

Kinsealy Cycleway and Footpath Network Feasibility Study

Fingal County Council

November 2018

**Comhairle Contae
Fhine Gall**
Fingal County
Council



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Terminology

- On-road (cycle facility): Refers to a cycle lane or grade-segregated cycle track adjacent to the road and/or footpath.
- Off-road (cycle facility): Refers to a cycle facility through undeveloped land / greenfield i.e. a greenway.

1. Introduction

1.1 Project Background

Fingal County Council commissioned AECOM in February 2018 to develop a feasibility study, options assessment and concept design, and prepare a report on same, for the provision of a cycleway/footpath network development in the Kinsealy Environs.

The scheme objective is to provide high quality pedestrian facilities and cycle provision with the optimum quality of service in accordance with the National Cycle Manual (targeting a quality of service of A).

The National Transport Authority produced the National Cycle Manual (NCM) to guide planners and engineers in their work to improve cycling provision in urban areas. The NCM has been used as basis for the development of concept designs presented in this report.

Any lines which show possible cycle routes included in this feasibility report are indicative only and do not indicate any current adopted plan of Fingal County Council. A planning process, including engineering design and environmental assessment, would have to be undertaken to approve a cycleway route prior to construction.

Kinsealy is a rural village which is designated as a Commuter Village in the Fingal Development Plan 2017-2023. It is situated on a busy major route into Dublin City, namely the R107 or Malahide Road. A considerable amount of traffic enters the Kinsealy area via Chapel Road and Baskin Lane. There are a number of schools located in the area, which are currently not serviced by adequate pedestrian footpaths and cycleway facilities, and need to be improved. In particular, linkage is required between schools and areas such as Portmarnock, Balgriffin and Kettles Lane.

The Fingal Development Plan 2017-2023 aims to promote and facilitate movement to, from and within the County of Fingal, by integrating land use with a high quality, sustainable transport system that prioritises walking, cycling and public transport.

Objective MT23 in the Fingal Development Plan 2017- 2023 reads as follows; Carry out a feasibility study for the provision of the following cycle/pedestrian routes, subject to the necessary environmental appraisals; Abbeyville to Kettles Lane, Balgriffin to Teagasc Kinsealy, Balgriffan to Kinsealy, Old Portmarnock to Teagasc Kinsealy.

The feasibility study is one of a number of studies identified in the new Fingal Development plan 2017-2023 together with Local Area Plans, Masterplans and Urban Framework Plan. These Plans and Studies will inform the delivery of infrastructure by Fingal County Council.

National Policy, the National Transport Authority (NTA) and various State Agencies are committed to ensuring that cycling as a transport mode is supported, enhanced and exploited, in order to achieve strategic objectives and reach national goals. Current Policy is set out in the various documents produced by the Department of Transport, Tourism and Sport, and its agencies. However, the National Cycle Policy Framework is the key document that sets out 19 specific objectives, and details the 109 individual but integrated actions, aimed at ensuring that, by 2020, 10% of all journeys will be by bike.

The following corridors were to be included in the feasibility study (refer to Figure 1.1):

- Kinsealy (junction of Malahide Road / Chapel Road) to Kettles Lane;
- Kinsealy to Malahide Demesne (via Malahide Road or Kinsealy Lane);
- Kinsealy (junction of Malahide Road / Chapel Road) to Balgriffin;
- Kinsealy (junction of Malahide Road / Chapel Road) to Portmarnock;
- Fingal Cemetery to the New Hole in the Wall Road junction, along the R123; and
- Kettles Lane to Holywell via Scoil an Duinninigh.



Figure 1.1: Location Map for Kinsealy Environs

1.2 Study Area

To form a comprehensive list of network options, the Study Area was divided into Primary and Secondary Nodes. These are shown in Figure 1.2 below.



Figure 1.2: Kinsealy Environs Proposed Cycle Network (source: www.googlemaps.ie)

The Primary Nodes are as follows:

- A. Kinsealy;
- B. Fingal Cemetery (Junction of Malahide Road/Belmayne Access Road);
- C. Balgriffin Cottages (Hole in the Wall Road Junction);
- D. Station Road (Portmarnock train station);
- E. Kettles Lane (to connect to the existing two-way cycle route at Russell Terrace);
- F. Feltrim Road (M1 Overbridge); and
- G. Malahide Castle and Garden (entrance gate).

To form a coherent network, all Primary Nodes should form a link to Kinsealy (Primary Node A). This acts as the centre ('hub') of the network, creating a 'hub and spoke' network.

Key trip attractors within the Study Area are shown as Secondary Nodes. Linkage to these nodes should be included within the proposed network. The Secondary Nodes are as follows:

- St. Nicholas of Myra Primary School and Malahide/Portmarnock Educate Together (temporary location on Malahide Road until 2020);
- Scoil an Duinninigh; and
- Portmarnock Train Station.

1.3 Scheme Aim

Develop the feasibility study, route options and options assessment, and prepare a report on same, for the provision of pedestrian and cycle routes in the Kinsealy Environs. The scheme should provide cycle provision with the optimum quality of service in accordance with the National Cycle Manual (targeting a Quality of Service of A).

1.4 User Groups

To expand upon the Scheme Aim and provide further context and clarity to support consistent design development, the anticipated primary user groups for the network are as follows:

1. Children, students and parents trips to and from schools in the area.
2. Local commuters travelling relatively short (15mins) walking or cycling distance to employment, to retail facilities (shops), to transport (Rail Station or Bus Stop) etc.

1.4.1 Priority Connectivity

Having regard to the users groups, the network should prioritise links to key trip attractors such as schools, retail and public transport interchanges.

2. Background & Transport Context

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

The Regional Planning Guidelines for the Greater Dublin Area 2010 – 2022 set out the planned direction for growth within the Greater Dublin Area by giving the regional effect to the National Planning Framework.

Section 6.3.6 states: “The integration of cycle and pedestrian routes and cycle parking facilities is considered a central component of the delivery of greener transport travel patterns. While the NCPF sets a national target of 10% of all trips by bicycle by 2020, within the GDA this should be viewed as a target to be exceeded. Within the metropolitan area in particular, there is scope for exceeding the 2020 national modal share target for cycling given that the spatial integration of higher tier population settlements with high capacity transport systems and employment areas within a relatively compact urban form allows for safe and functional cycle and walking routes from one to the other and may be more cost effective than within the more dispersed hinterland areas.

Speed limits in residential areas and core urban areas, greater levels of priority in terms of street space and signals, education programmes in schools and increasing the public profile of walking and cycling as green modes of transport should be explored throughout the GDA in order to create a culture of cycling and walking in line with the National Cycle Policy Framework vision.

The design of pedestrian movements and spaces and how they interact with the surrounding environment should make places inviting, attractive and well utilised for pedestrians. In the adaptation or creation of spaces and places within the GDA, pedestrian movements (including the needs of the disabled, mobility impaired and children) should therefore be planned and catered for, with issues of function, safety, legibility, and permeability in mind. (The European Charter of Pedestrian Rights, amongst other reference sources, provides important guidance on such matters). Walking and cycling tourism also has the potential to benefit from improvements to the cycle and footpath networks within the GDA.”

A new National Planning Framework (NPF), titled "Ireland 2040 - Our Plan", is currently being developed to succeed the National Spatial Strategy. The Draft NPF states that one of the key future growth enablers for Dublin includes "Delivery of the metropolitan cycle network set out in the Greater Dublin Area Cycle Network Plan".

National Policy Objective 28 of the draft NPF reads as follows: "Ensure the integration of safe and convenient alternatives to the car into the design of our communities, by integrating physical activity facilities for all ages, particularly prioritising walking and cycling accessibility to both existing and proposed future development, in all settlements."

2.2 National Cycle Policy Framework

The objective of the National Cycle Policy Framework is to promote cycling as a normal way to get about, especially for short trips, and that a culture of cycling will have developed in Ireland to the extent that 10% of all trips will be by bike by 2020.

The National Cycle Policy Framework (NCFP) 2009 – 2020 core vision is to “create a strong cycling culture in Ireland. The vision is that all cities, towns, villages and rural areas will be bicycle friendly. Cycling will be a normal way to get about, especially for short trips. Cycling contributes to improved quality of life and quality of the public realm, a stronger economy and business environment, and an enhanced environment.”

2.3 Greater Dublin Area Transport Strategy 2016 – 2035

The 'Greater Dublin Area Transport Strategy 2016 – 2035' (NTA, 2015) recognises the importance of improvements to cycle facilities and infrastructure within the GDA with reference to the GDA Cycle Network Plan the document states: "As well as setting out the proposed cycle network in the Metropolitan Area, the Greater Dublin Area Cycle Network Plan also establishes the cycle network for the main towns across the region, in addition to setting out the inter-urban cycle network connecting these towns with each other and with the Metropolitan Area. In relation to proposed future design in the Greater Dublin Area the Strategy states: "Recognising the need for a safe cycling network, it is intended that many of the key cycling routes will be developed as segregated facilities, with cyclists separated from vehicular traffic through the use of kerb separators or by having the cycleway at a higher level than the road carriageway. Complementing these facilities will be a corresponding level of priority given to cycle movements at road junctions."

2.4 Greater Dublin Area Cycle Network Plan

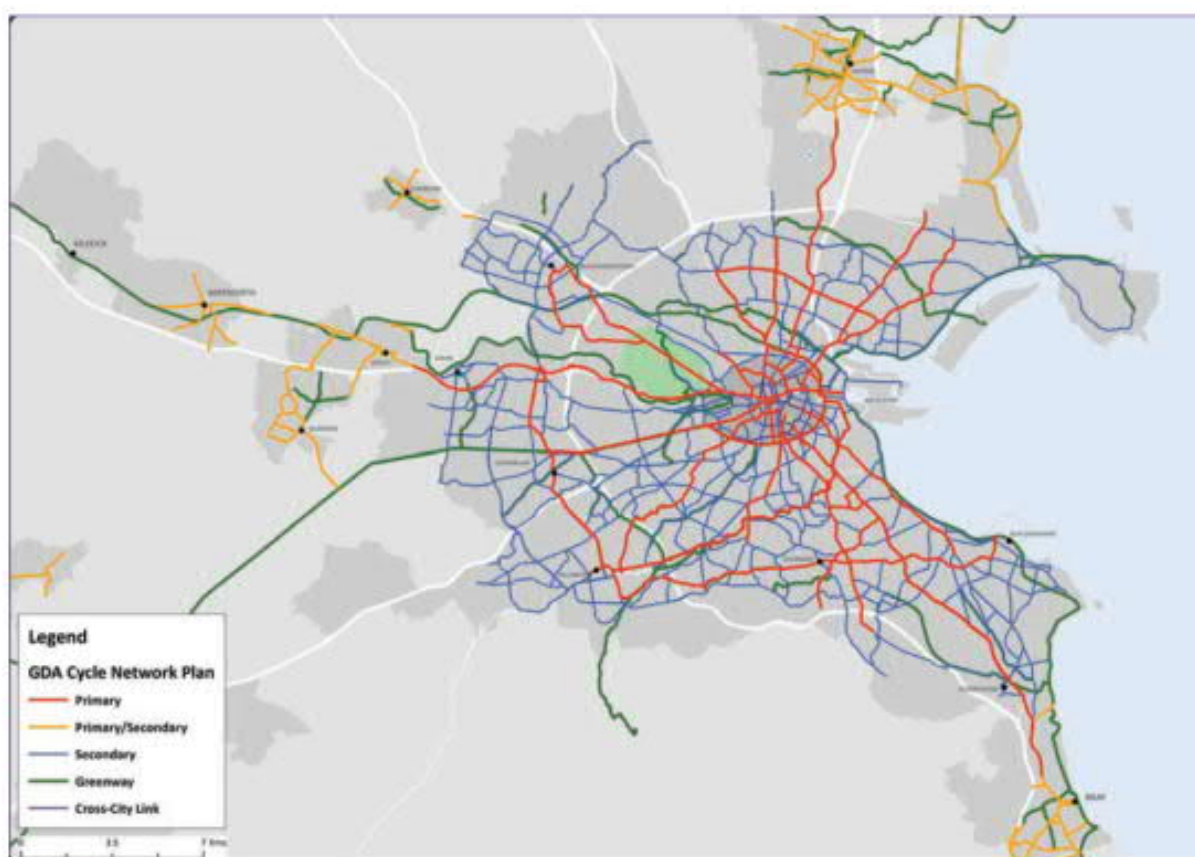


Figure 2.1: Metropolitan Cycle Network (source: GDA Cycle Network Plan 2013)

The GDA Cycle Network Plan (NTA, 2013) sets out the strategy for the development of an integrated cycle network. It identifies that Station Road and the North-Western section of Feltrim Road forms part of the primary and secondary cycle network and thus form a key part of the strategic cycle network as shown on Figure 2.2 below. It is therefore important that any upgrade to cyclist infrastructure along the network should take cognisance of these objectives and, where practical, provide cycle infrastructure to the appropriate level and quality of service required for a primary and secondary cycle route. However there are minimal amounts of cycle network infrastructure proposed for large parts of the study area, as can be seen from Figure 2.3 below.

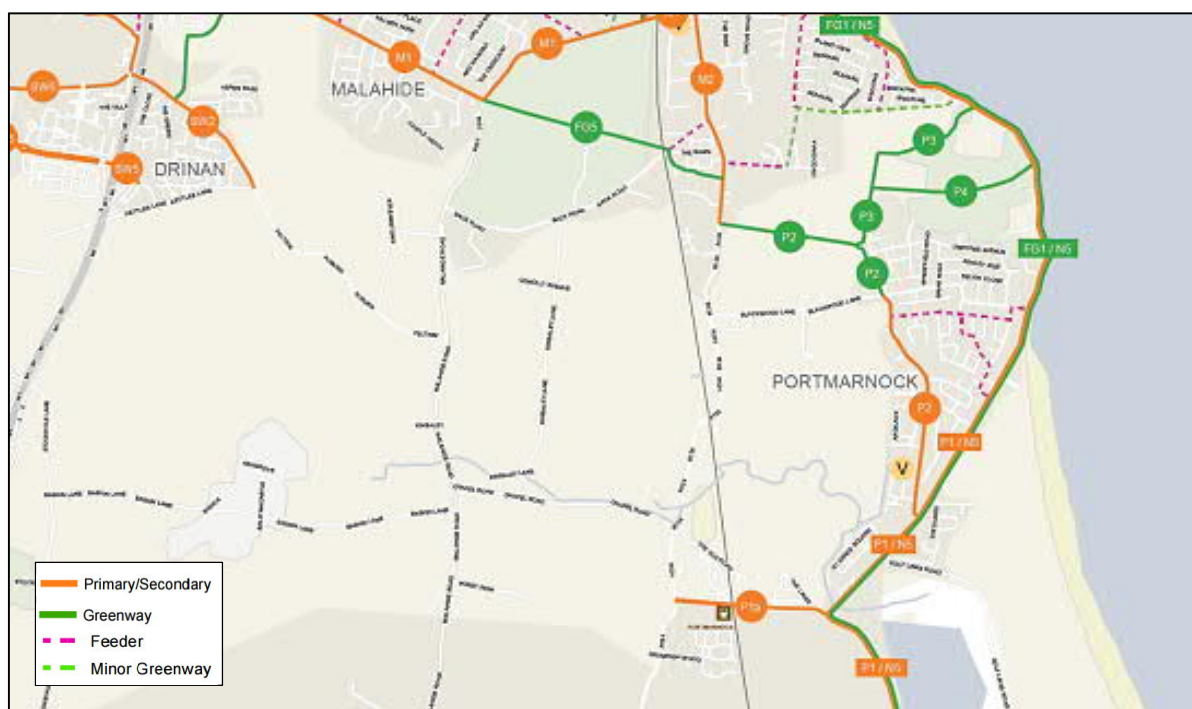


Figure 2.2: Proposed Cycle Network Plan for Greater Dublin Area (source: GDA Cycle Network Plan 2013)

2.5 Fingal Development Plan 2017-2023

Reference to the area is contained within the Fingal Development Plan 2017-2023 which states as Objective number 5 for Portmarnock: "Promote an enhanced rail station and rail service with improved facilities for cyclists including secure bike racks, and supporting an increase in car parking space provision for motorists together with the provision of a feeder bus service and improved pedestrian and cycle linkage between Chapel Road and the station."

Objective MT23 in the Fingal development Plan 2017 – 2023 reads as follows; "Carry out a feasibility study for the provision of the following cycle/pedestrian routes, subject to the necessary environmental appraisals; Abbeville to Kettles Lane, Balgriffin to Teagasc Kinsealy, Balgriffin to Kinsealy, Old Portmarnock to Teagasc Kinsealy."

The area is also referenced in Objective Balgriffin/Belcamp 7 which states: "Promote improved pedestrian and cycle linkage between Balgriffin/Belcamp and Portmarnock Railway Station."

The FDP however contains no specific infrastructure objectives relating to the provision of cycleways or pedestrian facilities within large parts of the study area.

Objective 11 for Malahide references Masterplans within the Study Area: "Prepare and/or implement the following Masterplans during the lifetime of this Plan:

- Streamstown Masterplan (see Map Sheet 9, MP 9.A)
- Broomfield Masterplan (see Map Sheet 9, MP 9.B)"

In terms of archaeological heritage, Objective CH02 states: "Favour the preservation in situ or at a minimum preservation by record, of archaeological sites, monuments, features or objects in their settings. In securing such preservation the Council will have regard to the advice and recommendations of the National Monuments Service of the Department of the Arts, Heritage, Regional, Rural and Gaeltacht Affairs."

In addition, Objective CH05 reads: “Ensure archaeological remains are identified and fully considered at the very earliest stages of the development process, that schemes are designed to avoid impacting on the archaeological heritage.”

The following objectives in relation to protected structures will be taken into consideration in the development of route option designs.

Objective CH20: “Ensure that any development, modification, alteration, or extension affecting a Protected Structure and/or its setting is sensitively sited and designed, is compatible with the special character, and is appropriate in terms of the proposed scale, mass, height, density, layout, materials, impact on architectural or historic features, and junction with the existing Protected Structure”

Objective CH21: “Seek that the form and structural integrity of the Protected Structure is retained in any redevelopment and that the relationship between the Protected Structure and any complex of adjoining buildings, designed landscape features, or designed views or vistas from or to the structure is conserved.”

Objective CH21: “Ensure that proposals for large scale developments and infrastructure projects consider the impacts on the architectural heritage and seek to avoid them. The extent, route, services and signage for such projects should be sited at a distance from Protected Structures, outside the boundaries of historic designed landscapes, and not interrupt specifically designed vistas. Where this is not possible the visual impact must be minimised through appropriate mitigation measures such as high quality design and/or use of screen planting.”

The section of Malahide Road within the study area has a high concentration/clustering of historic houses with demesnes. The route options will be designed to satisfy Objective CH32: “Avoid the removal of structures and distinctive elements (such as boundary treatments, street furniture, paving and landscaping) that positively contribute to the character of an Architectural Conservation Area.”

Sheet 14 of the Fingal Development Plan 2017-2023 sets out sensitive landscapes, ACAs, Archaeological Sites, historic graveyards, protected structures and Geological Sites – see Figure 2.4.

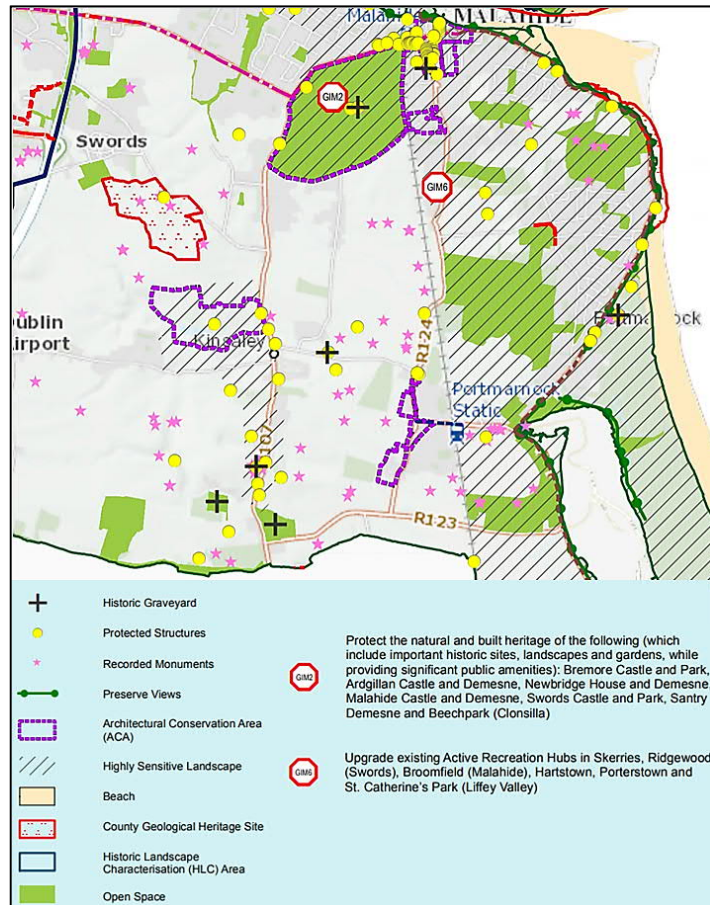


Figure 2.3: Sheet 14 of Fingal Development Plan 2017-2023

Sheet 15 sets out ecological designations, pNHAs and sensitive sites within the Study Area.

