes in detail, for each criteria and parameter:

- the methodology followed for the assessment,
- the sub-criteria considered (if applicable),
- the options assessment,
- the assessments result.

The overall results of the combined assessment of all options will then be described in the following Chapter 12 “End-to end options assessment”.

11.3.1 1. Economy

11.3.1.1 *Criteria 1 Cost*

Introduction

A cost analysis has been carried out on each of the 14 route options passed to the MCA1.

The aim of this cost analysis is simply to compare the estimated value of the direct variable construction elements for each route option, and as such, cannot be used to determine capital costs, budgets or feasibility working costs as further described in the disclaimer above.

Methodology

A standardised work breakdown structure (WBS) has been applied to each of the 14 route options consisting of the following:

1. Track
2. Stops
3. Structures
4. Retaining Walls
5. Roundabouts
6. Traffic Signalling
7. Traction Power
8. Power and Systems
9. Hardscaping
10. Full Depth Carriageway Reconstruction
11. Properties

The following elements are not included:

1. New depot or modifications to the existing depots along the Luas Green Line
2. Any retrofitting works along the Luas Green Line (apart from Broombridge stop)
3. New rolling stock if necessary

The routes have been quantified in terms of the WBS and uniform rates applied (e.g. cost per linear metre of track). This methodology seeks to ensure that each of the options are assessed in terms of a common standard. The uniform rates have been built up using cost data taken from various sources such as Luas Cross City, Luas Line B1 and MetroLink. These synthesised or composite rates have been applied consistently to the quantities included in the WBS for each of the 14 options.
This cost analysis approach is employed to compare one option against another using a common standard.

Assessment results

The following Table shows the results of the options assessment from Cost viewpoint.

Reasons for the scoring are given in the detailed MCA1 table, contained within Annex 1 of this report.

Table 8 Options assessment results for the Cost Criterion

				Options 1		Options 2						Options 3					
	Criteria		Parameter	1E	1H	2A	2B	2C	2E	2F	2G	3A	3F	3J	3K	3L	3M
1	Economy	1.1	Cost														

Options 1H, 2B and 2E scores very low, with the best options from costing viewpoint being 2A and 3A.

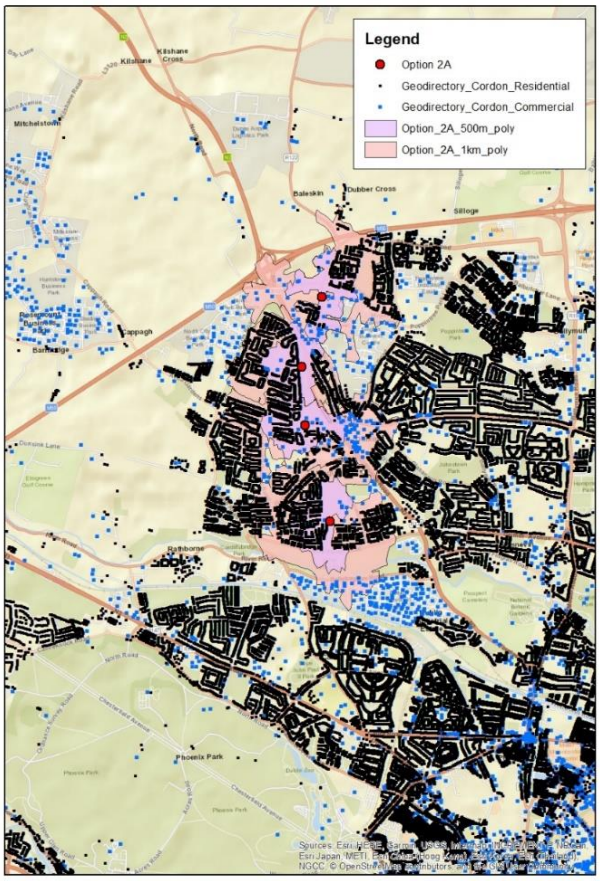
11.3.1.2 *Criteria 2 Catchment*

Methodology

The effectiveness of any option is determined in large part by the extent to which it can attract passengers and thus deliver benefits to users. Indicators of potential demand per kilometre of additional public transport route provided, has been used to assess the relative economic efficiency of the options. Potential demand has been estimated via accessibility analysis overlaid with population and employment numbers derived from Census 2016 datasets, for 500m and 1,000m walking distances.

This was assessed by considering the stops associated with each network option and the accessible walking catchment areas (500m and 1,000m distances) from same, within ArcGIS Network Analyst. The total catchment population per route kilometre (including actual population and employment numbers) served by each option was thus calculated, giving an overall indicator. The Figure below provides a sample of the GIS catchment analysis outputs for one of the route options.

Figure 80 Sample of GIS catchment analysis output



The various Luas Finglas options have been measured against each other in relative terms. The colour coding system adopted for this criteria is based on the catchment for a 1,000m walking distance and the following table gives details of the scoring system.

Table 9 Scoring system for the Catchment Criterion

Scoring	Indicative range of Pop. Or Employment per km	Description
	less than 5,000	Significant disadvantages over other options
	5,000 to 7,000	Some disadvantages over other options
		Comparable to other options
	7,000 to 10,000	Some advantages over other options
	more than 10,000	Significant advantages over other options

Assessment results

The following Table shows the results of the overall qualitative assessment of the options from Catchment viewpoint.

Reasons for the scoring are given in the detailed MCA1 table, contained within Annex 1 of this report.

Table 10 Options assessment results for the Catchment Criterion

				Options 1		Options 2						Options 3					
	Criteria		Parameter	1E	1H	2A	2B	2C	2E	2F	2G	3A	3F	3J	3K	3L	3M
1	Economy	1.2	Catchment														

In general, the majority of the options serve a population of between 7,000 and 10,000, with Options 2G, 3L and 3M showing some disadvantages against the other options with a range of between 5,000 and 7,000.

11.3.1.3 *Criteria 3 Journey time*

Methodology

Journey time for each of the 14 options is estimated based on a simplified simulation model, which is deemed sufficient for this initial stage of the analysis.

The model has been calibrated on Luas Cross City against its operational runtime, and on three options for which the runtime has been calculated with a more precise model working at 10m intervals.

The model takes into consideration the following parameters, specific for each option:

- total length of the line,
- length of the segregated off-road track,
- length of the segregated on-street track,
- length of the shared track with low to medium traffic,
- length of congested shared track sections,
- number of curves below 35m in segregated sections,
- number of curves below 60m in segregated sections,
- number stops,
- number of minor junctions,
- number of major junctions.

Dwell times of 30seconds at all stops and stop-and-go at all junctions are considered, with minor junctions having been assigned 5 seconds and major junctions 20 seconds average time loss.

Sensitivity analysis will also be carried out on key parameters, as for example time loss at minor and major junctions, to ensure that key assumption values would not affect the relative ranking of the 14 options.

Commercial speed is also assessed for each option, and compared against reference values recorded on the existing Luas network, as per the following table.

Table 11 Commercial speeds on the existing Luas Network

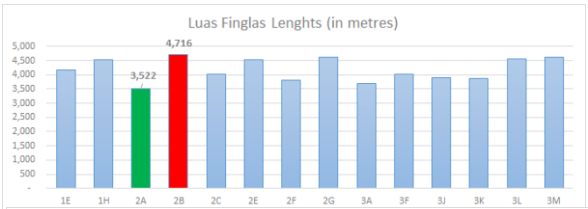
Luas line	*Section*	*Commercial Speed (kph)*
Green Line	SSG to Sandyford	24.0
Green Line	Broombridge to SSG	14.4
Green Line	Dominick to SSG	10.0
Green Line	Sandyford to Brides Glen	26.0
Red Line	Tallaght to Heuston	25.0
Red Line	Heuston to Busaras	12.7
Red Line	Busaras to The Point	15.0
Red Line	Saggart to Belgard	25.0

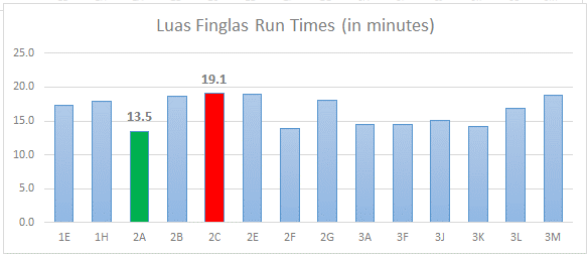
Journey time assessment

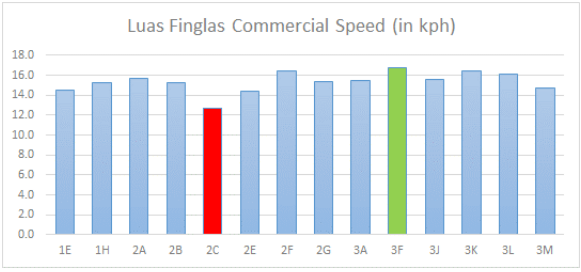
The following table shows the estimated runtimes and commercial speeds of each option and the graphs below contain a summary of the key operational parameters, with worst and best option indicated in green and red (not to be confused with the MCA1 colour coding).

Table 12 Journey times and commercial speeds of the 14 options

Options	Length	Stops	Run Time	Commercial speed
(name)	*(m)*	*(n)*	*(min)*	*(kph)*
1E	4,176	5	17.2	14.5
1H	4,532	5	17.9	15.2
2A	3,522	4	13.5	15.7
2B	4,716	4	18.6	15.2
2C	4,022	4	19.1	12.6
2E	4,521	4	18.9	14.3
2F	3,798	4	13.9	16.4
2G	4,611	4	18.0	15.3
3A	3,702	4	14.4	15.4
3F	4,028	4	14.4	16.7
3J	3,910	4	15.1	15.5
3K	3,879	4	14.1	16.5
3L	4,547	4	16.9	16.1
3M	4,614	4	18.8	14.8







The fastest option is the 2A (13.5 minutes) which is also the shortest route (3.52km), with options 2F, 3F, 3K and 3A all running below 15 minutes. The slowest option is 2C (19.1 minutes), with options 2B, 2E, 2G, 3M all running above 18 minutes.

In terms of commercial speed the highest is 16.7kph (Options 3F) and the lowest is 12.6kph (Option 2C). Highest commercial speeds (in the 15 to 16.7 range) are fully in line with the urban sections of the existing Luas network with the commercial speed of the fastest option 2A (15.7kph) being significantly higher than Broombridge to SSG (definitively higher than the Dominick to SSG section of Luas Cross City), Busaras to The Point and Heuston to Busaras.

Options assessment

Based on the results of the journey time calculations, options have been scored against each other. The following runtime bands have been defined, scoring dark green below 15 minutes and red over 20 minutes.

Table 13 Targets and scoring system for the Journey Time Criterion

Runtime scoring			
Colour		from (min)	to (min)
	significant advantages over other options	13.5	14.9
	some advantages over other options	14.9	16.3
	comparable to other options		
	some disadvantages over other options	16.3	17.7
	significant disadvantages over other options	17.7	19.1

				Options 1		Options 2						Options 3					
	Criteria		Parameter	1E	1H	2A	2B	2C	2E	2F	2G	3A	3F	3J	3K	3L	3M
1	Economy	1.3	Journey time														

It emerges that majority of Options 1s and 2s score lower than Options 3s in terms of runtime, with the exceptions of 2A and 2F.

11.3.2 Integration

11.3.2.1 - *Criteria 1 Compatibility with Development Plans (Land Use)*

Methodology

Distribution of land use plays an important part in determining travel demand and the vitality of a public transport system. Conversely, a well-planned public transport system can support and enhance land use objectives. The integration of each option with the land use objectives as set out in the following documents was assessed, with particular reference to related zonings and to transport policies contained within the documents:

- Dublin City Development Plan 2016 -2022

A key development plan objective is maximising the efficient use of land and integrating land use and transport within the context of an overarching philosophy of sustainability and quality of life.

