



Broadmeadow Way Proposed Greenway
Between Malahide Demesne and
Newbridge Demesne

Volume 4B

EIAR Appendix 2

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1.0 Introduction

- 1.0.1 The project is a proposed pathway/cycleway (greenway) between Malahide Demesne and Newbridge Demesne in Fingal (see Appendix H-Figure 1). The greenway would be c. 6km long. Much of the routing of the greenway is in place and follows existing pathways and roads.
- 1.0.2 Baseline environmental information and key constraints for the study area are identified in Volume 4A-Constraints Report for this project.
- 1.0.3 The approach to Route Option reporting in this document is broadly in line with Transport Infrastructure Ireland (TII) (formerly the National Roads Authority (NRA)) planning guidance on road developments, both in terms of documents prepared and individual sectoral guidance notes.

1.1 Study Area

- 1.1.1 The study area of c. 12km² is as outlined in red on the attached plan (see Appendix H-Figure 1). The key parts of the study area include Malahide Demesne, Malahide village, the railway causeway across Malahide Estuary, Kilcrea townland, and Newbridge Demesne. Each of these parts has been described appropriately in the Constraints Report for each of the environmental constraint elements.

1.2 Route Option via Swords

- 1.2.1 A preliminary screening exercise was conducted on the potential for the greenway to link Malahide Castle and Newbridge House via Swords along the southern and northern edges of the Malahide Estuary, respectively. This route was discounted at an early stage of the assessment, for the following reasons:
 - A greenway routed through Swords, rather than across the estuary, would double the proposed length to c. 11.5km. This would significantly reduce the number of potential users travelling between Donabate and Malahide – one of the main advantages of the estuary route.
 - Connectivity along the south side of the estuary would be difficult due to restrictions along Caves Road and the Old Yellow Walls Road. The inability to widen on either side of these roads to allow for a 4.0m shared surface would not allow for greenway construction. This would result in a discontinuous trail which would not be acceptable to the National Trails Association or the National Transport Authority.
 - The access track from Spittal Hill Road to the Kilcrea Road on the northern side of the estuary is tidal (i.e. the access link is under water at high tide). Raising of the road above high tide level would require the building of a new structure on the existing intertidal area and possible closure to vehicles. This road section lies entirely within SAC and SPA conservation areas.
 - The Kilcrea Road is a narrow public road with a number of private houses on both sides and an equestrian centre at its southern end. The level of traffic on the road would preclude the road being used as a shared car/pedestrian/cycle route. Spatial restrictions on either side would also make the widening of the road difficult and expensive.

- An option would be to continue along the northern estuary to the railway line. Again, this would require greenway construction on the bank above the shingle beach to the railway line. This option would add 2.0km to the route for no advantage. Knowledgeable users would most likely take the Kilcrea Road to the entrance to Newbridge.

1.3 Options

- 1.3.1 There are a number of route options within Malahide village (existing hardtop area) and Kilcrea townland (agricultural area) (see Appendix H-Figures 2, 3, 4, 5A and 5B). The routing in the other parts of the scheme is reasonably fixed; however, design options will need to be considered for these also. For presentation purposes, the route options at Malahide and Kilcrea are considered separately. Consequently, the proposed framework for the route option report is as set out below. For detailed descriptions of these options please refer to Chapters 4.0 to 11.0.

1.4 Reporting Framework for Options

Section 1 – Malahide Demesne

- 1.4.1 This includes Options 1 to 6, on existing pathways (see Appendix H-Figure 3). All options commence at the main car park at Malahide Castle and end at the Malahide-Dublin Road. The routes are physically fixed; however, options exist as to detailed design of greenway surface and signage.

Section 2 – R106 Dublin Road, Malahide

- 1.4.2 This includes Options 1 to 5 (see Appendix H-Figure 3). This section extends from the junction of the Malahide-Dublin Road with Yellow Walls Road to the west to its junction with Old Street to the east. To the north and south it is defined by boundary walls adjacent to existing footpaths.

Section 3 – R106 Dublin Road to Bissets Strand

- 1.4.3 This includes Options 1 to 5, all existing hardtop options (see Appendix H-Figure 3). All options commence on the north side of the Malahide-Dublin Road and end at Bissets Strand. Regardless of option, signage would be provided from Malahide railway station and railway bus stop to the greenway.

Section 4 – Bissets Strand to the North Shore of Malahide Estuary

- 1.4.4 All options follow on the existing western embankment of the railway causeway across Malahide Estuary (Appendix H-Figure 4). Concrete piers for the greenway bridge are in place at the causeway weir. This route is physically fixed; however, options exist as to detailed design of greenway surface and any barriers to protect the greenway on its western and eastern margins.

Section 5 – North Shore of Malahide Estuary to R126 Hearse Road

- 1.4.5 This is the only “new build” section of the route across agricultural land. There are six options here (Appendix H-Figure 5A). The options commence on the northern shore. The options terminate at the gate of Newbridge Demesne. This report considers the

greenway in the absence of the proposed Donabate Distributor Road; however, the EIAR assessment will include the integration of the bypass with the greenway at this location.

Section 6 – Newbridge Demesne

- 1.4.6 This is the most northerly section of the project. The principal route ends at the car park in front of Newbridge House (see Appendix H-Figure 5A). A subsidiary link is provided to the railway station in Donabate. As per Section 4 – Bissets Strand to the North Shore of Malahide Estuary, there are no physical options here; however, there are design issues to be considered.

1.5 Environmental Elements

- 1.5.1 The route options and implications for a suite of environmental topics are considered in this report (see Chapters 12.0 to 23.0 below). The number of environmental topics considered for each section is identified in Table 1.1 below. Chapter 22.0 considers a summary of the option analysis and indicates a rank order of option preference.

Table 1.1 The number of options and relevant environmental topics.

Section	Number of Options	Number of Environmental Topics
1	6	9
2	5	7
3	5	9
5	6	11

1.6 Environmental Preferences

- 1.6.1 In assessing preference of options, each contributor has utilised the framework as outlined in Table 1.2 below.

Table 1.2

Preference Type	Single Option	Multiple/All Options
Most Preferred	An option which is considered to have a positive or no material negative effect on an environmental attribute.	If multiple/all options have a positive or no material negative effect upon an environmental attribute, then multiple/all options should be identified as most preferred.
Preferred	An option which is considered to have a minor negative effect upon an environmental attribute.	If multiple/all options have a minor negative effect upon an environmental attribute, then multiple/all options should be identified as preferred.
Acceptable	An option which is considered to have a moderate negative effect upon an environmental attribute.	If multiple/all options have a moderate negative effect upon an environmental attribute, then multiple/all options should be identified as acceptable.

Preference Type	Single Option	Multiple/All Options
Least Acceptable	An option which is considered to have a potentially significant negative effect upon an environmental attribute.	If multiple/all options have a potentially significant negative effect upon an environmental attribute, then multiple/all options should be identified as least acceptable.

1.7 Public Consultation

- 1.7.1 The emerging preferred route was presented by Fingal County Council as part of a non-statutory public consultation process for discussion and comment by statutory consultees, local interest groups and members of the public (see Chapter 8.0 for details). A number of aspects raised at the public consultation exercise warranted further analysis (see Chapters 9.0 and 10.0).

2.0 Project Specific Elements

2.1 Greenway Gradient

- 2.1.1 In order to comply with the National Trails Office (NTO) and National Transport Authority (NTA) requirements a maximum gradient of 5% will be incorporated into the detailed design with a maximum of 8% over short distances.
- 2.1.2 Turning widths/landings of 1,700mm will be provided at the top and bottom of all ramps. The maximum height rise between landings will be 950mm with a maximum distance of no more than 9m between resting areas.
- 2.1.3 Where the gradient is greater than 5% handrails will be provided. A top rail (900mm above ground level) will be provided to cater for persons walking and a lower rail (750mm above ground level) will be provided for wheelchair users and children. The surface of handrails will be smooth with no projecting bolts or nail heads.
- 2.1.4 A maximum cross slope of 1:40 will be provided along the greenway.

2.2 Greenway Width

- 2.2.1 The proposed greenway utilises existing infrastructure in a number of locations along the route, in particular within Malahide and Newbridge Demesnes and within Malahide Village, which will impose restrictions on the allowable width of the greenway.
- 2.2.2 Within Malahide and Newbridge Demesnes the existing paths follow a width hierarchy. Both existing and/or new paths must conform to this requirement. This restricts the option of widening of the existing paths along the proposed routes.
- 2.2.3 The boundary conditions on either side of the proposed greenway also affect the required width by providing different buffer zones depending on the boundary condition which must also be taken into account, e.g. a buffer of 650mm must be allowed if the greenway abuts a wall, fence or crash barrier.
- 2.2.4 Using the width calculator in the NTA Cycle Manual and the requirements of the NTO guidelines the required width would be calculated at each section taking into account the boundary conditions.
- 2.2.5 In order to comply with the minimum width requirements of the NTO and NTA an optimum width of 4.0m will be provided where possible with a minimum width of 3.0m being provided where restrictions apply.

2.3 Greenway Surface Finish

- 2.3.1 The surface finish of the proposed pedestrian and cycle greenway is an important factor which has to be carefully considered. The surface should be a smooth surface with good drainage properties, long-term durability and low maintenance.
- 2.3.2 As the greenway passes through different types of areas including urban, urban fringe and rural, this will necessitate different construction methods. The greenway will therefore require different surface finishes for each section which will have to be

assessed individually. It is also proposed to utilise the existing infrastructure including existing roads and paths where possible.

- 2.3.3 It is a requirement of this project that the proposed greenway will be fully accredited by the National Trails Office and will be included on the National Trails Register.
- 2.3.4 In accordance with the NTO requirements the greenway will be a shared use trail (pedestrian and cycles) which is known as a greenway and a multi-access trail which will be accessible to all, including people with reduced mobility, wheelchair users, people with vision impairment, using crutches, with a buggy, with small children, older people, etc. and must comply with the requirements of the National Trails Office.
- 2.3.5 Sustrans (a UK charity enabling people to travel by foot, bike or public transport by working with communities, policy-makers and partner organisations) have published a technical information note titled "Cycle Path Surface Options, Technical Information Note No. 8" which reviews different surface finishes and the advantages and disadvantages of each and makes recommendations for different types of surface finishes for different situations.
- 2.3.6 This document has been referenced on other greenway planning applications in Ireland, including the Connemara Greenway in Galway. Inputs and experiences from other County Councils have also been taken into account.
- 2.3.7 The following is a summary of the possible different types of surface finishes that could be used as part of this project.

Dense Bitumen Macadam (DBM)/Hot Rolled Asphalt (HRA)

- 2.3.8 DBM and HRA finishes provide a sealed non-slip surface which can be used by all types of users including pedestrians, mobility impaired users and cyclists in accordance with the NTA and NTO requirements providing good ride quality and strength.
- 2.3.9 Bitumen macadam ("bitmac") is a combination of bitumen and aggregate used in road and path construction. It relies for its strength on the stability of the aggregate throughout its grading. As with asphalt, however, the bitumen content can vary and thus bitmacs may have less aggregate than asphalts. DBM (dense bitumen macadam) is one type of this material.
- 2.3.10 Thicknesses of each layer of the path construction need to be adapted to each individual location.
- 2.3.11 The bitumen used in making the blacktop can vary slightly in hardness. This is measured in terms of the bitumen "penetration grade", which is a measure of how deep a standard needle penetrates the hardened bitumen at a standard temperature under a standard pressure. Higher penetration grades (where the needle penetrates deeper) are softer and generate a smoother and more forgiving cycle path surface.
- 2.3.12 Typical penetration grades for cycle paths are 160/220 pen (softer) or 100/150 pen (harder). The typical penetration grade for road construction is 100/150 pen. Occasionally harder penetration grades are used for roads, e.g. for nearside lanes on a motorway (trucks).

- 2.3.13 The other main variant in blacktop design is the aggregate size that is used. Typically well-graded aggregate (i.e. a good size distribution down to fine particles) is used. Larger aggregate sizes make a rougher path surface, which is useful to allow rainwater to trickle through rather than flow across the surface, but may also allow the accumulation of dust with moss/vegetation growth particularly in wooded areas. Smaller aggregate gives a smoother riding surface, which is usually preferred by most cyclists.
- 2.3.14 For HRAs, the percentage aggregate content must be specified when ordering (typical percentages are 55%, 35% and 30%). Standard maximum aggregate sizes are 20mm, 14mm, 10mm and 6mm.
- 2.3.15 Asphalt is a combination of bitumen and aggregate used for road and path construction. It relies for its strength on the mortar binding together the aggregates (where the mortar is the bitumen + fines + filler). The aggregate content can vary. Asphalts are more difficult to lay than bitmacs (experienced contractors must be used), however they offer advantages for simple cycle path construction: asphalt can be more flexible and therefore tends to deform rather than break should the path base subside or wash out.
- 2.3.16 There may be however situations where alternative surface options might need to be considered where DBM or HRA finishes are not suitable such as appearance, sealing of ground, sustainability, restricted access, surface grip, etc.
- 2.3.17 Alternative types of this type of surface finish include:
- Coloured surfaces (including Addistone or similar approved).
 - Foamed bitumen products.
 - Porous asphalt.
 - Asphalts with recycled content.
 - Asphalts with vegetable binders.
 - Coldlay asphalt.
 - Grit rolled into newly laid surface.
 - Surface dressing: resin bound and tar spray and chip.

Coloured Surfaces

- 2.3.18 Coloured bituminous surfaces can be created by painting of the surface or using a clear binder and coloured aggregate (including Addistone or similar approved).



Text Figure 2.1. Coloured/Textured Surface Finish.

- 2.3.19 Painting is cheap and easy to apply, however the colour tends to peel off over time and is therefore not recommended.
- 2.3.20 Clear binder and coloured aggregate delivers an aesthetically pleasing finish but at an additional cost.

Foamed Bitumen Products

- 2.3.21 Foamed bitumen has been developed as a method of recycling road planings to become a new path surface. Bitumen is foamed to increase its volume, and to more effectively coat aggregate materials. It can be laid cold or hot by machine and needs to be compacted properly to bond. This is suitable where road planings and foaming plant is available locally.

Porous Asphalt

- 2.3.22 Asphalt can be made porous by elimination of finer particles from the aggregate mix which creates voids where water can seep through. The underlying path base will also need to be porous to allow drainage but this makes compacting difficult and can produce ruts due to the construction equipment.
- 2.3.23 Porous asphalt cannot be relied upon in the long term for drainage as the water pathways tend to clog with dust particles and mud. Porous asphalt has a rougher surface than normal asphalt.

Asphalts with Recycled Content

- 2.3.24 There is no real difference in material quality between asphalt made with freshly quarried or asphalt made with recycled aggregates. Where recycled products are locally available, using these materials can save on transport and reduce quarrying.

Asphalts with Vegetable Binders

- 2.3.25 This is asphalt where the bitumen is replaced by a vegetable based binder. It is laid as conventional asphalt, however the laying temperature tends to be lower. This avoids the use of the oil-based bitumen and replaces it with a renewable plant based binder.
- 2.3.26 Where local suppliers are available this is a suitable replacement for any other bound surface. It is also comparable from a cost perspective to coloured bituminous surfaces.

Coldlay Asphalt

- 2.3.27 Coldlay projects are designed for difficult situations, in particular where it is necessary to deal with long delivery routes or where the asphalt needs to be stored on site before laying. Oils are added to the bitumen, with the effect that the asphalt remains workable at lower or ambient temperatures. The oil evaporates from the finished surface so that the asphalt hardens at ambient temperatures.
- 2.3.28 The use of the path (especially for heavy vehicles) must be limited until the path has initially hardened.

Grit Rolled into Newly Laid Surface

- 2.3.29 After initially laying a bituminous surface grit is sprinkled on the path surface and rolled in using motorised rollers. Excess grit is swept from the path surface and reused at further sections of path.
- 2.3.30 This provides additional surface grip which is useful for horses. Surplus grit must be swept from the path surface before the path is opened to use by cyclists and walkers as this surface can be dangerous if not swept properly after application.

Surface Dressing: Resin Bound and Tar Spray and Chip

- 2.3.31 This treatment is applied to an existing bound surface, and comprises of a thin layer of chippings applied to a surface dressing adhesive. It can also be directly applied to a stone base. If the surface treatment is applied directly to a stone base, then two layers of the surface treatment are required.



Text Figure 2.2. Tar and Chip Surface Finish.

- 2.3.32 This method only works on surfaces that are smooth and even, as the finished surface treatment has only minimal thickness; it can be laid on any sound constructed surface in good condition.
- 2.3.33 Where an unbound surfacing has been specified, localised use of a resin bonded material is recommended on particularly vulnerable sections.
- 2.3.34 Surface dressing costs are higher than bituminous surfaces as the additional construction cost of the original asphalt surface or stoned surface must also be accounted for.

Self-Binding Surfaces

- 2.3.35 Self-binding gravel paths are versions of the standard limestone dust surface. All options require a 100–150mm thick aggregate base. Self-binding materials may be based on limestone, slate waste or granite waste and others.
- 2.3.36 The material is spread and levelled using a paving machine whilst damp/moist and then compacted using a roller or vibrating plate. The material 'sets' when dry, but not to the same extent as would a concrete or bitmac. The surface remains loose-ish and dusty, but does 'harden' to the point of becoming impermeable in some heavily trafficked

projects. Each material is different and therefore it is important to visit a site where the desired material has been laid several years ago to see how it performs.

2.3.37 This range of products is suitable for lightly trafficked environmentally sensitive areas.

2.3.38 Self-binding surfaces tend not to work very well in areas:

- Where erosion is likely to take place.
- Sharp corners, junctions or under bridges.
- With difficult drainage.
- Where water is present.
- Where heavy traffic uses a path.
- Where equestrians use a path.

2.3.39 Where this type of surface is chosen, localised use of resin bonded or other sealed surfaces is recommended for such vulnerable sections.

2.3.40 The life-cycle of self-binding surfaces tends to be significantly shorter than for bound surfaces, and there is a continuous problem with overgrowing vegetation, ponding and pothole development, which very quickly make paths unacceptable to many cyclists and walkers (unless repaired quickly).

2.3.41 Self-binding path surfaces can be easily repaired.

2.3.42 The quality of the surface is sensitive to the workmanship with which it is laid so effort must be put into ensuring a high level of quality control during construction.

Dust and Gravel Surfaces

Rolled Quarry Dust Finish

2.3.43 The construction build-up of such a surface would be a clean single sized stone with a 50mm layer of quarry dust rolled and compacted.

2.3.44 This type of finish is not a suitable long term finish for all users of the greenway, in particular cyclists and wheelchair users. Exposure to adverse weather conditions and heavy usage (including bicycles with narrow tyres) will develop ruts and grooves along the track. Wash out of the finer material would leave larger stones exposed which would not comply with the NTO requirements. These issues would require ongoing maintenance to ensure access for all users.

2.3.45 This type of finish is susceptible to developing low points and ponding over its lifetime. Heavy usage in combination with the above will exacerbate the potential damage to the finished surface and increase the maintenance requirements.

2.3.46 This type of finish would be environmentally friendly with minimal impact to the surrounding areas. It can be installed using small crews and machinery which will have minimal effect on the environment.

Gravel Surface

2.3.47 The construction build-up of such a surface would be a clean single sized stone with a layer of gravel rolled and compacted.

- 2.3.48 A gravel path has a number of disadvantages especially for cyclists. Gravel surfaces are slippery and bike riders can find it hard to stop or change direction. This would be a safety concern as the route is a shared use greenway and riders may have to stop or swerve to avoid other users and risk crashing. Gravel paths also tend to erode and leave dangerous ruts and grooves that can cause crashes.

Reinforced Grass and Sand

- 2.3.49 This type of construction involves the laying of interlocking plastic grids on top of a Type 1 (well graded granular sub base material) base. The grid sections are filled with soil/sand/gravel and can be seeded if necessary.
- 2.3.50 The surface is not perfectly smooth which can affect cyclists and is prone to damage by vehicles.

'No Dig' Construction

- 2.3.51 In locations where ground conditions prevent excavation for the sub base, such as over tree roots, the path may need to be constructed on the existing ground surface. Geotextiles, geo-grids or geo cells are laid on top of the existing ground and are then filled with Type 1 sub base, the path is then finished with a base course and wearing course as required.
- 2.3.52 This type of construction is mainly used to avoid tree roots severance or soil compaction, which can be seriously detrimental to tree health.

Non-Slip Timber Boardwalk Surfaces

- 2.3.53 A non-slip timber boardwalk is an environmentally sustainable option which is visually suited to the surrounding environment and in particular the Pill River estuary and the surrounding area.



Text Figure 2.3. Timber Boardwalk Surface Finish.

- 2.3.54 This option would be easy to construct in the agricultural areas using an environmentally friendly construction method.
- 2.3.55 Such methods of construction can utilise offsite fabrication for elements of the works which will reduce on site works, reducing the possible impact during construction.

Installation of the foundations can be carried out by small crews and machinery which will also reduce environmental impacts during construction.

- 2.3.56 This type of finish would be easy to maintain with typically a 25 year life span.

2.4 Surface Finish Summary, Whole Life Cost Comparison and Recommendation

- 2.4.1 Following the above review, it is recommended that different surface finishes will have to be used for different sections of the greenway. The greenway surface finish must comply with the following NTO requirements:

- Sealed non-slip surfaces, non-slip timber boardwalk, tarmac or compacted surface with no loose stone or gravel greater than 5mm.

- 2.4.2 Experience over the last 15-20 years (from other local authorities and in the UK) has shown that unbound surfaces, which were considered the most economic and more environmentally friendly, suffer erosion, rutting, ponding and other damage that make these paths very unattractive and unusable in wet weather conditions. Annual maintenance requirements for unbound surfaces are generally higher than for bound surfaces and this is demonstrated in numerous whole life cost studies and the general experience of other local authorities in Ireland.

Example of Whole Life Cost Comparison

- 2.4.3 For a bound surface the initial construction cost is approximately €35/m² (less ancillaries). The path surface lasts 25-30 years, then requires major repairs and additional wearing course at €15/m². Annual maintenance cost of €1-2/m²/year.

- 2.4.4 Therefore a total cost for 50 year life-cycle per metre squared of path construction (at current cost):

- Initial construction – €35
- Repair after 25 years – €15
- Annual maintenance (50 x €1.50) – €75
- Total – €125/m²

- 2.4.5 For a comparable construction with limestone dust the initial construction cost is approximately €25/m² (less ancillaries). The path surface lasts 12 years, then requires thorough repair/resurfacing at €15/m². Annual maintenance costs are higher than for bound surfaces at €2/m²/year.

- 2.4.6 Therefore a total cost for 50 year life cycle per metre squared of path construction(at current cost):

- Initial construction – €25
- Repairs after 12, 25 and 37 years – €45
- Annual maintenance (50 x €2.00) – €100
- Total – €170/m²

- 2.4.7 This total could increase considerably if the greenway wears at a faster rate (which is likely due to the coastal location, exposed position, and heavy linear usage of the

proposed greenway) which would require repairs after shorter periods and additional annual maintenance.

2.4.8 Therefore based on quality, on-going maintenance and associated costs the following is recommended.

Surface Finish No. 1 – Dense Bitumen Macadam (DBM)

2.4.9 From Malahide Demesne car park to Bissets Strand and from the Kilcrea Road to Newbridge Demesne car park the existing surface finish will be used. If new sections of greenway are required, a tarmac surface finish will be used. This finish is:

- Suitable for all users.
- Will allow for the use of existing paths and roads surface finishes along this section of the route.
- Will be the most cost effective solution for these sections.

2.4.10 From Bissets Strand to the north shore of the estuary it is recommended that a DBM surface is installed along the causeway for the following reasons:

- Suitable for all users.
- Low maintenance.
- Suitable for weather conditions.
- Suitable for flooding during high storm and tidal events.
- Most sustainable long term option.

2.4.11 It is also recommended, where appropriate, that a coloured/textured surface finish should also be used to delineate the route and enhance the visual appearance of the finish on all tarmacked areas, in particular across the Malahide Estuary and along Bissets Strand. This will be reviewed in more detail as part of the detail design.

2.4.12 A similar coloured/textured surface finish was used along the shared pedestrian and cycle track along the Grand Canal between Inchicore and Grangecastle as shown on Text Figure 2.1 above.

2.4.13 These findings reflect the findings of the Sustrans “Cycle Path Surface Options Technical Information Note No. 8” which recommends the default path surface is machine laid DBM or HRA for all trails and indicates that alternative surface treatments should only be considered where the standard options are not suitable.

2.5 Greenway Boundary Treatments

2.5.1 The following section of this report is a review of the requirements for the boundary treatments along the proposed greenway.

Malahide Demesne to Bissets Strand

2.5.2 This section of the greenway will utilise existing footpaths and roadways and will not require any boundary treatment. Some safety barriers may be required at road crossings which will be detailed as part of the detail design for the project.

Irish Rail Causeway

- 2.5.3 The proposed route of the greenway along the causeway to the south of the Irish Rail viaduct is at a lower level than the railway tracks and is currently used as an access track by Irish Rail for the maintenance of the viaduct (see Text Figure 2.4 and Text Figure 2.5 below).



Text Figure 2.4. Causeway to North of Viaduct.

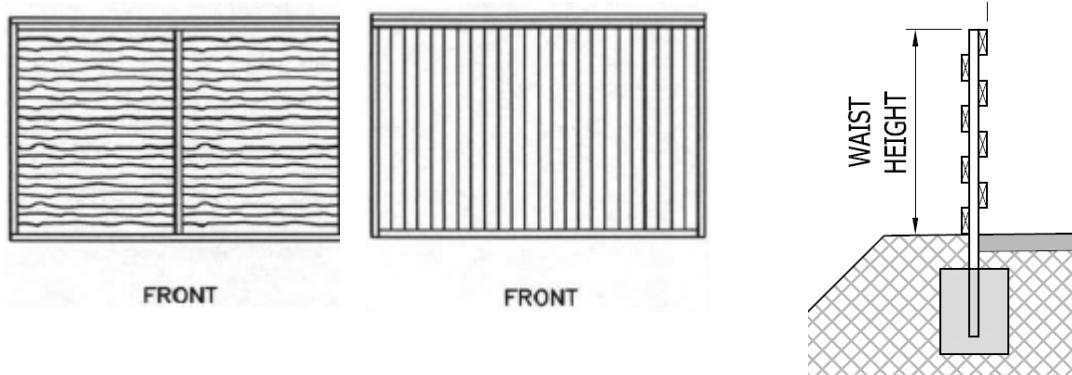


Text Figure 2.5. Causeway to South of Viaduct.

- 2.5.4 It is a requirement of Irish Rail to install a security fence along the eastern side of the proposed works from Bissets Strand to the north shore providing a 3m minimum separation between the greenway and the railway tracks. This would be installed by Irish Rail prior to any works being carried out along the causeway.
- 2.5.5 The proposed route of the greenway along the causeway to the north of the viaduct is at a higher level adjacent to the railway tracks.
- 2.5.6 It is a requirement of Irish Rail that the fabric of the causeway is not disturbed by the construction of the greenway.
- 2.5.7 Malahide Estuary is a designated Special Area of Conservation (SAC) and Special Protection Area (SPA) and therefore subject to SAC and SPA requirements. The estuary is also designated as a proposed Natural Heritage Area (pNHA) and is also listed under the RAMSAR Convention.
- 2.5.8 National Parks and Wildlife Service (NPWS) have been consulted in relation to the proposal in these areas. The NPWS have requested, as a mitigation measure, the provision of a solid barrier on the western side of the proposed greenway across the estuary. The barrier is required to minimise the effect/disturbance to estuary wildlife by blocking the leg movement of the pedestrian users which is known to disturb birds.
- 2.5.9 The boundary treatments will continue across the proposed pedestrian bridge. This will include the continuation of the security fencing on the eastern side of the bridge and the solid barrier on the western side to appropriate details.
- 2.5.10 The causeway is very exposed and any proposal must cater for the adverse weather conditions which the barrier will be subjected to.
- 2.5.11 A number of different barrier types were reviewed and these are detailed below.

Timber Fencing

- 2.5.12 A number of timber fencing options were reviewed including full solid timber panels and timber hit and miss fencing (see Text Figure 2.6 below).



Text Figure 2.6. Solid Panel Timber Fencing and Hit and Miss Fencing Section.

- 2.5.13 The timber fencing would be high quality pressure treated timber. The fencing would require foundations for the timber posts or pre-cast concrete posts at approximately 2.4m centres which would be difficult to construct along the stone causeway and may interfere with the fabric of the causeway itself (see Text Figure 2.7 below).



Text Figure 2.7. Timber Panel Fencing.

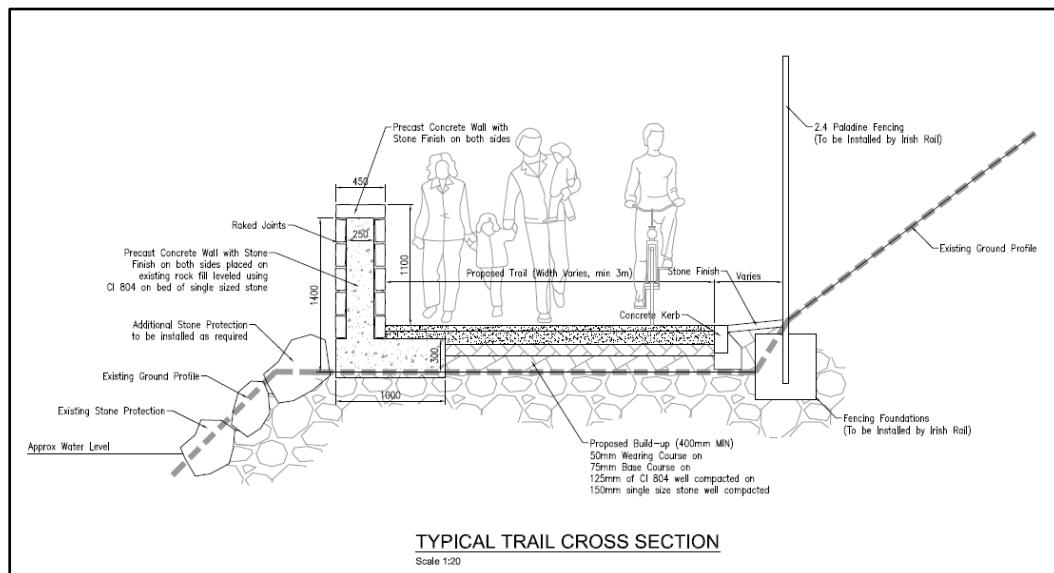
- 2.5.14 Willow fence panels would also be considered but would not be robust enough to cater for the weather conditions.
- 2.5.15 The timber panels can be easily replaced in sections if damaged. The timber would, however, require ongoing maintenance due to the proximity to the sea and the severe weather conditions that can occur in this area.

Metal Fencing

- 2.5.16 A number of metal fence types were considered but many of the metal fencing options did not provide a solid barrier and therefore were unsuitable.
- 2.5.17 Fabrication of bespoke metal fencing was also considered but would be uneconomical. The fencing would have to be galvanised and powder coated to a high standard to deal with the extreme weather conditions.
- 2.5.18 The fencing would require foundations for the posts at approximately 2.4m centres which would be difficult to construct along the stone causeway and may interfere with the fabric of the causeway itself.

Pre-cast Wall

- 2.5.19 A pre-cast wall with various finishes was considered. The pre-cast wall could be constructed as a free standing L-shaped piece which could be fabricated off-site and dropped into place along the proposed greenway. A sketch of the proposed wall is shown below.



- 2.5.20 The existing ground under the proposed wall would be prepared with a bed of single sized stone and CI804 built up off the existing ground to provide a level surface for placing of the precast units. The remainder of the greenway construction could then be built up off the existing ground profile as shown on the sketch above.
- 2.5.21 There are a number of options for the finished surface of the precast wall and these include:
- Bare concrete finish.
 - Imprinted board marking finish.
 - Stone finish.
- 2.5.22 The bare concrete finish and the imprinted board marking finish would not be in keeping with the existing surroundings, therefore a stone finish would be recommended. The proposed stone would be of a type to match the appearance of the existing stone defences. The unit including the stone finish would be fabricated off-site.
- 2.5.23 The benefits of such a system would include ease and speed of construction, and reduced amount of works on site ensuring consistent high quality finish. This would also mean the minimum environmental disturbance during the construction period.

Stone Gabion Wall

- 2.5.24 A stone gabion wall was considered with two 600 x 600mm cages stacked on top of each other (see Text Figure 2.8 below). This would give a stone finish which could be either rough or placed stone in the cages. The stone finish would be in keeping with the existing surroundings but the metal cages would be visible.

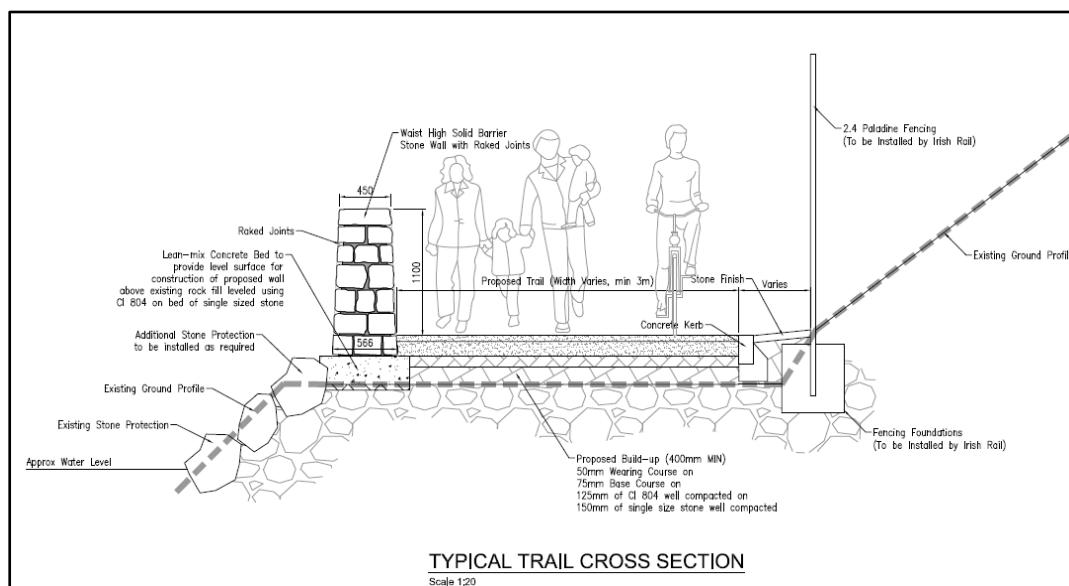


Text Figure 2.8. Gabion Wall Example.

- 2.5.25 The cages could be pre-filled and placed on site or they could be filled on site which is quite intrusive and time consuming during the construction period.
- 2.5.26 The existing ground under the proposed wall would be prepared with a bed of single sized stone and CI804 to provide a level surface for placing of the cages.
- 2.5.27 The proposed stone would be of a type to match the appearance and colour of the existing stone defences.
- 2.5.28 The gabions are visually unappealing due to the nature of their construction and the long term viability of the mesh would be questionable considering its exposed location.

Dry Stone Wall Effect

- 2.5.29 A stone wall with random coursing with deep raked joints using a stone to match the existing sea defences was considered (see sketch below).



- 2.5.30 The existing ground under the proposed wall would be prepared with lean mix concrete on a bed of single sized stone and CI804 off the existing ground level, which would provide a level surface for the construction of the wall. The remainder of the greenway construction could then be built up off the existing ground profile as shown on the sketch above.
- 2.5.31 The proposed stone would be of a type to match the appearance and colour of the existing sea defences.
- 2.5.32 The construction of this type of wall would be labour intensive but due to the economy of scale the cost of the construction for this type of barrier would be a viable option.
- 2.5.33 The dry stone wall has a more natural appearance which is more in keeping with the existing environment.

King Post Fence

- 2.5.34 A king post fence is a fence with steel I-Sections or pre-cast concrete posts constructed at a standard spacing and in-filled with timber sleepers, timber panels or concrete panels.
- 2.5.35 The fencing would require foundations for the steel sections or pre-cast concrete posts at approximately 2.4m centres which would be difficult to construct along the stone causeway and would interfere with the fabric of the causeway itself.
- 2.5.36 This type of fencing would not be visually appealing and would not marry with the existing environment.

Irish Rail Causeway Boundary Treatment Recommendation

- 2.5.37 Based on the above assessment the use of a dry stone wall or a precast wall with a suitable stone finish is recommended for the following reasons:
- Neither of these options interferes with the existing causeway and can be constructed on top of the existing ground level as shown on the drawings in Appendix H.
 - Both options are visually appealing and match/complement the existing environment and will complement the project as a whole.
- 2.5.38 These options have minimum maintenance requirements and are viable long term options.
- 2.5.39 A cost comparison can be incorporated into the construction tender for both of these options and the most economical solution can be constructed.

Malahide Estuary North Estuary Shore to Kilcrea Road

- 2.5.40 The greenway in this section will be either a dense bitumen macadam (DBM) or a combination of DBM and a raised stilt structure as discussed above.
- 2.5.41 The proposed railings on the section of greenway with a DMB finish will be a post and wire fence on both sides of the greenway. This type of rail is in keeping with a normal farming fenceline in accordance with the TII (formerly NRA) standard details.

Kilcrea Road to Newbridge House

- 2.5.42 This section of the greenway will be constructed using existing footpaths and roadways and will not require any boundary treatment on any of the route options. Some safety barriers may be required at road crossings which will be developed as part of the detail design of the project.

2.6 Greenway Lighting

- 2.6.1 Where the greenway is on existing roads which have an existing lighting standard there will be no upgrade of the existing lighting.
- 2.6.2 In areas where there is no lighting a designed lighting system which will give a light level which will allow for safe usage of the greenway during dusk/night-time by both tourists and commuters will be installed.

2.7 Greenway Signage

- 2.7.1 The proposed development will require signage to be installed in accordance with National Trails Office (NTO) signage requirements ("Management Standards for Recreational Trails").
- 2.7.2 As part of the signage and way-marking a number of different sign types are required as follows:
- Information boards.
 - Way-marking.
 - Directional signage.

Information Boards

- 2.7.3 Basic information about greenways must be available on an information board at the trail head, and on longer greenways at popular access points along the greenway (see Text Figure 2.9 and Text Figure 2.10). Information must include the following:
- (a) A map showing a clearly defined route with a start and finish point and a 'you are here' pointer.
 - (b) Information on the greenway grading (difficulty rating) including a definition of the grades.
 - (c) The length of the greenway from the start to finish, the total ascent in metres and the estimated time to complete the greenway for the average user.
 - (d) Details of way-marking used on the greenway.
 - (e) Where a greenway traverses open/exposed terrain a warning about the risks involved should there be a change of weather.
 - (f) A contact email for users to provide feedback and/or report incidents or issues on the greenway.
 - (g) Contact details for the nearest emergency services.
 - (h) Information on whether dogs are permitted on the greenway.
 - (i) The "Leave No Trace" principles.

Additional Shared Use Greenway Requirements

- (j) The information board must clearly inform users that they should expect to meet other user categories on the greenway, e.g. walkers, cyclists.
 - (k) A code of conduct for each user category must be provided.
 - (l) If there are any parts of the greenway network restricted to any user category, this must be made clear on the information board.
 - (m) If sections of greenway which are not shared use/join a section which is shared use, users must be clearly informed by appropriate signage.
- 2.7.4 The installation of reduced information boards is recommended at both Donabate and Malahide Railway Stations to inform greenway users of the details of the proposed development.

Way-Marking/Directional Signage

- 2.7.5 It is a requirement of the National Trails Office (NTO) to provide the following way-marking and directional signage for the proposed development (see Text Figure 2.11 to Text Figure 2.13 below):
- (a) The access route to the trailhead must be signposted from the nearest public road.
 - (b) Where there are junctions on a greenway route or there is a risk of the user diverting from the greenway, way-marking must be provided.
 - (c) On sections of greenway greater than 1km in length where there are no junctions, reassurance markers must be provided approximately every 500m and at least every 1km.
 - (d) Greenway marking can be achieved by the use of various types of way-marks including marker posts, sign posts (finger posts) arrow plates or discs, stone markers or painted flashes or arrows on rocks.
 - (e) Examples of some of these markers are shown below (Text Figure 2.11 and Text Figure 2.12). The same design of marker and marking standard must be used consistently throughout an entire route.
 - (f) If there are multiple greenways in the same area, markers must be coloured or numbered differently for each greenway such that each route can be clearly followed.
 - (g) Way-marks on the National Way-marked Way Network must be the yellow “walking man” symbol and arrow. The use of the yellow “walking man” is not acceptable on other routes. However, the “walking man” symbol may be used in a different colour on other routes.
 - (h) All markers and signs must be clearly visible to an approaching walker and cyclist and free from overgrown vegetation; on a greenway intended for travel in both directions the way-marker must be clearly visible from both directions. If designed as a greenway for one way use only, this must be stated on the information board, maps of the route and on any other sources of information about the route.
 - (i) All way-marks and signs must be securely erected or attached, correctly aligned and clean.
 - (j) Any temporary diversions on the greenway must be clearly way-marked.
- 2.7.6 Statutory signage in accordance with the Department of Transportation’s Traffic Signs Manual (2010) will also be installed where required.
- 2.7.7 The exact type and placing of all signs will be agreed with the relevant stakeholders as part of the detail design of the proposed development.



Text Figure 2.9. Example of Information Board.



Text Figure 2.10. Existing Information Boards in Malahide Demesne.



Text Figure 2.11. Example of Way-marking.



Text Figure 2.12. Example of Way-marking.



Text Figure 2.13. Examples of Directional Signage.

3.0 Preliminary Screening

3.1 Introduction

- 3.1.1 For ease and clarity of reporting and assessment the project has been divided into six sections as follows:
- Section 1 – Malahide Demesne.
 - Section 2 – R106 Dublin Road, Malahide.
 - Section 3 – R106 Dublin Road to Bissets Strand.
 - Section 4 – Bissets Strand to the North Shore of Malahide Estuary.
 - Section 5 – North Shore of Malahide Estuary to R126 Hearse Road.
 - Section 6 – Newbridge Demesne.
- 3.1.2 In Sections 1, 5 and 6 using and combining the identified segments there are a significant number of different possible route option combinations which would not meet the needs of the scheme.
- 3.1.3 A preliminary screening exercise is carried out below using the key objectives and constraints to rationalise the route options.
- 3.1.4 Sections 2, 3, and 4 have a limited number of route options which will all be fully assessed.

3.2 Section 1 – Malahide Demesne

- 3.2.1 There are 23 different possible route combinations in this section. For ease of environmental assessment these route options are colour coded (see Chapters 12.0 *et seq.*). These are shown on Appendix H-Drawing 12-160-131.
- 3.2.2 In reviewing this section it is clear that three north-south routes emerge; a western route, a central route and an eastern route. Each of these routes has a number of alternative end points. There are also a number of east-west links (segments A8, A7 and A6) in particular between the western route and the central route.
- 3.2.3 The land required for segment A8 is not available due to a 99 year lease agreement recently entered into between Fingal County Council and Malahide Cricket Club; therefore this segment is screened out.
- 3.2.4 Segments A7 and A6 run east-west which lacks the directness of the north-south routes. Section A7 runs in a southern direction (which is opposite to the direction of travel), at both ends of this section. Also due to the proximity of the existing entrances to the demesne, which can be seen at the start of sections A7 and A6, end users will naturally travel towards the entrance rather than away from it. Segments A7 and A6 are longer than the alternative routes and therefore lack directness and are likely not to be used by the intended end users and are therefore screened out.
- 3.2.5 The removal of segments A6, A7 and A8 results in a range of rationalised options which connect Malahide Demesne and Malahide Estuary.

- 3.2.6 Following the preliminary screening assessment of this section six route options were selected for further evaluation, viz:

Table 3.1 Preliminary Screening – Section 1.

Section 1 Options	Segments
Section 1 Option 1 – Green	A1 + A2 + A3 +A4
Section 1 Option 2 – Orange	A1 + A2 + A3 +A5
Section 1 Option 3 – Pink	B1 + B2 + B3 +B4
Section 1 Option 4 – Blue	B1 + B2 + B3 +B5
Section 1 Option 5 – Cyan	C1 + B2 + B3 + B4
Section 1 Option 6 – Yellow	C1 + B2 + B3 + C2

- 3.2.7 These routes are shown on Appendix H-Drawings 12-160-140 and 12-160-141.

3.3 Section 5 – North Shore of Malahide Estuary to R126 Hearse Road

- 3.3.1 Using and combining the identified segments there are over 20 different possible route combinations in this section. These are shown on Appendix H-Drawing 12-160-132.
- 3.3.2 Segments C1 and D1 both follow the line of the existing Pill River on the western and eastern bank respectively. Both require structures to cross the Pill River but the work involved, cost and environmental impact of providing the crossing for segment C1 is much greater than segment D1 for an equivalent result. Segment C1 river crossing has a larger span across the Pill River, poor ground conditions, and poor accessibility in comparison with Segment D1. It was therefore decided to screen out segment C1.
- 3.3.3 Segment E5 was reviewed with detailed drawings produced showing the extent of the works required, associated impacts and landtake required from private dwellings to provide safe crossing points at this location. These options would also require the removal of sections of existing mature hedgerows.
- 3.3.4 Due to the close proximity of existing boundary walls, buildings, entrances, etc, it was considered that the impact on the existing private properties would be considerable, therefore it was decided to screen out segment E5. This also screened out segments E3 and E4 as they were both linked to segment E5 and are now redundant.
- 3.3.5 Segment E7 was reviewed with input from the environmental consultants (detailed in the paragraph below). This segment contains dense mature hedgerow and is particularly sensitive from an environmental perspective. All of the vegetation in this area would have to be removed to allow construction of the greenway, therefore it was decided to screen out segment E7.

"Removal of Links E5 and E7 have a material benefit in terms of ecology. The area to the north of the Corballis Cottages Road displays habitat ecology of Local Value. This is an area of unmanaged meadow reverting to scrub. Here, due to little agricultural management, a complex mosaic of scrub, rank dry meadow and wet grassland has developed. Dense areas of bramble, Hawthorn (*Crataegus monogyna*), Gorse (*Ulex europaeus*) and willows (*Salix* spp.) occur. Some reeds (*Phragmites australis*) are also evident near drainage channels. This area may be described as moderate value locally important."

- 3.3.6 Following the preliminary screening assessment it is proposed to assess the following six route options for Section 5:

Table 3.2 Preliminary Screening – Section 5.

Section 5 Options	Segments
Section 5 Option 1 – Pink	A1 + A2 + A3
Section 5 Option 2 – Blue	B1 + B2 + A2 +A3
Section 5 Option 3 – Cyan	B1 + D1 + C2 + C3 + C4 + A3
Section 5 Option 4 – Green	B1 + D1 + C2 + D2 + D3 + D4
Section 5 Option 5 – Orange	B1 + E1 + E2 + C2 + C3 + C4 + A3
Section 5 Option 6 – Yellow	B1 + E1 + E2 + C2 + D2 + D3 + D4

- 3.3.7 These routes are shown on Appendix H-Drawings 12-160-147 and 12-160-148.

3.4 Section 6 – Newbridge Demesne

- 3.4.1 Appendix H-Drawing 12-160-133 shows the segments identified in Section 6.
- 3.4.2 A requirement of the National Trails Office is to provide suitable car parking at the head and tail of a greenway which is outlined in the Constraints Report. Segment A4 does not link with the car park and is therefore screened out.
- 3.4.3 Segment A4 does however provide a link from the greenway to Donabate Village, Donabate Railway Station and existing bus services.
- 3.4.4 Following the preliminary screening assessment it is proposed to assess the following route options for Section 6.

Table 3.3 Preliminary Screening – Section 6.

Section 6 Options	Segments
Section 6 Option 1 – Cyan	A1 + A2 + A3

- 3.4.5 These routes are shown on Appendix H-Drawing 12-160-149.

3.5 Route Options

- 3.5.1 Following the preliminary screening exercise which included reviewing the key objectives and constraints from an engineering perspective, and in consultation with environmental consultants, the following route options were selected to progress to the next stage.

Table 3.4 Preliminary Screening – Route Options.

Route Option	Segments
Section 1 Option 1 – Green	A1 + A2 + A3 +A4
Section 1 Option 2 – Orange	A1 + A2 + A3 +A5
Section 1 Option 3 – Pink	B1 + B2 + B3 +B4
Section 1 Option 4 – Blue	B1 + B2 + B3 +B5
Section 1 Option 5 – Cyan	C1 + B2 + B3 + B4
Section 1 Option 6 – Yellow	C1 + B2 + B3 + C2
Section 2 Option 1 – Orange	A1
Section 2 Option 2 – Pink	B1

Route Option	Segments
Section 2 Option 3 – Cyan	C1
Section 2 Option 4 – Green	D1
Section 2 Option 5 – Blue	E1
Section 3 Option 1 – Blue	A1 + A2 + A3 +A4
Section 3 Option 2 – Orange	A1 + B1 + A3 +A4
Section 3 Option 3 – Green	C1 + A4
Section 3 Option 4 – Pink	D1 + D2
Section 3 Option 5 – Yellow	E1 + D2
Section 4 Option 1 – Green	A1
Section 5 Option 1 – Pink	A1 + A2 + A3
Section 5 Option 2 – Blue	B1 + B2 + A2 +A3
Section 5 Option 3 – Cyan	B1 + D1 + C2 + C3 + C4 + A3
Section 5 Option 4 – Green	B1 + D1 + C2 + D2 + D3 + D4
Section 5 Option 5 – Orange	B1 + E1 + E2 + C2 + C3 + C4 + A3
Section 5 Option 6 – Yellow	B1 + E1 + E2 + C2 + D2 + D3 + D4
Section 6 Option 1 – Cyan	A1 + A2 + A3

3.5.2 These route options are shown on Appendix H-Drawings 12-160-140 to 12-160-149.

4.0 Route Options Engineering Review

4.1 Introduction

- 4.1.1 This chapter reviews each of the identified route options in-line with the key objectives and engineering constraints.
- 4.1.2 For ease and clarity of reporting and assessment the route options have been divided into six sections as follows:
- Section 1 – Malahide Demesne.
 - Section 2 – R106 Dublin Road, Malahide.
 - Section 3 – R106 Dublin Road to Bissets Strand.
 - Section 4 – Bissets Strand to the North Shore of Malahide Estuary.
 - Section 5 – North Shore of Malahide Estuary to R126 Hearse Road.
 - Section 6 – Newbridge Demesne.

4.2 Start and End Points

- 4.2.1 In accordance with the project brief and following the initial assessment of the proposed route it was agreed that the extent of the greenway will be from Malahide Demesne to Newbridge Demesne for the following reasons.
- 4.2.2 Both of these locations have positive features which will enhance the sustainability and attractiveness of the greenway including:
- Links to existing attractions.
 - Built heritage.
 - Natural heritage.
 - Existing paths, tracks.
 - Appropriate surfaces.
 - Picnic sites.
 - Good local services.
 - Proximity to villages/towns.
 - Ease of maintenance.
 - Car park areas.

- 4.2.3 It is a requirement of the National Trails Office that suitable car parking and access to public transport is available at the head and tail of a greenway. Therefore the proposed head and tail of the greenway will be the car parks in Malahide Demesne and Newbridge Demesne.

4.3 Section 1 – Malahide Demesne

- 4.3.1 Malahide Demesne is a regional park which covers an area of approximately 109ha. The park was acquired by Dublin County Council in 1975 from the Talbot Family and is a good example of an eighteenth century landscape park with perimeter woodland belt surrounding extensive lawns.
- 4.3.2 Malahide Castle is located in the centre of the park and includes a restaurant, coffee shop and tourist office. The walled garden forms part of the Talbot Botanic Gardens which contains over 5,000 species of plants.

4.3.3 The park also includes the following amenities:

- Children's playground.
- 9 hole par 3 golf course.
- 18 hole pitch and putt course.
- Sports pitches.
- Tennis courts.
- Cricket pitch.
- Exercise trail.
- Bowls area.

4.3.4 It is proposed to commence the greenway from the main car park within Malahide Demesne and this starting point has the following advantages:

- Proximity to Malahide Village.
- Proximity to rail and bus services.
- Proximity to the local housing estates.
- Easy access for walkers and cyclists when starting or completing the walk to Malahide Castle Retail Centre and Malahide Village.

4.3.5 The existing paths within the demesne are of varying widths and it would be proposed to use the existing footpaths within the demesne where possible. Path widths within the demesne follow a width hierarchy and any new paths and existing paths must conform to this requirement. This also restricts the option of widening of the existing paths.

4.3.6 As part of this study car parking surveys were carried out to determine the usage of the existing car parks within Malahide Demesne. The surveys were carried out both on weekdays and weekends and show that the car park usage peaks at 70%. This leaves 30% spare capacity during normal usage. Special events including major summer bank holiday weekends will have higher usages but these are exceptions to the norm and arrangements for additional car parking are provided as required.

4.3.7 The selected route options are shown on Appendix H-Drawings 12-160-140 and 12-160-141 and are described below.

Section 1 – Route Option 1 – Green

4.3.8 Starting at the main car park within Malahide Demesne, this option runs west, south of Malahide Castle, along the existing 2.75m wide path. It continues through a wooded area turning north on the eastern side of Malahide Castle. It joins up with an existing 2.5m path and continues east along the existing paths. The route continues north along an existing 2.0m path to the eastern side of the golf course and continues to the east and north of the tennis courts.

4.3.9 It then turns north up to the existing pedestrian entrance to Malahide Demesne adjacent to the junction of the Dublin Road and Yellow Walls Road.

Section 1 – Route Option 2 – Orange

4.3.10 Starting at the main car park within Malahide Demesne, this option runs west, south of Malahide Castle, along the existing 2.75m wide path. It continues through a wooded area turning north on the eastern side of Malahide Castle. It joins up with an existing 2.5m path and continues east along the existing paths. The route continues north along an

existing 2.0m path to the eastern side of the golf course and continues to the east of the tennis courts.

- 4.3.11 It is proposed to construct a new footpath running north through the existing wooded areas with a new pedestrian entrance west of the existing entrances to the cricket club.

Section 1 – Route Option 3 – Pink

- 4.3.12 Starting at the main car park within Malahide Demesne, this option runs north along existing paths between Malahide Castle and the new Retail Centre which have been recently upgraded and resurfaced (see Text Figure 4.1 below). Cyclists currently must dismount over this section due to the high volumes of pedestrians and existing by-laws. It then continues northeast on the northern side of the walled gardens alongside the recently completed FCC compound area.



Text Figure 4.1. Existing Paths within Malahide Demesne.

- 4.3.13 It then continues north along the existing 3.8m path up to Hogan's Gate exiting to the Dublin Road.

Section 1 – Route Option 4 – Blue

- 4.3.14 Starting at the main car park within Malahide Demesne, this option runs north along existing paths between Malahide Castle and the new Retail Centre which have been recently upgraded and resurfaced. Cyclists currently must dismount over this section due to the high volumes of pedestrians and existing by-laws. It then continues northeast on the northern side of the walled gardens alongside the recently completed FCC compound area. It then continues north along the existing 3.8m path.
- 4.3.15 This option then turns east along the southern and western boundary of Bridgefield car park, and exits the demesne at the existing pedestrian entrance to Malahide Demesne. This would involve the upgrade of the existing steps and ramps at this entrance to cater for all users including cyclists.

Section 1 – Route Option 5 – Cyan

- 4.3.16 Starting at the northeast of the existing main car park in Malahide Demesne this option runs north and then east along the existing 2.0m path passing the entrances to the children's playground through the existing wooded areas. It continues north following

the existing path as far as the open playing fields. It then continues north along the existing 3.8m path up to Hogan's Gate exiting to the Dublin Road.

Section 1 – Route Option 6 – Yellow

- 4.3.17 Starting at the northeast of the existing main car park in Malahide Demesne this option runs north and then east along the existing 2.0m path passing the entrances to the children's playground through the existing wooded areas. It continues north following the existing path as far as the open playing fields. It then continues north along the existing 3.8m path.
- 4.3.18 This option then turns east along the southern and western boundary of Bridgefield car park, and exits the demesne at the existing pedestrian entrance to Malahide Demesne. This would involve the upgrade of the existing steps and ramps at this entrance to cater for all users including cyclists.

4.4 Section 2 – R106 Dublin Road, Malahide

- 4.4.1 The R106 Dublin Road, Malahide is a 7.2m single carriageway with a 2.7m footpath on the northern side and a 2.1m footpath on the southern side. It is the main road into Malahide Village. Approaching Malahide there is an existing junction between the Dublin Road and Yellow Walls Road. There is an existing pedestrian entrance to Malahide Demesne adjacent to this junction. To the east of the junction there is an existing controlled pedestrian crossing.
- 4.4.2 There are a number of existing bus stops along the Dublin Road on both sides of the road. There is also a line of public lighting poles located close to the road edge in the existing northern footpath.
- 4.4.3 There are a number of private house entrances on the northern side of the road including the entrance to the Casino Apartment Complex and the Malahide Presbyterian Church.
- 4.4.4 The entrance to O'Hanlon's Lane (which is a cul-de-sac) is also located on the northern side of the road.
- 4.4.5 The entrances to Malahide Cricket Club and Bridgefield car park are located on the southern side of the road.
- 4.4.6 Approaching Malahide Village the road narrows to 6.2m wide and the footpaths reduce to 1.8m on the northern side and 1.1m wide on the southern side approaching the railway bridge.
- 4.4.7 The footpath on the northern side of the bridge reduces to less than 1.0m wide. A new pedestrian bridge has been installed on the southern side of the bridge providing a 2.0m wide footpath, however there is a restriction on the footpath just prior to the new pedestrian bridge where the width of the footpath is reduced to less than 1.0m.
- 4.4.8 Due to the horizontal alignment of the bridge, sight distances and visibility are greatly reduced at this location.
- 4.4.9 After crossing the railway bridge on-street car parking is provided on the northern side of the road.

- 4.4.10 There is a junction with St. Margaret's Road on the south side of the road opposite the entrance to Malahide Railway Station.
- 4.4.11 To the east of the entrance to the railway station there is an existing controlled pedestrian crossing.
- 4.4.12 St. Sylvester's Church is located on the northern side of the road after the pedestrian crossing.
- 4.4.13 The road continues towards the centre of Malahide Village with a junction with Old Street on the northern side of the road. Shops face onto the street with 2.0m and 3.5m paths on the north and south sides of the road respectively including on-street car parking on both sides.
- 4.4.14 The selected route options are shown on Appendix H-Drawings 12-160-142 and 12-160-143 and are described below.

Section 2 – Route Option 1 – Orange

- 4.4.15 Exiting Malahide Demesne at the existing pedestrian entrance cyclists would be required to dismount and continue east along the existing path on the southern side of the road due to the existing restricted width.
- 4.4.16 Users would cross the Dublin Road using the existing controlled pedestrian crossing.
- 4.4.17 To adequately provide safe crossing points for all users (due to the width of the mouth of the junction) the junction of Yellow Walls Road and Dublin Road would have to be upgraded to a signalised junction providing safe crossing points (including islands) as required (see Text Figure 4.2 and Text Figure 4.3 below).



Text Figure 4.2. Malahide Road/Yellow Walls Road Junction.



Text Figure 4.3. Pedestrian Crossing at Malahide Road/Yellow Walls Road Junction.

Section 2 – Route Option 2 – Pink

- 4.4.18 Exiting Malahide Demesne at a proposed new pedestrian/cycle entrance a new controlled crossing would have to be constructed. Cyclists would have to dismount at this location.
- 4.4.19 The users would then continue east along the existing path on the northern side of the road as far as the entrance to O'Hanlon's Lane.

Section 2 – Route Option 3 – Cyan

- 4.4.20 Exiting Malahide Demesne at the existing pedestrian entrance users would continue west along a newly constructed 3.2m wide shared surface on the southern side of the road.
- 4.4.21 This would be provided by realigning the existing R106 Dublin Road providing a 3.2m shared surface on the southern side, a 6.5m carriageway and a 2.0m path on the northern side (see Appendix H-Drawing 12-160-112 for details). Existing services including lamp standards will be re-located as required. These works would be carried out within the existing road reservation and will not impact on existing boundaries.
- 4.4.22 A new controlled crossing would be constructed adjacent to O'Hanlon's Lane.

Section 2 – Route Option 4 – Green

- 4.4.23 Exiting Malahide Demesne at the existing pedestrian entrance users would cross the Dublin Road on a new controlled crossing (Text Figure 4.4 and Text Figure 4.5).
- 4.4.24 Users would then continue west along a newly constructed 3.2m wide shared surface on the northern side of the road as far as O'Hanlon's Lane.
- 4.4.25 This would be provided by realigning the existing Dublin Road providing a 2.0m path on the southern side, a 6.5m carriageway and a 3.2m shared surface on the northern side (see Appendix H-Drawing 12-160-113 for details). Existing services including lamp standards will be re-located as required. These works would be carried out within the existing road reservation and will not impact on existing boundaries.



Text Figure 4.4. Entrance to Car Park 2 from Malahide Road.



Text Figure 4.5. Pedestrian Exit to Malahide Road.

Section 2 – Route Option 5 – Blue

- 4.4.26 Exiting Malahide Demesne at the existing pedestrian entrance adjacent to the Irish Rail bridge cyclists would have to dismount and continue east along the southern side of the Dublin Road using the new pedestrian bridge and the existing paths including crossing the junction of St. Margaret's Road and Dublin Road.
- 4.4.27 Users would cross the Dublin Road using the existing controlled pedestrian crossing adjacent to the entrance to the railway station and continue east as far as the top of Old

Street (see Text Figure 4.6 and Text Figure 4.7 below). Cyclists will be advised to remain dismounted as far as the top of Old Street.



Text Figure 4.6. Existing Pedestrian Crossing Adjacent to Entrance to Railway Station.



Text Figure 4.7. Restrictions at Railway Bridge on Malahide Road.

4.5 Section 3 – R106 Dublin Road to Bissets Strand

- 4.5.1 Section 3 reviews the route options between the R106 Dublin Road to Bissets Strand. This section is a built up urban area with existing roads and paths.
- 4.5.2 It is proposed to utilise the existing roads and paths to provide the proposed greenway using both on-road and off-road cycle facilities as required.
- 4.5.3 The selected route options are shown on Appendix H-Drawings 12-160-144 and 12-160-145 and are described below.

Section 3 – Route Option 1 – Blue

- 4.5.4 This option follows Yellow Walls Road running north from the Dublin Road Junction and turns right onto Texas Lane (see Text Figure 4.8 and Text Figure 4.9 below). Existing designated parking is provided on the northern side of the road which would be removed to provide on-street designated cycleways.
- 4.5.5 The route continues north on Texas Lane (see Text Figure 4.10 and Text Figure 4.11 below). The first section of Texas Lane is narrow with limited space for two way traffic and passing cars. There is a section of designated parking on the southern side of the road.
- 4.5.6 Texas Lane widens out and continues as far as Bissets Strand with on street parking on both sides of the road which would have to be removed to accommodate an on-road cycle path. The existing paths on both sides of the road are quite narrow which would have to be widened to provide the required path widths.
- 4.5.7 At the junction of Texas Lane and Bissets Strand (see Text Figure 4.12 below) a proposed pedestrian crossing would be required to allow users to cross to the northern side of Bissets Strand.
- 4.5.8 The proposed route will continue along the existing grass verge (see Text Figure 4.13 below) which runs along the north side of the Bissets Strand Road adjacent to the Malahide Estuary as far as the existing site compound at Bissets Strand bridge.



Text Figure 4.8. Yellow Walls Road.



Text Figure 4.9. Junction of Yellow Walls Road and Texas Lane.



Text Figure 4.10. Texas Lane.



Text Figure 4.11. Texas Lane.



Text Figure 4.12. Junction of Texas Lane and Bissets Strand.



Text Figure 4.13. Green Verge along Bissets Strand.

Section 3 – Route Option 2 – Orange

- 4.5.9 This option follows Yellow Walls Road running north from the Dublin Road Junction and turns right onto Texas Lane. Existing designated parking is provided on the northern side of the road which would be removed to provide on-street designated cycleways.

- 4.5.10 The route continues north on Texas Lane. The first section of Texas Lane is narrow with limited space for two way traffic and passing cars. There is a section of designated parking on the southern side of the road.
- 4.5.11 Texas Lane widens out and continues as far as Bissets Strand with on street parking on both sides of the road which would have to be removed to accommodate an on-road cycle path. The existing paths on both sides of the road are quite narrow which would have to be widened to provide the required path widths.
- 4.5.12 The route enters Chalfont Housing Estate which is a quiet estate with concrete roads, grass verges and narrow paths throughout. The route continues along existing estate roads as far as the northern end of Chalfont Avenue where an existing 2.5m pedestrian and cycle route linking with Bissets Strand exists.
- 4.5.13 At the entrance to the existing pedestrian and cycle route a proposed pedestrian crossing would be required to allow users to cross to the northern side of Bissets Strand.
- 4.5.14 The proposed route will continue along the existing grass verge which runs along the north side of the Bissets Strand adjacent to the Malahide Estuary as far as the existing site compound at Bissets Strand bridge.

Section 3 – Route Option 3 – Green

- 4.5.15 Route Option 3 follows O'Hanlon's Lane as far as Bissets Strand. O'Hanlon's Lane is a cul-de-sac with bollards restricting through traffic at the midpoint of O'Hanlon's Lane (see Text Figure 4.14 to Text Figure 4.17 below).
- 4.5.16 The first section of O'Hanlon's Lane is a 3.5m shared pedestrian, cycle and vehicular surface. The road then widens out to a 7.5m road with footpaths and private houses facing O'Hanlon's Lane on both sides. It would be proposed to use the existing footpath along this section for pedestrians and cyclists would use the existing road with appropriate signage and markings as required.
- 4.5.17 The road then returns to a 5.0m shared pedestrian, cycle and vehicular surface and continues on to Bissets Strand.
- 4.5.18 The junction of O'Hanlon's Lane and Bissets Strand has a number of entrances and approaches to the junction, which will require upgrading to allow safe and controlled access for pedestrians, cyclists and vehicular traffic.
- 4.5.19 At the junction of O'Hanlon's Lane and Bissets Strand a proposed pedestrian crossing would be required to allow users to cross to the northern side of Bissets Strand.
- 4.5.20 The proposed route will continue along the existing grass verge which runs along the north side of the Bissets Strand adjacent to the Malahide Estuary as far as the existing site compound at Bissets Strand bridge.

**Text Figure 4.14. O'Hanlon's Lane at R106.****Text Figure 4.15. O'Hanlon's Lane.****Text Figure 4.16. O'Hanlon's Lane.****Text Figure 4.17. O'Hanlon's Lane at Bissets Strand.**

Section 3 – Route Option 4 – Pink

- 4.5.21 This option starts on the western side of Old Street at the junction with Dublin Road. The route continues on the western side of the road. Old Street has existing narrow footpaths with trees and has designated parking on both sides of the road which would have to be removed to install a shared cycle path on one side of the road. A possible alternative would be the installation of a contra-flow cycle path up Old Street with northbound cyclists on-road. This would require the removal of parking on one side of the road only. A new pedestrian crossing would be required at the junction of Old Street and Railway Avenue.
- 4.5.22 The route continues to the end of Old Street and runs west along the southern side of Strand Street and under Bissets Strand bridge. The existing footpaths are narrow and there is no designated parking. Due to the limited width a designated shared surface cannot be installed in this section.
- 4.5.23 The underpass under Bissets Strand bridge is extremely narrow and is only wide enough for a single vehicle. A narrow path is provided on the south side of the underpass. The bridge is a listed structure.

- 4.5.24 Due to the width restrictions it would be difficult to provide cycle and pedestrian facilities along this section. A stop/go traffic light system would be required to allow safe passage of pedestrians, cyclists and vehicles.
- 4.5.25 A proposed pedestrian crossing would be required to allow users to cross to the northern side of Bissets Strand on the western side of the bridge.

Section 3 – Route Option 5 – Yellow

- 4.5.26 This option starts on the Dublin Road on the western side of the junction with Old Street (see Text Figure 4.18 and Text Figure 4.19 below).
- 4.5.27 The route continues on the northern side of the Dublin Road as far as Main Street. A proposed pedestrian crossing would be required to allow users to cross the junction with Old Street. The existing footpaths are very narrow and there is designated parking on both sides of the Dublin Road. Cyclists would be required to dismount along this section due to the width restrictions. The existing path is extremely busy.
- 4.5.28 The route turns on to Main Street and continues on the western side of the road. Main Street has existing footpaths with trees and designated parking on both sides of the road. To install a designated shared surface on Main Street would require the removal of car parking on the western side, removal of trees, widening of the existing footpath and reduction in overall carriageway width.
- 4.5.29 The route continues to the end of Main Street and turns west along the southern side of Strand Street as far as Bissets Strand bridge (see Text Figure 4.20 and Text Figure 4.21 below). A proposed pedestrian crossing would be required to allow users to cross the junction with Old Street. The existing footpaths are narrow with designated parking only in some sections. Due to the limited width a designated shared surface cannot be installed in this section.
- 4.5.30 The underpass under Bissets Strand bridge is extremely narrow and is only wide enough for a single vehicle. A narrow path is provided on the south side of the underpass. The bridge is a listed structure.
- 4.5.31 Due to the width restrictions it would be difficult to provide cycle and pedestrian facilities along this section. A stop/go traffic light system would be required to allow safe passage of pedestrians, cyclists and vehicles.
- 4.5.32 A proposed pedestrian crossing would be required to allow users to cross to the northern side of Bissets Strand on the western side of the bridge.



Text Figure 4.18. Malahide Road to Old Street.



Text Figure 4.19. Old Street.



Text Figure 4.20. Strand Street.



Text Figure 4.21. Bissets Railway Bridge.



Text Figure 4.22. Bissets Bridge (View from East Side).

4.6 Section 4 – Bissets Strand to the North Shore of Malahide Estuary

- 4.6.1 The proposed route in this section is defined as it runs parallel to the railway line across the existing causeway. The total length of this section is approximately 1,885m long.
- 4.6.2 This section of the route passes through the area of Malahide Estuary which is defined as a Special Area of Conservation (SAC), Special Protection Area (SPA) and proposed Natural Heritage Area (pNHA) which are statutory designations. It is the responsibility of NPWS for the designation and protection of these areas and their requirements will be incorporated in the design proposals as required.
- 4.6.3 As part of this project a viewing area will be provided at the location of the existing site compound (see Text Figure 4.23 below). This will be co-ordinated with Fingal County Council planning proposals and these works will tie-in with the Malahide Public Realm Strategy proposals in providing an urban public open space at this location.