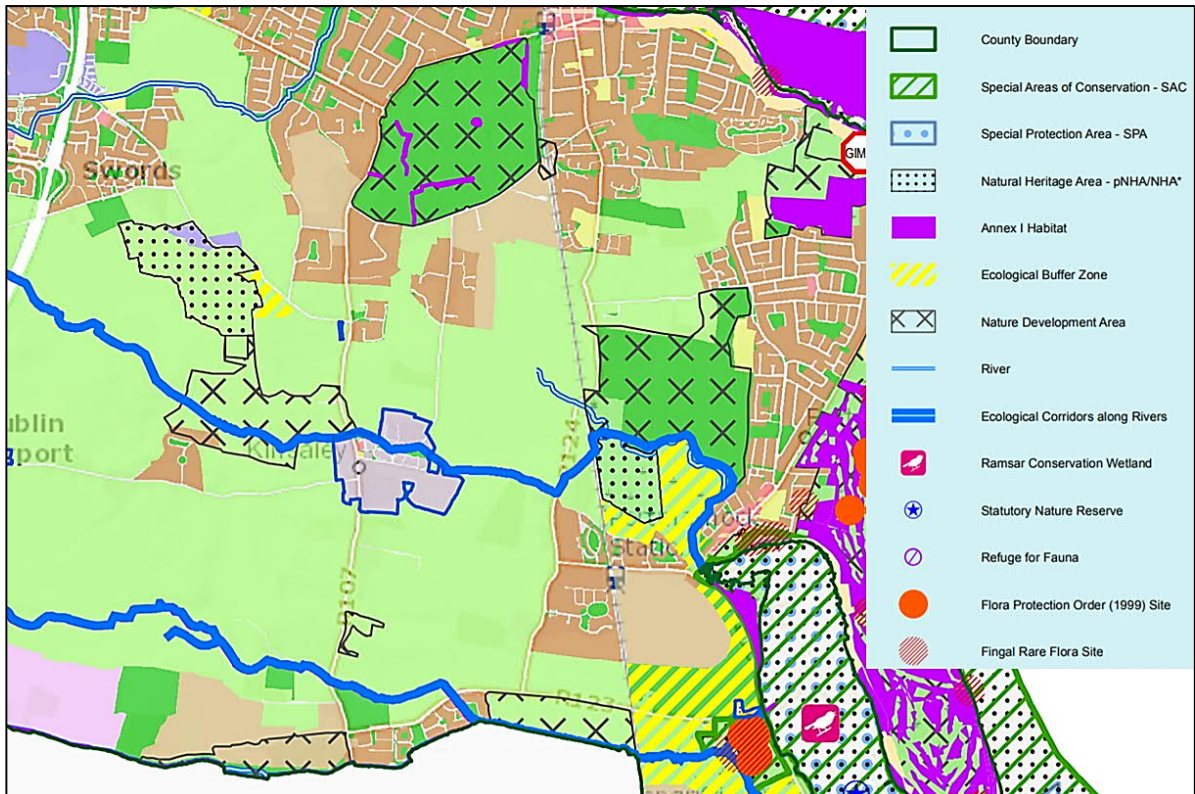


Figure 2.4: Sheet 15 of Fingal Development Plan 2017-2023

2.6 Local Area Plans, Masterplans and Urban Framework Plan

2.6.1 Kinsealy Village LAP

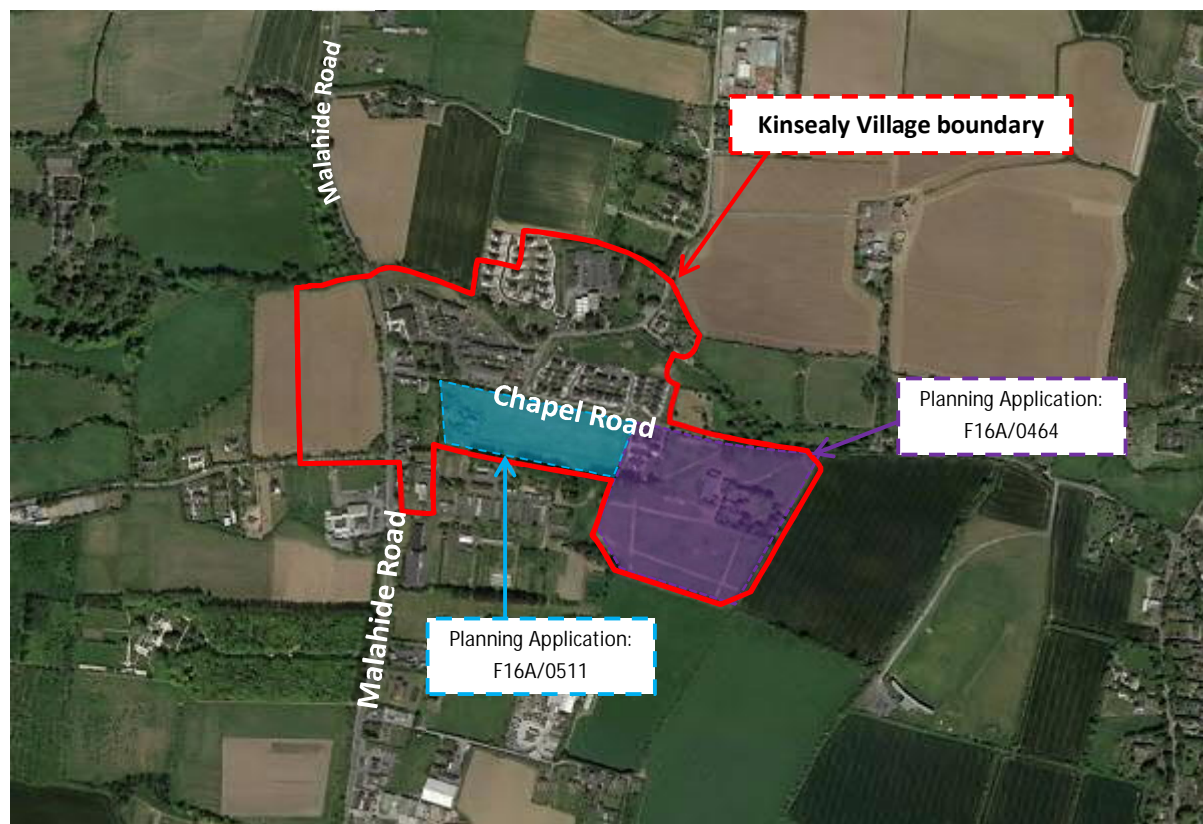


Figure 2.5: Kinsealy Village LAP Location Map (source: www.googlemaps.ie)

A draft Local Area Plan (LAP) for Kinsealy is in progress with a view to being prepared in late 2018 / early 2019. It is required under the 'RV' – Rural Village zoning objective of the Council's County Development Plan; this zoning objective seeks to: *'Protect and promote the character of the Rural Village and promote a vibrant community in accordance with an approved local area plan and the availability of physical and community infrastructure.'*

As part of the LAP process, the Planning Authority is examining all sites within the village with a view to identifying appropriate land uses, taking into consideration such issues as the nature and form of the existing village environment, permitted and as yet unconstructed development, consolidation of the village core, etc.

To date 182 no. dwelling units have been permitted within the LAP lands (PL06F.248584 /Reg. Ref. F16A/0511 and PL06F. 248515 / Reg. ref. F16A/0464) and a further scheme of 81 no. units was refused planning permission by FCC under Reg. Ref. F17A/757 and is awaiting determination by An Bord Pleanála (ABP 301145-18).

Proposed housing developments within the Kinsealy LAP (draft LAP in progress) lands and approved planning applications within the overall study area will be taken into consideration in the route options selection stage e.g. planning application F16A/0511 (Figure 2.7) and F16A/0464 (Figure 2.8).



Figure 2.6: Planning application F16A/0511

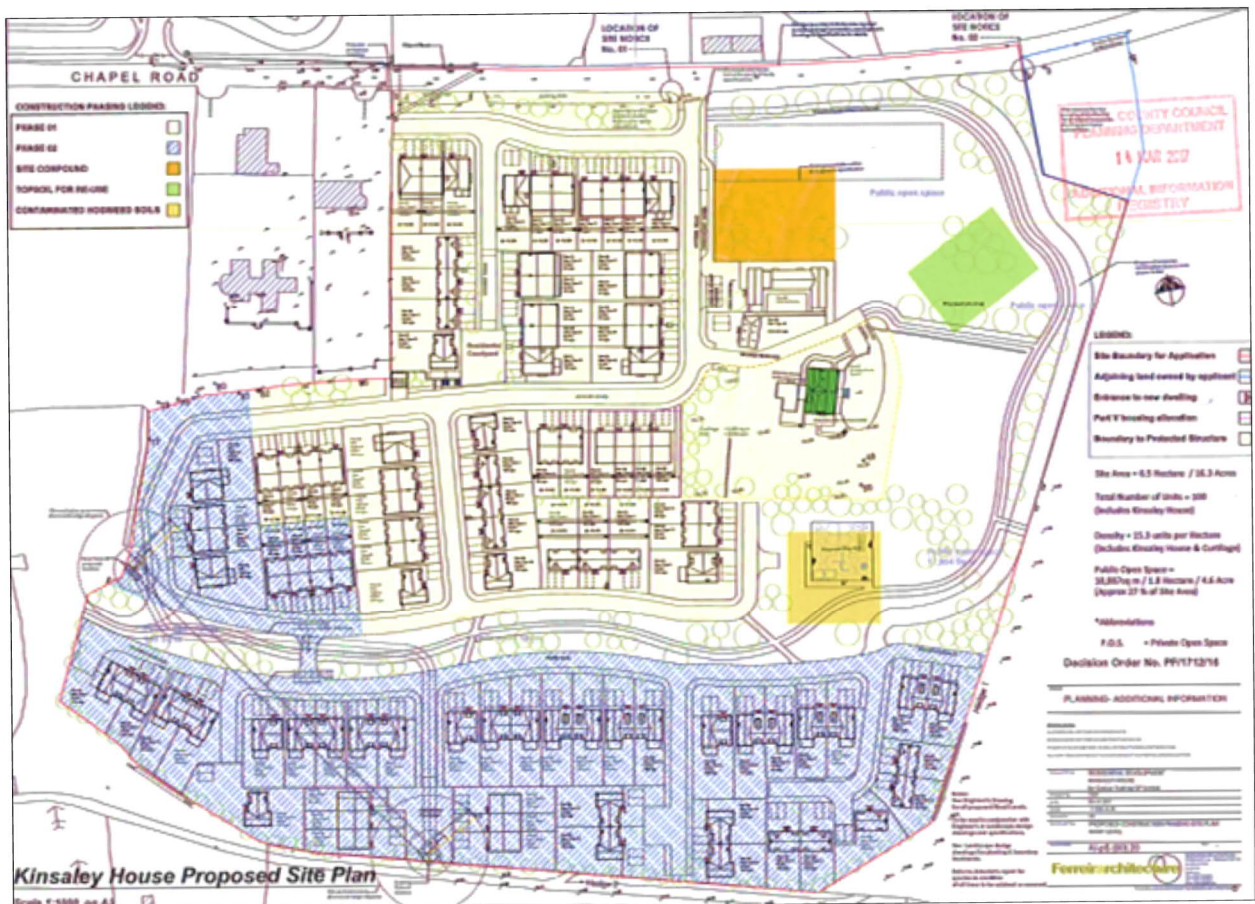


Figure 2.7: Planning application F16A/0464

2.6.2 Broomfield Local Area Plan 2010 (lapsed) / Masterplan

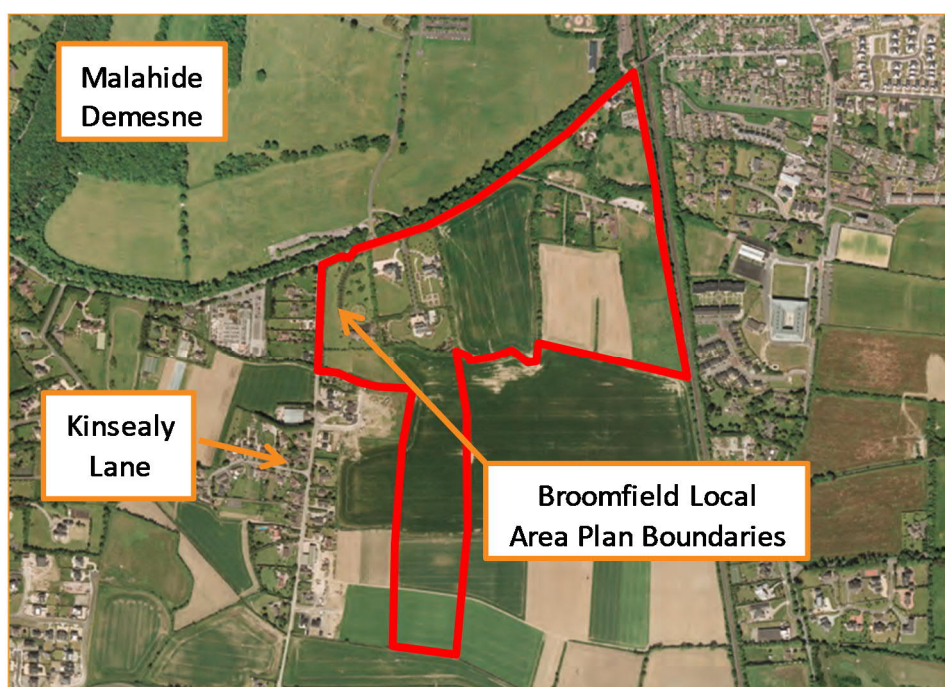


Figure 2.8: Broomfield Local Area Plan 2010 Location Map (source: www.googlemaps.ie)

The Broomfield Local Area plan was originally issued in February 2010 to provide a six year development strategy for the RA lands at Broomfield, Malahide. Objective RA is “to provide for new residential communities subject to the provision of the necessary social and physical infrastructure”. This LAP has lapsed but a Broomfield Masterplan is required under the Fingal Development Plan. However, this Masterplan is not part of the 2018 programme of works.

Cyclist and pedestrian facilities were key considerations in the original Broomfield LAP (2010); Section 5.2.2 of the document stated: “Provision shall be made for good connectivity throughout the development area for pedestrians and cyclists, so that one could travel easily from Kinsealy Lane to Back Road on foot or by bicycle.” Cyclist and pedestrian facilities were also referred to in Section 9.0 Urban form and design objectives as follows:

- UD 6 - To provide appropriate footpaths, cycle ways and roads to serve the levels of development envisaged in this LAP.
- UD 11 - Ensure permeability by way of cycle ways and footpaths throughout the scheme.

Figure 2.10 illustrates the proposed pedestrian and cycle links (in purple) through Broomfield as per the LAP. As these previously proposed (or alternative) cycle links may be included in the new Masterplan, route options will be developed to integrate with these proposals.

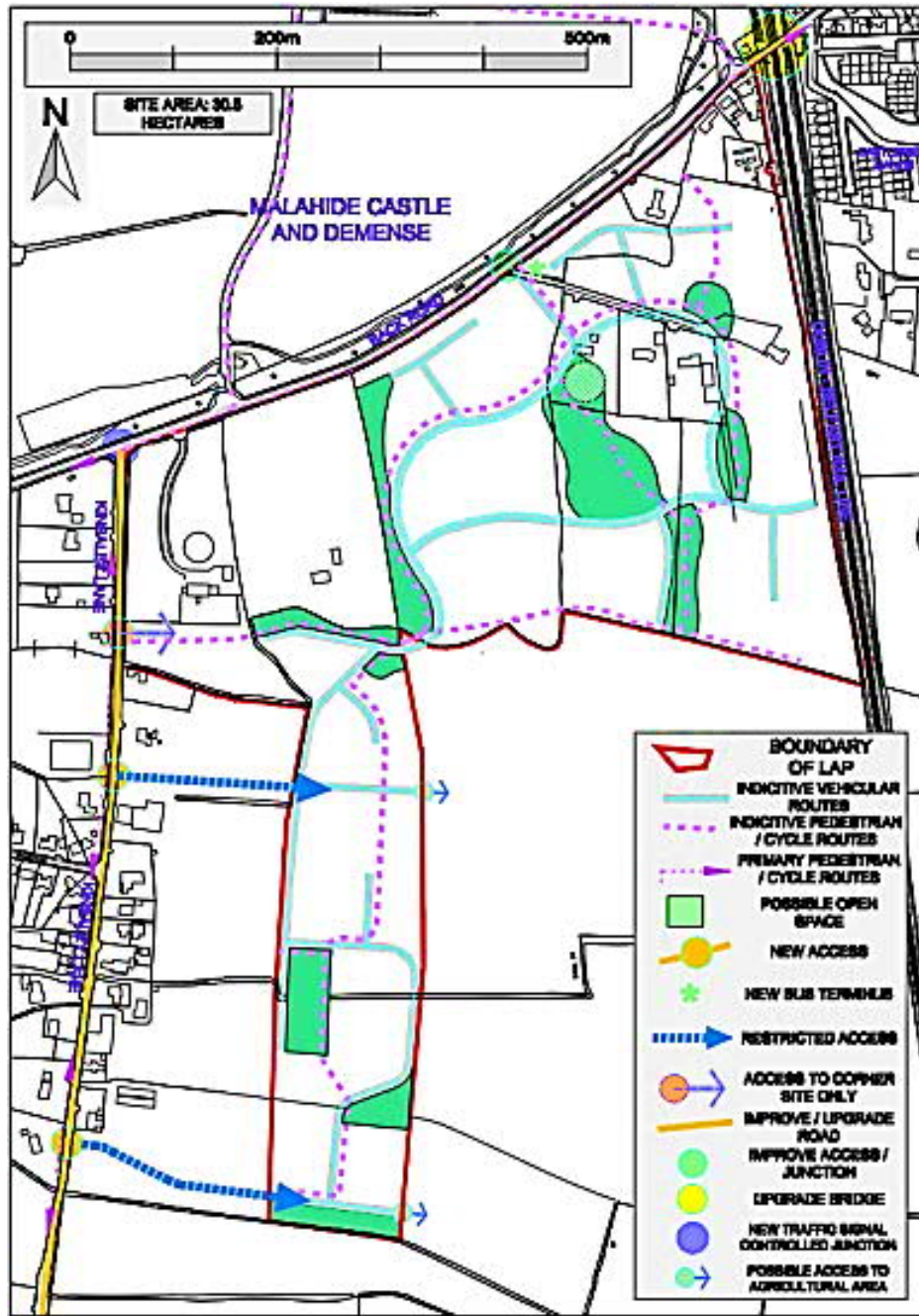


Figure 2.9: Broomfield Local Area Plan (lapsed)

2.6.3 Streamstown Local Area Plan

The Streamstown LAP was adopted in 2009 but has been extended until 9th February 2019. This LAP provides a development strategy for the RA lands in Streamstown. The Streamstown LAP boundary is illustrated in red in Figure 2.11 below. The primary pedestrian and cycle routes are illustrated in purple. The total site area is approx. 25.4 hectares, comprising established residential dwellings, an existing landscape business, fields and paddocks.