The Dublin City Development Plan transport strategy aligns with national policy, as set out in the NTA's *Transport Strategy for the Greater Dublin Area 2016 – 2035* and affirmed in the *Regional Planning Guidelines 2010 – 2022*. The Core Strategy Map for the study area shows a planned transport corridor between Broombridge and Finglas. It also designates Finglas Village as a Key District Centre (KDC), which is defined as 'the *top tier of urban centres outside the city centre, these will be string spatial hubs, providing a comprehensive range of commercial and community services'*

The Dublin City Development Plan zoning designations specific to the study area comprise of:

- *Z1 – to protect and improve residential amenity*
- *Z3 – to provide for and improve neighbourhood facilities*
- *Z4 – to provide for and improve mxed-serivces facilities*
- *Z6 – To provide for the creation and protection of enterprise and facilitate opportunities for employment creation.*
- *Z9 – to preserve, provide and improve recreational amenity and open space and green networks*
- *Z15 – to protect and provide for institutional and community uses.*

- Local Area Plans

A Local Environmental Improvement Plan (LEIP) for Finglas will be prepared within the lifetime of the Dublin City Development Plan 2016 – 2022

Light rail not only links areas of local and strategic importance, it has the capacity to regenerate an area through traffic displacement, improved permeability and local connections, the deployment of urban realm improvements and the cultivation of green infrastructure along the route. Luas Finglas represents an opportunity to tackle problems of traffic congestion, support land use objectives and growth, revitalise the north west of the city and make a positive contribution to the lives of residents.

In assessing the route options, consideration was given to the Key District Centre designation of Finglas Village and the ways in which a route option might support it. Consideration was also given to neighbourhood centres, which are defined in the Development Plan as supporting '*other higher level centres in the hierarchy, within reasonable walking distance. These small centres are extremely important for local communities for providing day to day needs and are considered appropriate localities for a range of community services'.* Two significant neighbourhood centres currently exist within the study area – Clearwater, which is largely a car-based model of shopping centre and Cappagh, in Finglas West, which comprises a neighbourhood shopping area, church, various educational institutions and sports facilities, grouped closely together.

The consolidation and possible densification of the area is also a consideration, in accordance with objective SC13 of the Development Plan 2016 – 2022: Shape and Structure of the City:

'*It is the policy of Dublin City to promote sustainable densities, particularly in public transport corridors, which will enhance the urban form and spatial structure of the city*'

Existing areas of higher density residential development include Pelletstown to the south west of the study area (currently served by Ashbourne railway station), Prospect Hill, to the south east and Charlestown to the north. The remaining residential settlement within the study area consists of low density suburban housing. It is reasonable to anticipate that both Jamestown Business Park and Broombridge Industrial Estate will in time contain an element of residential and mixed-use services (Z4 and Z6), notwithstanding their ongoing and important function (Z6) *to provide for the creation and protection of enterprise and facilitate opportunities for employment creation.*

Zone Z9 *to preserve, provide and improve recreational amenity and open space and green networks* is relevant to the assessment in that some of the route options entail encroachment into parks, green verges and residential backlands.

In general, an assessment was made on the ability of the receiving environment to continue to function as intended, the impact on future Green Links and the capacity for mitigation or enhancement. In some cases, due to the poor quality of the existing streetscape, opportunities arise for route related improvements, in line with wider Development Plan objectives for greening the city (Objectives G101 and G102 of the Dublin City Development Plan 2016 - 2022)

Also of relevance is Zone Z15 *to protect and provide for institutional and community uses.* The study area contains a diverse range of facilities with schools, community centres and sports pitches dispersed throughout.

The promotion of high quality non-car-based access opportunities for people attending school, college and sporting events formed a part of the assessment with route options evaluated on their propensity to either support or impede these objectives.

With regard to the potential impact on boundaries and access and the continuance or promotion of land use, those areas most susceptible to change include Jamestown Road and McKee Avenue, which are both characterised by established, low-density houses with front gardens situated opposite or adjacent to areas of light industry. The proposed treatment in both cases entails a realignment of the boundary to Jamestown Business Centre and a widening of the roadway.

Assessment sub-criteria considered

A qualitative assessment of all of the proposed route options was taken based on the following criteria:

1. Compatibility with relevant land use policy
2. Capacity for enhancement of the land use objectives
3. Future development within the area and ability to support population and employment growth
4. Resilience and capacity of receiving environment to adapt to a transport corridor
5. Positive and negative effect on intended land-uses vis a vis boundaries, green infrastructure, local character, public realm, connectivity and community.

Each option has been assessed against these sub-criteria and ranked against the other options on how well it delivers on those.

Scoring and colour coding follows the scoring system set up in section 11.2.

Assessment results

The following Table shows the results of the overall qualitative assessment of the options from Compatibility with Development Plans viewpoint.

Reasons for the scoring are given in the detailed MCA1 table, contained within Annex 1 of this report.

Table 14 Options assessment results for the Compatibility with Development Plans (Land Use) criterion

				Options 1		Options 2						Options 3					
	Criteria		Parameter	1E	1H	2A	2B	2C	2E	2F	2G	3A	3F	3J	3K	3L	3M
2	Integration	2.1	Compatibility with Development Plans (Land Use)														

The route options which scored highest in the assessment –2B/2C/2G - are those which best support the land use objectives set out in the Dublin City Development Plan 2016 – 2022 and in other associated policy documents. The capacity for the route to act as a catalyst for consolidation, regeneration and growth was considered, as was the linking of community, employment and retail/mixed uses in accordance with zoning objectives. The ability of the receiving environment to adapt and thrive as an outcome of the route was a key factor in the assessment. Route options which were dissociated and remote from the core land use centres or which were most vulnerable to change scored lowest.

11.3.2.2 *Criteria 2 Integration with GDA Transport Policies and Networks*

This criterion addresses integration of the proposed infrastructure with existing transport infrastructure and services, by:

- looking at missing links in the existing network;
- improving opportunities for interchange between modes.

This criterion will also ensure that options developed will also integrate with plans for the future transport network; particularly in terms of the BusConnects programme (Draft services and corridors) and the additional proposals (for all modes) as outlined within the Transport Strategy for the Greater Dublin Area 2016 – 2035.

The principal considerations reviewed within Criteria 2.2 are as follows:

- Option provides appropriate coverage of the region;
- Increases opportunities to transfer between modes and services,
  - opportunity for bus interchange (particularly with Bus Connects);
  - opportunity for rail interchange;
- Integration with the existing Light Rail network;
- Integration with the existing and future cycle network, in particular the GDA Cycle Network Plan;
- Integration with the existing walking network;
- Ease with which the option can facilitate and serve a Park and Ride site;
- Potential for duplicating catchments.

Following initial examination of the options, it was found that almost all of the options scored almost equally well in some of the consideration criteria outlined above, including:

- Provide appropriate corverage of the region;
- Opportunity for rail interchange;
- Integration with the existing Light Rail network; and
- Ease with which the option can facilitate and serve Park and Ride site.

The following table outlines how each of the principal integration considerations were examined.

Table 15 Sub Criteria for Integration Criterion

Sub-Criteria	
Provide appropriate coverage of the region.	Proportion of the study area catered for by each option. Generally all options scored well in this regard. Occasionally some options score 'good' as opposed to 'very good' as the coverage can occasionally drift slightly eastward and marginally outside the study area, which could overlap with the MetroLink catchments
Opportunity for bus interchange (particularly with Bus Connects).	BusConnects services are planned along Cardiffsbridge Road and North Road. Any option that intersects with these future services, potentially allowing for the creation of an interchange location, is marked high.

Opportunity for rail interchange.	All options have an interchange at Broombridge, some may have slight additional opportunities, with a potential future stop at Pelletstown. Therefore, there is little differentiation between the options in this regard.
Integration with the existing Light Rail network	All options tie into the Light Rail network at the same location, Broombridge. Therefore there is no differentiation between options in this regard.
Integration with the existing and future cycle network, in particular the GDA Cycle Network Plan.	The GDA Cycle Network Plan outlines a number of Primary and Secondary routes within the study area. Such routes have an impact in terms of the cross section necessary to accommodate the corresponding cyclist facilities and alongside potential Light Rail services and general traffic. Of particular concern are the Secondary Route requirements along: St. Margaret's Road, McKee Avenue, Jamestown Road and Melville Road. Furthermore, the presence of cycling facilities and encouragement of cycling has the potential to increase the catchment of some options. As such, each option has been examined in terms of potential for interchange between route options and the GDA Cycle Network Plan, alongside existing facilities.
Integration with the existing walking network.	Generally the location of stops in relation to the existing walking network was considered within this criteria. Stops generally sited on established, safe and secure footways, are marked well. Stops which are considered a little remote are marked down e.g. the stop at Pelletstown is considered a slight disadvantage due to its location inside the fences and gates of the Tolka Valley Park, similarly the stop at the park in St. Helena's. Stops located in close proximity to busy and complex junctions are also marked down as they may be hostile for pedestrians, for instance some stop locations near junctions on North Road. Also, limited existing pedestrian facilites exist between North Road Roundabout and Church St / Wellmount Road, is also a consideration.
Ease with which the option can facilitate and serve a Park and Ride site	Generally all options scored well in this regard, with a slight differentiation between options with a terminus stop on St Margarets Road (which is a little more remote from the potential P&R sites identified and also more remote from Charlestown S.C) as opposed to a stop located at Charlestown Place.
Potential for duplicating catchments.	The BusConnects programme includes for services along Cardiffsbridge Road and North Road. Some route options travel along the same corridor as the Draft Bus Connect services, and could in the future duplicate catchments.

The following Table shows the results of the overall assessment of the options from Integration with GDA Transport Policies and Networks viewpoint.

The narratives for the scoring are presented in the detailed MCA1 table, contained within Annex 1 of this report.

Table 16 Options assessment results for the Integration with GDA Transport Policies and Networks

				Options 1		Options 2						Options 3					
	Criteria		**Parameter**	**1E**	**1H**	**2A**	**2B**	**2C**	**2E**	**2F**	**2G**	**3A**	**3F**	**3J**	**3K**	**3L**	**3M**
2	Integration	2.2	Integration with GDA Transport Policies and Networks														

11.3.3 3. Environment

11.3.3.1 *Criteria 1 Material and Cultural Assets*

Introduction

The receiving Cultural Heritage baseline environment is defined by archaeological, architectural and cultural heritage sites within the study area which are afforded legal protection through their inclusion within the Record of Monuments and Places (RMPs) in accordance with the National Monuments Act 1930-2014; or through their inclusion within the Record of Protected Structures (RPS) in accordance with the Planning and Development Act 2000-2018. In the case of Protected Structures, it should be clarified that the legislative protection afforded such constraints includes the curtilage of the site. Thus legal protection is extended not just to the site itself but to any associated outbuildings, lands (including garden features) and boundary elements. It is important to note that an RMP may also be designated as an RPS within the relevant county development plan.

The Zone of Notification of an RMP has also been considered due to a legal requirement to formally notify the National Monument Section of the Department of Culture, Heritage and the Gaeltacht (DCHG) of proposed works within this zone. Such zones have the potential to expose archaeological remains relating to the subject RMP.

Architectural Conservation Areas (ACAs), Conservation Areas (CAs), proposed CAs (pACAs), Candidate CAs (cCAs) as identified in the Development Plans for Dublin City Council (DCC; 2016-2022) and Fingal County Council (FCC; 2017-2022) have also been taken into consideration.

Sites of architectural heritage merit as listed on the National Inventory of Architectural Heritage (NIAH), Historic Gardens and Designed Landscapes, and local authority burial grounds (where afforded legal protection as a component of a Recorded Monument and/or Protected Structure) have been considered. Sites of architectural heritage merit, sites of archaeological potential, industrial heritage sites and cultural heritage sites which are not included in the RMP or RPS will be assessed in the subsequent environmental evaluation of route options.

For the purpose of this assessment only direct impacts on cultural heritage sites have been considered. Direct impacts on RMPs, RPSs and ACAs are viewed as having a very high significance value. In order to avoid duplication an impact on an RMPs Zone of Notification is only considered where the RMP itself is not directly impacted. Impacts on a Zone of Notification are viewed as having a high significance value due to their archaeological potential. Impacts on CAs, are also viewed as having a high significance value.