Text Figure 4.23. Photograph of Green Area at Bissets Strand Prior to Construction of Irish Rail Site Compound.

- 4.6.4 Vehicle access will be restricted by the use of removable bollards and kerbing, all of which will be reviewed as part of the detailed design of this area.
- 4.6.5 The first section of this route will run along the west side of the existing railway tracks on the existing stoned access track (approximately 4.5m wide) which runs parallel with the existing railway at a lower level than the railway tracks. This section is approximately 605m long.
- 4.6.6 Access to the viaduct and the weir for maintenance purposes by Irish Rail and Fingal County Council will be provided along the greenway.
- 4.6.7 A viewing area will be provided on the southern side of the existing viaduct.
- 4.6.8 The second part of this section will be a new pedestrian bridge across the weir at the railway viaduct which would be constructed by Irish Rail. The bridge, which is to be constructed on existing piers, is a 12 span bridge structure which is 180m long.

- 4.6.9 This last part of this section of the greenway will run along the west side of the railway tracks on the existing raised stoned area (approximately 3.0-3.5m wide) which runs parallel with the existing railway and at the same level as the railway tracks (see Text Figure 4.24 and Text Figure 4.25 below). This section is approximately 1100m long. This stoned area was installed by Irish Rail to protect the existing causeway and to allow access to the viaduct for emergency repair works.



Text Figure 4.24. Existing Stoned Access Track to South of Viaduct.



Text Figure 4.25. Stoned Area to North of Viaduct.

- 4.6.10 The raised stone area stops short of the north shore of Malahide Estuary by approximately 70m. It is proposed to continue the greenway at the same level as the railway tracks as far as the agricultural lands along the north shore of the estuary. There is a drainage ditch at this location that will have to be maintained.

4.7 Section 5 – North Shore of Malahide Estuary to R126 Hearse Road

- 4.7.1 Section 5 reviews the route options from the north shore of the Malahide Estuary up to the R126 Hearse Road. This section is made up of agricultural lands and low lying flood plains (see Text Figure 4.26 below).



Text Figure 4.26. North Shore.

- 4.7.2 To reduce impact and prevent severance of agricultural lands, proposed routes that follow existing hedgerows, ditches and water courses have been identified.
- 4.7.3 Where crossing of water courses is required suitable bridge structures are proposed.
- 4.7.4 The selected route options are shown on Appendix H-Drawings 12-160-147 and 12-160-148 and are described below.

Section 5 – Route Option 1 – Pink

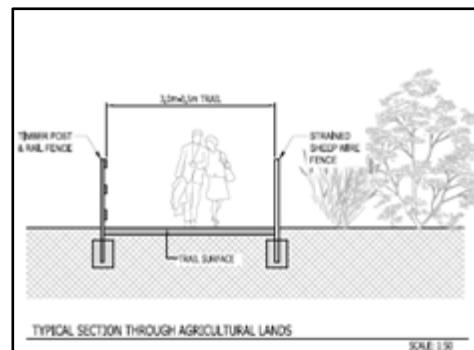
- 4.7.5 This route runs west on the northern side of the hedgerow along the north shore of the Malahide Estuary as far as the rear of a private dwelling.
- 4.7.6 The route crosses to the southern side of the hedgerow and the new greenway would be constructed on the sand and shingle area running west as far as the Kilcrea Road on the southern side of the private dwelling.
- 4.7.7 The route then continues north along Kilcrea Road which is a 3.0m wide road with room for single vehicles only. This road is trafficked with heavy farm machinery and vehicles serving the residents, farms, and an equestrian centre along this road.
- 4.7.8 Widening and upgrade works would be required to provide safe pedestrian and cycle facilities.
- 4.7.9 There are a number of private dwellings and agricultural entrances on both sides of the roads.
- 4.7.10 Drainage is provided on both sides of the road in both open ditches and piped sections.
- 4.7.11 This route continues north along Kilcrea Road as far as the junction at the Hearse Road opposite the existing pedestrian and cycle entrance to Newbridge Demesne. This entrance will be a focal point for the greenway in this area. Realignment and provision of a new pedestrian crossing would be required to cross both the Kilcrea Road and the Hearse Road at this location.
- 4.7.12 It would be proposed to construct the greenway on the western side of the road which would involve the filling in of the existing open ditch and may require the removal of the existing hedgerow along sections of the road. Existing drainage routes, paths and connections from the adjacent fields to the open drains would have to be maintained as part of the proposal.
- 4.7.13 The view of the Kilcrea Gates approaching Kilcrea Road will also enhance the enjoyment of the route at this location.

Section 5 – Route Option 2 – Blue

- 4.7.14 This route runs north from the north shore of Malahide Estuary and continues across agricultural lands. This runs parallel to an existing open drain and hedgerow on the western side of the railway line.
- 4.7.15 There is an existing agricultural crossing point across the railway line which provides access to the agricultural lands to the east of the railway line which will have to be maintained (see Text Figure 4.27 below).



Text Figure 4.27. Agricultural Lands.



Text Figure 4.28. Typical Construction Section.

- 4.7.16 This route then turns and runs west up a steep slope on the southern side of the existing hedgerow through open agricultural lands.
- 4.7.17 It then heads north through existing hedgerows and crosses a tributary of the Pill River. It then links back to Kilcrea Road through open agricultural lands which avoids passing through private residence and existing working farm yard.
- 4.7.18 There are excessive level differences and gradients along this route which would require significant ramp structures to be installed to maintain the required maximum gradient in particular adjacent to the crossing of the tributary of the Pill River.
- 4.7.19 The route then continues north along Kilcrea Road which is a 3.0m wide road with room for single vehicles only. This road is trafficked with heavy farm machinery and vehicles serving the residents, farms, and an equestrian centre along this road.
- 4.7.20 Widening and upgrade works would be required to provide safe pedestrian and cycle facilities.
- 4.7.21 There are a number of private dwellings and agricultural entrances on both sides of the roads.
- 4.7.22 Drainage is provided on both sides of the road in both open ditches and piped sections.
- 4.7.23 This route continues north along Kilcrea Road as far as the junction at the Hearse Road opposite the existing pedestrian and cycle entrance to Newbridge Demesne. This entrance will be a focal point for the greenway in this area. Realignment and provision of a new pedestrian crossing would be required to cross both the Kilcrea Road and the Hearse Road at this location.
- 4.7.24 It would be proposed to construct the greenway on the western side of the road which would involve the filling in of the existing open ditch and may require the removal of the existing hedgerow along sections of the road. Existing drainage routes, paths and connections from the adjacent fields to the open drains would have to be maintained as part of the proposal.
- 4.7.25 The view of the Kilcrea Gates approaching Kilcrea Road will also enhance the enjoyment of the route at this location.

Section 5 – Route Option 3 – Cyan

- 4.7.26 This route runs north from the north shore of Malahide Estuary and continues across agricultural lands. This runs parallel to an existing open drain and hedgerow on the western side of the railway line.
- 4.7.27 There is an existing agricultural crossing point across the railway line which provides access to the agricultural lands to the east of the railway line which will have to be maintained.
- 4.7.28 This route continues north crossing the Pill River adjacent to the existing Pill River culvert under the railway line.
- 4.7.29 A suitable structure will be required at this location which takes account of the changes in level on the southern bank of the river and the maximum allowable gradients and the low levels on the northern bank of the river.
- 4.7.30 A ramped structure will be required which continues north along the existing stoned area. This stoned area was provided by Irish Rail to allow access to the railway line when the railway bridge was being repaired.
- 4.7.31 This area is exceptionally scenic and would be an ideal location for a viewing area.
- 4.7.32 The route continues northwest following the line of the Pill River on the eastern bank through low lying agricultural lands which will require a stilt structure due to the poor ground conditions which will also ensure the volume of flood storage is not reduced and that the proposed greenway will be above flood levels during storm events.
- 4.7.33 The route continues on the eastern side of the Pill River until it reaches a private residence and working farm yard. At this location it crosses to the southern side of the Pill River which will require a structure at this location.
- 4.7.34 The route runs along the southern side of the private dwelling and farm buildings through open agricultural lands. There is an agricultural entrance between the farm buildings and the agricultural lands to the south which will have to be maintained at this location. The proposed greenway will be separated from the dwelling by the existing hedgerow and watercourse.
- 4.7.35 The route continues on the southern side of the existing property fence line and hedgerow through agricultural lands and continues as far as Kilcrea Road where a pedestrian crossing will be required.
- 4.7.36 It would be proposed to continue the greenway on the western side of the road running north as far as the junction with the Hearse Road opposite the existing pedestrian and cycle entrance to Newbridge Demesne which would involve the filling in of the existing open ditch while maintaining existing access points to private dwellings and drainage. This entrance will be a focal point for the greenway in this area.
- 4.7.37 This route continues north along Kilcrea Road as far as the junction at the Hearse Road realignment and provision of a new pedestrian crossing would be required to cross both the Kilcrea Road and the Hearse Road at this location.

- 4.7.38 Realignment and provision of a new pedestrian crossing would be required to cross both the Kilcrea Road and the Hearse Road at this location.

Section 5 – Route Option 4 – Green

- 4.7.39 This route runs north from the north shore of Malahide Estuary and continues across agricultural lands. This runs parallel to an existing open drain and hedgerow on the western side of the railway line.
- 4.7.40 There is an existing agricultural crossing point across the railway line which provides access to the agricultural lands to the east of the railway line which will have to be maintained.
- 4.7.41 This route continues north crossing the Pill River adjacent to the existing Pill River culvert under the railway line.
- 4.7.42 A suitable structure will be required at this location which takes account of the changes in level on the southern bank of the river and the maximum allowable gradients and the low levels on the northern bank of the river.
- 4.7.43 A ramped structure will be required which continues north along the existing stoned area. The stoned area was provided by Irish Rail to allow access to the railway line when the railway bridge was being repaired.
- 4.7.44 This area is exceptionally scenic and would be an ideal location for a viewing area (see Text Figure 4.29 below).



Text Figure 4.29. View from Pill River Viewing Area.

- 4.7.45 The route continues northwest following the line of the Pill River on the eastern bank through low lying agricultural lands which will require a stilt structure due to the poor ground conditions which will also ensure the volume of flood storage is not reduced and that the proposed greenway will be above flood levels during storm events.
- 4.7.46 The route continues on the eastern side of the Pill River until it reaches a private residence and working farm yard. At this location it crosses to the southern side of the Pill River which will require a structure at this location.
- 4.7.47 The route runs along the southern side of the private dwelling and farm buildings through open agricultural lands. There is an agricultural entrance between the farm

buildings and the agricultural lands to the south which will have to be maintained at this location. The proposed greenway will be separated from the dwelling by the existing hedgerow and watercourse.

- 4.7.48 The route continues to run north on the western side of the Pill River through privately owned lands that are used as a business premises for hiring of machinery. Routing of the greenway though these lands would be disruptive to this business.
- 4.7.49 The proposed route would also have to cross the existing entrance gates to the business and adjacent agricultural lands. The existing entrance would have to be upgraded including removal and reinstatement of existing entrance gates and provision of a safe crossing point for pedestrians and cyclists.
- 4.7.50 The route continues inside the hedgerow on the southern side of Corballis Cottages Road through agricultural lands as far as the Hearse Road following the line of the existing hedgerow as far as the junction of Kilcrea Road and Hearse Road.
- 4.7.51 Realignment and provision of a new pedestrian crossing would be required to cross both the Kilcrea Road and the Hearse Road at this location.

Section 5 – Route Option 5 – Orange

- 4.7.52 This route runs north from the north shore of Malahide Estuary and continues across agricultural lands. This runs parallel to an existing open drain and hedgerow on the western side of the railway line.
- 4.7.53 There is an existing agricultural crossing point across the railway line which provides access to the agricultural lands to the east of the railway line which will have to be maintained.
- 4.7.54 This route continues north crossing the Pill River adjacent to the existing Pill River culvert under the railway line.
- 4.7.55 A suitable structure will be required at this location which takes account of the changes in level on the southern bank of the river and the maximum allowable gradients and the low levels on the northern bank of the river.
- 4.7.56 A ramped structure will be required which continues north along the existing stoned area. The stoned area was provided by Irish Rail to allow access to the railway line when the railway bridge was being repaired.
- 4.7.57 This area is scenic and would be an ideal location for a viewing area.
- 4.7.58 The route continues north on the stoned area as far as the Corballis Cottages Road. It diverts around the rear of an existing recently refurbished private dwelling.
- 4.7.59 It then continues east inside the existing hedgerow on the southern side of the Corballis Cottages Road through open agricultural lands. The existing agricultural entrances from the public road will have to be maintained. The route then heads in a southwest direction towards the southern side of the private dwelling and farm buildings through open agricultural lands. Access to the agricultural lands on both sides of the greenway must be maintained and a crossing must be provided. At this location it crosses to the southern side of the Pill River which will require a structure at this location.

- 4.7.60 The route runs along the southern side of the private dwelling and farm buildings through open agricultural lands. There is an agricultural entrance between the farm buildings and the agricultural lands to the south which will have to be maintained at this location. The proposed greenway will be separated from the dwelling by the existing hedgerow and watercourse.
- 4.7.61 The route continues on the southern side of the existing property fence line and hedgerow through agricultural lands and continues as far as Kilcrea Road where a pedestrian crossing will be required.
- 4.7.62 It would be proposed to continue the greenway on the western side of the road running north as far as the junction with the Hearse Road which would involve the filling in of the existing open ditch while maintaining existing access points to private dwellings and drainage. A proposed pedestrian crossing will be required at the Hearse Road.

Section 5 – Route Option 6 – Yellow

- 4.7.63 This route runs north from the north shore of Malahide Estuary and continues across agricultural lands. This runs parallel to an existing open drain and hedgerow on the western side of the railway line which will have to be screened/separated from the greenway.
- 4.7.64 There is an existing agricultural crossing point across the railway line which provides access to the agricultural lands to the east of the railway line which will have to be maintained.
- 4.7.65 This route continues north crossing the Pill River adjacent to the existing Pill River culvert under the railway line.
- 4.7.66 A suitable structure will be required at this location which takes account of the changes in level on the southern bank of the river and the maximum allowable gradients and the low levels on the northern bank of the river.
- 4.7.67 A ramped structure will be required which continues north along the existing stoned area. The stoned area was provided by Irish Rail to allow access to the railway line when the railway bridge was being repaired. It diverts around the rear of an existing recently refurbished private dwelling.
- 4.7.68 This area is exceptionally scenic and would be an ideal location for a viewing area.
- 4.7.69 It then continues east inside the existing hedgerow on the southern side of the Corballis Cottages Road through open agricultural lands. The existing agricultural entrances from the public road will have to be maintained. The greenway then heads in a southwest direction towards the southern side of the private dwelling and farm buildings through open agricultural lands. Access to the agricultural lands on both sides of the greenway must be maintained and a crossing must be provided. At this location it crosses to the southern side of the Pill River which will require a structure at this location.
- 4.7.70 The route runs along the southern side of the private dwelling and farm buildings through open agricultural lands. There is an agricultural entrance between the farm buildings and the agricultural lands to the south which will have to be maintained at this location. The proposed greenway will be separated from the dwelling by the existing hedgerow and watercourse which will have to be separated from the greenway.

- 4.7.71 The route continues to run north on the western side of the Pill River through privately owned lands that are used as a business premises for hiring of machinery. Routing of the greenway through these lands would be disruptive to this business.
- 4.7.72 The proposed greenway would also have to cross the existing entrance gates to the business and adjacent agricultural lands. The existing entrance would have to be upgraded including removal and reinstatement of existing entrance gates and provision of a safe crossing point for pedestrians and cyclists.
- 4.7.73 The route continues inside the hedgerow on the southern side of Corballis Cottages Road through agricultural lands as far as the Hearse Road following the line of the existing hedgerow as far as the junction of Kilcrea Road and Hearse Road.
- 4.7.74 Realignment and provision of a new pedestrian crossing would be required to cross both the Kilcrea Road and the Hearse Road at this location.

4.8 Section 6 – Newbridge Demesne

- 4.8.1 Newbridge Demesne covers an area of 150 hectares and is an example of an eighteenth century landscaped park with perimeter woodland belts and fine vistas across lawns and meadows.
- 4.8.2 Newbridge House, which is a Georgian House, is situated in the centre of the park including the walled garden, cobbled courtyard and outbuildings. It includes a restaurant and a traditional farm which is open to the public. The park also includes children's playgrounds, sports pitches and picnic areas.
- 4.8.3 Newbridge Demesne is within easy walking distance of Donabate Village with links to existing rail and bus services.
- 4.8.4 It is proposed to start/end the greenway in the main car park which is located beside Newbridge House. Vehicular access to the park and the car park is via an existing driveway leading from the R126 Hearse Road, through the parkland.
- 4.8.5 Adjacent to the junction of the Hearse Road and Kilcrea Road (east of the vehicular entrance) is an existing entrance to the park known as Kilcrea Gate with existing paths leading to Newbridge House and the main car park. It is proposed to use the existing paths within the demesne for this section of the greenway.
- 4.8.6 Footpath widths within the demesne follow a width hierarchy and any new paths and existing paths must conform to this requirement.
- 4.8.7 As part of this study car parking surveys were carried out to determine the usage of the existing car parks within Malahide Demesne. The surveys were carried out both on weekdays and weekends and show that the car park usage peaks at 65% which leaves 35% spare capacity based on these surveys during normal usage. Special events including major summer bank holiday weekends will have higher usages but these are exceptions to the norm and arrangements for additional car parking are provided as required.
- 4.8.8 As discussed earlier the start/end of the proposed greenway will be the main car park adjacent to Newbridge House. Within Newbridge Demesne the only option is to utilise the existing path and this route is shown on Appendix H-Drawing 12-160-149 and is described below.

Section 6 – Route Option 1 – Cyan

- 4.8.9 The proposed route enters Newbridge Demesne via existing entrance gates and runs north through a wooded area. The gates and piers form part of the boundary to Newbridge Demesne and are protected structures. The path crosses the Pill River over an existing 2.0m wide bridge.
- 4.8.10 The route continues north on the existing 2.0m paths as far as Newbridge House and across to the main car park. It would be a requirement for cyclists to dismount in front of Newbridge House as the area is stoned with loose pebbles. A safe crossing point would be required across the existing driveway towards the main car park where signage could be provided.
- 4.8.11 The existing path is designated as a shared pedestrian and cycle path within the demesne.
- 4.8.12 Donabate Village can be accessed via Newbridge Avenue which connects users of the greenway and Newbridge Demesne to the village and public transport including Donabate Railway Station and existing bus services.

5.0 Route Selection (Engineering)

5.1 Introduction

5.1.1 A detailed assessment of all of the route options was carried out using the following criteria:

Table 5.1 Engineering Route Assessment Criteria.

	Criterion Elements
Technical	Comparison of technical merits in terms of: <ul style="list-style-type: none"> • Greenway level of service offered: <ul style="list-style-type: none"> - Surface quality/comfort. - Gradient. - Continuity of route. • Directness (waiting time at signals, detours). • Accessibility (mobility impaired).
Safety	Comparison of level of safety offered in terms of: <ul style="list-style-type: none"> • Interaction with live traffic and nature of traffic control facilities offered. • Personal security, levels of public lighting and surveillance offered.
Integration	Comparison of level of integration and inter-connectivity offered in terms of: <ul style="list-style-type: none"> • Connectivity to public transport (bus and rail). • Connectivity to wider cycle network. • Inter-connectivity of adjacent residential communities (existing and planned). • Provision of car parking areas at access points/key amenity areas. • Connectivity to adjacent recreational and amenity areas (existing and planned).
Construction Impact	Comparison on level of impact on the environment from a construction perspective.

5.1.2 Each route option was assessed using the above criteria and a rating was assigned to each route option. The ratings are as follows:

Table 5.2 Preference Rating.

Preference Type	Single Option	Multiple/All Options
Most Preferred	An option which is considered to have a positive or not material negative effect.	If multiple/all options have a positive or no material negative effect, then multiple/all options should be identified as most preferred.
Preferred	An option which is considered to have a minor negative effect.	If multiple/all options have a minor negative effect, then multiple/all options should be identified as preferred.
Acceptable	An option which is considered to have a moderate negative effect.	If multiple/all options have a moderate negative effect, then multiple/all options should be identified as acceptable.
Least Acceptable	An option which is considered to have a potentially significant negative effect.	If multiple/all options have a potentially significant negative effect, then multiple/all options should be identified as least acceptable.

- 5.1.3 Each option is given a rating and the route with the most "most preferred" rating is then selected as the preferred route as it is the best option of the overall process.

5.2 Section 1 – Malahide Demesne

Section 1 – Option Evaluation Summary Evaluation Matrix

Item	Description	Preference
Section 1 – Option 1 – Green		
Technical	Option has good quality surface finish and acceptable gradients. It is not the most direct route. Good accessibility for all users. However the path widths are restricted and would not comply with NTA guidelines.	Least Acceptable
Safety	Good safety level as users are off-road and do not mix with vehicular traffic excluding the car park section.	Preferred
Integration	Good integration with public transport (bus and rail) with links to wider cycle networks along the Dublin Road but furthest route option from Malahide Railway Station. Provides linkages and connectivity with adjacent residents by providing cycle routes through the demesne. Excellent connectivity to recreational and amenity areas within the demesne and Malahide Village but furthest route option from the village.	Acceptable
Construction Impact	Minimal level of environmental impact on the Malahide Demesne. Work can be kept separate from the day to day users of the demesne.	Preferred
Section 1 – Option 2 – Orange		
Technical	Option has good quality surface finish and acceptable gradients. It is not the most direct route. Good accessibility for all users. However the path widths are restricted and would not comply with NTA guidelines.	Least Acceptable
Safety	Good safety level as users are off-road and do not mix with vehicular traffic excluding the car park section.	Preferred
Integration	Good integration with public transport (bus and rail) with links to wider cycle networks along the Dublin Road but furthest route option from Malahide Railway Station. Provides linkages and connectivity with adjacent residents by providing cycle routes through the demesne. Excellent connectivity to recreational and amenity areas within the demesne and Malahide Village but furthest route option from the village.	Acceptable
Construction Impact	There is a level of environmental impact on the Malahide Demesne because of the requirement to construct a new section of path and demolition of a section of the demesne wall to create a new pedestrian entrance.	Least Acceptable
Section 1 – Option 3 – Pink		
Technical	Option has good quality surface finish and acceptable gradients. It is a direct route with good accessibility for all users.	Most Preferred
Safety	Good safety level as users are off-road and do not mix with vehicular traffic excluding the car park section.	Preferred

Item	Description	Preference
Integration	Good integration with public transport (bus and rail) with links to wider cycle networks along the Dublin Road. Provides linkages and connectivity with adjacent residents by providing cycle routes through the demesne. Excellent connectivity to recreational and amenity areas within the demesne and Malahide Village.	Preferred
Construction Impact	Minimal level of environmental impact on the Malahide Demesne. Work can be kept separate from the day to day users of the demesne.	Preferred
Section 1 – Option 4 – Blue		
Technical	Option has good quality surface finish and acceptable gradients. It is a direct route with accessibility for all users. New ramps to be constructed to upgrade the existing pedestrian entrance with restricted width at exit.	Acceptable
Safety	Good safety level as users are off-road and do not mix with vehicular traffic excluding the car park section.	Preferred
Integration	Good integration with public transport (bus and rail) with links to wider cycle networks along the Dublin Road. Provides linkages and connectivity with adjacent residents by providing cycle routes through the demesne. Excellent connectivity to recreational and amenity areas within the demesne and Malahide Village.	Preferred
Construction Impact	Medium level of environmental impact on the Malahide Demesne during the construction of the new ramp at the exit. Work cannot be kept separate from the day to day users of the demesne as the entrance would have to be closed for a period during construction.	Least Acceptable
Section 1 – Option 5 – Cyan		
Technical	Option has good quality surface finish and acceptable gradients. It is not the most direct route. Good accessibility for all users. However the path widths are restricted and would not comply with NTA guidelines.	Least Acceptable
Safety	Good safety level as users are off-road and do not mix with vehicular traffic excluding the car park section. This will generate addition cycle traffic which would pass by the entrance to the children's playground.	Acceptable
Integration	Good integration with public transport (bus and rail) with links to wider cycle networks along the Dublin Road. Provides linkages and connectivity with adjacent residents by providing cycle routes through the demesne. Excellent connectivity to recreational and amenity areas within the demesne and Malahide Village.	Preferred
Construction Impact	Minimal level of environmental impact on the Malahide Demesne. Work can be kept separate from the day to day users of the demesne.	Preferred
Section 1 – Option 6 – Yellow		
Technical	Option has good quality surface finish and acceptable gradients. It is not the most direct route. Good accessibility for all users. However the path widths are restricted and would not comply with NTA guidelines.	Least Acceptable

Item	Description	Preference
Safety	Good safety level as users are off-road and do not mix with vehicular traffic excluding the car park section. This will generate addition cycle traffic which would pass by the entrance to the children's playground.	Acceptable
Integration	Good integration with public transport (bus and rail) with links to wider cycle networks along the Dublin Road. Provides linkages and connectivity with adjacent residents by providing cycle routes through the demesne. Excellent connectivity to recreational and amenity areas within the demesne and Malahide Village.	Preferred
Construction Impact	Medium level of environmental impact on the Malahide Demesne during the construction of the new ramp at the exit. Work cannot be kept separate from the day to day users of the demesne as the entrance would have to be closed for a period during construction.	Least Acceptable

5.3 Section 2 – R106 Dublin Road, Malahide

Section 2 - Option Evaluation Summary Evaluation Matrix

Item	Description	Preference
Section 2 - Option 1 - Orange		
Technical	On exiting Malahide Demesne cyclists would have to dismount along a section of the Dublin Road between the entrance and the pedestrian crossing due to narrow paths. The junction of Yellow Walls Road and Dublin Road would have to be upgraded to provide pedestrian and cycle crossing points. Option has good quality surface finish and acceptable gradients, lacks continuity for cyclists. Most direct route.	Acceptable
Safety	Two road crossings required for cyclists heading north on Yellow Walls Road on both Dublin Road and Yellow Walls Road. Integration of cyclists and pedestrians on narrow paths.	Least Acceptable
Integration	Good integration with public transport (bus and rail) with links to wider cycle networks along the Dublin Road but furthest route option from Malahide Railway Station.	Acceptable
Construction Impact	Moderate level of environmental impact on the Dublin Road/Yellow Walls Road junction during the upgrade of the junction. Works cannot be kept separate from day to day users.	Acceptable
Section 2 - Option 2 – Pink		
Technical	Option has good quality surface finish and acceptable gradients, lacks continuity for cyclists as they have to dismount but it is a direct route.	Acceptable
Safety	Controlled crossing provides safe crossing for both pedestrians and cyclists.	Preferred
Integration	Good integration with public transport (bus and rail) with links to wider cycle networks along the Dublin Road.	Preferred
Construction Impact	Minor level of environmental impact on the Dublin Road during the construction of the crossing.	Preferred

Item	Description	Preference
Section 2 - Option 3 - Cyan		
Technical	Good level of service achieved by providing 3.2m shared surface. Acceptable gradients and good quality surface finish. Provides continuity for all users.	Most Preferred
Safety	Traffic calming provided by reduced road width. Dedicated off-road shared surface provided	Most Preferred
Integration	Good integration with public transport (bus and rail) with links to wider cycle networks along the Dublin Road.	Preferred
Construction Impact	Major level of environmental impact on the Dublin Road during the realignment and upgrade works.	Least Acceptable
Section 2 - Option 4 - Green		
Technical	Good level of service achieved by providing 3.2m shared surface. Acceptable gradients and good quality surface finish. Provides continuity for all users.	Most Preferred
Safety	Traffic calming provided by reduced road width. Dedicated off-road shared surface provided	Most Preferred
Integration	Good integration with public transport (bus and rail) with links to wider cycle networks along the Dublin Road. It also integrates with local cyclists from housing estates inbound to Malahide Village.	Most Preferred
Construction Impact	Major level of environmental impact on the Dublin Road during the realignment and upgrade works	Least Acceptable
Section 2 - Option 5 - Blue		
Technical	Narrow paths and restricted areas on approach to existing pedestrian bridge. Poor continuity of services as cyclists must dismount for much of the option and crossing of the Dublin Road at this location is not encouraged due to poor sight lines and restricted widths. Route not direct.	Least Acceptable
Safety	Poor sightlines and restricted widths. Two road crossings required.	Least Acceptable
Integration	Good integration with public transport (bus and rail) with links to wider cycle networks along the Dublin Road.	Preferred
Construction Impact	Medium level of environmental impact on the Malahide Demesne during the upgrade works at the exit.	Preferred

5.4 Section 3 – R106 Dublin Road to Bissets Strand

Section 3 – Option Evaluation Summary Evaluation Matrix

Item	Description	Preference
Section 3 - Option 1 - Blue		
Technical	Option has good quality surface finish and acceptable gradients. It is the longest route with a number of road crossings. It is accessible by all users.	Acceptable
Safety	Cyclists are on-road for the majority of the route with a number of road crossings required	Least Acceptable
Integration	Medium integration with public transport (bus and rail) with links to wider cycle networks along the Dublin Road and Bissets Strand. Furthest route from the railway station. Loss of parking on both Yellow Walls Road and Texas Lane.	Acceptable

Item	Description	Preference
Construction Impact	Medium environmental effects because of the works on Yellow Walls Road and Texas Lane. It is the longest section along the grass verge along Bissets Strand.	Acceptable
Section 3 – Option 2 – Orange		
Technical	Option has good quality surface finish and acceptable gradients. It is the second longest route with a number of road crossings. It is accessible by all users.	Acceptable
Safety	Cyclists are on-road for the majority of the route with a number of road crossings required	Least Acceptable
Integration	Medium integration with public transport (bus and rail) with links to wider cycle networks along the Dublin Road and Bissets Strand. Furthest route from the railway station. Loss of parking on both Yellow Walls Road and Texas Lane. Introduces traffic into an existing housing estate.	Least Acceptable
Construction Impact	Medium environmental effects because of the works on Yellow Walls Road and Texas Lane and the grass verge along Bissets Strand and the required crossings.	Acceptable
Section 3 – Option 3 – Green		
Technical	Option has good quality surface finish and acceptable gradients. It is the shortest route. There are acceptable widths along the route. There is only one road crossing. It is accessible by all users.	Most Preferred
Safety	The route is a cul-de-sac with no through vehicular traffic.	Preferred
Integration	Medium integration with public transport (bus and rail) with links to wider cycle networks along the Dublin Road and Bissets Strand. No loss of parking.	Preferred
Construction Impact	Minor level of environmental impact on Bissets Strand during the construction of the crossing and junction upgrade works.	Preferred
Section 3 – Option 4 – Pink		
Technical	Surface quality and gradient are acceptable. Path widths are restricted on Old Street and Strand Street with discontinuity and width restrictions as Bissets Bridge. It is not the most direct route.	Least Acceptable
Safety	Cyclists are on-road for the majority of the route with a number of road crossings and restrictions at Bissets Bridge.	Least Acceptable
Integration	Good integration with public transport (bus and rail) with links to wider cycle networks and amenities and services in Malahide Village. Removal of parking on Old Street.	Preferred
Construction Impact	Medium environmental effects because of the works on Old Street, Strand Street and at Bissets Bridge.	Acceptable
Section 3 – Option 5 – Yellow		
Technical	Surface quality and gradient are acceptable. Path widths are restricted on Dublin Road and Main Street with discontinuity and width restrictions at Bissets Bridge. It is not the most direct route.	Least Acceptable
Safety	Cyclists are on-road for the majority of the route with a number of road crossings and restrictions at Bissets Bridge.	Least Acceptable

Item	Description	Preference
Integration	Good integration with public transport (bus and rail) with links to wider cycle networks and amenities and services in Malahide Village. Removal of parking on Dublin Road and Main Street.	Acceptable
Construction Impact	Medium environmental effects because of the works on Dublin Road, Main Street and at Bissets Bridge.	Acceptable

5.5 Section 5 – North Shore of Malahide Estuary to R126 Hearse Road

Section 5 – Option Evaluation Summary Evaluation Matrix

Item	Description	Preference
Section 5 – Option 1 – Pink		
Technical	Surface quality and gradient are acceptable. It is not the most direct route. Path widths will be restricted on Kilcrea Road. It is accessible by all users.	Acceptable
Safety	Cyclists are on-road for a large section of the route with interaction with vehicles and farm machinery.	Least Acceptable
Integration	Introduces a pedestrian and cycle link to Malahide from the north side of Malahide Estuary.	Preferred
Construction Impact	Major environmental effects because of the works along the north shore especially the section which runs along the beach/shingles. There is also major works involved in upgrading the Kilcrea Road and providing pedestrian and cycle facilities and the culverting of existing open drains and removal of hedgerows.	Least Acceptable
Section 5 – Option 2 – Blue		
Technical	Surface quality is acceptable. There are severe gradient changes especially at the crossing point of the Pill River tributary which will require large structures. It is not the most direct route. Path widths will be restricted on Kilcrea Road. It is accessible by all.	Least Acceptable
Safety	Cyclists are on-road for the last section of the route with interaction with vehicles and farm machinery.	Acceptable
Integration	Introduces a pedestrian and cycle link to Malahide from the north side of Malahide Estuary.	Preferred
Construction Impact	Major environmental effects because of the works involved in upgrading the Kilcrea Road and providing pedestrian and cycle facilities and the culverting of existing open drains and removal of hedgerows and also the construction of major ramped structures crossing the Pill River tributary.	Least Acceptable
Section 5 – Option 3 – Cyan		
Technical	Surface quality and gradient are acceptable. Most direct route. It is accessible by all. Most scenic route	Most Preferred
Safety	Cyclists are off-road for the majority of the route with minimal interaction with live traffic.	Preferred
Integration	Introduces a pedestrian and cycle link to Malahide from the north side of Malahide Estuary.	Preferred

Item	Description	Preference
Construction Impact	Minor environment impact with the use of low impact construction methods. No impact on flood storage capacity of flood plains in the area.	Preferred
Section 5 – Option 4 – Green		
Technical	Surface quality and gradient are acceptable. It is accessible by all. Passes through existing business premises crossing existing entrance.	Acceptable
Safety	Cyclists are off-road for the majority of the route with minimal interaction with live traffic. Crossing existing business entrance.	Preferred
Integration	Introduces a pedestrian and cycle link to Malahide from the north side of Malahide Estuary.	Preferred
Construction Impact	Minor environment impact with the use of low impact construction methods. No impact on flood storage capacity of flood plains in the area.	Preferred
Section 5 – Option 5 – Orange		
Technical	Surface quality and gradient are acceptable. Most direct route. It is accessible by all.	Preferred
Safety	Cyclists are off-road for the majority of the route with minimal interaction with live traffic.	Preferred
Integration	Introduces a pedestrian and cycle link to Malahide from the north side of Malahide Estuary.	Preferred
Construction Impact	Minor environment impact with the use of low impact construction methods. No impact on flood storage capacity of flood plains in the area.	Preferred
Section 5 – Option 6 – Yellow		
Technical	Surface quality and gradient are acceptable. It is accessible by all. Passes through existing business premises crossing existing entrance.	Acceptable
Safety	Cyclists are off-road for the majority of the route with minimal interaction with live traffic. Crossing existing business entrance.	Preferred
Integration	Introduces a pedestrian and cycle link to Malahide from the north side of Malahide Estuary.	Preferred
Construction Impact	Minor environment impact with the use of low impact construction methods. No impact on flood storage capacity of flood plains in the area.	Preferred

5.6 Route Selection (Engineering) Summary

Option Evaluation Summary Evaluation Matrix

Section & Option	Technical	Safety	Integration	Construction Impact
Section 1 – Option Evaluation Summary Evaluation Matrix				
Option 1 – Green	Least Acceptable	Preferred	Acceptable	Preferred
Option 2 – Orange	Least Acceptable	Preferred	Acceptable	Least Acceptable
Option 3 – Pink	Most Preferred	Preferred	Preferred	Preferred

Section & Option	Technical	Safety	Integration	Construction Impact
Option 4 – Blue	Acceptable	Preferred	Preferred	Least Acceptable
Option 5 – Cyan	Least Acceptable	Acceptable	Preferred	Preferred
Option 6 – Yellow	Least Acceptable	Acceptable	Preferred	Least Acceptable
Section 2 – Option Evaluation Summary Evaluation Matrix				
Option 1 – Orange	Acceptable	Least Acceptable	Acceptable	Acceptable
Option 2 – Pink	Acceptable	Preferred	Preferred	Preferred
Option 3 – Cyan	Most Preferred	Most Preferred	Preferred	Least Acceptable
Option 4 – Green	Most Preferred	Most Preferred	Most Preferred	Least Acceptable
Option 5 – Blue	Least Acceptable	Least Acceptable	Preferred	Preferred
Section 3 – Option Evaluation Summary Evaluation Matrix				
Option 1 – Blue	Acceptable	Least Acceptable	Acceptable	Acceptable
Option 2 – Orange	Acceptable	Least Acceptable	Least Acceptable	Acceptable
Option 3 – Green	Most Preferred	Preferred	Preferred	Preferred
Option 4 – Pink	Least Acceptable	Least Acceptable	Preferred	Acceptable
Option 5 – Yellow	Least Acceptable	Least Acceptable	Acceptable	Acceptable

- 5.6.1 There is only one viable route option in Section 4 which will be assessed in detail at NIS/EIAR stage.

Section & Option	Technical	Safety	Integration	Construction Impact
Section 5 – Option Evaluation Summary Evaluation Matrix				
Option 1 – Pink	Acceptable	Least Acceptable	Preferred	Least Acceptable
Option 2 – Blue	Least Acceptable	Acceptable	Preferred	Least Acceptable
Option 3 – Cyan	Most Preferred	Preferred	Preferred	Preferred
Option 4 – Green	Acceptable	Preferred	Preferred	Preferred
Option 5 – Orange	Preferred	Preferred	Preferred	Preferred
Option 6 – Yellow	Acceptable	Preferred	Preferred	Preferred

- 5.6.2 There is only one viable route option in Section 6 which will be assessed in detail at NIS/EIAR stage.

5.7 Engineering Preference Order

- 5.7.1 The proposed project has been divided into six sections for the purpose of this report. As options are not presented in Sections 4 and 6, Sections 1, 2, 3 and 5 are considered below.

Table 5.3 Engineering Preference Order.

	Most Preferred	Preferred	Acceptable	Least Acceptable	Rank	Engineering Preference
Section 1						
Option 1 – Green	-	2	1	1	2nd	Preferred
Option 2 – Orange	-	1	1	2	3rd	Acceptable
Option 3 – Pink	1	3	-	-	1st	Most Preferred
Option 4 – Blue	-	2	1	1	2nd	Preferred
Option 5 – Cyan	-	2	1	1	2nd	Preferred
Option 6 – Yellow	-	1	1	2	3rd	Acceptable
Section 2						
Option 1 – Orange	-	-	3	1	5th	Least Acceptable
Option 2 – Pink	-	3	1	-	3rd	Preferred
Option 3 – Cyan	2	1	-	1	2nd	Preferred
Option 4 – Green	3	-	-	1	1st	Most Preferred
Option 5 – Blue	-	2	-	2	4th	Acceptable
Section 3						
Option 1 – Blue	-	-	3	1	3rd	Preferred
Option 2 – Orange	-	-	2	2	4th	Acceptable
Option 3 – Green	1	3	-	-	1st	Most Preferred
Option 4 – Pink	-	1	1	2	2nd	Preferred
Option 5 – Yellow	-	-	2	2	4th	Acceptable
Section 5						
Option 1 – Pink	-	1	1	2	4th	Acceptable
Option 2 – Blue	-	1	1	2	4th	Acceptable
Option 3 – Cyan	1	3	-	-	1st	Most Preferred
Option 4 – Green	-	3	1	-	3rd	Preferred
Option 5 – Orange	-	4	-	-	2nd	Preferred
Option 6 – Yellow	-	3	1	-	3rd	Preferred

6.0 Route Options Cost Review

6.1 Introduction

- 6.1.1 This chapter reviews each of the identified route options from a cost perspective. Budget costs have been prepared for each route option (excluding landtake costs) and are summarised as follows:

6.2 Cost Preference Order

Table 6.1 Costs Preference Order.

	Cost (€ ex VAT)	Cost Preference
Section 1		
Option 1 - Green	8,000.00	Most Preferred
Option 2 - Orange	18,000.00	Preferred
Option 3 - Pink	8,000.00	Most Preferred
Option 4 - Blue	38,000.00	Acceptable
Option 5 - Cyan	8,000.00	Most Preferred
Option 6 - Yellow	38,000.00	Acceptable
Section 2		
Option 1 - Orange	25,000.00	Acceptable
Option 2 - Pink	7,500.00	Most Preferred
Option 3 - Cyan	248,000.00	Least Acceptable
Option 4 - Green	248,000.00	Least Acceptable
Option 5 - Blue	10,000.00	Preferred
Section 3		
Option 1 - Blue	139,000.00	Acceptable
Option 2 - Orange	76,000.00	Preferred
Option 3 - Green	77,375.00	Preferred
Option 4 - Pink	42,500.00	Most Preferred
Option 5 - Yellow	47,500.00	Most Preferred
Section 4		
Option 1 - Green	1,442,500.00	Most Preferred
Section 5		
Option 1 - Pink	1,045,125.00	Acceptable
Option 2 - Blue	942,875.00	Preferred
Option 3 - Cyan	970,475.00	Preferred
Option 4 - Green	977,500.00	Preferred
Option 5 - Orange	927,500.00	Preferred
Option 6 - Yellow	932,975.00	Preferred
Section 6		
Option 1 - Cyan	25,000.00	Most Preferred

- 6.2.1 Costs were ranked as shown above based on relative costing bands within each section.

7.0 Overall Emerging Preferred Route Option

7.1 Introduction

- 7.1.1 Following the engineering and cost review in this report (Chapter 5.0 and Chapter 6.0 respectively) and the environmental review carried out by the environmental consultants (Chapters 12.0 to Chapter 22.0) the findings are combined. The results of the engineering, environmental and cost reviews are summarised in the table below.

Table 7.1 Combined Engineering, Environmental and Budget Cost Preferences.

	Engineering Preference	Environmental Preference	Budget Cost Preference
Section 1			
Option 1 - Green	Preferred	Preferred	Most Preferred
Option 2 - Orange	Acceptable	Acceptable	Preferred
Option 3 - Pink	Most Preferred	Most Preferred	Most Preferred
Option 4 - Blue	Preferred	Preferred	Acceptable
Option 5 - Cyan	Preferred	Preferred	Most Preferred
Option 6 - Yellow	Acceptable	Acceptable	Acceptable
Section 2			
Option 1 - Orange	Least Acceptable	Most Preferred	Acceptable
Option 2 - Pink	Preferred	Preferred	Most Preferred
Option 3 - Cyan	Preferred	Acceptable	Least Acceptable
Option 4 - Green	Most Preferred	Acceptable	Least Acceptable
Option 5 - Blue	Acceptable	Preferred	Preferred
Section 3			
Option 1 - Blue	Preferred	Acceptable	Acceptable
Option 2 - Orange	Acceptable	Least Acceptable	Preferred
Option 3 - Green	Most Preferred	Most Preferred	Preferred
Option 4 - Pink	Preferred	Preferred	Most Preferred
Option 5 - Yellow	Acceptable	Preferred	Most Preferred
Section 5			
Option 1 - Pink	Acceptable	Least Acceptable	Acceptable
Option 2 - Blue	Acceptable	Acceptable	Preferred
Option 3 - Cyan	Most Preferred	Preferred	Preferred
Option 4 - Green	Preferred	Most Preferred	Preferred
Option 5 - Orange	Preferred	Preferred	Preferred
Option 6 - Yellow	Preferred	Preferred	Preferred

7.2 Overall Preference Order

- 7.2.1 Each option is given a rating and the route with the most "most preferred" rating is then selected as the preferred route as it is the best option of the overall process. The options are then ranked and the overall preference is given to each route option as per the table below:

Table 7.2 Overall Preference Order.

	Most Preferred	Preferred	Acceptable	Least Acceptable	Rank	Overall Preference
Section 1						
Option 1 - Green	1	2	-	-	2nd	Preferred
Option 2 - Orange	-	1	2	-	4th	Acceptable
Option 3 - Pink	3	-	-	-	1st	Most Preferred
Option 4 - Blue	-	2	1	-	3rd	Preferred
Option 5 - Cyan	1	2	-	-	2nd	Preferred
Option 6 - Yellow	-	-	3	-	5th	Least Acceptable
Section 2						
Option 1 - Orange	1	-	1	1	2nd	Preferred
Option 2 - Pink	1	2	-	-	1st	Most Preferred
Option 3 - Cyan	-	1	1	1	4th	Acceptable
Option 4 - Green	1	-	1	1	2nd	Preferred
Option 5 - Blue	-	2	1	-	3rd	Preferred
Section 3						
Option 1 - Blue	-	1	2	-	4th	Acceptable
Option 2 - Orange	-	1	1	1	5th	Least Acceptable
Option 3 - Green	2	1	-	-	1st	Most Preferred
Option 4 - Pink	1	2	-	-	2nd	Preferred
Option 5 - Yellow	1	1	1	-	3rd	Preferred
Section 5						
Option 1 - Pink	-	-	2	1	4th	Acceptable
Option 2 - Blue	-	1	2	-	3rd	Preferred
Option 3 - Cyan	1	2	-	-	1st	Most Preferred
Option 4 - Green	1	2	-	-	1st	Most Preferred
Option 5 - Orange	-	3	-	-	2nd	Preferred
Option 6 - Yellow	-	3	-	-	2nd	Preferred

7.2.2 Based on the above findings the overall emerging preferred route is as follows:

- Section 1 – Option 3.
- Section 2 – Option 2.
- Section 3 – Option 3.
- Section 5 – Option 3 and 4.

7.3 Emerging Preferred Route

7.3.1 On reviewing the overall preference order the following is noted:

- Option 2 is the most preferred in Section 2, however it does not link directly to the preferred route in either Section 1 or Section 3.
- Option 3 in Section 1 was the most preferred from an engineering, cost and environmental perspective and Option 3 in Section 3 was the most preferred from an engineering and preferred from an environmental and cost perspective.

- 7.3.2 It is recommended that Option 4 in Section 2, which is ranked second in this section and links with the most preferred route in the section preceding and succeeding Section 2 is to be selected as the preferred route.
- 7.3.3 In Section 5 both Option 3 and Option 4 are the most preferred routes. Option 4 however does require landtake from the private business adjacent to Corballis Cottages Road. This landowner has already had lands CPO'ed on the western side of his business as part of the Donabate Distributor Road project. The additional landtake required on the western side of his lands would have a detrimental effect on this business, therefore it is recommended that Option 3 is to be selected as the preferred route.

Emerging Preferred Route

- 7.3.4 It is recommended that the following emerging preferred route is selected to progress to the next stage.
- Section 1 – Option 3 – Pink.
 - Section 2 – Option 4 – Green.
 - Section 3 – Option 3 – Green.
 - Section 4 – Option 1 – Green.
 - Section 5 – Option 3 – Cyan.
 - Section 6 – Option 1 – Cyan.
- 7.3.5 The emerging preferred route is shown on Appendix H-Drawings 12-160-154 to 12-160-160.

8.0 Non-Statutory Public Consultation

8.1 Introduction

- 8.1.1 As part of the process for the construction of the proposed development, Fingal County Council hosted a public consultation in February and March 2014, at which the proposed development was presented for discussion and comment to the public. Statutory consultees together with local interest groups in Malahide, Donabate and Swords were contacted and notified of the event. The exhibition was open to the public from 14th February 2014 to 14th March 2014 inclusive and ran concurrently in three venues:
- Malahide Public Library.
 - Donabate/Portrane Community Centre.
 - Fingal County Hall.
- 8.1.2 Representatives of Fingal County Council, design staff from Clifton Scannell Emerson Associates Ltd, and environmental specialists from Creagh House Environmental Ltd were in attendance during open evenings on 25th February in Malahide and on 5th March in Donabate.
- 8.1.3 Public display drawings showing the route options and the emerging preferred route were on display at all three locations. A public consultation brochure and questionnaire was also available.
- 8.1.4 One hundred and one questionnaires were returned to Fingal County Council by the stated deadline of 28th March 2014. In addition, 30 written submissions were received from interested parties. A public consultation report was prepared by Fingal County Council and their consultants and is available on Fingal County Council's website for reference.

8.2 General Comments

- 8.2.1 Respondents were unanimous and enthusiastic in their support for the scheme. Even those who had reservations concerning certain aspects of the proposal welcomed the concept in principle. A number of respondents listed specific benefits which they perceived to arise from the scheme.
- 8.2.2 Respondents expressed appreciation of the fact that the public were given the opportunity to have an input in the project, and sought reassurance that the project would proceed without delay and be implemented as soon as possible.
- 8.2.3 A public consultation report was prepared by Fingal County Council and their consultants which gave a detailed breakdown of the respondents and their comments and observations. This report was published on Fingal County Council's website.
- 8.2.4 The outcome of the public consultation report was that a number of issues were to be further analysed in the Malahide and Donabate areas and this analysis is presented below (see also Design Drawings 12-160-185 to 12-160-191 for reference).

8.3 Malahide Area Review

- 8.3.1 The points to be assessed as noted in the public consultation report for the Malahide area are:
- (1) Review the emerging preferred route option analysis for Section 3 of the proposed route, in particular the routes through Malahide Village.
 - (2) Improve linkages between the proposed development and Malahide village by:
- 8.3.2 Investigating the options of enhanced access and signage from Hogan's Gate to Malahide Village. These options may include local widening of Dublin Road to allow better cyclist and pedestrian access to Malahide Village and/or improved access through Bridgefield car park to the railway bridge. This will be carried out in consultation with the Malahide Public Realm Strategy Group.
- 8.3.3 Install a safe access under the existing Bissets Strand bridge for cyclists and pedestrians to the north side of the village in consultation with the Malahide Public Realm Strategy Group and the designers on the Swords Malahide Sutton Cycle Route (SMS) (see Design Drawing 12-160-185).

Response to Point 1

Review the emerging preferred route option analysis for Section 3 of the proposed route, in particular the routes through Malahide Village.

- 8.3.4 Section 3 of the proposed route was assessed from an engineering, environmental and cost perspective (refer to Chapter 4.0 and Chapter 6.0 of this report). Following the outcome of the public consultation report, a full engineering design of the greenway from Hogan's Gate, continuing east along Dublin Road to the railway bridge, along Main Street, down Old Street and accessing Bissets Strand under the railway bridge along Strand Court was carried out. This would allow for a comparison of this route versus the route down O'Hanlon's Lane to be undertaken. This analysis showed the following:
- The footpath on Dublin Road would have to be widened to 3.2m wide to allow access from the entrance from Malahide Castle (Hogan's Gate) to the railway bridge. Depending on which side the road is widened this would require the removal of the walls to either the Casino or Malahide Demesne. The walls on both sides of the road are part of the listed structures.
 - The existing pedestrian crossing on the east side of the railway bridge would have to be upgraded to a toucan crossing.
 - The existing on-street car parking on the R106 Malahide Road as far as the Old Street junction would have to be removed.
 - The bus pull-in on the R106 Malahide Road would have to be removed or relocated.
 - Car parking on the east side of Old Street would have to be removed to allow for the installation of a contra flow cycle path street for cyclists travelling from Donabate to Malahide.
 - This route would require the removal of 17 car parking spaces on Old Street.

- Because of the restricted width along Strand Court no designated greenway could be constructed in this area. Cyclists and pedestrians would have to use the existing roads and footpaths which are narrow and would deviate from the required standards.
 - A safe access through the existing railway bridge would have to be installed.
- 8.3.5 The objective of the greenway is to supply a high quality greenway for locals and visitors alike, bringing them from Malahide Demesne to Newbridge Demesne and vice versa. The requirements of a greenway are to provide a safe, coherent, attractive route which allows all users from beginners to enthusiasts equal access. The National Trails Office requirements differ from the requirements of a standard cycle route.
- 8.3.6 It should be noted that “hostile” traffic conditions can and do discourage cyclists. Traffic free routes are an essential element in encouraging as many people, especially the very young or very inexperienced, to start cycling. Once confidence is gained and the road network and driver behaviour is conducive to cycling, they will proceed to use the road for many journeys.
- 8.3.7 The proposed route along Dublin Road, Malahide Road and down Old Street to Bissets Strand is a very heavily trafficked route with hostile traffic conditions which do not conform to the requirements of the National Trails Office. It is a requirement of the National Trails Office to minimise the on-road sections of a greenway.
- 8.3.8 The proposed route has been reviewed with Fingal County Council Planning Department which includes the Malahide Public Realm Strategy Group.
- 8.3.9 Following reassessment of the route options in this area the original emerging preferred route, using O’Hanlon’s Lane, is the best option for the proposed development (see Design Drawing 12-160-185).

Response to Point 2a

Review improved access to Malahide Village across the railway line by investigating the options of enhanced access and signage from Hogan’s Gate to Malahide Village.

- 8.3.10 Following the outcome of the public consultation report, a review to improve access and connectivity between the proposed greenway adjacent to Hogan’s Gate and Malahide Village was carried out.
- 8.3.11 The following proposals were identified:
- The provision of a new shared surface along the southern and eastern boundary of Bridgefield car park. This will include the upgrading of the ramp and steps and widening of the pedestrian entrance to the car park adjacent to the existing pedestrian railway bridge.
 - Signage co-ordination between the proposed development and Malahide Village which will form part of the detail design of the scheme.
 - It is also intended to install bicycle stands in Bridgefield car park in consultation with Malahide Demesne and the Malahide Public Realm Strategy Group.

- 8.3.12 Following this review the above proposals will be incorporated as part of the proposed development and the detailed design will be included as part of the EIAR/NIS for the application to An Bord Pleanála (see Design Drawing 12-160-185).

Response to Point 2b

Review improved access to Malahide Village across/under the railway line by installing a safe access under the existing Bissets Strand bridge for cyclists and pedestrians.

- 8.3.13 Following the outcome of the public consultation report, a review to improve access and connectivity between the proposed greenway and Malahide Village under Bissets Bridge was carried out. The following proposals were identified:
- The installation of a stop/go system under Bissets Strand bridge. This will be subject to a detail design process.
 - The installation of a toucan crossing and a ramp access from the contemporary landscaped area on the north side of Bissets Strand Road to the existing footpath on the south side of Bissets Strand Road to allow safe pedestrian access to Malahide Village under Bissets Strand bridge.
 - The installation of permit parking for the residents of Bissets Strand Road. (House No. 1 to No. 4).
 - The installation of a designated wheelie bin pick up area for the residents in this area.
 - Signage co-ordination between the proposed development and Malahide Village which will form part of the detail design of the scheme.
- 8.3.14 Following this review the above proposals will be incorporated as part of the proposed development and will be co-ordinated with other cycle scheme projects and the Malahide Public Realm Strategy Group (see Design Drawing 12-160-185).

8.4 Donabate Area Review

- 8.4.1 The points to be assessed as noted in the public consultation report for the Donabate area are:
- (1) Extending the opening hours of Newbridge Demesne.
 - (2) Upgrade of the Hearse Road between Kilcrea Gates and Donabate Village to allow for pedestrians and cyclists
 - (3) Construction of a 4.0m cycle path along the western side of the railway track from Corballis Cottages Road to Donabate Village and train station with a new pedestrian and cycleway bridge, crossing the railway before the Donabate Railway Bridge.
 - (4) Construction of a 4.0m cycle path on the eastern side of the railway track from Corballis Cottages Road to Donabate Village and train station with safe access through the railway bridge at the Strand Road, utilising the existing railway underpass at the Corballis Cottages Road.
 - (5) Review/assess the severance of the agricultural land along the Pill River and review alternative routes which will negate the requirements for this severance of lands.

Response to Point 1 – Extending the Opening Hours of Newbridge Demesne

- 8.4.2 Following the outcome of the public consultation report and discussions with Fingal County Council Parks Department there is a possibility of extending morning opening hours during daylight. Late opening in the evening, particularly in the winter, would not be acceptable due to the potential for anti-social behaviour occurring and security issues.
- 8.4.3 Earlier opening hours will not solve the commuter concerns for access to the greenway at all times which were raised during the public consultation.

Response to Points 2, 3, 4 – Branches Linking the Emerging Preferred Route to Donabate

- 8.4.4 Following the outcome of the public consultation report it has been accepted by Fingal County Council that a branch linking the proposed greenway to Donabate Village should be assessed as part of this project. This assessment is carried out in Chapter 9.0 of this report. The proposed routes provide direct commuter access between Donabate and Malahide including links to bus and rail services.

Response to Point 5 – Review/Assess Severance of Agricultural Lands along the Pill River

- 8.4.5 Following the outcome of the public consultation report and discussions with local landowners Fingal County Council's consultants have carried out a detailed assessment of alternative routes along a section of the proposed route. This assessment is carried out in Chapter 10.0 of this report. This assessment will take into account the preferred route for the branch to Donabate Village which may affect the route options in this section.

9.0 Donabate Branch Review

9.1 Introduction

- 9.1.1 As an outcome of the public consultation review report four branches were identified as possible links between the greenway and Donabate Village, including links to existing bus and rail services. These branches are shown on Appendix H-Drawings 12-160-186 to 12-160-188 and are described below (see also Text Figure 9.1 to Text Figure 9.8 below).
- 9.1.2 A full detailed engineering and cost assessment of each of the branches is carried out below using the engineering route assessment criteria as before.

9.2 Donabate Branch Engineering Review

Branch 1

- 9.2.1 This route joins with the emerging preferred route at the junction with Newbridge Avenue within Newbridge Demesne.
- 9.2.2 It exits the demesne via an existing access gate at the end of Newbridge Avenue. It continues east along a 3.0-3.5m wide shared vehicle, cyclist and pedestrian path past a number of private houses and continues towards an area known as The Square. The route enters The Square on the southwest corner. The Square has 4.25m wide shared roads with no footpaths.
- 9.2.3 The route exits The Square on the northeast corner utilising the existing footpath along a link road joining the R126 Hearse Road with Turvey Avenue. Pedestrians are required to cross to the northern side of Turvey Avenue at the junction of the Link Road and Turvey Avenue. Cyclists would be on-road along this section due to the existing width restrictions.
- 9.2.4 Users of the greenway would then continue east using the existing footpath on the northern side of Turvey Avenue with cyclists on-road and continue into Donabate Village.

Branch 2

- 9.2.5 This route joins with the emerging preferred route at the Kilcrea Gate. This route follows the Hearse Road running northeast towards Donabate Village. The Hearse Road is heavily trafficked with no footpaths or cycle tracks on either side of the road. It is bounded on the northern side by the boundary of Newbridge Demesne as far as the existing petrol station. There are a number of private residents and businesses located on the southern side of Hearse Road.
- 9.2.6 Construction of a shared path would require road widening and removal of a significant section of the existing boundary wall to Newbridge Demesne.
- 9.2.7 After the filling station there is a narrow footpath on the northern side of the Hearse Road which continues past the junction with the Link Road to Turvey Avenue. The path narrows to 1.0m wide (approximately) and continues to the junction with Turvey Avenue. There is no path on the southern side of Hearse Road.
- 9.2.8 Construction of a shared path would require landtake from a number of properties on the northern side of the Hearse Road.

- 9.2.9 Users of the greenway would cross the junction of Hearse Road and Turvey Avenue and continue east using the existing footpath and continue into Donabate Village. Cyclists would be on-road for this section.



Text Figure 9.1. The Square.



Text Figure 9.2. Link Road.



Text Figure 9.3. Hearse Road.



Text Figure 9.4. Hearse Road.



Text Figure 9.5. Stone Access Track.



Text Figure 9.6. Agricultural Lands along Railway Line.



Text Figure 9.7. Railway Underpass on Corballis Cottages Road.



Text Figure 9.8. Smith's Pub, Donabate.

Branch 3

- 9.2.10 This route joins with the emerging preferred route on the northern side of the Pill River crossing. It utilises the existing stone access track and runs north as far as Corballis Cottages Road along the boundary of an existing private dwelling.
- 9.2.11 The route crosses the Corballis Cottages Road to the north side of the road and continues north along the western side of the railway through existing agricultural lands.
- 9.2.12 Due to space restrictions because of existing private dwellings on the western side of the railway line closer to Donabate, the proposed route would have to cross to the eastern side of the railway line via a significant new ramp and bridge structure crossing the railway line.
- 9.2.13 The route would then continue north adjacent to the railway line. There is a ground level change at this location which would require a small section of excavation to achieve the required gradients.
- 9.2.14 The route continues down through the existing car park next to Smith's Pub in Donabate where it would be proposed to construct a toucan crossing linking users of the greenway with Donabate Village including Donabate Train Station.

Branch 4

- 9.2.15 This route joins with the emerging preferred route on the northern side of the Pill River crossing. It utilises the existing stone access track and runs north as far as Corballis Cottages Road along the boundary of an existing private dwelling.
- 9.2.16 The route crosses the Corballis Cottages Road to the north side of the road. It then continues east under the existing railway bridge. This would require the realignment of a section of Corballis Cottages Road to provide adequate sight distances under the bridge and the installation of a stop/go traffic light system. A new 2m wide shared surface would be constructed under the bridge leaving a 3m wide carriageway which would allow one way traffic in both directions using the stop/go system.
- 9.2.17 The route would then continue north adjacent to the railway line on to Donabate Village. There is a ground level change as the greenway approaches Donabate Village which would require a small section of excavation to achieve the required gradients.
- 9.2.18 The route continues down through the existing car park next to Smith's Pub in Donabate where it would be proposed to construct a toucan crossing linking users of the greenway with Donabate Village including Donabate Train Station.

9.3 Donabate Branch Route Selection (Engineering)

- 9.3.1 Assessment carried out as per engineering route assessment criteria (see Chapter 5.0).

Table 9.1 Engineering Route Assessment Criteria.

	Criterion Elements
Technical	Comparison of technical merits in terms of: <ul style="list-style-type: none"> • Greenway level of service offered. <ul style="list-style-type: none"> - Surface quality/comfort. - Gradient. - Continuity of route. - Directness (waiting time at signals, detours). • Accessibility (mobility impaired).
Safety	Comparison of level of safety offered in terms of: <ul style="list-style-type: none"> • Interaction with live traffic and nature of traffic control facilities offered. • Personal security, levels of public lighting and surveillance offered.
Integration	Comparison of level of integration and inter-connectivity offered in terms of: <ul style="list-style-type: none"> • Connectivity to public transport (bus and rail). • Connectivity to wider cycle network. • Inter-connectivity of adjacent residential communities (existing and planned). • Provision of car parking areas at access points/key amenity areas. • Connectivity to adjacent recreational and amenity areas (existing and planned).
Construction Impact	Comparison on level of impact on the environment from a construction perspective.

9.3.2 Each route option was assessed using the above criteria and a rating was assigned to each route option. The ratings are as follows:

Table 9.2 Preference Rating.

Preference Type	Single Option	Multiple/All Options
Most Preferred	An option which is considered to have a positive or not material negative effect.	If multiple/all options have a positive or no material negative effect, then multiple/all options should be identified as most preferred.
Preferred	An option which is considered to have a minor negative effect.	If multiple/all options have a minor negative effect, then multiple/all options should be identified as preferred.
Acceptable	An option which is considered to have a moderate negative effect.	If multiple/all options have a moderate negative effect, then multiple/all options should be identified as acceptable.
Least Acceptable	An option which is considered to have a potentially significant negative effect.	If multiple/all options have a potentially significant negative effect, then multiple/all options should be identified as least acceptable.

9.3.3 Each option is given a rating and the route with the most "most preferred" rating is then selected as the preferred route as it is the best option of the overall process.

Table 9.3 Section 1 – Option Evaluation Summary Evaluation Matrix.

Item	Description	Preference
Branch 1		
Technical	Surface quality and gradient are acceptable. Most direct route to Newbridge Demesne.	Most Preferred
Safety	Cyclists are on-road for a section of the route with a number of road crossings and high traffic volumes.	Acceptable
Integration	Good integration with public transport (bus and rail) with links to wider cycle networks and amenities and services in the Donabate area. Lack of access due to Newbridge Demesne closing times.	Least Acceptable
Construction Impact	Minor levels of construction impact.	Most Preferred
Branch 2		
Technical	Surface quality and gradient are acceptable. Direct route to Newbridge Demesne	Most Preferred
Safety	Cyclists/pedestrians are adjacent to a heavily trafficked road along Hearse Road. Cyclists are on-road for a section of the route with a number of road crossings and high traffic volumes.	Acceptable
Integration	Good integration with public transport (bus and rail) with links to wider cycle networks and amenities and services in the Donabate area.	Most Preferred
Construction Impact	Major levels of distribution along the Hearse Road during construction. These works will require the removal of a large portion of Newbridge Demesne boundary.	Acceptable
Branch 3		
Technical	Surface quality and gradient are acceptable. Access across railway is via a ramp structure. Provides direct route between Donabate and Malahide.	Preferred
Safety	Cyclists are off-road for this section of the route with minor interaction with live traffic.	Most Preferred
Integration	Good integration with public transport (bus and rail) with links to wider cycle networks and amenities and services in the Donabate area. This route is a proposal on the Donabate Local Area Plan.	Most Preferred
Construction Impact	Major levels of distribution due to the realignment of Corballis Cottages Road, construction of ramp and bridge structure crossing the railway line.	Preferred
Branch 4		
Technical	Surface quality and gradient are acceptable. Provides direct route between Donabate and Malahide.	Most Preferred
Safety	Cyclists are off-road for this section of the route with minor interaction with live traffic.	Most Preferred
Integration	Good integration with public transport (bus and rail) with links to wider cycle networks and amenities and services in the Donabate area. This route is a proposal on the Donabate Local Area Plan.	Most Preferred
Construction Impact	Major levels of distribution due to the realignment of Corballis Cottages Road.	Preferred

Route Selection (Engineering) Summary

Table 9.4 Donabate Branches – Option Evaluation Summary Evaluation Matrix.

	Branch 1	Branch 2	Branch 3	Branch 3
Technical	Most Preferred	Most Preferred	Preferred	Most Preferred
Safety	Acceptable	Acceptable	Most Preferred	Most Preferred
Integration	Least Acceptable	Most Preferred	Most Preferred	Most Preferred
Construction Impact	Most Preferred	Acceptable	Preferred	Preferred

Engineering Preference Order

Table 9.5 Engineering Preference Order.

	Most Preferred	Preferred	Acceptable	Least Acceptable	Rank	Engineering Preference
Branch 1	2	-	1	1	4th	Least Acceptable
Branch 2	2	-	2	-	3rd	Acceptable
Branch 3	2	2	-	-	2nd	Preferred
Branch 4	3	1	-	-	1st	Most Preferred

9.4 Donabate Branch Cost Review

- 9.4.1 Each of the identified route options from a cost perspective are reviewed here. Budget costs have been prepared for each route options and are summarised as follows:

Table 9.6 Donabate Branch Costs Preference Order.

	Cost (€ ex VAT)	Cost Preference
Branch 1	€ 40,000.00	Most Preferred
Branch 2	€ 686,050.00	Preferred
Branch 3	€ 838,750.00	Acceptable
Branch 4	€ 623,750.00	Preferred

- 9.4.2 Costs were ranked as shown above based on relative costing bands within each section.

9.5 Donabate Branch Overall Preferred Route Option

- 9.5.1 Following the engineering and cost review in this report the findings are combined as follows and the overall preferred route from an engineering and cost perspective will be identified.

Table 9.7 Combined Engineering and Budget Cost Preferences.

	Engineering Preference	Budget Cost Preference
Branch 1	Least Acceptable	Most Preferred
Branch 2	Acceptable	Preferred
Branch 3	Preferred	Acceptable
Branch 4	Most Preferred	Preferred

Table 9.8 Overall Preference Order.

	Most Preferred	Preferred	Acceptable	Least Acceptable	Rank	Overall Preference
Branch 1	1	-	-	1	2nd	Preferred
Branch 2	-	1	1	-	3rd	Acceptable
Branch 3	-	1	1	-	3rd	Acceptable
Branch 4	1	1	-	-	1st	Most Preferred

- 9.5.2 Based on the above Branch 4 is the preferred branch.
- 9.5.3 Follow this engineering and cost review discussions were held with Fingal County Council Planning Department and the landowners of the zoned lands on the eastern side of the railway line between the Corballis Cottages Road and Donabate Village.
- 9.5.4 Fingal County Council are currently preparing a new Local Area Plan (LAP) for Donabate. Current draft proposals include for a pedestrian and cycle route on the eastern side of the railway line linking the Corballis Cottages Road with Donabate Village. The exact route of this branch will be determined within the context of the LAP and will provide connectivity for all users between Donabate, the proposed development and Malahide.
- 9.5.5 It is recommended that this connection should be constructed to comply with the National Trails Office standards.
- 9.5.6 Fingal County Council will carry out an Appropriate Assessment as part of the LAP for the overall area, which will include an assessment of the environmental impact of this section of the greenway.
- 9.5.7 It is recommended that the upgrade works required at the underpass at Corballis Cottages Road are carried out as part of this project which will provide future linkages from the greenway to Donabate Village and improve safety (including sightlines) at this location. The construction of the remainder of the branch will be carried out as part of the development of these zoned lands in accordance with the new Local Area Plan for Donabate.

10.0 Kilcrea Lands Route Options Review

10.1 Introduction

- 10.1.1 As an outcome of the public consultation review report and discussions with the local landowner it was agreed that the route options through agricultural lands in Kilcrea would be reviewed. This review is to determine if there is a viable route option for the greenway that does not separate/divide one landowner's land and still complies with requirements of the greenway. The identified emerging preferred route followed the line of the Pill River which traversed the landowner's overall land holding. This review takes account of a submission made by an affected landowner and also that a branch linking the greenway into Donabate Village is proposed as part of this scheme and the Donabate Local Area Plan (LAP).
- 10.1.2 The study area for this review is the land within the ownership of the landowner as shown on Appendix H-Drawings 12-160-189 to 12-160-191. Five route options were identified and a full detailed engineering and cost assessment of each of the options is carried out below using the engineering route assessment criteria as before. Option 1 was assessed earlier and formed part of the original emerging preferred route.
- 10.1.3 The review of the new route options will commence at the proposed bridge across the Pill River and will finish at the approach to Kilcrea Road.