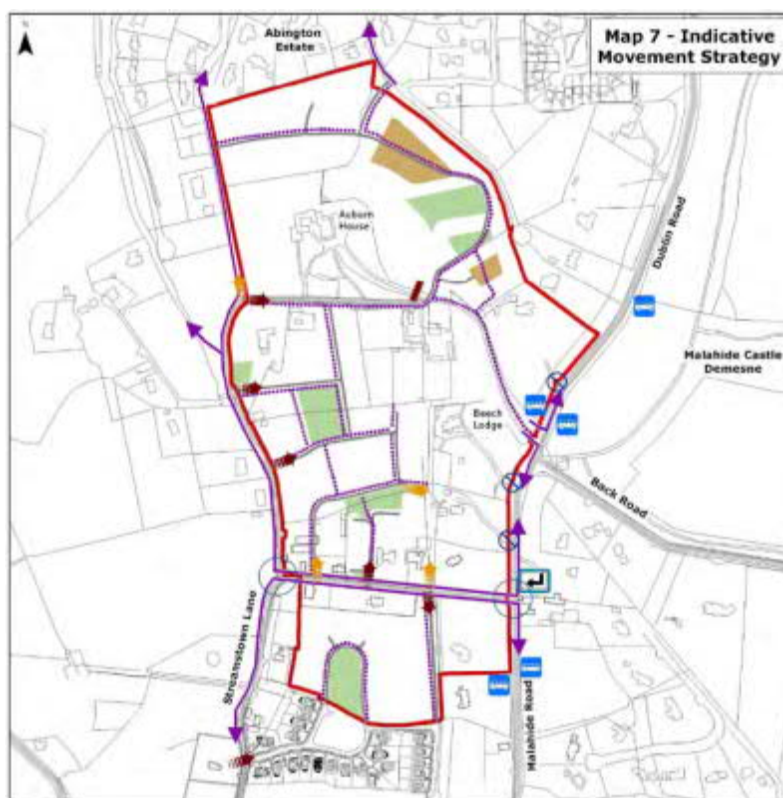


Figure 2.10 Streamstown LAP (Source: Fingal County Council website)

Some of the key principles of the LAP in relation to cyclist and pedestrian facilities include:

Access to Sustainable Modes of Transport - "The Local Area Plan is well placed to provide good access to sustainable means of transport.... The Local Area Plan provides for the establishment of new pedestrian and cycle routes and the upgrading of existing routes in order to provide both north-south and east-west connections."

Roads Improvement Works - "As part of development occurring within the Local Area Plan, upgrading works on Streamstown Lane and Carey's Lane will include resurfacing and, if necessary, widening of the roadway, the establishment of footpaths..."

Cyclist and pedestrian facilities are also referred to under the following LAP objectives:

- Open Space Objectives (OS1) - "To ensure that areas of public open space are easily accessible by pedestrians and cyclists, including the nearby Malahide Demesne."
- Urban Form Design Objectives (UD6) - "To provide appropriate footpaths, cycleways and roads to serve the levels of development envisaged in this LAP."

Pedestrian and cycle links are proposed by the Streamstown LAP to connect Carey's Lane and Abington to Malahide Road, linking to Malahide Castle demesne and bus stops. The proposed cycle and pedestrian routes would provide very good access to the amenities and open space of Malahide Demesne and to the services and facilities in Malahide.

2.6.4 Portmarnock South Local Area Plan



Figure 2.11: Portmarnock South Local Area Plan Location Map (source: Portmarnock South Local Area Plan, Fingal County Council, July 2013)

Fingal County Council has prepared this Local Area Plan (LAP) for lands at Portmarnock South. The LAP sets its new residential community within a wider landscape and environmental context and provides a framework for the proper planning and sustainable development of the Portmarnock South LAP lands.

Reference to pedestrian and cyclist facilities are contained within the document in several sections as stated below:

Section 6.4 - "The street network within the plans shall be designed to achieve the following: Accessible Streets with a focus on the free movement of vulnerable users such as cyclists and pedestrians."

Section 6.7 - Objective 12: "Facilitate the provision of pedestrian crossings on Moyne Road and Station Road and at other appropriate locations within the plan area."

Objective TM 13: "Implement a street network with a high quality public realm and priority for the pedestrian/cyclist and mobility impaired."

Station Road has also been identified as an Indicative Priority Ped/Cycle Route as shown on Figure 2.13 below. These Priority Green Routes should provide connecting routes for pedestrians and cyclists to key destinations in the area including Portmarnock train station. Some concept design guidance is also contained within Section 6 of the report which states: "There is an opportunity through the development of the plan lands to provide significantly enhanced pedestrian/cyclist facilities along this route. This will support the sustainable transport needs of existing and developing areas. In this regard, a tree lined boundary is proposed along Station Road with integrated pedestrian/cycle facilities located behind the tree line providing an attractive and efficient link to Portmarnock train station."



Figure 2.12: Indicative Internal Street and Movement Network (source: Portmarnock South Local Area Plan, Fingal County Council, July 2013)

3. Assessment Methodology

3.1 Introduction

The first step of the options assessment was to identify a Longlist of route corridor options which could link Kinsealy with the Primary Nodes identified in the Study Area, including:

- Fingal Cemetery (Junction of Malahide Road/Belmayne Road);
- Balgriffin Cottages (The Hole in the Wall Road/Balgriffin Road Junction);
- Old Portmarnock (Station Road);
- Kettles Lane (connect to the existing two-way cycleway that terminates at Russell Terrace);
- Feltrim Road (M1 Overbridge); and
- Malahide Castle and Garden (Entrance Gate).

The Longlist of route corridor options was developed based on:

- Ability to form key connections between Primary Nodes, whilst also accommodating Secondary Nodes;
- Knowledge of the existing topography and infrastructure; and
- Engineering reasoning and judgement.

A number of possible route options within each route corridor were assessed against the six Project Appraisal Criteria in the Common Appraisal Framework (CAF) (DTTAS, 2016). These criteria are:

1. Economy
2. Safety
3. Integration
4. Environment
5. Accessibility and Social Inclusion
6. Physical Activity (where applicable)

The assessment considerations took into account the existing built and natural environment (i.e. Land-use, Ecology, Archaeology and Heritage) and the National Cycle Manual's '5 Needs of the Cyclist'. Table 3.1 shows the different factors and needs of cyclists examined for each route option under each CAF criteria.

Table 3.1: CAF Multi-Criteria Analysis table

Common Appraisal Framework (CAF)		Route Option Selection Considerations	
		Factors	'Five Needs of Cyclists'
1	Economy	- Indicative Construction & Land Acquisition Costs	
2	Safety		- Safety
3	Integration	- Land-use	
4	Environmental	- Ecology - Archaeology & Heritage	
5	Accessibility & *Social Inclusion	- Accessibility	- Directness - Coherence
6	**Physical Activity		

*Social Inclusion has been scoped out of the multi-criteria analysis. As illustrated in Figure 4.7, all corridors in the feasibility study serve areas considered affluent and marginally above average, as per the Pobal Deprivation Index.

** Physical Activity has been scoped out of the multi-criteria analysis. This is because all route options are considered to promote physical activity equally and as such it is not considered to be a key differentiator between route options.

3.2 Assessment Considerations

The following considerations have been discussed as Multi-Criteria Analysis, leading to the recommendation of the most feasible routes options.

3.2.1 Economy

- Feasibility Working Construction Cost Estimate: the infrastructure construction cost estimate and land acquisition costs, based on a range of per kilometre rates, were determined.

3.2.2 Safety

- Route Safety and Security: The safety of each route was considered at a macro or network level. This primarily focused on the alignments of each route and how this influences personal security and safety.

3.2.3 Integration

- Land-use: Alignment integration or otherwise, with current or proposed land-use was considered.

3.2.4 Environment

- Ecology and Existing Trees: At a macro level, potential considerations on the ecology along each route option were outlined.
- Archaeology and Architectural Heritage: Potential archaeological and architectural heritage considerations along each route option were considered.

3.2.5 Accessibility and Social Inclusion

- Directness: The route directness was considered based upon the National Cycle Manual guidance.
- Coherence: The coherence of each route was considered based upon National Cycle Manual guidance.
- Accessibility: The accessibility of each route option from existing and proposed developments was discussed.

The National Cycle Manual defines the '5 Needs of the Cyclist' and outlines why they are central to network planning. The Manual (Section 3.3.1) states:

"The Cycle Network should address the 5 Needs of the Cyclist. The first 3 needs, namely Safety, Coherence and Directness are considered central to the network planning. Comfort and Attractiveness are not considered as significant factors in network planning, but remain important requirements at route and link level".

Cyclist Need	Implications for Cycle Network Planning
Directness	Offer as direct a route as possible, keeping detours or delays to a minimum. Provide a shorter average distance (or journey time) over short distances as compared to other modes.
Safety	Provide for the safe passage of cyclists and other road users. Provide socially safe route choices at night-time
Coherence	Link all main origin zones and destinations. Aim to carry the majority of cycle traffic (in cycle-km terms). Offer route choice, with at least one risk-averse option for key journeys

Figure 3.1: National Cycle Manual Section 3.3.1

Safety, Coherence and Directness are considered the most significant factors in network planning and have been included in the Multi-Criteria Analysis table.

3.3 Options Development

Based on engineering reasoning and judgement, an outline design was developed for each route option to provide a balance between:

- Provision of the optimum cycling and walking facilities;
- Land acquisition impacts; and
- Impacts on the existing built and natural environment.

Link types were developed based on the Scheme Aim (refer to Section 1.3) and suitable Link Types in the National Cycle Manual, a total of seven primary Link Types were established. Refer to Appendix I, for Link Types cross-sections.

3.4 Costing

For the route options considered along each route corridor, an outline ‘Order of Magnitude’ cost was prepared for assessment and comparison purposes. This cost assumes complete improvement of the entire cross-section of existing roads including improvement of pavement, provision of adequate public lighting, additional drainage measure, boundary works (where third-party land acquisition is required), signage and lining etc.

This cost estimate was based on a range of per kilometre rates reflecting the extent of construction works required. The following steps were followed in order to derive cost estimates for each route option:

- Step 1: Define construction activity levels and assumptions for route sections.
- Step 2: Estimation of cost rates in relation to construction activity levels for route sections.
- Step 3: Apply appropriate cost rates to each route option to derive route option cost estimate.

As part of the route optioneering process, constraints and associated mitigation measures, which provide improved / full cycle lane provision, have been identified, grouped and ranked in levels.

The following table presents the construction activity levels for corridor sections, the assumed level of works for each category and the per-kilometre rate.

Table 3.2: Feasibility Construction Cost Estimate

Step 1 Construction Activity Level	Construction Works Assumption	Step 2 €/km
Level 1 Improving existing road elements to include on-road cycle lanes, without geometrically altering the existing infrastructure	<ul style="list-style-type: none"> • Minor kerbs improvement locally (removal and replacement) • Footpaths improvement locally (breaking out/additional concrete) • Road resurfacing locally (milling/reinstatement or overlay) • Road markings (non-destructive removal of existing road markings, new road markings) • Signage (removal/relocation/replacement of existing and/or installation of new) 	€105,000
Level 2 (Cross section Link Type G) Segregated off-road cycle tracks construction (mostly greenfield), including private land acquisition	<ul style="list-style-type: none"> • General site clearance • Drainage works (installation of new drainage systems) • Earthworks (embankment treatments, retaining walls, etc.) • Full depth Cycle Track construction • Signage (installation of new) • Public lighting (cabling, ducting, lampposts) • Landscaping works (top soiling, fence, trees relocation, hedges, etc.) • Property boundary reinstatement works (walls, gates, etc.) 	€325,000
Level 3 (Cross Section Link Type A) Geometrical alterations to the existing infrastructure required to accommodate on and/or off-road cycle facilities, including private land acquisition	<ul style="list-style-type: none"> • General site clearance • Safety barriers/guardrails (removal and new) • Services protection/relocation/diversion (power supply, communications) • Drainage works (removal of and installation of new drainage systems) • Earthworks • Off-road cycle track construction • Road markings (non-destructive removal of existing road markings, new road markings) • Kerbs footways and paved areas (removal and new) • Road lighting (relocation, cabling, ducting) • Signage (removal/relocation/replacement of existing and/or installation of new) • Landscaping works (top soiling, fence, trees relocation, hedges, road margins re-grading, etc.) 	€435,000

Land acquisition costs will be accounted for separately at market value. Exclusions from the cost estimation process at this stage are listed below:

- Professional Fees;
- Contingency (optimism bias and quantifiable risk);
- Design and Construction Supervision Costs;
- VAT;
- Administration and management costs;
- Fees for planning process;
- Statutory Undertakers;
- Maintenance costs; and
- Escalation and inflation adjustments.

- **HT – High Technology** – “Provide for office, research and development and high technology/high technology manufacturing type employment in a high quality built and landscaped environment.”
- **RA – Residential Area** – “Provide for new residential communities subject to the provision of the necessary social and physical infrastructure.”
- **TC – Town and District Centre** – “Protect and enhance the special physical and social character of town and district centres and provide and/ or improve urban facilities.”

The land use assessment for this feasibility study examined private and public land along the different route corridors. This information was used for developing cost estimates for each of the route options, based on the area and nature (public or private) of the land acquisition required.

A larger, more detailed map of the development zones in vicinity of the Study Area is contained within Appendix A.

4.2 Planning Survey

A desk based review of active planning applications along the Study Area corridors was undertaken to identify any plans which may impact on the route option selection and design process. A map of the active planning applications is contained within Appendix B while a detailed description of each planning application is contained in a stand-alone document due to the large number of applications.

Irish Water has recently submitted a planning application for the GDD (Greater Dublin Drainage) scheme. The plans indicate that the scheme will pass through Kinsealy and should be taken into account at preliminary design stage. The wayleave above the pipe could potentially be used as a cycle route.

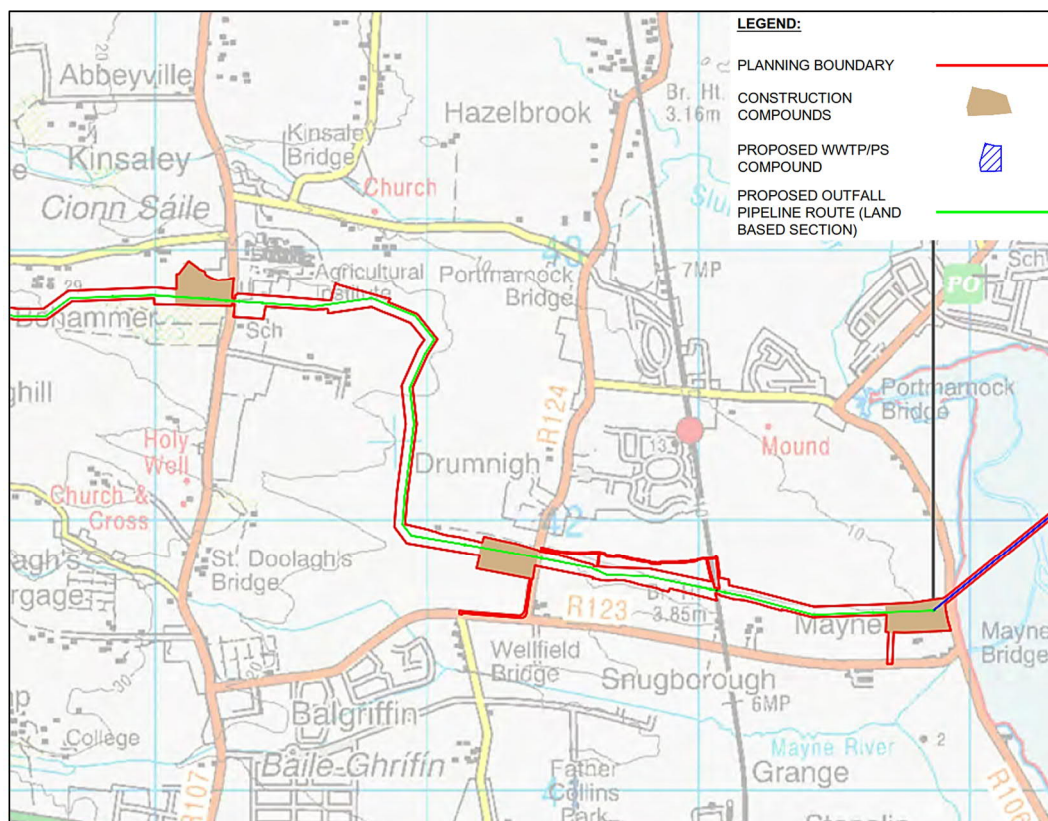


Figure 4.2: GDD scheme through Kinsealy

Route options along Malahide Road would take cognisance of the new Balgriffin Cemetery extension which is to be developed to the west of Malahide Road, adjacent to the existing Balgriffin Cemetery. The Cemetery boundary walls on Malahide Road pose a constraint in terms of land acquisition for cycle facilities i.e. it may be difficult to acquire land from the Cemetery.



Figure 4.3: New Balgriffin Cemetery extension

4.3 Geotechnical Investigation

A desktop analysis of the Study Area was completed to establish existing conditions in respect of geology, hydrology and hydrogeology.

The Teagasc soil map (available on the Geological Survey of Ireland (GSI) website) indicates that the topsoils in the area of the site are a combination of 'Surface water Gleys' and "Brown Earths". Glaciofluvial sands and gravels may also be present depending on the final route alignment. The GSI Geotechnical Viewer indicates that the subsoils beneath these are 'Till' derived chiefly from Limestone, with bedrock of the Tober Colleen formation, described as Calcareous shale, limestone conglomerate.

The drift geology of the area formed by Dublin Boulder Clay: a lodgement till derived chiefly from (Carboniferous) limestone and deposited during the last ice age, about 10,000 years ago. Investigations have identified:

- 'Brown Dublin Boulder Clay' typically, brown or mottled brown/grey sandy gravelly silt/clay with low to medium cobble content, generally firm / firm to stiff and locally soft to firm near ground level,

Underlain by

- 'Black Dublin Boulder Clay', typically encountered at 0.5-4.0m below natural ground level and comprising stiff / very stiff / hard, generally black / dark grey, sandy gravelly silt/clay with low to medium, locally high, cobble content with occasional boulders.

Upon selection of a preferred alignment, a site reconnaissance and intrusive investigation should be carried out to establish the localised soil conditions.

4.4 Ecological Studies

4.4.1 Ecological Condition

An ecological constraints site visit was conducted in March 2018 as well as a desk based survey. These exercises took cognisance of features with potential for roosting bats and breeding herons/egrets, badger setts, treelines, stone walls, Special Areas of Conservation (SAC), Special Protection Areas (SPA) and proposed Natural Heritage Areas (pNHA). The ecology constraints map is presented in Appendix C.

4.4.2 Tree Survey

A desk based review of potentially significant tree locations, supplemented by a walkover survey was completed by qualified arborists CMK Hort + Arb in April 2018. The tree survey assessment identified the approximate number and location of potentially significant roadside trees along within the network.

The route options selection took into consideration mature and protected trees within the Study Area. The Tree Survey Report in its entirety is presented in Appendix D.

4.5 Architectural Heritage

A desk based review of notable architectural heritage sites (e.g. Protected Structures, Architectural Conservation Areas, historic designed landscapes) along the route corridors was undertaken to identify any sites which may impact on the route option selection and design process. A map of the architectural heritage sites is contained within Appendix E.

4.6 Archaeological Study

A heritage review was undertaken by Irish Archaeology Consultancy (IAC) on behalf of AECOM in May 2018. This assessment has been carried out to establish significant existing architectural and archaeological conditions within the network and to ascertain the potential impacts of proposed footpath and cycleway options during the route options development.

Research for this report was undertaken by a desktop review of all available archaeological, historical and cartographic sources.

Refer to Appendix F, Archaeological Study and Report, for details of the assessment carried out and its findings.

4.7 Social Inclusion and Impact

A desk based review of socio-economic context was carried out within the Study Area. The socio-economic context was established by determining the relative affluence or disadvantage of the geographical area, and establishing the residential population catchment within a relatively short (15 mins or less) walk or cycle.

4.7.1 Residential Population and Employment Catchments

The population residing within a 15 minute walking and cycling distance from key trip attractors are shown in the following figures.

These figures are based on the Census 2011 Small Area Population Statistics (SAPS) and assume a cycling speed of 17km/hour and a walking speed of 5km/hour. Census 2016 data was not available at time of work.