The impact of each route option is assessed as being façade to façade, i.e. that the scheme will impact the complete footprint of the carriageway.

Direct impacts on archaeological, architectural and cultural heritage constraints will generally occur during the construction phase of a scheme and will potentially be a result of the following activities:

- Ground disturbance works associated with the construction of track, structures, utility and road diversions and the creation of stops; and
- Ground disturbance impacts associated with the requirements for additional land to accommodate the widening of roads/streets at particular pinch points along routes or to accommodate the provision of turn-back facilities, construction compounds, Park & Ride facilities, and depot/ terminus facilities.

Indirect visual and vibration impacts on archaeological, architectural and cultural heritage constraints with upstanding elements could potentially arise during the construction and/or operational phase of the scheme.

However, such impacts will not be assessed for the purpose of the Stage1 MCA report and will be assessed in the subsequent environmental evaluation of route options.

Cultural heritage in the Study Area

Thirty-nine RMPs (and their respective Zones of Notification), 25 RPSs (of which six are also RMPs), and 6 CAs were identified within the study area as illustrated in Annex 4. Each Recorded Monument has an individual reference number (RMP DUXXX-XXXXXX). Each Protected Structure has an individual reference number (RPS XXXXXX) followed by an abbreviation of the relevant County Council area e.g. RPS XXXXXX DCC. This number will be accompanied by the relevant RMP or NIAH registration number, where the Protected Structures is also listed on the respective register e.g. RPS XXXXXX DCC; NIAH XXXXXX.

A number of significant cultural heritage constraints are located within the study area for the proposed project as defined by the Project Appraisal Plan. The RMPs, RPSs and CAs are predominantly located within the medieval town of Finglas (RMP DU014-066000-) and along the route of the River Tolka and Royal Canal. The former extends from Wellmount Road in the south to Mellowes Road in the north, and from Finglaswood Road in the west to Main Street in the east. The settlement of Finglas was founded in the 6th century through the establishment of a medieval ecclesiastical enclosure dedicated to St Canice. The enclosure survives on an elevated site, which has been substantially truncated to west and south through the construction of the R135 and Wellmount Road respectively. The site is also over-sailed by a substantial pedestrian bridge on Church Street. These features provide the impression of a small contained church and graveyard physically separated from the heart of the medieval village by the R135. In contrast the archaeological record, coupled with the topography and curvature of the street pattern indicate it is likely that the original ecclesiastical enclosure was quite substantial and extended eastwards beyond present day Main Street and westwards to Patrickswell Place. Today the remains of the settlement are enclosed by a high stone wall and incorporate the remains of a medieval parish church (RMP DU014-066009-) located in the north of a large graveyard (RMP DU014-066017-). The church contains a number of burial vaults and incorporates two 17th century graveslabs (RMPs DU014-066015- and DU014-066016-) dedicated to the Treswell and Ryves families. The entrance to the graveyard is marked by a ringed granite High Cross (RMP DU014-066010-). The high cross originally stood north of the village on Watery Lane (now occupied by the R135), a fact which further supports the once substantial nature of this ecclesiastical enclosure. The surviving remains of this complex is a designated CA (CA08) and Protected Structure (RPS 1552 DCC).

In the twelfth century the manor of Archbishop Comyn was established to the east of the early medieval ecclesiastical enclosure on the intersection of Church Road and Cappagh Road. IN 1228 the site was occupied by the episcopal residence of Archbishop Luke, which subsequently became known as the 'Court' in the fourteenth century. The residence was substantial and is known to have incorporated a kitchen, a brewhouse and furnaces. No evidence of this late medieval manor have been found to date, however archaeological excavations have identified masonry remains relating to a 16th-17th century house variously called Springmount and Fortwilliam (RMP DU014-066005-) which subsequently occupied the manor site.

The construction of the towns fortified defences known as 'King William's Ramparts' (RMPs DU014-066002 – DU014-066017-; RPSs 8733 and 8734 DCC) is believed to have occurred c.1690, though it may have taken place c.1640 by Duke of Ormonde. Alternatively they could represent significantly earlier works, relating to the enclosing/defending of the episcopal lands. Vestiges of the ramparts northern extents survive, forming property boundaries to the south of Mellowes Road and the northern boundary of Patrickswell Court. The route of the ramparts, which are constructed of vaulted stone arches with supporting buttresses, are dissected by both Cappagh Road and Patrickswell Place. Subsurface remains of King Williams Ramparts may survive below current ground level along the course of its original route.

A number of towerhouses and later estate/demesne houses within the environs of Finglas are reflective of its former prosperity. 'Cardiff Castle' (RMP DU014-066003-) once stood on the junction of Cardiff Castle Road and Cappagh Road, with its location marked on the 1st edition Ordnane Survey maps. It has been postulated that 'The Elms' (RPS 1553 DCC), on Church Street could represent the remains of a modified towerhouse. However heavy cement render obscures its original fabric and there is insufficient cartographic information available at present to confirm this theory.

Of the numerous demesnes which once surrounded Finglas, the surviving notable example is Rose Hill House (RMP DU014-079----; RPS 4850 DCC; CA07). The house was built in the early eighteenth century in the Palladian style and is notable for its octagonal reception hall. The house and grounds are a protected structure and CA. The curtilage of the site on Finglas Road is partially defined by a high stone wall.

A less obvious reminder of the former Finglas demesne is the neighbouring Woodland Lodge (Towson's Cottage; RPS 4849). This red brick cottage stands on a linear traffic island between Finglas Road and the R135. It once functioned as a gate lodge to the former Farnham House, constructed c.1760. Two stone cottages (RPS 8729-8730 DCC) on Barrack Lane, at the entrance to the St Canice's medieval graveyard, in addition to the St Canice's Church of Ireland (RPS 1554 DCC) and St Canice's Roman Catholic Church (RPS 4851 DCC) are also Protected Structures.

Throughout prehistoric and historic times, rivers have been a focus of settlement due to the abundance of fresh water and food they can provide, the rich nature of the surrounding agricultural soils, their strategic boundary function in defending settlements and for their potential in driving industry. Therefore archaeological sites are commonly identified along the routes of rivers. Along the River Tolka a late medieval towerhouse (RMP DU014-076001-) once stood on the rivers northern banks, in lands subsequently occupied by Finglaswood House. Though the site has been subject to recent landscaping works, sub-surface remains of both the castle and later house, may be preserved beneath the current ground level. Four additional RMPs are located along the river and comprise an Iron Age burial ground (RMP DU014-095----), a possible medieval bridge (RMP DU014-075----; RPS 895 DCC); a 17th17th century bridge (RMP DU018-002----) and mill (RMP DU018-001----). Finglas Wood Bridge facilitating crossing of the River Tolka, within Tolka Valley Park is also a Protected Structure (RPS 906 DCC). This is a twin arch pedestrian bridge with an upstream cutwater on the central pier; it may incorporate medieval fabric suggesting it marks the site of a historically significant crossing point on the River Tolka (O'Keeffe et al. 2016, 352). To the east of the park lies Tolka Lodge (RPS 475 DCC) while the park itself incorporates two designated CAs (CA 36 and CA37).

In the south of the study area lies the Royal Canal CA (CA38). The canal, its associated walls, tow paths and lock gates are of cultural and industrial heritage significance; it is crossed by two bridges which are protected structures namely Broombridge Bridge (RPS 909 DCC; NIAH 50060126)) and H.S. Reilly Bridge (RPS 913 DCC; NIAH 50060125).

Evidence of prehistoric, early and late medieval settlement can be found throughout the study area and is not just confined to historic centres, For example within the environs of the M50 a number of enclosures (possible ringforts) have been identified in Balseskin (RMP DU014-102----), Merryfalls (RMP DU014-106----), Silloge (RMP DU014-110----) and Ballcurris (DU014-061001-), with evidence of early medieval settlement identified through archaeological excavations in Poppintree (RMP DU014-115---). In Meakestown the site of an 'extensive brick manor' recorded by the Civil Survey in 1654 (RMP DU014-020001-), to the west of which lies the site of Meakstown Castle (RMP DU014-020002-). Similar 17th century houses were also recorded for Jamestown Great (RMP DU014-064----), Ballygall (DU014-068----), Johnstown (DU014-070----). An example of an 18th century Georgian House can be found on Glasnevin Hill (RPS 3231 DCC)

The study area also boarders Prospect Cemetery at Glasnevin (RPS 2749 DCC) a significant cultural heritage constraint dominated by its iconic round tower housing the burial crypt of Daniel O'Connell, and surrounded

by the graves of other notable political and religious leaders such as those of Charles Stewart Parnell, Sir Charles Gavan Duffy and Oliver Plunkett.

Methodology

The route options are scored comparatively on a five point scale. Route Options which have the least impact on Cultural Heritage (having regard to the RMPs, RPSs, Zones of Archaeological Notification, ACAs and CAs) will be afforded the lowest point on the scale. Conversely those Route Options which have the most significant impact on Cultural Heritage are afforded the highest point on the scale. All other Route Options are assigned increasing points on the scale based on the comparative number and nature of direct impacts identified. For assessment/scoring purposes a degree of professional judgement is used taking into consideration the impacted sites significance value.

Assessment

All fourteen proposed Route Options will have a direct negative impact on three architectural and cultural heritage constraints – the wing wall of Broombridge Bridge (RPS 909 DCC) and the CAs for the Royal Canal (CA38) and River Tolka (CA37). Twelve Route Options will also impact on Finglas Wood Bridge, (RPS 906 DCC), a twin arch pedestrian bridge within Tolka Valley Park, which may incorporate medieval fabric. However the magnitude of the impact on this constraint ranges from a direct negative impact on the south-west parapet wall, leaving the main body of the bridge intact, to the complete removal of the bridge. [4]

As the route corridor progresses northwards twelve of the route options, impact adversely on the historic town of Finglas (RMP DU014-066000-) wherein proposed construction works pose the potential of directly impacting on any surviving associated sub-surface archaeological stratigraphy.

Route options which progress along Patrickswell Place/Cardiffs Castle Road, will directly impact the zones of notification for King Williams Ramparts (RMPs DU014-066002 – DU014-066017-; RPSs 8733 and 8734 DCC), Cardiffs Castle (RMP DU014-066003-) and the 12th century episcopal manner/16th – 17th century house (RMP DU014-066005-). As these are developed lands the impact merely reflects a potential to impact on previously unrecorded sub-surface archaeological stratigraphy associated with these RMPs. The significance of this impact will increase should works progress beyond the current carriageway where in situ remains survive, in particular those relating to King William's Ramparts.

The most significant constraint within Finglas is the medieval church and graveyard (RMPs DU014-066009-/DU017-066017-), which stands on the early ecclesiastical enclosure of St Canice. It is currently anticipated that the associated Zone of Notification will be impacted by seven Route Options, and that the enclosed elements of the church and graveyard will be preserved in situ. As indicated above Zones of Notification have the potential to contain previously unrecorded archaeological stratigraphy associated with the constraint. With regard to this constraint, due to extensive ground reduction works which have already taken place to the east and south of the constraint, the proposed Route Options which impact the Zone of Notification on either Wellmount Road and/or the R135 are interpreted as having the least potential for an archaeological impact.

[4] It has been considered at this stage that the design of the route options which traverse the Finglas Wood Bridge (RPS 906 DCC) will be adjusted as part of the next Stage 2 process where more detailed analysis of the track alignment will be possible. This may determine that the Route Options at this locations could be realigned parallel to the Protected Structure (either to the east or west) thus preserving the bridge in situ and avoiding a direct negative impact.

However, proposed Route Options which progress along Church Street, will not only have a significant negative visual impact on the upstanding church and graveyard but will also pose the potential of exposing significant sub-surface archaeological deposits associated with this constraint. This may take the form of ditches, structures or human burials. Route Option 2E, which progress along Church Street, will also have a direct profound impact on the boundary walls and façade of 'The Elms' which is Protected Structure (RPS 1553 DCC).