10.2 Kilcrea Lands Engineering Review

Option 1 – Light Blue

- 10.2.1 From the proposed new bridge and ramp structure the route continues north along a section of the existing stoned area. This stoned area was provided by Irish Rail to allow access to the railway line when the railway bridge was being repaired. This area is scenic and would be an ideal location for a viewing area.
- 10.2.2 The route turns northwest following the line of the Pill River on the eastern bank through low lying agricultural lands which will require a stilt structure due to the poor ground conditions which will also ensure the volume of flood storage is not reduced and that the proposed greenway will be above flood levels during storm events.
- 10.2.3 The route continues on the eastern side of the Pill River until it reaches a private residence and working farm yard. At this location it crosses to the southern side of the Pill River which will require a structure at this location.
- 10.2.4 The route runs along the southern side of the private dwelling and farm buildings through open agricultural lands. There is an agricultural entrance between the farm buildings and the agricultural lands to the south which will have to be maintained at this location. The proposed greenway will be separated from the dwelling by the existing hedgerow and watercourse.
- 10.2.5 The route continues on the southern side of the existing property fence line and hedgerow through agricultural lands and continues towards Kilcrea Road.

Option 2 – Green

- 10.2.6 From the proposed new bridge and ramp structure the route continues north along a section of the existing stoned area. This stoned area was provided by Irish Rail to allow access to the railway line when the railway bridge was being repaired. This area is scenic and would be an ideal location for a viewing area.
- 10.2.7 The route turns northwest following the line of the Pill River on the eastern bank through low lying agricultural lands which will require a stilt structure due to the poor ground conditions which will also ensure the volume of flood storage is not reduced and that the proposed greenway will be above flood levels during storm events.
- 10.2.8 The route then turns west crossing the Pill River where a structure will be required. The route continues on the northern side of the existing hedgerow across agricultural lands.
- 10.2.9 It then turns north along the rear boundary of existing private dwellings on the eastern side of the boundary through agricultural lands. The proposed greenway will be separated from the dwelling by the existing hedgerow and upgraded hedgerows and landscaping.
- 10.2.10 The route then turns west and continues towards Kilcrea Road.

Option 3 – Yellow

- 10.2.11 From the proposed new bridge and ramp structure the route continues north along a section of the existing stoned area. This stoned area was provided by Irish Rail to allow access to the railway line when the railway bridge was being repaired. This area is scenic and would be an ideal location for a viewing area.
- 10.2.12 The route continues north as far as the rear boundary of the existing private dwelling (this section of the route follows the preferred Donabate Branch 4). The route then turns west and continues across agricultural lands towards the Pill River.
- 10.2.13 The route continues on the eastern side of the Pill River until it reaches a private residence and working farmyard. At this location it crosses to the southern side of the Pill River which will require a structure at this location.
- 10.2.14 The route runs along the southern side of the private dwelling and farm buildings through open agricultural lands. There is an agricultural entrance between the farm buildings and the agricultural lands to the south which will have to be maintained at this location. The proposed greenway will be separated from the dwelling by the existing hedgerow and watercourse.
- 10.2.15 The route continues on the southern side of the existing property fence line and hedgerow through agricultural lands and continues towards Kilcrea Road.

Option 4 – Purple

- 10.2.16 From the proposed new bridge and ramp structure the route continues north along a section of the existing stoned area. This stoned area was provided by Irish Rail to allow access to the railway line when the railway bridge was being repaired. This area is scenic and would be an ideal location for a viewing area.

- 10.2.17 The route continues north as far as the rear boundary of the existing private dwelling (this section of the route follows the preferred Donabate Branch 4). The route then turns west and continues across agricultural lands towards the Pill River.
- 10.2.18 The route crosses the Pill River at this location where a structure will be required. The greenway continues on the northern side of the existing hedgerow across agricultural lands.
- 10.2.19 It then turns north along the rear boundary of existing private dwellings on the eastern side of the boundary through agricultural lands. The proposed greenway will be separated from the dwelling by the existing hedgerow and upgraded hedgerows and landscaping.
- 10.2.20 The route then turns west and continues towards Kilcrea Road.

Option 5 – Dark Blue

- 10.2.21 From the proposed new bridge and ramp structure the route continues north along a section of the existing stoned area. This stoned area was provided by Irish Rail to allow access to the railway line when the railway bridge was being repaired. This area is scenic and would be an ideal location for a viewing area.
- 10.2.22 The route continues north as far as Corballis Cottages Road. It diverts around the boundary of a recently refurbished private dwelling (this section of the route follows the preferred Donabate Branch 4).
- 10.2.23 It then continues west inside the existing hedgerow on the southern side of the Corballis Cottages Road through open agricultural lands. The existing agricultural entrances from the public road will have to be maintained. The route then heads in a southwest direction towards the southern side of the private dwelling and farm buildings through open agricultural lands. Access to the agricultural lands on both sides of the greenway must be maintained and a crossing must be provided. At this location it crosses to the southern side of the Pill River which will require a structure at this location.
- 10.2.24 The route runs along the southern side of the private dwelling and farm buildings through open agricultural lands. There is an agricultural entrance between the farm buildings and the agricultural lands to the south which will have to be maintained at this location. The proposed greenway will be separated from the dwelling by the existing hedgerow and watercourse.
- 10.2.25 The route continues on the southern side of the existing property fence line and hedgerow through agricultural lands and continues towards Kilcrea Road.

10.3 Kilcrea Lands Route Options Selection (Engineering)

- 10.3.1 An assessment is carried out as per engineering route assessment criteria (see Chapter 5.0).

Table 10.1 Engineering Route Assessment Criteria.

	Criterion Elements
Technical	Comparison of technical merits in terms of: <ul style="list-style-type: none"> • Greenway level of service offered. <ul style="list-style-type: none"> - Surface quality/comfort. - Gradient. - Continuity of route. - Directness (waiting time at signals, detours). <p>Accessibility (mobility impaired).</p>
Safety	Comparison of level of safety offered in terms of: <ul style="list-style-type: none"> • Interaction with live traffic and nature of traffic control facilities offered • Personal security, levels of public lighting and surveillance offered
Integration	Comparison of level of integration and inter-connectivity offered in terms of: <ul style="list-style-type: none"> • Connectivity to public transport (bus and rail). • Connectivity to wider cycle network. • Inter-connectivity of adjacent residential communities (existing and planned). • Provision of car parking areas at access points/key amenity areas. • Connectivity to adjacent recreational and amenity areas (existing and planned).
Construction Impact	Comparison on level of impact on the environment from a construction perspective.

- 10.3.2 Each route option was assessed using the above criteria and a rating was assigned to each route option. The ratings are as follows:

Table 10.2 Preference Rating.

Preference Type	Single Option	Multiple/All Options
Most Preferred	An option which is considered to have a positive or no material negative effect.	If multiple/all options have a positive or no material negative effect, then multiple/all options should be identified as most preferred.
Preferred	An option which is considered to have a minor negative effect.	If multiple/all options have a minor negative effect, then multiple/all options should be identified as preferred.
Acceptable	An option which is considered to have a moderate negative effect.	If multiple/all options have a moderate negative effect, then multiple/all options should be identified as acceptable.
Least Acceptable	An option which is considered to have a potentially significant negative effect.	If multiple/all options have a potentially significant negative effect, then multiple/all options should be identified as least acceptable.

- 10.3.3 Each option is given a rating and the route with the most "most preferred" rating is then selected as the preferred route as it is the best option of the overall process.

Table 10.3 Kilcrea Lands – Option Evaluation Summary Evaluation Matrix.

Item	Description	Preference
Option 1 - Light Blue		
Technical	Surface quality and gradient are acceptable. Most direct route. It is accessible by all. Scenic route.	Most Preferred
Safety	Cyclists are off-road for this section of the route with no interaction with live traffic.	Most Preferred
Integration	Links to Donabate Branch but does not utilise the proposed branch.	Preferred
Construction Impact	Minor environment impact with the use of low impact construction methods. No impact on flood storage capacity of flood plains in the area.	Acceptable
Option 2 - Green		
Technical	Surface quality and gradient are acceptable. It is accessible by all. Less scenic route.	Preferred
Safety	Cyclists are off-road for this section of the route with no interaction with live traffic.	Most Preferred
Integration	Links to Donabate Branch but does not utilise the proposed branch.	Preferred
Construction Impact	Minor environment impact with the use of low impact construction methods. No impact on flood storage capacity of flood plains in the area.	Acceptable
Option 3 - Yellow		
Technical	Surface quality and gradient are acceptable. It is accessible by all. Scenic route.	Preferred
Safety	Cyclists are off-road for this section of the route with no interaction with live traffic.	Most Preferred
Integration	Links to Donabate Branch and utilises a portion of the proposed branch.	Preferred
Construction Impact	Minor environment impact with the use of low impact construction methods. No impact on flood storage capacity of flood plains in the area. Re-uses a section of the existing stoned access track.	Preferred
Option 4 - Purple		
Technical	Surface quality and gradient are acceptable. It is accessible by all. Less scenic route.	Preferred
Safety	Cyclists are off-road for this section of the route with no interaction with live traffic.	Most Preferred
Integration	Links to Donabate Branch and utilises a portion of the proposed branch.	Preferred
Construction Impact	Minor environment impact with the use of low impact construction methods. No impact on flood storage capacity of flood plains in the area. Re-uses a section of the existing stoned access track.	Preferred
Option 5 - Dark Blue		
Technical	Surface quality and gradient are acceptable. It is accessible by all. Less scenic route.	Preferred
Safety	Cyclists are off-road for this section of the route with no interaction with live traffic.	Most Preferred
Integration	Links to Donabate Branch and utilises the largest portion of the proposed branch. Links to Corballis Cottages Road.	Most Preferred

Item	Description	Preference
Construction Impact	Least environmental impact with the use of low impact construction methods.	Most Preferred

Route Selection (Engineering) Summary

Table 10.4 Donabate Branches – Option Evaluation Summary Evaluation Matrix.

	Option 1 Light Blue	Option 2 Green	Option 3 Yellow	Option 4 Purple	Option 5 Dark Blue
Technical	Most Preferred	Preferred	Preferred	Preferred	Preferred
Safety	Most Preferred	Most Preferred	Most Preferred	Most Preferred	Most Preferred
Integration	Preferred	Preferred	Preferred	Preferred	Most Preferred
Construction Impact	Acceptable	Acceptable	Preferred	Preferred	Most Preferred

Engineering Preference Order

Table 10.5 Engineering Preference Order.

	Most Preferred	Preferred	Acceptable	Least Acceptable	Rank	Engineering Preference
Option 1 – Light Blue	2	1	1	-	2nd	Preferred
Option 2 – Green	1	2	1	-	4th	Least Acceptable
Option 3 – Yellow	1	3	-	-	3rd	Acceptable
Option 4 – Purple	1	3	-	-	3rd	Acceptable
Option 5 – Dark Blue	3	1	-	-	1st	Most Preferred

10.4 Kilcrea Lands Route Options Cost Review

- 10.4.1 Each of the identified route options from a cost perspective are reviewed here. There are cost reductions on Options 3, 4 and 5 as the cost for a section of these routes has already been accounted for as part the construction of the preferred Branch 4 into Donabate (see Chapter 9.0 above).
- 10.4.2 Budget costs have been prepared for each route option and are summarised as follows:

Table 10.6 Cost Preference Order.

	Cost (€ ex VAT)	Cost Preference
Option 1 – Light Blue	€787,900	Acceptable
Option 2 – Green	€575,600	Preferred
Option 3 – Yellow	€477,225	Preferred
Option 4 – Purple	€508,950	Preferred
Option 5 – Dark Blue	€154,600	Most Preferred

- 10.4.3 Costs were ranked as shown above based on relative costing bands within each section.

10.5 Kilcrea Lands Route Options Overall Preferred Route Option

- 10.5.1 Following the engineering and cost review in this report (Chapter 10.0) and the environmental review carried out by the environmental consultants (Chapter 12.0 to Chapter 22.0) the findings are combined. The results of the engineering, environmental and cost reviews are summarised in the table below.

Table 10.7 Overall Preferred Route Option.

	Engineering Preference	Environmental Preference	Budget Cost Preference
Option 1 – Light Blue	Preferred	Preferred	Acceptable
Option 2 – Green	Least Acceptable	Most Preferred	Preferred
Option 3 – Yellow	Acceptable	Preferred	Preferred
Option 4 – Purple	Acceptable	Preferred	Preferred
Option 5 – Dark Blue	Most Preferred	Preferred	Most Preferred

- 10.5.2 Each option is given a rating and the route with the most "most preferred" rating is then selected as the preferred route as it is the best option of the overall process. The options are then ranked and the overall preference is given to each route option as per the table below:

Table 10.8 Overall Preference Order.

	Most Preferred	Preferred	Acceptable	Least Acceptable	Rank	Overall Preference
Option 1 – Light Blue	-	2	1	-	3rd	Preferred
Option 2 – Green	1	1	-	-	2nd	Preferred
Option 3 – Yellow	-	2	1	-	3rd	Preferred
Option 4 – Purple	-	2	1	-	3rd	Preferred
Option 5 – Dark Blue	2	1	-	-	1st	Most Preferred

- 10.5.3 Based on the above Option 5 is the preferred route in this section.

11.0 Overall Preferred Route

- 11.0.1 The emerging preferred route identified in this report (see Chapter 7.0) was presented by Fingal County Council as part of a non-statutory public consultation process for discussion and comment by statutory consultees, local interest groups and members of the public (refer to Chapter 8.0). Following the outcome of the public consultation a number of issues raised were to be further analysed. This was carried out in Chapter 9.0 and Chapter 10.0 of this report.
- 11.0.3 Based on the above and incorporating the comments received from the public consultation process it is now recommended that the overall preferred route for the proposed development is as shown on Appendix H-Drawings 12-160-195 to 12-160-198.
- 11.0.4 This route has been progressed to the next stage which includes the preparation of an EIAR and NIS which form part of the application to An Bord Pleanála for the proposed development.

12.0 Landscape

12.1 Introduction

- 12.1.1 As discussed in the Constraints Report, the proposed greenway, irrespective of which option is adopted, would pass through a variety of landscape types of widely varying character but generally of a high quality and sensitivity. To the south, the route would pass through urban and residential areas with high visibility from a large number of receptors. Crossing the railway causeway, the route would introduce new activity in a highly exposed location and to the north, the greenway would cross an agricultural landscape again introducing new activity where currently it does not exist (refer to Appendix H-Figures 6 to 8A when reading this chapter).
- 12.1.2 In such landscapes, the construction and operation of the greenway will inevitably bring some form of visual and physical impact. Whereas construction activities are invariably negative, as the greenway moves into use and the associated mitigation construction and planting begins to mature, these effects can be greatly reduced or erased and the positive potential of the asset can be fully realised.
- 12.1.3 The following elements of the greenway development have the potential for landscape and visual impact during the construction stage:
- Tree and scrub removal to the northern section.
 - River Pill bridge construction.
 - Viaduct bridge construction.
 - Construction of wall, fencing and screening structures.
 - General construction disturbance, traffic, plant, working lights, etc.
 - Storage of materials.
- 12.1.4 The features of the operational stage of the proposed scheme which have potential for landscape and visual impact include the following main elements:
- Screens and fences.
 - Bridges.
 - Signage.
 - Greenway users - cyclists and walkers.

12.2 Construction Phase: Predicted Visual Impacts

- 12.2.1 Visual impacts tend to be most pronounced during the construction stages of a project when disturbance, particularly close to properties, is at its greatest and mitigation measures have not been introduced or have not matured to effect the intended results.
- 12.2.2 During the construction stages, impacts will generally arise from visual intrusion and disturbance from construction traffic, lighting and activity and in rural areas the loss of trees, hedgerows and scrub. The noise generated by construction can also draw attention to the visual activity, thereby heightening the perceived impact of any visual disturbance.

Section 1 – Malahide Demesne

- 12.2.3 The demesne at Malahide is a recognised and protected sensitive and valued landscape. However, works within the demesne are likely to be discreet, as the greenway would use existing footpaths and roads. Signage would need to be incorporated and both the signage and the associated construction would have the greatest visual impact in areas of open grassland, where new signage and the works would be seen in stark isolation. Route Options 1 and 2 cross the key sensitive vista from the castle across the southern lawn and ill-considered signage could prove detrimental to the character of the view. By contrast, Route Options 3, 4, 5 and 6 follow less-trod footpaths through wooded areas and any construction activity would be screened and of lesser magnitude.
- 12.2.4 The localised exception to the intended use of existing footpaths and roads would be the creation of the short length of greenway connecting Route Option 2 with Malahide Road, to the west of the cricket pavilion. Here, the removal of woodland vegetation, breaking through of the low perimeter wall, and the construction of the short length of macadam greenway, would have limited and localised impact, with the majority of activity involved in clearing the line of the route, indistinguishable from regular woodland management practice.
- 12.2.5 Overall within the demesne, visual impacts during construction would be a slight negative visual impact of temporary duration.

Section 2 – R106 Dublin, Malahide

- 12.2.6 There are a number of options for crossing the main Malahide-Dublin Road between Malahide demesne and the village, primarily dictated by the point of connection to the route selected within the demesne and through the village to the estuary. None of the route options in this section would require any physical works to be undertaken to the walls or boundaries to either side of the road and works would be contained within the road corridor.
- 12.2.7 All route options would include a controlled signal crossing of the road, and Options 3 and 4 would involve more significant works in the narrowing of the existing carriageways and reconstruction of one of the footpaths to create a shared cycleway and pedestrian footpath. During construction, therefore, there would be greater intrusion from Options 3 and 4, but as this is work of a typical refurbishment nature contained within a main road corridor the impact would only be slight and temporary.
- 12.2.8 Works to other options would be less intrusive and even more restricted and impacts would be imperceptible.

Section 3 – R106 Dublin Road to Bissets Strand

- 12.2.9 Regardless of which option is selected for development, it is intended to construct additional lay-by car parking along Bissets Strand for 8-10 vehicles, through connecting the existing indented car parking spaces within the grass verge along the shore frontage. Views from the estuary shoreline are protected and the associated construction activity would be local and of short duration, but highly visible.
- 12.2.10 This aside, throughout the village section of the greenway, all route options would be located on existing hard surfacing, and new construction would be limited to lining and

signage. Construction activity would, therefore, be of relatively short duration and within an urban setting such road works are an accepted part of the scene, predominantly lost amongst the general traffic and pedestrian activity. To the east of the railway, therefore, Options 4 and 5 would generate an imperceptible visual impact.

- 12.2.11 To the west of the railway, works within the quieter suburban environment would be more apparent, but still of limited magnitude. Excepting the car park construction as discussed above, which is common to all options, by utilising existing road and footpath construction, for Options 1, 2 and 3 the limited intervention of the construction works along the southern shore of the estuary would have negligible impact on the protected views. The two town centre options to the east of the railway do not afford views over the estuary. Visual impacts associated with Options 1, 2 and 3 during construction would be of slight negative visual impact.

Section 4 – Bissets Strand to the North Shore of Malahide Estuary

- 12.2.12 Given the open nature of the estuary and lack of cover on the viaduct, the route would be open to views from the north and south banks of the estuary. Only the section of greenway to the north of the weir would be visible to views from the east and west, as the length of greenway to the south of the weir, being at a lower level, would be screened by the body of the rail embankment.
- 12.2.13 Views over the estuary from the southern shore are protected and during construction the human and vehicular activity on the railway embankment would be open to view. This would be a short-term effect and, given the use of the causeway by the railway, heavy machinery on the viaduct is not an uncommon site. The railway causeway is also a recognisably man made structure of ongoing engineering use and construction work would not appear as an incongruous activity.
- 12.2.14 Any work undertaken after dark and requiring lighting would be highly visible from the roads and properties lining the estuary, particularly from the protected views to the north of Malahide. Again, however, as this is also the case for regular maintenance on the railway causeway the nature of the intrusion would not be new.
- 12.2.15 During the construction phase visual impacts would be of slight negative visual impact, but short-term.

Section 5 – North Shore of Malahide Estuary to R126 Hearse Road

- 12.2.16 With the exception of Option 1, all the options for the route in this section deviate from the rail embankment to the north of the ridgeline backing the estuary. All of these options would therefore enter an enclosed agricultural field pattern with limited views due to the screening effects of the mature hedgerows. The lack of access within this section, other than to the users of the greenway, would also limit areas from which the greenway would be visible, restricting visibility to glimpsed views through the dense screening along the three encircling roads or from the few adjacent properties. Where it is necessary for the greenway to break through field boundaries, then obviously the screening effect would be removed. This impact would be most pronounced where the greenway is required to cross or access the roads. However, these clearances would be of such limited lengths that the effect of opening up views of construction would be imperceptible. This construction impact would be further mitigated if the works could

be phased to undertake the construction of the greenway within the fields prior to removal of the roadside hedgerows, which then become the last activity.

- 12.2.17 Methods of construction have also been considered to retain the greenway on a timber boardwalk system throughout this area. This is a relatively discreet, light-touch operation with works underway in only limited areas at any one time. Any works after dark requiring lighting would be noticeable even through the hedgerows, and particularly in winter.
- 12.2.18 During the construction phase visual impacts would be of slight negative visual impact for Options 2, 3, 4, 5, and 6.
- 12.2.19 Option 1 through this section follows the northern shore of the estuary from the railway viaduct to Kilcrea Road. This area is extremely exposed with negligible screening. Due to the present lack of access to the shoreline, and the scarcity of properties, potential receptors are very distant – to the southern edge of the inner estuary (these are protected views), or fleeting – from passengers on the train on the viaduct. Machinery working on the greenway boardwalks and particularly lighting at night would be visible even from a distance, in an area of high sensitivity and a background of little illumination. If works are to be undertaken under lighting then the impact would be significant negative visual impact, otherwise the impact would be moderate negative visual impact.

Section 6 – Newbridge Demesne

- 12.2.20 This is a landscape of high value and sensitivity. However, from the inner gates, north of the wooded perimeter planting, the single route option through the parkland of the demesne to the car park, makes use of existing footpaths and the only further works required to create the greenway would be the erection of associated signage.

12.3 Construction Phase: Predicted Landscape Impacts

Section 1 – Malahide Demesne

Impact on Landscape Features, Trees and Woodland

- 12.3.1 At the northern end of Option 2 (leaving the demesne), a 20m length of the greenway would be required to the west of the cricket pavilion to cut through the perimeter woodland belt. This work should be undertaken to avoid the felling of mature trees. Assuming this can be achieved, Option 2 would cause a slight negative landscape impact during the construction phase, within the woodland perimeter to Malahide Demesne.

Impact on Landscape Planning

- 12.3.2 All routes would impact on the landscape of Malahide Demesne. However, there would be minimal impact on the setting of the castle and historic landscape and these impacts would be short-term during construction.
- 12.3.3 Any construction activity has the potential to cause disruption, which might be of detriment to policies AH37, AH38 and AH39 promoting access and understanding of the history of the area, but any such impacts would be minor and short-term.

Impact on Landscape Character

- 12.3.4 Due to the limited nature and magnitude of construction effects within the demesne, with the majority of all route options primarily on existing roads and footpaths, there would be negligible impact overall on the Estuary Landscape Character Type and minimal impact on character at a localised level within the demesne.

Section 2 – R106 Dublin Road, Malahide

Impact on Landscape Features, Trees and Woodland

- 12.3.5 As works are restricted to within the road corridor, provided excavations do not damage the roots of trees in the adjacent park and gardens, there would be no impact on landscape features.

Impact on Landscape Planning

- 12.3.6 None of the options would have an impact on existing planning policy.

Impact on Landscape Character

- 12.3.7 Due to the limited and restricted nature of the works and the fact that all works would be in keeping with the existing context, there would be no impact on existing landscape character.

Section 3 – R106 Dublin Road to Bissets Strand

Impact on Landscape Features, Trees and Woodland

- 12.3.8 Regardless of which option is selected for development, the greenway within this section would largely be routed through a hard, suburban and urban environment, predominantly making use of existing footpaths and roads. The construction of the additional lay-by parking along Bissets Strand would entail the removal and regrading of the grass verges between existing car park pull-ins. There would be little impact, therefore, on significant landscape features and this category of impacts within this section of the route proposals can be considered slight negative impact.

Impact on Landscape Planning

- 12.3.9 Works within this section would be of limited scope and of insufficient magnitude to impact on landscape planning policy.

Impact on Landscape Character

- 12.3.10 The effects on the visual domain of the estuary are described in the visual impact section of this chapter. Due to the limited nature and magnitude of physical construction effects within this section, with the majority of all route options primarily on existing roads and footpaths, there would be negligible impact overall on the Estuary Landscape Character Type and minimal impact on character at a localised level. The potential car parking provision along Bissets Strand is a consolidation of an existing condition.

Section 4 - Bissets Strand to the North Shore of Malahide Estuary

Impact on Landscape Features, Trees and Woodland

- 12.3.11 There are no landscape features affected along this section of the route.

Impact on Landscape Planning

- 12.3.12 No designated landscapes are affected in this section.

Impact on Landscape Character

- 12.3.13 The effects of the construction on the visual domain of the estuary are described below under visual impacts. The works to the railway causeway will have minimal impact on what is already clearly a man-made structure within the estuary and the greenway would share a transport and movement corridor with the railway. Impacts on the Estuary Landscape Character Type would be slight neutral.

Section 5 – North Shore of Malahide Estuary to R126 Hearse Road

Impact on Landscape Features, Trees and Woodland

- 12.3.14 The development of the greenway through this section would require the removal of sections of hedgerow to enable the construction of ramps, bridges and new lengths of greenway to pass through the landscape. The water features of the River Pill and the south shore of the estuary would be protected during construction.
- 12.3.15 The relative impact of each of the options in this respect is determined by the length and value of the hedgerow to be removed.

Option	Impact
1 - Pink	Imperceptible
2 - Blue	Slight negative
3 - Cyan	Slight negative
4 - Green	Slight negative
5 - Orange	Moderate negative
6 - Yellow	Moderate negative

- 12.3.16 Options 5 and 6 have a higher level of adverse impact as a greater length of hedgerow would need to be removed along Corballis Cottages Road around Corballis Cottages to allow sufficient visibility. If replacement hedgerows could be introduced at a greater set back from the road, then this impact would be medium-term.

Impact on Landscape Planning

- 12.3.17 No designated landscapes are affected in this section.

Impact on Landscape Character

- 12.3.18 The effects of the construction on the visual domain of the estuary are described below under visual impacts. The magnitude and nature of the construction works would not be significant in the broader scale of the estuary landscape. Whilst there are no significant structures or earthworks, there would be minor structures required to either

bridge watercourses or ramps to accommodate changes in level. Options 3, 4, 5 and 6 would require a greater number of structures in this respect. The fabrication of these structures off site would reduce adverse impacts during construction and erection.

- 12.3.19 Option 1 would introduce a new route along the northern edge of the estuary, but requiring little structure or earthworks and following the line of the existing field boundaries. Landscape impacts would be slight negative impacts.
- 12.3.20 Option 2 follows the line of the pronounced hedgerow to the base of the ridgeline and would have little impact on the existing character. Impacts are therefore slight neutral.
- 12.3.21 Options 3 and 4 would enter into the heart of the low-lying pasture area along the line of the River Pill. By introducing the greenway into this landscape would represent the greatest change in character in this localised area, but a boardwalk would be in keeping with the wetland nature and the route would follow the patterns of the field boundaries and waterways. Impacts for these two options would be moderate neutral impacts.
- 12.3.22 Options 5 and 6 follow the line of rail embankment and then the route of Corballis Cottages Road as far as the cottages and would be read as an adjunct to the existing movement corridors. As these are an accepted use within the landscape, the route would not result in significant effects on the character and would result in slight neutral impact on the landscape character. At the point that the two routes depart into the agricultural fields to the immediate east of the farm, impacts would be moderate but neutral in character.

Section 6 – Newbridge Demesne

Impact on Landscape Features, Trees and Woodland

- 12.3.23 As all the routes enter the demesne through the existing gates and follow the existing roadway, there would be no impact on the landscape features, trees and woodland of the demesne.

Impact on Landscape Planning

- 12.3.24 No significant impacts.

Impact on Landscape Character

- 12.3.25 Due to the limited nature and magnitude of construction effects within this section, with the majority of all route options primarily on existing roads and footpaths, there would be negligible impact overall on the Estuary Landscape Character Type and minimal impact on character at a localised level.

12.4 Operational Stage

- 12.4.1 Upon completion of construction of the greenway, there will be a change in the nature of impacts, particularly on the visual realm. The physical presence of the greenway will remain, but rather than construction works, the activity will become the visitor and user of the greenway. The physicality of the new greenway will be most pronounced in the pre-establishment period, before new planting to soften and screen the greenway has established and the effects of construction traffic on the fields and hedgerows has had a chance to repair and regrow.

Predicted Visual Impacts

- 12.4.2 Walkers and cyclists would replace machinery associated with construction and the rawness of new structures would mellow and be screened by maturing new planting as the greenway moves from the pre-establishment to the post-establishment phase.

Section 1 – Malahide Demesne

- 12.4.3 Once established, the new entrance into the park to the west of the cricket pavilion for Option 2 would have slight neutral visual impact.
- 12.4.4 New signage could have a permanent detrimental visual impact and should be carefully located.
- 12.4.5 The envisaged increase in visitor numbers would have a noticeable visual impact, but as this is an intended consequence, promoted by Local Area Plan policy and in a landscape capable of accommodating such change, any visual effect would be neutral. The possible exception to this would be, on balance, that large groups of walkers and particularly cyclists on Route Options 1 and 2, streaming across the axial view southwards from the castle, would result in a moderate negative visual impact.

Section 2 – R106 Dublin Road, Malahide

- 12.4.6 The works to create the greenway along and across the main road corridor are entirely complementary to the road environment and therefore would be a neutral impact on the existing landscape. In fact, Options 3 and 4, and the creation of a bespoke greenway route along the corridor, would be a slight positive effect, extending the influence of the public and recreational utility of the park across the road.

Section 3 – R106 Dublin Road to Bissets Strand

- 12.4.7 The additional car parking spaces along Bissets Strand would increase the number of intrusive elements within the view over the estuary from the road and adjacent properties. As parked cars already fall within this view, the visual impact would be slight negative.
- 12.4.8 The visual impact throughout the remainder of the Malahide section in operation would be imperceptible, as the user of the greenway would be indistinguishable from the ordinary pedestrian or walker along the streets and throughout the town. For the user, Options 1 and 2, which run through the suburban residential areas, would not be as visually stimulating. Option 3, which passes down Hanlon's Lane, is a more interesting and direct route through the housing area and brings the visitor onto the strand closer to the viaduct.
- 12.4.9 Options 4 and 5 in passing through the town would provide a far greater level of interest and visual experience for the user of the greenway and the transition through the Bissets Strand bridge into the estuary landscape would be both dramatic and memorable.

Section 4 – Bissets Strand to the North Shore of Malahide Estuary

- 12.4.10 The transition from construction to operation will improve the visual amenity of the highly visible railway causeway. The removal of the palisade enclosure on Bissets Strand, construction of the screening walls, completion of the weir bridge and amenity benefits

of the viaduct in active use by the community and visitor, would be a positive change to the appearance and perception of the viaduct and in operation the visual experience of the user will be dramatic. Overall the visual impacts would be a permanent change of moderate positive visual impact.

Section 5 – North Shore of Malahide Estuary to R126 Hearse Road

- 12.4.11 During use, Option 1 would remain an uncomfortable visual intrusion along the northern edge of the estuary and the impact would be slight negative visual impact.
- 12.4.12 Elsewhere, as the timber bridges and boardwalks mellow with age and the effects of mitigation planting and seeding mature, on balance, all the remaining route options and links would result in slight neutral visual impact.
- 12.4.13 There is also the experience of the user of the greenway to consider. Whilst all route options would create attractive alternatives for the user, Options 3 and 4, in following the route of the River Pill on boardwalk and entering into the heart of the enclosed landscape, would bring a new and enhanced experience to the visitor. On balance, therefore, and considering both views of and from the greenway, Options 3 and 4 could be considered to be of moderate positive visual impact.
- 12.4.14 To pass to the west of Corballis Cottages, however, Options 4 and 6 would have to move through a narrow corridor along the river course to pass between the cottages and a scrap yard. Screening would have to be incorporated to the scrap yard boundary to make this route attractive, and the area is very constrained. Options 3 and 5 would enable the routes to move around this pinch point and therefore could be considered to be of slight positive visual impact.

Section 6 – Newbridge Demesne

- 12.4.15 Within the demesne the minimal nature of the requirements to accommodate the greenway would have negligible impact and throughout the demesne visual impacts would be imperceptible. With respect to the means of access into the demesne, it would be a marked beneficial effect to see these gates in active use once again.

Predicted Landscape Impacts

Section 1 – Malahide Demesne

- 12.4.16 Once established, the new entrance into the park to the west of the cricket pavilion for Option 2 would have slight neutral landscape impact, in that the positives of providing a new pedestrian and cycle access to the demesne are balanced by the slight negative aspect of the new intrusion into the historic fabric.
- 12.4.17 As described above, the flow of visitors, particularly cyclists, across the axial vista from the castle, would create a change of character and alter the historic resonance of the aspect, resulting in a moderate negative landscape impact.

Section 2 – R106 Dublin Road, Malahide

- 12.4.18 Options 3 and 4 would have a slight positive landscape impact. All other options would be imperceptible.

Section 3 – R106 Dublin Road to Bissets Strand

- 12.4.19 The landscape impact throughout the remainder of Malahide Village in operation would be imperceptible for all options.

Section 4 – Bissets Strand to the North Shore of Malahide Estuary

- 12.4.20 The effect of opening the route along the railway causeway would be a significant positive landscape impact, as the greenway would introduce a new permanent character, quality and amenity to the viaduct, greatly enhancing the enjoyment and experience of the resident and visitor.

Section 5 – North Shore of Malahide Estuary to R126 Hearse Road

- 12.4.21 As the scheme matures from pre-establishment to post-establishment the greenways throughout this area would become settled into the environment and in keeping with the character of the landscape. On balance, all the routes with the exception of Option 1 would be considered of a slight neutral landscape impact.
- 12.4.22 Option 1 would affect the character of the north shore of the estuary on a permanent basis and on balance this would be a slight negative landscape impact.

Section 6 – Newbridge Demesne

- 12.4.23 The greenway in use would have negligible impact on the landscape of the demesne, in terms of landscape features, landscape planning designations and character. It might be argued that increased visitor numbers or allowing bicycles into the demesne could be considered a detrimental change in character, but this would have to be balanced against the amenity and policy enhancements. The demesne landscape is also one that could, and, on occasions, historically did, accommodate a large number of visitors. It would be a beneficial effect to bring the existing gates back into active use and this would be a moderate positive landscape impact.
- 12.4.24 In operation, therefore, the effect would be an imperceptible landscape impact.

12.5 Mitigation

- 12.5.1 As discussed above, in terms of potential visual and landscape impacts the appropriateness of the scheme and acceptability of the function of the greenway to the amenity of the user and enjoyment of the estuarine environment assists in the integration of the proposal into the setting. More than this, however, the railway viaduct creates a ready setting for the location of the route.
- 12.5.2 However, there are physical mitigation measures that should be adopted to ensure potentially adverse impacts are reduced or removed:
- Avoid or minimise damage to existing hedgerows and trees.
 - Where trees are removed, implement a replacement planting scheme within the next available growing season. Within the demesne landscapes, larger sized specimens should be considered.
 - Implement a light touch approach to the design and construction of structures such as the boardwalks, bridges and fences, with components fabricated off site.

- Introduce a complementary scheme of landscape within the boundary treatment of the alignment to maximise the potential contiguous wooded hedgerows. Wherever possible or appropriate, both hard and soft materials should be indigenous to the area.
- Consider the design of the screening and choice of materials on the viaduct to create a visually appropriate structure.
- Ensure signage is careful located and designed to enhance the enjoyment of the greenway without creating additional visual and physical clutter. Co-locate new signage on existing columns, walls and street lights to avoid increasing the number of new structures.

12.6 Summary and Conclusions

- 12.6.1 From a landscape and visual perspective, all the route options linking the historic demesnes of Malahide in the south and Newbridge in the north, could be satisfactorily integrated into the landscape of Malahide Estuary, a sensitive, protected environment of high landscape quality.
- 12.6.2 For the purposes of the appraisal, the study area has been divided into six zones of common landscape character: Section 1 is the historically important amenity facility provided by Malahide Demesne; Section 2 is the crossing of the Malahide-Dublin Road to the northern Malahide Demesne boundary; Section 3 is the urban area of Malahide in the south, up to the shores of the estuary; Section 4 is the narrow, man-made railway causeway separating the inner and outer estuaries; Section 5 is the agricultural land of Kilcrea Townland to the north of the estuary; and Section 6 is Newbridge Demesne to the north of the R126.

Section 1 – Malahide Demesne

- 12.6.3 A variety of options, making use of existing footpaths and roads within Malahide Demesne, would link the existing castle car park in the heart of the demesne with the existing and potential entrances to the park to the north.
- 12.6.4 There would be little new construction within the demesne. Therefore, the main consideration would be the effects of the visitors themselves and here, the only potential issue could arise through the introduction of cyclists and increased numbers of walkers across the front of the castle, breaking the main axial vista, associated with Options 1 and 2.
- 12.6.5 The preferred routes within the demesne would be Options 3/4 and 5/6, where both alignments avoid open landscape areas and provide a more direct route to the park boundary, avoiding crossing the axial vista from the castle. In this regard, Options 3 and 4 are the more direct routes of the two and potentially take in the Visitor Centre and feed centrally through the various attractions of the park, providing more interest for the user of the greenway.

Section 2 – R106 Dublin Road, Malahide

- 12.6.6 The crossing of the main Malahide to Dublin Road would introduce new infrastructure into the existing road corridor. The creation of a new bespoke shared cycleway and pedestrian route with Options 3 and 4, would be, on balance, a slight positive impact on

the road corridor, extending the recreational influence of the park and signposting positive change to the visitor.

- 12.6.7 For the other options that do not include the creation of a separate cycle/pedestrian way, the effects would be perceptible, but neutral in terms of impact, as they would be entirely consistent with a road environment.

Section 3 – R106 Dublin Road to Bissets Strand

- 12.6.8 To the south of the estuary, the options extend from Malahide Demesne. From here, options pass either to the west of the railway, through suburban residential streets to the southern shores of the inner estuary (Options 1, 2 and 3), or to the east of the railway through the town centre and down towards the estuary (Options 4 and 5).
- 12.6.9 For a number of reasons, Options 4 and 5 through the town centre are preferred. The reasons for this are:
- They provide a more direct route to the causeway;
 - The routes pass through commercial streets providing more interest, facilities, and for the town, more commercial opportunity;
 - Connections do not require any works within the historic Malahide Demesne;
 - The gateway to the estuary shore through the Bissets Strand railway bridge is a dramatic contrast to the enclosure of the narrow streets of the town (although engineering difficulties exist in routing the greenway through this narrow traffic pinch point); and,
 - Option 4 passes across the entrance to the railway station, providing either access to the train to enable a start in Donabate, or orientation should the train be taken from Donabate for the return journey.

- 12.6.10 So, of the two easterly alternatives, Option 4 is preferred.

- 12.6.11 If the difficulties of routing the greenway through the Bissets Strand rail bridge are insurmountable, then of the westerly route options, Option 3 is preferred as this is both direct and visually more stimulating and appropriate route for the greenway through the suburban area.

Section 4 – Bissets Strand to the North Shore of Malahide Estuary

- 12.6.12 There is only a single option for consideration and, as has been stated, this option is both visually acceptable to views from the surrounding estuary environment and, importantly, creates a wonderful new opportunity from an elevated viewpoint to take in the full expanse of the estuary.
- 12.6.13 The completion of the weir bridge and construction of the greenway, particularly to the south of the weir, will bring about positive change to the quality and character of the landscape and for the amenity of the user.
- 12.6.14 The need to screen the users of the greenway on the causeway from the estuarine bird population is an important consideration and options are being explored for future development. As within all man-made port, harbour and seascape environment, detailing needs to be so robust as to complement the scale of the infrastructure and

landscape, or so fine as to not compete. Options under consideration include metal and timber fencing, gabion walls, precast concrete wall sections faced with a variety of finishes and random dry stone walling. Of these options, the dry stone wall, in a material to match the limestone rubble of the causeway, would present the most contextual response from the perspective of visual appropriateness, scale and robustness; even more so if the wall could be treated as a sculptural element gradually merging into the line and texture of the riprap of the causeway. Where views through the wall would be beneficial and acceptable, for example at the termination of the southerly route up to the weir, this could be achieved in light section metal railing.

Section 5 – North Shore of Malahide Estuary to R126 Hearse Road

- 12.6.15 North of the causeway within Section 5, the greenway enters another landscape typology of small-scale field pattern and damp, low lying meadow. A number of options have been developed to traverse this landscape to Newbridge Demesne in the north. From a landscape perspective, the preferred route would be Option 3. This option would take the greenway user into the landscape along the course of the River Pill on boardwalk and follow the pronounced line of the hedgerow behind the properties along Corballis Cottages Road, Hearse Road, and Kilcrea Road, to connect with Kilcrea Road south of the junction with Hearse Road, but within sight of the gates into Newbridge Demesne. Unlike Option 4, Route Option 3 would avoid the narrow corridor between the river and the scrap yard to the west of the cottages. Option 4 would create a new section of the greenway within an interesting wetland meadow to the immediate north of Corballis Cottages Road, which would require the loss of lengths of mature roadside hedgerows
- 12.6.16 On balance, however, there is little to differentiate in terms of preference between Options 3 and 4 and Option 4 would be improved if the connection alongside the scrap yard could be resolved satisfactorily.

Section 6 – Newbridge Demesne

- 12.6.17 Only a single option is proposed for the route within the demesne which, due to the minimal physical impact and positive cultural effects of increasing access to the landscape and bringing the existing gates back into use, would be a positive overall impact.

12.7 Summary of Landscape Preferences

- 12.7.1 Table 12.1 outlines in summary the overall preferences from a landscape perspective.

Table 12.1 Summary of overall preference from a Landscape perspective.

	Overall Visual Impact	Overall Landscape Impact	Preference
Section 1 – Malahide Demesne			
Option 1 – Green	Slight negative	Slight negative	Preferred
Option 2 – Orange	Slight negative	Slight negative	Preferred
Option 3 – Pink	Slight positive	Slight neutral	Most preferred
Option 4 – Blue	Slight positive	Slight neutral	Most preferred
Option 5 – Cyan	Slight negative	Slight neutral	Preferred
Option 6 – Yellow	Slight negative	Slight neutral	Preferred
Section 2 – R106 Dublin Road, Malahide			
Option 1 – Orange	Neutral	Neutral	Most preferred
Option 2 – Pink	Neutral	Neutral	Most preferred
Option 3 – Cyan	Slight positive	Slight positive	Most preferred
Option 4 – Green	Slight positive	Slight positive	Most preferred
Option 5 – Blue	Neutral	Neutral	Most preferred
Section 3 – R106 Dublin Road to Bissets Strand			
Option 1 – Blue	Slight negative	Slight negative	Preferred
Option 2 – Orange	Slight negative	Slight negative	Preferred
Option 3 – Green	Neutral	Neutral	Most preferred
Option 4 – Pink	Neutral	Slight positive	Most preferred
Option 5 – Yellow	Neutral	Neutral	Most preferred
Section 4 – Bissets Strand to the North Shore of Malahide Estuary			
Option 1 – Green	Slight positive	Significant positive	N/A
Section 5 – North Shore of Malahide Estuary to R126 Hearse Road			
Option 1 – Pink	Moderate negative	Moderate negative	Acceptable
Option 2 – Blue	Neutral	Neutral	Most preferred
Option 3 – Cyan	Slight positive	Neutral	Most preferred
Option 4 – Green	Neutral	Neutral	Most preferred
Option 5 – Orange	Neutral	Neutral	Most preferred
Option 6 – Yellow	Neutral	Neutral	Most preferred
Section 6 – Newbridge Demesne			
Option 1 – Cyan	Moderate positive	Moderate positive	N/A

13.0 Population and Human Health

13.1 Introduction

13.1.1 This chapter assesses and evaluates the potential effects on the human environment of the proposed greenway between Malahide Demesne and Newbridge Demesne in Fingal. A comparative evaluation of the impacts of each route option is provided in order to assist in the identification of the preferred route option.

13.2 Methodology

13.2.1 The study was prepared with reference to *Draft Guidelines on the information to be contained in Environmental Impact Assessment Reports (EIAR)* (EPA, 2017) and *Draft Advice Notes for Preparing Environmental Impact Statements* (EPA, 2015).

13.2.2 A range of documentary, cartographic and photographic sources of information were consulted in this assessment. The primary sources included:

- 2016 Census of Ireland, Central Statistics Office, 2016.
- Fingal County Council Development Plan 2017-2023.
- Broadmeadow Pedestrian & Cycle Trail Feasibility Report, Fingal County Council 2012.
- Maps of the surrounding area, including Ordnance Survey 1:50,000 maps.
- Aerial photographs of the study area.

13.2.3 In addition, a number of community and other websites were visited for up-to-date information on communal and recreational activities available within the study area. For a list of these websites, please refer to the Constraints Report (see Volume 4A).

13.3 Receiving Environment

13.3.1 The chapter provides a brief outline of the receiving environment in terms of human environment. For a more comprehensive assessment of the communal, economic and recreational and amenity profile of the study area, please refer to the Constraints Report (see Volume 4A).

Section 1 – Malahide Demesne

13.3.2 Malahide Castle and Demesne form the heart of Malahide Village. The site is in the ownership of Dublin City Council and has since its acquisition in 1976 been developed into an important amenity and recreational area. Malahide Castle and Gardens are open to the public and, since October 2012, have been further enhanced by the opening of the Avoca Store, Food Hall and Café in the castle's courtyard complex.

13.3.3 The grounds of Malahide Castle are maintained by the Parks Department of Fingal County Council and offer a wide range of recreational and amenity options. In addition to a number of woodland and parkland walks, picnic areas and children's playgrounds, the demesne incorporates tennis courts, pitches for rugby, soccer and GAA games, a 9-hole golf course, an 18-hole pitch and putt course, and a cricket ground and stadium built to international standards.

Section 2 – R106 Dublin Road, Malahide

- 13.3.4 The Malahide-Dublin Road is the main commuter route and the location of several bus stops of Route 42 from Dublin and Route 102 from Sutton to Dublin Airport.

Section 3 – R106 Dublin Road to Bissets Strand

- 13.3.5 Malahide, winner of the 1990 Tidy Towns competition, is located 16km north of the city of Dublin in the administrative county of Fingal. It is characterised by a village-like centre, with extensive residential development to the east, west and south. A unique feature of the settlement is the 109ha former Malahide Castle demesne, which dominates its heart.
- 13.3.6 The population in 2016 was 16,550. The settlement demography is characterised by couples and family units comprising a husband, wife and one or more children. The 2016 Census revealed that Malahide has a higher percentage of employers, managers and higher professionals than any other town in Ireland. Of the town's population, 25.9% are children and teenagers aged 18 or under, and 15.0% are aged 65 and over.
- 13.3.7 The wide range of communal and recreational facilities in Malahide reflects the town's vibrant and self-sustained nature. The 109ha Malahide Demesne forms a key focal point in the heart of Malahide and acts as an important amenity area for local residents and visitors alike. The town's economic profile is characterised by boutiques specialising in designer and high street labels for men, women and children; shops specialising in gourmet foods and wine; and hair and beauty salons. The wide array of cafés, bistros and restaurants and large number of guesthouses and B&B-style accommodations, suggests that tourism plays a not insignificant role in the town's commercial life. The town is serviced by DART from Bray and Greystones; by train from Dublin (Pearse Station) and Drogheda/Dundalk; and by Dublin City Bus routes 32A and 42 from the city centre and 102 from Sutton to Dublin Airport.

Section 4 – Bissets Strand to the North Shore of Malahide Estuary

- 13.3.8 Malahide Estuary covers an area of 3.3km². The construction of a railway viaduct in the 1840s has resulted in the estuary having lagoon characteristics, with limited tidal exchange. It is an important wintering bird site and holds an internationally important population of Brent Geese and nationally important populations of 15 other species.
- 13.3.9 Water based recreational activities are a vital component of Malahide Estuary. Two sailing clubs are situated on its southern bank, along with the 350-berth Malahide Marina and Fingal Sailing School. The 2km Velvet Strand in Malahide is popular with bathers. Fishing in the estuary is permitted but there is no organised fishing activity.

Section 5 – North Shore of Malahide Estuary to R126 Hearse Road

- 13.3.10 The townland of Kilcrea forms part of the Donabate-Portrane peninsula. The area is largely rural in nature and remains predominantly in agricultural use. The townland's settlement comprises individual households along Kilcrea Road and Corballis Cottages Road, with no commercial outlets and no communal facilities. A limited amount of bathing and windsurfing takes place along the northern shore of Malahide Estuary. The coastal road which bounds Kilcrea townland to the south is used for walking, with the viewing area at the southern end of Kilcrea Road doubling as a small car park. The townland is also the location for the recently opened Kilcrea Equestrian Centre.

Section 6 – Donabate and Newbridge Demesne

- 13.3.11 Donabate is a small coastal suburban town between Malahide Estuary to the south and Rogerstown Estuary to the north. It is located 20km north-northeast of the city of Dublin in the administrative county of Fingal. It remained a small village until well into the twentieth century (with a population of 734 in 1911), when road improvements and the presence of a railway station resulted in rapid population growth. The population in 2016 was 7,443, showing an increase of 9.8% from 2011 and 35.3% from 2006. Population density is the fifth highest in Ireland.
- 13.3.12 The settlement demography is characterised by family units comprising a husband, wife and one or more children. The most dominant socio-economic groups present in the town are employers and managers; lower professional; and non-manual. Of the town's population, 34.9% are children and teenagers aged 18 or under, and just 4.4% are aged 65 and over.
- 13.3.13 Donabate is serviced by the Dublin-Belfast railway line and the Northern Commuter line between Dublin and Dundalk. The regional road R126, which connects Portrane to the R127 and the M1 motorway, runs through the town. Dublin Bus service 33B from Swords to Portrane also serves Donabate.
- 13.3.14 The communal facilities available in Donabate reflect the town's relatively young population base. Its basic range of retail facilities and other commercial and business services is typical of commuter towns and suggests that local residents do their shopping in neighbouring urban areas. Like Malahide, Donabate is adjoined by an important green area, Newbridge Demesne, which has significant amenity value to local residents. The settlement is also rich in sports clubs and provides generous opportunities for both formal and informal recreational activities.

13.4 Route Selection Analysis

Route Options

Section 1 – Malahide Demesne

- 13.4.1 The six route options within this section all commence at the existing car park to the immediate south of Malahide Castle. All six options give the users the opportunity to add a tour of the castle and/or gardens, or a visit to Avoca Store, Food Hall and Café to their itinerary.

OPTION 1 – GREEN

- 13.4.2 Option 1 – Green commences at the western extremity of the car park, following an existing pathway in a west-northwest direction across open parkland with a view of Malahide Castle to the north. At a T-junction, Option 1 – Green turns north and follows a second pathway in a northeasterly direction through a wooded area. At a second T-junction, Option 1 – Green turns east and follows a third pathway along the southern and eastern boundaries of the cricket grounds and the eastern boundary of the tennis courts. In the northeastern corner of the tennis courts, the route turns west and extends along the northern boundary of the tennis courts until its culmination at the existing pedestrian entrance providing access to the Malahide-Dublin Road. This option gives the

users the opportunity to time their walk to coincide with a cricket match, or to incorporate a round of golf, pitch and putt or tennis to their itinerary.

OPTION 2 – ORANGE

- 13.4.3 Option 2 – Orange is identical to Option 1 – Green up to the northeastern corner of the tennis courts where instead of turning west it continues north by means of a proposed short shared cycle/footpath culminating in a new pedestrian entrance to the immediate west of the Cricket Club clubhouse.

OPTION 3 – PINK

- 13.4.4 Option 3 – Pink commences at the western extremity of the car park and extends in a northeasterly direction along an existing pathway between Malahide Castle to the west and the Castle Gardens to the east. It then veers north and extends along the former back avenue to Malahide Castle, passing Bridgefield car park to the east and culminating at the existing pedestrian and vehicular entrance near the northeastern extremity of Malahide Demesne. This option does not bring the user near additional recreational options but has perhaps the greatest amenity value passing as it does a number of features of architectural and archaeological interest, including Malahide Abbey and Graveyard.

OPTION 4 – BLUE

- 13.4.5 Option 4 – Blue is identical to Option 3 – Pink up to the southwestern corner of Bridgefield car park, where it veers to the east and follows the southern and eastern boundaries of the car park by means of a new shared cycle/footpath. The option culminates at the existing pedestrian entrance and ramp in the northeastern extremity of Malahide Demesne, which will be upgraded. Option 4 gives users the opportunity to time their walk to coincide with a cricket match.

OPTION 5 – CYAN

- 13.4.6 Option 5 – Cyan commences at the northern extremity of the car park, turning sharply east and following an existing pathway through a wooded area. The pathway curves north to follow the demesne boundary and joins the former back avenue to Malahide Castle. It passes Bridgefield car park to the east and culminates at the existing pedestrian and vehicular entrance near the northeastern extremity of Malahide Demesne. This option does not bring the user near additional recreational options but has good amenity value traversing as it does a pleasant wooded area.

OPTION 6 – YELLOW

- 13.4.7 Option 6 – Yellow is identical to Option 5 – Cyan up to the southwestern corner of Bridgefield car park, where it veers to the east and follows the southern and eastern boundaries of the car park by means of a new shared cycle/footpath. The option culminates at the existing pedestrian entrance and ramp in the northeastern extremity of Malahide Demesne, which will be upgraded.

Section 2 – R106 Dublin Road, Malahide

- 13.4.8 This section extends from the junction of the Malahide-Dublin Road with Yellow Walls Road to the west to its junction with Old Street to the east. To the north and south it is defined by boundary walls adjacent to existing footpaths.

OPTION 1 – ORANGE

- 13.4.9 Option 1 – Orange entails the placement of a controlled pedestrian crossing and junction upgrade work at the junction of Dublin Road and Yellow Walls Road. These upgrade works may cause potential short-term disturbance to pupils and their parents and to teachers at St Sylvester's Infant School.

OPTION 2 – PINK

- 13.4.10 Option 2 – Pink entails the placement of a controlled pedestrian crossing outside the proposed new pedestrian entrance to the immediate west of the Cricket Club clubhouse. These upgrade works may cause potential short-term disturbance to Cricket Club members.

OPTION 3 – CYAN

- 13.4.11 Option 3 – Cyan entails the placement of a controlled pedestrian crossing adjacent to O'Hanlon's Lane and the widening of the existing pedestrian walkway on the south side of the road. These works may cause traffic delays and congestion and disturbance at the two bus stops located within the section for up to 12 weeks, and compromise access to the Presbyterian Church.

OPTION 4 – GREEN

- 13.4.12 Option 4 – Green entails the placement of a controlled pedestrian crossing to the immediate west of the existing pedestrian and vehicular entrance to Bridgefield car park and the widening of the existing pedestrian walkway on the north side of the road. These works may cause traffic delays and congestion and disturbance at the two bus stops located within the section for up to 12 weeks, and compromise access to the Presbyterian Church.

OPTION 5 – BLUE

- 13.4.13 Option 5 – Blue utilises an existing controlled pedestrian crossing to the immediate east of the entrance to Malahide Railway Station. There will be no disturbance to passengers travelling to and from the station.

Section 3 – R106 Dublin Road to Bissets Strand

- 13.4.14 The five route options within this section commence at Yellow Walls Road pedestrian crossing (Options 1 and 2), O'Hanlon's Lane pedestrian crossing (Option 3) or the junction of Malahide-Dublin Road with Old Street (Options 4 and 5). All five options culminate at Bissets Strand. Additional car parking for 8-10 cars will be provided in this location at the inner estuary grass roadside margin by connecting existing "indented" car park spaces with additional hardtop. The first two commencement points are within a short walking distance from Malahide Railway Station and Dublin City bus stops and afford users the option to have a stroll in Malahide Demesne and perhaps try out some

of the many sports facilities on offer. Children's playgrounds and picnic areas provide opportunities for relaxation, as does the extensive Avoca Store, Food Hall and Café adjacent to Malahide Castle. A tour of the castle and its gardens can also be added to the itinerary. The third commencement point is also within easy reach from the railway station and bus routes and affords visitors the opportunity to explore the town and its shops and cafés prior to or following their walk.

OPTION 1 – BLUE

- 13.4.15 Option 1 – Blue commences at the junction of Malahide-Dublin Road with Yellow Walls Road. It extends west-northwest along Yellow Walls Road, passing St Sylvester's Infant School to the north. The proximity of the school to the walking route may provide pupils with a recreational opportunity, or encourage them to explore the greenway with their parents after school hours. The route turns north to follow Texas Lane through a residential area until its junction with Sea Road. It then continues east along Sea Road and The Haven, ending at Bissets Strand. This stretch of the road offers fine views over the Malahide Estuary and of the Malahide Viaduct. Other objects of interest include a pair of thatched cottages adjacent to Fingal Sailing School, where the user may wish to incorporate a lesson in a water-based sport to their walk. For ambitious walkers Option 1 also provides the alternative of turning west at the Sea Road Junction and exploring the 7km Estuary Walk to Swords, or to continue east and follow the signposted Slí na Sláinte walking route.

OPTION 2 – ORANGE

- 13.4.16 Option 2 – Orange is identical to Option 1 up to Texas Lane. Instead of continuing all the way to the junction of Sea Road, it proceeds through the residential area of Chalfont by turning east and north along Chalfont Road. It then turns east onto Chalfont Place and north onto Chalfont Avenue. Option 2 – Orange veers off Chalfont Avenue at a point where the latter does a right-angled turn to the west, and continues north along an existing footpath connecting to The Haven. Here, Option 2 – Orange turns east and follows The Haven to Bissets Strand. This option provides the users with fine estuarine views and the opportunity to turn west at The Haven and link with the Estuary Walk, or to continue east and follow the signposted Slí na Sláinte walking route. It does not take the user past Fingal Sailing School.

OPTION 3 – GREEN

- 13.4.17 Option 3 – Green commences from O'Hanlon's Lane, following this road until its junction with The Haven. At this point, Option 3 – Green turns east and follows The Haven to Bissets Strand. While there are few attractions along this route to divert the user, this is the most direct way from Malahide Demesne to Bissets Strand and allows walkers to enjoy a view over Malahide Estuary and of the Malahide Viaduct. It also provides users with the opportunity to continue east and follow the signposted Slí na Sláinte walking route.

OPTION 4 – PINK

- 13.4.18 Option 4 – Pink commences from the junction of Malahide-Dublin Road with Old Street and follows the latter up to its junction with Strand Court. Before turning west to follow Strand Court to Bissets Strand, the user may wish to turn east onto Strand Street and explore some of the fashion boutiques for which the street is renowned.

OPTION 5 – YELLOW

- 13.4.19 Option 5 – Yellow commences from the junction of Malahide-Dublin Road with Old Street and continues along the former until its junction with New Street. Here, it turns north and follows New Street until its junction with Strand Street. Turning west, Option 5 – Yellow follows Strand Street and Strand Court to Bissets Strand. This option gives the user the best opportunity to enjoy the town's fine pleasant architecture, explore many of its shops on Main Street, New Street and Strand Street and sample its relaxed atmosphere in one of the wide range of cafés and bistros.

Section 4 – Bissets Strand to the North Shore of Malahide Estuary

- 13.4.20 The option for the crossing of Malahide Estuary is fixed and comprises three parts. The first part will extend along the western embankment of the railway causeway on an existing stoned access track, which runs parallel to the existing railway at a lower level than the railway tracks. This part is c. 605m long. The second part comprises a new 12-span pedestrian bridge, 180m long, to be constructed across the weir at the railway viaduct. The third and final part will extend along the west side of the railway tracks on an existing raised stoned area at the same level as the railway tracks. This part is c. 1100m long. This part of the greenway will afford the user fine sweeping views of Malahide Estuary and of Malahide Marina and its many boats.

Section 5 – North Shore of Malahide Estuary to R126 Hearse Road

- 13.4.21 This section is the only “new build” section of the greenway, traversing across agricultural land. The six proposed options all commence at a point where the greenway of the railway causeway reaches the northern shore of Malahide Estuary and at the main entrance to Newbridge Demesne.

OPTION 1 – PINK

- 13.4.22 Option 1 – Pink turns west at the railway causeway and follows the northern shore of Malahide Estuary to the viewing area at the end of Kilcrea Road. This section of the greenway affords the user views of the estuary and of Malahide. At the viewing area, Option 1 – Pink turns north onto Kilcrea Road, passing Kilcrea Equestrian Centre to the east. Here, the user may wish to incorporate a riding lesson or horse trekking on the estuary into the outing. Option 1 – Pink continues along Kilcrea Road until its junction with Hearse Road (R126). Crossing Hearse Road, Option 1 – Pink culminates at the main vehicular and pedestrian entrance to Newbridge Demesne. A pedestrian crossing and traffic calming measures will be introduced at the junction of Kilcrea Road and Hearse Road.

OPTION 2 – BLUE

- 13.4.23 Option 2 – Blue continues north parallel to the railway through agricultural lands as far as the Pill River, to the immediate south of a level crossing. At this point, Option 2 – Blue extends in a west-northwesterly direction along the river tributary for c. 650m and then veers northwest to join Kilcrea Road at a point c. 100m north of the Kilcrea House informal demesne boundary. Option 2 – Blue follows Kilcrea Road to its junction with Hearse Road (R126). Crossing the Hearse Road, Option 2 – Blue culminates at the main vehicular and pedestrian entrance to Newbridge Demesne. A pedestrian crossing and traffic calming measures will be introduced at the junction of Kilcrea Road and Hearse Road.

OPTION 3 – CYAN

- 13.4.24 Option 3 – Cyan extends north parallel to the railway through agricultural lands as far as the Pill River. A bridge structure will provide access over the river, after which Option 3 – Cyan extends in a northwesterly direction along the northeastern bank of the Pill River. At the rear of Corballis Cottages Road, Option 3 – Cyan crosses the river and follows it along its southwestern bank for c. 400m. It then extends in a westerly direction across agricultural land for c. 500m to link with Kilcrea Road. It extends north along Kilcrea Road to its junction with Hearse Road (R126). Crossing Hearse Road, Option 3 – Cyan culminates at the main vehicular and pedestrian entrance to Newbridge Demesne. A pedestrian crossing and traffic calming measures will be introduced at the junction of Kilcrea Road and Hearse Road.

OPTION 4 – GREEN

- 13.4.25 Option 4 – Green extends north parallel to the railway through agricultural lands as far as the Pill River. A bridge structure will provide access over the river, after which Option 4 – Green extends in a northwesterly direction along the northeastern bank of the Pill River. At the rear of Corballis Cottages Road, Option 4 – Green crosses the river and follows it along its southwestern bank to the point where the river meets Corballis Cottages Road. It continues parallel to and to the west of this road until it reaches Hearse Road (R126). It follows this road to the southwest to the latter's junction with Kilcrea Road. Crossing Hearse Road, Option 4 – Green culminates at the main vehicular and pedestrian entrance to Newbridge Demesne. A pedestrian crossing and traffic calming measures will be introduced at the junction of Kilcrea Road and Hearse Road.

OPTION 5 – ORANGE

- 13.4.26 Option 5 – Orange extends north parallel to the railway through agricultural lands as far as the Pill River. A bridge structure will provide access over the river, after which Option 5 – Orange continues northwards along an existing access track along the railway until a railway underbridge, where it veers northwest to run parallel to and to the south of the Corballis Cottages Road for c. 650m. It then turns southwest and crosses the Pill River, turning northwest to follow the river bank for c. 400m. It then extends in a westerly direction across agricultural land for c. 500m to link with Kilcrea Road. It extends north along Kilcrea Road to its junction with Hearse Road (R126). Crossing Hearse Road, Option 5 – Orange culminates at the main vehicular and pedestrian entrance to Newbridge Demesne. A pedestrian crossing and traffic calming measures will be introduced at the junction of Kilcrea Road and Hearse Road.

OPTION 6 – YELLOW

- 13.4.27 Option 6 – Yellow extends north parallel to the railway through agricultural lands as far as the Pill River. A bridge structure will provide access over the river, after which Option 6 – Yellow continues northwards along an existing access track along the railway until a railway underbridge, where it veers northwest to run parallel to and to the south of the Corballis Cottages Road for c. 650m. It then turns southwest and crosses the Pill River, turning northwest to follow the river bank until its junction with Corballis Cottages Road. Option 6 – Yellow continues northwest along the road until its junction with Hearse Road (R126). At this point Option 6 – Yellow turns southwest and extends along Hearse Road until its junction with Kilcrea Road. Crossing Hearse Road at this point, Option 6 – Yellow culminates at the main vehicular and pedestrian entrance to Newbridge Demesne. A

pedestrian crossing and traffic calming measures will be introduced at the junction of Kilcrea Road and Hearse Road.

Section 6 – Newbridge Demesne/Donabate

- 13.4.28 The route within Newbridge Demesne is fixed and utilises existing footpaths. This section of the greenway gives the user the option to explore Newbridge Demesne, its model farm and children's adventure park, or to enjoy a tour of Newbridge House and its gardens. Another alternative is to cross the demesne to Donabate, through the architecturally exceptional eighteenth-century Square (the former town centre), where St Patrick's Church of Ireland Church offers a peaceful pausing point before the user moves on to explore the newer part of the settlement.

Comparison of Route Options

- 13.4.29 The proposed scheme will benefit the amenity of the environs of Malahide-Donabate to a significant degree. The key benefits are seen as access to the greenway areas of Malahide Estuary and linkage of Malahide and Newbridge Demesnes. The proximity of rail and bus links to either end of the scheme is also an attraction as it promotes the use of public transport to access the scheme. The scheme is also a key building block on proposals to provide a linked coastal greenway along the east coast of North Dublin.
- 13.4.30 Taking the above points into account, all proposed options would appear suitable. However, some of the options proposed at Malahide and Kilcrea present greater benefits to human environment. A comparative assessment of these options is provided below.

Section 1 – Malahide Demesne

- 13.4.31 The comparative analysis of the proposed six options at Malahide Demesne was based on the premise that the main priority of the users of the greenway is to access the causeway in as direct a line as possible. Table 13.1 is a summary of the relative preferences of options for Malahide Demesne:

Table 13.1 Order of Preference of Route Options in Malahide Demesne.

Section 1 Route Options	Preference
Option 3 – Pink	Most Preferred
Option 4 – Blue	Most Preferred
Option 5 – Cyan	Preferred
Option 6 – Yellow	Preferred
Option 1 – Green	Acceptable
Option 2 – Orange	Acceptable

- 13.4.32 Option 3 – Pink and Option 4 – Blue are most preferred as they have high amenity value and offer the quickest routes through Malahide Demesne. Option 5 – Cyan and Option 6 – Yellow are preferred as they have good amenity value and offer a reasonably direct means of getting through Malahide Demesne. Option 1 – Green and Option 2 – Orange are considered acceptable. They provide the user with the best opportunities for enjoying Malahide Demesne to the full and for adding further recreational options to their itinerary; however, they are also by far the longest route options within Malahide Demesne.

Section 2 – R106 Dublin Road, Malahide

- 13.4.33 The comparative analysis of the proposed five pedestrian crossings at Malahide-Dublin Road was based on the safety of the crossing to users and the potential disturbance to traffic during construction. Table 13.2 is a summary of the relative preferences of options for Malahide-Dublin Road:

Table 13.2 Order of Preference of Route Options in Malahide-Dublin Road.

Section 2 Route Options	Preference
Option 5 – Blue	Most Preferred
Option 1 – Orange	Preferred
Option 2 – Pink	Preferred
Option 3 – Cyan	Acceptable
Option 4 – Green	Acceptable

- 13.4.34 Option 5 – Blue is most preferred as it utilises an existing controlled pedestrian crossing and will therefore not result in construction disturbance. Option 1 – Orange and Option 2 – Pink are preferred. They will introduce controlled pedestrian crossings; however, the construction of such crossings and related upgrading works may cause temporary short-term disturbance, particularly in the vicinity of St Sylvester's Infant School (Option 1) and Malahide Cricket Club premises (Option 2). Option 3 – Cyan and Option 4 – Green are acceptable. They will introduce controlled pedestrian crossings and wider pedestrian walkways; however, the construction works will cause traffic disturbance and congestion for up to 12 weeks.

Section 3 – R106 Dublin Road to Bissets Strand

- 13.4.35 The comparative analysis of the proposed five options at Malahide Village was based on the premise that the main priority of the users of the greenway is to access the causeway in as straight a line as possible and to enjoy the connectivity of the demesnes of Malahide and Newbridge. Table 13.3 is a summary of the relative preferences of options for Malahide Village:

Table 13.3 Order of Preference of Route Options in Malahide Village.

Section 3 Route Options	Preference
Option 3 – Green	Most Preferred
Option 4 – Pink	Preferred
Option 5 – Yellow	Preferred
Option 1 – Blue	Acceptable
Option 2 – Orange	Acceptable

- 13.4.36 Option 3 – Green is most preferred as it directs the user immediately northward from Malahide Demesne to Bissets Strand. This route also enjoys the benefit of limited vehicular traffic. Option 4 – Pink and Option 5 – Yellow are preferred as they offer the best opportunities for exploring the town; however, they also take users over unnecessary east-west links. Option 1 – Blue and Option 2 – Orange are acceptable. They provide the best views of Malahide Estuary and bring the greenway into residential areas where recreational opportunities are fewer than elsewhere in town. However, they also divert the user away from taking a northerly orientation, which is the shortest perceived routing to the causeway.

Section 4 – Bissets Strand to the North Shore of Malahide Estuary

- 13.4.37 The route across the causeway is fixed on the western embankment of the railway line. Options in this section will be determined by detailed design. Consideration should be given to viewing places, especially along the southern part of the causeway and along the pedestrian causeway bridge. The opportunity for seating and orientation panels (to explain birdlife etc) should also be explored.

Section 5 – North Shore of Malahide Estuary to R126 Hearse Road

- 13.4.38 This part of the route enjoys expansive views of Malahide Estuary at its southern end and the enclosed parkland expanse of Newbridge Demesne at its northern end. However, its middle section which passes through agricultural lands across Kilcrea lacks these advantages and needs therefore to maintain the quality of the experience open to the user at either end of the townland. This has been the main consideration for the comparative analysis for route options in this section. Table 13.4 is a summary of the relative preferences of options for Kilcrea Townland:

Table 13.4 Order of Preference of Route Options in Kilcrea Townland.