Malahide/Portmarnock Educate Together (temporary location until 2020) and St. Nicholas of Myra Primary School

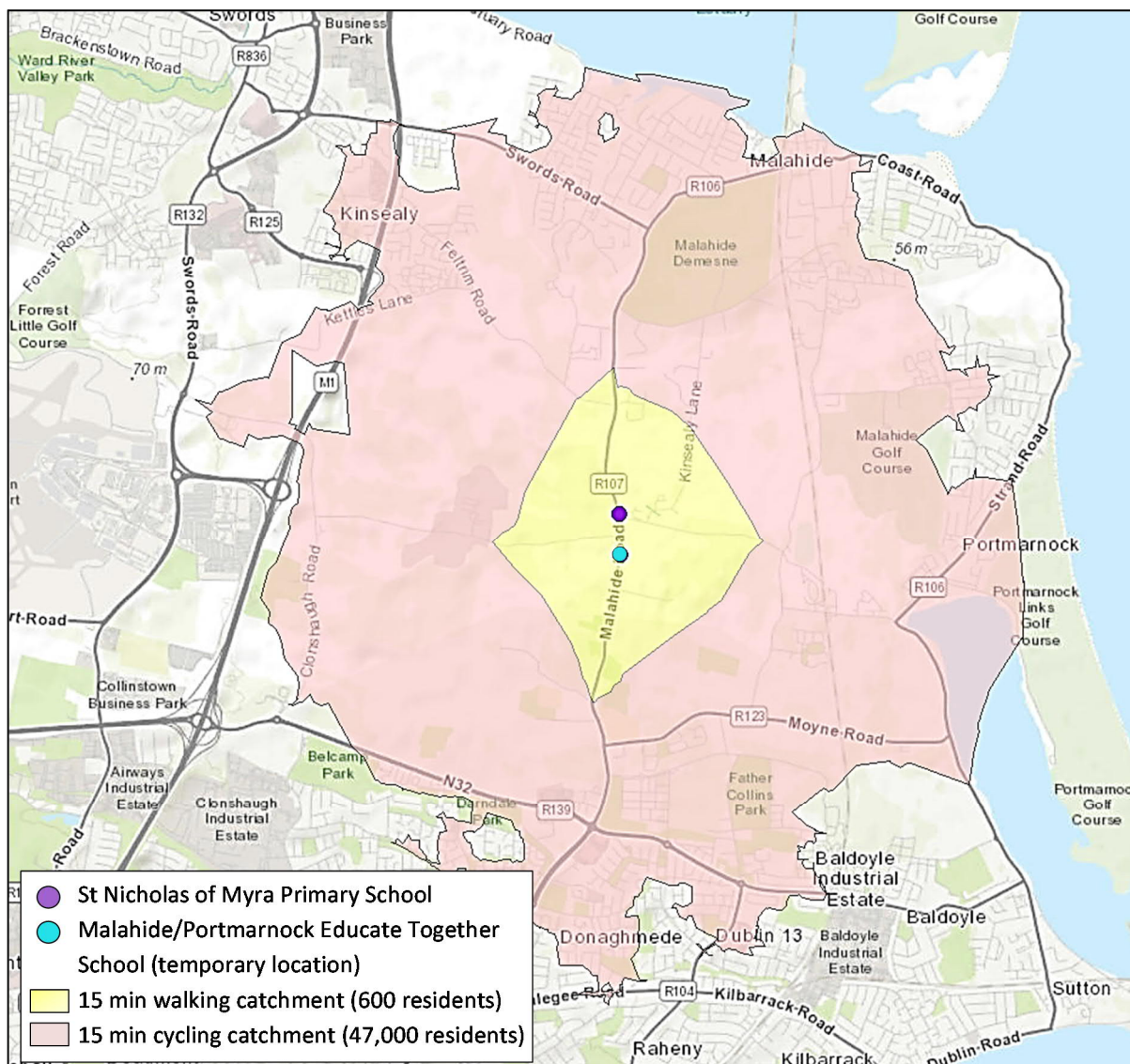


Figure 4.4: Cycling and walking catchment for Kinsealy Primary Schools

Scoil an Duinnigh

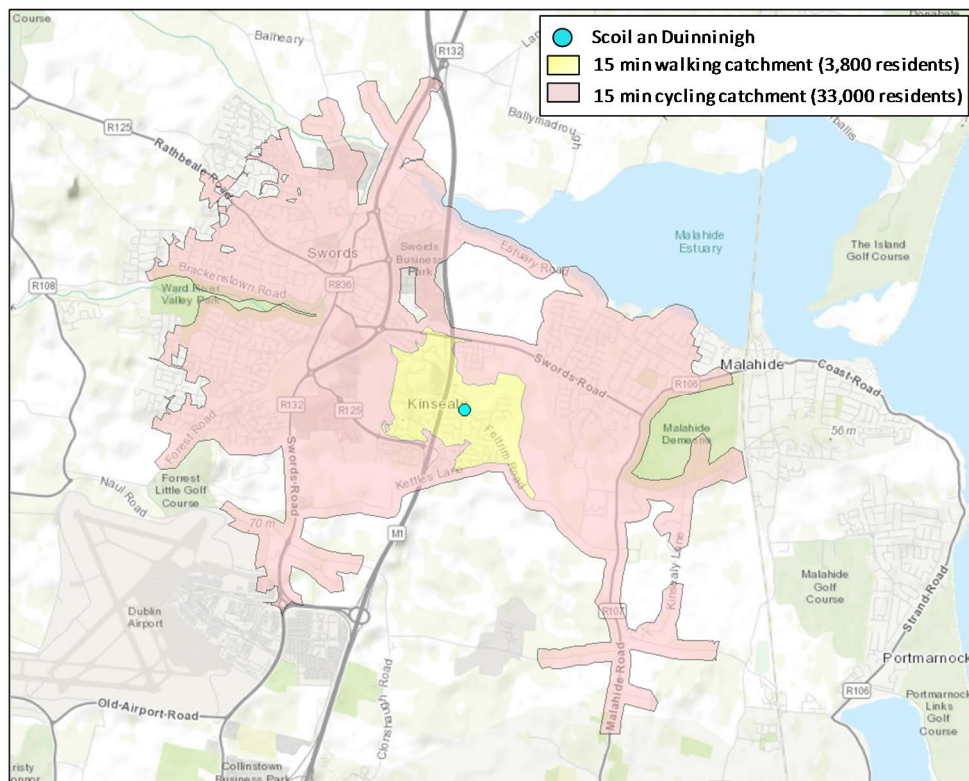


Figure 4.5: Cycling and walking catchment for Scoil an Duinnigh

Portmarnock Train Station

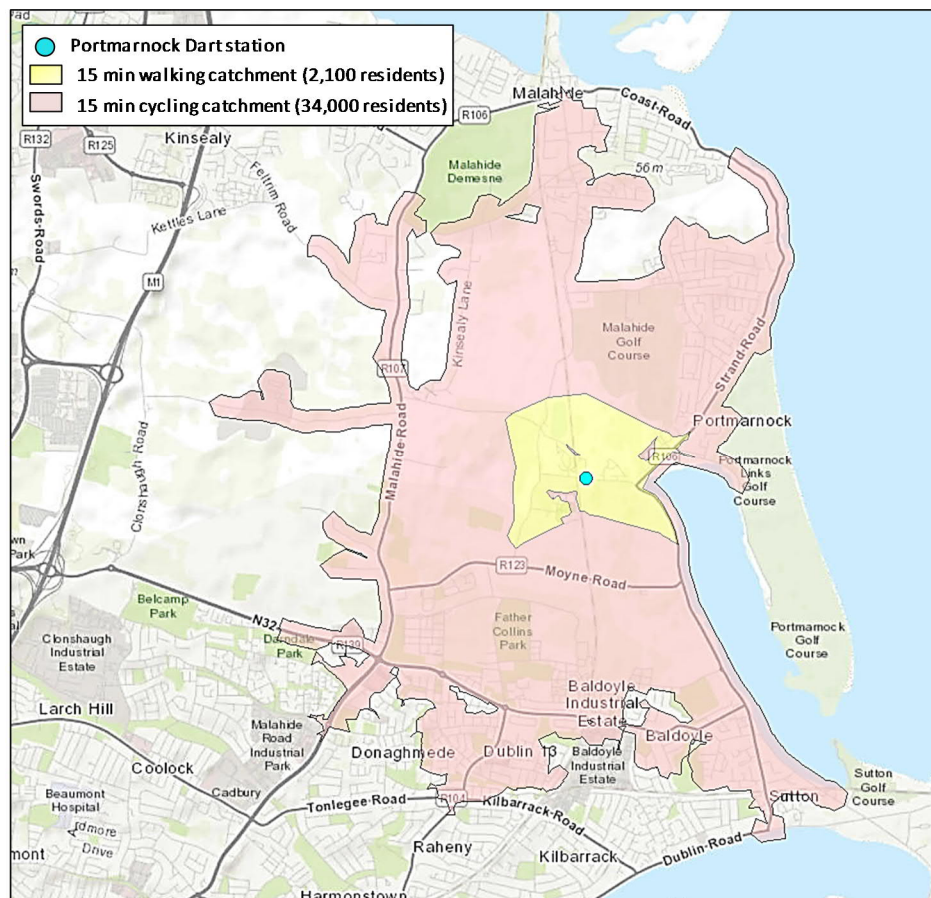


Figure 4.6: Cycling and walking catchment for Portmarnock Dart Station

4.7.2 Deprived Geographic Areas

A map of the 2016 Pobal HP Deprivation Index is shown in the figure below. This index provides a method of measuring the relative affluence or disadvantage of a particular geographical area based upon data compiled from various censuses.

As illustrated in Figure 4.7 the Study Area primarily serves areas considered affluent and marginally above average, as per the Pobal Deprivation Index.

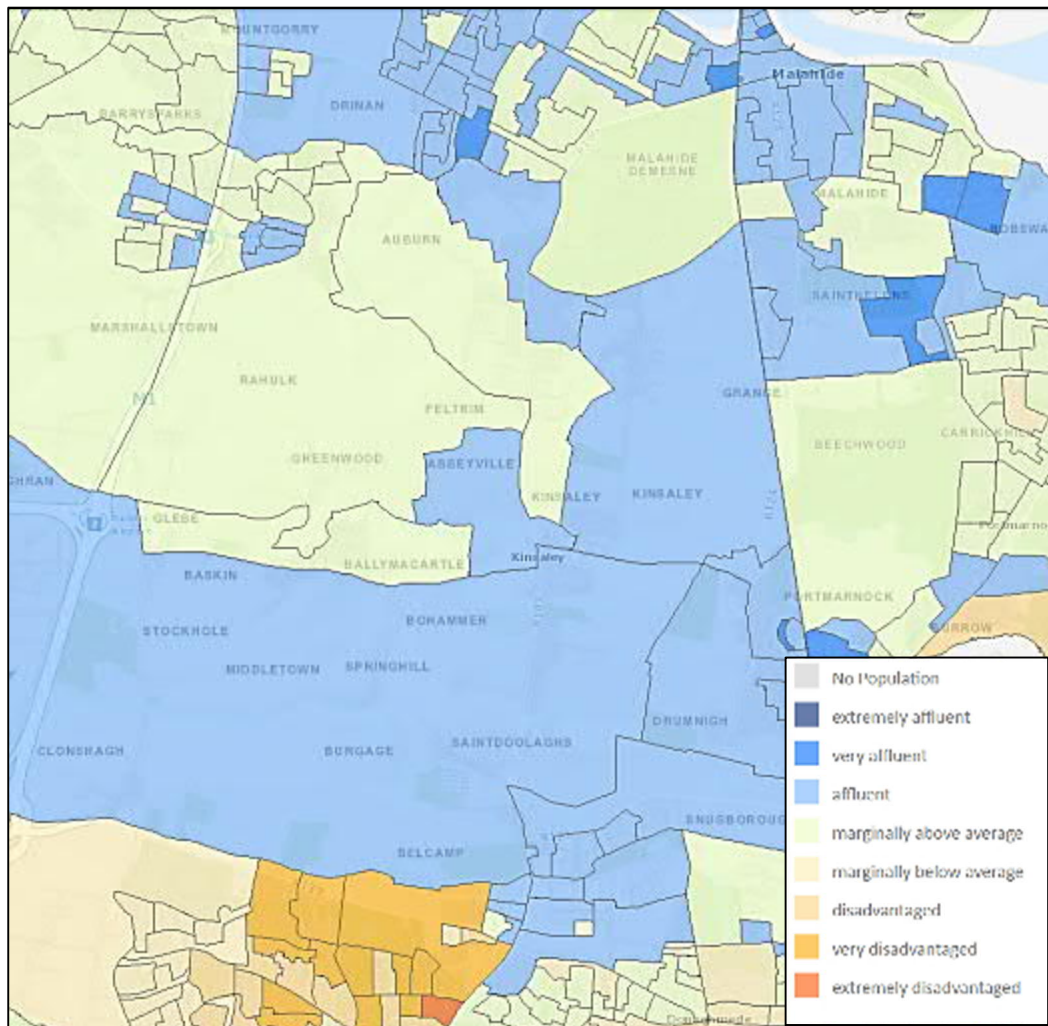


Figure 4.7: Pobal HP Deprivation Index for the Study Area

4.8 Route Network Audit

4.8.1 Physical Constraints and Opportunities

There are a number of constraints and opportunities, both natural (i.e. existing natural environment) and physical (the built environment), which constrain route options within the defined Study Area.

A map of the notable features in the existing built and natural environment is provided in Appendix G.

4.8.2 Existing Cycling and Footpaths Facilities

A map indicating the existing footpaths along Study Area corridors was produced to highlight sections without current dedicated walking provision. There are no existing cycle facilities in the Study Area.

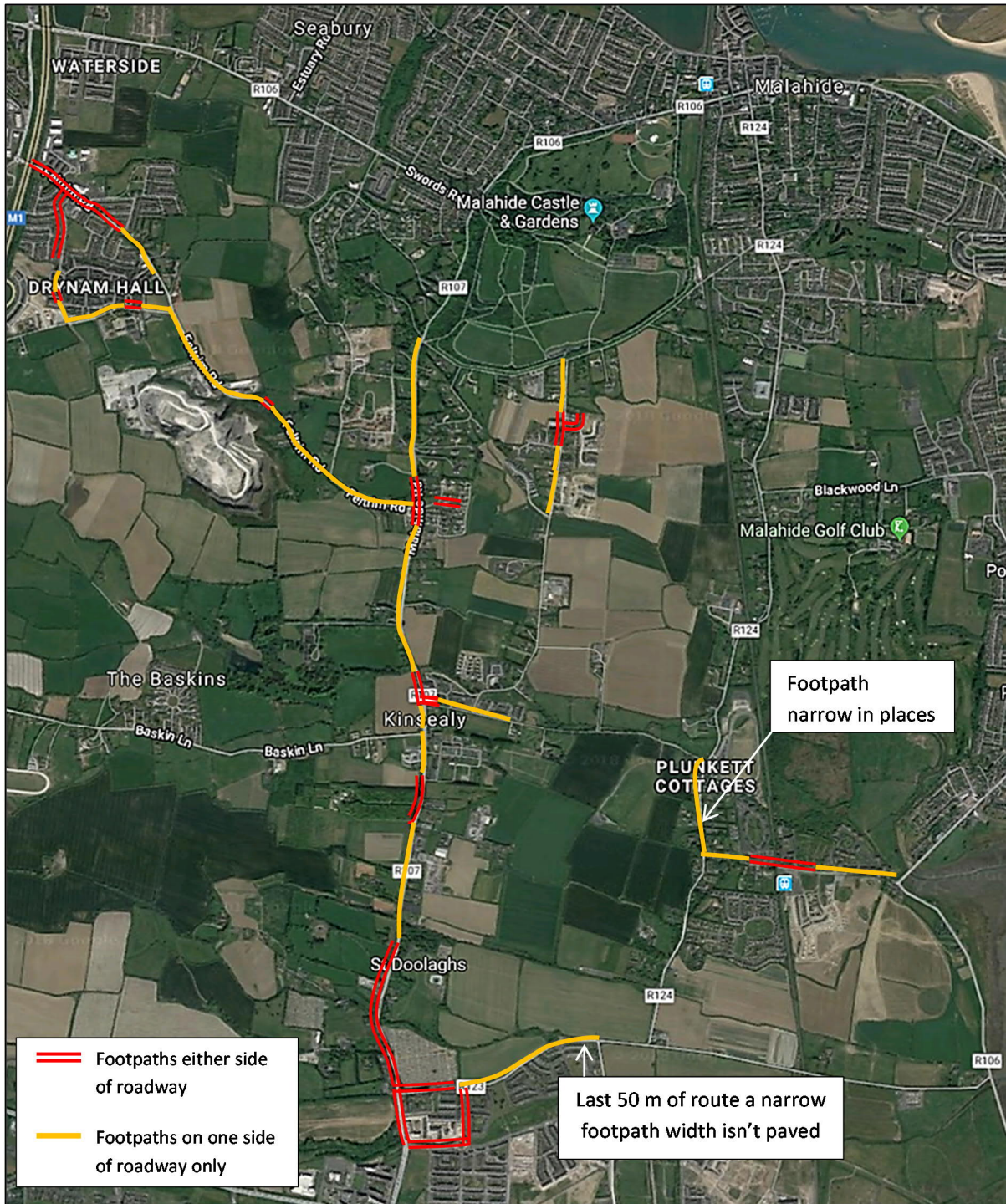


Figure 4.8: Map of existing footpaths (source: Google Earth)

4.8.3 Existing Public Transport Facilities

A map indicating the existing bus facilities throughout the Study Area was produced to highlight sections of the network where there are existing facilities - see Figure 4.9 below. The map shows existing bus stops along Malahide Road and Feltrim Road. There are no existing facilities along the R123 (Balgriffin Road), Chapel Road, R124, Station Road or Kettles Lane.

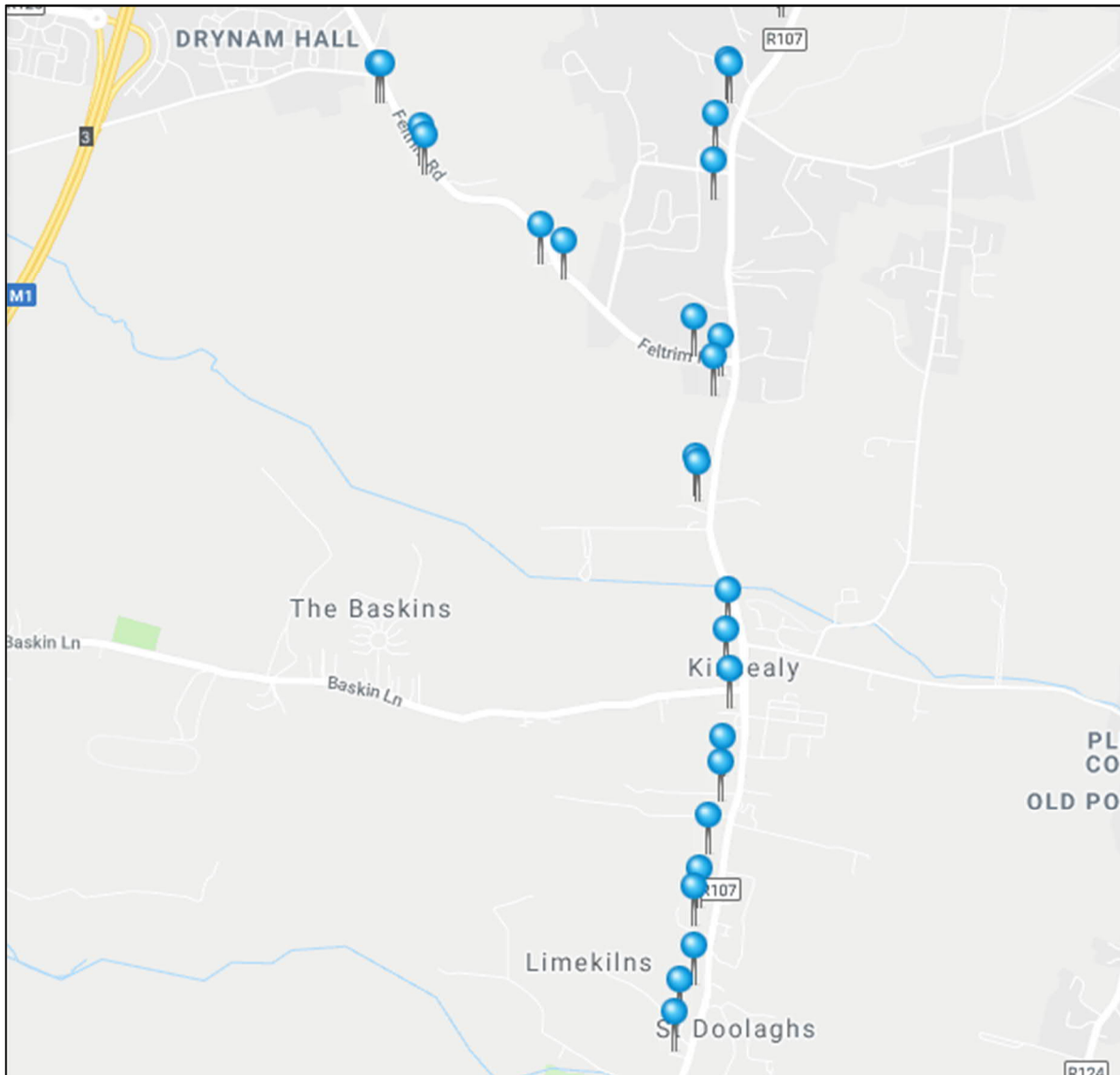


Figure 4.9: Bus Stops Kinsealy Environs (source: www.dublinbus.ie)

4.8.4 Road Collision History

The Road Safety Authority database of personal injury accidents was examined to establish if there are any existing safety issues along the route options that were not evident from the site visits. The database provides accident records for the period 2005 to 2014; in terms of location, year, road user type involved (pedestrian, car, cyclist, motorcyclist, bus etc.), circumstances and severity of collision (minor, serious or fatal). The following collision history maps indicate the location of incidents involving pedestrians (Figure 4.10) and cyclists (Figure 4.11) along the routes identified within the Study Area.