Route Option 3L will have a significant direct impact on the curtilage of Rosehill House, which is an RMP (RMP DU014-079---), an RPS (RPS 4850 DCC) and a CA (CA07).

Results of the assessment

The following Table shows the results of the overall assessment of the options from Material and Cultural Assets impact viewpoint.

Table 17 Options assessment results for the Material and cultural assets criterion

				Options 1		Options 2						Options 3					
	Criteria		Parameter	1E	1H	2A	2B	2C	2E	2F	2G	3A	3F	3J	3K	3L	3M
3	Environment	3.1	Material and cultural assets														

The narratives for the scoring are given in the detailed MCA1 table, contained within Annex 1 of this report.

The Archaeological Constraints maps with superimposed alignment options are contained within Annex 4.[5]

[5] *References*

Fingal County Council (2017) Fingal Development Plan 2017-2023. Dublin: Fingal County Council.
Dublin City Council (2015) Dublin City Development Plan 2016-2022. Dublin: Dublin City Council
O'Keeffe, P. and Simington, T. and Goodbody, R. (2016) Irish Sone Bridges: History and Heritage. (New Revised Edition). Kildare: Irish Academic Press

11.3.3.2 *Criteria 2 Natural Aspects*

Introduction

Environmental impact assessment (EIA) is the term applied to the systematic examination of the likely significant impacts of development proposals on the environment prior to the initiation of any activity. This process originated from the European Union's EIA Directive (85/337/EEC) which has been in force since 1985 and which has been amended three times by subsequent EU Directives. The EIA Directive was most recently amended in 2014 (2014/52/EU). Annex IV of the amended Directive requires a description of the aspects likely to be significantly affected by a project. These environmental aspects are listed below:

i. Biodiversity (for example fauna and flora)
ii. Land (for example land take)
iii. Soil (for example organic matter, erosion, compaction, sealing)
iv. Waste
v. Water (for example hydromorphological changes, quantity and quality)
vi. Air
vii. Climate (for example greenhouse gas emissions, impacts relevant to adaptation)
viii. Noise and vibration
ix. Radiation and stray current
x. Material assets (e.g. property, agronomy (if applicable))
xi. Cultural heritage, including architectural and archaeological aspects
xii. Landscape
xiii. Population and human health
xiv. Vulnerability of the project to risks of major accidents and/or disasters

Within this MCA 1 all 14 environmental aspects listed above have been considered.

Methodology

A data collection process was undertaken for environmental aspects to facilitate the identification of constraints which were then entered into a GIS Model (using ArcView 10.3). GIS was used to collate, map and analyse information. Data was obtained and captured from a range of sources as presented graphically in Annex 4. The information acquired related in the first instance to environmental criteria (e.g. sites) with statutory protection and thereafter to environmental criteria which is recognised as importance/sensitive from a local authority perspective (e.g. protected views and prospects).

For each environmental aspect, the 14 options were scored on the comparative five point scale as explained in section 11.2 "Scoring system".

Options showing significant advantages over other routes are graded "dark green", significant disadvantages than other routes graded "red", orange and light green being adopted for "some" advantages/disadvantages and yellow being used for options which deliver comparable results to all other options.

Potential adverse impacts on, for example, designated sites with statutory protection, surface water bodies, sensitive receptors and the landscape were considered when scoring the route options against the environmental objective for the project. For assessment/scoring purposes a degree of professional judgement was used taking into consideration the impacted sites significance value.

Whilst all environmental aspects have been considered for each of the 14 route options and scored across the five point scale, not all aspects are deemed to be differentiators at MCA1 stage. Only those environmental aspects which were identified as directly influencing the development of route options at this stage are considered in greater detail within this MCA1 report. Biodiversity and Noise were identified as directly influencing the development of route options at this stage and are thus considered in greater detail below, while Cultural Heritage has been assessed in the previous section 11.3.3.1.

Annex 5 considers all 14 environmental aspects.

Options Assessment

Biodiversity

Methodology

The methodology followed for the identification of ecological constraints and the impact on same is set out in the Section above.

Constraints

The main constraints associated with biodiversity relate to the presence of (i) international, national, county and local important sites and (ii) other ecological constraints.

Designated sites

Sites of international importance are designated or qualified for designation Special Areas of Conservation (SACs) or Special Protection Areas (SPAs) under the EU Habitats Directive (92/43/EEC) or Birds Directive (2009/147/EC).

There are four SACs (Baldoyle Bay SAC, Malahide Estuary SAC, North Dublin Bay SAC and South Dublin Bay SAC) and four SPAs (North Bull Island SPA, Baldoyle Bay SPA, South Dublin Bay and River Tolka Estuary SPA and Broadmeadow/Swords Estuary SPA) within 10km of the proposed route options. The nearest sites of international importance are the South Dublin Bay and River Tolka Estuary SPA which are located approximately 5km from Broombridge Luas Stop. The presence of European sites of importance is not a differentiator between the 14 route options.

Nationally importance sites include proposed Natural Heritage sites (pNHAs) or statutory Nature Reserves. The Royal Canal is a pNHA. The Rare and legally protected Opposite-leaved Pondweed (*Groenlandia densa*) (Flora Protection Order 1987) is present at one site in Dublin, between Locks 4 and 5. *Tolypella intricata* (a stonewort listed in the Red Data Book as being Vulnerable) is also in the Royal Canal in Dublin, the only site in Ireland where it is now found. All 14 options traverse the Royal Canal and thus the presence of nationally importance sites is not a differentiator between the route options.

Other ecological constraints

Parks

Parks are an ecological constraint. Both Tolka Valley Park and Mellowes Park are directly impacted by the route options.

Tolka Valley Park

Dublin City Council (DCC) describe Tolka Valley Park as "*an important regional park* with the valley being *rich in plant and animal life,* [and] *a haven for biodiversity within the city"*. Tolka Valley Park supports Reed Bunting, Common Frog, and Banded Demoiselle Damselfly.

In the early 1980's DCC constructed a pond in the Tolka Valley Park and used the existing culverted Finglaswood stream as its sole feedwater. The pond was designed to discharge directly into the Tolka River and was to be a central feature of the park. However, the Finglaswood stream drains the housing estates of Gortmore, Barnmore, Wellmount and Kippure. Following investigation into pond pollution, DCC determined that the Finglaswood stream was being polluted by misconnected domestic drains from the aforementioned housing estates. Wastewater from dishwashers, showers and washing machines, for example, together with surface water runoff from roads and houses was flowing directly to the artificial pond in the Park, before ultimately flowing into the nearby Tolka. To improve water quality discharging to the pond, DCC created a two cell Integrated Constructed Wetland (ICW) in 1999 to treat the contaminated Finglaswood stream and reduce impacts on the Tolka River whilst improving the amenity value of the ponds. The ICW is a surface flow wetland and is designed to treat all base flow and the first flush of a major event. Large flows due to storm events are diverted at a weir and bypass the wetland by flowing directly into the River Tolka. According to DCC the construction of the wetland has been a success on many fronts: trapping pollution, reducing bad odours, making the pond more pleasant, and creating a new wetland habitat for local biodiversity.

Whilst all options will directly impact Tolka Valley Park, Options 2A-2D and 2E-2G will have a direct impact on Cell No.2 of the ICW. This may result in indirect impacts on the bird population, invertebrates and plant life present in Tolka Valley Park due to loss of habitat. In addition, impacts on the ICW may result in a direct impact on the Tolka River due to increased pollutant loadings. The other eight options will not directly impact the ICW.

DCC Strategic Green Network

Within the Development Plan 2016-2022, DCC commit to actively promoting a green infrastructure strategy. The Development Plan describes green infrastructure as an interconnected network of green space that conserves natural ecosystem values and functions and also provides associated benefits to the human population. It is a strategically planned network of natural and semi-natural areas with other environmental features designed and managed to deliver a wide range of ecosystem services. It incorporates green spaces (or blue if aquatic ecosystems are concerned) and other physical features in terrestrial (including coastal) and marine areas.

All route options will have a direct impact on the Royal Canal and Tolka River DCC Strategic Green Networks. Therefore, direct impacts on the Royal Canal and Tolka River DCC Strategic Green Networks is not a differentiator between the 14 route options.

Conclusion

- Options 1E, 1H, 3A, 3F, 3J, 3K, 3L and 3M will have some advantages over other options
- Options 2A-2D, 2E-2G will have some disadvantages over other options

Noise

Methodology

The methodology followed for the identification of noise constraints and the impact of noise on same is set out in Section x.2 above.

Constraints

The main constraint associated with noise is the receiving noise environment and the associated number of sensitive receptors within the zone of influence.

Receiving noise environment:

The existing noise levels within the study area have been determined from a review of Phase III strategic noise mapping undertaken by DCC in 2017. Throughout the study area noise levels range from <55dBA to >70dBA (L_{den}). Areas along and in close proximity to, for example the R135, currently experience the highest noise levels. As would be expected, noise levels from road traffic within Tolka Valley Park and Mellows Park are significantly lower with levels <55dBA (L_{den}).

Noise sensitive receptors include designated Quiet Areas, residential properties, educational establishments, health care facilities and places of worship. Quiet areas are also considered noise sensitive receptors. The Environmental Noise Regulations (S.I. No. 140 of 2006) defines a 'Quiet Area in an agglomeration' as an area, delimited by an action planning authority following consultation with the Environmental Protection Agency and approval by the Minister of Communications, Climate Action and Environment, where particular requirements on exposure to environmental noise shall apply. In 2008, as part of the first Noise Action Plan under the Environmental Noise Regulations, eight designated quiet areas within the DCC administrative area were approved by the Minister for Environment as Quiet Areas. However, there are no designated Quiet Areas within the current study area.

The number of noise sensitive receptors, excluding Quiet Areas, within 50m either side of the route options vary from approximately 260 (Option 2A) to 730 (Option 3M). Whilst this is a significant difference, one must take account of the existing noise levels at each of the proposed route options. Options 1E and 1H primarily traverse roads with predicted noise levels ranging from 55-70dBA (L_{den}). Noise impacts associated with the operation of a light rail scheme along this route option may have a slight impact on sensitive receptors.

Options 2A-2D and 2E-2G and Options 3A, 3F, 3J, 3K, 3L and 3M pass through areas with lower pre-existing noise levels i.e. between Tolka Valley Road and Wellmount Road. Therefore, noise impacts associated with these route options will have a greater impact on noise sensitive receptors and also areas used for recreation e.g. Tolka Valley Park.

Conclusion

- Options 1E and 1H will have some advantages over other options
- Options 2A-2D and 2E-2G, 3A, 3F, 3J, 3K, 3L and 3M will have some disadvantages over other options

Results of the assessment

The following Table shows the results of the overall assessment of the options from Natural Aspects impact viewpoint.

Table 18 Options assessment results for the Natural aspects criterion

				Options 1		Options 2						Options 3					
	Criteria		**Parameter**	**1E**	**1H**	**2A**	**2B**	**2C**	**2E**	**2F**	**2G**	**3A**	**3F**	**3J**	**3K**	**3L**	**3M**
3	Environment	3.2	Natural aspects														

The narratives for the scoring are given in the detailed MCA1 table, contained within Annex 1 of this report.