Section 5 Route Options	Preference
Option 3 – Cyan	Most Preferred
Option 4 – Green	Most Preferred
Option 5 – Orange	Preferred
Option 6 – Yellow	Preferred
Option 1 – Pink	Acceptable
Option 2 – Blue	Acceptable

- 13.4.39 These preferences are based on the need to ensure a quality experience in keeping with that at the causeway and to ensure a reasonably direct line of movement north-south to Newbridge Demesne.
- 13.4.40 Option 3 – Cyan and Option 4 – Green are most preferred as they link directly between the causeway and the entrance to Newbridge Demesne. They also follow the most natural parts of Kilcrea and maintain quality of experience through this townland.
- 13.4.41 Option 5 – Orange and Option 6 – Yellow are preferred as they link largely north-south and pass through the margins of the natural area of Kilcrea. They are also routed on the agricultural side of the hedgerow on the Corballis Cottages Road.
- 13.4.42 Option 1 – Pink is acceptable. Notwithstanding a continuance along the northern shore of the estuary with pleasant views to the south, the route extends unnecessarily in an east-west direction. In addition, it subsequently connects with a public road (Kilcrea Road) which would diminish the quality of the experience. Option 2 – Blue is also acceptable. It is more direct than Option 1 – Pink but lies adjacent to agricultural grassland rather than an open natural environment, and also connects with Kilcrea Road before entry to Newbridge Demesne.

Section 6 – Newbridge Demesne

- 13.4.43 The route within Newbridge Demesne is fixed and utilises existing footpaths. Options in this section will be determined by detailed design.

13.5 Summary

- 13.5.1 The proposed greenway scheme will enhance the amenity of the environs of Malahide-Donabate to a significant degree. Its main benefits are the access which it provides to the greenway areas of Malahide Estuary and the linkage of Malahide and Newbridge Demesnes. This alteration between urban, rural and marine scenes and between natural and designed landscapes provides the user with a unique experience. The proximity of the scheme to rail and bus links at both ends is a further advantage by promoting the use of public transport. The scheme is also a key building block to provide a linked coastal greenway along the east coast of North Dublin.
- 13.5.2 In selecting the optimum route from the perspective of the human environment, a number of issues should be taken into consideration. At Malahide Demesne and Village the key consideration is the provision of direct access to the causeway, which has the added benefit of providing a greater sense of connectivity between Malahide and Newbridge Demesnes on the one hand and between Malahide and Donabate towns on the other. At Malahide-Dublin Road, the key consideration is the safety of crossing points and disturbance arising from the construction of pedestrian crossings and related roadworks. At Kilcrea, the key consideration is to maintain in conception the expansive estuarine and demesne views at its extremities through the predominantly agricultural heart of the townland. This is again best achieved by the selection of the most direct possible route utilising the natural rather than agricultural parts of the townland.

14.0 Architectural Heritage

14.1 Introduction and Methodology

Objectives

14.1.1 This chapter assesses and evaluates the potential effects on built heritage of the proposed 5km greenway between Malahide Demesne and Newbridge Demesne in Fingal. A qualitative and comparative evaluation of the impacts of each route option is provided in order to assist in the identification of the preferred route option (refer to Appendix H-Figures 9, 10 and 11A when reading this chapter).

Definition of Key Terms

- 14.1.2 In the context of this report, the term ‘architectural heritage’ is used as defined in the Architectural Heritage (National Inventory) & Historic Monuments Act 1999, to mean all:
- (a) structures and buildings together with their settings and attendant grounds, fixtures and fittings;
 - (b) groups of such structures and buildings; and
 - (c) sites, which are of architectural, historic, archaeological, artistic, cultural, scientific, social or technical interest.

- 14.1.3 As a further definition, this chapter focuses on all post-1700 standing structures. Pre-1700 structures and all levelled/buried features are dealt with in the Archaeology chapter of this report.

Methodology

- 14.1.4 This report was compiled in accordance with the *Guidelines for the Assessment of Architectural Heritage Impacts of National Road Schemes* (TII (formerly NRA), 2005), *Architectural Heritage Protection Guidelines* (DAHG 2011), *Draft Advice Notes for Preparing Environmental Impact Statements* (EPA, 2015), and *Draft Guidelines on the information to be contained in Environmental Impact Assessment Reports (EIAR)* (EPA, 2017). For relevant legislation and codes of practice adhered to, please refer to the Constraints Report (see Volume 4A). In accordance with the TII (formerly NRA) guidelines, the following bodies or individuals were consulted as part of the Route Options Study:
- Helena Bergin, Heritage Officer (Acting) for Fingal County Council.
 - Gerry Clabby, Conservation Officer for Fingal County Council.
 - Gerry Browner, Department of Culture, Heritage and the Gaeltacht Architectural Heritage Advisor.
 - Martin Reid, Department of Culture, Heritage and the Gaeltacht National Monuments Advisor.
 - The Arts Council.
 - Fáilte Ireland.
 - An Taisce.
 - The Heritage Council.
 - National Inventory of Architectural Heritage.
- 14.1.5 The route options assessment was based on desktop study. For primary sources consulted in the course of this research, please refer to the Constraints Report (see Volume 4A). For

all published sources used, please refer to the Bibliography of the Constraints Report. When available, published entries from the Record of Monuments and Places and the Fingal survey by NIAH for sites impacted upon by the route options have been reproduced in the Preliminary Inventory of Architectural Heritage in Appendix C.

Receiving Environment

Section 1 – Malahide Demesne

- 14.1.6 Malahide Castle and Demesne lie in the heart of the village of Malahide. This former country estate was the home of the Talbot family to whom the lands and harbour of Malahide had been granted in 1185. The three-storey tower house, which was built on these grounds c. 1250, was embellished and enlarged by subsequent generations of the family, most notably in the reign of Edward IV (1442-1483), when the Great Hall was added, and in the reign of Charles II (1660-1685), when most of the outworks and the defences of the castle were demolished. As was customary among Anglo-Irish settlers, the Talbots also founded and endowed Malahide Abbey, which replaced Malahide's first church (dedicated to St Fenivus) as the parish church until the dissolution of monasteries in the reign of Henry VIII (1509-1547).
- 14.1.7 Malahide Castle underwent further structural changes in the course of the eighteenth century, particularly between 1765 and 1782, when the west wing was reconstructed following a fire and new drawing rooms added. Two circular turret rooms were also built, and the north wing of the castle developed.
- 14.1.8 Malahide Castle is adjoined to the northeast by a c. 10ha botanic garden created predominantly by Milo, seventh Baron Talbot (1912-1973), who was a keen traveller and collector of exotic plants. He reconstructed the existing c. 2ha walled garden built in 1775 for use as a kitchen garden and erected a series of greenhouses to create protective environments for the most sensitive and exotic of plants. To these was added in 1990 an ornate Victoria greenhouse purchased from a nunnery in Cabinteely, County Dublin.
- 14.1.9 The Talbot connection with Malahide lasted for 791 years, coming to an end in 1976, when Rose Talbot (1915-2009), sister of Milo, seventh Baron Talbot (1912-1973), sold Malahide Castle and its 109ha demesne to Dublin City Council. The castle is now open to the public and displays a fine collection of Irish antique furniture, while its grounds are used for amenity and sporting purposes.

Section 2 – R106 Dublin Road, Malahide

- 14.1.10 Colonel Richard Talbot was responsible for improving the local road network by several road-widening works, the erection of turnpike gates and the recovery of tolls between Dublin and Malahide in 1780s. Cartographic evidence suggests that the existing Malahide-Dublin Road bounding the demesne to the west and north was constructed between 1777 and 1840. Local tradition maintains that the Dublin approach to Malahide originally passed in front of Malahide Castle and was moved to its present location by the Talbots in order to avoid the expense of its maintenance.
- 14.1.11 Toward the end of the century, the family built a cottage ornée, a thatched building of picturesque design, across the road from the north entrance to Malahide Castle. Known as the Casino, it is said to have been used by the family as a shooting lodge, but undoubtedly also acted as an attractive focal point at the entrance to Malahide town. Other buildings of note on the Malahide-Dublin road within the study area include a red-

brick school with granite dressings dating from c. 1900; a pair of handsome late Victorian town houses (Rosca and Sonas); a Presbyterian Church designed by William Baird in 1956; a late Victorian gate lodge at the northern entrance to Malahide Castle; a milestone dating from c. 1850; and a late nineteenth-century pedestrian gateway to Malahide Railway Station. The Malahide to Dublin Road also extends into the historic town core of Malahide (designated an Architectural Conservation Area) up to its junction with Old Street. Here, the most notable feature in the streetscape is St Sylvester's Roman Catholic Church, constructed between 1845 and 1901.

Section 3 – R106 Dublin Road to Bissets Strand

- 14.1.12 Malahide began to develop as a settlement when the Viking traders made their home in Malahide Estuary in the eighth century. The town enjoyed a substantial trade in herring and whitefish and imported quantities of salt from Chester and Bristol for the preservation of its stock. In 1476, Edward IV granted Thomas Talbot all the customs of goods passing through the port of Malahide and appointed him and his heirs perpetual Admirals of Malahide. In 1547, Malahide was described as one of the chief haven towns of Ireland because of the safety of its harbour. The Talbot family also patronised and encouraged other types of commerce in the area. In 1783, Colonel Richard Talbot established a cotton mill to the west of Malahide at a location which became known as Yellow Walls from the yellow dye stains left by produce placed on the walls to dry in the sun. The mill was enormously successful, with 'more spindles at work ... than any other Cotton Mill had at work in Ireland' and expanded the hamlet of six houses in which it was located to a centre larger in size than Malahide.
- 14.1.13 The arrival of the railway in 1844 marked the gradual transformation of Malahide into a tourist resort and residential town. Malahide Baths, a series of hot-and cold-water baths located at the back of the Royal Hotel, became a popular visitor attraction. The hotel, later renamed the Grand Hotel, had been built by James Fagan in 1835, and enjoyed considerable trade from railway passengers, particularly at the turn of the twentieth century when the Great Northern Railway Company began to issue combined weekly rail and hotel tickets.
- 14.1.14 The town developed its present layout in the course of the nineteenth century. At its core is the Diamond, or town centre, from which four streets radiate to the north, south, east and west. A sprinkling fountain which originally stood in the junction was removed in c. 1870 to make room for stage and other large coaches. The Mall, extending to the east and west of the junction, was originally constructed as a promenade to the Grand Hotel. To the north of it, diagonally across from the Grand Hotel, were the Pleasure Gardens with serpentine wooded walks where military bands played in the summer and where displays of various kinds were held on special occasions, such as the Malahide Regatta. New Street, extending to the north of the Diamond, forms the commercial heart of the town, while Church Street to the south contains a range of handsome Regency and Victorian terraced buildings. Similar elegant terraces were constructed along The Mall and the seafront, emulating in their design the seaside elegance of Brighton and other English coast towns. The former main street, Old Street, was inhabited by tradesmen and artisans and comprised 26 neat thatched cottages with diamond-paned windows. Public building works in the nineteenth century included the construction of the Roman Catholic Church of St Sylvester in 1837; and Malahide Cricket Club house in 1861.

- 14.1.15 Since 1961, the population of Malahide has grown from 2,534 to 15,846. The settlement has grown in all directions through the construction of housing estates, allowing the historic town core to retain its nineteenth-century seaside resort character.

Section 4 – Bissets Strand to the North Shore of Malahide Estuary

- 14.1.16 Throughout the middle ages, Malahide Estuary played an important commercial role to the inhabitants of Malahide, noted as it was for its rich supply of fish. During the eighteenth and nineteenth centuries, a substantial fleet operated out of the estuary, trading in cod, ling, herring, mussels, cockles and winkles. Another important resource was oysters, which were grown in large beds in the location of the present railway viaduct. The town also operated a ribbon factory, sawyer's factory, steam bakery, salt works and gas works, which among other things provided street lighting. Local exports included cod liver oil, grain, meal and flour, while the most significant imports were slate, timber and large quantities of coal, used predominantly for the manufacture of gas. In the course of the second half of the century, with the arrival of the railway, the development of Dublin Port and the closure of the gasworks, maritime trade gradually ceased.
- 14.1.17 The arrival of the railway in 1844 marked the gradual transformation of Malahide into a tourist resort and residential town. The construction of the line took nine years and involved the building of an eleven-span wooden viaduct over Malahide Estuary. Some 90,000 tons of stone were discharged along the line in an attempt to overcome the problem of scour produced by tidal currents. The first train, carrying 565 passengers in seven coaches, pulled into Malahide Station on 17 March 1844.
- 14.1.18 In 1965, the original timber viaduct on Malahide Estuary was replaced by a 12-span pre-cast superstructure, the largest of its kind at the time. The line from Dublin to Malahide was electrified in 1999, and a suburban DART service commenced a year later to accommodate the rapidly expanding town.

Section 5 – North Shore of Malahide Estuary to R126 Hearse Road

- 14.1.19 The townland of Kilcrea and the adjoining townlands of Ballymadrough and Donabate form part of the Donabate-Portrane peninsula. The area is largely rural in nature and remains predominantly in agricultural use. It is characterised by handsome country estates, most notably Seafield at Ballymadrough. This Palladian villa was constructed soon after 1737 for Benedict Arthur, but later became the seat of the Hely-Hutchinson family. Kilcrea House forms an attractive feature on the east side of Kilcrea Road. Across the road to the northwest of Kilcrea House are the remains of Kilcrea church and graveyard, possibly of medieval origin. Another feature of historical interest on this townland are the fragmental remains of a seventeenth century tidal mill, the Baltray Corn Mill.

Section 6 – Newbridge Demesne

- 14.1.20 The Newbridge estate came into being in 1736, when Dr Charles Cobbe, later Archbishop of Dublin, purchased the townlands of Donabate, Lanestown, Haggardstown and Newbridge. A year later he built Newbridge House, possibly designed by Richard Castle. The estate was extended in 1742 through the purchase of the townlands of Kilcrea, Corballis and Baltra, and the house enlarged to the rear in 1751 by the Archbishop's son, Colonel Thomas Cobbe. It remained the home of the Cobbe family until 1985, when it was acquired by Fingal County Council, with the family retaining the right to reside in the house from time to time. The building is open to the public and its c. 150ha walled

demesne, designated an Architectural Conservation Area, is in use for amenity purposes. The grounds, bisected by a number of scenic walks, are characterised by extensive woodbelts and islands of specimen trees, and extensive walled gardens to the north of Newbridge House.

14.2 Route Selection Analysis

Assessment of Impacts

- 14.2.1 The route options were assessed both by quantitative and qualitative means. Quantitative attributes comprise the relative number of structures of architectural heritage merit present within each route corridor and their relative distance from the centre line of the route. According to TII (formerly NRA) recommendations, a route corridor of 200m, i.e. 100m on either side of the centre line of each option, was established. A feature or site of architectural heritage merit was considered to be potentially directly impacted upon when it was physically located in whole or in part within this route corridor. Where the structure (or part thereof) within the route corridor was a demesne, the associated house was included in the calculations as a potential indirect impact even when it was located outside the route corridor. This precaution was taken in order to protect designed landscape elements such as vistas. It should be noted that in addition to designed landscape elements the term ‘demesne’ in the context of this report encompasses auxiliary structures such as gate lodges, outbuildings, courtyards, follies and boundary walls (see Volume 4A-Constraints Report for discussion).
- 14.2.2 Qualitative attributes take into consideration the type and relative importance, condition and rarity of a site or structure, and the quality, significance and duration of impact. The overall level of impact on each structure was assessed in accordance with the criteria provided in the draft Environmental Protection Agency guidelines (EPA, August 2017) and the terms applied are defined as follows:

Table 14.1 Definition of Categories of Impacts.

Category of Impacts	Definition
Quality of Impacts	
<i>Positive</i>	A change which improves the quality of the environment.
<i>Neutral</i>	A change which does not affect the quality of the environment.
<i>Negative</i>	A change which reduces the quality of the environment.
Significance of Impacts	
<i>Imperceptible</i>	An impact which is capable of measurement but without noticeable consequences.
<i>Not Significant</i>	An impact which is capable of measurement but without significant consequences
<i>Slight</i>	An impact which causes noticeable changes in the character of the environment without affecting its integrity or sensitivities. If negative, the effects although noticeable do not directly impact on the architectural structure or feature. Impacts are reversible and of relatively short duration. Appropriate mitigation will reduce the impact.
<i>Moderate</i>	An impact that alters the character of the environment in a manner that is consistent with existing and emerging trends. If negative, the effect does not alter the integrity of the heritage. Impacts are probably reversible and may be of relatively short duration. Appropriate mitigation is very likely to reduce the impact.

Category of Impacts	Definition
<i>Significant</i>	An impact which by its character, magnitude, duration or intensity alters the character and/or setting of the architectural heritage. These effects arise where an aspect or aspects of the architectural heritage is/are permanently impacted upon leading to a loss of character and integrity in the architectural structure of feature. Appropriate mitigation is likely to reduce the impact.
<i>Very Significant</i>	An impact which by its character, magnitude, duration or intensity alters the character and/or setting of the architectural heritage. Appropriate mitigation is unlikely to remove adverse effects to more than a limited degree.
<i>Profound</i>	An impact which obliterates sensitive characteristics. This arises when an architectural structure or feature is completely and irreversibly destroyed by the proposed development. Mitigation is unlikely to remove adverse effects.

Route Options

Section 1 – Malahide Demesne

- 14.2.3 The six route options within this section all commence at the existing car park adjacent to Malahide Castle.

OPTION 1 – GREEN

- 14.2.4 Option 1 – Green commences at the western extremity of the car park, following an existing pathway in a west-northwest direction across open parkland with a view of Malahide Castle to the north. At a T-junction the route turns north and follows a second pathway in a northeasterly direction through a wooded area. At a second T-junction, the route turns east and follows a third pathway which bounds the cricket grounds to the south and east and the tennis courts to the east. In the northeastern corner of the tennis courts, the route turns west and extends along the northern boundary of the tennis courts until its culmination at the existing pedestrian entrance providing access to the Malahide-Dublin Road.
- 14.2.5 A total of two structures or features of architectural heritage merit are located within 100m of the centre line of Option 1 – Green, as listed in Table 1 in Appendix B. As the proposed option utilises existing pathways, there is no predicted impact on either of these features. Table 14.2 is a summary of the impacts of Option 1 – Green at Malahide Demesne.

Table 14.2 Summary of Impacts of Option 1 – Green at Malahide Demesne.

Impacts	National Significance	Regional Significance	Local Significance	Total Impacts in Class	Of which are Key Constraints
Profound	0	0	0	0	0
Very Significant	0	0	0	0	0
Significant	0	0	0	0	0
Moderate	0	0	0	0	0
Slight	0	0	0	0	0
Not Significant	0	0	0	0	0
Imperceptible	0	0	0	0	0
None Predicted	1	1	0	2	2
Total sites	1	1	0	2	2

OPTION 2 – ORANGE

- 14.2.6 Option 2 – Orange is identical to Option 1 – Green up to the northeastern corner of the tennis courts where instead of turning west it continues north by means of a proposed short shared cycle/footpath culminating in a new pedestrian entrance to the immediate west of the Cricket Club clubhouse.
- 14.2.7 A total of two structures or features of architectural heritage merit are located within 100m of the centre line of Option 2 – Orange, as listed in Table 2 in Appendix B. As the proposed option utilises existing footpaths, and as the proposed new pathway and pedestrian entrance traverse shrubby vegetation with no evidence of boundary walls, the predicted impact on these features are considered to be neutral to imperceptible negative. Table 14.3 is a summary of the impacts of Option 2 – Orange at Malahide Demesne.

Table 14.3 Summary of Impacts of Option 2 - Orange at Malahide Demesne.

Impacts	National Significance	Regional Significance	Local Significance	Total Impacts in Class	Of which are Key Constraints
Profound	0	0	0	0	0
Very Significant	0	0	0	0	0
Significant	0	0	0	0	0
Moderate	0	0	0	0	0
Slight	0	0	0	0	0
Not significant	0	0	0	0	0
Imperceptible	0	1	0	0	1
None Predicted	1	0	0	2	0
Total sites	1	1	0	2	2

OPTION 3 – PINK

- 14.2.8 Option 3 – Pink commences at the western extremity of the car park and extends in a northeasterly direction along an existing pathway between Malahide Castle to the west and the castle gardens to the east. It then veers north and extends along the former back avenue to Malahide Castle, passing Bridgefield car park to the east and culminating at the existing pedestrian and vehicular entrance near the northeastern extremity of Malahide Demesne.
- 14.2.9 A total of seven structures or features of architectural heritage merit are located within 100m of the centre line of Option 3 – Pink, as listed in Table 3 in Appendix B. As the proposed option utilises existing footpaths and does not necessitate the construction of a new entrance, there is no predicted impact on any of these structures. Table 14.4 is a summary of the impacts of Option 3 – Pink at Malahide Demesne.

Table 14.4 Summary of Impacts of Option 3 – Pink at Malahide Demesne.

Impacts	National Significance	Regional Significance	Local Significance	Total Impacts in Class	Of which are Key Constraints
Profound	0	0	0	0	0
Very Significant	0	0	0	0	0
Significant	0	0	0	0	0
Moderate	0	0	0	0	0
Slight	0	0	0	0	0
Not Significant	0	0	0	0	0

Impacts	National Significance	Regional Significance	Local Significance	Total Impacts in Class	Of which are Key Constraints
Imperceptible	0	0	0	0	0
None Predicted	3	4	0	7	7
Total sites	3	4	0	7	7

OPTION 4 – BLUE

- 14.2.10 Option 4 – Blue is identical to Option 3 – Pink up to the southwestern corner of Bridgefield car park, where it veers to the east and follows the southern and eastern boundaries of the car park by means of a new shared cycle/footpath. The option culminates at the existing pedestrian entrance and ramp in the northeastern extremity of Malahide Demesne, which will be upgraded.
- 14.2.11 A total of six structures or features of architectural heritage merit are located within 100m of the centre line of Option 4 – Blue, as listed in Table 4 in Appendix B. There is no predicted impact on any of these structures, except for Malahide Demesne, where the impact of the construction of a new pathway and upgrading of the existing entrance is considered to be imperceptible negative. Table 14.5 is a summary of the impacts of Option 4 – Blue at Malahide Demesne.

Table 14.5 Summary of Impacts of Option 4 – Blue at Malahide Demesne.

Impacts	National Significance	Regional Significance	Local Significance	Total Impacts in Class	Of which are Key Constraints
Profound	0	0	0	0	0
Very Significant	0	0	0	0	0
Significant	0	0	0	0	0
Moderate	0	0	0	0	0
Slight	0	0	0	0	0
Not Significant	0	0	0	0	0
Imperceptible	0	1	0	1	1
None Predicted	3	2	0	5	5
Total sites	3	3	0	6	6

OPTION 5 – CYAN

- 14.2.12 Option 5 – Cyan commences at the northeastern extremity of the car park, turning sharply east and following an existing pathway through a wooded area. The pathway curves north to follow the demesne boundary, connecting with the former back avenue to Malahide Castle. It passes Bridgefield car park to the east and culminates at the existing pedestrian and vehicular entrance near the northeastern extremity of Malahide Demesne.
- 14.2.13 A total of two structures or features of architectural heritage merit are located within 100m of the centre line of Option 5 – Cyan, as listed in Table 5 in Appendix B. As the proposed option utilises existing footpaths and does not necessitate the construction of a new entrance, there is no predicted impact on either of these features. Table 14.6 is a summary of the impacts of Option 5 – Cyan at Malahide Demesne.

Table 14.6 Summary of Impacts of Option 5 – Cyan at Malahide Demesne.

Impacts	National Significance	Regional Significance	Local Significance	Total Impacts in Class	Of which are Key Constraints
Profound	0	0	0	0	0
Very Significant	0	0	0	0	0
Significant	0	0	0	0	0
Moderate	0	0	0	0	0
Slight	0	0	0	0	0
Not Significant	0	0	0	0	0
Imperceptible	0	0	0	0	0
None Predicted	1	1	0	2	2
Total sites	1	1	0	2	2

OPTION 6 – YELLOW

- 14.2.14 Option 6 – Yellow is identical to Option 5 – Cyan up to the southwestern corner of Bridgefield car park, where it veers to the east and follows the southern and eastern boundaries of the car park by means of a new shared cycle/footpath. The option culminates at the existing pedestrian entrance and ramp in the northeastern extremity of Malahide Demesne, which will be upgraded.
- 14.2.15 A total of two structures or features of architectural heritage merit are located within 100m of the centre line of Option 6 – Yellow, as listed in Table 6 in Appendix B. As a consequence of the construction of a new pathway and upgrading of the existing entrance the predicted impact on these features is considered to be neutral to imperceptible negative. Table 14.7 is a summary of the impacts of Option 6 – Yellow at Malahide Demesne.

Table 14.7 Summary of Impacts of Option 6 – Yellow at Malahide Demesne.

Impacts	National Significance	Regional Significance	Local Significance	Total Impacts in Class	Of which are Key Constraints
Profound	0	0	0	0	0
Very Significant	0	0	0	0	0
Significant	0	0	0	0	0
Moderate	0	0	0	0	0
Slight	0	0	0	0	0
Not Significant	0	0	0	0	0
Imperceptible	0	1	0	1	1
None Predicted	1	0	0	1	1
Total sites	1	1	0	2	2

SUMMARY OF IMPACTS

- 14.2.16 A total of seven structures or features of architectural heritage merit are located within 100m of the centre line of the six proposed route options as listed in Table 1 in Appendix A. No National Monuments, National Monuments in Ownership or Guardianship, sites on the Register of Historic Monuments, sites subject to Preservation Orders and Temporary Preservation Orders, or Architectural Conservation Areas are affected by any of the route options.

- 14.2.17 Of the seven structures, three are on the Record of Monuments and Places (RMP), six are on the Record of Protected Structures (RPS), and one is an Architectural Conservation Area, as identified in Table 1 in Appendix A. For a summary of the statutory protection of architectural heritage in Ireland, please refer to the Constraints Report (see Volume 4A).
- 14.2.18 Of the seven structures, all are considered to be key constraints, as identified in Table 1 in Appendix A. For methods applied to identifying key constraints, please refer to the Constraints Report (see Volume 4A).
- 14.2.19 Of the seven structures, three are perceived to be of national importance and four are perceived to be of regional importance, as identified in Table 1 in Appendix A. No structures of international significance are impacted upon by the route options. For methods applied to the assessment of perceived importance, please refer to the Constraints Report (see Volume 4A).

Section 2 – R106 Dublin Road, Malahide

- 14.2.20 This section extends from the junction of the Malahide-Dublin Road with Yellow Walls Road to the west to its junction with Old Street to the east. To the north and south it is defined by boundary walls adjacent to existing footpaths.

OPTION 1 – ORANGE

- 14.2.21 Option 1 – Orange entails the placement of a controlled pedestrian crossing and junction upgrade work at the junction of Dublin Road and Yellow Walls Road.
- 14.2.22 A total of two structures or features of architectural heritage merit are located within 100m of the proposed pedestrian crossing, as listed in Table 7 in Appendix B. There are no predicted impact on these structures. Table 14.8 is a summary of the impacts of Option 1 – Orange at Malahide Demesne.

Table 14.8 Summary of Impacts of Option 1 – Orange at Malahide-Dublin Road.

Impacts	National Significance	Regional Significance	Local Significance	Total Impacts in Class	Of which are Key Constraints
Profound	0	0	0	0	0
Very Significant	0	0	0	0	0
Significant	0	0	0	0	0
Moderate	0	0	0	0	0
Slight	0	0	0	0	0
Not Significant	0	0	0	0	0
Imperceptible	0	0	0	0	0
None Predicted	0	2	0	2	2
Total sites	0	2	0	2	2

OPTION 2 – PINK

- 14.2.23 Option 2 – Pink entails the placement of a controlled pedestrian crossing outside the proposed new pedestrian entrance to the immediate west of the Cricket Club clubhouse.
- 14.2.24 A total of three structures or features of architectural heritage merit are located within 100m of the proposed pedestrian crossing, as listed in Table 8 in Appendix B. There are

no predicted impacts on these structures. Table 14.9 is a summary of the impacts of Option 2 – Pink at Malahide-Dublin Road.

Table 14.9 Summary of Impacts of Option 2 – Pink at Malahide-Dublin Road.

Impacts	National Significance	Regional Significance	Local Significance	Total Impacts in Class	Of which are Key Constraints
Profound	0	0	0	0	0
Very Significant	0	0	0	0	0
Significant	0	0	0	0	0
Moderate	0	0	0	0	0
Slight	0	0	0	0	0
Not Significant	0	0	0	0	0
Imperceptible	0	0	0	0	0
None Predicted	0	3	0	3	3
Total sites	0	3	0	3	3

OPTION 3 – CYAN

- 14.2.25 Option 3 – Cyan entails the placement of a controlled pedestrian crossing adjacent to O'Hanlon's Lane and the widening of the existing pedestrian walkway on the south side of the road. The widening will not remove or alter the existing boundary walls; however, it may cause construction disturbance for up to 12 weeks.
- 14.2.26 A total of five structures or features of architectural heritage merit are located within 100m of the proposed pedestrian crossing and section of the pedestrian walkway requiring widening, as listed in Table 9 in Appendix B. There are no predicted impacts on these structures; however, three of these constraints may be subject to construction disturbance. Table 14.10 is a summary of the impacts of Option 3 – Cyan at Malahide-Dublin Road.

Table 14.10 Summary of Impacts of Option 3 – Cyan at Malahide-Dublin Road.

Impacts	National Significance	Regional Significance	Local Significance	Total Impacts in Class	Of which are Key Constraints
Profound	0	0	0	0	0
Very Significant	0	0	0	0	0
Significant	0	0	0	0	0
Moderate	0	0	0	0	0
Slight	0	0	0	0	0
Not Significant	0	0	0	0	0
Imperceptible	0	0	0	0	0
None Predicted	0	5	0	5	4
Total sites	0	5	0	5	4

OPTION 4 – GREEN

- 14.2.27 Option 4 – Green entails the placement of a controlled pedestrian crossing to the immediate west of the existing pedestrian and vehicular entrance to Bridgefield car park and the widening of the existing pedestrian walkway on the north side of the road. The widening will not remove or alter the existing boundary walls; however, it may cause construction disturbance for up to 12 weeks.

- 14.2.28 A total of five structures or features of architectural heritage merit are located within 100m of the proposed pedestrian crossing and section of the pedestrian walkway requiring widening, as listed in Table 10 in Appendix B. There are no predicted impacts on these structures; however, three of these constraints may be subject to construction disturbance. Table 14.11 is a summary of the impacts of Option 4 – Green at Malahide-Dublin Road.

Table 14.11 Summary of Impacts of Option 4 – Green at Malahide-Dublin Road.

Impacts	National Significance	Regional Significance	Local Significance	Total Impacts in Class	Of which are Key Constraints
Profound	0	0	0	0	0
Very Significant	0	0	0	0	0
Significant	0	0	0	0	0
Moderate	0	0	0	0	0
Slight	0	0	0	0	0
Not Significant	0	0	0	0	0
Imperceptible	0	0	0	0	0
None Predicted	0	5	0	5	4
Total sites	0	5	0	5	4

OPTION 5 – BLUE

- 14.2.29 Option 5 – Blue utilises an existing controlled pedestrian crossing to the immediate east of the entrance to Malahide Railway Station.
- 14.2.30 One structure of architectural heritage merit is located within 100m of the proposed pedestrian crossing, as listed in Table 11 in Appendix B. There are no predicted impacts on this structure. Table 14.12 is a summary of the impacts of Option 5 – Blue at Malahide-Dublin Road.

Table 14.12 Summary of Impacts of Option 5 – Blue at Malahide-Dublin Road.

Impacts	National Significance	Regional Significance	Local Significance	Total Impacts in Class	Of which are Key Constraints
Profound	0	0	0	0	0
Very Significant	0	0	0	0	0
Significant	0	0	0	0	0
Moderate	0	0	0	0	0
Slight	0	0	0	0	0
Not Significant	0	0	0	0	0
Imperceptible	0	0	0	0	0
None Predicted	0	1	0	1	1
Total sites	0	1	0	1	1

SUMMARY OF IMPACTS

- 14.2.31 A total of nine structures or features of architectural heritage merit are located within 100m of the centre line of the five proposed options as listed in Table 2 in Appendix A. No National Monuments, National Monuments in Ownership or Guardianship, sites on the Register of Historic Monuments, sites subject to Preservation Orders and Temporary Preservation Orders, or Architectural Conservation Areas are affected by any of the options.

- 14.2.32 Of the nine structures, none is on the Record of Monuments and Places (RMP), six are on the Record of Protected Structures (RPS), and one is an Architectural Conservation Area, as identified in Table 2 in Appendix A. For a summary of the statutory protection of architectural heritage in Ireland, please refer to the Constraints Report (see Volume 4A).
- 14.2.33 Of the nine structures, eight are considered to be key constraints, as identified in Table 2 in Appendix A. For methods applied to identifying key constraints, please refer to the Constraints Report (see Volume 4A).
- 14.2.34 Of the nine structures, all are perceived to be of regional importance, as identified in Table 2 in Appendix A. No structures of international significance are impacted upon by the route options. For methods applied to the assessment of perceived importance, please refer to the Constraints Report (see Volume 4A).

Section 3 – R106 Dublin Road to Bissets Strand

- 14.2.35 The five route options within this section commence at Yellow Road pedestrian crossing (Options 1 and 2), O'Hanlon's Lane pedestrian crossing (Option 3), or the junction of Malahide-Dublin Road with Old Street (Options 4 and 5). All five options culminate at Bissets Strand. Additional car parking for 8-10 cars will be provided in this location at inner estuary grass roadside margin by connection existing "indented" car park spaces with additional hardtop.

OPTION 1 – BLUE

- 14.2.36 Option 1 – Blue commences at the junction of Malahide-Dublin Road with Yellow Walls Road. It extends west-northwest along Yellow Walls Road, passing St Sylvester's Infant School to the north. The route turns north to follow Texas Lane through a residential area until its junction with Sea Road. It then continues east along Sea Road and The Haven, ending at Bissets Strand.
- 14.2.37 A total of three structures or features of architectural heritage merit are located within 100m of the centre line of Option 1, as listed in Table 12 in Appendix B. There is no predicted impact on any of these structures. Table 14.13 is a summary of the impacts of Option 1 – Blue at Malahide Village.

Table 14.13 Summary of Impacts of Option 1 – Blue at Malahide Village.

Impacts	National Significance	Regional Significance	Local Significance	Total Impacts in Class	Of which are Key Constraints
Profound	0	0	0	0	0
Very Significant	0	0	0	0	0
Significant	0	0	0	0	0
Moderate	0	0	0	0	0
Slight	0	0	0	0	0
Not Significant	0	0	0	0	0
Imperceptible	0	0	0	0	0
None Predicted	0	3	0	3	3
Total sites	0	3	0	3	3

OPTION 2 – ORANGE

- 14.2.38 Option 2 – Orange is identical to Option 1 up to Texas Lane. Instead of continuing all the way to the junction of Sea Road, it proceeds through the residential area of Chalfont by turning east and north along Chalfont Road. It then turns east onto Chalfont Place and north onto Chalfont Avenue. Option 2 – Orange veers off Chalfont Avenue at a point where the latter does a right-angled turn to the west, and continues north along an existing footpath connecting to The Haven. Here, Option 2 – Orange turns east and follows The Haven to Bissets Strand.
- 14.2.39 A total of six structures or features of architectural heritage merit are located within 100m of the centre line of Option 2 – Orange, as listed in Table 13 in Appendix B. There is no predicted impact on any of these structures. Table 14.14 is a summary of the impacts of Option 2 – Orange at Malahide Village.

Table 14.14 Summary of Impacts of Option 2 – Orange at Malahide Village.

Impacts	National Significance	Regional Significance	Local Significance	Total Impacts in Class	Of which are Key Constraints
Profound	0	0	0	0	0
Very Significant	0	0	0	0	0
Significant	0	0	0	0	0
Moderate	0	0	0	0	0
Slight	0	0	0	0	0
Not Significant	0	0	0	0	0
Imperceptible	0	0	0	0	0
None Predicted	0	2	0	2	2
Total sites	0	2	0	2	2

OPTION 3 – GREEN

- 14.2.40 Option 3 – Green commences from O'Hanlon's Lane, following this road until its junction with The Haven. At this point, Option 3 – Green turns east and follows The Haven to Bissets Strand.
- 14.2.41 A total of four structures or features of architectural heritage merit are located within 100m of the centre line of Option 3 – Green, as listed in Table 14 in Appendix B. There is no predicted impact on any of these structures. Table 14.15 is a summary of the impacts of Option 3 – Green at Malahide Village.

Table 14.15 Summary of Impacts of Option 3 – Green at Malahide Village.

Impacts	National Significance	Regional Significance	Local Significance	Total Impacts in Class	Of which are Key Constraints
Profound	0	0	0	0	0
Very Significant	0	0	0	0	0
Significant	0	0	0	0	0
Moderate	0	0	0	0	0
Slight	0	0	0	0	0
Not Significant	0	0	0	0	0
Imperceptible	0	0	0	0	0
None Predicted	0	4	0	4	4
Total sites	0	4	0	4	4

OPTION 4 – PINK

- 14.2.42 Option 4 – Pink commences from the junction of Malahide-Dublin Road with Old Street and follows the latter up to its junction with Strand Court. Here, Option 4 – Pink turns west to follow Strand Court to Bissets Strand.
- 14.2.43 A total of two structures or features of architectural heritage merit are located within 100m of the centre line of Option 4 – Pink, as listed in Table 15 in Appendix B. There is no predicted impact on either of these features. Table 14.16 is a summary of the impacts of Option 4 – Pink at Malahide Village.

Table 14.16 Summary of Impacts of Option 4 – Pink at Malahide Village.

Impacts	National Significance	Regional Significance	Local Significance	Total Impacts in Class	Of which are Key Constraints
Profound	0	0	0	0	0
Very Significant	0	0	0	0	0
Significant	0	0	0	0	0
Moderate	0	0	0	0	0
Slight	0	0	0	0	0
Not Significant	0	0	0	0	0
Imperceptible	0	0	0	0	0
None Predicted	0	2	0	2	2
Total sites	0	2	0	2	2

OPTION 5 – YELLOW

- 14.2.44 Option 5 – Yellow commences from the junction of Malahide-Dublin Road with Old Street and continues along the former until its junction with New Street. Here, it turns north and follows New Street until its junction with Strand Street. Turning west, Option 5 – Yellow follows Strand Street and Strand Court to Bissets Strand.
- 14.2.45 A total of two structures or features of architectural heritage merit are located within 100m of the centre line of Option 5 – Yellow, as listed in Table 16 in Appendix B. There is no predicted impact on either of these features. Table 14.16 is a summary of the impacts of Option 5 – Yellow at Malahide Village.

Table 14.17 Summary of Impacts of Option 5 – Yellow at Malahide Village.

Impacts	National Significance	Regional Significance	Local Significance	Total Impacts in Class	Of which are Key Constraints
Profound	0	0	0	0	0
Very Significant	0	0	0	0	0
Significant	0	0	0	0	0
Moderate	0	0	0	0	0
Slight	0	0	0	0	0
Not Significant	0	0	0	0	0
Imperceptible	0	0	0	0	0
None Predicted	0	2	0	2	2
Total sites	0	2	0	2	2

SUMMARY OF IMPACTS

- 14.2.46 A total of eight structures or features of architectural heritage merit are located within 100m of the centre line of the five proposed route options as listed in Table 3 in Appendix A. No National Monuments, National Monuments in Ownership or Guardianship, sites on the Register of Historic Monuments, sites subject to Preservation Orders and Temporary Preservation Orders, or Architectural Conservation Areas are affected by any of the route options.
- 14.2.47 Of the eight structures, none is on the Record of Monuments and Places (RMP), three are on the Record of Protected Structures (RPS), and two are Architectural Conservation Areas, as identified in Table 3 in Appendix A. For a summary of the statutory protection of architectural heritage in Ireland, please refer to the Constraints Report (see Volume 4A).
- 14.2.48 Of the eight structures, all are considered to be key constraints, as identified in Table 3 in Appendix A. For methods applied to identifying key constraints, please refer to the Constraints Report (see Volume 4A).
- 14.2.49 Of the eight structures, all are perceived to be of regional importance, as identified in Table 3 in Appendix A. No structures of international significance are impacted upon by the route options. For methods applied to the assessment of perceived importance, please refer to the Constraints Report (see Volume 4A).

Section 4 – Bissets Strand to the North Shore of Malahide Estuary

- 14.2.50 The option for the crossing of the Malahide Estuary is fixed and comprises three parts. The first part will extend along the west side of the railway tracks on an existing stoned access track, which runs parallel to the existing railway at a lower level than the railway tracks. This part is approximately 605m long. The second part comprises a new 12-span pedestrian bridge, 180m long, to be constructed across the weir at the railway viaduct. The third and final part will extend along the west side of the railway tracks on an existing raised stoned area at the same level as the railway tracks. This part is approximately 1100m long.
- 14.2.51 The only structure of architectural heritage merit in this section of the greenway is Malahide Railway Viaduct (see Table 17 in Appendix B). This is a protected structure of regional importance as listed in Table 4 in Appendix A. As the proposed pedestrian bridge appears to be a freestanding structure, there is no predicted impact on the existing viaduct. Table 14.18 is a summary of the impacts of the fixed option at the railway causeway.

Table 14.18 Summary of Impacts of the Fixed Option at the Railway Causeway.

Impacts	National Significance	Regional Significance	Local Significance	Total Impacts in Class	Of which are Key Constraints
Profound	0	0	0	0	0
Very Significant	0	0	0	0	0
Significant	0	0	0	0	0
Moderate	0	0	0	0	0
Slight	0	0	0	0	0
Not Significant	0	0	0	0	0
Imperceptible	0	0	0	0	0
None Predicted	0	1	0	1	1
Total sites	0	1	0	1	1

Section 5 – North Shore of Malahide Estuary to R126 Hearse Road

- 14.2.52 This section is the only “new build” section of the greenway, traversing across agricultural land. The six options all commence at a point where the greenway of the railway causeway reaches the northern shore of Malahide Estuary and end at the main entrance to Newbridge Demesne.

OPTION 1 – PINK

- 14.2.53 Option 1 – Pink turns west at the railway causeway and follows the northern shore of Malahide Estuary to the viewing area at the end of Kilcrea Road. At this point, Option 1 – Pink turns north and follows Kilcrea Road to its junction with Hearse Road (R126). Crossing Hearse Road, Option 1 – Pink culminates at the main vehicular and pedestrian entrance to Newbridge Demesne. A pedestrian crossing and traffic calming measures will be introduced at the junction of Kilcrea Road and Hearse Road.
- 14.2.54 A total of eight structures or features of architectural heritage merit are located within 100m of the centre line of Option 1 – Pink, as listed in Table 18 in Appendix B. There is no predicted impact on any of these structures. Table 14.19 is a summary of the impacts of Option 1 – Pink at Kilcrea Townland.

Table 14.19 Summary of Impacts of Option 1 – Pink at Kilcrea Townland.

Impacts	National Significance	Regional Significance	Local Significance	Total Impacts in Class	Of which are Key Constraints
Profound	0	0	0	0	0
Very Significant	0	0	0	0	0
Significant	0	0	0	0	0
Moderate	0	0	0	0	0
Slight	0	0	0	0	0
Not Significant	0	0	0	0	0
Imperceptible	0	0	0	0	0
None Predicted	1	6	1	8	8
Total sites	1	6	1	8	8

OPTION 2 – BLUE

- 14.2.55 Option 2 – Blue continues north parallel to the railway through agricultural lands as far as the Pill River, to the immediate south of a level crossing. At this point, Option 2 – Blue extends in a west-northwesterly direction along the river tributary for c. 650m and then veers northwest to join Kilcrea Road at a point c. 100m north of the Kilcrea House informal demesne boundary. Option 2 – Blue follows Kilcrea Road to its junction with Hearse Road (R126). Crossing Hearse Road, Option 2 – Blue culminates at the main vehicular and pedestrian entrance to Newbridge Demesne. A pedestrian crossing and traffic calming measures will be introduced at the junction of Kilcrea Road and Hearse Road.
- 14.2.56 A total of four structures or features of architectural heritage merit are located within 100m of the centre line of Option 2 – Blue, as listed in Table 19 in Appendix B. There is no predicted impact on any of these structures. Table 14.20 is a summary of the impacts of Option 2 – Blue at Kilcrea Townland.

Table 14.20 Summary of Impacts of Option 2 - Blue at Kilcrea Townland.

Impacts	National Significance	Regional Significance	Local Significance	Total Impacts in Class	Of which are Key Constraints
Profound	0	0	0	0	0
Very Significant	0	0	0	0	0
Significant	0	0	0	0	0
Moderate	0	0	0	0	0
Slight	0	0	0	0	0
Not Significant	0	0	0	0	0
Imperceptible	0	0	0	0	0
None Predicted	0	3	1	4	4
Total sites	0	3	1	4	4

OPTION 3 – CYAN

- 14.2.57 Option 3 – Cyan extends north parallel to the railway through agricultural lands as far as the Pill River. A bridge structure will provide access over the river, after which Option 3 – Cyan extends in a northwesterly direction along the northeastern bank of the Pill River. At the rear of Corballis Cottages Road, Option 3 – Cyan crosses the river and follows it along its southwestern bank for c. 400m. It then extends in a westerly direction across agricultural land for c. 500m to link with Kilcrea Road. It extends north along Kilcrea Road to its junction with Hearse Road (R126). Crossing Hearse Road, Option 3 – Cyan culminates at the main vehicular and pedestrian entrance to Newbridge Demesne. A pedestrian crossing and traffic calming measures will be introduced at the junction of Kilcrea Road and Hearse Road.
- 14.2.58 A total of three structures or features of architectural heritage merit are located within 100m of the centre line of Option 3 – Cyan, as listed in Table 20 in Appendix B. There is no predicted impact on either of these structures. Table 14.21 is a summary of the impacts of Option 3 – Cyan at Kilcrea Townland.

Table 14.21 Summary of Impacts of Option 3 – Cyan at Kilcrea Townland.

Impacts	National Significance	Regional Significance	Local Significance	Total Impacts in Class	Of which are Key Constraints
Profound	0	0	0	0	0
Very Significant	0	0	0	0	0
Significant	0	0	0	0	0
Moderate	0	0	0	0	0
Slight	0	0	0	0	0
Not Significant	0	0	0	0	0
Imperceptible	0	0	0	0	0
None Predicted	0	3	0	3	3
Total sites	0	3	0	3	3

OPTION 4 – GREEN

- 14.2.59 Option 4 – Green extends north parallel to the railway through agricultural lands as far as the Pill River. A bridge structure will provide access over the river, after which Option 4 – Green extends in a northwesterly direction along the northeastern bank of the Pill River. At the rear of Corballis Cottages Road, Option 4 – Green crosses the river and follows it along its southwestern bank to the point where the river meets Corballis

Cottages Road. It continues parallel to and to the west of this road until it reaches Hearse Road (R126). It follows this road to the southwest to the latter's junction with Kilcrea Road. Crossing Hearse Road, Option 4 – Green culminates at the main vehicular and pedestrian entrance to Newbridge Demesne. A pedestrian crossing and traffic calming measures will be introduced at the junction of Kilcrea Road and Hearse Road.

- 14.2.60 A total of two structures or features of architectural heritage merit are located within 100m of the centre line of Option 4, as listed in Table 21 in Appendix B. There is no predicted impact on any of these structures. Table 14.22 is a summary of the impacts of Option 4 at Kilcrea Townland.

Table 14.22 Summary of Impacts of Option 4 – Green at Kilcrea Townland.

Impacts	National Significance	Regional Significance	Local Significance	Total Impacts in Class	Of which are Key Constraints
Profound	0	0	0	0	0
Very Significant	0	0	0	0	0
Significant	0	0	0	0	0
Moderate	0	0	0	0	0
Slight	0	0	0	0	0
Not Significant	0	0	0	0	0
Imperceptible	0	0	0	0	0
None Predicted	0	3	0	3	3
Total sites	0	3	0	3	3

OPTION 5 – ORANGE

- 14.2.61 Option 5 – Orange extends north parallel to the railway through agricultural lands as far as the Pill River. A bridge structure will provide access over the river, after which Option 5 – Orange continues northwards along an existing access track along the railway until a railway underbridge, where it veers northwest to run parallel to and to the south of the Corballis Cottages Road for c. 650m. It then turns southwest and crosses the Pill River, turning northwest to follow the river bank for c. 400m. It then extends in a westerly direction across agricultural land for c. 500m to link with Kilcrea Road. It extends north along Kilcrea Road to its junction with Hearse Road (R126). Crossing Hearse Road, Option 5 – Orange culminates at the main vehicular and pedestrian entrance to Newbridge Demesne. A pedestrian crossing and traffic calming measures will be introduced at the junction of Kilcrea Road and Hearse Road.
- 14.2.62 A total of three structures or features of architectural heritage merit are located within 100m of the centre line of Option 5 – Orange, as listed in Table 22 in Appendix B. There is no predicted impact on any of these structures, except for Newbridge Demesne, where the construction of a new pedestrian entrance and short footpath is considered to be slight negative. Table 14.23 is a summary of the impacts of Option 5 – Orange at Kilcrea Townland.

Table 14.23 Summary of Impacts of Option 5 – Orange at Kilcrea Townland.

Impacts	National Significance	Regional Significance	Local Significance	Total Impacts in Class	Of which are Key Constraints
Profound	0	0	0	0	0
Very Significant	0	0	0	0	0
Significant	0	0	0	0	0
Moderate	0	0	0	0	0
Slight	0	0	0	0	0
Not Significant	0	0	0	0	0
Imperceptible	0	0	0	0	0
None Predicted	0	3	0	3	3
Total sites	0	3	0	3	3

OPTION 6 – YELLOW

- 14.2.63 Option 6 – Yellow extends north parallel to the railway through agricultural lands as far as the Pill River. A bridge structure will provide access over the river, after which Option 6 – Yellow continues northwards along an existing access track along the railway until a railway underbridge, where it veers northwest to run parallel to and to the south of the Corballis Cottages Road for c. 650m. It then turns southwest and crosses the Pill River, turning northwest to follow the river bank until its junction with Corballis Cottages Road. Option 6 – Yellow continues northwest along the road until its junction with Hearse Road (R126). At this point Option 6 – Yellow turns southwest and extends along Hearse Road until its junction with Kilcrea Road. Crossing Hearse Road at this point, Option 6 – Yellow culminates at the main vehicular and pedestrian entrance to Newbridge Demesne. A pedestrian crossing and traffic calming measures will be introduced at the junction of Kilcrea Road and Hearse Road.
- 14.2.64 A total of three structures or features of architectural heritage merit are located within 100m of the centre line of Option 6 – Yellow, as listed in Table 23 in Appendix B. There is no predicted impact on any of these structures, except for Newbridge Demesne, where the construction of a new pedestrian entrance and short footpath is considered to be slight negative. Table 14.24 is a summary of the impacts of Option 6 – Yellow at Kilcrea Townland.

Table 14.24 Summary of Impacts of Option 6 – Yellow at Kilcrea Townland.

Impacts	National Significance	Regional Significance	Local Significance	Total Impacts in Class	Of which are Key Constraints
Profound	0	0	0	0	0
Very Significant	0	0	0	0	0
Significant	0	0	0	0	0
Moderate	0	0	0	0	0
Slight	0	0	0	0	0
Not Significant	0	0	0	0	0
Imperceptible	0	0	0	0	0
None Predicted	0	3	0	3	3
Total sites	0	3	0	3	3

SUMMARY OF IMPACTS

- 14.2.65 A total of ten structures or features of architectural heritage merit are located within 100m of the centre line of the proposed six route options as listed in Table 5 in Appendix A. No National Monuments, National Monuments in Ownership or Guardianship, sites on the Register of Historic Monuments, sites subject to Preservation Orders and Temporary Preservation Orders, or Architectural Conservation Areas are affected by any of the route options.
- 14.2.66 Of the ten structures, three are on the Record of Monuments and Places (RMP), seven are on the Record of Protected Structures (RPS), and one is an Architectural Conservation Area, as identified in Table 5 in Appendix A. For a summary of the statutory protection of architectural heritage in Ireland, please refer to the Constraints Report.
- 14.2.67 Of the ten structures, all are considered to be key constraints, as identified in Table 5 in Appendix A. For methods applied to identifying key constraints, please refer to the Constraints Report (see Volume 4A).
- 14.2.68 Of the ten structures, one is perceived to be of national importance, seven are perceived to be of regional importance and two are perceived to be of local importance, as identified in Table 5 in Appendix A. No structures of international significance are impacted upon by the route options. For methods applied to the assessment of perceived importance, please refer to the Constraints Report (see Volume 4A).

Section 6 – Newbridge Demesne

- 14.2.69 The route within Newbridge Demesne is fixed and utilises existing footpaths. The principal route ends at the car park in front of Newbridge House, with a subsidiary link provided to the railway station in Donabate. As the Feasibility Report contains no reference to construction works in this section of the greenway, it is assumed that none will be required. Should this situation change, the impacts will be considered at the EIAR stage.

Preference Order for the Route Options

Preference Order Appraisal

- 14.2.70 The route corridors were appraised by considering in each case the total overall number of impacts and the number of direct impacts, direct impacts on higher significance sites, and direct impacts on key constraints. Table 14.25 is a summary of the appraisal of route options in Section 1 – Malahide Demesne. Table 14.26 is a summary of the appraisal of route options in Section 2 – R106 Dublin Road, Malahide.
- 14.2.71 Table 14.27 is a summary of the appraisal of route options in Section 3 – R106 Dublin Road to Bissets Strand. Table 14.28 is a summary of the appraisal of route options in Section 5 – North Shore of Malahide Estuary to R126 Hearse Road.

Table 14.25 Appraisal of Route Option Impacts in Section 1 – Malahide Demesne.

Section 1 Options	Total Potential Impacts	Ranking	Total Direct Impacts	Ranking	Total Direct Impacts on Higher Significance Sites*	Ranking	Direct Impacts on Key Constraints	Ranking	Overall Ranking Order
Option 1 – Green	2	Joint 1st	0	Joint 1st	0	Joint 1st	0	Joint 1st	Joint 1st
Option 2 – Orange	2	Joint 1st	1	Joint 2nd	1	Joint 2nd	1	Joint 2nd	Joint 3rd
Option 3 – Pink	7	3rd	0	Joint 1st	0	Joint 1st	0	Joint 1st	2nd
Option 4 – Blue	6	2nd	1	Joint 2nd	1	Joint 2nd	1	Joint 2nd	4th
Option 5 – Cyan	2	Joint 1st	0	Joint 1st	0	Joint 1st	0	Joint 1st	Joint 1st
Option 6 – Yellow	2	Joint 1st	1	Joint 2nd	1	Joint 2nd	1	Joint 2nd	Joint 3rd

'Higher significant sites' can be deemed as those of International, National and Regional Importance, collectively.

Table 14.26 Appraisal of Route Option Impacts in Section 2 – R106 Dublin Road, Malahide.

Section 2 Options	Total Potential Impacts	Ranking	Total Direct Impacts	Ranking	Total Direct Impacts on Higher Significance Sites*	Ranking	Direct Impacts on Key Constraints	Ranking	Overall Ranking Order
Option 1 – Orange	2	2nd	0	Joint 1st	0	Joint 1st	0	Joint 1st	2nd
Option 2 – Pink	3	3rd	0	Joint 1st	0	Joint 1st	0	Joint 1st	3rd
Option 3 – Cyan	5	Joint 4th	0	Joint 1st	0	Joint 1st	0	Joint 1st	Joint 4th
Option 4 – Green	5	Joint 4th	0	Joint 1st	0	Joint 1st	0	Joint 1st	Joint 4th
Option 5 – Blue	1	1st	0	Joint 1st	0	Joint 1st	0	Joint 1st	1st

'Higher significant sites' can be deemed as those of International, National and Regional Importance, collectively.

Table 14.27 Appraisal of Route Option Impacts in Section 3 – R106 Dublin Road to Bissets Strand.

Section 3 Options	Total Potential Impacts	Ranking	Total Direct impacts	Ranking	Total Direct Impacts on Higher Significance Sites*	Ranking	Direct Impacts on Key Constraints	Ranking	Overall Ranking Order
Option 1 – Blue	3	2nd	0	Joint 1st	0	Joint 1st	0	Joint 1st	2nd
Option 2 – Orange	2	Joint 1st	0	Joint 1st	0	Joint 1st	0	Joint 1st	Joint 1st
Option 3 – Green	4	3rd	0	Joint 1st	0	Joint 1st	0	Joint 1st	3rd
Option 4 – Pink	2	Joint 1st	0	Joint 1st	0	Joint 1st	0	Joint 1st	Joint 1st
Option 5 – Yellow	2	Joint 1st	0	Joint 1st	0	Joint 1st	0	Joint 1st	Joint 1st

'Higher significant sites' can be deemed as those of International, National and Regional Importance, collectively.

Table 14.28 Appraisal of Route Option Impacts in Section 5 – North Shore of Malahide Estuary to R126 Hearse Road.

Section 5 Options	Total Potential Impacts	Ranking	Total Direct impacts	Ranking	Total Direct Impacts on Higher Significance Sites*	Ranking	Direct Impacts on Key Constraints	Ranking	Overall Ranking Order
Option 1 – Pink	8	3rd	0	Joint 1st	0	Joint 1st	0	Joint 1st	3rd
Option 2 – Blue	4	2nd	0	Joint 1st	0	Joint 1st	0	Joint 1st	2nd
Option 3 – Cyan	3	Joint 1st	0	Joint 1st	0	Joint 1st	0	Joint 1st	Joint 1st
Option 4 – Green	3	Joint 1st	0	Joint 1st	0	Joint 1st	0	Joint 1st	Joint 1st
Option 5 – Orange	3	Joint 1st	0	Joint 1st	0	Joint 1st	0	Joint 1st	Joint 1st
Option 6 – Yellow	3	Joint 1st	0	Joint 1st	0	Joint 1st	0	Joint 1st	Joint 1st

'Higher significant sites' can be deemed as those of International, National and Regional Importance, collectively.

Preference Order Results

SECTION 1 – MALAHIDE DEMESNE

- 14.2.72 The proposed six route options in Section 1 – Malahide Demesne are comparatively similar in both quantitative and qualitative terms and their overall impact on the existing architectural environment is low, as most of them utilise existing pathways and entrances. Option 2 – Orange, Option 4 – Blue, and Option 6 – Yellow, which necessitate the construction of new pathways and/or pedestrian entrances, are considered to have an imperceptible negative impact on Malahide Demesne (AHC002); however, as the demesne is in use as a public amenity area, the adverse effect is negated by the resulting improvement in access to the demesne. Table 14.29 below is a summary of the order of preference of the route options at Section 1 – Malahide Demesne.

Table 14.29 Order of Preference of Route Options in Section 1 – Malahide Demesne.

Section 1 Options	Preference
Option 1 – Green	Most Preferred
Option 3 – Pink	Most Preferred
Option 5 – Cyan	Most Preferred
Option 2 – Orange	Preferred
Option 4 – Blue	Preferred
Option 6 – Yellow	Preferred

SECTION 2 – R106 DUBLIN ROAD, MALAHIDE

- 14.2.73 The proposed five pedestrian crossing options in Section 2 – R106 Dublin Road, Malahide are comparatively similar in both quantitative and qualitative terms and their overall impact on the existing architectural environment is low. Option 3 – Cyan and Option 4 – Green may result in disturbance to structures in their immediate vicinity; however, these disturbances are predicted to be of a temporary nature. Table 14.30 is a summary of the order of preference of the route options at Section 2 – R106 Dublin Road, Malahide .

Table 14.30 Order of Preference of Route Options in Section 2 – R106 Dublin Road, Malahide.

Section 2 Options	Preference
Option 1 – Orange	Most Preferred
Option 2 – Pink	Most Preferred
Option 5 – Blue	Most Preferred
Option 3 – Cyan	Preferred
Option 4 – Green	Preferred

SECTION 3 – R106 DUBLIN ROAD TO BISSETS STRAND

- 14.2.74 The proposed five route options in Section 3 – R106 Dublin Road to Bissets Strand are comparatively similar in both quantitative and qualitative terms and as each option utilises existing pedestrian footpaths and walkways their overall impact on the existing architectural environment is low. While some of the options have a higher number of structures within the 100m zone than others, the low-impact nature of the proposed greenway renders all options equal. Table 14.31 is a summary of the order of preference of the route options at Section 3 – R106 Dublin Road to Bissets Strand.

Table 14.31 Order of Preference of Route Options in Section 3 – R106 Dublin Road to Bissets Strand.

Section 3 Options	Preference
Option 1 – Blue	Most Preferred
Option 2 – Orange	Most Preferred
Option 3 – Green	Most Preferred
Option 4 – Pink	Most Preferred
Option 5 – Yellow	Most Preferred

SECTION 5 – NORTH SHORE OF MALAHIDE ESTUARY TO R126 HEARSE ROAD

- 14.2.75 The proposed six route options in Section 5 – North Shore of Malahide Estuary to R126 Hearse Road are comparatively similar in both quantitative and qualitative terms. As most of the options traverse agricultural land with no built structures in their vicinity, and their overall impact on the existing architectural environment is low. While some of the options have a relatively high number of structures within the 100m zone, the low-impact nature of the proposed greenway renders them equal to those with a lesser number of structures. Table 14.32 is a summary of the order of preference of the route options.

Table 14.32 Order of Preference of Route Options in Section 5 – North Shore of Malahide Estuary to R126 Hearse Road.

Route Option	Preference
Option 1 – Pink	Most Preferred
Option 2 – Blue	Most Preferred
Option 3 – Cyan	Most Preferred
Option 4 – Green	Most Preferred
Option 5 – Orange	Most Preferred
Option 6 – Yellow	Most Preferred

14.3 Conclusions

- 14.3.1 The route corridor selection phase constitutes the primary opportunity to avoid unacceptable impacts on architectural heritage. From the perspective of the proposed greenway, the standard appraisal of route corridors (by considering in each case the total overall number of impacts and the number of direct impacts, direct impacts on higher significance sites, and direct impacts on key constraints) is not entirely appropriate. In Malahide Demesne, although the proposed greenway is located within an Architectural Conservation Area, it utilises existing footpath requiring no interference with the existing built landscape. The adverse effect on Malahide Demesne (AHC002) of those options which do necessitate the construction of new pathways and/or pedestrian entrances is negated by the resulting improvement in access to this public amenity area. Similarly, the proximity of historic buildings to the proposed walkway will enhance the user experience and as such the proposed greenway should be considered as having a positive rather than a negative impact.
- 14.3.2 In Section 2 – R106 Dublin Road, Malahide, the proposed new pedestrian crossings will have no adverse impact on structures or features of architectural heritage merit. The widening of the existing pedestrian walkway necessitated by Option 3 – Cyan and

Option 4 – Green may cause disturbance to a small number of structures; however, such disturbance can be avoided by preventative measures such as fencing and monitoring.

- 14.3.3 The structures and features of architectural heritage merit in Section 3 – R106 Dublin Road to Bissets Strand are located in the immediate vicinity of the proposed route options, and will experience no adverse impacts from the proposed greenway. Indeed, the amenity nature of the greenway can be utilised to enhance the local area by highlighting the presence of sites and structures of architectural interest in the local landscape. For example, Option 4 – Pink and Option 5 – Yellow take walkers along the historic core of old Malahide offering the opportunity to enjoy St Sylvester's Church and the fine terraced houses which characterise the village centre. The proximity of the proposed greenway to features of architectural interest may therefore in this case be perceived as a positive rather than a negative one.
- 14.3.4 In Section 5 – North Shore of Malahide Estuary to R126 Hearse Road structures of architectural interest are few on the proposed routes, with the exception of Option 1 – Pink. In this case, as with Malahide Village, the proximity of features of architectural interest to the proposed greenway should be considered a positive rather than a negative element.
- 14.3.5 In all six sections of the proposed greenway, the overall impact of the proposed route options on the existing architectural environment is low. The only site experiencing a direct impact is Section 1 – Malahide Demesne with regard to Option 2 – Orange, Option 4 – Blue, and Option 6 – Yellow, all of which necessitate the construction of short section new pathways and/or a pedestrian entrance. In each case, the imperceptible negative impact will be negated by the resulting improvement in access to the demesne, and no mitigation measures are deemed necessary.
- 14.3.6 No impacts are currently anticipated at Section 6 – Newbridge Demesne as the proposed greenway would utilise the existing metalled pathway.

15.0 Archaeology and Cultural Heritage

15.1 Introduction

- 15.1.1 This chapter assesses and evaluates the potential archaeological and cultural heritage impacts of proposed options for the proposed development. Archaeological and cultural heritage includes all pre-1700 sites and all levelled/buried features of any date (refer to Appendix H-Figures 12, 13 and 14A when reading this chapter).
- 15.1.2 The route will connect Malahide and Donabate and runs through, or touches on, the following townlands: Malahide Demesne, Malahide and Yellow Walls in the parish of Malahide and barony of Coolock; Kilcrea, Newbridge Demesne and Donabate in the parish of Donabate and barony of Nethercross; and Beaverstown in the parish of Portrane and barony of Nethercross.
- 15.1.3 The route option phase constitutes the primary opportunity to avoid unacceptable impacts on the archaeological and cultural heritage. The nature of the proposed greenway is designed to enhance the local area by connecting the archaeological, cultural heritage and other environmental features of the area thus highlighting their presence in the landscape. The proximity of the route options to the archaeological and cultural heritage features is, in this case, not necessarily a negative impact but rather a positive one.

Definitions of Key Terms

- 15.1.4 ‘Archaeological heritage’ can be described as the study of past human societies through their material remains and artefactual assemblages. Our knowledge and understanding of past societies, with no written record, is enhanced by the study of archaeological remains.
- 15.1.5 The phrase ‘cultural heritage’ is a generic term that spans thousands of years and covers a multitude of cultural, archaeological and architectural sites and monuments within the landscape. EPA guidelines (2015), define cultural heritage as being tangible and intangible. Tangible cultural heritage includes; movable cultural heritage (artefacts), immovable cultural heritage (monuments, archaeological sites, and so on) and underwater cultural heritage (shipwrecks, underwater ruins and cities). Intangible cultural heritage encompasses oral traditions, folklore, history and language. Cultural heritage in this report includes history, landscape and garden design, folklore and tradition, geological features, language and dialect, religion, settlements, inland waterways (rivers) and place names. Architecture and architectural heritage do not form part of this chapter but are addressed in Chapter 14.0.
- 15.1.6 The ‘assessment corridor’ is an area on either side of the route where all known archaeological and cultural heritage sites are noted and used in assessing the impact of the proposed route on the known and potential archaeology of the area. The assessment corridor for this route selection report extended to 500m on either side of each route option. The *Guidelines for the Assessment of Archaeological Heritage Impacts of National Road Schemes* (TII (formerly NRA), 2005) suggest an overall assessment corridor of 500m (250m either side) for each route option. In this case, however, given the short length and narrow width of each route option it was decided that a wider corridor would present a fuller picture of the nature of the archaeological and cultural heritage of the area.

15.2 Methodology

15.2.1 This report was compiled in accordance with the following documents:

- *Draft Guidelines on the information to be contained in Environmental Impact Assessment Reports (EIAR)* (EPA, 2017).
- *Draft Advice Notes for Preparing Environmental Impact Statements* (EPA, 2015).
- *Framework and Principles for the Protection of the Archaeological Heritage* (Department of Arts, Heritage, Gaeltacht & the Islands, 1999).
- *Policy and Guidelines on Archaeological Excavation* (Department of Arts, Heritage, Gaeltacht & the Islands, 1999).
- *Guidelines for the Assessment of Archaeological Heritage Impacts of National Road Schemes* (TII (formerly NRA), 2005). (Although the proposed project is not a road it is a linear corridor extending continuously across the landscape and thus these guidelines were considered appropriate).

15.2.2 In compiling the desktop study the following sources were used;

- *Constraints Study Report for the Proposed Broadmeadow Greenway* (see Volume 4A): All relevant information from the report was used. This included the RMP listings and information.
- *Database of Irish Excavation Reports* (www.excavations.ie): This website provides a database of summary reports of all archaeological excavations and investigations in Ireland undertaken from 1970. The database was searched for any excavations that were undertaken in any of the townlands within each of the proposed route option alignments.
- *Cartographic Sources*: The following maps were consulted: the various editions of the Ordnance Survey six-inch maps; first, second and third editions for Dublin.
- *Aerial Photographs*: Aerial photographs can be useful in obtaining information on levelled, unknown archaeological monuments or in detecting potential archaeological features that may only be identified from the air. The proposed greenway was examined on aerial photographs from the following sources;
 - National Monuments Database (c. 2013) www.archaeology.ie.
 - Ordnance Survey of Ireland website (1995, 2000 and 2005) www.osi.ie.
 - Google maps www.googlemaps.ie.
 - Aerial photographs provided by CHE.
- *Record of Monuments and Places (RMP)*: This record was established under Section 12(1) of the National Monuments (Amendment) Act 1994. It provides a list of all known archaeological monuments and places of archaeological interest, with an accompanying set of constraint maps. Its numbering system consists of two parts: the first part is the county code (DU for Dublin) followed by the Ordnance Survey (OS) map number six-inch to the mile scale, which was further reduced to 1:12,500 to accommodate the RMP; the second part is the number which refers to the specific archaeological site, e.g. DU12-30 refers to circle 30 on OS sheet 12 for Dublin. This number is placed beside a circle (sometimes not a circle but a shape appropriate to the site) which surrounds the archaeological site. The area within the circle is referred to as the Zone of Archaeological Notification for that site. The RMP for

County Dublin was published in 1988. It is an offence to interfere with any of the sites or monuments listed in the RMP without first giving two months' notice in writing to the National Monuments Service (NMS) at the Department of Culture, Heritage and the Gaeltacht (DHCG).

- *Sites and Monuments Database of the Archaeological Survey of Ireland:* The purpose of the Archaeological Survey of Ireland (ASI) is to compile a baseline inventory of the known archaeological monuments in the State. The large archive and databases resulting from the survey are continually updated. This database, complete with maps, is now available for consultation via the NMS website at www.archaeology.ie. The database also provides lists of national monuments that are in the ownership or guardianship of the State.
- *National Monuments:* Section 8 of the National Monuments (Amendment) Act 1954 provides for the publication of a list of monuments, the preservation of which is deemed to be of national importance. Ministerial consent must be granted before any works are carried out with respect to a national monument.

15.2.3 Some recorded archaeological sites have been afforded added protection as follows (national monuments are mentioned above):

- *Monuments subject to Preservation Orders and Temporary Preservation Orders:* The National Monuments Act 1930 provides for the making of preservation orders to protect national monuments that are considered to be under threat. The prior written consent of the Minister is required for any works at or in proximity to the monument.
- *Register of Historic Monuments:* Under Section 5 of the National Monuments (Amendment) Act 1987, two months' notice must be given in writing to the Minister in advance of any proposal to carry out work in relation to a historic monument or archaeological area entered on the Register.