4.8.4.1 Pedestrian incidents



Figure 4.10: RSA road collision history map of pedestrian incidents

The RSA road collision statistics show a total of 9 pedestrian incidents along the route corridors between 2005 and 2014. Of the 9 incidents, 8 were minor and 1 was fatal; all involved a pedestrian collision with a car or goods vehicle.

4.8.4.2 Cyclist incidents



Figure 4.11: RSA road collision history map of cyclist incidents

The RSA road collision statistics show a total of 2 cyclist incidents along the feasibility study route corridors between 2005 and 2014. Both incidents occurred in the evening period (19:00 - 23:00).

4.8.5 Existing Utilities

Existing major utility providers in the Study Area were contacted and the combined existing services and utilities maps are presented in Appendix H.

5. Route Options Assessment

5.1 Longlist

The objective of the route option assessment was to identify feasible route options from the Longlist of route options.

The Longlist of route options was developed based on:

- Ability to form key connections between Primary Nodes, whilst also accommodating Secondary Nodes.
- Knowledge of the existing topography and infrastructure; and
- Engineering reasoning and judgement.

The draft Longlist for the route options assessment is shown in Figure 5.1 below.



Figure 5.1: Longlist Route Options

The Primary Nodes are as follows:

- Kinsealy;
- Fingal Cemetery (Junction of Malahide Road and Belmayne Access Road);
- Balgriffin Cottages (Hole in the Wall Road Junction);
- Station Road (Portmarnock train station);
- Kettles Lane (to connect to the existing two-way cycle route at Russell Terrace);
- Feltrim Road (M1 Overbridge); and
- Malahide Castle and Garden (entrance gate).

5.2 Corridor 1 (Node A-B): Kinsealy - Fingal Cemetery

This route would connect Kinsealy to Fingal Cemetery (Junction of Malahide Road and Belmayne Access Road).

Three route options have been considered for Corridor 1:

- Route Option 1: via Malahide Road only.
- Route Option 2a: off-road east of Malahide Road (following field boundaries) between Kinsealy and Fingal Cemetery.
- Route Option 2b: off-road east of Malahide Road (using more direct route through fields) between Kinsealy and Fingal Cemetery.

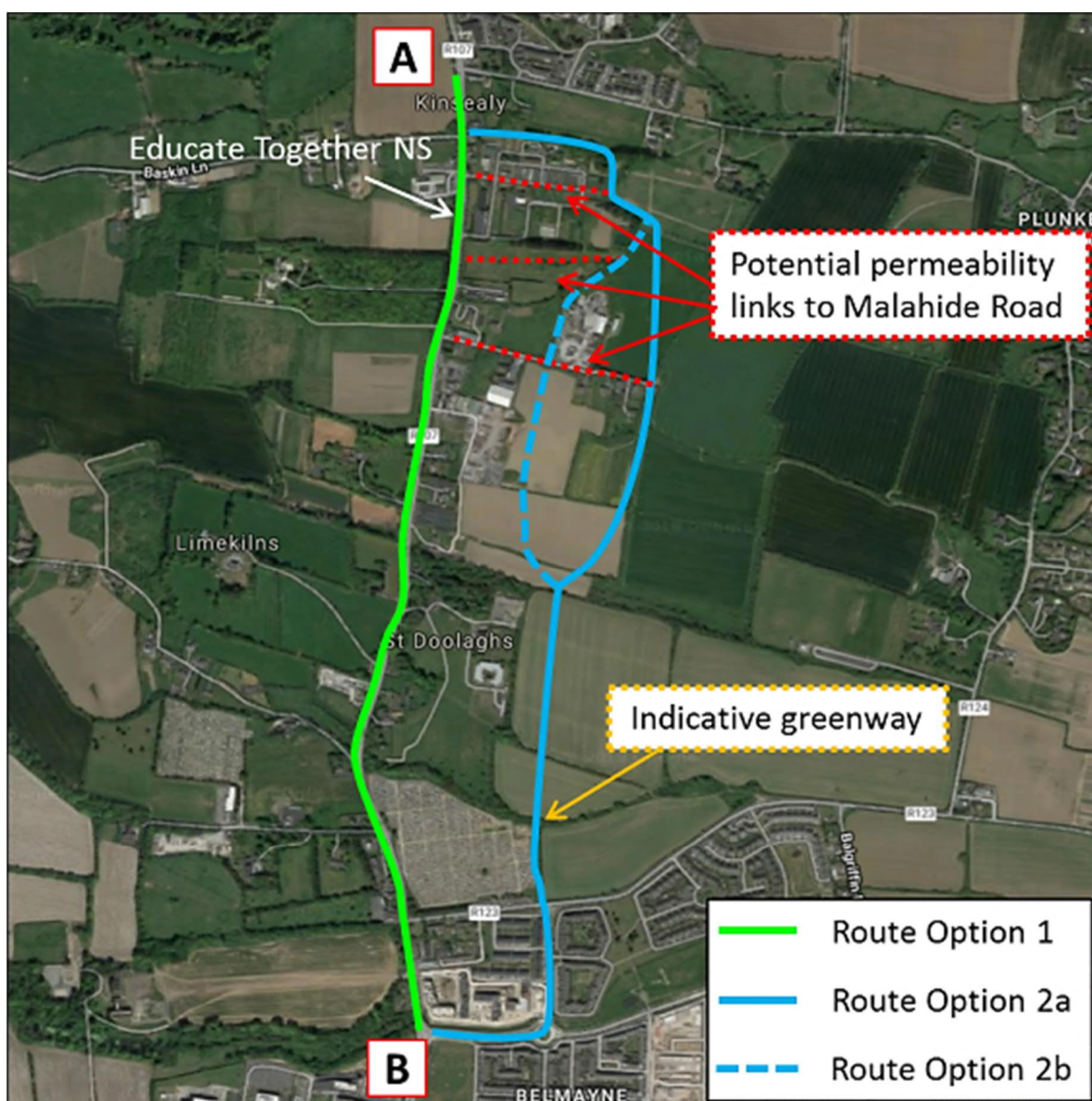


Figure 5.2: Route Options for Corridor 1, Node A-B

5.2.1 Route Option 1

Route Option 1 would provide the most direct and intuitive route with the shortest journey time. This on-road option would also provide passive surveillance and require less land acquisition than Route Option 2a and 2b. Segregated cycle facilities are achievable along the entirety of Route Option 1; however, land acquisition would be required along certain sections i.e. along the section of Malahide Road adjacent to St Doolagh's Park and Fingal Cemetery.

The existing width along Malahide Road between Balgriffin Road and the entrance to St Doolagh's Park Care and Rehab Centre is quite narrow. Significant land acquisition would be required along this section to provide cycle facilities in order to avoid a reduction in quality of service for cyclists. The boundary walls of the Fingal Cemetery and new Balgriffin Cemetery extension (see section 4.2) pose a major constraint in terms of available width and land acquisition for cycle facilities.

Route Option 1 would pass through the Kinsealy Village LAP (draft LAP in progress) boundary area but would not impact any of the planned developments.

Notable archaeological and architectural heritage sites along this route option include St Doolagh's Church, St Doolagh's Well, St Doolagh's Park gate lodge, St Catherine's Well and Malahide Portmarnock Educate Together School (temporary location until 2020). The walls associated with the protected structures of St Doolagh's are also protected. Many of the surrounding archaeological and architectural protected/conservation sites along Route Option 1 do not pose a constraint to achieving the required widths. However, there are existing stone walls, trees and hedgerows along the length of Malahide Road which may be affected; some of which are afforded protection and add to the character of the area.

The estimated capital cost of Route Option 1 is €3m - €5m.

5.2.2 Route Option 2a and 2b

Route Option 2a and 2b would provide a more scenic route than Route Option 1, with longer journey times. These off-road routes would have ample space to provide segregated cyclist and pedestrian facilities through the agricultural land east of Malahide Road. However, there would be a significant impact on trees and hedgerows. Due to the off-road nature of these routes, they could potentially require active surveillance e.g. CCTV. Route Option 2a and 2b may also require road markings and signposts on Balgriffin Road to inform cyclists of the off-road greenway.

East of the Fingal Cemetery the land is identified as a burial site as per the Fingal Development Plan 2017-2023. However, it is anticipated that it would be feasible to provide a route for cyclists adjacent to the eastern boundary of the existing Fingal Cemetery, considering that the new Balgriffin Cemetery is being developed to the west.

There is enough space along the on-road sections of Route Option 2a and 2b for segregated cycle lanes and footpaths i.e. along Belmayne and St Samson's Court.

Route Option 2a and 2b would pass through the Kinsealy Village LAP (draft LAP in progress) boundary area. Both route options would integrate with the cycleway routes proposed under existing planning permissions.

Notable archaeological and architectural heritage sites along Route Option 2a and 2b include St Doolagh's Park. These route option designs take cognisance of, and avoid impact on, protected/conservation sites; none of which pose a constraint to achieving required widths along either route option.

Figure 5.3 below illustrates where cycle facilities of quality of service A (as per the National Cycle Manual) could be achieved along each of the route options.

The estimated capital cost of Route Option 2a is: €14m - €18m.

The estimated capital cost of Route Option 2b is: €14m - €19m.

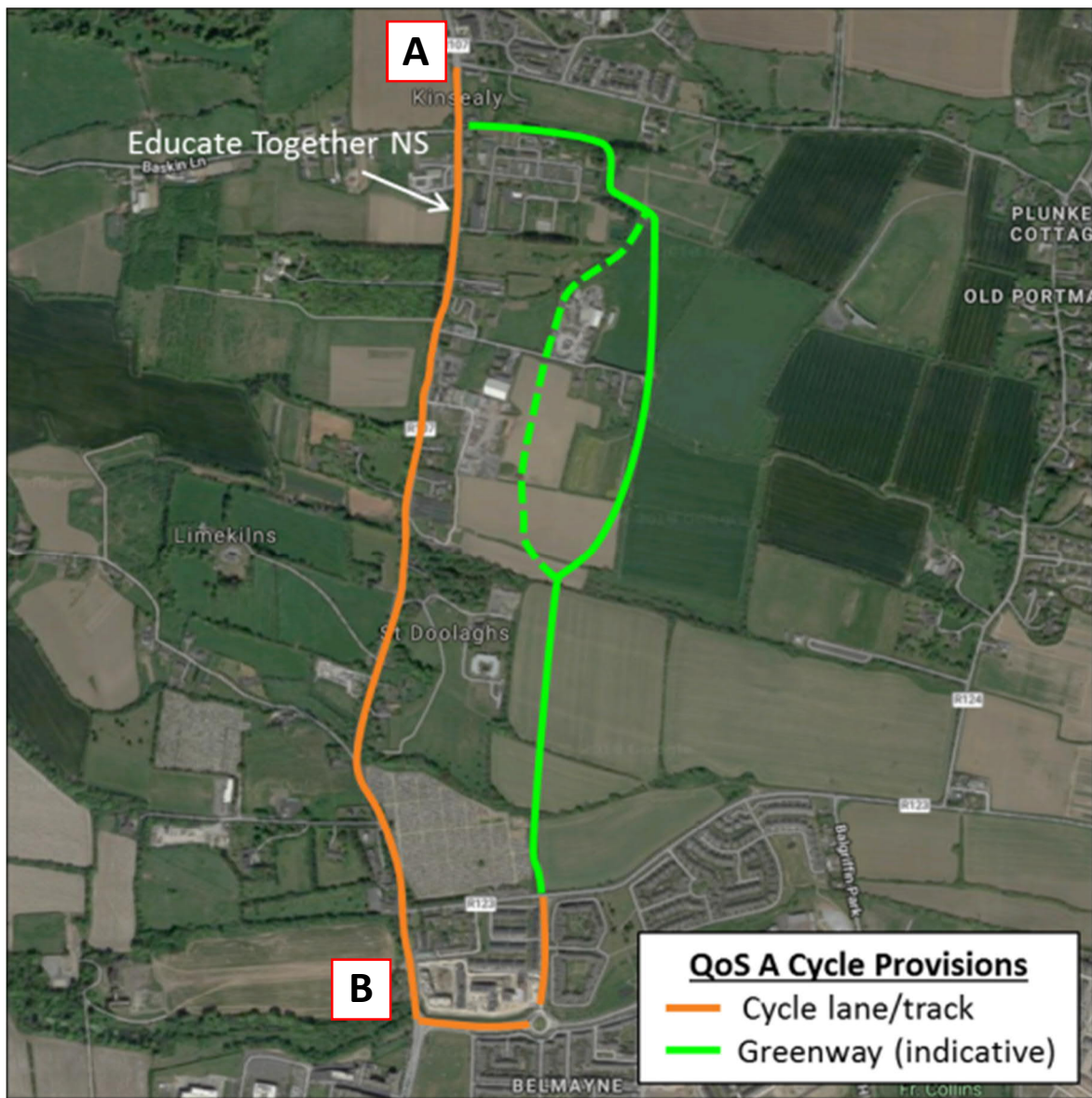


Figure 5.3 Potential cycle routes of quality of service A for Node A-B

Table 5.1 compares the route options under the CAF criteria.

Table 5.1 Multi-Criteria Analysis of Node A-B

Route Assessment Considerations	Corridor 1, Node A-B Kinsealy to Fingal Cemetery			
		Route Option 1	Route Option 2a	Route Option 2b
Economy	Indicative Construction & Land Acquisition Costs	€3-5m Capital Cost	€14-18m Capital Cost	€14-19m Capital Cost
Safety	Road Safety and Security	Route Option 1 would provide passive surveillance of users along Malahide Road.	Route Option 2a may require active surveillance (e.g. CCTV) to monitor users along the off-road section of the route.	Route Option 2b may require active surveillance (e.g. CCTV) to monitor users along the off-road section of the route.
Integration	Land-use	The boundary walls of St Doolagh's and of the existing Fingal Cemetery and new Balgriffin Cemetery extension (see section 4.2) pose a constraint in terms of available width and land acquisition for cycle facilities.	Route Options 2a and 2b would integrate with cycle facilities proposed under existing planning permissions within the Kinsealy Village LAP (draft LAP in progress) boundary area.	Route Options 2a and 2b would integrate with cycle facilities proposed under existing planning permissions within the Kinsealy Village LAP (draft LAP in progress) boundary area.
Environment	Ecology and Existing trees	There are existing stone walls, trees and hedgerows along the length of Malahide Road, some of which are afforded protection and add to the character of the area. All route options would cross the Cuckoo Stream north of Fingal Cemetery.	Route Option 2a and 2b would have the greatest impact on trees and hedgerows i.e. along the off-road section. All route options would cross the Cuckoo Stream north of Fingal Cemetery.	Route Option 2a and 2b would have the greatest impact on trees and hedgerows i.e. along the off-road section. All route options would cross the Cuckoo Stream north of Fingal Cemetery.

Route Assessment Considerations	Corridor 1, Node A-B Kinsealy to Fingal Cemetery			
		Route Option 1	Route Option 2a	Route Option 2b
Archaeology and Architectural Heritage		Many of the surrounding archaeological and architectural protected/conservation sites along Route Option 1 do not pose a constraint to achieving the required widths. Some existing stone walls, trees and hedgerows along the length of Malahide Road, some of which are afforded protection and which add to the character of the area, will be affected.	None of the surrounding archaeological and architectural protected/conservation sites along Route Option 2a pose a constraint to achieving the required widths.	None of the surrounding archaeological and architectural protected/conservation sites along Route Option 2b pose a constraint to achieving the required widths.
Accessibility and Social Inclusion	Directness	Route Option 1 would provide a more direct route (2.1km), offering a shorter journey time.	Route Option 2a and 2b would be the least direct options with the longest travel distance (2.85km and 2.75km respectively) and journey times.	Route Option 2a and 2b would be the least direct options with the longest travel distance (2.85km and 2.75km respectively) and journey times.
	Coherence	Route Option 1 would provide a more intuitive route to follow, alongside existing traffic on Malahide Road.	Route Option 2a and 2b would require road markings and signposts to inform users of the off-road route.	Route Option 2a and 2b would require road markings and signposts to inform users of the off-road route.
	Accessibility	Based on the existing road and footpath network, Route Option 1 would be more accessible.	Permeability links could be provided along Malahide Road to connect to Route Option 2a e.g. along Posie Row.	Permeability links could be provided along Malahide Road to connect to Route Option 2b e.g. along Posie Row.

5.3 Corridor 2 (Node B-C): Fingal Cemetery - Balgriffin Road (Hole in the Wall Junction)

This route would connect Malahide Road to the Hole in the Wall Road Junction via Balgriffin Road. Two route options have been considered for Corridor 2:

- Route Option 1: via Balgriffin Road.
- Route Option 2: Off-road, through Balgriffin fields and behind Fingal Cemetery.



Figure 5.4: Route Options for Corridor 2, Node B-C

5.3.1 Route Option 1

Balgriffin Road has sufficient width to accommodate segregated facilities for the majority of Route Option 1 with the exception of the first 300m from the Malahide Road Junction; space is limited along this section so to avoid cyclists sharing with traffic, land acquisition would be required either on the cemetery side or through front gardens.

Route Option 1 would better integrate with existing housing estates e.g. Castlemoyne, St Samson's Court and St Doolagh's Square.

No archaeological or architectural heritage sites have been identified along Route Option 1.

This route option design avoids impact on oak trees along Balgriffin Road which have potential for roosting bats.

The estimated capital cost of Route Option 1 is: €0.5m - €1.5m.

5.3.2 Route Option 2

Route Option 2 would offer a more scenic route, through the fields away from traffic. Additionally, Route Option 2 would provide a more direct link between Balgriffin Cottages and Kinsealy, offering greater journey time savings. However, due to the off-road (greenway) nature of this route, Route Option 2 may require active surveillance (e.g. CCTV). It would also require road markings and signposts to inform cyclists of the off-road cycle route through Balgriffin Park. This route would cross the Cuckoo Stream and have a greater impact on trees and hedgerows within Balgriffin Park and behind Fingal Cemetery.

No archaeological or architectural heritage sites have been identified along Route Option 2.

Permeability links could potentially be provided along Balgriffin Road to connect the housing estates to the proposed off-road greenway. However, Route Option 2 would not be as accessible nor integrate with existing housing developments to the same extent as Route Option 1.

The majority of the land required for Route Option 2 is in Fingal County Council ownership.

Figure 5.5 below illustrates where cycle facilities of quality of service A (as per the National Cycle Manual) could be achieved along each route option.

The estimated capital cost of Route Option 2 is: €5m - €7m.



Figure 5.5: Potential cycle routes of quality of service A for Node B-C

Table 5.2 compares the route options under the CAF criteria.

Table 5.2: Multi-Criteria Analysis of Node B-C

Route Assessment Considerations	Corridor 2, Node B-C Malahide Road to Balgriffin Road (Hole in the Wall Road Junction)		
		Route Option 1	Route Option 2
Economy	Indicative Construction & Land Acquisition Costs	€0.5m – 1.5m Capital Cost	€5m -7m Capital Cost
Safety	Road Safety and Security	This route option proposes a cycle facility parallel to traffic along Balgriffin Road. Route Option 1 would provide passive surveillance of cyclists.	Active surveillance (e.g. CCTV) may be required to monitor cyclists along the off-road facility through Balgriffin Park and behind Fingal Cemetery.
Integration	Land-use	Planning applications along Route Option 1 were reviewed. None of these will form a constraint to this route option. Refer to Appendix B for map of active planning applications.	Planning applications along Route Option 2 were reviewed. None of these will form a constraint to this route option. Refer to Appendix B for map of active planning applications.
Environment	Ecology and Existing trees	There is a stone wall along the Cemetery boundary on Balgriffin Road. Though it is not protected, it may pose a constraint in terms of acquiring land from the Cemetery. Alternatively, land acquisition would be required from gardens on the other side of the road. Route Option 1 scheme designs would need to take into account oak trees along Balgriffin Road with potential for roosting bats.	Route Option 2 would cross the Cuckoo Stream. Route Option 2 would have a greater impact on trees and hedgerows i.e. within Balgriffin Park and behind Fingal Cemetery.
	Archaeology and Architectural Heritage	No archaeological or architectural heritage sites have been identified along this route option.	No archaeology or architectural heritage sites have been identified along this route option.