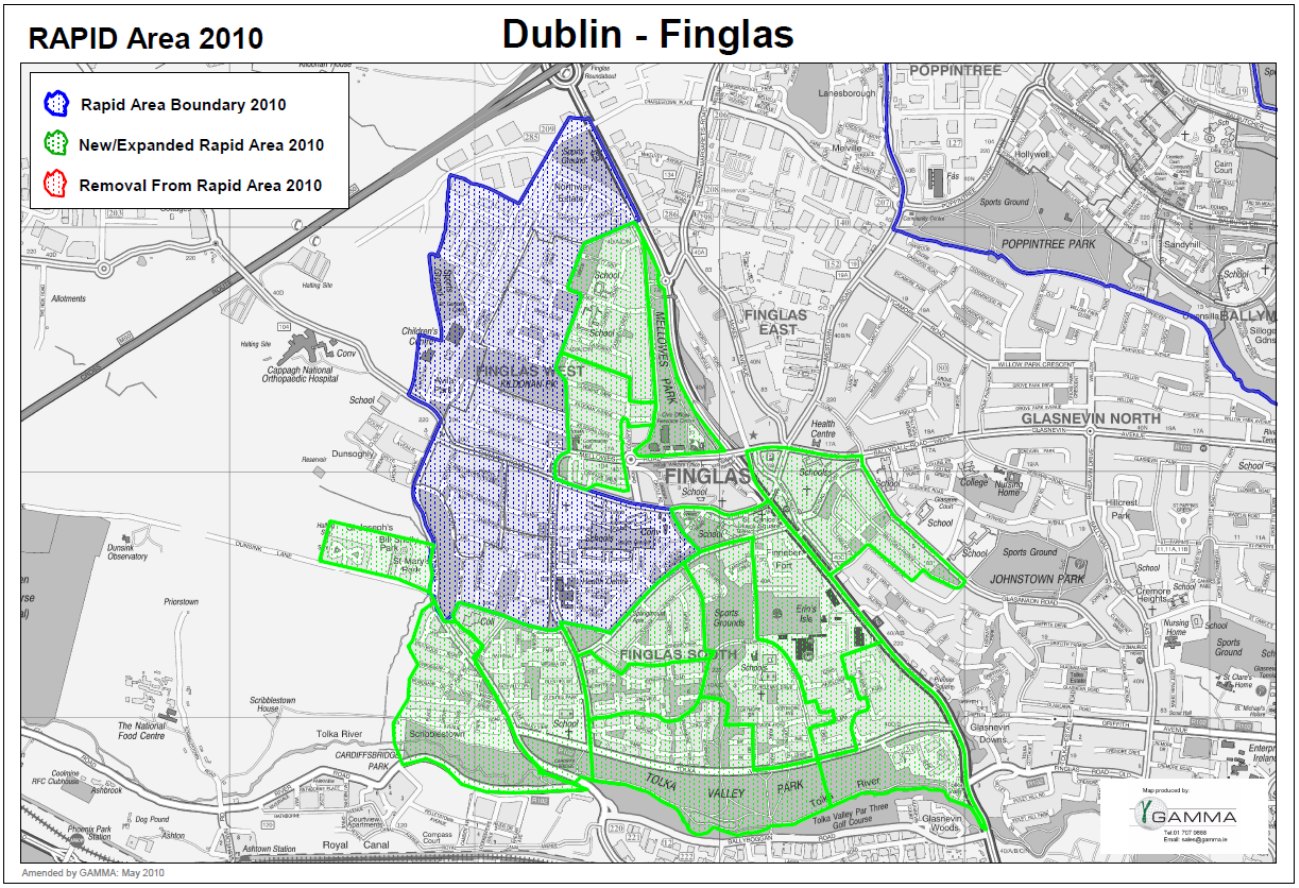
Environmental Constraints maps with superimposed alignment options are contained within Annex 4.

11.3.4 4. Accessibility and Social Inclusion

11.3.4.1 *Criteria 1 Social Inclusion*

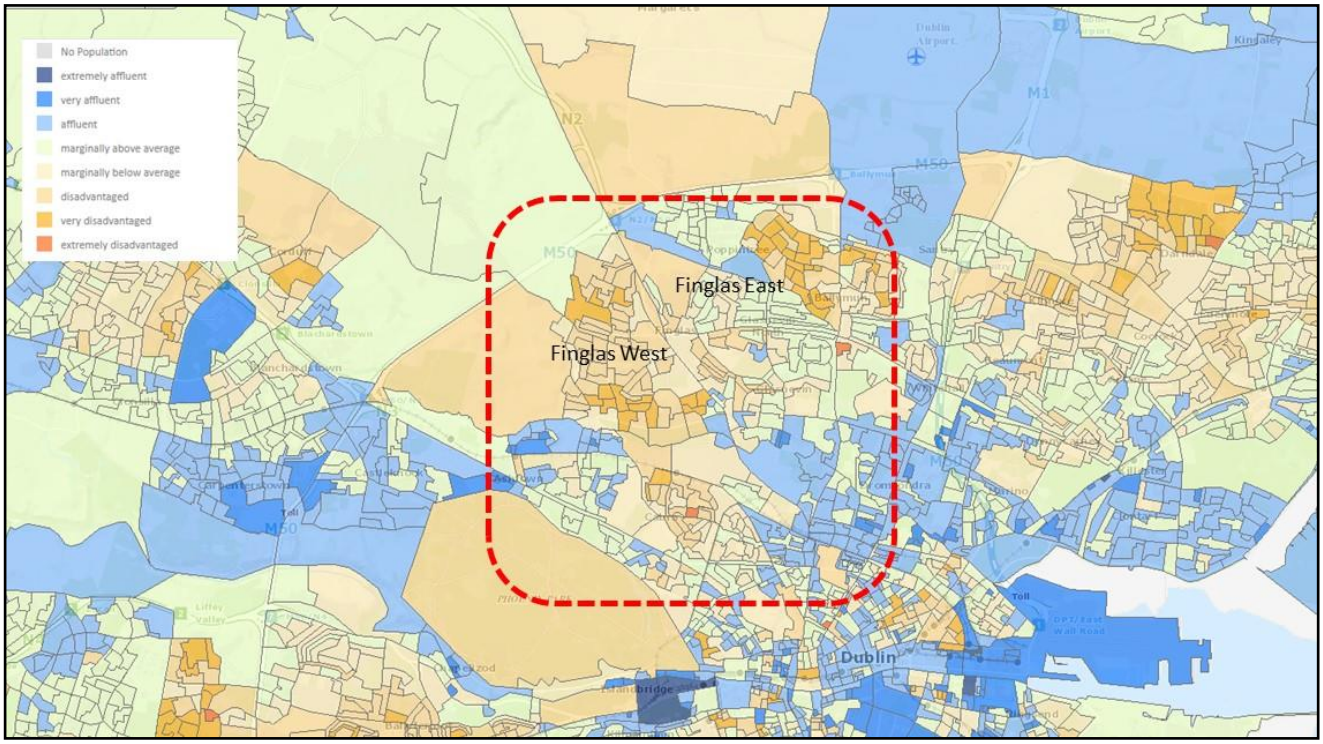
A review of the 2016 Census data with respect to the study area, indicates pockets of high population densities, however low employment opportunities outside of the Jamestown Industrial Estate and the Charlestown Shopping Centre. This indicates a situation where far fewer job opportunities are present in the region than residents; and that many residents will have to leave the study area to pursue work in other areas. These circumstances may also indicate an area where deprivation is widespread. Indeed, this is reflected in the inclusion of a large portion of the study area within the Finglas RAPID (Revitalising Areas by Planning, Investment and Development) area boundary which is being targeted for social and economic regeneration, shown below. In fact the RAPID area boundary includes most of the study area west of the R135 road corridor.

Figure 81 Finglas RAPID area boundary



Furthermore, the 2016 Pobal HP Deprivation Index indicates a number of pockets in Finglas, on both sides of the R135, which are 'disadvantaged' and 'very disadvantaged', with the Charlestown area indicated as 'affluent' or 'marginally above average', as shown overleaf.

Figure 82 Pobal Deprivation Index – Small Areas 2016



Methodology

Social inclusion:

The following datasets have been used in assessing the impact of each option in terms of social inclusion, particularly in areas of defined social deprivation:

- 2016 Pobal HP Deprivation index shapefiles;
- The accessibility catchment polygons (developed within the Criteria 1.2 analysis) for 500m and 1,000m walking distances;
- The An Post Geodirectory database of residential and commercial address points.

These datasets have resulted in a blend of qualitative and quantitative assessment in relation to this criteria.

This analysis was undertaken in ArcGIS and enabled a spatial approximation via an assessment of the overlap between the catchment polygons and the deprived areas; namely the 'Very Disadvantaged' and 'Disadvantaged' areas which are likely to be served by each of the route options. This approximation allowed a score to be developed for each of the sub-criteria.

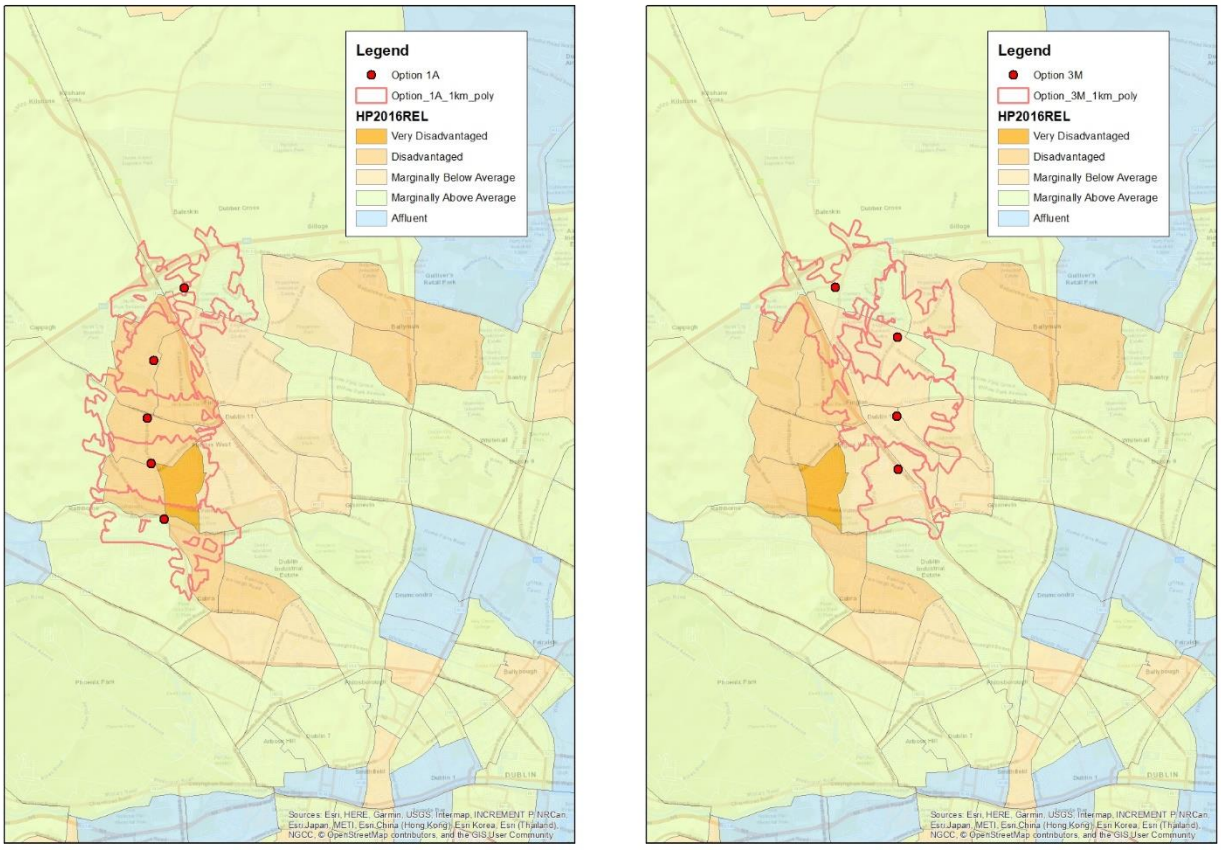
Assessment

Each option has been assessed in terms of the following sub-criteria for both the 500m and 1,000 walking distances:

- Accessibility to / from 'Very Disadvantaged' areas (as defined within the Deprivation Index);
- Accessibility to / from 'Disadvantaged' areas (as defined within the Deprivation Index);

The maps in the Figure below show 1km catchment polygons relative to the HP Deprivation Index and give an impression of good and bad perfomers in this regard.

Figure 83 Assessent for Social Inclusion (Electoral Divisions 2016)



Results

The following table shows the results of the overall assessment of the options from a Social Inclusion viewpoint.