15.2.4 There are no such sites in the assessment corridor.

- *Fingal Development Plan 2017-2023:* The development plan outlines the local authority's objectives with regard to the preservation of the archaeological (and architectural) heritage of the county. It provides the following information: National Monuments in Fingal in state care or subject to preservation orders. While the Record of Monuments and Places is not included in the development plan icons showing the location of RMP sites are shown on the maps which accompany the plan.
- *Donabate Local Area Plan 2014-2020:* This plan outlines objectives specific to the Donabate area.

15.3 Assessment of Constraints

Perceived Importance of Sites

15.3.1 For the purpose of this report an assessment is given of the perceived (not necessarily definitive) importance of the various archaeological and cultural heritage sites within the study area. The assessment of perceived importance is based on professional judgement of the information to hand, framed within the confines of the study. On a site-by-site basis, the levels of perceived cultural heritage importance are liable to future

revision where new information is brought to light, either through more detailed investigations, surveys or research. The classification of levels of perceived importance is, therefore, based on an appraisal of current information and an assessment of importance probability.

- 15.3.2 All recorded archaeological sites are afforded the same protection under National Monuments legislation. The majority of cultural heritage sites, by their nature, are not protected and this is particularly the case if the sites are non-specific. In the case of sites such as buildings etc which may be of cultural heritage as well as architectural heritage value they may be afforded protection under the Planning and Development Act 2000.
- (a) International Importance: A site is deemed to be of international importance where its known importance is perceived by the study to merit international recognition as a site of exemplary importance. There are no sites considered to be of international importance within the assessment corridor.
 - (b) National Importance: A site is deemed to be of national importance where its known importance is perceived by the study to merit national recognition as a site of considerable importance. There are no sites considered to be of national importance within the assessment corridor.
 - (c) Regional Importance: A site is deemed to be of regional importance where its known importance is perceived by the study to merit regional recognition as a site of high importance. Examples of site types within the study area include castles and churches and graveyards. There are six archaeological sites considered to be of regional importance within the assessment corridor.
 - (d) Local Importance: A site is deemed to be of local importance where its known importance is perceived by the study to merit local recognition as a site of notable importance. Examples of site types within the study area include holy wells and enclosures. The remaining sites within the assessment corridor are considered to be of local importance. There are also two cultural heritage sites considered to be of local importance within the assessment corridor.

Assessment of Impact

- 15.3.3 Impacts of route alignments on the receiving archaeological and cultural heritage environment are based on TII (formerly NRA) Guidelines 2005 as follows:

Categories of Impact

- Direct: Where an archaeological or cultural heritage feature or site is physically located within the footprint of a potential route and entails the removal of part, or all, of the monument or feature.
- Indirect: Where a feature or site of archaeological or cultural heritage merit or its setting is located in close proximity to the footprint of a potential route alignment.
- No Predicted Impact: Where the potential route does not adversely affect an archaeological or cultural heritage site.

15.4 Impact Assessment

- 15.4.1 As the route selection phase is considered to be the primary opportunity to avoid unacceptable impacts on the archaeological and cultural heritage, it is important to give as comprehensive a view as possible of the archaeological and cultural heritage of the area. In this case the greenway route is designed to enhance the local area by connecting the archaeological, cultural heritage and other environmental features and highlighting their presence in the landscape. The proximity of the proposed routes to archaeological and cultural heritage features in this case is perceived as a positive and the impact of the route on these sites may, therefore, be seen as a positive impact rather than a negative one.
- 15.4.2 The usual designation of archaeological and cultural heritage sites and features into constraints and key constraints was not considered appropriate as these features, in this case, are more likely to be complementary to the proposed greenway. Although archaeological and cultural heritage sites are considered as constraints in this report for the sake of consistency, they actually are complementary to the walk in all cases.
- 15.4.3 The assessment corridor for this Route Option Report extended to 500m on either side of each route option. The *Guidelines for the Assessment of Archaeological Heritage Impacts of National Road Schemes* (TII (formerly NRA), 2005) suggests an overall assessment corridor of 500m (250m either side) for each route option. In this case, however, given the short length and narrow width of each route option it was decided that a wider corridor would present a fuller picture of the nature of the archaeological and cultural heritage of the area. All archaeological and cultural heritage sites within the 1km assessment corridor are included in the tables below.

15.5 The Receiving Environment

- 15.5.1 The Constraints Report (see Volume 4A) provided a broad chronological overview of the landscape of the proposed greenway. It showed that the area has been inhabited since the Neolithic period and highlighted the manner in which previously unrecorded archaeological sites can still remain undisturbed below ground level only becoming apparent when subsurface disturbance takes place. Appendix E (Table 1) gives details of all archaeological sites identified in the Constraints Report (see Volume 4A). Seventeen of these archaeological sites (Appendix F; Table 1) fall within the assessment corridor. Appendix E (Table 2) gives details of all cultural heritage sites identified in the Constraints Report. Three of these CHS sites (Appendix F; Table 2) fall within the area of the four route options. CHS1 is the railway line, initially known as the Dublin-Drogheda railway, then the Great Northern Railway (Ireland) and, currently, better known as the Dublin-Belfast railway. CHS2 is Malahide Estuary, an SAC. CHS3 is the River Pill flowing through the townland of Kilcrea. Waterways, including rivers and estuaries, have always attracted humans and often provide areas where evidence of early human activity can be found in the form of fish traps, lost items, sunken boats etc.
- 15.5.2 The greenway will comprise a walking and cycling route connecting the villages of Malahide and Donabate across Malahide Estuary and both villages have a long and varied history. The key elements of the greenway comprise the village and demesne of Malahide on the south side of the estuary, the railway causeway connecting the two villages across the estuary, and Kilcrea townland and Newbridge Demesne on the north side of the estuary.

- 15.5.3 The route is divided into six sections.

Section 1 – Malahide Demesne

- 15.5.4 Malahide Castle and Demesne has been associated with the Talbot family since the late twelfth century. Nothing remains of the structures built here at that time but the core of the late medieval castle (DU012-030) is masked within the existing building, much of which was rebuilt in 1760. There are a number of later renovations and additions to the building also. The house, attendant buildings, gardens and demesne are now all owned by Fingal County Council. A fifteenth century ruined church (DU012-031001) and graveyard (DU012-031006) stand a short distance to the east of the castle.
- 15.5.5 The greenway in this section will connect the existing car park at Malahide Castle with the Malahide Road on the north side of the demesne. Existing paths will be used for this connection.

Section 2 – R106 Dublin Road, Malahide

- 15.5.6 The Malahide-Dublin Road is a busy thoroughfare leading eastward into Malahide and skirting Malahide Castle demesne. It is defined on its south side by the demesne walls of Malahide Castle. Existing hardtop will be used for this section of the route.

Section 3 – R106 Dublin Road to Bissets Strand

- 15.5.7 From the late twelfth century on, the history of the area is tied to that of the Talbot family of Malahide Castle, who were granted extensive lands in the area and over the following centuries developed their estate, and the village. By the early nineteenth century, the village had a population of over 1000, and a number of local industries, including salt harvesting, while the harbour continued in commercial operation, with landings of coal and construction materials. By 1831, the population had reached 1223. The area grew in popularity in Georgine times as a seaside resort for wealthy Dublin city dwellers and Malahide continues to be a popular spot for day-trippers, especially in the summer months.
- 15.5.8 The greenway in this section will be hardtop area with five options all commencing on the north side of the Malahide-Dublin Road and ending at Bissets Strand. It is proposed to extend existing car parking for 8-10 cars at Bissets Strand by way of additional hardtop.

Section 4 – Bissets Strand to the North Shore of Malahide Estuary

- 15.5.9 Construction of the railway commenced in 1840, under the stewardship of Sir John Benjamin MacNeill, and the Dublin to Drogheda line was officially opened in 1844 making travelling in both directions simpler and quicker. This was the third railway line to be constructed in Ireland, following the Dublin-Kingstown and Belfast-Lisburn lines. The railway line overtook the importance of the sea and the commercial use of the Malahide Estuary for export and import. The subsequent extension and connection of the line northbound later in the nineteenth century further facilitated northbound travel and transport. The railway line has, over the last century and a half, become an integral part of the landscape of the area and now plays a major part in the commuter value of towns and villages in this area.

- 15.5.10 All options for this section of the greenway will follow the existing western embankment of the railway causeway across Malahide Estuary. Uprights for the greenway bridge are in place at the causeway weir. This route is fixed; however, options exist as to the detailed design of the greenway surface and any barriers to protect the greenway on its western and eastern margins.

Section 5 – North Shore of Malahide Estuary to R126 Hearse Road

- 15.5.11 Cartographic sources from the mid nineteenth century show most of Kilcrea townland to comprise a small peninsula jutting into Malahide Estuary. There is a small island, named Mullan, c. 350m to the north of the northern edge of the peninsula. Kilcrea House is depicted and named along with a number of associated outbuildings at the landward (northwestern) end of the peninsula. Baltray Corn Mill (in ruins) (DU12-018) is depicted on the northern side of the peninsula connected to Kilcrea House by road. What appears to be a trackway extends north across the estuary to the island of Mullan from the mill. The construction of the Dublin-Drogheda railway embankment has commenced at the eastern end of the peninsula extending inland from its northern shore. Otherwise the peninsula is laid out in regular fields, those at the northern end of the peninsula are notably larger than those at the southern end. By the end of the nineteenth century the land to the north of the Kilcrea peninsula had been reclaimed enlarging the area of the townland of Kilcrea and subsuming the island of Mullan.
- 15.5.12 This section of the greenway will cross agricultural land. There are six options in this section. The options commence once the greenway on the causeway reaches the northern shore. The options terminate at the gate of Newbridge Demesne. It is proposed to construct the greenway as a boardwalk in this area.

Section 6 – Newbridge Demesne

- 15.5.13 Newbridge House (DU012-060) is a Georgian mansion built for Charles Cobbe, Archbishop of Dublin in 1736. It currently sits on 150ha of demesne parkland. It is owned by Fingal County Council.
- 15.5.14 This is the most northern leg of the project. The principal route ends at the car park in front of Newbridge House. There are no options for this section.

15.6 Analysis of Impacts

- 15.6.1 This appraisal considered all archaeological and cultural heritage sites within 1km (500m either side) of each option in order to give a more comprehensive picture of the archaeological and cultural heritage of the area. These are listed in Appendix F (Tables 1 and 2).
- 15.6.2 None of the options will impact directly on any known archaeological or cultural heritage sites.

Section 1 – Malahide Demesne

- 15.6.3 The greenway will run through Malahide Demesne. Some remains of a late medieval castle can still be found within the house named Malahide Castle. The late medieval castle (DU012-030) is considered in this chapter while the house and demesne are considered in the architectural heritage chapter. Options 1, 2 and 3 will come close to the castle (within the house), a church and graveyard with associated features (DU012-031001-006) and an

earthwork (DU012-029) within the demesne. Option 3, 4, 5 and 6 will come close to CHS1, the railway. As the route options already exist as walkways within the demesne, there will be no physical or visual impact on these sites. There will be no predicted impact on archaeological or cultural heritage (Table 15.1 to Table 15.6 below).

Section 2 – R106 Dublin Road, Malahide

- 15.6.4 Options 1-4 will not come close to any sites of archaeological or cultural heritage interest. Option 5 will intersect with the railway line (CHS1) but there will be no predicted impact. As the route already exists (as a hardtop), there will be no physical or visual impact on these sites (Table 15.7 to Table 15.11 below).

Section 3 – R106 Dublin Road to Bissets Strand

- 15.6.5 The route will come close to CHS1, the railway and CHS2, the estuary; however, as the route already exists (as a hardtop), there will be no physical or visual impact on these sites. Option 5 will come close to a holy well (DU12-023001), a church (DU012-023002) and an earthwork (DU-023003) (no above ground expression) but will not impact on these as the route already exists (as a hardtop). There will be no predicted impact on archaeological or cultural heritage (Table 15.2 to Table 15.16).

Section 4 – Bissets Strand to the North Shore of Malahide Estuary

- 15.6.6 The route runs beside the railway (CHS1) and estuary (CHS2) but it will not impact on these as the route already exists (as a hardtop). Whereas there are plans to improve the route in this section it is anticipated that none of the improvements will entail subsurface disturbance of the causeway. There will be no predicted impact on archaeological or cultural heritage (Table 15.17 below).

Section 5 – North Shore of Malahide Estuary to R126 Hearse Road

- 15.6.7 The route leaves the railway line on the north side of the estuary and at this point it is considered to be 0m from the railway (CHS1). There will be no impact on the railway line at this point as the route already exists (as a hardtop – see Section 2 above). Option 1 passes directly outside a church and graveyard in Kilcrea (DU012-016001 and DU012-016002). At this point the route will be on an existing road and although it will be close to the church and graveyard, it will not impact in any physical way on it. There will be no predicted impact. Indeed the impact should be perceived as a positive as it will highlight the presence of the church and graveyard to those using the route. Option 2 passes close to a levelled ring ditch (DU012-072) and will impact indirectly on this archaeological site if subsurface disturbance is to take place in constructing the walkway. It will run beside the River Pill (CHS 2) for some distance and will, therefore, impact visually on this cultural heritage site. This impact should be viewed as a positive one. Due to the distance of the other monuments from the routes there will be no predicted impact on the archaeological or cultural heritage (Table 15.18 to Table 15.23 below).

Section 6 – Newbridge Demesne

- 15.6.8 The route runs across the demesne towards Newbridge House (DU012-060) terminating in the car park c. 50m from the house. The route will not impact on the house in any physical way. There will be no predicted impact on archaeological or cultural heritage. Indeed the impact should be perceived as a positive with the house enhancing the walk (Table 15.24 below).

Table 15.1 Section 1 – Malahide Demesne: Option 1 – Green.

RMP No./CHS No	Site Type	Townland	Distance	Perceived Importance	Impact
DU012-023001	Holy well	Malahide	610m	Local	No predicted impact
DU012-023002	Church	Malahide	610m	Local/regional	No predicted impact
DU012-023003	Earthwork	Malahide	610m	Local	No predicted impact
DU012-030	Castle	Malahide Demesne	150m	Local/regional	No predicted impact
DU012-031001	Church	Malahide Demesne	140m	Local/regional	No predicted impact
DU012-031002	Sheela-na-gig	Malahide Demesne	140m	Local/regional	No predicted impact
DU012-031003	Sheela-na-gig	Malahide Demesne	140m	Local/regional	No predicted impact
DU012-031004	Architectural frag.	Malahide Demesne	140m	Local/regional	No predicted impact
DU012-031005	Tomb-effigial	Malahide Demesne	140m	Local/regional	No predicted impact
DU012-031006	Graveyard	Malahide Demesne	140m	Local/regional	No predicted impact
DU012-029	Earthwork	Malahide Demesne	50m	Local	No predicted impact
CHS 1	Railway	Kilcrea	200m	Local	No predicted impact
CHS 2	Estuary	Kilcrea	600m	Local	No predicted impact

Table 15.2 Section 1 – Malahide Demesne: Option 2 – Orange.

RMP No./CHS No	Site Type	Townland	Distance	Perceived Importance	Impact
DU012-023001	Holy well	Malahide	610m	Local	No predicted impact
DU012-023002	Church	Malahide	610m	Local/regional	No predicted impact
DU012-023003	Earthwork	Malahide	610m	Local	No predicted impact
DU012-030	Castle	Malahide Demesne	150m	Local/regional	No predicted impact
DU012-031001	Church	Malahide Demesne	140m	Local/regional	No predicted impact
DU012-031002	Sheela-na-gig	Malahide Demesne	140m	Local/regional	No predicted impact
DU012-031003	Sheela-na-gig	Malahide Demesne	140m	Local/regional	No predicted impact
DU012-031004	Architectural frag.	Malahide Demesne	140m	Local/regional	No predicted impact
DU012-031005	Tomb-effigial	Malahide Demesne	140m	Local/regional	No predicted impact
DU012-031006	Graveyard	Malahide Demesne	140m	Local/regional	No predicted impact
DU012-029	Earthwork	Malahide Demesne	50m	Local	No predicted impact
CHS 1	Railway	Kilcrea	200m	Local	No predicted impact
CHS 2	Estuary	Kilcrea	600m	Local	No predicted impact

Table 15.3 Section 1 – Malahide Demesne: Option 3 – Pink.

RMP No./CHS No	Site Type	Townland	Distance	Perceived Importance	Impact
DU012-023001	Holy well	Malahide	400m	Local	No predicted impact
DU012-023002	Church	Malahide	400m	Local/regional	No predicted impact
DU012-023003	Earthwork	Malahide	400m	Local	No predicted impact
DU012-030	Castle	Malahide Demesne	100m	Local/regional	No predicted impact
DU012-031001	Church	Malahide Demesne	10m	Local/regional	No predicted impact
DU012-031002	Sheela-na-gig	Malahide Demesne	10m	Local/regional	No predicted impact
DU012-031003	Sheela-na-gig	Malahide Demesne	10m	Local/regional	No predicted impact
DU012-031004	Architectural frag.	Malahide Demesne	10m	Local/regional	No predicted impact
DU012-031005	Tomb-effigial	Malahide Demesne	10m	Local/regional	No predicted impact
DU012-031006	Graveyard	Malahide Demesne	10m	Local/regional	No predicted impact
DU012-029	Earthwork	Malahide Demesne	460m	Local	No predicted impact
CHS 1	Railway	Kilcrea	100m	Local	No predicted impact
CHS 2	Estuary	Kilcrea	600m	Local	No predicted impact

Table 15.4 Section 1 – Malahide Demesne: Option 4 – Blue.

RMP No./CHS No	Site Type	Townland	Distance	Perceived Importance	Impact
DU012-023001	Holy well	Malahide	500m	Local	No predicted impact
DU012-023002	Church	Malahide	500m	Local/regional	No predicted impact
DU012-023003	Earthwork	Malahide	500m	Local	No predicted impact
DU012-030	Castle	Malahide Demesne	150m	Local/regional	No predicted impact
DU012-031001	Church	Malahide Demesne	140m	Local/regional	No predicted impact
DU012-031002	Sheela-na-gig	Malahide Demesne	140m	Local/regional	No predicted impact
DU012-031003	Sheela-na-gig	Malahide Demesne	140m	Local/regional	No predicted impact
DU012-031004	Architectural frag.	Malahide Demesne	140m	Local/regional	No predicted impact
DU012-031005	Tomb-effigial	Malahide Demesne	140m	Local/regional	No predicted impact
DU012-031006	Graveyard	Malahide Demesne	140m	Local/regional	No predicted impact
DU012-029	Earthwork	Malahide Demesne	50m	Local	No predicted impact
CHS 1	Railway	Kilcrea	10m	Local	No predicted impact
CHS 2	Estuary	Kilcrea	600m	Local	No predicted impact

Table 15.5 Section 1 – Malahide Demesne: Option 5 – Cyan.

RMP No./CHS No	Site Type	Townland	Distance	Perceived Importance	Impact
DU012-023001	Holy well	Malahide	500m	Local	No predicted impact
DU012-023002	Church	Malahide	500m	Local/regional	No predicted impact
DU012-023003	Earthwork	Malahide	500m	Local	No predicted impact
DU012-030	Castle	Malahide Demesne	200m	Local/regional	No predicted impact
DU012-031001	Church	Malahide Demesne	200m	Local/regional	No predicted impact
DU012-031002	Sheela-na-gig	Malahide Demesne	200m	Local/regional	No predicted impact
DU012-031003	Sheela-na-gig	Malahide Demesne	200m	Local/regional	No predicted impact
DU012-031004	Architectural frag.	Malahide Demesne	200m	Local/regional	No predicted impact
DU012-031005	Tomb-effigial	Malahide Demesne	200m	Local/regional	No predicted impact
DU012-031006	Graveyard	Malahide Demesne	200m	Local/regional	No predicted impact
DU012-029	Earthwork	Malahide Demesne	550m	Local	No predicted impact
CHS 1	Railway	Kilcrea	10m	Local	No predicted impact
CHS 2	Estuary	Kilcrea	600m	Local	No predicted impact

Table 15.6 Section 1 – Malahide Demesne: Option 6 – Yellow.

RMP No./CHS No	Site Type	Townland	Distance	Perceived Importance	Impact
DU012-023001	Holy well	Malahide	450m	Local	No predicted impact
DU012-023002	Church	Malahide	450m	Local/regional	No predicted impact
DU012-023003	Earthwork	Malahide	450m	Local	No predicted impact
DU012-030	Castle	Malahide Demesne	200m	Local/regional	No predicted impact
DU012-031001	Church	Malahide Demesne	200m	Local/regional	No predicted impact
DU012-031002	Sheela-na-gig	Malahide Demesne	200m	Local/regional	No predicted impact
DU012-031003	Sheela-na-gig	Malahide Demesne	200m	Local/regional	No predicted impact
DU012-031004	Architectural frag.	Malahide Demesne	200m	Local/regional	No predicted impact
DU012-031005	Tomb-effigial	Malahide Demesne	200m	Local/regional	No predicted impact
DU012-031006	Graveyard	Malahide Demesne	200m	Local/regional	No predicted impact
DU012-029	Earthwork	Malahide Demesne	550m	Local	No predicted impact
CHS 1	Railway	Kilcrea	10m	Local	No predicted impact
CHS 2	Estuary	Kilcrea	600m	Local	No predicted impact

Table 15.7 Section 2 – R106 Dublin Road, Malahide: Option 1 – Orange.

RMP No./CHS No	Site Type	Townland	Distance	Perceived Importance	Impact
DU012-023001	Holy well	Malahide	600m	Local	No predicted impact
DU012-023002	Church	Malahide	600m	Local/regional	No predicted impact
DU012-023003	Earthwork	Malahide	600m	Local	No predicted impact
DU012-030	Castle	Malahide Demesne	440m	Local/regional	No predicted impact
DU012-031001	Church	Malahide Demesne	440m	Local/regional	No predicted impact
DU012-031002	Sheela-na-gig	Malahide Demesne	440m	Local/regional	No predicted impact
DU012-031003	Sheela-na-gig	Malahide Demesne	440m	Local/regional	No predicted impact
DU012-031004	Architectural frag.	Malahide Demesne	440m	Local/regional	No predicted impact
DU012-031005	Tomb-effigial	Malahide Demesne	440m	Local/regional	No predicted impact
DU012-031006	Graveyard	Malahide Demesne	440m	Local/regional	No predicted impact
DU012-029	Earthwork	Malahide Demesne	440m	Local	No predicted impact
CHS 1	Railway	Kilcrea	420m	Local	No predicted impact
CHS 2	Estuary	Kilcrea	520m	Local	No predicted impact

Table 15.8 Section 2 – R106 Dublin Road, Malahide: Option 2 – Pink.

RMP No./CHS No	Site Type	Townland	Distance	Perceived Importance	Impact
DU012-023001	Holy well	Malahide	380m	Local	No predicted impact
DU012-023002	Church	Malahide	380m	Local/regional	No predicted impact
DU012-023003	Earthwork	Malahide	380m	Local	No predicted impact
DU012-030	Castle	Malahide Demesne	500m	Local/regional	No predicted impact
DU012-031001	Church	Malahide Demesne	500m	Local/regional	No predicted impact
DU012-031002	Sheela-na-gig	Malahide Demesne	500m	Local/regional	No predicted impact
DU012-031003	Sheela-na-gig	Malahide Demesne	500m	Local/regional	No predicted impact
DU012-031004	Architectural frag.	Malahide Demesne	500m	Local/regional	No predicted impact
DU012-031005	Tomb-effigial	Malahide Demesne	500m	Local/regional	No predicted impact
DU012-031006	Graveyard	Malahide Demesne	500m	Local/regional	No predicted impact
DU012-029	Earthwork	Malahide Demesne	650m	Local	No predicted impact
CHS 1	Railway	Kilcrea	280m	Local	No predicted impact
CHS 2	Estuary	Kilcrea	380m	Local	No predicted impact

Table 15.9 Section 2 – R106 Dublin Road, Malahide: Option 3 – Cyan.

RMP No./CHS No	Site Type	Townland	Distance	Perceived Importance	Impact
DU012-023001	Holy well	Malahide	240m	Local	No predicted impact
DU012-023002	Church	Malahide	240m	Local/regional	No predicted impact
DU012-023003	Earthwork	Malahide	240m	Local	No predicted impact
DU012-030	Castle	Malahide Demesne	330m	Local/regional	No predicted impact
DU012-031001	Church	Malahide Demesne	330m	Local/regional	No predicted impact
DU012-031002	Sheela-na-gig	Malahide Demesne	330m	Local/regional	No predicted impact
DU012-031003	Sheela-na-gig	Malahide Demesne	330m	Local/regional	No predicted impact
DU012-031004	Architectural frag.	Malahide Demesne	330m	Local/regional	No predicted impact
DU012-031005	Tomb-effigial	Malahide Demesne	330m	Local/regional	No predicted impact
DU012-031006	Graveyard	Malahide Demesne	330m	Local/regional	No predicted impact
DU012-029	Earthwork	Malahide Demesne	370m	Local	No predicted impact
CHS 1	Railway	Kilcrea	140m	Local	No predicted impact
CHS 2	Estuary	Kilcrea	290m	Local	No predicted impact

Table 15.10 Section 2 – R106 Dublin Road, Malahide: Option 4 – Green.

RMP No./CHS No	Site Type	Townland	Distance	Perceived Importance	Impact
DU012-023001	Holy well	Malahide	240m	Local	No predicted impact
DU012-023002	Church	Malahide	240m	Local/regional	No predicted impact
DU012-023003	Earthwork	Malahide	240m	Local	No predicted impact
DU012-030	Castle	Malahide Demesne	330m	Local/regional	No predicted impact
DU012-031001	Church	Malahide Demesne	330m	Local/regional	No predicted impact
DU012-031002	Sheela-na-gig	Malahide Demesne	330m	Local/regional	No predicted impact
DU012-031003	Sheela-na-gig	Malahide Demesne	330m	Local/regional	No predicted impact
DU012-031004	Architectural frag.	Malahide Demesne	330m	Local/regional	No predicted impact
DU012-031005	Tomb-effigial	Malahide Demesne	330m	Local/regional	No predicted impact
DU012-031006	Graveyard	Malahide Demesne	330m	Local/regional	No predicted impact
DU012-029	Earthwork	Malahide Demesne	370m	Local	No predicted impact
CHS 1	Railway	Kilcrea	140m	Local	No predicted impact
CHS 2	Estuary	Kilcrea	290m	Local	No predicted impact

Table 15.11 Section 2 – R106 Dublin Road, Malahide: Option 5 – Blue.

RMP No./CHS No	Site Type	Townland	Distance	Perceived Importance	Impact
DU012-023001	Holy well	Malahide	0m	Local	No predicted impact
DU012-023002	Church	Malahide	0m	Local/regional	No predicted impact
DU012-023003	Earthwork	Malahide	0m	Local	No predicted impact
DU012-030	Castle	Malahide Demesne	700m	Local/regional	No predicted impact
DU012-031001	Church	Malahide Demesne	700m	Local/regional	No predicted impact
DU012-031002	Sheela-na-gig	Malahide Demesne	700m	Local/regional	No predicted impact
DU012-031003	Sheela-na-gig	Malahide Demesne	700m	Local/regional	No predicted impact
DU012-031004	Architectural frag.	Malahide Demesne	700m	Local/regional	No predicted impact
DU012-031005	Tomb-effigial	Malahide Demesne	700m	Local/regional	No predicted impact
DU012-031006	Graveyard	Malahide Demesne	700m	Local/regional	No predicted impact
DU012-029	Earthwork	Malahide Demesne	800m	Local	No predicted impact
CHS 1	Railway	Kilcrea	0m	Local	No predicted impact
CHS 2	Estuary	Kilcrea	220m	Local	No predicted impact

Table 15.12 Section 3 – R106 Dublin Road to Bissets Strand: Option 1 – Blue.

RMP No./CHS No	Site Type	Townland	Distance	Perceived Importance	Impact
DU012-023001	Holy well	Malahide	200m	Local	No predicted impact
DU012-023002	Church	Malahide	200m	Local/regional	No predicted impact
DU012-023003	Earthwork	Malahide	200m	Local	No predicted impact
DU012-030	Castle	Malahide Demesne	450m	Local/regional	No predicted impact
DU012-031001	Church	Malahide Demesne	450m	Local/regional	No predicted impact
DU012-031002	Sheela-na-gig	Malahide Demesne	450m	Local/regional	No predicted impact
DU012-031003	Sheela-na-gig	Malahide Demesne	450m	Local/regional	No predicted impact
DU012-031004	Architectural frag.	Malahide Demesne	450m	Local/regional	No predicted impact
DU012-031005	Tomb-effigial	Malahide Demesne	450m	Local/regional	No predicted impact
DU012-031006	Graveyard	Malahide Demesne	450m	Local/regional	No predicted impact
DU012-029	Earthwork	Malahide Demesne	470m	Local	No predicted impact
CHS 1	Railway	Kilcrea	10m	Local	No predicted impact
CHS 2	Estuary	Kilcrea	10m	Local	No predicted impact

Table 15.13 Section 3 – R106 Dublin Road to Bissets Strand: Option 2 – Orange.

RMP No./CHS No	Site Type	Townland	Distance	Perceived Importance	Impact
DU012-023001	Holy well	Malahide	200m	Local	No predicted impact
DU012-023002	Church	Malahide	200m	Local/regional	No predicted impact
DU012-023003	Earthwork	Malahide	200m	Local	No predicted impact
DU012-030	Castle	Malahide Demesne	450m	Local/regional	No predicted impact
DU012-031001	Church	Malahide Demesne	450m	Local/regional	No predicted impact
DU012-031002	Sheela-na-gig	Malahide Demesne	450m	Local/regional	No predicted impact
DU012-031003	Sheela-na-gig	Malahide Demesne	450m	Local/regional	No predicted impact
DU012-031004	Architectural frag.	Malahide Demesne	450m	Local/regional	No predicted impact
DU012-031005	Tomb-effigial	Malahide Demesne	450m	Local/regional	No predicted impact
DU012-031006	Graveyard	Malahide Demesne	450m	Local/regional	No predicted impact
DU012-029	Earthwork	Malahide Demesne	470m	Local	No predicted impact
CHS 1	Railway	Kilcrea	10m	Local	No predicted impact
CHS 2	Estuary	Kilcrea	10m	Local	No predicted impact

Table 15.14 Section 3 – R106 Dublin Road to Bissets Strand: Option 3 – Green.

RMP No./CHS No	Site Type	Townland	Distance	Perceived Importance	Impact
DU012-023001	Holy well	Malahide	200m	Local	No predicted impact
DU012-023002	Church	Malahide	200m	Local/regional	No predicted impact
DU012-023003	Earthwork	Malahide	200m	Local	No predicted impact
DU012-030	Castle	Malahide Demesne	550m	Local/regional	No predicted impact
DU012-031001	Church	Malahide Demesne	550m	Local/regional	No predicted impact
DU012-031002	Sheela-na-gig	Malahide Demesne	550m	Local/regional	No predicted impact
DU012-031003	Sheela-na-gig	Malahide Demesne	550m	Local/regional	No predicted impact
DU012-031004	Architectural frag.	Malahide Demesne	550m	Local/regional	No predicted impact
DU012-031005	Tomb-effigial	Malahide Demesne	550m	Local/regional	No predicted impact
DU012-031006	Graveyard	Malahide Demesne	550m	Local/regional	No predicted impact
DU012-029	Earthwork	Malahide Demesne	670m	Local	No predicted impact
CHS 1	Railway	Kilcrea	10m	Local	No predicted impact
CHS 2	Estuary	Kilcrea	10m	Local	No predicted impact

Table 15.15 Section 3 – R106 Dublin Road to Bissets Strand: Option 4 – Pink.

RMP No./CHS No	Site Type	Townland	Distance	Perceived Importance	Impact
DU012-023001	Holy well	Malahide	0m	Local	No predicted impact
DU012-023002	Church	Malahide	0m	Local/regional	No predicted impact
DU012-023003	Earthwork	Malahide	0m	Local	No predicted impact
DU012-030	Castle	Malahide Demesne	950m	Local/regional	No predicted impact
DU012-031001	Church	Malahide Demesne	850m	Local/regional	No predicted impact
DU012-031002	Sheela-na-gig	Malahide Demesne	850m	Local/regional	No predicted impact
DU012-031003	Sheela-na-gig	Malahide Demesne	850m	Local/regional	No predicted impact
DU012-031004	Architectural frag.	Malahide Demesne	850m	Local/regional	No predicted impact
DU012-031005	Tomb-effigial	Malahide Demesne	850m	Local/regional	No predicted impact
DU012-031006	Graveyard	Malahide Demesne	850m	Local/regional	No predicted impact
DU012-029	Earthwork	Malahide Demesne	970m	Local	No predicted impact
CHS 1	Railway	Kilcrea	10m	Local	No predicted impact
CHS 2	Estuary	Kilcrea	10m	Local	No predicted impact

Table 15.16 Section 3 – R106 Dublin Road to Bissets Strand: Option 5 – Yellow.

RMP No./CHS No	Site Type	Townland	Distance	Perceived Importance	Impact
DU012-023001	Holy well	Malahide	0m	Local	No predicted impact
DU012-023002	Church	Malahide	0m	Local/regional	No predicted impact
DU012-023003	Earthwork	Malahide	0m	Local	No predicted impact
DU012-030	Castle	Malahide Demesne	950m	Local/regional	No predicted impact
DU012-031001	Church	Malahide Demesne	850m	Local/regional	No predicted impact
DU012-031002	Sheela-na-gig	Malahide Demesne	850m	Local/regional	No predicted impact
DU012-031003	Sheela-na-gig	Malahide Demesne	850m	Local/regional	No predicted impact
DU012-031004	Architectural frag.	Malahide Demesne	850m	Local/regional	No predicted impact
DU012-031005	Tomb-effigial	Malahide Demesne	850m	Local/regional	No predicted impact
DU012-031006	Graveyard	Malahide Demesne	850m	Local/regional	No predicted impact
DU012-029	Earthwork	Malahide Demesne	970m	Local	No predicted impact
CHS 1	Railway	Kilcrea	10m	Local	No predicted impact
CHS 2	Estuary	Kilcrea	10m	Local	No predicted impact

Table 15.17 Section 4 – Bissets Strand to the North Shore of Malahide Estuary: Option 1 – Green.

RMP No./CHS No	Site Type	Townland	Distance	Perceived Importance	Impact
DU012-023001	Holy well	Malahide	200m	Local	No predicted impact
DU012-023002	Church	Malahide	200m	Local/regional	No predicted impact
DU012-023003	Earthwork	Malahide	200m	Local	No predicted impact
CHS 1	Railway	Kilcrea	0m	Local	No predicted impact
CHS 2	Estuary	Kilcrea	0m	Local	No predicted impact

Table 15.18 Section 5 – North Shore of Malahide Estuary to R126 Hearse Road: Option 1 – Pink.

RMP No./CHS No	Site Type	Townland	Distance	Perceived Importance	Impact
DU012-016001	Church & Graveyard	Kilcrea	0m	Regional	No predicted impact
DU012-016002					
DU012-017	Enclosure	Kilcrea	80m	Local	No predicted impact
DU012-018	Mill	Kilcrea	500m	Local	No predicted impact
DU012-072	Ring Ditch	Kilcrea	500m	Local	No Predicted impact
CHS 1	Railway	Kilcrea	0m	Local	No predicted impact
CHS 2	Estuary	Kilcrea	5m	Local	No predicted impact
CHS 3	River	Kilcrea	70m	Local	No predicted impact

Table 15.19 Section 5 – North Shore of Malahide Estuary to R126 Hearse Road: Option 2 – Blue.

RMP No./CHS No	Site Type	Townland	Distance	Perceived Importance	Impact
DU012-016001	Church & Graveyard	Kilcrea	170m	Regional	No predicted impact
DU012-016002					
DU012-017	Enclosure	Kilcrea	80m	Local	No predicted impact
DU012-018	Mill	Kilcrea	80m	Local	No predicted impact
DU012-072	Ring Ditch	Kilcrea	30m	Local	Indirect
CHS 1	Railway	Kilcrea	0m	Local	No predicted impact
CHS 2	Estuary	Kilcrea	5m	Local	No predicted impact
CHS 3	River	Kilcrea	5m	Local	No predicted impact

Table 15.20 Section 5 – North Shore of Malahide Estuary to R126 Hearse Road: Option 3 – Cyan.

RMP No./CHS No	Site Type	Townland	Distance	Perceived Importance	Impact
DU012-016001	Church & Graveyard	Kilcrea	480m	Regional	No predicted impact
DU012-016002	Enclosure	Kilcrea	160m	Local	No predicted impact
DU012-017	Mill	Kilcrea	200m	Local	No predicted impact
DU012-072	Ring Ditch	Kilcrea	350m	Local	Indirect
CHS 1	Railway	Kilcrea	0m	Local	No predicted impact
CHS 2	Estuary	Kilcrea	5m	Local	No predicted impact
CHS 3	River	Kilcrea	5m	Local	No predicted impact

Table 15.21 Section 5 – North Shore of Malahide Estuary to R126 Hearse Road: Option 4 – Green.

RMP No./CHS No	Site Type	Townland	Distance	Perceived Importance	Impact
DU012-016001	Church & Graveyard	Kilcrea	480m	Regional	No predicted impact
DU012-016002	Enclosure	Kilcrea	380m	Local	No predicted impact
DU012-017	Mill	Kilcrea	200m	Local	No predicted impact
DU012-072	Ring Ditch	Kilcrea	350m	Local	Indirect
CHS 1	Railway	Kilcrea	0m	Local	No predicted impact
CHS 2	Estuary	Kilcrea	5m	Local	No predicted impact
CHS 3	River	Kilcrea	5m	Local	No predicted impact

Table 15.22 Section 5 – North Shore of Malahide Estuary to R126 Hearse Road: Option 5 – Orange.

RMP No./CHS No	Site Type	Townland	Distance	Perceived Importance	Impact
DU012-016001	Church & Graveyard	Kilcrea	480m	Regional	No predicted impact
DU012-016002	Enclosure	Kilcrea	380m	Local	No predicted impact
DU012-017	Mill	Kilcrea	320m	Local	No predicted impact
DU012-072	Ring Ditch	Kilcrea	420m	Local	Indirect
CHS 1	Railway	Kilcrea	0m	Local	No predicted impact
CHS 2	Estuary	Kilcrea	5m	Local	No predicted impact
CHS 3	River	Kilcrea	5m	Local	No predicted impact

Table 15.23 Section 5 – North Shore of Malahide Estuary to R126 Hearse Road: Option 6 – Yellow.

RMP No./CHS No	Site Type	Townland	Distance	Perceived Importance	Impact
DU012-016001	Church & Graveyard	Kilcrea	480m	Regional	No predicted impact
DU012-016002	Enclosure	Kilcrea	380m	Local	No predicted impact
DU012-017	Mill	Kilcrea	320m	Local	No predicted impact
DU012-072	Ring Ditch	Kilcrea	420m	Local	Indirect
CHS 1	Railway	Kilcrea	0m	Local	No predicted impact
CHS 2	Estuary	Kilcrea	5m	Local	No predicted impact
CHS 3	River	Kilcrea	5m	Local	No predicted impact

Table 15.24 Section 6 – Newbridge Demesne: Option 1 – Cyan.

RMP No./CHS No	Site Type	Townland	Distance	Perceived Importance	Impact
DU012-060	Country House	Newbridge Demesne	50m	Regional	No predicted impact
DU012-017	Enclosure	Kilcrea	420m	Local	No predicted impact
CHS 3	River	Kilcrea	10m	Local	No predicted impact

15.7 Unrecorded Archaeology

- 15.7.1 The proposed route will impact on previously unrecorded archaeology that may exist below the surface in areas which are still greenfield and remain undisturbed by modern development. The area of the proposed car park at Bissets Strand in Section 3 – R106 Dublin Road to Bissets Strand, is greenfield. It is possible that previously unrecorded subsurface archaeological sites may exist in this area. Portions of Section 5 – North Shore of Malahide Estuary to R126 Hearse Road run across farmland. It is possible that previously unrecorded subsurface archaeological sites may exist in this area.
- 15.7.2 As much of the route already exists in some form or other the proposed route will not impact visually on any upstanding recorded archaeological monuments.
- In Section 1 – Malahide Demesne there is no preferred route. All options are equally favourable.
 - In Section 2 – R106 Dublin Road, Malahide there is no preferred route. All options are equally favourable.
 - In Section 3 – R106 Dublin Road to Bissets Strand there is no preferred route. All options are equally favourable.
 - In Section 4 – Bissets Strand to the North Shore of Malahide Estuary there is only one route and it is favourable.
 - In Section 5 – North Shore of Malahide Estuary to R126 Hearse Road there is no preferred route. All options are equally favourable. Some construction work will take place for all options so there will be some impact on potential subsurface archaeological sites.
 - In Section 6 – Newbridge Demesne there is only one route and it is favourable.

15.8 Mitigation

- 15.8.1 The proposed greenway route will not impact on any known archaeological site (no predicted impact).
- 15.8.2 The proposed greenway route may impact on potential subsurface archaeological sites in two sections: Section 3 – R106 Dublin Road to Bissets Strand, and Section 5 – North Shore of Malahide Estuary to R126 Hearse Road. Mitigation is required for these two sections.
- 15.8.3 The extension of the car park in Section 3 will involve groundworks and the removal of topsoil. This may impact on potential subsurface archaeological sites. It is recommended that a geophysical survey of this area take place followed by archaeological testing. The survey should be licensed by the National Monuments Service at the Department of Culture, Heritage and the Gaeltacht. Archaeological testing should be targeted and the trench locations should be based on information gleaned from the geophysical survey. The testing should be licensed by the National Monuments Service at the Department of Culture, Heritage and the Gaeltacht.
- 15.8.4 When the route is chosen in Section 5 it is recommended that a geophysical survey be carried out of all areas where subsurface disturbance is to take place followed by archaeological testing. The survey should be licensed by the National Monuments Service at the Department of Culture, Heritage and the Gaeltacht. Archaeological testing

should be targeted and the trench locations should be based on information gleaned from the geophysical survey. The testing should be licensed by the National Monuments Service at the Department of Culture, Heritage and the Gaeltacht.

- 15.8.5 In the event of an archaeological find or feature being identified every effort should be made to change the route so that the find could remain *in situ*. In the event of this eventuality not being possible it is recommended that the find or feature be fully resolved and preserved by record in consultation with the National Monuments Service at the Department of Culture, Heritage and the Gaeltacht and the National Museum of Ireland.
- 15.8.6 All recommendations are subject to the approval of the Minister for Culture, Heritage and the Gaeltacht.

16.0 Land, Soils and Groundwater

16.1 Introduction

16.1.1 Following the Constraints Report (see Volume 4A), a route corridor selection study was undertaken to select a preferred route corridor for the proposed scheme. This study consisted of a geological and hydrogeological evaluation of the various sections and route options of the study area (refer to Appendix H-Figures 15, 16A, 17, 18A, 19 and 20A when reading this chapter).

16.2 Methodology and Sources of Information

16.2.1 In order to identify the key issues with respect to the geology and hydrogeology for the route corridor selection a desk study has been completed using the following relevant sources of information:

- *Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes* (TII (formerly NRA), 2009);
- *Draft Guidelines on the information to be contained in Environmental Impact Assessment Reports (EIAR)* (EPA, 2017);
- *Draft Advice Notes for Preparing Environmental Impact Statements* (EPA, 2015);
- Geology of Meath, Geological Survey of Ireland (GSI) (1999), Sheet 13;
- GSI Online Database – Generalised Bedrock Geology, Subsoil, Vulnerability and Aquifer maps;
- GSI well and geotechnical data.

16.3 Route Corridor Selection Analysis

Proposed Route Corridor Description

16.3.1 Following the Constraints Report (see Volume 4A) the geological and hydrogeological setting has been investigated for each of section of the route. The section and route options have been subdivided as shown in Table 16.1. Note that Section 4 – Bissets Strand to the North Shore of Malahide Estuary is not considered further as the route is fixed here and crosses the estuarine railway causeway.

Table 16.1 Route Section and Route Options.

Section Number and Name	Route Options
Section 1 – Malahide Demesne	Option 1 – Green Option 2 – Orange Option 3 – Pink Option 4 – Blue Option 5 – Cyan Option 6 – Yellow
Section 2 – R106 Dublin Road, Malahide	Option 1 – Orange Option 2 – Pink Option 3 – Cyan Option 4 – Green Option 5 – Blue

Section Number and Name	Route Options
Section 3 – R106 Dublin Road to Bissets Strand	Option 1 – Blue Option 2 – Orange Option 3 – Green Option 4 – Pink Option 5 – Yellow
Section 4 – Bissets Strand to the North Shore of Malahide Estuary	Option 1 - Green (Not analysed here as on marine embankment).
Section 5 – North Shore of Malahide Estuary to R126 Hearse Road	Option 1 – Pink Option 2 – Blue Option 3 – Cyan Option 4 – Green Option 5 – Orange Option 6 – Yellow
Section 6 – Newbridge Demesne	Option 1 – Cyan

16.4 Geology

Solid and Bedrock Geology

16.4.1 Information on the bedrock geology underlying Sections 1-6 was obtained from the Geological Survey of Ireland Bedrock Geology Map Series, Sheet 13 (Scale 1:100,0000 map) and the accompanying geological description. The geology underlying Section 1 comprises the Malahide Formation (MF), Waulsortian Limestone Formation (WS) and the Tober Collen Formation (TC). Section 2 and Section 3 comprises the Malahide Formation (ML), which includes all limestone strata between the top of the Donabate Formation (DE), and the base of the younger overlying Waulsortian Limestone. The bedrock geology of the study area is discussed in further detail in the Constraints Report (see Volume 4A). The Malahide Formation underlies Option 1 – Pink and Option 2 – Blue of Section 5. Options 3 – Cyan, 4 – Green and 5 – Orange of Section 5, are underlain by both the Malahide Formation and the Donabate Formation. Bedrock geology in Section 6 comprises both the Malahide Formation and the Donabate Formation.

Soils and Subsoils

- 16.4.2 Information on the soils and subsoils of the study area has been obtained from Teagasc and the Geological Survey of Ireland (GSI). Information on the soils and subsoils encountered in the study area is discussed in more detail in the Constraints Report.
- 16.4.3 The key aspect with regard to subsoils is the location of significant areas of soft ground. These areas are represented mainly by (AlluvMin) (alluvium deposits), marine or estuarine sediments (MarSands) and beach sands (Mbs). Option 1 – Green of Section 5, in the Kilcrea Townland, is underlain by beach sands. This route incorporates an existing route way and as such does not present any cause for concern in respect of potential impacts.

Karst Potential

- 16.4.4 Karst is the name given to a landscape characterised by surface and underground formations, created as a result of the action of water on permeable limestone. Information on the karst potential of the study area was obtained from the GSI online Aquifer Classification Map. Regionally Important Aquifers such as Regionally Important

Karstified Bedrock Aquifers (Rk) are associated with purer limestones which are more susceptible to karstification compared to impure (shaly) limestones.

- 16.4.5 The majority of the study area is underlain by a Locally Important Aquifer with bedrock that is generally productive only in local zones only (LI). The northern part of Section 5 is underlain by a Locally Important Aquifer, which is generally moderately productive (Lm). There is some potential for karstification to occur but it is not considered to pose a significant threat based on the nature of the bedrock formation within the study area; the potential for karst development is therefore considered low.

Active Quarries

- 16.4.6 There are no active quarries within the study area.

16.5 Hydrogeology

Extreme (E) and High (H) Vulnerability Areas

- 16.5.1 The vulnerability of a groundwater body is the term used to describe the ease with which the groundwater in the area can be contaminated by human activities. The vulnerability is determined by many factors including the travel time, the quantity of contaminants and the capacity of the deposits overlying the bedrock to attenuate contaminants. These factors are based on the thickness and permeability of the overburden, e.g. groundwater in bedrock which has a thick cover of low permeability clay is less vulnerable than the groundwater in bedrock which is exposed at the surface. GSI Groundwater Vulnerability Maps have been reproduced for the study area and these highlight the different groundwater vulnerability ratings throughout the study area. Full details for the groundwater vulnerability in the area can be found in the Constraints Report (see Volume 4A) and are summarised below.
- 16.5.2 The majority of Sections 5 and 6 of the proposed development study area is characterised by Low (L) groundwater vulnerability with local zones of High (H) to Extreme (E) vulnerability. Groundwater vulnerability within Sections 1, 2 and 3 is dominated by High (H) to Extreme (E). Option 1 – Orange of Section 2 will pass through an area of Moderate (M) vulnerability. Sections 1, 2, and 3 dominantly consist of pre-existing route ways with limited construction planned.

Third Party Wells

- 16.5.3 Using the GSI Online Database, only one third-party well (0-50m accuracy) has been identified at present within the study area within Section 1, the Malahide Demesne. This well is an old well and not used as a source for drinking water.

Karst Features

- 16.5.4 Using the GSI Online Karst Database, no karst features have been identified within the study area. According to the GSI Online Well Database, the identified well in the Malahide Demesne is fed by a spring.
- 16.5.5 The majority of the study area is underlain by a Locally Important Aquifer with bedrock that is generally productive in local zones (LI) with small areas of a Locally Important Aquifer, which is generally moderately productive (Lm). These aquifers are typically

associated with limited karst development and therefore the potential of karstification within the study area is considered to be low.

16.6 Route Option Preference

- 16.6.1 It is considered that, given the nature of the project, the high incidence of existing pavement and the general proposal not to excavate, whichever option is selected, no potential significant impact upon geology or hydrogeology will arise. With appropriate mitigation during construction and operation, it is considered that the project would have a neutral effect upon these aspects.

Section 1 – Malahide Demesne

- 16.6.2 Based on the lack of constraints identified within Section 1, any of the route options could be viable route options.

Table 16.2 Section 1 – Malahide Demesne Route Option Preference.

Section 1 Options	Rank	Route Corridor Preference
Option 1 – Green	6	Most Preferred
Option 2 – Orange	5	Most Preferred
Option 3 – Pink	4	Most Preferred
Option 4 – Blue	2	Most Preferred
Option 5 – Cyan	1	Most Preferred
Option 6 – Yellow	3	Most Preferred

Section 2 – R106 Dublin Road, Malahide

- 16.6.3 Based on the lack of constraints in relation to the underlying geology or hydrogeology within Section 2, any of the route options could be viable route options.

Table 16.3 Malahide-Dublin Road Route Option Preference.

Section 2 Options	Rank	Route Corridor Preference
Option 1 – Orange	5	Most Preferred
Option 2 – Pink	4	Most Preferred
Option 3 – Cyan	2	Most Preferred
Option 4 – Green	1	Most Preferred
Option 5 – Blue	3	Most Preferred

Section 3 – R106 Dublin Road to Bissets Strand

- 16.6.4 The lack of constraints identified within Section 2 allows for any of the route options to be technically feasible. However, Option 3 – Green is 'Most Preferred' and ranked as number 1 (Table 16.4).

Table 16.4 Section 3 – R106 Dublin Road to Bissets Strand Route Option Preference.

Section 3 Options	Rank	Route Corridor Preference
Option 1 – Blue	5	Preferred
Option 2 – Orange	4	Preferred
Option 3 – Green	1	Most Preferred
Option 4 – Pink	2	Preferred
Option 5 – Yellow	3	Preferred

- 16.6.5 Option 3 – Green makes use of existing sections of the footpath and roadway, which will eliminate the need to excavate existing ground that could lead to an increase in vulnerability of the underlying aquifer, which has been mapped Extreme (E) in this area.

Section 4 – Bissets Strand to the North Shore of Malahide Estuary

- 16.6.6 There are no route options to consider in this area which impact upon geology and hydrogeology.

Section 5 – North Shore of Malahide Estuary to R126 Hearse Road

- 16.6.7 Based on the absence of any significant geological and hydrological constraints for Section 5, any of the route options would be feasible. It is not envisioned that any of these route options will effect upon the environmental attributes of the area. Therefore, they have all been ranked as ‘Most Preferred’ (Table 16.5).

Table 16.5 Section 5 – North Shore of Malahide Estuary to R126 Hearse Road Route Option Preference.

Section 5 Options	Rank	Route Corridor Preference
Option 1 – Pink	6	Most Preferred
Option 2 – Blue	5	Most Preferred
Option 3 – Cyan	2	Most Preferred
Option 4 – Green	1	Most Preferred
Option 5 – Orange	3	Most Preferred
Option 6 – Yellow	4	Most Preferred

Section 6 – Newbridge Demesne

- 16.6.8 A single route option follows the existing metalled pathway in the demesne. There are no predicted impacts upon geology and hydrogeology in this section.

16.7 Mitigation Proposals

- 16.7.1 The variable groundwater vulnerability within the study area, especially within in Section 1 – Malahide Demesne, Section 2 – R106 Dublin Road, Malahide, and Section 3 – R106 Dublin Road to Bissets Strand, should be taken into consideration in the context of a potentially increased risk to groundwater where the subsoils are thinner.

17.0 Surface Water

17.1 Introduction

- 17.1.1 This chapter considers the potential impacts upon the aquatic environment (water quality, aquatic ecology and fisheries) of the proposed route options. The commentary here will confine itself to those options which may affect (a) the inner and outer Malahide Estuary (railway embankment section of the route) in Section 3, and (b) outer estuary mudflats and saltmarsh including the estuary of the Pill River and the western drain, and Newbridge Demesne Stream (Pill River) in Section 4 (refer to Appendix H-Figure 21A).

17.2 Malahide Estuary

- 17.2.1 The main constraints along this section of the route are the inner and outer sections of the Malahide Estuary. However, it is understood that the route will be laid on an existing hard-stand structure (the railway embankment) without impinging on the estuarine habitats. Accordingly the risk to the habitats of the Malahide Estuary is considered to be very low provided the materials and methods employed in laying the track are chosen to minimise any potential impact.

17.3 Estuary of River Pill

- 17.3.1 This area is immediately upstream of the railway embankment to the west of the Malahide Estuary SAC and should be avoided if possible. Avoidance here means any direct impingement on the habitat or crossing of the tidal creek/stream estuary. If it has to be crossed this should only be undertaken using a clear-span structure which would avoid any damage to aquatic habitats.

17.4 River Pill

- 17.4.1 This stream will need to be crossed by the greenway if it is to reach either the grounds of the estate or the village of Donabate. The site is not a protected habitat nor is it likely to have a high ecological value. Consequently, it may be crossed by a new crossing point provided a non-invasive structure is installed, i.e. given that the route will not require to carry vehicular traffic, a clear span structure not requiring culverting or instream works could be chosen to carry the route which would result in little or no potential impact on the watercourse.

17.5 Ranking of Constraints

- 17.5.1 The layout of the study area and the use of the railway embankment to carry the proposed greenway prompt the following list of constraints in increasing order of potential sensitivity in relation to the project:

- (1) Malahide Estuary inner and outer adjoining the railway embankment (Natura 2000 site – International Importance).
- (2) The northwest corner of Malahide Estuary to the east of the railway embankment – Kilcrea Townland (Natura 2000 site – International Importance).
- (3) Tidal inlet with narrow mudflats to west of railway embankment – Kilcrea Townland (Moderate to high ecological value – local importance).

(4) The Newbridge Demesne Stream (Pill River) (Low to Moderate Ecological Value – Local Importance).

(5) Western Drain – Kilcrea Townland (Low Ecological Value – Local Importance).

17.6 Route Option Preference

17.6.1 It is considered that, given the nature of the project, the high incidence of existing pavement and the general proposal to clearspan any watercourse crossing, the project, whichever option is selected, will not result in a potential significant impact upon the receiving aquatic environment. With appropriate mitigation during construction and operation, including a prohibition on any vehicular crossings of watercourses, it is considered that the project would have a negligible negative or neutral effect upon the aquatic receiving environment.

Section	Options	Aquatic Habitat Constraints	Preference
1 – Malahide Demesne	All	Not applicable – no new surface water crossings.	N/A
2 – R106 Dublin Road, Malahide	All	Not applicable – no new surface water crossings.	N/A
3 – R106 Dublin Road to Bissets Strand	All	Not applicable – no new surface water crossings.	N/A
4 – Bissets Strand to the North Shore of Malahide Estuary	All	Not applicable – no options.	N/A
5 – North Shore of Malahide Estuary to R126 Hearse Road	Option 1 – Pink	No aquatic constraints – new track confined to existing roads or tracks.	Most Preferred
	Option 2 – Blue	One small crossing of western drain – negligible potential impact.	Acceptable
	Option 3 – Cyan	One crossing of the Pill River and one crossing of the tidal creek – both crossings with clear span structures.	Preferred
	Option 4 – Green	One crossing of the Pill River and one crossing of the tidal creek – both crossings with clear span structures.	Preferred
	Option 5 – Orange	One crossing of the Pill River and one crossing of the tidal creek – both crossings with clear span structures.	Preferred
	Option 6 – Yellow	One crossing of the Pill River and one crossing of the tidal creek – both crossings with clear span structures.	Preferred
6 – Newbridge Demesne	All	N/A – no new surface water crossings.	N/A

18.0 Material Assets – Agronomy

18.1 Introduction

- 18.1.1 This assessment considers the impacts on agriculture of the Section 5 – North Shore of Malahide Estuary to R126 Hearse Road options for the greenway. The proposed greenway crosses agricultural land from the northern edge of Malahide Estuary to the point where the proposed greenway crosses the proposed Donabate Distributor Road (refer to Appendix H-Figures 22A, 23A and 24A when reading this chapter). Agricultural lands are not affected by the scheme in any other Section.

18.2 Methodology

- 18.2.1 This assessment is based on a desk top study which refers to the following sources of information:
- 2010 Census of Agriculture (in 2017 this is the most up-to-date data for farm enterprise types on a per county basis).
 - EPA Soil Mapping Data. This information is derived from a combination of aerial photography and on site surveying carried out in recent years by the Teagasc Spatial Unit in collaboration with the Geological Survey of Ireland, the Forestry Service and the EPA. As soil quality and type varies within a very small area the information is indicative only. Reference is also made to the An Foras Talúntais 1980 Soils Map of Ireland and the broad descriptions contained within the map.
 - Aerial photography was used to identify forestry, scrub and rough boggy land.
 - Land registry mapping was examined.
 - Windshield surveys were conducted in June 2012, February 2012 and October 2017.

18.3 Existing Agriculture

- 18.3.1 The townland of Kilcrea through which the proposed greenway options cross comprises of four agricultural land parcels identified as Reference Numbers 3, 6, 7 and 9. Land quality is not a differentiating factor as all affected land parcels have good quality land. Land Parcel 3 is a small grass land parcel consisting of 3ha and has a beef enterprise. Land Parcel 6 consists of 19ha and has beef enterprise. The farm yard of Land Parcel 6 is located on the northern boundary of the land parcel. Land Parcels 7 and 9 consist of 68ha and 15.5ha respectively and have tillage and grass enterprises. This grass is utilised by horses, beef cattle and sheep. There is a horse training track located in Land Parcel 7. The farm yards of Land Parcels 7 and 9 are located on the Kilcrea Road and there is an equestrian centre in No 9. The tillage cropping in Land Parcels 7 and 9 include cereals and potatoes.

18.4 Predicted Impacts

- 18.4.1 For this assessment it is assumed that the cycle path will be approximately 4m wide. In addition another 2m width is allowed for hedgerow reinstatement and other works.
- 18.4.2 Section 5 – Option 1 starts at the northern boundary of Malahide Estuary and takes a western alignment crossing along the southern boundaries of Land Parcels 7 and 9 for

1100m before joining the Kilcrea Road. This option then uses the existing Kilcrea Road for the next 1590m before joining the proposed Donabate Distributor Road.

- 18.4.3 Section 5 – Option 2 starts at the northern boundary of Malahide Estuary and initially takes a northern alignment (adjoining the existing railway line) crossing along the eastern boundary of Land Parcel 7 for 330m before taking a western alignment across Land Parcel 7 for 930m before joining Kilcrea Road. The pathway will cross the land parcel in a manner that separates approximately 2.6ha of land to the north of the pathway. This option then uses the existing Kilcrea Road for the next 590m before joining the proposed Donabate Distributor Road.
- 18.4.4 Section 5 – Option 3 starts at the northern boundary of Malahide Estuary and initially takes a northern alignment (adjoining the existing railway line) crossing along the eastern boundary of Land Parcels 6 and 7 for 485m before taking a northwestern alignment across Land Parcel 6 for 825m and across the southern boundary of Land Parcel 3 for 190m before joining the R126 Hearse Road. Option 3 will cross Land Parcel 6 in a manner that separates approximately 9ha of land to the south of the greenway and will cut off access from the farm yard to the land south of the greenway. This route option then uses the existing country road for the next 125m before joining the proposed Donabate Distributor Road. Option 3 crosses through a non-agricultural land parcel between Land Parcels 3 and 6 for 105m.
- 18.4.5 Section 5 – Option 4 takes a similar alignment to Option 3 but crosses the northern boundary of Land Parcel 3 to arrive at the proposed Donabate Distributor Road. This route option does not use the existing country road. Option 4 will cross Land Parcel 6 in a manner that separates approximately 9ha of land to the south of the greenway and will cut off access from the farm yard to the land north of the greenway.
- 18.4.6 Section 5 – Option 5 starts at the northern boundary of Malahide Estuary and takes a northern alignment (adjoining the existing railway line) crossing along the eastern boundary of Land Parcels 6 and 7 for 860m. It then takes a northwestern alignment along the northern boundary of Land Parcel 6 for 320m and then takes the same route as Option 3. The road access along the northern boundary of Land Parcel 6 is severed by this route.
- 18.4.7 Section 5 – Option 6 starts at the northern boundary of Malahide Estuary and takes a northern alignment (adjoining the existing railway line) crossing along the eastern boundary of Land Parcels 6 and 7 for 860m. It then takes a northwestern alignment along the northern boundary of Land Parcel 6 for 320m and then takes the same route as Option 4. The road access along the northern boundary of Land Parcel 6 is severed by this route.
- 18.4.8 See Table 18.1 for summary of impacts and Table 18.2 for summary of mitigation.

Table 18.1 Description of Impacts.

	Route Option					
	1	2	3	4	5	6
Total Length (m)	2,690	1,850	1,570	1,650	2,100	2,180
Length over agricultural land (m)	1,100	1,260	1,340	1,545	1,870	2,075
Total (m ²)	6,600	7,560	8,040	9,270	11,220	12,450
Land Separation	No	Yes	Yes	Yes	Yes	Yes
Area Separated (ha)	0	2.6	9	9	9	9
Impact on access	No	No	Yes	Yes	Yes	Yes

Table 18.2 Description of Mitigation.

Section 5 Options	Required Mitigation
Option 1 – Pink	Fencing along path.
Option 2 – Blue	Fencing along path.
Option 3 – Cyan	Fencing along path. Access from farm yard across/under/over path.
Option 4 – Green	Fencing along path. Access from farm yard across/under/over path. Access across path to public road (Land Parcel 3).
Option 5 – Orange	Fencing along path. Access from farm yard across/under/over path. Access across path to public road (Land Parcel 6).
Option 6 - Yellow	Fencing along path. Access from farm yard across/under/over path. Access across path to public road (Land Parcels 3 and 6).

18.5 Route Preference

- 18.5.1 Section 5 – Option 1 has the lowest landtake of agricultural land. It crosses along the southern boundary of Land Parcels 7 and 9. There are field accesses to Malahide Estuary north shore but these have no practical agricultural use. This route has the lowest landtake, will not have a significant impact on access, will not separate land. This option is considered to have an imperceptible effect on Land Parcels 7 and 9. It is the preferred route from an agricultural point of view.
- 18.5.2 Section 5 – Option 2 has the second lowest landtake and separates approximately 2.6ha of land in Land Parcel 7. A triangular 0.4ha of land north of the proposed greenway will be severely affected by the severance. This option is considered to have a slight/minor adverse effect on Land Parcel 7. This option is acceptable from an agricultural point of view.
- 18.5.3 Section 5 – Option 3 has the third lowest landtake and it separates approximately 9ha of land in Land Parcel 6 and severs the access from the farm yard to the land south of the proposed route. This option is considered to have a moderate adverse effect on Land Parcel 6, a slight adverse effect on Land Parcel 3 and imperceptible effect on Land Parcel 7. This option is acceptable from an agricultural point of view.
- 18.5.4 Section 5 – Option 4 has the fourth highest landtake of agricultural land. It separates approximately 9ha of land in Land Parcel 6 and severs the access from the farm yard to the land south of the proposed route. It also crosses along the northern boundary of Land Parcel 3 severing access to the public road. This option is considered to have a moderate adverse effect on Land Parcel 6, a slight adverse effect on Land Parcel 3 and imperceptible effect on Land Parcel 7. This option is acceptable from an agricultural point of view.
- 18.5.5 Section 5 – Option 5 has the fifth highest landtake and it separates approximately 9ha of land in Land Parcel 6 and severs the access from the farm yard to the land south of the proposed route. It also crosses along the northern boundary of Land Parcel 6 severing access to the public road. This option is considered to have a moderate adverse effect on Land Parcel 6, a slight adverse effect on Land Parcel 3 and imperceptible effect on Land Parcel 7. This option is acceptable from an agricultural point of view.
- 18.5.6 Section 5 – Option 6 has the sixth highest landtake and it separates approximately 9ha of land in Land Parcel 6 and severs the access from the farm yard to the land south of the proposed route. It also crosses along the northern boundaries of Land Parcels 3 and 6 severing access to the public road. This option is considered to have a moderate

adverse effect on Land Parcel 6, a slight adverse effect on Land Parcel 3 and imperceptible effect on Land Parcel 7. This option is acceptable from an agricultural point of view.

Table 18.3 Preference and ranking.

Option	Preference	Ranking
Option 1 - Pink	Preferred	1
Option 2 - Blue	Acceptable	2
Option 3 - Cyan	Acceptable	3
Option 4 - Green	Acceptable	4
Option 5 - Orange	Acceptable	5
Option 6 - Yellow	Acceptable	6

19.0 Biodiversity

19.1 Introduction

- 19.1.1 There are no material or route option constraints vis-à-vis habitats and flora in Section 1 – Malahide Demesne or Section 6 – Newbridge Demesne. The route options through Malahide Castle and Newbridge Demesne for the most part will utilise existing tracks, roads and pathways. Assuming the various route options will require similar treatment, in terms of upgrade and signage, there is no clear difference in terms of predicted impacts on birds and mammals between the route options considered for Malahide Castle Demesne, or those at Newbridge Demesne. It should be noted that Option 2 at Malahide Demesne would require the removal of a short area of wooded habitat (c. 20m) and for this reason would be slightly less preferred than all other options.
- 19.1.2 There are five options considered which run from the R106 Dublin Road through Malahide Village to Bissets Strand (Sections 2 and 3). At Malahide Village (Section 3 – R106 Dublin Road to Bissets Strand) the preference would be for a route option which links the castle demesne and the southern part of the railway embankment, to follow a route that minimises the length of the greenway that adjoins the inner estuary at Bissets Strand. Options 1-3 access Bissets Strand from the west and Options 4 and 5 reach that location from the east. Options 4 and 5 are considered marginally more preferred than Options 1-3 as these would involve less potential for disturbance of birds along the shore west of the railway embankment. However, it is observed that this part of the (southern) shoreline of the inner estuary is already reasonably popular as a public amenity and the potential for disturbance of birds at this location as a result of greater public use is considered very low. The distribution and abundance of birds in the inner estuary is described in greater detail in the Natura Impact Statement.
- 19.1.3 The route option analysis outlined below relates to Kilcrea Townland (Section 5 – North Shore of Malahide Estuary to R126 Hearse Road). Note that the potential effects of the scheme upon the ecologically designated areas of Malahide Estuary are subject to a separate Natura Impact Statement.
- 19.1.4 Desktop studies and field data underpin the assessments of the route options. Mammal surveys, including night-time bat surveys, as well as bird surveys of the lands at Kilcrea, were carried out during the winter of 2011-2012 with ongoing surveys carried out in 2013-2014. These surveys are described in detail in the EIAR (see Volume 2) and their findings combined with the habitat and botanical assessments are used in evaluating the various route options.

19.2 Section 5 – North Shore of Malahide Estuary to R126 Hearse Road

Introduction

- 19.2.1 Six options are considered below. In terms of habitat assessment all options, with appropriate mitigation, may be constructed. From a habitat and flora perspective, Option 2 would be preferred, while all other options would be acceptable. Generally, it is recommended that construction of the greenway would conserve existing hedgerows where possible.

- 19.2.2 In terms of impacts on terrestrial fauna there are certain options which are considered ‘Least Acceptable’ having the potential to cause significant disturbance or displacement of protected birds and mammals. Options 1 and 2 are defined as ‘Least Acceptable’ routes, whereas the remainder of the options (Options 3-6) are considered far less constrained. Options 2-6 cross the Pill Estuary close to the railway embankment. The Pill is culverted at the embankment and the lands adjoining the estuary – to the west of the proposed greenway – are prone to seasonal flooding. On occasion, these areas hold small to moderate numbers of wading birds and wildfowl.

Option 1 – Pink

- 19.2.3 This option encounters little in the way of natural habitat, following field margins and metalled road save for a very small section of shingle shoreline in the extreme southwest of the site just before the route turns north. Some hedgerows of local ecological value and field margins will be minimally impacted during construction. At the southwest of the site a little strip of shingle shore will be traversed by the boardwalk for c. 100m. This is a stretch of strandline/shingle and occurs at the fringe of the Malahide Estuary within the SAC (for location of Malahide SAC/SPA see Appendix H-Figure 25). As it is within the SAC this area of the site carries a value of international importance and is characterised by open communities of terrestrial vascular plants including Annual Sea-blite (*Suaeda maritima*), oraches (*Atriplex* spp.), Sea Beet (*Beta vulgaris*), Sea Mayweed (*Tripleurospermum maritimum*), Herb-robert (*Geranium robertianum*) and Cleavers (*Galium aparine*). Species such as sow thistles, hogweed, dandelions and ragworts are also common.
- 19.2.4 This shoreline supports examples of the annexed habitat, ‘annual vegetation of drift lines (1210)’. This habitat may be considered to be of high value. The Malahide Estuary SAC has not been selected for the conservation of this habitat, but every effort should be made to conserve this area of natural habitat in the course of site works. This route traverses an area of strandline/shingle within the Malahide Estuary SAC, but proper engineering solutions would mitigate against any significant impact to these habitats, ideally the boardwalks as proposed, and therefore Option 1 is considered an acceptable option.
- 19.2.5 This route heads westwards along the shoreline of the inner estuary before swinging north onto the narrow local road towards Newbridge Demesne, crossing Hearse Road and into Newbridge Demesne by the existing gate. This route is the ‘Least Acceptable’ of the options considered from a faunal perspective. The shoreline is used by a variety of wading birds and Gull species during the winter months and concentrations of diving ducks are frequently present in the areas close to shore. The development and use of this area of shoreline as part of the greenway would have the potential to cause significant disturbance to birds, particularly during the winter period. Consideration of Option 1 could only be deemed acceptable if the design avoided the shoreline and if accompanied with adequate screening to minimise disturbance risk to birds.