Route Assessment Considerations	Corridor 2, Node B-C Malahide Road to Balgriffin Road (Hole in the Wall Road Junction)		
		Route Option 1	Route Option 2
Accessibility and Social Inclusion	Directness	Route Option 1 (1km) and Route Option 2 (1.05km) would be similar in terms of directness between Malahide Road and Balgriffin Cottages.	Route Option 1 (1km) and Route Option 2 (1.05km) would be similar in terms of directness between Malahide Road and Balgriffin Cottages.
	Coherence	Route Option 1 would provide a more intuitive connection between Malahide Road and Balgriffin Cottages, along the existing roadway on Balgriffin Road.	Route Option 2 would require road markings and signposts to inform cyclist of the off-road cycle route through Balgriffin Park.
	Accessibility	Route Option 1 would better integrate with existing housing estates e.g. Castlemoyne, St Samson's Court and St Doolagh's Square.	Permeability links could potentially be provided along Balgriffin Road to connect the housing estates to the proposed off-road greenway. However, Route Option 2 would not integrate with existing housing developments to the same extent as Route Option 1.

5.4 Corridor 3 (Node A-D): Kinsealy - Station Road (Portmarnock train station)

This route would connect Kinsealy to Station Road (Portmarnock). Three route options have been considered for Corridor 3:

- Route Option 1: via Chapel Road, the R124/Drumnigh Road and Station Road.
- Route Option 2: Off-road, through existing park land behind Abbey Well Residential Development and through the fields north of Chapel Road, along the Old Road (access road south of Portmarnock raceway) and linking through an existing residential development to Station Road.
- Route Option 3: Off-road, through the agricultural land south of Chapel Road onto Station Road.

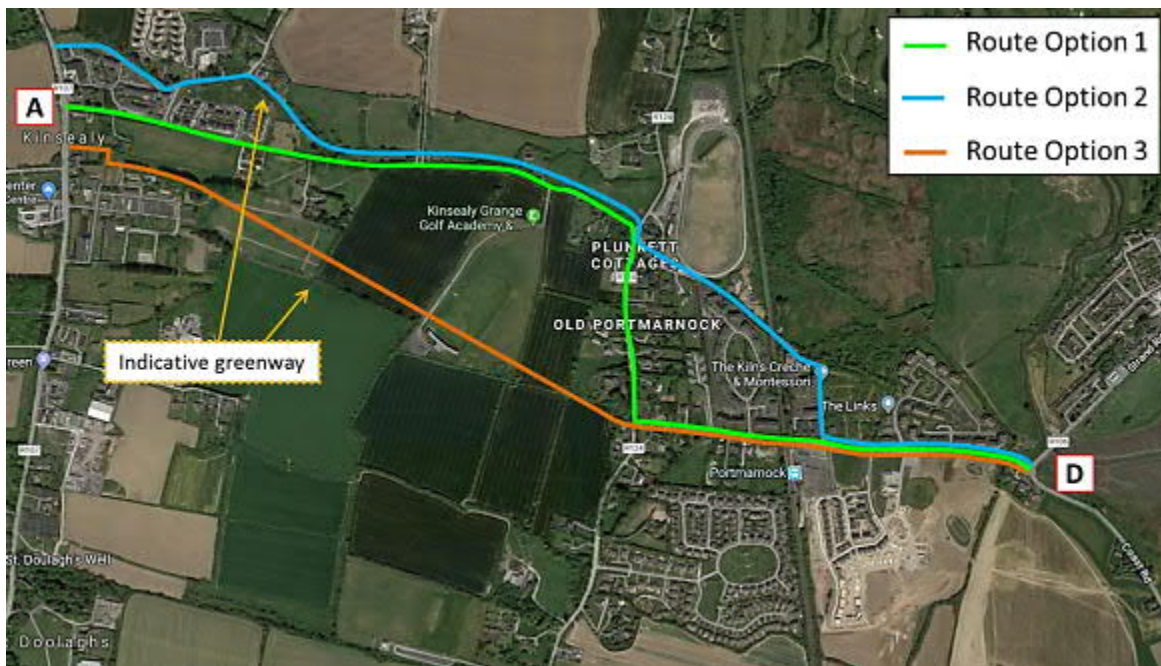


Figure 5.6: Route Options for Corridor 3, Node A-D

5.4.1 Route Option 1

Route Option 1 would best integrate with existing housing though permeability links could be provided along Chapel Road connect the existing housing to the off-road cycle facility proposed by Route Option 2 or 3.

This route option passes through the Portmarnock South LAP and Kinsealy Village LAP (draft LAP in progress) boundary areas. An opportunity exists to integrate Route Option 1 with the cycleway routes proposed under existing planning permissions within both the Kinsealy and Portmarnock South LAP lands. For example, there is already planning permission for a one-way cycle path adjacent to Chapel Road - see section 2.7.1.

The most significant constraint for Route Option 1 is the section of the R124 from Chapel Road to Station Road, which is within an Architectural Conservation Area. The character of this ACA relates to the older historic houses (many of which incorporate brick from the former Portmarnock brickworks) and the mature trees within the boundaries of these properties creating a pleasant tree-lined road on both sides.

There is a cluster of buildings on the eastern side of the R124 at the Chapel Road junction of the old forge; St. Marnock's (the house fronting onto the junction beside the forge) and the former church in its rear garden as well as the terrace of redbrick cottages, known as Plunkett Cottages (built with Portmarnock Brick), which positively contribute to the area. The other houses on the east side of the R124 until the junction with Station Road date from latter half of 20th century or early 21st century. On the western side of the R124 there are a number of large historic houses and smaller historic cottages that are hidden from view by the mature trees that also contribute positively to the character of the ACA. The boundaries along the northern side of Station Road are not of any particular architectural heritage significance.

There is very limited potential for cycle facilities within the ACA section of the R124 without impacting its character. Without the removal of significant mature trees and hedgerows, the most likely option for this section would be on-road cycle lanes or a shared surface etc. Alternatively, another possible solution would be a combination of Route Options 1 and 2 to in-effect bypass the R124 i.e. Route Option 1 would continue along Chapel Road, as proposed, but follow Route Option 2 from the junction of Chapel Road/R124 to connect to Station Road.

The first 180m section of Station Road between the R124 and Earnan's Wood is also within an Architectural Conservation Area. However, the hedgerows to the north of Station Road do not appear to be protected and it may be possible to construct cycle facilities along this narrow section of road with land acquisition. The most constrained section of Station Road is the existing bridge over the rail line and the approaches to the bridge.

The first 70m of Chapel Road, adjacent to St. Nicholas of Myra Church, could not accommodate segregated cycle facilities; quality of service A couldn't be achieved. The only option along this section would be a reduced quality of service i.e. a shared road.

Notable archaeological and architectural heritage sites along this route option include St. Nicholas of Myra Church, the boundary wall of a church (in ruins) and graveyard along Chapel Road, a three-bay two-storey house (including out-offices, lodge and gates), a former forge and the former Presbyterian Church and graveyard (now disused) at the junction of the R124 and Chapel Road. The boundary wall of a church (in ruins) and graveyard along Chapel Road poses a constraint to the design (i.e. in terms in land acquisition) though, this could be surmounted by road realignment and land acquisition on the opposite side of the road.

Hedges and trees with significant impact on rural character would need to be removed along most of Chapel Road in order to fit segregated cycle facilities. There is an existing stone wall along a small section of Chapel Road though it is not protected and could potentially be addressed with engineering measures.

Refer to Appendix E and F for Map of existing architectural and archaeological sites, respectively.

The estimated capital cost of Route Option 1 is: €9m - €11m.

5.4.2 Route Option 2

Route Option 2 would travel adjacent to (north of) Chapel Road through the agricultural lands to the junction of the R124. The section of the route from Malahide Road to past the old graveyard would utilise existing green space; most of which is in-charge of Fingal County Council. The greenway route would avoid impact on the historic graveyard but would sever the connection between the main house of Kinsealy Hall and the gate lodge. This would isolate the gate lodge into an island between the road and the greenway and would be likely to require provision of new boundary treatment and gates between the main house and the greenway.

From the junction of Chapel Road / R124, Route Option 2 would continue along an existing access road (Plunketts Lane/Old Road, is being maintained by Fingal County Council up to the railway underpass, but the ownership of the road is not confirmed for this study) south of the raceway to connect through one of the existing private developments (not yet taken in charge by Fingal County Council) (see Figure 5.7). From there, Route Option 2 would integrate with the cycle facility within the Portmarnock South LAP boundary area – see section 2.7.4 above.

As the majority (74%) of the route option is off-road, active surveillance would be recommended (e.g. CCTV).

Route Option 2 would require road markings and signposts to inform cyclists of the off-road route. A section of this route option would traverse one of the private estates not yet taken in charge by the council.

A significant constraint to Route Option 2 is the fact that the Kilns housing estate, the Links housing estate and the adjacent development land is in private ownership.

Furthermore, the Transport Infrastructure Ireland (TII) Rural Cycleway Design (offline) (DN-GEO-03047) standard gives desirable minimum headroom along cycleways of 2.7m; however, over short distances a reduced head height of 2.4 metres is considered acceptable.

The railway bridge underpass height is 2.13m at its lowest point. As-built structural information is required to determine if the ground level could be lowered i.e. whether there is scope to lower the ground level without impacting on a concrete foundation. The ground level would need to be lowered or cyclists would have to dismount in order to provide safe clearance.

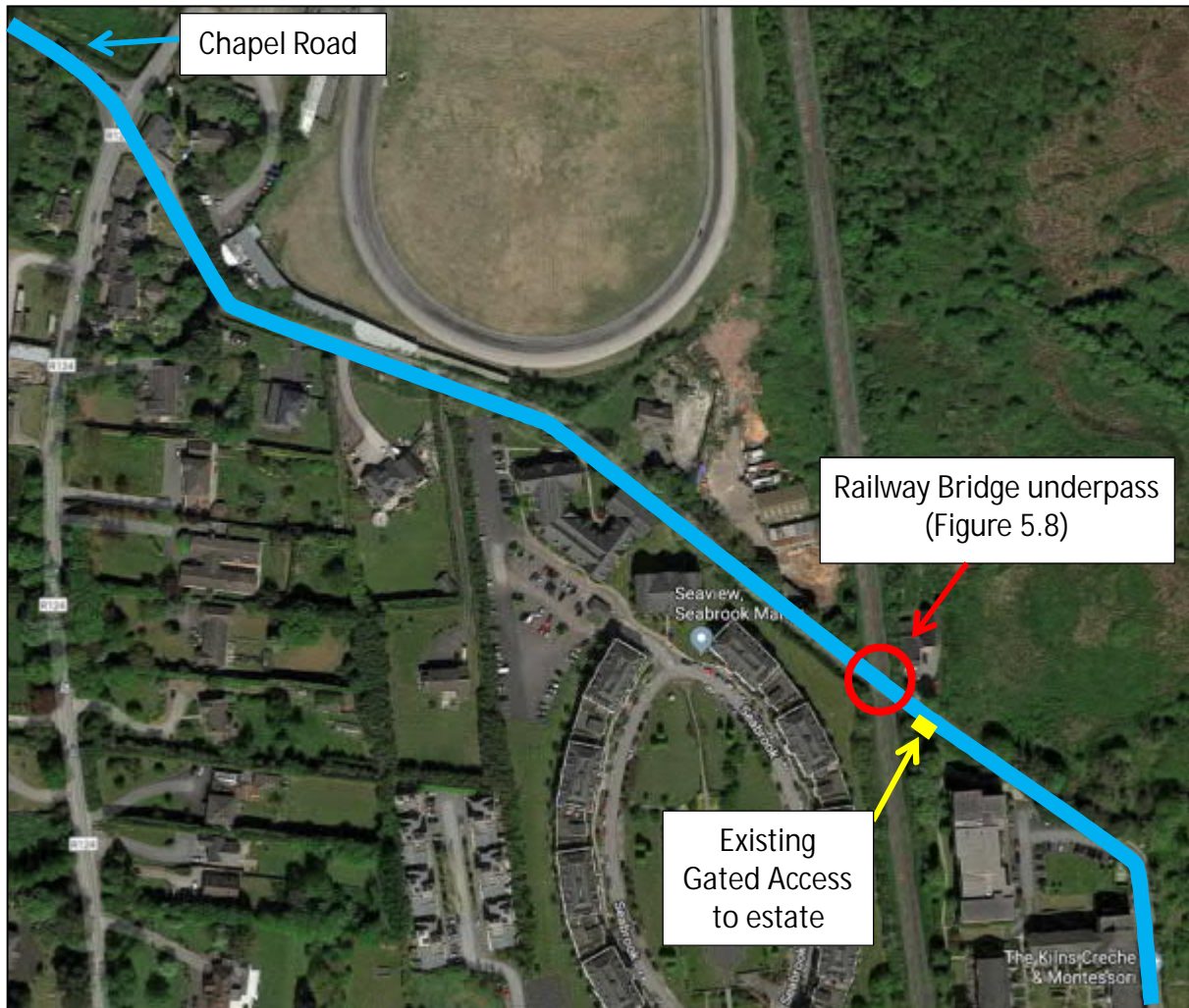


Figure 5.7: Route Option 2 along access road south of raceway



Figure 5.8: Railway bridge underpass on access road

Consultation would be required with local residents on the possibility of allowing access for cyclists and pedestrians if this route option was to be further developed.

Notable archaeological and architectural heritage sites along this route option which pose a constraint to this route option design include the boundary wall of a church (in ruins) and graveyard along Chapel Road and the lodge and gates of a three-bay two-storey house, also along Chapel Road. In order to avoid impacting on any of these protected structures, Route Option 2 would run along the north side or south side of (and adjacent to) the River Sluice.

The estimated capital cost of Route Option 2 is: €10m - €12m.

5.4.3 Route Option 3

Route Option 3 would travel south of Chapel Road through the agricultural land to the junction of the R124/Station Road. From there, Route Option 3 would cross the R124 road and continue along Station Road and integrate with the cycle facility proposed by the Portmarnock South LAP – see section 2.7.4 above. The agricultural land through which the route would traverse is within the Kinsealy Village LAP boundary area. Route Option 3 would utilise the cycleways that will be constructed as part of the approved planned developments.

As the majority (78%) of the route is off-road, active surveillance would be recommended e.g. CCTV. Route Option 3 would require road markings and signposts to inform cyclists of the off-road route.

Route Option 3 would offer the shortest route (200m shorter than Route Option 1 and 2) and would integrate with the cycle way routes permitted within existing planning applications in Kinsealy Village.

Difficulty may arise in connecting Route Option 3 to Station Road; the cycle facility may need to pass through the Architectural Conservation Area. This could constrain the ability to provide a high quality road crossing at the R124 close to Station Road.

Furthermore, the R124 and Station Road (the section between the R124 and Earnan's Wood) are within an Architectural Conservation Area and have very limited potential space to fit segregated cycle facilities. The character of the ACA relates to the older historic houses (many of which incorporate brick from the former Portmarnock brickworks) and the mature trees within the boundaries of these properties creating a pleasant tree-lined road on both sides.

The houses on the east side of the R124 section of this route option date from latter half of 20th century or early 21st century. On the western side of the R124 there are a number of large historic houses and smaller historic cottages that are hidden from view by the mature trees that also contribute positively to the character of the ACA.

The boundaries along the northern side of Station Road are not of any particular architectural heritage significance, though there is a major width constraint along Station Road between the R124 and Seabrook.

The estimated capital cost of Route Option 3 is: €12m - €15m.

Figure 5.9 below illustrates where cycle facilities of quality of service A (as per the National Cycle Manual) could be achieved along each route option.



Figure 5.9: Potential cycle routes of quality of service A for Node A-D

Table 5.3 compares the route options under the CAF criteria.

Table 5.3: Multi-Criteria Analysis of Node A-D

Route Assessment Considerations	Corridor 3 Node A-D Kinsealy to Station Road (Portmarnock)			
		Route Option 1	Route Option 2	Route Option 3
Economy	Indicative Construction & Land Acquisition Costs	€9-11m Capital Cost	€10-12m Capital Cost	€12-15m Capital Cost
Safety	Road Safety and Security	<p>Route Option 1 would provide passive surveillance of users.</p> <p>Route Option 1 will have a section (approx. 440m along the R124) where segregated cycle facilities cannot be provided due to the major constraints posed by the Architectural Conservation Area and the existing widths of the road. Also, the first 70m along Chapel Road adjacent to St. Nicholas of Myra Church, cyclists would have to share with traffic.</p>	Route Option 2 may require active surveillance (e.g. CCTV) to monitor users along the off-road section (74%) of the route.	Route Option 3 may require active surveillance (e.g. CCTV) to monitor users along the off-road section (78%) of the route.
Integration	Land-use	There is already planning permission for a one-way cycle path adjacent to Chapel Road which Route Option 1 has potential to integrate with.	Route Option 2 passes through the Kinsealy Village LAP (draft LAP in progress) boundary area but would not impact on any existing planning permissions within Kinsealy Village.	There is already planning permission for cycle paths within the Kinsealy Village LAP (draft LAP in progress) boundary and Portmarnock South LAP boundary which Route Option 3 has potential

Route Assessment Considerations	Corridor 3 Node A-D Kinsealy to Station Road (Portmarnock)			
		Route Option 1	Route Option 2	Route Option 3
		There is also existing planning permission for a cycle facility along Station Road which Route Option 1 would integrate with.	<p>Routing cyclists through the private housing estates or the adjacent development land may pose a constraint as both are in private ownership.</p> <p>There is existing planning permission for a cycle facility along Station Road which Route Option 1 would integrate with.</p>	to integrate with.
Environment	Ecology and Existing trees	<p>Significant stretches of hedges and trees would need to be removed along most of Chapel Road with significant impact on the rural character.</p> <p>The R124 and part of Station Road have narrow widths due to property boundaries and mature trees (with potential for roosting bats) and stone walls.</p>	<p>Route Option 2 would run adjacent to the River Sluice north of Chapel Road though this would not be a constraint.</p> <p>Route Option 2 would require the removal of some trees and hedgerows in the fields north of Chapel Road, depending on the precise route chosen at detailed design stage.</p> <p>Route Option 2 would also require the removal of some trees and hedgerows along the access road (south of Portmarnock raceway).</p>	<p>Depending on the precise route chosen at detailed design stage, Route Option 3 may require the removal of significant stretches of trees and hedgerows in the fields south of Chapel Road.</p> <p>This route option would also impact on private property and trees in order to connect to Station Road.</p>

Route Assessment Considerations	Corridor 3 Node A-D Kinsealy to Station Road (Portmarnock)			
		Route Option 1	Route Option 2	Route Option 3
Archaeology and Architectural Heritage		<p>There are 5 archaeological and architectural heritage sites along Chapel Road. The only one that poses a major constraint would be St. Nicholas of Myra Church. The first 70m of Chapel Road, adjacent to St. Nicholas of Myra Church, could not accommodate segregated cycle facilities. Cyclists would have to share with traffic.</p> <p>The R124 and part of Station Road are within an Architectural Conservation Area. The existing widths of these roads are quite narrow with limited potential for cycle facilities. The acquisition of land to provide cycle lanes would be a major constraint.</p>	<p>There are 4 archaeological and architectural heritage sites along Chapel Road which pose a constraint in terms of land-acquisition. To avoid impact, Route Option 2 would run along the north side of the River Sluice.</p>	<p>Route Option 3 would need to connect the off-road part of the route (south of Chapel Road) to the R124 / Station Road, which are within an Architectural Conservation Area. This would be a constraint in terms of land acquisition and achieving planning permission.</p> <p>Moreover, the cycle route would need to pass through private property along the R124 in order to connect to Station Road.</p>
Accessibility and Social Inclusion	Directness	<p>All route options would be similar in terms of directness. Route Option 1 would be approximately 2.7km in length.</p>	<p>All route options would be similar in terms of directness. Route Option 2 would be approximately 2.7km in length.</p>	<p>All route options would be similar in terms of directness. Route Option 3 would be approximately 2.5km in length.</p>

Route Assessment Considerations	Corridor 3 Node A-D Kinsealy to Station Road (Portmarnock)			
		Route Option 1	Route Option 2	Route Option 3
Coherence		Route Option 1 would provide a more intuitive connection between Kinsealy and Station Road, alongside traffic.	Route Option 2 would require road markings and signposts to inform users of the off-road cycle route through the fields north of Chapel Road.	Route Option 3 would require road markings and signposts to inform users of the off-road cycle route through the fields south of Chapel Road.
Accessibility		Route Option 1 would be most accessible, along the main roads and would best integrate with existing housing.	Permeability links could potentially be provided along Chapel Road to connect the housing estates to the off-road cycle facility proposed by Route Option 2. However this poses a challenge due to the location of the route option along the north of the Sluice River. Route Option 2 would be the most accessible to the adjacent residential developments.	Route Option 3 has potential to integrate with the cycle routes planned as part of the housing development sites south of Chapel Road i.e. within the Kinsealy Village LAP (draft LAP in progress) lands.