The narratives for the scoring are given in the detailed MCA1 table, contained within Annex 1 of this report.

Table 19 Options assessment results for the Social Inclusion criterion

				Options 1		Options 2						Options 3					
	Criteria		**Parameter**	**1E**	**1H**	**2A**	**2B**	**2C**	**2E**	**2F**	**2G**	**3A**	**3F**	**3J**	**3K**	**3L**	**3M**
4	Accessibility and social inclusion	4.1	Social inclusion														

11.3.4.2 *Criteria 2 Key Trip Attractors Served*

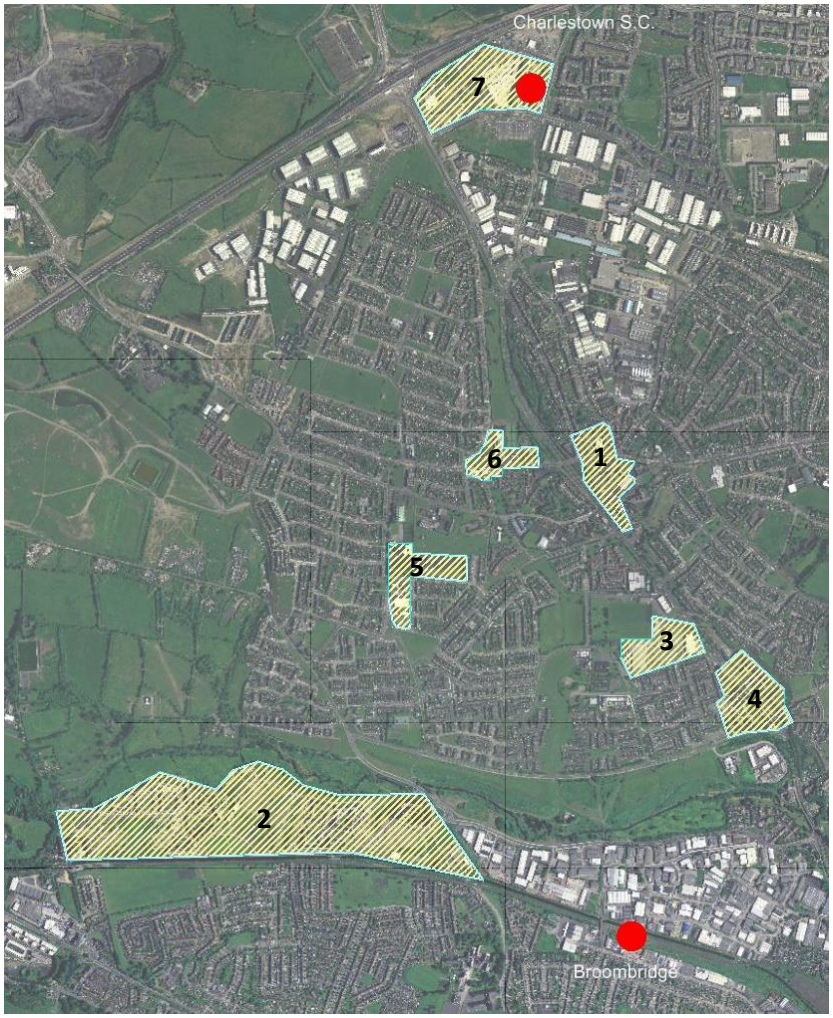
Methodology

Seven key trip attractors (KTA) have been identified within the study area.

1. Finglas Village: Located adjacent to the Finglas Road, on the eastern side of it, the Village is a lively typical local community centre, with mixed retail and service amenities and a significant footfall at all times of the day. Finglas Village is also one of Dublin City Key District Centres (K.D.C.) indicated in the Development Plan 2016-2022. This is considered one of the most important areas to be served by the new Luas.
2. Pelletstown-Royal Canal-Rathborne-Ashtown high density residential areas. Those areas are currently still undergoing a significant development which started in the early 2000, providing for a significant residential capacity at the completion of the schemes. The area is approximately 1.3 by 0.3km wide, making it one of the largest combined development residential areas in Dublin City. It is currently served by the Railway commuter service (Ashtown Station) and Luas services (Broombridge), with a new commuter station planned in between Ashtown and Broombridge.
3. Clearwater Retail Park (Tesco).
4. Prospect Hill and Premier Square. High density residential area with several up to eight storey apartment complexes along the R135 and around the R135-Tolka Valley Road junction. This area measures up to 350m in length and comprises approximately 25 apartment blocks, divided between Prospect Hill Development (approx. 470 apartments) and Premier Square Development (approx. 340 apartments) making this an important residential attractor/generator in the study area. The area has also potential for further high density development along the R135.
5. Cappagh Shopping Centre (Dunnes Store), College of further education ALAN (Coláiste Ide) and St.Brigid's Senior Girls National School. Those are clustered within a 200m range, at the Cardiffsbridge-Wellmount Avenue junction in Finglas West.
6. Finglas West - Mellowes Road Finglas Area Offices and Sport Centre, Mellow Spring Childcare Development Centre, Finglas Youth Resource Centre, Garda and Fire stations. Those are all located within a range of 200m along Mellowes Road, to the west of the R135, so they are clustered into a single key trip attractor/generator.
7. Charlestown Shopping Centre and Charlestown high density residential area. This area is located at the terminus of Luas Finglas and includes the current shopping centre and its parking areas, and the adjacent residential areas extending from the shopping centre towards the Ikea (east). It is bordered to the north by the M50 and to the south-east by the Jamestown Industrial Estate. The area extends by approximately 250m in each direction from the core of the shopping centre. Charlestown Development Phase 1 currently includes 285 apartments, while Phase 2 (currently under construction) will add 222 new apartments, bringing the total number to more than 500.

The following map shows the seven key trip attractors/generators within the Study Area.

Figure 84 All Luas Finglas KTAs



Assessment

In the assessment of each option against this criterion, has been considered how well an option serves a trip attractor.

An option is considered to serve well a KTA if the distance to a stop is within 400m, acceptable up to 600m and poorly if the distance is up to 800m. A KTA is not served if the distance is over 800m.

Options seving both Finglas and Charlestown KTAs well have a greater advantage over other options.

Results

While the detailed results for this criterion including the narratives can be found in the Annex 1, the following table is a summary of the scoring.

Table 20 Options assessment results for the Key Trip Attractors criterion

				Options 1		Options 2						Options 3					
	Criteria		**Parameter**	**1E**	**1H**	**2A**	**2B**	**2C**	**2E**	**2F**	**2G**	**3A**	**3F**	**3J**	**3K**	**3L**	**3M**
4	Accessibility and social inclusion	4.2	Key attractors served														

Three options serve the KTAs significnantly better than other options (1H, 3J, 3K), with a further three options having some advantages (1E, 3F and 3L).

Two options were considered to poorly serve the KTAs (2A and 2G), with all other options showing some disadvantages in how well they serve the KTAs.

11.3.5 Safety

11.3.5.1 *Criteria 1 Public/Road Interfaces/RSA Collision Maps*

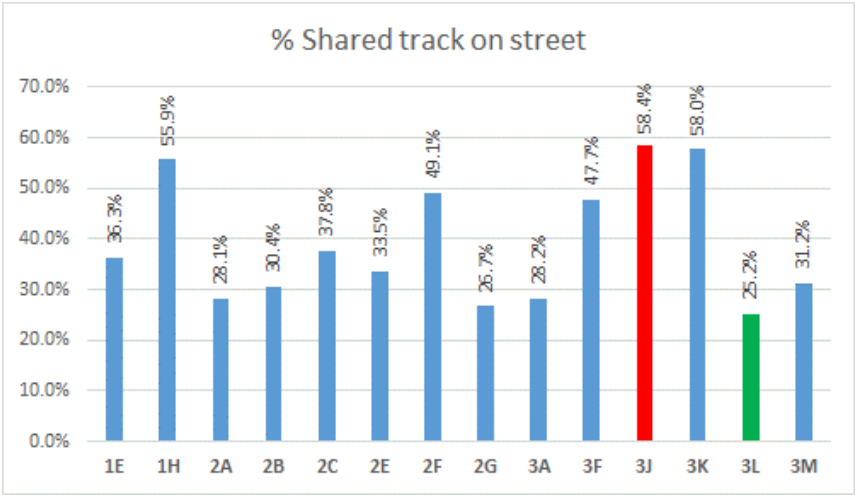
Methodology

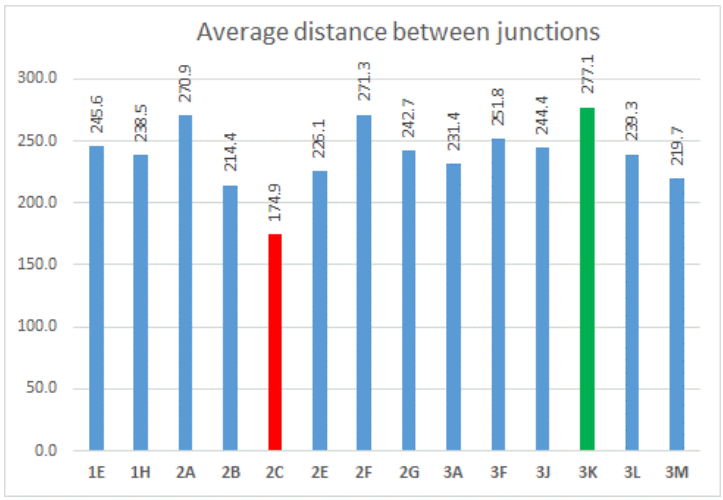
In order to assess the safety criterion associated with each of the 14 options, the following three sub-criteria (parameters) have been considered:

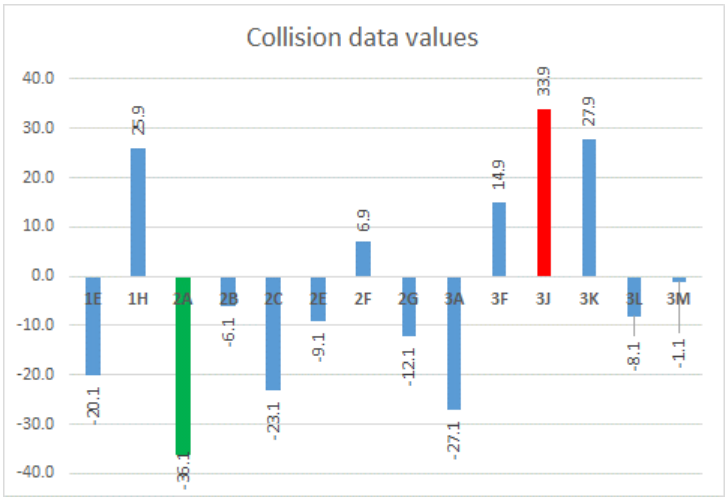
1. Potential level of segregation. This criterion has been adopted in consideration of the fact that segregated and off-street sections of the current Luas network are proven to be less prone to road traffic accidents and are therefore safer through the reduction of interferences, including with pedestrians ad cyclists.
2. Number of minor and major road junctions. The large majority of road traffic accidents occur at road junctions; a Luas corridor with a limited number of road junctions is therefore considered to be safer.
3. Collision data along the proposed corridor in the period 2014-2018. These include counts of serious injury collisions, non-serious injury collisions, pedestrians and cyclists collision and material damage only collisions. Collision data have been extracted from the 'Total number of collisions (2014-2018 Q2) as recorded by An Garda Síochána' and details of these are presented in Annex 10.

The following graphs represent the values of the three parameters.

Figure 85 Graphs of the three parameters considered for the Safety criterion







Assessment

In order to assess the three parameters in a single combined value, these have been normalised on a scale from 1 to 4 points, using the following normalisation values/ranges.