Option 2 – Blue

- 19.2.6 This option encounters little in the way of natural habitat, following field margins and metalled road for the most part of its length. The field margins are dominated by hedgerows.
- 19.2.7 Existing Hedgerows (WL1) along the field margins on this option are generally moderate examples of their habitat types with some gaps. They support a variety of shrub and tree

species and provide an important network of wildlife corridor at the site evaluated as of Moderate-Low Locally Important conservation value.

- 19.2.8 The hedgerows along the route corridor are above areas liable to flood and as such the route following these hedgerows is above the area of wet grassland and/or modified saltmarsh liable to flood and to which saline influence encroaches. The hedgerows along the field margins are very much dominated by Hawthorn (*Crataegus monogyna*) and some Elder (*Sambucus nigra*). In addition Blackthorn (*Prunus spinosa*), Gorse (*Ulex europaeus*), Bramble (*Rubus fruticosus* agg.), and willows (*Salix* spp.) occur.
- 19.2.9 At the field margin hedgerow interface tall grasses occur including False Oat grass (*Arrhenatherum elatius*) and Cock's-foot grass (*Dactylis glomerata*). As this option encounters very limited natural habitat it is a most preferred option vis-à-vis habitat/flora.
- 19.2.10 However, in order to be considered acceptable, Option 2 would require application of mitigation measures designed to minimise disturbance of active Badger setts and also winter feeding flocks of birds, including Light-bellied Brent Geese. Walkover surveys of this part of Kilcrea revealed a number of active Badger setts close to the line of Option 2. In addition, the fields that lie south of this route (where it traverses agricultural land between the railway embankment and the local Kilcrea Road) are frequently used by feeding and roosting flocks of wintering birds. The local topography would make users of Option 2 visible to the fields to the south, several of which are particularly important to wintering Brent Geese. Therefore, in order to be considered further this route option would require screening and measures to minimise the risk to the protected Badger setts. Without successful application of such measures Option 2 would be considered 'Least Acceptable' from a faunal perspective.

Option 3 – Cyan

- 19.2.11 This option encounters a small area of natural habitat where it departs from the railway embankment track and follows the tidal channel. Here small areas of the habitats Saltmarsh-Wet Grassland (CM2/GS4) and hydrologically important Tidal Channels CW2 occur. The saltmarsh habitats are linked to, 'Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) (1330)' annexed under Annex I of the EU natural habitats directive. These habitats also provide feeding habitat for a variety of birdlife, in particular wader species such as Curlew and Oystercatcher. This habitat is of high value local importance.
- 19.2.12 Above any area liable to flood at extremely high tides these important habitats do not occur.
- 19.2.13 For the remainder this route follows hedgerows and field boundaries.
- 19.2.14 Existing Hedgerows (WL1) along the field margins on this route are generally good examples of their habitat types with well-developed and dense mix of woody species. They support a variety of shrub and tree species and provide an important network of wildlife corridor at the site evaluated as of Moderate-Low Locally Important conservation value.
- 19.2.15 The hedgerows along the route corridor are above areas liable to flood and as such the route following these hedgerows is above the area of wet grassland and/or modified saltmarsh liable to flood and to which saline influence encroaches. The hedgerows along the field margins are very much dominated by Hawthorn (*Crataegus monogyna*) and

some Elder (*Sambucus nigra*). In addition Blackthorn (*Prunus spinosa*), Gorse (*Ulex europaeus*), Bramble (*Rubus fruticosus* agg.), and willows (*Salix* spp.) occur.

- 19.2.16 At the field margin hedgerow interface tall grasses occur including False Oat grass (*Arrhenatherum elatius*) and Cock's-foot grass (*Dactylis glomerata*).
- 19.2.17 The traverse of the area of wet grassland/saltmarsh and the tidal channels are the principal constraints to Option 3 but proper engineering solutions would mitigate against any significant impact to these habitats, ideally the boardwalks as proposed, and therefore this route is considered a preferred option.
- 19.2.18 The distribution and abundance of birds at Kilcrea is well understood (Roe & Lovatt, 2009; this report, 2013; Lewis & Butler 2017). Option 3 follows Option 4 northwards, parallel to the railway embankment, as in Option 2. Then Options 3 and 4 cross the Pill Estuary and run roughly parallel to the river to a second crossing point just over 1km to the northwest. From there Option 3 follows field boundaries westwards to the local Kilcrea Road and onwards to Newbridge Demesne.
- 19.2.19 The field northwest of the Pill Estuary crossing is an important feeding and roosting area for a number of wading bird species (Roe & Lovatt, 2009; this report, 2013). Kingfisher (*Alcedo atthis*), an Annex 1 bird species was observed feeding along this part of the river on two occasions in the winter of 2011/2012. Roe & Lovatt (2009) noted the area as important for feeding and roosting Curlew (*Numenius arquata*), Oystercatcher (*Haematopus ostralegus*) and Black-tailed Godwit (*Limosa limosa*). The river estuary was described as suitable for foraging Otter (*Lutra lutra*) (this report, 2013). A field survey in 2011 did not record any signs of Otter at this location, although it is noted that persistence of such signs was unlikely due to heavy rain at the time. Walkover surveys in 2013 recorded Otter spraints near the Pill Estuary culvert in November. As Route Option 3 follows Pill River to the northwest it is partly screened from the estuary by a sparse hedgerow. The fields traversed by this option are occasionally used by feeding Brent Geese and other waterbirds during the winter period (Roe & Lovatt, 2009). The agricultural fields are relatively large in size and Option 3 closely follows the field boundaries and it is unlikely to introduce significant disturbance into the open fields where feeding and roosting birds tend to occur. This option is considered 'Preferred' as the construction and use of the greenway along this route is unlikely to cause any significant disturbance to the terrestrial fauna that occurs in the area.

Option 4 – Green

- 19.2.20 This option encounters a small area of natural habitat where it departs from the railway embankment track and follows the tidal channel. Here small areas of the habitats Saltmarsh-Wet Grassland (CM2/GS4) occur. The saltmarsh habitats are linked to, 'Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) (1330)' annexed under Annex I of the EU natural habitats directive. These habitats also provide feeding habitat for a variety of birdlife in particular wader species such as Curlew and Oystercatcher. This habitat is of high value local importance.
- 19.2.21 Above any area liable to flood at extremely high tides these important habitats do not occur.
- 19.2.22 For the remainder this route follows hedgerows and field boundaries.

- 19.2.23 Existing Hedgerows (WL1) along the field margins on this route are generally good examples of their habitat types with well-developed and dense mix of woody species. They support a variety of shrub and tree species and providing an important network of wildlife corridor at the site evaluated as of Moderate-Low Locally Important conservation value.
- 19.2.24 The hedgerows along the route corridor are above areas liable to flood and as such the route following these hedgerows is above the area of wet grassland and/or modified saltmarsh liable to flood and to which saline influence encroaches. The hedgerows along the field margins are very much dominated by Hawthorn (*Crataegus monogyna*) and some Elder (*Sambucus nigra*). In addition, Blackthorn (*Prunus spinosa*), Gorse (*Ulex europaeus*), Bramble (*Rubus fruticosus* agg.) and willows (*Salix* spp.) occur.
- 19.2.25 At the field margin hedgerow interface tall grasses occur including False Oat grass (*Arrhenatherum elatius*) and Cock's-foot grass (*Dactylis glomerata*).
- 19.2.26 The crossing of the area of wet grassland/saltmarsh and the tidal channels are the principal constraints to Option 4 but proper engineering solutions would mitigate against any significant impact to these habitats, ideally the boardwalks as proposed, and therefore Option 4 is considered a preferred option.
- 19.2.27 Option 4 follows the same line as Route Option 3 as far as the second crossing of the Pill River. At this location, the Pill is a very small watercourse fringed by riparian scrub and boundary hedgerows. Option 4 swings to the north and follows the local road towards the R126 (Hearse Road) and approaches the existing gate into Newbridge Demesne from the northeast.
- 19.2.28 The fields east of the Pill, i.e. between the stream and the railway embankment, are occasionally used by feeding and roosting birds during the winter months. Roe & Lovatt (2009) recorded one large flock of Brent Geese feeding in these fields during their winter survey. Additional survey work was carried out in these fields during the winter of 2011/2012 and did not record use of these fields by feeding Brent Geese. A contemporary survey of these fields in the winter of 2016/2017 did not record Brent Geese using these areas (Butler & Lewis 2017). Given that these fields are occasionally used by feeding wildfowl and large wading birds the section of Options 3 and 4 which parallels the Pill River to the northwest is marginally less preferred than the corresponding part of Options 5 and 6 which follow the railway embankment northwards for three fields before swinging westwards towards the second crossing of the Pill. Both Options 3 and 4 have somewhat more potential for the disturbance of birds and mammals by traversing areas closer to where wintering flocks of birds such as Brent Geese are known to occur. However, the potential risk for significant disturbance is judged to be low given the size of the fields and the micro-topography. Both of these options avoid the areas of greatest sensitivity for field feeding waterbirds and breeding mammals and are therefore considered to be 'Preferred' options.

Option 5 – Orange

- 19.2.29 This route encounters a very small area of natural habitat along its length for the most part, following field margins and stony track road adjacent to the railway embankment. The field margins are dominated by hedgerows.
- 19.2.30 Existing Hedgerows (WL1) along the field margins on this route are generally good examples of their habitat types with well-developed and dense mix of woody species. They

support a variety of shrub and tree species and provide an important network of wildlife corridor at the site evaluated as of Moderate-Low Locally Important conservation value.

- 19.2.31 The hedgerows along the route corridor are above areas liable to flood and as such the route following these hedgerows is above the area of wet grassland and/or modified saltmarsh liable to flood and to which saline influence encroaches. The hedgerows along the field margins are very much dominated by Hawthorn (*Crataegus monogyna*) and some Elder (*Sambucus nigra*). In addition, Blackthorn (*Prunus spinosa*), Gorse (*Ulex europaeus*), Bramble (*Rubus fruticosus* agg.) and willows (*Salix* spp.) occur.
- 19.2.32 At the field margin hedgerow interface tall grasses occur including False Oat grass (*Arrhenatherum elatius*) and Cock's-foot grass (*Dactylis glomerata*). Because Option 5 encounters very little areas of habitat of conservation interest it is considered to be a most preferred option.
- 19.2.33 Options 5 and 6 follow the railway embankment northwards for three fields further than Options 3 and 4 after the Pill Estuary Crossing. Option 5 then swings westwards towards the second crossing of the Pill. From thereon Option 5 and Route Option 3 have a common course.
- 19.2.34 Option 5 is the 'Most Preferred' in terms of an assessment of potential impacts on birds and mammals. By closely following the railway embankment northwards towards the local road, this option minimises the potential for disturbance of birds feeding in the fields to the west. There are no known breeding or resting places of protected mammals, along or adjacent to this option.

Option 6 – Yellow

- 19.2.35 This option encounters very little areas of natural habitat along its length, for the most part following field margins and the stony track road adjacent to the railway embankment. The first part of the route follows the stony track adjacent to the railway embankment for the length of three fields whence it veers west to follow the northern part of Option 4 where it follows hedgerows and field boundaries.
- 19.2.36 Existing Hedgerows (WL1) along the field margins on this route are generally good examples of their habitat types with well-developed and dense mix of woody species. They support a variety of shrub and tree species and provide an important network of wildlife corridor at the site evaluated as of Moderate-Low Locally Important conservation value.
- 19.2.37 The hedgerows along the route corridor are above areas liable to flood and as such the route following these hedgerows is above the area of wet grassland and/or modified saltmarsh liable to flood and to which saline influence encroaches. The hedgerows along the field margins are very much dominated by Hawthorn (*Crataegus monogyna*) and some Elder (*Sambucus nigra*). In addition, Blackthorn (*Prunus spinosa*), Gorse (*Ulex europaeus*), Bramble (*Rubus fruticosus* agg.) and willows (*Salix* spp.) occur.
- 19.2.38 At the field margin hedgerow interface tall grasses occur including False Oat grass (*Arrhenatherum elatius*) and Cock's-foot grass (*Dactylis glomerata*).
- 19.2.39 Because this route encounters very little areas of habitat of conservation interest it is considered to be a most preferred route.

19.2.40 Options 5 and 6 follow the railway embankment northwards for three fields further than Options 3 and 4 after the Pill Estuary crossing. Option 6 from thereon shares a course with Option 4. As with the previous option, Option 6 is also considered 'Most Preferred' in terms of terrestrial fauna. It has low potential for significant disturbance or displacement of protected species.

19.3 Option Preferences

Section 1 – Malahide Demesne

Habitat and Botanical Appraisal

Section 1 Options	Preference
(1) Green	Most Preferred
(2) Orange	Preferred
(3) Pink	Most Preferred
(4) Blue	Most Preferred
(5) Cyan	Most Preferred
(6) Yellow	Most Preferred

Birds and Mammal Appraisal

Section 1 Options	Preference
(1) Green	Most Preferred
(2) Orange	Most Preferred
(3) Pink	Most Preferred
(4) Blue	Most Preferred
(5) Cyan	Most Preferred
(6) Yellow	Most Preferred

Section 3 – R106 Dublin Road to Bissets Strand

Habitat and Botanical Appraisal

Section 3 Options	Preference
(1) Blue	Most Preferred
(2) Orange	Most Preferred
(3) Green	Most Preferred
(4) Pink	Most Preferred
(5) Yellow	Most Preferred

Terrestrial Fauna

Section 3 Options	Preference
(1) Blue	Preferred
(2) Orange	Preferred
(3) Green	Preferred
(4) Pink	Most Preferred
(5) Yellow	Most Preferred

Section 5 – North Shore of Malahide Estuary to R126 Hearse Road

Habitat and Botanical Appraisal

Section 5 Options	Preference
(1) Pink	Acceptable
(2) Blue	Most Preferred
(3) Cyan	Preferred
(4) Green	Preferred
(5) Orange	Most Preferred
(6) Yellow	Most Preferred

Birds and Mammal Appraisal

Section 5 Options	Preference
(1) Pink	Least Acceptable
(2) Blue	Least Acceptable
(3) Cyan	Preferred
(4) Green	Preferred
(5) Orange	Most Preferred
(6) Yellow	Most Preferred

20.0 Air Quality and Climate

20.1 Introduction

- 20.1.1 This chapter considers a route selection review of potential options of the proposed development in terms of air quality and climate. For the purposes of this route selection study the requirements outlined in the Transport Infrastructure Ireland (TII) (formerly the National Roads Authority (NRA)) *Guidelines for the Treatment of Air Quality During the Planning and Construction of National Road Schemes* (TII, 2011) have been used as a basis for this report.
- 20.1.2 A constraints study has been prepared previously in relation to the project (see Volume 4A). This constraints study identified existing sensitive receptors within the study area along with the existing air pollution sources in the area. Furthermore, the constraints study presented a description of the existing air quality in the region and also discussed opportunities for mitigation.

20.2 Assessment Methodology

- 20.2.1 The TII document entitled *Guidelines for the Treatment of Air Quality During the Planning and Construction of National Road Schemes* (TII, 2011) provides guidance on the route selection assessment procedures in "Chapter 2 - Route Selection". The primary aspects of the assessment relate to existing ambient air quality and the proximity of sensitive locations.
- 20.2.2 The objective at this stage of the route selection process is to indicate whether there are likely to be significant air quality impacts associated with particular broadly defined routes. In the current assessment, the number of residential properties within 50m of the edge of each route has been identified.

20.3 Study Area

- 20.3.1 The scheme has been divided into different sections which are described below:
- Section 1 – This section considers the area where the proposed greenway is extended into Malahide Demesne.
 - Section 2 – This section considers the area where the proposed greenway connects the proposed greenway between the town of Malahide and Malahide Demesne via the main Malahide-Dublin Road.
 - Section 3 – This section considers the area where the proposed greenway commences on the north side of the Malahide-Dublin Road and ends at Bissets Strand.
 - Section 4 – This section is where the proposed route crosses the Malahide Estuary and passes through the Malahide/Swords SPA/SAC.
 - Section 5 – This section considers the area where the greenway passes through the townland of Kilcrea. This is the only potential "new build" section of the scheme whereby it is proposed to construct a boardwalk along the northern shore of the estuary.
 - Section 6 – This section considers the area where the greenway passes through Newbridge Demesne.

20.4 Baseline Air Quality

Air Pollution Sources

- 20.4.1 The major source of air pollution within the study area is road traffic from the R106, R124, R126 and to a lesser extent, the local roads in Malahide and Donabate. Air quality is variable and subject to significant spatial variation, with concentrations generally falling significantly with distance from major road sources (UK DEFRA, 2003). The Dublin to Belfast Rail Line is also a minor source of air pollution within the study area.
- 20.4.2 A review of IPPC licences issued by the EPA (2017) for the region shows no IPPC licensed facilities with emissions to atmosphere within the study area.

Meteorological Data

- 20.4.3 A key factor in assessing temporal and spatial variations in air quality is the prevailing meteorological conditions. Depending on wind speed and direction, individual receptors may experience very significant variations in pollutant levels under the same source strength (i.e. traffic levels) (WHO, 2006). Wind is of key importance in dispersing air pollutants and for ground level sources, such as traffic emissions, pollutant concentrations are generally inversely related to wind speed. Thus, concentrations of pollutants derived from traffic sources will generally be greatest under very calm conditions and low wind speeds when the movement of air is restricted. In relation to PM₁₀, the situation is more complex due to the range of sources of this pollutant, and thus measured levels of PM₁₀ can be a non-linear function of wind speed.
- 20.4.4 The nearest representative weather station collating detailed weather records is Dublin Airport meteorological station, which is located approximately 6.5km southwest of the site. For data collated during five representative years (2012-2016), the predominant wind direction is westerly and southwesterly with an average wind speed of approximately 5m/s.

Air Quality Zones in Ireland

- 20.4.5 As part of the implementation of the Framework Directive on Air Quality (1996/62/EC), four air quality zones have been defined in Ireland for air quality management and assessment purposes (EPA, 2016). Dublin is defined as Zone A and Cork as Zone B. Zone C is composed of 23 towns with a population of greater than 15,000. The remainder of the country, which represents rural Ireland but also includes all towns with a population of less than 15,000, is defined as Zone D. In terms of air monitoring, the study area south of the Malahide Estuary is categorised as Zone A whilst the study area within the Malahide Estuary and north of the estuary around Donabate is categorised as Zone D (EPA, 2016).

EPA/Local Authority Monitoring Programmes

- 20.4.6 Air quality monitoring programs have been undertaken throughout Ireland in recent years by the EPA and Local Authorities. The most recent EPA annual report on air quality monitoring undertaken throughout Ireland is entitled *Air Quality In Ireland 2015 - Key Indicators of Ambient Air Quality* (EPA, 2016). Although no EPA or Local Authority monitoring has been carried out within the study area, data from Zone A and Zone D locations in Ireland can be used to provide an indication of the prevailing air quality conditions.

Review of EPA Monitoring Data

- 20.4.7 The TII Guidelines (TII, 2011) state that the local air quality assessment should focus on NO₂ and PM₁₀, as these are the pollutants of greatest concern with respect to road traffic conditions.
- 20.4.8 With regard to NO₂, continuous monitoring data from the EPA at suburban Zone A locations in Rathmines, Ballyfermot, Dun Laoghaire, Ringsend and Blanchardstown show that current levels of NO₂ are below the annual limit value with no exceedances of the one-hour limit value. Average levels ranged from 13µg/m³ in Swords to 25µg/m³ in Blanchardstown in 2015. Based on these results, a conservative estimate of the background NO₂ concentration in Malahide in 2017 is 20µg/m³.
- 20.4.9 The results of NO₂ monitoring carried out at the urban Zone D locations of Castlebar Emo Court and Kilkitt in 2015 indicated an average NO₂ concentration of between 2-8µg/m³ with no exceedances of the one-hour limit value. Long-term NO₂ monitoring was carried out at the Zone C locations of Kilkenny Seville Lodge and Portlaoise. The NO₂ annual average in 2015 for these sites was between 5-10µg/m³ with no exceedance of the one-hour limit value. Hence, the long-term average concentrations measured at these locations were significantly lower than the annual average limit value of 40µg/m³. Based on the above information, a conservative estimate of the 2017 background NO₂ concentration in Donabate is 12µg/m³.
- 20.4.10 Continuous PM₁₀ monitoring carried out at the suburban Zone A locations of Rathmines, St Anne's Park, Davitt Road, Ballyfermot, Dun Laoghaire and Tallaght showed average levels of 12-17µg/m³ in 2015 with at most 9 exceedances (in Blanchardstown) of the 24-hour limit value of 50µg/m³ (35 exceedances are permitted per year). In addition, the average PM₁₀ level at the urban background monitoring location in the Phoenix Park in 2015 was 11 µg/m³, with only two exceedances of 50 µg/m³. Based on the EPA data, a conservative estimate of the background PM₁₀ concentration in Malahide in 207 is 18µg/m³.
- 20.4.11 Long-term PM₁₀ monitoring was carried out at the urban Zone D locations of Castlebar and Claremorris in 2015. The average concentrations measured at each of these sites were 13 and 10µg/m³, respectively. Long-term PM₁₀ measurements carried out at the rural Zone D location in Kilkitt in 2015 gave an average level of 9µg/m³. Based on the above information a conservative estimate of the 2017 background PM₁₀ concentration for Donabate is 14µg/m³.

20.5 Sensitive Receptors

- 20.5.1 The number of receptors sensitive to air quality within 50m of the edge of each of the proposed routes has been determined. Receptors for the purpose of this assessment are regarded as residential buildings. At this stage of the assessment no further distinction is made between different types of property. In general, the sensitive receptors consist primarily of residential houses located in Malahide, Donabate and Kilcrea Townland. A number of schools are also located in these areas.
- 20.5.2 The most sensitive receptor with respect to air quality impacts on ecology is the Malahide Estuary which is classified as a pNHA, SPA and SAC.

20.5.3 For the purposes of the route selection the proposal will be considered in terms of the following areas:

- Section 1 – Malahide Demesne: This section of the proposal includes six route options which all commence at the Malahide Castle car park and terminate at the Malahide Road.
- Section 2 – R106 Dublin Road, Malahide: This section of the proposed scheme includes five route options. Options 1, 2 and 5 involve the installation of pedestrian crossings and new road markings. Options 3 and 4 will involve road works with an associated construction period of up to 12 weeks.
- Section 3 – R106 Dublin Road to Bissets Strand: These include Options 1 to 5. All options commence at the Malahide-Dublin Road and end at Bissets Strand. Car parking for 8-10 cars will be provided at Bissets Strand.
- Section 4 – Bissets Strand to the North Shore of Malahide Estuary: All options will follow on the existing western embankment of the railway causeway across Malahide Estuary. Uprights for the greenway bridge are in place at the causeway weir.
- Section 5 – North Shore of Malahide Estuary to R126 Hearse Road: This is the only “new build” section of the route across agricultural land. Six options will commence once the greenway on the causeway reaches the northern shore. The options terminate at the gate of Newbridge Demesne.
- Section 6 – Newbridge Demesne: This is the final leg of the project. The principal route ends at the car park in front of Newbridge House.

20.5.4 Table 20.1 outlines the route options in the various sections and ranks them in order of number of receptors within 50m.

Table 20.1 Ranking of Route Options.

Section	Option Number	No. of Receptors	Ranking
1	Option 1 – Green	2	=1
	Option 2 – Orange	2	=1
	Option 3 – Pink	6	4
	Option 4 – Blue	9	6
	Option 5 – Cyan	4	3
	Option 6 – Yellow	7	5
2	Option 1 – Orange	4	1
	Option 2 – Pink	8	2
	Option 3 – Cyan	10	4
	Option 4 – Green	9	3
	Option 5 – Blue	14	5
3	Option 1 – Blue	112	3
	Option 2 – Orange	122	4
	Option 3 – Green	48	=1
	Option 4 – Pink	48	=1
	Option 5 – Yellow	77	2
4	Option 1 – Green	38	N/A
5	Option 1 – Pink	13	6
	Option 2 – Blue	5	2
	Option 3 – Cyan	7	5
	Option 4 – Green	4	1
	Option 5 – Orange	6	=3
	Option 6 – Yellow	6	=3
6	Option 1 – Cyan	3	N/A

- 20.5.5 In terms of Section 4 – Bissets Strand to the North Shore of Malahide Estuary there are a number of options being considered in terms of solid barriers at the request of the National Parks & Wildlife Service (NPWS). Currently recommendations are for a dry stone wall or precast wall. In terms of the day-to-day operations there is no preference from an air quality point of aspect to which type of construction is implemented.
- 20.5.6 Based the above comments, the following tier of preferences were identified in relation to air quality:

Table 20.2 Preference of Route Options.

Section	Route	Ranking	Preference
1	Option 1 – Green	=1	Most Preferred
	Option 2 – Orange	=1	Most Preferred
	Option 5 – Cyan	3	Most Preferred
	Option 3 – Pink	4	Most Preferred
	Option 6 – Yellow	5	Most Preferred
	Option 4 – Blue	6	Most Preferred
2	Option 1 – Orange	1	Most Preferred
	Option 2 – Pink	2	Most Preferred
	Option 4 – Green	3	Most Preferred
	Option 3 – Cyan	4	Most Preferred
	Option 5 – Blue	5	Most Preferred
3	Option 3 – Green	=1	Most Preferred
	Option 4 – Pink	=1	Most Preferred
	Option 5 – Yellow	2	Most Preferred
	Option 1 – Blue	3	Most Preferred
	Option 2 – Orange	4	Most Preferred
5	Option 4 – Green	1	Most Preferred
	Option 2 – Blue	2	Most Preferred
	Option 5 – Orange	=3	Most Preferred
	Option 6 – Yellow	=3	Most Preferred
	Option 3 – Cyan	5	Most Preferred
	Option 1 – Pink	6	Most Preferred

20.6 Impacts on Sensitive Ecosystems

- 20.6.1 The EC Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Fauna and Flora (the “Habitats Directive”) requires an Appropriate Assessment to be carried out where there is likely to be a significant impact upon a European protected site. The TII requires the air quality specialist to liaise with an ecologist on schemes where there is a European protected site within 2km of the route. However, as the potential impact of a scheme is limited to local level, detailed consideration need only be given to roads where there is a significant change to traffic flows (>5%) and the designated site lies within 200m of the road centre line. Where these two requirements are fulfilled, the assessment at the route selection stage involves a calculation of nitrogen oxides (NO_x) concentrations using the DMRB screening method.
- 20.6.2 As previously mentioned the proposed scheme will follow the existing western embankment of the railway causeway across Malahide Estuary. Malahide Estuary is classified as a pNHA, SPA and SAC. However, due to the nature of this scheme, i.e. it is a proposed walk/cycleway and not a road, there is no need to consider the impact of air quality on the Malahide Estuary.

20.7 Opportunities for Mitigation

- 20.7.1 The potential for dust to be emitted depends on the type of construction activity being carried out in conjunction with environmental factors including levels of rainfall, wind speeds and wind direction. The potential for impact from dust depends on the distance to potentially sensitive locations and whether the wind can carry the dust to these locations. The majority of any dust produced will be deposited close to the potential source and any impacts from dust deposition will typically be within 200m of the construction activities.
- 20.7.2 In order to minimise dust emissions during construction, a series of mitigation measures have been prepared for implementation during the construction phase of the project. These measures are as follows:
- Site roads will be regularly cleaned and maintained as appropriate. Hard surface roads will be swept to remove mud and aggregate materials from their surface while any unsurfaced roads will be restricted to essential site traffic only. Any road that has the potential to give rise to fugitive dust will be regularly watered during dry and/or windy conditions.
 - Vehicles using site roads will have their speeds restricted where there is a potential for dust nuisance at nearby properties.
 - Before entrance onto public roads, trucks will be adequately inspected to ensure no potential for dust emissions.
 - Material handling systems and site stockpiling of materials will be designed and laid out to minimise exposure to wind. Water misting or sprays will be used as required if particularly dusty activities are necessary during dry or windy periods.
 - The dust minimisation procedures put in place will be monitored and assessed in the event of dust nuisance occurring outside the site boundary, the effectiveness of existing measures will be reviewed and further mitigation will be implemented to rectify the problem.
- 20.7.3 Provided the dust minimisation measures outlined above are adhered to, the air quality impacts during the construction phase will not be significant.

20.8 Summary and Conclusions

- 20.8.1 The route option which should be chosen from an air quality perspective is the one which affects the least amount of sensitive receptors.
- 20.8.2 The amount of sensitive receptors which are affected by each of the route options can be seen in Table 20.1 above. However, from Table 20.2 above it can be seen that all options are deemed ‘most preferred’ as it is unlikely that any sensitive receptor will experience concentrations which exceed the ambient limit values. This is due to the nature of this scheme, the existing air quality and the limited and temporary nature of construction activities.

21.0 Noise and Vibration

21.1 Introduction

- 21.1.1 This chapter considers a route selection review of potential options of the proposed development in terms of noise and vibration. For the purposes of this route section study the requirements outlined in the Transport Infrastructure Ireland (TII) *Guidelines for the Treatment of Noise & Vibration* have been used as a basis for this report.
- 21.1.2 A constraints study has been prepared previously in relation to the project (see Volume 4A). This constraints study identified existing noise and vibration sensitive receptors within the study area along with the existing noise and vibration sources in the area. Furthermore, the constraints study presented a qualitative description of the existing noise and vibration climate, and presented a high level discussion in relation to opportunities for mitigation in terms of noise and vibration impacts associated with the proposed scheme.
- 21.1.3 Appendix G presents a glossary of the acoustic terminology used in this chapter.

21.2 Methodology and Sources of Information

- 21.2.1 For the purposes of this assessment it is appropriate to clearly define what is considered noise and additionally what constitutes a noise sensitive location. The following definitions have been sourced from the Environmental Protection Agency (EPA) document *Guidance Note for Noise: Licence Applications, Surveys and Assessments in Relation to Scheduled Activities (NG4)*:
- “Noise: Any sound, that has the potential to cause disturbance, discomfort or psychological stress to a person exposed to it, or any sound that could cause actual physiological harm to a person exposed to it, or physical damage to any structure exposed to it, is known as noise.”
 - “Noise sensitive location(NSL): Any dwelling house, hotel or hostel, health building, educational establishment, place of worship or entertainment, or any other facility or other area of high amenity which for its proper enjoyment requires the absence of noise at nuisance levels.”
- 21.2.2 While the definitions presented in the NG4 guidance are of assistance here the overall guidance contained within the document should be considered in the light of the following applicability statement contained within the document: “Note that the guidance within this document relates to the assessment and measurement of noise in relation to Agency scheduled activities only. The guidance does not relate to construction and/or off-site transportation noise. For any construction related noise, this process is generally covered by the conditions of the planning permission and it does not relate to the licensable activity on site.... All off-site transportation activities and construction related issues are typically covered in other guidance documents and best practice standards (see Chapter 11). In other instances, a competent person should be retained to develop a suitably robust noise assessment protocol for the issue in question.”
- 21.2.3 It is considered that any detailed noise assessment carried out on the proposal in question will require detailed consideration to any proposed noise criteria and that a verbatim application of EPA guidance may not be appropriate.

- 21.2.4 The following has been conducted to assess the impact rating of each of the five routes under consideration.
- Property counts have been conducted within a 50m band either side of the centreline of each route.
 - An assessment of the likely requirement for noise mitigation has been performed for each route. This has focused on the construction phase.
- 21.2.5 This report has been prepared with due consideration to Chapter 4 of the TII (formerly NRA) document *Guidelines for the Treatment of Noise and Vibration in National Road Schemes, Revision 1, 25 October 2004*. Variations to the methodology prescribed in this document have been adopted where appropriate.

21.3 Receiving Environment

General Description of Prevailing Noise Climate

- 21.3.1 A general description of the noise environment along various sections of the proposed route is detailed in the following paragraphs.

Section 1s, 2 and 3

- 21.3.2 These sections consider the area where the proposed greenway commences in the town of Malahide and run to the edge of the estuary.
- 21.3.3 The ambient noise levels (i.e. L_{Aeq} levels) are dictated by road traffic noise associated with the local network. Ambient noise levels are also affected, by varying degrees depending on proximity, by train movements on the Dublin to Belfast rail line. Aircraft noise associated with Dublin Airport would also be expected in the area.
- 21.3.4 The strategic noise mapping completed by Fingal County Council for the area as part of the requirements of the *Environmental Noise Regulations*¹ (2006) has been reviewed and the expected ambient noise levels in the area are as follows:

L_{day} (dB)	$L_{evening}$ (dB)	L_{night} (dB)	L_{den} (dB)
55–65	55–60	45–55	60–65

- 21.3.5 Note that review of the relevant strategic noise maps of the Malahide Demesne indicate that existing noise levels are some 10dB below the levels stated in the above table.
- 21.3.6 Background noise levels in the area will be typically dictated by distant road traffic noise, wind generated noise and other anthropogenic sources.

Section 4 – Bissets Strand to the North Shore of Malahide Estuary

- 21.3.7 Covering the section of the proposed route that crosses the Malahide Estuary and passes through the Malahide/Swords SPA.

¹ Which transpose into Irish law EU Directive 2002/49/EC.

- 21.3.8 The ambient noise levels (i.e. L_{Aeq} levels) are dictated by noise associated with train movements along the Dublin to Belfast railway line.
- 21.3.9 The strategic noise mapping completed by Fingal County Council for the area has been reviewed and the expected ambient noise levels in the area are as follows:

L _{day} (dB)	L _{evening} (dB)	L _{night} (dB)	L _{den} (dB)
55–65	55–60	45–55	60–65

- 21.3.10 Background noise levels in the area will be typically dictated by distant road traffic noise, wind generated noise and other anthropogenic sources.

Section 5 – North Shore of Malahide Estuary to R126 Hearse Road

- 21.3.11 This section considers the area where the walkway passes through the townland of Kilcrea.
- 21.3.12 The ambient noise levels (i.e. L_{Aeq} levels) and background noise levels are dictated by distant road traffic noise associated with the local network depending on the proximity to this infrastructure along with other anthropogenic sources.
- 21.3.13 The strategic noise mapping completed by Fingal County Council for the area has been reviewed and the expected ambient noise levels in the area are as follows:

L _{day} (dB)	L _{evening} (dB)	L _{night} (dB)	L _{den} (dB)
≤45–50	≤45–50	≤45–50	≤45–55

Section 6 – Newbridge Demesne

- 21.3.14 This section considers the area where the walkway passes through the Newbridge Demesne and into the town of Donabate.
- 21.3.15 The ambient noise levels (i.e. L_{Aeq} levels) are dictated by road traffic noise associated with the local network depending on the proximity to this infrastructure.
- 21.3.16 The strategic noise mapping completed by Fingal County Council for the area has been reviewed and the expected ambient noise levels in the area are as follows:

L _{day} (dB)	L _{evening} (dB)	L _{night} (dB)	L _{den} (dB)
≤45–50	≤45–50	≤45–50	≤45–55

- 21.3.17 Background noise levels in the area will be typically dictated by distant road traffic noise, wind generated noise and other anthropogenic sources.

Noise and Vibration Sensitive Locations

- 21.3.18 In general the noise sensitive locations consist primarily of residential houses located in the towns of Donabate and Malahide at the peripheral ends of the proposed route and along local roads.
- 21.3.19 Other noise sensitive areas that should be noted relate to the Malahide Estuary SPA for its amenity and ecological value and the Newbridge demesne, again for its amenity value.

Existing Noise and Vibration Sources

- 21.3.20 As discussed, the significant noise sources in the area relate to infrastructural elements including:
- the local road network;
 - Dublin to Belfast railway line; and
 - aircraft flight paths.
- 21.3.21 Vibration levels in the vicinity of existing sensitive properties are typically dictated by traffic movements on local roads and rail network. Levels associated with existing roads and rail would not be expected to be of a magnitude sufficient to cause disturbance to people or structural damage to property.

21.4 Ranking of Routes

- 21.4.1 For the purposes of the route selection the proposal will be considered in terms of the following areas:
- Section 1 – Malahide Demesne: The options in this section of the greenway connect the existing car park at Malahide Castle to the northern demesne wall at Malahide. There are no proposed extensions to either the castle car park or the Bridgefield car park. The options (1-6) follow existing pathways.
 - Section 2 – R106 Dublin Road, Malahide: The boundaries to this section are the southern and northern boundary walls adjacent to the roads footpaths. There are five options for crossing the road.
 - Section 3 – R106 Dublin Road to Bissets Strand: All five options would commence at the north side of the Malahide-Dublin Road and end at Bissets Strand. Regardless of option, signage will be provided from Malahide Railway Station to the greenway.
 - Section 4 – Bissets Strand to the North Shore of Malahide Estuary: All options will follow on the existing western embankment of the railway causeway across Malahide Estuary. Uprights for the greenway bridge are in place at the causeway weir.
 - Section 5 – North Shore of Malahide Estuary to R126 Hearse Road: This is the only “new build” section of the route across agricultural land. There are six options in this section. The options commence once the greenway on the causeway reaches the northern shore. The options terminate at the gate of Newbridge Demesne.
 - Section 6 – Newbridge Demesne: This is the final leg of the project. The route ends at the car park in front of Newbridge House.
- 21.4.2 Table 21.1 below outlines the route options in the various sections and ranks them in order of number or receptors within 50m.

Table 21.1 Ranking of Route Options.

Section	Option Number	Option Title	No. of Receptors	Ranking
1	1	Green	2	=1
	2	Orange	2	=1
	3	Pink	6	4
	4	Blue	9	6
	5	Cyan	4	3
	6	Yellow	7	5
2	1	Orange	4	1
	2	Pink	8	2
	3	Cyan	10	4
	4	Green	9	3
	5	Blue	14	5
3	1	Blue	112	4
	2	Orange	122	5
	3	Green	48	=1
	4	Pink	48	=1
	5	Yellow	77	3
4	1	Green	38	N/A
5	1	Pink	13	6
	2	Blue	5	2
	3	Cyan	7	5
	4	Green	4	1
	5	Orange	6	=3
	6	Yellow	6	=3
6	1	Cyan	3	N/A

- 21.4.3 In terms of Section 4 – Bissets Strand to the North Shore of Malahide Estuary there are a number of options being considered in terms of solid barriers at the request of the National Parks & Wildlife Service (NPWS). Currently recommendations are for a dry stone wall or precast wall. In terms of the day-to-day operations there is no preference from a noise and vibration point of aspect to which type of construction is implemented.
- 21.4.4 Based the above comments and on the PIR rankings the following tier of preferences were identified in relation to noise and vibration:

Table 21.2 Preference of Route Options

Section	Route	Option Title	Ranking	Preference
1	1	Green	=1	Most Preferred
	2	Orange	=1	Most Preferred
	5	Cyan	3	Acceptable
	3	Pink	4	Acceptable
	6	Yellow	5	Acceptable
	4	Blue	6	Acceptable
2	1	Orange	1	Most Preferred
	2	Pink	2	Acceptable
	4	Green	3	Acceptable
	3	Cyan	4	Acceptable
	5	Blue	5	Acceptable
3	3	Green	=1	Most Preferred
	4	Pink	=1	Most Preferred
	5	Yellow	3	Acceptable
	1	Blue	4	Acceptable
	2	Orange	5	Acceptable

Section	Route	Option Title	Ranking	Preference
5	4	Green	1	Most Preferred
	2	Blue	2	Acceptable
	5	Orange	=3	Acceptable
	6	Yellow	=3	Acceptable
	3	Cyan	5	Acceptable
	1	Pink	6	Acceptable

21.5 Opportunities for Mitigation

- 21.5.1 It is considered that the construction phase of the proposed greenway would have the greater potential to generate noise and vibration impacts. In general, good practice measures as contained within *BS 5228: 2008 – Code of practice for noise and vibration control on construction and open sites – Part 1: Noise and Part 2: Vibration* should be considered and implemented where necessary in order to mitigate any issues that may arise.
- 21.5.2 The works will be managed with a 'Best Practice' approach to dealing with potential noise and vibration emissions during the construction phase of the proposed greenway. The following guidance should be adopted by all contractors and sub-contractors involved in construction activities on the site. The Site Manager should ensure that adequate instruction is provided to contractors regarding the control measures outlined here.
- 21.5.3 The assessment presented here for the construction activity has highlighted that construction noise and vibration levels can be controlled to within relevant criteria identified as part of the environmental impact assessment. However, mitigation measures should be implemented in order to further reduce impacts to nearby sensitive areas.

Hours of Work

- 21.5.4 The proposed general construction hours are 07:00 to 19:00hrs, Monday to Friday and 08:00 to 13:00 on Saturdays.

Best Practice Guidelines for the Control of Noise and Vibration

- 21.5.5 BS5228 includes guidance on several aspects of construction site mitigation measures, including, but not limited to:
- selection of quiet plant;
 - control of noise sources;
 - screening;
 - hours of work;
 - liaison with the public; and
 - monitoring.
- 21.5.6 Detailed comment is offered on these items in the following paragraphs. Noise and vibration control measures that will be considered include the selection of suitable plant, enclosures and screens around noise sources, limiting the hours of work and monitoring.

Selection of Quiet Plant

- 21.5.7 This practice is recommended in relation to sites with static plant such as compressors and generators. It is recommended that these units be supplied with manufacturers'

proprietary acoustic enclosures where possible. The potential for any item of plant to generate noise will be assessed prior to the item being brought onto the site. The least noisy item should be selected wherever possible. Should a particular item of plant already on the site be found to generate high noise levels, the first action should be to identify whether or not said item can be replaced with a quieter alternative.

General Comments on Noise Control at Source

- 21.5.8 If replacing a noisy item of plant is not a viable or practical option, consideration should be given to noise control “at source”. This refers to the modification of an item of plant or the application of improved sound reduction methods in consultation with the supplier. For example, resonance effects in panel work or cover plates can be reduced through stiffening or application of damping compounds; rattling and grinding noises can often be controlled by fixing resilient materials in between the surfaces in contact.
- 21.5.9 BS5228 states that “as far as reasonably practicable sources of significant noise should be enclosed”. In applying this guidance, constraints such as mobility, ventilation, access and safety must be taken into account. Items suitable for enclosure include pumps and generators. Demountable enclosures will also be used to screen operatives using hand tools and will be moved around site as necessary.
- 21.5.10 In practice, a balance may need to be struck between the use of all available techniques and the resulting costs of doing so. As with Ireland’s Environmental Protection Act legislation, it is proposed that the concept of “best available techniques not entailing excessive cost” (BATNEEC) be adopted. Furthermore, proposed noise control techniques should be evaluated in light of their potential effect on occupational safety etc.
- 21.5.11 BS5228 makes a number of recommendations in relation to “use and siting of equipment”. These are all directly relevant and hence are reproduced in full. These recommendations will be adopted on site.
 - “Plant should always be used in accordance with manufacturers’ instructions. Care should be taken to site equipment away from noise-sensitive areas. Where possible, loading and unloading should also be carried out away from such areas. Special care will be necessary when work has to be carried out at night.
 - Circumstances can arise when night-time working is unavoidable. Bearing in mind the special constraints under which such work has to be carried out, steps should be taken to minimise disturbance to occupants of nearby premises.
 - Machines such as cranes that may be in intermittent use should be shut down between work periods or should be throttled down to a minimum. Machines should not be left running unnecessarily, as this can be noisy and waste energy.
 - Plant known to emit noise strongly in one direction should, when possible, be orientated so that the noise is directed away from noise-sensitive areas. Attendant operators of the plant can also benefit from this acoustical phenomenon by sheltering, when possible, in the area with reduced noise levels.
 - Acoustic covers to engines should be kept closed when the engines are in use and idling. The use of compressors that have effective acoustic enclosures and are designed to operate when their access panels are closed is recommended.

- Materials should be lowered whenever practicable and should not be dropped. The surfaces on to which the materials are being moved could be covered by resilient material."
- 21.5.12 All items of plant should be subject to regular maintenance. Such maintenance can prevent unnecessary increases in plant noise and vibration and can serve to prolong the effectiveness of control measures.

Screening

- 21.5.13 Typically screening is an effective method of reducing the noise level at a receiver location and can be used successfully as an additional measure to all other forms of noise control. The effectiveness of a noise screen will depend on the height and length of the screen and its position relative to both the source and receiver.
- 21.5.14 The length of the screen should in practice be at least five times the height; however, if shorter sections are necessary then the ends of the screen should be bent around the source. The height of any screen should be such that there is no direct line of sight between the source and the receiver.
- 21.5.15 BS5228 states that on level sites the screen should be placed as close as possible to either the source or the receiver. The construction of the barrier should be such that there are no gaps or openings at joints in the screen material. In most practical situations the effectiveness of the screen is limited by the sound transmission over the top of the barrier rather than the transmission through the barrier itself. In practice screens constructed of materials with a mass per unit of surface area greater than 7kg/m² will give adequate sound insulation performance.
- 21.5.16 In addition, careful planning of the site layout should also be considered. The placement of site buildings such as offices and stores and in some instances materials such as topsoil or aggregate can provide a degree of noise screening if placed between the source and the receiver.

Liaison with the Public

- 21.5.17 The contractor will provide proactive community relations and will notify the public and sensitive premises before the commencement of any works forecast to generate appreciable levels of noise or vibration, explaining the nature and duration of the works. The contractor will distribute information circulars informing people of the progress of works and any likely periods of significant noise and vibration.
- 21.5.18 A designated noise liaison should be appointed to site during construction works. Any complaints should be logged and followed up in a prompt fashion. In addition, prior to any particular construction activity that has potential to generate significant levels of noise or vibration, e.g. heavy groundworks, etc, the site contact should inform the nearest sensitive locations of the time and expected duration of the works.

Noise Monitoring

- 21.5.19 During the construction phase consideration should be given to noise monitoring at the nearest sensitive locations.

21.5.20 Noise monitoring should be conducted in accordance with the International Standard ISO 1996: 2016: *Acoustics – Description, measurement and assessment of environmental noise* and be located a distance of greater than 3.5m away from any reflective surfaces, e.g. walls, in order to ensure a free-field measurement without any influence from reflected noise sources.

21.6 Summary and Conclusions

- 21.6.1 The prevailing noise climate in the route option study area varies from:
- urban areas (i.e. Malahide, Donabate) which are likely to experience an elevated noise level typical of such urban areas due to road traffic flows, rail noise and aircraft movements;
 - semi-rural areas (e.g. Malahide/Newbridge Demesne, Kilcrea townland) with low ambient and background noise levels due to distant road noise etc.;
 - a section of an SPA (e.g. rail embankment crossing the Malahide Estuary) where rail movements along the Dublin to Belfast railway line typically dictate ambient noise levels.
- 21.6.2 The most sensitive receptors in terms of noise and vibration are residential properties and certain wildlife within the SPA in the study area. The latter of these receptors being typically more sensitive to construction activities potentially associated with the development. Outline mitigation measures have been presented.
- 21.6.3 Based the above comments and on the route section carried out here the following tier of preferences were identified in relation to noise and vibration:

Table 21.3

Section	Route	Option Title	Ranking	Preference
1	1	Green	=1	Most Preferred
	2	Orange	=1	Most Preferred
	5	Cyan	3	Acceptable
	3	Pink	4	Acceptable
	6	Yellow	5	Acceptable
	4	Blue	6	Acceptable
2	1	Orange	1	Most Preferred
	2	Pink	2	Acceptable
	4	Green	3	Acceptable
	3	Cyan	4	Acceptable
	5	Blue	5	Acceptable
3	3	Green	=1	Most Preferred
	4	Pink	=1	Most Preferred
	5	Yellow	3	Acceptable
	1	Blue	4	Acceptable
	2	Orange	5	Acceptable
5	4	Green	1	Most Preferred
	2	Blue	2	Acceptable
	5	Orange	=3	Acceptable
	6	Yellow	=3	Acceptable
	3	Cyan	5	Acceptable
	1	Pink	6	Acceptable

- 21.6.4 Note Sections 4 and 6 of the route are fixed.

22.0 Summary of Option Analysis

22.1 Introduction

22.1.1 For comparative purposes all options have been placed in numerical sequence. Individual contributions in the preceding specialist sections may have considered the sequence of preference in slightly different ways. Each contributor has also utilised a preference framework as set out in Chapter 1.0, and repeated here for ease of reference. The summary of preferences in this chapter reflects this approach. The preference order in this chapter is distinctly based on the summation order given to the environmental topic assessments.

Preference Type	Single Option	Multiple/All Options
Most Preferred	An option which is considered to have a positive or no material negative effect on environmental attribute.	If multiple/all options have a positive or no material negative effect upon an environmental attribute, then multiple/all options should be identified as most preferred.
Preferred	An option which is considered to have a minor negative effect upon an environmental attribute.	If multiple/all options have a minor negative effect upon an environmental attribute, then multiple/all options should be identified as preferred.
Acceptable	An option which is considered to have a moderate negative effect upon an environmental attribute.	If multiple/all options have a moderate negative effect upon an environmental attribute, then multiple/all options should be identified as acceptable.
Least Acceptable	An option which is considered to have a potentially significant negative effect upon an environmental attribute.	If multiple/all options have a potentially significant negative effect upon an environmental attribute, then multiple/all options should be identified as least acceptable.

22.2 Section 1 – Malahide Demesne (Six Options)

Landscape

Section 1 Options	Preference
(1) Green	Preferred
(2) Orange	Preferred
(3) Pink	Most preferred
(4) Blue	Most preferred
(5) Cyan	Preferred
(6) Yellow	Preferred

Population and Human Health

Section 1 Options	Preference
(1) Green	Acceptable
(2) Orange	Acceptable
(3) Pink	Most Preferred
(4) Blue	Most Preferred
(5) Cyan	Preferred
(6) Yellow	Preferred

Architectural Heritage

Section 1 Options	Preference
(1) Green	Most Preferred
(2) Orange	Preferred
(3) Pink	Most Preferred
(4) Blue	Preferred
(5) Cyan	Most Preferred
(6) Yellow	Preferred

Archaeology and Cultural Heritage

Section 1 Options	Preference
(1) Green	Most Preferred
(2) Orange	Most Preferred
(3) Pink	Most Preferred
(4) Blue	Most Preferred
(5) Cyan	Most Preferred
(6) Yellow	Most Preferred

Land, Soils and Groundwater

Section 1 Options	Preference
(1) Green	Most Preferred
(2) Orange	Most Preferred
(3) Pink	Most Preferred
(4) Blue	Most Preferred
(5) Cyan	Most Preferred
(6) Yellow	Most Preferred

Surface Water

22.2.1 No predicted potential impacts upon aquatic environment.

Material Assets - Agronomy

22.2.2 No predicted potential impacts upon agronomy.

Biodiversity

Habitat and Botanical Appraisal

Section 1 Options	Preference
(1) Green	Most Preferred
(2) Orange	Preferred
(3) Pink	Most Preferred
(4) Blue	Most Preferred
(5) Cyan	Most Preferred
(6) Yellow	Most Preferred

Birds and Mammal Appraisal

Section 1 Options	Preference
(1) Green	Most Preferred
(2) Orange	Most Preferred
(3) Pink	Most Preferred
(4) Blue	Most Preferred
(5) Cyan	Most Preferred
(6) Yellow	Most Preferred

Air Quality

Section 1 Options	Preference
(1) Green	Most Preferred
(2) Orange	Most Preferred
(3) Pink	Most Preferred
(4) Blue	Most Preferred
(5) Cyan	Most Preferred
(6) Yellow	Most Preferred

Noise

Section 1 Options	Preference
(1) Green	Most Preferred
(2) Orange	Most Preferred
(3) Pink	Acceptable
(4) Blue	Acceptable
(5) Cyan	Acceptable
(6) Yellow	Acceptable

22.3 Section 2 – R106 Dublin Road, Malahide (Five Options)

Landscape

Section 2 Options	Preference
(1) Orange	Most Preferred
(2) Pink	Most Preferred
(3) Cyan	Most Preferred
(4) Green	Most Preferred
(5) Blue	Most Preferred

Population and Human Health

Section 2 Options	Preference
(1) Orange	Preferred
(2) Pink	Preferred
(3) Cyan	Acceptable
(4) Green	Acceptable
(5) Blue	Most Preferred

Architectural Heritage

Section 2 Options	Preference
(1) Orange	Most Preferred
(2) Pink	Most Preferred
(3) Cyan	Preferred
(4) Green	Preferred
(5) Blue	Most Preferred

Archaeology and Cultural Heritage

Section 2 Options	Preference
(1) Orange	Most Preferred
(2) Pink	Most Preferred
(3) Cyan	Most Preferred
(4) Green	Most Preferred
(5) Blue	Most Preferred

Land, Soils and Groundwater

Section 2 Options	Preference
(1) Orange	Most Preferred
(2) Pink	Most Preferred
(3) Cyan	Most Preferred
(4) Green	Most Preferred
(5) Blue	Most Preferred

Surface Water

22.3.1 No predicted potential impacts upon aquatic environment.

Material Assets - Agronomy

22.3.2 No predicted potential impacts upon agronomy.

Biodiversity

22.3.3 No predicted potential impacts upon biodiversity.

Air Quality

Section 2 Options	Preference
(1) Orange	Most Preferred
(2) Pink	Most Preferred
(3) Cyan	Most Preferred
(4) Green	Most Preferred
(5) Blue	Most Preferred

Noise

Section 2 Options	Preference
(1) Orange	Most Preferred
(2) Pink	Acceptable
(3) Cyan	Acceptable
(4) Green	Acceptable
(5) Blue	Acceptable

22.4 Section 3 – R106 Dublin Road to Bissets Strand (Five Options)

Landscape

Section 3 Options	Preference
(1) Blue	Preferred
(2) Orange	Preferred
(3) Green	Most Preferred
(4) Pink	Most Preferred
(5) Yellow	Most Preferred

Population and Human Health

Section 3 Options	Preference
(1) Blue	Acceptable
(2) Orange	Acceptable
(3) Green	Most Preferred
(4) Pink	Preferred
(5) Yellow	Preferred

Architectural Heritage

Section 3 Options	Preference
(1) Blue	Most Preferred
(2) Orange	Most Preferred
(3) Green	Most Preferred
(4) Pink	Most Preferred
(5) Yellow	Most Preferred

Archaeology and Cultural Heritage

Section 3 Options	Preference
(1) Blue	Most Preferred
(2) Orange	Most Preferred
(3) Green	Most Preferred
(4) Pink	Most Preferred
(5) Yellow	Most Preferred

Land, Soils and Groundwater

Section 3 Options	Preference
(1) Blue	Preferred
(2) Orange	Preferred
(3) Green	Most Preferred
(4) Pink	Preferred
(5) Yellow	Preferred

Surface Water

- 22.4.1 No predicted potential impacts upon aquatic environment.

Agronomy

- 22.4.2 No predicted potential impacts upon agronomy.

Biodiversity

Habitat and Botanical Appraisal

Section 3 Options	Preference
(1) Blue	Most Preferred
(2) Orange	Most Preferred
(3) Green	Most Preferred
(4) Pink	Most Preferred
(5) Yellow	Most Preferred

Terrestrial Fauna

Section 3 Options	Preference
(1) Blue	Preferred
(2) Orange	Preferred
(3) Green	Preferred
(4) Pink	Most Preferred
(5) Yellow	Most Preferred

Air Quality

Section 3 Options	Preference
(1) Blue	Most Preferred
(2) Orange	Most Preferred
(3) Green	Most Preferred
(4) Pink	Most Preferred
(5) Yellow	Most Preferred

Noise

Section 3 Options	Preference
(1) Blue	Acceptable
(2) Orange	Acceptable
(3) Green	Most Preferred
(4) Pink	Most Preferred
(5) Yellow	Acceptable

22.5 Section 4 – Bissets Strand to the North Shore of Malahide Estuary (Single Geographical Option)

Landscape

- 22.5.1 Detailed commentary at EIAR stage. Anticipated slight positive visual impact and significant positive landscape impact.

Population and Human Health

- 22.5.2 Detailed commentary at EIAR stage. Anticipated significant positive human environment impact.

Architectural Heritage

- 22.5.3 Detailed commentary at EIAR stage. No predicted potential significant impacts.

Archaeology and Cultural Heritage

- 22.5.4 Detailed commentary at EIAR stage. No predicted potential significant impacts.

Land, Soils and Groundwater

- 22.5.5 Detailed commentary at EIAR stage. No predicted potential significant impacts.

Surface Water

- 22.5.6 Detailed commentary at EIAR/NIS stage. Assessment of residual significant impacts subject to EIAR/NIS.

Material Assets – Agronomy

- 22.5.7 Detailed commentary at EIAR stage. No predicted potential significant impacts upon agronomy.

Biodiversity

- 22.5.8 Detailed commentary at EIAR/NIS stage. Assessment of residual significant impacts subject to EIAR/NIS.

Air Quality

- 22.5.9 Detailed commentary at EIAR stage. No predicted potential significant impacts.

Noise

22.5.10 Detailed commentary at EIAR stage. No predicted potential significant impacts.

22.6 Section 5 – North Shore of Malahide Estuary to R126 Hearse Road (Six Options)

Landscape

Section 5 Options	Preference
(1) Pink	Acceptable
(2) Blue	Most Preferred
(3) Cyan	Most Preferred
(4) Green	Most Preferred
(5) Orange	Most Preferred
(6) Yellow	Most Preferred

Population and Human Health

Section 5 Options	Preference
(1) Pink	Acceptable
(2) Blue	Acceptable
(3) Cyan	Most Preferred
(4) Green	Most Preferred
(5) Orange	Preferred
(6) Yellow	Preferred

Architectural Heritage

Section 5 Options	Preference
(1) Pink	Most Preferred
(2) Blue	Most Preferred
(3) Cyan	Most Preferred
(4) Green	Most Preferred
(5) Orange	Most Preferred
(6) Yellow	Most Preferred

Archaeology and Cultural Heritage

Section 5 Options	Preference
(1) Pink	Most Preferred
(2) Blue	Most Preferred
(3) Cyan	Most Preferred
(4) Green	Most Preferred
(5) Orange	Most Preferred
(6) Yellow	Most Preferred

Land, Soils and Groundwater

Section 5 Options	Preference
(1) Pink	Most Preferred
(2) Blue	Most Preferred
(3) Cyan	Most Preferred
(4) Green	Most Preferred
(5) Orange	Most Preferred
(6) Yellow	Most Preferred

Surface Water

Section 5 Options	Preference
(1) Pink	Most Preferred
(2) Blue	Acceptable
(3) Cyan	Preferred
(4) Green	Preferred
(5) Orange	Preferred
(6) Yellow	Preferred

Material Assets - Agronomy

Section 5 Options	Preference
(1) Pink	Preferred
(2) Blue	Acceptable
(3) Cyan	Acceptable
(4) Green	Acceptable
(5) Orange	Acceptable
(6) Yellow	Acceptable

Biodiversity

Habitat and Botanical Appraisal

Section 5 Options	Preference
(1) Pink	Acceptable
(2) Blue	Most Preferred
(3) Cyan	Preferred
(4) Green	Preferred
(5) Orange	Most Preferred
(6) Yellow	Most Preferred

Birds and Mammal Appraisal

Section 5 Options	Preference
(1) Pink	Least Acceptable
(2) Blue	Least Acceptable
(3) Cyan	Preferred
(4) Green	Preferred
(5) Orange	Most Preferred
(6) Yellow	Most Preferred

Air Quality

Section 5 Options	Preference
(1) Pink	Least Acceptable
(2) Blue	Preferred
(3) Cyan	Acceptable
(4) Green	Most Preferred
(5) Orange	Acceptable
(6) Yellow	Acceptable

Noise

Section 5 Options	Preference
(1) Pink	Acceptable
(2) Blue	Acceptable
(3) Cyan	Acceptable
(4) Green	Most Preferred
(5) Orange	Acceptable
(6) Yellow	Acceptable

22.7 Section 6 – Newbridge Demesne (One Geographical Option)

Landscape

- 22.7.1 Detailed commentary at EIAR stage. Anticipated moderate positive visual impact and moderate positive landscape impact.

Population and Human Health

- 22.7.2 Detailed commentary at EIAR stage. Anticipated significant positive human environment impact.

Architectural Heritage

- 22.7.3 Detailed commentary at EIAR stage. No predicted potential significant impacts.

Archaeology and Cultural Heritage

- 22.7.4 Detailed commentary at EIAR stage. No predicted potential significant impacts.

Land, Soils and Groundwater

- 22.7.5 Detailed commentary at EIAR stage. No predicted potential significant impacts.

Surface Water

- 22.7.6 Detailed commentary at EIAR stage. No predicted potential significant impacts.

Material Assets - Agronomy

- 22.7.7 Detailed commentary at EIAR stage. No predicted potential significant impacts upon agronomy.

Biodiversity

- 22.7.8 Detailed commentary at EIAR stage. No predicted potential significant impacts upon biodiversity.

Air Quality

- 22.7.9 Detailed commentary at EIAR stage. No predicted potential significant impacts upon air quality.

Noise

- 22.7.10 Detailed commentary at EIAR stage. No predicted potential significant impacts upon noise quality.

22.8 Summary of Preferences

Table 22.1 Summary Table of Preferences (N/A = Not Applicable).

	Landscape	Population and Human Health	Architectural Heritage	Archaeology & Cultural Heritage	Land, Soils and Groundwater	Surface Water	Material Assets - Agronomy	Biodiversity - Habitat and Botanical	Biodiversity - Birds and Mammals	Air Quality	Noise
Section 1 – Malahide Demesne											
Option 1 – Green	Preferred	Acceptable	Most Preferred	Most Preferred	Most Preferred	N/A	N/A	Most Preferred	Most Preferred	Most Preferred	Most Preferred
Option 2 – Orange	Preferred	Acceptable	Preferred	Most Preferred	Most Preferred	N/A	N/A	Preferred	Most Preferred	Most Preferred	Most Preferred
Option 3 – Pink	Most Preferred	Most Preferred	Most Preferred	Most Preferred	Most Preferred	N/A	N/A	Most Preferred	Most Preferred	Most Preferred	Acceptable
Option 4 – Blue	Most Preferred	Most Preferred	Preferred	Most Preferred	Most Preferred	N/A	N/A	Most Preferred	Most Preferred	Most Preferred	Acceptable
Option 5 – Cyan	Preferred	Preferred	Most Preferred	Most Preferred	Most Preferred	N/A	N/A	Most Preferred	Most Preferred	Most Preferred	Acceptable
Option 6 – Yellow	Preferred	Preferred	Preferred	Most Preferred	Most Preferred	N/A	N/A	Most Preferred	Most Preferred	Most Preferred	Acceptable
Section 2 – R106 Dublin Road, Malahide											
Option 1 – Orange	Most Preferred	Preferred	Most Preferred	Most Preferred	Most Preferred	N/A	N/A	N/A	N/A	Most Preferred	Most Preferred
Option 2 – Pink	Most Preferred	Preferred	Most Preferred	Most Preferred	Most Preferred	N/A	N/A	N/A	N/A	Most Preferred	Acceptable
Option 3 – Cyan	Most Preferred	Acceptable	Preferred	Most Preferred	Most Preferred	N/A	N/A	N/A	N/A	Most Preferred	Acceptable
Option 4 – Green	Most Preferred	Acceptable	Preferred	Most Preferred	Most Preferred	N/A	N/A	N/A	N/A	Most Preferred	Acceptable

	Landscape	Population and Human Health	Architectural Heritage	Archaeology & Cultural Heritage	Land, Soils and Groundwater	Surface Water	Material Assets – Agronomy	Biodiversity - Habitat and Botanical	Biodiversity - Birds and Mammals	Air Quality	Noise
Option 5 – Blue	Most Preferred	Most Preferred	Most Preferred	Most Preferred	Most Preferred	N/A	N/A	N/A	N/A	Most Preferred	Acceptable
Section 3 – R106 Dublin Road to Bissets Strand											
Option 1 – Blue	Preferred	Acceptable	Most Preferred	Most Preferred	Preferred	N/A	N/A	Most Preferred	Most Preferred	Most Preferred	Acceptable
Option 2 – Orange	Preferred	Acceptable	Most Preferred	Most Preferred	Preferred	N/A	N/A	Most Preferred	Preferred	Most Preferred	Acceptable
Option 3 – Green	Most Preferred	Most Preferred	Most Preferred	Most Preferred	Most Preferred	N/A	N/A	Most Preferred	Preferred	Most Preferred	Most Preferred
Option 4 – Pink	Most Preferred	Preferred	Most Preferred	Most Preferred	Preferred	N/A	N/A	Most Preferred	Most Preferred	Most Preferred	Most Preferred
Option 5 – Yellow	Most Preferred	Preferred	Most Preferred	Most Preferred	Preferred	N/A	N/A	Most Preferred	Most Preferred	Most Preferred	Acceptable
Section 4 – Bissets Strand to the North Shore of Malahide Estuary											
Option 1 – Green	Detailed assessment at EIAR stage.										

	Landscape	Population and Human Health	Architectural Heritage	Archaeology & Cultural Heritage	Land, Soils and Groundwater	Surface Water	Material Assets - Agronomy	Biodiversity - Habitat and Botanical	Biodiversity - Birds and Mammals	Air Quality	Noise
Section 5 – North Shore of Malahide Estuary to R126 Hearse Road											
Option 1 – Pink	Acceptable	Acceptable	Most Preferred	Most Preferred	Most Preferred	Most Preferred	Preferred	Acceptable	Least Acceptable	Most Preferred	Acceptable
Option 2 – Blue	Most Preferred	Acceptable	Most Preferred	Most Preferred	Most Preferred	Acceptable	Acceptable	Most Preferred	Least Acceptable	Most Preferred	Acceptable
Option 3 – Cyan	Most Preferred	Most Preferred	Most Preferred	Most Preferred	Most Preferred	Preferred	Acceptable	Preferred	Preferred	Most Preferred	Acceptable
Option 4 – Green	Most Preferred	Most Preferred	Most Preferred	Most Preferred	Most Preferred	Preferred	Acceptable	Preferred	Preferred	Most Preferred	Most Preferred
Option 5 – Orange	Most Preferred	Preferred	Most Preferred	Most Preferred	Most Preferred	Preferred	Acceptable	Most Preferred	Most Preferred	Most Preferred	Acceptable
Option 6 – Yellow	Most Preferred	Preferred	Most Preferred	Most Preferred	Most Preferred	Preferred	Acceptable	Most Preferred	Most Preferred	Most Preferred	Acceptable
Section 6 – Newbridge Demesne											
Option 1 – Cyan	Detailed assessment at EIAR stage.										

22.9 Preference Order

Introduction

- 22.9.1 The proposed greenway has been divided into six sections for the purpose of environmental assessment. As options are not presented in Sections 4 and 6, Sections 1, 2, 3 and 5 are considered below. The number of options and relevant environmental topics are listed in Table 22.2.

Table 22.2 The number of options and relevant environmental topics.

Section	Number of Options	Number of Environmental Topics
1	6	9
2	5	7
3	5	9
5	6	11

- 22.9.2 The preference order is based on the summation of the number of most preferred, preferred, acceptable, and least acceptable topic assessments for each option (see tables below). The preference order for each option is then ranked as shown in Table 22.3.

Table 22.3 The preference order for each option.

Preference Order	Option Preference
1st	Most Preferred
2nd	Preferred
3rd	Preferred
4th	Acceptable
5th	Least Acceptable
6th	Least Acceptable

Section 1 – Malahide Demesne

Table 22.4 Summary of Preferences.

Section 1 Options	Least Acceptable	Acceptable	Preferred	Most Preferred
Option 1 – Green	-	1	1	7
Option 2 – Orange	-	1	3	5
Option 3 – Pink	-	1	-	8
Option 4 – Blue	-	1	1	7
Option 5 – Cyan	-	1	2	6
Option 6 – Yellow	-	1	3	5

Table 22.5 Preference Order.

Section 1 Options	Order	
Option 1 – Green	2=	Preferred
Option 2 – Orange	4=	Acceptable
Option 3 – Pink	1	Most Preferred
Option 4 – Blue	2=	Preferred
Option 5 – Cyan	3	Preferred
Option 6 – Yellow	4=	Acceptable

Section 2 – R106 Dublin Road, Malahide

Table 22.6 Summary of Preferences.

Section 2 Options	Least Acceptable	Acceptable	Preferred	Most Preferred
Option 1 – Orange	-	-	1	6
Option 2 – Pink	-	1	1	5
Option 3 – Cyan	-	2	1	4
Option 4 – Green	-	2	1	4
Option 5 – Blue	-	1	-	6

Table 22.7 Preference Order.

Section 2 Options	Order	
Option 1 – Orange	1	Most Preferred
Option 2 – Pink	3	Preferred
Option 3 – Cyan	4=	Acceptable
Option 4 – Green	4=	Acceptable
Option 5 – Blue	2	Preferred

Section 3 – R106 Dublin Road to Bissets Strand

Table 22.8 Summary of Preferences.

Section 3 Options	Least Acceptable	Acceptable	Preferred	Most Preferred
Option 1 – Blue	-	2	2	5
Option 2 – Orange	-	2	3	4
Option 3 – Green	-	-	1	8
Option 4 – Pink	-	-	2	7
Option 5 – Yellow	-	1	2	6

Table 22.9 Preference Order.

Section 3 Options	Order	
Option 1 – Blue	4	Acceptable
Option 2 – Orange	5	Least Acceptable
Option 3 – Green	1	Most Preferred
Option 4 – Pink	2	Preferred
Option 5 – Yellow	3	Preferred

Section 4 – Bissets Strand to the North Shore of Malahide Estuary

22.9.3 Detailed assessment at NIS/EIAR stage.

Section 5 – North Shore of Malahide Estuary to R126 Hearse Road

Table 22.10 Summary of Preferences.

Section 5 Options	Least Acceptable	Acceptable	Preferred	Most Preferred
Option 1 – Pink	1	4	1	5
Option 2 – Blue	1	4	–	6
Option 3 – Cyan	–	2	3	6
Option 4 – Green	–	1	3	7
Option 5 – Orange	–	2	2	7
Option 6 – Yellow	–	2	2	7

Table 22.11 Preference Order.

Section 5 Options	Order	
Option 1 – Pink	5	Least Acceptable
Option 2 – Blue	4	Acceptable
Option 3 – Cyan	3	Preferred
Option 4 – Green	1	Most Preferred
Option 5 – Orange	2=	Preferred
Option 6 – Yellow	2=	Preferred

Section 6 – Newbridge Demesne

22.9.4 Detailed assessment at EIAR stage.

23.0 Public Consultation – Route Modification at Kilcrea

23.1 Introduction

- 23.1.1 The emerging preferred route was presented by Fingal County Council as part of a non-statutory public consultation process for discussion and comment by statutory consultees, local interest groups and members of the public. The findings of this exercise are reported upon in Chapter 8.0 above. A number of aspects raised at the public consultation exercise warranted further analysis. Engineering aspects of same are considered in Chapters 9.0 and 10.0 above. Environmental aspects are considered below.