5.5 Corridor 4 (Node A-E/F): Kinsealy to Kettles Lane

This route would connect Kinsealy to Feltrim Road and Kettles Lane (to connect to the existing 2-way cycle route at Russell Terrace). Six route options have been considered for Corridor 4:

- Route Option 1: via Malahide Road up to approx. 200m before the Feltrim Road / Myra Manor junction, continues west through the agricultural lands north of Abbeville Demesne Lands and south of the quarry, onto Kettles Lane and also through Drynam Place and The Green onto Feltrim Road.
- Route Option 1a: via Malahide Road up to the entrance lane to Abbeville Demesne, continues west along or adjacent to the existing entrance lane then through the agricultural land north of The Baskins and south of the quarry, through Drynam Place and The Green onto Feltrim Road.
- Route Option 2: via Malahide Road, Feltrim Road and Kettles Lane.
- Route Option 2a: via Malahide Road, Streamstown Lane, Carey's Lane, and through the fields to join Feltrim Road at Roadstone Feltrim Retail Outlet.
- Route Option 3: via Malahide Road, Feltrim Road, Kettles Lane, and through Drynam Place and The Green onto Feltrim Road.
- Route Option 3a: via Malahide Road, Streamstown Lane, Carey's Lane and through the agricultural land to join Feltrim Road, onto Kettles Lane, and through Drynam Place and The Green onto Feltrim Road.

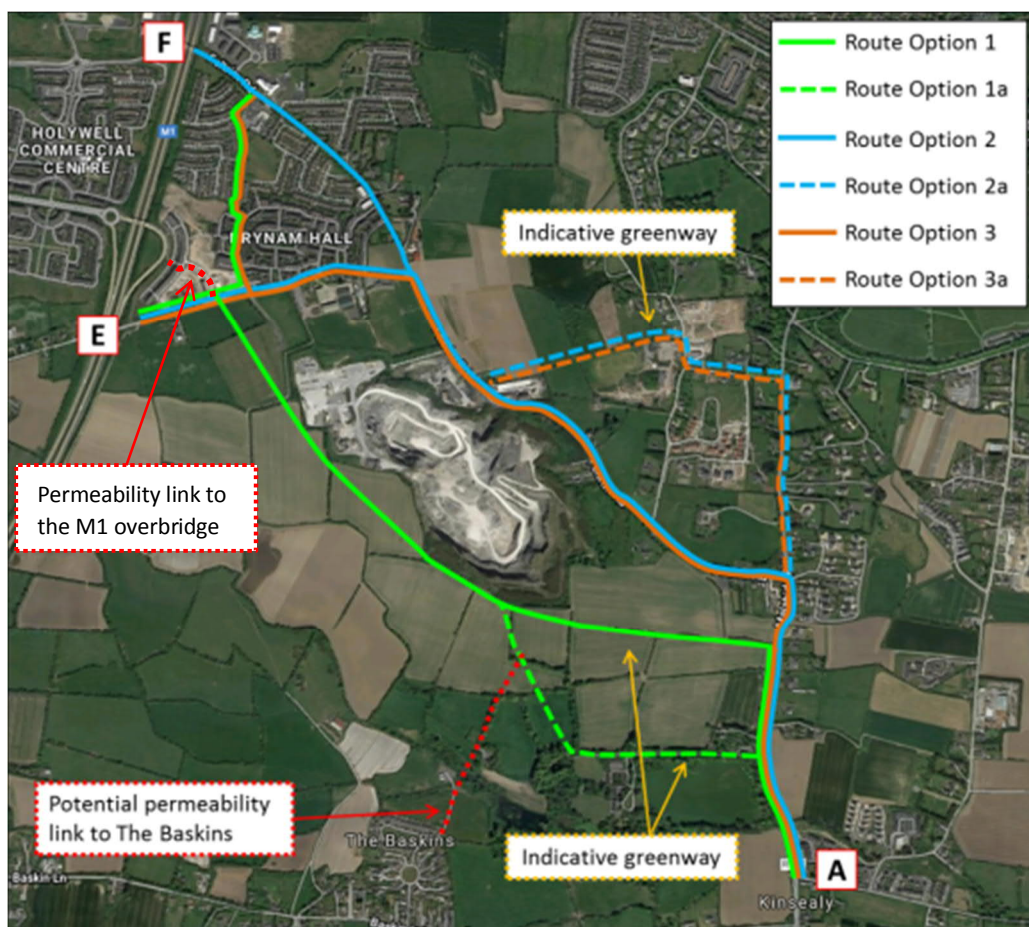


Figure 5.10: Route Options for Node A-E/F

All route options would provide a connection to the M1 overbridge via Drynam Avenue.

5.5.1 Route Option 1 and 1a

Route Option 1 and 1a would offer the most direct and scenic (off-road) routes and shortest journey times. The other route options would provide longer, though more coherent and more easily accessible routes. The main disadvantage of Route Option 1 and 1a is that they would not integrate with existing residential developments off Feltrim Road and Malahide Road e.g. Myra Manor, Streamstown Lane.

Route Option 1a would likely traverse the access road to Abbeville House and therefore permission would need to be sought as this is within private and protected land i.e. Abbeville Demesne (an Architectural Conservation Area).

Route Option 1 and 1a would pass through the Kinsealy Village LAP (draft LAP in progress) boundary but would not impact any planned developments. Both route options would require realignment on Malahide Road at the route selection/preliminary design stage to avoid a significant impact on trees and hedgerows. Neither route option would impact on Feltrim Hill, a proposed Natural Heritage Area (pNHA). With the majority of the routes being off road, surveillance cameras may be necessary to monitor users along the off-road routes.

Notable archaeological and architectural heritage sites along Route Option 1 and 1a include St Nicholas of Myra Church, the mid-18th century triple-arch masonry road bridge, the boundary wall of Abbeville House (19th century cast-iron milestone in granite setting in wall) and Abbeville Demesne (Route Option 1a only). None of the protected structures along Malahide Road would pose a constraint to providing segregated cycle facilities.

The estimated capital cost of Route Option 1 is: €9m - €12m.

The estimated capital cost of Route Option 1a is: €10m - €13m.

5.5.2 Route Option 2 and 3

Route Option 2 and 3 would provide passive surveillance for cyclists and intuitive routes along existing roads i.e. Malahide Road and Feltrim Road. These route options pass through the Kinsealy Village LAP (draft LAP in progress) boundary area but would not impact any proposed developments. Route Option 2 and 3 would be more easily accessible than Route Option 1/1a and serve a larger catchment.

In order to provide segregated facilities along the entirety of Route Option 2 and 3, hedges and trees would need to be removed along significant sections of Feltrim Road, with an impact on the rural character of the area.

Three archaeological and architectural conversation sites are located along Malahide Road, which all route options would pass adjacent to. None of these protected structures would pose a constraint to providing segregated cycle facilities, for any route option.

The estimated capital cost of Route Option 2 is: €9m - €11m.

The estimated capital cost of Route Option 3 is: €12m - €14m.

5.5.3 Route Option 2a and 3a

Route Options 2a and 3a have been considered for their potential to integrate with proposed cycle links within the Streamstown LAP boundary area - see section 2.7.3. For the most part, these route options have potential to provide segregated cycle facilities though greenfield land acquisition and road realignment would be required along certain sections i.e. Feltrim Road. Signage would be required to inform cyclists of the detour from Malahide Road via Streamstown Lane, Carey's Lane and through the fields to join Feltrim Road at Roadstone Feltrim Retail Outlet. Active surveillance would also be recommended to monitor cyclist safety along the off-road section.

Route Option 2a (4.77km) and Route Option 3a (4.56km) would be the most circuitous routes but would best integrate with residential developments off Feltrim Road and Malahide Road e.g. Myra Manor, Streamstown Lane. However, there is potential for some overlap between Node A-E/F and Node A-G route options along Malahide Road; two of the Node A-G route options already propose to integrate with these housing estates (Myra Manor and Streamstown Lane) i.e. Node A-G Route Option 1 and 2.

Three archaeological and architectural conservation sites are located along Malahide Road, which all route options would pass by. None of these protected structures would pose a constraint to providing segregated cycle facilities, for any route option. However, for Route Option 2a and 3a the provision of segregated cycle facilities would require road widening that would have a significant impact on young and mature trees and hedgerows along the length of Malahide Road, including an impact on the character of the protected tree-lined approach to Malahide.

The estimated capital cost of Route Option 2a is: €8m - €10m.

The estimated capital cost of Route Option 3a is: €11m - €13m.

Figure 5.11 illustrates where cycle facilities of quality of service A (as per the National Cycle Manual) could be achieved along each route option.

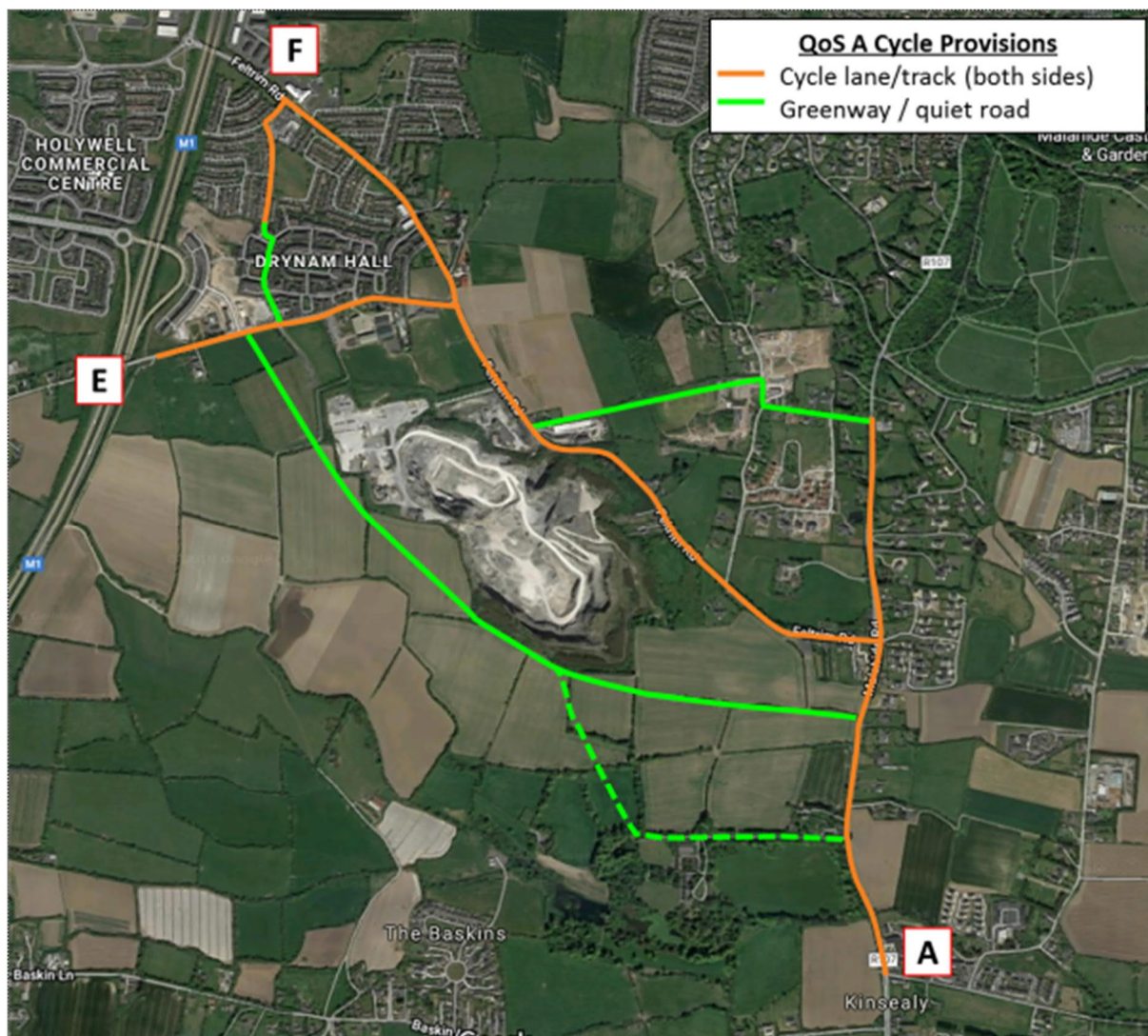


Figure 5.11: Potential cycle routes of quality of service A for Node A-E/F

Table 5.4 compares the route options under the CAF criteria.

Table 5.4: Multi-Criteria Analysis of Node A-E/F

Route Assessment Considerations	Corridor 4 Node A-E/F Kinsealy to Feltrim Road and Kettles Lane						
		Route Option 1	Route Option 1a	Route Option 2	Route Option 2a	Route Option 3	Route Option 3a
Economy	Indicative Construction & Land Acquisition Costs	€9-12m Capital Cost	€10-13m Capital Cost	€9-11m Capital Cost	€12-14m Capital Cost	€8-10m Capital Cost	€11-13m Capital Cost
Safety	Road Safety and Security	The majority of Route Option 1 and 1a would be off-road with no passive surveillance. It would be recommended to provide active surveillance to monitor users.	The majority of Route Option 1 and 1a would be off-road with no passive surveillance. It would be recommended to provide active surveillance to monitor users.	Route Option 2 would provide passive surveillance of cyclists.	The off-road section of this route option may require active surveillance to monitor users.	Route Option 3 would provide passive surveillance of cyclists.	Active surveillance is recommended along the off-road section of this route option to monitor users.
Integration	Land-use	Route Option 1 and 1a would allow for effective integration with the future Kinsealy Village LAP along Malahide Road.	Route Option 1a would likely traverse the access road to Abbeville House and therefore permission may need to be sought from owners.	Route Option 2 and 2a would integrate with the Kinsealy Village LAP (draft LAP in progress) along Malahide Road.	This route option would integrate with the cycle and pedestrian facilities proposed by the Streamstown LAP i.e. along Streamstown Lane and Carey's Lane.	Route Option 3 and 3a would allow for effective integration with the future Kinsealy Village LAP (draft LAP in progress) along Malahide Road.	This route option would integrate with the cycle and pedestrian facilities proposed by the Streamstown LAP i.e. along Streamstown Lane and Carey's Lane.

Route Assessment Considerations	Corridor 4 Node A-E/F Kinsealy to Feltrim Road and Kettles Lane						
		Route Option 1	Route Option 1a	Route Option 2	Route Option 2a	Route Option 3	Route Option 3a
Environment	<p>Ecology and Existing trees</p>	<p>Route Option 1 would impact on trees, hedgerows and stone walls Malahide Road, Kettles Lane and along the off-road route.</p> <p>Realignment of the off-road section of the route option at preliminary design stage, through the agricultural land, could avoid significant impact on trees and hedgerows.</p> <p>Route Option 1 would not impact on Feltrim Hill, which is a proposed Natural Heritage Area (pNHA).</p>	<p>Route Option 1 would impact on trees, hedgerows and stone walls Malahide Road, Kettles Lane and along the off-road route.</p> <p>Realignment of the off-road section of the route option at preliminary design stage, through the agricultural land, could avoid significant impact on trees and hedgerows.</p> <p>Route Option 1a would not impact on Feltrim Hill, which is a proposed Natural Heritage Area (pNHA).</p>	<p>Route Option 2 would require the removal of young and mature trees, stone walls and hedgerow along Malahide Road, Kettles Lane and Feltrim Road, with significant impact on rural character.</p>	<p>Route Option 2a would require the removal of young and mature trees, stone walls and hedgerow along Malahide Road, Kettles Lane, Feltrim Road and possibly along Streamstown Lane and Carey's Lane also.</p>	<p>Route Option 3 would require the removal of young and mature trees, stone walls and hedgerow along Malahide Road, Kettles Lane and Feltrim Road, with significant impact on rural character.</p>	<p>Route Option 3a would require the removal of young and mature trees, stone walls and hedgerow along Malahide Road, Kettles Lane, Feltrim Road and possibly along Streamstown Lane and Carey's Lane also.</p>

Route Assessment Considerations	Corridor 4 Node A-E/F Kinsealy to Feltrim Road and Kettles Lane						
		Route Option 1	Route Option 1a	Route Option 2	Route Option 2a	Route Option 3	Route Option 3a
Archaeology and Architectural Heritage		There are 3 protected structures along Malahide Road though none pose a constraint to the provision of segregated cycle facilities.	There are 3 protected structures along Malahide Road though none pose a constraint to the provision of segregated cycle facilities. Route Option 1a would pass through Abbeville Demesne which is private and protected land (i.e. an Architectural Conservation Area) and so, permission would need to be sought from the owner.	There are 3 protected structures along Malahide Road though none pose a constraint to the provision of segregated cycle facilities.	There are 3 protected structures along Malahide Road though none pose a constraint to the provision of segregated cycle facilities.	There are 3 protected structures along Malahide Road though none pose a constraint to the provision of segregated cycle facilities.	There are 3 protected structures along Malahide Road though none pose a constraint to the provision of segregated cycle facilities.

Route Assessment Considerations	Corridor 4 Node A-E/F Kinsealy to Feltrim Road and Kettles Lane						
		Route Option 1	Route Option 1a	Route Option 2	Route Option 2a	Route Option 3	Route Option 3a
Accessibility and Social Inclusion	Directness	Route Option 1 and 1a would be the most direct (both approx. 3.75km) with the shortest overall journey times.	Route Option 1 and 1a would be the most direct (both approx. 3.75km) with the shortest overall journey times.	Route Option 2 (4.28km) and Route Option 3 (4.07km) would be less direct than Route Option 1 and 1a, with longer journey times.	Route Option 2a (4.77km) and Route Option 3a (4.56km) would be the most circuitous routes.	Route Option 2 (4.28km) and Route Option 3 (4.07km) would be less direct than Route Option 1 and 1a, with longer journey times.	Route Option 2a (4.77km) and Route Option 3a (4.56km) would be the most circuitous routes.
	Coherence	Route Option 1 and 1a would require road markings and signposts to inform cyclists of the off-road cycle route between Malahide Road and Kettles Lane.	Route Option 1 and 1a would require road markings and signposts to inform cyclist of the off-road cycle route between Malahide Road and Kettles Lane.	Route Option 2 and 3 would provide a more intuitive connection between Kinsealy, Feltrim Road and Kettles Lane, along the existing roadway.	Route Option 2a and 3a would, for the most part, provide an intuitive route. Signage would be required to inform cyclists of the detour from Malahide Road to Feltrim Road via Streamstown lane and Carey's Lane.	Route Option 2 and 3 would provide a more intuitive connection between Kinsealy, Feltrim Road and Kettles Lane, along the existing roadway.	Route Option 2a and 3a would, for the most part, provide an intuitive route. Signage would be required to inform cyclists of the detour from Malahide Road to Feltrim Road via Streamstown lane and Carey's Lane.
	Accessibility	Route Option 1 and 1a would be least accessible to existing residential	Route Option 1 and 1a would be least accessible to existing residential	Route Option 2 and 3 would serve a greater residential catchment than Route 1 and 1a but	Route Option 2a and 3a would best integrate with existing residential developments off	Route Option 2 and 3 would serve a greater residential catchment than Route 1 and 1a but	Route Option 2a and 3a would best integrate with existing residential developments off

Route Assessment Considerations	Corridor 4 Node A-E/F Kinsealy to Feltrim Road and Kettles Lane						
		Route Option 1	Route Option 1a	Route Option 2	Route Option 2a	Route Option 3	Route Option 3a
		developments off Feltrim Road and Malahide Road e.g. Myra Manor, Streamstown Lane.	developments off Feltrim Road and Malahide Road e.g. Myra Manor, Streamstown Lane.	a lesser catchment than Route 2a and 3a.	Feltrim Road and Malahide Road e.g. Myra Manor, Streamstown Lane.	a lesser catchment than Route 2a and 3a.	Feltrim Road and Malahide Road e.g. Myra Manor, Streamstown Lane.

5.6 Corridor 5 (Node A-G): Kinsealy to Malahide Castle and Garden

This route would connect Kinsealy to Malahide Castle and Garden (entrance gate). Four route options have been considered for Corridor 5:

- Route Option 1: Malahide Road.
- Route Option 2: Malahide Road as far north as the junction with Feltrim Road, eastward through the fields to continue along Kinsealy Lane from the Sleepy Hollow junction.
- Route Option 3: Chapel Road onto Kinsealy lane.
- Route Option 3a: same as Route Option 3 up to Castleway junction, from there Route Option 3a continues north-east on Castleway through the Broomfield fields onto Back Road.