Table 21 Safety Criterion normalisation factors

Normalization factors - points			
	% of Shared Track	Average junction distance	Collision data
max value	58.4%	277.1	33.9
min value	25.2%	174.9	-36.1
points: 4	<33.5	<277	< -18.6
points: 3	<42	<252	<- 1.1
points: 2	<50.5	<227	< 16.4
points: 1	<58.5	<202	< 33.9

Table 22 Overall safety factor calculation table

Option	% of Shared Track on Street		Average distance between junctions		Collision Data		Safety factor (overall figure)
	%	normalized data	(m)	normalized data		normalized data	
1E	36.3%	3	245.6	3	-20.1	4	**10**
1H	55.9%	1	238.5	3	25.9	1	**5**
2A	28.1%	4	270.9	4	-36.1	4	**12**
2B	30.4%	4	214.4	2	-6.1	3	**9**
2C	37.8%	3	174.9	1	-23.1	4	**8**
2E	33.5%	3	226.1	2	-9.1	3	**8**
2F	49.1%	2	271.3	4	6.9	2	**8**
2G	26.7%	4	242.7	3	-12.1	3	**10**
3A	28.2%	4	231.4	3	-27.1	4	**11**
3F	47.7%	2	251.8	3	14.9	2	**7**
3J	58.4%	1	244.4	3	33.9	1	**5**
3K	58.0%	1	277.1	4	27.9	1	**6**
3L	25.2%	4	239.3	3	-8.1	3	**10**
3M	31.2%	4	219.7	2	-1.1	2	**8**

Table 23 MCA1 Safety assessment table

max=	**12**	
min=	**5**	
< 6.75		Significant disadvantages over other options
<8.5		Some disadvantages over other options
<10.25		Some advantages over other options
<12		Significant advantages over other options

Options Scoring

While the detailed results for this criterion including the narratives can be found in the Annex 1, the following table is a summary of the scoring.

Table 24 Options assessment results for the Safety criterion

				Options 1		Options 2						Options 3					
	Criteria		**Parameter**	**1E**	**1H**	**2A**	**2B**	**2C**	**2E**	**2F**	**2G**	**3A**	**3F**	**3J**	**3K**	**3L**	**3M**
5	Safety	5.1	Public/Road interfaces/RSA collision maps														

12 END-TO-END OPTIONS ASSESSMENT

12.1 Overall MCA1 Matrix

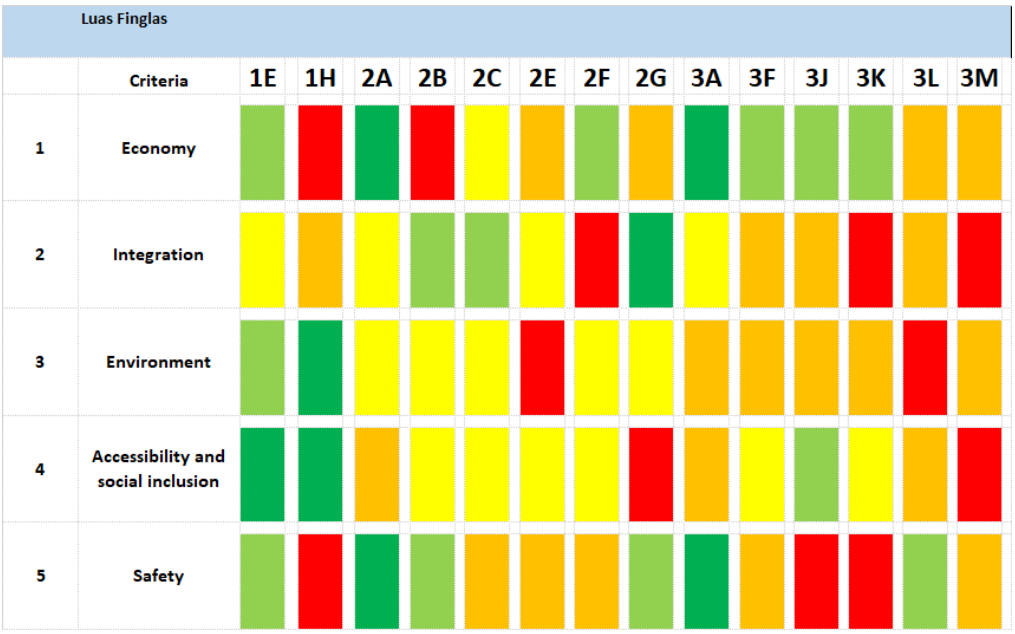
The following matrix shows the combined results of the MCA1 for the ten sub-criteria assessed.

Table 25 Overall MCA1 Options assessment results

	Luas Finglas	MCA1															
				Options 1		Options 2						Options 3					
	Criteria		Parameter	1E	1H	2A	2B	2C	2E	2F	2G	3A	3F	3J	3K	3L	3M
1	Economy	1.1	Cost														
		1.2	Catchment														
		1.3	Journey time														
2	Integration	2.1	Compatibility with Development Plans (Land Use)														
		2.2	Integration with GDA Transport Policies and Networks														
3	Environment	3.1	Material and cultural assets														
		3.2	Natural aspects														
4	Accessibility and social inclusion	4.1	Social inclusion														
		4.2	Key attractors served														
5	Safety	5.1	Public/Road interfaces/RSA collision maps														

The individual scores have been combined into the single 5 criteria (Economy, Integration, Environment, Accessibility and Social Inclusion, Safety) and have been assigned a colour code emerging from the combination of the sub-criteria assessments. The result is shown in the table below.

Table 26 Overall MCA1 Options assessment summary



Five of the 14 options show an overall low score on several sub-criteria:

Option 1H – This option scores significantly lower than other options on cost, journey time and safety, lower than other options on integration with Transport Policies and compatibility with Development Plans, while not delivering significantly better results on catchment. Despite being a good option from environmental and social inclusion viewpoints, it does not deliver on significant criteria compared to other options.

Option 2E - This option scores significantly lower than other options on cost, journey time and impact on Material and Cultural Aspects, lower than other options on Natural aspects, Serving the Key Trip Attractors and Compatibility with Development Plans, while not delivering significantly better results on catchment.

Option 3K - This option scores significantly lower than other options on Social Inclusion, Safety, and Compatibility with Development Plans; lower than other options on Integration with Transport Policies and Impact on Material and Cultural Assets, but it delivers some or significant advantages over other options on Journey Time (very fast option), Catchment, and Key Trip Attractors.

Option 3L – This option scores significantly lower or lower than other options on all criteria, except Safety and Key Trip Attractors.

Option 3M – This option scores significantly lower or lower than other options on all criteria.

Six of the 14 Options show a mixed outcome.

These are:

Option 2B - This option scores significantly lower than other options on Cost and Journey Time; and lower than other options on Key Trip Attractors and Natural aspects, but it delivers some advantages over other options on all other criteria.

Option 2C - This option delivers some advantages over other options on the majority of all criteria, with the significant exception of Journey Time (Red). It also scores lower than other options on Safety, Key Trip Attractors and Natural Aspects.

Option 2F - This option delivers some advantages over other options on half of the criteria, and has only one red scoring in terms of Compatibility with Development Plans.

Option 2G - This option scores significantly lower than other options on journey time and Key Trip Attractors, and lower than other options on Cost, Catchment and Social Inclusion.

Option 3F – This option scores high on Catchment, Journey Time and Key Trip Attractors and shows no criteria in which it delivers significant disadvantages in comparison to other options.

Option 3J - This option scores high on Catchment, Journey Time and Key Trip Attractors, but significantly lower than other options on Safety partially because of its extensive running along the R135.

Three of the 14 options show an overall good to high score on several criteria and are therefore recommended for further assessment.

These are:

Option 1E – This is one of the best options, scoring better or significantly better than other options on almost all criteria, with the exception of Journey Time and Compatibility with Development Plans where it delivers some disadvantages. It is also one of the few options scoring better than others on Natural aspects.

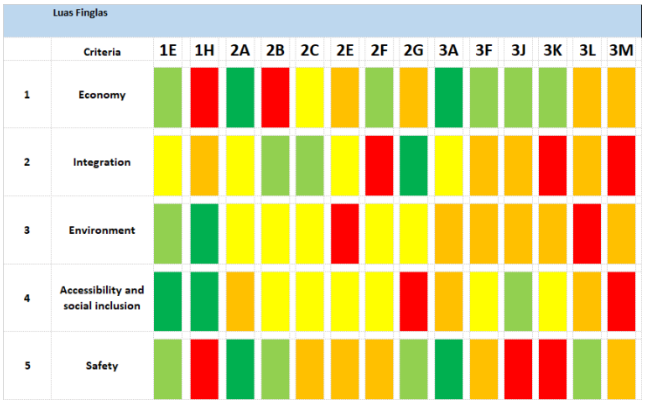
Option 2A – This is one of the best options, scoring better or significantly better than other options on almost all criteria, with the significant exception of Key Trip Attractors and Natural aspects. This option scores highest in terms of Cost and directness (Journey Time), as Option 3A.

Option 3A – Very similar to 2A, with very similar outcomes.

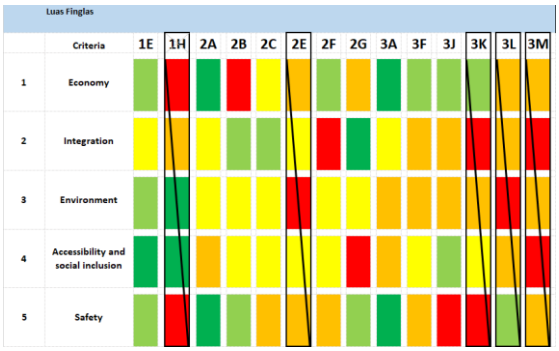
13 SHORTLISTED OPTIONS FOR STAGE 2

Following the overall MCA1 options assessment:

- 5 Options are largely under-delivering,
- 6 Options are delivering mixed results,
- 3 Options show positive or very positive results.

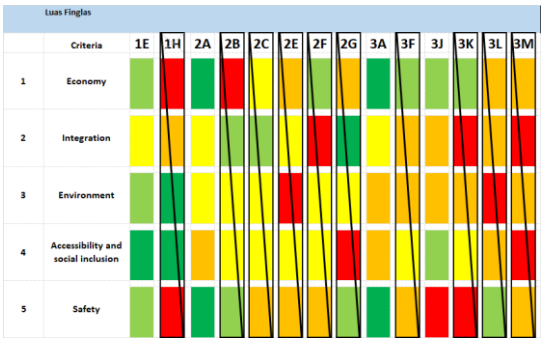


➢ All the 5 options under-delivering have been ruled out at this stage as there are clearly other options delivering better results on the majority of the criteria.