23.2 Kilcrea Townland

- 23.2.1 As an outcome of the public consultation exercise and discussions with the local landowners it was agreed that the route options through agricultural lands in Kilcrea would be reviewed. This review was to determine if there is a viable route option for the greenway that does not separate landowners' lands and complies with appropriate design requirements. Five revised route options were considered (see Appendix H- Figures 5B, 8B, 11B, 14B, 16B, 18B, 20B, 21B, 22B, 23B and 24B for location). The environmental aspects of the route option analysis are considered individually below.
- 23.2.2 A revised order of preference and a new emerging preferred route in Kilcrea are identified in this chapter.

23.3 Landscape

Construction Phase: Predicted Visual Impacts

- 23.3.1 On attaining the northern shore of the estuary, the initial section of the route within the Kilcrea Townlands is common to all options and descends from the causeway to follow the field boundary to the west of the railway. It then ascends the ridge forming the backdrop to the estuary to views from the south. Due to the distance of the views from the southern shores of the estuary and the location of the greenway alongside the field boundary, visual effects would be negligible and neutral in nature. Night-time working under lights would be visible from a considerable distance across the estuary, but as with works on the causeway, these effects are transitory and localised.
- 23.3.2 From the River Pill, all of the options for the route in this section deviate from the rail embankment to the north of the ridgeline backing the estuary. All of these options would therefore enter an enclosed agricultural field pattern with limited views due to the screening effects of the mature hedgerows. The lack of access within this section, other than to the users of the greenway, would also limit areas from which the greenway would be visible, restricting visibility to glimpsed views through the dense screening along the three encircling roads or from the few adjacent properties. Where it is necessary for the greenway to break through field boundaries, then obviously the screening effect would be removed. This impact would be most pronounced where the greenway is required to cross or access the roads. However, these clearances would be of such limited lengths that the effect of opening up views of construction would be imperceptible. This construction impact would be further mitigated if the works could

be phased to undertake the construction of the greenway within the fields prior to removal of the roadside hedgerows, which then become the last activity.

- 23.3.3 Methods of construction have also been considered to retain the greenway on a timber boardwalk system throughout this area. This is a relatively discreet, light-touch operation with works underway in only limited areas at any one time. Any works after dark requiring lighting would be noticeable even through the hedgerows, and particularly in winter.
- 23.3.4 During the construction phase visual impacts would be of slight negative visual impact for all options.

Construction Phase: Predicted Landscape Impacts

Impact on Landscape Features, Trees and Woodland

- 23.3.5 The development of the greenway through this section would require the removal of sections of hedgerow to enable the construction of ramps, bridges and new lengths of greenway to pass through the landscape. The water features of the River Pill would be protected during construction.
- 23.3.6 The relative impact of each of the options in this respect is determined by the length and value of the hedgerow to be removed.

Option	Impact
1 – Light Blue	Slight negative
2 – Green	Slight negative
3 – Yellow	Slight negative
4 – Purple	Slight negative
5 – Dark Blue	Moderate negative

- 23.3.7 Option 5 has a higher level of adverse impact as a greater length of hedgerow would need to be removed along Corballis Cottages Road around Corballis Cottages to allow sufficient visibility. If replacement hedgerows could be introduced at a greater set back from the road, then this impact would be medium-term.

Impact on Landscape Planning

- 23.3.8 No designated landscapes are affected in this section.

Impact on Landscape Character

- 23.3.9 The effects of the construction on the visual domain of the estuary are described below under visual impacts. The magnitude and nature of the construction works would not be significant in the broader scale of the estuary landscape. Whilst there are no significant structures or earthworks, there would be minor structures required to either bridge watercourses or ramps to accommodate changes in level. All five options would require the construction of the greenway alongside the field boundary to the south and then a ramp and bridge structure over the River Pill. Each option then requires a new second bridge crossing of the River Pill further to the north, but in varied locations. The fabrication of these structures off-site would reduce adverse impacts during construction and erection.

- 23.3.10 Options 1 and 2 would enter into the heart of the low-lying pasture area along the line of the Pill River. By introducing the greenway into this landscape would represent the greatest change in character in this localised area, but a boardwalk would be in keeping with the wetland nature and the route would follow the patterns of the field boundaries and waterways. Impacts for these two options would be moderate neutral impacts.
- 23.3.11 Options 3 and 4 follow the line of rail embankment before veering left into fields before reaching Corballis cottage Road, along the line of an existing hedgerow. At the point that the two routes depart into the agricultural fields, impacts would be slight neutral in character.
- 23.3.12 Option 5 again follows the line of the rail embankment, but then continues along the route of Corballis Cottages Road as far as the cottages and would be read as an adjunct to the existing movement corridors. As these are an accepted use within the landscape, the route would not result in significant effects on the character and would result in slight neutral impact on the landscape character. At the point that the route leaves the road to enter into the agricultural fields to the immediate east of the farm, impacts would be moderate but neutral in character.

Operational Stage – Predicted Visual Impacts

- 23.3.13 During use, as the timber bridges and boardwalks mellow with age and the effects of mitigation planting and seeding mature, on balance, all the remaining route options would result in slight neutral visual impact.
- 23.3.14 There is also the experience of the user of the greenway to consider. Whilst all route options would create attractive alternatives for the user, Options 1 and 2, in following the route of the River Pill on boardwalk and entering into the heart of the wetland landscape, would bring a new and enhanced experience to the visitor. Option 1 continues along the route of the river and therefore flows with the watercourse through the landscape. On balance, therefore, and considering both views of and from the greenway, Options 1 could be considered to be of moderate positive visual impact and Option 2 slight positive visual impact.
- 23.3.15 Options 3 would describe the same alignment as Option 1 to the north of this section and would follow the line of the river, but would not enter into the low lying wetland landscape, and could be considered to be of neutral to slight positive visual impact.
- 23.3.16 Similarly, Options 4 and 5 follow the line of hedgerows, roads and, in the case of Option 5, short lengths of the river in its northern section. In so doing, both options lie comfortably with the field pattern and would be of neutral to slight positive visual impact.
- 23.3.17 During use, as the timber bridges and boardwalks mellow with age and the effects of mitigation planting and seeding mature, on balance, all the remaining route options would result in slight neutral visual impact.
- 23.3.18 There is also the experience of the user of the greenway to consider. Whilst all route options would create attractive alternatives for the user, Options 1 and 2, in following the route of the River Pill on boardwalk and entering into the heart of the wetland landscape, would bring a new and enhanced experience to the visitor. Option 1 continues along the route of the river and therefore flows with the watercourse through

the landscape. On balance, therefore, and considering both views of and from the greenway, Options 1 could be considered to be of moderate positive visual impact and Option 2 slight positive visual impact.

- 23.3.19 Options 3 would describe the same alignment as Option 1 to the north of this section and would follow the line of the river, but would not enter into the low lying wetland landscape, and could be considered to be of neutral to slight positive visual impact.
- 23.3.20 Similarly, Options 4 and 5 follow the line of hedgerows, roads and, in the case of Option 5, short lengths of the river in its northern section. In so doing, both options lie comfortably with the field pattern and would be of neutral to slight positive visual impact.

Operational Phase – Predicted Landscape Impacts

- 23.3.21 As the scheme matures from pre-establishment to post-establishment, the greenways throughout this area would become settled into the environment and in keeping with the character of the landscape. On balance, all the routes would be considered of a slight neutral landscape impact.

Summary

- 23.3.22 North of the causeway within Section 5 to R126 Hearse Road, the greenway enters another landscape typology of small-scale field pattern and damp, low lying meadow. A number of options have been developed to traverse this landscape to the Newbridge demesne in the north. All options take cognizance of the existing pattern of fields and development, either following the watercourses and hedgerow or exiting tracks and roads. All the options would require hedgerow removal and new structures to be built and set within the landscape.
- 23.3.23 From a landscape perspective, the preferred route would be Option 1. This option would take the greenway user into the landscape along the course of the River Pill on boardwalk and follow the pronounced line of the hedgerow behind the properties along Corballis Cottages Road, Hearse Road and Kilcrea Road, to connect with Kilcrea Road south of the junction with Hearse Road, but within sight of the gates into the Newbridge Demesne.

Summary of Landscape Preferences

- 23.3.24 Table 23.1 outlines in summary the overall preferences from a landscape perspective.

Table 23.1 Summary of overall preference from a Landscape perspective.

Section 5 Options	Overall Visual Impact	Overall Landscape Impact	Preference
Option 1 - Light Blue	Moderate positive	Slight positive	Most Preferred
Option 2 - Green	Slight Positive	Neutral	Most Preferred
Option 3 - Yellow	Neutral	Neutral	Most Preferred
Option 4 - Purple	Neutral	Neutral	Most Preferred
Option 5 - Dark Blue	Neutral	Neutral	Most Preferred

23.4 Population and Human Health

Route Selection Analysis

- 23.4.1 This section is the only “new build” section of the greenway, traversing across agricultural land. The five route options in this section commence at the northern margin of the greenway across the Malahide Estuary. The route options are identical from this point up to Pill River, extending north parallel to the existing railway along a field boundary at the bottom of the railway embankment. All five options culminate at the main entrance to Newbridge Demesne.

Option 1 – Light Blue

- 23.4.2 Upon reaching Pill River, Option 1 – Light Blue turns north-west to follow the eastern bank of the river along a stilt structure for c. 650m. At the location of a private residence and working farm yard Option 1 – Light Blue crosses to the southern side of Pill River by means of a bridge structure and extends across open agricultural lands in a westerly direction to join Kilcrea Road. Option 1 – Light Blue follows Kilcrea Road to its junction with Hearse Road (R126). Crossing Hearse Road, Option 1 – Light Blue culminates at the main vehicular and pedestrian entrance to Newbridge Demesne. A pedestrian crossing and traffic calming measures will be introduced at the junction of Kilcrea Road and Hearse Road.

Option 2 – Green

- 23.4.3 Upon reaching Pill River, Option 2 – Green turns north-west to follow the eastern bank of river by means of a stilt structure for c. 350m. It then crosses the river by means of a bridge structure and extends west across agricultural lands for c. 400m. Meeting the rear boundary of a private dwelling, Option 2 – Green turns north and extends in this direction for c. 175m. It then traverses west for c. 150m to link with Kilcrea Road and extends north along Kilcrea Road to its junction with Hearse Road (R126). Crossing Hearse Road, Option 2 – Green culminates at the main vehicular and pedestrian entrance to Newbridge Demesne. A pedestrian crossing and traffic calming measures will be introduced at the junction of Kilcrea Road and Hearse Road.

Option 3 – Yellow

- 23.4.4 From the end point of the common ground, Option 3 – Yellow continues extending north parallel to the railway as far as the rear boundary of a private dwelling, where it turns west across agricultural lands towards Pill River. Meeting the river, Option 3 – Yellow follows it on the eastern side for c. 200m and then crosses the river to its southern side by means of a bridge structure. Option 3 – Yellow extends across open agricultural lands in a westerly direction for c. 400m to join Kilcrea Road. Option 3 – Yellow follows Kilcrea Road to its junction with Hearse Road (R126). Crossing Hearse Road, Option 3 – Yellow culminates at the main vehicular and pedestrian entrance to Newbridge Demesne. A pedestrian crossing and traffic calming measures will be introduced at the junction of Kilcrea Road and Hearse Road.

Option 4 – Purple

- 23.4.5 From the end point of the common ground, Option 4 – Purple continues extending north parallel to the railway as far as the rear boundary of a private dwelling where it turns west across agricultural lands towards Pill River. Crossing the river by means of a bridge

structure, Option 4 – Purple continues west for c. 400m. Meeting the rear boundary of a private dwelling, Option 4 – Purple turns north and extends in this direction for c. 175m. It then traverses west for c. 150m to link with Kilcrea Road and extends north along Kilcrea Road to its junction with Hearse Road (R126). Crossing Hearse Road, Option 4 – Purple culminates at the main vehicular and pedestrian entrance to Newbridge Demesne. A pedestrian crossing and traffic calming measures will be introduced at the junction of Kilcrea Road and Hearse Road.

Option 5 – Dark Blue

- 23.4.6 From the end point of the common ground, Option 5 – Dark Blue continues extending north parallel to the railway through agricultural lands as far as Corballis Cottages Road, diverting around the boundary of a private dwelling to the east. Option 5 – Dark Blue extends north-west following Corballis Cottages Road on its southern side for c. 200m at which point the route veers south-west to meet Pill River. It crosses the river by means of a bridge structure and follows its southern bank for c. 150m, at which point Option 5 – Dark Blue turns, extending west for c. 200m to link with Kilcrea Road. It extends north along Kilcrea Road to its junction with Hearse Road (R126). Crossing Hearse Road at this point, Option 5 – Dark Blue culminates at the main vehicular and pedestrian entrance to Newbridge Demesne. A pedestrian crossing and traffic calming measures will be introduced at the junction of Kilcrea Road and Hearse Road.

Comparison of Route Options

- 23.4.7 This part of the route enjoys expansive views of Malahide Estuary at its southern end and the enclosed parkland expanse of Newbridge Demesne at its northern end. However, its middle section which passes through agricultural lands across Kilcrea lacks these advantages and needs therefore to maintain the quality of the experience open to the user at either end of the townland. This has been the main consideration for the comparative analysis for route options in this section. Table 23.2 is a summary of the relative preferences of options for Kilcrea Townland:

Table 23.2 Order of Preference of Route Options in Kilcrea Townland.

Route Option	Preference
Option 1 – Light Blue	Most Preferred
Option 3 – Yellow	Most Preferred
Option 2 – Green	Preferred
Option 4 – Purple	Preferred
Option 5 – Dark Blue	Acceptable

- 23.4.8 These preferences are based on the need to ensure a quality experience in keeping with that at the causeway and to ensure a reasonably direct line of movement north-south to Newbridge Demesne.
- 23.4.9 Options 1 – Light Blue and 3 – Yellow are most preferred as they link directly between the causeway and the entrance to Newbridge Demesne. They also follow the most natural parts of Kilcrea and maintain quality of experience through this townland.
- 23.4.10 Options 2 – Green and 4 – Purple are preferred as they link largely north-south and pass through the margins of the natural area of Kilcrea. They are also routed on the agricultural side of the hedgerow on the Corballis Cottages Road.

- 23.4.11 Option 5 – Dark Blue is acceptable, as it primarily utilises the existing railway and Corballis Cottages Road rather than lying adjacent to an open natural environment.

23.5 Architectural Heritage

Section 5 Route Options

- 23.5.1 This section is the only “new build” section of the greenway, traversing across agricultural land. The five route options in this section commence at the northern margin of the greenway across the Malahide Estuary. The route options are identical from this point up to Pill River, extending north parallel to the existing railway along a field boundary at the bottom of the railway embankment. No architectural heritage constraints have been identified within this common ground. All five options culminate at the main entrance to Newbridge Demesne.

OPTION 1 – LIGHT BLUE

- 23.5.2 Upon reaching Pill River, Option 1 – Light Blue turns north-west to follow the eastern bank of the river along a stilt structure for c. 650m. At the location of a private residence and working farm yard Option 1 – Light Blue crosses to the southern side of Pill River by means of a bridge structure and extends across open agricultural lands in a westerly direction to join Kilcrea Road. Option 1 – Light Blue follows Kilcrea Road to its junction with Hearse Road (R126). Crossing Hearse Road, Option 1 – Light Blue culminates at the main vehicular and pedestrian entrance to Newbridge Demesne. A pedestrian crossing and traffic calming measures will be introduced at the junction of Kilcrea Road and Hearse Road.
- 23.5.3 A total of 3 structures or features of architectural heritage merit are located within 100m of the centre line of Option 1 – Light Blue, as listed in Table 2 in Appendix D. There is no predicted impact on any of these structures. Table 23.3 is a summary of the impacts of Option 1 – Light Blue at Kilcrea Townland.

Table 23.3 Summary of Impacts of Option 1 – Light Blue at Kilcrea Townland.

Impacts	National significance	Regional significance	Local significance	Total impacts in class	Of which are Key Constraints
Profound	0	0	0	0	0
Significant	0	0	0	0	0
Moderate	0	0	0	0	0
Slight	0	0	0	0	0
Imperceptible	0	0	0	0	0
None Predicted	0	3	0	3	3
Total sites	0	3	0	3	3

OPTION 2 – GREEN

- 23.5.4 Upon reaching Pill River, Option 2 – Green turns north-west to follow the eastern bank of river by means of a stilt structure for c. 350m. It then crosses the river by means of a bridge structure and extends west across agricultural lands for c. 400m. Meeting the rear boundary of a private dwelling, Option 2 – Green turns north and extends in this direction for c. 175m. It then traverses west for c. 150m to link with Kilcrea Road and extends north along Kilcrea Road to its junction with Hearse Road (R126). Crossing Hearse Road, Option 2 – Green culminates at the main vehicular and pedestrian entrance to Newbridge Demesne. A pedestrian crossing and traffic calming measures will be introduced at the junction of Kilcrea Road and Hearse Road.

- 23.5.5 A total of 3 structures or features of architectural heritage merit are located within 100m of the centre line of Option 2 – Green, as listed in Table 3 in Appendix D. There is no predicted impact on either of these structures. Table 23.4 is a summary of the impacts of Option 2 – Green at Kilcrea Townland.

Table 23.4 Summary of Impacts of Option 2 – Green at Kilcrea Townland.

Impacts	National significance	Regional significance	Local significance	Total impacts in class	Of which are Key Constraints
Profound	0	0	0	0	0
Significant	0	0	0	0	0
Moderate	0	0	0	0	0
Slight	0	0	0	0	0
Imperceptible	0	0	0	0	0
None Predicted	0	3	0	3	3
Total sites	0	3	0	3	3

OPTION 3 - YELLOW

- 23.5.6 From the end point of the common ground, Option 3 – Yellow continues extending north parallel to the railway as far as the rear boundary of a private dwelling, where it turns west across agricultural lands towards Pill River. Meeting the river, Option 3 – Yellow follows it on the eastern side for c. 200m and then crosses the river to its southern side by means of a bridge structure. Option 3 – Yellow extends across open agricultural lands in a westerly direction for c. 400m to join Kilcrea Road. Option 3 – Yellow follows Kilcrea Road to its junction with Hearse Road (R126). Crossing Hearse Road, Option 3 – Yellow culminates at the main vehicular and pedestrian entrance to Newbridge Demesne. A pedestrian crossing and traffic calming measures will be introduced at the junction of Kilcrea Road and Hearse Road.
- 23.5.7 A total of 3 structures or features of architectural heritage merit are located within 100m of the centre line of Option 3 - Yellow, as listed in Table 4 in Appendix D. There is no predicted impact on any of these structures. Table 23.5 is a summary of the impacts of Option 3 - Yellow at Kilcrea Townland.

Table 23.5 Summary of Impacts of Option 3 – Yellow at Kilcrea Townland.

Impacts	National significance	Regional significance	Local significance	Total impacts in class	Of which are Key Constraints
Profound	0	0	0	0	0
Significant	0	0	0	0	0
Moderate	0	0	0	0	0
Slight	0	0	0	0	0
Imperceptible	0	0	0	0	0
None Predicted	0	3	0	3	3
Total sites	0	3	0	3	3

OPTION 4 – PURPLE

- 23.5.8 From the end point of the common ground, Option 4 – Purple continues extending north parallel to the railway as far as the rear boundary of a private dwelling, where it turns west across agricultural lands towards Pill River. Crossing the river by means of a bridge structure, Option 4 – Purple continues west for c. 400m. Meeting the rear boundary of a private dwelling, Option 4 – Purple turns north and extends in this direction for c. 175m.

It then traverses west for c. 150m to link with Kilcrea Road and extends north along Kilcrea Road to its junction with Hearse Road (R126). Crossing Hearse Road, Option 4 – Purple culminates at the main vehicular and pedestrian entrance to Newbridge Demesne. A pedestrian crossing and traffic calming measures will be introduced at the junction of Kilcrea Road and Hearse Road.

- 23.5.9 A total of 3 structures or features of architectural heritage merit are located within 100m of the centre line of Option 4 - Purple, as listed in Table 5 in Appendix D. There is no predicted impact on any of these structures. Table 23.6 is a summary of the impacts of Option 4 – Purple at Kilcrea Townland.

Table 23.6 Summary of Impacts of Option 4 – Purple at Kilcrea Townland.

Impacts	National significance	Regional significance	Local significance	Total impacts in class	Of which are Key Constraints
Profound	0	0	0	0	0
Significant	0	0	0	0	0
Moderate	0	0	0	0	0
Slight	0	0	0	0	0
Imperceptible	0	0	0	0	0
None Predicted	0	3	0	3	3
Total sites	0	3	0	3	3

OPTION 5 – DARK BLUE

- 23.5.10 From the end point of the common ground, Option 5 – Dark Blue continues extending north parallel to the railway through agricultural lands as far as Corballis Cottages Road, diverting around the boundary of a private dwelling to the east. Option 5 – Dark Blue extends north-west following Corballis Cottages Road on its southern side for c. 200m at which point the route veers south-west to meet Pill River. It crosses the river by means of a bridge structure and follows its southern bank for c. 150m, at which point Option 5 – Dark Blue turns, extending west for c. 200m to link with Kilcrea Road. It extends north along Kilcrea Road to its junction with Hearse Road (R126). Crossing Hearse Road at this point, Option 5 – Dark Blue culminates at the main vehicular and pedestrian entrance to Newbridge Demesne. A pedestrian crossing and traffic calming measures will be introduced at the junction of Kilcrea Road and Hearse Road.
- 23.5.11 A total of three structures or features of architectural heritage merit are located within 100m of the centre line of Option 5 – Dark Blue, as listed in Table 6 in Appendix D. There is no predicted impact on any of these structures. Table 23.7 is a summary of the impacts of Option 5 - Dark Blue at Kilcrea Townland.

Table 23.7 Summary of Impacts of Option 5 – Dark Blue at Kilcrea Townland.

Impacts	National significance	Regional significance	Local significance	Total impacts in class	Of which are Key Constraints
Profound	0	0	0	0	0
Significant	0	0	0	0	0
Moderate	0	0	0	0	0
Slight	0	0	0	0	0
Imperceptible	0	0	0	0	0
None Predicted	0	3	0	3	3
Total sites	0	3	0	3	3

SUMMARY OF IMPACTS

- 23.5.12 A total of 3 structures or features of architectural heritage merit are located within 100m of the centre line of the proposed 6 route options as listed in Table 5 in Appendix A. No National Monuments, National Monuments in Ownership or Guardianship, sites on the Register of Historic Monuments, sites subject to Preservation Orders and Temporary Preservation Orders, or Architectural Conservation Areas are affected by any of the route options.
- 23.5.13 Of the 3 structures, 2 are on the Record of Protected Structures (RPS) and one is an Architectural Conservation Area, as identified in Table 5 in Appendix A. For a summary of the statutory protection of architectural heritage in Ireland, please refer to the Constraints Report.
- 23.5.14 Of the 3 structures, all are considered to be Key Constraints, as identified in Table 5 in Appendix A. For methods applied to identifying Key Constraints, please refer to the Constraints Report.
- 23.5.15 All 3 structures are perceived to be of regional importance, as identified in Table 5 in Appendix A. No structures of international significance are impacted upon by the route options. For methods applied to the assessment of perceived importance, please refer to the Constraints Report.

Preference Order Appraisal

- 23.5.16 See Table 23.8.

Table 23.8 Appraisal of Route Option Impacts in Kilcrea Townland.

Options	Total Potential Impacts	Ranking	Total Direct impacts	Ranking	Total Direct Impacts on Higher Significance Sites*	Ranking	Direct Impacts on Key Constraints	Ranking	Overall ranking order
1 – Light Blue	3	Joint 1st	0	Joint 1st	0	Joint 1st	0	Joint 1st	Joint 1st
2 – Green	3	Joint 1st	0	Joint 1st	0	Joint 1st	0	Joint 1st	Joint 1st
3 – Yellow	3	Joint 1st	0	Joint 1st	0	Joint 1st	0	Joint 1st	Joint 1st
4 – Purple	3	Joint 1st	0	Joint 1st	0	Joint 1st	0	Joint 1st	Joint 1st
5 – Dark Blue	3	Joint 1st	0	Joint 1st	0	Joint 1st	0	Joint 1st	Joint 1st

*Higher significant sites' can be deemed as those of International, National and Regional Importance, collectively.

Preference Order Results

- 23.5.17 The proposed five route options in Kilcrea Townland traverse agricultural land with few built structures in their vicinity and their overall impact on the existing architectural environment is low. The impacts of the five options are in each case limited to the same three constraints, none of which will experience a direct impact. As a consequence, the proposed five route options are identical in both quantitative and qualitative terms. Table 23.9 is a summary of the order of preference of the route options.

Table 23.9 Order of Preference of Route Options in Kilcrea Townland.

Route Option	Preference
Option 1 – Light Blue	Most Preferred
Option 2 – Green	Most Preferred
Option 3 – Yellow	Most Preferred
Option 4 – Purple	Most Preferred
Option 5 – Dark Blue	Most Preferred

Conclusions

- 23.5.18 In Kilcrea Townland, the proposed routes traverse primarily agricultural land with few structures of architectural interest. The impact of the proposed development in this section is therefore considered to be neutral.

23.6 Archaeology and Cultural Heritage

Analysis of Impacts

- 23.6.1 The route continues along beside the railway line on the north side of the Malahide estuary and at this point it is considered to be 0m from the railway (CHS1). There will be no impact on the railway.
- 23.6.2 Light Blue Option 1 continues north beside the railway line crossing the Pill estuary. Just north of the estuary it veers northwest away from the railway line following the eastern bank of the Pill before finally crossing it to turn west across agricultural land to meet the Kilcrea Road. There will be no predicted impact on any archaeological sites within the study area. While this route option runs close to two cultural heritage sites, the railway line (CHS 1) and the River Pill (CHS 2), it will not impact on these (Table 23.10 to Table 23.14 below).
- 23.6.3 Green Option 2 continues north beside the railway line crossing the Pill estuary. Just north of the estuary it veers northwest away from the railway line following the eastern bank of the Pill. It crosses the river further south than Option 1 above and then turns, first west, then north, and west again across agricultural land to meet the Kilcrea Road. There will be no predicted impact on any archaeological sites within the study area. While this route option runs close to two cultural heritage sites, the railway line (CHS 1) and the River Pill (CHS 2), it will not impact on these.
- 23.6.4 Yellow Option 3 continues north beside the railway line crossing the Pill estuary. It turns west from the railway line some 300m to the north of the estuary crossing to follow the river northwest eventually crossing it and traversing agricultural land to meet the Kilcrea Road. There will be no predicted impact on any archaeological sites within the study area. While this route option runs close to two cultural heritage sites, the railway line (CHS 1) and the River Pill (CHS 2), it will not impact on these.
- 23.6.5 Purple Option 4 continues north beside the railway line crossing the Pill estuary. It turns west from the railway line some 300m to the north of the estuary crossing and runs west across agricultural land, crossing the River Pill, veering north and west again before meeting the Kilcrea Road. There will be no predicted impact on any archaeological sites within the study area. While this route option runs close to two cultural heritage sites, the railway line (CHS 1) and the River Pill (CHS 2), it will not impact on these.

23.6.6 Dark Blue Option 5 continues north beside the railway line crossing the Pill estuary. It turns west from the railway line just south of Corballis Cottages Road and follows the south side of this road, then, before turning into agricultural land crossing the River Pill and finally meeting the Kilcrea Road. There will be no predicted impact on any archaeological sites within the study area. While this route option runs close to two cultural heritage sites, the railway line (CHS 1) and the River Pill (CHS 2), it will not impact on these.

Table 23.10 Section 5 Option 1 - Light Blue.

RMP No./ CHS No	Site Type	Townland	Distance	Perceived Importance	Impact
DU012-016001	Church & Graveyard	Kilcrea	450m	Regional	No predicted impact
DU012-016002					
DU012-017	Enclosure	Kilcrea	200m	Local	No predicted impact
DU012-018	Mill	Kilcrea	175m	Local	No predicted impact
CHS 1	Railway	Kilcrea	0m	Local	No predicted impact
CHS 2	Estuary	Kilcrea	10m	Local	No predicted impact
CHS 3	River	Kilcrea	0m	Local	No predicted impact

Table 23.11 Section 5 Option 2 - Green.

RMP No./ CHS No	Site Type	Townland	Distance	Perceived Importance	Impact
DU012-016001	Church & Graveyard	Kilcrea	300m	Regional	No predicted impact
DU012-016002					
DU012-017	Enclosure	Kilcrea	190m	Local	No predicted impact
DU012-018	Mill	Kilcrea	175m	Local	No predicted impact
CHS 1	Railway	Kilcrea	0m	Local	No predicted impact
CHS 2	Estuary	Kilcrea	10m	Local	No predicted impact
CHS 3	River	Kilcrea	0m	Local	No predicted impact

Table 23.12 Section 5 Option 3 - Yellow.

RMP No./ CHS No	Site Type	Townland	Distance	Perceived Importance	Impact
DU012-016001	Church & Graveyard	Kilcrea	450m	Regional	No predicted impact
DU012-016002					
DU012-017	Enclosure	Kilcrea	290m	Local	No predicted impact
DU012-018	Mill	Kilcrea	300m	Local	No predicted impact
CHS 1	Railway	Kilcrea	0m	Local	No predicted impact
CHS 2	Estuary	Kilcrea	10m	Local	No predicted impact
CHS 3	River	Kilcrea	0m	Local	No predicted impact

Table 23.13 Section 5 Option 4 - Purple.

RMP No./ CHS No	Site Type	Townland	Distance	Perceived Importance	Impact
DU012-016001	Church & Graveyard	Kilcrea	320m	Regional	No predicted impact
DU012-016002					
DU012-017	Enclosure	Kilcrea	200m	Local	No predicted impact
DU012-018	Mill	Kilcrea	300m	Local	No predicted impact
CHS 1	Railway	Kilcrea	0m	Local	No predicted impact
CHS 2	Estuary	Kilcrea	10m	Local	No predicted impact
CHS 3	River	Kilcrea	0m	Local	No predicted impact

Table 23.14 Section 5 Option 5 – Dark Blue.

RMP No./CHS No	Site Type	Townland	Distance	Perceived Importance	Impact
DU012-016001	Church & Graveyard	Kilcrea	450m	Regional	No predicted impact
DU012-016002					
DU012-017	Enclosure	Kilcrea	200m	Local	No predicted impact
DU012-018	Mill	Kilcrea	300m	Local	No predicted impact
CHS 1	Railway	Kilcrea	0m	Local	No predicted impact
CHS 2	Estuary	Kilcrea	10m	Local	No predicted impact
CHS 3	River	Kilcrea	0m	Local	No predicted impact

Unrecorded Archaeology

- 23.6.7 In Section 5 there is no preferred route. All options are equally favourable. Some construction work will take place for all options so there will be some impact on potential subsurface archaeological sites. All the route options cross the River Pill (CHS3). None of the options come close to any recorded archaeological sites. Due to the distance of recorded archaeological monuments from the route options there will be no predicted impact on the archaeological heritage (Table 23.10 to Table 23.14 above).

23.7 Land, Soils and Groundwater

Route Option Preference

- 23.7.1 Based on the absence of any significant geological and hydrological constraints for Section 5, any of the route options would be feasible. It is not envisioned that any of these route options will effect upon the environmental attributes of the area. Therefore, they have all been ranked as 'Most Preferred' (Table 23.15).

Table 23.15 Section 5 – Route Option Preference.

Route Options	Rank	Route Corridor Preference
Option 1 – Light Blue	2	Most Preferred
Option 2 – Green	3	Most Preferred
Option 3 – Yellow	1	Most Preferred
Option 4 – Purple	4	Most Preferred
Option 5 – Dark Blue	5	Most Preferred

- 23.7.2 Option 3 – Yellow is ranked as number 1 as it proposes access for all users. This route has the highest safety level because the route is off-road and along its entire length with limited interaction between the greenway users and vehicle traffic. This route will not require intrusive construction to widen roads or develop footpaths. The proposed method of construction and will be sensitive to the area both in term of materials used and development. Groundwater vulnerability ranges from Low to Moderate with thick overburden.

23.8 Surface Water

Route Option Preference

- 23.8.1 It is considered that, given the nature of the project, the high incidence of existing pavement and the general proposal to clearspan any watercourse crossing, the project, whichever option is selected, will not result in a potential significant impact upon the

receiving aquatic environment. With appropriate mitigation during construction and operation, including a probation and any vehicular crossings of watercourses, it is considered that the project would have a negligible negative or neutral effect upon the aquatic receiving environment.

Section 5	Options	Aquatic Habitat Constraints	Preference
Light Blue	1	One crossing of the Pill River and one crossing of the tidal creek – both crossings with clear span structures.	Preferred
Green	2	One crossing of the Pill River and one crossing of the tidal creek – both crossings with clear span structures.	Preferred
Yellow	3	One crossing of the Pill River and one crossing of the tidal creek – both crossings with clear span structures.	Preferred
Purple	4	One crossing of the Pill River and one crossing of the tidal creek – both crossings with clear span structures.	Preferred
Dark Blue	5	One crossing of the Pill River and one crossing of the tidal creek – both crossings with clear span structures.	Preferred

23.9 Material Assets – Agronomy

Existing Agriculture

- 23.9.1 The townland of Kilcrea through which the proposed greenway option cross comprises of five agricultural land parcels identified as Reference Numbers 3, 6, 7, 9 and 10. Land quality is not a differentiating factor as all affected land parcels have good quality land. Land parcel 3 is a small grass land parcel consisting of 3ha and has a beef enterprise. Land Parcel 6 consists of 19ha and has beef enterprise. The farm yard of parcel 6 is located on the northern boundary of the land parcel. Land Parcels 7 and 9 consist of 68ha and 15.5ha respectively and have tillage and grass enterprises. This grass is utilised by horses, beef cattle and sheep. There is a horse training track located in Land Parcel 7. There are all weather equine training and exercising facilities in the farm yard of Land Parcel 9. The farm yards of Land Parcels 7 and 9 are located on the Kilcrea Road. The tillage cropping in Land Parcels 7 and 9 include cereals and potatoes.

Predicted Impacts

- 23.9.2 There is the section of the proposed greenway (approximately 425m) from the northern boundary of the estuary to the northern bank of the Pill River which is common to all five route options. This section runs along the western edge of the railway line and along the eastern edge of Land Parcels 7 and 9, with an imperceptible impact on both of these land parcels. The evaluation of the five route options concentrates on the impacts north of the Pill River.

Option 5 – Dark Blue

- 23.9.3 This route option crosses Land Parcel 6 for 585m and Land Parcel 10 for 145m. It uses a gravel road on the eastern boundary of Land Parcel 6 for approximately 375m – which is not agricultural land. It severs access from the farmyard to the land south of the

greenway - separating the 1.7ha around the farm yard. Assuming the landtake will be approximately 6m wide then 0.44ha of agricultural land will be required.

23.9.4 **Table 23.16 Summary of Impacts (north of Pill River).**

	Route Option				
	1	2	3	4	5
Length (m)	1,180	1,290	1,205	1,315	1,230
Length on agricultural land (m)	1,055	1,165	790	900	730
Area of Landtake (ha)	0.6	0.7	0.5	0.5	0.45
Severance	Yes	Yes	Yes	Yes	Yes
Area Severed	9	2	13.5	6.5	1.7

Conclusion

- 23.9.5 Options 1, 3 and 5 are moderately adverse in impact and are acceptable. Options 2 and 4 are preferred.
- 23.9.6 Route Option 5 has the lowest landtake. However, the access from the farm yard is severed and this will have a high potential impact on the operation of the farm. Therefore this route is third preference and is acceptable.
- 23.9.7 Route Option 1 has the second highest landtake. However, the access from the farm yard is severed and this will have a high potential impact on the operation of the farm. Therefore this route is fourth preference and is acceptable.
- 23.9.8 Route Option 3 has the lowest landtake impact but has the highest severance impact. This is the least preferred route option and is acceptable.

Table 23.17 Preference and ranking.

Option	Preference	Ranking
1 – Light Blue	Acceptable	4
2 – Green	Preferred	1
3 – Yellow	Acceptable	5
4 – Purple	Preferred	2
5 – Dark Blue	Acceptable	3

23.10 Biodiversity

Introduction

- 23.10.1 Five route options are considered below – these were refined following public consultation and a constraint identification process. In terms of habitat assessment, all options, with appropriate mitigation, may be constructed. From a habitat and flora perspective, Option 5 would be preferred, while all other options would be acceptable, given proper mitigation. Generally, it is recommended that construction of the greenway would conserve existing hedgerows where possible.
- 23.10.2 In terms of impacts on terrestrial fauna there are certain options which are considered ‘Least Acceptable’ having the potential to cause significant disturbance or displacement of protected birds and mammals. Route Options 2 and 4 are defined as ‘Least Acceptable’ routes, whereas the remainder of the options (Route Options 1, 3 & 5) are considered less constrained. Options 2 & 4 cross the agricultural fields between the Pill

River and Kilcrea Road and have greater potential for the disturbance of wintering birds that use these fields to forage and roost. The Pill is culverted at the embankment and the lands adjoining the estuary – to the west of the proposed greenway – are prone to seasonal flooding. On occasion, these areas hold small to moderate numbers of wading birds and wildfowl.

- 23.10.3 The field northwest of the Pill Estuary crossing is an important feeding and roosting area for a number of wading bird species (Roe & Lovatt, 2009; this report, 2013). Kingfisher (*Alcedo atthis*), an Annex 1 bird species was observed feeding along this part of the river on two occasions in the winter of 2011/2012. Roe & Lovatt (2009) noted the area as important for feeding and roosting Curlew (*Numenius arquata*), Oystercatcher (*Haematopus ostralegus*) and Black-tailed Godwit (*Limosa limosa*). The river estuary was described as suitable for foraging Otter (*Lutra lutra*) (this report, 2013). A field survey in 2011 did not record any signs of Otter at this location, although it is noted that persistence of such signs was unlikely due to heavy rain at the time. Walkover surveys in 2013 recorded Otter spraints near the Pill Estuary culvert in November. As Route Options 1 & 2 follows Pill River to the northwest it is partly screened from the estuary by a sparse hedgerow. The fields traversed by these routes are occasionally used by feeding Brent Geese and other waterbirds during the winter period (Roe & Lovatt, 2009). However, the agricultural fields are relatively large in size and the route options considered closely follow the field boundaries and are generally unlikely to introduce significant disturbance into the open fields where feeding and roosting birds tend to occur. The route options that follow the rail line to the north and, to a marginally lesser extent the eastern side of the River Pill, minimise the risk of disturbance of terrestrial fauna by avoiding the higher value areas west of the River Pill.
- 23.10.4 All of the options have a common section from the point where the route crosses onto lands at Kilcrea, towards the Pill River to the north. All of the routes stay close and parallel to the rail-line minimising potential disturbance of wintering waterbirds that use the fields to the west and north.

Option 1 (Light Blue)

- 23.10.5 This route encounters only small areas of semi natural habitat. The southern portion of the route follows the causeway north and then passes over a small area of semi-natural habitat, fringing the tidal channel of the pill river at the southern crossing of the pill river and northwards parallel to the main channel. Here the route is located in an area where tidal inundation can occur and there is a limited saline influence in the grassland vegetation. This vegetation community is characteristic of permanently moist and sometimes inundated meadows and typically occurs on periodically tidally flooded sites as is the case here. At the site the vegetation bordering the tidal channels is transitional to a lower salt marsh community classifiable within the *Elymo-Rumicion crispi* (Westhoff and Den Held 1969) described below, transitional areas of the meadow contain species representative of both the *Holco-Juncetum effusi* and the *Elymo-Rumicion crispi*.
- 23.10.6 As the route progresses north it follows the course of the Pill River, comprising riparian hedgerows/scrub. Hedgerows here are very much dominated by Hawthorn (*Crataegus monogyna*) with some Elder (*Sambucus nigra*). In addition some Blackthorn (*Prunus spinosa*), Gorse (*Ulex europaeus*), Holly (*Ilex aquifolium*), Dog-rose (*Rosa canina*) and Bramble (*Rubus fruticosus agg.*) occur. Adjacent to the watercourse willows (*Salix spp.*) and occasional Alder (*Alnus glutinosa*) and Ash (*Fraxinus excelsior*) also occur. These hedgerows are of local ecological value and field margins will be minimally impacted

during construction. The last portion of this section of the route follows a small length of the metalled Kilcrea Road.

- 23.10.7 The traverse of the area of wet grassland/saltmarsh and the tidal channels are the principal constraints to this route option but proper engineering solutions would mitigate against any significant impact to these habitats.
- 23.10.8 In the southern portion area liable to occasional tidal flooding boardwalks are proposed, and the vegetation will not be seriously impacted, and therefore this route is considered an acceptable option. As it encounters more habitat that is influenced by infrequent tidal flooding the route Option 1 is marginally less favoured than route Options 3, 4 and 5. The route is very similar to that of Option 2 but as it encounters more riparian habitat is marginally less favoured.
- 23.10.9 The Light Blue route runs parallel to the rail-line to a point north of the southern Pill River crossing. At this location, the Pill is a very small tidal watercourse fringed by riparian scrub and boundary hedgerows. The route swings to the north and follows the local road towards the R126 (Hearse Road) and approaches the existing gate into Newbridge Demesne from the northeast.
- 23.10.10 The fields east of the Pill, i.e. between the stream and the railway embankment, are occasionally used by feeding and roosting birds during the winter months. Roe & Lovatt (2009) recorded one large flock of Brent Geese feeding in these fields during their winter survey. Additional survey work was carried out in these fields during the winter of 2011/2012 and did not record use of these fields by feeding Brent Geese. Given that these fields are occasionally used by feeding wildfowl and large wading birds the section of Route Options 1 & 2 which run parallel to the Pill River to the northwest are marginally less preferred than the corresponding section of Route Options 3, 4 & 5 which follow the railway embankment northwards for several (two fields for Route Options 3 & 4, or three fields in Route Option 5) fields before swinging westwards towards the second crossing of the River Pill. However, the potential risk for significant disturbance of terrestrial fauna for these routes is judged to be low given the size of the fields and the micro-topography. Other than Route Options 2 & 4, the routes under consideration avoid the areas of greatest sensitivity for field feeding waterbirds and breeding mammals and are therefore considered to be 'acceptable'.

Option 2 (Green)

- 23.10.11 This route encounters only small areas of semi natural habitat. The southern portion of the route follows the causeway north and then similar to route option 1 passes over a small area of semi-natural habitat, fringing the tidal channel of the pill river at the southern crossing of the pill river and northwards parallel to the main channel. Here the route is located in an area where tidal inundation can occur and there is a limited saline influence in the wet grassland vegetation. This vegetation community is characteristic of permanently moist and sometimes inundated meadows and typically occurs on periodically tidally flooded sites as is the case here. At the site the vegetation bordering the tidal channels is transitional to a lower salt marsh community classifiable within the Elymo-Rumicion crispae (Westhoff and Den Held 1969) described below, transitional areas of the meadow contain species representative of both the Holco-Juncetum effusi and the Elymo-Rumicion crispae.

- 23.10.12 As the route progresses north it follows the course of the Pill River, comprising riparian hedgerows/scrub and field margins. This route however does not follow the river for as long as Option 1 and follows field boundary hedgerows westwards just before the Pill river kinks northwest. Hedgerows here are very much dominated by Hawthorn (*Crataegus monogyna*) with some Elder (*Sambucus nigra*). In addition some Blackthorn (*Prunus spinosa*), Gorse (*Ulex europaeus*), Holly (*Ilex aquifolium*), Dog-rose (*Rosa canina*) and Bramble (*Rubus fruticosus* agg.) occur.
- 23.10.13 Existing Hedgerows (WL1) along the field margins on this route are generally moderate examples of their habitat types with some gaps. They support a variety of shrub and tree species and provide an important network of wildlife corridor at the site evaluated as of Moderate-Low Locally Important conservation value.
- 23.10.14 At the field margin hedgerow interface tall grasses occur including False Oat grass (*Arrhenatherum elatius*) and Cock's-foot grass (*Dactylis glomerata*). As with Option 1 the last portion of this section of the route follows a small length of the metalled Kilcrea Road.
- 23.10.15 The traverse of the area of wet grassland/saltmarsh and the tidal channels are the principal constraints to this route option but proper engineering solutions would mitigate against any significant impact to these habitats.
- 23.10.16 In the southern portion area liable to occasional tidal flooding boardwalks are proposed, and the vegetation will not be seriously impacted, and therefore this route is considered an acceptable option. As with Option 1 Option 2 is marginally less favoured than routes 3, 4 and 5 as it encounters more of the saline influenced areas. The route is very similar to that of Option 1 but follows less of the river channel of the Pill River and is therefore acceptable.
- 23.10.17 This route option follows the same route as Option 1 to two fields north of the Pill crossing. Then it crosses the Pill once more heading westwards, turning northwards one field east of Kilcrea Road and joining the common section of all the route options just south of Hearse Road. This route option has greater potential of disturbing terrestrial fauna than route options 1, 3 & 5. This route option would require application of mitigation measures designed to minimise disturbance of terrestrial fauna, particularly winter feeding flocks of birds, including Light-bellied Brent Geese. Walkover surveys of this part of Kilcrea revealed a number of active Badger setts a few hundred metres south of this route option. In addition, the fields that lie south of this route (where it traverses agricultural land between the railway embankment and the local Kilcrea Road) are frequently used by feeding and roosting flocks of wintering birds. The local topography would make users of this route option visible to the fields to the south, several of which are particularly important to wintering Brent Geese. Therefore, in order to be considered further this route option would require screening and measures to minimise the risk to the protected terrestrial mammals. Without successful application of such measures this route option would be considered 'Least Acceptable' from a faunal perspective.

Option 3 (Yellow)

- 23.10.18 The southern portion of the route follows the railway causeway/embankment north. Two field north of the southern Pill River crossing the route veers west and follows the course of the Pill River, comprising riparian hedgerows/scrub and field margins. This section of the route is equivalent to the northern portion of Option 1. Here hedgerows

here are very much dominated by Hawthorn (*Crataegus monogyna*) with some Elder (*Sambucus nigra*). In addition some Blackthorn (*Prunus spinosa*), Gorse (*Ulex europaeus*), Holly (*Ilex aquifolium*), Dog-rose (*Rosa canina*) and Bramble (*Rubus fruticosus* agg.) occur. Adjacent to the watercourse willows (*Salix* spp.) and occasional Alder (*Alnus glutinosa*) and Ash (*Fraxinus excelsior*) also occur. These hedgerows are of local ecological value and field margins will be minimally impacted during construction. The last portion of this section of the route follows a small length of the metalled Kilcrea Road.

- 23.10.19 With the exception of the riparian corridor of the Pill River and local hedgerows this route encounters very little natural habitat of conservation interest. It is thus an acceptable option.
- 23.10.20 The distribution and abundance of birds at Kilcrea is well understood (Roe & Lovatt, 2009). Route Option 3 (Yellow) runs parallel to the rail-line to a point two fields north of the Pill crossing and then swings west and follows the same route as the northern portion of Route Option 1 (Light Blue). Given that these fields are occasionally used by feeding wildfowl and large wading birds the section of Route Options 3 and 4 which parallels the Pill River to the northwest is marginally less preferred than the corresponding part of Route Option 5 which follows the railway embankment northwards for three fields before swinging westwards towards the second crossing of the Pill. Route Option 3 (Yellow) is marginally more ‘Preferred’ than Route Option 1 (Light Blue) as it follows the rail-line for two fields northwards before crossing west and onto the same route as Option 1. Routes following the Pill have marginally greater potential for the disturbance of birds and mammals by traversing areas closer to where wintering flocks of birds such as Brent Geese are known to occur. However, the potential risk for significant disturbance is judged to be low given the size of the fields and the micro-topography. Both of these routes avoid the areas of greatest sensitivity for field-feeding waterbirds and breeding mammals and are therefore considered to be acceptable options.

Option 4 (Purple)

- 23.10.21 This route Option follows the railway embankment causeway for the same distance as Option 3. Then it traverses the Pill River two fields north of the southern Pill river Crossing. Then the route follows the field boundary hedgerows westwards for three field before following the field boundary hedgerows north. Hedgerows here are very much dominated by Hawthorn (*Crataegus monogyna*) with some Elder (*Sambucus nigra*). In addition some Blackthorn (*Prunus spinosa*), Gorse (*Ulex europaeus*), Holly (*Ilex aquifolium*), Dog-rose (*Rosa canina*) and Bramble (*Rubus fruticosus* agg.) occur.
- 23.10.22 Existing Hedgerows (WL1) along the field margins on this route are generally moderate examples of their habitat types with some gaps. They support a variety of shrub and tree species and provide an important network of wildlife corridor at the site evaluated as of Moderate-Low Locally Important conservation value.
- 23.10.23 At the field margin hedgerow interface tall grasses occur including False Oat grass (*Arrhenatherum elatius*) and Cock’s-foot grass (*Dactylis glomerata*). As with Option 1 the last portion of this section of the route follows a small length of the metalled Kilcrea Road.
- 23.10.24 With the exception of the crossings of the Pill River and local hedgerows this route encounters very little natural habitat of conservation interest. It is thus an acceptable option.

23.10.25 Route Option 4 (Purple) follows a very similar route as Option 3 (Yellow) as far the second approach to the River Pill. At this point Option 4 crosses the Pill and follows the same route as Option 2 (Green). This route option has greater potential of disturbing terrestrial fauna than route options 1, 3 & 5. This route option would also require application of mitigation measures designed to minimise disturbance of terrestrial fauna, particularly winter feeding flocks of birds. As described above, these fields are important for feeding and roosting birds during the winter period. There are also a number of active Badger setts a few hundred metres south of this route option. The fields that are crossed by Route Options 2 & 4 and fields that lie south of these routes (where the routes traverses agricultural land between the railway embankment and the local Kilcrea Road) are frequently used by feeding and roosting flocks of wintering birds. Therefore, in order to be considered further this route option would require screening and measures to minimise the risk to the protected fauna. Without successful application of such measures this route option would be considered 'Least Acceptable' from a faunal perspective.

Option 5 (Dark Blue)

- 23.10.26 Route Option 5 follows the railway embankment northwards for three fields, further than Route Options 3 and 4, after the Pill Estuary Crossing. Route Option 5 then swings westwards towards the second crossing of the Pill. From there onwards Option 1 (Light Blue) Option 3 (Yellow) and Option 5 (Dark Blue) have a common course.
- 23.10.27 This route encounters only a very small area of natural habitat along its length for the most part, following a stony track road adjacent to the railway causeway/embankment, field margin hedgerows and metalled roads.
- 23.10.28 The field margins are dominated by hedgerows. Existing Hedgerows (WL1) along the field margins on this route are generally good examples of their habitat types with well developed and dense mix of woody species. They support a variety of shrub and tree species and provide an important network of wildlife corridor at the site evaluated as of Moderate-Low Locally Important conservation value.
- 23.10.29 The hedgerows along the route corridor are above areas liable to flood and as such the route following these hedgerows is above the area of wet grassland and/or modified saltmarsh liable to flood and to which saline influence encroaches. The hedgerows along the field margins are very much dominated by Hawthorn (*Crataegus monogyna*) and some Elder (*Sambucus nigra*). In addition Blackthorn (*Prunus spinosa*), Gorse (*Ulex europaeus*), Bramble (*Rubus fruticosus* agg.) and willows (*Salix* spp.) occur.
- 23.10.30 At the field margin hedgerow interface tall grasses occur including False Oat grass (*Arrhenatherum elatius*) and Cock's-foot grass (*Dactylis glomerata*). Because this route encounters very little areas of habitat of conservation interest it is considered to be a preferred option.
- 23.10.31 Route Option 5 is the 'Preferred' in terms of an assessment of potential impacts on habitats birds and mammals. By closely following the railway embankment northwards towards the local road and also following the roadway hedgerows, this option minimises the potential for disturbance of natural habitats. The option also minimises the impact on birds feeding in the fields to the west. There are no known breeding or resting places of protected mammals, along or adjacent to this route.

Option Preferences

Habitat and Botanical Appraisal

Route Option	Preference
(1) Light Blue	Least Acceptable
(2) Green	Acceptable
(3) Yellow	Preferred
(4) Purple	Preferred
(5) Dark Blue	Most Preferred

Birds and Mammal Appraisal

Route Option	Preference
(1) Light Blue	Preferred
(2) Green	Least Acceptable
(3) Yellow	Preferred
(4) Purple	Least Acceptable
(5) Dark Blue	Most Preferred

23.11 Air Quality and Climate

Sensitive Receptors

- 23.11.1 Section 5: This is the only “new build” section of the route across agricultural land. Five options will commence once the greenway on the causeway reaches the northern shore. The options terminate inside the gate of Newbridge Demesne. There is a common element of the proposed greenway in this section that runs from the estuary and the River Pill.

Table 23.18 Ranking of Route Options.

Section	Option Number	No. of Receptors	Ranking
5	Option 1	2	=1
	Option 2	2	=1
	Option 3	3	=2
	Option 4	3	=2
	Option 5	4	3

Table 23.19 Preference of Route Options.

Section	Route	Ranking	Preference
5	Option 1	=1	Most Preferred
	Option 2	=1	Most Preferred
	Option 3	=2	Most Preferred
	Option 4	=2	Most Preferred
	Option 5	3	Most Preferred

23.12 Noise and Vibration

Ranking of Routes

- 23.12.1 Section 5: This is the only “new build” section of the route across agricultural land. There are six options in this section. The options commence once the greenway on the causeway reaches the northern shore. The options terminate at the gate of Newbridge Demesne. There is a common element of the proposed greenway in this section that runs from the estuary and the River Pill.

Table 23.20 Ranking of Route Options.

Section	Option Number	Option Title	No. of Receptors	Ranking
5	1	Light Blue	2	=1
	2	Green	2	=1
	3	Yellow	3	=3
	4	Purple	3	=3
	5	Dark Blue	4	5

Table 23.21 Preference of Route Options

Section	Route	Option Title	Ranking	Preference
5	1	Light Blue	=1	Most Preferred
	2	Green	=1	Most Preferred
	3	Yellow	=3	Acceptable
	4	Purple	=3	Acceptable
	5	Dark Blue	5	Acceptable

Summary and Conclusions

Table 23.22

Section	Route	Option Title	Ranking	Preference
5	1	Light Blue	=1	Most Preferred
	2	Green	=1	Most Preferred
	3	Yellow	=3	Acceptable
	4	Purple	=3	Acceptable
	5	Dark Blue	5	Acceptable

23.13 Summary of Option Analysis – Section 5 (Five Options)

Landscape

Route Option	Preference
(1) Light Blue	Most Preferred
(2) Green	Most Preferred
(3) Yellow	Most Preferred
(4) Purple	Most Preferred
(5) Dark Blue	Most Preferred

Population and Human Health

Route Option	Preference
(1) Light Blue	Most Preferred
(2) Green	Most Preferred
(3) Yellow	Preferred
(4) Purple	Preferred
(5) Dark Blue	Acceptable

Architectural Heritage

Route Option	Preference
(1) Light Blue	Most Preferred
(2) Green	Most Preferred
(3) Yellow	Most Preferred
(4) Purple	Most Preferred
(5) Dark Blue	Most Preferred

Archaeology and Cultural Heritage

Route Option	Preference
(1) Light Blue	Most Preferred
(2) Green	Most Preferred
(3) Yellow	Most Preferred
(4) Purple	Most Preferred
(5) Dark Blue	Most Preferred

Land, Soils and Groundwater

Route Option	Preference
(1) Light Blue	Most Preferred
(2) Green	Most Preferred
(3) Yellow	Most Preferred
(4) Purple	Most Preferred
(5) Dark Blue	Most Preferred

Surface Water

Route Option	Preference
(1) Light Blue	Preferred
(2) Green	Preferred
(3) Yellow	Preferred
(4) Purple	Preferred
(5) Dark Blue	Preferred

Material Assets - Agronomy

Route Option	Preference
(1) Light Blue	Acceptable
(2) Green	Preferred
(3) Yellow	Acceptable
(4) Purple	Preferred
(5) Dark Blue	Acceptable

Biodiversity

Habitat and Botanical Appraisal

Route Option	Preference
(1) Light Blue	Acceptable
(2) Green	Acceptable
(3) Yellow	Acceptable
(4) Purple	Acceptable
(5) Dark Blue	Preferred

Birds and Mammal Appraisal

Route Option	Preference
(1) Light Blue	Acceptable
(2) Green	Least Acceptable
(3) Yellow	Acceptable
(4) Purple	Least Acceptable
(5) Dark Blue	Preferred

Air Quality

Route Option	Preference
(1) Light Blue	Most Preferred
(2) Green	Most Preferred
(3) Yellow	Most Preferred
(4) Purple	Most Preferred
(5) Dark Blue	Most Preferred

Noise

Route Option	Preference
(1) Light Blue	Most Preferred
(2) Green	Most Preferred
(3) Yellow	Acceptable
(4) Purple	Acceptable
(5) Dark Blue	Acceptable

23.14 Summary of Preferences

Table 23.23 Summary Table of Preferences (N/A = Not Applicable).

Section 5 Options	Landscape	Population and Human Health	Architectural Heritage	Archaeology & Cultural Heritage	Land, Soils and Groundwater	Surface Water	Material Assets - Agronomy	Biodiversity - Habitat and Botanical	Biodiversity - Birds and Mammals	Air Quality	Noise
Option 1 – Light Blue	Most Preferred	Most Preferred	Most Preferred	Most Preferred	Most Preferred	Preferred	Acceptable	Acceptable	Acceptable	Most Preferred	Most Preferred
Option 2 – Green	Most Preferred	Most Preferred	Most Preferred	Most Preferred	Most Preferred	Preferred	Preferred	Acceptable	Least Acceptable	Most Preferred	Most Preferred
Option 3 – Yellow	Most Preferred	Preferred	Most Preferred	Most Preferred	Most Preferred	Preferred	Acceptable	Acceptable	Acceptable	Most Preferred	Acceptable
Option 4 – Purple	Most Preferred	Preferred	Most Preferred	Most Preferred	Most Preferred	Preferred	Preferred	Acceptable	Least Acceptable	Most Preferred	Acceptable
Option 5 – Dark Blue	Most Preferred	Acceptable	Most Preferred	Most Preferred	Most Preferred	Preferred	Acceptable	Preferred	Preferred	Most Preferred	Acceptable

23.15 Preference Order

Table 23.24 Summary of Preferences.

Section 5 Options	Least Acceptable	Acceptable	Preferred	Most Preferred
Option 1 – Light Blue	-	3	1	7
Option 2 – Green	1	2	2	7
Option 3 – Yellow	-	4	2	5
Option 4 – Purple	1	2	3	5
Option 5 – Dark Blue	-	3	3	5

Table 23.25 Preference Order.

Section 5 Options	Order	
Option 1 – Light Blue	2	Preferred
Option 2 – Green	1	Most Preferred
Option 3 – Yellow	3	Preferred
Option 4 – Purple	5	Preferred
Option 5 – Dark Blue	4	Preferred

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Appendices

Appendix A

Architectural Heritage – Master Tables of Impacts of the Route Options

Section 1 – Malahide Demesne

TABLE 1. Structures Affected by the Route Options at Malahide Demesne.

AHC No.	Description	Site Name	Townland	RMP	RPS	Statutory Protection	Key Constraint (Yes/No)	Perceived Importance
AHC001	Country House	Malahide Castle	Malahide Demesne	DU012-030----	383	RMP & RPS	Yes	National
AHC002	Demesne	Malahide Castle	Malahide Demesne, Mabestown	None	None	ACA	Yes	Regional
AHC003	Outbuildings	Malahide Castle	Malahide Demesne	None	383	RPS	Yes	Regional
AHC004	House	Malahide Castle	Malahide Demesne	None	383	RPS	Yes	Regional
AHC005	Church, Undetermined	Malahide Abbey	Malahide Demesne	DU012-031001-	384	RMP & RPS	Yes	National
AHC006	Graveyard	Malahide Abbey	Malahide Demesne	DU012-031006-	384	RMP & RPS	Yes	National
AHC007	Gate Lodge	Malahide Castle	Malahide Demesne	None	383	RPS	Yes	Regional

Section 2 – R106 Dublin Road, Malahide

TABLE 2. Structures Affected by the Route Options at Malahide-Dublin Road.

AHC No.	Description	Site Name	Townland	RMP	RPS	Statutory Protection	Key Constraint (Yes/No)	Perceived Importance
AHC002	Demesne	Malahide Castle	Malahide Demesne, Mabestown	None	None	ACA	Yes	Regional
AHC007	Gate Lodge	Malahide Castle	Malahide Demesne	None	383	RPS	Yes	Regional
AHC021	Pedestrian Gateway	Malahide Station	Malahide	None	None	None	Yes	Regional
AHC024	Vernacular House	Casino	Malahide	None	381	RPS	Yes	Regional

AHC No.	Description	Site Name	Townland	RMP	RPS	Statutory Protection	Key Constraint (Yes/No)	Perceived Importance
AHC025	Milestone	Milestone	Malahide	None	386	RPS	No	Regional
AHC026	Church, Presbyterian	Malahide Presbyterian Church	Malahide	None	426	RPS	Yes	Regional
AHC027	Town House	Sonas	Malahide	None	425	RPS	Yes	Regional
AHC028	Town House	Rosca	Malahide	None	424	RPS	Yes	Regional
AHC029	School	Malahide School	Malahide	None	None	None	Yes	Regional

Section 3 – R106 Dublin Road to Bissets Strand

TABLE 3. Structures Affected by the Route Options at Malahide Village.