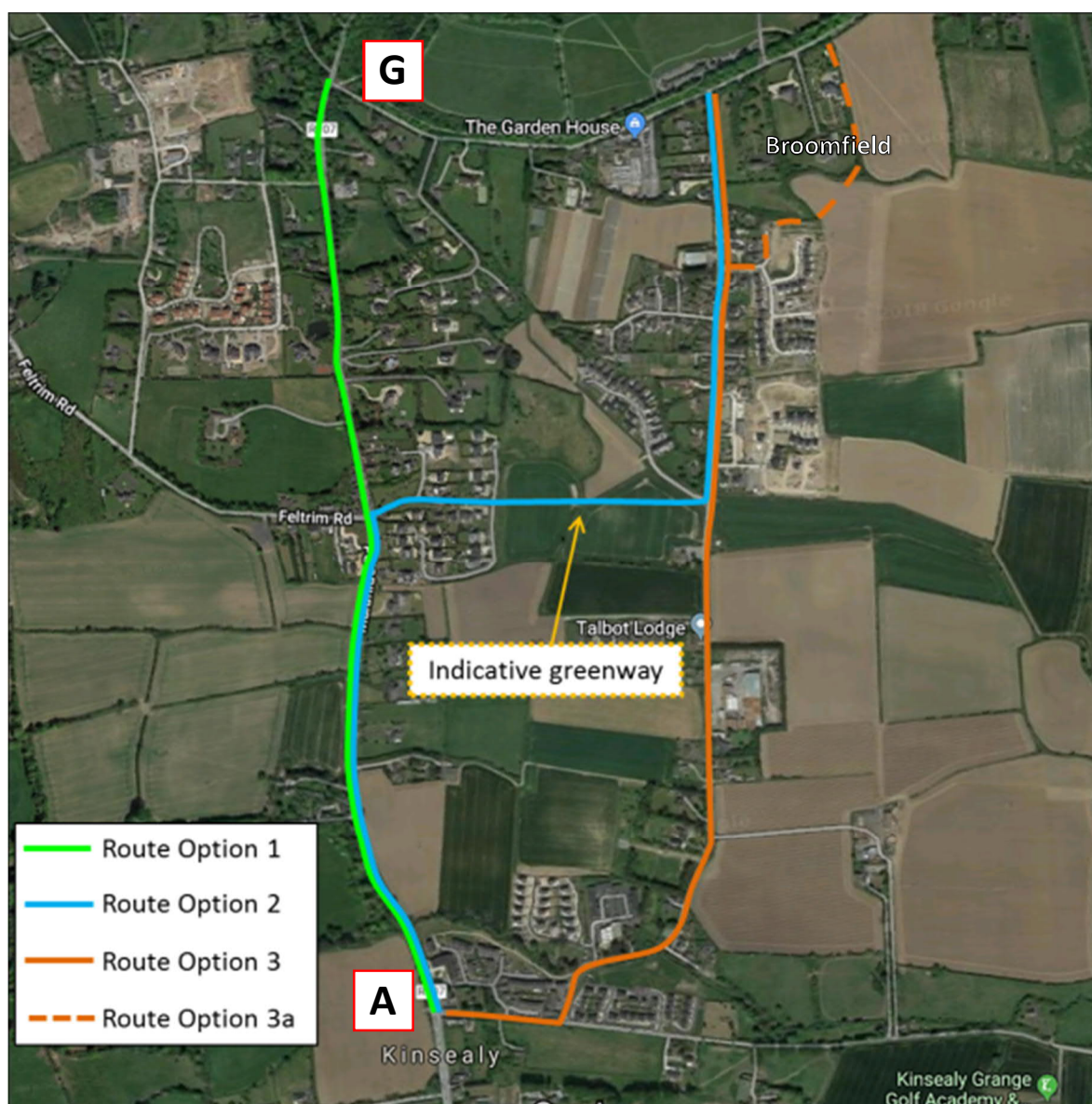


Figure 5.12: Route Options for Node A-G

5.6.1 Route Option 1

Route Option 1 would offer the most direct route with the shortest journey time and has potential to overlap with Node A-E/F i.e. Kinsealy to Feltrim Road and Kettles Lane. The route would be intuitive, parallel to traffic along Malahide Road which would provide passive surveillance.

Route Option 1 would pass through the Kinsealy Village LAP boundary but would not impact any proposed developments. The provision of segregated cycle facilities would have a significant impact on young and mature trees and hedgerows along the length of Malahide Road, including an impact on the character of the protected tree-lined approach to Malahide.

Notable archaeological and architectural heritage sites along Route Option 1 include St Nicholas of Myra Church, the mid-18th century triple-arch masonry road bridge and the boundary wall of Abbeville House (19th century cast-iron milestone in granite setting in wall). None of the protected structures along Malahide Road would pose a constraint to providing segregated cycle facilities.

The estimated capital cost of Route Option 1 is: €4m-6m.

5.6.2 Route Option 2

Route Option 2 includes approximately 400m of greenway through the fields to join Malahide Road to Kinsealy Lane at the Sleepy Hollow junction. It would be the least direct route with the longest journey time, requiring signposts and road markings to inform cyclists of the off-road section. Active surveillance would also be recommended along the off-road section.

Route Option 2 would pass through the Kinsealy Village LAP (draft LAP in progress) boundary but would not impact any proposed developments. The provision of segregated cycle facilities would have a significant impact on trees and hedgerows along both Malahide Road and Kinsealy Lane and particularly along the off-road section of the route, linking the two roads.

Notable archaeological and architectural heritage sites along Route Option 2 include St Nicholas of Myra Church, the mid-18th century triple-arch masonry road bridge and the boundary wall of Abbeville House (19th century cast-iron milestone in granite setting in wall). None of the protected structures along Malahide Road would pose a constraint to providing segregated cycle facilities.

The estimated capital cost of Route Option 2 is: €7m-9m.

5.6.3 Route Option 3 and 3a

Route Options 3 and 3a would both be primarily on-road, providing passive surveillance. There is already planning permission for a one-way cycle path adjacent to Chapel Road which Route Option 3 and 3a have potential to integrate with. However, the first 70m of Chapel Road, adjacent to St. Nicholas of Myra Church, could not accommodate segregated cycle facilities; quality of service A couldn't be achieved. The only option along this section would be a reduced quality of service i.e. a shared road.

Route Option 3a includes a short section of greenway through Broomfield which may require active surveillance to monitor the cyclists. However, these fields are part of a proposed development area in the Broomfield Masterplan, which would provide active surveillance of cyclists should the Masterplan be developed. The new Broomfield Masterplan is required under the Fingal Development Plan but it is not part of the 2018 programme of works.

There were proposals for cycle links through the Broomfield fields as part of the Broomfield Local Area Plan (2010) which has lapsed. Should the previously proposed (or alternative) cycle links be included in the new Masterplan, Route Option 3a could integrate with these plans.

Significant land acquisition and the removal of trees and stonewalls would be required along Kinsealy Lane for the provision of segregated cycle facilities for both Route Option 3 and 3a. No archaeology or architectural heritage sites have been identified along either route option.

The estimated capital cost of Route Option 3 is: €4m-6m.

The estimated capital cost of Route Option 3a is: €4m-6m.

Figure 5.13 below illustrates where cycle facilities of quality of service A (as per the National Cycle Manual) could be achieved along each route option.

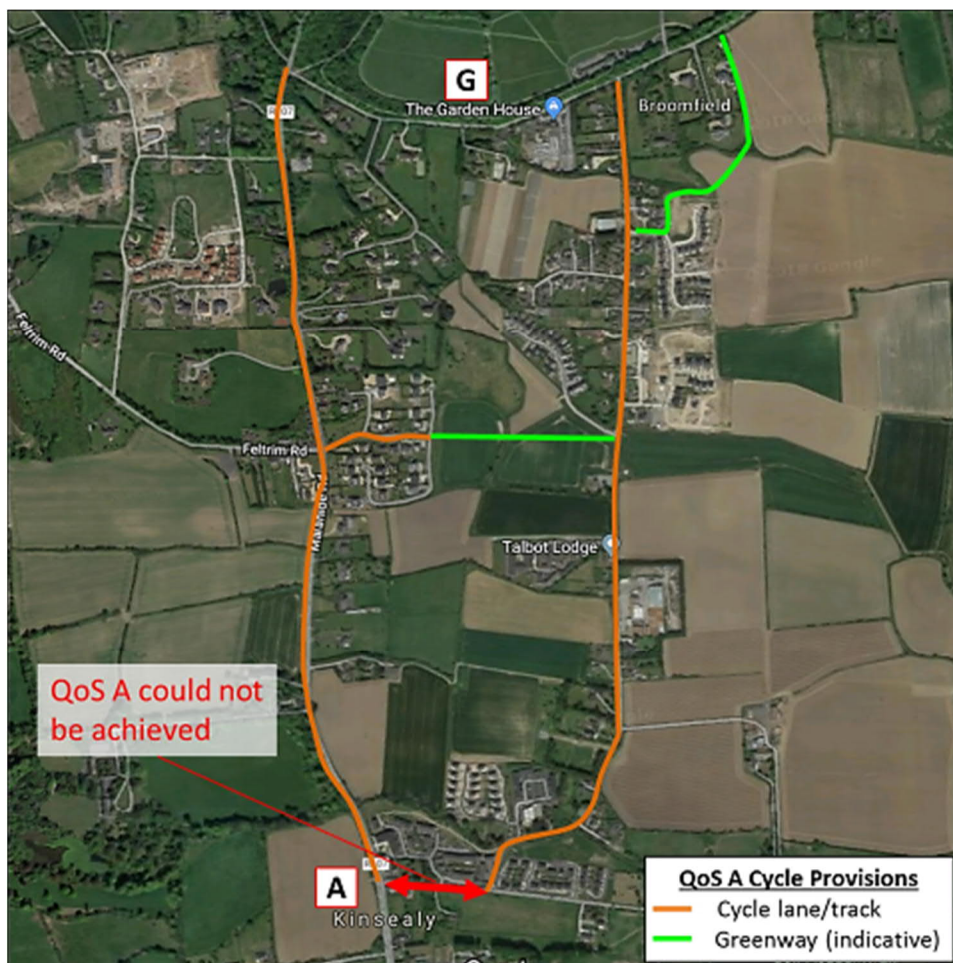


Figure 5.13: Potential cycle routes of quality of service A for Node A-G

Table 5.5 compares Node A-G route options under the CAF criteria.

Table 5.5: Multi-Criteria Analysis of Node A-G

Route Assessment Considerations	Corridor 5, Node A-G Kinsealy to Malahide Castle and Garden				
		Route Option 1	Route Option 2	Route Option 3	Route Option 3a
Economy	Indicative Construction & Land Acquisition Costs	€4-6m Capital Cost	€7-9m Capital Cost	€4-6m Capital Cost	€4-6m Capital Cost
Safety	Road Safety and Security	This route option proposes a cycle facility parallel to traffic along Malahide road. Hence, passive surveillance of users would be provided.	Route Option 2 would provide passive surveillance of cyclists along Malahide Road and Kinsealy Lane but active surveillance would be recommended to monitor users through the fields.	This route option proposes a cycle facility parallel to traffic along Chapel Road and Kinsealy Lane. Hence, passive surveillance of users would be provided.	Route Option 3b would provide passive surveillance of cyclists along Chapel Road and Kinsealy Lane, but active surveillance would be recommended to monitor users through the Broomfield fields.
Integration	Land-use	Route Option 1 would integrate with the future Kinsealy Village LAP along Malahide Road. Route Option 1 also has potential to connect to the Streamstown LAP development.	Route Option 2 would integrate with the future Kinsealy Village LAP (draft LAP in progress) along Malahide Road. Route Option 2 also has potential to connect to the Broomfield Masterplan development.	Route Option 3 would integrate with the future Kinsealy Village LAP (draft LAP in progress) along Chapel Road. Route Option 3 also has potential to connect to the Broomfield Masterplan development.	Route Option 3a would integrate with the future Kinsealy Village LAP (draft LAP in progress) along Chapel Road. Route Option 3a also has potential to integrate with the Broomfield Masterplan.

Route Assessment Considerations	Corridor 5, Node A-G Kinsealy to Malahide Castle and Garden				
		Route Option 1	Route Option 2	Route Option 3	Route Option 3a
Environment	Ecology and Existing trees	<p>Along Malahide Road, south of Feltrim Road, there is a structure along with potential for roosting bats. To provide segregated cycle lanes but avoid impacting the structure, the stone wall and mature trees would need to be removed.</p> <p>Route Option 1 would impact on both young and mature trees and also hedgerows along the length of Malahide Road, including an impact on the character of the protected tree-lined approach to Malahide.</p>	<p>Along Malahide Road, south of Feltrim Road, there is a structure along with potential for roosting bats. To provide segregated cycle lanes but avoid impacting the structure, the stone wall and mature trees would need to be removed.</p> <p>Route Option 2 would have a significant impact on trees and hedgerows, along Malahide Road, Kinsealy Lane and the off-road section connecting the two roads.</p>	<p>Significant land acquisition and the removal of trees and stonewalls would be required along Kinsealy Lane for the provision of segregated cycle facilities for both Route Option 3 and 3a.</p>	<p>Significant land acquisition and the removal of trees and stonewalls would be required along Kinsealy Lane for the provision of segregated cycle facilities for both Route Option 3 and 3a.</p>
	Archaeology and Architectural Heritage	<p>There are 3 protected structures along Malahide Road though none pose a constraint to the provision of segregated cycle facilities.</p>	<p>There are 3 protected structures along Malahide Road though none pose a constraint to the provision of segregated cycle facilities.</p>	<p>There is 1 archaeological and architectural heritage sites along Chapel Road; Nicholas of Myra Church. The first 70m of Chapel Road, adjacent to St. Nicholas of Myra Church, could not accommodate segregated cycle facilities.</p>	<p>There is 1 archaeological and architectural heritage sites along Chapel Road; Nicholas of Myra Church. The first 70m of Chapel Road, adjacent to St. Nicholas of Myra Church, could not accommodate segregated cycle facilities.</p>

Route Assessment Considerations	Corridor 5, Node A-G Kinsealy to Malahide Castle and Garden				
		Route Option 1	Route Option 2	Route Option 3	Route Option 3a
				Cyclists would have to share with traffic.	Cyclists would have to share with traffic.
Accessibility and Social Inclusion	Directness	Route Option 1 would provide the most direct route (1.7km), with the shortest overall journey time.	Route Option 2 (2.4km) would be the most circuitous route with the longest journey time.	Route Option 3 (2km) and 3a (2.3km) would be similar in terms of directness though neither would provide a connection between Kinsealy and Malahide as direct or simplified as Route Option 1.	Route Option 3 (2km) and 3a (2.3km) would be similar in terms of directness though neither would provide a connection between Kinsealy and Malahide as direct or simplified as Route Option 1.
	Coherence	Route Option 1 would provide an intuitive connection between Kinsealy and Malahide Castle and Gardens via Malahide Road.	Route Option 2 would require road markings and signposts to inform cyclists of the off-road cycle facility through the fields between Malahide Road and Kinsealy Lane.	Route Option 3 would provide an intuitive connection between Kinsealy and Malahide Castle and Gardens via Chapel Road and Kinsealy Lane.	Route Option 3b would, for the most part, provide an intuitive connection between Kinsealy and Malahide Castle and Gardens. Signage would be required to inform cyclists of the off-road section of the routes through fields.
	Accessibility	Each of the route options would offer similar benefits in terms of accessibility i.e. serve a similar catchment size.	Each of the route options would offer similar benefits in terms of accessibility i.e. serve a similar catchment size.	Each of the route options would offer similar benefits in terms of accessibility i.e. serve a similar catchment size.	Each of the route options would offer similar benefits in terms of accessibility i.e. serve a similar catchment size.

Though Node A-G stops at Malahide Demesne / Back Road, the route option selection should take cognisance of cyclist accessibility to Malahide Village which is another key trip attractor due to its residential and employment catchment.



Figure 5.14: Back Road potential cycle link and GDA Cycle Network Plan

Figure 5.14 illustrates where the route options would connect to Back Road and also the proposed cycle network plan for Malahide as per the GDA Cycle Network Plan 2013 i.e. primary cycle routes, greenway and feeder routes. There are two main routes which could connect Malahide Village to Back Road, illustrated in Figure 5.15 below. Both routes would integrate with GDA primary cycle links, serve similar residential catchments and have potential to integrate with Local Area Plans i.e. Broomfield Masterplan and Streamstown LAP.



Figure 5.15: Back Road to Malahide route options

6. Summary and Conclusions

The Fingal Development Plan 2017-2023 aims to promote and facilitate movement to, from and within Fingal by integrating land use with a high quality, sustainable transport system that prioritises walking, cycling and public transport.

Objective MT23 in the Fingal Development Plan 2017- 2023 reads as follows: Carry out a feasibility study for the provision of the following cycle/pedestrian routes, subject to the necessary environmental appraisals; Abbeyville to Kettles Lane, Balgriffin to Teagasc Kinsealy, Balgriffin to Kinsealy, Old Portmarnock to Teagasc Kinsealy.

In this regard, Fingal County Council commissioned AECOM to develop this report which includes a feasibility study, options assessment and concept designs for the provision of a cycleway and footpath network in Kinsealy Environs.

Kinsealy is a rural village which is designated as a Commuter Village in the Fingal Development Plan 2017-2023. It is situated on a busy major route into Dublin City, namely the R107 or Malahide Road. A considerable amount of traffic enters the Kinsealy area via Chapel Road and Baskin Lane. There are a number of schools located in the area, which are currently not serviced by adequate pedestrian footpaths and cycleway facilities, and need to be improved. In particular, linkage is required between schools and areas such as Portmarnock, Balgriffin and Kettles Lane.

This feasibility study is one of a number of measures identified in the Fingal Development plan 2017-2023, together with Local Area Plans, Masterplans and specific objectives that will inform the future delivery of infrastructure by Fingal County Council.

The route options identified have been considered against the various constraints considered in the report. Significant constraints relate to archaeological sites, mature trees and demesnes of historic houses.

The identified route options were prepared with cognisance of the environmental and other constraints, and can be seen to vary in terms of length, cost and level of service achieved. Route options which would run along existing public roads were, in general, identified as being the most economical to construct. A number of route options were identified that would require the acquisition of private land, some of which is likely to remain in agricultural use while other sections may be developed in the future. There is some potential for delivering routes through possible future development lands, including through the implementation of various LAPs, in the short- to medium-term.

There are significant challenges to developing the wider cycle and footpath network within the study area. The estimated overall costs to implement the network along all of the corridors range from €25 million to €65 million. This cost assumes complete improvement of the entire cross-section of existing roads, including improvement of pavement, provision of adequate public lighting, additional drainage measure, boundary works (where third-party land acquisition is required), signage and lining etc.

These high level cost estimates would require further surveys and design, so could potentially reduce as the design and planning process is progressed. However, given the constraints identified in this report, and design work, the costs are likely to remain significant in any event.

Objective MT23 of the Fingal Development Plan relates to the preparation of this feasibility study. For any infrastructure proposals to move forward, it would be preferable from a planning perspective that they would be founded on specific objectives, including map-based objectives, within the Fingal Development Plan; at present, there is no specific map-based objective in relation to the provision of cycle tracks or footpaths along the route corridors that have been assessed as part of this feasibility study.

Similarly, Objective MT14 of the Fingal Development Plan supports the implementation of the NTA's Greater Dublin Area Cycle Network Plan. This Plan does not indicate any cycle network provision along the route corridors identified in this study, which could have planning and funding implications were any such proposals to be brought forward by Fingal County Council.

Notwithstanding these issues, if any elements of the proposed network were to be progressed further, the next stages would be broadly as set out below:

(i) Route Options Study and Preliminary Design

- Prepare Preliminary Scheme Design
- Agree Preliminary Scheme Design
- Prepare Preliminary Cost Estimate
- Prepare Preliminary Appraisal Form

(ii) Statutory Planning Process

- Prepare Planning Approval Documentation
- Obtain Planning Approval

(iii) Detailed Design and Tender process

- Prepare Detailed Design
- Produce Tender Documents
- Tender Scheme
- Assess Tenders and Prepare Tender Report
- Prepare Tender Scheme Budget
- Prepare Project Appraisal Report

(iv) Tender and Construction and Project Close Out

- Appoint Contractor
- Monitor Construction Progress
- Monitor Project Expenditure
- Carry out Post Project Review

Appendix A - Fingal Development Plan 2017-2023

Appendix B - Active Planning Application (Date 13/03/18)

Appendix C - Ecological Constraint

Appendix D - Tree Survey and Report

Appendix E - Architectural Heritage

Appendix F - Archaeological Study and Report

Appendix G - Existing Built and Natural Environment

Appendix H - Existing Utilities

Appendix I - Link Type Cross-Sections