➢ Of the 6 options delivering mixed results:

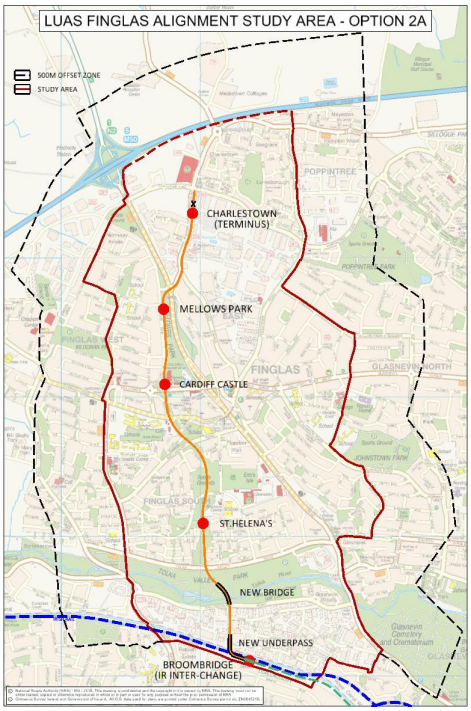
- Options 3J and 3F are very similar in the alignment, and Option 3J has been brought forward over Option 3F because of its slightly better performances on Accessibility and Social Inclusion despite its slightly lower performances on Safety.
- Option 2C has been thoroughly considered because while it does not excel on any criteria, it shows positive outcome on Integration and has no red scores. Despite this, and following a thorough analysis, Option 2C is not to be considered any further because of its additional challenges associated with the passage through the core of the Village and its traffic, runtime and reliability implications. At this stage, it has been assumed that all other criteria being similar, other options deliver similar outcomes and stop locations with less interaction with traffic and specifically with the Five Arms junction.
- Of the other options, none appear to deserve to be brought forward (2B-2F-2G)

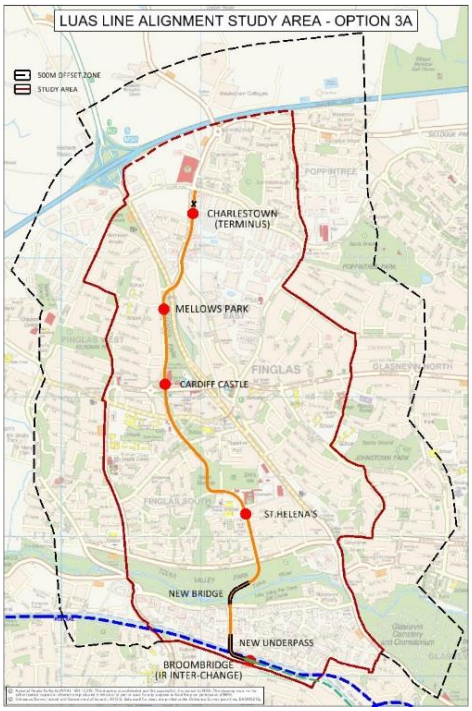


- Of the 3 high scoring options:
  - Options 2A and 3A have been brought forward, potentially as a single corridor, subject to a more detailed alignment/catchment analysis of the lower section of the route (to be carried out as part of the Stage 2). It is suggested that within the next Stage 2, a sub-option with an alternate crossing of Mellowes Road (i.e. a sub-option that does not traverse through the Garda Station car park) is also assessed.
  - Option 1E, despite scoring high on the majority of the criteria, has not been brought forward following the consideration of the most recent information about the new Irish Rail Station to be built between Broombridge and Ashtown. This station will be built adjacent to Ashington Park, opposite Royal Canal Avenue. A new pedestrian/cyclist overbridge will also be built to link the station to the Pelletstown area, providing direct access to urban and suburban railway services and to the Luas network, via Broombridge interchange. Having considered this new information, and following a meeting held with the NTA in March 2019 (during the drafting of this report), it has been agreed not to progress this option further, in consideration of other shortlisted options providing a better and more direct service to Finglas and Charlestown. It has to be noted that only the Options 1s served the Pelletstown area; and therefore would have benefitted additionally from this within the Key Trip Attractors criteria, but of these, only Options 1E and 1H passed the initial screening. Option 1H subsequently failed on the Economy and Safety criteria in any case. Therefore this late decision is not deemed to jeopardise the Stage 1 phase of the options selection process, as the elimination of Pelletstown from the Key Trip Attractors criteria would not have changed the relative scoring of all other options.

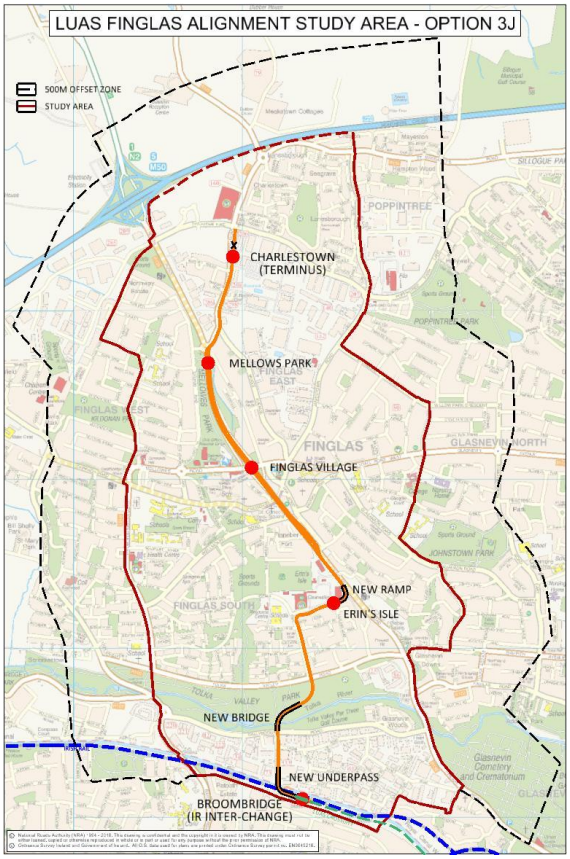
Finally, the following Options are recommended for Stage 2:

Option 2A-3A





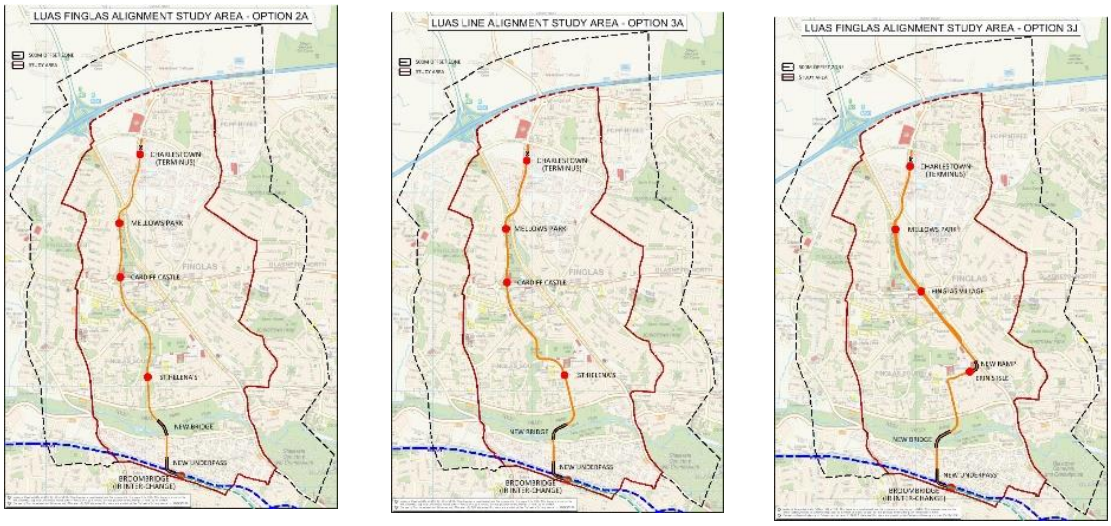
Option 3J



14 CONCLUSIONS OF STAGE 1

Within Stage 1 of the Phase 1 Options Selection process for Luas Finglas, 29 Options were initially developed. These were reduced to 14 options during the initial sifting stage and finally to 3 at the conclusion of the MCA1.

The three options recommended for further analysis are 2A, 3A and 3J, and shown below.



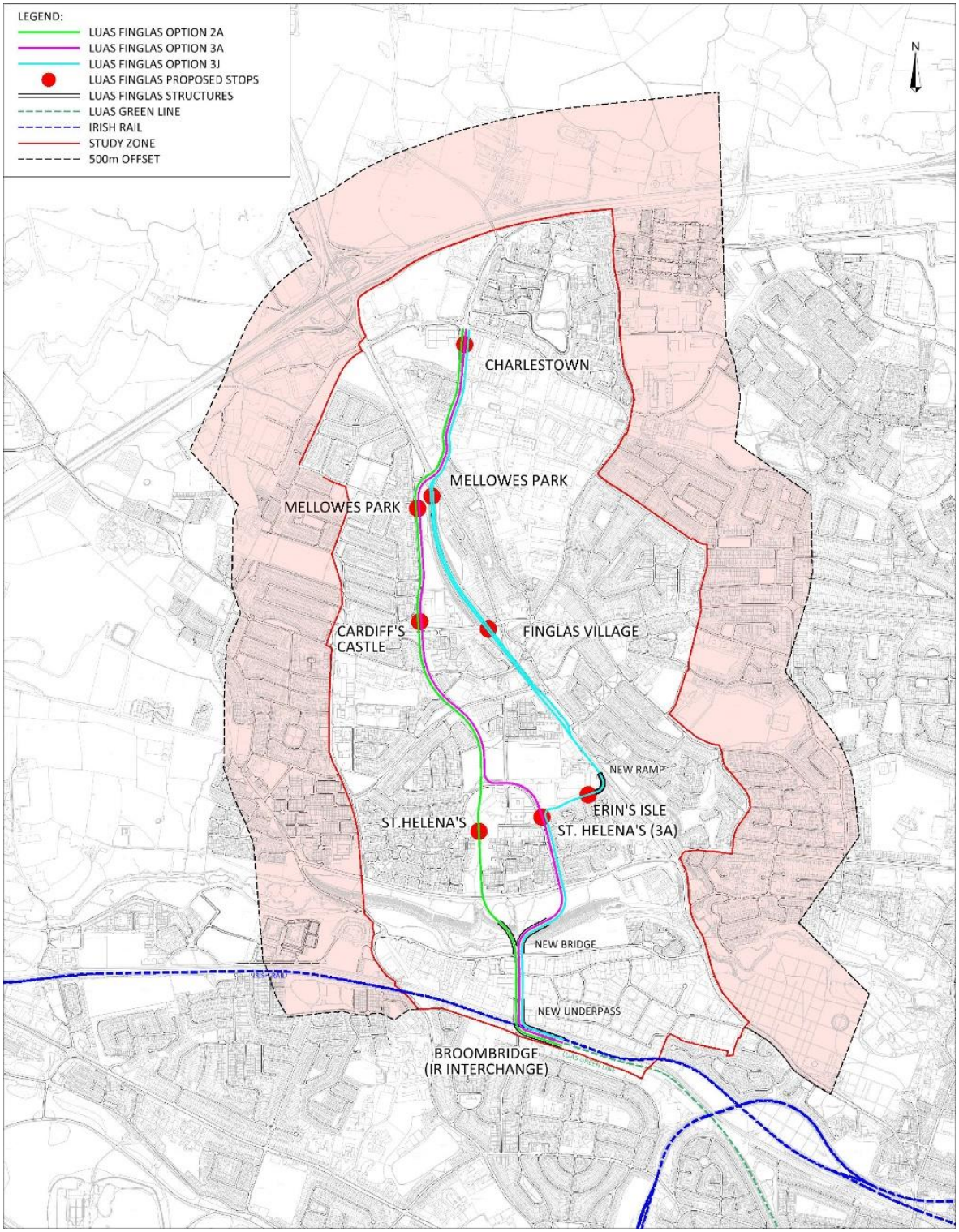
They are representative of the whole Study Area, as they span from Finglas West (2A-3A), to the R135 (3J). The emerging options are quite diversified while all being direct and fast.

It is now recommended that those three options are brought to a more detailed engineering stage within the Stage 2 process, where their technical, economical, social and environmental aspects are assessed, together with a full transport demand analysis and Cost Benefit Analysis, to finally determine the optimal route corridor in connecting the Luas Green line from Broombridge to the areas of Finglas and Charlestown.

It is also recommended that the first part of the Stage 2 process will include an initial assessment of all the potential variances of each of the shortlisted options, in order to optimise each corridor and to address their shortcomings which may have emerged in the MCA1 process.

The current high level design offers potential for all of the three shortlisted options to be further optimised within the Stage 2 process. By way of example, Option 3J, currently assessed in its configuration with two single tracks running within the bus lanes of the R135, appears to offer significant scope for further improvements, subject to a more detailed analysis, whereby the two tracks could run off-road on either side of the R135. For this more detailed analysis, a further step in the design of the route corridors shall be undertaken at the beginning of Stage 2 assessment.

Figure 86 Three shortlisted Options of Stage 1



15 ANNEX (SEPARATE DOCUMENT)

Annex 1	MCA1 tables
Annex 2	Plans for the 14 Options
Annex 3	Cross sections of the Options
Annex 4	Environmental constraints maps
Annex 5	Environmental considerations
Annex 6	Fleet estimation and analysis of the depots
Annex 7	P&R Optioneering analysis
Annex 8	Catchment maps
Annex 9	Social inclusion maps
Annex 10	Road Collision Details

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