AHC No.	Description	Site Name	Townland	RMP	RPS	Statutory Protection	Key Constraint (Yes/No)	Perceived Importance
AHC002	Demesne	Malahide Castle	Malahide Demesne, Mabestown	None	None	ACA	Yes	Regional
AHC018	Historic Town	Malahide Historic Core	Malahide	None	None	ACA	Yes	Regional
AHC022	Railway Bridge	Malahide Station	Malahide	None	423	RPS	Yes	Regional
AHC026	Church, Presbyterian	Malahide Presbyterian Church	Malahide	None	426	RPS	Yes	Regional
AHC027	Town House	Sonas	Malahide	None	425	RPS	Yes	Regional
AHC028	Town House	Rosca	Malahide	None	424	RPS	Yes	Regional
AHC029	School	Malahide School	Malahide	None	None	None	Yes	Regional
AHC030	Vernacular House	Unnamed	Malahide	None	381	RPS	Yes	Regional

Section 4 – Bissets Strand to the North Shore of Malahide Estuary

TABLE 4. Structures Affected by the Fixed Option at the Railway Causeway

AHC No.	Description	Site Name	Townland	RMP	RPS	Statutory Protection	Key Constraint (Yes/No)	Perceived Importance
023	Viaduct	Malahide Railway Viaduct	Malahide	None	420	RPS	Yes	Regional

Section 5 – North Shore of Malahide Estuary to R126 Hearse Road

TABLE 5. Structures Affected by the Route Options at Kilcrea Townland

AHC No.	Description	Site Name	Townland	RMP	RPS	Statutory Protection	Key Constraint (Yes/No)	Perceived Importance
031	Bridge, Railway	Unnamed	Kilcrea	None	502	RPS	Yes	Regional
032	Church, Undetermined	Kilcrea Church	Kilcrea	DU012-016001-	499	RMP & RPS	Yes	Regional
033	Graveyard	Kilcrea Cemetery	Kilcrea	DU012-016002-	499	RMP & RPS	Yes	Regional
034	Country House	Kilcrea House	Kilcrea	None	500	RPS	Yes	Regional
035	Informal Demesne	Kilcrea House	Kilcrea	None	None	None	Yes	Local
036	Mill, Tidal	Baltry Corn Mill	Kilcrea	DU012-018----	501	RMP & RPS	Yes	Local
037	Country House	Seafield	Ballymadrough	None	483	RPS	Yes	National
038	Demesne	Seafield	Ballymadrough	None	None	None	Yes	Regional
041	Demesne	Newbridge House	Newbridge Demesne	None	None	ACA	Yes	Regional
044	Gate Entrance	Newbridge House	Newbridge Demesne	None	494	RPS	Yes	Regional

Appendix B

Architectural Heritage – Potential Impacts of Route Options

Section 1 – Malahide Demesne

TABLE 1. Potential Impacts of Option 1 - Green at Malahide Demesne

AHC No.	Site Type	Site Name	Townland	Statutory Protection	Key Constraint (Yes/No)	Perceived Architectural Importance	Potential Impact
AHC001	Country House	Malahide Castle	Malahide Demesne	RPS, RMP	Yes	National	Neutral
AHC002	Demesne	Malahide Castle	Malahide Demesne, Mabestown	ACA	Yes	Regional	Neutral

TABLE 2. Potential Impacts of Option 2 – Orange at Malahide Demesne

AHC No.	Site Type	Site Name	Townland	Statutory Protection	Key Constraint (Yes/No)	Perceived Architectural Importance	Potential Impact
AHC001	Country House	Malahide Castle	Malahide Demesne	RPS, RMP	Yes	National	Neutral
AHC002	Demesne	Malahide Castle	Malahide Demesne, Mabestown	ACA	Yes	Regional	Imperceptible Negative

TABLE 3. Potential Impacts of Option 3 – Pink at Malahide Demesne

AHC No.	Site Type	Site Name	Townland	Statutory Protection	Key Constraint (Yes/No)	Perceived Architectural Importance	Potential Impact
AHC001	Country House	Malahide Castle	Malahide Demesne	RPS, RMP	Yes	National	Neutral
AHC002	Demesne	Malahide Castle	Malahide Demesne, Mabestown	ACA	Yes	Regional	Neutral
AHC003	Outbuildings	Malahide Castle	Malahide Demesne	RPS	Yes	Regional	Neutral
AHC004	House	Malahide Castle	Malahide Demesne	RPS	Yes	Regional	Neutral

AHC No.	Site Type	Site Name	Townland	Statutory Protection	Key Constraint (Yes/No)	Perceived Architectural Importance	Potential Impact
AHC005	Church, Undetermined	Malahide Abbey	Malahide Demesne	RPS, RMP	Yes	National	Neutral
AHC006	Graveyard	Malahide Abbey	Malahide Demesne	RPS, RMP	Yes	National	Neutral
AHC007	Gate Lodge	Malahide Castle	Malahide Demesne	RPS	Yes	Regional	Neutral

TABLE 4. Potential Impacts of Option 4 - Blue at Malahide Demesne

AHC No.	Site Type	Site Name	Townland	Statutory Protection	Key Constraint (Yes/No)	Perceived Architectural Importance	Potential Impact
AHC001	Country House	Malahide Castle	Malahide Demesne	RPS, RMP	Yes	National	Neutral
AHC002	Demesne	Malahide Castle	Malahide Demesne, Mabestown	ACA	Yes	Regional	Imperceptible Negative
AHC003	Outbuildings	Malahide Castle	Malahide Demesne	RPS	Yes	Regional	Neutral
AHC004	House	Malahide Castle	Malahide Demesne	RPS	Yes	Regional	Neutral
AHC005	Church, Undetermined	Malahide Abbey	Malahide Demesne	RPS, RMP	Yes	National	Neutral
AHC006	Graveyard	Malahide Abbey	Malahide Demesne	RPS, RMP	Yes	National	Neutral

TABLE 5. Potential Impacts of Option 5 – Cyan at Malahide Demesne

AHC No.	Site Type	Site Name	Townland	Statutory Protection	Key Constraint (Yes/No)	Perceived Architectural Importance	Potential Impact
AHC001	Country House	Malahide Castle	Malahide Demesne	RPS, RMP	Yes	National	Neutral
AHC002	Demesne	Malahide Castle	Malahide Demesne, Mabestown	ACA	Yes	Regional	Neutral

TABLE 6. Potential Impacts of Option 6 - Yellow at Malahide Demesne

AHC No.	Site Type	Site Name	Townland	Statutory Protection	Key Constraint (Yes/No)	Perceived Architectural Importance	Potential Impact
AHC001	Country House	Malahide Castle	Malahide Demesne	RPS, RMP	Yes	National	Neutral
AHC002	Demesne	Malahide Castle	Malahide Demesne, Mabestown	ACA	Yes	Regional	Neutral

Section 2 – R106 Dublin Road, Malahide

TABLE 7. Potential Impacts of Option 1 - Orange at Malahide-Dublin Road

AHC No.	Site Type	Site Name	Townland	Statutory Protection	Key Constraint (Yes/No)	Perceived Architectural Importance	Potential Impact
AHC002	Demesne	Malahide Castle	Malahide Demesne, Mabestown	ACA	Yes	Regional	Neutral
AHC029	School	Malahide School	Malahide	None	Yes	Regional	Neutral

TABLE 8. Potential Impacts of Option 2 – Pink at Malahide-Dublin Road

AHC No.	Site Type	Site Name	Townland	Statutory Protection	Key Constraint (Yes/No)	Perceived Architectural Importance	Potential Impact
AHC002	Demesne	Malahide Castle	Malahide Demesne, Mabestown	ACA	Yes	Regional	Neutral
AHC027	Town House	Sonas	Malahide	RPS	Yes	Regional	Neutral
AHC028	Town House	Rosca	Malahide	RPS	Yes	Regional	Neutral

TABLE 9. Potential Impacts of Option 3 – Cyan at Malahide-Dublin Road

AHC No.	Site Type	Site Name	Townland	Statutory Protection	Key Constraint (Yes/No)	Perceived Architectural Importance	Potential Impact
AHC002	Demesne	Malahide Castle	Malahide Demesne, Mabestown	ACA	Yes	Regional	Neutral
AHC007	Gate Lodge	Malahide Castle	Malahide Demesne	RPS	Yes	Regional	Neutral
AHC024	Vernacular House	Casino	Malahide	RPS	Yes	Regional	Neutral
AHC025	Milestone	Milestone	Malahide	RPS	No	Regional	Neutral
AHC026	Church, Presbyterian	Malahide Presbyterian Church	Malahide	RPS	Yes	Regional	Neutral

TABLE 10. Potential Impacts of Option 4 – Green at Malahide-Dublin Road

AHC No.	Site Type	Site Name	Townland	Statutory Protection	Key Constraint (Yes/No)	Perceived Architectural Importance	Potential Impact
AHC002	Demesne	Malahide Castle	Malahide Demesne, Mabestown	ACA	Yes	Regional	Neutral
AHC007	Gate Lodge	Malahide Castle	Malahide Demesne	RPS	Yes	Regional	Neutral
AHC024	Vernacular House	Casino	Malahide	RPS	Yes	Regional	Neutral
AHC025	Milestone	Milestone	Malahide	RPS	No	Regional	Neutral
AHC026	Church, Presbyterian	Malahide Presbyterian Church	Malahide	RPS	Yes	Regional	Neutral

TABLE 11. Potential Impacts of Option 5 - Blue at Malahide-Dublin Road

AHC No.	Site Type	Site Name	Townland	Statutory Protection	Key Constraint (Yes/No)	Perceived Architectural Importance	Potential Impact
AHC021	Pedestrian Gateway	Malahide Station	Malahide	None	Yes	Regional	Neutral

Section 3 – R106 Dublin Road to Bissets Strand

TABLE 12. Potential Impacts of Option 1 – Blue at Malahide Village

AHC No.	Site Type	Site Name	Townland	Statutory Protection	Key Constraint (Yes/No)	Perceived Architectural Importance	Potential Impact
AHC002	Demesne	Malahide Castle	Malahide Demesne, Mabestown	ACA	Yes	Regional	Neutral
AHC029	School	Malahide School	Malahide	None	Yes	Regional	Neutral
AHC030	Vernacular House	Unnamed	Malahide	RPS	Yes	Regional	Neutral

TABLE 13. Potential Impacts of Option 2 - Orange at Malahide Village

AHC No.	Site Type	Site Name	Townland	Statutory Protection	Key Constraint (Yes/No)	Perceived Architectural Importance	Potential Impact
AHC002	Demesne	Malahide Castle	Malahide Demesne, Mabestown	ACA	Yes	Regional	Neutral
AHC029	School	Malahide School	Malahide	None	Yes	Regional	Neutral

TABLE 14. Potential Impacts of Option 3 – Green at Malahide Village

AHC No.	Site Type	Site Name	Townland	Statutory Protection	Key Constraint (Yes/No)	Perceived Architectural Importance	Potential Impact
AHC002	Demesne	Malahide Castle	Malahide Demesne, Mabestown	ACA	Yes	Regional	Neutral
AHC026	Church, Presbyterian	Malahide Presbyterian Church	Malahide	RPS	Yes	Regional	Neutral
AHC027	Town House	Sonas	Malahide	RPS	Yes	Regional	Neutral
AHC028	Town House	Rosca	Malahide	RPS	Yes	Regional	Neutral

TABLE 15. Potential Impacts of Option 4 – Pink at Malahide Village

AHC No.	Site Type	Site Name	Townland	Statutory Protection	Key Constraint (Yes/No)	Perceived Architectural Importance	Potential Impact
AHC018	Historic Town	Malahide Historic Core	Malahide	ACA	Yes	Regional	Neutral
AHC022	Railway Bridge	Malahide Station	Malahide	RPS	Yes	Regional	Neutral

TABLE 16. Potential Impacts of Option 5 - Yellow at Malahide Village

AHC No.	Site Type	Site Name	Townland	Statutory Protection	Key Constraint (Yes/No)	Perceived Architectural Importance	Potential Impact
AHC018	Historic Town	Malahide Historic Core	Malahide	ACA	Yes	Regional	Neutral
AHC022	Railway Bridge	Malahide Station	Malahide	RPS	Yes	Regional	Neutral

Section 4 – Bissets Strand to the North Shore of Malahide Estuary

TABLE 17. Potential Impacts of the Fixed Option at the Railway Causeway

AHC No.	Site Type	Site Name	Townland	Statutory Protection	Key Constraint (Yes/No)	Perceived Architectural Importance	Potential Impact
AHC023	Viaduct	Malahide Railway Viaduct	Malahide	RPS	Yes	Regional	Neutral

Section 5 – North Shore of Malahide Estuary to R126 Hearse Road

TABLE 18. Potential Impacts of Option 1 – Pink at Kilcrea Townland

AHC No.	Site Type	Site Name	Townland	Statutory Protection	Key Constraint (Yes/No)	Perceived Architectural Importance	Potential Impact
AHC032	Church, undetermined	Kilcrea Church	Kilcrea	RMP, RPS	Yes	Regional	Neutral
AHC033	Graveyard	Kilcrea Cemetery	Kilcrea	RMP, RPS	Yes	Regional	Neutral
AHC034	Country House	Kilcrea House	Kilcrea	RPS	Yes	Regional	Neutral
AHC035	Informal Demesne	Kilcrea House	Kilcrea	None	Yes	Local	Neutral
AHC037	Country House	Seafield	Ballymadrough	RPS	Yes	National	Neutral
AHC038	Demesne	Seafield	Ballymadrough	None	Yes	Regional	Neutral
AHC041	Demesne	Newbridge House	Newbridge Demesne	ACA	Yes	Regional	Neutral
AHC044	Gate Entrance	Newbridge House	Newbridge Demesne	RPS	Yes	Regional	Neutral

TABLE 19. Potential Impacts of Option 2 – Blue at Kilcrea Townland

AHC No.	Site Type	Site Name	Townland	Statutory Protection	Key Constraint (Yes/No)	Perceived Architectural Importance	Potential Impact
AHC031	Bridge	Railway Bridge	Kilcrea	RPS	Yes	Regional	Neutral
AHC036	Mill, Tidal	Baltray Corn Mill	Kilcrea	RMP, RPS	Yes	Local	Neutral
AHC041	Demesne	Newbridge House	Newbridge Demesne	ACA	Yes	Regional	Neutral
AHC044	Gate Entrance	Newbridge House	Newbridge Demesne	RPS	Yes	Regional	Neutral

TABLE 20. Potential Impacts of Option 3 – Cyan at Kilcrea Townland

AHC No.	Site Type	Site Name	Townland	Statutory Protection	Key Constraint (Yes/No)	Perceived Architectural Importance	Potential Impact
AHC031	Bridge	Railway Bridge	Kilcrea	RPS	Yes	Regional	Neutral
AHC041	Demesne	Newbridge House	Newbridge Demesne	ACA	Yes	Regional	Neutral
AHC044	Gate Entrance	Newbridge House	Newbridge Demesne	RPS	Yes	Regional	Neutral

TABLE 21. Potential Impacts of Option 4 – Green at Kilcrea Townland

AHC No.	Site Type	Site Name	Townland	Statutory Protection	Key Constraint (Yes/No)	Perceived Architectural Importance	Potential Impact
AHC031	Bridge	Railway Bridge	Kilcrea	RPS	Yes	Regional	Neutral
AHC041	Demesne	Newbridge House	Newbridge Demesne	ACA	Yes	Regional	Neutral
AHC044	Gate Entrance	Newbridge House	Newbridge Demesne	RPS	Yes	Regional	Neutral

TABLE 22. Potential Impacts of Option 5 – Orange at Kilcrea Townland

AHC No.	Site Type	Site Name	Townland	Statutory Protection	Key Constraint (Yes/No)	Perceived Architectural Importance	Potential Impact
AHC031	Bridge	Railway Bridge	Kilcrea	RPS	Yes	Regional	Neutral
AHC041	Demesne	Newbridge House	Newbridge Demesne	ACA	Yes	Regional	Neutral
AHC044	Gate Entrance	Newbridge House	Newbridge Demesne	RPS	Yes	Regional	Neutral

TABLE 23. Potential Impacts of Option 6 – Yellow at Kilcrea Townland

AHC No.	Site Type	Site Name	Townland	Statutory Protection	Key Constraint (Yes/No)	Perceived Architectural Importance	Potential Impact
AHC031	Bridge	Railway Bridge	Kilcrea	RPS	Yes	Regional	Neutral
AHC041	Demesne	Newbridge House	Newbridge Demesne	ACA	Yes	Regional	Neutral
AHC044	Gate Entrance	Newbridge House	Newbridge Demesne	RPS	Yes	Regional	Neutral

Appendix C

A Preliminary Inventory of Architectural Heritage within the Route Corridors

AHC001 – Malahide Castle (Country House)

Reference No.	AHC001
Location Co-ordinates	ITM East 721923; ITM North 745444
Townland	Malahide Demesne
County	Dublin
Site Type	Country House
Site Name	Malahide Castle
Description	<p>NIAH: Detached five-bay three-storey over basement medieval mansion, c. 1450, renovated and extended, c. 1650. Partly rebuilt and extended, c. 1770, with single-bay three-storey Georgian Gothic style circular towers added at each end of the front elevation. Single-bay three-storey flat-roofed entrance block with single-bay full-height square turrets to corners added c. 1825. In use as museum, c.1975, extensively renovated, c.1990. ROOF: Double-pitched and hipped behind battlemented parapets; slate; concrete ridge tiles; nap rendered chimney stack; clay pots; cast-iron rainwater goods; flat-roof to towers, turrets and entrance block. WALLS: Random coursed rubble stone; nap rendered over; nap rendered courses; unpainted; stone coping to battlemented parapets. OPENINGS: Ogee-headed openings to tower to left; stone sills; moulded surrounds; Gothic style timber sash windows; square-headed window openings to right; cut-stone hood mouldings; 6/6 timber sash windows; pointed-arch door opening to centre; cut-stone surround; timber panelled door; shallow-arch window openings over; cut-stone surrounds and mullions; diamond-leaded five-pane windows; square-headed window openings to tower to right; diamond-leaded fixed-pane windows. INTERIOR: Restored, c. 1990, great hall; vaulted undercroft; corbel heads of Edward IV; oak room; carved timber panelled walls; pair of drawing rooms rebuilt, c. 1770 (after fire, 1760); rococo plasterwork; decorative doorcases; turret rooms.</p> <p>Archaeological Inventory: Malahide castle erected on an elevated situation in the present grounds of the Demesne is associated with the Talbot family who were granted these lands by Henry 11 in 1174. The family remained here until 1973, except for a short period in 1653 when Talbot was outlawed and the castle and lands were given to Miles Corbet but later restored in 1665 (Anon 1914, 255-257). It is large, irregular, and unequal in its height. The late medieval core of the castle is largely masked by a re-build c. 1760, which involved the construction of a long symmetrical wing with corner towers that enclosed the earlier castle thus creating a castellated structure. Externally this is of Georgian Gothic style. The castle was re-roofed and renovated in the 19th-century. The ground floor of the late medieval core is vaulted and entered by a Gothic doorway, the upper chambers are approached by a spiral staircase in a SE angle tower which projects in the E. On the first floor adjoining the hall in the medieval core of the castle is the Oak Room. This has a vaulted undercroft and corbel heads of Edward 1V, which are original (Dims L10.75m, Wth 7.15m, T 1.30m). Its walls are covered with carved panelling of 16th-century date. There is a 16th-century Flemish carving over the fireplace depicting the Assumption of the Virgin (Flanagan 1984, 25-29; Bence-Jones 1988, 198-199, O'Shea 1992, 12).</p>

Bence-Jones: The most distinguished of all Irish castles, probably in continuous occupation by the same family for longer than any other house in Ireland. It also contains the only surviving medieval great hall in Ireland to keep its original form and remain in domestic use – at any rate, until recently. The great hall, which continued as the dining room, dates from C15; it was re-roofed and given various features in C19; but its dimensions, its vaulted undercroft and its corbel heads of Edward IV are original. Adjoining the hall, in the early medieval core of the castle, is the Oak Room, its walls covered with carved panelling of different periods and nationalities. According to tradition, the carving of the Coronation of the Virgin above the fireplace of this room miraculously disappeared when the castle was occupied by the regicide, Myles Corbet, during the Cromwellian period, and reappeared when the Talbots returned after the Restoration. The opposite side of the castle to the great hall, dating from C16 or early C17, originally contained 4 tapestry-hung rooms; but this range was gutted by fire 1760. It was rebuilt *ca* 1770, probably by the same architect or builder who designed C18 wing at Ballinlough Castle, co Westmeath; the then owner, Richard Talbot, being married to Margaret, daughter of James O'Reilly of Ballinlough, who, after her husband's death, was created Baroness Talbot of Malahide. Externally, the rebuilt range was given a Georgian Gothic character, a slender round corner tower being added at each end of it. Inside, 2 magnificent drawing rooms were formed out of the space which had been previously occupied by the 4 smaller rooms; with ceilings of splendid rococo plaster work which can be attributed stylistically to Robert West. The doorway between the 2 rooms has on one side a doorcase with an entablature carried on Corinthian columns, and on the other a doorcase with a broken pediment on Ionic columns. The walls of the 2 drawing rooms are painted a subtle shade of orange, which makes a perfect background to the pictures in their gilt frames. Opening off each of the two drawing rooms is a charming little turret room. A 3rd round tower was subsequently added at the corner of the hall range, balancing one of C18 towers at the opposite side of the entrance front; and in early C19, an addition was built in the centre of this front, with 2 wide mullioned windows above an entrance door; forming an extension to the Oak Room and providing an entrance hall below it. The castle was noted for its splendid contents, which included a magnificent collection of ancestral portraits of the Talbots, and also of the Wogans and of other families to whom they were allied; including portraits of many prominent Irish Jacobites. 7th Baron, who succeeded 1948, made a notable garden here, with a collection of rare shrubs from Australasia and other parts of the world. Owing to death duties resulting from the death of 7th Baron, 1973, Malahide has been sold; the Talbots' connexion with the place, which went back to the reign of Henry II, has been brought to an end. The castle was acquired by Dublin County Council and has recently been opened to the public by Dublin Tourism, which bought some of the furniture. Some of the portraits are also still in the castle, having been bought by the National Gallery and lent to Dublin Tourism. Much of the contents, however, have been dispersed.

Approximate Date	1400-1990 (multi-period structure)
Statutory Protection	RMP (DU012-030----); RPS (383)
NIAH No.	11344019
Archaeological Inventory No.	N/A
Importance	National
Key Constraint	Yes
Distance from Centre Line	450-500m
Type of Impact	No predicted impact

AHC002 – Malahide Castle (Demesne)

Reference No.	AHC002
Location Co-ordinates	ITM East 721763; ITM North 745333
Townland	Malahide Demesne, Mabestown
County	Dublin
Site Type	Demesne
Site Name	Malahide Castle
Description	<p>NIAH: Main features substantially present – no loss of integrity. Tree cover reduced. Feature richness index 7. Areas of the demesne have been converted to sports grounds, with car parks to north and south</p>
Approximate Date	1750-1950 (multi-period grounds)
Statutory Protection	ACA
NIAH No.	DU-50-O-222454
Archaeological Inventory No.	N/A
Importance	Regional
Key Constraint	Yes
Distance from Centre Line	0m
Type of Impact	Direct

AHC003 – Malahide Castle (Outbuildings)

Reference No.	AHC003
Location Co-ordinates	ITM East 722032; ITM North 745455
Townland	Malahide Demesne
County	Dublin
Site Type	Outbuildings
Site Name	Malahide Castle
Description	<p>NIAH: Two-storey stable yard complex on a U-shaped plan, c. 1840, comprising gabled central block. Pairs of carriageway arches to north and south gables attached to flanking perpendicular blocks. Remodelled c. 1990 to accommodate workshops and retail outlets.</p> <p>ROOF: Double-pitched; slate; concrete ridge tiles; red brick chimney stack; metal-framed square roof light; cast-iron rainwater goods.</p> <p>WALLS: Coursed rubble stone; red brick dressings.</p> <p>OPENINGS: Square-headed window openings; concrete sills; red brick quoined surrounds; replacement 8/8 timber sash and casement windows, c. 1990, round-and square-headed door openings; red brick quoined surrounds; replacement glazed timber doors, c.1990.</p>
Approximate Date	1830-1850
Statutory Protection	RPS (383)
NIAH No.	11344021
Archaeological Inventory No.	N/A
Importance	Regional
Key Constraint	Yes
Distance from Centre Line	0-50m
Type of Impact	No predicted impact

AHC004 – Malahide Castle (House)

Reference No.	AHC004
Location Co-ordinates	ITM East 722037; ITM North 745419
Townland	Malahide Demesne
County	Dublin
Site Type	House
Site Name	Malahide Castle
Description	<p><i>NIAH:</i> Detached three-bay two-storey house, c. 1860, retaining original features with single-bay two-storey return to rear. ROOF: Hipped; slate; concrete ridge tiles; red brick chimney stacks with yellow terracotta pots; cast-iron rainwater goods. WALLS: Rubble stone; red brick dressings; lime render over; unpainted. OPENINGS: Segmental-headed window openings; granite sills; 2/2 timber sash windows; square-headed to return; timber casement windows; round headed door openings; timber pilaster doorcase; timber panelled door; overlight; square-headed to return; timber door.</p>
Approximate Date	1850-1870
Statutory Protection	RPS (383)
NIAH No.	11344022
Archaeological Inventory No.	N/A
Importance	Regional
Key Constraint	Yes
Distance from Centre Line	0-50m
Type of Impact	No predicted impact

AHC005 – Malahide Abbey (Church)

Reference No.	AHC005
Location Co-ordinates	ITM East 721988; ITM North 745448
Townland	Malahide Demesne
County	Dublin
Site Type	Church, Undetermined
Site Name	Malahide Abbey
Description	<p><i>NIAH:</i> Ruined church with nave, chancel and sacristy to south. Late fifteenth-century nave, sixteenth-century chancel, possibly post Reformation. Sheela-na-gigs in wall. ROOF: Originally double-pitched behind battlemented parapet. WALLS: Random coursed rubble stone; cut stone bellcote to right gable end. OPENINGS: Pointed-arch door openings; carved cut stone hood moulding; trefoil-headed blind opening; cut stone surround; three pointed arch openings to bellcote.</p>

Archaeological Inventory: Located in the grounds of Malahide Castle. The church contains a nave (int. dims. L 16.9m, Wth 6.8m and chancel (int. dims. L 8.8m, Wth 5.6m) with a sacristy attached to SE corner. There are stepped battlements on the side walls of the nave. Built of coursed, well mortared limestone masonry. There are buttresses against the W gable either side of the window and a batter or buttress in the SW corner. The church is entered towards the W end of the nave through opposed doorways with pointed arches, chamfered jambs and a hood moulding. Apex on the exterior of the S door contains a 'mitred head' and a zoomorphic figure on the moulding stop. In the interior there is a red sandstone stoup (?) secured to S wall and an altar tomb dedicated to Maud Plunkett (d. 1494) with a recumbent effigy of a female figure in a horned cap. Interior is lit by a fine triple-light, ogee-headed W window of 15th-century date and two double-light tracery windows in the E end. Above the W gable is a triple bellcote with steps leading up to it. The chancel is entered through a pointed, segmental chancel arch (Int. dims. L 8.80m, W 5.60m). Interior is lit by wide, flat-arched windows in the S wall. The E window is a large, limestone, triple-light, tracery window. Corbels project from the E wall at altar level. The sacristy is entered off the chancel into a vaulted ground floor with wall presses. There is an external stairs to first floor which contains a fireplace and wall presses in the E wall. At the exterior E gable wall there is a sheela-na-gig (Healy 1975, 26; Anon 1914, 257; Hartnett 1954, 179, 181). Another sheela-na-gig is built into quoin at the NE angle of the medieval chancel.

Approximate Date	1450-1500
Statutory Protection	RMP (DU012-031001-); RPS (384)
NIAH No.	11344020
Archaeological Inventory No.	N/A
Importance	National
Key Constraint	Yes
Distance from Centre Line	0-50m
Type of Impact	No predicted impact

AHC006 – Malahide Abbey (Graveyard)

Reference No.	AHC006
Location Co-ordinates	ITM East 721990; ITM North 745462
Townland	Malahide Demesne
County	Dublin
Site Type	Graveyard
Site Name	Malahide Abbey
Description	<p>NIAH: Graveyard with various cut stone grave markers.</p> <p>Archaeological Inventory: Located in the grounds of Malahide Castle and surrounded by farm buildings. This is a relatively small circular graveyard enclosed by a battlemented wall (E-W c. 40m, N-S c. 45m). It is raised in the centre and dominated by the church (DU012-031001-) the interior of which has been used for interment. There are low headstones of 19th/20th century date.</p>
Approximate Date	1450-1500
Statutory Protection	RMP (DU012-031006-); RPS (384)
NIAH No.	11344020
Archaeological Inventory No.	N/A
Importance	National
Key Constraint	Yes
Distance from Centre Line	0-50m
Type of Impact	No predicted impact

AHC007 – Malahide Castle (Gate Lodge)

Reference No.	AHC007
Location Co-ordinates	ITM East 722300; ITM North 746003
Townland	Malahide Demesne
County	Dublin
Site Type	Gate Lodge
Site Name	Malahide Castle
Description	<p>NIAH: Detached three-bay single-storey gate lodge, c. 1880, with gabled advanced central bay, and open recessed entrance bay to right-hand side. Gateway, c. 1880, comprising pair of limestone ashlar piers with moulded capping and ball finials, having cast-iron gates and railings. ROOF: Pyramidal and gable-fronted -behind limestone parapet; slate; limestone ashlar central chimney stack; red clay pot; timber eaves; cast-iron rainwater goods. WALLS: Uncoursed cut-limestone; limestone dressings including quoins; cut-stone coping to gable-front; cut-stone plaque to gable with coat-of-arms. OPENINGS: Square-headed openings; cut-limestone surrounds and tracery; square-leaded timber casement windows; open internal porch to right; segmental-headed colonnade with carved stone posts; glazed timber panelled door.</p>
Approximate Date	1820-1900 (modified)
Statutory Protection	RPS (383)
NIAH No.	11344023
Archaeological Inventory No.	N/A
Importance	Regional
Key Constraint	Yes
Distance from Centre Line	50m
Type of Impact	No predicted impact

AHC018 – Malahide Historic Core

Reference No.	AHC018
Location Co-ordinates	ITM East 722637; ITM North 746105
Townland	Malahide
County	Dublin
Site Type	Historic Town
Site Name	Malahide Historic Core
Description	<p><i>Malahide Historic Core ACA Draft Statement of Character:</i> Malahide Historic Core Architectural Conservation Area (ACA) has The Diamond as its focal point and the four streets radiating from it New Street, Church Road, Dublin Road and The Mall (the latter two now forming Main Street). The northern boundary stretches along the south side of Strand Street and continues along The Green. St James' Terrace and the railway line border the ACA to the east and west respectively while the southern limit is bounded by St Margaret's Avenue and the rear of the plots of the buildings along The Mall. The railway station and Old Street are located on the western side of the ACA. The streets included within the ACA Boundary are: Main Street (The Mall to the intersection with James' Terrace and Dublin Road to the intersection with the railway line); Old Street; New Street; South side of Strand Road; South side of The Green; South side of Railway Avenue; Townyard Lane; James' Terrace Upper; West side of James' Terrace; St Margaret's Road approximately half the distance to the intersection with</p>

St Margaret's Avenue; Church Road to the intersection with St Margaret's Avenue; and St Margaret's Avenue (only to the extent of which the rear boundaries of properties on Dublin Road front onto it).	
Approximate Date	1750-1900 (multi-period area)
Statutory Protection	ACA
NIAH No.	N/A
Archaeological Inventory No.	N/A
Importance	Regional
Key Constraint	Yes
Distance from Centre Line	0m
Type of Impact	No perceived impact

AHC021 - Malahide Station (Pedestrian Gateway)

Reference No.	AHC021
Location Co-ordinates	ITM East 722425; ITM North 746460
Townland	Malahide
County	Dublin
Site Type	Pedestrian Gateway
Site Name	Malahide Station
Description	NIAH: Freestanding single-bay single-storey pedimented pedestrian gateway, c.1890. Renovated, c.1990.
Approximate Date	1880-1900
Statutory Protection	None
NIAH No.	11344041
Archaeological Inventory No.	N/A
Importance	Regional
Key Constraint	Yes
Distance from Centre Line	0-50m
Type of Impact	No predicted impact

AHC022 - Malahide Station (Railway Bridge)

Reference No.	AHC022
Location Co-ordinates	ITM East 722450; ITM North 746264
Townland	Malahide
County	Dublin
Site Type	Railway Bridge
Site Name	Malahide Station
Description	NIAH: Single-arch ashlar limestone built railway bridge over road, opened 1844. Coursed snecked limestone; cut-stone piers with concrete coping; cast-iron panels to one parapet wall; red brick soffit. Round-headed arch; cut-stone voussoirs.
Approximate Date	1840-1850
Statutory Protection	RPS (423)
NIAH No.	11344015
Archaeological Inventory No.	N/A
Importance	Regional
Key Constraint	Yes
Distance from Centre Line	0-50m
Type of Impact	No predicted impact

AHC023 – Malahide Railway Viaduct

TABLE 52. Structure 1 of 1

Reference No.	AHC023
Location Co-ordinates	ITM East 722490; ITM North 746978
Townland	Malahide
County	Dublin
Site Type	Viaduct
Site Name	Malahide Railway Viaduct
Description	<p><i>Malahide Viaduct Appropriate Assessment:</i> The original Malahide Viaduct was built in 1844 and was of timber construction supported on timber piles driven into the estuary bed. Within a few years of its opening the viaduct was strengthened against the effects of scour with the placing of rock armour, encapsulating the timber supports and thus forming a weir extending over the length of the bridge from abutment to abutment. In 1860 the viaduct was replaced with masonry piers and wrought iron girders, the piers founded directly on top of the weir. In the late 1960s the twelve wrought iron spans were replaced with precast post-tensioned beams placed on the masonry piers and supporting ballasted track. The masonry piers are founded directly on top of the weir and therefore were extremely vulnerable to the effects of scour. Following the collapse the collapsed pier was reinstated and supported on piles driven through the weir to bed-rock level. To protect the viaduct against the effects of potential scour, micro-piles were installed at each pier and abutment, with a total of fifteen piles in each.</p>
Approximate Date	1840-1860
Statutory Protection	RPS (420)
NIAH No.	N/A
Archaeological Inventory No.	N/A
Importance	Regional
Key Constraint	Yes
Distance from Centre Line	0m
Type of Impact	No predicted impact

AHC024 – Casino

Reference No.	AHC024
Location Co-ordinates	ITM East 722326; ITM North 746092
Townland	Malahide
County	Dublin
Site Type	Vernacular House
Site Name	Casino
Description	<p><i>NIAH:</i> Detached eight-bay single- and two-storey thatched house, c. 1750, comprising three-bay two-storey curved entrance bow to centre. Two- and three-bay single-storey flanking end bays having pair of three-bay single-storey curved bows to left side elevation. ROOF: Sliced straw thatched; hazel rod pinning; red brick chimney stacks; clay pots; overhanging eaves. Double-pitched (half-conical to bows). WALLS: Rubble stone construction; whitewashed; mostly ivy-covered. OPENINGS: Square-headed; stone sills; 6/6 timber sash windows; timber panelled door; 'spider's web' fanlight; sidelights.</p>
Approximate Date	1730-1770
Statutory Protection	RPS (381)

NIAH No.	11344016
Archaeological Inventory No.	N/A
Importance	Regional
Key Constraint	Yes
Distance from Centre Line	50-100m
Type of Impact	No predicted impact

AHC025 – Milestone

Reference No.	AHC025
Location Co-ordinates	ITM East 722305; ITM North 746020
Townland	Malahide
County	Dublin
Site Type	Milestone
Site Name	Milestone
Description	<p>NIAH: Wall-mounted cast-iron milestone, c. 1850, with cut granite surround and inscription. Inscribed: "GPO/Dublin/9/Malahide/O" Possibly originally freestanding.</p>
Approximate Date	1825-1875
Statutory Protection	RPS (386)
NIAH No.	11344038
Archaeological Inventory No.	N/A
Importance	Regional
Key Constraint	No
Distance from Centre Line	50-100m
Type of Impact	No predicted impact

AHC026 – Malahide Presbyterian Church

Reference No.	AHC026
Location Co-ordinates	ITM East 722263; ITM North 746047
Townland	Malahide
County	Dublin
Site Type	Church, Presbyterian
Site Name	Malahide Presbyterian Church
Description	Designed by William Baird as the first Presbyterian church to be constructed in the Republic in the twentieth century. It is also the first building in Ireland constructed of split concrete blocks.
Approximate Date	1955-1956
Statutory Protection	RPS (426)
NIAH No.	N/A
Archaeological Inventory No.	N/A
Importance	Regional
Key Constraint	Yes
Distance from Centre Line	100m
Type of Impact	No predicted impact

AHC027 – Sonas (Town House)

Reference No.	AHC027
Location Co-ordinates	ITM East 722180; ITM North 746028
Townland	Malahide
County	Dublin
Site Type	Town House
Site Name	Sonas
Description	Two-storey four bay semi-detached red brick building comprising on the ground floor two central round-headed entrances flanked by canted bay windows. Segmental-headed window openings with one up-one down sash windows, brick string course to window heads, coursed brick cornices, slated hip-roof and tall brick chimney stacks
Approximate Date	1860-1900
Statutory Protection	RPS (425)
NIAH No.	N/A
Archaeological Inventory No.	N/A
Importance	Regional
Key Constraint	Yes
Distance from Centre Line	0-50m
Type of Impact	No predicted impact

AHC028 – Rosca (Town House)

Reference No.	AHC028
Location Co-ordinates	ITM East 722188; ITM North 746028
Townland	Malahide
County	Dublin
Site Type	Town House
Site Name	Rosca
Description	Two-storey building with a projecting gable; pitched slate roof; house under renovation and obscured by scaffolding.
Approximate Date	1860-1900
Statutory Protection	RPS (424)
NIAH No.	N/A
Archaeological Inventory No.	N/A
Importance	Regional
Key Constraint	Yes
Distance from Centre Line	0-50m
Type of Impact	No predicted impact

AHC029 – Malahide School

Reference No.	AHC029
Location Co-ordinates	ITM East 722000; ITM North 745955
Townland	Malahide
County	Dublin
Site Type	School
Site Name	Malahide School
Description	<p>NIAH: Formerly detached eight-bay single-storey red brick school house, c. 1900, with advanced gabled entrance bays to west end. Flat-roofed recessed extension to west, c. 1960, linking building with 1956 school house. Single-storey advanced extension to east, c.1985.</p> <p>ROOF: Double pitched and gable-fronted; flat-roof to end bay; natural slates to main block; fibre-cement slate to wing; concrete ridge tiles; timber eaves; clay finial; cast-iron rainwater goods.</p> <p>WALLS: Red brick; Flemish bond; grey brick courses; pair of buttresses to front; granite coping; cut-stone plaque inscribed: "Malahide/schools"; roughcast to end bay; nap rendered to wing; red brick dressings.</p> <p>OPENINGS: Round- and segmental-headed window openings; stone sills; 6/6 and 9/6 timber sash windows; square-headed window openings to wings; concrete sills; timber casement windows.</p>
Approximate Date	1890-1910
Statutory Protection	None
NIAH No.	11344018
Archaeological Inventory No.	N/A
Importance	Regional
Key Constraint	Yes
Distance from Centre Line	0-50m
Type of Impact	No predicted impact

AHC030 – Unnamed Vernacular House

Reference No.	AHC030
Location Co-ordinates	ITM East 722095; ITM North 746414
Townland	Malahide
County	Dublin
Site Type	Vernacular House
Site Name	Unnamed
Description	<p>NIAH: Pair of semi-detached two- and three-bay single-storey thatched houses, c.1775, with buttressed end bay to right-hand side. Individually renovated and refenestrated, c. 1950-1970.</p> <p>ROOF: Double-pitched; hipped to right; barley straw thatch; hazel rod pinning; nap rendered chimney stack.</p> <p>WALLS: Roughcast; painted; buttressed/battered bay to right.</p> <p>OPENINGS: Square-headed; deep reveal to right; replacement timber casement window; glazed timber panelled door; concrete sills to left; replacement timber casement windows and panelled door.</p>
Approximate Date	1750-1800
Statutory Protection	RPS (381)
NIAH No.	11344045
Archaeological Inventory No.	N/A
Importance	Regional
Key Constraint	Yes
Distance from Centre Line	0-50m
Type of Impact	No predicted impact

AHC031 – Unnamed Railway Bridge

Reference No.	AHC031
Location Co-ordinates	ITM East 722586; ITM North 748520
Townland	Kilcrea
County	Dublin
Site Type	Bridge
Site Name	Railway Bridge
Description	NIAH: Metal railway bridge spanning between stone piers, c. 1860, with alterations, c. 1960
Approximate Date	1860
Statutory Protection	RPS (502)
NIAH No.	11336027
Archaeological Inventory No.	N/A
Importance	Regional
Key Constraint	Yes
Distance from Centre Line	0-50m
Type of Impact	No predicted impact

AHC032 – Kilcrea Church

Reference No.	AHC032
Location Co-ordinates	ITM East 721672; ITM North 748840
Townland	Kilcrea
County	Dublin
Site Type	Church, Undetermined
Site Name	Kilcrea Church
Description	<i>Archaeological Inventory:</i> Within the graveyard is a plain rectangular building with the E gable and side walls still standing (Wth 5.40m, L 8.75m, max. H 3.50m). It is roughly built of blocks of conglomerate and limestone. It has splayed, single light windows in the E gable and E end of S wall. Entrance with door rebate survives on the S side.
Approximate Date	Pre-1700
Statutory Protection	RMP (DU012-016001-); RPS (499)
NIAH No.	N/A
Archaeological Inventory No.	N/A
Importance	Regional
Key Constraint	Yes
Distance from Centre Line	0-50m
Type of Impact	No predicted impact

AHC033 – Kilcrea Cemetery

Reference No.	AHC033
Location Co-ordinates	ITM East 721676; ITM North 748831
Townland	Kilcrea
County	Dublin
Site Type	Graveyard
Site Name	Kilcrea Cemetery
Description	<p><i>Archaeological Inventory:</i> Situated by a roadside near Malahide estuary. Within the graveyard is a plain rectangular building with the E gable and side walls still standing. It has been recently walled (L 45m, Wth 30m). The graveyard is no longer used for burial and is very overgrown.</p>
Approximate Date	Pre-1700
Statutory Protection	RMP (DU012-016002-); RPS (499)
NIAH No.	N/A
Archaeological Inventory No.	N/A
Importance	Regional
Key Constraint	Yes
Distance from Centre Line	0-50m
Type of Impact	No predicted impact

AHC034 – Kilcrea House (Country House)

Reference No.	AHC034
Location Co-ordinates	ITM East 721763; ITM North 748728
Townland	Kilcrea
County	Dublin
Site Type	Country House
Site Name	Kilcrea House
Description	<p><i>NIAH:</i> Detached five-bay two-storey house c. 1800, with single-bay two-storey parallel range to south-east and two-bay two-storey return to north-east. Renovated and refenestrated c.1985, with projecting entrance porch added to return. Several outbuildings and entrance gateways to site. ROOF: Double-pitched slate with concrete ridge tiles, roughcast rendered chimneys and cast-iron rainwater goods. WALLS: Roughcast rendered with nap rendered plinth and corner strips. OPENINGS: Replacement timber casement windows with granite sills and render keystones. Venetian-style window to first floor. Replacement timber panelled door with overlight, set in segmental arched opening with moulded limestone archivolt.</p>
Approximate Date	1780-1820
Statutory Protection	RPS (500)
NIAH No.	11336025
Archaeological Inventory No.	N/A
Importance	Regional
Key Constraint	Yes
Distance from Centre Line	100-150m
Type of Impact	No predicted impact

AHC035 – Kilcrea House (Informal Demesne)

Reference No.	AHC035
Location Co-ordinates	ITM East 721686; ITM North 748674
Townland	Kilcrea
County	Dublin
Site Type	Informal Demesne
Site Name	Kilcrea House
Description	<p>NIAH: Main features unrecognisable – peripheral features visible. Feature richness index 4. Farming or industrial units built to the east of the house. Walled garden visible; apparently not in use. Demesne mostly in agricultural use, except for a small area of parkland to the north and north-west</p>
Approximate Date	1780-1820
Statutory Protection	None
NIAH No.	DU-50-O-218487
Archaeological Inventory No.	N/A
Importance	Local
Key Constraint	Yes
Distance from Centre Line	0-50m
Type of Impact	No predicted impact

AHC036 – Baltray Corn Mill

Reference No.	AHC036
Location Co-ordinates	ITM East 722214; ITM North 748677
Townland	Kilcrea
County	Dublin
Site Type	Mill, Tidal
Site Name	Baltray Corn Mill
Description	<p><i>Archaeological Inventory:</i> The 1937 OS 6-inch map marks the 'highest point to which medium tides flow' at a point along a millrace E of Kilcrea House. There is some stone collapse at this point. This is probably the site of the tidal mill marked on Rocque's map of County Dublin (1756). The N side of the millrace is stone-walled.</p>
Approximate Date	Pre-1700
Statutory Protection	RMP (DU012-018----); RPS (501)
NIAH No.	N/A
Archaeological Inventory No.	N/A
Importance	Local
Key Constraint	Yes
Distance from Centre Line	50m
Type of Impact	No predicted impact

AHC037 - Seafield (Country House)

Reference No.	AHC037
Location Co-ordinates	ITM East 721136; ITM North 748462
Townland	Ballymadrough
County	Dublin
Site Type	Country House
Site Name	Seafield
Description	<p><i>NIAH:</i> Detached five-bay three-storey over basement Palladian villa, c.1750, with advanced tetrastyle granite Doric portico, balustrade to parapet and having curved quadrant wall to right side. Sandstone and granite steps to entrance with nap rendered plinth walls and piers crowned by spheres. Four-bay two-storey wing, c. 1855, to west, terminated by five-stage Italianate tower. ROOF: Hidden behind balustraded parapet; three hipped roofs running perpendicular to façade; slate; terracotta ridge tiles; tall nap rendered stacks with modillion cornices; hipped slate roof to wing. WALLS: Nap rendered; granite plinth and string courses; granite balustrade to parapet; granite quoins; pebble dash side elevation; channelled render to wing. OPENINGS: Square headed; granite surrounds with keystones to ground floor openings; granite and limestone cills; timber sashes, c. 1890, to basement and ground floor; timber casements above 2/2 and 1/1 timber sashes to rear; rendered surrounds to wing windows; granite cills; single pane timber sashes; square headed stone doorcase to main block; console brackets and cornice; decorative timber overlight; timber and glazed double doors flanked by single pane timber sash sidelights; roundheaded doorcase to wing; rendered archivolt and wings original panelled timber double doors; granite steps. INTERIOR: Two-storey hall runs full depth of house crossed by gallery.</p> <p><i>Bence-Jones:</i> A Palladian villa of Sir Edward Lovett Pearce's school, probably a remodelling of an earlier house, carried out soon <i>post</i> 1737 for Benedict Arthur. Of 3 storeys over a basement, the top storey being an attic of narrow windows with 3 small hip-roofs above them on the entrance front and 3 gables of late C17 style above them on the garden front. Entrance and garden fronts of 7 bays, the entrance front having a 2 storey pedimented Doric portico <i>in antis</i>, with a broad flight of steps leading up to it. Balustraded roof parapet on entrance front; ground floor windows with rusticated surrounds. The chief – and unusual – feature of the interior is the impressive 2 storey hall, which runs through the full depth of the house, with windows at each end; crossed by a gallery to provide communication between 1st floor rooms on either side. The walls are decorated with superimposed fluted Ionic and Corinthian pilasters; with, between them, <i>grisaille</i> paintings of Classical figures which were probably added later C18. Some of the other rooms are panelled; the dining room has a carved cornice and frieze and fluted Corinthian pilasters. At one side of the house is a Victorian wing with an Italianate tower. Bought by John Hely-Hutchinson in 2nd half of C19. Recently the home of Mr G. R. Dawes; now [1978] of Sir Robert Davis-Goff, Bt.</p>
Approximate Date	1740-1760
Statutory Protection	RPS (483)
NIAH No.	11336024
Archaeological Inventory No.	N/A
Importance	National
Key Constraint	Yes
Distance from Centre Line	300m
Type of Impact	No predicted impact

AHC038 – Seafield (Demesne)

Reference No.	AHC038
Location Co-ordinates	ITM East 721071; ITM North 748600
Townland	Ballymadrough
County	Dublin
Site Type	Demesne
Site Name	Seafield
Description	<p>NIAH: Main features substantially present – some loss of integrity. Feature richness index 7. Route of drive is longer and more curved on the south. Tree density increased. Mature ornamental planting visible. View to the estuary. Bordered by the estuary. Pools in the woodland to the north indicated on the 6" map just visible amongst the trees. Demesne predominantly in agricultural use except for a tree belt to the north, and to the north of the avenue to the east</p>
Approximate Date	1740-1760
Statutory Protection	None
NIAH No.	DU-50-O-194298
Archaeological Inventory No.	N/A
Importance	Regional
Key Constraint	Yes
Distance from Centre Line	0-50m
Type of Impact	No predicted impact

AHC041 – Newbridge House (Demesne)

Reference No.	AHC041
Location Co-ordinates	ITM East 721614; ITM North 749949
Townland	Newbridge Demesne
County	Dublin
Site Type	Demesne
Site Name	Newbridge House
Description	<p>NIAH: Main features substantially present – no loss of integrity. Glasshouses on southern edge of walled garden. Gate lodge labelled on 6" map not visible. Ornamental avenue to the east of the house. Very complete 'Brownian landscape'. River runs through site. Feature Richness Index: 8.</p> <p>Demesne planting characterised by tree belts to the east, west and south and in the immediate vicinity of the main building; islands of specimen trees to the south; and walled kitchen gardens to the north.</p>
Approximate Date	1730-1800
Statutory Protection	ACA
NIAH No.	DU-43-O-216501
Archaeological Inventory No.	N/A
Importance	Regional
Key Constraint	Yes
Distance from Centre Line	0m
Type of Impact	Direct

AHC044 – Newbridge House (Gate Entrance)

Reference No.	AHC044
Location Co-ordinates	ITM East 721969; ITM North 749393
Townland	Newbridge Demesne
County	Dublin
Site Type	Gate Entrance
Site Name	Newbridge House
Description	NIAH: Vermiculated granite entrance piers, c. 1770, capped by crown finials. Flanked by smaller piers to form pedestrian entrances
Approximate Date	1750-1790
Statutory Protection	RPS (494)
NIAH No.	11336002
Archaeological Inventory No.	N/A
Importance	Regional
Key Constraint	Yes
Distance from Centre Line	0m
Type of Impact	No predicted impact

Appendix D

Post-Public Consultation Amendments to Architectural Heritage (Kilcrea Townland)

Master Tables of Impacts of the Route Options

TABLE 1. Structures Affected by the Route Options at Kilcrea Townland

AHC No.	Description	Site Name	Townland	RMP	RPS	Statutory Protection	Key Constraint (Yes/No)	Perceived Importance
031	Bridge, Railway	Unnamed	Kilcrea	None	502	RPS	Yes	Regional
041	Demesne	Newbridge House	Newbridge Demesne	None	None	ACA	Yes	Regional
044	Gate Entrance	Newbridge House	Newbridge Demesne	None	494	RPS	Yes	Regional

Potential Impacts of Route Options

TABLE 2. Potential Impacts of Option 1 – Light Blue at Kilcrea Townland

AHC No.	Site Type	Site Name	Townland	Statutory Protection	Key Constraint (Yes/No)	Perceived Architectural Importance	Potential Impact
AHC031	Bridge	Railway Bridge	Kilcrea	RPS	Yes	Regional	Neutral
AHC041	Demesne	Newbridge House	Newbridge Demesne	ACA	Yes	Regional	Neutral
AHC044	Gate Entrance	Newbridge House	Newbridge Demesne	RPS	Yes	Regional	Neutral

TABLE 3. Potential Impacts of Option 2 – Green at Kilcrea Townland

AHC No.	Site Type	Site Name	Townland	Statutory Protection	Key Constraint (Yes/No)	Perceived Architectural Importance	Potential Impact
AHC031	Bridge	Railway Bridge	Kilcrea	RPS	Yes	Regional	Neutral
AHC041	Demesne	Newbridge House	Newbridge Demesne	ACA	Yes	Regional	Neutral
AHC044	Gate Entrance	Newbridge House	Newbridge Demesne	RPS	Yes	Regional	Neutral

TABLE 4. Potential Impacts of Option 3 – Yellow at Kilcrea Townland

AHC No.	Site Type	Site Name	Townland	Statutory Protection	Key Constraint (Yes/No)	Perceived Architectural Importance	Potential Impact
AHC031	Bridge	Railway Bridge	Kilcrea	RPS	Yes	Regional	Neutral
AHC041	Demesne	Newbridge House	Newbridge Demesne	ACA	Yes	Regional	Neutral
AHC044	Gate Entrance	Newbridge House	Newbridge Demesne	RPS	Yes	Regional	Neutral

TABLE 5. Potential Impacts of Option 4 – Purple at Kilcrea Townland

AHC No.	Site Type	Site Name	Townland	Statutory Protection	Key Constraint (Yes/No)	Perceived Architectural Importance	Potential Impact
AHC031	Bridge	Railway Bridge	Kilcrea	RPS	Yes	Regional	Neutral
AHC041	Demesne	Newbridge House	Newbridge Demesne	ACA	Yes	Regional	Neutral
AHC044	Gate Entrance	Newbridge House	Newbridge Demesne	RPS	Yes	Regional	Neutral

TABLE 6. Potential Impacts of Option 5 – Dark Blue at Kilcrea Townland

AHC No.	Site Type	Site Name	Townland	Statutory Protection	Key Constraint (Yes/No)	Perceived Architectural Importance	Potential Impact
AHC031	Bridge	Railway Bridge	Kilcrea	RPS	Yes	Regional	Neutral
AHC041	Demesne	Newbridge House	Newbridge Demesne	ACA	Yes	Regional	Neutral
AHC044	Gate Entrance	Newbridge House	Newbridge Demesne	RPS	Yes	Regional	Neutral

Appendix E

Recorded Archaeological and Cultural Heritage Sites within the Constraints Study Area

Table 1. Recorded archaeological sites within the Constraint Study Area.

RMP/SMR No.	Townland	Site Type	Perceived Importance
DU012-004	Newbridge Demesne	Castle-tower house	Regional
DU012-005001	Donabate	Church	Regional
DU012-005002	Donabate	Castle-tower house	Regional
DU012-005003	Donabate	Graveyard	Regional
DU012-005004	Donabate	Wall monument	Local
DU012-006	Lanestown	Enclosure	Local
DU012-014	Ballymadrough	Castle-motte	Regional
DU012-016001	Kilcrea	Church	Regional
DU012-016002	Kilcrea	Graveyard	Regional
DU012-017	Kilcrea	Enclosure	Local
DU012-018	Kilcrea	Tide mill	Local
DU012-019	Corballis	Earthwork	Regional
DU012-023001	Malahide	Ritual site-holy well	Local
DU012-023002	Malahide	Church	Regional
DU012-023003	Malahide	Earthwork	Local
DU012-029	Malahide Demesne	Earthwork	Local
DU012-030	Malahide Demesne	Castle-tower house	Regional
DU012-031001	Malahide Demesne	Church	Regional
DU012-031002	Malahide Demesne	Sheela-na-gig	Local
DU012-031003	Malahide Demesne	Sheela-na-gig	Local
DU012-031004	Malahide Demesne	Architectural fragment	Local
DU012-031005	Malahide Demesne	Chest tomb	Local
DU012-031006	Malahide Demesne	Graveyard	Regional
DU012-060	Newbridge Demesne	House-18 th /19 th century	Local
DU012-066	Beaverstown	Habitation site	Regional
DU012-067	Beaverstown	Enclosure	Regional
DU012-072	Kilcrea	Ring ditch	Regional
DU012-074	Newbridge Demesne	Ring ditch	Regional
DU012-082001	Donabate	Excavation Miscellaneous	Local
DU012-082002	Donabate	Structure	Local
DU012-082003	Donabate	Structure	Local
DU012-082004	Donabate	Structure	Local
DU012-083	Beaverstown	Excavation Miscellaneous	Local

Table 2. Cultural Heritage Sites within the Constraint Study Area.

CHS Number	Townland	Site type	Perceived Importance	Distance from Route
CHS 1	Malahide, Kilcrea, Donabate	Dublin-Belfast Railway	Regional	0m
CHS 2	Malahide, Kilcrea	Malahide Estuary	Local	0m
CHS 3	Malahide Demesne	Malahide Demesne	Local	0m
CHS 4	Newbridge Demesne	Newbridge Demesne	Local	0m

Appendix F

Recorded Archaeological and Cultural Heritage Sites within 500m of Each Route Option

Table 1. Recorded archaeological sites within 500m of each route option.

RMP/SMR Number	Townland	Site type	Perceived Importance
DU012-016001	Kilcrea	Church	Regional
DU012-016002	Kilcrea	Graveyard	Regional
DU012-017	Kilcrea	Enclosure	Local
DU012-018	Kilcrea	Tide mill	Local
DU12-023001	Malahide	Ritual site-holy well	Local
DU12-023002	Malahide	Church	Regional
DU12-023003	Malahide	Earthwork	Local
DU12-029	Malahide Demesne	Earthwork	Local
DU12-030	Malahide Demesne	Castle-tower house	Regional
DU12-031001	Malahide Demesne	Church	Regional
DU12-031002	Malahide Demesne	Sheela-na-gig	Local
DU12-031003	Malahide Demesne	Sheela-na-gig	Local
DU12-031004	Malahide Demesne	Architectural fragment	Local
DU12-031005	Malahide Demesne	Chest tomb	Local
DU12-031006	Malahide Demesne	Graveyard	Regional
DU12-060	Newbridge Demesne	House-18 th /19 th century	Regional
DU12-072	Kilcrea	Ring-ditch	Regional

Table 2. Cultural Heritage Sites (CHS) within 500m of each route option.

CHS Number	Townland	Site type	Perceived Importance
CHS 1	Malahide, Kilcrea, Donabate	Dublin Belfast Railway	Regional
CHS 2	Malahide, Kilcrea	Malahide Estuary	Local
CHS 3	Kilcrea	River	Local

Appendix G

Glossary of Acoustic Terminology

ambient noise The totally encompassing sound in a given situation at a given time, usually composed of sound from many sources, near and far.

background noise The steady existing noise level present without contribution from any intermittent sources. The A-weighted sound pressure level of the residual noise at the assessment position that is exceeded for 90 per cent of a given time interval, T ($L_{AF90,T}$).

dB Decibel - The scale in which sound pressure level is expressed. It is defined as 20 times the logarithm of the ratio between the RMS pressure of the sound field and the reference pressure of 20 micro-pascals (20 μ Pa).

$L_{Aeq,T}$ This is the equivalent continuous sound level. It is a type of average and is used to describe a fluctuating noise in terms of a single noise level over the sample period (T). The closer the L_{Aeq} value is to either the L_{AF10} or L_{AF90} value indicates the relative impact of the intermittent sources and their contribution. The relative spread between the values determines the impact of intermittent sources, such as traffic, on the background.

L_{AF90} Refers to those A-weighted noise levels in the lower 90 percentile of the sampling interval; it is the level which is exceeded for 90% of the measurement period. It will therefore exclude the intermittent features of traffic and is used to describe a background level. Measured using the "Fast" time weighting.

L_{den} Is the 24 hour noise rating level determined by the averaging of the L_{day} with the $L_{evening}$ plus a 5 dB penalty and the L_{night} plus a 10 dB penalty. L_{den} is calculated using the following formula:

$$L_{den} = 10 \log \left(\frac{1}{24} \right) \left(12 * \left(10^{\frac{L_{day}}{10}} \right) + 4 * \left(10^{\frac{L_{evening}+5}{10}} \right) + 8 * \left(10^{\frac{L_{night}+10}{10}} \right) \right)$$

Where:

L_{day} is the A-weighted long-term average sound level as defined in ISO 1996-2, determined over all the day periods of a year;

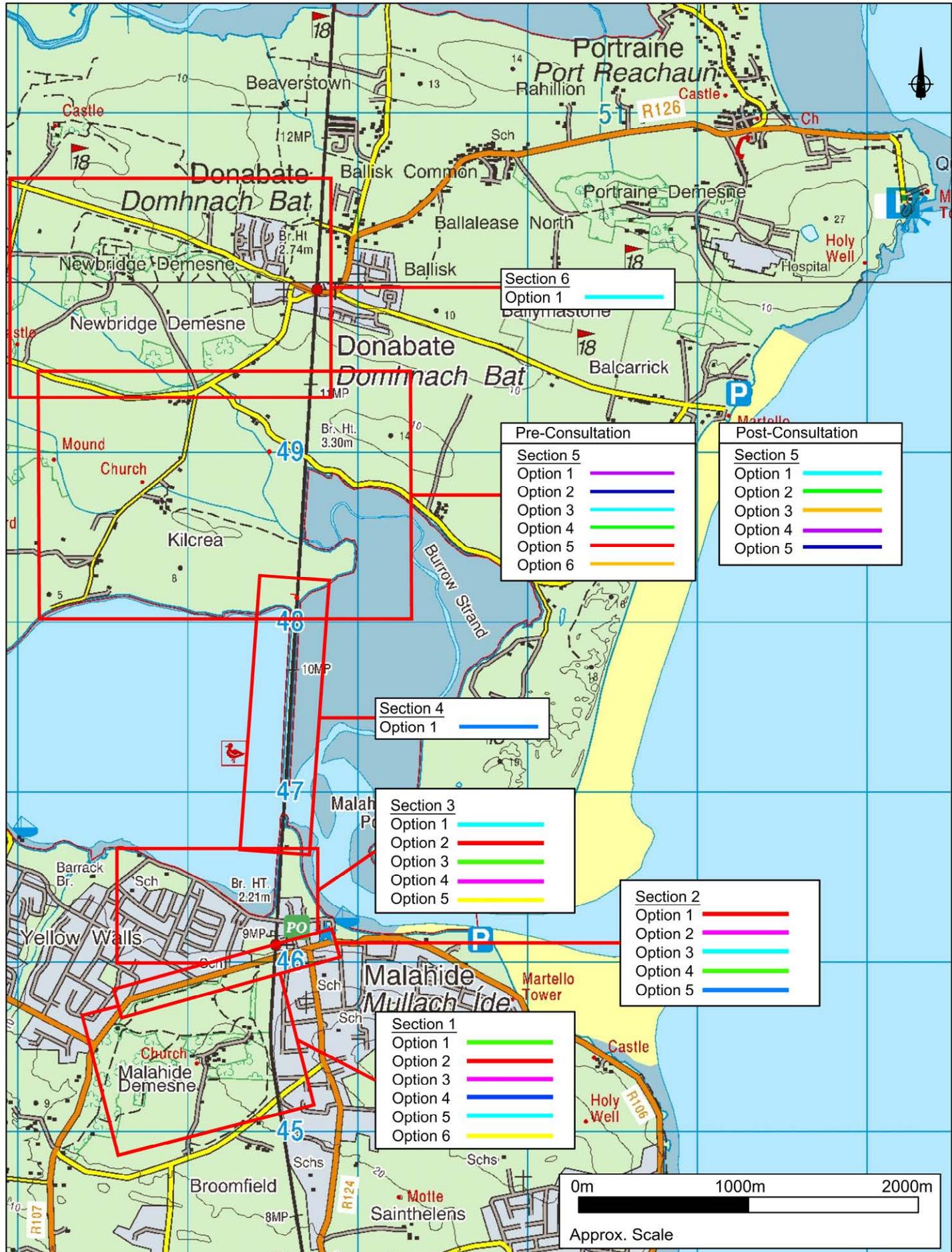
$L_{evening}$ is the A-weighted long-term average sound level as defined in ISO 1996-2, determined over all the evening periods of a year and;

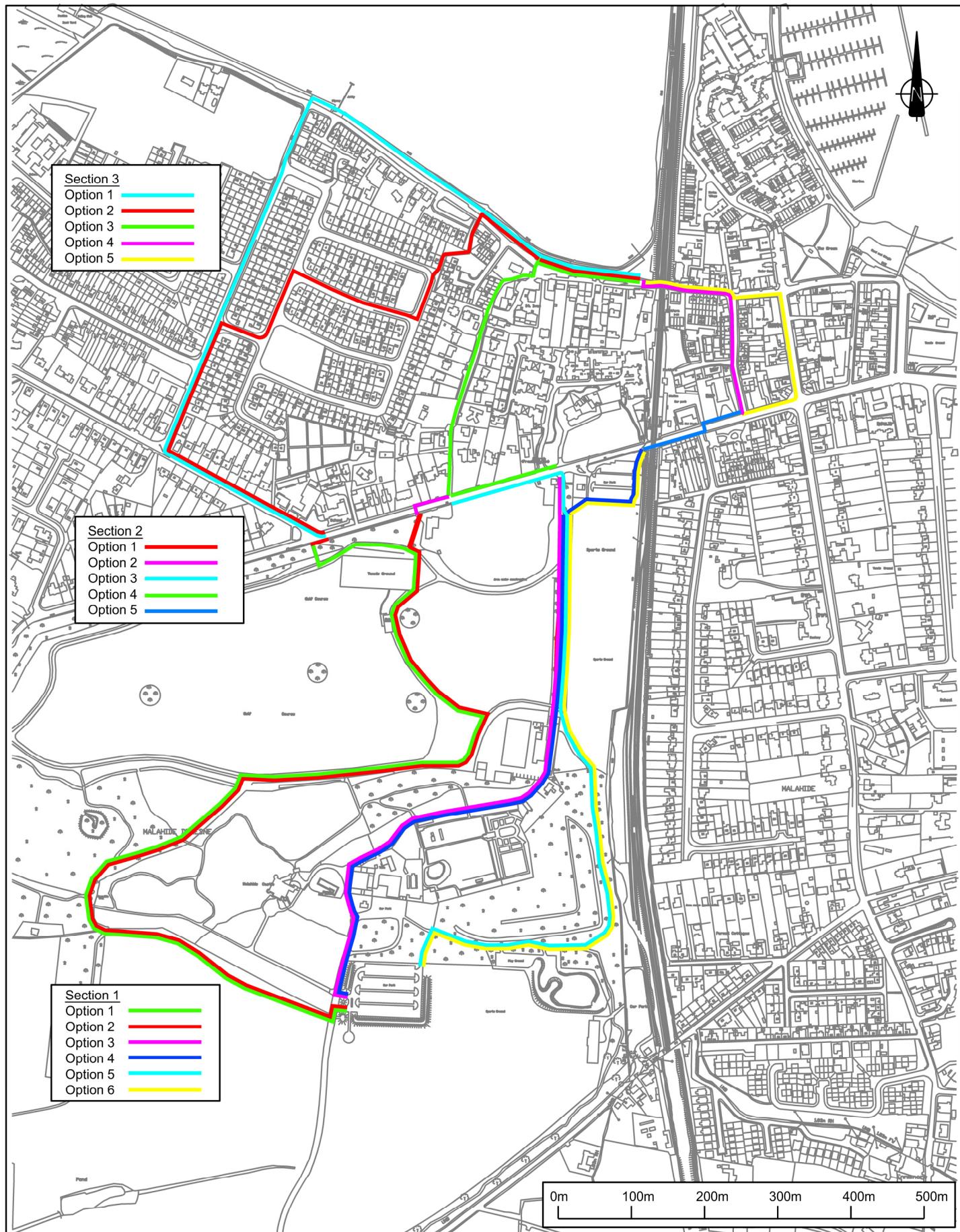
L_{night} is the A-weighted long-term average sound level as defined in ISO 1996-2, determined over all the night periods of a year.

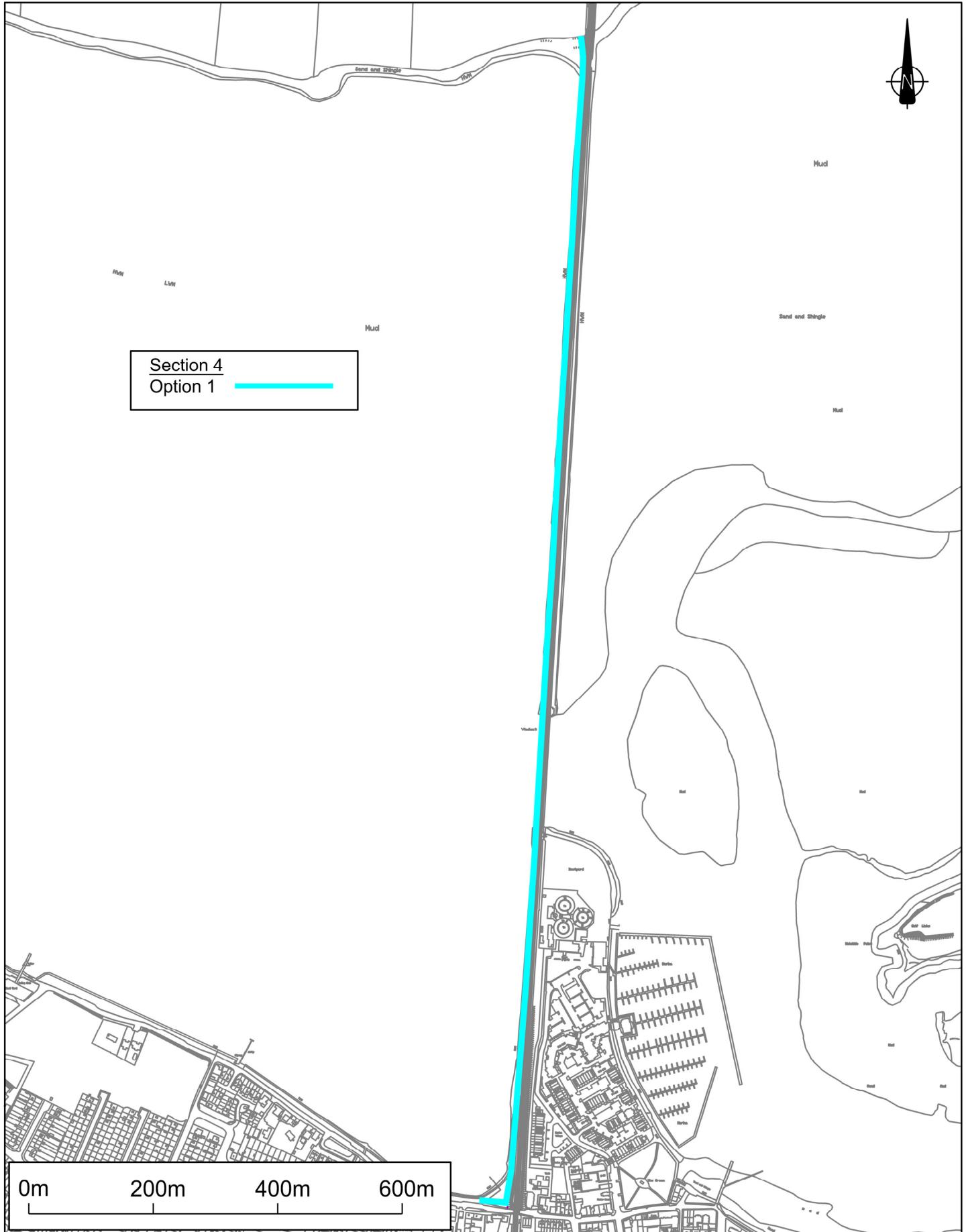
Appendix H

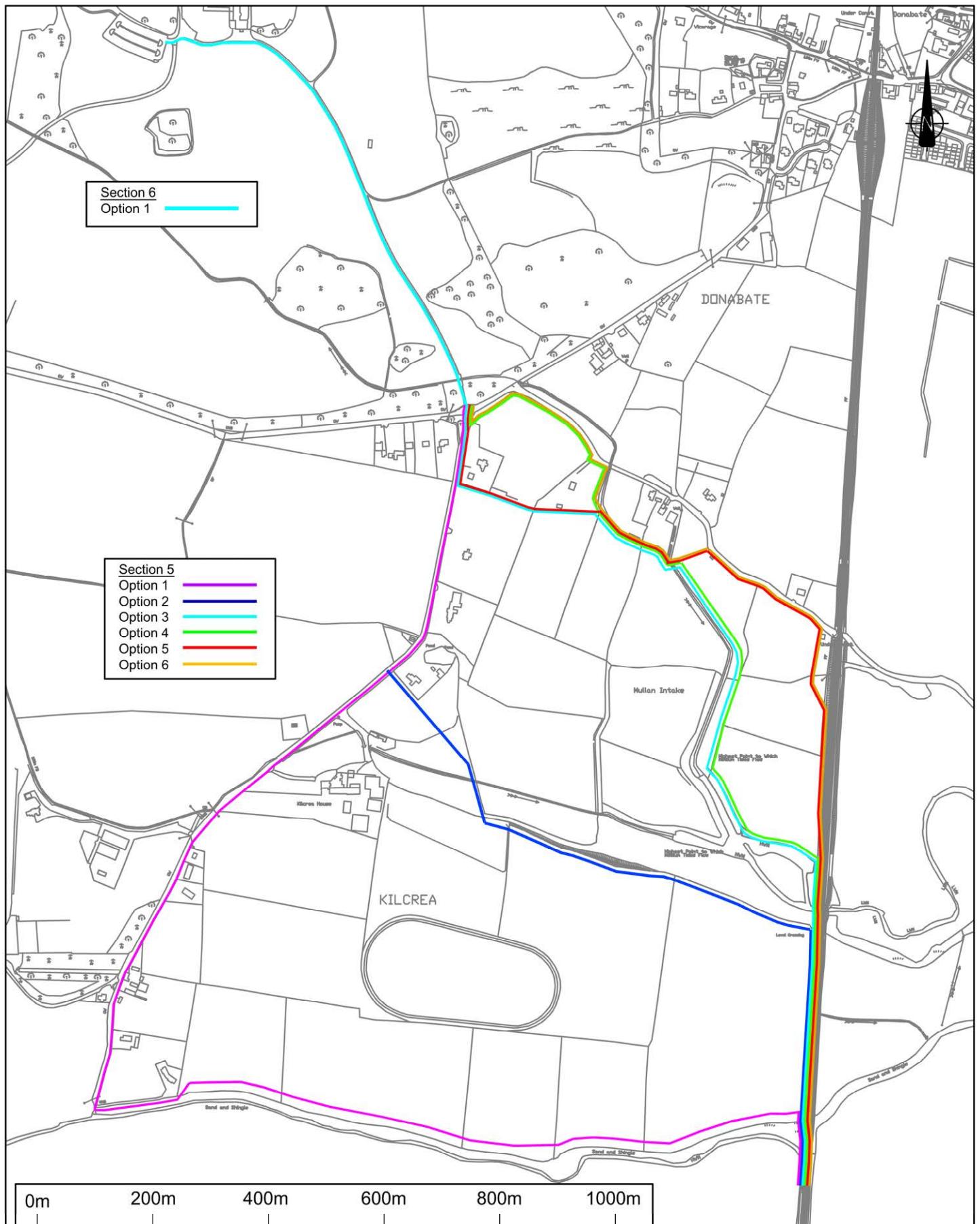
Route Options Report – Drawings and Figures

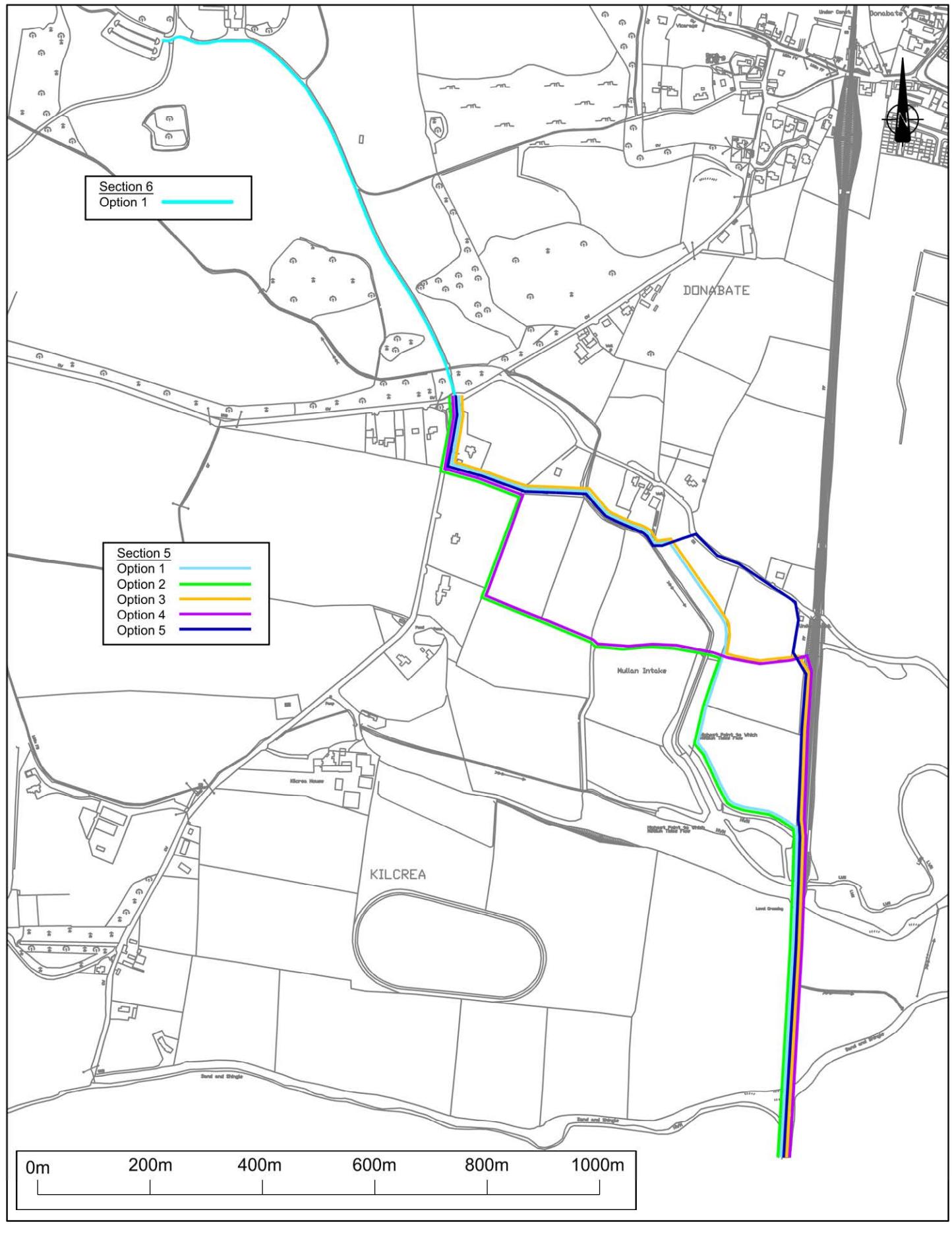












Malahide Estuary

Section 3
Option 1
Option 2
Option 3
Option 4
Option 5

Section 2
Option 1
Option 2
Option 3
Option 4
Option 5

Section 1
Option 1
Option 2
Option 3
Option 4
Option 5
Option 6

Coastal

Low Lying Agricultural

0m 100m 200m 300m 400m 500m

